Application Note DK9122-0311-0026

Monitoring and diagnosis

Keywords
1-second UPS
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Non-interruptible
Power supply
Power failure
Save data
C6915
CX5000
CP77xx
CP62xx

1-second UPS: Securing important data in case of power failure

This application example describes the advantages of using UPS-assisted Industrial PCs on the basis of three exemplary applications. As an 'on-board UPS,' the capacitor-assisted 1-second UPS from Beckhoff is very compact, inexpensive and maintenance-free due to the low power consumption of the Intel® Atom™ based motherboard. If a UPS of several minutes duration is not needed, the capacitor performance is sufficient in many applications to save important data before the IPC switches itself off.

Uninterruptible power supply (UPS)

In the event of a power failure, a UPS creates time for saving important data from the main memory to non-volatile memory. Depending upon the version, a UPS bridges the power supply for a longer period. External rechargeable battery packs installed close to the PC are often used.

On-Board-USV

Due to the low power consumption of the Intel® Atom™ based motherboard, Beckhoff offers an 'on-board UPS' that is very compact, inexpensive and maintenance-free. Since the '1-second UPS' is also fully integrated into TwinCAT, the customer has the same advantages as with a regular UPS, but at a lower cost. The time that can be bridged varies according to the motherboard: depending upon the board, it remains operational for several seconds following a power failure. The relevant data must be saved during this time. It was possible to save a maximum of 128 KB data with the NOVRAM; at least 1 MB data can now be saved with the capacitive 1-second UPS.

Areas of application of the 1-second UPS

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The 1-second UPS from Beckhoff is available for the following Industrial PCs and embedded devices:

– Embedded PCs from the CX50x0 series
– Industrial PC C6915
– Control Panels from the CP62xx and CP77xx series with Intel® Atom™ motherboard

UPS under TwinCAT

The UPS is controlled in TwinCAT by the calling of a function block. Depending on the selected mode, the function block **FB_S_UPS** initiates the storage of persistent data and/or QuickShutdown of the operating system in the event of a power failure. The necessary library is integrated into the installation from TwinCAT 2.11 R2 Build 2016 onwards. For older TwinCAT versions, an appropriate library must be copied into the library folder.

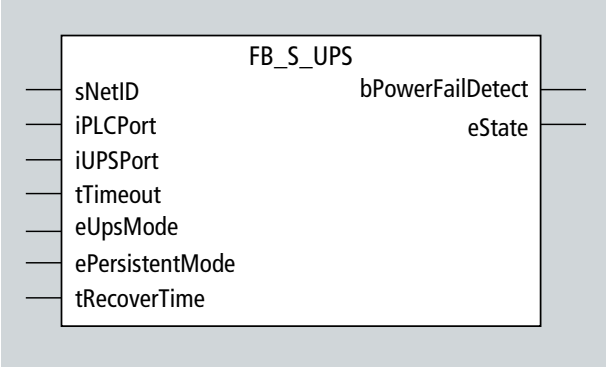

Fig. 1 TwinCAT function block for controlling the UPS

Behavior of the UPS: Data handling

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mode	operation
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	pure monitoring (neither writing of persistent data nor a QuickShutdown) Data handling is entirely at the discretion of the user.

Fig. 2 The mode defines whether persistent data is to be written and whether a QuickShutdown is to be performed.

Practical examples

The advantages of UPS-assisted use for typical areas of application:

1. Switching off plants by the main switch
2. Logging lots, process values and measured values
3. Securing the process image

1. Switching off plants by the main switch

Mobile plant elements with their own control and separate power supply are frequently switched off via the integrated main switch, without giving consideration to the state of the controller. The use of the 1-second UPS from Beckhoff guarantees that, when the power supply is switched off, the plant can save the relevant operating data that need to be available when switched on again.

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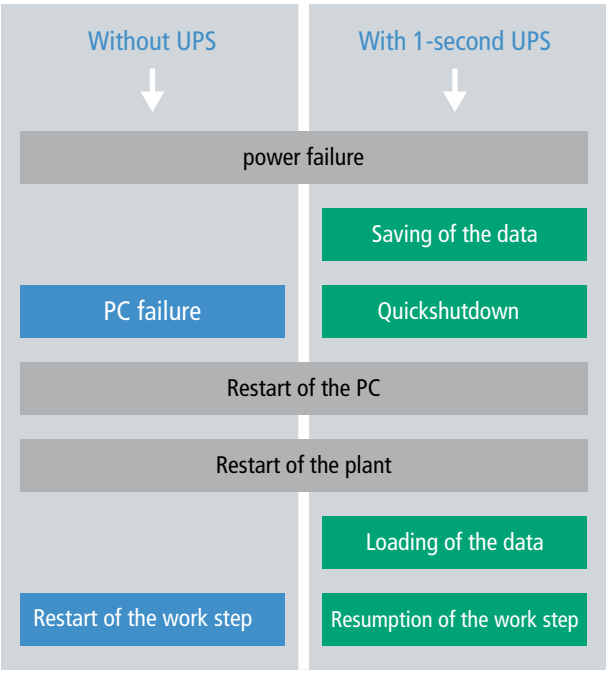

Fig. 3 Practical example: 'switching off plants by the main switch'

2. Logging lots, process values and measured values

For the complete documentation of the manufacturing process of an individual component, the lot number, time and, if necessary, tool changes are logged at each station.

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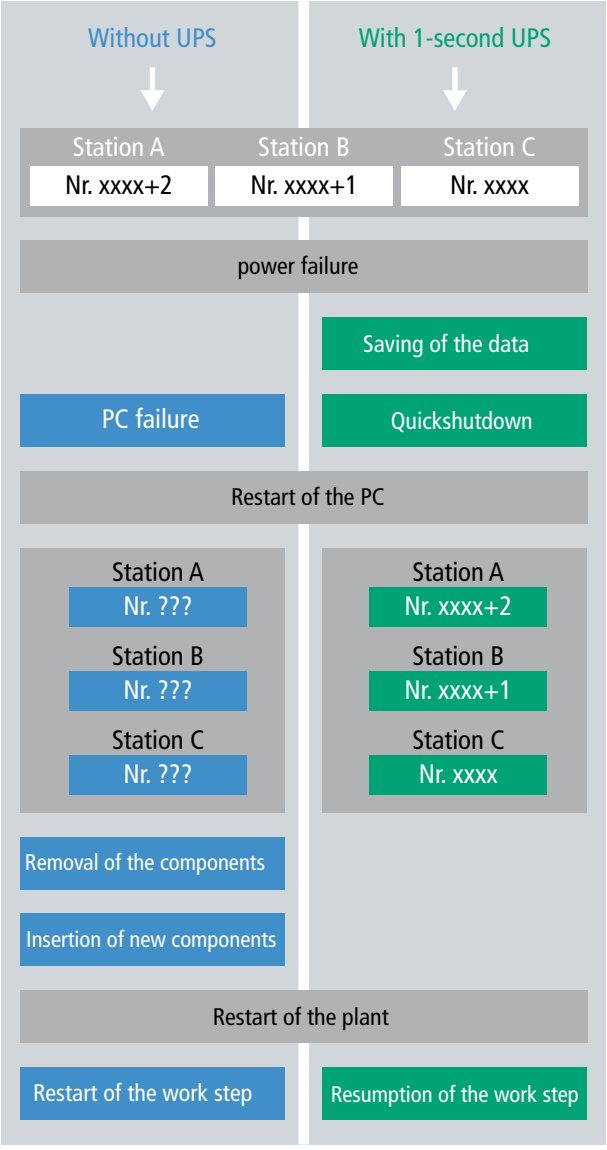

Fig. 4 Practical example: 'logging lots, process values and measured values'

The storage of these data in the event of a power failure avoids having to declare entire lots as scrap, after switching on again and checking the components.

3. Securing the process image

The entire process image is saved for fault finding and reconstruction of the events leading to errors. As a result, the state of individual components within the plant in the event of a power failure is comprehensible for the service personnel and can be referred to for clarification.

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– Embedded PC CX5000 **www.beckhoff.com/CX5000**

– Control cabinet Industrial PC with Intel® Atom™ **www.beckhoff.com/C6915**

– The compact Industrial PC with mounting arm **www.beckhoff.com/CP77xx**

– The slimline built-in Industrial PC with 3½-inch motherboard **www.beckhoff.com/CP62xx**

– Reference of USV software components

http://infosys.beckhoff.com/content/1033/tcplclibsups/html/tcplclibsups_overview.htm