Device description
Controller Cards for KE/KW System
KW-R33-000 (prev. KW-R34)
KW-R34-000 (prev. KW-R34-R)
KW-R35-000
KW-R36-000

Version: 2025/50
Part no.: 208399

Translation of the "Original Dokumentation"

AMKmotion

MEMBER OF THE ARBURG FAMILY

Imprint

Name: PDK_208399_KW-R3x

Version:

Version: 2025/42	
Change	**Letter symbol**

• KW-R36: new X132 and X141
• New Designations:
  • KW-R33 previous KW-34
  • KW-R34 previous KW-R34-R
• FG AER35 ECsoe V3.03 2025/05
  • Factory assignment of the digital inputs and outputs
  • ad object addresses
• Hall sensor (H-encoder) is supported
	LeS

Previous version: 2025/23

Product version:

Product	Firmware Version (Part no.)	Part no. circuit board (Hardware
KW-R33-000 (O990)	AER34 ECsoe 3.02 2024/04 (208643)	51269 / 51272 (1.05)
(prev. KW-R34) (O974)	AER34 ECsoe V3.02 2024/04 (208643)	51208 / 51206 (1.02)
KW-R34-000 (O989)	AER34R ECsoe V3.02 2024/04 (208644)	51268 / 51271 (1.05)
(prev. KW-R34-R) (O975)	AER34R ECsoe V3.02 2024/04 (208644)	51209 / 51207 (1.03)
KW-R35-000 (O988)	AER35 ECsoe V3.03 2025/05 (208843)	51267 / 51270 (1.05)
(prev. KW-R35) (O976)	AER35 ECsoe V3.03 2025/05 (208843)	51196 / 51127 (1.02)
KW-R36-000 (O987)	AER36 ECsoe V3.02 2024/04 (208646)	51266 / 51258 (1.05)
(prev. KW-R36) (O977)	AER36 ECsoe V3.02 2024/04 (208646)	51195 / 51172 (1.02)

Reservation: We reserve the right to modify the content of the documentation as well as the delivery options for the product.

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For fast and reliable troubleshooting, you can help us by informing our Customer Service about the following:

- Type plate data for each unit
- Software version
- Device configuration and application
- Type of fault/problem and suspected cause
- Diagnostic messages (error messages)

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Content

1 About this documentation

1.1 Where is what?

Topic	Chapter	Chapter number
Validity, use and the propose of the documentation	Imprint	-
	About this document	1
Basic safety information	For your safety	2
Specific safety instructions (thematic safety instructions)	Located in the various chapters	
Information for planning and projecting personnel	Product overview	3
	Environmental conditions	4
	Accessories and options	8
Practice information for startup, operating or maintenance personnel	Assembly / disassembly	5
	Electrical connections	6
	Startup and operation	7
	Service	9
Abbreviations and terms will be explained	Glossary	-

1.2 Keeping this document

This document must permanently be available and readable at the place where the product is in use. If the product is used at another place or changed the owner, the document must be passed on.

1.3 Purpose

This document is addressed to any person who handles the product. It gives information about the following topics:

- Safety messages which are absolutely necessary to take care of during handling the product
- Product identification
- Projecting, planning and dimensioning of the application
- Environmental conditions for storage, transportation and operation
- Assembly
- Electrical connections
- Startup and operation
- Replacement
- Diagnosis
- Decommissioning and disposal

1.4 Target group

Any person that is qualified and intends to work with this product must read, understand and follow this document:

- Transportation and storage
- Unpacking and installation
- Projecting
- Connection
- Parameterization
- Startup
- Testing and maintenance
- Service, troubleshooting or repair
- Decommissioning and disposal
- Replacement

1.5 Display conventions

Display	Meaning
	This symbol points to parts of the text to which particular attention should be paid!
0x	0x followed by a hexadecimal number, e. g. 0x500A
'Names'	Names are represented with apostrophes e. g. parameters, variables, etc.
See 'chapter name' on page x	Executable cross-reference in electronic output media

1.6 Appendant documents

Device descriptions

Part-no.	Title
28932	Servo drives KE/KW

Functional documentations

Part-no.	Title
25786	Diagnostic messages
203704	Parameter description KW-R33, -R34, -R35, -R36 in preparation
	Function descriptions in preparation
208953	Software Tool AIPEX 5

2 For your safety

2.1 Basic notes for your safety

- At electrical drive systems, hazards are present in principle that can result in death or fatal injuries:
  - Electrical hazard (e. g. electric shock due to touch on electrical connections)
  - Mechanical hazard (e. g. crush, retract due to the rotation of the motor shaft)
  - Thermal hazard (e. g. burns due to touch on hot surfaces)
- These hazards are present while starting up and operating the unit, and also during servicing or maintenance work.
- Safety instructions in the documentation and on the product warn about the hazards.
- Personnel must have read and understood the safety instructions before installing and operating the product. In the documentation about the product the usage warnings pertain to direct hazards and must therefore be followed directly when operating or handling the product by the operator.
- AMKmotion products must be kept in their original order, that means it is not allowed to do a significant constructional change on hardware side and software is not allowed to be decompiled and change the source code.
- Damaged or faulty products are not allowed to be integrated or put into operation.
- Do not start the system in which the AMKmotion products are installed (begin of intended use) until you can determine that all relevant standards, laws, and directives have been complied with, e. g. low voltage directive, EMC directive, and the machinery directive, and possible further product standards. The plant manufacturer is responsible for the compliance with the laws, directives, and standards.
- The devices must be installed, electrically connected and operated as shown in the device description documentation. The technical data and the required environmental conditions must be observed at all times.

2.2 Safety rules for handling electrical systems

In particular on drive systems, the instructions pertaining to safety and the following five safety rules have to be kept in the specified sequence:

1. Switch off electrical circuits (also electronic and auxiliary circuits).
2. Secure against being switched on again.
3. Determine that there is no voltage.
4. Ground and short circuit.
5. Cover or close off neighboring parts that are under voltage.

Reverse the measures taken in reverse order after completing the work.

2.3 Presenting safety messages

Any safety information is configured as follows:

⚠ SIGNAL WORD	
	**Type and source of risk** Consequence(s) of non-observance **Steps to prevent:** • ...

2.4 Class of hazard

Safety and warning messages are graduated into classes of hazard (according to ANSI Z535). The class of hazard defines the potential risk of harm and is described by a single word, if the safety information is ignored. The signal word is followed by a safety alert symbol (ISO 3864, DIN EN ISO 7010). In accordance with ANSI Z535, the following signal words are used to define the class of hazard.

Safety alert symbol and signal word	Class of hazard and its meaning
⚠ DANGER	DANGER indicates a hazardous situation which, if not avoided, **will** result in death or serious injury
⚠ WARNING	WARNING indicates a hazardous situation which, if not avoided, **could** result in death or serious injury
⚠ CAUTION	CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, **could** result in minor or moderate injury
NOTICE	NOTICE is used to address preventions to avoid material damage, but not related to personal injury.

2.5 Safety alert symbols used in this document

Safety symbol	Meaning
	Generic warning!
	Warning against dangerous electrical voltage!

2.6 Intended use

The controller cards are intended for installation into the compact inverters KW and KWD.

2.7 Requirements for the personnel and their qualification

Only authorized and qualified personnel may work on and with the AMKmotion drive systems.

Specialised personnel must:

- Perform mechanical and electrical work that is described in this documentation, such as mounting and connecting
- Observe all information in the documentation accompanying the product in order to work with the product safely and in an error-free manner
- Understand and know hazards that occur when handling the product
- Know connections and functions of the system
- Be familiar with the control concept in order to operate the drive system
- Be authorized to switch circuits and devices on and off, ground and label them
- Observe local specific safety requirements

2.8 Warranty

- All information in the documents accompanying the product must be complied with for a safe and trouble-free operation.
- The assertion of warranty claims is excluded if the information in the documents is not observed completely.
- Hardware and firmware may not be modified except by personnel authorized by AMKmotion and after consultation with AMKmotion.
- The company AMKmotion GmbH + Co KG is not liable for damages from unintended use, incorrect installation or operation, exceeding rated values and non-observance with the environmental conditions.

3 Product overview

3.1 Product name and ordering data

Product name	Controller card	Option (Communication)			
		SECS EtherCAT SoE	SECC EtherCAT CoE	SVNS VARAN SoV	MBX[1)]
	Order number	O823	O948	O824	O980
KW-R33-000 (previous KW-R34)	O990 (O974)	x	-	-	x
KW-R34-000 (previous KW-R34-R)	O989 (O975)	x	-	-	x
KW-R35-000 (previous KW-R35)	O988 (O976)	x	-	-	x
KW-R36-000 (previous KW-R36)	O987 (O977)	x	-	-	x

1) The MBX option limits the mailbox length to 780 bytes and makes the controller card compatible with the KW-R2x controller cards in terms of the mailbox length. Without this option, the mailbox of the KW-R3x controller cards has a standard length of 1024 bytes.

The (communication) option and the firmware are not included in the order number of the controller card and must be ordered separately.

3.2 Type code

K W - R 3 x - 0 0 0

|	|	|	|	|
|	|	|	|	Reserved
|	|	|	Reserved	
|	|	Reserved		
|	Encoder characteristics:			
|	**3**: Sensorless (without encoder)			
|	**4**: Resolver			
|	**5**: Encoder evaluation according to encoder interface X131			
|	**6**: Encoder evaluation according to encoder interface X131 and software pulse transmission (SIWL)			
Generation 3				

3.3 Scope of delivery

Please check whether the delivered parts correspond with the delivery note. If the delivery is incomplete, please contact your nearest AMKmotion representative.

Check the components for signs of transport damage after their arrival. Do not install and operate any damaged components.

If there is any transport damage, immediately inform the delivering freight carrier and inform your AMKmotion representative.

3.4 Prerequisites

The following prerequisites must at least be met to operate the controller cards.

Hardware revisions of the devices	
KW	Rev. 3.20
KWD	Rev. 3.20
KW100	Rev. 4.01

Software version	
AIPEX 5	from V1.3
Service pack	-
Firmware (controller card)	from ECsoe V3.02 2024/04

3.5 Product description

The controller cards are designed as card slots for the KW compact inverters in the KE/KW drive system. Each controller card controls a servo motor connected to the compact inverter in the operating modes position control, speed control or torque control (current control) or operates the drive in the V/f control operating mode.

The setpoints are commanded by a controller via the real-time Ethernet interface. The actual values of the motor are coming via the encoder input terminals from e.g. absolute encoders, delivered to the controller card and evaluated.

To communicate with a controller, each participant must be assigned a unique participant address. The participant address can be set using DIP switch S1 (not currently supported) or via parameters.

The cycle time for real-time Ethernet communication is typically 1 ms. In this cycle time, a controller can easily supply over 100 drives with cyclic setpoints synchronously. The real-time Ethernet line can be forwarded from drive to drive (Daisy-Chain). The controller card is available with the following protocol according to IEC 61800-7-300:

- servo drive profile over EtherCAT (SoE)

With AMKmotions AIPEX 5 software tool, the controller card is adapted, configured and optimized to the respective application. Process variables can also be recorded and diagnostic messages can be read out.

3.5.1 Significant differences to the KW-R2x controller card generation

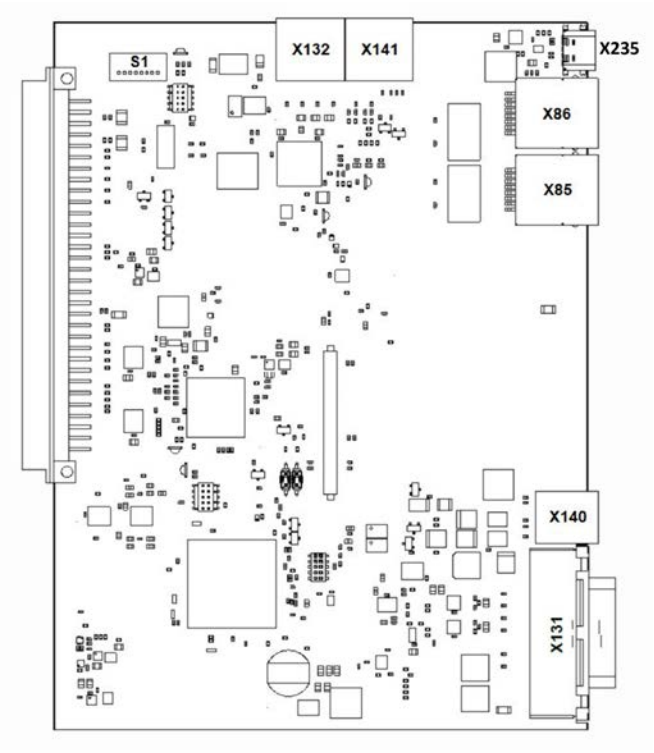
- There is only 1 parameter set and 1 instance. The instance for bus settings is also instance 0.
- ID192 contains all parameters that can be stored remanent in the system. Parameters from ID192 'List backup data' are not automatically saved remanently when writing. In order for the written parameters to be saved in the SEEP, the ID264 command must be executed after writing, otherwise the written values will only be effective until switched off 24 VDC or e.g. with RESET.
- The SERCOS standard operating modes ID32...ID35 and ID284...ID287 are supported. In the SERCOS operating modes with cyclic setpoint specification, no speed ramp is active. Operating modes ID32800...ID32809 are no longer supported
- Online switching of the operating mode with active control is not yet possible. Currently, a change between cyclic position/speed control and torque control is intercepted with the error message 1408, Info 1=999.
- The speed ramps are activated not longer in operating mode ID32800, but in SERCOS operating mode, bit 15=1 must be set and ID33304 bit 6 activates/deactivates the speed ramp.
- Activation of the position fine interpolator (Fipo): ID33304 offers various Fipo settings via bit 2 and 3:
    - bit 3=0, bit 2=0: no Fipo
    - bit 3=0, bit 2=1: linear Fipo
    - bit 3=1, bit 2=0: Fipo with jerk
- The previous following error compensation (SAK) via ID32800... and the associated parameters ID298 and ID348 are no longer available.
    - The replacement is the function 'Speed feed-forward by differentiating the position setpoints' in ID34225 'Mode feed forward control' Bit 4=1. The new SAK via the speed feed-forward behaves like the previous SAK with the settings ID296=100 % and ID348=0 %.

3.6 Views and interface overview

Shown is a KW-R36-000 controller card

Front side

Board



Interfaces	Function	KW-R33	KW-R34	KW-R35	KW-R36
LED Hx	Status LEDs: See 'Status LEDs' on page 14.	H2-H5	H2-H5	H2-H5	H2-H5
BR2	Service jumper	■	■	■	■
S1	DIP switch: currently no funktion EtherCAT address	■	■	■	■
X132	Square-wave pulse interface Connection for an external pulse encoder or output for pulse transmission				■
X141	Binary I/Os and analogue inputs				■
X235	Service and commissioning interface for connection to a PC and AIPEX 5 software tool	USB-C	USB-C	USB-C	USB-C
X86	Real-time Ethernet OUT	■	■	■	■
X85	Real-time Ethernet IN	■	■	■	■
X140	binary I/Os	■	■	■	■
X131	Sine encoder input	-	-	■ 3)	■ 3)
X130	Resolver input	-	■	-	-

3) The characteristic of the interface depends on the controller card type. See '[X131] sine encoder' on page 22.
KW-R35: no Hiperface DSL (Y-encoder), EnDat 2.2 light (P-/Q-encoder) and E-/F-encoder supported up to 25 m cable length
KW-R36: supports Hiperface DSL (Y-encoder), EnDat 2.2 light (P-/Q-encoder) and E-/F-encoder up to 100 m cable length

3.6.1 Status LEDs

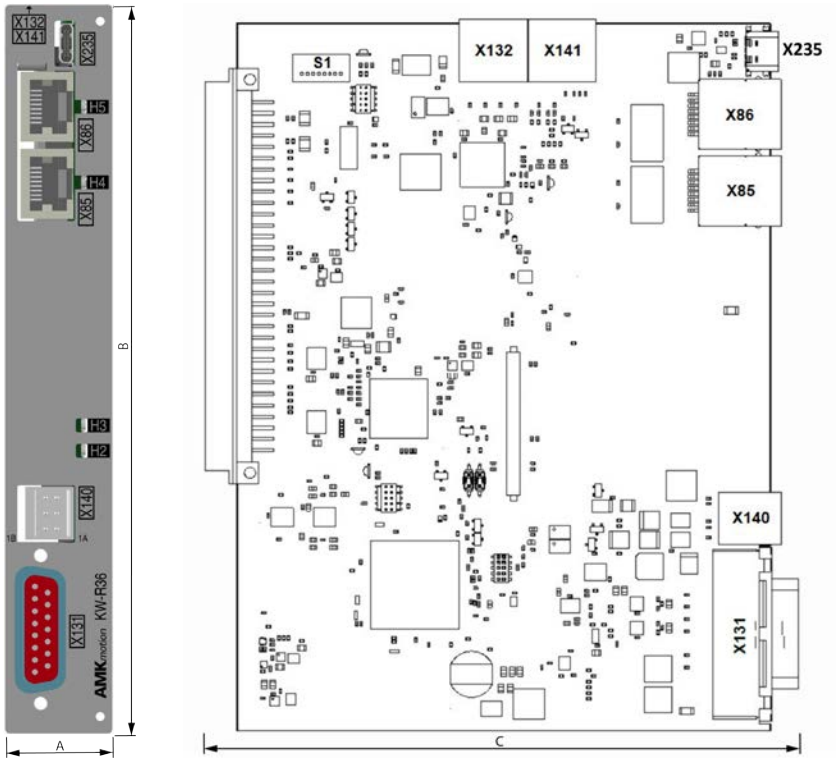
LED	Class	Status	Note
H2	Drive status	Green	System Ready (SBM)
		Green flashing	Drive under control (SBM and QRF)
		Orange flashing	Warning occurs during active controller enable
		Orange	Warning occurs during inactive controller enable / flash mode
		Red	Error with reaction depending on the error number
H3	Bus status (EtherCAT)	Off	Initialisation
		Green flashing	Pre-operational
		Green single flash	Safe-operational
		Green	Operational
		Red flashing	Configuration error
		Red flashing (1 time)	Error-dependent switch back to the Operational, Safe-operational, Pre-operational or Initialising states
H4	Ethernet bus (link status) [X85]	Off	No connection
		Green	Link connection
		Flashing	Link/Activity – connection and data exchange
H5	Ethernet bus (link status) [X86]	Off	No connection
		Green	Link connection
		Flashing	Link/Activity – connection and data exchange

blinking: T_{Ein} = 200 ms, T_{Aus} = 200 ms (2,5 Hz)

single flash: T_{Ein} = 200 ms, T_{Aus} = 1000 ms (0,83 Hz)

3.7 Dimensions

Shown is a KW-R36-000 controller card



A	23.8 mm
B	164 mm
C	138 mm

4 Ambient conditions

4.1 Transport

- Any AMKmotion products may only be transported in its original packaging.
- Shocks during transport must be prevented.
- Check the components for signs of transport damage after their arrival. Do not install and operate any damaged components.

4.2 Storage

Ambient temperature	-25 °C up to +75 °C
Maximum relative humidity	95 %
Maximum height	2000 m above NHN
Storage period	up to 1 year
Storage conditions	acc. to EN 61800-2
Storage	in the original packaging, clean, dry protected from • condensation • weather conditions • sudden temperature and humidity changes • salt fog, industrial fumes, corroding liquids • vermin and mildew

4.3 Operation

Ambient conditions	according to EN 61800-2
Ambient temperature	+5 °C - +40 °C
Relative humidity	5 % - 85 % no condensation
Altitude	Up to 2000 m over sea level (NHN). For altitudes between 1000 m and 2000 m, the rated data of the converters must be reduced by 1 % per 100 m. The controller cards can be used unrestricted up to 2000 m over sea level.
Shock resistance	15 g for 11 ms according to EN 60068-2-27
Vibration conditions	1 g at 10 - 150 Hz according to EN 60068-2-6

4.4 Disposal

Clarify with your local waste disposal company which materials and chemicals need to be separated and how to dispose of them. Observe the local regulations for disposal. Alternatively, you can send devices that you have received from us back to AMKmotion for proper disposal.

Examples of materials to be disposed of separately:

Components

- Electronic scrap, e. g., encoder electronics
- Iron scrap
- Aluminium
- Non-ferrous metal, e. g., motor windings
- Insulating materials

Chemicals

- Oils (disposal as hazardous waste, in acc. with the pertinent legislation; in Germany, the Waste Oil Ordinance (AltölV) applies)
- Grease
- Solvents

- Paint residue
- Coolant

5 Assembly / disassembly

5.1 For your safety

⚠ DANGER	
	**Danger to life from touching electrical connections!** Electrical terminals and connectors carry voltages that may cause death or serious injury upon contact. The terminals of the DC circuit capacitors (UZP, UZN) on the front panel of the device may retain hazardous DC voltage for up to 5 minutes after switching off the device! In OFF state, the LED indicators on the device front panels do not indicate the voltage status of the terminals. **Steps to prevent:** • Provide shock-hazard protection • Prior to any work on the device: Turn off the main switch to disconnect the power supply, and secure switch against being turned on again. • Wait at least 5 minutes for components to discharge. • Connection or disconnection of terminals is only allowed if they are free of voltage. • Measure the terminals voltage to verify that the terminal is de-energized. One suitable measuring point is the DC bus between the UZP and UZN terminals. • If the PE connection between the modules is open, avoid touching the casing since dangerous voltages may be present. During the proper operation of the KE/KW modules there is an earth leakage current of more than 3.5 mA. In this case, the standard requires that the devices be firmly connected to PE. The PE conductor must have a cross section of at least 10 mm^2. • Do not connect, disconnect and/or install the electrical lines (terminal cables, plugs, sockets) until they have been electrically de-energized.

5.2 Avoiding material damage

NOTICE	
Material Damage!	**Electronic components could be destroyed through static discharge!** Therefore touching of the electrical connections (e. g. signal and power supply cable or on the soldering and assembly side of the electronic assemblies e.g. option and controller cards) must be avoided. Otherwise you can be damaged the components when touching by static discharge. **Steps to prevent:** • Avoid touching electrical connections and contacts. • During handling the electronic component discharge yourself by touching PE. • Pay attention to the ESD-notes (electrostatic discharge).

5.3 Disassemble the controller card

1. Remove all connectors on the front side of the controller card.
2. Loosen the collar screw below of the controller card.
3. Carefully pull the controller card out of the card slot.
4. Place the card only on a non-conducting, padded surface.

5.4 Installing the controller card

1. Carefully insert the controller card into the card slot and guide rail.
2. Slide the card(s) into the device until the controller card is plugged in securely into the connector.
3. Make sure the front panel of the controller card rest on the device casing.
4. Fasten the controller card with the 2 collar screws.
5. You can assign the connections of the controller card now.

The controller card needs to be parameterized on new devices or after an exchange according to the application.

6 Electrical connections

6.1 [X85/X86] real-time Ethernet

Description

The interface is constructed as a real-time Ethernet interface and supports the following protocols:

- EtherCAT SoE (servo drive profile over EtherCAT (SoE) according to IEC 61800-7-300)
- EtherCAT EoE (Ethernet over EtherCAT)
  Access to parameters - routing - through a controller
- EtherCAT FoE (File Access over EtherCAT)

X85: Connection master or previous node

X86: Connection next node (X85)

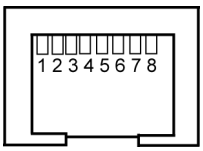
Technical data

- 100BASE-T 100 Mbit/s Ethernet standard
- Data frame and assignment of the RJ45 socket acc. to IEEE802.3
- Maximum line length: 50 m (industrial environment)

Design

Type	Poles	Class
RJ45	8	Socket

Assignment

[X85] / [X86]	Connection	Signal	Description
front view, device side 	1	Tx+	Transmit data +
	2	Tx-	Transmit data -
	3	Rx+	Receive data +
	4	-	Reserved
	5	-	Reserved
	6	Rx-	Receive data -
	7	-	Reserved
	8	-	Reserved

Connection

Cable	Patch cable of the category min. CAT5, shielded
Shield connection	Both sides
Cable assembly	RJ45 connector, prefabricated cables: See 'Ethernet cable' on page 37.

6.2 [X130] resolver (only KW-R34)

Description

This connection supports following encoder types: R

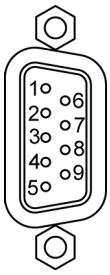
Technical data

- Maximum encoder line length: 100 m

Design

Type	Poles	Class
D-SUB	9	Socket

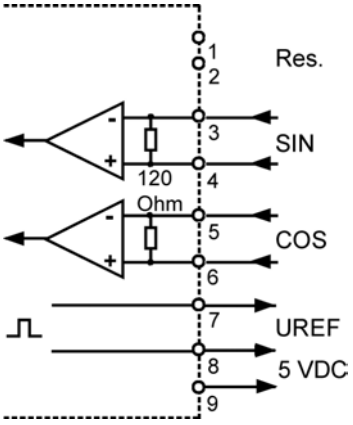
Assignment

[X130]	Connection	Signal
front view, device side 	1	-
	2	-
	3	+SIN
	4	-SIN
	5	+COS
	6	-COS
	7	+UREF
	8	-UREF
	9	

Connection

Cable	4 x 2 x 0.25 mm^2 twisted pair + 4 x 0.5 mm^2 shielded
Shield connection	Shield on both sides
Cable assembly	D-SUB connector 9-pin with metalized housing
Note	The shield of the cable has to be grounded by the screw connection in the plug housing on the motor side. The shield mesh is everted over the terminal insert. After screwing together, the shield is placed over the contact spring and the plug housing on the mass.

Controller input circuit



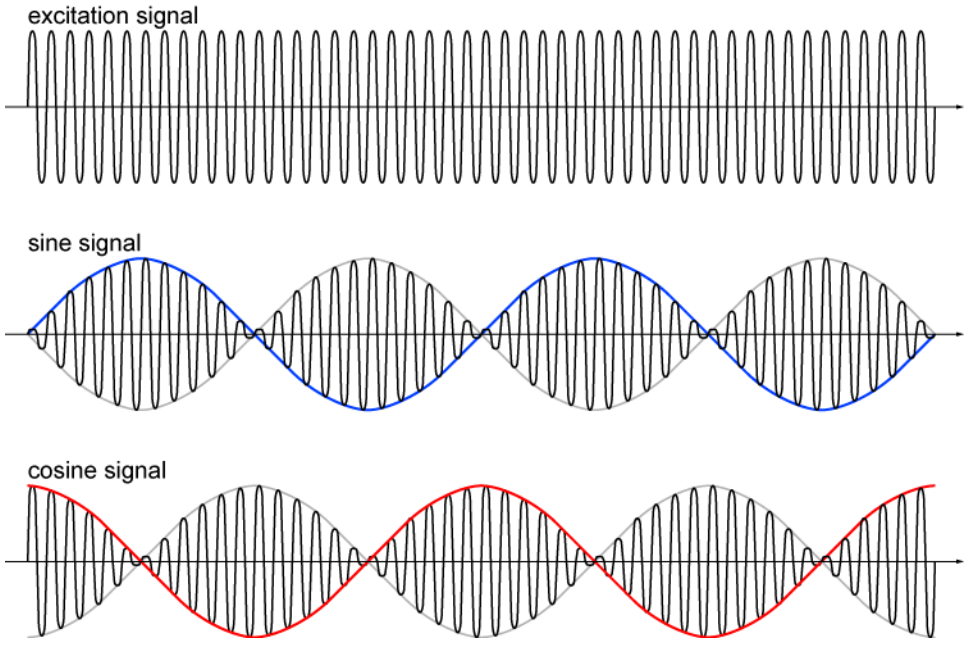
Requirements to the encoder

Encoder evaluation according ID32953		R-encoder
Data	**Units**	**Resolver**
Excitation signal		
Primary voltage	**VDC**	6 ±8 %
Input current without load	**mA**	max. 75
Frequency [kHz]	**kHz**	8
Output signals		
Transmission ratio		0.5 ±5 %
Number of pole pairs 1)		1
Output voltage	**V_{SS}**	1 - 1.8

1) Resolvers / Hall encoders with one pole pair are exclusively permitted!

Encoder signal

Resolver



Encoder signal evaluation

In ID32953 'Encoder type' is defined how to evaluate the incoming encoder signals.

6.3 [X131] sine encoder

Description

This interface supports the following encoder types:
E, F, H, I, P, Q, S, T, U, V, Y (Y only KW-R36)

Technical data

- The maximum input frequency is 200 kHz
- Input signals according to RS485 specification
- Encoder line length:

Encoder designation		**ERN 1380 ERN 1381**	**ECN 1113 ECN 1313 EQN 1125 EQN 1325**	**ECN 113*)**	**ECI 119 ECI 1118 ECI 1319 EQI 1130 EQI 1331**	**SKS 36 SRS 50 SKM 36 SRM 50**	**SEK 37 SEL 37**	**EKS 36 EFS 50 EKM 36 EFM 50**
AMKmotion Encoder designation	**H**	**I**	**E / F**		**P / Q**	**S / T**	**U / V**	**Y**
max. Encoder line length [m]	100	100	100 KW-R35: 25	25	100 KW-R35: 25	100	100	100 at AWG 22 30 at AWG 26

*) The encoder ECN113 does not have a extended voltage range and can therefore only be employed with line lengths up to a maximum of 25 m. The encoder is built into the following motors:

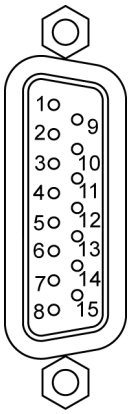
- SKT7-55-20-EBW-5200-DB-B9 (Teile-Nr.: A2405ED)

The above mentioned line lengths are valid only with the specified voltage ranges (see table requirements for the encoder) and the cable cross-sections recommended by AMKmotion (see table connection, line cable).

Design

Type	Poles	Class
D-SUB	15	Socket

Assignment

[X131]	Connection	H-encoder	I-encoder	E- / F-encoder	P- / Q-encoder	S- / T-, U- / V-encoder	Y-encoder
front view, device side 	1		-REF	-	-	-	-
	2		+REF	-	-	-	-
	3	-COS	-COS	-COS	-	-COS	-
	4	+COS	+COS	+COS	-	+COS	-
	5	-SIN	-SIN	-SIN	-	-SIN	-
	6	+SIN	+SIN	+SIN	-	+SIN	-
	7	5 VDC[1)]	5 VDC[1)]	5 VDC[1)]	5 VDC[1)]	-	-
	8	GND	GND	GND	GND	GND	-
	9	-	-	-EN_DAT	-EN_DAT	-RS485	-
	10	-	-	+EN_DAT	+EN_DAT	+RS485	-
	11	-	-	-EN_CLK	-EN_CLK	-	-
	12	-	-	+EN_CLK	+EN_CLK	-	-
	13	-	-	5 VDC[1)]	5 VDC[1)]	-	-
	14	GND	GND	GND	GND	GND	-DSL [3)]
	15	-	-	-	-	9 VDC [3)]	+DSL [3)]

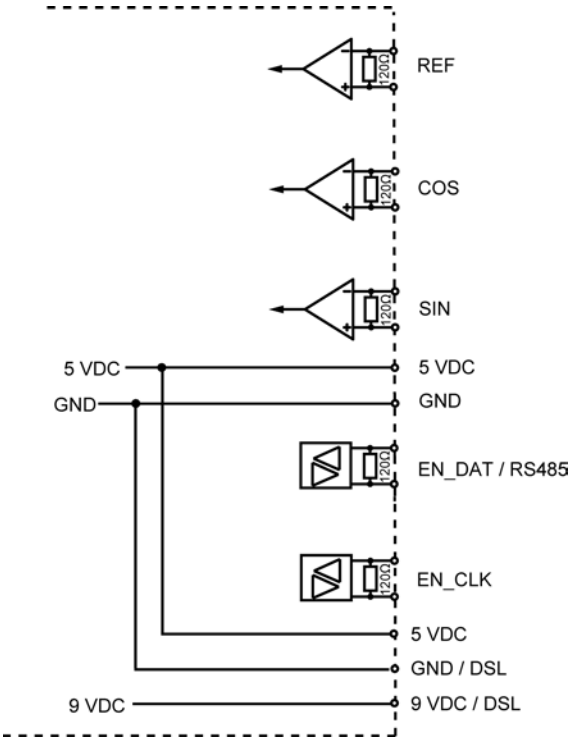
1) 5 VDC ±5 % max. 350 mA

3) 9 VDC ±15 % at load, max. 400 mA, short-circuit-proofed

Connection

	E-/ F-/ H-/ I-/P-/ Q-/ S-/ T-/ U-/ V-encoder	Y-encoder
Cable	E- / F- / P- / Q- encoder: 4 x 2 x 0.25 mm^2twisted pair, + 4 x 0.5 mm^2 shielded H-/ I-/ S-/ T-/ U-/ V-encoder: 4 x 2 x 0,5 mm^2 twisted pair shielded	Hybrid cable DSL: twisted pair, shielded 4 x 1,5 mm^2+(2 x 0,75 mm^2)+(2 x AWG22 or AWG26) 4 x 0,5 mm^2+(2 x 0,75 mm^2)+(2 x AWG22 or AWG26) e. g. HELUKABEL and Tecni
Shield connection	Shielded on both sides	Shielded on both sides
Cable assembly	D-SUB connector 15-pin with metallized casing Assembly instruction: See 'Assemble cable with D-SUB connector' on page 33. Prefabricated cables: Siehe Encoder cable auf Seite 37.	
Note	The shield of the cable has to be grounded by the screw connection in the plug housing on the motor side. The shield mesh is everted over the terminal insert. After screwing together, the shield is placed over the contact spring and the plug housing on the mass. The sensor housing is mounted insulated on the motor.	

Controller input circuit



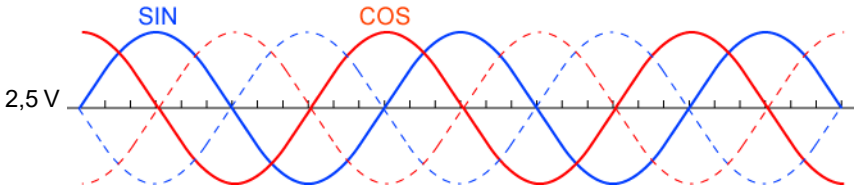
Requirements for the encoder

Encoder evaluation in accordance with ID32953		H-encoder	I-encoder	E-/ F-encoder	S-/ T-, U- / V-encoder	P-/ Q-encoder	Y-encoder
Data		**Hall-sensor**	**Sine encoder**	**EnDat 2.1**	**Hiperface**	**EnDat 2.2 light (digital) 3)**	**Hiperface DSL**
Voltage supply to the encoder							
Input voltage	**VDC**	5 ±5 % 1)	5 ±5 % 1)	5 ±5% 1)	9 ±15% 2)	5 ±5% 1)	9 VDC ±15% 4)
Output signals of the analog tracks							
Output voltage	**V_{SS}**	0.6 - 1.1	0.6 - 1.1			-	-
Offset	**V**	2.5 ±0.5	2.5 ±0.5			-	-
Output signal of the homing track							
Resting value	**mV**	200	200	-	-	-	-
Signal width	**° el.**	90 ... 270	90 ... 270	-	-	-	-

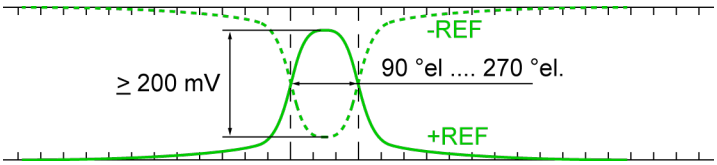
1) 5 VDC ±5 % max. 350 mA
2) 9 VDC ±15 % at load; max. 400 mA, 12 VDC ±20 % in idle
3) EnDat 2.2 light means, that the encoder supports EnDat 2.2, which is used only with the commands of EnDat 2.1 from the AMK controller.
4) 9 VDC ±15 % at load, max. 400 mA, short-circuit-proofed

Encoder signal

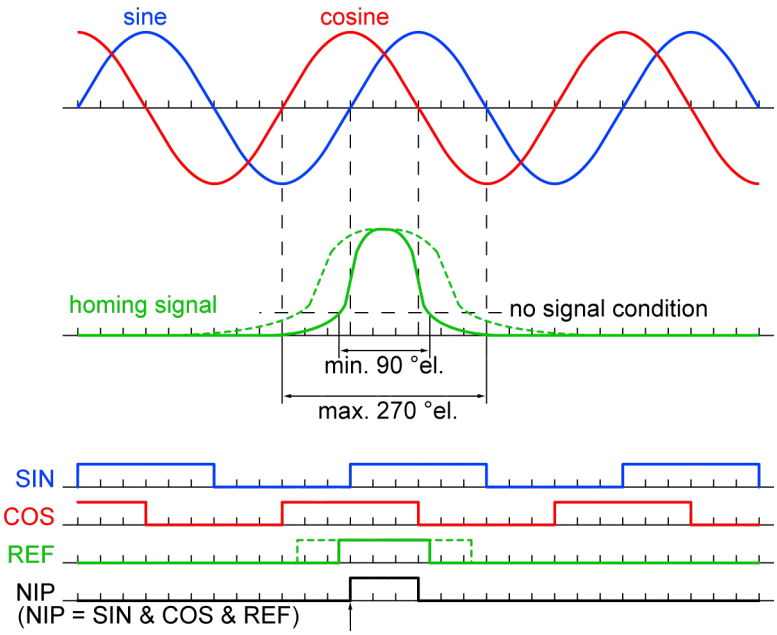
Analog tracks



Homing signal



To receive a unique signal, the homing signals (+REF and -REF) must overlap by at least 200 mV. The overlap range must be at least 90 °el. and maximum 270 °el. long.

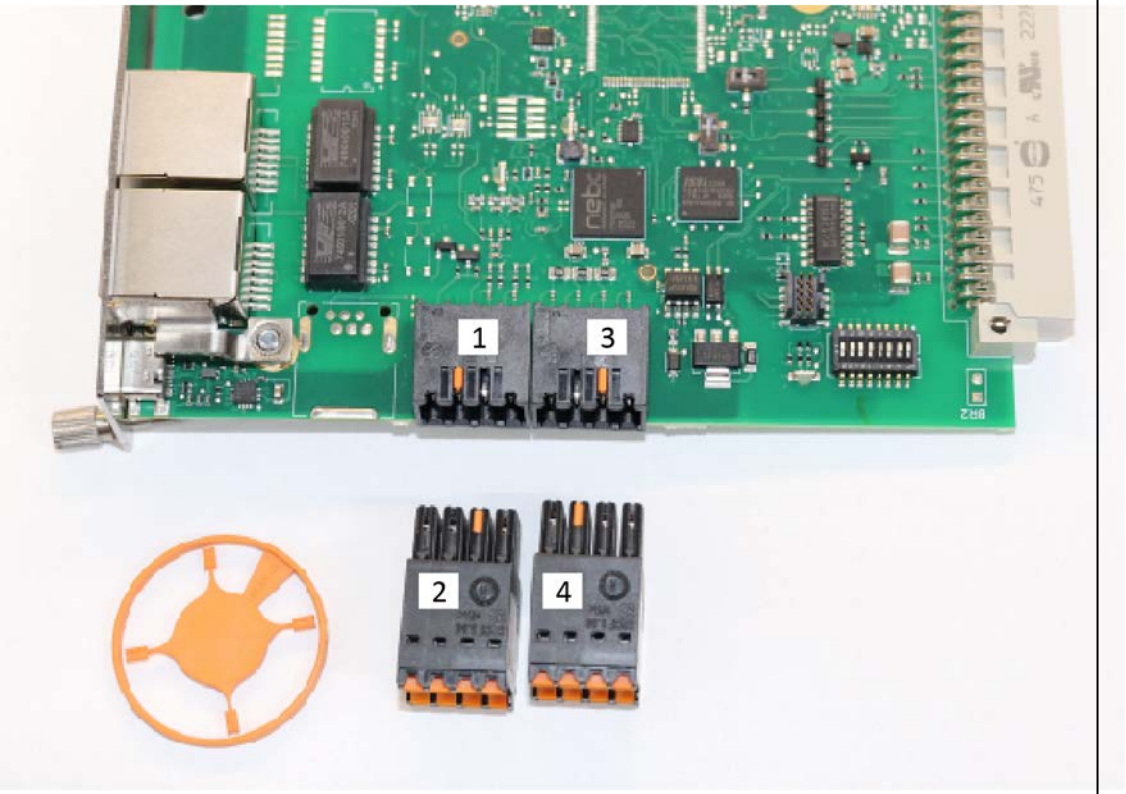


The zero pulse NIP is determined in the controller. A logic AND link of SIN, COS and REF results in the NIP signal. The positive edge (for right-turning motor) is evaluated for exact determination of the zero pulse.

Encoder signal evaluation

In ID32953 'Encoder type' is defined how to evaluate the incoming encoder signals.

6.4 [X132] pulse encoder

NOTICE	
Material Damage!	**Material damage!** A hardware defect will occur if the connections X141 and X132 are exchanged. **Steps to prevent:** • Observe the connector coding.  Legend for the picture: 1 Connection X141, pins, coding on position 2 2 Connector for connection X141, socket, coding on position 3 3 Connection X132, pins, coding on position 3 4 Connector for connection X132, socket, coding on position 2

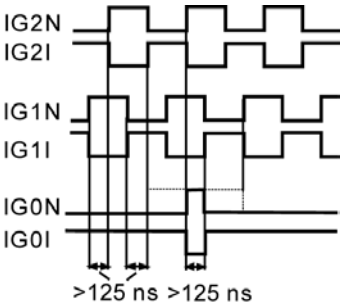
Description

The potential-bound pulse encoder interface can be used as an input or as a software pulse transmission (SIWL).

The difference inputs IG1N, IG1I, IG2N, IG2I of the square-wave pulse input make the position feedback value detection possible by an external position sensor with square-wave pulse output. The external position feedback value system needs to be equipped with difference outputs (line drivers acc. to RS422).

The following signal form is the only one supported as pulse encoder input:

2 square-wave pulses with a 90° offset



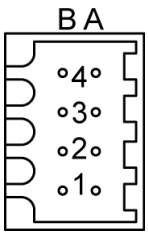
Technical data

- Square-wave signal (Input and Output) acc. to RS422 interface.
- The maximum input frequency is 4 MHz.
- The maximum output frequency is 2 MHz.
- Incoming encoder signals are evaluated 4 times (edge evaluation).
- Input impedance 120 ohm (max. input current ≤ 20mA).

Design

Type	Poles	Class
Connector with spring connection	8	2-row pin strip, coded to position 3

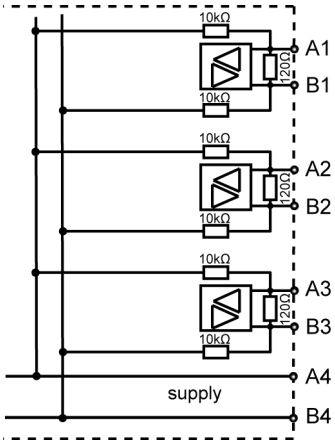
Assignment

[X132]	Connection	Signal
front view, device side 	A1	IG0I
	B1	IG0N
	A2	IG1I
	B2	IG1N
	A3	IG2I
	B3	IG2N
	A4	5 VDC ± 5% max. 350 mA
	B4	GND
	Shield	PE

Connection

Cable	4 x 2 x 0.8 mm² (max.) / AWG 18, twisted pair, shielded
Shield connection	Shield on on one side on the module housing
Cable assembly	Weidmüller socket connector, 8-poles, coded to position 2 Not included in the delivery! See 'Socket connector and coding profil for X132 and X141' on page 37.

Input circuit



6.5 [X140] binary inputs and outputs (BI/O)

Description

The controller card supports 3 multifunctional BI/O (BI/O1 to 3) at terminal X140. Each BI/O can be used either as binary input or binary output. Inputs and outputs can be mixed up, e.g. BI/O1 and BI/O2 are inputs, BI/O3 is configured as output.

If the binary inputs not used, then must the open binary inputs be parametrized with 0.

Preassignment of the binary inputs and outputs

BI/O	Pin	Port	Parameter	Object	Code	Meaning
BI/O1	BI1	3 bit 0	ID32978	0x2258/1	32904	RF (Controller enable)
	BO1	3 bit 0	ID32865	0x2238/1	0	no function assigned
BI/O2	BI2	3 bit 1	ID32979	0x2258/2	0	no function assigned
	BO2	3 bit 1	ID32866	0x2238/2	33029	SBM (System Ready Message)
BI/O3	BI3	3 bit 2	ID32980	0x2258/3	0	no function assigned
	BO3	3 bit 2	ID32867	0x2238/2	33052	Control of the motor holding brake

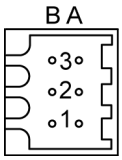
Technical data

- Standard IEC 61131-2 type 3 digital inputs:
  Rated input voltage 0-30 VDC, maximal input current at 30 VDC = 15 mA
  Level 0-5 VDC: low, 11-30 VDC: high
  Electrically delay of T_{on} = 3-8 µs, T_{off} = 48-57 µs
- Standard IEC 61131-2 digital outputs:
  Rated output voltage 24 VDC, rated output current maximal 0.5 A, short-circuit safe, electrically isolated, electrically delay of T_{on} 8-20 µs, T_{off} = 50-55 µs at 200 mA load

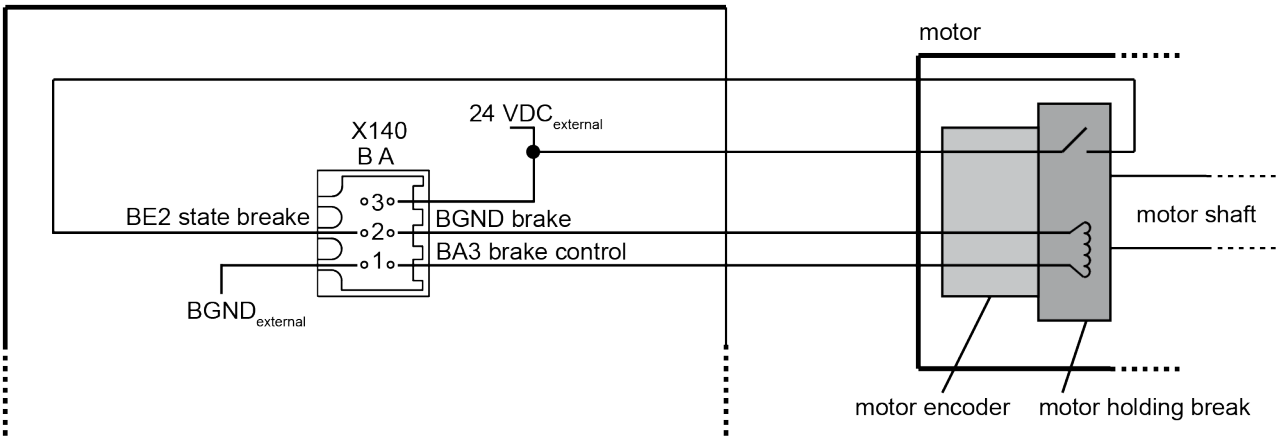
Design

Type	Poles	Class
Connector with spring connection	6	2-row pin strip

Assignment

[X140]	Connection	Signal	Description
front view, device side 	1A	BI/O3	Digital input 3, 24 VDC ± 15 %, max. 10 mA, potential-isolated
			Digital output 3, 24 VDC, 2.5 A [1], potential-isolated, permanent-short-circuit proofed, e.g. to control a motor holding brake [2].
	1B	BGND	Reference potential 0 V for supply of the digital inputs and outputs
	2A	BGND	Reference potential 0 V for supply of the digital inputs and outputs
	2B	BI/O2	Digital input 2, 24 VDC ± 15 %, max. 10 mA, potential-isolated
			Digital output 2, 24 VDC, 100 mA, potential-isolated, permanent-short-circuit proofed
	3A	BVCC	Supply of the digital outputs 24 VDC ± 15 %
	3B	BI/O1	Digital input 1, 24 VDC ± 15 %, max. 10 mA, potential separated, e.g. RF
			Digital output 1, 24 VDC, 100 mA, potential separated, permanent-short-circuit proofed

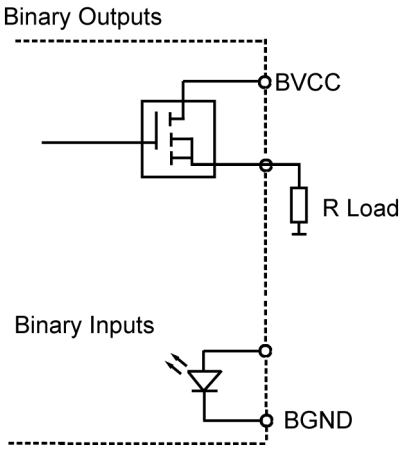
1) Motor holding brakes with higher power requirements, must be controlled with an external auxiliary relay.
2) Example wiring motor holding brake with acknowledgment. Functional description see: FKT_Ansteuerung_der_Motorhaltebremse_en



Connection

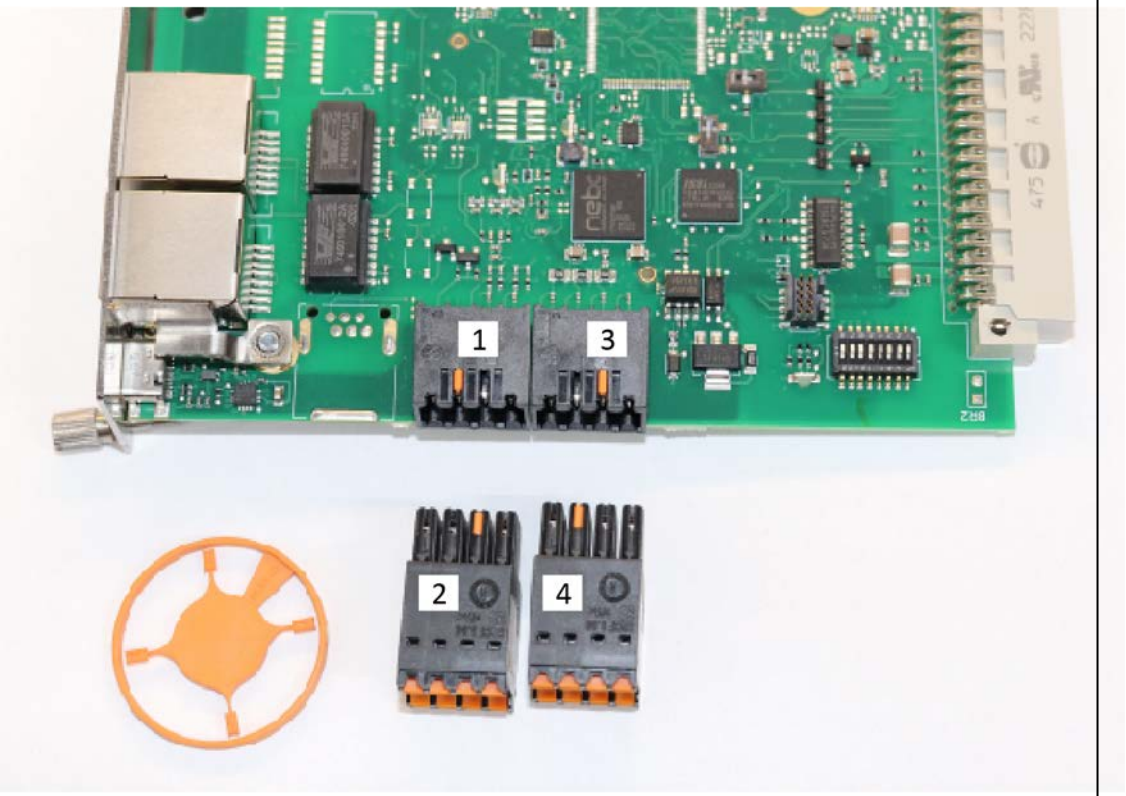
Cable	6 x 1,5 mm² (max.) /AWG 16, shielded
Shield connection	Cable length up to 30 m unshielded, from 30 m shielded, place the shield on both sides of the PE/chassis
Cable assembly	Weidmüller socket connector, 6-poles (part no. 208440) Included in the scope of delivery. clamping range: 0.14 mm^2 - 1.5 mm^2 / AWG 25 - AWG 16

Circuit principle



6.6 [X141] binary inputs and outputs and analog inputs

Note: The analog inputs are currently not in use.

NOTICE	
Material Damage!	**Material damage!** A hardware defect will occur if the connections X141 and X132 are exchanged. **Steps to prevent:** • Observe the connector coding.  Legend for the picture: 1 Connection X141, pins, coding on position 2 2 Connector for connection X141, socket, coding on position 3 3 Connection X132, pins, coding on position 3 4 Connector for connection X132, socket, coding on position 2

Description

Preassignment of the binary inputs and outputs

Input / output	Port	Parameter	Code	Meaning
BI3	3 bit 2	ID32980	32905	NK (Cam signal)
BO1	3 bit 0	ID32865	33031	QRF (Acknowledgement controller enable)
BO2	3 bit 1	ID32866	33029	SBM (System ready message)

Technical data

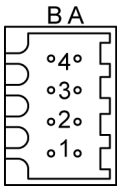
- Standard IEC 61131-2 type 3 digital inputs:
  Rated input voltage 0-30 VDC, maximal input current at 30 VDC = 15 mA
  Level 0-5 VDC: low, 11-30 VDC: high
  Electrically delay of T_{on} = 3-8 µs, T_{off} = 48-57 µs
- Standard IEC 61131-2 digital outputs:
  Rated output voltage 24 VDC, rated output current maximal 0.5 A, short-circuit safe, electrically isolated, electrically delay of T_{on} 8-20 µs, T_{off} = 50-55 µs at 200 mA load
- Analog inputs
  - Differential inputs, potential-bound
  - Input voltage: ±10 VDC (maximum 12VDC)
  - Resolution: 12 bit for ±10 VDC
  - Scanning cycle 250 µs

The GND potential of the setpoint source may deviate in relation to the PE by a maximum of ±10 VDC.

Design

Type	Poles	Class
Connector with spring connection	8	2-row pin strip, coded to position 2

Assignment

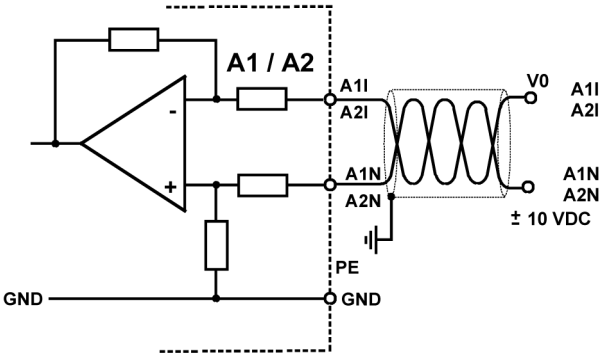
[X141]	Connection	Signal	Description
front view, device side 	1A	BE3	Binary input 3, 24 VDC ± 15%, max. 10 mA, potential separated, e.g. probe input
	1B	BGND	Reference potential
	2A	BA1	Binary output 1, 24 VDC, 100 mA, potential separated, permanently short-circuit safe
	2B	BA2	Binary output 2, 24 VDC, 100 mA, potential separated, permanently short-circuit safe
	3A	A1N	Analog channel 1 not inverted, ±10 VDC, max. 10 mA
	3B	A2N	Analog channel 2 not inverted, ±10 VDC, max. 10 mA
	4A	A1I	Analog channel 1 inverted, ±10 VDC, max. 10 mA
	4B	A2I	Analog channel 2 inverted, ±10 VDC, max. 10 mA

Connection:

Cable	8 x 0.8 mm² (max.)/ AWG 18, shielded
Shield connection	Shield on on one side on the module housing
Cable assembly	Weidmüller socket connector, 8-pin, coded to position 3 Not included in the delivery! See 'Socket connector and coding profil for X132 and X141' on page 37.

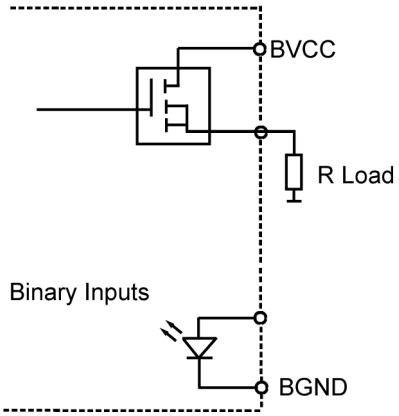
Circuit principle:

Analog inputs



Binary inputs and outputs

Binary Outputs



6.7 [X235] USB

Description

Via the USB-C interface, the controller card can be connected to a PC and the software AIPEX 5. The software supports startup and diagnosis and firmware update.

Design

Type	Poles	Class
USB -C		Socket

Assignment

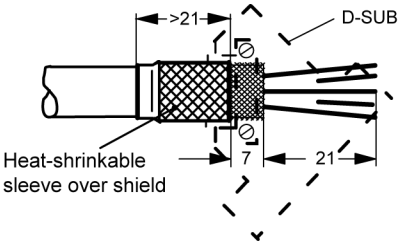
[X235]	Connection	Signal	Description
front view, device side 	A1	GND	Reference potential
	A2	-	n.a.
	A3	-	n.a.
	A4	5 VDC	Voltage
	A5	CC1	Configuration channel 1
	A6	Dp1	USB 2.0 diff. pair position 1, positive
	A7	Dn1	USB 2.0 diff. pair position 1, negative
	A8	SBU1	Sideband usage 1 (not used)
	A9	5 VDC	Voltage
	A10	-	n.a.
	A11	-	n.a.
	A12	GND	Reference potential
	B1	GND	Reference potential
	B2	-	n.a.
	B3	-	n.a.
	B4	5 VDC	Voltage
	B5	CC2	Configuration channel 2
	B6	Dp2	USB 2.0 diff. pair position 2, positive
	B7	Dn2	USB 2.0 diff. pair position 2, negative
	B8	SBU2	Sideband usage 2 (not used)
	B9	5 VDC	Voltage
	B10	-	n.a.
	B11	-	n.a.
	B12	GND	Reference potential

Connection

Cable	0.08 mm² / AWG 28 Data+ and Data- twisted pair, shielded
Shield connection	Attached on both sides
Cable assembly	Prefabricated cables: See 'Cable for PC connection' on page 1.
Note	Maximum 3 m length permitted for USB cable! With active USB repeater, longer cable lengths are possible.

6.8 Assemble cable with D-SUB connector

1. Metallic D-SUB casing with a side cable output have to be used. The cable shield is earthed through the D-SUB casing on the KE/KW module.
2. Remove outer cable insulation (to about 21 mm for 9-pin D-SUB connector).
3. Evert cable shield over the outer insulation sheath.
4. Fix and insulate the shield with heat-shrinkable sleeve so that a blank shielding edge of about 7 mm width remains.
5. Connect the plug.
6. Relieve the cable with strain relief clamp and securely connect the everted blank shield edge with the metallic plug casing.
7. After plugging the corresponding plug pedestal into the casing, the D-SUB connector has to be screwed onto the pedestal.
8. If shielded cables have to be interrupted by a plug connector, a continuing shield connection has to be ensured by placing the shield onto the connector casing. The shield may not lead over connector contacts.
9. Cables leading into the casing have to be secured with grounding cable screw connections with which the cable shield is directly attached to the casing of the screwed cable gland.



7 Startup and operation

The startup includes application specific parameter setting and optimization of the drives and is supported by AIPEX 5. AIPEX 5 can be connected to the drives:

- direct connection via Ethernet from PC to the controller card interface X85
- USB interface X235
- via central controllers (EtherCAT SoE or CoE (in preparation))
    - B-Fortis CC-Slim, company Berghof (AMKmotion part-no. E1309)
    - E1, company Automata (AMKmotion part-no. E1310)
    - S1, company Automata (AMKmotion part-no. E1311)

7.1 For your safety

⚠ DANGER	
	**Motor shaft movement (rotating parts)!** Hair, body parts and clothes can be captured and wrapped by rotating parts and people result suffer fatal injuries. Hazardous motor movement occurs when the motor shaft moves in an uncontrolled or unintentional manner. Even the intended drive movement may be hazardous, if persons remain inside the machine's range of movement. **Uncontrolled motor shaft movement** occurs when the motor is no longer controllable. Depending on the type of machine, this may have lethal consequences. Possible causes include the following: • Faulty wiring, e.g., faulty phase sequence while connecting motor • Faulty encoder or components • Faulty motor parameters • Software error • Faulty motor commutation **Unintended motor shaft movement** is caused by errors in the motor control. Depending on the type of machine, this may have lethal consequences. Possible causes include the following: • Operator errors • Controller or application program faults • Faulty setpoint specification and scaling • Improper operating mode The monitoring devices in the drive system are capable of detecting various fault states. Their purpose is to reduce the drive speed to zero in a controlled manner before switching off the power supply. However, the monitoring devices by themselves are not sufficient to completely and reliably prevent uncontrolled movement. Uncontrolled movement cannot be prevented completely, even if it occurs only for a brief period of time before a monitoring device trips and shuts down the drive or switch off power supply. **Steps to prevent:** • Never allow personnel to remain in the vicinity of the machine while it is operating. • Always ensure that the is fully de-energized before commencing work on the machine or within the machine's vicinity. • Install an emergency off / stop switch. • Only use modules with the optional Output Stage Release feature according to EN ISO 13849-1 Cat. 4, PL e. • All suspended axles must be mechanically secured against falling down. • Check the limit values for torque, speed, and position, as well as the acceleration and deceleration ramps. • Specify the maximum permissible process speed and set ID113 accordingly. (ID113 = max. process speed/1,25)

7.2 Avoiding material damage

NOTICE	
Material Damage!	**Material damages due to incorrect parameterization!** The drive configuration is in the responsibility of the machine manufacturer. Entering incorrect parameters can lead to malfunctions and thus to errors and damage to the system! **Steps to prevent:** • Only personnel trained by AMKmotion may configure the drives.

7.3 Drive addressing

Within a machine, the higher-ranking controller acts as fieldbus master. The subordinated drives are slaves.

The addressing of the drives can either be done automatically by the master, or the address can be set by dip switch (currently not supported yet) or via parameter.

Fieldbus	Addressing possible by ...			Range
	Bus master (automatic)	DIP switch S1	Parameter	
EtherCAT Slave (SoE)	■	1)	ID34023	1 ≤ ID34023 ≤ 65535

1) Note: The DIP switch S1 is currently not supported and cannot yet be used for addressing

On delivery ex works AMKmotion, the DIP switch S1 as well as the parameter ID34023 'BUS address participant' are set to 0 in all instances.
In this case the EtherCAT master will assign an address automatically to each bus participant in order to start communication between master and slaves.

The slave addresses correspond to the physical slave positions in the EtherCAT bus.

Automatic addressed devices can not be marked as 'optional' (optional bus participant) in the AIPEX 5 software.

7.3.1 EtherCAT: Addressing by parameter ID34023 'BUS address participant'

If the DIP switch S1 is set to 0, the address can be set by parameter ID34023 'BUS address participant'.
The setting of the parameter can be done by means of software AIPEX 5 via the EtherCAT master (fixed address via ID34023) without connecting point-to-point to each single device.

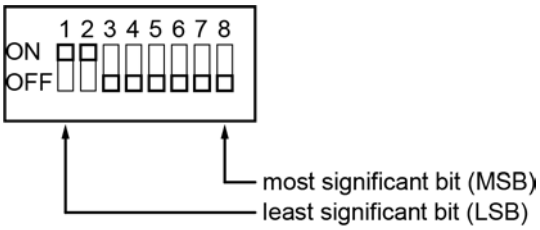
7.3.2 EtherCAT: Addressing by DIP switch S1

in preparation, not yet supported!

NOTICE	
Material Damage!	On the open unit a dry, non-conductive pollution may only occur. The penetrating pollution into the open housing may not affect the functionality of the device (EN 61800-5-1, pollution degree 1). Ensure that no objects fall into the housing when working on the open housing. Foreign objects can cause short-circuits during operation and thereby destroy the device.

The address setting by DIP switch is prior to addresses via parameter ID34023 'BUS address participant'.

Address range up to 250



Example: address = 3

If you change a fieldbus participant which is addressed by DIP switch, make sure that the previous address is set correctly to the new device.

8 Accessories and options

8.1 Encoder cable

Designation	Part no.	Description
AG-GD15S+T-KW...M	101612	S+T-encoder, connector straight
AG-GD15E+F-KW...M	101613	E+F+P+Q-encoder, connector straight
AG-WD15S+T-KW...M	101614	S+T-encoder, angular connector
AG-WD15E+F-KW...M	101615	E+F+P+Q-encoder, angular connector
AG-GD15I	101763	I-encoder, connector straight
AG-GD9R	101761	R-encoder, connector straight
AG-WD15I	101764	I-encoder, angular connector
AG-WD9R	101762	R-encoder, angular connector
Hybrid cable Q1,5 DSL	403549	Y-encoder, connector straight M23 8-poles, power lead 1.5 mm^2 1)
Hybrid cable Q0,5 DSL	403550	Y-encoder, connector straight M15 8-poles, power lead 0.5 mm^2 1)

8.2 Socket connector and coding profil for X132 and X141

Designation	Part no.	Description
Weidmüller socket connector, 8 poles	208441	Weidmüller socket connector, 8 poles for connector X132 and X141 (Weidmüller art. no. 1277480000)
Coding profil	202901	Coding set for socket connector (part no. 208441) for the connectors X132 and X141 (Weidmüller art. no. 1849730000)

8.3 Ethernet cable

Designation	Part no.	Description
Cable RJ45 CAT5e PUR 0.20 m	202665	0.20 m length with straight plug, snap in
Cable RJ45 CAT5e PUR 0.30 m	202666	0.30 m length with straight plug, snap in
Cable RJ45 CAT5e PUR 0.40 m	202667	0.40 m length with straight plug, snap in
Cable RJ45 CAT5e PUR 1.00 m	202668	1.00 m length with straight plug, snap in
Cable RJ45 CAT5e PUR 2.00 m	202669	2.00 m length with straight plug, snap in
Cable RJ45 CAT5e PUR 5.00 m	202670	5.00 m length with straight plug, snap in
Cable RJ45 CAT5e PUR 10.00 m	202671	10.00 m length with straight plug, snap in

8.4 Cable for PC connection

Designation	Part no.	Description
Cable USB-A / USB-C (2m)	208387	USB cable to connect the controller card (X235) to a PC

8.5 Software

Designation	Part no.	Description
Software AIPEX 5	Download from AMKmotion Homepage	Web-based engineering tool AIPEX 5

9 Service

9.1 Controller card exchange

When exchange the controller card, the application specific data (parameters) have to be transferred to the new controller card.

With AIPEX 5 the parameter can be read out of a controller card, can be saved on the PC and can be transferred from PC to the new controller card.

9.2 Diagnostics

Diagnostic messages can be error messages or warning messages and are generated automatically. Existing diagnostic messages are displayed by the LEDs on the front of the controller card. In case of warning messages, the drive remains in regulated operation.

In case of malfunctions, the SBM is withdrawn and an attempt is made automatically to brake the drive to a standstill and to withdraw the controller enable afterwards. If no braking can be carried out successfully, the power output stage enable is withdrawn automatically and the drive runs out.

If an error causes a coasting motor (e. g. EF is withdrawn while RF is active or encoder error) the brake output will be set and a potential motor holding brake engages.

In order to avoid brake wear, the application has to ensure in cases of errors with previous warning that the drive is braked (e.g. RF controller enable withdrawn) before EF is withdrawn.

Diagnostic messages can be read out with AIPEX 5 or with the higher-level controller via the fieldbus.
See document Diagnostic messages, Part no. 25786.

9.3 Loading firmware

NOTICE	
	Firmware Download Due to downloading a firmware, application specific parameter settings are overwritten and become invalid! **Steps to prevent:** • Before you download a new firmware, please make really sure that application specific data is saved as backup.

The controller card operates with a firmware that has been installed in the factory.
A new firmware can be loaded with AIPEX 5

Glossary

A

A
Outputs

AIPEX
AMKmotion startup and parameterizing software (PC software): Programming, parameterization, configuration, diagnosis, oscilloscope, status information

AWG
American Wire Gauge (Coding of wire diameter)

Ax
Output, binary outputs

AIPEX 5
Web-based and platform-independent engineering tool for configuration, parameterization, commissioning and diagnostics of AMKmotion products

B

BI/O
Digital input / output

BI
Binary input, digital input

BO
Binary output, digital output

C

Controller enable
The controller enable describes the energized state in which the drive is controlled depending on the set operating mode.

CoE
CAN application protocol over EtherCAT

D

Default
Factory setting

DSL
Digital Servo Link (Hiperface DSL encoder interface with single cable solution)

E

EF
Power output stage enable

EF2
Power output stage enable

E-encoder
Absolute encoder, singleturn, EnDAT 2.1 with additional sine and cosine track

EnDat 2.1
Motor encoder interface protocol of the company Heidenhain

EnDat 2.2
Motor encoder interface protocol of the company Heidenhain

EtherCAT
Real-time Ethernet bus

EoE
Ethernet over EtherCAT

F

FoE
File over EtherCAT

Firmware
System software, loaded factory by AMKmotion

F-encoder
Absolute encoder, multiturn, EnDAT 2.1 with additional sine and cosine track

H

Homing point
Zero position after homing cycle

Homing switch
Cam for homing cycle function

Hiperface DSL
Motor encoder interface protocol of the company Sick Stegmann

Hiperface
Motor encoder interface protocol of the company Sick Stegmann

I

I
Input, binary input, digital input

I/O
Input / output

I-encoder
Incremental encoder, optical encoder with sine and cosine track and zero pulse

Instance
Parameters, depending on the fieldbus, are instanced. For each bus, different values can be parameterized (bus depending participant address, transmission rate etc.). Field bus interfaces

and slots where field bus option cards can be installed are allocated to instances (see product documentation)

Ix
inputs, binary inputs, digital inputs

K

KW-Rxx
Controller card for installation into compact inverter

KE
Compact power supply with recovery

KE/KW
Modular drive system (contains compact power supply KE, compact inverter KW with controller card and applicable option card)

KW
Compact inverter

KWD
Compact double inverter to control two motors

M

MBX
Mailbox

N

NHN
Heights measured above the base height levelReference plane for heights over the sea level for Germany since 1992. The reference plane is located in Germany on the church in Wallenhorst.

NIP
Zero pulse of encoder, Homing signal

O

O
Output, binary output, digital output

Operational
In state operational, data are transferred cyclically via fieldbus

Ox
Outputs, binary outputs, digital outputs

P

Pre-operational
In pre-operational state, the controller can access the bus participants via the service channel. No cyclic data is exchanged.

PDK_xxxxxx_abcdefgh
Product documentation; xxxxxx - AMKmotion part no. , abcdefgh - name

P-encoder
Absolute encoder singleturn, EnDAT 2.2 light

Q

QRF
Acknowledgment controller enable; the drive is controlled in the activated operation mode

QUE
Acknowledgment DC bus on; shows that DC bus is loaded

Q-encoder
Absolute encoder multiturn, EnDAT 2.2 light

R

Real-time task
The AMKmotion real-time task owns a defined cycle time and is synchronized to the AMK controller cycle (ID2). Control units can synchronously sent setpoints to different bus participants. The jitter is less than 1 µs. Data up to 32 bit will be handled consistently.

Resolver
Absolute angle encoder singleturn (1 sine and cosine track per rotation)

RF
Command 'Controller enable'; the drive is energized and will be controlled depending on the selected operation mode. Controller enable can only be set if the device is error-free (SBM = TRUE) and acknowledgement DC bus on is set (QUE = TRUE).Acknowledgement controller enable (QRF) is set.

S

SoE
Servodrive Profile (SERCOS) over EtherCAT (Acc. to IEC 61800-7-300)

S-encoder
Absolute encoder, singleturn, RS485 Hiperface with sine and cosine track

SBM
System ready message; shows that the device is error-free In case of error. SBM will be reset

T

T-encoder
Absolute encoder, multiturn, RS485 Hiperface with sine and cosine track

U

U-encoder
Absolute encoder, singleturn, RS485 Hiperface with sine and cosine track

U/f
Voltage / frequency control (open loop)

UE
Command 'DC bus on' control signal to load the DC bus e.g. in KE. DC bus on can only be set if the device is error-free (SBM = TRUE). After the DC bus is loaded, the acknowledgement message QUE is set.

V/f
Voltage / frequency control (open loop)

V

V-encoder
Absolute encoder, multiturn, RS485 Hiperface with sine and cosine track

Y

Y-encoder
Absolute encoder, singleturn or multiturn, RS485 Hiperface DSL

Your opinion is important!

With our documentation we want to offer you the highest quality support in handling the AMKmotion products.
That is why we are now working on optimizing our documentation.
Your comments or suggestions are always of interest to us.
We would be grateful if you take a bit of time and answer our questions. Please return a copy of this page to us.

e-mail: Documentation@amk-motion.com

Thank you for your assistance.
Your AMKmotion documentation team

1. How would you rate the layout of our AMKmotion documentation?

   (1) very good (2) good (3) satisfactory (4) less than satisfactory (5) poor

2. Is the content structured well?

   (1) very good (2) good (3) moderate (4) hardly (5) not at all

3. How easy is it to understand the documentation?

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