

Photo-electric Amplifier ISG-N37

1-channel amplifier (manual gain setting)

- Amplifier with modulated infrared light
- Range up to 35 m (115 ft)
- High immunity to ambient light and interference from other light barriers
- Sensitivity adjustable with potentiometer
- Adjustable switching-on and switching-off delay
- Switching mode light/dark switchable
- Basic transmit power 20% / 100% switchable
- 4 different selectable transmit frequencies
- Alarm output
- Relay (change over)
- Transistor output (npn/pnp)
- Transmitter and receiver connections are short-circuit proof
- 11-pin DIN rail mounting socket for simple installation



Description

The 1-channel photo-electric amplifier with manual gain setting from Pantron is an amplifier with an integrated analysis unit. The amplifier works with modulated infrared light, which enables a high degree of immunity to ambient light and cross talk from neighbouring photo-sensors. The manual gain setting, adjusted with a potentiometer located on the front side, enables the user to simplify the installation and work.

According to the application the amplifier can be switched to the different working conditions by DIP-switches. Thus, the user can switch to different basic transmit levels, which selected according to the range and the pollution level, to increase the fine adjustment of the sensitivity. By this, the object recognition can be optimize. If several sensor heads are mounted side by side, the amplifier works only by different

transmit frequencies. Four transmit frequencies are selectable.

An alarm display and output, which shows errors and the limit of the transmit power and is connectable with a PLC, enables users to safely work with the photoelectric amplifier.

Ordering Guide

Supply voltage	Model
230 V AC	ISG-N37/230VAC
115 V AC	ISG-N37/115VAC
24 V AC	ISG-N37/24VAC
24 V DC	ISG-N37/24VDC



Safety Instructions

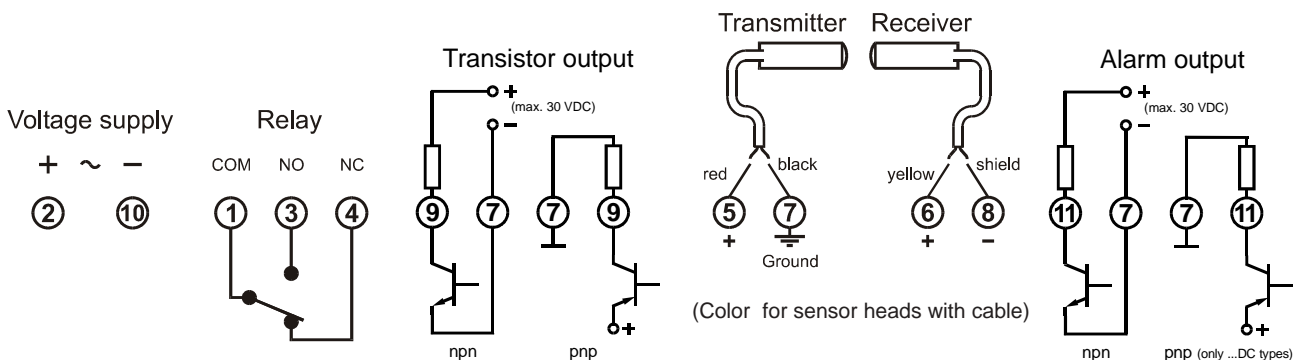
The operation of infrared amplifier ISG... is not authorized for applications where safety of the person depends on the device function.

Technical Data

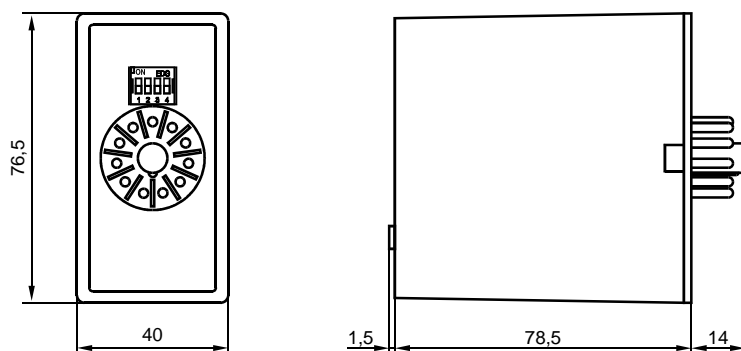
Operating basis	Modulated IR-light
Max. Range (through beam)	
Sensor heads Standard	25 m (82 ft)
Sensor heads High Power	35 m (115 ft)
Displays:	
Switching status	LED yellow
Sensitivity	LED green
Alarm	LED red
Power ON	LED green
Switching function	Light / dark, selectable
Switching delay	0 - 10 s
Housing	Plastic
Housing protection	IP 40
Temperature (operation)	-25 °C ... +50 °C
Temperature (storage)	-40 °C ... +80 °C
Mounting orientation	Free
Mounting	11-pin DIN-socket
Size (mm)	40 x 76,5 x 78,5

Supply voltage	230 V AC, 115 V AC, 24 V AC, 24 V DC
Voltage tolerance	...AC: 10 %; ...DC: 20%
Power consumption	...AC: 4,2 VA; ...DC: 1,7 W
Transmit frequency (kHz)	3,5 / 3,8 / 4,0 / 4,5
System power	manual adjustable
Basic transmit level	20 % / 100 %, selectable
Relay output:	1 change over
Switching data (max.)	5 A / 230 V AC (24 V DC)
Switching frequency	18 Hz
Transistor output ...DC	npn/pnp: 100 mA / 30 V DC
...AC	npn: 100 mA / 30 V DC pnp: 5 mA / 12 V DC
Switching frequency	30Hz
Alarm output ...DC	npn/pnp: 100 mA / 30 V DC
...AC	npn: 100 mA / 30 V DC pnp: 5 mA / 12 V DC

Wiring diagram



Dimensions



Dimensions in mm

General Description

1. Principle of operation

The system (consisting of one transmitter, one receiver and one amplifier) works with modulated infrared light.

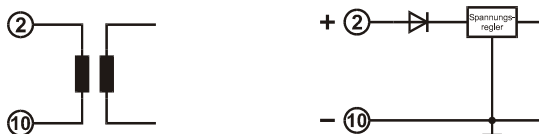
According to the channel condition, the displays and outputs are set.

2. Connections

The amplifier is connected with an 11-pin DIN mounting socket.

a) Power Supply (POWER)¹

The power supply will be connected on PIN 2 and PIN 10. For devices with direct current, PIN 2 is positive and PIN 10 is neutral (see picture 1).



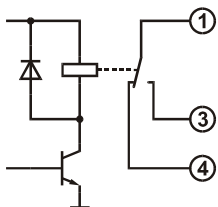
picture 1: left: AC-Connection, right: DC-Connection

CAUTION!

The AC-supply devices are isolated from main. A grounded connection on the low voltage side is required (PIN 7).

b) Relay output (RELAY)¹

The amplifier has one relay (changeover) with the maximum allowable current of 5 A. A contact arrangement in which PIN 1 opens its connection to PIN 4, and then closes its connection to PIN 3 (see picture 2).



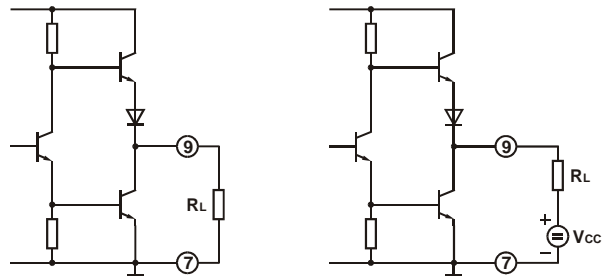
picture 2: Relay output

c) Transistor output¹

The transistor output (PIN 9) which can be used as pnp or npn outputs depending on the connection (see picture 3). The maximum allowable switching data for devices with alternating current (ISG-N24/...VAC) und direct current (ISG-N24/...VDC) are printed in table 1.

	pnp-output	npn-output
ISG-N37/...AC	5 mA / 12 VDC	100 mA / 30 VDC
ISG-N37/...DC	100 mA / 30 VDC	

table 1: Switching data transistor output



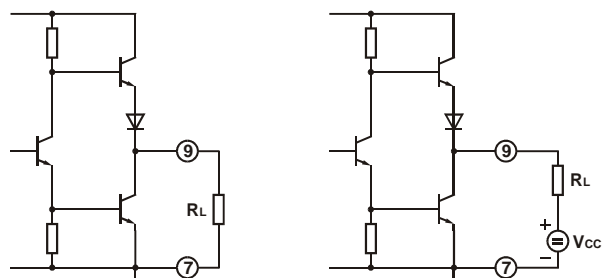
picture 3: left: pnp-circuit; right: npn-circuit

d) Alarm output (ALARM)¹

The alarm output (PIN 11) which can be used as pnp or npn outputs depending on the connection (see picture 4). The maximum allowable switching data for devices with alternating current (ISG-N24/...VAC) und direct current (ISG-N24/...VDC) are printed in table 2.

	pnp-output	npn-output
ISG-N37/...AC	5 mA / 12 VDC	100 mA / 30 VDC
ISG-N37/...DC	100 mA / 30 VDC	

table 2: Switching data alarm output



picture 4: left: pnp-circuit; right: npn-circuit

3. Functions terminology

With the functions, the amplifier can be switched to different working conditions. The functions are selected by DIP-switches on the bottom of the amplifier.

a) Basic transmit level (transmit power)^{1 2}

The basic transmit level is the power level of the amplifier and it may be adjusted by the user to control the sensitivity.

100 %: The amplifier has the maximum sensitivity (maximum range).

20 %: The amplifier has 20 % of the maximum sensitivity.

b) Switching mode¹

The switching function describes the output behavior of the infrared beam. There are two types of switching functions:

Light mode operation: the relay contact closes on interruption of the infrared beam (PIN 1 → PIN 4) and the transistor output switch to ground (PIN 9 → PIN 7).

Dark mode operation: the relay contact opens on interruption of the infrared beam (PIN 1 → PIN 3) and the transistor output switch to plus.

c) Transmit frequency (transmit freq.)¹

The transmit frequency means the modulation frequency at which the amplifier works. If more than one sensor head is mounted side by side, the amplifier must be set to different frequencies. Each amplifier reacts only with its own transmit frequency and place.

d) Switching-on delay (t-ON)²

Switching-on delay is the time between the presence (light mode operation) or the absence (dark mode operation) of the infrared beam and turning the output on.

e) Switching-off delay (t-OFF)²

Switching-off delay is the time between the absence (light mode operation) or the presence (dark mode operation) of the infrared beam and turning the output off.

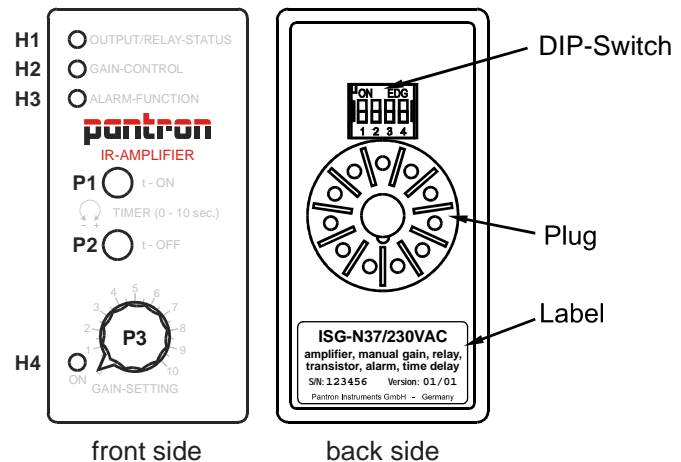
¹ Inscription side label

² Inscription front label

Operating Instructions

Display contents:

- H1: Output status indicator (yellow)
- H2: Sensitivity display (green)
- H3: Alarm display (red)
- H4: Power ON display (green)
- P1: Switching-on delay
- P2: Switching-off delay
- P3: Gain setting



1. Choose the sensor heads

Before you turn on the amplifier, select the transmitter and receiver for your application. This includes choosing the sensor heads, body style, and cable length or quick disconnect that meets your requirements.

2. Connect wiring to the socket

The amplifier is designed for simple installation. An 11-pin socket must be used for installation. Do not cover the ventilation slots of the multiplexer. The air circulation stopped in the multiplexer and neighboring devices will be extra heated. Therefore, the minimum distance should be at a vertical installation (on a horizontal DIN mounting rail) 10 mm and at a horizontal installation (on a vertical DIN mounting rail) 15 - 20 mm. The wiring diagram is printed on the side label from the amplifier or see **Wiring diagram**. For more information see **General Description** point 2 **Connections**.

3. Choose the function

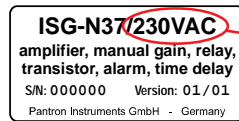
The functions are selectable by DIP-switches on the bottom of the amplifier. For complete description of function, see **General Description** point 3 **Function terminology**. The selection of the functions is described in table 3.

basic transmit level (transmit power) ¹		switching mode ¹		transmit frequency (transmit freq.) ¹	
	100 % ¹		light ¹		4,4 kHz (f1) ¹
	20 % ¹		dark ¹		4,0 kHz (f2) ¹
					3,8 kHz (f3) ¹
					3,5 kHz (f4) ¹

Table 3: Functions

4. Check the supply voltage

Before starting, check if the supply voltage value is the same as the connection value. On the bottom of the amplifier is the type plate. The supply voltage is the last two or three numbers of the part number.



supply voltage
for example: 230 V AC

5. Operating procedure

Plug the amplifier into the socket and switch the power supply on. The Power ON indicator H4 (POWER ON)² lights green. To guarantee the regular operation of the infrared amplifier, the sensitivity must be adjusted manually. For this, turn the potentiometer P3 (GAIN-SETTING)² from the left side to the right side until the green sensitivity indicator H2 (GAIN-CONTROL)² is lit constantly. As the potentiometer is adjusted to the right side, the amplifier will become less sensitive. For description of how the switching output works, see table 4.

After adjustment, the sensitivity display serves as an indicator for the correct adjustment of the amplifier. After many working days the sensor heads pollute slowly. The sensitivity display will begin to flash and eventually go out if the sensor heads become contaminated. When the sensitivity indicator H2 is OFF and the output status indicator H1 is ON, the alarm display H3 lights and the alarm output has 12 V DC (ISG-N37/...AC) or 24 V DC (ISG-N37/...DC) after 2 seconds. For optimal working conditions, the sensitivity must be increased or sensor heads must be cleaned. The switching ON and OFF delay is adjustable between 0...10 s using potentiometer P1 and P2.

Note: If the sensitivity display H2 (GAIN-CONTROL)² is not lit, the contact between the transmitter and receiver is interrupted, polluted, adjusted incorrectly, or the distance between the sensor heads is too far.

Beam status	Switching function	Output status indicator H1	Relay output	Transistor output
	light			...AC: 12 VDC ...DC: 24 VDC
	dark			0 V
	light			0 V
	dark			...AC: 12 VDC ...DC: 24 VDC

Table 4: Switching logic

¹ Inscription side label

² Inscription front label