

CONNECTOR BLOCK FOR BASLER ACE

PIOKBAXX01

Datasheet

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atesystem 
FOCUSED ON **DETAIL**

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Appendixes

Notes

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1 KEY FEATURES

- For easy connection of I/O cables to the camera.
- Option for camera power supply – standard connector 5,5/2,1 mm for +24 VDC power adapter or screw terminals.
- Option to connect external lighting, triggered by digital camera output.
- Extended terminals for +24 VDC power supply voltage of external components (such as light).
- Test of digital input/output with a button and LED.
- Mounting on a DIN rail.
- M8 connector for connecting lights equipped with this connector.
- Dimensions: 78×102×40 mm



Fig. 1 – Connector block

2 POWER SUPPLY OF CONNECTOR BLOCK / CONNECTED CAMERA / LIGHTS

The connector block offers two options of power supply:

- XC4 – screw terminals
- Jack J1 coaxial connector with positive pole on the centre pin

The supply voltage and ground are then distributed to the terminal block XC1 to supply other devices – e.g. lights. The layout of pins is shown in Tab. 1.

Never connect the +24 VDC supply voltage to the XC4 and J1 connectors at the same time. Always choose only one connector for the power supply!

Warning! The power supply on the XC1 is not protected by an overcurrent fuse!

Connector	Terminal	Description
XC4	GND	Ground for power input
	+24 V	Power input +24 VDC
Jack J1		Power input, positive pole on the centre pin
XC1	GND	Ground for powering external components
	+24 V	+24 VDC for powering external components

Tab. 1 – Connectors for power input and output



Fig. 2 – Power Jack –polarity

3 SIGNALING AND CONTROLS

DI button is used to test the galvanically isolated input of the camera. Its function, as well as the function of LED DO, is conditioned by connecting voltage and ground to terminal 8 and 5 of the XC2 or XC3 terminal block. The reason is explained on the figure Fig. 13. The status of the connector block or camera outputs is indicated by green LEDs.

LED	Colour	Meaning
SUPPLY	green	Indication of the connected supply voltage
GPIO1	green	Logical 1 on GPIO1 for USB 3.0 camera, or GigE camera power indication
GPIO2	green	Logical 1 on GPIO2
DO	green	Active DO output, galvanically isolated

Tab. 2 – Description of LED indication

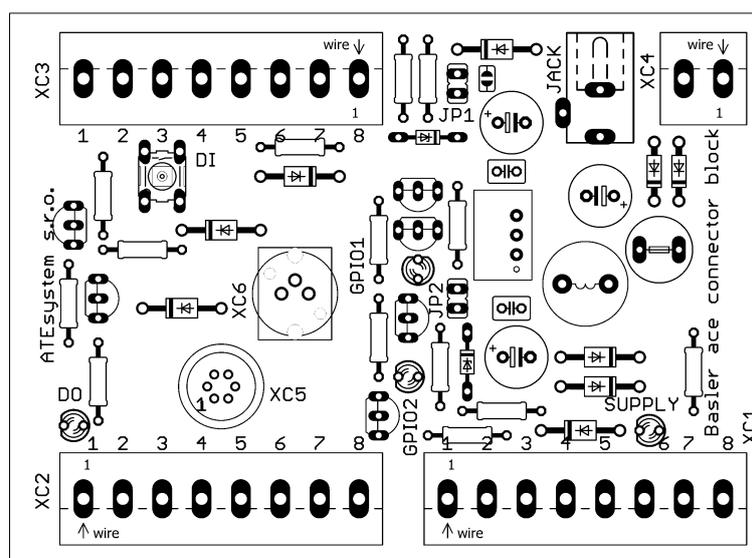


Fig. 3 – Layout of LED indicators, connectors and parts

4 CONNECTING CAMERAS

When connecting the power supply and I/O signals, it is necessary to strictly follow the information provided in manufacturer’s manual. The connection of the camera and the connector block can be made either by Basler I/O cable or ATEsystem cable 69984040. Colour coding listed in Tab. 3 applies only to the original Basler I/O cable, the free end of which is connected to the XC2 or XC3 terminal blocks. The XC2 and XC3 terminal blocks are interconnected 1-1, 2-2, etc.; they are equal in terms of connection. Cable 69984040 has Hirose connectors at both ends; one connects to the camera and the other one to the XC5 connector on the connector block. GPIO is understood as input/output with general use, without optical isolation.

Terminal	Wire colour coding	Description		
		GigE with GPIO	GigE without GPIO	USB 3.0
1	Brown	+12 VDC camera supply		GPIO (Line 3)
2	Pink	Optically isolated output (Line 1)		
3	Green	GPIO (Line 3)	NC	GPIO (Line 4)
4	Yellow	Optically isolated output (Line 2)		
5	Grey	Ground for optically isolated I/O		
6	White	Ground for DC power supply of the camera, GPIO ground	Ground for DC power supply of the camera	GPIO ground
7		Reserve		
8		DC supply for optically isolated I/O		

Tab. 3 – Description of XC2 and XC3 connectors for camera connection

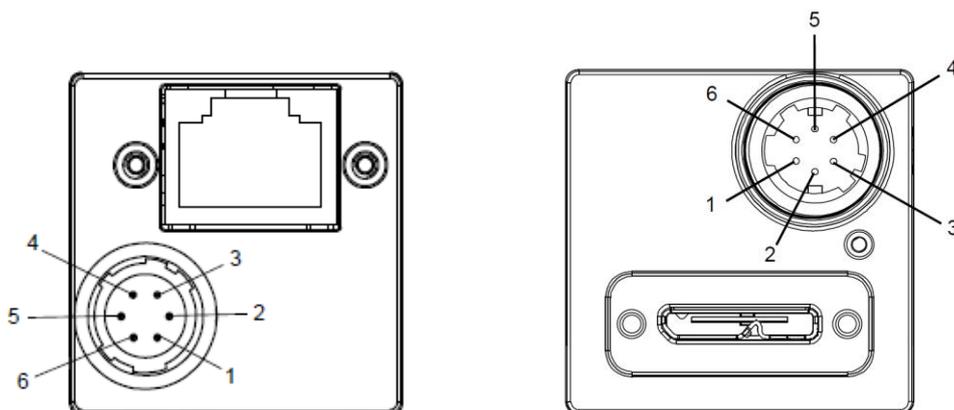


Fig. 4 – Pin layout on camera connector – on left option with gigabit Ethernet, on right USB 3.0

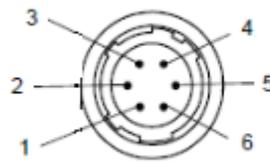


Fig. 5 – Pin layout on XC5 (Hirose) connector – numbering corresponds with Tab. 3, the connector has a mirrored pin layout compared to the camera; it must be connected using the cable with the order number 69984040

5 HARDWARE CONFIGURATION OF THE CONNECTOR BLOCK

Before use, it is necessary to configure the connector block for a particular type of camera and purpose of connection. SJ3 and SJ4 are soldering jumpers that define whether the connector block is designed for the GigE or USB 3.0 camera. Their configuration will be made by the manufacturer based on customer requirements (product variant). JP1 and JP2 are manually selectable jumpers that activate pull-up resistors on GPIO.

Terminal XC2, XC3	SJ/JP	Description		
		GigE with GPIO	GigE without GPIO	USB 3.0
1	SJ3	Connected		NC
	SJ4	Connected		NC
3	JP1	NC		
	JP2	Connected = pull-up activated	NC	Connected = pull-up activated

Tab. 4 – HW configuration for GigE and USB 3.0 camera

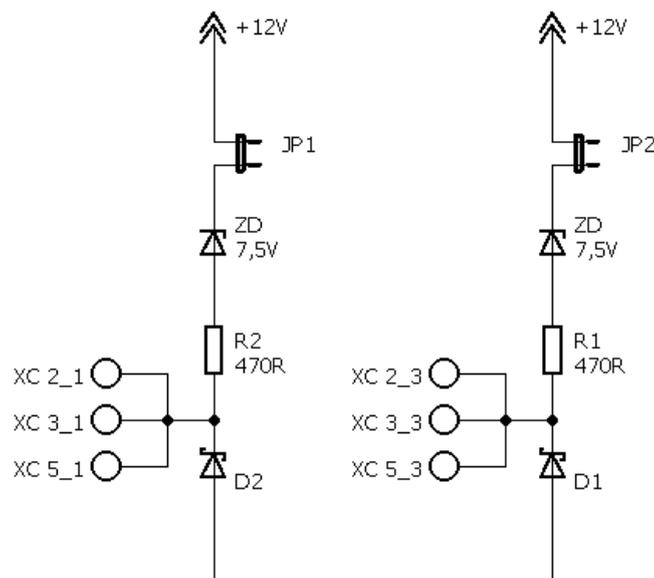


Fig. 6 – Connection of short-circuit jumpers in the connector block

6 CONNECTOR XC6 (M8)

An external component, such as a light with +24 VDC power supply, can be connected via the M8 connector. A galvanically isolated output of the camera is connected to the pin 4, which allows the light to be triggered if such function is supported. The output of the camera is equipped with a pull-up resistor as in the schematic in Fig. 11.

Pin	Colour	Description
1	Brown	Supply voltage
3	Blue	Ground for power supply and trigger
4	Black	Trigger, galvanically isolated output for the camera

Tab. 5 – XC6 (M8) connector for external accessories

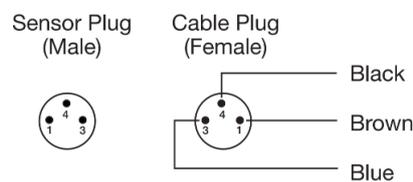


Fig. 7 – Layout of pins on the M8 connector

7 EXAMPLES OF CONNECTION

7.1 CONNECTION VIA CABLES WITH CONNECTORS (COMMON POWER SUPPLY)

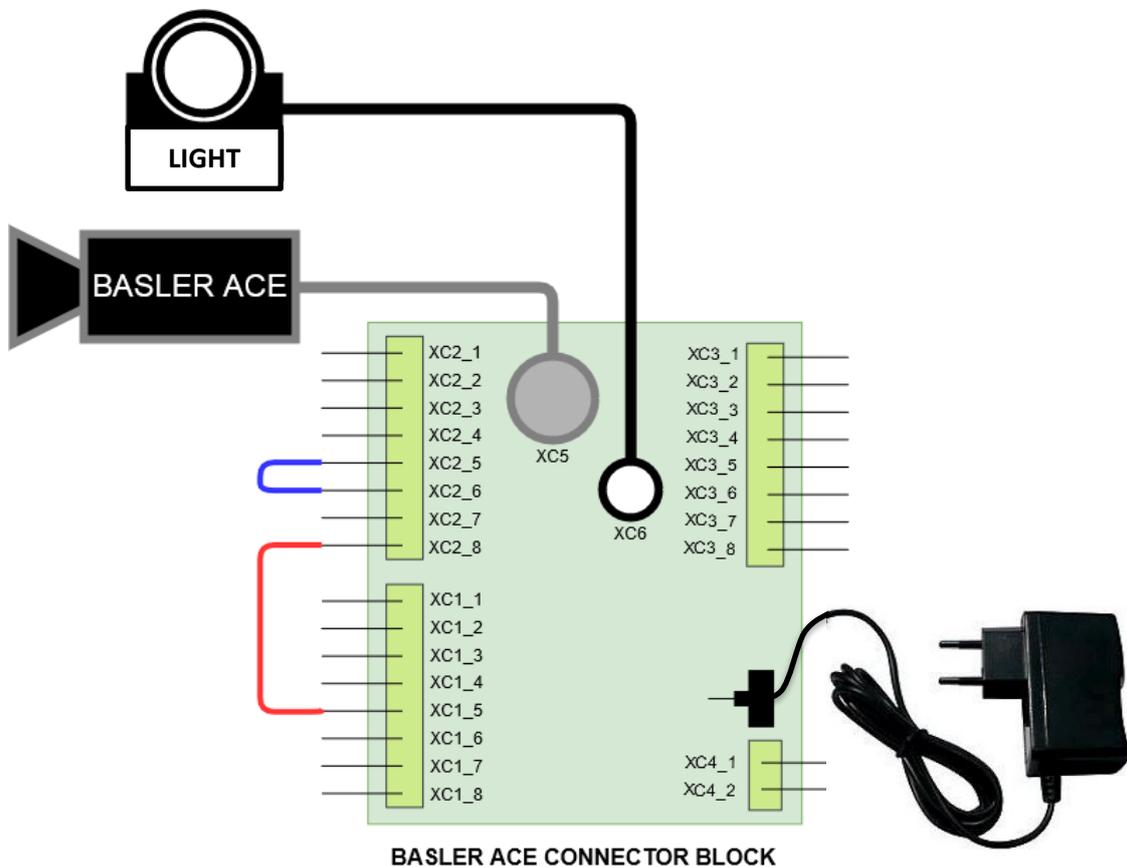


Fig. 8 – Connection via cables with connectors (common power supply)

For this connection, the camera is connected via the cable 69984040 to the XC5 and the light to XC6 connector. On the XC2 terminal block, the XC2_5 and XC2_6 contacts need to be interconnected to ensure that the grounds of power supply and galvanically isolated camera inputs/outputs are connected. It is also necessary to connect one of the contacts XC1_5 to XC1_8 (+24 VDC) with the XC2_8 contact, as this supplies the power to the galvanically isolated output of the camera. Both the light and the camera are powered from a single source.

7.2 CONNECTION VIA CABLES WITH FREE ENDS (COMMON POWER SUPPLY)

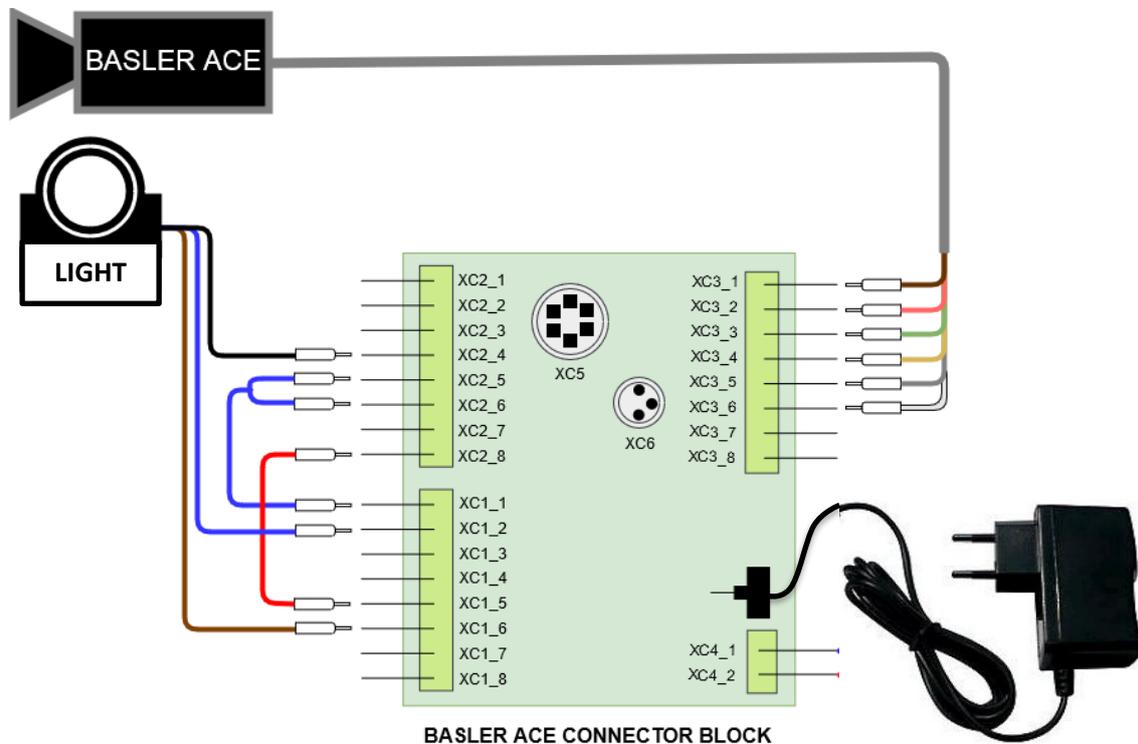


Fig. 9 – Connection via terminal block with internal power for light

Screw terminals are used in this connection; the XC3 is used to connect the camera, and the light is connected via XC1 and XC2 terminal blocks. The colour coding of the cables applies to the Basler I/O cable (see Tab. 3). It is again necessary to interconnect the grounds and bring the supply power to the XC2_8 pin, as in the connection 7.1. The light is powered from the connector block, or more precisely from the same source as the camera. The power cable is thus connected to one of the power contacts XC1_5 to XC1_8 and the ground to XC1_1 to XC1_4. The trigger cable is then connected to the XC2_4 contact, which corresponds to the galvanically isolated output from the camera.

Connection 7.1 and 7.2 can also be combined by connecting the camera via a cable with connectors and the light via a cable with a free end, or vice versa. Other power supply connected to the XC4 terminal block can be also used as an alternative to the wall adapter.

7.3 SEPARATE POWER SUPPLY FOR CAMERA AND LIGHT

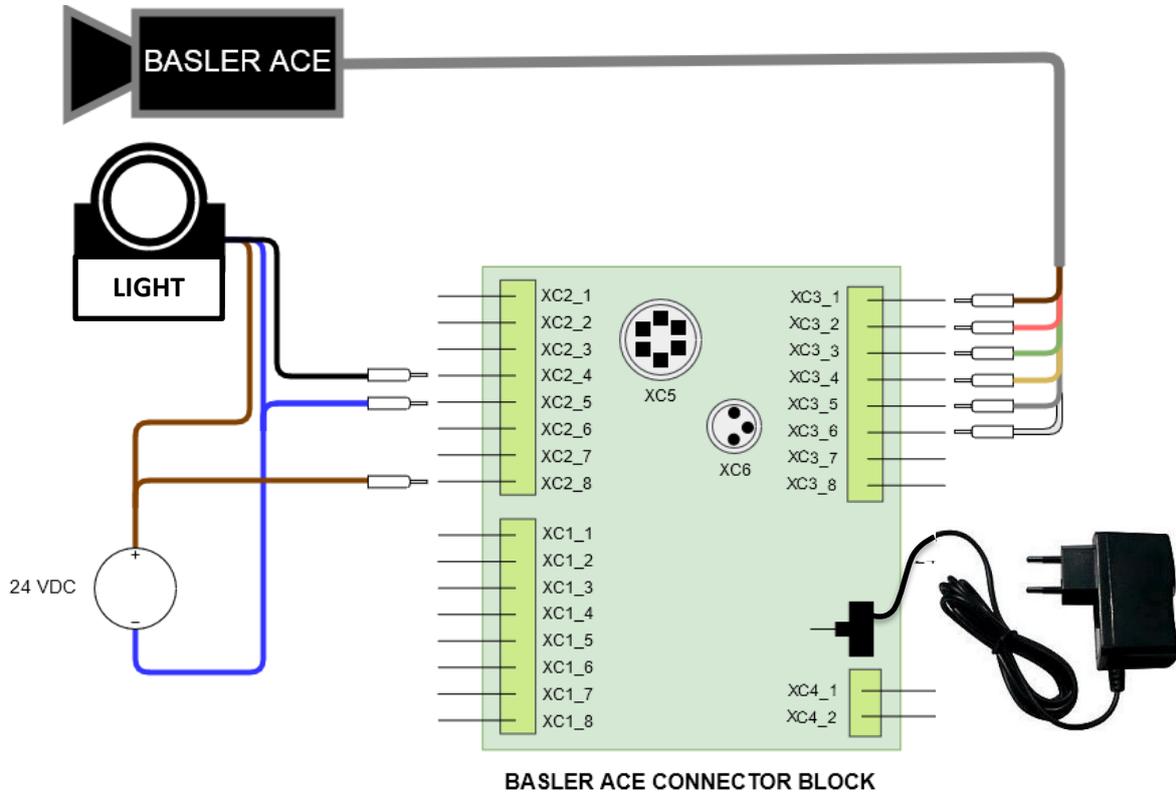
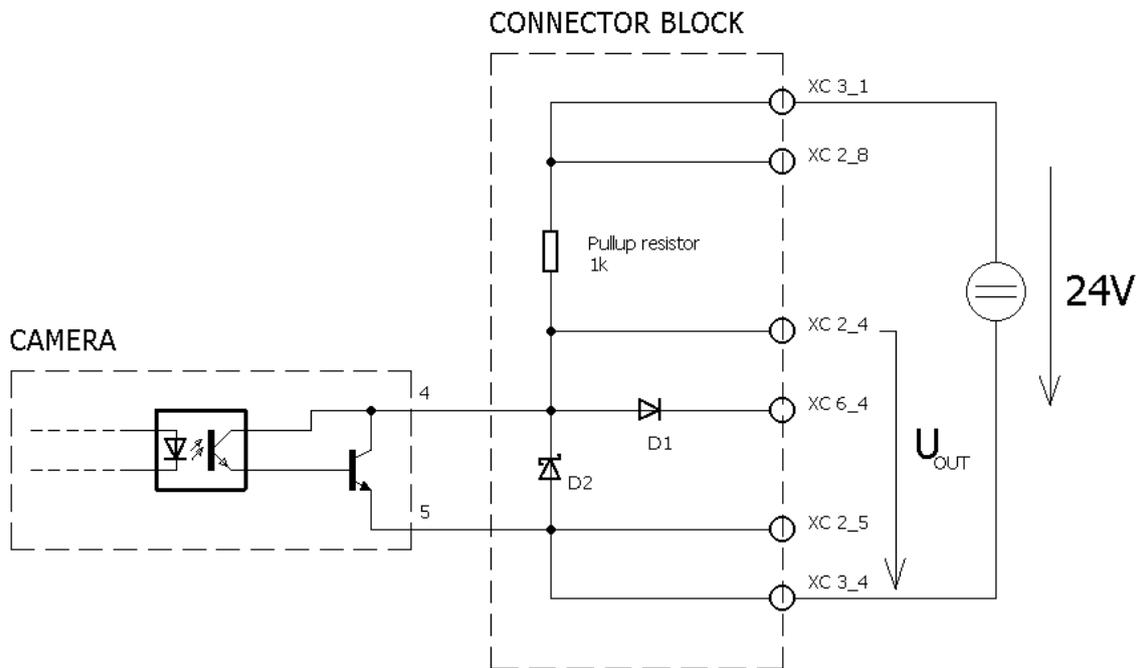


Fig. 10 – Separate power supply of camera and light

In this connection, the light and galvanically isolated digital output of the camera are powered from a separate source that does not have a common ground with a source for the camera. Therefore, there is no conductive connection between the camera and the lighting, and there are no ground loops if both sources are on different potential. When using a USB 3.0 camera that is powered from a USB port, the wall adapter is not needed.

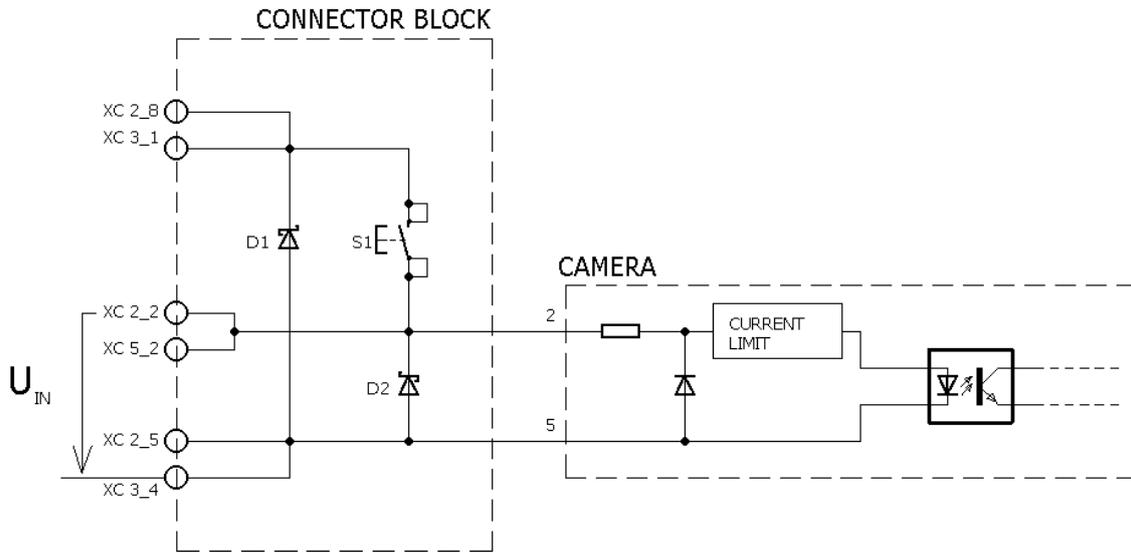
7.4 GENERAL CONNECTION OF DIGITAL OUTPUT



**Fig. 11 – General connection of digital output from the camera
 (camera is connected via cable 69984040 to XC5)**

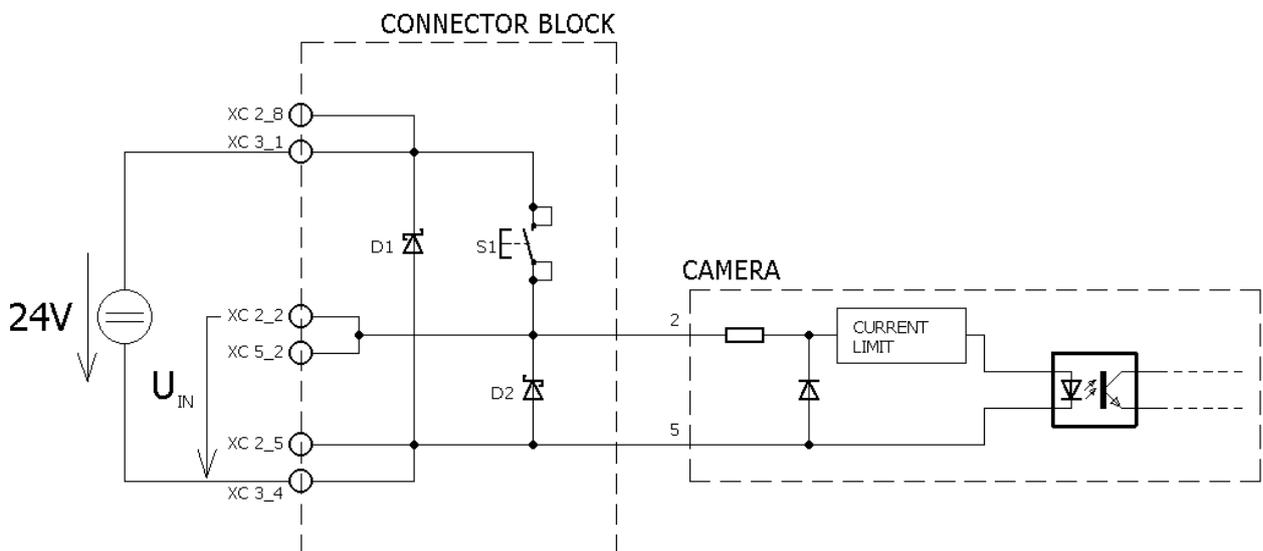
A supply voltage of +24 VDC is brought to terminal XC3_8. The output voltage is then between ground and the terminal XC2_4. The D1 diode reduces the residual voltage after switching the transistor inside the camera. The reason for that is the feature of some PWM dimming lights, which shine weakly even at a very low voltage around 0.7 V on the input. This applies when the light is connected to XC6. If the light is connected to the screw terminal block, and the problem occurs, it is advisable to include an ordinary rectifier diode behind the XC2_4 terminal.

7.5 GENERAL CONNECTION OF DIGITAL INPUT



**Fig. 12 – General connection of digital input to the camera
(camera is connected via cable 69984040 to XC5)**

To switch the digital input, it is necessary to bring the voltage to the XC2_2 terminal within the range specified in the camera data sheet (+2.2 V to +24 V).



**Fig. 13 – General connection of digital input to the camera using a button on the terminal block
(camera is connected via cable 69984040 to XC5)**

To switch the digital input via a button on the connector block, the voltage between +2.2 V and +24 V must be brought to terminals XC3_8 or XC2_8. **Otherwise the button does not work.**

8 PRODUCT VARIANTS

Order number	Product number	Name
69984001	PIOKBA0001	Connector block for GigE camera without M8 and Hirose connectors
69984011	PIOKBA0101	Connector block for USB 3.0 camera without M8 and Hirose connectors
69984021	PIOKBA0201	Connector block for GigE camera with M8 and Hirose connectors
69984031	PIOKBA0301	Connector block for USB 3.0 camera with M8 and Hirose connectors

Tab. 6 – Product variants

9 ACCESSORIES

Order number	Product number	Name
69984040	PIOKBA0400	Cable to connect the connector block with the camera, length 3 m
10170232	-	Basler I/O cable with 6p Hirose connector (counterpart to the camera) and free end

Tab. 7 – Accessories