

Speed sensor



- Doppler radar based sensor
- Narrow beam pattern
- Presence or motion detection

Rotary switch programming

- Sensitivity by rotary switch 'gain'
- 14 speed thresholds by rotary switch 'prog'

Serial communication bus (1)

only if rotary switch 'prog' on C

Type	Color	Designation	Characteristics
RS232 standard	brown	0V	Negative logic +12V / -12V
	white	+Vsupply	
	blue	Rx on sensor	
	yellow	Tx on sensor	
RS485 option	brown	0V	
	white	+Vsupply	
	blue	Rx + on sensor	
	black	Rx -	
	yellow	Tx + on sensor	
UART option	brown	0V	Positive logic +3.3V / 0V
	white	+Vsupply	
	blue	Rx on sensor	
	yellow	Tx on sensor	

3 ON/OFF outputs (1)

Type	Color	Designation	Characteristics
TOR	brown	Coming dir.	Open drain
	white	Leaving dir.	Open drain
	blue	Overspeed	Open drain

(1) : RS232 is the standard in addition with the TOR outputs. RS485 or UART are available on request

Wiring

- As OEM, delivered with locking screw terminal blocks
- Enclosed in polycarbonate cover, delivered with a 2m cable

Specifications

RF specifications

Frequency	24.15 to 24.25 GHz
Output power	1mW (EIRP<20dBm)
Antenna beamwidth	Horiz : 4° / Verti :18°
Compliant with	EN300440

Performances

Velocity range	5km/h to 255km/h
Turn on time	100ms
Meas. refreshing time	35ms
Accuracy	± 1km/h
Sensitivity	Programmable gain

DC specifications

Supply voltage	from 9 to 30V
Supply current (typ. @ 12V)	65 mA

Mechanical specifications

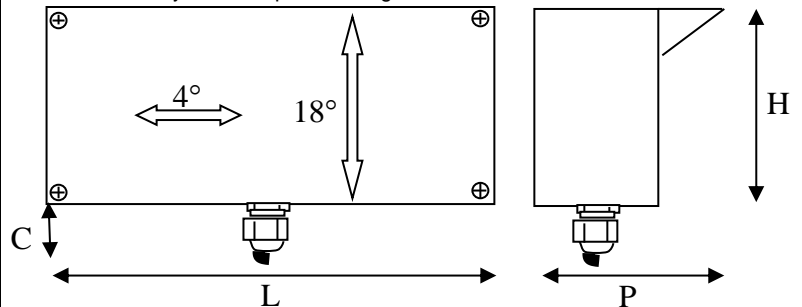
Enclosure material	Polycarbonate
Weight	500g
Electrical connection	wires

Environmental conditions

Operating temperature	-20°C..+60°C
Storing temperature	-40°C..+70°C
Protection classification	IP65

Mechanical drawing (mm)

Consult factory for OEM part drawing

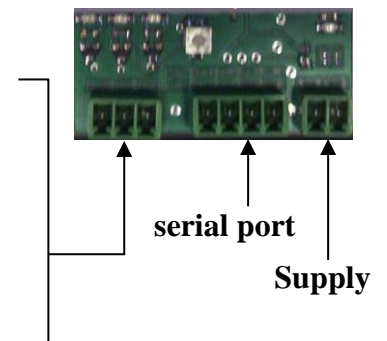


L	P	H	C
300	120	80	30

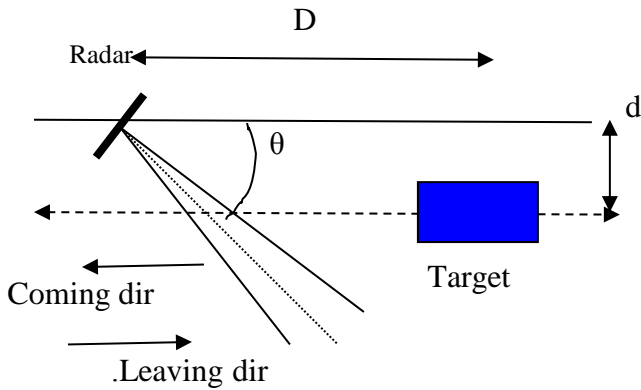
TOR outputs (activ low)

- Cd1 / coming dir. / blue led
- Cd2 / leaving dir. / yellow led
- Cd3 / overspeed / red led

- Operating defaults are reported by a simultaneous leds flash .
- A pull up resistance or a relais must be connected to the TOR outputs.



Velocity measurement based on Doppler



The speed is obtained by the difference of the radar radiated frequency and the target reflected frequency.
 Velocity = $F_{Doppler} \lambda / (2 \cos \theta)$

if $\theta < 10$ deg. error measurement is less than à 2% (see Diag. 1)
 if $\theta > 45$ deg. accuracy is poor.

A thinner beamwidth in the target moving plan, results in a more accurate speed measurement.
 To ensure greater accuracy, place the wide side of the sensor horizontally for measurements on the side of the road. For measurement above the traffic lane, place the wide side of the sensor vertically.

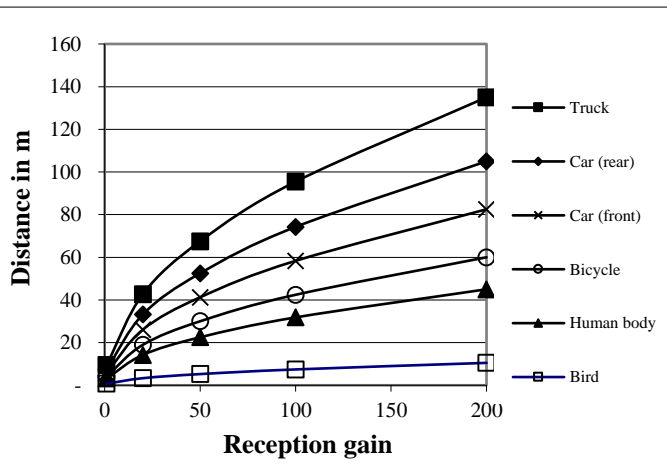
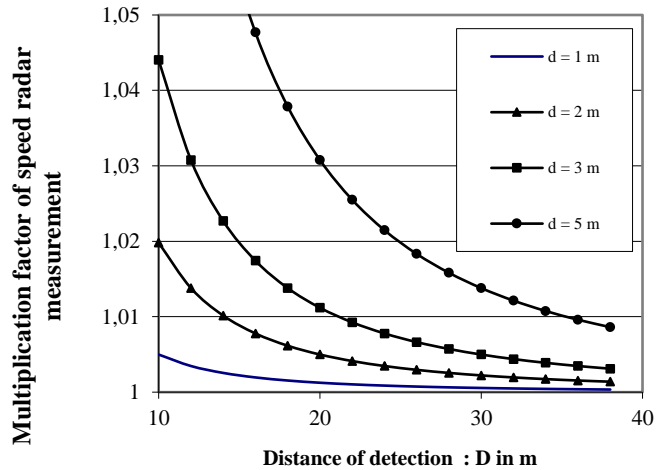
Auto test

Communication bus : frame transmitted by the radar

Byte 1	0xAA
Byte 2	0x55
Byte 3	NTR : frame N°
Byte 4	Cf/St o Bit 0 : 0 no filtering / 1 filtering o Bit 1 : 0 = coming dir. - 1 = leaving dir. o Bits 2 à 7 : free.
Byte 5	VPE : Velocity integer part
Byte 6	VPD : Velocity decimal part
Byte 7	OK >0 : the radar is OK = 0 : the radar is down
Byte 8	HT : default indicator o Bits 0 et 1 : Not used. o Bit 2 : 1 signal degradation o Bit 3 : 1 signal is missing on way 2 o Bit 4 : 1 signal is missing on way 1 o Bits 5 à 7 : Not used.
Byte 9	GAIN : 255 gain step, programmed value copy
Byte 10	SV : speed threshold, programmed value copy

RS232 : 9600 bps / 8 bits / 1 stop / no parity / no control

Diag 1. Correction factor



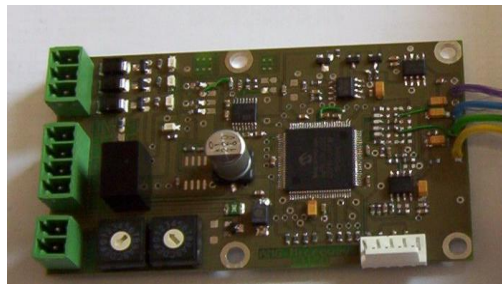
Sensitivity

- The target reflectivity depends of its surface size and composition.
- Metallic surfaces are greatly reflective.
- The target shape can degrade its detection.
- Radar waves do not cross water films and metallic sheets, but can cross some walls or plastic sheets.
- Radar waves are slightly weakened by the rain and the dirt.
- Only the waves reflected by moving target are detected by Doppler radar.
- Thin antenna beamwidth are more sensitive.

Communication bus : frame received by the radar

Byte 1	0xAA
Byte 2	0x55
Byte 3	Cf/St o Bit 0 : 0 no filtering / 1 filtering o Bit 1 et 2 : 1 = Com. dir. - 2 = leav. dir. - 3 double dir. o Bits 3 à 7 : free.
Byte 4	SV : speed threshold, TOR output = 1 if speed meas. is less than SV
Byte 5	GAIN : 255 gain step from 1 to 255

Rotary switch use



Rotary switch for gain adjustment

Software configuration

Rotary switch value	Overspeed threshold	Gain	Operation mode
0	0 km/h	Rotary switch	Vehicles detection, sensitivity and overspeed threshold set by rotary switch
1	10 km/h		
2	20 km/h		
3	30 km/h		
4	40 km/h		
5	50 km/h		
6	60 km/h		
7	70 km/h		
8	80 km/h		
9	90 km/h		
A	100 km/h	RS232 config.	Vehicles detection, sensitivity and overspeed threshold set by RS232. All parameters are stored in the sensor memory.
B	110 km/h		
C	RS232 config.	RS232 config.	Vehicles detection, sensitivity and overspeed threshold set by RS232. All parameters are stored in the sensor memory.
D	120 km/h	Rotary switch	Vehicles detection, sensitivity and overspeed threshold set by rotary switch
E	140 km/h		
F	Factory test	Factory test	TOR outputs are all at 0, "Coming dir.", "Leaving dir" and "Overspeed" are all lit. This operating mode is reserved for factory tests.

Gain configuration

Rotary switch value	Gain prog.
0	1 less sensitive
1	4
2	9
3	16
4	25
5	36
6	49
7	64

Rotary switch value	Gain prog.
8	81
9	100
A	121
B	144
C	169
D	196
E	225
F	256 more sensitive

DISCLAIMER :

Different technical specifications are possible upon request, AMG reserves the right to make modifications to the design and characteristic of the product at any times and without prior notice