

Manual | EN

# TX1200

TwinCAT 2 | PLC Library: TcSUPS





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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.

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EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702  
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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.

#### **WARNING**

##### **Risk of injury!**

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

#### **CAUTION**

##### **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.

## 1.3 Notes on information security

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Beckhoff products and solutions undergo continuous further development. This also applies to security functions. In light of this continuous further development, Beckhoff expressly recommends that the products are kept up to date at all times and that updates are installed for the products once they have been made available. Using outdated or unsupported product versions can increase the risk of cyber threats.

To stay informed about information security for Beckhoff products, subscribe to the RSS feed at <https://www.beckhoff.com/secinfo>.

## 2 Overview

The library **TcSUPS.Lib** contains functions and function blocks which are needed in order to use the Seconds UPS. See sample project <https://infosys.beckhoff.com/content/1033/tcplclibsupps/Resources/zip/11947613963.zip>.

### Function Blocks

Name	Description
<a href="#">FB_S_UPS [► 10]</a>	Function block to use the Seconds UPS from the PLC.
<a href="#">FB_NT_QuickShutdown [► 9]</a>	Internal function block for the QuickShutdown, used by the <a href="#">FB_S_UPS</a> .

### Functions

Name	Description
<a href="#">F_GetVersionTcSUPS [► 13]</a>	The function returns library version info.

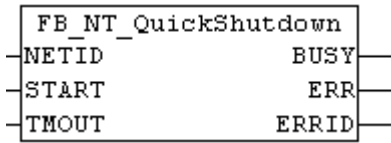
### Requirements

Component	Version
TwinCAT on the development PC, on the target system	TwinCAT 2.11 Build 2016 or higher (R2)



### 3 Function Blocks

#### 3.1 FB\_NT\_QuickShutdown



The function block FB\_NT\_QuickShutdown is used to immediately reboot the PC without stopping TwinCAT or the operating system Windows.

The function block FB\_NT\_QuickShutdown is used internally from FB\_S\_UPS and is not intended to be used elsewhere!

#### FUNCTION\_BLOCK FB\_NT\_QuickShutdown

##### VAR\_INPUT

```
VAR_INPUT
    NETID :T_AmsNetId;
    START :BOOL;
    TMOUT :TIME := DEFAULT_ADS_TIMEOUT;
END_VAR
```

- NETID** : AmsNetID of the PC.
- START** : rising edge leads to an immediate reboot of the PC.
- TMOUT** : Timeout time.

##### VAR\_OUTPUT

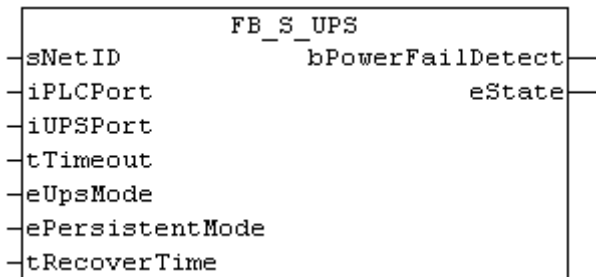
```
VAR_OUTPUT
    BUSY :BOOL;
    ERR :BOOL;
    ERRID :UDINT;
END_VAR
```

- BUSY** : The QuickShutdown is being executed.
- ERR** : Is TRUE, if an error occurs.
- ERRID** : Delivers the error number in case that **ERR** is TRUE.

#### Requirements

Development environment	Target platform	Hardware	PLC Libraries to include
TwinCAT v2.11.0 Build 2016 or higher (R2)	PC (i386)	Second-UPS	TcSUPS.Lib

## 3.2 FB\_S\_UPS



The function block FB\_S\_Ups can be used on PCs with Seconds UPS, to communicate from the PLC with the UPS. The FB\_S\_Ups can be used to save persistent data and to QuickShutdown the PC in case of a power failure. The INPUTs of the FB\_S\_UPS should be used with the default values.

### NOTE

#### Data loss

The Seconds UPS is only capable of holding the voltage for a few seconds. This is just enough time to save the persistent data. The used persistent saving mode must be "SPDM\_2PASS", even though if this could causes realtime problems. The router memory must be big enough in order to save the persistent data!

Mode [► 14] eSUPS\_WrPersistData\_Shutdown (default setting): The persistenten data are written and a QuickShutdown is automatically performed.

Mode eSUPS\_WrPersistData\_NoShutdown: Only the persistenten data are written, a QuickShutdown will not be performed.

Mode eSUPS\_ImmediateShutdown: a QuickShutdown is immediatelly performed.

Mode eSUPS\_CheckPowerStatus: only the powerfailure will be detected, no action is performed. In case of the powerfailure the FB waits until the tRecoverTime (10s) has expired before it goes back to the PowerOK state.

The UPS will switch off the main board after the capacitors have been discharged, independent of the mode and therefore independent of the writing of the persistent data and of the QuickShutdown, even if the power supply is restored.

The capacity of the UPS is to small to hold the system alive during longer power outages. The saving of the persistent data has to be done to the Compact Flash, since a hard disk cannot be operated if the UPS supplies the voltage. After the saving of the persistent data a QuickShutdown will be executed.

### NOTE

#### Attention if files are modified:

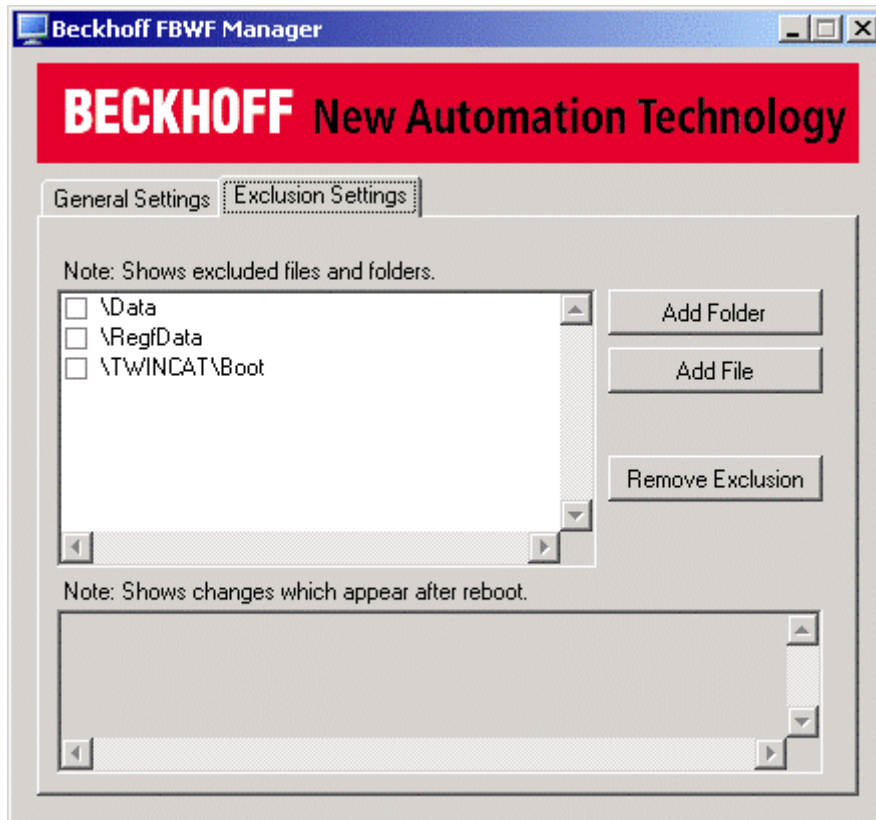
If other applications or the PLC are keeping files open or write to files during a power failure, then these files can get corrupted, since the QuickShutdown immediatelly reboots the PC.

**NOTE**

**Attention if using Windows XP embedded:**

The EWF (Enhanced Write Filter) or the FBWF (File Based Write Filter) has to be activated in order to ensure the validity of the Windows XP embedded files on systems with a Seconds UPS.

- In case of the EWF the TwinCAT\Boot folder needs to be located on a not protected partition (see in the registry: HKEY\_LOCAL\_MACHINE\SOFTWARE\Beckhoff\TwinCAT\System\BootPrjPath).
- In case of the FBWF the TwinCAT\Boot folder needs to be excluded from the protection (see Beckhoff FBWF Manager, Exclusion Settings).



**FUNCTION\_BLOCK FB\_S\_UPS**

**VAR\_INPUT**

```

VAR_INPUT
  sNetID      : T_AmsNetId := '';          (* '' = local netid *)
  iPLCPort    : UINT := AMSPORT_R0_PLC_RTS1;  (* PLC Runtime System for writing persistent data *)
  iUPSPort    : UINT := 16#4A8;           (* Port for reading Power State of UPS, default 16#4A8 *)
  tTimeout    : TIME := DEFAULT_ADS_TIMEOUT; (* ADS Timeout *)
  eUpsMode    : E_S_UPS_Mode := eSUPS_WrPersistData_Shutdown; (* UPS mode (w/wo writing persistent data, w/wo shutdown) *)
  ePersistentMode : E_PersistentMode := SPDM_2PASS; (* mode for writing persistent data *)
  tRecoverTime : TIME := T#10s;          (* ON time to recover from short power failure in mode eSUPS_WrPersistData_NoShutdown/eSUPS_CheckPowerStatus *)
END_VAR
    
```

**sNetID** : AmsNetID of the PC.

**iPLCPort** : Port number of the PLC runtime system (AMSPORT\_R0\_PLC\_RTS1 = 801, AMSPORT\_R0\_PLC\_RTS2 = 811, AMSPORT\_R0\_PLC\_RTS3 = 821, AMSPORT\_R0\_PLC\_RTS4 = 831).

**iUPSPort** : Port number for reading the UPS-State (default value is 16#4A8).

**tTimeout** : Timeout for the execution of the QuickShutdown.

**eUpsMode** : eUpsMode defines, if persistent data need to be written and if a QuickShutdown needs to be executed.

The default value is eSUPS\_WrPersistData\_Shutdown, means with writing of the persistent data and then a QuickShutdown. See [E S UPS Mode \[► 14\]](#).

**ePersistentMode** : Mode for the writing of the persistent data. Default value is SPDM\_2PASS.

**tRecoverTime** : Time which will be waited after a power failure (in case of UPS modes without shutdown) to go back to the status PowerOK.

The tRecoverTime needs to be a little bit bigger than the maximum holding time of the UPS, since the UPS will shut off even if the power supply is restored.

## VAR\_OUTPUT

```
VAR_OUTPUT
  bPowerFailDetect : BOOL;          (* TRUE while powerfailure is detected *)
  eState           : E_S_UPS_State; (* current ups state *)
END_VAR
```

**bPowerFailDetect** : TRUE if a power failure is detected; FALSE if the power supply is sufficient.

**eState** : internal state of the function block, for the values see [E S UPS State \[► 14\]](#).

## VAR\_GLOBAL

```
VAR_GLOBAL
  eGlobalSUpsState : E_S_UPS_State; (* current ups state *)
END_VAR
```

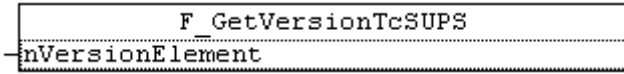
**eGlobalUpsState** : internal state of the function block as a global copy of **eState**, for the values see [E S UPS State \[► 14\]](#).

## Requirements

Development environment	Target platform	Hardware	PLC Libraries to include
TwinCAT v2.11.0 Build 2016 or higher (R2)	PC (i386)	Second-UPS	TcSUPS.Lib

## 4 Functions

### 4.1 F\_GetVersionTcSUPS



The function returns library version info.

#### FUNCTION F\_GetVersionTcSUPS : UINT

```

VAR_INPUT
    nVersionElement : INT;
END_VAR
    
```

**nVersionElement** : Version element:

- 1 : major number;
- 2 : minor number;
- 3 : revision number;

#### Requirements

Development environ- ment	Target platform	Hardware	PLC Libraries to include
TwinCAT v2.11.0 Build 2016 or higher (R2)	PC (i386)	Second-UPS	TcSUPS.Lib

## 5 Data Types

### 5.1 E\_S\_UPS\_Mode

```
eSUPS_WrPersistData_Shutdown: Writing of persistent data and then a QuickShutdown
eSUPS_WrPersistData_NoShutdown: Only writing of the persistent data (no QuickShutdown)
eSUPS_ImmediateShutdown: Only QuickShutdown (no writing of persistent data)
eSUPS_CheckPowerStatus: Only check status (neither writing of persistent data nor a QuickShutdown)
```

#### Requirements

Development environment	Target platform	Hardware	PLC Libraries to include
TwinCAT v2.11.0 Build 2016 or higher (R2)	PC (i386)	Second-UPS	TcSUPS.Lib

### 5.2 E\_S\_UPS\_State

```
eSUPS_PowerOK:
  in all modes: Power supply is OK

eSUPS_PowerFailure:
  in all modes: Power supply is faulty (only shown for one PLC cycle)

eSUPS_WritePersistentData:
  in Mode eSUPS_WrPersistData_Shutdown: Writing of persistent data is active
  in Mode eSUPS_WrPersistData_NoShutdown: Writing of persistent data is active

eSUPS_QuickShutdown:
  in Mode eSUPS_WrPersistData_Shutdown: QuickShutdown is active
  in Mode eSUPS_ImmediateShutdown: QuickShutdown is active

eSUPS_WaitForRecover:
  in Mode eSUPS_WrPersistData_NoShutdown: Wait for the reestablishment of the power supply
  in Mode eSUPS_CheckPowerStatus: Wait for the reestablishment of the power supply

eSUPS_WaitForPowerOFF:
  in Mode eSUPS_WrPersistData_Shutdown: Wait for switching off of the PC by the UPS
  in Mode eSUPS_ImmediateShutdown: Wait for switching off of the PC by the UPS
```

#### Requirements

Development environment	Target platform	Hardware	PLC Libraries to include
TwinCAT v2.11.0 Build 2016 or higher (R2)	PC (i386)	Second-UPS	TcSUPS.Lib



More Information:  
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