



P-EASY Data Radio Short Operating Manual

Specifications

Frequency range	335 – 380 MHz, 403 – 470 MHz
Channel spacing	12,5, 20, 25 kHz
Interfaces	10/100 MB Ethernet, RS-232, RS-422/485
Interface speed	300 to 115.200 Bit/s asynchronous
Output Power	0,01 – 5 W / 50 Ohm
Modulation rate	19.200 or 9.600 Bit/s switchable
Sensitivity	-116 dBm @ 10 ⁻³ BER
Operating voltage	10,8 – 18,0 V DC
Current Consumption RX, Display off	230 mA
RX, Display on	250 mA
TX 1W	770 mA
TX 5W	1,4 A
Operating temperature	-25 bis +55°C
Physical dimensions	(H x L x D) 104 x 97 x 32 mm
Weight	475 g
Mounting	DIN-rail
Antenna connector	BNC
RS232- connector	9-pol Mini-DIN female
RS 422/485 connector	Spring clip
Ethernet	RJ45
Standards	EN 300 113-1 EN 300 113-2 EN 301 489-5 EN 60 950 EN 50 385

Safety information

1. Between power supply and P-Easy data radio modem has to be installed a 2A- current limiting fuse.
2. During the antenna installation please take relevant building regulations, installation instructions as well as lightning protection into account.
3. The Use of P-Easy data radio modems is only permitted on authorized assigned frequencies. Please observe country specific regulations for the operation of your radio installation and contact the responsible authority if necessary.
4. In every country the installation of aerial systems is subject of relevant standards and regulations, especially regarding lightning protection and grounding. Furthermore constructional design can be subject to special regulations as well. Additionally the erection of masts can require a planning permission depending on its height. Please take note of them during planning and installation of your construction.

Installation

General information

The installation of radio systems, in particular antennas, is subject to several country-specific regulations, which have to be considered during assembly. Particularly pay attention to lightning protection, as an improper installation may be life-threatening!

Assembly

The installation of a P-EASY data radio modem in a control cabinet is conceivably easy; it is attached by means of fixing clips, included in the delivery, to a DIN-rail. In the control cabinet data radio modems generally should be installed as wide apart as possible from transformers. Please note that the electrical ground of the data radio modem is in contact with the body as well as the antenna socket and has to be grounded adequately. Please also care for a protection of the power supply and consider safety standards and regulations.

Power supply

Usually P-EASY data radio modems are supplied with 12V, whereas the whole automotive range (10,8-15,6V) is acceptable. Power consumption exceeds the closed-circuit working only insignificantly, as the periods of active transmission phases are very short. The power supply units or DC/DC converters and the cabling must be dimensioned in such way that no voltage drop during transmission can occur. Care must furthermore be taken to ensure that the installed components do not cause interruptions in the supply voltage or magnetic field in the surrounding area. Both can lead to dysfunction of P-EASY data radio modems.

Interfaces

RS232

This serial interface uses a common ground with the connected installation and therefore they are not electrically isolated. As the transmission uses voltage pulses, the cable length is limited to 10-15m due to security-relevant and transmission technology perspectives, and to system components with common mass-compensation. The usage of shielded cables is recommended especially near HF- or power lines. P-EASY data radio modems can either be connected via 3 cores (TX,RX, ground) or via 5 cores with additional flow control (CTS, RTS). The pinout for the D-sub miniature socket can be found in table below:

Pin	Signal	Description
1	-	Not in use
2	TX	P-Easy transmission line
3	RX	P-Easy receiving line
4	-	Not in use
5	GND	Ground
6	-	Not in use
7	RTS	P-Easy ready to send
8	CTS	P-Easy clear to send
9	-	Not in use

RS485/422

The RS485/422-interface of P-EASY data radio modem already is decoupled unit-side and as a result electrically isolated. For the transmission voltage-pulses are used, which dependent on conductor cross-section and transmission speed, can bridge a distance of up to several kilometers.

As transmission and receiving device RS422 uses one wire pair each, which enables an entire Duplex operation with counter stations. RS485 by contrast uses one wire pair for receiving and transmitting device, which enables on one hand operation of multiple stations on one interface; on the other hand communication only takes place half-duplex. The pin assignment of the spring clip is shown in the following table:

Pin	RS422	RS485
	2	
1	Y +	A +
2	Z -	B -
3	B -	NC
4	A +	NC
5	Shield	Shield

Ethernet

For Ethernet connections pre- assembled patch cables are used generally. Thereby, attention has to be paid, that connections between P-EASY data radio modem and a hub, switch or router require a “regular” cable, whereas connections between P-EASY data radio modem and a SPS or a PC require a so called “cross (over)” cable.

HF-Installations

In every country the installation of aerial systems is subject of relevant standards and regulations, especially regarding lightning protection and grounding. Furthermore constructional design can be subject to special regulations as well. Additionally the erection of masts can require a planning permission depending on its height. Please take note of them during planning and installation of your construction.

Antenna location

Generally the surrounding area of the antenna in emission direction (for omnidirectional antennas in all directions) needs to be free of electrically conductive objects for at least 5 wavelengths. Furthermore it can be expected, that massive obstacles like buildings or terrain elevations shadow the radiation in the respective direction. If the antenna is installed on a building or any stand-alone construction steps must be taken to ensure that the antenna won't get covered in snow during winter, as a snow-covered antenna inevitably causes the connection to fail.

Multiple antennas on one mast

If multiple antennas are located on one mast, attention has to be paid to their decoupling, which depends on the distance and position of the antennas to each other. Two half wave radiators fixed above one another, show a correlated attenuation of 48dB, if they are fixed above one another within a distance of 2 wavelengths (2 wavelengths horizontal distance) the correlated attenuation amounts only 25dB.

Surge protection

To protect data radio modems from over voltage on the coaxial cable conductor, surge protection has to be fixed in the coaxial line near the cabinet entry, in between antenna and data radio modem. Please also take care to ground your surge protection!

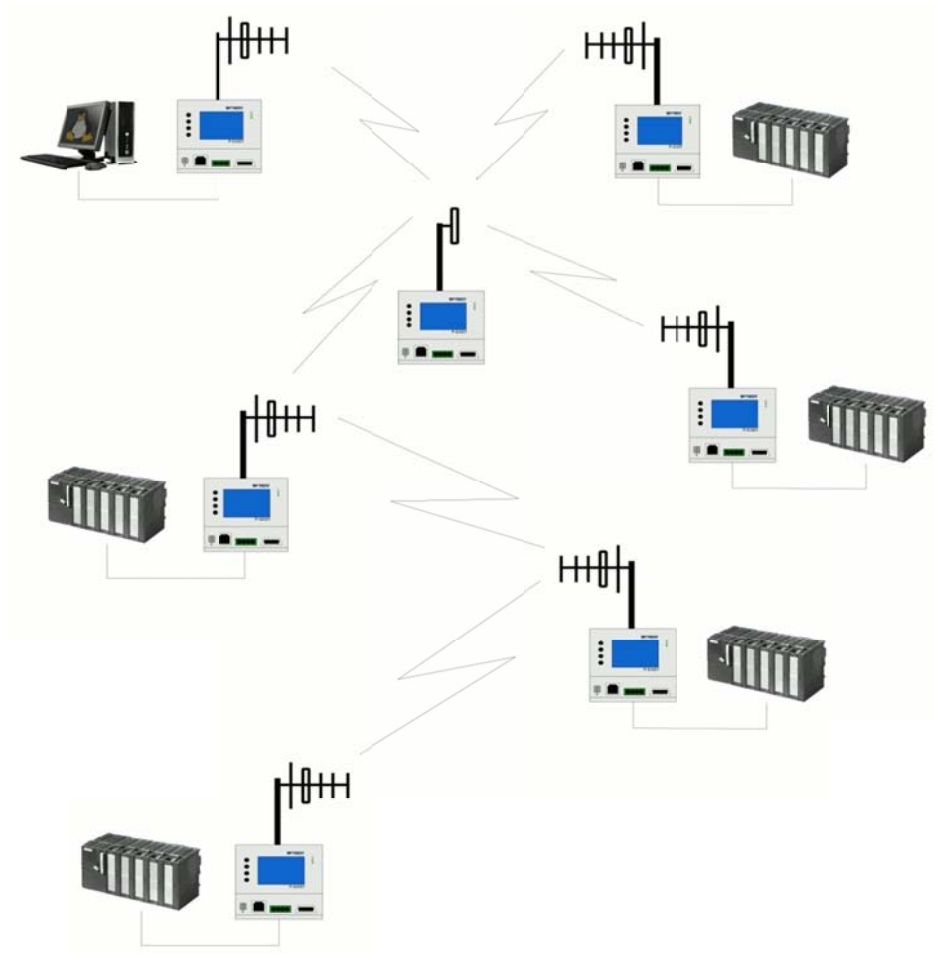
Configuration and Diagnostics

For configuration of P-EASY data radio network P-EASY-Config software should be used. Also direct parameter entry via build-in buttons is possible for experienced users. For further information please check P-EASY operating manual at our website <http://www.data-radio.net>

System Configurations



Point-to-Point



Point-to-Multipoint

Screenshots

The screenshots show the following panels and their content:

- Top Left:** TIP-TECH DATA RADIO SYSTEMS logo and navigation menu (Diagnostic, Parameters, Tables, Connectors, Display, Info).
- Top Right:** "Funkeinstellungen" (Radio Settings) for 345.0000 MHz. Parameters include Kanal 1, Frequenz 345.0000 MHz, Leistung 0.1 W, Squelch 14 dB, and Modulations-Rate 19 200. A small table shows Ucc (12.4V), PWR (0.09W), Icc (0.20A), and SWR (19). A signal level graph shows a peak at 0 dBm. Temperature is 27°C.
- Middle Left:** "Funkeinstellungen" (Radio Settings) with a spectrum graph showing a signal at 345.0000 MHz with a level of -120 dBm. Span is 1 MHz, BW is 25 kHz.
- Middle Right:** "Bit Error Rate" (BER) statistics. Address 2 20 >> 2 21 shows BER 0E-4 and S/N 64 dB. Address 2 20 << 2 21 shows BER 0E-4 and S/N 61 dB. A table shows S/N (dB) and DO for different addresses and times.
- Bottom Left (Top):** "Radio modem" settings (Channel 1, Frequency 345.0000 MHz, Power 0.1 W, Squelch 14 dB, Modulation rate 19 200) and "Setting" (My address 2 20, Broadcast 255 255, Synchron. period 1 000 Bytes, Repeat 0, Spontaneity 5, Avg. mess. length 100 Bytes).
- Bottom Left (Middle):** "Serial port" settings (Type RS 232, Baud rate 19 200, Parity None, Data bits 8, Stop bits 1, Flow control None, Buffer size 1 000 Bytes, Time out 5 Bytes, Protocol Address, Parameters Edit).
- Bottom Left (Bottom):** "Protokoll-Parameter" (Modus Master, Adressen-Größe 0 Bytes, Adressen-Position 1 Byte).
- Bottom Middle (Top):** "Connections table" and "Retranslations table" showing "Keine Verbindung" (No connection).
- Bottom Middle (Middle):** "Hinzufügen / Aufbereiten" (Add/Edit) and "Löschen" (Delete) options.
- Bottom Middle (Bottom):** "Verbindung hinzufügen" (Add connection) with address 002 021 and metrics 001.
- Bottom Right (Top):** "Adresse" and "Metriken" table showing "Keine Verbindung" (No connection).
- Bottom Right (Middle):** "Verbindung hinzufügen" (Add connection) with address 002 021 and metrics 001.
- Bottom Right (Bottom):** "Geräte" (Devices) table showing "Kein Gerät" (No device).
- Bottom Far Left:** "IP-Adressen" table showing 192.168.001.001 for address 002 021.
- Bottom Far Middle:** "Stromversorgung" (Power supply) settings for Ethernet (RS 422/485, RS 232) and RS 232 (1. Gnd, 2. 10.8 - 15.6 V).
- Bottom Far Right:** "Ethernet" settings (1. Tx +, 2. Tx -, 3. Rx +, 4. Rx -, 5. Shield, 6. Rx +, 10 / 100 BASE-T) and "Info" (Serien-Nummer 532, Produktions-Datum 10.2009, Firmware-Version 2.0.5, Loader-Version 2.1.4).