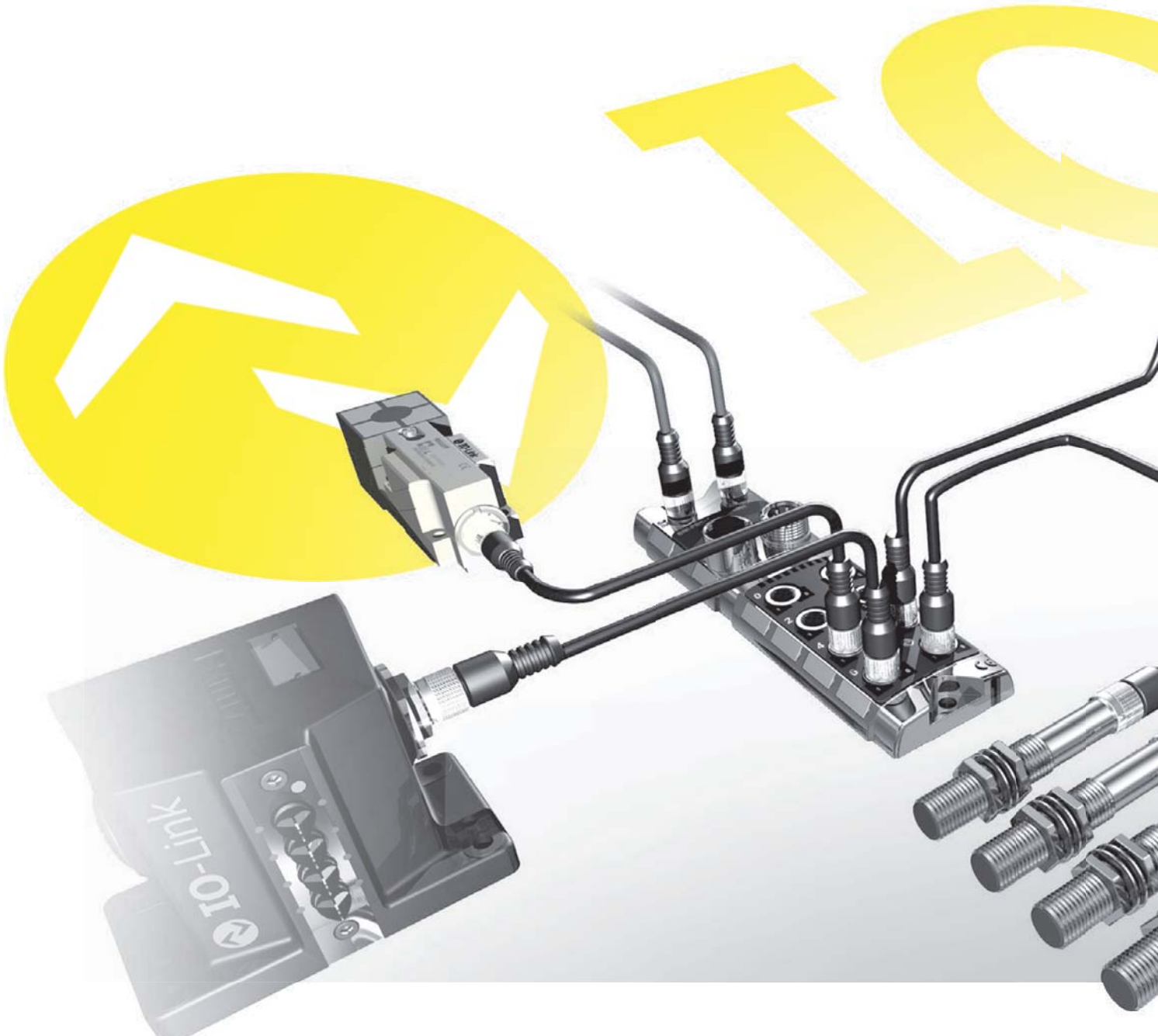
As the first standardized, uniform, universally applicable interface in control technology, IO-Link transmits all sensor and actuator signals to the controller. Likewise, IO-Link passes control data down to the lowest sensor level. All of this makes automation even more powerful than ever before.

IO-Link advantages at a glance
– Easy to get started, time-saving installation
– Automatic adjustment during operation
– Continuous monitoring



IO-Link
Distributed Modular I/O

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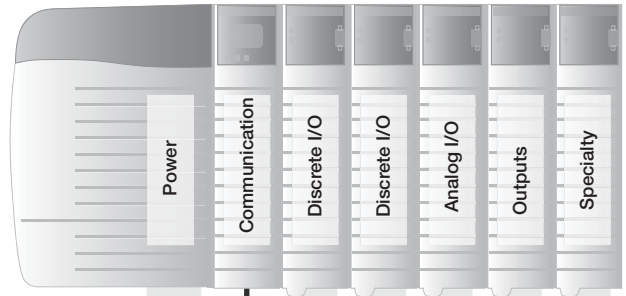
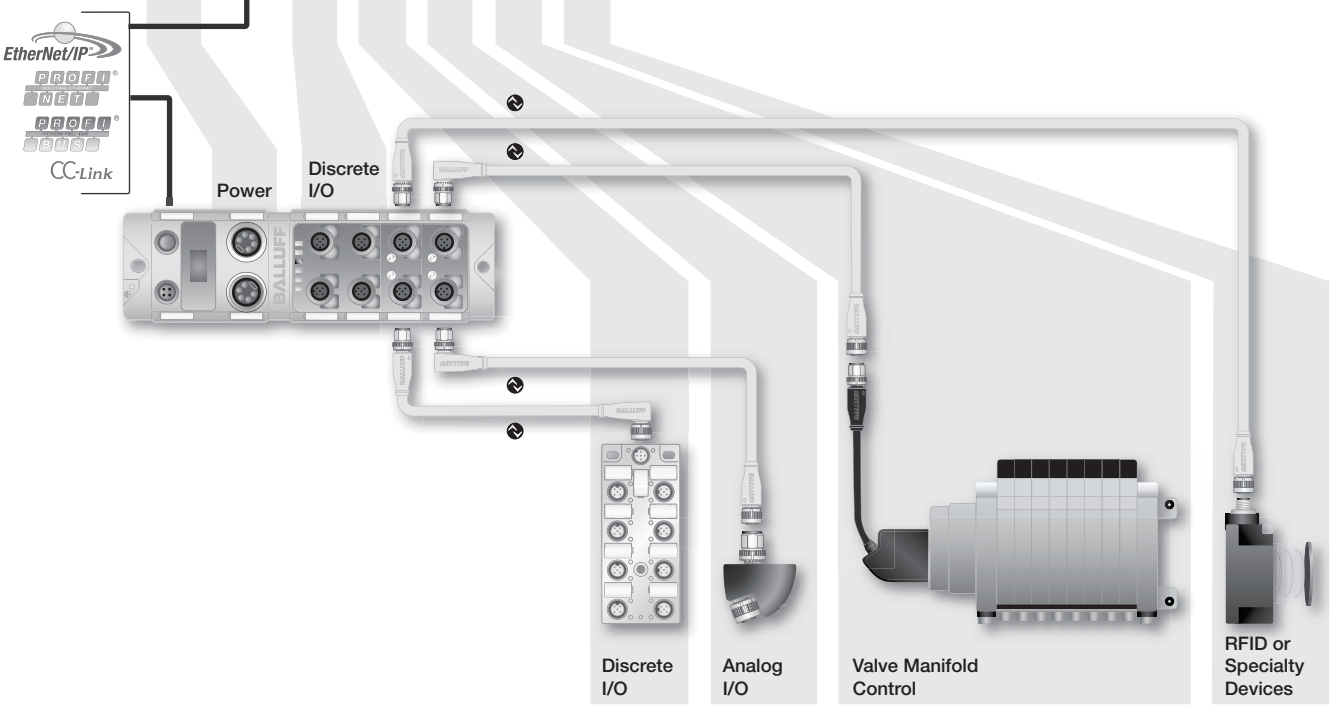
IO-Link
What is Distributed Modular I/O?

Think of a remote “slice” I/O. In a typical application, the communication head and the power supply sit on the left hand side and are followed along the backplane by the individual I/O devices. Usually there are a limited number of slots available in the backplane and individual slices of control components, for example, discrete 24V input cards or 0-10V analog cards can be inserted.



In a similar fashion, a Distributed Modular I/O system has a communications head that talks over the desired industrial network on one side and the right hand side acts as a data collector. In lieu of a backplane, each device is connected to an industry standard M12 port utilizing a basic 3-wire sensor cable for IO-Link communication. With the ability to be installed within a 20 meter radius from the data, collector devices can be easily distributed across the machine.

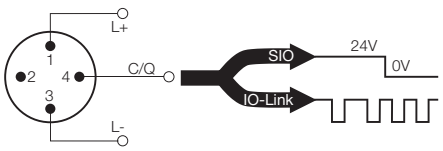


The backplane of Distributed Modular I/O = IO-Link

Utilizing a widely accepted and open point-to point technology, IO-Link, a Distributed Modular I/O system is fieldbus independent, is easily configured and is vendor neutral. Process data shows up as simple packets of bytes in the controller for easy integration. The parameterization data allows the devices to be quickly configured using simple read/write commands, and best of all, there is no “sub-bus” to cause headaches, nor is there some new protocol to be educated on. The digital signal is carried over pin 4 of a standard cable and 24V power is provided to the device in a standard configuration. If required, the IO-Link port can be used for a standard I/O point.

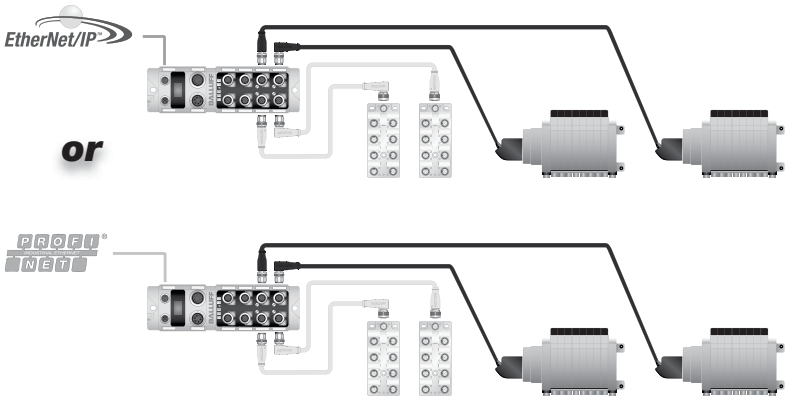
3 Wire or 4 Wire Sensor Cable

20 Meters maximum



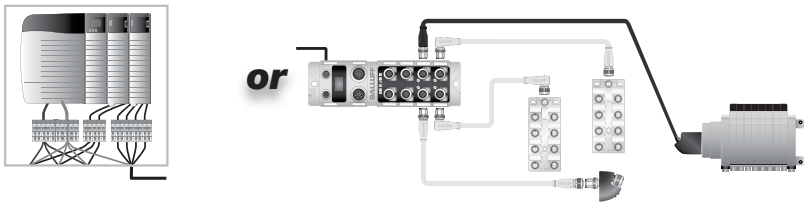
Simplify Controls Quotation Process

Utilize the same components for I/O regardless of the PLC brand or industrial network selected. Pricing for control equipment can be standardized from machine to machine and calculations are easily expandable.



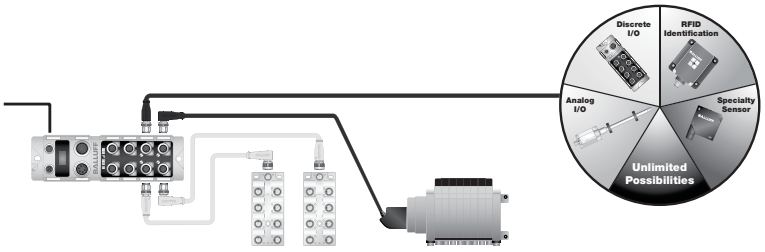
Reduce Total Cost per Point

Simplify the labor involved in parallel wiring a valve manifold or terminating a set of discrete sensors. Analog devices can get costly with shielded cable runs and expensive four channel analog input cards, especially when there is only a need for one analog channel. Distributed Modular I/O reduces hardware setup labor and can be customized to reduce I/O hardware costs.



Maximize Spares

Most initial designs include a set of spare I/O points for later development or modifications. Whether the customer wants to add a few discrete sensors to the design or there is a need to add a single channel of analog to the machine, spares and additions to the design can add major cost to the control's bill of materials. With this solution, spare connections can be a flexible placeholder for any type of I/O until the need arises.



IO-Link

Types of Distributed Modular I/O devices

Discrete I/O

M8 ports
– Up to 16 inputs

M12 ports
– Up to 16 inputs
– 16 outputs
– 16 configurable

IP20 terminals
– Up to 16 configurable

Analog I/O

1 channel (14 bit)
– 0-10 V in/out
– 4-20mA in/out
– PT100 in

4 channels (10 bit)
– 0-10 V
– 4-20mA
– plus 8 inputs

Valve Manifold Control

25 pin D-sub

IP67 & Terminal

Specialty Devices and RFID

Measurement and position sensors

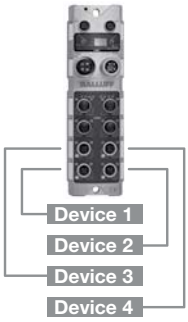
RFID
– Read/write
– Read only

Non-contact connectors
– 3 bytes to 11 bytes

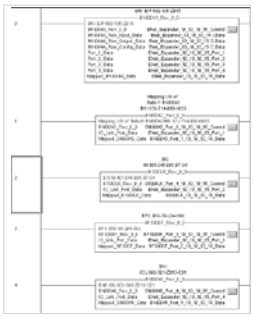
While hardware selection is important to the success of a project, if the hardware is not easily integrated into the engineering software, any benefits gained could be lost. However, Distributed Modular I/O is easily integrated into typical engineering software with an easy three step process. Below are examples of how to integrate industrial ethernet solutions. These steps can also be easily implemented on industrial bus networks as well.

EtherNet/IP™

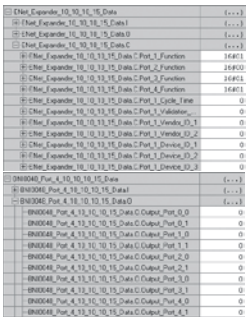
Step 1
Select hardware



Step 2
Import add on instructions (AOI)



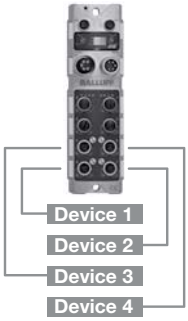
Step 3
Create user defined tags (UDTs)



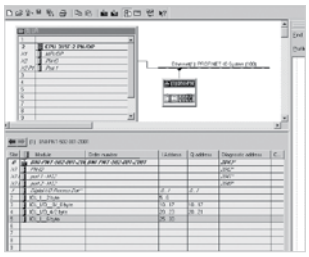
www.balluff.com/AOI

PROFINET® INDUSTRIAL ETHERNET

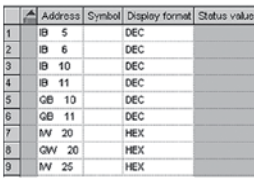
Step 1
Select hardware



Step 2
Configure Profinet expander and expansion devices from one screen using GSD and GSDML files



Step 3
Assign I/O to user defined address scheme



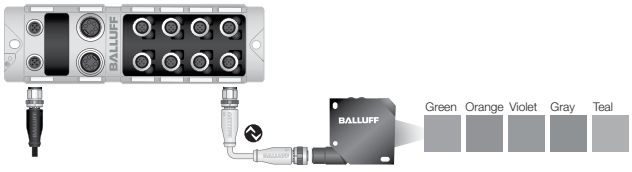
	Address	Symbol	Display format	Status value
1	IB 5		DEC	
2	IB 6		DEC	
3	IB 10		DEC	
4	IB 11		DEC	
5	QB 10		DEC	
6	QB 11		DEC	
7	MW 20		HEX	
8	QW 20		HEX	
9	MW 25		HEX	

Device parameterization and configuration

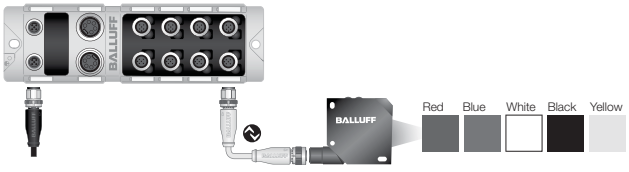
There are multiple advantages to device parameterization. The two major advantages are the ability to quickly swap out a failed device and the ability to reconfigure a device for a recipe or production change on the fly. The controller stores the necessary data for each setup and, when needed, it sends the parameters via the network over the backplane to the slave device. This can shorten setup times and increase efficiency.

Color Sensor Example

While running project A, the color sensor is configured to detect the difference between five different colors as parts are loaded into a fixture.

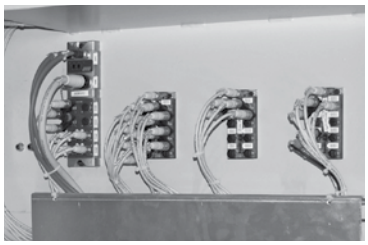


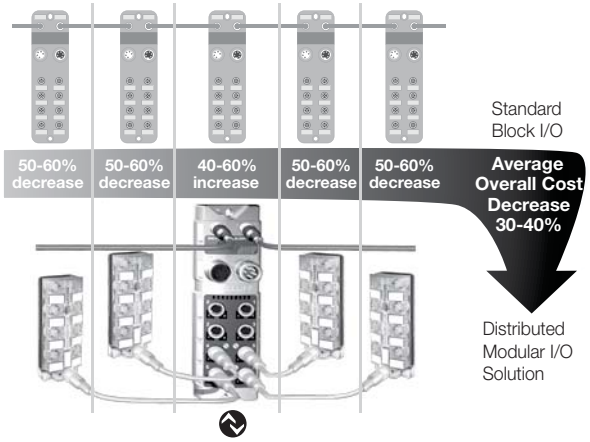
After the required parts are run off, a new project is begun with a different color set. In the past, a second color sensor would be required, or the operator would have to reprogram the current sensor for each new color. By using device parameterization, the controller tells the sensor its configuration for project B and quickly, without hassle, the sensor has its new colors.



Discrete I/O Savings

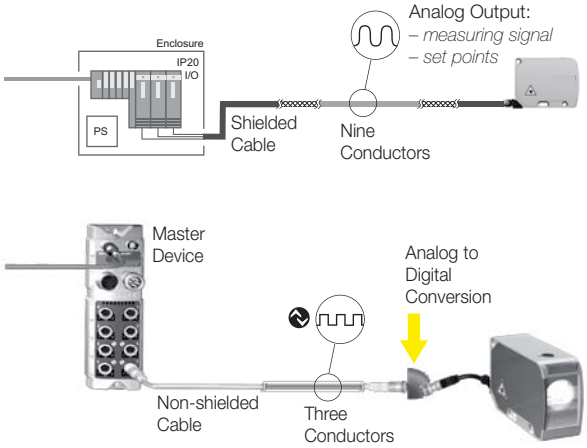
Machine builders looking to lower the cost per point for discrete I/O gain many advantages with distributed modular I/O. Reduced cable and device costs can save an OEM 15-60% over traditional I/O systems.





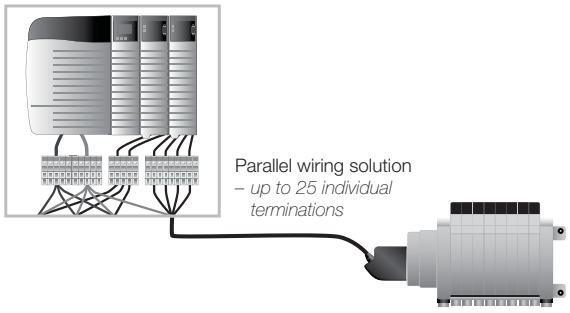
Analog I/O Savings

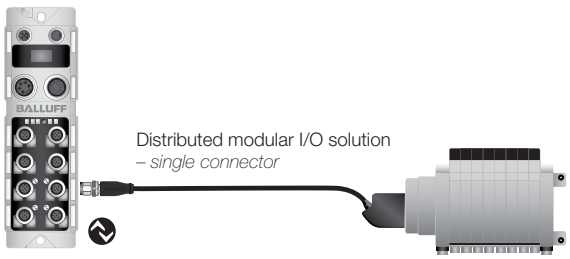
One channel of analog I/O can add significant cost to a typical machine design in components, cables, and labor. By putting the analog I/O right at the signal's source, the complications and costs can be significantly reduced.



Valve Manifold Control

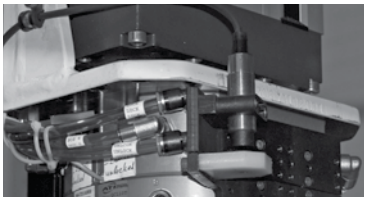
Every pneumatic action requires valve control. The typical parallel wiring of valve manifolds can be labor intensive and add dramatically to cabinet space and setup time.

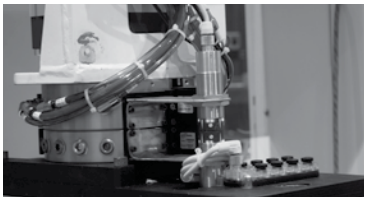


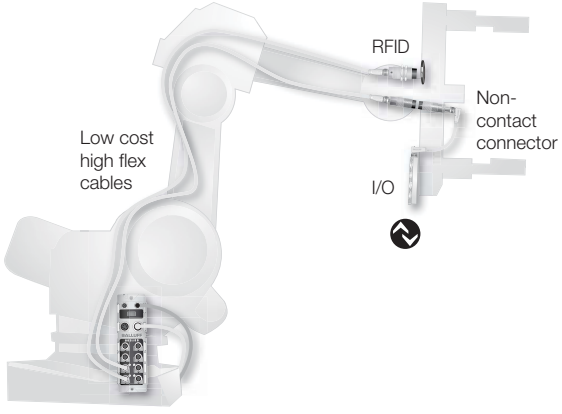


Quick Tool Change

With the increasing demand for multiple recipe manufacturing, the need to quickly change tooling on a robot or in a fixture is growing. Utilizing multiple technologies, the connection can be made quickly without failure; tool verification can be included with RFID. This speed has improved our customers' throughput by 15%.



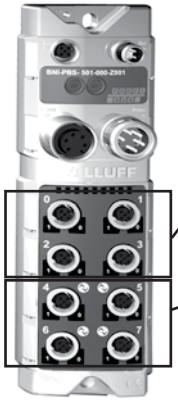




IO-Link

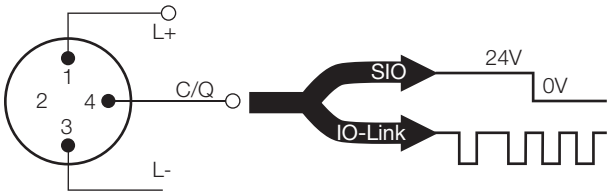
Flexible IO-Link Master Blocks

Each port of the Balluff IO-Link master block can be configured to fit any IO-Link and/or discrete application. The top 4 ports can be configured as NO/NC inputs, outputs, or diagnostic points depending on the block type. The bottom 4 ports can be configured as IO-Link or as any of the discrete settings, depending on the block type.



Pin 2	Pin 4
Input Output* Diagnostic	Input Output* Diagnostic

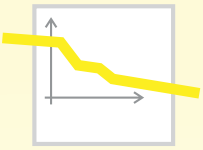
Pin 2	Pin 4
Input Output* Diagnostic	Input Output* Diagnostic **IO-Link**



*Only available in configurable versions

Network Protocol	EtherNet/IP	DeviceNet	ProfiNet	Profibus	
Addressing	Display	Display	Display	Rotary Dials	
4 IO-Link / 4 Configurable					
4 IO-Link / 12 Configurable	**BNI004A**	**BNI005A***	**BNI004U**	**BNI003K**	
	BNI EIP-502-105-Z015	BNI DNT-502-100-Z001*	BNI PNT-502-105-Z002	BNI PBS-502-001-Z001	

*Consult factory for availability

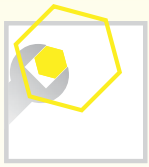


Reduce Costs

- Connect devices with standard sensor/actuator cordset
- Simplify cordset stocking with universal M12 standard connectors on IO-Link devices
- Secure investment with open standard, valid from all manufacturers
- Future-proof, with greatest flexibility in project planning

Reduce Engineering and Commissioning

- Commissioning performed by the controller, not at each individual IO-Link device
- Scalability of each IO-Link port
- Same architecture for different network protocols
- Fewer network nodes and IP addresses to commission



Reduce Maintenance

- Capability of plug, play, and walk away
- Automatic read adjustment of parameters
- Reliable error detection
- Troubleshoot a point-to-point connection, rather than a network

Increase Uptime

- Recipe driven parameterization of IO-Link devices
- Health diagnostics down to the IO-Link device level
- Network cable can be removed from harsh areas, replaced by standard sensor/actuator cordsets
- Continuous monitoring of process parameters

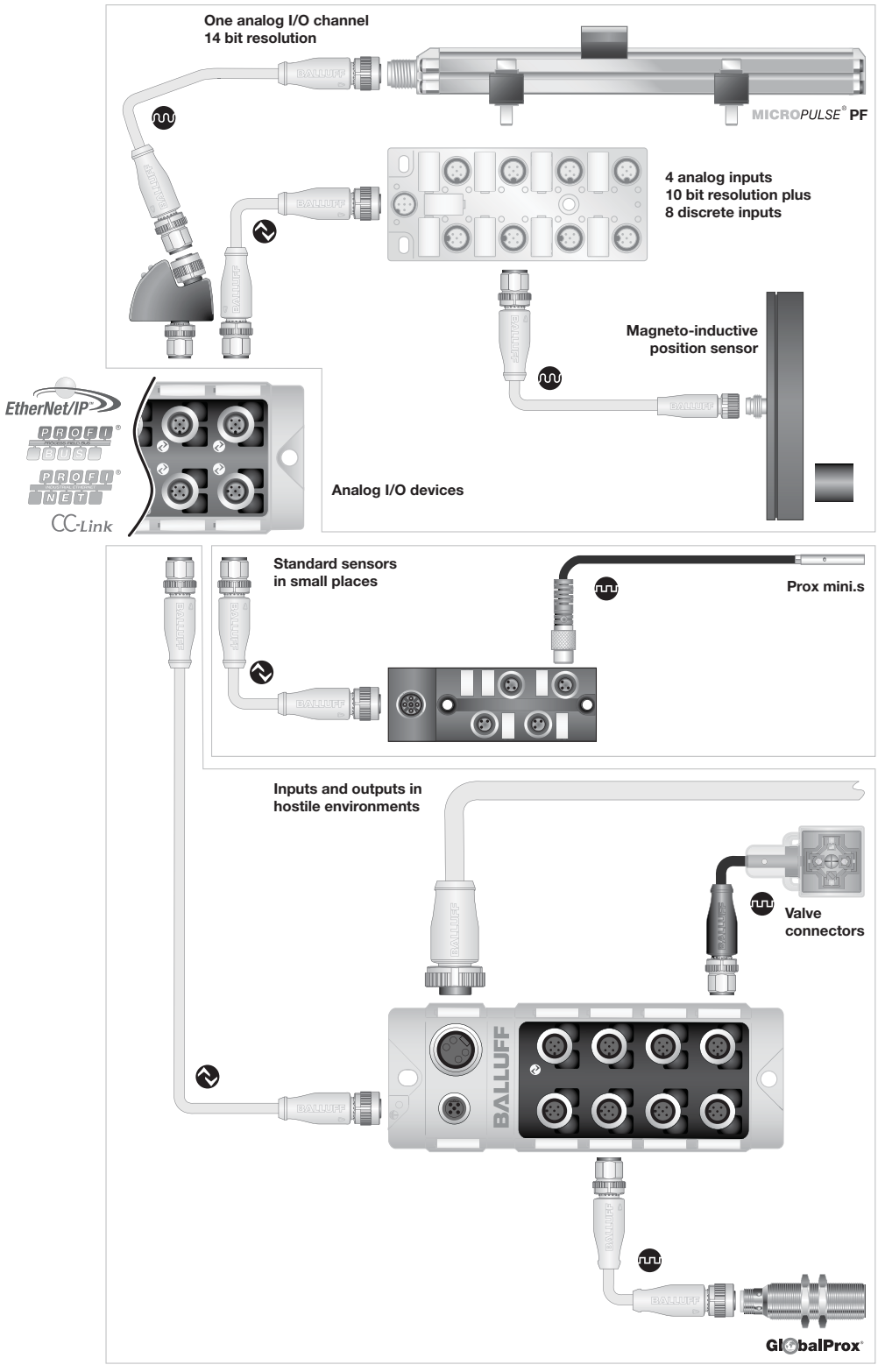
IO-Link

	Profibus	Profibus	Profibus	CC-Link
	Display	Rotary Dials	Rotary Dials	Display
		BNI003P	**BNI0030**	
		BNI PBS-507-001-Z011	BNI PBS-504-001-K008	
				BNI0040*
	BNI PBS-502-101-Z001*			BNI CCL-502-100-Z001*

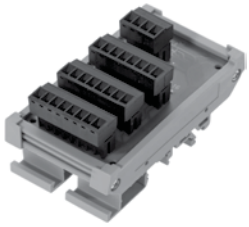
IO-Link Input/Output Devices

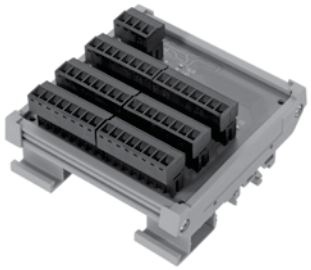
One of the major values of IO-Link over standard network I/O is the ability to run many sensors and actuators back through one node or IP address. This is accomplished using the many varieties of I/O hubs offered by Balluff.

- Multiple analog sensors can be run into an input hub with discrete inputs as well
- Balluff's full line of mini sensors can be run in small spaces using M8 hubs
- Metal Inputs and Outputs allows for I/O in the most hostile environments



IO-Link
IP20 terminal I/O hubs
M12 analog I/O plugs





IP20 terminal I/O hubs are designed for use in custom projects like small push button or indicator stations.

Connection Type	Spring Terminal	Spring Terminal
8 Configurable	**BNI004K**	
	BNI IOL-309-000-K024	
16 Configurable		**BNI004L**
		BNI IOL-310-000-K025
Max Output Current/Channel	400 mA	400 mA
Max Current	<1.4 A	<1.4 A
Mounting	DIN Rail	DIN Rail
Data	1 Byte IN, 1 Byte OUT	2 Bytes IN, 2 Bytes OUT

IO-Link

M12 analog I/O plugs are designed for applications where you need analog I/O without the cost or hassle of an analog input card.

Type	Inputs	Outputs	Order Code/Part Number
0-10 V Analog (14 bit), 3-wire input	1		**BNI0042**
			BNI IOL-714-000-K023
4-20 mA Analog (14 bit), 3-wire input	1		**BNI0041**
			BNI IOL-712-000-K023
PT100 Analog (14 bit), 3-wire input	1		**BNI004T***
			BNI IOL-716-000-K023
0-10 V Analog (14 bit), 3-wire output		1	**BNI004E**
			BNI IOL-724-000-K023
4-20 mA Analog (14 bit), 3-wire output		1	**BNI004C**
			BNI IOL-722-000-K023

*Consult factory for availability

IO-Link

M8 discrete I/O hubs
M12 discrete I/O hubs
M12 analog I/O hubs

I/O hubs come in multiple form factors and configurations and can be used for almost any basic I/O applications, including analog inputs.

Type	PNP Inputs	Outputs	M8 Plastic	M8 Plastic	M12 Plastic	
Variation						
Number of Ports			4	8	8	
Max Output per port/per block					-	
3-wire input	4/8	-	**BNI000P**	**BNI000R**		
			BNI IOL-101-000-K018	BNI IOL-102-000-K019		
3-wire input, w/diagnostics	4/8	-	**BNI001W**	**BNI001Y**		
			BNI IOL-101-S01-K018	BNI IOL-102-S01-K019		
4-wire input	8/16	-		**BNI0021**	**BNI0005**	
				BNI IOL-104-000-K021	BNI IOL-102-000-K006	
4-wire input w/diagnostics	8/16	-	**BNI001Z***	**BNI0022**		
			BNI IOL-102-S01-K020	BNI IOL-104-S01-K021		
4-wire output	-	8				
4-wire output, w/ diagnostics	-	8				
5-wire input	16	-			**BNI0006**	
					BNI IOL-104-000-K006	
5-wire input, w/diagnostics	16	-				
5-wire input, w/diagnostics, w/ID data	16	-				
5-wire output	-	16				
5-wire output w/diagnostics	-	16				
5-wire configurable	max 16	max 16				
5-wire configurable, w/ diagnostics	max 16	max 16				
5-wire configurable, w/diagnostics, w/ID data	max 16	max 16				
0-10 V analog (10 bit) 5-wire input	4x VDC 8x PNP	-			**BNI0008**	
					BNI IOL-710-000-K006	
4-20 mA analog (10 bit) 5-wire input	4x mA 8x PNP	-			**BNI0007**	
					BNI IOL-709-000-K006	

*Consult factory for availability

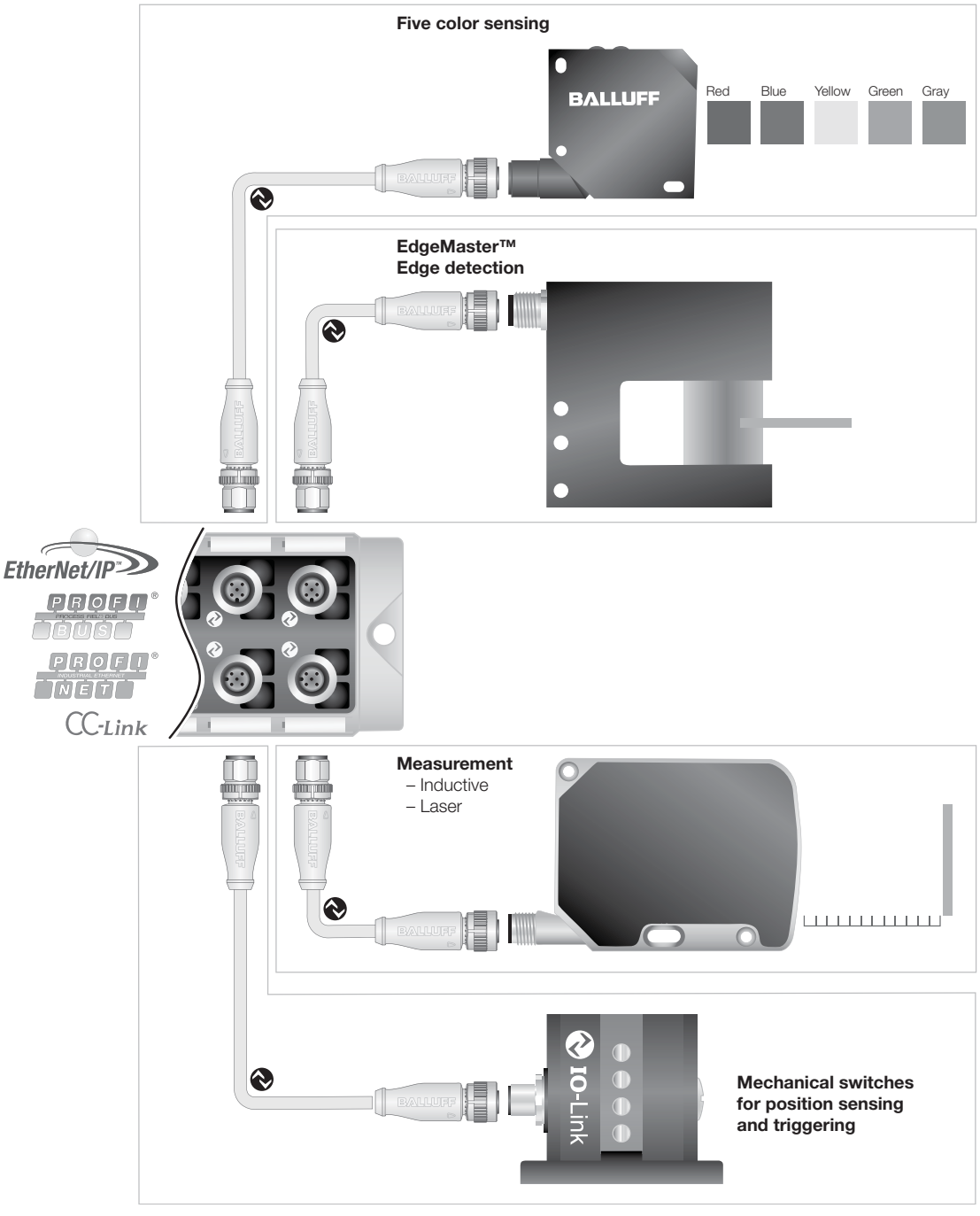
	M12 Metal	M12 Metal	M12 Metal	M12 Metal
	with Integrated Power	with 4-pole Auxilliary Power	with 5-pole Auxilliary Power	with Galvanic Isolation
	8	8	8	8
	0.5A / 1.4A	2A / 9A	2A / 9A	2A / 9A
	BNI0031			
	BNI IOL-102-000-Z012			
				BNI0033
				BNI IOL-252-000-Z013
				BNI003W*
				BNI IOL-252-S01-Z013
	BNI0032			
	BNI IOL-104-000-Z012			
	BNI0039			
	BNI IOL-104-S01-Z012			
	BNI003T			
	BNI IOL-104-S01-Z012-C01			
	BNI0043			**BNI0034**
	BNI IOL-205-000-Z012			BNI IOL-256-000-Z013
				BNI003Y
				BNI IOL-256-S01-Z013
	BNI003U	**BNI0050***	**BNI0035**	
	BNI IOL-302-000-Z012	BNI IOL-302-000-Z026	BNI IOL-302-000-Z013	
	BNI003C	**BNI0051***	**BNI003A**	
	BNI IOL-302-S01-Z012	BNI IOL-302-S01-Z026	BNI IOL-302-S01-Z013	
			BNI0048	
			BNI IOL-302-S01-Z013-C01	

IO-Link

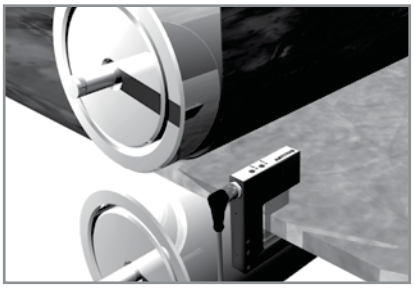
Intelligent Sensors with IO-Link

As manufacturing needs to get more flexible, sensors and other devices installed in the process need to be flexible as well. Right now, most production lines require the operator to reprogram a sensor, or the engineer needs to design multiple sensors into the process. Intelligent sensors with IO-Link built into them can reduce this downtime and the errors that come with reprogramming. IO-Link sensors can have their parameters changed via the PLC to accommodate multiple recipes or configurations. Some examples of sensors with this capability are:

- Color sensors for detecting product colors for error proofing or JIT (just in time) production
- Measurement sensors for detecting the position of targets or measuring their size
- Precision Mechanical Switches have been in the Balluff product portfolio from the very beginning, use their upgraded functionality by connecting them via IO-Link
- Edge detection sensors allow for positioning on machines or in production



Edge position detection is a vital sensor application in many industries from paper or laminates, to steel moving into presses. The exact edge position is vital to efficient automation.



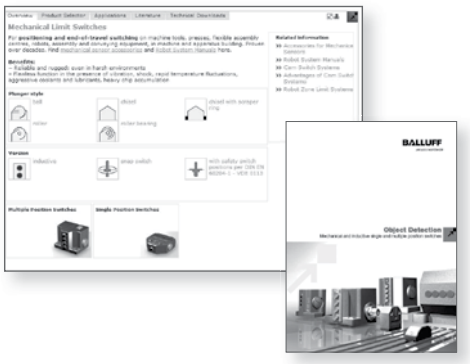
Edge Detection

30 mm	**BGL0035**
	BGL 30C-007-S4
50 mm	**BGL003F**
	BGL 50C-007-S4
Resolution	0.08 mm
Light Spot	28 mm x 3 mm
Air Blowoff	Built-in
Analog Valve Range	0...1024

IO-Link

Mechanical Switches

Part Number	**BNS 819-...**
Housing Series Available	40, 46, 61, 62, 100



To select an exact part number, visit www.balluff.com/bns

Inductive Measurement Sensors

Order Code	BAW002F	BAW003A
Part Number	BAW M18MI-BLC50B-S04G	BAW Z01AC-BLD50B-DP03
Range	1...5 mm	1...5 m
Switch Points	0	3
Resolution	± 8 µm	± 10 µm
Analog Value Range	0000...03FF	0000...03FF
Process Data	3 bytes	2 bytes

Inductive Positioning Sensors

Order Code	BIP0004
Part Number	BIP LD2-T040-02-S4
Range	0...40 mm
Target Width	14 mm
Resolution	40 µm
Process Data	2 bytes

Laser Measurement Sensors

Order Code	BOD0012
Part Number	BOD 63M-LI06-S4
Range	200...6000 mm
Resolution	≤ 1 mm
Repeatability	≤ ± 4 mm
Analog Value Range	00C8...1770
Process Data	3 bytes/1 byte

Color Sensing

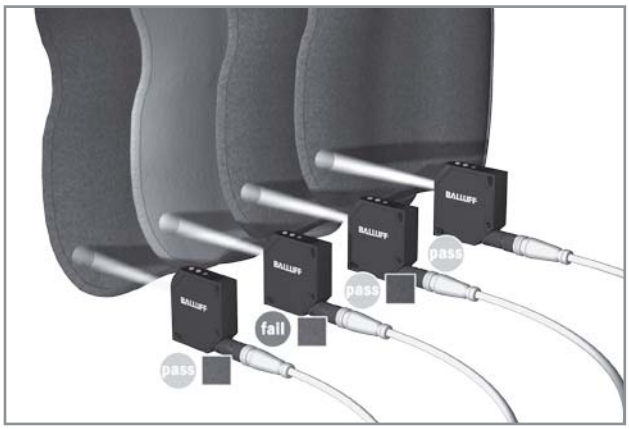
Order Code	BFS000F
Part Number	BFS 26K-GI-L04-S92
Diffuse Range	12…32 mm
Reflector Range	50…200 mm
Working Colors	5
Process Data	1 byte
Light Spot	Ø4 mm at 22 mm

IO-Link

Laser Position Measurement

In this application, the measurement sensor was selected to determine the exact position of the component being loaded into the work cell. A tight resolution of 1 mm and the ability to automatically reprogram the trigger distances allows for multiple styles to be run on the same workcell increasing productivity and equipment life. The sensor communicates using IO-Link with the network expansion block and over the industrial network to the controller. You can see diagnostic bits, turn the laser on and off, and re-parameterize the sensor all at the controller.

In Line Sequencing of Colors



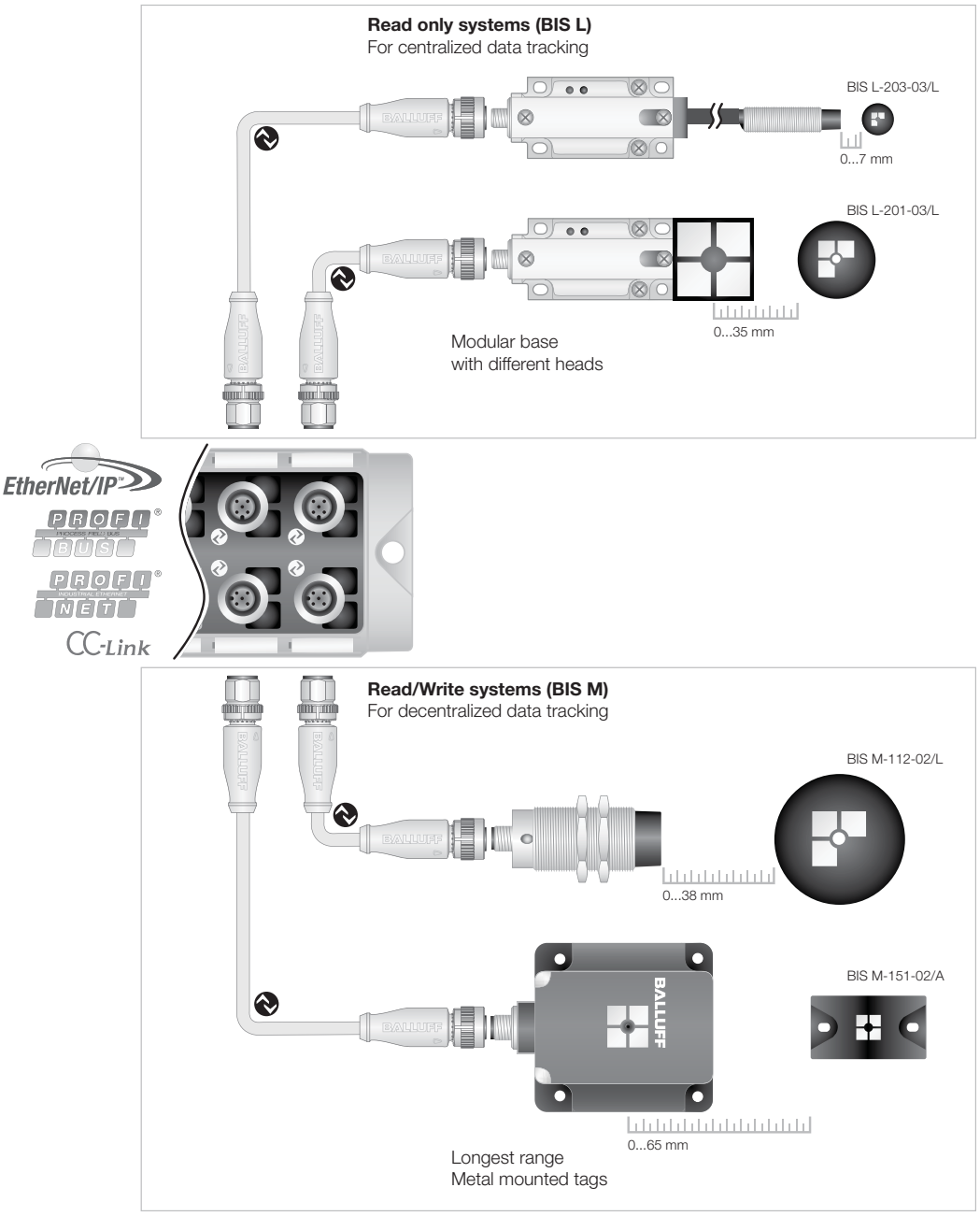
Many manufacturers today assemble parts in a variable and customizable order to increase productivity and for customer specific customization. Color sensors are essential to this process and have been used by many machine builders to help determine slight variances in color or to ensure parts are in the proper order. In the past, every color needed to be programmed onto a sensor and multiple sensors were required. Using color sensors with IO-Link communications allows the user to store up to five colors into one sensor and then, if required, re-parameterize the sensor for a different set of five colors. This can allow for on-the-fly recipe or model changes in a flexible manufacturing process.

Data Tracking with Industrial RFID using IO-Link

In today's manufacturing environment, it is becoming more and more important to track every step of the production process. Many manufacturers have installed barcode systems or hand written paper work filed by operators or maintenance crews. This can be time consuming and prone to failure. Industrial RFID systems can be used to track production data and record plant floor information in every step of the process. There are two main ways to track part data.

- **Centralized Data Tracking**: All of the information is stored in a central computer and the RFID system is used only for identification of the part in the work cell. This is a very similar concept to barcoding, but it is more rugged and 100% reliable. (Read Only Systems)

- **Decentralized Data Tracking**: Data per part is stored on the RFID tag and is written to the tag at each workstation. This concept allows for the data to always stay with the part throughout the production process.



Select your RFID system in 4 easy steps:

1. Decide whether you need to write data to a data carrier.

   Yes ➔ see page 2.18

   No ➔ see page 2.17

2. Choose the appropriate data carrier form factor.
3. Determine the head based on distance.
4. Determine your required memory capacity.

IO-Link

	Size	M12	M18	25x50	40x40
	IO-Link Processors Read only	BIS00E1	BIS00E0	BIS00E2	BIS00CZ
		BIS L-409-045-003-07-S4	BIS L-409-045-002-07-S4	BIS L-409-045-004-07-S4	BIS L-409-045-001-07-S4
Data Carriers	BIS0035	---	0...15 mm	0...15 mm	0...25 mm
	BIS L-100-05/L-RO				
	BIS0038	---	0...18 mm	0...18 mm	0...35 mm
	BIS L-101-05/L-RO				
	BIS003C	---	---	---	0...48 mm
	BIS L-102-05/L-RO				
	BIS003F	0...7 mm	0...10 mm	0...10 mm	0...16 mm
	BIS L-103-05/L-RO				
	BIS003R	---	0…15 mm	0…15 mm	0…25 mm
	BIS L-200-03/L				
	BIS003T	---	0…18 mm	0…18 mm	0…35 mm
	BIS L-201-03/L				
	BIS003U	---	---	---	0…48 mm
	BIS L-202-03/L				
	BIS003W	0…7 mm	0…10 mm	0… 10 mm	0…16 mm
	BISL-203-03/L				

Note:

The BIS L-1_ _-05/L-RO uses a single write data carrier with 192 bytes.
The BIS L-2_ _-03/L uses read only data carriers with a fixed “unique number” of five bytes (40 bits).
No repetition of the unique number or delivery of sequential numbers is possible.
All IO-Link RFID processors require a shielded cable. See page 2.19 for suggested part numbers.

IO-Link
RFID read/write systems
Standard and metal mount data carriers

		Size	M15.5	M18	
		IO-Link Processors	BIS00LJ	BIS00LW	
		Read/Write Heads	BIS M-400-045-002-07-S4	BIS M-402-045-002-07-S4	
	Standard Data Carriers	752 bytes	2000 bytes		
		BIS0048	BIS004A	0…5(6) mm	0…5 mm	
		BIS M-122-01/A	BIS M-122-02/A			
		BIS0040	BIS0042	0…6(9) mm	0…5 mm	
		BIS M-105-01/A	BIS M-105-02/A			
			BIS0044	0…15 mm	0…8 mm	
			BIS M-110-02/L			
		BIS003Y		0…15 mm		
		BIS M-101-01/L				
		BIS003Z		0…18 mm		
		BIS M-102-01/L				
			BIS0043	0…20 m		
			BIS M-108-02/L			
			BIS0045	0…20 mm		
			BIS M-111-02/L			
			BIS0046	0…28 mm		
			BIS M-112-02/L			
		BIS0047				
		BIS M-120-01/L				

For reliable traceability: All data carriers have a 4-byte unique ID contained in the read/write memory. This number is read-only.
All IO-Link RFID processors require a shielded cable. See page 2.19 for suggested part numbers.

		Size	80x84
		IO-Link Processors	BIS00LM
		Read/Write Heads	BIS M-451-045-001-07-S4
	Metal Mount DataCarriers	BIS004F	0…65 mm
		BIS M-150-02/A (vertical mount)	
		BIS004H	0…65 mm
		BIS M-151-02/A (horizontal mount)	

Metal Mount Series: These tags provide highly reliable RFID performance mounted on any metal surface.

Features:
- No reduction in range, regardless of metal alloy
- Large read/write range
- Compatible with all M processors

Metal mounting plate 40x22mm BIS Z-MP-001 please order separately (10 to a package). Required if no metal substrate is used.

	M30	25x50	80x84
	BIS00LH	**BIS00M1**	**BIS00LK**
	BIS M-400-045-001-07-S4	BIS M-402-045-004-07-S4	BIS M-401-045-001-07-S4
		0...5 (8) mm	
	0…7(11) mm	0...6 (8) mm	
	0…20 mm	0...15 mm	0…30 mm
	0…20 mm		0…28 mm
	0…28 mm		0…45 mm
	0…28 mm		0…40 mm
	0…28 mm		0…40 mm
	0…38 mm		0…60 mm
			0…50 mm

IO-Link

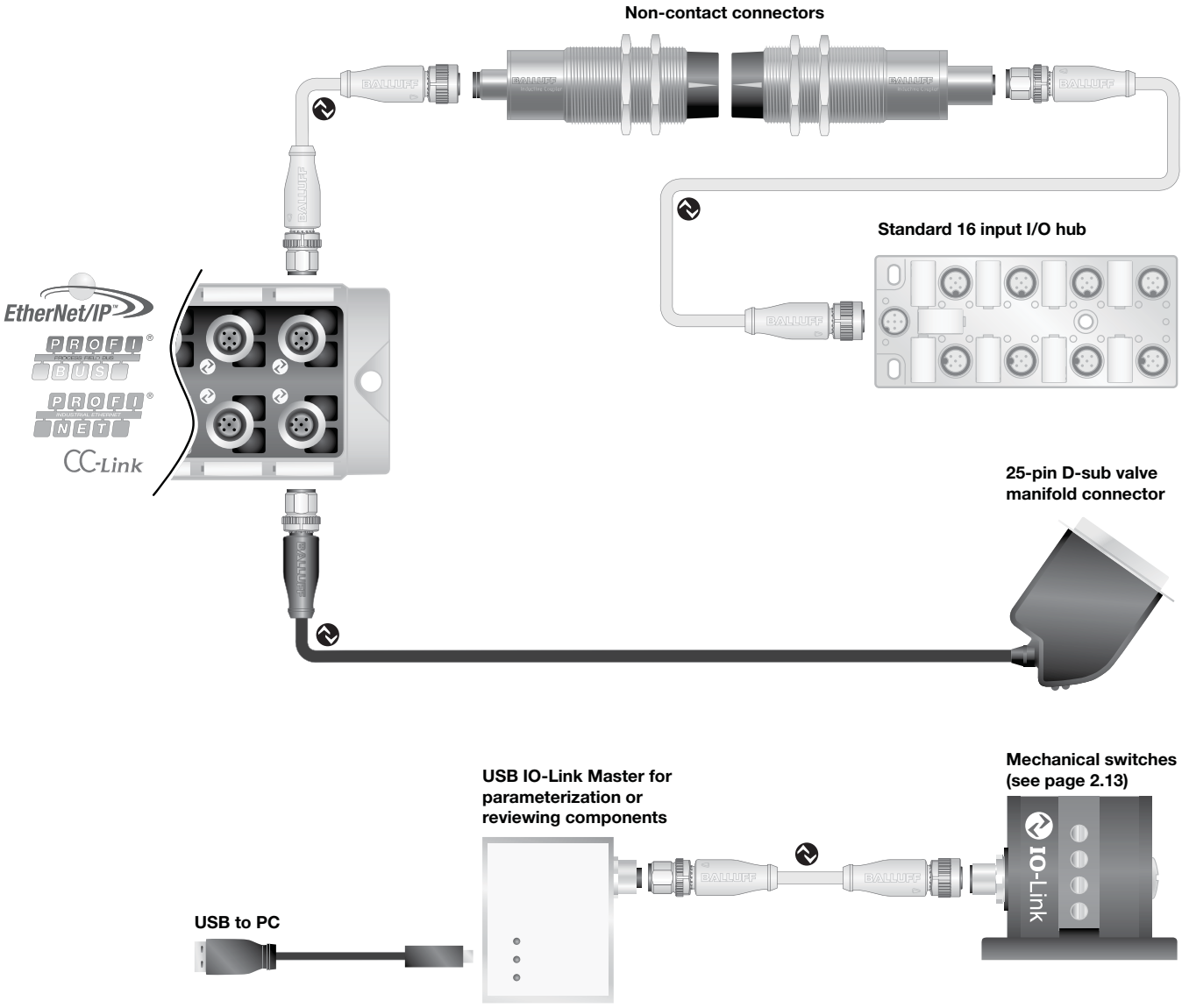
Shielded Cable Options		
Size	M12 - M12	M12
Configuration	Female - Male	Female with Male Field Attachable
Jacket	Shielded PUR Black	Shielded PUR Black
Conductors	4x 0.34 mm²	4x 0.34 mm²
Available Lengths	1 m, 2 m, 2.5 m, 5 m	2 m, 5 m, 10 m, 20 m
Double-Ended Straight-Straight	**BCC M415-M414-3A-305-PS0434-_ _ _***	
Single-Ended Straight Female		**BCC M415-0000-1A-014-PS0434-_ _ _**
Single-Ended Right Angle Female		**BCC M425-0000-1A-014-PS0434-_ _ _**
Field Attachable Straight Male		**BCC M474-0000-2A-000-01X475-000**

* 010 = 1 m, 020 = 2 m, 025 = 2.5 m, 050 = 5 m, 100 = 10 m

Connectivity Products with IO-Link

IO-Link's versatility can be seen in the deep product offering covered in these pages. There are times when a standard sensor cable is just not enough. Maybe you need to have I/O on constantly changing end effectors or a rotating fixture. Valve banks with built in network control can add additional costs to a project. Then there are the times you wish you could just hook the device to your computer, just to get that extra bit of interaction with the device. All of these things are capable with IO-Link by Balluff.

- Non-contact connectors allow for quick change out and free rotation without loss of power or signal
- Remove costly valve bank network controllers and go to an intelligent 25-pin D-sub connector
- Connect directly to any IO-Link device with your computer for easy setup or parameterization



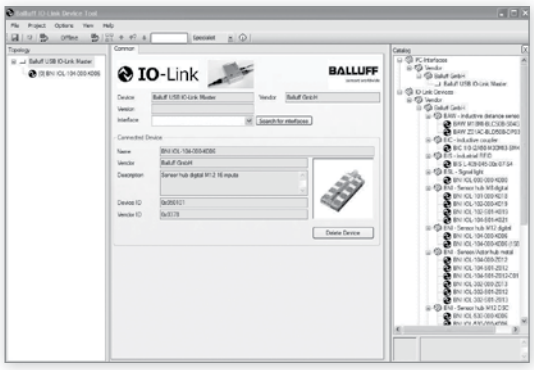
Non-Contact Connectors

Base	**BIC005A**	**BIC000C**	**BIC0053**
	BIC 1I0-I2A50-Q40KFU-SM4A4A	BIC 1I0-I2A50-M30MI3-SM4A4A	BIC 1I0-IAA50-M30MI3-SM4A4A
Remote	**BIC005C**	**BIC000E**	**BIC0054**
	BIC 2I0-I2A50-Q40KFU-SM4A5A	BIC 2I0-I2A50-M30MI3-SM4A5A	BIC 2I0-IAA50-M30I3-SM4A5A
Housing Type	40x40	M30	M30
Remote Side, Max Current	500 mA	500 mA	500 mA
Transmission Range	0...5 mm	0…5 mm	0...5 mm
Max Data Transmitted	3 bytes	3 bytes	10 bytes
Process Data	4 bytes	4 bytes	11 bytes

For more information on applications for these products, visit section 4

USB Master

USB Master	**BNI002U**
	BNI USB-901-000-A501
Number of IO-Link Ports	1
USB, Max Current	50 mA
External Power, Max Current	1.6 A
Software Included	Yes

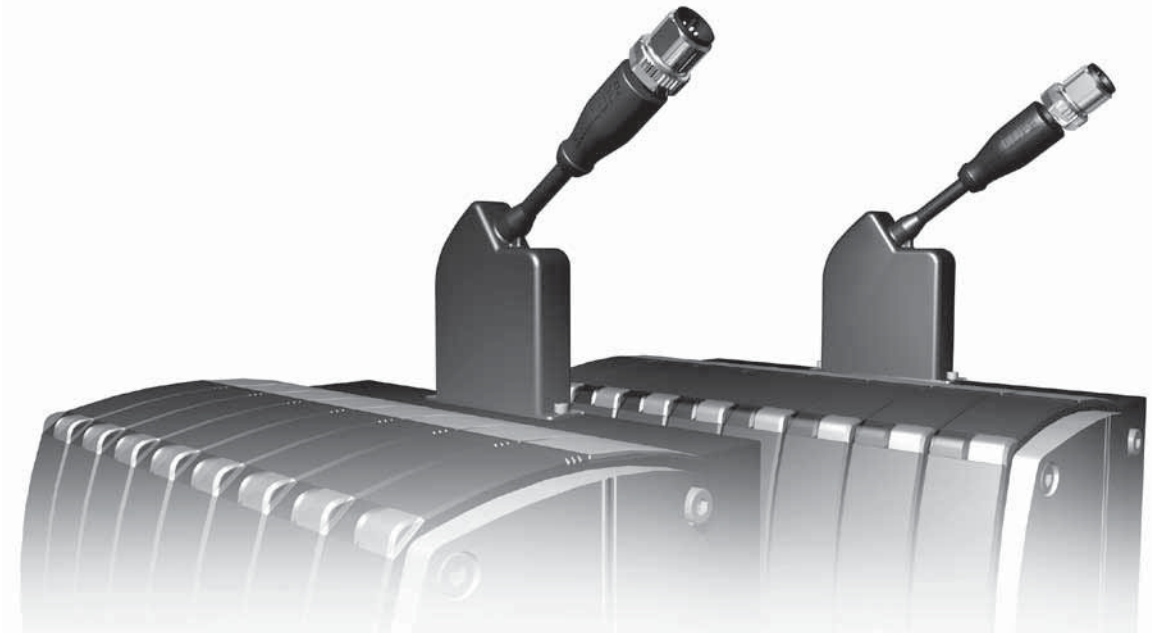


USB Master Features:

- Standard parameterization
- Troubleshooting by device
- PC backup of parameter data

2 Byte with Output Master Control		**BNI001L**	
		BNI IOL-751-V02-K007	
3 Byte with Output Master Control	**BNI001K**		
	BNI IOL-751-V01-K007		
6 Byte with Output Master Control, with Open Coil Detection			
Connection Type	25-pin D-Sub	25-pin D-Sub	
Pin Configuration	Pin1: Coil1: Address0 Pin2: Coil2: Address1 Pin25: 0V	Pin1: Coil1: Slot1 Pin2: Coil2: Slot1 Pin25: 0V	
Max Current	1.6A	1.6A	
Max Number of Pistons	24 max	16 max	
Valve Models	Festo MPA Bosch Rexroth LS04, HFO2-LG, HFO3-LG, HF04	Festo CPV	

Note:
- Must be used with configurable IO-Link expansion module
- Source power: auxiliary output power



		BNI001N	
		BNI IOL-751-V04-K007	
	BNI001M		
	BNI IOL-751-V03-K007		
			BNI004W*
			BNI IOL-770-V06-A027*
	25-pin D-Sub	25-pin D-Sub	M26 IP27
	Pin1: Slot1: Coil1 Pin13: 0V Pin14: Slot1: Coil2	Pin1: Slot1: Coil1 Pin13: 0V Pin14: Slot1: Coil2	26 pole
	1.6A	1.6A	1.6A
	24 max	16 max	24 max
	SMC VQC 1000/2000/4000 SMC SJ2000/3000	SMC VQC 1000/2000/4000	SMC

*Consult factory for availability