

IO-Link

Consistent Communication

... down to the last meter





Communications standard IO-Link

Seamless communication down to the last meter

Consistent cost reduction, high system availability and transparency - the requirements for continuous industrial communication are increasing. At the same time, actuators and sensors are becoming more and more intelligent.

With the open communication standard IO-Link it is possible to close the last meter in the process cost-effectively: with data transparency from the sensor / actuator level to the automation level.

You benefit not only from a simple, uniform and inexpensive point-to-point connection with which sensors and actuators can be connected to the control level, but also from systematic diagnostic concepts and efficient handling of parameter data at all levels of automation technology.

With IO-Link you lay the ideal basis for efficient data transparency

>> [Learn more...](#)

IO-Link

An open standard for point-to-point communication

Communication for the lower field level

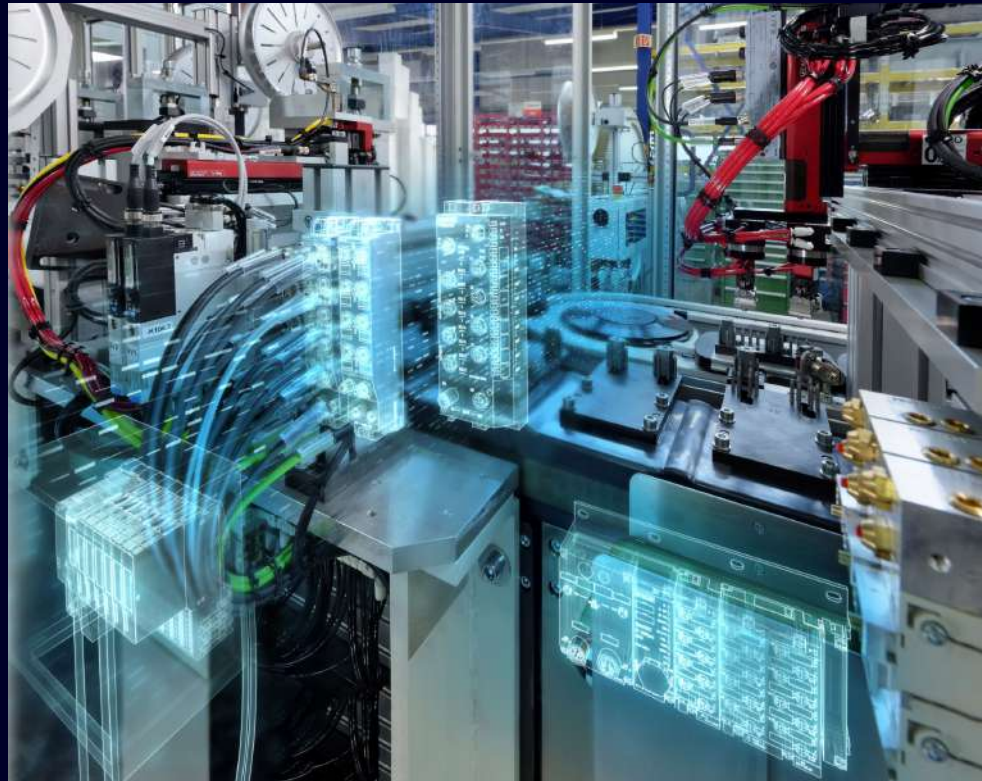
- ✓ Bidirectional cyclic and acyclic data transmission

Use of current sensor/actuator wiring & reduction of wiring effort

- ✓ 3-wire, point-to-point connection with transfer of data & power

Reduction of variety of signal types

- ✓ Digital transfer of analog and binary data



Large product portfolio / many suppliers

- ✓ Defined open standard

Protection of the fieldbus independency

- ✓ Seamless integration in existing fieldbus

Consistent data management of parameters

- ✓ Supply of parameter settings

SIMATIC IO-Link Requirements

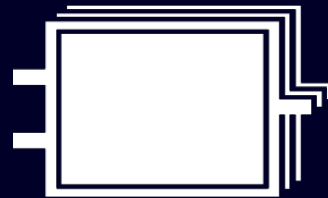
Installation



Simple Installation

- Less wiring
- Reliable transfer of measured values
- Standardized interfaces and cables
- Modular machine concepts

Parametrization



Easy Parametrization

- Using engineering tools
- Using function blocks

Diagnosis



Extended Diagnostics

- Remote diagnostics down to the field device level for complete transparency
- Cable break detection
- Standardized, vendor-neutral diagnostics

SIMATIC IO-Link Communication

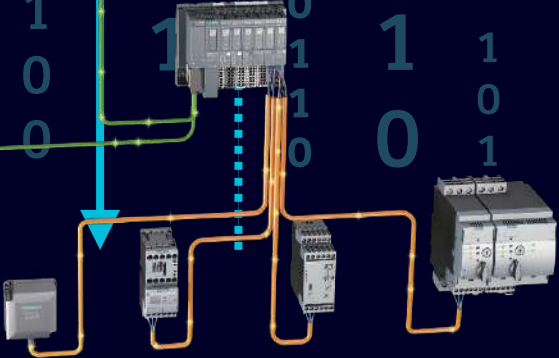
Engineering level



Control level



Field level



Communication is possible with both simple and advanced sensors / actuators

Bi-directional transfer of cyclic and acyclic data

IO-Link closes the communication gap in integrated automation systems

Siemens IO-Link

Additional advantages over standard functions

General IO-Link benefits



- Reduced parameterization time
- Reparameterization during operation

- Universal and flexible uniform wiring
- Reduced wiring effort

- Straightforward device replacement thanks to automatic parameterization
- Flexible device setup for different product variants

- Rapid diagnosis right down to the field level

Efficient engineering



Rapid wiring



Automatic parameterization



More transparency at all levels



Siemens IO-Link additional benefits



- Error-free interaction between the engineering tools TIA and S7-PCT

- SIRIUS 3RA6 and SIRIUS 3RA27 leads to additional reduced wiring effort and a compact cabinet installation

- Simple master replacement thanks to redundant storage of parameters when using ET 200SP or IO-Link function block

- SIRIUS 3RR24 with diagnostics information for predictive maintenance and energy management

Siemens IO-Link Advantages with Siemens products

SIMATIC S7 / ET 200

- Standard automation solution for central and decentralized configurations



SIMATIC S7 with IO-Link

- **Extended diagnostics** of sensors and switching devices
- **Automatic parameterization** following the replacement of IO-Link devices

SIRIUS

- Integration of basic requirements for switching and monitoring of the motor



SIRIUS with IO-Link

- **Extended diagnostics** and easier system integration into SIMATIC S7
- **Energy management** even for simple switching devices

SIMATIC RF200

- Scalable complete RFID portfolio in the RF range
- Compact space-saving components



SIMATIC RF200 with IO-Link

- **Lower price per read point**
- **No programming necessary**
- **Open standard**

IO-Link @ Siemens

Consistent
coordinated

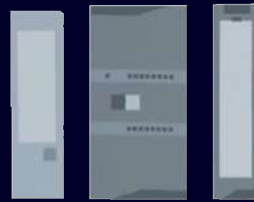
Portfolio

IO-Link Master & Devices

IO-Link Master

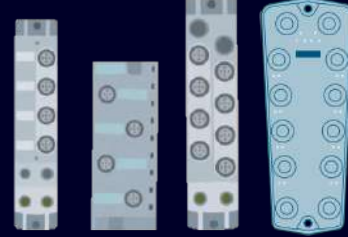
IP20

S7-1200 | ET 200SP |
S7-1500/ET 200MP

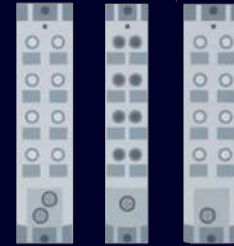


IP65/67/69K

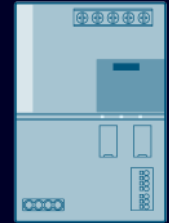
ET 200AL | ET 200PRO |
ET 200eco PN | ET 200clean



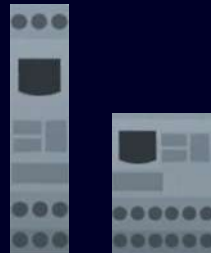
IO-Modules



Power Supplies



Monitoring & Switching devices



Commanding & Signaling devices



RFID Reader



Process Sensors



IO-Link Master

Portfolio

IP20 and IP65/67/69K

S7-1200

4 IO-Link-Ports Class A



ET 200MP

8 IO-Link-Ports Class A



ET 200SP

4 IO-Link-Ports Class A



ET 200AL

4 IO-Link-Ports Class B



EtherNet/IP

Modbus TCP

PROFIBUS

PROFINET

ET 200pro

4 IO-Link-Ports Class B



ET 200eco PN

- 4 IO-Link-Ports Class B
- 4 IO-Link-Ports Class A + 8 DI/4 DO



ET 200eco PN M12-L

- 8 IO-Link-Ports (4 Class A & 4 Class B) + 4 DI
- 8 IO-Link-Ports Class A + 8 DIQ
- 4 IO-Link-Ports Class A + 12 DIQ



ET 200clean



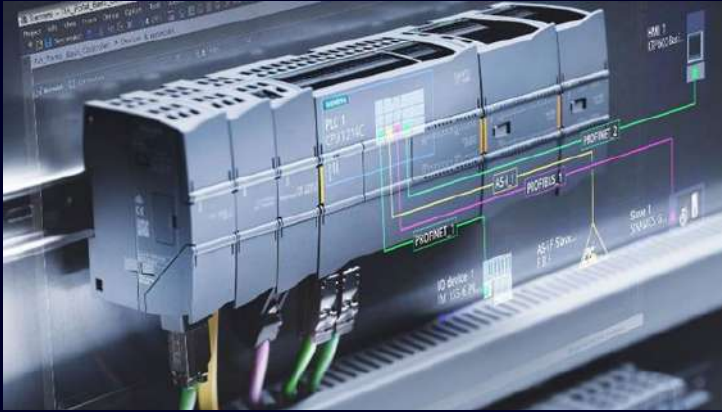
EtherNet/IP

Modbus TCP

... PROFIBUS

... PROFINET

IO-Link Master SIMATIC S7-1200



Product features

- 4 IO-Link-Ports (Class A)
- Supports IO-Link specification 1.1
- IP20 enclosure for use in control cabinets
- Supports PROFINET & PROFIBUS

Function

Lower to medium power

Modular

Flexible

Cost-effective

> Customer benefits

Ideal choice to flexibly and efficiently perform automation tasks in the lower to medium performance range

Modular design can increase configuration limits or adapt the controller to new tasks

Versatility of communication with a wide range of communication modules

SIMATIC S7-1200 is the more cost efficient choice of IO-Link Master for the control cabinet

IO-Link Master SIMATIC S7-1500



Product features

- 8 IO-Link-Ports (Class A)
- Supports IO-Link specification 1.1
- IP20 enclosure for use in control cabinets
- Supports PROFINET & PROFIBUS

Function

High performance

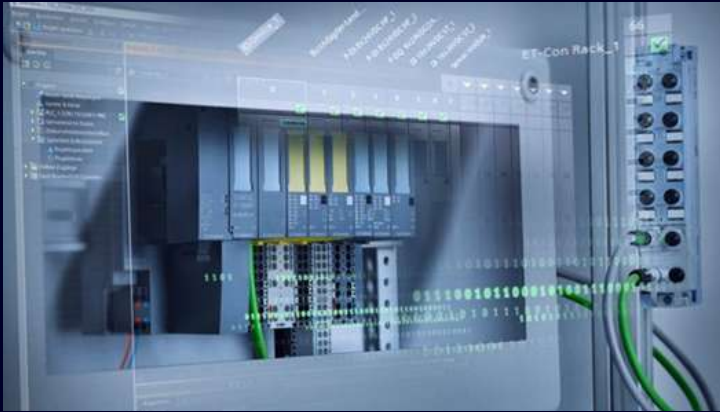
Integrated system diagnostics

> Customer benefits

Achieve the highest performance and productivity in the production process by using SIMATIC S7-1500 with its fast backplane bus, PROFINET performance, shortest reaction times and command processing time

Error messages in TIA Portal on the HMI, in the web server, and on the display of the CPU are visualized identically as plain text information

IO-Link Master SIMATIC ET 200SP



Product features

- 4 IO-Link-Ports (Class A)
- Supports IO-Link specification 1.1
- IP20 enclosure for use in control cabinets
- Supports PROFINET, PROFIBUS, EtherNet/IP & Modbus TCP (Multifieldbus)

Function

Quick & easy station setup

Effective footprint

Easy extension in IP67

Maximum flexibility

> Customer benefits

Tool-free cabling with push-in terminals
Tool-free setup of the station

- High module density leads to ET 200SP needing less space than other I/Os
- Base Units enable sufficient space for standardized bending

Direct connection of ET 200AL IO modules
Integrated diagnostics from IP20 to IP67
Integrated functionality, e.g. configuration control

Configuration control with option handling
Easy expandability thanks to design with gaps
Fast replacement of modules with multiple hot-swapping
Easy handling for decentralized periphery with one single PROFINET cable connecting central with decentral periphery

IO-Link Master SIMATIC ET 200AL



Product features

- 4 IO-Link-Ports (Class B)
- Supports IO-Link specification 1.1
- IP 65/67 enclosure for use outside control cabinet
- Supports PROFINET & PROFIBUS
- Supports EtherNet/IP & Modbus TCP
(Multifieldbus with ET 200SP)

Function

Easy installation

Flexible Portfolio

Lightweight and compact

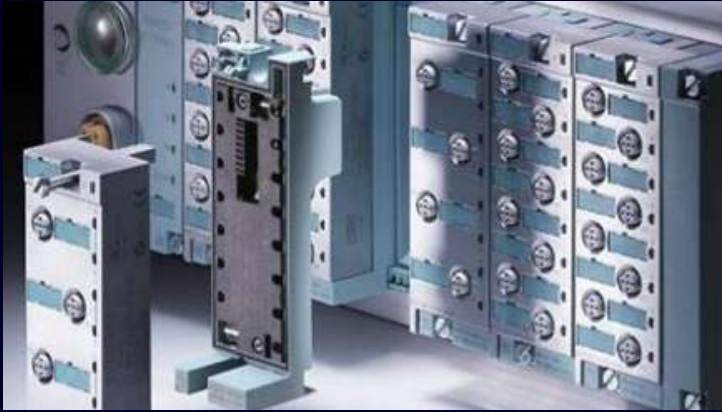
> Customer benefits

mounting directly on the machine, even on moving parts
Can be connected to ET 200SP

Easy expansion of all IO-Link masters with
ET 200AL IO-Link IO-Modulen (DI/DQ/DIQ)

Compact block periphery
High vibration resistance
Small footprint for use even when space is limited

IO-Link Master SIMATIC ET 200pro



Product features

- 4 IO-Link-Ports (Class A oder Class B)
- Supports IO-Link specification 1.1
- IP 65/67 enclosure for use outside control cabinet
- Supports PROFINET & PROFIBUS

Function

Easy installation

Extensive portfolio for a wide range of applications

High availability

> Customer benefits

Simple, fast assembly
Stable mounting technology through module support
Low variance and storage costs due to wide range adjustment

Safety module
Motor starters and frequency converters
Valve actuation

Quick module exchange
Modules can be mounted and dismantled individually
Hot Swapping: Module exchange without bus interruption during CPU run

IO-Link Master

SIMATIC ET 200eco PN



Product features

NEW

Master 1: 8 IO-Link-Ports (8 Class A) + 8 DIQ + Multifieldbus

Master 2: 8 IO-Link-Ports (4 Class A & 4 Class B) + 4 DI + Multifieldbus

NEW

Master 3: 4 IO-Link-Ports (4 Class A) + 12 DIQ + Multifieldbus

Master 4: 4 IO-Link-Ports (Class B)

Master 5: 4 IO-Link-Ports (Class A) + 8 DI/4 DQ

Supports IO-Link specification 1.1

IP 65/67/69K enclosure for use outside control cabinet

Supports PROFINET, PROFIBUS, EtherNet/IP & Modbus TCP (Multifieldbus)

Function

Robust

> Customer benefits

Robust design thanks to metal housing

Use in harsh conditions:

e.g. condensation & salty environments

Operation down to -40 °C

High vibration resistance (up to 20 g)

Efficient

Mounting directly on the machine in harsh environmental conditions

Powerful and compact block periphery

High performance thanks to direct PROFINET connection and integrated 2-port switch

Channel diagnosis

Extensive portfolio

IO-Link master available with different IO-Link ports/IO combinations

IO-Link Master SIMATIC ET 200clean



Product features

- 8 IO-Link-Ports
(4 Class A & 4 Class B) + 4 DIQ
- Supports IO-Link specification 1.1
- IP 65/67/69K enclosure for use outside control cabinet
- Supports PROFINET, PROFIBUS, EtherNet/IP & Modbus TCP (Multifieldbus)

NEW

Function

> Customer benefits

Robust

Hygienic design incl. hygienic sealings

Use in F&B conditions:

e.g. resistance to cleaning detergents & high pressure cleaning

Operation down to -30 °C

High vibration resistance (up to 10 g)

Efficient

Mounting directly on the machine in harsh environmental conditions

Powerful and compact block periphery

High performance thanks to direct PROFINET connection
and integrated 2-port switch

Channel diagnosis

Extensive portfolio

IO-Link master available with first delivery release



IO-Link @ Siemens

Consistent
coordinated

Portfolio

IO-Link Master

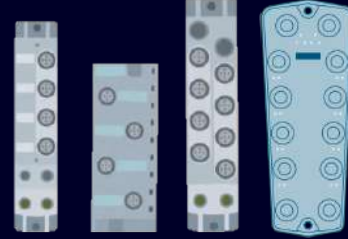
IP20

S7-1200 | ET 200SP |
S7-1500/ET 200MP

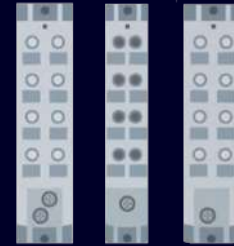


IP65/67/69K

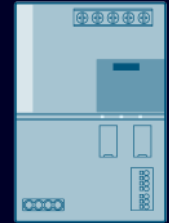
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IO-Modules

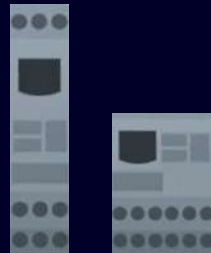


Power Supplies



IO-Link Master & Devices

Monitoring & Switching devices



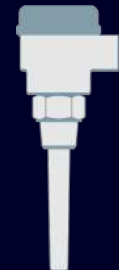
Commanding & Signaling devices



RFID Reader



Process Sensors



IO-Link Devices

Portfolio

Wide range of IO-Link-devices from Siemens

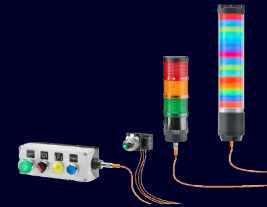
I/O modules



Power Supply



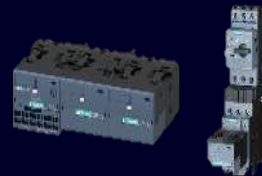
Commanding and Signaling devices



Characteristic value monitoring devices



Function modules



RFID-Module



Flow sensor



Limit switch



Power Supply with IO-Link

SITOP PSU8400 stabilized 24 V DC power supply

NEW



Product features

- 3-phase power supplies 24 V DC/20 A and 40 A
- 4-digit display for parameterization and diagnostics on site
- High efficiency up to 96%
- Slim and compact design
- Diverse and high power reserves
- Uniform load distribution in parallel operation
- Special advantages in combination with SITOP SEL1600 selectivity system

Function

Robust power supply

Energy efficient

Compact design

High power reserves

Comprehensive diagnostics

> Customer benefits

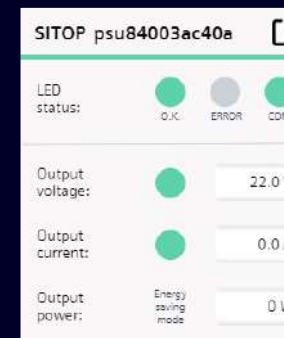
Reliable operation in unstable grids, 2-phase operation permitted

High efficiency and switchable output save energy

Small space requirement in the control cabinet, no lateral distances to other devices required

Stable 24 V even under short-term high loads, tripping of miniature circuit breakers possible

Early detection of critical conditions such as phase failure, overtemperature or overload. Free WinCC faceplates enable convenient monitoring:



	Min. since reset	Max. since reset	Min. overall	Max. overall
Input voltage	476 V	479 V	0 V	646 V
Output voltage	22.0 V	24.0 V	0.0 V	26.3 V
Output current	0.0 A	0.0 A	0.0 A	2.9 A
Output power	0 W	0 W	0 W	0 W

Selectivity System with IO-Link

SITOP SEL1600 Basic and expansion modules

NEW



Product features

Basic and expansion module, each with 4 outputs 24 V/10 A

Basic module with 4-digit display for parameterization and diagnostics on site

Individually adjustable response threshold value 0.5 - 10 A per output

Power increase by connecting 2 adjacent outputs of a module in parallel for up to 20 A

Remote on/off per output via IO-Link

Function

Safe shutdown of faulty branches

Modulare design

Energy efficient

Fast fault diagnostic

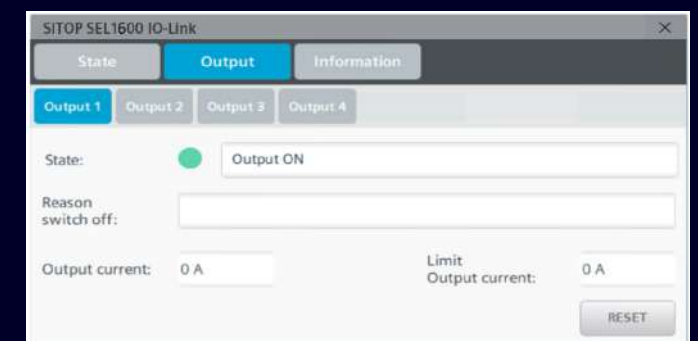
> Customer benefits

High system availability through reliable detection and shutdown of overload and short circuit, all other 24 V feeders are supplied

Conveniently expandable to up to 40 outputs via wiring brackets. Up to 60 A load current, even 120 A when fed in from both sides. Special advantages in combination with SITOP PSU8400 power supply

Individual outputs can be switched off during break times

Early detection of critical conditions in a consumer branch. Free WinCC faceplates enable convenient monitoring:



IO-Link Device

SIRIUS Monitoring Relay



Product features

SIRIUS 3RR24 Analog Setting Current Monitoring Relay

SIRIUS 3RS2 Temperature Monitoring Relay

SIRIUS 3UG48 Monitoring Relay

Complete diagnostic capability and transmission of measured values

Function

> Customer benefits

Surveillance

Accurate monitoring and transmission of electrical and mechanical parameters: voltage, current, power factor (cos F), speed, temperature and line monitoring

Rapid diagnosis

Warnings and shutdown limits for warning or shutdown, parameterization via IO-Link or on-site control possible

Flexibility in device parameterization

Complete parameterization can be carried out via the device or a controller

Automatic device parameterization

Integrated

Efficient engineering

Integration in energy management systems

IO-Link Device

SIRIUS ACT and Signaling Column



Product features

SIRIUS ACT 3SU1 ID Key
3SU1 SIRIUS ACT Electronic module for enclosure
8WD4 signaling columns 8WD44 and 8WD46

Function

Flexible use of ID Key

> Customer benefits

Selection options dependent on ID key coding
Opportunity for individual coding with white key
Authentication of employee groups or individual employees
Flexible use thanks to 4 function levels

Modular

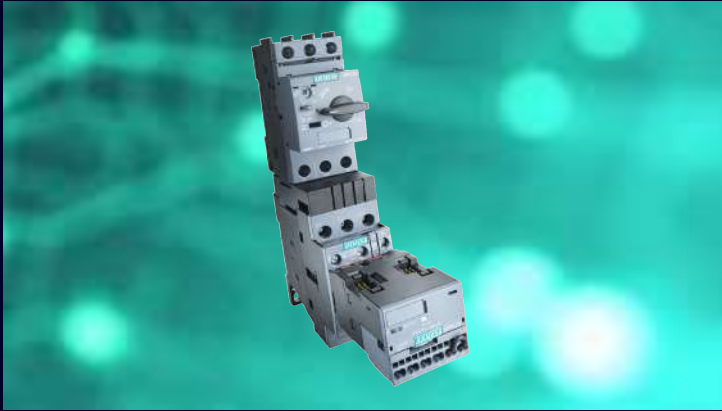
Customized configuration of the Enclosure or signal tower two to its modular structure
Automatic device parameterization

Easy

Integration of the ID Key, Push Buttons for enclosure and Signaling Column in the IO-Link system

IO-Link Device

3RA27 Function Module



Product features

IO-Link offers high information density, including process diagnostic data, short circuit, end position and much more

Function

Function module

Comprehensive unified diagnosis

Less wiring effort and compact design

> Customer benefits

For mounting on contactors (SIRIUS 3RT2) for significantly lower wiring effort; includes the most important control functions
Good overview in the control cabinet, fast installation and low error rate during wiring

Fast diagnosis available system-wide
(e.g. power failure, motor "on", end position right/left, indication of end of life cycle, triggered overload, triggered short circuit)

Grouping of up to 4 supply lines per IO-Link master port
Smaller space requirement thanks to fewer IO modules

IO-Link RFID-Module SIMATIC RF200



Product features

Operating frequency 13,56 MHz
Reach up to 140 mm
3-color diagnostic LED
IO-Link interface V1.0 and V1.1
IP67, welded housing
CE (ETCI), FCC, UL-Approval

Function

> Customer benefits

Ease of use

No RFID-specific programming required, ideal for RFID beginners

Easy configuration

Application can be duplicated quickly

Easy integration

Easy integration with IO Link standard
Up to 8 readers can be used via one master module
be connected by Siemens

Flexible and
economical solution

Complete and scalable portfolio
Lower price per readout point

Open Standard

Flexibility & easy integration into existing systems

IO-Link Flowmeter

SITRANS FM100 Magnetic Inductive Flowmeter



Product features

Magnetic inductive flowmeter
Connection 1/2", 3/4", 1", 2"
Flow rates from 0.03 to 350 l/min
Analog and IO-Link output
Dosing function with external control

Function

Flow and temperature measurement

Color display with 4 optical touch buttons

Display rotatable through 90° about software

Non-resettable and resettable counter

> Customer benefits

Two process values for additional application information

Easy and fast setup
User-friendly operation
Can be used with gloves

Flexible mounting
Individual setup of the device

Individual use of the totals counters according to user/application

Flexible Point Level Sensor SITRANS LCS100



Product features

- Versatile Capacitance Point Level measurement
- Connections starting at 1/2"
- Flexible insertion and compact design
- Flexible output and Digital IO-Link options
- Optional M12 connector

Function

Level and Interface measurement

Device status testing

Local adjustment

S7-PCT / IO-Link

> Customer benefits

Ability to measure either Liquids or solids point level or interface

Reliable instrument performance
Remote testing for convenience

Local or remote adjustment for flexible application setup

Configuration
Hot swap device
Advanced diagnostics

Reference Case Zollner Elektronik AG

IO-Link-Reader in assembling the power electronics of electric cars

Project information



IO-Link-Reader in assembling the power electronics of electric cars



RFID-reader



Components used



RF200 IO-Link Reader

MDS D160 Transponder

Customer challenges



Components/ solutions



Customer benefits



1

- Based on the identification number (UID) the required operation is initiated at each station

- 100 reading points are providing identification number (UID) for the controlling of workflow

- Low system costs

2

- Import of completed operations in a database
- Collection, documentation and archiving of Track and Trace data

- Prompt process data acquisition (IO/NIO, screw driving parameters etc.)

- Easy connection to module controller via IO-Link
- No RFID-specific programming required

3

- Heat resistance transponder (casting at 100°C)
- Modular structured module- and final assembly of power electronic aggregate for electronic cars

- RF200 IO-Link reader with MDS D160 transponder

- Ruggedized transponders for temperatures to 175°C
- Possibility of simple application duplication because of easily configurable components

Reference Case Tolsma

High transparency in converting of agricultural commodities thanks to IO-Link

Project information



High transparency in converting of agricultural commodities thanks to IO-Link



Current monitoring relays

Components used



Siemens S7-1500 CPU

ET 200SP decentral periphery

Motor starter SIRIUS 3RA6 with IO-Link

Current monitoring relay SIRIUS 3UG48/3RR2 1 & 3 phase IO-Link

Customer challenges



Components/ solutions



Customer benefits



1

- Factory with 800 conveyors
- New control unit for production process of agricultural commodities

- Groupings of up to 4 feeders per IO-Link Master port and comprehensive unified diagnostics

- Reduction of I/O modules through usage of IO-Link Master Module (abolition of DI, DQ, AQ, AI modules)

2

- Requirement of compact design, minimal cabling and high process transparency

- Precise monitoring and transmission e.g. current, phase failure, current asymmetry, blocking current

- Up to 80% reduced cabling
- Faster mounting and reduced failure in wiring
- Extended diagnostics

3

- Exchange old control units and homogenization

- S7-1500 CPU & ET 200SP
- Motor starter SIRIUS 3RA6 with IO-Link
- Current monitoring relay SIRIUS 3UG48/3RR2 with IO-Link

- Reduction of engineering efforts up to 30%

Reference Case Miprotek GmbH

IO-Link for communication between the field and control levels

Project information



IO-Link for communication between the field and control levels



Motor circuit breaker

Components used



SIRIUS 3RT2 connector

3RV2 motor circuit breaker

3RA27 IO-Link function modules

Customer challenges



Components/ solutions



Customer benefits



1

- Glass sorting facility for recycling business
- Install a cost-efficient, easy wiring control system

- More than 100 electric motors transport the glass

- Complete signal chain from the controller to the field level
- Time and space savings
- Less wiring effort and fewer wiring errors

2

- Detect the status of the facility and gather valuable diagnostic information

- Direct starters used with SIRIUS 3RT2 contactor, 3RV2 motor circuit breaker and 3RA27 IO-Link function modules

- Simple diagnostic options down to the drive
- Status, warnings and diagnostics can be read of WinCC visualization thanks to integrated IO-Link

More information about IO-Link ...



Examples

Acyclic Read and Write with the IO-Link Library (LIO-Link)

→ LINK

Use of the block library "Siemens IO-Link-Devices"

→ LINK

Reading and writing RFID data with SIMATIC RF200 IO-Link readers and SIMATIC S7 controllers

→ LINK

Common and Smart Sensor Profiles for IO-Link

→ LINK

ID-key application example

→ LINK

Safety related shutdown of IO-Link devices

→ LINK

IO-Link in general

[SIEMENS-Homepage IO-Link](#)

[SIEMENS Industry Online Support – Topic page IO-Link](#)

[Brochure: IO-Link – Seamless communication down to the last meter](#)

[YouTube: IO-Link – IO-Link Master and Devices](#)

Tools

S7-PCT

→ LINK

PRONETA

→ LINK

IODDfinder

→ LINK

TIA Selection Tool

→ LINK

Training

IO-Link web-based Training

→ LINK

IO-Link Basic Training (Vol.1-5)

→ LINK

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