KeConnect
I/O modules

KEBA®

Automation by innovation.

I/O modules

I/O modules – overview

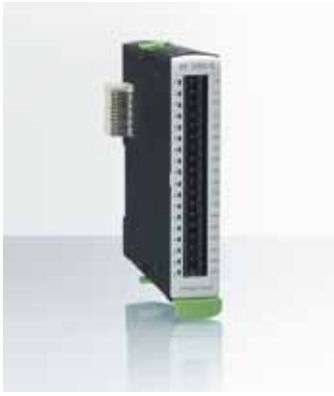
	KePlast	KeMotion	Universal	Page
Digital input modules				
DI 240/B: 8 digital inputs	•	•	•	4
DI 260/A: 16 digital inputs	•	•	•	4
Digital output modules				
DO 242/B: 8 digital outputs	•		•	6
DO 272/A: 14 digital outputs	•	•	•	6
Digital mixed modules (I/O)				
DM 272/A: 8 digital inputs, sink + 8 digital outputs 2 A, source	•	•	•	8
DM 276/A: 6 digital inputs, source + 8 digital outputs 2 A, sink	•	•	•	8
Analog input modules				
AI 240/A: 4 analog inputs ±10 V	•	•	•	10
Analog output modules				
AO 240/A: 4 analog outputs ±10 V	•	•	•	12
Analog hybrid modules (I/O)				
AM 280/A: 4 analog inputs ±10 V (14 bit) + 4 analog outputs ±10 V (12 bit)	•	•	•	14
AM 282/A: 4 analog inputs ±10 V (16 bit) + 4 analog outputs ±10 V (14 bit)	•		•	14
AM 280/B: 4 analog inputs 0-20 or 4-20 mA + 4 analog outputs 0-20 or 4-20 mA	•	•	•	14
Compact modules				
IM 270/W: 32 digital inputs + 16 digital outputs 0.5 A + 24 digital outputs 2A + 8 analog outputs + 6 analog outputs + 8 temperature inputs for J/K/L/N thermoelements + 4 SSI interfaces	•	•	•	16

	KePlast	KeMotion	Universal	Page
Temperature measurement modules				
TM 220/A: 3 temperature inputs for J/K/L thermoelements	•			22
TM 240/A: 6 temperature inputs for J/K/L thermoelements	•	•	•	22
TM 225/A: 4 temperature inputs for PT100 sensors	•	•	•	22
Positioning modules				
MM 240/A: 2 incremental position encoder inputs + 2 latch inputs	•	•	•	26
Communication modules				
SM 210/A: Serial interface module 2x RS232	•	•	•	28
SM 220/A: Serial interface module Current Loop	•	•	•	28
SM 230/A: Serial interface module 2x RS485/RS422	•	•	•	28
SM 250/A: Serial interface module 4x SSI interface	•		•	28
FM 265/A: PROFIBUS slave module	•			30
FX 271/B: SERCOS III master interface module for CP 24x and CP 26x	•	•		32
FM 200/A: CANopen interface module	•	•	•	34
FX 200/A: CANopen option module	•	•	•	34
BL 210/B: CANopen bus coupler module	•		•	36
BL 27x/A: EtherCAT slave bus coupler module with 4 digital inputs	•	•	•	36
BL 27x/B: EtherCAT slave bus coupler module with 4 digital outputs	•	•	•	36
NX 252/A: Ethernet interface (only for CP 26x)	•	•	•	40
SX 210/A: Serial interface 1x RS232 option module	•	•	•	42
SX 220/A: Serial interface 1x Current Loop option module	•	•	•	42
SX 230/A: Serial interface 1x RS485/RS422 option module	•	•	•	42

KeConnect DI 240/B, DI 260/A
Digital input modules

Product features

- Up to 16 digital inputs
- 2 digital inputs with interrupt
- Electronic parameter chip
- Configurable input filter



Short description

The digital input module of the DI 2xx/x series enables the connection of 8 (DI 240/B) or 16 (DI 260/A) digital inputs. 24 V DC control signals are captured by the digital inputs and transmitted galvanically isolated to the higher-level automation device. In addition, two digital inputs can be used as interrupt inputs.

These modules are attached directly to a CPU module or can be operated with all KEBA controls by means of bus couplers.

Digital inputs		
	DI 240/B	**DI 260/A**
Number of inputs	8	16
Input type	Type 1 (acc. to EN 61131-2)	
Voltage range for "1"	15 V ≤ UH ≤ 30 V	
Voltage range for "0"	-3 V ≤ UL ≤ 5 V	
Status display	Green LED	
Galvanic isolation	Yes, electric strength 707 V with isolated ground connection	
Cycle time	1 ms	
Debouncing	Configurable 1 ms, 100 ms	

Interrupt inputs	
Number of inputs	2 (DI0, DI1) of the digital inputs
Input type	Type 1 (acc. to EN 61131-2)
Voltage range for "1"	15 V ≤ UH ≤ 30 V
Voltage range for "0"	-3 V ≤ UL ≤ 5 V
Response time of the K-bus interrupt	100 µs with 5 kHz input filter
Status display	Green LED
Galvanic isolation	Yes

Dimensions, weight	
Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug
Depth	100 mm
Weight	130 g

Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General	
I/O supply voltage	24 V DC from K-bus 5 V DC from K-bus
Overvoltage category	II
Protection class	III acc. to EN 61131-2
Addressing on K-bus	Via 16-digit address switch, on the side
Type of terminals	Open - pitch 5.08 mm
Max. power consumption K-bus 24 V	1 W
Max. power consumption K-bus 5 V	0.4 W

KeConnect DO 242/B, DO 272/A
Digital output modules

Product features

- 8 or 14 digital outputs
- Short-circuit detection and diagnosis
- Permanently short-circuit proof
- Current load capacity 2 A at 50 % simultaneity
- Fast shutdown function for inductive loads
- Electronic parameter chip

Short description

Digital output modules DO 242/B and DO 272/A enable the connection of up to 14 digital outputs. The digital outputs switch the 24 V DC control signals of a central module galvanically isolated from the connected actuators and are designed for a load of up to 2 A at 50 % simultaneity.

The modules are equipped with a fast shutdown function that enables a rapid shutdown of inductive loads, e.g., hydraulic valves. Machine processes can thereby be accelerated and productivity increased.

The operational safety is ensured by the permanent short-circuit protection of the outputs. Should a short circuit occur, it is detected and reported to the control module.

These modules are attached directly to a CPU module or can be operated with all KEBA controls by means of bus couplers.

Digital outputs

	DO 242/B	DO 272/A
Number of outputs	8	14
Nominal voltage	24 V DC	
Processing time	1 ms	
Nominal current of digital outputs	2 A at 50 % simultaneity	
Galvanic isolation	Yes	
Status display	Orange LED	
Protection facility	Short-circuit protection	
Max. inductive load	1 J at max 0.2 Hz	

Dimensions, weight

Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. plug
Depth	100 mm
Weight	130 g

Environmental conditions

Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

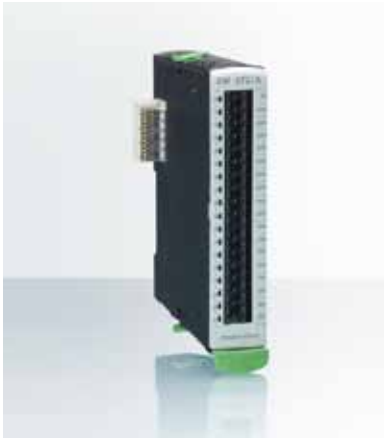
General

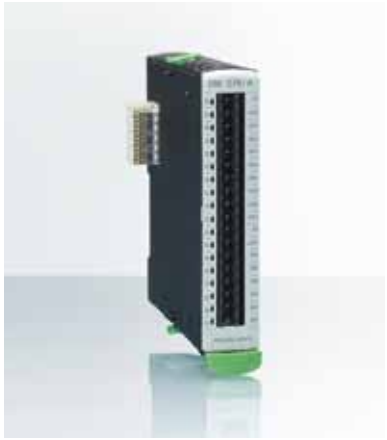
	DO 242/B	DO 272/A
Supply voltage	24 V DC from front (nominal voltage tolerance: 19.2 V … 30 V, acc. to EN 61131-2) 24 V DC from K-bus, 5 V DC from K-bus	
Overvoltage category	II	
Protection class	III acc. to EN 61131-2	
Addressing on K-bus	Via 16-digit address switch, on the side	
Type of terminals	Open - pitch 5.08 mm	
Displays on the front plate	16 signal status LEDs	
Max. power consumption K-bus 24 V	2.1 W	2.1 W
Max. power consumption K-bus 5 V	0.4 W	0.4 W

KeConnect DM 27x/A
Digital hybrid modules

Product features

- Up to 8 digital inputs
- 8 digital 2 A outputs
- 2 digital inputs with interrupt
- Short-circuit detection
- Permanently short-circuit proof
- Electronic rating plate





Short description

The DM 27x/A series is a digital input/output module of the KeConnect C2 product line and enables the connection of 6 or 8 digital inputs and 8 digital outputs. 24 V DC control signals are captured by the digital inputs and transmitted galvanically isolated to the higher-level automation device. In addition, two of the digital inputs can be used as interrupt inputs.

The digital outputs switch the 24 V DC control signals of a CPU module galvanically isolated from the connected actuators. In addition to the short-circuit connection, outputs that cause short circuits can be switched off individually.

This module is attached directly to a CPU module or can be operated with all KEBA controls by means of a bus coupler.

Digital inputs		
	DM 272/A	**DM 276/A**
Number / wiring of inputs	8x sink	6x source
Input type	Type 1 (acc. to EN 61131-2)	
Voltage range for "1"	15 V ≤ UH ≤ 30 V	
Voltage range for "0"	-3 V ≤ UL ≤ 5 V	
Debouncing	Configurable 1 ms, 100 ms	
Cycle time	1 ms	
Status display	Green LED	
Galvanic isolation	Yes, electric strength 707 V with isolated ground connection	

Interrupt inputs	
Number of inputs	Two of the digital inputs can be used as interrupt inputs
Voltage range for "1"	15 V ≤ UH ≤ 30 V
Voltage range for "0"	-3 V ≤ UL ≤ 5 V
Response time of the K-bus interrupt	50 µs
Status display	Green LED
Galvanic isolation	Yes

Digital outputs

	DM 272/A	DM 276/A
Number / wiring of outputs	8x source	8x sink
Nominal voltage	24 V DC	
Processing time	1 ms	
Nominal current of digital outputs	2 A at 50 % simultaneity	
Protection facility	Short-circuit protection	
Max. inductive load	1 J at max 0.2 Hz	
Status display	Orange LED	
Galvanic isolation	Yes, from the control electronics and between one another, electric strength 707 V with isolated ground connection	

Dimensions, weight

Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug
Depth	100 mm
Weight	135 g

Environmental conditions

Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

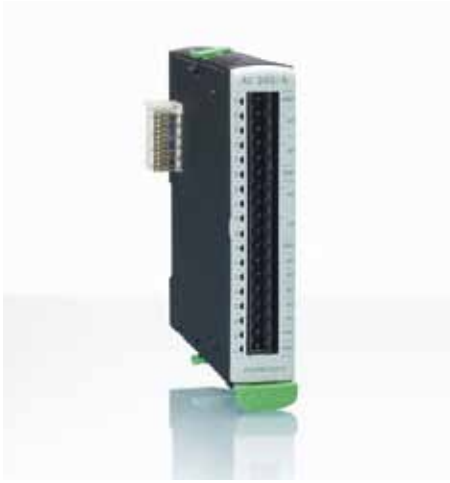
General

Supply voltage	24 V DC from front (nominal voltage tolerance: 19.2 V to 30 V, acc. to EN 61131-2) 24 V DC from K-bus, 5 V DC from K-bus
Overvoltage category	II
Protection class	III acc. to EN 61131-2
Addressing on K-bus	Via 16-digit address switch, on the side
Type of terminals	Open - pitch 5.08 mm
Max. power consumption K-bus 24 V	1.9 W
Max. power consumption K-bus 5 V	0.4 W

KeConnect AI 240/A
Analog input modules

Product features

- 4 analog voltage inputs usable as differential inputs or as single-ended inputs
- Resolution 14 bit
- Sensor failure detection
- Electronic parameter chip



Short description

Analog input module KeConnect AI 240/A features four analog voltage inputs that process differential or ratiometric input signals in the range from ±10 V or 0-10 V with a resolution of 14 bit.

A sensor failure, should it occur, is reported to the higher-level central module and can be evaluated in the application. This module is attached directly to a CPU module or can be operated with all KEBA controls by means of a bus coupler.

Analog inputs	
Number / type of inputs	4 voltage inputs
Resolution	14 bit
Signal range	±10 V or 0 – Uref (10 V)
Max. measurement signal	±10.4 V
Input type	Differential or single-ended
Galvanic isolation	No
Reference voltage output	10 V ±2.5 %; max. 20 mA
Scan repeat cycle	1 ms
Input impedance in signal range	10 MΩ
Input filter characteristic – order	First order
Input filter limiting frequency	250 Hz
Conversion method	Successive approximation
Monotonicity without error codes	Yes
Synchroneity control	±13.5 V
Synchroneity suppression	> 80 dB
Value of the lowest bit (LSB)	1.3 mV
Maximum permitted continuous load (without damage)	±30 V
Typ. temp. coefficient measurement error	±5 ppm of scale end value / °C
Max. temp. coefficient measurement error	±20 ppm of scale end value / °C
Largest error at 25 °C	±0.01 % of scale end value

Dimensions, weight	
Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug
Depth	100 mm
Weight	135 g

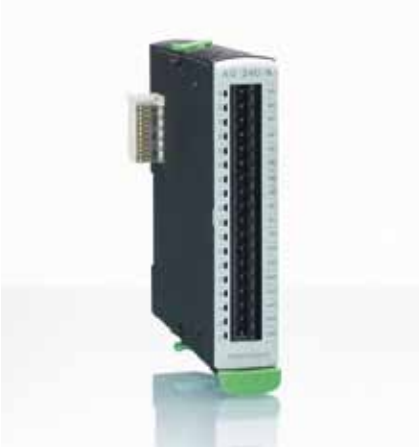
Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General	
Supply voltage	24 V DC from K-bus, 5 V DC from K-bus
Overvoltage category	II
Protection class	III acc. to EN 61131-2
Addressing on K-bus	Via 16-digit address switch, on the side
Type of terminals	Open - pitch 5.08 mm
Power consumption K-bus 24 V	2 W
Power consumption K-bus 5 V	0.3 W

KeConnect AO 240/A
Analog output modules

Product features

- 4 analog voltage outputs
- Resolution 12 bit
- Electronic parameter chip



Short description

KeConnect AO 240/A is an analog voltage output module. The outputs produce signals in the range of ±10 V with a resolution of 12 bit.

This module is attached directly to a CPU module or can be operated with all KEBA controls by means of a bus coupler.

Analog outputs

Number / type of outputs	4 voltage outputs
Resolution	12 bit
Signal range	±10 V
Galvanic isolation	No
Conversion cycle	1 ms
Value of the lowest bit (LSB)	5.32 mV
Monotonicity	Yes
Load resistance	≥ 1000 Ω
Largest capacitive load	≤ 10 nF
Differential non-linearity	≤±1 LSB
Settling time when changing over the full range (with ohmic load)	≤ 50 µs
Typ. temp. coefficient analog output error	±20 ppm of scale end value / °C
Max. temp. coefficient analog output error	±30 ppm of scale end value / °C
Largest error at 25 °C	±0.15 % of scale end value

Dimensions, weight

Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug
Depth	100 mm
Weight	135 g

Environmental conditions

Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

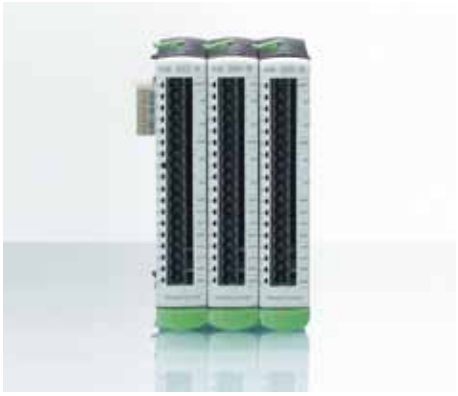
General

Supply voltage	24 V DC from K-bus, 5 V DC from K-bus
Overvoltage category	II
Protection class	III acc. to EN 61131-2
Addressing on K-bus	Via 16-digit address switch, on the side
Type of terminals	Open - pitch 5.08 mm
Power consumption K-bus 24 V	1.9 W
Power consumption K-bus 5 V	0.3 W

KeConnect AM 28x/x
Analog hybrid modules

Product features

- 4 analog inputs
- 4 analog outputs
- Signal form: Voltage or current
- Sensor failure detection
- Resolution of the outputs up to 14 bit
- Electronic parameter chip



Short description

The AM 28x/x series is a hybrid module and enables the connection of four analog inputs and four analog outputs with voltage or current signals. The analog inputs of the AM 28x/A process both single-ended as well as differential voltage signals. The AM 280/B is equipped with current inputs and outputs.

A sensor failure, should it occur, is reported to the higher-level CPU module and can be evaluated accordingly in the application. These modules are attached directly to a CPU module or can be operated with all KEBA controls by means of bus couplers.

Analog inputs			
	AM 280/A	**AM 282/A**	**AM 280/B**
Number of inputs	4	4	4
Type	Voltage input	Voltage input	Current input
Resolution	14 bit	16 bit	14 bit
Signal range	±10 V or 0 – Uref (10 V)	±10 V or 0 – Uref (10 V)	0 – 20 mA or 4 – 20 mA
Max. measurement signal	±10.4 V	±10.4 V	-0.8 mA … 20.8 mA
Input type	Differential or single-ended	Differential or single-ended	Differential
Galvanic isolation	No	No	No
Reference voltage output	10 V ±2.5 %; max. 20 mA	10 V ±2.5 %; max. 20 mA	–
Scan repeat cycle	1 ms	1 ms	1 ms
Input impedance in signal range	10 MΩ	10 MΩ	< 200 Ω
Input filter characteristic	First order	First order	First order
Limiting frequency of the input filter	250 Hz	250 Hz	250 Hz
Conversion method	Successive approximation	Successive approximation	Successive approximation
Monotonicity without error codes	Yes	Yes	Yes
Common mode range	±13.5 V	±13.5 V	±13.5 V
Common mode rejection ratio	> 80 dB	> 80 dB	> 80 dB
Value of the lowest bit (LSB)	1.3 mV	1.3 mV	1.35 µA
Maximum permitted continuous load (without damage)	±30 V		
Typ. temp. coefficient measurement error	±5 ppm of scale end value / °C		
Max. temp. coefficient measurement error	±20 ppm of scale end value / °C		
Largest error at 25 °C	±0.01 % of scale end value		

Analog outputs

	AM 280/A	AM 282/A	AM 280/B
Number of outputs	4	4	4
Type	Voltage output	Voltage output	Current output
Digital resolution	12 bit	14 bit	12 bit
Signal range	±10 V	±10 V	0 – 20 mA
Galvanic isolation	No	No	No
Conversion cycle	1 ms	1 ms	1 ms
Value of the lowest bit (LSB)	5.32 mV	1.33 mV	5.39 µA
Monotonicity	Yes	Yes	Yes
Load resistance	≥ 1000 Ω	≥ 1000 Ω	≤ 600 Ω
Largest capacitive load	≤ 10 nF	≤ 10 nF	-
Differential non-linearity	≤±1 LSB		
Settling time when changing over the full range (with ohmic load)	≤ 50 µs		
Typ. temp. coefficient analog output error	±20 ppm of scale end value / °C		
Max. temp. coefficient analog output error	±30 ppm of scale end value / °C		
Largest error at 25 °C	±0.15 % of scale end value		

Dimensions, weight

Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. plug
Depth	100 mm
Weight	135 g

Environmental conditions

Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

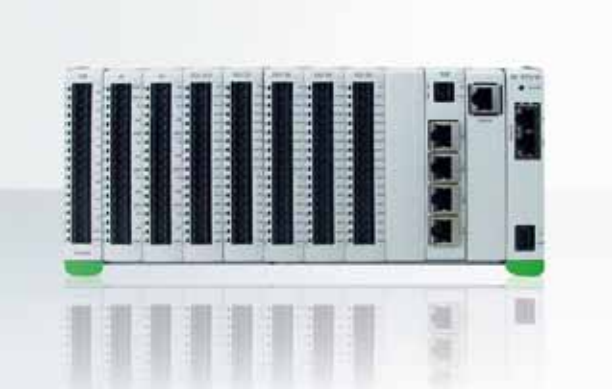
General

	AM 280/A	AM 282/A	AM 280/B
Supply voltage	24 V DC from K-bus, 5 V DC from K-bus		
Overvoltage category	II		
Protection class	III acc. to EN 61131-2		
Addressing on K-bus	Via 16-digit address switch, on the side		
Type of terminals	Open - pitch 5.08 mm		
Power consumption K-bus 24 V	3.3 W	3.3 W	3.6 W
Power consumption K-bus 5 V	0.3 W	0.3 W	0.3 W

KeConnect IM 270/W
Compact modules

Product features

- Cost- and space-optimized compact module, especially well suited for plastic machines
- Supports the “fast control” concept
- Functions for changeover point recognition
- Connection via high-performance EtherCAT connection
- Direct expandability by means of KeConnect C2 modules
- Extensive diagnostic options



Short description

The IM 270/W is a cost- and space-saving compact module. It combines the typical I/O design for plastic injection molding machines in one module and offers functions for changeover point detection. In addition to application in the plastics sector, it can also be used in other areas.

The IM 270/W supports the “fast control” concept. Innovative EtherCAT communication between the compact module and the CPU module is used here to minimize dead times and thereby greatly reduce reaction times. This increases the performance of the machine considerably.

Depending on the type of inputs and outputs, various diagnostic possibilities are available, such as the detection of sensor failures or short circuits.

The IM 270/W is connected to the CPU module via EtherCAT. To adapt the I/O configuration to the application, KeConnect C2 modules can be attached at the side directly via the K-bus.

Digital inputs	
Number of inputs	32
Input type	Type 1 (acc. to EN 61131-2)
Voltage range for "1"	15 V ≤ U ≤ 30 V
Voltage range for "0"	-3 V ≤ U ≤ 5 V
Status display	Green LED
Min. update cycle	200 µs
Galvanic isolation	No
Debouncing	Configurable (via software)

Digital outputs 0.5 A	
Number of outputs	16 (DO0 - DO15) (2 groups of 8 outputs with their own supply)
Type	Semiconductor output
Nominal voltage	24 V DC
Nominal current	0.5 A at 100 % simultaneity per group
Status display	Orange LED (on the load side)
Galvanic isolation of the output groups	No
Galvanic isolation of the control electronics	No
Inductive load (energy)	Max. 100 mJ at 0.2 Hz
Overload-proof	Yes
Permanently short-circuit proof	Yes
Short-circuit diagnosis	Yes
Protected against polarity reversal	No, defects possible

Digital outputs 2 A	
Number of outputs	24 (DO16-DO39) (3 groups of 8 outputs with their own supply)
Type	Semiconductor output
Nominal voltage	24 V DC
Nominal current	2 A at 50 % simultaneity per group
Status display	Orange LED (on the load side)
Galvanic isolation of the output groups	Yes
Galvanic isolation of the control electronics	Yes; electric strength 500 V AC
Inductive load (energy)	Max. 1 J at 0.2 Hz
Overload-proof	No
Permanently short-circuit proof	Yes
Short-circuit diagnosis	Yes
Protected against polarity reversal	Yes

KeConnect IM 270/W
Compact modules

Analog inputs (differential or single-ended)	
Number of inputs	8
Type	Voltage input
Input type	Differential (standard setting) or single-ended; freely assignable via software
Signal range	Differential: ±10 V; single-ended: 0 - Uref
Reference voltage output Uref	10 V ±2.5 %, max. 20 mA
Max. measurement signal	-10.4 V … +10.4 V
Galvanic isolation of the output groups	No
Galvanic isolation from the control electronics	No
Sensor failure detection	Yes
Scan repeat cycle	100 µs
Input impedance in signal range	5 MΩ
Input filter characteristic – order	Second order
Input filter transfer frequency	2500 Hz
Digital filters	Configurable to: no filter, 500 µs, 1 ms, 5 ms
Resolution	16 bit (±10 V), 15 bit (0 V - Uref)
Conversion method	Successive approximation
Monotonicity without error codes	Yes
Common mode range	±13.5 V
Common mode rejection ratio	> 80 dB
Value of the lowest bit (LSB)	0.325 mV
Maximum permitted continuous load (without damage)	±30 V
Typ. temp. coefficient measurement error	±5 ppm of scale end value / °C
Max. temp. coefficient measurement error	±20 ppm of scale end value / °C
Largest error at 25 °C	±0.02 % of scale end value

Analog outputs	
Number of outputs	6
Type	Voltage output
Signal range	±10 V
Galvanic isolation of the output groups	No
Galvanic isolation from the control electronics	No
Permanently short-circuit proof	Yes
Conversion cycle	100 µs
Digital resolution	12 bit
Value of the lowest bit (LSB)	5.22 mV
Monotonicity	Yes
Load resistance	≥ 1000 Ω
Largest capacitive load	≤ 10 nF
Settling time when changing over the full range	≤ 100 µs
Typ. temp. coefficient analog output error	±20 ppm of scale end value / °C
Max. temp. coefficient analog output error	±30 ppm of scale end value / °C
Largest error at 25 °C	±0.15 % of scale end value

Temperature inputs J, K, L, N	
Number of inputs	8
Galvanic isolation	Yes, from the control electronics and between one another Electric strength 500 V AC
Sensor failure detection	Yes, underflow
Thermoelement types	J, K, L, N
Measurement ranges	Type J (Fe-CuNi): -100 °C … +700 °C Type K (NiCr-Ni): -100 °C … +1000 °C Type L (FeCu-Ni): -100 °C … +700 °C Type N (NiCrSi-NiSi): -100 °C … +1000 °C
Measurement principle	Integrated
Measurement interval	Configurable: 20 / 40 / 100 ms
Mains frequency	Configurable: 50 / 60 Hz
Input resistance	10 MΩ
Maximum resistance value of the thermoelement	50 Ω
Resolution of the measurement process	16 bit
Connections	Pluggable connection terminals pitch 5.08, gold-plated contacts
Intrinsic deviation	±2.5 °C max. absolute measurement deviation over the entire measurement range (±0.5 °C typical), at 25 °C ambient temperature at the module
Operational deviation	±1 % of measurement value or ±2.5 °C absolute. The larger of the two values applies. Absolute measurement deviation under reference conditions: Ambient temperature of the module between 0 °C and 55 °C, temperature measurement range between 0 °C and 500 °C
Precision of terminal temperature sensor	±1 °C max. absolute measurement deviation at 0 °C to 70 °C ambient temperature (±0.5 °C typical)
Precision with internal terminal temperature compensation	±2 °C after 30 minutes, with natural convection
Precision with external compensation with TE 220/A	With the optimized positioning of the external sensor (TE 220/A), the error can be minimized to ±0.5 °C (typical) through terminal temperature compensation
Thermal settling time	After 15 - 30 minutes, the measurement result is stable and within the specified tolerances

EtherCAT interface	
Number	2
Data transmission rate	100 Mbit/s

K-bus interface	
Function	for the direct connection of K-bus modules

KeConnect IM 270/W
Compact modules

SSI Interfaces	
Number	4
Data transmission rate	125 kbit/s, 250 kbit/s, 500 kbit/s, 1 Mbit/s
Galvanic isolation	According to suggestion of the SSI standard
Resolution	Max. 32 bit (number of bits can be configured)
Supported data code	Binary code, Gray code
Output voltage for encoder supply	+24 V DC
Max. current for encoder supply	250 mA per channel
Line break monitoring	Yes
Short-circuit protection	Via self-resetting fuse

Dimensions, weight	
Height	120 mm
Width	270 mm
Depth	100 mm
Weight	880 g

Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance	Acc. to EN 61131-2:2007
Shock resistance	Acc. to EN 61131-2:2007

General	
Nominal voltage	24 V DC from front (nominal voltage tolerance: 19.2 V DC to 30 V DC acc. to EN 61131-2)
Max. switch-on current	5 A
Overvoltage category	II
Protection class	III acc. to EN 61131-2:2007
Max. total power consumption	62.5 W
- Own power consumption	9 W
- Max. output power K-bus 5 V	8.5 W
- Max. output power K-bus 24 V	45 W
Protective measures against	Polarity reversal
Supply connection terminals	Open terminals, pitch 5.08 mm
Reverse polarity protection	Yes
Protection rating	IP20

KeConnect TM 2x0/A, TM225/A
Temperature measurement modules

Product features

- Thermoelement type J, K, L
  (TM 220/A, TM 240/A)
- For PT100 sensors
  (TM 225/A)
- Internal and external cold junction compensation
- High measurement precision
- Sensor failure detection
- Electronic parameter chip

Short description

The TM 2xx/A series consists of temperature measurement modules that can be directly attached to CPU modules and operated with all product lines of the KEBA control system by means of bus couplers.

TM 220/A, TM 240/A

Analog input modules TM 220/A and TM 240/A enable the direct connection of thermoelements (2-conductor technique). The calibration and linearization of the temperature values takes place via a microcontroller. A sensor failure, should it occur, is reported to the higher-level central module and can be evaluated in the application.

Two operating modes are supported:

- Display of the actually measured temperature (standard mode)
- Display of the measured voltage in µV

Cold junction compensation can occur via internal temperature measurement at the terminals of the module or optionally with the aid of external sensor TE 220/A (external terminal temperature compensation).

TM 225/A

Analog input module TM 225/A enables the direct connection of PT100 resistor sensors. Up to four temperature sensors can be operated with 2- or 4-conductor technique. With the 4-conductor technique, the interference associated with the conductor lengths is compensated for and the precision of the measurement thereby increased.

Temperature inputs J, K, L – TM 2x0/A only

	TM 220/A	TM 240/A
Number	3	6
Thermoelement types	J, K, L	
Resolution	14 bit	
Galvanic isolation	Yes, from the control electronics and between one another Electric strength: 707 V DC	
Sensor failure detection	Yes	
Measurement ranges	Type J (Fe-CuNi): -100 °C … +700 °C Type K (NiCr-Ni): -100 °C … +1000 °C Type L (Fe-CuNi): -100 °C … +700 °C	
Measurement principle	Integrated	
Measurement time	100 ms	
Input resistance	>10 kΩ	
Connections	Pluggable connection terminals, gold-plated contacts, nominal cross section: 1.5 mm²	
Intrinsic deviation	±1.0 °C max. absolute measurement deviation at 25 °C ambient temperature at the module over the entire measurement range (±0.5 °C typical)	
Temperature measurement sensor error	±1.0 °C max. absolute measurement deviation at 0 °C to 70 °C ambient temperature (±0.5 °C typical)	
Operational deviation	±1.5 °C max. absolute measurement deviation at 0 °C to 55 °C ambient temperature at the module over the entire measurement range (±1.0 °C typical)	
Thermal settling time	20 minutes	
Error with external compensation	With external sensor TE 220/A: ±0.5 °C	

KeConnect TM 2x0/A, TM225/A
Temperature measurement modules

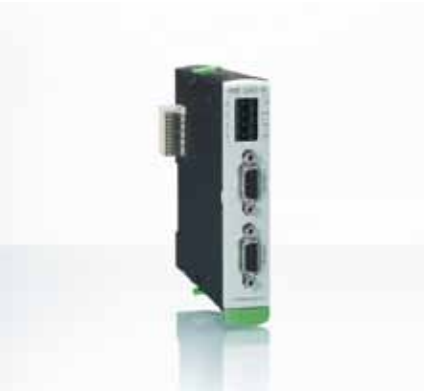
PT100 temperature inputs - only TM 225/A	
Number	4x PT100
Resolution	14 bit
Galvanic isolation	No
Sensor failure detection	Yes
Measurement range	-100 °C … 850 °C
Linearization method	Internal
Input type	4- or 2-conductor measurement
Calibration	Yes
Constant current output	600 µA (each type)
Scan repeat cycle	2 ms
Input impedance in signal range	10 MΩ
Input filter characteristic	First order
Input filter characteristic - transfer frequency	15 Hz
Conversion method	Successive approximation
Monotonicity without error codes	Yes
Common mode range	≤ 13.5 V
Common mode rejection ratio	> 80 dB
Value of the lowest bit (LSB)	0.058 °C
Maximum permitted continuous load (without damage)	≤ 30 V
Typ. temp. coefficient measurement error	≤ 10 ppm of scale end value / °C
Max. temp. coefficient measurement error	≤ 40 ppm of scale end value / °C
Largest error at 25 °C	≤ 0.02 % of scale end value / °C
Averaging	Moving average over 100 ms

Dimensions, weight			
	TM 220/A	TM 240/A	TM 225/A
Height	120 mm		
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug		
Depth	100 mm		
Weight	142 g	142 g	134 g

Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General			
	TM 220/A	TM 240/A	TM 225/A
Supply voltage	24 V DC from K-bus, 5 V DC from K-bus		
Overvoltage category	II		
Protection class	III acc. to EN 61131-2		
Addressing on K-bus	Via 16-digit address switch, on the side		
Connection terminals	Open - pitch: 5.08 mm		
Max. power consumption K-bus 24 V	1.6 W	1.6 W	2.5 W
Max. power consumption K-bus 5 V	0.5 W	0.6 W	0.3 W

KeConnect MM 240/A
Positioning module



Product features

- 2 incremental encoder inputs with 12- or 32-bit resolution
- 2 latch inputs as sink or source input
- Electronic parameter chip

Short description

The MM 240/A is an incremental encoder of the KeConnect C2 product line. This module is attached directly to a CPU module or can be operated with all KEBA controls by means of bus couplers.

MM 240/A features

- Position measurement: Forward/backward counter of increments by means of tracks A and B
- Single, double, quadruple evaluation
- 32-bit resolution
- Speed measurement through sampling with internal time basis
- Rotary encoder monitoring via zero track information
- Latch function of the counter status via an external latch input 24 V (sink and source)
- Latch function of the counter status via zero pulse
- Sensor failure monitoring of tracks A, B and zero

Incremental encoder inputs	
Number of inputs	2
Resolution	32 bit
Galvanic isolation	No
Max. encoder frequency	250 kHz (differential)
Evaluation	Single, double and quadruple evaluation configurable, counter function with and without direction evaluation
Max. pulse rate	1 MHz when using quadruple evaluation (differential)
Input range	Configurable 5 V differential and 24 V

Position counter	
Counter width	32 bit

Speed measurement	
Measurement process	Gate time measurement with internal 50 MHz cycle
Counter width	24 bit
Minimum detectable speed	Pulse duration greater than 0.33 s = speed 0

Encoder supply	
Supply 24 V	Looped through from 24 V input terminal
Load capacity	100 mA per encoder
Protection	Against overload and short circuit
Supply 5 V	Produced by 24 V supply via input terminal
Nominal voltage	5.05 V ±4 %

Latch inputs	
Number of inputs	2
Response time of latch input	20 µs
Input type	Configuration as sink or source input
Galvanic isolation	No

Time stamp for latch event	
Resolution	1 µs
Max. cycle time	16-bit counter: Unique up to 65 ms cycle time

Dimensions, weight	
Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug
Depth	100 mm
Weight	135 g

Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General	
Supply voltage	24 V DC from front (nominal voltage tolerance: 19.2 V … 30 V, acc. to EN 61131-2) 24 V DC from K-bus, 5 V DC from K-bus
Overvoltage category	II
Protection class	III acc. to EN 61131-2
Addressing on K-bus	Via 16-digit address switch, on the side
Connection terminals	Open – pitch: 5.08 mm
Max. power consumption K-bus 24 V	0 W
Max. power consumption K-bus 5 V	0.6 W

KeConnect SM 2x0/A
Serial communication modules

Product features

- Serial interface modules
  (RS 232-C, RS 422/485-A, Current Loop)
- Full-duplex operation
- SSI interface module
- High interference immunity
- Electronic parameter chip

Short description

The SM 2x0/A series consists of serial and SSI interface modules that can be attached directly to a CPU module or operated with all KEBA control systems by means of bus couplers.

SM 210/A and SM 230/A are serial interface modules and enable the connection of two RS 232-C or RS 422/485-A serial interfaces. The two communication channels function independent of one another in full-duplex operation.

SM 220/A is a serial interface card. This module enables the connection of a serial 20 mA Current Loop interface. The interface functions both for the transmitter as well as for the receiver in active or passive operation. DIP switches are provided on the front for switching the operating mode. At a maximum transmission rate of 9.6 kbits/s, a line length of up to 1,000 m is possible.

SM 250/A is an SSI interface module that enables the connection of up to 4 position measuring systems and is equipped with sensor failure detection.

Serial interface

	SM 210/A	SM 220/A	SM 230/A	SM 250/A
Number	2	1	2	-
Type of interface	RS-232-C, 9-pin Male connector	Current Loop, 9-pin Male connector	RS-485-A / RS-422-A, 9-pin Male connector (switchable via SW)	-
Data transmission rate	1200 to 115200 bits/s, can be set via SW	1200 to 9600 bits/s, can be set via SW	1200 to 115200 bits/s, can be set via SW	-
Galvanic isolation	No	No	No	-
Transmission medium	Cable, shielded	Cable, shielded	Cable, shielded	-

SSI interface (only SM 250/A)

Number	4
Data transmission rate	125 kbit/s, 250 kbit/s, 500 kbit/s, 1 Mbit/s
Galvanic isolation	No
Output voltage for encoder supply	+24 V DC
Max. current for encoder supply	250 mA per channel
Sensor failure detection	Yes

Dimensions, weight

	SM 210/A	SM 220/A	SM 230/A	SM 250/A
Height	120 mm			
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug			
Depth	100 mm			
Weight	132 g	132 g	132 g	140 g

Environmental conditions

Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General

	SM 210/A	SM 220/A	SM 230/A	SM 250/A
Supply voltage	24 V DC from K-bus, 5 V DC from K-bus			
Addressing on K-bus	Via 16-digit address switch, on the side, max. 4 modules possible (address switch position 4 - F invalid)			
Max. power consumption K-bus 24 V	0 W	0 W	0 W	0 W
Max. power consumption K-bus 5 V	0.4 W	1.5 W	0.5 W	0.65 W

KeConnect FM 265/A
Profibus communication module

Product features

- Profibus slave
- Protocol DPV-1
- High interference immunity
- Electronic parameter chip

Short description

The FM 265/A is a Profibus slave interface module. It belongs to the communication modules of the KeConnect C2 product line. It enables the exchange of cyclical process data and acyclical parameter data between a KeControl C2 control and any Profibus slave devices with a transmission rate of up to 12 Mbit/s.

These modules are attached directly to a CPU module or can be operated with all KEBA controls by means of bus couplers.

Profibus DP interface	
Master/slave	1x slave
Data transmission rates	9.6 kbit/s to 12 Mbit/s
Max. line length	100 m (at 12 Mbit/s) to 1200 m (at 9.6 kbit/s)
Galvanic isolation	Yes, signal lines

Dimensions, weight	
Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug
Depth	100 mm
Weight	140 g

Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General	
Supply voltage	24 V DC from K-bus, 5 V from K-bus
Protection class	III acc. to EN 61131-2
LED displays on the front plate	Status and error
Max. operable on a CPU module	1x
Max. power consumption K-bus 24 V	0 W
Max. power consumption K-bus 5 V	1.4 W

KeConnect FX 271/B
Sercos III communication module

Product features

- Sercos III master (FX 271/B)
- High interference immunity
- Electronic parameter chip

Short description

The FX 271/B is a Sercos III master fieldbus option module. The option module is operated directly in a PCI slot of a CP 24x/x or CP 26x/x of the KeControl C2 product line. In addition, the FX 271/B is equipped with two Ethernet interfaces.

Sercos III is an Ethernet-based bus that was developed both for drive technology as well as for I/O operation as a digital interface. This standard enables flexible, fast and precise control and coordination of machine movements. The Ethernet technology enables continuous communication between a control or service station and the respective slaves.

Sercos III interface	
Number / data transmission rate	1x 100 Mbit/s
Galvanic isolation	Yes, signal lines
Connection	Modular plug, 8-pin (RJ45 connector)

Ethernet interface	
Number / data transmission rate	2x 100 Mbit/s
Galvanic isolation	Yes, signal lines
Connection	Modular plug, 8-pin (RJ45 connector)

Mechanical data	
Structure	Front plate mounted on PCB; no housing
Protection rating	IP20 if the module is plugged into the CPU module
Weight	83 g

Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General	
Type of interface	PCI
Supply voltage	5 V DC and 3.3 V DC
Protection class	III acc. to EN 61131-2
Displays on the front plate	Activity LED
Max. operable on a CPU module	1x
Max. power consumption K-bus 5 V	2 W
Max. power consumption K-bus 3.3 V	2.6 W
Module detection	YES (no type detection)

KeConnect FM 200/A, FX 200/A
CAN communication modules

Product features

- Up to 2x CANopen interfaces
- High interference immunity
- Transmission rate up to 1 Mbit/s
- Electronic parameter chip

Short description

The FM 200/A and FX 200/A are CANopen interface modules of the KeConnect C2 product line.

Depending on the line length, the interface operates with a maximum transmission rate of 1 Mbit/s. The connection is made via a 9-pin D-sub plug. The states of the interface are indicated by means of transmission and reception LEDs.

The FM 200/A is attached directly to a CPU module or can be operated with all KEBA controls by means of a bus coupler.

The FX 200/A is inserted directly into the central module of the KeControl C2 product line.

CAN interface

	FM 200/A	FX 200/A
Number	2	1
Data transmission rate	Can be set via software (125 kbit/s to 1 Mbit/s)	
Terminating resistor	Yes, can be bridged in plug	
Galvanic isolation	No	
Connection	DSUB 9-pin Male connector	

Dimensions, weight (only FM 200/A)

Height	120 mm
Width	22.5 mm front plate / 32.5 mm incl. K-bus plug
Depth	100 mm
Weight	140 g

Mechanical data (only FX 200/A)

Structure	Front plate mounted on PCB; no housing
Protection rating	IP20 if the module is plugged into the CPU module
Weight	27 g

Environmental conditions

Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

General

	FM 200/A	FX 200/A
Type of interface	K-bus interface	Option-module interface
Supply voltage from K-bus	24 V DC, 5 V	
Protection class	III acc. to EN 61131-2	
Displays on the front plate	Status LED	
Max. number of modules operable on a CP module	2	1
Max. power consumption K-bus 24 V	0 W	-
Max. power consumption K-bus 5 V	0.8 W	5 V
Max. power consumption K-bus 3.3 V	-	
Module detection	Yes (no type detection)	

KeConnect BL 210/B, BL 27x/x
Bus coupler modules

Product features

- CAN bus coupler modules (BL 210/B)
- EtherCAT bus coupler modules for the connection of remote I/O modules (BL 270/A, BL 270/B, BL 272/A, BL 272/B)
- Additionally integrated digital inputs (BL 27x/A) or outputs (BL 27x/B)
- Support of remote modules for serial interfaces and fieldbus interfaces (BL 272/A, BL 272/B)
- Electronic parameter chip

Short description

The BL 210/B (CANopen) and the BL 27x/x series are bus coupler modules that, in combination with I/O modules, enable the decentralization and transmission from module islands.

The BL 27x/x series is used as a bus coupler between EtherCAT and K-bus. Modules of the system can thereby be operated as remote I/O islands. The BL 27x/x can be connected to a control via EtherCAT and is thereby made an EtherCAT slave. Two variants of the BL27x series are available:
- With four additional digital inputs (BL 27x/A)
- With four additional digital outputs (BL 27x/B)

As a special feature, the BL 272/x enables the connection of interface modules for fieldbuses (FM 200/A) and serial interfaces (SM 210/A, SM 220/A, SM 230/A). This enables the operation of such interfaces remotely from CPU modules. This feature is also referred to as “bus via bus communication”.

The status of the module is indicated via a status LED. The LEDs on the RJ45 sockets provide information about the link and activity status of the respective network connection. Each digital input/output also has a status display (active/not active).

These modules are attached directly to a CPU module or can be operated with all KEBA controls by means of bus couplers.

CAN interface (only BL 210/B)	
Number	1
Data transmission rate	Adjustable by means of rotary selector switch: 125 kbit/s to 1 Mbit/s
Terminating resistor	Yes, can be bridged in plug
Galvanic isolation	No
Connection	DSUB plug, 9-pin

EtherCAT slave BL 27x/x	
Field bus	EtherCAT
Baudrate of EtherCAT slave	100 Mbit/s

Digital inputs (only BL 27x/A)	
Number / type of inputs	4x type 1 (acc. to EN 61131-2)
Voltage range for "1"	15 V ≤ UH ≤ 30 V
Voltage range for "0"	-3 V ≤ UL ≤ 5 V
Status display	Green LED
Cycle time	1 ms
Usable as interrupt inputs	Yes
Response time of the K-bus interrupt	100 µs with 5 kHz input filter
Galvanic isolation	No
Debouncing	Configurable 1 ms, 100 ms

Digital outputs (only BL 27x/B)	
Number of outputs	4
Nominal voltage	24 V DC
Processing time	1 ms
Nominal current of digital outputs	0.5 A at 100 % simultaneity per group
Galvanic isolation	No
Status display	Orange LED
Protection facility	Short-circuit protection
Max. inductive load	100 mJ at 1 Hz

Dimensions, weight		
	BL 210/B	BL 27x/x
Height	120 mm	
Width	22.5 mm	
Depth	100 mm	
Weight	121 g	121 g

KeConnect BL 210/B, BL 27x/x
Bus coupler modules

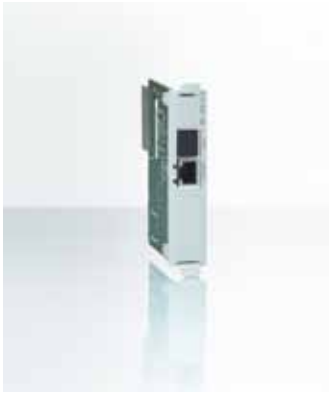
Environmental conditions	
Operating temperature:	+5 °C … +55 °C
Storage temperature:	-40 °C … +70 °C
Relative air humidity:	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance:	Acc. to EN 61131-2

General		
	BL 210/B	**BL 27x/x**
Supply voltage:	24 V DC from front (nominal voltage tolerance: 19.2 V DC to 30 V DC acc. to EN 61131-2)	
Max. switch-on current:	7 A	14 A
Overvoltage category:	II	
Protection class:	III acc. to EN 61131-2:2007	
Max. total power consumption:	58 W	
- Max. power consumption Own power consumption:	4.5 W	
- Max output power K-bus 5 V:	8.5 W	
- Max. output power K-bus 24 V:	45 W	
Protected against:	Polarity reversal, overload, reversed infeed, short circuit	Polarity reversal, reversed infeed
Addressing on K-net:	16-digit address switch on the front	
Supply connection terminals:	Open terminals, pitch 5.08 mm	
Display on the front plate	Multi-color LED for operating status	

KeConnect NX 252/A
Ethernet option module

Product features

- Ethernet interface
- 10/100 Mbit/s transmission rate



Short description

The NX 252/A is an Ethernet PCI module that is directly plugged into a CP-26x-CPU module, thereby expanding this module with an additional RJ45 Ethernet interface. The transmission rate is 10/100 Mbit/s; the states are indicated by means of transmission and reception LEDs. The NX 252/A is equipped with an electronic parameter chip.

Ethernet interface	
Ethernet interface	10/100 Mbit/s LAN
Galvanic isolation	Yes, signal lines
Connection	Modular plug, 8-pin (RJ45 plug)

Interface to CPU module:	
Type of interface	PCI
Power consumption	2 W, supply via CPU module
Module detection	Yes (no type detection)

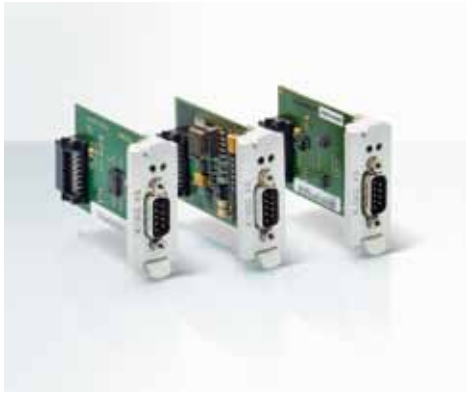
Mechanical data	
Structure	PCI plug-in module, front plate mounted on PCB; no housing
Protection rating	IP20 if the module is plugged into the CPU module
Weight	65 g

Environmental conditions	
Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

KeConnect SX 2x0/A
Serial option module

Product features

- Serial interface RS232,
  RS 422/485-A or Current Loop
- Full-duplex operation
- High interference immunity



Short description

Serial interface modules of the SX 2x0/A series are used as an option directly in a CP 23x or in a CP 26x CPU module.

They enable the connection of an RS 232, RS 422/485-A or Current Loop serial interface. This interface operates in full-duplex mode with a maximum transmission rate of 115,000 baud.

The Current Loop interface (SM 220/A) functions both for transmitter as well as for the receiver in active or passive operation. The operating mode is switched on the side on the PCB via DIP switches.

Serial interface

	SX 210/A	SX 220/A	SX 230/A
Type of interface	RS-232-C, 9-pin Male connector	Current Loop, 9-pin Male connector	RS-485-A / RS-422-A, 9-pin Male connector (switchable via SW)
Data transmission rate	1200 to 115200 bits/s, can be set via SW	1200 to 9600 bits/s, can be set via SW	1200 to 115200 bits/s, can be set via SW
Galvanic isolation	No		
Transmission medium	Cable, shielded		

Interfaces to CPU module

	SX 210/A	SX 220/A	SX 230/A
Type of interface	Option-module interface		
Power consumption	0.2 W; supply via CPU module	1.0 W; supply via CPU module	0.1 W; supply via CPU module
Module detection	Yes (no type detection)		

Mechanical data

Structure	Front plate mounted directly on PCB; without housing
Protection rating	IP20 if the module is plugged into the CPU module
Weight	31 g

Environmental conditions

Operating temperature	+5 °C … +55 °C
Storage temperature	-40 °C … +70 °C
Relative air humidity	10 % to 95 % (non-condensing)
Vibration resistance / shock resistance	Acc. to EN 61131-2

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