OS version update

OS version update for controllers

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Table of contents

1 Introduction

1.1 OS versions

This document describes the enhancements and bug fixes for the following OS versions:

Product	Version	CANOpen	J1939	MQTT	OPCUA	EtherCAT®	JetWay Slave
JC-340 JC-350	1.38.0.00						Yes
JC-365MC	1.38.0.00	Yes	Yes				Yes
JC-12xMC	1.38.1.00	Yes	Yes				Yes
JC-940MC JC-970MC	1.22.0.00				Yes		
JC-945MC JC-975MC	1.22.0.00				Yes	Yes	
JC-440MC /EXT	1.14.0.00	Yes		Yes	Yes	Yes	
JC-440CN	1.14.0.00	Yes		Yes	Yes	Yes	
JV_JVM-*	4.16.0.00	Yes	Yes				
JC-310-JM	1.38.0.00						
JC-200-ETH	1.38.0.00						

1.2 Discontinued controllers

The following controllers have been discontinued and are no longer included in JetSym:

- JCM-350
- JCM-501
- JCM-511
- JCM-521
- JCM-620
- JVM-104
- JVM-407B
- JVM-507B
- JVM-604B
- BTM011B
- BTM09B

2 New Enhancements

2.1 MCX

2.1.1 Participants in a path group can be read out at the axis object

As with technology groups, it is now possible to read from the axis object whether the axis is assigned to an active path group.
The following new command is available in the Motion API for this purpose:
nInt := AX1.State.Geo.**GeoID**
This command returns the MCGeo ID of a path group in which this axis is integrated. If the axis is not integrated into a path group or the path group is not active, the value 0 is returned.
This command is available starting with Motion API 1.3.0.0 and 2.2.0.0.

2.1.2 New positioning mode for absolute positioning of orientation

There is now a new positioning mode for the movement of orientation within a path group. Previously, the **Absolute** positioning mode always moved along the shortest path from the actual orientation to the target orientation. With the **AbsOriNormal** positioning mode, the moving now is in the direction resulting from the difference between the target orientation and the actual orientation.
This command is available starting with Motion API 1.3.0.0 and 2.2.0.0.

2.1.3 JC-975/JC-965/JC-945: Increase in the number of axes

The number of controllable axes has been increased from 64 to 132 in these controllers. It does not matter whether the axes are in simulation or not.

2.1.4 JM-35xx: Automatic adjustment of speed and position controllers

For the JM-3000 series servo amplifiers, automatic adjustment of the parameters for the speed and position controllers can now be activated in the motion setup of the axis. The total moment of inertia is also measured, the value of which is required for estimating the control parameters. During this optimization process, the axis is moved in an oscillating manner.

Notice:
The machine mechanics must be designed for this purpose.

The new **Start Optimization** button on the **Speed Controller** page starts an oscillating motion and measures current and speed values. The mass moment of inertia is determined from these values. Depending on the stiffness setting, the values for the controller parameters are calculated and entered. The JetSym help section contains an explanation of the function and the necessary parameters.

2.1.5 Activate second encoder when first encoder is set to “not active”

A second encoder can now be selected if the first encoder is not activated.

Use case:
The JM-10xx can operate stepper motors in both controlled and uncontrolled modes. If a stepper motor is operated without regulation, the option **not active** has to be selected for the first encoder. Until now, it has not been possible to activate a second encoder in this case. However, a second encoder can still be selected as a square-wave incremental encoder or sine-cosine incremental encoder. In this way, an encoder can be used to monitor the position of the stepper motor without this encoder being used for control purposes. The position of the second encoder can be assigned to an external axis, which you can use to read out the encoder position.

2.2 Jet-VM

2.2.1 Method calls with a null reference

With memory protection enabled, method calls to the Jet-VM with a null reference are now better caught.

2.2.2 New error message for STX heap malloc

If there is an error in the internal STX heap malloc memory management, the new error message SYSERR_JVM_HEAPMALLOC Reg is displayed and bit 19 in register 200009 is set.

2.3 Changes for mobile controllers

2.3.1 CANOpen

After downloading an OS file (CanOpenDownloadOS) to a mobile node, heartbeat monitoring of the target node was subsequently deactivated. After a successful download, this is now automatically set to the previously configured value.

2.4 JC-440MC-EXT

2.4.1 Loopback

Loopback has been implemented. You can now talk to yourself via the IP address 127.0.0.1.

2.5 JC-440MC-EXT and JC-9xx*

2.5.1 FTPS

The FTPS server uses the same TCP/IP ports as the FTP server. Encryption via TLS/SSL is now supported. To ensure maximum compatibility with previous operating systems, all users are accessible via FTP and

FTPS, with the exception of the **admin** user. Logging in with **admin** and accessing the user management files in the **System directory** is now only possible via FTPS.

2.5.2 Firewall

When updating a controller with an operating system version prior to the introduction of the firewall, the firewall's non-volatile memory must first be initialized.

- The controller maintains two tables with TCP and UDP ports that are closed.
- The tables can be created by the user.
- The tables are stored in non-volatile memory and are therefore already active during the boot phase.
- The tables can be changed by the user during runtime. The changes take effect immediately.
- Received Ethernet packets whose destination port is contained in one of the tables are not forwarded to the TCP/IP stack, but are discarded.
- The firewall is accessed via registers in the range 315000 to 315999

– Register	– Description
315000	Status (read) Bit 0: 1 = Tables with closed ports valid: CRC correct Bit 1: 1 = Firewall ON (commands 1 and 2): only switched on if bit 0 is set
315001	Command (read/write) 1: Switch firewall ON 2: Switch firewall OFF 3: Close ports from Reg. 3152xx and Reg. 3154xx 4: Open ports from Reg. 3152xx and Reg. 3154xx 6: Initialization: Release all closed ports
315002	Maximum number of ports per table = 20 (read)
315003	Number of closed TCP ports (read)
315004	Number of closed UDP ports (read)
315005	Number of discarded TCP packets (read/write)
315006	Number of discarded UDP packets (read/write)
315009	Software version (read)
315010 .. 315020	Admin password (register string) (read/write)
315100 .. 315119	Table of closed TCP ports (remanent) (read)
315200 .. 315219	User table with ports that are to be closed or released with the next command 3 or 4 (read/write)

– Register	– Description
315300 .. 315319	Table of closed UDP ports (remanent) (read)
315400 .. 315419	User table with ports that are to be closed or released with the next command 3 or 4 (read/write)

Boot phase of the controller
During the boot phase, the controller checks the contents of the two tables with closed ports (registers 3151xx and 3153xx) for validity by forming a CRC via the remanent memory. If the CRC is correct, bit 0 is set in status register 315000. If, in addition, at least one register in one of the two tables has a value other than 0, bit 1 is also set in the status register and the firewall is activated.

Command register 315001
The user controls the firewall exclusively via commands that are written to the command register. Each command is processed immediately.
If the password in Reg. 315010-315020 does not match the password of the user “admin”, the command written to this register is not executed and the register returns the value 0 when read back.
If the password in Reg. 315010-315020 contains the correct “admin” password, the command written to this register is executed and the register returns the value of the written command when read back. Once a command has been executed, the password registers are deleted.

Closing ports
The value 0 in the port tables (registers 3151xx, 3152xx, 3153xx, 3154xx) has no effect.
To close ports, proceed as follows:

1. Enter the numbers of the ports to be closed in registers 315200 to 315219 for TCP ports and 315400 to 315419 for UDP ports.
2. Write the “admin” password in the string register starting at 315010.
3. Write the value 3 in command register 315001.

⇨ The TCP ports from registers 315200 to 315219 and the UDP ports from registers 315400 to 315419 are transferred to the remanent registers 315100 to 315119 and 315300 to 315319, respectively, and the firewall is activated (Reg. 315000.1 = 1).

⇨ The CRC is calculated and, if necessary, bit 0 is set in register 315000.

⇨ If ports that are already closed are to be closed, this has no further effect.

Enabling ports
The value 0 in the port tables (registers 3151xx, 3152xx, 3153xx, 3154xx) has no effect. To enable ports, proceed as follows:

1. Enter the numbers of the ports to be enabled in registers 315200 to 315219 for TCP ports and 315400 to 315419 for UDP ports.
2. Write the “admin” password in the string register starting at 315010.

3. Write the value 4 in command register 315001.

⇨ The TCP ports from registers 315200 to 315219 and the UDP ports from registers 315400 to 315419 remove the corresponding entries from the remanent registers 315100 to 315119 and 315300 to 315319, respectively. When no more ports are closed, the firewall is disabled (Reg. 315000.1 = 0).

⇨ The CRC is calculated and, if necessary, bit 0 is set in register 315000.

⇨ If ports that are not closed are to be enabled, this has no further effect.

Initialization / Release all closed ports
This can also be used as an initialization command. To release all ports, proceed as follows:

1. Write the “admin” password in the string register starting at 315010.

2. Write the value 6 in command register 315001.

⇨ All entries in the remanent registers 315100 to 315119 and 315300 to 315319 are set to 0, thereby enabling all ports. The firewall is disabled (reg. 315000.1 = 0).

⇨ The CRC is calculated and, if necessary, bit 0 is set in register 315000.

2.6 JC-97x

Three new system commands have been added for the Windows part of the controls:

- **111** = Shutdown Windows: Shut down Windows properly before turning off the control
- **112** = Reboot Windows: Restart Windows, analogous to system command 102 for restarting the control part
- **113** = Boot Windows: Reboot Windows after a shutdown

3 Bugfix

3.1 General

3.1.1 Name length of a DA file

The maximum name length of a DA file has been increased from 32 to 256 characters.

3.1.2 Function DirLister

If an invalid path was specified when calling the **DirListPath()** function, it was possible that no error was returned. This was the case, for example, when attempting to access a USB stick or SD card, but the length of the path exceeded 260 characters. All subsequent calls to DirList functions, including **DirListClose()**, were not executed and immediately returned an error. This error has been fixed so that an error is returned when **DirListPath()** is called.

3.1.3 File-Browser in JetSym

Uploading a file by right-clicking on **File** in the **Configuration/File System** tab in JetSym did not work for controllers with “USB/SD Card/System Path”. In the directories mentioned, no date or file size was displayed for the files, only the content.

3.2 HTTP Server

3.2.1 ServerSideIncludes for JSON files

Previously, ServerSideIncludes could only be used for HTML files. Now, ServerSideIncludes can also be used directly in JSON files. This eliminates the need to parse HTML files for small visualizations.

Example ServerSideIncludes:

```
<JC:DTAG xmlns:JC="http://jetter.de/ssi/jetcontrol" />

{

  "Uptime_Sec": <JC:DTAG name="R201001" type="INT" />,

  "Hostname": "<JC:DTAG name=R101233" type="STRING" />",

  "OS-Version": "0x<JC:DTAG name="R200169" type="INTX" />",

  "BL-Version": <JC:DTAG name="R200168" type="INT" />

}
```

3.2.2 Connection monitoring on the HTTP server

The HTTP server can manage a maximum of 16 simultaneously open connections. If connections are not closed properly by the browser, as is the case with remote maintenance, for example, it may not be possible to establish any further connections. In future, connections on which no activity is detected will be closed by the control system after 5 minutes.

3.3 Industrial controls

3.3.1 JetSym oscilloscope

An error occurred when starting an oscilloscope recording in JetSym.
The error only occurred with the following configuration:

- Device internal mode
- The actual current, for example, is to be recorded from a variable in a JetMove 2xx.
- Cyclic STX tasks or pub/sub communication with short cycle times

When starting the oscilloscope recording, it could happen that the cycle times of STX tasks and/or Pub/Sub were not adhered to. The error only occurred at startup, but not during an oscilloscope recording.

3.3.2 MQTT certificates call sequence unclear

When the controller boots up, the MQTT module searches for the public and private certificate elements in the file system under the path **/SysConfig/PKI/Mqtt** during initialization. The **Mqtt** directory must be created by the user (note that it is case-sensitive). Then copy the public and private keys into it.

Public .pem
Private .key

A certificate will be issued based on this. If an error occurs during reading or conversion, the internal default certificate of the controller is used. The broker determines whether the certificate will be used. If a certificate is required, the data exchange takes place in encrypted form after successful authentication.

3.3.3 Crash during program download when Modbus TCP was running

The ModbusTCP connection could not be stopped when downloading the application. This resulted in the last command of the previously executed application continuing to be processed. A renewed initialization failed (return -10). Now, a program download from JetSym can be performed without stopping ModbusTCP communication in the application.

3.3.4 Error: License violation (JC-96x)

A license violation was reported even though the feature was not used at all.

3.4 Jet-VM

3.4.1 Errors in RPC calls

Fixed errors in RPC calls that are not available.

3.4.2 Task status of a cyclic task

The task status of a cyclic task was displayed incorrectly.

3.4.3 Extended Semaphore

STX tasks that request a busy semaphore are now placed in a wait queue.

3.5 MCX

3.5.1 Path group: No error message or malfunction when INI file was missing

Error pattern:
If the **LoadFromFile** command was executed for a path group whose INI file was not stored on the controller, error **50** was not triggered in the MCX. The path group could
no longer be deactivated after that.

Remedy:
Do not use the **LoadFromFile** command in the STX program.

3.5.2 Incorrect target for relative positioning at module break

Error pattern:
If an axis was locked at the module break, e.g., at **0.0°**, and had thus moved slightly in the actual position, e.g., to 359.9°, it could happen that relative positioning to the last target moved in the wrong direction after release.

Remedy:
Do not place targets for relative positioning on module breaks.

3.5.3 Error 7631 issued after initial activation of a tracking axis

Error pattern:
When a tracking axis (shadow axis) was activated for the first time after restarting the controller, error 7631 (Techno: Lead axis speed) was sometimes incorrectly issued. This message could simply be acknowledged and the program then continued to run.

Remedy:
Acknowledge error.

3.5.4 Incorrect modulo overflow of the tracking axis when overflow value > 1000

Error pattern:
If the modulo overflow of the source axis of a tracking axis (shadow axis) was greater than 1000 or less than -1000, this led to a premature modulo overflow of the shadow axis (already at 1000 or -1000). This could have had an impact on a techno couple in which the trailing axle was the leading axle.

3.5.5 JC-940MC/JC-365MC: Incorrect values in the ini file after SafeToFile

Error pattern:
The **SaveToFile** command on an EtherNet(CANopen®) axis had written incorrect values to the modulation switching threshold, motor rated speed, and thermal time constant parameters.

3.5.6 JC-940MC/JC-960: Bus interruption error when changing the axis type

Error pattern:
If an axis was changed from rotary to linear or vice versa during operation using the **MCAxisaxVornY.Mechanism.AxisType** command, error F43 (bus interruption) occurred on JM-2xx devices with versions higher than 1.16.0.05. The error could be acknowledged and occurred since control version 1.19.0.42.

Remedy:
Use an earlier OS version of the JM-200

3.5.7 JC-940MC/JC-960: Capture event was announced too late

When JX2 axes and Ethernet axes were used together, it could happen that the information about a capture event was only known late (> 100 ms). This occurred particularly when many axes, including JX2 axes, were waiting for a capture event at the same time.

Remedy:
Only use Ethernet axes.

3.5.8 EtherCAT® controllers: Trailing error in electric transmission

Error pattern:
When two modulo axes were moved in an electric transmission with actual value coupling, it could happen that a tracking error of the slave axis was reported at the modulo break of the master axis, even though there was no mechanical deviation. The error did not occur with setpoint coupling.

Remedy:
Use setpoint coupling

3.5.9 EtherCAT® controllers: RPC error in systems with many axes

Error pattern:
In large systems with a large number of axes, RPC timeout error messages could occur, preventing access to the axes.

This occurred when the servo amplifier reported an error to the MCX. Sometimes it also occurred when the absolute encoder reference was deleted on an axis with an absolute encoder.

Remedy:
Restarting the control system

3.5.10 EtherCAT® controllers: Trailing error when releasing axes

Error pattern:
For axes that were operated with the **overflow handling function for axes with absolute encoders**, a position or speed tracking error could occur during enable. This also occurred even when the axis did not move.

3.5.11 EtherCAT® controllers: Trailing pointer display not evaluated in every operating state

Error pattern:
The drag pointer evaluation was not visible in every operating state.

3.5.12 JM-35xx: Commutation search did not start after ClearError

If a ClearError was executed before the start command for the commutation search of an axis (from the motion setup or via a Motion API command in the STX program) because there was an axis error, the commutation search was not executed. The function is started, but since the motor is not powered, the function does not stop. However, it could be canceled.

Remedy:
Before issuing the command to start the commutation search, briefly enable the axis and then disable it again.

3.5.13 JM-35xx: Commutation search does not work with SICK encoder SEM70

Error pattern:
The **commutation offset search** function did not work with motors equipped with the SICK SEM70 absolute encoder (not offered by Bucher Automation). This was only needed for the motors to determine a commutation offset once.

3.5.14 JM-10xx: Hiperface DSL encoder not initialized

Error pattern:
When using a JM-10xx with the TD option, a connected Hiperface DSL encoder was not initialized completely or only initialized with error messages.

3.5.15 Accessing the same axis by multiple tasks resulted in a timeout

Affected Motion API versions:
- 1.1.0.1
- 1.1.1.0

- 2.1.0.1
- 2.2.0.0

Affected controllers:

- JC-365MC (all variants) with OS version < 1.37.0.01
- JC-440MC/EXT (all variants) with OS version < 1.13.0.06
- JC-940MC (all variants) with OS version < 1.21.0.12
- JC-945MC (all variants) with OS version < 1.21.0.12
- JC-960EXT (all variants) with OS version < 1.21.0.12
- JC-970MC (all variants) with OS version < 1.21.0.12
- JC-975MC (all variants) with OS version < 1.21.0.12

When multiple user tasks accessed the same axis/axis object, it could happen that the tasks received no response from the axis, or received a response very late, or that the timeout period for the Motion API commands was exceeded. This behavior depended on the STX program and the configuration.

Remedy:

Use Motion API version 2.2.0.0 for controllers with EtherCAT® MC axes. Use the 1.2.0.0 controllers with Ethernet or JX2-MC axes. Please note that the OS version used is higher than the corresponding version in the list above.

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JC-365MC	1.36.0.00	Yes	Yes				Yes
JC-120MC	1.36.1.00	Yes	Yes				Yes
JC-940MC JC-970MC	1.20.0.00				Yes		
JC-945MC JC-975MC	1.20.0.00				Yes	Yes	
JC-960EXT JC-965EXT							
JC-440MC /EXT	1.12.0.00	Yes		Yes	Yes	Yes	
JC-440CN	1.12.0.00	Yes		Yes	Yes	Yes	
JVM-C02*	4.14.0.00	Yes	Yes				
JCM-C02*	4.14.0.00	Yes	Yes				
JV-10xx*	4.14.0.00	Yes	Yes				
JC-310-JM	1.36.0.00						
JC-200- ETH	1.36.0.00						

1.1.1 Placeholder

Placeholder	Controllers
JVM-C02*	JVM-C02 (JVM-10t4, JVM-407B, JVM-507B, JVM-604B)
JCM-C02*	JCM-C02 (JCM-511/521, JCM-501)
JV-10xx*	JV-1005, JV-1007, JV-1010

2 Enhancements

2.1 New controllers

The controller JC-96xEXT was added in JetSym 5.7.1.

2.2 STX

2.2.1 Function for calculating a CRC

Function declaration

```
Type
       CRC_TYPE: Enum (
              CRC8_CCITT = 1,    //CCITT  x^8  + x^2  + x^1  + x^0  (0x107)
              CRC16_CCITT,      //CCITT          x^16 + x^12 + x^5  + x^0  (0x1021)
              CRC16_ANSI,       //CRC-16-ANSI    x^16 + x^15 + x^2  + x^0  (0x8005)
              CRC32_IEEE802_3  //IEEE802.3      x^32 + x^26 + x^23 + x^22 + x^16 + x^12 +
              x^11 + x^10 + x^8 + x^7 + x^5 + x^4 + x^2 + x^1 + x^0 (0x04C11DB7)
               );
       End_Type;

function CRC_Calculate(crctype:CRC_TYPE, ref DataAddr, DataLength:int,
                        ulInitialCRC:int):int;  SYSCALL(3);
```

Meaning of the parameters

`crctype`

CRC polynomial to be used. CRC8_CCITT, CRC16_CCITT, CRC16_ANSI and CRC32_IEEE802_3 are available.

`DataAddr`

Buffer that will be used to calculate the CRC.

`DataLength`

The size of the buffer transferred as DataAddr. The maximum supported length is 512 bytes.

`ulInitialCRC`

The value with which the CRC calculation will be started or continued.

`Return value`

Calculated CRC. If an error occurs, ulInitialCRC will be returned, for example if the length is 0 or greater than 512.

2.2.2 Runtime behavior of cyclic tasks and Motion Control

For special applications it may be advisable or necessary to couple a cyclic task of the application program to the timing of MotionControl. The task will then be started synchronously to the cycle of MotionControl.

Configuring a synchronized STX task
A cyclic task defined in the application program can be configured as a synchronized task by writing its task ID in register 210081.
If the task ID of another cyclic task or an invalid task ID is written to register 210081, the task that was previously listed as synchronized will then become a cyclic task again with its cycle time as specified in the application program.

Function
Only one synchronized STX task at a time is possible.
An STX task that will be operated as a synchronized task must be created as a cyclic task in the application program (keyword **Cycle**).
The synchronized task will always be called with a system cycle time for the time of the MC cycle.
The priority of the synchronized task is determined by the declaration as a cyclic task.
Register 210081 defines which cyclic task will run synchronized.
The same conditions for programming apply to synchronized tasks as for cyclic tasks.
The cycle time for monitoring of cyclic tasks is also applied to synchronized tasks.
A task can be changed between cyclic and synchronized call at any time by writing to the register.
This means it is possible to make **any** exchange between different cyclic tasks.

2.2.3 Clear definition of register 210006

Previous function
Register 210006 contains the highest task ID that occurs in the program.

Change
Register 210006 now contains the number of tasks in the application program minus 1. Register 210019 now contains the highest task ID that occurs in the program.

2.2.4 Improvement with memory monitoring switched on

STX memory protection was improved for certain read access processes.

2.3 Modbus TCP client

Previously, only STX variables could be specified for local data. Now register (%VL) can also be used in addition.
The write/read function from conformance class 2 with function code fc23 is supported.

Example:

```
Function ModbusWriteReadReg(Const Ref MbParam: MODBUS_PARAM_WR): Int;
```

RemoteScan via Modbus/TCP client was expanded to include the additional data types and Modbus command fc23.

2.3.1 JetIP/TCP interface monitoring and STX debug server

This enhancement makes it possible to check which IP address is connected with which controller.

Register number	Description	Access
212100 … 212119	IP address of STX Debug client	ro
212200 … 212219	connection port of STX Debug client	ro
212300 … 212319	Timestamp [ms] of last received message STX Debug client	ro
230100 … 230107	IP address of JetIP /TCP client	ro
230200 … 230207	connection port of JetIP /TCP client	ro
230300 … 230307	Timestamp [ms] of last received message JetIP /TCP client	ro
231000	Number of active JetIP/UDP connections (maximum 32)	ro
231002	Timeout for JetIP/UDP client connections. Connection is removed if no data was received within the timeout time. Default: -1 = disable	rw
231100 … 231131	IP address of JetIP/UDP client	ro
231200 … 231231	connection port of JetIP/UDP	ro
231300 … 231331	Timestamp [ms] of last received message JetIP/UDP client	ro

2.4 Changes for MCX

MC version > 1.21.0.22 (belongs to OS 1.18.0.0)
MC version in release version for JS 5.7: 1.22.0.1
DM version > 1.3.0.22a (belongs to OS 1.18.0.0)
DM version in release version for JS 5.7: 1.7.0.0

2.4.1 EtherCAT® and MCX cycle time

JC_94x, JC_940MC, JC_945 MC, JC_97X
The bus and MCX cycle time can be selected in JetSym, if JM-3xxx is used, on page **MC Global/Properties** between 2 ms, 1 ms and 0.5 ms.

2.4.2 JC-975 MC error message if the position range exceeds the range that can be displayed

If the position range that can be displayed in MCX is exceeded in the mechanical configuration of an axis due to the settings of the gear transmission ratio, linear/rotational transmission ratio and the range of motion, this is now reported to the user by error message 8013. If this happens, the range of motion must be reduced.

2.4.3 EtherCAT® controllers: Overflow handling of axes with absolute encoders

For axes with Multiturn absolute encoders and a gear with a non-binary transmission ratio (i != 2, 4, 8, 16 …), the reference previously had to be redetermined in case of an overflow of the Multiturn range and controller reset. This required extensive effort especially for modulo axes, which always turn in the same direction. With this function it is now possible for these axes to retain the same adequate position they had when the controller was switched off after the controller reset. To achieve this, data is stored in remanent memory of the controller while the axis is in operation. When a restart occurs, the correct position value is determined from this data and this is used to initialize the axis, so that no additional referencing measures are necessary.
A USB stick can also be used to transfer the data saved internally, including when the controller is replaced by a new controller. Thus in this case as well, no additional measures are necessary.
For additional information see JetSym help. A more extensive description may be required.

2.4.4 EtherCAT® controllers: Displaying the actual motor current on the oscilloscope

In addition to the actual torque, the actual motor current of an MCX axis can now also be selected and displayed on the JetSym oscilloscope. This can be done in Live mode and also in the device-internal mode of the controller.

2.4.5 EtherCAT® controllers: Touch probe with signal status evaluatable

The signal status of the touch probe inputs can now be observed in the Motion Setup on the IO page. It can also be evaluated in an STX program using the Motion API (version 2.x).

2.4.6 EtherCAT® controllers: Error message for incomplete axis initialization

If it was not possible to initialize an EtherCAT® axis completely due to incorrect data in the MCAxis.ini file, all axes were previously set to "Inactive" and the MCX was not started. One disadvantage of this situation was that the incorrect parameter could not be adjusted because the axis cannot be edited in "Inactive" status.
In a case like this, MCX is now fully initialized and the axis has status "Disabled". An error message appears in the Motion Setup and Motion Logger.
The axis can now be correctly parameterized and after the MCAxis.ini file is saved and the controller is rebooted, the initialization is carried out without any errors.

2.4.7 EtherCAT® controllers: Superset.eni, change to the EtherCAT® bus configuration via the STX program

The superset.eni function is a component of the EtherCAT® master stack in the controller. This function makes it possible to remove EtherCAT® slaves from the bus configuration using the STX program and to reinsert them. This offers the advantage that with the Superset.eni function, no new configuration needs to be downloaded with JetSym. The machine operator can select a new machine configuration using only the user interface.

Basic process

1. The machine type is configured in JetSym with the maximum number of EtherCAT® stations and loaded into the controller.
2. At runtime of the application program, in the specific form of the system, EtherCAT® stations that are not present are excluded by means of an STX function call.
3. The excluded EtherCAT® stations are saved in a file on the controller.
4. The controller is rebooted.
5. During the initialization of the EtherCAT® bus, the file with the excluded stations is loaded and reported to the EtherCAT® master stack.
6. With the complete ENI file and the exclusion list, the bus is placed in operation by the EC master.

Diagnostic

Diagnostic	Comment
Function return	Value for successful execution or errors (see below)
Logger	LOG_ECATBUS (register 209745)
ErrorHistory	Entries in value range 1557xx

Functions

```
#define ETHERCAT_MAX_SLAVES_EXCLUDE            127;

function EcatConfigExcludeInit(MaxSlaves:int := ETHERCAT_MAX_SLAVES_EXCLUDE):int;
function EcatConfigExcludeSlave(SlaveAddress:int,
                                const ref SlaveName:string:='',
                                const ref SlaveType:string:=''):int;
function EcatConfigExcludeWrite(const ref FileName:string:=''):int;
```

EcatConfigExcludeInit

```
#define ETHERCAT_MAX_SLAVES_EXCLUDE            127;

function EcatConfigExcludeInit(MaxSlaves:int := ETHERCAT_MAX_SLAVES_EXCLUDE):int;
```

Before one of the other functions is called, this function must be called once.
A smaller number of stations to be subsequently excluded can optionally be specified.

EcatConfigExcludeSlave

```
function EcatConfigExcludeSlave(SlaveAddress:int,
                                const ref SlaveName:string:='',
                                const ref SlaveType:string:=''):int;
```

This makes it possible to exclude individual stations from the complete configuration.
The maximum number of stations that can be excluded is equal to the number specified in the EcatConfig-ExcludeInit() function.

Parameter

Parameter	Comment
SlaveAddress	EtherCAT® station address (1001, 1002, …)
SlaveName	Name of the station (appears in the Exclude file, otherwise has no meaning) → This parameter is currently not relevant
SlaveType	Type of the station (appears in the Exclude file, otherwise has no meaning) → This parameter is currently not relevant

Return value

Parameter	Comment
0	OK
-3	Too many stations are to be excluded or a station with the same address has already been excluded

EcatConfigExcludeWrite

Function declaration:

```
function EcatConfigExcludeWrite(const ref FileName:string:=''):int;
```

An XML file is created in the file system of the controller from the list of excluded stations.
The function is executed asynchronously to the interpreter in a separate operating system thread that also executes all other STX file functions.

Parameter

Parameter	Comment
FileName	Optional

Return value

Parameter	Comment
>=0	Number of excluded stations
-2 -3 -4	Internal errors
	File cannot be created (wrong path or filename, etc.)

Sample STX program

The number of stations to be excluded is not limited.
The slaves with station addresses 1001, 1002, 1006 and 1004 will be excluded.
The filename with the list of stations to be excluded will be defined by the system.
Warning!
The list is completely regenerated with the EcatConfigExcludeWrite(); command.
If additional stations are to be excluded, the stations that have already been excluded must therefore be specified with command EcatConfigExcludeSlave(station address);.
If all devices should be included in the configuration, only command EcatConfigExcludeWrite(); needs to be executed WITHOUT running EcatConfigExcludeSlave(station address); in advance. This will cause the file to be created again, but it will not contain any exclude entries.
Example:

```
nResult := EcatConfigExcludeInit();
If nResult = 0 Then
       nResult := EcatConfigExcludeSlave(1001);
       nResult |= EcatConfigExcludeSlave(1002);
       nResult |= EcatConfigExcludeSlave(1006);
       nResult |= EcatConfigExcludeSlave(1004);
       If nResult = 0 Then
              nResult := EcatConfigExcludeWrite();
       End_If;
(*Optional ReBoot by program, instead of manual power cycle*)
(* mem[202960] := 0x424f6f74;  *)
(* mem[202961] := 102;  *)
End_If;
```

2.5 JM-3xxx: Actual and target positions displayable on the device-internal oscilloscope

The actual and target positions of the axis can now be selected and displayed on the device-internal oscilloscope of JM-3xxx drives. However, these values are not available in the servo amplifier in SI units or relative to the reference point. This must be taken into account when interpreting the values.

2.6 JM-3xxx: Drive behavior with the disable(forced) command during motion

If the disable(forced) command is issued for the axis while it is in motion, the axis now behaves like a JM-2xx axis. The behavior is as follows:
The drive is delayed with the emergency stop ramp until the delayed time for the "Delayed while closing the brake" has elapsed. Then the motor is de-energized and the axis coasts down. If a motor brake is fitted, it will reduce the coasting. However, it should be noted that this significantly reduces the wear on the brake. The behavior is then exactly the same as when FW version 3.00-01 or higher is active on the JM-3xxx axis.

2.7 JM-10xx: Commutation angle searching with parameter "Dynamic"

Just as for JM-3xxx axes, it is now also possible for JM-10xx axes to select the "Dynamic" parameter for the Motion-API command for the commutation search. In this case the axis is moved significantly less during the commutation search. This mode is recommended especially if the commutation angle search has to be carried out every time after the machine is restarted for an axis with a sin-cos or incremental encoder. "Static" mode is still recommended for the initial commissioning when the axis controllers are not set yet.

2.8 JX3-BN-EC: Accelerated access to acyclic data

Access to parameters that are not transferred cyclically to a JX3 module on a JX3-BN-EC are now transferred to the JX3 module by the controller at a greatly accelerated rate. An example of this is the pulse width if a digital output is operated in PWM mode.

2.9 Device Dashboard

Starting with this version, the device dashboard is loaded when the system is delivered.

2.10 OPC UA client

Typedesc with "a2[s55]" is supported by STX function **OPCUAClient_UA_WriteList()** starting with the current OS.
STX OPCUA client writing a Boolean on a OPCUA server with function OPCUAClient_UA_WriteList(). The Boolean type has been expanded to include 'B'. VarType[3] := 'B'; fix for bool

2.11 EtherCAT® and MCX cycle time

Applies to the controllers JC-94x, JC-940MC, JC-945MC, JC-97x and JC-975MC.
The bus and MCX cycle time can be selected in JetSym on page MC Global/Properties between 2 ms, 1 ms and 0.5 ms.
This may be helpful for very fast processes that require a fast cyclic update of the drives.

3 Bugfixes

3.1 Runtime behavior of cyclic tasks corrected

Error pattern

If 2 or more cyclic STX tasks have to be started at the same time, there was previously a possibility that only one of them would be started at the correct time. The other task was not started until 1 or 2 milliseconds later.

Change

The STX tasks are started within the same millisecond.

3.2 Time measurement for cyclic tasks corrected

Error pattern

The display of the execution time of a cyclic STX task in register 210601 no longer worked for operating systems that were created in or after August 2021.

Change

The display of the ratio of the processing time to the cycle time now works again.

3.3 Option for comparison of double values

For STX comparisons <, <=, >, >= of double variables, the accuracy was reduced to float values. This error has been eliminated in the new version. No other double/float calculations are affected.

3.4 ModbusCRCCheck(&frameArray, length) caused a crash of the controller if "Length < 2"

Error pattern

If an invalid address to the data or a length less than 2 was specified when calling function ModbusCRCCheck(), the controller crashed.
The error could also occur in the ModbusCRCGen() function.

Change

If an invalid address or an invalid length is passed to the functions as a call parameter, the functions are aborted and send -1 as return value. In case of an error for ModbusCRCGen(), the two CRC bytes are also not appended.

3.5 Platform files_Type declaration_RemoteScan faulty

The definition of type RSCAN_STATBIT was defined incorrectly as enum, whereas bits are actually involved.
Correct definition:

```
RSCAN_STATBIT:        Bits (
                      RUNNING       = 0,
                      Error         = 1
                      );
```

3.6 IP-Prim

3.6.1 TCP data was not sent

Error pattern:
No data was sent for ConnectionSendData(), even though the size of the data package was smaller than the size indicated in the documentation (4000 bytes).

Change:
It has never been possible to send data packages with more than 1458 bytes for controllers of the JC-3xx family. Because of this, the maximum data size for sending and receiving is now limited to 1458 bytes for all controllers.
If the limit is exceeded, the error message for a parameter error (-3) is returned.
Data packets on the send side of a TCP/IP connection are stored temporarily until they have been received and acknowledged by the opposite side. So if they are sent faster than they are received, for example, it may happen that not all data or no data at all can be sent.
This is now indicated by the two new return values -6 and -7.

3.6.2 Program Reload blocked controller

Error pattern:
If multiple TCP server connections were opened and then one of them was closed and opened again, if could happen that ConnectionInitialize() had not closed all connections.
Change:
Connection management for TCP servers has been improved.

3.6.3 Abort connection after the STX application program is stopped by JetSym

Error pattern:
If a program was stopped during ongoing communication, for example via JetSym, a receive buffer overflow was possible if the counterpart station sent telegrams faster than 10 per second.

Change:
Open connections are also queried more frequently for received packets when the program is stopped (about 100 telegrams per second).

3.6.4 When a connection was closed, telegrams remained in the receive buffer

Error pattern:
If the counterpart station sent files and then closed the connection before the received data was retrieved by the application, this data was lost.
Change:
Now all received data can be retrieved until the application closes the connection on its side.

3.6.5 UDP client ErrorHistory entries after ConnectionCreate

Error pattern:
If a UDP client connection was created with ConnectionCreate() but had not sent anything yet with this connection, connection errors were entered cyclically in the error history.

Change:
A UDP client connection that has been created but not used yet is no longer evaluated as an error.

3.6.6 Error in topic manual "Freely programmable PRIM interfaces V.110 section 2.1

Error pattern:
In the topic manual freiprogrammierbare_prim-schnittstellen_110_themenhandbuch.pdf (German and English version) there are errors in the configuration of the IP interface that cause the functions described here ("ConnectionSendData" and "ConnectionReceiveData") not to work. According to the documentation noted above, an address should be transferred for various parameters. This is not correct. A variable must be transferred, not its address.

Change:
page 39: ConnectionSendData
Parameter SendData: "Variable with the content of the data block to be sent"
Parameter DataLen: 1…1458
page 41: ConnectionReceiveData
Parameter IPAddr: "Variable for saving the IP address of the sender"
Parameter IPPort: "Variable for saving the IP port number of the sender"
Parameter ReceiveData: "Variable for saving the content of the receive data block"
Parameter DataLen: 1…1458

3.6.7 HTTP server

Error pattern:
If a scan of the controller with port 80 (http) was carried out with nmap, the controller then no longer responded.

Remedy:
None

3.7 EtherCAT® controllers

3.7.1 Flexible EtherCAT® configuration

See MCX functions

3.8 Industrial controllers

Starting with this version, JCF-SV1 functionality can also be used with JX3_BN_EC.

3.8.1 JCF-SV1 - cyclic access to asynchronous register

Error pattern:
Multiple entries in ErrorHistory for JX3-CNT and JX3-Mix1 due to cyclic access to asynchronous register

Change:
MIX1 Analog output improved performance (MR80 to MR05)
Avoid unnecessary async access by checking the mode before calling.

3.8.2 EtherCAT® controllers

3.8.3 JC-440, JC-940

Error pattern:
Problems with the nominal value output for JX3 modules connected locally and to BN-ETH.

Change:
The Little Endian and Big Endian method of differentiation for Ultiwire and BN-ETH has been corrected.

3.8.4 JC-340, JC-350, JC-440, JC-940

Error pattern:
If command AUTO_REF_CMD12 is given for the reference movement, the axis moves to the limit switch at the assigned speed, in this case 10% = 1V. When the axis has reached the limit switch, the reversal of direction no longer occurs and the speed is still set to 10%, but only about 0.1V is generated.

Change:
The timing problem for carrying out the nominal position has been eliminated.

3.9 MCX

3.9.1 Techno coupling: Cam disk with very low slave axis factor for master axis factor < 1

Error pattern:
If the slave axis factor of a cam disk became very small (< 0.05) with a master axis factor of < 1 at the same time, the cam disk became distorted or moved with jumps if the slave axis factor was set to > 1 again .

Remedy:
None

3.9.2 Modulo axes: Target window query when positioning over multiple modulo ranges not until the end

Error pattern:
If a modulo axis is positioned over more than one modulo range, the status "In the target window" now does not appear until the end of the movement, not already when the modulo transition is reached.

Remedy:
None

3.9.3 Target window status incorrect after AX.Stop

Error pattern:
If a movement that was started with an Ax.MovePtP command was ended with an Ax.Stop command, it could happen that after the movement was stopped, the target window status was reported to "Axis in the target window".

Remedy:
None

3.9.4 Technology coupling: Coupling command not in MC Logger

Error pattern:
The Techno.Coupling.Couple(…) command was not displayed in MC Logger.

Remedy:
None

3.9.5 Specifications for the spline movement were interpreted incorrectly

Error pattern:
The position values for the spline movement, assigned in the STX program were not interpreted correctly by MCX. Error 4002 was generated instead.

Remedy:
None

3.9.6 Geo group: Scara: Short target value jumps during linear and orientation movement

Error pattern:
Depending on the position approached, short jumps could occur in Scara during linear and orientation movements. They occur at the beginning (larger) and at the end (smaller) for one or two MCX cycles. They produce a "current pulse" in the drive that can be heard as a crackling sound in the machine.

Remedy:
None

3.9.7 JC-940: LoadFromFile after SaveToFile and restart causes the controller to crash

Error pattern:
If command SaveToFile was executed with a JC-940MC and the controller was restarted, command LoadFromFile caused the controller to crash.

Remedy:
Do not use command LoadFromFile in the STX program.

3.9.8 EtherCAT® controllers: System bus initialization (EtherCAT®) failed if there was no station present

Error pattern:
If an EtherCAT® controller was booted without an EtherCAT® station, EtherCAT® errors were displayed, even if the bus configuration matched the layout.

Remedy:
Connect a station to EtherCAT® and configure it

3.9.9 EtherCAT® controllers: Incorrect message "Buffer for positioning blocks full"

Error pattern:
MCX error 1000 "Buffer for positioning blocks full" was triggered if the reference offset was performed twice in a row for an axis with absolute encoder and several MoveVelocity- and MoveHalt commands were then executed in a row. The controller could be brought out of this state by a reset.

Remedy:
None

3.9.10 EtherCAT® controllers: Jump in speed at modulo transition

Error pattern:
Under certain conditions it could happen that the calculated speed of a slave axis that was running in a technology coupling as a cam disk was briefly calculated as zero at the modulo transition.

Remedy:
None

3.9.11 EtherCAT® controllers: Firmware version display not clear for simulation axes

Error pattern:
If the firmware version was queried for a simulation axis on the EtherCAT®, an unclear value (string) was returned. Now the string "Simulation!" is returned.

Remedy:
None

3.9.12 EtherCAT® controllers: STO error message could not be acknowledged

Error pattern:
In certain cases it was possible that an STO error message could not be acknowledged even though the signals were present and correct at the STO inputs.

Remedy:
Restart the controller

3.9.13 EtherCAT® controllers: Touch probe status query blocked access to MCX values

Error pattern:
If the touch probe status was continuously queried in a task in the STX program with the touch probe function active, for example in a When instruction, this caused access to MCX parameters (such as the actual position) to be blocked.

Remedy:
Observe at least one delay (t#20ms) between two status queries.

3.9.14 EtherCAT® controllers: Group in intermediate state, no further response

Error pattern:
Both a technology couple and a geo group could freeze in an intermediate state (number 8 - No status display in the Motion Setup) if various processes were conducted with disabling and enabling of the group due to a drive error.

Remedy:
Restart controller.

3.9.15 EtherCAT® controllers / Scara geo group: When the Z-axis was moved, there was a jump in orientation

Error pattern:
If the Z-axes (vertical axis) of Scara were moved with the MovePtP command, it could happen that the calculated orientation underwent a rapid change. This then resulted in tracking errors in other Scara axes.

Remedy:
Do not move Z-axes with the MovePtP command. Use the MoveLinear command instead.

3.9.16 EtherCAT® controllers: Techno couple: No more status indication for group with tracking axis

Error pattern:
If the STO was triggered on a group axis that was operated in a techno coupling with tracking axis as a master axis and this error was then deleted, this group sometimes remained frozen in operating state 8 (no status display in Motion Setup).

Remedy:
Restart the controller

3.9.17 EtherCAT® controllers: Quickstop command to virtual axis leads to error message

Error pattern:
If a Quickstop command was issued to a vertical axis, this resulted in error message 6906 "Drive error: Disable controller“. Since clicking on the disable button in the Motion Setup (until a Power.Disable(forced) command was executed in the STX program) also triggered a quick stop, it was possible to provoke the error in this case.

Remedy:
For virtual axes always use the Power.Disable() command

3.9.18 EtherCAT® controllers: Incorrect error response of axis to some drive errors

Error pattern:
For drive errors that had the error response "Stop with emergency stop ramp" and then “Disable“ (such as HW limit switches or tracking errors), an immediate disabling of the axis became active, which caused the axis to coast down.

Remedy:
None

3.9.19 JM-10xx: Commutation search was not completed

Error pattern:
The measurement was reported as complete for the commutation search with JM-10xx (Motion Setup and in the STX program), but the drive was always still blocked and not supplied with electrical power. The axis could not be used again until after a Power.Enable() followed by a Power.Disable().

Remedy:
After a command for the commutation search, enable the axis once and disable it again.

3.9.20 JM-10xx: Immediate repetition of the commutation search not possible after drive error

Error pattern:

If a drive error occurred during a commutation search with a JM-10xx (e.g., commutation not found), the commutation search was no longer executed if the call was repeated. The motor was not supplied with electrical power and the search function was not terminated.

Remedy:
Before repeating the command for the commutation search, enable the axis once and disable it again.

3.9.21 JM-10xx: Stepper motor operation (without encoder) not possible

Error pattern:
If motor design "2-phase stepper motor" was used for the JM-10xx and no encoder type was selected (not active), error message 8807 "Drive: Not ready (STO)" was displayed even though the motor and STO signals were connected correctly. This operating mode was not possible.
Remedy:

None

3.9.22 JM-10xx: When reversal of direction of rotation was active, the axis could not be moved by the limit switch

Error pattern:
If reversal of direction of rotation was active for a JM-10xx, the limit switches were detected, but it was not possible to move the axis away from the limit switch in the correct direction again: When the positive limit switch was activated, motion was only possible in the positive direction. When the negative limit switch was activated, motion was only possible in the negative direction.

Remedy:
None

3.9.23 JM-3xxx / JM-10xx: Motor brake always closes when switching from automatic to manual

Error pattern:
If the setting for the motor brake operating mode of the JM-3xxx was changed manually from automatic to manual, the brake always became closed, even if it was previously opened. The status of the brake now remains intact when switching, regardless of the previous status.

Remedy:
None

3.9.24 JM-3xxx: Algebraic signs of the actual torque and current display were incorrect if reversal of direction of rotation was active

Error pattern:
The algebraic signs of the actual torque and current display were incorrect in relation to the actual speed display if reversal of direction of rotation was active.

Remedy:
None

3.9.25 JM-3xxx: Device-internal oscilloscope function: Object addresses and position value incorrect

Error pattern:
With the internal oscilloscope function for the JM-3xxx, CANopen object addresses can also be specified for the recording channels. For object addresses lower than 0x6000, the required address numbers were previously incorrect in this case.
The recorded values for the actual position and target position were displayed with a value that was 16 times too large.

Remedy:
None

3.9.26 JM-3xxx: Controller parameters were not completely taken over from the initialization file

Error pattern:
In certain cases with three-axis modules, it could happen that the values saved in the ini file for the speed and bearing controller parameters were no longer applied correctly. The parameters that were created automatically were then used when the controller optimization was carried out. This occurred more frequently in combination with JC-440xx than with JC-945MC and JC-975MC, and was also only observed if reversal of direction of rotation of one of the axes was active.

Remedy:
At the beginning of the STX program, write the desired parameters/values to parameters Kv, Kp and Tn.

3.9.27 JM-3xxx: Device version A2: Initialization error when connecting motor temperature sensor to encoder input

Error pattern:
From device version A2 it is possible to connect the motor temperature sensor either to the motor connector, as previously, or to the encoder plug. In Motion Setup and when saving in the MCAxis.ini file, this selection must be reported to the controller.
If the temperature sensor was connected to the encoder plug, a motor temperature error was triggered already during initialization, which caused the position encoder not to be initialized.
When the error was acknowledged in Motion Setup or in the STX program, the position encoder was initialized, but the temperature sensor was not set correctly.

Remedy:
At the beginning of the STX program, select the temperature sensor connector again and then acknowledge the pending drive error.

3.9.28 JM-5xx: Motor current values scaled incorrectly

Error pattern:
The display of the motor current values was incorrect for the JM-5xx by a factor of the root (2).

Remedy:
None

3.10 Changes for mobile controllers

3.10.1 3.9.1 J1939 CanOpen® Index 0x1000

According to CiA DS301, the object must have content 0 if no device profile is used (older versions have 301 here).

3.11 Changes for display

WEC2013 for JV-10xx

3.12 Changes for specific controllers

3.12.1 JC-310-JM

Access to certain overlaid registers on the JX2 system bus not possible.

Error pattern:
Access to certain overlaid registers of the JX2 system bus is not possible, for example: R200004200, R200004201, R200004261.

Remedy:
None

New minimum OS version from hardware version 5.01
From HW version 5.01, OS version 1.36.0.00 of higher must be used because the Flash module that is now used is not backwards-compatible.

3.12.2 JC-340/JC-350

New minimum OS version from hardware version 6.01
From HW version 6.01, OS version 1.36.0.00 of higher must be used because the Flash module that is now used is not backwards-compatible.

3.12.3 JC-440MC_EXT: License violation reported for EtherCAT®

Error pattern:
If an JC-440EXT was operated without an EtherCAT® master license, a license violation occurred for EtherCAT®, even though no EtherCAT® stations were configured.

Remedy:
Load EtherCAT® license

3.12.4 Very long boot time if no axis license present

Error pattern:
There was a long boot time (> 150 s) for JC-440EXT if no valid license was found for real axes.

Remedy:
Load license for real axes

3.12.5 Long internal computation time for bus access processes

Error pattern:
The internal access mechanisms to PDO data of the EtherCAT® required a relatively long computation time. In some cases this affected the available computation time of the STX program.

Remedy:
None

3.12.6 OPCUA client arrays from strings

Typedesc with **a2[s55]** is now supported with STX function **OPCUAClient_UA_WriteList()**.

3.12.7 OPCUA client data type Boolean

Writing a Boolean on an OPCUA server with function **OPCUAClient_UA_WriteList()**. The Boolean type has been expanded to include 'B'. VarType[3] := 'B'; fix for bool.

3.12.8 JC_9X0 : No oscilloscope function for axes on the second PCI slot

For JC-940MC and JC-970MC it was not possible to display the values of the axes on the third CAN bus line (second PCI slot and first JX6-SBI) on the JetSym oscilloscope.

3.12.9 JC_9X5 : Incorrect function with more than 64 axes

Error pattern:
If more than 64 axes were configured for JC-945MC or JC-975MC (real axes, virtual axes, tracking axes, external axes), axes beyond that number could no longer be addressed.

Remedy:
None

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OS version updates

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Translation of the german original User Manual

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Table of contents

1 Introduction

This document describes the enhancements and bug fixes made to the following OS versions:

OS versions per product line:

Product	Version	CAN open	J1939	MQTT	OPC UA	Ether CAT®	MC/ MCX	Type
JC-340	1.34.0.00							Industry
JC-350	1.34.0.00							Industry
JC-365	1.34.0.00	Yes						Industry
JC-365MC	1.34.0.00	Yes					Yes	Industry
JC-360	1.34.0.00	Yes						Industry
JC-360MC	1.34.0.00	Yes					Yes	Industry
JC-940MC	1.18.0.00						Yes	Industry
JC-945MC	1.18.0.00					Yes	Yes	Industry
JC-970MC	1.18.0.00						Yes	Industry
JC-975MC	1.18.0.00					Yes	Yes	Industry
JC-440MC	1.10.0.00	Yes				Yes	Yes	Industry
JC-440EXT	1.10.0.00	Yes		Yes	Yes	Yes	Yes	Industry
JCM-501	4.12.0.00	Yes	Yes					Mobile
JCM-511	4.12.0.00	Yes	Yes					Mobile
JCM-521	4.12.0.00	Yes	Yes					Mobile
JCM-631	4.12.0.00	Yes	Yes					Mobile
JVM-104	4.12.0.00	Yes	Yes					Mobile
JVM-407B	4.12.0.00	Yes	Yes					Mobile
JVM-507B	4.12.0.00	Yes	Yes					Mobile
JVM-604B	4.12.0.00	Yes	Yes					Mobile
JV-1004	4.12.0.00							Industry
JV-1005	4.12.0.00							Industry
JV-1007	4.12.0.00							Industry
JV-1010	4.12.0.00							Industry
JC-310-JM	1.34.0.00							Industry
JM-200-ETH	1.34.0.00							Industry

Tab. 1: OS versions per product line

Preconditions

To use the JetSym-dependent enhancements and bug fixes, at least JetSym version 5.6.1. is required.

2 New Enhancements

2.1 Industrial automation controllers - Enhancements

The enhancements mentioned here affect the following OS versions of the industrial control systems:

OS version	Product	
1.34.0.00	– JC-340 – JC-350 – JC-365 / JC-365MC – JC-360 / JC-360MC – JC-310-JM – JC-200-ETH	
1.18.0.00	– JC-940MC – JC-970MC – JC-945MC – JC-975MC	
1.10.0.00	– JC-440MC – JC-440EXT	

2.1.1 JC-3xx: JetWay slave

As of this OS version, controllers of the JC-3xx series, equipped with an RS-485 interface, can be used as JetWay slaves.

The following requests from a JetWay master are supported:

1. 0x1: N-Hole register
2. 0x2: N-Send register
3. 0x1E: Block read access
4. 0x1F: Block write access

ⓘ Info Restriction: Access to float values is not possible.

Introduction to JetWay

JetWay is a proprietary RS-485-based fieldbus from Bucher Automation. JetWay makes it possible to network controllers (JetWay-H) and remote IOs (JetWay-R). The JetWay has not been implemented in modern controllers of the JetControl (JC-) type. By implementing a JetWay slave stack in the JC-3xx, plant sections, currently controlled by a NANO (JetWay slave), can be replaced e.g. with a JC-340. JC-340 registers as a JetWay slave in the network.

Configuration registers

Register	Designation	Description
103000	Error	See the list of error codes below.
103001	Protocol	Additional value 4=JetWay slave
103002	Baud rate	JetWay 115.2 kBaud Alternatively 19.2 kBaud
103003	Bits per character	JetWay: 8
103004	Stopbits	JetWay: 1
103005	Parity	JetWay: 5
103006		JetWay: 3 = RS485
103010 … 103018	Error counter	
103050	JetWay slave address	JetWay address of the controller Default: 2
103051	Register offset	Offset for JetWay register mapping. Default: 1000000

Tab. 2: JetWay slave configuration register

Configuration

The JetWay slave function is configured via the configuration registers mentioned above. If value 4 (= JetWay protocol) is entered into register 103001 (protocol), the required parameters for the JetWay protocol will automatically be entered into configuration registers 103002-103006.

Error codes (register 103000)

Possible error codes are:

1. Bit 10: Command not supported
2. Bit 11: Command unknown
3. Bit 12: Overflow
4. Bit 13: Parity error
5. Bit 14: Framing error

2.2 Enhancements for MCX

The enhancements mentioned here affect the following OS versions of the controllers with MotionControl. As of the OS versions listed below, MCX version 1.20.0.98 is used in the operating system:

OS version	Product
1.34.0.00	– JC-365MC – JC-360MC
1.18.0.00	– JC-940MC – JC-970MC – JC-945MC (EtherCAT® controller) – JC-975MC (EtherCAT® controller)
1.10.0.00	– JC-440MC (EtherCAT® controller) – JC-440EXT (EtherCAT® controller)

2.2.1 Important for EtherCAT®-compatible controllers

If the controller OS version is used for JetSym 5.6.1, it is essential to use JetSym version 5.6.1 or a more recent version when using axes. In an already existing project, after updating the controller, the project must be opened in JetSym version 5.6.1. and the following actions must be performed:

- Changing the OS version on the CPU side
- Download the hardware configuration with the help of the "Compare and Download" dialog
- Restart the controller
- Delete the old Motion API from the library and include Motion API 2.0.0.5.
- Recompile and transfer the program.

2.2.2 Path orientation can take on negative values

In the kinematics "Cartesian-with-orientation-axes" and "Scara", a negative value can now also be used for the orientation position (previously only 0-360). With an orientation range of 0° to 360°, it could happen that the actual orientation was just in the negative range due to calculation inaccuracies. This caused the error 3002 "3D orientation not in the permissible range" to occur.

2.2.3 JC-365MC: Up to eight technology groups

Up to eight technology groups can now be used in one JC-365MC controller. Previously, only six technology groups were possible.

2.3 Enhancements for EtherCAT® controllers

The enhancements described here affect the following OS versions of the EtherCAT® controllers:

OS version	Controllers
1.18.0.00	– JC-945MC – JC-975MC
1.10.0.00	– JC-440MC – JC-440EXT

2.3.1 EtherCAT® controllers: Saving the reference shift for absolute encoders

If axes with absolute encoders are used, a permanent offset between the position encoder zero point and the machine zero point must often be observed. This reference shift is now determined via the new instruction `MCAxis.MoveHome.SetAbsEncoderReference(double refPos;)`. In contrast to the instruction `MCAxis.MoveHome.SetReference(double refPos);`, this instruction saves the determined reference shift in the non-volatile memory of the controller. When the controller is restarted, valid reference shifts in the memory are taken over directly in the corresponding axes and the axes are reported as referenced.

The reference shift can also be saved on a USB stick so that when the control system is replaced, valid reference descriptions can also be used in the new controller. A detailed description with all functions can be found in the document “Doku_AbsolutEncoder_RefShift.pdf” which can be requested from Jetter AG.

2.3.2 EtherCAT® controllers: Reading out the relevant data for absolute encoders

When using absolute encoders, there is now the new parameter "Max number of absolute revolutions". This parameter, in conjunction with the displayed resolution, can be used to infer the encoder type in the motor.

2.3.3 EtherCAT® controllers: Touch probe function possible also in groups and in all movement states

The touch probe function can now be used also with axes which work in an activated group. Furthermore, it can be used in all error-free movement states. No messages are now output in the MC logger when touch probe functions are successfully executed.

2.3.4 EtherCAT® controllers: Drive warnings can be read out

The drive warnings can be read out and displayed via the Motion API instructions and the Motion Setup.

2.3.5 EtherCAT® controllers: JM-3xxx: I²t of motor and devices can be evaluated

The I²t functions for monitoring the device temperature can now be used. New instructions are available both in the Motion Setup and in the Motion API to enable parameterization.

2.3.6 EtherCAT® controllers: JM-3xxx motor cable test also monitors interruption

Up to now, the motor cable test of the JM-3xxx has monitored only a short circuit of the motor phases. Now, when the axis is released for the first time, an interruption of the motor phases is also detected and an error is triggered.

2.3.7 EtherCAT® controllers: Connection interruption results in an MCX error message

Error 8700 is now also output for EtherCAT® axes if the connection to the axes is interrupted. The following error is output: "Synchronous Interface: Internal timing problem (check bus system) / Synchronous Interface: Internal timing problem (check bus connection). The error occurs with the axis which is the first to become inaccessible. This way, it is possible to localize on which axis module the EtherCAT® connection was interrupted. This error means that the controller must be restarted after establishing the EtherCAT® connection.

2.3.8 EtherCAT® controllers: ANG: Encoder on X410 and X412 can be used as 2nd encoder

Due to a change in the firmware of the ANG, all encoders on the two connectors can now also be used as first and second encoders. In particular, an incremental encoder on X410 can now also be used as a second encoder (if, for example, an EnData encoder is connected to X412 as the first encoder).

2.3.9 EtherCAT® controllers: OS update mechanism for JM-3000

JetSym can now also be used to update the OS of JM-3000.

2.3.10 EtherCAT® controllers: No support for outdated JM-3xxx firmware

JM-3xxx with an OS version older than version 2.x. are no longer supported.

2.4 Mobile automation controllers - Enhancements

The enhancements mentioned here affect the following OS versions of the mobile control systems:

OS version	Product	
4.12.0.00	– JCM-501 – JCM-511 – JCM-521 – JCM-631 – JVM-104 – JVM-407B – JVM-507B – JVM-604B	

2.4.1 J1939 SAEJ1939AddTx

Special treatment must be observed for message TSC1. This includes a counter and a checksum. If you want to transmit this message to the bus, the message must be registered normally. The content of the current value on the bus is not transmitted to the STX variable. The content is not available for the application.

Example:

```
stateSAEJ1939Tx.byPriority = 3;
SAEJ1939AddTx(
    1.0x0000.8,1,SAEJ1939_BYTE,1,value,stateSAEJ1939Tx,10,10);
```

3 Bug Fixes

3.1 General Bug Fixes

The bug fixes mentioned below apply to the OS versions of all products.

3.1.1 FileSeek does not position pointers correctly in large files

FileSeek() calculated the sector and offset incorrectly. This correction is included in tag 1.10.0.12.

3.1.2 Length of the name of a DA file increased.

The permissible length of the name of a DA file has been increased from 32 to 256 characters.

3.1.3 Modified behavior in the handling of system commands

Until now, when an application program was downloaded, the system password register was automatically rewritten; as a result, a system command could not be executed in some situations. From now on, the system password register is only rewritten when all system commands have been processed.

3.1.4 IPPrim Client-Server closes connection before a response was received

In the case of a TCP connection, the FIN flag was set by the server directly after it sent a response, therewith terminating the connection. In this case, if the user application was in debug mode, the response from the server could no longer be received and the return value of ConnectionReceiveData was -1. This means that the connection did not work from the user's point of view.

3.1.5 SNTP client

An SNTP client can now be accessed. To do this, the file /SysConfig/NTP/sntp.ini must be available when the system is started. SNTP provides UTC and does not know the summer or winter time changeover. The correction of the RTC to local time can be set by the user via an offset.
During the boot phase, the SNTP client tries to read the time from the NTP server up to three times. If the RTC cannot be set during the boot phase, BIT 29 of system error register 200009 is set. The server name is “de.pool.ntp.org”. The address of the NTP server can be specified as an IP address or name. When using a name, a DNS server must be configured and accessible. The maximum length of the name is 63 characters.

The following commands are available:

Command 1: Write 1 to the system register

- Fetches the current time from the STNP server
- Time and date are written to registers 102931 to 102937
- The offsets UTC_TimeOffsetHours and UTC_TimeOffsetMinutes are added and therefore the real-time clock is set.

Command 2: Write 2 to the system register

- Fetches the time from the NTP server and writes it to the following register array:
  - 102931: Seconds
  - 102932: Minutes
  - 102933: Hours
  - 102935: Day

    – 102936: Month
    – 102937: Year
- The offsets from UTC_TimeOffesetHours and UTC_TimeOffsetMinutes are not taken into account
- The real time clock is not set
- This function is used to align the RTC with the UTC.

Command 3: Write 3 to the system register

- Re-reads the file "sntp.ini" to update it. The values read from the file can be read in the following registers:
    - 102942: UTC_TimeOffsetHours
    - 102943: UTC_TimeOffsetMinutes
    - 102944: Timeout [s]
    - 102945: AutoSynchronizeAtStartup
    - 102948-102949: NTP server name

Example:

```
[SNTP]
Servername = de.pool.ntp.org
AutoSynchronizeAtStartup = 1
UTC_TimeOffSetHours = 1
UTC_TimeOffsetMinutes = 0
Timeout = 10
```

Overview of registers:

Register number	Description	Access
102931	UTC time from NTP server seconds	ro
102932	UTC time from NTP server minutes	ro
102933	UTC time from NTP server hours	ro
102935	UTC time from NTP server tag	ro
102936	UTC time from NTP server month	ro
102937	UTC time from NTP server year	ro
102940	Command / Status: 1: Set real time clock 2: Fetch UTC time 3: Read in "sntp.ini" The command can be read in the register until the function has been processed. Then the result can be read.	rw
102942	Value of “UTC_TimeOffsetHours”	ro
102943	Value of “UTC_TimeOffsetMinutes”	ro
102944	Value of timeout in seconds	ro
102945	Value of “AutoSynchronizeAtStartup”	ro

Register number	Description	Access
102946	IP address of the NTP server after DNS resolution	ro
102947	Port number of the NTP server	ro
102948-102969	Name of the NTP server	ro

3.2 Bug Fixes for MCX

The bug fixes mentioned here affect the following OS versions of the controllers with MotionControl. As of the OS versions listed below, MCX version 1.20.0.98 is used in the operating system:

OS version	Product	
1.34.0.00	– -365MC – JC-360MC	
1.18.0.00	– JC-940MC – JC-970MC – JC-945MC (EtherCAT® controller) – JC-975MC (EtherCAT® controller)	
1.10.0.00	– JC-440MC (EtherCAT® controller) – JC-440EXT (EtherCAT® controller)	

3.2.1 Crash of the controller after blocking a path group in error state

If a path group was blocked while it was in a path deviation, the controller could crash.

3.2.2 MoveVelocity could move an axis beyond the procedure limit

If, in the case of a normal axis (not modulo), the axis was moved beyond the procedure limits with the help of a MoveVelocity instruction, the axis was either positioned further or it stopped abruptly without an error message.
The error message (6201: MoveVelocity: position beyond limits / MoveVelocity: Position beyond limits) is output and the axis is stopped with the programmed ramp. The axis then remains in feedback control.

Remedy: Monitoring the procedure limit in the controller program

3.2.3 JC-365MC: Crash when trying to start a spline movement without valid configuration

If a spline movement was started without a valid configuration, the controller crashed.

Remedy: Specify at least two spline points for the path calculation.

3.2.4 Shadow axis does not observe the overrunning of the modulo range when the controller is locked

When the controller of the associated (modulo) data source was locked, the shadow axis did not observe its overflow over the zero point, resulting in an incorrect movement of the follower axis when the controller was released again.

3.2.5 Shadow axis has wrong status in a certain configuration

A shadow axis remained in the "Running" status if the data source was a moving follower axis in another technology group. Status queries on this axis have resulted in incorrect information.

3.2.6 The actual position of the shadow axis is only updated if the technology group has been activated

The actual position of a shadow axis was not updated if the technology group, in which the shadow axis was the master axis, was deactivated. If the data source was moved in this case, this was not visible in the actual position of the shadow axis.

3.2.7 Follower axis factor too small when activating a cam disk

If, when activating a cam disk `(MCTechno.Coupling.Cam.Activate(…))`, a `FollowerFactor` was transferred very close to zero, a position jump could occur when activating the subsequent cam disk.

Remedy: Use a `FollowerFactor` > 0.1.

3.2.8 Trigger in the real-time oscilloscope of the control system inaccurate

A trigger operation in the integrated oscilloscope of the controller on an MC parameter could result in the trigger reaction being very slow and therefore a recording not being carried out or only very delayed.

3.2.9 JC-940MC: Axes on 3rd SBI module cannot be used

With the JC-940MC, the axes on the JX2 bus of the third SBI module could not be used. Access to the axes on this bus was not forwarded to the axes.

3.2.10 Query on ramp status briefly returns wrong value

The query of the ramp status could sometimes briefly return a value which was not up-to-date.

3.2.11 Timeout for Quickstop instruction

Previously, the MCX generated a timeout error if the quick stop ramp was not completed after 250 times the MCX cycle time. This timeout monitoring has been removed, as it may be useful to use longer quick stop ramps in applications.

3.2.12 JC-365MC: Switching instructions with timing drum

Since MC version 1.20.0.98, the switching of cam disks via the timing drum has responded with delay.

3.2.13 JC-365MC: Crash when using technos with drum and virtual master axis at the same time

If a group with a virtual master axis and at the same time a group with the drum axis was activated as a master axis, the controller crashed.

3.2.14 JC-940MC: Axes on 3rd SBI module cannot be used

With the JC-940MC, the axes on the JX2 bus of the third SBI module could not be used. Access to the axes on this bus was not forwarded to the axes.

3.3 Bug fixes for EtherCAT® controllers

The bug fixes described here affect the following OS versions of the EtherCAT® controllers:

OS version	Controllers
1.18.0.00	– JC-945MC – JC-975MC
1.10.0.00	– JC-440MC – JC-440EXT

3.3.1 EtherCAT® controllers: No temperature display of THI2 modules on a BN-EC

In the previous version, the temperature was not displayed or not correctly displayed when a THI2 module was connected to a BN-EC. This error has now been rectified.

3.3.2 EtherCAT® controllers: No error message when enabling axes not ready for operation

If an axis was enabled which was not ready for operation, the axes remained without torque. However, no error message was issued to indicate this. As of this version, a corresponding error message will be issued.

A non-operational axis may occur in the following cases:

– The STO (Safe-Torque-Off) of the axis is still active.

– The DC link voltage is not present.

– The position encoder configuration is not complete.

– **Remedy**: Check in the controller program before the enable command whether the axis is ready for operation.

3.3.3 EtherCAT® controllers: No error message for STO request with enabled axis

If the STO was requested via the safe inputs on an enabled axis, the axes became torque-free, but no error message was issued and the MCX continued to transmit setpoints to the drive. If the STO was activated on several axes of a group at the same time, this group was stuck in an intermediate state. The group could no longer be used and a reboot was required.

Remedy: Set the tracking sensor monitoring so that in this case the tracking error triggers after a short time.

3.3.4 EtherCAT® controllers: Technology group with external axis - unknown status in case of drive error

If a drive error was triggered on an axis in a technology group with an external axis, this group was stuck in an intermediate state. The group could no longer be used and a reboot was required.

3.3.5 EtherCAT® controllers: JM-3xxx - Disable command during movement does not result in a standstill

If a disable command (forced) was issued while the axis was moving, the axis did not become torque-free and did not stop.

Remedy: Use Quickstop command.

3.3.6 EtherCAT® controllers: JM-3xxx position of the external axis wrong

As the position of the external axis was evaluated incorrectly in some OS versions, the value changed considerably, even if the position encoder was rotated only very slowly and in one direction.

3.3.7 EtherCAT® controllers: JM-3xxx - Time not observed when closing the brake

The time for closing the brake (hold torque until brake is closed) was not observed. The axis was always locked immediately with the disable command.

3.3.8 EtherCAT® controllers: Access to encoder information takes a very long time

Accessing the parameters for the encoder angle and the number of encoder revolutions could take up to 80 ms. The provision of this information has been changed so that access does not take longer than with other parameters.

3.3.9 EtherCAT® controllers: Fast Coupling with external axis does not work

If an attempt was made to couple a follower axis in a technology group with the "Fast" coupling type, the coupling was immediate provided the master axis was an external axis.

3.3.10 EtherCAT® controllers: Axis is on the limit switch during machine referencing

If machine referencing was started using the limit switches while the limit switch was activated in the machine referencing direction, the controller crashed.

Remedy: Before starting the machine referencing, remove the axis from the limit switch.

3.4 Bug fixes for specific controllers

3.4.1 JC-94x and JC-97x: Deleting error history blocked controller

When deleting the error history via command 1, it could happen that the controller was blocked for several milliseconds.

3.4.2 JC-94x: No communication with several interfaces in the same subnet

If several interfaces were in the same subnet due to a faulty IP configuration, it could happen that it was no longer possible to communicate via any of these interfaces. This error has now been rectified. If there are several interfaces in the same subnet, it is now ensured that communication with the controller can take place at least via interface ETH 1.

4 Older version updates

4.1 Enhancements as of 10.09.2020

4.1.1 General Enhancements

The enhancements mentioned here affect the following OS versions of all products:

Product	Version	CAN open	J1939	MQTT	OPC UA	Ether CAT®	MC/ MCX	Type
JC-340	1.32.0.00							Industry
JC-350	1.32.0.00							Industry
JC-365	1.32.0.00	Yes						Industry
JC-365MC	1.32.0.00	Yes					Yes	Industry
JC-360	1.32.0.00	Yes						Industry
JC-360MC	1.32.0.00	Yes					Yes	Industry
JC-940MC	1.16.0.00						Yes	Industry
JC-945MC	1.16.0.00					Yes	Yes	Industry
JC-970MC	1.16.0.00						Yes	Industry
JC-975MC	1.16.0.00					Yes	Yes	Industry
JC-440MC	1.08.0.00	Yes				Yes	Yes	Industry
JC-440EXT	1.08.0.00	Yes		Yes	Yes	Yes	Yes	Industry
JCM-501	4.08.0.00	Yes	Yes					Mobile
JCM-511	4.08.0.00	Yes	Yes					Mobile
JCM-521	4.08.0.00	Yes	Yes					Mobile
JCM-529	4.08.0.00	Yes	Yes					Mobile
JVM-104	4.10.00	Yes	Yes					Mobile
JVM-407B	4.10.00	Yes	Yes					Mobile
JVM-507B	4.10.00	Yes	Yes					Mobile
JVM-604B	4.10.00	Yes	Yes					Mobile
JV-1004	4.10.00							Industry
JV-1005	4.10.00							Industry
JV-1007	4.10.00							Industry
JV-1010	4.10.00							Industry
JCM-350	1.32.0.00							Mobile
JC-310-JM	1.32.0.00							Industry
JM-200-ETH	1.32.0.00							Industry
JX3-COM-PND	1.06.0.00							Industry

Tab. 3: OS versions per product line

More usable data memory for STX variables

Up to now, the STX application program could use a maximum of 16 MB data memory for variables, even if the controller had more than 16 MB RAM. Thanks to an enhancement in the operating system, more than 16 MB can now be used if a corresponding controller is used.

The maximum size can be found in the following table:

Controller	Maximum possible memory for APP
JC-310	2 + 1 MB
JC-340	2 + 1 MB
JC-350	2 + 1 MB
JC-360	4 + 0.5 MB
JC-365	24 + 1 MB
JC-440	32 + 1 MB
JC-940MC	64 + 1 MB
JC-970MC	64 + 1 MB
JC-945MC	64 + 1 MB
JC-975MC	64 + 1 MB
JV-1005/7/10	15 + 1 MB
JCM-350	4 + 1 MB
JVM-407B	8 + 1 MB
JVM-507B	8 + 1 MB
JCM-501	8 + 1 MB
JCM-511	8 + 1 MB
JCM-521	8 + 1 MB
JCM-529	8 + 1 MB
JVM-630	8 + 1 MB

Tab. 4: Use of data memory in STX greater than 16 MB

4.1.2 Industrial automation controllers - Enhancements

The enhancements mentioned here apply to the following OS versions of the industrial automation controllers:

OS version	Product	
1.32.0.00	– JC-340 – JC-350 – JC-365/JC-365MC – JC-360/JC-360MC – JC-310-JM – JC-200-ETH	
1.16.0.00	– JC-940MC – JC-970MC – JC-945MC – JC-975MC	
1.08.0.00	– JC-440MC – JC-440EXT	
1.06.0.00	– JX3-COM-PND	

JX3-COM-PND - Revision and new features

1. Up to now it was necessary to enter the name of the device in JetSym under "`Configuration → PROFINET IO DEVICE`". This is no longer necessary. Names entered are ignored.
2. Under "`Diagnostics → PROFINET IO Device Stack`" it was so far necessary to set the "`4: Bus On`" command in the command box. This is no longer necessary and a set command has no effect.
3. Under "`Diagnostics → PROFINET IO Device Stack`", the lines "Station name X of 10" no longer contain the name assigned in JetSym, but the name assigned by the PROFINET supervisor and saved in the JX3.

HTTP types – Enhancement

The following file types are now supported by the HTTP server:

- .map
- .tff
- .woff
- .woff2

Timeout before the first publication received

The Jetter Ethernet system bus now has a new register for monitoring the timeout period for receiving a publication for a subscription.

- **Index**: 250005
- **Name**: Start timeout in milliseconds
- **Description:** Timeout for the start of communication

Until now, a subscription had to receive at least one publication before timeout monitoring via register 250x27 became active. If the first publication already exceeded the timeout period, this was not registered as an error.

For this purpose, there is now the additional function "Start-Timeout" via register 250005. This register monitors the receipt of publications for all subscriptions. Detected timeout errors are displayed in the following registers:

- 250000
- 250002
- 254001 through 254003

After the start timeouts have expired, register 250005 is reset to 0. The register can be written to again and again and thus timeout monitoring can be triggered manually.

4.1.3 Enhancements for MCX

The enhancements mentioned here affect the following OS versions of the controllers with MotionControl. As of the OS versions listed below, MCX version 1.20.0.98 is used in the operating system:

OS version	Product	
1.32.0.00	– JC-365MC – JC-360MC	
1.16.0.00	– JC-940MC – JC-970MC – JC-945MC (EtherCAT® controller) – JC-975MC (EtherCAT® controller)	
1.08.0.00	– JC-440MC (EtherCAT® controller) – JC-440EXT (EtherCAT® controller)	

Automatic coupling of an electric gearbox can be set

Until now, the follower axis was automatically engaged in a technology group with electronic gearing as soon as the group was activated. As this does not make sense in all applications, it is now possible to specify via the "`configGearing`" function whether the coupling should be done automatically or not.

To configure an axis so that it is not automatically coupled, the following instruction must be sent to the technology group:

```
AV_Techno.Coupling.Gearing.Configure(
AX_Follower,1,1,MCTechnoGearingActivationModes.Decoupled
);
```

To do this, the technology group must be activated once at the beginning of the program.

Internal position setpoint can be used in Scope function

For special diagnostics, the internal target position value as well as the current actual position value can now be recorded in the internal scope function of the controller. The target and actual position values are sent cyclically from the controller (MCX) to the servo amplifier.

The target position value is displayed on register 50xxx9230. The actual position value is displayed on register 50xxx9320. The values are transmitted in a 32-bit integer in which the low word represents the angular position and the high word the number of revolutions.

EtherCAT® controllers: Important change

If the controller OS version is used for JetSym 5.6., it is essential to use JetSym version 5.6.0 (or a more recent version) when using axes. In an already existing project, e.g. created with JetSym V5.5.1, the project must be opened in JetSym 5.6.0 after updating the controller and the following actions must be performed:

– Changing the OS version on the CPU side
– Download the hardware configuration with the help of the "Compare and Download" dialog
– Delete the old Motion API from the library and include Motion API 2.0.0.3
– Recompile and transfer the program

EtherCAT® controllers: Touch probe function

The controllers JC-440MC, JC-945MC and JC-975MC have a touch probe function as of this version. This function enables the current position of the axis to be recorded very accurately on the basis of the signal at a fast digital input and to be stored temporarily. This function can be used to program compensation procedures or to make accurate length measurements of moving objects.

Features:

– Depending on inverter type 1 or 2 channels
– Single or continuous recording
– Rising, falling or both edges parameterizable
– Recorded position in user units
– Programming via Motion API functions

ⓘ Info This function cannot be used in axis groups!

EtherCAT® controllers: Torque shut-off

For EtherCAT® controllers, there is now a special function called "torque shut-off" which is used primarily in screwdriving applications. The main function is to parameterize from which load torque a fast braking of the drive is to be initiated. This function was integrated in the servo amplifiers of the JetMove 200 series and is used again here in the proven form. The function can be used with the help of Motion API functions.

ⓘ Info The screwing process cannot be carried out by a controller several times at the same time.

EtherCAT® controllers: JetMove 1008/1005 can be used

The servo amplifiers JetMove 1008 and JetMove 1005 can now be connected to and used with a compatible controller via EtherCAT®.

EtherCAT® controllers: String objects readable

Special CANopen objects of the servo amplifiers can be read and written in EtherCAT® controllers via Motion API access. As of this version, this is possible also for string objects (visible strings type).

EtherCAT® controllers: External axis

"External axes" can now be used with EtherCAT® controllers. An encoder on a second encoder interface of an axis module can be used for this purpose. The position of this encoder can be used in the MCX as a master axis in a technology group. The external axis is created and configured in JetSym in the hardware manager.

4.1.4 Enhancements for CANopen

The enhancements mentioned here apply to the following OS versions of the CANopen-compatible controllers:

OS version	Product
1.32.0.00	– JC-365 /JC-365MC – JC-360 / JC-360MC – JCM-350
1.08.0.00	– JC-440EXT – JC-440MC
4.08.0.00	– JCM-501 – JCM-511 – JCM-521 – JCM-529
4.10.0.00	– JVM-104 – JVM-407B – JVM-507B – JVM-604B

New STX API functions for CANopen

New functions for bitwise transmission and reception of PDO messages:

```
CanOpenAddPDORxBit(
    CANNo:int,
    CANID:int,
    BitPos:int,
    BitLength:int,
    dataType:int,
    DataLength:int,
    ref VarAddr,
    EventTime:int:=100,
    InhibitTime:int:=10,
    Paramset:int:=CANOPEN_ASYNCPDO|CANOPEN_NORTR
):int;


CanOpenAddPDOTxBit(
```

```
    CANNo:int,
    CANID:int,
    BitPos:int,
    BitLength:int,
    dataType:int,
    DataLength:int,
    ref VarAddr,
    EventTime:int:=100,
    InhibitTime:int:=10,
    Paramset:int:=CANOPEN_ASYNCPDO|CANOPEN_NORTR
):int;
```

New STX function CanOpenExit(CANNo:int)

This function can be used to close the CAN interface. Then, no more messages are sent or received on the bus. Access by JetSym to the closed interface is also no longer possible.

```
CanOpenExit(CANNo:int):int;
```

STX function CanOpenAddObject() enhanced

The data type CANOPEN_VISIBLE_STRING can now be used for the object directory.

STX function CanOpen_SetCommand extended

New command for changing the own heartbeat time available:

```
#define CMD_HEARTBEAT_TIME 4
```

Example: Changing the heartbeat from can 0 to 2 seconds

```
CanOpenSetCommand(0, CMD_HEARTBEAT_TIME, T#_2s)
```

STX access to own object directory via SDO command with own NodeID as target

With the functions `CanOpenUploadSDO()` and `CanOpenDownloadSDO()` the own object directory can now be accessed. For this, the own NodeID must be specified as the target.

STX DLC of PDO TX messages shortened to effective length

As of this version, only the actual used/registered length for a CAN message is sent. So far, all PDOs were sent with a DLC of 8.

Emergency message if PDO size is smaller than mapped size

When messages are received that are smaller than the mapped size, an emergency message is now sent with the code 0x8210.

ManufacturerError[0] = 2

ManufacturerError[1 - 4] = CAN ID little endian of the affected PDO

CANopen object types in object table

Object index 1 ... 27 is now supported. The size of the type in bytes is returned as unsigned32.

CANopen support for node guarding

If the heartbeat time is set to 0 ms, node guarding can be used. Until now, 0 ms was not a valid value.

New CANopen registers for retrieving the runtime of PDOs

Register	Description
40×900	Current runtime of the RX list.
40×901	Minimum runtime of the RX list.
40×902	Maximum runtime of the RX list.
40×903	Number of times the RX list is called up.
40×910	Current runtime of the TX list.
40×911	Minimum runtime of the TX list.
40×912	Maximum runtime of the TX list.
40×913	Number of times the TX list is called up.

4.1.5 Mobile automation controllers - Enhancements

The enhancements mentioned here apply to the following OS versions of the mobile automation controllers:

OS version	Product	
4.08.0.00	– JCM-501 – JCM-511 – JCM—521 – JCM-529	
4.10.0.00	– JVM-104 – JVM-407B – JVM-507B – JVM-604B	
1.32.0.00	– JCM-350	

J1939 SAEJ1939AddTx

If the PGN, BytePos, BitPos and the variable type are identical, a transferred variable, the RepetitionTime and the InhibitTime can be changed by registering the message again.

4.1.6 HMI enhancements

The enhancements mentioned here affect the following OS versions of the user interfaces:

OS version	Product
4.10.0.00	– JVM-104 – JVM-407B – JVM-507B – JVM-604B – JV-1004 – JV-1005 – JV-1007 – JV-1010

Windows embedded Compact 2013 (WEC2013) for HMIs of the JV-10xx series

The following devices can also be ordered with the WEC2013 operating system. The order number code is: -B9.

- JV-1005
- JV-1007
- JV-1010

WEC2013 is not available for the JV-1004 user interface.

Jv-10xx HMIs - Reading out information about installed expansion modules

The following registers can now be used to read out information about expansion modules on all JV-10xx user interfaces (JV-1004, JV-1005, JV-1007 and JV-1010).

Register	Description
111xx0 … 111xx5	Name of the expansion module
111xxx+10 … 111xxx+13	Bit-coded function of the expansion module: Bit 1: CAN Bit 6: PROFIBUS

ⓘ Info

xx = number of the expansion module (0 … 3) * 50

➔ Name of the expansion module 2 = 111100

CANopen modules for JV-10xx

All JV-10xx user interfaces (JV-1004, JV-1005, JV-1007, JV-1010) now support up to 2 CAN modules.

PROFIBUS slave module for JV-10xx

The user interfaces JV-1004, JV-1005, JV-1007 and JV-1010 can now be expanded with a maximum of one PROFIBUS module.

Register	Description
135100	**Status** Lower byte (1) is number-coded: 0: No errors 5: Timeout in PROFIBUS communication 7: Communication CPU → PROFIBUS module timeout 8: No cable connected, no response 9: Bus not in data exchange mode The next byte (1) is bit-coded: **Bit 8**: Status of the consistent input words 0 = Basic status or input words are transmitted. 1= Input words transmitted completely. **Bit 9**: Status of the consistent output words 0 = Basic status or output words are transmitted. 1= Output words transmitted completely
135101	**Command register** 11: Start cyclical communication 15: Transmit consistent inputs 16: Consistent outputs received
135107	Station address
135108	DPID code default: 0x2DC
135118	IO length
135119	IO length
135132	**Status of the DP state machine** 0 = RESET Chip (bootup state) 1 = RESET Chip Wait 2 = OFFLINE 3 = OFFLINE WAIT 4 = WAIT PRM (Parametrization) 5 = WAIT CFG 6 = DATA EXCHANGE
135133	**Current baud rate** 0000 = 12 MBaud 0001 = 6 MBaud 0010 = 3 MBaud 0011 = 1.5 MBaud 0100 = 500 kBaud 0101 = 187.5 kBaud 0110 = 93.75 kBaud

Register	Description
	0111 = 45.45 kBaud 1000 = 19.2 kBaud 1001 = 9.6 kBaud
135135	**WatchDog status** 00 = ’Baud_Search’ state 01= ’Baud_Control’ state 10 = ’DP_Control’ state
135300 … 135399	Receiving buffer
135400 … 135499	Transmit buffer
135500 … 135599	Receiving buffer consistent
135600 … 135699	Transmit buffer consistent

Setting the station address:
The station address register R135107 is written with the station address.

➔ Change of status DP state machine R135132 from `0 = RESET Chip` to `3 = OFF-LINE WAIT`.

4.1.7 Enhancements for specific controllers

JC-440 EXT: MQTT

As of this version, the JC-440EXT can be used as MQTT client. STX configuration functions are available for this purpose.

JC-440 MC/EXT: Integration Gratuitous ARP

As soon as an IP-based interface becomes active, the own IP address is made known to the other bus nodes without being requested. This happens when the node is reset and also when the IP address of the respective node changes. Thus, any bus node that is already active can update its ARP table. An active request for new IP nodes is therefore not necessary. This will speed up initial contact with new nodes if necessary.

4.2 Bug fixes as of 10.09.2020

4.2.1 General Bug Fixes

The bug fixes mentioned here affect the following OS versions of all products.

Product	Version	CAN open	J1939	MQTT	OPC UA	Ether CAT®	MC/ MCX	Type
JC-340	1.32.0.00							Industry
JC-350	1.32.0.00							Industry
JC-365	1.32.0.00	Yes						Industry
JC-365MC	1.32.0.00	Yes					Yes	Industry
JC-360	1.32.0.00	Yes						Industry
JC-360MC	1.32.0.00	Yes					Yes	Industry
JC-940MC	1.16.0.00						Yes	Industry

Product	Version	CAN open	J1939	MQTT	OPC UA	Ether CAT®	MC/ MCX	Type
JC-945MC	1.16.0.00					Yes	Yes	Industry
JC-970MC	1.16.0.00						Yes	Industry
JC-975MC	1.16.0.00					Yes	Yes	Industry
JC-440MC	1.08.0.00	Yes				Yes	Yes	Industry
JC-440EXT	1.08.0.00	Yes		Yes	Yes	Yes	Yes	Industry
JCM-501	4.08.0.00	Yes	Yes					Mobile
JCM-511	4.08.0.00	Yes	Yes					Mobile
JCM-521	4.08.0.00	Yes	Yes					Mobile
JCM-529	4.08.0.00	Yes	Yes					Mobile
JVM-104	4.10.00	Yes	Yes					Mobile
JVM-407B	4.10.00	Yes	Yes					Mobile
JVM-507B	4.10.00	Yes	Yes					Mobile
JVM-604B	4.10.00	Yes	Yes					Mobile
JV-1004	4.10.00							Industry
JV-1005	4.10.00							Industry
JV-1007	4.10.00							Industry
JV-1010	4.10.00							Industry
JCM-350	1.32.0.00							Mobile
JC-310-JM	1.32.0.00							Industry
JM-200-ETH	1.32.0.00							Industry
JX3-COM-PND	1.06.0.00							Industry

Tab. 5: OS versions per product line

Try_catch is not allowed in classes

When calling virtual methods through interfaces in connection with try/catch, the this pointer could be lost in certain cases which could cause the task to stop. This bug has been fixed.

Rename() with empty string

If an empty string ("") is entered as the name during renaming using the rename() function, the function now returns a "FALSE" as the return value.

4.2.2 Bug Fixes for MCX

The bug fixes mentioned here affect the following OS versions of the controllers with MotionControl. As of the OS versions listed below, MCX version 1.20.0.98 is used in the operating system:

OS version	Product
1.32.0.00	– JC-365 / JC-365MC – JC-360 / JC-360MC
1.16.0.00	– JC-940MC – JC-970MC – JC-945MC (EtherCAT® controller) – JC-975MC (EtherCAT® controller)
1.08.0.00	– JC-440MC (EtherCAT® controller) – JC-440EXT (EtherCAT® controller)

Geo group - Interruption and resumption

If one of the following actions was performed in a geo-group with a buffered movement, an MCX error was reported on the third resumption:

– The movement is interrupted
– The axes are mechanically removed from their stopping point
– A resumption is started
– While the mechanism are being moved back to the original path, an interrupt instruction is given again.

The error is fixed to the extent that 25 interruptions (JC-440MC, JC-9xxMC) or 10 interruptions (JC-365MC) are now possible before the error is reported.

Offset of the position display of virtual axes

So far, it could happen that the target and actual positions of a virtual axis did not exactly match. Under certain circumstances, this slight offset could also be effective in a follower axis. This bug has been fixed.

Incorrect error message 6200

If in a technology group with a shadow axis as the master axis a superpose command for the follower axis was issued, the error "6200: PTP target position oustide limits" was output.

This bug has now been fixed. If a real axis is used as the master axis, the superpose command works correctly.

MCX with JM-2xx/JM-1xx axes

If the STO (or hardware enable) is frequently requested in conjunction with Clear-Error and Drive-Disable/Drive-Enable instructions from various STX tasks, drive error F15 (hardware enable missing) may no longer be acknowledgeable on the servo amplifier.

Remedy: Issue all instructions for controlling an axis only in one STX task.

JC-945MC and JC-975MC: Initializing more than 27 axes

On the JC-945MC and JC-975MC controllers, the initialization of more than 27 axes failed. The motion control kernel (MCX) was not initialized properly. This error has now been rectified.

Configuration of JM-122xx/JM-14xx: PTC motor temperature sensor

For some motors with PTC as temperature sensors, when connected to the servo amplifiers JM-12xx or JM-14xx, an error could be displayed in the controller which incorrectly signalled a short circuit of the PTC. This error occurred with a resistance of less than 50 Ω. The monitoring is now set to less than 5 Ω, so that a functioning PTC sensor cannot cause an error message.

EtherCAT® controllers: Download incomplete axis configurations

If the axis configuration of an incompletely configured shadow axis (source axis not assigned) was transferred to the controller despite a warning, it could no longer be accessed after the restart.

Remedy: Before transferring the configuration, check that it is complete. To do this, follow the instructions (yellow triangles) on the axes in the hardware tree and the instructions in the "Compare and Download" dialog.

4.2.3 Bugfixes for CANopen

The bug fixes mentioned here apply to the following OS versions of the CANopen-compatible controllers:

OS version	Product
1.32.0.00	– JC-365 /JC-365MC – JC-360 / JC-360MC – JCM-350
1.08.0.00	– JC-440EXT – JC-440MC
4.08.0.00	– JCM-501 – JCM-511 – JCM-521 – JCM-529
4.10.0.00	– JVM-104 – JVM-407B – JVM-507B – JVM-604B

CANopen – CanOpenDownloadOS()

The status given is now better calculated when, for example, a JXM-IO-E2 is updated. The remaining controllers are not affected by this (identical to JetEasyDownload console application 1.01.0.00).

RTR for PDO is not supported

A query via RTR is not implemented on Jetter controllers. The function therefore now transfers the value -1 (invalid parameter) when called. Until now, this parameter was ignored and the entry was created as CANopen_ASYNCPDO.

CANopen – PDOTX blocks controller

If TX messages were entered with eventTime = 0 and inhibitTime = 0, the controller could no longer be addressed. This bug has been fixed.

4.2.4 Bug fixes for HMIs

The bug fixes mentioned here affect the following OS versions of the user interfaces:

OS version	Product
4.10.0.00	– JVM-104 – JVM-407B – JVM-507B – JVM-604B – JV-1004 – JV-1005 – JV-1007 – JV-1010

New and revised registers

The following registers have been corrected or added in this OS version:

Register	Description
107003	Free memory on the SD card in MB.
107004	Available memory on the SD card in MB.
107005	Used memory on the SD card in MB.
109003	Free memory on the USB mass storage in MB.
109004	Available memory on the USB mass storage in MB.
109005	Used memory on the USB mass storage in MB.

In previous versions, memory sizes over 4 GB were not displayed correctly. This error has now been rectified.

CANopen initialization without CAN module (JV-10xx)

In the case of the user interfaces JV-1004, JV-1005, JV-1007 and JV-1010, CANopen initialization could result in a crash if no CAN module was plugged in. This error has now been rectified.

4.2.5 Bug fixes for specific controllers

JX3-COM-PND: Modules with position greater than 9

So far, the JX3-COM-PND could not be used as a module with a position greater than 9. This bug has been fixed.

JC-340/JC-350: Blocked task when querying the NTP time

So far, it could happen that the task that performs the query of the NTP time was permanently blocked if the NTP time was already queried during the boot phase. This was due to a bug in the BSD interface of netX which is now fixed.

JC-365MC: Crash when starting the oscilloscope

If a register on a non-connected drive was used as trigger with OS version 1.30.0.00, the controller crashed when starting the oscilloscope. This error has now been rectified.

JC-365MC: No Ethernet communication after repeated loading of an HTML page

So far, it could happen that after loading an HTML page several times, the Ethernet communication was disrupted because the transmit packet buffers were used up. This could occur if "send" or "sendto" was called with a length to be sent of "0". In this case, an error message occurred and the function aborted without releasing the transmit packet.

This bug has been fixed.

JC-97X: Cyclical tasks do not maintain cycle

With JC-970 and JC-975, it could happen that the time slice of a user task was not kept. This could lead to the execution of one or more tasks being aborted too early within a program cycle.

This bug mainly affected cyclic tasks with a short cycle time, which then did not exactly keep their cycle and were possibly even aborted by the time monitoring.

This bug has been fixed.

List of tables

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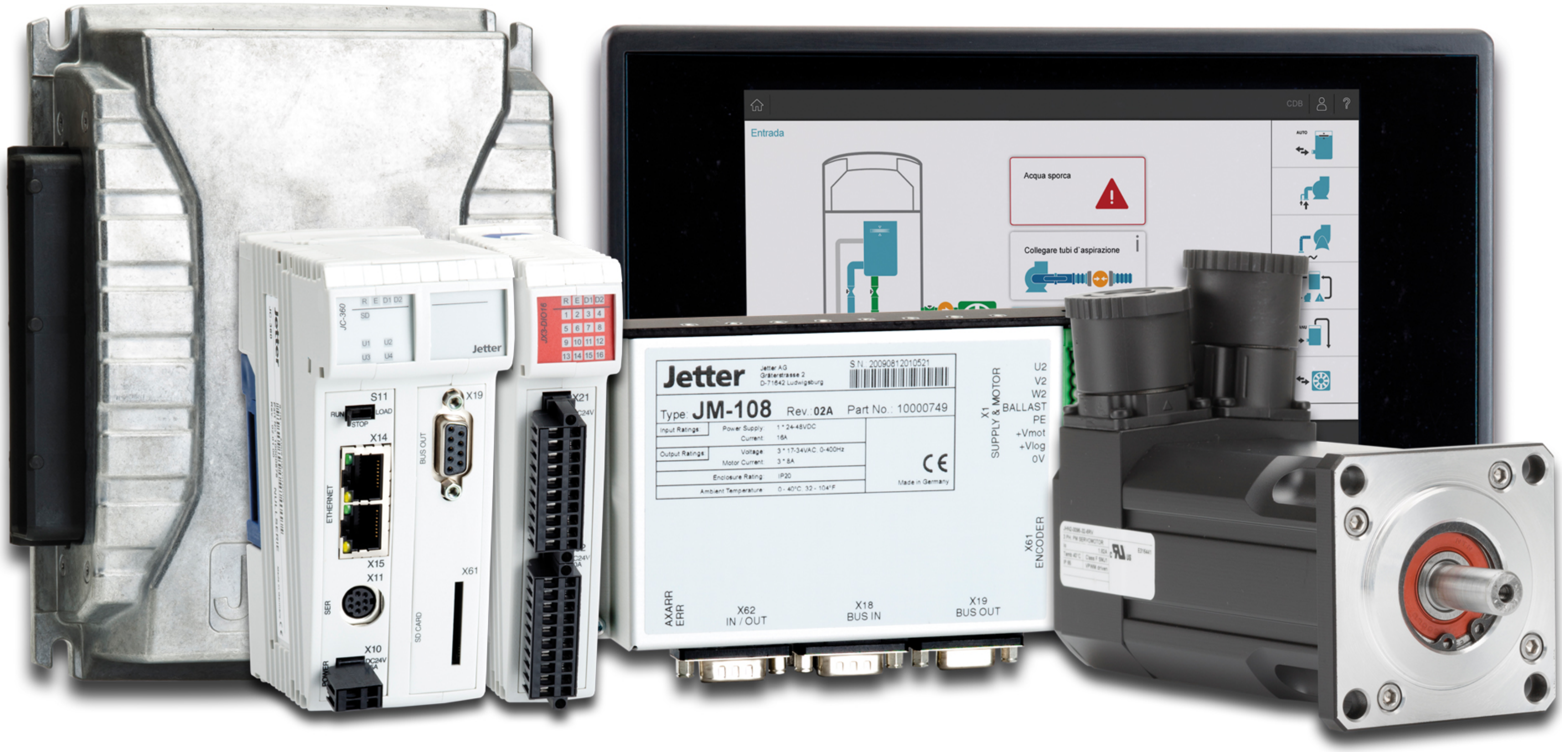

OS version updates

as of September 10, 2020

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Translation of the original User Manual

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Table of contents

1 Introduction

This document describes the enhancements and bug fixes released in the following OS versions:

OS versions per product line:

Product	Version	CAN-Open®	J1939	MQTT	OPCUA	Ether-CAT©	MC / MCX	Type
JC-340	1.32.0.00							Industrial Automation
JC-350	1.32.0.00							Industrial Automation
JC-365	1.32.0.00	Yes						Industrial Automation
JC-365MC	1.32.0.00	Yes					Yes	Industrial Automation
JC-360	1.32.0.00	Yes						Industrial Automation
JC-360MC	1.32.0.00	Yes					Yes	Industrial Automation
JC-940MC	1.16.0.00						Yes	Industrial Automation
JC-945MC	1.16.0.00					Yes	Yes	Industrial Automation
JC-970MC	1.16.0.00						Yes	Industrial Automation
JC-975MC	1.16.0.00					Yes	Yes	Industrial Automation
JC-440MC	1.08.0.00	Yes				Yes	Yes	Industrial Automation
JC-440EXT	1.08.0.00	Yes		Yes	Yes	Yes	Yes	Industrial Automation
JCM-501	4.08.0.00	Yes	Yes					Mobile Automation
JCM-511	4.08.0.00	Yes	Yes					Mobile Automation
JCM-521	4.08.0.00	Yes	Yes					Mobile Automation
JCM-529	4.08.0.00	Yes	Yes					Mobile Automation
JVM-104	2000-10-04	Yes	Yes					Mobile Automation
JVM-407B	2000-10-04	Yes	Yes					Mobile Automation
JVM-507B	2000-10-04	Yes	Yes					Mobile Automation
JVM-604B	2000-10-04	Yes	Yes					Mobile Automation
JV-1004	2000-10-04							Industrial Automation
JV-1005	2000-10-04							Industrial Automation
JV-1007	2000-10-04							Industrial Automation
JV-1010	2000-10-04							Industrial Automation
JCM-350	1.32.0.00							Mobile Automation

Product	Version	CAN-Open®	J1939	MQTT	OPCUA	Ether-CAT©	MC / MCX	Type
JC-310-JM	1.32.0.00							Industrial Automation
JM-200-ETH	1.32.0.00							Industrial Automation
JX3-COM-PND	1.06.0.00							Industrial Automation

Tab. 1: OS versions per product line

Added controllers:

- JC-975MC
- JCM-631
- JC-440EXT
- JV-1004, JV-1005, JV-1007, JV-1010

No longer supported after this version:

- JC-360
- JC-360MC

Prerequisites

JetSym version 5.6.0 is required to use the JetSym-dependent enhancements and bug fixes.

2 New Enhancements

2.1 General Enhancements

The enhancements mentioned here apply to the OS versions of all products [▶ 5].

2.1.1 More usable data memory for STX variables

Up to now, the STX application program could use a maximum of 16 MB of data memory for variables, even if the controller had more than 16 MB of RAM. Thanks to an extension in the operating system, more than 16 MB can now be used if a corresponding controller is used.

The maximum size is shown in the following table:

Controller	Maximum memory available for APP
JC-310	2 + 1 MB
JC-340	2 + 1 MB
JC-350	2 + 1 MB
JC-360	4 + 0.5 MB
JC-365	24 + 1 MB
JC-440	32 + 1 MB
JC-940MC	64 + 1 MB
JC-970MC	64 + 1 MB
JC-945MC	64 + 1 MB
JC-975MC	64 + 1 MB
JV-1005/7/10	15 + 1 MB
JCM-350	4 + 1 MB
JVM-407B	8 + 1 MB
JVM-507B	8 + 1 MB
JCM-501	8 + 1 MB
JCM-511	8 + 1 MB
JCM-521	8 + 1 MB
JCM-529	8 + 1 MB
JVM-630	8 + 1 MB

Tab. 2: Use of data memory in STX larger than 16 MB

2.2 Industrial automation controllers - Enhancements

The enhancements mentioned here apply to the following OS versions of the industrial automation controllers:

OS version	Product
1.32.0.00	■ JC-340 ■ JC-350 ■ JC-365/JC-365MC ■ JC-360/JC-360MC ■ JC-310-JM ■ JC-200-ETH

OS version	Product
1.16.0.00	■ JC-940MC ■ JC-970MC ■ JC-945MC ■ JC-975MC
1.08.0.00	■ JC-440MC ■ JC-440EXT
1.06.0.00	■ JX3-COM-PND

2.2.1 JX3-COM-PND - Revision and new features

1. Up to now it was necessary to enter the name of the device in JetSym under "`Configuration → PROFINET IO DEVICE`". This is no longer necessary. Names entered are ignored.
2. Under "`Diagnostics → PROFINET IO Device Stack`" it was so far necessary to set the "`4: Bus On`" command in the command box. This is no longer necessary and a set command has no effect.
3. Under "`Diagnostics → PROFINET IO Device Stack`", the lines "Station name X of 10" no longer contain the name assigned in JetSym, but the name assigned by the PROFINET supervisor and saved in the JX3.

2.2.2 More HTTP types supported

Now, the HTTP server supports the following file types:

- .map
- .tff
- .woff
- .woff2

2.2.3 Timeout before the first publication received

The Jetter Ethernet system bus now has a new register for monitoring the timeout period for receiving a publication for a subscription.

- **Index**: 250005
- **Name**: Start timeout in milliseconds
- **Description:** Timeout for the start of communication

Until now, a subscription had to receive at least one publication before timeout monitoring via register 250x27 became active. If the first publication already exceeded the timeout period, this was not registered as an error.

For this purpose, there is now the additional function "Start-Timeout" via register 250005. This register monitors the receipt of publications for all subscriptions. Detected timeout errors are displayed in the following registers:

- 250000
- 250002
- 254001 through 254003

After the start timeouts have expired, register 250005 is reset to 0. The register can be written to again and again and thus timeout monitoring can be triggered manually.

2.3 Enhancements for MCX

The enhancements mentioned here apply to the following OS versions of the controllers with Motion Control. As of the OS versions listed below, the operating system uses MCX version 1.20.0.98:

OS version	Product
1.32.0.00	■ JC-365MC ■ JC-360MC
1.16.0.00	■ JC-940MC ■ JC-970MC ■ JC-945MC (EtherCAT© controller) ■ JC-975MC (EtherCAT© controller)
1.08.0.00	■ JC-440MC (EtherCAT© controller) ■ JC-440EXT (EtherCAT© controller)

2.3.1 Automatic coupling of an electric gearbox can be set

Up to now, in a technology group involving an electric gearbox, the follower axis was automatically coupled as soon as the group was activated. Since this is not useful in all applications, the function "`configGearing`" can now be used to set whether the coupling should be automatic or not.

To configure an axis so that it is not automatically coupled, the following command must be sent to the technology group:

```
AV_Techno.Coupling.Gearing.Configure(
AX_Follower,1,1,MCTechnoGearingActivationModes.Decoupled
);
```

For this purpose, the technology group must be activated once at the beginning of the program.

2.3.2 Internal position setpoint can be used in Scope function

For special diagnostic purposes, the internal setpoint position value and the current actual position value can now be recorded in the internal scope function of the controller. The setpoint and actual position values are sent cyclically from the controller (MCX) to the servo amplifier.

The setpoint position value is displayed in register 50xxx9230. The actual position value is displayed in register 50xxx9320. The values are transmitted in a 32-bit integer in which the low word represents the angular position and the high word the number of revolutions.

2.3.3 EtherCAT© controllers: Important change

If the controller OS version for JetSym 5.6 is used, it is absolutely necessary to use JetSym version 5.6.0 (or a more recent one) when using axes. In an existing project, which was created with JetSym V5.5.1, for example, the project must be opened in JetSym 5.6.0 after the controller has been updated and the following actions must be carried out:

- Change the OS version on the CPU side
- Download the hardware configuration using the "Compare and Download" dialog

- Delete the old Motion API from the library and include Motion API 2.0.0.3
- Recompile and transfer the program

2.3.4 EtherCAT© controllers: Touch Probe Function

Starting with this version, the controllers JC-440MC, JC-945MC and JC-975MC have a touch probe function. This function enables the actual position of the axis to be recorded and stored very accurately on the basis of the signal at a fast digital input. This function lets you program compensation operations or make accurate length measurements of moving objects.

Properties:

- 1 or 2 channels depending on the inverter type
- Once-only or continuous recording
- Rising, falling or both edges can be parameterized
- Position recording in user-defined units
- Programming via Motion API functions

ⓘ INFO	This function cannot be used in axis groups!

2.3.5 EtherCAT© controllers: Torque cut-off

EtherCAT controllers now feature the special function "torque cut-off", which is primarily used in screwing applications. The main function is the parameterization of the load-torque that triggers a fast braking of the drive. This function was integrated into the servo amplifiers of the JetMove 200 series and is used here again in its proven form. The function can be used with the help of Motion API functions.

ⓘ INFO	The screwing process cannot be carried out by a controller several times at the same time.

2.3.6 EtherCAT© controllers: JetMove 1008/1005 can be used

The JetMove 1008 and JetMove 1005 servo amplifiers can now be connected and used with a compatible controller via EtherCAT©.

2.3.7 EtherCAT© controllers: String objects can now be read

Special CANopen objects of the servo amplifiers can be read and written in EtherCAT© controllers via motion API access. As of this version, this is also possible for string objects (type: visible strings).

2.3.8 EtherCAT© controllers: External axis

For EtherCAT© controllers, "external axes" can now be used. For this purpose, an encoder can be used on a second encoder interface of an axis module. The position value of this encoder can be used in the MCX as the master axis in a technology group. The external axis is created and configured in the Hardware Manager in JetSym.

2.4 Extensions for CANopen®

The extensions mentioned below apply to the following OS versions of CANopen®-capable controllers:

OS version	Product
1.32.0.00	■ JC-365/JC-365MC ■ JC-360/JC-360MC ■ JCM-350
1.08.0.00	■ JC-440EXT ■ JC-440MC
4.08.0.00	■ JCM-501 ■ JCM-511 ■ JCM-521 ■ JCM-529
4.10.0.00	■ JVM-104 ■ JVM-407B ■ JVM-507B ■ JVM-604B

2.4.1 New STX API functions for CANopen®

New functions for bit-by-bit sending and receiving of PDO messages:

```
CanOpenAddPDORxBit(
    CANNo:int,
    CANID:int,
    BitPos:int,
    BitLength:int,
    dataType:int,
    DataLength:int,
    ref VarAddr,
    EventTime:int:=100,
    InhibitTime:int:=10,
    Paramset:int:=CANOPEN_ASYNCPDO|CANOPEN_NORTR
):int;
```

```
CanOpenAddPDOTxBit(
    CANNo:int,
    CANID:int,
    BitPos:int,
    BitLength:int,
    dataType:int,
    DataLength:int,
    ref VarAddr,
    EventTime:int:=100,
    InhibitTime:int:=10,
    Paramset:int:=CANOPEN_ASYNCPDO|CANOPEN_NORTR
):int;
```

2.4.2 New STX function CANopenExit(CANNo:int)

This function can be used to close the CAN interface. Then, no more messages are sent or received on the bus. Access by JetSym to the closed interface is also no longer possible.

```
CanOpenExit(CANNo:int):int;
```

2.4.3 STX function CanOpenAddObject() enhanced

The data type CANOPEN_VISIBLE_STRING can now be used for the object directory.

2.4.4 STX function CANopen_SetCommand enhanced

New command for changing the own heartbeat time available:

```
#define CMD_HEARTBEAT_TIME 4
```

Example: Changing the heartbeat from can 0 to 2 seconds

```
CanOpenSetCommand(0, CMD_HEARTBEAT_TIME, T#_2s)
```

2.4.5 STX access to own object directory via SDO command with own NodeID as target

With the functions `CanOpenUploadSDO()` and `CanOpenDownloadSDO()` the own object directory can now be accessed. For this, the own NodeID must be specified as the target.

2.4.6 STX DLC of PDO TX messages shortened to effective length

As of this version, only the actual used/registered length for a CAN message is sent. So far, all PDOs were sent with a DLC of 8.

2.4.7 Emergency message if PDO size is smaller than the mapped size

When messages are received that are smaller than the mapped size, an emergency message is now sent with the code 0x8210.

ManufacturerError[0] = 2

ManufacturerError[1 - 4] = CAN ID little endian of the affected PDO

2.4.8 CANopen® object types in object table

Object index 1 … 27 is now supported. The size of the type in bytes is returned as unsigned32.

2.4.9 CANopen® support for node guarding

If the heartbeat time is set to 0 ms, Node Guarding can be used. So far, 0 ms was not a valid value.

2.4.10 CANopen® new registers for retrieving the runtime of PDOs

Register	Description
40x900	Current propagation time RX list
40×901	Minimum propagation time RX list
40×902	Maximum propagation time RX list
40×903	Number of calls RX list
40×910	Current propagation time TX list
40×911	Minimum propagation time TX list
40×912	Maximum propagation time TX list
40×913	Number of calls TX list

2.5 Mobile automation controllers - Enhancements

The enhancements mentioned here apply to the following OS versions of the mobile automation controllers:

OS version	Product
4.08.0.00	■ JCM-501 ■ JCM-511 ■ JCM—521 ■ JCM-529
4.10.0.00	■ JVM-104 ■ JVM-407B ■ JVM-507B ■ JVM-604B
1.32.0.00	■ JCM-350

2.5.1 J1939 SAEJ1939AddTx

If PGN, BytePos, Bitpos, and variable type are identical, a passed variable, the RepetitionTime, and InhibitTime can be changed by logging on the message again.

2.6 HMI enhancements

The enhancements mentioned below apply to the following HMI OS versions:

OS version	Product
4.10.0.00	■ JVM-104 ■ JVM-407B ■ JVM-507B ■ JVM-604B ■ JV-1004 ■ JV-1005 ■ JV-1007 ■ JV-1010

2.6.1 Windows embedded Compact 2013 (WEC2013) for HMIs of the JV-10xx series

The following devices can also be ordered with the WEC2013 operating system: JV-1005, JV-1007, JV-1010. The order number code is: -B9

WEC2013 is not available for the JV-1004 HMI.

2.6.2 Jv-10xx HMIs - Reading out information about installed expansion modules

With all HMIs of the JV-10xx series (JV-1004, JV-1005, JV-1007 and JV-1010) information about expansion modules can now be read out via the following registers.

Register	Description
111xx0 … 111xx5	Name of the expansion module
111xxx+10 … 111xxx+13	Bit-coded function of the expansion module Bit1: CAN Bit6: PROFIBUS

INFO

xx = Number of the expansion module (0 ... 3) * 50

➔ Name of the expansion module 2 = 111100

2.6.3 CANopen® modules for JV-10xx

All JV-10xx HMIs (JV-1004, JV-1005, JV-1007, JV-1010) now support up to two CAN modules.

2.6.4 PROFIBUS slave module for JV-10xx

One PROFIBUS module can now be connected to JV-1004, JV-1005, JV-1007, and JV-1010 HMIs.

Register	Description
135100	**Status** Lower byte (1) is number-coded: 0: No error 5: Timeout in PROFIBUS communication 7: Timeout in communication CPU → PROFIBUS module 8: No cable connected, no response 9: Bus not in data exchange mode The next byte (1) is bit-coded: **Bit 8**: Status of the consistent input words 0 = Basic state or input words are being sent. 1= Input words sent completely. **Bit 9**: Status of the consistent output words 0 = Basic state or output words are being sent. 1= Output words sent completely

Register	Description
135101	**Command register** 11: Start cyclic communication 15: Send consistent inputs 16: Receive consistent outputs
135107	Station address
135108	DPID code default: 0x2DC
135118	IO length
135119	IO length
135132	**Status of the DP state machine** 0 = RESET Chip (boot-up state) 1 = RESET Chip Wait 2 = OFFLINE 3 = OFFLINE WAIT 4 = WAIT PRM (Parametrization) 5 = WAIT CFG 6 = DATA EXCHANGE
135133	**Current baud rate** 0000 = 12 MBaud 0001 = 6 MBaud 0010 = 3 MBaud 0011 = 1.5 MBaud 0100 = 500 kBaud 0101 = 187.5 kBaud 0110 = 93.75 kBaud 0111 = 45.45 kBaud 1000 = 19.2 kBaud 1001 = 9.6 kBaud
135135	**Watchdog status** 00 = ’Baud_Search’ state 01= ’Baud_Control’ state 10 = ’DP_Control’ state
135300 … 135399	Receive buffer
135400 … 135499	Send buffer
135500 … 135599	Receive buffer consistent
135600 … 135699	Send buffer consistent

Setting the station address:
The station address is written to station address register R135107.

➜ The status of DP state machine R135132 changes from `0 = RESET chip` to `3 = OFFLINE WAIT`.

2.7 Enhancements for specific controllers

2.7.1 JC-440 EXT: MQTT

As of this version, the JC-440EXT can be used as MQTT client. STX configuration functions are available for this purpose.

2.7.2 JC-440 MC/EXT: Integration Gratuitous ARP

As soon as an IP-based interface becomes active, the own IP address is made known to the other bus nodes without being requested. This happens when the node is reset and also when the IP address of the respective node changes. Thus, any bus node that is already active can update its ARP table. An active request for new IP nodes is therefore not necessary. This will speed up initial contact with new nodes if necessary.

3 Bug Fixes

3.1 General Bug Fixes

The bug fixes mentioned below apply to the OS versions of all products [▶ 5].

3.1.1 Try_catch is not allowed in classes

When calling virtual methods through interfaces in connection with try/catch, the this pointer could be lost in certain cases which could cause the task to stop. This bug has been fixed.

3.1.2 Rename() with empty string

If an empty string ("") is entered as name when renaming by the rename() function, the function now returns "FALSE".

3.2 Bug Fixes for MCX

The bug fixes mentioned below apply to the following OS versions of the controllers with Motion Control. As of the OS versions listed below, the operating system uses MCX version 1.20.0.98:

OS version	Product
1.32.0.00	■ JC-365/JC-365MC ■ JC-360/JC-360MC
1.16.0.00	■ JC-940MC ■ JC-970MC ■ JC-945MC (EtherCAT© controller) ■ JC-975MC (EtherCAT© controller)
1.08.0.00	■ JC-440MC (EtherCAT© controller) ■ JC-440EXT (EtherCAT© controller)

3.2.1 Geo group - Interruption and resumption

If any of the following actions were performed in a geo group with a buffered motion, an MCX error was reported on the third resume:

- The movement is interrupted
- The axes are mechanically removed from their stopping point
- The movement is resumed
- While the mechanical system is being moved back to the original path, another interrupt command is issued.

The bug is fixed in that 25 interruptions (JC-440MC, JC-9xxMC) or 10 interruptions (JC-365MC) are now possible before the error is signalled.

3.2.2 Offset of the position display of virtual axes

So far, it could happen that the target and actual positions of a virtual axis did not exactly match. Under certain circumstances, this slight offset could also be effective in a follower axis. This bug has been fixed.

3.2.3 Incorrect error message 6200

If in a technology group with a shadow axis as the master axis a superpose command for the follower axis was issued, the error "6200: PTP target position oustide limits" was output.

This bug has now been fixed. If a real axis is used as the master axis, the superpose command works correctly.

3.2.4 MCX with JM-2xx/JM-1xx axes

If the STO (or hardware enable) is requested frequently in connection with Clear Error and Drive Disable/Drive Enable commands from different STX tasks, it may happen that drive error F15 (hardware enable missing) can no longer be acknowledged on the servo amplifier.

Workaround: Issue all commands for controlling an axis only in one STX task.

3.2.5 JC-945MC and JC-975MC: Initializing more than 27 axes

The JC-945MC and JC-975MC controllers failed to initialize more than 27 axes. The motion control kernel (MCX) was not properly initialized. This bug has been fixed.

3.2.6 Configuration of JM-122xx/JM-14xx: PTC motor temperature sensor

For some motors with PTC as temperature sensors, when connected to the servo amplifiers JM-12xx or JM-14xx, an error could be displayed in the controller which incorrectly signalled a short circuit of the PTC. This error occurred with a resistance of less than 50 Ω. The monitoring is now set to less than 5 Ω, so that a functioning PTC sensor cannot cause an error message.

3.2.7 EtherCAT© controllers: Download of incomplete axis configurations

If the axis configuration of an incompletely configured shadow axis (source axis not assigned) was transferred to the controller despite a warning, it could no longer be accessed after the restart.

Workaround: Before transferring the configuration, check whether it is complete. To do so, check the axes in the hardware tree for yellow triangles and observe the information in the "Compare and Download" dialog.

3.3 Bug Fixes for CANopen®.

The bug fixes mentioned below apply to the following OS versions of CANopen®-capable controllers:

OS version	Product
1.32.0.00	■ JC-365/JC-365MC ■ JC-360/JC-360MC ■ JCM-350
1.08.0.00	■ JC-440EXT ■ JC-440MC
4.08.0.00	■ JCM-501 ■ JCM-511 ■ JCM-521 ■ JCM-529

OS version	Product
4.10.0.00	■ JVM-104 ■ JVM-407B ■ JVM-507B ■ JVM-604B

3.3.1 CANopen® CanOpenDownloadOS()

The status provided is now better calculated, e.g. when updating a JXM-IO-E2. The other controllers are not affected (identical to JetEasy Download Console Application 1.01.0.00)

3.3.2 RTR for PDO is not supported

A query via RTR is not implemented on Jetter controllers. Therefore, this function now passes the value -1 (invalid parameter) when called. So far, this parameter was ignored and the entry was created as CANopen_ASYNCPDO.

3.3.3 CANopen® PDOTX blocks control

If TX messages were entered with eventTime = 0 and inhibitTime = 0, the controller could no longer be addressed. This bug has been fixed.

3.4 Bug fixes for HMIs

The bug fixes mentioned below apply to the following HMI OS versions:

OS version	Product
4.10.0.00	■ JVM-104 ■ JVM-407B ■ JVM-507B ■ JVM-604B ■ JV-1004 ■ JV-1005 ■ JV-1007 ■ JV-1010

3.4.1 New and revised registers

The following registers have been revised or added in this OS version:

Register	Description
107003	Free memory on the SD card in MB
107004	Available memory on the SD card in MB
107005	Used memory on the SD card in MB
109003	Free memory on the USB mass storage device in MB
109004	Available memory on the USB mass storage device in MB
109005	Used memory on the USB mass storage device in MB

In previous versions, memory sizes above 4GB were not displayed correctly. This bug has been fixed.

3.4.2 CANopen® initialization without CAN module (JV-10xx)

With the HMIs JV-1004, JV-1005, JV-1007 and JV-1010, CANopen® initialization could lead to a crash if no CAN module was plugged in. This bug has been fixed.

3.5 Bug fixes for specific controllers

3.5.1 JX3-COM-PND: Modules with position greater than 9

So far, the JX3-COM-PND could not be used as a module with a position greater than 9. This bug has been fixed.

3.5.2 JC-340/JC-350: Blocked task when querying the NTP time

So far, it could happen that the task that performs the query of the NTP time was permanently blocked if the NTP time was already queried during the boot phase. This was due to a bug in the BSD interface of netX which is now fixed.

3.5.3 JC-365MC: Crash when starting the oscilloscope

If with OS version 1.30.0.00 a register on an unconnected drive was used as trigger, the controller crashed when the oscilloscope was started. This bug has been fixed.

3.5.4 JC-365MC: No Ethernet communication after repeated loading of an HTML page

So far, it could happen that after loading an HTML page several times, the Ethernet communication was disrupted because the transmit packet buffers were used up. This could occur if "send" or "sendto" was called with a length to be sent of "0". In this case, an error message occurred and the function aborted without releasing the transmit packet.

This bug has been fixed.

3.5.5 JC-97X: Cyclical tasks do not maintain cycle

With JC-970 and JC-975, it could happen that the time slice of a user task was not kept. This could lead to the execution of one or more tasks being aborted too early within a program cycle.

This bug mainly affected cyclic tasks with a short cycle time, which then did not exactly keep their cycle and were possibly even aborted by the time monitoring.

This bug has been fixed.

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