

MODBUS communication for QUINT UPS-IQ, TRIO-UPS

Data Sheet
105360_en_02

© PHOENIX CONTACT 2012-11-08



1 Description

The 12-pole data port of QUINT UPS-IQ or TRIO-UPS can be used for communication between the Uninterruptible Power Supply (UPS) and high-level controllers. You can therefore benefit from all the advantages of IQ technology and be kept informed of the state of your UPS solution.



WARNING: Explosion hazard

The data cable may not be used in potentially explosive areas!



NOTE: Damage to the electronics

The data cable may only be used for communication with Phoenix Contact devices. Check the relevant documentation whether the device is approved for this purpose. Do not use the data cable if you suspect that it is damaged.



Make sure you always use the latest documentation.

It can be downloaded at www.phoenixcontact.net/catalog.

2 Table of contents

1	Description.....	1
2	Table of contents	2
3	Modbus RTU communication	3
3.1	Hardware requirements.....	3
3.2	Signal assignment	3
3.3	Serial configuration.....	3
3.4	Software requirements	3
4	Read input registers general	4
4.1	Read input registers from QUINT-UPS/24DC/24DC/... ..	5
4.2	Read input registers from QUINT-UPS/24DC/24DC/... /...AH.....	6
4.3	Read input registers from QUINT-UPS/1AC/1AC/500VA	7
4.4	Read input registers from TRIO-UPS/1AC/24DC/5	8

3 Modbus RTU communication

This document describes the Modbus RTU communication for QUINT UPS-IQ and TRIO-UPS devices by using the IFS-RS232-DATACABLE (2320490). The IFS-RS232-DATACABLE converts data into a serial communication in accordance to ANSI/ TIA/ EIA-232 standard (RS232).

Based on the physical layer RS232 the UPS-IQ devices communicate on a MODBUS serial line using the RTU (Remote Terminal Unit) mode. The MODBUS serial line protocol is specified by the Modbus Organization (www.modbus.org). For new MODBUS implementations use: Modbus Serial Line Protocol and Implementation Guide V1.02

3.1 Hardware requirements

The IFS-RS232-DATACABLE is used for communication between devices with a 9-pole D-SUB RS-232 connection and Phoenix Contact devices with the 12-pole IFS data port such as QUINT-POWER UPS.

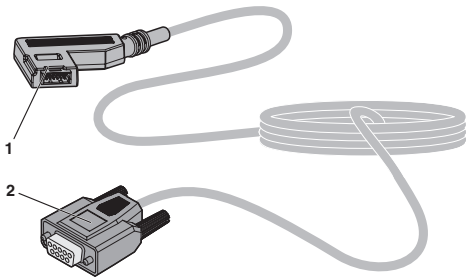


Figure 1 IFS-RS232-DATACABLE (2320490)

No.	Description
1	12-pole IFS plug-in connector
2	9-pole D-SUB connector (female)

Carefully insert the 12-pole IFS plug-in connector of the cable into the IFS data port of the Phoenix Contact device.

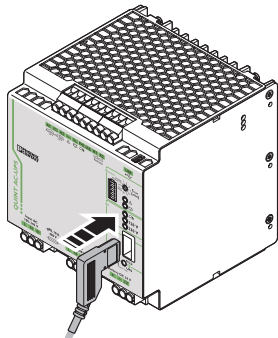


Figure 2 QUINT-UPS/1AC/1AC/500VA (Example)

3.2 Signal assignment

Plug the 9-pole D-SUB connector (female) into the corresponding device interface.

D-SUB connector (female) pin no.	Signal
1	DCD
2	TxD
3	RxD
4	DTR
Shield	Shield/GND

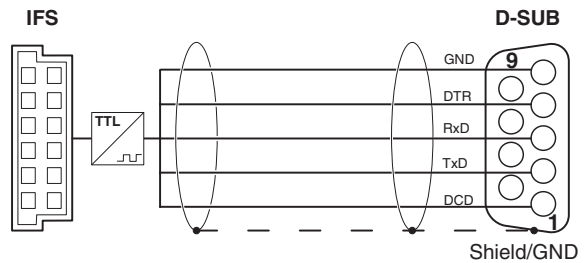


Figure 3 IFS-RS232-DATACABLE

3.3 Serial configuration

	QUINT-UPS/ 24DC/24DC/...	QUINT-UPS/ 24DC/24DC/.../...AH	QUINT-UPS/ 1AC/500VA	TRIO-UPS/ 1AC/24DC/5
Baud rate	115.200		19.200	
Start bit	1			
Data bits	8			
Parity	even			
Stop bit	1			

3.4 Software requirements



You must install the software required for your device prior to initial startup. Observe the relevant documentation for this purpose.

4 Read input registers general

MODBUS is a request/reply protocol and offers services specified by function codes. MODBUS function codes are elements of MODBUS request/reply Protocol Data Unit (PDU). The MODBUS Serial Line protocol is a Master-Slaves protocol. Only one master (at the same time) is connected to the bus, and one or several slaves are also connected to the same serial bus. A MODBUS communication is always initiated by the master. The slaves will never transmit data without receiving a request from the master. The slaves will never communicate with each other. The master initiates only one MODBUS transaction at the same time.

Messages must be transmitted in a continuous stream of characters. The baud rate has to be chosen depending on the used slave, it's mentioned in the device specific chapters of this document. When devices communicate on a MODBUS serial line using the RTU (Remote Terminal Unit) mode, each 8-bit byte in a message contains two 4-bit hexadecimal characters. How to use the read function code 0x04 is described in the table below.

Byte	Name	Request	Response	Error Response
1	Slave address	192	192	-
2	Function code	0x04	0x04	0x84
3	Register address MSB	XX	Byte count	0x01 ... 0x04
4	Register address LSB	XX	XX, Data High	-
5	Register count MSB	0	XX, Data Low	-
6	Register count LSB	1	XX, ...	-
7	Register data MSB	-	XX, ...	-
8	Register data LSB	-	XX	-

4.1 Read input registers from QUINT-UPS/24DC/24DC/...

UNSIGN 16 Parameter

Dec Address	Hex Address	Name	Unit	Min	Max (Device)	Coding
29696	7400	OUT_LX_Remote	Binary	0	1	0 = enabled; 1 = disabled
29697	7401	OUT_LX_BatteryMode	Binary	0	1	0 = off; 1 = on
29698	7402	OUT_LX_ShutdownEvent	Binary	0	1	0 = off; 1 = on
29699	7403	OUT_LX_BatteryCharging	Binary	0	1	0 = off; 1 = on
29702	7406	OUT_LUI_PowerSourceBoost	State	0	2	State of the I-IN terminal of the UPS Power source in Boost operation 0 = I > Inominal 1 = I < Inominal 2 = not connected
29745	7431	OUT_LUDI_OutputVoltage	mV	0	30000	-
29749	7435	OUT_LUI_SocStateOfCharge	%	0	100, 65535	65535 = not initialized
29750	7436	OUT_LUI_SocResidualBackupTimeM	Minute	0	65534, 65535	65535 = not initialized
29753	7439	OUT_LUI_SohResidualLifeTime	Day	0	7300, 65535	65535 = not initialized
29792	7460	OUT_LUI_BatteryVoltage	mV	0	30000	-
29793	7461	OUT_LUI_BatteryTemperature	Kelvin	200	400	-
29794	7462	OUT_LUI_OutputVoltage2	mV	0	3000	-
29795	7463	OUT_LUI_SocResidualBackupTimeS	Second	0	65534, 65535	65535 = not initialized
29796	7464	OUT_LUDI_BatteryNomCapacityWs	100Ws	5 (5A) 10 (10A) 50 (20A) 50 (40A)	10000 (5A) 10000 (10A) 15000 (20A) 15000 (40A)	65535 = inconsistent, not detected
29798	7466	OUT_LUI_BatteryDischaCurrent	mA	0	10000 (5A) 20000 (10A) 30000 (20A) 50000 (40A)	-
29799	7467	OUT_LUI_BatteryDetectedUnits	Count	1	15	-
29800	7468	OUT_LUDI_BatteryNomCapacitymAh	100mAh	8 (5) 13 (10) 30 (20) 70 (40)	1400 (5A) 1400 (10A) 2000 (20A) 2000 (40A)	65535 = inconsistent, not detected
29801	7469	OUT_LUI_BatteryInstalledType	State	0	65535	65535 = inconsistent or not initialized Detected battery type 1000+ Lead battery 11000+ Lithium battery 18000+ Capacitor
29840	7490	OUT_LDW_ActualAlarm	Binary	0		0 = no alarm; if high... Bit0 = End of life (SOH) Bit4,5 = End of life (Resitance) Bit6 = End of life (Time) Bit7 = End of life (Voltage) Bit9 = no battery Bit10 = inconsistent technology Bit11 = overload cutoff Bit12 = Low battery (Voltage) Bit13 = Low battery (Charge) Bit14 = Low battery (Time) Bit16 = Service
29844	7494	OUT_LDW_ActualWarning	Binary	0		0 = no alarm; if high... Bit0 = End of life (SOH) Bit7 = inconsistent capacity Bit8 = notify more batteries Bit9 = less batteries Bit12 = Low battery (Voltage) Bit13 = Low battery (Charge) Bit14 = Low battery (Time) Bit16 = Service without battery registration

4.2 Read input registers from QUINT-UPS/24DC/24DC/... /...AH

UNSIGN 16 Parameter

Dec Address	Hex Address	Name	Unit	Min	Max (Device)	Coding
29696	7400	OUT_LX_Remote	Binary	0	1	0 = enabled; 1 = disabled
29697	7401	OUT_LX_BatteryMode	Binary	0	1	0 = off; 1 = on
29698	7402	OUT_LX_ShutdownEvent	Binary	0	1	0 = off; 1 = on
29699	7403	OUT_LX_BatteryCharging	Binary	0	1	0 = off; 1 = on
29702	7406	OUT_LUI_PowerSourceBoost	State	0	2	State of the I-IN terminal of the UPS Power source in Boost operation 0 = I > Inominal 1 = I < Inominal 2 = not connected
29745	7431	OUT_LUDI_OutputVoltage	mV	0	30000	-
29749	7435	OUT_LUI_SocStateOfCharge	%	0	100, 65535	65535 = not initialized
29750	7436	OUT_LUI_SocResidualBackupTimeM	Minute	0	65534, 65535	65535 = not initialized
29753	7439	OUT_LUI_SohResidualLifeTime	Day	0	7300, 65535	65535 = not initialized
29792	7460	OUT_LUI_BatteryVoltage	mV	0	30000	-
29793	7461	OUT_LUI_BatteryTemperature	Kelvin	200	400	-
29795	7463	OUT_LUI_SocResidualBackupTimeS	Second	0	65534, 65535	65535 = not initialized
29798	7466	OUT_LUI_BatteryDischaCurrent	mA	0	10000 (5A) 20000 (10A) 30000 (20A) 50000 (40A)	-
29799	7467	OUT_LUI_BatteryDetectedUnits	Count	1	15	-
29801	7469	OUT_LUI_BatteryInstalledType	State	0	65535	65535 = inconsistent or not initialized Detected battery type 1000+ Lead battery 11000+ Lithium battery 18000+ Capacitor
29840	7490	OUT_LDW_ActualAlarm	Binary	0		0 = no alarm; if high... Bit0 = End of life (SOH) Bit4,5 = End of life (Resistance) Bit6 = End of life (Time) Bit7 = End of life (Voltage) Bit9 = no battery Bit10 = inconsistent technology Bit11 = overload cutoff Bit12 = Low battery (Voltage) Bit13 = Low battery (Charge) Bit14 = Low battery (Time) Bit16 = Service
29844	7494	OUT_LDW_ActualWarning	Binary	0		0 = no alarm; if high... Bit0 = End of life (SOH) Bit7 = inconsistent capacity Bit8 = notify more batteries Bit9 = less batteries Bit12 = Low battery (Voltage) Bit13 = Low battery (Charge) Bit14 = Low battery (Time) Bit16 = Service without battery registration

4.3 Read input registers from QUINT-UPS/1AC/1AC/500VA

UNSIGN 16 Parameter

Dec Address	Hex Address	Name	Unit	Min	Max (Device)	Coding
29696	7400	OUT_LX_Remote	Binary	0	1	0 = enabled; 1 = disabled
29697	7401	OUT_LX_BatteryMode	Binary	0	1	0 = off; 1 = on
29698	7402	OUT_LX_ShutdownEvent	Binary	0	1	0 = off; 1 = on
29699	7403	OUT_LX_BatteryCharging	Binary	0	1	0 = off; 1 = on
29746	7432	OUT_LUDI_OutputVoltage	100mV	0	30000	-
29749	7435	OUT_LUI_SocStateOfCharge	%	0	100, 65535	65535 = not initialized
29750	7436	OUT_LUI_SocResidualBackupTimeM	Minute	0	65534, 65535	65535 = not initialized
29753	7439	OUT_LUI_SohResidualLifeTime	Day	90	7300, 65535	65535 = not initialized
29792	7460	OUT_LUI_BatteryVoltage	mV	0	30000	-
29793	7461	OUT_LUI_BatteryTemperature	Kelvin	200	400	-
29795	7463	OUT_LUI_SocResidualBackupTimeS	Second	0	65534, 65535	65535 = not initialized
29796	7464	OUT_LUDI_BatteryNomCapacityWs	100Ws	50	15000	65535 = inconsistent, not detected
29798	7466	OUT_LUI_BatteryDischaCurrent	mA	0	30000	-
29799	7467	OUT_LUI_BatteryDetectedUnits	Count	1	15	-
29800	7468	OUT_LUDI_BatteryNomCapacitymAh	100mAh	30	2000	65535 = inconsistent, not detected
29801	7469	OUT_LUI_BatteryInstalledType	State	0	65535	65535 = inconsistent or not initialized Detected battery type 1000+ Lead battery 11000+ Lithium battery 18000+ Capacitor
29840	7490	OUT_LDW_ActualAlarm	Binary	0		0 = no alarm; if high... Bit0 = End of life (SOH) Bit4,5 = End of life (Resitance) Bit6 = End of life (Time) Bit7 = End of life (Voltage) Bit9 = no battery Bit10 = inconsistent technology Bit11 = overload cutoff Bit12 = Low battery (Voltage) Bit13 = Low battery (Charge) Bit14 = Low battery (Time) Bit15 = prohibited Autonomic-Start – 120V and 230V Bit16 = Service
29844	7494	OUT_LDW_ActualWarning	Binary	0		0 = no alarm; if high... Bit0 = End of life (SOH) Bit7 = inconsistent capacity Bit8 = notify more batteries Bit9 = less batteries Bit11 = Boost Operation (P>PN) Bit12 = Low battery (Voltage) Bit13 = Low battery (Charge) Bit14 = Low battery (Time) Bit15 = Service without battery registration Bit16 = Overvoltage Bit17 = Undervoltage

4.4 Read input registers from TRIO-UPS/1AC/24DC/5

UNSIGN 16 Parameter

Dec Address	Hex Address	Name	Unit	Min	Max (Device)	Coding
29696	7400	OUT_LUI_Remote	Binary	0	1	0 = enabled; 1 = disabled
29697	7401	OUT_LUI_BatteryMode	Binary	0	1	0 = off; 1 = on
29698	7402	OUT_LUI_ShutdownEvent	Binary	0	1	0 = off; 1 = on
29699	7403	OUT_LUI_BatteryCharging	Binary	0	1	0 = off; 1 = on
29702	7406	OUT_LUI_OutputVoltage	mV	0	30000	-
29704	7408	OUT_LUI_AmbientTemperature	Kelvin	200	400	-
29703	7407	OUT_LUI_BatteryDischaCurrent	mA	0	10000	-
29792	7460	OUT_LUI_BatteryVoltage	mV	0	30000	-

UNSIGN 32 Parameter

Dec Address	Hex Address	Name	Unit	Min	Max (Device)	Coding
29706	740A	OUT_LUDI_ActualAlarm	Binary	0	15	0 = no alarm; if high... Bit0 = End of life (Time) Bit1 = no battery Bit2 = End of life (Voltage) Bit3 = Low battery (Voltage)