Technical Documentation

for metraTec PulsarMX UHF RFID Reader

Date: November 2016

Version: 1.2

Table of Contents

1 General Information / Security Advice

1.1 Notes on the use of this documentation

This user manual and integration guide uses different symbols to point out potentially dangerous situations. The following signs and symbols are used throughout the document.

ATTENTION

Declares a potentially hazardous situation. If this is not avoided, the product or something in its surrounding could be damaged.

NOTE

Declares notes for the user as well as other useful information, where no harmful or dangerous situations can be expected.

1.2 Security Advice

The PulsarMX UHF RFID Reader was not designed for use in dangerous environments. Using this product in applications where a failure could directly result in severe injuries or death ("high risk activities") is not permitted. This includes but is not limited to applications in nuclear facilities, flight control systems, life support systems or weapon systems. The manufacturer denies the suitability of this device for such scenarios.

1.3 Export Restrictions

The PulsarMX UHF RFID Reader contains components that underlie US Export restrictions. It is therefore forbidden to export the product to countries that are on the US trade embargo list. The same applies to any countries that are on the EU embargo list.

1.4 Further Documents

While this documentation explains the electrical and mechanical characteristics of the PulsarMX RFID Reader, it might be useful to also read the metraTec Protocol Guide, which explains the protocols used to control the reader in full detail.

All further documents can be either found at the metraTec's product web page or are listed at: http://www.metratec.com → Support → Downloads → Documentation.

2 Product Description

The PulsarMX is an UHF RFID reader/writer for demanding industrial applications, where mid read ranges (2-4m depending on antenna and transponder), speed or extensive special features are needed. The reader can be used for container tracing, reading of sensor tags, and applications directly at conveyor belts. Due to its compact dimensions and little heat generation, the reader is also suitable for integration into electric control cabinets or other production machinery.

2.1 Intended Use

UHF RFID Reader/Writer for wireless communication with RFID transponders according to EPC Class 1 Gen 2.

2.2 Technical Specification

|	
Operating Voltage	24 V DC
Digital Inputs/Outputs	optically isolated 24V DC Inputs (2x), 24 V DC Outputs (4x), 24 V DC Out (1x)
Operating Frequency	868 MHz (ETSI UHF RFID)
System Impedance	50 Ohm
RF Output	500 mW / 27 dBm
Current Consumption	up to 270 mA (without Ethernet) / 420 mA (with Ethernet)
Operating Temperature	-20°C bis +75°C
Dimensions	130 x 106 x 55 mm
Protection	IP 40 (higher on request)
Conformity	CE, e.g. EN 60950-1, ETSI 300 330

2.3 Product Drawing
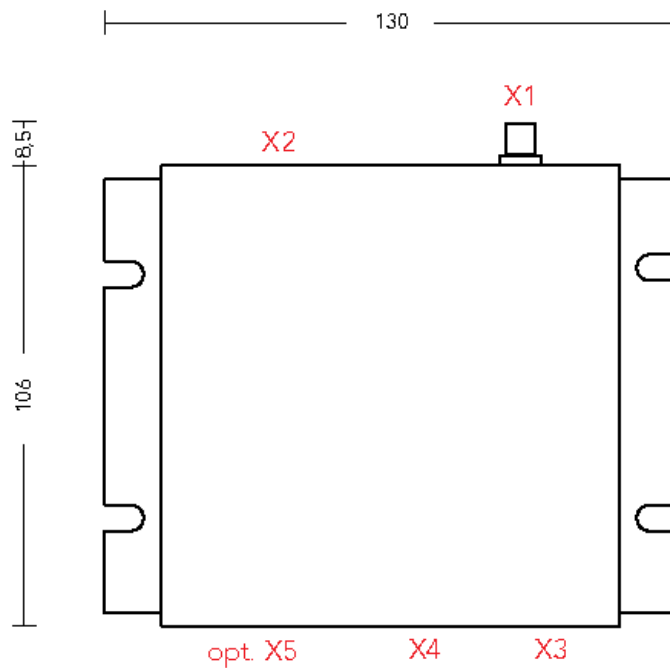
Fig. 1: Dimensions of PulsarMX Reader (in mm)

2.4 Scope of Delivery

The PulsarMX RFID Reader comes with the following parts:

- PulsarMX UHF RFID Reader

- 24 V DC power supply

- Documentation, Drivers and Demo Software are available via download from metraTec's website

2.5 Accessories

Compatible to the PulsarMX UHF RFID Module metraTec offers accessories for configuration of full RFID systems:

- UHF Multiplexer (hyperMux 4x, 8x and 16x)

- Various UHF Antennas

- Coaxial cable (normal or low loss)

3 Power Supply and Electrical Specification

The PulsarMX is powered using 24 V DC which are connected at the front of the device (X3). If you do not use a 24 V power supply supplied by metraTec, please make sure that your own PSU provides a supply voltage of high quality. If possible, use a PSU with high precision / high speed linear regulator. If you use a switching PSU, please make sure that the switching frequency is > 500 kHz and the layout according to EMC standards.
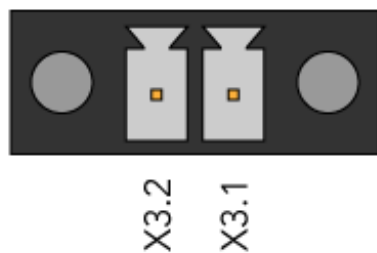

Fig. 2: Power Connector Description (ref. Tab. 1)

Connector	Description
X3.1	GND
X3.2	24 V DC

Tab. 1: Description of Power Connector

Operating Voltage	24 V DC
Current Consumption[1], RF on	up to 270 mA (depending on Power Mode)
Power Consumption[1], RF off (idle)	90 mA
Power Consumption[1], Stand-By	70 mA
Voltage Inputs/Outputs	24 V

Tab. 2: Maximum Rating and Electrical Limits

---

1   Note: For Ethernet power consumption is increased by 150 mA.

4 Communication

The PulsarMX offers two main options as a host interface – USB and optionally an Ethernet connection. Additionally, versions with WiFi and ZigBee are available on special request.

4.1 USB Driver Installation

The basic option for connecting the PulsarMX with your host PC is using the USB connection every reader has.

1. Connect the reader with a 24 V DC power source as described before.

2. Connect the reader with a PC using a USB cable (X4).

3. Install the USB driver. metraTec offers the needed driver including Installation Guides for Windows XP and Windows 7 (as downloads from metraTec's website).

4.2 Ethernet

Communication of the PulsarMX goes via the Ethernet connection to a host for data evaluation.

Factory IP address of the PulsarMX is *192.168.2.239*

For changing the address, access the above IP address via web browser. You will be asked for a password. Default password is „tucadmin". You can now change the IP address via the web mask.

In case the changed address got lost, the „TUC Config Manager" software from metraTec can be used to search for the device and assign another IP address. Software and more documentation can be found here:

http://www.metratec.com/en/support/downloads/software.html

5 Antenna Connection

To send and receive data to and from the tags an appropriate UHF RFID antenna (868 MHz, 50 Ohm) has to be connected to the reader. This is done via the SMA connector on the reader (X1).

Since the design of UHF antennas can be a task requiring expert knowledge, metraTec RFID Solutions offers a range of standard antenna types for UHF applications which are compatible to the PulsarMX. Further, we offer an antenna design service for custom designs. metraTec UHF antennas come equipped with standard SMA connectors which can be directly connected to the PulsarMX. In cases in which a different antenna geometry or connector is needed please contact support@metratec.com.

To connect the antenna to the reader or multiplexer the devices are equipped with SMA jacks (SMA female). The appropriate cables are equipped with SMA plugs (male) at both ends, accordingly. When connecting antennas with multiplexers or readers please keep in mind that the cable has a signal dampening effect reducing the RF power reaching the antenna. If long cables are to be used in connection with one or more multiplexers the reading range can be reduced measurably. Using higher quality cables ("low loss cables") can reduce the power loss in cases in which this is important. Recommended cables with different lengths can be ordered from metraTec as accessories.

ATTENTION

Always connect an 50 Ohm antenna as described above first, before powering the device. Powering the reader without an appropriate 50 Ohm load for a longer time could damage the reader permanently.

6 Digital Input/Outputs

The PulsarMX has 2 digital input pins and 4 digital output pins which can be be read or set via the reader. The input pins are optically isolated 24 V DC inputs as common in automation technology in general. Up to 25 mA are needed to set the input to "high".

The output pins are 24 V high side switch DC outputs with a maximum current of 250 mA per pin. These can be used to directly power e.g. signal towers. In total a maximum current of 1000 mA for all pins is allowed. Outputs are equipped with internal overcurrent and overtemperature shutdown.

The pins X2.1 and X2.2 are connected directly to the power supply input, i.e. the applied voltage is 24 V DC. This can be used for power supply of e.g. sensors, etc. The power of these pins is only limited by the power of the power supply used.
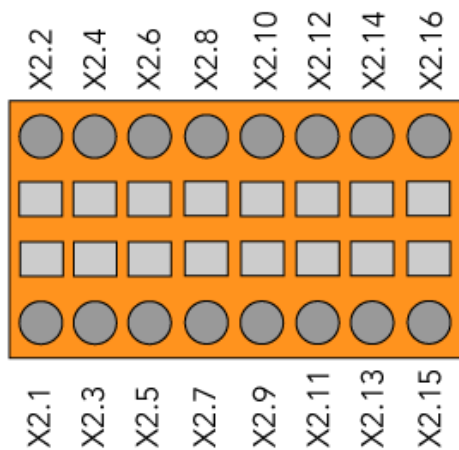

Fig. 3: Connector description of PulsarMX

Connector	Description
X2.1	GND
X2.2	24 V DC Out
X2.3	Out 1 -
X2.4	Out 1 +
X2.5	Out 2 -
X2.6	Out 2 +
X2.7	Out 3 -
X2.8	Out 3 +
X2.9	Out 4 -
X2.10	Out 4 +
X2.11	In 1 -
X2.12	In 1 +
X2.13	In 2 -
X2.14	In 2 +
X2.15	GND
X2.16	24 V DC

Tab. 3: Pin Description for digital IOs. Note: All "Out X -" are connected to ground internally!

7 Further Notes

7.1 Environmental

Electronic devices like the PulsarMX are covered by the (German) ElektroG (electronic waste law) as well as the European WEEE directive and as such may not be disposed of by way of the normal household trash. Instead they have to be recycled properly. For you as our customer this is no additional burden, however, as you can send the device back to us for proper recycling. We assure you that the devices received back will be recycled properly and in an environmentally friendly way. Our WEEE Registration ID is DE 56060482.

When selecting electronic components we additionally made sure that all components are free of heavy metals and other harmful substances as required by the RoHS Directive for many industries. Hence, our products are produced in the most environmentally friendly way possible.

7.2 Declaration of Conformity

The PulsarMX complies with all directives and regulations applicable in the European Union for this kind of device. This especially includes all laws regarding use of spectrum and EMC. The product therefore bears the CE sign, as required by Directive 1999/5/EC (Radio & Telecommunication Terminal Equipment Directive).

The product is currently not registered for use in the US or Canada. However, metraTec is registered as a manufacturer of electronics at the FCC and IC. A certification of this product is therefore possible, if required. Please ask us or your system integrator for further information.

8 Version Control

Version	Change	by	Date
1.0	created	KD	01.06.2011
1.1	English translation, minor changes	CS	28.05.2015
1.2	insert 4.2 Ethernet, update address	KS	28.11.2016

Contact

metraTec GmbH
Niels-Bohr-Str. 5
39106 Magdeburg, Germany

Tel.: +49 (0)391 251906-00
Fax: +49 (0)391 251906-01

Email: support@metratec.com
Web: http://www.metratec.com

Copyright