

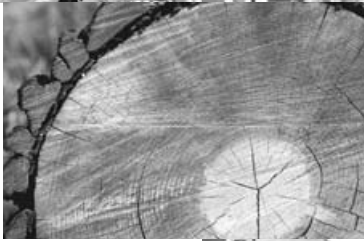
BMG..T Double Disc Brakes for Stage Applications

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Operating Instructions





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Important Notes

Safety and warning instructions

1 Important Notes

1.1 Safety and warning instructions

Always follow the safety and warning instructions in this publication!



Electrical hazard

Possible consequences: Severe or fatal injuries.



Hazard

Possible consequences: Severe or fatal injuries.



Hazardous situation

Possible consequences: Slight or minor injuries.



Harmful situation

Possible consequences: Damage to the unit and the environment.



Tips and useful information.

This documentation contains safety requirements and additional information on the BMG..T double disc brake for use in stage applications.



A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that you adhere to the information in the operating instructions. Consequently, read the operating instructions before you start working with the brake! The operating instructions contain important information about servicing and should be kept close to the unit. This document supplements the "AC Motors, Asynchronous Servomotors" operating instructions and limits the application notes according to the following information.

The guidelines in this documentation must be strictly observed for safety applications. This applies in particular to the requirements of the employer's liability insurance association and TÜV.

Disposal



This product consists of:

- Iron
- Copper
- Aluminum
- Plastic

Please dispose of the parts in accordance with the applicable regulations.



2 Safety Notes

- The requirements for the emergency stop relay and the permitted circuit variants are specified in detail in the following sections and must be strictly observed.
- **The system/machine manufacturer must perform a system/machine-specific risk analysis. The use of BMG..T double disc brakes for stage applications must be taken into account in this analysis.**
- **The switching equipment of the external voltage supply for the brakes must at least comply with category 3 to EN 954-1 or with a comparable national standard.**
- **In normal operation, the manual release lever for the brake must not be attached. This prevents the brake from being released unintentionally. The brake must not be converted to enable lockable manual release.**

General information

- **Please also consider the supplementary safety notes in the individual sections of these operating instructions.**
- During and after operation, the brakes may have live and moving parts and their surfaces may be hot.
- **All work related to transport, putting into storage, setting up/mounting, connection, startup, maintenance and repair may only be performed by trained personnel observing**
 - The corresponding detailed operating instruction(s) and wiring diagrams
 - The specific regulations and requirements for the system
 - National/regional regulations governing safety and the prevention of accidents
- **Severe injuries and damage to property may result from**
 - Incorrect use
 - Incorrect installation or operation
 - Removal of required protective covers or the housing when this is not permitted
- **If work is carried out on the electrical section of the system, the supply voltage must be disconnected.**

Designated use

- The BMG..T double disc brakes are certified as safe components of mobile flying equipment or rigging systems for stage applications to DIN 56925, DIN 56921-11 and DIN 56950. Drives fitted with BMG..T brakes must fulfill the requirements in the above standards. The "Driving mechanisms" section in particular must be observed.
- Technical data and information about the permitted conditions can be found on the nameplate and in the documentation.
- BMG..T double disc brakes cannot be retrofitted.
- **It is essential to observe all the specified information!**

Transportation

- Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.



3 Certificate

The following certification is available for the BMG..T double disc brake for stage applications:

- Product certificate of the Rheinisch-Westfälischer Technischer Überwachungs-Verein e.V (RW TÜV)

The certification reports accompanying the respective certificates must be observed. The conditions are listed in this publication. The sections "Safety Notes" and "Installation/Startup" must be observed in particular.



Figure 1: Product certificate

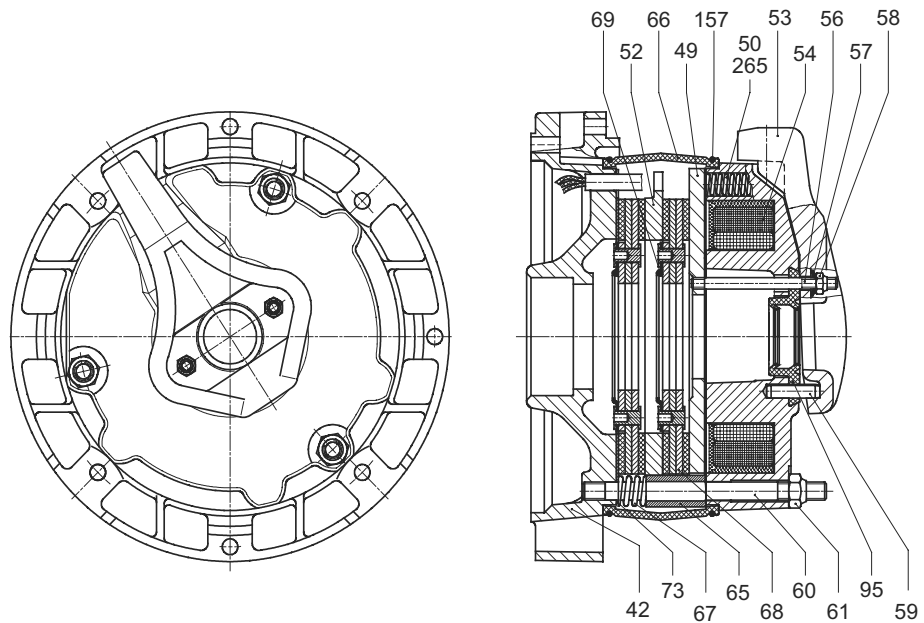
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4 Structure of the BMG..T Stage Brake

4.1 Basic structure

The following sectional view is intended to explain the general structure. Its only purpose is to facilitate the assignment of components to the spare parts lists. Discrepancies may occur depending on the brake size and version!



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Figure 2: Basic structure of the BMG..T brake

42	Brake end shield	61	Hex nut
49	Pressure plate	65	Pressure ring
50	Brake spring	66	Rubber sealing collar
52	Brake stationary disc	67	Counter spring
53	Manual release	68	Complete brake disc
54	Complete brake coil body	69	Annular spring
56	Stud	73	Stainless steel shim plate
57	Conical coil spring	95	Sealing ring
58	Hex nut	157	Clamping strap
59	Dowel pin	265	Brake spring, red
60	Stud		

4.2 Unit designation

The following motor/brake combinations are permitted for stage applications:

Brake type	For motor size	Rated braking torque [Nm]
BMG4T	90/100	40 (2 x 20)
		20 (2 x 10)
BMG8T	112-132S	75 (2 x 37.5)
		37 (2 x 18.5)
BMG15T	132M-160M	150 (2 x 75)
		100 (2 x 50)



5 Installation/Startup

5.1 Mechanical installation

- **In normal operation, the manual release lever for the brake must not be attached. This prevents the brake from being released unintentionally.**
- **The drive may only be installed if**
 - The drive is undamaged (no damage caused by transportation or storage)
 - It is certain that the following requirements have been met:
 - Ambient temperature between -25 °C and +40 °C
 - No oil, acid, gas, vapors, radiation, etc.
 - Installation altitude max. 1000 m above sea level

5.2 Electrical installation

- **As regards the safety of the switching equipment, it must comply at least with category 3 to EN 954-1 or with a comparable national standard.**
- **The utilization category of the contactors for the brake control system must be at least AC-3 in accordance with EN 60947-4-1 or a comparable national standard.**
- **The brake is released electrically. The brake is applied mechanically when the voltage is switched off.**
 - Connect the brake according to the wiring diagram supplied with the brake.
 - The supply voltage must lie within the rated voltage range of the brake coil (see Sec. "Technical Data").
- The brake can only be run with the SEW brake control system it is intended for (see Sec. "Technical Data").
- **Check the line cross sections – operating currents (see Sec. "Technical Data").**
 - Apply brake voltage according to the nameplate.
 - Connect the brake control system according to the wiring diagram supplied with the brake.
 - For motors in thermal class H, install the brake rectifier in the switch cabinet!
 - Use only copper cables with the following temperature ranges as connection cables: Temperature range: 60/75 °C
- **Comply with the applicable regulations issued by the relevant employer's liability insurance association regarding phase failure protection and the associated circuit/circuit modification!**

5.3 Startup

- For startup, in addition to the safety notes in these operating instructions, it is essential that you comply with the safety notes in the operating instructions for the motor as well as the legal and liability insurance conditions.



6 Inspection/Maintenance

- Use only genuine spare parts in accordance with the valid parts list!
- Always install a new brake control system at the same time as replacing the brake coil!
- Motors can become very hot during operation – danger of burns!
- Secure or lower the mobile flying equipment and rigging system (danger of falling).
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

6.1 Inspection and maintenance periods

The necessary inspection/maintenance periods must be calculated by the system manufacturer according to the specific project planning documents for individual applications, in accordance with the directives of the employer's liability insurance association. According to the "BGV C1" regulation of the employer's liability insurance association, brakes for stage applications must be checked once a year.

The BMG..T brakes can only be disassembled by trained personnel.



During maintenance, the mobile flying equipment or rigging system must not be subject to load.

6.2 Checking the dual circuit braking function

The BMG..T brakes can be checked both statically and dynamically. A static check may not be suitable for some applications (due to the higher reference torque). The system operator determines the procedure that is to be used and how often a check is to be performed (see the inspection and maintenance periods).

The following table lists the reference torque ratings to be applied. **Regardless of the inspection and test procedure used, the test should only be carried out by qualified personnel!**

Brake type	Rated braking torque	Permitted load torque	Dynamic reference torque	Static reference torque
BMG4T	40 (2 x 20)	13	16	32
	20 (2 x 10)	6.5	8	16
BMG8T	75 (2 x 37.5)	25	31	62
	37 (2 x 18.5)	12	15	30
BMG15T	150 (2 x 75)	50	62	125
	100 (2 x 50)	35	44	88



Inspection/Maintenance

Checking the dual circuit braking function

**Dynamic check to
DIN 56921 or
DIN 56925**



The BMG..T brakes have a dual circuit braking function. If one brake circuit fails, the other is able to hold the load. The following section describes how to check the effectiveness of this backup brake system. The effectiveness is checked in accordance with the periods specified by the system operator (see the inspection and maintenance intervals). To check the effectiveness, one of the two brake discs is removed from the power flow by inserting distance blocks.

1. **Secure or lower the mobile flying equipment and rigging system (danger of falling)!**
2. Remove protective canopy and encoder.
3. Remove the rubber sealing collar.
4. Release the brake manually or electrically.
5. Remove one brake disc from the power flow by inserting three distance blocks above the studs (see Figure 3 on page 11). When doing so, loosen the adjusting screws of the distance blocks until the air gap is applied completely at the bridged brake disc.
6. Set the working air gap for the brake disc in the power flow to 0.25 mm. **At this point the brake motor is free to rotate!**
7. Apply the brake.
8. The brake system in the power flow; that is, the one that has not been bridged using distance blocks, must be able to cope with the dynamic reference torque ratings listed in the following table, i.e. 125 % of the permitted load torque.

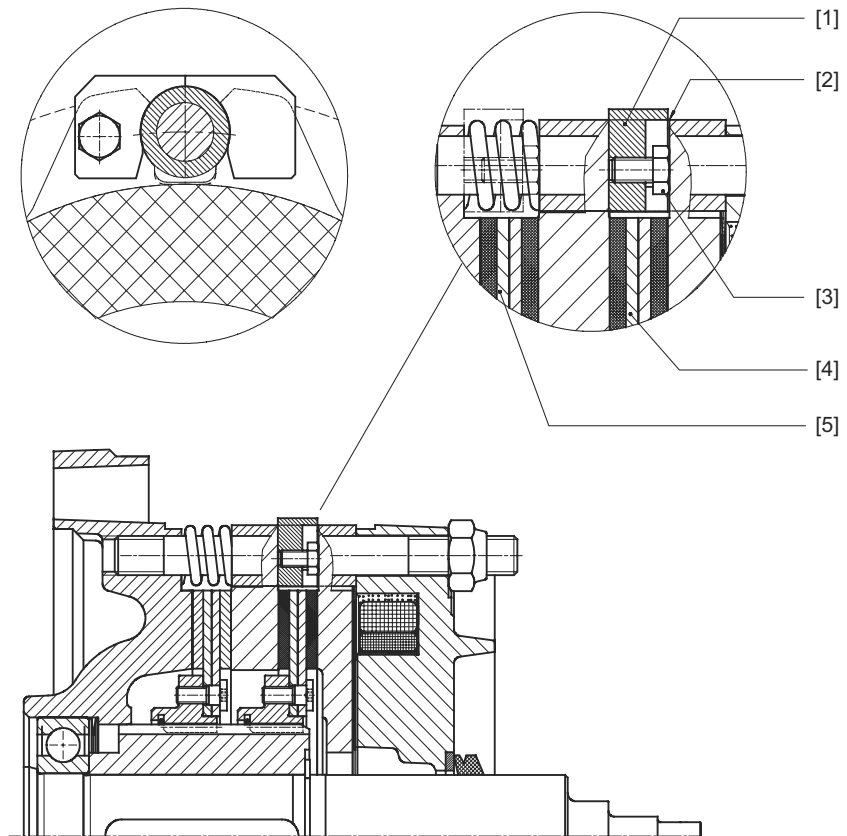
Brake type	Rated braking torque	Permitted load torque	Dynamic reference torque	Static reference torque
BMG4T	40 (2 x 20)	13	16	32
	20 (2 x 10)	6.5	8	16
BMG8T	75 (2 x 37.5)	25	31	62
	37 (2 x 18.5)	12	15	30
BMG15T	150 (2 x 75)	50	62	125
	100 (2 x 50)	35	44	88



9. **Remove distance blocks.**
10. Repeat points 4 to 9 for the second brake disc.
11. Reset the working air gap.
12. Install the rubber sealing collar.
13. Attach the encoder and protective canopy.



If one of the brake systems cannot cope with the specified dynamic torque, stop the test immediately. This means that the dual circuit brake function is not ensured. Stop the mobile flying equipment or rigging system, remove the brake and check it.



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Figure 3: Checking the dual circuit brake function with distance blocks

- [1] Distance block (3x)
- [2] Air gap
- [3] Adjusting screw
- [4] Brake disc not in the power flow
- [5] Brake disc in the power flow



Static check

Brakes in the BMG..T series have a dual circuit braking function. The permitted load torque during operation is much lower than the rated braking torque.

Before performing the static check described here, you must ensure that the transmission components are strong enough to cope with the test ratings. The strength must be proven beforehand.

The static check is used to test the total braking torque of the individual brake discs; that is, the braking circuits are subjected to load at the same time. Choose the static reference torque according to the following table and apply the torque once you have secured or lowered the mobile flying equipment and rigging system.

Brake type	Rated braking torque	Permitted load torque	Dynamic reference torque	Static reference torque
BMG4T	40 (2 x 20)	13	16	32
	20 (2 x 10)	6.5	8	16
BMG8T	75 (2 x 37.5)	25	31	62
	37 (2 x 18.5)	12	15	30
BMG15T	150 (2 x 75)	50	62	125
	100 (2 x 50)	35	44	88

To check the backup and safety factors in a single test, 250 % of the permitted load torque is applied as a static reference torque.

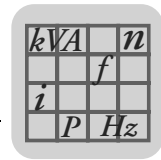


If the system cannot cope with the specified static torque during the test, stop the test immediately. This means that the dual circuit brake function is not ensured. Stop the mobile flying equipment or rigging system, remove the brake and check it.

6.3 Customer service

Please have the following information to hand if you require the assistance of our customer service team:

- Data from the nameplate (complete)
- Nature and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause



7 Technical Data

7.1 BMG..T braking torque ratings

Brake type	For motor size	Working air gap		Braking torque settings				
		[mm]	[mm]	Rated torque [Nm]	Type and no. of brake springs		Order number of brake springs	
		min.	max.		stan- dard	red	standard	red
BMG4T	90/100	0,2	0,6	40 (2 x 20)	3		135 150 8	135 151 6
				20 (2 x 10)		6		
BMG8T	112-132S			75 (2 x 37.5)	3		184 845 3	135 570 8
				37 (2 x 18.5)		6		
BMG15T	132M-160M			150 (2 x 75)	3		184 486 5	184 487 3
				100 (2 x 50)		6		

After the motor test run, deviations of ± 0.05 mm can occur in the working air gap caused by parallelism tolerances in the brake disc.

7.2 Brake control systems

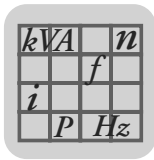
SEW-EURODRIVE stipulates the following brake control systems as standard in combination with brakes from the BMG..T series for installation in terminal boxes:

	BMG4T	BMG8T	BMG15T
AC supply	BG	BGE	BGE
24 V _{DC} supply	BS	BSG	BSG

If you want to install the brake control system in a switch cabinet, SEW-EURODRIVE stipulates the following brake control systems in combination with brakes in the BMG..T series:

	BMG4T	BMG8T	BMG15T
AC supply	BMS	BME	BME
24 V _{DC} supply	BS	BSG	BSG

If you want to install a different brake control system, please contact SEW-EURODRIVE to discuss the possibilities.



7.3 BMG..T operating currents

	BMG4T	BMG8T	BMG15T
Motor size	90-100	112-132S	132M-160M
Max. rated braking torque [Nm]	40	75	150
Braking power [W]	50	65	95
Inrush current ratio I_B/I_H	-	6.3	7.5

Rated voltage V_N	BMG4T	BMG8T	BMG15T
	I_H [A_{AC}]	I_H [A_{AC}]	I_H [A_{AC}]
24 DC	2.2 ¹⁾	2.77 ²⁾	4.15 ²⁾
230 AC (208-233)	0.36	0.46	0.66
240 AC (234-261)	0.32	0.41	0.59
290 AC (262-293)	0.29	0.36	0.53
400 AC (370-414)	0.20	0.26	0.37
440 AC (415-464)	0.18	0.24	0.33

- 1) Direct current with DC supply
- 2) Direct current in BSG operation

I_B Accelerator current – brief inrush current

I_H Holding current r.m.s. value in the connecting lead to the SEW brake rectifier

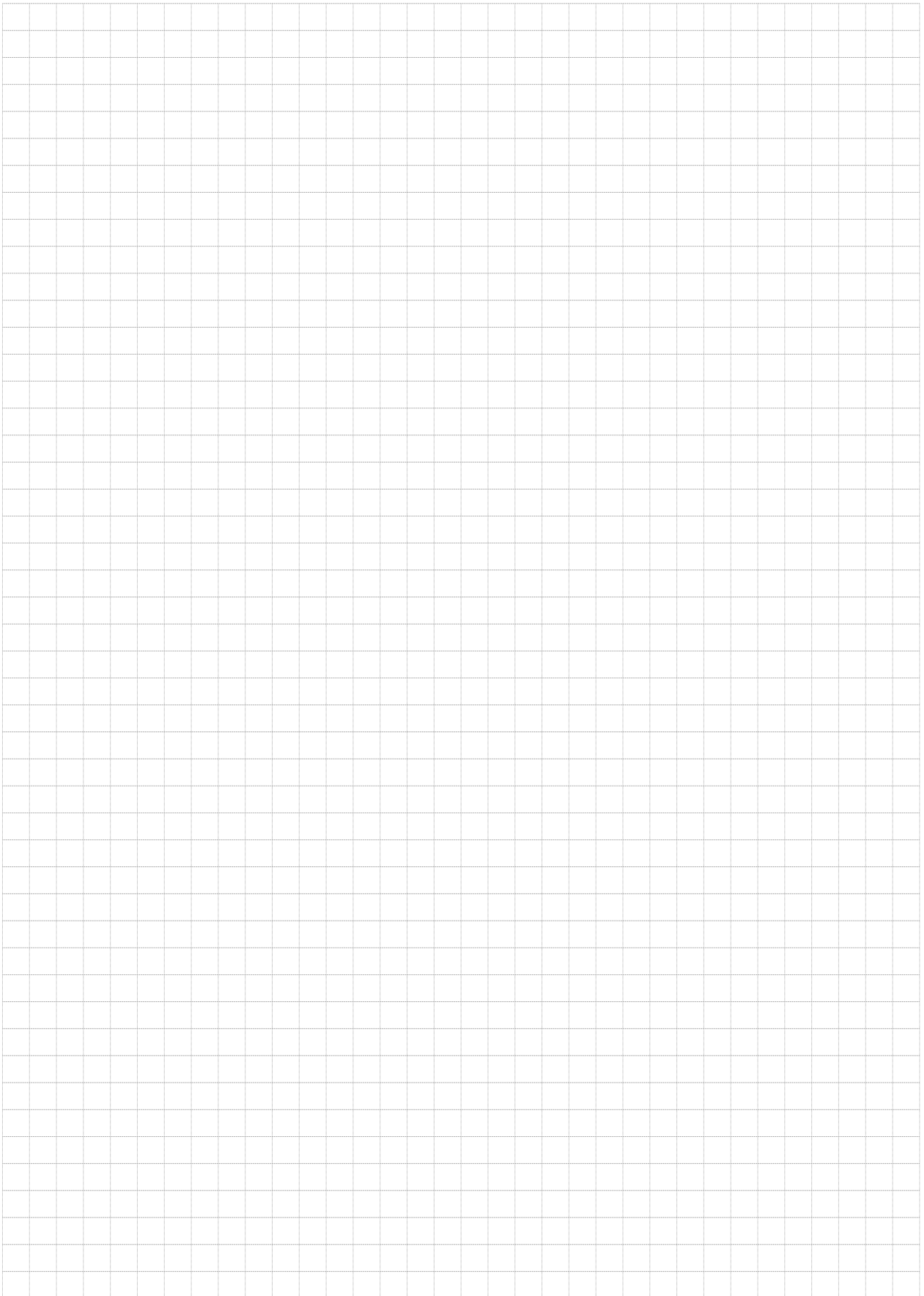
U_N Rated voltage (rated voltage range)

Permitted tolerances for rated voltage: Rated voltage range $\pm 10\%$

Example: Rated voltage 230 V_{AC}

Lower limit 208 V_{AC} -10 %

Upper limit 253 V_{AC} +10 %



How we're driving the world

With people who think fast and develop the future with you.



With a global presence that offers responsive and reliable solutions. Anywhere.

With a worldwide service network that is always close at hand.

With drives and controls that automatically improve your productivity.



With innovative technology that solves tomorrow's problems today.

With comprehensive knowledge in virtually every branch of industry today.



With online information and software updates, via the Internet, available around the clock.

With uncompromising quality that reduces the cost and complexity of daily operations.

SEW-EURODRIVE
Driving the world



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