1 General for the use of the DIO-Module

The DIO-Module provides three optically isolated inputs and one potential-free relay-output. The inputs and outputs are accessible using the SERVICE-connector of the device. This is located in the connector area of the Industrial PC.

Input 1 (CH1) has its own positive (+) and negative (–) connection.

Input 2 (CH2) and Input 3 (CH3) have a common negative (–) connection.

The output (CH4) is designed as a potential-free changeover contact.

The ground-connections of the inputs are not connected to the ground of the device.
Therefore, please pay attention to the correct wiring of the inputs.

The pin assignment of the SERVICE-connector can be found under chapter 4.

To be able to use the internal functions of the DIO-Module, these must be configured by using a configuration file or the ”NSetup” tool.

ⓘ For further information please visit our web site **www.noax.com**.

2 Important points

**The retrofitting of the DIO-Module can be performed by trained and skilled personnel.
noax recommends the retrofitting by noax’s service department.
In case of further questions please contact the hotline.**

If no customer configuration is known, the internal functions are deactivated by default. This prevents the device malfunctioning.

Please ensure that the potential difference of the device ground for the negative connection of an input (Pins 09 and 10) does not exceed the maximum value of 50 V.

**Ensure the inputs and outputs are wired correctly.
In doing so, pay attention to the common negative connection of the inputs 2 and 3 and the permitted input voltages or switching voltages of the output.**

**Please note the maximum input voltages.
If higher switching voltages or -currents are necessary, noax recommends the use of switching relays with potential-free contacts. Using the voltages provided at the SERVICE-connector, this makes the wiring easier and ensures flawless operation.**

**Please note the maximum switching voltages and -currents.
If higher switching voltages or -currents are necessary, noax recommends the use of switching relays with potential-free contacts.**

3 Technical data for the inputs and for the output

3.1 Switching levels and -currents for the inputs

Switching threshold	Input voltage	Input current
LOW –> HIGH	> 3.5 V DC	typical 4.0 mA at 3.6 V
HIGH –> LOW	< 2.5 V DC	typical 0.6 mA at 2.4 V

Maximum input voltage	30 V DC
Maximum current consumption per input	5.5 mA (constant current-circuit)

3.2 Maximum switching voltages and -currents for the output

Maximum permitted switching voltage	30 V DC
Maximum permitted switching current	250 mA

4 Pin assignment of the SERVICE-connector by the DIO-Module

SERVICE-connector	Pin assignment by the DIO-Module
Pin 01	Input 1 – positive (+) connection
Pin 09	Input 1 – negative (–) connection
Pin 02	Input 2 – positive (+) connection
Pin 03	Input 3 – positive (+) connection
Pin 10	Inputs 2+3 – common negative (–) connection
Pin 11	Output 1 – common connection
Pin 12	Output 1 – normally closed contact (closed when not active)
Pin 04	Output 1 – normally open contact (open when not active)
Pin 05	GND
Pin 06	+ 5 V switched, max. 250 mA Present when PC-part is switched on
Pin 13	+ 5 V standby, max. 250 mA Present if the power supply is plugged into the IPC
Pin 07 – 08 – 14 – 15	reserved – **ATTENTION:** Do not use, leave open, internally assigned!

ⓘ **A 15-pin, double row DSUB-connector is needed for the connection of the external signal lines.**

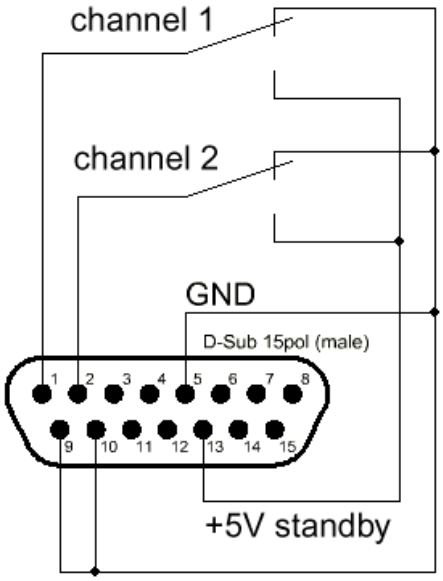
5 Function configuration for the DIO-Module (NSetup software tool)

The internal functions of the DIO-Module such as,

- Switching the device on and off
- Prevent switching on the IPC
- Display on and off, or display save mode
- Blocking and releasing the touch screen or operating buttons
- Switching the relay
- Setting and resetting an internal counter

can be done using a configuration file which is loaded with a command line tool or configured using the graphical ”NSetup” tool.

5.1 Wiring examples



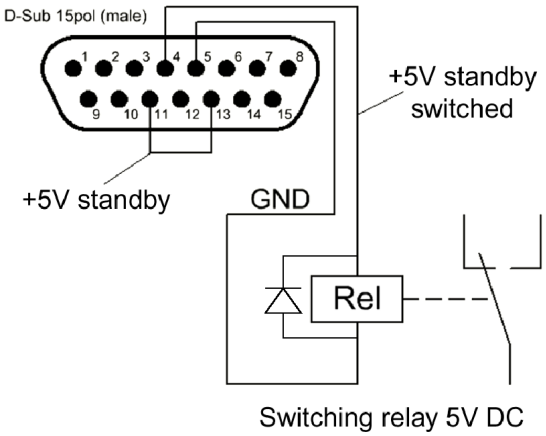
The input wiring of the DIO-connector in the accompanying example can be used for many applications.

Channel 1 of the DIO can be connected to a contact which produces the travel signal of a forklift. When idle, the changeover contact is in the inactive position and applies a LOW-level (GND) and in travel operation this contact is switched and applies a HIGH-level (+5 V standby) on channel 1.

The second channel can be connected to a key switch which applies a HIGH-level to the input port when activated.

The travel signal and the key switch therefore control the IPC directly.

Fig. 1 Wiring example 1 (input) of the DIO-connector



The output wiring in the example can be used for switching an additional relay with deleting diode (connected in parallel).

The relay of the DIO is activated with the output contact.

For this reason the IPC can switch other loads on- or off.

Fig. 2 Wiring example 2 (output) of the DIO-connector

5.2 Selectable functions

Function	No.	Comment
IPC power on	01	The IPC is activated from the standby-mode
IPC power off	02	The IPC is switched off. ***ATTENTION***: Data will not be saved and open files are not closed!
IPC shutdown (ATX)	03	The function performs a shutdown using the operating system and therefore the IPC shut down in a controlled way (ACPI/APM must be supported by the operating system)
Display off	10	The display of the IPC is switched off
Display on	11	The display of the IPC is switched on
Display save mode	12	The display of the IPC is activated. The brightness of the backlight is reduced; the display appears darker
Touch disable	20	Inputs using the touch screen are not accepted and transferred to the operating system.
Touch enable	21	The touch screen processes all inputs and transfers them to the operating system
IPC power on disable	22	The IPC can no longer be switched on using the buttons or the ”TouchPowerOn”-function
SFK disable	30	All IPC buttons are deactivated (SFK = special function keys)
SFK enable	31	The functions of the buttons are activated (SFK = special function keys)
Output disable	40	The relay on the DIO-assembly is activated; the normally open-contact is connected electrically
Output enable	41	The relay on the DIO-assembly is deactivated; the normally closed-contact is connected electrically
Counter reset	50	An internal counter (increments from 0) is set to 0. This counter can be interrogated via the serial port using commands (NxCOM).
Counter set	51	An internal counter (increments from 0) is set to the value of the parameter 1 or parameters 2 and is decremented every second. This counter can be interrogated via the serial port using commands (NxCOM).

Only a change of the input-state (level change) from active to inactive (or vice versa) executes the selected function. A pulse or level change at the DIO input always must be longer than the configured delay time in order to trigger an action.

5.3 Configuration example

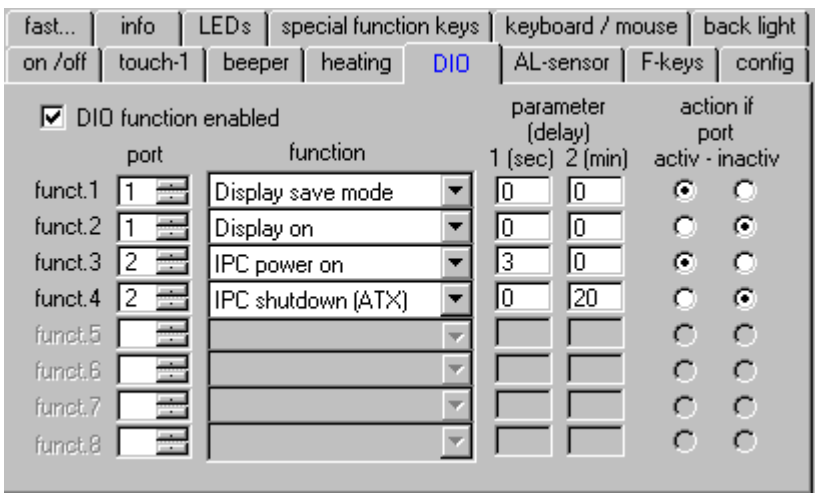


Fig. 3 Example for configuration of the DIO functions

The Figure 3 shows the ”DIO” tab of the NSetup application with the configuration for Example 1. A contact for the travel signal of a forklift and a contact for the starter key are connected to the IPC in this example.

Travel signal at the Input 1: The functions 1 and 2 are controlled by the input-channel 1 and are assigned with the functions for the display. An active input signal (HIGH-level at the input port 1) immediately switches the display into screensaver mode; an inactive signal (LOW-level at the input port 1) switches on the display with full brightness. So an irritation of the driver by the display can be avoided during the travel operation.

Key switch at the input 2: Functions 3 and 4 switch the IPC on or off via the input port whereby an active signal (HIGH-level at the input 2) switches on the IPC after 3 seconds; an inactive signal (LOW-level at the input port 2) shuts down the IPC after 20 minutes (parameter 2) and then switches off. The IPC can be started automatically with the key switch. Also the IPC is not automatically driven down (key switch removed) after a long work interruption.

ⓘ Several functions can also be switched with one channel. For example, with one input port the touch screen is disabled and the IPC shut down automatically after a specified time.

5.4 Other application examples

Key switch disables touch screen: In order to avoid unauthorized access to the IPC, the touch screen can be disabled with a key switch contact.

Battery check disables switching on the IPC: Switching on the IPC can be prevented with a signal to the DIO so that Batteries of battery-powered vehicles are not completely discharged.

Travel signal activates additional lights: Additional lights at the relay-output of the DIO can be activated with an input signal and the cut-out delay for the run-on lights can be used when the vehicle is stopped.

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