

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Peripheral Equipment**

with type designation(s)
Bus Terminal Controller & Bus Coupler

Issued to
**Beckhoff Automation GmbH & Co. KG
Verl, Germany**

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Location classes:**Temperature D****Humidity B****Vibration B****EMC B****Enclosure Required protection according to the Rules shall be provided upon installation on board.**

Issued at **Hamburg** on **2020-04-08**

This Certificate is valid until **2025-04-07**.

for **DNV GL**

DNV GL local station: **Essen**

Approval Engineer: **Heinz Scheffler**

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Joannis Papanuskas
Head of Section

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Product description

Bus Terminal Controller

- BC3100: PROFIBUS Bus Terminal Controller 24 V DC, 64 Bus Terminals
- BC7300: Modbus Bus Terminal Controller 24 V DC, 64 Bus Terminals
- BC8000: RS485 Bus Terminal Controller 24 V DC, 64 Bus Terminals
- BC8100: RS232 Bus Terminal Controller 24 V DC, 64 Bus Terminals
- BC9000: Ethernet TCP/IP Bus Terminal Controller 24 V DC, 64 Bus Terminals
- BC9100: Ethernet TCP/IP Bus Terminal Controller 24 V DC, 64 Bus Terminals (with integrated 2-channel switch)
- BC9020: Ethernet TCP/IP Bus Terminal Controller 24 V DC, 64 Bus Terminals (255 with K-bus extension)
- BC9120: Ethernet TCP/IP Bus Terminal Controller 24 V DC, 64 Bus Terminals (255 with K-bus extension, with integrated 2-channel switch)

Bus Coupler

- BK3010: PROFIBUS Bus Coupler 24 V DC, 64 Bus Terminals, 1.5 Mbaud
- BK3100: PROFIBUS DP/FMS Bus Coupler 24 V DC, 64 Bus Terminals, 12 Mbaud
- BK3110: PROFIBUS Bus Coupler 24 V DC, 64 Bus Terminals, 12 Mbaud
- BK3120: PROFIBUS Bus Coupler 24 V DC, 64 Bus Terminals (255 with K-bus extension), 12 Mbaud
- BK5110: CANopen Bus Coupler 24 V DC, 64 Bus Terminals
- BK5120: CANopen Bus Coupler 24 V DC, 64 Bus Terminals (255 with K-bus extension)
- BK5210: DeviceNET Bus Coupler 24 V DC, 64 Bus Terminals
- BK5220: DeviceNET Bus Coupler 24 V DC, 64 Bus Terminals (255 with K-bus extension)
- BK7300: Modbus Bus Coupler 24 V DC, 64 Bus Terminals
- BK8000: RS485 Bus Coupler 24 V DC, 64 Bus Terminals
- BK8100: RS232 Bus Coupler 24 V DC, 64 Bus Terminals
- BK9000: Ethernet TCP/IP Bus Coupler 24 V DC, 64 Bus Terminals
- BK9050: Ethernet TCP/IP Bus Coupler 24 V DC, 64 Bus Terminals (255 with K-Bus extension)
- BK9100: Ethernet TCP/IP Bus Coupler 24 V DC, 64 Bus Terminals (with integrated 2-channel switch)
- BK9103: PROFINET Bus Coupler 24 V DC, 64 Bus Terminals (with integrated 2-channel switch)
- BK9105: EtherNet/IP Bus Coupler 24 V DC, 64 Bus Terminals (with integrated 2-channel switch)

Application/Limitation

Please observed the "Notes for operation of the Beckhoff Bus Terminal System in the Marine Sector (DNV GL), Version: 1.1, Date: 2020-02-03" regarding the required Surge filter.

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV GL, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV GL rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force.

Job Id: **262.1-032992-1**
Certificate No: **TAA00002M6**

Software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV GL for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Type Approval documentation

Test Reports: TAA00002M6-List of Test Reports, Rev. 1.0
Documents: TAA00002M6-List of Documents, Rev. 1.0

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

Marking of product

The products to be marked with:

- Model name
- Manufacturer name
- Serial number

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Peripheral Equipment**

with type designation(s)

Bus Terminals Digital Input, Digital Output, Analog Input, Analog Output

Issued to

**Beckhoff Automation GmbH & Co. KG
Verl, Germany**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Location classes:****Temperature D****Humidity B****Vibration B****EMC A*/B****Enclosure Required protection according to the Rules shall be provided upon installation on board.***** see Application/Limitation**Issued at **Hamburg** on **2020-04-08**This Certificate is valid until **2025-04-07**.for **DNV GL**DNV GL local station: **Essen**Approval Engineer: **Heinz Scheffler**

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Joannis Papanuskas
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Product description

Bus Terminals Digital Input

- KL/KS1002: 2-Channel 24 V DC Digital Input, Input filter 3ms
- KL/KS1012: 2-Channel 24 V DC Digital Input, Input filter 0.2ms
- KL/KS1032: 2-Channel 48 V DC Digital Input, Input filter 3ms
- KL/KS1104: 4-Channel 24 V DC Digital Input, Input filter 3ms
- KL/KS1114: 4-Channel 24 V DC Digital Input, Input filter 0.2ms
- KL/KS1212: 2-Channel 24 V DC Digital Input, Input filter 3ms, diagnostics
- KL/KS1352: 2-Channel 24 V DC Digital Input for NAMUR Sensors, Input filter 3ms
- KL/KS1362: 2-Channel 24 V DC Digital Input for break-in alarm
- KL/KS1382: 2-Channel 24 V DC Digital Input for Thermistor
- KL/KS1402: 2-Channel 24 V DC Digital Input, Input filter 3ms
- KL/KS1404: 4-Channel 24 V DC Digital Input, Input filter 3ms
- KL/KS1412: 2-Channel 24 V DC Digital Input, Input filter 0.2ms
- KL/KS1414: 4-Channel 24 V DC Digital Input, Input filter 0.2ms
- KL/KS1408: 8-Channel 24 V DC Digital Input, Input filter 3ms
- KL/KS1418: 8-Channel 24 V DC Digital Input, Input filter 0.2ms
- KL/KS1702: 2-Channel 120 V AC to 230 V AC, 4-wire system
- KL/KS1722: 2-Channel 120 V AC to 230 V AC, without power contacts, 4-wire system

Bus Terminals Digital Output

- KL/KS2022: 2-Channel 24 V DC Digital Output, max. output 2.0 A
- KL/KS2032: 2-Channel 24 V DC Digital Output, max. output 0.5 A (Reverse voltage protection)
- KL/KS2134: 4-Channel 24 V DC Digital Output, max. output 0.5 A (Reverse voltage protection)
- KL/KS2408: 8-Channel 24 V DC Digital Output, max. output 0.5 A (Reverse voltage protection)
- KL/KS2602: 2-Channel Relay 230 V AC / 30 V DC Digital Output, max. output 2 A AC / DC
- KL/KS2612: 2-Channel Relay 125 V AC / 30 V DC Digital Output, 0.5 A AC / 2 A DC, no power contacts
- KL/KS2622: 2-Channel Relay 230 V AC / 30 V DC Digital Output, max. output 2 A AC / DC, no power contacts
- KL/KS2631: 1-Channel Relay 400 V AC / 300 V DC Digital Output, max. output 1500 VA AC / 0.15 A DC
- KL/KS2702: 2-Channel Solid State Load Relay 0...230 V AC / DC Digital Output, max. output 0.3 A (on each channel)
- KL/KS2712: 2-Channel Triac 12...230 V AC Digital Output, max. output 0.5 A
- KL/KS2722: 2-Channel Triac 12...230 V AC Digital Output, max. output 1 A, mutually locked outputs
- KL/KS2732: 2-Channel Triac 12...230 V AC Digital Output, max. output 1 A, mutually locked outputs, no power contacts

Bus Terminals Special Functions

- KL/KS6031: Serial interface RS232, 115.2 kbaud
- KL/KS6041: Serial interface RS422/RS485, 115.2 kbaud

Bus Terminals Analog Input

- KL/KS3011: 1-Channel 0...20 mA Analog Input, differential input, 12 bit
- KL/KS3012: 2-Channel 0...20 mA Analog Input, differential input, 12 bit
- KL/KS3021: 1-Channel 4...20 mA Analog Input, differential input, 12 bit
- KL/KS3022: 2-Channel 4...20 mA Analog Input, differential input, 12 bit
- KL/KS3041: 1-Channel loop-powered 0...20 mA Analog Input, 12 bit
- KL/KS3042: 2-Channel loop-powered 0...20 mA Analog Input, 12 bit
- KL/KS3044: 4-Channel 0...20 mA Analog Input, 12 bit
- KL/KS3051: 1-Channel loop-powered 4...20 mA Analog Input, 12 bit
- KL/KS3052: 2-Channel loop-powered 4...20 mA Analog Input, 12 bit
- KL/KS3054: 4-Channel 4...20 mA Analog Input, 12 bit
- KL/KS3064: 4-Channel 0...10 V Analog Input, single-ended, 12 bit
- KL/KS3201: 1-channel input terminal PT100 (RTD) for resistance sensors, 16 bit, 3-wire system
- KL/KS3202: 2-channel input terminal PT100 (RTD) for resistance sensors, 16 bit, 3-wire system
- KL/KS3204: 4-channel input terminal PT100 (RTD) for resistance sensors, 16 bit, 2-wire system
- KL3314: 4-channel thermocouple input terminal, preset to type K, with wire breakage detection, 16 bit
- KL/KS3404: 4-Channel -10...+10 V Analog Input, 4 x 2-wire system, 12 bit
- KL/KS3408: 8-Channel -10...+10 V Analog Input, 1-wire system, 12 bit

Bus Terminals Analog Output

- KL/KS4011: 1-Channel 0...20 mA Analog Output, 12 bit
- KL/KS4012: 2-Channel 0...20 mA Analog Output, 12 bit
- KL/KS4021: 1-Channel 4...20 mA Analog Output, 12 bit
- KL/KS4022: 2-Channel 4...20 mA Analog Output, 12 bit
- KL/KS4031: 1-Channel -10 V...+10 V Analog Output, 12 bit
- KL/KS4032: 2-Channel -10 V...+10 V Analog Output, 12 bit
- KL/KS4034: 4-Channel -10 V...+10 V Analog Output, 12 bit
- KL/KS4404: 4-Channel 0 V...10 V Analog Output, 4 x 2-wire system, 12 bit
- KL/KS4408: 8-Channel 0 V...10 V Analog Output, 1-wire system, 12 bit
- KL/KS4414: 4-Channel 0...20 mA Analog Output, 4 x 2-wire system, 12 bit
- KL/KS4418: 8-Channel 0...20 mA Analog Output, 1-wire system, 12 bit
- KL/KS4424: 4-Channel 4...20 mA Analog Output, 4 x 2-wire system, 12 bit
- KL/KS4428: 8-Channel 4...20 mA Analog Output, 1-wire system, 12 bit
- KL/KS4434: 4-Channel -10 V...+10 V Analog Output, 4 x 2-wire system, 12 bit
- KL/KS4438: 8-Channel -10 V...+10 V Analog Output, 1-wire system, 12 bit

Application/Limitation

Location classes EMC A: KL/KS3201, KL/KS3202, KL/KS3204; KL3314; KL/KS6031; KL/KS6041

Please observed the "Notes for operation of the Beckhoff Bus Terminal System in the Marine Sector (DNV GL), Version: 1.1, Date: 2020-02-03" regarding the required Surge filter.

Approval conditions

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Job Id: **262.1-032994-1**
Certificate No: **TAA00002M3**

Product certificate

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Software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV GL for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Type Approval documentation

Test Reports: TAA00002M3-List of Test Reports, Rev. 1.0
Documents: TAA00002M3-List of Documents, Rev. 1.0

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

Marking of product

The products to be marked with:

- Model name
- Manufacturer name
- Serial number

Periodical assessment

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Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

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Bus Terminals Digital Input, Digital Output

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Location classes:**Temperature D****Humidity B****Vibration B****EMC B****Enclosure Required protection according to the Rules shall be provided upon installation on board.**

Issued at **Hamburg** on **2020-04-08**

This Certificate is valid until **2025-04-07**.

for **DNV GL**

DNV GL local station: **Essen**

Approval Engineer: **Heinz Scheffler**

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Joannis Papanuskas
Head of Section

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Product description

Bus Terminals Digital Input

- KL1804: 4-channel digital input 24 V DC, 3-wire connection, Input filter 3ms
- KL1814: 4-channel digital input 24 V DC, 3-wire connection, Input filter 0.2ms
- KL1808: 8-channel digital input 24 V DC, 2-wire connection, Input filter 3ms
- KL1809: 16-channel digital input 24 V DC, 1-wire connection, Input filter 3ms
- KL1819: 16-channel digital input 24 V DC, 1-wire connection, Input filter 0.2ms
- KL1859: 8-channel digital input & output 24 V DC, 1-wire connection, Input filter 3ms
- KL1889: 6-channel digital input 24 V DC, 0 V (ground), 1-wire connection, Input filter 3ms

Bus Terminals Digital Output

- KL2424: 4-channel digital output 24 V DC, max. 2 A per channel, 2-wire connection
- KL2808: 8-channel digital output 24 V DC, max 0.5 A per channel, 2-wire connection
- KL2809: 16-channel digital output 24 V DC, max. 0.5 A per channel, 1-wire connection
- KL 2889. 16-channel digital output 24 V DC, 0 V (ground) switching, max. 0.5 A per channel, 1-wire connection

Application/Limitation

Please observed the "Notes for operation of the Beckhoff Bus Terminal System in the Marine Sector (DNV GL), Version: 1.1, Date: 2020-02-03" regarding the required Surge filter.

Approval conditions

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Product certificate

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Software control

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Type Approval documentation

Test Reports: TAA00002D5-List of Test Reports, Rev. 1.0

Documents: TAA00002D5-List of Documents, Rev. 1.0

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

Job Id: **262.1-031646-1**
Certificate No: **TAA00002D5**

Marking of product

The products to be marked with:

- Model name
- Manufacturer name
- Serial number

Periodical assessment

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Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Peripheral Equipment**with type designation(s)
System Terminals

Issued to

**Beckhoff Automation GmbH & Co. KG
Verl, Germany**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Location classes:****Temperature D****Humidity B****Vibration B****EMC B****Enclosure Required protection according to the Rules shall be provided upon installation on board.**Issued at **Hamburg** on **2020-04-08**This Certificate is valid until **2025-04-07**.for **DNV GL**DNV GL local station: **Essen**Approval Engineer: **Heinz Scheffler****Joannis Papanuskas
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Product description

System Terminals

- KL9010: Bus end terminal
- KL9020: Bus end terminal 24 V DC, connection with an Ethernet cable and RJ45 plug
- KL9050: Bus coupler terminal 24 V DC and is the counterpart to KL9020
- KL9080: Bus potential groups (e.g. 230 V AC/24 V DC)
- KL/KS9100: Power feed terminal 24 V DC
- KL/KS9110: Power feed terminal 24 V DC, diagnostics
- KL/KS9150: Power supply terminal, 230 V AC
- KL/KS9160: Power supply terminal with diagnostics, 230 V AC
- KL/KS9180: Power feed terminal up to 230 V AC, PE contact, Additional power contact 2
- KL/KS9185: Power feed terminal up to 230 V AC, Additional power contact 4
- KL/KS9186: Potential distribution terminal, 8 x 24 V contact
- KL/KS9187: Potential distribution terminal, 8 x 0 V contact
- KL/KS9190: Power feed terminal rated load voltage arbitrary
- KL/KS9195: Power feed terminal up to 230 V AC, Additional power contact 1, Shielding connection 2
- KL9200: Power feed terminal 24 V DC, Integrated fine-wire fuse 6.3 A
- KL9210: Power feed terminal 24 V DC, Integrated fine-wire fuse 6.3 A, diagnostics
- KL9250: Power supply terminal with fuse, 125 V AC...230 V AC
- KL9260: Power supply terminal with fuse and diagnostics, 230 V AC
- KL9290: Power feed terminal rated load voltage arbitrary, Integrated fine-wire fuse 6.3 A
- KL/KS9400: Power supply unit terminal for the K-bus, 24 V DC, 2 A
- KL/KS9540: Surge filter terminal 24 V DC, Surge filter for field supply
- KL9540-0010: Surge filter terminal 24 V DC, Surge filter for field supply, analog terminals
- KL/KS9550: Surge filter terminal 24 V DC, Surge filter for field supply and system supply
- KL/KS9560: Power supply unit terminal 24V DC/24 V DC, Insulation voltage in-/output 500 V AC permanent load
- KL9184: Potential distribution terminal, 8 x 24 V contact, 8 x 0 V contact
- KL9188: Potential distribution terminal, 16 x 24 V contact
- KL9189: Potential distribution terminal, 16 x 0 V contact

Application/Limitation

Please observed the "Notes for operation of the Beckhoff Bus Terminal System in the Marine Sector (DNV GL), Version: 1.1, Date: 2020-02-03" regarding the required Surge filter.

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV GL, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV GL rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Type Approval documentation

Test Reports: TAA00002M2-List of Test Reports, Rev. 1.0
Documents: TAA00002M2-List of Documents, Rev. 1.0

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

Job Id: **262.1-032993-1**
Certificate No: **TAA00002M2**

Marking of product

The products to be marked with:

- Model name
- Manufacturer name
- Serial number

Periodical assessment

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