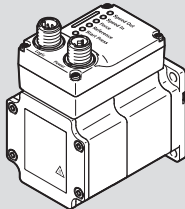


EMCS-YY-ST
Integrated drive



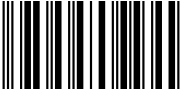
FESTO

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Addendum document

8222324
2024-08c
[8222326]



8222324

Original instructions

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IO-Link is a registered trademark of its respective trademark holder in certain countries.

1 Applicable documents

 All available documents for the product ➔ www.festo.com/sp.

Document	Product
Integrated drive	
Manual	Integrated drive EMCS-ST
Drive system	
Operating instruction	Mini slide unit EGSS-BS
Operating instruction	Toothed belt axis unit ELGE-TB
Operating instruction	Ball screw axis unit ELGS-BS
Operating instruction	Toothed belt axis unit ELGS-TB
Operating instruction	Electric cylinder unit EPCS-BS
Drive	
Operating instruction	Mini slide EGSC
Operating instruction	Toothed belt axis ELGR-TB
Operating instruction	Ball screw axis ELGC-BS
Operating instruction	Toothed belt axis ELGC-TB
Operating instruction	Electric cylinder EPCC
Mounting kit	
Assembly instructions	Axial kit EAMM-A
Assembly instructions	Parallel kit EAMM-U
IO-Link cable	
Assembly instructions	Adapter NEFC-M12G8-0.3-M12G5-LK

Tab. 1: Applicable documents for the product

2 Product version

This documentation refers to the following datasets:

- Hardware version of the integrated drive from "Rev04" or "RevD"
- Firmware version of the integrated drive from "v19.0.4.107_release"
- IO-Link device description file (IODD) from V1.2.6
- Adapter NEFC from production date 01/2022

When using a different hardware version or firmware version, check whether a corresponding version of the documentation is available ➔ www.festo.com/sp.

3 Product labelling

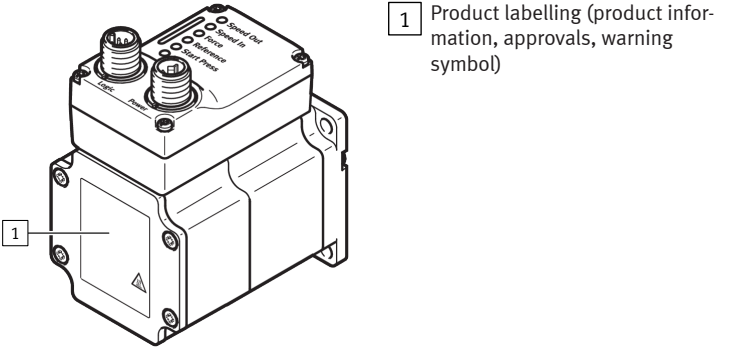


Fig. 1: Product labelling

Warning symbol

Warning symbol	Meaning
	Attention! Hot surface Metallic housing parts of the device can reach high temperatures during operation. In the event of a fault, internal components may become overloaded.

Tab. 2: Warning symbol

4 Specified standards

Version	
IEC 60204-1:2005+AMD1:2008 CSV	EN 61800-5-1:2016-08
IEC 61131-2:2013	EN 60034-1:2011-02
EN 61800-2:2016	EN 60204-1:2006+A1:2009+AC:2010

Tab. 3: Standards specified in the document

5 Safety

5.1 Safety instructions

- Only use the product if it is in perfect technical condition.
- Only use the product in its original condition without unauthorised modifications.
- Do not carry out repairs on the product. Replace defective product immediately.
- Observe the identifications on the product.
- Never remove or insert the plug connector while live.
- Operate the product only in an installed condition when all required protective measures have been taken ➔ EN 60204-1.
- Before working on the product, switch off the power supply and secure it against being switched on again.
- Store the product in a cool, dry environment protected from UV and corrosion. Keep storage times short.

5.2 Intended use

The intended use of the EMCS-ST integrated drive is to power the connected actuator technology. The integrated electronics enable control of position, speed or force/torque.

5.2.1 Application areas

The device is intended for use in an industrial environment. Outside industrial environments, e.g. in commercial and residential/mixed-use areas, it may be necessary to take measures to suppress radio interference.

5.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers. The qualified personnel have knowledge and experience in dealing with electric drive systems.

5.4 Approvals and certifications

CE approval (conformity)

In conjunction with the CE mark on the product, the EC directives and standards listed below in the Declaration of Conformity ➔ www.festo.com/sp apply.

- in accordance with EU EMC Directive
- in accordance with EU RoHS Directive

KC certification

KC number: R-R-FTO-KC-2018-1082

RCM certification

The product fulfils the EMC requirements for Australia and New Zealand with the RCM certification mark on the product.

6 Additional information

- Contact the regional Festo contact if you have technical problems ➔ www.festo.com.
- Accessories and spare parts ➔ www.festo.com/catalogue.

7 Product overview

7.1 Scope of delivery

The following components are included in the scope of delivery:

- Integrated drive EMCS-YY-ST-... (Spare part)
- Instruction manual for the integrated drive EMCS-YY-ST

7.2 Product design

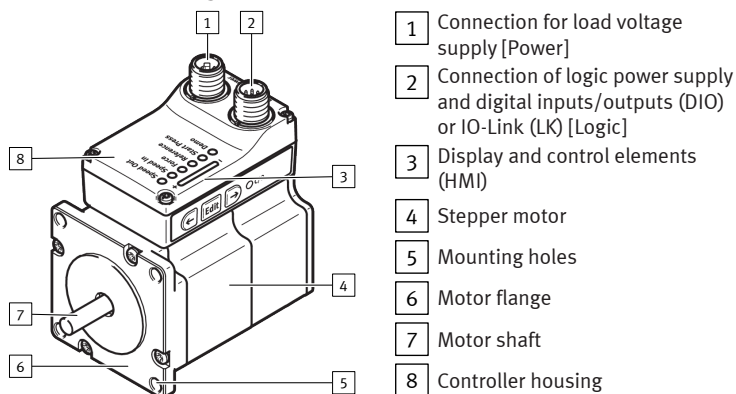


Fig. 2: Product design EMCS-ST
(example EMCS-ST-57 -...)

8 Transport

- Store and transport the product in its original packaging.
- Store product in areas where it is not exposed to oils, greases and degreasing vapours.

9 Replacement

Replace integrated drive EMCS

1. Save the application parameters to the IO-Link master → 12.1 Data backup (Data Storage).
2. Demount the defective integrated drive EMCS.
3. Mount the new integrated drive EMCS → 10 Assembly.
4. Connect the integrated drive EMCS → 11 Installation.
5. Commission the drive system → 12 Commissioning.
6. Update the parameter set → 12.2 Parameter set.
7. Update the firmware (optional) → "Integrated drive EMCS" instruction manual → www.festo.com/sp.

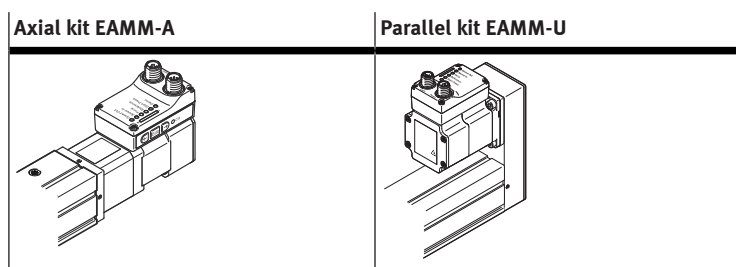
10 Assembly

⚠ WARNING

Risk of injury due to unexpected movement of components.

The drive can move freely in the voltage-free state. This can cause unexpected movements of the connected mechanics and crush parts of the body.

- Bring moving parts of the mechanical system into a safe position.



Tab. 4: Overview of motor mountings (example electric cylinder unit EPCS-BS)

Only loosen screws or threaded pins that are described in the directions in the instruction manuals.

1. Fasten motor mounting kit, observe instruction manual
→ www.festo.com/sp.
2. Fasten the motor without tension.

Connect motor cables only on completion of mounting.

11 Installation

⚠ WARNING

Risk of injury due to electric shock.

- For the electrical power supply with extra-low voltages, use only PELV circuits that guarantee a reinforced isolation from the mains network.
- Observe IEC 60204-1/EN 60204-1.

ⓘ

Damage to the device due to non-approved potentials at the pins

- Power connection:
 - Do not connect pin 3
- GND and L– connections:
 - Apply the Power, GND [Pin 2] and Logic, GND/L– [Pin 4/8] connections to one potential. For example, ensure the same potential by using a common fixed power supply or an electrical connection of the two 0 V DC GND potentials.

ⓘ

When using hardware version "Rev02" or "RevB" or older, check additional precautionary measures to avoid damage to the device due to impermissible potentials on the pins in the corresponding version of the documentation

→ www.festo.com/sp

1. Connect the power cable to the [Power] connection of the integrated drive EMCS-ST and to a PELV fixed power supply.
2. Connect the logic cable to the [Logic] connection of the integrated drive EMCS-ST and to a controller or to a IO-Link master.

Wiring diagram: IO-Link operation

ⓘ

Current consumption of IO-Link power supply [Logic]

An input current at pin 1 (L+) of 100 ... 150 mA is required for operation.

Connecting IO-Link directly to the master

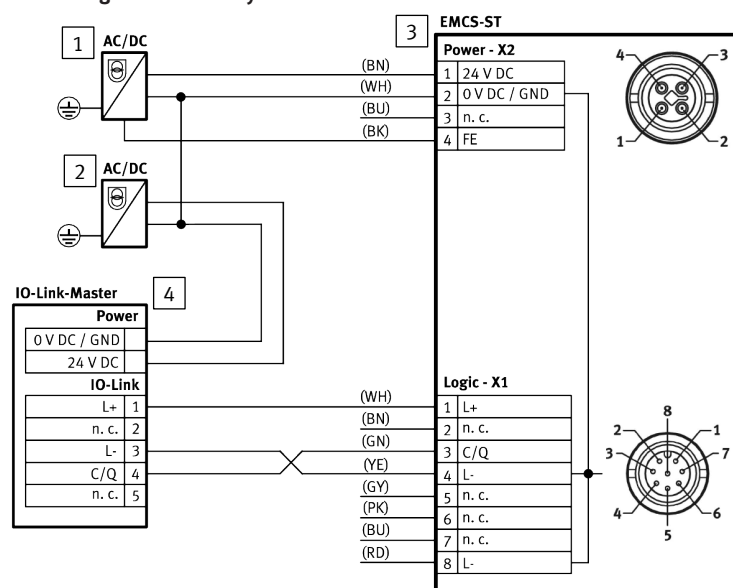


Fig. 3: Wiring diagram: IO-Link operation

- 1 PELV fixed power supply for the load voltage supply
- 2 PELV fixed power supply for the logic power supply
- 3 Integrated drive EMCS-ST
- 4 IO-Link master with IO-Link interface, port class A

Connecting IO-Link to the master via the NEFC adapter

ⓘ

Adapter NEFC up to production date 2021

NEFC adapters up to production date 2021 can only be used for IO-Link masters with port class A.

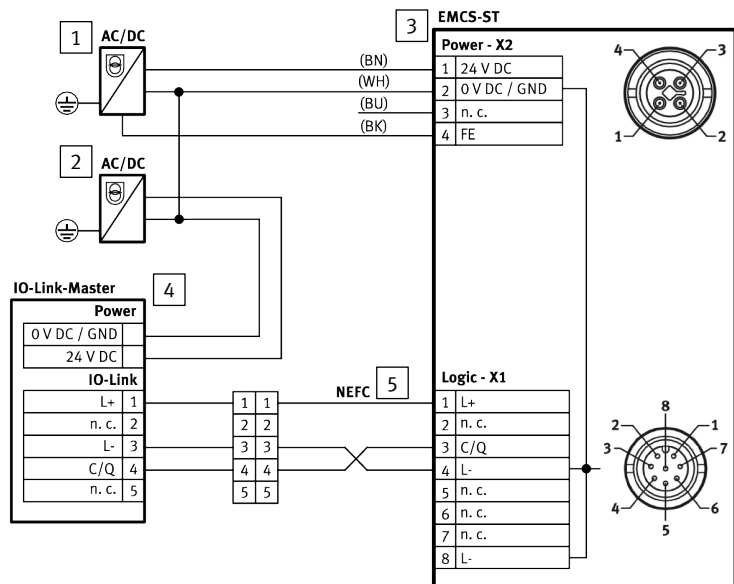


Fig. 4: Wiring diagram: IO-Link operation via adapter NEFC

- | | |
|---|---|
| 1 PELV fixed power supply for the load voltage supply | 4 IO-Link master with IO-Link interface |
| 2 PELV fixed power supply for the logic power supply | 5 Adapter NEFC |
| 3 Integrated drive EMCS-ST | |

1

Core colours of Festo cables:

BK = black, BN = brown, BU = blue, GN = green, GY = grey, PK = pink, WH = white, YE = yellow

[Logic] connection: IO-Link (LK), port class A

IO-Link data are exchanged with the IO-Link master via the [Logic] connection and the logic part of the device is supplied with electrical voltage.

1

An adapter is available as an accessory for convenient connection to the IO-Link master → www.festo.com/catalogue.

1

Adapter NEFC

Depending on the production date, the NEFC adapter can be used as follows:

- Until 12/2021: for IO-Link masters, port class A.
- From 01/2022: for IO-Link masters; port class A and B.

[Logic] ¹⁾	Pin	Function	Description
	1	L+	IO-Link power supply 24 V DC
	2	n. c.	reserved, do not connect
	3	C/Q	Communication to the IO-Link Master
	4	L-	Reference potential IO-Link power supply 0 V DC ²⁾
	5	n. c.	reserved, do not connect
	6	n. c.	reserved, do not connect
	7	n. c.	reserved, do not connect
	8	L-	IO-Link power supply reference potential 0 V DC ²⁾

1) plug M12x1, A-coded, 8-pin

2) pin 4, 8 [Logic] and pin 2 [Power] are internally connected.

Tab. 5: [Logic] connection: IO-Link (LK)

[Power] connection: load voltage supply

The power unit of the device is supplied with electrical voltage at the [Power] connection.

[Power] ¹⁾	Pin	Function	Description
	1	24 V DC	Load voltage supply
	2	0 V DC/GND	Load voltage supply reference potential ²⁾
	3	-	reserved, do not connect
	4	FE	Functional earth (FE)

1) M12x1 plug, T-coded, 4-pin

2) pin 4, 8 [Logic] and pin 2 [Power] are connected internally.

Tab. 6: [Power] connection: load voltage supply

WARNING

Severe, irreversible injuries from accidental movements of the connected actuator technology.

Unintentional movements of the connected actuator technology can result from exchanging the connecting cables of a servo drive or between servo drives.

- Before commissioning: all cables must be correctly assigned and connected.

WARNING

Danger of burns from hot housing surfaces.

Metallic housing parts can reach high temperatures during operation.

Contact with metal housing parts can cause burn injuries.

- Do not touch metallic housing parts.
- After the power supply is switched off, let the device cool down to room temperature.

Commissioning: IO-Link operation

Requirement for the IO-Link master/application software

- The IO-Link master must support the IO-Link standard "IO-Link BLOB Transfer & Firmware Update V1.1", e.g. the Festo USB IO-Link Master CDSU-1 with firmware version V2.1.0.11 or higher.
- An IODD device description file with version V1.2.6 or higher is used in the application software.

Preparation

- Check the mounting of the drive system.
- Check the wiring of the power supplies and the IO-Link "C/Q" interface at the [Power] and [Logic] connections.
- Download and install the application software of the IO-Link master.
- Download the parameter set → www.festo.com/sp.

1

When using hardware version "Rev02" or "RevB" or older, check additional precautionary measures to avoid damage to the device due to impermissible potentials on the pins in the corresponding version of the documentation

→ www.festo.com/sp

Procedure

- Switch on load voltage.
- Switch on logic voltage via IO-Link master. A switch-on delay of ≥50 ms is recommended.
 - If the logic voltage is switched on before the load voltage, the EMCS-ST starts with an error that must be acknowledged.
- Wait for the initialisation ≈ 7 s until the C/Q LED is yellow.
- Update the parameter set → 12.2 Parameter set.
- Prepare the drive system for operation
 - If data has been backed up (Data Storage), the application data are automatically transferred to the integrated drive and must then be permanently saved → 12.1 Data backup (Data Storage), 8. Save application data
 - If data backup is not performed (Data Storage), homing with end-position detection must be carried out → 12.1 Data backup (Data Storage), 9. Referencing the new drive system

The drive system is then ready for operation.

12.1 Data backup (Data Storage)

Perform data backup (Data Storage)

The table shows all steps for executing the data storage function using the application software of the Festo USB IO-Link Master CDSU-1 as an example.

Steps for executing the data storage function

- Start the application software



12 Commissioning

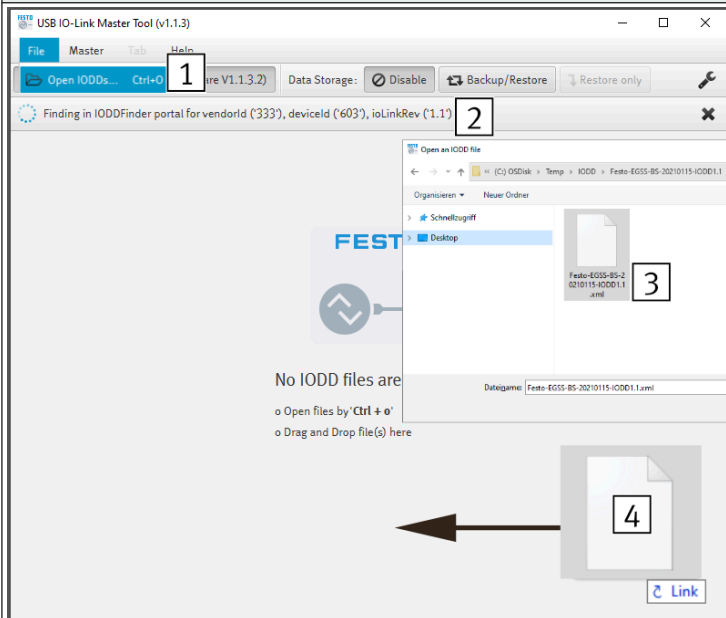
WARNING

Risk of injury due to unexpected movement of components.

- Protect the positioning range from unwanted access.
- Keep foreign objects out of the positioning range.
- Perform commissioning with low dynamic response.

Steps for executing the data storage function

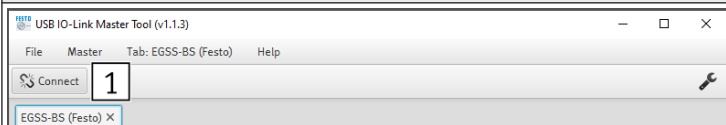
2. Open the IODD file (device description file)



Variants for opening the file:

- Open the "File" tab and execute the "Open IODDs" submenu [1]
- Via the automatic search [2]¹⁾
- Via the key combination "Ctrl + o [3]"
- By Drag&Drop [4]

3. Establish a connection to the IO-Link Master

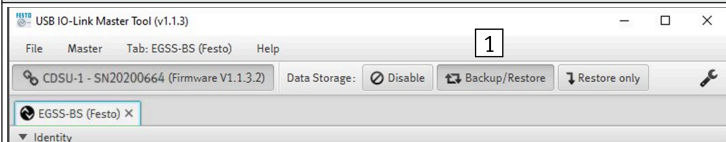


– Press the "Connect [1]" button



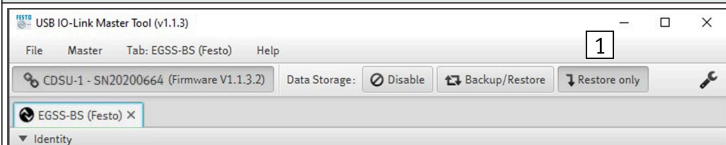
- The connection is established [2]
- Default setting: the data storage function is disabled — the "Disable [3]" button is active

4. Activate automatic saving (backup)



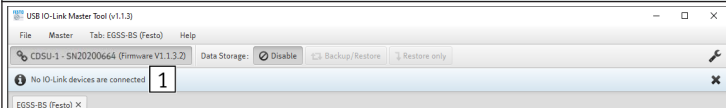
- In the "Data Storage" tab press the "Backup/Restore [1]" button
- The predefined application data is automatically saved in the IO-Link master with every change

5. Activate one-time storage (restore only)

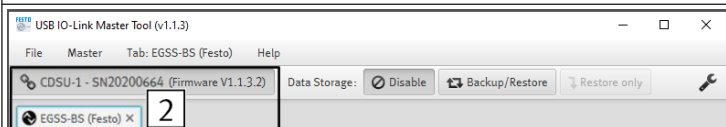


- In the "Data Storage" tab press the "Restore only [1]" button
- The predefined application data are saved once in the IO-Link master

6. Replace device



- Disconnect the electrical connections at the integrated drive
- The connection to the IO-Link master is interrupted [1]



- Electrically connect the new integrated drive to the IO-Link Master
- The connection to the IO-Link Master is automatically re-established [2]
- After a successful compatibility check of the device ID "0x0000.0A ... 0C, DeviceID1 ... ID3", the application data are automatically transferred to the integrated drive

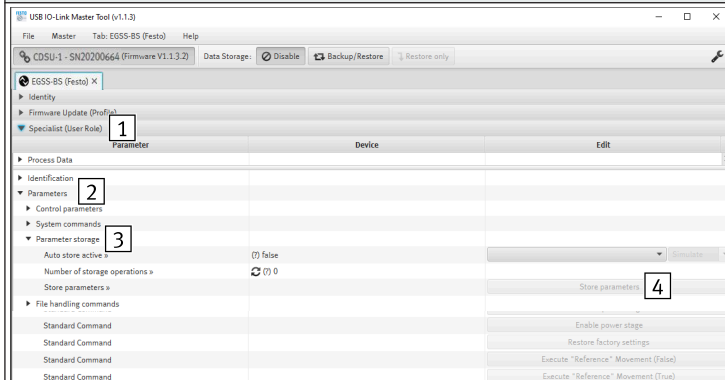
Steps for executing the data storage function

7. Check the current status of the application data



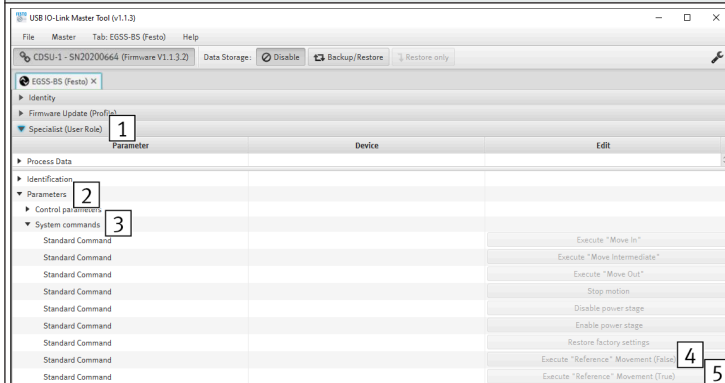
- Open the "Identity [1]" tab
- Check the current device ID in the "Device [2]" parameter. The device ID must correspond to the drive system in use
 - 0x000259 (601): ELGS-TB
 - 0x00025A (602): ELGS-BS
 - 0x00025B (603): EGSS-BS
 - 0x00025C (604): ELGE-TB
 - 0x00025E (606): EPCS-BS

8. Save application data



- Open the "Specialist (user role) [1]" tab
- Open "Parameter [2]" and "Save parameter [3]" submenus
- In the "Save parameters" parameter press the "Save parameter [4]" button

9. Reference the new drive system



- Open the "Specialist (user role) [1]" tab
- Open the "Parameter [2]" and "System commands [3]" submenus
- Execute the default command "Reference" movement [4]
- Press one of the two following buttons for the default commands:
 - Execute "Reference" movement (False) [4] (= factory setting)
 - Execute "Reference" movement (True) [5]

– Note:

After successful homing with end position determination, the transmitted values of the parameters "0x0105.0, Position Start Press", "0x0106.0, End Position Out" and "0x0108.0, Intermediate Position" are only retained if they are in the value range of the parameter "0x0106.0, End position Out" of the new drive system. If exceeded, the transferred values are replaced by the newly determined value of the parameter "0x0106.0, end position Out".

1) The use of the function depends on the application software.

Tab. 7: Steps for executing the data storage function

12.2 Parameter set

Updating parameter set

WARNING

Risk of Injury due to Unexpected Movement of Components

For vertical or slanted mounting position: when power is off, moving parts can travel or fall uncontrolled into the lower end position.

- Bring moving parts of the product into a safe end position or secure them against falling.

The integrated drive supports the update of the parameter set after a device replacement. The parameter set contains the factory settings of the drive system. Drive system-dependent parameters, such as maximum payload of the mechanism, are determined at the first homing and stored.

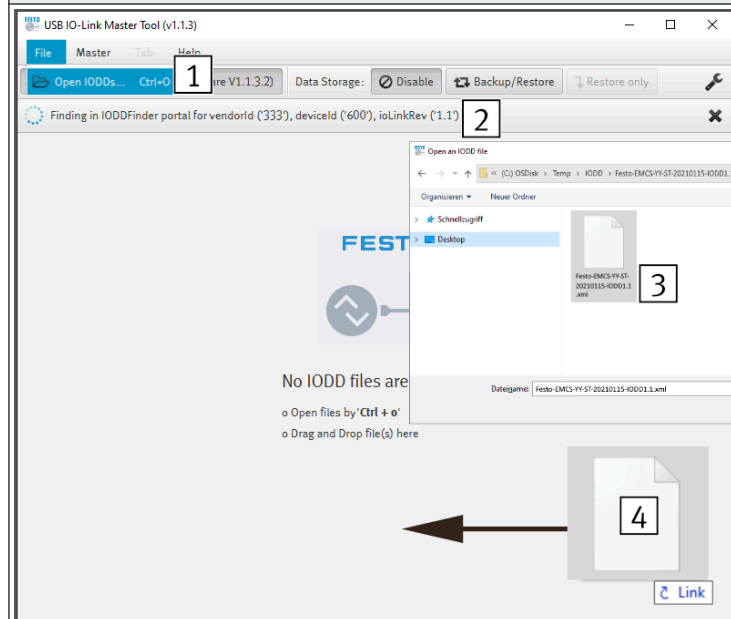
The table shows all steps for updating the parameter set using the application software of the Festo USB IO-Link Master CDSU-1 as an example.

Steps for updating the parameter set

1. Start the application software



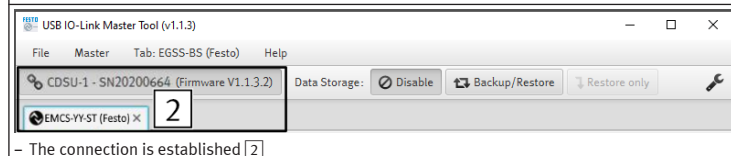
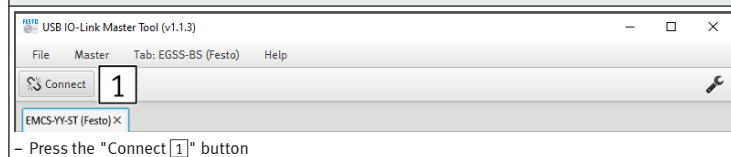
2. Open the IODD file of the replacement device "EMCS-YY-ST" (device description file)



Variants for opening the file:

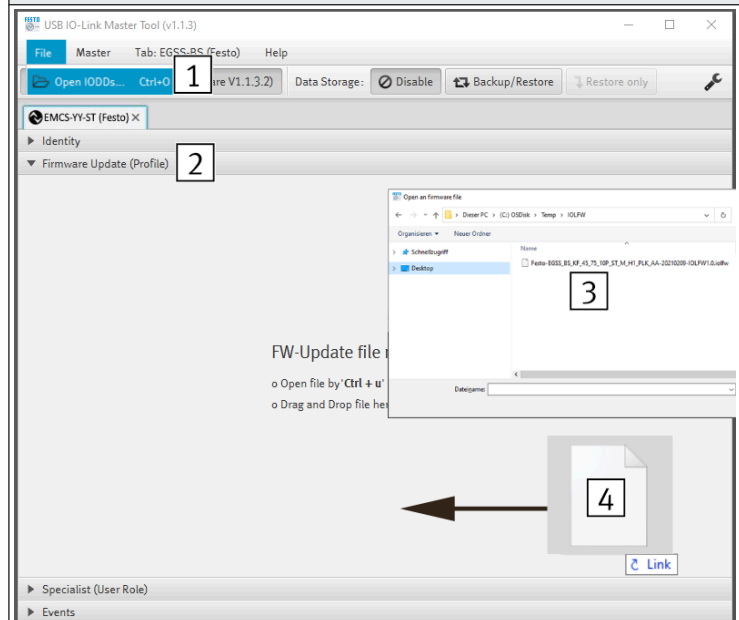
- Open the "File" tab and run the "Open IODDs" submenu [1]
- Via the automatic search [2]¹⁾
- Via the key combination "Ctrl + o [3]"
- By Drag&Drop [4]

3. Establish a connection to the IO-Link Master



Steps for updating the parameter set

4. Open the parameter set file (e.g. Festo-EGSS_....-20210209-IOLFW1.0.iolfw)

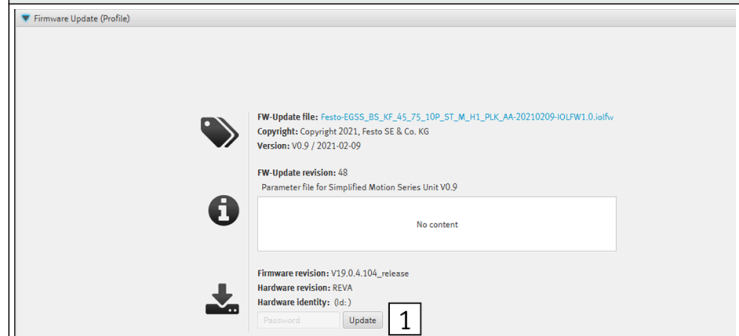


- Open the "Firmware Update (Profile)" [1] tab

Variants for opening the file:

- Open the "File" tab and run the "Open IODDs" submenu [2]
- Via the key combination "Ctrl + u [3]"
- By Drag&Drop [4]

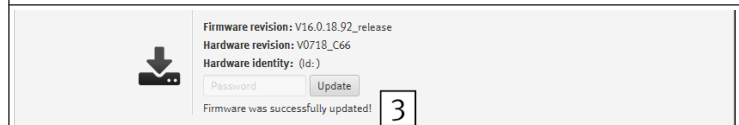
5. Upload the parameter set file into the integrated drive



- Press the "Update [1]" button

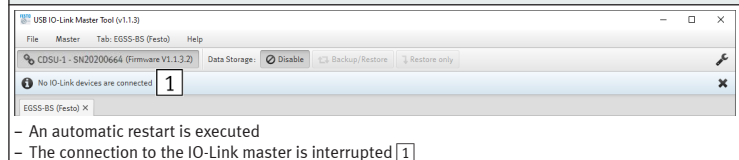


- The parameter set is transmitted [2]

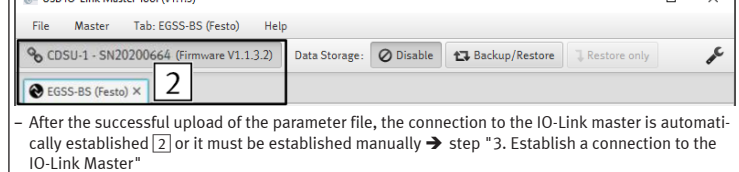


- The transfer is successfully completed [3]

6. Update the parameter set file in the integrated drive



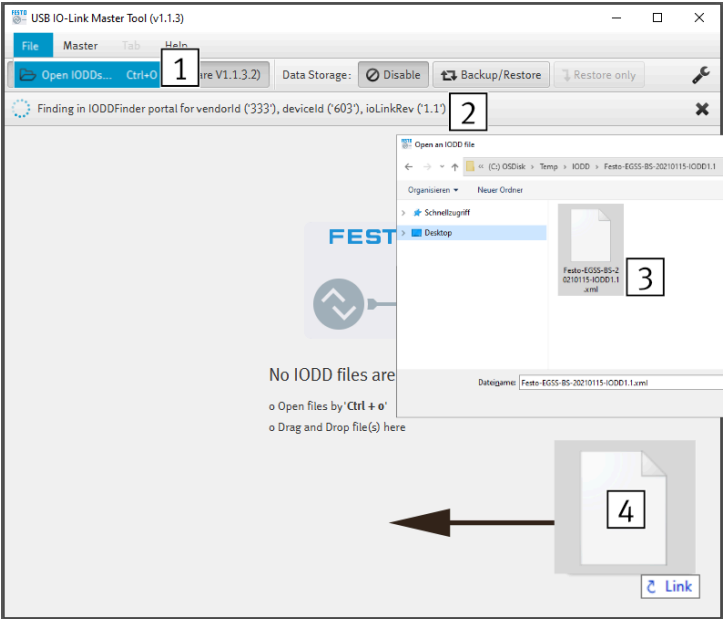
- The connection to the IO-Link master is interrupted [1]



- After the successful upload of the parameter file, the connection to the IO-Link master is automatically established [2] or it must be established manually -> step "3. Establish a connection to the IO-Link Master"

Steps for updating the parameter set

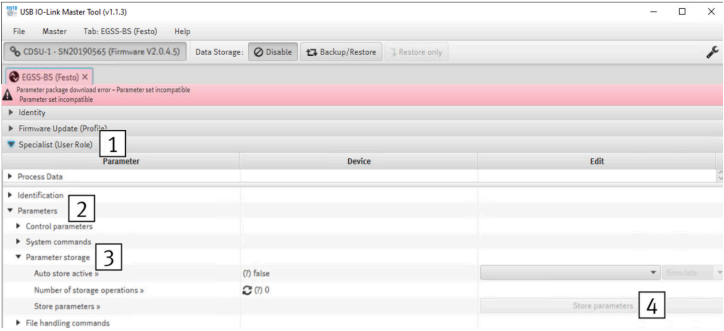
7. Open the IODD file of the drive unit (device description file)



Variants for opening the file:

- Open the "File" tab and run the "Open IODDs" submenu (1)
- Via the automatic search (2)¹⁾
- Via the key combination "Ctrl + o (3)"
- By Drag&Drop (4)

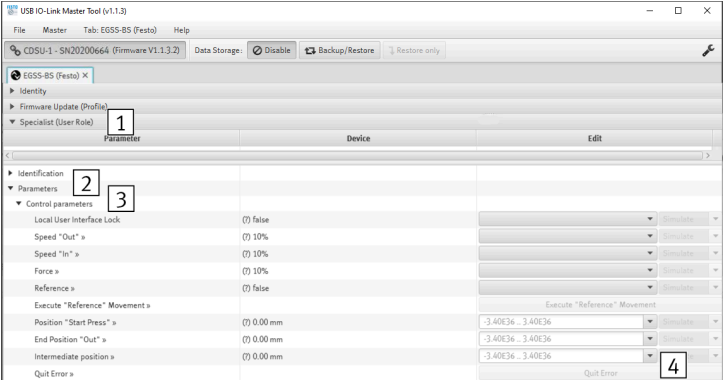
8. Eliminate incompatibility errors. Only if the error in question is displayed.



With error message "Parameter package download error - parameter set incompatible".

- Upload the parameter set to the integrated drive again and update it in the drive.
 - 5. Upload the parameter set file into the integrated drive.
 - 6. Update the parameter set file in the integrated drive.
- Acknowledge error if an error is pending.
 - Open the "Specialist (user role)" tab.
 - Open the "Parameters" and "Control parameters" submenus.
 - Press the "Acknowledge error" button.
- Save parameters/Store parameters.
 - Open the "Specialist (user role)" (1) tab.
 - Open the "Parameters" (2) and "Save parameters" (3) tab.
 - Press the "Save parameter" (4) button in the "Save parameters" parameter.
- Restart the drive with power OFF/ON.

9. Acknowledge error (only if an error is pending)



- Open the "Specialist (user role)" (1) tab
- Open "Parameter (2)" and "Control parameter (3)" submenus
- Press the "Acknowledge error (4)" button

Steps for updating the parameter set

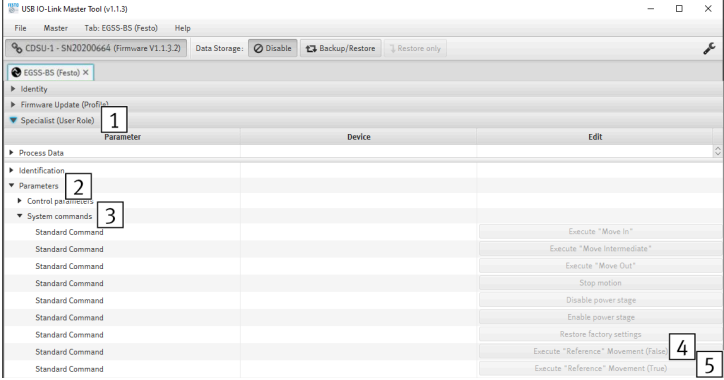
10. Check current status of the parameter set



- Open the "Identity" (1) tab
- Check the current device ID in the "Device" (2) parameter. The device ID must correspond to the drive system in use
 - 0x000259 (601): ELGS-TB
 - 0x00025A (602): ELGS-B5
 - 0x00025B (603): EGSS-B5
 - 0x00025C (604): ELGE-TB
 - 0x00025E (606): EPCS-B5

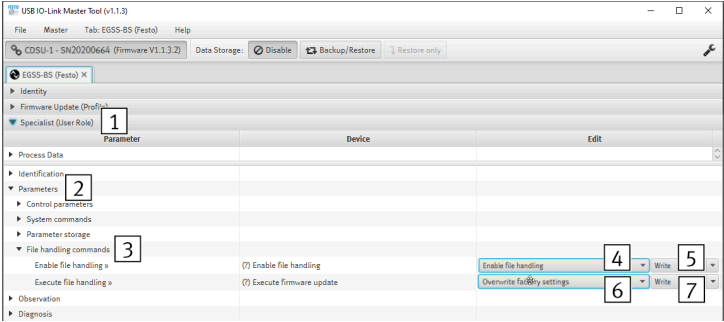
With 0x000258 (600), EMCS-YY-ST spare part, the parameter set file was not updated successfully. Repeat the sequence from step "4. Open parameter set file".

11. Initialise end positions "LimIn/ LimOut" and reference end position "Ref"



- Open the "Specialist (user role)" (1) tab
- Open the "Parameter (2)" and "System commands (3)" submenus
- Execute the default command "Reference" movement (4)
 - Press one of the two following buttons for the default commands:
 - Execute "Reference" movement (False) (4) (factory setting, motor-facing reference end position "Ref")
 - Execute "Reference" movement (True) (5) (reference end position "Ref" motor facing away)

12. Save parameter set as factory setting



- Open the "Specialist (user role)" (1) tab
- Open the "Parameter (2)" and "File handling commands (3)" submenus
- In the "Activate file handling" parameter activate the "Activate file handling (4)" value and press the "Write (5)" button
- In the "Execute file handling" parameter select the "Overwrite factory settings (6)" value and press the "Write (7)" button

1) The use of the function depends on the application software.

Tab. 8: Steps for updating the parameter set

Diagnostic messages when updating the parameter set
The table shows all diagnostic messages that may be shown when updating the parameter set.

Event code (IO-Link)	Description	LED C/Q	Error code hex (dec)
0x1820	Parameter set not found	 red light	0x0061 (97)
	Remedy – Check selection of parameter set		
0x1821	Parameter set invalid		0x0062 (98)
	Remedy – Overwrite parameter set (save) ➔ Tab. 8 Steps for updating the parameter set, 8. Eliminate incompatibility error.		
0x1822	Parameter set incompatible		0x0063 (99)
	Remedy – Overwrite parameter set (save) ➔ Tab. 8 Steps for updating the parameter set, 8. Eliminate incompatibility error.		
0x1823	Parameter not found		0x0064 (100)
	Remedy – Overwrite parameter set (save) ➔ Tab. 8 Steps for updating the parameter set, 8. Eliminate incompatibility error.		

Tab. 9: "Parameter set error" diagnostic messages