TURCK works

Radio Frequency Identification Systems

BALOGH

Distributed By TURCK

BALOGH / TURCK Relationship

Since 1958, BALOGH has offered the industrial market quality products on the leading edge of technology. Today, BALOGH offers you the most complete line of Radio Frequency Identification (RFID) systems and products available. BALOGH's ambition is to continue to provide an extended range of products and services, responding to the needs of the marketplace in a world that requires quality, flexibility, and productivity.

Since 1965, **TURCK** has been a worldwide leader in inductive and capacitive proximity switches, cordsets, connection products and automation devices. With seven manufacturing facilities and 1400 employees worldwide, **TURCK** has excelled with a focused commitment to provide unsurpassed customer value. **TURCK** continues to uphold its commitment to unequaled customer value through an expanding and innovative product offering, global customer accessibility and application expertise.

BALOGH Distributed by **TURCK** is a complimentary partnership between BALOGH and **TURCK** that was formed to take advantage of the strengths of both companies. The goal of this partnership is to provide innovative and quality RFID and connectivity solutions to a strong industrial network. Together we add the "BALOGH Distributed by **TURCK**" RFID systems to **TURCK**'s extensive portfolio of sensor, connectivity and interface products.

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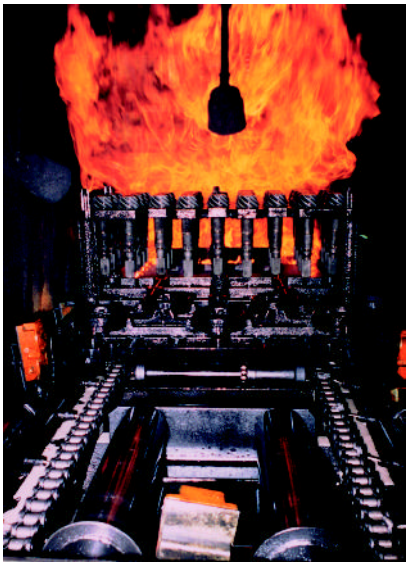
Why RFID?



Automatic identification comes in many forms such as proximity sensors, mechanical flags, bar codes, or optical systems. These identification systems are limited to reading a few pieces of information and can require a large centralized data file. Accuracy can be irregular and system design is often rigid. Radio Frequency Identification (RFID) is a highly flexible solution that overcomes the limits of other automatic ID systems. In addition to tracking products, RFID can manage information to allow users to increase productivity and quality, reduce costs of manufacturing, and multi-task on single lines. Data transfer is reliable and safe, even under harsh industrial conditions. With read ranges of up to 0.5 meters, most mechanical clearance and alignment concerns are eliminated.

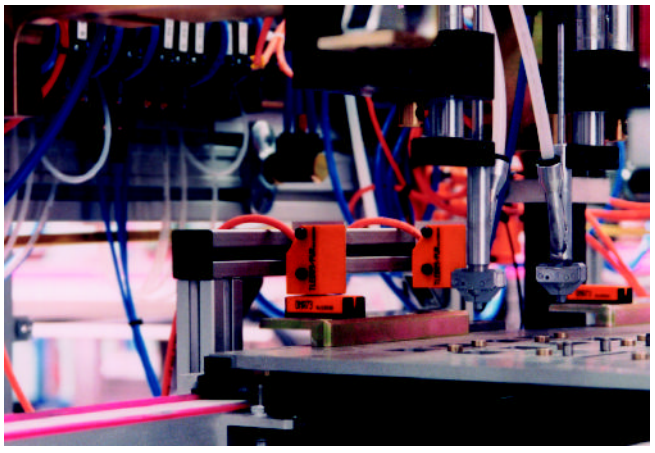
What is RFID?

Radio Frequency Identification systems provide a solution that can identify and control free moving components, such as pallets on a conveyor or automatic guidance vehicles. A system typically consists of a TAG, transceiver and controller. Using the principle of inductive transmission, data can be exchanged between the TAGs and transceivers without physical contact between the two. The object of the system is to carry data in the tags so it can be retrieved by the transceivers at a time and place to satisfy the application. The controller provides absolute data security and acts as an interface to the PLC or PC. The data within the tag can be used to identify an item in manufacturing, goods in transit, or a location.

RFID vs. Bar Code

- TAGs can be embedded and hidden with no need for line-of-sight. They can be read through wood, plastic, cardboard, or any material other than metal.
- TAGs can be reprogrammed on-the-fly to be reused in other applications, whereas barcodes can only hold a small amount of information and cannot be reprogrammed.
- TAGs are applicable in harsh environments such as outdoors, around chemicals, moisture and high temperatures. Barcode is very susceptible to damage and always requires a line of sight-to-read correctly.
- Read and Write capability.

100% Read Accuracy



Because RFID systems do not suffer from line of sight or environmental limitations, fewer items are missed during the first pass. Also, there is absolute data security without the possibility of degraded data entering the system. If an error occurs during the Read cycle, a fault code will be displayed and no data will be transferred. This read accuracy advantage reduces cycle times and effectively increases the productivity of the process.

Passive TAGs

Unlike active TAGs, no power source is necessary in the TAG when data is exchanged. The energy for the data transfer is supplied by the electromagnetic field generated by the transceiver that is reading or writing the TAG. Passive TAGs do not have any maintenance requirements and a virtually unlimited life span (unlimited Read and 10 billion Write cycles).

No "Line-of-Sight" Necessary

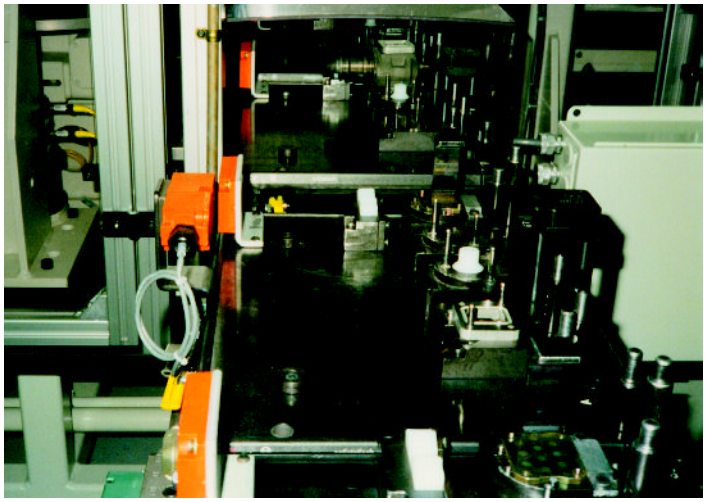
TAGs can be embedded and hidden with no need for line of sight between the TAG and transceiver. They can be read through wood, plastic, cardboard, or any material other than metal. This ability also makes TAGs applicable in harsh environments where water, oils, dirt and chemicals could block optical transmission technologies.

Traceability with Read/Write TAGs

Other identification systems are limited to just reading a few pieces of information and can require a large centralized data file. By using Read/Write TAGs, an information exchange between the transceiver and the TAG is possible. With memories of up to 64 Kbytes, TAGs can keep track of production tests, inspection records, lot numbers, and more. This information can then be downloaded at the end of the production run for quality control and traceability.

FDA Plastics

Optional FDA approved plastic housings are available for TAGs and transceivers used in food, beverage, or pharmaceutical applications.

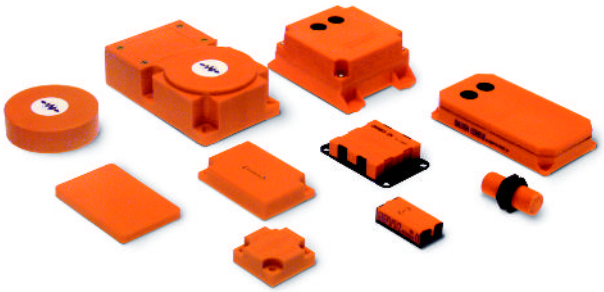


Diagnostic Bits

A TAG present bit indicates when the TAG is present in front of the transceiver. This part present indication eliminates the need to use a separate sensor to monitor position. In the event that a TAG is seen, but a data transfer error occurs, an error bit is executed with a corresponding error code. This bit alerts the user of a problem and gives an indication to the possible problem in the system.

System Components

TAGs



Two categories of TAGs are available: Read Only and Read / Write. Each TAG is available in a variety of shapes and sizes, with varying memory capabilities. All TAGs are passive and receive power from the transceiver for communications. The non-contact communications cause no wear on the TAG or transceiver and can take place while the TAG is static or moving. The factors for selecting a TAG are:

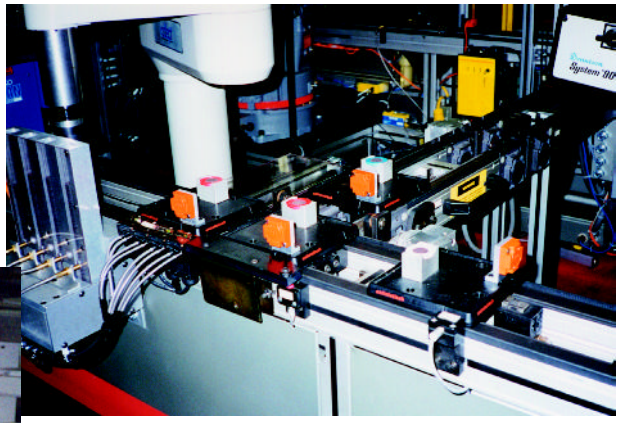
- Shape and mounting configuration
- The read or read/write distance necessary
- Memory capacity

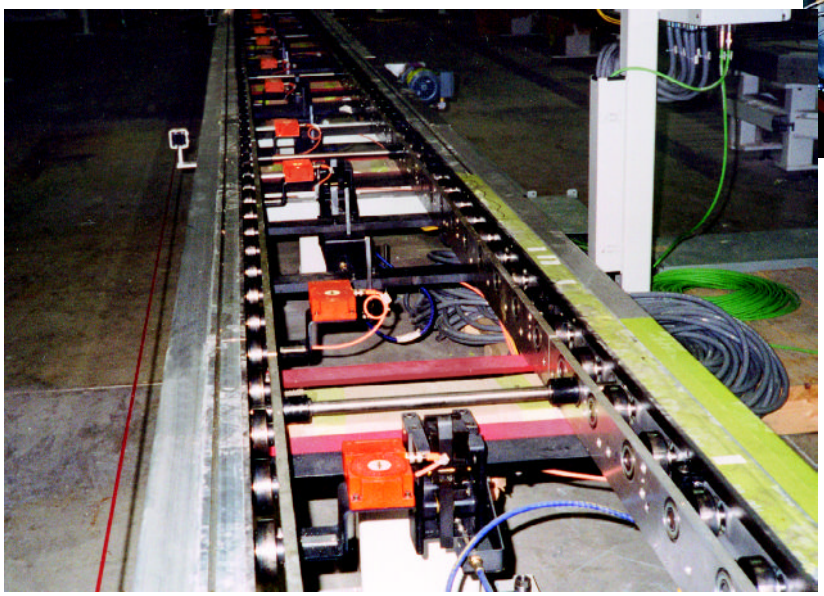
Read Only

- "Alternative to Barcode" - Economical, Read-only data transfer is reliable even under harsh conditions. The Read-only TAGs are programmed at the factory with options to program in the field. Fixed code TAGs are available with 1 byte, 2 byte or 7 byte memory capacities.

Read / Write

- "Manage Your Information" - Do not just track, but manage your information. The Read/Write TAGs can be read or written to when the TAG is in the transmission zone. Read/Write TAGs are available with 64 byte, 512 byte, 2 Kbyte, 8 Kbyte, 32 Kbyte or 64 Kbyte memory capacities.



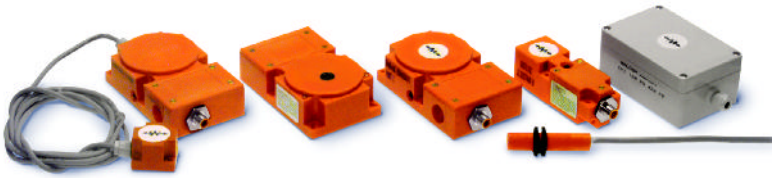


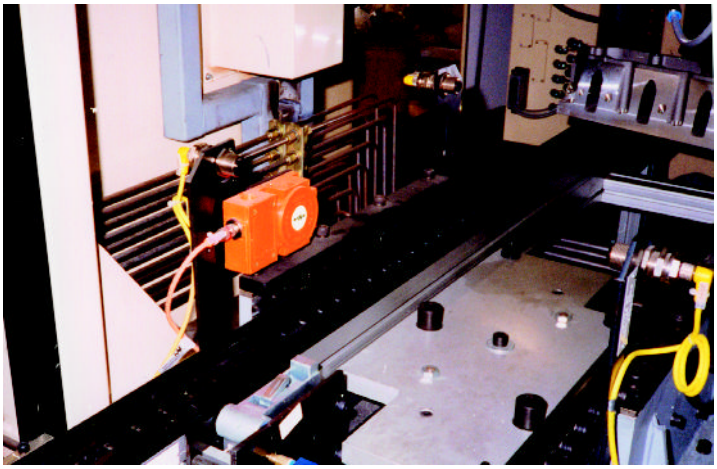
Transceivers

The transceiver establishes the electromagnetic field that provides power for the TAG. They are also the conduit for data transmission and reception. In order to perform a Read or Write application, the transceiver must be wired to a controller. These two components work together to allow communication to or from a TAG in the transmission zone.

The three factors that determine the selection of a transceiver are:

- Shape and mounting requirements
- Transmission zone dimensions (distance to TAG and length of zone)
- The proximity of the next transceiver



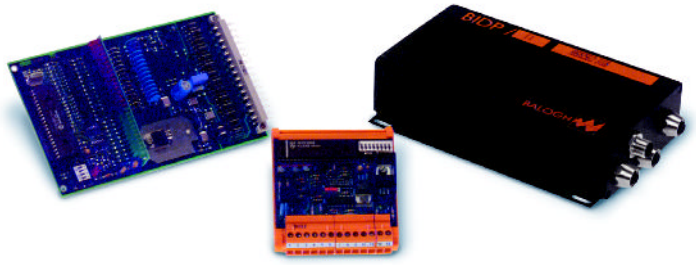


Controllers

The controller provides absolute data security and is the link between the user's control or logic system (PLC or PC) and the transceiver/TAG communication. Many controllers are available to allow for connection to various computer, controller, and Fieldbus system interfaces.

The following factors determine which control board best suits the application:

- Read-Only or Read/Write application?
- Is a Serial, Parallel or Fieldbus interface being used?
- What kind of controller? (PLC or PC)



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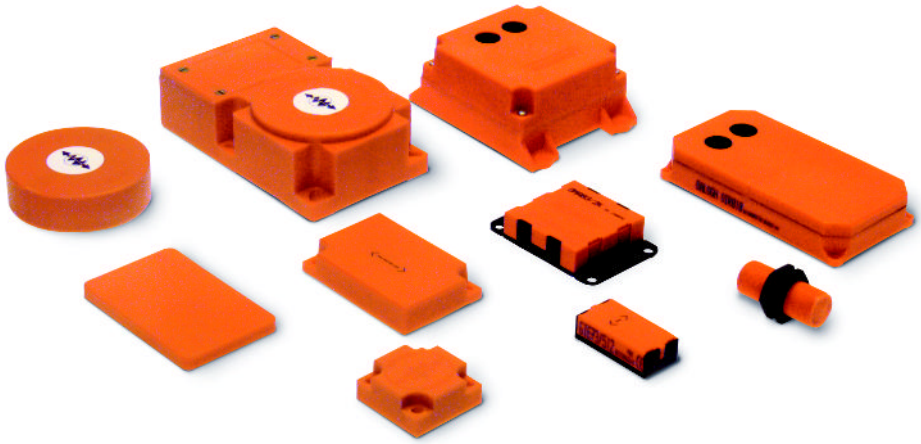
Selection Guide



"OC" Series - Read Only TAGs B2
"OF" Series - Read Only TAGs B3
"OFR" Series - Read Only TAGs B4
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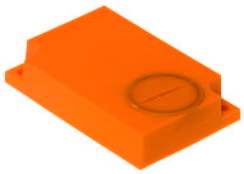
"OC" Series - Read Only TAGs

Description:

- Electronic Read-Only TAG
- User Definable Coding
- Passive - Functions without power source
- Reads at a distance without contact
- Reads "On the fly" or at a stop
- Optional in FDA Approved casing
- Optional with Directional/Positional outputs
- Optional with Dry Contact Inputs

Styles:	Memory Capacity:	Styles:	Memory Capacity:
 **56**	8 Bits	 **93/1195 Style (2 Meter Cable)**	8 Bits
 **85**	8 Bits	 **93/1281 Style (5 Meter Cable)**	8 Bits
 **93**	8 Bits		

Read System:

BALOGH Transceiver:

- "ERA" Series
- "ERO" Series
- "TLEB" Series

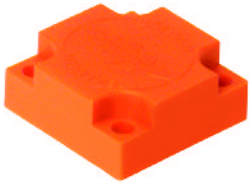
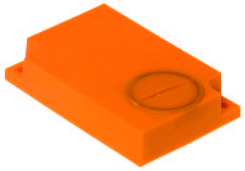
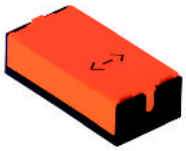
"OC" Series Compatible Interface Board:

- CLC Board

"OF" Series - Read-Only TAGs

Description:

- Electronic Read-Only TAG
- Passive - Functions without power source
- Reads at a distance without contact
- Reads "On-the-fly" or at a stop
- Optional in FDA Approved casing
- Factory programmed to user specifications

Styles:	Memory Capacity:	Styles:	Memory Capacity:
 **18**	7 bytes	 **85**	7 bytes
 **56**	7 bytes	 **861**	7 bytes
 **71**	7 bytes	 **93**	7 bytes
 **73**	7 bytes		

Read System:

BALOGH Transceiver:

- "ERA" Series
- "ERO" Series
- "TLEB" Series

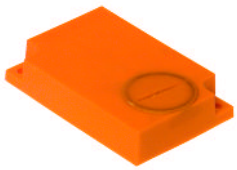
"OF" Series Compatible Interface Board:

- BS-46
- BI-1746
- BIGE
- BIBS-70
- MRUC-20 w/MRER-21
- BICN
- BIDN
- BIDP
- BIPC
- CLF-81
- MELS-30
- BIET

"OFR" Series - Read Only TAGs

Description:

- Electronic Read-Only TAG
- User Re-Programmable with "CPF" Hand-Held Unit and "OFR" Programming Cable
- Fully Functional as an "OF"-Series Replacement TAG
- Passive - Functions without power source
- Reads at a distance without contact
- Reads "On-the-fly" or at a stop
- Optional in FDA Approved casing

Styles:	Memory Capacity:	Styles:	Memory Capacity:
 **56**	7 bytes	 **93**	7 bytes
 **85**	7 bytes		

Read System:

BALOGH Transceiver:

- "ERA" Series
- "ERO" Series
- "TLEB" Series

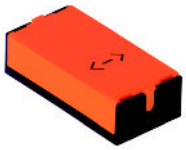
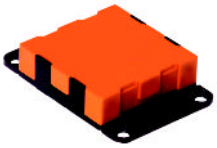
"OFR" Series Compatible Interface Board:

- BS-46
- BI-1746
- BIGE
- BIBS-70
- BICN
- BIDN
- MRUC-20 w/MRER-21
- BIDP
- BIPC
- CLF-81
- MELS-30
- BIET

"GIE" Series - Read/Write TAGs

Description:

- Electronic Read/Write TAG
- Passive - functions without power source
- Reads/Writes at a distance without contact
- Reads/Writes “on-the-fly” or at a stop
- Optional in FDA Approved casing
- Ferro-electric memory data storage

Styles:	Memory Capacity:	Styles:	Memory Capacity:
711 	512, 2 K, and 8 K bytes	**851** 	512, 2 K, and 8 K bytes
731 	512 and 2 K bytes	**931** 	512, 2 K, and 8 K bytes
831 	512, 2 K, and 8 K bytes		

Read System:

BALOGH Transceiver:

- “ERO” Series
- “TLEB” Series

“GIE” Series Compatible Interface Board:

- BICN
- BI-1746
- BIDN
- BIPC
- BIBS-70
- BIGE
- BIDP
- BS-46
- MELS-30
- MRUC-20
- BIET

"OIR" Series - Read/Write TAGs

Description:

- Infrared Read/Write TAG
- Reads/Writes at a distance without contact
- Reads/Writes "On-the-fly" or at a stop
- Large memory capacity, 32 K and 64 K

Styles:	Memory Capacity:	Styles:	Memory Capacity:
 **801**	32 K and 64 K bytes	 **810**	32 K and 64 K bytes

Read System:

BALOGH Transceiver:

- "EIR" Series

"OIR" Series Compatible Interface Board:

- BS-46
- BIGE
- BIDN
- BI-1746
- BICN
- BIPC
- BIBS-70
- MELS-30
- MRUC-20 w/MRER-21
- BIET

"OLR" Series - Read-Only TAGs

Description:

- Electronic Read-only TAG
- Long range - up to .5 meters
- Passive: Functions without a power source
- Factory coded to user specifications
- Reads at a distance without contact
- Can be Read "on-the-fly" or motionless

Styles:	Memory Capacity:
 **85 Style**	2 bytes

Read System:

BALOGH Transceiver:

- ERL

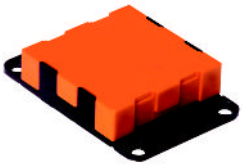
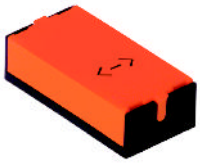
“OLR” Series Compatible Interface Board:

- BIDP
- BIBS-70
- BIDN
- BICN
- BIET

"OMA" Series - Read/Write TAGs

Description:

- Electronic Read/Write TAG
- Passive - Functions without power source
- Reads and Writes at a distance without contact
- Reads/Writes "On-the-fly" or at a stop
- Optional in High-Temp Models
- Optional in FDA Approved Casing
- Optional with Dry Contact Inputs
- Ferro Electric Memory Storage

Styles:	Memory Capacity:	Styles:	Memory Capacity:	Styles:	Memory Capacity:
 **181**	64 bytes	 **831**	64, 2 k and 8 k bytes	 **931**	64, 2 K, and 8 K bytes
 **711**	64, 2 K and 8 k bytes	 **851**	64, 2 K, and 8 K bytes		
 **731**	64 bytes	 **861**	64 bytes		

Read System:

BALOGH Transceiver:

- "ERA" Series
- "ERO" Series
- "TLEB" Series

"OMA" Series Compatible Interface Board:

- BS-46
- BIGE
- BIDN
- BIDP
- BI-1746
- BICN
- BIPC
- BIBS-70
- MELS-30
- MRUC-20 w/MRER-21
- CELA-81
- CELB-81
- CEPR-96
- BIET

"OMX" Series - High-Speed Read/Write TAGs

Description:

- Electronic High-Speed Read/Write TAG
- 8 K bytes or 32 K Data Memory Storage
- Passive - Functions without power source
- Reads and Writes at a distance without contact
- Reads/Writes "On-the-fly" or at a stop
- Optional in FDA Approved Casing
- Ferro-Electric Memory Storage

Styles:	Memory Capacity:
 **931 Style**	8 K bytes and 32 K

Read System:

BALOGH Transceiver:

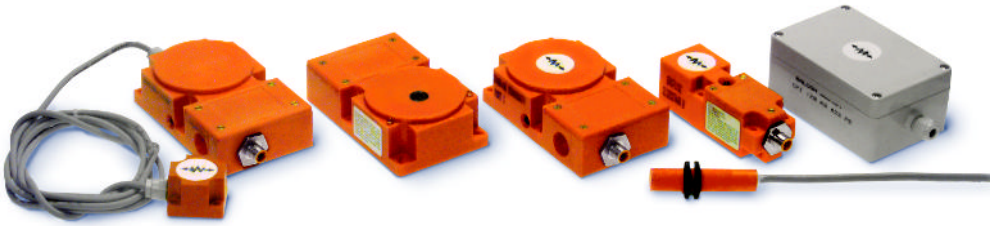
- "ERC" Series

"OMX" Series Compatible Interface Board:

- BS-46
- BIGE
- BIDN
- BIDP
- BICN
- BIPC
- BIBS-70
- MELS-30
- MRUC-20 w/MRER-21
- CEPR-96
- BIET

Notes:

Selection Guide



ERO-71/QC Transceiver **C2**
ERO-85/QC Transceiver **C3**
ERO-80/QC Transceiver **C4**
ERC-85/QC Transceiver **C5**
ERC-80/QC Transceiver **C6**
EIR-85/QC Transceiver **C7**
ERA-18 Transceiver **C8**
ERA-80/QC Transceiver **C9**
TLEB-891/PUR Transceiver **C10**
ERL-120+ANT 80/LP Transceiver **C11**
CPI-120/ Transceiver** **C12**

ERO-71/QC Transceiver

Description:

The ERO-71/QC Transmitter/receiver used with a Control Board allows:

- Reading of TAG types; "OC" and "OF/OFR"
- Reading and Writing of TAG types: "GIE" and "OMA"

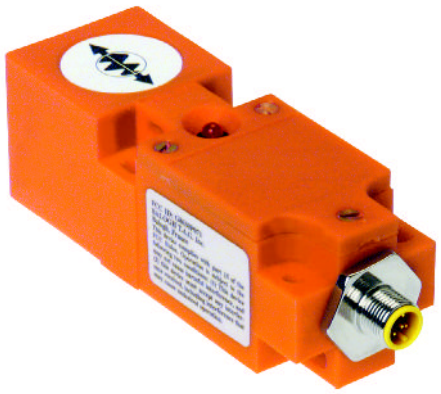
The ERO-71 has frontal and top sensing faces for transmission purposes.

Dimensions:

113 mm x 40 mm x 40 mm

Cabling:

The ERO-71/QC is designed to properly connect with **TURCK**'s full line of shielded polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.



Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG				
			OF-71	OF-93	OMA-731	OMA-931 OC-93	OMA-931/2K
Maximum Range	H	mm	16	23	16	25	22
Static Transmission Zone: Height (at Sr)	Sr	mm	6	9	6.5	10	8
Typical Length (at Sr)	L	mm	48	55	40	60	55
Typical Width (at Sr)	W	mm	25	25	25	30	30
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	40	45	40	45	40
Maximum Lateral Offset	DSr	mm	4	7.5	4	7.5	7.5
Maximum Angular Offset	<°	°	20	20	20	20	20
Distance Between Two Transceivers	Der	mm	250	250	250	250	250
Zone without Metal Present			See Section H				
Power Supply (< 10% Ripple)	Ual	VDC	24				
Voltage Tolerance	dUal		-10% to +10%				
Maximum Current Consumption	Im	mA	150				
Minimum Ambient Temperature	Tmin	°C	-25				
Maximum Ambient Temperature	Tmax	°C	+70				
Protection Degree	IP		65				
Weight	M	g	200				
Casing			Rilsan				
Interior Electric Protection Material			Polyurethane				
Max. Length Cable to Control Board		M	300				
Protected Against: Polarity Reversal			Yes				
Load Short-Circuit			Yes				

ERO-85/QC Transceiver

Description:

The ERO-85/QC Transmitter/receiver used with a Control Board allows:

- Reading of TAG types; “OC” and “OF/OFR”
- Reading and Writing of TAG types: “GIE” and “OMA”

Dimensions:

130 mm x 80 mm x 40 mm

Cabling:

The ERO-85/QC is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG				
			OF-73	OF-93	OMA-851	OMA-931 OC-93	OMA-931/2K
Maximum Range	H	mm	45	68	110	80	75
Static Transmission Zone: Height (at Sr)	Sr	mm	18	27	44	32	30
Typical Length (at Sr)	L	mm	90	150	220	160	150
Typical Width (at Sr)	W	mm	50	50	60	55	55
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	70	100	160	110	110
Maximum Lateral Offset	DSr	mm	13.5	15	18	15	15
Maximum Angular Offset	<°	°	20	20	20	20	20
Distance Between Two Transceivers	Der	mm	1200	1200	1200	1200	1200
Zone without Metal Present			See Section H				
Power Supply (< 10% Ripple)	Ual	VDC	24				
Voltage Tolerance	dUal		-20% to +15%				
Maximum Current Consumption	Im	mA	150				
Minimum Ambient Temperature	Tmin	°C	-25				
Maximum Ambient Temperature	Tmax	°C	+70				
Protection Degree	IP		65				
Weight	M	g	600				
Casing			Rilsan				
Interior Electric Protection Material			Polyurethane				
Max. Length Cable to Control Board		M	300				
Protected Against: Polarity Reversal			Yes				
Load Short-Circuit			Yes				

ERO-80/QC Transceiver

Description:

The ERO-80/QC Transmitter/receiver used with a Control Board allows:

- Reading of TAG types; "OC" and "OF/OFR"
- Reading and Writing of TAG types: "GIE" and "OMA"

Dimensions:

235 mm x 80 mm x 40 mm

Cabling:

The ERO-8O/QC is designed to properly connect **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG			
			OF-93	OMA-851	OMA-931 OC-93	OMA-931/2K
Maximum Range	H	mm	100	180	120	100
Static Transmission Zone: Height (at Sr)	Sr	mm	40	72	48	40
Typical Length (at Sr)	L	mm	180	360	240	200
Typical Width (at Sr)	W	mm	120	160	150	120
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	140	220	160	120
Maximum Lateral Offset	DSr	mm	37.5	40	37.5	30
Maximum Angular Offset	<°	°	20	20	20	20
Distance Between Two Transceivers	Der	mm	2000	2000	2000	2000
Zone without Metal Present			See Section H			
Power Supply (<10% Ripple)	Ual	VDC	24			
Voltage Tolerance	dUal		-10% to +10%			
Maximum Current Consumption	Im	mA	150			
Minimum Ambient Temperature	Tmin	°C	-25			
Maximum Ambient Temperature	Tmax	°C	+70			
Protection Degree	IP		65			
Weight	M	g	500			
Casing			Rilsan			
Interior Electric Protection Material						
Max. Length Cable to Control Board		M	300			
Protected Against: Polarity Reversal			Yes			
Load Short-Circuit			Yes			

ERC-85/QC Transceiver

Description:

The ERC-85/QC Transceiver used with a BALOGH Control Board allows Reading and/or Writing of Electronic TAG: "OMX" series.

Dimensions:

130 mm x 80 mm x 40 mm

Cabling:

The ERC-85/QC is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

Optional remote head not shown.

Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG OMX-931/8K
Maximum Range	H	mm	50
Static Transmission Zone: Height (at Sr)	Sr	mm	20
Typical Length (at Sr)	L	mm	100
Typical Width (at Sr)	W	mm	35
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	60
Maximum Lateral Offset	DSr	mm	12
Maximum Angular Offset	<°	°	20
Distance Between Two Transceivers	Der	mm	500
Zone without Metal Present			See Section H
Power Supply (<10% Ripple)	Ual	VDC	24
Voltage Tolerance	dUal		-10% to +10%
Maximum Current Consumption	Im	mA	200
Minimum Ambient Temperature	Tmin	°C	-25
Maximum Ambient Temperature	Tmax	°C	+70
Protection Degree	IP		65
Weight	M	g	600
Casing			Rilsan
Interior Electric Protection Material			Polyurethane
Max. Length Cable to Control Board		M	300
Protected Against: Polarity Reversal			Yes
Load Short-Circuit			Yes

ERC-80/QC Transceiver

Description:

The ERC-80/QC Transceiver used with a BALOGH Control Board allows Reading and/or Writing of Electronic TAGS type; OMX Series.

Dimensions:

235 mm X 80 mm x 40 mm

Cabling:

The ERC-80/QC is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG	
			OMX-931/8K	OMX-851/8K
Maximum Range	H	mm	70	100
Static Transmission Zone: Height (at Sr)	Sr	mm	28	40
Typical Length (at Sr)	L	mm	160	220
Typical Width (at Sr)	W	mm	45	120
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	110	140
Maximum Lateral Offset	DSr	mm	20	25
Maximum Angular Offset	<°	°	20	20
Distance Between Two Transceivers	Der	mm	1450	1450
Zone without Metal Present			See Section H	
Power Supply (<10% Ripple)	Ual	VDC	24	
Voltage Tolerance	dUal		-10% to +10%	
Maximum Current Consumption	Im	mA	150	
Minimum Ambient Temperature	Tmin	°C	-25	
Maximum Ambient Temperature	Tmax	°C	+70	
Protection Degree	IP		65	
Weight	M	g	500	
Casing			Rilsan	
Interior Electric Protection Material				
Max. Length Cable to Control Board			100	
Protected Against: Polarity Reversal			Yes	
Load Short-Circuit			Yes	

EIR-85/QC Transceiver

Description:

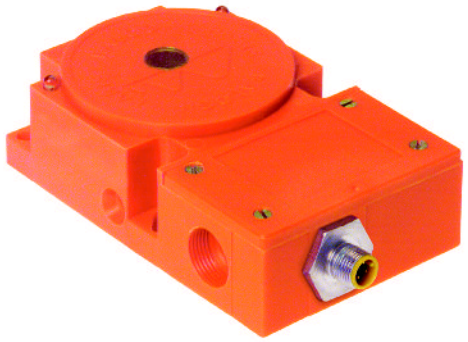
The EIR-85/QC Transceiver used with a BALOGH Control Board allows Reading and/or Writing of Infrared TAGS, type: "OIR" series. Special features include long range ability provided by infrared data transmission

Dimensions:

130 mm x 80 mm x 40 mm

Cabling:

The EIR-85/QC is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.



Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG OIR-801
Maximum Range	H	mm	2000
Static Transmission Zone: Height (at Sr)	Sr	mm	1200
Typical Length (at Sr)	L	mm	600
Typical Width (at Sr)	W	mm	600
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	600
Maximum Lateral Offset	DSr	mm	100
Maximum Angular Offset	<°	°	+/-15
Distance Between Two Transceivers	Der	mm	
Zone without Metal Present			See Section H
Power Supply (<10% Ripple)	Ual	VDC	24
Voltage Tolerance	dUal		-10% to +10%
Maximum Current Consumption	Im	mA	150
Minimum Ambient Temperature	Tmin	°C	0
Maximum Ambient Temperature	Tmax	°C	+25
Protection Degree	IP		65
Weight	M	g	400
Casing			Rilsan
Interior Electric Protection Material			Polyurethane
Max. Length Cable to Control Board		M	300
Protected Against: Polarity Reversal			
Load Short-Circuit			

ERA-18 Transceiver

Description:

The ERA-18 Transceiver used with a BALOGH Control Board allows:

- Reading of TAG types; "OF 18" TAGS.
- Reading and Writing of TAG types; "OMA 18" TAGS.

Connections:

Connection is made between a control board and the ERA-18 with a #4 conductor cable (includes 2 meter cable).
Dimensions: 76 mm x 18 mm Dia.

Cabling:

The ERA-18 is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG OMA-18
Maximum Range	H	mm	8
Static Transmission Zone: Height (at Sr)	Sr	mm	3
Typical Length (at Sr)	L	mm	
Typical Width (at Sr)	W	mm	
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	
Maximum Lateral Offset	DSr	mm	5
Maximum Angular Offset	<°	°	360
Distance Between Two Transceivers	Der	mm	80
Zone without Metal Present			See Section H
Power Supply (<10% Ripple)	Ual	VDC	24
Voltage Tolerance	dUal		-10% to +10%
Maximum Current Consumption	Im	mA	150
Minimum Ambient Temperature	Tmin	°C	-25
Maximum Ambient Temperature	Tmax	°C	+70
Protection Degree	IP		67
Weight	M	g	150
Casing			Rilsan
Interior Electric Protection Material			Polyurethane
Max. Length Cable to Control Board		M	300M
Protected Against:			
Load Short-Circuit			

ERA-80/QC Transceiver

Description:

The ERA-80/QC Transmitter/receiver used with a Control Board allows:

- Reading of TAG types; "OC" and "OF/OFR"
- Reading and Writing of TAG types: "GIE" and "OMA"

Dimensions:

235 mm X 80 mm x 40 mm

Cabling:

The ERA-80/QC is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

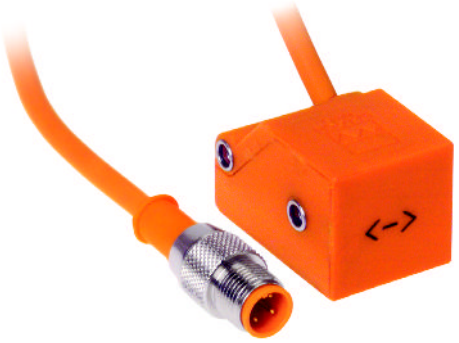
Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG				
			OF-93	OC-93	OMA-851	OMA-931	GIE-851
Maximum Range	H	mm	26	32	40	28	40
Static Transmission Zone: Height (at Sr)	Sr	mm	10	14	16	11	16
Typical Length (at Sr)	L	mm	200	220	220	200	220
Typical Width (at Sr)	W	mm	40	45	50	40	50
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	180	200	200	180	200
Maximum Lateral Offset	DSr	mm	12	12	15	10	15
Maximum Angular Offset	<°	°	20	20	20	20	20
Distance Between Two Transceivers	Der	mm	2000	2000	2000	2000	2000
Zone without Metal Present			See Section H				
Power Supply (<10% Ripple)	Ual	VDC	24				
Voltage Tolerance	dUal		-10% to +10%				
Maximum Current Consumption	Im	mA	150				
Minimum Ambient Temperature	Tmin	°C	-25				
Maximum Ambient Temperature	Tmax	°C	+70				
Protection Degree	IP		65				
Weight	M	g	600				
Casing			Rilsan				
Interior Electric Protection Material							
Max. Length Cable to Control Board		M	100				
Protected Against: Polarity Reversal			Yes				
Load Short-Circuit			Yes				

TLEB-891/PUR Transceiver

Description:

The TLEB-891/PUR Transmitter/receiver used with a Control Board allows:

- Reading of TAG types; “OC” and “OF/OFR”
- Reading and Writing of TAG types: “GIE” and “OMA”



Connections:

Connection is made between a control board and TLEB-891/PUR Transceiver with a 4 conductor shielded cable with a maximum cable length of 50 meters. Includes 0.8m cable.

Dimensions:

42.5 mm x 27 mm x 26 mm

Cabling:

The TLEB-891/PUR is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG				
			OF-73	OF-71	OMA-931	OMA-731	GIE-711
Maximum Range	H	mm	20	25	30	20	23
Static Transmission Zone: Height (at Sr)	Sr	mm	8	10	12	8	9
Typical Length (at Sr)	L	mm	40	50	70	40	
Typical Width (at Sr)	W	mm	15	20	32	20	
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	30	40	55	30	55
Maximum Lateral Offset	DSr	mm	6	12	12	8	5
Maximum Angular Offset	<°	°	20	20	20	20	20
Distance Between Two Transceivers	Der	mm	170	170	170	170	170
Zone without Metal Present			See Section H				
Power Supply (<10% Ripple)	Ual	VDC	24				
Voltage Tolerance	dUal		-10% to +10%				
Maximum Current Consumption	Im	mA	60				
Minimum Ambient Temperature	Tmin	°C	-25				
Maximum Ambient Temperature	Tmax	°C	+50				
Protection Degree	IP		67				
Weight	M	g	85				
Casing			Rilsan				
Interior Electric Protection Material			Polyurethane				
Max. Length Cable to Control Board		M	50				
Protected Against: Polarity Reversal			Yes				
Load Short-Circuit			Yes				

ERL-120+ANT 80/LP Transceiver

Description:

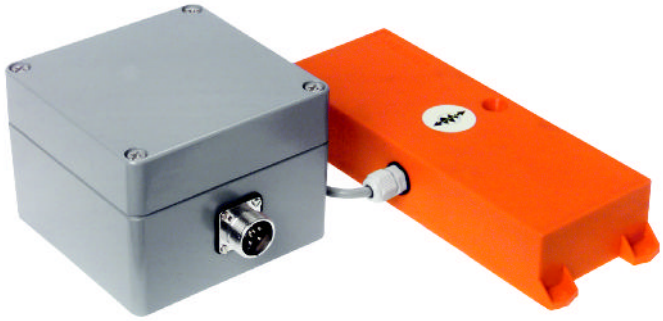
The ERL-120+ANT 80/LP Transmitter/receiver used with a BALOGH Control Board allows Reading of "OLR" Style Electronic TAGS type

Dimensions:

118 mm x 118 mm x 90 mm (ERL-120)80 mm x 235 mm x 40 mm (ANT 80)0.45 m Cable between ERL-120 and ANT 80/LP

Cabling:

The ERL-120+ANT 80/LP is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.



Characteristics (At 25 C)	Symbol	Unit	With Electronic TAG OLR-85
Maximum Range	H	mm	550
Static Transmission Zone: Height (at Sr)	Sr	mm	220
Typical Length (at Sr)	L	mm	850
Typical Width (at Sr)	W	mm	250
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	800
Maximum Lateral Offset	DSr	mm	100
Maximum Angular Offset	<°	°	20
Distance Between Two Transceivers	Der	mm	2000
Zone without Metal Present			See Section H
Power Supply (< 10% Ripple)	Ual	VDC	24
Voltage Tolerance	dUal		-10% to +10%
Maximum Current Consumption	Im	mA	300
Minimum Ambient Temperature	Tmin	°C	-25
Maximum Ambient Temperature	Tmax	°C	+70
Protection Degree	IP		65 (ANT 80/LP)-10 (ERL-120)
Weight	M	g	4300
Casing			Rilsan (ANT 80/LP)- Metal (ERL-120)
Interior Electric Protection Material			Polyurethane
Max. Length Cable to Control Board		M	300
Protected Against:			Yes
Load Short-Circuit			Yes

CPI-120/** Transceiver

Description:

The CPI-120/** is an inductive coupled, single channel, asynchronous, half-duplex, slave device. It enables serial communications between two intelligent devices (Computers, Terminals, etc.) by means of serial communications (independent of protocol or format).

Dimensions:

172 mm x 60 mm x 80 mm each

Cabling:

The CPI-120/** is designed to properly connect with **TURCK**'s full-line of Shielded Polyurethane jacket cable sets. Please contact **TURCK** for additional connector/cabling information.

Characteristics (At 25 C)	Symbol	Unit	Dialogue Antenna CPI-120
Maximum Range	H	mm	
Static Transmission Zone: Height (at Sr)	Sr	mm	80
Typical Length (at Sr)	L	mm	320
Typical Width (at Sr)	W	mm	
Dynamic Transmission Zone: Min. Length (at Sr)	LSr	mm	
Maximum Lateral Offset	DSr	mm	60
Maximum Angular Offset	<°	°	20
Distance Between Two Transceivers	Der	mm	800
Zone without Metal Present			See Section H
Power Supply (<10% Ripple)	Ual	VDC	24
Voltage Tolerance	dUal		-10% to +10%
Maximum Current Consumption	Im	mA	150
Minimum Ambient Temperature	Tmin	°C	-25
Maximum Ambient Temperature	Tmax	°C	+70
Protection Degree	IP		65
Weight	M	g	360
Casing			PVC
Interior Electric Protection Material			
Max. Length Cable to Control Board		M	50
Protected Against: Polarity Reversal			Yes
Load Short-Circuit			

PM-15

Features:

- Configurable to "OMA" series Read/Write TAGS, and "OMX" High Speed Read/Write TAGS.
- 4 line LCD backlight display, and hand strap.
- Touch pad key entry with bi-directional cursor movement.
- Programmable function keys.
- Built-in scrolling Help menu.
- 64 K Internal data buffer.
- Can Read, Write, and Initialize TAGS.
- Displays last TAG status.
- Displays data in Byte or Word format.
- Hex, Decimal, Binary, or ASCII.
- Quick connector port for optional PMTD remote transceiver.
- Optional SPM15 RF changer (non-contact recharging of Ni-CAD batteries). Powered by 4 AA Ni-CAD or Alkaline batteries.

CPF-88

Features:

- Reads "OF" series and "OFR" series Read Only TAGS.
- Programming of "OFR" re-programmable TAGS, (Programming cable optional).
- LCD Display.
- Displays data in Hex, or Decimal format.
- Auto power shut-off after 6 minutes of inactivity. Powered by 4 AA Ni-CAD or Alkaline batteries.

SPM-15

Features:

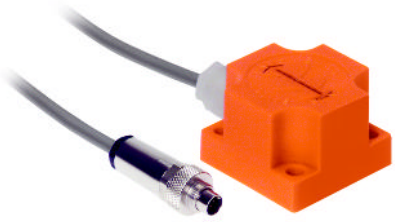
- Contact-less re-charger for PM-15 Hand-held.
- Will re-charge 4 AA Ni-cad batteries while still in the PM-15.
- AC/DC power cord.

PMTD

Features:

- Remote transceiver for PM-15 Handheld. Allows user to Read\Write from PM-15. Small 40 x 40 x 28 mm profile. 6 ft. Cable.

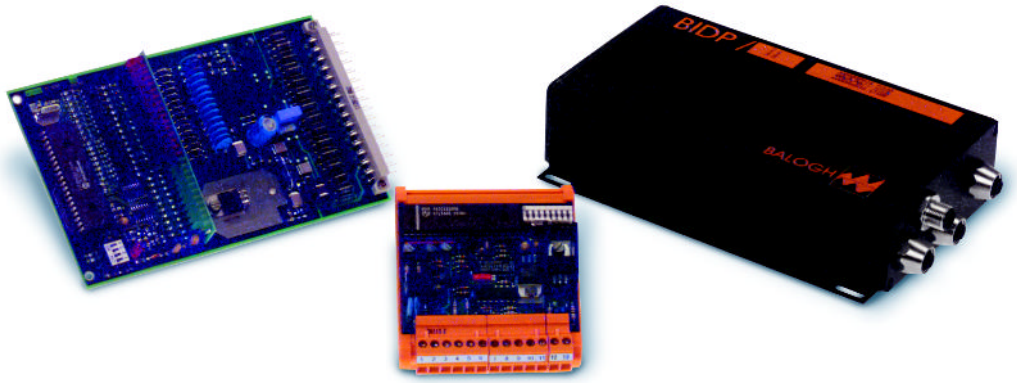
- PM-15 with SPM15 charger and PMTD remote Transceiver.



Notes:

Notes:

Selection Guide



BIET/** EtherNet® Interface E3
BI-1746/**Allen-Bradley SLC® Backplane Module E4
BICN/** ControlNet® Network Interface E4
BIDN/**DeviceNet® Network Interface E5
BIDP/** ProfiBus-DP® Interface E5
BIGE/** G.E. Genius® Bus Network Interface E6
BS-46/** Multi-Protocol Control Board E6
BIPC/** ISA PC-Bus Interface Card E7
MELS-30/* Single Channel Multi-Protocol Control Board E7
BIBS-70/** INTERBUS-S® Remote Bus Interface E8
MRUC-20 . . . . . E8
MRER-21/** E9
MRES-22 . . . . . E9
CLC-81 Control Board E10
CLC-83 Control Board E10

CLF-81 Control Board **E11**

CELA-81 Control Board **E11**

CELB-81 Control Board **E12**

CEPR-96 Programmable Control Board **E12**

NEW

BIET/** EtherNet® Interface

Features:

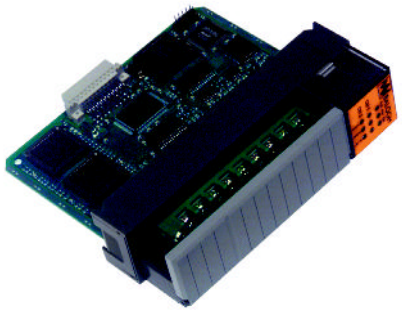
- Dual channel capability. Controls two transceivers functioning independently and simultaneously.
- Allows Reading & Writing of "GIE", "OMA", "OMX", and "OIR" series TAGs and Reading of "OF/OFR" and "OLR" series TAGs.
- Supports Multiple Protocols:
  TCP/IP with BALOGH Messaging
  EtherNet/IP®
  MODBUS® - TCP
- Connects via Etherlink at 10 or 100 Mbauds with automatic switchover
- 9 visible LEDS provide power, status and diagnostic information
- IP-65 rated enclosure allows for field mounting
- Encompass® Partner Product

BI-1746/** Allen-Bradley SLC® Backplane Module

Features:

- Dual channel capability. Controls two transceivers functioning independently and simultaneously. 2 RS-232 serial ports, one general purpose to send/receive data, the other port provides the ability to upgrade the flash program memory.
- CE Compliant.
- Allows Reading & Writing of BALOGH "GIE", “OIR”, “OMA", & "OMX" TAGs, and Reading of BALOGH "OF" , "OFR" and “OLR” Read-Only TAGs.
- Battery backed SRAM Memory.
- Easy to use instruction set.
- Encompass® Partner Product

* * Defines control for channel 1 & 2



BICN/** ControlNet® Network Interface

Features:

- Dual channel capability. Controls two transceivers functioning independently and simultaneously
- Allows Reading & Writing of BALOGH "GIE", “OIR”, "OMA", & "OMX" TAGs, and Reading of BALOGH "OF", "OFR" and “OLR” Read Only TAGs.
- User configurable serial port allows sending and receiving of data at 115K baud. Battery backed SRAM memory, flash upgradeable IP-65 rated enclosure allows field mounting.
- 9 external, visible, LEDs provide power, status, and diagnostic information.
  Dip switch node ID selectable.
- Communicates on ControlNet® Network at 5M baud.
- Simple communication instructions for Read and/or Write.
- CE compliant.
- Encompass® Partner Product

* * Defines control for channel 1 & 2

BIDN/** DeviceNet Network Interface

Features:

- Dual channel capability. Controls two transceivers functioning independently and simultaneously.
- Multi-Drop capability.
- Allows Reading & Writing of BALOGH "GIE", “OIR”, "OMA", & "OMX" TAGs, and reading of BALOGH "OF", "OFR" and “OLR” Read Only TAGs.
- Selectable data transfer rates of 125 K, 250 K, or 500 K Baud.
- Dip Switch Node ID selectable automatic self-test on power-up. CE compliant
- IP 65 rated metallic enclosure with quick connectors.
- Small footprint provides for ease of mounting.
- LED status indication.
- DeviceNet® Conformance tested.
- Encompass® Partner Product

For DeviceNet® Drop cables and Tees see pages F9 and F10.

* Defines control for channel 1 & 2.

BIDP/** ProfiBus-DP Interface

Features:

- Dual channel capability. Controls two Transceivers functioning independently and simultaneously.
- IP 65 rated metallic enclosure and quick connect wiring, provides field mounting, durability, and reduces wiring costs.
- Selectable data transfer rates up to 12 mega-baud
- Bi-Color LED indication for: Bus status, Channel Operation, TAG Presence, Transceiver Fault, and 24 VDC Power.
- Dip Switch Selectable Node Addressing.
- Allows Reading & Writing of BALOGH "GIE", “OIR”, "OMA", & "OMX" TAGs, and Reading of BALOGH "OF", "OFR" and “OLR” Read Only TAGs.
- PTO Certified.

For ProfiBus® Drop cables and Tees see pages F9 and F10.

* * Defines control for channel 1 & 2.

BIGE/** G.E. Genius® Bus Network Interface

Features:

- Dual channel capability. Controls two Transceivers.
- Multiple BIGE units on the Genius® Bus (each with unique slave address).
- Executes Block Reads and Block Writes of up to 128 bytes in length.
- Allows Reading & Writing of BALOGH "GIE", “OIR”, "OMA", & "OMX" TAGs, and Reading of BALOGH "OF", "OFR" Read Only TAGs.
- Provides the current execution status for each BIGE channel through Global data.
- Communicates with G.E. Fanuc series 90/30 & 90/70 PLC through the Genius® Bus Controller module.
- Can communicate with PC based systems using a computer-host bus controller such as the PCIM (Personal Computer Interface Module) card.
- Available in NEMA 12 enclosure with quick connectors or Non-NEMA enclosure with screw terminals(As pictured).

* * Defines control for channel 1 & 2

BS-46/** Multi-Protocol Control Board

Features:

- Dual channel capability. Controls two Transceivers functioning independently and simultaneously.
- Allows Reading & Writing of BALOGH "GIE", “OIR”, "OMA", & "OMX" TAGs and Reading of BALOGH "OF", "OFR" Read only TAGs.
- Serial link configurable to RS-422, RS-485, or RS-232.
- Multi-Drop capability using RS-422 communications. You can connect up to 16 BS-46 units (controlling up to 32 Transceivers).
- Easy access dip switches to configure Protocol, Slave Number, Baud Rate, & Parity.
- Allen-Bradley Channel Zero connection to a PLC5 or SLC 5/03, 5/04. Utilitize the DH+ Typed Read and Typed Write message instructions.
- LED Status lights.
- Din Rail mountable.

Protocols:

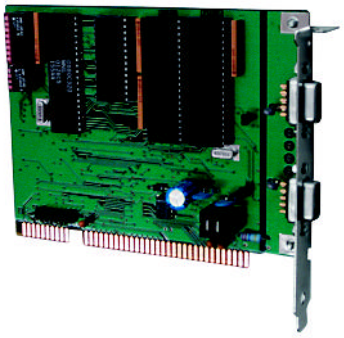
- UNITELWAY® a trademark of Telemecanique.
- 3964R® a trademark of Siemens.
- DF1®(Full Duplex) DF1®(Half Duplex) a trademark of Allen-Bradley.
- JBUS® a trademark of April.
- MODBUS® a trademark of Modicon.

* * Defines control for channel 1 & 2

BIPC/** ISA PC-Bus Interface Card

Features:

- Dual channel capability, each operating independently and simultaneously.
- Multi-card capability to a single computer.
- Multiple address ranges and IRQ selections
- Quick connector wiring
- Virtual Device Drivers for Win3.11, Win95/98, Win NT.
- CE Compliant
- "C" driver library for programming compatibility
- Operational power is supplied by the PC-Bus
- 1/2" slot PC card format
- Available for the BALOGH passive "OMA", "GIE", "OIR" series Read/Write TAGs, "OMX" series High-speed Read/Write TAGs and "OF", "OFR" Read-Only TAGs.



MELS-30/* Single-Channel Multi-Protocol Control Board

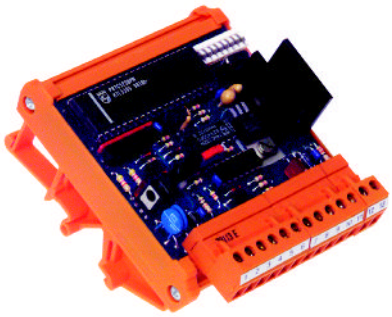
Features:

The BALOGH MELS-30 is a single channel multi-protocol serial interface. Configured as a serial slave device, the MELS-30 provides a simple, small profile interface to the BALOGH RFID system.

Protocol configurations include:

- **DF1®(Full Duplex) DF1®(Half Duplex), Multi-Drop® to channel 0**, a trademark of Allen-Bradley,
- **MODBUS®** a trademark of Modicon.
- **UNITELWAY®** a trademark of Telemecanique.
- **JBUS®** a trademark of April, Each MELS-30 can control (1) Transceiver.

Allows the Reading and the Writing of BALOGH "GIE", "OIR", "OMA" series, "OMX" series TAGs, and reading of BALOGH "OF" and "OFR" Read-Only TAGs. DIN rail mountable.



BIBS-70/** INTERBUS-S® Remote Bus Interface

Features:

- Allows Reading and Writing of BALOGH "GIE", “OIR”, "OMA" series, and "OMX" series TAGs. Reading of BALOGH "OF", "OFR" and “OLR” series Read-Only TAGs.
- Phoenix version 2.0 PCP protocol.
- Each BIBS-70 controls two transceivers.
- Remote Bus unit providing connectivity of up to 62 BIBS-70 (1 PCP word version) controllidng 124 Read-Only or Read/Write stations.
- InterBus-S® module ID of 241 with standard 4 PCP word version.
- One word of status returned each bus scan over I/Ochannel providing: Operation in progress, TAG presences, and error indication.
- PCP channel used for communication of: Orders to execute, TAG address to Read/Write, & Data. LED status indications for Bus and channel status.
- IP 65 Rated enclosure with quick connectors.

* * Defines control for channel 1 & 2

MRUC-20

Features:

Central Processor Unit for the BALOGH Modul-R® CAN-Bus RFID system.

High Speed network running at 300 K baud.

Multi-Protocol capable: DF1®, ModBus®, JBUS®, UNITELWAY®, and 3964R®.

Executes user-designed programs for the control and management of data.

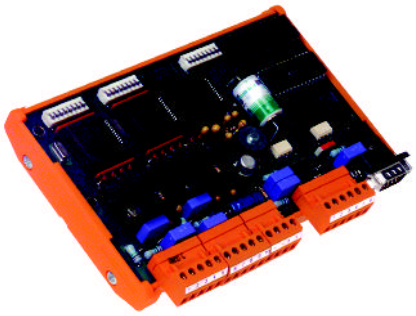
1270 program lines in 1 program or up to 5 separate programs (1 supervisor and 4 application) running independently in mono-task or multi-task modes.

Allows Reading and Writing of BALOGH "OMA", "GIE", “OIR”, series, and "OMX" series TAGs. Reading of BALOGH "OF" series, "OFR" series, and Only TAGs.

Supports up to 2 independent CAN network channels each accepting up to 8 Transceiver modules (MRER-21), 16 parallel I/O modules (MRES-22), or a combination of both.

2 Serial ports, 1 RS-232, 1 RS-422.

Din Rail mountable.

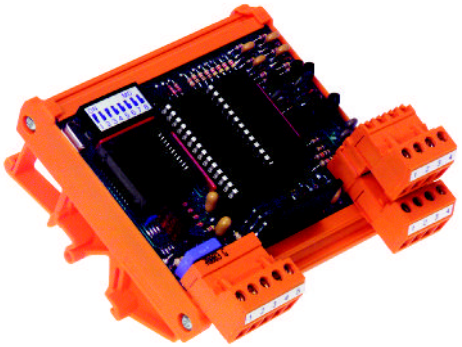


MRER-21/**

Features:

- Modul-R® slave module permitting communication with BALOGH RFID TAGs.
- Provides communication channel to MRUC-20 CPU. Each module controls 2 channels simultaneously and independently.
- 8 MRER-21 modules can be connected to each of 2 CAN networks supplied by the CPU (MRUC-20).
- Din Rail mountable.

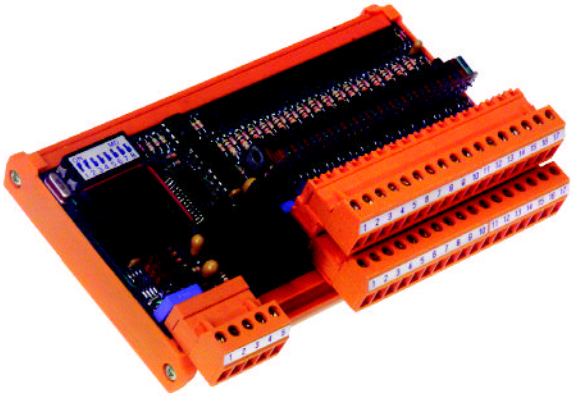
** Defines control for channel 1 & 2.



MRES-22

Features:

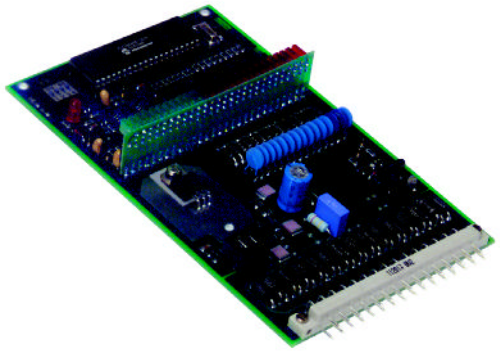
- 16 inputs LED indicated.
- 16 static outputs, LED indicated and protected.
- Up to 1024 Parallel I/O.



CLC-81 Control Board

Features:

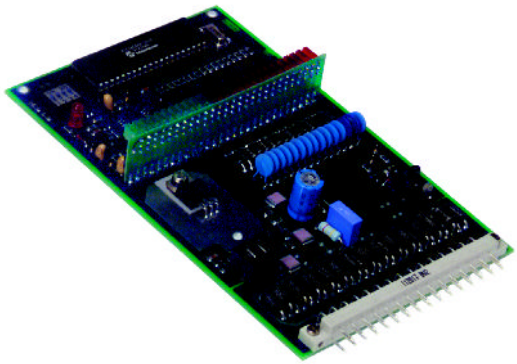
- Parallel Control Card, Eurocard Format (100 mm x 160 mm).
- Multiplexable parallel connection.
- Allows Reading of type "OC" Read-Only TAGs.
- Each Control Board must be connected to a BALOGH Transceiver in order to Read data from the TAGs.
- Requires GC-01 Board Holder.



CLC-83 Control Board

Features:

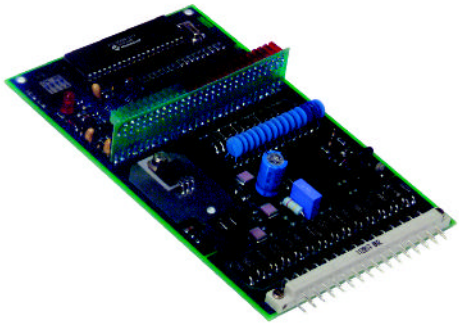
- Parallel Control Card, Eurocard Format (100 mm x 160 mm).
- Multiplexable parallel connection.
- Allows Reading of type "OC" Read-Only TAGs.
- Each Control Board must be connected to a BALOGH Transceiver in order to Read data from the TAGs.
- When used in conjunction with an ERAI-80 Transceiver, provides Data, Directional and Positioning information.
- Requires GC-01 Board Holder.



CLF-81 Control Board

Features:

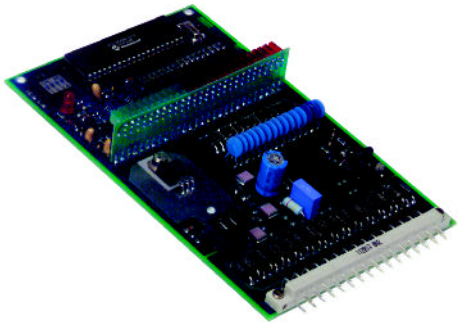
- Parallel Control Card, Eurocard Format (100 mm x 160 mm).
- Multiplexable parallel connection.
- Allows Reading of type "OF"/"OFR" TAGs.
- Reads and buffers entire "OF"/"OFR" TAG (7 bytes).
- Echoes each byte read according to the selected address.
- Each Control Board must be connected to a BALOGH Transceiver in order to Read data from the TAGs.
- Requires GC-01 Board Holder.



CELA-81 Control Board

Features:

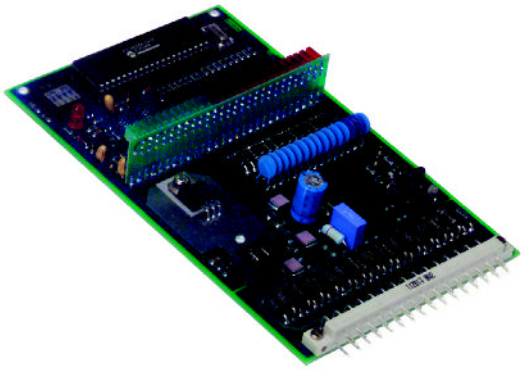
- Parallel Control Card, Eurocard Format (100 mm x 160 mm).
- Allows Reading and Writing of type "OMA 64" byte TAGS.
- Reads/Writes blocks one byte at a time.
- Each Control Board must be connected to a BALOGH Transceiver in order to Read data from the TAGS.
- Requires GC-01 Board Holder.



CELB-81 Control Board

Features:

- Parallel Control Card, Eurocard Format (100 mm x 160 mm).
- Allows Reading and Writing of type "OMA 64" byte or 2K byte TAGs.
- Reads or Writes blocks of data (77 bytes Continuous Format, 38 bytes Discontinuous Format).
- Each Control Board must be connected to a BALOGH Transceiver in order to Read data from the TAGs.
- Requires GC-01 Board Holder.



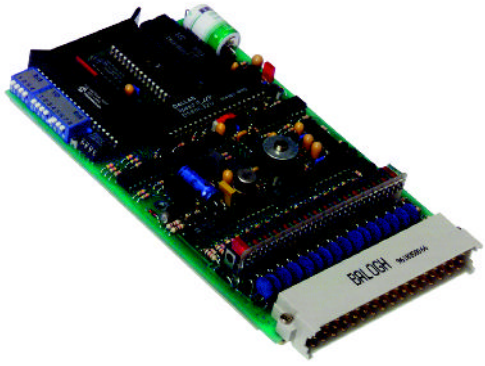
CEPR-96 Programmable Control Board

Features:

Programmable control card, Eurocard format (188 mm x 130 mm with GC-02).
Allows Reading and Writing of BALOGH "OMA", "OIR", "OMX", and "GIE" TAGs. Reading of BALOGH "OF/OFR" and "OLR" Read-Only TAGs.

Multi-Protocol capable.

- **UNITELWAY®** a trademark of Telemecanique.
- **3964R®** a trademark of Siemens.
- **DF1®**(Full Duplex) **DF1®**(Half Duplex) a trademark of Allen-Bradley.
- **JBUS®** a trademark of April.



Executes user-designed programs for the control and management of data.

16 isolated outputs, LED indicated and short circuit protected (RED).

16-isolated LED indicated inputs (GREEN).

Additional remote I/O is possible (CESP-94).

1 serial RS-232 line, 150 to 19.2K baud.

1 serial RS-422 or RS-485 line.

Connection for (1) transceiver.

Requires GC-02 Board Holder (Not Shown).

Plug in Board Options:

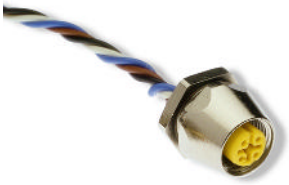
1. CFER 23 - Second transceiver extension board.
2. CFMR 24 - CAN network extension card.
3. CFLS 25 - Serial Port extension board.

Notes:

Notes:

Cable Selection Guide



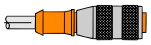




eurofast® *Cordsets* F3
eurofast® Receptacles F5
eurofast® Field Wireables F7
DeviceNet® Drop Cables F9
DeviceNet® Tees F10
DeviceNet® Terminators F10
ProfiBus-DP® Drop Cables F11
ProfiBus-DP® Tees F12
ProfiBus-DP® Terminators F12

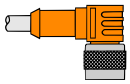
Notes:

eurofast® Standard Duty Connector

- Oil and Abrasive Resistant PUR
- Overall Foil Shield and Wire
- 22 AWG
- Shielded Pairs



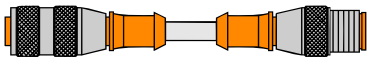
SEF-ST ...

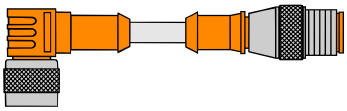


SEF-RA ...

5-pin, 250 V, 4 A ***Female***

Application	Cable Specs	Pinout	Straight	Right Angle
Shielded pairs Overall foil shield and drain (drain connected) UL Recognized CSA Certified	2/22 AWG pairs 24 AWG drain, foil shield Orange PUR 80°C 5.2 mm OD	1. Bn 3. Bu 2. Wh 4. Bk 5. Drain	SEF-ST/*	SEF-RA/*





5-pin, 250 V, 4 A

Application	Cable Specs	Straight Female Straight Male	Right Angle Female Straight Male
Shielded Pairs Overall foil shield and drain (drain connected to pin 5) UL Recognized CSA Certified	2/22 AWG pairs 24 AWG drain, foil shield Orange PUR 80°C 5.2 mm OD	M-F/EXT/*M	M-FRA/EXT/*M

* = Length in meters

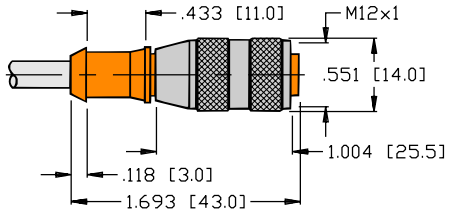
Specifications

Connector:	Oil resistant polyurethane body material, Nylon or PUR contact carrier. Spacings to VDE 0110 Group C.
Contacts:	Gold plated brass.
Coupling Nuts:	Nickel plated brass. See options below**.
Cable:	See table.
Protection:	NEMA 1,3,4,6P and IEC IP 68.
Cable Length:	Standard cable lengths are nominal 2, 4 and 6 meters. Other lengths available by request - consult factory.

** **Options**: To specify nylon coupling nut, add a "K" to part number.
For example: RK .. to RKK .. (straight female) or WS .. to WSK .. (right angle male).
To specify stainless steel coupling nut, add a "V" to part number.
For example: RK .. to RKV .. (straight female) or WS .. to WSV .. (right angle male).

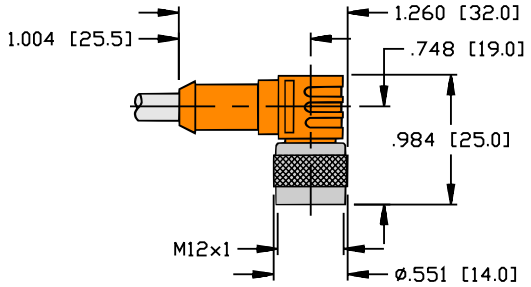
Dimensions

SEF-ST..

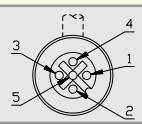
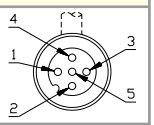


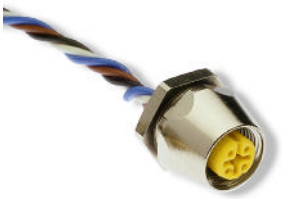
Female Connector

SEF-RA ..



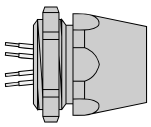
Female Connector

Female	Male
	
5-pin	**5-pin**

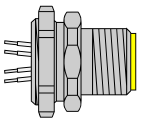


eurofast® Receptacles, Front Mount

- **For Use in Distribution Panels, Junction Boxes and Sensors**
- **Available with Leads or Solder Cups**
- **Machined from Solid Brass**



FK ..



FS ..

PG 9 Threads, Leads; 5-Pin

Application	Specifications	Pinout	Female	Male
5-conductor, mates with 5-pin cordsets, Leads UL Recognized, CSA Certified	5/22 AWG leads 250 V 4.0 A	1. Bn 2. Wh 3. Bu 4. Bk 5. Gy	FK 4.5-0.5	FS 4.5-0.5

Specifications

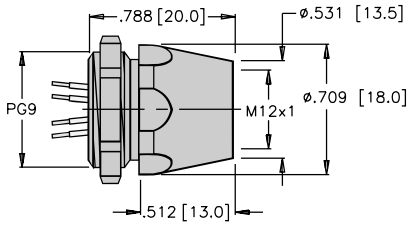
Housing:	Nickel plated brass, machined from solid stock. See options below**.
Contact Carrier:	Oil resistant Nylon or PUR. Spacings to VDE 0110 Group C.
Contacts:	Gold plated brass.
Lock Nuts:	Nickel plated brass.
Leads:	Flexible stranding, PVC insulation.
Temperature:	-30°C to +80°C (-22°F to +176°F).
Protection:	NEMA 1,3,4,6P and IEC IP 68.

** **Options**: The following receptacles are offered in stainless steel:
PG 9 threads - male & female

Notes: PG 9 receptacles require 5/8" (16 mm) hole for panel mounting. Use PT-PG9 tap for receptacles with PG 9 threads.
O-ring included.

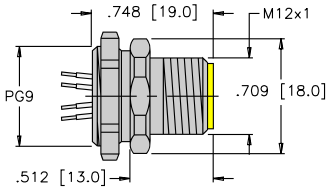
Dimensions

FK 4.5-0.5



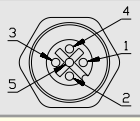
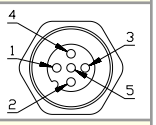
Female, Leads

FS 4.5-0.5



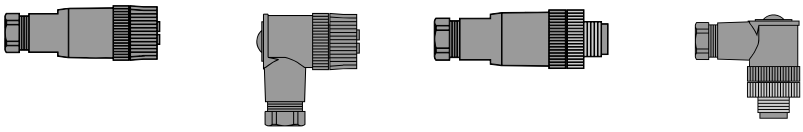
Male, Leads

Pinouts

Female	Male
	
5-pin	**5-pin**

eurofast® Field Wireable Connectors

- **Convert Hard Wiring to Quick Disconnect**
- **Facilitates Field Replacements**
- **For use with Custom Wiring, Junction Boxes and Sensors**



5-pin, Standard Key

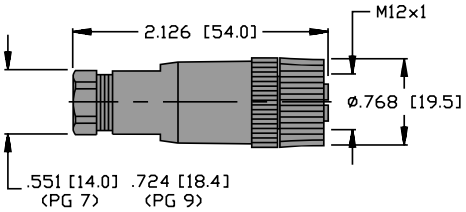
		Female		***Male***	
Application	**Specifications**	**Straight**	**Right Angle**	**Straight**	**Right Angle**
Mates with standard key 5-pin cordsets and receptacles	30 VAC / 36 VDC, 4.0 A PG 9 cable gland, accepts 4-8 mm cable Screw terminals	B 8151-0	B 8251-0	BS 8151-0	BS 8251-0

Specifications

Housing:	PBT, Black.
Connector:	Nylon. Spacings to VDE 0110 Group C.
Contacts:	CuSnZn.
Coupling Nuts:	Female - Nylon; Male and BM 8151-0 - Nickel plated brass.
Terminals:	Conductors to 18 AWG.
Temperature:	-40°C to +85°C (-40°F to +185°F)
Protection:	IEC IP 67.

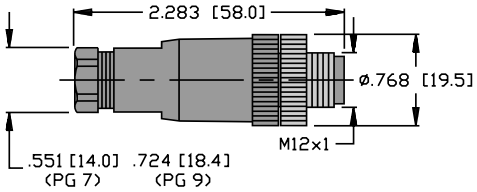
Dimensions

B 81...



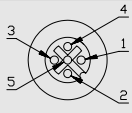
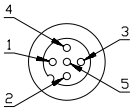
Female Connector

BS 81...

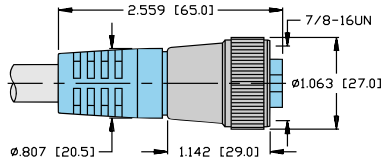
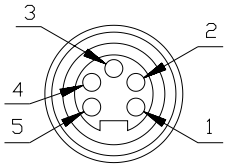
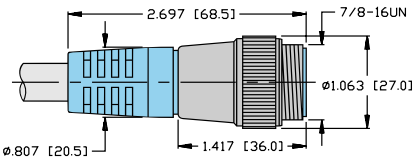
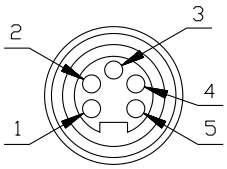
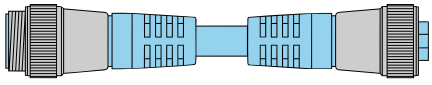
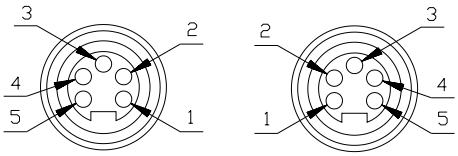


Male Connector

Pinouts

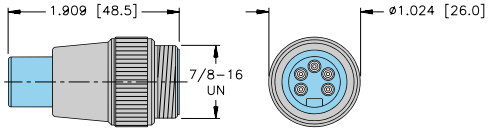
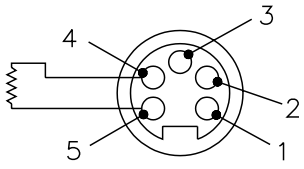
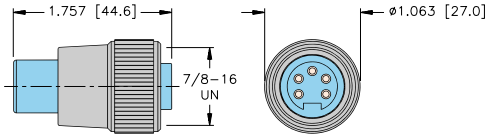
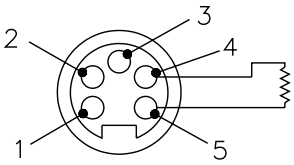
Female	Male
	
5-pin	**5-pin**

DeviceNet - Drop Cables

Type	Applications	Pinout Diagram
 **RKM 57^{x}-*M**	***minifast***® straight female connector	
 **RSM 57^{x}-*M**	***minifast***® right angle female connector	
 See dimensions above **RSM RKM 57^{x}-*M**	***minifast***® straight male connector to straight female connector extension cord	

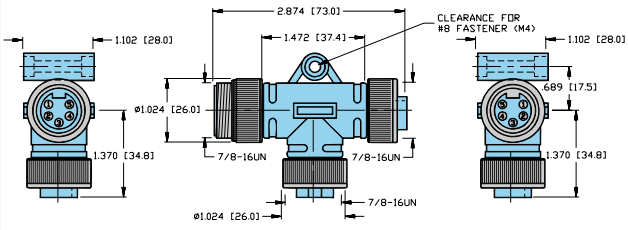
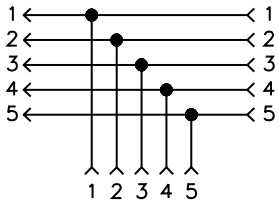
X Indicates cable type
* Indicates length in meters

DeviceNet® Terminating Resistors

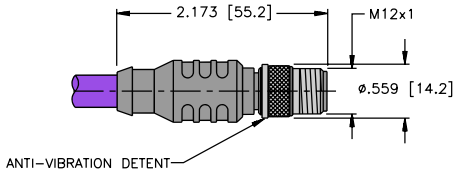
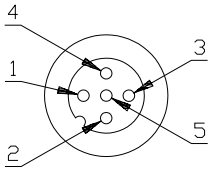
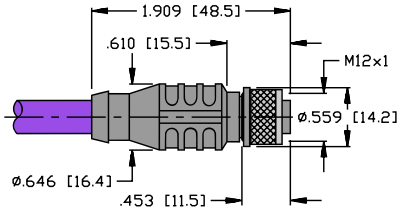
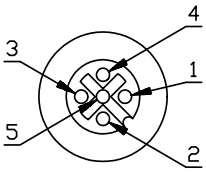
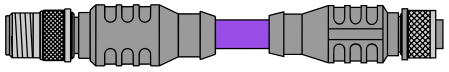
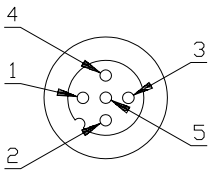
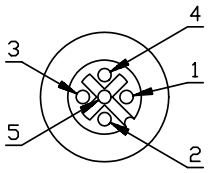
Type	Applications	Wiring diagram / Pin configuration
 **RSM 57-TR2**	***minifast*** ® terminating resistor • Internal resistor • Male minifast connector	 Nominal voltage: 24 VDC internal resistance: 120 , 1/4 W
 **RKM 57-TR2**	***minifast*** ® terminating resistor • Internal resistor • Female ***minifast*** ® connector	 Nominal voltage: 24 VDC Internal resistance: 120, 1/4 W

Cordsets

DeviceNet® Bus Tees

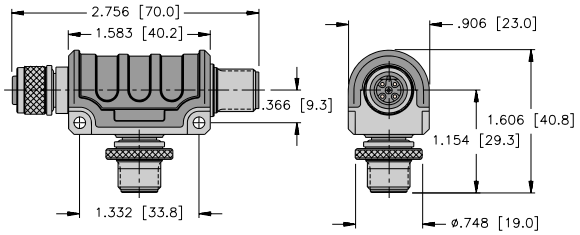
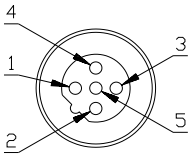
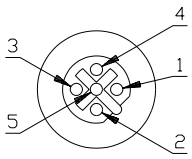
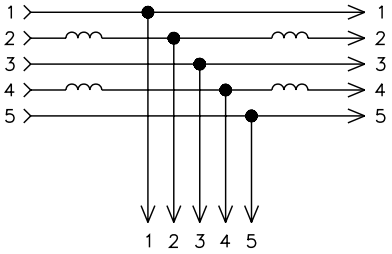
Type	Applications	Wiring Diagram/Pin Configuration
 **RSM 2RKM 57-KM**	***minifast*** ® Drop Off Bus Line • Full power and data drop • Maximum 6 meter branch • Keyway facing male	

ProfiBus -DP - Drop Cables

Type	Applications	Pinout Diagram
 **RSSW 45^{X}-*M**	***eurofast*** ® straight male connector	
 **RKSW 45^{X}-*M**	***eurofast*** ® straight female connector	
 See dimensions above **RSSW RKSW 45^{X}-*M**	***eurofast*** ® straight male connector to straight female connector extension cord	 

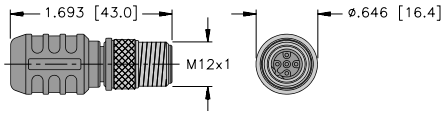
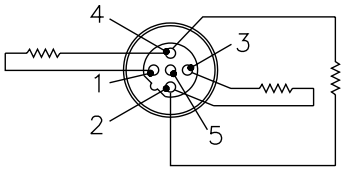
X Indicates cable type
* Indicates length in meters

ProfiBus®-DP Bus Tees

Dimensions	Pin Configuration	Wiring Diagram
 **RKSW 2RSSW45**	**Male**  **Female** 	

Cordsets

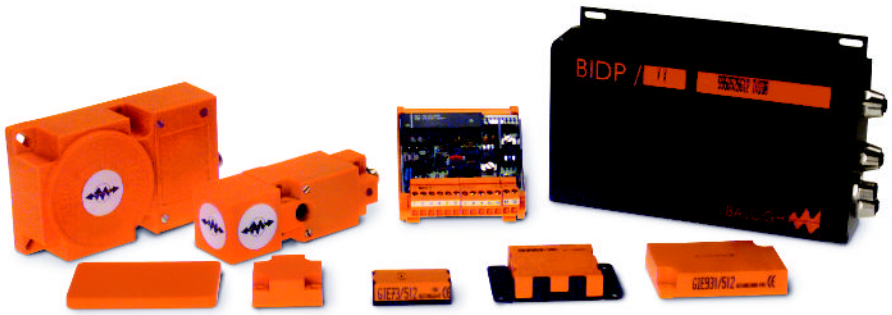
ProfiBus®-DP Terminating Resistors

Type	Application	Wiring Diagram/Pin Configuration
 **RSSW 45-TR**	***eurofast*®** terminating resistor (M12x1) • Internal resistor • Male ***eurofast*®** connector • Reverse-keyed	

Notes:

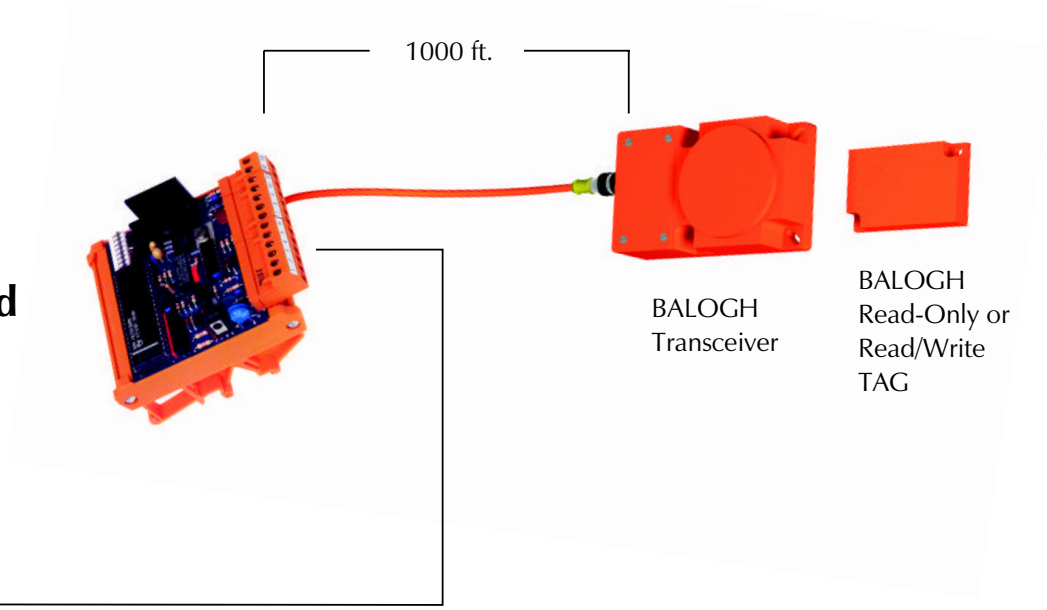
Notes:

Selection Guide

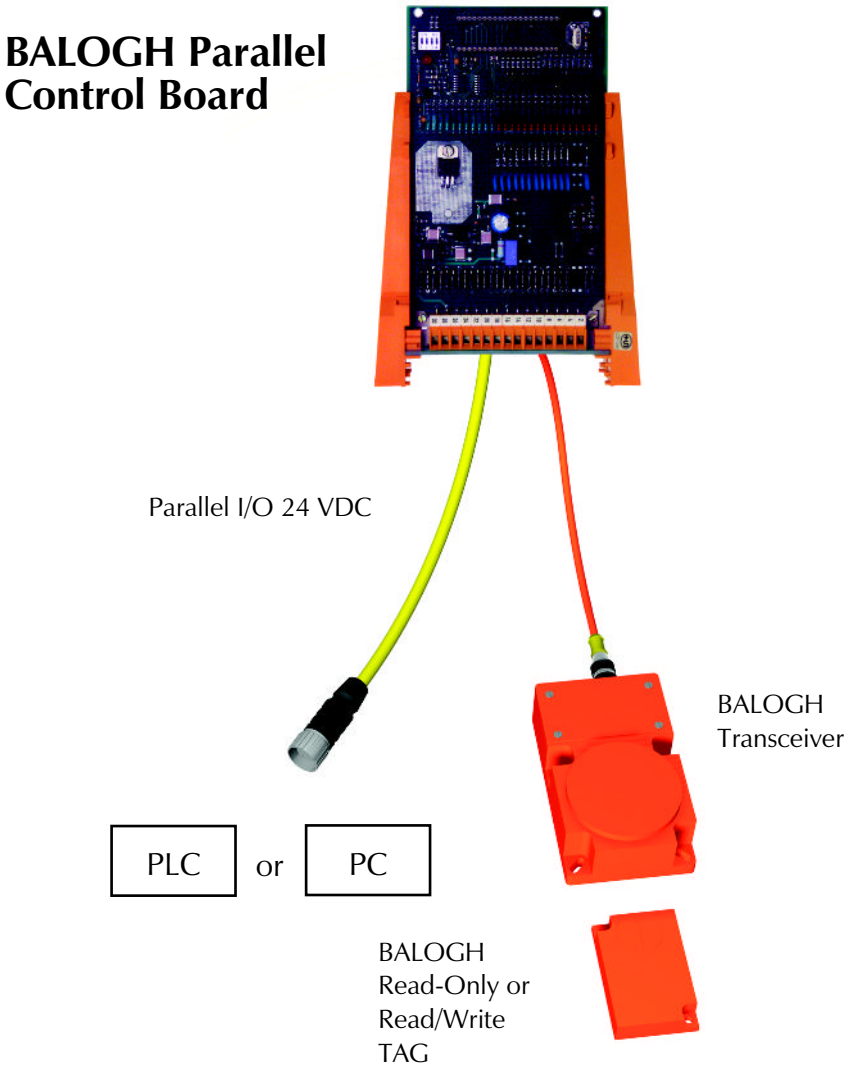


BALOGH RF Interface via Serial RS-232, or RS-422 Connection G2
BALOGH RF Interface via Parallel I/O Connection G3
BALOGH RF Interface via GENIUS® BUS Potocol G4
BALOGH RF Interface via DeviceNet® Bus Protocol G5
BALOGH RF Interface via ControlNet Bus Protocol G6
BALOGH RF Interface via InterBus-S Protocol G7
BALOGH RF Interface via ProfiBus-DP® Protocol G8
BALOGH RF Interface to Allen Bradley PLC-5 Channel Zero/Data Highway Plus® Connection . G9
BALOGH RF Interface via RS-232 Connection G10
BALOGH RF Identification System G11
BALOGH RF Inerface via EtherNet® G13

BALOGH RF Interface via Serial RS-232, or RS-422 Connection



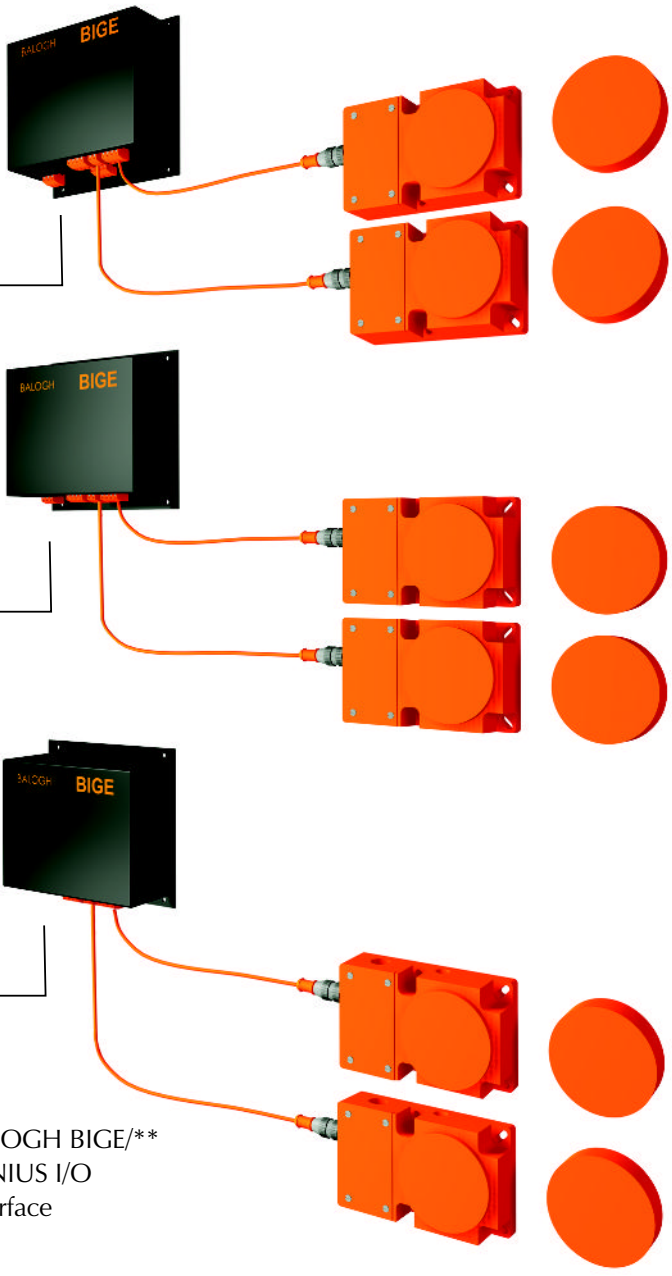
BALOGH RF Interface via Parallel I/O Connection



BALOGH RF Interface via GENIUS BUS Protocol

Maximum Connection Limit Dictated by
G. E. Specification

G. E. GENIUS® Network



BALOGH BIGE/**
GENIUS I/O
Interface

BALOGH
Transceivers

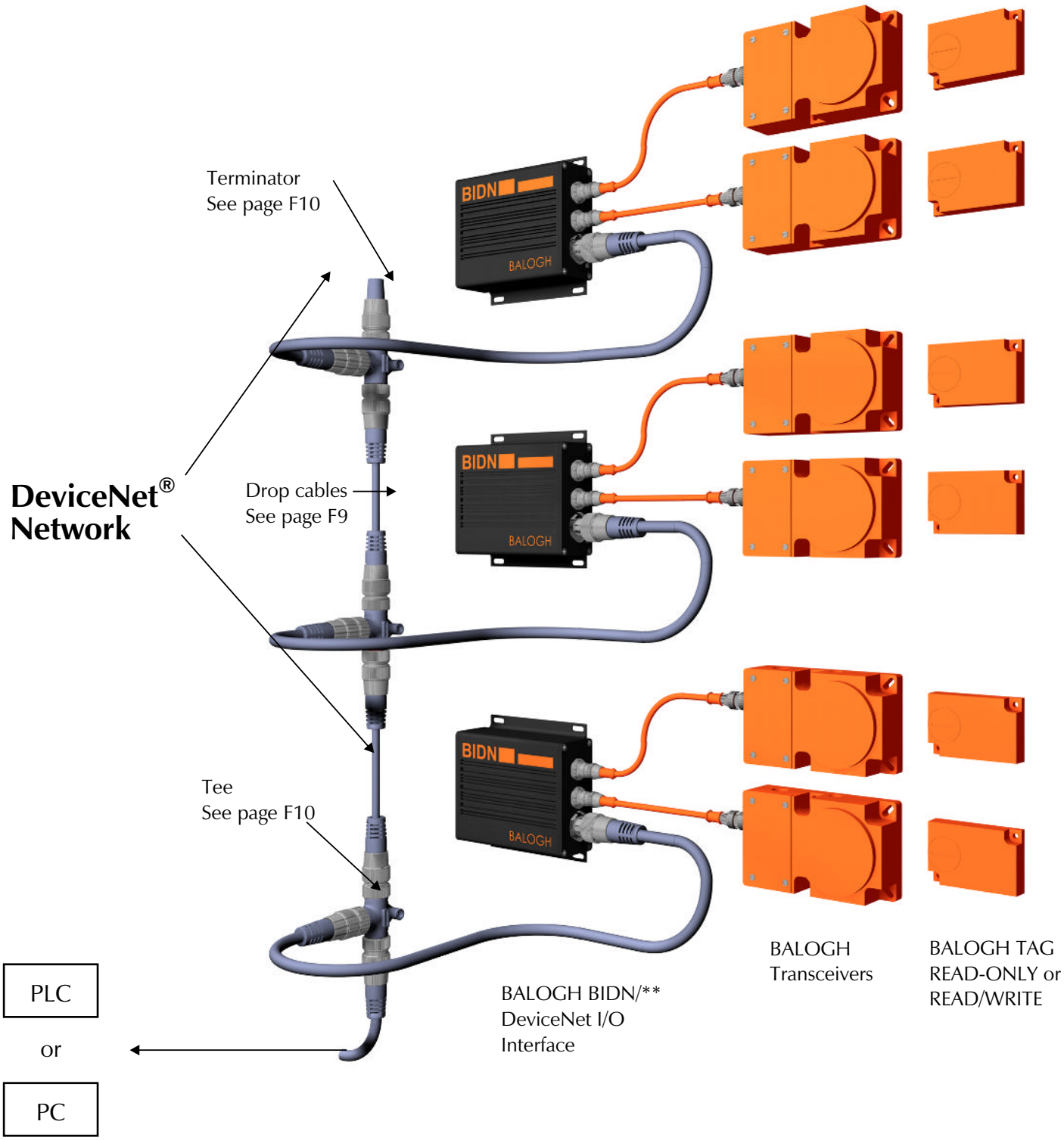
BALOGH TAG
Read-only or
Read/Write

PLC

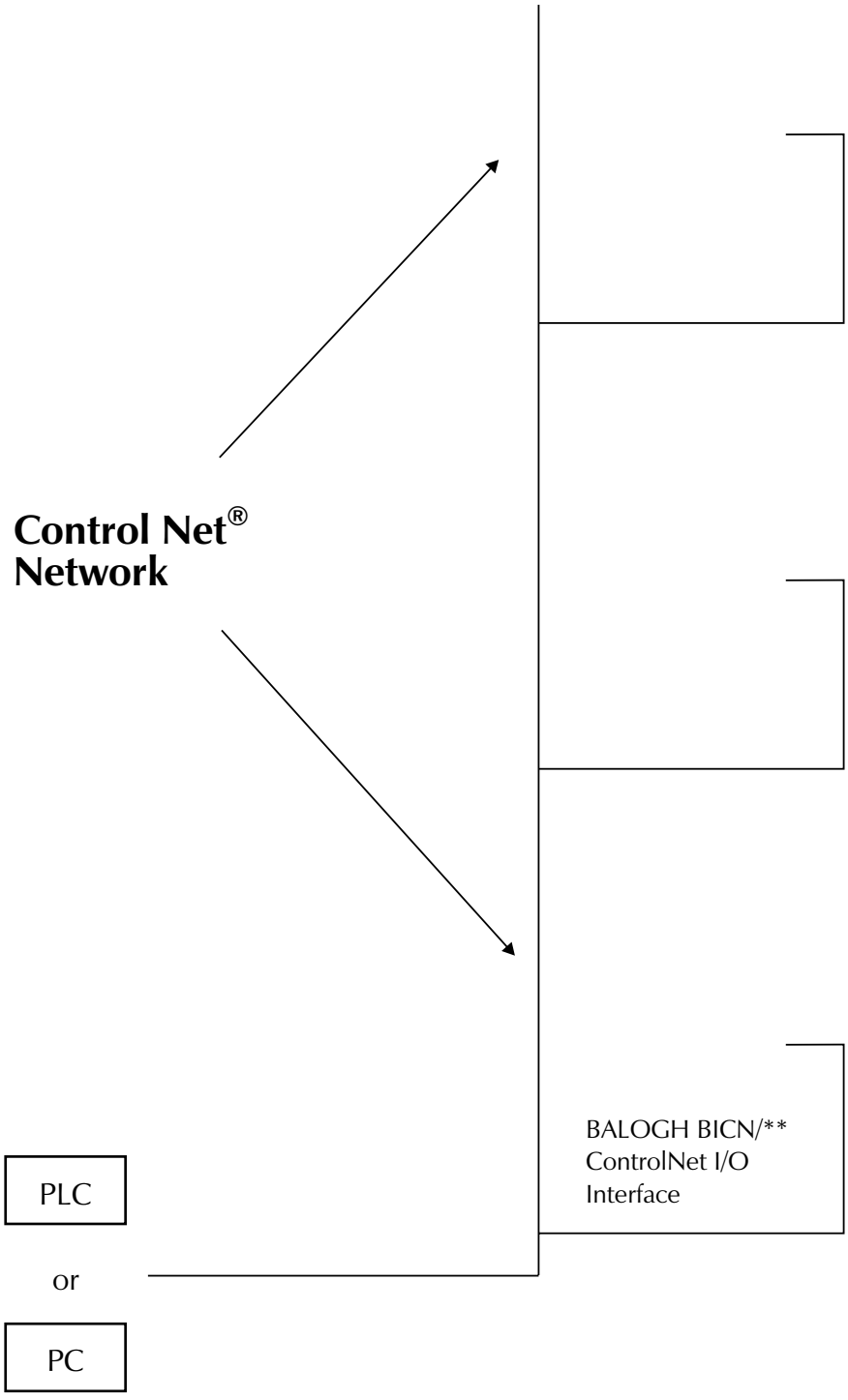
or

PC

BALOGH RF Interface via DeviceNet Bus Protocol



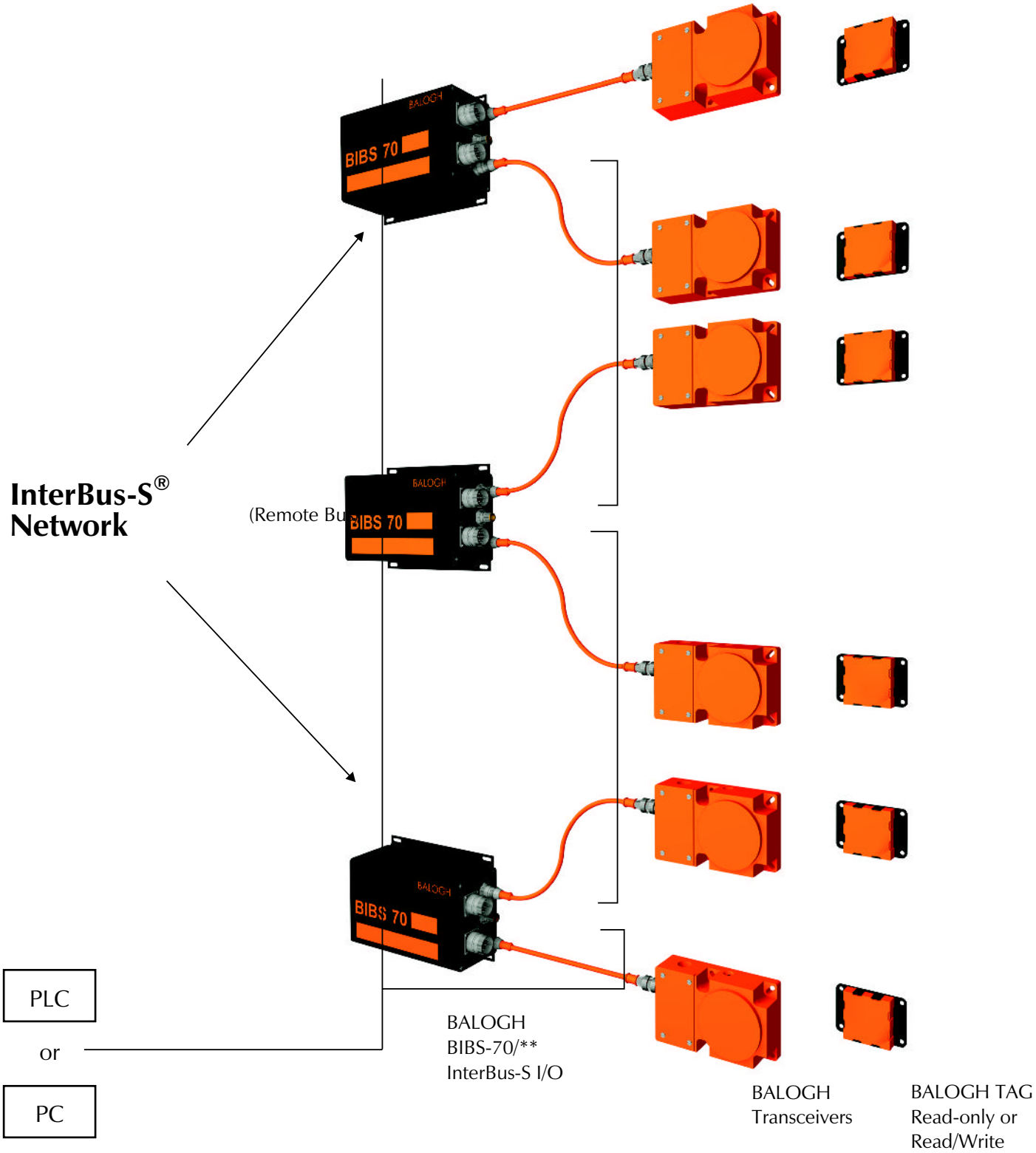
BALOGH RF Interface via ControlNet Bus Protocol



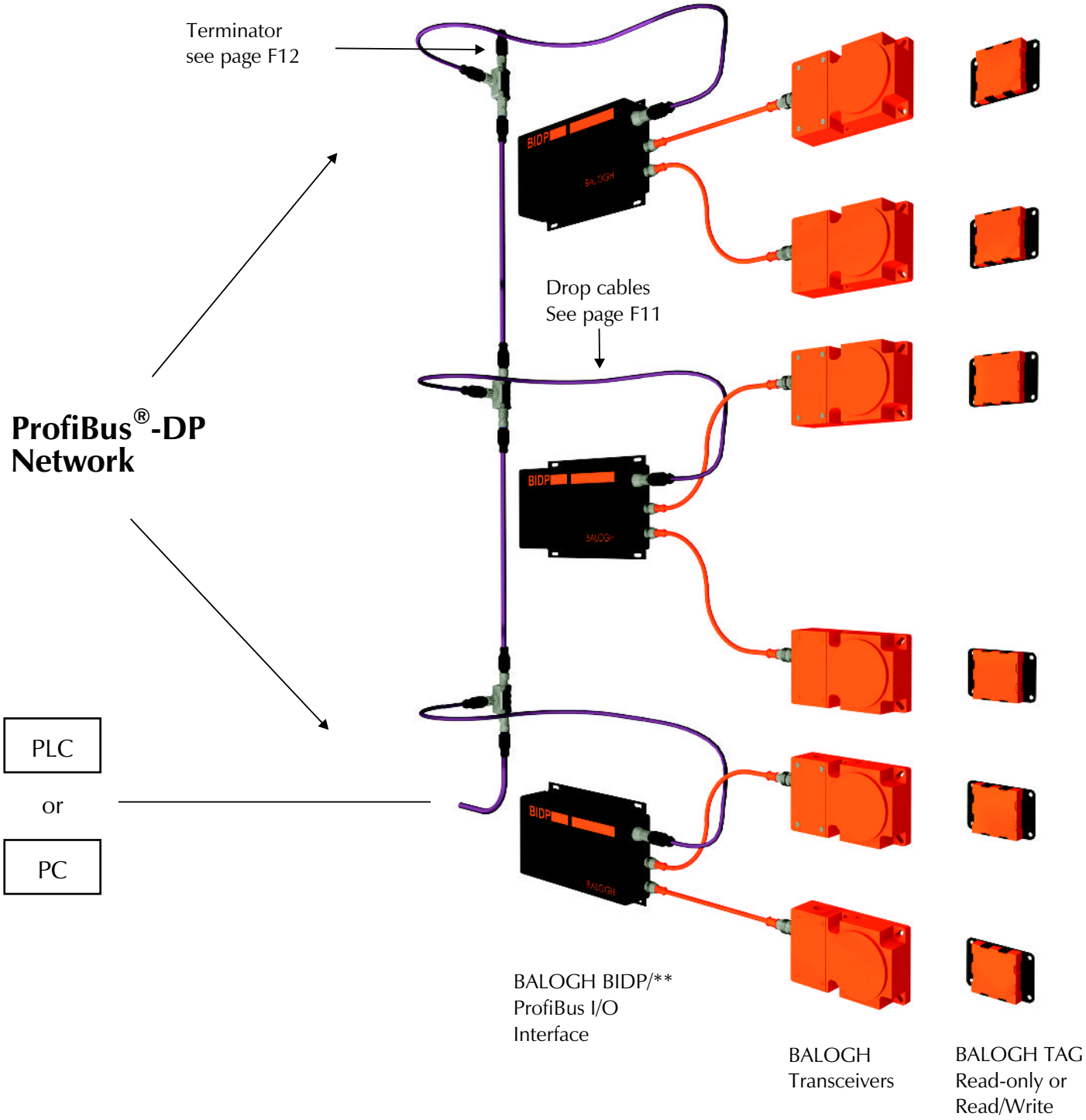
BALOGH Transceivers

BALOGH TAG Read-only or Read/Write

BALOGH RF Interface via InterBus-S Protocol



BALOGH RF Interface via ProfiBus -DP Protocol



BALOGH RF Interface to Allen Bradley PLC-5 Channel Zero

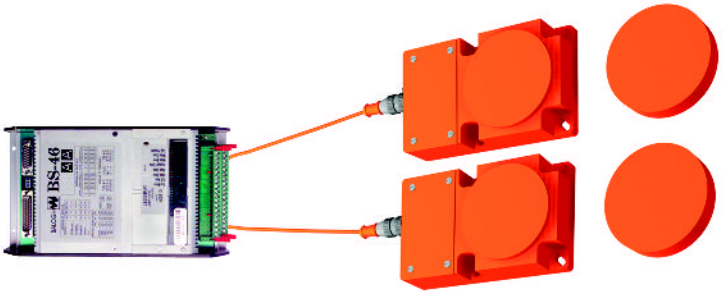
Can control up to 32 transceivers and 16 BS-46 Controllers

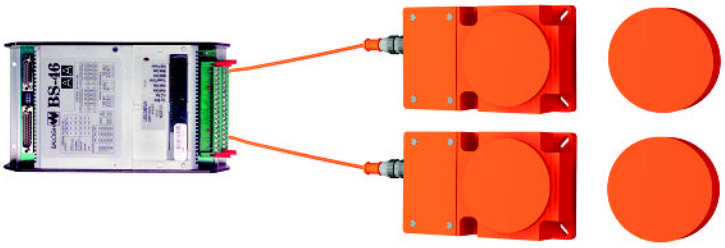
BS-46
Multi-Channel
Multi-Protocol
Interface Control Board
2 control Inputs/Channel
4 Status Outputs/Channel

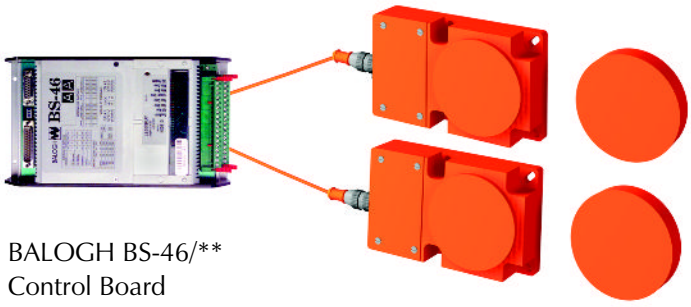
RS-422 Serial
Connection

RS-422 Serial
Connection

1000 ft.







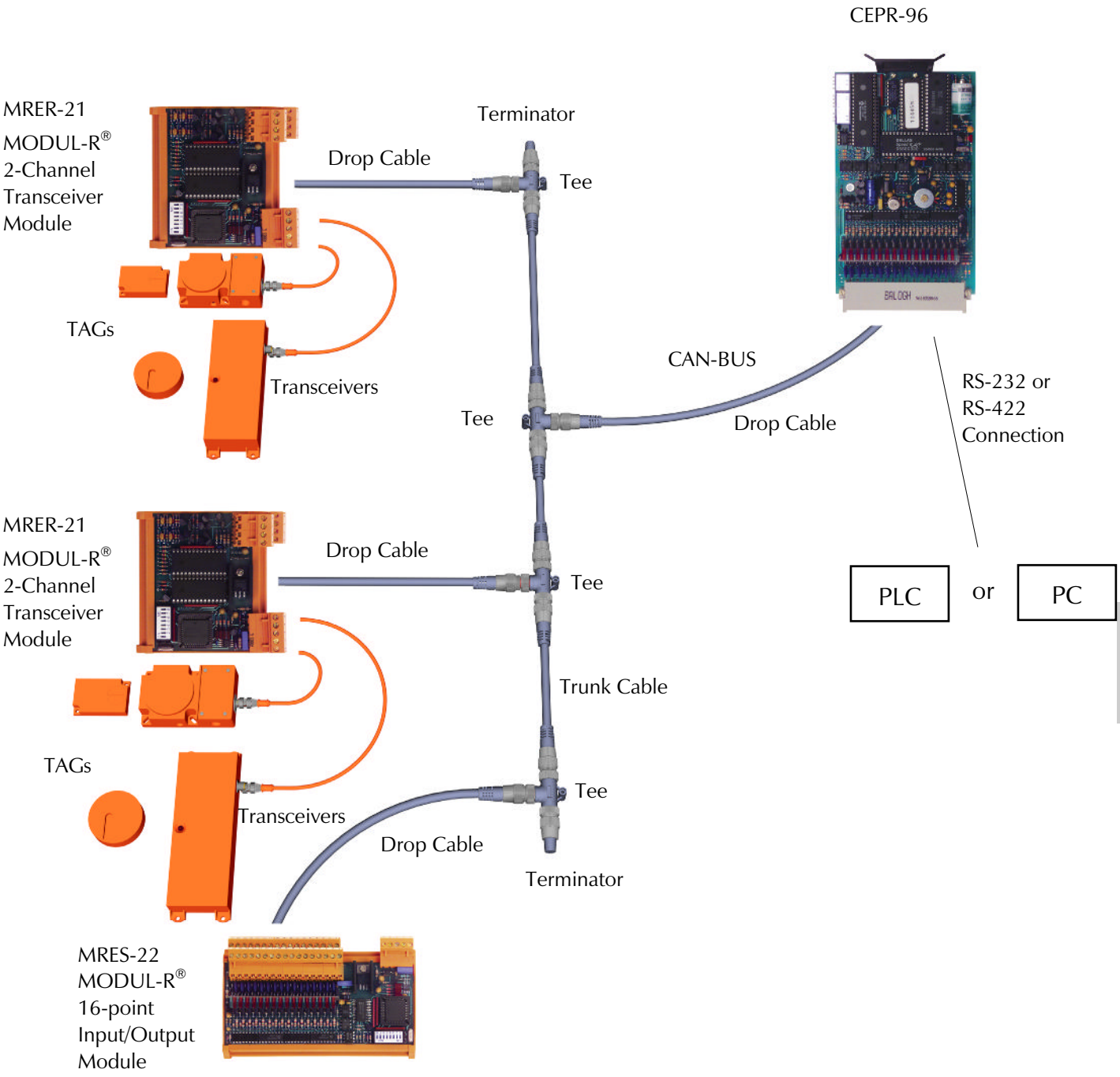
BALOGH BS-46/**
Control Board

BALOGH
Transceivers

BALOGH TAG
Read-only or
Read/Write

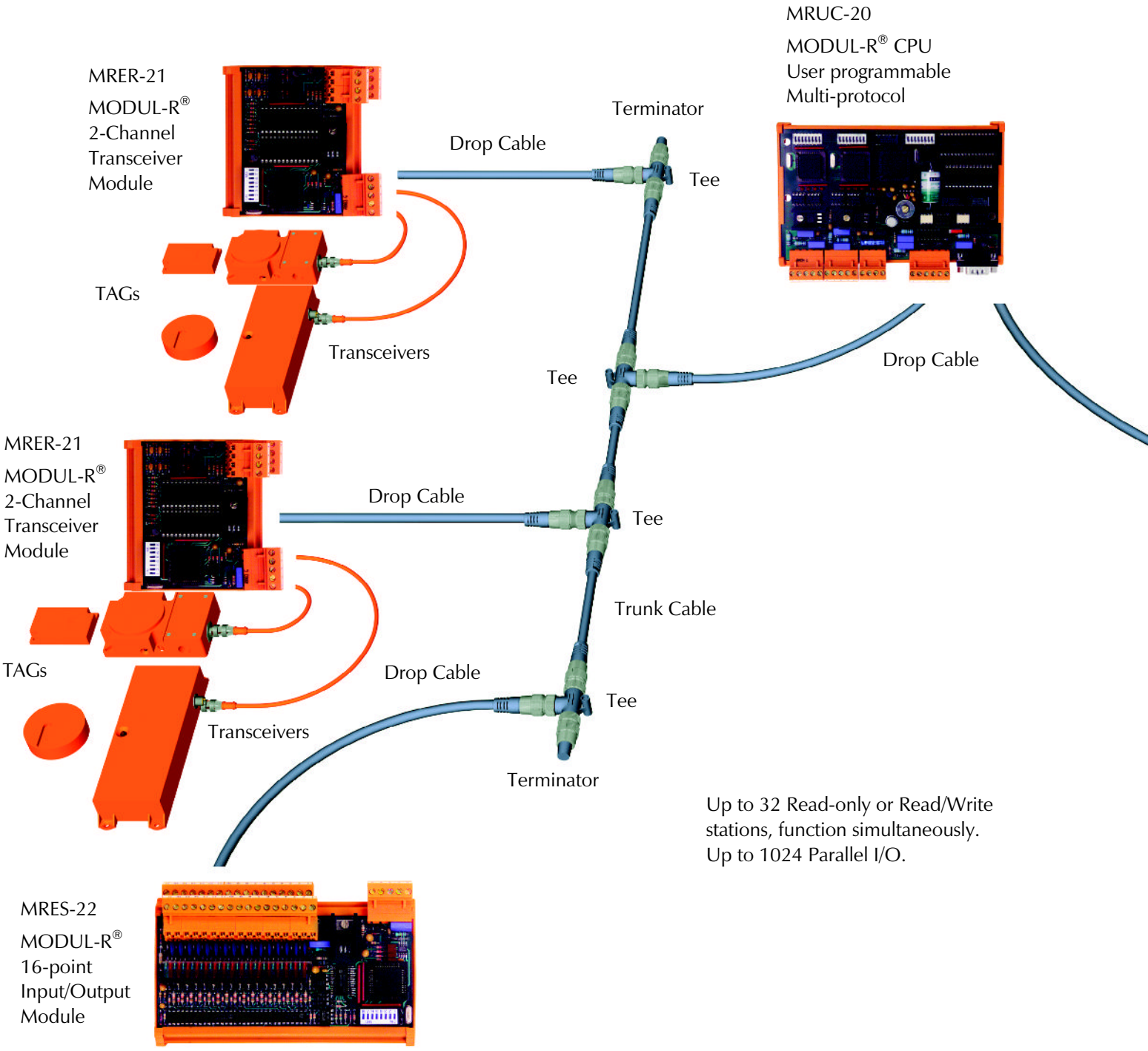
DataHighway Plus® message instructions
Channel Zero
DF1® Protocol
Modbus® Protocol
3964R® Protocol
UNITELWAY® Protocol
JBUS® Protocol

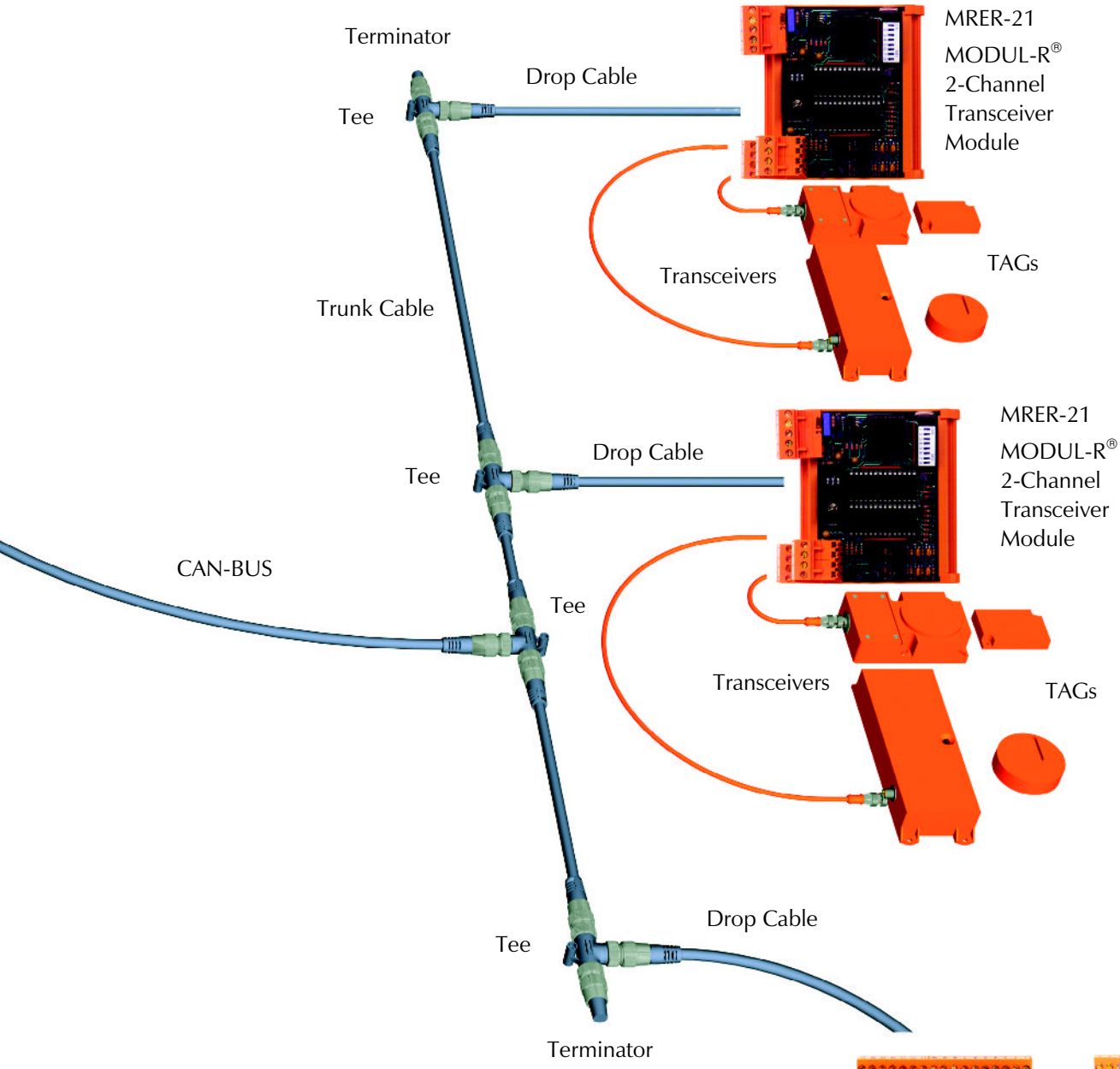
BALOGH RF Interface via RS-232 Connection
Controls up to 16 modules

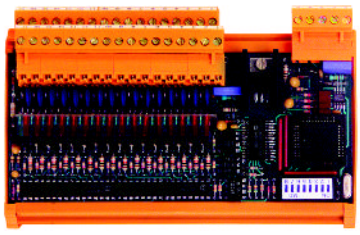


RF Identification System

BALOGH MODUL-R®, based on the High-Speed CAN Network, allows easy and flexible multi-drop connections of the BALOGH Radio Frequency Identification System and parallel I/O.



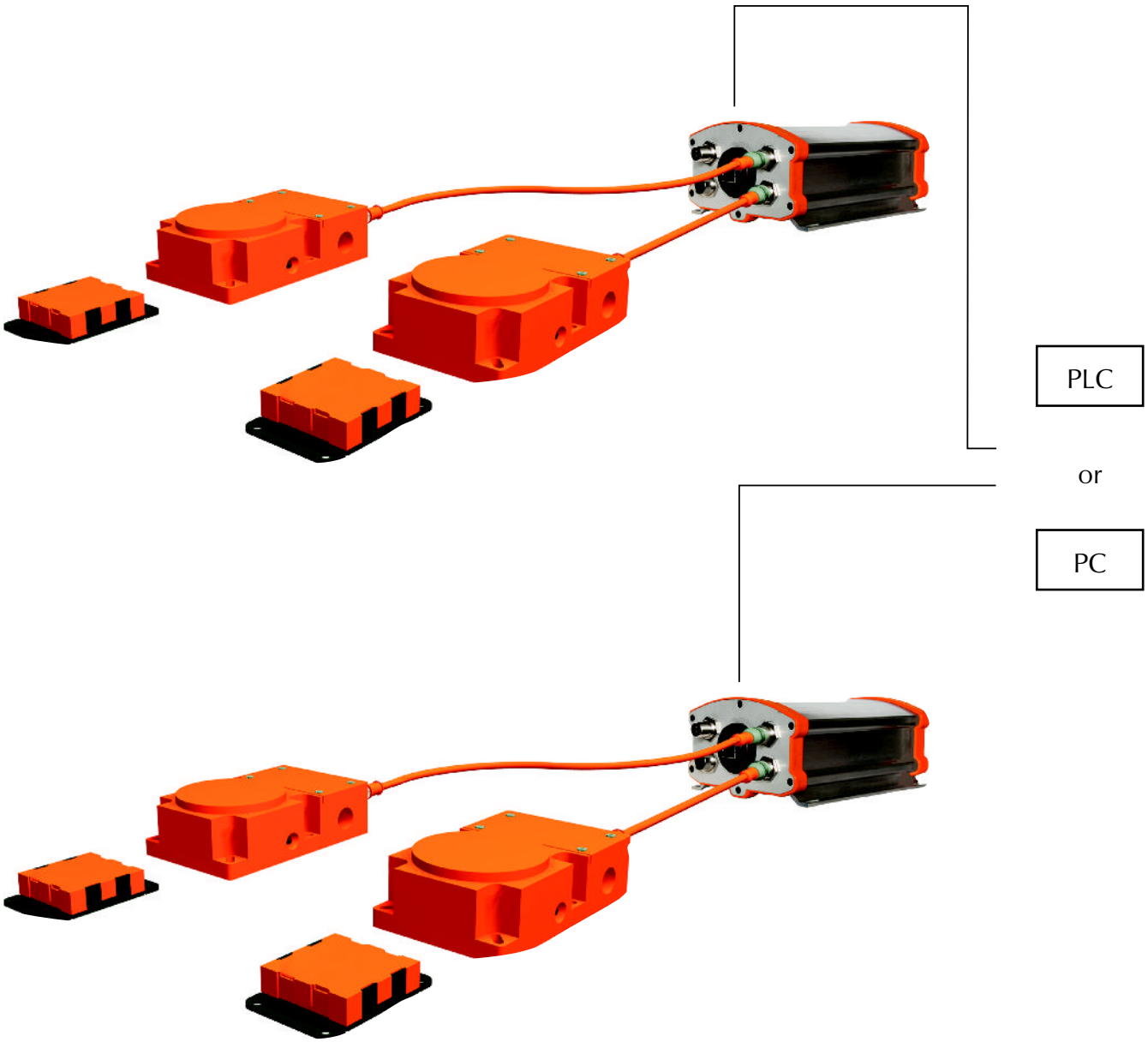




MRES-22
MODUL-R®
16-point
Input/Output
Module

BALOGH RF Interface EtherNet

EtherNet/IP®
MODBUS® - TCP
TCP/IP with BALOGH Messaging



Notes:

Selection Guide

Overview **H2**
Primary Transmission Zones **H6**
“On-the-fly” Reading or Writing **H8**
Configuration Recommendations **H10**
Electrical Connections **H16**

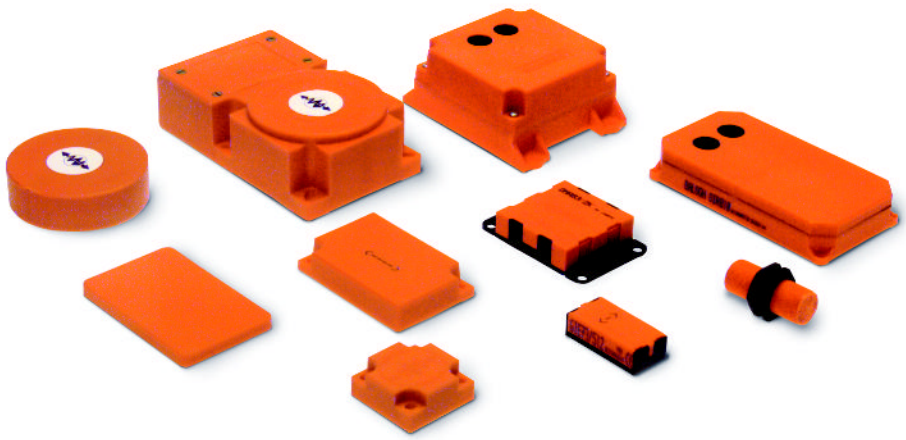
1 Overview

Advantages of the BALOGH RFID System:

- Absolute data security with no possibility of degraded data entering the system
- Remote, non-contact Reading and Writing
- Reading and/or Writing of stationary TAGs or TAGs "On-the-fly"
- Large angular and lateral axial offsets
- Large Reading and Writing ranges
- Read-Only or Read/Write TAGs
- Data stored in TAG memory is secure for 10 years or more
- Unlimited number of Read/10 billion Write operations
- Parallel, serial and multiple field bus interfaces, for flexibility when choosing PLCs, computers, or relays
- Multiplexing of Control Boards
- Simplified wiring
- Unaffected by interference, will Read and Write in intense electromagnetic fields without risking data integrity
- High resistance to severe industrial conditions, such as temperature, water, coolant oil, detergents, paint, metal chips, etc.

BALOGH RFID System Operation:

BALOGH TAGs are PASSIVE, meaning that no power source in the TAG is necessary when exchanging data, other than the energy supplied by the electromagnetic field. BALOGH Radio Frequency Systems identify and control free-moving components, such as pallets on an automated conveyor belt or Automatic Guidance Vehicles. A system typically consists of a TAG, a Transceiver and Control Board or Interface. Using the principle of inductive transmission, data can be exchanged without contact whenever the TAG enters the electromagnetic field generated by a transceiver. Since BALOGH offers Read ranges of up to 0.5 meters, most mechanical clearance and alignment concerns are eliminated. Data transmission between the TAG and transceiver takes place in serial mode. Since communications depend only upon the proximity of the two devices, the direction of travel of the approaching TAG is of no significance to the transceiver.



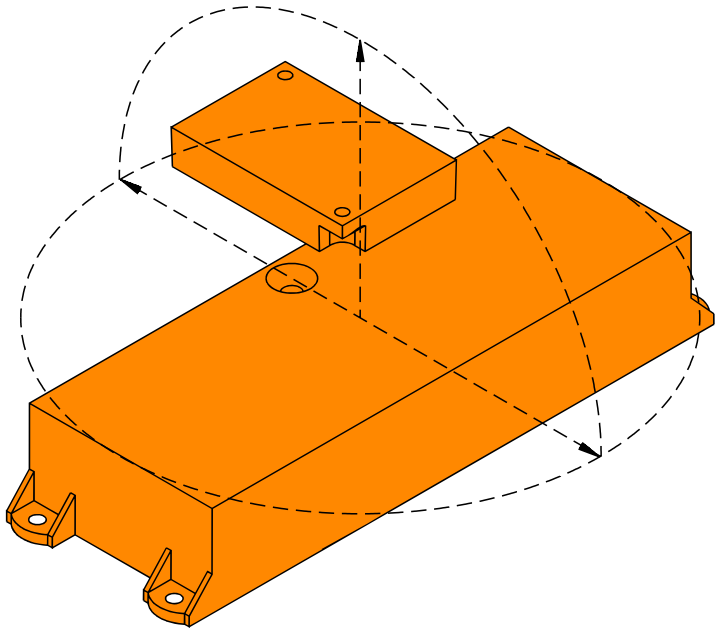
Overview

Transceiver Operation:

A Transceiver is necessary for any identification or coding application. Its function is essential to the system's basic operation because it is the transceiver that establishes the electromagnetic field that provides the power for the TAG. Aside from energy emission, the transceiver is also the conduit for data transmission and data reception. In order to perform a Read or Write operation, transceivers must be wired to a control board. They are connected by a serial link requiring 4 conductors (twin shielded pairs). These two components work together to allow the reception from, or transmission to, a TAG in the transmission zone. Transmission zones vary in size depending on the Transceiver chosen.

Three Factors Determine the Basis for Selecting a Transceiver

- Model, shape and mounting requirements of the transceiver.
- Transmission zone dimensions.
- The proximity of the next transceiver.



Control Board Operation

The link between the user's control or logic system (PLC or PC) and the Transceiver/TAG communication is the BALOGH Control Board. Like all components of the BALOGH RFID System, the choice of Control Board will depend upon the application. Whether an application calls for Read-Only or Read/Write, "On-The-fly" or Static Transmission, Transceivers, TAGs and Control Boards can be mixed and matched until the combination fits the application.

Overview

Answering the following questions will help to determine which Control Board best suits the needs of the application

- Is it a Read/Write or Read-Only application?
- What type of interface is needed? (Serial, Parallel or Fieldbus)
- Are you using a field bus network? (DeviceNet®, G.E. Genius®, InterBus-S® etc.)
- What kind of controller? (PLC, PC, etc.)
- Does the application need stand-alone control with independent I/O?

BALOGH has a large selection of Control Boards and interfaces to meet your needs.

BALOGH BIDN, Control Board for Allen-Bradley DeviceNet®

Electronic TAG Operation:

Two categories of TAGs are available:

Read-Only and Read/Write. Each TAG is available in a variety of shapes and sizes, with varying memory capabilities. All BALOGH TAGs are PASSIVE and receive power from the BALOGH Transceiver for communications. The following describes the different categories of TAGs.

Fixed Code TAGs OC Series

Also called Read-Only TAGs, these TAGs can carry an eight bit binary code. The OC series Fixed Code TAGs are encoded BY THE USER, providing the following possible combinations: for eight bits, 0-255.

To encode the TAG, open the chamber that houses eight wire straps. By cutting or not cutting the wire straps, a binary value is designated for the TAG. Cutting a strap will signify a binary "0", while leaving it uncut will signify a "1". The least significant bit will be indicated by a dot of paint.

*OC-93 TAG shown above with all eight straps connected for a value of 255.

Overview

Fixed Code TAGs OF/OFR/OL Series:

The OF series 7 byte Read-Only TAGs are available for applications where a larger amount of Fixed Code data needs to be stored (see data sheets for dimensions). The price of the OF series TAGs makes applications which call for a large number of TAGs very economical. These TAGs are coded at the factory to user specifications with 17 billion combinations available. The OFR series 7 byte Read-Only TAG is a user re-programmable TAG using the CPF-88 Handheld and Programming cable. This TAG operates the same as the OF TAG, with the exception of the Read-Only data on the TAG, which can be changed when the programming cable is connected to a port on the TAG and the CPA-88 Handheld is used to change the data. The OFR TAG is available only in 56, 85, & 93 TAG series. The OLR series TAG is a 2 byte Read-Only TAG available in the 85 series case. The OLR series was specifically designed to provide extended read ranges of up to 0.5 meters. When ordering OF or OLR TAGs, a coding sheet must accompany your purchase order to manufacture and code the TAGs. For coding, request a “OF” Coding sheet from **TURCK**.

Read/Write TAGs OMA/OMX/GIE series:

The OMA TAG series is available with 64 bytes, 2 K bytes or 8 K bytes of memory. The OMX series is available with 8 Kbytes or 32 Kbytes of memory. The GIE series is available with 512, 2 K or 8 Kbytes of memory. Not all memory configurations are available in all OMA TAG styles. Data is stored in an OMA, OMX and GIE TAGS using Ferro Electric memory. This allows these TAGs to have unlimited Reads and 10 billion Write capability. When calculating "On-the-fly" operations for the data transmission speed between OMA, OMX or GIE TAGs and a BALOGH Transceiver, use the following:

OMA TAGs: 10 ms per byte + 50 ms per instruction

OMX TAGs: 0.4 ms per byte read and 0.6 ms per byte written, zero overhead for instructions

GIE TAGs: 5 ms per byte, zero overhead for instructions

Read/Write TAG data is easily accessed and updated, providing the user with immediate information (Real Time). Criteria used for selecting a TAG are:

- Model, shape and mounting configurations of the TAG
- Read/Write distance (TAG and Transceiver dependent)
- Memory capacity

Read/Write TAGS

ERO-85/QC Transceiver & OMA-931 TAG:

Primary Transmission zones

The Transceiver establishes a semi-spherical electromagnetic field. The orientation of the TAG to the Transceiver is shown with directional arrows on both the Transceiver and TAG (See section 3.3). It is important to align these arrows so that the optimal Reading and Writing range can be achieved. See section 3.3 for details. Maximum Range is defined as H and is used to define Sr: Sr is the recommended distance between a TAG and a Transceiver. This value corresponds to range H, modified by a coefficient: Sr = H * 0.4

Types of Transmission zones

The semi-spherical zone in which a stationary TAG can be Read or Written to, with complete security, is the Static Transmission zone. The values for the following variables are found on each individual product data sheet.

H:	Maximum Range of Transmission zone
Sr:	Typical height of Transmission zone at Sr
L:	Typical length of Transmission zone at Sr
I:	Typical width of Transmission zone at Sr

Primary Transmission zones

When referring to the data sheets for information concerning the Static Transmission zone, the variables H, Sr, L, and I are shown as typical values with tolerances of +/- 20%. The formula for Sr gives the maximum and minimum values for the Transmission Zone, taking into account dispersion due to ambient temperature, production activities, and mechanical clearances (see fig. A).

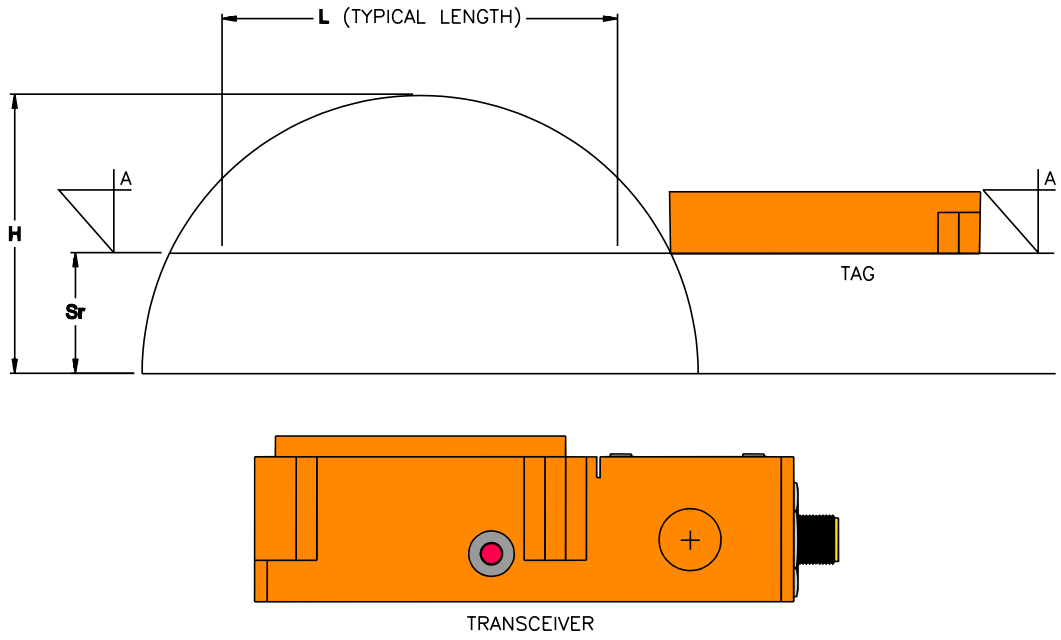


Figure A - Transceiver Zone Cross Section

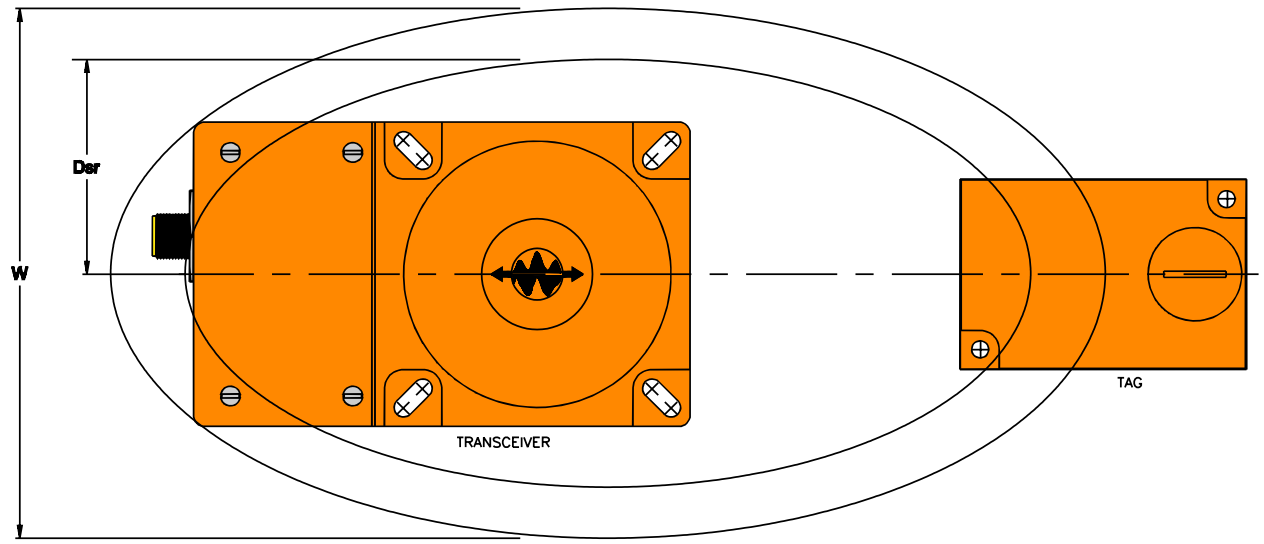


Figure B - Dynamic Transceiver Transmission Zone

The Dynamic Transmission Zone is a window relative to the Static Transmission Zone where it is possible to Read or Write to a TAG in motion. Data is transmitted with complete security, even when severe industrial conditions prevail and metal is present. Whether Reading and Writing blocks of data or a single bit, data integrity remains intact.

For Reading or Writing "On-the-fly", the following conditions apply: (please see data sheets for product specifications) .

LSr: Minimum length of Dynamic Transmission Zone for a maximal lateral and angular offset.

DSr: Maximum lateral offset of the Dynamic Transmission Zone (fig. C).

- Maximum angular offset of the Dynamic Transmission Zone (fig. D).

Figure C

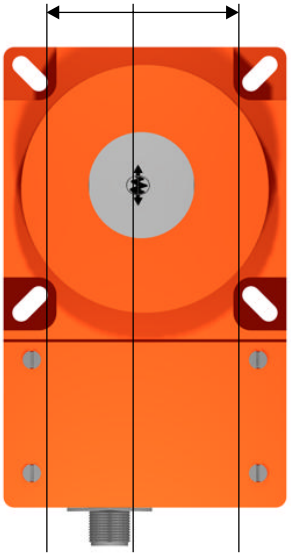
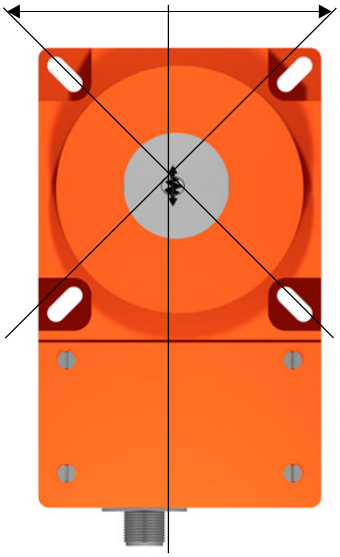


Figure D



Note:

The values **Sr** and **LSr** should be used as the basis for calculating the rates of travel and/or the number of bytes that can be Written or Read "On-the-fly" (figs. A and B). These values, based on lab tests and field industrial conditions, already take into account problems that may occur under certain conditions, such as:

- Mechanical clearances, including angular and lateral offsets
- Metallic environments
- Electrical environments
- Abusive thermal and physical environments (water, solvents, coolant oil, etc.)

"On-the-fly" Reading or Writing

Operating conditions:

In order to Read or Write "On-the-fly", the following variables must be known:

- TAG rate of travel (V TAG).
- Distance between the TAG and the Transceiver (Sr).
- Length of the Dynamic Transmission Zone which determines the rate of travel or the time of TAG presence in the window (LSr).
- Read or Write time per byte (TS).
- Number of bytes to be Read or Written (n).

"On-the-fly" Reading or Writing

Calculation for Reading, Writing "On-the-fly".

$$\text{Td (Time in Zone, in seconds)} = \frac{\text{L Sr (in meters)}}{\text{V TAG (in meters per second)}}$$

Convert Td in seconds to milliseconds by multiplying by 1000.

$$\text{n (Number of bytes to Read/Write)} = \frac{\text{Td (in milliseconds)}}{\text{TS (in milliseconds)}}$$

Example

This example will solve for the value n, with n = number of bytes which can Read "On-the-fly" at a given velocity. The BALOGH components being used are an OMX-931/8K byte TAG and ERC-85/QC Transceiver.
We know that:

V TAG	= 0.5m/s.	=	velocity at which a TAG passes through the Transmission zone of a Transceiver.
L Sr	= 0.06m	=	length of the Dynamic Transmission Zone of an ERC-85/QC Transceiver.
TS	= 0.4ms *n	=	OMX Read Transmission time in block mode. The variable is equal to the number of successive bytes between the start address and the end address. (10ms per byte + 50 ms for OMA TAG) (5ms per byte for GIE TAG) (0.4ms per byte read and 0.6ms per byte written for OMX TAG) (70ms to read all 7 bytes for OF/OFR TAG)

The following equations determine the minimum acceptable length of time to Read or Write while "On-the-fly":

$$\text{Td} = \frac{\text{L Sr}}{\text{V TAG}} \quad \frac{0.06\text{m}}{0.5\text{m/s}} = 0.12\text{s}$$

Td = 120ms

Number of bytes transmitted:

$$\text{n} = \frac{\text{Td}}{\text{TS}} \quad \frac{120\text{ms}}{0.4\text{ms/byte}} = 300 \text{ bytes}$$

n = 300 bytes @ Sr (See TAG data sheet)

Directional Arrows

In order to ensure data exchange, the TAG and Transceiver should be correctly positioned according to the arrows indicating direction of travel. The arrows marked on each Transceiver and each TAG show:

- The direction of travel. Since they operate in pairs (one TAG opposite a Transceiver), it is important to check that the arrows on the TAG and Transceiver have the same orientation.
- The center point of the Transmission zone. Please refer to the appropriate data sheet for centering and mounting conditions.

Since inductive transmission is subject to certain physical laws, the following points should be carefully considered:

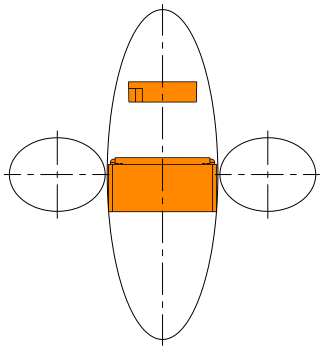
- Distance in metal free zones; see figs. H, J and K
- Distance between two transceivers; see fig. S and table 1
- Distance between two TAGs; see fig. G and table 2
- Coupling between transceivers by interfering metallic antennas; see figs. Q, R, and S

Configuration Recommendations

Potential Transmission Zones

Potential Transmission Zones are areas in which dialogue can take place with BALOGH TAGs (figs. E and F). BALOGH simplifies its RFID System by only using the Primary Transmission Zone for data transmission. This zone represents the main arc in fig. A. However, the other arcs that form potential Transmission zones are also present. Please read this chapter carefully and be sure to follow the recommendations for the minimum distances between two transceivers or between two TAGs and one transceiver.

Figure E - Front View



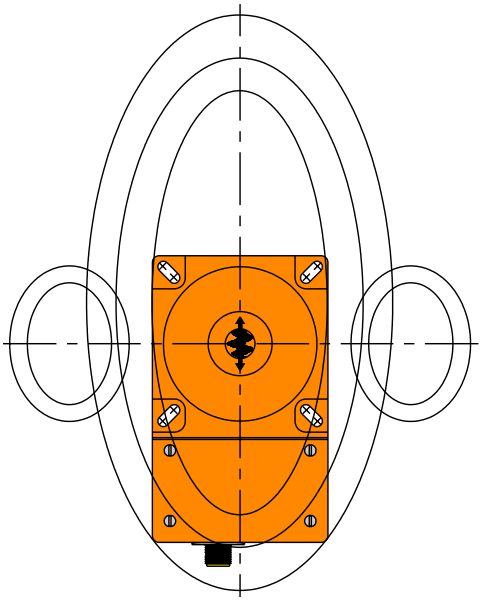


Figure F - Top View

These concentric circles indicate the 3 dimensional field surrounding the TAG and transceiver.

Configuration Recommendations

Recommended Distance Between two Transceivers (Der)

To avoid interference between transceivers, there must be a minimum space between them. The necessary distances are shown in the table below:

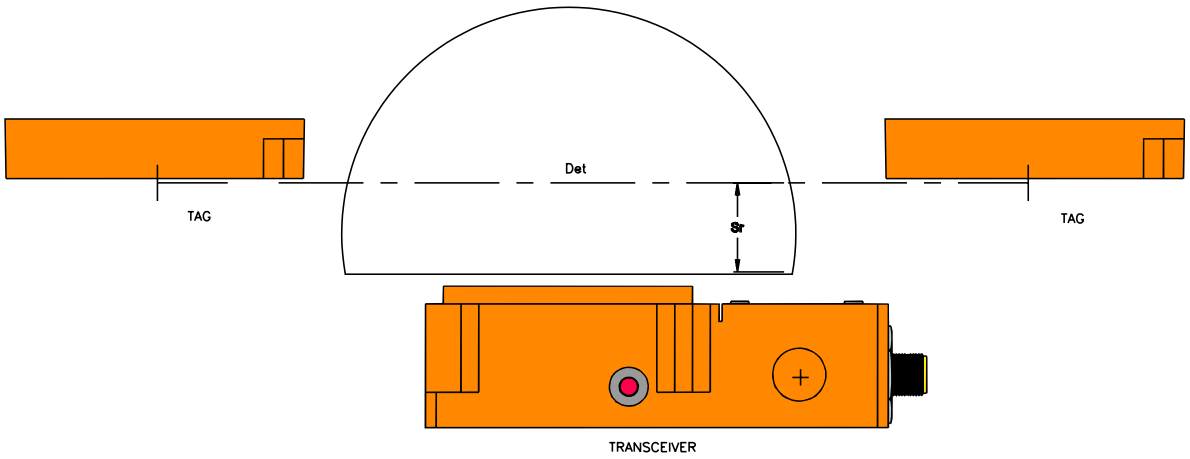
Table 1

Distance between two Transceivers edge to edge (mm)	ERO-71/QC	ERO-85/QC	ERO-80/QC	ERA-18/QC	TLEB-891/PUR	TLE-18/B	ERC-85/QC	ERC-80/QC	ERA-80/QC
ERO-71/QC	250								
ERO-85/QC		1200							
ERO-80/QC			2000						
ERA-18/QC				80					
TLEB-891/PUR					200				
TLE-18/B						36			
ERC-85/QC							500		
ERC-80/QC								1450	
ERA-80/QC									400

Recommended Distance Between two TAGs (Det)

This safety feature (Det) prevents any Read or Write error caused by two TAGS entering the field of the same transceiver (fig. G).

Figure G - Distance Between two TAGs



The values shown in the following table correspond to the maximum distance to be maintained between two TAGs of the same style relative to a transceiver:

Table 2

Distance between two TAGs (mm)	ERO-71/QC	ERO-85/QC	ERO-80/QC	TLEB-891/PUR	ERC-85/QC
OC-93		400	600		
OF-71	100	300	600	170	
OF-73	72	162		140	
OF-93	100	300	600	200	
OMA-181					
OMA-711	75	240		125	
OMA-731	72	162	172	100	
OMA-831	75	240	360		
OMA-851		330	540		
OMA-861		260			
OMA-931	75	240	360		
OMX-931/8K					200

Not all TAG and transceiver combinations are shown. Consult product data sheet or contact **TURCK** for more information.

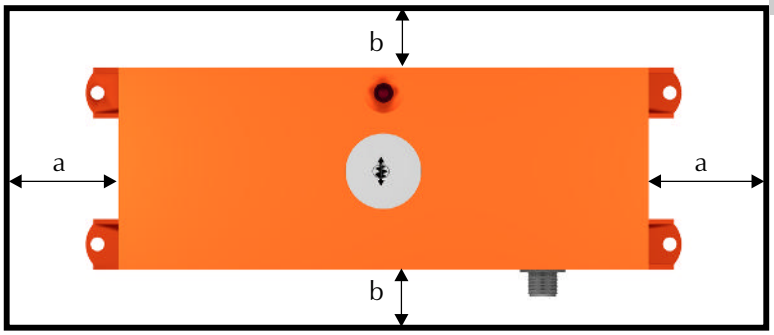
Transceiver Mounting Guidelines:

BALOGH Transceivers are designed to be operated in industrial environments on metal brackets. The metal bracket should be located on the back of the transceiver, i.e. the side opposite the wiring chamber. All other metal surfaces surrounding the transceiver should be no closer than the minimum distances specified in Table 3.

Table 3

Dimensions (mm)	a	b
ERO-80/QC	100	50
ERO-85/QC	30	30
ERO-71/QC	15	15
ERC-85/QC	30	30
TLEB-891/PUR	15	15

Figure H - 80 Style Transceiver



Configuration Recommendations

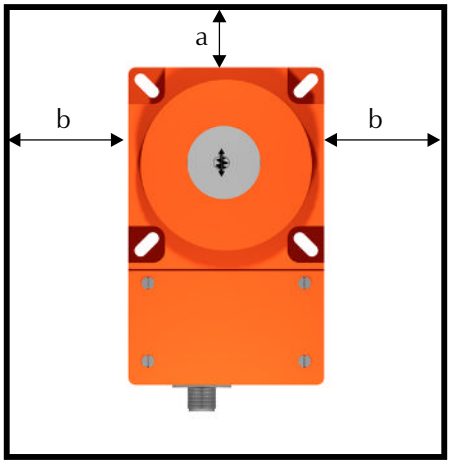


Figure J - 85 Style Transceiver

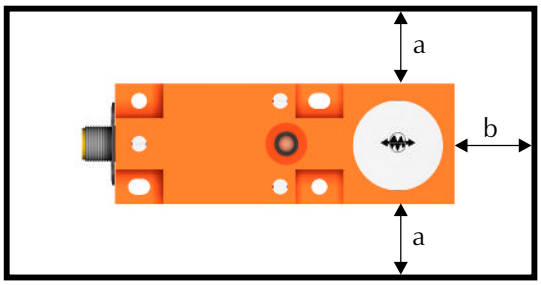


Figure K - 71 Style Transceiver

Not all transceiver styles are shown. Consult **TURCK** for more information.

TAG Mounting Guidelines:

BALOGH TAGs can be mounted in a recessed metal cavity if there is a space free of metal that corresponds to the values shown in the following table. The minimum metal-free clearance surrounding the TAG can be seen in figs. L, M, and N:

Table 4

Clearance (mm)	a	b
STYLE-85	30	30
STYLE-56	30	
STYLE-93	10	10
STYLE-71	10	10
STYLE-73	10	10

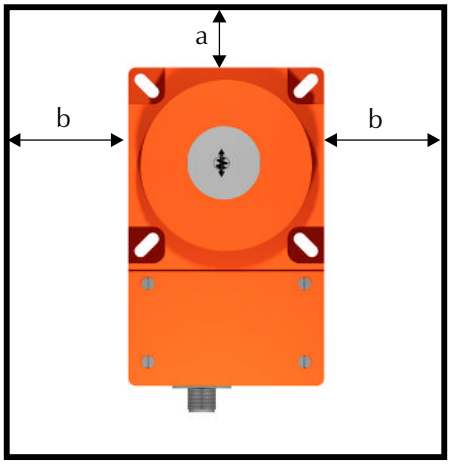


Figure L - 85 Style TAG

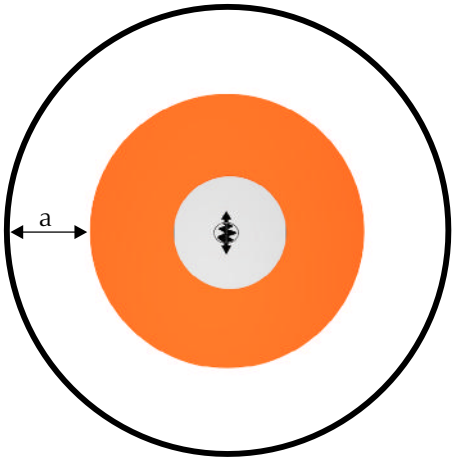


Figure M - 56 Style TAG

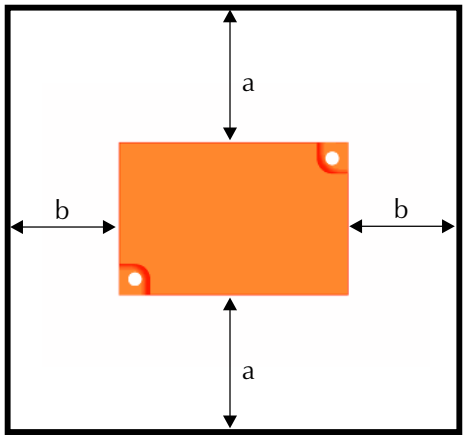
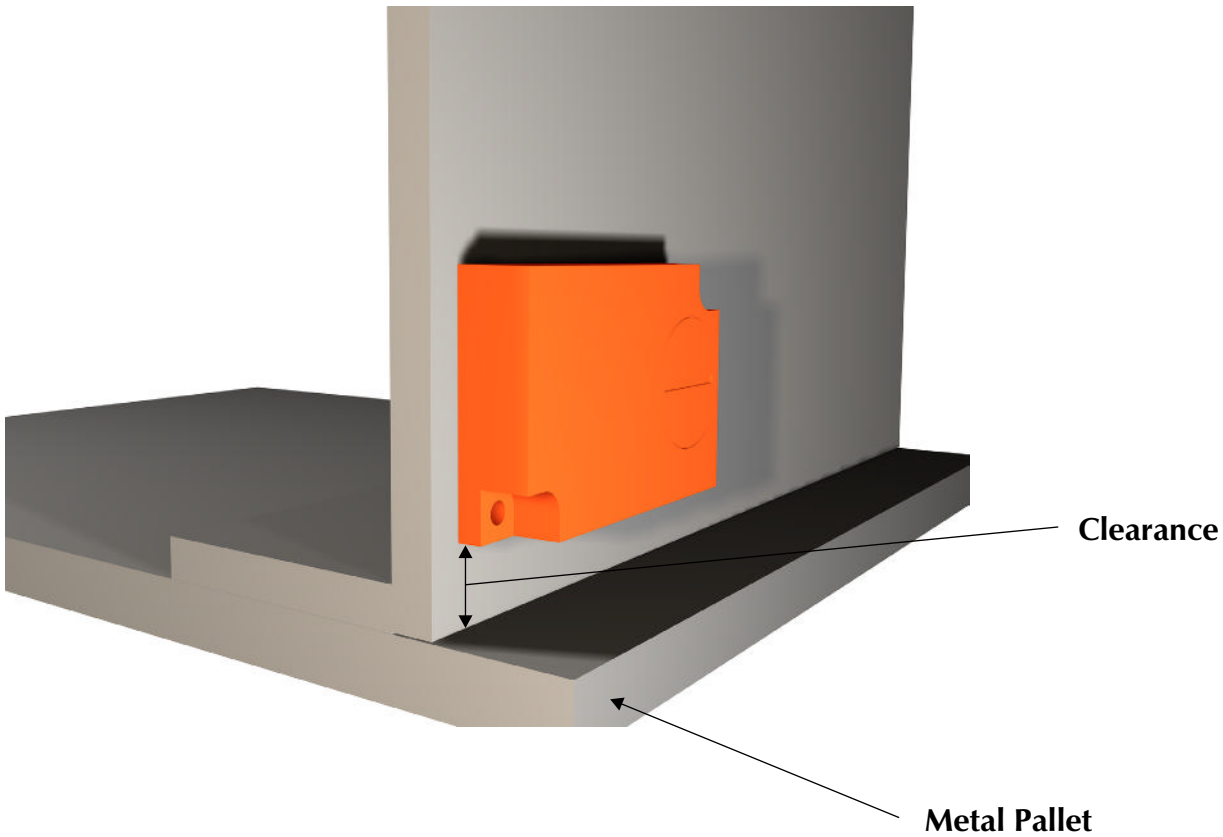


Figure N - 93 Style TAG

Configuration Recommendations

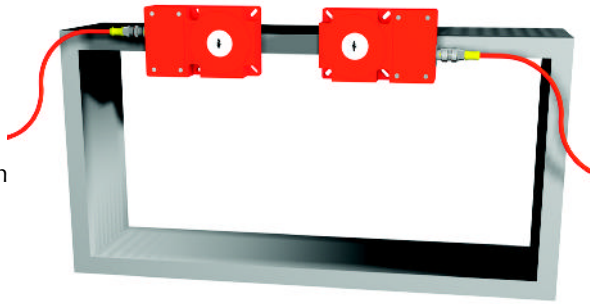
When mounting a TAG in a metallic environment, i.e. a metal bracket on a metal pallet, the values shown in the preceding table 4 must be maintained. These values represent the absolute minimum distances recommended for clearance between the TAG and the metal environment. Fig. P shows an example using a 93 Style TAG in a metallic environment.

Figure P - 93 Style TAG:



Configuration Recommendations

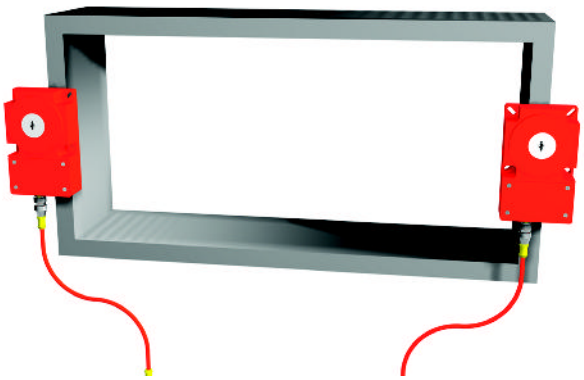
Figure Q



Special Transceiver Configurations:

It is not recommended to mount 2 Transceivers in a conducting loop or within the vicinity of conductor, which could form an electric loop. These configurations may form an antenna that would promote reciprocal interference to the Transceivers. Figures Q and R show examples of configurations that result in such influences.

Figure R

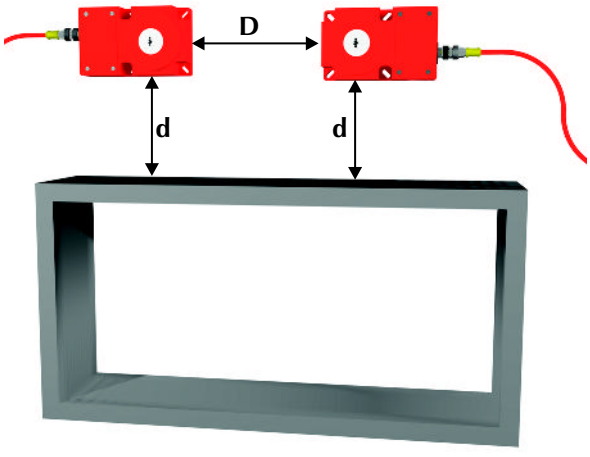


Any position similar to figures Q and R may result in interference. Complying with the minimum distances and placing the Transceivers outside the loop will avoid problems of interference (figure S).

D = Minimum distance between 2 Transceivers.
d = Distance between a Transceiver and a conductive loop.

Figure S

Minimum Distance (Meters)	D	d
ERO-71/QC	.25	.00
ERO-85/QC	1.2	.12
ERO-80/QC	2.0	0.2
ERA-80/QC	.40	.00



Power Supply

Supply voltage:	24V
Tolerance:	- 20%; + 15%
Ripple ratio:	10%
Protection against:	Polarity reversals
Max. current input:	50 to 150mA

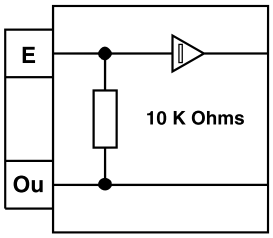
Note:

The Control Board's power supply can be disrupted by rubbing contacts (distribution by rails). If lightning strikes, over-voltage could accidentally contact the network. It is recommended to distribute the power via a system for protecting and monitoring the voltage supplied.

Parallel Connections

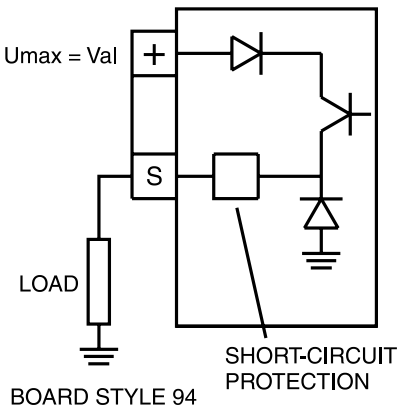
Input characteristics

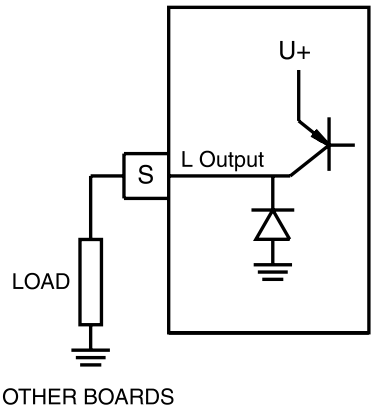
Input impedance:	10 Kohms
Input level "0":	0 to + 10 V
Input level "1":	+ 15 V to + 24 V
Protected against:	Polarity reversals



Output Characteristics

Maximum continuous current supplied: 100 mA to 250 mA (depending on board style)
Logic 1: Supply Voltage-1.5 V
Leakage current in logic 0: 0.5 mA
Protected against load short circuits (94/95 series Control Boards)





Electrical Connections

Serial Connections

RS-232 Serial Connection

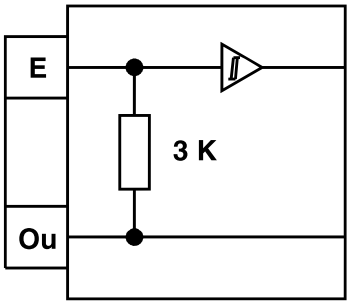
RS-232 Serial Connection

This type of connection is used for applications not requiring a long distance between the **TURCK** Control Board and the user's system.

- Cable length: 15 m
- Cable type: Shielded
- Conductor cross-section: 0.2 to 0.4 mm^2

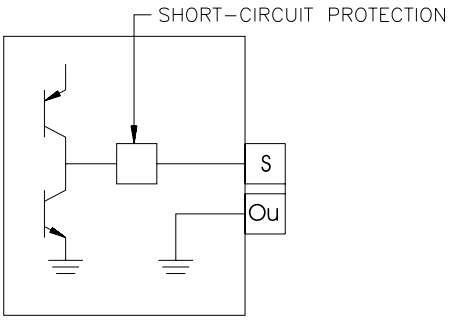
Input Characteristics

- Input impedance: 3 Kohms
- Logic 0: +3 V
- Logic 1: -3 V



Output Characteristics

- Max. continuous current supply: 20 mA
- Output logic 0 at 20 mA: min. +12V
- Output logic 1 at 20 mA: min. -12V
- Protected against: short-circuits



Cable Transceiver Connections

Cable for Transceiver Connection:

The following transceiver cable types should be used when wiring the BALOGH Transceivers and any BALOGH Control Board. The maximum recommended cable length will depend on the type of transceiver used. Consult the transceiver data sheet for specific length information.

SEF-ST or RA/*, Single End Female-Straight Thru, or Right Angle/* Length of cable

M-F/EXT/*, Male-Female/Extension/* Length of cable

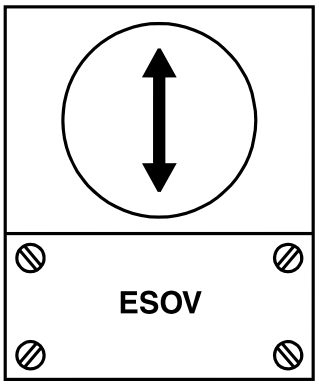
TURCK cables are polyurethane outer jacketed, twin pair, twin shielded cables. SEF cables have one female connector end and one pigtail end. M-F cables have connectors on both ends. Contact TURCK for available lengths off the shelf and special order lengths.

Transceiver Wiring

Transceiver cables should be used when making a connection between control boards and transceivers.

- On the transceiver side, the shielding is "open type" (not connected)
- On the board side, the shielding should be connected to the 0 V on the board terminal block or "open type" (not connected)

The maximum cable length between a transceiver and a board is 300 m (1000 feet) for ERO series Transceivers. Consult the transceiver data sheet for cable length. It is not advised to run the transceiver control board cable in close proximity to conveying pulsating current.



E = Input
O = DC Ground
S = Output
V = 24VDC

The letters E, O, S, V appear either on the front of the transceiver or inside the wiring chamber. When the keyed cap is removed from the transceiver, four (4) saddle mount terminals will be shown. These correspond to the order of the letters on the cap. The 85 series transceiver provides 3 port locations to install the Quick Connector (QC). Port #1 is the standard QC location. Port #2 and #3 are special order installations. When ordering an 85/QC Transceiver, a QC location sheet must accompany your order. If you need assistance in filling out this form or need one faxed to you, please contact **TURCK**.

Electrical Connections

Cable applications

Overview:

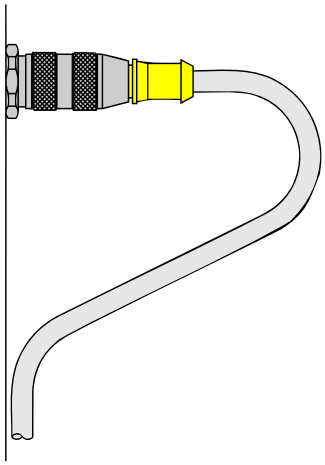
Managing cable systems correctly can significantly reduce the risk of cable failure and reoccurring down time. Below is a list of common problems and simple solutions to these problems:

Proper Bend Radius for fixed and Moving Applications:

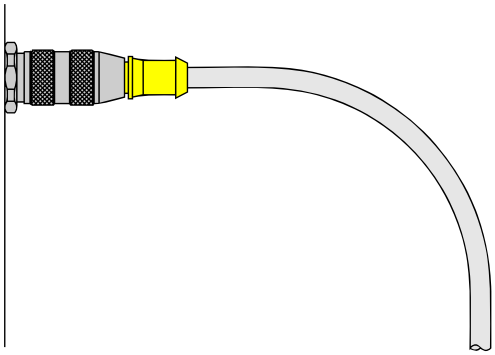
By providing a sufficient bend radius, you will greatly reduce the stress on the cable by distributing the stress over a greater length of the cable. This will provide a much longer cable life.

Fixed applications

Minimum bend radius 3 x cable diameter



Moving applications:

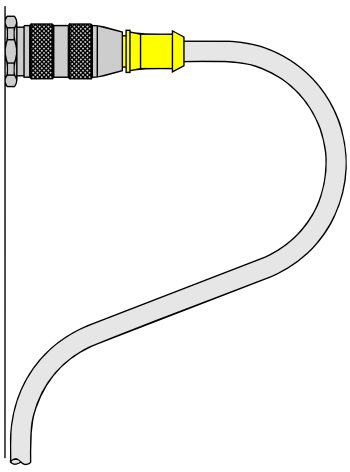


Eliminating Stress Points in Cable Dress

Installing cables to allow for adequate stress loops and freedom of motion increases the life of the cables.

Strain Relief

Correct



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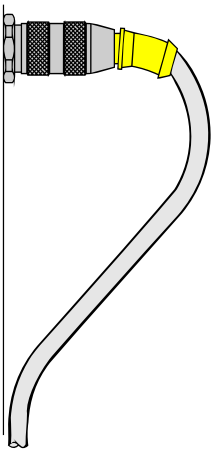
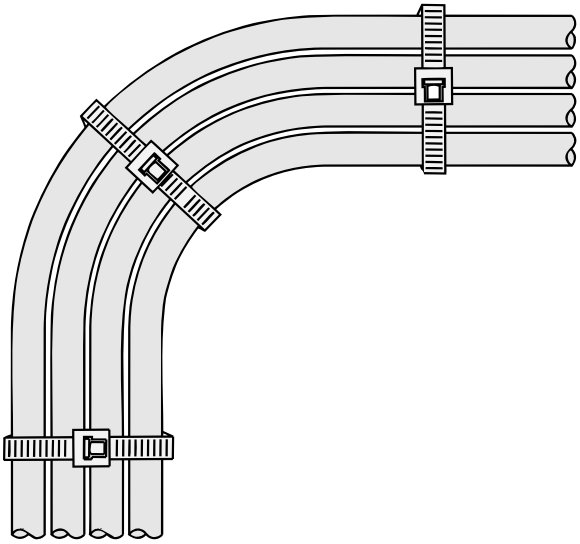


Electrical Connections

Cable Bundling Techniques

When you are bundling several cables together, be sure they are not tied too tightly together. Doing so will create stress and tension on the cables when the bundle is moved.

Correct



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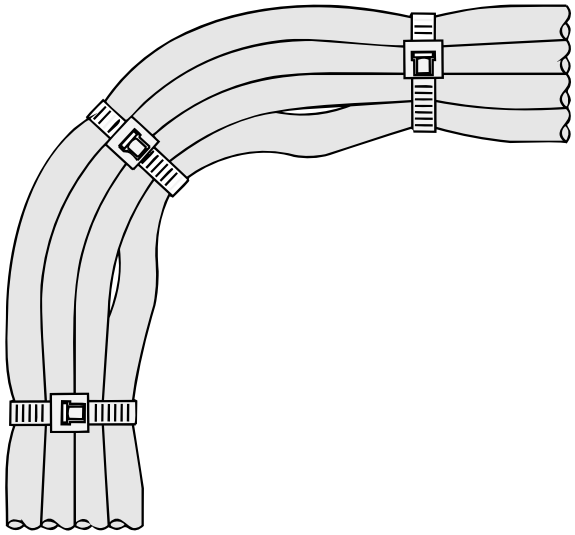
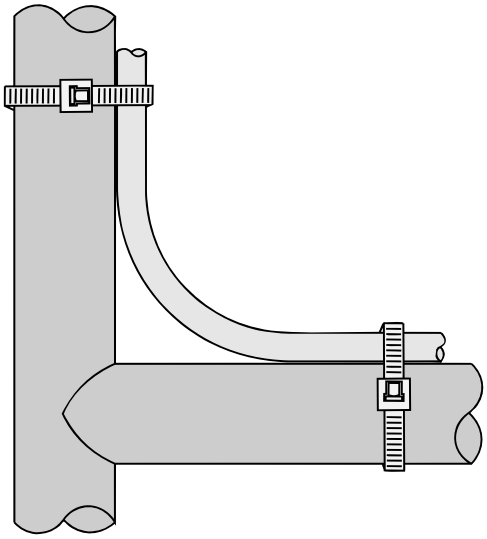


Tying Cables with Cable Ties:

When using self-locking style cable ties, be sure they are not tied too tightly. The ties should be loose enough so the cable slides freely underneath them. Over-tightening the tie will cause the cable to fail prematurely. The cable jackets should never be deformed by the tie. If they are, the tie is too tight.

Correct



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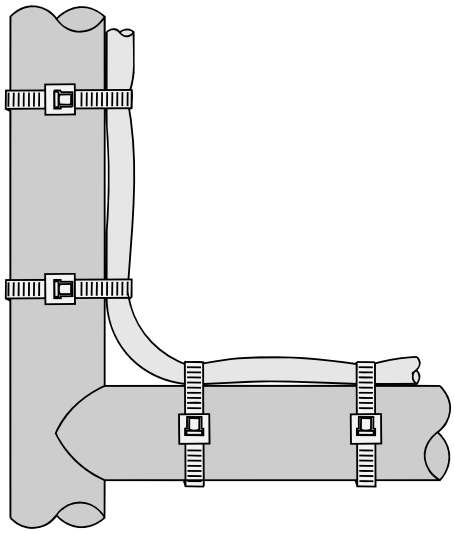

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Notes:

Warranty Terms and Conditions

RISK OF LOSS

Delivery of the equipment to a common carrier shall constitute delivery to the Purchaser and the risk of loss shall transfer at that time to Purchaser. Should delivery be delayed due to an act or omission on the part of the Purchaser, risk of loss shall transfer to the Purchaser upon notification by **TURCK Inc.** that the order is complete and ready for shipment.

WARRANTIES

TURCK INC. (hereinafter **"TURCK"**) offers three (3) WARRANTIES to cover all products sold. They are as follows:

1) The 12-MONTH WARRANTY is available for the products listed - generally those not covered by lifetime, 5-year or 18-month warranty. No registration required.
2) The **18-MONTH WARRANTY** is available for the products listed - generally those not covered by **LIFETIME** or 5-YEAR WARRANTY. No registration is required.
3) The **5-YEAR WARRANTY** is available generally for the products listed. No registration is required.
4) A **LIFETIME WARRANTY** is available for the products listed. It becomes effective when the accompanying **TURCK LIFETIME WARRANTY REGISTRATION** is completed and returned to **TURCK**.

GENERAL TERMS AND CONDITIONS FOR ALL WARRANTIES

- **12-MONTH STANDARD WARRANTY**
- **18-MONTH STANDARD WARRANTY**
- **5-YEAR WARRANTY**
- **LIFETIME WARRANTY**

TURCK warrants the Products covered by the respective WARRANTY AGREEMENTS to be free from defects in material and workmanship under normal and proper usage for the respective time periods listed above from the date of shipment from **TURCK**. In addition, certain specific terms apply to the various WARRANTIES.

THESE EXPRESS WARRANTIES ARE IN LIEU OF AND EXCLUDE ALL OTHER REPRESENTATIONS MADE - BOTH EXPRESSED AND IMPLIED. THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE FOR PRODUCTS COVERED BY THESE TERMS AND CONDITIONS.

TURCK warrants that the goods sold are as described, but no promise, description, affirmation of fact, sample model or representation, oral or written shall be part of an order, unless set forth in these terms and conditions, or are in writing and signed by an authorized representative of **TURCK**. These WARRANTIES do not apply to any Product which has been subject to misuse, negligence, or accident - or to any Product which has been modified or repaired, improperly installed, altered, or disassembled -except according to **TURCK's** written instructions.

These WARRANTIES are subject to the following conditions:

1) These WARRANTIES are limited to the electronic and mechanical performance only, as expressly detailed in the Product specifications and NOT to cosmetic performance.
2) These WARRANTIES shall not apply to any cables attached to, or integrated with the Product. However, the **18-MONTH WARRANTY** shall apply to cables sold separately by **TURCK**.
3) These WARRANTIES shall not apply to any Products which are stored, or utilized, in harsh environmental or electrical conditions outside **TURCK's** written specifications.
4) The WARRANTIES are applicable only to Products shipped from **TURCK** subsequent to January 1, 1988.

ADDITIONAL SPECIFIC TERMS FOR -

(12-MONTH STANDARD WARRANTY) for Encoders, Linear Displacement Transducers and RFID products.

(18-MONTH STANDARD WARRANTY) FOR ULTRASONIC SENSORS, CABLES AND ALL NON-SENSING PRODUCTS SOLD BY TURCK INC. INCLUDING MULTI-SAFE, MULTI-MODUL, MULTI-CART AND RELATED AMPLIFIER PRODUCTS, RELAYS AND TIMERS and

5-YEAR WARRANTY FOR INDUCTIVE AND CAPACITIVE PROXIMITY SENSORS: The periods covered for the above WARRANTIES and Products shall be 12 MONTHS, 18-MONTHS and 5-YEARS, respectively, from the date of shipment from TURCK.

LIFETIME WARRANTY (OPTIONAL - REGISTRATION REQUIRED) FOR INDUCTIVE, INDUCTIVE MAGNET OPERATED AND CAPACITIVE PROXIMITY SENSORS SOLD TO THE ORIGINAL PURCHASER FOR THE LIFETIME OF THE ORIGINAL APPLICATION.

Warranty Terms and Conditions

The following terms apply to the LIFETIME WARRANTY in addition to the General Terms:

1) This WARRANTY shall be effective only when the LIFETIME WARRANTY REGISTRATION has been completed, signed by the End User and an authorized **TURCK** Representative or Distributor and has been received by **TURCK** no later than six (6) months after installation in the End User's Plant, or two (2) years from the date product was shipped from **TURCK**, whichever is sooner.
2) This warranty is available only to **TURCK's** authorized Representatives, Distributors and to the Original User. (The term "Original User" means that person, firm, or corporation which first uses the Product on a continuous basis in connection with the operation of a production line, piece of machinery, equipment, or similar device.) In the event the ownership of the product is transferred to a person, firm or corporation other than the Original User, this WARRANTY shall terminate.
3) This WARRANTY is applicable only to the Original Application. In the event the machinery, equipment, or production line to which the Product is connected, or on which it is installed, is substituted, changed, moved or replaced, the WARRANTY shall terminate.
4) This WARRANTY shall be valid only if the Product was purchased by the Original User from **TURCK**, or from an authorized **TURCK** Distributor, or was an integral part of a piece of machinery and equipment obtained by the Original user from an Original Equipment Manufacturer, which itself, was purchased directly from **TURCK** or from an authorized Distributor.

PURCHASER'S REMEDIES

This Remedy shall apply to all WARRANTIES. If a **TURCK** Distributor desires to make a WARRANTY Claim, the Distributor shall, if requested by **TURCK**, ship the Product to **TURCK's** factory in Minneapolis, Minnesota, postage or freight prepaid. If the User desires to make a WARRANTY Claim, they shall notify the authorized **TURCK** Distributor from whom it was purchased or, if such Distributor is unknown, shall notify **TURCK**. **TURCK** shall, at its option, take any of the following two courses of action for any products which **TURCK** determines are defective in materials or workmanship.

1) Repair or replace the Product and ship the Product to the Original Purchaser or to the authorized **TURCK** Distributor, postage or freight prepaid; or
2) Repay to the Original Purchaser that price paid by the Original Purchaser; provided that if the claim is made under the LIFETIME WARRANTY, and such Product is not then being manufactured by **TURCK**, then the amount to be repaid by **TURCK** to the Original Purchaser shall be reduced according to the following schedule:

Number of Years Since Date of Purchase by Original Purhaser	Percent of Original Purchase Price To Be Paid by TURCK
10	50%
15	25%
20	10%
More than 20	5%

PURCHASER'S REMEDIES SHALL BE LIMITED EXCLUSIVELY TO THE RIGHT OF REPLACEMENT, REPAIR OR REPAYMENT AS PROVIDED AND DOES NOT INCLUDE ANY LABOR COST OR REPLACEMENT AT ORIGINAL PURCHASER'S SITE. TURCK SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF ANY WARRANTY, EXPRESSED OR IMPLIED, APPLICABLE TO THE PRODUCT, INCLUDING WITHOUT LIMITATION, ANY DAMAGES RESULTING FROM PROPERTY DAMAGE, PERSONAL INJURY OR BUSINESS INTERRUPTION.

CONSIDER SAFETY AND PROTECTION PRECAUTIONS

TURCK takes great care to design and build reliable and dependable products, however, some products can fail eventually. You must take precautions to design your equipment to prevent property damage and personal injury in the unlikely event of failure. As a matter of policy, **TURCK** does NOT recommend the installation of electronic controls as the sole device FOR THE PROTECTION OF PERSONNEL in connection with power driven presses, brakes, shears and similar equipment and, therefore, the customer should build in redundancy or dual control using approved safety devices for these applications.

GOVERNING LAW

The sale and purchase of Products covered hereby and all terms and conditions hereof shall be governed by the law of the State of Minnesota.

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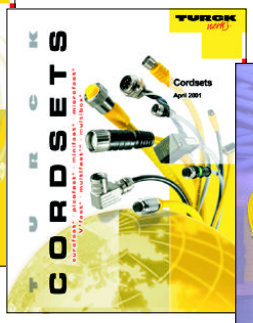

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Order B0180

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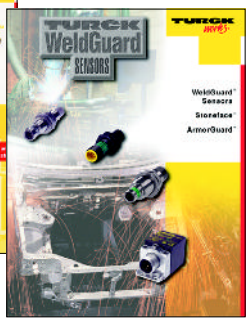

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