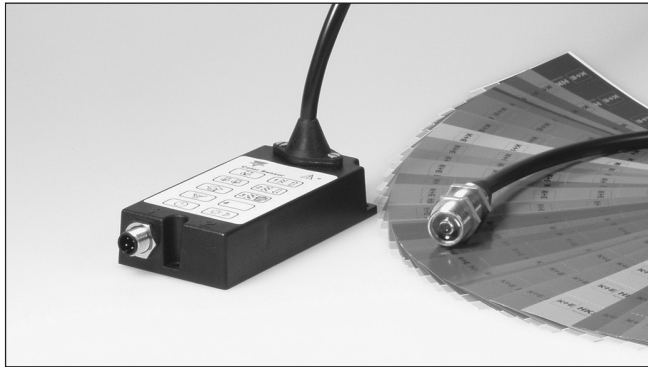# Photoelectrics, Fibre Optic Sensor
Colour Sensor
Type PD12CNC0.BPM1T

CARLO GAVAZZI

- Range: From 2 to 60 mm, fibre dependent
- Teach-In (keyboard or remote setup)
- Keyboard lock
- Detection of 1 or 1 to 4 recorded colours
- Microprocessor controlled and EEPROM parameter storage
- Operational voltage 24 V DC
- Output 100 mA, NPN and PNP
- Light or dark switching selectable
- M12 standard plug
- IP65 protection
- Timer: One shot function 0.05 to 5 s

CE (UL) c(UL)

Product Description

The Colour Sensor is a fibre optic amplifier made specifically for recognition of 1 or 1 to 4 colours. Teaching of the colours is easily performed by means of the "Teach-in" function. Each colour has a separate output which can be delayed up to 5 sec by means of the built-in timer. The output function can also be programmed to be either NO or NC.

The colour sensor is used for detection of coloured labels, marks, tags, wires, liquids, etc.

Ordering Key

PD12CNC04BPM1T

Type
Housing style
Housing size
Housing material
Not used
Colour sensor
Number of channels
Output type
Output configuration
Connection type
Teach-In mode

Type Selection Amplifier

Housing W x H x D	Range	Ordering no. 1-channel	Ordering no. 4-channel
61 x 115 x 26 mm	2 to 60 mm	PD12CNC01BPM1T	PD12CNC04BPM1T

Type Selection Fibres

Detection distance	Spot	Cable length	Ordering no.
18 mm	Ø 1.5 mm	1000 mm	FPDC01SCC100
40 - 60 mm	Ø 6.0 mm	1000 mm	FPDC02SCC100
4 - 6 mm	Small tip	1000 mm	FPDC03SCC100
2 - 4 mm	12 mm Needle-nose tip	1000 mm	FPDC04SCC100
2 - 4 mm	40 mm Needle-nose tip	1000 mm	FPDC05SCC100

Specifications

Detection distance (S_n)	2 to 60 mm, (fibre-dependent)	**Voltage drop** (U_d)	
Analysis type	True RGB analysis	I_L = 100 mA	≤ 2.2 VDC
Teach input Active	4 to 24 VDC @10 µs minimum	I_L = 10 mA	≤ 0.5 VDC
Not active	≤ 1 VDC	**Timer**	
Recording time	1 sec	Range programmable	0 to 5 s
Levels of sensitivity	Fine, medium and low	First step	50 ms
Temperature drift	< 0,4%/C°	Following steps	250 ms
Rated operational volt. (U_B)	24 VDC ±10% (ripple included)	**Protection**	Short-circuit, reverse polarity, transients
Ripple (U_{rpp})	≤ 10%	**Light source**	LED, red, green and blue
Output current		**Spot diameter**	0.5 mm
Continuous (I_e)	100 mA	**Ambient light**	
Short-time (I)	100 mA	Incandescent light	3'000 Lux
No load supply current (I_o)	120 mA	Sunlight	5'000 Lux

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Specifications (cont.)

Switching frequency	
Mode "short distance"	500 Hz
Mode "long distance"	25 Hz
Response time	
OFF-ON (t_{ON})	1 ms
ON-OFF (t_{OFF})	20 ms
Power ON delay (t_v)	≤ 300 ms
Output function	
NPN and PNP	Available (Push-pull output)
Indication function	Signal, Teach-in, Output ON
Environment	
Installation category	I (IEC 60664/60664A;60947-1)
Pollution degree	3 (IEC 60664/60664A;60947-1)
Degree of protection	IP 65 (IEC 60529; 60947-1)
Temperature	
Operating	0° to +40°C (32° to +104°F)
Storage	-20° to +60°C (-4° to +140°F)
Vibration	10 to 150 Hz, 0.5 mm/7.5 g (IEC60068-2-6)

Shock	2 x 1 m & 100 x 0.5 m (IEC 60068-2-6, 60068-2-32)
Rated insulation voltage	50 VAC (rms)
Housing material	
Body	Polycarbonate
Tip	NPB or anodized aluminium
Tip dimensions	Ø 1.8 - Ø 18 mm
Sheath	PVC
Length (for each reference)	60 cm and 100 cm
Connection	
Plug	M12
Weight	150 g
Approvals	cUL
CE-marking	Yes

Wiring Diagram

1-channel type: plug 1
4-channel type: plugs 1 and 2
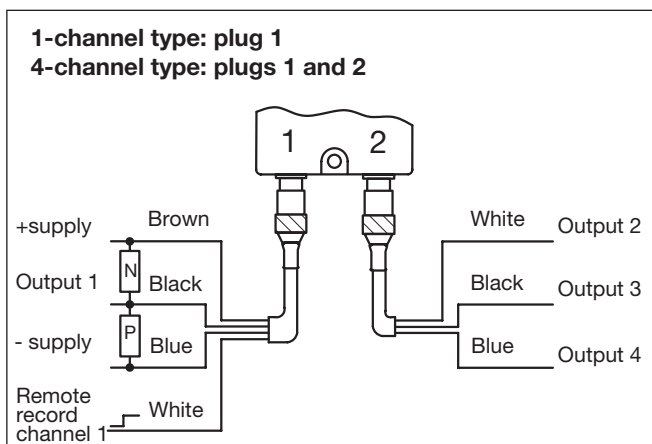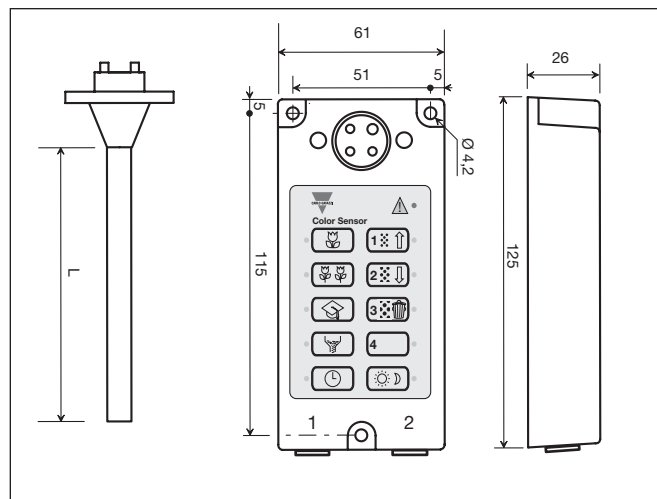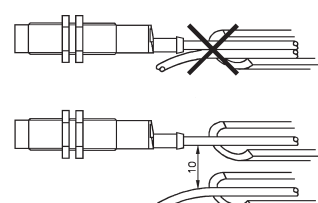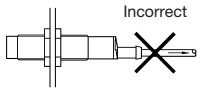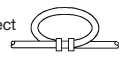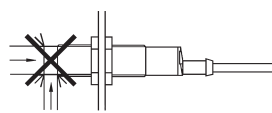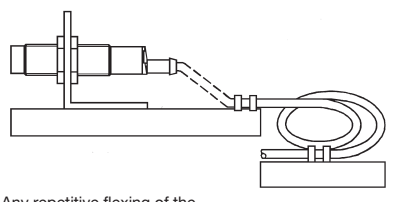
Fibers Dimensions and Specifications

Dimensions

Fibre heads	Tip	SPOT mm	Distance	TR	Application
FPDC01...100	M18	1.5	18 mm	1 mS	Fine detection with focus spot
FPDC02...100	M18	6	40-60 mm	20 mS	Fine detection at fluctuating distance
FPDC03...100	M8	1.5	4-6 mm	1 mS	Fine detection with small tip dimensions
FPDC04...100	M4 + extension 1.8 x 12	2-3	2-4 mm	1 mS	Fine detection with the smallest head
FPDC05...100	M4 + extension 1.8 x 40	2-3	2-4 mm	1 mS	Fine detection with the smallest head and pliable extension

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Programming Functions

Teach-in*)	Place the object under the tip of the fibre and press		**Light or dark operation** Change the output function	Press [☼)] for 4 s
	[🌷] for short distance or		**Timing function**	
	[🌷🌷] for long distance			Press [🕐]
	The respective LED flashes			The LED "Timer" flashes
Output	Select the output by pressing		To clear the Timer	Press [3🗑]
	[1 ⇑] [2 ⇓] [3🗑] or [4]		Increase time (50 ms/1st step, following steps: 250 ms/step)	Press [1 ⇑]
Sensitivity adjustment	Sensitivity assigned for the selected output		Decrease time (50 ms/1st step, following steps: 250 ms/step)	Press [2 ⇓]
For fine sensitivity	Press [1 ⇑]		Exit timer setting	Press [🕐]
For medium sensitivity	Press [2 ⇓]			The timer LED remains ON if the time > 0
For low sensitivity	Press [3🗑]		**Filter function**	
Record colour	Place the object in position			Press [🍸]
	Press [🎓]			The "Filter" LED flashes
	Select the output by pressing		To clear the filter value	Press [3🗑]
	[1 ⇑] [2 ⇓] [3🗑] or [4]		Increase the filter value	Press [1 ⇑]
			Decrease the filter value	Press [2 ⇓]
			Exit filter setting	Press [🍸]
	The colour is recognized, and the corresponding LED goes ON		*)To get started, unlock the keyboard by pressing [1 ⇑] and [3🗑] To lock the keyboard, press the same two keys.	

Installation Hints

To avoid interference from inductive voltage/current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables	Relief of cable strain	Protection of the sensing face	Switch mounted on mobile carrier
	Incorrect / Correct — The cable should not be pulled	A proximity switch should not serve as mechanical stop	Any repetitive flexing of the cable should be avoided

Delivery Contents

- Photoelectric switch: PD12CNC04
- Installation instruction
- **Packaging:** Cardboard box

Accessories

- Plastic fibres type FPDC0.SCC103
- Connector type: CON.1A../CON.14NF.. series

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