

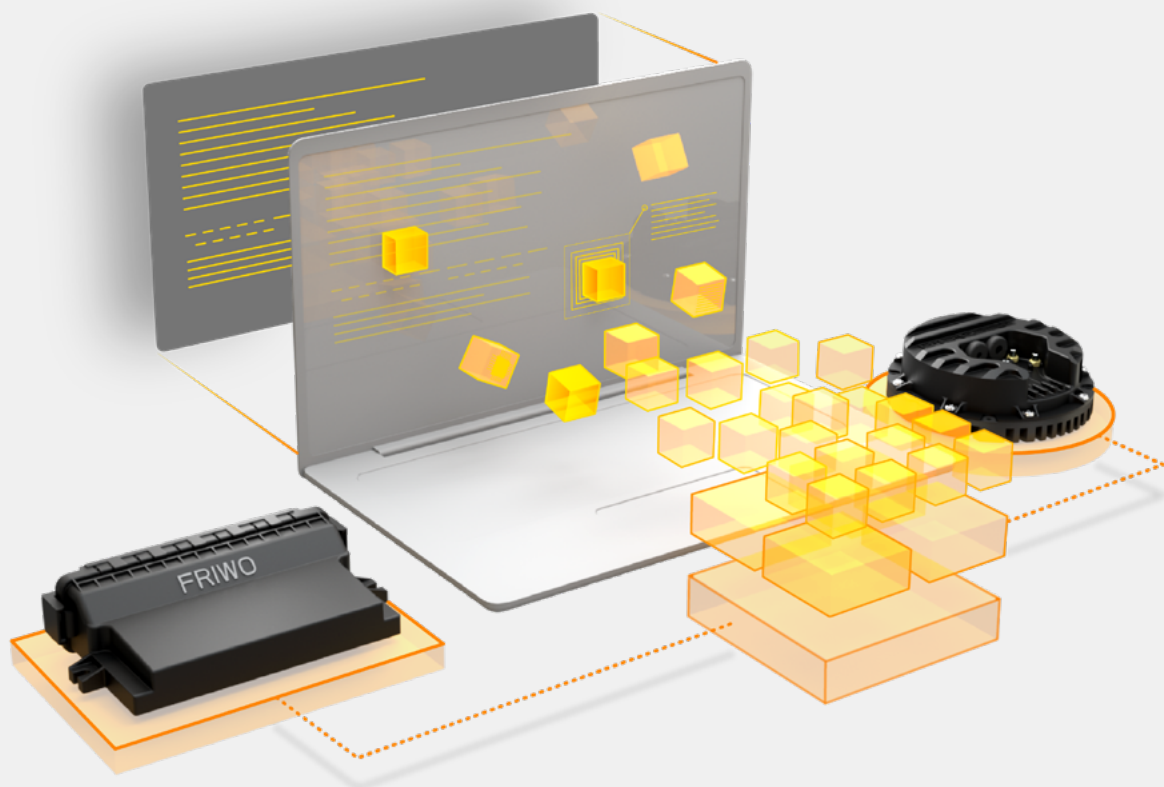


SOFTWARE DEVELOPMENT KIT

End-to-end Development Environment Setup Solution

MANUAL

Version 1.0



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4 Copyright

The content of this document is protected and may not be used, not even in part, for own publications and implementations. Exceptions require written approval.

5 Safety Information, Terms of Use and Liability Waiver

Warning!

Using the motor control unit referenced in this document can be dangerous. Please follow instructions it with extreme caution. Stop your application work if you encounter unexpected behavior.

Terms of use

1. Scope of the Terms of Use

1. FRIWO Gerätebau GmbH, von-Liebig-Str. 11, 48346 Ostbevern, Germany, ("FRIWO") offers a platform that allows Customers, among other things, to get access to the Developer Platform (means access to all software or parts of the software relating to the battery management System „BMS“, motor control unit „MCU“ etc.) of FRIWO to obtain a license to use the Software Development Kit („SDK“), provided by FRIWO. These Terms of Use ("**Terms of Use**") govern exclusively the legal relationship between FRIWO and the Customer, or the entity the Customer is representing, regarding the access to the Developer Platform and the use of .
2. FRIWO operates the Developer Platform for businesses only and does not accept consumers within the meaning of § 13 of the German Civil Code as Customers.
3. Customer, in case of an individual, warrants that he is lawfully able and has the capacity to enter into contracts (e.g. he is not a minor). If a person is entering into this agreement as a representative for an entity, such as the company for which the Customer is working for, such person warrants to FRIWO that their company is duly organized, validly existing and in good standing under the laws of the country in which it is organized or incorporated and that he has legal authority, permission, resolution or power of attorney to bind that company.
4. Terms and conditions of Customer or of third parties that deviate from or conflict with these Terms of Use, shall not apply, even if FRIWO does not expressly contradict these terms and conditions of the Customer.
5. FRIWO is entitled to commission any service from third parties (including Affiliates of FRIWO) acting as subcontractors.
6. The Listing of a Product by a Customer via the Developer Platform is not in the scope within these Terms of Use and requires a separate agreement between FRIWO and the Customer.

2. Subject Matter

1. FRIWO provides the access to the Developer Platform and the use of the on the basis of these Terms of Use.
2. The Developer Platform is a platform with various via which a Customer can, inter alia, influence or control a connected electronic control system such as motor-controllers, battery-managament-units or other general electronic control devices.
3. As far as the Developer Platform and the are provided free of charge, there are no warranties and there is no right to access or use the Developer Platform and the

without interruption. FRIWO does not warrant that the access to the Developer Platform will not be impaired by downtime, maintenance activities, further developments, updates and upgrades or malfunctions. FRIWO will use reasonable efforts to ensure that the Developer Platform are as user-friendly as possible. Technical malfunctions (e.g. interruption in the electricity supply, hardware and software errors, and technical problems in the data lines) also can, however, give rise to temporary restrictions or interruptions.

3. Account, Users and Notices

1. The access to the Developer Platform requires an Account. Customer must provide certain information required by FRIWO to open an Account ("**Registration**").
2. The data requested by FRIWO at the time of the Registration must be stated completely and correctly, e.g. company name, current address, VAT identification number (if applicable), telephone number, valid e-mail address and a representative's name ("**Registration Data**"). The Registration of a legal person may only be carried out by an authorized natural person, who must be mentioned by name.
3. By submitting Registration Data, Customer is making FRIWO an offer to conclude a contract based on these Terms of Use. After submitting the Registration Data, these are validated by FRIWO for completeness and plausibility. If the Registration Data is correct, FRIWO shall decide on whether to accept Customer's offer at FRIWO's own discretion. If Customer's Registration is not confirmed by FRIWO by e-mail to the e-mail address provided by Customer within a reasonable time, Customer shall no longer be bound by the offer. If an e-mail confirmation is received, an limited user relationship shall be established, according to the length of the term chosen by the Customer, on the basis of these Terms of Use and Customer shall be entitled to use the Developer Portal in accordance with these Terms of Use.
4. In particular, Customer is responsible for Customer's Users' compliance with the obligations set out in Section 4.
5. All notices will be sent in electronic form to the email address associated with the Account.
6. Customer is liable for all activities performed under Customer's Account, to the extent that he is responsible for them.

4. Customer's Duties

1. Customer is obliged to provide in due time reasonable cooperation required from him. Therefore Customer is
 - obliged to immediately change all initial passwords which are assigned to him into passwords known only to the Customer. Customer is required to carefully store Customer's Access Credentials and protect them from unauthorized access. If a Customer becomes aware that a third party has used Customer's Access Credentials, he is required to notify FRIWO immediately;
 - obliged to correct the information in Customer's Account immediately, if, after the Registration, the indicated data changes.

2. Customer shall not (and shall procure that any User under Customer's Account shall not):
 - Intentionally access, tamper with, or use non-public portions of the Developer Portal or the technical delivery systems of FRIWO;
 - Use any robot, spider, scraper, or other similar automated data collection or extraction tools, program, algorithm or methodology to search, access, acquire, copy or monitor any portion of the Developer Portal other than via documented API endpoints;
 - Post or transmit any file which contains viruses, worms, Trojan horses or any other contaminating or destructive features, or that otherwise interfere with the proper working of the Developer Platform;
 - Attempt to decipher, decompile, disassemble, or reverse-engineer or otherwise attempt to discover or determine the source code of any software or any proprietary algorithm used, comprising or in any way making up a part of the Developer Portal;
 - Attempt to probe, scan or test the vulnerability of the Developer Portal or breach or impair or circumvent any security or authentication measures protecting the Developer Portal;
 - Frame or mirror the Developer Portal; or
 - Use any device, software, or routine that interferes with any application, function, or use of the Developer Portal or is intended to damage, create undue load, detrimentally interfere with, surreptitiously intercept, or expropriate any system, data, or communication stored or transmitted therewith.
3. Customers' access to the Developer Portal and the use of it shall comply with all applicable laws, including copyright or trademark laws, antitrust and competition laws, export control laws, data protection laws, or other laws in any applicable jurisdiction or be in contravention of any agreement that the Customer has signed with a third party. Customer is responsible for making sure that its access to the Developer Portal and the use of is in compliance with the applicable laws and regulations.

5. Usage Rights, Intellectual Property, Open Source

1. FRIWO owns all right, title, and interest in and to the Developer Portal and all related technology and intellectual property rights. It is not permitted to remove notices and notations on the Developer Portal that refer to confidentiality, copyrights, trademark rights, patent rights and other intellectual property rights. FRIWO hereby grants to Customer the timely limited, non-exclusive, non-sub-licensable, revocable and non-transferable right to access the Developer portal solely in accordance with this Terms of Use.
2. By using the Developer Portal Customer agrees that FRIWO is allowed to implement an error reporting to make statics of the error feedbacks. Personalised data will not be evaluated or saved. The provisons of section 9 hereto shall apply.

3. The Customer agrees that FRIWO is allowed to save a copy of the code which was programmed by the Customer. For further explanation please refer to the Quick Start Guide.
4. Provided that FRIWO makes new versions, updates, upgrades, modifications or extensions of the Developer Portal available or carries out other changes with respect to the Developer Portal, the provisions of Section 5 shall also apply thereto.
5. The Customer is only entitled to download Content and to print out Content, if there is a possibility to download or print Content as a functionality on the Developer Platform (e.g. by means of a download or print button).
6. Customer shall have no rights which are not explicitly granted to the Customer under these Terms of Use. Customer shall not be entitled to use the Developer Platform beyond the scope of use granted in these Terms of Use or make the Developer Platform available to third parties. In particular, it is not permitted to duplicate the Developer Platform and the or to provide it for use for a limited period of time, in particular not to lease it or loan it.
7. If Customer violates any of the provisions of this Section 5, FRIWO shall be entitled to and reserves the right to terminate Customer's access to the Developer Portal in accordance with Section 8, provided that such suspension remedies the violation. Customer shall be informed prior to such suspension. In case of repeated violations by the Customer, FRIWO shall be entitled to terminate the Account for cause, unless Customer is not responsible for the violation.
8. Free and Open Source Software (FOSS) components including the applicable FOSS license conditions used within the Developer Portal shall be illustrated on the Developer Portal, if providing via software as a service requires explicitly the fulfilment of FOSS license obligations.

6. Liability

1. FRIWO shall be liable in accordance with the statutory provisions
 - in the event of intent or gross negligence;
 - in accordance with the provisions of the German Product Liability Act or any applicable corresponding mandatory laws;
 - within the scope of a guarantee given by FRIWO; and
 - for loss of life or bodily injury/harm.
2. In the event of any property and financial damage caused negligently in any other way, FRIWO and persons engaged by it for the performance of its obligations shall be liable only in the event of a breach of a material contractual obligation, the amount being limited, however, to the damages foreseeable at the time of acceptance of these Terms of Use by the Customer and typical of the type of contract; material contractual obligations are those obligations which are necessary to the fulfillment of these Terms of Use, upon which the Customer may therefore rely ("**Material Obligation**").
3. Notwithstanding the provision in Section 6.1, in the event of a negligent breach of a Material Obligation evidenced by Customer, the amount of FRIWO's liability for all damaging events occurring in the same contract year is limited to 100% of the fees incurred under the Account of the Customer in the year of the damaging event,

however, at least Euro 50,000 per contract year. A contract year shall be the 12-month period starting on the date of Registration and every subsequent twelve-month period.

4. No-fault liability for damages per § 536a BGB shall be excluded for defects that existed at the time of conclusion of these Terms of Use.
5. FRIWO shall not be liable for loss of data **personal injury or damage of property caused by misuse of the program or by use of improper settings.**
6. Furthermore, FRIWO's liability is excluded.
7. The foregoing limitations of liability shall also apply in the event of fault by a person engaged by FRIWO in the performance of its obligations and to the personal liability of employees, representatives and corporate bodies of FRIWO.

7. Indemnification

1. The Customer is obligated to indemnify, defend and hold FRIWO harmless for and from any third party claims related to
 - any breach of this Terms of Use, the Use Policy or any violation of any applicable law or regulation by the Customer;
 - the incorrect use of the Developer Portal or software in particular but not limited to the misuse of the software program or by use of improper settings
 - the usage of the Developer Portal or the by the Customer in a manner in which it infringes or violates any third-party rights;
 - the use of Open Source Software by the Customer;
 - any infringement of data protection law respectively applicable or other data protection law relevant stipulations as agreed between the Parties herein or in another context by the Customer or through Customer Content;
 - any violation of applicable export and re-export control laws and sanctions regulations by the Customer; unless Customer is not responsible for the claim.
2. FRIWO shall notify the Customer without delay and leave to the Customer the defense of these claims. FRIWO will provide the Customer with all reasonable support. In particular, FRIWO will, as far as possible, provide the Customer with all the necessary information of the use and the possible processing of the Developer Portal , which are subject to this Terms of Use.

8. Term and Termination

1. The term of this Terms of Use commences with the date of Registration and will remain in effect until terminated by FRIWO or by the Customer.
2. Termination for Convenience
 - The Customer may terminate this Terms of Use for any reason and close the Account for all , for which FRIWO provides an account closing mechanism by providing three (3) months' notice effective at the calendar month-end in a case of an annual runtime. In a case of a monthly runtime the Customer shall provide a fourteen (14) days notice effective at the calendar month-end.

- FRIWO may terminate this Terms of Use for any or no reason, at any time, by providing one (1) month notice effective at the calendar month-end.
- 3. The right of the Parties to terminate these Terms of Use for cause and without notice shall remain unaffected. Good cause shall be in evidence when one Party grossly breaches express obligations under these Terms of Use, in particular if the Customer utilizes the Developer Portal outside the scope of these Terms of Use and remains in breach after the end of a reasonable cure period following a warning notification by FRIWO.
- 4. Effect of Termination
Upon the effective date of termination
 - the Developer Portal will no longer be accessible;
 - the Customer remains responsible for all fees and charges which have incurred through the date of termination, including fees and charges for in-process tasks completed after the date of termination; and
 - all authorizations of the Customer according to these Terms of Use end.

9. Data Privacy

1. The Parties shall comply with the provisions of data protection law respectively applicable and bind their employees engaged in connection with this contractual relationship and the execution thereof to data privacy and confidentiality in accordance with the applicable laws, except to the extent that they are already under a general obligation to act accordingly.
2. FRIWO processes personal data in accordance with the Developer Portal.

8. Collection of General Data and Information

1. The online-network infrastructure and software program collects a series of general data, electronic-control-unit-specific data and information when a data subject or automated system uses the program. This general data, electronic-control-unit - specific data and information are stored in the server log files. Collected may be (1) the browser types and versions used, (2) the operating system used by the accessing system, (3) the website from which an accessing system reaches our website (so-called referrers), (4) the data of the connected electronic-control-unit, (5) the date and time of access to the online site, (6) an internet protocol address (IP address), (7) the Internet service provider of the accessing system, and (8) any other similar data and information that may be used in the event of attacks on our information technology systems.
2. When using these general data and information, FRIWO does not draw any conclusions about the data subject. Rather, this information is needed to (1) deliver the content of the software program properly, (2) grant or deny access to the data of the electronic-control-unit, (3) ensure the long-term viability of our information technology systems and website technology, and (4) provide law enforcement authorities with the

information necessary for criminal prosecution in case of a cyber-attack or violation of street-legal regulation. Therefore, FRIWO analyzes anonymously collected data and information statistically, with the aim of increasing the data protection and data security of our enterprise, and to ensure an optimal level of protection for the personal data we process. The anonymous data of the server log files are stored separately from all personal data provided by a data subject.

10. Confidentiality

1. The Parties agree to keep all Confidential Information that becomes known to them while accessing Developer Portal and using the strictly confidential and only use such information for the contractually agreed purposes. **"Confidential Information"** for the purpose of this use shall mean information, documents, details and data, which is marked as such or that reasonable should be understood to be confidential given the nature of the information.
2. If Confidential Information within the above definition is requested by a public authority, then the other Party – to the extent that it is legally allowed – shall be informed without delay and before the Confidential Information is supplied to the public authority.
3. The obligations under Section 16.1 shall lapse for such information or parts thereof with respect to which the Party receiving the information evidences that it
 - was known to that Party or generally accessible prior to the date of receipt or became known from a third Party after the date of receipt in a lawful manner and without any confidentiality obligation;
 - was already known to the general public or was generally accessible prior to the date of receipt;
 - became known to the general public or became generally accessible after the date of receipt without the party receiving the information being responsible for this,
 - has waived its right to confidentiality in respect of which the notifying Party has waived its right to confidentiality by means of a written declaration to the receiving Party.
4. Each Party may disclose Confidential Information to its employees and Affiliates if
 - this is necessary for the purpose of the fulfillment of these Terms of Use,
 - Confidential Information will only be disclosed to the extent that it is necessary for integration in these Terms of Use ("need to know"), and
 - the recipient of Confidential Information is obliged to maintain confidentiality in accordance with Section 16.5.
5. Each Party is obliged to commit employees and Affiliates within the meaning of Section 16.4 to maintain confidentiality in accordance with the provisions of Section 16.1 to 16.3 insofar as they are not already otherwise obliged to do so by virtue of contractual and/or statutory provisions to an extent that is at least equivalent to the level of protection resulting from Section 16.1 to 16.3.

6. The rights and obligations under Section 16 shall not be affected by the termination of an Account, and for as long as there is no evidence of an exception under Section 16.3.

11. Changes

1. At any time, FRIWO shall have the right to rebrand the Developer Portal, modify the online-network infrastructure, make new available either free of charge and/or for a fee and as well as to change these Terms of Use and the Use Policy. FRIWO reserves the right to modify these Terms of Use and the Use Policy. Customer shall be notified of changes by email no later than thirty (30) calendar days before the planned effective date of the changes. If Customer does not object within thirty (30) days of receipt of the notification, then the changes shall be deemed to have been effectively agreed as from the expiry date of the time limit. In the event of an objection, the contractual relationship shall be continued subject to the conditions applying hitherto. If an objection is raised, FRIWO is entitled to terminate these Terms of Use subject to a one (1) month notice period. Customer shall be advised of its right to object and of the consequences in the change notification.
2. Editorial changes to these Terms of Use, i.e. changes, which do not affect the contractual relationship, such as correcting typing errors, will be made without notifying the Customer.

12. Applicable law and place of jurisdiction

1. The contractual relationships between the Parties shall be governed by the laws of the Federal Republic of Germany. Application of the UN Convention on Contracts for the International Sale of Goods (CISG) is excluded.
2. The exclusive place of jurisdiction for any legal disputes arising from or in connection with these Terms of Use shall be Münster, Germany.

13. Miscellaneous

1. Force Majeure: Operational disruptions caused by force majeure or other unavoidable events beyond FRIWO's control,
 - which could not be averted with reasonable effort; and
 - which could not have been foreseen even when exercising with extreme care, and
 - which make FRIWO's obligations under these Terms of Use considerably more difficult or completely or partially impossible,

such as strikes, lockouts, exceptional weather conditions, operational or traffic disruptions and transport obstructions, discharge FRIWO from its obligations under these Terms of Use for the duration of such an event. Any statements or notifications to be made by Customer to FRIWO after Customer's acceptance of these Terms of Use

(e.g. setting of time limits, notification of defects) must be provided in text form in order to be effective.

2. Customer may not assign any or all portion of its obligations without the prior written consent of FRIWO, not to be unreasonably withheld.
3. Should any provision of these Terms of Use be or become invalid or unenforceable, this shall, however, not affect the remaining provisions.

FRIWO Gerätebau GmbH

6 General Information

6.1 Usage

The FRIWO Software Development Kit (FRIWO SDK) is an application for developing and generating software based on the standard firmware for FRIWO E-Mobility products. The FRIWO firmware is modular with a defined interface of inputs and outputs. This allows individual modules to be replaced by adapted variants of the module or completely new developments of the module.

The adapted modules are compiled together with the basic firmware and released as signed software via a connection to FRIWO servers. Thus, the software can be flashed to released FRIWO hardware. The flash process is not part of the SDK, but takes place in the **FRIWO Enable Tool**. <https://friwo.link/m/enable-tool>

The SDK is typically used for the following purposes.

6.1.1 Simple Modification

- FRIWO offers a standard version for each customizable module, as it is also included in the series software
- On this basis, minor adjustments of values and parameters are possible
- Only existing parameters are edited, there are no new variables created

6.1.2 New Feature Development

- New parameters are created, which can also be made available in the Enable Tool
- New functions are introduced, which consist of a combination of inports and change the behavior of the outports compared to the standard firmware.
- On request, additional inports can be enabled to develop software that enables features tailored to new use cases.

6.2 Nomenclature of parameters and measured values

This document describes parameters and measured values that influence or make measurable the behavior of the software at runtime.

The nomenclature is based on the following principle:

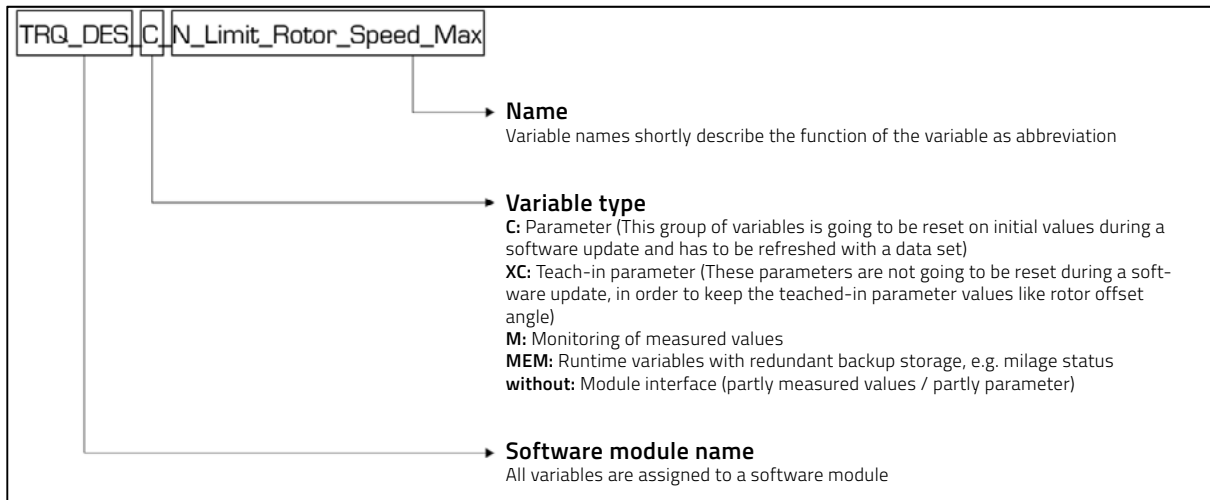


Figure 1: Variable education.

Parameters and measured values can be used, modified, or generated with the SDK. Before using the SDKs, read the corresponding module description of the modules used carefully.

6.3 Important notes on changing parameters



Changing parameters can have a negative effect on the behaviour of the controller. Please observe the following notes when making adjustments:

- Start your application work only after you have read this document and the module descriptions completely and understood the function of the parameters.
- Change parameters in as small steps as possible and avoid uncontrolled programming loops. Note that you are working on a real-time system!
- Great importance was attached to your safety during the development of the motor control software. Incorrect inputs are mostly intercepted and parameter changes are limited to safe values. This is usually done outside your module.
- Some parameters are monitored by superimposed protective functions, so that only limited changes are possible during motor operation.
- In order to protect you and your devices from damage, we limit your working space and the output variables inside the SDK. The warning and error handlers inside our FRIWO Firmware will always monitor the whole system. Due to security reasons the following ANSI C commands or structures are not allowed:
 - External Variables
 - External Functions
 - Any code that tries to access Registers
- Please be aware, that we cannot guarantee full protection when using custom code.

7 Installing the program on a Windows PC

7.1 System and Software Requirements

The SDK requires an x86-based PC with the following minimum requirements:

- Screen resolution: at least 1024 x 720 pixels.
- CPU: 1.8 GHz Intel Core Duo or better.
- Working memory: min. 2GB
- Hard disk capacity: Approx. 250MB
- Windows Operating Systems: Windows 7 or Windows 10 - You need local Administrator access!

Keil Compiler v4.7 incl. License, **please visit keil.com**
<https://friwo.link/m/keil>

7.2 Installation Guide

Please see our [SDK Quickstart Guide](https://friwo.link/m/quickstart) to install the software on your machine.

<https://friwo.link/m/quickstart>

7.3 The first compilation of your own software

Please see our [SDK Quickstart Guide](https://friwo.link/m/quickstart) to see how to compile a software for the first time on your machine.

<https://friwo.link/m/quickstart>

8 Features

8.1 Overview Graphical User Interface

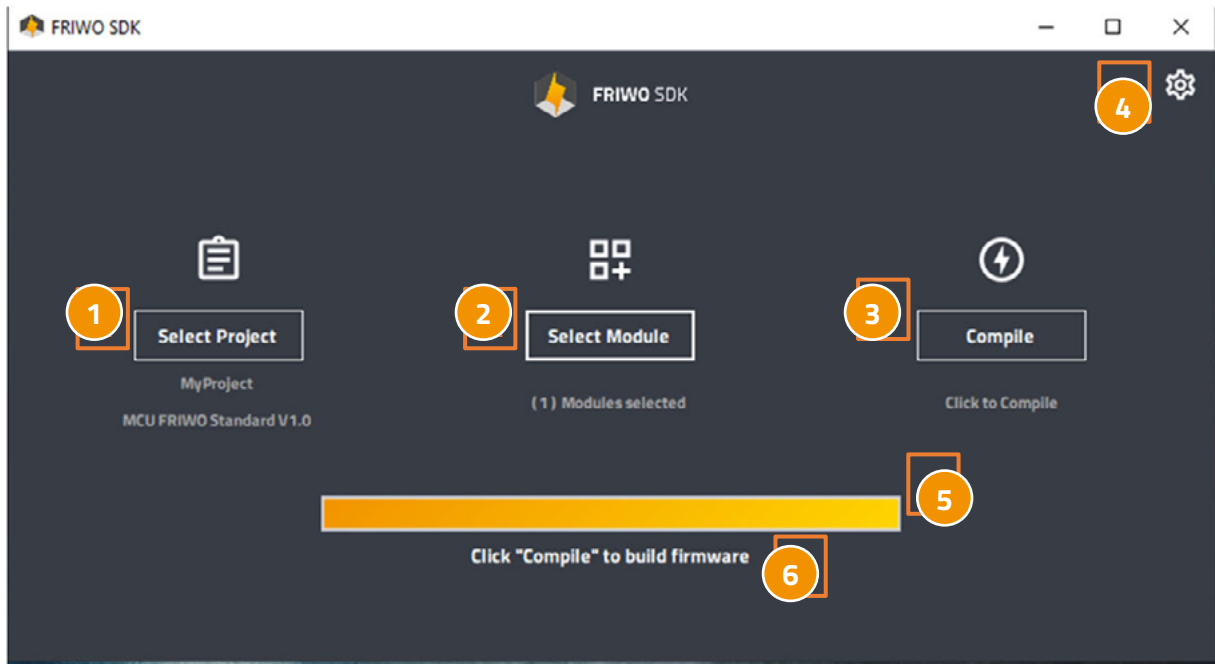


Figure 1: Main View graphical user interface

Features of the Main View of the graphical user interface	
element	description
1	Select Project: Here you load an existing project or create a new one, with different Frameworks.
2	Select Module: Choose the modules that you want to customize
3	Compile: Start the compilation process, if your project and modules are selected and you verified your code
4	Settings: Change different settings, like Keil Compiler location or error reporting.
5	Progress Bar: During the compilation process, it indicates the progress
6	Message Box: Shows what to do next, progress information during compilation and error codes if something went wrong

Table 1: Features of the Main View of the graphical user interface

When you click on "Select Project" in Figure 1, you will see the following view:

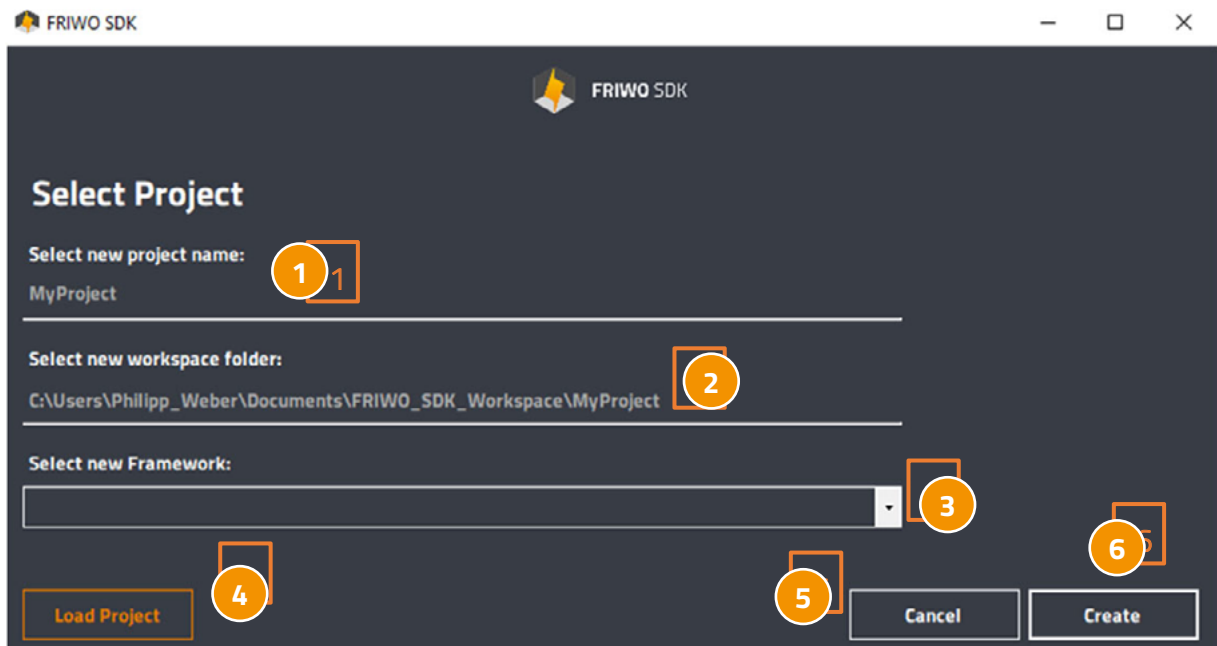


Figure 2: -Select Project- View

Features of the -Select Project- View	
element	description
1	Give your new project a name
2	Select the workspace folder, where you want to store all your project data including the generated software after compilation.
3	Select the Framework that you want to work with, in your project. Please see chapter 8.2
4	Load an existing project. Your framework, selected modules and code will be automatically loaded.
5	Cancel the select project process and go back to main view. Your last used project will be selected by default.
6	Create the new project & the view will automatically switch back to main view.

Table 2: Features of the -Select Project- View

When you click on “Select Module” in Figure 1, you will see the following view:

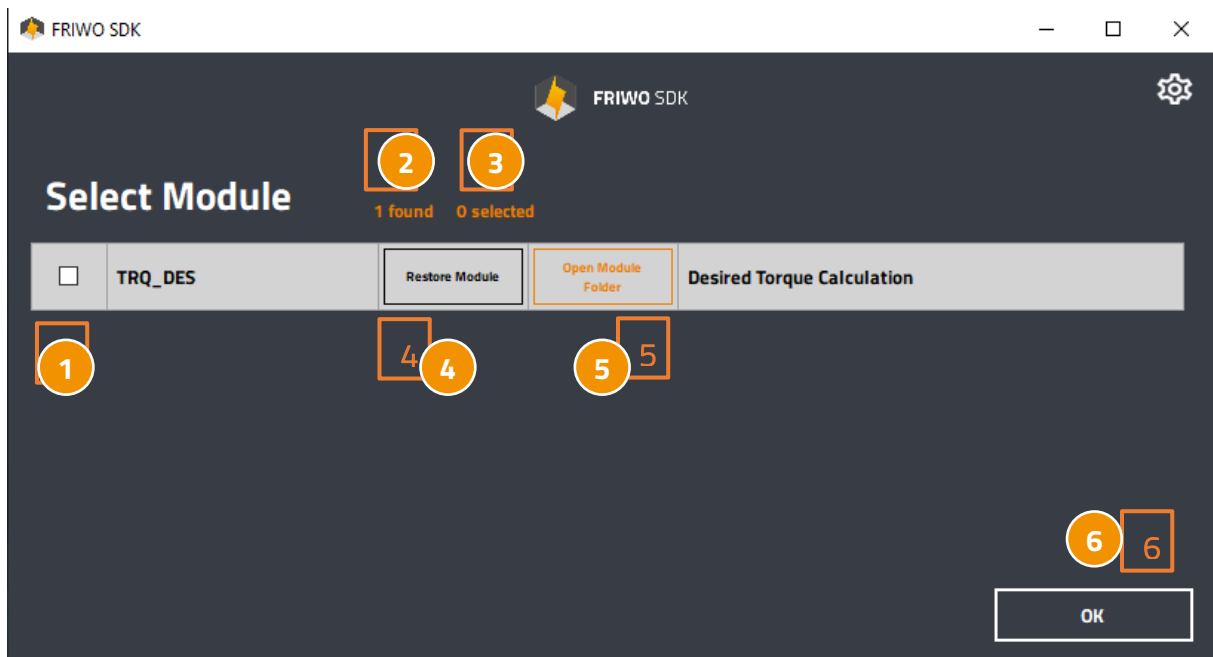


Figure 3: -Select Module- View

Features of the -Select Module- View	
element	description
1	When you select the module, it will use your custom code. If you select it for the first time, the default code will be copied to your workspace folder, see chapter 8.3. If you deselect the module, the default FRIWO firmware will be used for compilation.
2	Indication how many modules you are able to select. Equals the number of elements in the module list.
3	Indication how many modules you have selected.
4	Click on this button to overwrite your custom code with it's FRIWO Default. ATTENTION: This can't be undone! Your customized code will be lost!!
5	Click on this button to open the module folder inside your selected project
6	Press OK, to go back to the Main View.

Table 3: Features of the -Select Module- View

When you click on "Settings" in Figure 1, you will see the following view:



Figure 4: -Settings- View

Features of the -Settings- View	
element	description
1	You can select whether you want to report errors and statistic data to FRIWO or not. Per default it is activated. ATTENTION: We highly recommend to activate this option.
2	If checked, after the successful compilation process, the resulting firmware folder will be opened automatically
3	Select the path to your Keil Compiler. Per default it is located under: C:\Keil
4	Indication of the SDKs software version that you are using. Updates will be provided automatically, when available
5	Indicates your SDKs license number
6	Press OK, to go back to the Main View.

Table 4: Features of the -Settings- View

8.2 SDK Frameworks

An SDK Framework describes the setup, for which you want to write your software. It defines for which hardware you want to write your own software, and which basic series software version you want to build on. Every project can only have one framework.

8.3 SDK Workspace Folder

When you create a new project, a new project folder is created inside your SDK workspace. When you open the project folder, you should see something like this:




 FirmwareRelease	25.03.2021 15:12	Dateiordner	
 module_TRQ_DES	24.03.2021 14:14	Dateiordner	
 MyProject.sdkproj	25.03.2021 17:59	Friwo SDK Project ...	1 KB

Figure 5: Overview Project Folder

In the first folder „FirmwareRelease“ is your customized firmware stored, after the first successful compilation. In the “module_TRQ_DES” folder, your custom code of the module “Desired Torque – Trq_Des” will be stored. When you select the module for the first time in your project, this folder will be created automatically and filled with the standard series software. The file “MyProject.sdkproj” contains all project information and is named after the project. With a double-click on it, FRIWO SDK will launch automatically, when installed and load all project data from the last time you closed it. When you modify project data inside the SDK, it will be stored automatically in the project file. There can be multiple “module_XXX” folders, depending how many you have selected to be customized.

When you enter the FirmwareRelease folder, you should see something like this:




 100999054	24.03.2021 14:24	Dateiordner
 100999065	25.03.2021 15:09	Dateiordner
<input checked="" type="checkbox"/>  100999066	25.03.2021 15:12	Dateiordner

Figure 6: Firmware Release Folder

During the compilation process, your firmware will get signed by FRIWO License Servers and will obtain a software release number. Each folder stands for a successful compilation and is named after it's specific release numbers. Please do not change the folder name.

When opening the blue marked folder from Figure 6, the folder should look like this:





 Emerge_MC_V100999066.eef	25.03.2021 15:12	EEF-Datei
 Emerge_MC_V100999066.xml	25.03.2021 15:12	XML-Dokument
 VARIABLES_CONFIG_MC_DEV_V100999066.x...	25.03.2021 15:12	XML-Dokument
 VARIABLES_CONFIG_MC_SDK_default_V1009...	25.03.2021 15:12	XML-Dokument

Figure 7: Firmware Release Files

<https://friwo.link/m/enable-tool>

Here you can see, the flash file .eef, which you can use together with the **FRIWO Enable Tool** to flash your firmware onto your device. Using the XML files, you can load your custom view into the Enable Tool. Your custom variables that you previously declared inside the **SDK Application Guide** can be monitored or modified live.

<https://friwo.link/m/application-guide>

When you open the "module_Trq_Des" folder, you should see this:




 TRQ_DES_custom.c	24.03.2021 14:14	C Source
 TRQ_DES_custom.h	24.03.2021 14:14	C/C++ Header
 TRQ_DES_variables.xml	24.03.2021 14:14	XML-Dokument

Figure 8: Module Trq_Des Files

The folder in Figure 8 shows your customized ANSI C code in form of an .c and .h files. Furthermore, it contains an xml file, where the global variables are stored, that you can read and write. These variables are part of the FRIWO basic firmware and are used as interface to your module. They are specific for every module, for further information have a look at the [SDK Module Description](https://friwo.link/m/module-description).

<https://friwo.link/m/module-description>

8.4 Error Reporting

To constantly improve the features and user experience of our products. To provide you quick support or help you in case of errors, we upload per default log files to FRIWO servers. These log files contain some usage statistics and detailed information about the compilation process. During the compilation process the log output of the Keil Compiler itself is merged into the SDK log files. In order to provide you fast support and improve our software, we need these information.

8.5 SDK Update

When a new version of the SDK is available, you will be notified on the start of the SDK Application.

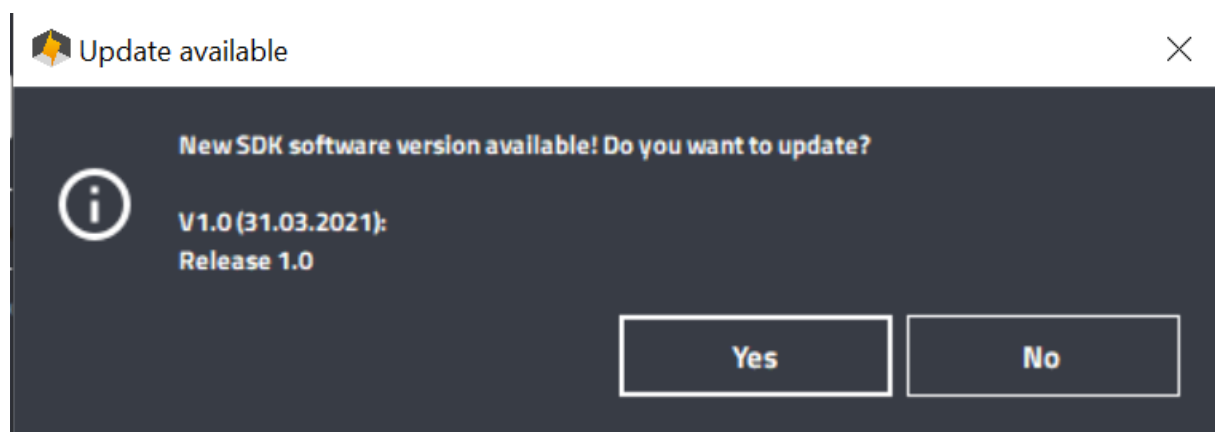


Figure 9: Confirm Update of SDK

Press "Yes" to update to the latest Applikation version. You don't have to do anything afterwards. All projects and configurations will be retrieved from the old version. The SDK will now download all necessary data from the FRIWO Servers. During this time, please do NOT shut down your computer or disconnect it from the internet!

After the successful download, you will see the following window:

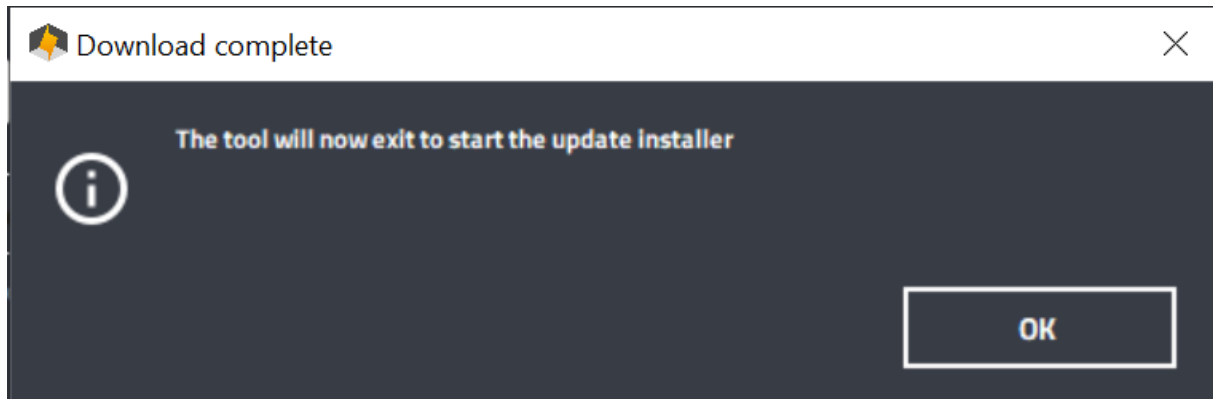


Figure 10: Download complete confirmation

<https://friwo.link/m/quickstart>

Now press „OK” to restart your SDK. The known FRIWO SDK Installer from the **SDK Quickstart Guide**. Will now start automatically and guide you as usual through the installation process. After successful installation process, the latest SDK version can be used.

9 Troubleshooting

The FRIWO SDK distinguishes between a variety of possible errors to be able to provide information on the cause of the error and to help you quickly correct the error.

9.1 Error codes

Table 5: Description of all error codes

Description of all error codes		
Error Code	Type	Description
1000	Server Error	-
1001	Server Error	NoOnlineConnection
2000	Client Error	-
2100	Client Error	FileSystemError
2101	Client Error	DirectoryNotFoundToCopy
2102	Client Error	FileNotFoundToLoadFramework
2103	Client Error	FailedToLoadFrameworkFile
2104	Client Error	FileNotFoundToLoadProject
2105	Client Error	FailedToLoadProjectFile
3000	Process Error	-
3100	Process Error	PreBuildError
3101	Process Error	ReleaseVersionError
3102	Process Error	ParameterVersionError
3103	Process Error	FirmwareVersionFileNotFoundError
3104	Process Error	FirmwareVersionFileFormatError
3105	Process Error	ModuleUserFileValidationFailed
3106	Process Error	ModuleUserDefaultFileNotExist
3200	Build Error	-
3201	Build Error	KeilPathError
3202	Build Error	PathMissing
3203	Build Error	CleanFailed
3204	Build Error	CopyFailed
3205	Build Error	CompilerInstructionFailed
3206	Build Error	LinkerInstructionFailed
3207	Build Error	CompilerRunFailed
3208	Build Error	LinkerExecutionFailed
3209	Build Error	HexBuilderRunFailed

3210	Build Error	PostBuildSrecordToolFailed
3211	Build Error	PostBuildToolsMissing
3212	Build Error	PostBuildCrcToolFailed
3213	Build Error	CompilerArgumentFileNotFound
3214	Build Error	CompilerPathNotSet
3215	Build Error	LinkerArgumentFileNotFound
3216	Build Error	LinkerPathNotSet
3217	Build Error	HexBuilderInputFileNotFound
3218	Build Error	HexBuilderPathNotSet
3300	Post Build Error	-
3301	Post Build Error	DeleteBuildFolderFailed
3302	Post Build Error	CreateBuildFolderFailed
3303	Post Build Error	CreateOutputFolderFailed
3304	Post Build Error	CopyHexFileFailed
3305	Post Build Error	CopyVersionFileFailed
3306	Post Build Error	LoadBasisVariableFileFailed
3307	Post Build Error	LoadAdditionalVariableFileFailed
3308	Post Build Error	VariableDuplicateError
3309	Post Build Error	LoadMapFileFailed
3310	Post Build Error	DefaultVariableConfigCreationError
3311	Post Build Error	ExtendVariableConfigError
3312	Post Build Error	FlashFileEefCreationError
3313	Post Build Error	FlashFileEefxCreationError
3314	Post Build Error	UNKNOWN_Exception
3315	Post Build Error	CopyBinFileFailed
3316	Post Build Error	VariablesNotFoundInCode
3400	Roll Out Error	-
3401	Roll Out Error	ReleaseVersionAlreadyExists
3402	Roll Out Error	UploadBuildInfoToDbFailed
3403	Roll Out Error	UploadBuildFilesFailed
3404	Roll Out Error	UploadSoftwareDescriptionFileFailed
3405	Roll Out Error	CopyBuildToWorkspaceFailed
4000	License Error	-
4001	License Error	NoSdkLicenseFoundBeforeBuild
4002	License Error	NoSdkLicenseFoundAfterBuild
4003	License Error	SdkLicServerErrorAfterBuild
4004	License Error	UsageDenied
4005	License Error	RegistrationSkipped



5000	Settings Error	-
5001	Settings Error	ProjectToFrameworkMismatch
5002	Settings Error	NoFrameworkForProject
5003	Settings Error	NoProjectFileLoaded
5004	Settings Error	SetupNotValid

10 Versioning

Versions of this document		
version	date	comment
V1.0	20210331	initial Document

Table 6: Versions of this document.

Feedback

We are working very hard to improve our products and therefore **feedback** is indispensable! Please send us your valuable feedback as contact form or via Mail to feedback@friwo.com



<https://friwo.link/m/feedback>

