noax® Technologies

User Manual
Internal Capacitor UPS

Uninterruptible power supply

Subject to change without notice!

Table of Contents

1 About this manual

1.1 Target group

This manual is intended for qualified personnel.

It serves to complete their knowledge about proper assembly, commissioning and maintenance of the device.

However, the manual does not replace expert knowledge.

1.2 Requirements

A prerequisite for the understanding and proper implementation of the descriptions in this document are skills for basic installation, software installation and maintenance of technical devices.

1.3 Signal words

The following signal words are used in this document:

Danger	*Danger* indicates warnings whose nonobservance can lead to imminent death or severe injury.
Warning	*Warning* indicates warnings whose nonobservance can lead to minor injury or severe material damage.
Caution	*Caution* indicates warnings whose nonobservance can lead to minor material damage.

1.4 Symbols

The following signal words are used in this document:

1.4.1 Indicative symbols

This manual contains instructions which must be observed to ensure your personal safety and to prevent damage to property.


Warning regarding dangers in association with one of the signal words **Caution**, **Warning** or **Danger**.


Warning regarding dangers of electricity in association with one of the signal words **Caution**, **Warning** or **Danger**.


Warning regarding dangers of electrostatic discharge in association with one of the signal words **Caution**, **Warning** or **Danger**.


Warning regarding dangers of a hot surface in association with one of the signal words **Caution**, **Warning** or **Danger**.


Warning regarding dangers of explosion in association with one of the signal words **Caution**, **Warning** or **Danger.**


Warning regarding caustic agents in association with one of the signal words **Caution**, **Warning** or **Danger**.

ⓘ **Note** on use of the product.
Failure to observe these instructions may result in an adverse event or an undesirable condition.

📖 Cross−references to other sections.

1.4.2 List symbols

- Enumeration
  - Subitem

▶ Action instruction which consists of only 1 step.

1. Action instruction which consists of several steps. The steps must be performed in the specified order.

1.5 Distinctions

The following distinctions are used in this document:

Distinction	Description
italic	Emphasis
bold	Product designation or strong emphasis
`Courier`	Term of software interfaces (GUI) and device labels

1.6 Abbreviations

The following abbreviations are used in this document:

Abbreviation	Description
IPC	**I**ndustrial **PC**
UPS	**U**ninterruptible **P**ower **S**upply
DC	**D**irect **c**urrent
Windows	Microsoft Windows operating system
DIO	**D**igital **I**n-/**O**utput
SELV	**S**afety **E**xtra **L**ow **V**oltage

2 Intended use

The ”Internal Capacitor UPS” provides an uninterruptible power supply and is installed in a noax Industrial PC as an optional unit. The unit is supplied with direct current (DC supply voltage) and uses capacitors to buffer the supply voltage.

Any other use or use beyond the intended purpose is not allowed.
The user or operator of the device is solely liable for any resulting damage. This also applies to unauthorized modifications to the unit or the Industrial PC.

Intended use includes in particular compliance with the safety instructions described in this manual.

The unit has been manufactured according to current technical standards and complies with approved safety regulations.

ⓘ If the optional unit is installed, the use of **extension cards in slot 2 of the Industrial PC is not possible**.

ⓘ When **extension cards** are used in slot 1, please ensure that the power consumption on the 12 V power supply of the extension card does not exceed 0.5 A.
This limit applies to PCI cards anyway. **For PCIe cards**, only cards of the **10 W class** may be used, in which case the 0.5 A limit also applies. But many cards do not adhere to these specifications. Therefore, **caution is required in the selection of cards**, especially those that supply power to external consumers**.**

ⓘ If noax **RS232 modules** are used in the device to supply **5 V** / **12 V to external devices** (pin 4 / pin 9 of the RS232 module), the total maximum power consumption may not exceed 2.4 W for both RS232 modules together (0.20 A for 12 V / 0.48 A for 5 V).

Danger
The ”Internal Capacitor UPS” may be operated only with Industrial PC types C12, S12, C15, P15, S15, and S15-G2 with an N11 mainboard.
Operation with other devices can lead to irreversible damage to the device and the UPS. Danger to the operator due to improper use cannot be ruled out.

Danger
The ”Internal Capacitor UPS” may not be operated in potentially explosive areas.

Warning
The ”Internal Capacitor UPS” may not be operated in aircraft, on ships, in hospitals or in other medical environments.

Use in life support or critical security systems, in which a malfunction can be indirectly or directly life-threatening, is not allowed.

3 General safety instructions

Please follow the valid VDE/IEC/EN regulations while using products with electrical power supply.

Documentation

- Failure to follow the user manual or the connecting instructions, e.g. mix up the input terminals, can lead to damage to the unit and causes the operator to lose liability and warranty claims.
- Keep this documentation and make sure to include it when passing on the device.

In addition, please make sure that you also heed the information and safety instructions in the user manual for the Industrial PC.

Handling the device

- Only use device in error-free condition and fully functional. Replace defective devices or components immediately, especially when:
  - The power supply cable is damaged
  - Liquid has entered the device
  - The device does not work as described in the documentation
  - The housing is damaged
- Ingress protection (IP protection):
  Prevent liquids or aggressive fumes (e.g. from cleaning detergents) from entering IP-protected areas such as the connector area.
- Any additions and modifications to the device are prohibited unless expressly approved by noax.
- Please observe the disposal instructions in this document (see section 11).

General maintenance and repair

ESD protection measures must be taken when work is being done on the UPS unit or on the Industrial PC itself. The UPS unit contains highly integrated components that are very sensitive to static discharges.

Warning
Work on the UPS unit may be done only by authorized specialist personnel.

Warning
Never repair the UPS unit yourself. Always contact the noax Service Hotline for this purpose and send in your device for repair, if necessary. Please refer to the rating plate of the Industrial PC. Important information about the features of your device are documented there.

Warning
For noax Industrial PCs with option ”Internal Capacitor UPS” noax recommends that you do not replace solid state disks (SSDs), hard drives and memory modules yourself. Always contact the noax Service Hotline for this purpose.

Warning
Make sure that the three connectors between the UPS unit and the mainboard of the IPC are in the correct position. Otherwise the UPS unit and possibly the mainboard as well will be damaged.

Warning
noax is not liable for damages resulting from improper handling and failure to heed the safety instructions.

3.1 Safety instructions for the ”Internal Capacitor UPS”

Warning
Before the IPC housing is opened and work is done on the ”Internal Capacitor UPS” unit, the Industrial PC must be disconnected from the power supply for at least 24 hours to ensure that the capacitors used are safely discharged.
Performing modifications or maintenance work while the capacitors are still charged can damage the Industrial PC.

General handling

- Do not short-circuit the capacitors.
- Do not open the capacitors.
- Do not drop the ”Internal Capacitor UPS” on the floor or expose it to other stresses and strains.
- Do not expose the ”Internal Capacitor UPS” to heat by storing it in close vicinity of heat- emitting devices or by burning it, for example.

Warning
Electrolyte leaked from a damaged capacitor must not come into contact with skin or eyes because this will produce irritation, inflammation, or burning.

Warning
The built-in capacitors contain Acetonitrile (UN no.: 1648). During transport by air or by ship the relevant safety regulations must be observed.

Warning
Failure to heed these instructions can cause strong sparking to occur inside the device, or damage to components.

3.2 Emergency measures

- In the event that leaked electrolyte comes into contact with skin or eyes, rinse affected area immediately with plenty of water and instantly consult a physician.
- If the device catches fire or even explodes due to incorrect handling of the IPC, use the following to extinguish the fire:
  - CO_2
  - Dry chemicals
  - Dry sand
  - ABC powder extinguisher

4 Scope of delivery

The scope of delivery consists of the following components:

- ”Internal Capacitor UPS” unit installed in the Industrial PC
- 5-pin connector
- This User Manual

5 Function description

5.1 General

The ”Internal Capacitor UPS” is integrated as an optional unit in a noax Industrial PC.

The unit is used to supply uninterruptible power to the Industrial PC. In addition, disturbances on the input voltage are also filtered out.

This way, an Industrial PC with option ”Internal Capacitor UPS” can be connected directly to a suitable DC supply voltage, such as that of a vehicle for example, or another suitable DC power supply.

🕮 Please refer to the technical data in section 12.

5.2 ”Internal Capacitor UPS” function

The ”Internal Capacitor UPS” provides an uninterrupted power supply for the Industrial PC. Capacitors are used to buffer the power supply. An integrated charge management monitors the charge level of the capacitors.

When the DC supply voltage is trouble-free, it is connected directly to the internal supply voltage of the Industrial PC.

If the input voltage falls below or exceeds a critical value, the UPS unit automatically switches to the capacitors (= UPS mode). This way, voltage fluctuations are absorbed and voltage interruptions are bridged.

Once the input voltage is in the permitted range again, the UPS unit automatically reconnects the input voltage directly to the Industrial PC. In addition, the capacitors are also recharged.

5.2.1 Settings for runtime in UPS mode

The runtime in UPS mode depends on the power required by the Industrial PC.

See section 12.2 for the typical runtime / backup power time in UPS mode.

The noax software tool “nSMART™” can be used to configure how the operating system and the Industrial PC should react in the event that the backup power time in UPS mode is not sufficient for the duration of the voltage interruption.

This reaction basically depends on the settings in the power options of the respective operating system.

See section 8.1 for the settings in “nSMART™”
and section 8.2 for the settings in the operating system.

5.3 Ignition input – connection ”IGN”

The ignition input (= ignition key switch input) can be used to start and shut down the Industrial PC.

If the voltage level of the IGN input exceeds 3.5 V, the input is detected as active (the ignition is on). If the voltage level falls below 3.5 V, the input is detected as not active (the ignition is off).

See section 8.1.2 for possible settings for the ignition key function

5.4 Programmable signal input – connection “IN2”

The programmable signal input can be used to control various functions of the Industrial PC such as the display backlight or the touch input option.

If the voltage level of the IN2 input exceeds 3.5 V, the programmable signal input is detected as active. If the voltage level falls below 3.5 V, the programmable signal input is detected as not active.

See section 8.1.3 for possible settings for the programmable input

5.5 “Deep Sleep switch” function

- **“ON” switch setting**
  This switch position enables the Deep Sleep mode.
- **“OFF” switch setting** (factory default setting)
  This switch position disables the Deep Sleep mode.

Warning
The Deep Sleep mode can be used only in combination with the enabled ignition key function. Set the Deep Sleep switch to “OFF” when the ignition key function is not active.
If the ignition key function is not used, but Deep Sleep mode is still enabled, the IPC will no longer be able to be started in the normal way after the operating system has been shut down.

Deep Sleep switch “ON”

Deep Sleep mode is enabled.

If the signal on the IGN ignition key input is no longer active or is no longer present, the input voltage circuit will be disconnected completely from the IPC (=Deep Sleep state) after the operating system has been shut down.
Thus the further supply of power to the IPC is prevented by the input voltage source, for example, to save the battery power of a vehicle.
This will reduce the power consumption to a few mA (< 10 mA).

Because the input voltage circuit is completely disconnected from the IPC in the Deep Sleep state, the IPC can be started again only by the ignition key function. The ON/OFF button cannot be used to switch the IPC on in the Deep Sleep state.

ⓘ If the ignition key function is not used, the Deep Sleep function cannot be used either. The switch must then be set to “OFF”.

Deep Sleep switch “OFF”

Deep Sleep mode is disabled.

If the signal on the IGN ignition key input is no longer enabled or is no longer present, the input voltage circuit will **not be disconnected** from the IPC after the operating system has been shut down.
The IPC standby power will be supplied from the input voltage source. This can cause the vehicle battery to be discharged inadvertently, for example.
Here, the power consumption is the power consumed by the IPC in standby mode (see technical data in the IPC manual).

ⓘ If Deep Sleep mode is disabled (switch position “OFF”), the ignition key function can still be used.

6 Unit connection panel

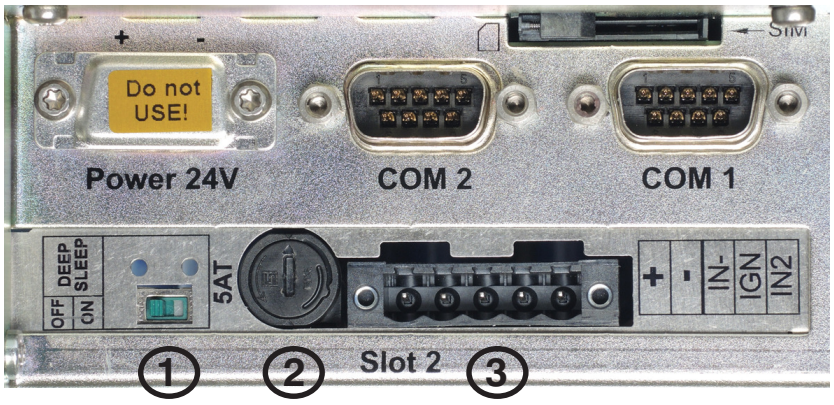

Fig. 1 Connection panel of the ”Internal Capacitor UPS” unit

① Deep Sleep switch
② Input fuse
③ 5-pin input connector

Warning
If a UPS unit is installed, the power plug of the mainboard cannot be used to supply power to the IPC. For this reason, the power plug is covered by a safety cap.

6.1 Input connector pin assignment

The 5-pin input connector of the UPS is used to connect the power supply instead of the existing power plug on the mainboard.

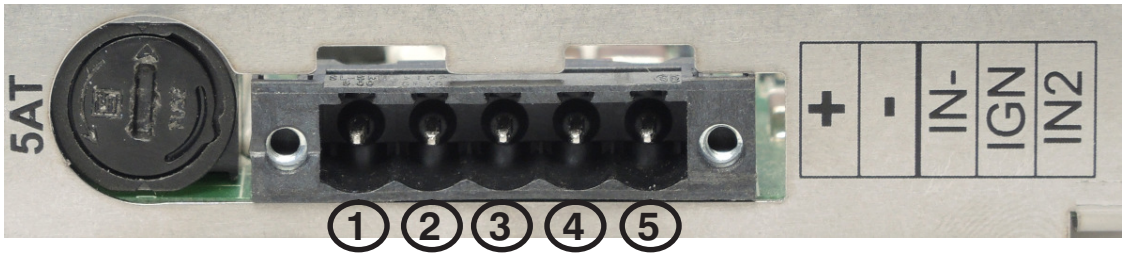

Fig. 2 Input connector pin assignment for the ”Internal Capacitor UPS”

- Pin 1 (“+”): Positive pole of the input voltage
- Pin 2 (“–”): Negative pole of the input voltage
- Pin 3 (“IN–”): Signal common for inputs IGN and IN2 (ground / negative pole)
- Pin 4 (“IGN”): Ignition input (control input for ignition key function)
- Pin 5 (“IN2”): Programmable signal input

6.1.1 Input fuse

The fuse can be replaced from the outside. The input voltage is to be protected by a **5 x 20 mm, 5.0 A T glass tube fuse (micro fuse)**
(5.0 A, “slow-acting” tripping behavior according to IEC 60127-2).

7 Commissioning

To operate an Industrial PC with option ”Internal Capacitor UPS” the UPS unit requires a DC power supply as input.

📖 **The limits for the input voltage can be found in the technical data in section 12.**

Mainly the following types of DC voltage supply are used:

- Direct connection to a vehicle electrical system
- Supply via a noax power supply
- Connection to a vehicle electrical system via a noax DC/DC converter

For all connection types, it is important to ensure that the input voltage is within the admissible limits.

ⓘ **Note:**
noax recommends that the „nSMART” software be used to adapt the operating behavior for the ”Internal Capacitor UPS” to the respective application situation.

📖 See section 8.1 for settings in „nSMART”.

ⓘ **Note:**
It is also necessary to select settings appropriate for the application situation in the power options of the operating system.

📖 See section8.2 for information on this matter.

7.1 Safety instructions for commissioning

Danger
An Industrial PC with option ”Internal Capacitor UPS” may not be operated in areas with explosive atmospheres.

Danger
Short circuits of the capacitor contacts with each other, the housing, tools, or other metal objects are to be avoided entirely. The high amount of energy in the capacitors can lead to burns, explosions, fires, or injuries!
Therefore, use only insulated tools and do not wear any rings or chains when working on the UPS unit or the Industrial PC.

Danger
To prevent sensitive electronic devices from being affected, an Industrial PC with option ”Internal Capacitor UPS” may not be operated in aircraft, hospitals or other medical environments.

Danger
No additions or modifications may be made to the Industrial PC or the UPS unit unless expressly approved by the manufacturer.

Warning
Ensure that no potential differences are balanced thru the device, for example ground loops.

Caution
Pay attention to the ambient conditions when selecting a location to use the Industrial PC with option ”Internal Capacitor UPS”.

Caution
When connecting the power supply, make sure the cable is not damaged, modified, stretched, excessively bent, or twisted. Do not place heavy and/or sharp-edged objects on the cables.

Also make sure that you heed the safety instructions in the user manual for the Industrial PC.

7.2 Safety instructions for operation

Danger
Disconnecting the DC supply voltage, for example by using an EMERGENCY OFF switch to disconnect the external power supply, will not necessarily shut down the Industrial PC!
The energy stored in the capacitors will continue to power the device and can extend the runtime of the Industrial PC unintentionally.

Warning
If electrolyte escapes from a capacitor during operation, shut down the Industrial PC immediately and disconnect it from the power supply!

See Emergency measures in section 3.2.

Warning
Electrolyte leaked from a damaged capacitor must not come into contact with skin or eyes because this will produce irritation, inflammation, or burning.

See Emergency measures in section 3.2.

7.3 Notes on starting the Industrial PC

In the factory default setting, an Industrial PC with the option ”Internal Capacitor UPS” option can be started only by the ON/OFF button or the „Touch Power On“ function (if enabled).

Another possibility for starting the IPC would be to use the ignition key function.

Also another signal can be used instead of the ignition key signal. Here, special attention must be drawn to the signal common and the voltage limits of the “IGN” control input.

See section 12 for the technical data and section 5.3 for function ”Ignition input”.

The „nSMART” software can be used to change the settings for starting the Industrial PC. For example, in the `Power On` area, the option `Power-On IPC when external power is applied` can be activated. This will cause the Industrial PC to be started as soon as there is input voltage applied to the UPS.

7.4 Direct connection to a vehicle electrical system

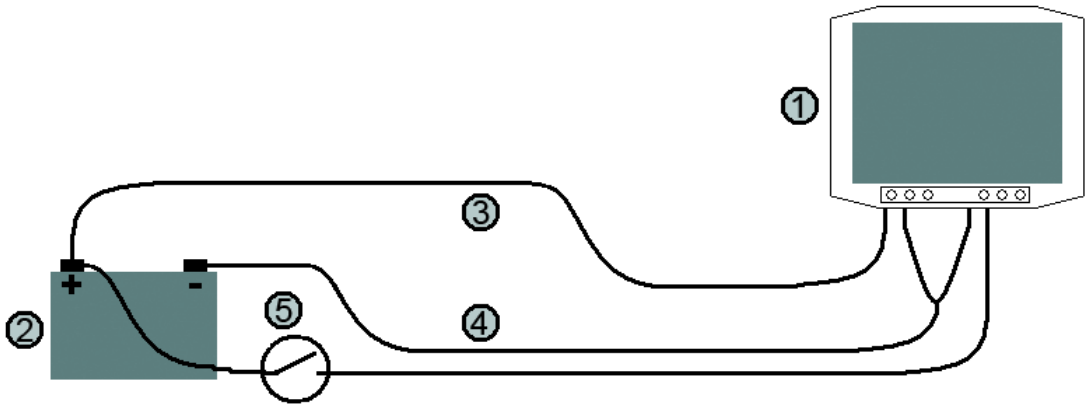

Fig. 3 Example of a Industrial PC connection to a vehicle electrical system.

① noax Industrial PC with built-in ”Internal Capacitor UPS” unit
② Vehicle battery as an example of the vehicle electrical system
③ Positive terminal cable of the vehicle electrical system to the UPS in the Industrial PC
④ Negative terminal cable of the vehicle electrical system (vehicle / device ground and signal common) to the UPS in the Industrial PC
⑤ Ignition key switch

Warning
When the UPS is connected directly to a vehicle electrical system, the input voltage limits must be strictly complied with (currently 12 V and 24 V electrical systems). For vehicle system voltages outside the input voltage limits, a DC/DC converter is required.

See section 12 for the technical data and section 7.6.

Warning for forklift electrical systems
When you are connecting to forklift electrical systems, special attention must be paid to the electric potentials!
There are forklifts where the vehicle ground is connected to the positive terminal of the vehicle battery instead of the negative terminal. In this case, attention must also be paid to the electric potentials when connecting and installing peripheral devices. Otherwise, severe damage to all devices may occur.

Notes regarding the cabling

The positive terminal of the vehicle electrical system (here, the vehicle battery) is connected to pin 1 (“+”) and the negative terminal of the vehicle electrical system to pin 2 (“−”) of the UPS input connector.

In order to use the ignition input (for the ignition key function) and/or the programmable signal input, a signal common (ground / negative pole) is required for these inputs on pin 3 (“IN−”).

When connected to a vehicle electrical system, this signal common is usually equal to the negative terminal of the vehicle electrical system. In this case, a short cable must be used to connect both the “−” and the “IN−” connections (pins 2 and 3) of the input connector.

The signal from the ignition key switch is connected to pin 4 (“IGN”).

The signal for the programmable signal input is connected to pin 5 (“IN2”).

Note regarding the cables
The cables to be used must have a cross section of at least 1.5 mm^2 and must not be longer than 197 inch (5.0 m). Especially the cables for the positive and negative terminals must meet these requirements, because otherwise the voltage drop will be too great in the cables.
For selecting the cables, noax recommends a electric strength of at least 60 V and a temperature range from −30 °C to +70 °C (still).

7.5 Supply via a noax power supply

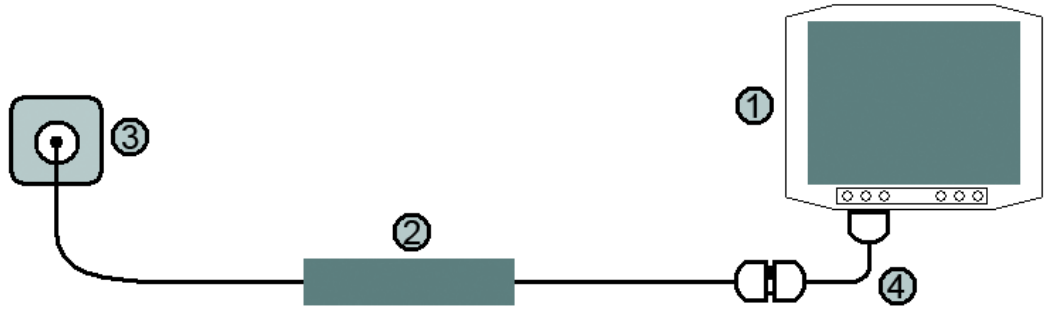

Fig. 4 Supply via a noax power supply

① noax Industrial PC with built-in ”Internal Capacitor UPS” unit
② noax power supply for N11 / N10 / N8 (24 V DC output voltage)
③ Mains supply (socket)
④ Power adapter: Power supply – Internal Capacitor UPS

ⓘ **The power adapter to connect the noax power supply to the ”Internal Capacitor UPS” is optional and must be ordered separately.**

The power adapter is plugged in between the power supply and the „Internal Capacitor UPS”.

7.6 Connection to a vehicle electrical system via a noax DC/DC converter

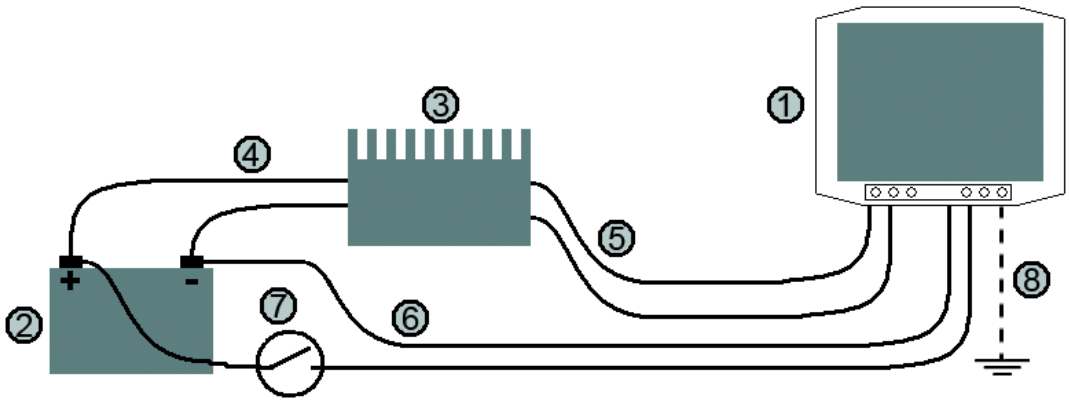

Fig. 5 Example of an Industrial PC connection to a vehicle battery via a noax DC/DC converter

① noax Industrial PC with built-in ”Internal Capacitor UPS” unit
② Vehicle battery as an example of the vehicle electrical system
③ noax DC/DC converter
④ Cables from the vehicle electrical system to the input of the noax DC/DC converter
⑤ Cables from the output of the noax DC/DC converter to the UPS in the Industrial PC
⑥ Connection for signal common of the ignition input and programmable signal input
⑦ Ignition key switch
⑧ Functional ground connection for the IPC housing when using galvanically isolated DC/DC converter

Warning for forklift electrical systems
When you are connecting to forklift electrical systems, special attention must be paid to the electric potentials!
There are forklifts where the vehicle ground is connected to the positive terminal of the vehicle battery instead of the negative terminal. In this case, attention must also be paid to the electric potentials when connecting and installing peripheral devices. Otherwise, severe damage to all devices may occur.

Notes regarding the cabling

The positive terminal of the DC/DC converter output is connected to pin 1 (“+”) and the negative terminal to pin 2 (“−”) of the UPS input connector.

In the external DC/DC converters supplied by noax the input and output voltage are galvanically isolated. The galvanic isolation separates the electrical potentials of the DC input voltage and the internal supply voltage from each other and both circuits are potential-free from each other.

Warning
If the ”Internal Capacitor UPS” is connected to a galvanically isolated DC/DC converter, it is mandatory that the housing of the Industrial PC is connected to a suitable grounding point. For this the functional ground connection point in the connector area of the Industrial PC or alternatively one of the bolts of the safety cap for the 24V power plug (see section 6) can be used.

In order to use the ignition input (for the ignition key function) and/or the programmable signal input, a signal common (ground / negative pole) is required for these inputs.

When connected to a galvanically isolated DC/DC converter, a separate connection from the signal common of the ignition input and the programmable signal input to pin 3 (”IN−”) of the UPS input connector is necessary.

The signal of the ignition key switch is connected to pin 4 (“IGN”).

The signal for the digital control input is connected to pin 5 (“IN2”).

Note regarding the cables
The cables to be used must have a cross section of at least 1.5 mm^2 and must not be longer than 197 inch (5.0 m). Especially the cables for the positive and negative terminals must meet these requirements, because otherwise the voltage drop will be too great in the cables.
For selecting the cables, noax recommends a electric strength of at least 60 V and a temperature range from −30 °C to +70 °C (still).

8 Setting and control options

8.1 Setting options via nSMART™

The ”nSMART™” software can be used to configure the settings for the ”Internal Capacitor UPS“ and to determine the status of the UPS.

ⓘ The current version of the ”nSMART™” configuration software can be downloaded from the following area of the noax website **www.noax.com**:
“Service & Support” — “Download-Center” — “Software - Driver” — “Tools”

🕮 Also make sure that you heed the user manual for the Industrial PC

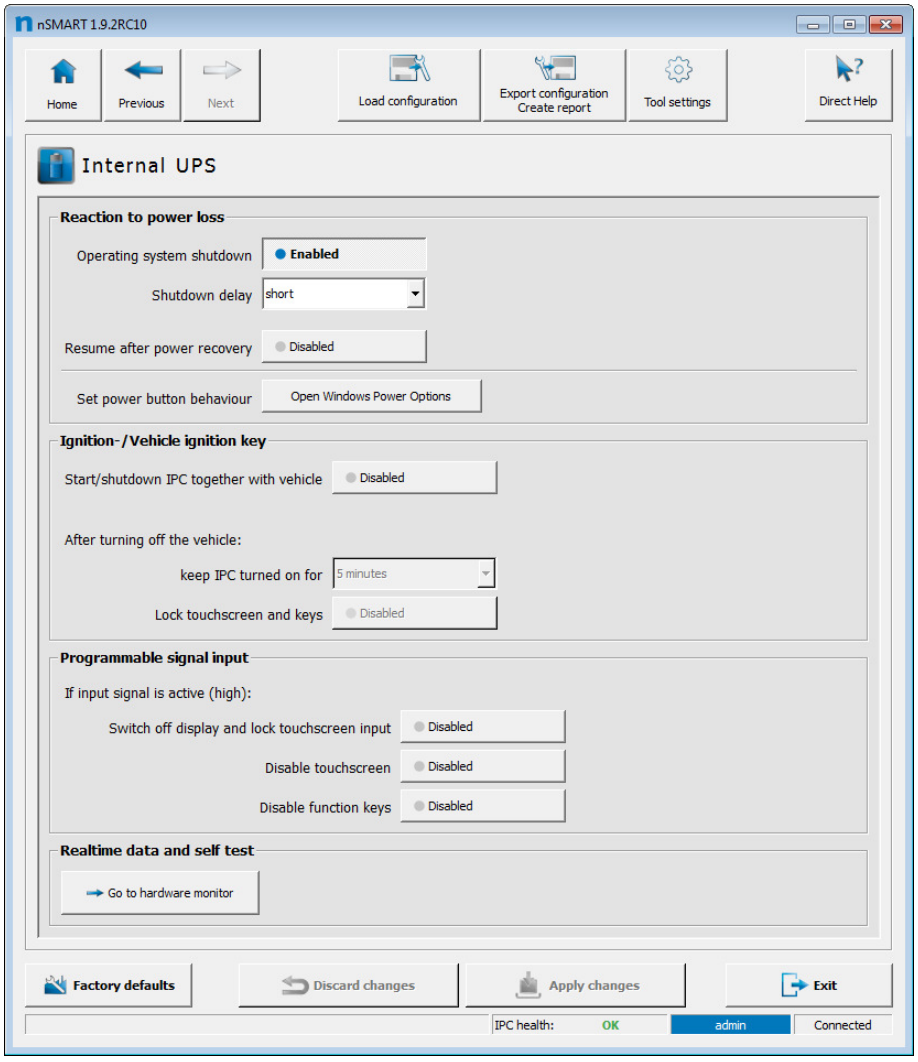

Fig. 6 Setting window for the ”Internal Capacitor UPS”

ⓘ The illustration shows the factory setting for the shown setting options.

8.1.1 Settings in the section “Reaction to power loss”

The following option can be used to set the reaction of the UPS to an interrupted DC supply voltage or the undershooting of the lower voltage limit:

- **Option** `Operating system shutdown`

  Enabled: (default)
  If the DC supply voltage is interrupted or if it falls below the lower voltage limit, a shutdown of the operating system will be triggered.

  Disabled:
  Once the capacitors are discharged and can no longer supply power to the IPC, the Industrial PC will be powered off (hard off). This can result in irreversible data losses or a corruption of the operating system.

The time until shutdown of the operating system can be set by the following setting with three options:

- **Setting** `Delay until shutdown:`

  None:
  Interruptions and undershoots are bridged up to 1 second. After this, a shutdown of the operating system is triggered. The maximum possible buffered device runtime is available for shutdown.

  Short: (default)
  Longer interruptions and undershoots of a few seconds are bridged. Then the shutdown is started at a lower charge level. Therefore, less buffered runtime remains available for shutdown.

  Long:
  Shutdown is started when the charge level is very low. This allows the longest backup power time to be achieved. But only a short buffered runtime remains available for shutdown.

ⓘ Runtimes in UPS mode are system-dependent (CPU load, memory amount, display brightness, USB devices connected, etc.) and can therefore not be given as an exact value.

If the operating system was shut down or switched to standby mode due to a power loss, the following options can be used to set the reaction to a power recovery:

- **Option** `Resume after power recovery`

  Disabled: (default)
  After power recovery, the Industrial PC must be started by the ON/OFF button or the ”Touch Power On” function (if enabled).

  Enabled:
  After power recovery, the Industrial PC switches on automatically and starts up the operating system.

Setting of the Windows power options

The button `Open windows power options` can be used to open directly the regarding settings window for the Windows power options.

Warning
The behavior during shutdown of the operating system depends on the setting for the reaction on pressing the power button and on the software running. A wrong setting can result in irreversible data losses and/or a corruption of the operating system.

See section 8.2 for settings in the operating system

Additional notes

The time required to shutdown the operating system depends heavily on the respective installation and operating state, such as running applications, virus scanners, background services, current CPU load, etc.
Therefore, in practice, it is usually necessary to determine the actual time required for the shutdown by tests and to find the appropriate setting for the backup power time in this way.

If the DC supply voltage is present before the backup power time expires, or if the DC supply voltage is again within the admissible limits, the UPS will connect the DC supply voltage back to the internal supply voltage of the Industrial PC again and a shutdown of the operating system will not be triggered.

8.1.2 Settings in the section ”Ignition-/Vehicle ignition key”

ⓘ If the ignition input for the ignition key signal is not used, the following settings have no effect.

- **Option** `Start/shutdown IPC together with vehicle`

  Disabled: (default)
  The control for starting and shutting down the operating system via a signal on the ”IGN” control input is not enabled.
  Use of the Deep Sleep function is not possible.

  Enabled:
  If the ”IGN” control input is detected as active (= vehicle ignition on), the operating system is started. This functions also from the Deep Sleep state.

  If the control input is detected as not active (= vehicle ignition off), a shutdown of the operating system is triggered according to the setting `Keep IPC turned on for`.

- **Setting** `Keep IPC turned on for`

  Setting the operating system ”shutdown delay time” after the vehicle ignition has been switched off. The setting can be between 10 seconds and 60 minutes (Default: 5 minutes).

- **Option** `Lock touchscreen and keys`

  Disabled: (default)
  During the ”shutdown delay time”, the operating system can be operated by the touchscreen and keys.

  Enabled:
  During the ”shutdown delay time”, operating of the operating system by the touchscreen and keys is blocked.

Example:

Control by the ignition key can be used to start and shut down the operating system conveniently.

The adjustable ”shutdown delay time” can be configure so that the operating system does not have to shutdown and be restarted every time, for example, when the vehicle is not in operation for short periods of time (when the ignition key is not inserted).

In addition, the ”Lock touchscreen and keys” option can also be used to prevent unauthorized access to the operating system when the vehicle is not in operation.

📖 See also section 5.3 for a description of the “Ignition input” function

8.1.3 Settings in the section “Programmable signal input”

ⓘ If the programmable (digital) signal input is not used, the following settings have no effect.

As long as the programmable signal input ”IN2” is detected as active (input level = high), the following options will also be active, if enabled:

- **Option** `Switch off display and lock touchscreen input`
  Disabled: (default)
  No action when signal input is active.
  Enabled:
  The display backlight is switched off and input by touchscreen is blocked.

- **Option** `Disable touchscreen`
  Disabled: (default)
  No action when signal input is active.
  Enabled:
  Only input by touchscreen is blocked.

- **Option** `Disable function keys`
  Disabled: (default)
  No action when signal input is active.
  Enabled:
  The function keys are switched off.

Example:

The programmable signal input can be used to perform safety functions, for example.

When the drive signal of a forklift is used as the input signal, the display can be switched off when the forklift is being driven, for example, and input by touch can be blocked to prevent the forklift driver from being distracted.

🕮 See also section 5.4 for a description of the “Programmable signal input” function

8.2 Settings in the operating system

If a setting to shut down the operating system has been selected in the ”nSMART™” software, settings must also be made in the operating system.

The ”Internal Capacitor UPS” sends a ”power button signal” to the operating system to trigger a shutdown. This is comparable to briefly pressing the power button on a normal desktop PC.

The reaction of the installed operating system to the power button signal is dependent on the setting selected in the operating system. In Windows, for example, this setting is configured in the power options.

Usually, a selection can be made from the following settings:

Setting “`Do nothing`”

The operating system does not react further to the power button signal. It continues to run until the UPS can no longer buffer the input voltage and the Industrial PC is hard powered off due to the lack of input voltage.

After the IPC is powered off, a complete restart is performed from the disk (SSD, HDD). The time required for the restart is the same as a normal start of the operating system.

ⓘ This setting is not recommended by noax because the purpose of the UPS is to shut down the operating system safely.

⚠ **Caution:**
Hard powering off the Industrial PC can result in data losses and damage to the operating system installation. This behavior can generally occur during DC supply voltage outages and is not affected by the UPS.

Setting “`Shut down`”

The operating system shuts down completely. Open files and files not saved can prevent the shutdown as some active programs prompt you to save. This behavior is determined by the programs themselves and by Windows. The UPS has no effect on it.

If not all programs and services can be ended, the operating system will continue to run until the capacitors are out of power. Then the Industrial PC is hard powered off.

When it is restarted, the operating system is rebooted completely from the disk. The time required for the restart is the same as a normal start of the operating system.

ⓘ This setting is useful if the operating system is to be shut down completely, for example, whenever extended outages of the DC supply voltage are expected.

ⓘ Programs with an autosave function are recommended so that open files and files not saved will not prevent the shutdown.

⚠ **Caution:**
Hard powering off the Industrial PC can result in data losses and damage to the operating system installation. This behavior is not affected by the UPS.

Setting "Sleep" or "Stand by"

The operating system switches to sleep mode. All programs remain open and the data is retained in the RAM. Only the components that are not required, such as the display, the hard drive, and the devices connected are switched off to save as much energy as possible.

The ON/OFF button can be used to ”wake up” the IPC quickly from sleep mode. The starting time required for ”wake up” is very little because the data is still in the RAM.

If the DC supply voltage is interrupted for a longer period of time, the operating system will continue to run in sleep mode until the capacitors are out of power. Then the Industrial PC will hard power off and the data in the RAM will be lost.

After the IPC is hard powered off, a complete restart is performed from the disk (SSD, HDD). The time required for the restart is the same as a normal start of the operating system.

ⓘ This setting is useful if brief outages of the DC supply voltage (e.g. due to battery change for electric forklifts) can be assumed and/or a quick wakeup of the operating system is required.

⚠ **Caution:**
Hard powering off the Industrial PC can result in data losses and damage to the operating system installation. This behavior can generally occur during DC supply voltage outages and is not affected by the UPS.

Setting "Sleep" and "Hybrid sleep"

The operating system saves the content of the RAM on the disk and then switches to sleep mode. This process takes somewhat longer than a switch to normal sleep mode.

The advantage of the hybrid sleep mode is that the operating system can be “awakened” very quickly from sleep mode after brief voltage interruptions. In the case of longer outages of the DC supply voltage and subsequent hard powering off of the Industrial PC, there is no risk of data loss, because the data in the RAM is also saved on the disk. This allows the operating system to be started as from sleep mode.

ⓘ **noax recommends this setting**

ⓘ This setting allows a quick start of the operating system after brief interruptions of the DC supply voltage and offers protection from data loss.

ⓘ **Important:**
Hybrid sleep mode must be enabled (see following section).

Setting "Hibernate"

The operating system saves the content of the RAM on the disk and then shuts down. For this purpose, sufficient free memory must be available on the disk and the UPS backup power time must be sufficient to save the data.
This will prevent the Industrial PC from being hard powered off and data loss as a result.

When the operating system is started from hibernate mode, the RAM is restored from the file saved on the disk and the work can continue immediately. Starting from hibernate mode takes somewhat longer than starting from sleep mode, but does not require as much time as a complete restart of the operating system.

ⓘ This setting is useful when data loss is to be prevented and a quick restart is required after an outage of the DC supply voltage.

8.2.1 Settings in Windows 10

ⓘ With ”nSMART™” the settings page for the additional power options can be opened directly via the `Open Windows Power Options` button on the UPS tab. Then the following steps 1—4 no longer apply.

Setting the behavior for the power button signal:

1. Open the control panel
2. Click on `System`
3. Click on `Power and sleep`
4. Click on `Additional power settings`
5. On the left side, select `Choose what the power button does`
6. Select the desired option in “Power button settings” under `When I press the power button`

Enabling / disabling hybrid sleep mode:

1. Open the control panel
2. Click on `System`
3. Click on `Power and sleep`
4. Click on `Additional power settings`
5. Click on `Change when the computer sleeps` on the left
6. Click on `Change advanced power settings`
7. Under `Sleep` select the item `Allow hybrid sleep` and configure the desired setting (ON or OFF).

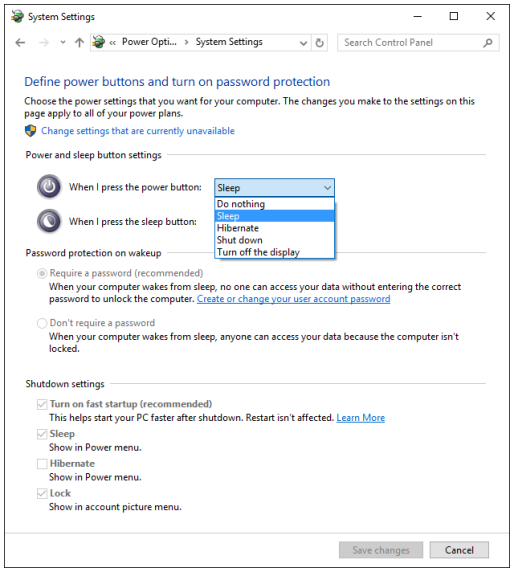

Fig. 7 Power options in Windows 10
Power button behavior

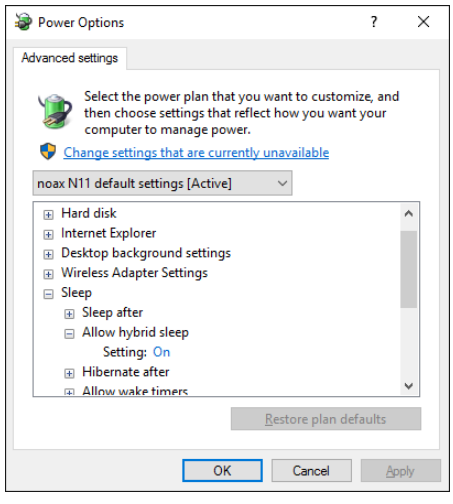

Fig. 8 Power options in Windows 10
Set hybrid sleep

🕮 You will find an explanation of the individual setting for the behavior of the power button at section 8.2.

8.2.2 Settings in Windows 7

ⓘ With “nSMART™” the settings page for the power options can be opened directly via the `Open Windows Power Options` button on the UPS tab. Then the following steps 1–3 no longer apply.

Setting the behavior for the power button signal:

1. Open the control panel
2. Click on `System and Security`
3. Click on `Power options`
4. On the left side, select `Choose what the power button does`
5. Select the desired option in “Power button settings” under`When I press the power button`

Enabling / disabling hybrid sleep mode:

1. Open the control panel
2. Click on `System and Security`
3. Click on `Power options`
4. Click on `Change when the computer sleeps` on the left
5. Click on `Change advanced power settings`
6. Under `Sleep` select the item `Allow hybrid sleep` and configure the desired setting (ON or OFF).

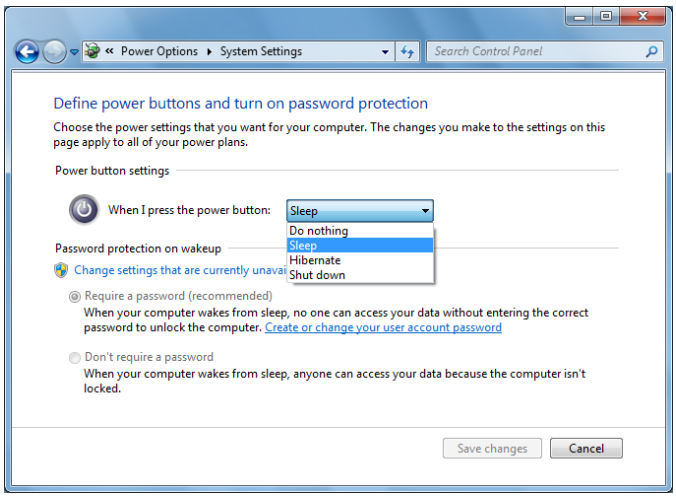

Fig. 9 Power options in Windows 7
Power button behavior

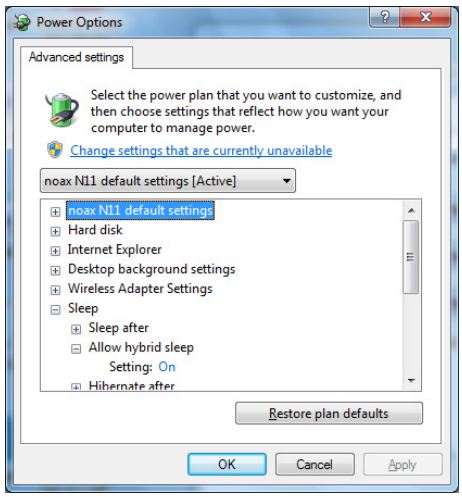

Fig. 10 Power options in Windows 7
Set hybrid sleep

🕮 You will find an explanation of the individual setting for the behavior of the power button at the beginning of section 8.2.

8.3 Control option for the UPS function

The ”nSMART™” software shows information about the current state of the ”Internal Capacitor UPS” in the area ”Hardware Monitor” – Tab ”Internal UPS”.

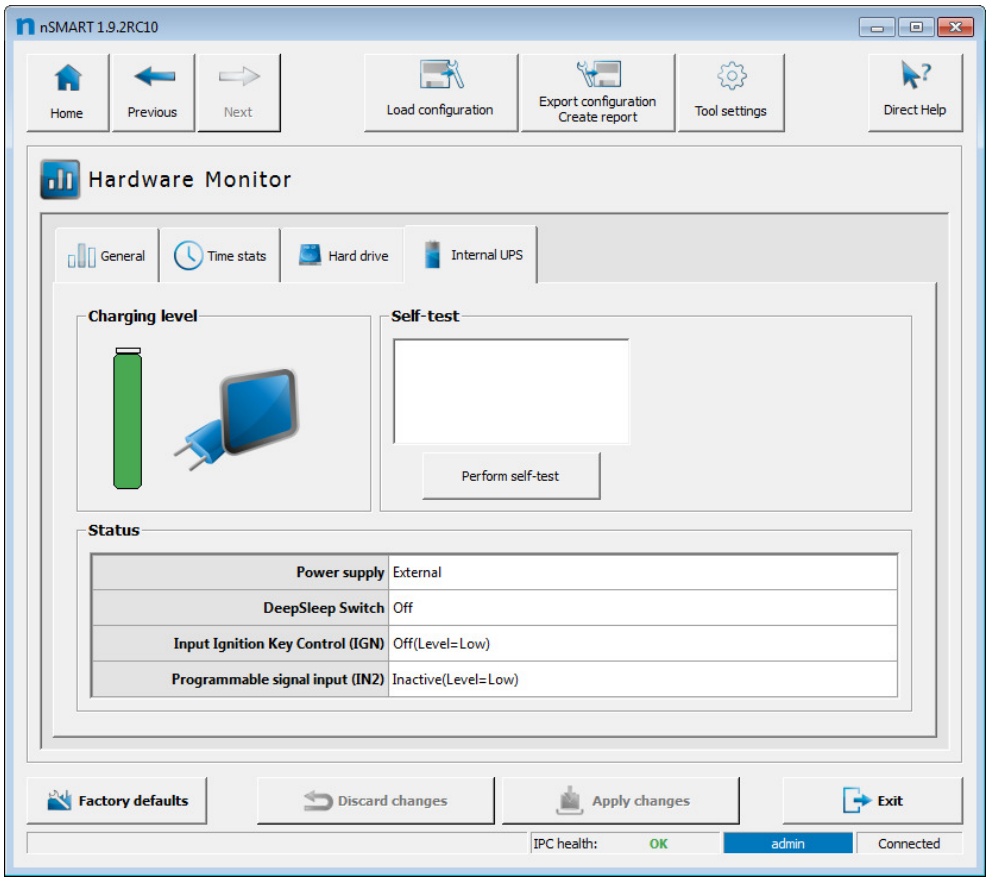

Fig. 11 Hardware monitor – ”Internal Capacitor UPS” with charged capacitors

- **`Charging level`**
  Provides information on the charge level of the capacitors. During discharging, the color of the bar changes from green to red.
- **`Status area`**
  Here the status of the power supply (External / Internal UPS), of the Deep Sleep switch (OFF / ON) and of the “IGN” input for the ignition signal (OFF / ON) and the programmable signal input ”IN2” (Inactive / Active) is indicated.
- **`Perform self-test button`**
  A self-test is triggered for the ”Internal Capacitor UPS”.
  The ”Internal Capacitor UPS” switches briefly to UPS mode for this purpose. The discharging is shown in the charge level indicator.
  After the switchover time has elapsed, the UPS switches back to normal mode. The charging is also shown in the charge level indicator.
  Note:
  The UPS self-test can be performed only if the capacitors are sufficiently charged.

9 Maintenance

The capacitors of the ”Internal Capacitor UPS” unit are maintenance free and therefore do not require any maintenance.

10 Troubleshooting

10.1 FAQ – Frequently Asked Questions

Under **Service and Support** on our homepage **www.noax.com**, there is an FAQ section with frequently asked questions. The information included there may already help solve one problem or the other.

10.2 Replacing a fuse

Danger
Fuses may be replaced by authorized personnel only. Compliance with the stated values and technical data of the fuses is mandatory in all circumstances!

Caution
Before replacing the fuse, you must unplug the UPS input connector.

See section 12 for the technical data for the required fuse.

10.3 Repairs

You can contribute to a rapid and smooth repair process by observing the following points:

- Please use our service repair ticket which is available for download as a PDF on our homepage under **www.noax.com**.
  Please fill out the form as completely as possible and include it with the return shipment.
- Please ensure safe transport and a suitable packaging. Use the original packaging if possible. **We are not liable for any damages that may occur during transport**.
- We recommend using UPS Standard for shipping. The shipment must be prepaid. Within the warranty period, noax also accepts UPS standard consignments freight collect if a written confirmation by noax Service exists. noax does not accept extra services such as express services, etc.
- In urgent cases we offer loan equipment for the duration of the repairs for a small fee. Please contact our Hotline:
- Immediately upon receipt of the device you will receive confirmation of receipt from our service department.

Hotline Europe		**Hotline North America**	
Tel.	**+49 (0) 8092 8536 33**	**Tel.**	**+1 704 992 1606**
Fax	**+49 (0) 8092 8536 55**	**Fax**	**+1 704 992 1712**
eMail:	**hotline@noax.com**	**eMail:**	**hotline@noaxna.com**

11 Disposal

The ”Internal Capacitor UPS” unit contain components that may not be disposed of as normal household waste at the end of their service life. These units must be returned to noax for disposal.

For more information on the disposal of these units, please contact the noax Hotline.

By reusing, recycling or other forms of utilizing old devices, you are making an important contribution to the protection of our environment.

Warning
The „Internal Capacitor UPS” unit may not be disposed of in the normal household waste.

12 Technical data

Warning
For an Industrial PC with option ”Internal Capacitor UPS”, the technical data for add-on cards differing from that of a normal Industrial PC must be observed and complied with.

See section 2 for the intended use.

12.1 General data

Description of the option	Uninterruptible power supply, integrated in the Industrial PC
Energy storage	The input voltage is buffered by capacitors.
Capacitor type	Double layer capacitor with Acetonitrile
Connection	5-pin input connector Type Weidmüller SL-SMT5.00/5/90LF
Mating Connector (included)	Weidmüller BLZP 5.00HC/05/180F SN BK (Order no. 1956000000) or similar
Operation elements	Deep Sleep switch (see section 5.5 and 6)

12.2 Typical backup power time

Examples of typical runtimes in UPS mode	
IPC power consumption = 45 W	approx. 15 s backup power time
IPC power consumption = 30 W	approx. 23 s backup power time
IPC power consumption = 25 W	approx. 28 s backup power time

Runtime in UPS mode depends on the power required by the Industrial PC. This in turn depends on the hardware equipment, the devices that are connected and on the applications that are active in the operating system.

12.3 Electrical data

Input voltage	10 V DC to 30 V DC
Input fuse	5 x 20 mm, glass tube fuse (micro fuse) 5.0 A, ”slow-acting” triggering behavior according to IEC 60127-2
Ignition input ”IGN”	
Control voltage	0 V DC to 30 V DC, galvanically isolated
Switching threshold	3.5 V
Programmable signal input ”IN2”	
Control voltage	0 V DC to 30 V DC, galvanically isolated
Switching threshold	3.5 V
Electrical protection class	Protection class III – SELV – safety extra-low voltage

ⓘ The charging current for the capacitors is required in addition to the power required by the Industrial PC. (For the power requirement of the Industrial PC, see the technical data for the Industrial PC.)

ⓘ **noax recommends that an input power of at least 70 W is provided.**

ⓘ The capacitors are also charged when the operating system is shut down and DC supply voltage is present.
Exception: When the Deep Sleep switch is ”ON”
(see also section 5.5 for the ”Deep Sleep switch” function)

12.4 Ambient conditions

Temperature range for operation	Depends on the Industrial PC (see technical data for the IPC) max. −22 °F to 131 °F (−30 °C to +55 °C)
Temperature range for storage	Depends on the Industrial PC (see technical data for the IPC) max. −22 °F to 131 °F (−30 °C to +55 °C)

🕮 **Ambient conditions in the user manual for the Industrial PC**
Section ”Technical data” for general conditions
Section ”Technical data for Industrial PC types” for device-specific values

13 Declarations of conformity

The „Internal Capacitor UPS” unit is labeled as follows:

Fig. 12: Label for ”Internal Capacitor UPS”

13.1 CE conformity

The noax UPS unit described in these user manual comply with the valid standards and regulations for CE conformity.

13.2 FCC conformity

The noax UPS unit described in these user manual comply with the valid standards and regulations for FCC conformity.

The following supplementary information is necessary to meet the FCC requirements:

- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.
- These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
- This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
- Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

13.3 WEEE

In order to comply with the directive Waste Electrical and Electronic Equipment (WEEE) the company noax Technologies AG (ear Reg. No. DE27359889) offers to take back old devices for disposal free of charge (with the exclusion of transport costs to the company noax Technologies AG).

13.4 Declarations of conformity as downloads

The current declarations of conformity can be download from the following area of the **www.noax.com** website:

“Service & Support” — “Download-Center” — “Certificates”

If the website cannot be accessed, the noax Hotline can help.

14 Your notes

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