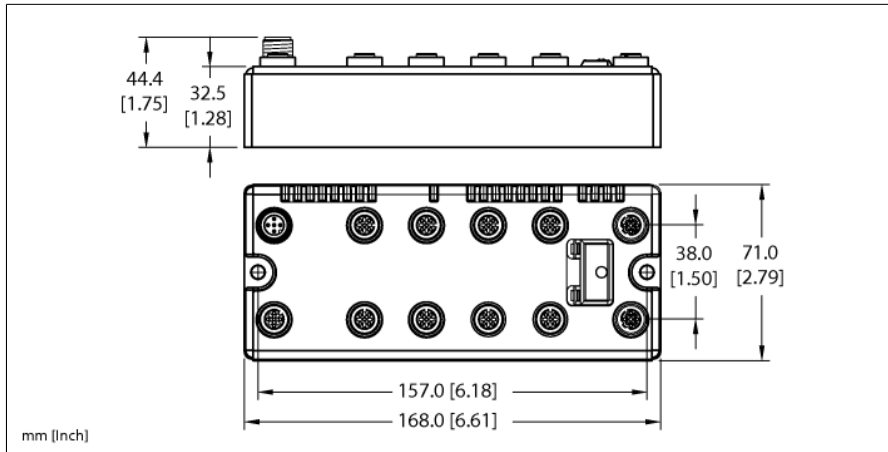


BL compact™ multiprotocol fieldbus station for Industrial Ethernet

4 Analog Current or Voltage Inputs and 4 Analog Voltage Outputs

BLCEN-8M12LT-4AI4AO-VI-4AI-VI



ID	6811638
Nominal system voltage	24 VDC
System power supply	Via auxiliary power
Voltage supply connection	2 x M12, 5-pin
Admissible range Vi	11...30 VDC
Nominal current Vi	187 mA
Max. current Vi	2 A
Admissible range Vo	11...30 VDC
Nominal current Vo	50 mA
Max. current Vo	4 A
Fieldbus transmission rate	10/100 Mbps
Adjustment transmission rate	Automatic detection
Fieldbus address range	1...92 0 (192.168.1.254) 93 (BOOTP) 94 (DHCP) 95 (PGM) 96 (PGM-DHCP) *recommended for PROFINET 97...98 (manufacturer specific)
Fieldbus addressing	2 decimally coded rotary switches
Fieldbus connection technology	2 x M12 4-pole, D-coded
Protocol detection	automatic
Web server	Integrated
Service interface	Ethernet
Vendor ID	48
Product type	12
Product code	11638

- On-machine Compact fieldbus I/O block
- EtherNet/IP™, Modbus® TCP, or PROFINET slave
- Integrated Ethernet Switch
- 10 Mbps / 100 Mbps supported
- Two 4-pole M12, D-coded, connectors for fieldbus connection
- 2 rotary switches for node address
- IP67, IP69K
- M12 I/O connectors
- LEDs indicating status and diagnostics
- Electronics galvanically separated from the field level via optocouplers
- 4 analog inputs for current or voltage
- 0/4...20 mA or -10/0...+10 VDC (selectable per channel)

Modbus TCP	
Addressing	Static IP, BOOTP, DHCP
Supported function codes	FC1, FC2, FC3, FC4, FC5, FC6, FC15, FC16, FC23
Number of TCP connections	6
Input Data Size	max. 10 register
Input register start address	0 (0x0000 hex)
Output Data Size	max. 4 register
Output register start address	2048 (0x0800 hex)

Ethernet/IP	
Addressing	acc. to EtherNet/IP specification
Device Level Ring (DLR)	supported
Class 1 connections (CIP)	6
Input Assembly Instance	103
Input Data Size	13 INT
Output Assembly Instance	104
Output Data Size	4 INT
Configuration Assembly Instance	106
Configuration Size	0
Comm Format	Data - INT

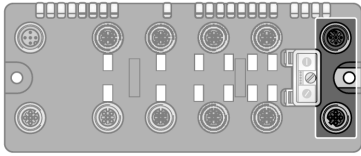
PROFINET	
Addressing	DCP
Conformance class	B (RT)
MinCycleTime	1 ms
Diagnostics	acc. to PROFINET alarm handling
Topology detection	supported
Automatic addressing	supported
Media Redundancy Protocol (MRP)	supported
Input Data Size	max. 16 BYTE
Output Data Size	max. 8 BYTE

Analog inputs	
Operating modes	0/4 ... 20 mA or -10/0 ... 10 VDC
Type of input diagnostics	Channel diagnostics
Sensor supply	24 VDC, 1 amp max.
Input resistance	Current: < 0.125 K Ω , Voltage: < 98.5 K Ω
Maximum limiting frequency analog	< 20 Hz
Basic fault limit at 23 °C	< 0.3 %
Repeatability	< 0.05 %
Temperature coefficient	< 300 ppm / °C of full scale
Resolution	16 Bit
Measuring principle	Sigma Delta
Measurement display	16 bit signed integer 12 bit full range left-justified

analog inputs	
Input type	0/4 ... 20 mA or -10/0 ... 10 VDC
Type of input diagnostics	Channel diagnostics
Sensor supply	24 VDC
Input resistance	Current: < 0.125 K Ω , Voltage: < 98.5 K Ω
Maximum limiting frequency analog	< 20 Hz
Basic fault limit at 23 °C	< 0.3 %
Repeatability	< 0.05 %
Temperature coefficient	< 300 ppm/°C of full scale
Resolution	16 Bit
Measuring principle	Sigma Delta
Measured-value display	16 bit signed integer 12 bit full range left justified

Analog outputs	from 4AI4AO-VI
Operating modes	-10/0 ... 10 V
Type of output diagnostics	Channel diagnostics
Sensor supply	24 VDC, 250 mA per channel
Load resistance, resistive	> 1 k Ω
Load resistance, capacitive	< 1 μ F
Transmission frequency	< 100 Hz
Basic fault limit at 23 °C	< 0.3 %
Repeat accuracy	< 0.05 %
Temperature coefficient	< 300 ppm/°C of full scale
Resolution	16 bit
Measured-value display	16 bit signed integer
	12 bit full range left-justified
Dimensions	
Dimensions	168 x 71 x 32.5 mm
Mounting	2 x 5.4 mm diameter holes, 1.7 Nm torque
Weight	620 \pm 20 g
Housing material	Glass-filled nylon, nickel plated brass connectors
Housing color	Black
Material screw	Nickel-plated brass
Material label	Polyester with polycarbonate overlay
Ground label material	Nickel plated brass
Protection class	IP67 IP69K
Ambient temperature	-40...+70 °C
Storage temperature	-40...+85 °C
Relative humidity	15 to 95% (non-condensing)
Vibration test	Acc. to IEC 61131-2
- up to 20 g (at 10 up to 150 Hz)	For mounting on base plate or machinery
Shock test	according to IEC 61131-2
Electromagnetic compatibility	Acc. to IEC 61131-2
Approvals and certificates	CE, cULus

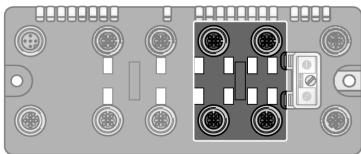
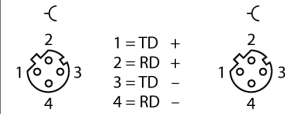
Pinning and wiring diagram



Ethernet

Fieldbus cable (IP67 example): RSSD RSSD 441-2M ID number U-02482 or RSSD-RSSD-441-2M/S2174 ID number 6914218

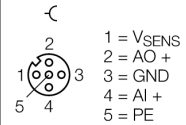
Pin Assignment (M12, D-code)



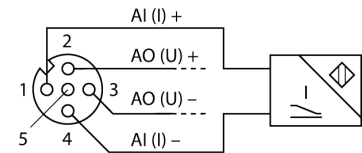
Slot 1: Analog Inputs and Outputs

Extension cable (example): RK 4.5T-2-RS 4.5T/S653 ident-no. U2187-09 or RKC4.5T-2-RSC4.5T/TEL ident-no. 6625212

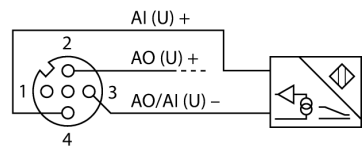
Pin Assignment



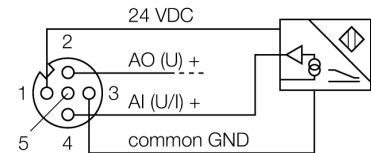
2-wire Technology (Current)



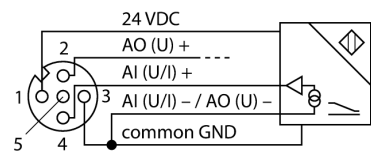
2-wire Technology (Voltage)



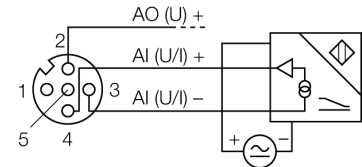
3-wire Technology

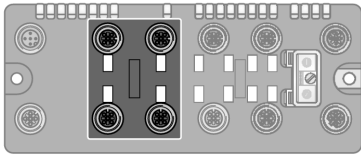


4-wire Technology



4-wire Technology (External Power)

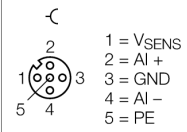




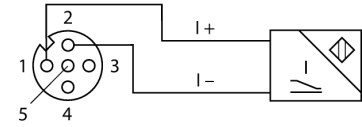
Slot 2: Analog Inputs

Extension cable (example): RK 4.5T-2-RS 4.5T/S653 ident-no. U2187-09 or RKC4.5T-2-RSC4.5T/TEL ident-no. 6625212

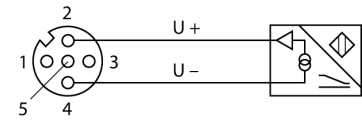
Pin Assignment



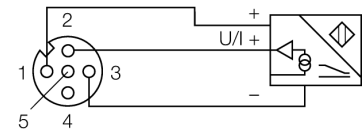
2-wire Technology (Current)



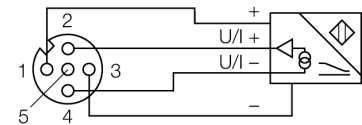
2-wire Technology (Voltage)



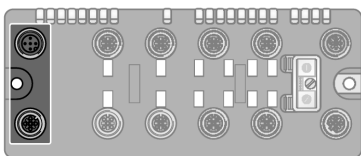
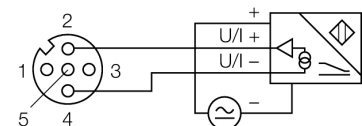
3-wire Technology



4-wire Technology



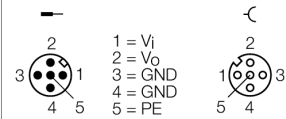
4-wire Technology (External Power)



Auxiliary Power

Extension cable (example): RKC 4.4T-2-RSC 4.4T ident-no. U5264 or RKC4.4T-2-RSC4.4T/TEL ident-no. 6625208

Pin Assignment



Station LED status

LED	Color	Status	Description
IOs		OFF	No power
	RED	ON	Low power or station error
	RED	FLASHING (1 Hz)	I/O module configuration error
	RED	FLASHING (4 Hz)	No I/O module bus communication
	GREEN	ON	Station ok
	GREEN	FLASHING	Force mode active
BUS		OFF	Power Off
	GREEN	ON	Connected to Master
	GREEN	FLASHING	Ready
	GREEN	FLASHING 3x (1Hz)	ARGEE Running
	RED	ON	Error
	RED	FLASHING	WINK
	YELLOW	ON	DHCP/BOOTP Search
LNK/ACT		OFF	No Link
	GREEN	ON	Link
	GREEN	FLASHING	Traffic
	YELLOW	ON	100 Mbit Linked

I/O LED status slot 1

LED	Color	Status	Description
D1 *		OFF	No diagnostics active
	RED	ON	Station error/ module bus communication failure
	RED	FLASHING (0.5Hz)	Diagnostics active (Slot 1)
AI channels 0...3		OFF	Channel inactive
	GREEN	ON	Channel active
	GREEN	FLASHING (0.5 Hz)	Underflow diagnostics
	GREEN	FLASHING (4 Hz)	Overflow diagnostics
AO channels 4...7			Not connected (The analog outputs do not have a LED)

* D1 LED also indicates gateway diagnostics

I/O LED status slot 2

LED	Color	Status	Description
D2 *		OFF	No diagnostics active
	RED	ON	Station error/ module bus communication failure
	RED	FLASHING (0.5Hz)	Diagnostics active (Slot 2)
AI channels 2 ₀ ...2 ₃		OFF	Not active
	GREEN	ON	Active
	GREEN	FLASHING (0.5 Hz)	Underflow in measuring range
	GREEN	FLASHING (4 Hz)	Overflow in measuring range

* D2 LED also indicates gateway diagnostics

Process Data Mapping of Each Protocol

EtherNet/IP™ I/O & Diagnostics Data Mapping

INPUT	BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AI 1 ₀	0	AI 1 ₀ LSB							
	1	AI 1 ₀ MSB							
AI 1 ₁	2	AI 1 ₁ LSB							
	3	AI 1 ₁ MSB							
AI 1 ₂	4	AI 1 ₂ LSB							
	5	AI 1 ₂ MSB							
AI 1 ₃	6	AI 1 ₃ LSB							
	7	AI 1 ₃ MSB							
AI 2 ₀	8	AI 2 ₀ LSB							
	9	AI 2 ₀ MSB							
AI 2 ₁	10	AI 2 ₁ LSB							
	11	AI 2 ₁ MSB							
AI 2 ₂	12	AI 2 ₂ LSB							
	13	AI 2 ₂ MSB							
AI 2 ₃	14	AI 2 ₃ LSB							
	15	AI 2 ₃ MSB							
Diagnostics	16	Module number reporting diagnostic data							
	17	Replacement station	-	Diagnostics active	-	-	-	-	-
Slot X* (ref. byte 16)	18	Hardware error	-	-	-	AI X ₀ overflow/underflow	-	Wire break AI X ₀ (4...20 mA range only)	Range error AI X ₀
	19	Hardware error	-	-	-	AO X ₀ overflow/underflow	-	-	Range error AO X ₀
	20	Hardware error	-	-	-	AI X ₁ overflow/underflow	-	Wire break AI X ₁ (4...20 mA range only)	Range error AI X ₁
	21	Hardware error	-	-	-	AO X ₁ overflow/underflow	-	-	Range error AO X ₁
	22	Hardware error	-	-	-	AI X ₂ overflow/underflow	-	Wire break AI X ₂ (4...20 mA range only)	Range error AI X ₂
	23	Hardware error	-	-	-	AO X ₂ overflow/underflow	-	-	Range error AO X ₂
	24	Hardware error	-	-	-	AI X ₃ overflow/underflow	-	Wire break AI X ₃ (4...20 mA range only)	Range error AI X ₃
	25	Hardware error	-	-	-	AO X ₃ overflow/underflow	-	-	Range error AO X ₃
	26	-	-	-	-	-	-	Open circuit AI 2 ₀	Range error AI 2 ₀
	27	-	-	-	-	-	-	Open circuit AI 2 ₁	Range error AI 2 ₁
	28	-	-	-	-	-	-	Open circuit AI 2 ₂	Range error AI 2 ₂
	29	-	-	-	-	-	-	Open circuit AI 2 ₃	Range error AI 2 ₃
OUTPUT	BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AO 1 ₀	0	AO 1 ₀ LSB							
	1	AO 1 ₀ MSB							
AO 1 ₁	2	AO 1 ₁ LSB							
	3	AO 1 ₁ MSB							
AO 1 ₂	4	AO 1 ₂ LSB							
	5	AO 1 ₂ MSB							
AO 1 ₃	6	AO 1 ₃ LSB							
	7	AO 1 ₃ MSB							
AO 2 ₀	8	AO 2 ₀ LSB							
	9	AO 2 ₀ MSB							
AO 2 ₁	10	AO 2 ₁ LSB							
	11	AO 2 ₁ MSB							
AO 2 ₂	12	AO 2 ₂ LSB							

	13	AO 2 ₂ MSB
AO 2 ₃	14	AO 2 ₃ LSB
	15	AO 2 ₃ MSB

* The scheduled diagnostic information changes every 125 ms between Slot 1 and Slot 2, if both slots send active diagnostics.

Legend:

MR	Measured Value out of range	FCE	Force Mode Enabled
WB	Wire break (4-20 mA only)	CFG	Configuration Error
OFU	Overflow/Underflow	COM	Modulebus Configuration Error
HW	Hardware Error	VI LOW	Voltage Field Supply Usys
OVR	Output value out of range	VO LOW	Voltage Field Supply Ui
OFU	Overflow/Underflow	DIA	Module Diagnostics Available

Modbus® TCP Register Mapping

	REG	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Inputs (RO)	0x0000	AI 1 ₀															
	0x0001	AI 1 ₁															
	0x0002	AI 1 ₂															
	0x0003	AI 1 ₃															
	0x0004	AI 2 ₀															
	0x0005	AI 2 ₁															
	0x0006	AI 2 ₂															
	0x0007	AI 2 ₃															
Status (RO)	0x0008	-	FCE	-	-	CFG	COM	VI low	-	VO low	-	-	-	-	-	-	DIA
Diag. (RO)	0x0009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S2 DIA	S1 DIA
Outputs (RW)	0x0800	AO 1 ₀															
	0x0801	AO 1 ₁															
	0x0802	AO 1 ₂															
	0x0803	AO 1 ₃															
	I/O Diag. (RO)	0xA000	-	-	-	-	OFUAI 1 ₁	SCAI 1 ₁	WBAI 1 ₁	MRAI 1 ₁	-	-	-	-	OFUAI 1 ₀	SCAI 1 ₀	WBAI 1 ₀
0xA001		-	-	-	-	OFUAI 1 ₃	SCAI 1 ₃	WBAI 1 ₃	MRAI 1 ₃	-	-	-	-	OFUAI 1 ₂	SCAI 1 ₂	WBAI 1 ₂	MRAI 1 ₂
0xA002		-	-	-	-	OFUAO 1 ₁	SCAO 1 ₁	WBAO 1 ₁	MRAO 1 ₁	-	-	-	-	OFUAO 1 ₀	SCAO 1 ₀	WBAO 1 ₀	MRAO 1 ₀
0xA003		-	-	-	-	OFUAO 1 ₃	SCAO 1 ₃	WBAO 1 ₃	MRAO 1 ₃	-	-	-	-	OFUAO 1 ₂	SCAO 1 ₂	WBAO 1 ₂	MRAO 1 ₂
0xA004		-	-	-	-	-	-	OCAI 2 ₁	MRAI 2 ₁	-	-	-	-	-	-	OCAI 2 ₀	MRAI 2 ₀
0xA005		-	-	-	-	-	-	OCAI 2 ₃	MRAI 2 ₃	-	-	-	-	-	-	OCAI 2 ₂	MRAI 2 ₂

PROFINET® Process Data

	BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Inputs	0	AI 1 ₀ LSB							
	1	AI 1 ₀ MSB							
	2 pieces	AI 1 ₁ LSB							
	3	AI 1 ₁ MSB							
	Class 4.	AI 1 ₂ LSB							
	5	AI 1 ₂ MSB							
	6	AI 1 ₃ LSB							
	7	AI 1 ₃ MSB							
	8	AI 2 ₀ LSB							
	9	AI 2 ₀ MSB							
	10	AI 2 ₁ LSB							
	11	AI 2 ₁ MSB							
	12	AI 2 ₂ LSB							
	13	AI 2 ₂ MSB							
	14	AI 2 ₃ LSB							
15	AI 2 ₃ MSB								
Outputs	0	AO 1 ₀ LSB							
	1	AO 1 ₀ MSB							
	2 pieces	AO 1 ₁ LSB							
	3	AO 1 ₁ MSB							
	Class 4.	AO 1 ₂ LSB							
	5	AO 1 ₂ MSB							
	6	AO 1 ₃ LSB							
7	AO 1 ₃ MSB								