

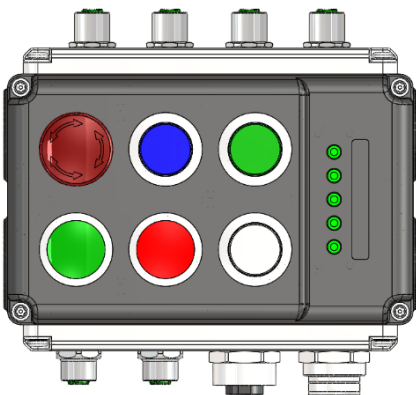


IDEM Safety Switches

NET-BOX-PS

RFID Guard Interlock with additional Safety IO, Standard IO, and integrated PROFINET with PROFIsafe.

Operating Instructions

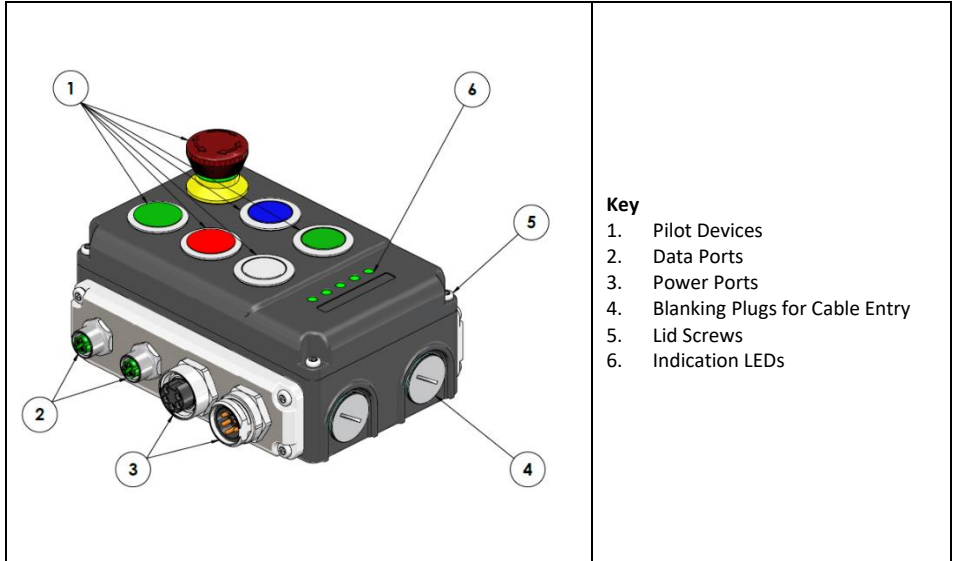


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1. System Overview

NET-BOX Switch Body



2. Safety Functions

	<p>IMPORTANT</p> <ul style="list-style-type: none">• It is the responsibility of the user to ensure the correct overall functionality of its systems and machines. IDEM its subsidiaries and affiliates are not in a position to guarantee all of the characteristics of a given system or product not design by IDEM.• All relevant safety regulations and standards are to be observed.
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The NET-BOX-PS complies with the requirements of Cat. 4 / PL e and SIL 3 in accordance with ISO 13849-1, IEC 62061 and IEC 61508. The device implements the following safety functions:

- **Emergency stop** function (optional, see part number options).
- **Safe Inputs** monitoring of up to 3 additional safety devices, OSSD inputs or voltage free contacts (with test pulses).
- **Safe Outputs** control of single dual channel output.


3. Installation & Maintenance

Principle


The NET-BOX device is designed to be fitted near a guarded access point where a mix of safe and standard IO control functions are required. The NET-BOX is fitted with an (optional) E-Stop and can monitor external dual channel safety devices that are equipped with either voltage-free contacts (NET-BOX provides test pulses) or OSSD outputs. A single dual channel output is also provided for safe control of an actuator.

	<p>WARNING DO NOT DEFEAT, TAMPER, OR BYPASS THE SAFETY FUNCTION. FAILURE TO DO SO CAN RESULT IN DEATH OR SERIOUS INJURY.</p> <p>NE PAS DESACTIVER, MODIFIER, RETIRER, OU CONTOURNER CETI, INTERVERROUILLAGE IL PEUT EN RESULTER DES BLESSURES GRAVES DU PERSONNEL UTILISATEUR.</p> <ul style="list-style-type: none">• Observe the county-specific regulations when installing the device.• Repair or modification of the NET-BOX is not allowed unless authorised by IDEM and carried out according to operating guidelines.• Safety critical failures which do not lead to the safe state shall be reported to IDEM immediately.• Replace a malfunctioning NET-BOX immediately.
	<p>NOTES REGARDING  US :</p> <ul style="list-style-type: none">• Maximum Temperature 40°C





Fastening

	<p>IMPORTANT</p> <ul style="list-style-type: none">• The tightening torque to ensure reliable fixing is 4.0Nm.
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Maintenance Activities

	<p>IMPORTANT</p> <ul style="list-style-type: none">• To achieve the target safety level, it is required to routinely check the safety functions are operating correctly. For applications targeting PLe a check should take place once per month, for PLd applications a check should take place once per year.• If any part of the NET-BOX displays mechanical damage then remove and replace.• IDEM will not accept responsibility for failure of the switch functions if the installation and maintenance requirements shown in this document are not implemented.
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4. Electrical Connection

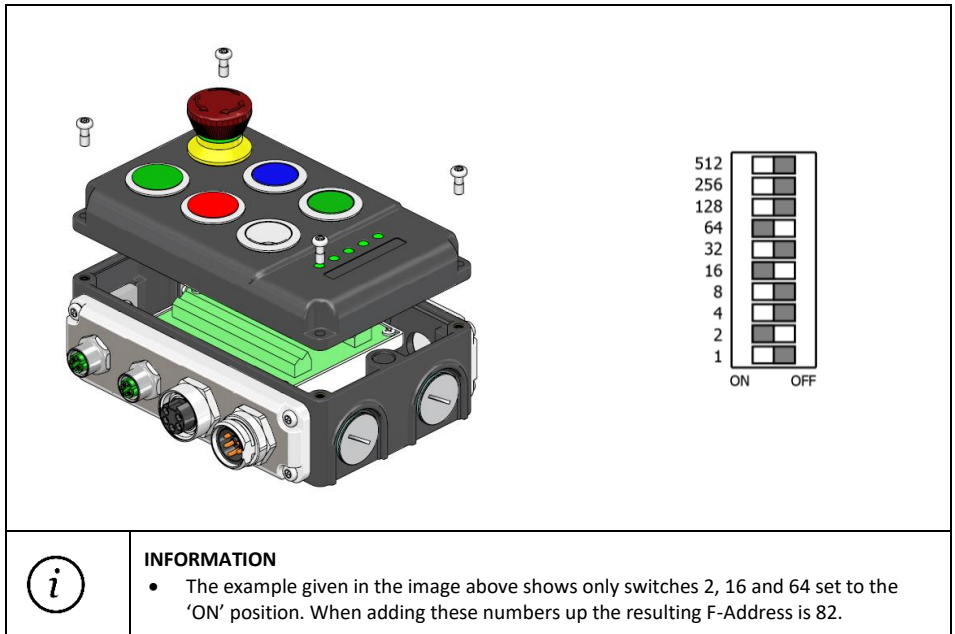
	<p>WARNING</p> <ul style="list-style-type: none">• The device shall be supplied by a 24V SELV/PELV power supply acc. to IEC 61131-2 which limits the maximum voltage in case of failure to 60V.• Function Earth must be connected. <p>NOTES REGARDING  :</p> <ul style="list-style-type: none">• To meet the requirements for UL a class 2 power supply must be used.
	<p>INFORMATION</p> <ul style="list-style-type: none">• When multiple devices are used in a daisy-chain arrangement the power bus may be forwarded via the NET-BOX device. See technical specification and ensure the total current through each device does not exceed the specified maximum current.
	<p>INFORMATION</p> <ul style="list-style-type: none">• Not all connections are required for all applications, the minimum requirement to operate the device is one data connection and one power connection. All 4 ports are utilised when the NET-BOX is used a 'daisy chain' configuration.



5. Protocol Setup

PROFIsafe F-Address assignment using DIP Switch

To adjust the device PROFIsafe 'F-Address' the DIP switches located inside the NET-BOX are used. The following steps can be performed with the device powered on or off, note the final step if the device is powered.

- Remove the lid screws and turn over the NET-BOX Lid to locate the DIP switches (see below).
- Using a small tool push the required switches to the 'ON' position to set the corresponding bit.
- The address is given by adding the values of the DIP switches in the ON position.
- Cycle power to the NET-BOX **OR** press and hold the reset button until the LEDs turn red then release to reset the device.
- The NET-BOX will restart with the configured F-Address.
- Replace the NET-BOX Lid and Lid screws, ensuring a tight seal of the lid.



	<p>WARNING</p> <ul style="list-style-type: none">• The minimum time between the change of a single safe digital input and the transmission to the safety fieldbus is 6 ms. In case of an input level change at all 6 safe digital inputs at the same time, the maximum safe application reaction time is 16 ms (approx. 2 ms processing time per changed input).• The maximum operation time (proof-test interval) of the NET-BOX shall not exceed 20 years. When reaching the proof test interval the NET-BOX shall be replaced and put permanently out of order.• Error bits reported by the NET-BOX via PROFIsafe shall not be used to trigger the safety function of a device or system.• Only use configuration files provided directly by IDEM.• After the detection of a safety critical error, the NET-BOX shall not be kept in fail-safe state for more than 1 hour.
	<p>INFORMATION</p> <ul style="list-style-type: none">• The device GSDML file can be found via the NET-BOX product page of the IDEM website www.idemsafety.com/products or alternatively please contact technical@idemsafety.com

PROFINET/PROFIsafe Configuration

Download the GSDML file for the NET-BOX and import into the application control software.

The NET-BOX, once connected, will be discoverable on the network. The device name can be set, allowing the control software to integrate the NET-BOX into the system. Ensure the PROFIsafe F-address set on the NET-BOX DIP switches matches the configured F-Address setting for the specific NET-BOX device in the control system.

Device replacement

If the topology of the devices within the PROFINET system is defined by the control system, automatic device replacement may be possible:

1. Remove the existing device, taking note of the DIP switch positions.
2. Copy the DIP switch settings to the new device.
3. Ensure the new device has been factory reset (See 5.3.) and does not contain a device name (new devices are delivered in this state).
4. Connect the replacement device to the same port as its predecessor.
5. Wait while the PROFINET systems finds and configures the replacement device before normal operation is resumed.

To manually replace a NET-BOX device:

1. Record the device name of the NET-BOX to be replaced.
2. Remove the existing device, taking note of the DIP switch positions.
3. Copy the DIP switch setting to the new NET-BOX.
4. Fit the new device in place, install power, and network connections then apply power.
5. Using the control software, find the new NET-BOX device on the network and assign the same device name as the replaced device.
6. Wait while the PROFINET systems finds and configures the replacement device before normal operation is resumed.

Factory reset

Please consult the instruction manual of the application control software or for further assistance please contact technical@idemsafety.com

Functional Tests

Once the device has been installed and setup within the PROFINET/PROFIsafe application control software the following checks are necessary to ensure correct operation of the system.

- Expected operation of all control circuits.

6. Data Map

See configuration specific technical datasheet supplied with product. For assistance please contact: technical@idemsafety.com

7. Diagnostic Indication



LED	Function	Colour
DS	Device state	Red/Green
PS	PROFIsafe	Red/Green
PN	PROFINET/Network	Red/Green
L1	Link 1	Amber/Green
L2	Link 2	Amber/Green

LED	LED State	Comment
DS	Green	Device running
	Red	Internal fault detected
PS	Green	PROFIsafe OK
	Green Flash	PROFIsafe Integration required
	Red	Safe input fault detected, reset qualifier bits
PN	Off	Not initialised
	Green	Normal operation
	Green flash 1Hz	Locate PROFINET device
	Green 1 flash	Diagnostic event present
	Red	Exception
	Red 1 flash	Configuration error
	Red 2 flashes	IP address not set
	Red 3 flashes	Station name not set
Red 4 flashes	Internal error	
L1/L2	Off	No Ethernet link detected
	Amber	Ethernet link detected
	Amber flash	Ethernet data transfer

	<ul style="list-style-type: none"> Diagnostic LED's are not reliable indicators and cannot be guaranteed to provide accurate information. They should only be used for general diagnostics during commissioning or troubleshooting. Do not attempt to use LEDs as operational indicators.
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8. Technical

Device Characteristics

Response time (Safety Inputs)	36 ms max. (Change of input state -> transmission to field bus)
Response time (Safety Outputs)	7.7 ms max. (field bus telegram recv'd -> change of output state)

Electrical Data

Operating voltage	24 V DC +10%/-15% (SELV/PELV)
Power Supply UL Requirements	Class 2 power supply must be used.
Current consumption, max.	250 mA (excluding Standard Outputs and Safety Outputs).
Allowed through current (daisy-chain)	5 A

Standard Inputs

Input Rated Voltage	24V DC
Input Rated Current	2 mA

Standard Outputs

Output Rated Voltage	24V DC (sourced from power connectors)
Output Maximum Current	500 mA single / 1.5 A group (OUT1..4 / OUT5..8)

Test Outputs

Parameter	Unit	Min	Typ.	Max
Voltage Test Output High	V	19.2	24	30
Voltage Test Output Low	V	--	High Z	--
Current Test Output High	mA	--	100	100
Current Test Output Low	mA	--	--	0.5
Short Circuit Peak	A	9	17	28

Safety Inputs

Parameter	Unit	Min	Typ.	Max
Voltage Digital Input High	V	15	24	30
Voltage Digital Input Low	V	-3	0	5
Current Digital Input High	mA	2	5	15
Current Digital Input Low	mA	0	--	15

Safety Outputs

Parameter	Unit	Min	Typ.	Max
Voltage Digital Output High	V	19.2	24	30
Current Digital Output High	mA	--	--	500
Current Digital Output Low	mA	--	--	0.5
Inductive Load	H	--	--	0.5
Capacitive Load	uF	--	--	1
Short Circuit Peak	A	2	5	8

Mechanical Data

Housing material	PBT
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Environmental Data

Operating temperature	-25 °C to 40 °C
Enclosure Protection	IP 65
Maximum operating altitude	2000 m
Shock and Vibration	Tested in accordance with: IEC 60068-2-6 and IEC 60068-2-27
Pollution Degree	Degree 2 (EN 60664) (Storage and Operation)

Reliability / Safety Data (EN ISO 13849-1)

Category	4
Performance Level	e
MTTFd	High
DC	>90%

Reliability / Safety Data (EN 62061 / IEC 61508)

Mission Time	20 years
SIL CL	SIL 3
PFHd (Emergency Stop Function)	2.3E-9
PFHd Safety Inputs (voltage free contacts with test pulses)	2.4E-9
PFHd Safety Inputs (OSSD inputs to device)	2.4E-9
PFHd Safety Outputs	2.4E-9



EC / EU Declaration of Conformity

ADDRESSES:
MANUFACTURER:
IDEM SAFETY SWITCHES LIMITED
Hindley Industrial Estate
Hindley Green
Wigan
Lancashire
WN2 4HR
United Kingdom

EU REPRESENTATIVE:
IDEM SAFETY SWITCHES Ro SRL
Bloc OD6, nr. 35
Bulevardul Timișoara
București
061344
Romania

DEVICE(s): NET-BOX

THE LISTED DEVICES CONFORM TO THE ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF THE FOLLOWING EUROPEAN DIRECTIVES AND STANDARDS

DIRECTIVES: Machinery Directive 2006/42/EC
EMC Directive 2014/30/EU

STANDARDS: EN 13849-1 :2015
EN 13849-2 :2012
EN 62061 :2015
EN 61508 (Parts 1-7) :2010
EN ISO 14119 :2013
IEC 60947-5-3 :2013

THIRD PARTY APPROVALS:

TUV Rheinland Industrie Service GmbH
Am Grauen Stein
51105 Köln / Germany



(Notified Body for Machinery, NB 0035)

M.Mohtasham
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Managing Director