SIEMENS

usa.siemens.com/sirius-act

SIRIUS ACT IO-Link

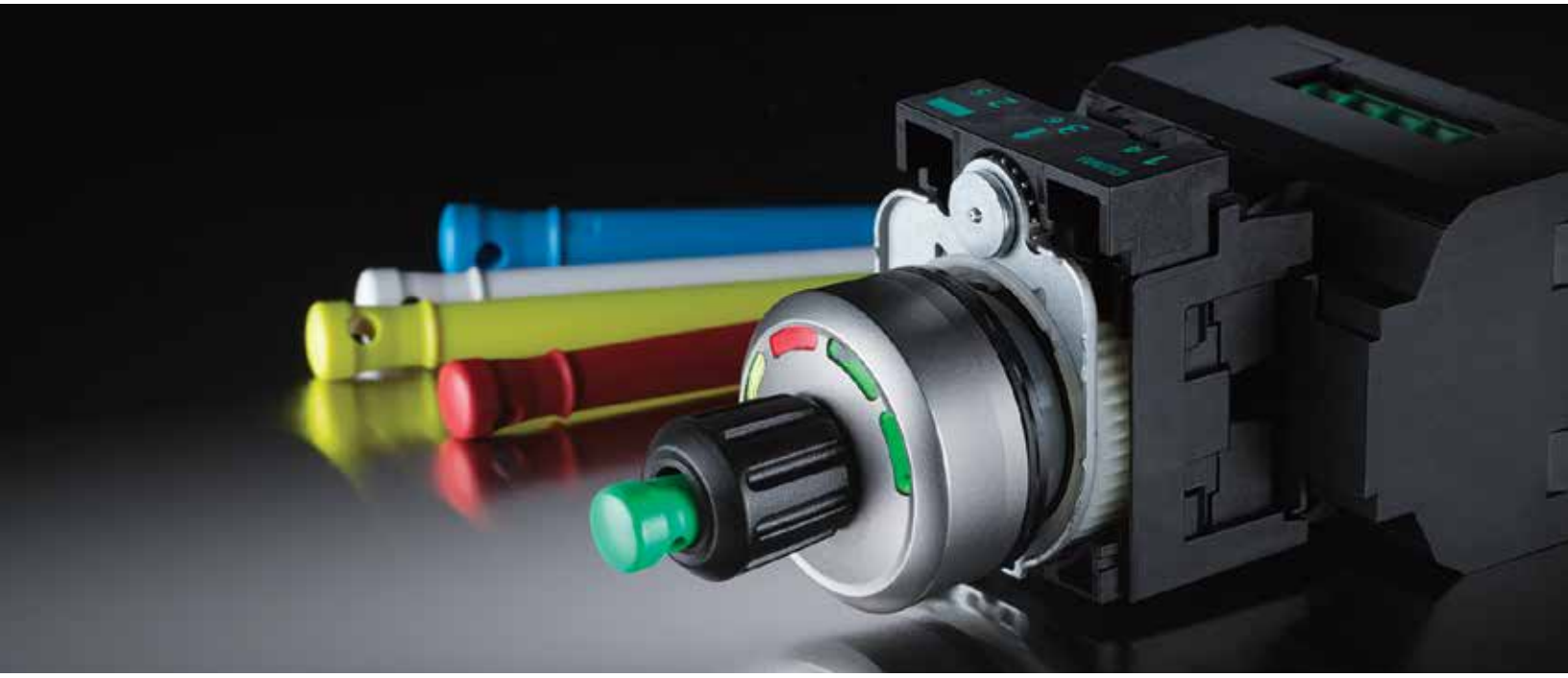
The point-to-point connection system for push buttons, indicator lights and switches for the last meter

When it comes to communication, SIRIUS ACT is a strong performer. Besides the standard wiring, you can also connect these push buttons, indicator lights and switches directly to the controller – via AS-Interface or with IO-Link. With our new SIRIUS ACT PROFINET technology, you can now directly interface to PROFINET and bring all the features of Ethernet down to the field level.

With IO-Link, wiring time and effort for standard sensors and actuators can be reduced and error sources can be eliminated. Furthermore, sensors and actuators are getting smarter and are offering improved functionality.

As a result, the requirements for sensor parameterization, identification and diagnostics is increasing. For instance, authentication and selection with modern RFID technology becomes reality with the new SIRIUS ACT ID key-operated switch. SIRIUS ACT IO-Link helps you to keep your sensors and actuators under control at any time and will ultimately save you time and money.

Get to know IO-Link in this paper and learn how you can take advantage of this state-of-the-art point-to-point connection system in your application.



IO-Link – Your point-to-point connection for the last meter

USE – Universal, Smart, Easy

IO-Link is the smart concept for standardized linking of switching devices and sensors to the control level by means of an economical point-to-point connection. The communication standard was developed by the IO-Link Consortium – a group of leading providers of automation products that have come together to support the new concept in all areas of control, sensor, and actuator technology.

As an open interface, IO-Link can be integrated with all common fieldbus and automation systems. Thanks to data access right down to the lowest field level, plant availability is increased and the engineering overhead is reduced. Consistent interoperability ensures maximum protection of investment. This also applies in the context of existing machine concepts for continued use of sensors without an IO-Link interface.

Universal	Smart	Easy
• Open standard • Fieldbus independent / can be integrated into all fieldbus systems worldwide • Standard connectors (e.g. M12, M8 or M5)	• Fast and reliable diagnostics • Reduced wiring effort • Fast communication with three transmission rates (4.8 kbaud, 38.4 kbaud and 230.4 kbaud)	• Easiest wiring with an unscreened three-wire cable • Automated, decentralized parameter setting in shortest time • Efficient engineering

IO-Link is the smart concept for standardized linking of switching devices .

Use IO-Link
Universal · Smart · Easy

Universal

Open Standard

With the open IO-Link standard according to IEC 61131-9, switching devices and sensors are connected to the control level with a cost-efficient point-to-point-connection.

Leading suppliers of automation products developed the communication standard. The IO-Link organization supports the new concept in all areas of control, sensor and actuator technology.

Fieldbus independent

Because of the fact that IO-Link is an open interface, devices can be integrated in the same way in all commonly used fieldbus and automation systems worldwide. By now IO-Link has been implemented in all established fieldbus systems on the market (PROFIBUS, PROFINET, AS-i, CANopen, CC-Link, DeviceNet, EtherCat, Ethernet/IP, Interbus S, Powerlink and Sercos III).

Standard connectors

IO-Link devices are connected using an unscreened three-wired cable, which can reach distances up to 20m. Wiring is based on standard, unshielded M5, M8 and M12 connectors. As a result, the amount of different connection wires can be reduced and wiring and installation is less complex.

Smart

Fast and reliable diagnostics

Diagnostics data cannot be transmitted when an actuator or sensor fails that does not have an IO-Link connection. The HMI does not show a diagnostics notification and the reason for the failure can only be seen at the device. IO-link sensors and actuators make a reliable diagnostics possible. Diagnostics notifications can be transmitted and displayed at the HMI together with their explanation. This enables a fast and reliable diagnostics as well as short reaction times and minimized downtime.

Reduced wiring effort

Without the use of IO-Link, actuators and sensors require a lot of wiring effort. Each sensor and actuator is connected separately to the distributed periphery within the control cabinet. Separate connections are required for switching and response. Innovative IO-Link components reduce the wiring effort and the space requirement in the control cabinet. Thanks to the IO-Link technology, a SIRIUS ACT enclosure with up to six command points can be connected with a single IO-Link connection.

Fast communication with three transmission rates
From the outset, the fathers of the IO-Link specification had a wide range of field devices, including sensors, actuators and much more that should have communication capability. Naturally, the devices have completely different requirements and conditions with regard to available processor performance. Thanks to the three defined transmission rates – 4.8 kbaud, 38.4 kbaud and 230.4 kbaud, developers always find a transmission rate adapted to the IO-Link device. The device specifies the utilized transmission rate in IO-Link. The IO-Link master handles all three transmission rates. When establishing a connection, the master initially uses the highest transmission rate and then the next lower transmission rate until the connection is actually established.

Furthermore, IO-Link also provides an acyclic channel for on-request data, for example, for diagnostics and parameter assignment.

Easy

Easy wiring with an unscreened three-wired cable
The use of IO-Link reduces the wiring effort for actuators and sensors and simplifies the storage. The use of the consistent IO-Link interface reduces the variety of interfaces of sensors and IO-periphery. It also reduces the amount of different connection wires. Multiple cables can be replaced with unshielded standard cables M12, M8, or M5. Thanks to IO-Link, wiring and installation become less complex.

Automated, decentralized parameter setting in shortest time
Without the use of IO-Link, each parameter has to be assigned with a programming device in case actuators and sensors have to be replaced due to a fault. When IO-Link sensors and actuators are used, for instance the SIRIUS ACT ID key-operated switch, the parameters can be assigned automatically after the exchange of devices. This reduces the parameterization effort and avoids errors.

Efficient engineering
The IO-Link standard and the SIMATIC S7-PCT-Tool enable the synchronous parameterization with a single click. SIMATIC S7-PCT is the efficient and comfortable engineering tool for project design, parameterization and testing of IO-Link masters and devices. Together with STEP 7, it enables the direct access to your project design, parameterization, and tests. All available IO-Link components from Siemens are already implemented in the selection menu and other IO-Link devices can be integrated with an electronic IO device description file (IODD). The IODD file stores all necessary information to ease the system integration, such as communication properties, device parameters and data, identification, process and diagnostics data.

Summary of I/O-Link key technical data	
Number of I/Os	8
Topology	Point-to-point connection
Medium	Unscreened three-wire cable with standard connectors
Line length	Max. 20 m
Cycle time	400 µs (typical at a speed of 230 kbaud)
Data per cycle	2 Bytes (standard), up to 32 Bytes

IO-Link for SIRIUS ACT

The SIRIUS ACT push buttons and indicator lights can easily be connected to IO-Link via a special SIRIUS ACT IO-Link module. This module is freely programmable (default 6DI/2DO) and available as a front-mounted version (for example, for the use on the front panel of a switching cabinet) and as a base-mounted version for the use in a SIRIUS ACT enclosure.

ID key-operated switch

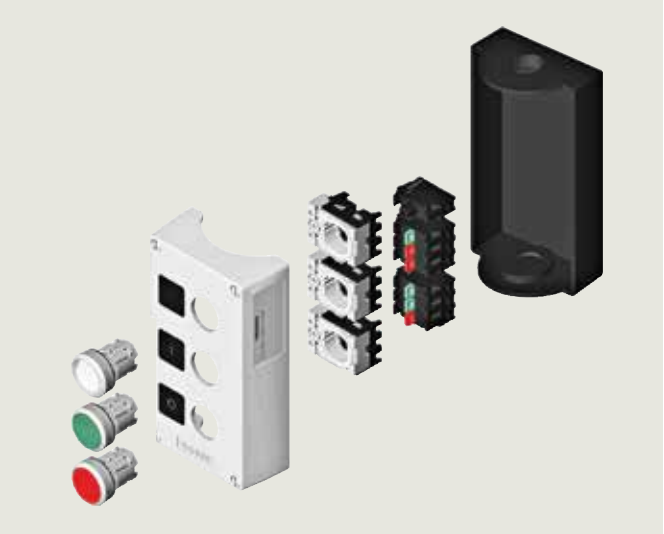
Thanks to IO-Link, sensors and actuators are getting smarter and are offering improved functionality. The SIRIUS ACT ID key-operated switch with state-of-the-art RFID technology makes authorization and identification possible. Learn more about the SIRIUS ACT ID key-operated switch in our ID key-operated paper online at usa.siemens.com/sirius-act

I/O Link Module

ID Key Module

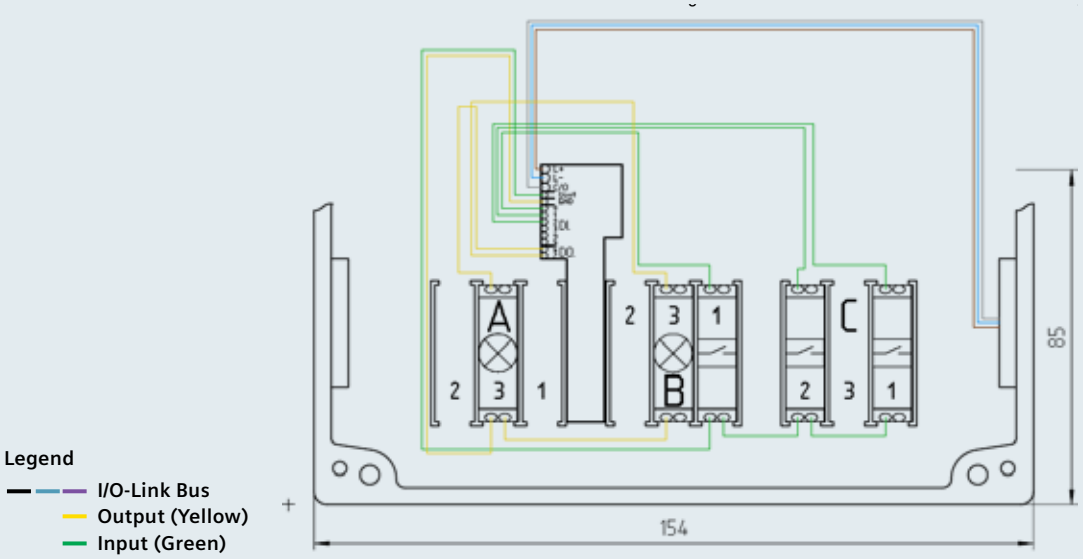
Configure your individual IO-Link enclosure with the SIRIUS ACT Configurator

Identically to the configuration of AS-i enclosures, you can also take advantage of the new SIRIUS ACT configurator to configure your individual IO-Link enclosure. The intuitive new online tool makes it as easy as possible for you to choose your product online, with picture-based component selection, drag-and-drop functions, and user-friendly documentation as well as reordering options. In the results view, you can see an overview of your enclosure, including all components you have put together with the configurator. All the documents you need, such as a product list, manuals, wiring plan, data sheets or CAx data are just one click away. As soon as you have added your configuration to the cart, all enclosure specific data, like price, weight and lead time will be automatically calculated and shown instantly. You can easily access the SIRIUS ACT configurator via our homepage and check it out online: usa.siemens.com/sirius-act-configurator.



I/O Link Enclosure

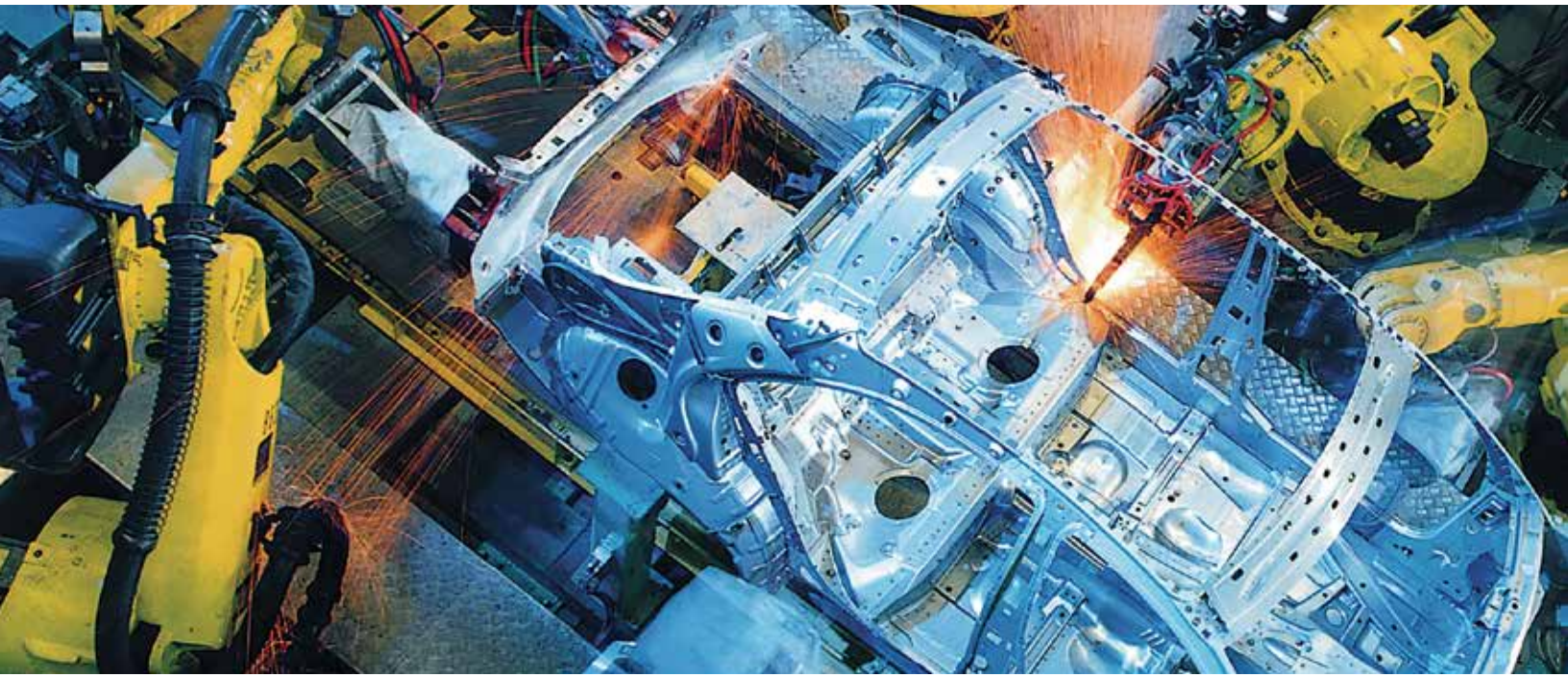
Wiring plan of a typical SIRIUS ACT I/O Link enclosure



Legend

- I/O-Link Bus
- Output (Yellow)
- Input (Green)

This information is supplied without liability.



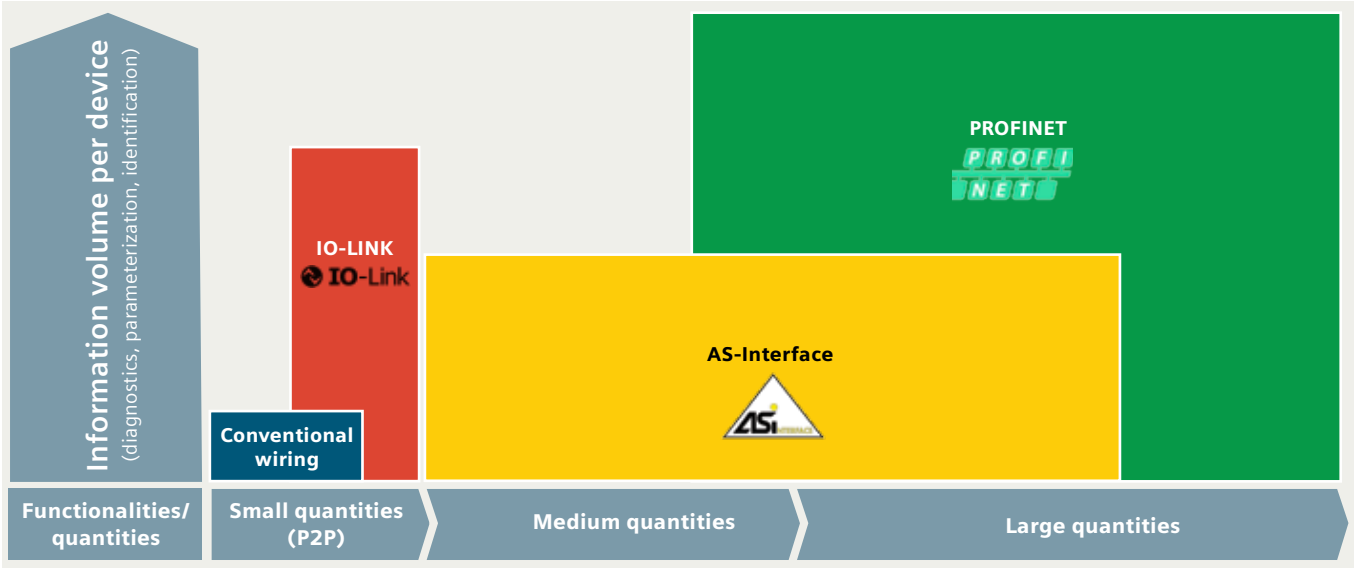
Siemens Offers You the Right Solution for Your Application

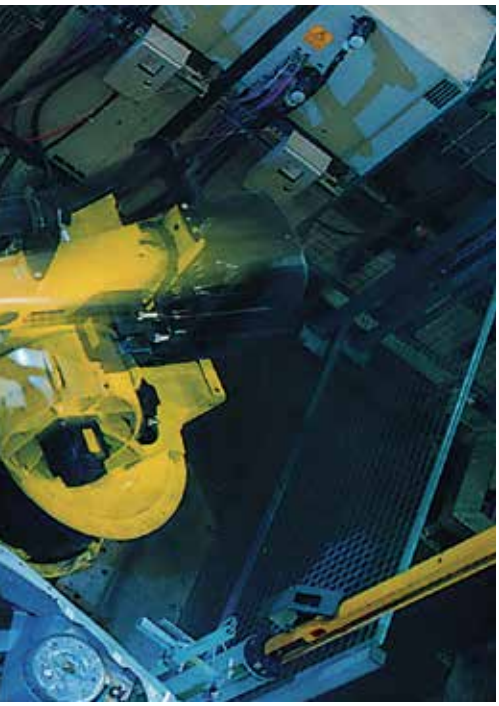
AS-Interface, IO-Link and PROFINET coexist in the Totally Integrated Automation (TIA) world of Siemens. Depending on your application, you can select and combine the communication system according to your individual needs.

For applications with a low information volume per device, for example, digital sensors and actuators such as push buttons and a medium or high number of network participants in the switching cabinet or in the field, the AS-Interface bus system is the system of choice.

Applications that require higher information volume per device for small quantities, for example, SIRIUS ACT ID key-operated switch in the switching cabinet or in the field, the point-to-point connection system IO-Link suits the best.

For highly demanding applications, Siemens also offers you the Ethernet-based PROFINET system.





TIA

Totally Integrated Automation

AS-Interface, IO-Link and PROFINET coexist in the Totally Integrated Automation (TIA) world of Siemens.

		Kind of the system	Data volume	Dimension	Infrastructure cabling	Safety	Supply of devices	SIRIUS ACT
Field bus / Network Systems	PROFINET	• Network system • Max. 256 devices (w/o router) • Any topology • Real-time • Synchronous	• Max 1440 bytes I • Max 1140 bytes O • Parameters • Diagnosis date • Generic data (TCP/IP)	• Copper/segment: max. 100m • Optical/segment > 15 km	• Fiber optic • Coax • Twisted pair • IWLAN	Yes	Typically No, but possible with PoE (power over Ethernet)	✓
	AS-Interface	• Field bus • Max. 62 devices • Any topology	• 4 I / 4 O • Parameters • Diagnosis data	100m (standard), up to 600m	• Power supply • 2-core data cable • Unshielded	Yes	Power supply via data cable resp. via sensor/actuator connection	✓
Wiring	IO-Link	• Intelligent point-to-point wiring system	• 32 bytes I/O • Parameters and diagnosis data	20m	• 3-core data cable • Unshielded	No	Power supply via cable resp. sensor/actuator connection	✓
	Conventional wiring	• Point-to-point	• 1 I / 1 O	600m	• 1-3 core data cable • Unshielded (digital) • Shielded (analog)	No (add. wiring)	Ext. supply	✓

Published by
Siemens Industry, Inc. 2016.

Siemens Industry, Inc.
100 Technology Drive
Alpharetta , GA 30005

For more information, please contact
our Customer Support Center.
Phone: 1-800-241-4453
E-mail: info.us@siemens.com

usa.siemens.com/sirius-act

Order No. CCFL-SAIOL-0216
Printed in U.S.A.