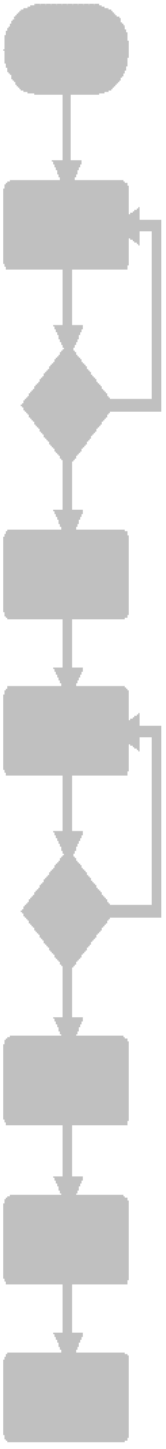

JetControl 24x

Version Update

from V. 3.13 to V. 3.14

Jetter

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Table of Contents

1 Introduction 5

1.1 Update Information 5

1.1.1 Compatibility with former versions 5

1.1.2 Special registers 5

2 Expansions 7

2.1 New System Bus Driver V. 1.28 7

2.2 System Bus 7

2.2.1 Dummy-slave modules 8

2.2.2 Valve terminal EX250 9

2.2.3 Milan Drives 10

2.2.4 Ecostep Drives 11

2.2.5 Vacon NX frequency converter 12

2.2.6 Monitoring the I/O Modules 13

2.3 JetIP V1.1 15

2.4 Operating System Update 15

2.5 Timer 16

2.6 Networking 16

2.7 HTTP-Server 16

2.8 System Command 16

2.8.1 Register 16

2.8.2 Instruction: Establishing the delivered condition 17

2.8.3 Instruction: Creating the delivered condition; deleting the password of the user program 17

2.9 Password of the Application Program 17

2.9.1 Register 18

2.9.2 Function 18

2.9.3 JetSym 19

3 Eliminated Software Bugs 20

3.1 System Bus 20

3.1.1 Reading back the analog outputs from the JX-SIO 20

3.2 User Interfaces 20

3.2.1 Monitor enable 20
3.2.2 Inputs / Outputs 20
3.2.3 Registers 20
3.3 AXARR 20
3.4 Flags 20
3.5 Debugger 21

1 Introduction

Version Updates - Survey			
Version	**Function**	**upgraded**	**corrected**
V 3.12	Interpreter		✓
V. 3.13	Register		✓
	Modbus	✓	✓
	Scheduler	✓	
	Communication		✓
	Debugger		✓
	E-mail		✓
	Http-Server		✓
V. 3.14	System bus	✓	✓
	Communication	✓	
	Operating system update	✓	
	Interpreter	✓	✓
	Register	✓	✓
	Debugger		✓
	Http-Server	✓	

1.1 Update Information

1.1.1 Compatibility with former versions

Operating systems as of version 3.14 can only be installed in JC-24x controllers of serial numbers as of **20020523070000.** If an older device is to be upgraded with version 3.14 (or a later version), please contact the technical hotline of Jetter AG.

1.1.2 Special registers

After updating an operating system version older than V. 3.14, the battery-backed special registers are set to their standard values at power-up of the controller the first time.

Register Number	Meaning	Delivered value
2023	JX2-I/O dummy module; bit-coded Bit = 1 : The module really exists	-1
2024	JX2-Slave dummy module, bit-coded Bit = 1 : The module really exists	255
2029	Baud rate on the system bus 7 = 1 MBaud	7
2032	Delay at system start before initializing the system	10

	bus	
2909	Number of the first floating-point register	65024
2964	JetIP protocol, sub-version number (V. 1.1)	0

2 Expansions

2.1 New System Bus Driver V. 1.28

2.2 System Bus

As of operating system version 3.14, some new modules can be directly connected to the system bus.
The modules that have been recognized and commissioned can be read out by means of the module array in registers 2015 and 2016.

Coding of Modules		
JX2-I/O Modules		
Module Code	**Designation**	**Comment**
0	JX2-OD8	8 digital outputs
1	JX2-ID8	8 digital inputs
2	JX2-IO16	8 digital inputs and 8 digital outputs
3	JX2-IA4	4 analog inputs
4	JX2-OA4	4 analog outputs
5	JX2-CNT1	Counter input
6	JX2-PRN1	Module with Centronics interface
7	JX2-SER1	Module with serial interface
9	JX-TP20	Module equipped with 20 keys; it can be used as a user interface
10	LJX7-CSL-108-ID16	16 digital inputs, IP67
11	LJX7-CSL-109-ID16-NPN	16 digital inputs (n), IP67
12	LJX7-CSL-107-OD8-2A	16 digital outputs, IP67
13	LJX7-CSL-114-OD16	8 digital outputs, IP67
14	LJX7-CSL-113-ID8-OD8	8 digital inputs and 8 digital outputs, IP67
JX-SIO and Third-Party Modules		
Module Code	**Designation**	**Comment**
64	JX-SIO	System bus coupler for Smart I/O
65	CPV-Direct Valve Terminal	Festo AG & Co.
66	Terminal CPX	Festo AG & Co.
67	Valve terminal type 8640	Bürkert GmbH & Co. KG
68	SI unit EX12# - SCA1	SMC Pneumatik GmbH
70	Frequency converter 8200 vector	Lenze Drives Systems GmbH

Coding of Modules		
71	SI unit EX250	SMC Pneumatik GmbH
103	Milan drive	Werner Riester GmbH & Co. KG (auma)
104	Ecostep	Jenaer Antriebstechnik
105	NX frequency converter	Vacon GmbH
JX2-Slave Modules		
Module Code	**Designation**	**Comment**
128	JX2-SV1	Position feedback controller, frequency converter …
129	CAN-DIMA	Position feedback controller with integrated servo amplifier
130	JX2-SM2	Module for controlling 2 stepper motor amplifiers
131	JX2-SM1D	Module with integrated power unit for controlling a stepper motor
132	JX2-PID1	Module with 4 PID controllers
133	JX2-PROFI1	Slave for Profibus-DP
135	JetMove 200 series	Position feedback controller with integrated servo amplifier
136	JX2-ProfiM	Master for Profibus-DP
146	JetMove 600 series	Position feedback controller with integrated servo amplifier
Dummy Modules		
Module Code	**Designation**	**Comment**
252	JX-SIO dummy module	
253	JX2-Slave dummy module	
254	JX2-I/O dummy module	
255	not identified	

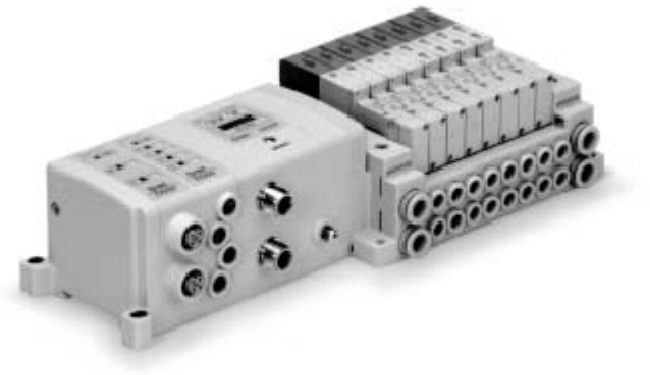
2.2.1 Dummy-slave modules

Access to registers of dummy-slave modules will not cause a timeout error report any more.

2.2.2 Valve terminal EX250

The valve terminals EX250 of SMC Pneumatik GmbH can be connected to the system bus. For information on how to connect the EX250 valve terminals to the system bus, please refer to the corresponding user information.

Valve terminal EX250



Technical Data of the EX250 Valve Terminal	
Maximum amount of EX250 valve terminals in connection with JC-24x The maximum number of modules is limited by the maximum allowable I/O sum of the respective controller	JC-241: 1 JC-243: 3 JC-246: 5
Size of I/Os	64
Supported EX250	SI units EX250 - SCA1 All solenoid valves that can be connected to the SI unit are supported

2.2.3 Milan Drives

The system bus allows for connection of Milan Drives made by Werner Riester GmbH & Co. KG. For information on how to connect Milan Drives to the system bus, please refer to the corresponding user information.

Milan Drives

Technical Data of Milan Drives	
Maximum number of Milan drives	JC-241: 1 JC-243: 3 JC-246: 6
Size of I/Os	1 JX2-slave module
Supported Milan Drives	MI 1.5/075 MI 2/090 MI 4/110

2.2.4 Ecostep Drives

The system bus allows for connection of Ecostep drives made by Jenaer Antriebstechnik. For information on how to connect Ecostep drives to the system bus, please refer to the corresponding user information.

Ecostep Drives

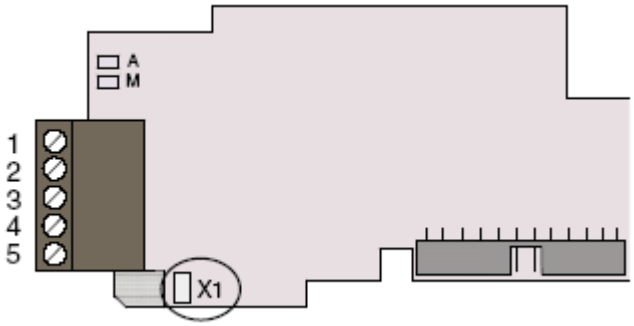
Technical Data of Ecostep Drives	
Maximum number of Ecostep drives	JC-241: 1 JC-243: 3 JC-246: 6
Size of I/Os	1 JX2-slave module
Supported Ecostep drives	100-AA-000 100-LA-000 100-PA-000 200-AA-000 200-PA-000 200-ZA-000 200-QA-000 216-AA-000 216-PA-000 216-ZA-000 216-QA-000

2.2.5 Vacon NX frequency converter

Vacon NX frequency converters made by Vacon Oyi, can be connected to the system bus. For information on how to connect the Vacon NX frequency converters to the system bus, please refer to the corresponding user information.

Vacon NX frequency converter

CANopen option board



The Vacon NX frequency converter is connected to the system bus via the CANopen option board.

Technical Data	
Maximum number of Vacon NX frequency converters	JC-241: 1 JC-243: 3 JC-246: 6
Size of I/Os	1 JX2-slave module
Supported Vacon NX frequency converters	all frequency converters made by Vacon Oyi which allow for installing the CANopen option board

2.2.6 Monitoring the I/O Modules

The monitoring function of JX2-I/O modules can be freely configured and adjusted to the requirements of the specific controllers.

Register 2760: Configuring the Timeout of JX2-I/O Modules	
Function	**Description**
Read	Actual JX2-I/O timeout configuration
Write	New JX2-I/O timeout configuration
Value range	0 – 255
Value after reset	5

By means of configuring the JX2-I/O timeout, the maximum permitted number repeating an I/O upload to a JX2-IO module is set. The JetControl 24x will not report a timeout error via error register 2008, before the I/O update for a specific module has reached the configured value.

Register 2761: Index to a JX2-I/O Timeout Monitoring Array	
Function	**Description**
Read	Present index The index corresponds to the I/O module number
Write	New index
Value range	2 – 32, 70 – 79
Value after reset	2

Register 2762: JX2-I/O Timeout Monitoring Array	
Function	**Description**
Read	Actual value of the JX2-I/O monitoring array Reg. 2761 = 2 → Reg. 2762: Entry for I/O module 2 Reg. 2761 = 3 → Reg. 2762: Entry for I/O module 3 Reg. 2761 = 70 → Reg. 2762: Entry for JX-SIO module 70
Write	By writing value zero into the register, the entry for the presently selected I/O module will be set to zero.
Value range	0 – 65535
Value after reset	0

If the JetControl 24x has not received a reply from a JX2-I/O or a JX-SIO module within the timeout time configured in register 2763, the value assigned to the module will be increased by one in the JX2-I/O timeout monitoring array.
By means of the JX2-I/O timeout monitoring array, the quality of the connection between the JetControl 24x and the individual expansion modules can be evaluated.

Register 2763: JX2-I/O Monitoring Timeout	
Function	**Description**
Read	Actual JX2-I/O monitoring timeout
Write	New JX2-I/O monitoring timeout
Value range	0 – 255 [ms]
Value after reset	10 [ms]

The maximum permitted time of the JetControl 24x waiting for a reply sent by the expansion module during I/O update can be configured via register 2763. Not before this time has expired, the entry assigned to te respective expansion module in the JX2-I/O timeout monitoring array will be incremented by one.

Register 2764: Timeout at Register Access to JX2-I/O Modules	
Function	**Description**
Read	Present timeout time
Write	New timeout time
Value range	0 – 255 [ms]
Value after reset	10 [ms]

The maximum permitted time of the JetControl 24x waiting for a reply sent by the expansion module during register access to an I/O module (register 3xxx) can be configured via register 2764. Not before this time has expired, a timeout error will be reported in register 2008.

Register 2765: Timeout at Register Access to JX2-Slave Modules	
Function	**Description**
Read	Present timeout time
Write	New timeout time
Value range	0 – 255 [ms]
Value after reset	20 [ms]

The maximum permitted time of the JetControl 24x waiting for a reply sent by the expansion module during register access to a slave module (register 121xx - 17999) can

be configured via register 2765. Not before this time has expired, a timeout error will be reported in register 2008.

2.3 JetIP V1.1

As of this operating system version, version 1.1 of the JetIP network protocol will be supported. This way it is possible to combine several commands in one single enquiry frame. The answers will also be returned in one single reply frame by the controller. This way, update rates can be reduced, especially for visualization masks.
Nevertheless, communication in plants with JC-24x and JC-800 controllers, as well as with PC software (e.g. JetSym, JetViewSoft, etc.) with various protocol versions will not be inhibited by this.
Due to a software error in the operating system of JetControl 647 up to version 3.50 included, JetControl 647 cannot communicate with controllers using protocol version 1.1.
This means that if a JC-24x as of version 3.14 is to be operated in connection with JetControl 647, the JetControl 647 needs to be equipped with operating system version 3.51 at least, or with a later one. If a JC-647 cannot be updated, the protocol version of the JC-24x can be set back to 1.0.

Register 2964: JetIP Protocol Version	
Function	**Description**
Read	JetIP Protocol Version 0: V 1.1 1: V 1.0
Write	Set the protocol version. The settings will not be activated before reboot of the controller.
Value range	0 .. 1
Value after reset	As set last. Delivered value: 0 (V 1.1)

The register is battery-backed. This way, it will keep its contents even beyond switching off the controller. By means of system commands 104 and 204, the register is reset to its delivered value.

2.4 Operating System Update

In the operating system update, the data having been received via Ethernet interface up to then will directly be written to the flash memory of the JC-24x. As of this operating system version, all data are first stored temporarily, then a CRC checkup is made and finally, after all data having been transmitted correctly, the new operating system is stored to the flash memory only.
Please mind: In a password protected application program, an operating system update can only be made if the password written in register 2063 has been set correctly!

2.5 Timer

The instructions START_TIMER – for starting a monitoring time – and TIMER_END? – for checking, whether a set time has expired – have only worked with user registers 0 through 1999 so far. As of this version, the expansion registers 20000 through 49999, as well as local variables, can be used in functions.

2.6 Networking

For transmitting register contents from and to other controllers, the instructions N_COPY_TO2 and N_COPY_FROM2 are now available. Other than the N_COPY_TO and N_COPY_FROM instructions used so far – they will still be supported – they offer the possibility of specifying the IP port in the target system. This way, it is possible to address JetIP servers that react to another port than does the local JetIP server.
For making use of these new instructions, JetSym version 2.3.1 will be needed.

2.7 HTTP-Server

Now, the http-server also supports bitmap files with the extension "bmp".

2.8 System Command

By means of the system command register, system commands can be carried out.
In order to prevent inadvertent issuing of system commands, the password register must first be set correctly.

- If the command register is written into, while the password register still contains the wron value, value –1 will be read back out of the command register.
- If an incorrect command is written, while the password register contains the right value, the value of the command register will remain unchanged, while the password register is set to '0'.
- If a correct value is written into both registers, both of them will contain value zero, depending on how the command is carried out.

2.8.1 Register

Register 2960: Password for System Command	
Function	**Description**
Read	0, or value entered last
Write	Enter the password: 1112502132 (0x424f6f74)
Value range	32 bits
Value after reset	0

Register 2961: System Command	
Function	**Description**

Read	-1, 0, or value entered last
Write	Issue the command 104: Turn remanent setting values into the respective delivered value 204: As in 104; in addition, the application program and the user password are deleted
Value range	32 bits
Value after reset	0

2.8.2 Instruction: Establishing the delivered condition

Most special registers are initialized by standard values at power-up. Some, though, have been stored to the battery-backed memory and are initialized once by the manufacturer before shipping. By means of command **104,** the remanent special registers can be set back to their delivered condition.

Register Number	Meaning	Delivered va
2023	JX2-I/O dummy module; bit-coded Bit = 1 : The module really exists	-1
2024	JX2-Slave dummy module, bit-coded Bit = 1 : The module really exists	255
2029	Baud rate on the system bus 7 = 1 MBaud	7
2032	Delay at system start before initializing the system bus	10
2909	Number of the first floating-point register	65024
2964	JetIP protocol, sub-version number (V. 1.1)	0

2.8.3 Instruction: Creating the delivered condition; deleting the password of the user program

First of all, the delivered condition of the remanent registers (see command 104) is restored by means of command **204.** Then, the application program is removed from the flash disk and the memory of the controller, while the password of the application program is set to zero.

2.9 Password of the Application Program

In order to protect the intellectual property of the application programmer, there is the possibility of protecting the application program data from **being read out** via the pcom7 or the JetIP protocol by a password. The FTP access to the application program is not protected by this password. Data security for this can be achieved via the user administration of the file system.

2.9.1 Register

Register 2962: Stored Password	
Function	**Description**
Read	0: No password protection -1: The program is protected
Write	A new password is set by writing the same value twice
Value range	32 bits
Value after reset	Delivered condition: 0

Register 2963: Entered Password	
Function	**Description**
Read	Value entered last
Write	Enter the password
Value range	32 bits
Value after reset	0

2.9.2 Function

- In the delivered condition and after issuing system command 204, both the stored and the entered password are 0. Register 2962 displays –1 to indicate that the program is protected. Register 2963 contains the correct password 0. This way, the application program can be read out (e.g. during a comparison of programs in JetSym).
- In order to enter a new password, the same value must be written into register 2962 twice. After the first write access, value 0 is displayed in register 2962, as there is no password protection now. Not before confirming the new password by a second write access of the same value the password will be accepted and the protection from reading out will be activated.
- For reading out the application program or for changing the password, the new password must be entered into register 2963.
- In a protected application program, an operating system update is also only possible, if register 2963 contains the correct password.

Changing the password

1. Enter the presently valid password into register 2963
2. Enter the new password into register 2962
3. For confirmation, enter the new password into register 2962 a second time

Example

present password: 1234
new password: 5678

```
mem[2963] := 1234;
mem[2962] := 5678;
mem[2962] := 5678;
```

2.9.3 JetSym

If a protected program is tried to be read out by JetSym without a correctly set password, the following error report will be displayed:

```
fatal error 4202: Communications fault: IP – invalid parameter
```

.

3 Eliminated Software Bugs

3.1 System Bus

3.1.1 Reading back the analog outputs from the JX-SIO

After switching on the system bus, the actual values of the digital and analog outputs at the JX-SIO will be read back once by the JC-24x.
This way, at restarting the system bus, the configured error statuses at the outputs of the JX-SIO will agree with the process image of the controller.

3.2 User Interfaces

3.2.1 Monitor enable

Users should actually not be able to access the enable register for the monitor functions (register 2818) with the help of the monitor mode. Due to an error, though, this register could be changed. As of this operating system version it is not possible any more to change the enable register by means of the monitor mode at the user interface.

3.2.2 Inputs / Outputs

If in monitor mode a number smaller than permitted was input, the operating system of the controller would occasionally crash. As of this version, this error will be intercepted and "invalid" will be displayed on the LCD.

3.2.3 Registers

Registers 2800 through 2899 have been reserved for user interface functions. Yet, at the moment, only registers 2800 through 2840 have been occupied. Accessing registers of this range which are not occupied could lead to unpredictible results. As of this operating version, writing access to registers between 2841 and 2899 will not be granted; the defined reply to reading access is value '0'.

3.3 AXARR

In a condition (after IF or WHEN), when the axis had been specified indirectly via register, making a request, whether an axis had reached its target position, would not function. As of this operating system version, the AXARR instruction will also function properly after specifying an indirect axis number.

3.4 Flags

As of operating system version 3.10, flags 40 through 47, 104 through 111, and 168 through 175 would be initialized by '0' (FALSE) at activating the controller. This way, they could not be used as remanent flags any more. As of this version, all user flags will keep their status again beyond switching off the controller.

3.5 Debugger

If in a JetSym program a branching condition by IF .. THEN .. had been programmed (the THEN branch being in the same line as IF in the source text; there is no ELSE branch), the IF instruction would be overwritten in the JetSym debugger in case of a Single Step over this line. When during program processing this position was being passed again (no matter whether in the debug or in the run mode), program processing would be stopped by reporting an OPC error (illegal instruction in the application program).
As the debugger only functions in one program copy in rhe RAM memory of the controller, te marked program on the flashh-disk would not be changed.
As of this operating system version, overwriting of program instructions will be inhibited.