

# User Manual

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## FXIO-Gateway

INUX AB  
Katrinedalsg. 3, 504 51 Borås  
<http://www.inux.se>

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Uppdaterad 2010-04-09

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## 1. Product Overview

The INUX FXIO-Gateway offers a straight forward Modbus-TCP interface for the Fidelix Modbus-RTU I/O modules DI-16, DO-8, AI-8, AO-8 and COMBI-36. It will allow controllers to utilize these modules over a TCP/IP network, without requiring complex arithmetics to be done or requiring the use of conversion tables. Summary of features

- Support for 1-63 Modbus-RTU slave I/O-modules.
- Embedded conversion tables for common thermal resistor types Pt1000, Pt100, Ni1000LG and Ni1000DIN.
- Calculation of measured voltage and current.
- Modbus-RTU/TCP stack.
- Webserver for easy network configuration and diagnostics.

## 2. Operation

The FXIO-Gateway uses separate registers for all combinations of I/O and modules, hence no need for individual I/O-configuration. For complete addressing see chapter 5 – Modbus Addressing.

## 3. Modbus Interface

The I/O-modules are accessible via Modbus-TCP at port 502 and using function code 3 only.

<i>Access</i>	<i>Description</i>	<i>Function code</i>	<i>(hex)</i>
16 bit	Read Holding Registers	03	03

## 4. Register Types

<i>Register type</i>	<i>Range</i>	<i>Unit</i>	<i>Description</i>
AI voltage	0..10000	1 mV	0-10V
AI current	0..2500	1/100 mA	0-25mA
AI Pt1000	-32767..32768	1/10 °C	
AI Pt100	-32767..32768	1/10 °C	
AI Ni1000LG	-32767..32768	1/10 °C	
AI Ni1000DIN	-32767..32768	1/10 °C	
AO	0..1023	1/10.23 %	
DI/DO	0..1		
DI pulse counter	0..65535		
DI min. pulse width	0..255	5 ms	Max. 1275 ms min. pulse width
DO/AO preset mode	0..1		0 = preset not in use 1 = preset in use
Communication status	0..1		0 = OK 1 = Error

## 5. Modbus Addressing

To address the I/O-module slaves via Modbus-TCP the register address is prefixed with the Modbus-RTU slave address. The slave address, referred to as x below, must be such that  $1 \leq x \leq 63$ .

### General registers

For all types of boards the following registers are available.

	Read register	Write register
x900	Get communication status	

### Digital Input Module

	Read register	Write register
x100	Get DI1..DI16 *	
x101	Get DI1	
x102	Get DI2	
x103	Get DI3	
x104	Get DI4	
x105	Get DI5	
x106	Get DI6	
x107	Get DI7	
x108	Get DI8	
x109	Get DI9	
x110	Get DI10	
x111	Get DI11	
x112	Get DI12	
x113	Get DI13 *	
x114	Get DI14 *	
x115	Get DI15 *	
x116	Get DI16 *	
x117	Get DI1 pulse counter	Set DI1 pulse counter
x118	Get DI2 pulse counter	Set DI2 pulse counter
x119	Get DI3 pulse counter	Set DI3 pulse counter
x120	Get DI4 pulse counter	Set DI4 pulse counter
x121	Get DI5 pulse counter	Set DI5 pulse counter
x122	Get DI6 pulse counter	Set DI6 pulse counter
x123	Get DI7 pulse counter	Set DI7 pulse counter
x124	Get DI8 pulse counter	Set DI8 pulse counter
x125	Get DI9 pulse counter	Set DI9 pulse counter
x126	Get DI10 pulse counter	Set DI10 pulse counter
x127	Get DI11 pulse counter	Set DI11 pulse counter
x128	Get DI12 pulse counter	Set DI12 pulse counter
x129	Get DI13 pulse counter *	Set DI13 pulse counter *
x130	Get DI14 pulse counter *	Set DI14 pulse counter *
x131	Get DI15 pulse counter *	Set DI15 pulse counter *
x132	Get DI16 pulse counter *	Set DI16 pulse counter *
x133	Get DI1 min. pulse	Set DI1 min. pulse
x134	Get DI2 min. pulse	Set DI2 min. pulse
x135	Get DI3 min. pulse	Set DI3 min. pulse
x136	Get DI4 min. pulse	Set DI4 min. pulse

x137	Get DI5 min. pulse	Set DI5 min. pulse
x138	Get DI6 min. pulse	Set DI6 min. pulse
x139	Get DI7 min. pulse	Set DI7 min. pulse
x140	Get DI8 min. pulse	Set DI8 min. pulse
x141	Get DI9 min. pulse	Set DI9 min. pulse
x142	Get DI10 min. pulse	Set DI10 min. pulse
x143	Get DI11 min. pulse	Set DI11 min. pulse
x144	Get DI12 min. pulse	Set DI12 min. pulse
x145	Get DI13 min. pulse *	Set DI13 min. pulse *
x146	Get DI14 min. pulse *	Set DI14 min. pulse *
x147	Get DI15 min. pulse *	Set DI15 min. pulse *
x148	Get DI16 min. pulse *	Set DI16 min. pulse *

\*) COMBI-36 modules have DI1-DI12 only.

### Digital Output Module

	Read register	Write register
x200	Get DO1..DO8	Set DO1..DO8
x201	Get DO1	Set DO1
x202	Get DO2	Set DO2
x203	Get DO3	Set DO3
x204	Get DO4	Set DO4
x205	Get DO5	Set DO5
x206	Get DO6	Set DO6
x207	Get DO7	Set DO7
x208	Get DO8	Set DO8
x209		
x210		
x211		
x212		
x213		
x214		
x215		
x216		
x217	Get DO1 preset value	Set DO1 preset value
x218	Get DO2 preset value	Set DO2 preset value
x219	Get DO3 preset value	Set DO3 preset value
x220	Get DO4 preset value	Set DO4 preset value
x221	Get DO5 preset value	Set DO5 preset value
x222	Get DO6 preset value	Set DO6 preset value
x223	Get DO7 preset value	Set DO7 preset value
x224	Get DO8 preset value	Set DO8 preset value
x225		
x226		
x227		
x228		
x229		
x230		
x231		
x232		
x233	Get DO1 preset mode	Set DO1 preset mode
x234	Get DO2 preset mode	Set DO2 preset mode
x235	Get DO3 preset mode	Set DO3 preset mode

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x236	Get DO4 preset mode	Set DO4 preset mode
x237	Get DO5 preset mode	Set DO5 preset mode
x238	Get DO6 preset mode	Set DO6 preset mode
x239	Get DO7 preset mode	Set DO7 preset mode
x240	Get DO8 preset mode	Set DO8 preset mode

## Analog Input Module

	Read register	Write register
x300		
x301	Get AI1 (0-10V)	
x302	Get AI2 (0-10V)	
x303	Get AI3 (0-10V)	
x304	Get AI4 (0-10V)	
x305	Get AI5 (0-10V)	
x306	Get AI6 (0-10V)	
x307	Get AI7 (0-10V)	
x308	Get AI8 (0-10V)	
x309		
x310		
x311		
x312		
x313	Get AI1 (0-20mA)	
x314	Get AI2 (0-20mA)	
x315	Get AI3 (0-20mA)	
x316	Get AI4 (0-20mA)	
x317	Get AI5 (0-20mA)	
x318	Get AI6 (0-20mA)	
x319	Get AI7 (0-20mA)	
x320	Get AI8 (0-20mA)	
x321		
x322		
x323		
x324		
x325	Get AI1 (Pt1000)	
x326	Get AI2 (Pt1000)	
x327	Get AI3 (Pt1000)	
x328	Get AI4 (Pt1000)	
x329	Get AI5 (Pt1000)	
x330	Get AI6 (Pt1000)	
x331	Get AI7 (Pt1000)	
x332	Get AI8 (Pt1000)	
x333		
x334		
x335		
x336		
x337	Get AI1 (Pt100)	
x338	Get AI2 (Pt100)	
x339	Get AI3 (Pt100)	
x340	Get AI4 (Pt100)	
x341	Get AI5 (Pt100)	
x342	Get AI6 (Pt100)	
x343	Get AI7 (Pt100)	
x344	Get AI8 (Pt100)	
x345		
x346		
x347		
x348		
x349	Get AI1 (Ni1000LG)	

x350	Get AI2 (Ni1000LG)	
x351	Get AI3 (Ni1000LG)	
x352	Get AI4 (Ni1000LG)	
x353	Get AI5 (Ni1000LG)	
x354	Get AI6 (Ni1000LG)	
x355	Get AI7 (Ni1000LG)	
x356	Get AI8 (Ni1000LG)	
x357		
x358		
x359		
x360		
x361	Get AI1 (Ni1000DIN)	
x362	Get AI2 (Ni1000DIN)	
x363	Get AI3 (Ni1000DIN)	
x364	Get AI4 (Ni1000DIN)	
x365	Get AI5 (Ni1000DIN)	
x366	Get AI6 (Ni1000DIN)	
x367	Get AI7 (Ni1000DIN)	
x368	Get AI8 (Ni1000DIN)	

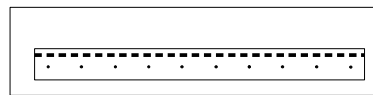
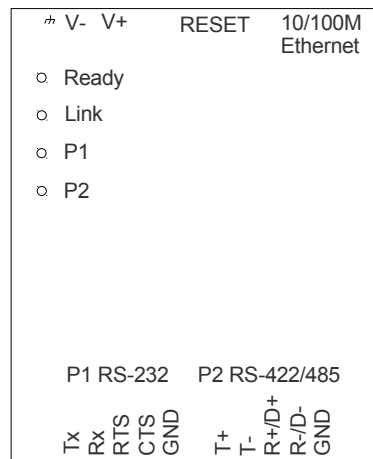
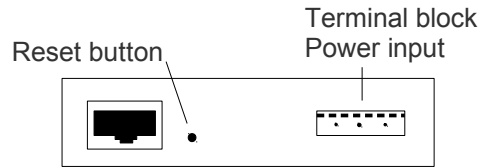


## Analog Output Module

	Read register	Write register
x400		
x401	Get AO1	Set AO1
x402	Get AO2	Set AO2
x403	Get AO3	Set AO3
x404	Get AO4	Set AO4
x405	Get AO5	Set AO5
x406	Get AO6	Set AO6
x407	Get AO7	Set AO7
x408	Get AO8	Set AO8
x409		
x410		
x411		
x412		
x413		
x414		
x415		
x416		
x417	Get AO1 preset value	Set AO1 preset value
x418	Get AO2 preset value	Set AO2 preset value
x419	Get AO3 preset value	Set AO3 preset value
x420	Get AO4 preset value	Set AO4 preset value
x421	Get AO5 preset value	Set AO5 preset value
x422	Get AO6 preset value	Set AO6 preset value
x423	Get AO7 preset value	Set AO7 preset value
x424	Get AO8 preset value	Set AO8 preset value
x425		
x426		
x427		
x428		
x429		
x430		
x431		
x432		
x433	Get AO1 preset mode	Set AO1 preset mode
x434	Get AO2 preset mode	Set AO2 preset mode
x435	Get AO3 preset mode	Set AO3 preset mode
x436	Get AO4 preset mode	Set AO4 preset mode
x437	Get AO5 preset mode	Set AO5 preset mode
x438	Get AO6 preset mode	Set AO6 preset mode
x439	Get AO7 preset mode	Set AO7 preset mode
x440	Get AO8 preset mode	Set AO8 preset mode

## 6. Hardware Introduction

The FXIO-Gateway has one Ethernet port (RJ45), one 10-pin terminal block with 5 pins used for one RS232 port and 5 pins used for one RS-422/485 port and a 3-pin terminal block for power supply.



RS-232 & RS-422/485

**LED Indicators** – The device have four LED indicators, as described in the following table.

LED Name	LED color	LED function
Ready	red	Steady on: Power is on and device is booting up.
Ready	green	Steady on: Power is on and device is functioning normally.
Ready	off	Power is off or error condition exists.
Link	orange	10 Mbps Ethernet connection
Link	green	100 Mbps Ethernet connection
Link	off	Ethernet cable is disconnected or has a short
P1,P2	orange	Serial port is receiving data
P1,P2	green	Serial port is transmitting data
P1,P2	off	No data is beeing transmitted or received through the serial port

## 7. Gateway Installation Procedure

**STEP 1:** The first thing to do is to connect a 12–30VDC power line to the device terminal block.

**STEP 2:** Connect the gateway to a network. Use a standard straight-through Ethernet cable to connect to a hub or a switch. When setting up or testing the gateway, you might find it convenient to connect directly to your computer's Ethernet port. In this case, use a cross-over Ethernet cable.

**STEP 3:** Use a web browser to do the necessary IP-configuration of the gateway.

**STEP 4:** Connect the RS485 serial port (P2) on the gateway to the I/O-modules.

## 8. Environmental Specifications

Power requirements	Gateway	12 to 48 VDC 305 mA at 12 VDC (max)
Operating temp.		0 to 55°C
Operating humidity		5 to 95%rH
Dimensions (WxDxH)	(including ears)	90 x 100.4 x 22 mm
	(without ears)	67 x 100.4 x 22 mm
Surge protection		15kV ESD for serial ports
Magnetic isolation		1.5 kV for Ethernet port
Power line protection		4kV Burst (EFT) EN61000-4-4