

# 17

### Decentral Drive Technology

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# Energy Efficient Geared Motors

## AC Variable Speed

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### EtaK2.0 geared motors

All Bauer geared motors from 0.12 to 7. kW are available with an externally mounted EtaK2.0 frequency inverter. These are mounted directly onto the motor in place of a terminal box. The installation volume required for the geared motor is not much greater than that required for standard geared motors.

### Efficient and ideal for distributed systems

EtaK2.0 geared motors help you to save several times over: in planning and installation, in operation and in maintenance. They help you boost the efficiency of your installations, protect your mechanical components and reduce the mains load. In this way, EtaK2.0 geared motors make a significant contribution to energy savings and efficiency optimisation of your application.

All EtaK2.0 geared motor models (helical, shaft-mounted, bevel and worm-gear motors) are equipped with a variable frequency drive (VFD). They give you compact drive solutions with continuously variable speed and rated motor power up to 7.5 kW.

EtaK2.0 geared motors are smart power components for future-oriented system designs and can easily be adapted to specific working conditions and required process speeds. They are preferably controlled using a field bus system, but they also support control through digital and analogue inputs and outputs. The VFD provides valuable additional information for system protection and monitoring.



### Features of EtaK2.0 geared motors

The combination of geared motor with inverter opens up a whole range of attractive possibilities:

#### Reduce costs - Save space

- Planning and installation costs are down
- Less space needed for switchgear
- Fewer drive versions, so stock holding is streamlined
- Thermal situation inside the switchgear cabinet is better
- Fewer shielded motor cables

#### Think system - Avoid interfaces

- Inverter and motor are integrated in a single, compact unit
- Inverter is optimised ex-works for motor and application
- Retrofits available for existing drive configurations
- Cabling is simplified

#### User benefits

- Preconfigured, plug and play on application-specific basis
- Slip compensation for load-independent constant speed
- PID controller for structuring process control
- Switching frequency adjusts automatically to temperature

### Technical Data for EtaK2.0

- Motor power range 0,12 to 7,5 kW
- Supply voltage 3 x 400 .. 480 V +/- 10 %
- Input frequency 50/60 Hz
- 200 % of rated motor torque over the entire frequency-inverter range
- Design compliant with UL requirements
- Degree of protection IP 65: motor and inverter
- Integrated protection against overload, overcurrent, phase failure, overvoltage and under-voltage
- Drive is thermally monitored

### Added benefits

- 200 % overload current (3 s)
- V/f control with or without encoder
- Sensorless vector control
- Short-circuit and frame fault protection
- Direct current braking
- S ramps for gentle acceleration
- Maximum output frequency 300 Hz
- CANopen, PROFIBUS, PROFINET, EtherCAT, EtherNet/IP and AS-Interface
- Safety function STO in combination with a communication unit with field bus system

### Motor combinations

#### Induction motors (ASM)

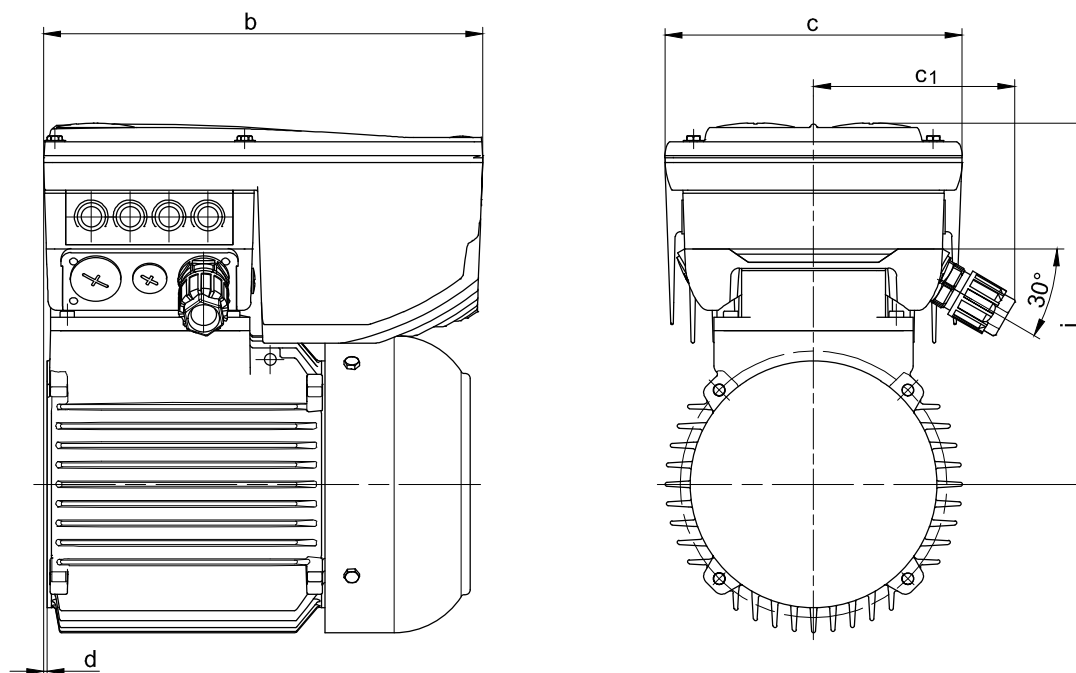
P <sub>N</sub> 50Hz [kW]	Typ*	Base frequency 50 Hz Motor: 350V/50Hz/Y	Base frequency 87 Hz Motor: 202V/50Hz/D
		P <sub>FU</sub> [kW]	P <sub>FU</sub> [kW]
0.12	DHE06LA4	0.37	0.37
0.18	DHE06LA4	0.37	0.37
0.25	DHE07LA4	0.37	0.55
0.37	DHE08MA4	0.37	0.75
0.55	DHE08LA4	0.55	1.1
0.75	DHE08XA4	0.75	1.5
1.1	DHE09LA4	1.1	2.2
1.5	DHE09XA4	1.5	3
2.2	DHE09XB4	2.2	4
3	DHE11MA4	3	5.5
4	DHE11LA4	4	7.5
5.5	DHE11LB4	5.5	-
7.5	DHE13LA4	7.5	-

P <sub>N</sub> 60Hz [kW]	Typ*	Base frequency 60 Hz Motor: 400V/60Hz/Y	Base frequency 104 Hz Motor: 230V/60Hz/D
		P <sub>FU</sub> [kW]	P <sub>FU</sub> [kW]
0.12	DHE06LA4	0.37	0.37
0.18	DHE06LA4	0.37	0.37
0.25	DHE07LA4	0.37	0.55
0.37	DHE08MA4	0.37	0.75
0.55	DHE08LA4	0.55	1.1
0.75	DHE08XA4	0.75	1.5
1.1	DHE09LA4	1.1	2.2
1.5	DHE09XA4	1.5	3
2.2	DHE09XB4	2.2	4
3	DHE11MA4	3	5.5
4	DHE11LA4	4	7.5
5.5	DHE11LB4	5.5	-
7.5	DHE13LA4	7.5	-

# Electronics

## Decentral Drive Technology

Dimensional drawing with attached EtaK2.0 inverter



Other dimensions see the appropriate normal dimensioned sketch

Motor	Type ETA-K2...		Dimensions (mm)					Cable entry
			b	c	c <sub>1</sub>	d	i	
D06	K2A003		245	156	120	-5	159	QUICKON
D07	K2A005		245	156	120	-5	159	QUICKON
D..08	K2A003	K2A005	341	156	120	-1	176	QUICKON
	K2A007	K2A011	341	156	120	-1	176	QUICKON
	K2A015		341	156	120	-1	176	QUICKON
D..09	K2A011	K2A015	238	156	120	2	213	QUICKON
	K2A022	K2A030	258	176	120	2	213	QUICKON
	K2A040		326	195	120	-1	285	QUICKON
D..11	K2A022	K2A030	259	176	120	1	233	QUICKON
	K2A040	K2A055	327	195	120	-2	304	QUICKON
	K2A075		327	195	132	-2	304	QUICKON
D..13	K2A075		344	195	132	-18.5	335	QUICKON

### Available accessories

Either the USB diagnostic adapter in combination with free software or the handheld terminal is required for parameterisation and control of the EtaK2.0. Without this accessory, no parameter adjustments are possible.

### USB diagnostic adapter

The EtaK 2.0 is operated, parameterised and diagnosed via the diagnostic interface. A PC can be connected via the USB interface and the USB diagnostic adapter. To connect the USB diagnostic adapter to the diagnostic interface (DIAG) on the inverter, a 5-metre flying lead is already included in the package. The connection can be established during operation. The EASY Starter or Engineer engineering tools can be used to operate, parameterise or diagnose the inverters. Both tools have simple intuitive interfaces. This makes commissioning, for example, quick and easy to carry out.

Features	Plug-in location	BAU ID
<ul style="list-style-type: none"> <li>• Input-side power supply via USB connection from PC</li> <li>• Output-side power supply via inverter diagnostic interface</li> <li>• Diagnostic LEDs</li> <li>• Galvanic decoupling of PC and inverter</li> <li>• Hot-plug-capable</li> <li>• 5 m flying lead</li> </ul>	DIAG	BAU4020468



### Handheld terminal

As an alternative to the PC, the handheld terminal can be used for local operation, parameterisation or diagnostics. The data is quickly accessible via structured menus and a plain text display. The handheld terminal can be plugged onto the diagnostic interface (DIAG) of the VFD from the outside.

Features	Plug-in location	BAU ID
<ul style="list-style-type: none"> <li>• Handheld terminal in robust housing</li> <li>• Including 2.5 m cable</li> <li>• IP20 enclosure rating</li> <li>• For 8400 motec</li> </ul>	DIAG	BAU2612968



# Electronics

## Decentral Drive Technology

### Switch potentiometer unit

The switch / potentiometer unit is mounted directly onto the 8400 motec or to another part of the system. With the switch/potentiometer unit and the control connections integrated into the drive controller, an analogue reference value can be preset with the integrated potentiometer; the drive can be started or stopped or the direction of rotation can be changed, for example, via the rotary switch.

Specification	Features	Plug-in location	BAU ID
Switch / potentiometer unit E82ZBU	<ul style="list-style-type: none"> <li>• 2.5 m flying lead</li> <li>• IP65 enclosure rating</li> </ul>	Connection to the control ports of the communication unit	BAU2616424

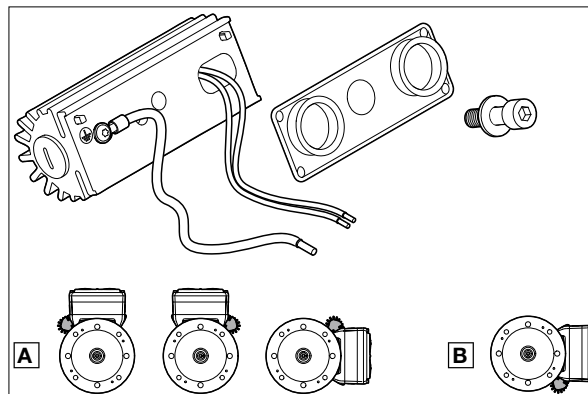


### Built-in potentiometer

Features	Plug-in location	BAU ID
<ul style="list-style-type: none"> <li>• The mounted potentiometer can be mounted directly to the EtaK2.0 wiring unit.</li> <li>• With the potentiometer and the control connections integrated into the drive controller, an analogue reference value can be preset or the drive can be started or stopped.</li> </ul>	Connection to the control ports of the communication unit	BAU3126561



### Internal braking resistances





	$R_B$ (C00129)	$P_D$ (C00130)		$Q_B$ (C00131)	<b>C00574</b>	<b>IP</b>	<b>E84DGDVB...</b>
	[Ω]	A	B	[kWA]	=		
		[W]	[W]				
BAU-ID 2612887	220	40	30	0.6	1 Fault	IP65	3714 5514 7514 1124 1524
BAU-ID 2612879	100	40	30	0.6	1 Fault	IP65	2224 3024
BAU-ID 2612861	47	40	30	0.6	1 Fault	IP65	4024 5524 7524

### Setpoint potentiometer

A setpoint potentiometer for installation in a cable entry gland of the inverter housing is available for adjusting speed directly at the drive. This potentiometer is particularly suitable as an alternative to mechanical actuating drives.

### Easy Starter

All VFDs can be parameterised, operated and controlled from the PC using this software. This considerably simplifies parameter setting, commissioning, diagnostics and documentation of the systems. Networking of up to 126 VFDs is possible. Downtimes during device replacement can thus be drastically reduced.

- Basic module for convenient parameterisation and test run.
- Protocol module with monitor function for commissioning complex systems and possibility of modem connection.
- Masking module for creating input and output masks with password protection.

### Braking operation with braking resistor

For regenerative operation over a longer period of time or when you have to decelerate large moments of inertia, you need a braking resistor. It converts the braking energy into heat.

The braking resistor is switched on when the DC link voltage exceeds the switching threshold. This prevents the drive controller from setting pulse inhibition due to the „overvoltage“ fault and the drive from running out.

The braking resistor guides the braking process at all times.

#### Note:

An internal braking resistor is not integrated in the device. Conversion of braking energy into heat is not possible. Only the brake chopper is integrated in the device.

### Supply for mechanical brake

Bauer geared motors can be equipped with spring-applied brakes. A mechanical brake for the motor can be actuated directly by the frequency inverter. The EtaK2.0 VFDs have an integrated motor brake control. The EtaK2.0 supplies and controls the brake as long as it is supplied with mains voltage. The EtaK2.0 generates an appropriate brake supply voltage depending on the mains voltage present, so that a brake suitable for the application can be fitted. The corresponding values for a brake supply voltage are listed in the following table:

--> on the 400 V mains: solenoid voltage 180 V DC
--> on the 400 V mains: solenoid voltage 180 V DC

Optionally, the switching of the brake can also be controlled via an external control contact (e.g. PLC).

### Possible assemblies for EtaK2.0

#### BG-series

Terminal box position	B3 H4	B6 H1	B7 H2	B8 H3	V5 H5	V6 H6	B5	V1	V3
I	✓	x	✓	✓	✓	✓	✓	✓	✓
II	✓	✓	✓	x	✓	✓	✓	✓	✓
III	✓	✓	x	✓	✓	✓	✓	✓	✓
IV	x	✓	✓	✓	✓	✓	x	✓	✓

✓ possible, x not possible

#### BF-series

Terminal box position	H1	H2	H3	H4	V1	V2
I	x	✓	✓	✓	✓	✓
II	✓	✓	x	✓	✓	✓
III	✓	x	✓	✓	✓	✓
IV	✓	✓	✓	x	✓	✓

✓ possible, x not possible

#### BK-series

Terminal box position	H1	H2	H3	H4	V1	V2
I	✓	✓	✓	✓	x	✓
II	✓	x	✓	✓	✓	✓
III	✓	✓	✓	✓	✓	x
IV	x	✓	✓	✓	✓	✓

✓ possible, x not possible

#### BS-series

Terminal box position	H1	H2	H3	H4	V1	V2
I	✓	✓	✓	✓	x	✓
II	✓	x	✓	✓	✓	✓
III	✓	✓	✓	✓	✓	x
IV	x	✓	✓	✓	✓	✓

✓ possible, x not possible