

SWD[®] ez-Config

Configuration Software for SWD[®]

OPERATING INSTRUCTIONS

Version 1.1.x-a – Original version

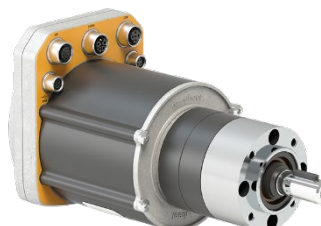
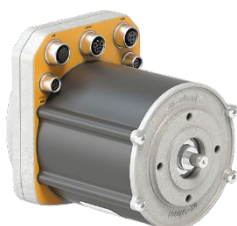


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 Please read this document carefully before using the product for the first time.

1. Introduction

1.1 Who are these operating instructions intended for ?

These operating instructions are intended for qualified personnel involved in the configuration, commissioning, and maintenance of **Safety Wheel Drive (SWD®)** systems, including system integrators, AGV / AMR developers, and maintenance engineers. Basic knowledge of CAN / CANopen communication and functional safety concepts is required.

1.2 Terms of use

SWD® ez-Config is a configuration software tool used to parameterize **SWD®** via CAN communication. Safety-related parameters must only be configured by qualified personnel and validated as part of the overall system risk assessment.

1.3 Additional resources

The following documents are available:

- Datasheets
- Instruction manuals, operating instructions and technical specifications of IDEC devices
- General brochures

	https://github.com/IDEC-ezWheel
	https://ez-wheel.com/en https://ez-wheel.com/en/resources
	https://www.idec.com https://www.idec.com/en-us/mobility-solutions/motorization-for-automation
	PCAN-USB drivers (PEAK-System) https://www.peak-system.com/support/downloads/drivers/

1.4 Important information about these operating instructions

	Important information – Read carefully
	Tip
	Additional information

1.5 Terminology

A dictionary of the acronyms used in these operating instructions can be found below.

Dictionary of acronyms:

AMR	Autonomous Mobile Robot
DCF	Device Configuration File - File containing the full configuration of a device
FW	Firmware - Internal software running on the device
OS	Operating System
PC	Personal Computer
SWD	Safety Wheel Drive: Motorized wheel drive unit with integrated safety functions
CAN	Controller Area Network: Industrial communication bus
CANopen	Communication protocol based on CAN

SYNC	Synchronization message used in CANopen networks
EMCY	Emergency Message: Indicates a critical error
SDO	Service Data Object: Point to point communication for configuration
PDO	Process Data Object - High priority real time CANopen messages
RPDO	Receive Process Data Object (RX)
TPDO	Transmit Process Data Object (TX)
SRDO	Safety Related Data Object: Redundant message for safety communication
SCT	Safety Cycle Time - Refresh cycle for SRDO communication
SRVT	Safety-Related Validation Time - Maximum allowed interval between valid SRDOs
SSW	Safety Status Word - Safety status information returned via SRDO
SCW	Safety Control Word: Safety command word used within SRDOs.
STO	Safe Torque Off
SBC	Safe Brake Control - Safe brake activation control
SBU	Safe Brake Unlock – Disabling SBC
SDI	Safe Direction Indication
SLS	Safely Limited Speed
SLSa	Safely Limited Speed – Asymmetric. Variant of Safely Limited Speed
SMS	Safe Maximum Speed. Maximum permitted safe speed
I/O	Input/Output
DC	Direct Current
USB	Universal Serial Bus
M12	Industrial M12 circular connector standard
PCB	Printed Circuit Board

1.6 Disclaimer

The technical information included in these operating instructions is subject to change. We decline all responsibility for the completeness, timeliness, or accuracy of the data and illustrations provided.

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2. Product overview

SWD ez-Config® is a graphical configuration tool used to connect a PC to a **SWD®** via CAN and to configure operational parameters, CANopen communication, and safety-related functions.

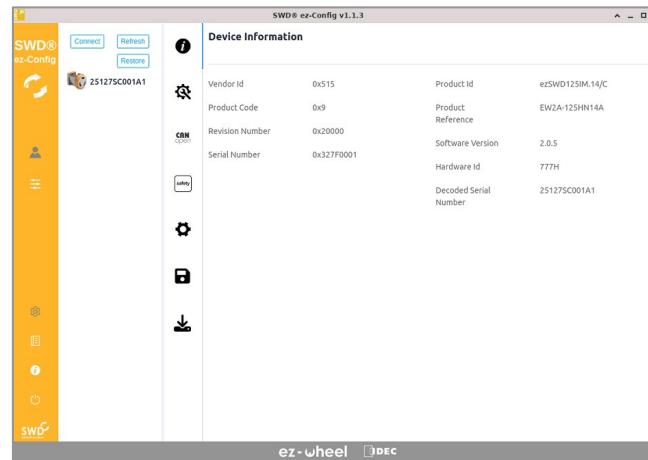


Figure 1: SWD® ez-Config Overview

2.1 Benefits

- Windows and Linux versions available
- Graphical User Interface, with intuitive experience
- Centralized configuration of **SWD®** parameters and key information

2.2 Compatibility

- OS Windows 10 and Windows 11 (64 bits)
- OS Ubuntu 20.04 Focal Fossa / 22.04 Jammy Jellyfish / 24.04 Oracular Oriole (x86-64bits)

2.3 Requirements

- PC with compliant OS installed
- **SWD®** powered at 24 VDC
- **SWD®** Diag and Config Pack (EW9Z-2DCP1) cables
- PCAN-USB driver

2.4 Key features

- Device information
- Device Configuration
- CANopen configuration
- Safety functions configuration
- Read-Write CANopen dictionary objects
- Import and export **SWD®** configuration files (.DCF)

2.5 Technical specifications

SWD ez-Config® is a configuration tool and does not replace system-level safety validation. Please save your configuration before any changes.

We advise keeping **SWD®** firmware up to date, and to store its configuration. Configuration may be lost during firmware update.

3. Installation

3.1 Wiring

Plug the **SWD®** Diag and Config Pack (EW9Z-2DCP1) from your PC to the **SWD®** CAN connector, as shown below:

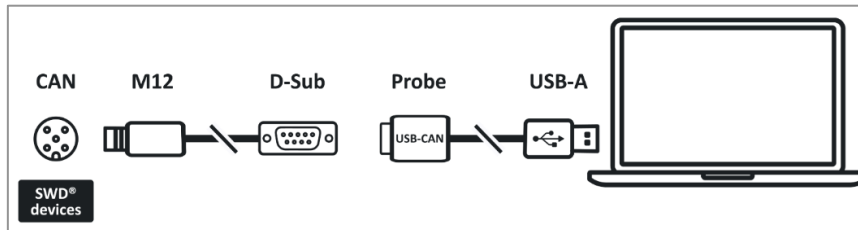


Figure 2: Wiring synoptic

3.2 Windows OS

- [Download](https://www.peak-system.com/support/downloads/documentation/) Windows device Driver and install it. For details, please refer to the PCAN-USB User Manual on the website <https://www.peak-system.com/support/downloads/documentation/>.
- Download Windows version of **SWD ez-Config®**.
- Run the executable "**SWD_ez-Config_*.*)_x64.exe**", with a double-click.

💡 It can take a few seconds to start-up the application.

3.3 Linux OS

- Download Linux version of **SWD ez-Config®** and make it executable.
- Update and install packages, load can modules, set-up CAN interface. Then, run the program (double-click).

```
chmod +x ./SWD_ez-Config_*.*)_x86_64.AppImage
sudo apt update
sudo apt upgrade
sudo apt install can-utils
sudo apt install libfuse2t64 libnss3 libasound2t64 -y
sudo modprobe can
sudo modprobe can_raw
ip link show
sudo ip link set can0 up txqueuelen 1000 type can bitrate 1000000 restart-ms 100
```

💡 Check you can interface name, "ip link show" describes the names of the interfaces. It can differ from "**can0**" to "**CAN0**" for instance or "**can1**".

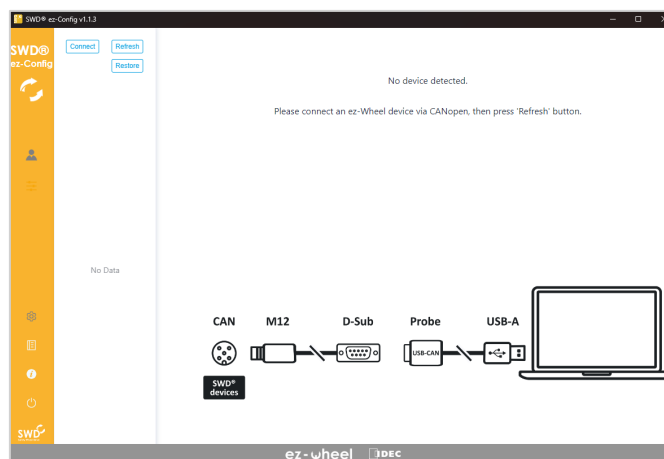


Figure 3: SWD® ez-Config Start-up

4. Usage

4.1 Navigation Menu

	Open "Connect Configuration" to setup CAN interface, Bittate, and Node-ID.
	Reconnect SWD® .
	Write the default parameters from factory to the SWD® .

Table 1: Connect, Refresh, Restore buttons description

	Log report	Shows the logs of everything that happened in the application since it has been opened.
	About	Shows the version and general information about the application.
	Quit	Click and confirm to exit the application.

Table 2: Log, About, Quit icons description

4.2 Connection to SWD®

- Click "Connect" button on top left and set up the configuration according to your application:

Figure 4: Connection Configuration example

Connect configuration		
Host (read-only)	127.0.0.1	
CAN Interface	can0 / CAN0	
Bittate	1 Mbps	
Node-ID:	SWD® default value from factory:	10
	SWD® Left:	4
	SWD® Right:	5

💡 Don't connect 2 **SWD®** with the same Node-ID at the same time on the CAN bus.

Once “confirm” button has been clicked and the connection with the **SWD®** is established a “Success” Pop-up will appear.

If the connection with the **SWD®** is established:

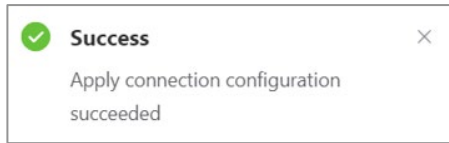


Figure 5: "Success" Connection Pop-Up

Otherwise:

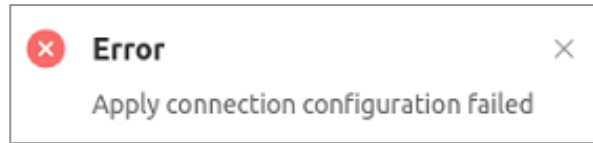


Figure 6: "Error" Connection Pop-Up

The "Device Information" tab will appear by default. Different tabs are available, as shown in the table below:

Device Information	Display device information.
Device Configuration	Display or change basic device configuration such as rotation direction, velocity, PID, etc.
CANopen Configuration	Display or change CANopen configuration such as Node-ID, bitrate, PDO, SDO, etc.
Safety functions – Safe motion configuration	Display or change safety function configuration such as STO, SLS, SDI, etc.
CANopen Object Tool	Display or change the value of CANopen objects by specifying its address.
Export Device Configuration	Read all values from SWD® and save it to DCF (Device Configuration File).
Import Device Configuration	Read values from DCF and write them to SWD® .

4.3 Device Information

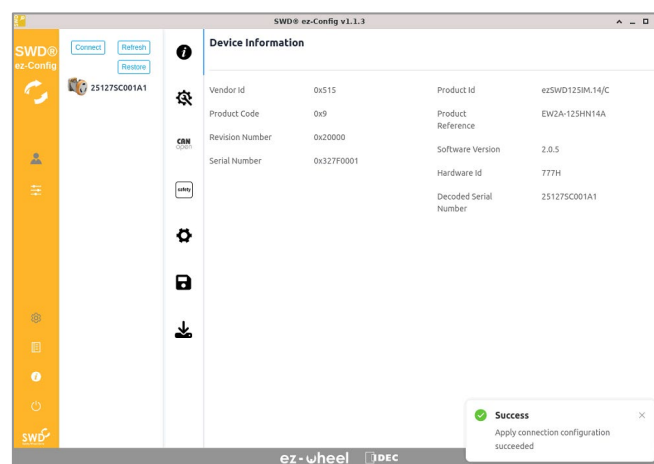


Figure 7: Device Information example

Vendor Id	SWD® manufacturer using a unique vendor identifier.
Product Code	SWD® vendor-defined code that specifies the product type or model.
Revision Number	SWD® revision.
Serial Number	SWD® serial number
Product Id	SWD® mechanical characteristics
Product Reference	SWD® reference identifier

Software Version	SWD® firmware version.
Hardware Id	SWD® version of the Printed Circuit Board (PCB).
Decoded Serial Number	SWD® decoded serial number.

4.4 Device Configuration

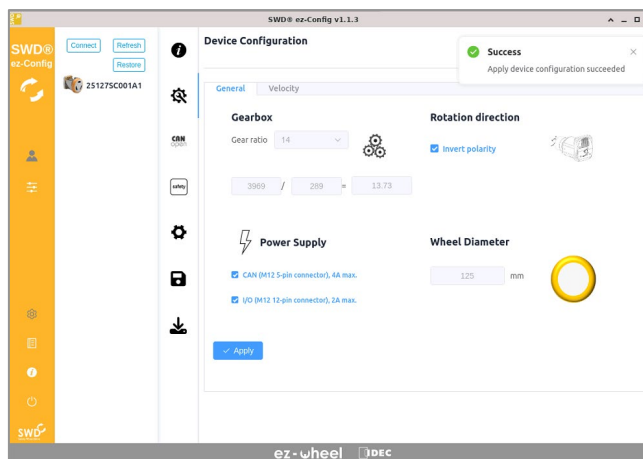


Figure 8: Device Configuration

Gear ratio	The ratio between motor rotation and output shaft rotation.
CAN	Enables or disables the 24V DC output power supply (4A) of CAN connector.
I/O	Enables or disables the 24V DC output power supply (2A) of I/O connector.
Invert polarity	Enables or disables the inversion of the motor rotation direction.
Wheel Diameter	The wheel diameter (<i>if available</i>)

Velocity Max	The maximum motor speed in RPM motor before gearbox.
Velocity Min	The minimum motor speed in RPM motor before gearbox.
Acceleration delta speed	The rate of speed increases during acceleration.
Deceleration delta speed	The rate of speed decreases during acceleration.
Quick stop delta speed	The rate of speed decreases during quick stop.
Proportional	The proportional gain that adjusts motor control.
Integral	The integral gain that compensates accumulated speed error.
Derivative	The derivative gain that stabilizes motor control by responding to speed changes.
Integral anti-windup time constant	The time constant that limits excessive accumulation of the integral term.
Derivative filter time constant	The time constant of the filter applied to the derivative term to reduce noise.

4.5 CANopen Configuration

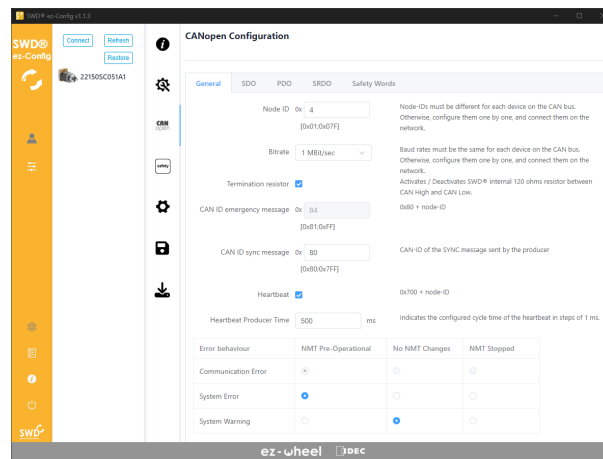


Figure 9: CANopen Configuration, General

Node ID	SWD® unique node identifier.
Baudrate	SWD® communication speed (1 Mbit/sec. by default).
Termination resistor	SWD® internal CAN bus termination resistor (enabled or disabled).
CAN ID emergency message	SWD® CAN identifier used for transmitting emergency (EMCY) message.
CAN ID sync message	SWD® CAN identifier used for SYNC message.
Heartbeat	SWD® heartbeat function for CANopen state machine monitoring (enabled or disabled).
Heartbeat Producer Time	SWD® time interval to send heartbeat message.
Communication Error	SWD® behavior when a CAN communication error is detected.
System Error	SWD® behavior when a system error is detected.
System Warning	SWD® behavior when a system warning is detected.

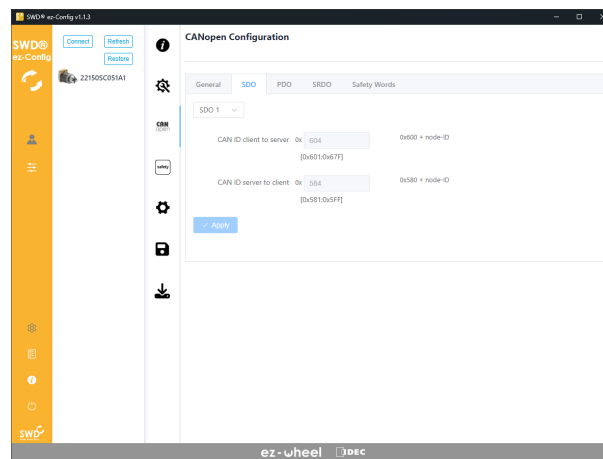


Figure 10: CANopen Configuration, SDO

CAN ID client to server	SWD® CAN identifier used for SDO request from the client to the server.
CAN ID server to client	SWD® CAN identifier used for SDO answer from the server to the client.

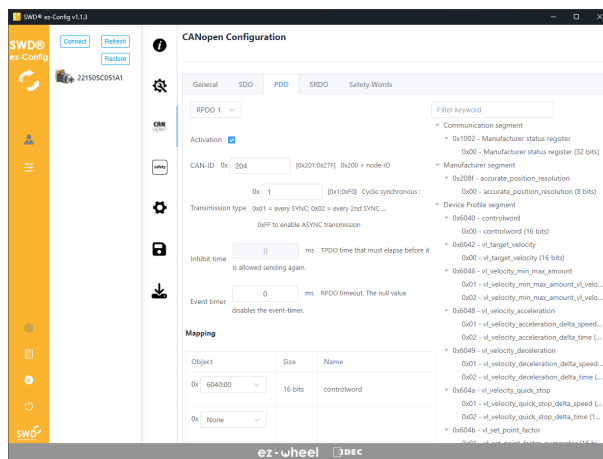


Figure 11: CANopen Configuration, PDO

Activation:	Enables or disables the selected PDO.
CAN-ID:	CAN identifier used for this PDO communication.
Transmission type	Defines when the received RPDO data is applied or when the TPDO is transmitted.
Inhibit time	Minimum time that must elapse before the PDO can be transmitted again.
Event timer	Time interval triggers periodic PDO transmission.
Mapping	Objects that are mapped into the PDO.

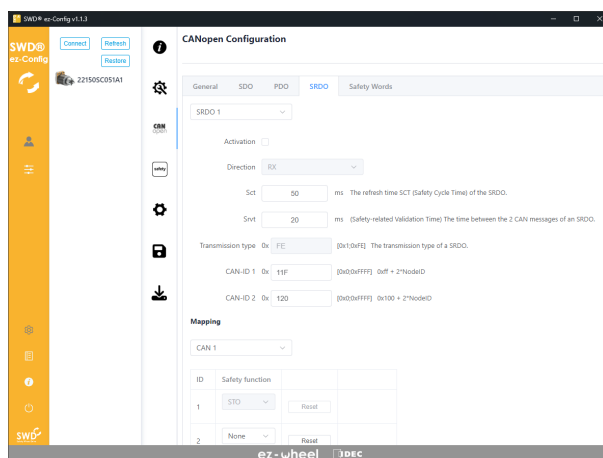


Figure 12: CANopen Configuration, SRDO

Activation	Enables or disables the selected SRDO.
Direction	Communication direction of the SRDO.
SCT	Safety Cycle Time defines how often the SRDO is refreshed.
SRVT	Safety-Related Validation Time defines the maximum allowed interval between SRDO messages.
Transmission type	Defines SRDO transmission type.
CAN-ID 1	1 st CAN identifier used for SRDO communication.
CAN-ID 2	2 nd CAN identifier used for redundant SRDO communication.
Mapping	Objects that are mapped into the SRDO.

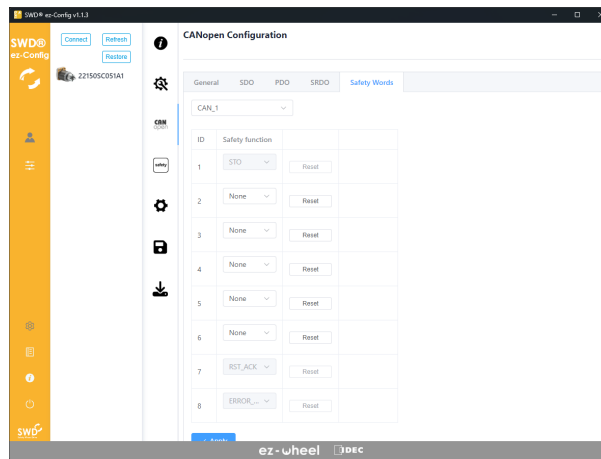


Figure 13: CANopen Configuration, Safety Words

The objects mapped into the SCW (Safety Control Word) and SSW (Safety Status Word) are used for SRDO.

4.6 Safety Functions – Safe Motion Configuration

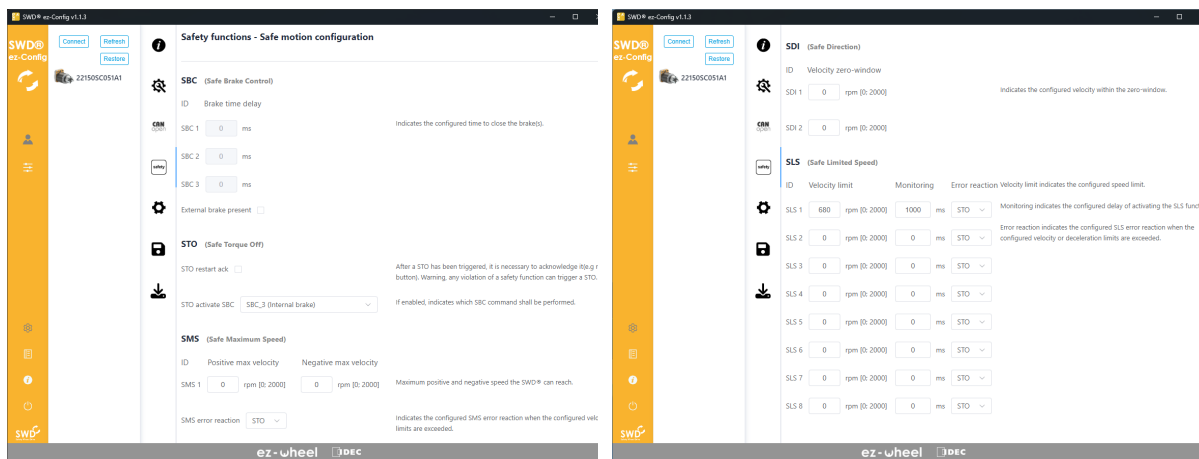


Figure 14: Safety Functions – Safe Motion Configuration

Brake time delay	Time delay used to close the brake after a stop occurred.
External brake present	Enables or disables external brake. It can only be used for SWD ® equipped with an external brake.
STO restart ack	Defines whether an acknowledgment is required to restart after STO is cleared.
STO activate SBC	Defines whether the SBC is activated when STO is triggered.
Positive max velocity	Maximum allowed positive velocity monitored by the SMS.
Negative max velocity	Maximum allowed negative velocity monitored by the SMS.
SMS error reaction	Safety reaction when SMS velocity limits are exceeded.
Velocity zero-window	Speed range considered as zero speed for SDI.
Velocity limit	Speed limit monitored by the SLS.
Monitoring	Time tolerance used to trigger the violations of the SLS.
Error reaction	Safety reaction when the SLS or SLSa limits are exceeded.
Positive Velocity	Speed limit in the positive direction used for SLSa.
Negative Velocity	Speed limit in the negative direction used for SLSa.

4.7 CANopen Object Tool

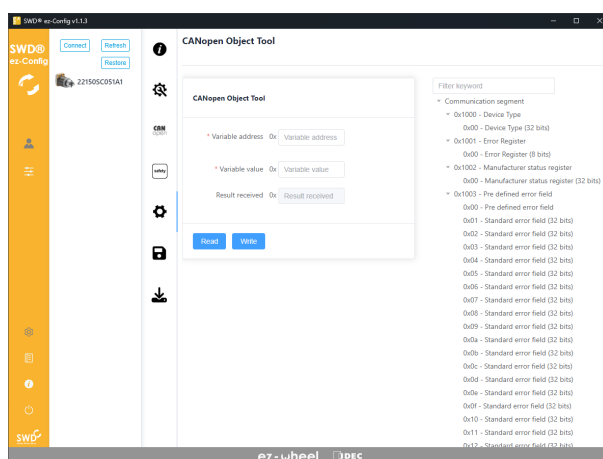


Figure 15: CANopen Object Tool

Variable address	The address to read/write value. e.g. 1000:00 or 2155:00.
Variable value	The value of writing to object when you click Write button.
Result received	The value read from SWD® when you click Read button.

4.8 Writing settings to SWD®

Modify parameters and click Apply to write settings to the device.

⚠ Any changes in the tabs below, must be followed by clicking “Apply” button before changing view, or changes may be lost:

	Device Configuration
	CANopen Configuration
	Safety functions – Safe motion configuration
	“Apply” button at the bottom of each page

💡 Once the settings have been written, a "Success" pop-up will be displayed.

4.9 Export (Read) SWD® configuration

It is possible to export current **SWD®** parameters to a Device Configuration File (.DCF format).



It reads the current settings from the **SWD®** and saves them into a file.

When the "Export Device Configuration" dialog box appears, enter a "File name" and click "Save". If the exports of the settings was a success, a “Success” Pop-Up message appears:

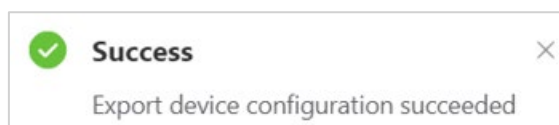


Figure 16: Export Configuration

4.10 Import (Write) SWD® configuration

It is possible to import a configuration to commission a **SWD®** from a Device Configuration File (.DCF format).



It writes the contents of the selected configuration file to the **SWD®**.

⚠ Writing starts immediately after file selection. No confirmation dialog is displayed.

If the import of the settings was a success, a “Success” Pop-Up message appears:



Figure 17: Import Configuration

5. Appendices

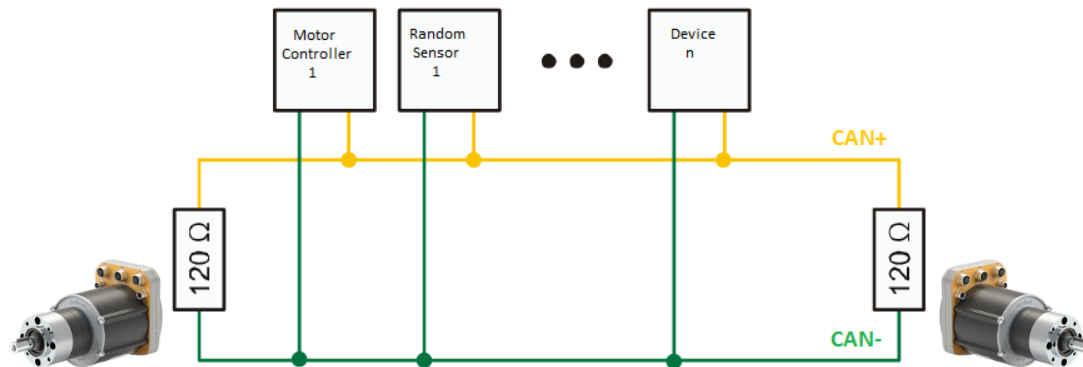


Figure 18: CAN bus synoptic

6. Troubleshooting

Verify CAN interface configuration, wiring, termination resistors, and firmware compatibility if connection issues occur.

Close the software, unplug the PCAN-USB device from your PC, then plug it back in and restart the application.

7. Modification history

Revision	Release date	Changes
V1.1.x-a	April 2026	First release