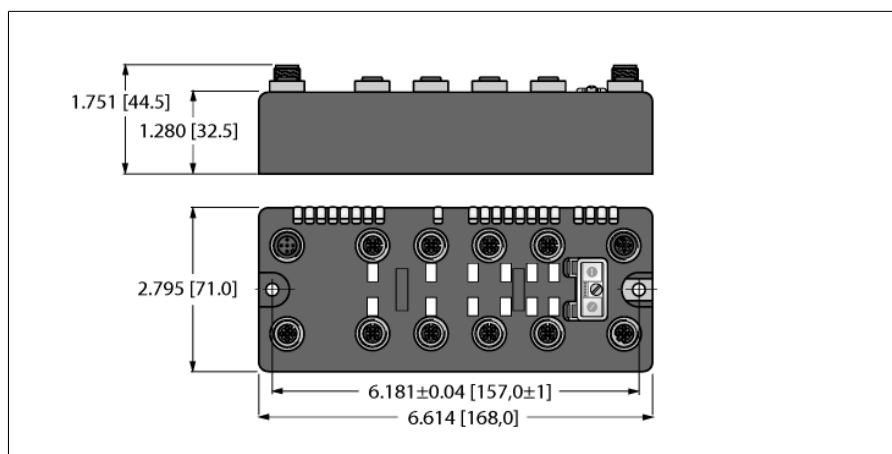


BL compact™ multiprotocol fieldbus station for Industrial Ethernet

4 IO-Link Channels and 4 Analog Inputs for Current or Voltage, 4 Analog Outputs for Voltage

BLCEN-8M12LT-4IOL-4AI4AO-VI



Type	BLCEN-8M12LT-4IOL-4AI4AO-VI
ID	6811504
Nominal system voltage	24 VDC
System power supply	Via auxiliary power
Voltage supply connection	2 x M12, 5-pin
Admissible range Vi	20...30 VDC
Nominal current Vi	215 mA
Max. current Vi	2 A
Admissible range Vo	20...30 VDC
Nominal current Vo	130 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	11504

- 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)
- 4 analog voltage outputs
- -10/0...+10 VDC

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. 13 register
Input register start address	0 (0x0000 hex)
Output Data Size	max. 12 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	21 INT
Output Assembly Instance	104
Output Data Size	12 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. 24 BYTE
Output Data Size	max. 24 BYTE

Digital inputs	
Input type	PNP
Low-level signal voltage	< 5 V
High level signal voltage	> 11 V
Low level signal current	< 1.5 mA DI / < 5mA SIO
High level signal current	2.1 ... 3.7 mA DI / 5 ... 11 mA SIO

Digital outputs	
Output type	PNP
Sensor supply (V_{SENS})	24 VDC
Output current per channel	0.5 A
Output voltage	24 VDC
Output delay	3 ms
Load type	resistive, inductive, lamp load
Load resistance, resistive	> 48 Ω
Load resistance, inductive	< 1.2 H
Lamp load	< 3 W
Switching frequency, resistive	< 200 Hz
Switching frequency, inductive	< 2 Hz
Switching frequency, lamp load	< 20 Hz
Short-circuit protection	yes

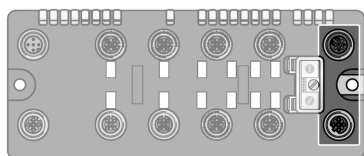
analog inputs	from 4AI4AO-VI
Input type	0/4 ... 20 mA or -10/0 ... 10 VDC
Type of input diagnostics	Channel diagnostics
Sensor supply	24 VDC
Input resistance	Current: < 0.065 K Ω , Voltage: < 225 K Ω
Maximum limiting frequency analog	< 20 Hz
Basic fault limit at 23 °C	< 0.3 %
Repeatability	< 0.05 %
Temperature 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
Output type	-10/0 ... 10 V
Type of output diagnostics	Channel diagnostics
Sensor supply	24 VDC, 250 mA per channel
Load resistance, resistive	> 1
Load resistance, capacitive	> 1 μ F
Transmission frequency	< 100 Hz
Basic fault limit at 23 °C	< 0.3 %
Repeatability	< 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

Technology	
Signal type	IO-Link
Electrical isolation	isolation of electronics and field level via optocouplers

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
MTTF	79 years
MTTF note	acc. to SN 29500 (Ed. 99) 20 °C
Approvals and certificates	CE, cULus, Class I Div.2

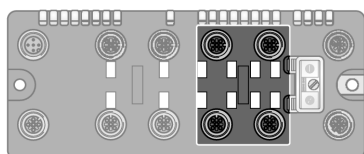
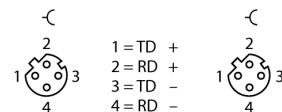
Pinning and wiring diagram



Ethernet

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

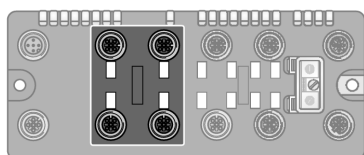
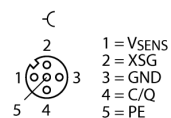
Pin assignment (M12, D-coded)



Slot 1: IO-Link Channels

Extension cable (example): RK 4.4T-2-RS 4.4T ident-no. U2445 or RKC4.4T-2-RSC4.4T/TEL ident-no. 6625208

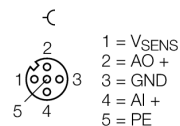
Pin Assignment



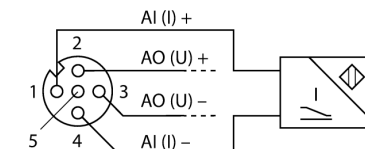
Slot 2: Analog Inputs and Outputs

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

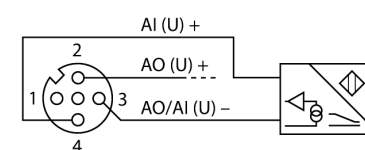
Pin Assignment



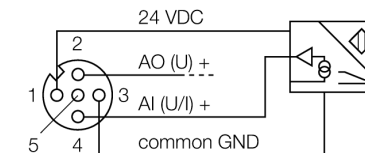
2-wire Technology (Current)



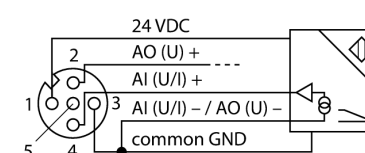
2-wire connection (voltage)



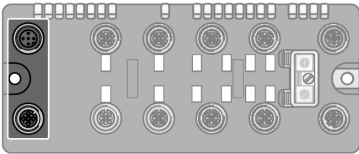
3-wire connection



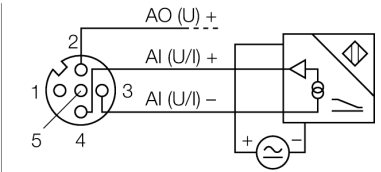
4-wire Technology



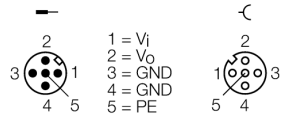
4-wire connection (external voltage supply)



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)	ARGE Running
	RED	ON	Error
	RED	FLASHING	WINK
LNK/ACT	YELLOW	ON	DHCP/BOOTP Search
		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)
IO-Link Mode Channels 1 ₀ ...1 ₃		OFF	Channel Status x = "0" (OFF), no diagnostics active
	GREEN	Flashing	IO-Link communication, Process data valid
	RED	ON	No IO-Link communication
		Flashing	Process Data Invalid
DI Mode Channels 1 ₀ ...1 ₃		OFF	Channel Status x = "0" (OFF)
	GREEN	ON	Channel Status x = "1" (ON)
XSG 1 ₀ ...1 ₇		OFF	Channel Status x = "0" (OFF)
	GREEN	ON	Channel Status x = "1" (ON)

* 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 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)

* 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
Digital	0	DI 1 ₇	DI 1 ₆	DI 1 ₅	DI 1 ₄	DI 1 ₃	DI 1 ₂	DI 1 ₁	DI 1 ₀
	1	OCDO 1 ₇	OCDO 1 ₆	OCDO 1 ₅	OCDO 1 ₄	DVS 1 ₃	DVS 1 ₂	DVS 1 ₁	DVS 1 ₀
	2...15	IO-Link Read Data (depends on parameter settings)							
AI 2 ₀	16	AI 2 ₀ LSB							
	17	AI 2 ₀ MSB							
AI 2 ₁	18	AI 2 ₁ LSB							
	19	AI 2 ₁ MSB							
AI 2 ₂	20	AI 2 ₂ LSB							
	21	AI 2 ₂ MSB							
AI 2 ₃	22	AI 2 ₃ LSB							
	23	AI 2 ₃ MSB							
Diagnostics	24	Module number reporting diagnostic data							
	25	Replace Station	-	Diagnostics Active	-	-	-	-	-
Slot X (ref. Byte 24)	26	IOL 1 ₀ EVT2	IOL 1 ₀ EVT1	IOL 1 ₀ PDINV	IOL 1 ₀ HWER	IOL 1 ₀ DSER	IOL 1 ₀ CFGER	-	OCDO 1 ₄
	27	IOL 1 ₀ GENER	IOL 1 ₀ OVL	IOL 1 ₀ VHIG	IOL 1 ₀ VLOW	IOL 1 ₀ ULVE	IOL 1 ₀ LLVU	IOL 1 ₀ OTMP	IOL 1 ₀ PRMER
	28	IOL 1 ₁ EVT2	IOL 1 ₁ EVT1	IOL 1 ₁ PDINV	IOL 1 ₁ HWER	IOL 1 ₁ DSER	IOL 1 ₁ CFGER	-	OCDO 1 ₅
	29	IOL 1 ₁ GENER	IOL 1 ₁ OVL	IOL 1 ₁ VHIG	IOL 1 ₁ VLOW	IOL 1 ₁ ULVE	IOL 1 ₁ LLVU	IOL 1 ₁ OTMP	IOL 1 ₁ PRMER
	30	IOL 1 ₂ EVT2	IOL 1 ₂ EVT1	IOL 1 ₂ PDINV	IOL 1 ₂ HWER	IOL 1 ₂ DSER	IOL 1 ₂ CFGER	-	OCDO 1 ₆
	31	IOL 1 ₂ GENER	IOL 1 ₂ OVL	IOL 1 ₂ VHIG	IOL 1 ₂ VLOW	IOL 1 ₂ ULVE	IOL 1 ₂ LLVU	IOL 1 ₂ OTMP	IOL 1 ₂ PRMER
	32	IOL 1 ₃ EVT2	IOL 1 ₃ EVTX	IOL 1 ₃ PDINV	IOL 1 ₃ HWER	IOL 1 ₃ DSER	IOL 1 ₃ CFGER	-	OCDO 1 ₇
	33	IOL 1 ₃ GENER	IOL 1 ₃ OVL	IOL 1 ₃ VHIG	IOL 1 ₃ VLOW	IOL 1 ₃ ULVE	IOL 1 ₃ LLVU	IOL 1 ₃ OTMP	IOL 1 ₃ PRMER
	34	Hardware Failure	-	-	-	AI 2 ₀ Overflow/Underflow	-	Wire Break AI 2 ₀ (4...20 mA range only)	Range Error AI 2 ₀
	35	Hardware Failure	-	-	-	AO 2 ₀ Overflow/Underflow	-	-	Range Error AO 2 ₀
	36	Hardware Failure	-	-	-	AI 2 ₁ Overflow/Underflow	-	Wire Break AI 2 ₁ (4...20 mA range only)	Range Error AI 2 ₁
	37	Hardware Failure	-	-	-	AO 2 ₁ Overflow/Underflow	-	-	Range Error AO 2 ₁
	38	Hardware Failure	-	-	-	AI 2 ₂ Overflow/Underflow	-	Wire Break AI 2 ₂ (4...20 mA range only)	Range Error AI 2 ₂
	39	Hardware Failure	-	-	-	AO 2 ₂ Overflow/Underflow	-	-	Range Error AO 2 ₂
	40	Hardware Failure	-	-	-	AI 2 ₃ Overflow/Underflow	-	Wire Break AI 2 ₃ (4...20 mA range only)	Range Error AI 2 ₃
	41	Hardware Failure	-	-	-	AO 2 ₃ Overflow/Underflow	-	-	Range Error AO 2 ₃
OUTPUT	BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Digital	0	DO 1 ₇	DO 1 ₆	DO 1 ₅	DO 1 ₄	-	-	-	-
	1	-	-	-	-	-	-	-	-
	2...15	IO-Link Write Data (depends on parameter settings)							
AO 2 ₀	16	AO 2 ₀ LSB							
	17	AO 2 ₀ MSB							
AO 2 ₁	18	AO 2 ₁ LSB							

	19	AO 2, MSB
AO 2 ₂	20	AO 2, LSB
	21	AO 2, MSB
AO 2 ₃	22	AO 2, LSB
	23	AO 2, MSB

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

Legend

GENER	Common error	EVT1	Maintenance events
VHIGH	Overvoltage	HWER	Hardware error
ULVE	Upper limit value exceeded	CFGER	Wrong or missing device
OTMP	Overtemperature	DVS	Data Valid Signal
EVT2	Out of specification error	OC	Over Current
PDINV	Process input data invalid	DIAG	Diagnostics
DSER	Data storage error	DO	Digital Output
OVL	Overload	DI	Digital Input
VLOW	Undervoltage	COM	Communication Lost Bit
LLVU	Lower limit value underrun	CFG	Configuration Error
PRMER	Parameterization error		

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	OCDO ₁₇	OCDO ₁₆	OCDO ₁₅	OCDO ₁₄	DVS ₁₃	DVS ₁₂	DVS ₁₁	DVS ₁₀	DI ₁₇	DI ₁₆	DI ₁₅	DI ₁₄	DI ₁₃	DI ₁₂	DI ₁₁	DI ₁₀
	0x0001... 0x0007	IO-Link Read Data (depends on parameter settings)															
	0x0008	AI ₂															
	0x0009	AI ₂															
	0x000A	AI ₂															
	0x000B	AI ₂															
Status (RO)	0x000C	-	FCE	-	-	CFG	COM	VI low	VI high	VO low	VO high	OCVI	-	-	-	-	DIAG
Diag. (RO)	0x000D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S2 DIAG	S1 DIAG
Outputs (RW)	0x0800	-	-	-	-	-	-	-	-	DO ₁₇	DO ₁₆	DO ₁₅	DO ₁₄		-		-
	0x0801... 0x0807	IO-Link Write Data (depends on parameter settings)															
	0x0808	AO ₂₀															
	0x0809	AO ₂₁															
	0x080A	AO ₂₃															
	0x080B	AO ₂₄															
I/O Diag. (RO)	0xA000	IOL ₁₅ GEN- ER	IOL ₁₆ OVL	IOL ₁₇ VHIGH	IOL ₁₈ VLOW	IOL ₁₉ ULVE	IOL ₂₀ LLVU	IOL ₂₁ OTMP	IOL ₂₂ PRMER	IOL ₂₃ EVT2	IOL ₂₄ EVT1	IOL ₂₅ PDINV	IOL ₂₆ HWER	IOL ₂₇ DSER	IOL ₂₈ CFGER	-	OC DO ₁₄
	0xA001	IOL ₁ GEN- ER	IOL ₂ OVL	IOL ₃ VHIGH	IOL ₄ VLOW	IOL ₅ ULVE	IOL ₆ LLVU	IOL ₇ OTMP	IOL ₈ PRMER	IOL ₉ EVT2	IOL ₁₀ EVT1	IOL ₁₁ PDINV	IOL ₁₂ HWER	IOL ₁₃ DSER	IOL ₁₄ CFGER	-	OC DO ₁₅
	0xA002	IOL ₂ GEN- ER	IOL ₃ OVL	IOL ₄ VHIGH	IOL ₅ VLOW	IOL ₆ ULVE	IOL ₇ LLVU	IOL ₈ OTMP	IOL ₉ PRMER	IOL ₁₀ EVT2	IOL ₁₁ EVT1	IOL ₁₂ PDINV	IOL ₁₃ HWER	IOL ₁₄ DSER	IOL ₁₅ CFGER	-	OC DO ₁₆
	0xA003	IOL ₃ GEN- ER	IOL ₄ OVL	IOL ₅ VHIGH	IOL ₆ VLOW	IOL ₇ ULVE	IOL ₈ LLVU	IOL ₉ OTMP	IOL ₁₀ PRMER	IOL ₁₁ EVT2	IOL ₁₂ EVT1	IOL ₁₃ PDINV	IOL ₁₄ HWER	IOL ₁₅ DSER	IOL ₁₆ CFGER	-	OC DO ₁₇
	0xA004	HWAO ₂₄	-	-	-	OFUAO ₂₄	-	-	OVRACHWAI ₂₁	OVRACHWAI ₂₀	-	-	-	OFUAI ₂₀	-	WBAI ₂₀	MRAI ₂₀
	0xA005	HWAO ₂₅	-	-	-	OFUAO ₂₅	-	-	OVRACHWAI ₂₅	OVRACHWAI ₂₁	-	-	-	OFUAI ₂₁	-	WBAI ₂₁	MRAI ₂₁
	0xA006	HWAO ₂₆	-	-	-	OFUAO ₂₆	-	-	OVRACHWAI ₂₆	OVRACHWAI ₂₂	-	-	-	OFUAI ₂₂	-	WBAI ₂₂	MRAI ₂₂
	0xA007	HWAO ₂₇	-	-	-	OFUAO ₂₇	-	-	OVRACHWAI ₂₇	OVRACHWAI ₂₃	-	-	-	OFUAI ₂₃	-	WBAI ₂₃	MRAI ₂₃

PROFINET® Process Data

Inputs	0	DI ₁₇	DI ₁₆	DI ₁₅	DI ₁₄	DI ₁₃	DI ₁₂	DI ₁₁	DI ₁₀
	1	OCDO ₁₇	OCDO ₁₆	OCDO ₁₅	OCDO ₁₄	DVS ₁₃	DVS ₁₂	DVS ₁₁	DVS ₁₀
	2...15	IO-Link Read Data (depends on parameter settings)							
AI ₂₀	16	AI ₂₀ LSB							
	17	AI ₂₀ MSB							

AI 2 ₁	18	AI 2 ₁ LSB							
	19	AI 2 ₁ MSB							
AI 2 ₂	20	AI 2 ₂ LSB							
	21	AI 2 ₂ MSB							
AI 2 ₃	22	AI 2 ₃ LSB							
	23	AI 2 ₃ MSB							
Outputs	0	DO 1 ₇	DO 1 ₆	DO 1 ₅	DO 1 ₄	-	-	-	-
	1	-	-	-	-	-	-	-	-
	2...15	IO-Link Write Data (depends on parameter settings)							
AO 2 ₀	16	AO 2 ₀ LSB							
	17	AO 2 ₀ MSB							
AO 2 ₁	18	AO 2 ₁ LSB							
	19	AO 2 ₁ MSB							
AO 2 ₂	20	AO 2 ₂ LSB							
	21	AO 2 ₂ MSB							
AO 2 ₃	22	AO 2 ₃ LSB							
	23	AO 2 ₃ MSB							

Accessories

Type code	Ident-No.		Dimension drawing
LOCK-EURO-C	A0885	Locking guard for straight eurofast™ C-body connectors (RKC, RKCV, RSC, RSCV) in a Class I, Division 2 installations	
LOCK-EURO-C (10/BAG)	A0886	Locking guard for straight eurofast™ C-body connectors (RKC, RKCV, RSC, RSCV) in a Class I, Division 2 installations	