

BALLUFF

sensors worldwide

Expanding the Value of EtherCAT Position Monitoring, Traceability & Distributed Modular I/O



Ether**CAT**[®]

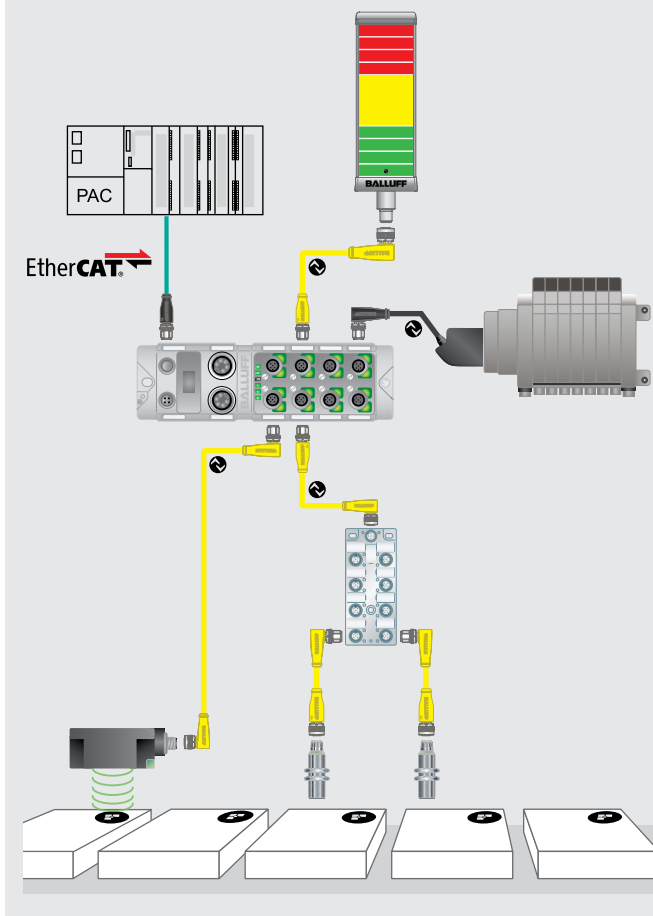


Expanding the Value of EtherCAT

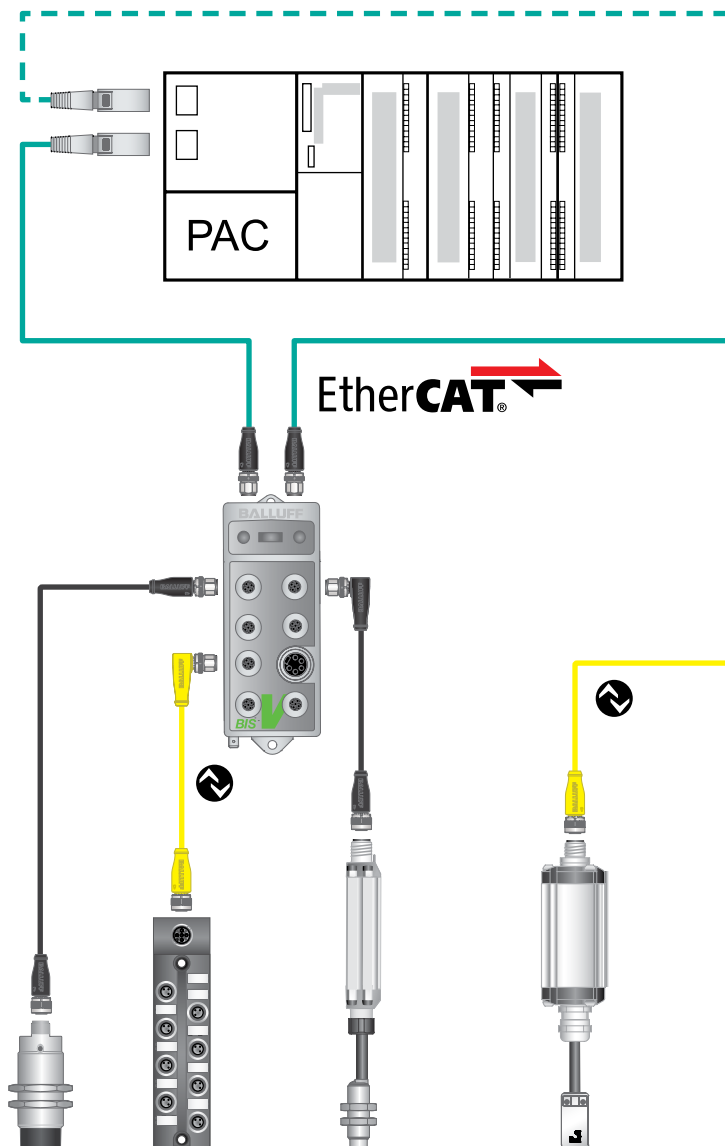
When implementing EtherCAT into automation equipment, Balluff adds a unique set of benefits to the existing portfolio in the market. Whether you are in assembly automation, packaging, plastics, research, energy or any other industry, there is a need for tracking and communicating data. Requirements demand flexibility for change down the road, which Balluff brings with linear position monitoring, traceability and distributed modular I/O.

Adding to the Possibilities of EtherCAT

The control of an automated workstation can be simplified immensely by utilizing the benefits of distributed modular I/O. All devices are IP67 machine mount and do not require a controls cabinet. This allows for easier troubleshooting over the lifecycle of the machine from build to support. Devices can also be quickly swapped upon failure and are automatically configured by the master. RFID data can be communicated, valve manifolds controlled and Smart Lights implemented all with one node on the EtherCAT network.



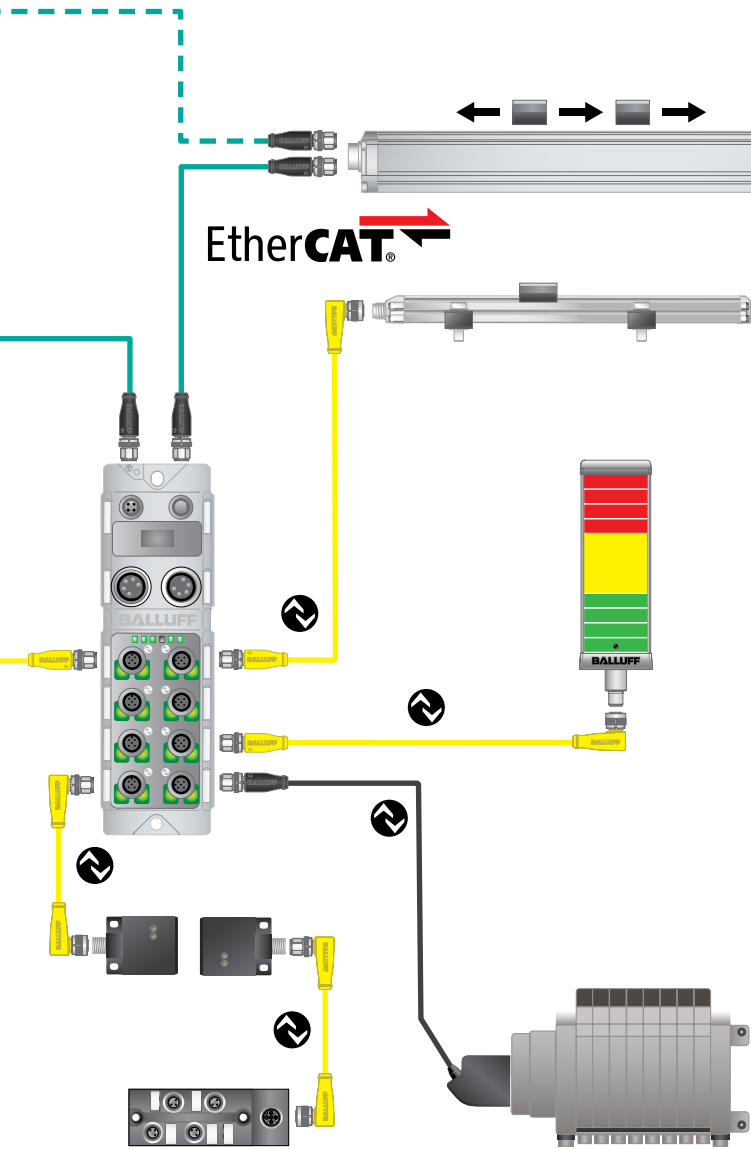
Flexible Topologies



Traceability with EtherCAT

Traceability is the act of documenting every step in a process chain. Manufacturers use this information to gain visibility to achieve on-time delivery, lean manufacturing, enhanced quality and regulatory compliance. It is also used to track assets, logistics and material movement. Traceability can be easily implemented over EtherCAT in a variety of ways. Using RFID systems native on EtherCAT with proven technology from Balluff makes traceability easy to integrate into any system or process.

See page 6 for available products.



Distributed Modular I/O over EtherCAT

Distributed Modular I/O with IO-Link gives EtherCAT access to many powerful technologies already available on the market from a variety of vendors. The universal, smart and easy IO-Link technology works like USB for industrial automation and is easily configured in the engineering software with simple byte selections. Key Balluff technologies available with IO-Link are: RFID, non-contact couplers, valve manifold connectors, the Smart Light indicator and smart sensors like linear transducers and pressure sensors.

See page 5 for available products.

Position Monitoring with EtherCAT

Position monitoring is a key technology utilized in automation designs. This is a necessity when working in precise and synchronized applications. EtherCAT is an ideal network for this. Linear transducers can be used to provide closed loop motion control or provide basic position measurement for applications that don't require closed loop control. Balluff offers linear transducers for mounting inside a hydraulic cylinder or externally mounting adjacent to the axis of motion.

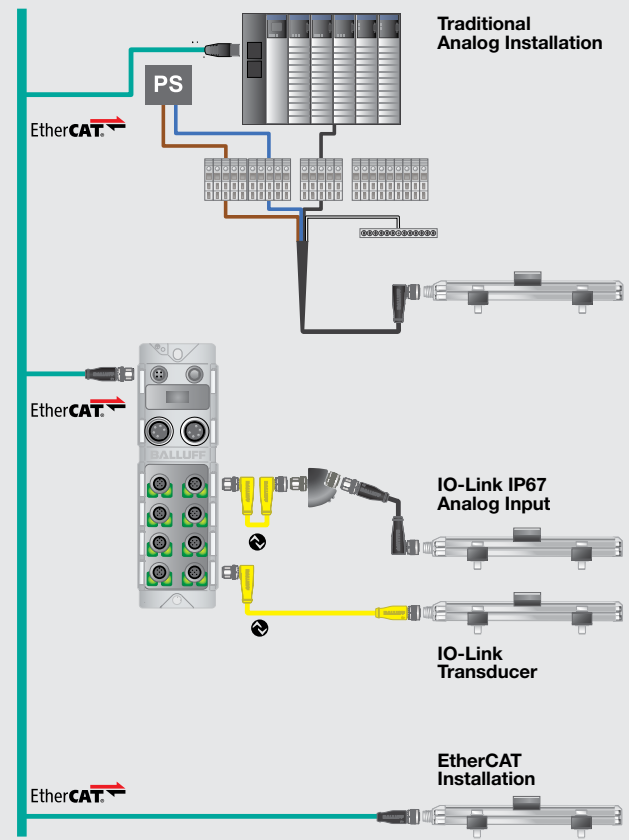
See page 4 for available products.



Eliminate Analog Headaches

When using analog devices on a machine it can be difficult to find a path for the shielded cable that does not incur noise from motors, drives or other environmental factors. These issues can be eliminated by the use of native IO-Link or EtherCAT devices.

- By utilizing an IO-Link device, the analog to digital conversion is performed right at the device and then a standard sensor cable can be used for the data.
- By utilizing an EtherCAT device, the measurement signal can be synchronized with the distributed clock and closed loop applications can be solved.
- Both solutions provide the measurement signals noise free and the complicated wiring requirements of analog signals are reduced.
- Both solutions provide additional information about the device such as set-points or diagnostics.



⚠ WARNING

- Read, understand, and follow warnings and manual. Failure to do so could result in serious injury or death.
- NEVER USE AS A SENSING DEVICE FOR PERSONNEL PROTECTION
- Does NOT include self-checking redundancy circuitry required for use in personnel safety applications
- Does NOT meet OSHA and ANSI standards for point-of-operation devices

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Closed Loop Motion Control

- Real time synchronous motion control with distributed clock
- Dynamic, highly-repeatable position and velocity measurement
- Non-contact measurement principle with absolute output signal
- Up to 16 magnets on a single transducer



Part number	BTL7-V50E-M_ _ _ _-P-C003
Model	Square profile
Application	External mount
Resolution	1 µm position, 0.1 mm/s velocity
Repeat Accuracy	≤ ± 5 µm
Non-linearity	± 30 µm for L ≤ 5500mm ± 0.02% FS for 5500 mm...7620 mm
Floating Magnet	BAM014M BTL5-P-3800-2
Captive Magnet	BAM014H BTL5-F-2814-1S

M_ _ _ _
Lengths Available:
0025...7620 mm

Position Monitoring and Measuring

- Ideal for position monitoring applications that do not require distributed clock
- Native EtherCAT communication and absolute output signal
- Eliminates noise concerns coming from normal analog measurements



Part number	BTL6-V11E-M_ _ _ _-S115	BTL6-V11E-M_ _ _ _-A1-S115
Model	Rod Style	AT Tubular Profile
Application	In cylinder	External mount
System Resolution	≤ 10 µm	≤ 15 µm
Repeat Accuracy	≤ 30 µm	≤ 30 µm
Non-linearity	≤ ± 200 µm for L ≤ 500mm ± 0.04% for 500 mm...4000 mm	≤ ± 200 µm for L ≤ 500mm ± 0.04% for 500 mm...1500 mm
Required Accessory – M12/M8 Y-plug splitter	BCC0CK4 BCC M418-M314-M415-V0038-000	BCC0CK4 BCC M418-M314-M415-V0038-000
Magnet	BAM013L BTL-P-1013-4R (Captive)	BAM014Z BTL6-A-3801-2 (Floating)

M_ _ _ _
Lengths Available:
0025...4012 mm

B = M18x1.5
Z = 3/4"-16 UNF

M_ _ _ _
Lengths Available:
0160...1500 mm

Expanding the Value of EtherCAT

Distributed Modular I/O with IO-Link

- Connect 8 IO-Link slave devices to the EtherCAT master
- Ethernet over EtherCAT capable device (webserver & IP address)
- Discrete & Analog I/O, Valve Manifold Control, RFID, Smart Sensors, Smart Light & any IO-Link device from any vendor



Type	EtherCAT IO-Link Master								M8 Shorty I/O Hub with Point Diagnostics				M8 I/O Hub with Point Diagnostics				14 bit Analog Input Plug (output versions available)				Valve Manifold Control Bosch, Festo MPA		Valve Manifold Control MAC, Festo CPV		Valve Manifold Control SMC, Parker		Valve Manifold Control Numatics		Non-Contact Couplers BASE		Non-Contact Couplers REMOTE		IO-Link Smart Light 1-5 zone Stacklight or Level Indicator		IO-Link Smart Light 1-3 zone Stacklight or Level Indicator		IO-Link Micropulse Linear Transducer*** 51 to 4572 mm							
Ordering code* Part number	BNI0077 BNI ECT-508-105-Z015								BNI001W BNI IOL-101-S01-K018				BNI001Y BNI IOL-102-S01-K019				BNI0022 BNI IOL-104-S01-K021				BNI0041 BNI IOL-712-000-K023		BNI0042 BNI IOL-714-000-K023		BNI004T BNI IOL-716-000-K023		BNI001K BNI IOL-751-V01-K007		BNI001L BNI IOL-751-V02-K007		BNI001M BNI IOL-751-V03-K007		BNI006R BNI IOL-751-V13-K007		BIC0070 BIC 1B0-ITA50-Q40KFU-SM44A		BIC0071 BIC 2B0-ITA50-Q40KFU-SM45A		BNI0072 BNI IOL-802-000-Z036		BNI007F BNI IOL-801-000-Z036		BTL6-U110-M_ _-PF-S4	
No. of Ports	8								4				8				8				1		1		1		1		1		1		1		1		1		1					
IO-Link Master Ports	8								4				8				8				1		1		1		1		1		1		1		1		1		1					
Discrete Inputs	max 8								4				8				16																											
Discrete Outputs	max 8																																											
4-20mA Inputs																	1																											
0-10V Input																																												
PT100 RTD Input																																												
Degree of protection	IP67								IP67				IP67				IP67				IP67		IP67		IP67		IP67		IP67		IP67		IP67		IP67		IP67		IP67					

* See Industrial Networking & Connectivity Catalog for more housing and options

** IP67 with provided gasket installed

*** See Square Profile Transducer on page 4 for magnets



IO-Link can run up to 20 meters between the master and slave.

		BCC05M7		BCC05P4		BCC0617		BCC0AW6		BCC05M8		BCC05P5		BCC0618		BCC05M9		BCC05P6		BCC0619		BCC0724		BCC05MA		BCC05P7		BCC061A		BCC05MC		BCC05P8		BCC061C		BCC05MH		BCC05PA		BCC061F		BCC085J		BCC0CET		BCC0C8T	
		0.3 m		0.6 m		1.0 m		1.5 m		2.0 m		5.0 m		10.0 m																																	
Female	Male	Cable	Color																																												
Straight	Straight	PVC	Yellow	■																																											
Straight	Right angle	PVC	Yellow		■																																										
Right angle	Straight	PVC	Yellow			■																																									
Right angle	Right angle	PVC	Yellow				■																																								

Traceability with RFID

- Improve productivity by simultaneously connecting to 4 Read/Write heads
- Easiest RFID to implement with IO-Link
- Localized I/O port provides access to most IO-Link applications



Type	Type																
	BIS V - RFID processor	BIS V - 90x90 Read/Write Head	BIS V - 90x90 FERROIDENT/ Metal Mount	BIS V - 25x50 Read/Write Head	BIS V - M30 Read/Write Head	BIS V - M18 Read/Write Head	BIS V - M12 Read/Write Head	IO-Link - 90x90	IO-Link - 90x90 FERROIDENT/ Metal Mount	IO-Link - 25x50	IO-Link - 25x50	IO-Link - M30	IO-Link - M30	IO-Link - M18	IO-Link - M18	IO-Link - M15.5	IO-Link - M15.5
Ordering code	BIS00U9	BIS00T0	BIS00T2	BIS00T9	BIS00RF	BIS00T8	BIS00T7	BIS0102	BIS0103	BIS00M1	BIS0106	BIS00LH	BIS0108	BIS00LW	BIS0105	BIS00LJ	BIS0104
Part number	BIS V-6110-063-C002	BIS VM-301-001-S4	BIS VM-351-001-S4	BIS VM-305-001-S4	BIS VM-300-001-S4	BIS VM-307-001-S4	BIS VM-306-001-S4	BIS M-401-072-001-07-S4	BIS M-451-072-001-07-S4	BIS M-402-045-004-07-S4	BIS M-402-072-004-07-S4	BIS M-400-045-001-07-S4	BIS M-400-072-001-07-S4	BIS M-402-045-002-07-S4	BIS M-402-072-002-07-S4	BIS M-400-045-002-07-S4	BIS M-400-072-002-07-S4
No. of Read/Write Heads	4																
IO-Link Master Ports	1																
No. Bytes in Data Block								32	32	10	32	10	32	10	32	10	32
Non-Flush Mounting		■		■	■	■	■	■		■	■	■	■	■	■	■	■
Read/Write Distances (mm)																	
BIS004A	2000 bytes			7		7	5			8	8			5	5	6	6
BIS0044	2000 bytes	30		13	22	13		30		15	15	20	20	15	15	15	15
BIS0043	2000 bytes	50						40				28	28			20	20
BIS0046	2000 bytes	90			44			60				38	38			28	28
BIS004H	2000 bytes		65						65								
BIS0111	8000 bytes		65						65								

See Industrial Identification Catalog for more head and tag combinations



BIS V Connection Cables

Male	Female	Cable material	Color	BCC039H	BCC039R	BCC03A8	BCC03AJ	BCC039J	BCC039T	BCC03A9	BCC03AK	BCC039K	BCC039U	BCC03AA	BCC03AL	BCC039L	BCC039W	BCC03AC	BCC03AM	BCC039M	BCC039Y	BCC03AE	BCC03AN	
				0.3 m			0.6 m			1 m			1.5 m			2 m								
Straight	Straight	PUR	Black	■				■				■				■				■				
Angled	Straight	PUR	Black		■				■				■				■				■			
Straight	Straight	PUR	Black			■				■				■				■				■		
Angled	Angled	PUR	Black				■				■				■				■				■	

Please order matching plug connectors separately. (Unshielded cable can be used only for lengths up to 3m. Cable lengths over 3m have to be shielded.)

Ethernet Connectivity

- High flexibility Cat5e Ethernet cables are available in unshielded and shielded versions
- Can accommodate virtually any topology or rating
- When star topologies are required, unmanaged switches can be used in the cabinet or on the machine



Ethernet Cables	TPE Unshielded				TPE Shielded				Bulkhead Connectors			
	M12 - M12 Double-Ended	M12 - RJ45 Double-Ended	M12 - RJ45 Double-Ended	RJ45-RJ45 Double-Ended	M12-M12 Double-Ended	M12-RJ45 Double-Ended	RJ45-RJ45 Double-Ended	M12-M12	M12-RJ45	RJ45-RJ45		
Ordering code	BCC M414-M414-6D-366-EX64N9-_-_-				BCC M414-M414-6D-366-EX64N9-_-_-				BCC M414-M414-6D-338-ES64N9-_-_-			
Part number	BCC M414-M414-6D-366-EX64N9-_-_-				BCC M414-M414-6D-366-EX64N9-_-_-				BCC M414-M414-6D-338-ES64N9-_-_-			
Cat5e Compliant	■	■	■	■	■	■	■	■	■	■	■	■
Degree of protection	IP67	IP67	IP67	IP67/IP20	IP67/IP20	IP20	IP67	IP67/IP20	IP20	IP67	IP67/IP20	IP67/IP20
600V, CMX, Flex10mio	■	■	■	■	■	■	■	■	■	■	■	■
Flex 5mio												
Straight - Straight	■				■				■			
Angled - Straight		■				■				■		
Angled - Angled			■								■	




Power Cables	M8 4-wire BTL Power	7/8" 5-wire BNI & BIS Power			7/8" 5-wire Power Tee
Part number	BCC M314-0000-10-003-VX44T2-_-_-	BCC M324-0000-10-003-VX44T2-_-_-	BCC A315-0000-10-063-VX45W6-_-_-	BCC A325-0000-10-063-VX45W6-_-_-	BCC A315-A315-30-335-VX45W6-_-_-
Degree of protection	IP67	IP67	IP67	IP67	IP67
Single-Ended Straight	■		■		
Single-Ended Angled		■		■	
Straight - Straight				■	■



Star Topology Ethernet Switches	Unmanaged	Unmanaged	Unmanaged
Ordering code	BNI005E		
Part number	BNI TCP-951-000-E028		
No. of Ports	5	8	9
DIN Rail Mounting	■	■	
Degree of protection	IP20	IP20	IP67
Input Power	24 VDC	24 VDC	24 VDC

Single-Ended Lengths: 020 (2.0m), 050 (5.0m), 100 (10.0m)
 Double-Ended Lengths: 003 (0.3m), 006 (0.6m), 010 (1.0m) 020 (2.0m), 050 (5.0m), 100 (10.0m), 200 (20.0m), 300 (30.0m)


* Requires 4-wire Auxiliary power connection

 Systems and Services

 Industrial Networking and Connectivity

 Industrial Identification

 Object Detection

 Linear Position Sensing and Measurement

 Fluid Sensors

 Accessories

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