

# **HMI Service Center**

## **User's manual**

Version: **1.15 (May 2018)**  
Model no.: **HMI Service Center**

### **Translation of the original manual**

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# Chapter 1 • General information

## Information:

This user's manual is not intended for end customers! It is the responsibility of the machine manufacturer or system provider to provide the safety guidelines relevant to end customers in the operating instructions for the end customer in the respective local language.

## 1 Manual history

Version	Date	Change
1.00	2015-06-03	<ul style="list-style-type: none"> <li>First version</li> </ul>
1.10	2016-07-06	<ul style="list-style-type: none"> <li>Updated the pinout of the serial loopback adapter, see <a href="#">"COM" on page 23</a>.</li> </ul>
1.15	2018-05-25	<ul style="list-style-type: none"> <li>Renamed introduction heading to HMI Service Center.</li> <li>Documented section <a href="#">"HMI Service Center Maintenance Tool" on page 50</a>.</li> <li>Updated the following sections:               <ul style="list-style-type: none"> <li><a href="#">"Supported devices" on page 11</a></li> <li><a href="#">"Order data" on page 12</a></li> <li><a href="#">"Test system" on page 13</a></li> <li><a href="#">"Target system" on page 13</a></li> <li><a href="#">"Test reports" on page 17</a></li> <li><a href="#">"Test overview" on page 18</a></li> <li><a href="#">"Test cases" on page 20</a></li> </ul> </li> </ul>

## 2 Safety guidelines

### 2.1 Intended use

Programmable logic controllers (PLCs), operating/monitoring devices (industrial PCs, Power Panels, Mobile Panels, etc.) and uninterruptible power supplies from B&R 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 impairment or loss of any kind without the implementation of exceptionally stringent safety precautions. In particular, this includes the use of these devices to monitor nuclear reactions in nuclear power plants, 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 points apply 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 must always be placed on or stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Components must not be subjected to electrostatic discharge (e.g. caused by charged plastics).
- Observe a minimum distance of 10 cm from monitors and television sets.
- Measuring instruments and equipment must be grounded.
- Probe tips of galvanically isolated measuring instruments must be temporarily discharged on suitably grounded surfaces before taking measurements.

##### Individual components

- ESD protective measures for individual components are thoroughly implemented at B&R (conductive floors, footwear, arm bands, etc.).
- Increased ESD protective measures for individual components are not required for handling B&R products at customer locations.

### 2.3 Policies and procedures

Electronic devices are never completely failsafe. If the programmable logic controller, operating/monitoring device or uninterruptible power supply fails, the user is responsible for ensuring that other connected devices such as motors are brought to a safe state.

When using programmable logic controllers or operating/monitoring devices as control systems in connection 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, etc.) must be observed in accordance with applicable national and international regulations. This also applies to 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 to perform these tasks (e.g. IEC 60364). National accident prevention regulations must be observed.

The safety notices, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and are to be observed in all cases.

## 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

- Devices are not ready for use immediately upon delivery. They must be installed and wired according to the requirements of this documentation in order for EMC limit values to be observed.
- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices are only permitted to be installed by qualified personnel and when the power is switched off. 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. wire cross sections, fuses, protective ground connections).

## 2.6 Operation

### 2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating/monitoring devices and uninterruptible power supplies, certain components must carry dangerous voltage levels over 42 VDC. Touching one of these components can result in a life-threatening electric shock. This could lead to death, severe injury or damage to property.

Before switching on programmable logic controllers, operating/monitoring devices or the uninterruptible power supply, it must be ensured that the housing is properly connected to ground (PE rail). Ground connections must also be established when the operating/monitoring device or uninterruptible power supply is connected for test purposes or only being operated for a short period of time!

Before switching on the device, all voltage-carrying components 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) and uninterruptible power supplies in very dusty environments must be avoided. The collection of dust on devices can affect functionality and may prevent sufficient cooling, especially in systems with active cooling (fans).

The presence of corrosive gases can also result in impaired functionality. In combination 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. The presence of corrosive gases is indicated by blackened copper surfaces and cable ends on existing installations.

When operated in dusty or moist environments that could potentially impair functionality, operating/monitoring devices such as the Automation Panel and Power Panel are protected on the front against the ingress of dust or moisture when installed properly (e.g. cutout installation). The back of all devices must be protected from the ingress of dust and moisture, however; any collected dust must be removed 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 storage device (e.g. diskette, CD-ROM, USB flash drive, etc.), network connection or the Internet. The user is responsible for assessing these risks, implementing preventive measures such as virus protection programs, firewalls, etc. and making sure that software is obtained only from trusted sources.

## 2.7 Environmentally friendly disposal

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

### 2.7.1 Separation of materials

It is necessary to separate out the different materials so that devices 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/Paper packaging	Paper/Cardboard recycling
Plastic packaging material	Plastic recycling

Table 1: Environmentally friendly disposal

Disposal must take place in accordance with applicable legal regulations.

## 2.8 Security concept

To protect plants, systems, machines and networks against cyber threats, it is necessary to implement (and continuously maintain) an integrated security concept that is state of the art. B&R products and solutions form only one part of such a concept.

The user is responsible for preventing unauthorized access to his plants, systems, machines and networks. Systems, machines and components should only be connected to the corporate network or Internet if and to the extent necessary and appropriate protective measures (e.g. use of firewalls and network segmentation) have been taken.

B&R products and solutions are constantly being developed further to make them even more secure. B&R strongly recommends that updates be performed as soon as the corresponding updates are available and that only the latest product versions are used. Using outdated or unsupported versions can increase the risk of cyber threats.

### 2.9 Third-party software updates

This product contains third-party software (e.g. drivers, etc.). B&R only assumes warranty for updates/patches to the third-party software if they have been officially released by B&R. Otherwise, updates/patches are undertaken at your own risk.

### 2.10 Administrator accounts

A user with administrator rights has extensive access and manipulation options available on the system.

Therefore, make sure that your administrator accounts are adequately secured to prevent unauthorized changes. Use secure passwords and a standard user account for regular operation. Further measures such as the use of security guidelines are to be applied as needed.

### 3 Organization of notices

#### Safety notices

Contain **only** information that warns of dangerous functions or situations.

Signal word	Description
<b>Danger!</b>	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
<b>Warning!</b>	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
<b>Caution!</b>	Failure to observe these safety guidelines and notices can result in minor injury or damage to property.
<b>Notice!</b>	Failure to observe these safety guidelines and notices can result in damage to property.

Table 2: Organization of safety notices

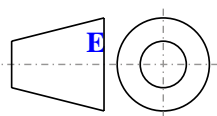
#### General notices

Contain **useful** information for users and instructions for avoiding malfunctions.

Signal word	Description
<b>Information:</b>	Useful information, application tips and instructions for avoiding malfunctions.

Table 3: Organization of general notices

### 4 Guidelines



European dimension standards apply to all dimension diagrams.

All dimensions are specified in mm.

Unless otherwise specified, the following general tolerances apply:

Range of nominal size	General tolerance per DIN ISO 2768 (medium)
Up to 6 mm	±0.1 mm
6 to 30 mm	±0.2 mm
30 to 120 mm	±0.3 mm
120 to 400 mm	±0.5 mm
400 to 1000 mm	±0.8 mm

Table 4: Range of nominal sizes

# Chapter 2 • Software

## 1 HMI Service Center

The HMI Service Center is software for testing B&R industrial PCs and Automation Panels. The test covers different categories such as COM interfaces, network connectivity, SRAM, etc. (see section ["Test reports" on page 17](#)). This manual explains how to use the HMI Service Center.

### 1.1 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)
- Automation PC 2200 (APC2200)
- Automation PC 3100 (APC3100)
- Panel PC 800 (PPC800)
- Panel PC 900 (PPC900)
- Panel PC 2100 (PPC2100)
- Panel PC 2200 (PPC2200)
- Panel PC 3100 (PPC3100)
- Power Panel 500 (PP500)
- Automation Panel 800 (AP800)
- Automation Panel 900 (AP900)
- Automation Panel 9x3 (AP9x3)
- Automation Panel 9xD (AP9xD)
- Automation Panel 1000 (AP1000)
- Automation Panel 5000 (AP5000)

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

- 5AC901.I485-00
- 5AC901.ISRM-00
- 5AC901.IETH-00
- 5AC901.IUPS-00
- 5AC901.IUPS-01
- 5ACCIF01.FPLS-000
- 5ACCIF01.FPLS-001
- 5ACCIF03.CETH-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

## 1.2 Order data

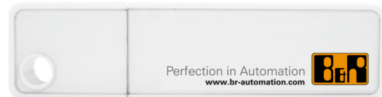
Model number	Short description	Figure
	<b>Accessories</b>	
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC810/PPC800 - For APC910/PPC900 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC51x/PP500 - For Automation Panel 800/900 - For Automation Panel 1000/5000	

Table 5: 5SWUTI.0001-000 - Order data

### Information:

The Automation PC 2200, Automation PC 3100, Panel PC 2200, Panel PC 3100, Automation Panel 1000 and Automation Panel 5000 are supported with revision D0 and later of the HMI Service Center flash drive.

## 1.3 Requirements

### 1.3.1 Test system

The test system consists of a USB flash drive with an installed Windows PE 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. 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.**

### 1.3.2 Target system

The PC to be analyzed by the HMI Service Center must be a B&R industrial PC (see section "[Supported devices](#)" on page 11) that meets the following hardware requirements:

- At least 512 MB RAM for V1.0
- At least 1 GB RAM for V1.1 or later
- Display (integrated or connected) with VGA resolution (640 x 480) or higher

#### Information:

**The test system does not support widescreen resolutions on the APC810, PP500, APC510, APC511, APC2100, PPC800, PPC2100 and AP910 with a TS17 CPU board.**

Touch screen support is provided for PCs with a single- or multi-touch screen. Otherwise, a mouse or keyboard is also required for operation.

In order to obtain full test support, certain firmware versions are required on the target system:

- 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
- APC2200: MTCX V0.05 or higher
- APC3100: MTCX V4.16 or higher
- PPC900: MTCX V1.07 or higher
- PPC2100: MTCX V1.00 or higher
- PPC2200: MTCX V0.05 or higher
- PPC3100: MTCX V4.16 or higher
- PPC500: 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.**

### 1.3.3 Test accessories

The following test accessories are necessary to provide full functionality<sup>1)</sup>:

- 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

<sup>1)</sup> Test accessories are not included.

## 1.4 Start

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.<sup>2)</sup>
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 [Fig. 1 "Boot screen"](#)).
6. The HMI Service Center is launched.

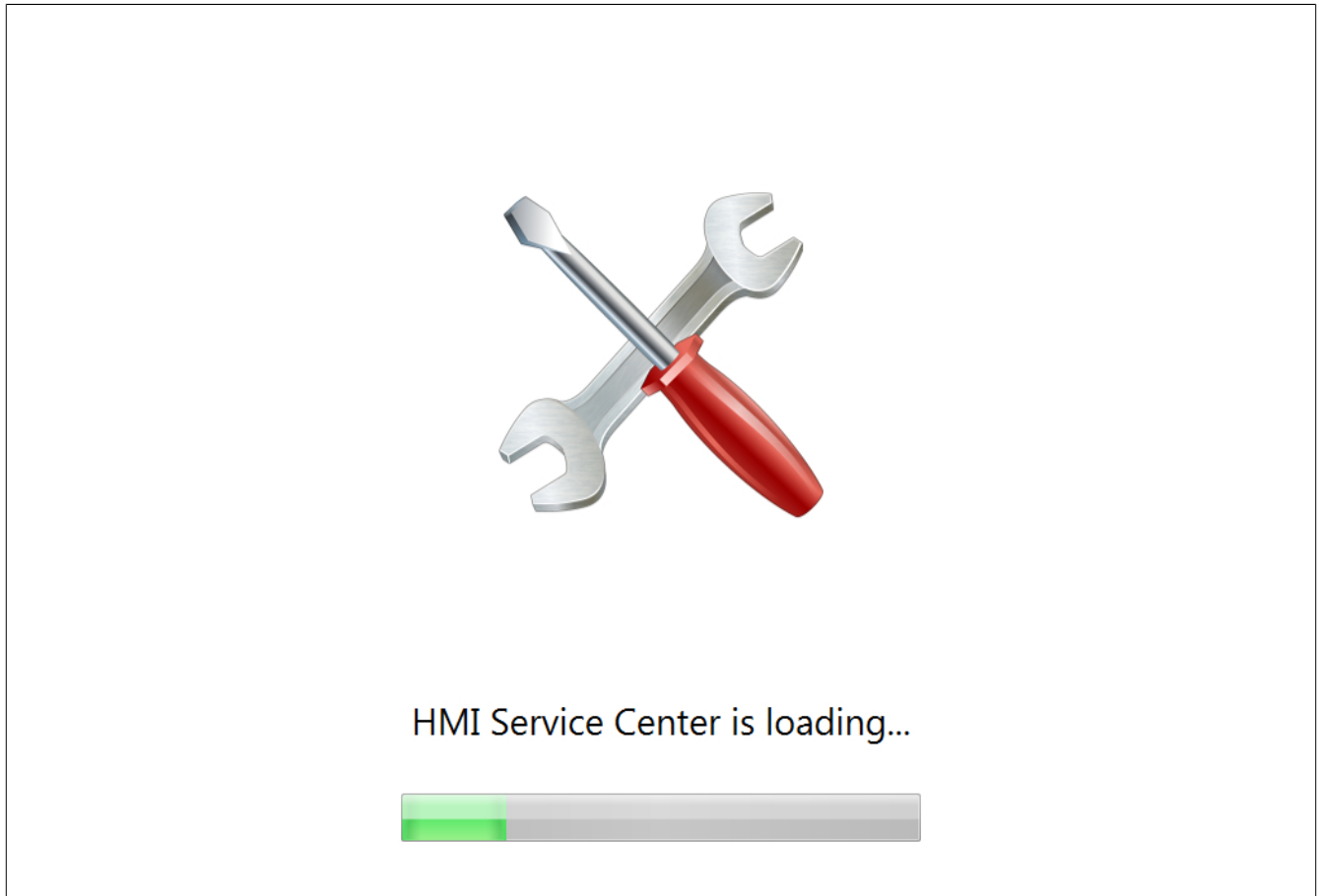


Figure 1: Boot screen

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

## 1.5 Operation

### 1.5.1 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:

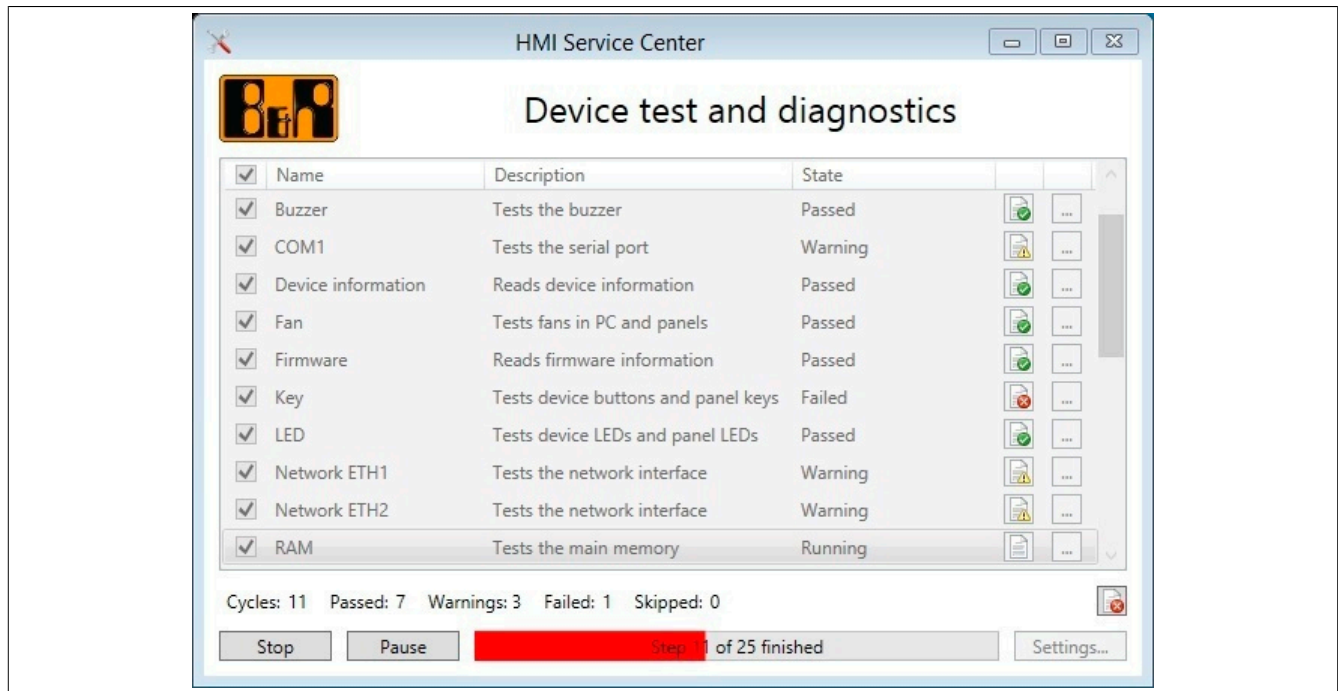


Figure 2: User interface (main window)

### 1.5.2 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.

### 1.5.3 Configuring test settings

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

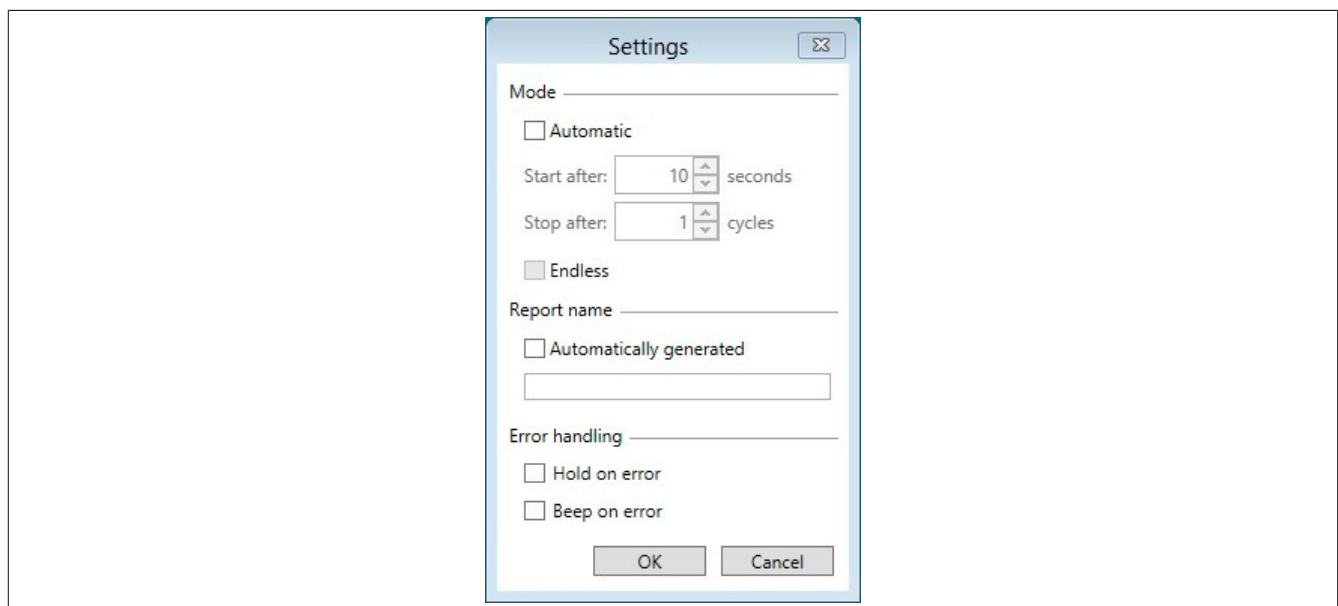



Figure 3: Settings window

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 17](#) 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**). For possible settings, see the descriptions for the tests.

#### 1.5.4 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**.

#### 1.5.5 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.**

#### 1.5.6 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 is listed in the summary report.



## 1.6 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 will also be generated with "<modelnumber>\_<serialnumber>\_errors.txt". 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 2018-04-13 13:57:43
System family: Automation PC 3100

Service framework version: 1.1.0.0
ADI .NET SDK version: 2.5.0.0
ADI DLL version: 4.14.0.0

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
```

## 1.7 Test overview

Test name	Test instances	Automatic test	Supported devices	Test accessories necessary?
Battery	1	Yes	APC510, APC511, APC810, APC910, APC2200, APC3100 PPC800, PPC900, PPC2200, PPC3100 PP500	No
BIOS	1	Yes	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 PP500	No
Buzzer	1	No	APC510, APC511, APC810, APC910 PPC800, PPC900 PP500	No
COM	1...x <sup>1)</sup>	Yes	APC510, APC511, APC810, APC910, APC2100 (interface option only), APC2200 (interface option only), APC3100 (interface option only) PPC800, PPC900, PPC2100 (interface option only), PPC2200 (interface option only), PPC3100 (interface option only) PP500	Yes
Device information	1	Yes	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 AP800, AP900, AP9x3, AP9xD, AP1000, AP5000 PP500	No
Fan	1	Yes	APC810, APC910 PPC800, PPC900	No
Firmware	1	Yes	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 AP800, AP900, AP9x3, AP9xD, AP1000, AP5000 PP500	No
Key	1	No	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 AP800, AP900, AP9x3, APC9xD, AP1000, AP5000 PP500	No
LED	1	No	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 AP800, AP900, AP9x3, AP9xD, AP1000, AP5000 PP500	No
Network	1...x <sup>2)</sup>	Yes <sup>3)</sup>	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 PP500	Yes
RAM	1	Yes	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 PP500	No
SRAM	1	Partial	APC510, APC511, APC810, APC910, APC3100 PPC900, PPC3100 PP500	No
Statistics	1	Yes	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 AP800, AP900, AP9x3, AP9xD, AP1000, AP5000 PP500	No
Storage	1...x <sup>4)</sup>	Partial	APC510, APC511, APC810, APC910, APC2100, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 PP500	No

Table 6: Test overview

Test name	Test instances	Automatic test	Supported devices	Test accessories necessary?
Temperature	1	Yes	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 AP800, AP900, AP9x3, AP9xD, AP1000, AP5000 PP500	No
Touch screen	1	No	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PC800, PPC900, PPC2100, PPC2200, PPC3100 P800, AP900, AP9x3, AP9xD, AP1000, AP5000 PP500	No
UPS	1	Partial	APC810, APC910, APC3100 PPC800, PPC900, PPC3100	No
USB	1...x <sup>5)</sup>	Yes <sup>6)</sup>	APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100 PPC800, PPC900, PPC2100, PPC2200, PPC3100 AP800, AP900, AP9x3, AP9xD, AP1000, AP5000 PP500	Yes

Table 6: Test overview

- 1) The number of instances depends on the number of serial interfaces.
- 2) The number of instances depends on the number of Ethernet interfaces.
- 3) Automatic testing is only possible for one Ethernet interface.
- 4) The number of instances depends on the number of RAM modules.
- 5) The number of instances depends on the number of USB interfaces and connected panels.
- 6) 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.

## 1.8 Test cases

### 1.8.1 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, APC2200, APC3100
- PPC800, PPC900, PPC2200, PP3100
- PP500

**Required test accessories:**

None

**Sample report:**

```
--- Battery ---
```

```
Plug-in version: 1.1.0.0
```

```
State: Good
```

```
Test passed.
```

## 1.8.2 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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- PP500

### Required test accessories:

None

### Sample report:

```
--- BIOS ---  
  
Plug-in version: 1.1.0.0  
  
Version: c1.00  
Description: InsydeH2O Version 05.12.30c1.00  
Manufacturer: B&R Industrial  
  
Test passed.
```

### 1.8.3 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: 1.1.0.0

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

Test passed.
```

## 1.8.4 COM

### Scope of testing:

Tests the serial interfaces on the PC and interface options.

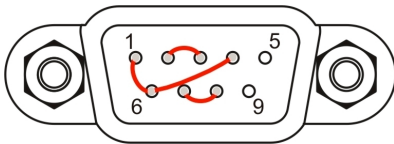
### Test description:

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 interfaces and click **OK**.

### Notes:

- The serial interface on an APC2100, APC2200, PPC2100 or PPC2200 (on interface option 5ACCIF01.F-PLS-000 or 5ACCIF01.FPLS-001) does not have a standard connector (DSUB). For additional details, see the respective PC user's manual.
- 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<sup>3)</sup>, APC2200<sup>3)</sup>, APC3100<sup>3)</sup>
- PPC800, PPC900, PPC2100<sup>3)</sup>, PPC2200<sup>3)</sup>, PPC3100<sup>3)</sup>
- PP500

### Supported interface options and I/O boards:

- 5AC901.I485-00
- 5ACCIF01.FPLS-000
- 5ACCIF01.FPLS-001
- 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: 1.1.0.0

Interface: COM3 (IF Option 1)

Vendor ID: 0x00000000
Device ID: 0x0000D84A
Compatibility ID: 0x0000
Hardware revision: D0
Serial number: D84A0169636
```

<sup>3)</sup> serial interface on interface option only

Model number: 5AC901.I485-00

Power-on cycles: 41

Power-on hours: 372h 30min

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.



### 1.8.5 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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- PP500
- AP800, AP900, AP9x3, AP9xD, AP1000, AP5000

#### Required test accessories:

None

#### Sample report:

```
--- Device information ---

Plug-in version: 1.1.0.0

System unit:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000EF97
Compatibility ID: 0x0000
Hardware revision: A6
Serial number: EF970168422
Model number: 5APC3100.KBU1-000

Panel (local):
Present: False

Bus Unit:
Present: False

IF Module 3:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000ECCC
Compatibility ID: 0x0000
Hardware revision: A0
Serial number: ECCC0168439
Model number: 5ACCLI02.SD40-000

IF Module 1:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000D84A
Compatibility ID: 0x0000
Hardware revision: D0
Serial number: D84A0169636
Model number: 5AC901.I485-00

IF Module 2:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000D850
Compatibility ID: 0x0000
```

Hardware revision: B0  
Serial number: D8500168667  
Model number: 5AC901.ISRM-00

Memory Module 1:  
Present: False

Memory Module 2:  
Present: False

Fan Kit (System):  
Present: False

Slide-in 1:  
Present: False

Slide-in 2:  
Present: False

CPU Board:  
Present: False

Fan Kit (Bus):  
Present: False

Expansion Unit (local):  
Present: False

Panel 0:  
Present: True  
Vendor ID: 0x00000000  
Device ID: 0x0000E16A  
Combility ID: 0x0000  
Hardware revision: B2  
Serial number: E16A0168573  
Model number: 5AP933.156B-00

Panel Link 0:  
Present: True  
Vendor ID: 0x00000000  
Device ID: 0x0000ECE3  
Compatibility ID: 0x0000  
Hardware revision: B0  
Serial number: ECE30168480  
Model number: 5DLSD4.1001-00

SDL Converter 0:  
Present: True  
Vendor ID: 0x00000000  
Device ID: 0x0000F10C  
Compatibility ID: 0x0000  
Hardware revision: A0  
Serial number: F10C0100000  
Model number: 5COSD4.1000-00

Expansion Unit 0:  
Present: False

HDBaseT 0:  
Present: True

Panel 1:  
Present: False

Panel 2:  
Present: False

Panel 3:  
Present: False

Panel 4:  
Present: False

```
Panel 5:
Present: False

Panel 6:
Present: False

Panel 7:
Present: False

Panel 8:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000E16C
Compatibility ID: 0x0000
Hardware revision: D0
Serial number: E16C0171473
Model number: 5AP933.215C-00

Panel Link 8:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000ECE3
Compatibility ID: 0x0000
Hardware revision: B0
Serial number: ECE30168481
Model number: 5DLSD4.1001-00

SDL Converter 8:
Present: False

Expansion Unit 8:
Present: False

HDBaseT 8:
Present: True

Panel 9:
Present: False

Panel 10:
Present: False

Panel 11:
Present: False

Panel 12:
Present: False

Panel 13:
Present: False

Panel 14:
Present: False

Panel 15:
Present: False

Test passed.
```

### 1.8.6 Fan

#### Scope of testing:

Tests integrated fans in the PC.

#### Test description:

This test reads the speed, factory settings <sup>4)</sup>, 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 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 permissible 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

#### Required test accessories:

None

#### Sample report:

```

--- Fan ---

Plug-in version: 1.1.0.0

Fan Kit (System):
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000D6E7
Compatibility ID: 0x0000
Hardware revision: D0
Serial number: D6E70183453
Model number: 5AC901.FA02-00

Fan Kit (Bus):
Present: False

Fan Kit (System) - fan 1:
Current: 0 rpm, State: OK
Running: 2h 45min (34 cycles), Too slow: 0h 0min, Alarm: 0h 0min

Fan Kit (System) - fan 2:
Current: 0 rpm, State: OK
Running: 2h 45min (34 cycles), Too slow: 0h 0min, Alarm: 0h 0min

Fan Kit (System) - fan 3:
Current: 0rpm, State: OK
Running: 2h 45min (34 cycles), Too slow: 0h 0min, Alarm: 0h 0min

Fan Kit (System) - fan 4:
Current: 0 rpm, State: OK
Running: 2h 45min (34 cycles), Too slow: 0h 0min, Alarm: 0h 0min

```

<sup>4)</sup> Supported on APC910 and PPC900 only

Fan test

Fan Kit (System) - fan 1:  
Current: 5302 rpm, State: OK

Fan Kit (System) - fan 2:  
Current: 5186 rpm, State: OK

Fan Kit (System) - fan 3:  
Current: 2137 rpm, State: OK

Fan Kit (System) - fan 4:  
Current: 5441 rpm, State: OK

Test passed.

### 1.8.7 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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- AP800, AP900, AP9x3, AP9xD, AP1000, AP5000
- PP500

**Required test accessories:**

None

**Sample report:**

```
--- Firmware ---  
  
Plug-in version: 1.1.0.0  
  
BIOS: a1.11  
System Unit: 4.18  
IF Module 3: 0.06  
Panel Link (panel 8): 6.12  
HDBaseT (panel 8): 0.02  
  
Test passed.
```

## 1.8.8 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.

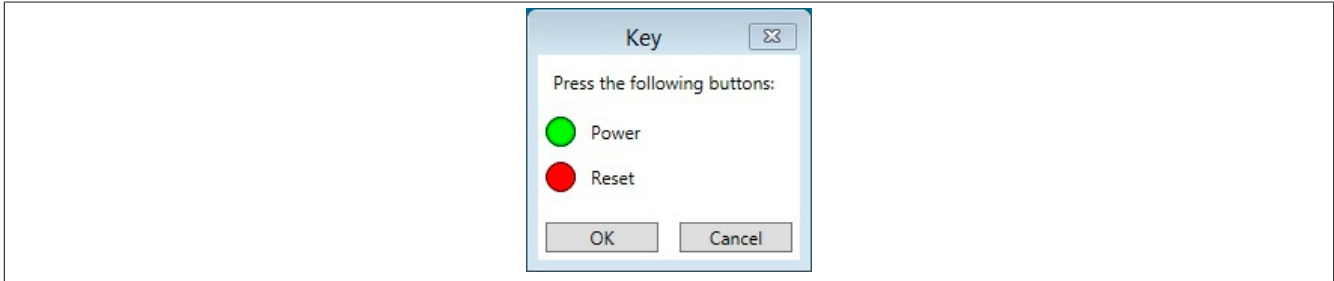


Figure 4: Window for PC buttons

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 otherwise be written to the report.

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 window<sup>5)</sup>.
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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- AP800, AP900, AP9x3, APC9xD, AP1000, AP5000
- PP500

<sup>5)</sup> Refer to the respective PC or panel user's manual for key numbers

### Required test accessories:

None

### Sample report:

```
--- Key ---

Plug-in version: 1.1.0.0

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.
```



### 1.8.9 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 (LED "Power", for example) one after the other; you must then confirm the functionality of each LED:

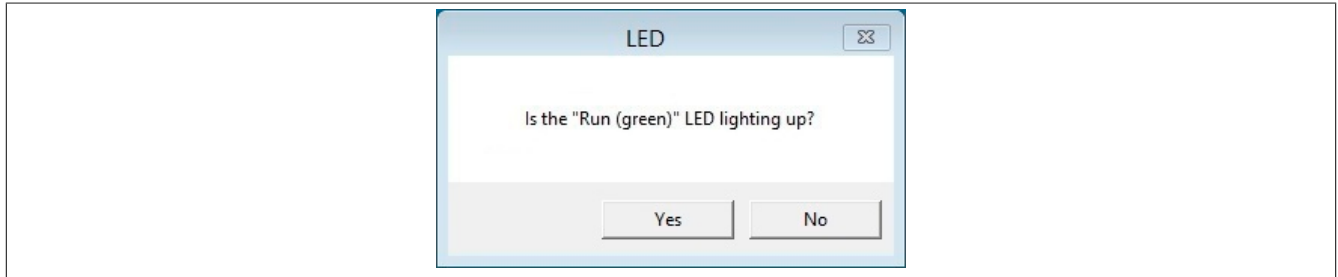


Figure 6: Message for PC LED

LEDs are only switched on if the test is supported by the firmware on the PC. A corresponding message will otherwise be written to the report.

After that, all panel LEDs are switched on simultaneously; you must then confirm their functionality:



Figure 7: Message for PC LEDs

This message 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 is found, then a corresponding message is written to the report.

#### Automatic testing:

None

#### Supported devices:

- APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- AP800, AP900, AP9x3, AP9xD, AP1000, AP5000
- PP500

#### Required test accessories:

None

**Sample report:**

```
--- LED ---

Plug-in version: 1.1.0.0

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 "Disk" LED...
Passed

Testing panel LEDs...
Passed

Test passed.
```

### 1.8.10 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).

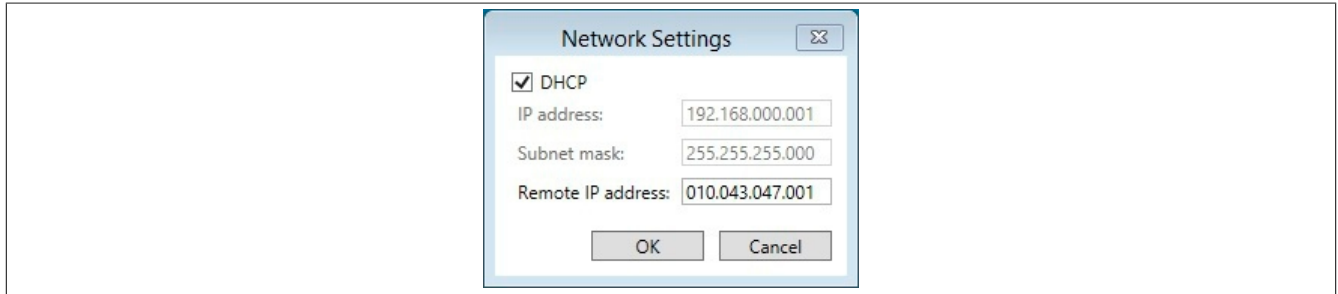


Figure 8: Network settings window

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.

Next, the network test is started: 10 pings are transmitted to the remote IP address with a packet size of 8000 bytes and timeout of 4 seconds. When all pings have been sent successfully, the test has successfully completed.

#### Notes:

- It is not possible to assign the Ethernet interface to the housing label.
- 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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- PP500

#### Supported interface options:

- 5PP5IF.FETH-00
- 5AC901.IETH-00
- 5ACCIF03.CETH-000

#### Required test accessories:

Network cable

**Sample report:**

```
--- Network ---

Plug-in version: 1.1.0.0

Interface name: IF Ethernet
Adapter name: Intel(R) I210 Gigabit Network Connection #2
Physical address: 00:60:65:43:A5:5E

Vendor ID: 0x00000000
Device ID: 0x0000EC3C
Compatibility ID: 0x0000
Hardware revision: B9
Serial number: EC3C0168957
Model number: 5AC901.1ETH-00
Power-on cycles: 14990
Power-on hours: 11h 0min

Testing network LEDs...
Passed

Pinging 10.43.47.1 with 8000 bytes of data.
Reply from 10.43.47.1: bytes=8000 time=3ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=2ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=2ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=3ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=3ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=2ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=2ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=3ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=3ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=3ms TTL=255
Reply from 10.43.47.1: bytes=8000 time=3ms TTL=255

Test passed.
```

### 1.8.11 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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- PP500

#### Required test accessories:

None

#### Sample report:

```
--- RAM ---

Plug-in version: 1.1.0.0

Memory size: 16324 MB.

Memory module 1:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000EC40
Compatibility ID: 0x0000
Hardware revision: A0
Serial number: EC400168425
Model number: 5MMDR.8192-04

Memory module 2:
Present: True
Vendor ID: 0x00000000
Device ID: 0x0000EC40
```

```
Compatibility ID: 0x0000
Hardware revision: A0
Serial number: EC400168422
Model number: 5MMDDR.8192-04

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.
```

### 1.8.12 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, APC3100
- PPC900, PPC3100
- 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: 1.1.0.0

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

Power-on cycles: 655
Power-on hours: 2899h 15min

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.
```



### 1.8.13 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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- AP800, AP900, AP9x3, AP9xD, AP1000, AP5000
- PP500

#### Required test accessories:

None

#### Sample report:

```
--- Statistics ---

Plug-in version: 1.1.0.0

System Unit:
Power-on cycles: 342
Operating hours: 1224h 15min

IF Module 3:
Power-on cycles: 358
Operating hours: 2213h 0min

IF Module 1:
Power-on cycles: 49
Operating hours: 372h 45min

IF Module 2:
Power-on cycles: 663
Operating hours: 2906h 15min

Panel 8:
Power-on cycles: 23
Operating hours: 1774h 0min
Backlight-on cycles: 1596
Backlight operating hours: 262h 0min

Test passed.
```

### 1.8.14 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 does not correct any errors it finds.

#### Automatic testing:

Partial (disk check only performed in manual mode)

#### Supported devices:

- APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- PP500

#### Required test accessories:

None

#### Sample report:

```

--- Storage ---

Plug-in version: 1.1.0.0

Model number: SFCA064GH1AD4TO-I-GS-216-STD
Serial number: 000060112907B1000003
Firmware version: SBS10020
Size: 59 GB
Location: CFast1

SMART:
Predict failure status: OK
  ID Current Worst Threshold   Data Status
    1     100    100        50       0    OK
    5     100    100        50       0    OK
    9     100    100        50      45    OK
   12     100    100        50     561    OK
  160     100    100        50       0    OK
  161     100    100        50     136    OK
  162     100    100        50       1    OK
  163     100    100        50      53    OK
  164     100    100        50    53729    OK
  165     100    100        50      27    OK
  166     100    100        50      15    OK
  167     100    100        50      26    OK
  168     100    100        50     3000    OK
  192     100    100        50     256    OK
  194     100    100        50      32    OK
  195     100    100        50       0    OK
  196     100    100        50       0    OK
  199     100    100        50       1    OK
  241     100    100        50    39206    OK
  242     100    100        50    34381    OK
  245     100    100        50    46084    OK

Reading test...
500 MB
Passed

Run "Check Disk" on drive C: "Windows"...
```

```
The type of the file system is NTFS.
Volume label is Windows.

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

Stage 1: Examining basic file system structure...

    990726 file records processed.

File verification completed.

2193 large file records processed.

0 bad file records processed.

Stage 2: Examining file name linkage...

    72 reparse records processed.

    142386 index entries processed.
Index verification completed.

0 unindexed files scanned.

0 unindex files recovered to lost and found.

72 reparse records processed.

Stage 3: Examining security descriptors...
Security descriptor verification completed.

    21658 data files processed.

CHKDSK is verifying Usn Journal...

    8522896 USN bytes processed.

Usn Journal verification completed.

Windows has scanned the file system and found no problems.
No further action is required.

62238719 KB total disk space.
30645816 KB in 74997 files.
66260 KB in 21659 indexes.
0 KB in bad sectors.
175871 in use by the system.
65536 KB occupied by the log file.
31350772 KB available on disk.

    4096 bytes in each allocation unit.
15559679 total allocation units on disk.
7837693 allocation units available on disk.
Passed

Test passed.
```

### 1.8.15 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 permissible 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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- AP800, AP900, AP9x3, AP9xD, AP1000, AP5000
- PP500

#### Required test accessories:

None

#### Sample report:

```

--- Temperature ---

Plug-in version: 1.1.0.0

CPU:
Current: 31.00°C / 87.80°F, State: OK

System Unit (sensor 1):
Current: 27.00°C / 80.60°F, State: OK
Max.: 42.00°C / 107.60°F, Log: 0h 0min, Alarm: 0h 0min
Min.: 23.00°C / 73.40°F, Log: 0h 0min, Alarm: 0h 0min

System Unit (sensor 2):
Current: 30.00°C / 86.00°F, State: OK
Max.: 46.00°C / 114.80°F, Log: 0h 0min, Alarm: 0h 0min
Min.: 25.00°C / 77.00°F, Log: 0h 0min, Alarm: 0h 0min

System Unit (sensor 3):
Current: 35.00°C / 95.00°F, State: OK
Max.: 50.00°C / 122.00°F, Log: 0h 0min, Alarm: 0h 0min
Min.: 29.00°C / 84.20°F, Log: 0h 0min, Alarm: 0h 0min

System Unit (sensor 4):
Current: 31.00°C / 87.80°F, State: OK
Max.: 100.00°C / 212.00°F, Log: 0h 0min, Alarm: 0h 0min
Min.: -128.00°C / -198.40°F, Log: 0h 0min, Alarm: 0h 0min

```

IF Module 3 (sensor 1):  
Current: 48.25°C / 118.85°F, State: OK  
Max.: 67.75°C / 153.95°F, Log: 0h 0min, Alarm: 0h 0min  
Min.: 24.50°C / 76.10°F, Log: 0h 0min, Alarm: 0h 0min

Panel 8 (sensor 1):  
Current: 29.50°C / 85.10°F, State: OK  
Max.: 42.50°C / 108.50°F, Log: 0h 0min Alarm: 0h 0min  
Min.: 23.25°C / 73.85°F, Log: 0h 0min Alarm: 0h 0min

Test passed.

### 1.8.16 Touch screen

#### 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 entry is written to the report and the test completes with status "Passed".

If a touch screen is detected, you must confirm that the touch screen 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 [Fig. 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 do not support widescreen resolutions (APC510, APC511, APC810, APC2100, PPC800 and PP500, PPC2100, AP910 with TS17 CPU board), 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.**

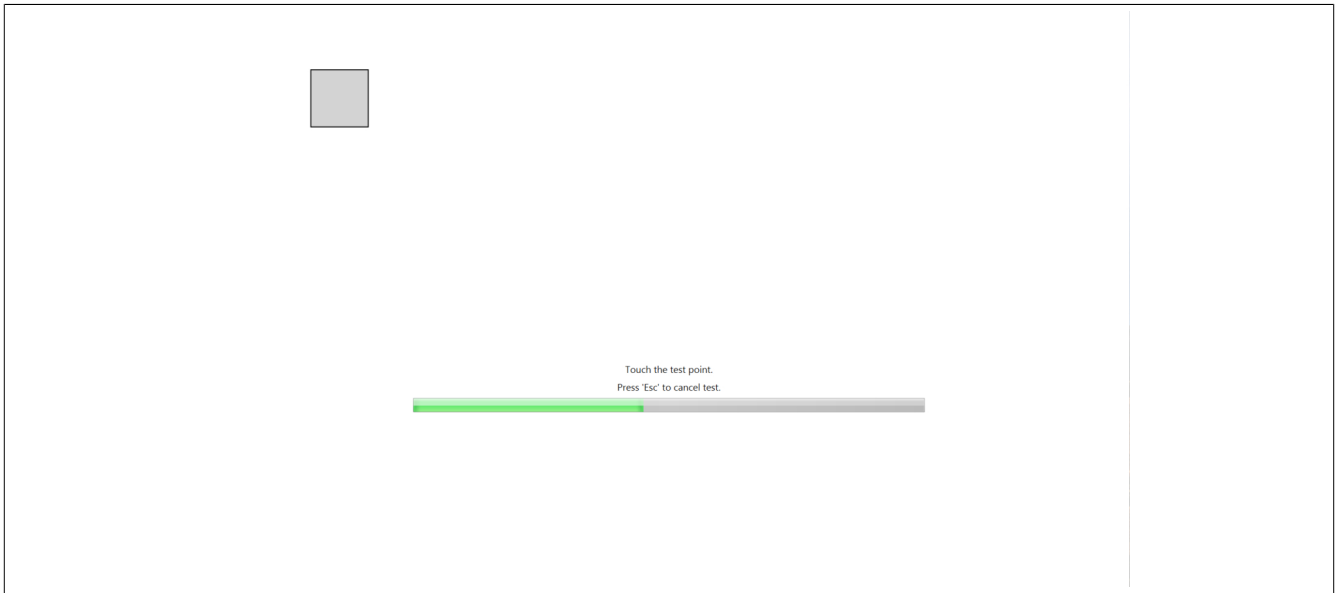


Figure 9: Test image on touch screen

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, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- AP800, AP900, AP9x3, AP9xD, AP1000, AP5000
- PP500

#### Required test accessories:

None

#### Sample report:

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

```
Plug-in version: 1.1.0.0
```

```
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.
```

## 1.8.17 UPS

### Scope of testing:

Tests the optional UPS.

### Test description:

This test reads the firmware version<sup>6)</sup>, factory settings, statistics<sup>7)</sup>, 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, APC3100
- PPC800, PPC900, PPC3100

### Supported interface options:

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

### Required test accessories:

None

### Sample report:

```

--- UPS ---

Plug-in version: 1.1.0.0

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

Power-on cycles: 1149
Operating hours: 10306h 0min
On-battery cycles: 67
Battery operating hours: 0h 30min

Battery volatage: 29.497 V
Battery current: 0.106 A

Status: PowerOk

UPS function test passed.

Test passed.
```

<sup>6)</sup> Only supported on APC810 and PPC800 systems.

<sup>7)</sup> Only supported on APC910, APC3100, PPC900 and PPC3100 systems.



## 1.8.18 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 should not 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:

It is not possible to assign the USB interfaces to the housing label.

### Automatic testing:

Yes (for one USB interface only)

### Supported devices:

- APC510, APC511, APC810, APC910, APC2100, APC2200, APC3100
- PPC800, PPC900, PPC2100, PPC2200, PPC3100
- AP800, AP900, AP9x3, AP9xD, AP1000, AP5000
- PP500

### Supported I/O boards:

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

### Required test accessories:

USB flash drive

### Sample report:

```
--- USB ---

Plug-in version: 1.1.0.0

USB interface: 1

Testing USB interface...
Passed

Test passed.
```

## 2 HMI Service Center Maintenance Tool

The HMI Service Center Maintenance tool provides information about the HMI Service Center (e.g. version, edition and activation status) and offers the possibility to update the flash drive and perform activation in two steps. The HMI Service Center Maintenance Tool can be downloaded from the B&R website [www.br-automation.com](http://www.br-automation.com).

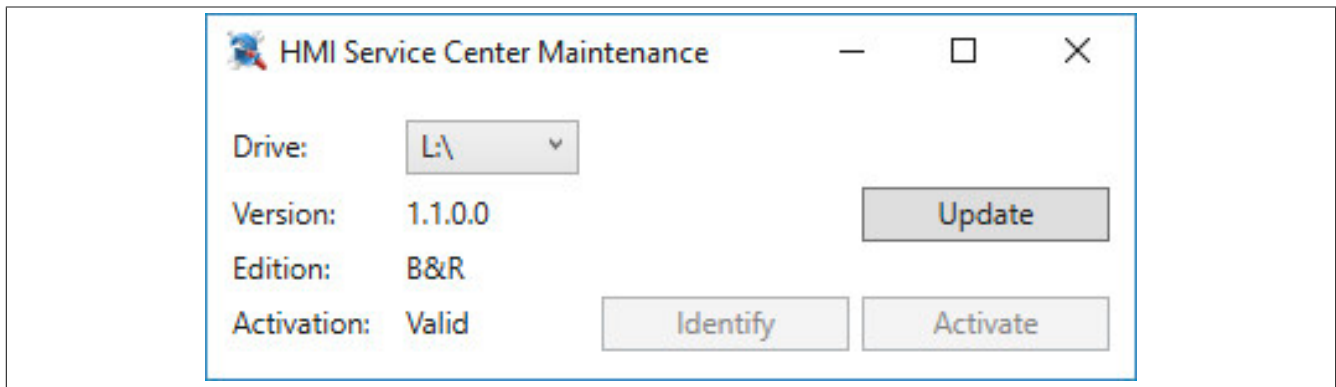


Figure 10: HMI Service Center Maintenance Tool

### 2.1 Requirements

To run the tool, Microsoft .NET Framework 4.6.2. is required. This can be downloaded from the Microsoft website [www.microsoft.com](http://www.microsoft.com).

### 2.2 Updating the flash drive

To update the HMI Service Center, a Service Center Update Package (SCU) file is required. This can be downloaded from the B&R website .

Click on **Update** and select the SCU file. Next, the HMI Service Center flash drive is updated.

It is possible to update to a newer or older version.

### 2.3 Activating the flash drive

Activation is required if the text "Invalid" is displayed during **activation**.

Click on **Identify** to generate a Service Center Identification (SCI) file.

Send this file with the serial number of the HMI Service Center flash drive to B&R Support. This can generate a Service Center Activation (SCA) file using the SCI file and serial number.

After you have received the SCA file, click on **Activate** and select the SCA file. The HMI Service Center flash drive is now reactivated and ready for use.

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