# JetWeb

# JX2-SER1

# Operator's Manual

Edition 1.11

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# This Manual is an Integral Part of the JetWeb Module JX2-SER1:

Model: _____

Serial Number: _____

Year of Manufacture: _____

Order Number: _____



To be entered by the customer:

Inventory Number: _____

Place of Operation: _____

# Significance of this Operator's Manual

This manual is an integral part of the JX2-SER1 module, and

- must be kept in a way that it is always at hand until the JX2-SER1 module will be disposed of;
- if the JX2-SER1 module is sold, alienated or loaned, this manual must be handed over.

In any case you encounter difficulties to clearly understand the manual, please contact the manufacturer.
We would appreciate any kind of suggestion and contributions on your part and would ask you to inform or write us. This will help us to produce manuals that are more user-friendly and to address your wishes and requirements.

From this JX2-SER1 module may result unavoidable residual risks to persons and property. For this reason, any person who has to deal with the operation, transport, installation, maintenance and repair of the JX2-SER1 module must have been familiarised with it and must be aware of these dangers.
Therefore, this person must carefully read, understand and observe this manual, and especially the safety instructions.

Missing or inadequate knowledge of the manual results in the loss of any claim of liability on part of Jetter AG. Therefore, the operating company is recommended to have the instruction of the persons concerned confirmed in writing.

# Table of Contents

# 1         Safety Instructions

The JX2-SER1 module is in line with the current state of the art. The JX2-SER1 module complies with the safety regulations and standards in effect. Special emphasis was given to the safety of the users.

Of course, the following regulations apply to the user:

• relevant accident prevention regulations;
• accepted safety rules;
• EC guidelines and other country-specific regulations.

## Usage as Agreed Upon

Usage as agreed upon includes operation in accordance with the operating instructions.
The JX2-SER1 module is used to control machinery, such as conveyors, production machines, and handling machines.
The supply voltage of the JX2-SER1 module is DC 24 V . This operating voltage is classified as SELV (Safety Extra Low Voltage). The JX2-SER1 module is therefore not subject to the EU Low Voltage Directive.
The JX2-SER1 module may only be operated within the limits of the stated data.

## Usage Other Than Agreed Upon

The JX2-SER1 module must not be used in technical systems which to a high degree have to be fail-save, e.g. ropeways and aeroplanes.l

If the JX2-SER1 module is to be run under surrounding conditions, which differ from the conditions mentioned in ? , the manufacturer is to be contacted beforehand.

## Who is Permitted to Operate the JX2-SER1 Module?

Only instructed, trained and authorised persons are permitted to operate the JX2-SER1 module.
Mounting and backfitting may only be carried out by specially trained personnel, as specific know-how will be required.

## Maintaining the JX2-SER1 Module

The JX2-SER1 module is maintenance-free. Therefore, for the operation of the module no inspection or maintenance are required.

## Decommissioning and Disposal of the JX2-SER1 Module

Decommissioning and disposal of the JX2-SER1 module are subject to the environmental legislation of the respective country in effect for the operator's premises.

# Descriptions of Symbols

This sign is to indicate a possible impending danger of serious physical damage or death.

**Danger**

This sign is to indicate a possible impending danger of light physical damage. This sign is also to warn you of material damage.

**Caution**

This sign is to indicate a possible impending situation which might bring damage to the product or to its surroundings.

**Important!**

You will be informed of various possible applications and will receive further useful suggestions.

**Note!**

· / -    Enumerations are marked by full stops, strokes or scores.

Operating instructions are marked by this arrow.

Automatically running processes or results to be achieved are marked by this arrow.

Illustration of PC and user interface keys.

# 1.1     Ensure Your Own Safety

➢     Disconnect the JX2-SER1 module from the mains to carry out
      maintenance work. By doing so, you will prevent accidents resulting from
      electric voltage and moving parts.

➢     Safety and protective devices, e.g. the barrier and cover of the terminal
      box must never  be shunted or by-passed.

➢     Dismantled protective equipment must be reattached prior to
      commissioning and checked for proper functioning.

## Modifications and Alterations to the Module

For safety reasons, no modifications and changes to the JX2-SER1 module and its
functions are permitted. Any modifications to the module not expressly authorised by
the manufacturer will result in a loss of any liability claims to Jetter AG.

The original parts are specially designed for the JX2-SER1 module. Parts and
equipment of other manufacturers are not tested on our part, and are, therefore, not
released by us. The installation of such parts may impair the safety and the proper
functioning of the JX2-SER1 module.

For any damages resulting from the use of non original parts and equipment any
claims with respect to liability of Jetter AG are excluded.

## Malfunctions

➢     Malfunctions or other damages are to be reported to an authorised person
      immediately.

➢     Safeguard the JX2-SER1 module against misuse or accidental use.

➢     Only qualified experts are allowed to carry out repairs.

## Information Signs and Labels

➢     Writings, information signs, and labels always have to be observed and
      kept readable.

➢     Damaged or unreadable information signs and labels are to be
      exchanged.

# 1.2    Instructions on EMI

The noise immunity of a system corresponds to the weakest component of the system. For this reason, correct wiring and shielding of the cables is important.

**Important!**

Measures for increasing immunity to interference:

➢ On principle, physical separation should be maintained between signal and voltage lines.

➢ Shield both sides of the cable.

➢ The entire shield must be drawn behind the isolation, and then be clamped under an earthed strain relief with the greatest possible surface area.

When male connectors are used:

➢ Only use metallised connectors, e.g. SUB-D with metallised housing. Please take care of direct connection of the strain relief with the housing here as well (refer to Fig. 1).
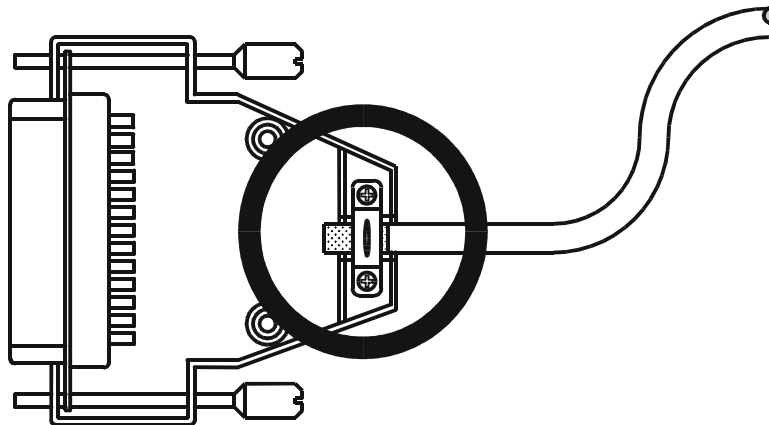
**Fig. 1: Shielding of SUB-D connectors in conformity with the EMC standards.**
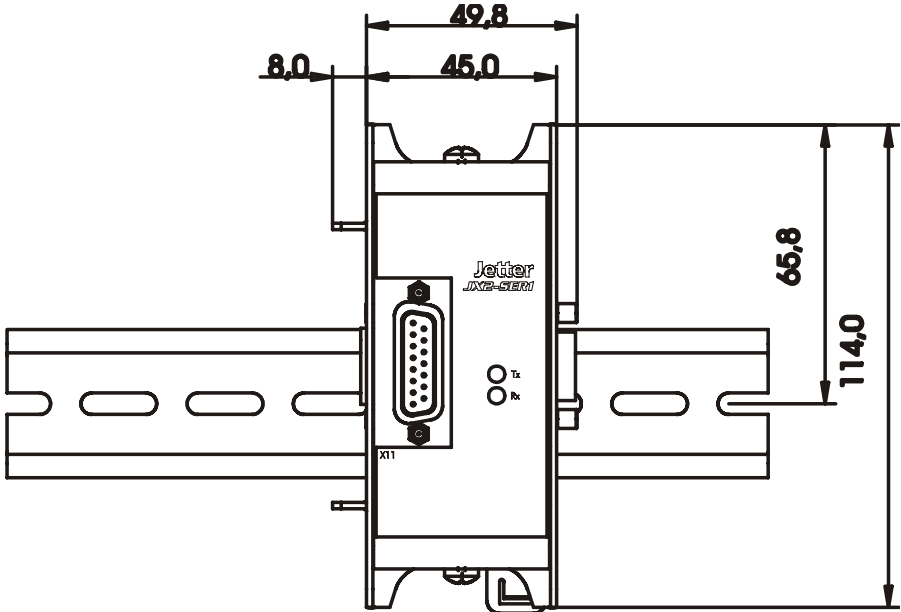
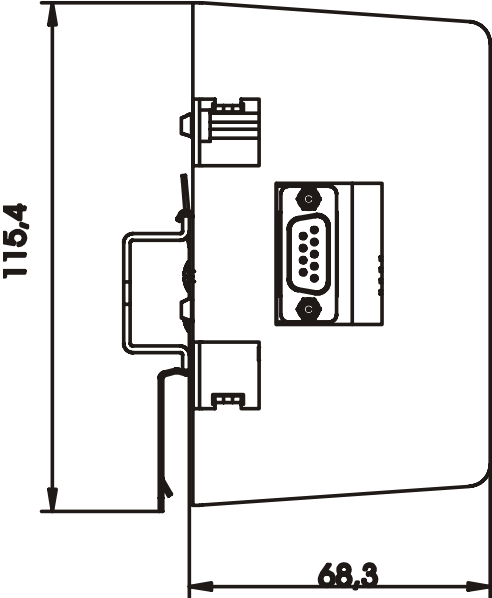# 2 Physical Dimensions



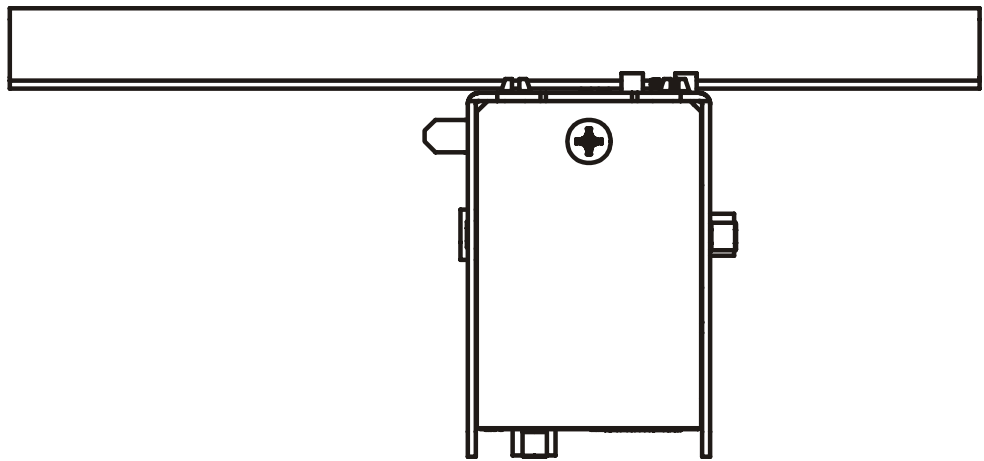**Fig. 2: Front View - JX2-SER1**



**Fig. 3: Side View - JX2-SER1**

**Fig. 4: Top View - JX2-SER1**

# 3 Operating Parameters

| Environmental Operating Parameters | | |
|---|---|---|
| **Parameter** | **Value** | **Reference** |
| Operating Temperature Range | 0 °C through 50 °C | |
| Storage Temperature Range | -25 °C through +70 °C | DIN EN 61131-2<br>DIN EN 60068-2-1<br>DIN EN 60068-2-2 |
| Air Humidity / Humidity Rating | 5 % to 95 %<br>No condensing | DIN EN 61131-2 |
| Pollution Degree | 2 | DIN EN 61131-2 |
| Corrosion Immunity/ Chemical Resistance | No special protection against corrosion. Ambient air must be free from higher concentrations of acids, alcaline solutions, corrosive agents, salts, metal vapours, or other corrosive or electroconductive contaminants. | |
| Operating Altitude | Up to 2000 m above sea level | DIN EN 61131-2 |

| Mechanical Operating Parameters | | |
|---|---|---|
| **Parameter** | **Value** | **Reference** |
| Free Falls Withstanding Test | Height of fall (units within packing): 1 m | DIN EN 61131-2<br>DIN EN 60068-2-32 |
| Vibration Resistance | 10 Hz - 57 Hz: with an amplitude of 0.0375 mm for continuous operation (peak amplitude of 0.075 mm)<br>57 Hz -150 Hz: 0.5 g constant acceleration for continuous operation (1 g constant acceleration as peak value),<br>1 octave per minute,<br>10 frequency sweeps (sinusoidal), all spatial axes | DIN EN 61131-2<br>IEC 68-2-6 |
| Shock Resistance | 15 g occasionally, 11 ms, sinusoidal half-wave, 2 shocks in all three spatial axes | DIN EN 61131-2<br>IEC 68-2-27 |
| Degree of Protection | IP20, rear: IP10 | DIN EN 60529 |
| Mounting Position | Any position, snapped on DIN Rail | |

| Operating Parameters - Electrical Safety | | |
|---|---|---|
| **Parameter** | **Value** | **Reference** |
| Class of Protection | III | DIN EN 61131-2 |
| Dielectric Test Voltage | Functional ground is connected to chassis ground internally. | DIN EN 61131-2 |
| Overvoltage Category | II | DIN EN 61131-2 |

| Operating Parameters (EMC) - Emitted Interference | | |
|---|---|---|
| **Parameter** | **Value** | **Reference** |
| Enclosure | Frequency 30 -230 MHz, limit 30 dB (µV/m) at 10 m distance frequency band 230-1000 MHz, limit 37 dB (µV/m) at 10 m distance (class B) | DIN EN 50081-1 DIN EN 55011 DIN EN 50081-2 |

| Operating Parameters (EMC) - Immunity to Interference of Housing | | |
|---|---|---|
| **Parameter** | **Value** | **Reference** |
| Magnetic Field with Mains Frequency | 50 Hz, 60 Hz 30 A/m | DIN EN 61000-6-2 DIN EN 61000-4-8 |
| RF Field, amplitude-modulated | Frequency band 27 - 1000 MHz Test field strength 10 V/m AM 80 % with 1 kHz Criterion A | DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-3 |
| ESD | Discharge through air: Test peak voltage 15 kV (Humidity Rating RH-2 / ESD-4) Contact Discharge: Test peak voltage 4 kV (severity level 2) Criterion A | DIN EN 61000-6-2 DIN EN 61131-2 DIN EN 61000-4-2 |

| Operating Parameters (EMC) - Immunity to Interference of Signal Ports | | |
|---|---|---|
| **Parameter** | **Value** | **Reference** |
| Asymmetric RF, amplitude-modulated | Frequency band 0.15 -80 MHz Test voltage 10 V AM 80 % with 1 kHz Source impedance 150 Ohm Criterion A | DIN EN 61000-6-2 DIN EN 61000-4-6 |
| Burst | Test voltage 1 kV tr/tn 5/50 ns Repetition rate 5 kHz Criterion A | DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-4 |

| Operating Parameters (EMC) - Immunity to Interference of DC Power Supply In- and Outputs | | |
|---|---|---|
| **Parameter** | **Value** | **Reference** |
| Asymmetric RF, amplitude-modulated | Frequency band 0.15 -80 MHz Test voltage 10 V AM 80 % with 1 kHz Source impedance 150 Ohm Criterion A | DIN EN 61000-6-2 DIN EN 61000-4-6 |
| Burst | Test voltage 2 kV tr/tn 5/50 ns Repetition rate 5 kHz Criterion A | DIN EN 61131-2 DIN EN 61000-6-2 DIN EN 61000-4-4 |

# 4       Technical Data

| Technical Data - JX2-SER1 | |
|---|---|
| Power Supply | • centralised arrangement: via basic unit<br>• decentralised arrangement: via power supply module JX2-PS1. |
| Connections to the basic unit via system bus | Male connector SUB-D, 9 pins |
| Serial interface port | Male connector SUB-D, 15 pins |
| Enclosure | Aluminium, painted |
| Dimensions (H x W x D in mm) | 115 x 45 x 69 |
| Weight | 190 g |
| Mounting | DIN Rail |
| User-Programmable Interface | 15-pin socket for:<br><br>RS 232:            150 ... 19200 bits/s[*)]<br><br>RS 485:            150 ... 19200 bits/s[*)]<br><br>or<br>RS 422:            150 ... 115200 bits/s[*)] |
| Electrical Isolation | None |
| Heat loss of CPU logic circuit | 0.8 Watt |

# 5        Serial Interface Module JX2-SER1

The JX2-SER1 module provides the user with a programmable serial interface. Through this module, for instance, data of a pair of scales, communicating via a RS-232 interface, can be sensed. While doing so, data are exchanged, for example, with an application program.

| LEDs of the JX2-SER1 Module | |
|---|---|
| **Tx** (Transmit Data): | The diode will flash up each time a bit is sent. |
| **Rx** (Receive Data): | The diode will flash up each time a bit is received. |

## 5.1       Description of Connections

The user can select from interfaces with the specifications RS-232, RS-422 or RS-485 according to diagram depicted in Fig. 5. While doing so, only one interface is allowed to be used. The rest of the interfaces must not be used.
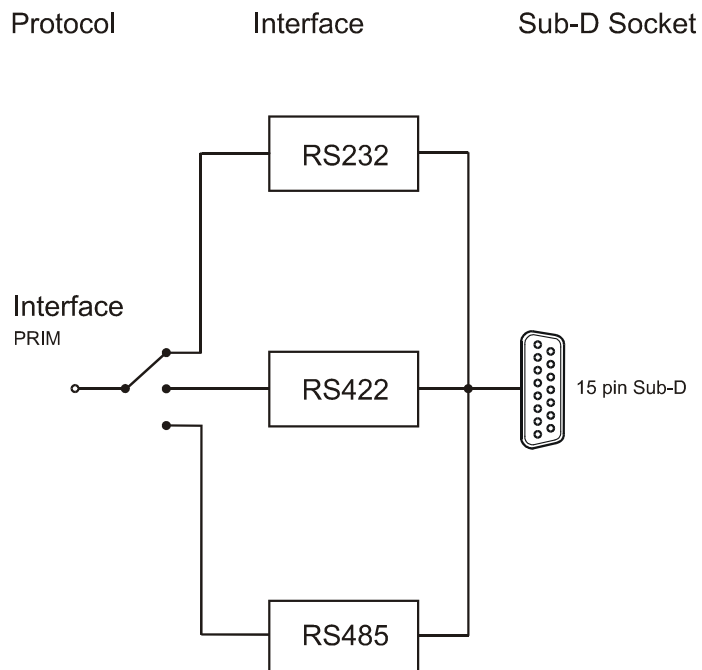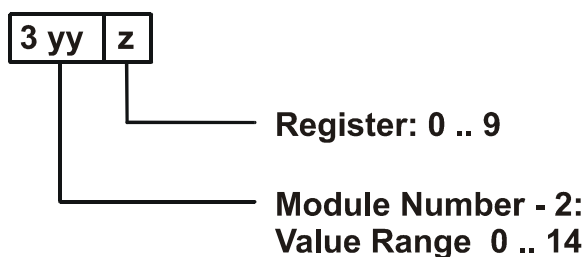
**Fig. 5: Interface Block Diagram - JX2-SER1 Module**
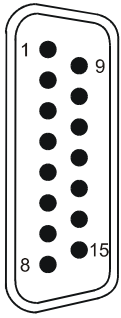
| Pin Assignment - 15 pin male SUB-D connector | | | |
|------|--------|-----------|----------------|
| **Pin** | **Signal** | **Interface** | **Comment** |
| 1 | - | - | - |
| 2 | TXD | RS232 | Transmit Data |
| 3 | RXD | RS232 | Receive Data |
| 4 | RTS | RS232 | Output |
| 5 | CTS | RS232 | Input |
| 6 | - | - | - |
| 7 | GND | - | - |
| 8 | Data + | RS485 | - |
| 9 | Data - | RS485 | - |
| 10 | SDB | RS422 | Sending |
| 11 | SDA | RS422 | Sending |
| 12 | RDB | RS422 | Receiving |
| 13 | RDA | RS422 | Receiving |
| 14 | - | - | - |
| 15 | - | - | - |

# 5.2    Register Addressing

**Coding of the registers:**

```
┌──┬──┬──┐
│3 │yy│ z│
└──┴──┴──┘
         │
         └──────────── Register: 0 .. 9

      └─────────────── Module Number - 2:
                       Value Range  0 .. 14
```

**Note!**

For determination of the module number, only the non-intelligent modules will be counted. Intelligent modules, such as SV, SM, PID, etc., located among the modules, are not being taken into consideration.

Module number 1 is always assigned to the basic control unit. Starting from there, the module numbers are being counted left to right.

For communication with the CPU, 8 registers have been provided by the JX2-SER1 module. The operating system version number of the module can always be read from register 9. The other module registers are being defined by the function of the module. The registers are addressed as follows:

`Register number = 3000 + (module number - 2) * 10 + local register number`

## Example: Determination of the register numbers

The number of the third expansion module's register is determined as follows:
Module number = 4
Local register number = 9

Register number = 3000 + (4-2) * 10 +9 = 3029

# 5.3    JX2-SER1 Registers

| Register 3yy0: Status register | |
|---|---|
| **Function** | **Description** |
| Read | present interface state<br><br>Bit 0: 0<br>Bit 1: 1=Overflow receiving buffer<br>Bit 2: 1=Parity error during reception<br>Bit 3: 1=Framing error during reception<br>Bit 4: 1=Breaking-off condition1 [*]<br>Bit 5: 0<br>Bit 6: 0<br>Bit 7: 1=Error in the present FIFO data<br><br>Value following reset: 0 |
| Write | Illegal |
| Value Range | 0 .. 255 |

[*] Rx signal was logically 0 for the duration of one byte

The status register is bit-coded, i.e. each bit indicates a specific state.
The status register is cleared when reading.

| Register 3yy1: Baud Rate | |
|---|---|
| **Function** | **Description** |
| Read | present value of the baud rate<br><br>Value following reset: 6 |
| Write | new baud rate:<br>0          150 bits/s<br>1          300 bits/s<br>2          600 bits/s<br>3         1200 bits/s<br>4         2400 bits/s<br>5         4800 bits/s<br>6         9600 bits/s    Default setting<br>7        19200 bits/s<br>8        38400 bits/s    for RS485 only<br>9        57600 bits/s    for RS485 only<br>10      115200 bits/s    for RS485 only |
| Value Range | 0 ... 256 |

| Register 3yy2: Interface configuration | |
|---|---|
| **Function** | **Description** |
| Read | Present data format |
| | Value following reset: 4 |
| Write | New data format: |
| | 0 = 7 bit           even    1 stop bit |
| | 1 = 7 bit           odd    1 stop bit |
| | 2 = 8 bit           even    1 stop bit |
| | 3 = 8 bit           odd    1 stop bit |
| | 4 = 8 bit      no parity    1 stop bit |
| | 5 = 7 bit           even    1 stop bit |
| | 6 = 7 bit           odd    2 stop bit |
| | 7 = 7 bit      no parity    2 stop bit |
| Value Range | 0 ... 7 |

| Register 3yy3: Sending Buffer | |
|---|---|
| **Function** | **Description** |
| Read | Latest character that has been sent or is to be sent |
| | Value following reset: 0 |
| Write | Send a character |
| Value Range | 0 .. 255 (8-bit format) <br> 0 .. 127 (7-bit format) |

**Important!**

The maximum size of sending buffer is 128 characters.

| Register 3yy4: Sending Buffer Occupancy | |
|---|---|
| **Function** | **Description** |
| Read | Present occupancy of the sending buffer |
| | Value following reset: 0 |
| Write | Illegal |
| Value Range | 0 .. 128 |

Register `3yy4` displays the number of received values.

| Register 3yy5: Receiving buffer; characters are cleared at access | |
|---|---|
| **Function** | **Description** |
| Read | Received character<br><br>Value following reset: 0 |
| Write | Illegal |
| Value Range | 0 .. 255 (8-bit format)<br>0 .. 127 (7-bit format) |

**Note!**

- The maximum size of receiving buffer is 129 characters. Access to register **3yy5** deletes the characters contained in the receiving buffer. This means that for reprocessing a character must be stored before a read access is carried out.
- Reading from this register is only useful, if the contents of the receiving buffer occupancy register **3yy6** are greater than 0.

| Register 3yy6: Receiving Buffer Occupancy | |
|---|---|
| **Function** | **Description** |
| Read | Present occupancy of the receiving buffer<br><br>Value following reset: 0 |
| Write | Illegal |
| Value Range | 0 .. 129 |

**Note!**

- The characters coming in via serial interface of the JX2-SER1 module are buffered in register **3yy6** (receiving buffer), until they are taken over by the corresponding program.
- The receiving buffer can store a maximum of 129 characters. If further characters are received from sender although the receiving buffer is full, the last sent characters will get lost, while bit 1 is set in the status register.

| Register 3yy9: Version number of the operating system | |
|---|---|
| **Function** | **Description** |
| Read | Version number of the operating system<br>e.g. 101 = V 1.01<br><br>Value following reset: Version number of the operating system |
| Write | Illegal |
| Value Range | 0 .. 8388607 |

# 5.4 Hardware and Software Flow Control of the JX2-SER1 Module

The JX2-SER1 module supports hardware and software flow control. These control functions are activated or deactivated through virtual outputs.
The flow control is to prevent the loss of data due to receiving buffer overflow.

The JX2-SER1 module offers two options of flow control:
1.  For hardware flow control two additional wires are used.
2.  For software flow control special characters are used.

Both with hardware and software flow control, the receiving device informs the sending device that is not ready to receive data any more.
The JX2-SER1 module will send the respective stop signal by hardware or software, when a receiving buffer occupancy of 60 characters has been reached. When an occupancy of 56 characters has been reached, readiness to receive will be signalled.

**Hardware Flow Control**
The hardware flow control will be activated by setting the virtual output `xx01` and will be deactivated by clearing output `xx01`.
The function will automatically be carried out by using the RTS and CTS signals.
The RTS line will be activated by the JX2-SER1 module, in order to inform the sender that no more data can be received.
During the sending process, the CTS line will be checked by the module. If the CTS line is activated, the sending process will be interrupted, until this line is deactivated again.

**Software Flow Control**
The software flow control will be activated by setting the virtual output `xx02` and will be deactivated by clearing this output.
The function will automatically be carried out by using the characters XON (value 11H) and XOFF (value 013H).
If no more data can be received by the JX2-SER1 module, the XOFF character will be sent in order to inform the sender. If data can be received again, XON will be sent.
During the sending process, it will be checked by the module, whether the receiver is sending an XOFF. If this is the case, the sending process will be interrupted, until an XON has been received.

**Note!**

The characters XON and XOFF must not be contained in the user data! This may result in a shutdown of the plant.