SX:NETLINK (ES3)

Ethernet/SIOX/Modbus RTU Gateway

CONTENT

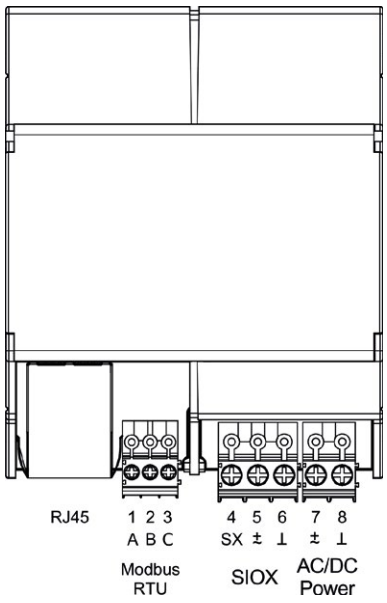
1 GENERAL DESCRIPTION

The SX:NETLINK (ES3) module is a Gateway between a LAN/WAN Ethernet network and a SIOX fieldbus providing remote access to the SIOX bus and also a Modbus RTU bus.

To simplify installation, the module is intended for mounting on standard DIN-rails.

The unit is fitted with the same connectors as used for other SIOX smoke modules for the supply and SIOX bus and a standard RJ-45 connector for Ethernet 100BaseT (100Mbit/s). Communications over the Ethernet is carried out in accordance with the SIOX Net protocol or Modbus TCP/IP.

2 CONNECTIONS



3 CAPACITY

SX:NETLINK handles up to 6 simultaneous SIOX Net and 6 Modbus TCP/IP connections.

4 INSTALLATION AND STARTUP

The SX:NETLINK unit is intended for installation on standard DIN-rails conforming to EN50022 (DIN46277-3). The unit should be located inside an enclosure prohibiting access by unauthorized personnel. The casing does however support direct mounting on a wall by pulling the orange DIN-clips out and use the holes in them for screws.

The SX:NETLINK is a bus master that supplies current to the SIOX bus. As a consequence, there is no galvanic isolation between the supply and the bus.

Please note that the SX:NETLINK unit has to be configured in order to become operative. This involves setting parameters such as IP-address, subnet mask and SIOX and Modbus baud rate.

Refer to Configuration on page 4.

The following electrical connections have to be made:

1. Connect a 100BaseT Ethernet cable to the RJ-45 connector. This cable can be shielded or unshielded.
2. **If a DC supply is used:** connect the positive supply output to screw terminal 7 and the negative to screw terminal 8 (ground). The supply voltage range is 18 VDC to 35 VDC. **If an AC supply is used:** if one of the two supply wires is regarded as “ground”, connect it to terminal 8 and the other to terminal 7. The supply voltage range is 12 VAC to 24 VAC.
3. For SIOX modules with galvanic isolation, the bus can be connected unpolarized, i.e. either way. Connect the two-wire SIOX bus to screw terminal 4 (the SIOX bus) and 6 (ground). SIOX modules that are sensitive to the polarity, such as Damper Control Modules intended for 3-wire bus (communication and power) should normally use terminal 4 (SIOX bus), terminal 5 (power) and terminal 6 (ground). However, use of terminal 5 for power to the modules is optional.

Note that screw terminal 6 (ground) is internally connected to terminal 8. Terminal 5 is for possible supply of other SIOX modules. It is internally connected to terminal 7. For this reason connected SIOX modules must be able to handle the same type of supply as the SX:NETLINK (AC or DC and same voltage).

The SIOX modules should be interconnected through a two (communication only) or 3-wire (communication and power) low capacitance cable.

For a two-wire bus it is recommended to use twisted pair cables. Shielded cables are normally not required. Otherwise, unless a correct strategy for shield grounding is adopted, it may prove to be of little benefit. Instead, the capacitance between the shield and the bus wires will add to the total capacitive load on the SIOX bus and decrease the maximum distance over which communication can be carried out for a given bit rate.

For a two-wire bus the total resistance of the bus should not be higher than 2 * 50 Ω.

After power is applied to the unit, check the yellow ETH LED. It will be activated if there is a working connection to another network unit and will flash when there is activity.

5 INDICATORS AND ERROR CODES

The LEDs on the front of the unit are used to indicate different modes and error codes. These can be translated with the help of this table:

Table 1: Indicators and error codes

Mode	Description	LED	Sequence	Button pressed?
Normal	Unit has power	PWR	Solid ON	No
Normal	SIOX communication	SIOX	One blink every 1,5 second	No
Normal	Modbus communication	MOD	One blink every 1,5 second	No
Normal	Ethernet communication	ETH	Solid ON: Link, Blinking: Activity	No
Error	SIOX bus shorted	SIOX	Turned OFF	No
Error	High level detected on SIOX bus (possibly shorted to positive supply)	PWR + SIOX	Double blink on both LEDs	No
Error	50/60Hz detected on SIOX bus	PWR + SIOX	Fast blink on both LEDs	No
Error	Double addressing on SIOX bus detected (twodevices on the bus has same address)	SIOX	Double blink	No
Normal	SIOX communication inactive (no messages sent and no responses)	SIOX	Solid ON	No
Service	Hunt mode	ALL	Fast blink	Hold both buttons for 5 seconds
LED Test	Test the LEDS	N/A	All LEDS activated	Press the downmost button
Info	Firmware version indication *	N/A	First version number, dark pause, secondversion number, dark pause, third version number	Press the topmost button. Also shown after power-on

*Version indication is made in three steps. First the number of LEDs that corresponds to the first version number are lit, then a dark pause and then the number of LEDs that corresponds to the second version number is lit and finally after a dark pause the number of LEDs that corresponds to the third version number is lit. For example for a firmware with version 3.41, in the first step 3 LEDs will be lit, then after the darkpause, all 4 LEDs will be lit and finally after a dark pause 1 LED will be lit.

6 CONFIGURATION

Before the unit can be operative it has to be configured for the task. This is accomplished by communicating with the unit through an Ethernet connection in compliance with the SIOX Net protocol. By doing so, the configuration parameters can be changed.

Preferably, use a network cable and connect the unit directly to the computer that will be used for configuration. If the unit is connected directly to a LAN (Local Area Network), there is a small possibility that the unit's default IP-address will be the same as some other equipment. This will disturb operation of the other system. Please contact the network administration to check this out.

If not already accomplished, download and install the Visual Setup software from http://sioxsolutions.se/download/VisualSetup.exe.

Also download the SX_NETLINK_(ES3)_Setup_3.20.dff used for configuration from https://sioxsolutions.se/dff/SX_NETLINK_(ES3)_Setup_3.20.dff which, when run by the Visual Setup, will provide a configuration interface for the SX:NETLINK.

When all is working, the SX:NETLINK will act as a virtual SIOX module accessible on one SIOX address in the range 1 - 63 depending on earlier configuration. This address cannot be used by other SIOX modules. Factory default address is 63, which preferably should be left unchanged. This leaves addresses 1 - 62 for other modules.

However, the first thing to do is to establish a connection with the unit, so we will need to know the unit's IP-address. There are three ways to do this:

1. If the unit has previously been configured to a known IP-address, then try to use this address. However, this will only work if the unit remains installed on the network it was originally configured for or alternatively, the PC is reconfigured to an IP-address close to the known IP-address for the SX:NETLINK.
2. If the unit is new or otherwise set to factory default, it will be configured to IP-address 192.168.0.234. However, as there are many network address ranges in use, this address will not be accessible on a LAN unless that network uses the 192.168.0.xxx address range.
3. The third way to get in contact with the unit is more universal and will also make it possible to recover a module set at an unknown IP-address. When the unit is on, press the two buttons and hold them for 5 seconds, the LEDs will blink in a flowing pattern. When the pattern changes to all blinking, 5 seconds has passed and the buttons can be released. The unit has now entered a special "hunt" mode and will be able to discover what network address range that is used, and readdress itself accordingly.

To accomplish this, use the Visual Setup software to run the SX_NETLINK_(ES3)_Setup_3.20.dff in an attempt to establish a connection with the unit on IP-address xxx.xxx.xxx.234. Press F6 to enter SIOX Bus setup to change the IP-address. The 'xxx'-marked portions of the IP-address should be filled in with values corresponding to the address range used by the local network (or a directly connected PC) to which the unit is now connected. For example, if the local network is configured to use the 192.168.4.xxx range, then the SX:NETLINK will be accessible at IP-address 192.168.4.234. Enter the address in the Server Address field (seen by pressing F6 to enter SIOX Bus setup). Also check/change the Station Address field to correspond with the SX:NETLINK SIOX address (factory default is 63). Then click on the Reinit button on the right side.

When an access attempt to the SX:NETLINK is detected, it will reconfigure itself and perform a restart. Occasionally, it might be necessary to retry the access attempt by pressing F6 and clicking on the Reinit button again.

Access to the unit should now be possible. Unless the SX:NETLINK uses the default address 63, a search must be performed over the entire SIOX bus address range 1 - 63 in order to find it. Note that several other SIOX modules may appear if a

SIOX bus is connected to the SX:NETLINK.

To summarize the steps involved to get in contact with the unit:

1. Connect the SX:NETLINK by Ethernet, either to a LAN or directly to another computer.
2. When the unit is on, press the two buttons and hold them for 5 seconds, the LEDs will blink in a flowing pattern.
3. Try to access the unit at IP-address xxx.xxx.xxx.234. Note: two attempts are usually required due to system timeouts. If the module's SIOX address is different from the default address 63, a search may be necessary that will query the SIOX bus for answering modules. In the list of detected modules, select the ES3 unit for further operations.

When contact is established with the unit, the following configurations can be checked and changed (restart the unit when the changes are complete).

Check the box EEPROM Write Enable in the SX_NETLINK_(ES3)_Setup_3.20.dff before changing any configuration, otherwise it will not be possible to make any changes.

6.1 Network tab

- **IP-address and Subnet mask** for the network where the unit eventually will be installed. It might be a good idea to perform these changes as the final ones after the rest of the configurations are handled. Otherwise, an inadvertent restart of the unit will necessitate a repeated recovery process as previously described.
- **Default Gateway address.** Used by the SX:NETLINK to know where to send communications for destination addresses outside the network where it is located. Will typically be the address of the firewall/router.
- **TCP port number** used for SIOX Net communication (not for Modbus TCP/IP which always uses port 502). This is the port number that the central should try to connect to when establishing contact with the SX:NETLINK thru the SX_NETLINK_(ES3)_Setup_3.20.dff. Factory default is 1024.

6.2 SIOX tab

- **ES3 address** (1 - 63) on the SIOX bus for its virtual SIOX module, thru which these configurations are carried out. This address can not be used by any SIOX module connected to the SIOX bus. Factory default address is 63.
- **SIOX bus baud rate.** Available baud rates are 300, 600, 1200, 2400, 4800, 9600 and 19200 baud. Factory default is 4800 baud.
- **SIOX bus current** drive capability 0, 25, 50, 75 or 100 mA. Factory default is 100 mA.
- **Additional SIOX timeout** (0 - 63 ms), used in conjunction with modems or radio modules where delays inherent in these units must be considered. Factory default is 0 ms.
- **SIOX repeats.** How many times a message would be repeated with no answer until the remote device is flagged as silent (no response).
- **SX:EXIRA (SD1) as Digital Inputs.** Because SX:NETLINK does not have any digital inputs there is a possibility to use an external SX:EXIRA (SD1) I/O-module. The address of the I/O-module can be set. Status of the four inputs are also shown. Input status can be read from parameter 5 in the SX:NETLINK. If the I/O-module is silent (no response) the most significant bit in parameter 5 is set and the input bits are all cleared.
- **Set Watchdog in SX:UNO/DUO.** This is a function that will set the communication watchdog in SX:UNO/DUO-modules found on the bus. Addresses 1-59 in Groups 0, 61, 62 and 63 will be searched. If an SX:UNO/DUO is found it will have its watchdog updated. To prevent inadvertent changes the code '46' (as mentioned in the dff-file) must be entered in the corresponding box to start the update operation. Progress will be shown below in the Group/Address boxes.

7 MODBUS TCP/IP

7.1 General Information

There are no configurations specific for Modbus TCP/IP to handle.

SX:NETLINK operates as a Modbus TCP/IP server on the Ethernet. When a Modbus request is received, appropriate SIOX communications are carried out to transfer the requested data to/from the intended SIOX module. SX:NETLINK then assembles a reply which is sent back to the client.

A maximum of 6 Modbus clients can be connected to the unit simultaneously and up to 62 connected SIOX modules can be addressed in the range 1 - 62. The SX:NETLINK occupies one address itself, typically address 63 (factory default). By using Group Addressing even more modules can be accessed, see SIOX Addressing for more information.

7.2 Modbus TCP Port Number

To connect to the unit, use the standard Modbus TCP/IP port number 502.

7.3 Data Representation

In a SIOX module data is organized in 16-bit parameters whose numbering starts at 0 and extends upwards to the last parameter used, which is device dependent. Please refer to the specific SIOX module manual for a detailed parameter description.

From Modbus's point of view, the SIOX module has only one data block. Thus, the same data can be reached via several Modbus functions, either via 16-bit register accesses or by using bit-accesses.

For register accesses the following apply (using 1-based configuration): Register no. 1 corresponds to parameter no. 0, register no. 2 corresponds to parameter no. 1 and so on.

If using 0-based configuration the register and parameter numbering will correspond.

Function Codes 3, 4, 6 and 16 supports read/writes to EEPROM. Selecting to write to EEPROM is done by adding an offset of hex 8000 to the parameter number. **Writing must not be done continuously because each parameter is only guaranteed for 1 million writes.**

For bit accesses the following apply: Input/Coil no. 1 is the LSB (Least Significant Bit) in parameter no. 0 whereas Input/Coil no. 16 is the MSB (Most Significant Bit) in parameter no. 0. Likewise, Input/Coil no. 17 is the LSB (Least Significant Bit) in parameter no. 1 and so on. Please refer to the specific SIOX module manual to find out where the actual I/O bits are located.

For example, the SX:EXIRIOX (S45) module has seven outputs located in parameter no. 8, starting at the LSB. To calculate the output address for the first output, use the following formula:

Address = (parameter no. x 16) + bit no. => (8 x 16) + 1 = 129

The six other outputs are accessed at the succeeding addresses 130 – 135.

7.4 Supported Function Codes

The following Modbus Protocol Function Codes are supported:

- 01 Read Coils (1-16384) corresponding to parameters 0 - 1023.
- 02 Read Discrete Inputs (returns same data as Read Coils).
- 03 Read Holding Registers (1-16384) corresponding to parameters 0 - 16383
- 04 Read Input Registers (returns same data as Read Holding Registers)
- 05 Write Single Coil (1-16384) corresponding to parameters 0 - 1023.
- 06 Write Single Register (1 - 16384) corresponding to parameters 0 - 16383.

- 15 Write Multiple Coils (1-16384) corresponding to parameters 0 - 1023.
- 16 Write Multiple Registers (1 - 16384) corresponding to parameters 0 – 16383.

7.5 SIOX Addressing

The address of the SIOX module that a Modbus message wants to access has to be stored in the Unit Identifier position in the MBAP (ModBus Application Protocol) header. This is the last byte of the seven header bytes. The SIOX address is stored in the 6 lower bits. Four Group Addresses can be used, 0, 61, 62 and 63. Under each of these Groups up to 63 (1-63) addresses are available.

The two upper bits in the Unit Identifier byte controls the Group Address handling:

0 0 Group Address 0 (no Group Address sent).

0 1 Group Address 61. Add 64 to the address.

1 0 Group Address 62. Add 128 to the address.

1 1 Group Address 63. Add 192 to the address.

Example: for a module at address 5 on Group 63 the address to set in the Unit Identifier will be 5 + 192 = 197

7.6 Data Limitations

Msg 01/02: Max coils/discrete inputs to read: 128

Msg 03/04: Max registers to read: 125

Msg 15: Max coils to write: 128

Msg 16: Max registers to write: 16

Avoid accessing irrelevant registers because it will just slow down the communication.

7.7 Error Codes

Following Modbus TCP error codes are returned:

01: Illegal function specified.

02: Illegal data address specified.

03: Illegal data value specified.

11: Module silent. Communication failed when accessing the SIOX bus.

8 MODBUS RTU MASTER/SLAVE

The SX:NETLINK (ES3) module can handle Modbus RTU communications in one of the two following ways:

- It can act as a **Modbus TCP/IP server** enabling data exchange **not only** with SIOX modules connected to the SIOX bus but also with **Modbus RTU slave units** connected to the Modbus RTU port where it operates as an **RTU master**. A threshold value for the Modbus slave addresses defines the last Modbus TCP/IP slave address that will be assigned to the SIOX bus. Addresses above will be assigned to the RTU port and can be used by other RTU slave devices which can be accessed from the SX:NETLINK module.
- It can act as a **Modbus RTU slave** unit enabling data exchange with SIOX modules connected to the SIOX bus. A threshold value for the Modbus slave addresses defines the last Modbus slave address that will be assigned to the SIOX bus. Addresses above will be free for use by other devices on the RTU bus. **This communication mode enables an RTU Master to communicate with SIOX modules thru its RTU interface in situations where Modbus TCP/IP is not available.**

8.1 Modbus RTU (Master) tab

- **Select RTU Mode.** Activate RTU Master Mode.
- **Communication timeout.** The timeout for the Modbus RTU communication.
- **Baud rate.** The baud rate of the Modbus RTU. Selectable between 4800, 9600, 19200 and 38400 baud.
- **Format.** The format that will be used on Modbus RTU. The options are:
  - 8 data bits, even parity and 1 stop bit
  - 8 data bits, even parity and 2 stop bits
  - 8 data bits, no parity and 1 stop bit
  - 8 data bits, no parity and 2 stop bits
  - 8 data bits, odd parity and 1 stop bit
- **Last Modbus Slave Address assigned for SIOX.** This number tells the SX:NETLINK

where the breakpoint is in the address space of which addresses that are SIOX addresses and which are Modbus RTU addresses. Modbus RTU devices should have addresses assigned to them that are greater than this number. SIOX devices should have addresses lower or equal to this number.

- **Communication Attempts.** The number of attempts that SX:NETLINK will perform before it declares the Modbus RTU device silent.
- **RTU slave response time** gives the ID and the response time of the Modbus RTU device that takes the longest to respond.
- **Currently active connections** shows the number of Mobus TCP/IP connections. Maximum number will be 6.

8.2 Modbus RTU (Slave) tab

- **Select RTU Mode.** Activate RTU Slave Mode.
- **Baud rate.** The baud rate of the Modbus RTU. Selectable between 4800, 9600, 19200 and 38400 baud.
- **Format.** The format that will be used on Modbus RTU. The options are:
  - 8 data bits, even parity and 1 stop bit
  - 8 data bits, even parity and 2 stop bits
  - 8 data bits, no parity and 1 stop bit
  - 8 data bits, no parity and 2 stop bits
  - 8 data bits, odd parity and 1 stop bit
- **Last Modbus Slave Address assigned for SIOX.** This number tells the SX:NETLINK where the breakpoint is in the address space of which addresses that are SIOX addresses and which are Modbus RTU addresses. Modbus RTU devices should have addresses assigned to them that is greater than this number. SIOX devices should have addresses lower or equal to this number.

8.3 Supported Function Codes

The following Modbus Protocol Function Codes are supported:

- 01 Read Coils
- 02 Read Discrete Inputs (returns same data as Read Coils)
- 03 Read holding Registers
- 04 Read Input Registers (returns same data as Read holding Registers)
- 05 Write Single Coil
- 06 Write Single Register
- 15 Write Multiple Coils
- 16 Write Multiple Registers

Function Codes 3, 4, 6 and 16 supports read/writes to EEPROM. Selecting to write to EEPROM is done by adding an offset of hex 8000 to the parameter number. Please note that continuously writing to an EEPROM parameter is prohibited as it wears out the memory cell. Each parameter is only guaranteed 1 million writes. **Writing must not be done continuously because each parameter is only guaranteed for 1 million writes.**

8.4 RTU Hardware Port

A 3-pole pluggable screw terminal is used to connect the RTU bus (RS485).

Terminal	Function
1	A TX-/RX- (also ref. as D-)
2	B TX+/RX+ (also ref. as D+)
3	C (ground) Note: connected to the module's ground terminals 6 and 8

Use a shielded two-wire (twisted pair) cable. Shield should be connected to "C" in all units.

Modbus RTU requires that each end of the bus should be terminated to minimize reflections. Line termination (150 ohm) can be activated in the unit by use of a small slide switch located adjacent to the 3-pole pluggable screw terminal. If the slide switch is operated **towards** the screw terminal then the line termination is activated.

This unit does not require line polarization and can not implement line polarization.

8.5 Topology

An RS485-Modbus configuration has one trunk cable, along which devices are connected, directly

(daisy chaining) or by short derivation cables. The maximum length depends on the baud rate, the cable (Gauge, Capacitance or Characteristic impedance), and the number of loads on the daisy chain.

For 9600 baud and minimum AWG26 (0,405 mm) gauge, the maximum length is 1000 m. The derivations must be short, never more than 20 m.

8.6 Maximum number of devices

A maximum of 32 devices is always authorized on any RS485-Modbus system without repeater.

8.7 Grounding Arrangements

The SX:NETLINK power supply ground should be connected directly to protective ground at **one point only** for the entire bus (SIOX and RTU). This will prevent ground loops which otherwise may cause excessive currents in the ground wiring that can cause disturbances or even burned cables.

9 PARAMETERS DESCRIPTION

SX:NETLINK contains an EEPROM to permanently store configuration data. Most changes requires a restart of the unit, either by power off/on or by writing $FFFF_{16}$ to parameter number 0. In the dff-file, check the box "RESTART". This initiates a full soft reset, using the updated EEPROM values for initialization which are copied to the corresponding RAM parameters. All changes should be carried out in EEPROM. Configuration data is stored in the lower parameters. Parameters from 70_{16} and upwards are reserved for future applications running in the SX:NETLINK.

Note: Changes should normally always be carried out by using the SX_NETLINK (ES3) - Setup.dff.

Each parameter contains 16 bits. Unless otherwise stated the parameter descriptions refer to access the EEPROM parameters. However, in order to read current status information the corresponding RAM parameter should be read and this will be indicated for those parameters affected with the word "RAM".

NOTE!

Allow changes by klicking the checkbox "EEPROM Write Enable" at the top of SX_NETLINK_(ES3)_Setup_3.20.dff.

Table 2: Definitions of Parameter setup

$(XXXX_{16})$	Factory preset information for the parameter.
tttt	One nibble (4bit), where the left bit is the most significant bit and the right bit is the least significant.
tttt tttt tttt tttt	One parameter (2byte/16bit), where the left byte is the most significant byte and the right byte is the least significant.
'	Only this bit is relevant.
t	This bit is used for other purposes.

Table 3: Parameter 00_{16}: (0700_{16}) Restart unit to effectuate change

'" '" '" '"	$FFFF_{16}$ = Restart of the unit.
'ttt tttt tttt tttt	1 = Write Enable flag. Cleared by reset.
tttt '" tttt tttt	Transmission speed or baud rate 3 = 300 baud 4 = 600 baud 5 = 1200 baud 6 = 2400 baud 7 = 4800 baud 8 = 9600 baud 9 = 19 200 baud

For instance, writing 8900_{16} will set the SIOX baud rate to 19 200 baud and also set the Write Enable flag so other parameters can be written, too. The flag if set, will automatically be cleared at next power-on or reset. Write $FFFF_{16}$ to the parameter for a reset of the unit. Writing a non-zero value to ram parameter 67_{16} will also reset the unit.

Table 4: Parameter 01_{16}: ($3F04_{16}$) Unit does not need to be restarted after change

tt" '"' tttt tttt	01-$3F_{16}$ = Module address
tttt tttt tttt t"'	SIOX bus current. 0 = 0 mA. Another unit must supply the current. 1 = 25 mA 2 = 50 mA 3 = 75 mA 4 = 100 mA (factory default)

Normally, a bus current of 100 mA is recommended. However, if the bus wires are very resistive, SX:NETLINK has the provision for selectable bus current and may therefore be able to communicate on wires otherwise deemed unusable. By decreasing the bus current, voltage lost in the wires will be correspondingly lower. However, there are two disadvantages of lower bus current. Firstly, the lower current will lead to a slower charge/discharge of the wire capacitance which may necessitate a change to a lower baud rate. Secondly, fewer SIOX modules can be connected to the bus.

For a two-wire bus the total resistance of the bus should not be higher than 2 * 50 Ω.

As a complement, the SX:ECHO (R30) Bus Expander unit can be used if a bus segment needs to be strengthened.

Table 5: Parameter 02_{16}: (0000_{16}) Reserved for future use

"" "" "" ""	0000_{16} = Reserved for future use.

Table 6: Parameter 03_{16} (RAM): (0000_{16}) Number of active Modbus TCP/IP connections

"" "" "" ""	0000-0006_{16} = Active Modbus TCP/IP connections.

Table 7: Parameter 04_{16} (RAM): (0000_{16}) Number of SIOX Communication errors

"" "" "" ""	0000_{16} = SIOX Communication errors. Errors since power-up.

Table 8: Parameter 05_{16}: (0000_{16}) Used if function to read digital input information from an SD1-module is activated. Makes it compatible with ES2 that had four digital inputs built in.

tttt tttt tttt ttt'	DI1 Status. Cleared if comm. fail
tttt tttt tttt tt't	DI2 Status. Cleared if comm. fail
tttt tttt tttt t'tt	DI3 Status. Cleared if comm. fail
tttt tttt tttt 'ttt	DI4 Status. Cleared if comm. fail
'ttt tttt tttt tttt	Set if ommunication failure.

Table 9: Parameter 06_{16}: (0400_{16}) Restart unit to effectuate change

'"' '"' '"' '"'	0400-$FFFF_{16}$ = TCP Port Number $1024\text{-}65535_{10}$ for use with SIOXNet.

This is the port number that the central should try to connect to when establishing contact with the SX:NETLINK using the SIOXNet protocol. Factory default port number is 1024_{10} and should normally not be changed. If so, document the change for future reference to make it easy to get in contact with the module. It will be reset to 1024_{10} by doing a "hunt"-restart. The SIOXNet protocol is used by VisualSetup, SioxTools, Smoke Edit and other applications that use the SIOX Driver.

Table 10: Restart the unit to effectuate changes.
Note: parameters not listed are reserved.

Parameter	Default	Bit pattern	Description
07_{16}	0000_{16}	tttt tttt tt" ""	00-$3F_{16}$ = Additional SIOX timeout 0 ms to 63 ms. Leave at zero for normal conditions. However, if there are special SIOX modules connected to the bus, i.e. modems or radio modules, extra timeout may be added to compensate for the delay in these units.
08_{16}	$00C0_{16}$	"" "" "" ""	0000-$00FF_{16}$ = First byte of IP-address 0-255_{10}.
09_{16}	$00A8_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Second byte of IP-address 0-255_{10}.
$0A_{16}$	0000_{16}	"" "" "" ""	0000-$00FF_{16}$ = Third byte of IP-address 0-255_{10}.
$0B_{16}$	$00EA_{16}$	"" "" "" ""	0000-$00FF_{16}$ = First byte of IP-address 0-255_{10}.
$0C_{16}$	$00FF_{16}$	"" "" "" ""	0000-$00FF_{16}$ = First byte of subnet mask 0-255_{10}.
$0D_{16}$	$00FF_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Second byte of subnet mask 0-255_{10}.
$0E_{16}$	$00FF_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Third byte of subnet mask 0-255_{10}.
$0F_{16}$	0000_{16}	"" "" "" ""	0000-$00FF_{16}$ = Fourth byte of subnet mask 0-255_{10}.
16_{16}	0000_{16}	"" "" "" ""	0000-$00FF_{16}$ = First byte of Default Gateway address 0-255_{10}.
17_{16}	0000_{16}	"" "" "" ""	0000-$00FF_{16}$ = Second byte of Default Gateway address 0-255_{10}.
18_{16}	0000_{16}	"" "" "" ""	0000-$00FF_{16}$ = Third byte of Default Gateway address 0-255_{10}.
19_{16}	$00EA_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Fourth byte of Default Gateway address 0-255_{10}.
$1A_{16}$	$00XX_{16}$	"" "" "" ""	0000-$00FF_{16}$ = First byte of MAC address 00-FF_{16}. Not user configurable.
$1B_{16}$	$00XX_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Second byte of MAC address 00-FF_{16}. Not user configurable.
$1C_{16}$	$00XX_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Third byte of MAC address 00-FF_{16}. Not user configurable.
$1D_{16}$	$00XX_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Fourth byte of MAC address 00-FF_{16}. Not user configurable.
$1E_{16}$	$00XX_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Fifth byte of MAC address 00-FF_{16}. Not user configurable.
$1F_{16}$	$00XX_{16}$	"" "" "" ""	0000-$00FF_{16}$ = Sixth byte of MAC address 00-FF_{16}. Not user configurable.
60_{16}	0003_{16}	tttt tttt ttt' ""	0001-$001E_{16}$ = SIOX repeats. The number of repeats that SX:NETLINK tries before flagging the slave as silent. A value of 0 or greater than 30_{10} is invalid and a value of 3 will be used. Factory default value is 3.

Table 11: Restart the unit to effectuate changes. Note: parameters not listed are reserved.

Parameter	Default	Bit pattern	Description
61_{16}	0000_{16}	tttt tttt ‘”’ ‘”’	$0001\text{-}00FF_{16}$ = Last modbus slave address assigned for SIOX. Addresses above this number are on Modbus RTU and addresses less than or equal are on SIOX. A value of 0 or greater than 247 will set it to 255. That means all addresses can be used by the SIOX bus. Factory default value is 255.
62_{16}	0000_{16}	‘”’ ‘”’ ‘”’ ‘”’	$0000\text{-}FFFF_{16}$ = RTU longest response time (ms). If the parameter is cleared a new measurement is initiated. Parameter 63_{16} will be updated with the RTU device ID.
63_{16}	0000_{16}	‘”’ ‘”’ ‘”’ ‘”’	$0000\text{-}FFFF_{16}$ = RTU device ID of device with longest response time. Read only.
64_{16}	0000_{16}	‘”’ ‘”’ ‘”’ ‘”’	$0000\text{-}FFFF_{16}$ = RTU baud rate. 0 = RTU Disabled. Values 4800, 9600, 19200 or 38400 sets the baud rate. Any other value will set the baud rate to 19200.
65_{16}	0000_{16}	‘”’ ‘”’ ‘”’ ‘”’	$0000\text{-}FFFF_{16}$ = RTU Format 0 = 8 data bits, 1 stop bits, even parity 1 = 8 data bits, 1 stop bits, odd parity 2 = 8 data bits, 2 stop bits, no parity 3 = 8 data bits, 1 stop bits, no parity 4 = 8 data bits, 2 stop bits, even parity All other values will set format to 8 data bits, 1 stop bit, even parity.
66_{16}	0000_{16}	‘”’ ‘”’ ‘”’ ‘”’	$0000\text{-}FFFF_{16}$ = RTU Master Communication timeout in ms. A value of 0 will set the timeout to 3000 ms.
67_{16}(RAM)	0000_{16}	‘”’ ‘”’ ‘”’ ‘”’	$0000\text{-}FFFF_{16}$ = RTU Reinitialization after change. Writing a nonzero value will reinitialize the RTU port by restarting the unit.
68_{16}	0003_{16}	‘”’ ‘”’ ‘”’ ‘”’	$0001\text{-}0007_{16}$ = RTU Master Communication attempts (1-7) before declaring a slave silent. Default is 1 attempt.
69_{16}	0000_{16}	tttt tttt tttt ttt’	$0000\text{-}0001_{16}$ = If set to 0000 (default) will activate ES3 as a master device on its RTU port. If set to 0001 will activate ES3 as a slave device on its RTU port.
$6A_{16}$(RAM)	0000_{16}	tttt tttt tttt ttt’	Error Flag: High level on SIOX bus. Possibly shorted to positive supply.
$6A_{16}$(RAM)	0000_{16}	tttt tttt tttt tt’t	Error Flag: 50/60Hz 24 VAC voltage detected on SIOX bus.
$6A_{16}$(RAM)	0000_{16}	tttt tttt tttt t’tt	Error Flag: SIOX bus shorted to ground.
$6A_{16}$(RAM)	0000_{16}	tttt tttt tttt ’ttt	Error Flag: A probable Double Addressing Fault is detected. The flag will remain set for 10 seconds after the last fault has occurred.
$70_{16}\text{-}3FFF_{16}$	0000_{16}	tttt tttt tttt tttt	Reserved for future application use.

10 ELECTRICAL SPECIFICATIONS

Tamb = 20 °C	Min	Typ	Max	Unit
Power supply voltage	18	24	35	VDC
	12	18	24	VAC
Power Supply Current (@24 VDC)				
Idle, no SIOX communication		40		mA
Normal operation		90		mA
SIOX bus shorted		160		mA

11 ENVIRONMENTAL SPECIFICATIONS

	Min	Typ	Max	Unit
Operating Temperature Range	0		+55	°C
Storage Temperature Range	-20		+70	°C

12 MECHANICAL SPECIFICATIONS

		Unit
Case size (W x H x D)	72 x 94 x 62	mm
Weight	120	g

13 ASSISTANCE

Assistance regarding safety and technical matters is available from:

PROFCON AB

Victor Hasselblads Gata 9

SE-421 31 VÄSTRA FRÖLUNDA

SWEDEN

Tel: +46 31 40 30 60

E-mail: info@profcon.se

Visual Setup Download:

http://www.sioxsolutions.com