Documentation

EL6201, EL9520

EtherCAT Terminals for AS-Interface

Version: 2.4
Date: 2019-04-09

BECKHOFF

Table of Contents

1 Foreword

1.1 Notes on the documentation

Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.
It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement.

No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

Trademarks

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Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents: EP1590927, EP1789857, DE102004044764, DE102007017835 with corresponding applications or registrations in various other countries.

The TwinCAT Technology is covered, including but not limited to the following patent applications and patents: EP0851348, US6167425 with corresponding applications or registrations in various other countries.

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Copyright

1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Description of instructions

In this documentation the following instructions are used.
These instructions must be read carefully and followed without fail!

⚠ DANGER

Serious risk of injury!

Failure to follow this safety instruction directly endangers the life and health of persons.

⚠ WARNING

Risk of injury!

Failure to follow this safety instruction endangers the life and health of persons.

⚠ CAUTION

Personal injuries!

Failure to follow this safety instruction can lead to injuries to persons.

NOTE

Damage to environment/equipment or data loss

Failure to follow this instruction can lead to environmental damage, equipment damage or data loss.

ℹ **Tip or pointer**

This symbol indicates information that contributes to better understanding.

1.3 Documentation issue status

Version	Comment
2.4	• Update chapter “Object description” • Update structure • Update revision status
2.3	• Addenda EL9520 • Update chapter “Technical data” • Update chapter "Connection system" -> "Connection" • Update structure • Update revision status
2.2	• Update chapter "Object description and parameterization" • Update structure
2.1	• Update chapter "Notes on the documentation" • Correction of Technical data • Addenda chapter "TwinCAT Quick Start"
2.0	• Migration • Amendments in section "Commissioning" • Amendments in section "Technical data" • Amendments in section "Object description and parameterization" • Update structure
1.5	• Update chapter "Technical data" • Addenda chapter "Installation instructions for enhanced mechanical load capacity" • Update revision status
1.4	• Update chapter "Technical data" • Section "Connection" updated • Update revision status
1.3	• Update chapter "Technical data" • Update chapter "Object description and parameterization" • Update structure • Update revision status
1.2	• Update chapter "Technical data"
1.1	• Amendments re commissioning
1.0	• First public issue
0.8	• Amendments & corrections in section "Quickstart"
0.7	• Amendments & corrections in section "AS-i Master functionality"
0.6	• Addenda & corrections
0.5	• Addenda & corrections
0.4	• Addenda
0.3	• Addenda
0.2	• Addenda
0.1	• Provisional documentation for EL6201

1.4 Version identification of EtherCAT devices

Designation

A Beckhoff EtherCAT device has a 14-digit designation, made up of

- family key
- type
- version
- revision

Example	Family	Type	Version	Revision
EL3314-0000-0016	EL terminal (12 mm, non-pluggable connection level)	3314 (4-channel thermocouple terminal)	0000 (basic type)	0016
ES3602-0010-0017	ES terminal (12 mm, pluggable connection level)	3602 (2-channel voltage measurement)	0010 (high-precision version)	0017
CU2008-0000-0000	CU device	2008 (8-port fast ethernet switch)	0000 (basic type)	0000

Notes

- The elements mentioned above result in the **technical designation**. EL3314-0000-0016 is used in the example below.
- EL3314-0000 is the order identifier, in the case of “-0000” usually abbreviated to EL3314. “-0016” is the EtherCAT revision.
- The **order identifier** is made up of
  - family key (EL, EP, CU, ES, KL, CX, etc.)
  - type (3314)
  - version (-0000)
- The **revision** -0016 shows the technical progress, such as the extension of features with regard to the EtherCAT communication, and is managed by Beckhoff.
  In principle, a device with a higher revision can replace a device with a lower revision, unless specified otherwise, e.g. in the documentation.
  Associated and synonymous with each revision there is usually a description (ESI, EtherCAT Slave Information) in the form of an XML file, which is available for download from the Beckhoff web site.
  From 2014/01 the revision is shown on the outside of the IP20 terminals, see Fig. *“EL5021 EL terminal, standard IP20 IO device with batch number and revision ID (since 2014/01)”*.
- The type, version and revision are read as decimal numbers, even if they are technically saved in hexadecimal.

Identification number

Beckhoff EtherCAT devices from the different lines have different kinds of identification numbers:

Production lot/batch number/serial number/date code/D number

The serial number for Beckhoff IO devices is usually the 8-digit number printed on the device or on a sticker. The serial number indicates the configuration in delivery state and therefore refers to a whole production batch, without distinguishing the individual modules of a batch.

Structure of the serial number: **KK YY FF HH**

KK - week of production (CW, calendar week)
YY - year of production
FF - firmware version
HH - hardware version

Example with
Ser. no.: 12063A02:   12 - production week 12 06 - production year 2006 3A - firmware version 3A 02 - hardware version 02

Exceptions can occur in the **IP67 area**, where the following syntax can be used (see respective device documentation):

Syntax: D ww yy x y z u

D - prefix designation
ww - calendar week
yy - year
x - firmware version of the bus PCB
y - hardware version of the bus PCB
z - firmware version of the I/O PCB
u - hardware version of the I/O PCB

Example: D.22081501 calendar week 22 of the year 2008 firmware version of bus PCB: 1 hardware version of bus PCB: 5 firmware version of I/O PCB: 0 (no firmware necessary for this PCB) hardware version of I/O PCB: 1

Unique serial number/ID, ID number

In addition, in some series each individual module has its own unique serial number.

See also the further documentation in the area

- IP67: EtherCAT Box
- Safety: TwinSafe
- Terminals with factory calibration certificate and other measuring terminals

Examples of markings

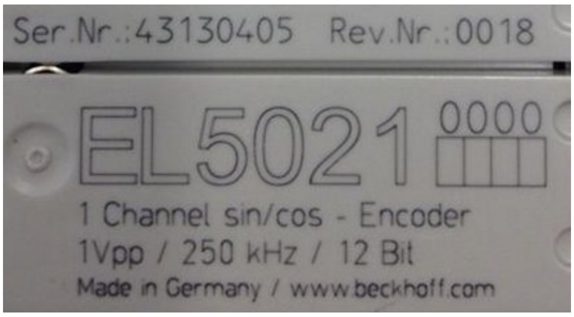

Ser.Nr.:43130405 Rev.Nr.:0018
EL5021 0000
1 Channel sin/cos - Encoder
1Vpp / 250 kHz / 12 Bit
Made in Germany / www.beckhoff.com

Fig. 1: EL5021 EL terminal, standard IP20 IO device with serial/ batch number and revision ID (since 2014/01)

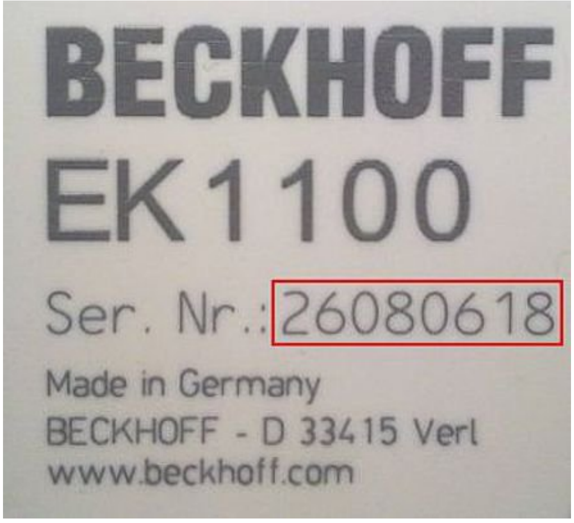


Fig. 2: EK1100 EtherCAT coupler, standard IP20 IO device with serial/ batch number

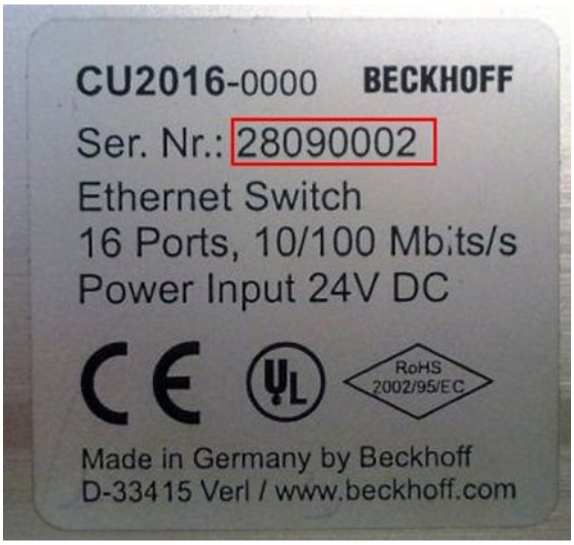


Fig. 3: CU2016 switch with serial/ batch number

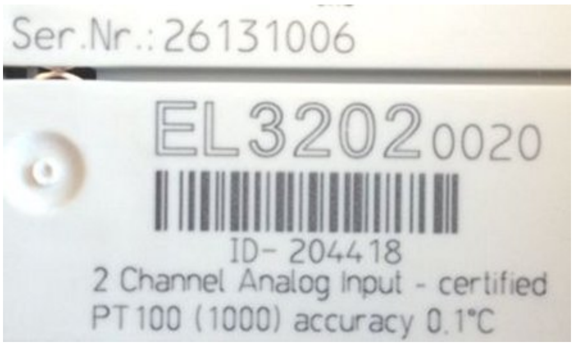

Ser.Nr.: 26131006
EL3202 0020
ID- 204418
2 Channel Analog Input - certified
PT100 (1000) accuracy 0.1°C

Fig. 4: EL3202-0020 with serial/ batch number 26131006 and unique ID-number 204418

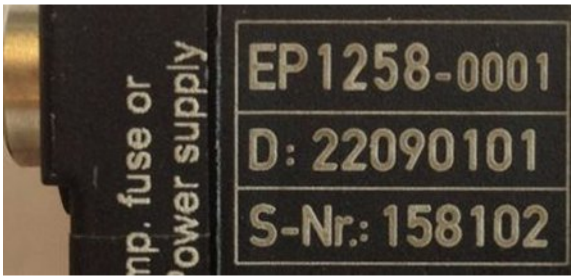


Fig. 5: EP1258-00001 IP67 EtherCAT Box with batch number/ date code 22090101 and unique serial number 158102

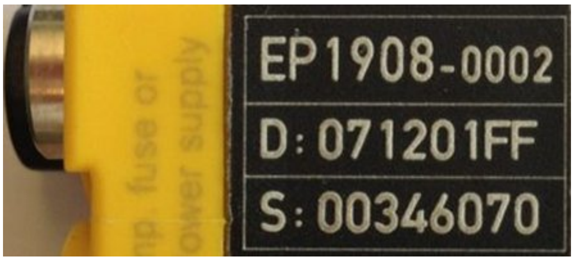


Fig. 6: EP1908-0002 IP67 EtherCAT Safety Box with batch number/ date code 071201FF and unique serial number 00346070

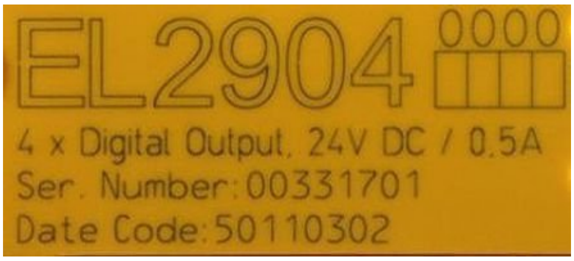


Fig. 7: EL2904 IP20 safety terminal with batch number/ date code 50110302 and unique serial number 00331701

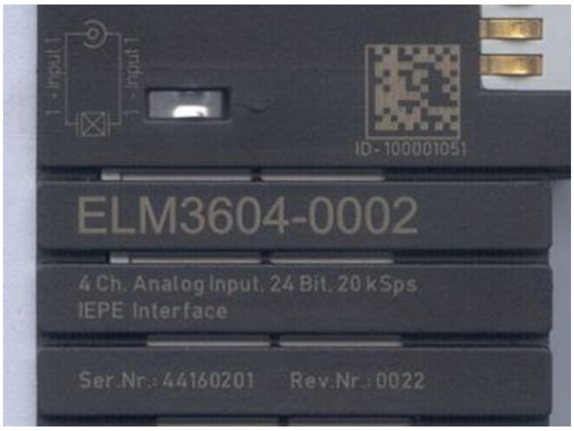


Fig. 8: ELM3604-0002 terminal with unique ID number (QR code) 100001051 and serial/ batch number 44160201

2 Product overview

2.1 Introduction

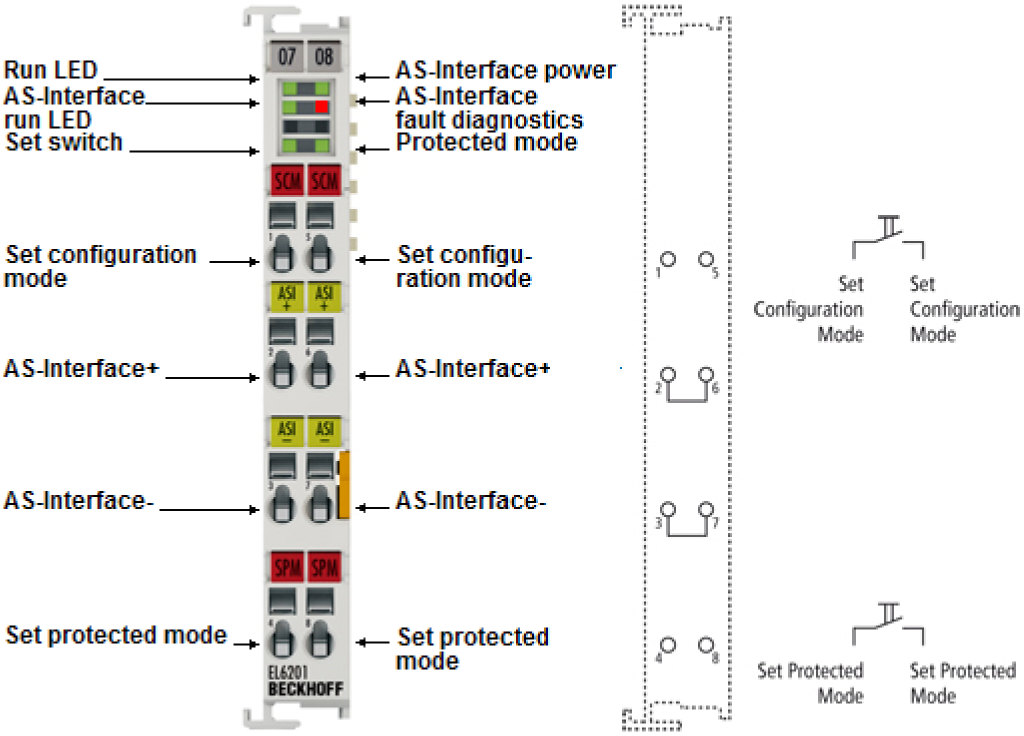


Fig. 9: EL6201

Fig. 10: AS-i logo

AS-Interface master terminal

The EL6201 AS-Interface master terminal enables the direct connection of AS-Interface slaves. The AS-Interface compliant interface supports digital and analog slaves, versions 3.0 (master profile M3; M4). The connected devices are supplied via the EL9520 AS-Interface potential feed terminal with integrated filter [▶ 17].

Quick links

- EtherCAT basics
- EL9520 AS-Interface potential feed terminal with integrated filter [▶ 17]
- Technology [▶ 14]
- Technical data [▶ 13]
- Quick start [▶ 112]

2.2 Technical data

Technical data	EL6201-0000
AS-Interface channels	1
Number of slaves	up to 31 in V 2.0; up to 62 in V 2.11, V 3.0
AS-Interface versions	V 2.0, V 2.11, V 3.0 (Rev. 4)
Slave types	Standard: digital and analog, extended: Type 1 (CTT1): S-7.3, S-7.4, Type 2 (CTT2): S-7.5.5, S-7.A.5, S-B.A.5, Type 3 (CTT3): S-7.A.7, S-7.A.A, Type 4 (CTT4): S-7.A.8, S-7.A.9, Type 5 (CTT5): S-6.0, Safety at work: S-0.B, S-7.B
Diagnostics	power failure, slave failure, parameterization fault
AS-Interface address assignment	via configuration or automatic
Cycle time	max. 5 ms (with 31 or 62 slaves)
Connection	2 lines via spring force technology
Data transfer rates	167 kbit/s
Distributed clocks	-
Power contacts	no
Electrical isolation	500 V (AS-Interface/E-bus)
Supply voltage for electronics	via the E-bus
Current consumption	120 mA (E-Bus), typ. 40 mA/max. 60 mA (AS-Interface)
Configuration	via TwinCAT System Manager
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Weight	approx. 55 g
Assembly [▸ 29]	on 35 mm mounting rail conforms to EN 60715
Operating temperature	0°C ... +55°C
Storage temperature	-25°C ... +85°C
Relative humidity	95 % no condensation
Vibration/shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27, see also installation instructions [▸ 32] for enhanced mechanical load capacity
EMC immunity/emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protect. class / installation pos.	IP20 / see note [▸ 36]!
AS-Interface certificate	yes, cert. no. 97701
Approvals	CE

2.3 Technology

This section provides a short general technical introduction to the technology of the AS interface. Please refer to the following sections for further details.
(Source: (AS-INTERNATIONAL ASSOCIATION e.V.)

Fig. 11: AS-i logo

2.3.1 • AS-i requirements

The industry places many different demands on modern automation systems. It demands that the necessary functions are fulfilled at an optimum price-performance ratio. AS-Interface, or AS-i for short, does precisely that. The system is focused on the lower field level. The goal of the development was not a universal fieldbus for all areas of automation, but rather an economically practical system for the lower field level, with which binary sensors and actuators can be simply, reliably and economically networked and connected to the higher control level.

The sensors and actuators can be networked and supplied with power via the AS-i-specific twin-core cable. The cable harnesses of traditional cabling are dispensed with. A massive cost reduction due to the simple wiring, which is possible without extensive training thanks to the proven click-and-go technology. Due to its cost effectiveness the AS-Interface system proves to be a technically and economically practical supplement to the normal fieldbus.

The freely selectable network topology and its simple configuration facilitate the installation of an AS-i network. The susceptibility to faults of other systems frequently leads to delays in the installation, for which reason care was taken with the AS-Interface system to reduce sources of error. Reverse voltage protection by means of the profiled cable is just one corresponding measure.

2.3.2 Assembly using the piercing technology

The simple assembly of the AS-interface is made possible by the special assembly method, which is also called the piercing technology or, less frequently, the click-and-go method. The technology is based on the use of the usually yellow AS-i cable, a cable with two cores that is protected against polarity reversal. When assembling, the piercing pins of the device to be connected penetrate into the cores of the cable and reliably make the contact. Some advantages:

- Direct, simple connection of sensors/actuators or modules
- Flat cable with reverse voltage protection
- Data and energy in one cable
- Piercing technology
- Very simple connection method
- Secure contacting
- Protection class IP67
- Cutting to length and stripping of insulation are not necessary
- Can be mounted in any place
- Trouble-free shifting is possible thanks to the self-healing capability of the cable for each type of cable

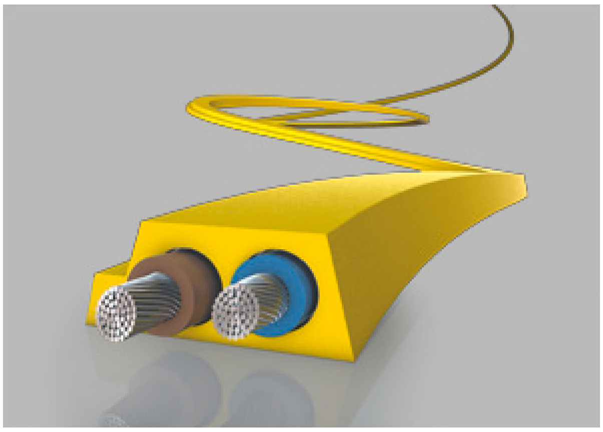


Fig. 12: Profiled twin-core cable for use with the AS-i technology

Assembly example

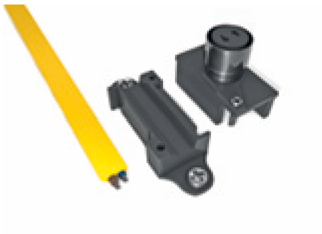


Fig. 13: Upper and lower half of the AS-i component are disassembled.

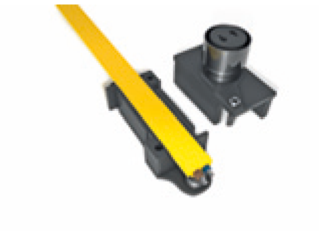


Fig. 14: The AS-i cable is placed – always without error thanks to its profiling – in the lower half of the AS-i component.

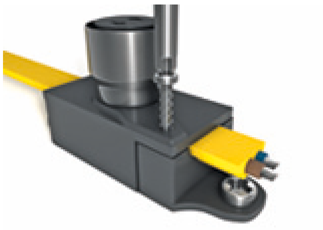


Fig. 15: Upper and lower halves are assembled using a simple tool.

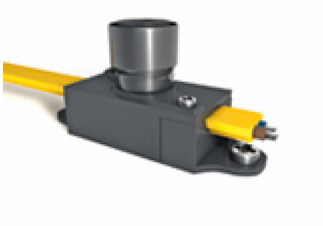


Fig. 16: Finished assembled junction

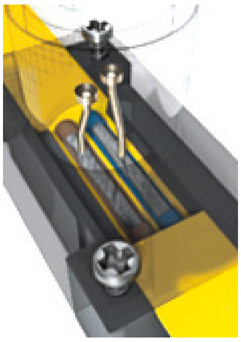


Fig. 17: The piercing technology ensures the reliable connection of the AS-i component to the AS-i network cable.

2.3.3 AS interface for every topology

The AS-i protocol guarantees simple expandability. The AS-interface network can be configured like every conventional electrical installation. Every AS-i slave is freely addressable and can be connected to the bus cable in any place. This enables a modular structure and, due to the robust principle of operation, there are no limits to the structure. Any desired network topology may be used, i.e. including star or tree topologies.

Fail-safe

The data are transmitted reliably on the AS-i network. Each AS-Interface telegram is monitored in the receiver with regard to a parity bit and several further independent variables. This ensures extremely high reliability in the detection of single and multiple errors. The use of the AS-Interface in very noisy environments such as welding plants and frequency converters is thus possible without problems.

Standardized economic efficiency

All AS-Interface products conform to the European standard EN 50295 and the world standard IEC 62026-2.

Certified: Economic and reliable

The certification of the AS-i products guarantees the user maximum system security. The products are fully compatible and interchangeable with one another. As a user you can recognize the tested and certified products by the AS-Interface “shadow logo” and the associated test number.

2.4 EL9520: AS-i potential feed terminal with filter

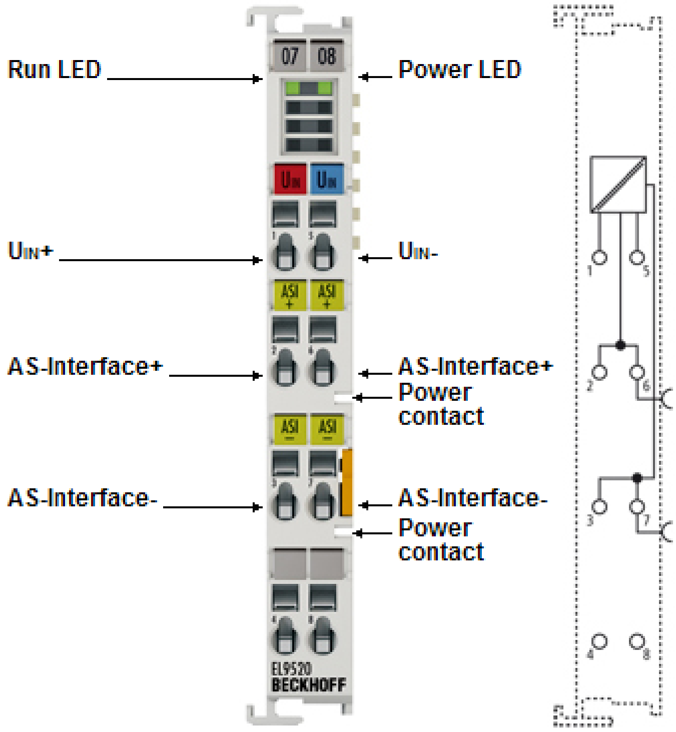


Fig. 18: EL9520

The EL9520 potential feed terminal uncouples the input and output signal through an integrated filter and enables the supply of AS-Interface networks from standard power supply units or another AS-Interface network.
The EL9520 can be used directly next to the EL6201 AS-Interface master terminal. Multiple parallel operation of this combination in an EtherCAT Terminal block is possible and saves several AS-Interface power supply units.

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 22]: **INIT** = initialization of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		Single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 92] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible
		flickering	State of the EtherCAT State Machine: **BOOTSTRAP** = function for terminal firmware updates [▶ 224]
Power	green	off	AS-i voltage is switched off.
		on	AS-i voltage is switched on.

Technical data

Technical data	ELL9520
Input voltage	up to 35 V_{DC}
Output voltage	up to 35 V_{DC}
Input current	max. 2 A
Output current	max. 2 A (not short-circuit-proof)
Current consumption from K-bus	typ. 100 mA
Electrical isolation	500 V (E-bus/field potential)
Galvanic isolation	no
Configuration	no address or configuration settings required
Bit width in process image	0 input bits, 0 output bits
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Weight	app. 90 g
Assembly [▸ 29]	on 35 mm mounting rail conforms to EN 60715
Permissible ambient temperature during operation	0°C ... +55°C
Permissible ambient temperature during storage	-25°C ... +85°C
Permissible relative humidity	95 %, no condensation
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27 see also installation instructions [▸ 32] for enhanced mechanical load capacity
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP20
Installation position	variable
Approval	CE
AS-Interface certificate	yes, ZU-No. 101601

2.5 Start

For commissioning:

- mount the EL6201 as described in the chapter Mounting and wiring [▸ 29]
- configure the EL6201 in TwinCAT as described in the chapter Commissioning [▸ 112].

3 Basics communication

3.1 EtherCAT basics

Please refer to the EtherCAT System Documentation for the EtherCAT fieldbus basics.

3.2 EtherCAT cabling – wire-bound

The cable length between two EtherCAT devices must not exceed 100 m. This results from the FastEthernet technology, which, above all for reasons of signal attenuation over the length of the cable, allows a maximum link length of 5 + 90 + 5 m if cables with appropriate properties are used. See also the Design recommendations for the infrastructure for EtherCAT/Ethernet.

Cables and connectors

For connecting EtherCAT devices only Ethernet connections (cables + plugs) that meet the requirements of at least category 5 (CAt5) according to EN 50173 or ISO/IEC 11801 should be used. EtherCAT uses 4 wires for signal transfer.

EtherCAT uses RJ45 plug connectors, for example. The pin assignment is compatible with the Ethernet standard (ISO/IEC 8802-3).

Pin	Color of conductor	Signal	Description
1	yellow	TD +	Transmission Data +
2	orange	TD -	Transmission Data -
3	white	RD +	Receiver Data +
6	blue	RD -	Receiver Data -

Due to automatic cable detection (auto-crossing) symmetric (1:1) or cross-over cables can be used between EtherCAT devices from Beckhoff.

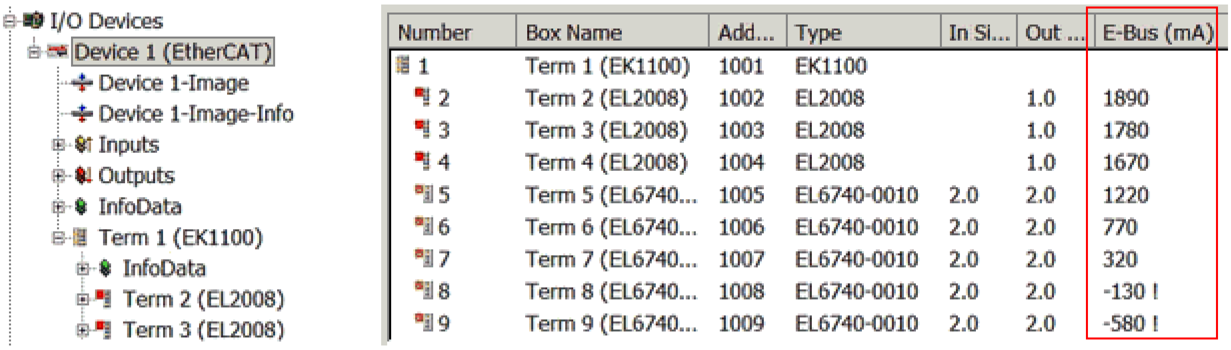
Recommended cables

Suitable cables for the connection of EtherCAT devices can be found on the Beckhoff website!

E-Bus supply

A bus coupler can supply the EL terminals added to it with the E-bus system voltage of 5 V; a coupler is thereby loadable up to 2 A as a rule (see details in respective device documentation).
Information on how much current each EL terminal requires from the E-bus supply is available online and in the catalogue. If the added terminals require more current than the coupler can supply, then power feed terminals (e.g. EL9410) must be inserted at appropriate places in the terminal strand.

The pre-calculated theoretical maximum E-Bus current is displayed in the TwinCAT System Manager. A shortfall is marked by a negative total amount and an exclamation mark; a power feed terminal is to be placed before such a position.



Number	Box Name	Add...	Type	In Si...	Out ...	E-Bus (mA)
1	Term 1 (EK1100)	1001	EK1100			
2	Term 2 (EL2008)	1002	EL2008		1.0	1890
3	Term 3 (EL2008)	1003	EL2008		1.0	1780
4	Term 4 (EL2008)	1004	EL2008		1.0	1670
5	Term 5 (EL6740...	1005	EL6740-0010	2.0	2.0	1220
6	Term 6 (EL6740...	1006	EL6740-0010	2.0	2.0	770
7	Term 7 (EL6740...	1007	EL6740-0010	2.0	2.0	320
8	Term 8 (EL6740...	1008	EL6740-0010	2.0	2.0	-130 !
9	Term 9 (EL6740...	1009	EL6740-0010	2.0	2.0	-580 !

Fig. 19: *System manager current calculation*

NOTE

Malfunction possible!

The same ground potential must be used for the E-Bus supply of all EtherCAT terminals in a terminal block!

3.3 General notes for setting the watchdog

ELxxxx terminals are equipped with a safety feature (watchdog) that switches off the outputs after a specifiable time e.g. in the event of an interruption of the process data traffic, depending on the device and settings, e.g. in OFF state.

The EtherCAT slave controller (ESC) in the EL2xxx terminals features 2 watchdogs:

- SM watchdog (default: 100 ms)
- PDI watchdog (default: 100 ms)

SM watchdog (SyncManager Watchdog)

The SyncManager watchdog is reset after each successful EtherCAT process data communication with the terminal. If no EtherCAT process data communication takes place with the terminal for longer than the set and activated SM watchdog time, e.g. in the event of a line interruption, the watchdog is triggered and the outputs are set to FALSE. The OP state of the terminal is unaffected. The watchdog is only reset after a successful EtherCAT process data access. Set the monitoring time as described below.

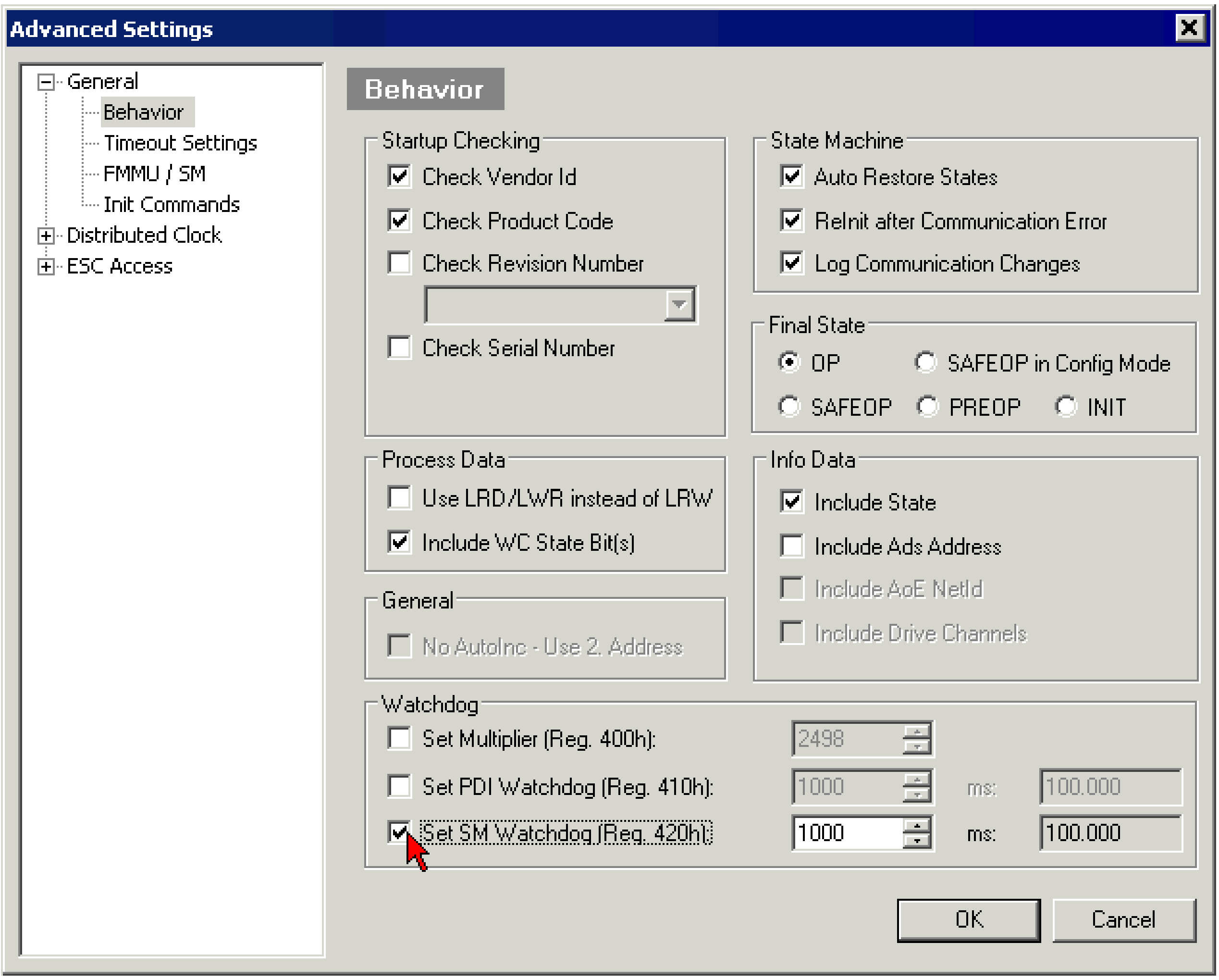
The SyncManager watchdog monitors correct and timely process data communication with the ESC from the EtherCAT side.

PDI watchdog (Process Data Watchdog)

If no PDI communication with the EtherCAT slave controller (ESC) takes place for longer than the set and activated PDI watchdog time, this watchdog is triggered.
PDI (Process Data Interface) is the internal interface between the ESC and local processors in the EtherCAT slave, for example. The PDI watchdog can be used to monitor this communication for failure.

The PDI watchdog monitors correct and timely process data communication with the ESC from the application side.

The settings of the SM- and PDI-watchdog must be done for each slave separately in the TwinCAT System Manager.



Startup Checking
- ☑ Check Vendor Id
- ☑ Check Product Code
- □ Check Revision Number
- □ Check Serial Number

State Machine
- ☑ Auto Restore States
- ☑ ReInit after Communication Error
- ☑ Log Communication Changes

Final State
- ● OP ○ SAFEOP in Config Mode
- ○ SAFEOP ○ PREOP ○ INIT

Process Data
- □ Use LRD/LWR instead of LRW
- ☑ Include WC State Bit(s)

General
- □ No AutoInc - Use 2. Address

Info Data
- ☑ Include State
- □ Include Ads Address
- □ Include AoE NetId
- □ Include Drive Channels

Watchdog

□ Set Multiplier (Reg. 400h):	2498		
□ Set PDI Watchdog (Reg. 410h):	1000	ms:	100.000
☑ Set SM Watchdog (Reg. 420h):	1000	ms:	100.000

Fig. 20: *EtherCAT tab -> Advanced Settings -> Behavior -> Watchdog*

Notes:

- the multiplier is valid for both watchdogs.
- each watchdog has its own timer setting, the outcome of this in summary with the multiplier is a resulting time.
- Important: the multiplier/timer setting is only loaded into the slave at the start up, if the checkbox is activated.
  If the checkbox is not activated, nothing is downloaded and the ESC settings remain unchanged.

Multiplier

Multiplier

Both watchdogs receive their pulses from the local terminal cycle, divided by the watchdog multiplier:

1/25 MHz * (watchdog multiplier + 2) = 100 µs (for default setting of 2498 for the multiplier)

The standard setting of 1000 for the SM watchdog corresponds to a release time of 100 ms.

The value in multiplier + 2 corresponds to the number of basic 40 ns ticks representing a watchdog tick. The multiplier can be modified in order to adjust the watchdog time over a larger range.

Example "Set SM watchdog"

This checkbox enables manual setting of the watchdog times. If the outputs are set and the EtherCAT communication is interrupted, the SM watchdog is triggered after the set time and the outputs are erased. This setting can be used for adapting a terminal to a slower EtherCAT master or long cycle times. The default SM watchdog setting is 100 ms. The setting range is 0..65535. Together with a multiplier with a range of 1..65535 this covers a watchdog period between 0..~170 seconds.

Calculation

Multiplier = 2498 → watchdog base time = 1 / 25 MHz * (2498 + 2) = 0.0001 seconds = 100 µs
SM watchdog = 10000 → 10000 * 100 µs = 1 second watchdog monitoring time

⚠ **CAUTION**

Undefined state possible!

The function for switching off of the SM watchdog via SM watchdog = 0 is only implemented in terminals from version -0016. In previous versions this operating mode should not be used.

⚠ **CAUTION**

Damage of devices and undefined state possible!

If the SM watchdog is activated and a value of 0 is entered the watchdog switches off completely. This is the deactivation of the watchdog! Set outputs are NOT set in a safe state, if the communication is interrupted.

3.4 EtherCAT State Machine

The state of the EtherCAT slave is controlled via the EtherCAT State Machine (ESM). Depending upon the state, different functions are accessible or executable in the EtherCAT slave. Specific commands must be sent by the EtherCAT master to the device in each state, particularly during the bootup of the slave.

A distinction is made between the following states:

- Init
- Pre-Operational
- Safe-Operational and
- Operational
- Boot

The regular state of each EtherCAT slave after bootup is the OP state.

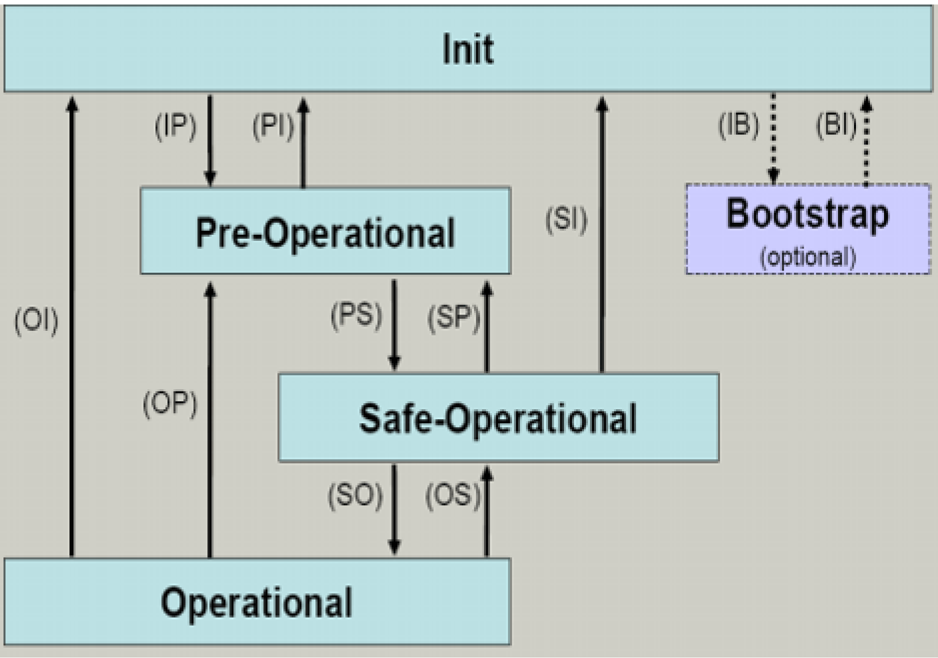


Fig. 21: *States of the EtherCAT State Machine*

Init

After switch-on the EtherCAT slave in the *Init* state. No mailbox or process data communication is possible. The EtherCAT master initializes sync manager channels 0 and 1 for mailbox communication.

Pre-Operational (Pre-Op)

During the transition between *Init* and *Pre-Op* the EtherCAT slave checks whether the mailbox was initialized correctly.

In *Pre-Op* state mailbox communication is possible, but not process data communication. The EtherCAT master initializes the sync manager channels for process data (from sync manager channel 2), the FMMU channels and, if the slave supports configurable mapping, PDO mapping or the sync manager PDO assignment. In this state the settings for the process data transfer and perhaps terminal-specific parameters that may differ from the default settings are also transferred.

Safe-Operational (Safe-Op)

During transition between *Pre-Op* and *Safe-Op* the EtherCAT slave checks whether the sync manager channels for process data communication and, if required, the distributed clocks settings are correct. Before it acknowledges the change of state, the EtherCAT slave copies current input data into the associated DP-RAM areas of the EtherCAT slave controller (ECSC).

In *Safe-Op* state mailbox and process data communication is possible, although the slave keeps its outputs in a safe state, while the input data are updated cyclically.

Outputs in SAFEOP state

The default set watchdog [▸ 20] monitoring sets the outputs of the module in a safe state - depending on the settings in SAFEOP and OP - e.g. in OFF state. If this is prevented by deactivation of the watchdog monitoring in the module, the outputs can be switched or set also in the SAFEOP state.

Operational (Op)

Before the EtherCAT master switches the EtherCAT slave from *Safe-Op* to *Op* it must transfer valid output data.

In the *Op* state the slave copies the output data of the masters to its outputs. Process data and mailbox communication is possible.

Boot

In the *Boot* state the slave firmware can be updated. The *Boot* state can only be reached via the *Init* state.

In the *Boot* state mailbox communication via the *file access over EtherCAT* (FoE) protocol is possible, but no other mailbox communication and no process data communication.

3.5 CoE Interface

General description

The CoE interface (CANopen over EtherCAT) is used for parameter management of EtherCAT devices. EtherCAT slaves or the EtherCAT master manage fixed (read only) or variable parameters which they require for operation, diagnostics or commissioning.

CoE parameters are arranged in a table hierarchy. In principle, the user has read access via the fieldbus. The EtherCAT master (TwinCAT System Manager) can access the local CoE lists of the slaves via EtherCAT in read or write mode, depending on the attributes.

Different CoE parameter types are possible, including string (text), integer numbers, Boolean values or larger byte fields. They can be used to describe a wide range of features. Examples of such parameters include manufacturer ID, serial number, process data settings, device name, calibration values for analog measurement or passwords.

The order is specified in 2 levels via hexadecimal numbering: (main)index, followed by subindex. The value ranges are

- Index: 0x0000 …0xFFFF (0...65535$_{dez}$)
- SubIndex: 0x00…0xFF (0...255$_{dez}$)

A parameter localized in this way is normally written as 0x8010:07, with preceding "x" to identify the hexadecimal numerical range and a colon between index and subindex.

The relevant ranges for EtherCAT fieldbus users are:

- 0x1000: This is where fixed identity information for the device is stored, including name, manufacturer, serial number etc., plus information about the current and available process data configurations.
- 0x8000: This is where the operational and functional parameters for all channels are stored, such as filter settings or output frequency.

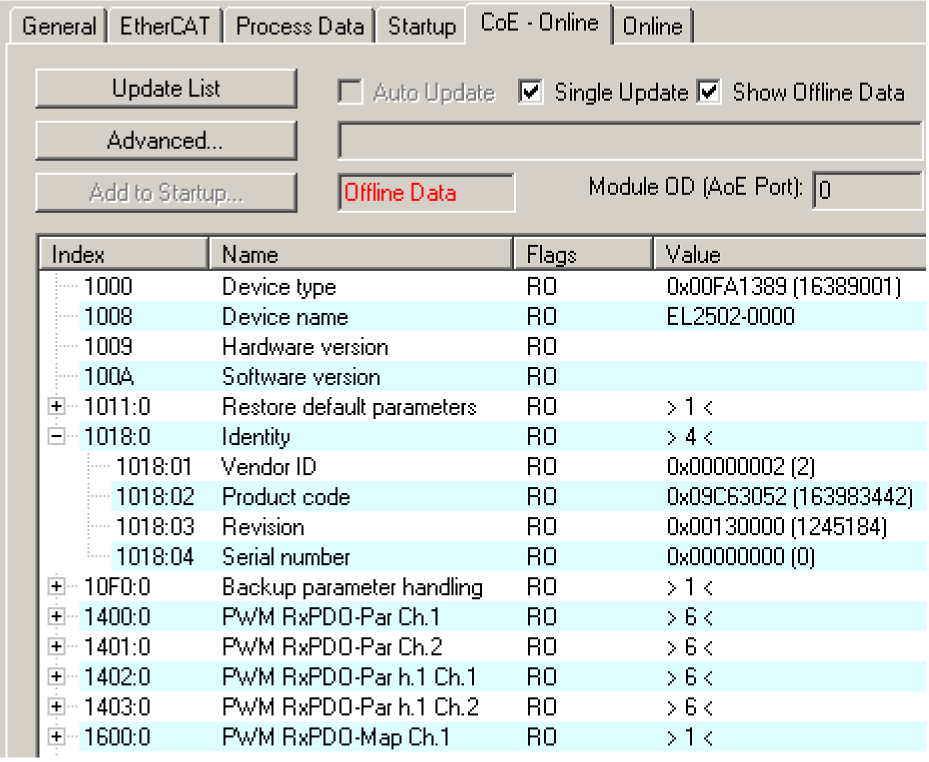
Other important ranges are:

- 0x4000: In some EtherCAT devices the channel parameters are stored here (as an alternative to the 0x8000 range).
- 0x6000: Input PDOs ("input" from the perspective of the EtherCAT master)
- 0x7000: Output PDOs ("output" from the perspective of the EtherCAT master)

Availability

Not every EtherCAT device must have a CoE list. Simple I/O modules without dedicated processor usually have no variable parameters and therefore no CoE list.

If a device has a CoE list, it is shown in the TwinCAT System Manager as a separate tab with a listing of the elements:



☐ Auto Update ☑ Single Update ☑ Show Offline Data

Offline Data

Module OD (AoE Port): 0

Index	Name	Flags	Value
1000	Device type	RO	0x00FA1389 (16389001)
1008	Device name	RO	EL2502-0000
1009	Hardware version	RO	
100A	Software version	RO	
+ 1011:0	Restore default parameters	RO	> 1 <
− 1018:0	Identity	RO	> 4 <
1018:01	Vendor ID	RO	0x00000002 (2)
1018:02	Product code	RO	0x09C63052 (163983442)
1018:03	Revision	RO	0x00130000 (1245184)
1018:04	Serial number	RO	0x00000000 (0)
+ 10F0:0	Backup parameter handling	RO	> 1 <
+ 1400:0	PWM RxPDO-Par Ch.1	RO	> 6 <
+ 1401:0	PWM RxPDO-Par Ch.2	RO	> 6 <
+ 1402:0	PWM RxPDO-Par h.1 Ch.1	RO	> 6 <
+ 1403:0	PWM RxPDO-Par h.1 Ch.2	RO	> 6 <
+ 1600:0	PWM RxPDO-Map Ch.1	RO	> 1 <

Fig. 22: *"CoE Online " tab*

The figure above shows the CoE objects available in device "EL2502", ranging from 0x1000 to 0x1600. The subindices for 0x1018 are expanded.

Data management and function "NoCoeStorage"

Some parameters, particularly the setting parameters of the slave, are configurable and writeable. This can be done in write or read mode

- via the System Manager (Fig. *"CoE Online " tab*) by clicking
  This is useful for commissioning of the system/slaves. Click on the row of the index to be parameterised and enter a value in the "SetValue" dialog.
- from the control system/PLC via ADS, e.g. through blocks from the TcEtherCAT.lib library
  This is recommended for modifications while the system is running or if no System Manager or operating staff are available.

Data management

If slave CoE parameters are modified online, Beckhoff devices store any changes in a fail-safe manner in the EEPROM, i.e. the modified CoE parameters are still available after a restart.
The situation may be different with other manufacturers.

An EEPROM is subject to a limited lifetime with respect to write operations. From typically 100,000 write operations onwards it can no longer be guaranteed that new (changed) data are reliably saved or are still readable. This is irrelevant for normal commissioning. However, if CoE parameters are continuously changed via ADS at machine runtime, it is quite possible for the lifetime limit to be reached. Support for the NoCoeStorage function, which suppresses the saving of changed CoE values, depends on the firmware version.
Please refer to the technical data in this documentation as to whether this applies to the respective device.

- If the function is supported: the function is activated by entering the code word 0x12345678 once in CoE 0xF008 and remains active as long as the code word is not changed. After switching the device on it is then inactive. Changed CoE values are not saved in the EEPROM and can thus be changed any number of times.
- Function is not supported: continuous changing of CoE values is not permissible in view of the lifetime limit.

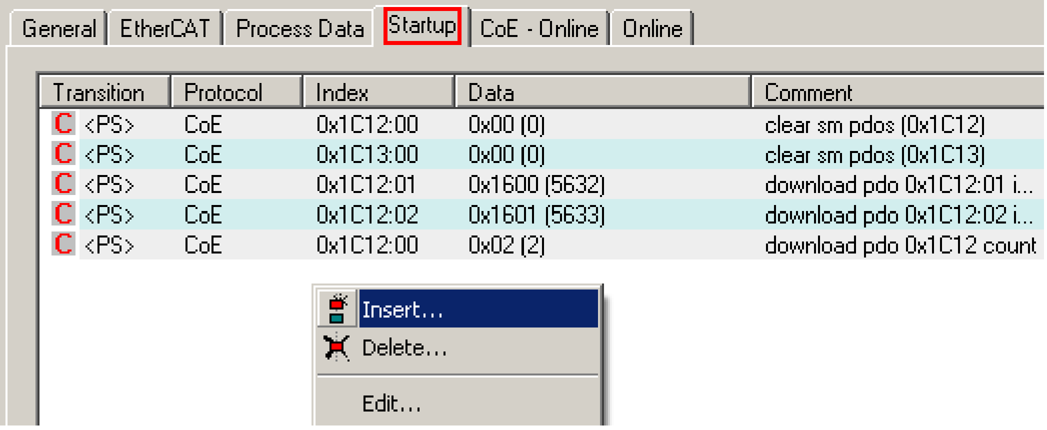
Startup list

Changes in the local CoE list of the terminal are lost if the terminal is replaced. If a terminal is replaced with a new Beckhoff terminal, it will have the default settings. It is therefore advisable to link all changes in the CoE list of an EtherCAT slave with the Startup list of the slave, which is processed whenever the EtherCAT fieldbus is started. In this way a replacement EtherCAT slave can automatically be parameterized with the specifications of the user.

If EtherCAT slaves are used which are unable to store local CoE values permanently, the Startup list must be used.

Recommended approach for manual modification of CoE parameters

- Make the required change in the System Manager
  The values are stored locally in the EtherCAT slave
- If the value is to be stored permanently, enter it in the Startup list.
  The order of the Startup entries is usually irrelevant.



Transition	Protocol	Index	Data	Comment
C <PS>	CoE	0x1C12:00	0x00 (0)	clear sm pdos (0x1C12)
C <PS>	CoE	0x1C13:00	0x00 (0)	clear sm pdos (0x1C13)
C <PS>	CoE	0x1C12:01	0x1600 (5632)	download pdo 0x1C12:01 i...
C <PS>	CoE	0x1C12:02	0x1601 (5633)	download pdo 0x1C12:02 i...
C <PS>	CoE	0x1C12:00	0x02 (2)	download pdo 0x1C12 count

Fig. 23: *Startup list in the TwinCAT System Manager*

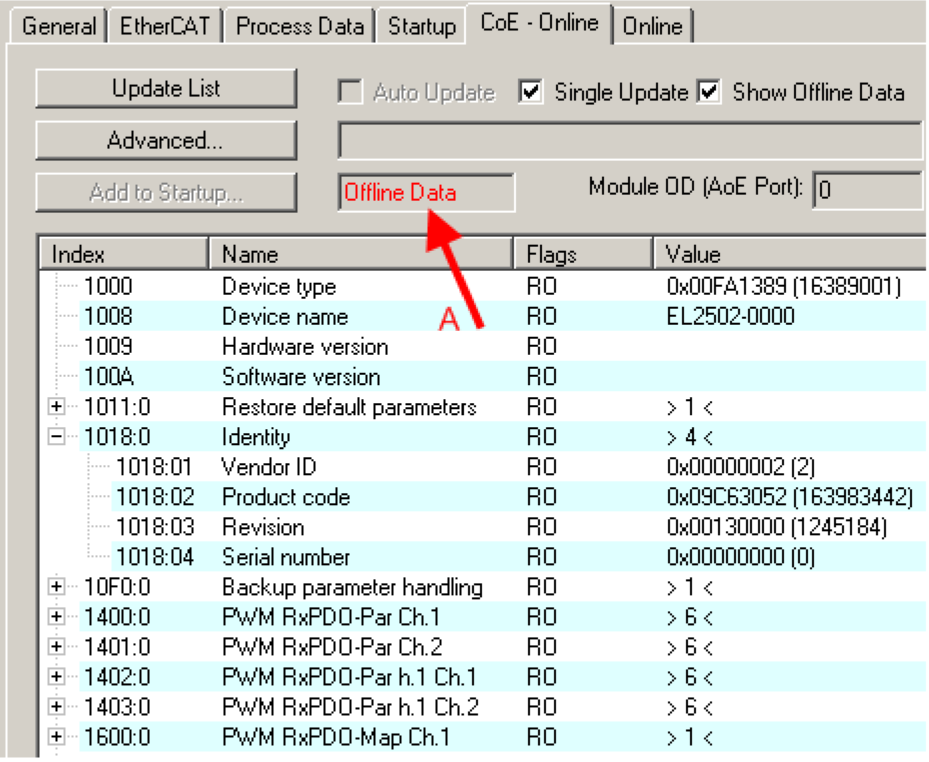
The Startup list may already contain values that were configured by the System Manager based on the ESI specifications. Additional application-specific entries can be created.

Online/offline list

While working with the TwinCAT System Manager, a distinction has to be made whether the EtherCAT device is "available", i.e. switched on and linked via EtherCAT and therefore **online**, or whether a configuration is created **offline** without connected slaves.

In both cases a CoE list as shown in Fig. *“’CoE online’ tab”* is displayed. The connectivity is shown as offline/online.

- If the slave is offline
  - The offline list from the ESI file is displayed. In this case modifications are not meaningful or possible.
  - The configured status is shown under Identity.
  - No firmware or hardware version is displayed, since these are features of the physical device.
  - **Offline** is shown in red.



☐ Auto Update ☑ Single Update ☑ Show Offline Data

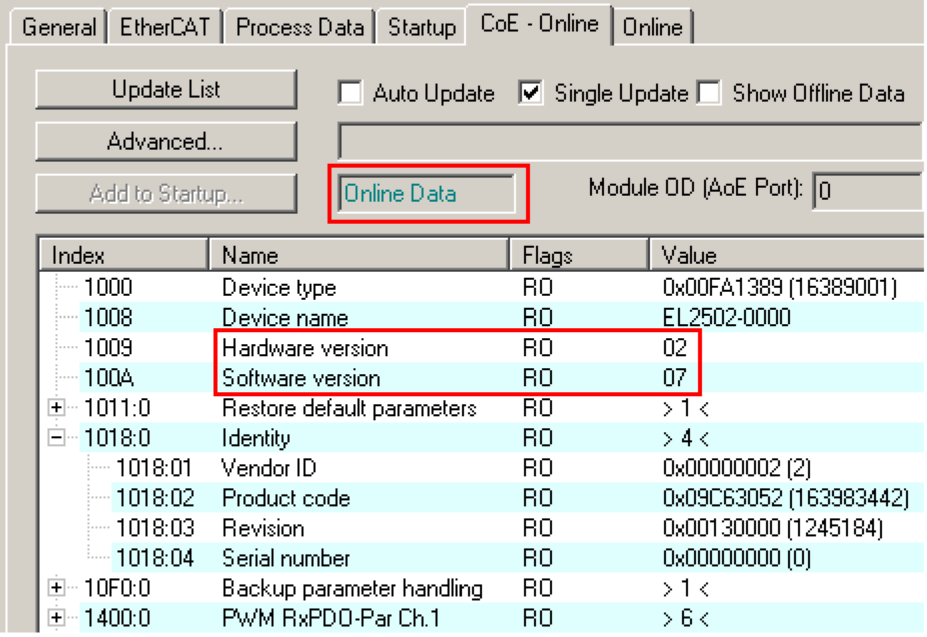
Offline Data

Module OD (AoE Port): 0

Index	Name	Flags	Value
1000	Device type	RO	0x00FA1389 (16389001)
1008	Device name	RO	EL2502-0000
1009	Hardware version	RO	
100A	Software version	RO	
+ 1011:0	Restore default parameters	RO	> 1 <
− 1018:0	Identity	RO	> 4 <
1018:01	Vendor ID	RO	0x00000002 (2)
1018:02	Product code	RO	0x09C63052 (163983442)
1018:03	Revision	RO	0x00130000 (1245184)
1018:04	Serial number	RO	0x00000000 (0)
+ 10F0:0	Backup parameter handling	RO	> 1 <
+ 1400:0	PWM RxPDO-Par Ch.1	RO	> 6 <
+ 1401:0	PWM RxPDO-Par Ch.2	RO	> 6 <
+ 1402:0	PWM RxPDO-Par h.1 Ch.1	RO	> 6 <
+ 1403:0	PWM RxPDO-Par h.1 Ch.2	RO	> 6 <
+ 1600:0	PWM RxPDO-Map Ch.1	RO	> 1 <

Fig. 24: *Offline list*

- If the slave is online
  - The actual current slave list is read. This may take several seconds, depending on the size and cycle time.
  - The actual identity is displayed
  - The firmware and hardware version of the equipment according to the electronic information is displayed
  - **Online** is shown in green.



☐ Auto Update ☑ Single Update ☐ Show Offline Data

Online Data

Module OD (AoE Port): 0

Index	Name	Flags	Value
1000	Device type	RO	0x00FA1389 (16389001)
1008	Device name	RO	EL2502-0000
1009	Hardware version	RO	02
100A	Software version	RO	07
+ 1011:0	Restore default parameters	RO	> 1 <
− 1018:0	Identity	RO	> 4 <
1018:01	Vendor ID	RO	0x00000002 (2)
1018:02	Product code	RO	0x09C63052 (163983442)
1018:03	Revision	RO	0x00130000 (1245184)
1018:04	Serial number	RO	0x00000000 (0)
+ 10F0:0	Backup parameter handling	RO	> 1 <
+ 1400:0	PWM RxPDO-Par Ch.1	RO	> 6 <

Fig. 25: *Online list*

Channel-based order

The CoE list is available in EtherCAT devices that usually feature several functionally equivalent channels. For example, a 4-channel analog 0..10 V input terminal also has 4 logical channels and therefore 4 identical sets of parameter data for the channels. In order to avoid having to list each channel in the documentation, the placeholder "n" tends to be used for the individual channel numbers.

In the CoE system 16 indices, each with 255 subindices, are generally sufficient for representing all channel parameters. The channel-based order is therefore arranged in $16_{dec}/10_{hex}$ steps. The parameter range 0x8000 exemplifies this:

- Channel 0: parameter range 0x8000:00 ... 0x800F:255
- Channel 1: parameter range 0x8010:00 ... 0x801F:255
- Channel 2: parameter range 0x8020:00 ... 0x802F:255
- ...

This is generally written as 0x80n0.

Detailed information on the CoE interface can be found in the EtherCAT system documentation on the Beckhoff website.

4 Installation

4.1 Instructions for ESD protection

NOTE

Destruction of the devices by electrostatic discharge possible!

The devices contain components at risk from electrostatic discharge caused by improper handling.

- Please ensure you are electrostatically discharged and avoid touching the contacts of the device directly.
- Avoid contact with highly insulating materials (synthetic fibers, plastic film etc.).
- Surroundings (working place, packaging and personnel) should by grounded probably, when handling with the devices.
- Each assembly must be terminated at the right hand end with an EL9011 or EL9012 bus end cap, to ensure the protection class and ESD protection.

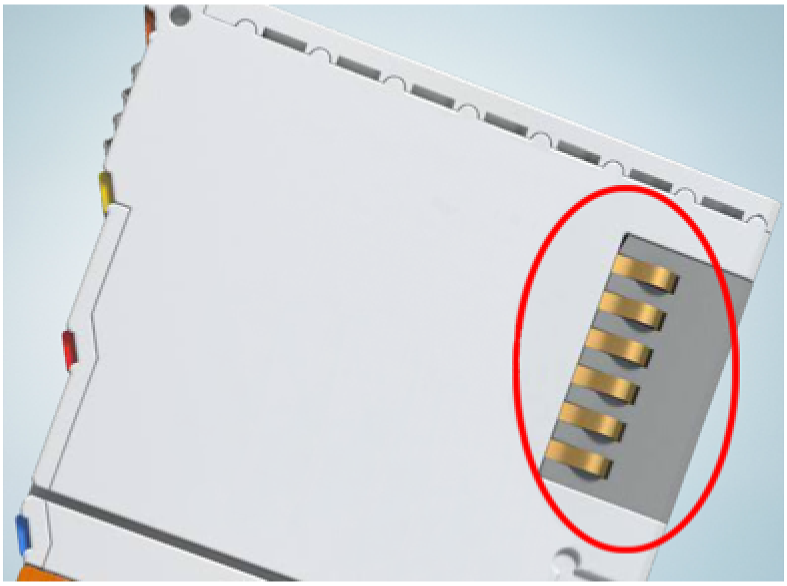


Fig. 26: Spring contacts of the Beckhoff I/O components

4.2 Installation on mounting rails

⚠ **WARNING**

Risk of electric shock and damage of device!

Bring the bus terminal system into a safe, powered down state before starting installation, disassembly or wiring of the bus terminals!

Assembly

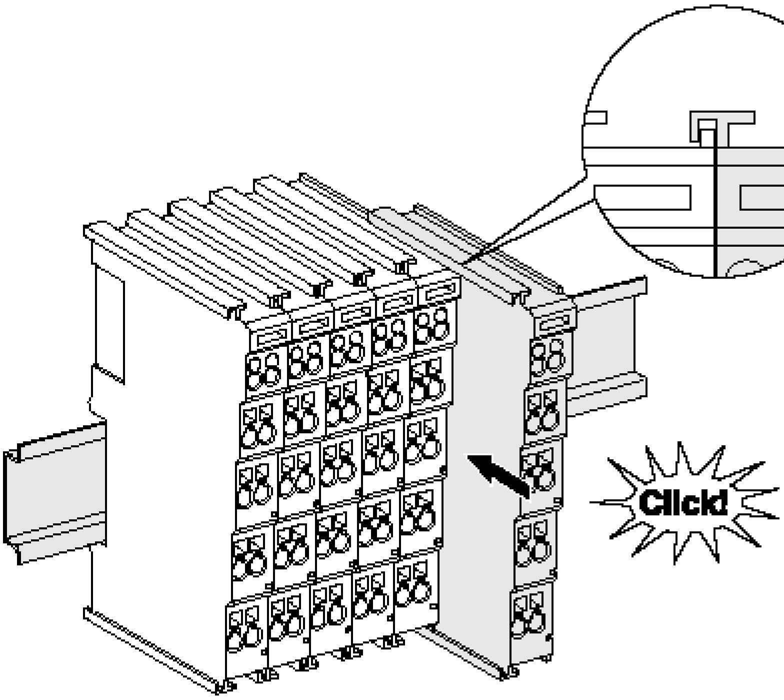


Fig. 27: Attaching on mounting rail

The bus coupler and bus terminals are attached to commercially available 35 mm mounting rails (DIN rails according to EN 60715) by applying slight pressure:

1. First attach the fieldbus coupler to the mounting rail.
2. The bus terminals are now attached on the right-hand side of the fieldbus coupler. Join the components with tongue and groove and push the terminals against the mounting rail, until the lock clicks onto the mounting rail.
   If the terminals are clipped onto the mounting rail first and then pushed together without tongue and groove, the connection will not be operational! When correctly assembled, no significant gap should be visible between the housings.

Fixing of mounting rails

The locking mechanism of the terminals and couplers extends to the profile of the mounting rail. At the installation, the locking mechanism of the components must not come into conflict with the fixing bolts of the mounting rail. To mount the mounting rails with a height of 7.5 mm under the terminals and couplers, you should use flat mounting connections (e.g. countersunk screws or blind rivets).

Disassembly

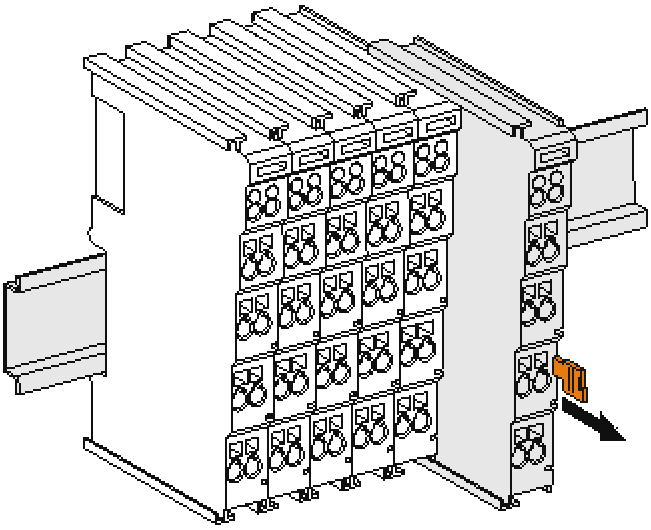


Fig. 28: Disassembling of terminal

Each terminal is secured by a lock on the mounting rail, which must be released for disassembly:

1. Pull the terminal by its orange-colored lugs approximately 1 cm away from the mounting rail. In doing so for this terminal the mounting rail lock is released automatically and you can pull the terminal out of the bus terminal block easily without excessive force.
2. Grasp the released terminal with thumb and index finger simultaneous at the upper and lower grooved housing surfaces and pull the terminal out of the bus terminal block.

Connections within a bus terminal block

The electric connections between the Bus Coupler and the Bus Terminals are automatically realized by joining the components:

- The six spring contacts of the K-Bus/E-Bus deal with the transfer of the data and the supply of the Bus Terminal electronics.
- The power contacts deal with the supply for the field electronics and thus represent a supply rail within the bus terminal block. The power contacts are supplied via terminals on the Bus Coupler (up to 24 V) or for higher voltages via power feed terminals.

Power Contacts

During the design of a bus terminal block, the pin assignment of the individual Bus Terminals must be taken account of, since some types (e.g. analog Bus Terminals or digital 4-channel Bus Terminals) do not or not fully loop through the power contacts. Power Feed Terminals (KL91xx, KL92xx or EL91xx, EL92xx) interrupt the power contacts and thus represent the start of a new supply rail.

PE power contact

The power contact labeled PE can be used as a protective earth. For safety reasons this contact mates first when plugging together, and can ground short-circuit currents of up to 125 A.

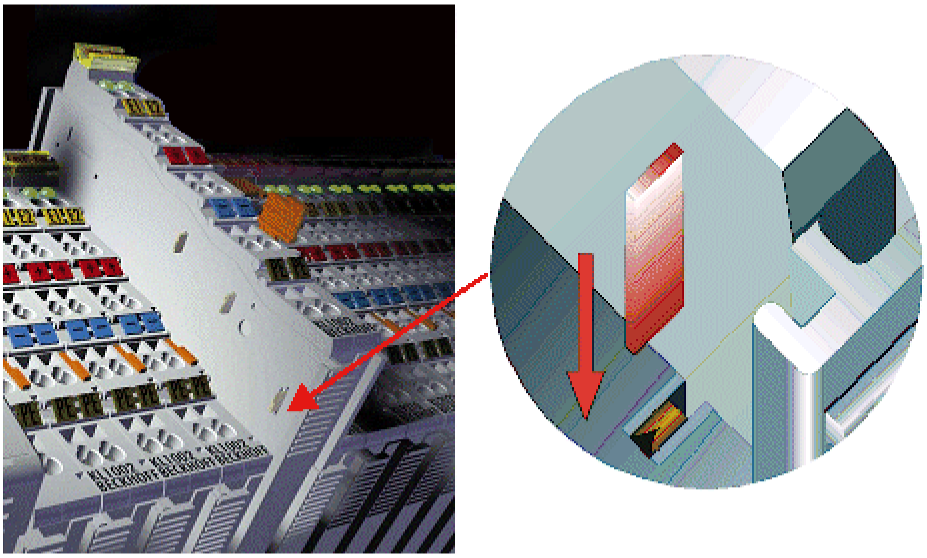


Fig. 29: *Power contact on left side*

NOTE

Possible damage of the device

Note that, for reasons of electromagnetic compatibility, the PE contacts are capacitatively coupled to the mounting rail. This may lead to incorrect results during insulation testing or to damage on the terminal (e.g. disruptive discharge to the PE line during insulation testing of a consumer with a nominal voltage of 230 V). For insulation testing, disconnect the PE supply line at the Bus Coupler or the Power Feed Terminal! In order to decouple further feed points for testing, these Power Feed Terminals can be released and pulled at least 10 mm from the group of terminals.

⚠ WARNING

Risk of electric shock!

The PE power contact must not be used for other potentials!

4.3 Installation instructions for enhanced mechanical load capacity

⚠ WARNING

Risk of injury through electric shock and damage to the device!

Bring the Bus Terminal system into a safe, de-energized state before starting mounting, disassembly or wiring of the Bus Terminals!

Additional checks

The terminals have undergone the following additional tests:

Verification	Explanation
Vibration	10 frequency runs in 3 axes
	6 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude
	60.1 Hz < f < 500 Hz acceleration 5 *g*, constant amplitude
Shocks	1000 shocks in each direction, in 3 axes
	25 *g*, 6 ms

Additional installation instructions

For terminals with enhanced mechanical load capacity, the following additional installation instructions apply:

- The enhanced mechanical load capacity is valid for all permissible installation positions
- Use a mounting rail according to EN 60715 TH35-15
- Fix the terminal segment on both sides of the mounting rail with a mechanical fixture, e.g. an earth terminal or reinforced end clamp
- The maximum total extension of the terminal segment (without coupler) is:
  64 terminals (12 mm mounting with) or 32 terminals (24 mm mounting with)
- Avoid deformation, twisting, crushing and bending of the mounting rail during edging and installation of the rail
- The mounting points of the mounting rail must be set at 5 cm intervals
- Use countersunk head screws to fasten the mounting rail
- The free length between the strain relief and the wire connection should be kept as short as possible. A distance of approx. 10 cm should be maintained to the cable duct.

4.4 Connection

4.4.1 Connection system

⚠ **WARNING**

Risk of electric shock and damage of device!

Bring the bus terminal system into a safe, powered down state before starting installation, disassembly or wiring of the bus terminals!

Overview

The Bus Terminal system offers different connection options for optimum adaptation to the respective application:

- The terminals of ELxxxx and KLxxxx series with standard wiring include electronics and connection level in a single enclosure.
- The terminals of ESxxxx and KSxxxx series feature a pluggable connection level and enable steady wiring while replacing.
- The High Density Terminals (HD Terminals) include electronics and connection level in a single enclosure and have advanced packaging density.

Standard wiring (ELxxxx / KLxxxx)

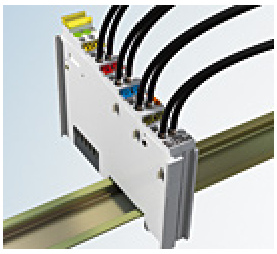


Fig. 30: Standard wiring

The terminals of ELxxxx and KLxxxx series have been tried and tested for years.
They feature integrated screwless spring force technology for fast and simple assembly.

Pluggable wiring (ESxxxx / KSxxxx)

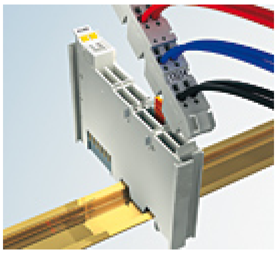


Fig. 31: Pluggable wiring

The terminals of ESxxxx and KSxxxx series feature a pluggable connection level.
The assembly and wiring procedure is the same as for the ELxxxx and KLxxxx series.
The pluggable connection level enables the complete wiring to be removed as a plug connector from the top of the housing for servicing.
The lower section can be removed from the terminal block by pulling the unlocking tab.
Insert the new component and plug in the connector with the wiring. This reduces the installation time and eliminates the risk of wires being mixed up.

The familiar dimensions of the terminal only had to be changed slightly. The new connector adds about 3 mm. The maximum height of the terminal remains unchanged.

A tab for strain relief of the cable simplifies assembly in many applications and prevents tangling of individual connection wires when the connector is removed.

Conductor cross sections between 0.08 mm^2 and 2.5 mm^2 can continue to be used with the proven spring force technology.

The overview and nomenclature of the product names for ESxxxx and KSxxxx series has been retained as known from ELxxxx and KLxxxx series.

High Density Terminals (HD Terminals)

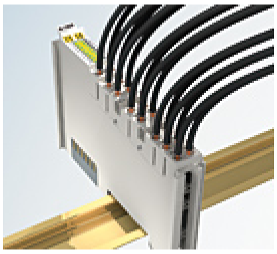


Fig. 32: *High Density Terminals*

The Bus Terminals from these series with 16 terminal points are distinguished by a particularly compact design, as the packaging density is twice as large as that of the standard 12 mm Bus Terminals. Massive conductors and conductors with a wire end sleeve can be inserted directly into the spring loaded terminal point without tools.

Wiring HD Terminals

The High Density (HD) Terminals of the ELx8xx and KLx8xx series doesn't support pluggable wiring.

Ultrasonically "bonded" (ultrasonically welded) conductors

Ultrasonically “bonded" conductors

It is also possible to connect the Standard and High Density Terminals with ultrasonically "bonded" (ultrasonically welded) conductors. In this case, please note the tables concerning the wire-size width below!

4.4.2 Wiring

⚠ WARNING

Risk of electric shock and damage of device!

Bring the bus terminal system into a safe, powered down state before starting installation, disassembly or wiring of the Bus Terminals!

Terminals for standard wiring ELxxxx/KLxxxx and for pluggable wiring ESxxxx/KSxxxx

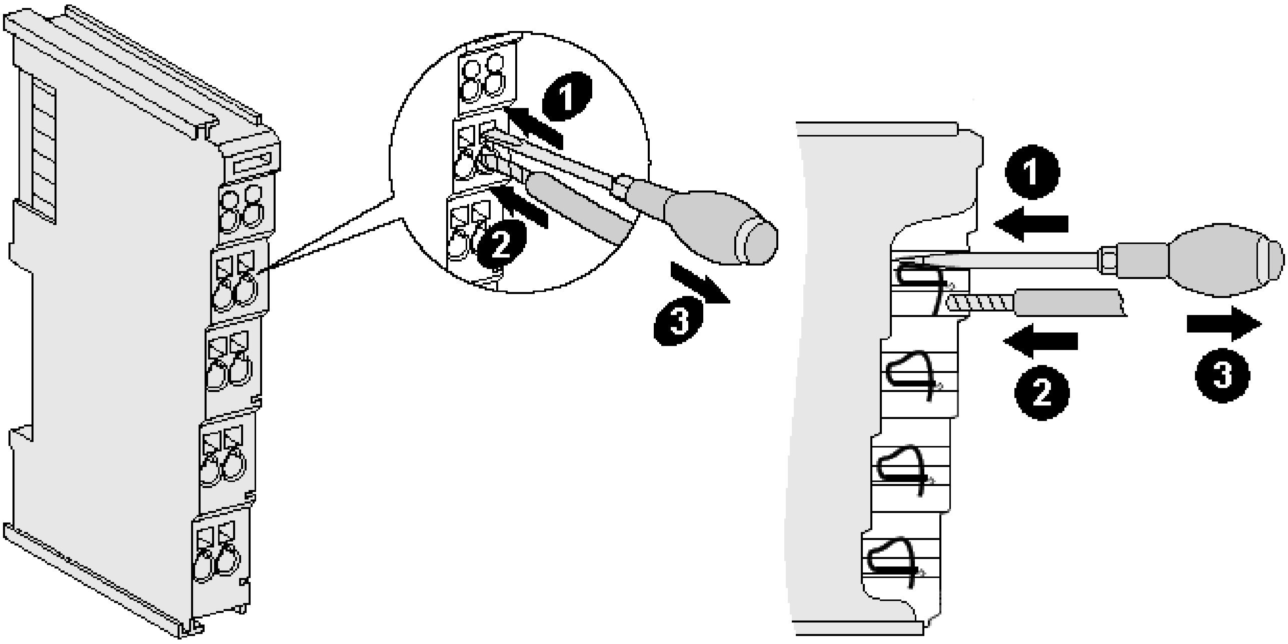


Fig. 33: Connecting a cable on a terminal point

Up to eight terminal points enable the connection of solid or finely stranded cables to the Bus Terminal. The terminal points are implemented in spring force technology. Connect the cables as follows:

1. Open a terminal point by pushing a screwdriver straight against the stop into the square opening above the terminal point. Do not turn the screwdriver or move it alternately (don't toggle).
2. The wire can now be inserted into the round terminal opening without any force.
3. The terminal point closes automatically when the pressure is released, holding the wire securely and permanently.

See the following table for the suitable wire size width.

Terminal housing	ELxxxx, KLxxxx	ESxxxx, KSxxxx
Wire size width (single core wires)	0.08 ... 2.5 mm^2	0.08 ... 2.5 mm^2
Wire size width (fine-wire conductors)	0.08 ... 2.5 mm^2	0,08 ... 2.5 mm^2
Wire size width (conductors with a wire end sleeve)	0.14 ... 1.5 mm^2	0.14 ... 1.5 mm^2
Wire stripping length	8 ... 9 mm	9 ... 10 mm

High Density Terminals (HD Terminals [▶ 34]) with 16 terminal points

The conductors of the HD Terminals are connected without tools for single-wire conductors using the direct plug-in technique, i.e. after stripping the wire is simply plugged into the terminal point. The cables are released, as usual, using the contact release with the aid of a screwdriver. See the following table for the suitable wire size width.

Terminal housing	**High Density Housing**
Wire size width (single core wires)	0.08 ... 1.5 mm^2
Wire size width (fine-wire conductors)	0.25 ... 1.5 mm^2
Wire size width (conductors with a wire end sleeve)	0.14 ... 0.75 mm^2
Wire size width (ultrasonically “bonded" conductors)	only 1.5 mm^2
Wire stripping length	8 ... 9 mm

4.4.3 Shielding

ℹ **Shielding**

Encoder, analog sensors and actors should always be connected with shielded, twisted paired wires.

4.5 Prescribed installation position

NOTE

Constraints regarding installation position and operating temperature range

When installing the terminals ensure that an adequate spacing is maintained between other components above and below the terminal in order to guarantee adequate ventilation!

Prescribed installation position

The prescribed installation position requires the mounting rail to be installed horizontally and the connection surfaces of the EL/KL terminals to face forward (see Fig. *Recommended distances for standard installation position*).

The terminals are ventilated from below, which enables optimum cooling of the electronics through convection. "From below" is relative to the acceleration of gravity.

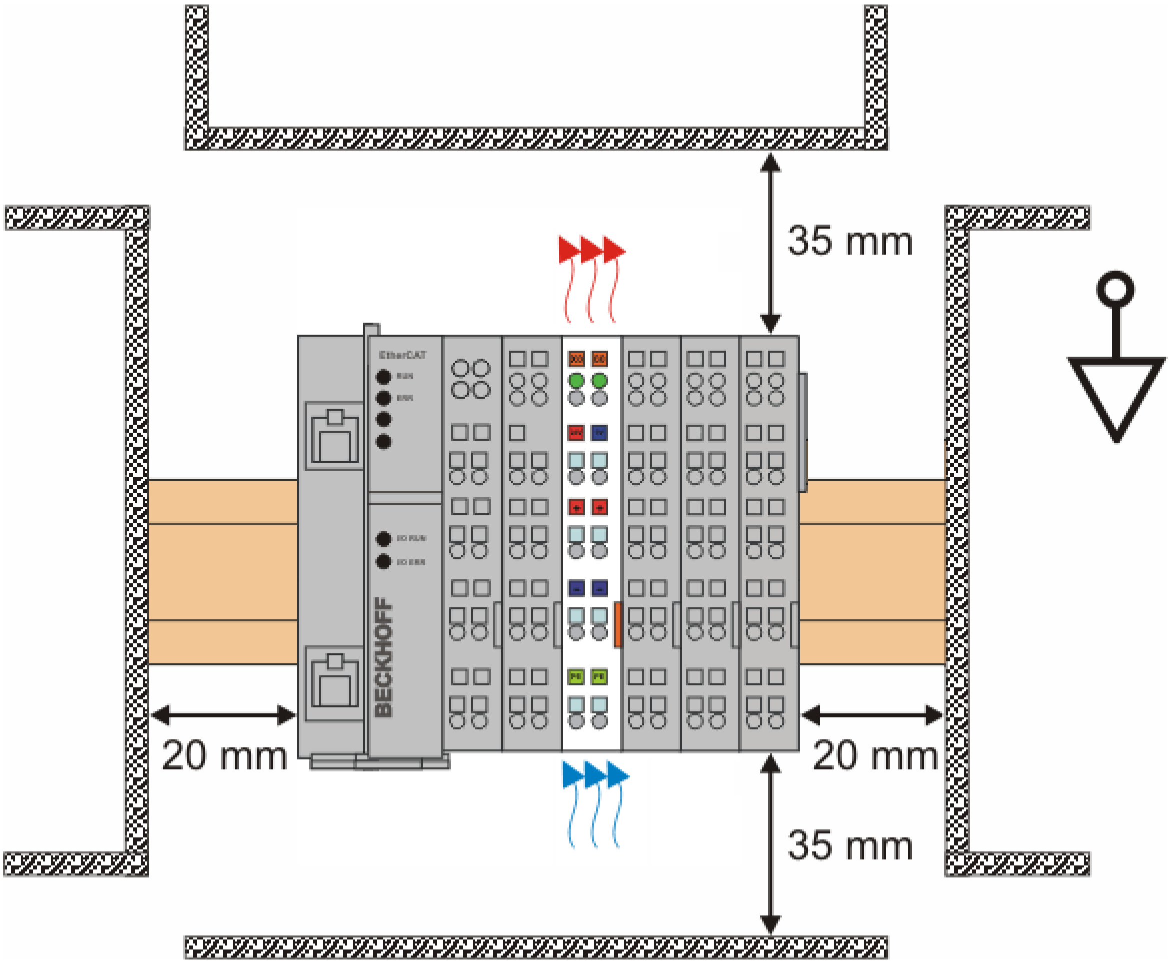


Fig. 34: *Recommended minimum distances for standard installation position*

Compliance with the distances shown in Fig. *Recommended distances for standard installation position* is strongly recommended.

4.6 Positioning of passive Terminals

Hint for positioning of passive terminals in the bus terminal block

EtherCAT Terminals (ELxxxx / ESxxxx), which do not take an active part in data transfer within the bus terminal block are so called passive terminals. The passive terminals have no current consumption out of the E-Bus.

To ensure an optimal data transfer, you must not directly string together more than 2 passive terminals!

Examples for positioning of passive terminals (highlighted)

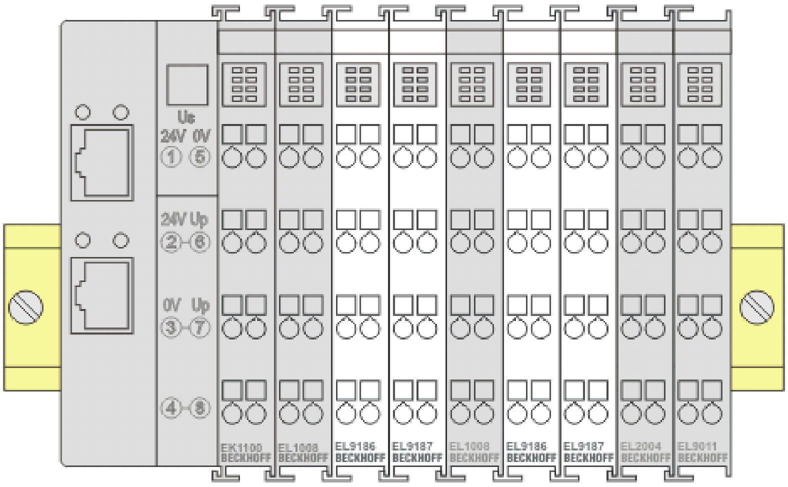


Fig. 35: Correct positioning

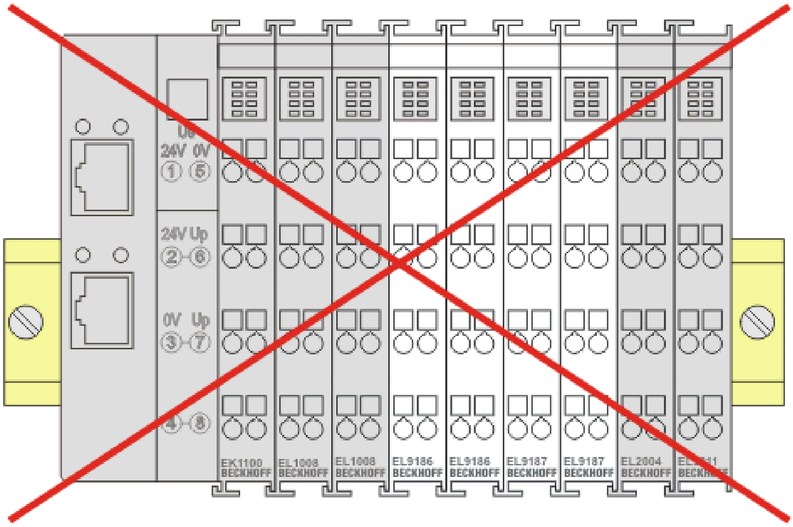


Fig. 36: Incorrect positioning

4.7 LEDs and connection

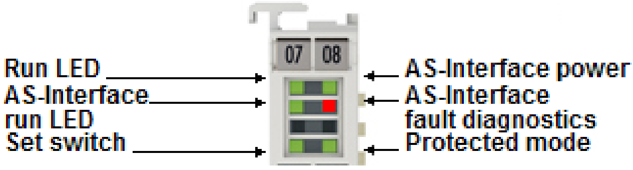


Fig. 37: EL6201 LEDs

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 22]: **INIT** = initialization of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		Single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 92] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible
		flickering	State of the EtherCAT State Machine: **BOOTSTRAP** = function for terminal firmware updates [▶ 224]
AS-i Diag	green	This LED lights up during the AS-i data exchange phase (it flickers in regular operation).	
Set switch	green	This LED is on as long as both set inputs are short-circuited.	
AS-i Power	green	This LED is on as long as the AS-i power supply is connected and at least one AS-i slave was found.	
AS-i fault diagnostics	red	This LED flashes if the nominal and actual configuration do not match. Possible causes: • AS-i ID code of one or several slaves does not match the currently projected values. • The AS-i I/O code of one or several slaves does not match the currently projected values. • The currently projected AS-i slave was not found.	
Protected mode	green	This LED lights up as long as the two protected mode inputs are short-circuited.	

AS-i installation

⚠ WARNING

Risk of injury through electric shock and damage to the device!

Bring the Bus Terminals system into a safe, de-energized state before starting mounting, disassembly or wiring of the Bus Terminals.

Connection of the AS interface

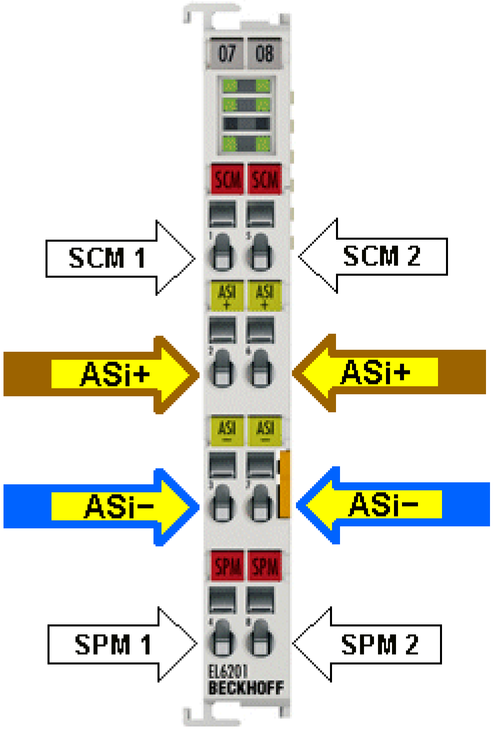


Fig. 38: Connection of EL6201 AS-i master

Terminal contact	Name	Use
1 and 5	SCM	Setting of the configuration mode by briefly bridging contacts 1 and 5
2 and 6	ASi+	ASi+ connection (brown). Both terminal points identified with ASi+ are connected internally.
3 and 7	ASi-	ASi- connection (blue). Both terminal points identified with ASi- are connected internally.
4 and 8	SPM	The detected slaves from the list of detected slaves can be projected for the protected mode by briefly bridging the two SPM contacts 4 and 8.

Connection AS-i potential supply terminal EL9520

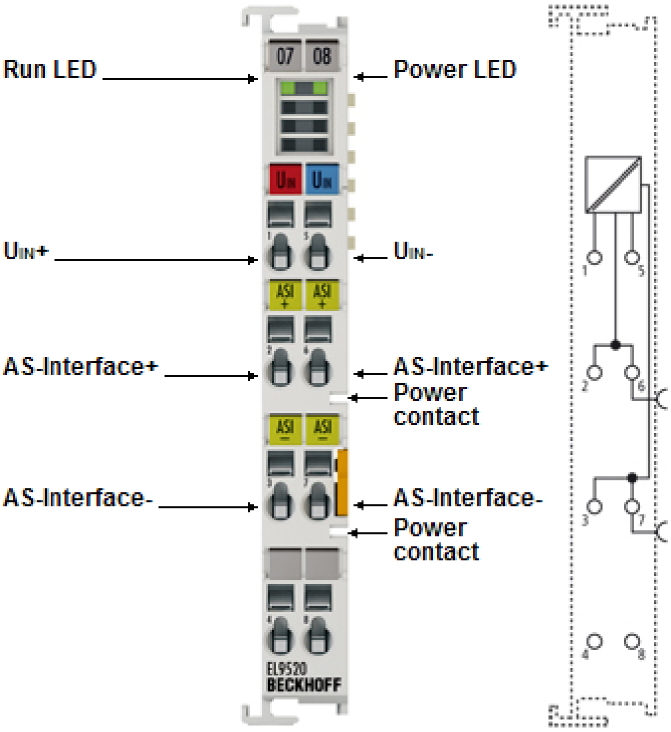


Fig. 39: Connection AS-i potential supply terminal EL9520

Terminal contact	Name	Use
1	Uin+	Positive voltage input 24 V..35 V
2	ASi+	Connection AS-i+ Both terminal points identified with ASi+ are connected internally.
3	ASi-	Connection AS-i- Both terminal points identified with ASi- are connected internally.
4		not used
5	Uin-	Negative voltage input 24 V..35 V
6	ASi+	Connection AS-i+ Both terminal points identified with ASi+ are connected internally.
7	ASi-	Connection AS-i- Both terminal points identified with ASi- are connected internally.
8		not used

Wiring of the AS interface

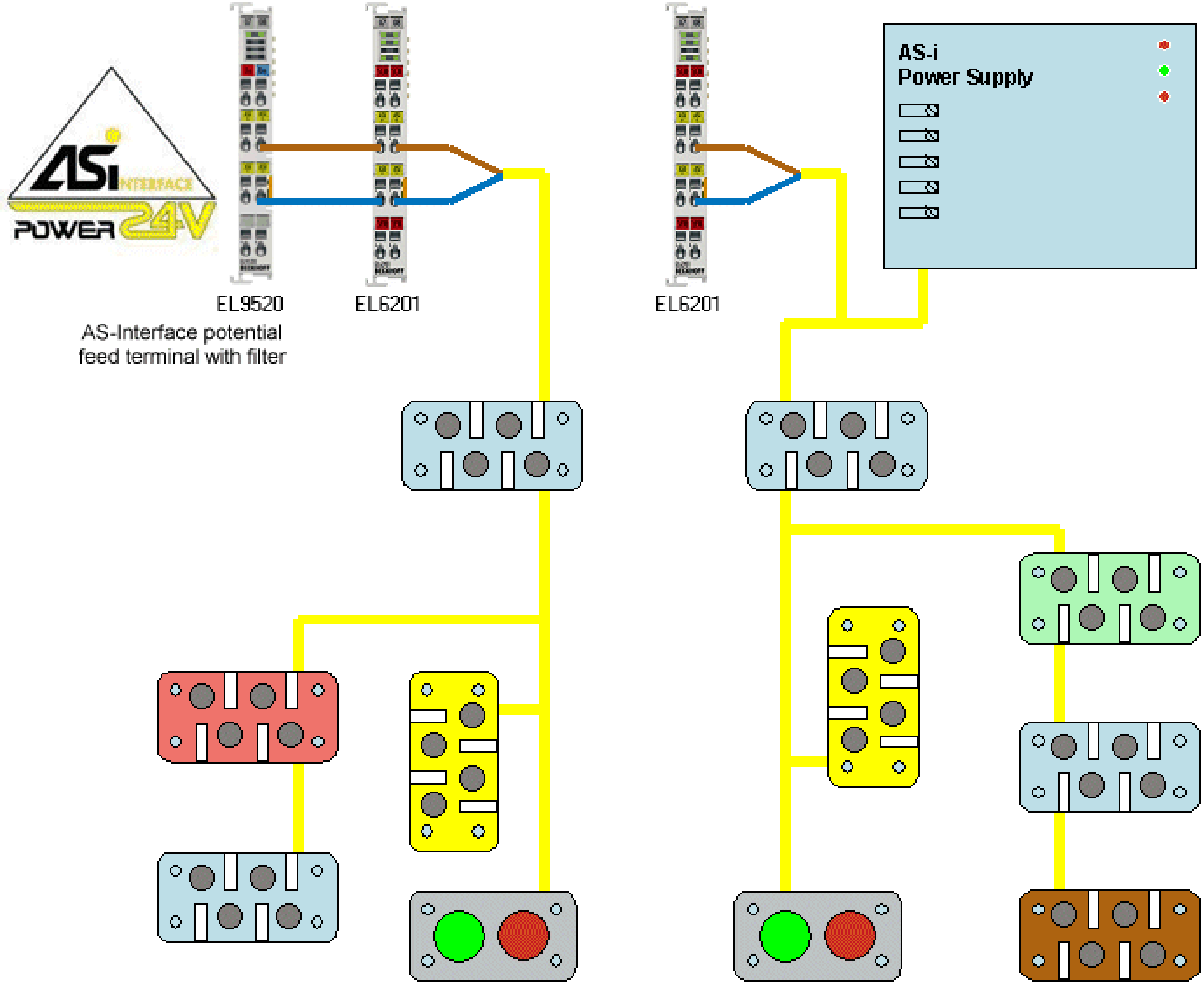


Fig. 40: Wiring diagram (example) for EL6201 AS-i master: connection to EL9520 (left), connection to AS-i power supply unit (right)

Since the user data are modulated on the power supply line with the AS-Interface, a special AS-i power supply unit (30.5 V_{DC}) is required.
A further possibility is offered by the EL9520 AS-i potential supply terminal, which provides the supply direct from the EtherCAT Terminal network.

5 Commissioning

5.1 TwinCAT Quick Start

TwinCAT is a development environment for real-time control including multi-PLC system, NC axis control, programming and operation. The whole system is mapped through this environment and enables access to a programming environment (including compilation) for the controller. Individual digital or analog inputs or outputs can also be read or written directly, in order to verify their functionality, for example.

For further information please refer to http://infosys.beckhoff.com:

- **EtherCAT Systemmanual:**
  Fieldbus Components → EtherCAT Terminals → EtherCAT System Documentation → Setup in the TwinCAT System Manager
- **TwinCAT 2** → TwinCAT System Manager → I/O - Configuration
- In particular, TwinCAT driver installation:
  Fieldbus components → Fieldbus Cards and Switches → FC900x – PCI Cards for Ethernet → Installation

Devices contain the terminals for the actual configuration. All configuration data can be entered directly via editor functions (offline) or via the "Scan" function (online):

- **"offline"**: The configuration can be customized by adding and positioning individual components. These can be selected from a directory and configured.
  - The procedure for offline mode can be found under http://infosys.beckhoff.com:
    TwinCAT 2 → TwinCAT System Manager → IO - Configuration → Adding an I/O Device
- **"online"**: The existing hardware configuration is read
  - See also http://infosys.beckhoff.com:
    Fieldbus components → Fieldbus cards and switches → FC900x – PCI Cards for Ethernet → Installation → Searching for devices

The following relationship is envisaged from user PC to the individual control elements:

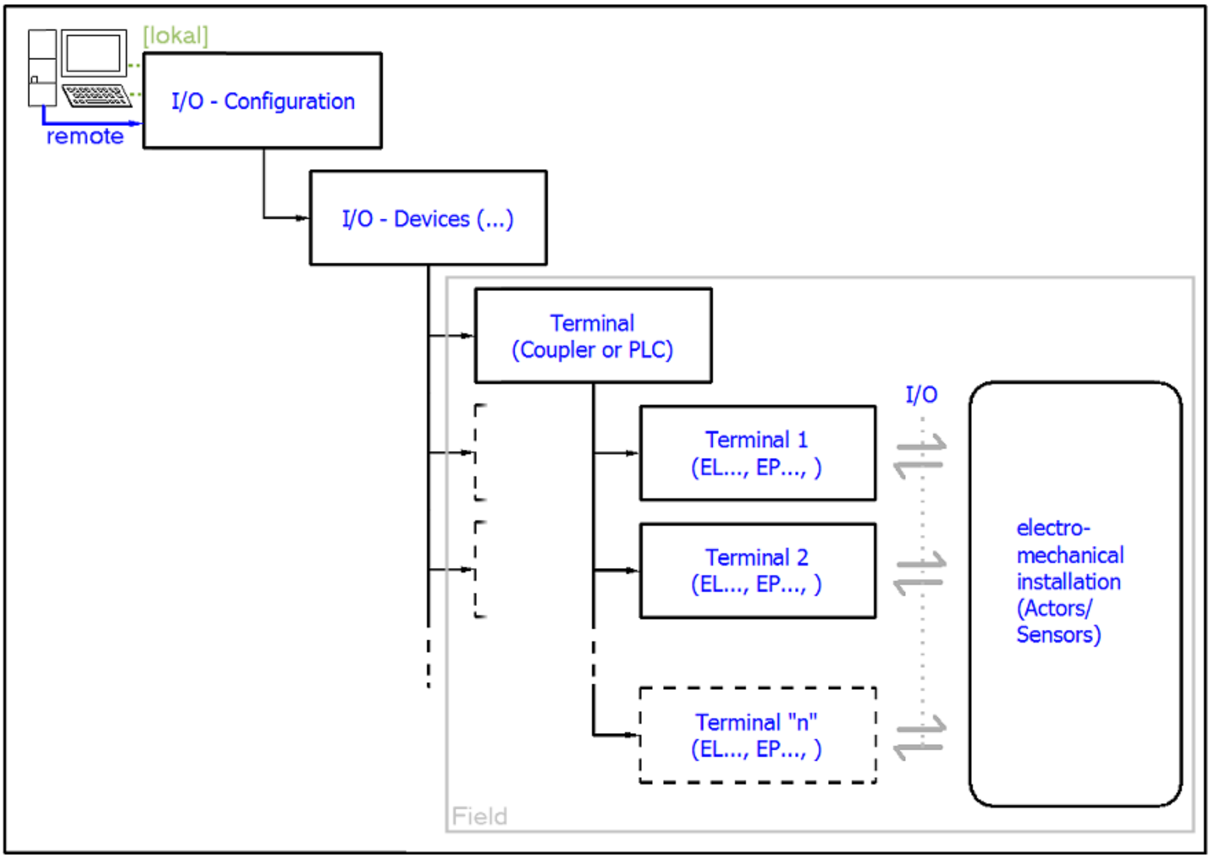


Fig. 41: Relationship between user side (commissioning) and installation

The user inserting of certain components (I/O device, terminal, box...) is the same in TwinCAT 2 and TwinCAT 3. The descriptions below relate to the online procedure.

Sample configuration (actual configuration)

Based on the following sample configuration, the subsequent subsections describe the procedure for TwinCAT 2 and TwinCAT 3:

- Control system (PLC) **CX2040** including **CX2100-0004** power supply unit
- Connected to the CX2040 on the right (E-bus):
  EL1004 (4-channel analog input terminal -10…+10 V)
- Linked via the X001 port (RJ-45): **EK1100** EtherCAT Coupler
- Connected to the EK1100 EtherCAT coupler on the right (E-bus):
  EL2008 (8-channel digital output terminal 24 V DC; 0.5 A)
- (Optional via X000: a link to an external PC for the user interface)

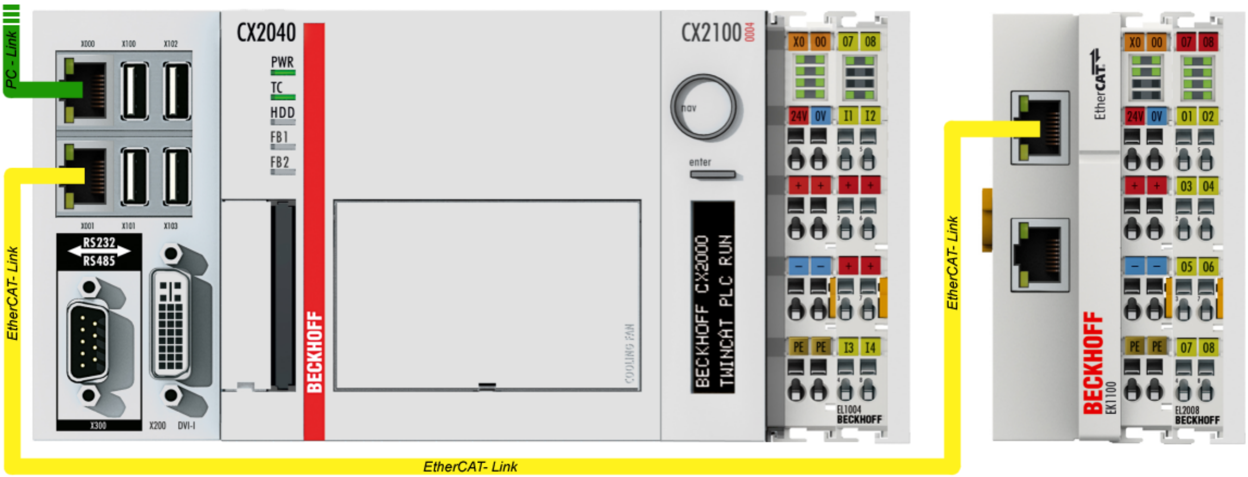


Fig. 42: Control configuration with Embedded PC, input (EL1004) and output (EL2008)

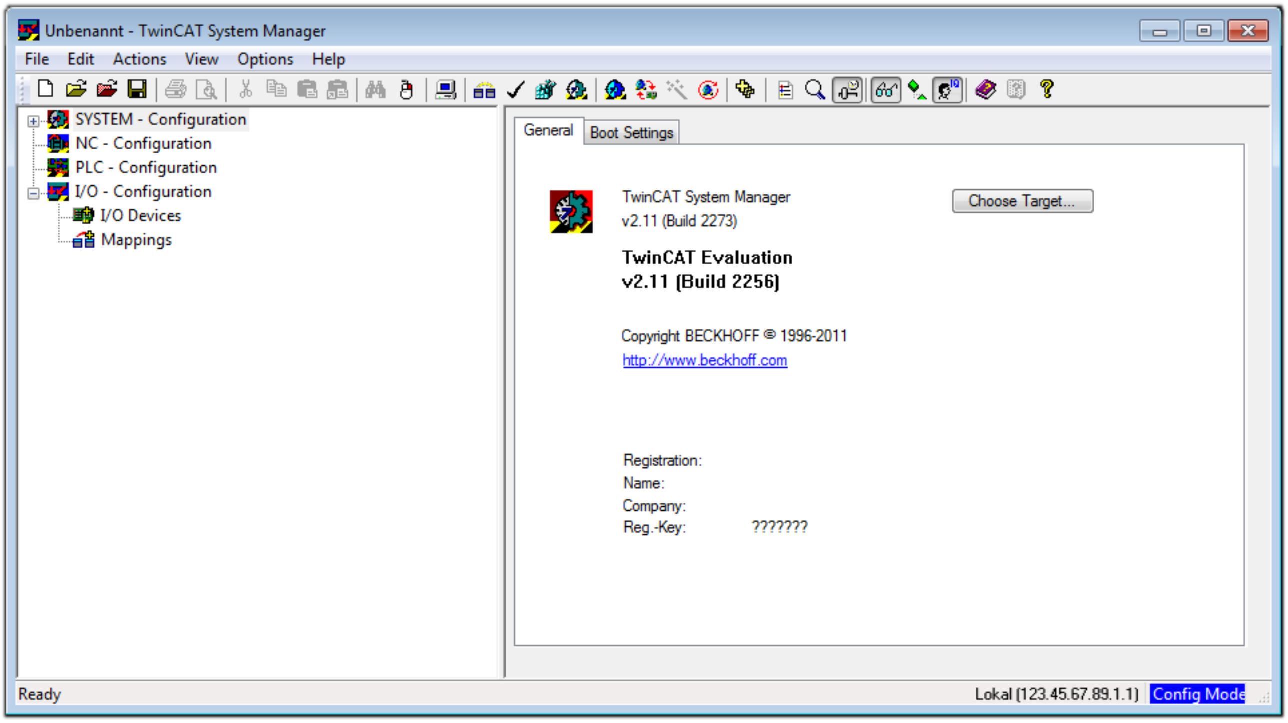
Note that all combinations of a configuration are possible; for example, the EL1004 terminal could also be connected after the coupler, or the EL2008 terminal could additionally be connected to the CX2040 on the right, in which case the EK1100 coupler wouldn’t be necessary.

5.1.1 TwinCAT 2

Startup

TwinCAT basically uses two user interfaces: the TwinCAT System Manager for communication with the electromechanical components and TwinCAT PLC Control for the development and compilation of a controller. The starting point is the TwinCAT System Manager.

After successful installation of the TwinCAT system on the PC to be used for development, the TwinCAT 2 System Manager displays the following user interface after startup:



TwinCAT System Manager
v2.11 (Build 2273)

TwinCAT Evaluation
v2.11 (Build 2256)

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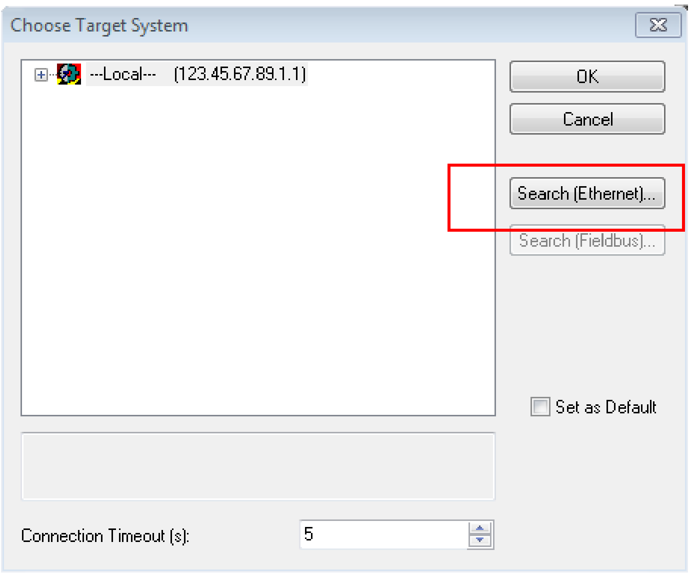
Registration:
Name:
Company:
Reg.-Key: ???????

Lokal (123.45.67.89.1.1)

Fig. 43: Initial TwinCAT 2 user interface

Generally, TwinCAT can be used in local or remote mode. Once the TwinCAT system including the user interface (standard) is installed on the respective PLC, TwinCAT can be used in local mode and thereby the next step is "Insert Device [▶ 48]".

If the intention is to address the TwinCAT runtime environment installed on a PLC as development environment remotely from another system, the target system must be made known first. In the menu under "Actions" → "Choose Target System...", via the symbol " 🖥 " or the "F8" key, open the following window:



---Local--- (123.45.67.89.1.1)

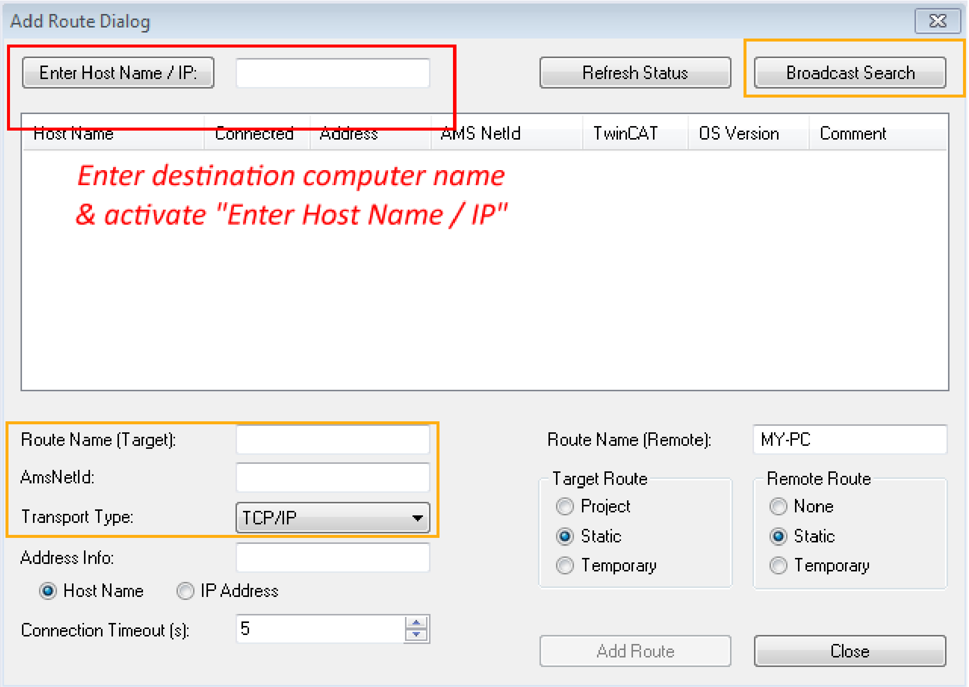
□ Set as Default

Connection Timeout (s): 5

Fig. 44: Selection of the target system

Use "Search (Ethernet)..." to enter the target system. Thus a next dialog opens to either:

- enter the known computer name after "Enter Host Name / IP:" (as shown in red)
- perform a "Broadcast Search" (if the exact computer name is not known)
- enter the known computer IP or AmsNetID.



Host Name	Connected	Address	AMS NetId	TwinCAT	OS Version	Comment

Enter destination computer name & activate "Enter Host Name / IP"

Route Name (Target):

AmsNetId:

Transport Type: TCP/IP

Address Info:

● Host Name ○ IP Address

Connection Timeout (s): 5

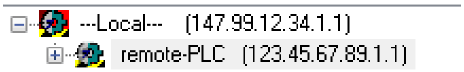
Route Name (Remote): MY-PC

Target Route: ○ Project ● Static ○ Temporary

Remote Route: ○ None ● Static ○ Temporary

Fig. 45: Specify the PLC for access by the TwinCAT System Manager: selection of the target system

Once the target system has been entered, it is available for selection as follows (a password may have to be entered):



---Local--- (147.99.12.34.1.1)
remote-PLC (123.45.67.89.1.1)

After confirmation with "OK" the target system can be accessed via the System Manager.

Adding devices

In the configuration tree of the TwinCAT 2 System Manager user interface on the left, select "I/O Devices” and then right-click to open a context menu and select "Scan Devices…", or start the action in the menu bar via . The TwinCAT System Manager may first have to be set to "Config mode" via or via menu “Actions" → "Set/Reset TwinCAT to Config Mode…" (Shift + F4).

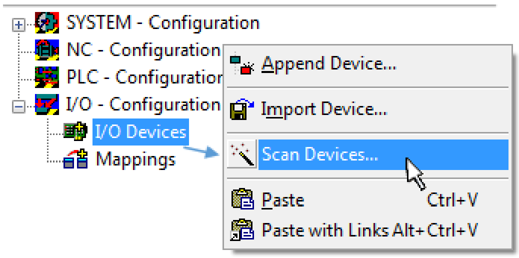
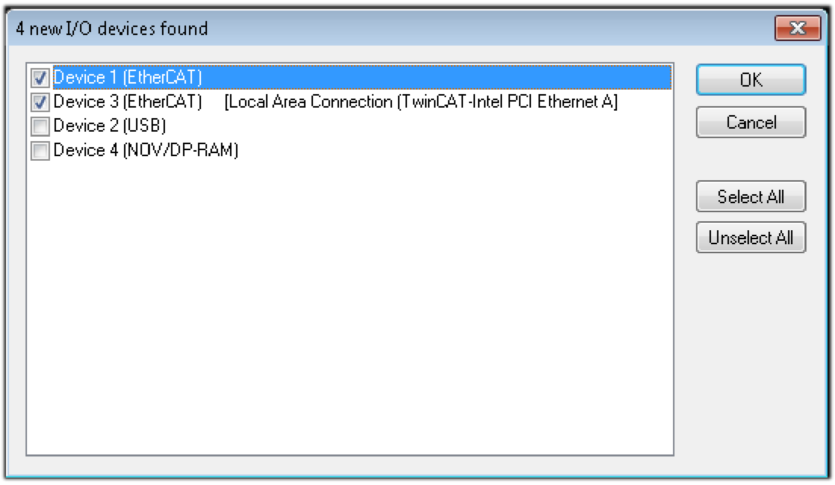


Fig. 46: Select "Scan Devices..."

Confirm the warning message, which follows, and select "EtherCAT" in the dialog:


4 new I/O devices found

☑ Device 1 (EtherCAT)
☑ Device 3 (EtherCAT) [Local Area Connection (TwinCAT-Intel PCI Ethernet A)
□ Device 2 (USB)
□ Device 4 (NOV/DP-RAM)

Fig. 47: Automatic detection of I/O devices: selection the devices to be integrated

Confirm the message "Find new boxes", in order to determine the terminals connected to the devices. "Free Run" enables manipulation of input and output values in "Config mode" and should also be acknowledged.

Based on the sample configuration [▶ 44] described at the beginning of this section, the result is as follows:

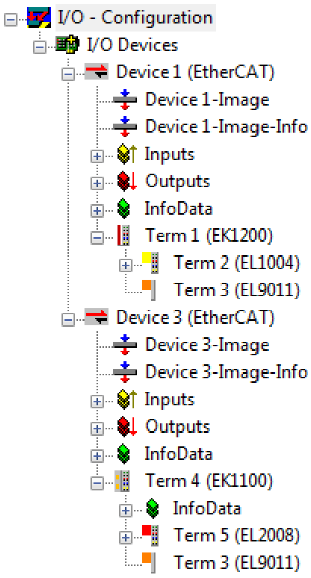


Fig. 48: Mapping of the configuration in the TwinCAT 2 System Manager

The whole process consists of two stages, which may be performed separately (first determine the devices, then determine the connected elements such as boxes, terminals, etc.). A scan can also be initiated by selecting "Device ..." from the context menu, which then reads the elements present in the configuration below:

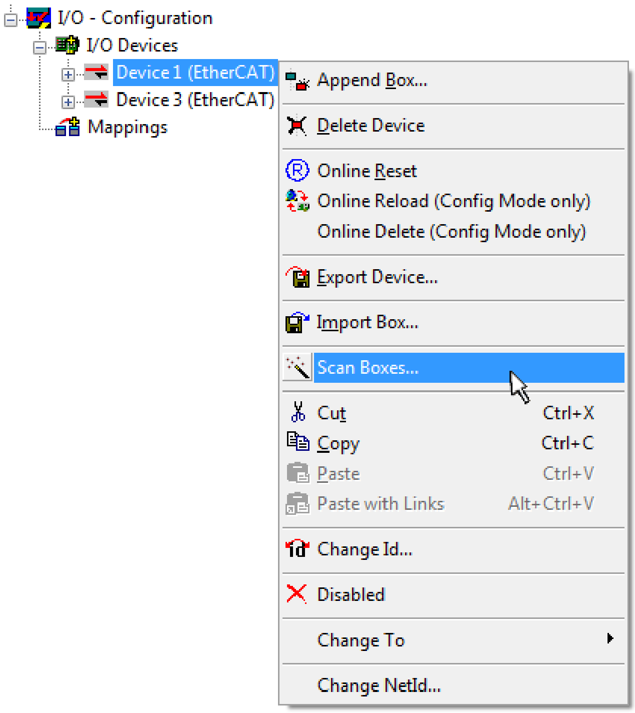


Fig. 49: Reading of individual terminals connected to a device

This functionality is useful if the actual configuration is modified at short notice.

Programming and integrating the PLC

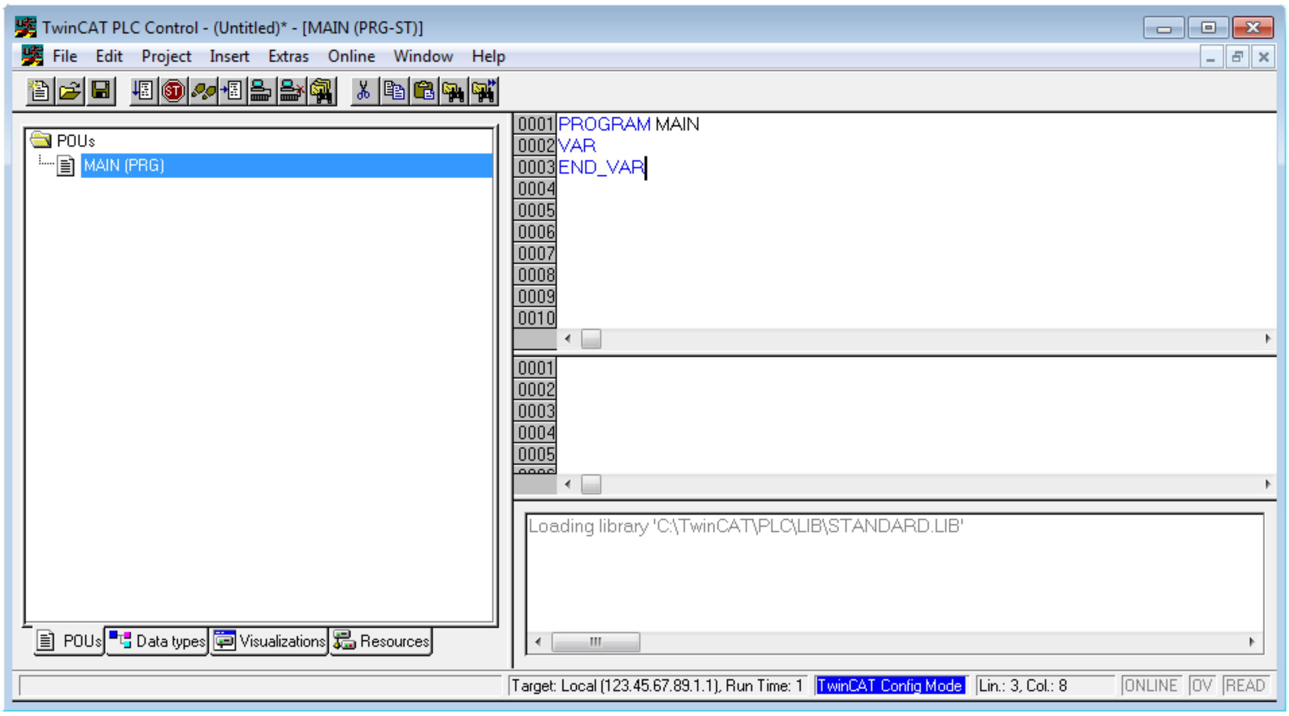
TwinCAT PLC Control is the development environment for the creation of the controller in different program environments: TwinCAT PLC Control supports all languages described in IEC 61131-3. There are two text-based languages and three graphical languages.

- **Text-based languages**
    - Instruction List (IL)

  - Structured Text (ST)
- **Graphical languages**
  - Function Block Diagram (FBD)
  - Ladder Diagram (LD)
  - The Continuous Function Chart Editor (CFC)
  - Sequential Function Chart (SFC)

The following section refers to Structured Text (ST).

After starting TwinCAT PLC Control, the following user interface is shown for an initial project:



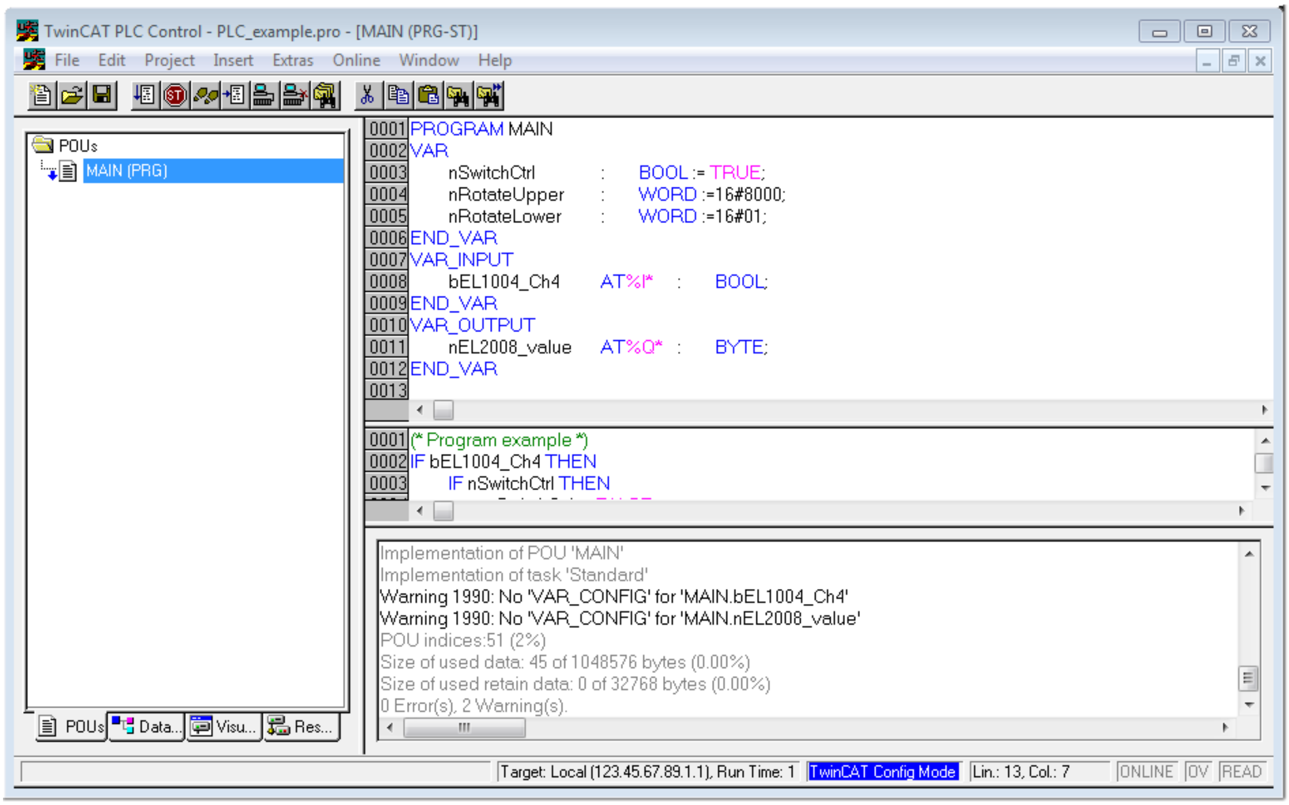
```
PROGRAM MAIN
VAR
END_VAR
```

```
Loading library 'C:\TwinCAT\PLC\LIB\STANDARD.LIB'
```

Target: Local (123.45.67.89.1.1), Run Time: 1 | TwinCAT Config Mode | Lin.: 3, Col.: 8 | ONLINE | OV | READ

Fig. 50: TwinCAT PLC Control after startup

Sample variables and a sample program have been created and stored under the name "PLC_example.pro":


TwinCAT PLC Control - PLC_example.pro - [MAIN (PRG-ST)]
File Edit Project Insert Extras Online Window Help
POUs
MAIN (PRG)
POUs
Data...
Visu...
Res...

```
PROGRAM MAIN
VAR
      nSwitchCtrl       :   BOOL := TRUE;
      nRotateUpper      :   WORD :=16#8000;
      nRotateLower      :   WORD :=16#01;
END_VAR
VAR_INPUT
      bEL1004_Ch4      AT%I*   :      BOOL;
END_VAR
VAR_OUTPUT
      nEL2008_value    AT%Q*   :      BYTE;
END_VAR
```

```
(* Program example *)
IF bEL1004_Ch4 THEN
      IF nSwitchCtrl THEN
```

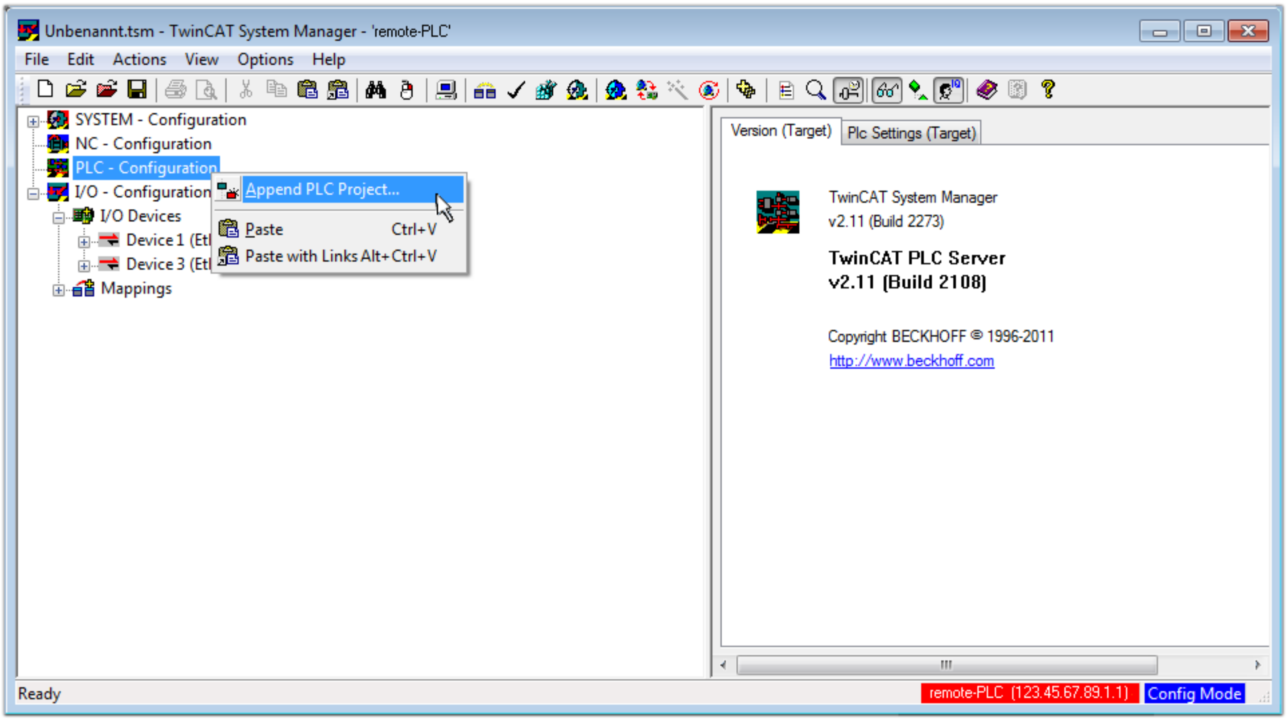
```
Implementation of POU 'MAIN'
Implementation of task 'Standard'
Warning 1990: No 'VAR_CONFIG' for 'MAIN.bEL1004_Ch4'
Warning 1990: No 'VAR_CONFIG' for 'MAIN.nEL2008_value'
POU indices:51 (2%)
Size of used data: 45 of 1048576 bytes (0.00%)
Size of used retain data: 0 of 32768 bytes (0.00%)
0 Error(s), 2 Warning(s).
```

Target: Local (123.45.67.89.1.1), Run Time: 1 | TwinCAT Config Mode | Lin.: 13, Col.: 7 | ONLINE | OV | READ

Fig. 51: Sample program with variables after a compile process (without variable integration)

Warning 1990 (missing "VAR_CONFIG") after a compile process indicates that the variables defined as external (with the ID "AT%I*" or "AT%Q*") have not been assigned. After successful compilation, TwinCAT PLC Control creates a "*.tpy" file in the directory in which the project was stored. This file (*.tpy) contains variable assignments and is not known to the System Manager, hence the warning. Once the System Manager has been notified, the warning no longer appears.

First, integrate the TwinCAT PLC Control project in the **System Manager** via the context menu of the PLC configuration; right-click and select "Append PLC Project…":



TwinCAT System Manager
v2.11 (Build 2273)

TwinCAT PLC Server
v2.11 (Build 2108)

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http://www.beckhoff.com

remote-PLC (123.45.67.89.1.1) | Config Mode

Fig. 52: Appending the TwinCAT PLC Control project

Select the PLC configuration "PLC_example.tpy" in the browser window that opens. The project including the two variables identified with "AT" are then integrated in the configuration tree of the System Manager:

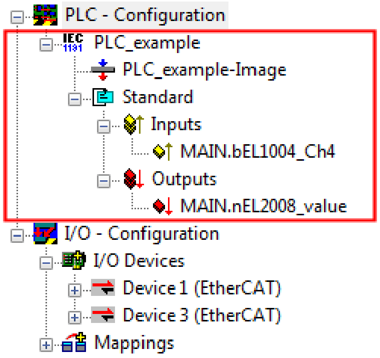
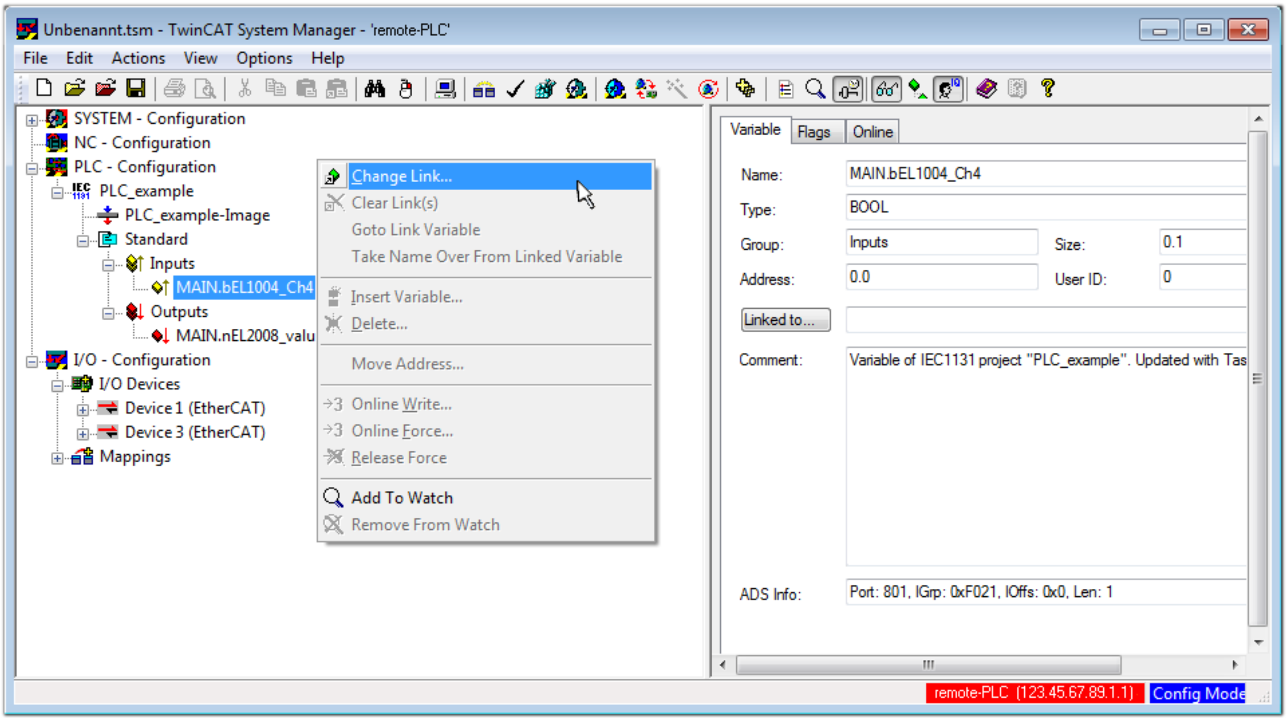


Fig. 53: PLC project integrated in the PLC configuration of the System Manager

The two variables "bEL1004_Ch4" and "nEL2008_value" can now be assigned to certain process objects of the I/O configuration.

Assigning variables

Open a window for selecting a suitable process object (PDO) via the context menu of a variable of the integrated project "PLC_example" and via "Modify Link..." "Standard":



Name: MAIN.bEL1004_Ch4

Type: BOOL

Group: Inputs Size: 0.1

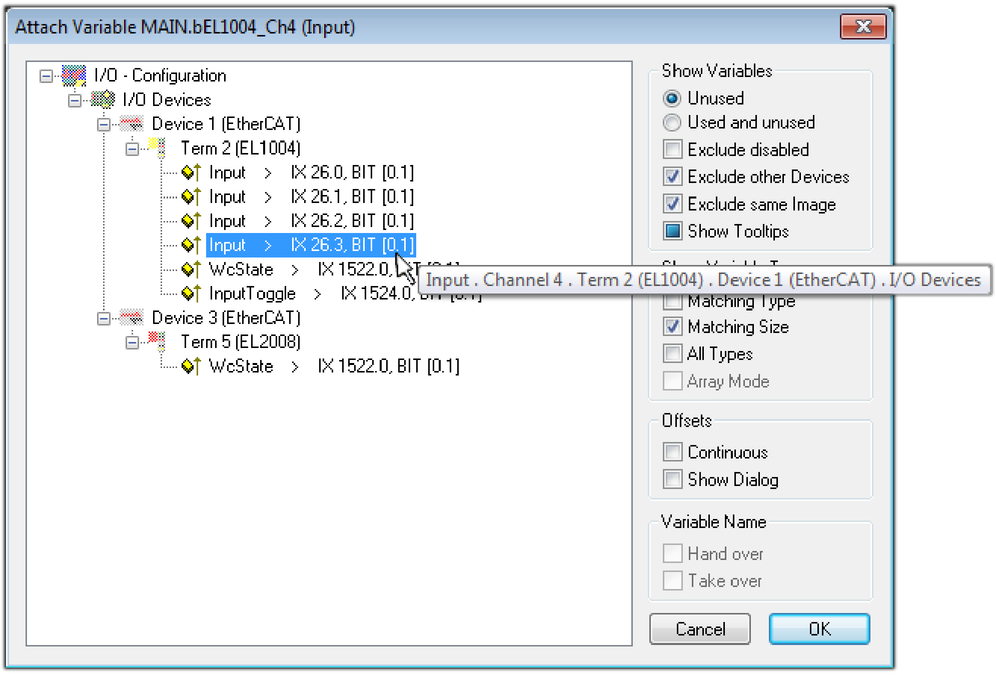
Address: 0.0 User ID: 0

Comment: Variable of IEC1131 project "PLC_example". Updated with Tas

ADS Info: Port: 801, IGrp: 0xF021, IOffs: 0x0, Len: 1

Fig. 54: Creating the links between PLC variables and process objects

In the window that opens, the process object for the variable “bEL1004_Ch4” of type BOOL can be selected from the PLC configuration tree:



Attach Variable MAIN.bEL1004_Ch4 (Input)

I/O - Configuration
I/O Devices
Device 1 (EtherCAT)
Term 2 (EL1004)
Input > IX 26.0, BIT [0.1]
Input > IX 26.1, BIT [0.1]
Input > IX 26.2, BIT [0.1]
Input > IX 26.3, BIT [0.1]
WcState > IX 1522.0, BIT [0.1]
InputToggle > IX 1524.0, BIT [0.1]
Device 3 (EtherCAT)
Term 5 (EL2008)
WcState > IX 1522.0, BIT [0.1]

Input . Channel 4 . Term 2 (EL1004) . Device 1 (EtherCAT) . I/O Devices

Show Variables
● Unused
○ Used and unused
□ Exclude disabled
☑ Exclude other Devices
☑ Exclude same Image
■ Show Tooltips

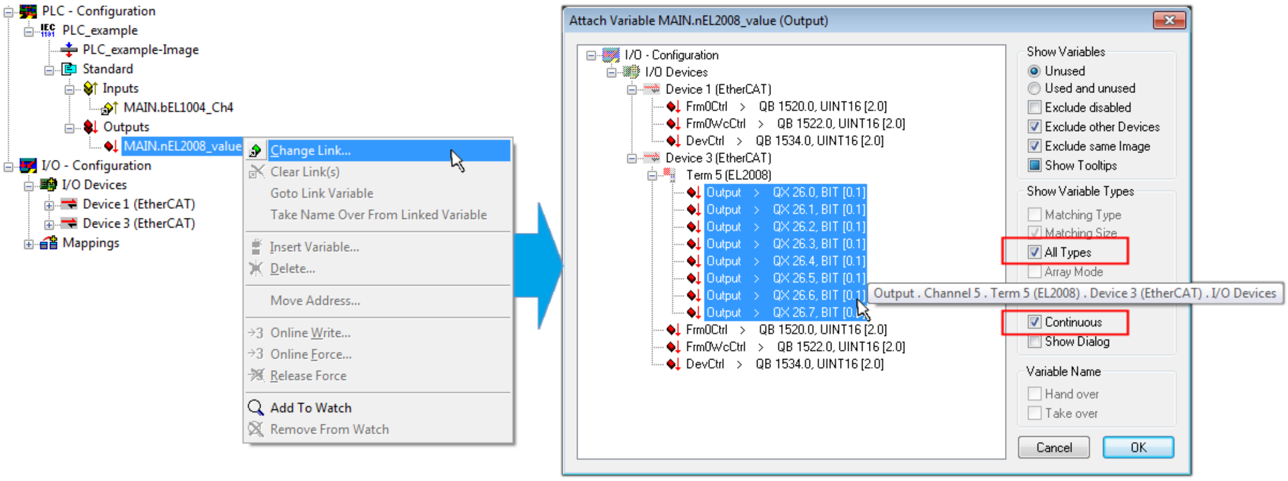
Show Variable Types
□ Matching Type
☑ Matching Size
□ All Types
□ Array Mode

Offsets
□ Continuous
□ Show Dialog

Variable Name
□ Hand over
□ Take over

Fig. 55: Selecting PDO of type BOOL

According to the default setting, certain PDO objects are now available for selection. In this sample the input of channel 4 of the EL1004 terminal is selected for linking. In contrast, the checkbox "All types" must be ticked for creating the link for the output variables, in order to allocate a set of eight separate output bits to a byte variable. The following diagram shows the whole process:



PLC - Configuration
PLC_example
PLC_example-Image
Standard
Inputs
MAIN.bEL1004_Ch4
Outputs
MAIN.nEL2008_value
I/O - Configuration
I/O Devices
Device 1 (EtherCAT)
Device 3 (EtherCAT)
Mappings

Attach Variable MAIN.nEL2008_value (Output)

I/O - Configuration
I/O Devices
Device 1 (EtherCAT)
Frm0Ctrl > QB 1520.0, UINT16 [2.0]
Frm0WcCtrl > QB 1522.0, UINT16 [2.0]
DevCtrl > QB 1534.0, UINT16 [2.0]
Device 3 (EtherCAT)
Term 5 (EL2008)
Output > QX 26.0, BIT [0.1]
Output > QX 26.1, BIT [0.1]
Output > QX 26.2, BIT [0.1]
Output > QX 26.3, BIT [0.1]
Output > QX 26.4, BIT [0.1]
Output > QX 26.5, BIT [0.1]
Output > QX 26.6, BIT [0.1]
Output > QX 26.7, BIT [0.1]
Frm0Ctrl > QB 1520.0, UINT16 [2.0]
Frm0WcCtrl > QB 1522.0, UINT16 [2.0]
DevCtrl > QB 1534.0, UINT16 [2.0]

Output . Channel 5 . Term 5 (EL2008) . Device 3 (EtherCAT) . I/O Devices

Show Variables
● Unused
○ Used and unused
□ Exclude disabled
☑ Exclude other Devices
☑ Exclude same Image
■ Show Tooltips

Show Variable Types
□ Matching Type
☑ Matching Size
☑ All Types
□ Array Mode

☑ Continuous
□ Show Dialog

Variable Name
□ Hand over
□ Take over

Fig. 56: Selecting several PDOs simultaneously: activate "Continuous" and "All types"

Note that the "Continuous" checkbox was also activated. This is designed to allocate the bits contained in the byte of the variable "nEL2008_value" sequentially to all eight selected output bits of the EL2008 terminal. In this way it is possible to subsequently address all eight outputs of the terminal in the program with a byte

corresponding to bit 0 for channel 1 to bit 7 for channel 8 of the PLC. A special symbol (⧉) at the yellow or red object of the variable indicates that a link exists. The links can also be checked by selecting a "Goto Link Variable" from the context menu of a variable. The object opposite, in this case the PDO, is automatically selected:

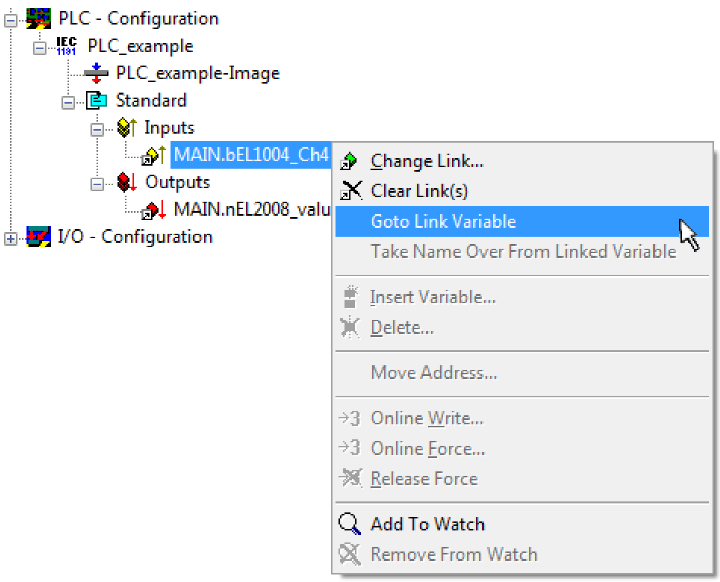
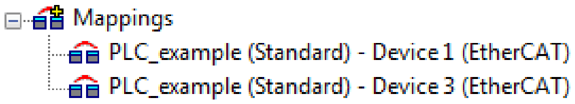


Fig. 57: Application of a "Goto Link" variable, using "MAIN.bEL1004_Ch4" as a sample

The process of assigning variables to the PDO is completed via the menu selection "Actions" → "Generate Mappings", key Ctrl+M or by clicking on the symbol in the menu.

This can be visualized in the configuration:


Mappings
PLC_example (Standard) - Device 1 (EtherCAT)
PLC_example (Standard) - Device 3 (EtherCAT)

The process of creating links can also take place in the opposite direction, i.e. starting with individual PDOs to variable. However, in this example it would then not be possible to select all output bits for the EL2008, since the terminal only makes individual digital outputs available. If a terminal has a byte, word, integer or similar PDO, it is possible to allocate this a set of bit-standardised variables (type "BOOL"). Here, too, a "Goto Link Variable" from the context menu of a PDO can be executed in the other direction, so that the respective PLC instance can then be selected.

Activation of the configuration

The allocation of PDO to PLC variables has now established the connection from the controller to the inputs and outputs of the terminals. The configuration can now be activated. First, the configuration can be verified via ✓ (or via "Actions" → "Check Configuration"). If no error is present, the configuration can be activated via (or via "Actions" → "Activate Configuration…") to transfer the System Manager settings to the runtime system. Confirm the messages "Old configurations are overwritten!" and "Restart TwinCAT system in Run mode" with "OK".

A few seconds later the real-time status RTime 0% is displayed at the bottom right in the System Manager. The PLC system can then be started as described below.

Starting the controller

Starting from a remote system, the PLC control has to be linked with the Embedded PC over Ethernet via "Online" → “Choose Run-Time System…":

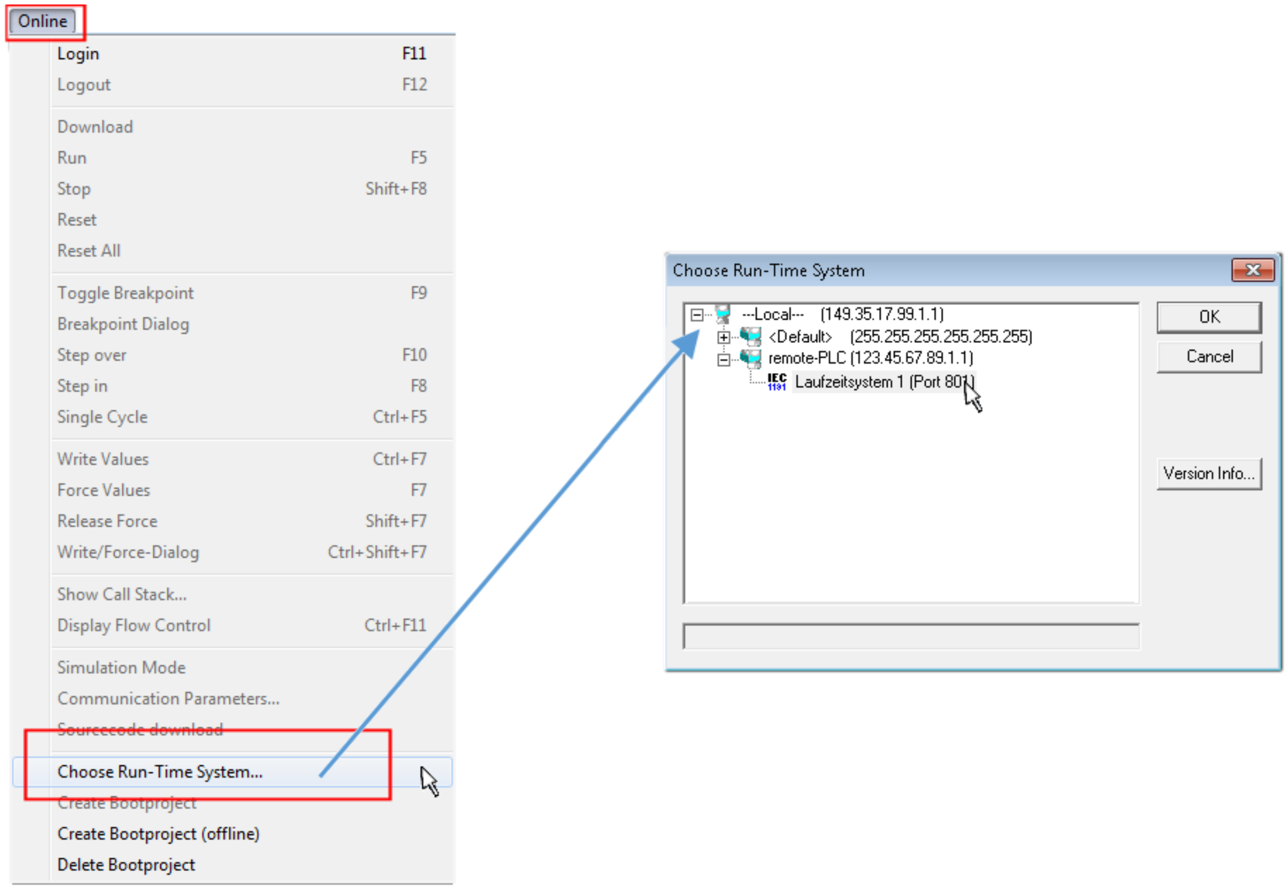
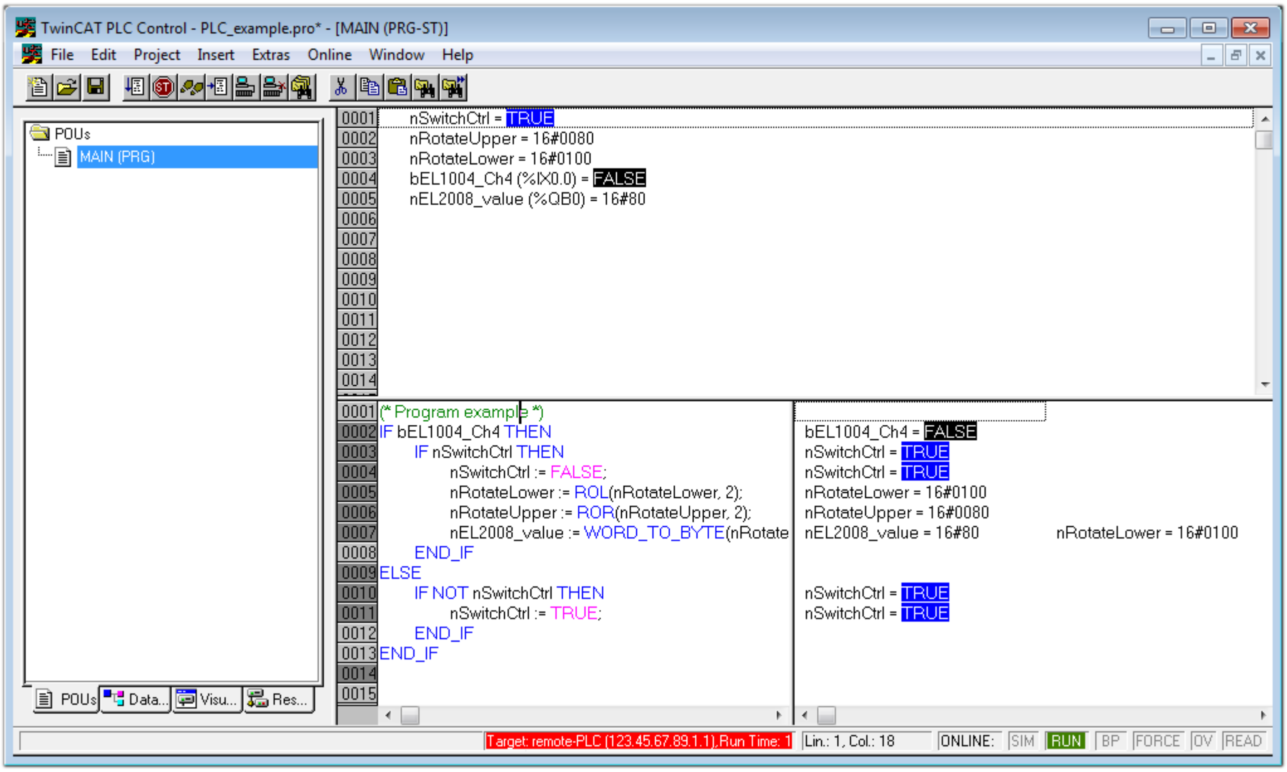


Fig. 58: Choose target system (remote)

In this sample "Runtime system 1 (port 801)" is selected and confirmed. Link the PLC with the real-time system via menu option "Online" → "Login", the F11 key or by clicking on the symbol . The control program can then be loaded for execution. This results in the message "No program on the controller! Should the new program be loaded?", which should be acknowledged with "Yes". The runtime environment is ready for the program start:


TwinCAT PLC Control - PLC_example.pro* - [MAIN (PRG-ST)]
File Edit Project Insert Extras Online Window Help
POUs
MAIN (PRG)
POUs Data... Visu... Res...
Target: remote-PLC (123.45.67.89.1.1),Run Time: 1
Lin.: 1, Col.: 18
ONLINE: SIM RUN BP FORCE OV READ

```
    nSwitchCtrl = TRUE
    nRotateUpper = 16#0080
    nRotateLower = 16#0100
    bEL1004_Ch4 (%IX0.0) = FALSE
    nEL2008_value (%QB0) = 16#80
```

```
(* Program example *)
IF bEL1004_Ch4 THEN
    IF nSwitchCtrl THEN
        nSwitchCtrl := FALSE;
        nRotateLower := ROL(nRotateLower, 2);
        nRotateUpper := ROR(nRotateUpper, 2);
        nEL2008_value := WORD_TO_BYTE(nRotate
    END_IF
ELSE
    IF NOT nSwitchCtrl THEN
        nSwitchCtrl := TRUE;
    END_IF
END_IF
```

```
bEL1004_Ch4 = FALSE
nSwitchCtrl = TRUE
nSwitchCtrl = TRUE
nRotateLower = 16#0100
nRotateUpper = 16#0080
nEL2008_value = 16#80        nRotateLower = 16#0100

nSwitchCtrl = TRUE
nSwitchCtrl = TRUE
```

Fig. 59: PLC Control logged in, ready for program startup

The PLC can now be started via "Online" → "Run", F5 key or .

5.1.2 TwinCAT 3

Startup

TwinCAT makes the development environment areas available together with Microsoft Visual Studio: after startup, the project folder explorer appears on the left in the general window area (cf. "TwinCAT System Manager" of TwinCAT 2) for communication with the electromechanical components.

After successful installation of the TwinCAT system on the PC to be used for development, TwinCAT 3 (shell) displays the following user interface after startup:

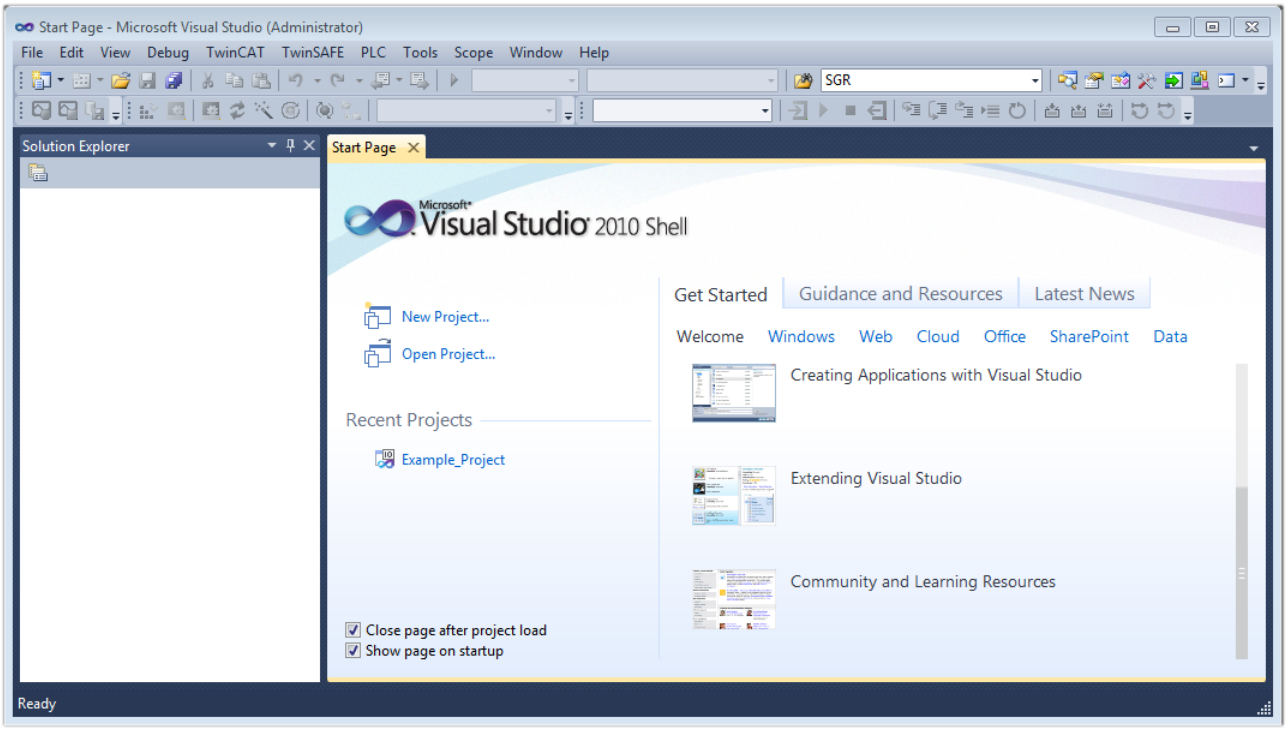
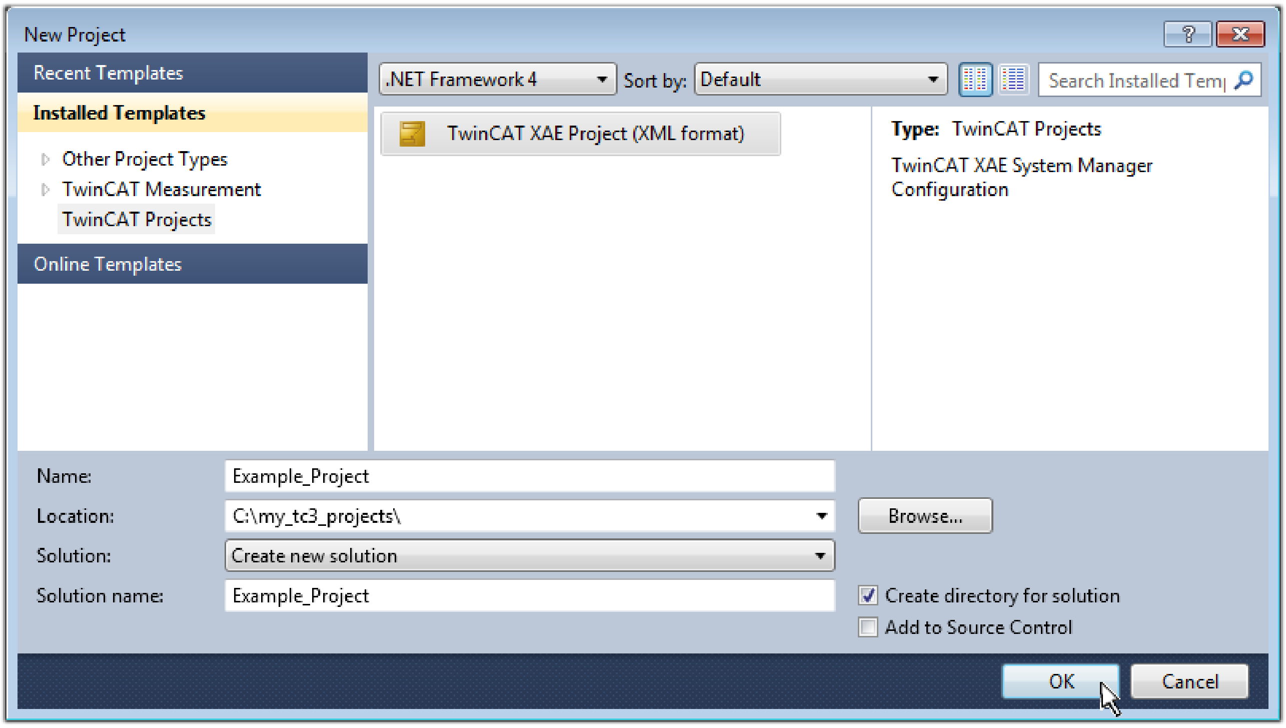

Start Page - Microsoft Visual Studio (Administrator)
File Edit View Debug TwinCAT TwinSAFE PLC Tools Scope Window Help
SGR
Solution Explorer
Start Page
Microsoft® Visual Studio® 2010 Shell
New Project...
Open Project...
Recent Projects
Example_Project
Get Started
Guidance and Resources
Latest News
Welcome Windows Web Cloud Office SharePoint Data
Creating Applications with Visual Studio
Extending Visual Studio
Community and Learning Resources
☑ Close page after project load
☑ Show page on startup
Ready

Fig. 60: Initial TwinCAT 3 user interface

First create a new project via New TwinCAT Project... (or under "File"→“New"→ "Project…"). In the following dialog make the corresponding entries as required (as shown in the diagram):



.NET Framework 4

Sort by: Default

Type: TwinCAT Projects

TwinCAT XAE System Manager Configuration

Name: Example_Project

Location: C:\my_tc3_projects\

Solution: Create new solution

Solution name: Example_Project

☑ Create directory for solution

□ Add to Source Control

Fig. 61: Create new TwinCAT project

The new project is then available in the project folder explorer:

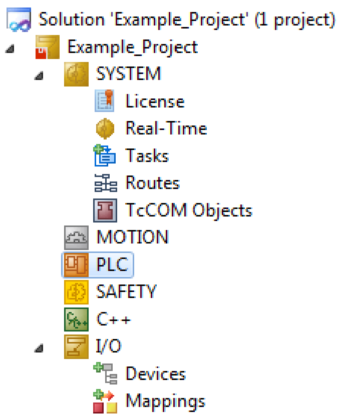
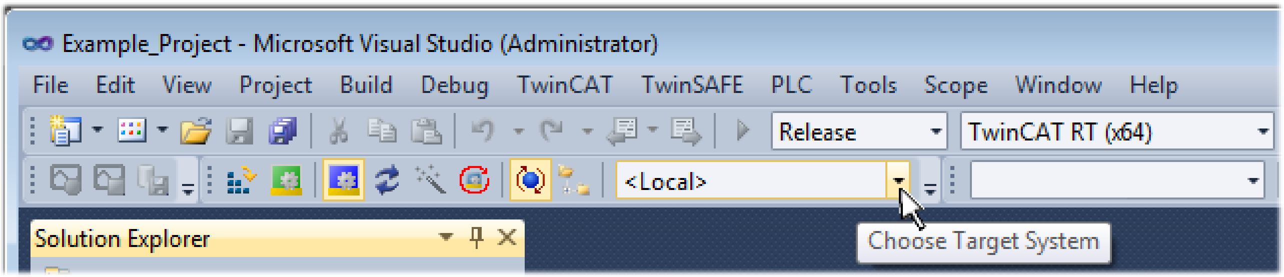


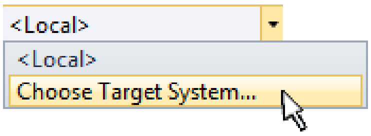
Fig. 62: New TwinCAT3 project in the project folder explorer

Generally, TwinCAT can be used in local or remote mode. Once the TwinCAT system including the user interface (standard) is installed on the respective PLC, TwinCAT can be used in local mode and thereby the next step is "Insert Device [▶ 59]".

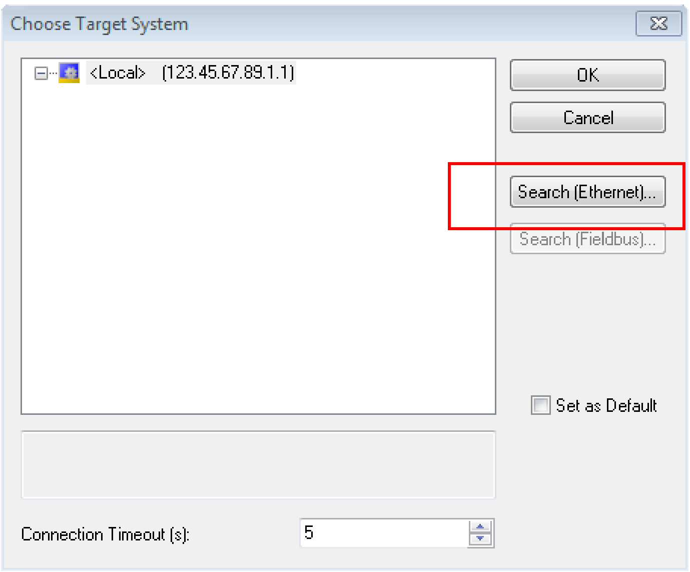
If the intention is to address the TwinCAT runtime environment installed on a PLC as development environment remotely from another system, the target system must be made known first. Via the symbol in the menu bar:



expand the pull-down menu:



and open the following window:

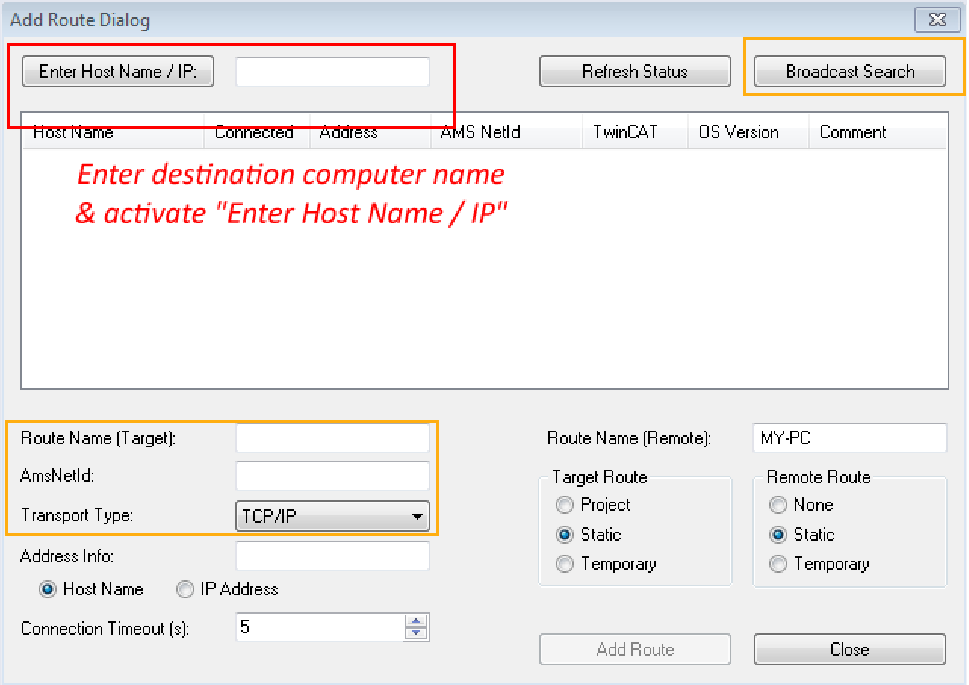


Connection Timeout (s): 5

Fig. 63: Selection dialog: Choose the target system

Use "Search (Ethernet)..." to enter the target system. Thus a next dialog opens to either:

- enter the known computer name after "Enter Host Name / IP:" (as shown in red)
- perform a "Broadcast Search" (if the exact computer name is not known)
- enter the known computer IP or AmsNetID.



Add Route Dialog

Enter Host Name / IP:

Host Name	Connected	Address	AMS NetId	TwinCAT	OS Version	Comment

Enter destination computer name & activate "Enter Host Name / IP"

Route Name (Target):

AmsNetId:

Transport Type: TCP/IP

Address Info:

● Host Name ○ IP Address

Connection Timeout (s): 5

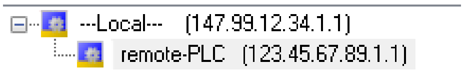
Route Name (Remote): MY-PC

Target Route: ○ Project ● Static ○ Temporary

Remote Route: ○ None ● Static ○ Temporary

Fig. 64: Specify the PLC for access by the TwinCAT System Manager: selection of the target system

Once the target system has been entered, it is available for selection as follows (a password may have to be entered):



---Local--- (147.99.12.34.1.1)

remote-PLC (123.45.67.89.1.1)

After confirmation with "OK" the target system can be accessed via the Visual Studio shell.

Adding devices

In the project folder explorer of the Visual Studio shell user interface on the left, select "Devices" within element “I/O”, then right-click to open a context menu and select "Scan" or start the action via in the menu bar. The TwinCAT System Manager may first have to be set to "Config mode" via or via the menu "TwinCAT" → "Restart TwinCAT (Config mode)".

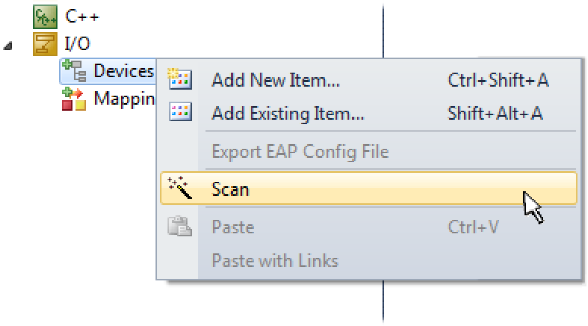
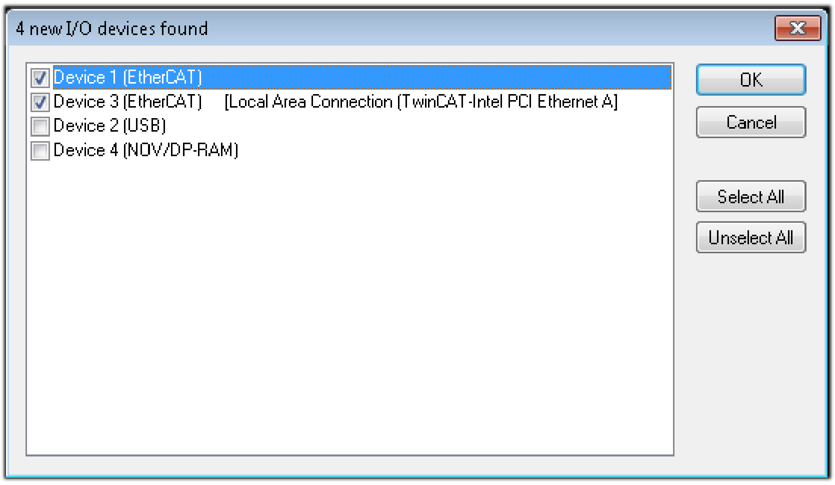


Fig. 65: Select "Scan"

Confirm the warning message, which follows, and select "EtherCAT" in the dialog:



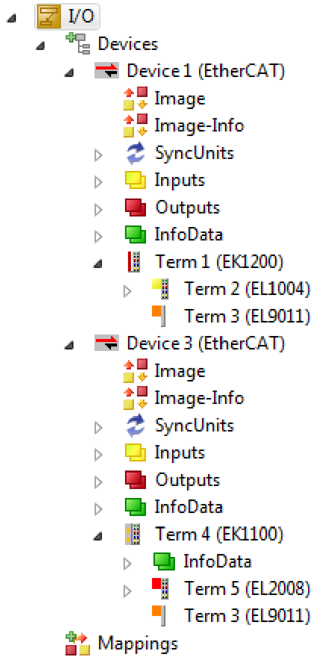
4 new I/O devices found

- ☑ Device 1 (EtherCAT)
- ☑ Device 3 (EtherCAT) [Local Area Connection (TwinCAT-Intel PCI Ethernet A]
- □ Device 2 (USB)
- □ Device 4 (NOV/DP-RAM)

Fig. 66: Automatic detection of I/O devices: selection the devices to be integrated

Confirm the message "Find new boxes", in order to determine the terminals connected to the devices. "Free Run" enables manipulation of input and output values in "Config mode" and should also be acknowledged.

Based on the sample configuration [▶ 44] described at the beginning of this section, the result is as follows:



- I/O
  - Devices
    - Device 1 (EtherCAT)
      - Image
      - Image-Info
      - SyncUnits
      - Inputs
      - Outputs
      - InfoData
      - Term 1 (EK1200)
        - Term 2 (EL1004)
        - Term 3 (EL9011)
    - Device 3 (EtherCAT)
      - Image
      - Image-Info
      - SyncUnits
      - Inputs
      - Outputs
      - InfoData
      - Term 4 (EK1100)
        - InfoData
        - Term 5 (EL2008)
        - Term 3 (EL9011)
  - Mappings

Fig. 67: Mapping of the configuration in VS shell of the TwinCAT3 environment

The whole process consists of two stages, which may be performed separately (first determine the devices, then determine the connected elements such as boxes, terminals, etc.). A scan can also be initiated by selecting "Device ..." from the context menu, which then reads the elements present in the configuration below:

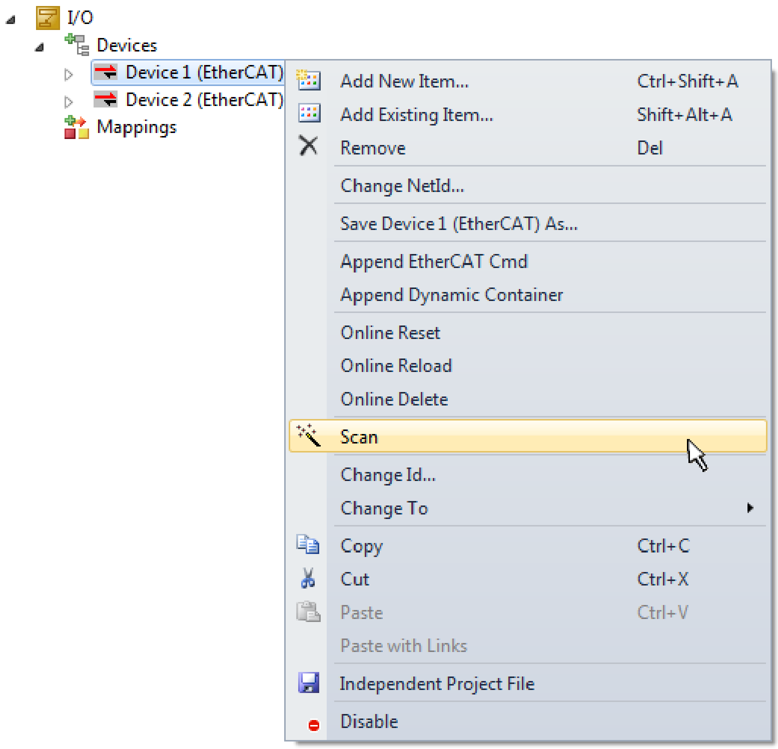


Fig. 68: Reading of individual terminals connected to a device

This functionality is useful if the actual configuration is modified at short notice.

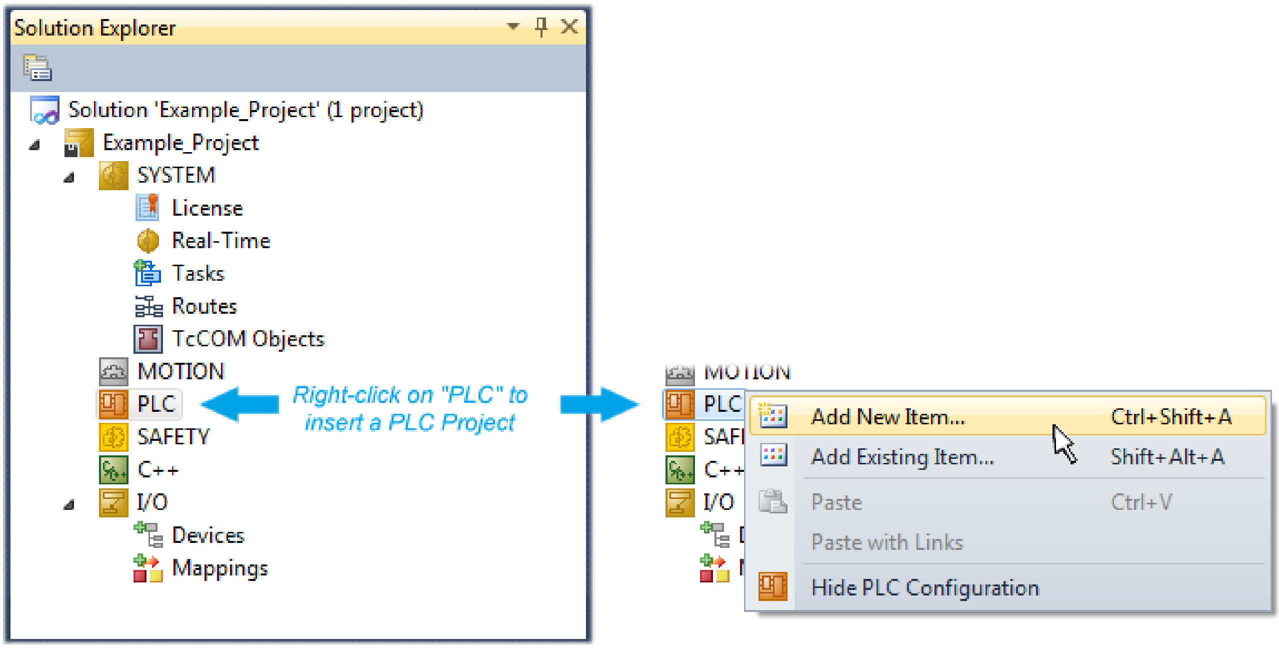
Programming the PLC

TwinCAT PLC Control is the development environment for the creation of the controller in different program environments: TwinCAT PLC Control supports all languages described in IEC 61131-3. There are two text-based languages and three graphical languages.

- **Text-based languages**
  - Instruction List (IL)
  - Structured Text (ST)
- **Graphical languages**
  - Function Block Diagram (FBD)
  - Ladder Diagram (LD)
  - The Continuous Function Chart Editor (CFC)
  - Sequential Function Chart (SFC)

The following section refers to Structured Text (ST).

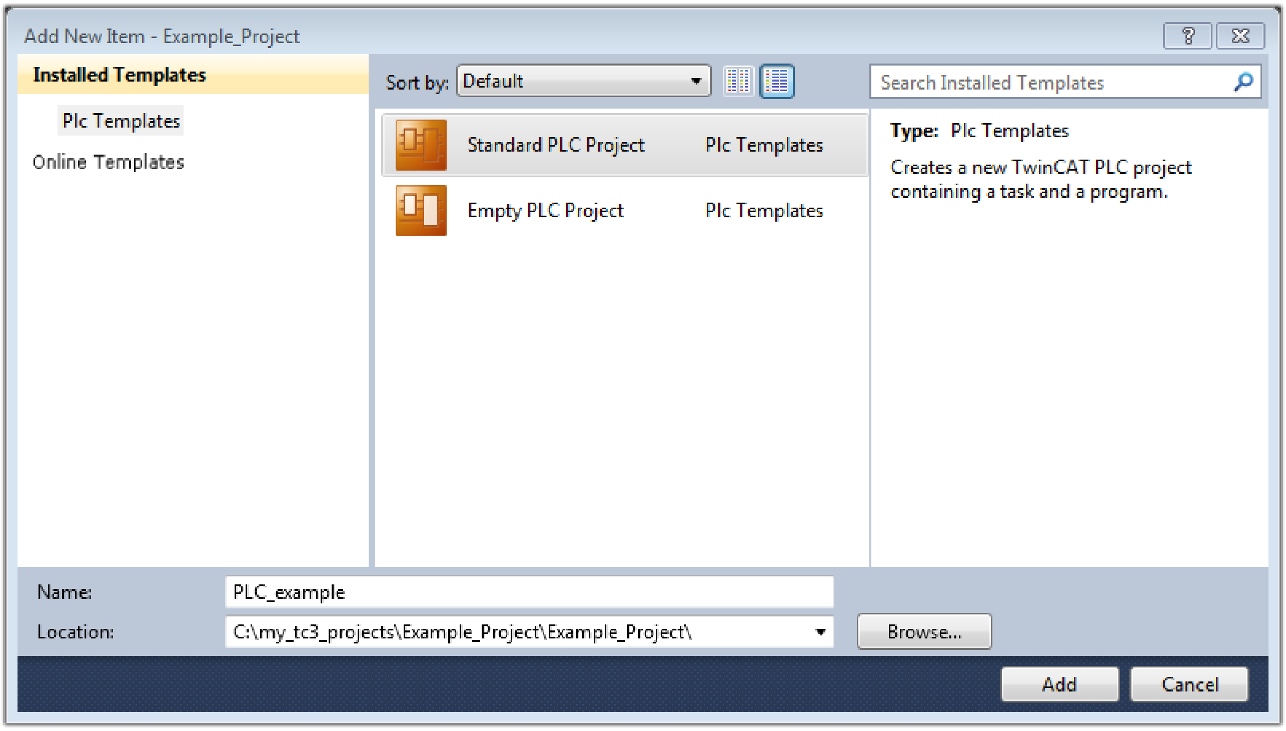
In order to create a programming environment, a PLC subproject is added to the project sample via the context menu of "PLC" in the project folder explorer by selecting "Add New Item….":



Right-click on "PLC" to insert a PLC Project

Fig. 69: Adding the programming environment in "PLC"

In the dialog that opens select "Standard PLC project" and enter "PLC_example" as project name, for example, and select a corresponding directory:


Add New Item - Example_Project
Installed Templates
Plc Templates
Online Templates
Sort by: Default
Search Installed Templates
Standard PLC Project Plc Templates
Empty PLC Project Plc Templates
Browse...
Add
Cancel

Type: Plc Templates

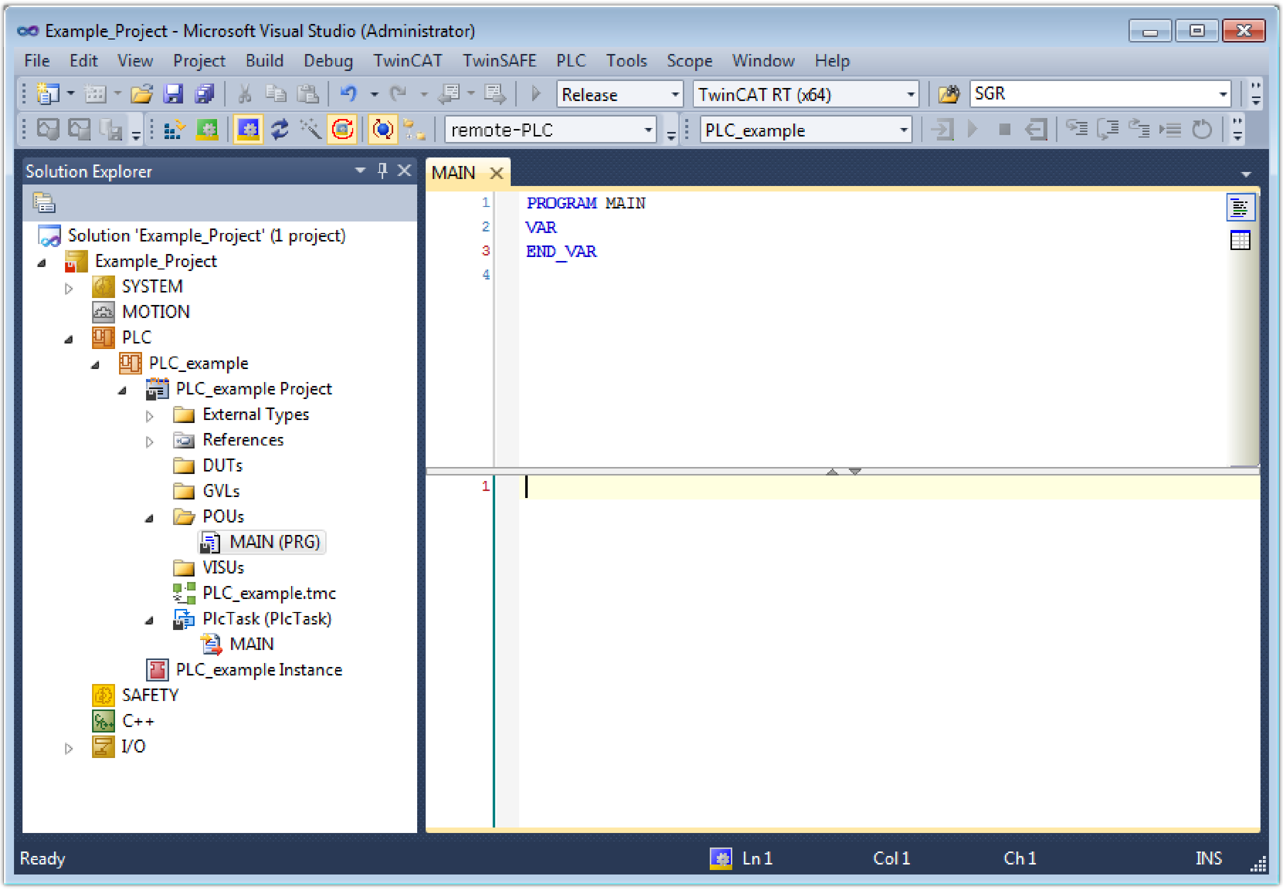
Creates a new TwinCAT PLC project containing a task and a program.

Name: PLC_example

Location: C:\my_tc3_projects\Example_Project\Example_Project\

Fig. 70: Specifying the name and directory for the PLC programming environment

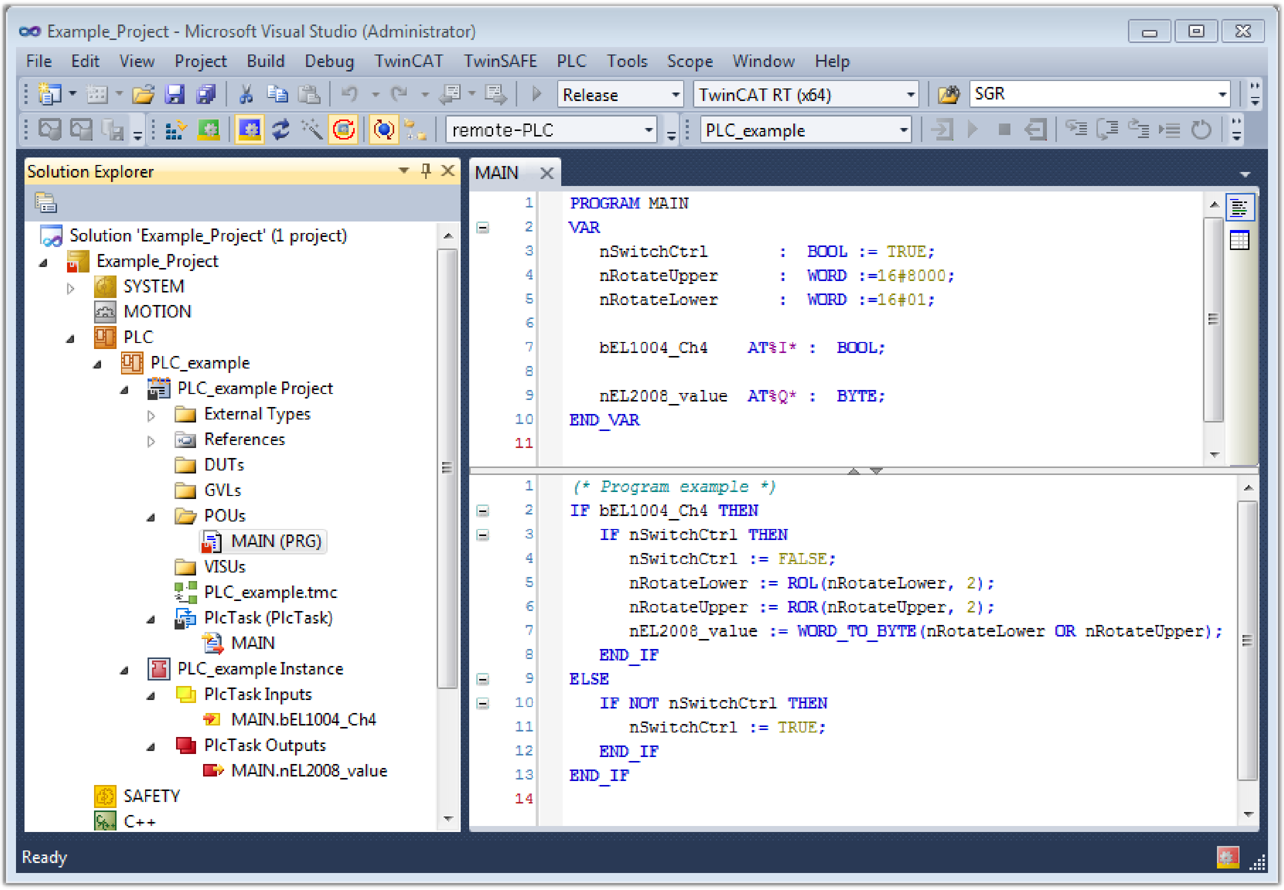
The "Main" program, which already exists by selecting "Standard PLC project", can be opened by double-clicking on "PLC_example_project" in "POUs”. The following user interface is shown for an initial project:



```
PROGRAM MAIN
VAR
END_VAR
```

Fig. 71: Initial "Main" program of the standard PLC project

To continue, sample variables and a sample program have now been created:



```
PROGRAM MAIN
VAR
    nSwitchCtrl       :  BOOL := TRUE;
    nRotateUpper      :  WORD :=16#8000;
    nRotateLower      :  WORD :=16#01;

    bEL1004_Ch4    AT%I* :  BOOL;

    nEL2008_value  AT%Q* :  BYTE;
END_VAR
```

```
(* Program example *)
IF bEL1004_Ch4 THEN
    IF nSwitchCtrl THEN
        nSwitchCtrl := FALSE;
        nRotateLower := ROL(nRotateLower, 2);
        nRotateUpper := ROR(nRotateUpper, 2);
        nEL2008_value := WORD_TO_BYTE(nRotateLower OR nRotateUpper);
    END_IF
ELSE
    IF NOT nSwitchCtrl THEN
        nSwitchCtrl := TRUE;
    END_IF
END_IF
```

Fig. 72: Sample program with variables after a compile process (without variable integration)

The control program is now created as a project folder, followed by the compile process:

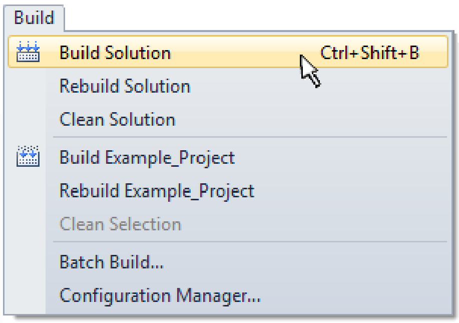
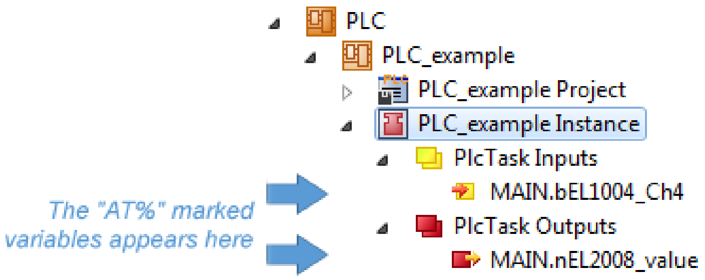


Fig. 73: Start program compilation

The following variables, identified in the ST/ PLC program with "AT%", are then available in under "Assignments" in the project folder explorer:



Assigning variables

Via the menu of an instance - variables in the "PLC" context, use the "Modify Link…" option to open a window for selecting a suitable process object (PDO) for linking:

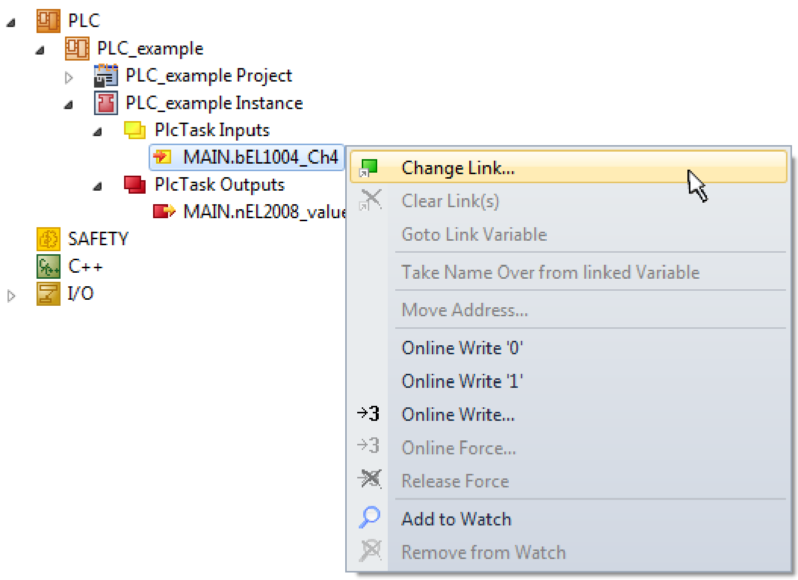
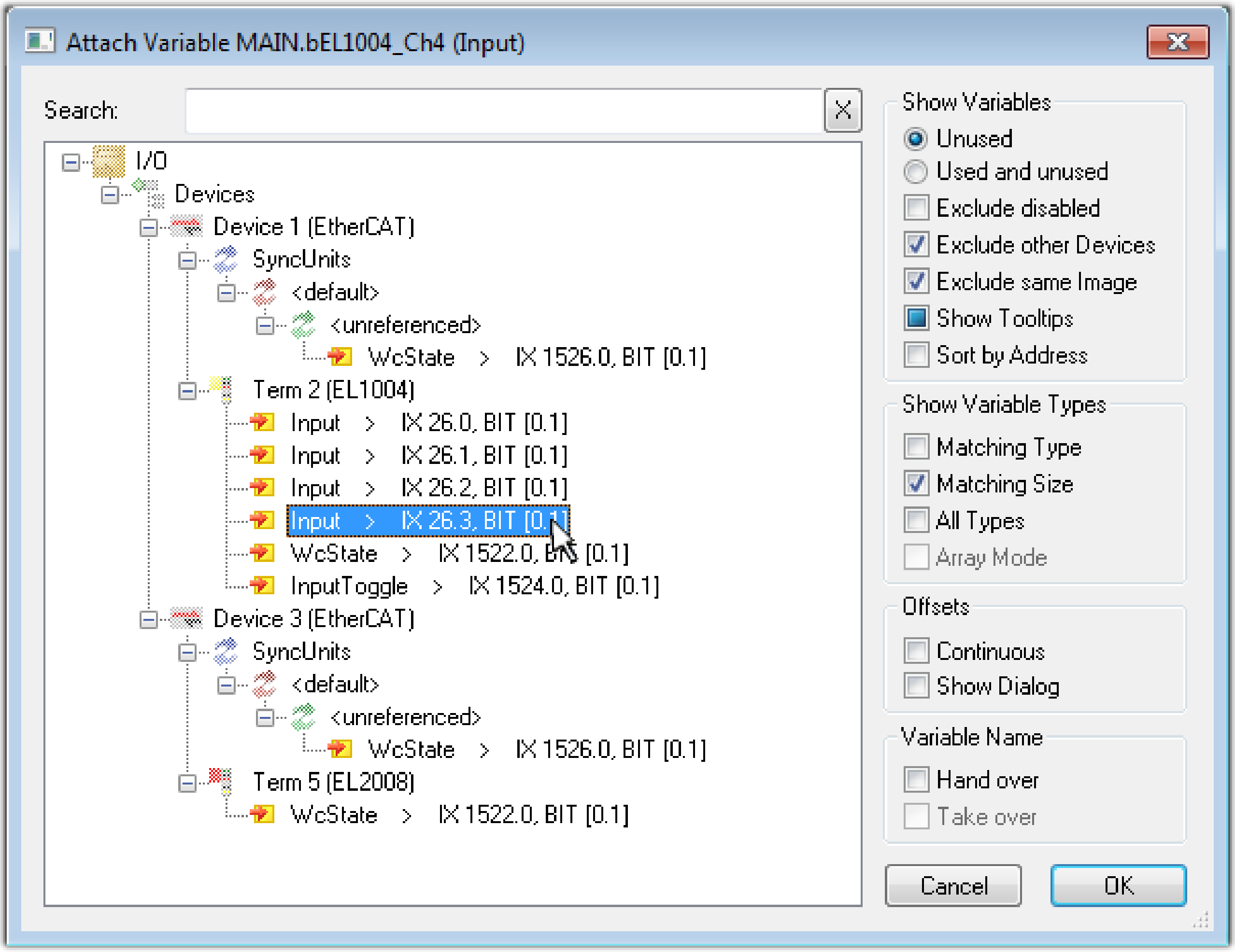


Fig. 74: Creating the links between PLC variables and process objects

In the window that opens, the process object for the variable "bEL1004_Ch4" of type BOOL can be selected from the PLC configuration tree:



Attach Variable MAIN.bEL1004_Ch4 (Input)

Search:

```
I/O
  Devices
    Device 1 (EtherCAT)
      SyncUnits
        <default>
          <unreferenced>
            WcState  >  IX 1526.0, BIT [0.1]
      Term 2 (EL1004)
        Input  >  IX 26.0, BIT [0.1]
        Input  >  IX 26.1, BIT [0.1]
        Input  >  IX 26.2, BIT [0.1]
        Input  >  IX 26.3, BIT [0.1]
        WcState  >  IX 1522.0, BIT [0.1]
        InputToggle  >  IX 1524.0, BIT [0.1]
    Device 3 (EtherCAT)
      SyncUnits
        <default>
          <unreferenced>
            WcState  >  IX 1526.0, BIT [0.1]
      Term 5 (EL2008)
        WcState  >  IX 1522.0, BIT [0.1]
```

Show Variables
● Unused
○ Used and unused
□ Exclude disabled
☑ Exclude other Devices
☑ Exclude same Image
■ Show Tooltips
□ Sort by Address

Show Variable Types
□ Matching Type
☑ Matching Size
□ All Types
□ Array Mode

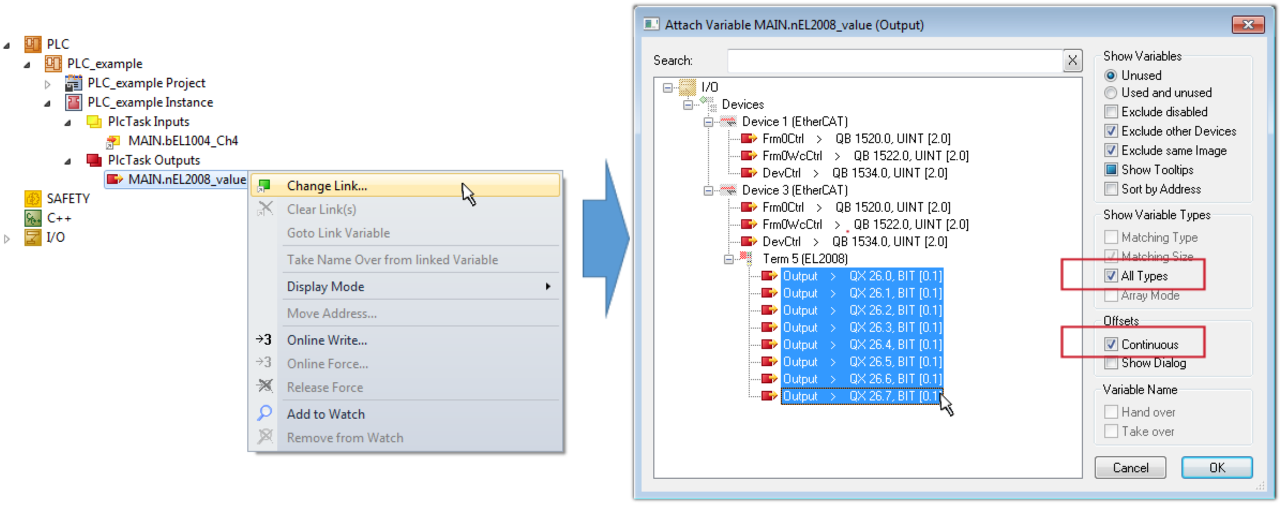
Offsets
□ Continuous
□ Show Dialog

Variable Name
□ Hand over
□ Take over

Cancel OK

Fig. 75: Selecting PDO of type BOOL

According to the default setting, certain PDO objects are now available for selection. In this sample the input of channel 4 of the EL1004 terminal is selected for linking. In contrast, the checkbox "All types" must be ticked for creating the link for the output variables, in order to allocate a set of eight separate output bits to a byte variable. The following diagram shows the whole process:


PLC
PLC_example
PLC_example Project
PLC_example Instance
PlcTask Inputs
MAIN.bEL1004_Ch4
PlcTask Outputs
MAIN.nEL2008_value
SAFETY
C++
I/O
Change Link...
Clear Link(s)
Goto Link Variable
Take Name Over from linked Variable
Display Mode
Move Address...
Online Write...
Online Force...
Release Force
Add to Watch
Remove from Watch
Attach Variable MAIN.nEL2008_value (Output)
Search:
I/O
Devices
Device 1 (EtherCAT)
FrmOCtrl > QB 1520.0, UINT [2.0]
FrmOWcCtrl > QB 1522.0, UINT [2.0]
DevCtrl > QB 1534.0, UINT [2.0]
Device 3 (EtherCAT)
FrmOCtrl > QB 1520.0, UINT [2.0]
FrmOWcCtrl > QB 1522.0, UINT [2.0]
DevCtrl > QB 1534.0, UINT [2.0]
Term 5 (EL2008)
Output > QX 26.0, BIT [0.1]
Output > QX 26.1, BIT [0.1]
Output > QX 26.2, BIT [0.1]
Output > QX 26.3, BIT [0.1]
Output > QX 26.4, BIT [0.1]
Output > QX 26.5, BIT [0.1]
Output > QX 26.6, BIT [0.1]
Output > QX 26.7, BIT [0.1]
Cancel
OK

Show Variables
- ● Unused
- ○ Used and unused
- □ Exclude disabled
- ☑ Exclude other Devices
- ☑ Exclude same Image
- ■ Show Tooltips
- □ Sort by Address

Show Variable Types
- □ Matching Type
- ☑ Matching Size
- ☑ All Types
- □ Array Mode

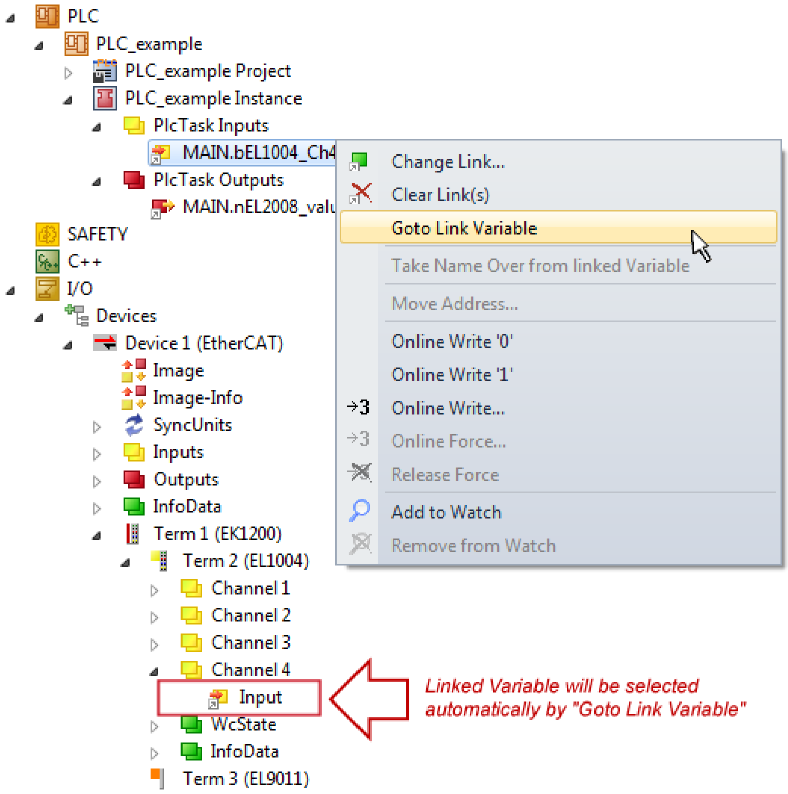
Offsets
- ☑ Continuous
- □ Show Dialog

Variable Name
- □ Hand over
- □ Take over

Fig. 76: Selecting several PDOs simultaneously: activate "Continuous" and "All types"

Note that the "Continuous" checkbox was also activated. This is designed to allocate the bits contained in the byte of the variable "nEL2008_value" sequentially to all eight selected output bits of the EL2008 terminal. In this way it is possible to subsequently address all eight outputs of the terminal in the program with a byte

corresponding to bit 0 for channel 1 to bit 7 for channel 8 of the PLC. A special symbol (◪) at the yellow or red object of the variable indicates that a link exists. The links can also be checked by selecting a "Goto Link Variable” from the context menu of a variable. The object opposite, in this case the PDO, is automatically selected:



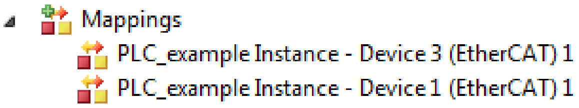
Linked Variable will be selected automatically by "Goto Link Variable"

Fig. 77: Application of a "Goto Link" variable, using "MAIN.bEL1004_Ch4" as a sample

The process of creating links can also take place in the opposite direction, i.e. starting with individual PDOs to variable. However, in this example it would then not be possible to select all output bits for the EL2008, since the terminal only makes individual digital outputs available. If a terminal has a byte, word, integer or similar PDO, it is possible to allocate this a set of bit-standardised variables (type "BOOL"). Here, too, a "Goto Link Variable” from the context menu of a PDO can be executed in the other direction, so that the respective PLC instance can then be selected.

Activation of the configuration

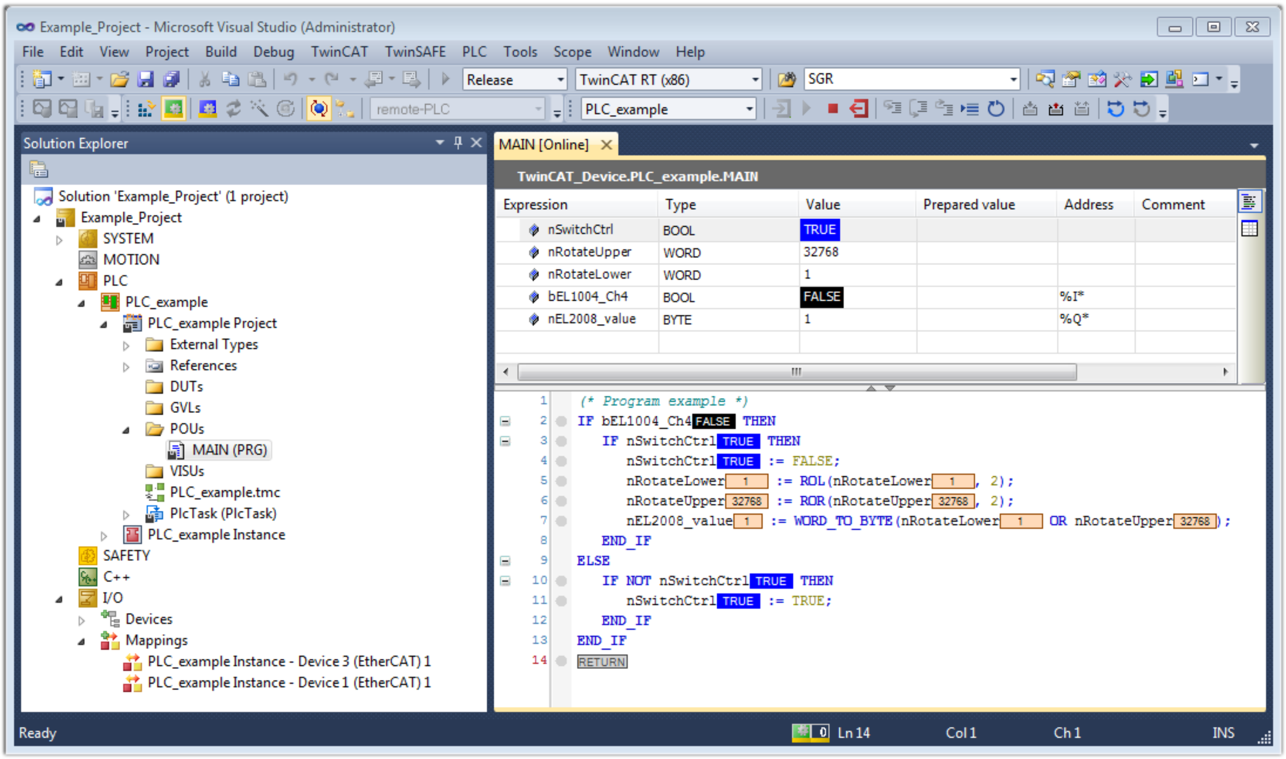
The allocation of PDO to PLC variables has now established the connection from the controller to the inputs and outputs of the terminals. The configuration can now be activated with or via the menu under "TwinCAT" in order to transfer settings of the development environment to the runtime system. Confirm the messages "Old configurations are overwritten!" and "Restart TwinCAT system in Run mode" with "OK". The corresponding assignments can be seen in the project folder explorer:


Mappings
PLC_example Instance - Device 3 (EtherCAT) 1
PLC_example Instance - Device 1 (EtherCAT) 1

A few seconds later the corresponding status of the Run mode is displayed in the form of a rotating symbol at the bottom right of the VS shell development environment. The PLC system can then be started as described below.

Starting the controller

Select the menu option "PLC" → "Login" or click on to link the PLC with the real-time system and load the control program for execution. This results in the message *"No program on the controller! Should the new program be loaded?"*, which should be acknowledged with "Yes". The runtime environment is ready for program start by click on symbol , the "F5" key or via "PLC" in the menu selecting “Start”. The started programming environment shows the runtime values of individual variables:



TwinCAT_Device.PLC_example.MAIN

Expression	Type	Value	Prepared value	Address	Comment
nSwitchCtrl	BOOL	TRUE			
nRotateUpper	WORD	32768			
nRotateLower	WORD	1			
bEL1004_Ch4	BOOL	FALSE		%I*	
nEL2008_value	BYTE	1		%Q*	

```
(* Program example *)
IF bEL1004_Ch4 FALSE THEN
   IF nSwitchCtrl TRUE THEN
      nSwitchCtrl TRUE := FALSE;
      nRotateLower 1 := ROL(nRotateLower 1, 2);
      nRotateUpper 32768 := ROR(nRotateUpper 32768, 2);
      nEL2008_value 1 := WORD_TO_BYTE(nRotateLower 1 OR nRotateUpper 32768);
   END_IF
ELSE
   IF NOT nSwitchCtrl TRUE THEN
      nSwitchCtrl TRUE := TRUE;
   END_IF
END_IF
RETURN
```

Fig. 78: TwinCAT development environment (VS shell): logged-in, after program startup

The two operator control elements for stopping and logout result in the required action (accordingly also for stop "Shift + F5", or both actions can be selected via the PLC menu).

5.2 TwinCAT Development Environment

The Software for automation TwinCAT (The Windows Control and Automation Technology) will be distinguished into:

- TwinCAT 2: System Manager (Configuration) & PLC Control (Programming)
- TwinCAT 3: Enhancement of TwinCAT 2 (Programming and Configuration takes place via a common Development Environment)

Details:

- **TwinCAT 2:**
    - Connects I/O devices to tasks in a variable-oriented manner
    - Connects tasks to tasks in a variable-oriented manner
    - Supports units at the bit level
    - Supports synchronous or asynchronous relationships
    - Exchange of consistent data areas and process images
    - Datalink on NT - Programs by open Microsoft Standards (OLE, OCX, ActiveX, DCOM+, etc.)
    - Integration of IEC 61131-3-Software-SPS, Software- NC and Software-CNC within Windows NT/2000/XP/Vista, Windows 7, NT/XP Embedded, CE
    - Interconnection to all common fieldbusses
    - More...

Additional features:

- **TwinCAT 3** (eXtended Automation)**:**
    - Visual-Studio®-Integration
    - Choice of the programming language
    - Supports object orientated extension of IEC 61131-3
    - Usage of C/C++ as programming language for real time applications
    - Connection to MATLAB®/Simulink®
    - Open interface for expandability
    - Flexible run-time environment
    - Active support of Multi-Core- und 64-Bit-Operatingsystem
    - Automatic code generation and project creation with the TwinCAT Automation Interface
    - More...

Within the following sections commissioning of the TwinCAT Development Environment on a PC System for the control and also the basically functions of unique control elements will be explained.

Please see further information to TwinCAT 2 and TwinCAT 3 at http://infosys.beckhoff.com.

5.2.1 Installation of the TwinCAT real-time driver

In order to assign real-time capability to a standard Ethernet port of an IPC controller, the Beckhoff real-time driver has to be installed on this port under Windows.

This can be done in several ways. One option is described here.

In the System Manager call up the TwinCAT overview of the local network interfaces via Options → Show Real Time Ethernet Compatible Devices.

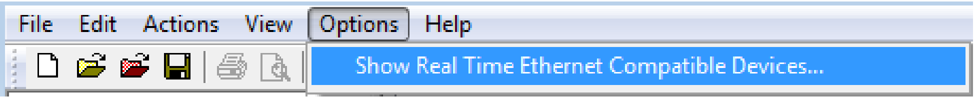


Fig. 79: *System Manager “Options” (TwinCAT 2)*

This have to be called up by the Menü “TwinCAT” within the TwinCAT 3 environment:

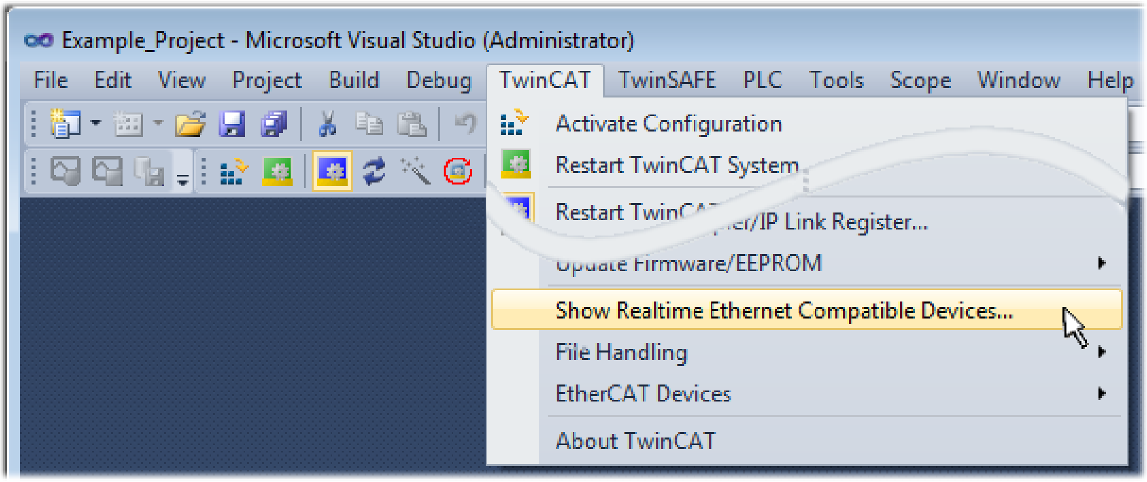


Fig. 80: *Call up under VS Shell (TwinCAT 3)*

The following dialog appears:

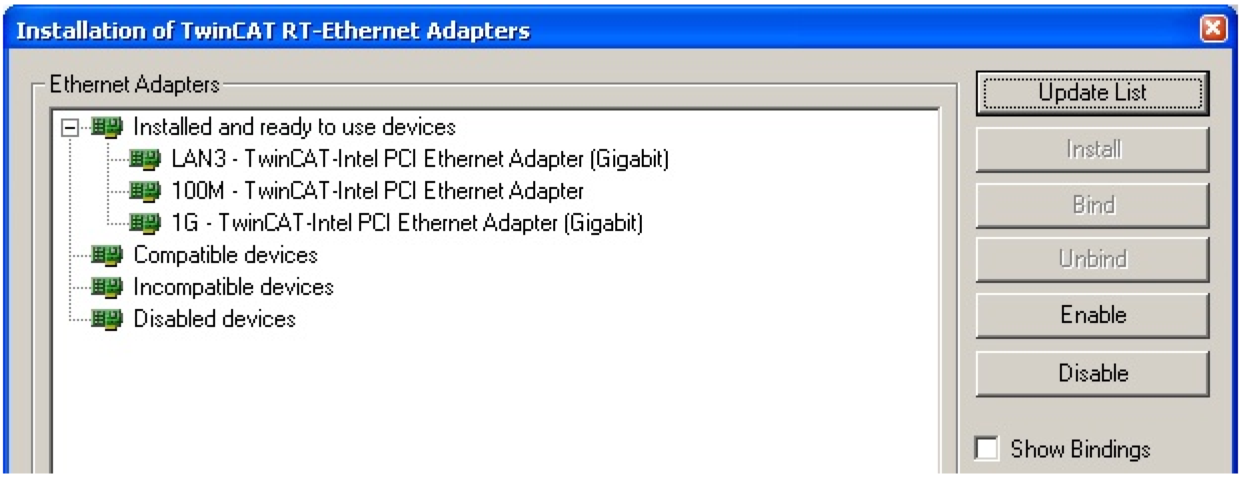
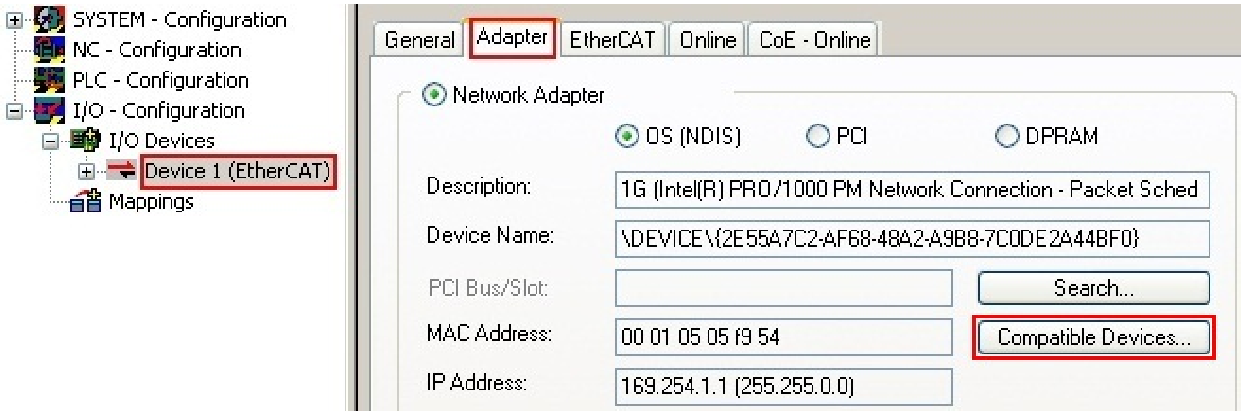

Installation of TwinCAT RT-Ethernet Adapters
Ethernet Adapters
Installed and ready to use devices
LAN3 - TwinCAT-Intel PCI Ethernet Adapter (Gigabit)
100M - TwinCAT-Intel PCI Ethernet Adapter
1G - TwinCAT-Intel PCI Ethernet Adapter (Gigabit)
Compatible devices
Incompatible devices
Disabled devices
Update List
Install
Bind
Unbind
Enable
Disable
□ Show Bindings

Fig. 81: *Overview of network interfaces*

Interfaces listed under “Compatible devices” can be assigned a driver via the “Install” button. A driver should only be installed on compatible devices.

A Windows warning regarding the unsigned driver can be ignored.

Alternatively an EtherCAT-device can be inserted first of all as described in chapter Offline configuration creation, section “Creating the EtherCAT device” [► 79] in order to view the compatible ethernet ports via its EtherCAT properties (tab „Adapter“, button „Compatible Devices…“):



● Network Adapter

● OS (NDIS) ○ PCI ○ DPRAM

Description: 1G (Intel(R) PRO/1000 PM Network Connection - Packet Sched

Device Name: \DEVICE\{2E55A7C2-AF68-48A2-A9B8-7C0DE2A44BF0}

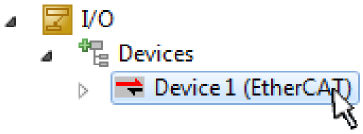
PCI Bus/Slot:

MAC Address: 00 01 05 05 f9 54

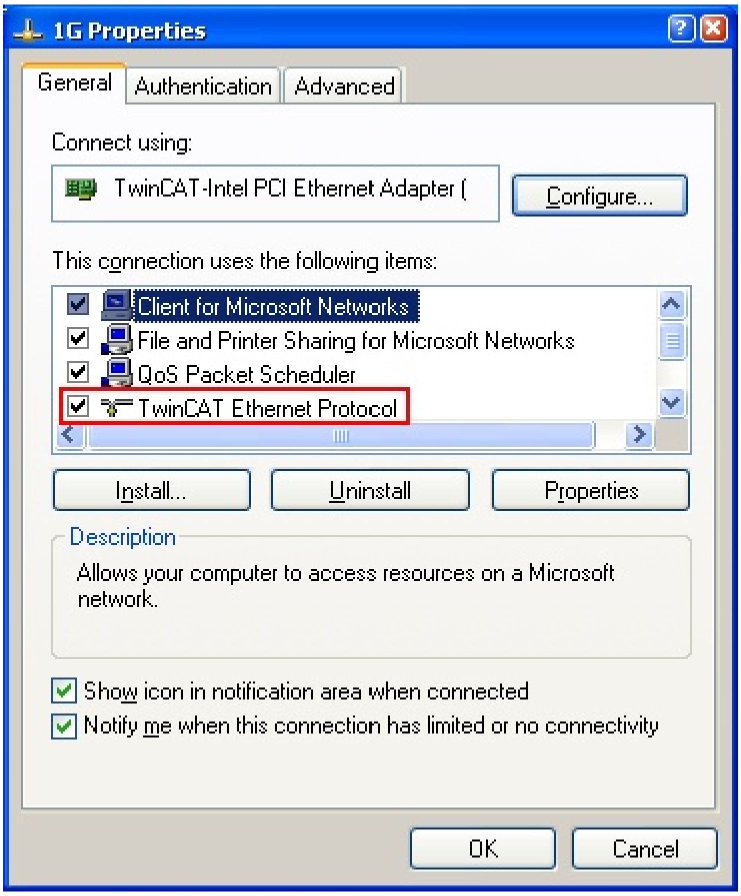
IP Address: 169.254.1.1 (255.255.0.0)

Fig. 82: *EtherCAT device properties(TwinCAT 2): click on „Compatible Devices…“ of tab “Adapter”*

TwinCAT 3: the properties of the EtherCAT device can be opened by double click on “Device .. (EtherCAT)” within the Solution Explorer under “I/O”:



After the installation the driver appears activated in the Windows overview for the network interface (Windows Start → System Properties → Network)



Connect using:

TwinCAT-Intel PCI Ethernet Adapter (

This connection uses the following items:

☑ Client for Microsoft Networks

☑ File and Printer Sharing for Microsoft Networks

☑ QoS Packet Scheduler

☑ TwinCAT Ethernet Protocol

Description

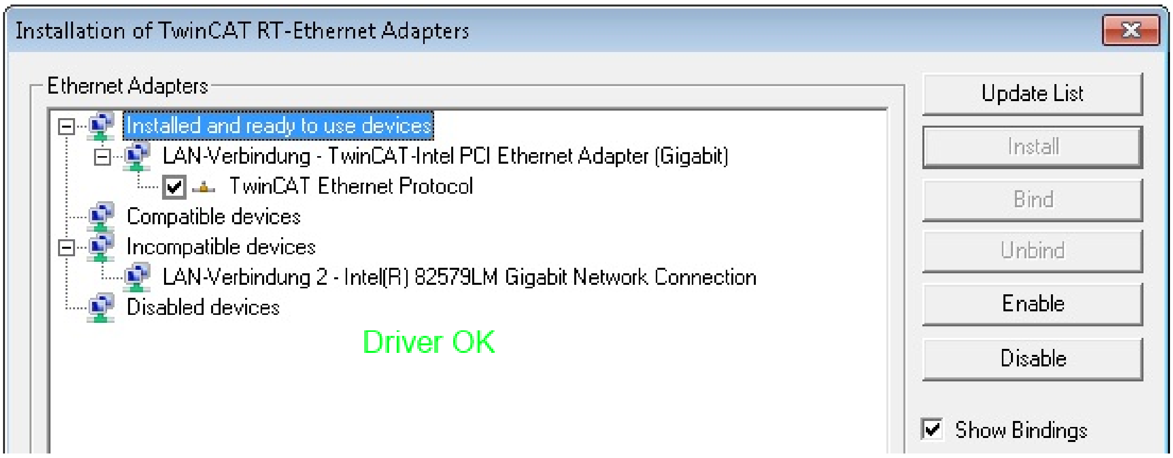
Allows your computer to access resources on a Microsoft network.

☑ Show icon in notification area when connected

☑ Notify me when this connection has limited or no connectivity

Fig. 83: *Windows properties of the network interface*

A correct setting of the driver could be:



Installation of TwinCAT RT-Ethernet Adapters

Ethernet Adapters

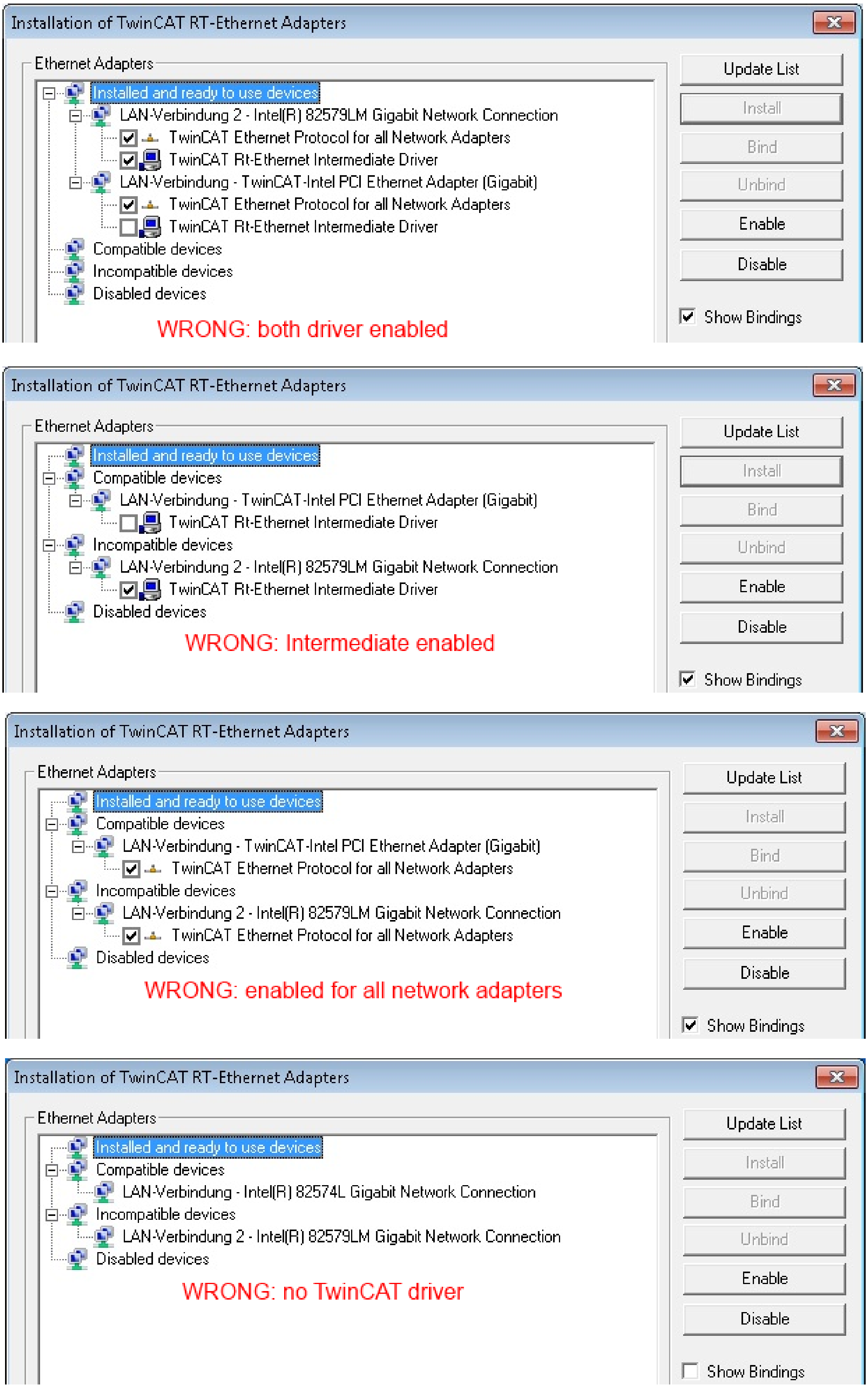
- Installed and ready to use devices
  - LAN-Verbindung - TwinCAT-Intel PCI Ethernet Adapter (Gigabit)
    - ☑ TwinCAT Ethernet Protocol
- Compatible devices
- Incompatible devices
  - LAN-Verbindung 2 - Intel(R) 82579LM Gigabit Network Connection
- Disabled devices

Driver OK

☑ Show Bindings

Fig. 84: *Exemplary correct driver setting for the Ethernet port*

Other possible settings have to be avoided:



Installation of TwinCAT RT-Ethernet Adapters

Ethernet Adapters

- Installed and ready to use devices
  - LAN-Verbindung 2 - Intel(R) 82579LM Gigabit Network Connection
    - ☑ TwinCAT Ethernet Protocol for all Network Adapters
    - ☑ TwinCAT Rt-Ethernet Intermediate Driver
  - LAN-Verbindung - TwinCAT-Intel PCI Ethernet Adapter (Gigabit)
    - ☑ TwinCAT Ethernet Protocol for all Network Adapters
    - □ TwinCAT Rt-Ethernet Intermediate Driver
- Compatible devices
- Incompatible devices
- Disabled devices

WRONG: both driver enabled

☑ Show Bindings

Installation of TwinCAT RT-Ethernet Adapters

Ethernet Adapters

- Installed and ready to use devices
- Compatible devices
  - LAN-Verbindung - TwinCAT-Intel PCI Ethernet Adapter (Gigabit)
    - □ TwinCAT Rt-Ethernet Intermediate Driver
- Incompatible devices
  - LAN-Verbindung 2 - Intel(R) 82579LM Gigabit Network Connection
    - ☑ TwinCAT Rt-Ethernet Intermediate Driver
- Disabled devices

WRONG: Intermediate enabled

☑ Show Bindings

Installation of TwinCAT RT-Ethernet Adapters

Ethernet Adapters

- Installed and ready to use devices
- Compatible devices
  - LAN-Verbindung - TwinCAT-Intel PCI Ethernet Adapter (Gigabit)
    - ☑ TwinCAT Ethernet Protocol for all Network Adapters
- Incompatible devices
  - LAN-Verbindung 2 - Intel(R) 82579LM Gigabit Network Connection
    - ☑ TwinCAT Ethernet Protocol for all Network Adapters
- Disabled devices

WRONG: enabled for all network adapters

☑ Show Bindings

Installation of TwinCAT RT-Ethernet Adapters

Ethernet Adapters

- Installed and ready to use devices
- Compatible devices
  - LAN-Verbindung - Intel(R) 82574L Gigabit Network Connection
- Incompatible devices
  - LAN-Verbindung 2 - Intel(R) 82579LM Gigabit Network Connection
- Disabled devices

WRONG: no TwinCAT driver

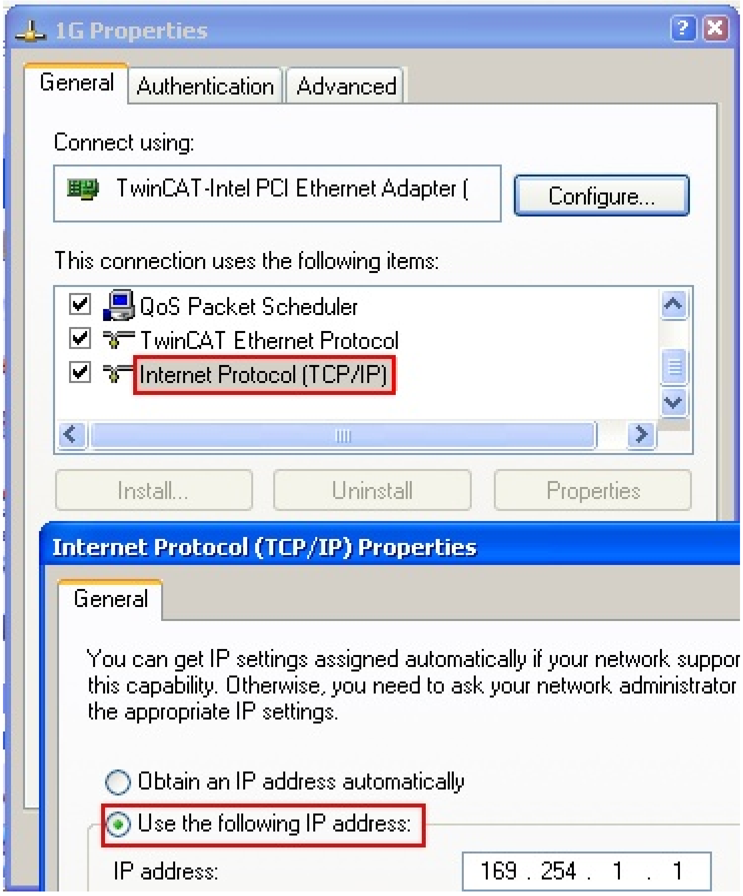
□ Show Bindings

Fig. 85: *Incorrect driver settings for the Ethernet port*

IP address of the port used

IP address/DHCP

In most cases an Ethernet port that is configured as an EtherCAT device will not transport general IP packets. For this reason and in cases where an EL6601 or similar devices are used it is useful to specify a fixed IP address for this port via the “Internet Protocol TCP/IP” driver setting and to disable DHCP. In this way the delay associated with the DHCP client for the Ethernet port assigning itself a default IP address in the absence of a DHCP server is avoided. A suitable address space is 192.168.x.x, for example.



1G Properties

General | Authentication | Advanced

Connect using:

TwinCAT-Intel PCI Ethernet Adapter (

Configure...

This connection uses the following items:

☑ QoS Packet Scheduler
☑ TwinCAT Ethernet Protocol
☑ Internet Protocol (TCP/IP)

Install... | Uninstall | Properties

Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network suppor this capability. Otherwise, you need to ask your network administrator the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 169 . 254 . 1 . 1

Fig. 86: *TCP/IP setting for the Ethernet port*

5.2.2 Notes regarding ESI device description

Installation of the latest ESI device description

The TwinCAT EtherCAT master/System Manager needs the device description files for the devices to be used in order to generate the configuration in online or offline mode. The device descriptions are contained in the so-called ESI files (EtherCAT Slave Information) in XML format. These files can be requested from the respective manufacturer and are made available for download. An *.xml file may contain several device descriptions.

The ESI files for Beckhoff EtherCAT devices are available on the Beckhoff website.

The ESI files should be stored in the TwinCAT installation directory.

Default settings:

- **TwinCAT 2**: C:\TwinCAT\IO\EtherCAT
- **TwinCAT 3**: C:\TwinCAT\3.1\Config\Io\EtherCAT

The files are read (once) when a new System Manager window is opened, if they have changed since the last time the System Manager window was opened.

A TwinCAT installation includes the set of Beckhoff ESI files that was current at the time when the TwinCAT build was created.

For TwinCAT 2.11/TwinCAT 3 and higher, the ESI directory can be updated from the System Manager, if the programming PC is connected to the Internet; by

- **TwinCAT 2**: Option → “Update EtherCAT Device Descriptions”
- **TwinCAT 3**: TwinCAT → EtherCAT Devices → “Update Device Descriptions (via ETG Website)…”

The TwinCAT ESI Updater [▶ 78] is available for this purpose.

ESI

The *.xml files are associated with *.xsd files, which describe the structure of the ESI XML files. To update the ESI device descriptions, both file types should therefore be updated.

Device differentiation

EtherCAT devices/slaves are distinguished by four properties, which determine the full device identifier. For example, the device identifier EL2521-0025-1018 consists of:

- family key “EL”
- name “2521”
- type “0025”
- and revision “1018”

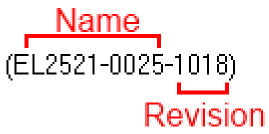
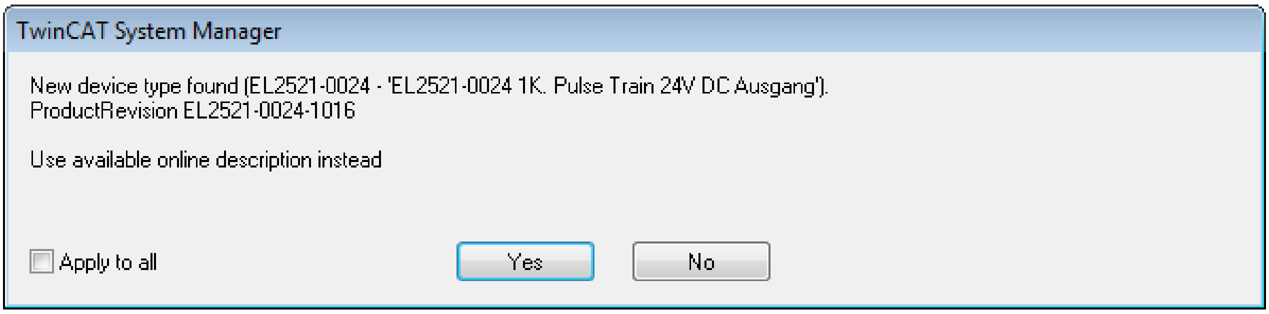


Fig. 87: *Identifier structure*

The order identifier consisting of name + type (here: EL2521-0010) describes the device function. The revision indicates the technical progress and is managed by Beckhoff. In principle, a device with a higher revision can replace a device with a lower revision, unless specified otherwise, e.g. in the documentation. Each revision has its own ESI description. See further notes [▶ 7].

Online description

If the EtherCAT configuration is created online through scanning of real devices (see section Online setup) and no ESI descriptions are available for a slave (specified by name and revision) that was found, the System Manager asks whether the description stored in the device should be used. In any case, the System Manager needs this information for setting up the cyclic and acyclic communication with the slave correctly.



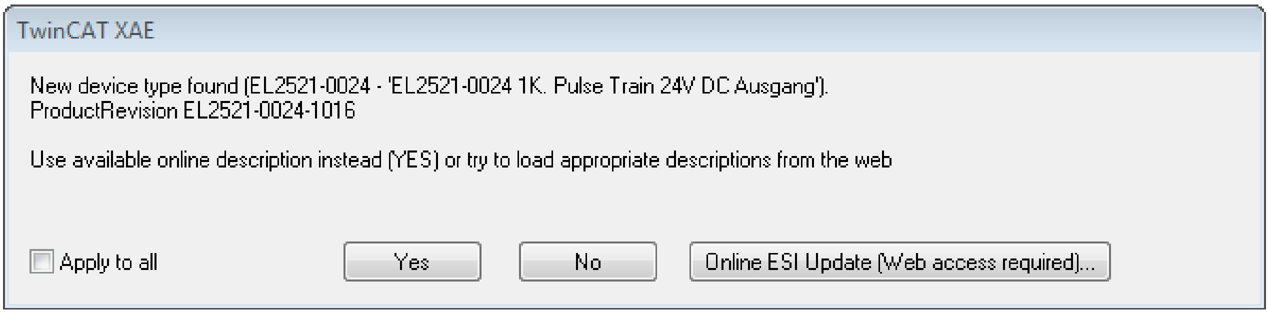
TwinCAT System Manager

New device type found [EL2521-0024 - 'EL2521-0024 1K. Pulse Train 24V DC Ausgang'].
ProductRevision EL2521-0024-1016

Use available online description instead

Fig. 88: *OnlineDescription information window (TwinCAT 2)*

In TwinCAT 3 a similar window appears, which also offers the Web update:



TwinCAT XAE

New device type found [EL2521-0024 - 'EL2521-0024 1K. Pulse Train 24V DC Ausgang'].
ProductRevision EL2521-0024-1016

Use available online description instead (YES) or try to load appropriate descriptions from the web

Fig. 89: *Information window OnlineDescription (TwinCAT 3)*

If possible, the *Yes* is to be rejected and the required ESI is to be requested from the device manufacturer. After installation of the XML/XSD file the configuration process should be repeated.

NOTE

Changing the ‘usual’ configuration through a scan

✓ If a scan discovers a device that is not yet known to TwinCAT, distinction has to be made between two cases. Taking the example here of the EL2521-0000 in the revision 1019

a) no ESI is present for the EL2521-0000 device at all, either for the revision 1019 or for an older revision. The ESI must then be requested from the manufacturer (in this case Beckhoff).

b) an ESI is present for the EL2521-0000 device, but only in an older revision, e.g. 1018 or 1017. In this case an in-house check should first be performed to determine whether the spare parts stock allows the integration of the increased revision into the configuration at all. A new/higher revision usually also brings along new features. If these are not to be used, work can continue without reservations with the previous revision 1018 in the configuration. This is also stated by the Beckhoff compatibility rule.

Refer in particular to the chapter ‘General notes on the use of Beckhoff EtherCAT IO components’ and for manual configuration to the chapter ‘Offline configuration creation’ [▶ 79].

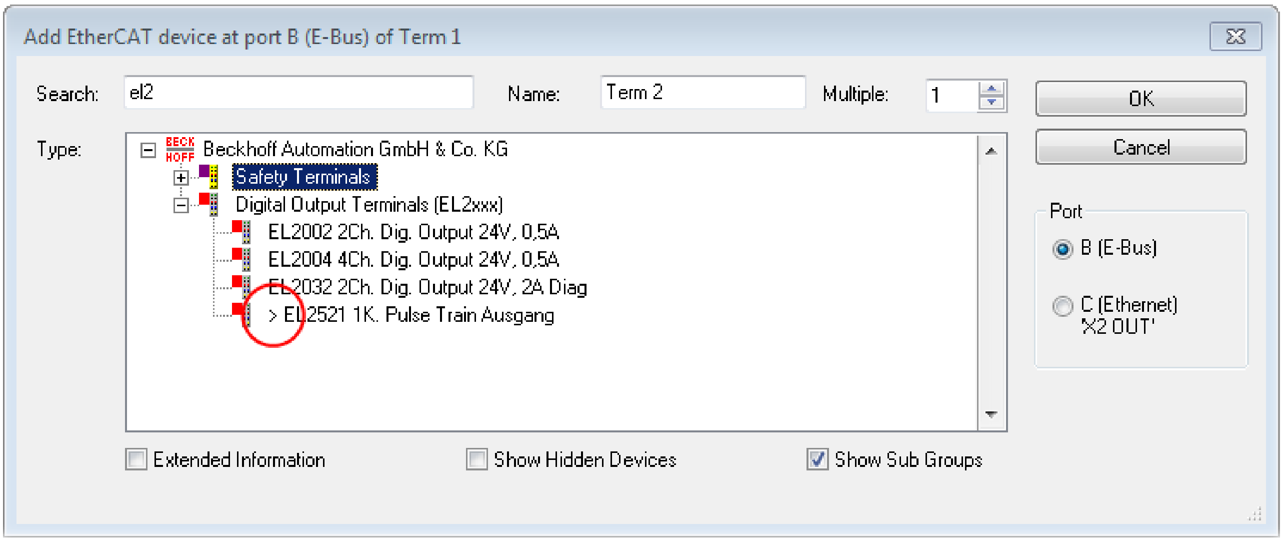
If the OnlineDescription is used regardless, the System Manager reads a copy of the device description from the EEPROM in the EtherCAT slave. In complex slaves the size of the EEPROM may not be sufficient for the complete ESI, in which case the ESI would be *incomplete* in the configurator. Therefore it’s recommended using an offline ESI file with priority in such a case.

The System Manager creates for online recorded device descriptions a new file “OnlineDescription0000...xml” in its ESI directory, which contains all ESI descriptions that were read online.

OnlineDescriptionCache00000002.xml

Fig. 90: *File OnlineDescription.xml created by the System Manager*

Is a slave desired to be added manually to the configuration at a later stage, online created slaves are indicated by a prepended symbol “>” in the selection list (see Figure *“Indication of an online recorded ESI of EL2521 as an example”)*.



Add EtherCAT device at port B (E-Bus) of Term 1

Search: el2

Name: Term 2

Multiple: 1

Type:
- Beckhoff Automation GmbH & Co. KG
  - Safety Terminals
  - Digital Output Terminals (EL2xxx)
    - EL2002 2Ch. Dig. Output 24V, 0,5A
    - EL2004 4Ch. Dig. Output 24V, 0,5A
    - EL2032 2Ch. Dig. Output 24V, 2A Diag
    - > EL2521 1K. Pulse Train Ausgang

Port: ● B (E-Bus) ○ C (Ethernet) 'X2 OUT'

□ Extended Information □ Show Hidden Devices ☑ Show Sub Groups

Fig. 91: *Indication of an online recorded ESI of EL2521 as an example*

If such ESI files are used and the manufacturer's files become available later, the file OnlineDescription.xml should be deleted as follows:

- close all System Manager windows
- restart TwinCAT in Config mode
- delete "OnlineDescription0000...xml"
- restart TwinCAT System Manager

This file should not be visible after this procedure, if necessary press <F5> to update

OnlineDescription for TwinCAT 3.x

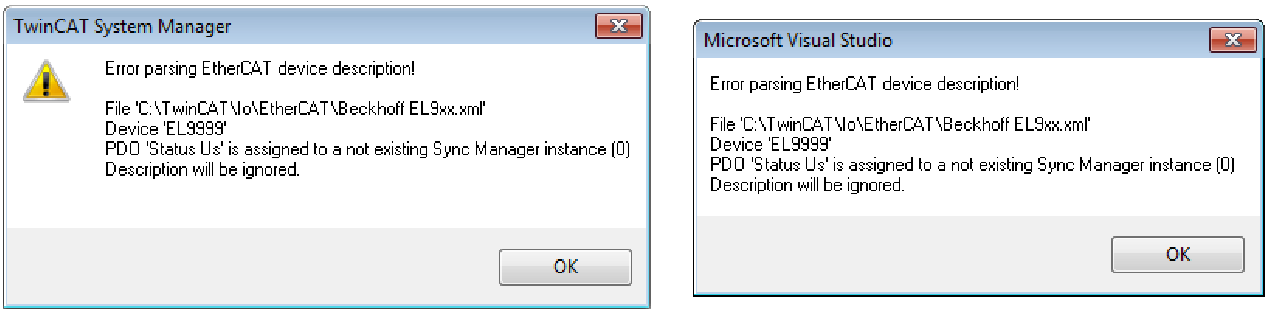
In addition to the file described above "OnlineDescription0000...xml" , a so called EtherCAT cache with new discovered devices is created by TwinCAT 3.x, e.g. under Windows 7:

C:\User\[USERNAME]\AppData\Roaming\Beckhoff\TwinCAT3\Components\Base\EtherCATCache.xml

(Please note the language settings of the OS!)
You have to delete this file, too.

Faulty ESI file

If an ESI file is faulty and the System Manager is unable to read it, the System Manager brings up an information window.



TwinCAT System Manager

Error parsing EtherCAT device description!

File 'C:\TwinCAT\Io\EtherCAT\Beckhoff EL9xx.xml'
Device 'EL9999'
PDO 'Status Us' is assigned to a not existing Sync Manager instance (0)
Description will be ignored.

Microsoft Visual Studio

Error parsing EtherCAT device description!

File 'C:\TwinCAT\Io\EtherCAT\Beckhoff EL9xx.xml'
Device 'EL9999'
PDO 'Status Us' is assigned to a not existing Sync Manager instance (0)
Description will be ignored.

Fig. 92: *Information window for faulty ESI file (left: TwinCAT 2; right: TwinCAT 3)*

Reasons may include:

- Structure of the *.xml does not correspond to the associated *.xsd file → check your schematics
- Contents cannot be translated into a device description → contact the file manufacturer

5.2.3 TwinCAT ESI Updater

For TwinCAT 2.11 and higher, the System Manager can search for current Beckhoff ESI files automatically, if an online connection is available:

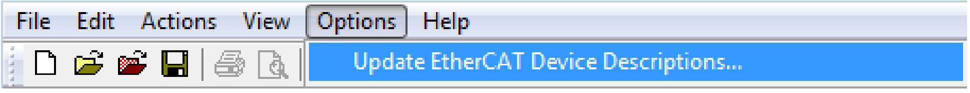
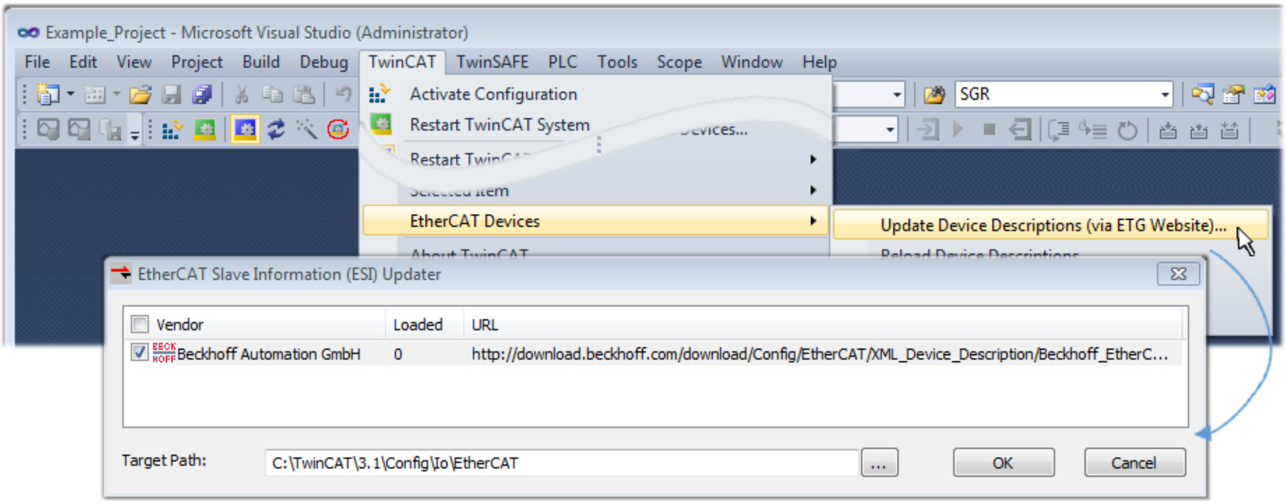


Fig. 93: *Using the ESI Updater (>= TwinCAT 2.11)*

The call up takes place under:
“Options” → "Update EtherCAT Device Descriptions"

Selection under TwinCAT 3:



☐ Vendor	Loaded	URL
☑ Beckhoff Automation GmbH	0	http://download.beckhoff.com/download/Config/EtherCAT/XML_Device_Description/Beckhoff_EtherC...

Target Path: C:\TwinCAT\3.1\Config\Io\EtherCAT

Fig. 94: *Using the ESI Updater (TwinCAT 3)*

The ESI Updater (TwinCAT 3) is a convenient option for automatic downloading of ESI data provided by EtherCAT manufacturers via the Internet into the TwinCAT directory (ESI = EtherCAT slave information). TwinCAT accesses the central ESI ULR directory list stored at ETG; the entries can then be viewed in the Updater dialog, although they cannot be changed there.

The call up takes place under:
“TwinCAT“ → „EtherCAT Devices“ → “Update Device Description (via ETG Website)…“.

5.2.4 Distinction between Online and Offline

The distinction between online and offline refers to the presence of the actual I/O environment (drives, terminals, EJ-modules). If the configuration is to be prepared in advance of the system configuration as a programming system, e.g. on a laptop, this is only possible in “Offline configuration” mode. In this case all components have to be entered manually in the configuration, e.g. based on the electrical design.

If the designed control system is already connected to the EtherCAT system and all components are energised and the infrastructure is ready for operation, the TwinCAT configuration can simply be generated through “scanning” from the runtime system. This is referred to as online configuration.

In any case, during each startup the EtherCAT master checks whether the slaves it finds match the configuration. This test can be parameterised in the extended slave settings. Refer to note “Installation of the latest ESI-XML device description” [▶ 74].

For preparation of a configuration:

- the real EtherCAT hardware (devices, couplers, drives) must be present and installed
- the devices/modules must be connected via EtherCAT cables or in the terminal/ module strand in the same way as they are intended to be used later

- the devices/modules be connected to the power supply and ready for communication
- TwinCAT must be in CONFIG mode on the target system.

The online scan process consists of:

- detecting the EtherCAT device [▶ 84] (Ethernet port at the IPC)
- detecting the connected EtherCAT devices [▶ 85]. This step can be carried out independent of the preceding step
- troubleshooting [▶ 88]

The scan with existing configuration [▶ 89] can also be carried out for comparison.

5.2.5 OFFLINE configuration creation

Creating the EtherCAT device

Create an EtherCAT device in an empty System Manager window.

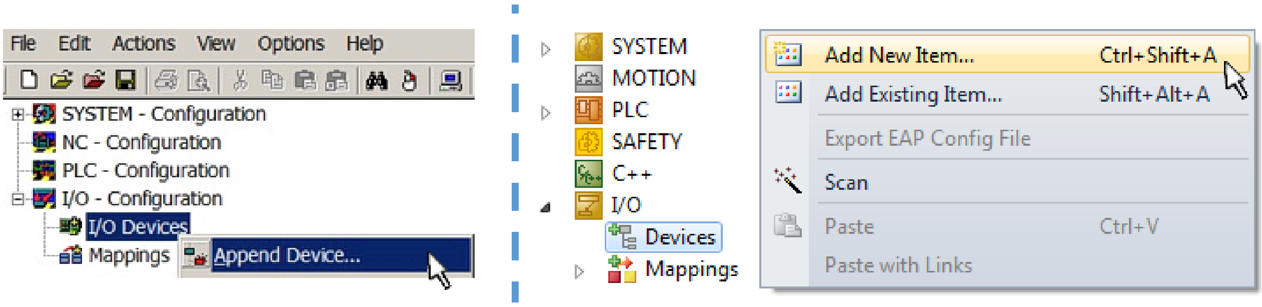


Fig. 95: *Append EtherCAT device (left: TwinCAT 2; right: TwinCAT 3)*

Select type ‘EtherCAT’ for an EtherCAT I/O application with EtherCAT slaves. For the present publisher/subscriber service in combination with an EL6601/EL6614 terminal select “EtherCAT Automation Protocol via EL6601”.

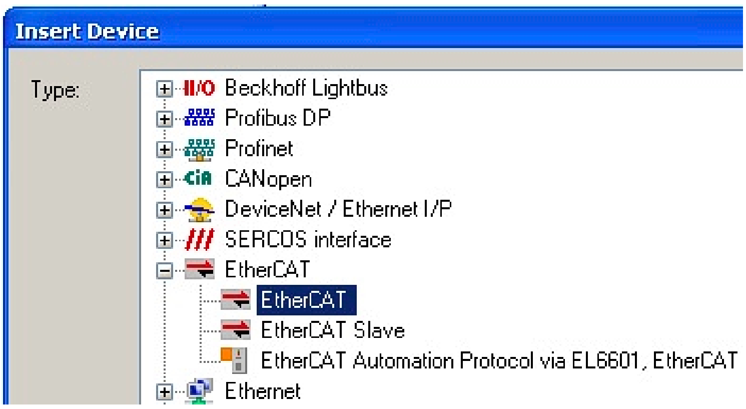


Fig. 96: *Selecting the EtherCAT connection (TwinCAT 2.11, TwinCAT 3)*

Then assign a real Ethernet port to this virtual device in the runtime system.

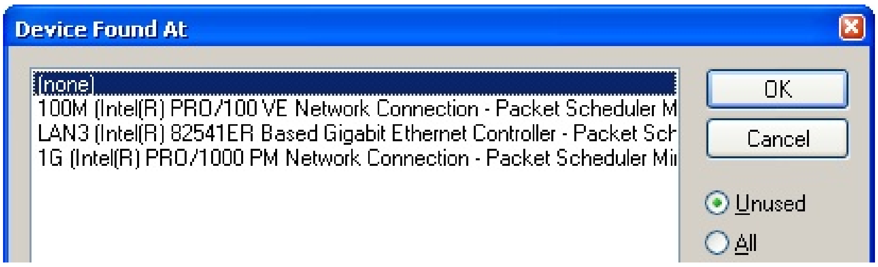
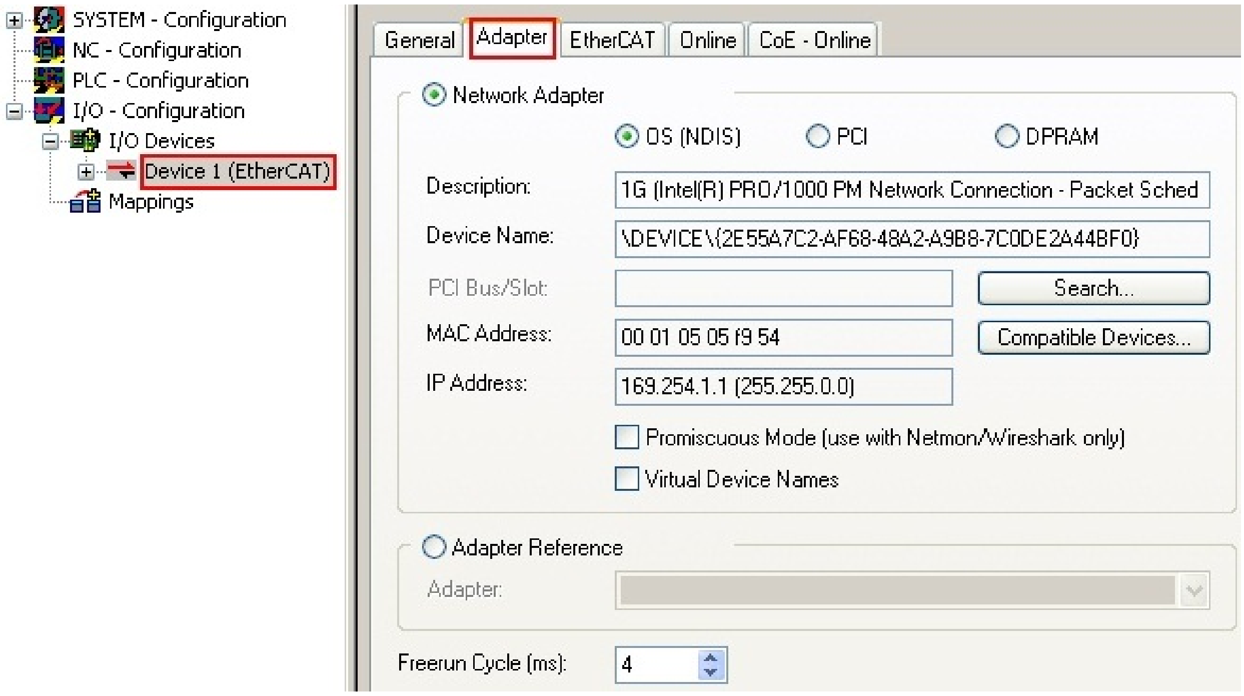

Device Found At
(none)
100M (Intel(R) PRO/100 VE Network Connection - Packet Scheduler M
LAN3 (Intel(R) 82541ER Based Gigabit Ethernet Controller - Packet Sch
1G (Intel(R) PRO/1000 PM Network Connection - Packet Scheduler Mi
OK
Cancel
● Unused
○ All

Fig. 97: *Selecting the Ethernet port*

This query may appear automatically when the EtherCAT device is created, or the assignment can be set/ modified later in the properties dialog; see Fig. *“EtherCAT device properties (TwinCAT 2)”*.



● Network Adapter

● OS (NDIS) ○ PCI ○ DPRAM

Description: 1G (Intel(R) PRO/1000 PM Network Connection - Packet Sched

Device Name: \DEVICE\{2E55A7C2-AF68-48A2-A9B8-7C0DE2A44BF0}

PCI Bus/Slot:

MAC Address: 00 01 05 05 f9 54

IP Address: 169.254.1.1 (255.255.0.0)

□ Promiscuous Mode (use with Netmon/Wireshark only)

□ Virtual Device Names

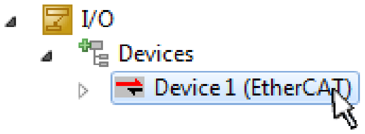
○ Adapter Reference

Adapter:

Freerun Cycle (ms): 4

Fig. 98: *EtherCAT device properties (TwinCAT 2)*

TwinCAT 3: the properties of the EtherCAT device can be opened by double click on “Device .. (EtherCAT)” within the Solution Explorer under “I/O”:



Selecting the Ethernet port

Ethernet ports can only be selected for EtherCAT devices for which the TwinCAT real-time driver is installed. This has to be done separately for each port. Please refer to the respective installation page [▸ 68].

Defining EtherCAT slaves

Further devices can be appended by right-clicking on a device in the configuration tree.

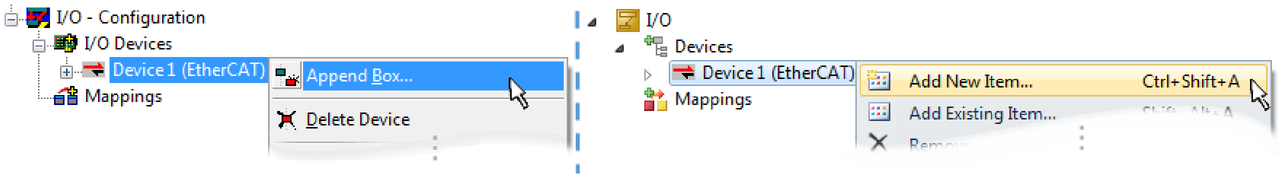


Fig. 99: *Appending EtherCAT devices (left: TwinCAT 2; right: TwinCAT 3)*

The dialog for selecting a new device opens. Only devices for which ESI files are available are displayed.

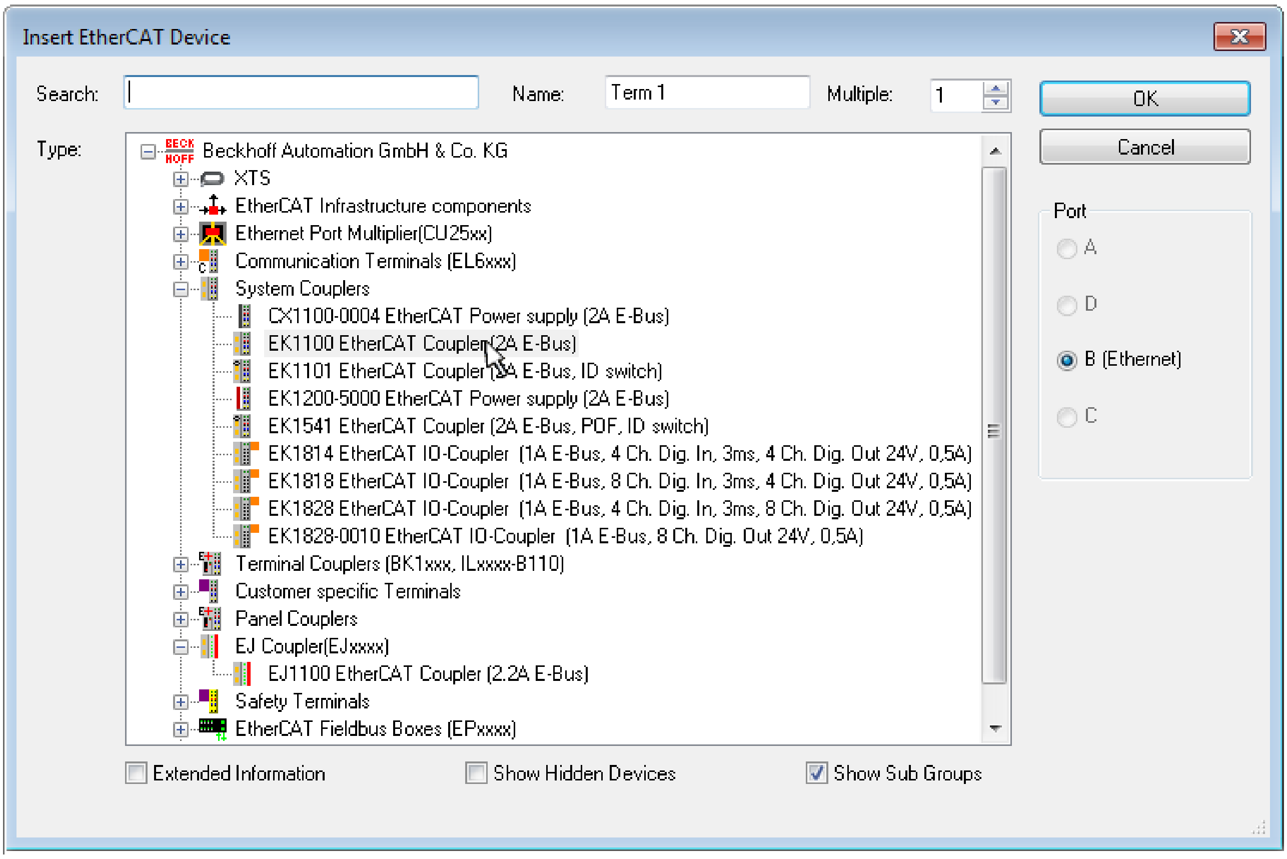
Only devices are offered for selection that can be appended to the previously selected device. Therefore the physical layer available for this port is also displayed (Fig. *“Selection dialog for new EtherCAT device”*, A). In the case of cable-based Fast-Ethernet physical layer with PHY transfer, then also only cable-based devices are available, as shown in Fig. *“Selection dialog for new EtherCAT device”*. If the preceding device has several free ports (e.g. EK1122 or EK1100), the required port can be selected on the right-hand side (A).

Overview of physical layer

- “Ethernet”: cable-based 100BASE-TX: EK couplers, EP boxes, devices with RJ45/M8/M12 connector

- "E-Bus": LVDS "terminal bus", "EJ-module": EL/ES terminals, various modular modules

The search field facilitates finding specific devices (since TwinCAT 2.11 or TwinCAT 3).



Insert EtherCAT Device

Search: | Name: Term 1 | Multiple: 1

Type:

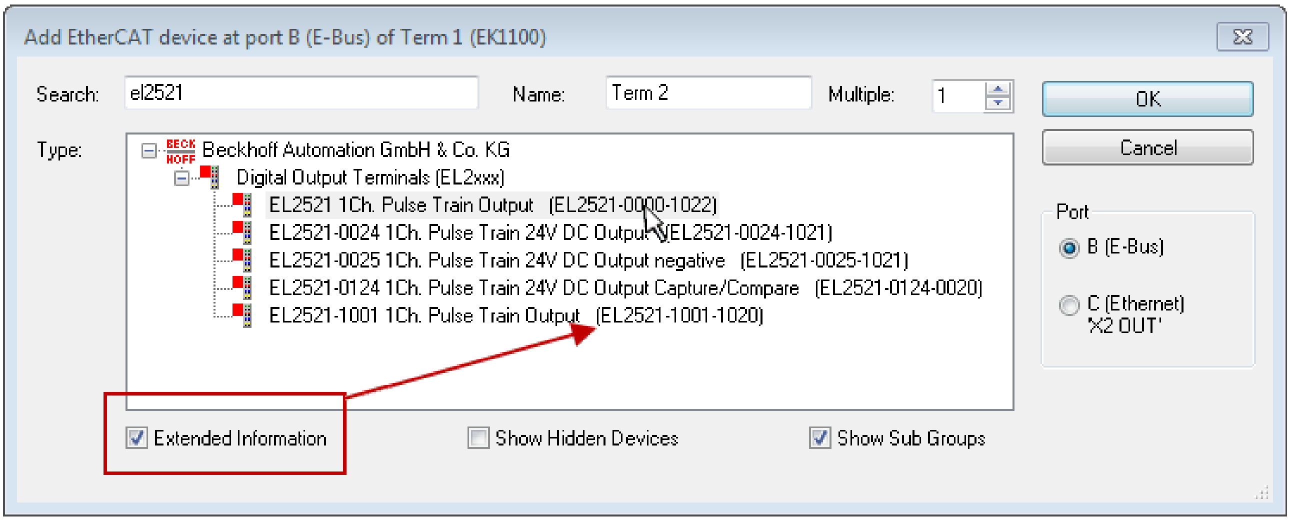
- Beckhoff Automation GmbH & Co. KG
  - XTS
  - EtherCAT Infrastructure components
  - Ethernet Port Multiplier(CU25xx)
  - Communication Terminals (EL6xxx)
  - System Couplers
    - CX1100-0004 EtherCAT Power supply (2A E-Bus)
    - EK1100 EtherCAT Coupler (2A E-Bus)
    - EK1101 EtherCAT Coupler (2A E-Bus, ID switch)
    - EK1200-5000 EtherCAT Power supply (2A E-Bus)
    - EK1541 EtherCAT Coupler (2A E-Bus, POF, ID switch)
    - EK1814 EtherCAT IO-Coupler (1A E-Bus, 4 Ch. Dig. In, 3ms, 4 Ch. Dig. Out 24V, 0,5A)
    - EK1818 EtherCAT IO-Coupler (1A E-Bus, 8 Ch. Dig. In, 3ms, 4 Ch. Dig. Out 24V, 0,5A)
    - EK1828 EtherCAT IO-Coupler (1A E-Bus, 4 Ch. Dig. In, 3ms, 8 Ch. Dig. Out 24V, 0,5A)
    - EK1828-0010 EtherCAT IO-Coupler (1A E-Bus, 8 Ch. Dig. Out 24V, 0,5A)
  - Terminal Couplers (BK1xxx, ILxxxx-B110)
  - Customer specific Terminals
  - Panel Couplers
  - EJ Coupler(EJxxxx)
    - EJ1100 EtherCAT Coupler (2.2A E-Bus)
  - Safety Terminals
  - EtherCAT Fieldbus Boxes (EPxxxx)

Port: ○ A ○ D ● B (Ethernet) ○ C

□ Extended Information □ Show Hidden Devices ☑ Show Sub Groups

Fig. 100: *Selection dialog for new EtherCAT device*

By default only the name/device type is used as selection criterion. For selecting a specific revision of the device the revision can be displayed as "Extended Information".



Add EtherCAT device at port B (E-Bus) of Term 1 (EK1100)

Search: el2521 | Name: Term 2 | Multiple: 1

Type:

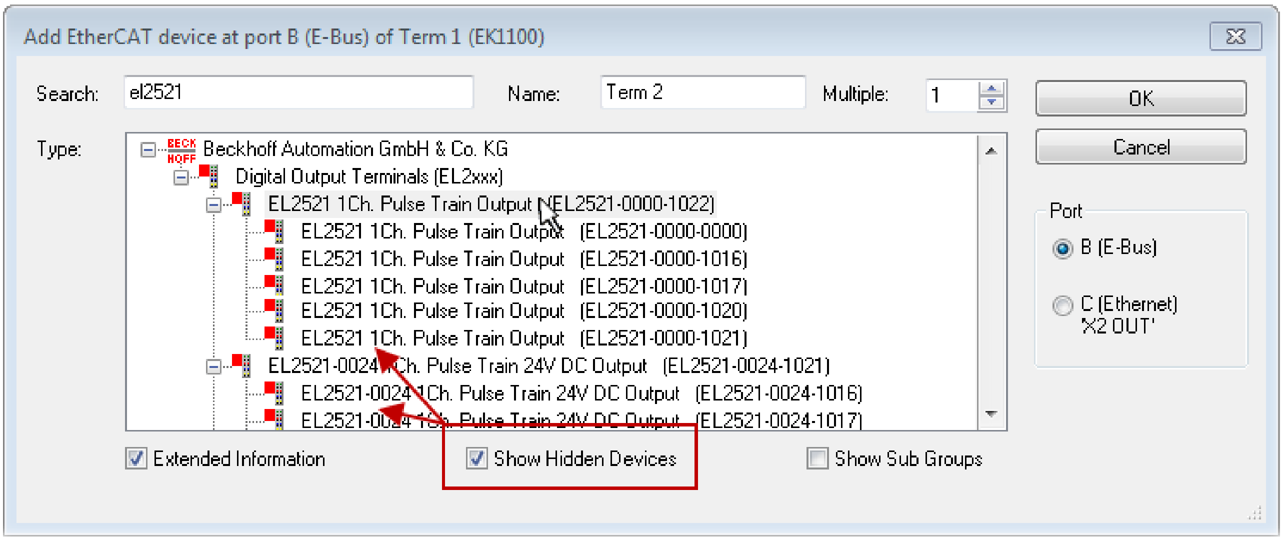
- Beckhoff Automation GmbH & Co. KG
  - Digital Output Terminals (EL2xxx)
    - EL2521 1Ch. Pulse Train Output (EL2521-0000-1022)
    - EL2521-0024 1Ch. Pulse Train 24V DC Output (EL2521-0024-1021)
    - EL2521-0025 1Ch. Pulse Train 24V DC Output negative (EL2521-0025-1021)
    - EL2521-0124 1Ch. Pulse Train 24V DC Output Capture/Compare (EL2521-0124-0020)
    - EL2521-1001 1Ch. Pulse Train Output (EL2521-1001-1020)

Port: ● B (E-Bus) ○ C (Ethernet) 'X2 OUT'

☑ Extended Information □ Show Hidden Devices ☑ Show Sub Groups

Fig. 101: *Display of device revision*

In many cases several device revisions were created for historic or functional reasons, e.g. through technological advancement. For simplification purposes (see Fig. *"Selection dialog for new EtherCAT device"*) only the last (i.e. highest) revision and therefore the latest state of production is displayed in the selection dialog for Beckhoff devices. To show all device revisions available in the system as ESI descriptions tick the "Show Hidden Devices" check box, see Fig. *"Display of previous revisions"*.



Add EtherCAT device at port B (E-Bus) of Term 1 (EK1100)

Search: el2521   Name: Term 2   Multiple: 1   OK   Cancel

Type:
- Beckhoff Automation GmbH & Co. KG
  - Digital Output Terminals (EL2xxx)
    - EL2521 1Ch. Pulse Train Output (EL2521-0000-1022)
      - EL2521 1Ch. Pulse Train Output (EL2521-0000-0000)
      - EL2521 1Ch. Pulse Train Output (EL2521-0000-1016)
      - EL2521 1Ch. Pulse Train Output (EL2521-0000-1017)
      - EL2521 1Ch. Pulse Train Output (EL2521-0000-1020)
      - EL2521 1Ch. Pulse Train Output (EL2521-0000-1021)
    - EL2521-0024 1Ch. Pulse Train 24V DC Output (EL2521-0024-1021)
      - EL2521-0024 1Ch. Pulse Train 24V DC Output (EL2521-0024-1016)
      - EL2521-0024 1Ch. Pulse Train 24V DC Output (EL2521-0024-1017)

Port
● B (E-Bus)
○ C (Ethernet) 'X2 OUT'

☑ Extended Information ☑ Show Hidden Devices □ Show Sub Groups

Fig. 102: *Display of previous revisions*

Device selection based on revision, compatibility

The ESI description also defines the process image, the communication type between master and slave/device and the device functions, if applicable. The physical device (firmware, if available) has to support the communication queries/settings of the master. This is backward compatible, i.e. newer devices (higher revision) should be supported if the EtherCAT master addresses them as an older revision. The following compatibility rule of thumb is to be assumed for Beckhoff EtherCAT Terminals/ Boxes/ EJ-modules:

device revision in the system >= device revision in the configuration

This also enables subsequent replacement of devices without changing the configuration (different specifications are possible for drives).

Example:

If an EL2521-0025-**1018** is specified in the configuration, an EL2521-0025-**1018** or higher (-**1019**, -**1020**) can be used in practice.

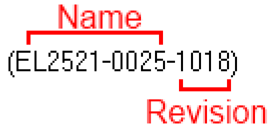
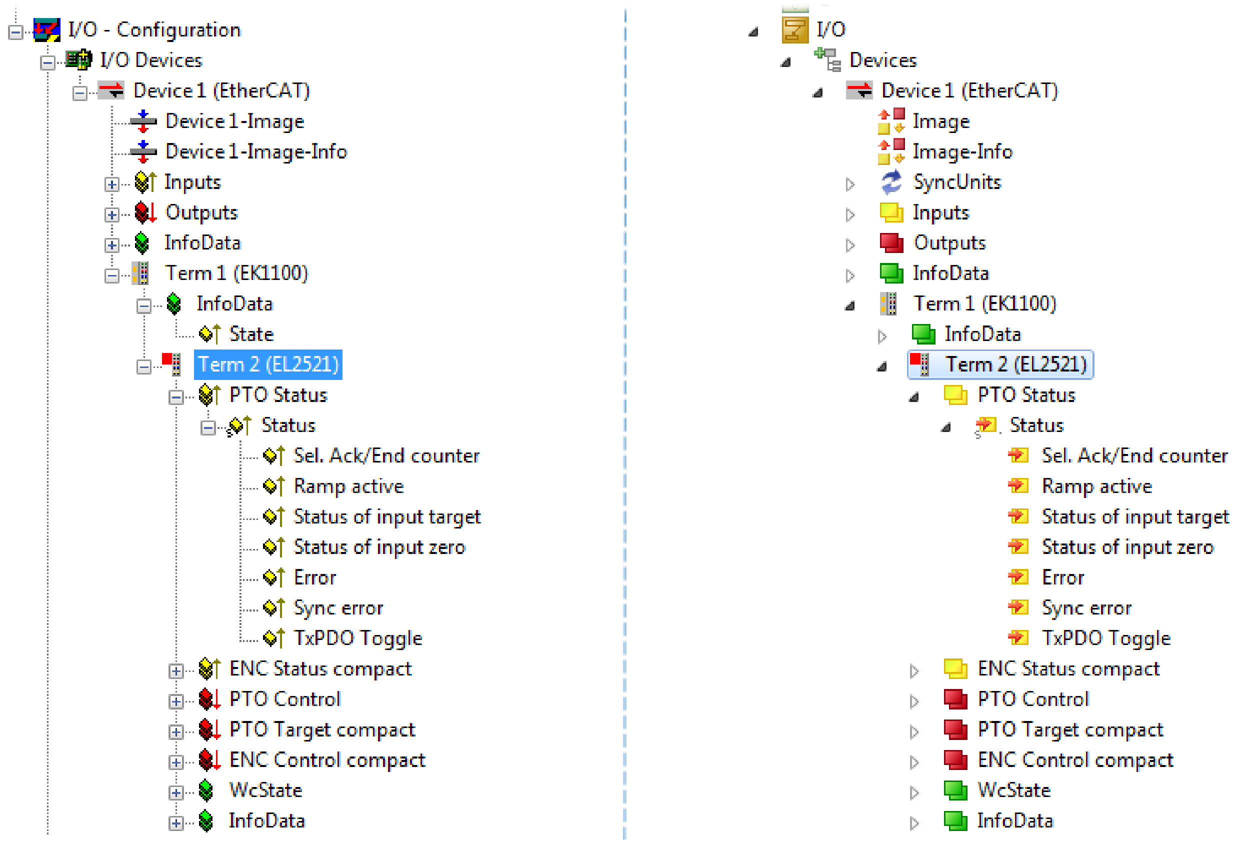


Fig. 103: *Name/revision of the terminal*

If current ESI descriptions are available in the TwinCAT system, the last revision offered in the selection dialog matches the Beckhoff state of production. It is recommended to use the last device revision when creating a new configuration, if current Beckhoff devices are used in the real application. Older revisions should only be used if older devices from stock are to be used in the application.

In this case the process image of the device is shown in the configuration tree and can be parameterised as follows: linking with the task, CoE/DC settings, plug-in definition, startup settings, ...



```
I/O - Configuration
  I/O Devices
    Device 1 (EtherCAT)
      Device 1-Image
      Device 1-Image-Info
      Inputs
      Outputs
      InfoData
      Term 1 (EK1100)
        InfoData
          State
        Term 2 (EL2521)
          PTO Status
            Status
              Sel. Ack/End counter
              Ramp active
              Status of input target
              Status of input zero
              Error
              Sync error
              TxPDO Toggle
          ENC Status compact
          PTO Control
          PTO Target compact
          ENC Control compact
          WcState
          InfoData
```

```
I/O
  Devices
    Device 1 (EtherCAT)
      Image
      Image-Info
      SyncUnits
      Inputs
      Outputs
      InfoData
      Term 1 (EK1100)
        InfoData
        Term 2 (EL2521)
          PTO Status
            Status
              Sel. Ack/End counter
              Ramp active
              Status of input target
              Status of input zero
              Error
              Sync error
              TxPDO Toggle
          ENC Status compact
          PTO Control
          PTO Target compact
          ENC Control compact
          WcState
          InfoData
```

Fig. 104: *EtherCAT terminal in the TwinCAT tree (left: TwinCAT 2; right: TwinCAT 3)*

5.2.6 ONLINE configuration creation

Detecting/scanning of the EtherCAT device

The online device search can be used if the TwinCAT system is in CONFIG mode. This can be indicated by a symbol right below in the information bar:

- on TwinCAT 2 by a blue display “Config Mode” within the System Manager window: Config Mode .
- on TwinCAT 3 within the user interface of the development environment by a symbol ⚙ .

TwinCAT can be set into this mode:

- TwinCAT 2: by selection of ⚙ in the Menubar or by “Actions” → “Set/Reset TwinCAT to Config Mode…”
- TwinCAT 3: by selection of ⚙ in the Menubar or by „TwinCAT“ → “Restart TwinCAT (Config Mode)“

Online scanning in Config mode

The online search is not available in RUN mode (production operation). Note the differentiation between TwinCAT programming system and TwinCAT target system.

The TwinCAT 2 icon (⚙) or TwinCAT 3 icon (⚙) within the Windows-Taskbar always shows the TwinCAT mode of the local IPC. Compared to that, the System Manager window of TwinCAT 2 or the user interface of TwinCAT 3 indicates the state of the target system.

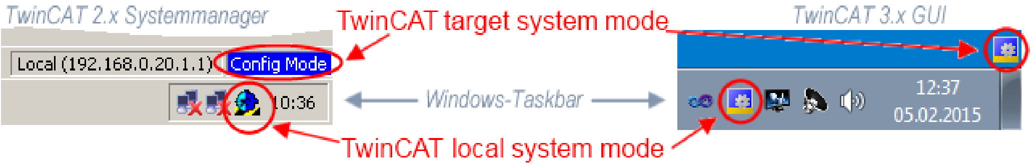


Fig. 105: *Differentiation local/target system (left: TwinCAT 2; right: TwinCAT 3)*

Right-clicking on “I/O Devices” in the configuration tree opens the search dialog.

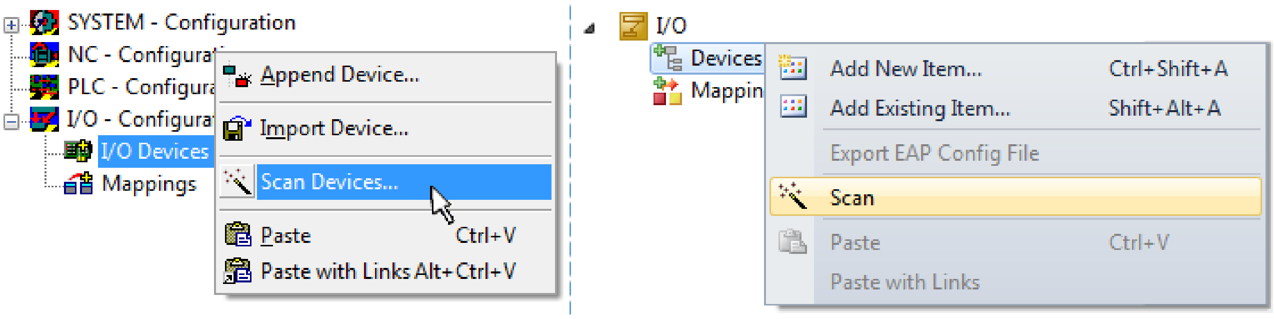
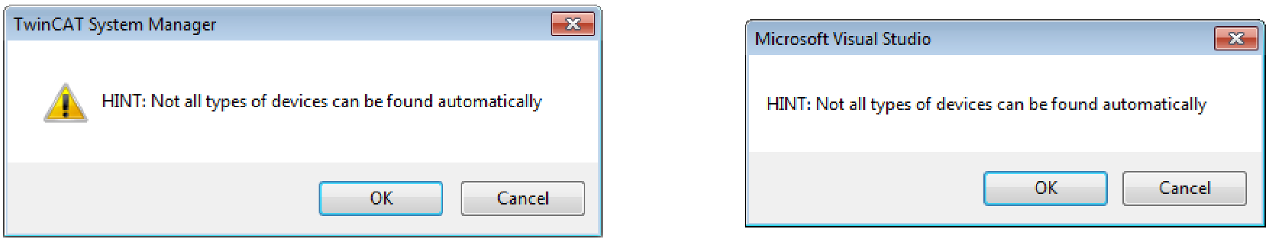


Fig. 106: *Scan Devices (left: TwinCAT 2; right: TwinCAT 3)*

This scan mode attempts to find not only EtherCAT devices (or Ethernet ports that are usable as such), but also NOVRAM, fieldbus cards, SMB etc. However, not all devices can be found automatically.


TwinCAT System Manager

HINT: Not all types of devices can be found automatically

OK Cancel

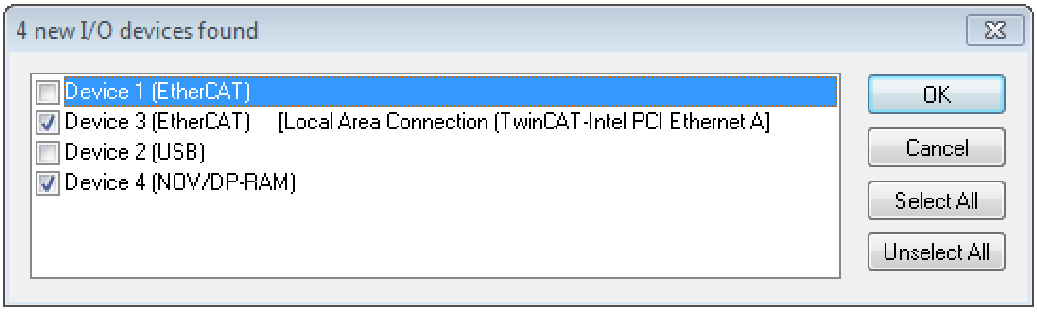
Microsoft Visual Studio

HINT: Not all types of devices can be found automatically

OK Cancel

Fig. 107: *Note for automatic device scan (left: TwinCAT 2; right: TwinCAT 3)*

Ethernet ports with installed TwinCAT real-time driver are shown as “RT Ethernet” devices. An EtherCAT frame is sent to these ports for testing purposes. If the scan agent detects from the response that an EtherCAT slave is connected, the port is immediately shown as an “EtherCAT Device” .



4 new I/O devices found

- □ Device 1 (EtherCAT)
- ☑ Device 3 (EtherCAT) [Local Area Connection (TwinCAT-Intel PCI Ethernet A)]
- □ Device 2 (USB)
- ☑ Device 4 (NOV/DP-RAM)

Fig. 108: *Detected Ethernet devices*

Via respective checkboxes devices can be selected (as illustrated in Fig. “*Detected Ethernet devices*” e.g. Device 3 and Device 4 were chosen). After confirmation with “OK” a device scan is suggested for all selected devices, see Fig.: “*Scan query after automatic creation of an EtherCAT device”*.

Selecting the Ethernet port

Ethernet ports can only be selected for EtherCAT devices for which the TwinCAT real-time driver is installed. This has to be done separately for each port. Please refer to the respective installation page [▶ 68].

Detecting/Scanning the EtherCAT devices

Online scan functionality

During a scan the master queries the identity information of the EtherCAT slaves from the slave EEPROM. The name and revision are used for determining the type. The respective devices are located in the stored ESI data and integrated in the configuration tree in the default state defined there.

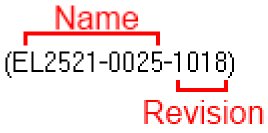


Fig. 109: *Example default state*

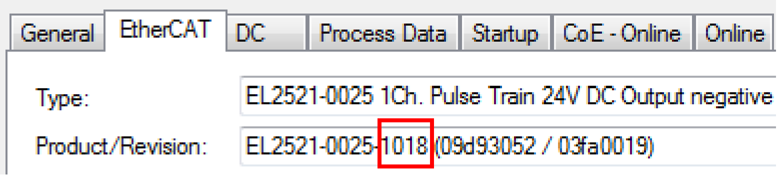
NOTE

Slave scanning in practice in series machine production

The scanning function should be used with care. It is a practical and fast tool for creating an initial configuration as a basis for commissioning. In series machine production or reproduction of the plant, however, the function should no longer be used for the creation of the configuration, but if necessary for comparison [▶ 89] with the defined initial configuration.Background: since Beckhoff occasionally increases the revision version of the delivered products for product maintenance reasons, a configuration can be created by such a scan which (with an identical machine construction) is identical according to the device list; however, the respective device revision may differ from the initial configuration.

Example:

Company A builds the prototype of a machine B, which is to be produced in series later on. To do this the prototype is built, a scan of the IO devices is performed in TwinCAT and the initial configuration ‘B.tsm’ is created. The EL2521-0025 EtherCAT terminal with the revision 1018 is located somewhere. It is thus built into the TwinCAT configuration in this way:



Type: EL2521-0025 1Ch. Pulse Train 24V DC Output negative

Product/Revision: EL2521-0025-1018 (09d93052 / 03fa0019)

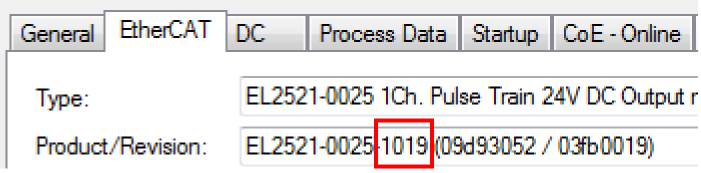
Fig. 110: *Installing EthetCAT terminal with revision -1018*

Likewise, during the prototype test phase, the functions and properties of this terminal are tested by the programmers/commissioning engineers and used if necessary, i.e. addressed from the PLC ‘B.pro’ or the NC. (the same applies correspondingly to the TwinCAT 3 solution files).

The prototype development is now completed and series production of machine B starts, for which Beckhoff continues to supply the EL2521-0025-0018. If the commissioning engineers of the series machine production department always carry out a scan, a B configuration with the identical contents results again for each machine. Likewise, A might create spare parts stores worldwide for the coming series-produced machines with EL2521-0025-1018 terminals.

After some time Beckhoff extends the EL2521-0025 by a new feature C. Therefore the FW is changed, outwardly recognizable by a higher FW version and **a new revision -1019**. Nevertheless the new device naturally supports functions and interfaces of the predecessor version(s); an adaptation of ‘B.tsm’ or even ‘B.pro’ is therefore unnecessary. The series-produced machines can continue to be built with ‘B.tsm’ and ‘B.pro’; it makes sense to perform a comparative scan [▶ 89] against the initial configuration ‘B.tsm’ in order to check the built machine.

However, if the series machine production department now doesn’t use ‘B.tsm’, but instead carries out a scan to create the productive configuration, the revision **-1019** is automatically detected and built into the configuration:



Type: EL2521-0025 1Ch. Pulse Train 24V DC Output r

Product/Revision: EL2521-0025-1019 (09d93052 / 03fb0019)

Fig. 111: *Detection of EtherCAT terminal with revision -1019*

This is usually not noticed by the commissioning engineers. TwinCAT cannot signal anything either, since virtually a new configuration is created. According to the compatibility rule, however, this means that no EL2521-0025-**1018** should be built into this machine as a spare part (even if this nevertheless works in the vast majority of cases).

In addition, it could be the case that, due to the development accompanying production in company A, the new feature C of the EL2521-0025-1019 (for example, an improved analog filter or an additional process data for the diagnosis) is discovered and used without in-house consultation. The previous stock of spare part devices are then no longer to be used for the new configuration ‘B2.tsm’ created in this way.Þ if series machine production is established, the scan should only be performed for informative purposes for comparison with a defined initial configuration. Changes are to be made with care!

If an EtherCAT device was created in the configuration (manually or through a scan), the I/O field can be scanned for devices/slaves.

TwinCAT System Manager
Yes
No
Microsoft Visual Studio
Yes
No

Scan for boxes

Scan for boxes

Fig. 112: *Scan query after automatic creation of an EtherCAT device (left: TwinCAT 2; right: TwinCAT 3)*

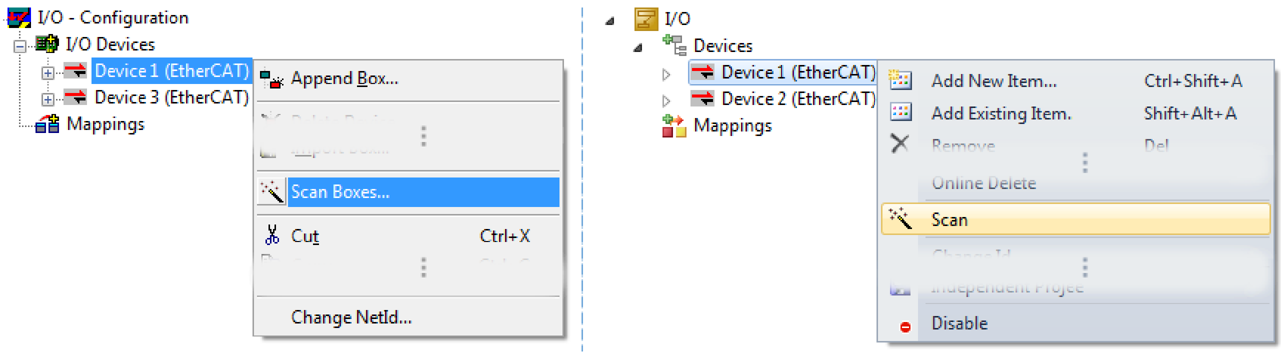


Fig. 113: *Manual triggering of a device scan on a specified EtherCAT device (left: TwinCAT 2; right: TwinCAT 3)*

In the System Manager (TwinCAT 2) or the User Interface (TwinCAT 3) the scan process can be monitored via the progress bar at the bottom in the status bar.

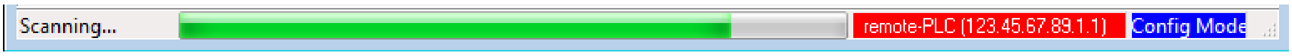
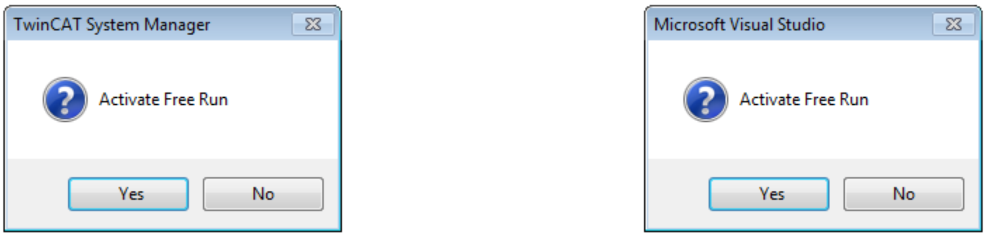


Fig. 114: *Scan progressexemplary by TwinCAT 2*

The configuration is established and can then be switched to online state (OPERATIONAL).


TwinCAT System Manager

Activate Free Run

Microsoft Visual Studio

Activate Free Run

Fig. 115: *Config/FreeRun query (left: TwinCAT 2; right: TwinCAT 3)*

In Config/FreeRun mode the System Manager display alternates between blue and red, and the EtherCAT device continues to operate with the idling cycle time of 4 ms (default setting), even without active task (NC, PLC).

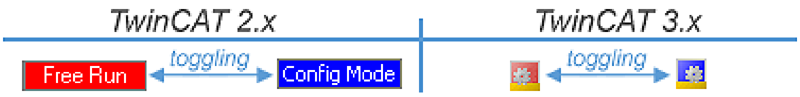


Fig. 116: *Displaying of “Free Run” and “Config Mode” toggling right below in the status bar*

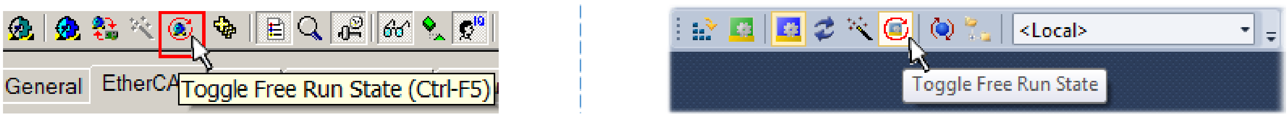
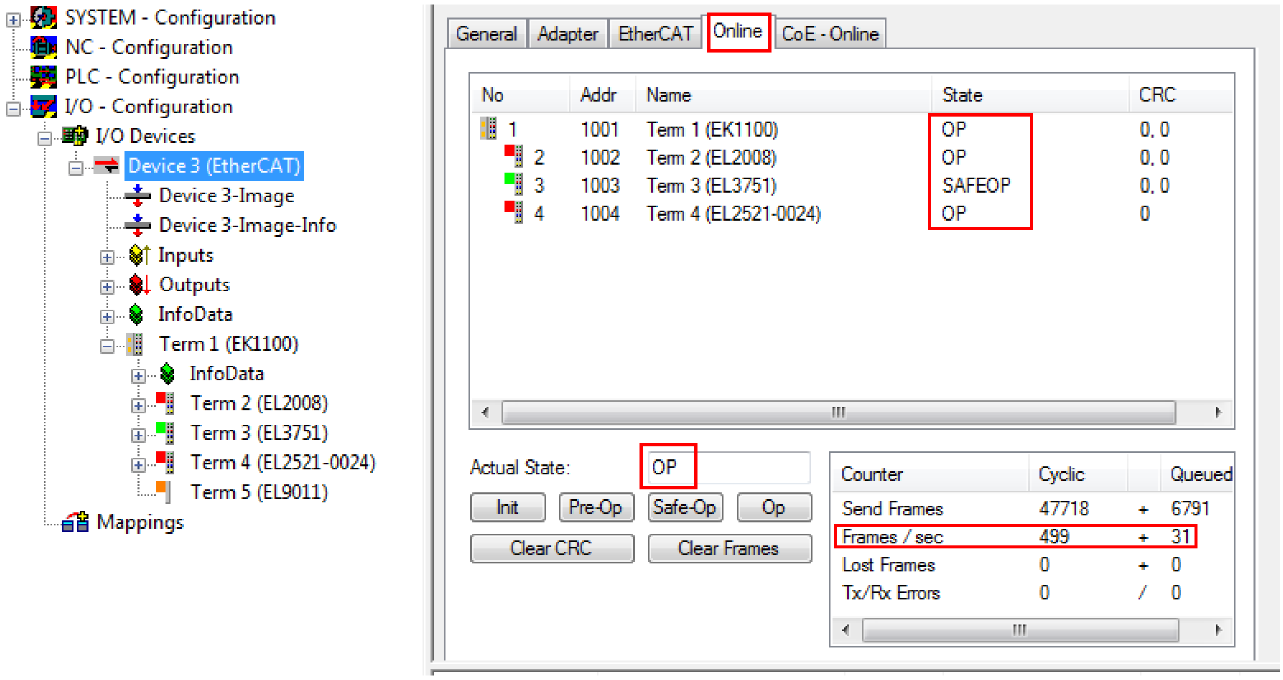


Fig. 117: *TwinCAT can also be switched to this state by using a button (left: TwinCAT 2; right: TwinCAT 3)*

The EtherCAT system should then be in a functional cyclic state, as shown in Fig. *“Online display example”*.



SYSTEM - Configuration
NC - Configuration
PLC - Configuration
I/O - Configuration
I/O Devices
Device 3 (EtherCAT)
Device 3-Image
Device 3-Image-Info
Inputs
Outputs
InfoData
Term 1 (EK1100)
InfoData
Term 2 (EL2008)
Term 3 (EL3751)
Term 4 (EL2521-0024)
Term 5 (EL9011)
Mappings

No	Addr	Name	State	CRC
1	1001	Term 1 (EK1100)	OP	0, 0
2	1002	Term 2 (EL2008)	OP	0, 0
3	1003	Term 3 (EL3751)	SAFEOP	0, 0
4	1004	Term 4 (EL2521-0024)	OP	0

Actual State: OP

Counter	Cyclic		Queued
Send Frames	47718	+	6791
Frames / sec	499	+	31
Lost Frames	0	+	0
Tx/Rx Errors	0	/	0

Fig. 118: *Online display example*

Please note:

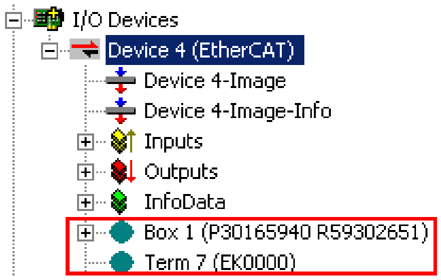
- all slaves should be in OP state
- the EtherCAT master should be in “Actual State” OP
- “frames/sec” should match the cycle time taking into account the sent number of frames
- no excessive “LostFrames” or CRC errors should occur

The configuration is now complete. It can be modified as described under manual procedure [▸ 79].

Troubleshooting

Various effects may occur during scanning.

- An **unknown device** is detected, i.e. an EtherCAT slave for which no ESI XML description is available. In this case the System Manager offers to read any ESI that may be stored in the device. This case is described in the chapter "Notes regarding ESI device description".
- **Device are not detected properly**
  Possible reasons include:
  - faulty data links, resulting in data loss during the scan
  - slave has invalid device description
  The connections and devices should be checked in a targeted manner, e.g. via the emergency scan. Then re-run the scan.



I/O Devices
Device 4 (EtherCAT)
Device 4-Image
Device 4-Image-Info
Inputs
Outputs
InfoData
Box 1 (P30165940 R59302651)
Term 7 (EK0000)

Fig. 119: *Faulty identification*

In the System Manager such devices may be set up as EK0000 or unknown devices. Operation is not possible or meaningful.

Scan over existing Configuration

NOTE

Change of the configuration after comparison

With this scan (TwinCAT 2.11 or 3.1) only the device properties vendor (manufacturer), device name and revision are compared at present! A ‘ChangeTo’ or ‘Copy’ should only be carried out with care, taking into consideration the Beckhoff IO compatibility rule (see above). The device configuration is then replaced by the revision found; this can affect the supported process data and functions.

If a scan is initiated for an existing configuration, the actual I/O environment may match the configuration exactly or it may differ. This enables the configuration to be compared.

TwinCAT System Manager

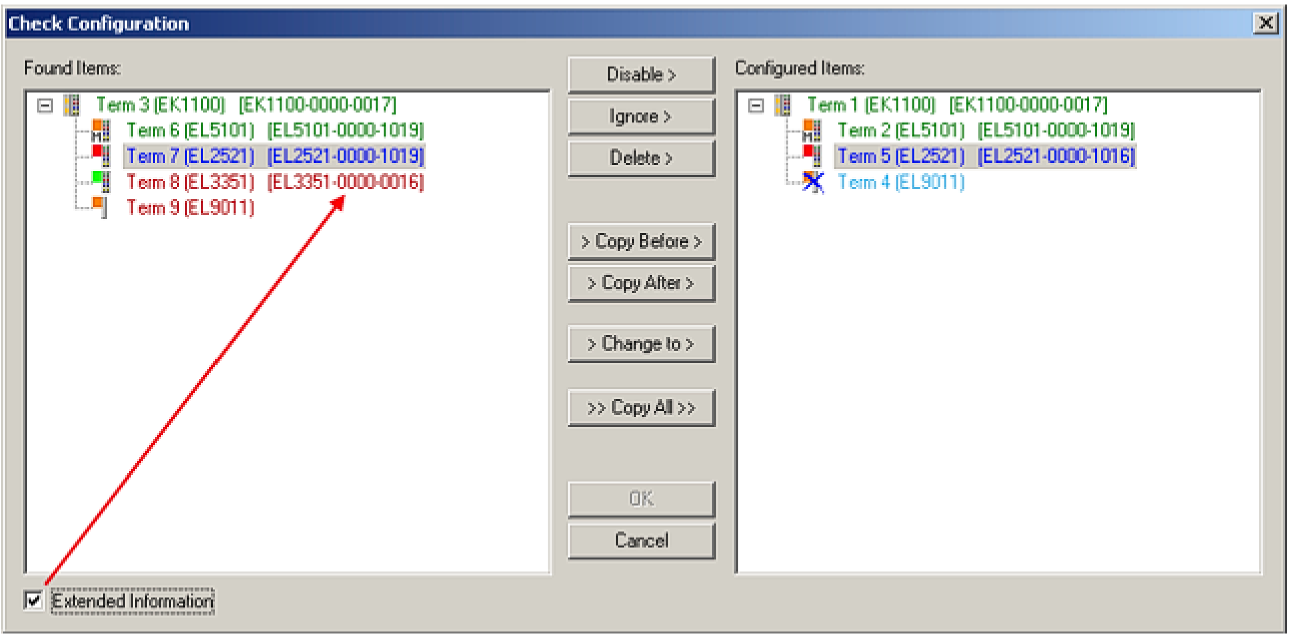
Configuration is identical

Microsoft Visual Studio

Configuration is identical

Fig. 120: *Identical configuration (left: TwinCAT 2; right: TwinCAT 3)*

If differences are detected, they are shown in the correction dialog, so that the user can modify the configuration as required.



Check Configuration

Found Items:

Term 3 (EK1100) [EK1100-0000-0017]
Term 6 (EL5101) [EL5101-0000-1019]
Term 7 (EL2521) [EL2521-0000-1019]
Term 8 (EL3351) [EL3351-0000-0016]
Term 9 (EL9011)

Configured Items:

Term 1 (EK1100) [EK1100-0000-0017]
Term 2 (EL5101) [EL5101-0000-1019]
Term 5 (EL2521) [EL2521-0000-1016]
Term 4 (EL9011)

☑ Extended Information

Fig. 121: *Correction dialog*

It is advisable to tick the “Extended Information” check box to reveal differences in the revision.

Colour	Explanation
green	This EtherCAT slave matches the entry on the other side. Both type and revision match.
blue	This EtherCAT slave is present on the other side, but in a different revision. This other revision can have other default values for the process data as well as other/additional functions. If the found revision is higher than the configured revision, the slave may be used provided compatibility issues are taken into account. If the found revision is lower than the configured revision, it is likely that the slave cannot be used. The found device may not support all functions that the master expects based on the higher revision number.
light blue	This EtherCAT slave is ignored ("Ignore" button)
red	• This EtherCAT slave is not present on the other side. • It is present, but in a different revision, which also differs in its properties from the one specified. The compatibility principle then also applies here: if the found revision is higher than the configured revision, use is possible provided compatibility issues are taken into account, since the successor devices should support the functions of the predecessor devices. If the found revision is lower than the configured revision, it is likely that the slave cannot be used. The found device may not support all functions that the master expects based on the higher revision number.

Device selection based on revision, compatibility

The ESI description also defines the process image, the communication type between master and slave/device and the device functions, if applicable. The physical device (firmware, if available) has to support the communication queries/settings of the master. This is backward compatible, i.e. newer devices (higher revision) should be supported if the EtherCAT master addresses them as an older revision. The following compatibility rule of thumb is to be assumed for Beckhoff EtherCAT Terminals/ Boxes/ EJ-modules:

device revision in the system >= device revision in the configuration

This also enables subsequent replacement of devices without changing the configuration (different specifications are possible for drives).

Example:

If an EL2521-0025-**1018** is specified in the configuration, an EL2521-0025-**1018** or higher (-**1019**, -**1020**) can be used in practice.

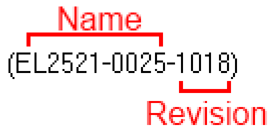


Fig. 122: *Name/revision of the terminal*

If current ESI descriptions are available in the TwinCAT system, the last revision offered in the selection dialog matches the Beckhoff state of production. It is recommended to use the last device revision when creating a new configuration, if current Beckhoff devices are used in the real application. Older revisions should only be used if older devices from stock are to be used in the application.

In this case the process image of the device is shown in the configuration tree and can be parameterised as follows: linking with the task, CoE/DC settings, plug-in definition, startup settings, ...

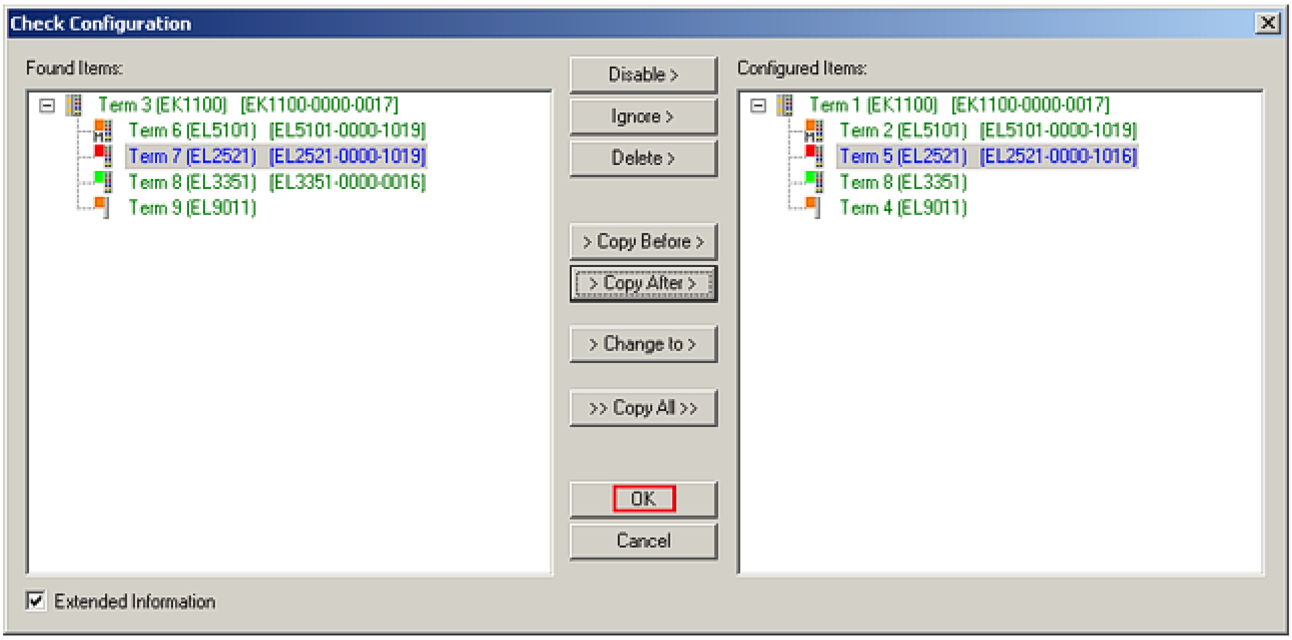

Check Configuration
Found Items:
Term 3 (EK1100) [EK1100-0000-0017]
Term 6 (EL5101) [EL5101-0000-1019]
Term 7 (EL2521) [EL2521-0000-1019]
Term 8 (EL3351) [EL3351-0000-0016]
Term 9 (EL9011)
Disable >
Ignore >
Delete >
> Copy Before >
> Copy After >
> Change to >
>> Copy All >>
OK
Cancel
Configured Items:
Term 1 (EK1100) [EK1100-0000-0017]
Term 2 (EL5101) [EL5101-0000-1019]
Term 5 (EL2521) [EL2521-0000-1016]
Term 8 (EL3351)
Term 4 (EL9011)
☑ Extended Information

Fig. 123: *Correction dialog with modifications*

Once all modifications have been saved or accepted, click “OK” to transfer them to the real *.tsm configuration.

Change to Compatible Type

TwinCAT offers a function *“Change to Compatible Type…”* for the exchange of a device whilst retaining the links in the task.

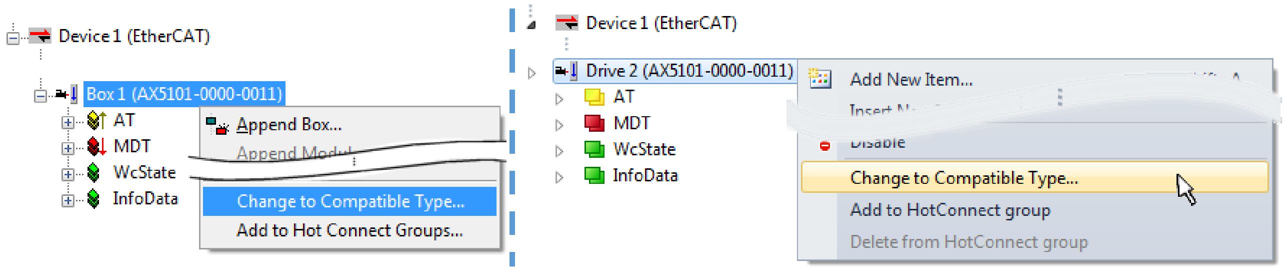


Fig. 124: *Dialog* “*Change to Compatible Type…” (left: TwinCAT 2; right: TwinCAT 3)*

This function is preferably to be used on AX5000 devices.

Change to Alternative Type

The TwinCAT System Manager offers a function for the exchange of a device: *Change to Alternative Type*

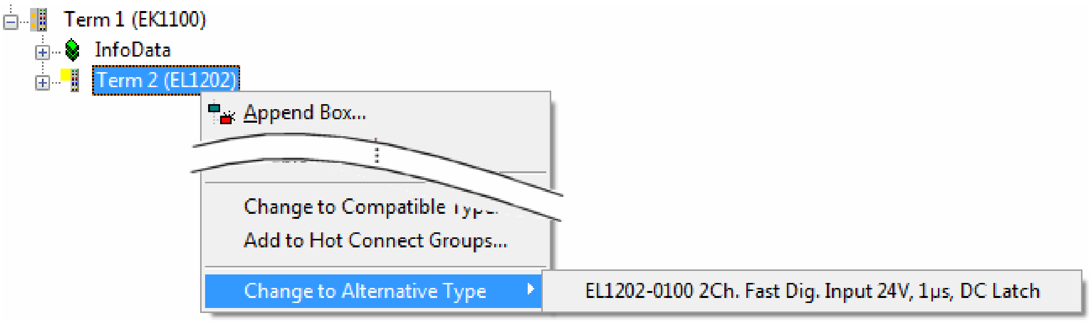

Term 1 (EK1100)
InfoData
Term 2 (EL1202)
Append Box...
Change to Compatible Type
Add to Hot Connect Groups...
Change to Alternative Type
EL1202-0100 2Ch. Fast Dig. Input 24V, 1µs, DC Latch

Fig. 125: *TwinCAT 2 Dialog Change to Alternative Type*

If called, the System Manager searches in the procured device ESI (in this example: EL1202-0000) for details of compatible devices contained there. The configuration is changed and the ESI-EEPROM is overwritten at the same time – therefore this process is possible only in the online state (ConfigMode).

5.2.7 EtherCAT subscriber configuration

In the left-hand window of the TwinCAT 2 System Manager or the Solution Explorer of the TwinCAT 3 Development Environment respectively, click on the element of the terminal within the tree you wish to configure (in the example: EL3751 Terminal 3).

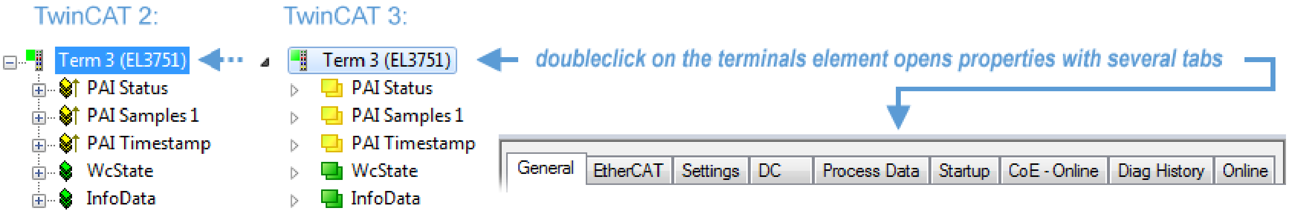
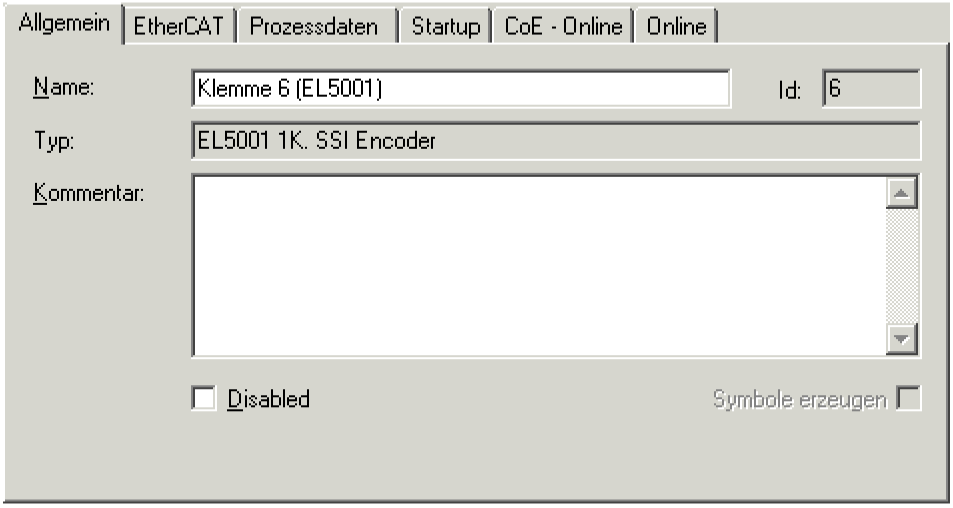


Fig. 126: *Branch element as terminal EL3751*

In the right-hand window of the TwinCAT System manager (TwinCAT 2) or the Development Environment (TwinCAT 3), various tabs are now available for configuring the terminal. And yet the dimension of complexity of a subscriber determines which tabs are provided. Thus as illustrated in the example above the terminal EL3751 provides many setup options and also a respective number of tabs are available. On the contrary by the terminal EL1004 for example the tabs "General", "EtherCAT", "Process Data" and “Online“ are available only. Several terminals, as for instance the EL6695 provide special functions by a tab with its own terminal name, so “EL6695” in this case. A specific tab “Settings” by terminals with a wide range of setup options will be provided also (e.g. EL3751).

„General“ tab



Name: Klemme 6 (EL5001)
Id: 6
Typ: EL5001 1K. SSI Encoder
Kommentar:
□ Disabled
Symbole erzeugen □

Fig. 127: “General” tab

Name Name of the EtherCAT device

Id Number of the EtherCAT device

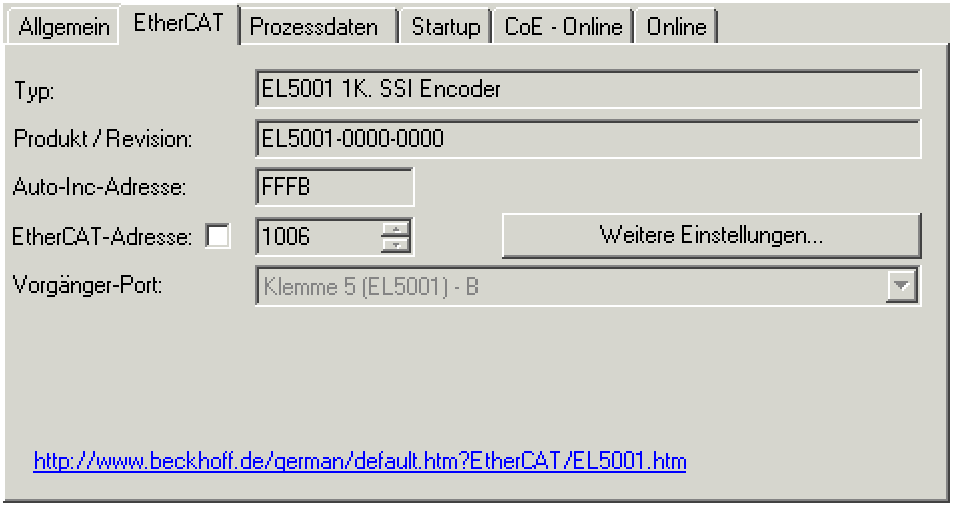
Type EtherCAT device type

Comment Here you can add a comment (e.g. regarding the system).

Disabled Here you can deactivate the EtherCAT device.

Create symbols Access to this EtherCAT slave via ADS is only available if this control box is activated.

„EtherCAT“ tab



Typ: EL5001 1K. SSI Encoder

Produkt / Revision: EL5001-0000-0000

Auto-Inc-Adresse: FFFB

EtherCAT-Adresse: □ 1006

Vorgänger-Port: Klemme 5 (EL5001) - B

http://www.beckhoff.de/german/default.htm?EtherCAT/EL5001.htm

Fig. 128: „EtherCAT“ tab

Type EtherCAT device type

Product/Revision Product and revision number of the EtherCAT device

Auto Inc Addr. Auto increment address of the EtherCAT device. The auto increment address can be used for addressing each EtherCAT device in the communication ring through its physical position. Auto increment addressing is used during the start-up phase when the EtherCAT master allocates addresses to the EtherCAT devices. With auto increment addressing the first EtherCAT slave in the ring has the address 0000_{hex}. For each further slave the address is decremented by 1 ($FFFF_{hex}$, $FFFE_{hex}$ etc.).

EtherCAT Addr. Fixed address of an EtherCAT slave. This address is allocated by the EtherCAT master during the start-up phase. Tick the control box to the left of the input field in order to modify the default value.

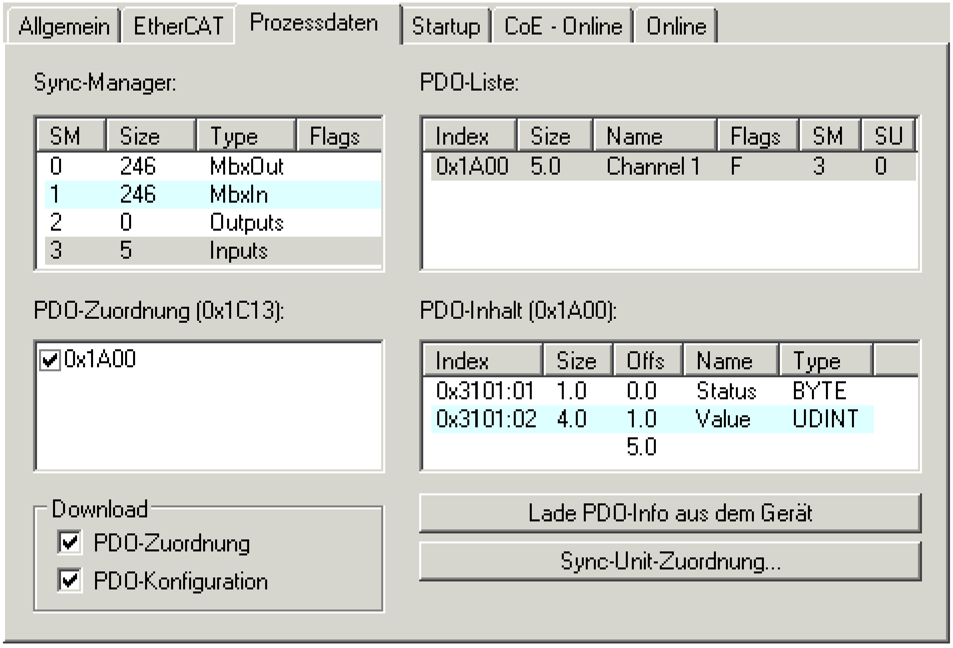
Previous Port Name and port of the EtherCAT device to which this device is connected. If it is possible to connect this device with another one without changing the order of the EtherCAT devices in the communication ring, then this combination field is activated and the EtherCAT device to which this device is to be connected can be selected.

Advanced Settings This button opens the dialogs for advanced settings.

The link at the bottom of the tab points to the product page for this EtherCAT device on the web.

“Process Data” tab

Indicates the configuration of the process data. The input and output data of the EtherCAT slave are represented as CANopen process data objects (**P**rocess **D**ata **O**bjects, PDOs). The user can select a PDO via PDO assignment and modify the content of the individual PDO via this dialog, if the EtherCAT slave supports this function.



Allgemein | EtherCAT | Prozessdaten | Startup | CoE - Online | Online

Sync-Manager:

SM	Size	Type	Flags
0	246	MbxOut	
1	246	MbxIn	
2	0	Outputs	
3	5	Inputs	

PDO-Liste:

Index	Size	Name	Flags	SM	SU
0x1A00	5.0	Channel 1	F	3	0

PDO-Zuordnung (0x1C13):

☑ 0x1A00

PDO-Inhalt (0x1A00):

Index	Size	Offs	Name	Type
0x3101:01	1.0	0.0	Status	BYTE
0x3101:02	4.0	1.0	Value	UDINT
		5.0		

Download

☑ PDO-Zuordnung

☑ PDO-Konfiguration

Fig. 129: “Process Data” tab

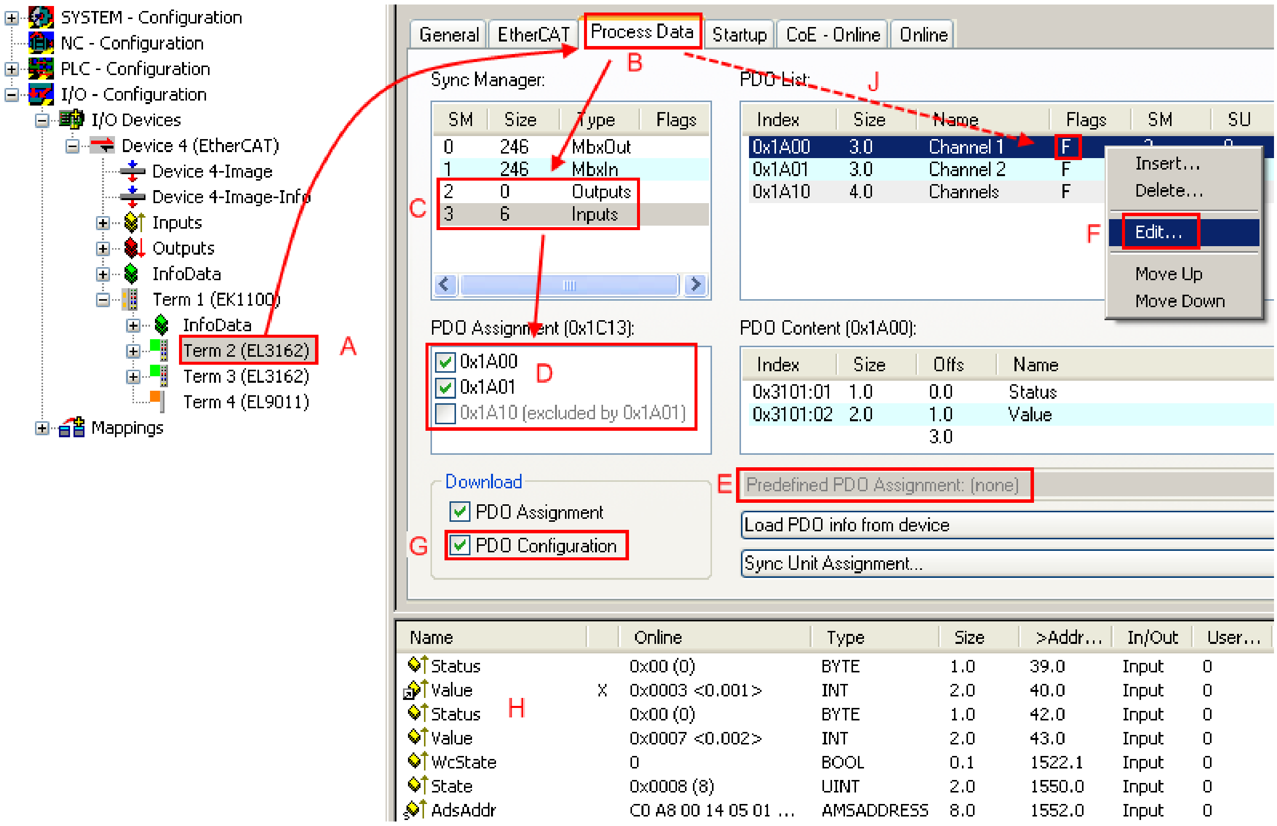
The process data (PDOs) transferred by an EtherCAT slave during each cycle are user data which the application expects to be updated cyclically or which are sent to the slave. To this end the EtherCAT master (Beckhoff TwinCAT) parameterizes each EtherCAT slave during the start-up phase to define which process data (size in bits/bytes, source location, transmission type) it wants to transfer to or from this slave. Incorrect configuration can prevent successful start-up of the slave.

For Beckhoff EtherCAT EL, ES, EM, EJ and EP slaves the following applies in general:

- The input/output process data supported by the device are defined by the manufacturer in the ESI/XML description. The TwinCAT EtherCAT Master uses the ESI description to configure the slave correctly.
- The process data can be modified in the system manager. See the device documentation.
  Examples of modifications include: mask out a channel, displaying additional cyclic information, 16-bit display instead of 8-bit data size, etc.
- In so-called “intelligent” EtherCAT devices the process data information is also stored in the CoE directory. Any changes in the CoE directory that lead to different PDO settings prevent successful startup of the slave. It is not advisable to deviate from the designated process data, because the device firmware (if available) is adapted to these PDO combinations.

If the device documentation allows modification of process data, proceed as follows (see Figure *“Configuring the process data”*).

- A: select the device to configure
- B: in the “Process Data” tab select Input or Output under SyncManager (C)
- D: the PDOs can be selected or deselected
- H: the new process data are visible as linkable variables in the system manager
  The new process data are active once the configuration has been activated and TwinCAT has been restarted (or the EtherCAT master has been restarted)
- E: if a slave supports this, Input and Output PDO can be modified simultaneously by selecting a so-called PDO record (“predefined PDO settings”).



- SYSTEM - Configuration
- NC - Configuration
- PLC - Configuration
- I/O - Configuration
  - I/O Devices
    - Device 4 (EtherCAT)
      - Device 4-Image
      - Device 4-Image-Info
      - Inputs
      - Outputs
      - InfoData
      - Term 1 (EK1100)
        - InfoData
        - Term 2 (EL3162)
        - Term 3 (EL3162)
        - Term 4 (EL9011)
  - Mappings

General | EtherCAT | Process Data | Startup | CoE - Online | Online

Sync Manager:

SM	Size	Type	Flags
0	246	MbxOut	
1	246	MbxIn	
2	0	Outputs	
3	6	Inputs	

PDO List:

Index	Size	Name	Flags	SM	SU
0x1A00	3.0	Channel 1	F		
0x1A01	3.0	Channel 2	F		
0x1A10	4.0	Channels	F		

PDO Assignment (0x1C13):

☑ 0x1A00
☑ 0x1A01
☐ 0x1A10 (excluded by 0x1A01)

PDO Content (0x1A00):

Index	Size	Offs	Name
0x3101:01	1.0	0.0	Status
0x3101:02	2.0	1.0	Value
		3.0	

Download

☑ PDO Assignment
☑ PDO Configuration

Predefined PDO Assignment: (none)

Name		Online	Type	Size	>Addr...	In/Out	User...
Status		0x00 (0)	BYTE	1.0	39.0	Input	0
Value	X	0x0003 <0.001>	INT	2.0	40.0	Input	0
Status		0x00 (0)	BYTE	1.0	42.0	Input	0
Value		0x0007 <0.002>	INT	2.0	43.0	Input	0
WcState		0	BOOL	0.1	1522.1	Input	0
State		0x0008 (8)	UINT	2.0	1550.0	Input	0
AdsAddr		C0 A8 00 14 05 01 ...	AMSADDRESS	8.0	1552.0	Input	0

Fig. 130: Configuring the process data

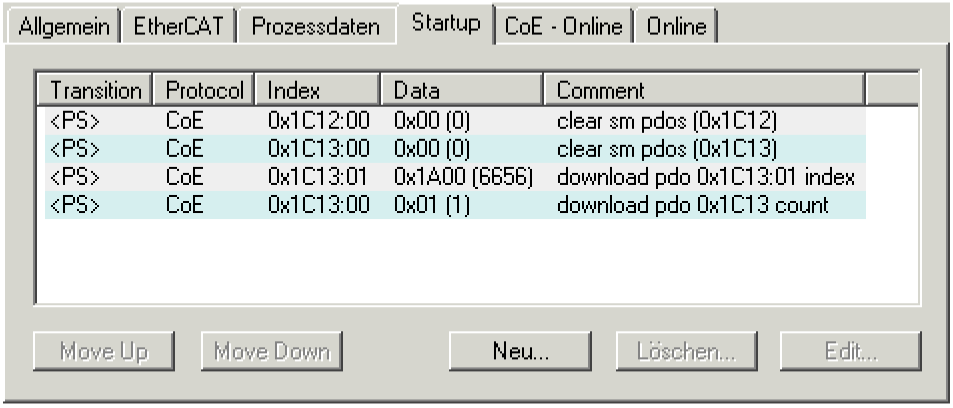
Manual modification of the process data

According to the ESI description, a PDO can be identified as “fixed” with the flag “F” in the PDO overview (Fig. *“Configuring the process data”*, J). The configuration of such PDOs cannot be changed, even if TwinCAT offers the associated dialog (“Edit”). In particular, CoE content cannot be displayed as cyclic process data. This generally also applies in cases where a device supports download of the PDO configuration, “G”. In case of incorrect configuration the EtherCAT slave usually refuses to start and change to OP state. The System Manager displays an “invalid SM cfg” logger message: This error message (“invalid SM IN cfg” or “invalid SM OUT cfg”) also indicates the reason for the failed start.

A detailed description [▸ 100] can be found at the end of this section.

„Startup“ tab

The *Startup* tab is displayed if the EtherCAT slave has a mailbox and supports the *CANopen over EtherCAT* (CoE) or *Servo drive over EtherCAT* protocol. This tab indicates which download requests are sent to the mailbox during startup. It is also possible to add new mailbox requests to the list display. The download requests are sent to the slave in the same order as they are shown in the list.



Transition	Protocol	Index	Data	Comment
<PS>	CoE	0x1C12:00	0x00 (0)	clear sm pdos (0x1C12)
<PS>	CoE	0x1C13:00	0x00 (0)	clear sm pdos (0x1C13)
<PS>	CoE	0x1C13:01	0x1A00 (6656)	download pdo 0x1C13:01 index
<PS>	CoE	0x1C13:00	0x01 (1)	download pdo 0x1C13 count

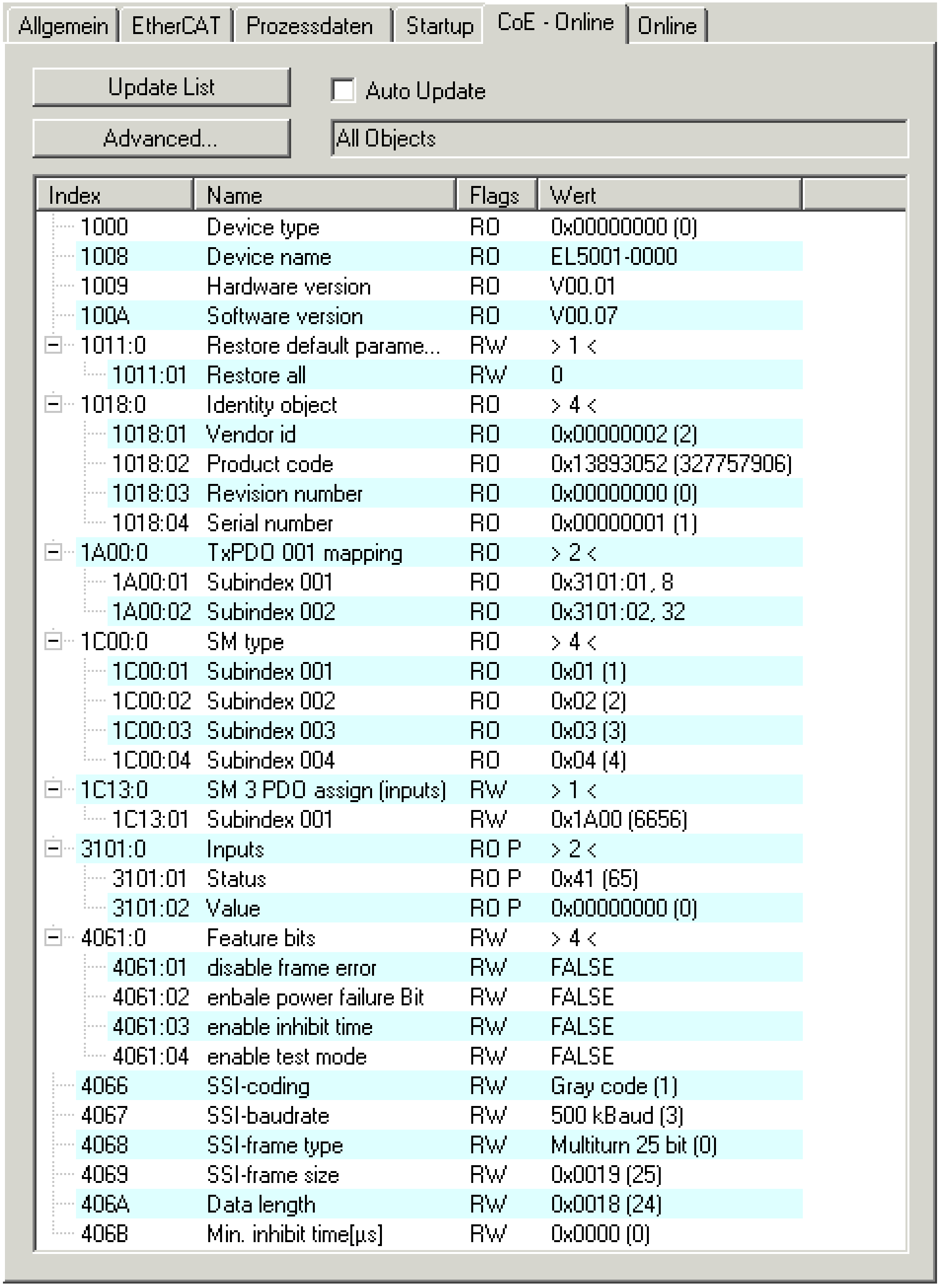
Fig. 131: „Startup“ tab

Column	Description
Transition	Transition to which the request is sent. This can either be • the transition from pre-operational to safe-operational (PS), or • the transition from safe-operational to operational (SO). If the transition is enclosed in "<>" (e.g. <PS>), the mailbox request is fixed and cannot be modified or deleted by the user.
Protocol	Type of mailbox protocol
Index	Index of the object
Data	Date on which this object is to be downloaded.
Comment	Description of the request to be sent to the mailbox

Move Up	This button moves the selected request up by one position in the list.
Move Down	This button moves the selected request down by one position in the list.
New	This button adds a new mailbox download request to be sent during startup.
Delete	This button deletes the selected entry.
Edit	This button edits an existing request.

“CoE – Online” tab

The additional *CoE - Online* tab is displayed if the EtherCAT slave supports the *CANopen over EtherCAT* (CoE) protocol. This dialog lists the content of the object list of the slave (SDO upload) and enables the user to modify the content of an object from this list. Details for the objects of the individual EtherCAT devices can be found in the device-specific object descriptions.



Index	Name	Flags	Wert
1000	Device type	RO	0x00000000 (0)
1008	Device name	RO	EL5001-0000
1009	Hardware version	RO	V00.01
100A	Software version	RO	V00.07
1011:0	Restore default parame...	RW	> 1 <
1011:01	Restore all	RW	0
1018:0	Identity object	RO	> 4 <
1018:01	Vendor id	RO	0x00000002 (2)
1018:02	Product code	RO	0x13893052 (327757906)
1018:03	Revision number	RO	0x00000000 (0)
1018:04	Serial number	RO	0x00000001 (1)
1A00:0	TxPDO 001 mapping	RO	> 2 <
1A00:01	Subindex 001	RO	0x3101:01, 8
1A00:02	Subindex 002	RO	0x3101:02, 32
1C00:0	SM type	RO	> 4 <
1C00:01	Subindex 001	RO	0x01 (1)
1C00:02	Subindex 002	RO	0x02 (2)
1C00:03	Subindex 003	RO	0x03 (3)
1C00:04	Subindex 004	RO	0x04 (4)
1C13:0	SM 3 PDO assign (inputs)	RW	> 1 <
1C13:01	Subindex 001	RW	0x1A00 (6656)
3101:0	Inputs	RO P	> 2 <
3101:01	Status	RO P	0x41 (65)
3101:02	Value	RO P	0x00000000 (0)
4061:0	Feature bits	RW	> 4 <
4061:01	disable frame error	RW	FALSE
4061:02	enbale power failure Bit	RW	FALSE
4061:03	enable inhibit time	RW	FALSE
4061:04	enable test mode	RW	FALSE
4066	SSI-coding	RW	Gray code (1)
4067	SSI-baudrate	RW	500 kBaud (3)
4068	SSI-frame type	RW	Multiturn 25 bit (0)
4069	SSI-frame size	RW	0x0019 (25)
406A	Data length	RW	0x0018 (24)
406B	Min. inhibit time[µs]	RW	0x0000 (0)

Fig. 132: “CoE – Online” tab

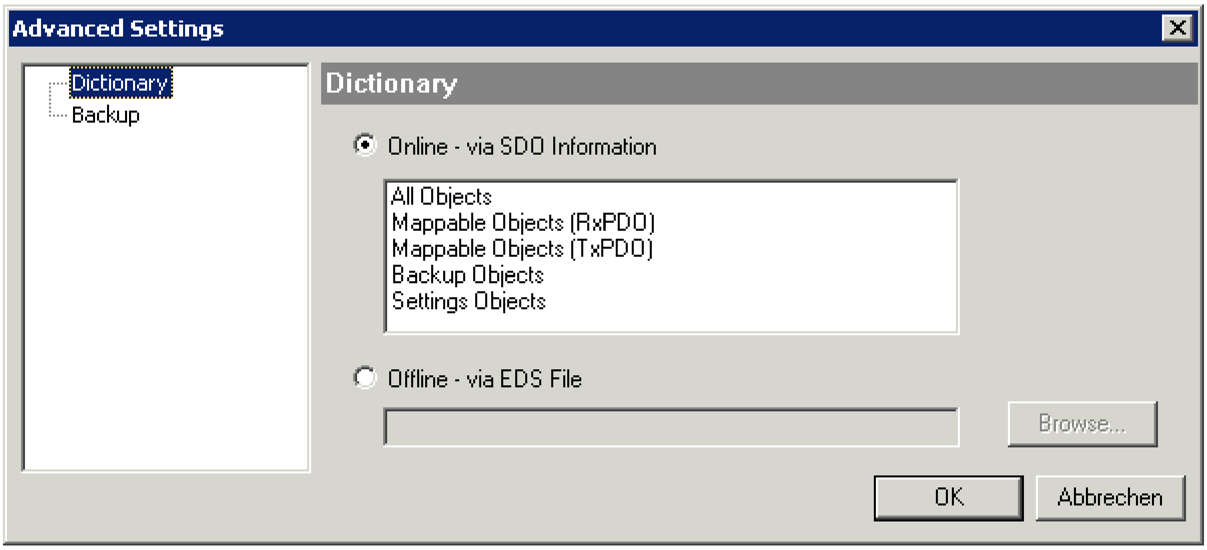
Object list display

Column	Description	
Index	Index and sub-index of the object	
Name	Name of the object	
Flags	RW	The object can be read, and data can be written to the object (read/write)
	RO	The object can be read, but no data can be written to the object (read only)
	P	An additional P identifies the object as a process data object.
Value	Value of the object	

Update List The *Update list* button updates all objects in the displayed list

Auto Update If this check box is selected, the content of the objects is updated automatically.

Advanced The *Advanced* button opens the *Advanced Settings* dialog. Here you can specify which objects are displayed in the list.



Advanced Settings

Dictionary

Backup

Dictionary

● Online - via SDO Information

All Objects
Mappable Objects (RxPDO)
Mappable Objects (TxPDO)
Backup Objects
Settings Objects

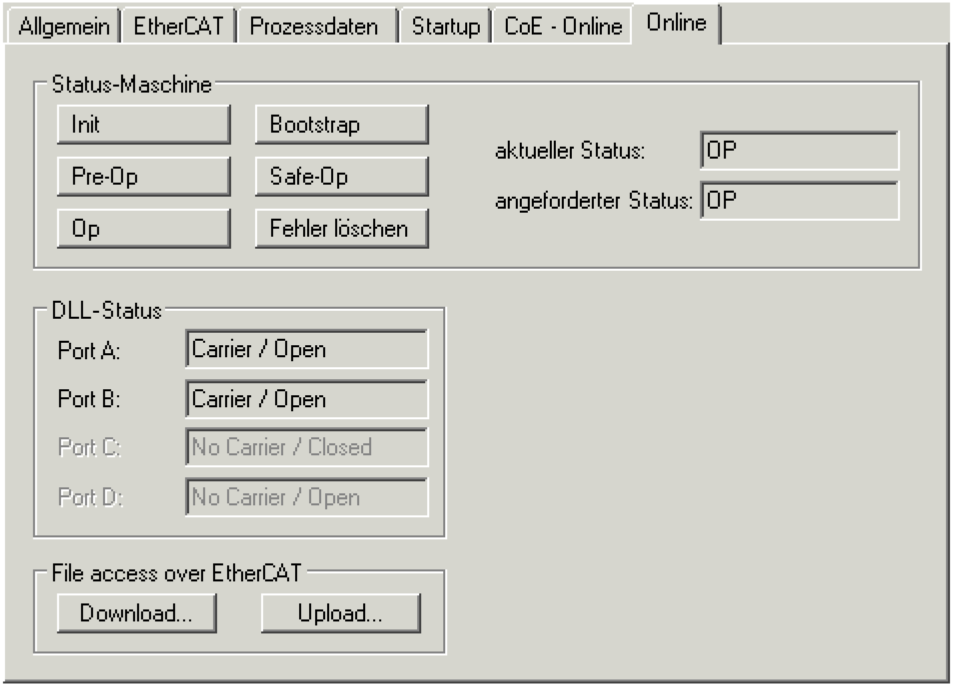
○ Offline - via EDS File

Fig. 133: Dialog “Advanced settings”

Online - via SDO Information If this option button is selected, the list of the objects included in the object list of the slave is uploaded from the slave via SDO information. The list below can be used to specify which object types are to be uploaded.

Offline - via EDS File If this option button is selected, the list of the objects included in the object list is read from an EDS file provided by the user.

„Online“ tab



aktueller Status: OP

angeforderter Status: OP

DLL-Status

Port A: Carrier / Open

Port B: Carrier / Open

Port C: No Carrier / Closed

Port D: No Carrier / Open

Fig. 134: „Online“ tab

State Machine

Init This button attempts to set the EtherCAT device to the *Init* state.

Pre-Op This button attempts to set the EtherCAT device to the *pre-operational* state.

Op This button attempts to set the EtherCAT device to the *operational* state.

Bootstrap This button attempts to set the EtherCAT device to the *Bootstrap* state.

Safe-Op This button attempts to set the EtherCAT device to the *safe-operational* state.

Clear Error This button attempts to delete the fault display. If an EtherCAT slave fails during change of state it sets an error flag.

Example: An EtherCAT slave is in PREOP state (pre-operational). The master now requests the SAFEOP state (safe-operational). If the slave fails during change of state it sets the error flag. The current state is now displayed as ERR PREOP. When the *Clear Error* button is pressed the error flag is cleared, and the current state is displayed as PREOP again.

Current State Indicates the current state of the EtherCAT device.

Requested State Indicates the state requested for the EtherCAT device.

DLL Status

Indicates the DLL status (data link layer status) of the individual ports of the EtherCAT slave. The DLL status can have four different states:

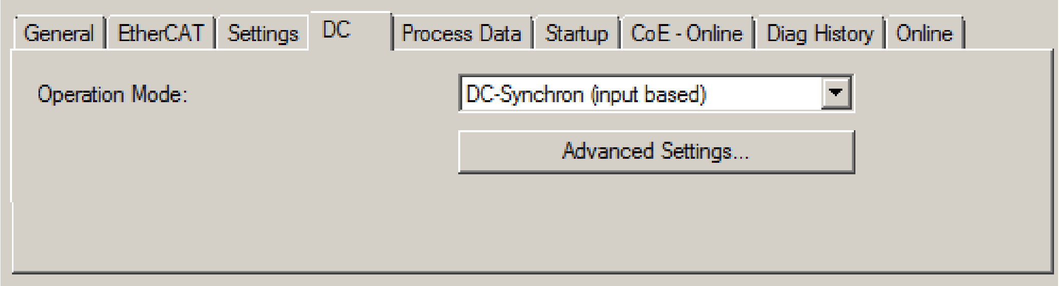
Status	Description
No Carrier / Open	No carrier signal is available at the port, but the port is open.
No Carrier / Closed	No carrier signal is available at the port, and the port is closed.
Carrier / Open	A carrier signal is available at the port, and the port is open.
Carrier / Closed	A carrier signal is available at the port, but the port is closed.

File Access over EtherCAT

Download With this button a file can be written to the EtherCAT device.

Upload With this button a file can be read from the EtherCAT device.

"DC" tab (Distributed Clocks)



Operation Mode: DC-Synchron (input based)

Fig. 135: "DC" tab (Distributed Clocks)

Operation Mode Options (optional):

- FreeRun
- SM-Synchron
- DC-Synchron (Input based)
- DC-Synchron

Advanced Settings… Advanced settings for readjustment of the real time determinant TwinCAT-clock

Detailed information to Distributed Clocks are specified on http://infosys.beckhoff.com:

Fieldbus Components → EtherCAT Terminals → EtherCAT System documentation → EtherCAT basics → Distributed Clocks

5.2.7.1 Detailed description of Process Data tab

Sync Manager

Lists the configuration of the Sync Manager (SM).
If the EtherCAT device has a mailbox, SM0 is used for the mailbox output (MbxOut) and SM1 for the mailbox input (MbxIn).
SM2 is used for the output process data (outputs) and SM3 (inputs) for the input process data.

If an input is selected, the corresponding PDO assignment is displayed in the *PDO Assignment* list below.

PDO Assignment

PDO assignment of the selected Sync Manager. All PDOs defined for this Sync Manager type are listed here:

- If the output Sync Manager (outputs) is selected in the Sync Manager list, all RxPDOs are displayed.
- If the input Sync Manager (inputs) is selected in the Sync Manager list, all TxPDOs are displayed.

The selected entries are the PDOs involved in the process data transfer. In the tree diagram of the System Manager these PDOs are displayed as variables of the EtherCAT device. The name of the variable is identical to the *Name* parameter of the PDO, as displayed in the PDO list. If an entry in the PDO assignment list is deactivated (not selected and greyed out), this indicates that the input is excluded from the PDO assignment. In order to be able to select a greyed out PDO, the currently selected PDO has to be deselected first.

Activation of PDO assignment

✓ If you have changed the PDO assignment, in order to activate the new PDO assignment,

a) the EtherCAT slave has to run through the PS status transition cycle (from pre-operational to safe-operational) once (see Online tab [▸ 98]),

b) and the System Manager has to reload the EtherCAT slaves

(button for TwinCAT 2 or button for TwinCAT 3)

PDO list

List of all PDOs supported by this EtherCAT device. The content of the selected PDOs is displayed in the *PDO Content* list. The PDO configuration can be modified by double-clicking on an entry.

Column	Description	
Index	PDO index.	
Size	Size of the PDO in bytes.	
Name	Name of the PDO. If this PDO is assigned to a Sync Manager, it appears as a variable of the slave with this parameter as the name.	
Flags	F	Fixed content: The content of this PDO is fixed and cannot be changed by the System Manager.
	M	Mandatory PDO. This PDO is mandatory and must therefore be assigned to a Sync Manager! Consequently, this PDO cannot be deleted from the *PDO Assignment* list
SM	Sync Manager to which this PDO is assigned. If this entry is empty, this PDO does not take part in the process data traffic.	
SU	Sync unit to which this PDO is assigned.	

PDO Content

Indicates the content of the PDO. If flag F (fixed content) of the PDO is not set the content can be modified.

Download

If the device is intelligent and has a mailbox, the configuration of the PDO and the PDO assignments can be downloaded to the device. This is an optional feature that is not supported by all EtherCAT slaves.

PDO Assignment

If this check box is selected, the PDO assignment that is configured in the PDO Assignment list is downloaded to the device on startup. The required commands to be sent to the device can be viewed in the Startup [▶ 95] tab.

PDO Configuration

If this check box is selected, the configuration of the respective PDOs (as shown in the PDO list and the PDO Content display) is downloaded to the EtherCAT slave.

5.3 General Notes - EtherCAT Slave Application

This summary briefly deals with a number of aspects of EtherCAT Slave operation under TwinCAT. More detailed information on this may be found in the corresponding sections of, for instance, the EtherCAT System Documentation.

Diagnosis in real time: WorkingCounter, EtherCAT State and Status

Generally speaking an EtherCAT Slave provides a variety of diagnostic information that can be used by the controlling task.

This diagnostic information relates to differing levels of communication. It therefore has a variety of sources, and is also updated at various times.

Any application that relies on I/O data from a fieldbus being correct and up to date must make diagnostic access to the corresponding underlying layers. EtherCAT and the TwinCAT System Manager offer comprehensive diagnostic elements of this kind. Those diagnostic elements that are helpful to the controlling task for diagnosis that is accurate for the current cycle when in operation (not during commissioning) are discussed below.

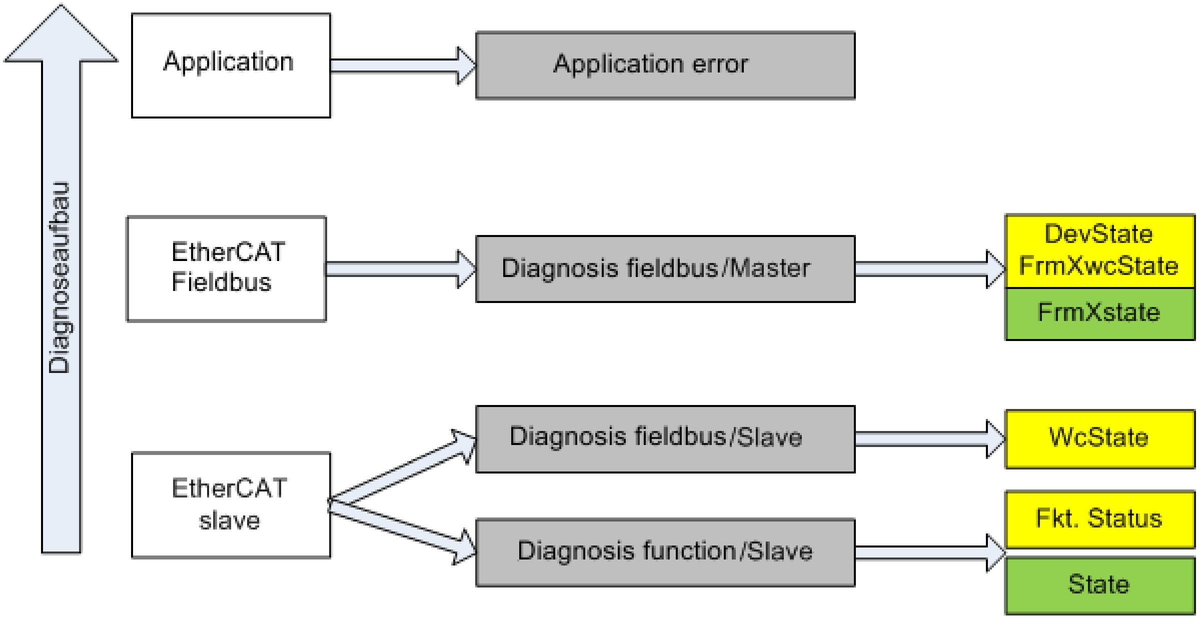


Fig. 136: Selection of the diagnostic information of an EtherCAT Slave

In general, an EtherCAT Slave offers

- communication diagnosis typical for a slave (diagnosis of successful participation in the exchange of process data, and correct operating mode)
  This diagnosis is the same for all slaves.

  as well as
- function diagnosis typical for a channel (device-dependent)
  See the corresponding device documentation

The colors in Fig. *“Selection of the diagnostic information of an EtherCAT Slave”* also correspond to the variable colors in the System Manager, see Fig. *“Basic EtherCAT Slave Diagnosis in the PLC”*.

Colour	Meaning
yellow	Input variables from the Slave to the EtherCAT Master, updated in every cycle
red	Output variables from the Slave to the EtherCAT Master, updated in every cycle
green	Information variables for the EtherCAT Master that are updated acyclically. This means that it is possible that in any particular cycle they do not represent the latest possible status. It is therefore useful to read such variables through ADS.

Fig. *“Basic EtherCAT Slave Diagnosis in the PLC”* shows an example of an implementation of basic EtherCAT Slave Diagnosis. A Beckhoff EL3102 (2-channel analogue input terminal) is used here, as it offers both the communication diagnosis typical of a slave and the functional diagnosis that is specific to a channel. Structures are created as input variables in the PLC, each corresponding to the process image.

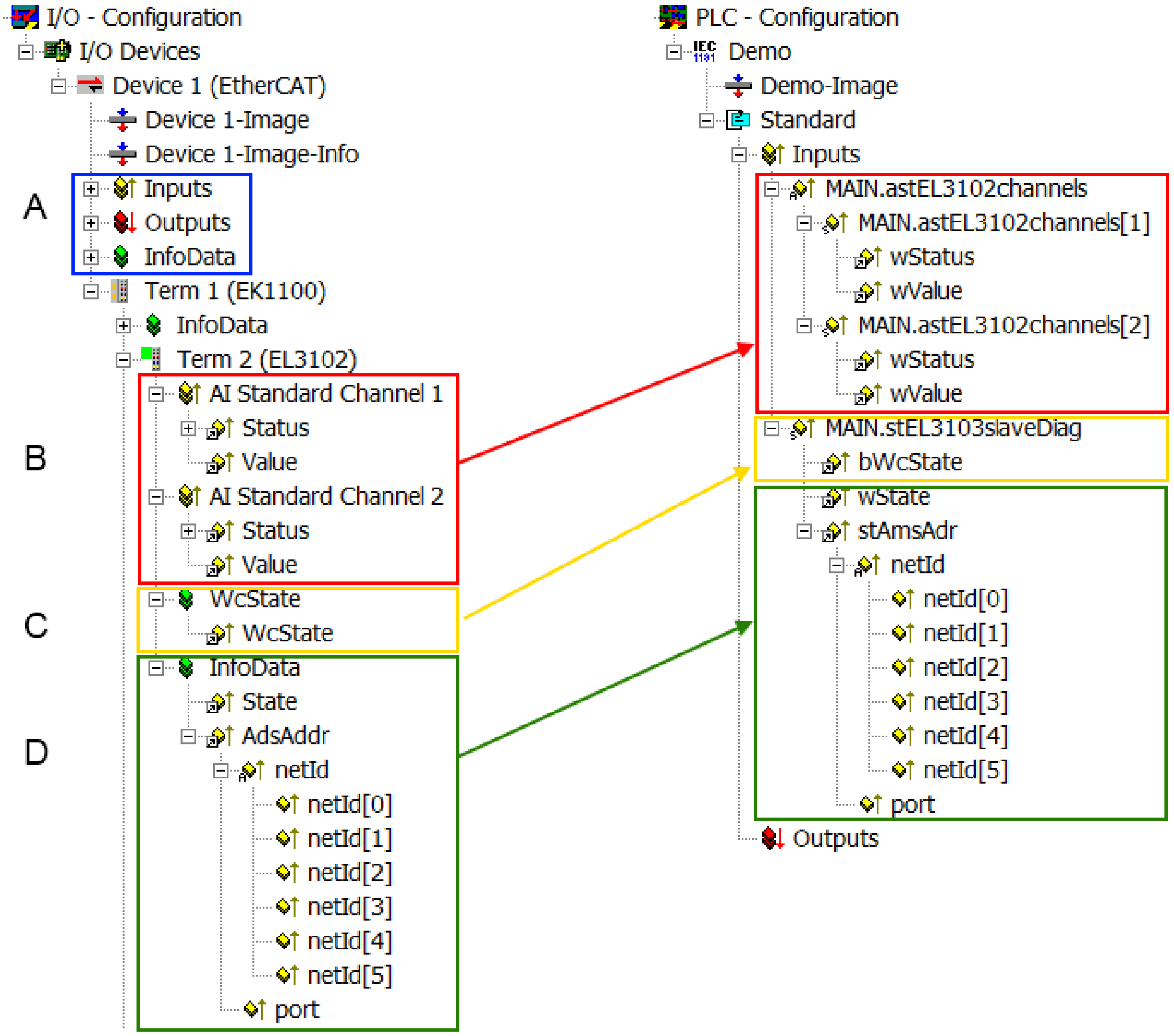


Fig. 137: Basic EtherCAT Slave Diagnosis in the PLC

The following aspects are covered here:

Code	Function	Implementation	Application/evaluation
A	The EtherCAT Master's diagnostic information updated acyclically (yellow) or provided acyclically (green).		At least the DevState is to be evaluated for the most recent cycle in the PLC. The EtherCAT Master's diagnostic information offers many more possibilities than are treated in the EtherCAT System Documentation. A few keywords: • CoE in the Master for communication with/through the Slaves • Functions from *TcEtherCAT.lib* • Perform an OnlineScan
B	In the example chosen (EL3102) the EL3102 comprises two analogue input channels that transmit a single function status for the most recent cycle.	Status • the bit significations may be found in the device documentation • other devices may supply more information, or none that is typical of a slave	In order for the higher-level PLC task (or corresponding control applications) to be able to rely on correct data, the function status must be evaluated there. Such information is therefore provided with the process data for the most recent cycle.
C	For every EtherCAT Slave that has cyclic process data, the Master displays, using what is known as a WorkingCounter, whether the slave is participating successfully and without error in the cyclic exchange of process data. This important, elementary information is therefore provided for the most recent cycle in the System Manager 1. at the EtherCAT Slave, and, with identical contents 2. as a collective variable at the EtherCAT Master (see Point A) for linking.	WcState (Working Counter) 0: valid real-time communication in the last cycle 1: invalid real-time communication This may possibly have effects on the process data of other Slaves that are located in the same SyncUnit	In order for the higher-level PLC task (or corresponding control applications) to be able to rely on correct data, the communication status of the EtherCAT Slave must be evaluated there. Such information is therefore provided with the process data for the most recent cycle.
D	Diagnostic information of the EtherCAT Master which, while it is represented at the slave for linking, is actually determined by the Master for the Slave concerned and represented there. This information cannot be characterized as real-time, because it • is only rarely/never changed, except when the system starts up • is itself determined acyclically (e.g. EtherCAT Status)	State current Status (INIT..OP) of the Slave. The Slave must be in OP (=8) when operating normally. *AdsAddr* The ADS address is useful for communicating from the PLC/task via ADS with the EtherCAT Slave, e.g. for reading/writing to the CoE. The AMS-NetID of a slave corresponds to the AMS-NetID of the EtherCAT Master; communication with the individual Slave is possible via the *port* (= EtherCAT address).	Information variables for the EtherCAT Master that are updated acyclically. This means that it is possible that in any particular cycle they do not represent the latest possible status. It is therefore possible to read such variables through ADS.

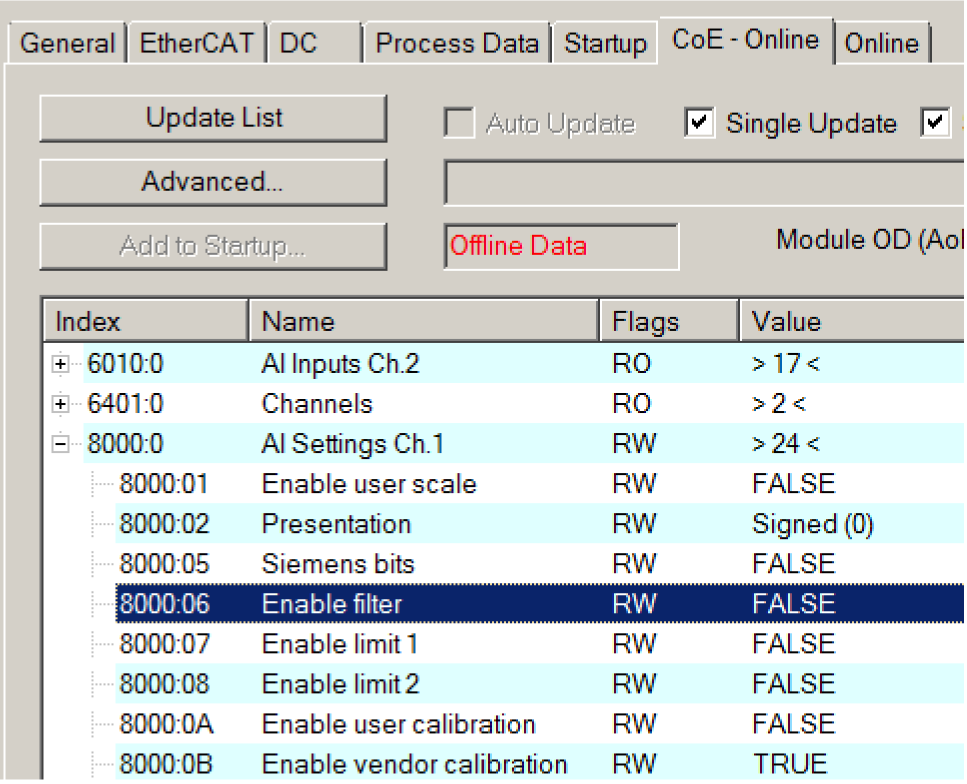
NOTE

Diagnostic information

It is strongly recommended that the diagnostic information made available is evaluated so that the application can react accordingly.

CoE Parameter Directory

The CoE parameter directory (CanOpen-over-EtherCAT) is used to manage the set values for the slave concerned. Changes may, in some circumstances, have to be made here when commissioning a relatively complex EtherCAT Slave. It can be accessed through the TwinCAT System Manager, see Fig. *“EL3102, CoE directory”*:



Index	Name	Flags	Value
+ 6010:0	AI Inputs Ch.2	RO	> 17 <
+ 6401:0	Channels	RO	> 2 <
− 8000:0	AI Settings Ch.1	RW	> 24 <
8000:01	Enable user scale	RW	FALSE
8000:02	Presentation	RW	Signed (0)
8000:05	Siemens bits	RW	FALSE
8000:06	Enable filter	RW	FALSE
8000:07	Enable limit 1	RW	FALSE
8000:08	Enable limit 2	RW	FALSE
8000:0A	Enable user calibration	RW	FALSE
8000:0B	Enable vendor calibration	RW	TRUE

Fig. 138: EL3102, CoE directory

EtherCAT System Documentation

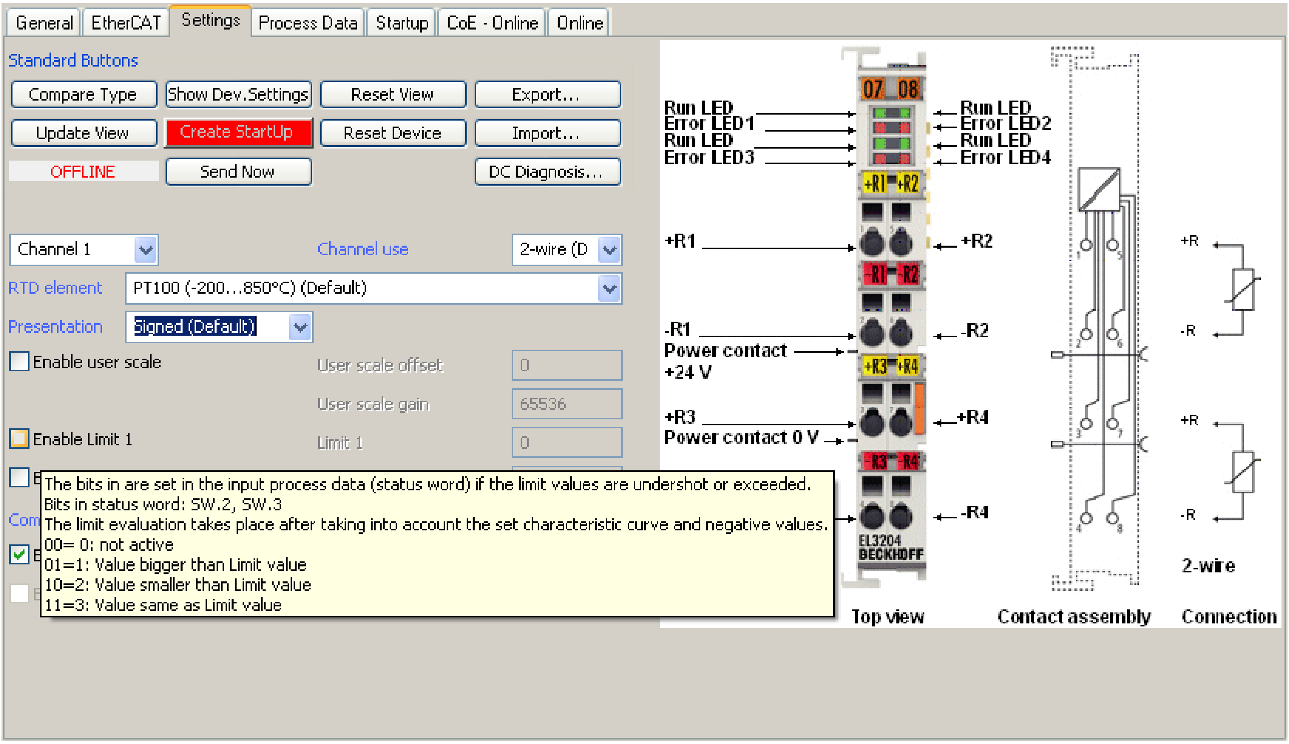
The comprehensive description in the EtherCAT System Documentation (EtherCAT Basics --> CoE Interface) must be observed!

A few brief extracts:

- Whether changes in the online directory are saved locally in the slave depends on the device. EL terminals (except the EL66xx) are able to save in this way.
- The user must manage the changes to the StartUp list.

Commissioning aid in the TwinCAT System Manager

Commissioning interfaces are being introduced as part of an ongoing process for EL/EP EtherCAT devices. These are available in TwinCAT System Managers from TwinCAT 2.11R2 and above. They are integrated into the System Manager through appropriately extended ESI configuration files.



Channel 1

Channel use: 2-wire (D

RTD element: PT100 (-200...850°C) (Default)

Presentation: Signed (Default)

□ Enable user scale

User scale offset: 0

User scale gain: 65536

□ Enable Limit 1

Limit 1: 0

☑

The bits in are set in the input process data (status word) if the limit values are undershot or exceeded.
Bits in status word: SW.2, SW.3
The limit evaluation takes place after taking into account the set characteristic curve and negative values.
00= 0: not active
01=1: Value bigger than Limit value
10=2: Value smaller than Limit value
11=3: Value same as Limit value

Fig. 139: Example of commissioning aid for a EL3204

This commissioning process simultaneously manages

- CoE Parameter Directory
- DC/FreeRun mode
- the available process data records (PDO)

Although the "Process Data", "DC", "Startup" and "CoE-Online" that used to be necessary for this are still displayed, it is recommended that, if the commissioning aid is used, the automatically generated settings are not changed by it.

The commissioning tool does not cover every possible application of an EL/EP device. If the available setting options are not adequate, the user can make the DC, PDO and CoE settings manually, as in the past.

EtherCAT State: automatic default behaviour of the TwinCAT System Manager and manual operation

After the operating power is switched on, an EtherCAT Slave must go through the following statuses

- INIT
- PREOP
- SAFEOP
- OP

to ensure sound operation. The EtherCAT Master directs these statuses in accordance with the initialization routines that are defined for commissioning the device by the ES/XML and user settings (Distributed Clocks (DC), PDO, CoE). See also the section on "Principles of Communication, EtherCAT State Machine [▶ 22]" in this connection. Depending how much configuration has to be done, and on the overall communication, booting can take up to a few seconds.

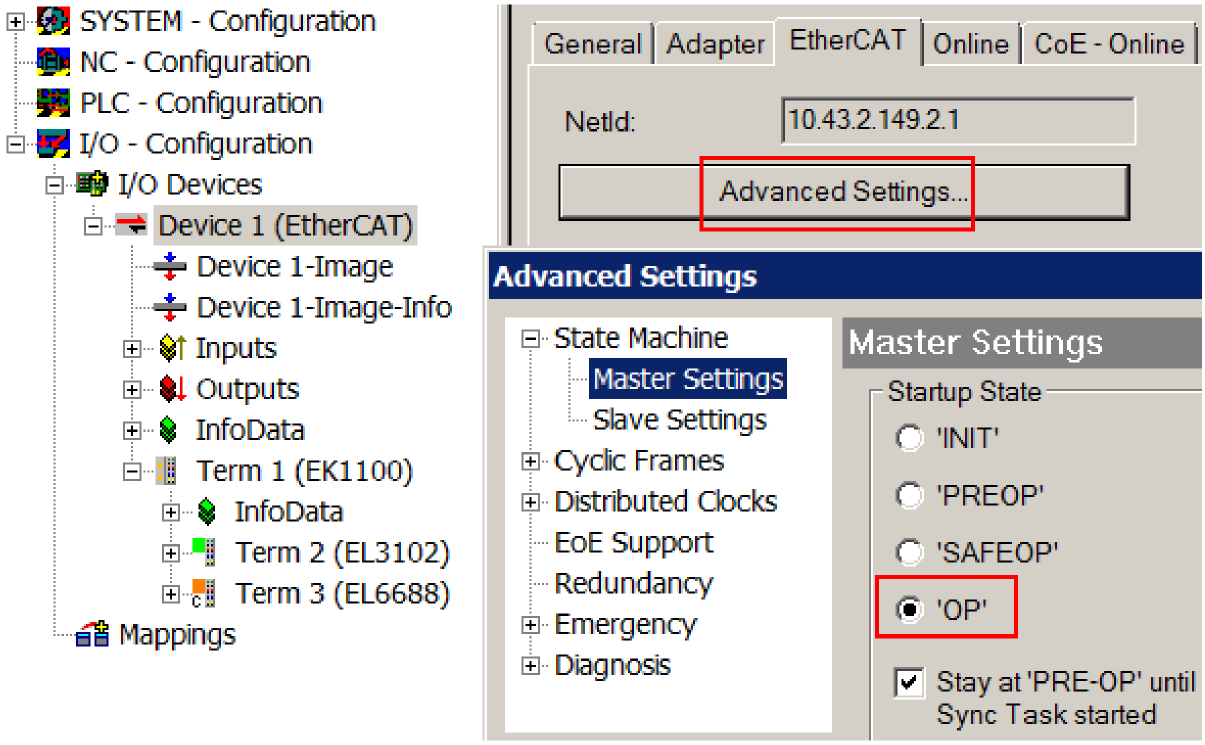
The EtherCAT Master itself must go through these routines when starting, until it has reached at least the OP target state.

The target state wanted by the user, and which is brought about automatically at start-up by TwinCAT, can be set in the System Manager. As soon as TwinCAT reaches the status RUN, the TwinCAT EtherCAT Master will approach the target states.

Standard setting

The advanced settings of the EtherCAT Master are set as standard:

- EtherCAT Master: OP
- Slaves: OP
  This setting applies equally to all Slaves.



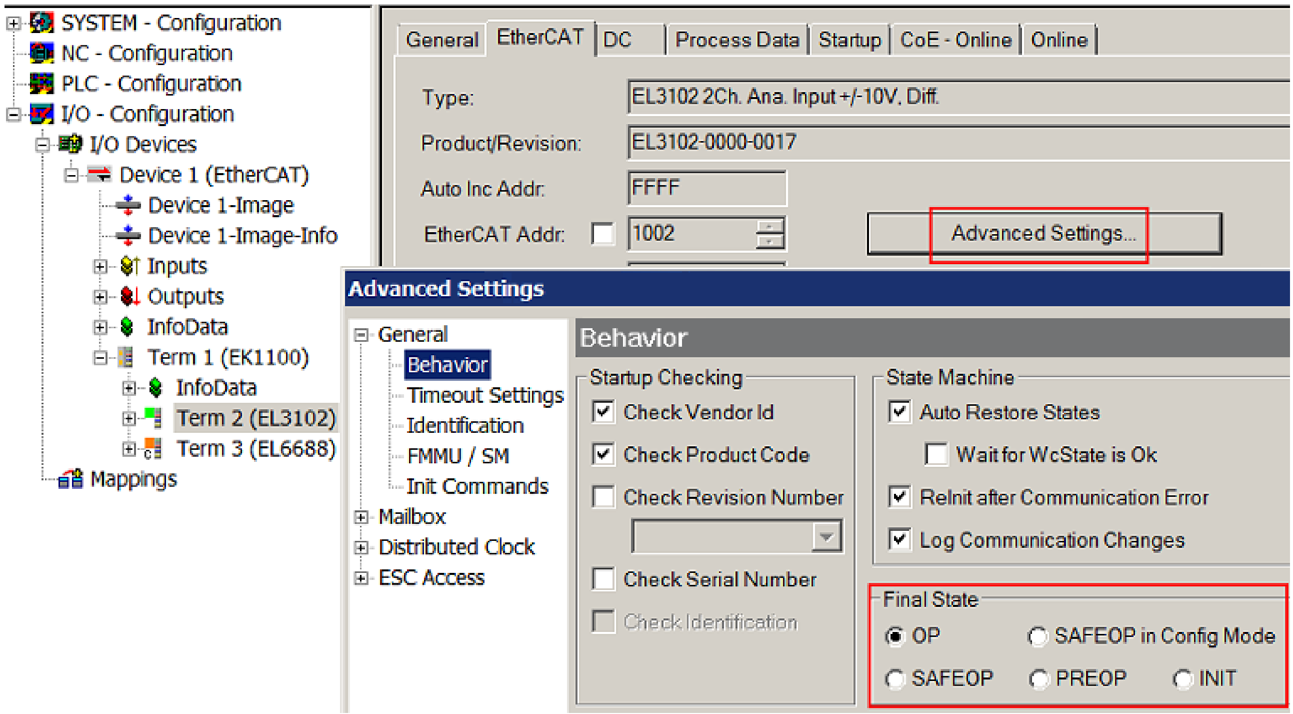
NetId: 10.43.2.149.2.1

Startup State
○ 'INIT'
○ 'PREOP'
○ 'SAFEOP'
● 'OP'

☑ Stay at 'PRE-OP' until Sync Task started

Fig. 140: Default behaviour of the System Manager

In addition, the target state of any particular Slave can be set in the "Advanced Settings" dialogue; the standard setting is again OP.



Type: EL3102 2Ch. Ana. Input +/-10V, Diff.

Product/Revision: EL3102-0000-0017

Auto Inc Addr: FFFF

EtherCAT Addr: □ 1002

Startup Checking
☑ Check Vendor Id
☑ Check Product Code
□ Check Revision Number
□ Check Serial Number
□ Check Identification

State Machine
☑ Auto Restore States
□ Wait for WcState is Ok
☑ ReInit after Communication Error
☑ Log Communication Changes

Final State
● OP ○ SAFEOP in Config Mode
○ SAFEOP ○ PREOP ○ INIT

Fig. 141: Default target state in the Slave

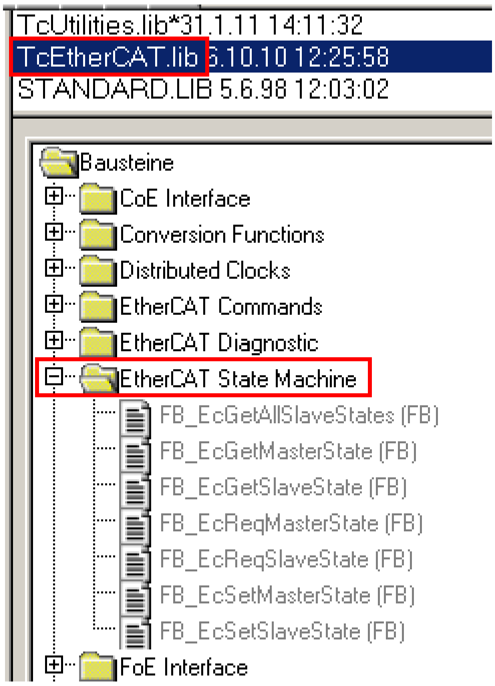
Manual Control

There are particular reasons why it may be appropriate to control the states from the application/task/PLC. For instance:

- for diagnostic reasons
- to induce a controlled restart of axes
- because a change in the times involved in starting is desirable

In that case it is appropriate in the PLC application to use the PLC function blocks from the *TcEtherCAT.lib*, which is available as standard, and to work through the states in a controlled manner using, for instance, *FB_EcSetMasterState*.

It is then useful to put the settings in the EtherCAT Master to INIT for master and slave.



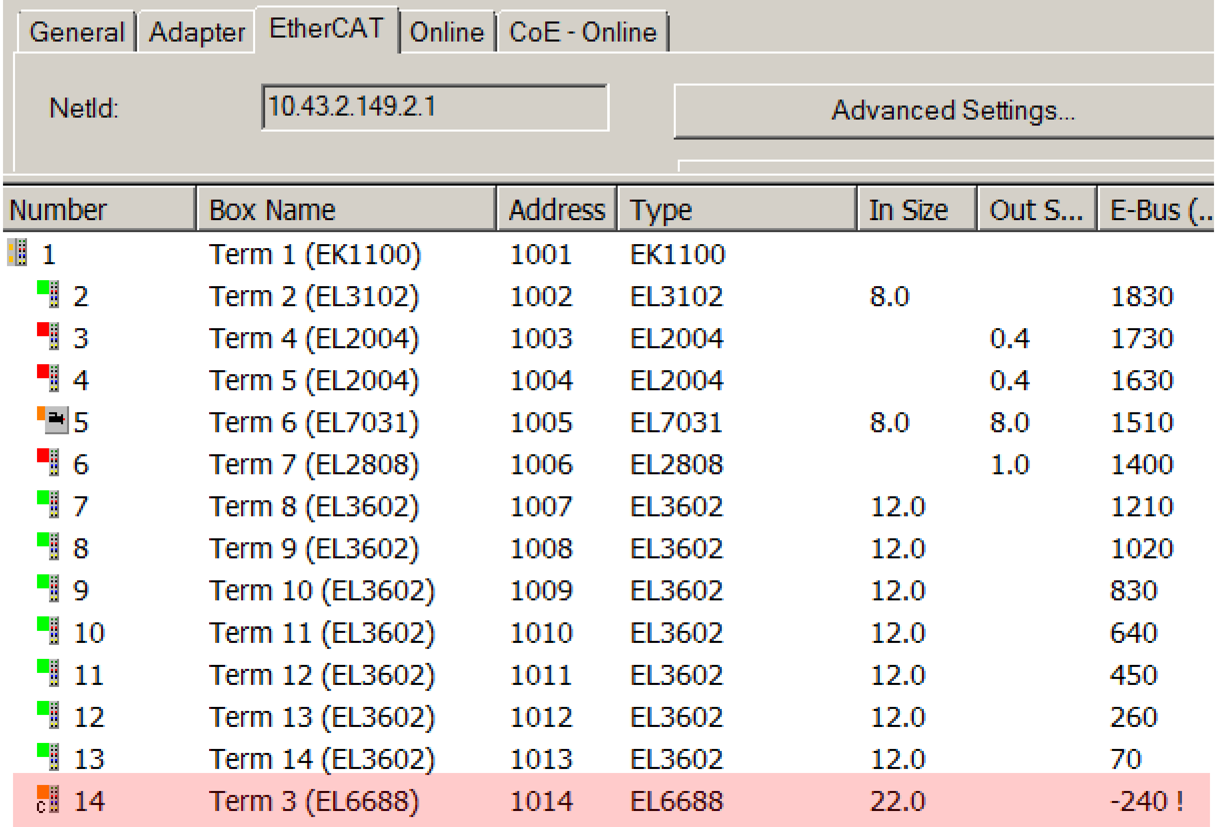
```
TcUtilities.lib*31.1.11 14:11:32
TcEtherCAT.lib 6.10.10 12:25:58
STANDARD.LIB 5.6.98 12:03:02

Bausteine
  CoE Interface
  Conversion Functions
  Distributed Clocks
  EtherCAT Commands
  EtherCAT Diagnostic
  EtherCAT State Machine
    FB_EcGetAllSlaveStates (FB)
    FB_EcGetMasterState (FB)
    FB_EcGetSlaveState (FB)
    FB_EcReqMasterState (FB)
    FB_EcReqSlaveState (FB)
    FB_EcSetMasterState (FB)
    FB_EcSetSlaveState (FB)
  FoE Interface
```

Fig. 142: PLC function blocks

Note regarding E-Bus current

EL/ES terminals are placed on the DIN rail at a coupler on the terminal strand. A Bus Coupler can supply the EL terminals added to it with the E-bus system voltage of 5 V; a coupler is thereby loadable up to 2 A as a rule. Information on how much current each EL terminal requires from the E-bus supply is available online and in the catalogue. If the added terminals require more current than the coupler can supply, then power feed terminals (e.g. EL9410) must be inserted at appropriate places in the terminal strand.

The pre-calculated theoretical maximum E-Bus current is displayed in the TwinCAT System Manager as a column value. A shortfall is marked by a negative total amount and an exclamation mark; a power feed terminal is to be placed before such a position.

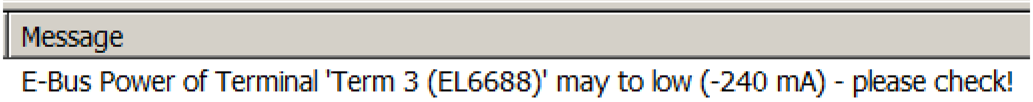


NetId: 10.43.2.149.2.1

Number	Box Name	Address	Type	In Size	Out S...	E-Bus (..
1	Term 1 (EK1100)	1001	EK1100			
2	Term 2 (EL3102)	1002	EL3102	8.0		1830
3	Term 4 (EL2004)	1003	EL2004		0.4	1730
4	Term 5 (EL2004)	1004	EL2004		0.4	1630
5	Term 6 (EL7031)	1005	EL7031	8.0	8.0	1510
6	Term 7 (EL2808)	1006	EL2808		1.0	1400
7	Term 8 (EL3602)	1007	EL3602	12.0		1210
8	Term 9 (EL3602)	1008	EL3602	12.0		1020
9	Term 10 (EL3602)	1009	EL3602	12.0		830
10	Term 11 (EL3602)	1010	EL3602	12.0		640
11	Term 12 (EL3602)	1011	EL3602	12.0		450
12	Term 13 (EL3602)	1012	EL3602	12.0		260
13	Term 14 (EL3602)	1013	EL3602	12.0		70
14	Term 3 (EL6688)	1014	EL6688	22.0		-240 !

Fig. 143: Illegally exceeding the E-Bus current

From TwinCAT 2.11 and above, a warning message "E-Bus Power of Terminal..." is output in the logger window when such a configuration is activated:



Message
E-Bus Power of Terminal 'Term 3 (EL6688)' may to low (-240 mA) - please check!

Fig. 144: Warning message for exceeding E-Bus current

NOTE

Caution! Malfunction possible!

The same ground potential must be used for the E-Bus supply of all EtherCAT terminals in a terminal block!

5.4 Functionality of the AS-i master

The AS-i functionality is only mentioned briefly in this chapter. Further details can be found in the book *AS-Interface* by Kriesl/Madelung, published by Hanser (essentially Chapter 4.1). Further information can also be found on the website of the AS-Interface Association (http://www.as-interface.net).

5.4.1 AS-i status machine

First, an overview of the status machine is provided. Details of the individual operating phases can be found below.

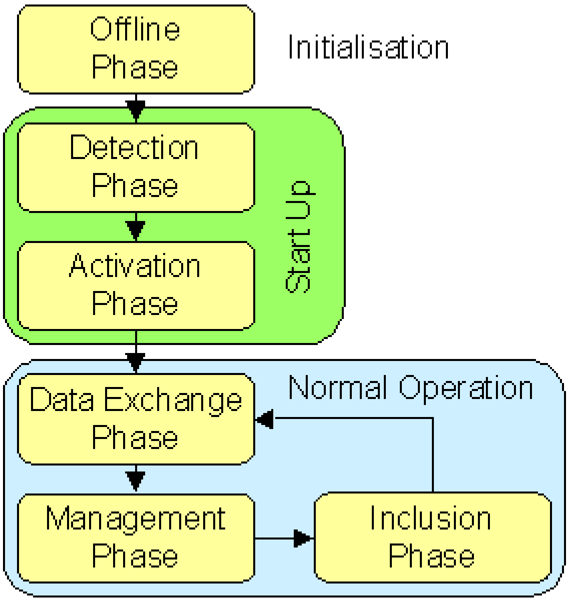


Fig. 145: Status machine overview

Initialization

Offline phase: During initialization, there is no AS-i data traffic.

Start-up

Detection phase

During detection phase, the AS-i master initially looks for existing slaves - irrespective of whether they are currently projected or not. This phase is only exited once at least one slave has been found.

Activation phase

During this phase, the slaves that were found are activated depending on the operation mode:

- Protected mode: All detected and currently projected slaves are activated, if the I/O ID and ID code of the detected slaves match the currently projected data.
- Configuration mode: All detected slaves are activated by the master.

Normal operation

Data exchange phase

Cyclic data exchange between the AS-i master and the activated slaves.

Management phase

At the end of a cycle, the AS-i master enters the management phase, during which it can send a command to a specific slave (if required).

Inclusion phase

The AS-i master then enters the inclusion phase, during which it sends a command to a free slave address, in order to detect new slaves. If there is no response, the master immediately starts the next data exchange phase.

5.4.2 Lists

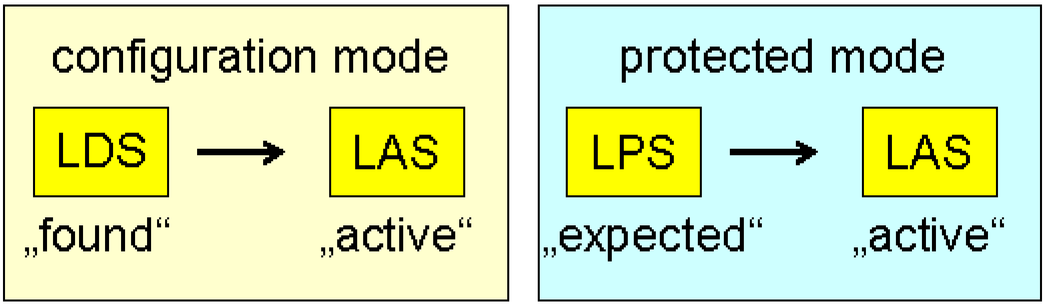


Fig. 146: Lists of the AS-i slaves in configuration and protected mode

LDS - list of detected slaves

This lists all slaves that physically exist in the network, have a valid address and were detected by the master.

LPS - list of currently projected slaves

This list comprises all slaves that the master expects to find in the network. In protected mode, the master only communicates with these slaves and issues a message as soon as additional slaves are detected, or if slaves are missing from this list.

LAS - list of activated slaves

All slaves with which the master communicates. In protected mode, this list corresponds to the LPS, in configuration mode it corresponds to the LDS (LDS).

5.4.3 Operating modes

Protected mode

In protected mode, only the AS-i slaves that are entered in the LPS are activated. In addition, their configuration (I/O ID and ID codes) must correspond to the projected configuration from the objects
- 0x8pp0:20 [▸ 133], 0x8pp0:25 [▸ 133] (projected I/O IDs) or
- 0x8pp0:21 [▸ 133], 0x8pp0:26 [▸ 133] (projected ID codes)
- 0x8pp0:22 [▸ 133], 0x8pp0:27 [▸ 133] (projected Extended ID codes 1) and
- 0x8pp0:23 [▸ 133], 0x8pp0:28 [▸ 133] (projected Extended ID codes 2),
if checking of the I/O ID or ID codes is enabled in the indices 0x8pp0:20 [▸ 133] (bit 7), 0x8pp0:25 [▸ 133] (bit 7) or 0x8pp0:21 [▸ 133] (bit 7), 0x8pp0:26 [▸ 133] (bit 7) and 0x8pp0:22 [▸ 133] (bit 7), 0x8pp0:27 [▸ 133] (bit 7), as well as 0x8pp0:23 [▸ 133] (bit 7) and 0x8pp0:28 [▸ 133] (bit 7).

Automatic addressing is possible, if I/O ID and ID code verification is enabled for all AS-i slaves listed in the LPS, and if precisely one currently projected AS-i slave is missing.

Configuration mode

In configuration mode, all AS-i slaves that are found are activated. Automatic addressing is possible, with the next free address being assigned when a slave with address 0 is found. However, an AS-i address can be manually set via the index 0x2000 [▶ 137] (AS-i command interface). All the AS-i slaves found can be projected by setting the set input. In this case, the

- corresponding I/O IDs and ID codes are also entered into the indices 0x8pp0:20 [▶ 133], 0x8pp0:25 [▶ 133] (projected I/O IDs) or 0x8pp0:21 [▶ 133], 0x8pp0:26 [▶ 133] and 0x8pp0:22 [▶ 133], 0x8pp0:27 [▶ 133], as well as 0x8pp0:23 [▶ 133]0x8pp0:28 [▶ 133] (projected ID codes) and
- the check is enabled in the indices 0x8pp0:20 [▶ 133] (bit 7), 0x8pp0:25 [▶ 133] (bit 7) or 0x8pp0:21 [▶ 133] (bit 7), 0x8pp0:26 [▶ 133] (bit 7) and 0x8pp0:22 [▶ 133](bit 7), 0x8pp0:27 [▶ 133] (bit 7), as well as 0x8pp0:23 [▶ 133] (bit 7), 0x8pp0:28 [▶ 133] (bit 7) (ID codes).

5.4.4 Operating phases

Offline

After power-on, the AS-i master goes into offline mode, i.e. there is no communication with the AS-i slaves.

During normal operation, the AS-i master can be put into offline mode (OFFLINE-flag is set) via the process data. The output data of all activated AS-i slaves are set to default value 1_{bin}, and the input data of all activated AS-i slaves are set to default value 0_{bin}. The AS-i master is then in offline mode and will send no further AS-i commands.

Start-up

Detection phase

During the detection phase, the I/O ID and ID codes of all AS-i slaves are queried and entered in parameters
- 0x9pp0:20 [▶ 141], 0x9pp0:25 [▶ 141] (I/O IDs read) or
- 0x9pp0:21 [▶ 141], 0x9pp0:26 [▶ 141] (ID codes read),
- 0x9pp0:22 [▶ 141], 0x9pp0:27 [▶ 141] (Extended ID codes 1 read) and
- 0x9pp0:23 [▶ 141], 0x9pp0:28 [▶ 141] (Extended ID codes 2 read).

All AS-i slaves found are entered in the **L**ist of **D**etected AS-i **S**laves (LDS), index 0xF101 [▶ 144]. The AS-i master will only enter the activation phase once at least one slave was detected or found.

Activation phase

In protected mode the AS-i master activates only the projected AS-i Slaves from the **L**ist of **P**rojected **S**laves (LPS, index 0xF103 [▶ 145]).

In configuration mode, all AS-i slaves that were found during the detection phase are activated. To this end the AS-i master sends a parameterization call (activation parameter, 0x8pp0:24 [▶ 133], 0x8pp0:29 [▶ 133]) and a data call (with the default values 1_{bin} as outputs). All activated slaves are entered in the **L**ist of **A**ctivated **S**laves (LAS, index F102 [▶ 145]). Once all AS-i slaves have been processed, the AS-i master automatically enters the data exchange phase.

Normal operation

Data exchange phase

During the data exchange phase, the AS-i master exchanges data with each activated AS-i slave. If an AS-i slave does not respond in three consecutive data exchange phases, it is removed from the LAS and the LDS, and its inputs are set to the default value 0_{bin}. Once a data cycle has been completed with all activated AS-i slaves, the AS-i master enters the management phase.

Management phase

During the management phase, an AS-i command is sent if an operating address is to be set via automatic address programming, or if an AS-i command was requested via the AS-i command interface (index 0x2000 [▸ 137]). Otherwise the AS-i master enters the inclusion phase without issuing an AS-i command.

Inclusion phase

During the inclusion phase, only one command is sent. The system will attempt to find and activate new AS-i slaves, and the respective status is updated accordingly. The steps are the same as during the recognition or activation phase, except that they are now distributed over up to seven cycles.

5.4.5 Address assignment of the AS-i slaves

Address assignment can be done via the AS-i master or via an addressing device. AS-i slaves are usually supplied with address 0. Slaves that were added later are searched under this address, and an address is then assigned. Address 0 is not permitted during the data exchange phase.

The extended addressing is supported from AS-i specification 2.1, so that corresponding slaves can also be given the addresses 1B to 31B. 0B is not permitted.

Normal address assignment

New AS-i slaves usually have address 0. An addressing call command can be initiated via the parameter 0x2000 [▸ 137] (AS-i command interface). However, the addressing call command only works if precisely one AS-i slave with address 0 is connected to the bus. A further addressing possibility is shown in the Quickstart [▸ 112] section

5.4.6 Automatic address assignment

Automatic address assignment

Automatic address assignment must be enabled in index 0xF100:03 [▸ 144].

Configuration mode

In configuration mode, the next free address is automatically assigned if a slave with address 0 is found.

Protected Mode

In protected mode, an AS-i slave with address 0 is automatically programmed with its new address, if precisely one currently projected AS-i slave is missing, and if no other not currently projected AS-i slave is present at the bus. This enables a (no longer functioning) AS-i slave to be exchanged during operation.

5.5 Quickstart

No special measures are required for the initial commissioning of the EL6201.
Knowledge of the introductory Technology section is required.

The following examples initially illustrate **manual** addressing and integration of a digital AS-i slave in the TwinCAT system.
For **automatic** addressing the EL6201 is commissioned with two digital and one analog AS-i slave, for example.
The EL6201 is commissioned with the following configuration:

- Operating system Windows 7 Professional SP1
- TwinCAT 2.11 R3 Build 2256, AS-i System Manager Extension installed

- Terminal network EK1100, EL1202, EL6201 and EL9010
- AS-i standard power supply unit 30.5 V
- AS-i slave 2 button / 2 LED
- AS-i slave 4 digital inputs
- AS-i slave 4 digital outputs

AS-i System Manager extension for 32-bit and 64-bit Windows systems

The AS-i System Manager extension has been tested and runs under 32-bit and 64-bit Windows 7 Professional SP1.

1. Mounting and connection

⚠ **WARNING**

Risk of injury through electric shock and damage to the device!

Bring the Bus Terminal system and the AS-i power supply unit into a safe, de-energized state before starting installation, disassembly or wiring of the Bus Terminals!

- Mount the EL6201 in the terminal network as described in the section Mounting and wiring [▶ 29].

Cable lengths

When using the EL9520 (potential distribution terminal with filter, AS-i power 24), the maximum expansion of the network topology may not exceed 50 m!
When determining the total length, all branches should be included (Fig. *Wiring diagram for connecting the AS-i power supply unit and AS-i slaves with the EL6201*).
If an AS-i standard power supply unit is used, the maximum topology expansion is 100 m.

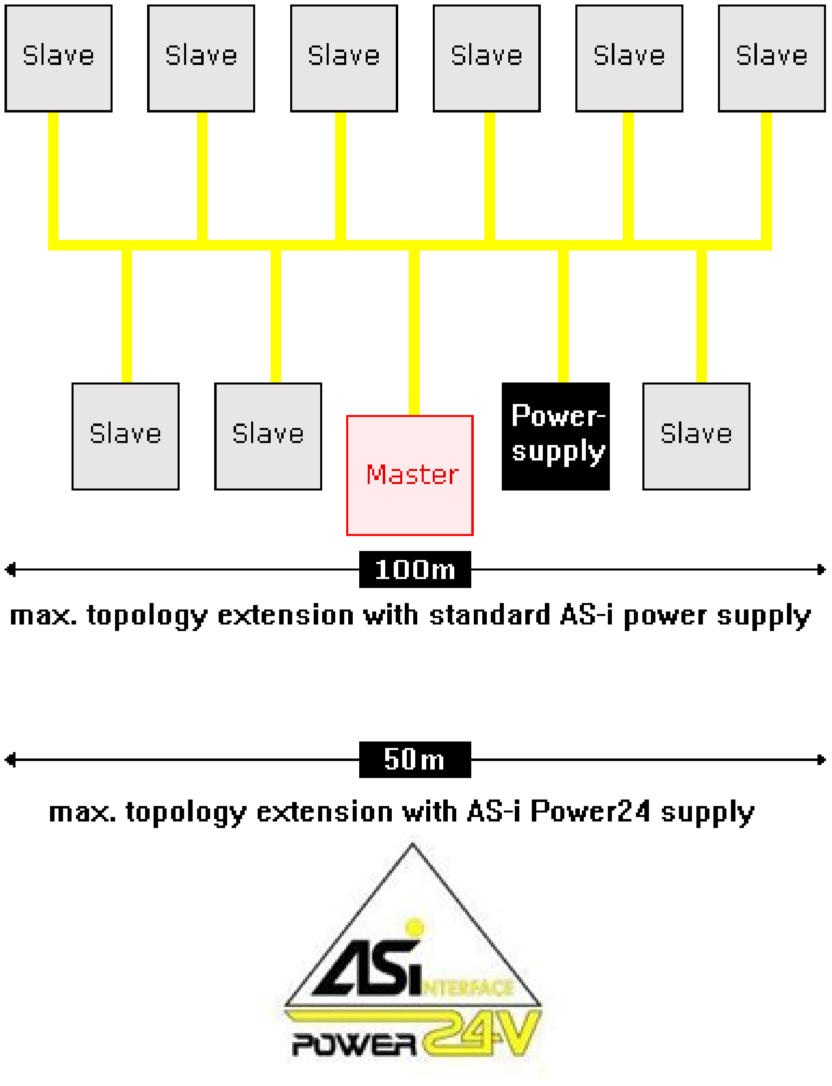

Slave
Slave
Slave
Slave
Slave
Slave
Slave
Slave
Master
Power-supply
Slave
100m
max. topology extension with standard AS-i power supply
50m
max. topology extension with AS-i Power24 supply
ASi INTERFACE
POWER 24V

Fig. 147: Maximum topology extent with standard AS-i power supply and AS-i Power24 supply

- Connect the AS-i slave and the standard 24 V power supply unit to the EL6201 according to the following wiring diagram (Fig. *Wiring diagram for connecting the AS-i power supply unit and AS-i slaves with the EL6201*). Correct connection of the slave as described in the Technology [▸ 14]section is required.
- Alternatively the AS-i slaves can be supplied with power via the EL9520 AS-i potential supply terminal as described in the Connection [▸ 41] section.

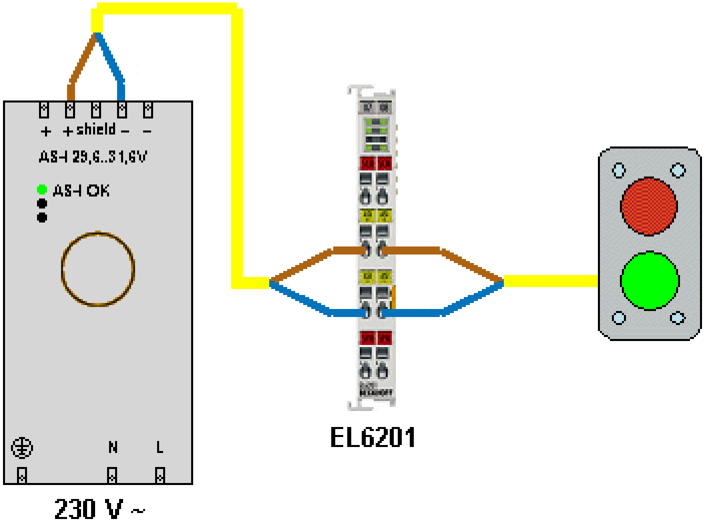


Fig. 148: Wiring diagram AS-i slave / EL6201

- Switch the Bus Terminal system power supply and the AS-i power supply unit on.

2. Configuration

Creating a TwinCAT configuration

New features from firmware 02 and TwinCAT plug-in, version 2.1

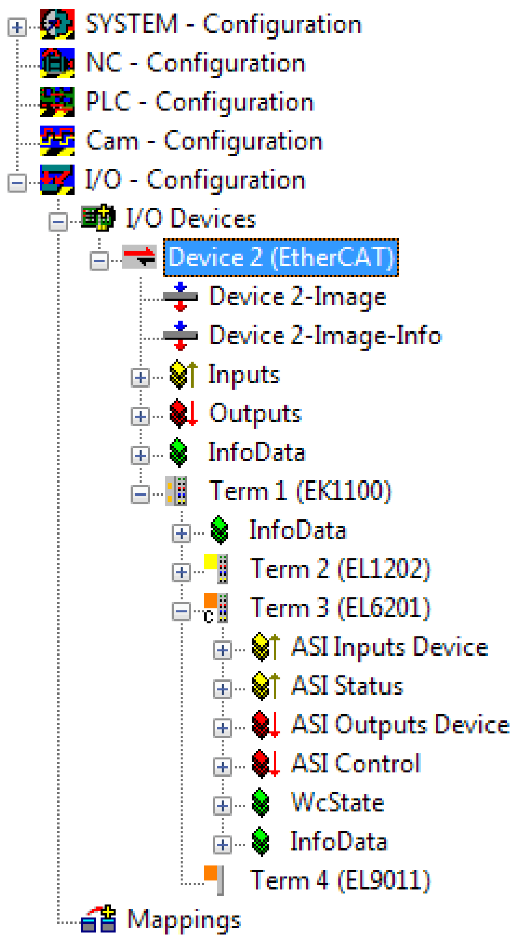
Firmware 02:
• Support of M4 master profile for slaves of types 2, 3, 5 (S-7.5.5, S-7.A.5, S-B.A.5; S7.A.7, S-7.A.A; S-6.0) (can be activated via flag in AS-i Control)
• Support of Power24 (can be activated via flag in AS-i Control)
• ExtendedID code can be modified

TwinCAT plug-in, version 2.1:
• Advanced view for new slave types
• New design for more intuitive application
• Simplified project planning, standard and advanced mode
• Optimization for lower resolutions and high DPI settings for optimum operation in suboptimum working environments

Download the latest EtherCAT XML Device Description and the AS-i System Manager Extension

Make sure that you download the latest XML file from the download section on the Beckhoff website and install it in accordance with the installation instructions.
The addressing of the AS-i slaves described below requires the installation of the AS-i System Manager Extension, which you should likewise download and install.

- Create a configuration in the TwinCAT System Manager by manually inserting the terminal or scanning it online. Refer to installation chapter TwinCAT 2.x [▶ 92] regarding this.
- The TwinCAT tree now looks like this:



- SYSTEM - Configuration
- NC - Configuration
- PLC - Configuration
- Cam - Configuration
- I/O - Configuration
  - I/O Devices
    - Device 2 (EtherCAT)
      - Device 2-Image
      - Device 2-Image-Info
      - Inputs
      - Outputs
      - InfoData
      - Term 1 (EK1100)
        - InfoData
        - Term 2 (EL1202)
        - Term 3 (EL6201)
          - ASI Inputs Device
          - ASI Status
          - ASI Outputs Device
          - ASI Control
          - WcState
          - InfoData
        - Term 4 (EL9011)
  - Mappings

Fig. 149: Configuration tree in the TwinCAT System Manager

Manual addressing of the AS-i slave

AS-i address

The address of a brand new AS-i slave is always "0".

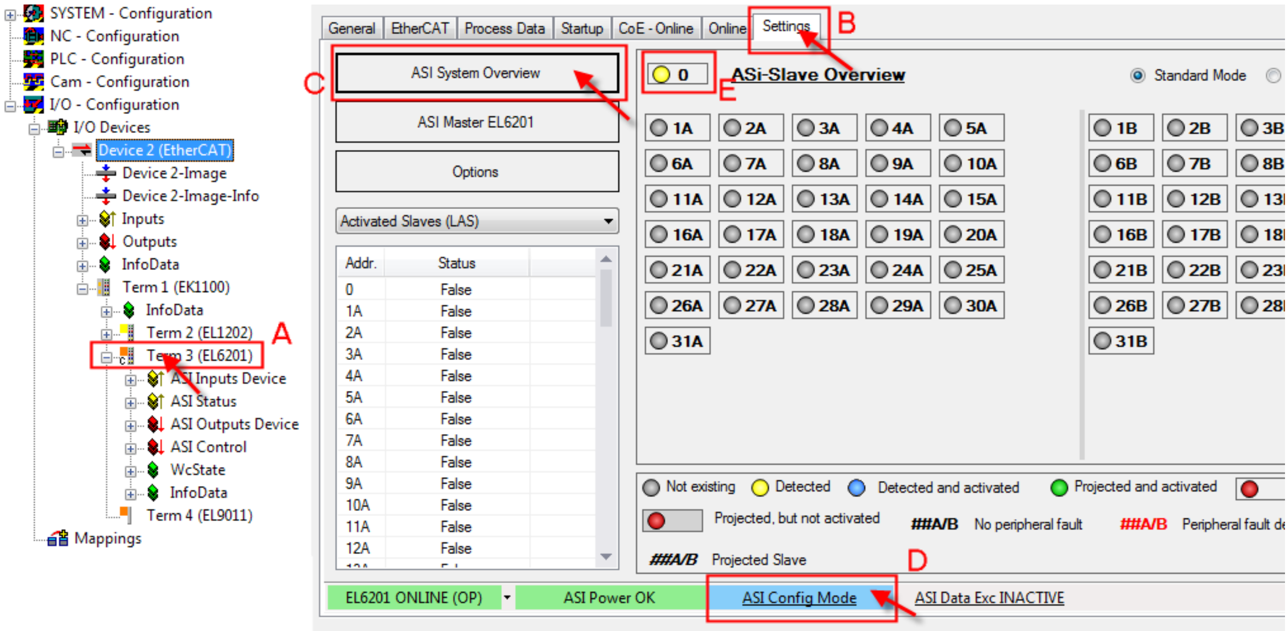
The addressing of a brand new AS-i slave can be done using the TwinCAT System Manager. The installation of the AS-i System Manager Extension is required for this.

- Click on the EL6201 in the TwinCAT tree (A) and the “Settings” tab (B). Then click on "AS-i System Overview" (C) to navigate to the AS-i overview below, which shows the AS-i slaves to be addressed.
- The "AS-i Config Mode" (D) field in the status bar is shown in blue. If a green field “ASI Protected Mode” is displayed here, click on the field to access the “ASI Config Mode”

Status Bar

The status bar in the system overview indicates the system state. Underlined settings can be changed (switch between config mode/protected mode, activation/deactivation of data exchange).

- The slave “0” (E) marked with the yellow dot is the connected slave that has already been detected and which is to be given a valid address



Addr.	Status
0	False
1A	False
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 150: AS-i system overview with the slaves to be addressed

- In order to convert the slave address "0" into a valid address, right-click on the yellow dot in the address field "0" so that you can then select an AS-i address via the "Change Address" selection field; for instance the address "1A" in the example.

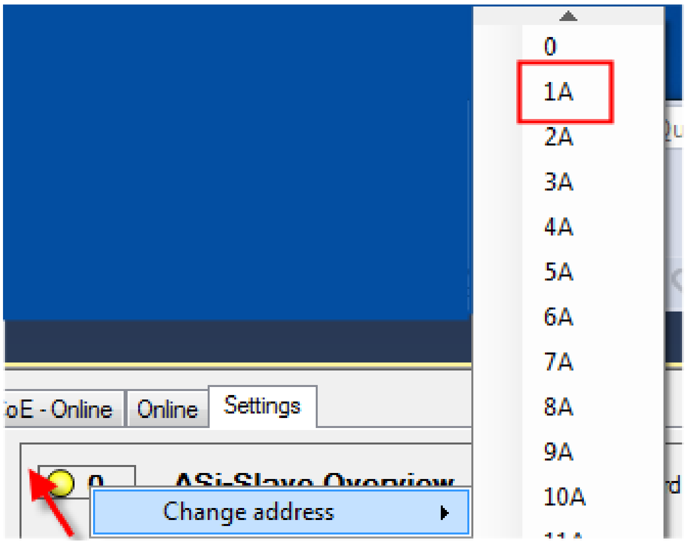
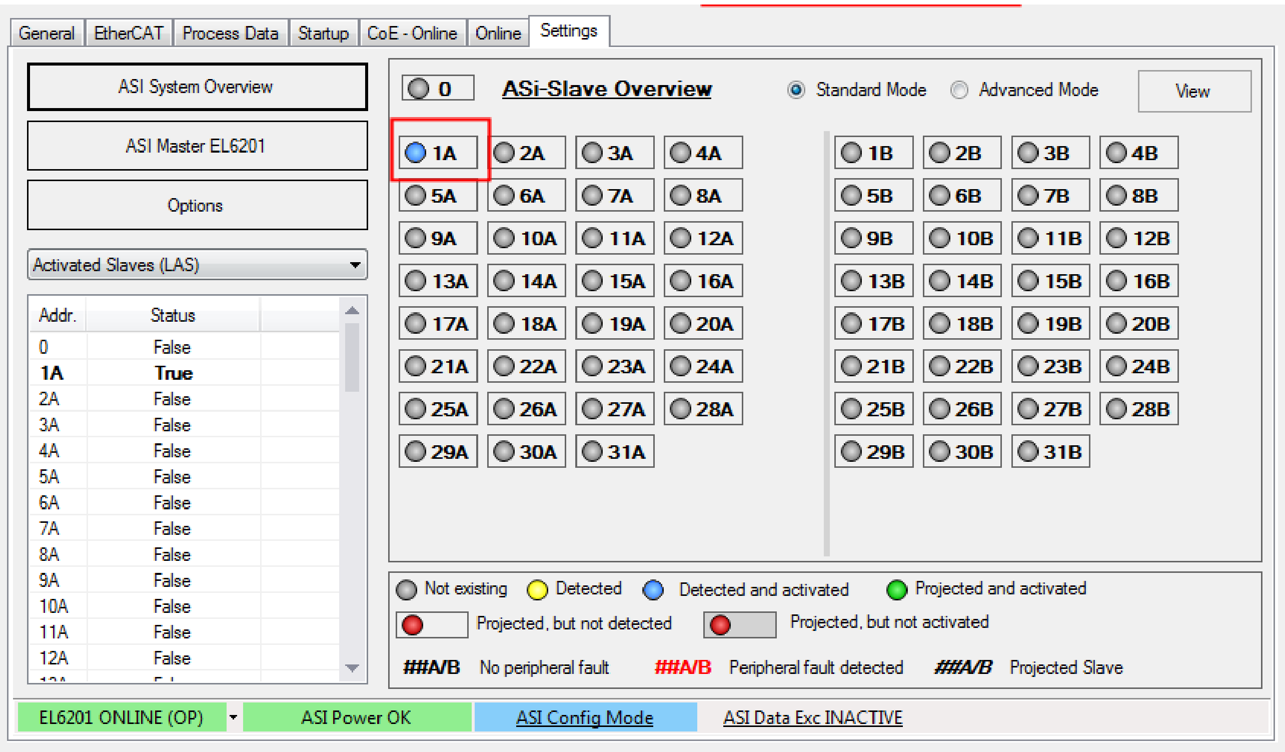


Fig. 151: Address assignment for the AS-i slave

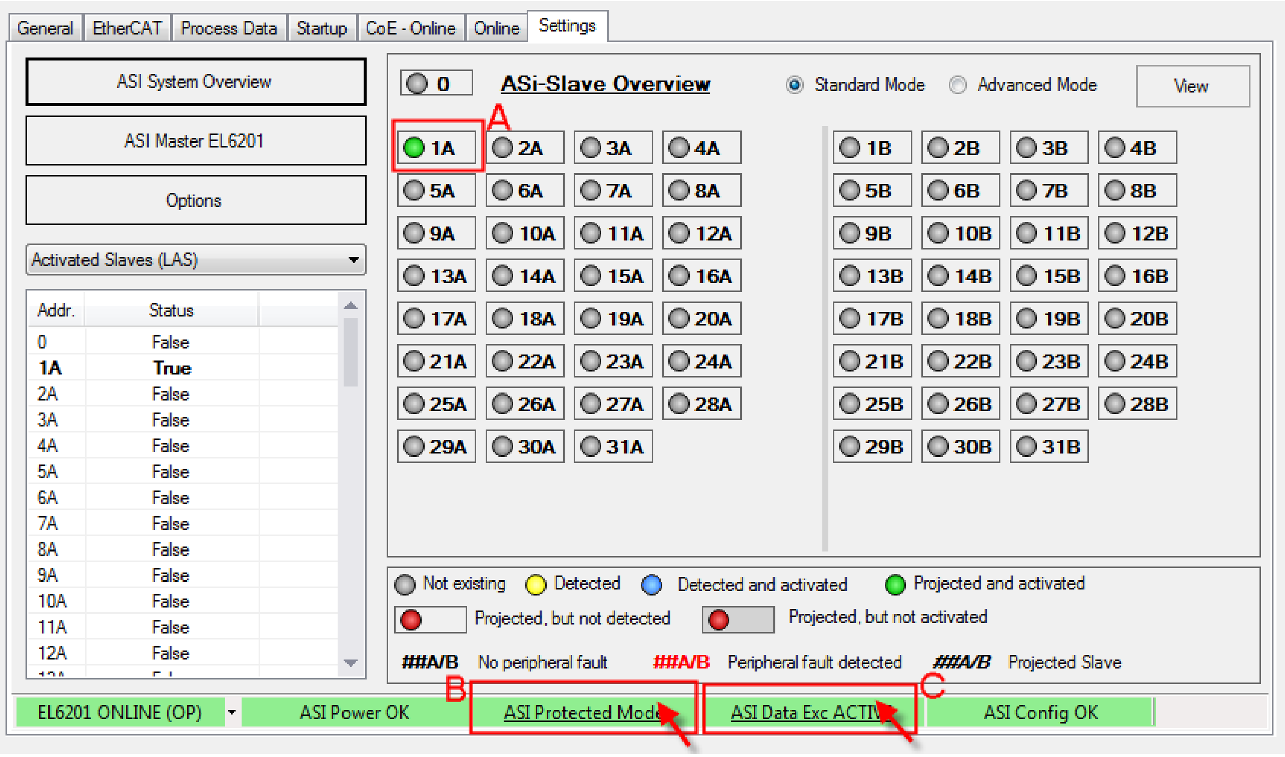
- The address is now shown as "Detected and activated" (blue).


General
EtherCAT
Process Data
Startup
CoE - Online
Online
Settings
ASI System Overview
ASI Master EL6201
Options
Activated Slaves (LAS)
0
ASi-Slave Overview
Standard Mode
Advanced Mode
View
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A 14A 15A 16A 17A 18A 19A 20A 21A 22A 23A 24A 25A 26A 27A 28A 29A 30A 31A
1B 2B 3B 4B 5B 6B 7B 8B 9B 10B 11B 12B 13B 14B 15B 16B 17B 18B 19B 20B 21B 22B 23B 24B 25B 26B 27B 28B 29B 30B 31B
Not existing
Detected
Detected and activated
Projected and activated
Projected, but not detected
Projected, but not activated
##A/B No peripheral fault
##A/B Peripheral fault detected
##A/B Projected Slave
EL6201 ONLINE (OP)
ASI Power OK
ASI Config Mode
ASI Data Exc INACTIVE

Addr.	Status
0	False
1A	**True**
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 152: Address assignment for the AS-i slave accepted

- In order to conclude the projecting for the slave, click on the blue field "ASI Config Mode" (B); the system switches to "ASI Protected Mode" (green field).
- In order to enable the AS-i data exchange, click on the grey field "ASI Data Exc INACTIVE"; the field changes to green "ASI Data Exc ACTIVE" (C).
- The completed configuration is indicated by the green field “ASI Config OK”.



Addr.	Status
0	False
1A	**True**
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 153: Switching to "Protected mode" and completion of project planning

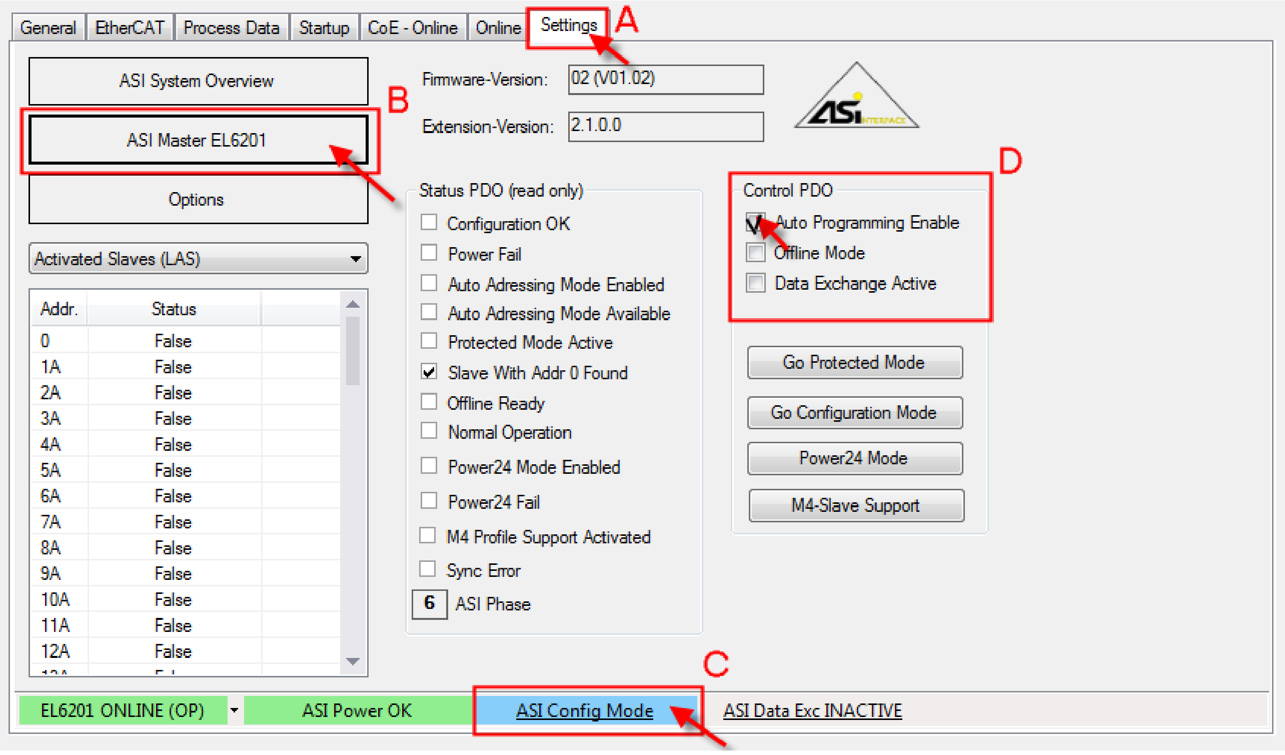
Automatic addressing of the AS-i slaves

AS-i-address for automatic addressing

For automatic allocation of AS-i addresses in the EL6201, the connected AS-i slaves must have the address "0" (not addressed).
Successive automatic allocation of addresses is not possible, if a slave is already addressed/projected.

Automatic addressing is also done via the AS-i System Manager extension.

- The AS-i slaves referred to above are not yet connected to the AS-i fieldbus line and have the address "0" or come straight from the factory.
- Click on the EL6201 in the TwinCAT tree and the "Settings" tab (A). Then click on "AS-i master EL6201" (B) to open the screen shown below.
- Ensure that the terminal is in "ASI Config Mode" (blue). If necessary, change the mode by clicking (C).
- Set "Auto Programming Mode" in the field "Control PDO" (D).



Activated Slaves (LAS)

Addr.	Status
0	False
1A	False
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Firmware-Version: 02 (V01.02)

Extension-Version: 2.1.0.0

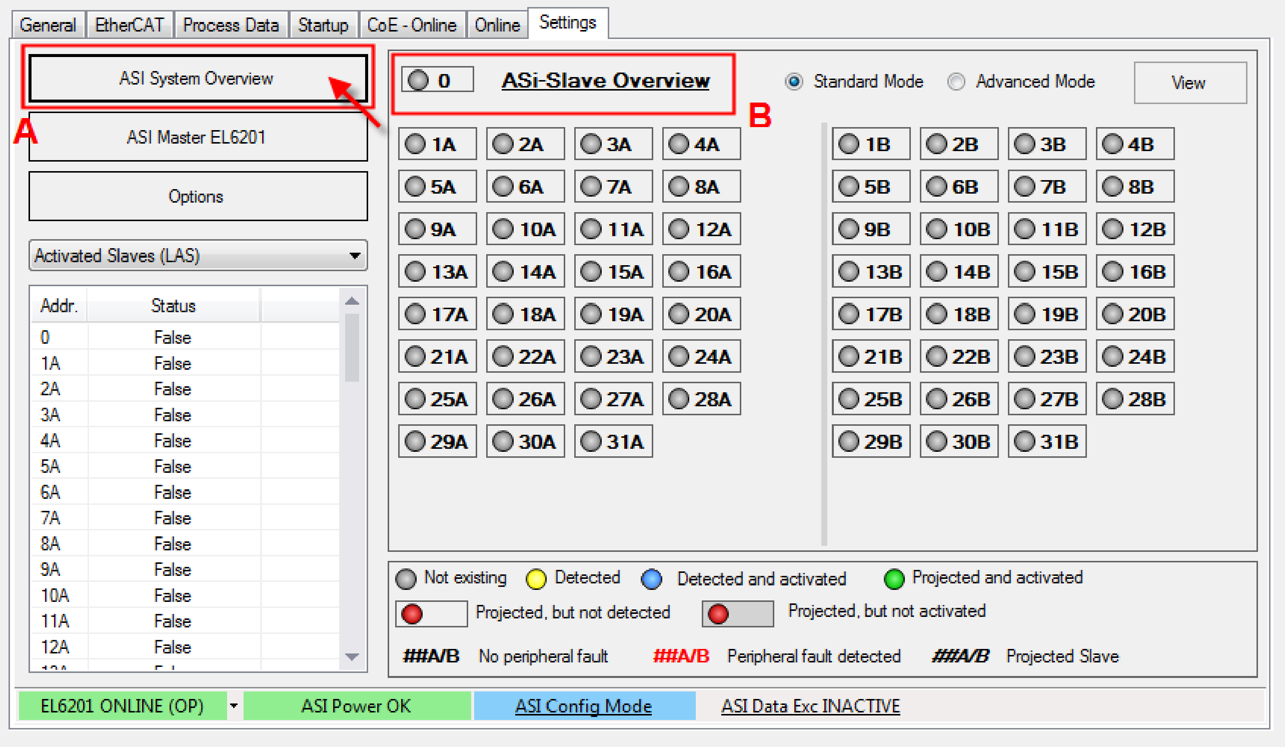
Status PDO (read only)
- □ Configuration OK
- □ Power Fail
- □ Auto Adressing Mode Enabled
- □ Auto Adressing Mode Available
- □ Protected Mode Active
- ☑ Slave With Addr 0 Found
- □ Offline Ready
- □ Normal Operation
- □ Power24 Mode Enabled
- □ Power24 Fail
- □ M4 Profile Support Activated
- □ Sync Error
- 6 ASI Phase

Control PDO
- ☑ Auto Programming Enable
- □ Offline Mode
- □ Data Exchange Active

EL6201 ONLINE (OP) | ASI Power OK | ASI Config Mode | ASI Data Exc INACTIVE

Fig. 154: Activating "Auto Programming Mode"

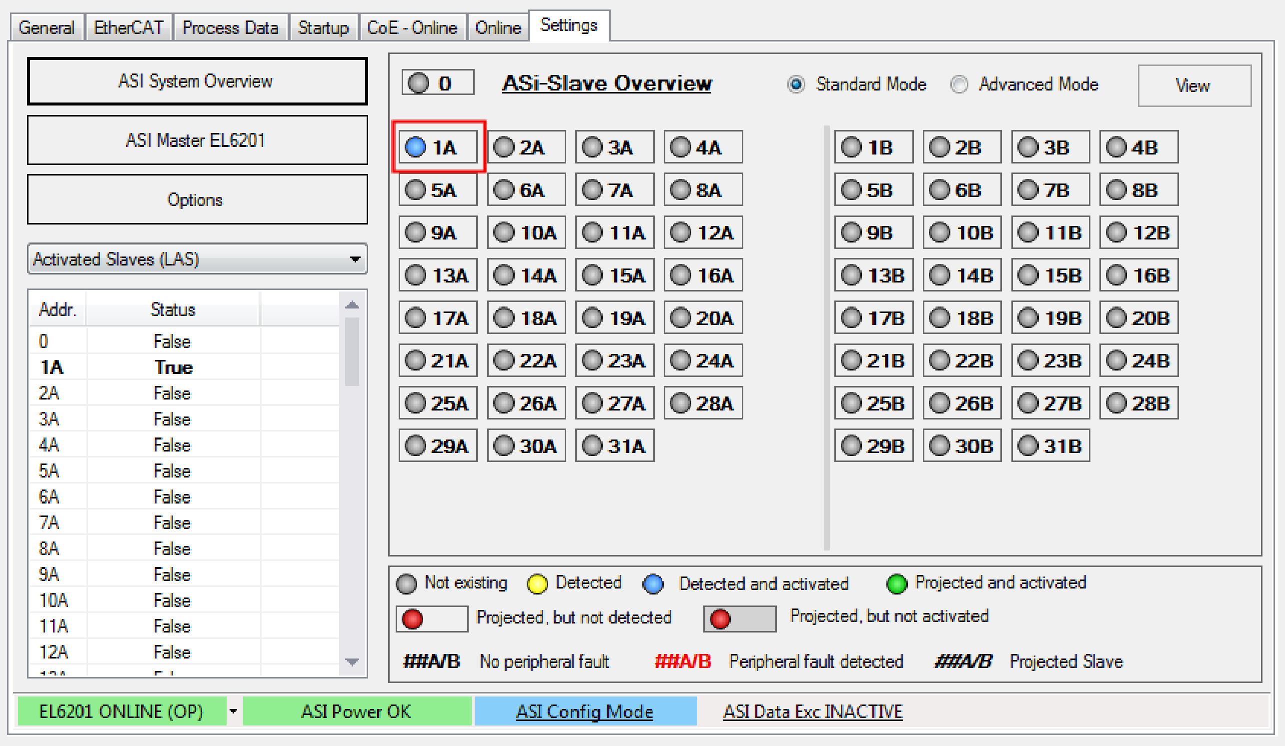
- Now click on "AS-i system Overview" (A), as shown in Fig. *Switching to "Protected mode" and completion of project planning.* As you can see in the image below, no slave is detected/projected (B).


General
EtherCAT
Process Data
Startup
CoE - Online
Online
Settings
ASI System Overview
A
ASI Master EL6201
Options
Activated Slaves (LAS)
0
ASi-Slave Overview
B
Standard Mode
Advanced Mode
View
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A 14A 15A 16A 17A 18A 19A 20A 21A 22A 23A 24A 25A 26A 27A 28A 29A 30A 31A
1B 2B 3B 4B 5B 6B 7B 8B 9B 10B 11B 12B 13B 14B 15B 16B 17B 18B 19B 20B 21B 22B 23B 24B 25B 26B 27B 28B 29B 30B 31B
Not existing
Detected
Detected and activated
Projected and activated
Projected, but not detected
Projected, but not activated
##A/B No peripheral fault
##A/B Peripheral fault detected
##A/B Projected Slave
EL6201 ONLINE (OP)
ASI Power OK
ASI Config Mode
ASI Data Exc INACTIVE

Addr.	Status
0	False
1A	False
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

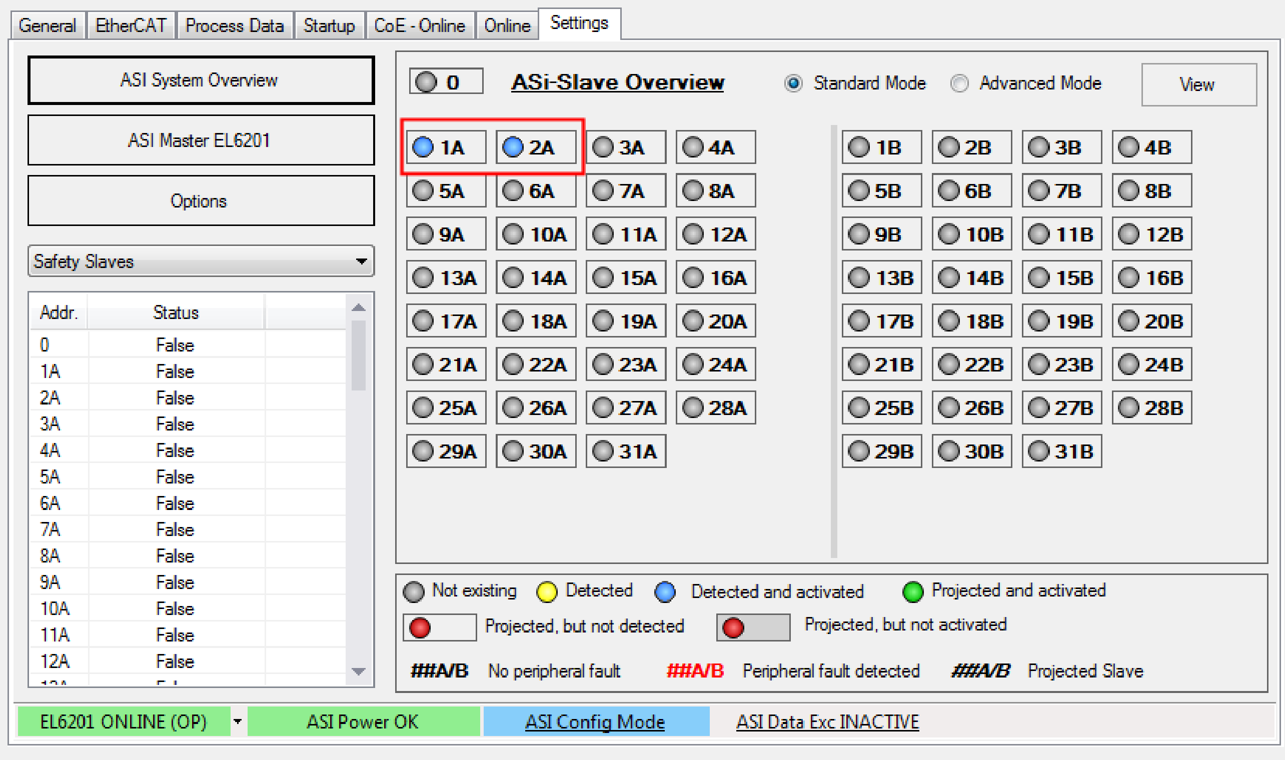
Fig. 155: No slave detected in the AS-i System Overview

- Now connect the first slave with the AS-i fieldbus line. The slave is automatically addressed with "1A", as shown below (Fig. *The first slave connected is allocated address "1A"*). The address is now permanently implemented in the slave.
- Now connect further slaves with the AS-i fieldbus line. The slaves are allocated addresses "2A" and "3A", as shown below.


General
EtherCAT
Process Data
Startup
CoE - Online
Online
Settings
ASI System Overview
ASI Master EL6201
Options
Activated Slaves (LAS)
0
ASi-Slave Overview
Standard Mode
Advanced Mode
View
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A 14A 15A 16A 17A 18A 19A 20A 21A 22A 23A 24A 25A 26A 27A 28A 29A 30A 31A
1B 2B 3B 4B 5B 6B 7B 8B 9B 10B 11B 12B 13B 14B 15B 16B 17B 18B 19B 20B 21B 22B 23B 24B 25B 26B 27B 28B 29B 30B 31B
Not existing
Detected
Detected and activated
Projected and activated
Projected, but not detected
Projected, but not activated
##A/B No peripheral fault
##A/B Peripheral fault detected
##A/B Projected Slave
EL6201 ONLINE (OP)
ASI Power OK
ASI Config Mode
ASI Data Exc INACTIVE

Addr.	Status
0	False
1A	**True**
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 156: The first slave connected is allocated address "1A"



Addr.	Status
0	False
1A	False
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 157: The second slave connected is allocated address "2A"

Problems during project planning through AS-i "Periphery Fault"

During project planning of a new AS-i slave, an AS-i "Periphery Fault" may put automatic project planning into an undefined state, as indicated by flashing in the project planning overview; see Fig. *Undefined state of a slave to be projected*.

Remedy:
Click on the grey button "AS-i Data Exc INACTIVE", which switches to green "AS-i Data Exc ACTIVE" (see Fig.). The slaves should then show a stable state "Detected and activated" (blue).

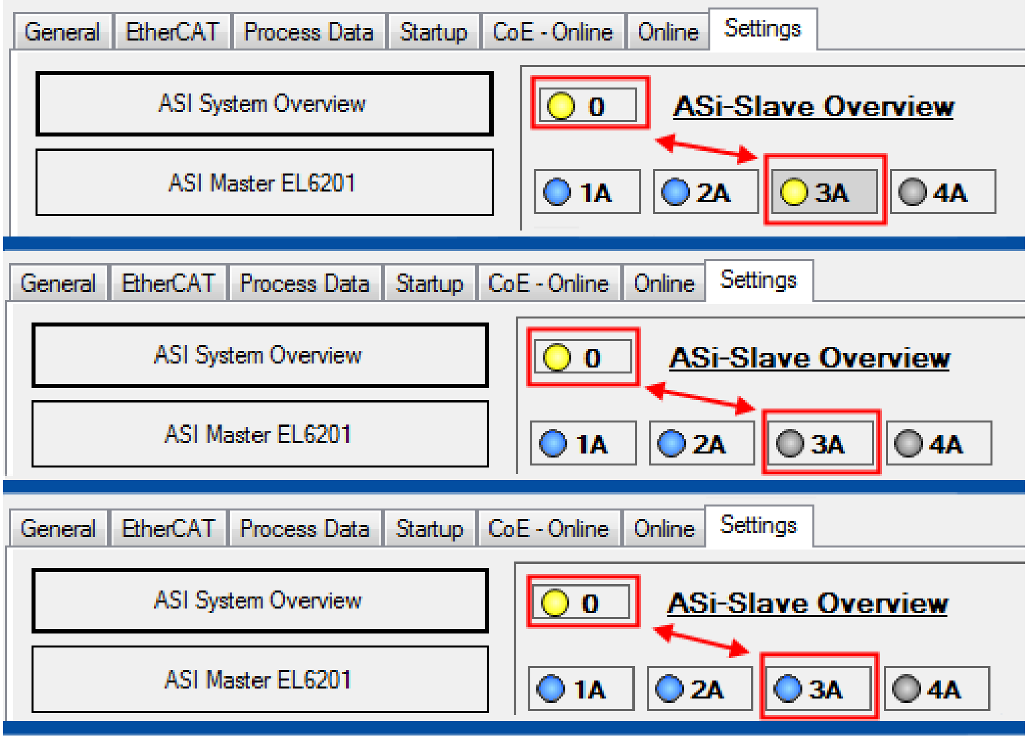
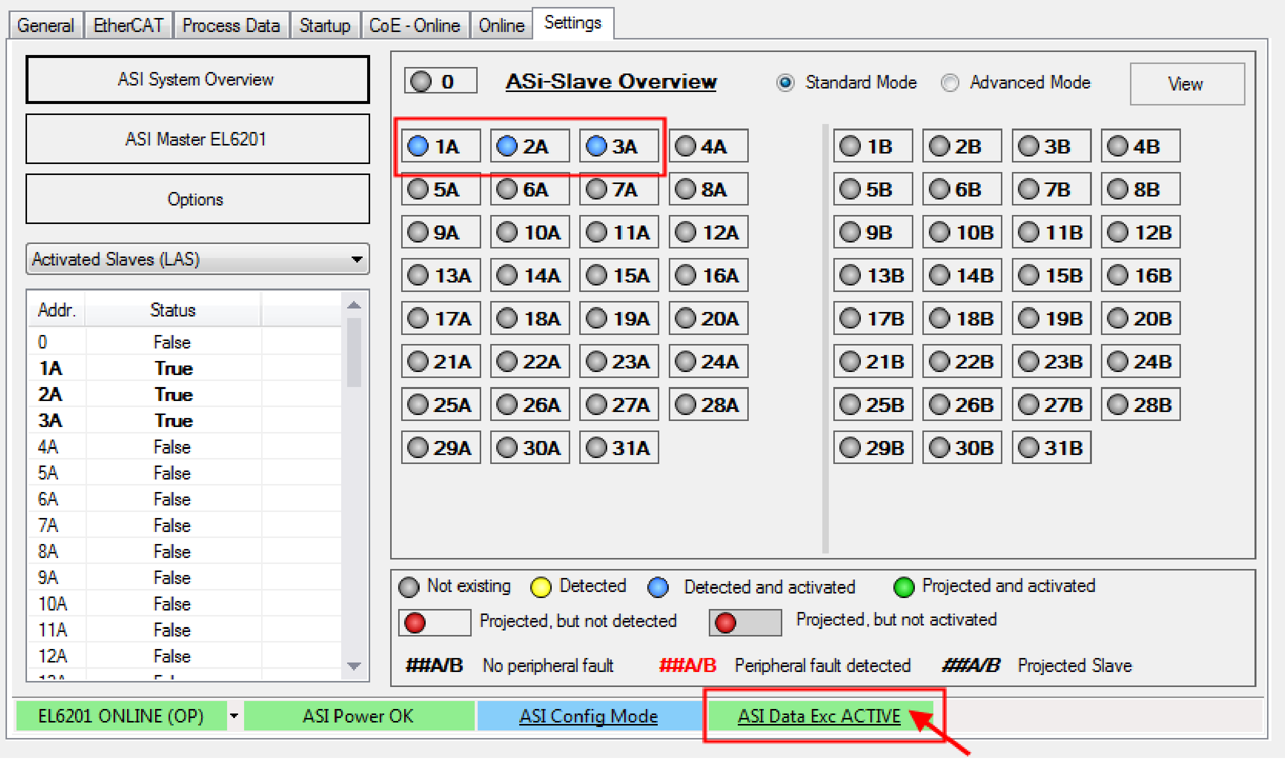
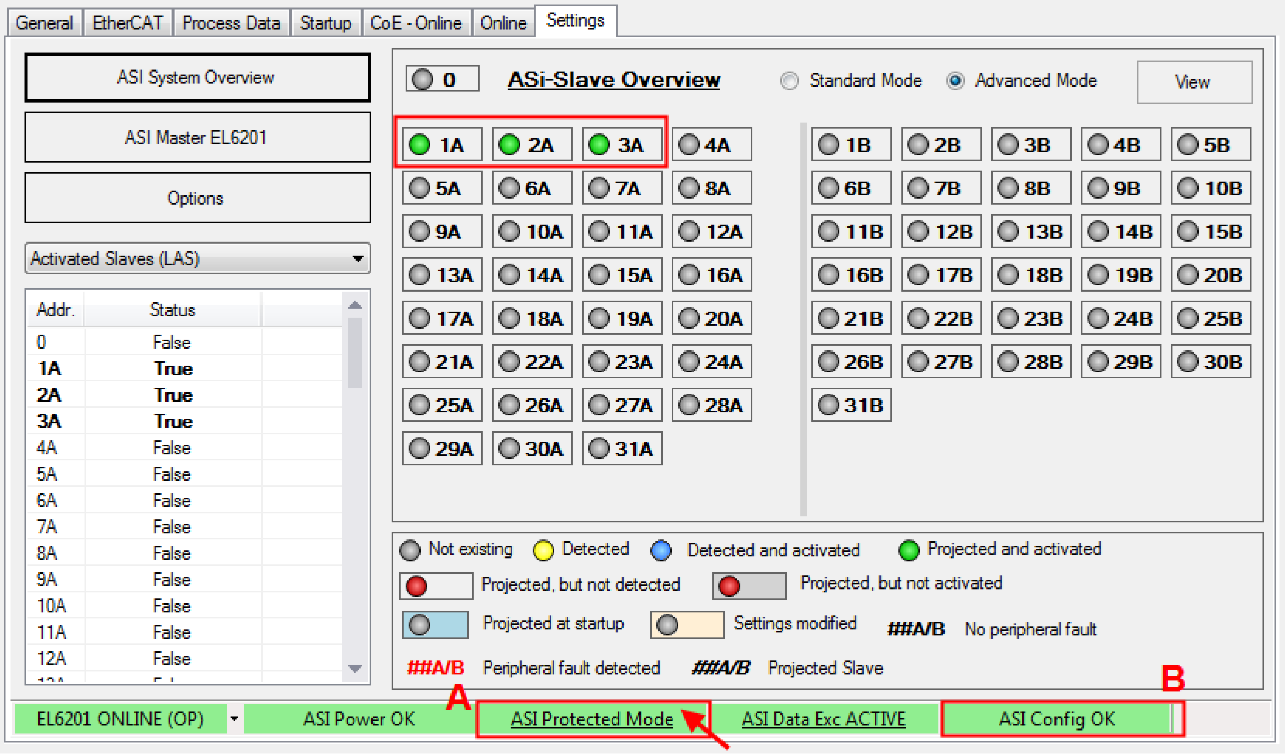


Fig. 158: Undefined state of the slave to be projected


General
EtherCAT
Process Data
Startup
CoE - Online
Online
Settings
ASI System Overview
ASI Master EL6201
Options
Activated Slaves (LAS)
0
ASi-Slave Overview
● Standard Mode
○ Advanced Mode
View
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A 14A 15A 16A 17A 18A 19A 20A 21A 22A 23A 24A 25A 26A 27A 28A 29A 30A 31A
1B 2B 3B 4B 5B 6B 7B 8B 9B 10B 11B 12B 13B 14B 15B 16B 17B 18B 19B 20B 21B 22B 23B 24B 25B 26B 27B 28B 29B 30B 31B
Not existing
Detected
Detected and activated
Projected and activated
Projected, but not detected
Projected, but not activated
##A/B No peripheral fault
##A/B Peripheral fault detected
##A/B Projected Slave
EL6201 ONLINE (OP)
ASI Power OK
ASI Config Mode
ASI Data Exc ACTIVE

Addr.	Status
0	False
1A	**True**
2A	**True**
3A	**True**
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 159: Remedy: Activating AS-i data exchange



Addr.	Status
0	False
1A	**True**
2A	**True**
3A	**True**
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 160: The third connected slave is allocated address "3A"; switching to "AS-i Protected Mode"; confirming the configuration

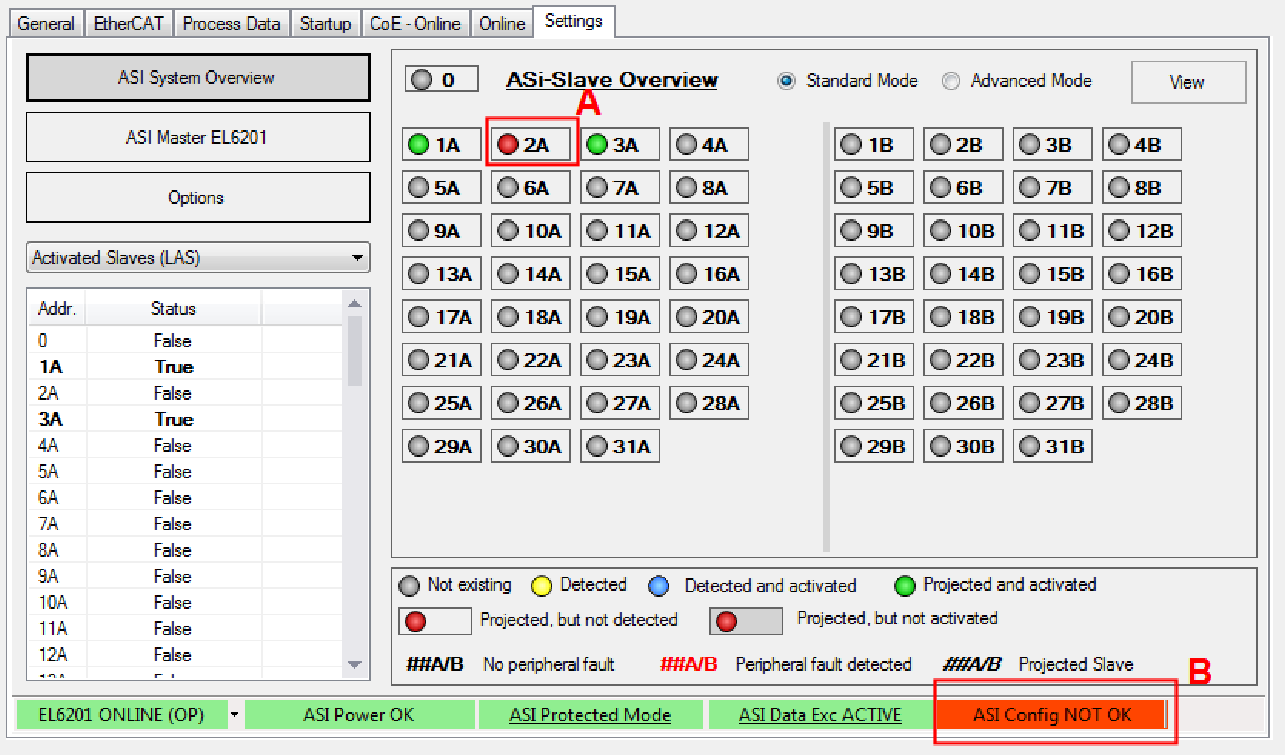
- Now click on the blue "AS-i Config mode" button to complete the project planning (Fig. *The third contacted slave is allocated the address "3A"; switching to "AS-i Protected mode"; confirming the configuration*). The green "ASI Protected Mode" button appears (A). Confirm correct project planning with "ASI Config OK" (B).

Failure of a slave in the AS-i configuration

Automatic addressing if a slave is replaced

A faulty slave can be replaced with a brand-new slave or with a slave addressed with "0".
If automatic addressing is used, the new slave will automatically be allocated the address of the replaced slave.

In the event of a fault (interruption of the connection between the slave and the AS-i fieldbus), the affected slave is shown as "Projected, but not detected" (A) - see Fig. *Failure of slave "2A"*. The green "AS-i Config OK" light goes out and switches to a red "AS-i Config NOT OK" (B)
Remedy: Check the connection between the slave and the AS-i fieldbus line. A screw-connection of the slave used in this example may be inadequate, so that the required penetration depth to the fieldbus cable is not achieved.



Addr.	Status
0	False
1A	**True**
2A	False
3A	**True**
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

🟢 1A	🔴 2A	🟢 3A	○ 4A	○ 1B	○ 2B	○ 3B	○ 4B
○ 5A	○ 6A	○ 7A	○ 8A	○ 5B	○ 6B	○ 7B	○ 8B
○ 9A	○ 10A	○ 11A	○ 12A	○ 9B	○ 10B	○ 11B	○ 12B
○ 13A	○ 14A	○ 15A	○ 16A	○ 13B	○ 14B	○ 15B	○ 16B
○ 17A	○ 18A	○ 19A	○ 20A	○ 17B	○ 18B	○ 19B	○ 20B
○ 21A	○ 22A	○ 23A	○ 24A	○ 21B	○ 22B	○ 23B	○ 24B
○ 25A	○ 26A	○ 27A	○ 28A	○ 25B	○ 26B	○ 27B	○ 28B
○ 29A	○ 30A	○ 31A		○ 29B	○ 30B	○ 31B	

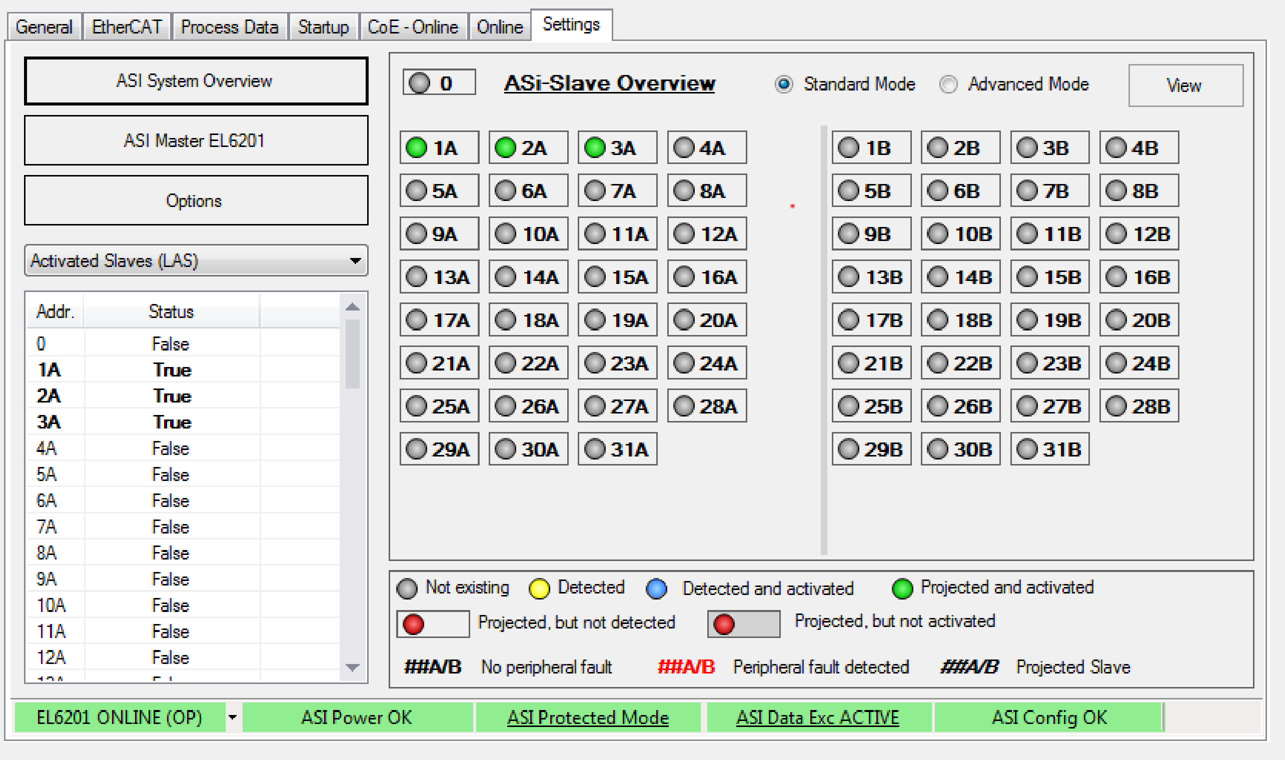
○ Not existing 🟡 Detected 🔵 Detected and activated 🟢 Projected and activated
🔴 Projected, but not detected 🔴 Projected, but not activated
##A/B No peripheral fault ##A/B Peripheral fault detected ##A/B Projected Slave

EL6201 ONLINE (OP) | ASI Power OK | ASI Protected Mode | ASI Data Exc ACTIVE | ASI Config NOT OK

Fig. 161: Failure of slave "2A", marked red

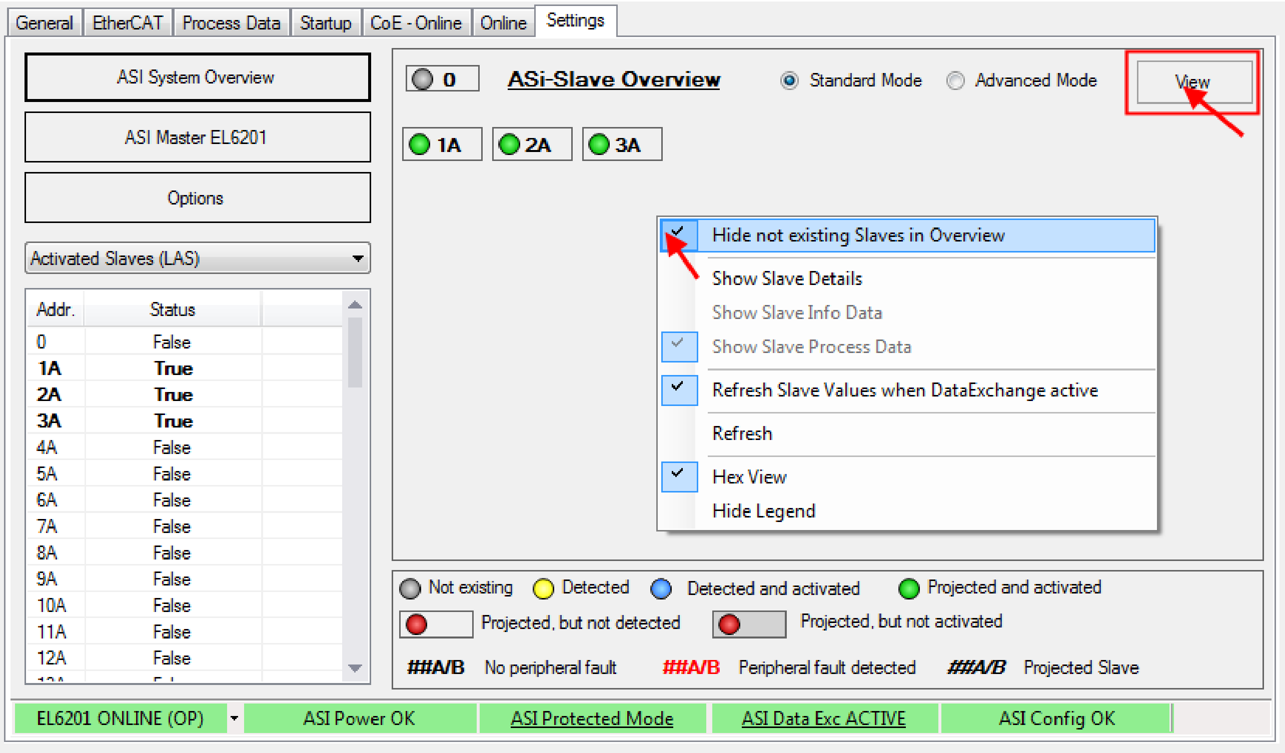
Changes in the AS-i slave overview

The choices available for "ASI System Overview" display are shown in the screens below:


General EtherCAT Process Data Startup CoE - Online Online Settings
ASI System Overview
ASI Master EL6201
Options
Activated Slaves (LAS)
0
ASi-Slave Overview
Standard Mode
Advanced Mode
View
1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A 14A 15A 16A 17A 18A 19A 20A 21A 22A 23A 24A 25A 26A 27A 28A 29A 30A 31A
1B 2B 3B 4B 5B 6B 7B 8B 9B 10B 11B 12B 13B 14B 15B 16B 17B 18B 19B 20B 21B 22B 23B 24B 25B 26B 27B 28B 29B 30B 31B
Not existing
Detected
Detected and activated
Projected and activated
Projected, but not detected
Projected, but not activated
##A/B No peripheral fault
##A/B Peripheral fault detected
##A/B Projected Slave
EL6201 ONLINE (OP)
ASI Power OK
ASI Protected Mode
ASI Data Exc ACTIVE
ASI Config OK

Addr.	Status
0	False
1A	**True**
2A	**True**
3A	**True**
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

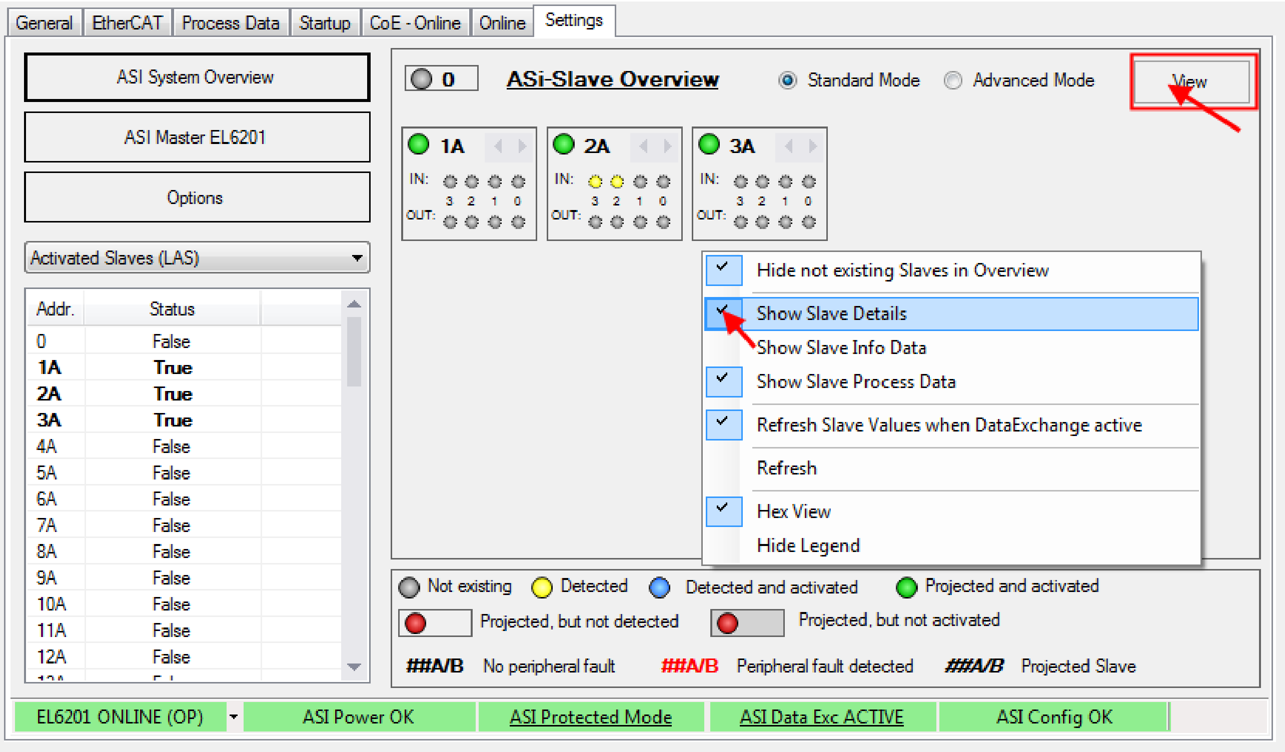
Fig. 162: All slaves are shown without configuration details. Detected, projected and active slaves are marked green



Addr.	Status
0	False
1A	**True**
2A	**True**
3A	**True**
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 163: Detected and projected slaves shown without details

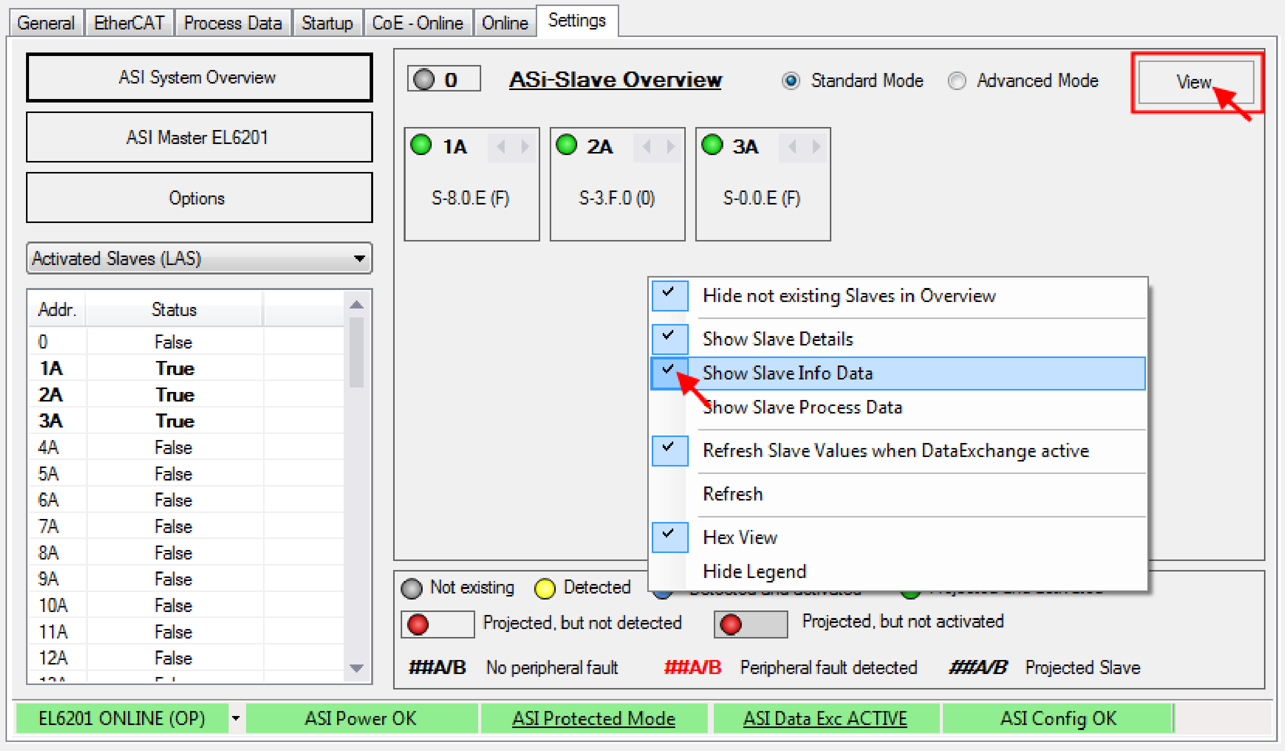
In order to only show the slaves, which are currently projected and active, right-click in the grey area below the slaves (or select the menu via the button "View") and select "Hide non-existing slaves in overview" in the context menu (Fig. *Displaying the detected and currently projected slaves without details*)



Addr.	Status
0	False
1A	True
2A	True
3A	True
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

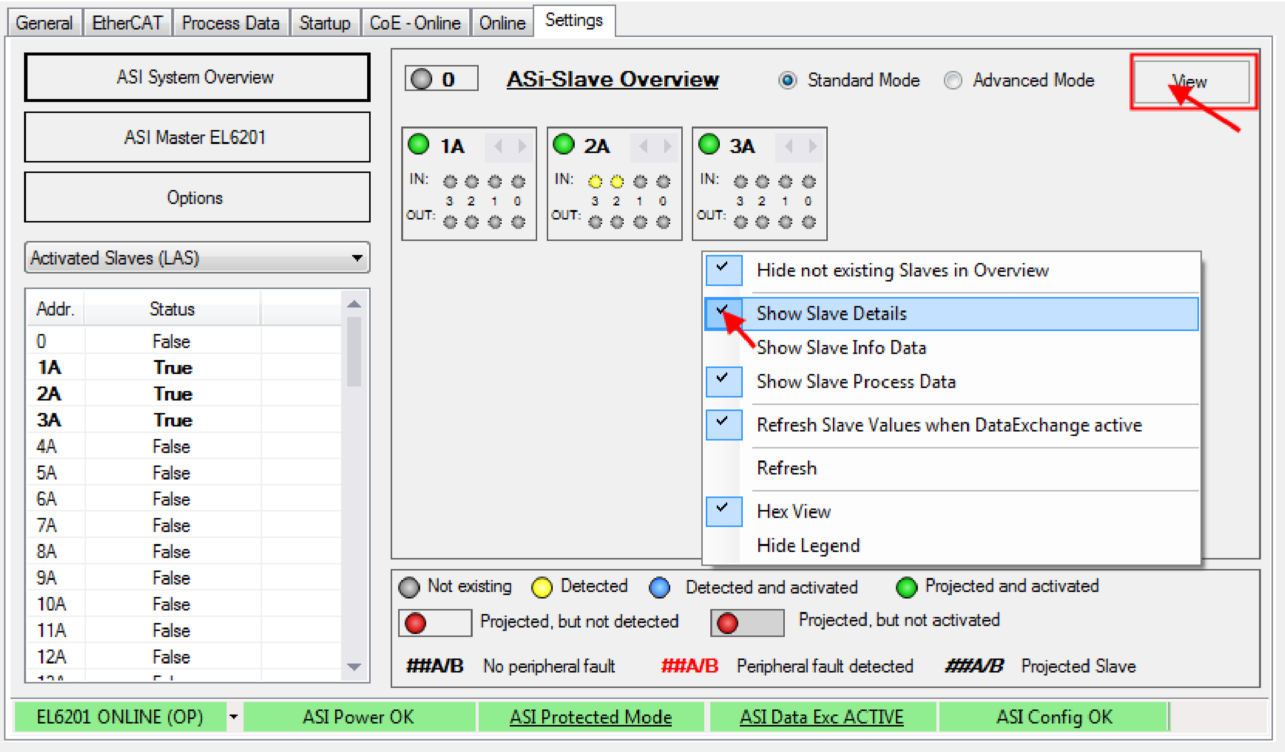
Fig. 164: Detected and projected slaves shown with details

In order to show the details of the slaves, which are currently projected and active, right-click in the grey area below the slaves (or select the menu via the button "View") and select "Show slave details" in the context menu (Fig. *Detected and projected slaves shown with details*)



Addr.	Status
0	False
1A	True
2A	True
3A	True
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 165: Profiles of detected and projected slaves shown with details



Addr.	Status
0	False
1A	**True**
2A	**True**
3A	**True**
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 166: Process data of detected and projected slaves shown with details

You can now choose between "Show Slave Info Data" and "Show Process Data" (see Fig. above)

3. Setting the parameters and process data

CoE parameters

If the default CoE parameters are to be changed, they must be saved for each channel in the CoE.

Parameterization via the CoE list (CAN over EtherCAT)

The terminal is parameterized via the CoE - Online tab (double-click on the respective object) or via the Process Data tab (allocation of PDOs).
Please note the following general CoE information [▶ 24] when using/manipulating the CoE parameters:
- Keep a startup list if components have to be replaced
- Differentiation between online/offline dictionary, existence of current XML description
- use “CoE reload” for resetting changes

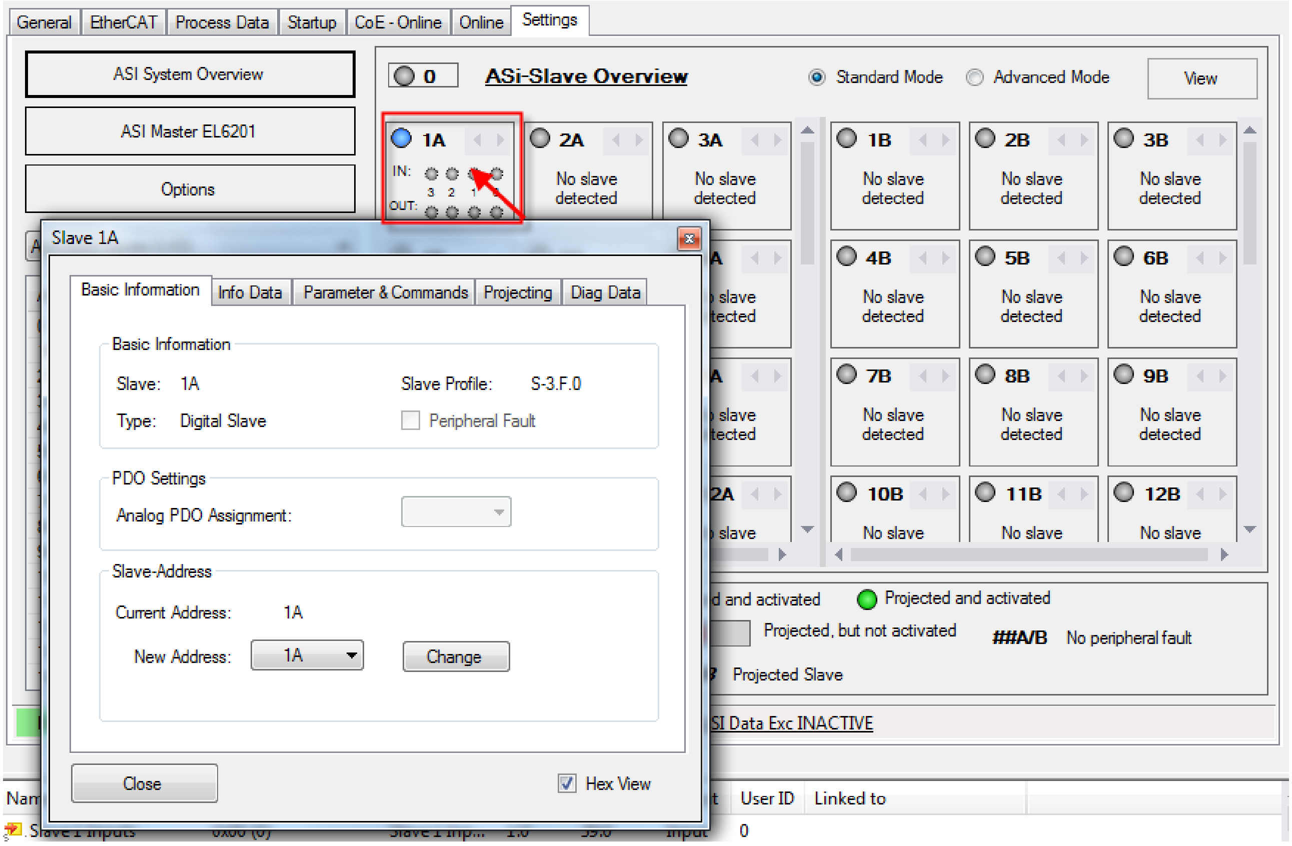
The CoE settings can also be loaded via the SPS/PLC/Task at runtime.

4. Operation

If voltage/current is present, the process data will now be exchanged, e.g. in the TwinCAT FreeRun mode, following a TwinCAT restart.

5.6 Further notes on commissioning

System overview



Basic Information

Slave: 1A

Type: Digital Slave

Slave Profile: S-3.F.0

□ Peripheral Fault

PDO Settings

Analog PDO Assignment:

Slave-Address

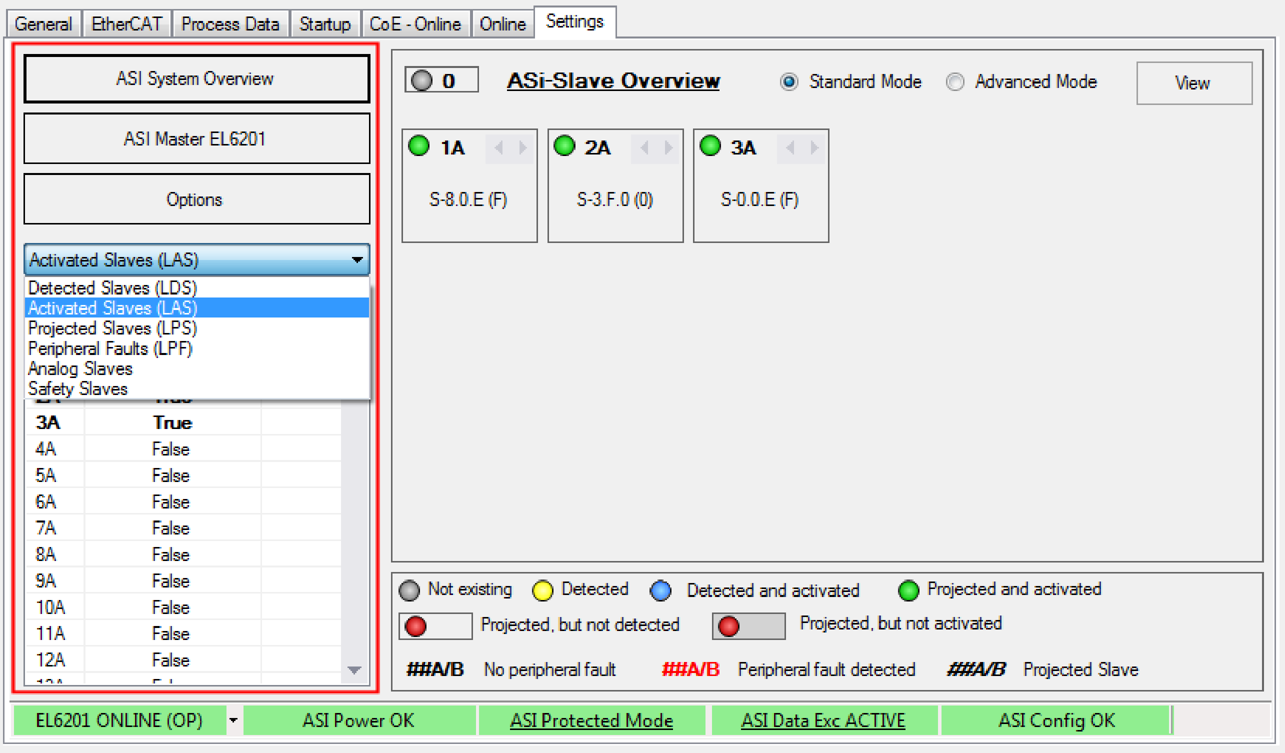
Current Address: 1A

New Address: 1A

☑ Hex View

Fig. 167: Properties window with further information

Double-click on a slave in the system overview to open a Properties window (see Fig.), where slave settings can be implemented or diagnostic data viewed.
The slave properties show the slave profile and the diagnostic data. Depending on the slave profile, further options are available, such as AS-i string parameters or string parameters for serial slaves. In addition, parameters can be set and the project planning implemented (manual project planning only in Advanced mode).



Activated Slaves (LAS)

- Detected Slaves (LDS)
- Activated Slaves (LAS)
- Projected Slaves (LPS)
- Peripheral Faults (LPF)
- Analog Slaves
- Safety Slaves

3A	True
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

○ 0 **ASi-Slave Overview** ● Standard Mode ○ Advanced Mode

● 1A S-8.0.E (F)

● 2A S-3.F.0 (0)

● 3A S-0.0.E (F)

○ Not existing ● Detected ● Detected and activated ● Projected and activated

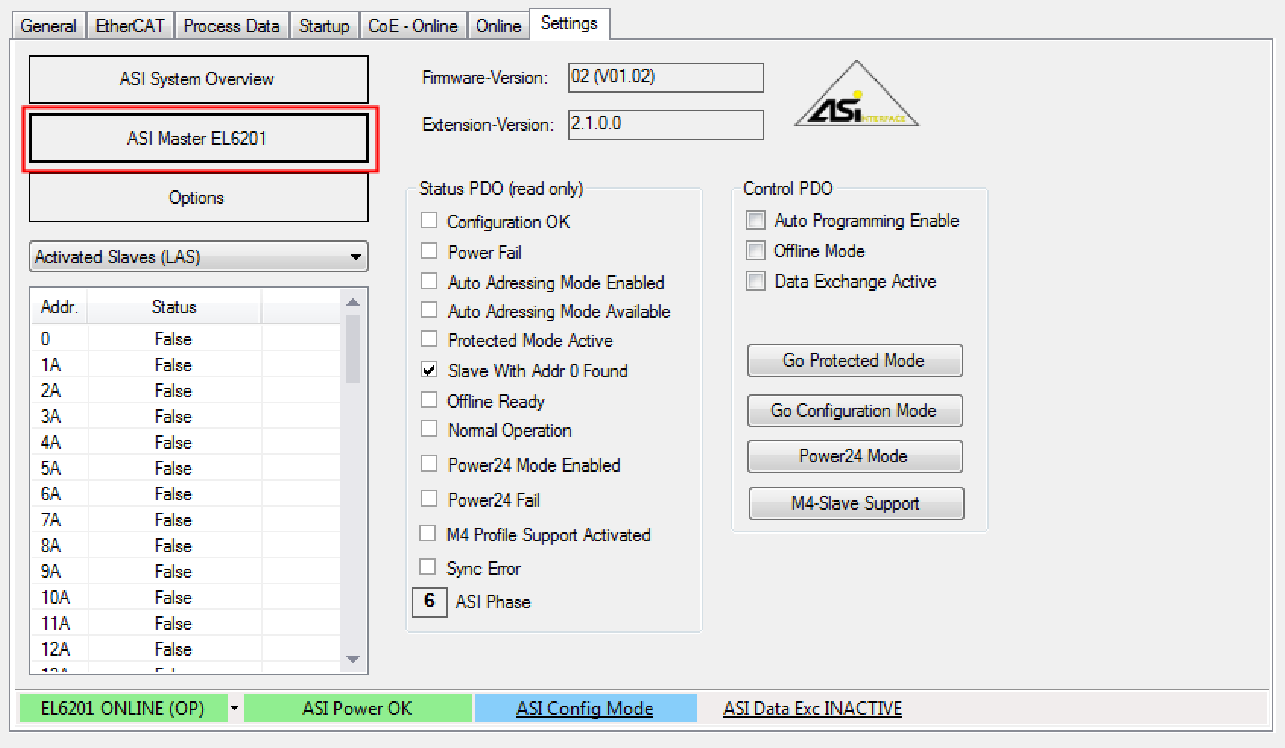
● Projected, but not detected ● Projected, but not activated

##A/B No peripheral fault ##A/B Peripheral fault detected ##A/B Projected Slave

EL6201 ONLINE (OP) | ASI Power OK | ASI Protected Mode | ASI Data Exc ACTIVE | ASI Config OK

Fig. 168: Left part of the Settings tab

In the left part of the plugins (see Fig.) you can switch between system overview and AS-i master settings or call the Options menu. The AS-i lists provide readily readable information on detected, activated and projected slaves, as well as peripheral errors.



Activated Slaves (LAS)

Addr.	Status
0	False
1A	False
2A	False
3A	False
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Firmware-Version: 02 (V01.02)

Extension-Version: 2.1.0.0

Status PDO (read only)

- □ Configuration OK
- □ Power Fail
- □ Auto Adressing Mode Enabled
- □ Auto Adressing Mode Available
- □ Protected Mode Active
- ☑ Slave With Addr 0 Found
- □ Offline Ready
- □ Normal Operation
- □ Power24 Mode Enabled
- □ Power24 Fail
- □ M4 Profile Support Activated
- □ Sync Error
- 6 ASI Phase

Control PDO

- □ Auto Programming Enable
- □ Offline Mode
- □ Data Exchange Active

EL6201 ONLINE (OP) | ASI Power OK | ASI Config Mode | ASI Data Exc INACTIVE

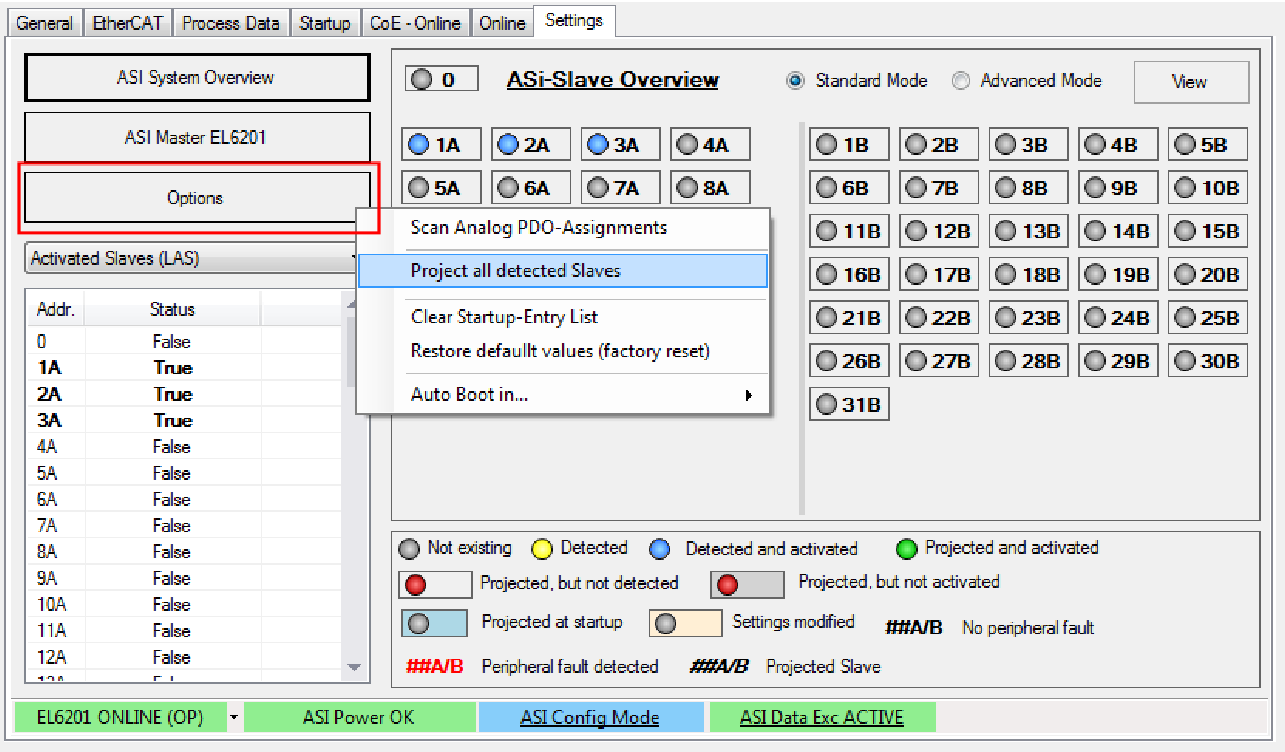
Fig. 169: AS-i master view

The AS-i master view shows the configurable system status values. It also shows the firmware version and the extension (plug-in) version, which must be quoted with any support requests.

Project planning

The project planning options via the plug-in differ depending on the selected view; the Advanced view differs from the Standard view as follows:

- Standard view
  Automatic project planning can be selected (see Fig. *Option menu "Project all detected slaves"*). The plug-in configures all connected (detected) slaves according to their profile. Once the system has been projected it is ready and operates in protected mode (automatic start in protected mode).

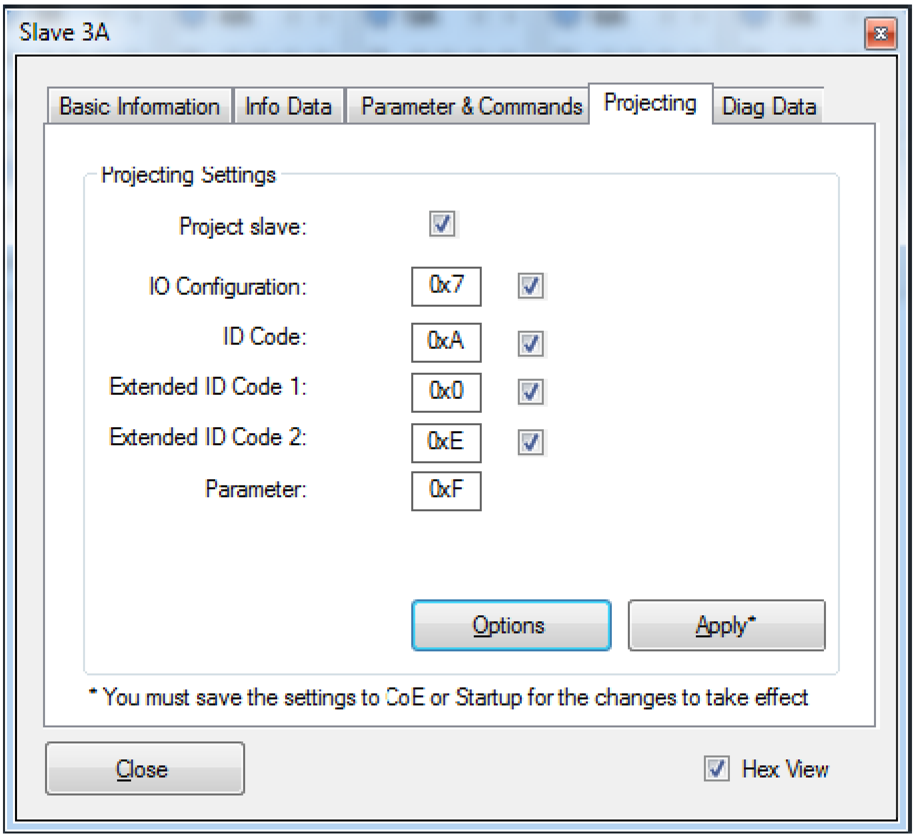


Addr.	Status
0	False
1A	True
2A	True
3A	True
4A	False
5A	False
6A	False
7A	False
8A	False
9A	False
10A	False
11A	False
12A	False

Fig. 170: Option menu "Project all detected slaves"

- Extended view

In addition, manual project planning options are available. For each slave the required profile can be specified manually via the Properties window



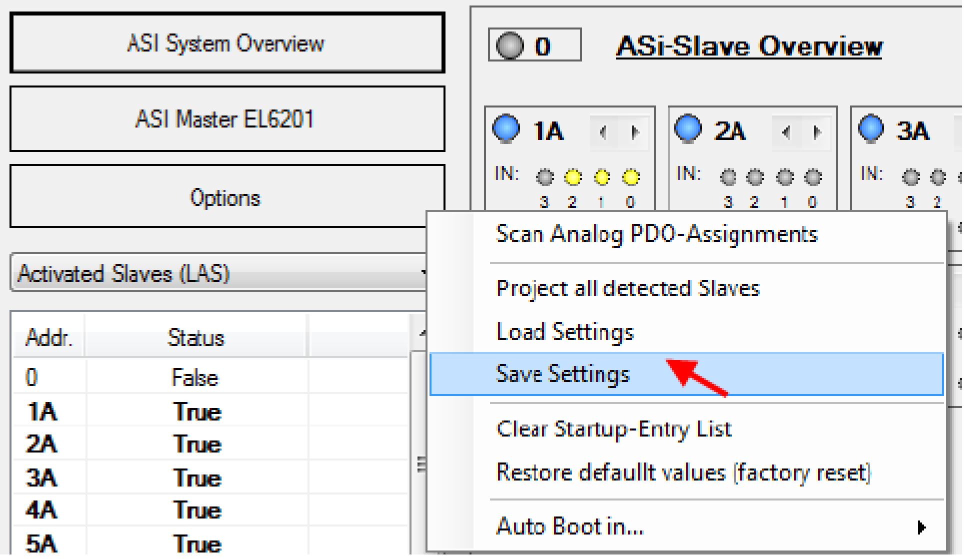
Project slave:	☑	
IO Configuration:	0x7	☑
ID Code:	0xA	☑
Extended ID Code 1:	0x0	☑
Extended ID Code 2:	0xE	☑
Parameter:	0xF	

* You must save the settings to CoE or Startup for the changes to take effect

☑ Hex View

Fig. 171: Manual programming

The data can be stored in the startup data or directly in the terminal (CoE) (see Fig.).



Addr.	Status
0	False
1A	True
2A	True
3A	True
4A	True
5A	True

Fig. 172: Storing the startup data

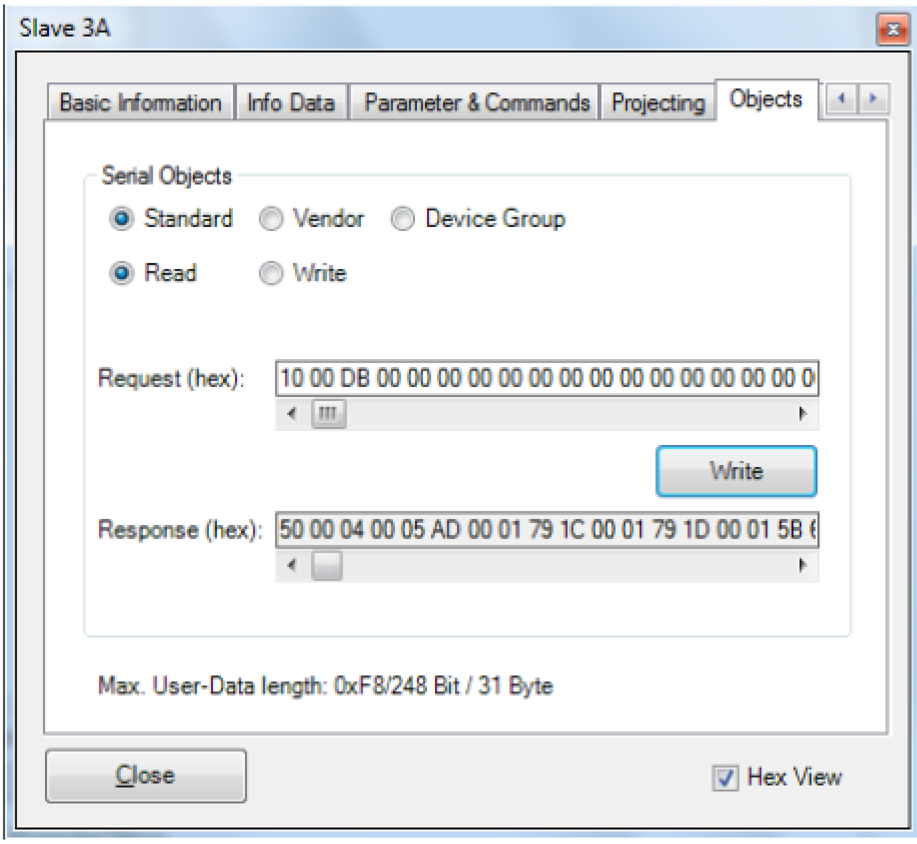
Automatic project planning is recommended

Notes on the "Auto Programming" function

If the function "Auto Programming" is used in Config mode, each new slave with address 0 is automatically assigned the next free address. Note that slaves with the profile S-6.0 can require several addresses.

Special features of M4 slaves (CTT2, CTT3, CTT5)

- Slave type 3
  Slaves of type CTT2 (S-7.5.5, S-7.A.5, S-B.A.5) have a further "Objects" tab in the Properties window (see Fig.), which can be used for acyclic communication with the slave via AS-i string command.



Serial Objects

● Standard ○ Vendor ○ Device Group

● Read ○ Write

Request (hex): 10 00 DB 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0

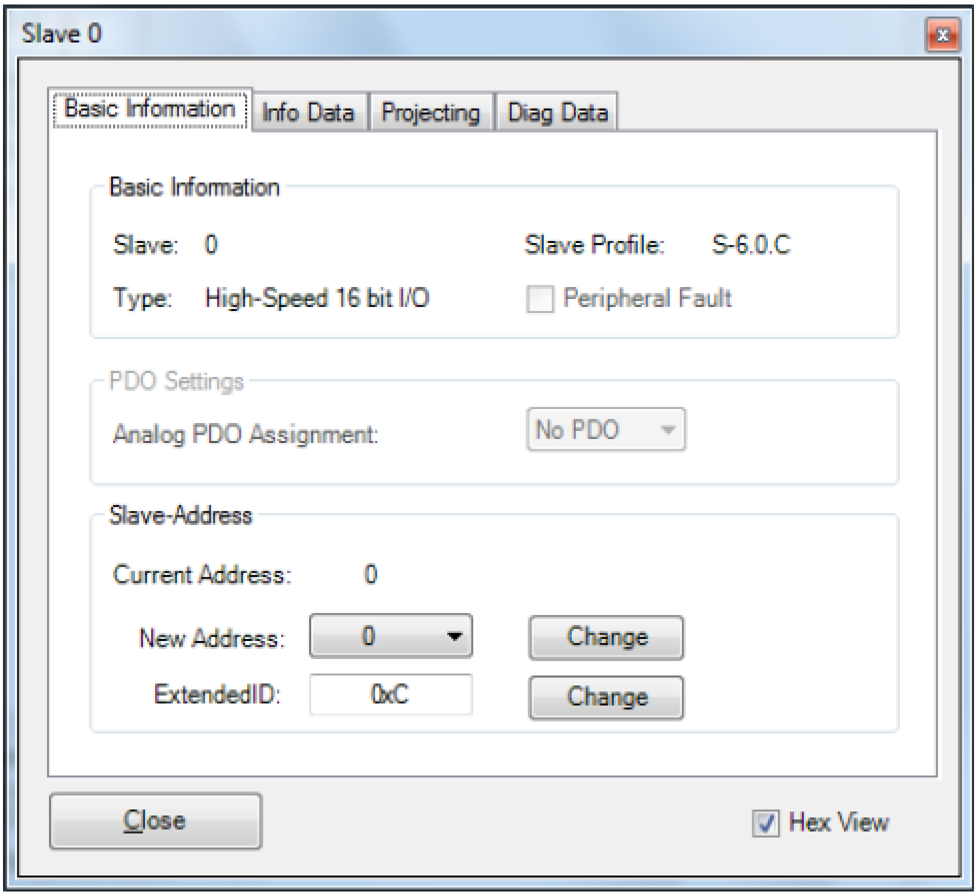
Response (hex): 50 00 04 00 05 AD 00 01 79 1C 00 01 79 1D 00 01 5B

Max. User-Data length: 0xF8/248 Bit / 31 Byte

☑ Hex View

Fig. 173: M4 slave, "Objects" tab

- Slave type 3
  Slaves of type CTT3 (S-7.A.7, S-7.A.A, S-7.A.8) can be used in the A or B section (Extended Address mode). The digital I/O data are stored in the analog process image (inputs: 0x6XXX range, outputs: 0x7XXX range) and shown accordingly in the system overview.
- Slave type 5
  Slaves of type CTT5 (S-6.0) achieve a higher velocity thanks to the use of several slave addresses. Depending on the slave, the number of slave addresses used can be set via the extended ID code. To change the extended ID code the slave address must be 0, see the figure below.



Slave 0

Basic Information

Slave: 0

Type: High-Speed 16 bit I/O

Slave Profile: S-6.0.C

□ Peripheral Fault

PDO Settings

Analog PDO Assignment: No PDO

Slave-Address

Current Address: 0

New Address: 0

ExtendedID: 0xC

☑ Hex View

Fig. 174: Slave type 5, changing the extended ID code

The process data are stored in the analog slave process data.

Automatic addressing with slaves type 5

If auto-addressing is enabled in config mode, slaves with address 0 are automatically assigned the next free address. Since slaves of type CTT5 require further slave addresses, depending on the start address, there may be overlaps if there are not enough free addresses.

CoE extensions

- Access to M4 profiles

- Slaves from CTT2 profile (S-7.5.5, S-7.A.5, S-7.B.A)
  - Cyclic communication via analog data object per slave (AODI/AIDI) – address range in CoE 0x6000/0x7000
  - Acyclic communication via "AS-i string command" (0x2010-object).

Command structure:

Byte	Content
0	Increment for new command
1	0x02 (Write Parameter string)
2	Slave address*
3	Command-Length**
4 - 7	Reserved
8..	*Command*

Example: 01 02 03* 03** 00 00 00 00 *10 00 DB*

- Slaves from CTT3 profile (S-7.A.7, S-7.A.A), slaves from CTT4 profile (S-7.A.8, S-7.A.9) and slaves from CTT5 profile (S-6.0)
  - Data from 4I/4O slaves (S-7.A.7) are transferred directly to the digital input and output data
  - Data from 8/8O slaves are transferred to the analog data objects (value channel)

- Changing the extended ID code

- The extended ID code of a slave can be changed, if the slave has the address 0 (and supports this).
- The change is implemented via the object "AS-i command" (0x2000)

Command:

Byte	Content
0	Increment for new command
1	0xC (change ID Code)
2	New ID Code

Also see about this

🗎 Technology [▸ 14]

5.7 Object description and parameterization

EtherCAT XML Device Description

The display matches that of the CoE objects from the EtherCAT XML Device Description. We recommend downloading the latest XML file from the download area of the Beckhoff website and installing it according to installation instructions.

Parameterization via the CoE list (CAN over EtherCAT)

The EtherCAT device is parameterized via the CoE-Online tab [▸ 96] (double-click on the respective object) or via the Process Data tab [▸ 93](allocation of PDOs). Please note the following general CoE notes [▸ 24] when using/manipulating the CoE parameters:

- Keep a startup list if components have to be replaced
- Differentiation between online/offline dictionary, existence of current XML description
- use “CoE reload” for resetting changes

5.7.1 Restore object

Index 1011 Restore default parameters

Index (hex)	Name	Meaning	Data type	Flags	Default
1011:0	Restore default parameters [▸ 236]	Restore default parameters	UINT8	RO	0x01 (1_{dec})
1011:01	SubIndex 001	If this object is set to "**0x64616F6C**" in the set value dialog, all backup objects are reset to their delivery state.	UINT32	RW	0x00000000 (0_{dec})

5.7.2 Configuration data

Index 8pp0 AS-i settings slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:0	ASI Settings Slave	Max. subindex	UINT8	RO	> 41 <
8pp0:01	ASI Address	Slave address (see table below)	UINT16	RW	0x0000 (0_{dec})

Bit	Value	Description
0 - 4	0 - 31 (default 0)	Slave address (0=>entry inactive, XX=>entry active) (Slave address arises from bit 4 to bit 8 of the index (0x8**pp**0)
5 - 11	-	reserved
12	0_{bin}	A-slave or standard slave not projected
	1_{bin}	A-slave or standard slave projected
13	0_{bin}	B-slave not projected
	1_{bin}	B-slave projected
14 - 15	-	reserved

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:20	IO Configuration (A-slave)	Projected I/O ID (set configuration) In protected mode, the I/O ID of the projected AS-i slaves is checked. The projected 4-bit I/O ID of the AS-i slaves is located in the object 0x8pp0:20 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	IO Config (A-slave or standard slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:21	ID code (A-slave)	Projected ID code (nominal configuration) In protected mode, the ID code of the projected AS-i slaves is checked. The projected 4-bit ID codes of the AS-i slaves are located in the object 0x8pp0:21 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	IO code (A-slave or standard slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:22	Extended ID code 1 (A-slave)	Projected extended ID code 1 (nominal configuration) In protected mode, the extended ID code 1 of the currently projected AS-i slaves is checked. The projected 4-bit Extended ID codes 1 of the AS-i slaves are located in the object 0x8pp0:22 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	Extended ID code 1 (A-slave or standard slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:23	Extended ID code 2 (A-slave)	Projected extended ID code 2 (nominal configuration) In protected mode, the extended ID code 2 of the currently projected AS-i slaves is checked. The projected 4-bit Extended ID codes 1 of the AS-i slaves are located in the object 0x8pp0:23 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	Extended ID code 2 (A-slave or standard slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:24	Parameter (A-slave)	Activation parameters for the AS-i slaves During the activation phase (or during the inclusion phase - for AS-i slaves that are added later), 4-bit parameter data are sent once to each AS-i slave prior to the first data exchange. These activation parameters can be specified for each AS-i slave via the objects 0x8pp0:24. The objects 0x8pp0:24 can be read and written and are saved in the Flash of the AS-i master, i.e. they are still present after power off/on of the AS-i master. (see following table)	UINT8	RW	0x0F (15_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 15)	Parameter (A-slave or standard slave)
4 - 7	-	reserved

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:25	IO Configuration (B-slave)	Projected I/O ID (set configuration) In protected mode, the I/O ID of the projected AS-i slaves is checked. The projected 4-bit I/O ID of the AS-i slaves is located in the object 0x8pp0:20 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	IO Config (B-slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:26	ID code (B-slave)	Projected ID code (nominal configuration) In protected mode, the ID code of the projected AS-i slaves is checked. The projected 4-bit ID codes of the AS-i slaves are located in the object 0x8pp0:21 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	ID code (B-slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:27	Extended ID Code 1 (B-slave)	Projected extended ID code 1 (nominal configuration) In protected mode, the extended ID code 1 of the currently projected AS-i slaves is checked. The projected 4-bit Extended ID codes 1 of the AS-i slaves are located in the object 0x8pp0:22 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	Extended ID Code 1 (B-slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:28	Extended ID Code 2 (B-slave)	Projected extended ID code 2 (nominal configuration) In protected mode, the extended ID code 2 of the currently projected AS-i slaves is checked. The projected 4-bit Extended ID codes 1 of the AS-i slaves are located in the object 0x8pp0:23 (these objects are read-write and are saved in the Flash of the AS-i master (i.e. they are still present after power off/on)): (see following table)	UINT8	RW	0x00 (0_{dec})

Bit	Value	Description
0 - 3	0 - 15 (default 0)	Extended ID Code 2 (B-slave)
4 - 6	-	reserved
7	0	Value is taken into account when comparing set/actual configuration in protected mode
	1	Value is ignored when comparing set/actual configuration in protected mode

Index 8pp0 ASI Settings Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:29	Parameter (B-slave)	Activation parameters for the AS-i slaves During the activation phase (or during the inclusion phase - for AS-i slaves that are added later), 4-bit parameter data are sent once to each AS-i slave prior to the first data exchange. These activation parameters can be specified for each AS-i slave via the objects 0x8pp0:24. The objects 0x8pp0:24 can be read and written and are saved in the Flash of the AS-i master, i.e. they are still present after power off/on of the AS-i master. (see following table)	UINT8	RW	0x07 (7_{dec})

Bit	Value	Description
0 - 2	0 - 7 (default 7)	Parameter (B-slave)
3 - 7	-	reserved

5.7.3 Command object

Index 2000 ASI Command

You can send commands to AS-i slaves with index 2000. This is possible both during the offline phase (no other commands on the AS-i bus) and during the management phase. In the management phase, however, you can address only AS-i slaves that are not activated.

Index (hex)	Name	Meaning	Data type	Flags	Default
2000:0	ASI Command	Max. subindex	UINT8	RO	0x03 (3_{dec})
2000:01	Request	Slave address (see table below)	OCTET-STRING[4]	RW	{0}

Bit	Value	Description
0 - 4	0 - 255	Command sequence number (should be incremented so that the command is sent)
8 - 15	1	reserved
	2	reserved
	3	reserved
	4	AS-i command *write parameter*
	5	reserved
	6	reserved
	7	AS-i command *addressing call* If an address unequal 0 is specified in bits 16 to 23, the AS-i command "*Delete operating address*" is called first, since the address can only be set if it was previously set to 0.
	8	reserved
	12	AS-i command change extended ID code (slave must have address 0)
16 - 23	0 - 63	Address of the AS-i slave to which the command is to be sent (32 is not permitted)
24 - 31	0 - 31	AS-i command data: • for AS-i command *Write parameter:* Parameter data • for AS-i command *Addressing call*: new address • new ID code with AS-i command change extended ID code

Index 2000 ASI Command

Index (hex)	Name	Meaning	Data type	Flags	Default
2000:02	Status	(see following table)	UINT8	RO	0x00 (0_{dec})

Bit	Value	Description
0 - 7	0	ASI_COMMAND_READY (command object ready for operation, index 0x2000:01)
	1	ASI_COMMAND_BUSY (command object not ready for operation, index 0x2000:01)
	2 - 255	reserved

Index 2000 ASI Command

Index (hex)	Name	Meaning	Data type	Flags	Default
2000:03	Response	(see following table) *For acknowledgement of AS-i command (AS-i command value bit 4 set): write parameter* Bits 31 to 24 return the data handed over in the call of the AS-i command (bits 31 to 24 of the AS-i command). *For acknowledgement of AS-i command* (*AS-i command value bit 7 set*): *addressing call* If the error bit (bit 15) is not set, bits 31 to 24 contain the value 00_{hex}. If the error bit (bit 15) is set, bits 31 to 24 contain an error code. (see following table)	OCTET-STRING[4]	RW	{0}

Bit	Description
0 - 7	Command sequence number from the request
8 - 14	Corresponding to bits 8 to 15 of the command call.
15	Error bit: If bit 15 is set, this means that an error occurred during the execution of the command and an error code is output in bits 31 to 24!
16 - 23	Address of the AS-i slave to which the command was sent.

Bit	Value	Description
24 - 31	0x00	Address modification was successful.
	0x11	No slave exists with an address that was specified as the old address.
	0x22	Address 0 is currently assigned to another slave. In order to change the address of an AS-i slave, the EL6201 must first assign the address 0 to the slave in order to address it again afterwards from there.
	0x36	A slave with the address that was specified as the new address already exists.
	0x47	After deleting the old address, no slave with address 0 exists.
	0x58	After deleting the old address, an error is generated during reading of the extended ID code 1 of slave 0. Address changes for A/B slaves also require the extended ID code 1.
	0x69	After writing of extended ID code 1, no slave with address 0 exists.
	0x6B	After writing of the new address, the slave with the new address is not available during reading of the ID code.
	0x6C	After writing of the new address, the slave with the new address is not available during reading of the status.
	0x7D	The address could not be saved permanently (non-volatile).
	0x7E	The extended ID code of an A/B slave could not be saved permanently (non-volatile).
	0x7F	ID code 1 is invalid for A/B slaves
	0x83	The new address is a B address. If slaves are to be operated on two parallel addresses in address areas A and B, e.g. 10A (10) and 10B (42), both slaves have to support B addressing. In this case, the parallel A address contains a slave that does not support B addressing!
	0x84	The new address is a B address. The slave selected with the old address is, however, not an A/B-slave, i.e. it does not support the B-addresses (1B to 31B).
	0x85	The new address is an A address. Slave is not an A/B slave: the associated B slave for the new address exists.

Index 2010 AS-i string command

Object 0x2010 can be used to send string commands to the AS-i slaves (analog slaves with profile 7.4 and CTT2 slaves with M4 profile). This is only possible if the AS-i master is already in the data exchange phase and the "Data Exchange Active" bit in AS-i control is set.

Index (hex)	Name	Bit	Value	Meaning	Data type	Flags	Default
2010:0	ASI Command	-	-	Max. subindex	UINT8	RO	0x03 (3_{dec})
2010:01	Request	0 - 7	0 - 255	Command sequence number (should be incremented so that the command is sent)	OCTET-STRING[256]	RW	{0}
		8 - 15	0, 1, 3 - 9	reserved			
			2 (0x2)	Write CTT2 Parameter String			
			10 (0xA)	Write Parameter String			
			11 (0xB)	Read Parameter String			
			12 (0xC)	Read Diagnosis String			
			13 (0xD)	Read ID String			
			14 - 255	reserved			
		16 - 23	0 - 31	Address of the AS-i slave to which the command is to be sent			
		24 - 31	0 - 31	Command length (number of subsequent command bytes/string data) – only CTT2			
		32 - 63	-	reserved			
		64 - 2047	xxxx	String data			
2010:02	Status	0 - 7	Bit 0 = 0	ASI_STRING_COMMAND_READY (command object ready for operation, index 0x2010:01)	UINT8	RO	0x00 (0_{dec})
			Bit 0 = 1	ASI_STRING_COMMAND_BUSY (command object not ready for operation, index 0x2010:01)			
			Bit 1 - 5	Reserved			
			Bit 6	Data exchange not active			
			Bit 7	PWR fail			
2010:03	Response	0 - 7	Command sequence number from the request		OCTET-STRING[256]	RO	{0}
		8 - 14	Corresponding to bits 8 to 15 of the command call.				
		15	Error bit: If bit 15 is set, this means that an error occurred during the execution of the command and an error code is output in bits 31 to 24!				
		16 - 23	Address of the AS-i slave to which the command was sent.				
		24 - 31	If the error bit (bit 15) is set, bits 31 to 24 contain an error code.				
			0x00	Command was successfully executed.			
			0x10	Slave is not an analog slave			
			0x20	Slave does not support slave profile 7.4			
			0x40	String transfer is already active			
			0x80	Data exchange is not active			
			0x08	Command is not supported			
		32 - 63	-	reserved			
		64 - 2047	xxxx	String data			

5.7.4 Input data

Index 6pp0 ASI Analog Inputs Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
6pp0:0	ASI Analog Inputs Slave	Max. subindex	UINT8	RO	0x08 (8_{dec})
6pp0:01	State Ch.1 (A-Slave)	Status channel 1 (A-slave)	UINT16	RO	0x0000 (0_{dec})
6pp0:02	Value Ch.1 (A-Slave)	Input data channel 1 (A-slave)	UINT16	RO	0x0000 (0_{dec})
6pp0:03	State Ch.2 (A-Slave)	Status channel 2 (A-slave)	UINT16	RO	0x0000 (0_{dec})
6pp0:04	Value Ch.2 (A-Slave)	Input data channel 2 (A-slave)	UINT16	RO	0x0000 (0_{dec})
6pp0:05	State Ch.3 (A-Slave)	Status channel 3 (A-slave)	UINT16	RO	0x0000 (0_{dec})
6pp0:06	Value Ch.3 (A-Slave)	Input data channel 3 (A-slave)	UINT16	RO	0x0000 (0_{dec})
6pp0:07	State Ch.4 (A-Slave)	Status channel 4 (A-slave)	UINT16	RO	0x0000 (0_{dec})
6pp0:08	Value Ch.4 (A-Slave)	Input data channel 4 (A-slave)	UINT16	RO	0x0000 (0_{dec})

5.7.5 Output data

Index 7pp0 ASI Analog Outputs Slave (for 01 ≤ pp ≤ 1F; slave 1 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
7pp0:0	ASI Analog Outputs Slave	Max. subindex	UINT8	RO	0x08 (8_{dec})
7pp0:01	State Ch.1 (A-Slave)	Status channel 1 (A-slave)	UINT16	RW	0x0000 (0_{dec})
7pp0:02	Value Ch.1 (A-Slave)	Output data channel 1 (A-slave)	UINT16	RW	0x0000 (0_{dec})
7pp0:03	State Ch.2 (A-Slave)	Status channel 2 (A-slave)	UINT16	RW	0x0000 (0_{dec})
7pp0:04	Value Ch.2 (A-Slave)	Output data channel 2 (A-slave)	UINT16	RW	0x0000 (0_{dec})
7pp0:05	State Ch.3 (A-Slave)	Status channel 3 (A-slave)	UINT16	RW	0x0000 (0_{dec})
7pp0:06	Value Ch.3 (A-Slave)	Output data channel 3 (A-slave)	UINT16	RW	0x0000 (0_{dec})
7pp0:07	State Ch.4 (A-Slave)	Status channel 4 (A-slave)	UINT16	RW	0x0000 (0_{dec})
7pp0:08	Value Ch.4 (A-Slave)	Output data channel 4 (A-slave)	UINT16	RW	0x0000 (0_{dec})

5.7.6 Information data

Index 10F3 Diagnosis History

Index (hex)	Name	Meaning	Data type	Flags	Default
10F3:0	Diagnosis History	Maximum subindex	UINT8	RO	0x15 (21_{dec})
10F3:01	Maximum Messages	reserved	UINT8	RO	0x00 (0_{dec})
10F3:02	Newest Message	reserved	UINT8	RO	0x00 (0_{dec})
10F3:03	Newest Acknowledged Message	reserved	UINT8	RW	0x00 (0_{dec})
10F3:04	New Messages Available	reserved	BOOLEAN	RO	0x00 (0_{dec})
10F3:05	Flags	reserved	UINT16	RW	0x0000 (0_{dec})
10F3:06 - 15	Diagnosis Message 001 - 016	reserved	OCTET-STRING[20]	RO	{0}

Index 10F8 Actual Time Stamp

Index (hex)	Name	Meaning	Data type	Flags	Default
10F8:0	Actual Time Stamp	Time stamp	UINT64	RO	

Index 9pp0 ASI Info Data Slave (for 00 ≤ pp ≤ 1F; slave 0 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
9pp0:0	ASI Info Data Slave	Maximum subindex	UINT8	RO	0x29 (41$_{dec}$)
9pp0:01	ASI Address	Address of the AS-i slave (actual configuration)	UINT16	RO	0x0000 (0$_{dec}$)
9pp0:20	IO Configuration (A-Slave)	Read I/O ID (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:21	ID Code (A-Slave)	Read standard ID code (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:22	Extended ID Code 1 (A-Slave)	Read extended ID code 1 (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:23	Extended ID Code 2 (A-Slave)	Read extended ID code 2 (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:24	Parameter (A-Slave)	Response of the slave to the activation parameter command (see object 0x8pp0:24 [▶ 133])	UINT8	RO	0x00 (0$_{dec}$)
9pp0:25	IO Configuration (B-slave)	Read I/O ID (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:26	ID code (B-slave)	Read standard ID code (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:27	Extended ID Code 1 (B-slave)	Read extended ID code 1 (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:28	Extended ID Code 2 (B-slave)	Read extended ID code 2 (actual configuration)	UINT8	RO	0x00 (0$_{dec}$)
9pp0:29	Parameter (B-slave)	Response of the slave to the activation parameter command (see object 0x8pp0:29 [▶ 133])	UINT8	RO	0x00 (0$_{dec}$)

5.7.7 Diagnostic data

Index App0 ASI Diag Data Slave (for 00 ≤ pp ≤ 1F; slave 0 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
App0:0	ASI Diag Data Slave 0	Maximum subindex	UINT8	RO	0x12 (18$_{dec}$)
App0:01	Communication State (A-Slave)	Slave status (see table below)	UINT16	RO	0x00 (0$_{dec}$)

Description	Value
Slave is in LDS	Bit 0 (LSB)
Slave is in LAS	Bit 1
Slave is in LPS	Bit 2
Slave is in advanced addressing mode (A/B slaves)	Bit 3
In protected mode the slave is only enabled if the EA code of this slave matches the projected slave.	Bit 4
In protected mode the slave is only enabled if the ID code of this slave matches the projected slave.	Bit 5
In protected mode the slave is only enabled if the extended ID code 1 of this slave matches the projected slave.	Bit 6
In protected mode the slave is only enabled if the extended ID code 2 of this slave matches the projected slave.	Bit 7
Slave supports extended ID code 1 and 2	Bit 8
Slave is an analog slave	Bit 9
Slave is a safety slave	Bit 10
reserved	Bit 11
reserved	Bit 12
Slave requires M4 master (one of the M4 profiles)	Bit 13 (MSB)
Slave has no digital inputs	Bit 14 (MSB)
Slave has no digital outputs	Bit 15 (MSB)

Index App0 ASI Diag Data Slave (for 00 ≤ pp ≤ 1F; slave 0 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
App0:02	Status Register (A-Slave)	General status information Last received response of a slave to the command "ReadStatus" (see table below)	UINT8	RO	0x00 (0$_{dec}$)

Bit	Description
0 - 3	Status register of the slave (default = 0)
4 - 7	reserved

Index App0 ASI Diag Data Slave (for 00 ≤ pp ≤ 1F; slave 0 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
App0:03	Physical Fault Counter (A-Slave)	Counter that increments if a response from the respective AS-i slave had a start bit, stop bit or parity bit error	UINT16	RO	0x0000 (0_{dec})
App0:04	Timeout Counter (A-Slave)	Counter that increments if the respective AS-i slave did not respond	UINT16	RO	0x0000 (0_{dec})
App0:05	Response Counter (A-Slave)	Counter that increments if the respective AS-i slave responded correctly	UINT16	RO	0x0000 (0_{dec})
App0:06	Leave Data-Exchange Counter (A-Slave)	Counter that increments if the respective AS-i slave has been deleted from the LAS, i.e. it did not respond (or correctly respond) three times in succession	UINT16	RO	0x0000 (0_{dec})
App0:07	Data-Exchange Failed Counter (A-Slave)	Counter that increments if the respective AS-i slave did not respond (or correctly respond) to a data exchange telegram	UINT16	RO	0x0000 (0_{dec})
App0:08	Timeout Statistics (A-Slave)	Timeouts per telegram in percent	UINT16	RO	0x0000 (0_{dec})
App0:09	Data-Exchange Repeat Counter (A-Slave)	This counter is incremented if the data exchange has to be repeated (slave responded incorrectly or not all)	UINT16	RO	0x0000 (0_{dec})
App0:0A	Communication State (B-Slave)	Slave Status see "Extracted nested table 13"	UINT8	RO	0x00 (0_{dec})

Description	Value
Slave is in LDS	Bit 0 (LSB)
Slave is in LAS	Bit 1
Slave is in LPS	Bit 2
Slave is in advanced addressing mode (A/B slaves)	Bit 3
In protected mode the slave is only enabled if the EA code of this slave matches the projected slave.	Bit 4
In protected mode the slave is only enabled if the ID code of this slave matches the projected slave.	Bit 5
In protected mode the slave is only enabled if the extended ID code 1 of this slave matches the projected slave.	Bit 6
In protected mode the slave is only enabled if the extended ID code 2 of this slave matches the projected slave.	Bit 7
Slave supports extended ID code 1 and 2	Bit 8
Slave is an analog slave	Bit 9
Slave is a safety slave	Bit 10
reserved	Bit 11
reserved	Bit 12
Slave requires M4 master (one of the M4 profiles)	Bit 13 (MSB)
Slave has no digital inputs	Bit 14 (MSB)
Slave has no digital outputs	Bit 15 (MSB)

Index App0 ASI Diag Data Slave (for 00 ≤ pp ≤ 1F; slave 0 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
App0:0B	Status Register (B-Slave)	General status information Last received response of a slave to the command "ReadStatus" (see table below)	UINT8	RO	0x00 (0_{dec})

Bit	Description
0 - 3	Status register of the slave (default = 0)
4 - 7	reserved

Index App0 ASI Diag Data Slave (for 00 ≤ pp ≤ 1F; slave 0 to slave 31)

Index (hex)	Name	Meaning	Data type	Flags	Default
App0:0C	Physical Fault Counter (B-Slave)	Counter that increments if a response from the respective AS-i slave had a start bit, stop bit or parity bit error	UINT16	RO	0x0000 (0_{dec})
App0:0D	Timeout Counter (B-Slave)	Counter that increments if the respective AS-i slave did not respond	UINT16	RO	0x0000 (0_{dec})
App0:0E	Response Counter (B-Slave)	Counter that increments if the respective AS-i slave responded correctly	UINT16	RO	0x0000 (0_{dec})
App0:0F	Leave Data-Exchange Counter (B-Slave)	Counter that increments if the respective AS-i slave has been deleted from the LAS, i.e. it did not respond (or correctly respond) three times in succession	UINT16	RO	0x0000 (0_{dec})
App0:10	Data-Exchange Failed Counter (B-Slave)	Counter that increments if the respective AS-i slave did not respond (or correctly respond) to a data exchange telegram	UINT16	RO	0x0000 (0_{dec})
App0:11	Timeout Statistics (B-Slave)	Timeouts per telegram in percent	UINT16	RO	0x0000 (0_{dec})
App0:12	Data-Exchange Repeat Counter (B-Slave)	This counter is incremented if the data exchange has to be repeated (slave responded incorrectly or not all)	UINT16	RO	0x0000 (0_{dec})

5.7.8 ASI data

Index F100 ASI Status

Index (hex)	Name	Meaning	Data type	Flags	Default
F100:0	ASI Status	Maximum subindex	UINT8	RO	0x10 (16_{dec})
F100:01	Configuration okay	Valid AS-i configuration 1_{bin}: the nominal configuration and the actual configuration match (only relevant for protected mode)	BOOLEAN	RO	0x00 (0_{dec})
F100:02	Power Fail	1_{bin}: a power failure has occurred	BOOLEAN	RO	0x00 (0_{dec})
F100:03	Auto addressing mode enabled	1_{bin}: automatic addressing is enabled (protected mode must be active) 0_{bin}: automatic addressing is locked: • an AS-i slave with address 0 was found, but no projected AS-i slave is missing or • a non-projected AS-i slave was found	BOOLEAN	RO	0x00 (0_{dec})
F100:04	Auto addressing mode available	1_{bin}: automatic addressing is available (protected mode must be active and precisely one projected AS-i slave must be missing)	BOOLEAN	RO	0x00 (0_{dec})
F100:05	Protected mode active	1_{bin}: protected mode is activated	BOOLEAN	RO	0x00 (0_{dec})
F100:06	Slave with address 0 found	1_{bin}: an AS-i slave with address "0" was found	BOOLEAN	RO	0x00 (0_{dec})
F100:07	Offline Ready	1_{bin}: The AS-i master is set to offline phase (the outputs of the activated AS-i slaves are set to the default value (1_{bin}), the inputs of the activated AS-i slaves in the controller were also set to the default value (0_{bin})	BOOLEAN	RO	0x00 (0_{dec})
F100:08	Normal Operation	1_{bin}: The AS-i master operates in normal mode (the data exchange phase was reached, AS-i outputs and AS-i inputs have the current values)	BOOLEAN	RO	0x00 (0_{dec})
F100:09	ASI phase	ASI-State Machine [▶ 109]: 0: Offline phase 1: Reset phase 2: Detection phase 3: Activation phase 4: Data exchange phase 5: Management phase 6: Inclusion phase	BIT3	RO	0x00 (0_{dec})
F100:0C***	Power24 Mode Enabled	Power24 support active	BOOLEAN	RO	0x00 (0_{dec})
F100:0D***	Power24 Mode Fail	Power24 mode error	BOOLEAN	RO	0x00 (0_{dec})
F100:0E***	M4 Profile Support Enabled	M4 profile support	BOOLEAN	RO	0x00 (0_{dec})
F100:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated	BOOLEAN	RO	0x00 (0_{dec})

***) from firmware 02

Index F101 ASI LDS

This lists all slaves that physically exist in the network, have a valid address and were detected by the master.

Index (hex)	Name	Meaning	Data type	Flags	Default
F101:0	ASI LDS	Maximum subindex	UINT8	RO	0x3F (63_{dec})
F101:01	Slave 0	Slave 0 detected	BOOLEAN	RO	0x00 (0_{dec})
F101:02 ... 20	Slave 1A ... 31A	Slave 1A ... 31A detected	BOOLEAN	RO	0x00 (0_{dec})
F101:21 ... 3F	Slave 1B ... 31B	Slave 1B ... 31B detected	BOOLEAN	RO	0x00 (0_{dec})

Index F102 ASI LAS

All slaves with which the master communicates. In protected mode, this list corresponds to the LPS, in configuration mode it corresponds to the LDS

Index (hex)	Name	Meaning	Data type	Flags	Default
F102:0	ASI LAS	Maximum subindex	UINT8	RO	0x3F (63$_{dec}$)
F102:01	Slave 0	**	BOOLEAN	RO	0x00 (0$_{dec}$)
F102:02 ...20	Slave 1A ... 31A	Slave 1A ... 31A enabled	BOOLEAN	RO	0x00 (0$_{dec}$)
F102:21 ... 3F	Slave 1B ... 31B	Slave 1B ... 31B enabled	BOOLEAN	RO	0x00 (0$_{dec}$)

Index F103 ASI LPS

This list comprises all slaves that the master expects to find in the network. In protected mode, the master only communicates with these slaves and issues a message as soon as additional slaves are detected, or if slaves are missing from this list.

Index (hex)	Name	Meaning	Data type	Flags	Default
F103:0	ASI LPS	Maximum subindex	UINT8	RO	0x3F (63$_{dec}$)
F103:01	Slave 0	**	BOOLEAN	RO	0x00 (0$_{dec}$)
F103:02 ...20	Slave 1A ... 31A	Slave 1A ... 31A projected	BOOLEAN	RO	0x00 (0$_{dec}$)
F103:21 ...3F	Slave 1B... 31B	Slave 1B ... 31B projected	BOOLEAN	RO	0x00 (0$_{dec}$)

Index F200 ASI Control

Index (hex)	Name	Meaning	Data type	Flags	Default
F200:0	ASI Control	Maximum subindex	UINT8	RO	0x05 (5$_{dec}$)
F200:01	Auto Programming Enable	0$_{bin}$: automatic addressing locked. 1$_{bin}$: automatic addressing enabled	BOOLEAN	RW	0x00 (0$_{dec}$)
F200:02	Go Offline Mode	1$_{bin}$: the AS-i master enters the offline phase 0$_{bin}$: the AS-i master exits the offline phase.	BOOLEAN	RW	0x00 (0$_{dec}$)
F200:03	Data Exchange Active	Enabling of AS-i data exchange: 1$_{bin}$: the current AS-i outputs are sent to the AS-i slaves, and the received AS-i inputs transferred to the controller. 0$_{bin}$: the default values (1$_{bin}$) are sent to the AS-i slaves, the received AS-i inputs are deleted, and the default values (0$_{bin}$) are transferred to the controller.	BOOLEAN	RW	0x00 (0$_{dec}$)
F200:04	Go Protected Mode	1$_{bin}$: activate protected mode	BOOLEAN	RW	0x00 (0$_{dec}$)
F200:05	Go Configuration Mode	1$_{bin}$: activate configuration mode	BOOLEAN	RW	0x00 (0$_{dec}$)
F200:06***	Toggle Power24 mode	Activate Power24 mode	BOOLEAN	RW	0x00 (0$_{dec}$)
F200:07***	Toggle M4 Profile Support	Activate M4 Profile support	BOOLEAN	RW	0x00 (0$_{dec}$)

***) from firmware 02

Index F600 ASI Digital Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
F600:0	ASI Digital Inputs	Maximum subindex	UINT8	RO	0xF8 (248$_{dec}$)
F600:01	Slave 1 Inputs__Slave 1A, DI0	Slave 1 Inputs__Slave 1A, DI0, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:02	Slave 1 Inputs__Slave 1A, DI1	Slave 1 Inputs__Slave 1A, DI1, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:03	Slave 1 Inputs__Slave 1A, DI2	Slave 1 Inputs__Slave 1A, DI2, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:04	Slave 1 Inputs__Slave 1A, DI3	Slave 1 Inputs__Slave 1A, DI3, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:05	Slave 1 Inputs__Slave 1B, DI0	Slave 1 Inputs__Slave 1B, DI0, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:06	Slave 1 Inputs__Slave 1B, DI1	Slave 1 Inputs__Slave 1B, DI1, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:07	Slave 1 Inputs__Slave 1B, DI2	Slave 1 Inputs__Slave 1B, DI2, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:08	Slave 1 Inputs__Slave 1B, DI3	Slave 1 Inputs__Slave 1B, DI3, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)
***	***	***	***	***	***
F600:F1	Slave 31 Inputs__Slave 31A, DI0	Slave 31 Inputs__Slave 31A, DI0, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:F2	Slave 31 Inputs__Slave 31A, DI1	Slave 31 Inputs__Slave 31A, DI1, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:F3	Slave 31 Inputs__Slave 31A, DI2	Slave 31 Inputs__Slave 31A, DI2, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:F4	Slave 31 Inputs__Slave 31A, DI3	Slave 31 Inputs__Slave 31A, DI3, digital inputs or safety flags**	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:F5	Slave 31 Inputs__Slave 31B, DI0	Slave 31 Inputs__Slave 31B, DI0, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:F6	Slave 31 Inputs__Slave 31B, DI1	Slave 31 Inputs__Slave 31B, DI1, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:F7	Slave 31 Inputs__Slave 31B, DI2	Slave 31 Inputs__Slave 31B, DI2, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F600:F8	Slave 31 Inputs__Slave 31B, DI3	Slave 31 Inputs__Slave 31B, DI3, digital inputs	BOOLEAN	RO	0x00 (0$_{dec}$)

**) Safety flags: Information about the state of an AS-i safety slave:

hex	Bit3	Bit2	Bit1	Bit0	Status
0x7	0	1	1	1	Sensor according to the rules in status ON
0xC	1	1	0	0	Sensor in status OFF, but only contact 2 open
0xA	1	0	1	0	Sensor in status OFF, but only contact 1 open
0x8	1	0	0	0	Sensor according to the rules in status OFF

⚠ WARNING

Evaluation of not permitted!

Evaluation of the safety flags, shown in the process image of EL6201 for controlling safety-relevant functions is not permitted!
They are not allowed to be used for protection functions such as emergency stop, access protection, protected area monitoring, robot area monitoring, press safety valves etc.!

Index F700 ASI Digital Outputs

Index (hex)	Name	Meaning	Data type	Flags	Default
F700:0	ASI Digital Outputs	Maximum subindex	UINT8	RO	0xF8 (248$_{dec}$)
F700:01	Slave 1 Outputs__Slave 1A, DO0	Slave 1 Outputs__Slave 1A, DO0, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:02	Slave 1 Outputs__Slave 1A, DO1	Slave 1 Outputs__Slave 1A, DO1, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:03	Slave 1 Outputs__Slave 1A, DO2	Slave 1 Outputs__Slave 1A, DO2, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:04	Slave 1 Outputs__Slave 1A, DO3	Slave 1 Outputs__Slave 1A, DO3, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:05	Slave 1 Outputs__Slave 1B, DO0	Slave 1 Outputs__Slave 1B, DO0, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:06	Slave 1 Outputs__Slave 1B, DO1	Slave 1 Outputs__Slave 1B, DO1, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:07	Slave 1 Outputs__Slave 1B, DO2	Slave 1 Outputs__Slave 1B, DO2, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:08	Slave 1 Outputs__Slave 1B, DO3	Slave 1 Outputs__Slave 1B, DO3, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
***	***	***	***	***	***
F700:F1	Slave 31 Outputs__Slave 31A, DO0	Slave 31 Outputs__Slave 31A, DO0, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:F2	Slave 31 Outputs__Slave 31A, DO1	Slave 31 Outputs__Slave 31A, DO1, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:F3	Slave 31 Outputs__Slave 31A, DO2	Slave 31 Outputs__Slave 31A, DO2, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:F4	Slave 31 Outputs__Slave 31A, DO3	Slave 31 Outputs__Slave 31A, DO3, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:F5	Slave 31 Outputs__Slave 31B, DO0	Slave 31 Outputs__Slave 31B, DO0, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:F6	Slave 31 Outputs__Slave 31B, DO1	Slave 31 Outputs__Slave 31B, DO1, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:F7	Slave 31 Outputs__Slave 31B, DO2	Slave 31 Outputs__Slave 31B, DO2, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)
F700:F8	Slave 31 Outputs__Slave 31B, DO3	Slave 31 Outputs__Slave 31B, DO3, digital outputs	BOOLEAN	RO	0x00 (0$_{dec}$)

Index F901 ASI Analog Slaves

Index (hex)	Name	Meaning	Data type	Flags	Default
F901:0	ASI Analog Slaves	Maximum subindex	UINT8	RO	0x3F (63$_{dec}$)
F901:01	Slave 0	Slave 0 is an analog slave	BOOLEAN	RO	0x00 (0$_{dec}$)
F901:02 ... 20	Slave 1A ... 31A	Slave 1A ... 31A is an analog slave	BOOLEAN	RO	0x00 (0$_{dec}$)
F901:21 ... 3F	Slave 1B ... 31B	Slave 1B ... 31B is an analog slave	BOOLEAN	RO	0x00 (0$_{dec}$)

Index F902 ASI Safety Slaves

Index (hex)	Name	Meaning	Data type	Flags	Default
F902:0	ASI Safety Slaves	Maximum subindex	UINT8	RO	0x3F (63$_{dec}$)
F902:01	Slave 0	Slave 0 is a safety slave	BOOLEAN	RO	0x00 (0$_{dec}$)
F902:02 ... 20	Slave 1A ... 31A	Slave 1A ... 31A is a safety slave	BOOLEAN	RO	0x00 (0$_{dec}$)
F902:21 ... 3F	Slave 1B ... 31B	Slave 1B ... 31B is a safety slave	BOOLEAN	RO	0x00 (0$_{dec}$)

5.8 Object description - standard objects

Standard objects

Index 1000 Device type

Index (hex)	Name	Meaning	Data type	Flags	Default
1000:0	Device type	Device type of the EtherCAT slave: The Lo-Word contains the CoE profile used (5001). The Hi-Word contains the module profile according to the modular device profile.	UINT32	RO	0x18381389 (406328201$_{dec}$)

Index 1008 Device name

Index (hex)	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EL6201

Index 1009 Hardware version

Index (hex)	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slave	STRING	RO	

Index 100A Software version

Index (hex)	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version of the EtherCAT slave	STRING	RO	01

Index 1010 Store parameters

Index (hex)	Name	Meaning	Data type	Flags	Default
1010:0	Store parameters	reserved	UINT8	RO	0x01 (1$_{dec}$)
1010:01	SubIndex 001	reserved	UINT32	RW	0x00000000 (0$_{dec}$)

Index 1018 Identity

Index (hex)	Name	Meaning	Data type	Flags	Default
1018:0	Identity	Information for identifying the slave	UINT8	RO	0x04 (4$_{dec}$)
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2$_{dec}$)
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x18393052 (406401106$_{dec}$)
1018:03	Revision	Revision number of the EtherCAT slave; the low word (bit 0-15) indicates the special terminal number, the high word (bit 16-31) refers to the device description	UINT32	RO	0x00000000 (0$_{dec}$)
1018:04	Serial number	Serial number of the EtherCAT slave; the low byte (bit 0-7) of the low word contains the year of production, the high byte (bit 8-15) of the low word contains the week of production, the high word (bit 16-31) is 0	UINT32	RO	0x00000000 (0$_{dec}$)

Index 10F0 Backup parameter handling

Index (hex)	Name	Meaning	Data type	Flags	Default
10F0:0	Backup parameter handling	Information for standardized loading and saving of backup entries	UINT8	RO	0x01 (1$_{dec}$)
10F0:01	Checksum	Checksum across all backup entries of the EtherCAT slave	UINT32	RO	0x00000000 (0$_{dec}$)

Index 10F2 Backup parameter storage

Index (hex)	Name	Meaning	Data type	Flags	Default
10F2:0	Backup parameter storage		OCTET-STRING[4]	RW	{0}

Index 1601 ASI RxPDO-Map Analog Outputs Slave 1

Index (hex)	Name	Meaning	Data type	Flags	Default
1601:0	ASI RxPDO-Map Analog Outputs Slave 1	PDO Mapping RxPDO 2	UINT8	RO	0x08 (8_{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7010:01, 16
1601:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7010:02, 16
1601:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7010:03, 16
1601:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7010:04, 16
1601:05	SubIndex 005	5. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7010:05, 16
1601:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7010:06, 16
1601:07	SubIndex 007	7. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7010:07, 16
1601:08	SubIndex 008	8. PDO Mapping entry (object 0x7010 (ASI Analog Outputs Slave 1), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7010:08, 16

Index 1602 ASI RxPDO-Map Analog Outputs Slave 2

Index (hex)	Name	Meaning	Data type	Flags	Default
1602:0	ASI RxPDO-Map Analog Outputs Slave 2	PDO Mapping RxPDO 3	UINT8	RO	0x08 (8_{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7020:01, 16
1602:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7020:02, 16
1602:03	SubIndex 003	3. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7020:03, 16
1602:04	SubIndex 004	4. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7020:04, 16
1602:05	SubIndex 005	5. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7020:05, 16
1602:06	SubIndex 006	6. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7020:06, 16
1602:07	SubIndex 007	7. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7020:07, 16
1602:08	SubIndex 008	8. PDO Mapping entry (object 0x7020 (ASI Analog Outputs Slave 2), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7020:08, 16

Index 1603 ASI RxPDO-Map Analog Outputs Slave 3

Index (hex)	Name	Meaning	Data type	Flags	Default
1603:0	ASI RxPDO-Map Analog Outputs Slave 3	PDO Mapping RxPDO 4	UINT8	RO	0x08 (8_{dec})
1603:01	SubIndex 001	1. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7030:01, 16
1603:02	SubIndex 002	2. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7030:02, 16
1603:03	SubIndex 003	3. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7030:03, 16
1603:04	SubIndex 004	4. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7030:04, 16
1603:05	SubIndex 005	5. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7030:05, 16
1603:06	SubIndex 006	6. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7030:06, 16
1603:07	SubIndex 007	7. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7030:07, 16
1603:08	SubIndex 008	8. PDO Mapping entry (object 0x7030 (ASI Analog Outputs Slave 3), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7030:08, 16

Index 1604 ASI RxPDO-Map Analog Outputs Slave 4

Index (hex)	Name	Meaning	Data type	Flags	Default
1604:0	ASI RxPDO-Map Analog Outputs Slave 4	PDO Mapping RxPDO 5	UINT8	RO	0x08 (8_{dec})
1604:01	SubIndex 001	1. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7040:01, 16
1604:02	SubIndex 002	2. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7040:02, 16
1604:03	SubIndex 003	3. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7040:03, 16
1604:04	SubIndex 004	4. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7040:04, 16
1604:05	SubIndex 005	5. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7040:05, 16
1604:06	SubIndex 006	6. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7040:06, 16
1604:07	SubIndex 007	7. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7040:07, 16
1604:08	SubIndex 008	8. PDO Mapping entry (object 0x7040 (ASI Analog Outputs Slave 4), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7040:08, 16

Index 1605 ASI RxPDO-Map Analog Outputs Slave 5

Index (hex)	Name	Meaning	Data type	Flags	Default
1605:0	ASI RxPDO-Map Analog Outputs Slave 5	PDO Mapping RxPDO 6	UINT8	RO	0x08 (8_{dec})
1605:01	SubIndex 001	1. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7050:01, 16
1605:02	SubIndex 002	2. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7050:02, 16
1605:03	SubIndex 003	3. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7050:03, 16
1605:04	SubIndex 004	4. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7050:04, 16
1605:05	SubIndex 005	5. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7050:05, 16
1605:06	SubIndex 006	6. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7050:06, 16
1605:07	SubIndex 007	7. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7050:07, 16
1605:08	SubIndex 008	8. PDO Mapping entry (object 0x7050 (ASI Analog Outputs Slave 5), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7050:08, 16

Index 1606 ASI RxPDO-Map Analog Outputs Slave 6

Index (hex)	Name	Meaning	Data type	Flags	Default
1606:0	ASI RxPDO-Map Analog Outputs Slave 6	PDO Mapping RxPDO 7	UINT8	RO	0x08 (8_{dec})
1606:01	SubIndex 001	1. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7060:01, 16
1606:02	SubIndex 002	2. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7060:02, 16
1606:03	SubIndex 003	3. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7060:03, 16
1606:04	SubIndex 004	4. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7060:04, 16
1606:05	SubIndex 005	5. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7060:05, 16
1606:06	SubIndex 006	6. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7060:06, 16
1606:07	SubIndex 007	7. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7060:07, 16
1606:08	SubIndex 008	8. PDO Mapping entry (object 0x7060 (ASI Analog Outputs Slave 6), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7060:08, 16

Index 1607 ASI RxPDO-Map Analog Outputs Slave 7

Index (hex)	Name	Meaning	Data type	Flags	Default
1607:0	ASI RxPDO-Map Analog Outputs Slave 7	PDO Mapping RxPDO 8	UINT8	RO	0x08 (8_{dec})
1607:01	SubIndex 001	1. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7070:01, 16
1607:02	SubIndex 002	2. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7070:02, 16
1607:03	SubIndex 003	3. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7070:03, 16
1607:04	SubIndex 004	4. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7070:04, 16
1607:05	SubIndex 005	5. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7070:05, 16
1607:06	SubIndex 006	6. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7070:06, 16
1607:07	SubIndex 007	7. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7070:07, 16
1607:08	SubIndex 008	8. PDO Mapping entry (object 0x7070 (ASI Analog Outputs Slave 7), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7070:08, 16

Index 1608 ASI RxPDO-Map Analog Outputs Slave 8

Index (hex)	Name	Meaning	Data type	Flags	Default
1608:0	ASI RxPDO-Map Analog Outputs Slave 8	PDO Mapping RxPDO 9	UINT8	RO	0x08 (8_{dec})
1608:01	SubIndex 001	1. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7080:01, 16
1608:02	SubIndex 002	2. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7080:02, 16
1608:03	SubIndex 003	3. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7080:03, 16
1608:04	SubIndex 004	4. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7080:04, 16
1608:05	SubIndex 005	5. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7080:05, 16
1608:06	SubIndex 006	6. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7080:06, 16
1608:07	SubIndex 007	7. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7080:07, 16
1608:08	SubIndex 008	8. PDO Mapping entry (object 0x7080 (ASI Analog Outputs Slave 8), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7080:08, 16

Index 1609 ASI RxPDO-Map Analog Outputs Slave 9

Index (hex)	Name	Meaning	Data type	Flags	Default
1609:0	ASI RxPDO-Map Analog Outputs Slave 9	PDO Mapping RxPDO 10	UINT8	RO	0x08 (8_{dec})
1609:01	SubIndex 001	1. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7090:01, 16
1609:02	SubIndex 002	2. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7090:02, 16
1609:03	SubIndex 003	3. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7090:03, 16
1609:04	SubIndex 004	4. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7090:04, 16
1609:05	SubIndex 005	5. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7090:05, 16
1609:06	SubIndex 006	6. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7090:06, 16
1609:07	SubIndex 007	7. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7090:07, 16
1609:08	SubIndex 008	8. PDO Mapping entry (object 0x7090 (ASI Analog Outputs Slave 9), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7090:08, 16

Index 160A ASI RxPDO-Map Analog Outputs Slave 10

Index (hex)	Name	Meaning	Data type	Flags	Default
160A:0	ASI RxPDO-Map Analog Outputs Slave 10	PDO Mapping RxPDO 11	UINT8	RO	0x08 (8_{dec})
160A:01	SubIndex 001	1. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x70A0:01, 16
160A:02	SubIndex 002	2. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x70A0:02, 16
160A:03	SubIndex 003	3. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x70A0:03, 16
160A:04	SubIndex 004	4. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x70A0:04, 16
160A:05	SubIndex 005	5. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x70A0:05, 16
160A:06	SubIndex 006	6. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x70A0:06, 16
160A:07	SubIndex 007	7. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x70A0:07, 16
160A:08	SubIndex 008	8. PDO Mapping entry (object 0x70A0 (ASI Analog Outputs Slave 10), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x70A0:08, 16

Index 160B ASI RxPDO-Map Analog Outputs Slave 11

Index (hex)	Name	Meaning	Data type	Flags	Default
160B:0	ASI RxPDO-Map Analog Outputs Slave 11	PDO Mapping RxPDO 12	UINT8	RO	0x08 (8_{dec})
160B:01	SubIndex 001	1. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x70B0:01, 16
160B:02	SubIndex 002	2. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x70B0:02, 16
160B:03	SubIndex 003	3. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x70B0:03, 16
160B:04	SubIndex 004	4. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x70B0:04, 16
160B:05	SubIndex 005	5. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x70B0:05, 16
160B:06	SubIndex 006	6. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x70B0:06, 16
160B:07	SubIndex 007	7. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x70B0:07, 16
160B:08	SubIndex 008	8. PDO Mapping entry (object 0x70B0 (ASI Analog Outputs Slave 11), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x70B0:08, 16

Index 160C ASI RxPDO-Map Analog Outputs Slave 12

Index (hex)	Name	Meaning	Data type	Flags	Default
160C:0	ASI RxPDO-Map Analog Outputs Slave 12	PDO Mapping RxPDO 13	UINT8	RO	0x08 (8_{dec})
160C:01	SubIndex 001	1. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x70C0:01, 16
160C:02	SubIndex 002	2. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x70C0:02, 16
160C:03	SubIndex 003	3. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x70C0:03, 16
160C:04	SubIndex 004	4. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x70C0:04, 16
160C:05	SubIndex 005	5. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x70C0:05, 16
160C:06	SubIndex 006	6. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x70C0:06, 16
160C:07	SubIndex 007	7. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x70C0:07, 16
160C:08	SubIndex 008	8. PDO Mapping entry (object 0x70C0 (ASI Analog Outputs Slave 12), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x70C0:08, 16

Index 160D ASI RxPDO-Map Analog Outputs Slave 13

Index (hex)	Name	Meaning	Data type	Flags	Default
160D:0	ASI RxPDO-Map Analog Outputs Slave 13	PDO Mapping RxPDO 14	UINT8	RO	0x08 (8_{dec})
160D:01	SubIndex 001	1. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x70D0:01, 16
160D:02	SubIndex 002	2. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x70D0:02, 16
160D:03	SubIndex 003	3. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x70D0:03, 16
160D:04	SubIndex 004	4. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x70D0:04, 16
160D:05	SubIndex 005	5. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x70D0:05, 16
160D:06	SubIndex 006	6. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x70D0:06, 16
160D:07	SubIndex 007	7. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x70D0:07, 16
160D:08	SubIndex 008	8. PDO Mapping entry (object 0x70D0 (ASI Analog Outputs Slave 13), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x70D0:08, 16

Index 160E ASI RxPDO-Map Analog Outputs Slave 14

Index (hex)	Name	Meaning	Data type	Flags	Default
160E:0	ASI RxPDO-Map Analog Outputs Slave 14	PDO Mapping RxPDO 15	UINT8	RO	0x08 (8_{dec})
160E:01	SubIndex 001	1. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x70E0:01, 16
160E:02	SubIndex 002	2. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x70E0:02, 16
160E:03	SubIndex 003	3. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x70E0:03, 16
160E:04	SubIndex 004	4. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x70E0:04, 16
160E:05	SubIndex 005	5. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x70E0:05, 16
160E:06	SubIndex 006	6. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x70E0:06, 16
160E:07	SubIndex 007	7. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x70E0:07, 16
160E:08	SubIndex 008	8. PDO Mapping entry (object 0x70E0 (ASI Analog Outputs Slave 14), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x70E0:08, 16

Index 160F ASI RxPDO-Map Analog Outputs Slave 15

Index (hex)	Name	Meaning	Data type	Flags	Default
160F:0	ASI RxPDO-Map Analog Outputs Slave 15	PDO Mapping RxPDO 16	UINT8	RO	0x08 (8_{dec})
160F:01	SubIndex 001	1. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x70F0:01, 16
160F:02	SubIndex 002	2. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x70F0:02, 16
160F:03	SubIndex 003	3. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x70F0:03, 16
160F:04	SubIndex 004	4. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x70F0:04, 16
160F:05	SubIndex 005	5. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x70F0:05, 16
160F:06	SubIndex 006	6. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x70F0:06, 16
160F:07	SubIndex 007	7. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x70F0:07, 16
160F:08	SubIndex 008	8. PDO Mapping entry (object 0x70F0 (ASI Analog Outputs Slave 15), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x70F0:08, 16

Index 1610 ASI RxPDO-Map Analog Outputs Slave 16

Index (hex)	Name	Meaning	Data type	Flags	Default
1610:0	ASI RxPDO-Map Analog Outputs Slave 16	PDO Mapping RxPDO 17	UINT8	RO	0x08 (8_{dec})
1610:01	SubIndex 001	1. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7100:01, 16
1610:02	SubIndex 002	2. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7100:02, 16
1610:03	SubIndex 003	3. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7100:03, 16
1610:04	SubIndex 004	4. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7100:04, 16
1610:05	SubIndex 005	5. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7100:05, 16
1610:06	SubIndex 006	6. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7100:06, 16
1610:07	SubIndex 007	7. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7100:07, 16
1610:08	SubIndex 008	8. PDO Mapping entry (object 0x7100 (ASI Analog Outputs Slave 16), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7100:08, 16

Index 1611 ASI RxPDO-Map Analog Outputs Slave 17

Index (hex)	Name	Meaning	Data type	Flags	Default
1611:0	ASI RxPDO-Map Analog Outputs Slave 17	PDO Mapping RxPDO 18	UINT8	RO	0x08 (8_{dec})
1611:01	SubIndex 001	1. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7110:01, 16
1611:02	SubIndex 002	2. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7110:02, 16
1611:03	SubIndex 003	3. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7110:03, 16
1611:04	SubIndex 004	4. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7110:04, 16
1611:05	SubIndex 005	5. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7110:05, 16
1611:06	SubIndex 006	6. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7110:06, 16
1611:07	SubIndex 007	7. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7110:07, 16
1611:08	SubIndex 008	8. PDO Mapping entry (object 0x7110 (ASI Analog Outputs Slave 17), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7110:08, 16

Index 1612 ASI RxPDO-Map Analog Outputs Slave 18

Index (hex)	Name	Meaning	Data type	Flags	Default
1612:0	ASI RxPDO-Map Analog Outputs Slave 18	PDO Mapping RxPDO 19	UINT8	RO	0x08 (8_{dec})
1612:01	SubIndex 001	1. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7120:01, 16
1612:02	SubIndex 002	2. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7120:02, 16
1612:03	SubIndex 003	3. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7120:03, 16
1612:04	SubIndex 004	4. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7120:04, 16
1612:05	SubIndex 005	5. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7120:05, 16
1612:06	SubIndex 006	6. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7120:06, 16
1612:07	SubIndex 007	7. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7120:07, 16
1612:08	SubIndex 008	8. PDO Mapping entry (object 0x7120 (ASI Analog Outputs Slave 18), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7120:08, 16

Index 1613 ASI RxPDO-Map Analog Outputs Slave 19

Index (hex)	Name	Meaning	Data type	Flags	Default
1613:0	ASI RxPDO-Map Analog Outputs Slave 19	PDO Mapping RxPDO 20	UINT8	RO	0x08 (8_{dec})
1613:01	SubIndex 001	1. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7130:01, 16
1613:02	SubIndex 002	2. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7130:02, 16
1613:03	SubIndex 003	3. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7130:03, 16
1613:04	SubIndex 004	4. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7130:04, 16
1613:05	SubIndex 005	5. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7130:05, 16
1613:06	SubIndex 006	6. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7130:06, 16
1613:07	SubIndex 007	7. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7130:07, 16
1613:08	SubIndex 008	8. PDO Mapping entry (object 0x7130 (ASI Analog Outputs Slave 19), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7130:08, 16

Index 1614 ASI RxPDO-Map Analog Outputs Slave 20

Index (hex)	Name	Meaning	Data type	Flags	Default
1614:0	ASI RxPDO-Map Analog Outputs Slave 20	PDO Mapping RxPDO 21	UINT8	RO	0x08 (8_{dec})
1614:01	SubIndex 001	1. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7140:01, 16
1614:02	SubIndex 002	2. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7140:02, 16
1614:03	SubIndex 003	3. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7140:03, 16
1614:04	SubIndex 004	4. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7140:04, 16
1614:05	SubIndex 005	5. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7140:05, 16
1614:06	SubIndex 006	6. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7140:06, 16
1614:07	SubIndex 007	7. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7140:07, 16
1614:08	SubIndex 008	8. PDO Mapping entry (object 0x7140 (ASI Analog Outputs Slave 20), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7140:08, 16

Index 1615 ASI RxPDO-Map Analog Outputs Slave 21

Index (hex)	Name	Meaning	Data type	Flags	Default
1615:0	ASI RxPDO-Map Analog Outputs Slave 21	PDO Mapping RxPDO 22	UINT8	RO	0x08 (8_{dec})
1615:01	SubIndex 001	1. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7150:01, 16
1615:02	SubIndex 002	2. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7150:02, 16
1615:03	SubIndex 003	3. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7150:03, 16
1615:04	SubIndex 004	4. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7150:04, 16
1615:05	SubIndex 005	5. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7150:05, 16
1615:06	SubIndex 006	6. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7150:06, 16
1615:07	SubIndex 007	7. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7150:07, 16
1615:08	SubIndex 008	8. PDO Mapping entry (object 0x7150 (ASI Analog Outputs Slave 21), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7150:08, 16

Index 1616 ASI RxPDO-Map Analog Outputs Slave 22

Index (hex)	Name	Meaning	Data type	Flags	Default
1616:0	ASI RxPDO-Map Analog Outputs Slave 22	PDO Mapping RxPDO 23	UINT8	RO	0x08 (8_{dec})
1616:01	SubIndex 001	1. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7160:01, 16
1616:02	SubIndex 002	2. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7160:02, 16
1616:03	SubIndex 003	3. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7160:03, 16
1616:04	SubIndex 004	4. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7160:04, 16
1616:05	SubIndex 005	5. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7160:05, 16
1616:06	SubIndex 006	6. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7160:06, 16
1616:07	SubIndex 007	7. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7160:07, 16
1616:08	SubIndex 008	8. PDO Mapping entry (object 0x7160 (ASI Analog Outputs Slave 22), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7160:08, 16

Index 1617 ASI RxPDO-Map Analog Outputs Slave 23

Index (hex)	Name	Meaning	Data type	Flags	Default
1617:0	ASI RxPDO-Map Analog Outputs Slave 23	PDO Mapping RxPDO 24	UINT8	RO	0x08 (8_{dec})
1617:01	SubIndex 001	1. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7170:01, 16
1617:02	SubIndex 002	2. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7170:02, 16
1617:03	SubIndex 003	3. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7170:03, 16
1617:04	SubIndex 004	4. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7170:04, 16
1617:05	SubIndex 005	5. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7170:05, 16
1617:06	SubIndex 006	6. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7170:06, 16
1617:07	SubIndex 007	7. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7170:07, 16
1617:08	SubIndex 008	8. PDO Mapping entry (object 0x7170 (ASI Analog Outputs Slave 23), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7170:08, 16

Index 1618 ASI RxPDO-Map Analog Outputs Slave 24

Index (hex)	Name	Meaning	Data type	Flags	Default
1618:0	ASI RxPDO-Map Analog Outputs Slave 24	PDO Mapping RxPDO 25	UINT8	RO	0x08 (8_{dec})
1618:01	SubIndex 001	1. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7180:01, 16
1618:02	SubIndex 002	2. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7180:02, 16
1618:03	SubIndex 003	3. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7180:03, 16
1618:04	SubIndex 004	4. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7180:04, 16
1618:05	SubIndex 005	5. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7180:05, 16
1618:06	SubIndex 006	6. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7180:06, 16
1618:07	SubIndex 007	7. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7180:07, 16
1618:08	SubIndex 008	8. PDO Mapping entry (object 0x7180 (ASI Analog Outputs Slave 24), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7180:08, 16

Index 1619 ASI RxPDO-Map Analog Outputs Slave 25

Index (hex)	Name	Meaning	Data type	Flags	Default
1619:0	ASI RxPDO-Map Analog Outputs Slave 25	PDO Mapping RxPDO 26	UINT8	RO	0x08 (8_{dec})
1619:01	SubIndex 001	1. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x7190:01, 16
1619:02	SubIndex 002	2. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x7190:02, 16
1619:03	SubIndex 003	3. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x7190:03, 16
1619:04	SubIndex 004	4. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x7190:04, 16
1619:05	SubIndex 005	5. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x7190:05, 16
1619:06	SubIndex 006	6. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x7190:06, 16
1619:07	SubIndex 007	7. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x7190:07, 16
1619:08	SubIndex 008	8. PDO Mapping entry (object 0x7190 (ASI Analog Outputs Slave 25), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x7190:08, 16

Index 161A ASI RxPDO-Map Analog Outputs Slave 26

Index (hex)	Name	Meaning	Data type	Flags	Default
161A:0	ASI RxPDO-Map Analog Outputs Slave 26	PDO Mapping RxPDO 27	UINT8	RO	0x08 (8_{dec})
161A:01	SubIndex 001	1. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x71A0:01, 16
161A:02	SubIndex 002	2. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x71A0:02, 16
161A:03	SubIndex 003	3. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x71A0:03, 16
161A:04	SubIndex 004	4. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x71A0:04, 16
161A:05	SubIndex 005	5. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x71A0:05, 16
161A:06	SubIndex 006	6. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x71A0:06, 16
161A:07	SubIndex 007	7. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x71A0:07, 16
161A:08	SubIndex 008	8. PDO Mapping entry (object 0x71A0 (ASI Analog Outputs Slave 26), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x71A0:08, 16

Index 161B ASI RxPDO-Map Analog Outputs Slave 27

Index (hex)	Name	Meaning	Data type	Flags	Default
161B:0	ASI RxPDO-Map Analog Outputs Slave 27	PDO Mapping RxPDO 28	UINT8	RO	0x08 (8_{dec})
161B:01	SubIndex 001	1. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x71B0:01, 16
161B:02	SubIndex 002	2. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x71B0:02, 16
161B:03	SubIndex 003	3. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x71B0:03, 16
161B:04	SubIndex 004	4. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x71B0:04, 16
161B:05	SubIndex 005	5. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x71B0:05, 16
161B:06	SubIndex 006	6. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x71B0:06, 16
161B:07	SubIndex 007	7. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x71B0:07, 16
161B:08	SubIndex 008	8. PDO Mapping entry (object 0x71B0 (ASI Analog Outputs Slave 27), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x71B0:08, 16

Index 161C ASI RxPDO-Map Analog Outputs Slave 28

Index (hex)	Name	Meaning	Data type	Flags	Default
161C:0	ASI RxPDO-Map Analog Outputs Slave 28	PDO Mapping RxPDO 29	UINT8	RO	0x08 (8_{dec})
161C:01	SubIndex 001	1. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x71C0:01, 16
161C:02	SubIndex 002	2. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x71C0:02, 16
161C:03	SubIndex 003	3. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x71C0:03, 16
161C:04	SubIndex 004	4. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x71C0:04, 16
161C:05	SubIndex 005	5. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x71C0:05, 16
161C:06	SubIndex 006	6. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x71C0:06, 16
161C:07	SubIndex 007	7. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x71C0:07, 16
161C:08	SubIndex 008	8. PDO Mapping entry (object 0x71C0 (ASI Analog Outputs Slave 28), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x71C0:08, 16

Index 161D ASI RxPDO-Map Analog Outputs Slave 29

Index (hex)	Name	Meaning	Data type	Flags	Default
161D:0	ASI RxPDO-Map Analog Outputs Slave 29	PDO Mapping RxPDO 30	UINT8	RO	0x08 (8_{dec})
161D:01	SubIndex 001	1. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x71D0:01, 16
161D:02	SubIndex 002	2. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x71D0:02, 16
161D:03	SubIndex 003	3. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x71D0:03, 16
161D:04	SubIndex 004	4. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x71D0:04, 16
161D:05	SubIndex 005	5. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x71D0:05, 16
161D:06	SubIndex 006	6. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x71D0:06, 16
161D:07	SubIndex 007	7. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x71D0:07, 16
161D:08	SubIndex 008	8. PDO Mapping entry (object 0x71D0 (ASI Analog Outputs Slave 29), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x71D0:08, 16

Index 161E ASI RxPDO-Map Analog Outputs Slave 30

Index (hex)	Name	Meaning	Data type	Flags	Default
161E:0	ASI RxPDO-Map Analog Outputs Slave 30	PDO Mapping RxPDO 31	UINT8	RO	0x08 (8_{dec})
161E:01	SubIndex 001	1. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x71E0:01, 16
161E:02	SubIndex 002	2. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x71E0:02, 16
161E:03	SubIndex 003	3. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x71E0:03, 16
161E:04	SubIndex 004	4. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x71E0:04, 16
161E:05	SubIndex 005	5. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x71E0:05, 16
161E:06	SubIndex 006	6. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x71E0:06, 16
161E:07	SubIndex 007	7. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x71E0:07, 16
161E:08	SubIndex 008	8. PDO Mapping entry (object 0x71E0 (ASI Analog Outputs Slave 30), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x71E0:08, 16

Index 161F ASI RxPDO-Map Analog Outputs Slave 31

Index (hex)	Name	Meaning	Data type	Flags	Default
161F:0	ASI RxPDO-Map Analog Outputs Slave 31	PDO Mapping RxPDO 32	UINT8	RO	0x08 (8_{dec})
161F:01	SubIndex 001	1. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x71F0:01, 16
161F:02	SubIndex 002	2. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x71F0:02, 16
161F:03	SubIndex 003	3. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x71F0:03, 16
161F:04	SubIndex 004	4. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x71F0:04, 16
161F:05	SubIndex 005	5. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x71F0:05, 16
161F:06	SubIndex 006	6. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x71F0:06, 16
161F:07	SubIndex 007	7. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x71F0:07, 16
161F:08	SubIndex 008	8. PDO Mapping entry (object 0x71F0 (ASI Analog Outputs Slave 31), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x71F0:08, 16

Index 1640 ASI RxPDO-Map Outputs Device

Index (hex)	Name	Meaning	Data type	Flags	Default
1640:0	ASI RxPDO-Map Outputs Device	PDO Mapping RxPDO 65	UINT8	RO	0xF8 (248_{dec})
1640:01	SubIndex 001	1. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x01 (Slave 1 Outputs__Slave 1A, DO0))	UINT32	RO	0xF700:01, 1
1640:02	SubIndex 002	2. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x02 (Slave 1 Outputs__Slave 1A, DO1))	UINT32	RO	0xF700:02, 1
1640:03	SubIndex 003	3. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x03 (Slave 1 Outputs__Slave 1A, DO2))	UINT32	RO	0xF700:03, 1
1640:04	SubIndex 004	4. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x04 (Slave 1 Outputs__Slave 1A, DO3))	UINT32	RO	0xF700:04, 1
1640:05	SubIndex 005	5. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x05 (Slave 1 Outputs__Slave 1B, DO0))	UINT32	RO	0xF700:05, 1
1640:06	SubIndex 006	6. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x06 (Slave 1 Outputs__Slave 1B, DO1))	UINT32	RO	0xF700:06, 1
1640:07	SubIndex 007	7. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x07 (Slave 1 Outputs__Slave 1B, DO2))	UINT32	RO	0xF700:07, 1
1640:08	SubIndex 008	8. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x08 (Slave 1 Outputs__Slave 1B, DO3))	UINT32	RO	0xF700:08, 1
1640:09	SubIndex 009	9. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x09 (Slave 2 Outputs__Slave 2A, DO0))	UINT32	RO	0xF700:09, 1
1640:0A	SubIndex 010	10. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x0A (Slave 2 Outputs__Slave 2A, DO1))	UINT32	RO	0xF700:0A, 1
1640:0B	SubIndex 011	11. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x0B (Slave 2 Outputs__Slave 2A, DO2))	UINT32	RO	0xF700:0B, 1
1640:0C	SubIndex 012	12. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x0C (Slave 2 Outputs__Slave 2A, DO3))	UINT32	RO	0xF700:0C, 1
1640:0D	SubIndex 013	13. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x0D (Slave 2 Outputs__Slave 2B, DO0))	UINT32	RO	0xF700:0D, 1
1640:0E	SubIndex 014	14. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x0E (Slave 2 Outputs__Slave 2B, DO1))	UINT32	RO	0xF700:0E, 1
1640:0F	SubIndex 015	15. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x0F (Slave 2 Outputs__Slave 2B, DO2))	UINT32	RO	0xF700:0F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:10	SubIndex 016	16. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x10 (Slave 2 Outputs__Slave 2B, DO3))	UINT32	RO	0xF700:10, 1
1640:11	SubIndex 017	17. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x11 (Slave 3 Outputs__Slave 3A, DO0))	UINT32	RO	0xF700:11, 1
1640:12	SubIndex 018	18. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x12 (Slave 3 Outputs__Slave 3A, DO1))	UINT32	RO	0xF700:12, 1
1640:13	SubIndex 019	19. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x13 (Slave 3 Outputs__Slave 3A, DO2))	UINT32	RO	0xF700:13, 1
1640:14	SubIndex 020	20. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x14 (Slave 3 Outputs__Slave 3A, DO3))	UINT32	RO	0xF700:14, 1
1640:15	SubIndex 021	21. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x15 (Slave 3 Outputs__Slave 3B, DO0))	UINT32	RO	0xF700:15, 1
1640:16	SubIndex 022	22. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x16 (Slave 3 Outputs__Slave 3B, DO1))	UINT32	RO	0xF700:16, 1
1640:17	SubIndex 023	23. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x17 (Slave 3 Outputs__Slave 3B, DO2))	UINT32	RO	0xF700:17, 1
1640:18	SubIndex 024	24. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x18 (Slave 3 Outputs__Slave 3B, DO3))	UINT32	RO	0xF700:18, 1
1640:19	SubIndex 025	25. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x19 (Slave 4 Outputs__Slave 4A, DO0))	UINT32	RO	0xF700:19, 1
1640:1A	SubIndex 026	26. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x1A (Slave 4 Outputs__Slave 4A, DO1))	UINT32	RO	0xF700:1A, 1
1640:1B	SubIndex 027	27. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x1B (Slave 4 Outputs__Slave 4A, DO2))	UINT32	RO	0xF700:1B, 1
1640:1C	SubIndex 028	28. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x1C (Slave 4 Outputs__Slave 4A, DO3))	UINT32	RO	0xF700:1C, 1
1640:1D	SubIndex 029	29. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x1D (Slave 4 Outputs__Slave 4B, DO0))	UINT32	RO	0xF700:1D, 1
1640:1E	SubIndex 030	30. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x1E (Slave 4 Outputs__Slave 4B, DO1))	UINT32	RO	0xF700:1E, 1
1640:1F	SubIndex 031	31. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x1F (Slave 4 Outputs__Slave 4B, DO2))	UINT32	RO	0xF700:1F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:20	SubIndex 032	32. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x20 (Slave 4 Outputs__Slave 4B, DO3))	UINT32	RO	0xF700:20, 1
1640:21	SubIndex 033	33. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x21 (Slave 5 Outputs__Slave 5A, DO0))	UINT32	RO	0xF700:21, 1
1640:22	SubIndex 034	34. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x22 (Slave 5 Outputs__Slave 5A, DO1))	UINT32	RO	0xF700:22, 1
1640:23	SubIndex 035	35. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x23 (Slave 5 Outputs__Slave 5A, DO2))	UINT32	RO	0xF700:23, 1
1640:24	SubIndex 036	36. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x24 (Slave 5 Outputs__Slave 5A, DO3))	UINT32	RO	0xF700:24, 1
1640:25	SubIndex 037	37. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x25 (Slave 5 Outputs__Slave 5B, DO0))	UINT32	RO	0xF700:25, 1
1640:26	SubIndex 038	38. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x26 (Slave 5 Outputs__Slave 5B, DO1))	UINT32	RO	0xF700:26, 1
1640:27	SubIndex 039	39. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x27 (Slave 5 Outputs__Slave 5B, DO2))	UINT32	RO	0xF700:27, 1
1640:28	SubIndex 040	40. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x28 (Slave 5 Outputs__Slave 5B, DO3))	UINT32	RO	0xF700:28, 1
1640:29	SubIndex 041	41. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x29 (Slave 6 Outputs__Slave 6A, DO0))	UINT32	RO	0xF700:29, 1
1640:2A	SubIndex 042	42. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x2A (Slave 6 Outputs__Slave 6A, DO1))	UINT32	RO	0xF700:2A, 1
1640:2B	SubIndex 043	43. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x2B (Slave 6 Outputs__Slave 6A, DO2))	UINT32	RO	0xF700:2B, 1
1640:2C	SubIndex 044	44. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x2C (Slave 6 Outputs__Slave 6A, DO3))	UINT32	RO	0xF700:2C, 1
1640:2D	SubIndex 045	45. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x2D (Slave 6 Outputs__Slave 6B, DO0))	UINT32	RO	0xF700:2D, 1
1640:2E	SubIndex 046	46. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x2E (Slave 6 Outputs__Slave 6B, DO1))	UINT32	RO	0xF700:2E, 1
1640:2F	SubIndex 047	47. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x2F (Slave 6 Outputs__Slave 6B, DO2))	UINT32	RO	0xF700:2F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:30	SubIndex 048	48. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x30 (Slave 6 Outputs__Slave 6B, DO3))	UINT32	RO	0xF700:30, 1
1640:31	SubIndex 049	49. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x31 (Slave 7 Outputs__Slave 7A, DO0))	UINT32	RO	0xF700:31, 1
1640:32	SubIndex 050	50. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x32 (Slave 7 Outputs__Slave 7A, DO1))	UINT32	RO	0xF700:32, 1
1640:33	SubIndex 051	51. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x33 (Slave 7 Outputs__Slave 7A, DO2))	UINT32	RO	0xF700:33, 1
1640:34	SubIndex 052	52. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x34 (Slave 7 Outputs__Slave 7A, DO3))	UINT32	RO	0xF700:34, 1
1640:35	SubIndex 053	53. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x35 (Slave 7 Outputs__Slave 7B, DO0))	UINT32	RO	0xF700:35, 1
1640:36	SubIndex 054	54. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x36 (Slave 7 Outputs__Slave 7B, DO1))	UINT32	RO	0xF700:36, 1
1640:37	SubIndex 055	55. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x37 (Slave 7 Outputs__Slave 7B, DO2))	UINT32	RO	0xF700:37, 1
1640:38	SubIndex 056	56. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x38 (Slave 7 Outputs__Slave 7B, DO3))	UINT32	RO	0xF700:38, 1
1640:39	SubIndex 057	57. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x39 (Slave 8 Outputs__Slave 8A, DO0))	UINT32	RO	0xF700:39, 1
1640:3A	SubIndex 058	58. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x3A (Slave 8 Outputs__Slave 8A, DO1))	UINT32	RO	0xF700:3A, 1
1640:3B	SubIndex 059	59. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x3B (Slave 8 Outputs__Slave 8A, DO2))	UINT32	RO	0xF700:3B, 1
1640:3C	SubIndex 060	60. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x3C (Slave 8 Outputs__Slave 8A, DO3))	UINT32	RO	0xF700:3C, 1
1640:3D	SubIndex 061	61. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x3D (Slave 8 Outputs__Slave 8B, DO0))	UINT32	RO	0xF700:3D, 1
1640:3E	SubIndex 062	62. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x3E (Slave 8 Outputs__Slave 8B, DO1))	UINT32	RO	0xF700:3E, 1
1640:3F	SubIndex 063	63. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x3F (Slave 8 Outputs__Slave 8B, DO2))	UINT32	RO	0xF700:3F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:40	SubIndex 064	64. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x40 (Slave 8 Outputs__Slave 8B, DO3))	UINT32	RO	0xF700:40, 1
1640:41	SubIndex 065	65. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x41 (Slave 9 Outputs__Slave 9A, DO0))	UINT32	RO	0xF700:41, 1
1640:42	SubIndex 066	66. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x42 (Slave 9 Outputs__Slave 9A, DO1))	UINT32	RO	0xF700:42, 1
1640:43	SubIndex 067	67. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x43 (Slave 9 Outputs__Slave 9A, DO2))	UINT32	RO	0xF700:43, 1
1640:44	SubIndex 068	68. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x44 (Slave 9 Outputs__Slave 9A, DO3))	UINT32	RO	0xF700:44, 1
1640:45	SubIndex 069	69. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x45 (Slave 9 Outputs__Slave 9B, DO0))	UINT32	RO	0xF700:45, 1
1640:46	SubIndex 070	70. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x46 (Slave 9 Outputs__Slave 9B, DO1))	UINT32	RO	0xF700:46, 1
1640:47	SubIndex 071	71. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x47 (Slave 9 Outputs__Slave 9B, DO2))	UINT32	RO	0xF700:47, 1
1640:48	SubIndex 072	72. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x48 (Slave 9 Outputs__Slave 9B, DO3))	UINT32	RO	0xF700:48, 1
1640:49	SubIndex 073	73. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x49 (Slave 10 Outputs__Slave 10A, DO0))	UINT32	RO	0xF700:49, 1
1640:4A	SubIndex 074	74. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x4A (Slave 10 Outputs__Slave 10A, DO1))	UINT32	RO	0xF700:4A, 1
1640:4B	SubIndex 075	75. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x4B (Slave 10 Outputs__Slave 10A, DO2))	UINT32	RO	0xF700:4B, 1
1640:4C	SubIndex 076	76. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x4C (Slave 10 Outputs__Slave 10A, DO3))	UINT32	RO	0xF700:4C, 1
1640:4D	SubIndex 077	77. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x4D (Slave 10 Outputs__Slave 10B, DO0))	UINT32	RO	0xF700:4D, 1
1640:4E	SubIndex 078	78. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x4E (Slave 10 Outputs__Slave 10B, DO1))	UINT32	RO	0xF700:4E, 1
1640:4F	SubIndex 079	79. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x4F (Slave 10 Outputs__Slave 10B, DO2))	UINT32	RO	0xF700:4F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:50	SubIndex 080	80. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x50 (Slave 10 Outputs__Slave 10B, DO3))	UINT32	RO	0xF700:50, 1
1640:51	SubIndex 081	81. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x51 (Slave 11 Outputs__Slave 11A, DO0))	UINT32	RO	0xF700:51, 1
1640:52	SubIndex 082	82. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x52 (Slave 11 Outputs__Slave 11A, DO1))	UINT32	RO	0xF700:52, 1
1640:53	SubIndex 083	83. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x53 (Slave 11 Outputs__Slave 11A, DO2))	UINT32	RO	0xF700:53, 1
1640:54	SubIndex 084	84. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x54 (Slave 11 Outputs__Slave 11A, DO3))	UINT32	RO	0xF700:54, 1
1640:55	SubIndex 085	85. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x55 (Slave 11 Outputs__Slave 11B, DO0))	UINT32	RO	0xF700:55, 1
1640:56	SubIndex 086	86. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x56 (Slave 11 Outputs__Slave 11B, DO1))	UINT32	RO	0xF700:56, 1
1640:57	SubIndex 087	87. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x57 (Slave 11 Outputs__Slave 11B, DO2))	UINT32	RO	0xF700:57, 1
1640:58	SubIndex 088	88. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x58 (Slave 11 Outputs__Slave 11B, DO3))	UINT32	RO	0xF700:58, 1
1640:59	SubIndex 089	89. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x59 (Slave 12 Outputs__Slave 12A, DO0))	UINT32	RO	0xF700:59, 1
1640:5A	SubIndex 090	90. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x5A (Slave 12 Outputs__Slave 12A, DO1))	UINT32	RO	0xF700:5A, 1
1640:5B	SubIndex 091	91. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x5B (Slave 12 Outputs__Slave 12A, DO2))	UINT32	RO	0xF700:5B, 1
1640:5C	SubIndex 092	92. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x5C (Slave 12 Outputs__Slave 12A, DO3))	UINT32	RO	0xF700:5C, 1
1640:5D	SubIndex 093	93. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x5D (Slave 12 Outputs__Slave 12B, DO0))	UINT32	RO	0xF700:5D, 1
1640:5E	SubIndex 094	94. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x5E (Slave 12 Outputs__Slave 12B, DO1))	UINT32	RO	0xF700:5E, 1
1640:5F	SubIndex 095	95. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x5F (Slave 12 Outputs__Slave 12B, DO2))	UINT32	RO	0xF700:5F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:60	SubIndex 096	96. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x60 (Slave 12 Outputs__Slave 12B, DO3))	UINT32	RO	0xF700:60, 1
1640:61	SubIndex 097	97. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x61 (Slave 13 Outputs__Slave 13A, DO0))	UINT32	RO	0xF700:61, 1
1640:62	SubIndex 098	98. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x62 (Slave 13 Outputs__Slave 13A, DO1))	UINT32	RO	0xF700:62, 1
1640:63	SubIndex 099	99. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x63 (Slave 13 Outputs__Slave 13A, DO2))	UINT32	RO	0xF700:63, 1
1640:64	SubIndex 100	100. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x64 (Slave 13 Outputs__Slave 13A, DO3))	UINT32	RO	0xF700:64, 1
1640:65	SubIndex 101	101. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x65 (Slave 13 Outputs__Slave 13B, DO0))	UINT32	RO	0xF700:65, 1
1640:66	SubIndex 102	102. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x66 (Slave 13 Outputs__Slave 13B, DO1))	UINT32	RO	0xF700:66, 1
1640:67	SubIndex 103	103. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x67 (Slave 13 Outputs__Slave 13B, DO2))	UINT32	RO	0xF700:67, 1
1640:68	SubIndex 104	104. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x68 (Slave 13 Outputs__Slave 13B, DO3))	UINT32	RO	0xF700:68, 1
1640:69	SubIndex 105	105. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x69 (Slave 14 Outputs__Slave 14A, DO0))	UINT32	RO	0xF700:69, 1
1640:6A	SubIndex 106	106. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x6A (Slave 14 Outputs__Slave 14A, DO1))	UINT32	RO	0xF700:6A, 1
1640:6B	SubIndex 107	107. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x6B (Slave 14 Outputs__Slave 14A, DO2))	UINT32	RO	0xF700:6B, 1
1640:6C	SubIndex 108	108. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x6C (Slave 14 Outputs__Slave 14A, DO3))	UINT32	RO	0xF700:6C, 1
1640:6D	SubIndex 109	109. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x6D (Slave 14 Outputs__Slave 14B, DO0))	UINT32	RO	0xF700:6D, 1
1640:6E	SubIndex 110	110. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x6E (Slave 14 Outputs__Slave 14B, DO1))	UINT32	RO	0xF700:6E, 1
1640:6F	SubIndex 111	111. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x6F (Slave 14 Outputs__Slave 14B, DO2))	UINT32	RO	0xF700:6F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:70	SubIndex 112	112. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x70 (Slave 14 Outputs__Slave 14B, DO3))	UINT32	RO	0xF700:70, 1
1640:71	SubIndex 113	113. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x71 (Slave 15 Outputs__Slave 15A, DO0))	UINT32	RO	0xF700:71, 1
1640:72	SubIndex 114	114. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x72 (Slave 15 Outputs__Slave 15A, DO1))	UINT32	RO	0xF700:72, 1
1640:73	SubIndex 115	115. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x73 (Slave 15 Outputs__Slave 15A, DO2))	UINT32	RO	0xF700:73, 1
1640:74	SubIndex 116	116. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x74 (Slave 15 Outputs__Slave 15A, DO3))	UINT32	RO	0xF700:74, 1
1640:75	SubIndex 117	117. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x75 (Slave 15 Outputs__Slave 15B, DO0))	UINT32	RO	0xF700:75, 1
1640:76	SubIndex 118	118. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x76 (Slave 15 Outputs__Slave 15B, DO1))	UINT32	RO	0xF700:76, 1
1640:77	SubIndex 119	119. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x77 (Slave 15 Outputs__Slave 15B, DO2))	UINT32	RO	0xF700:77, 1
1640:78	SubIndex 120	120. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x78 (Slave 15 Outputs__Slave 15B, DO3))	UINT32	RO	0xF700:78, 1
1640:79	SubIndex 121	121. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x79 (Slave 16 Outputs__Slave 16A, DO0))	UINT32	RO	0xF700:79, 1
1640:7A	SubIndex 122	122. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x7A (Slave 16 Outputs__Slave 16A, DO1))	UINT32	RO	0xF700:7A, 1
1640:7B	SubIndex 123	123. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x7B (Slave 16 Outputs__Slave 16A, DO2))	UINT32	RO	0xF700:7B, 1
1640:7C	SubIndex 124	124. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x7C (Slave 16 Outputs__Slave 16A, DO3))	UINT32	RO	0xF700:7C, 1
1640:7D	SubIndex 125	125. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x7D (Slave 16 Outputs__Slave 16B, DO0))	UINT32	RO	0xF700:7D, 1
1640:7E	SubIndex 126	126. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x7E (Slave 16 Outputs__Slave 16B, DO1))	UINT32	RO	0xF700:7E, 1
1640:7F	SubIndex 127	127. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x7F (Slave 16 Outputs__Slave 16B, DO2))	UINT32	RO	0xF700:7F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:80	SubIndex 128	128. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x80 (Slave 16 Outputs__Slave 16B, DO3))	UINT32	RO	0xF700:80, 1
1640:81	SubIndex 129	129. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x81 (Slave 17 Outputs__Slave 17A, DO0))	UINT32	RO	0xF700:81, 1
1640:82	SubIndex 130	130. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x82 (Slave 17 Outputs__Slave 17A, DO1))	UINT32	RO	0xF700:82, 1
1640:83	SubIndex 131	131. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x83 (Slave 17 Outputs__Slave 17A, DO2))	UINT32	RO	0xF700:83, 1
1640:84	SubIndex 132	132. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x84 (Slave 17 Outputs__Slave 17A, DO3))	UINT32	RO	0xF700:84, 1
1640:85	SubIndex 133	133. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x85 (Slave 17 Outputs__Slave 17B, DO0))	UINT32	RO	0xF700:85, 1
1640:86	SubIndex 134	134. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x86 (Slave 17 Outputs__Slave 17B, DO1))	UINT32	RO	0xF700:86, 1
1640:87	SubIndex 135	135. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x87 (Slave 17 Outputs__Slave 17B, DO2))	UINT32	RO	0xF700:87, 1
1640:88	SubIndex 136	136. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x88 (Slave 17 Outputs__Slave 17B, DO3))	UINT32	RO	0xF700:88, 1
1640:89	SubIndex 137	137. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x89 (Slave 18 Outputs__Slave 18A, DO0))	UINT32	RO	0xF700:89, 1
1640:8A	SubIndex 138	138. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x8A (Slave 18 Outputs__Slave 18A, DO1))	UINT32	RO	0xF700:8A, 1
1640:8B	SubIndex 139	139. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x8B (Slave 18 Outputs__Slave 18A, DO2))	UINT32	RO	0xF700:8B, 1
1640:8C	SubIndex 140	140. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x8C (Slave 18 Outputs__Slave 18A, DO3))	UINT32	RO	0xF700:8C, 1
1640:8D	SubIndex 141	141. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x8D (Slave 18 Outputs__Slave 18B, DO0))	UINT32	RO	0xF700:8D, 1
1640:8E	SubIndex 142	142. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x8E (Slave 18 Outputs__Slave 18B, DO1))	UINT32	RO	0xF700:8E, 1
1640:8F	SubIndex 143	143. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x8F (Slave 18 Outputs__Slave 18B, DO2))	UINT32	RO	0xF700:8F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:90	SubIndex 144	144. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x90 (Slave 18 Outputs__Slave 18B, DO3))	UINT32	RO	0xF700:90, 1
1640:91	SubIndex 145	145. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x91 (Slave 19 Outputs__Slave 19A, DO0))	UINT32	RO	0xF700:91, 1
1640:92	SubIndex 146	146. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x92 (Slave 19 Outputs__Slave 19A, DO1))	UINT32	RO	0xF700:92, 1
1640:93	SubIndex 147	147. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x93 (Slave 19 Outputs__Slave 19A, DO2))	UINT32	RO	0xF700:93, 1
1640:94	SubIndex 148	148. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x94 (Slave 19 Outputs__Slave 19A, DO3))	UINT32	RO	0xF700:94, 1
1640:95	SubIndex 149	149. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x95 (Slave 19 Outputs__Slave 19B, DO0))	UINT32	RO	0xF700:95, 1
1640:96	SubIndex 150	150. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x96 (Slave 19 Outputs__Slave 19B, DO1))	UINT32	RO	0xF700:96, 1
1640:97	SubIndex 151	151. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x97 (Slave 19 Outputs__Slave 19B, DO2))	UINT32	RO	0xF700:97, 1
1640:98	SubIndex 152	152. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x98 (Slave 19 Outputs__Slave 19B, DO3))	UINT32	RO	0xF700:98, 1
1640:99	SubIndex 153	153. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x99 (Slave 20 Outputs__Slave 20A, DO0))	UINT32	RO	0xF700:99, 1
1640:9A	SubIndex 154	154. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x9A (Slave 20 Outputs__Slave 20A, DO1))	UINT32	RO	0xF700:9A, 1
1640:9B	SubIndex 155	155. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x9B (Slave 20 Outputs__Slave 20A, DO2))	UINT32	RO	0xF700:9B, 1
1640:9C	SubIndex 156	156. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x9C (Slave 20 Outputs__Slave 20A, DO3))	UINT32	RO	0xF700:9C, 1
1640:9D	SubIndex 157	157. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x9D (Slave 20 Outputs__Slave 20B, DO0))	UINT32	RO	0xF700:9D, 1
1640:9E	SubIndex 158	158. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x9E (Slave 20 Outputs__Slave 20B, DO1))	UINT32	RO	0xF700:9E, 1
1640:9F	SubIndex 159	159. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0x9F (Slave 20 Outputs__Slave 20B, DO2))	UINT32	RO	0xF700:9F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:A0	SubIndex 160	160. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA0 (Slave 20 Outputs__Slave 20B, DO3))	UINT32	RO	0xF700:A0, 1
1640:A1	SubIndex 161	161. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA1 (Slave 21 Outputs__Slave 21A, DO0))	UINT32	RO	0xF700:A1, 1
1640:A2	SubIndex 162	162. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA2 (Slave 21 Outputs__Slave 21A, DO1))	UINT32	RO	0xF700:A2, 1
1640:A3	SubIndex 163	163. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA3 (Slave 21 Outputs__Slave 21A, DO2))	UINT32	RO	0xF700:A3, 1
1640:A4	SubIndex 164	164. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA4 (Slave 21 Outputs__Slave 21A, DO3))	UINT32	RO	0xF700:A4, 1
1640:A5	SubIndex 165	165. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA5 (Slave 21 Outputs__Slave 21B, DO0))	UINT32	RO	0xF700:A5, 1
1640:A6	SubIndex 166	166. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA6 (Slave 21 Outputs__Slave 21B, DO1))	UINT32	RO	0xF700:A6, 1
1640:A7	SubIndex 167	167. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA7 (Slave 21 Outputs__Slave 21B, DO2))	UINT32	RO	0xF700:A7, 1
1640:A8	SubIndex 168	168. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA8 (Slave 21 Outputs__Slave 21B, DO3))	UINT32	RO	0xF700:A8, 1
1640:A9	SubIndex 169	169. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xA9 (Slave 22 Outputs__Slave 22A, DO0))	UINT32	RO	0xF700:A9, 1
1640:AA	SubIndex 170	170. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xAA (Slave 22 Outputs__Slave 22A, DO1))	UINT32	RO	0xF700:AA, 1
1640:AB	SubIndex 171	171. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xAB (Slave 22 Outputs__Slave 22A, DO2))	UINT32	RO	0xF700:AB, 1
1640:AC	SubIndex 172	172. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xAC (Slave 22 Outputs__Slave 22A, DO3))	UINT32	RO	0xF700:AC, 1
1640:AD	SubIndex 173	173. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xAD (Slave 22 Outputs__Slave 22B, DO0))	UINT32	RO	0xF700:AD, 1
1640:AE	SubIndex 174	174. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xAE (Slave 22 Outputs__Slave 22B, DO1))	UINT32	RO	0xF700:AE, 1
1640:AF	SubIndex 175	175. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xAF (Slave 22 Outputs__Slave 22B, DO2))	UINT32	RO	0xF700:AF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:B0	SubIndex 176	176. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB0 (Slave 22 Outputs__Slave 22B, DO3))	UINT32	RO	0xF700:B0, 1
1640:B1	SubIndex 177	177. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB1 (Slave 23 Outputs__Slave 23A, DO0))	UINT32	RO	0xF700:B1, 1
1640:B2	SubIndex 178	178. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB2 (Slave 23 Outputs__Slave 23A, DO1))	UINT32	RO	0xF700:B2, 1
1640:B3	SubIndex 179	179. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB3 (Slave 23 Outputs__Slave 23A, DO2))	UINT32	RO	0xF700:B3, 1
1640:B4	SubIndex 180	180. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB4 (Slave 23 Outputs__Slave 23A, DO3))	UINT32	RO	0xF700:B4, 1
1640:B5	SubIndex 181	181. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB5 (Slave 23 Outputs__Slave 23B, DO0))	UINT32	RO	0xF700:B5, 1
1640:B6	SubIndex 182	182. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB6 (Slave 23 Outputs__Slave 23B, DO1))	UINT32	RO	0xF700:B6, 1
1640:B7	SubIndex 183	183. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB7 (Slave 23 Outputs__Slave 23B, DO2))	UINT32	RO	0xF700:B7, 1
1640:B8	SubIndex 184	184. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB8 (Slave 23 Outputs__Slave 23B, DO3))	UINT32	RO	0xF700:B8, 1
1640:B9	SubIndex 185	185. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xB9 (Slave 24 Outputs__Slave 24A, DO0))	UINT32	RO	0xF700:B9, 1
1640:BA	SubIndex 186	186. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xBA (Slave 24 Outputs__Slave 24A, DO1))	UINT32	RO	0xF700:BA, 1
1640:BB	SubIndex 187	187. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xBB (Slave 24 Outputs__Slave 24A, DO2))	UINT32	RO	0xF700:BB, 1
1640:BC	SubIndex 188	188. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xBC (Slave 24 Outputs__Slave 24A, DO3))	UINT32	RO	0xF700:BC, 1
1640:BD	SubIndex 189	189. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xBD (Slave 24 Outputs__Slave 24B, DO0))	UINT32	RO	0xF700:BD, 1
1640:BE	SubIndex 190	190. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xBE (Slave 24 Outputs__Slave 24B, DO1))	UINT32	RO	0xF700:BE, 1
1640:BF	SubIndex 191	191. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xBF (Slave 24 Outputs__Slave 24B, DO2))	UINT32	RO	0xF700:BF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:C0	SubIndex 192	192. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC0 (Slave 24 Outputs__Slave 24B, DO3))	UINT32	RO	0xF700:C0, 1
1640:C1	SubIndex 193	193. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC1 (Slave 25 Outputs__Slave 25A, DO0))	UINT32	RO	0xF700:C1, 1
1640:C2	SubIndex 194	194. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC2 (Slave 25 Outputs__Slave 25A, DO1))	UINT32	RO	0xF700:C2, 1
1640:C3	SubIndex 195	195. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC3 (Slave 25 Outputs__Slave 25A, DO2))	UINT32	RO	0xF700:C3, 1
1640:C4	SubIndex 196	196. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC4 (Slave 25 Outputs__Slave 25A, DO3))	UINT32	RO	0xF700:C4, 1
1640:C5	SubIndex 197	197. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC5 (Slave 25 Outputs__Slave 25B, DO0))	UINT32	RO	0xF700:C5, 1
1640:C6	SubIndex 198	198. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC6 (Slave 25 Outputs__Slave 25B, DO1))	UINT32	RO	0xF700:C6, 1
1640:C7	SubIndex 199	199. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC7 (Slave 25 Outputs__Slave 25B, DO2))	UINT32	RO	0xF700:C7, 1
1640:C8	SubIndex 200	200. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC8 (Slave 25 Outputs__Slave 25B, DO3))	UINT32	RO	0xF700:C8, 1
1640:C9	SubIndex 201	201. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xC9 (Slave 26 Outputs__Slave 26A, DO0))	UINT32	RO	0xF700:C9, 1
1640:CA	SubIndex 202	202. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xCA (Slave 26 Outputs__Slave 26A, DO1))	UINT32	RO	0xF700:CA, 1
1640:CB	SubIndex 203	203. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xCB (Slave 26 Outputs__Slave 26A, DO2))	UINT32	RO	0xF700:CB, 1
1640:CC	SubIndex 204	204. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xCC (Slave 26 Outputs__Slave 26A, DO3))	UINT32	RO	0xF700:CC, 1
1640:CD	SubIndex 205	205. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xCD (Slave 26 Outputs__Slave 26B, DO0))	UINT32	RO	0xF700:CD, 1
1640:CE	SubIndex 206	206. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xCE (Slave 26 Outputs__Slave 26B, DO1))	UINT32	RO	0xF700:CE, 1
1640:CF	SubIndex 207	207. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xCF (Slave 26 Outputs__Slave 26B, DO2))	UINT32	RO	0xF700:CF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:D0	SubIndex 208	208. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD0 (Slave 26 Outputs__Slave 26B, DO3))	UINT32	RO	0xF700:D0, 1
1640:D1	SubIndex 209	209. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD1 (Slave 27 Outputs__Slave 27A, DO0))	UINT32	RO	0xF700:D1, 1
1640:D2	SubIndex 210	210. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD2 (Slave 27 Outputs__Slave 27A, DO1))	UINT32	RO	0xF700:D2, 1
1640:D3	SubIndex 211	211. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD3 (Slave 27 Outputs__Slave 27A, DO2))	UINT32	RO	0xF700:D3, 1
1640:D4	SubIndex 212	212. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD4 (Slave 27 Outputs__Slave 27A, DO3))	UINT32	RO	0xF700:D4, 1
1640:D5	SubIndex 213	213. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD5 (Slave 27 Outputs__Slave 27B, DO0))	UINT32	RO	0xF700:D5, 1
1640:D6	SubIndex 214	214. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD6 (Slave 27 Outputs__Slave 27B, DO1))	UINT32	RO	0xF700:D6, 1
1640:D7	SubIndex 215	215. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD7 (Slave 27 Outputs__Slave 27B, DO2))	UINT32	RO	0xF700:D7, 1
1640:D8	SubIndex 216	216. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD8 (Slave 27 Outputs__Slave 27B, DO3))	UINT32	RO	0xF700:D8, 1
1640:D9	SubIndex 217	217. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xD9 (Slave 28 Outputs__Slave 28A, DO0))	UINT32	RO	0xF700:D9, 1
1640:DA	SubIndex 218	218. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xDA (Slave 28 Outputs__Slave 28A, DO1))	UINT32	RO	0xF700:DA, 1
1640:DB	SubIndex 219	219. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xDB (Slave 28 Outputs__Slave 28A, DO2))	UINT32	RO	0xF700:DB, 1
1640:DC	SubIndex 220	220. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xDC (Slave 28 Outputs__Slave 28A, DO3))	UINT32	RO	0xF700:DC, 1
1640:DD	SubIndex 221	221. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xDD (Slave 28 Outputs__Slave 28B, DO0))	UINT32	RO	0xF700:DD, 1
1640:DE	SubIndex 222	222. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xDE (Slave 28 Outputs__Slave 28B, DO1))	UINT32	RO	0xF700:DE, 1
1640:DF	SubIndex 223	223. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xDF (Slave 28 Outputs__Slave 28B, DO2))	UINT32	RO	0xF700:DF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1640:E0	SubIndex 224	224. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE0 (Slave 28 Outputs__Slave 28B, DO3))	UINT32	RO	0xF700:E0, 1
1640:E1	SubIndex 225	225. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE1 (Slave 29 Outputs__Slave 29A, DO0))	UINT32	RO	0xF700:E1, 1
1640:E2	SubIndex 226	226. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE2 (Slave 29 Outputs__Slave 29A, DO1))	UINT32	RO	0xF700:E2, 1
1640:E3	SubIndex 227	227. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE3 (Slave 29 Outputs__Slave 29A, DO2))	UINT32	RO	0xF700:E3, 1
1640:E4	SubIndex 228	228. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE4 (Slave 29 Outputs__Slave 29A, DO3))	UINT32	RO	0xF700:E4, 1
1640:E5	SubIndex 229	229. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE5 (Slave 29 Outputs__Slave 29B, DO0))	UINT32	RO	0xF700:E5, 1
1640:E6	SubIndex 230	230. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE6 (Slave 29 Outputs__Slave 29B, DO1))	UINT32	RO	0xF700:E6, 1
1640:E7	SubIndex 231	231. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE7 (Slave 29 Outputs__Slave 29B, DO2))	UINT32	RO	0xF700:E7, 1
1640:E8	SubIndex 232	232. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE8 (Slave 29 Outputs__Slave 29B, DO3))	UINT32	RO	0xF700:E8, 1
1640:E9	SubIndex 233	233. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xE9 (Slave 30 Outputs__Slave 30A, DO0))	UINT32	RO	0xF700:E9, 1
1640:EA	SubIndex 234	234. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xEA (Slave 30 Outputs__Slave 30A, DO1))	UINT32	RO	0xF700:EA, 1
1640:EB	SubIndex 235	235. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xEB (Slave 30 Outputs__Slave 30A, DO2))	UINT32	RO	0xF700:EB, 1
1640:EC	SubIndex 236	236. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xEC (Slave 30 Outputs__Slave 30A, DO3))	UINT32	RO	0xF700:EC, 1
1640:ED	SubIndex 237	237. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xED (Slave 30 Outputs__Slave 30B, DO0))	UINT32	RO	0xF700:ED, 1
1640:EE	SubIndex 238	238. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xEE (Slave 30 Outputs__Slave 30B, DO1))	UINT32	RO	0xF700:EE, 1
1640:EF	SubIndex 239	239. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xEF (Slave 30 Outputs__Slave 30B, DO2))	UINT32	RO	0xF700:EF, 1

Index 1640 ASI RxPDO-Map Outputs Device

Index (hex)	Name	Meaning	Data type	Flags	Default
1640:F0	SubIndex 240	240. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF0 (Slave 30 Outputs__Slave 30B, DO3))	UINT32	RO	0xF700:F0, 1
1640:F1	SubIndex 241	241. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF1 (Slave 31 Outputs__Slave 31A, DO0))	UINT32	RO	0xF700:F1, 1
1640:F2	SubIndex 242	242. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF2 (Slave 31 Outputs__Slave 31A, DO1))	UINT32	RO	0xF700:F2, 1
1640:F3	SubIndex 243	243. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF3 (Slave 31 Outputs__Slave 31A, DO2))	UINT32	RO	0xF700:F3, 1
1640:F4	SubIndex 244	244. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF4 (Slave 31 Outputs__Slave 31A, DO3))	UINT32	RO	0xF700:F4, 1
1640:F5	SubIndex 245	245. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF5 (Slave 31 Outputs__Slave 31B, DO0))	UINT32	RO	0xF700:F5, 1
1640:F6	SubIndex 246	246. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF6 (Slave 31 Outputs__Slave 31B, DO1))	UINT32	RO	0xF700:F6, 1
1640:F7	SubIndex 247	247. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF7 (Slave 31 Outputs__Slave 31B, DO2))	UINT32	RO	0xF700:F7, 1
1640:F8	SubIndex 248	248. PDO Mapping entry (object 0xF700 (ASI Digital Outputs), entry 0xF8 (Slave 31 Outputs__Slave 31B, DO3))	UINT32	RO	0xF700:F8, 1

Index 1680 ASI RxPDO-Map Control

Index (hex)	Name	Meaning	Data type	Flags	Default
1680:0	ASI RxPDO-Map Control	PDO Mapping RxPDO 129	UINT8	RO	0x06 (6_{dec})
1680:01	SubIndex 001	1. PDO Mapping entry (object 0xF200 (ASI Control), entry 0x01 (Auto Programming Enable))	UINT32	RO	0xF200:01, 1
1680:02	SubIndex 002	2. PDO Mapping entry (object 0xF200 (ASI Control), entry 0x02 (Go Offline Mode))	UINT32	RO	0xF200:02, 1
1680:03	SubIndex 003	3. PDO Mapping entry (object 0xF200 (ASI Control), entry 0x03 (Data Exchange Active))	UINT32	RO	0xF200:03, 1
1680:04	SubIndex 004	4. PDO Mapping entry (object 0xF200 (ASI Control), entry 0x04 (Go Protected Mode))	UINT32	RO	0xF200:04, 1
1680:05	SubIndex 005	5. PDO Mapping entry (object 0xF200 (ASI Control), entry 0x05 (Go Configuration Mode))	UINT32	RO	0xF200:05, 1
1680:06	SubIndex 006	6. PDO Mapping entry (11 bits align)	UINT32	RO	0x0000:00, 11

Index 1A01 ASI TxPDO-Map Analog Inputs Slave 1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	ASI TxPDO-Map Analog Inputs Slave 1	PDO Mapping TxPDO 2	UINT8	RO	0x08 (8_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6010:01, 16
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6010:02, 16
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6010:03, 16
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6010:04, 16
1A01:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6010:05, 16
1A01:06	SubIndex 006	6. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6010:06, 16
1A01:07	SubIndex 007	7. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6010:07, 16
1A01:08	SubIndex 008	8. PDO Mapping entry (object 0x6010 (ASI Analog Inputs Slave 1), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6010:08, 16

Index 1A02 ASI TxPDO-Map Analog Inputs Slave 2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	ASI TxPDO-Map Analog Inputs Slave 2	PDO Mapping TxPDO 3	UINT8	RO	0x08 (8_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6020:01, 16
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6020:02, 16
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6020:03, 16
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6020:04, 16
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6020:05, 16
1A02:06	SubIndex 006	6. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6020:06, 16
1A02:07	SubIndex 007	7. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6020:07, 16
1A02:08	SubIndex 008	8. PDO Mapping entry (object 0x6020 (ASI Analog Inputs Slave 2), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6020:08, 16

Index 1A03 ASI TxPDO-Map Analog Inputs Slave 3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	ASI TxPDO-Map Analog Inputs Slave 3	PDO Mapping TxPDO 4	UINT8	RO	0x08 (8_{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6030:01, 16
1A03:02	SubIndex 002	2. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6030:02, 16
1A03:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6030:03, 16
1A03:04	SubIndex 004	4. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6030:04, 16
1A03:05	SubIndex 005	5. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6030:05, 16
1A03:06	SubIndex 006	6. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6030:06, 16
1A03:07	SubIndex 007	7. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6030:07, 16
1A03:08	SubIndex 008	8. PDO Mapping entry (object 0x6030 (ASI Analog Inputs Slave 3), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6030:08, 16

Index 1A04 ASI TxPDO-Map Analog Inputs Slave 4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A04:0	ASI TxPDO-Map Analog Inputs Slave 4	PDO Mapping TxPDO 5	UINT8	RO	0x08 (8_{dec})
1A04:01	SubIndex 001	1. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6040:01, 16
1A04:02	SubIndex 002	2. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6040:02, 16
1A04:03	SubIndex 003	3. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6040:03, 16
1A04:04	SubIndex 004	4. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6040:04, 16
1A04:05	SubIndex 005	5. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6040:05, 16
1A04:06	SubIndex 006	6. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6040:06, 16
1A04:07	SubIndex 007	7. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6040:07, 16
1A04:08	SubIndex 008	8. PDO Mapping entry (object 0x6040 (ASI Analog Inputs Slave 4), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6040:08, 16

Index 1A05 ASI TxPDO-Map Analog Inputs Slave 5

Index (hex)	Name	Meaning	Data type	Flags	Default
1A05:0	ASI TxPDO-Map Analog Inputs Slave 5	PDO Mapping TxPDO 6	UINT8	RO	0x08 (8_{dec})
1A05:01	SubIndex 001	1. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6050:01, 16
1A05:02	SubIndex 002	2. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6050:02, 16
1A05:03	SubIndex 003	3. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6050:03, 16
1A05:04	SubIndex 004	4. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6050:04, 16
1A05:05	SubIndex 005	5. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6050:05, 16
1A05:06	SubIndex 006	6. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6050:06, 16
1A05:07	SubIndex 007	7. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6050:07, 16
1A05:08	SubIndex 008	8. PDO Mapping entry (object 0x6050 (ASI Analog Inputs Slave 5), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6050:08, 16

Index 1A06 ASI TxPDO-Map Analog Inputs Slave 6

Index (hex)	Name	Meaning	Data type	Flags	Default
1A06:0	ASI TxPDO-Map Analog Inputs Slave 6	PDO Mapping TxPDO 7	UINT8	RO	0x08 (8_{dec})
1A06:01	SubIndex 001	1. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6060:01, 16
1A06:02	SubIndex 002	2. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6060:02, 16
1A06:03	SubIndex 003	3. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6060:03, 16
1A06:04	SubIndex 004	4. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6060:04, 16
1A06:05	SubIndex 005	5. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6060:05, 16
1A06:06	SubIndex 006	6. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6060:06, 16
1A06:07	SubIndex 007	7. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6060:07, 16
1A06:08	SubIndex 008	8. PDO Mapping entry (object 0x6060 (ASI Analog Inputs Slave 6), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6060:08, 16

Index 1A07 ASI TxPDO-Map Analog Inputs Slave 7

Index (hex)	Name	Meaning	Data type	Flags	Default
1A07:0	ASI TxPDO-Map Analog Inputs Slave 7	PDO Mapping TxPDO 8	UINT8	RO	0x08 (8_{dec})
1A07:01	SubIndex 001	1. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6070:01, 16
1A07:02	SubIndex 002	2. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6070:02, 16
1A07:03	SubIndex 003	3. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6070:03, 16
1A07:04	SubIndex 004	4. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6070:04, 16
1A07:05	SubIndex 005	5. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6070:05, 16
1A07:06	SubIndex 006	6. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6070:06, 16
1A07:07	SubIndex 007	7. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6070:07, 16
1A07:08	SubIndex 008	8. PDO Mapping entry (object 0x6070 (ASI Analog Inputs Slave 7), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6070:08, 16

Index 1A08 ASI TxPDO-Map Analog Inputs Slave 8

Index (hex)	Name	Meaning	Data type	Flags	Default
1A08:0	ASI TxPDO-Map Analog Inputs Slave 8	PDO Mapping TxPDO 9	UINT8	RO	0x08 (8_{dec})
1A08:01	SubIndex 001	1. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6080:01, 16
1A08:02	SubIndex 002	2. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6080:02, 16
1A08:03	SubIndex 003	3. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6080:03, 16
1A08:04	SubIndex 004	4. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6080:04, 16
1A08:05	SubIndex 005	5. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6080:05, 16
1A08:06	SubIndex 006	6. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6080:06, 16
1A08:07	SubIndex 007	7. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6080:07, 16
1A08:08	SubIndex 008	8. PDO Mapping entry (object 0x6080 (ASI Analog Inputs Slave 8), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6080:08, 16

Index 1A09 ASI TxPDO-Map Analog Inputs Slave 9

Index (hex)	Name	Meaning	Data type	Flags	Default
1A09:0	ASI TxPDO-Map Analog Inputs Slave 9	PDO Mapping TxPDO 10	UINT8	RO	0x08 (8_{dec})
1A09:01	SubIndex 001	1. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6090:01, 16
1A09:02	SubIndex 002	2. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6090:02, 16
1A09:03	SubIndex 003	3. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6090:03, 16
1A09:04	SubIndex 004	4. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6090:04, 16
1A09:05	SubIndex 005	5. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6090:05, 16
1A09:06	SubIndex 006	6. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6090:06, 16
1A09:07	SubIndex 007	7. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6090:07, 16
1A09:08	SubIndex 008	8. PDO Mapping entry (object 0x6090 (ASI Analog Inputs Slave 9), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6090:08, 16

Index 1A0A ASI TxPDO-Map Analog Inputs Slave 10

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0A:0	ASI TxPDO-Map Analog Inputs Slave 10	PDO Mapping TxPDO 11	UINT8	RO	0x08 (8_{dec})
1A0A:01	SubIndex 001	1. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x60A0:01, 16
1A0A:02	SubIndex 002	2. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x60A0:02, 16
1A0A:03	SubIndex 003	3. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x60A0:03, 16
1A0A:04	SubIndex 004	4. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x60A0:04, 16
1A0A:05	SubIndex 005	5. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x60A0:05, 16
1A0A:06	SubIndex 006	6. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x60A0:06, 16
1A0A:07	SubIndex 007	7. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x60A0:07, 16
1A0A:08	SubIndex 008	8. PDO Mapping entry (object 0x60A0 (ASI Analog Inputs Slave 10), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x60A0:08, 16

Index 1A0B ASI TxPDO-Map Analog Inputs Slave 11

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0B:0	ASI TxPDO-Map Analog Inputs Slave 11	PDO Mapping TxPDO 12	UINT8	RO	0x08 (8_{dec})
1A0B:01	SubIndex 001	1. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x60B0:01, 16
1A0B:02	SubIndex 002	2. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x60B0:02, 16
1A0B:03	SubIndex 003	3. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x60B0:03, 16
1A0B:04	SubIndex 004	4. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x60B0:04, 16
1A0B:05	SubIndex 005	5. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x60B0:05, 16
1A0B:06	SubIndex 006	6. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x60B0:06, 16
1A0B:07	SubIndex 007	7. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x60B0:07, 16
1A0B:08	SubIndex 008	8. PDO Mapping entry (object 0x60B0 (ASI Analog Inputs Slave 11), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x60B0:08, 16

Index 1A0C ASI TxPDO-Map Analog Inputs Slave 12

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0C:0	ASI TxPDO-Map Analog Inputs Slave 12	PDO Mapping TxPDO 13	UINT8	RO	0x08 (8_{dec})
1A0C:01	SubIndex 001	1. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x60C0:01, 16
1A0C:02	SubIndex 002	2. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x60C0:02, 16
1A0C:03	SubIndex 003	3. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x60C0:03, 16
1A0C:04	SubIndex 004	4. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x60C0:04, 16
1A0C:05	SubIndex 005	5. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x60C0:05, 16
1A0C:06	SubIndex 006	6. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x60C0:06, 16
1A0C:07	SubIndex 007	7. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x60C0:07, 16
1A0C:08	SubIndex 008	8. PDO Mapping entry (object 0x60C0 (ASI Analog Inputs Slave 12), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x60C0:08, 16

Index 1A0D ASI TxPDO-Map Analog Inputs Slave 13

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0D:0	ASI TxPDO-Map Analog Inputs Slave 13	PDO Mapping TxPDO 14	UINT8	RO	0x08 (8_{dec})
1A0D:01	SubIndex 001	1. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x60D0:01, 16
1A0D:02	SubIndex 002	2. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x60D0:02, 16
1A0D:03	SubIndex 003	3. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x60D0:03, 16
1A0D:04	SubIndex 004	4. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x60D0:04, 16
1A0D:05	SubIndex 005	5. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x60D0:05, 16
1A0D:06	SubIndex 006	6. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x60D0:06, 16
1A0D:07	SubIndex 007	7. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x60D0:07, 16
1A0D:08	SubIndex 008	8. PDO Mapping entry (object 0x60D0 (ASI Analog Inputs Slave 13), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x60D0:08, 16

Index 1A0E ASI TxPDO-Map Analog Inputs Slave 14

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0E:0	ASI TxPDO-Map Analog Inputs Slave 14	PDO Mapping TxPDO 15	UINT8	RO	0x08 (8_{dec})
1A0E:01	SubIndex 001	1. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x60E0:01, 16
1A0E:02	SubIndex 002	2. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x60E0:02, 16
1A0E:03	SubIndex 003	3. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x60E0:03, 16
1A0E:04	SubIndex 004	4. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x60E0:04, 16
1A0E:05	SubIndex 005	5. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x60E0:05, 16
1A0E:06	SubIndex 006	6. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x60E0:06, 16
1A0E:07	SubIndex 007	7. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x60E0:07, 16
1A0E:08	SubIndex 008	8. PDO Mapping entry (object 0x60E0 (ASI Analog Inputs Slave 14), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x60E0:08, 16

Index 1A0F ASI TxPDO-Map Analog Inputs Slave 15

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0F:0	ASI TxPDO-Map Analog Inputs Slave 15	PDO Mapping TxPDO 16	UINT8	RO	0x08 (8_{dec})
1A0F:01	SubIndex 001	1. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x60F0:01, 16
1A0F:02	SubIndex 002	2. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x60F0:02, 16
1A0F:03	SubIndex 003	3. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x60F0:03, 16
1A0F:04	SubIndex 004	4. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x60F0:04, 16
1A0F:05	SubIndex 005	5. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x60F0:05, 16
1A0F:06	SubIndex 006	6. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x60F0:06, 16
1A0F:07	SubIndex 007	7. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x60F0:07, 16
1A0F:08	SubIndex 008	8. PDO Mapping entry (object 0x60F0 (ASI Analog Inputs Slave 15), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x60F0:08, 16

Index 1A10 ASI TxPDO-Map Analog Inputs Slave 16

Index (hex)	Name	Meaning	Data type	Flags	Default
1A10:0	ASI TxPDO-Map Analog Inputs Slave 16	PDO Mapping TxPDO 17	UINT8	RO	0x08 (8_{dec})
1A10:01	SubIndex 001	1. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6100:01, 16
1A10:02	SubIndex 002	2. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6100:02, 16
1A10:03	SubIndex 003	3. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6100:03, 16
1A10:04	SubIndex 004	4. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6100:04, 16
1A10:05	SubIndex 005	5. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6100:05, 16
1A10:06	SubIndex 006	6. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6100:06, 16
1A10:07	SubIndex 007	7. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6100:07, 16
1A10:08	SubIndex 008	8. PDO Mapping entry (object 0x6100 (ASI Analog Inputs Slave 16), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6100:08, 16

Index 1A11 ASI TxPDO-Map Analog Inputs Slave 17

Index (hex)	Name	Meaning	Data type	Flags	Default
1A11:0	ASI TxPDO-Map Analog Inputs Slave 17	PDO Mapping TxPDO 18	UINT8	RO	0x08 (8_{dec})
1A11:01	SubIndex 001	1. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6110:01, 16
1A11:02	SubIndex 002	2. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6110:02, 16
1A11:03	SubIndex 003	3. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6110:03, 16
1A11:04	SubIndex 004	4. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6110:04, 16
1A11:05	SubIndex 005	5. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6110:05, 16
1A11:06	SubIndex 006	6. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6110:06, 16
1A11:07	SubIndex 007	7. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6110:07, 16
1A11:08	SubIndex 008	8. PDO Mapping entry (object 0x6110 (ASI Analog Inputs Slave 17), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6110:08, 16

Index 1A12 ASI TxPDO-Map Analog Inputs Slave 18

Index (hex)	Name	Meaning	Data type	Flags	Default
1A12:0	ASI TxPDO-Map Analog Inputs Slave 18	PDO Mapping TxPDO 19	UINT8	RO	0x08 (8_{dec})
1A12:01	SubIndex 001	1. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6120:01, 16
1A12:02	SubIndex 002	2. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6120:02, 16
1A12:03	SubIndex 003	3. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6120:03, 16
1A12:04	SubIndex 004	4. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6120:04, 16
1A12:05	SubIndex 005	5. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6120:05, 16
1A12:06	SubIndex 006	6. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6120:06, 16
1A12:07	SubIndex 007	7. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6120:07, 16
1A12:08	SubIndex 008	8. PDO Mapping entry (object 0x6120 (ASI Analog Inputs Slave 18), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6120:08, 16

Index 1A13 ASI TxPDO-Map Analog Inputs Slave 19

Index (hex)	Name	Meaning	Data type	Flags	Default
1A13:0	ASI TxPDO-Map Analog Inputs Slave 19	PDO Mapping TxPDO 20	UINT8	RO	0x08 (8_{dec})
1A13:01	SubIndex 001	1. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6130:01, 16
1A13:02	SubIndex 002	2. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6130:02, 16
1A13:03	SubIndex 003	3. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6130:03, 16
1A13:04	SubIndex 004	4. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6130:04, 16
1A13:05	SubIndex 005	5. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6130:05, 16
1A13:06	SubIndex 006	6. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6130:06, 16
1A13:07	SubIndex 007	7. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6130:07, 16
1A13:08	SubIndex 008	8. PDO Mapping entry (object 0x6130 (ASI Analog Inputs Slave 19), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6130:08, 16

Index 1A14 ASI TxPDO-Map Analog Inputs Slave 20

Index (hex)	Name	Meaning	Data type	Flags	Default
1A14:0	ASI TxPDO-Map Analog Inputs Slave 20	PDO Mapping TxPDO 21	UINT8	RO	0x08 (8_{dec})
1A14:01	SubIndex 001	1. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6140:01, 16
1A14:02	SubIndex 002	2. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6140:02, 16
1A14:03	SubIndex 003	3. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6140:03, 16
1A14:04	SubIndex 004	4. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6140:04, 16
1A14:05	SubIndex 005	5. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6140:05, 16
1A14:06	SubIndex 006	6. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6140:06, 16
1A14:07	SubIndex 007	7. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6140:07, 16
1A14:08	SubIndex 008	8. PDO Mapping entry (object 0x6140 (ASI Analog Inputs Slave 20), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6140:08, 16

Index 1A15 ASI TxPDO-Map Analog Inputs Slave 21

Index (hex)	Name	Meaning	Data type	Flags	Default
1A15:0	ASI TxPDO-Map Analog Inputs Slave 21	PDO Mapping TxPDO 22	UINT8	RO	0x08 (8_{dec})
1A15:01	SubIndex 001	1. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6150:01, 16
1A15:02	SubIndex 002	2. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6150:02, 16
1A15:03	SubIndex 003	3. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6150:03, 16
1A15:04	SubIndex 004	4. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6150:04, 16
1A15:05	SubIndex 005	5. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6150:05, 16
1A15:06	SubIndex 006	6. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6150:06, 16
1A15:07	SubIndex 007	7. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6150:07, 16
1A15:08	SubIndex 008	8. PDO Mapping entry (object 0x6150 (ASI Analog Inputs Slave 21), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6150:08, 16

Index 1A16 ASI TxPDO-Map Analog Inputs Slave 22

Index (hex)	Name	Meaning	Data type	Flags	Default
1A16:0	ASI TxPDO-Map Analog Inputs Slave 22	PDO Mapping TxPDO 23	UINT8	RO	0x08 (8_{dec})
1A16:01	SubIndex 001	1. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6160:01, 16
1A16:02	SubIndex 002	2. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6160:02, 16
1A16:03	SubIndex 003	3. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6160:03, 16
1A16:04	SubIndex 004	4. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6160:04, 16
1A16:05	SubIndex 005	5. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6160:05, 16
1A16:06	SubIndex 006	6. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6160:06, 16
1A16:07	SubIndex 007	7. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6160:07, 16
1A16:08	SubIndex 008	8. PDO Mapping entry (object 0x6160 (ASI Analog Inputs Slave 22), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6160:08, 16

Index 1A17 ASI TxPDO-Map Analog Inputs Slave 23

Index (hex)	Name	Meaning	Data type	Flags	Default
1A17:0	ASI TxPDO-Map Analog Inputs Slave 23	PDO Mapping TxPDO 24	UINT8	RO	0x08 (8_{dec})
1A17:01	SubIndex 001	1. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6170:01, 16
1A17:02	SubIndex 002	2. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6170:02, 16
1A17:03	SubIndex 003	3. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6170:03, 16
1A17:04	SubIndex 004	4. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6170:04, 16
1A17:05	SubIndex 005	5. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6170:05, 16
1A17:06	SubIndex 006	6. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6170:06, 16
1A17:07	SubIndex 007	7. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6170:07, 16
1A17:08	SubIndex 008	8. PDO Mapping entry (object 0x6170 (ASI Analog Inputs Slave 23), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6170:08, 16

Index 1A18 ASI TxPDO-Map Analog Inputs Slave 24

Index (hex)	Name	Meaning	Data type	Flags	Default
1A18:0	ASI TxPDO-Map Analog Inputs Slave 24	PDO Mapping TxPDO 25	UINT8	RO	0x08 (8_{dec})
1A18:01	SubIndex 001	1. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6180:01, 16
1A18:02	SubIndex 002	2. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6180:02, 16
1A18:03	SubIndex 003	3. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6180:03, 16
1A18:04	SubIndex 004	4. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6180:04, 16
1A18:05	SubIndex 005	5. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6180:05, 16
1A18:06	SubIndex 006	6. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6180:06, 16
1A18:07	SubIndex 007	7. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6180:07, 16
1A18:08	SubIndex 008	8. PDO Mapping entry (object 0x6180 (ASI Analog Inputs Slave 24), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6180:08, 16

Index 1A19 ASI TxPDO-Map Analog Inputs Slave 25

Index (hex)	Name	Meaning	Data type	Flags	Default
1A19:0	ASI TxPDO-Map Analog Inputs Slave 25	PDO Mapping TxPDO 26	UINT8	RO	0x08 (8_{dec})
1A19:01	SubIndex 001	1. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x6190:01, 16
1A19:02	SubIndex 002	2. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x6190:02, 16
1A19:03	SubIndex 003	3. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x6190:03, 16
1A19:04	SubIndex 004	4. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x6190:04, 16
1A19:05	SubIndex 005	5. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x6190:05, 16
1A19:06	SubIndex 006	6. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x6190:06, 16
1A19:07	SubIndex 007	7. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x6190:07, 16
1A19:08	SubIndex 008	8. PDO Mapping entry (object 0x6190 (ASI Analog Inputs Slave 25), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x6190:08, 16

Index 1A1A ASI TxPDO-Map Analog Inputs Slave 26

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1A:0	ASI TxPDO-Map Analog Inputs Slave 26	PDO Mapping TxPDO 27	UINT8	RO	0x08 (8_{dec})
1A1A:01	SubIndex 001	1. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x61A0:01, 16
1A1A:02	SubIndex 002	2. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x61A0:02, 16
1A1A:03	SubIndex 003	3. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x61A0:03, 16
1A1A:04	SubIndex 004	4. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x61A0:04, 16
1A1A:05	SubIndex 005	5. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x61A0:05, 16
1A1A:06	SubIndex 006	6. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x61A0:06, 16
1A1A:07	SubIndex 007	7. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x61A0:07, 16
1A1A:08	SubIndex 008	8. PDO Mapping entry (object 0x61A0 (ASI Analog Inputs Slave 26), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x61A0:08, 16

Index 1A1B ASI TxPDO-Map Analog Inputs Slave 27

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1B:0	ASI TxPDO-Map Analog Inputs Slave 27	PDO Mapping TxPDO 28	UINT8	RO	0x08 (8_{dec})
1A1B:01	SubIndex 001	1. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x61B0:01, 16
1A1B:02	SubIndex 002	2. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x61B0:02, 16
1A1B:03	SubIndex 003	3. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x61B0:03, 16
1A1B:04	SubIndex 004	4. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x61B0:04, 16
1A1B:05	SubIndex 005	5. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x61B0:05, 16
1A1B:06	SubIndex 006	6. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x61B0:06, 16
1A1B:07	SubIndex 007	7. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x61B0:07, 16
1A1B:08	SubIndex 008	8. PDO Mapping entry (object 0x61B0 (ASI Analog Inputs Slave 27), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x61B0:08, 16

Index 1A1C ASI TxPDO-Map Analog Inputs Slave 28

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1C:0	ASI TxPDO-Map Analog Inputs Slave 28	PDO Mapping TxPDO 29	UINT8	RO	0x08 (8_{dec})
1A1C:01	SubIndex 001	1. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x61C0:01, 16
1A1C:02	SubIndex 002	2. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x61C0:02, 16
1A1C:03	SubIndex 003	3. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x61C0:03, 16
1A1C:04	SubIndex 004	4. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x61C0:04, 16
1A1C:05	SubIndex 005	5. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x61C0:05, 16
1A1C:06	SubIndex 006	6. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x61C0:06, 16
1A1C:07	SubIndex 007	7. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x61C0:07, 16
1A1C:08	SubIndex 008	8. PDO Mapping entry (object 0x61C0 (ASI Analog Inputs Slave 28), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x61C0:08, 16

Index 1A1D ASI TxPDO-Map Analog Inputs Slave 29

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1D:0	ASI TxPDO-Map Analog Inputs Slave 29	PDO Mapping TxPDO 30	UINT8	RO	0x08 (8_{dec})
1A1D:01	SubIndex 001	1. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x61D0:01, 16
1A1D:02	SubIndex 002	2. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x61D0:02, 16
1A1D:03	SubIndex 003	3. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x61D0:03, 16
1A1D:04	SubIndex 004	4. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x61D0:04, 16
1A1D:05	SubIndex 005	5. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x61D0:05, 16
1A1D:06	SubIndex 006	6. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x61D0:06, 16
1A1D:07	SubIndex 007	7. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x61D0:07, 16
1A1D:08	SubIndex 008	8. PDO Mapping entry (object 0x61D0 (ASI Analog Inputs Slave 29), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x61D0:08, 16

Index 1A1E ASI TxPDO-Map Analog Inputs Slave 30

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1E:0	ASI TxPDO-Map Analog Inputs Slave 30	PDO Mapping TxPDO 31	UINT8	RO	0x08 (8_{dec})
1A1E:01	SubIndex 001	1. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x61E0:01, 16
1A1E:02	SubIndex 002	2. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x61E0:02, 16
1A1E:03	SubIndex 003	3. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x61E0:03, 16
1A1E:04	SubIndex 004	4. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x61E0:04, 16
1A1E:05	SubIndex 005	5. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x61E0:05, 16
1A1E:06	SubIndex 006	6. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x61E0:06, 16
1A1E:07	SubIndex 007	7. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x61E0:07, 16
1A1E:08	SubIndex 008	8. PDO Mapping entry (object 0x61E0 (ASI Analog Inputs Slave 30), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x61E0:08, 16

Index 1A1F ASI TxPDO-Map Analog Inputs Slave 31

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1F:0	ASI TxPDO-Map Analog Inputs Slave 31	PDO Mapping TxPDO 32	UINT8	RO	0x08 (8_{dec})
1A1F:01	SubIndex 001	1. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x01 (State Ch.1 (A-Slave)))	UINT32	RO	0x61F0:01, 16
1A1F:02	SubIndex 002	2. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x02 (Value Ch.1 (A-Slave)))	UINT32	RO	0x61F0:02, 16
1A1F:03	SubIndex 003	3. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x03 (State Ch.2 (A-Slave)))	UINT32	RO	0x61F0:03, 16
1A1F:04	SubIndex 004	4. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x04 (Value Ch.2 (A-Slave)))	UINT32	RO	0x61F0:04, 16
1A1F:05	SubIndex 005	5. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x05 (State Ch.3 (A-Slave)))	UINT32	RO	0x61F0:05, 16
1A1F:06	SubIndex 006	6. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x06 (Value Ch.3 (A-Slave)))	UINT32	RO	0x61F0:06, 16
1A1F:07	SubIndex 007	7. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x07 (State Ch.4 (A-Slave)))	UINT32	RO	0x61F0:07, 16
1A1F:08	SubIndex 008	8. PDO Mapping entry (object 0x61F0 (ASI Analog Inputs Slave 31), entry 0x08 (Value Ch.4 (A-Slave)))	UINT32	RO	0x61F0:08, 16

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:0	ASI TxPDO-Map Inputs Device	PDO Mapping TxPDO 65	UINT8	RO	0xF8 (248$_{dec}$)
1A40:01	SubIndex 001	1. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x01 (Slave 1 Inputs__Slave 1A, DI0))	UINT32	RO	0xF600:01, 1
1A40:02	SubIndex 002	2. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x02 (Slave 1 Inputs__Slave 1A, DI1))	UINT32	RO	0xF600:02, 1
1A40:03	SubIndex 003	3. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x03 (Slave 1 Inputs__Slave 1A, DI2))	UINT32	RO	0xF600:03, 1
1A40:04	SubIndex 004	4. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x04 (Slave 1 Inputs__Slave 1A, DI3))	UINT32	RO	0xF600:04, 1
1A40:05	SubIndex 005	5. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x05 (Slave 1 Inputs__Slave 1B, DI0))	UINT32	RO	0xF600:05, 1
1A40:06	SubIndex 006	6. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x06 (Slave 1 Inputs__Slave 1B, DI1))	UINT32	RO	0xF600:06, 1
1A40:07	SubIndex 007	7. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x07 (Slave 1 Inputs__Slave 1B, DI2))	UINT32	RO	0xF600:07, 1
1A40:08	SubIndex 008	8. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x08 (Slave 1 Inputs__Slave 1B, DI3))	UINT32	RO	0xF600:08, 1
1A40:09	SubIndex 009	9. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x09 (Slave 2 Inputs__Slave 2A, DI0))	UINT32	RO	0xF600:09, 1
1A40:0A	SubIndex 010	10. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x0A (Slave 2 Inputs__Slave 2A, DI1))	UINT32	RO	0xF600:0A, 1
1A40:0B	SubIndex 011	11. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x0B (Slave 2 Inputs__Slave 2A, DI2))	UINT32	RO	0xF600:0B, 1
1A40:0C	SubIndex 012	12. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x0C (Slave 2 Inputs__Slave 2A, DI3))	UINT32	RO	0xF600:0C, 1
1A40:0D	SubIndex 013	13. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x0D (Slave 2 Inputs__Slave 2B, DI0))	UINT32	RO	0xF600:0D, 1
1A40:0E	SubIndex 014	14. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x0E (Slave 2 Inputs__Slave 2B, DI1))	UINT32	RO	0xF600:0E, 1
1A40:0F	SubIndex 015	15. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x0F (Slave 2 Inputs__Slave 2B, DI2))	UINT32	RO	0xF600:0F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:10	SubIndex 016	16. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x10 (Slave 2 Inputs__Slave 2B, DI3))	UINT32	RO	0xF600:10, 1
1A40:11	SubIndex 017	17. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x11 (Slave 3 Inputs__Slave 3A, DI0))	UINT32	RO	0xF600:11, 1
1A40:12	SubIndex 018	18. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x12 (Slave 3 Inputs__Slave 3A, DI1))	UINT32	RO	0xF600:12, 1
1A40:13	SubIndex 019	19. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x13 (Slave 3 Inputs__Slave 3A, DI2))	UINT32	RO	0xF600:13, 1
1A40:14	SubIndex 020	20. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x14 (Slave 3 Inputs__Slave 3A, DI3))	UINT32	RO	0xF600:14, 1
1A40:15	SubIndex 021	21. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x15 (Slave 3 Inputs__Slave 3B, DI0))	UINT32	RO	0xF600:15, 1
1A40:16	SubIndex 022	22. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x16 (Slave 3 Inputs__Slave 3B, DI1))	UINT32	RO	0xF600:16, 1
1A40:17	SubIndex 023	23. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x17 (Slave 3 Inputs__Slave 3B, DI2))	UINT32	RO	0xF600:17, 1
1A40:18	SubIndex 024	24. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x18 (Slave 3 Inputs__Slave 3B, DI3))	UINT32	RO	0xF600:18, 1
1A40:19	SubIndex 025	25. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x19 (Slave 4 Inputs__Slave 4A, DI0))	UINT32	RO	0xF600:19, 1
1A40:1A	SubIndex 026	26. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x1A (Slave 4 Inputs__Slave 4A, DI1))	UINT32	RO	0xF600:1A, 1
1A40:1B	SubIndex 027	27. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x1B (Slave 4 Inputs__Slave 4A, DI2))	UINT32	RO	0xF600:1B, 1
1A40:1C	SubIndex 028	28. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x1C (Slave 4 Inputs__Slave 4A, DI3))	UINT32	RO	0xF600:1C, 1
1A40:1D	SubIndex 029	29. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x1D (Slave 4 Inputs__Slave 4B, DI0))	UINT32	RO	0xF600:1D, 1
1A40:1E	SubIndex 030	30. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x1E (Slave 4 Inputs__Slave 4B, DI1))	UINT32	RO	0xF600:1E, 1
1A40:1F	SubIndex 031	31. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x1F (Slave 4 Inputs__Slave 4B, DI2))	UINT32	RO	0xF600:1F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:20	SubIndex 032	32. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x20 (Slave 4 Inputs__Slave 4B, DI3))	UINT32	RO	0xF600:20, 1
1A40:21	SubIndex 033	33. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x21 (Slave 5 Inputs__Slave 5A, DI0))	UINT32	RO	0xF600:21, 1
1A40:22	SubIndex 034	34. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x22 (Slave 5 Inputs__Slave 5A, DI1))	UINT32	RO	0xF600:22, 1
1A40:23	SubIndex 035	35. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x23 (Slave 5 Inputs__Slave 5A, DI2))	UINT32	RO	0xF600:23, 1
1A40:24	SubIndex 036	36. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x24 (Slave 5 Inputs__Slave 5A, DI3))	UINT32	RO	0xF600:24, 1
1A40:25	SubIndex 037	37. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x25 (Slave 5 Inputs__Slave 5B, DI0))	UINT32	RO	0xF600:25, 1
1A40:26	SubIndex 038	38. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x26 (Slave 5 Inputs__Slave 5B, DI1))	UINT32	RO	0xF600:26, 1
1A40:27	SubIndex 039	39. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x27 (Slave 5 Inputs__Slave 5B, DI2))	UINT32	RO	0xF600:27, 1
1A40:28	SubIndex 040	40. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x28 (Slave 5 Inputs__Slave 5B, DI3))	UINT32	RO	0xF600:28, 1
1A40:29	SubIndex 041	41. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x29 (Slave 6 Inputs__Slave 6A, DI0))	UINT32	RO	0xF600:29, 1
1A40:2A	SubIndex 042	42. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x2A (Slave 6 Inputs__Slave 6A, DI1))	UINT32	RO	0xF600:2A, 1
1A40:2B	SubIndex 043	43. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x2B (Slave 6 Inputs__Slave 6A, DI2))	UINT32	RO	0xF600:2B, 1
1A40:2C	SubIndex 044	44. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x2C (Slave 6 Inputs__Slave 6A, DI3))	UINT32	RO	0xF600:2C, 1
1A40:2D	SubIndex 045	45. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x2D (Slave 6 Inputs__Slave 6B, DI0))	UINT32	RO	0xF600:2D, 1
1A40:2E	SubIndex 046	46. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x2E (Slave 6 Inputs__Slave 6B, DI1))	UINT32	RO	0xF600:2E, 1
1A40:2F	SubIndex 047	47. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x2F (Slave 6 Inputs__Slave 6B, DI2))	UINT32	RO	0xF600:2F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:30	SubIndex 048	48. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x30 (Slave 6 Inputs__Slave 6B, DI3))	UINT32	RO	0xF600:30, 1
1A40:31	SubIndex 049	49. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x31 (Slave 7 Inputs__Slave 7A, DI0))	UINT32	RO	0xF600:31, 1
1A40:32	SubIndex 050	50. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x32 (Slave 7 Inputs__Slave 7A, DI1))	UINT32	RO	0xF600:32, 1
1A40:33	SubIndex 051	51. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x33 (Slave 7 Inputs__Slave 7A, DI2))	UINT32	RO	0xF600:33, 1
1A40:34	SubIndex 052	52. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x34 (Slave 7 Inputs__Slave 7A, DI3))	UINT32	RO	0xF600:34, 1
1A40:35	SubIndex 053	53. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x35 (Slave 7 Inputs__Slave 7B, DI0))	UINT32	RO	0xF600:35, 1
1A40:36	SubIndex 054	54. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x36 (Slave 7 Inputs__Slave 7B, DI1))	UINT32	RO	0xF600:36, 1
1A40:37	SubIndex 055	55. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x37 (Slave 7 Inputs__Slave 7B, DI2))	UINT32	RO	0xF600:37, 1
1A40:38	SubIndex 056	56. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x38 (Slave 7 Inputs__Slave 7B, DI3))	UINT32	RO	0xF600:38, 1
1A40:39	SubIndex 057	57. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x39 (Slave 8 Inputs__Slave 8A, DI0))	UINT32	RO	0xF600:39, 1
1A40:3A	SubIndex 058	58. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x3A (Slave 8 Inputs__Slave 8A, DI1))	UINT32	RO	0xF600:3A, 1
1A40:3B	SubIndex 059	59. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x3B (Slave 8 Inputs__Slave 8A, DI2))	UINT32	RO	0xF600:3B, 1
1A40:3C	SubIndex 060	60. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x3C (Slave 8 Inputs__Slave 8A, DI3))	UINT32	RO	0xF600:3C, 1
1A40:3D	SubIndex 061	61. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x3D (Slave 8 Inputs__Slave 8B, DI0))	UINT32	RO	0xF600:3D, 1
1A40:3E	SubIndex 062	62. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x3E (Slave 8 Inputs__Slave 8B, DI1))	UINT32	RO	0xF600:3E, 1
1A40:3F	SubIndex 063	63. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x3F (Slave 8 Inputs__Slave 8B, DI2))	UINT32	RO	0xF600:3F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:40	SubIndex 064	64. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x40 (Slave 8 Inputs__Slave 8B, DI3))	UINT32	RO	0xF600:40, 1
1A40:41	SubIndex 065	65. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x41 (Slave 9 Inputs__Slave 9A, DI0))	UINT32	RO	0xF600:41, 1
1A40:42	SubIndex 066	66. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x42 (Slave 9 Inputs__Slave 9A, DI1))	UINT32	RO	0xF600:42, 1
1A40:43	SubIndex 067	67. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x43 (Slave 9 Inputs__Slave 9A, DI2))	UINT32	RO	0xF600:43, 1
1A40:44	SubIndex 068	68. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x44 (Slave 9 Inputs__Slave 9A, DI3))	UINT32	RO	0xF600:44, 1
1A40:45	SubIndex 069	69. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x45 (Slave 9 Inputs__Slave 9B, DI0))	UINT32	RO	0xF600:45, 1
1A40:46	SubIndex 070	70. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x46 (Slave 9 Inputs__Slave 9B, DI1))	UINT32	RO	0xF600:46, 1
1A40:47	SubIndex 071	71. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x47 (Slave 9 Inputs__Slave 9B, DI2))	UINT32	RO	0xF600:47, 1
1A40:48	SubIndex 072	72. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x48 (Slave 9 Inputs__Slave 9B, DI3))	UINT32	RO	0xF600:48, 1
1A40:49	SubIndex 073	73. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x49 (Slave 10 Inputs__Slave 10A, DI0))	UINT32	RO	0xF600:49, 1
1A40:4A	SubIndex 074	74. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x4A (Slave 10 Inputs__Slave 10A, DI1))	UINT32	RO	0xF600:4A, 1
1A40:4B	SubIndex 075	75. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x4B (Slave 10 Inputs__Slave 10A, DI2))	UINT32	RO	0xF600:4B, 1
1A40:4C	SubIndex 076	76. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x4C (Slave 10 Inputs__Slave 10A, DI3))	UINT32	RO	0xF600:4C, 1
1A40:4D	SubIndex 077	77. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x4D (Slave 10 Inputs__Slave 10B, DI0))	UINT32	RO	0xF600:4D, 1
1A40:4E	SubIndex 078	78. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x4E (Slave 10 Inputs__Slave 10B, DI1))	UINT32	RO	0xF600:4E, 1
1A40:4F	SubIndex 079	79. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x4F (Slave 10 Inputs__Slave 10B, DI2))	UINT32	RO	0xF600:4F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:50	SubIndex 080	80. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x50 (Slave 10 Inputs__Slave 10B, DI3))	UINT32	RO	0xF600:50, 1
1A40:51	SubIndex 081	81. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x51 (Slave 11 Inputs__Slave 11A, DI0))	UINT32	RO	0xF600:51, 1
1A40:52	SubIndex 082	82. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x52 (Slave 11 Inputs__Slave 11A, DI1))	UINT32	RO	0xF600:52, 1
1A40:53	SubIndex 083	83. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x53 (Slave 11 Inputs__Slave 11A, DI2))	UINT32	RO	0xF600:53, 1
1A40:54	SubIndex 084	84. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x54 (Slave 11 Inputs__Slave 11A, DI3))	UINT32	RO	0xF600:54, 1
1A40:55	SubIndex 085	85. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x55 (Slave 11 Inputs__Slave 11B, DI0))	UINT32	RO	0xF600:55, 1
1A40:56	SubIndex 086	86. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x56 (Slave 11 Inputs__Slave 11B, DI1))	UINT32	RO	0xF600:56, 1
1A40:57	SubIndex 087	87. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x57 (Slave 11 Inputs__Slave 11B, DI2))	UINT32	RO	0xF600:57, 1
1A40:58	SubIndex 088	88. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x58 (Slave 11 Inputs__Slave 11B, DI3))	UINT32	RO	0xF600:58, 1
1A40:59	SubIndex 089	89. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x59 (Slave 12 Inputs__Slave 12A, DI0))	UINT32	RO	0xF600:59, 1
1A40:5A	SubIndex 090	90. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x5A (Slave 12 Inputs__Slave 12A, DI1))	UINT32	RO	0xF600:5A, 1
1A40:5B	SubIndex 091	91. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x5B (Slave 12 Inputs__Slave 12A, DI2))	UINT32	RO	0xF600:5B, 1
1A40:5C	SubIndex 092	92. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x5C (Slave 12 Inputs__Slave 12A, DI3))	UINT32	RO	0xF600:5C, 1
1A40:5D	SubIndex 093	93. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x5D (Slave 12 Inputs__Slave 12B, DI0))	UINT32	RO	0xF600:5D, 1
1A40:5E	SubIndex 094	94. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x5E (Slave 12 Inputs__Slave 12B, DI1))	UINT32	RO	0xF600:5E, 1
1A40:5F	SubIndex 095	95. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x5F (Slave 12 Inputs__Slave 12B, DI2))	UINT32	RO	0xF600:5F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:60	SubIndex 096	96. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x60 (Slave 12 Inputs__Slave 12B, DI3))	UINT32	RO	0xF600:60, 1
1A40:61	SubIndex 097	97. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x61 (Slave 13 Inputs__Slave 13A, DI0))	UINT32	RO	0xF600:61, 1
1A40:62	SubIndex 098	98. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x62 (Slave 13 Inputs__Slave 13A, DI1))	UINT32	RO	0xF600:62, 1
1A40:63	SubIndex 099	99. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x63 (Slave 13 Inputs__Slave 13A, DI2))	UINT32	RO	0xF600:63, 1
1A40:64	SubIndex 100	100. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x64 (Slave 13 Inputs__Slave 13A, DI3))	UINT32	RO	0xF600:64, 1
1A40:65	SubIndex 101	101. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x65 (Slave 13 Inputs__Slave 13B, DI0))	UINT32	RO	0xF600:65, 1
1A40:66	SubIndex 102	102. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x66 (Slave 13 Inputs__Slave 13B, DI1))	UINT32	RO	0xF600:66, 1
1A40:67	SubIndex 103	103. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x67 (Slave 13 Inputs__Slave 13B, DI2))	UINT32	RO	0xF600:67, 1
1A40:68	SubIndex 104	104. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x68 (Slave 13 Inputs__Slave 13B, DI3))	UINT32	RO	0xF600:68, 1
1A40:69	SubIndex 105	105. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x69 (Slave 14 Inputs__Slave 14A, DI0))	UINT32	RO	0xF600:69, 1
1A40:6A	SubIndex 106	106. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x6A (Slave 14 Inputs__Slave 14A, DI1))	UINT32	RO	0xF600:6A, 1
1A40:6B	SubIndex 107	107. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x6B (Slave 14 Inputs__Slave 14A, DI2))	UINT32	RO	0xF600:6B, 1
1A40:6C	SubIndex 108	108. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x6C (Slave 14 Inputs__Slave 14A, DI3))	UINT32	RO	0xF600:6C, 1
1A40:6D	SubIndex 109	109. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x6D (Slave 14 Inputs__Slave 14B, DI0))	UINT32	RO	0xF600:6D, 1
1A40:6E	SubIndex 110	110. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x6E (Slave 14 Inputs__Slave 14B, DI1))	UINT32	RO	0xF600:6E, 1
1A40:6F	SubIndex 111	111. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x6F (Slave 14 Inputs__Slave 14B, DI2))	UINT32	RO	0xF600:6F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:70	SubIndex 112	112. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x70 (Slave 14 Inputs__Slave 14B, DI3))	UINT32	RO	0xF600:70, 1
1A40:71	SubIndex 113	113. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x71 (Slave 15 Inputs__Slave 15A, DI0))	UINT32	RO	0xF600:71, 1
1A40:72	SubIndex 114	114. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x72 (Slave 15 Inputs__Slave 15A, DI1))	UINT32	RO	0xF600:72, 1
1A40:73	SubIndex 115	115. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x73 (Slave 15 Inputs__Slave 15A, DI2))	UINT32	RO	0xF600:73, 1
1A40:74	SubIndex 116	116. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x74 (Slave 15 Inputs__Slave 15A, DI3))	UINT32	RO	0xF600:74, 1
1A40:75	SubIndex 117	117. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x75 (Slave 15 Inputs__Slave 15B, DI0))	UINT32	RO	0xF600:75, 1
1A40:76	SubIndex 118	118. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x76 (Slave 15 Inputs__Slave 15B, DI1))	UINT32	RO	0xF600:76, 1
1A40:77	SubIndex 119	119. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x77 (Slave 15 Inputs__Slave 15B, DI2))	UINT32	RO	0xF600:77, 1
1A40:78	SubIndex 120	120. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x78 (Slave 15 Inputs__Slave 15B, DI3))	UINT32	RO	0xF600:78, 1
1A40:79	SubIndex 121	121. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x79 (Slave 16 Inputs__Slave 16A, DI0))	UINT32	RO	0xF600:79, 1
1A40:7A	SubIndex 122	122. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x7A (Slave 16 Inputs__Slave 16A, DI1))	UINT32	RO	0xF600:7A, 1
1A40:7B	SubIndex 123	123. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x7B (Slave 16 Inputs__Slave 16A, DI2))	UINT32	RO	0xF600:7B, 1
1A40:7C	SubIndex 124	124. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x7C (Slave 16 Inputs__Slave 16A, DI3))	UINT32	RO	0xF600:7C, 1
1A40:7D	SubIndex 125	125. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x7D (Slave 16 Inputs__Slave 16B, DI0))	UINT32	RO	0xF600:7D, 1
1A40:7E	SubIndex 126	126. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x7E (Slave 16 Inputs__Slave 16B, DI1))	UINT32	RO	0xF600:7E, 1
1A40:7F	SubIndex 127	127. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x7F (Slave 16 Inputs__Slave 16B, DI2))	UINT32	RO	0xF600:7F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:80	SubIndex 128	128. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x80 (Slave 16 Inputs__Slave 16B, DI3))	UINT32	RO	0xF600:80, 1
1A40:81	SubIndex 129	129. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x81 (Slave 17 Inputs__Slave 17A, DI0))	UINT32	RO	0xF600:81, 1
1A40:82	SubIndex 130	130. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x82 (Slave 17 Inputs__Slave 17A, DI1))	UINT32	RO	0xF600:82, 1
1A40:83	SubIndex 131	131. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x83 (Slave 17 Inputs__Slave 17A, DI2))	UINT32	RO	0xF600:83, 1
1A40:84	SubIndex 132	132. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x84 (Slave 17 Inputs__Slave 17A, DI3))	UINT32	RO	0xF600:84, 1
1A40:85	SubIndex 133	133. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x85 (Slave 17 Inputs__Slave 17B, DI0))	UINT32	RO	0xF600:85, 1
1A40:86	SubIndex 134	134. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x86 (Slave 17 Inputs__Slave 17B, DI1))	UINT32	RO	0xF600:86, 1
1A40:87	SubIndex 135	135. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x87 (Slave 17 Inputs__Slave 17B, DI2))	UINT32	RO	0xF600:87, 1
1A40:88	SubIndex 136	136. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x88 (Slave 17 Inputs__Slave 17B, DI3))	UINT32	RO	0xF600:88, 1
1A40:89	SubIndex 137	137. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x89 (Slave 18 Inputs__Slave 18A, DI0))	UINT32	RO	0xF600:89, 1
1A40:8A	SubIndex 138	138. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x8A (Slave 18 Inputs__Slave 18A, DI1))	UINT32	RO	0xF600:8A, 1
1A40:8B	SubIndex 139	139. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x8B (Slave 18 Inputs__Slave 18A, DI2))	UINT32	RO	0xF600:8B, 1
1A40:8C	SubIndex 140	140. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x8C (Slave 18 Inputs__Slave 18A, DI3))	UINT32	RO	0xF600:8C, 1
1A40:8D	SubIndex 141	141. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x8D (Slave 18 Inputs__Slave 18B, DI0))	UINT32	RO	0xF600:8D, 1
1A40:8E	SubIndex 142	142. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x8E (Slave 18 Inputs__Slave 18B, DI1))	UINT32	RO	0xF600:8E, 1
1A40:8F	SubIndex 143	143. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x8F (Slave 18 Inputs__Slave 18B, DI2))	UINT32	RO	0xF600:8F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:90	SubIndex 144	144. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x90 (Slave 18 Inputs__Slave 18B, DI3))	UINT32	RO	0xF600:90, 1
1A40:91	SubIndex 145	145. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x91 (Slave 19 Inputs__Slave 19A, DI0))	UINT32	RO	0xF600:91, 1
1A40:92	SubIndex 146	146. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x92 (Slave 19 Inputs__Slave 19A, DI1))	UINT32	RO	0xF600:92, 1
1A40:93	SubIndex 147	147. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x93 (Slave 19 Inputs__Slave 19A, DI2))	UINT32	RO	0xF600:93, 1
1A40:94	SubIndex 148	148. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x94 (Slave 19 Inputs__Slave 19A, DI3))	UINT32	RO	0xF600:94, 1
1A40:95	SubIndex 149	149. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x95 (Slave 19 Inputs__Slave 19B, DI0))	UINT32	RO	0xF600:95, 1
1A40:96	SubIndex 150	150. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x96 (Slave 19 Inputs__Slave 19B, DI1))	UINT32	RO	0xF600:96, 1
1A40:97	SubIndex 151	151. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x97 (Slave 19 Inputs__Slave 19B, DI2))	UINT32	RO	0xF600:97, 1
1A40:98	SubIndex 152	152. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x98 (Slave 19 Inputs__Slave 19B, DI3))	UINT32	RO	0xF600:98, 1
1A40:99	SubIndex 153	153. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x99 (Slave 20 Inputs__Slave 20A, DI0))	UINT32	RO	0xF600:99, 1
1A40:9A	SubIndex 154	154. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x9A (Slave 20 Inputs__Slave 20A, DI1))	UINT32	RO	0xF600:9A, 1
1A40:9B	SubIndex 155	155. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x9B (Slave 20 Inputs__Slave 20A, DI2))	UINT32	RO	0xF600:9B, 1
1A40:9C	SubIndex 156	156. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x9C (Slave 20 Inputs__Slave 20A, DI3))	UINT32	RO	0xF600:9C, 1
1A40:9D	SubIndex 157	157. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x9D (Slave 20 Inputs__Slave 20B, DI0))	UINT32	RO	0xF600:9D, 1
1A40:9E	SubIndex 158	158. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x9E (Slave 20 Inputs__Slave 20B, DI1))	UINT32	RO	0xF600:9E, 1
1A40:9F	SubIndex 159	159. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0x9F (Slave 20 Inputs__Slave 20B, DI2))	UINT32	RO	0xF600:9F, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:A0	SubIndex 160	160. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA0 (Slave 20 Inputs__Slave 20B, DI3))	UINT32	RO	0xF600:A0, 1
1A40:A1	SubIndex 161	161. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA1 (Slave 21 Inputs__Slave 21A, DI0))	UINT32	RO	0xF600:A1, 1
1A40:A2	SubIndex 162	162. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA2 (Slave 21 Inputs__Slave 21A, DI1))	UINT32	RO	0xF600:A2, 1
1A40:A3	SubIndex 163	163. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA3 (Slave 21 Inputs__Slave 21A, DI2))	UINT32	RO	0xF600:A3, 1
1A40:A4	SubIndex 164	164. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA4 (Slave 21 Inputs__Slave 21A, DI3))	UINT32	RO	0xF600:A4, 1
1A40:A5	SubIndex 165	165. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA5 (Slave 21 Inputs__Slave 21B, DI0))	UINT32	RO	0xF600:A5, 1
1A40:A6	SubIndex 166	166. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA6 (Slave 21 Inputs__Slave 21B, DI1))	UINT32	RO	0xF600:A6, 1
1A40:A7	SubIndex 167	167. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA7 (Slave 21 Inputs__Slave 21B, DI2))	UINT32	RO	0xF600:A7, 1
1A40:A8	SubIndex 168	168. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA8 (Slave 21 Inputs__Slave 21B, DI3))	UINT32	RO	0xF600:A8, 1
1A40:A9	SubIndex 169	169. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xA9 (Slave 22 Inputs__Slave 22A, DI0))	UINT32	RO	0xF600:A9, 1
1A40:AA	SubIndex 170	170. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xAA (Slave 22 Inputs__Slave 22A, DI1))	UINT32	RO	0xF600:AA, 1
1A40:AB	SubIndex 171	171. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xAB (Slave 22 Inputs__Slave 22A, DI2))	UINT32	RO	0xF600:AB, 1
1A40:AC	SubIndex 172	172. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xAC (Slave 22 Inputs__Slave 22A, DI3))	UINT32	RO	0xF600:AC, 1
1A40:AD	SubIndex 173	173. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xAD (Slave 22 Inputs__Slave 22B, DI0))	UINT32	RO	0xF600:AD, 1
1A40:AE	SubIndex 174	174. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xAE (Slave 22 Inputs__Slave 22B, DI1))	UINT32	RO	0xF600:AE, 1
1A40:AF	SubIndex 175	175. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xAF (Slave 22 Inputs__Slave 22B, DI2))	UINT32	RO	0xF600:AF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:B0	SubIndex 176	176. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB0 (Slave 22 Inputs__Slave 22B, DI3))	UINT32	RO	0xF600:B0, 1
1A40:B1	SubIndex 177	177. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB1 (Slave 23 Inputs__Slave 23A, DI0))	UINT32	RO	0xF600:B1, 1
1A40:B2	SubIndex 178	178. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB2 (Slave 23 Inputs__Slave 23A, DI1))	UINT32	RO	0xF600:B2, 1
1A40:B3	SubIndex 179	179. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB3 (Slave 23 Inputs__Slave 23A, DI2))	UINT32	RO	0xF600:B3, 1
1A40:B4	SubIndex 180	180. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB4 (Slave 23 Inputs__Slave 23A, DI3))	UINT32	RO	0xF600:B4, 1
1A40:B5	SubIndex 181	181. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB5 (Slave 23 Inputs__Slave 23B, DI0))	UINT32	RO	0xF600:B5, 1
1A40:B6	SubIndex 182	182. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB6 (Slave 23 Inputs__Slave 23B, DI1))	UINT32	RO	0xF600:B6, 1
1A40:B7	SubIndex 183	183. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB7 (Slave 23 Inputs__Slave 23B, DI2))	UINT32	RO	0xF600:B7, 1
1A40:B8	SubIndex 184	184. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB8 (Slave 23 Inputs__Slave 23B, DI3))	UINT32	RO	0xF600:B8, 1
1A40:B9	SubIndex 185	185. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xB9 (Slave 24 Inputs__Slave 24A, DI0))	UINT32	RO	0xF600:B9, 1
1A40:BA	SubIndex 186	186. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xBA (Slave 24 Inputs__Slave 24A, DI1))	UINT32	RO	0xF600:BA, 1
1A40:BB	SubIndex 187	187. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xBB (Slave 24 Inputs__Slave 24A, DI2))	UINT32	RO	0xF600:BB, 1
1A40:BC	SubIndex 188	188. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xBC (Slave 24 Inputs__Slave 24A, DI3))	UINT32	RO	0xF600:BC, 1
1A40:BD	SubIndex 189	189. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xBD (Slave 24 Inputs__Slave 24B, DI0))	UINT32	RO	0xF600:BD, 1
1A40:BE	SubIndex 190	190. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xBE (Slave 24 Inputs__Slave 24B, DI1))	UINT32	RO	0xF600:BE, 1
1A40:BF	SubIndex 191	191. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xBF (Slave 24 Inputs__Slave 24B, DI2))	UINT32	RO	0xF600:BF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:C0	SubIndex 192	192. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC0 (Slave 24 Inputs__Slave 24B, DI3))	UINT32	RO	0xF600:C0, 1
1A40:C1	SubIndex 193	193. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC1 (Slave 25 Inputs__Slave 25A, DI0))	UINT32	RO	0xF600:C1, 1
1A40:C2	SubIndex 194	194. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC2 (Slave 25 Inputs__Slave 25A, DI1))	UINT32	RO	0xF600:C2, 1
1A40:C3	SubIndex 195	195. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC3 (Slave 25 Inputs__Slave 25A, DI2))	UINT32	RO	0xF600:C3, 1
1A40:C4	SubIndex 196	196. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC4 (Slave 25 Inputs__Slave 25A, DI3))	UINT32	RO	0xF600:C4, 1
1A40:C5	SubIndex 197	197. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC5 (Slave 25 Inputs__Slave 25B, DI0))	UINT32	RO	0xF600:C5, 1
1A40:C6	SubIndex 198	198. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC6 (Slave 25 Inputs__Slave 25B, DI1))	UINT32	RO	0xF600:C6, 1
1A40:C7	SubIndex 199	199. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC7 (Slave 25 Inputs__Slave 25B, DI2))	UINT32	RO	0xF600:C7, 1
1A40:C8	SubIndex 200	200. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC8 (Slave 25 Inputs__Slave 25B, DI3))	UINT32	RO	0xF600:C8, 1
1A40:C9	SubIndex 201	201. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xC9 (Slave 26 Inputs__Slave 26A, DI0))	UINT32	RO	0xF600:C9, 1
1A40:CA	SubIndex 202	202. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xCA (Slave 26 Inputs__Slave 26A, DI1))	UINT32	RO	0xF600:CA, 1
1A40:CB	SubIndex 203	203. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xCB (Slave 26 Inputs__Slave 26A, DI2))	UINT32	RO	0xF600:CB, 1
1A40:CC	SubIndex 204	204. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xCC (Slave 26 Inputs__Slave 26A, DI3))	UINT32	RO	0xF600:CC, 1
1A40:CD	SubIndex 205	205. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xCD (Slave 26 Inputs__Slave 26B, DI0))	UINT32	RO	0xF600:CD, 1
1A40:CE	SubIndex 206	206. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xCE (Slave 26 Inputs__Slave 26B, DI1))	UINT32	RO	0xF600:CE, 1
1A40:CF	SubIndex 207	207. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xCF (Slave 26 Inputs__Slave 26B, DI2))	UINT32	RO	0xF600:CF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:D0	SubIndex 208	208. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD0 (Slave 26 Inputs__Slave 26B, DI3))	UINT32	RO	0xF600:D0, 1
1A40:D1	SubIndex 209	209. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD1 (Slave 27 Inputs__Slave 27A, DI0))	UINT32	RO	0xF600:D1, 1
1A40:D2	SubIndex 210	210. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD2 (Slave 27 Inputs__Slave 27A, DI1))	UINT32	RO	0xF600:D2, 1
1A40:D3	SubIndex 211	211. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD3 (Slave 27 Inputs__Slave 27A, DI2))	UINT32	RO	0xF600:D3, 1
1A40:D4	SubIndex 212	212. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD4 (Slave 27 Inputs__Slave 27A, DI3))	UINT32	RO	0xF600:D4, 1
1A40:D5	SubIndex 213	213. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD5 (Slave 27 Inputs__Slave 27B, DI0))	UINT32	RO	0xF600:D5, 1
1A40:D6	SubIndex 214	214. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD6 (Slave 27 Inputs__Slave 27B, DI1))	UINT32	RO	0xF600:D6, 1
1A40:D7	SubIndex 215	215. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD7 (Slave 27 Inputs__Slave 27B, DI2))	UINT32	RO	0xF600:D7, 1
1A40:D8	SubIndex 216	216. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD8 (Slave 27 Inputs__Slave 27B, DI3))	UINT32	RO	0xF600:D8, 1
1A40:D9	SubIndex 217	217. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xD9 (Slave 28 Inputs__Slave 28A, DI0))	UINT32	RO	0xF600:D9, 1
1A40:DA	SubIndex 218	218. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xDA (Slave 28 Inputs__Slave 28A, DI1))	UINT32	RO	0xF600:DA, 1
1A40:DB	SubIndex 219	219. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xDB (Slave 28 Inputs__Slave 28A, DI2))	UINT32	RO	0xF600:DB, 1
1A40:DC	SubIndex 220	220. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xDC (Slave 28 Inputs__Slave 28A, DI3))	UINT32	RO	0xF600:DC, 1
1A40:DD	SubIndex 221	221. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xDD (Slave 28 Inputs__Slave 28B, DI0))	UINT32	RO	0xF600:DD, 1
1A40:DE	SubIndex 222	222. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xDE (Slave 28 Inputs__Slave 28B, DI1))	UINT32	RO	0xF600:DE, 1
1A40:DF	SubIndex 223	223. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xDF (Slave 28 Inputs__Slave 28B, DI2))	UINT32	RO	0xF600:DF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:E0	SubIndex 224	224. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE0 (Slave 28 Inputs__Slave 28B, DI3))	UINT32	RO	0xF600:E0, 1
1A40:E1	SubIndex 225	225. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE1 (Slave 29 Inputs__Slave 29A, DI0))	UINT32	RO	0xF600:E1, 1
1A40:E2	SubIndex 226	226. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE2 (Slave 29 Inputs__Slave 29A, DI1))	UINT32	RO	0xF600:E2, 1
1A40:E3	SubIndex 227	227. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE3 (Slave 29 Inputs__Slave 29A, DI2))	UINT32	RO	0xF600:E3, 1
1A40:E4	SubIndex 228	228. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE4 (Slave 29 Inputs__Slave 29A, DI3))	UINT32	RO	0xF600:E4, 1
1A40:E5	SubIndex 229	229. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE5 (Slave 29 Inputs__Slave 29B, DI0))	UINT32	RO	0xF600:E5, 1
1A40:E6	SubIndex 230	230. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE6 (Slave 29 Inputs__Slave 29B, DI1))	UINT32	RO	0xF600:E6, 1
1A40:E7	SubIndex 231	231. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE7 (Slave 29 Inputs__Slave 29B, DI2))	UINT32	RO	0xF600:E7, 1
1A40:E8	SubIndex 232	232. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE8 (Slave 29 Inputs__Slave 29B, DI3))	UINT32	RO	0xF600:E8, 1
1A40:E9	SubIndex 233	233. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xE9 (Slave 30 Inputs__Slave 30A, DI0))	UINT32	RO	0xF600:E9, 1
1A40:EA	SubIndex 234	234. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xEA (Slave 30 Inputs__Slave 30A, DI1))	UINT32	RO	0xF600:EA, 1
1A40:EB	SubIndex 235	235. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xEB (Slave 30 Inputs__Slave 30A, DI2))	UINT32	RO	0xF600:EB, 1
1A40:EC	SubIndex 236	236. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xEC (Slave 30 Inputs__Slave 30A, DI3))	UINT32	RO	0xF600:EC, 1
1A40:ED	SubIndex 237	237. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xED (Slave 30 Inputs__Slave 30B, DI0))	UINT32	RO	0xF600:ED, 1
1A40:EE	SubIndex 238	238. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xEE (Slave 30 Inputs__Slave 30B, DI1))	UINT32	RO	0xF600:EE, 1
1A40:EF	SubIndex 239	239. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xEF (Slave 30 Inputs__Slave 30B, DI2))	UINT32	RO	0xF600:EF, 1

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Index (hex)	Name	Meaning	Data type	Flags	Default
1A40:F0	SubIndex 240	240. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF0 (Slave 30 Inputs__Slave 30B, DI3))	UINT32	RO	0xF600:F0, 1
1A40:F1	SubIndex 241	241. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF1 (Slave 31 Inputs__Slave 31A, DI0))	UINT32	RO	0xF600:F1, 1
1A40:F2	SubIndex 242	242. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF2 (Slave 31 Inputs__Slave 31A, DI1))	UINT32	RO	0xF600:F2, 1
1A40:F3	SubIndex 243	243. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF3 (Slave 31 Inputs__Slave 31A, DI2))	UINT32	RO	0xF600:F3, 1
1A40:F4	SubIndex 244	244. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF4 (Slave 31 Inputs__Slave 31A, DI3))	UINT32	RO	0xF600:F4, 1
1A40:F5	SubIndex 245	245. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF5 (Slave 31 Inputs__Slave 31B, DI0))	UINT32	RO	0xF600:F5, 1
1A40:F6	SubIndex 246	246. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF6 (Slave 31 Inputs__Slave 31B, DI1))	UINT32	RO	0xF600:F6, 1
1A40:F7	SubIndex 247	247. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF7 (Slave 31 Inputs__Slave 31B, DI2))	UINT32	RO	0xF600:F7, 1
1A40:F8	SubIndex 248	248. PDO Mapping entry (object 0xF600 (ASI Digital Inputs), entry 0xF8 (Slave 31 Inputs__Slave 31B, DI3))	UINT32	RO	0xF600:F8, 1

Index 1A80 ASI TxPDO-Map Status

Index (hex)	Name	Meaning	Data type	Flags	Default
1A80:0	ASI TxPDO-Map Status	PDO Mapping TxPDO 129	UINT8	RO	0x0D (13$_{dec}$)
1A80:01	SubIndex 001	1. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x01 (Configuration okay))	UINT32	RO	0xF100:01, 1
1A80:02	SubIndex 002	2. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x02 (Power Fail))	UINT32	RO	0xF100:02, 1
1A80:03	SubIndex 003	3. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x03 (Auto addressing mode enabled))	UINT32	RO	0xF100:03, 1
1A80:04	SubIndex 004	4. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x04 (Auto addressing mode available))	UINT32	RO	0xF100:04, 1
1A80:05	SubIndex 005	5. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x05 (Protected mode active))	UINT32	RO	0xF100:05, 1
1A80:06	SubIndex 006	6. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x06 (Slave with address 0 found))	UINT32	RO	0xF100:06, 1
1A80:07	SubIndex 007	7. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x07 (Offline Ready))	UINT32	RO	0xF100:07, 1
1A80:08	SubIndex 008	8. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x08 (Normal Operation))	UINT32	RO	0xF100:08, 1
1A80:09	SubIndex 009	9. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x09 (ASI phase))	UINT32	RO	0xF100:09, 3
1A80:0A	SubIndex 010	10. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A80:0B	SubIndex 011	11. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x0E (Sync error))	UINT32	RO	0xF100:0E, 1
1A80:0C	SubIndex 012	12. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A80:0D	SubIndex 013	13. PDO Mapping entry (object 0xF100 (ASI Status), entry 0x10 (TxPDO Toggle))	UINT32	RO	0xF100:10, 1

Index 1A81 ASI TxPDO-Map LDS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A81:0	ASI TxPDO-Map LDS	PDO Mapping TxPDO 130	UINT8	RO	0x40 (64$_{dec}$)
1A81:01	SubIndex 001	1. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x01 (Slave 0))	UINT32	RO	0xF101:01, 1
1A81:02	SubIndex 002	2. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x02 (Slave 1A))	UINT32	RO	0xF101:02, 1
1A81:03	SubIndex 003	3. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x03 (Slave 2A))	UINT32	RO	0xF101:03, 1
1A81:04	SubIndex 004	4. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x04 (Slave 3A))	UINT32	RO	0xF101:04, 1
1A81:05	SubIndex 005	5. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x05 (Slave 4A))	UINT32	RO	0xF101:05, 1
1A81:06	SubIndex 006	6. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x06 (Slave 5A))	UINT32	RO	0xF101:06, 1
1A81:07	SubIndex 007	7. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x07 (Slave 6A))	UINT32	RO	0xF101:07, 1
1A81:08	SubIndex 008	8. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x08 (Slave 7A))	UINT32	RO	0xF101:08, 1
1A81:09	SubIndex 009	9. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x09 (Slave 8A))	UINT32	RO	0xF101:09, 1
1A81:0A	SubIndex 010	10. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x0A (Slave 9A))	UINT32	RO	0xF101:0A, 1
1A81:0B	SubIndex 011	11. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x0B (Slave 10A))	UINT32	RO	0xF101:0B, 1
1A81:0C	SubIndex 012	12. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x0C (Slave 11A))	UINT32	RO	0xF101:0C, 1
1A81:0D	SubIndex 013	13. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x0D (Slave 12A))	UINT32	RO	0xF101:0D, 1
1A81:0E	SubIndex 014	14. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x0E (Slave 13A))	UINT32	RO	0xF101:0E, 1
1A81:0F	SubIndex 015	15. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x0F (Slave 14A))	UINT32	RO	0xF101:0F, 1

Index 1A81 ASI TxPDO-Map LDS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A81:10	SubIndex 016	16. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x10 (Slave 15A))	UINT32	RO	0xF101:10, 1
1A81:11	SubIndex 017	17. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x11 (Slave 16A))	UINT32	RO	0xF101:11, 1
1A81:12	SubIndex 018	18. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x12 (Slave 17A))	UINT32	RO	0xF101:12, 1
1A81:13	SubIndex 019	19. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x13 (Slave 18A))	UINT32	RO	0xF101:13, 1
1A81:14	SubIndex 020	20. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x14 (Slave 19A))	UINT32	RO	0xF101:14, 1
1A81:15	SubIndex 021	21. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x15 (Slave 20A))	UINT32	RO	0xF101:15, 1
1A81:16	SubIndex 022	22. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x16 (Slave 21A))	UINT32	RO	0xF101:16, 1
1A81:17	SubIndex 023	23. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x17 (Slave 22A))	UINT32	RO	0xF101:17, 1
1A81:18	SubIndex 024	24. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x18 (Slave 23A))	UINT32	RO	0xF101:18, 1
1A81:19	SubIndex 025	25. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x19 (Slave 24A))	UINT32	RO	0xF101:19, 1
1A81:1A	SubIndex 026	26. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x1A (Slave 25A))	UINT32	RO	0xF101:1A, 1
1A81:1B	SubIndex 027	27. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x1B (Slave 26A))	UINT32	RO	0xF101:1B, 1
1A81:1C	SubIndex 028	28. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x1C (Slave 27A))	UINT32	RO	0xF101:1C, 1
1A81:1D	SubIndex 029	29. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x1D (Slave 28A))	UINT32	RO	0xF101:1D, 1
1A81:1E	SubIndex 030	30. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x1E (Slave 29A))	UINT32	RO	0xF101:1E, 1
1A81:1F	SubIndex 031	31. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x1F (Slave 30A))	UINT32	RO	0xF101:1F, 1

Index 1A81 ASI TxPDO-Map LDS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A81:20	SubIndex 032	32. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x20 (Slave 31A))	UINT32	RO	0xF101:20, 1
1A81:21	SubIndex 033	33. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x21 (Slave 1B))	UINT32	RO	0xF101:21, 1
1A81:22	SubIndex 034	34. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x22 (Slave 2B))	UINT32	RO	0xF101:22, 1
1A81:23	SubIndex 035	35. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x23 (Slave 3B))	UINT32	RO	0xF101:23, 1
1A81:24	SubIndex 036	36. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x24 (Slave 4B))	UINT32	RO	0xF101:24, 1
1A81:25	SubIndex 037	37. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x25 (Slave 5B))	UINT32	RO	0xF101:25, 1
1A81:26	SubIndex 038	38. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x26 (Slave 6B))	UINT32	RO	0xF101:26, 1
1A81:27	SubIndex 039	39. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x27 (Slave 7B))	UINT32	RO	0xF101:27, 1
1A81:28	SubIndex 040	40. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x28 (Slave 8B))	UINT32	RO	0xF101:28, 1
1A81:29	SubIndex 041	41. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x29 (Slave 9B))	UINT32	RO	0xF101:29, 1
1A81:2A	SubIndex 042	42. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x2A (Slave 10B))	UINT32	RO	0xF101:2A, 1
1A81:2B	SubIndex 043	43. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x2B (Slave 11B))	UINT32	RO	0xF101:2B, 1
1A81:2C	SubIndex 044	44. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x2C (Slave 12B))	UINT32	RO	0xF101:2C, 1
1A81:2D	SubIndex 045	45. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x2D (Slave 13B))	UINT32	RO	0xF101:2D, 1
1A81:2E	SubIndex 046	46. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x2E (Slave 14B))	UINT32	RO	0xF101:2E, 1
1A81:2F	SubIndex 047	47. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x2F (Slave 15B))	UINT32	RO	0xF101:2F, 1

Index 1A81 ASI TxPDO-Map LDS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A81:30	SubIndex 048	48. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x30 (Slave 16B))	UINT32	RO	0xF101:30, 1
1A81:31	SubIndex 049	49. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x31 (Slave 17B))	UINT32	RO	0xF101:31, 1
1A81:32	SubIndex 050	50. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x32 (Slave 18B))	UINT32	RO	0xF101:32, 1
1A81:33	SubIndex 051	51. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x33 (Slave 19B))	UINT32	RO	0xF101:33, 1
1A81:34	SubIndex 052	52. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x34 (Slave 20B))	UINT32	RO	0xF101:34, 1
1A81:35	SubIndex 053	53. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x35 (Slave 21B))	UINT32	RO	0xF101:35, 1
1A81:36	SubIndex 054	54. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x36 (Slave 22B))	UINT32	RO	0xF101:36, 1
1A81:37	SubIndex 055	55. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x37 (Slave 23B))	UINT32	RO	0xF101:37, 1
1A81:38	SubIndex 056	56. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x38 (Slave 24B))	UINT32	RO	0xF101:38, 1
1A81:39	SubIndex 057	57. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x39 (Slave 25B))	UINT32	RO	0xF101:39, 1
1A81:3A	SubIndex 058	58. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x3A (Slave 26B))	UINT32	RO	0xF101:3A, 1
1A81:3B	SubIndex 059	59. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x3B (Slave 27B))	UINT32	RO	0xF101:3B, 1
1A81:3C	SubIndex 060	60. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x3C (Slave 28B))	UINT32	RO	0xF101:3C, 1
1A81:3D	SubIndex 061	61. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x3D (Slave 29B))	UINT32	RO	0xF101:3D, 1
1A81:3E	SubIndex 062	62. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x3E (Slave 30B))	UINT32	RO	0xF101:3E, 1
1A81:3F	SubIndex 063	63. PDO Mapping entry (object 0xF101 (ASI LDS), entry 0x3F (Slave 31B))	UINT32	RO	0xF101:3F, 1
1A81:40	SubIndex 064	64. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1

Index 1A82 ASI TxPDO-Map LAS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A82:0	ASI TxPDO-Map LAS	PDO Mapping TxPDO 131	UINT8	RO	0x40 (64_{dec})
1A82:01	SubIndex 001	1. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x01 (Slave 0))	UINT32	RO	0xF102:01, 1
1A82:02	SubIndex 002	2. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x02 (Slave 1A))	UINT32	RO	0xF102:02, 1
1A82:03	SubIndex 003	3. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x03 (Slave 2A))	UINT32	RO	0xF102:03, 1
1A82:04	SubIndex 004	4. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x04 (Slave 3A))	UINT32	RO	0xF102:04, 1
1A82:05	SubIndex 005	5. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x05 (Slave 4A))	UINT32	RO	0xF102:05, 1
1A82:06	SubIndex 006	6. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x06 (Slave 5A))	UINT32	RO	0xF102:06, 1
1A82:07	SubIndex 007	7. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x07 (Slave 6A))	UINT32	RO	0xF102:07, 1
1A82:08	SubIndex 008	8. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x08 (Slave 7A))	UINT32	RO	0xF102:08, 1
1A82:09	SubIndex 009	9. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x09 (Slave 8A))	UINT32	RO	0xF102:09, 1
1A82:0A	SubIndex 010	10. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x0A (Slave 9A))	UINT32	RO	0xF102:0A, 1
1A82:0B	SubIndex 011	11. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x0B (Slave 10A))	UINT32	RO	0xF102:0B, 1
1A82:0C	SubIndex 012	12. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x0C (Slave 11A))	UINT32	RO	0xF102:0C, 1
1A82:0D	SubIndex 013	13. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x0D (Slave 12A))	UINT32	RO	0xF102:0D, 1
1A82:0E	SubIndex 014	14. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x0E (Slave 13A))	UINT32	RO	0xF102:0E, 1
1A82:0F	SubIndex 015	15. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x0F (Slave 14A))	UINT32	RO	0xF102:0F, 1

Index 1A82 ASI TxPDO-Map LAS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A82:10	SubIndex 016	16. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x10 (Slave 15A))	UINT32	RO	0xF102:10, 1
1A82:11	SubIndex 017	17. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x11 (Slave 16A))	UINT32	RO	0xF102:11, 1
1A82:12	SubIndex 018	18. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x12 (Slave 17A))	UINT32	RO	0xF102:12, 1
1A82:13	SubIndex 019	19. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x13 (Slave 18A))	UINT32	RO	0xF102:13, 1
1A82:14	SubIndex 020	20. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x14 (Slave 19A))	UINT32	RO	0xF102:14, 1
1A82:15	SubIndex 021	21. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x15 (Slave 20A))	UINT32	RO	0xF102:15, 1
1A82:16	SubIndex 022	22. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x16 (Slave 21A))	UINT32	RO	0xF102:16, 1
1A82:17	SubIndex 023	23. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x17 (Slave 22A))	UINT32	RO	0xF102:17, 1
1A82:18	SubIndex 024	24. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x18 (Slave 23A))	UINT32	RO	0xF102:18, 1
1A82:19	SubIndex 025	25. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x19 (Slave 24A))	UINT32	RO	0xF102:19, 1
1A82:1A	SubIndex 026	26. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x1A (Slave 25A))	UINT32	RO	0xF102:1A, 1
1A82:1B	SubIndex 027	27. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x1B (Slave 26A))	UINT32	RO	0xF102:1B, 1
1A82:1C	SubIndex 028	28. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x1C (Slave 27A))	UINT32	RO	0xF102:1C, 1
1A82:1D	SubIndex 029	29. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x1D (Slave 28A))	UINT32	RO	0xF102:1D, 1
1A82:1E	SubIndex 030	30. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x1E (Slave 29A))	UINT32	RO	0xF102:1E, 1
1A82:1F	SubIndex 031	31. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x1F (Slave 30A))	UINT32	RO	0xF102:1F, 1

Index 1A82 ASI TxPDO-Map LAS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A82:20	SubIndex 032	32. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x20 (Slave 31A))	UINT32	RO	0xF102:20, 1
1A82:21	SubIndex 033	33. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x21 (Slave 1B))	UINT32	RO	0xF102:21, 1
1A82:22	SubIndex 034	34. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x22 (Slave 2B))	UINT32	RO	0xF102:22, 1
1A82:23	SubIndex 035	35. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x23 (Slave 3B))	UINT32	RO	0xF102:23, 1
1A82:24	SubIndex 036	36. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x24 (Slave 4B))	UINT32	RO	0xF102:24, 1
1A82:25	SubIndex 037	37. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x25 (Slave 5B))	UINT32	RO	0xF102:25, 1
1A82:26	SubIndex 038	38. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x26 (Slave 6B))	UINT32	RO	0xF102:26, 1
1A82:27	SubIndex 039	39. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x27 (Slave 7B))	UINT32	RO	0xF102:27, 1
1A82:28	SubIndex 040	40. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x28 (Slave 8B))	UINT32	RO	0xF102:28, 1
1A82:29	SubIndex 041	41. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x29 (Slave 9B))	UINT32	RO	0xF102:29, 1
1A82:2A	SubIndex 042	42. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x2A (Slave 10B))	UINT32	RO	0xF102:2A, 1
1A82:2B	SubIndex 043	43. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x2B (Slave 11B))	UINT32	RO	0xF102:2B, 1
1A82:2C	SubIndex 044	44. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x2C (Slave 12B))	UINT32	RO	0xF102:2C, 1
1A82:2D	SubIndex 045	45. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x2D (Slave 13B))	UINT32	RO	0xF102:2D, 1
1A82:2E	SubIndex 046	46. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x2E (Slave 14B))	UINT32	RO	0xF102:2E, 1
1A82:2F	SubIndex 047	47. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x2F (Slave 15B))	UINT32	RO	0xF102:2F, 1

Index 1A82 ASI TxPDO-Map LAS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A82:30	SubIndex 048	48. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x30 (Slave 16B))	UINT32	RO	0xF102:30, 1
1A82:31	SubIndex 049	49. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x31 (Slave 17B))	UINT32	RO	0xF102:31, 1
1A82:32	SubIndex 050	50. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x32 (Slave 18B))	UINT32	RO	0xF102:32, 1
1A82:33	SubIndex 051	51. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x33 (Slave 19B))	UINT32	RO	0xF102:33, 1
1A82:34	SubIndex 052	52. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x34 (Slave 20B))	UINT32	RO	0xF102:34, 1
1A82:35	SubIndex 053	53. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x35 (Slave 21B))	UINT32	RO	0xF102:35, 1
1A82:36	SubIndex 054	54. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x36 (Slave 22B))	UINT32	RO	0xF102:36, 1
1A82:37	SubIndex 055	55. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x37 (Slave 23B))	UINT32	RO	0xF102:37, 1
1A82:38	SubIndex 056	56. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x38 (Slave 24B))	UINT32	RO	0xF102:38, 1
1A82:39	SubIndex 057	57. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x39 (Slave 25B))	UINT32	RO	0xF102:39, 1
1A82:3A	SubIndex 058	58. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x3A (Slave 26B))	UINT32	RO	0xF102:3A, 1
1A82:3B	SubIndex 059	59. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x3B (Slave 27B))	UINT32	RO	0xF102:3B, 1
1A82:3C	SubIndex 060	60. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x3C (Slave 28B))	UINT32	RO	0xF102:3C, 1
1A82:3D	SubIndex 061	61. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x3D (Slave 29B))	UINT32	RO	0xF102:3D, 1
1A82:3E	SubIndex 062	62. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x3E (Slave 30B))	UINT32	RO	0xF102:3E, 1
1A82:3F	SubIndex 063	63. PDO Mapping entry (object 0xF102 (ASI LAS), entry 0x3F (Slave 31B))	UINT32	RO	0xF102:3F, 1
1A82:40	SubIndex 064	64. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1

Index 1A83 ASI TxPDO-Map LPS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A83:0	ASI TxPDO-Map LPS	PDO Mapping TxPDO 132	UINT8	RO	0x40 (64_{dec})
1A83:01	SubIndex 001	1. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x01 (Slave 0))	UINT32	RO	0xF103:01, 1
1A83:02	SubIndex 002	2. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x02 (Slave 1A))	UINT32	RO	0xF103:02, 1
1A83:03	SubIndex 003	3. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x03 (Slave 2A))	UINT32	RO	0xF103:03, 1
1A83:04	SubIndex 004	4. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x04 (Slave 3A))	UINT32	RO	0xF103:04, 1
1A83:05	SubIndex 005	5. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x05 (Slave 4A))	UINT32	RO	0xF103:05, 1
1A83:06	SubIndex 006	6. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x06 (Slave 5A))	UINT32	RO	0xF103:06, 1
1A83:07	SubIndex 007	7. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x07 (Slave 6A))	UINT32	RO	0xF103:07, 1
1A83:08	SubIndex 008	8. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x08 (Slave 7A))	UINT32	RO	0xF103:08, 1
1A83:09	SubIndex 009	9. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x09 (Slave 8A))	UINT32	RO	0xF103:09, 1
1A83:0A	SubIndex 010	10. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x0A (Slave 9A))	UINT32	RO	0xF103:0A, 1
1A83:0B	SubIndex 011	11. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x0B (Slave 10A))	UINT32	RO	0xF103:0B, 1
1A83:0C	SubIndex 012	12. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x0C (Slave 11A))	UINT32	RO	0xF103:0C, 1
1A83:0D	SubIndex 013	13. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x0D (Slave 12A))	UINT32	RO	0xF103:0D, 1
1A83:0E	SubIndex 014	14. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x0E (Slave 13A))	UINT32	RO	0xF103:0E, 1
1A83:0F	SubIndex 015	15. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x0F (Slave 14A))	UINT32	RO	0xF103:0F, 1

Index 1A83 ASI TxPDO-Map LPS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A83:10	SubIndex 016	16. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x10 (Slave 15A))	UINT32	RO	0xF103:10, 1
1A83:11	SubIndex 017	17. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x11 (Slave 16A))	UINT32	RO	0xF103:11, 1
1A83:12	SubIndex 018	18. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x12 (Slave 17A))	UINT32	RO	0xF103:12, 1
1A83:13	SubIndex 019	19. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x13 (Slave 18A))	UINT32	RO	0xF103:13, 1
1A83:14	SubIndex 020	20. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x14 (Slave 19A))	UINT32	RO	0xF103:14, 1
1A83:15	SubIndex 021	21. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x15 (Slave 20A))	UINT32	RO	0xF103:15, 1
1A83:16	SubIndex 022	22. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x16 (Slave 21A))	UINT32	RO	0xF103:16, 1
1A83:17	SubIndex 023	23. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x17 (Slave 22A))	UINT32	RO	0xF103:17, 1
1A83:18	SubIndex 024	24. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x18 (Slave 23A))	UINT32	RO	0xF103:18, 1
1A83:19	SubIndex 025	25. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x19 (Slave 24A))	UINT32	RO	0xF103:19, 1
1A83:1A	SubIndex 026	26. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x1A (Slave 25A))	UINT32	RO	0xF103:1A, 1
1A83:1B	SubIndex 027	27. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x1B (Slave 26A))	UINT32	RO	0xF103:1B, 1
1A83:1C	SubIndex 028	28. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x1C (Slave 27A))	UINT32	RO	0xF103:1C, 1
1A83:1D	SubIndex 029	29. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x1D (Slave 28A))	UINT32	RO	0xF103:1D, 1
1A83:1E	SubIndex 030	30. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x1E (Slave 29A))	UINT32	RO	0xF103:1E, 1
1A83:1F	SubIndex 031	31. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x1F (Slave 30A))	UINT32	RO	0xF103:1F, 1

Index 1A83 ASI TxPDO-Map LPS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A83:20	SubIndex 032	32. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x20 (Slave 31A))	UINT32	RO	0xF103:20, 1
1A83:21	SubIndex 033	33. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x21 (Slave 1B))	UINT32	RO	0xF103:21, 1
1A83:22	SubIndex 034	34. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x22 (Slave 2B))	UINT32	RO	0xF103:22, 1
1A83:23	SubIndex 035	35. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x23 (Slave 3B))	UINT32	RO	0xF103:23, 1
1A83:24	SubIndex 036	36. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x24 (Slave 4B))	UINT32	RO	0xF103:24, 1
1A83:25	SubIndex 037	37. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x25 (Slave 5B))	UINT32	RO	0xF103:25, 1
1A83:26	SubIndex 038	38. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x26 (Slave 6B))	UINT32	RO	0xF103:26, 1
1A83:27	SubIndex 039	39. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x27 (Slave 7B))	UINT32	RO	0xF103:27, 1
1A83:28	SubIndex 040	40. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x28 (Slave 8B))	UINT32	RO	0xF103:28, 1
1A83:29	SubIndex 041	41. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x29 (Slave 9B))	UINT32	RO	0xF103:29, 1
1A83:2A	SubIndex 042	42. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x2A (Slave 10B))	UINT32	RO	0xF103:2A, 1
1A83:2B	SubIndex 043	43. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x2B (Slave 11B))	UINT32	RO	0xF103:2B, 1
1A83:2C	SubIndex 044	44. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x2C (Slave 12B))	UINT32	RO	0xF103:2C, 1
1A83:2D	SubIndex 045	45. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x2D (Slave 13B))	UINT32	RO	0xF103:2D, 1
1A83:2E	SubIndex 046	46. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x2E (Slave 14B))	UINT32	RO	0xF103:2E, 1
1A83:2F	SubIndex 047	47. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x2F (Slave 15B))	UINT32	RO	0xF103:2F, 1

Index 1A83 ASI TxPDO-Map LPS

Index (hex)	Name	Meaning	Data type	Flags	Default
1A83:30	SubIndex 048	48. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x30 (Slave 16B))	UINT32	RO	0xF103:30, 1
1A83:31	SubIndex 049	49. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x31 (Slave 17B))	UINT32	RO	0xF103:31, 1
1A83:32	SubIndex 050	50. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x32 (Slave 18B))	UINT32	RO	0xF103:32, 1
1A83:33	SubIndex 051	51. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x33 (Slave 19B))	UINT32	RO	0xF103:33, 1
1A83:34	SubIndex 052	52. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x34 (Slave 20B))	UINT32	RO	0xF103:34, 1
1A83:35	SubIndex 053	53. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x35 (Slave 21B))	UINT32	RO	0xF103:35, 1
1A83:36	SubIndex 054	54. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x36 (Slave 22B))	UINT32	RO	0xF103:36, 1
1A83:37	SubIndex 055	55. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x37 (Slave 23B))	UINT32	RO	0xF103:37, 1
1A83:38	SubIndex 056	56. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x38 (Slave 24B))	UINT32	RO	0xF103:38, 1
1A83:39	SubIndex 057	57. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x39 (Slave 25B))	UINT32	RO	0xF103:39, 1
1A83:3A	SubIndex 058	58. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x3A (Slave 26B))	UINT32	RO	0xF103:3A, 1
1A83:3B	SubIndex 059	59. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x3B (Slave 27B))	UINT32	RO	0xF103:3B, 1
1A83:3C	SubIndex 060	60. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x3C (Slave 28B))	UINT32	RO	0xF103:3C, 1
1A83:3D	SubIndex 061	61. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x3D (Slave 29B))	UINT32	RO	0xF103:3D, 1
1A83:3E	SubIndex 062	62. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x3E (Slave 30B))	UINT32	RO	0xF103:3E, 1
1A83:3F	SubIndex 063	63. PDO Mapping entry (object 0xF103 (ASI LPS), entry 0x3F (Slave 31B))	UINT32	RO	0xF103:3F, 1
1A83:40	SubIndex 064	64. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1

Index 1C00Sync manager type

Index (hex)	Name	Meaning	Data type	Flags	Default
1C00:0	Sync manager type	Using the sync managers	UINT8	RO	0x04 (4$_{dec}$)
1C00:01	SubIndex 001	Sync-Manager Type Channel 1: Mailbox Write	UINT8	RO	0x01 (1$_{dec}$)
1C00:02	SubIndex 002	Sync-Manager Type Channel 2: Mailbox Read	UINT8	RO	0x02 (2$_{dec}$)
1C00:03	SubIndex 003	Sync-Manager Type Channel 3: Process Data Write (Outputs)	UINT8	RO	0x03 (3$_{dec}$)
1C00:04	SubIndex 004	Sync-Manager Type Channel 4: Process Data Read (Inputs)	UINT8	RO	0x04 (4$_{dec}$)

Index 1C12 RxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x02 (2_{dec})
1C12:01	SubIndex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1640 (5696_{dec})
1C12:02	SubIndex 002	2. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1680 (5760_{dec})
1C12:03	SubIndex 003	3. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:04	SubIndex 004	4. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:05	SubIndex 005	5. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:06	SubIndex 006	6. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:07	SubIndex 007	7. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:08	SubIndex 008	8. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:09	SubIndex 009	9. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:0A	SubIndex 010	10. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:0B	SubIndex 011	11. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:0C	SubIndex 012	12. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:0D	SubIndex 013	13. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:0E	SubIndex 014	14. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:0F	SubIndex 015	15. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})

Index 1C12 RxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:10	SubIndex 016	16. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:11	SubIndex 017	17. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:12	SubIndex 018	18. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:13	SubIndex 019	19. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:14	SubIndex 020	20. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:15	SubIndex 021	21. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:16	SubIndex 022	22. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:17	SubIndex 023	23. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:18	SubIndex 024	24. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:19	SubIndex 025	25. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:1A	SubIndex 026	26. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:1B	SubIndex 027	27. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:1C	SubIndex 028	28. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:1D	SubIndex 029	29. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:1E	SubIndex 030	30. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:1F	SubIndex 031	31. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:20	SubIndex 032	32. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:21	SubIndex 033	33. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C12:22	SubIndex 034	34. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})

Index 1C13 TxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x02 (2_{dec})
1C13:01	SubIndex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A40 (6720_{dec})
1C13:02	SubIndex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A80 (6784_{dec})
1C13:03	SubIndex 003	3. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:04	SubIndex 004	4. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:05	SubIndex 005	5. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:06	SubIndex 006	6. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:07	SubIndex 007	7. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:08	SubIndex 008	8. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:09	SubIndex 009	9. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:0A	SubIndex 010	10. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:0B	SubIndex 011	11. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:0C	SubIndex 012	12. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:0D	SubIndex 013	13. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:0E	SubIndex 014	14. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:0F	SubIndex 015	15. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})

Index 1C13 TxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:10	SubIndex 016	16. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:11	SubIndex 017	17. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:12	SubIndex 018	18. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:13	SubIndex 019	19. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:14	SubIndex 020	20. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:15	SubIndex 021	21. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:16	SubIndex 022	22. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:17	SubIndex 023	23. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:18	SubIndex 024	24. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:19	SubIndex 025	25. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:1A	SubIndex 026	26. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:1B	SubIndex 027	27. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:1C	SubIndex 028	28. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:1D	SubIndex 029	29. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:1E	SubIndex 030	30. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:1F	SubIndex 031	31. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:20	SubIndex 032	32. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:21	SubIndex 033	33. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:22	SubIndex 034	34. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:23	SubIndex 035	35. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:24	SubIndex 036	36. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})
1C13:25	SubIndex 037	37. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0_{dec})

Index 1C32 SM output parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	UINT8	RO	0x20 (32$_{dec}$)
1C32:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchronous with SM 2 event • 2: DC-Mode - Synchronous with SYNC0 Event • 3: DC-Mode - Synchronous with SYNC1 event	UINT16	RW	0x0000 (0$_{dec}$)
1C32:02	Cycle time	Cycle time (in ns): • Free Run: Cycle time of the local timer • Synchronous with SM 2 event: Master cycle time • DC-Mode: SYNC0/SYNC1 Cycle Time	UINT32	RW	0x000F4240 (1000000$_{dec}$)
1C32:03	Shift time	Time between SYNC0 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00000384 (900$_{dec}$)
1C32:04	Sync modes supported	Supported synchronization modes: • Bit 0 = 1: free run is supported • Bit 1 = 1: Synchronous with SM 2 event is supported • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 10: Output shift with SYNC1 event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 1C32:08 [▸ 221])	UINT16	RO	0xC007 (49159$_{dec}$)
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x00002710 (10000$_{dec}$)
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x00000000 (0$_{dec}$)
1C32:07	Minimum delay time		UINT32	RO	0x00000384 (900$_{dec}$)
1C32:08	Command	• 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 0x1C32:03 [▸ 221], 0x1C32:05 [▸ 221], 0x1C32:06 [▸ 221], 0x1C32:09 [▸ 221], 0x1C33:03 [▸ 222], 0x1C33:06 [▸ 221], 0x1C33:09 [▸ 222] are updated with the maximum measured values. For a subsequent measurement the measured values are reset	UINT16	RW	0x0000 (0$_{dec}$)
1C32:09	Maximum delay time	Time between SYNC1 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00000384 (900$_{dec}$)
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0$_{dec}$)
1C32:0C	Cycle exceeded counter	Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early)	UINT16	RO	0x0000 (0$_{dec}$)
1C32:0D	Shift too short counter	Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only)	UINT16	RO	0x0000 (0$_{dec}$)
1C32:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC mode only)	BOOLEAN	RO	0x00 (0$_{dec}$)

Index 1C33 SM input parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32$_{dec}$)
1C33:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchronous with SM 3 Event (no outputs available) • 2: DC - Synchronous with SYNC0 Event • 3: DC - Synchronous with SYNC1 Event • 34: Synchronous with SM 2 Event (outputs available)	UINT16	RW	0x0000 (0$_{dec}$)
1C33:02	Cycle time	as 0x1C32:02 [▶ 221]	UINT32	RW	0x000F4240 (1000000$_{dec}$)
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000384 (900$_{dec}$)
1C33:04	Sync modes supported	Supported synchronization modes: • Bit 0: free run is supported • Bit 1: Synchronous with SM 2 Event is supported (outputs available) • Bit 1: Synchronous with SM 3 Event is supported (no outputs available) • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 01: input shift through local event (outputs available) • Bit 4-5 = 10: input shift with SYNC1 event (no outputs available) • Bit 14 = 1: dynamic times (measurement through writing of 0x1C32:08 [▶ 221] or 0x1C33:08 [▶ 222])	UINT16	RO	0xC007 (49159$_{dec}$)
1C33:05	Minimum cycle time	as 0x1C32:05 [▶ 221]	UINT32	RO	0x00002710 (10000$_{dec}$)
1C33:06	Calc and copy time	Time between reading of the inputs and availability of the inputs for the master (in ns, only DC mode)	UINT32	RO	0x00000000 (0$_{dec}$)
1C33:07	Minimum delay time		UINT32	RO	0x00000384 (900$_{dec}$)
1C33:08	Command	as 0x1C32:08 [▶ 221]	UINT16	RW	0x0000 (0$_{dec}$)
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000384 (900$_{dec}$)
1C33:0B	SM event missed counter	as 0x1C32:11 [▶ 221]	UINT16	RO	0x0000 (0$_{dec}$)
1C33:0C	Cycle exceeded counter	as 0x1C32:12 [▶ 221]	UINT16	RO	0x0000 (0$_{dec}$)
1C33:0D	Shift too short counter	as 0x1C32:13 [▶ 221]	UINT16	RO	0x0000 (0$_{dec}$)
1C33:20	Sync error	as 0x1C32:32 [▶ 221]	BOOLEAN	RO	0x00 (0$_{dec}$)

Index F000 Modular device profile

Index (hex)	Name	Meaning	Data type	Flags	Default
F000:0	Modular device profile	General information for the modular device profile	UINT8	RO	0x02 (2$_{dec}$)
F000:01	Module index distance	Index distance of the objects of the individual channels	UINT16	RO	0x0010 (16$_{dec}$)
F000:02	Maximum number of modules	Number of channels	UINT16	RO	0x0020 (32$_{dec}$)

Index F008 Code word

Index (hex)	Name	Meaning	Data type	Flags	Default
F008:0	Code word	reserved	UINT32	RW	0x00000000 (0$_{dec}$)

Index F010 Module list

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module list	reserved	UINT8	RW	0x20 (32$_{dec}$)
F010:01 - 20	SubIndex 001 - 032	reserved	UINT32	RW	0x00001838 (6200$_{dec}$)

6 Appendix

6.1 EtherCAT AL Status Codes

For detailed information please refer to the EtherCAT system description.

6.2 Firmware compatibility

Beckhoff EtherCAT devices are delivered with the latest available firmware version. Compatibility of firmware and hardware is mandatory; not every combination ensures compatibility. The overview below shows the hardware versions on which a firmware can be operated.

Note

- It is recommended to use the newest possible firmware for the respective hardware.
- Beckhoff is not under any obligation to provide customers with free firmware updates for delivered products.

NOTE

Risk of damage to the device!

Pay attention to the instructions for firmware updates on the separate page [▶ 224].

If a device is placed in BOOTSTRAP mode for a firmware update, it does not check when downloading whether the new firmware is suitable. This can result in damage to the device! Therefore, always make sure that the firmware is suitable for the hardware version!

EL6201-0000			
Hardware (HW)	**Firmware (FW)**	**Revision no..**	**Release date**
01 - 05*	01	EL6201-0000-0017	2013/01
	02	EL6201-0000-0018	2016/01
	03*		2019/04

*) This is the current compatible firmware/hardware version at the time of the preparing this documentation. Check on the Beckhoff web page whether more up-to-date documentation is available.

6.3 Firmware Update EL/ES/EM/ELM/EPxxxx

This section describes the device update for Beckhoff EtherCAT slaves from the EL/ES, ELM, EM, EK and EP series. A firmware update should only be carried out after consultation with Beckhoff support.

Storage locations

An EtherCAT slave stores operating data in up to 3 locations:

- Depending on functionality and performance EtherCAT slaves have one or several local controllers for processing I/O data. The corresponding program is the so-called **firmware** in *.efw format.
- In some EtherCAT slaves the EtherCAT communication may also be integrated in these controllers. In this case the controller is usually a so-called **FPGA** chip with *.rbf firmware.
- In addition, each EtherCAT slave has a memory chip, a so-called **ESI-EEPROM**, for storing its own device description (ESI: EtherCAT Slave Information). On power-up this description is loaded and the EtherCAT communication is set up accordingly. The device description is available from the download area of the Beckhoff website at (https://www.beckhoff.de). All ESI files are accessible there as zip files.

Customers can access the data via the EtherCAT fieldbus and its communication mechanisms. Acyclic mailbox communication or register access to the ESC is used for updating or reading of these data.

The TwinCAT System Manager offers mechanisms for programming all 3 parts with new data, if the slave is set up for this purpose. Generally the slave does not check whether the new data are suitable, i.e. it may no longer be able to operate if the data are unsuitable.

Simplified update by bundle firmware

The update using so-called **bundle firmware** is more convenient: in this case the controller firmware and the ESI description are combined in a *.efw file; during the update both the firmware and the ESI are changed in the terminal. For this to happen it is necessary

- for the firmware to be in a packed format: recognizable by the file name, which also contains the revision number, e.g. ELxxxx-xxxx_REV0016_SW01.efw
- for password=1 to be entered in the download dialog. If password=0 (default setting) only the firmware update is carried out, without an ESI update.
- for the device to support this function. The function usually cannot be retrofitted; it is a component of many new developments from year of manufacture 2016.

Following the update, its success should be verified

- ESI/Revision: e.g. by means of an online scan in TwinCAT ConfigMode/FreeRun – this is a convenient way to determine the revision
- Firmware: e.g. by looking in the online CoE of the device

NOTE

Risk of damage to the device!

Note the following when downloading new device files

• Firmware downloads to an EtherCAT device must not be interrupted
• Flawless EtherCAT communication must be ensured. CRC errors or LostFrames must be avoided.
• The power supply must adequately dimensioned. The signal level must meet the specification.

In the event of malfunctions during the update process the EtherCAT device may become unusable and require re-commissioning by the manufacturer.

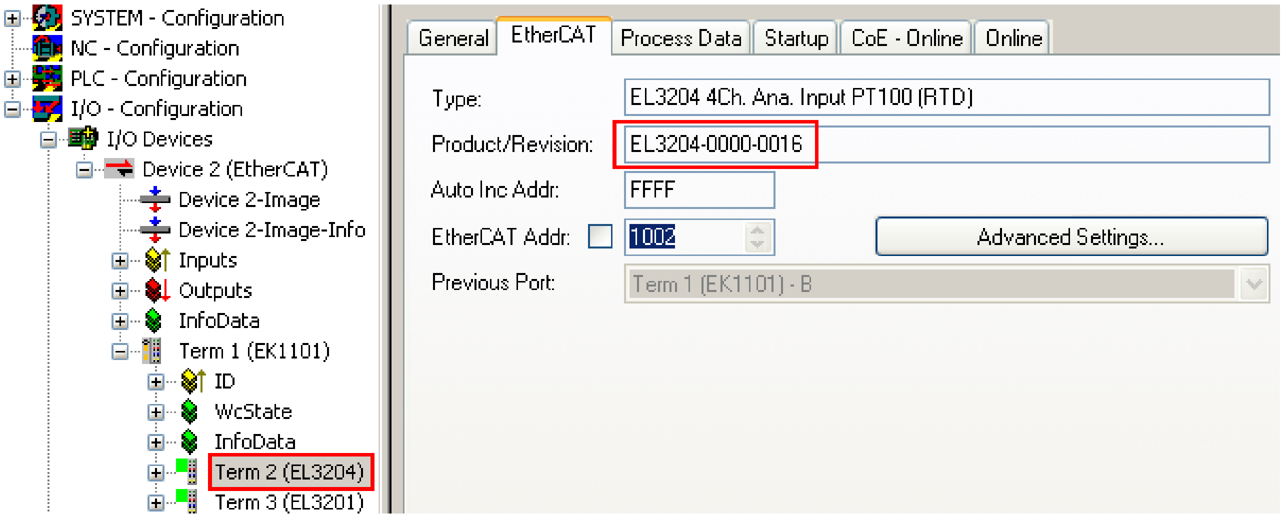
6.3.1 Device description ESI file/XML

NOTE

Attention regarding update of the ESI description/EEPROM

Some slaves have stored calibration and configuration data from the production in the EEPROM. These are irretrievably overwritten during an update.

The ESI device description is stored locally on the slave and loaded on start-up. Each device description has a unique identifier consisting of slave name (9 characters/digits) and a revision number (4 digits). Each slave configured in the System Manager shows its identifier in the EtherCAT tab:



Type: EL3204 4Ch. Ana. Input PT100 (RTD)

Product/Revision: EL3204-0000-0016

Auto Inc Addr: FFFF

EtherCAT Addr: □ 1002

Previous Port: Term 1 (EK1101) - B

Fig. 175: Device identifier consisting of name EL3204-0000 and revision -0016

The configured identifier must be compatible with the actual device description used as hardware, i.e. the description which the slave has loaded on start-up (in this case EL3204). Normally the configured revision must be the same or lower than that actually present in the terminal network.

For further information on this, please refer to the EtherCAT system documentation.

Update of XML/ESI description

The device revision is closely linked to the firmware and hardware used. Incompatible combinations lead to malfunctions or even final shutdown of the device. Corresponding updates should only be carried out in consultation with Beckhoff support.

Display of ESI slave identifier

The simplest way to ascertain compliance of configured and actual device description is to scan the EtherCAT boxes in TwinCAT mode Config/FreeRun:

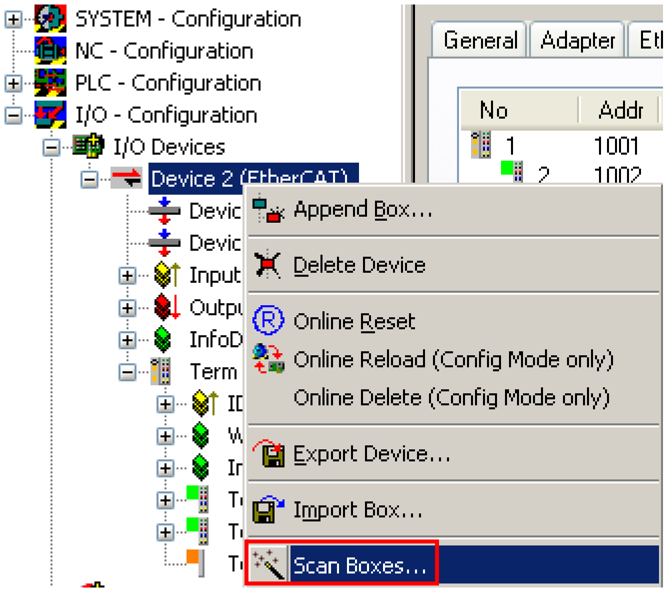
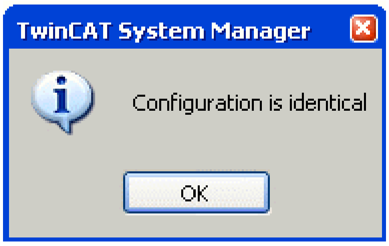


Fig. 176: Scan the subordinate field by right-clicking on the EtherCAT device

If the found field matches the configured field, the display shows

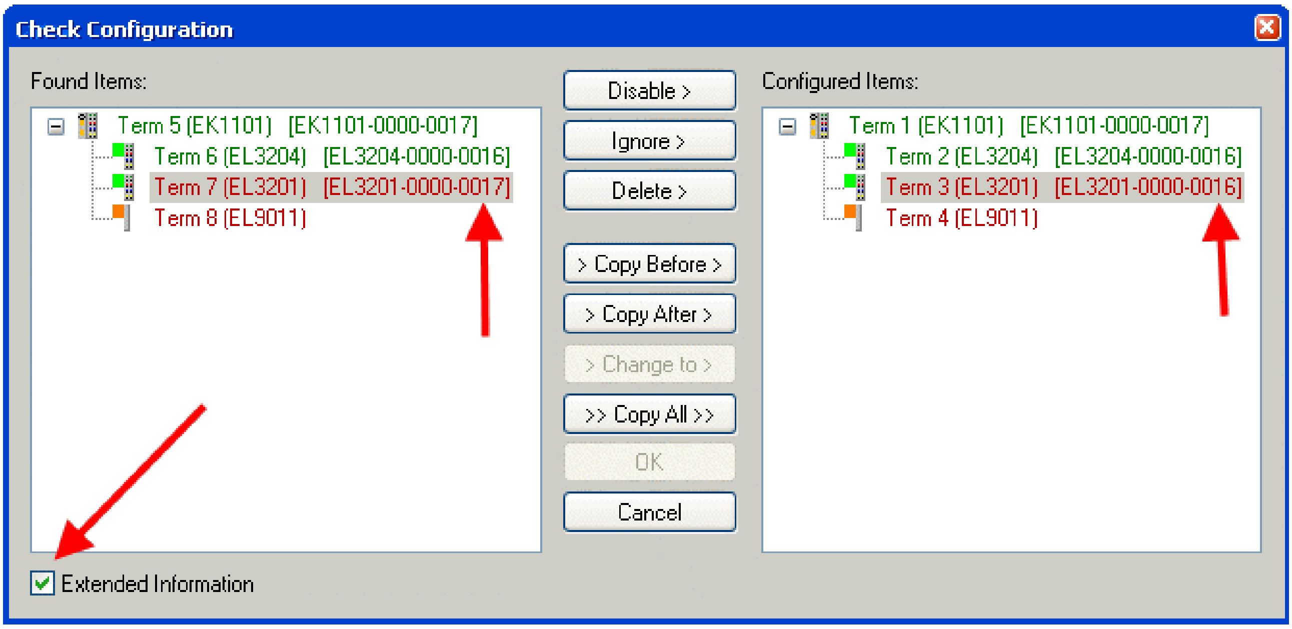


TwinCAT System Manager

Configuration is identical

Fig. 177: *Configuration is identical*

otherwise a change dialog appears for entering the actual data in the configuration.



Check Configuration

Found Items:

- Term 5 (EK1101) [EK1101-0000-0017]
  - Term 6 (EL3204) [EL3204-0000-0016]
  - Term 7 (EL3201) [EL3201-0000-0017]
  - Term 8 (EL9011)

Configured Items:

- Term 1 (EK1101) [EK1101-0000-0017]
  - Term 2 (EL3204) [EL3204-0000-0016]
  - Term 3 (EL3201) [EL3201-0000-0016]
  - Term 4 (EL9011)

☑ Extended Information

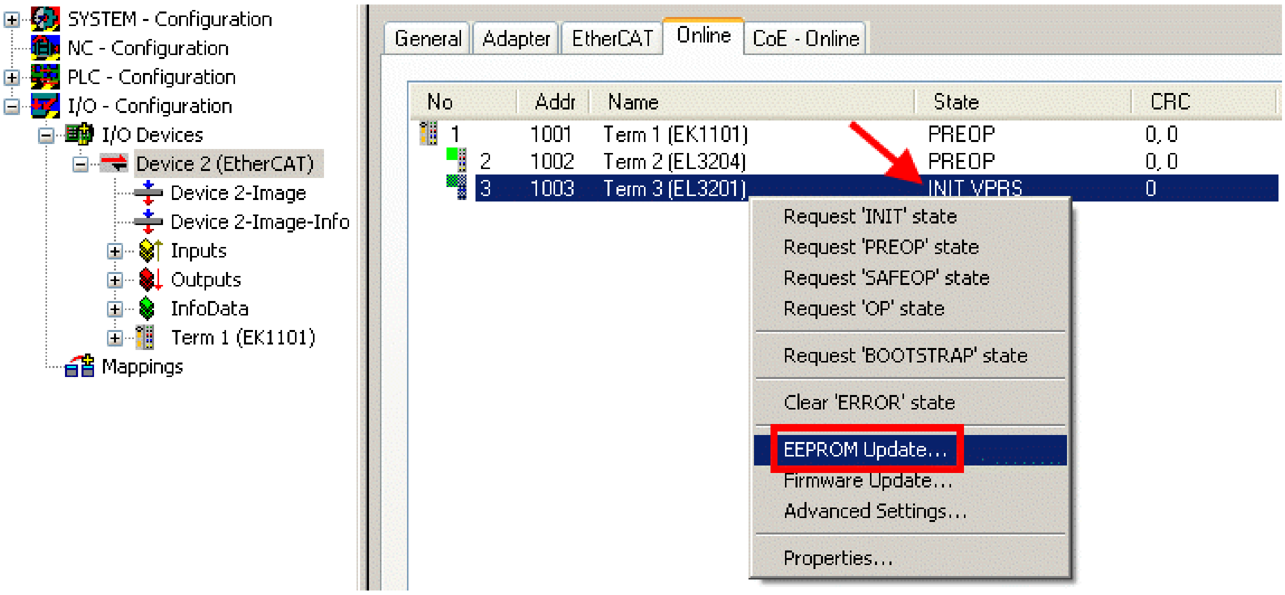
Fig. 178: *Change dialog*

In this example in Fig. *Change dialog*, an EL3201-0000-**0017** was found, while an EL3201-0000-**0016** was configured. In this case the configuration can be adapted with the *Copy Before* button. The *Extended Information* checkbox must be set in order to display the revision.

Changing the ESI slave identifier

The ESI/EEPROM identifier can be updated as follows under TwinCAT:

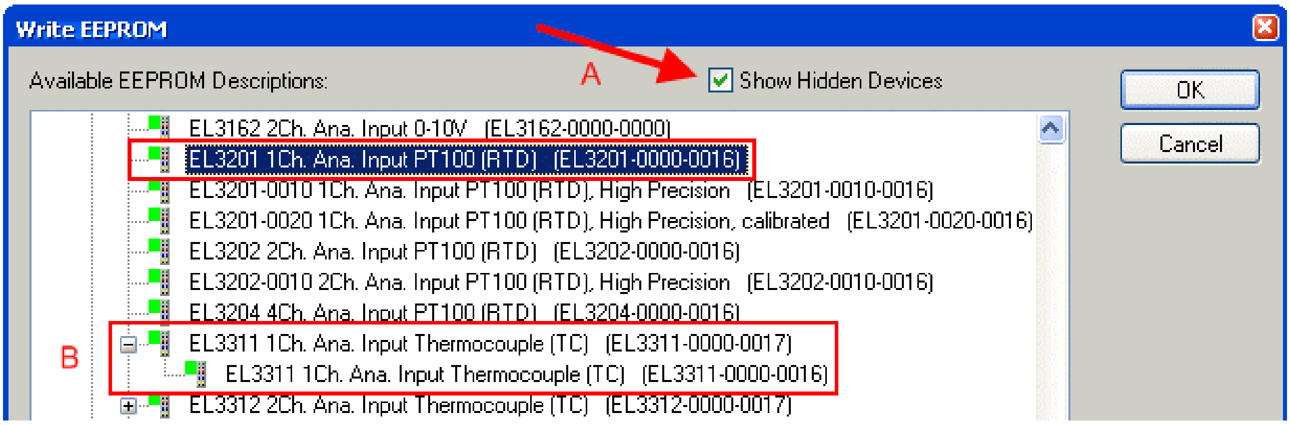
- Trouble-free EtherCAT communication must be established with the slave.
- The state of the slave is irrelevant.
- Right-clicking on the slave in the online display opens the *EEPROM Update* dialog, Fig. *EEPROM Update*



No	Addr	Name	State	CRC
1	1001	Term 1 (EK1101)	PREOP	0, 0
2	1002	Term 2 (EL3204)	PREOP	0, 0
3	1003	Term 3 (EL3201)	INIT VPRS	0

Fig. 179: EEPROM Update

The new ESI description is selected in the following dialog, see Fig. *Selecting the new ESI.* The checkbox *Show Hidden Devices* also displays older, normally hidden versions of a slave.



EL3162 2Ch. Ana. Input 0-10V (EL3162-0000-0000)
EL3201 1Ch. Ana. Input PT100 (RTD) (EL3201-0000-0016)
EL3201-0010 1Ch. Ana. Input PT100 (RTD), High Precision (EL3201-0010-0016)
EL3201-0020 1Ch. Ana. Input PT100 (RTD), High Precision, calibrated (EL3201-0020-0016)
EL3202 2Ch. Ana. Input PT100 (RTD) (EL3202-0000-0016)
EL3202-0010 2Ch. Ana. Input PT100 (RTD), High Precision (EL3202-0010-0016)
EL3204 4Ch. Ana. Input PT100 (RTD) (EL3204-0000-0016)
EL3311 1Ch. Ana. Input Thermocouple (TC) (EL3311-0000-0017)
EL3311 1Ch. Ana. Input Thermocouple (TC) (EL3311-0000-0016)
EL3312 2Ch. Ana. Input Thermocouple (TC) (EL3312-0000-0017)

Fig. 180: Selecting the new ESI

A progress bar in the System Manager shows the progress. Data are first written, then verified.

The change only takes effect after a restart.

Most EtherCAT devices read a modified ESI description immediately or after startup from the INIT. Some communication settings such as distributed clocks are only read during power-on. The EtherCAT slave therefore has to be switched off briefly in order for the change to take effect.

6.3.2 Firmware explanation

Determining the firmware version

Determining the version on laser inscription

Beckhoff EtherCAT slaves feature serial numbers applied by laser. The serial number has the following structure: **KK YY FF HH**

KK - week of production (CW, calendar week)
YY - year of production
FF - firmware version
HH - hardware version

Example with ser. no.: 12 10 03 02:

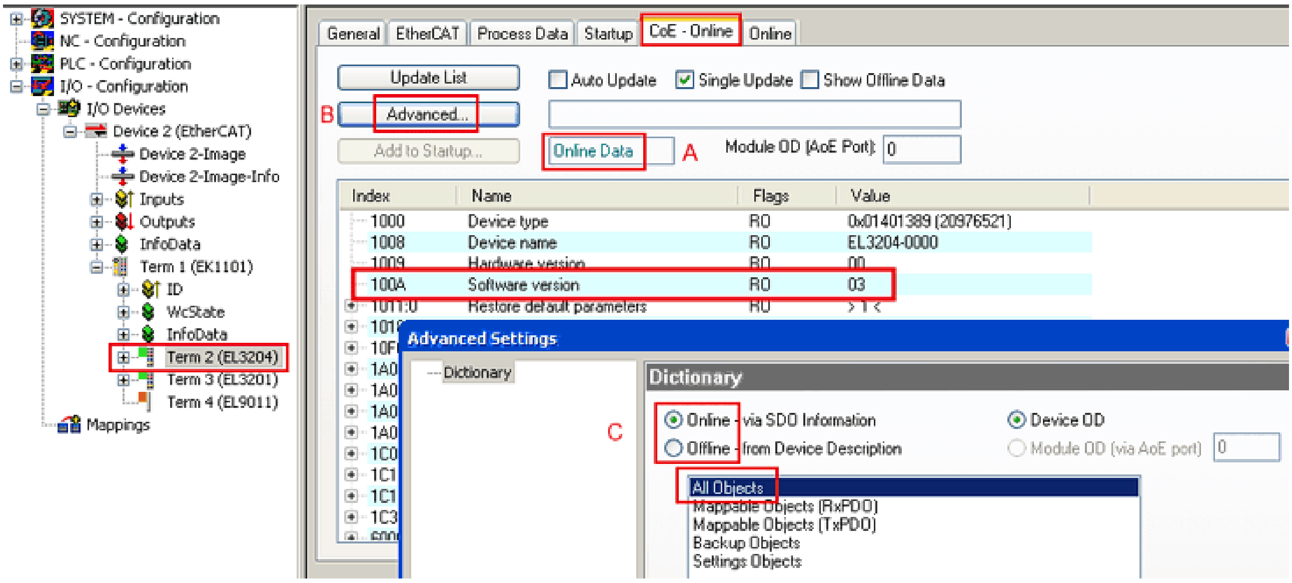
12 - week of production 12
10 - year of production 2010
03 - firmware version 03
02 - hardware version 02

Determining the version via the System Manager

The TwinCAT System Manager shows the version of the controller firmware if the master can access the slave online. Click on the E-Bus Terminal whose controller firmware you want to check (in the example terminal 2 (EL3204)) and select the tab *CoE Online* (CAN over EtherCAT).

> **CoE Online and Offline CoE**
>
> Two CoE directories are available:
> • **online**: This is offered in the EtherCAT slave by the controller, if the EtherCAT slave supports this. This CoE directory can only be displayed if a slave is connected and operational.
> • **offline**: The EtherCAT Slave Information ESI/XML may contain the default content of the CoE. This CoE directory can only be displayed if it is included in the ESI (e.g. "Beckhoff EL5xxx.xml").
>
> The Advanced button must be used for switching between the two views.

In Fig. *Display of EL3204 firmware version* the firmware version of the selected EL3204 is shown as 03 in CoE entry 0x100A.



☐ Auto Update ☑ Single Update ☐ Show Offline Data

Online Data

Module OD (AoE Port): 0

Index	Name	Flags	Value
1000	Device type	RO	0x01401389 (20976521)
1008	Device name	RO	EL3204-0000
1009	Hardware version	RO	00
100A	Software version	RO	03
1011:0	Restore default parameters	RO	> 1 <
1018			
10F			
1A0			
1A0			
1A0			
1A0			
1C0			
1C1			
1C1			
1C3			
600			

Dictionary

● Online - via SDO Information
○ Offline - from Device Description

● Device OD
○ Module OD (via AoE port) 0

All Objects
Mappable Objects (RxPDO)
Mappable Objects (TxPDO)
Backup Objects
Settings Objects

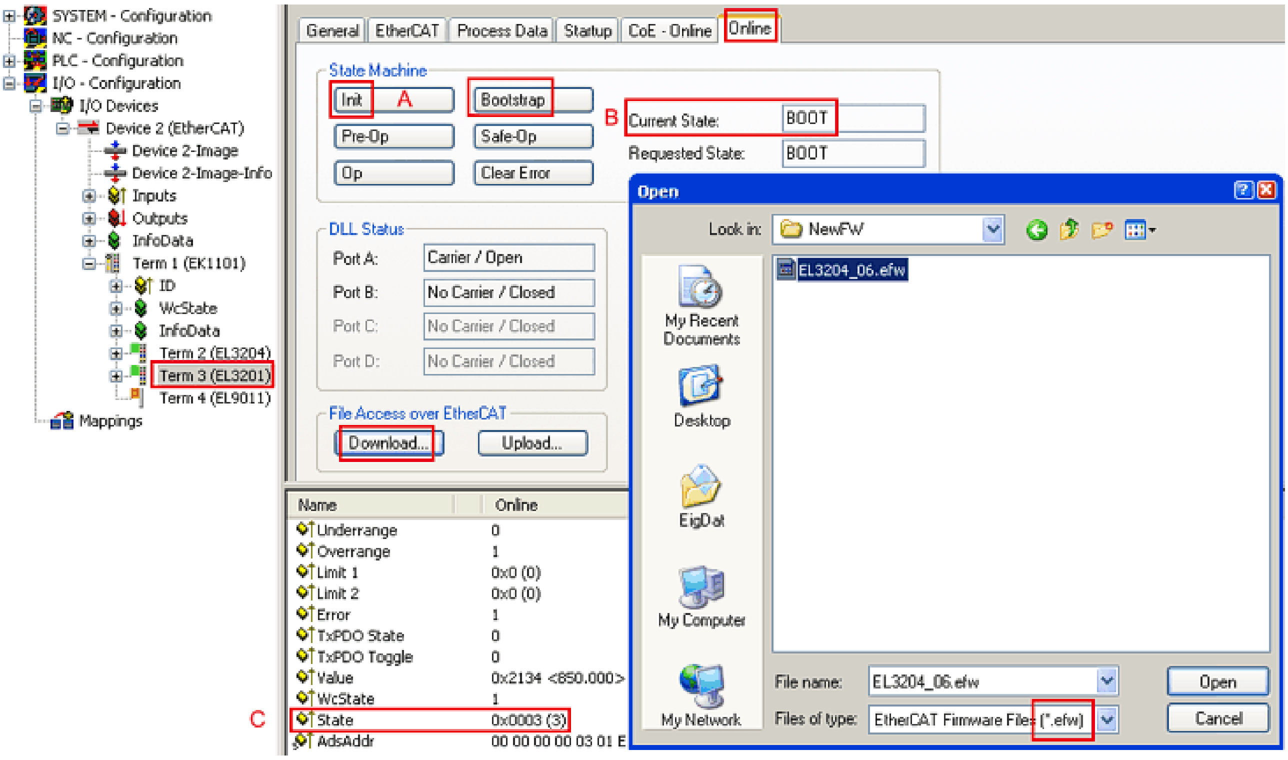
Fig. 181: Display of EL3204 firmware version

In (A) TwinCAT 2.11 shows that the Online CoE directory is currently displayed. If this is not the case, the Online directory can be loaded via the *Online* option in Advanced Settings (B) and double-clicking on *AllObjects*.

6.3.3 Updating controller firmware *.efw

> **CoE directory**
>
> The Online CoE directory is managed by the controller and stored in a dedicated EEPROM, which is generally not changed during a firmware update.

Switch to the *Online* tab to update the controller firmware of a slave, see Fig. *Firmware Update.*



Current State: BOOT

Requested State: BOOT

Port A:	Carrier / Open
Port B:	No Carrier / Closed
Port C:	No Carrier / Closed
Port D:	No Carrier / Closed

Name	Online
Underrange	0
Overrange	1
Limit 1	0x0 (0)
Limit 2	0x0 (0)
Error	1
TxPDO State	0
TxPDO Toggle	0
Value	0x2134 <850.000>
WcState	1
State	0x0003 (3)
AdsAddr	00 00 00 00 03 01 E

Look in: NewFW

EL3204_06.efw

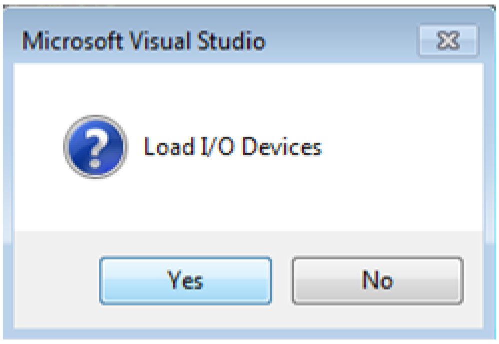
File name: EL3204_06.efw

Files of type: EtherCAT Firmware Files (*.efw)

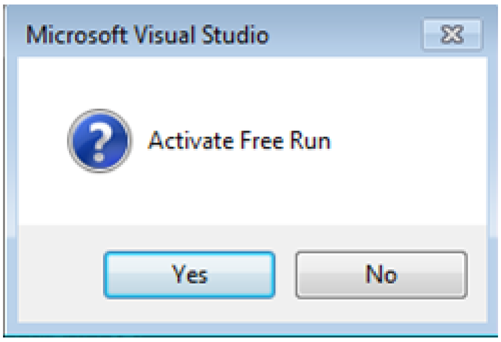
Fig. 182: Firmware Update

Proceed as follows, unless instructed otherwise by Beckhoff support. Valid for TwinCAT 2 and 3 as EtherCAT master.

- Switch TwinCAT system to ConfigMode/FreeRun with cycle time >= 1 ms (default in ConfigMode is 4 ms). A FW-Update during real time operation is not recommended.

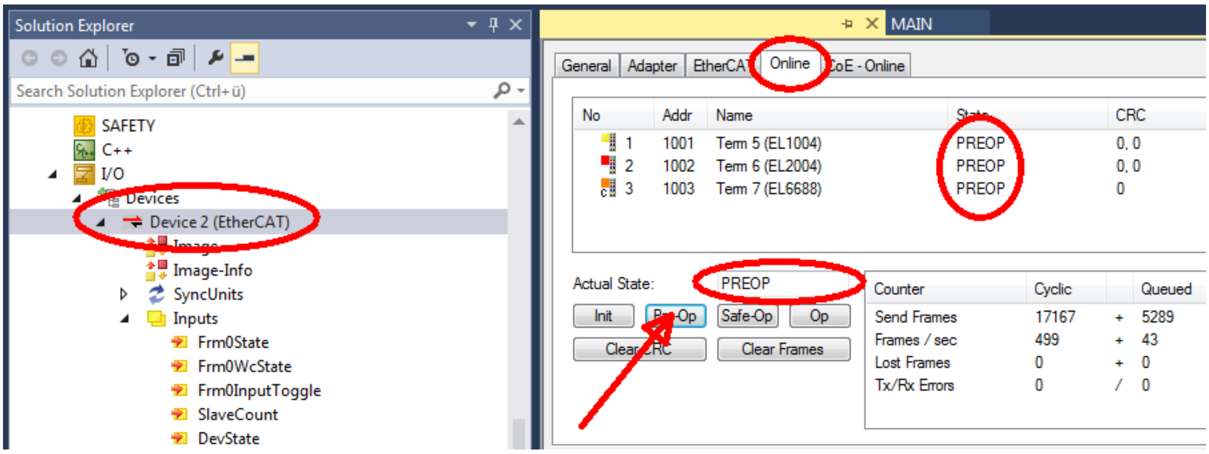

Microsoft Visual Studio

Load I/O Devices


Microsoft Visual Studio

Activate Free Run

- Switch EtherCAT Master to PreOP



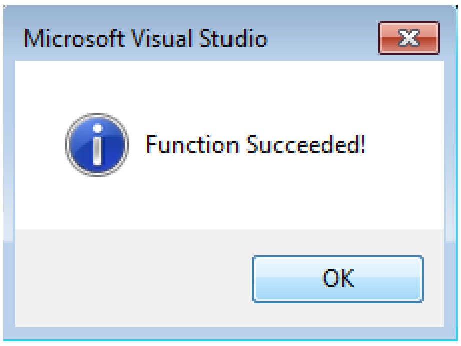
No	Addr	Name	State	CRC
1	1001	Term 5 (EL1004)	PREOP	0, 0
2	1002	Term 6 (EL2004)	PREOP	0, 0
3	1003	Term 7 (EL6688)	PREOP	0

Actual State: PREOP

Counter	Cyclic		Queued
Send Frames	17167	+	5289
Frames / sec	499	+	43
Lost Frames	0	+	0
Tx/Rx Errors	0	/	0

- Switch slave to INIT (A)
- Switch slave to BOOTSTRAP

- Check the current status (B, C)
- Download the new *efw file (wait until it ends). A pass word will not be neccessary usually.



Microsoft Visual Studio

Function Succeeded!

- After the download switch to INIT, then PreOP
- Switch off the slave briefly (don't pull under voltage!)
- Check within CoE 0x100A, if the FW status was correctly overtaken.

6.3.4 FPGA firmware *.rbf

If an FPGA chip deals with the EtherCAT communication an update may be accomplished via an *.rbf file.

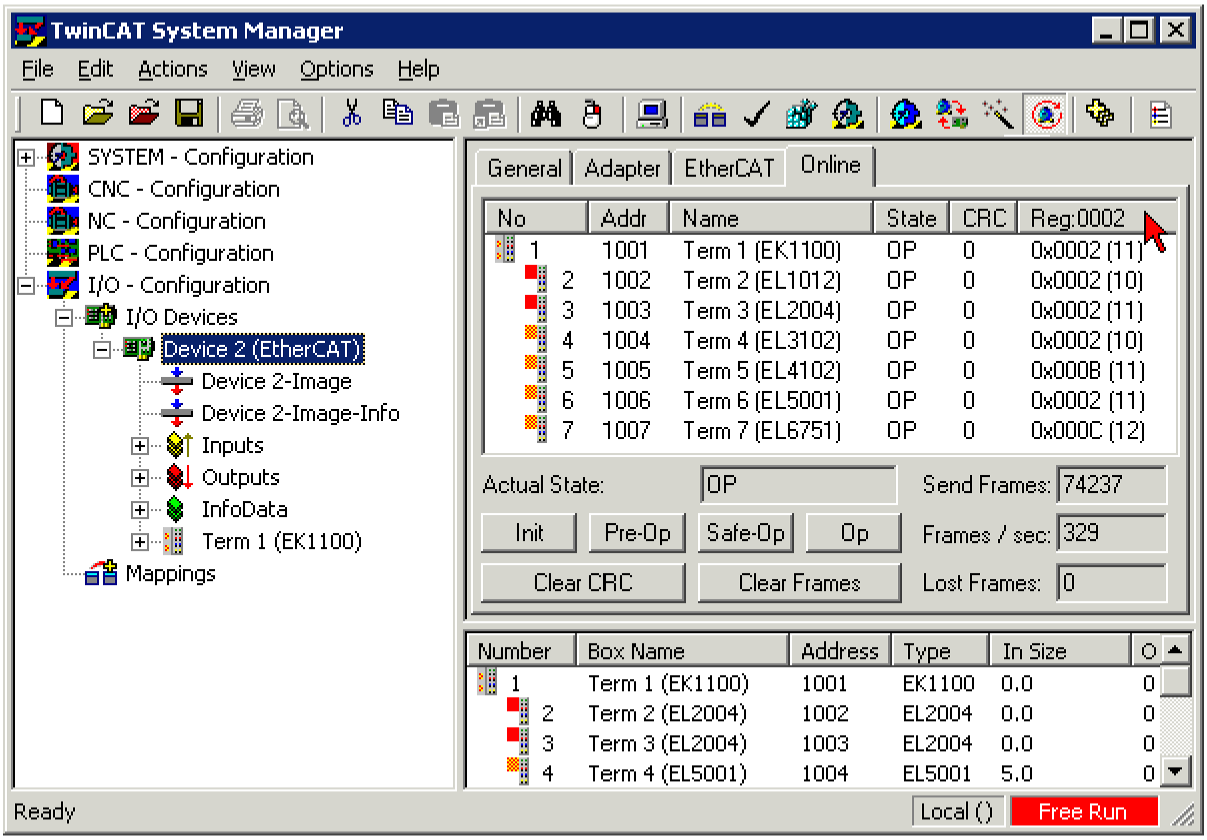
- Controller firmware for processing I/O signals
- FPGA firmware for EtherCAT communication (only for terminals with FPGA)

The firmware version number included in the terminal serial number contains both firmware components. If one of these firmware components is modified this version number is updated.

Determining the version via the System Manager

The TwinCAT System Manager indicates the FPGA firmware version. Click on the Ethernet card of your EtherCAT strand (Device 2 in the example) and select the *Online* tab.

The *Reg:0002* column indicates the firmware version of the individual EtherCAT devices in hexadecimal and decimal representation.



No	Addr	Name	State	CRC	Reg:0002
1	1001	Term 1 (EK1100)	OP	0	0x0002 (11)
2	1002	Term 2 (EL1012)	OP	0	0x0002 (10)
3	1003	Term 3 (EL2004)	OP	0	0x0002 (11)
4	1004	Term 4 (EL3102)	OP	0	0x0002 (10)
5	1005	Term 5 (EL4102)	OP	0	0x000B (11)
6	1006	Term 6 (EL5001)	OP	0	0x0002 (11)
7	1007	Term 7 (EL6751)	OP	0	0x000C (12)

Actual State: OP
Send Frames: 74237
Frames / sec: 329
Lost Frames: 0

Number	Box Name	Address	Type	In Size	O
1	Term 1 (EK1100)	1001	EK1100	0.0	0
2	Term 2 (EL2004)	1002	EL2004	0.0	0
3	Term 3 (EL2004)	1003	EL2004	0.0	0
4	Term 4 (EL5001)	1004	EL5001	5.0	0

Fig. 183: FPGA firmware version definition

If the column *Reg:0002* is not displayed, right-click the table header and select *Properties* in the context menu.

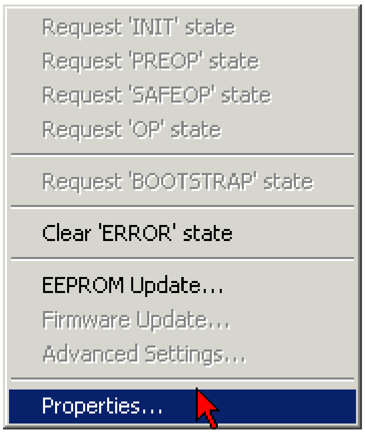
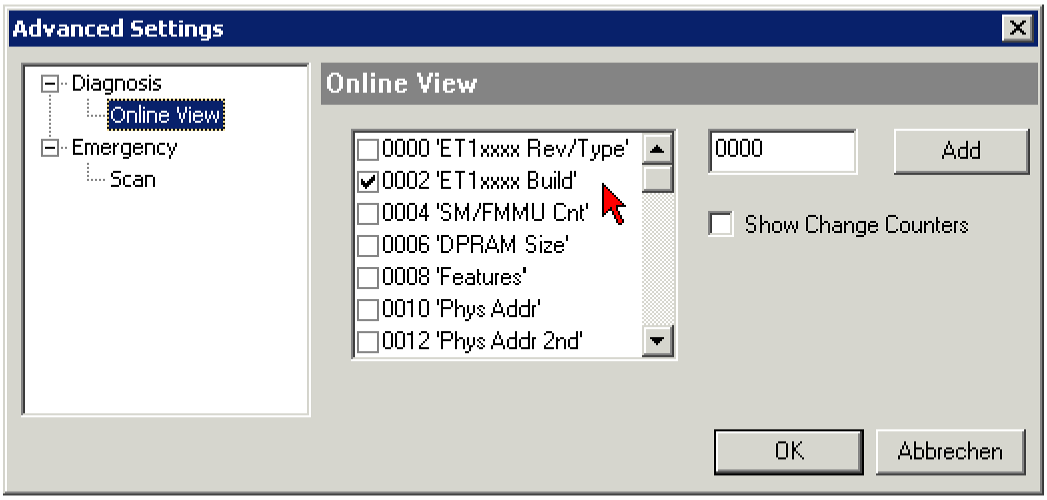


Fig. 184: Context menu *Properties*

The *Advanced Settings* dialog appears where the columns to be displayed can be selected. Under *Diagnosis/***Online View** select the *'0002 ETxxxx Build'* check box in order to activate the FPGA firmware version display.



- □ 0000 'ET1xxxx Rev/Type'
- ☑ 0002 'ET1xxxx Build'
- □ 0004 'SM/FMMU Cnt'
- □ 0006 'DPRAM Size'
- □ 0008 'Features'
- □ 0010 'Phys Addr'
- □ 0012 'Phys Addr 2nd'

0000

□ Show Change Counters

Fig. 185: Dialog *Advanced Settings*

Update

For updating the FPGA firmware

- of an EtherCAT coupler the coupler must have FPGA firmware version 11 or higher;
- of an E-Bus Terminal the terminal must have FPGA firmware version 10 or higher.

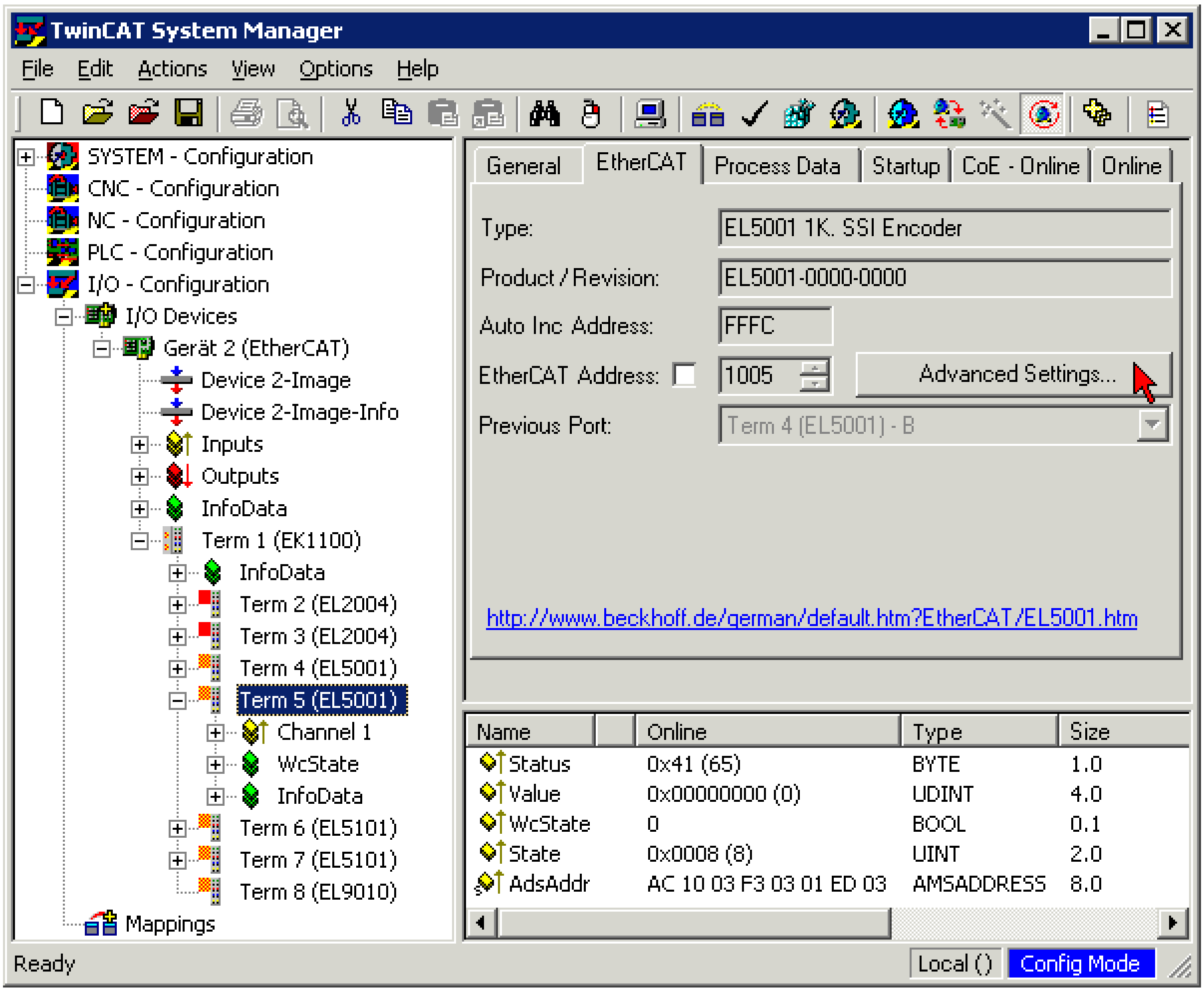
Older firmware versions can only be updated by the manufacturer!

Updating an EtherCAT device

The following sequence order have to be met if no other specifications are given (e.g. by the Beckhoff support):

- Switch TwinCAT system to ConfigMode/FreeRun with cycle time >= 1 ms (default in ConfigMode is 4 ms). A FW-Update during real time operation is not recommended.

- In the TwinCAT System Manager select the terminal for which the FPGA firmware is to be updated (in the example: Terminal 5: EL5001) and
click the *Advanced Settings* button in the *EtherCAT* tab:



Type: EL5001 1K. SSI Encoder

Product / Revision: EL5001-0000-0000

Auto Inc Address: FFFC

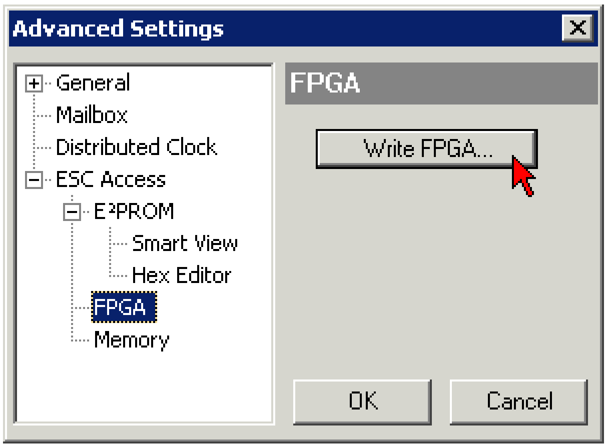
EtherCAT Address: □ 1005

Previous Port: Term 4 (EL5001) - B

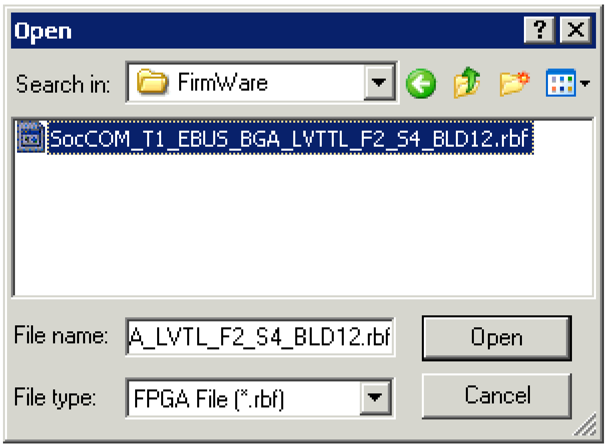
http://www.beckhoff.de/german/default.htm?EtherCAT/EL5001.htm

Name		Online	Type	Size
Status		0x41 (65)	BYTE	1.0
Value		0x00000000 (0)	UDINT	4.0
WcState		0	BOOL	0.1
State		0x0008 (8)	UINT	2.0
AdsAddr		AC 10 03 F3 03 01 ED 03	AMSADDRESS	8.0

- The *Advanced Settings* dialog appears. Under *ESC Access/E²PROM*/FPGA click on *Write FPGA* button:



- Select the file (*.rbf) with the new FPGA firmware, and transfer it to the EtherCAT device:



Open

Search in: FirmWare

SocCOM_T1_EBUS_BGA_LVTTL_F2_S4_BLD12.rbf

File name: A_LVTL_F2_S4_BLD12.rbf

File type: FPGA File (*.rbf)

- Wait until download ends
- Switch slave current less for a short time (don't pull under voltage!). In order to activate the new FPGA firmware a restart (switching the power supply off and on again) of the EtherCAT device is required.
- Check the new FPGA status

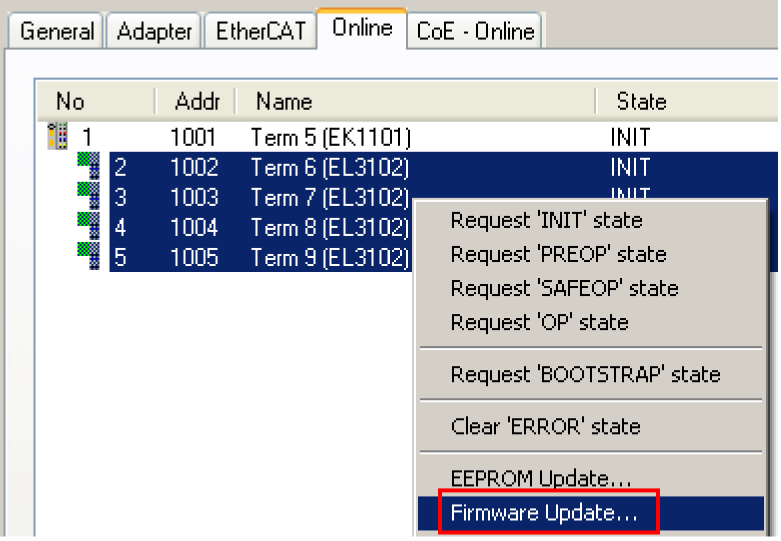
NOTE

Risk of damage to the device!

A download of firmware to an EtherCAT device must not be interrupted in any case! If you interrupt this process by switching off power supply or disconnecting the Ethernet link, the EtherCAT device can only be recommissioned by the manufacturer!

6.3.5 Simultaneous updating of several EtherCAT devices

The firmware and ESI descriptions of several devices can be updated simultaneously, provided the devices have the same firmware file/ESI.



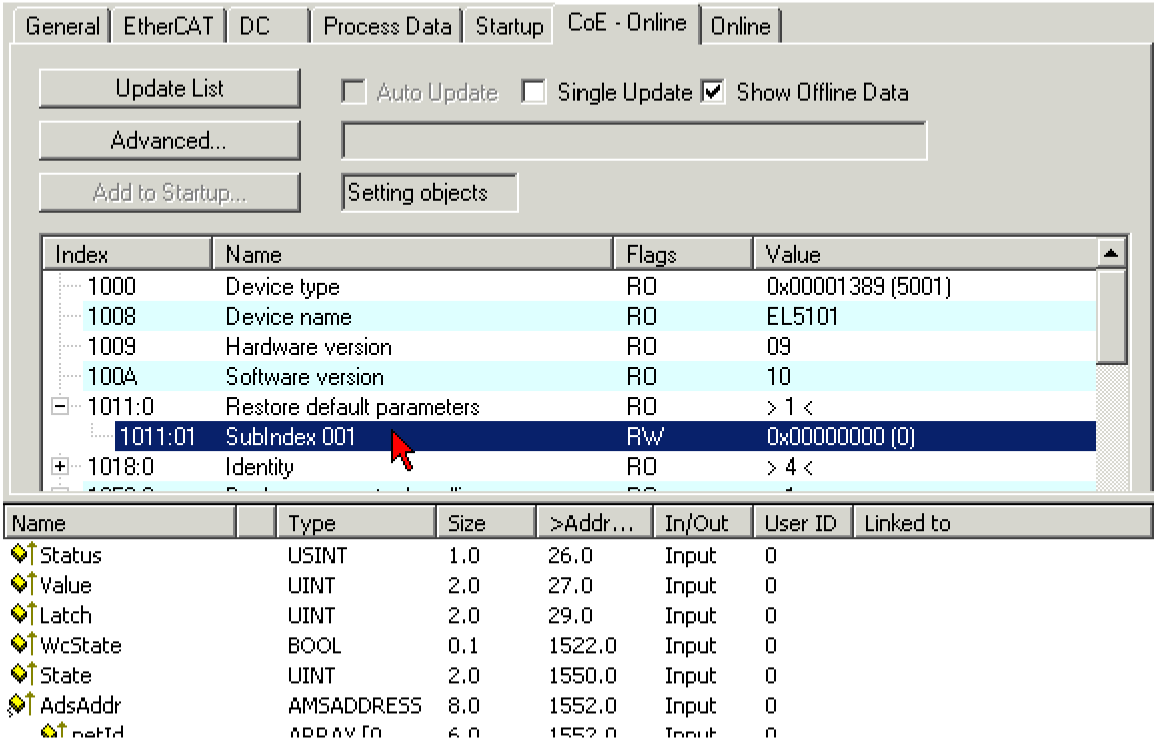
No	Addr	Name	State
1	1001	Term 5 (EK1101)	INIT
2	1002	Term 6 (EL3102)	INIT
3	1003	Term 7 (EL3102)	INIT
4	1004	Term 8 (EL3102)	
5	1005	Term 9 (EL3102)	

Fig. 186: *Multiple selection and firmware update*

Select the required slaves and carry out the firmware update in BOOTSTRAP mode as described above.

6.4 Restoring the delivery state

To restore the delivery state for backup objects in ELxxxx terminals, the CoE object Restore default parameters, *SubIndex 001* can be selected in the TwinCAT System Manager (Config mode) (see Fig. *Selecting the Restore default parameters PDO*)



General | EtherCAT | DC | Process Data | Startup | CoE - Online | Online

Update List | Advanced... | Add to Startup...

□ Auto Update □ Single Update ☑ Show Offline Data

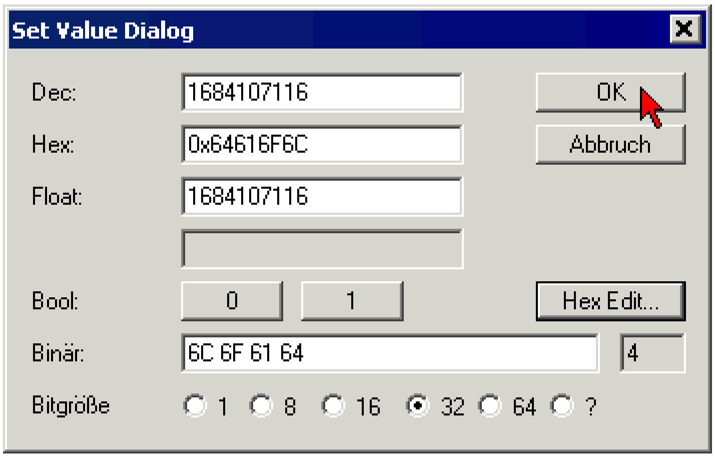
Setting objects

Index	Name	Flags	Value
1000	Device type	RO	0x00001389 (5001)
1008	Device name	RO	EL5101
1009	Hardware version	RO	09
100A	Software version	RO	10
1011:0	Restore default parameters	RO	> 1 <
1011:01	SubIndex 001	RW	0x00000000 (0)
1018:0	Identity	RO	> 4 <

Name		Type	Size	>Addr...	In/Out	User ID	Linked to
Status		USINT	1.0	26.0	Input	0	
Value		UINT	2.0	27.0	Input	0	
Latch		UINT	2.0	29.0	Input	0	
WcState		BOOL	0.1	1522.0	Input	0	
State		UINT	2.0	1550.0	Input	0	
AdsAddr		AMSADDRESS	8.0	1552.0	Input	0	
netId		ARRAY [0..	6.0	1552.0	Input	0	

Fig. 187: Selecting the "Restore default parameters" PDO

Double-click on SubIndex 001 to enter the Set Value dialog. Enter the value **1684107116** in field *Dec* or the value **0x64616F6C** in field *Hex* and confirm with *OK* (Fig. *Entering a restore value in the Set Value dialog*). All backup objects are reset to the delivery state.



Set Value Dialog

Dec: 1684107116

Hex: 0x64616F6C

Float: 1684107116

Bool: 0 | 1

Binär: 6C 6F 61 64 | 4

Bitgröße ○ 1 ○ 8 ○ 16 ● 32 ○ 64 ○ ?

OK | Abbruch | Hex Edit...

Fig. 188: Entering a restore value in the Set Value dialog

Alternative restore value

In some older terminals the backup objects can be switched with an alternative restore value: Decimal value: 1819238756, Hexadecimal value: 0x6C6F6164An incorrect entry for the restore value has no effect.

6.5 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages:
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You will also find further documentation for Beckhoff components there.

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