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Release Notes

XC20 DRIVE

Runtime AXL-V-04RS (up to AXL-V-0406.14)



Edition 01

Release Notes:

XC20 DRIVE Runtime AXL-V-04RS

Firmware Version Support up to AXL-V-0406.14

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1. Overview

In the type codes of the drive controllers and supply units, the firmware is referred to as Runtime. In this documentation, the term “firmware” is used interchangeably.

1.1 Releases

The following table provides a record of revisions for firmware FWA-XD1-AXL-V-04RSN-NN.

Firmware Designation	Release Date	Change of Version
FWA-XD1-AXL-V-0406-NN.08-EC+LocalBuild	2026-01-16	AXL-V-0406.08
FWA-XD1-AXL-V-0406-NN.08-PN+LocalBuild	2026-01-16	AXL-V-0406.08
FWA-XD1-AXL-V-0406-NN.08-FC+LocalBuild	2026-01-16	AXL-V-0406.08
FWA-XD1-AXL-V-0406-NN.14-EC+LocalBuild	2026-06-29	AXL-V-0406.14
FWA-XD1-AXL-V-0406-NN.14-PN+LocalBuild	2026-06-29	AXL-V-0406.14

> **Note:** A patch is based on a full version of the firmware. A patch typically fixes one or multiple major restrictions.

1.2 Compatibility

1.2.1 AXL-V-04RS

- **Device Compatibility:** Releases of version AXL-V-04RS only run on XC20 devices. It is **not** compatible with other devices in the ctrlX DRIVE portfolio.

Digits :	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Characteristic-Nr.:	01				.	02	03				04	05	06	.	07		08	09		10		11		12		.	13	14		15		16	17	18				19	20	21	
Typecode :	XC20				–	W	0005			C-	RB	N	–	01		B	PN		T0		NN		NN		–	S	VS		RS		N	2	NNN				NN		NN	

Fig. 1: XC20 DRIVE type designation

1.2.2 AXL-V-0406

- **Incompatible (PROFINET Pre-addressing):** Pre-addressing via `S-0-090x` is not supported with PROFINET in this version.
- **Incompatible (PROFINET I&M Data Parameters):** Obsolete I&M data parameters cannot be accessed anymore via PROFINET:

- `P-0-1680.0.1` (PND I&M0 RevisionCounter) was set to a fixed value of “0”. No parameter is contained.
- `P-0-1680.0.6` (PND I&M4 Descriptor) has been removed.

1.3 System Overview



Fig. 2: Firmware releases up up to AXL-V-0406.14

Digits :	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Characteristic-Nr.:	01			.	02		03				04	05	06	.	07		08	09		10		11		12		.	13	14		15		16	17	18				19	20	21	
Typecode :	XC20			–	W		0005				C	RB	N	–	01		B	PN		T0		NN		NN		–	S	VS		RS		N	2	NNN				N	NO	NN	

Fig. 3: Device type code

- **STO Certification:** Certified firmware/STO options are highlighted in safety manuals.
- **Firmware Delivery:** When ordering the firmware AXL-V-04RS, the last patch of AXL-V-0406 is provided. For additional information, please see the specific Release Notes of AXL-V-0406.

XC20 DRIVE						
	XC20	Certified Safe Funtion Built into AXL	Encoder	Multi-Ethernet		
			Tamagawa	EtherCAT SoE	EtherCAT CoE	Profinet-IO
AXL-V-0406	√	STO	√	√	√	√

1.4 Related Documentation

The following documents are currently in preparation:

- *XC20 DRIVE Runtime AXL-V-04 Functions*
- *XC20 DRIVE, Runtime AXL-V-04RS Functions (CoE)*
- *XC20 DRIVE Parameters of Runtime AXL-V-04*
- *XC20 DRIVE Diagnostic Messages of Runtime AXL-V-04*
- *XC20 DRIVE Drive Systems, Project Planning Manual*

2. Firmware Replacement

2.1 General Information

2.1.1 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 encoded in the type code at the “VS” position (e.g., AXL–V–**VS**RS).
- **Firmware Release:** A new firmware release makes available compatible functional enhancements or bug fixes. The firmware release is encoded in the type code at the “RS” position (e.g., AXL–V–VV**RS**).

Different Firmware Replacement Types:

1. **Release Update:** An old firmware release contained in the device (e.g., AXL–V–0304) is replaced by a new firmware release (e.g., AXL–V–0306).
2. **Version Upgrade:** The old firmware version contained in the device is replaced by a new firmware version (e.g., AXL–V–0306 is replaced by AXL–V–0404).
3. **Release Downgrade:** A new firmware release contained in the device (e.g., AXL–V–0306) is replaced by an old firmware release (e.g., AXL–V–0304).
4. **Version Downgrade:** The new firmware version contained in the device is replaced by an old firmware version (e.g., AXL–V–0404 is replaced by AXL–V–0306).

2.1.2 Tools for Firmware Replacement

Firmware for XC20 DRIVE can be replaced using the following hardware and software:

- Computer equipped with “ctrlX DRIVE Engineering XC” software.

2.2 Commissioning

2.2.1 Preparations and Conditions

Comply with the following instructions when replacing the firmware:

- **Communication:** Ethernet communication with the device must be ensured when replacing the firmware via ctrlX DRIVE Engineering XC (see Application Manual “TCP/IP communication”).
- **Power Supply:** Do not switch off the 24V control voltage while replacing the firmware.
- **Completion:** Always let the firmware replacement process complete fully.

> **Note:** Please refer to the “How-to instructions” for firmware replacement of ctrlX DRIVE on the community platform of ctrlX AUTOMATION.

Requirements:

- The device must be in **Configuration Mode (CM)**.

- It is highly recommended to save a backup of the parameters before replacing the firmware (see Application Manual “Loading, storing and saving parameters”).

2.2.2 Firmware Release Update or Downgrade Procedure

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

5. Connect the device to the computer.
6. Launch “ctrlX DRIVE Engineering XC” and load the project for the corresponding device or create a new project by addressing the device via Ethernet.
7. Switch the project to “online” status.
8. Select/highlight the device and open “Firmware update” in the context menu. A new window will display the current firmware.
9. Select the new firmware (*.fwa file) in the upper part of the dialog and start the replacement via the “Update” button. The firmware components will load automatically.
10. Close the window once the transfer has finished.
11. Restart the device using the reboot command S-0-1350 within the software, or by cycling the 24V control voltage.
12. Put the machine back into service according to the manufacturer's safety instructions, and verify device functions.

2.3 Additional Information and Details

2.3.1 Possible Issues During Firmware Replacement

If the firmware replacement is interrupted, the device may become inoperable. Interruptions can be caused by:

- 24V supply of control section being switched off.
- Unstable or poor connection to the drive (e.g., due to EMC interference).
- Physical connection interrupted (e.g., defective interface cable).
- PC crash or software crash of ctrlX DRIVE Engineering.

> **Warning:** After a failed update, different errors (such as F8115, F8122, F8131) can be reported. In some cases, the control voltage must be reset up to three times until the bootloader recovers and allows the firmware download to be retried.

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3. XC20 DRIVE Runtime AXL-V-04RS Details

3.1 Firmware Release AXL-V-0406.08

3.1.1 New Functions

Control 24V Power Supply Dropout Detection Filter Optimization *(ID 1152659)*

- **Description:** Adjusted the software filter depth for detecting voltage failures when control power fails or drops due to external load.
- **Benefit:** Improved storage stability of `0x24B4:02 / P-0-0177` (Retain Data) and `0x24B4:03 / P-0-3819` (Static Data) under weak voltage conditions.

Transition of E2815 Warning to E8025/F8817 Fault Indication *(ID 1150998)*

- **Description:** Since the XC20 does not feature input Mains detection, main power overvoltage in the disabled state is detected via the DC Bus voltage.
- **Change:** The warning `E2815` is deprecated; overvoltage is now indicated via bus overvoltage fault `E8025 / F8817`.

F4002 Error Auto-Reset Functionality *(ID 1115912)*

- **Description:** Added options to adapt to various third-party master controllers.
- **Configuration:**

```
0x2BD2:01 / P-0-4088 bit 4 = 0 (Default):
  Retains original F4002 strategy. Reports error when abnormal consumer data exceeds
2.
  Requires manual reset.

0x2BD2:01 / P-0-4088 bit 4 = 1:
  Activates auto-reset strategy. When communication switches to OP state and consumer
  data recovers, the F4002 fault automatically resets.
```

3.1.2 Resolved Restrictions

DC Bus Voltage Lag at 16 kHz Carrier Frequency *(ID 1144924)*

- **Issue:** DC bus voltage display showed a lag under 16 kHz carrier frequency.
- **Fix:** Since the XC20 hardware does not have the Lp-mini sampling board, the refresh strategy was adjusted to resolve the display lag.

DC Bus Voltage Fluctuation at 4 kHz Carrier Frequency *(ID 1144931)*

- **Issue:** DC bus voltage display fluctuated under 4 kHz carrier frequency.
- **Fix:** Adjusted sampling refresh strategy to stabilize readings at 4 kHz.

Optimization of LED Test Command C9900 *(ID 1155348)*

- **Issue:** Problems with LED service Command C9900 were found during production line testing.
- **Fix:** Optimized implementation logic for the command via 0x2B00:01 / P-0-0260.

Optimization of Fan Test Command C9900 *(ID 1155473)*

- **Issue:** Problems with Fan service Command C9900 during line testing.
- **Fix:** Optimized logic for command 0x2B00:01 / P-0-0260 to ensure robust production testing.

3.1.3 Restrictions & Workarounds

S-0-0135 ZKL2 Warning Bit Issue *(ID 1075746)*

- **Restriction:** Under Profile Type “ServoDrive” (SoE), Bit 12 in status word S-0-0135 does not associate with the status of S-0-0012 as documented.
- **Workaround:** Use bit 2 of the axis status word 0x2802:02 / P-0-0115 to read Class 2 category warnings.

Acyclic Communication Timeout under Frequent SIP/Internal Acyclic Calls *(ID 1161170)*

- **Restriction:** Frequent disconnections during test sequences using SIP or SDO for non-periodic parameter/command reads.
- **Workaround:** Avoid executing a high frequency of large read/write blocks in a short duration. Fragment large test routines into smaller sequential segments. (Discovered during stress testing; typically not reproducible in normal customer applications).

CoE: Object 0x60B9 Display Value Error in PDO Channel *(ID 1162563)*

- **Restriction:** In PDO, the value 0x60B9 is incorrect and copies the previous PDO parameter or returns a random value.
- **Workaround:** Read via SDO channel. (Fixed in release patch AXL-V-0406.10).

CoE: FErr- Error when Adding 0x60B8 to PDO List *(ID 1162564)*

- **Restriction:** Adding probe control word 0x60B8 to the cyclic PDO list causes the digital tube to display FErr- and disconnects ctrlX Drive Engineering. Requires reboot.
- **Workaround:** Read via SDO channel. (Fixed in release patch AXL-V-0406.10).

3.2 Firmware Release AXL-V-0406.14

3.2.1 New Functions

Panel Display Hierarchy Priority Optimization *(ID 1233151)*

- **Description:** Switched the default panel display from “Status Display” to “Diagnostic Display” to increase overall status visibility consistency.

Full Increment Scaling Support for CODESYS PLCs *(ID 1160999)*

- **Description:** Under the 'Increment' scaling type, homing and absolute reference settings function normally. The position overflow issue in older CODESYS SoftMotion versions is resolved.
- **Configuration Settings:**

```
Settings for SoE Profile:
  S-0-0076 = 8 (Incremental scaling type)
  P-0-0559 = 8388608 (Encoder resolution of single turn)
  S-0-0278 = 0 (Position overflow range set to 32-bit)

Settings for CoE Profile:
  0x60A8:00 / P-0-1901.0.35 = 0x00B50000 (Incremental scaling type)
  0x2900:05 / P-0-0559 = 8388608 (Encoder resolution of single turn)
  0x2488:02 / S-0-0278 = 0 (Position overflow range set to 32-bit)
```

User-Configurable Data Loss Threshold *(ID 1239157)*

- **Description:** Users can now configure parameter `S-0-1050.x.11` (Allowed Data Losses) to suit noisy or specific third-party EMC environments. Previously, this parameter was forced back to 1 upon every restart.

3.2.2 Resolved Restrictions

CoE Object 0x60B9 Display Bug Fix *(ID 1162563)*

- **Issue:** Display bug on CoE Object 0x60B9.
- **Fix:** Resolved in AXL-V-0406.10 and later.

CoE FErr- Bug Fix when Adding 0x60B8 to PDO *(ID 1162564)*

- **Issue:** FErr- error when adding 0x60B8 to PDO.
- **Fix:** Resolved in AXL-V-0406.10 and later.

Network Robustness Enhancements for E2092 / F4002 *(ID 1233375)*

- **Issue:** Occasional communication interruptions in high-noise environments related to physical layer MII initialization.
- **Fix:** Improved physical layer startup stability in MII mode, disabled obsolete physical layer protocols, and boosted electromagnetic signal immunity. (Fixed in AXL-V-0406.14 and later).

False F8820 Error Trigger Correction *(ID 1157027)*

- **Issue:** False trigger of F8820 error if the bleeder resistor enabling was unselected and OM auto-start power mode was disabled.
- **Fix:** Corrected the triggering conditions. (Fixed in AXL-V-0406.14 and later).

Incorrect Reaction on E-Stop Warning E8034 *(ID 1160097)*

- **Issue:** Axis did not decelerate or disable status AF when warning E8034 was active.
- **Fix:** The axis now properly decelerates to Ab/bb status in accordance with the specified drive halt strategy. (Fixed in AXL-V-0406.14 and later).

ESC Physical Port Error Mapping Fix *(ID 1230527)*

- **Issue:** Incorrect port error frame display on the ESC physical layer.

- **Fix:** The mapping between parameter S-0-1034 and ESC physical ports P0 and P1 has been corrected. (Fixed in AXL-V-0406.14 and later).

3.2.3 Restrictions & Workarounds

S-0-0135 ZKL2 Warning Association *(ID 1075746)*

- **Restriction:** Bit 12 in status word S-0-0135 does not map to warning status S-0-0012 under SoE.
- **Workaround:** Read warnings via bit 2 of axis status word 0x2802:02 / P-0-0115.

Frequent SIP/Internal Acyclic Communication Timeout *(ID 1161170)*

- **Restriction:** Timeout risk during heavy concurrent parameter writing.
- **Workaround:** Avoid sending large batches of acyclic SDO/SIP commands in short intervals.

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4. Service and Support

Our worldwide service network provides an optimized and efficient support. Our experts provide you with advice and assistance. You can contact us 24/7 — including weekends and public holidays.

Local Service China

The service center is located in Xi'an city, providing customer and technical support.

- **Tel:** +400 887 6910
- **Internet:** Bosch Rexroth China

Service Worldwide

Outside China/Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses listed on our internet sites.

Preparing Information for Support Case

To assist you quickly, please prepare the following information before contacting support:

- Detailed description of the malfunction and operation circumstances.
- Type plate specifications of the affected products (type codes and serial numbers).
- Your contact information (phone/fax number and e-mail address).
- **Important:** Back up all parameters or generate a system report in ctrlX DRIVE Engineering ("**Help**" → "**Generate system report**").

Manufacturer Information

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