BECKHOFF New Automation Technology

Manual | EN TF2000

TwinCAT 3 | HMI Server

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|--------------------------------------|--|--|--|------------------|---|--|
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1 Foreword

1.1 Notes on the documentation

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

It is essential that the documentation and the following notes and explanations are followed when installing and commissioning the 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.

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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 symbols

In this documentation the following symbols are used with an accompanying safety instruction or note. The safety instructions must be read carefully and followed without fail!

▲ DANGER

Serious risk of injury!

Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.

A WARNING

Risk of injury!

Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.

Personal injuries!

Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.

NOTE

Damage to the environment or devices

Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.



Tip or pointer

This symbol indicates information that contributes to better understanding.

2 Overview

2.1 **Product description**

The TwinCAT HMI server is a web server that was developed in-house by Beckhoff. It is platformindependent and not based on any web server functionalities of the operating system. The TwinCAT HMI server has a modular structure. Via server extensions it can provide additional functionalities such as a reporting system or other protocols. This enables customers to develop their own server extensions, so that their business logic can be provided centrally.

The TwinCAT HMI server supports the TwinCAT ADS protocol and can therefore communicate with all TwinCAT devices. Third-party systems can be connected via OPC UA extensions.

| Content | | Framework | | |
|------------------|-----------------|---------------|----------------|----|
| Pages Logic | | Controls | API | |
| | | HTTP(S), WS(| S) | |
| - OAT LINK O | | | | |
| vinCAT HMI Serve | er | Server Extens | sion | |
| WINCAT HMI Serve | er Framework | Server Extens | sion Events |]] |

3 Installation

3.1 System requirements

Version 1.12

Technical data Min. TwinCAT Version

Min. TwinCAT level Operating system

TF2000 TC3 HMI server 3.1.4024.0 TC1000 TC3 | ADS Windows 10 Windows CE7 TwinCAT/BSD

Version 1.10

Technical data Min. TwinCAT Version

Min. TwinCAT level Operating system **TF2000 TC3 HMI server** 3.1.4022.0 TC1000 TC3 | ADS Windows 7/8/10

3.2 Installation

Procedure for installing the TwinCAT HMI Server for Windows-based operating systems except for Windows CE7:

1. For an update installation, close all HMI server instances that may be running.



This is done automatically by the setup starting with version 1.12.

- Double-click on the downloaded file *TF2000-HMI-Server*. Start the installation under Windows with **Run As Admin** by right-clicking the setup files and selecting the corresponding option in the context menu.
- 3. Select the language to guide you through the installation.

| Beckhoff TE2000 HMI Engineering - Ins | tallShield Wizard 🛛 🛛 💌 |
|---------------------------------------|---------------------------------|
| Select the language for the insta | llation from the choices below. |
| English (United States) | OK Cancel |

4. Click on **Next** and then accept the end user agreement.

| 🚽 Bec | khoff TF2000 HMI Server - 1.8.593.0 |
|------------------------------|---|
| | と |
| § 1 | Scope of this Agreement |
| (1) | Licensor has agreed with Licensee to grant Licensee a license to use and exploit the software set out in the License Certificate ("Licensed Software") subject to the terms and conditions of this Software License Agreement ("Agreement"). |
| (2) | Licensor shall also grant Licensee access to user documentation for the Licensed Software ("Licensed Documentation"). The Licensed Software and the Licensed Documentation are jointly referred to as "Licensed Material". Anv data (e.o. files. data base materials) which is |
| ● I <u>a</u> ◎ I <u>d</u> | ccept the terms in the license agreement Print Print |
| nstallSi | < <u>B</u> ack Next > Cancel |

5. Enter your user data.

| Beckhoff TF2000 HMI Server - 1.8.593.0 | EX |
|--|--------------|
| | と |
| User Name: | |
| Max Mustermann | |
| Organization: | |
| Max Mustermann Inc. | |
| | |
| | |
| | |
| | |
| | |
| | |
| < <u>B</u> ack N | ext > Cancel |



6. You have a choice between complete and user-specific installation. Confirm with **Next**.

| 🛃 Beckhoff TF200 | 0 HMI Server - 1.8.593.0 | — |
|------------------|---|----------|
| | | と |
| Please select a | setup type. | |
| © Complete | All program features will be installed to all installed TwinCAT 3 versions on your system. (Requires the most disk space.) | |
| Custom | Choose which program features you want installed and to which TwinCAT 3 version they will be installed. Recommended for advanced users. | |
| InstallShield | < <u>B</u> ack <u>N</u> ext > | Cancel |

7. The user-specific installation offers the following settings:

| Beckhoff TF2000 HMI Server - 1.8.593.0 | × |
|--|-----|
| | と |
| Click on an icon in the list below to change how a feature is installed. | |
| | |
| | |
| | |
| | |
| Delete Server Configuration (if exists) | |
| Create a Desktop shortcut | |
| Enable HTTP access from all IP addresses (default only localhost) | |
| InstalShield | |
| < <u>Back</u> <u>N</u> ext > Can | cel |

⇒ If all HMI server instances are not yet closed, the setup will pause.

8. Close all HMI server instances and click Retry.



This is done automatically by the setup starting with version 1.12.

9. Select Finish to exit the setup.

| Beckhoff TF2000 HMI Server | - 1.8.593.0 | × |
|----------------------------|--------------------------------|---|
| | Beckhoff Setup Completed | |
| | Show the Windows Installer log | |
| | < Back Finish Cance | |

 \Rightarrow The installation is now completed.

Version 1.10:

You can start the TF2000 HMI server via the optional desktop shortcut or the start menu (Programs/ Beckhoff/TF2000 HMI Server).



Version 1.12:

The TwinCAT HMI Server has been registered as a service. This means that the TwinCAT HMI Server starts automatically with the TwinCAT System Service and does not have to be started manually. You can manually stop or restart the service using the Task Manager.

3.3 Licensing

Licensing a full version

- 1. Start TwinCAT XAE
- 2. Open an existing TwinCAT 3 project or create a new project

3. In the Solution Explorer, navigate to the entry SYSTEM/License



4. Open the **Manage Licenses** tab and add a **Runtime License** for your product (in this screenshot **TF2000: TC3 HMI Server**).

| Disable a | utomatic detection of required licer | nses for project | |
|-----------|--------------------------------------|------------------|--|
| Order No | License | Add License | |
| TF2000 | TC3 HMI Server | Cpu license | |
| TF2010 | TC3 HMI Clients Pack 1 | cpu license | |
| TF2020 | TC3 HMI Clients Pack 3 | Cpu license | |
| TF2030 | TC3 HMI Clients Pack 10 | Cpu license | |
| TF2040 | TC3 HMI Clients Pack 25 | Cpu license | |
| TF2045 | TC3 HMI Clients Pack 100 | Cpu license | |
| TF2050 | TC3 HMI Targets Pack 1 | Cpu license | |
| TF2060 | TC3 HMI Targets Pack 3 | Cpu license | |
| TF2070 | TC3 HMI Targets Pack 10 | Cpu license | |
| TF2080 | TC3 HMI Targets Pack 25 | Cpu license | |
| TF2090 | TC3 HMI Targets Pack 100 | Cpu license | |
| TF2110 | TC3 HMI OPC UA | Cpu license | |
| TF2200 | TC3 HMI Extension SDK | cpu license | |

5. **Optional:** If you wish to add the license for a remote device, you must first connect to this device via the TwinCAT XAE toolbar

| i 🔛 🚨 🗖 🌮 🔨 🎯 🔐 🛙 | <local></local> |
|-------------------|------------------------------|
| | <local></local> |
| orer | CX-08A38E (10.1.128.204.1.1) |
| | Choose Target System |

6. Open the **Order Information**

tab. The **System ID** and **HW Platform** fields cannot be changed. They describe the platform to be licensed. In general, a TwinCAT 3 license is bound to two key figures: The **System ID** uniquely identifies your device.

The **HW platform** is a key figure for the performance of the device.



7. Optionally, you can enter your own order number and a comment for your own needs

| License Devid System Id: | ce Target (Hardwa | are Id) | Add Platform: | | |
|-----------------------------|---------------------|----------------|-----------------------|-------------|------------------------------------|
| B868EB51-A | 0D5-D60D-BA3A-D447 | 6BCAB1AF | other (90) | v | |
| License Requ | lest | | | | |
| Provider: | Beckhoff Automation | ו י | Generate File | | |
| License Id: | VA0815 | Customer I | d: | | |
| Comment: | | | | | |
| License Activ | ation | | | | |
| 7[| Days Trial License | | License Response File | | |
| Order No | | License | | Instances | Current Status |
| TC1000 | | TC3 ADS | | cpu license | expires on Jun 5, 2017 (trial lice |
| TF2000 | | TC3 HMI Server | | cpu license | expires on Jun 5, 2017 (trial lice |

- 8. On the **Order Information** tab, click the **Generate License Request File...** button to generate a license request file that is validated by a Beckhoff license server (if you do not know your **Beckhoff License ID**, contact your Beckhoff sales representative).
- 9. After you have saved the License Request File, the system asks whether the file should be sent to the Beckhoff license server by email:

| TwinCAT XAE | 83 |
|----------------------------------|----|
| Send license request to Beckhoff | |
| Yes No | |

- 10. If you confirm the dialog with **Yes**, your default email client opens and creates a new email for <u>tclicense@beckhoff.com</u> containing the license request file.
- 11. Send this activation request to Beckhoff

The License Response File is sent to the same email address that sent the License Request File.

12. Shortly afterwards, you will receive a license file from the Beckhoff license server. Import the file via the **Activate License Response File...** button to activate the product

| License Device | Target (Hardware Id) | ✓ Add | |
|-------------------|----------------------|--------------------|------------------------------------|
| System Id: | F | Platform: | |
| B868EB51-A0D5-D6 | 0D-BA3A-D4476BCAB1AF | other (90) 👻 | |
| icense Request | | | |
| Provider: Beck | hoff Automation 🔹 | Generate File | |
| License Id: VAD | Customer Id: | | |
| Comment: | | | |
| icense Activation | | | |
| 7 Days Tri | al License | ense Response File | |
|)rder No | License | Instances | Current Status |
| C1000 | TC3 ADS | cpu license | expires on Jun 5, 2017 (trial lice |
| F2000 | TC3 HMI Server | cpu license | expires on Jun 5, 2017 (trial lice |

13. Select the License Response File you received in your folder system

| 🚥 Open | | | X |
|-----------------------|-----------------------------|--|-------------|
| 😋 💽 🗢 📜 🕨 Computer 🕨 | Downloads 👻 | Search Downloads | Q |
| Organize 🔻 New folder | | | |
| 🔆 Favorites | ▲ Name | A | Date m |
| 🧮 Desktop | E LicenseResponseFile.tclrs | | 21.03.20 |
| 🗼 Downloads | | | |
| 📃 Recent Places | | | |
| Pictures | | | |
| | | | |
| 🥽 Libraries | | | |
| Application | | | |
| Documents | | | |
| J Music | | | |
| E Pictures | | | |
| Public . | III | | |
| File name | LicenseResponseFile.tclrs | TwinCAT License Response | onse File 🔻 |
| | | Open | Cancel |

14. The License Response File is imported and all licenses contained in it are activated (all affected demo licenses are removed)

15. Restart TwinCAT to activate the license



⇒ The license file is automatically copied to your local hard disk under ...\TwinCAT\3.1\Target\License.

4 Configuration

After the installation, assign a default password for the system administrator so that the HMI server can be configured and the HMI engineering utility can access it.

| After starting the server you can use the system tray is call u | up the configuration page of the serve |
|--|--|
|--|--|



Assign a password for the system administrator when you call up the page for the first time.



The configuration and the published HMI project can be found under *ProgramData\Beckhoff\TF2000 TwinCAT 3 HMI Server*. To reset the server, you can delete the directory. To back up or delete the files, stop the server.

4.1 ADS

The ADS Server Extension displays the configured target systems of the selected publish configuration. You can add further devices.

| TwinCAT HMI Server Configura | ation → × | | | | | |
|--|---|---|-----|--|--|--|
| ADS TcHmiSrv TcHmiEventLogger TcHmiRecipeManagement TcHmiScope | Publish Configuration: default | Manage Configurations | | | | |
| | ADS | | | | | |
| | PLC1 Enabled AmsNetId Port Use whitelisting > Symbols | true 127.0.0.1.1.1 851 false | × × | | | |
| | Add Runtime Timeout Default timeout for ADS requests Accept Version: 1.12.748.0, Config Version | PT15 | | | | |

- Enabled: Specifies whether the target system should be active or disabled in the HMI.
- AmsNetId: AmsNetId of the target system. An ADS route to the target system must exist.
- Port: Port on the target system that is to be accessed (e.g. 851 for PLC, 10000 for TwinCAT System Service, etc.)
- Use whitelisting: Specifies whether <u>blacklisting (false) or whitelisting (true) [19]</u> should apply to the configured target.
- Symbols: Manually add symbols per IndexGroup and Offset [▶ 23].
- Add Runtime: Add a new target system.
- Timeout: Timeout for ADS requests. If the target system does not respond within this time, the access is considered an error.

Click on **Add Runtime** to add a new target system. In the dialog you will automatically see all locally configured

All locally configured routes are displayed with their AmsNetId when adding a runtime. You can select the AmsNetId and the corresponding port to add the target system.

| TwinCAT HMI Server Configura | ition 🕆 X | | | | - |
|------------------------------|---|--------------------------------|---|---|----|
| ADS | Publish Configuration: | default | Manage Configurations |] | |
| TcHmiSrv | General Diagn | ostics | | | |
| TcHmiEventLogger | ADS | | | | |
| TcHmiRecipeManagement | | | | | |
| TcHmiScope | ✓ Runtimes Runtimes at which an ADS co | nnection is established, Can b | e set for specific remote configuration | | |
| | ✓ PLC1 | Add Runtime | | 0 | |
| | | Name | NewTarget | | ×× |
| | Enabled | Enabled | true | ~ | * |
| | Amsivetio | AmsNetId | | | |
| | Port | Port | 851 | | |
| | > Symbols | Use whitelisting | false | * | × |
| | 7 Symbols | | Add | | |
| | + Add Runtime | | | _ | |
| | Timeout | 12.0 | PT1S | | |
| | Default timeout for ADS requ | ests | | | |
| | Accept | | | | |
| | Version: 1.12.748.0, C | onfig Version: 1.0.0.3 | 4 | | |

4.1.1 Blacklisting and whitelisting

With version 1.12, it is possible to use black or whitelisting for PLC symbols. With black or whitelisting, PLC symbols can be explicitly hidden or shown for use in the HMI. For this, you can tag the corresponding variables in the PLC with an <u>attribute pragma</u>. In the default case, blacklisting is active, which means that you have access to all variables of the PLC that are not explicitly hidden for the HMI. On the configuration page of the ADS extension, you can switch between black and whitelisting (**Use whitelisting**).

| TwinCAT HMI Server Configura | ition +⊨ × | | | | | |
|---|--|--------------------------|-----------------------|----|--|--|
| ADS | Publish Configuration: | default ~ | Manage Configurations | | | |
| TcHmiSrv | General Diag | nostics | | | | |
| TcHmiEventLogger TcHmiRecipeManagement | ADS | | | | | |
| TcHmiScope | Runtimes Runtimes at which an ADS connection is established, Can be set for specific remote configuration PLC1 | | | | | |
| | 0 | | | XX | | |
| | Enabled | | true | ~ | | |
| | AmsNetId | | 127.0.0.1.1.1 | | | |
| | Port | | 851 | | | |
| | Use whitelistin | g | false | | | |
| | Symbols | | | | | |
| | + Add Runtime | | | | | |
| | Timeout Default timeout for ADS req | p. uests | 15 | | | |
| | Accept | | | | | |
| | Version: 1.12.748.0, 0 | Config Version: 1.0.0.34 | | | | |

The following attribute pragmas are available for black or whitelisting in the TwinCAT HMI:

```
{ attribute 'TcHmiSymbol.Show' }
{ attribute 'TcHmiSymbol.ShowRecursively' }
{ attribute 'TcHmiSymbol.Hide' }
{ attribute 'TcHmiSymbol.ReadOnly' }
{ attribute 'TcHmiSymbol.BLOB' }
```

Use:

- TcHmiSymbol.Show: If a variable has this attribute, it will be displayed in the HMI in case of whitelisting. With this attribute only the first level is displayed (example: only the struct, but not the subelements). The attribute has no effect on blacklisting.
- TcHmiSymbol.ShowRecursively: If a variable has this attribute, it is displayed with all sub-elements in the HMI in the case of whitelisting (e.g. structure or function block with all sub-elements). Variables in the sub-elements that are blacklisted with *TcHmiSymbol.Hide* are not displayed.
- TcHmiSymbol.Hide: If a variable has this attribute, it will not be displayed in the HMI in case of blacklisting. All variables without an attribute are displayed. If the attribute is used with a structure, all sub-elements are also hidden in the HMI, even if they are tagged with *TcHmiSymbol.Show*.
- TcHmiSymbol.ReadOnly: If a variable has this attribute, the variable with all sub-elements cannot be written in the HMI.
- TcHmiSymbol.BLOB: If a variable has this attribute, the data is transferred to the server and the client in binary form (reduction of packet size). The data must be converted in the client itself.
- Blacklisting overrides whitelisting.

With blacklisting, all variables are visible in the HMI, except variables with the attribute *TcHmi-Symbol.Hide*.

With whitelisting, no variables are visible in the HMI except variables with the attributes *TcHmiSymbol.Show* and *TcHmiSymbol.ShowRecursively*.

Available from version 1.12.

4.1.2 Methods and properties

With version 1.12 it is possible to access PLC properties in the HMI and to call PLC methods in the HMI.

PLC properties

The properties must be made visible in the PLC with an <u>attribute pragma</u> via ADS.

```
{attribute 'monitoring' := 'call'}
PROPERTY Prop : BOOL
```

You can then access the property in the TwinCAT HMI.



PLC properties can only be used explicitly in the HMI by linking the property individually to a control attribute. If the entire function block is linked to a control attribute, the property is not called. This is the case when a function block is used as the source data of the DataGrid or as a user control parameter.

PLC methods

The methods must be switched visible in the PLC with an attribute pragma via ADS.

```
{attribute 'TcRpcEnable'}
METHOD MyMethod : BOOL
VAR_INPUT
bInput : BOOL;
END_VAR
```

Afterwards you can see the methods in the TwinCAT HMI. Within the TwinCAT HMI Configuration Window, you can call them explicitly.

| | Conver Constrain | Nama | Value | | Datations | Orline | Dentist | b.f |
|---|----------------------|-------------------------------|-----------------------------------|--------|-----------------------|--------------|---------|----------------------|
| 1 | Server Symbols | Name | value | | Datatype | Unline | Persist | IVIapp |
| | All Symbols | A (A ADS | | - | | | | |
| | co iviapped symbols | P Tr PLC1.MAIN.fbTest | | S PLO | L1.FB_lest | ~ | | PLC1::MAIN::fbTest |
| | Internal Symbols | PLC1.MAIN.fbTest.MethodWithou | utParam | S PLO | C1.BOOL(VOID) | \checkmark | | PLC1::MAIN::fbTest: |
| | Cocalizations | PLC1.MAIN.fbTest.MyMethod | | c DI (| 1.BOOL(blnput : BOOL) | ~ | | PLC1::MAIN::fbTest: |
| | C Data types | PLC1.MAIN.iTest.Prop | Create new server syr | lodr | OL(BOOL) | \checkmark | | PLC1::MAIN::iTest::P |
| | Controls | Copy symbol express | | | | | | |
| | Global Events | | Unman | | - | | | |
| | fx Functions | | Onmap | | | | | |
| 1 | Files | | | | | | | |
| | [] All files | | Map to other symbol | | | | | |
| | | | Refresh Mapping Rename Mapping | | | | | |
| | Views | | | | | | | |
| | Users and Groups | | Write Value to symbo | L | | | | |
| | Users | sers | | 2 | | | | |
| | Groups | | Edit Permissions | | | | | |
| | I►I Action Templates | | | | | | | |
| | | | | | | | | |

At runtime in the client, you can call the methods using a JavaScript/TypeScript function and the Framework API. Below you will find an example for the call via Framework API.

```
// call of method without parameter
TcHmi.Symbol.readEx2("%s%PLC1.MAIN.fbTest.MethodWithoutParam%/s%", function (data) {
  console.log(data);
});
// call of method with parameter
TcHmi.Symbol.writeEx("%s%PLC1.MAIN.fbTest.MyMethod%/s%", { bInput: true }, function (data) {
  console.log(data);
});
```

If the method has a return value, you can access the return value within the callback function in the Result object.



In a future version of the TwinCAT HMI, it will be possible to call the methods directly via the Actions and Conditions Editor without using JavaScript/TypeScript.



4.1.3 **Pointers and references**

With version 1.12.748.0, <u>references</u>, <u>pointers</u> and <u>interface pointers</u> can be resolved in the HMI. This makes it possible to access the original variable being pointed to via the pointer or reference. This can be read and written when accessing via the pointer or reference. The resolved pointers or references are listed as usual under the variables in the TwinCAT HMI Configuration Window.

Changing the addresses of the pointers or references so that they point to another variable is not possible in the HMI. This must be done in the PLC.



Available from version 1.12.748.0.

4.1.4 Access by IndexGroup and Offset

It makes most sense to access PLC variables by symbol name in order to detect changes in the symbolism (e.g. due to an OnlineChange). Small controllers (e.g. BC/BX) that have no symbolism can be addressed directly via IndexGroup and Offset. Via the configured ADS runtime you can add a new symbol that fetches the values by IndexGroup and Offset (hex values are converted to the corresponding decimal values).

| TwinCAT HMI Server Configuration 👳 🗡 | | | | |
|--------------------------------------|--|----------------------|-----------------|---------|
| ADS | Publish Configuration: default | ▼ Man | nage Configurat | ions |
| TcHmiLua | | | | |
| TcHmiSqliteLogger | ADS Version: 1.2.107.200, Config Versio | on: 1.0.0.6 | | |
| TcHmiSrv | Maximum number of sessions | 8 | | |
| TcHmiTextStorage | Runtimes | + PLC1 | | |
| TcHmiUserManagement | Can be set for specific remote configuration | Enabled true | | * |
| | | IP address 127.0.0.1 | | |
| | | AmsNetId 127.0.0.1. | .1.1 | • |
| | | Port 851 | | • |
| | | Symbols | | |
| | | TAda | Add Sym | bol 🛛 🕄 |
| | | -Remove | Name | Marker |
| | | + TcSysService | IndexGroup | 0x4020 |
| | | + Add | IndexOffset | 0 |
| | Timeout | DT1S | Datatype | INT16 · |
| | | P115 | | Add |
| | Accept | | | |

4.2 TcHmiSrv

4.2.1 Configuring certificates

The TwinCAT HMI server offers the option of issuing certificates for a secure connection. To verify the certificates, install them on the respective clients.

| TcHmiSrv ADS | TcHmiEventLogger | TcHmiLua | TcHmiSqliteHistorize | TcHmiSqliteLogger | TcHmiTextStorage | | |
|--|-------------------------|------------------------------|---|-------------------|--|--|--|
| Other Server-Extensi | ons | Sett | ings | | | | |
| TcHmiUserManagemen Log Configurations default | t | Expo Impo Expo Rest | ort TcHmiSrv Config ort TcHmiSrv Config ort SSL Certificate art Server | | | | |
| remote | | Show | v/Hide Diagnostics | | | | |
| Log Level Project name | Info | * | | | .NET Classic Versions | | |
| Project version Authentication required Can be set for specific remote config Publish timeout | 1.0.0.0 None PT5S | • | | | Memory usage Remote Server Inbound bytes Outbound bytes | 49.11 MB 875138.00 byte 14872418.00 byte | |
| UsergroupUsers Virtual directories Can be set for specific remote config | guration | | | | Uptime | PT1H26M39S | |
| Accept | | | | | | | |
| 127.0.0.1:3000/ExportCertifica | te | /ersion | : 1.0.0.37 | | | | |

If an officially issued certificate is available, you can upload it on the configuration page of the server under TcHmiSrv/Security/Certificate (.crt). Save the private key in PEM format.

| TcHmiSrv | ADS | TcHmiEventLc | ogger | TcHmiLua | TcHmiSq | liteHistorize | TcHmiSqliteLogger | TcHmiTextStorage | | ▼ |
|---|-----------------|--------------------|---------|---------------|---------|---------------|-------------------|-----------------------|------------------|---|
| General | Advanced | Security | Symbols | Webserver | | | | | | |
| TcHmiSrv | | | | | | | | | | |
| Only client certi Approved certificate | ificates allow | ed to authenticate | e false | | - | | | Diagnostics | | |
| Certificate | | | Select | a File | × | | | Accepted sockets | 88 | |
| Duration for de | fault certifica | Ite | P365D | | | | | Active sessions | 4 | |
| Client Certifica | ates | | | | | | | Active sockets | 88 | |
| Default authent | tication exter | nsion | TcHmi | UserManagemen | | | | Architecture | Windows x86 | |
| Key | | | Select | a File | × | | | .NET Core Versions | | |
| Key Password | | | Select | a File | | | | .NET Classic Versions | | |
| Self signed roo | ot certificate | • | Select | a File | × | | | Memory usage | 48.85 MR | |
| Self signed root | t certificate k | ey | Select | a File | × | | | Remote Server | 40.05 MD | |
| TempDH | | | Select | a File | | | | Inbound bytes | 883182.00 byte | |
| Select User by | | | Comb | obox | * | | | Outbound bytes | 14958933.00 byte | |
| Aco | ept | | | | | | | Uptime | PT1H28M16S | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Product Version: 1.10.1018.48, Version: 1.10.1018.48, Config Version: 1.0.0.37

4.2.2 Configuring the network interface card

Under *TcHmiSrv/Webserver/Endpoints* you can configure under which network interface cards, port numbers and protocols the HMI server can be reached.

- Protocols supported: HTTP/HTTPS
- Binding to all network interface cards: Static IP address of a network card: Binding to associated cards. 127.0.0.1: Only local access is allowed, remote connections are rejected.



• Port number: Freely selectable, should not already be accessed by the operating system.

| 🖉 TcHmiSr | v | × | 5 | | |
|-------------------------------------|-------------------------------|-----------------------|---------------|-------------------|---------|
| $\leftrightarrow \ \Rightarrow \ G$ | (i) 127.0.0 | . 1 :1010/Conf | ig/TcHmiSr | v?Content=C/ | ATEGORY |
| TcHmiSrv | ADS | TcHmiEver | ntLogger | TcHmiLua | TcHm |
| General | Advanced | Security | Webserve | r | |
| TcHmiSrv Product Versio | / on: 1.8.593.0, V | ersion: 1.2.107. | 200, Config V | /ersion: 1.0.0.24 | |
| Enable cache | | | true | | - |
| Cache max ag Server restart req | ge uired | | P30D | | |
| Cache max er Server restart req | ntry size ^{uired} | | 1048576 | | |
| Cache max si | ze | | 2097152 | | |

| Cache max size Server restart required | 2097152 | |
|---|-------------------------|---|
| Cookie expiration date | P30D | |
| Gzip compression level | 5 | Ŧ |
| Endpoints | + http://127.0.0.1:1010 | |
| | + https://0.0.0.0:1020 | |

+Add

4.3 Start more instances

Since version 1.12, multiple server instances can be started on one system. This function is included in the basic TF2000 license. The target and client licenses are shared among the server instances, so you need licenses for the sum of all connected targets or clients.

To start another server instance, proceed as follows:

1. Stop the service from the TwinCAT HMI Server (**TcHmiSrv**). You can do this in the Task Manager under the services:

| Processes Performa | ance App history | Start-u | Users Details | Services | | |
|--|------------------|---------|-------------------|----------|---------|-----|
| Name | PIC | Des | cription | | Status | |
| 🖏 TcHmiSrv 🛛 🗕 | 712 | n Twi | nCAT3 HMI Serve | r | Running | |
| Contemporate Contemporate Contemporation Contempora | Start | | nCAT Motion Con | trol GST | Running | |
| Contract Con | Stop | | nCAT Nc Interpret | ter | Running | |
| CSysSrv | Restart | | nCAT3 System Se | rvice | Running | |
| Contraction TeamViewer | Open Service | ; | mViewer | | Running | - 1 |
| Contraction Contraction Contraction | Search online | | note Desktop Ser | vices | Stopped | |
| TF3300 Scope : | Go to details | | nCAT3 Scope Sen | ver | Running | |
| < | | | | | | > |

- 2. Navigate to the following folder on the system hard disk: C:\ProgramData\Beckhoff\TF2000 TwinCAT 3 HMI Server\service.
- 3. Create a new folder for the additional server instance. The folder name specifies the name of the instance. The default instance has the name "*TcHmiProject*".
- 4. Start the service again via the Task Manager.
 - ⇒ There are now multiple server instances initially running on the same port. Since this is not allowed, the ports must be changed.

5. Open the configuration page of the default server instance at **TcHmiSrv - Web server** and change the ports to free ports.

| TcHmiSrv ADS TcHmiLua | TcHmiRecipeManagement | TcHmiScope | TcHmiSql |
|--|--|----------------------------------|-----------------|
| General Advanced Security | Symbols Webserver | | |
| TcHmiSrv | | | |
| Running as service with project TcHmiProject | t | | |
| > Remote Server> Allowed certificates for remote servers | | | |
| Enable cache | true | | ~ |
| Cache max age Server restart required | P30D | | |
| Cache max entry size 🗊 Server restart required | 1048576 | | |
| Cache max size | 2097152 | | |
| > Client priority list Ip addresses of preferred clients. If client limit is reached th | is clients will be able to connect and clients whi | ich are not in this list will be | e disconnected. |
| Client-Cache max age Defines, how long (in seconds) server responses may be car | 0 ched | | |
| Cookie expiration date | P30D | | |
| Gzip compression level | GZIP_MEDIUM | | |
| SSDP discovery | Enabled on alternative port | | ~ |
| 🗸 Endpoints 🔸 | | | |
| | | | |
| https://0.0.0.0 <mark>·1021</mark> | | | × |
| | | | |
| ✓ http://127.0.0.1:1010 | | | |
| | | | × |
| http://127.0.0.1 <mark>:1011</mark> | | | |
| | | | |

+ Add

6. Confirm the changes by clicking **Accept** at the bottom of the page.

7. Change the name of the instance at **TcHmiSrv - General** and confirm the changes by clicking on **Accept**. Enter the name you used for the folder name here.

| TcHmiSrv | ADS | TcHmiLua | TcHmiRe | ecipeManagement | TcHmiScope | TcHmiSqliteLogger |
|--|--|-----------------|----------------------------|-----------------|------------|-------------------|
| General | Advanced | Security | Symbols | Webserver | | |
| TcHmiSrv | | | | | | |
| Running as serv | vice with pro | ject TcHmiProje | ect | | | |
| > Configuration > Default docum Default Locale Leave empty to use of Default Time Locale Leave empty to use of Default timezon Leave empty to use of Default timezon Leave empty to use of | ns ment client locale ccale client locale ne client timezone | | client client client | | | * * |
| > Extensions | | | | | | |
| > Files | | | Talles | (Desci-1422) | | |
| | | | IcHm | iProject23 | | |
| Project version | | | 1.0.0.0 | 0 | | |
| Authentication | required | | Alway | s authenticate | | M |
| > Usergroups | | | | | | |
| > UsergroupUs | ers | | | | | |
| > virtual directo | ones | _ | | | | |
| Acce | ept | | | | | |

- 8. Repeat the procedure from steps 3 to 7 for additional server instances.
- \Rightarrow The server instances are now accessible via different ports.

In the future, a service management page will be provided in the TwinCAT HMI server which will make it easy to create further instances.



Available from version 1.12.

5 Appendix

5.1 Return codes

5.1.1 ADS Return Codes

Grouping of error codes: <u>0x000 [▶ 29]</u>..., <u>0x500 [▶ 29]</u>..., <u>0x700 [▶ 30]</u>..., <u>0x1000 [▶ 32]</u>...

Global error codes

| Hex | Dec | HRESULT | Name | Description | |
|------|-----|-------------|---------------------------|--|--|
| 0x0 | 0 | 0x9811 0000 | ERR_NOERROR | No error. | |
| 0x1 | 1 | 0x9811 0001 | ERR_INTERNAL | Internal error. | |
| 0x2 | 2 | 0x9811 0002 | ERR_NORTIME | No real-time. | |
| 0x3 | 3 | 0x9811 0003 | ERR_ALLOCLOCKEDMEM | Allocation locked – memory error. | |
| 0x4 | 4 | 0x9811 0004 | ERR_INSERTMAILBOX | Mailbox full – the ADS message could not be sent. Reducing the number of ADS messages per cycle will help. | |
| 0x5 | 5 | 0x9811 0005 | ERR_WRONGRECEIVEHMSG | Wrong HMSG. | |
| 0x6 | 6 | 0x9811 0006 | ERR_TARGETPORTNOTFOUND | Target port not found – ADS server is not started or is not reachable. | |
| 0x7 | 7 | 0x9811 0007 | ERR_TARGETMACHINENOTFOUND | Target computer not found – AMS route was not found. | |
| 0x8 | 8 | 0x9811 0008 | ERR_UNKNOWNCMDID | Unknown command ID. | |
| 0x9 | 9 | 0x9811 0009 | ERR_BADTASKID | Invalid task ID. | |
| 0xA | 10 | 0x9811 000A | ERR_NOIO | No IO. | |
| 0xB | 11 | 0x9811 000B | ERR_UNKNOWNAMSCMD | Unknown AMS command. | |
| 0xC | 12 | 0x9811 000C | ERR_WIN32ERROR | Win32 error. | |
| 0xD | 13 | 0x9811 000D | ERR_PORTNOTCONNECTED | Port not connected. | |
| 0xE | 14 | 0x9811 000E | ERR_INVALIDAMSLENGTH | Invalid AMS length. | |
| 0xF | 15 | 0x9811 000F | ERR_INVALIDAMSNETID | Invalid AMS Net ID. | |
| 0x10 | 16 | 0x9811 0010 | ERR_LOWINSTLEVEL | Installation level is too low –TwinCAT 2 license er- ror. | |
| 0x11 | 17 | 0x9811 0011 | ERR_NODEBUGINTAVAILABLE | No debugging available. | |
| 0x12 | 18 | 0x9811 0012 | ERR_PORTDISABLED | Port disabled – TwinCAT system service not started. | |
| 0x13 | 19 | 0x9811 0013 | ERR_PORTALREADYCONNECTED | Port already connected. | |
| 0x14 | 20 | 0x9811 0014 | ERR_AMSSYNC_W32ERROR | AMS Sync Win32 error. | |
| 0x15 | 21 | 0x9811 0015 | ERR_AMSSYNC_TIMEOUT | AMS Sync Timeout. | |
| 0x16 | 22 | 0x9811 0016 | ERR_AMSSYNC_AMSERROR | AMS Sync error. | |
| 0x17 | 23 | 0x9811 0017 | ERR_AMSSYNC_NOINDEXINMAP | No index map for AMS Sync available. | |
| 0x18 | 24 | 0x9811 0018 | ERR_INVALIDAMSPORT | Invalid AMS port. | |
| 0x19 | 25 | 0x9811 0019 | ERR_NOMEMORY | No memory. | |
| 0x1A | 26 | 0x9811 001A | ERR_TCPSEND | TCP send error. | |
| 0x1B | 27 | 0x9811 001B | ERR_HOSTUNREACHABLE | Host unreachable. | |
| 0x1C | 28 | 0x9811 001C | ERR_INVALIDAMSFRAGMENT | Invalid AMS fragment. | |
| 0x1D | 29 | 0x9811 001D | ERR_TLSSEND | TLS send error – secure ADS connection failed. | |
| 0x1E | 30 | 0x9811 001E | ERR_ACCESSDENIED | Access denied – secure ADS access denied. | |

Router error codes

| Hex | Dec | HRESULT | Name | Description |
|-------|------|-------------|----------------------------|--|
| 0x500 | 1280 | 0x9811 0500 | ROUTERERR_NOLOCKEDMEMORY | Locked memory cannot be allocated. |
| 0x501 | 1281 | 0x9811 0501 | ROUTERERR_RESIZEMEMORY | The router memory size could not be changed. |
| 0x502 | 1282 | 0x9811 0502 | ROUTERERR_MAILBOXFULL | The mailbox has reached the maximum number of possible messages. |
| 0x503 | 1283 | 0x9811 0503 | ROUTERERR_DEBUGBOXFULL | The Debug mailbox has reached the maximum number of possible messages. |
| 0x504 | 1284 | 0x9811 0504 | ROUTERERR_UNKNOWNPORTTYPE | The port type is unknown. |
| 0x505 | 1285 | 0x9811 0505 | ROUTERERR_NOTINITIALIZED | The router is not initialized. |
| 0x506 | 1286 | 0x9811 0506 | ROUTERERR_PORTALREADYINUSE | The port number is already assigned. |
| 0x507 | 1287 | 0x9811 0507 | ROUTERERR_NOTREGISTERED | The port is not registered. |
| 0x508 | 1288 | 0x9811 0508 | ROUTERERR_NOMOREQUEUES | The maximum number of ports has been reached. |
| 0x509 | 1289 | 0x9811 0509 | ROUTERERR_INVALIDPORT | The port is invalid. |
| 0x50A | 1290 | 0x9811 050A | ROUTERERR_NOTACTIVATED | The router is not active. |
| 0x50B | 1291 | 0x9811 050B | ROUTERERR_FRAGMENTBOXFULL | The mailbox has reached the maximum number for fragmented messages. |
| 0x50C | 1292 | 0x9811 050C | ROUTERERR_FRAGMENTTIMEOUT | A fragment timeout has occurred. |
| 0x50D | 1293 | 0x9811 050D | ROUTERERR_TOBEREMOVED | The port is removed. |

General ADS error codes

| Hex | Dec | HRESULT | Name | Description |
|-------|------|-------------|---|--|
| 0x700 | 1792 | 0x9811 0700 | ADSERR_DEVICE_ERROR | General device error. |
| 0x701 | 1793 | 0x9811 0701 | ADSERR DEVICE SRVNOTSUPP | Service is not supported by the server. |
| 0x702 | 1794 | 0x9811 0702 | ADSERR DEVICE INVALIDGRP | Invalid index group. |
| 0x703 | 1795 | 0x9811 0703 | ADSERR_DEVICE_INVALIDOFFSET | Invalid index offset. |
| 0x704 | 1796 | 0x9811 0704 | ADSERR DEVICE INVALIDACCESS | Reading or writing not permitted. |
| 0x705 | 1797 | 0x9811 0705 | ADSERR DEVICE INVALIDSIZE | Parameter size not correct. |
| 0x706 | 1798 | 0x9811 0706 | ADSERR DEVICE INVALIDDATA | Invalid data values. |
| 0x707 | 1799 | 0x9811 0707 | ADSERR DEVICE NOTREADY | Device is not ready to operate. |
| 0x708 | 1800 | 0x9811 0708 | ADSERR DEVICE BUSY | Device is busy. |
| 0x709 | 1801 | 0x9811 0709 | ADSERR_DEVICE_INVALIDCONTEXT | Invalid operating system context. This can result from use of ADS function blocks in different tasks. It may be possible to resolve this through Multi-task data access synchronization in the PLC. |
| 0x70A | 1802 | 0x9811 070A | ADSERR_DEVICE_NOMEMORY | Insufficient memory. |
| 0x70B | 1803 | 0x9811 070B | ADSERR_DEVICE_INVALIDPARM | Invalid parameter values. |
| 0x70C | 1804 | 0x9811 070C | ADSERR_DEVICE_NOTFOUND | Not found (files,). |
| 0x70D | 1805 | 0x9811 070D | ADSERR_DEVICE_SYNTAX | Syntax error in file or command. |
| 0x70E | 1806 | 0x9811 070E | ADSERR_DEVICE_INCOMPATIBLE | Objects do not match. |
| 0x70F | 1807 | 0x9811 070F | ADSERR_DEVICE_EXISTS | Object already exists. |
| 0x710 | 1808 | 0x9811 0710 | ADSERR_DEVICE_SYMBOLNOTFOUND | Symbol not found. |
| 0x711 | 1809 | 0x9811 0711 | ADSERR_DEVICE_SYMBOLVERSIONIN- VALID | Invalid symbol version. This can occur due to an on- line change. Create a new handle. |
| 0x712 | 1810 | 0x9811 0712 | ADSERR_DEVICE_INVALIDSTATE | Device (server) is in invalid state. |
| 0x713 | 1811 | 0x9811 0713 | ADSERR_DEVICE_TRANSMODENOTSUPP | AdsTransMode not supported. |
| 0x714 | 1812 | 0x9811 0714 | ADSERR_DEVICE_NOTIFYHNDINVALID | Notification handle is invalid. |
| 0x715 | 1813 | 0x9811 0715 | ADSERR_DEVICE_CLIENTUNKNOWN | Notification client not registered. |
| 0x716 | 1814 | 0x9811 0716 | ADSERR_DEVICE_NOMOREHDLS | No further handle available. |
| 0x717 | 1815 | 0x9811 0717 | ADSERR_DEVICE_INVALIDWATCHSIZE | Notification size too large. |
| 0x718 | 1816 | 0x9811 0718 | ADSERR_DEVICE_NOTINIT | Device not initialized. |
| 0x719 | 1817 | 0x9811 0719 | ADSERR_DEVICE_TIMEOUT | Device has a timeout. |
| 0x71A | 1818 | 0x9811 071A | ADSERR_DEVICE_NOINTERFACE | Interface query failed. |
| 0x71B | 1819 | 0x9811 071B | ADSERR_DEVICE_INVALIDINTERFACE | Wrong interface requested. |
| 0x71C | 1820 | 0x9811 071C | ADSERR_DEVICE_INVALIDCLSID | Class ID is invalid. |
| 0x71D | 1821 | 0x9811 071D | ADSERR_DEVICE_INVALIDOBJID | Object ID is invalid. |
| 0x71E | 1822 | 0x9811 071E | ADSERR_DEVICE_PENDING | Request pending. |
| 0x71F | 1823 | 0x9811 071F | ADSERR_DEVICE_ABORTED | Request is aborted. |
| 0x720 | 1824 | 0x9811 0720 | ADSERR_DEVICE_WARNING | Signal warning. |
| 0x721 | 1825 | 0x9811 0721 | ADSERR_DEVICE_INVALIDARRAYIDX | Invalid array index. |
| 0x722 | 1826 | 0x9811 0722 | ADSERR_DEVICE_SYMBOLNOTACTIVE | Symbol not active. |
| 0x723 | 1827 | 0x9811 0723 | ADSERR_DEVICE_ACCESSDENIED | Access denied. |
| 0x724 | 1828 | 0x9811 0724 | ADSERR DEVICE LICENSENOTFOUND | Missing license. |
| 0x725 | 1829 | 0x9811 0725 | ADSERR_DEVICE_LICENSEEXPIRED | License expired. |
| 0x726 | 1830 | 0x9811 0726 | ADSERR_DEVICE_LICENSEEXCEEDED | License exceeded. |
| 0x727 | 1831 | 0x9811 0727 | ADSERR DEVICE LICENSEINVALID | Invalid license. |
| 0x728 | 1832 | 0x9811 0728 | ADSERR DEVICE LICENSESYSTEMID | License problem: System ID is invalid. |
| 0x729 | 1833 | 0x9811 0729 | ADSERR DEVICE LICENSENOTIMELIMIT | License not limited in time. |
| 0x72A | 1834 | 0x9811 072A | ADSERR DEVICE LICENSEFUTUREISSUE | License problem: Time in the future. |
| 0x72B | 1835 | 0x9811 072B | ADSERR DEVICE LICENSETIMETOLONG | License period too long. |
| 0x72C | 1836 | 0x9811 072C | ADSERR DEVICE EXCEPTION | Exception at system startup. |
| 0x72D | 1837 | 0x9811 072D | ADSERR DEVICE LICENSEDUPLICATED | License file read twice. |
| 0x72E | 1838 | 0x9811 072E | ADSERR DEVICE SIGNATUREINVALID | Invalid signature. |
| 0x72F | 1839 | 0x9811 072F | ADSERR DEVICE CERTIFICATEINVALID | Invalid certificate. |
| 0x730 | 1840 | 0x9811 0730 | ADSERR_DEVICE_LICENSEOEMNOT- FOUND | Public key not known from OEM. |
| 0x731 | 1841 | 0x9811 0731 | ADSERR DEVICE LICENSERESTRICTED | License not valid for this system ID. |
| 0x732 | 1842 | 0x9811 0732 | ADSERR DEVICE LICENSEDEMODENIED | Demo license prohibited. |
| 0x733 | 1843 | 0x9811 0733 | ADSERR DEVICE INVALIDENCID | Invalid function ID. |
| 0x734 | 1844 | 0x9811 0734 | ADSERR DEVICE OUTOFRANGE | Outside the valid range. |
| 0x735 | 1845 | 0x9811 0735 | ADSERR DEVICE INVALIDALIGNMENT | Invalid alignment. |

| Hex | Dec | HRESULT | Name | Description | |
|-------|------|-------------|-------------------------------|--|--|
| 0x736 | 1846 | 0x9811 0736 | ADSERR_DEVICE_LICENSEPLATFORM | Invalid platform level. | |
| 0x737 | 1847 | 0x9811 0737 | ADSERR_DEVICE_FORWARD_PL | Context – forward to passive level. | |
| 0x738 | 1848 | 0x9811 0738 | ADSERR_DEVICE_FORWARD_DL | Context – forward to dispatch level. | |
| 0x739 | 1849 | 0x9811 0739 | ADSERR_DEVICE_FORWARD_RT | Context – forward to real-time. | |
| 0x740 | 1856 | 0x9811 0740 | ADSERR_CLIENT_ERROR | Client error. | |
| 0x741 | 1857 | 0x9811 0741 | ADSERR_CLIENT_INVALIDPARM | Service contains an invalid parameter. | |
| 0x742 | 1858 | 0x9811 0742 | ADSERR_CLIENT_LISTEMPTY | Polling list is empty. | |
| 0x743 | 1859 | 0x9811 0743 | ADSERR_CLIENT_VARUSED | Var connection already in use. | |
| 0x744 | 1860 | 0x9811 0744 | ADSERR_CLIENT_DUPLINVOKEID | The called ID is already in use. | |
| 0x745 | 1861 | 0x9811 0745 | ADSERR_CLIENT_SYNCTIMEOUT | Timeout has occurred – the remote terminal is not responding in the specified ADS timeout. The route setting of the remote terminal may be configured incorrectly. | |
| 0x746 | 1862 | 0x9811 0746 | ADSERR_CLIENT_W32ERROR | Error in Win32 subsystem. | |
| 0x747 | 1863 | 0x9811 0747 | ADSERR_CLIENT_TIMEOUTINVALID | Invalid client timeout value. | |
| 0x748 | 1864 | 0x9811 0748 | ADSERR_CLIENT_PORTNOTOPEN | Port not open. | |
| 0x749 | 1865 | 0x9811 0749 | ADSERR_CLIENT_NOAMSADDR | No AMS address. | |
| 0x750 | 1872 | 0x9811 0750 | ADSERR_CLIENT_SYNCINTERNAL | Internal error in Ads sync. | |
| 0x751 | 1873 | 0x9811 0751 | ADSERR_CLIENT_ADDHASH | Hash table overflow. | |
| 0x752 | 1874 | 0x9811 0752 | ADSERR_CLIENT_REMOVEHASH | Key not found in the table. | |
| 0x753 | 1875 | 0x9811 0753 | ADSERR_CLIENT_NOMORESYM | No symbols in the cache. | |
| 0x754 | 1876 | 0x9811 0754 | ADSERR_CLIENT_SYNCRESINVALID | Invalid response received. | |
| 0x755 | 1877 | 0x9811 0755 | ADSERR_CLIENT_SYNCPORTLOCKED | Sync Port is locked. | |

RTime error codes

| Hex | Dec | HRESULT | Name | Description |
|--------|------------------|-------------|---------------------------|---|
| 0x1000 | 4096 | 0x9811 1000 | RTERR_INTERNAL | Internal error in the real-time system. |
| 0x1001 | 4097 | 0x9811 1001 | RTERR_BADTIMERPERIODS | Timer value is not valid. |
| 0x1002 | 4098 | 0x9811 1002 | RTERR_INVALIDTASKPTR | Task pointer has the invalid value 0 (zero). |
| 0x1003 | 4099 | 0x9811 1003 | RTERR_INVALIDSTACKPTR | Stack pointer has the invalid value 0 (zero). |
| 0x1004 | 4100 | 0x9811 1004 | RTERR_PRIOEXISTS | The request task priority is already assigned. |
| 0x1005 | 4101 0x9811 1005 | | RTERR_NOMORETCB | No free TCB (Task Control Block) available. The maximum number of TCBs is 64. |
| 0x1006 | 4102 | 0x9811 1006 | RTERR_NOMORESEMAS | No free semaphores available. The maximum num- ber of semaphores is 64. |
| 0x1007 | 4103 | 0x9811 1007 | RTERR_NOMOREQUEUES | No free space available in the queue. The maximum number of positions in the queue is 64. |
| 0x100D | 4109 | 0x9811 100D | RTERR_EXTIRQALREADYDEF | An external synchronization interrupt is already applied. |
| 0x100E | 4110 | 0x9811 100E | RTERR_EXTIRQNOTDEF | No external sync interrupt applied. |
| 0x100F | 4111 | 0x9811 100F | RTERR_EXTIRQINSTALLFAILED | Application of the external synchronization interrupt has failed. |
| 0x1010 | 4112 | 0x9811 1010 | RTERR_IRQLNOTLESSOREQUAL | Call of a service function in the wrong context |
| 0x1017 | 4119 | 0x9811 1017 | RTERR_VMXNOTSUPPORTED | Intel VT-x extension is not supported. |
| 0x1018 | 4120 | 0x9811 1018 | RTERR_VMXDISABLED | Intel VT-x extension is not enabled in the BIOS. |
| 0x1019 | 4121 | 0x9811 1019 | RTERR_VMXCONTROLSMISSING | Missing function in Intel VT-x extension. |
| 0x101A | 4122 | 0x9811 101A | RTERR_VMXENABLEFAILS | Activation of Intel VT-x fails. |

TCP Winsock error codes

| Hex | Dec | Name | Description | | | |
|--------|---|-----------------|--|--|--|--|
| 0x274C | 10060 | WSAETIMEDOUT | A connection timeout has occurred - error while establishing the connection, because the remote terminal did not respond properly after a certain period of time, or the es- tablished connection could not be maintained because the connected host did not re- spond. | | | |
| 0x274D | 10061 | WSAECONNREFUSED | Connection refused - no connection could be established because the target computer has explicitly rejected it. This error usually results from an attempt to connect to a service that is inactive on the external host, that is, a service for which no server application is running. | | | |
| 0x2751 | 10065 | WSAEHOSTUNREACH | No route to host - a socket operation referred to an unavailable host. | | | |
| | More Winsock error codes: Win32 error codes | | | | | |

5.1.2 HMI_ADS_CONSTANTS Enumeration

Return codes of the TcHmiAds extension.

Namespace: TcHmiAds Assembly: TcHmiAds (in TcHmiAds.dll) Version: 1.0.0.0 (1.0.0.0)

Members

| Hex | Dec | Member name | Value | Description |
|----------|---------|---------------------------------------|---------|--|
| 0x0 | 0 | HMI_ADS_SUCCE | 0 | No error, everything fine |
| 0x100000 | 1048576 | HMI_ADS_E_OFF SET | 1048576 | Offset of TcHmiAds specific error codes |
| 0x100010 | 1048592 | HMI_ADS_E_TCDI R | 1048592 | TwinCAT directory not found on local system |
| 0x100011 | 1048593 | HMI_ADS_E_TCV ERSION | 1048593 | TwinCAT version invalid |
| 0x100012 | 1048594 | HMI_ADS_E_CON FIGDIR | 1048594 | TwinCAT configuration directory not found |
| 0x100013 | 1048595 | HMI_ADS_E_STA TE | 1048595 | TwinCAT Router is in invalid state no port could be opened |
| 0x100020 | 1048608 | HMI_ADS_E_PAR SE_BASETYPES | 1048608 | Error while parsing ADS base types |
| 0x100021 | 1048609 | HMI_ADS_E_PAR SE_DATA | 1048609 | Error while parsing ADS data |
| 0x100022 | 1048610 | HMI_ADS_E_NOT _IMPLEMENTED | 1048610 | Function not implemented (trying to write a reference value) |
| 0x100030 | 1048624 | HMI_ADS_E_INVA LID_DATA | 1048624 | Invalid data written to server or an ADS datatype can not be parsed |
| 0x100031 | 1048625 | HMI_ADS_E_UPL OAD_DATA | 1048625 | No upload data provided by configured ADS runtime |
| 0x100032 | 1048626 | HMI_ADS_E_UNE XPECTED | 1048626 | Should not happen contact support |
| 0x100033 | 1048627 | HMI_ADS_E_INVA LID_RUNTIME | 1048627 | Runtime name is empty or invalid |
| 0x100034 | 1048628 | HMI_ADS_E_INVA LID_PARAMETER | 1048628 | A parameter of the requested function is invalid |
| 0x100035 | 1048629 | HMI_ADS_E_NO_ OFFLINE_DATA | 1048629 | No offline data available |
| 0x100036 | 1048630 | HMI_ADS_E_INVA LID_SYMBOL | 1048630 | The requested symbol is not available |
| 0x100037 | 1048631 | HMI_ADS_E_MISS ING_PARAMETER | 1048631 | A parameter is missing in the requested function |
| 0x100038 | 1048632 | HMI_ADS_E_ADD _ROUTE | 1048632 | An ADS route could not be added |
| 0x100039 | 1048633 | HMI_ADS_E_EMP TY | 1048633 | No ADS symbols found |
| 0x10003A | 1048634 | HMI_ADS_E_DISA BLED | 1048634 | The requested runtime is disabled in the HMI configuration |
| 0x10003B | 1048635 | HMI_ADS_E_LICE NSE | 1048635 | A license error occurred |
| 0x10003C | 1048636 | HMI_ADS_E_INVA LID_SYMBOL_TY PE | 1048636 | A type from ADS could not be interpreted |

| Hex | Dec | Member name | Value | Description |
|----------|---------|---|---------|--|
| 0x10003D | 1048637 | HMI_ADS_E_INVA LID_SYMBOL_HA NDLE | 1048637 | A handle to an ADS symbol has become invalid |
| 0x10003E | 1048638 | HMI_ADS_E_ABO RTED | 1048638 | A TCP/IP error occurred |

Reference

TcHmiAds Namespace

5.1.3 ErrorValue Enumeration

Namespace: TcHmiSrv

Assembly: TcHmiSrvExtNet (in TcHmiSrvExtNet.dll) Version: 1.0.0.0 (1.0.0.0)

Syntax

C#

public enum ErrorValue



Members

| Member name | Value | Description |
|--------------------------------------|-------|-------------|
| HMI_SUCCESS | 0 | |
| HMI FINISHED | 1 | |
| HMI DISCONNECTED | 2 | |
| HMI_SHUTDOWN | 3 | |
| HMI_RESTART | 4 | |
| HMI_SKIP | 5 | |
| HMI_FIRST_INIT | 6 | |
| HMI_UPGRADE | 7 | |
| HMI_UNCHANGED | 8 | |
| HMI_IGNORE | 9 | |
| HMI_E_SERVER | 256 | |
| HMI_E_FAIL | 257 | |
| HMI_E_UNEXPECTED | 258 | |
| HMI_E_SCRIPT | 259 | |
| HMI_E_REQUIRED_EXTENSI ON_MISSING | 260 | |
| HMI_E_INIT | 261 | |
| HMI_E_NO_LANGUAGE_FILE | 262 | |
| HMI_E_SYNTAX | 263 | |
| HMI_E_FILE_NOT_FOUND | 264 | |
| HMI_E_FILESYSTEM | 265 | |
| HMI_E_REQUEST_TOO_LAR GE | 266 | |
| HMI_E_DATABASE | 267 | |
| HMI_E_INVALID_POINTER | 268 | |
| HMI_E_INVALID_PARAMETE R | 269 | |
| HMI_E_INVALID_TYPE | 270 | |
| HMI_E_NOT_REGISTERED | 271 | |
| HMI_E_NOT_IMPLEMENTED | 272 | |
| HMI_E_ID_IN_USE | 273 | |
| HMI_E_SYMBOL_IN_USE | 274 | |
| HMI_E_INTERRUPTED | 275 | |
| HMI_E_FILE_LOCK | 276 | |
| HMI_E_FILE_IN_USE | 277 | |
| HMI_E_FILE_WRITE | 278 | |
| HMI_E_INVALID_PATH | 279 | |
| HMI_E_HANDLE | 280 | |
| HMI_E_ENCODE | 281 | |
| HMI_E_DECODE | 282 | |
| HMI_E_NETWORK | 283 | |
| HMI_E_LANGUAGE | 284 | |
| HMI_E_CACHE | 285 | |
| HMI_E_ENDPOINT_DENIED | 286 | |
| HMI_E_ENDPOINT_BUSY | 287 | |
| HMI_E_ENDPOINT_INVALID | 288 | |
| HMI_E_WEBSERVER_UNEXP ECTED | 289 | |
| HMI_E_WEBSOCKET_UNEXP ECTED | 290 | |

| Member name | Value | Description |
|----------------------------------|-------|-------------|
| HMI_E_LUA_EXEC | 291 | - |
| HMI_E_ENTRY_NOT_FOUND | 292 | |
| HMI_E_INVALID_SYMBOL | 293 | |
| HMI E BLACKLISTED | 294 | |
| HMI_E_UPLOAD_TIMER_EXP | 295 | |
| IRED | | |
| HMI_E_SERVER_ALREADY_ RUNNING | 296 | |
| HMI_E_INVALID_SUBSYMBO | 512 | |
| HMI_E_SYMBOL_NOT_MAPP ED | 513 | |
| HMI_E_SYMBOL_SCHEMA_M ISSING | 514 | |
| HMI_E_INVALID_METHOD | 515 | |
| HMI_E_API | 768 | |
| HMI_E_INTERFACE_VERSIO | 769 | |
| HMI_E_INTERFACE_POINTE | 770 | |
| HMI_E_CRT_NOT_FOUND | 771 | |
| HMI_E_CRT_INIT | 772 | |
| HMI_E_LICENSE | 773 | |
| HMI_E_LICENSE_CHECK | 774 | |
| HMI_E_LICENSE_ADS | 775 | |
| HMI_E_LICENSE_SERVER | 776 | |
| HMI_E_LICENSE_CLIENT | 777 | |
| HMI_E_LICENSE_TARGET | 778 | |
| HMI_E_LICENSE_EXPIRED | 779 | |
| HMI_E_LICENSE_EXTENSIO | 780 | |
| HMI_E_LICENSE_HANDSHAK | 781 | |
| HMI_E_LICENSE_VERIFY | 782 | |
| HMI_E_LICENSE_EMPTY | 783 | |
| HMI_E_STORAGE | 1280 | |
| HMI_E_STORAGE_WRITE | 1281 | |
| HMI_E_STORAGE_VERSION | 1282 | |
| HMI_E_STORAGE_CREATE | 1283 | |
| HMI_E_STORAGE_STORE | 1284 | |
| HMI_E_STORAGE_LOAD | 1285 | |
| HMI_E_STORAGE_FILE_NOT _FOUND | 1286 | |
| HMI_E_STORAGE_ADD_PAR AMETER | 1287 | |
| HMI_E_STORAGE_SCHEMA | 1288 | |
| HMI_E_STORAGE_CONSTRA | 1289 | |
| HMI_E_STORAGE_ADD | 1290 | |
| HMI_E_STORAGE_EXTENSIO | 1291 | |

| Member name | Value | Description |
|--------------------------------------|-------|-------------|
| HMI_E_STORAGE_PARAMET ER | 1292 | |
| HMI_E_STORAGE_TYPE | 1293 | |
| HMI_E_CONNECT | 1294 | |
| HMI_E_STORAGE_BACKUP | 1295 | |
| HMI_E_SCHEMA | 1536 | |
| HMI_E_TYPE_MISMATCH | 1537 | |
| HMI_E_RANGE_MISMATCH | 1538 | |
| HMI_E_INVALID_FIELD | 1539 | |
| HMI_E_REQUIRED_FIELD | 1540 | |
| HMI_E_UNEXPECTED_FIELD | 1541 | |
| HMI_E_ENUM_VALUE_MISM ATCH | 1542 | |
| HMI_E_ARRAY_RANGE_MIS MATCH | 1543 | |
| HMI_E_STRING_LENGTH_MI SMATCH | 1544 | |
| HMI_E_MULTIPLE_MATCHES | 1545 | |
| HMI_E_UNIQUE | 1546 | |
| HMI_E_FORMAT | 1547 | |
| HMI_E_TYPE_MISSING | 1548 | |
| HMI_E_EXCLUDED | 1549 | |
| HMI_E_MIGRATION | 1550 | |
| HMI_E_MIGRATION_RULE | 1551 | |
| HMI_E_MIGRATION_PATH | 1552 | |
| | 2048 | |
| | 2049 | |
| | 2050 | |
| | 2051 | |
| | 2052 | |
| HMI_E_AUTH_EXTENSION | 2053 | |
| HMI_E_EXTENSION_CONFIG | 2054 | |
| R | 2055 | |
| HMI E UNLOAD FAILED | 2056 | |
| HMI E AUTH WAIT | 2057 | |
| HMI E SESSION | 4096 | |
| HMI_E_INVALID_SESSION | 4097 | |
| HMI_E_AUTH_USER_NOT_F | 4098 | |
| OUND | | |
| HMI_E_AUTH_FAILED | 4099 | |
| HMI_E_AUTH_GROUP_NOT_ FOUND | 4100 | |
| HMI_E_INSUFFICIENT_ACCE | 4101 | |
| HMI_E_CREATE_SESSION | 4102 | |
| HMI_E_SESSION_NOT_FOUN D | 4103 | |
| HMI_E_CERTIFICATE | 4104 | |
| HMI_E_NO_LOGIN_DATA | 4105 | |

| Member name | Value | Description |
|--------------------------------|-------|-------------|
| HMI_E_ALREADY_LOGGED_I N | 4106 | |
| HMI_E_SESSION_TIMEOUT | 4107 | |
| HMI_E_TOO_MANY_CONNEC TIONS | 4108 | |
| HMI_E_CHECKSUM | 4608 | |
| HMI_E_INVALID_CHECKSUM | 4609 | |
| HMI_E_CHECKSUM_UNEXPE CTED | 4610 | |
| HMI_E_CHECKSUM_MATCH | 4611 | |
| HMI_E_SIGNATURE | 4612 | |
| HMI_E_SIGNATURE_MISSIN G | 4613 | |
| HMI_E_SIGNATURE_MISMAT | 4614 | |
| HMI_E_KEY_MISSING | 4615 | |
| HMI_E_RESTART_REQUIRED | 4616 | |
| HMI_E_INITIALIZE_PASSWO RD | 4617 | |

See Also

Reference

TcHmiSrv Namespace

5.2 Troubleshooting

The product version number can be read via the system tray icon 🚨 . Additional information is required:

- · Operating system
- Event log
- · Memory images (if available)

5.2.1 Config page

The configuration page of the TwinCAT HMI server provides access to the event log of the server, which can provide important information.

| 🕞 Log | | × | | | | | |
|-------------------------------------|--------------------------|---------------------|---------------|-------------------|------------------|---------------------|-----------|
| \leftrightarrow \Rightarrow G (| 127.0.0 | 0.1:1010/Config/Log | | | | | |
| TcHmiSrv | ADS | TcHmiEventLogger | TcHmiLua | TcHmiSqliteLogger | TcHmiTextStorage | TcHmiUserManagement | Event Log |
| Event Log | | | | | | | |
| Time 05/06/2017 16:5 | Do 3-19 II Тан | main Text | Administrator | | | | |

In addition, the page offers further diagnostic information. The **TcHmiSrv** category shows the supported .NET versions and the status of the licenses.

| Log | × 🕞 TcHi | miSrv | × | | | Erster Nutzer | | 23 |
|---|---|-----------------|-----------------|---------|---|--|--------|----|
| ← → C ③ 127.0.0.1 | L:3000/Config/ | TcHmiSrv | | | | \$ ☆ | 0 | : |
| TcHmiSrv ADS | TcHmiLua | TcHmiSqlite | Logger | TcHmiTe | extStorage | | | ▼ |
| Allgemein Erweitert | Sicherheit | Webserver | | | | | | |
| TcHmiSrv Produktversion: 1.8.593.0, Ver Automatische Abmeldung Konfigurationen Standard-Dokument Standard-Dokument Standard-Nutzergruppe Definitionen Erweiterungen | sion: 1.2.107.200, P30D de SystemUsers | Konfigurationsv | version: 1.0.0. | 24 | Diagnostics Akzeptierte Socke Aktive Sitzungen Aktive Sockets Architektur DOTNETVERSIO Lizenz | ets 169 4 9 Windows x86 N | | 1 |
| Dateien Log Level Projektname Projektversion | Info TcHmiProject14 1.0.0.0 | 40 | | | Clients Erweiterungen Server Status | 100 true 1 Engineering | • | |
| Authentifizierung erforderlich Symbole Timeout bei Veröffentlichung Nutzergruppen Gruppenmitglieder | h Keine PT5S | • | | | Ziele Benutze Clients Benutze Server Benutze Ziele | 100 3 0 1 | | |
| Virtuelle Verzeichnisse DEFAULTCONFIGURABLE Accept | | | | | Speicherverbrauc Server-Zeit Empfangene Byte Gesendete bytes Betriebszeit | 55.00 2017-06-05T15:2 845303.00 846166.00 PT4H44M48S | 26:32Z | |

Under the **ADS** category you can read out the status of the configured TwinCAT system.

| ADS | | × | | | | Enstar Mutizar | | 22 |
|---|---------------------------------|---------------------|---------|-----------------------|--|--|---|----|
| $\epsilon \rightarrow G$ | i) 127.0.0 | 0.1:3000/Config | /ADS?Co | onfiguration | =default | ជ <u>្</u> | 9 | : |
| TcHmiSrv | ADS | TcHmiLua | TcHmi | SqliteLogge | r TcHmiT | extStorage | | ▼ |
| ADS Version: 1.2.107.2 MAXSESSIONS RUNTIMES DEFAULTCONFIGURA TIMEOUT Acce | 200, Konfig 8 BLE PT1S | urationsversion: 1. | 0.0.6 | Diagnosti runtimes | cs + PLC1 + TcSysServi adsState adsVersion deviceName | ce Config 3.1.4022 TwinCAT System | | |

5.2.2 Crash dumps

If the server crashes, an attempt is made to write an image of the process (TcHmiSrv.exe). This can then be found in the working directory of the server under *Windows:* *ProgramData\Beckhoff\TF2000 TwinCAT 3 HMI Server.*

After a server restart the image is compressed (extension .tar.gz). Please send this image to support, including the product version number, the configuration (logger.db and storage.db) and, if possible, a description of the last steps you performed before the crash, so that we can reproduce the malfunction.

More Information: www.beckhoff.com/tf2000

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