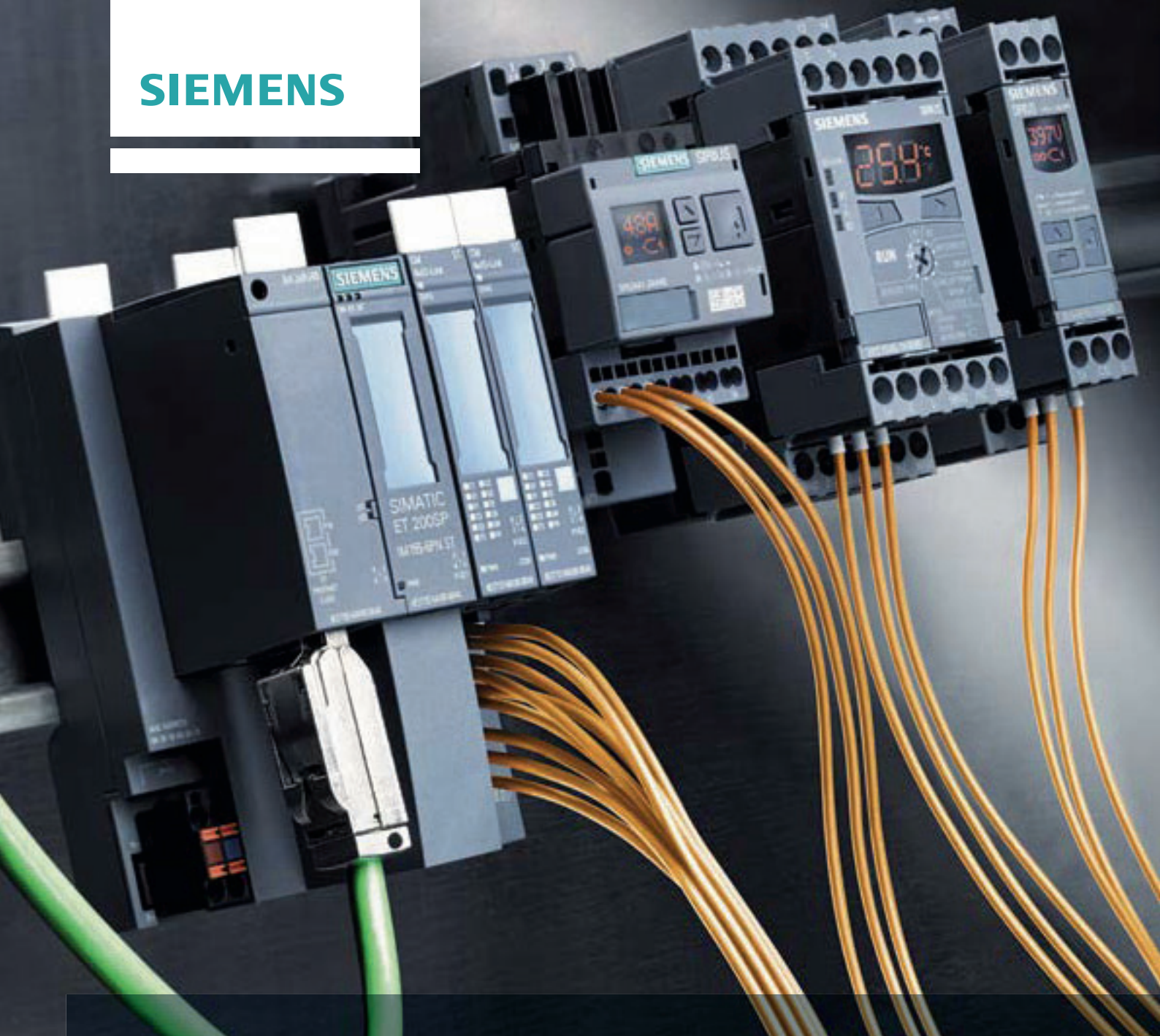




SIEMENS



# IO-Link for transparency down to the lowest field level

Simple wiring, fast fault diagnostics, efficient engineering

[siemens.com/io-link](https://www.siemens.com/io-link)

# Uninterrupted communication down to the last meter: the point-to-point connection IO-Link

Consistent cost reductions, high plant availability, and transparency require an open, standardized and low-cost system for connecting actuators, sensors, and other field devices to the automation system. IO-Link meets these requirements and additionally offers systematic diagnostics concepts and efficient handling of parameter data at all levels of automation engineering.



## IO-Link – more than just another interface

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 IO-Link communication standard at the fieldbus level enables centralized fault diagnostics and localization down to the sensor/actuator level. Because parameter data can be modified dynamically direct from the application, the devices can be adjusted to the prevailing production requirements during operation.

## IO-Link-enabled products

The requirements for integrated communication are increasing. At the same time, sensors and actuators are becoming more and more intelligent. This is where the IO-Link solution from Siemens goes that extra distance in the process, with data transparency from the field level to the highest automation level, and with an increasing number of IO-Link-enabled products. As an open interface, the IO-Link can be integrated into 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. IO-Link enables automatic integration of measured values for energy data management systems without additional installation costs. This makes it easy to determine and subsequently analyze energy consumption and fluctuations right down to the field level.

## Together for uniform quality

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.



SIRIUS switching devices

IO-Link master

RFID systems

Commanding and signaling devices

## References

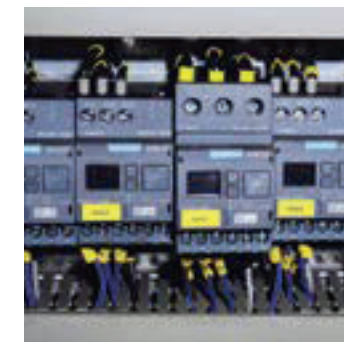
### Steel industry



#### Modern industrial controls as the basis for efficient plant operation when preparing hard coal products

##### The task

The furnace of this steel production plant in Duisburg, Germany requires above all a reliable supply of well-prepared coal. In a modernization project at Emscher Aufbereitung GmbH, the conveyor belts, along with all auxiliary equipment – from the underground hopper to the three run-of-mine coal silos – were fitted with new electrical engineering and automation systems under the auspices of the automation specialist EAS GmbH.



Current monitoring relays in the conveyor system ensure targeted monitoring of the drives.

##### Our solution

Skillful grouping of SIRIUS motor starters with IO-Link and parallel wiring enables a considerable reduction in wiring overhead. The motor starters combine the circuit breaker, contactor and electronic overload relay functions in a single compact enclosure. SIRIUS current monitoring relays help to improve data acquisition and also communicate with the controller via IO-Link. Measuring the active current also allows conclusions to be drawn about how efficiently the drives are working.

##### The benefits

- Motor starter with IO-Link results in considerable savings in wiring overhead
- Multiple diagnostic options optimize plant operation
- Rapid detection of faults in the control room and targeted troubleshooting

### Food processing industry



#### Conveyor application for agricultural products

##### The task

Tolsma-Grisnich, specialists for automation solutions for agricultural products, has implemented a series of processing lines for foodstuffs for the Wild company in Eppingen in Baden-Württemberg.

Cleaning, sorting, drying, storing and packaging agricultural products requires a huge challenge for the processing industry: hundreds of metric tons of foodstuffs must be packed and delivered on time to retailers. Right from the installation stage, attention was paid to compact design and minimal wiring in order to achieve clarity in the control cabinet. Diagnostic data acquired during the process ensure the highest possible degree of transparency down to the field level. But this approach assumes simple engineering as a precondition.

##### Our solution

We use SIRIUS 3RA6 motor feeders with IO-Link communication to significantly reduce the wiring – as well as minimizing the risk of errors. SIRIUS current monitoring relays are used for transferring current measured values. They monitor the process for overcurrent and undercurrent, cable breaks or phase failure.

##### The benefits

- Simple wiring, efficient engineering and rapid diagnostics using IO-Link technology
- Valuable diagnostics information about processes, operation and potential faults

Substantial savings in control circuit wiring, fewer downtimes, accelerated engineering, and transparent diagnostics were the decisive arguments in favor of IO-Link.



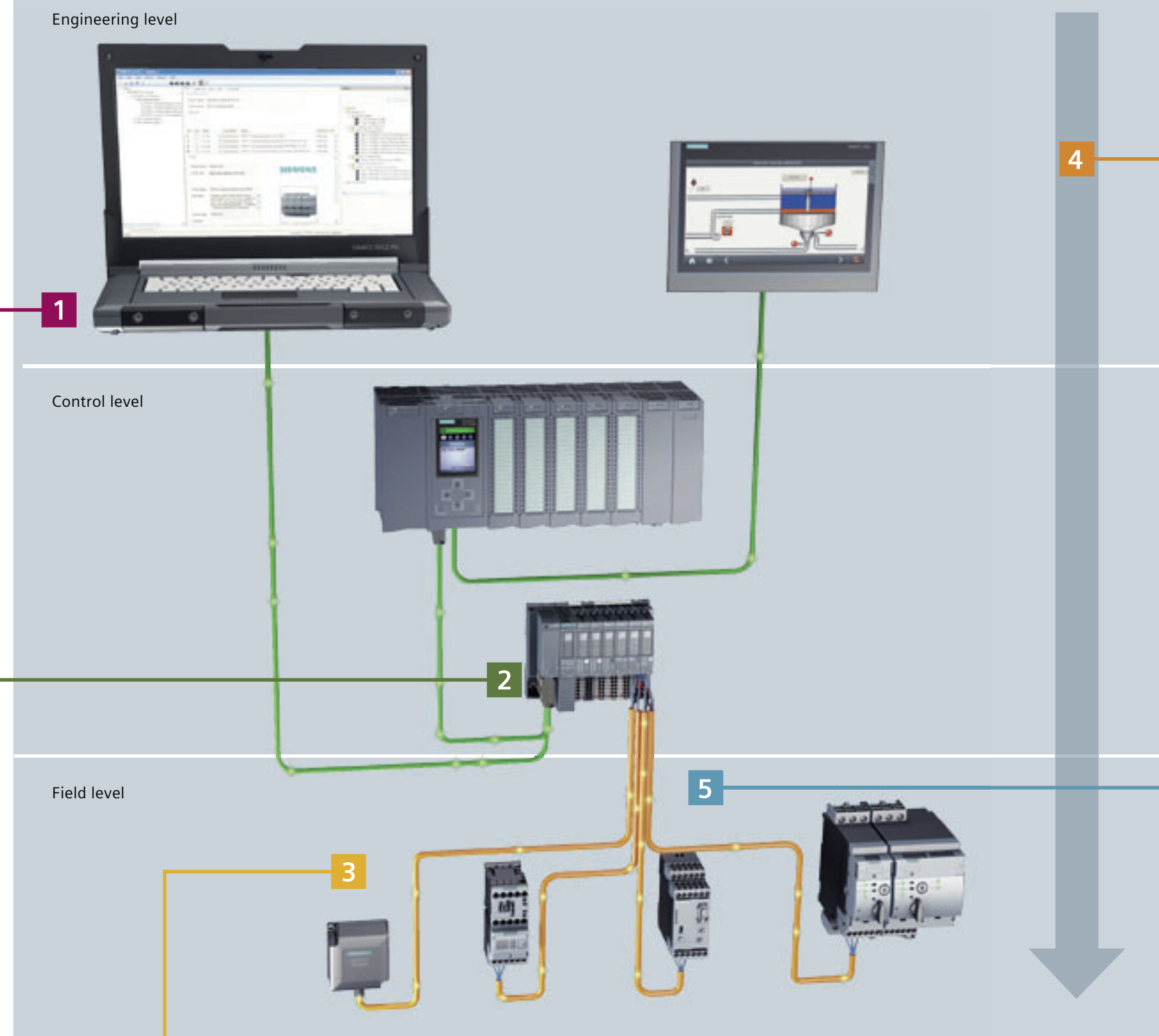
# More efficiency at all levels: Thanks to IO-Link, Totally Integrated Automation is possible right down to the process

Requirement	Solution	Benefit
<b>1 Efficient engineering</b>		
<b>Lower parameterization overhead with the Port Configuration Tool from Siemens</b>		
<ul style="list-style-type: none"> <li>Error-free and efficient data exchange between engineering tools</li> </ul>	<ul style="list-style-type: none"> <li>SIMATIC S7-PCT configuration tool integrated in STEP 7 for IO-Link devices from a wide range of manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>Fast, error-free engineering of the IO-Link system</li> <li>Parameter reassignment during continuous operation and reading out of additional information</li> </ul>
<b>Device-specific function blocks make commissioning easier</b>		
<ul style="list-style-type: none"> <li>Easier access to IO-Link devices</li> </ul>	<ul style="list-style-type: none"> <li>Library with device-specific function blocks for all IO-Link devices from the Siemens portfolio for STEP 7</li> </ul>	<ul style="list-style-type: none"> <li>Fast, simple commissioning of Siemens IO-Link devices</li> </ul>

Requirement	Solution	Benefit
<b>2 Automatic parameter assignment</b>		
<b>Easy device replacement with automatic parameterization</b>		
<ul style="list-style-type: none"> <li>Rapid replacement of worn or defective components</li> </ul>	<ul style="list-style-type: none"> <li>Device parameters stored in the IO-Link Master according to IO-Link specification V1.1</li> <li>Storage of the device parameters in the CPU with the IOL_DEVICE function block</li> <li>New devices are parameterized with the IO-Link master or IOL_DEVICE function block</li> </ul>	<ul style="list-style-type: none"> <li>Avoidance of setting errors</li> <li>Minimization of downtimes and simplified replacement</li> </ul>
<b>Flexible device setting</b>		
<ul style="list-style-type: none"> <li>Manufacture of different product versions and recipes</li> <li>Monitoring of product-specific characteristics</li> </ul>	<ul style="list-style-type: none"> <li>Storage and transfer of parameters for manufacturing different product versions and recipes</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced production diversity and faster product change</li> <li>Avoidance of setting errors</li> </ul>
<b>Simple replacement of the master thanks to redundant storage of the parameters</b>		
<ul style="list-style-type: none"> <li>Fast re-configuration of the master after replacement or fault</li> </ul>	<ul style="list-style-type: none"> <li>Storage of the master parameters in the CPU with the IOL_MASTER function block</li> <li>Redundant storage of the master parameters in the system (ET 200SP only)</li> <li>Parameterization of the new master using the IOL_MASTER function block or the ET 200SP system</li> </ul>	<ul style="list-style-type: none"> <li>Avoidance of setting errors</li> <li>Minimization of downtimes and simplified replacement</li> </ul>

All IO-Link devices feature this basic functionality

Siemens IO-Link devices equipped with enhanced functionality and associated added benefits



Requirement	Solution	Benefit
<b>3 The standard IO-Link</b>		
<b>Automation with an open standard</b>		
<ul style="list-style-type: none"> <li>Interaction of components from different manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>Wide range of Siemens IO-Link master and device products in accordance with the IO-Link standard</li> </ul>	<ul style="list-style-type: none"> <li>Free choice of products thanks to interoperability</li> <li>Further development ensured by wide device manufacturer base</li> </ul>

Requirement	Solution	Benefit
<b>4 More transparency at all levels</b>		
<b>Quick diagnostics</b>		
<ul style="list-style-type: none"> <li>Fast localization and identification of faults and defects</li> </ul>	<ul style="list-style-type: none"> <li>Detection and reporting of relevant diagnostics events</li> <li>Self-test option for actuators</li> </ul>	<ul style="list-style-type: none"> <li>Reduced troubleshooting overhead</li> <li>Minimization of downtimes</li> </ul>
<b>Predictive maintenance</b>		
<ul style="list-style-type: none"> <li>Avoidance of costly downtimes</li> </ul>	<ul style="list-style-type: none"> <li>Detection and reporting of maintenance information</li> <li>Remote diagnostics possible right down to the sensor/actuator level</li> </ul>	<ul style="list-style-type: none"> <li>Maximization of plant availability and extension of machine runtimes</li> <li>Targeted maintenance planning</li> <li>Preventive maintenance and minimization of expensive repairs</li> </ul>
<b>Integrated energy management</b>		
<ul style="list-style-type: none"> <li>Reduced operating costs thanks to power-saving measures</li> </ul>	<ul style="list-style-type: none"> <li>Forwarding of measured data through the IO-Link devices to the higher-level controller</li> </ul>	<ul style="list-style-type: none"> <li>Optimization of energy requirements</li> <li>Avoidance of costly load peaks</li> <li>Longer product lifetime</li> </ul>

Requirement	Solution	Benefit
<b>5 Fast wiring</b>		
<b>Uniform wiring</b>		
<ul style="list-style-type: none"> <li>Problem-free conversion of classic wiring to IO-Link technology</li> <li>Wiring easy to implement when upgrading</li> <li>Clearly arranged wiring in the control cabinet</li> </ul>	<ul style="list-style-type: none"> <li>Standardized point-to-point connection using unshielded three-core cable</li> </ul>	<ul style="list-style-type: none"> <li>Vendor-independent and low-cost wiring technology</li> <li>Fast and error-free changeover from conventional wiring to IO-Link technology</li> <li>Simplified warehousing</li> <li>Increased productivity for service personnel</li> </ul>
<b>Reduced wiring overhead</b>		
<ul style="list-style-type: none"> <li>Reductions in terminals and cabling</li> </ul>	<ul style="list-style-type: none"> <li>Reduced cabling and lower number of I/O modules thanks to the use of up to 16 Siemens motor starters per IO-Link master</li> </ul>	<ul style="list-style-type: none"> <li>Faster installation and lower rate of wiring errors</li> <li>Reduced number of I/O modules and cables</li> </ul>
<b>Compact design</b>		
<ul style="list-style-type: none"> <li>Reduced control cabinet requirement</li> </ul>	<ul style="list-style-type: none"> <li>Compact configuration thanks to IO-Link master</li> <li>Fewer terminals thanks to the use of Siemens motor starters</li> </ul>	<ul style="list-style-type: none"> <li>Space savings in the control cabinet</li> <li>Reduced complexity</li> <li>Simplified replacement of components during maintenance work</li> </ul>

## The IO-Link product portfolio from Siemens

IO-Link master centralized	SIMATIC S7-1200
IO-Link master distributed	SIMATIC ET 200eco PN
	SIMATIC ET 200AL
	SIMATIC ET 200S
	SIMATIC ET 200SP
RFID systems	SIMATIC RF210R
	SIMATIC RF220R
	SIMATIC RF260R
Industrial controls	SIRIUS 3RR24, 3UG48, 3RS1 Monitoring relays
	SIRIUS 3RB24 Electronic overload relay
	SIRIUS 3RA6 Compact starter
	SIRIUS 3RA27 Function module
Commanding and signaling devices	SIRIUS ACT ID key-operated switches
	SIRIUS ACT electronic module
I/O modules	K20 Input modules
Software	SIMATIC S7 Port Configuration Tool
	IOL_DEVICE function block, IOL_MASTER function block, Library with device-specific function blocks

Find out more:

[www.siemens.com/io-link](http://www.siemens.com/io-link)

Find out everything  
about IO-Link:

- › Animations about the benefits of IO-Link
- › Product and reference films
- › Detailed information about IO-Link and the IO-Link products

Siemens  
IO-Link –  
at a glance!



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