3U Rack-Mount AC Servo Amplifiers

MSK Series

MSK 06 I_S = 6 A; U_Z = 120 V
MSK 12 I_S = 12 A; U_Z = 120 V
MSK 15 I_S = 15 A; U_Z = 120 V

- High performance in a compact package
- Continuous power range from 100 W to 1.5 kW
- 3 kW peak power
- Sinusoidal commutation with resolver
- High bandwidth
- Current control using special hybrid technique
- Surface mount technology
- Internal logic supply
- Protected against short-circuit phase to phase and phase to ground
- Personality module
- Optional encoder simulation

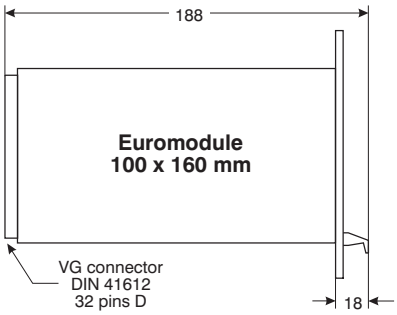
MSK 12

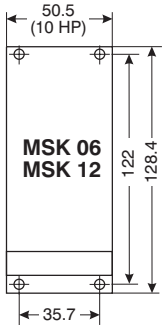
The AC servo amplfiers of the MSK series were developed especially for motors with lower power ranges. Despite their compactness, a peak power of 3 kW is supplied, which is sufficient to accelerate a 1 kW motor to the rated speed within the shortest time. The PWM power stage features POWERMOS technology. Highly accurate current control is accomplished on special ceramic substrate hybrids. The logic system consists of surface mount devices. It is powered from the bus voltage via a fly-back converter. Alternatively, the logic system can be supplied by external 24 V_{DC}. The bus voltage of 120 V_{DC} allows to comply with the VDE and IEC regulations to minimum distances between printed conductors, despite the small dimensions. Advanced testing methods guarantee high reliability.

Technical data

Supply and auxiliary voltages	
Bus voltage	120 V_{DC} (60 V–140 V)
Logic voltages (version A)	The logic voltages are generated internally from the bus voltage by a fly-back converter.
Logic voltages (version B)	The logic voltages are generated from an external 24 V_{DC} supply by a fly-back converter. Necessary: 24 V / 550 mA
Logic voltages (version C)	The logic voltages are generated internally via a rectifier from an external 19 V_{AC}–0–19 V_{AC} supply. Necessary: 400 mA
Auxiliary DC output	+ 15 V, – 15 V, max. load 10 mA each
Torque controller	
Bandwidth	1.5 kHz
Torque limitation	Command signal input: 0 – 10 V
Continuous current / amplifier (peak value)	MSK 06: 6 A MSK 12: 12 A MSK 15: 15 A
Continuous current / amplifier (rms value) I_N	MSK 06: 4.2 A MSK 12: 8.5 A MSK 15: 10.5 A (from 7 A, forced air cooling required)
Peak current (peak value)	MSK 06: 12.5 A MSK 12: 25 A MSK 15: 30 A
Peak current / motor (rms value) I_S	MSK 06: 8.9 A MSK 12: 17.7 A MSK 15: 21 A

Dimensions





All dimensions in mm

Specifications are subject to change without notice

Velocity controller (PI regulator)

Tacho gain	adjustable
Gain	adjustable
Velocity command gain	adjustable
Offset	adjustable

Monitoring devices

Bus undervoltage	< 55 V_{AC} (LED illuminated)
Bus overvoltage	> 170 V_{AC} (LED illuminated)
Undervoltage of logic supply	± 14 V (LED illuminated)
I^2 x t limit	active after 600 ms at twice the rated current; the current will be reduced to the rated value
Current limitation of I_{max}	adjustable from 0.1 to 2 I_N
Current limitation of I_{rms}	adjustable from 25 to 100% I_N
Thermo protection of motor	input for potential-free thermo switch
Thermo protection of module	heat sink temperature 85°C ± 10%

Velocity command signal (R_i = 20 kOhm)

Input 1	± 10 V via ramp generator, slope 10–200 ms / 10 V, adjustable on dn/dt potentiometer
Input 2	± 10 V differential amplifier input

Logic inputs (active = high, PLC compatible, 11–33 V)

Enable	enables the MSK device
Limit switches (cw and ccw)	depend on direction of rotation, with dynamic braking
Reset	cancels all error signals, high active

Relay outputs (normally open contact, rated 24 V / 0.5 A)

Standby relay	drive is ready to operate
Brake relay	activates an external brake contactor

Monitor devices (test jacks on front panel)

Current monitor	± 10 V corresponding to twice the rated current
Velocity (VEL) monitor	1 V corresponding to 1000 rpm

Basic potentiometer settings

d_n/d_t: Potentiometer for slope
Basic setting: fully ccw, corresponding to maximum acceleration/ deceleration time. Range: 10–200 ms with 10 V level change of command signal

n_{ist}: Potentiometer for tacho gain
Basic setting: fully ccw, corresponding to maximum tacho gain, i.e. minimum speed.

n_{soll}: Potentiometer for velocity command gain
Basic setting: fully cw, corresponding to maximum velocity command gain

offset: Potentiometer for offset adjustment
For fine adjustment of velocity "zero"" at command value 0 V

gain: Potentiometer for gain
Basic setting: fully ccw, corresponding to minimum gain

I_{max}: Potentiometer for peak current
Basic setting: fully cw, corresponding to maximum peak current

I_{rms}: Potentiometer for rms motor current
Basic setting: fully cw, corresponding to the rated servo drive current

Personality Module

All parameter setting options are on a small PC board. This allows optimum adaptation of the servo amplifier to a certain motor and to the motion control application in question. The PC board can be configured into a personality module if the specific parameters are set with fixed resistors and jumpers.

Encoder simulation ES2:

Each MSK device can be provided with this option (retroactive extension possible). The outputs of the encoder simulator are opto-isolated.

Ext. power supply	5 V, 50 mA
Output level	5 V, according to RS-422
Output signals	A, $\overline{A}$, B, $\overline{B}$ and gated I, $\overline{I}$

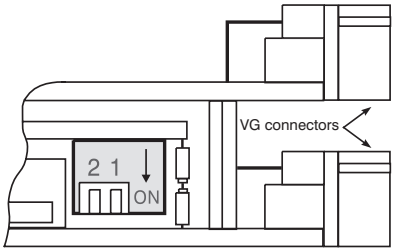
Outputs on 9-pin D-submin mates socket X3

1	$\overline{I}$	6	I
2	$\overline{A}$	7	A
3	$\overline{B}$	8	B
4	+ 5 V external	9	GND external
5	nc		

Resolution setting

Resolution	Switch 1	Switch 2
128 counts/rev.	off	off
256 counts/rev.	off	on
512 counts/rev.	on	off
1024 counts/rev.	on	on

Location of switches 1 and 2

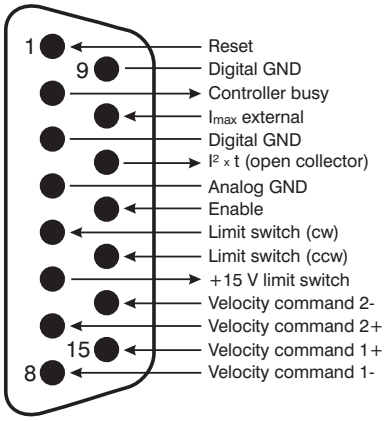


I/O on 10-pin ribbon cable connector X7

(only for internal connections, e.g. to PTS)

1	$N_{soll}2-$ (GND)	6	Encoder B
2	$N_{soll}2+$	7	PTS error input (+ 15 V)
3	Enable + 15 V active	8	nc
4	GND	9	nc
5	Encoder A	10	nc

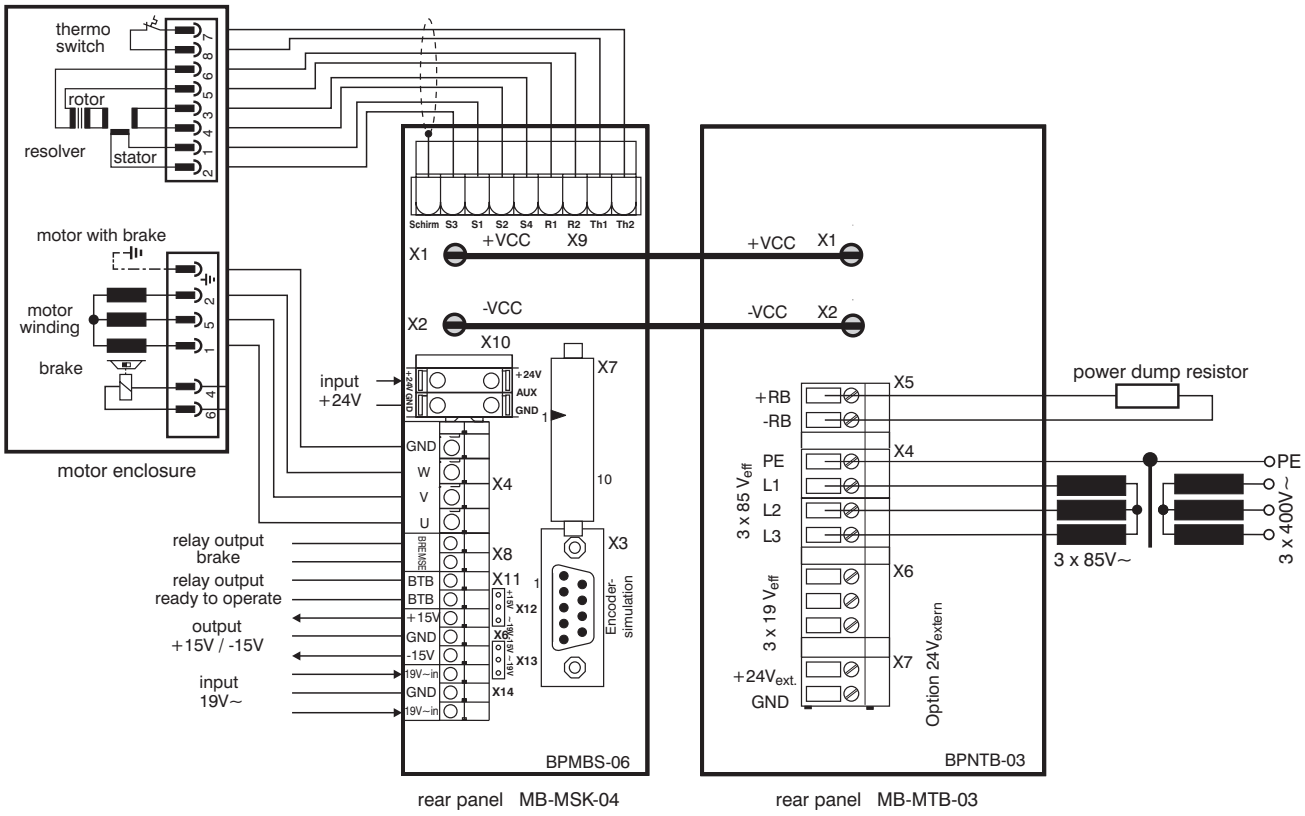
I/O of D-submin socket on front panel



Terminal side of mating connector

8	Velocity command 1–	± 10 V via ramp generator
15	Velocity command 1+	with linear slope (10–200 ms) at 10 V level change
7	Velocity command 2+	± 10 V velocity command input
14	Velocity command 2–	via differential amplifier
13	Limit switch ccw	(HIGH = active) 11–33 V_{DC}
5	Limit switch cw	(HIGH = active) 11–33 V_{DC}
12	Enable (without dynamic braking)	(HIGH = active) 11–33 V_{DC}
3	Digital GND	for limit switch and enable
9	Digital GND	for limit switch and enable
10	External current reduction	0–10 V corresponding to 0–I_{max} (R_i = 1 kΩ)
4	Analog GND	for external current reduction and monitor outputs
1	Input for error reset	(15 V pulse 1 ms to pin 3)

Electrical connection of motherboards



Terminalsboards

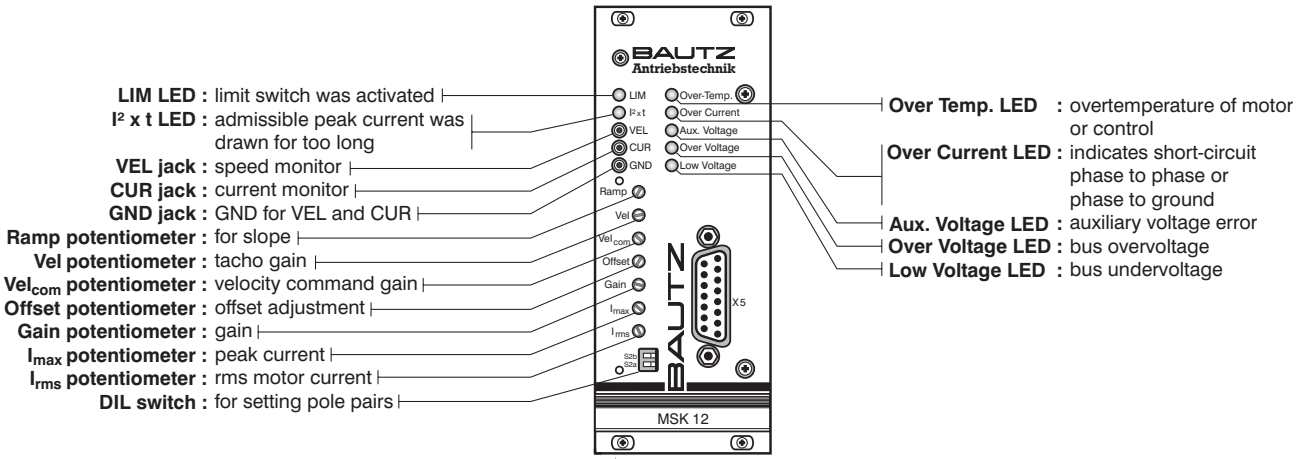
An optional back panel is available for external connection of the devices.

MB-MSK-04 Terminal board for MSK servo amplifier, encoder output via 9-pin submin-D connector when using option ES2, ribbon cable connector for connection to a PTS.

Switch setting for motor poles (DIL switch S2a, S2b)

No. of pole pairs	S2a	S2b
2	off	on
3	off	off
4	on	off
8	on	on

Displays and control elements on the front panel



Order code

MSK 12 - 10 - ES2 A A

A	=	Standard version: Logic supply from bus voltage
B	=	Logic supply from external 24 V
C	=	Logic supply from external 19 V_{AC}
A	=	Standard version
B–Z	=	Special versions
ES2	=	With encoder simulation
000	=	Without encoder simulation
10	=	Hardware status, downward compatible
15	=	Current peak value15 A
12	=	Current peak value 12 A
06	=	Current peak value 6 A
MSK	=	19" 3U rack-mount servo amplifier with sinusoidal commutation

3U Rack-Mount Power Supply Devices

MTB Series

MTB 25-AA
MTB 25-AB

The power supply devices of the MTB series generate the bus voltage for the AC servo amplifier of the MSK series.
An external single-phase or three-phase isolation transformer provides the required input power. With single-phase operation the power output is reduced.
The power supply MTB 25-AB comes with an integrated power dump resistor and supplies an auxiliary voltage of 24 V.

MTB Module

Technical data

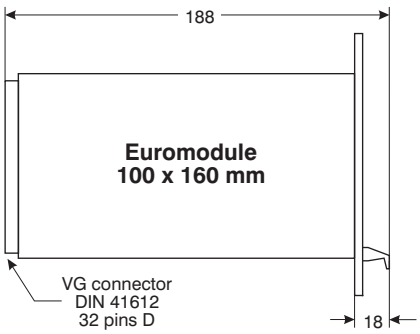
Common data for MTB 25-AA and MTB 25-AB

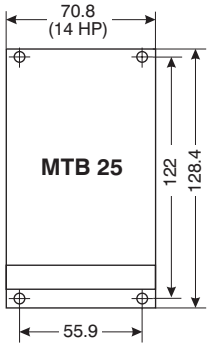
Rated connection voltage	
	1 x 85 V_{rms} (40 V_{rms} ... 95 V_{rms})
	3 x 85 V_{rms} (40 V_{rms} ... 95 V_{rms})
Rated output voltage	
Bus voltage U_Z	120 V_{DC} (55 V_{DC} ... 140 V_{DC})
Rated output current	
single-phase supply	8 A_{DC}
three-phase supply	25 A_{DC}
Rated output power	
single-phase supply	960 W
three-phase supply	3 kW
Power dump circuit	
Peak power	3.2 kW
Ext. power dump resistor	8 Ω, 500 W
Continuous power	500 W
Switching threshold	U_Z

Additional data for MTB 25-AB

Internal power dump circuit	
Peak power	650 W
Continuous power	
without cooling	30 W
with cooling	60 W
Auxiliary voltage 24 V_{DC}	
Rated value	24 V_{DC} (20–28 V_{DC})
Rated current	
single-phase supply	2 A_{DC}
three-phase supply	3 A_{DC}
Rated input voltage	
single-phase supply	1 x 19 V_{rms}
three-phase supply	3 x 19 V_{rms}

Dimensions





All dimensions in mm
Specifications are subject to change without notice

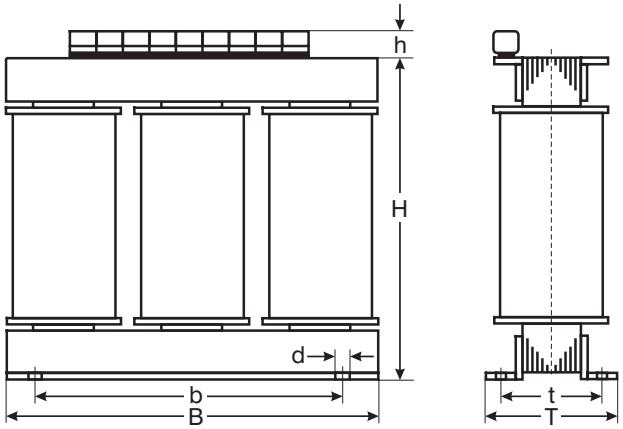
Order code

MTB – 3 – 25-85 – 012 – AB

	A=	Without option
	B=	With option (external 24 V and internal dump resistor)
	A=	Standard versions
	B–Z=	Special versions
2=		reserved
1=		reserved
0=		reserved
85=		85 V_{AC} input current
25=		25 A_{DC} output current
3=		Hardware status, downward compatible
MTB=		19" 3U rack-mount power supply device

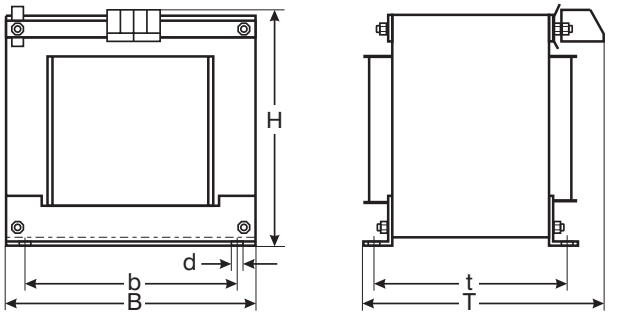
Transformer dimensions and order codes

Three-phase transformer acc. to VDE 0550



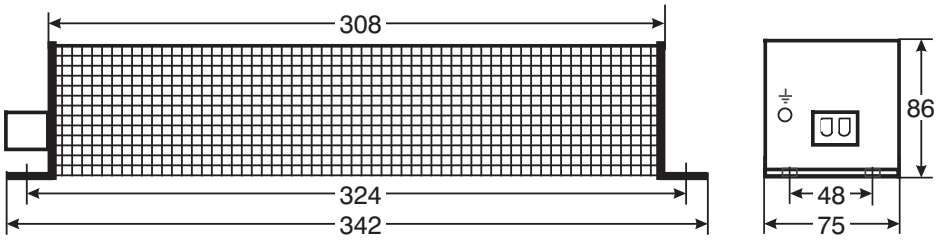
Order code	Power	B	b	T	t	H	h	d
T0118.1	1.0 kVA	230	180	124	98	200	0–10	8 (M6)
T0119	2.3 kVA	265	215	152	126	225	0–10	10 (M8)
T0121	3.3 kVA	300	240	150	120	260	50	10 (M8)

Single-phase transformer acc. to VDE 0550



Order code	Power	B	b	T	t	H	h	d
T065.1	0.5 kVA	120	90	125	92	110	—	6
T066.1	1.0 kVA	150	122	165	127	133	—	7

Dimensions of dump resistor 09 RK



Available Motherboards

MB-MTB03

Motherboard for MTB 25

All dimensions in mm

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