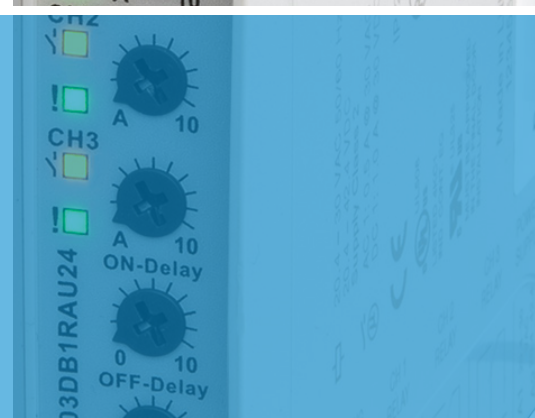




PAM03 - Photoelectric amplifier

Sensors

PAM03

Photoelectric amplifier

The Carlo Gavazzi PAM03 amplification module can operate alone, controlling 3 MOF... sensor sets. Up to 10 amplifiers can also be connected automatically in a master/slave setup via the built-in communication port sharing power and controlling up to 30 MOF... sensor sets. All connected MOF... sensors are multiplexed, eliminating crosstalk.

Due to their signal strength, the combination of MOF... sensor sets and PAM03 amplifiers are suitable for environments with high amounts of dust or fog like automatic industrial doors, stone crushing conveyors, wood working machinery, car washes or other applications where a photoelectric sensor must work despite a build-up of dust and dirt or sense through fog, vapor or similar visibility hindrances.

The Carlo Gavazzi photoelectric PAM03 amplifiers are available in a plastic (PC/ABS) IP20 approved housing material.



A powerful solution for harsh environments

Reduced machine set-up time

Integrated alignment control allows optimized adjustment of the sensors by means of flashing yellow LEDs combined with two distance setup modes: Automatic or manual via trimmer. Excess gain and maximum distance are selectable via the DIP switches.

Reduced machine down-time

- Built-in diagnostics: Tri-color LEDs show what type of error occurred and where, making fault finding quick and easy.
- Alarm output: Allows for predictive maintenance instead of waiting until built up dust or rimefrost blind the sensors.
- Sensor test function: A mute input on PAM03 allows the sensor system to be remote tested in order to comply with the European standards for Industrial automatic Doors.

Reliable detection

The combination with the powerful MOF... sensor sets allows for reliable detection despite refracting icy vapor or high levels of dust in the environment.

High neighbour immunity

The highest neighbor immunity is achieved by multiplexing all connected MOF-family sensors, eliminating crosstalk. Up to 10 connected modules (Master/Slave set-up) can control up to 30 multiplexed sensor sets.

Approvals

International Door Standards: EN12453, EN12978, UL325, and UL508



Applications

Speed doors - Cold storage rooms

High speed, automatic industrial doors that separate very cold areas and warm, humid areas place high demands on the controlling elements. Very low temperatures cause icy condensation to form, which results in significant visual hindrances. Condensation may also form on the lense, causing false readings or sensor failure. The combination of the PAM03 amplifier and MOF... sensor sets alleviate these issues. If installed correctly the PAM03 module lives up to the European Door Standards as well as UL325 and UL508.



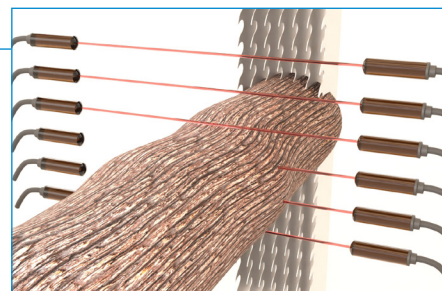
Stone crushing conveyors

Controlling the flow of material on stone crushing conveyors is essential to keep the crusher from being overloaded or going idle. The PAM03 amplifier and MOF... sensor sets keep track of consistent material flow on the conveyor, and of the level of material in a hopper. Despite an environment characterized by high levels of dust and dirt, the PAM03 module offers highly reliable detection. Thanks to the diagnostic functions, maintenance can be scheduled to avoid costly downtime in the production line.



Wood working machinery

In automated wood working systems, sensors are needed to monitor presence, position and size of timber, as well as triggering processes. Sawmills with their airborne dust and wood particles represent a challenging environment, that requires robust sensing systems that work in low visibility conditions and that can withstand vibrations and shocks. Dust will accumulate on the sensing face, but thanks to the diagnostic functions, maintenance can be scheduled to avoid costly downtime in the production line.



Car washes

Car washes are especially challenging environments because of the airborne water spray and the high levels of dirt and mud on sensors near the floor. These factors impair visibility. On top of this, high sensing speed is essential to ensure that roof racks, antennas or other irregular shapes are detected in time.

The dryer needs closely placed sensors to navigate the curvature of a vehicle without touching the windshield. High neighbor immunity is essential to avoid interference.

Presence detection is essential to start the machine when the car is correctly placed and to avoid empty starts.



PAM03

Photoelectric amplifier

Easy setup

Relay output active

The relay output is active when the yellow LED is ON.

Distance setup

Potentiometer for each channel.

- Automatic mode by turning the potentiometer fully counterclockwise
- Manual mode by turning the potentiometer clockwise away from Automatic mode

Easy alignment

In alignment mode, the yellow LED in tri-color LED flashing according to the signal quality.

Master/slave function

Power or Master/slave function

Alignment settings

Off or Alignment mode for easy optical sensor alignment.



Diagnostics

In case of a defective sensor the tri-color LED is flashing:

- Yellow and red LED, alternating: Receiver error
- Green and red, alternating: Transmitter error

ON and OFF delay

0 ... 10 sec., by common (for all 3 channels) single turn trimmer, 270°

Excess gain settings

Low or High dust reserve.

Sensitivity settings

50% or 100% of maximum distance.

Warnings settings

- “!” , for single module only.
- “Common”, a common warning for all connected modules.

Through-beam sensors for PAM03

	MOFT emitter		MOFR receiver	
Housing diameter	Ø10	M12/M14	Ø10	M12/M14
Housing material	Plastic	Stainless	Plastic	Stainless
Sensor	MOFT20	MOFT20-M12-2	MOFR	MOFR-M12-2
Rated operating distance	20 m	20 m	-	-
Optical angle	2°	2°	2°	2°
Sensor	MOFT50	MOFT50-M12-2	MOFR	MOFR-M12-2
Rated operating distance	50 m	50 m	-	-
Optical angle	2°	2°	2°	2°
Sensor	MOFT20-5	MOFT20-M12-5	MOFR-5	MOFR-M12-5
Rated operating distance	20 m	20 m	-	-
Optical angle	5°	5°	5°	5°
Sensor	MOFT20-8 PAM03	MOFT20-M12/M14-8 PAM03	MOFR-8	MOFR-M12/M14-8
Rated operating distance	20 m	20 m	-	-
Optical angle	8°	8°	8°	8°

All sensors are also available as ATEX versions.



MOFT, Ø10, 2°/ 5°
MOFR, Ø10, 2°/ 5°



MOFT, Ø10, 8°
MOFR, Ø10, 8°



MOFT, M12, 2°/ 5°
MOFR, M12, 2°/ 5°



MOFT, M12/M14, 8°
MOFR, M12/M14, 8°

Specifications

	PAM03BD1RAU24
Rated operating distance (S_n)	MOFT20-MOFR... - 20 m MOFT50-MOFR... - 50 m
Sensitivity adjustment	Manual or automatic sensitivity adjustment. Manual: Single turn trimmer 240° Automatic sensitivity adjustment: Trimmer setting fully counterclockwise "A"
Hysteresis	Typically between 10% ... 30%, sensor dependent
Operating frequency	1 module - 55Hz, 2 modules - 27 Hz, n modules - 55/n Hz
Response time	1 module - 9 ms max, 2 modules - 18 ms max, n modules - n x 9 ms max
Rated operational voltage (U_o)	U_b : 20.4...46.2 VAC/DC (Ripple included) U_e : 24...42 VAC/DC (Ripple included) For UL508/UL325 certification: U_e : 20.4...30 VAC/20.4...42.4 VDC (Supply Class 2)
No load supply current (I_o)	DC: 120 mA @ U_b min, 60 mA @ U_b max AC: 170 mA @ U_b min, 95 mA @ U_b max
Power on delay (t_v)	≤ 300 ms
Relay output	SPDT
Minimum operational current (I_m)	≥ 1mA @ 5 V (Gold contacts)
Ambient temperature	Operating: -20 ... +50 °C (-4 ... +122 °F), Storage: -40 ... +85 °C (-40 ... +185 °F)
Vibration	10 ... 55 Hz, 1.0 mm/15 g (EN IEC 60068-2-6)
Shock	30G / 11ms, 3 pos and 3 neg (EN IEC 60068-2-27)
Drop test	2 x 1 m and 100 x 0.5 m (EN IEC 60068-2-31)
Pollution degree	2 (EN IEC 60664, 60664A; 60947-1)
Overvoltage category	III (EN IEC 60664; EN IEC 60947-1)
Degree of protection	IP20 (IEC 60529; 60947-1)
NEMA type	1 (NEMA 250)
Protection	Reverse polarity
Electrostatic discharge	± 8 kV @ air discharge (EN IEC 61000-4-2), ± 4 kV @ contact discharge
Fast transients/burst	± 2 kV (EN IEC 61000-4-4)
Surge	1 kV (EN IEC 61000-4-5)
Wire conducted disturbances	10 Vrms (EN IEC 61000-4-6)
Power - frequency magnetic fields	30 A/m (EN IEC 61000-4-8)
DIP-switch settings	Alignment mode, Excess gain, Sensitivity range, Warning relay
Led indications	Yellow LED: Relay active; Green LED: Power, master/slave; Tri-color LED: Sensitivity, quality, alarm
Housing material	PC/ABS
Dimensions	97 x 22.5 x 121 mm (H x W x D) (Without terminal blocks).
Weight	185 g
Connection	Spring terminals
MTTF _d	216.8 years (EN ISO 13849-1, SN 29500)
CE marking	According to EN12445, EN12453, EN12978
Approvals	cULus Listed (UL508), cURus (UL325)
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