



JX6-SB / JX6-SB-I
Version Update
from V. 2.11 to V. 2.12



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1 Introduction

Version Updates - Survey			
Version	Function	upgraded	corrected
V 2.12	<i>Fast inputs at JX2-ID8 / JX2-IO16</i> The inputs of the expansion modules JX2-ID8 and JX2-IO16 can be configured as fast inputs	✓	
	<i>Expansion modules JX6-SB(-I)</i> - EX250-SCA1 by SMC	✓	
	<i>Expansion modules JX6-SB-I</i> - Vacon NX frequency converter	✓	
	<i>Remanent values</i> Baud rate, dummy module, etc., can also be stored on the JX6-SB(-I) module as remanent items. This is of special significance for JetControl 800. <i>Error acknowledging and error recognition</i> Error-LED reset and enquiry on the system bus statuses have been optimized. <i>JX-SIO</i> After starting the system busses, the values of the analog outputs will be read back. 32-bit register overlay of the digital outputs	✓	✓ ✓
V 2.11	<i>Expansion Modules</i> The JX6-SB(-I) submodule now supports the following expansions in the master-slave mode JX6-SB ... - LJX7-CSL-108-ID16 - LJX7-CSL-109-ID16-NPN - LJX7-CSL-107-OD8-2A - LJX7-CSL-113-ID8-OD8 - LJX7-CSL-114-OD16 - Milan Drives	✓	
	<i>Monitoring JX2-I/O Modules</i> The behaviour of the JX6-SB(-I) submodule can be configured	✓	
	<i>JX2-Dummy-Slaves</i> There is no timeout, if JX2-dummy-slaves are applied	✓	
	<i>FESTO CP-FB Modules</i> Parallel mode with JX-SIO is possible	✓	

V 2.10	<p><i>JX6-SB Master-Slave Mode</i></p> <p>This has been newly added; it is a special feature of this mode that its IO and register numbers match those of NANO, respectively JC-24X.</p>	✓	
	<p><i>Expansion Modules</i></p> <p>The JX6-SB(-I) submodule now supports the following expansions in the master-slave mode JX6-SB ...</p> <ul style="list-style-type: none"> - JX-SIO - Festo CPV-Direct - Festo CPX-Terminal Unit - SMC SI-Unit - Bürkert Valve Block - Lenze Frequency Converter 	✓	
	<p><i>Master-Master Mode</i></p> <p>A register for direct input of the latest register data number has been added</p> <p>now, 32-bit registers can be transferred</p>	✓	

The operating system version 2.12 of the JX6-SB / JX6-SB-I submodule offers a great variety of new functions.

Important!



While the operating system is being updated, the voltage supply of the controller must not be interrupted.

2 Expansions

2.1 Fast Digital Inputs at JX2-ID8 and JX2-IO16

Via register 3m02078 "Automatic Indicator", the digital inputs of JX2-IO-modules can be configured as fast inputs.

A JX2-IO module configured as an "Automatic Indicator" transmits the status of each of its inputs to the JX6-SB(-I) submodule immediately after they have been changed. The changed input data for the controller are also made available on the JX6-SB(-I) submodule immediately.

The input status of all JX2-IO modules that have not been configured as "Automatic Indicators" is still read in cyclic mode.

Note!

A JX2-IO module configured as an "Automatic Indicator" causes the performance of its digital inputs to increase, while additional computing expenditure is caused for the JX6-SB(-I) submodule. For configuring JX2-IO modules as "Automatic Indicators", the QOS rating must be considered by all means.

Register 3m02078: JX2-IO "Automatic Indicator"	
Function	Description
Read	Actual configuration of the "Automatic Indicators" Bit 0: 1 = The JX2-IO module 2 is an "Automatic Indicator" Bit 1: 1 = The JX2-IO module 3 is an "Automatic Indicator" Bit 2: 1 = The JX2-IO module 4 is an "Automatic Indicator" etc. Bit 30: 1 = The JX2-IO module 32 is an "Automatic Indicator"
Write	New configuration of JX2-IO modules as "Automatic Indicators" The change will not become effective before a re-start of the system bus by command 30
Value range	32 Bit signed
Value after reset	Value stored last Delivered condition: 0

2.1.1 QOS - Quality of Service

The term QOS "Quality of Service" describes the process of evaluating the quality of a connection.

Especially regarding the fast inputs at the JX6-SB(-I) submodule, make sure that the computing time for supplying the fast inputs for the controller does not exceed specific limiting values.

For evaluation of the required computing time, there are three counter registers on the JX6-SB(-I) submodules. The counters are updated in intervals of 1000 ms. The JX6-SB(-I) submodule writes the so far greatest value into the registers.

Register 11m153: Interrupt Counter 1	
Function	Description
Read	Maximum value of the interrupt counter up to this time 1
Write	New value
Value range	0 - 65535
Value after reset	0

Register 11m154: Interrupt Counter 2	
Function	Description
Read	Maximum value of the interrupt counter 2 up to this time
Write	New value
Value range	0 - 65535
Value after reset	0

Register 11m155: Interrupt Counter 3	
Function	Description
Read	Maximum value of the interrupt counter up to this time 3
Write	New value
Value range	0 - 65535
Value after reset	0

The counters must not allow for the values below to be exceeded. Otherwise the fast digital inputs will need too much calculating time on the JX6-SB(-I) submodule. This can be put right by reducing the number of expansion modules equipped with fast inputs.

Condition 1:

If this condition has been complied with, processing the fast inputs will require 50 % of the JX6-SB(-I) submodule's calculating time as a maximum. Each edge change at a JX2-IO "Automatic Indicator" module requires a calculating time of approximately 50 μ s on the JX6-SB(-I) submodule.

$$100000\mu\text{s} \cdot 50\% \geq \text{Reg 11m153} \cdot 50\mu\text{s}$$

Condition 2:

If this condition has been complied with, the JX6-SB(-I) submodule receives the information of 20 % of all fast inputs as a maximum, while another fast input is being processed.

$$\text{Reg 11m153} \cdot 20\% \geq \text{Reg 11m154}$$

Condition 3:

If this condition has been complied with, the JX6-SB(-I) submodule receives the information of 5 % max. of all fast inputs almost simultaneously. Because the Jetter system bus has been designed as a serial bus, transmitting the input data of two modules simultaneously is not possible.

$$\text{Reg 11m153} \cdot 5\% \geq \text{Reg 11m155}$$

2.2 Expansion Modules at the System Bus

As of operating system version 2.12 for the JX6-SB(-I) submodule, a great number of modules can be connected with the system bus directly.

The modules that have been recognized and commissioned by the submodule can be read out by means of the module array in registers 3m02015 and 3m02016.

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
71	SI unit EX250	SMC Pneumatik GmbH

Coding of Modules		
JX-SIO and Third Party Modules – a JX6-SB-I Module is Required		
Module code	Designation	Comment
103	Milan Drives	Werner Riester GmbH & Co. KG (auma)
104	Ecostep	Jenaer Antriebstechnik
105	NX frequency converter	Vacon GmbH
JX2-Slave Modules – a JX6-SB-I Module is Required		
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-PROF11	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 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 number of EX250-SCA at the JX6-SB(-I) submodule The maximum number of modules is limited by the maximum allowable I/O sum of the respective controller	7
Size of I/Os	64
Supported EX250	SI units EX250 - SCA1 All solenoid valves that can be connected to the SI unit are supported

2.2.2 Vacon NX frequency converter

The 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.

For operating the Vacon NX frequency converter at the system bus, the JX6-SB-I submodule is essential.

Vacon NX frequency converter

Technical Data of the Vacon NX Frequency Converter	
Maximum number of Milan Drives at the JX6-SB-I submodule	8
Size of I/Os	1 JX2-slave module
Interface module communicating with the Jetter system bus	CANopen option board

2.3 Configuring the JX6-SB(-I) Submodule by means of Default Values

In delivered condition, the JX6-SB(-I) submodule sets various registers to definite values. This also includes the on-delay, the baud rate, etc., which are assigned certain values when they have been activated.

If, for example, the baud rate of the system bus is 1 MBaud (Default-Wert im Register = 7), before starting the system bus by issuing command 30, the baud rate must be changed first. Especially in the JC-800, the system busses of all connected JX6-SB(-I) submodules are already initialized by command 30 when the controller is started.

In this case, the default values of the JX6-SB(-I) submodule in delivered condition can be overwritten by new default values. Then it is also possible at the JC-800 to automatically initialize the system bus by 500 kBaud at activating the controller.

System Bus-Configuration Values		
Registers	Description	Delivered condition
3m0 2032	Switch-On Delay	20
3m0 2029	Baud rate	7
3m0 2023	I/O dummy modules	-1
3m0 2024	Slave dummy modules	255
3m0 2078	JX2-IO "Automatic Indicator"	0

Register 11m101: Command	
Function	Description
Read	Latest command
Write	New command
Value range	0 ... 255
Value after reset	0

Commands for default values:

- 33** Store the actual default values for the system bus configuration values.
Value 1234567 must be written in register 11m162.
- 140** Reset the system bus configuration values to the values of delivered condition.
After issuing this command, the JX6-SB(-I) submodule must be switched off and on again.
Value 1234567 must be written in register 11m162.

The default values of the JX6-SB(-I) submodule can be changed at this command, in order for them to be available immediately after start-up.

2.4 Error Recognition

The error condition of the system bus is now checked in cyclic mode during the operation phase. Via the JX6-SB(-I) special flags 2067 "Fatal system bus-error" and 2068 "Warning condition of the system bus", the condition of the system bus can be checked. The JX6-SB(-I) special flags can only be read and written into via registers indirectly.

JX6-SB(-I) Special Flags			
Special Flags	Registers	Bit	Description
2067	3m0 2639	3	Fatal system bus error
2068	3m0 2639	4	Warning condition of the system bus

3 Eliminated Software Bugs

3.1 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 JX6-SB(-I) submodule.

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 Fault Acknowledgement

At clearing register 3m02008 "System bus error", as of now bits 0 through 4 of register 11m02008 "Status" are also cleared.

Meaning of the individual status register bits of register 11m100:

- Bit 0 : 1 = Timeout of JX2-I/O module
- Bit 1 : 1 = Output driver error with one of the JX2-I/O modules
- Bit 2 : 1 = Fatal system bus error
- Bit 3 : 1 = Festo CP-FB module error
- Bit 4 : 1 = Timeout of JX2-slave module

At clearing register 3m02027 "Error Output Driver", bit 9 in register 3m02008 and bit 1 in register 11m100 "Status" will now be cleared as well.

3.3 I/O Register Overlay regarding JX-SIO Modules

With the help of 32-bit register overlaying by digital outputs for the JX-SIO and third-party modules, all 64 outputs can now be addressed as of register 3m0600. In former versions, only the first eight outputs could be addressed.