

# W&T

[www.WuT.de](http://www.WuT.de)

## Manual

Installation, Startup and Application

### **POF Interface Converters and Tools**

valid for:

#81009: RS232 <> POF, 9 pin Standard

#81029: RS232 <> POF, 9 pin Low Power

#81025: RS232 <> POF, 25 pin DCE

#81026: RS232 <> POF, 25 pin DTE

#81600: POF Cutting Tool

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Subject to errors and changes:

Since we can make mistakes, none of our statements should be used without checking. Please let us know of any mistakes or misunderstandings you are aware of, so that we can recognize and eliminate them quickly.

Perform work on and with W&T products only as described here and only if you have read and understood the manual fully. Unauthorized use can result in hazards. We are not liable for the consequences of unauthorized use. When in doubt, check with us or consult you dealer!

Wiesemann & Theis offers an entire family of compact self-powered fiber optic interfaces that allows you to convert RS232 serial ports into an optical port for connecting POF cable.

This interface family is described on the following pages along with the corresponding technical data and including connection examples.

For up-to-date information on new developments, see our Internet site at <http://www.wut.de> or check the e-mail short notices at the W&T Interface Club, which you can also subscribe to from the W&T Homepage.

# Inhalt

<b>Legal Notices .....</b>	<b>5</b>
Warning note concept .....	5
Qualified personnel .....	6
Disposal .....	6
Symbols on the product and on the part la .....	6
<b>Safety instructions .....</b>	<b>7</b>
General precautions .....	7
Intended use .....	7
Electrical safety .....	7
Optical radiation .....	8
EMC .....	8
<b>Notes for use of the fiber optic interfaces .....</b>	<b>9</b>
Ambient conditions for the use of POF cables .....	10
<b>Interface RS232 &lt;&gt; Plastic Fiber Optic .....</b>	<b>11</b>
Function .....	11
Power supply .....	11
Pinout and connectors .....	12
Assembly .....	13
Technical data: .....	14
<b>Cutting tool for plastic fiber optics, Model 81600 .....</b>	<b>15</b>
Background information .....	15
Preparing the cutter .....	16
Stripping fiber optic cables .....	18
Replacing the cutter .....	18
Technical Data .....	19

# Legal Notices

## Warning note concept

This manual contains notes which must be observed for your personal safety and to prevent equipment damage. The notes are called out with a warning triangle. Depending on the hazard level the warning notes are represented in decreasing order of hazard as follows:

 **DANGER**

Indicates a hazard which will result in death or serious injury if no appropriate safety measures are taken.

 **WARNING**

Indicates a hazard which can result in death or serious injury if no appropriate safety measures are taken.

 **CAUTION**

Indicates a hazard which can result in slight injury if no appropriate safety measures are taken.

 **NOTE**

Indicates a hazard which can result in equipment damage if no appropriate safety measures are taken.

When multiple hazard levels are present the warning note for the highest level is used. If the warning triangle for personal injury is used, then a warning for equipment damage may also be added in the same warning note.

## Qualified personnel

The product described in this manual may be installed and placed in operation only by personnel who are qualified for the respective task.

In addition the documentation for the respective task must be followed, especially the safety and warning notes included in it.



Qualified personnel have received training and experience which enable them to recognize risks associated with handling the described products and to avoid possible hazards.

## Disposal

Electronic devices may not be disposed of with household waste, but rather be brought to a proper electronics waste disposal facility.

A complete Declaration of Conformity for the described devices can be found on the respective datasheet pages on the W&T Homepage at <http://www.wut.de>.

## Symbols on the product and on the part label

Symbol	Explanation
	CE marking  The produce meets the requirements of the corresponding EU Directives.
	WEEE marking  The product may not be disposed of with household waste, but rather in accordance with the disposal regulations for electrical waste that prevail where the device is installed.

# Safety instructions

## General precautions

This manual is intended for the installer of the described devices and must be read and understood before beginning any work. The devices are to be installed and placed in service only by an electrical specialist.

## Intended use

### **DANGER**

The fiber optic interfaces from Wiesemann & Theis convert the data signals from RS232 interfaces into light signals, thereby enabling the transmission of serial data over plastic fiber optic cables. This allows the interfaces to suppress compensation currents which can flow as a result of potential differences between the connected devices when directly copper connections are used. Such currents can cause interference with data transmission or even destroy the interfaces.

The interfaces described in this manual are primarily designed for protecting RS232 ports and for ensuring noise-free data transmission in noisy environments. When using the interfaces for personal protection against contact with hazardous voltages, observe the relevant safety standards and regulations.

Any other use or modification of the interface convertors is not permitted.

## Electrical safety

### **WARNING**

If an additional power supply is used, it must provide safe isolation of the low-voltage side from the supply network in accordance with EN62368-1. In addition, the power supply must have an LPS feature.

## Optical radiation

### **NOTE**

All W&T fiber optic interfaces for plastic fiber optic cables use a standard LED with a wavelength of 660nm as the optical emitter. Because of the limited energy which the serial port has available, the LEDs only couple an optical power of typ. -7dBm (approx. 0.2mW) into the fibers.

This precludes any health risk from the optical radiation.

## EMC

### **NOTE**

Only shielded serial signal cables should be used to connect fiber optic interfaces. Alternately the interfaces can of course be plugged directly into the respective RS232 port.

The fiber optic interfaces then meet the industrial noise limits and the stricter emissions limits for residential and small businesses.



## Notes for use of the fiber optic interfaces

All specifications for maximum transmission parameters refer to operation of the interfaces on serial ports equipped with type MC1488 RS232 drivers and at a voltage of  $\pm 12V$ . The specifications also presume that the handshake lines of the interface are enabled.

If the interfaces are supplied only from the data lines, and when operating on low-efficiency RS232 ports you must take into account limitations with respect to maximum transmission length, baud rate and temperature range.

Since maintaining of all three parameters is a direct function of the construction of the RS232 port and a solid power supply for the ports, and these parameters have a mutual effect, it is not possible to suggest specific values.

Practice has shown that for RS232 ports equipped with MAX232-compatible IC's, no operating restrictions exist as long as the handshake lines on the port are enabled.

Laptop ports with low output levels are however only in exceptional cases able to provide the fiber optic interfaces with sufficient power. For short distances, however (up to max. 20 meters), there is a special power-saving version 81029, which can be purchased for such applications.

When there are power supply problems, it is always however possible to supply the interface converter externally through its handshake inputs with a voltage of up to 9V, or to use fiber optic interfaces with their own power supply (such as our model 81201).

The specified minimum distance of 5 meters for the 81009 Interface only applies if the Interface is operated on an RS232 port with high output levels. If under these conditions a short cable length is required, a model 81029 may also be used.

## Ambient conditions for the use of POF cables

If the POF cable is permanently exposed to a high relative humidity, the cable attenuation will increase significantly. Although this effect is reversible with decreasing humidity values, it can lead to transmission failures if a combination of large cable length, fast baud rate and limited performance of the serial interface is used.

For reliable optical data transmission even in humid environments, the length of the POF cable should not exceed 50 meters for the 81009 model and 70 meters for the 81025/81026 models.

For larger lengths, glass fibre should be used to ensure long-term reliable operation under the mentioned operating conditions.

## Interface RS232 <> Plastic Fiber Optic

The W&T Plastic Fiber Optic Interfaces, type 81009, 81025, 81026 and 81029 permit bi-directional transmission of RS232 signals by the means of duplex plastic fiber optic cable.

### Function

The Interfaces support one data line in each direction and transmit data over a distance of max. 100 meters (dependent on the model of the interface converter).

The transmission medium is standard duplex plastic fiber optic cable, which is inexpensive and extremely easy to work with and install. The use of fiber optic as a transmission medium ensures perfect galvanic isolation between the connected devices and clean transmission even in noise-prone environments.

The interfaces convert both of the data lines, while the optional handshake lines can be used to carry additional supply voltage for the interface. The converter uses jumper resistors between RTS and CTS as well as DTR and DSR for enabling the connected interface, so that as a rule no additional jumpers are required in the connector.

### Power supply

The W&T Fiber Optic Interfaces sources its supply voltage from the connected RS232 lines, and does not require any additional external power supply. Getting sufficient power to the Interfaces requires that the data lines as well as the handshake lines be connected.

## Pinout and connectors

The fiber optic connection for the interface is configured as a self-locking coupling for duplex plastic fiber optic, with the RS232 interface formatted as DB9/DB25 connector. Refer to the following table for connector pin assignments:

### Pinout RS232 <> POF interface, model 81009 and 81029

pin#	RS232 signal
2	data out
3	data in
4	connection to pin 6
5	signal GND
6	connection to pin 4
7	connection to pin 8
8	connection to pin 7

### Pinout RS232 <> POF interface, model 81025

pin#	RS232 signal
2	data in
3	data out
4	connection to pin 5
5	connection to pin 4
6	connection to pin 20
7	signal GND
20	connection to pin 6

### Pinout RS232 <> POF interface, model 81026

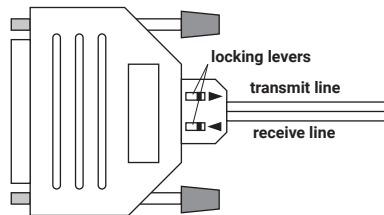
pin#	RS232 signal
2	data out
3	data in
4	connection to pin 5
5	connection to pin 4
6	connection to pin 20
7	signal GND
20	connection to pin 6

## Assembly

Connecting the plastic fiber optic cable to the W&T Fiber Optic Interfaces requires no special tools:

- Trim the fiber optic cable to the desired length using a sharp knife and separate the individual duplex conductors back from the cut point to a distance of around 2 cm.
- Pull the locking levers on the fiber optic female connector back towards the module along the upper side of the coupling. At the same time insert the separated end of the fiber optic duplex line into the fiber optic coupling female.
- Releasing the locking levers locks the fiber optic into the coupling.
- To release, pull the two locking levers on the top of the coupling towards the module, and pull the fiber optic cable out of the female.

The arrows on the top side of the coupling show the location of the emitter and receiver lines.



Please note that when connecting two fiber optic components, the emitter of the first must always be connected to the receiver channel of the second component.

A visible red light beam is always sent along with data, so that the sending line can always be easily identified.

## Technical data:

### Common

Baud rate:	110..115,200 baud
Data format:	any format
Signal lines:	RxD, TxD (full duplex)
Power supply:	through the RS232 signals
POF cable adapter:	integrated socket with automatic interlocking of the fiber-optic cable
Transmitter type:	LED
Optical output power:	typ. -7dBm
Wavelength:	approx. 660 nm
Ambient temperature:	Storage: -40..+70°C Operation: 0..+50°C
Housing:	SUB-D adapter housing
Weight:	approx. 30 g

### RS232 <> POF interface, 9-pin, #81009

Transfer distance:	typically 5 to 80 m
RS232 adapter:	9-pin SUB-D socket for PC
Delivery:	RS232 <> POF interface, #81009

### RS232 <> POF interface, 9-pin, #81029

Transfer distance:	typically 0 to 20 m
RS232 adapter:	9-pin SUB-D socket for PC
Delivery:	RS232 <> POF interface, #81029

### RS232 <> POF interface, 25-pin, DCE, #81025

Transfer distance:	typically 0 to 100 m
RS232 adapter:	25-pin SUB-D socket, DCE pinout
Delivery:	RS232 <> POF interface, #81025 Gender changer, 25-pin, m/m

### RS232 <> POF interface, 25-pin, DTE, #81026

Transfer distance:	typically 0 to 100 m
RS232 adapter:	25-pin SUB-D plug, DTE pinout
Delivery:	RS232 <> POF interface, #81026 Gender changer, 25-pin, f/f

## Cutting tool for plastic fiber optics, Model 81600

The 81600 cutting tool enables fast and precise trimming of duplex POF cables size 4.4 x 2.2 mm without the necessity of grinding or polishing the resulting cut surfaces.

### Background information

For short runs it is generally sufficient to trim the plastic fiber optic cable using simple tools such as a sharp knife. In these cases the additional attenuation caused by a less than ideal cut is non-critical for the stability of the data transmission. The light intensity at the receiving location is almost always sufficient for a reliable connection regardless of cut-related losses.

But when you begin to approach the maximum permissible distance, the cut quality is important in terms of the achievable distance and the stability of the connection, and can determine whether a connection is feasible or not. A perfect cut can give you up to an additional 20 meters of distance in borderline conditions.

The decisive criterion for the quality of the cut is a flat cut at right angles to the cable axis, so that as little light as possible is lost through scatter or reflection. Such cuts can be achieved using the described cutting tool without requiring additional grinding or polishing of the cut surface.

**Important:** This tool is not suitable for trimming glass fiber cables. Any attempt to use the tool for cutting glass fiber media will permanently damage the cutting element.

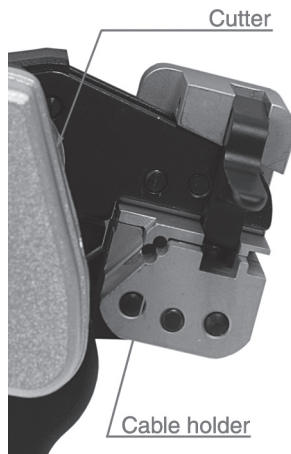
## Preparing the cutter

The plier is shipped from the factory with a safety lock which must be removed before using the tool.

Cutting fiber optic cable

Open the plier by pressing the two grips on the tool together and then releasing them.

Place the duplex fiber optic cable into the holder provided in the clamping block of the plier:



cable is securely held in the clamping block. While doing this take care not to squeeze the grips until they touch, since this will release the plier again.

Then press the cutting wheel against the fiber optic cable by squeezing the trigger-like grip towards you using your index finger.





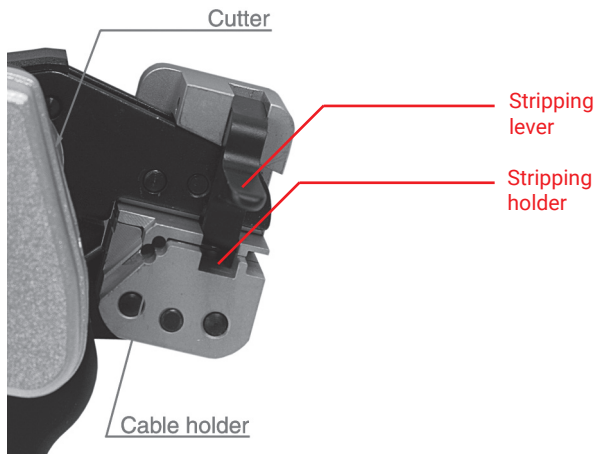
A firm pull with the index finger quickly and cleanly cuts the fiber optic cable. To remove the cable from the clamping block, open the plier.

With each cutting operation the cutting wheel rotates forward by a slight angle, thus significantly increasing the service life of the tool.

## Stripping fiber optic cables

In addition to the cutting function, the plier is also capable of stripping duplex fiber optic cable. This function is now required however when using fiber optic cable together with W&T fiber optic interfaces.

To strip the cable, insert it into the stripping holder of the clamping block and pull the associated lever up to expose the inner cable section.



## Replacing the cutter

In order to ensure consistent cutting quality, the cutter monitors the number of cuts made and indicates the end of the useful life of the cutting wheel in a small window on the side. When the life expectancy is reached, which occurs after 1260 cutting operations, the entire safety cutter needs to be replaced.

The safety cutter including cutting wheel is user replaceable as a self-contained unit and can be ordered from W&T under Article No. 81602.

## Technical Data

Functions:	Cutting and stripping fiber optic cables
Compatible media:	2.2 mm Simplex- and 4.4 x 2.2 mm Duplex fibers with 980um fiber core
Dimensions:	200 mm x 80 mm x 50 mm
Weight:	520 g
Included:	Fiber optic cutting tool Allen key for releasing transport safety lock

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