

HMI Service Center

User's manual

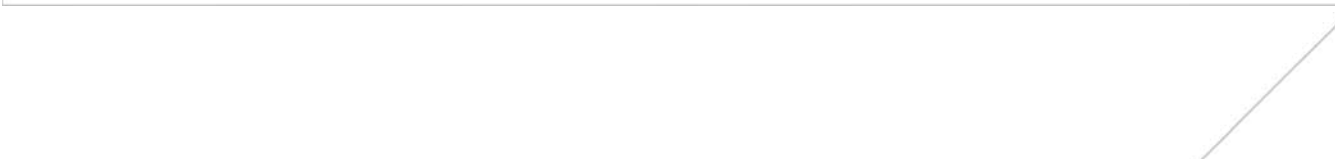
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Model no.: **HMI Service Center**

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Chapter 1 • General information

1 Manual history

| Version | Date | Change |
|---------|------------|-----------------|
| 1.00 | 2015-06-03 | • First version |

2 Safety guidelines

2.1 Intended use

Programmable logic controllers (PLCs), operating/monitoring devices (industrial PCs, Power Panels, Mobile Panels, etc.) and B&R uninterruptible power supplies have been designed, developed and manufactured for conventional use in industrial environments. They were not designed, developed and manufactured for any use involving serious risks or hazards that could lead to death, injury, serious physical damage or loss of any kind without the implementation of exceptionally stringent safety precautions. In particular, such risks and hazards include the use of these devices to monitor nuclear reactions in nuclear power plants, their use in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

2.2 Protection against electrostatic discharge

Electrical components that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

2.2.1 Packaging

- **Electrical components with a housing**
...do not require special ESD packaging but must be handled properly (see "Electrical components with a housing").
- **Electrical components without a housing**
...are protected by ESD-suitable packaging.

2.2.2 Guidelines for proper ESD handling

Electrical components with a housing

- Do not touch the connector contacts on connected cables.
- Do not touch the contact tips on circuit boards.

Electrical components without a housing

The following applies in addition to the points listed under "Electrical components with a housing":

- Any persons handling electrical components or devices with installed electrical components must be grounded.
- Components are only permitted to be touched on their narrow sides or front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Components should not be subjected to electrostatic discharge (e.g. through the use of charged plastics).
- Ensure a minimum distance of 10 cm from monitors and TV sets.
- Measuring instruments and equipment must be grounded.
- Probes on potential-free measuring instruments must be discharged on sufficiently grounded surfaces before taking measurements.

Individual components

- ESD protective measures for individual components are thoroughly integrated at B&R (conductive floors, footwear, arm bands, etc.).
- These increased ESD protective measures for individual components are not necessary for customers handling B&R products.

2.3 Policies and procedures

Electronic devices are never completely failsafe. If the programmable control system, operating/monitoring device or uninterruptible power supply fails, the user is responsible for ensuring that other connected devices, e.g. motors, are brought to a secure state.

When using programmable logic controllers or operating/monitoring devices as control systems together with a soft PLC (e.g. B&R Automation Runtime or comparable product) or slot PLC (e.g. B&R LS251 or comparable product), safety precautions relevant to industrial control systems (e.g. the provision of safety devices such as emergency stop circuits, etc.) must be observed in accordance with applicable national and international regulations. The same applies for all other devices connected to the system, such as drives.

All tasks such as the installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of devices who also have the appropriate qualifications (e.g. IEC 60364). National accident prevention regulations must be observed.

The safety notices, connection descriptions (type plate and documentation) and limit values listed in the technical data are to be read carefully before installation and commissioning and must be observed.

2.4 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical loads, temperature, moisture, corrosive atmospheres, etc.).

2.5 Installation

- These devices are not ready for use upon delivery and must be installed and wired according to the specifications in this documentation in order for the EMC limit values to apply.
- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices are only permitted to be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.
- General safety guidelines and national accident prevention regulations must be observed.
- Electrical installation must be carried out in accordance with applicable guidelines (e.g. line cross sections, fuses, protective ground connections).

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating and monitoring devices, and uninterruptible power supplies, certain components must carry dangerous voltage levels. Touching one of these parts can result in a life-threatening electric shock. This could lead to death, severe injury or damage to equipment.

Before turning on the programmable logic controller, operating/monitoring devices or uninterruptible power supply, the housing must be properly grounded (PE rail). Ground connections must be established even when testing or operating operating/monitoring devices or the uninterruptible power supply for a short time!

Before turning the device on, all parts that carry voltage must be securely covered. During operation, all covers must remain closed.

2.6.2 Environmental conditions - Dust, moisture, corrosive gases

The use of operating/monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels, etc.) and uninterruptible power supplies in very dusty environments should be avoided. Dust collection on the devices can affect functionality and may prevent sufficient cooling, especially in systems with active cooling systems (fans).

The presence of corrosive gases can also lead to malfunctions. When combined with high temperature and humidity, corrosive gases – e.g. with sulfur, nitrogen and chlorine components – can induce chemical reactions that can damage electronic components very quickly. Signs of the presence of corrosive gases are blackened copper surfaces and cable ends on existing equipment.

For operation in dusty or moist conditions, correctly installed (e.g. cutout installations) operating/monitoring devices like the Automation Panel or Power Panel are protected on the front. The back of all devices must be protected from dust and moisture and cleaned at suitable intervals.

2.6.3 Viruses and dangerous programs

This system is subject to potential risk each time data is exchanged or software is installed from a data medium (e.g. diskette, CD-ROM, USB flash drive, etc.), a network connection or the Internet. The user is responsible for assessing these dangers, implementing preventive measures such as virus protection programs, firewalls, etc. and making sure that software is only obtained from trusted sources.

2.7 Environmentally friendly disposal

All B&R programmable controllers, operating/monitoring devices and uninterruptible power supplies are designed to inflict as little harm as possible on the environment.

2.7.1 Separation of materials

It is necessary to separate different materials so the device can undergo an environmentally friendly recycling process.

| Component | Disposal |
|--|---------------------------------|
| Programmable logic controllers Operating/Monitoring devices Uninterruptible power supply Batteries and rechargeable batteries Cables | Electronics recycling |
| Cardboard box / Paper packaging | Cardboard box / Paper recycling |
| Plastic packaging | Plastic recycling |

Table 1: Environmentally friendly separation of materials

Disposal must comply with applicable legal regulations.

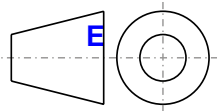
3 Organization of safety notices

Safety notices in this manual are organized as follows:

| Safety notice | Description |
|---------------------|--|
| Danger! | Disregarding these safety guidelines and notices can be life-threatening. |
| Warning! | Disregarding these safety guidelines and notices can result in severe injury or substantial damage to equipment. |
| Caution! | Disregarding these safety guidelines and notices can result in injury or damage to equipment. |
| Information: | This information is important for preventing errors. |

Table 2: Description of the safety notices used in this documentation

4 Guidelines



European dimension standards apply to all dimension diagrams in this document.

All dimensions are specified in mm.

| Range of nominal sizes | General tolerance according to DIN ISO 2768 (medium) |
|------------------------|--|
| Up to 6 mm | ±0.1 mm |
| For 6 to 30 mm | ±0.2 mm |
| For 30 to 120 mm | ±0.3 mm |
| For 120 to 400 mm | ±0.5 mm |
| For 400 to 1000 mm | ±0.8 mm |

Table 3: Range of nominal sizes

Chapter 2 • Software

1 Introduction

The HMI Service Center is a software tool used to test B&R Industrial PCs and Automation Panels. These tests cover many different aspects, including COM interfaces, network connectivity, SRAM, etc. (see the section "Test reports" on page 14). This manual explains how to use the HMI Service Center.

2 Supported devices

The HMI Service Center can be used on PCs from the following device families:

- Automation PC 510 (APC510)
- Automation PC 511 (APC511)
- Automation PC 810 (APC810)
- Automation PC 910 (APC910)
- Automation PC 2100 (APC2100)
- Panel PC 800 (PPC800)
- Panel PC 900 (PPC900)
- Panel PC 2100 (PPC2100)
- Power Panel 500 (PP500)
- Automation Panel 800 (AP800)
- Automation Panel 900 (AP900)
- Automation Panel 9x3 (AP9x3)
- Automation Panel 9xD (AP9xD)

The following interface options and I/O boards are supported by their own specific tests:

- 5AC901.I485-00
- 5AC901.ISRM-00
- 5AC901.IUPS-00
- 5AC901.IUPS-01
- 5ACCIF01.FPLS-000
- 5PC810.SX0X-00
- 5PP5IF.FCAN-00
- 5PP5IF.FETH-00
- 5PP5IF.FPLM-00
- 5PP5IF.FSJA-00
- 5PP5IF.FXCM-00
- 5PP5IF.FX2X-00
- 5PP5IO.GMAC-00
- 5PP5IO.GNAC-00

3 Order data


| Model number | Short description | Figure |
|-----------------|------------------------------------|---|
| | Accessories | |
| 5SWUT1.0001-000 | HMI Service Center USB flash drive |  |

Table 4: 5SWUT1.0001-000 - Order data

4 Prerequisites and requirements

4.1 Test system

The test system consists of a USB flash drive with an installed Windows PE 5.1 operating system and the HMI Service Center.

Information:

The HMI Service Center can only be executed on the USB flash drive. The necessary activation key exists in the form of the Settings.xml file. This file is therefore not permitted to be overwritten or deleted!

Information:

The HMI Service Center was developed for use in Windows PE 5.1. If executed on a standard Windows operating system, some functions will not be supported (automatic restart or the buzzer, for example). Certain ADI driver versions may also be required.

4.2 Target system

The PC to be analyzed by the HMI Service Center must be a B&R Industrial PC (see the section "Supported devices" on page 9) that meets the following hardware requirements:

- At least 512 MB RAM
- Display (integrated or connected) with VGA resolution (640 x 480) or higher

Information:

The test system does not support widescreen resolutions on the APC810 with a GM45 CPU board, PP500, APC510 or APC511.

Touch screen support is provided for PCs with a single- or multi-touch screen. A mouse or keyboard is needed otherwise to operate the software.

Certain firmware versions are necessary on the target system to provide complete test functionality:

- APC510: MTCX V0.40 or higher
- APC511: MTCX V0.40 or higher
- APC810: MTCX V1.12 or higher
- APC910: MTCX V1.12 or higher
- APC2100: MTCX V1.00 or higher
- PPC900: MTCX V1.07 or higher
- PPC2100: MTCX V1.00 or higher
- PP500: MTCX V0.40 or higher

Information:

BIOS default settings are required for tests to be carried out properly. For information about loading BIOS default settings, please see the user's manual for the respective PC.

4.3 Test accessories

The following test accessories are necessary to provide full functionality¹⁾:

- 1 serial loopback adapter for the COM test in manual mode or up to 2 in automatic mode (+1 for each serial interface on an interface option or I/O board)
- 1 Ethernet cable for the network connectivity test and a remote station for the ping test
- 1 USB flash drive to test USB interfaces

¹⁾ Test accessories are not included.

5 Startup

1. Connect the USB flash drive containing the test system to the PC to be tested.
2. Turn on the PC.
3. Launch the BIOS boot manager.²⁾
4. Select the USB flash drive in the BIOS boot manager.
5. Windows PE is booted and the HMI Service Center boot screen appears (see Figure 1 "Boot screen").
6. The HMI Service Center is launched.



HMI Service Center is loading...



Figure 1: Boot screen

²⁾ See the respective PC user's manual for the key that starts the BIOS boot manager.

6 Operation

6.1 User interface

The HMI Service Center displays the tests available for the PC along with a short description and the status of the most recent test cycle:

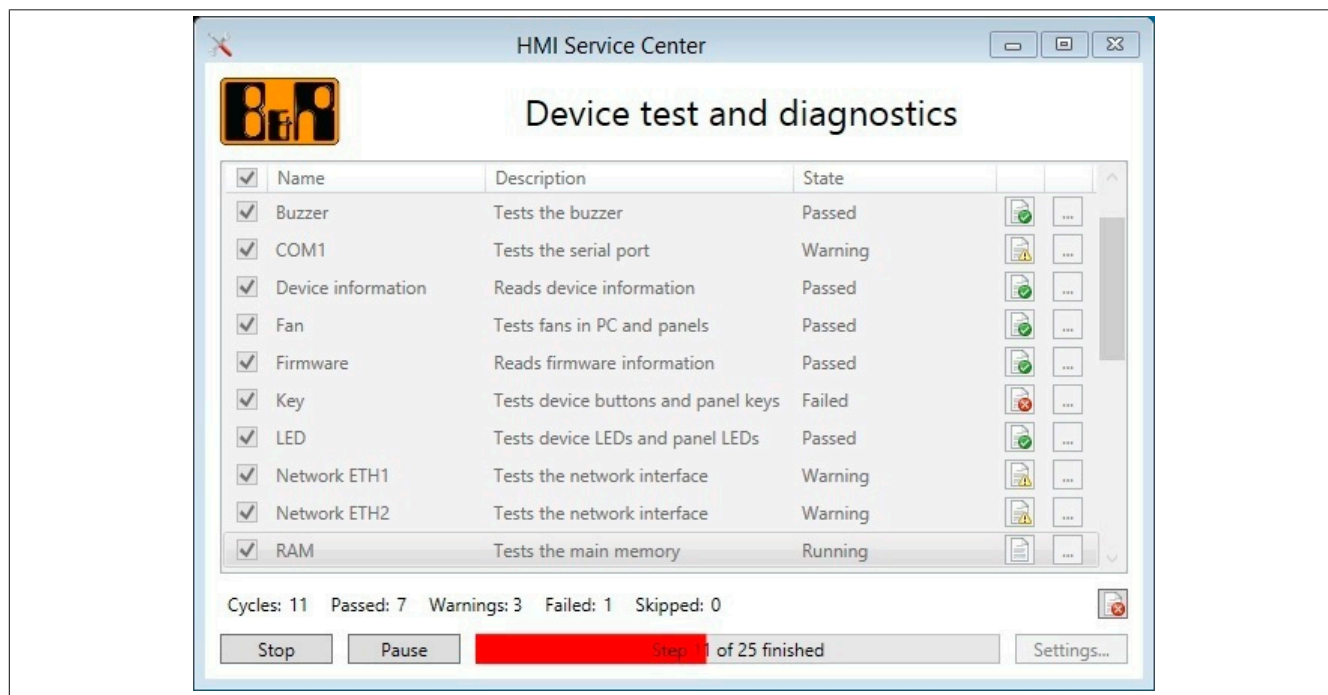


Figure 2: User interface (main window)

6.2 Selecting tests

First click the checkbox to the left of the test name to select the desired tests.

Clicking on the checkbox to the left of the "Name" column header will enable or disable all tests at once.

6.3 Configuring test settings

You can change general test settings by clicking on **Settings**:

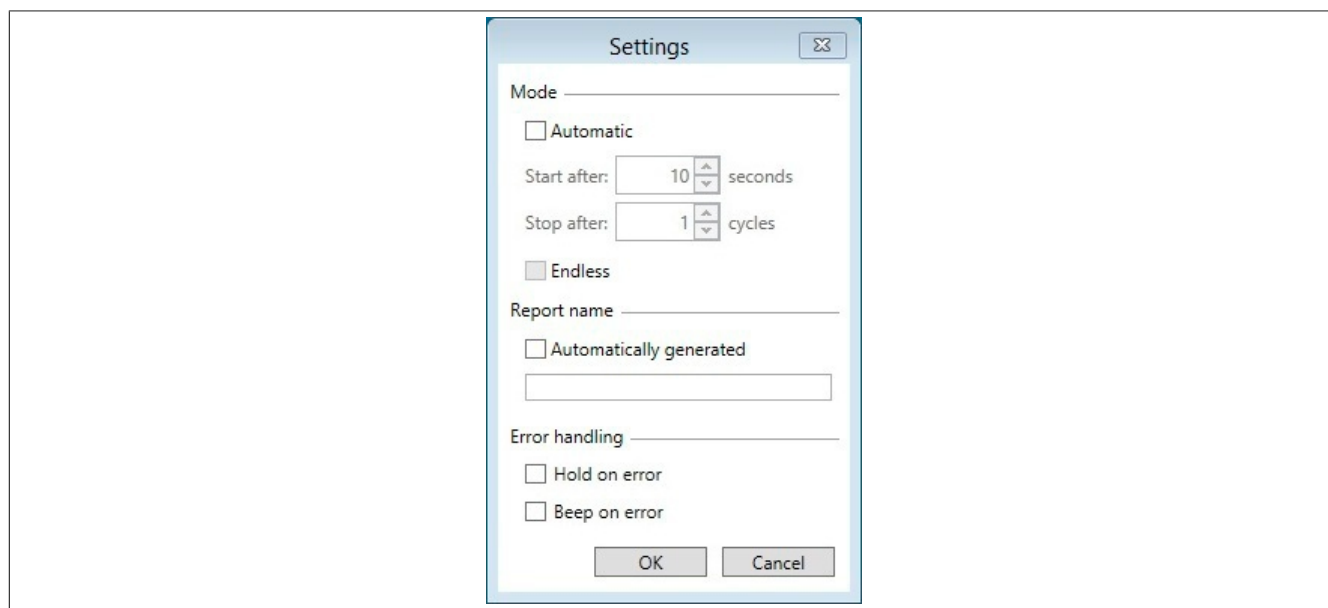



Figure 3: Settings window

Automatic testing can be enabled by selecting **Automatic** under **Mode**. This will start 10 seconds later by default and perform all of the selected tests automatically. The deeper functionality that is available in manual mode is not provided for all tests, however, since some tests require user interaction (for the Ethernet interfaces, for example). The test overview lists which tests can be executed in automatic testing mode. Any limitations or differences to manual testing mode are listed for each of the tests.

Start after allows you to specify the starting time in seconds, while **Stop after** allows you to set the number of test cycles. You can also select **Endless** if you want to perform endless testing (note that Windows PE automatically restarts after 72 hours).

The **Automatically generated** option under **Report name** allows you to have a filename for the report generated automatically instead of having to choose one yourself. The section "Test reports" on page 14 explains how the filenames are put together.

You can also select **Hold on error** under **Error handling** to indicate that the test cycle should stop if an error occurs. If **Beep on error** is selected, the PC will also emit a beep (as long as it has the ability to do so).

If certain settings are needed for an individual test, you can open these settings with the  button to the right of the test status (**State**). Possible settings can be found in the descriptions for the tests.

6.4 Connecting test accessories

Necessary test accessories are listed before the tests are started in automatic mode or before each test step in manual mode. The testing mode can be configured under **Settings**.

6.5 Starting and pausing tests

Click on **Start** (which switches to **Stop**) to start (or stop) a test cycle. The progress indicator displays the current testing progress, the current test step and the number of test steps that have been completed.

The test cycle can be paused and resumed by clicking on **Pause** (which switches to **Resume**). The number of test cycles is configured under **Settings**.

Information:

If a test ends unexpectedly (PC restart, blue screen, etc.), the last completed test step is repeated automatically and the test cycle will resume from that point.

6.6 Viewing test results

The summary bar shows the number of test steps that have been executed (**Cycles**), passed (**Passed**), failed (**Failed**) and skipped (**Skipped**) as well as test steps with warnings (**Warnings**). During endless testing, the number of test cycles is displayed.

The results of each test step are saved to individual reports as well as a summary report. Each report can be opened by clicking on the respective icon either directly for each test or in the summary bar:



= Report for passed test



= Report for test with warning



= Report for failed test

Information:

- Only the summary report can be opened while a test cycle is ongoing.
- If the PC is restarted, the individual report for a test step will only contain the information from the new cycle; the information from the old cycle can be found in the summary report.

7 Test reports

Summary reports are stored after each test cycle in the ".\Service Center\Reports" directory on the USB flash drive.

If the **Automatically generated** option is enabled in the settings, the filename of the report will include the model number and serial number of the PC's system unit: "<ModelNumber>_<SerialNumber>.txt".

An error report called "<ModelNumber>_<SerialNumber>_errors.txt" is also created. This error report contains all test reports with errors and warnings.

If a report already exists, a sequential number will be appended to the report's filename, for example "5PC910.SX01-00_D6DA0100000_Report (2).txt".

A report begins with the file header, which contains the date and time of the test, the system family, software component versions and testing mode:

```
*** HMI Service Center Report ***
Created on 2014-10-13 13:04:53
System family: Automation PC 910

Service framework version: 1.0.0.0
ADI .NET SDK version: 2.2.0.0
ADI DLL version: 4.3

Mode: Automatic
```

The actual test reports follow the file header and are concluded by a summary at the end of the report.

```
--- Summary ---
Steps: 9
Passed: 5
Warnings: 1
Skipped: 3
Failed: 0
```

8 Test overview

| Test name | Test instances | Automatic test | Supported devices | Test accessories necessary? |
|--------------------|---------------------|-------------------|---|-----------------------------|
| Battery | 1 | Yes | APC510, APC511, APC810, APC910 PPC800, PPC900 PP500 | No |
| BIOS | 1 | Yes | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 PP500 | No |
| Buzzer | 1 | No | APC510, APC511, APC810, APC910 PPC800, PPC900 PP500 | No |
| COM | 1...x ¹⁾ | Yes | APC510, APC511, APC810, APC910, APC2100 (interface option only) PPC800, PPC900, PPC2100 (interface option only) PP500 | Yes |
| Device information | 1 | Yes | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, APC9xD PP500 | No |
| Fan | 1 | Yes | APC810, APC910 PPC800, PPC900 AP800, AP900, AP9x3, AP9xD ²⁾ | No |
| Firmware | 1 | Yes | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, AP9xD PP500 | No |
| Key | 1 | No | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, APC9xD PP500 | No |
| LED | 1 | No | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, AP9xD PP500 | No |
| Network | 1...x ³⁾ | Yes ⁴⁾ | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 PP500 | Yes |
| RAM | 1 | Yes | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 PP500 | No |
| SRAM | 1 | Partial | APC510, APC511, APC810, APC910 PPC900 PP500 | No |
| Statistics | 1 | Yes | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, AP9xD PP500 | No |
| Storage | 1...x ⁵⁾ | Partial | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 PP500 | No |
| Temperature | 1 | Yes | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, AP9xD PP500 | No |
| Touch | 1 | No | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, AP9xD PP500 | No |
| UPS | 1 | Partial | APC810, APC910 PPC800, PPC900 | No |
| USB | 1...x ⁶⁾ | Yes ⁷⁾ | APC510, APC511, APC810, APC910, APC2100 PPC800, PPC900, PPC2100 AP800, AP900, AP9x3, AP9xD PP500 | Yes |

Table 5: Test overview

- 1) The number of instances depends on the number of serial interfaces.
- 2) Standard Automation Panels are not equipped with a fan.
- 3) The number of instances depends on the number of Ethernet interfaces.
- 4) Automatic testing is only possible for one Ethernet interface.
- 5) The number of instances depends on the number of RAM modules.
- 6) The number of instances depends on the number of USB interfaces and connected panels.
- 7) Automatic testing is only possible for one USB interface.

Automation Panels must be used as a display unit or connected via SDL or SDL3. Some tests can only be performed on the "primary" panel. The primary panel is either the integrated panel (display unit) or the first connected panel (search order: integrated panel -> panel connected to the monitor/panel interface -> panel connected to the Display/AP link). Connecting an Automation Panel via DVI is not recommended since some tests will not be supported.

9 Test cases

9.1 Battery

Scope of testing:

Tests the PC's CMOS battery.

Test description:

This test reads the status of the CMOS battery. The states *Bad* and *Unknown* are treated as errors.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910
- PPC800, PPC900
- PP500

Required test accessories:

None

Sample report:

```
--- Battery ---  
  
Plug-in version: 1.0.0.0  
  
State: Good  
  
Test passed.
```


9.2 BIOS

Scope of testing:

Reads the PC's BIOS information.

Test description:

This test reads the BIOS version, description and manufacturer (SMBIOS only) as well as the CMOS profile switch setting (APC810 and PPC800 only) and writes this information to the report.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- PP500

Required test accessories:

None

Sample report:

```
--- BIOS ---  
  
Plug-in version: 1.0.0.0  
  
Version: Q1.18  
Description: BIOS Date: 05/26/14 01:00:00 Ver: 04.06.05  
Manufacturer: Bernecker + Rainer Industrie-Elektronik  
  
Test passed.
```

9.3 Buzzer

Scope of testing:

Tests the PC buzzer.

Test description:

In this test, the buzzer outputs a 800 Hz tone for one second. You have to confirm that the tone was played.

Automatic testing:

No

Supported devices:

- APC510, APC511, APC810, APC910
- PPC800, PPC900
- PP500

Required test accessories:

None

Sample report:

```
--- Buzzer ---

Plug-in version: 1.0.0.0

Buzzer played a sound at 800 Hz for 1000 ms.
User asked "Was a sound played?". User confirmed with "Yes".

Test passed.
```

9.4 COM

Scope of testing:

Tests the serial interfaces on the PC and interface options.

Test description:

The COM test checks data transfer at various baud rates (300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 56000, 57600, 115200) as well as the control lines (RTS, CTS, DTR, DSR) on the serial interface. If the serial interface is on an interface option, then the factory settings and statistical values of the module are also written to the report.

A loopback adapter is required for this test. When the test is started, the user is requested to connect the loopback adapter. Connect the loopback adapter to the serial interface and click **OK**.

Notes:

- The serial interface on an APC2100 / PPC2100 (on the 5ACCIF01.FPLS-000 interface option) does not have a standard connector (DSUB). Please refer to the respective PC user's manual for additional details.
- A loopback adapter is not included with this software. An adapter can be ordered from a retailer or built relatively easily by yourself. All that is necessary is to connect some of the pins on the serial interface.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100 (serial interface on interface option only)
- PP500

Supported interface options and I/O boards:

- 5AC901.I485-00
- 5ACCIF01.FPLS-000
- 5PP5IO.GMAC-00
- 5PP5IO.GNAC-00

Required test accessories:

Manual mode: 1 serial loopback adapter

Automatic mode: 2 serial loopback adapters (+1 for each serial interface on an interface option or I/O board)

Sample report:

```
--- COM ---

Plug-in version: 1.0.0.0

Interface: COM6 (IF Option 2)

Vendor ID: 0x00000000
Device ID: 0x0000D84A
Compatibility ID: 0x0000
Hardware revision: D0
Serial number: D84A0169644
Model number: 5AC901.I485-00
Power-on cycles: 386
Power-on hours: 522

Testing data lines (TX, RX) at 300 baud...
Passed.
Testing data lines (TX, RX) at 600 baud...
Passed.
Testing data lines (TX, RX) at 1200 baud...
```

```
Passed.  
Testing data lines (TX, RX) at 2400 baud...  
Passed.  
Testing data lines (TX, RX) at 4800 baud...  
Passed.  
Testing data lines (TX, RX) at 9600 baud...  
Passed.  
Testing data lines (TX, RX) at 14400 baud...  
Passed.  
Testing data lines (TX, RX) at 19200 baud...  
Passed.  
Testing data lines (TX, RX) at 38400 baud...  
Passed.  
Testing data lines (TX, RX) at 56000 baud...  
Passed.  
Testing data lines (TX, RX) at 57600 baud...  
Passed.  
Testing data lines (TX, RX) at 115200 baud...  
Passed.  
  
Testing control lines (RTS, CTS)...  
Passed.  
  
Testing control lines (DTR, DSR)...  
Passed.  
  
Test passed.
```

9.5 Device information

Scope of testing:

Reads information about the hardware used on the PC and connected panels.

Test description:

This test reads the factory settings (including model number, serial number, etc.) of the PC and panels and writes this information to the report.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- PP500

Required test accessories:

None

Sample report:

```

--- Device information ---

Plug-in version: 1.0.0.0

System unit:
Vendor ID: 0x00000000
Device ID: 0x0000D6DA
Compatibility ID: 0x0000
Hardware revision: A0
Serial number: D6DA0100000
Model number: 5PC910.SX01-00

CPU board:
Vendor ID: 0x00000000
Device ID: 0x0000D6F6
Compatibility ID: 0x0000
Hardware revision: A0
Serial number:
Model number: 5PC900.TS77-01

Memory module 1:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000B512
Compatibility ID: 0x0000
Hardware revision: C0
Serial number: 01234567890
Model number: 5MMDR.4096-02

Memory module 2:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000B512
Compatibility ID: 0x0000
Hardware revision: C0
Serial number: 01234567890
Model number: 5MMDR.4096-02

Bus:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000D6DC
Compatibility ID: 0x0000
Hardware revision: A0

```

Serial number: D6DC0100000
Model number: 5AC901.BX01-00

Drive1:
Present: False

Drive2:
Present: False

IF1:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000D851
Compatibility ID: 0x0000
Hardware revision: A5
Serial number: D8510168533
Model number: 5AC901.IUPS-00

IF2:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000D850
Compatibility ID: 0x0000
Hardware revision: B0
Serial number: D8500168667
Model number: 5AC901.ISRM-00

Fan1:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000D6E6
Compatibility ID: 0x0000
Hardware revision: A0
Serial number: D6E60000000
Model number: 5AC901.FA01-00

Fan2:
Present: False

Display link:
Present: False

Panel0:
Present: True
Vendor ID: 0x00000000
Device ID: 0x00001A06
Compatibility ID: 0x0000
Hardware revision: G0
Serial number: 66620169416
Model number: 5AP920.1706-01

Panel1:
Present: False

Panel2:
Present: False

Panel3:
Present: False

Panel4:
Present: False

Panel5:
Present: False

Panel6:
Present: False

Panel7:
Present: False

```
Panel8:  
Present: False  
  
Panel9:  
Present: False  
  
Panel10:  
Present: False  
  
Panel11:  
Present: False  
  
Panel12:  
Present: False  
  
Panel13:  
Present: False  
  
Panel14:  
Present: False  
  
Panel15:  
Present: False  
  
Test passed.
```

9.6 Fan

Scope of testing:

Tests integrated fans in the PC and connected panels.

Test description:

This test reads the speed, status and log entries of each available fan and performs a fan test run. The fan test switches the fans to operate at 100% speed. After a startup phase, the speed and status of the fans are checked before they are switched back to automatic mode.

Notes:

- The fan test can only be run on fans in the PC, not the fans in panels.
- The limit values for fan speeds are defined in the PC (except for the APC810 and PPC800) and not written to the report.
- APC810 and PPC800 systems provide no information as to whether fans are installed. Fan logs are also not supported, and the fan status never returns an error since no limit values are defined in the PC. For this reason, the test is always completed with a "Warning" result and you will have to check the values yourself (by comparing them to the maximum permitted values in the user's manual for the PC, for example).
- Fan speeds are only listed in the report.

Automatic testing:

Yes

Supported devices:

- APC810, APC910
- PPC800, PPC900
- AP800, AP900, AP9x3, AP9xD

Required test accessories:

None

Sample report:

```

--- Fan ---

Plug-in version: 1.0.0.0

Case fan 1:
Current: 0 rpm, State: OK
Running: 138h 15min (654 cycles), too slow: 0h 0min, Alarm: 0h 0min

Case fan 2:
Current: 0 rpm, State: OK
Running: 138h 15min (654 cycles), too slow: 0h 0min, Alarm: 0h 0min

Case fan 3:
Current: 0 rpm, State: OK
Running: 138h 15min (654 cycles), too slow: 0h 0min, Alarm: 0h 0min

Panel fan:
Current: 0 rpm, State: OK

Fan test

Case fan 1:
Current: 2257 rpm, State: OK

Case fan 2:
Current: 2186 rpm, State: OK

Case fan 3:
Current: 5295 rpm, State: OK

```


Test passed.

9.7 Firmware

Scope of testing:

Reads information about the firmware used on the PC and connected panels.

Test description:

This test reads all firmware versions and writes them to the report.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- AP800, AP900, AP9x3, AP9xD
- PP500

Required test accessories:

None

Sample report:

```
--- Firmware ---  
  
Plug-in version: 1.0.0.0  
  
AP Link (panel 0): 1.19  
BIOS: 1.19  
MTCX: 1.12  
  
Test passed.
```

9.8 Key

Scope of testing:

Tests the PC buttons and optional keys on the primary panel.

Test description:

The following window appears to test the power and reset buttons.

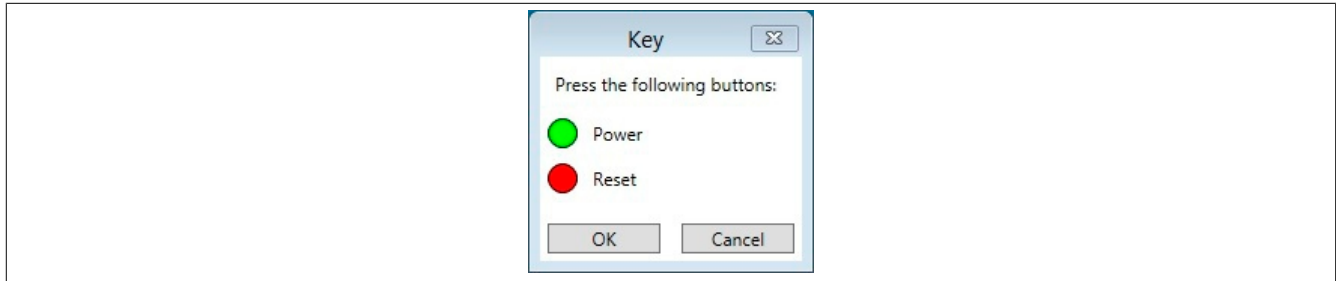


Figure 4: Window for PC buttons

Carry out the following steps:

1. Press the power button on the PC and check whether the red "Power" indicator in the window switches to green.
2. Press the reset button on the PC and check whether the red "Reset" indicator in the window switches to green.
3. Click **OK** to end the test. The system will check whether all buttons were pressed.

Clicking **Cancel** cancels the test.

This window is only displayed if the test is supported by the firmware on the PC. A corresponding message will be written to the report otherwise.

The test for the panel keys (function keys, system keys, key switches, etc.) is carried out with the following window:



Figure 5: Window for panel keys

Carry out the following steps:

1. Press all panel keys and check the key number shown in the window³⁾.
2. Click **OK** to end the test. You then have to confirm that all keys worked correctly.

Clicking **Cancel** cancels the test.

This window is only displayed if the panel reports having more than zero keys.

Notes:

Automation Panels always report having keys, even if the panel has none. You must first confirm a message before testing the panel keys.

Automatic testing:

No

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- AP800, AP900, AP9x3, APC9xD
- PP500

³⁾ Refer to the respective PC or panel user's manual for key numbers.

Required test accessories:

None

Sample report:

```
--- Key ---

Plug-in version: 1.0.0.0

Testing power button...
Passed
Testing reset button...
Passed

Testing panel keys...
Pressed keys:
1, 2, 8, 9, 10, 11, 12, 13, 14, 40, 56, 72, 105
Passed

Test passed.
```

9.9 LED

Scope of testing:

Tests the LED status indicators on the PC and optional LEDs on the primary panel.

Test description:

This test switches on the PC's LED status indicators (the "Power" LED, for example) one after the other, with you having to confirm the function of each LED:

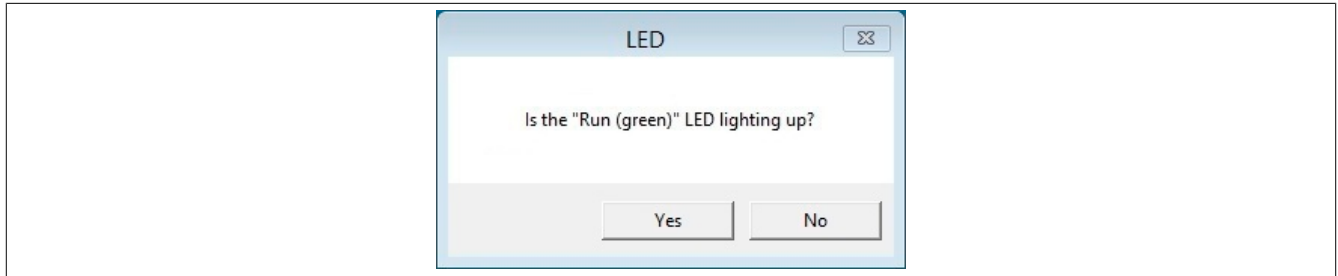


Figure 6: Message box for one LED on the PC

LEDs are only switched on if the test is supported by the firmware on the PC (see footnotes further down under "Supported devices"). A corresponding message will be written to the report otherwise.

All panel LEDs are then switched on simultaneously, which you must also confirm:



Figure 7: Message box for all LEDs on the panel

This message box is only displayed if the panel reports having more than zero LEDs.

Notes:

- Automation Panels always report having LEDs, even if the panel has none. You must first confirm a message before testing the panel LEDs.
- Not all PCs are equipped with the LEDs mentioned above.
- The HDD LED can only be tested by performing write operations on a drive. If no HDD, SSD, CF or CFast card can be found, then a corresponding message is written to the report.

Automatic testing:

None

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- AP800, AP900, AP9x3, AP9xD
- PP500

Required test accessories:

None

Sample report:

```
--- LED ---

Plug-in version: 1.0.0.0

Testing "Run (green)" LED...
Passed
Testing "Run (red) LED"...
Passed
Testing "Link" LED...
Passed
Testing "Power (green)" LED...
Passed
Testing "Power (red)" LED...
Passed
Testing "HDD" LED...
Passed

Testing panel LEDs...
Passed

Test passed.
```

9.10 Network

Scope of testing:

Tests the Ethernet interfaces on the PC.

Test description:

This test configures and checks the integrated Ethernet interfaces as well as Ethernet interfaces on interface options. Network settings must be made in the settings window for the test step before the test is started (the settings button is shown on the right side of the list of tests).

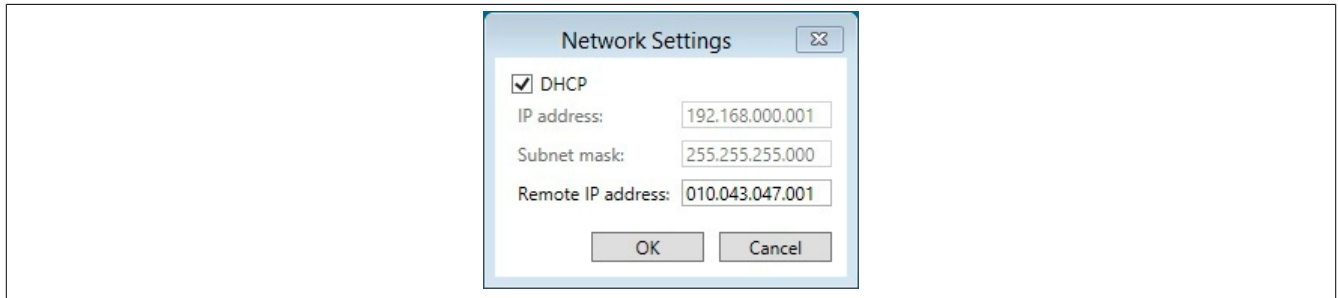


Figure 8: Network settings window

Enter the **IP address** and **Subnet mask** of the Ethernet interface to be tested as well as the **Remote IP address** of the connected remote station being used for the ping test. The settings are saved and can be used for subsequent test cycles as well.

Now connect the Ethernet cable to the interface being tested and disconnect all other Ethernet cables (a message box will remind you of this).

The configured IP address is then set for the first connected Ethernet interface. The adapter name and MAC address of the Ethernet interface are written to the report. If the Ethernet interface is on an interface option, then the factory settings of the module are also read and written to the report.

In the next step, you have to confirm that the LEDs on the Ethernet interface are lit.

The network test is then started. 10 pings are transmitted to the remote IP address with a packet size of 65500 bytes and timeout of 4 seconds. When all pings have been sent successfully, the test has successfully completed.

Notes:

- Assigning the Ethernet interface to the housing label is not possible.
- A loopback test between two Ethernet interfaces on one PC (without a remote station) is not possible for technical reasons.

Automatic testing:

Yes (for one Ethernet interface only)

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- PP500

Supported interface options:

- 5PP5IF.FETH-00

Required test accessories:

Network cable

Sample report:

```
--- Network ---

Plug-in version: 1.0.0.0

Interface name: IF Ethernet
Adapter name: Intel(R) 82574L Gigabit Network Connection
Physical address: 00:60:65:15:B4:37

Vendor ID: 0x00000000
Device ID: 0x0000B7C4
Compatibility ID: 0x0000
Hardware revision: B6
Serial number: B7C40169010
Model number: 5PP5IF.FETH-00
Power-on cycles: 165
Power-on hours: 347

Testing network LEDs...
Passed

Pinging 10.43.47.1 with 65500 bytes of data.
Reply from 10.43.47.2: bytes=65500 time=41ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=42ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=40ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=40ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=41ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=42ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=46ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=38ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=40ms TTL=64
Reply from 10.43.47.2: bytes=65500 time=39ms TTL=64

Test passed.
```


9.11 RAM

Scope of testing:

Tests the PC's main memory (RAM).

Test description:

This test reads the size and factory settings of the RAM and tests the memory in 6 different ways:

- **Sequence**
A sequence of numbers from 0 to 255 is written from the lowest to the highest address and then read back again from the lowest to the highest address.
- **Binary 1**
The hexadecimal value 0xAA is written from the lowest to the highest address and then read back again from the lowest to the highest address.
- **Binary 2**
The hexadecimal value 0x55 is written from the lowest to the highest address and then read back again from the lowest to the highest address.
- **Zeros**
A sequence of zeros (0x00) is written from the lowest to the highest address and then read back again from the lowest to the highest address.
- **Ones**
A sequence of ones (0xFF) is written from the lowest to the highest address and then read back again from the lowest to the highest address.
- **Cell adjacency test**
The hexadecimal value 0xA5 is written from the lowest to the highest address and then read back again from the highest to the lowest address. The binary pattern 0x5A is then written from the highest to the lowest address and then read back again from the lowest to the highest address.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- PP500

Required test accessories:

None

Sample report:

```

--- RAM ---

Plug-in version: 1.0.0.0

Memory size: 8103 MB.

Memory module 1:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000B512
Compatibility ID: 0x0000
Hardware revision: C0
Serial number: 01234567890
Model number: 5MMDR.4096-02

Memory module 2:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000B512

```

```
Compatibility ID: 0x0000
Hardware revision: C0
Serial number: 01234567890
Model number: 5MMDDR.4096-02

Sequence (0, 1, 2, ..., 255)...
Passed
Binary 1 (10101010)...
Passed
Binary 2 (01010101)...
Passed
Zeros (00000000)...
Passed
Ones (11111111)...
Passed
8-bit cell adjacency test...
Passed

Test passed.
```

9.12 SRAM

Scope of testing:

Tests the PC's SRAM.

Test description:

This test reads the device ID, firmware version and SRAM size. If the SRAM is on an interface option, then the factory settings and statistical values of the module are also read and written to the report (not supported on APC810 and customized PPC800 systems).

The following test steps are carried out:

1. The complete contents of SRAM are backed up.
2. Random values are written to SRAM.
3. The SRAM data is read again and compared with the written values.

A data retention test is also performed in manual mode:

- The PC is switched off, and the power supply must be disconnected.
- After the PC restarts, the SRAM data is read again and compared with the written values.

The original contents of SRAM are restored at the end.

Automatic testing:

Partial (without the data retention test)

Supported devices:

- APC510, APC511, APC810, APC910
- PPC900
- PP500

Supported interface options and I/O boards:

- 5PC810.SX0X-00
- 5AC901.ISRM-00 (+ customized versions)
- 5PP5IF.FCAN-00
- 5PP5IF.FETH-00
- 5PP5IF.FPLM-00
- 5PP5IF.FSJA-00
- 5PP5IF.FXCM-00
- 5PP5IF.FX2X-00

Required test accessories:

None

Sample report:

```
--- SRAM ---

Plug-in version: 1.0.0.0

Vendor ID: 0x00000000
Device ID: 0x0000DF9C
Compatibility ID: 0x0000
Hardware revision: A0
Serial number: DF9C0100000
Model number: 5AC901.ISRM-P00

Power-on cycles: 9
Power-on hours: 7

Firmware version: 3
```

```
SRAM size: 2048 kB

Backing up original SRAM data...
Passed
Writing random values to SRAM...
Passed
Reading SRAM data...
Passed
Verifying data...
Passed
Restart the PC to perform the SRAM retention test.
Reading SRAM data...
Passed
Verifying data...
Passed
Restoring original SRAM data...
Passed

Test passed.
```

9.13 Statistics

Scope of testing:

Reads statistical information about the PC and connected panels.

Test description:

This test reads statistical values (e.g. power-on cycles and operating hours) from the PC and connected panels and writes the information to the report.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- AP800, AP900, AP9x3, AP9xD
- PP500

Required test accessories:

None

Sample report:

```
--- Statistics ---

Plug-in version: 1.0.0.0

System unit (power-on cycles): 803
System unit (operating hours): 4920
FAN (fan operating hours): 138
Panel 0 (backlight-on cycles): 65535
Panel 0 (backlight operating hours): 36117
IF board (power-on cycles): 239
IF board (operating hours): 1947
Bus unit (power-on cycles): 802
Bus unit (operating hours): 4920
IF board 2 (power-on cycles): 388
IF board 2 (operating hours): 523
FAN (fan-on cycles): 654
UPS (on-battery cycles): 27
UPS (on-battery time): 0

Test passed.
```

9.14 Storage

Scope of testing:

Tests the mass storage device (HDD/SSD/CF/CFast) in the PC.

Test description:

This test first reads information such as the model number, serial number, firmware version and location from the drive and writes it to the report. The SMART values and SMART state are then determined.

The last step in manual mode is a disk check. The disk check only performs a check of the drive; it doesn't correct any errors it finds.

Automatic testing:

Partial (disk check only performed in manual mode)

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- PP500

Required test accessories:

None

Sample report:

```

--- Storage ---

Plug-in version: 1.0.0.0

Model number: WDC WD5000AAKS-00UU3A0
Serial number: W -DCWYA0U118678
Firmware version: 01.0Size: 465 GB
Location: Unknown

SMART:
Predict failure status: OK
  ID Current Worst Threshold      Data Status
  1      200   200       51         0     OK
  3      142   141       21      3858     OK
  4      100   100        0       957     OK
  5      200   200      140         0     OK
  7      200   200        0         0     OK
  9       87    87        0      9701     OK
 10      100   100        0         0     OK
 11      100   100        0         0     OK
 12      100   100        0       876     OK
 192     200   200        0        34     OK
 193     200   200        0       922     OK
 194     105   101        0        38     OK
 196     200   200        0         0     OK
 197     200   200        0         0     OK
 198     200   200        0         0     OK
 199     200   200        0         0     OK
 200     200   200        0         0     OK

Reading test...
Passed

Run "Check Disk" on drive D: "Data"...

The type of the file system is NTFS.
The volume is in use by another process. Chkdsk
might report errors when no corruption is present.

Volume label is Data.
```

```

WARNING! F parameter not specified.
Running CHKDSK in read-only mode.

CHKDSK is verifying files (stage 1 of 3)...
  310016 file records processed.

File verification completed.
  46 large file records processed.

  0 bad file records processed.

  0 EA records processed.

  0 reparse records processed.

CHKDSK is verifying indexes (stage 2 of 3)...
  327562 index entries processed.

Index verification completed.
  0 unindexed files scanned.

  0 unindexed files recovered.

CHKDSK is verifying security descriptors (stage 3 of 3)...
  310016 file SDs/SIDs processed.

Security descriptor verification completed.
  8774 data files processed.

CHKDSK is verifying Usn Journal...
  35027888 USN bytes processed.

Usn Journal verification completed.
Windows has checked the file system und found no problems.
  488384172 KB total disk space.
  52015668 KB in 39715 files.
    20508 KB in 8775 indexes.
      0 KB in bad sectors.
    425688 KB in use by the system.
    65536 KB occupied by the log file.
  435922308 KB available on disk.

    4096 bytes in each allocation unit.
  122096043 total allocation units on disk.
  108980577 allocation units available on disk.
Passed

Test passed.

```

9.15 Temperature

Scope of testing:

Reads temperatures from the PC and connected panels.

Test description:

This test reads the values, status and log entries of each available temperature sensor. The status is reported as an "Alarm" if the sensor value exceeds the limit value defined in the PC. Log entries also include the time period in which the temperature range was violated.

Notes:

- The limit values for temperatures are defined in the PC (except for the APC810 and PPC800) and not written to the report.
- Log entries for temperatures are not supported on APC810 and PPC800 systems, and the temperature status never returns an error since no limit values are defined in the PC (except for the UPS battery temperature). For this reason, the test is always completed with a "Warning" result and you will have to check the values yourself (by comparing them to the maximum permitted values in the user's manual for the PC, for example).
- Minimal temperature values $\leq 0^{\circ}\text{C}$ are written to the logbook by the PPC900 until MTCX V1.17 for CPU board sensor 0 and system unit sensor 3.

Automatic testing:

Yes

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- AP800, AP900, AP9x3, AP9xD
- PP500

Required test accessories:

None

Sample report:

```

--- Temperature ---

Plug-in version: 1.0.0.0

Panel 0:
Current: 33.00 °C / 91.40 °F, State: OK

UPS battery:
Current: -128.00 °C / -198.40 °F, State: Alarm
Max temperature: 28.00 °C / 82.40 °F, Log: 0h 0min, Alarm: 0h 0min
Min temperature: 22.00 °C / 71.60 °F, Log: 0h 0min, Alarm: 0h 0min

CPU board (sensor 1):
Current: 40.00 °C / 104.00 °F, State: OK

CPU board (sensor 2):
Current: 36.00 °C / 96.80 °F, State: OK

CPU board (sensor 3):
Current: 44.00 °C / 111.20 °F, State: OK

CPU board (sensor 4):
Current: 45.00 °C / 113.00 °F, State: OK

System unit (sensor 1):
Current: 36.50 °C / 97.70 °F, State: OK

```


Max temperature: 50.50 °C / 122.90 °F, Log: 0h 0min, Alarm: 0h 0min
Min temperature: 22.00 °C / 71.60 °F, Log: 0h 0min, Alarm: 0h 0min

System unit (sensor 2):

Current: 35.00 °C / 95.00 °F, State: OK

Max temperature: 55.00 °C / 131.00 °F, Log: 0h 0min, Alarm: 0h 0min

Min temperature: 21.75 °C / 71.15 °F, Log: 0h 0min, Alarm: 0h 0min

System unit (sensor 3):

Current: 40.00 °C / 104.00 °F, State: OK

Max temperature: 54.50 °C / 130.10 °F, Log: 0h 0min, Alarm: 0h 0min

Min temperature: 21.75 °C / 71.15 °F, Log: 0h 0min, Alarm: 0h 0min

Test failed.

9.16 Touch

Scope of testing:

Tests the touch screen of the primary panel.

Test description:

This test first checks whether a serial (resistive) single-touch screen or USB (capacitive) multi-touch screen is present. If no touch screen is detected, a corresponding message is written to the report and the test completes with a "Passed" status.

If a touch screen is detected, you have to confirm that the touch test can be started. In this test, you have to tap five test points on the touch screen: the top left, top right, lower left, lower right and center of the screen (see Figure 9 "Test image on touch screen"). The test can be canceled with the ESC key; it will also time out automatically after 20 seconds of inactivity.

Information:

On devices that don't support widescreen resolutions (APC510, APC511, APC810, PPC800 and PP500), the test image will either be "stretched" or shown in the center. A precise touch test is not possible in this case since you have to "locate" the right places to tap on the touch screen.



Figure 9: Test image on touch screen

A message box is displayed at the end of the touch screen test that you have to confirm with OK if the test was successful.

Automatic testing:

No

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- AP800, AP900, AP9x3, AP9xD
- PP500

Required test accessories:

None

Sample report:

```
--- Touch ---
```

```
Plug-in version: 1.0.0.0
```

```
Test point 1 of 5 touched.  
Test point 2 of 5 touched.  
Test point 3 of 5 touched.  
Test point 4 of 5 touched.  
Test point 5 of 5 touched.  
User asked "Did the touch screen work correctly?". User confirmed with "Yes".  
  
Test passed.
```

9.17 UPS

Scope of testing:

Tests the optional UPS.

Test description:

This test reads the firmware version⁴⁾, factory settings, statistics⁵⁾, voltage values and state of the UPS in addition to performing a UPS test.

The PC's power supply is switched off during the UPS test. The system then checks whether the UPS takes over supplying power or the PC restarts. This test is only possible in manual mode since the power supply must be switched off manually (a message box will remind you of this).

Automatic testing:

Partial (without PC restart)

Supported devices:

- APC810, APC910
- PPC800, PPC900

Supported interface options:

- 5AC901.IUPS-00
- 5AC901.IUPS-01

Required test accessories:

None

Sample report:

```

--- UPS ---

Plug-in version: 1.0.0.0

Vendor ID: 0x00000000
Device ID: 0x0000D851
Compatibility ID: 0x0000
Hardware revision: A5
Serial number: D8510168533
Model number: 5AC901.IUPS-00

Power-on cycles: 151
Power-on hours: 1848
On-battery cycles: 23
On-battery hours: 0

Battery voltage: 25.801 V
Battery current: 0.000 A

Status: PowerOk

UPS function test passed.

Test passed.
```

⁴⁾ Only supported on APC810 and PPC800 systems.

⁵⁾ Only supported on APC910 and PPC900 systems.

9.18 USB

Scope of testing:

Tests the USB interfaces on the PC and connected panels.

Test description:

A message box appears requesting you to connect a USB flash drive to the USB interface to be tested. If the HMI Service Center USB flash drive is connected to the USB interface, you can just leave it there. Click **OK** to continue.

The system then checks whether a new USB flash drive was connected. If not, the USB interface to which the HMI Service Center USB flash drive is connected is tested.

Information:

Testing with the HMI Service Center USB flash drive connected can only be done once since the USB flash drive shouldn't be disconnected and reconnected during a system cycle.

Data is read from the USB flash drive in the next step.

This test cannot determine how many USB interfaces are actually on an Automation Panel or Panel PC display unit, or if there are any at all. For this reason, you have to confirm a message box that asks whether the panel has a USB interface. Click **OK** to continue.

A message box will be shown after each tested USB interface. If an additional USB interface exists on the panel, this message box must be confirmed with **OK**.

Notes:

Assigning the USB interface to the housing label is not possible.

Automatic testing:

Yes (for one USB interface only)

Supported devices:

- APC510, APC511, APC810, APC910, APC2100
- PPC800, PPC900, PPC2100
- AP800, AP900, AP9x3, AP9xD
- PP500

Supported I/O boards:

- 5PP5IO.GMAC-00
- 5PP5IO.GNAC-00

Required test accessories:

USB flash drive

Sample report:

```
--- USB ---

Plug-in version: 1.0.0.0

USB interface: 1

Testing USB Port...
Passed

Test passed.
```

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