

# IO-Link Device Tool



## User Manual

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## 1. Introduction

The IO-Link device tool is used for the operation of IO-Link masters and connected IO-Link devices. The central technological element for the operation of the connected devices is the IO device description (IODD). Special for IO-Link is that this IO device description is mandatory. So a worldwide accepted integration possibility is available independently from the system environment.

As long as the IODD will also be used in the future for further communication standards, the tool will also support this. Also today there exists a prototypically integration of IO-Link wireless.

The tool can be used as independent program as well as integrated in an engineering system. Most of the features are identical so that this manual describes all variants. The specific differences are marked accordingly.

### 1.1 The use in different system environments

IO-Link masters can be used in very different system landscapes. Either they are gateways connecting IO-Link in overlapping fieldbus or Ethernet systems, modules in modular remote IO-systems, interfaces to typical PC interfaces such as USB or they are an integral part of devices or controllers.

In most cases a supervisory engineering tool will be used in the according system landscape. Unfortunately there is often no or at least no uniform integration possibility. So we have tried our best to find solutions easy to handle for the appropriate cases. Therefore we implemented different options for the IO-Link device tool.

#### 1.1.1 Operation as independent program

The IO-Link device tool can be started as an independent program from the start menu or through the desktop symbol. It provides then the necessary functions in order to get connected with or to look for the accessible IO-Link masters.

According to the master and the setting, the tool can take over the following functionalities:

- Diagnosis, identification, parameterization and display of the process data of the IO-Link devices
- Writing of output process data

Normally this is the job of the control system and the tool may not write competitively. But some masters can be operated without SPS at the tool. In this case, the tool can also write the process data. This is particularly true for the USB IO-Link masters, but also for some Ethernet based IO-Link masters. You can recognize this by calling the master or please read the appropriate chapter in the documentation.

- Configuration of the master

Normally this is the job of the control system and the tool may not competitively change the configuration. But some masters can be operated without SPS at the tool. In this case the tool can configure the master. With the Ethernet based IO-Link masters the functionality as a rule is then available if there is no existing connection to SPS. For further information please read the appropriate document of the master.

- Reading from the master's configuration

The configuration will be read from the master, compared with the tool setting and displayed. This function is always available.

The masters supported in this operation mode appear accordingly in the device catalogue. Especially the PROFIBUS IO-Link masters are not supported in the operation mode as here the communication channel of the engineering tool is used. For further details please see chapter 1.2.2. "Operation via TCI (Tool Calling Interface)".

### 1.1.2 Operation via TCI (Tool Calling Interface)

TCI is a relatively simple software interface for integrating device software in engineering tools. TCI is specified by the PNO (PROFIBUS User Organization) and is available today as open interface for PROFIBUS and PROFINET. Unfortunately this interface is only supported by a few manufacturers. This includes currently Siemens with STEP 7 and the TIA portal and Phoenix Contact with PC Worx.

The start of TCI happens from the network configurator of the engineering tool. With Siemens' STEP 7 it is the "HW Konfig.". The IO-Link device tool starts by pressing the right mouse button on the requested device and the function selection "start of device tool". The engineering tool transfers all devices supported by the tool. These will then show up in the topology. Under the menu option "extras" you can select if only the device selected in STEP 7, the network string with the selected device or all network strings shall be displayed in the topology.

The topology can't be changed by the tool. The supported masters appear in fact in the device catalogue, but can only be added or deleted by the overlapping engineering tool of the topology.

By calling via TCI the tool takes over the following functionalities:

- Diagnosis, identification, parameterization and display of the process data of the IO-Link devices
- The output process data can't be written.
- The configuration of the master is carried out over the calling engineering tool.  
The data won't be transferred, whether or not of an existing communication connection.
- Reading the configuration of the master

The configuration will be read from the master and the information will be complemented through the TCI calling where appropriate. However the data from the TCI calling are leading. At inconsistency a failure notice occurs and the configuration has to be newly written with the actual data by the SPS.

The communication with the master happens from case to case via the communication channels provided by the engineering tool (TCI class 3) or via the own communication channels (TCI class 2).

The project data will be filed in the project folder of the engineering tool, ensuring its availability in case of archiving and de-archiving of the project with the engineering tool.

## 2. Quick access

### 2.1 With a USB IO-Link Master

- Do **not connect** the USB IO-Link master.
- First install the IO-Link device tool.
- Now connect the USB IO-Link master to the PC.
- Confirm „Search Masters“ via the right mouse menu in the topology area.
- Now the USB IO-Link master is displayed.
- By double-clicking the entry, you can use it.
- Connect an IO-Link device to the USB IO-Link master. If you are not sure if the power supply from the USB is sufficient, please use the external power supply unit.
- Press the button „Go Online“.
- Press the button “Check Devices”.
- Now the IO-Link device is displayed. Transfer it then in the project engineering.
- By double-clicking in the user interface of the master or by selecting in the topology you can change the IODD interpreter.

### 2.2 With an Ethernet IO-Link Master

- First install the IO-Link device tool.
- Connect the pc with the network connected with the Ethernet IO-Link masters. Please note the remarks to the Windows firewall in chapter 6 “installation”.
- Confirm „device search“ in the right mouse menu in the topology area.
- The Ethernet IO-Link masters should now be displayed. Turn off experimentally the Windows firewall, if the IO-Link masters will not be recognized.
- By double-clicking the entry, you can save it.
- Connect minimum one IO-Link device to the USB IO-Link master.
- Press the button „online“ in the toolbar. If the configuration of the IO-Link master does not correspond with the configuration displayed in the tool, you can choose which configuration to use.
- Press the button “device search”.
- The connected IO-Link devices are now displayed unless the ports are configured as IO-Link. Transfer the found devices in the project engineering.
- By double-clicking in the user interface of the master or by selecting in the topology you can change the IODD interpreter.

### 2.3 Integrated via TCI e. g. in STEP 7 or in the TIA Portal

- First of all install the SPS engineering tool supporting the TCI. At least it must support the version TCI V1.2.
- Import the GSD data for the PROFIBUS and PROFINET IO-Link masters supported by the IO-Link device tool. You will find these in the program directory of the IO-Link device tool → \Devices\Master\GSD.
- Install the IO-Link device tool.
- In the fieldbus configuration of the SPS tool (e.g. HW Konfig at Step 7) you can now start the IO-Link device tool by using the right mouse button “start device tool”. The according IO-Link master automatically appears on the tool’s interface.
- By operation via TCI you can’t change the configuration of the IO-Link master in the IO-Link device tool. This happens in the “HW Konfig” of the SPS engineering tool. Please read the documentation of the SPS engineering tool and the IO-Link master accordingly.
- The communication between the IO-Link device tool and the IO-Link masters will be realized by the SPC engineering tool. Please note the documentation of the SPC engineering tool accordingly.
- Connect minimum one IO-Link device to the USB IO-Link master.
- Press the button „online“ in the toolbar. If the configuration of the IO-Link master does not correspond with the configuration displayed in the tool, you can choose which configuration to use.
- Press the button “device search”.
- The connected IO-Link devices are now displayed unless the ports are configured as IO-Link. Transfer the found devices in the project engineering.
- By double-clicking in the user interface of the master or by selecting in the topology you can change the IODD interpreter.

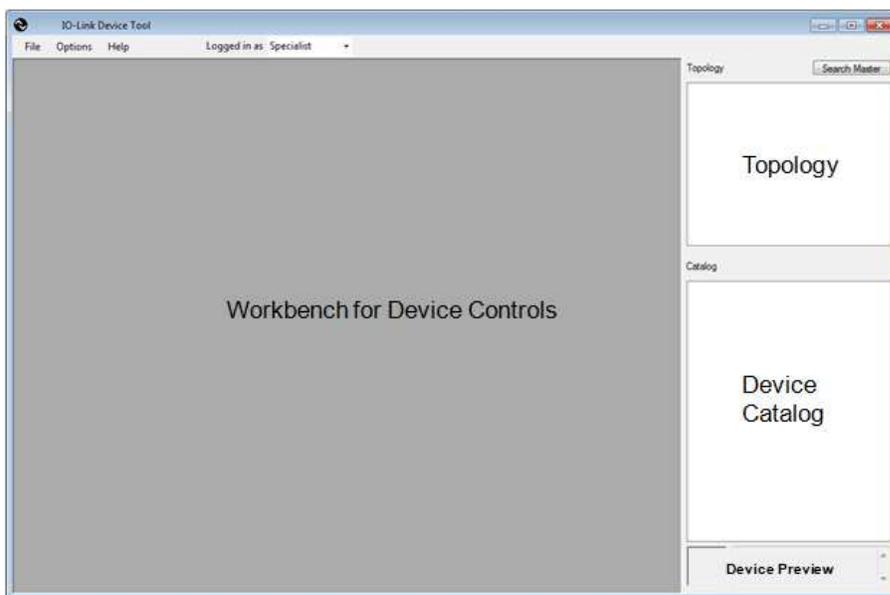
## 3. Software Setup

### 3.1 Start screen and login dialogue

The login dialogue enables the selection of the user role and can be saved with a password per user role. By calling via TCI the project data will only be transferred again at the call. Thus e.g. in the start-up phase the login dialogue must not be serviced continuously, this can be switched off for a specific period “password expiration”. The login is then made automatically with the last user role and without password request. Also this set-up is made in the section “[extras/user administration](#)”.

### 3.2 Workbench

After the login the workbench appears which always serves as frame for the other elements. The workbench consists of menu and symbol bar, topology, windows with device controls and device catalogue. According to the operation mode the relevant functions will be displayed.



### 3.3 Device catalog

In the device catalog you will find all tool relevant devices. These are the IO-Link masters and the IO-Link devices. According to the operation mode the device catalogue consists of the according devices in use. It can be hidden and showed by the user on request.

With the installation of the tool, the IO-Link masters will be integrated. Further IO-Link masters can be added later if these haven't been integrated with the software release yet. You will receive an appropriate update routine from the relevant master manufacturer. The masters are arranged according to its communication connection to the supervisory network and the manufacturer.

The IO-Link devices are described by its [IODD](#). The device descriptions can be read through the section “extras/device description reading”. The IO-Link device tool supports IODDs with the specifications 1.0.1 and 1.1. One IODD can contain several device variants. In the catalogue every variant appears as single entry as there are manufacturer devices with different order numbers. But always all variants will be imported or deleted. The IO-Link devices are arranged according to manufacturer, device family and device (variant). The entries can be deleted with the right mouse button.

**Note/Warning:** The IO-Link device tool uses a hidden directory as storage location for the imported IODDs. By the import the IODDs will be copied into it. Similar to a data base it is an internal working directory of the tool. Please **do not copy** data in the IO-Link directory **on your own!** Please always use the import function or the delete option with the right mouse button. Only then data consistency can be guaranteed. If you want to create a collection of your used IODDs independently from the tool, then you have to save these in any working directory. From this directory you can import the IODDs in the tool.

### 3.4 Topology

Here the topology is displayed and administrated with the reachable IO-Link masters and the connected IO-Link devices.

In the operation as single program IO-Link masters reachable from the tool can be searched and then included in the topology (online). Optional IO-Link masters can also be inserted in the topology out of the catalogue (offline). The allocation of the requested addressing information is executed online afterwards. The arrangement of the IO-Link masters in the topology will be made according to the communication connections to the supervisory network.

In the operation out of an engineering tool (TCI), the topology will be transferred by the engineering tool except the connected IO-Link devices. The structure of the topology starts here with the CPU followed by its communication strings with the connected IO-Link masters. In this case only, IO-Link devices can be added or deleted in the tool. The supervisory topology is firmly defined by the engineering tool and can only be changed there. In order to activate topology changes in the engineering tool as well as in the IO-Link device tool, the tool must be closed and restarted again.

**Note:** As the IO-Link devices are permanently assigned to fix connections of the according IO-Link master, these can't be pasted into the topology by 'drag and drop' but have to be pulled to the according port of the IO-Link master.

### 3.5 Window with device control

In this section the [master controls](#), the [device control](#) or the [project properties control](#) will be displayed. Only one control is visible and active. The master controls respectively the device control will be displayed by selecting the according device in the topology and the project properties control by the call from the menu or the tool bar.

## 3.6 Menu and tool bar

### 3.6.1 Project administration

A project consists of a topology with the IO-Link masters and the IO-devices. The information about identity and network addressing as well as the configuration will be saved with the IO-masters. The instance data and status information of the parameters and the condition of the menu – either open or closed – will be saved with the IO-devices. The data will be saved in a project file (XML). In addition to this, all device descriptions with all necessary files are saved so that all requested data will be transferred if the project is passed on. Thus the IODDs don't have to be available on the target computer. They are automatically transferred with the project. All data are stored together in one project directory.

If the IO-Link device tool is run as standalone program, the user can freely choose where to store the projects. By call via TCI the project information is in principle stored in the project folder of the engineering tool.

Execution as standalone program:

Menu	Description
File/New Project	Opens an empty project.
File/Open Project	Opens an existing project.
File/Save Project	Saves a project. It will be automatically saved at the last archive location otherwise the dialogue "save under" will open.
File/Save Project as	Saves a project in a new archive location. As default the last archive location with its project directories will be offered.
List of last opened projects	Opens one of the last used projects.

Execution via TCI:

Menu	Description
File/New Project	Deletes all project contents that have been added to the information from the engineering tool.
File/Save Project	Saves the project.

### 3.6.2 Change Language

Except the standard dialogues all tool texts can be switched between English and German. If the according IODD also contains the selected language, also these texts will displayed accordingly. If the selected language is not contained in the IODD, English will be used as default language.

Menu	Symbol	Description
Options/Change Language		Switches the language set. The language set doesn't effect the standard dialogues. The language of the standard dialogues is determined by the setting of the operating system.

### 3.6.3 Administration of login and user roles

With the start of the device tool, the login is made by the requested user role. In the IO-Link device descriptions it is determined which parameters are displayed to the user and can be changed by him. Every user role can be protected by a password. Only the specialist can change the settings for the user roles.

Menu	Symbol	Description
extras/use role change		Changes the user role. If a password for the user role exists, this has to be entered again.
extras/use role administration		Opens the dialogue „user role administration“. Only possible as specialist.

### 3.6.4 User roles

#### 3.6.4.1 Observer

The parameter selection „observer“ is displayed for the user. Write access is normally not allowed. This will be defined in the device description of the device manufacturer and may be different for different devices.

- The observer is not allowed to change passwords and its validity.
- There is not default password in the IO-Link device tool for the user role „observer“.

## 3.6.4.2 Maintenance

The parameter selection „maintenance“ is displayed for the user. Write access is normally restricted. This will be defined in the device description of the device manufacturer and may be different for different devices.

- In the user role “maintenance” it is not allowed to change passwords and its validity.
- The default password is ‘maintain’.

## 3.6.4.3 Specialist

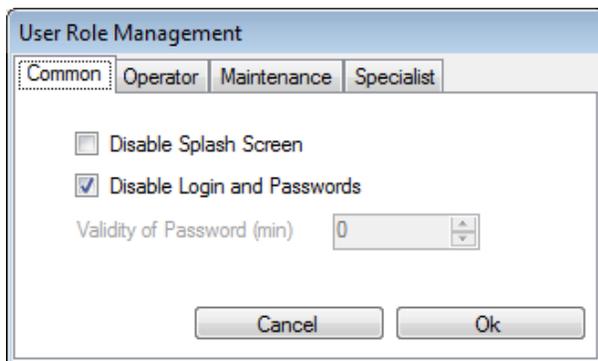
The parameter selection „specialist“ is displayed for the user. Write access is normally not restricted. This will be defined in the device description of the device manufacturer and may be different for different devices.

- The specialist is allowed to change passwords and its validity for all user roles.
- The default password is 'special'.

## 3.6.5 Administration of the user roles' dialogue

This dialogue is only available for the user role “specialist”. Here the passwords for the user roles can be edited and the behavior when calling the tool can be set.

In order to avoid the continuous re-entering of the password during the start-up, password expiration can be assigned. For the duration of the password expiration the password will not be requested again after the first successful login. This is especially helpful with the operation via TCI. Moreover the start screen can be suppressed.



Suppressing the start screen:

The start screen is no longer displayed during the start. But it can be reached via "help/info about".

Suppressing login and password request:

This function switches off the login and the passwords for the user roles.

Password expiration (min):

This function is only available if "login and password request" is not suppressed. After the successful login in a user role, the program will start the selected time without the login dialogue. If the user wants to change the role, this can be done via the symbol bar or the menu. For this the appropriate password must be entered.

### 3.6.6 Import of the device description IODD

The Device descriptions can be imported from any space into the IO-Link device tool. The device descriptions have to be checked with a valid checker and must be marked accordingly. By the import the validity of the IODD XML data will be checked according to the marking "stamp". Also all referenced graphic files must be available. Only when the files are complete and correct the import will start.

At present the IO-Link device tool supports

IODD V1.0.1 for IO-Link devices according to IO-Link V1.0 and

IODD V1.1 for IO-Link devices according to IO-Link V1.1.

IODD V1.0 shall not be used again and is therefore no longer being supported.

Menu	Description
extras/device description import	Opens the dialogue „import of the device description“.

**Note/Warning:** The IO-Link device tool uses a hidden directory as storage location for the imported IODDs. By the import the IODDs will be copied into it. Similar to a data base it is an internal working directory of the tool. Please **do not copy** data in the IO-Link directory **on your own!** Please always use the import function or the delete option with the right mouse button. Only then data consistency can be guaranteed if you create a collection of your used IODDs independently from the tool.

#### 3.6.6.1 IODDs with different release levels

If IODDs updated with new dates will be imported in the file name, the previous versions will remain. When inserting new IO-Link devices into the project (topology) always the latest IODD will be used. Older versions can't be read in, except when projects will be read in.

**Note:** If this is requested, e.g. for the function comparison of the old and current IODD, you then have to delete the IODD from the catalogue and import the old IODD.

By already inserted devices the current version is valid. By saving projects all related IODDs will be stored accordingly. They will be installed by the opening if not contained in the database.

### 3.6.6.2 More recent IODD with the same date in the file name

This must **not happen** at all except during the development phase of the IO-Link devices. The device developer must ensure that no different IODDs (of a device) with the same date are circulating.

However this can be realized in the development phase, the imported IODD replaces the previously existing one. As in this case the data consistency is no longer guaranteed, these will be discarded by the tool. A corresponding error message will be displayed.

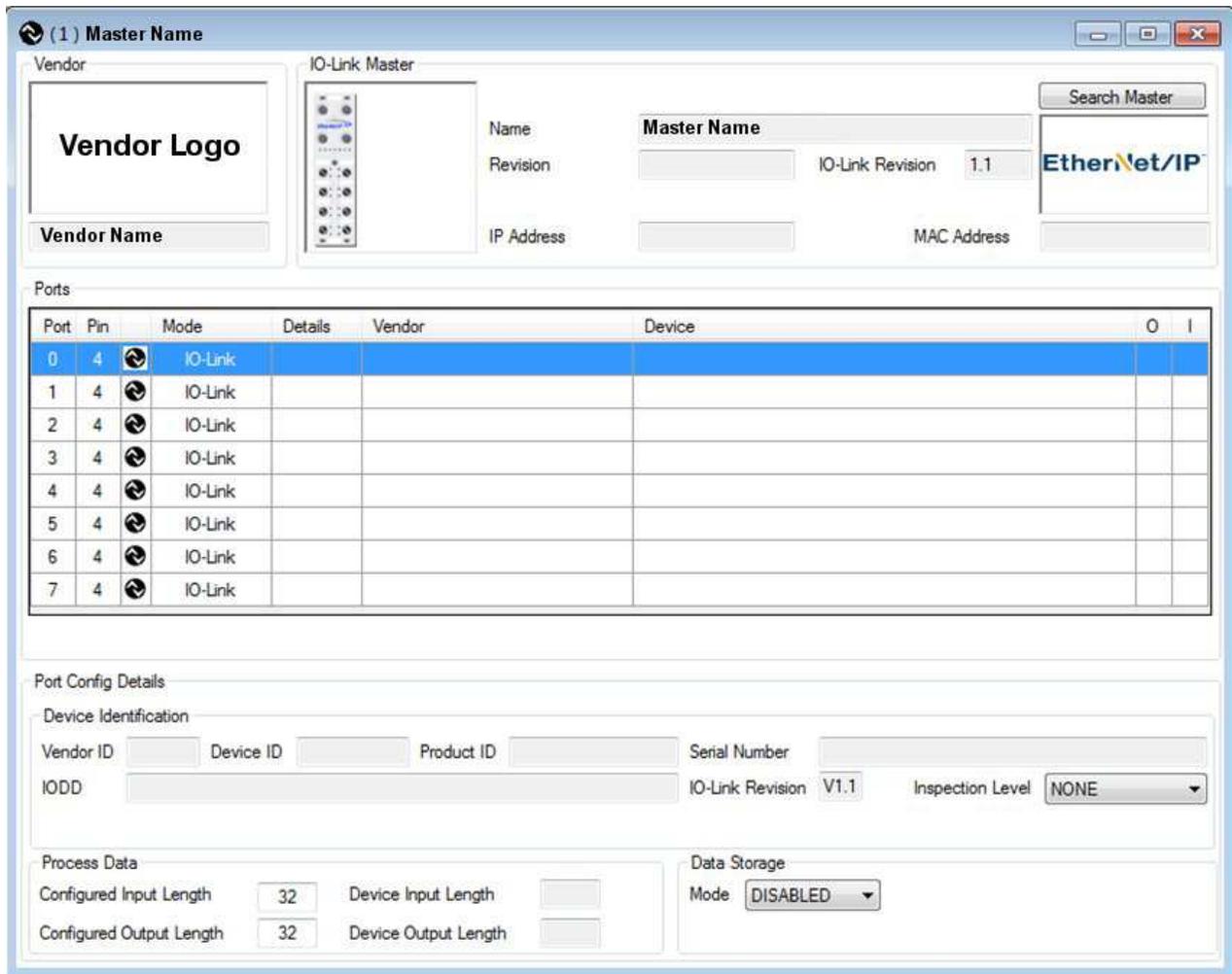
### 3.6.7 TCI Call

At this point you can select if only the IO-Link master selected in the engineering tool, the network string with the selected IO-Link master or all network strings shall be displayed. The default setting is displaying the selected IO-Link master only. This principally corresponds to the user philosophy in the engineering tool. Here the user starts the tool belonging to the IO-Link master. For the expert it can be easier to receive access to all IO-Link masters with just one call.

This is a pure display setting. In the project always all transferred IO-Link masters are enclosed. No data will be lost just because the display was reduced.

Menu	Symbol	Description
extras/TCI call/ only selected devices		After the call from the engineering tool only the IO-Link master will be displayed from which the call started out of the engineering tool.
extras/TCI call/ only selected subsystem		After the call from the engineering tool only the subsystem (network string) and the connected reachable IO-Link masters will be displayed from which the call started out of the engineering tool. The IO-Link master selected in the engineering tool will also be selected in the topology of the IO-Link device tool.
extras/TCI call all subsystems		After the call from the engineering tool only the subsystem (network string) and the connected reachable IO-Link masters will be displayed. The IO-Link master selected in the engineering tool will also be selected in the topology of the IO-Link device tool.

### 3.7 IO-Link Master Control



In the upper third the IO-Link master control contains the information about the IO-Link master (identification section). The table in the middle shows all available ports and its configuration. Below you find the buttons for the search of connected IO-Link devices and for the transfer of the parameter server data of the IO-Link master. The upper section shows detailed information for the port selected in the table.

#### 3.7.1 Searching for IO-Link masters

There are several possibilities to search for IO-Link masters and transferring these into the project. With integrated versions via TCI these functions are deactivated as the configuration is made by the SPS engineering software.

In the topology:

Right mouse button in the empty area

Any IO-Link masters will be searched.

Right mouse button on the fieldbus or Ethernet symbol

Only IO-Link masters with the according communication interface will be searched.

Searching the button „searching the master“:

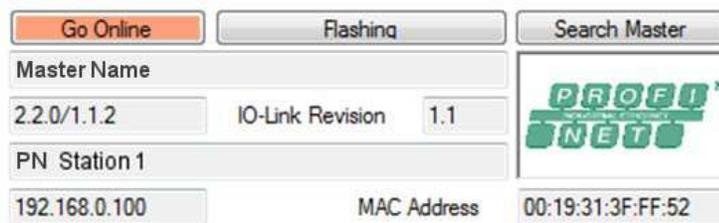
If the master is selected out of the device catalogue and inserted in the topology, the exactly configured IO-Link master can be searched with the button.



A list with the found IO-Link masters will show up. The master to be taken over will be selected with a double click. The right mouse button enables further functions such as changing the network settings and blinking.

IO-Link Master	Vendor Name	Device Name	Address
PROFINET	Vendor Name	Master Name	192.168.0.100

If the master was taken over, the function “blinking” can be used to identify the master.



## 3.7.2 Setting online / offline and port mode

The connection to the IO-Link master will be made with the online mode. By the connection set-up it will be checked if the configuration can be changed by the tool and if the configurations in the project planning (tool) and the IO-Link master match.

The configuration can only be changed offline and then be transferred to the master.

The parameter in the IO-Link devices can be changed both online and offline. So the parameterization of complete applications can be prepared without the devices (offline).

## 3.7.3 Searching for IO-Link Devices

This can only be made online. If the ports are configured as IO-Link, connected devices can be searched. As long as the IO-Link for these devices can be found in the database of the tool, the according IO-Link will be opened. Otherwise only the data will be shown that can be displayed without IO-Link.

## 3.7.4 Transferring the data of the parameter server (data storage)

For the exchange of defective IO-Link devices the parameters will be saved in the IO-Link master. In order to be able to exchange the IO-Link master without a new parameterization, the data of the parameter server can be saved in the project. This function enables the copying (cloning) of applications.

"Master to Project" transfers all available parameter server data into the project database. "Project to Master" transfers all available parameter server data from the project database into the master.

These functions are used to exchange between tool and master. The commands under "Port Configuration Details" serve as an exchange between master and device!

## 3.7.5 Details of port configuration

The details of the port selected in the list will be displayed or can be set here. By TCI the commands can be used in the online mode. All other data will only be displayed.

## 3.7.6 Details of port configuration: validation / inspection level

For the port it can be selected which IO-Link devices will be accepted:

inspection level = none

Acceptance of any devices. This setting is especially used during the start-up phase.

inspection level = compatible

Vendor ID and Device ID will be checked.

inspection level = identical

In addition the serial number will be checked. With this it is ensured that devices can be exchanged from authorized personnel only. For this purpose the inspection level must be taken back minimum to „compatible“, the new serial number must be entered and the inspection level must be set again to “identical”.

### **3.7.7 Details of port configuration: parameter server / data storage mode**

This function is only available for devices of the IO-Link versions subsequently V1.1 and higher. The following operation modes can be selected:

#### Disabled

no parameter server function

#### Auto

Changes of the parameterization in the device will be automatically transferred in the parameter server.

#### Download

The data in the parameter server (master) have priority. By exchanging a device those parameter will be set out of the parameter server. Changes of the parameterization at the tool or by the tool only remain until the next start (power on).

#### Upload

The data in the device have priority and will be transferred into the parameter server. This setting can be used when the devices will be pre-parameterized e.g. with the USB IO-Link master and when the data should be transferred in the master. Also it is possible to change a master if all devices have already been parameterized and their data should be transferred into the master.

### **3.7.8 Details of port configuration: parameter server commands**

The exchange of the parameterization between parameter server and IO-Link device can also be triggered manually. The following commands are available: clear, upload and download.

### **3.7.9 Details of port configuration: configuration of process data**

The setting of the process data width to the SPS is displayed respectively will be set here. Configured length shows the process data width to the SPS, device length the number of input or output bytes of the IO-Link device. A color-coding shows that too little process image is configured to the SPS.

### 3.8 IO-Link Device Control

The IO-Link devices will be described by XML device descriptions. These device descriptions IODD (IO Device Description) will be imported in the device catalogue of the tool. The configuration and the parameterization can be made both offline and online. The settings are saved in a project file so that they are available e.g. for the documentation or a device exchange. The project file will be saved in the project directory with the used device descriptions.

By usage with TCI the project directory will be saved so the data can also be included by archiving and de-archiving of the engineering project.

If the IO-Link device will be selected in the topology or called in the master control by a double click, the device control appears that essentially realizes an IODD interpreter.

There are tabs for general product characteristics ("Common"), process data, identification, observation, parameter and diagnostics. The content presented therein originates from the IODD. If no entries for the specific tab are available in the IODD the tab is hidden.

The IO-Link Device Tool provides an interface in order to integrate graphics interfaces for IO-Link devices ("Open IO Device GUI"). If such a graphic interface for the import of IODDs exists, it is imported and you will see a new tab "Device GUI".

In addition, there is the tab "Generic" which allows access to the device via index and subindex and displays the data in raw format, respectively. This is also available if no IODD for the IO-Link device is available.

#### 3.8.1 Tab Common

General information about the IO-Link Device.

Command "DS store"

A "ParamDownloadStore" command is sent to the device. This means that the parameters of the device are tried to load into the data storage of the IO-Link master. If this is disabled for the associated port of the IO-Link master, the upload flag remains set until the IO-Link device is connected to a master whose Data Storage is enabled (upload or Enable). The pre-configured data of the IO-Link device are then uploaded. So the parameters of an IO-Link device, which is pre-configured with an USB IO-Link master, will automatically be transferred to the Data Storage. In a later device replacement then the data from the data storage will be played in the newly connected device.

Command "Operate"

If the port of the IO-Link master is configured so that the IO-Link device stays in pre-operate state, the device can be brought into operate state.

### 3.8.2 Tab Process Data

The behavior is adjusted according to the IO-Link master and the operation mode.

Offline:

Only the structure of the process data will be displayed. Values will not be displayed respectively can't be entered.

Online:

The process input data will be displayed cyclically. Depending on the interface the user can set if the tool can write the process output data. By the USB IO-Link master the process output data will always be written from the tool. By the operation with TCI the process data can only be read. By the stand-alone operation with Ethernet, the tool is in control if the SPS is not connected.

### 3.8.3 Tab Identification, Observation, Parameter, Diagnosis

Offline

The structure and the set values of the variables will be displayed. The variable values can be changed at R/W variables and will be saved in the project.

Online

By changing to online there is no automatic data transfer. With the button „check“ you can compare the data in the device with those in the project planning. With the buttons „upload“ and „download“ you can synchronize the data between tool and device. Only those device parameters will be transferred that are defined for the relevant active user role.

If the field „value“ of a variable is selected, the value will be taken from the device and the display will be updated.

In the context menu (right mouse button) the operation mode for the entering can be set. So it may be chosen if the value of a changed variable should be transferred immediately after the entry in the device or if the entries should be collected until they can be transferred by command (also in the context menu).

### 3.8.4 Tab Generic

This tab is used to operate the IO-Link device without IODD. The data is displayed as raw data and the address is set via index and subindex. The standard variables can be accessed easily by using the pull down table at index.

If no IODD exists, only that tab appears. Otherwise, it is available as a supplement. In particular, for the programming of the PLC, it is useful since you usually address here via index and subindex and must work with the raw data.

## 4. Installation

The installation is performed as MSI installation. Here all requested data will be copied into the working directory. For versions supporting the USB IO-Link master at least one link will be installed in the start menu.

'Uninstall' will be accessed by the Windows control panel.

The installation is only possible for users with administrator rights.

### 4.1 Windows Firewall

With the installation the IO-Link device tool will be registered as exception for incoming and outgoing connections for the windows firewall. The tool uses the UDP port 1999 for outgoing telegrams and port 2000 for incoming telegrams.

If you are using another firewall or if the automatic entry at the installation is blocked, please contact your system administrator. The firewall has to be unlocked accordingly.

From Windows 7 onwards the UDP broadcasts „255.255.255.255“ will only be sent on the network interface with the lowest metrics. Therefore you should change the metrics of the network interfaces where appropriate if during the use of the tool several network interfaces are active.

For this purpose, the auxiliary tool "SetIPBroadCastRoute" is called during installation and is copied into the program directory. Here you can select the network interface to which the Ethernet IO-Link masters are connected. Please note that the network is not displayed when it is not active, for example, if no device is connected.

The following commands will be used for the entry in the Windows firewall:

*For Windows XP*

Entering:

```
netsh firewall add allowedprogram mode=ENABLE profile=ALL name=[exception name]  
program=[program path]
```

Deleting:

```
netsh firewall delete allowedprogram profile=ALL program=[program path]
```

*For Windows 7*

Entering:

```
netsh advfirewall firewall add rule action=allow profile=any protocol=any enable=yes  
direction=[in|out] name=[exception name] program=[program path]
```

Deleting:

```
netsh advfirewall firewall delete rule profile=any name=[exception name]
```

## 5. System Requirements

### Hardware recommendations

processor: dual core 2,5 GHz  
working memory: 2 gbytes  
hard drive: 500 mbytes free space  
monitor: 1024 \* 768

### According to the IO-Link master

free USB 1.1 or 2.0 interface  
Ethernet network interface

### Operating system

Windows XP 32 Service Pack 3  
Windows 7 32/64 Service Pack 1  
Windows 8.1  
Microsoft .Net Framework 2.0

By calling via TCI the system requirements of the engineering tool are valid as far as they go beyond the above mentioned requirements.

## 6. Appendix

### 6.1 IODD – IO Device Description

For the download you will find the specification with scheme and examples on the homepage of the IO-Link community [www.io-link.com](http://www.io-link.com).

### 6.2 Tool Calling Interface TCI

The Tool Calling Interface TCI is an interface between an engineering system and a device tool. It ensures calling software for the configuration, parameterization and diagnosis of field devices out of an engineering system so that the user receives an integrated user interface.

For example the Simatic STEP 7 can be started out of the HWKonfig and device tools through the right mouse button.

TCI only describes the software interface. It is not determined which technology is used for the device integration. So tools for the adaption to FDT-DTM as well as tools interpreting EDDs can also be connected and also web browser or tools that are developed with TCI or are adjusted accordingly.

The IO-Link device tool is directly connected to the TCI interface which has the advantage of avoiding unnecessary efforts of other integration technologies. Certainly the tool can be operated next to any other tools connected via TCI.

The Tool Calling Interface is easily explained through its two main functions:

#### 6.2.1 Invocation Interface

The invocation interface (calling interface) serves for starting the device tool out of the engineering system and providing it with the requested information in order to operate the connected field devices. Herewith the IO-Link device tool can be set to the following operation modes under “extras/TCI call”:

Only selected device

Only the device will be offered in the tool that is selected in the engineering system. So this is the easiest ways to recognize the direct relationship between engineering system and device tool.

Only selected subsystem

Only the network string in which the device was selected when calling the tool will be displayed. So it can be recognized in the device tool which devices can be operated with the tool and also collective functions can be executed.

All subsystems

All network strings of the project in the engineering system will be displayed.

## 6.2.2 Communication Server

There are several opportunities for the IO-Link device tool to communicate with the supported IO-Link masters and thus with the IO-Link devices. In the best case the engineering system provides a communication channel and the IO-Link device tool does not have to care about the communication. This communication is known as communication server. STEP 7 supports PROFIBUS and PROFINET. At PROFIBUS the so-called dataset routing is requested which is not supported by all products yet. Therefore the IO-Link device tool supports own communication opportunities independent from the communication server.

## 6.2.3 TCI Conformance Classes

The IO-Link device tool supports all TCI conformance classes depending on the operation mode and the communication system. PROFIBUS basically uses the TCI conformance class 3, PROFINET preferably the TCI conformance class 2.

### 6.2.3.1 TCI conformance class 1

Only call by the invocation interface. No communication to the field device.

### 6.2.3.2 TCI conformance class 2

Call by the invocation interface and communication via own communication channels.

### 6.2.3.3 TCI conformance class 3

Call by the invocation interface and communication via the communication server.

## 6.3 Used standards and specifications

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

- IO-Link Communication Specification V1.0

- IO-Link Interface and System Specification V1.1.2

- IO Device Description V1.0.1 Specification

- IO Device Description V1.1 Specification

- IO-Link Test Specification V1.1.2

Available at: [www.profibus.com](http://www.profibus.com):

- TCI-2602-7602\_V11\_Oct08

## Glossary

diagnosis	<p>The diagnosis with IO-Link is based on events. These are sent to the IO-Link master and from there to the controller. The IO-Link Device Tool can display the error memory with the last reported events.</p> <p>In addition, variables are used for diagnosis. Thus, e.g. a variable indicating the pollution degree optics, are used for state-controlled maintenance. If this equipment then in response to certain events limits, maintenance activities can be derived before real problems occur.</p>
engineering tool	<p>In this document the term, for example, used for PLC programming systems such as RSLogix, STEP 7 or TIA Portal. The IO-Link device tool is a device engineering tool for IO-Link master and IO-Link devices and thus has a tailored application. Device engineering tools can be integrated in the superior engineering tool.</p> <p>The user should compare whether the handling is really simplified or he is unnecessarily burdened with the resulting associated software complexity as FDT or FDI.</p>
identification	<p>The identification is used to properly set up and test systems, spare parts to order correctly or get the valid reference to manuals and similar information.</p> <p>The identification of IO-Link master and IO-Link devices can be carried out with different depth of selection:</p> <ul style="list-style-type: none"><li>device type: (for IO-Link master and device)<ul style="list-style-type: none"><li>VendorID and DeviceID</li></ul></li><li>Device variant (only IO-Link device)<ul style="list-style-type: none"><li>ProductID</li></ul></li><li>precisely detected a device<ul style="list-style-type: none"><li>Serial number, MAC address, ...</li></ul></li></ul>
IODD	<p>IO Device Description. XML-based device description that was specified by the IO-Link Community. Do not use the name "IO-Link Device Description" means deliberately because the use of other systems such as IO-Link wireless is prepared.</p>

IODD Checker	Command-line utility to verify the IODDs. The IODDs is checked against the schema and further plausibility checks are performed. When no errors occur in the IODDs and their language files a stamp (CRC) is written. IO-Link tools recognize the valid Stamp the correctness of the IODDs, and do not need to repeat the actions taken by Checker checks. The IODDs Checker is free for IODD V1.0.1 and V1.1 for <a href="http://www.io-link.com">www.io-link.com</a> available. Beta releases are about to be released on the IO-Link Project Server.
IO-Link	International standard for sensors and actuators that was specified by the IO-Link Community and published as IEC 61131-9.
IO-Link Community	Organizationally, the IO-Link Community is a group within the PROFIBUS and PROFINET user organization (PNO). But to the openness and acceptance of any system and manufacturers to ensure world, advanced rules were defined and set up a separate and independent web page.
IO-Link Master	Communication interface that provides IO-Link data and services to higher-level systems, usually fieldbus or Ethernet based communication systems.
IO-Link wireless	Special wireless standard for factory automation. It is characterized by a very high performance (10ms for 112 participants) and has the same device model as IO-Link. The standard was first as WSA-FA (wireless sensor network actor) specified in the PNO.
Offline	Functions that are available without devices are physically available.
Online	Functions which are available when a communication link is established to the device.
Parameterization	Parameterization means the setting of parameters in devices. The parameters can also be changed during operation via the IO-Link device tool or function blocks in the controller.

PNO	<p>PROFIBUS Nutzerorganisation e.V. Haid-und-Neu-Strasse 7 76131 Karlsruhe Germany Is at the same branch of the IO-Link Community.</p>
TCI	<p>Tool Calling Interface; Software interface that can be accessed from the engineering tools for PROFIBUS and PROFINET device software; TCI was specified by the PROFIBUS user organization.</p>
XML	<p>Extensible Markup Language. Is used to represent hierarchically constructed data in text form. The specification is done via the World Wide Web Consortium (W3C). Through schema limitations of the language standardization for the description file can be made. XML is widely used throughout and there are powerful tools for editing.</p>
XML Schema	<p>Specifies limitations of XML for a particular application, as here, the IODDs. The schema for the IODDs is very detailed, so that with XML tools that support scheme IODDs can be easily created.</p>