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# Firmware replacement

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## General information

### Explanation of terms

**Firmware version:**

A new firmware version comprises basic changes in the scope of functions compared to the previous version. The scope of functions may also contain incompatible changes. The firmware version is encrypted in the type code at position "VS" in AXS–V–**VS**RS.

**Firmware release:**

With a new firmware release, compatible functional enhancements are provided or errors in the firmware were corrected. The firmware release is encrypted in the type code at position "RS" in AXS–V–VS**RS**.

Different firmware replacement types:

- **Release update**
  An old firmware release contained in the device (e.g. AXS-V-03**04**) is replaced by a newer firmware release (e.g.AXS-V-03**06**).
- **Version upgrade**
  The old firmware version contained in the device is replaced by a new firmware version (example: AXS–V–**03**06 AXS–V–**is replaced by 04**04).
- **Release downgrade**
  A new firmware release contained in the device (e.g., AXS–V–03**06**) is replaced by an old firmware release (e.g., AXS–V–03**04**).
- **Version downgrade**
  The new firmware version contained in the device is replaced by an old firmware version (example: AXS–V–**04**04 is replaced by AXS–V–**03**06).

## Tools for the firmware replacement

Firmware for ctrlX DRIVE and ctrlX DRIVEplus can be replaced using the following hardware and software:

- Computer with software "ctrlX DRIVE Engineering“ or
- device with ctrlX DRIVE Panel or
- Computer with TFTP client

Under ↘ Commissioning describes the firmware replacement using the "ctrlX DRIVE Engineering" software.

For the descriptions of the variant “Firmware replacement with a TFTP client”, please see ↘ Additional information and details.

For the descriptions of the variant “Device with ctrlX DRIVE Panel“, refer to “ctrlX DRIVE Panel“.

# Commissioning

## Preparation and conditions for firmware replacement

### General information on how to proceed

Comply with the following points when replacing the firmware:

- Ethernet communication with a device has to be ensured when replacing the firmware via ctrlX DRIVE Engineering (see the application manual “TCP/IP communication”) .
- Do not switch off the 24V control voltage while replacing the firmware.
- Always complete the firmware replacement.

Also refer to the “How-to instruction" to the firmware replacement for ctrlX DRIVE (https://developer.community.boschrexroth.com/t5/Store-and-How-to/Do-firmware-or-runtime-update-with-ctrlX-DRIVE/ba-p/15289) on the community platform of ctrlX AUTOMATION.

### Preparing the firmware replacement

Firmware replacement requirements:

- The device has to be in the configuration mode (CM).
- It is recommended to save the backup parameters before replacing the firmware (see application manual " Loading, storing and saving parameters”).

### Firmware release update or firmware release downgrade

It is recommended to save the backup the device parameters before a firmware release update or a firmware release downgrade (see application manual " Loading, storing and saving parameters”).

If the firmware is replaced for a device with active SafeMotion, this procedure has to be recorded in the machine logbook, together with the axis identifier (P-0-3235.0.1 (/redirect/patternMatch?code=P-0-3235.*.1&redirectOrigin=ID1675801_483208643)), configuration type data (P-0-3234.0.1 (/redirect/patternMatch?code=P-0-3234.*.1&redirectOrigin=ID1675801_483208643)) and parameterization type data (P-0-3234.0.4 (/redirect/patternMatch?code=P-0-3234.*.4&redirectOrigin=ID1675801_483208643)).

In case of a device with safety technology options “M5”, the system checks whether firmware and parameter set are compatible. Operating the safety technology with an incompatible parameter set is prevented (the diagnostics "C8213 (/redirect/patternMatch?code=C8213&redirectOrigin=ID1675801_483208643) SMO: Incorrect parameterization“ or “C8214 (/redirect/patternMatch?code=C8214&redirectOrigin=ID1675801_483208643) SMO: Incorrect configuration“ are generated). Incompatible parameter sets are caused by Safe Motion functions being used that are no longer available in the currently loaded firmware (older firmware release).

In case of an incompatibility of firmware and parameter set, there are two options:

- Either continue with the existing parameterization by reloading the originally available firmware or
- or perform the complete initial commissioning with the new firmware, including the loading of the basic parameters for SMO.

To update a firmware release or to downgrade a firmware release, proceed as follows:

## Firmware replacement with ctrlX DRIVE Engineering

1. Connect the device to the computer.
2. - Starting ctrlX DRIVE Engineering.
   - Load project for the corresponding device or create a new project by addressing the device via Ethernet.
   - Switching the project online.
   - Select/highlight the device and call “Firmware update” in the context menu.
     ⇒A new window opens and the firmware currently available in the device is displayed. (see “Firmware update" dialog in ctrlX DRIVE Engineering).
   - Select new firmware (*.fwa file) in the upper part of the dialog and start the firmware replacement via the “Update” button.
     ⇒The firmware is downloaded automatically. All required firmware components are loaded to the device.
   - After the firmware has been replaced, close the “Firmware update” window.
3. Restart the device.

   At the end of the firmware replacement, ctrlX DRIVE Engineering automatically provides the option to restart the drive via the reboot command S-0-1350 (/redirect/patternMatch?code=S-0-1350&redirectOrigin=ID1675801_483208643). Optionally, the device can be reset via a control voltage reset.
4. Put the machine back into ready-for-operation state according to machine manufacturer's instructions.
5. Check controller functions.
6. **For drive control devices with active SafeMotion:** The firmware replacement has to be recorded in the machine logbook, together with the axis identifier (P-0-3235.0.1

(/redirect/patternMatch?code=P-0-3235.*.1&redirectOrigin=ID1675801_483208643)), configuration type data (P-0-3234.0.1 (/redirect/patternMatch?code=P-0-3234.*.1&redirectOrigin=ID1675801_483208643)) and parameterization type data (P-0-3234.0.4 (/redirect/patternMatch?code=P-0-3234.*.4&redirectOrigin=ID1675801_483208643)).

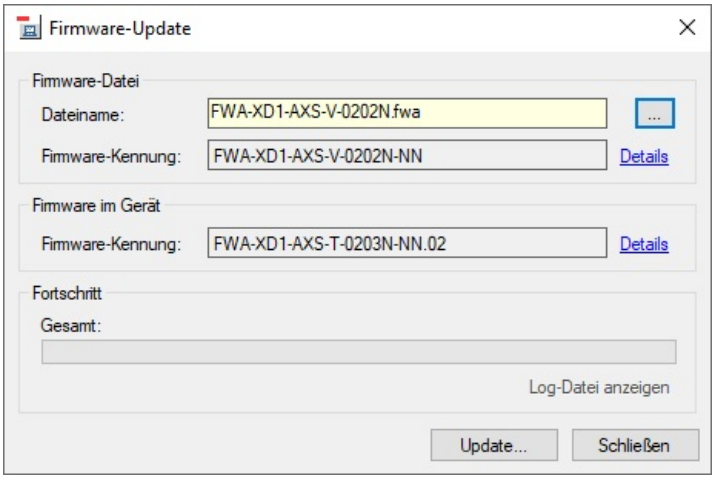

Fig. 96: "Firmware update" dialog in ctrlX DRIVE Engineering

## Additional information and details

### Firmware replacement with a TFTP client

To replace the firmware using a TFTP client, proceed as follows:

1. Connect the device to the computer.
2. The firmware update service is provided via a TFTP server. The command for transmitting the firmware is the “put” command. The TFTP client has to transmit the file in the binary format.

   It is possible to use any TFTP client supporting the "put” command (e.g. Windows command line program "tftp.exe”) to replace the firmware**without** ctrlX DRIVE Engineering.

   **Example** (with “Microsoft Windows consoles TFTP client”):

   To replace the firmware, only a “put” request is transmitted. Leave the optional alternative name (<destination>) for the file on the target system blank. The IP address of the device has to be specified as the target (<host>) (the standard IP address is 192.168.0.1): `tftp -i 192.168.0.1 put FWA-XD1-AXS-V-0306N.fwa`. (The parameter “-i” indicates that the file is to be transmitted as a binary file).

3. Restart the device. There are the following options:
   - Restart the device by a control voltage reset.
   - Restart the device by a executing the reboot command S-0-1350 (/redirect/patternMatch?

code=S-0-1350&redirectOrigin=ID1675801_483208643).

4. Put the machine back into ready-for-operation state according to machine manufacturer's instructions.
5. Check controller functions.
6. **For drive control devices with active SafeMotion:** The firmware replacement has to be recorded in the machine logbook, together with the axis identifier (P-0-3235.0.1 (/redirect/patternMatch?code=P-0-3235.*.1&redirectOrigin=ID1675801_483208643)), configuration type data (P-0-3234.0.1 (/redirect/patternMatch?code=P-0-3234.*.1&redirectOrigin=ID1675801_483208643)) and parameterization type data (P-0-3234.0.4 (/redirect/patternMatch?code=P-0-3234.*.4&redirectOrigin=ID1675801_483208643)).

## Possible issues during firmware replacement

After an incomplete firmware replacement, the device possibly is no longer operable.

The firmware replacement is carried out incompletely, if one of the following situations occurs while the firmware is replaced:

- 24V supply of control section is switched off
- Instable/poor connection to the drive (e. g. due to interferences)
- Connection to the device is interrupted (e.g., defective interface cable)
- Crash of the update software or of the computer

A reboot or reset of the control voltage is required after each failed firmware replacement.

**In case of a failed firmware replacement, different errors (e. g. F8115 (/redirect/patternMatch?code=F8115&redirectOrigin=ID1675801_483208643), F8122 (/redirect/patternMatch?code=F8122&redirectOrigin=ID1675801_483208643), F8131 (/redirect/patternMatch?code=F8131&redirectOrigin=ID1675801_483208643)) can be reported. In individual cases, the control voltage has to be reset three times until the firmware can be downloaded.**

Following a successful firmware replacement, restart the device.