

MANUAL

**DAD30**

**OPTICAL DATA COUPLER**





With regard to the supply of products, the current issue of the following document is applicable:  
The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

Part No. Z26398  
Date of Issue 2010-04

<b>1</b>	<b>Introduction .....</b>	<b>4</b>
1.1	Warranty .....	4
<b>2</b>	<b>Declaration of Conformity .....</b>	<b>5</b>
<b>3</b>	<b>Safety .....</b>	<b>6</b>
3.1	Symbols used .....	6
3.2	General safety instructions .....	6
<b>4</b>	<b>Model Number .....</b>	<b>7</b>
<b>5</b>	<b>Product description .....</b>	<b>7</b>
5.1	Function description .....	7
5.2	Interfaces and connections .....	8
5.3	Set up switch .....	9
<b>6</b>	<b>Appendix .....</b>	<b>10</b>
6.1	Technical data .....	10
6.2	Diagrams .....	11
6.3	Dimensions .....	11

## 7 Introduction

### **Congratulations!**

You have chosen a device from Pepperl+Fuchs. Pepperl+Fuchs develops, produces, and markets electronic sensors and interface components for the automation technology market worldwide.

### **Contact**

If you have questions about the device, accessories, or other functions, please contact:

Pepperl+Fuchs GmbH  
Lilienthalstraße 200  
68307 Mannheim  
Phone: +49 621 776-4411  
Fax: +49 621 776-274411  
E-mail: fa-info@pepperl-fuchs.com

### 7.1. Warranty

Pepperl+Fuchs manufactures its hardware products according to recognized industrial standards. Pepperl+Fuchs guarantees its products to be free of defects in material and workmanship provided the products are used under the normal operating conditions specified by the manufacturer. The warranty applies only to the original owner and is not transferable. All accompanying exclusions of liability, restrictions, and other conditions of this section apply to this warranty.

#### **Exclusions of liability**

No warranty obtained or granted hereby shall apply to products that:

- have been repaired, modified, or tampered with unless explicitly performed or approved by Pepperl+Fuchs
- have not been serviced in accordance with the Operating and Handling Instructions provided by Pepperl+Fuchs
- have been exposed to unusual physical or electrical loads, immersed in liquids, or exposed to any one of the following circumstances:
  - breakdown
  - crushing
  - improper use
  - misuse
  - low current
  - unsuitable power supply
  - reverse polarity
  - negligence or accident
- has been used for any purpose other than what is described in the Operating and Handling Instructions

Preventive maintenance is the customer's responsibility and is not covered by this warranty.

**General**

With the exception of the warranties noted above, Pepperl+Fuchs offers no warranties for products delivered below in any form whatsoever, whether explicit or implicit, including, but not limited to implicit defect warranty services and guarantee of suitability for a specific purpose, and absence of injury. The explicit warranties noted above shall satisfy all obligations and liabilities of Pepperl+Fuchs for damages, including but not limited to concrete damages, indirect damages or consequential damages in connection with the use or design of the product. The seller's liability to the buyer and other persons (regardless of the origin of liability, whether it be based on contract, warranty, impermissible handling, misuse, and/or other origin) in connection with the use of a product shall in no case exceed the original purchase price of the product. Pepperl+Fuchs shall in no event be liable for consequential damages, concrete and indirect damages, secondary damages or penalties, or lost profits, sales, or loss of data, even if Pepperl+Fuchs had been made aware of this possibility.

**8 Declaration of Conformity**


We, Pepperl+Fuchs GmbH, hereby declare on our sole responsibility that the

**DAD30 Optical data coupler**

and all models of this product to which this declaration refers are in conformity with the following standards and other regulatory documents

**EN 60947-5-2**

Product family standard: Electromagnetic Compatibility (EMC for light industry and industry)

	A corresponding Declaration of Conformity may be requested from the manufacturer.
---	---


Pepperl+Fuchs GmbH in D-68301 Mannheim has a certified quality assurance system in conformity with ISO 9001.



## 9 Safety

### 9.1. Symbols used

Safety-related symbols

	<p><b>Danger!</b> This symbol identifies an immediate and present danger. Failure to observe this warning may result in personal injury or even death.</p>
---	--

### 9.2. General safety instructions

The following basic instructions must be observed in all cases:

- The device must not be placed in service until the manual has been read and understood
- The power device for generating the power supply voltage must be reliably insulated electrically by means of double insulation and a safety transformer according to DIN VDE 0551 (corresponds to IEC 742).
- The device must not be used outside the specification without suitable protective measures
- No unauthorized tampering with the device is permitted
- Do not point the device directly at the sun or measure into the sun
- Do not remove the warning instructions or rating plates

The radiation emitted by a Class 1 laser is harmless. This type of laser instrument can be operated by anyone.

The system operator is responsible for planning, assembly, commissioning, operation, and maintenance of the system.

Installation and commissioning of all devices must only be performed by personnel specially trained for that purpose.

The protection of the system and operating personnel is not ensured if the module is not used according to its intended purpose.


Observe the applicable laws and regulations for use and for the intended purpose. The devices are only approved for proper use in accordance with intended purpose. Any other use voids all warranty claims and manufacturer's responsibility.

Use only recommended original accessories.

If you are unable to eliminate malfunctions, take the device out of operation. Secure the device against accidental operation. Return the device to Pepperl+Fuchs for repair. Own interventions and modifications are potentially hazardous, and any guarantee and manufacturer's liability shall become void.

Dispose of the useless device in keeping with the applicable national legal regulations.

For example, you can take the sensor to the designated collection point for electronic scrap.

	<p><i>In applications with shelf distances and moving carriages, care must always be taken to observe the applicable safety regulations. Failure to do so will result in grave danger to life and limb!</i></p>
---	---

## 10 Model Number

Ordering inf.	Art.-No.	Range	Wave length
DAD30	418446	30 m	880 nm
DAD30/35	418447	100 m	880 nm
DAD30-W	418448	15 m	880 nm
DAD30-RT	418449	30 m	660 nm
DAD30-RT/35	418450	100 m	660 nm

## 11 Product description

### Characteristics

- Range 30 m, Option 35: 100m
- Full-duplex operation ; suited for two full duplex lines using the red-light version
- 2-colour LED (switching state indication and function reserve indication)
- Baud rate 0 - 19200bps
- Function reserve outputs, PNP, short circuit protected
- Measuring output
- Inputs for data interruption and transmitter power down
- Interfaces: 20 mA current loop active/passive  
RS 232  
RS 422/485.
- Supply voltage 24 V DC
- Plug connection.
- Protection class IP 65.

### 11.1 Function description

The DAD30 is an optical device for wireless serial data transmission up to 19200 bit per second and up to 100m.

The device contains both transmitter as receiver ; so the user can rise a full duplex transmission line with two devices.

All usual serial interfaces are included.

#### Details:

Data will be transmitted by modulated infrared/red light. To prevent undesired mutual interference there are two frequency channels with centre frequencies F1 and F2.

The 2-colour LED lights up red when the level of the received signal has reached the switching point. The data is only released for transmission after reaching this level. When 3 x the switching point has been reached, the LED lights up green, indicating sufficient function reserve.

The DAD 30 works on the principle of Frequency Shift Keying. By means of the data, the transmission frequency is shift keyed via the installed interface. The signal is amplified in the receiver and led to a Phase Locked Loop (PLL) which evaluates the signal and leads it to the interface as binary information.

**Interface :**

Three serial interfaces were installed: RS232, RS422/485 and 20mA current loop.  
 The outputs were served at once; the appropriate input must be choiced by the user means of a switch.

In case of using current loop there are the modes active and passive switchable.

An additional switch for the optional data inversion seperately for input and output was invented. So the user can change the data polarity in case of light beam interruption if necessary. Normally the interrupt state will take logic high levels at the outputs (-3..15V for RS232, for RS485 3V Difference in level (A< B) and for the current loop leading with 20mA.

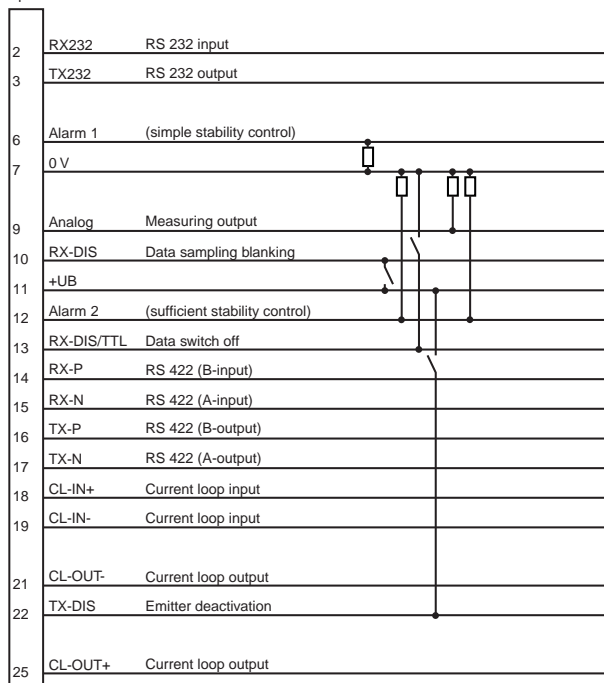
Interruptions of light beam will probable corrupt the data stream.

For data blanking of the receiver there is an additional input; switching-off is signalized by a red LED. There are also a measuring output and two function reserve outputs for optimal alignment and control of function security.

The set up of the device will be performed by an eightfold switch inside.

**11.2 Interfaces and connections**

Option:



Part No. 226388

2016-04

Date of issue



**Terminal assignment:**

2	RX232	RS 232 input ( $\pm 2 \dots 25$ V)
3	TX232	RS 232 output ( $\pm 3$ V)
6	FRES1	Function reserve output: 1 x security, PNP, 0.2A / 30 V
7	UB-	"UB-" Supply voltage 0V
9	MESS	Measuring output; + 2.5 V ... +6.5 V, max. 10 mA
10	RX_DIS	Data blanking +24 V DC/7mA; (data output of the receiver)
11	UB+	"UB+" Supply voltage, 24 V DC, $\pm 25$ %
12	FRES2	Function reserve output.; 3 x security, PNP, 0.2A / 30 V
13	RX_DIS	Disable /TTL, Data switch off; (Uo = 5 V; Ri = 4,7 K Ohm)
14	RX_P	RS422/485 Data+ (input B)
15	RX_N	RS422/485 Data- (input A)
16	TX_P	RS422/485 Data+ (output B)
17	TX_N	RS422/485 Data- (output A)
18	CL_IN+	20 mA-current loop input + max. 3V drop
19	CL_IN-	20 mA- current loop input -
21	CL_OUT-	20 mA-current loop output -
22	TX_DIS+	transmitter disable; @ +4 ... 30 V, max. 6 mA
25	CL_OUT+	20 mA- current loop output +voltage drop max. 2V

**11.3 Set up switch**

**(inside view onto the print):**

S1: on =	Transmitter F1 Receiver F2
off =	Transmitter F2 Receiver F1
S2: on =	Data input inverse
off =	Data input normal
S3: on =	Data output inverse
off =	Data output normal
S4: on =	Data input 20mA current loop
S5: on =	Data input RS 422/485
S6: on =	Data input RS 232
S7: on =	Data input active current-loop
off =	passive
S8: on =	Data output active current-loop
off =	passive



**Note!**  
 Only one of S4-S6 may be switched on

## 12 Appendix

### 12.1 Technical data

#### General specifications

Effective detection range		
	DAD30, DAD30-RT	0 ... 30 m
	DAD30/35, DAD30-RT/35	0 ... 100 m
	DAD30-W	0 ... 15 m
Threshold detection range		45 m
Light source		IREL
Light type		
	DAD30	infrared, (880 nm), Modulated light
	DAD30-RT	red (660 nm), Modulated light
Approvals		CE
Alignment aid		with function display
Transmission mode		FSK
Response delay		40 $\mu$ s
Diameter of the light spot		
	DAD30, DAD30-RT	0.52 m at a distance of 30 m
	DAD30/35, DAD30-RT/35	1,8 m at a distance of 100 m
	DAD30-W	4.2 m at a distance of 15 m
Angle of divergence		Emitter: 1 ° Receiver: 5 °
	Emitter	1°; DAD30-W: 16°
	Receive	5°, DAD30-W: 16°
Ambient light limit		30000 Lux

#### Indicators/operating means

Function display		LED red: switch point LED green: sufficient stability control
Controls		8-fold DIP-switch for selection of transmission frequency and interface

#### Electrical specifications

Operating voltage	$U_B$	24 V DC $\pm$ 25 %
No-load supply current	$I_0$	200 mA
Data sampling blanking		Input for incoming data blanking with +24 V DC
Data rate		0 ... 19.2 kBit/s
Operation frequency		F1 = 83 kHz F2 = 118 kHz

#### Interface

Interface type		RS 232, RS 422, CL20 mA active/passive switchable
----------------	--	---

#### Output

Output of the pre-fault indication		2 PNP-outputs, short-circuit proof, 30 V DC 0.1 A activated for single or sufficient stability control
Measurement output		+1.8 ... 5.8 V DC, max. 10 mA, simple stability control: 2.5 V triple stability control: 4.2 V

#### Standard conformity

Standards		EN 60947-5-2
-----------	--	--------------

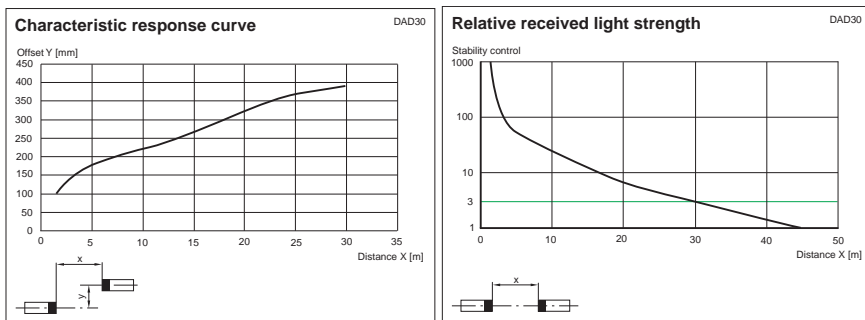
### Ambient conditions

Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)

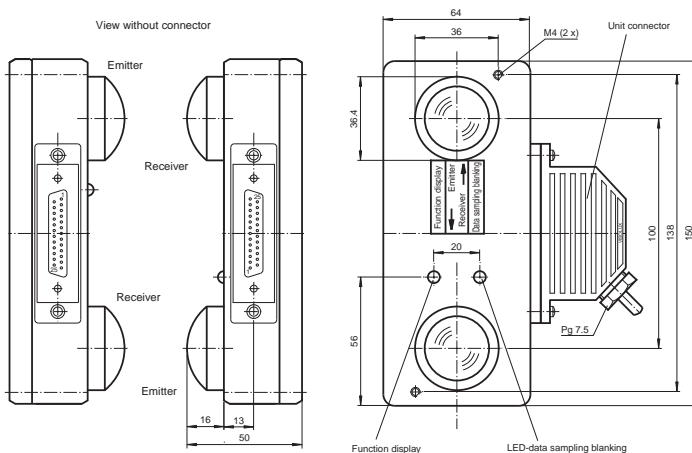
### Mechanical specifications

Protection degree	IP65
Connection	25-pin Sub-D connector
Material	
Housing	aluminium
Optical face	Plastic lens
Mass	500 g

## 12.2 Diagrams



## 12.3 Dimensions



Part No. 226386

2010-04

Date of issue

# FACTORY AUTOMATION – SENSING YOUR NEEDS



## Worldwide Headquarters

Pepperl+Fuchs GmbH  
68307 Mannheim · Germany  
Tel. +49 621 776-0  
E-mail: [info@de.pepperl-fuchs.com](mailto:info@de.pepperl-fuchs.com)

## USA Headquarters

Pepperl+Fuchs Inc.  
Twinsburg, Ohio 44087 · USA  
Tel. +1 330 4253555  
E-mail: [sales@us.pepperl-fuchs.com](mailto:sales@us.pepperl-fuchs.com)

## Asia Pacific Headquarters

Pepperl+Fuchs Pte Ltd.  
Company Registration No. 199003130E  
Singapore 139942  
Tel. +65 67799091  
E-mail: [sales@sg.pepperl-fuchs.com](mailto:sales@sg.pepperl-fuchs.com)

[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

 **PEPPERL+FUCHS**  
SENSING YOUR NEEDS

Subject to modifications  
Copyright PEPPERL+FUCHS • Printed in Germany

226386 / DOCT-2080  
04/2010