Fuji Electric
Innovating Energy Technology

Starting guide

Software interface between Computer and Inverters

SG_Loader_Software_EN_1.0.1

Version	Changes applied	Date	Written	Checked	Approved
1.0.0	First version	18/06/2021	C. Arjona	J. Alonso JM Ibáñez	J. Català
1.0.1	Table 4.4 correction (combination G2+TP-E1U)	19/09/2022	C. Arjona	JM Ibáñez	J. Català

CONTENTS

0. Preface

This starting guide describes how to use the inverter support software FRENIC-Loader in the different versions. This guide does not cover the handling of inverters. For information on the handling of inverters, refer to inverter instruction manuals or user's manuals.

In this guide, the Microsoft Windows operating system is used as a standard.

Note

- If you use a folder name or file name that contains environment-dependent characters created in a Windows that differs from the language specifications of your Windows, you may not be able to read or write the file. Use folder and file names that do not contain environment-dependent characters.
- If the settings shown below are set in the Windows of use, the characters may protrude.
  - When the size of text or the like is set to a size larger than specified in the [Display] setting of the control panel.
  - In the Windows10, when the size of text or the like is set to a size larger than the specified size in [Settings] → [System] → [Display] settings.
- Some of the views may be in languages or fonts that depend on your Windows preferences.
- If you do not install language packs Microsoft.NET Framework Ver. 4.5 or higher, some of the displayed languages may become English.
- The resolution of the monitor is recommended to be 1920 × 1080 or more. Below that, the operability may deteriorate.
- Example screens shown in this manual might differ from actual displaying screen by the software version or specifications change.

1. Safety information

Prior to the use (including connection, wiring, operation, maintenance, inspection, etc.), be sure to read this instruction manual as well as the "RS-485 Communication User's Manual", inverter instruction manuals and user's manuals, as needed, to gain an understanding of how to handle the product and ensure correct use of related devices. Incorrect handling may hinder normal operation or result in inverter failure or shortening of product life.

Use your devices after ensuring a thorough understanding of device knowledge, safety information, and all related precautions.

Safety precautions contained in this instruction manual have been categorized as follows.

⚠WARNING	Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in death or serious bodily injuries.
⚠CAUTION	Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in minor or light bodily injuries and/or substantial property damage.

Failure to heed the information contained under the CAUTION title can also result in serious consequences. These safety precautions are important and must be observed at all times.

Wiring

⚠WARNING
• Before wiring the RS-485 ports and connecting the cables, ensure that the power is off (the switch is open). **Failure to observe this could result in electric shock.**

⚠CAUTION
• Before connecting wires to the RJ-45 connectors on the inverter (such as the RJ-45 connector for keypad connection, the RS-485 communication card's RJ-45 connector, and the inverter's RJ-45 connector for RS-485 communication), check the wiring of the devices to be connected. Refer to the "RS-485 Communication User's Manual" for details. **Failure to observe this could result in a failure.**

Operating Precautions

⚠WARNING

- Carefully note that resetting the alarm with the operation command on causes the inverter to start unexpectedly as soon as the alarm is cleared.
  Failure to observe this could result in an accident.

⚠WARNING

- If the loader goes down or is forcibly terminated during the operation with the test drive screen open, it will be impossible to stop the inverter operation with the loader. If this is the case, stop the inverter by doing one of the following:
  Failure to observe this could result in an accident.
  <How to stop the inverter when the loader goes down or is forcibly terminated>
  1) If an emergency stop switch is available, use the switch to stop the inverter.
  2) Turn off the inverter power.
  3) Turn off the inverter operation command and switch the inverter from "remote command mode" to "local command mode".
  More specifically, do one of the following:
  - Turn off the terminal to which the "LE" command is assigned.
  - Zero the data for the link function for support (function code: y99).
  - Zero the data for the link function (function code H30).
- Do not remove the RS-485 cable, USB cable, or keypad during the operation with the test drive screen open. Doing so would be dangerous because it would be impossible to stop the inverter operation with the loader.
  Failure to observe this could result in an accident.

2. Before use

The Loader is a software that supports remote operation of our inverters from a personal computer using the RS-485 communication port and the USB connection (including the connection via the TP-E1U Keypad), and is designed to operate on the Windows operating system.

Connection methods are different depending on the type of inverters to be connected. Check the relevant instruction manuals for the inverters and use the correct connection method. Table 2.1 lists the different options to connect the inverter with the computer, refer to section 4 of this document for detailed information.

Table 2.1. Different connection methods.

Number of connections	Terminal		Connection Methods
	PC side	Inverter side	
1:n (n = 1, 2, …, 32)	USB	RS-485	Connection via the USB/RS-485 converter[1]
	COM port (RS-232C)	RS-485	Connection via the RS-232C/RS-485 converter[1]
1:1	USB	TP-E1U[2] TP-E2, TP-A2SW[3]	Connection using the USB cable. If the TP-E1U, TP-A2SW or TP-E2 cannot be attached to the inverter, connect the keypad to the inverter using the LAN cable.
	USB	USB[4]	Connection using the USB cable.

*1) When using the RJ-45 connector, use a branch adapter for multi-drop connection from the second inverter onward.
*2) This connection is possible only for inverters that support the TP-E1U.
*3) This connection is possible only for inverters that support the TP-E2 or TP-A2SW.
*4) This connection is possible only for inverters with built-in USB port.

Note If the RS-485 (RJ-45 connector) is commonly used with the keypad connector for the inverter, the keypad must be removed from the inverter. If there are two different ports, they can be used at same time.

In case of common port, it is not possible to use the Loader with a PLC or other host devices at the same time. Before using the Loader, disconnect the connection cables to other host devices.

⚠ WARNING

- Be sure to turn off the power to the inverters and related devices before wiring or making RS-485.
  Failure to observe this could result in electric shock.

⚠ WARNING

- **Do not connect** the LAN terminal of the PC directly with the RJ-45 connector of the inverter using the LAN cable.

  The RJ-45 connector of the inverter is not for LAN communication.

  The voltage level and pin arrangement are different from those of the LAN terminal of the PC.

  A trouble such as a power short-circuit or signal line collision may occur and may damage the product.

  Failure to observe this could result in a product failure.

⚠ CAUTION

- When connecting cables to the RJ-45 connectors on the inverter (RJ-45 connector for connecting to the keypad, RJ-45 connector for connecting to the RS-485 communication card, and RJ-45 connector for the inverter's RS-485 communication), be sure to check the wiring of the devices to be connected.

  For details, refer to the "RS-485 Communication User's Manual".

  Failure to observe this could result in a product failure.

2.1 Loader versions

The Loader software has different versions available in function of the used inverter. Therefore, not all the versions are available with all the inverters. Table 2.2 shows the proper Loader version regarding the current available inverter models. Refer to this table in order to check which Loader version is needed for your inverter.

Table 2.2. Loader versions in function of the inverter model.

Software / Inverter	FRENIC-Loader 3.3	FRENIC-Loader for Lift	FVR-Loader	FRENIC-Loader 4	FRENIC-Loader VG
FRENIC-Mini C1 / C2	○	×	×	○	×
FVR-Micro AS1S	×	×	○	×	×
FRENIC-Multi E1	○	×	×	○	×
FRENIC-ACE E2 / E2-H	○	×	×	○	×
FRENIC-ECO F1	○	×	×	○	×
FRENIC-HVAC/AQUA AR1 / AQ1	×	×	×	○	×
FRENIC-MEGA G1	○	×	×	○	×
FRENIC-MEGA G2	×	×	×	○	×
FRENIC-Lift LM1S	×	○	×	×	×
FRENIC-Lift LM2A / LM2C	×	×	×	○	×
FRENIC-VG VG7 / VG1 / SVG1 / BVG1	×	×	×	×	○

2.2 Software installation

The Loader software is available to download from our web page. Refer to the manual of each version for detailed information of the procedure. During the installation, different application could be added to the procedure. These applications are needed for the proper functionality of the Loader software.

The most important needed application is Message Manager. It must be running at the same time than Loader software in order to enable the communications with the inverter. It is possible to check if it is running or not looking at the tools window at the right in the bottom of the screen, it has an icon with a double M:

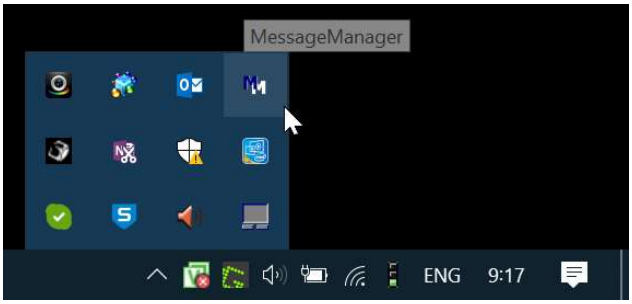

Figure 2.1. Message Manager icon appearance.

Note Message Manager will be opened simultaneously with Loader software once this last one is executed. If it was not running at the same time than Loader, the inverter will appear as "Disconnected" on the screen.

The Message Manager can be installed in the same procedure than Loader software. If not, it can be installed separately with its own file. The first screen of the installer asks for the language, showing Japanese by default; select the second option in order to change to English (blue option in figure 2.2). Clicking on (N) "Next" you will be moved to the following steps.

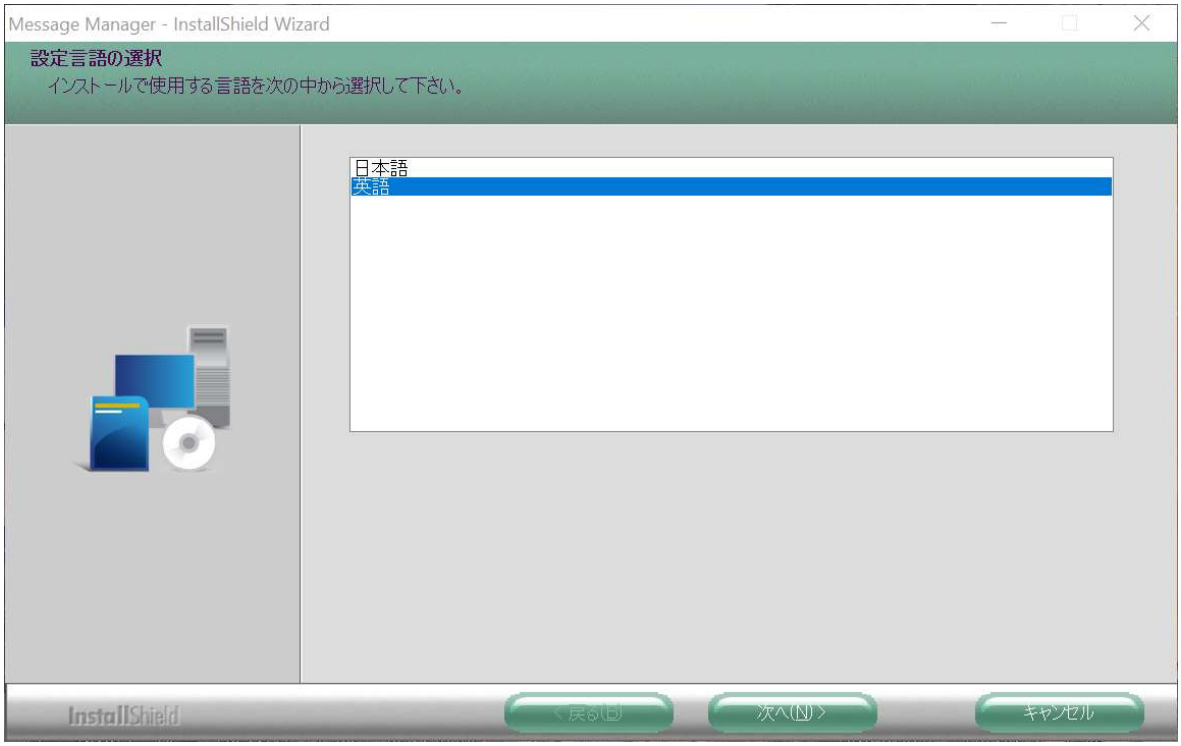

Figure 2.2. Message Manager installer - language selection.

2.3 Software uninstallation

For details of the uninstallation of the Loader software or Message Manager, refer to the manual of each version of the Loader, which is included inside the installer files.

3. Features

The Loader facilitates simple operation to set or manage function codes of the inverter. Different options to develop with the Loader are shown in table 3.1. Note that icons shown in this table are from Loader 4 version; they may differ in function of the Loader version used.

Table 3.1. Loader functionality options.

Icon	Name	Description
	Function code	Can be used to read or write, edit, compare, initialize, save, or print the parameters (function code setting data) that set the inverter operations.
	Operation monitor	Can be used to check the status of the external I/O (I/O monitor), the Loader information or maintenance information (system monitor), alarm occurrence information (alarm monitor), or information such as the current frequency (operation monitor).
	Customizable logic	Can be used to extend the inverter functionality and to customize for the user interface.
	Schedule operation	Can be used to set the inverter operation pattern according to the calendar settings.
	Real-time trace	Can be used to monitor operation conditions in the form of continuous waveform information with the maximum of four analog channels and the maximum of eight digital channels (to the maximum total of eight channels). In case of VG, eight analog and sixteen digital channels.
	Historical trace	Can be used to monitor inverter operation conditions in the form of waveform information in a sampling time that is shorter than the real-time trace. (The number of samplings is limited.)
	Trace back	Can be used to graphically view the status of the inverter in the event of an alarm. Operation status at occurrence of alarm is saved into the memory in the inverter as waveform data; this function can read the waveform data and display it in the graph up to the three latest alarms.
	Test run	Can be used to manipulate the frequency command or operation command on the Loader screen to test run the inverter.
	Communication setting	Can be used to make communication settings between the PC and the inverter or with the remote control keypad provided with a USB terminal.

Note FVR-Loader version has no icons. To access the different functions go to the toolbar in the software, where they are located.

FRENIC-Loader VG has an additional trace option, thanks to that it is possible to graphically view the status of the inverter in the event of an alarm.

However, not all these functions are available for all the inverter series. In the table 3.2 it is shown which functions can be used for each inverter. Note that not all the functions can be used with the copy data function of the keypads TP-E1U, TP-E2 or TP-A2SW, and some of them can be limited. Refer to the manual of the keypad for detailed information of this function.

Table 3.2. Loader functions availability.

Inverter \ Function	Function code	Operation monitor	Customizable logic	Schedule operation	Real-time trace	Historical trace	Trace back	Test run	Communication setting
FRENIC-Mini C1 / C2	O[1]	O	×	×	O	×	×	O	O
FVR-Micro AS1S	O[1]	×	×	×	×	×	×	×	O
FRENIC-Multi E1	O	O	×	×	O	×	×	O	O
FRENIC-ACE E2 / E2-H	O	O	O	×	O	O	×	O	O
FRENIC-ECO F1	O	O	×	×	O	×	×	O	O
FRENIC-HVAC/AQUA AR1 / AQ1	O	O	O[2]	O	O	×	×	O	O
FRENIC-MEGA G1	O	O	×	×	O	O	×	O	O
FRENIC-MEGA G2	O	O	O	×	O	O	O	O	O
FRENIC-Lift LM1S	O	O	×	×	×	×	×	O	O
FRENIC-Lift LM2A / LM2C	O	O	O	×	O	O	×	O	O
FRENIC-VG VG7 / VG1 / SVG1 / BVG1	O	O	×	×	O[3]	O[3]	O	×	O

*1) Auto tuning cannot be used. In case of FRENIC-Mini, only C1 model is affected by this limitation.
*2) I/O checking, logic checking, and trace monitoring cannot be used. On-line monitoring can be used only for one function block. Function block inputs cannot be monitored. Input terminals and output terminals cannot be monitored. Settings for the user setting area and storage area (function codes: U121 to U140 and U171 to U175) cannot be used.
*3) Functions available at premium version.

For the inverter series compatibles with two different versions of Loader software, basically FRENIC-Loader 3.3 and FRENIC-Loader 4 (refer to table 2.2), could be a mismatch on the type file generated between both programs. Generally, Loader 4 is able to open and manage (not to store) files created with an older format type, but not in vice versa. To open this kind of files, select “Other Loader files” in the browser or just drag and drop the file over the Loader 4 screen. It is recommended to convert Loader 3.3 files into Loader 4 in order to get a better behavior and all the functions.

Table 3.3 shows the different file formats generated by the different Loader versions, including older; while table 3.4 shows how the Loader 4 can work with these formats.

Table 3.3. Common Loader file formats.

	FRENIC-Loader 4	FRENIC-Loader 3.3	FRENIC HVAC/AQUA Loader	FRENIC Visual Customizer
Function code data	*.FNL *.FBL	*.FNC *.FNB	*.FN1	-
Real-time trace data	*.RT2	*.RTM	*.RT1	*.RT1
Historical trace data	*.HT2	*.HIM	-	-
Customizable logic project data	*.CML	-	*.CMX	*.CMX
Schedule data	*.CSV	-	*.CSV	-

Note Opening a *.RT1 file with Loader 4 the [START/STOP] button will be disabled. The scales from files *.RTM and *.HIM could be different in Loader 4.
User definitions and comments from *.FNC and *.FNB will not be restored in Loader 4.

Table 3.4. List of file formats used by Loader 4.

File types			File format	File operation	
				Save	Open
Function code setting	Standard function codes	Function code data	FNL	o	o
			FN1 FNC	×	o
			CSV[1]	o	o
	Customizable logic function codes	Function code data	FBL	o	o
			FNB	×	o
	Error information - File read error - Inverter access error		CSV	o	×
Operation monitor	I/O monitoring	Monitor data	CSV	o	×
		Display item selection	TXT	o	o
	Monitor data of the system monitor		CSV	o	×
	Monitor data of the alarm monitor		CSV	o	×
	Operating state monitoring	Monitor data	CSV	o	×
		Display item selection	TXT	o	o
Customizable logic	Project data		CML	o	o
			CMX	×	o
	User setting area and customizable logic memory area		CSV	o	o
	Input/output check		CSV	o	×
	Logic check		CSV	o	×
	Comparison results		CSV	o	×
	Common function blocks (FBs)		EXFBL	o	o
Schedule data			CSV	o	o
Real-time trace	Waveform data		RT2	o	o
			RT1 RTM	×	o
			CSV	o	×
	Waveform images		JPG	o	×
			BMP	o	×
	Advanced		EXRTM	o	o
Historical trace	Waveform data		HT2	o	o
			HIM	×	o
			CSV	o	×
	Waveform images		JPG	o	×
			BMP	o	×
	Advanced		EXHIM	o	o

*1) To open/save a CSV file in Loader 4 with a function code data information it is needed to import/export it on an existing function code data.

Regarding the Loader versions for a specific inverter with a single option, there is no chance to open or save in a different file format. Table 3.5 shows the different formats for the remaining versions.

Table 3.5. Loader file formats.

	FVR-Loader	FRENIC-Loader for Lift	FRENIC Loader VG
Function code data	*.FNL	*.FNC2 *.CSV	*.FN1 / *.FNC[1] *.CSV
Trace back data	-	-	*.TB1
Real-time trace data	-	*.RTM	*.RT1
Historical trace data	-	*.HIM	*.HT1

*1) In case of VG7, it can only work with *.FNC file format; while VG1 can in both formats.

4. Connection

There are different options to connect the inverter with the computer in order to communicate the inverter with the Loader software. Check the available options shown at table 2.1 and the limitations of the inverter in its manual. Refer to the manual of the inverter for details of how to remove and mount the front cover if it would be needed.

4.1 Device requirements

PCs are not normally equipped with RS-485 ports. Therefore, an RS-232C/RS-485 converter or USB/RS-485 converter is required. Always use a converter that meets the recommended specifications shown below in order to ensure correct use. Note that the software may not function properly if a converter other than those recommended is used.

Table 4.1. Recommended converter specifications

Description	Condition
Transmission/receipt switching method	Automatic switching through monitoring transmission data at the PC side (RS-232C)
Isolation	Must be dielectrically isolated from the RS-485 side
Fail-safe	Must be equipped with a fail-safe function
Noise	Must have excellent noise resistance properties

Cables for RJ-45 connector must fulfill the specification of 10BASE-T/100BASE-TX straight cables (commercially available LAN cable) that satisfies the US ANSI/TIA/EIA-568A Category 5 standard, with a maximum length of 20 meters.

It is possible to use the USB port at the keypad TP-E1U, TP-E2 and TP-A2SW or the integrated in the inverter (if it has) to communicate directly with the computer and the Loader software. The specifications of the USB port in the keypad are described below; refer to table 4.3 for specifications of the inverters that have a built-in USB port.

Table 4.2. USB Specifications for the TP-E1U, TP-E2 and TP-A2SW

Description	Condition
Specification	Conforming to USB 1.1
Transfer speed	12 Mbps
Wire length	5 m (maximum)
Connector	USB Mini-B
Power supply	Connected to the inverter: Self power Connected to the PC: Bus power

Table 4.3. USB Specifications for the built-in port

Description	Condition	
	HVAC / AQUA	VG1
Specification	Conforming to USB 2.0	
Transfer speed	12 Mbps	Full speed
Wire length	5 m (maximum)	
Connector	USB Mini-B	

4.2 RS-485 communication port connection

In case of using the communications terminals from the inverter, a converter with the specifications detailed at table 4.1 must be used. In figure 4.1 appears the simple connection, from the computer to a single inverter, using the RJ-45 port. On it, Cable 1 must fulfill the specifications of the converter; Cable 2 the specifications detailed on section 4.1 on this document.

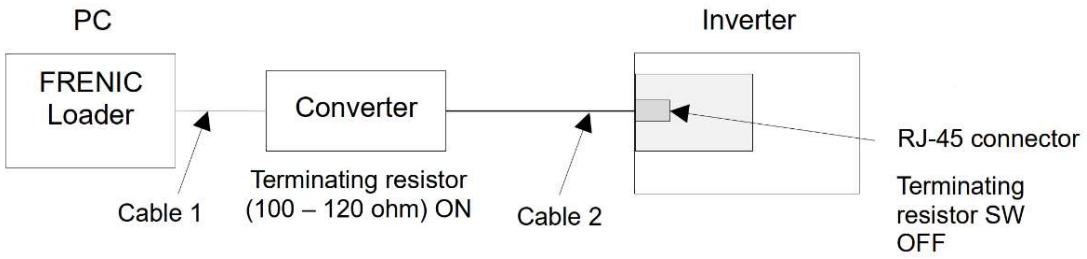

Figure 4.1. RS-485 Connection Diagram (RJ-45 connector)

⚠ WARNING

- The power supply (1, 2, 7, and 8 pins) for the keypad is connected to the RJ-45 connector for the RS-485 communication (communication port 1). When connecting to other devices, be careful not to connect to pins assigned to the power supply. Connect **only pin 4 and pin 5**.
- **Do not connect** the LAN terminal of the PC directly with the RJ-45 connector of the inverter using the LAN cable.

Failure to observe this could result in a product failure.

In case of using the communications terminals DX (+) and DX (-) for a single inverter connection follow the diagram on figure 4.2. Conditions for Cable 2 in this situation is to use a shielded twisted-pair cable for long distance transmission.

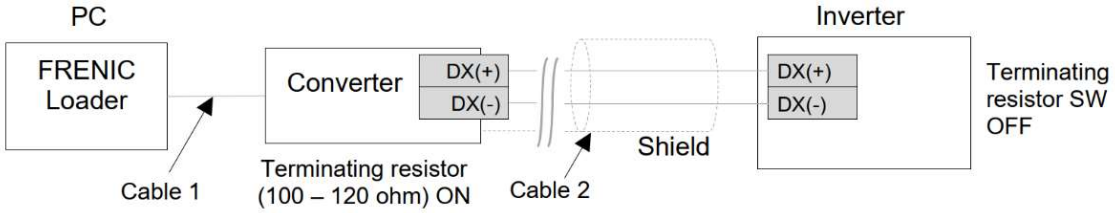

Figure 4.2. RS-485 Connection Diagram (terminal block connection)

Depending on the operating environment, the system may malfunction due to noise generated by the inverter. To prevent such malfunction, countermeasures can be taken by using shielded cables, separating wiring lines and isolating the power supply, adding an inductance or wiring through a ferrite core. As an example, wiring through a ferrite core is shown below.

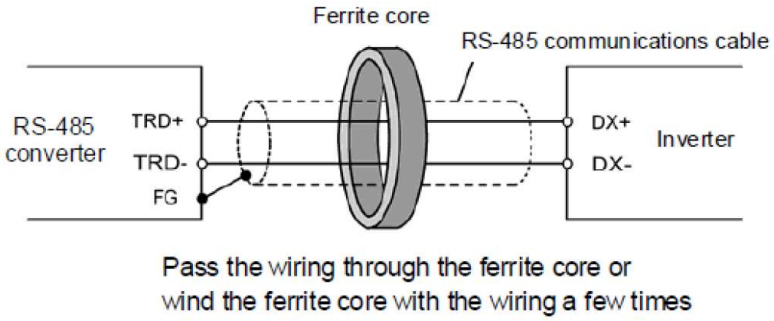

Figure 4.3. Addition of a ferrite core for noise suppression

4.3 USB communication port connection

When the inverter supports the keypad TP-E1U or it has a built-in USB port, it is possible to connect the inverter directly to the computer without any kind of converter. Check the table 4.4 for to know the inverters with the possibility of this connection.

Table 4.4. USB port in function of the inverter model

USB port / Inverter	TP-E1U	TP-E2, TP-A2SW	Built-in
FRENIC-Mini C1 / C2	O[1]	×	×
FVR-Micro AS1S	×	×	×
FRENIC-Multi E1	×	×	×
FRENIC-ACE E2 / E2-H	O	×	×
FRENIC-ECO F1	×	×	×
FRENIC-HVAC/AQUA AR1 / AQ1	×	×	O
FRENIC-MEGA G1	O	×	×
FRENIC-MEGA G2	O	O	×
FRENIC-Lift LM1S	×	×	×
FRENIC-Lift LM2A / LM2C	O	×	×
FRENIC-VG VG7 / VG1 / SVG1 / BVG1	×	×	O[2]

*1) FRENIC-Mini C1 model does not support keypad TP-E1U.
*2) FRENIC-VG7 does not have built-in USB port.

In case of connecting through the keypad, follow the diagram on figure 4.3. The keypad can be connected directly to the inverter (if the inverter has the place for it) or using an external cable (Cable 2 on the diagram) that satisfies the specifications from section 4.1.

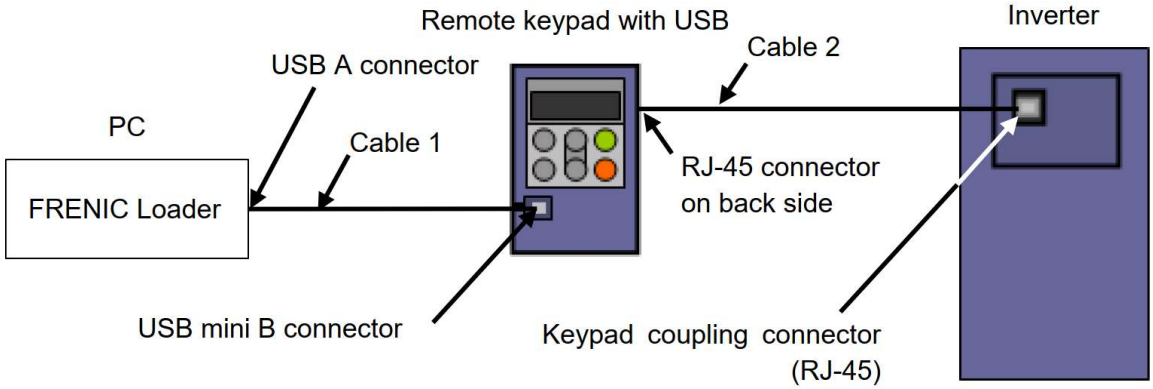

Figure 4.4. USB Connection Diagram (connection with the inverter via keypad with USB)

Note

Be sure to connect the TP-E1U to the keypad coupling connector on the inverter. For example, the keypad coupling connector for the FRENIC-Ace is available only on the RS-485 communication port 1. Therefore, if the TP-E1U is connected to the RS-485 communication port 2, no communication is possible.

For the inverter with built-in USB port, connect it directly to the USB port in the computer as it is shown on figure 4.4. refer to the instruction manual of the inverter to know the position of the port.

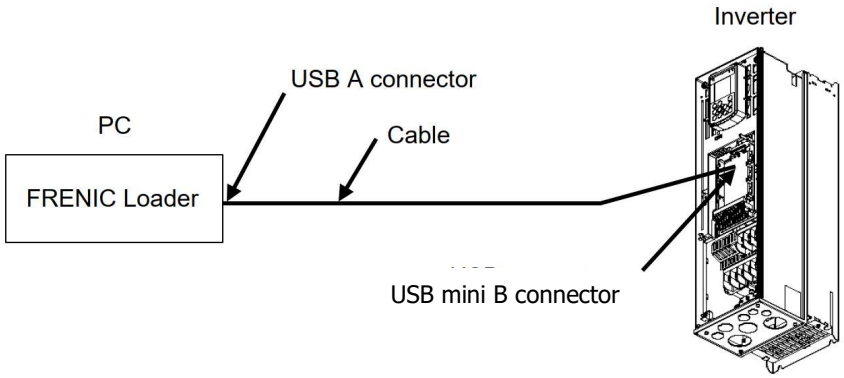

Figure 4.5. USB Cable Connection Diagram (for the inverter with Built-in USB Port)

Note If communication is enabled while the inverter is stopped and if it is disabled while the inverter is in operation, it is highly possible that the communication is affected by noise. Implement an appropriate noise countermeasure such as by passing the USB cable through a ferrite core. Connect the USB cable to the USB 3.0 terminal of the PC. If the problem is not solved, use the RS-485 communication.

4.4 Multi-drop connection

It is possible to connect more than one drive at the same time to the Loader software. For this kind of connection, it cannot be used the USB port from the keypad nor the built-in. It is needed to use the RS-485 connection from section 4.2 and the USB converter. An additional branch adapter could be needed. The specifications explained at section 4.1 will be the same.

Diagram on figure 4.5 shows the connection in case of using the RJ-45 connector from the inverter. Connection through terminal block connection is on diagram from figure 4.6. In both situations, the total cable length must be less than 500 meters.

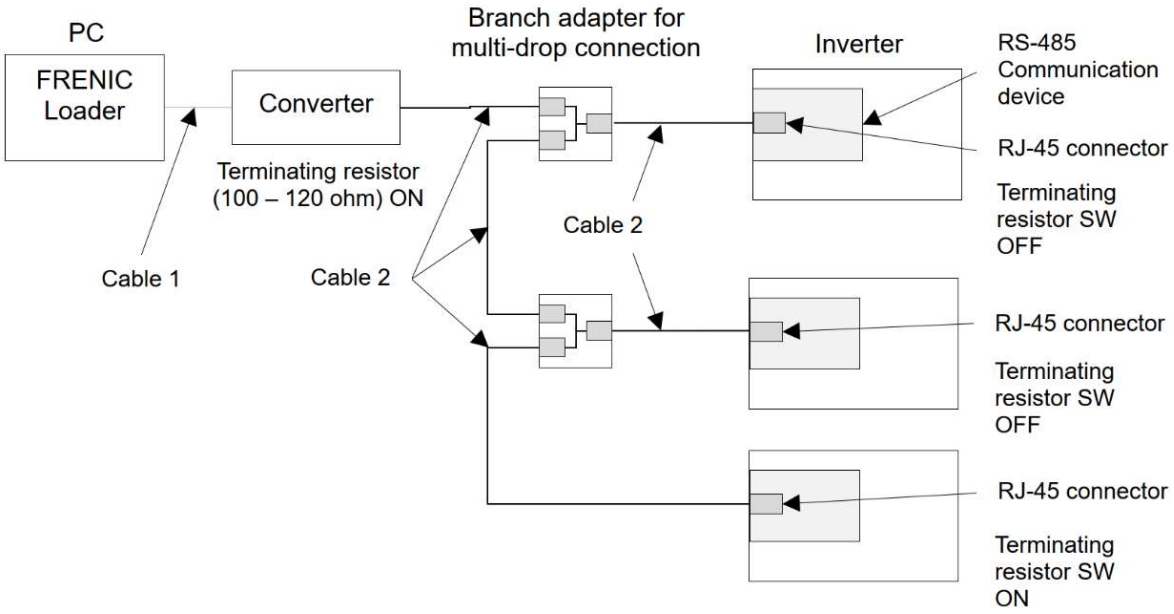

Figure 4.6. Multi-drop connection diagram (RJ-45 connector)

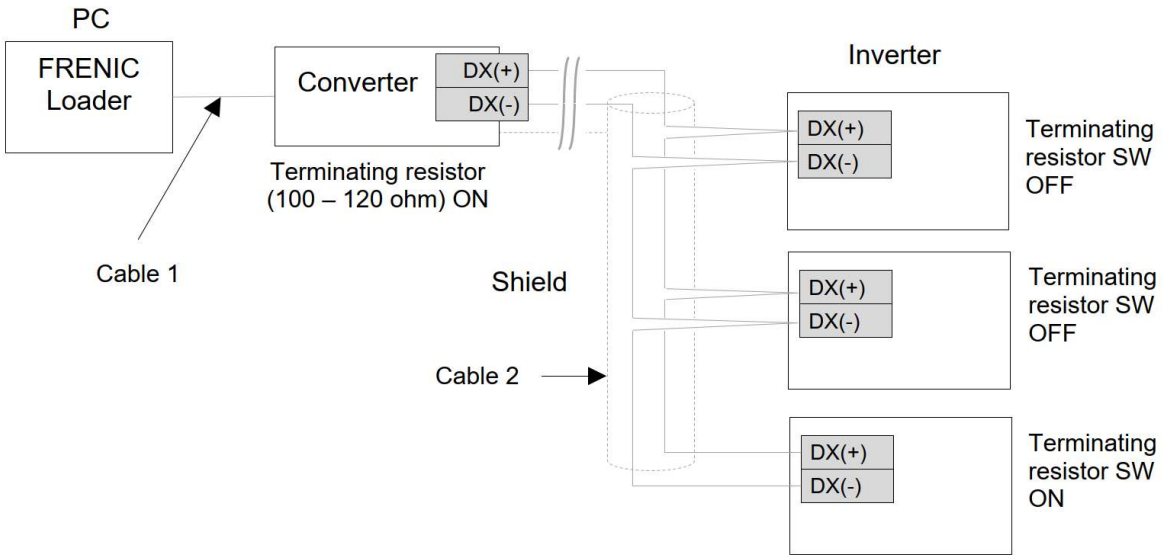

Figure 4.7. Multi-drop connection diagram (terminal block connection)

4.5 Driver installation

To establish communication by connecting to the USB device (keypad TP-E1U or inverter with built-in USB port), first you must install the USB driver. This installation work is required only once, at the first time that this device is used in your system. If the USB driver is not properly installed, communication is not possible via the USB connector on the TP-E1U or on the inverter. The installation procedure for the TP-E1U is the same as for the inverter with built-in port

Note This procedure could also be required for the USB/RS-485 converter. Follow the same steps and install the driver from the manufacturer.

With the Loader software and Message Manager already installed on the computer, they must remain closed during the driver installation. Connect the PC with the USB device, and then the system will recognize it. In order to go the device list on Windows OS Windows 10:

[START] (Windows icon) → [Control Panel] → [Device Manager]

On this list will appear an unknown device, click with the right button and select “Update Driver Software” as is shown in figure 4.7.

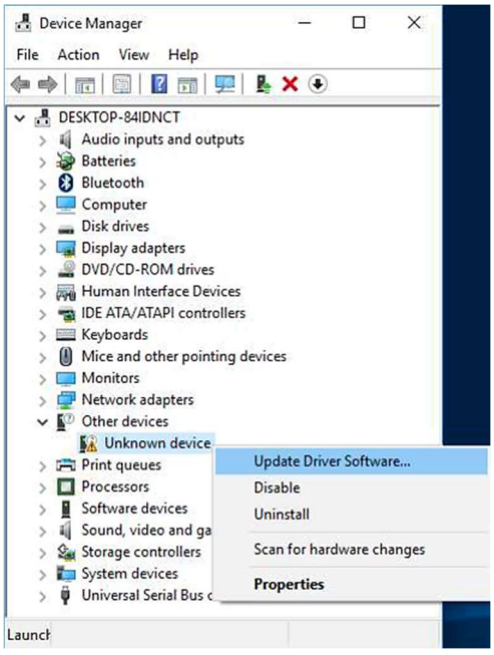

Figure 4.8. Screenshot from the "Device Manager"

A new window will be deployed with two options, select “Browse my computer for driver software”. Browse into the FRENIC Loader folder, where it has been installed in the hard disk and then select “Driver” → “MICREXSX”, as appear on figure 4.8.

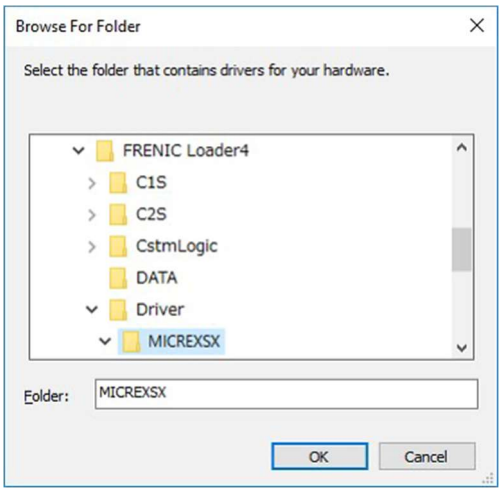

Figure 4.9. Screenshot from the folder selection

Clicking on next the driver will be installed. Once it has been finished, coming back to the device manager, the USB device will appear inside “Loader USB device” as “FRENIC”.

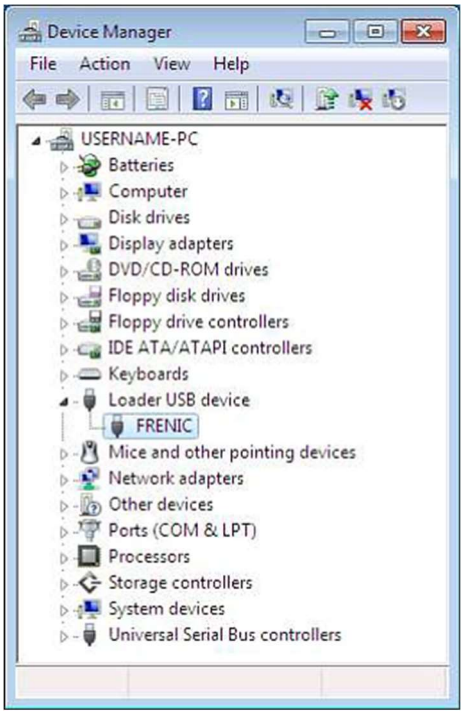

Figure 4. 10. Screenshot from the Device Manager once the driver has been installed

5. Setting

For the proper communication between the inverter and the Loader software, it is needed that they have the same setting. In case of the inverter, this setting is normally placed at parameter group y; while in Loader are at Communication setting. If the communication is done under the USB conditions, there is no special setting needed.

5.1 Inverter setting

In case of using the RS-485 communication explained on previous sections, it is needed to set the inverter parameters shown at table 5.1. Refer to table 5.2 to check the needed parameters for the USB connection. The setting range and setting contents might differ depending on the model of the using inverter.

Table 5.1. Inverter parameters related to communication with Loader

Function code	Name	Setting range	Comments
y01, y11 H31 [1]	Station address	1 to 255	Match with the address of Loader. For multi-drop connection, avoid giving duplicate address.
y04, y14 H34 [1]	Baud rate	0: 2400 bps 3: 19200 bps 1: 4800 bps 4: 38400 bps 2: 9600 bps	Match with the baud rate of Loader.
y06, y16 H36 [1]	Parity check	0: None (Stop bit 2) 2: Odd parity 1: Even parity 3: None (Stop bit 1)	Match with the parity check of Loader. Only needed when Modbus RTU protocol is used in FRENIC-MEGA G2.
y07, y17 H37 [1]	Stop bits	0: 2 bits 1: 1 bit	Match bit the stop bits of Loader Only needed when Modbus RTU protocol is used in FRENIC-MEGA G2.
y10, y20 H40 [1]	Protocol selection	0: Modbus RTU protocol 1: SX protocol (Loader protocol) etc.	Set it according to the inverter model and communication port used.

*1) Only in case of FRENIC-VG model.

Note For the Protocol selection setting, it is mandatory to set it at value 1 (SX protocol) for all the inverter models, except for FVR-Micro which must be at value 0 (Modbus RTU). With other setting at this parameter, the communication will not be done.

Function codes that require settings depend on which communication port of the inverter the Loader is connected. The function code setting in function of the communication port that it is used is shown below. Note that not all the inverter models have all the option described in the table, being the communication port 1 the standard for all of them.

Table 5.2. Inverter parameter setting in function of the port

		Loader connection point			
		RS-485		USB	
		Communication port 1	Communication port 2	Keypad	Built-in
Function code	y01 (H31)	1 to 255	-	1 to 255	-
	y04 (H34)	0 to 4	-	-	-
	y10 (H40)	1 [1]	-	-	-
	y11	-	1 to 255	-	-
	y14	-	0 to 4	-	-
	y20	Other than 1	1	-	-

*1) Not in case of FVR-Micro and FRENIC-MEGA G2 models. For them, y10 (or y20 in FRENIC-MEGA G2) value must be 0.

For the test run operation, it is needed to set the parameter y99, where it is selected from where is given the run and speed commands. It can be set from the inverter or from the option at the Loader. Note that this parameter is related to parameter H30 setting and it must be turned back for the normal operation, if not the inverter could have a not desired operation.

5.2 Loader setting

When the Loader is started, clicking on the icon on the screen for the Communication setting, the configuration window will be deployed. It is also accessible by the route in the main menu bar: [Setup] → [Communication Setting]. On this screen (figure 5.1) it is needed to select if the communication is through the RS-485 (and its setting) or USB port.

Note The Communication settings window can be open but not edited while another Loader function is running at the same time.

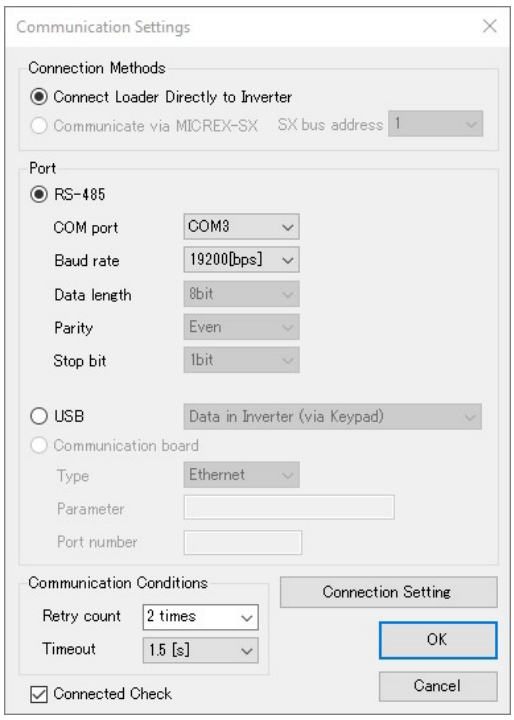

Figure 5.1. Screenshot of the Communication Settings window from Loader 4

Note In FRENIC-Loader 4, version 1.1.0.32 or higher, there is available a “Communication Setting Wizard”. This wizard allows to set up the needed configuration through some steps with some visual questions. It is located at the top of Communication Settings window.

COM port setting is related to the computer configuration. It is the port in the computer where the USB/RS-485 or RS-232C/RS-485 converter from the inverter has been connected. This setting must match with the port number assigned by the computer. It can be checked on the device manager of the Windows OS:

[START] (Windows icon) → [Control Panel] → [Device Manager]

Note In FRENIC-Loader 4, version 1.1.0.32 or higher, there is available a shortcut button to the Device Manager list. It is located at the Communication Settings window.

The COM port number will appear clicking on the option “Ports (COM & LPT)” and checking the different devices deployed as in figure 5.2.

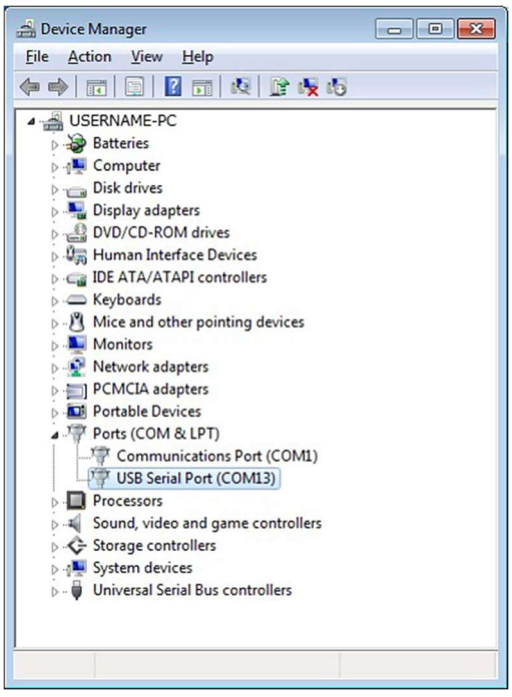

Figure 5.2. Screenshot from the Windows OS Device Manager for checking the COM port number

Other settings on figure 5.1 must match with the parameter setting explained on previous section, tables 5.1 and 5.2. On this window, it is important to activate the option “Connected check”, thanks to that the Loader software will check and show constantly if the inverter is communicating with Loader or not.

Note If there are different Loader software opened at the same time with the same COM port configuration set on them, the Connected check option could not work properly (in example, the message is flashing or changing its state permanently). If it occurs, the communications between Loader software and inverter will not start.

If the Message Manager is not running at the same time than Loader software, the Connected check option will not change the state and the communications will not start.

In FRENIC-Loader 4, version 1.1.0.32 or higher, the “Connected check” is not placed in the Communication Settings window. It is possible to find it at the toolbar.

When the USB port communication is set, the Loader software will ask from where it is connected. There are three different possibilities through two main groups, being possible to select “Data in inverter” (with printed circuit board or TP, whose means keypad) and “Data in Keypad” for the data copy function of the TP-E1U, TP-E2 or TP-A2SW.

Table 5.3. USB port setting

	USB Connection selection		
Option	Data in Inverter		Data in Keypad
Port	Printed circuit board (built-in USB)	TP (Keypad USB)	TP (Keypad USB)
Functions	All [1]		Only Data copy function

*1) Available options will depend on the inverter limitations. Refer to table 3.2 for detailed information.

5.3 Multi-drop connection

In case that two or more inverters are connected to the Loader with a multi-drop connection, it is needed to set up their addresses. From the inverter, it will be set a numeric address on parameter y01, y11 or H31, in function of the used port or inverter model as explained previously on tables 5.1 and 5.2.

The numeric address assigned on the inverter must be the same than in Loader software. On the software, it can be set inside the Communication settings clicking on the option “Connection Setting” or “Connection List” in function of the Loader version used.

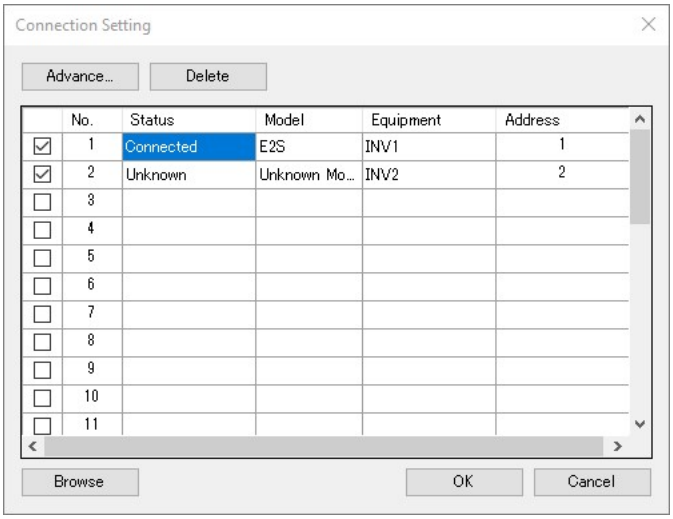

Figure 5.3. Screenshot from the Connection Setting / Connection List of Loader

From the deployed window, it is possible to manage the inverters connected to the computer, giving a name and number and checking the status. In case of a connection of a single unit, it must match the station address setting between Loader and inverter.

Note When using the operation monitor function, be sure to register the target inverter for monitoring in the No.1 row. When you want to monitor multiple devices connected in multi-drop connection, specify the monitored inverters serially in rows No.1, No.2, No.3, and so on.

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