



# RADARXENSE

## RXS-DR-26LP

Low power  
Speed & Range  
Measurement  
Radar



- Ultra low power
- Range and speed information of approaching and receding targets
- Configurable open collector output

The RXS-DR-26LP radar measures the velocity of an approaching and receding target. Information on the moving targets is presented in a telegram sent over the serial line output. Through a control pin, the radar can be periodically switched on and off. In pulsed operation, the power consumption is lowered substantially. The Open Collector output is configured by a speed, distance and signal level threshold.

### General Description

The RXS-DR-26LP radar module measures the velocity of moving targets. The approaching and receding target giving the strongest signal is represented at the RS422 output. The relative speed, the distance to the target and the signal strength value of the receding and approaching targets can be found in the readout telegram. The configurable open collector output can be used to drive other external equipment, for example a display. This radar system operates in the license free 24 GHz ISM-band.

### Application

By applying a pulse on the Control Pin, the radar switches on for 50 to 80ms. It will provide one output telegram for this period. Of all approaching targets, the target giving the strongest reflection is taken into account, even if another approaching target is closer to the radar but giving a smaller reflection. Also from all the receding targets, the target with the highest signal level is taken into account in the output telegram. After sending this telegram the radar switches off again. Depending on the application, the user can determine their own trade-off between power consumption and data output rates. In an average traffic monitoring situation, the unit draws roughly 10mA. For continuous operation the Control Pin should be continuously high. A relative small Doppler and therefore speed can be measured; the minimum speed is 10 cm per second. Both positive and negative speeds are measured. The radar should be installed such, that the target of interest is positioned well inside the 11 by 11 degrees antenna beam.

### General Technical Data

Supply voltage: 9 to 30V (secured against false polarity)  
Supply current: ~10mA  
Supply current in continuous mode: 70mA (typical)

Transmit frequency: 24.000 – 24.250GHz  
Maximum transmit power: 20dBm (EIRP)  
FCC and ETSI 300 / 440 compliant with 50MHz bandwidth  
Antenna beam:  
horizontal: 11° (+/-5,5°) (typical)  
vertical: 11° (+/-5,5°) (typical)  
Readout period: 10ms  
Sensitive distance range: 0.3...100m  
Relative Speed Range: -70m/s...+70m/s  
Minimum speed: 10cm/s  
Accuracy: 3%

Output resistance (RS422): 1360hm  
Output voltage (RS422): 5V (diff.)

Dimensions (lxwxh): 100 x 100 x 42 (mm)  
Mounting possibilities:  
• 4x M4 holes at the back side  
• 82 x 82 mm in square

### Environmental:

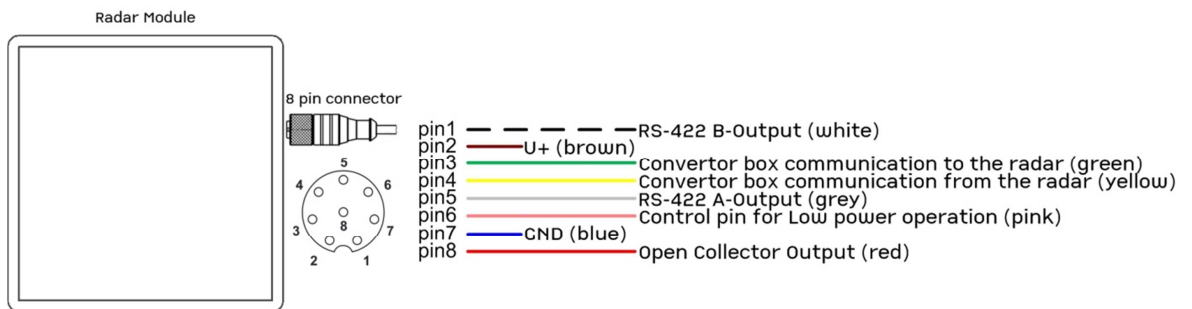
Housing: Rated IP67, waterproof and vibration proof  
Operating temperature: -20° to +60°  
Storage temperature: -30° to +80°C



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## Module Interface

The circular connectors used are industrial standard, rated IP67. The connector type on the radar module is an eight pole M12 male. (An example for the part number is: SAC-8P- 5,0-PUR/M12FS)



The radar system has the following interfaces:

- Power supply +9 to 30V (brown wire) and GND (ground, blue wire)
- RS422 serial interface; A-output (black wire) and B-output (white wire)
- TTL to RS232 convertor box communication to (green wire) and from the radar (yellow wire)
- Control Pin (pink wire)
- Configurable Open Collector Output (red wire)

## Readout Description

The RS422 communication interface output has the following specification:

- Interface specification: 19200, 8, N, 1

The readout telegram consists of:

- |         |                                                                                                        |
|---------|--------------------------------------------------------------------------------------------------------|
| Byte 1: | 0x7e (126 decimal) constant                                                                            |
| Byte 2: | 0x7e (126 decimal) constant                                                                            |
| Byte 3: | 0x7e (126 decimal) constant                                                                            |
| Byte 4: | distance between Radar and approaching target in cm (lower Byte)                                       |
| Byte 5: | distance between Radar and approaching target in cm (higher Byte)                                      |
| Byte 6: | relative speed of the approaching target in cm/s (signed integer; positive = approaching; lower Byte)  |
| Byte 7: | relative speed of the approaching target in cm/s (signed integer; positive = approaching; higher Byte) |
| Byte 8: | signal strength of the approaching target in dB                                                        |
| Byte 9: | distance between Radar and receding target in cm (lower Byte)                                          |
| Byte10: | distance between Radar and receding target in cm (higher Byte)                                         |
| Byte11: | relative speed of the receding target in cm/s (signed integer; negative = receding, lower Byte)        |
| Byte12: | relative speed of the receding target in cm/s (signed integer; negative = receding, higher Byte)       |
| Byte13: | signal strength of receding target in dB                                                               |

## Configurable Open Collector Output

The RS232 communication interface input and output from the convertor box has the following specification:

- Interface specification: 19200, 8, N, 1



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To request the current settings of the radar the following telegram should be sent to the radar:

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Content	7Eh	5Eh	8Eh	9Eh	00	05	06	07	00	00	00	02	08	0C

The radar will reply with a 14 byte telegram containing the current settings. The reply telegram has the following byte order:

1	2	3	4	5	6	7	8	9	10	11	12
7Bh	5Bh	8Bh	9Bh	00h	Min Speed threshold	Distance threshold	Signal threshold	Max Speed threshold	00h	00h	00h

- Byte 1: 7Bh
- Byte 2: 5Bh
- Byte 3: 8Bh
- Byte 4: 9Bh
- Byte 5: 00h
- Byte 6: Minimum Speed threshold in kmh (approaching only), 8 bit unsigned integer
- Byte 7: Distance threshold in m, 8 bit unsigned integer
- Byte 8: Signal threshold in dB, 8 bit unsigned integer
- Byte 9: Maximum Speed threshold in kmh (approaching only), 8 bit unsigned integer
- Byte 10: 00h
- Byte 11: 00h
- Byte 12: 00h
- Byte 13: 00h
- Byte 14: 00h

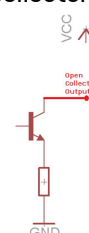
To configure the radar the following 14 byte telegram structure should be used:

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Content	7Eh	5Eh	8Eh	9Eh	FF	Min Speed threshold	Distance threshold	Signal threshold	Max Speed Threshold	00h	00h	00h	00h	00h

- Byte 1: 7Eh
- Byte 2: 5Eh
- Byte 3: 8Eh
- Byte 4: 9Eh
- Byte 5: FFh
- Byte 6: Minimum Speed threshold in kmh (approaching only), 8 bit unsigned integer
- Byte 7: Distance threshold in m, 8 bit unsigned integer
- Byte 8: Signal threshold in dB, 8 bit unsigned integer
- Byte 9: Maximum Speed threshold in kmh (approaching only), 8 bit unsigned integer
- Byte 10: 00h
- Byte 11: 00h
- Byte 12: 00h
- Byte 13: 00h
- Byte 14: 00h

Immediately after sending the configuration telegram, the radar will reply with the 12 bit reply telegram, see above.

The Open Collector (red wire, pin8) sources to ground. When in the on state, it will drive to ground. See below for a simplified schematic of the Open Collector Output:





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Drawing and dimensions of the housing in mm

