PARATRONIC
Eau Environnement Risques Naturels

INSTALLATION INSTRUCTIONS

Entreprise certifiée
ISO 9001

French manufacturer

NRV 485 RADAR SENSOR

1   SPECIFICATIONS

Mechanical specifications:

Housing material	ABS
Dimensions	121 x 121 x 45mm
Weight	450g
Cable	4 wires of cross-section 0.35mm²
	Length 2m (other lengths on request)

Electrical specifications:

Technology	Pulse radar
Measurement frequency	24.05 to 26.5 GHz
Repeat frequency	3.57 MHz
Pulse duration	1.2 ns
Radiated power	<20 dBm
Antenna aperture at -3dB	+/-4° / +/-6° (8°/12°)
Power supply voltage	9 to 20Vdc
Consumption	15 mA in operation
	100 µA on standby
Output signal	Jbus slave on RS485
Communication	9600 bauds, 8 bits, sans parité, 1 stop
Clearance (*)	NRV485-3: 0.3 to 3m - NRV485-8: 0.3 to 8m - NRV485-12: 0.3 to 12m
Fault signal	Negative distance (on 16 bits with signature)
Smoothing depth	1, 4, or 16s
Minimum heating time	Case where sensitivity is set to 0: 2s (+ smoothing depth)
Maximum heating time	Case where sensitivity is set to 7: 9s (+ smoothing depth)
Resolution	1mm
Precision (**)	Clearance of 30cm to 50cm: +/-20mm
	Clearance of 50cm to 12m: +/-5mm (EMC +/-10mm)

(*) Distance between the water surface and the flat section at the front of the radar.
(**) With an echo on a planar metal surface and a clean radome.

Environment, standards:

Protection rating	IP68, 100 days under 1 metre of water
Fire rating	UL94-V2
Storage temperature	-20 to 60°C
Operating temperature	-20 to 60°C
Altitude	0 to 2000 m
CE Mark:	EN 302729-1/2(2011-05) - EN 60950-1(2006-09)+ Av. A1, A2, A11, A12
	EN 61326-1 (2013-05) - EN 62479 (2010-11) - EN 50581 (2013-01)
Fast transients	Level 4
Lightning protection, wave 1.2/50 - 8/20	1KV
As per ISO 4373 standard	Physical principle of the device: radar echo-location
	Maximum variation rate: not applicable
	Response time (with 1s smoothing): 2s
	Performance class (clearance > 50cm): 1
	Temperature class: 2
	Relative humidity class: 1
	IP rating: IP68
	Drinking water compatibility: not applicable
	Explosive environment compatibility: no

<u>According to the ISO 4373 standard:</u>

Physical principle of the device: radar echolocation
Maximum rate of change: not applicable
Response time (with smoothing 1s):   2s
Performance class (air draft > 50cm):   1
Temperature class: 2
Relative humidity class: 1
IP rating: IP68
Compatibility with drinking water: yes
Compatibility with explosive environment: no

2   <u>INSTALLATION</u>

➢ The NRV radar sensor is mounted directly using the hanger provided (or using the optional angle bracket). Positioning and fastening are carried out using two M4 screws (3mm hex key).


➢ To be able to perform measurement, the radome (radar antenna) must be parallel with the water level to be measured (horizontal).

➢ As the measurement cone is oval, the zone where the measurement is made and the potential presence of obstacles in the cone are directly dependent on the sensor orientation (see diagram below).
As the angle of aperture is +/- 4° by +/- 6° with respect to the vertical, it is necessary to envisage offsetting the walls by at least 10 cm (20 cm recommended) per metre of clearance.

➢ To avoid any interference when it is sought to run 2 radars simultaneously, it is recommended not to install them in the immediate proximity of one another. The minimum distance is dependent on the eddy currents of the water area and the reflective surfaces located above it (the underside of a bridge, for example, the station ceiling, etc.), which may require tests. In any case, the distance separating 2 radars should be at least equivalent to the clearance value.

WALL (top view)

Bracket

NRV485
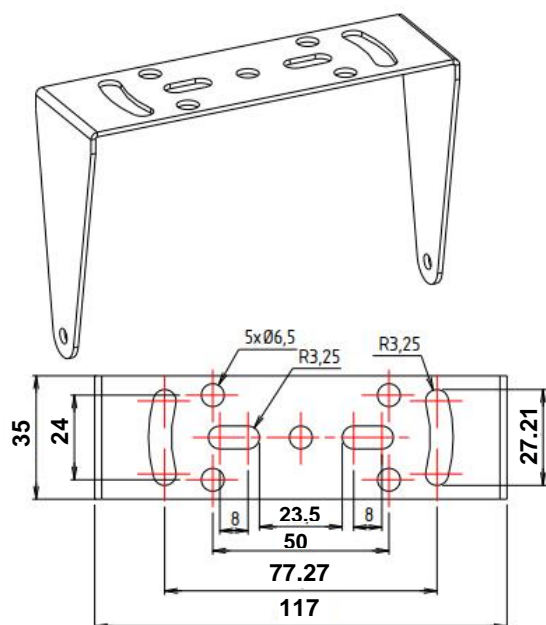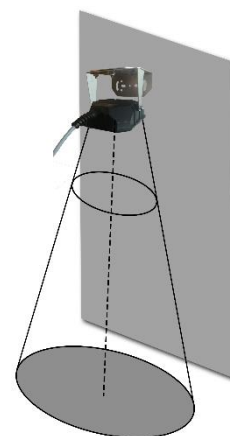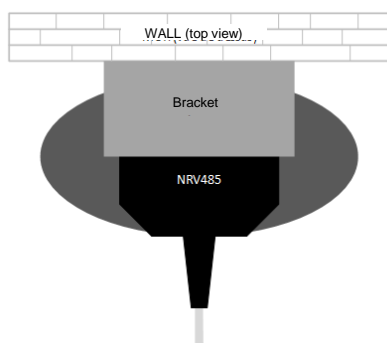
Hanger (provided)
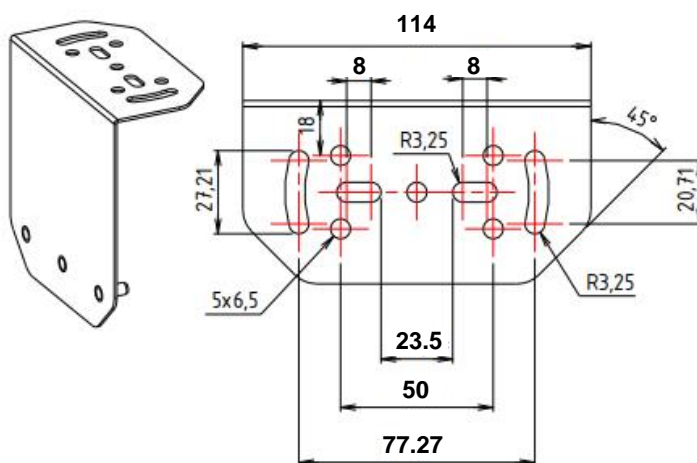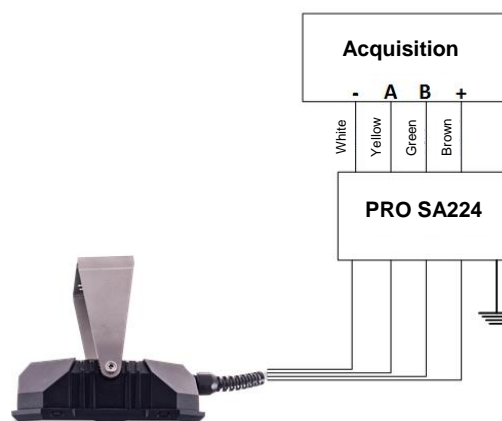

Angle bracket (optional)

3   CONNECTIONS

Power supply   SELV type limited to 1A or <
Connections   Brown wire: + power supply
                White wire: - power supply
                Yellow wire: RS485 RTX+ (A)
                Green wire: RS485 RTX- (B)

PARATRONIC PRO SA224 type
lightning protection must be used.

4   CONFIGURATION

➢ No configuration is required on the NRV sensor. In fact, it can be used directly with the "factory settings" in most use scenarios. In specific cases in which the configuration needs to be modified, the "HMI sensors" software provides access to some of the radar settings:

As needed, use the "HMI sensors" software with a Paratronic "ADP USB" adapter to access the following settings:

- Usable measurement range (clearance): used to remove "parasitic" echoes by defining a minimum clearance value and a maximum clearance value (default = radar range)
- Value output in absence of echoes (= measurement in case of fault) (default = 65533)
- The slave number (default 1)
- The sensitivity between 0 and 7 (default 4 = normal)
- Sensitivity via automatic setting

In the event of any reflective obstacles located outside the usable measurement zone or a risk of multiple reflections, it is recommended to reduce the measurement range to that strictly necessary.

In the event of a risk of condensation on the radome or poor reflection conditions (e.g. the presence of moss), perform a sensitivity setting. Run the setting process under good reflection conditions (clean radome, normal reflection surface), and after checking that the clearance specified matches the required echo.

➢ The radar sensor settings can be modified with:

  o The "ADPUSB" adapter to connect to your sensor (refer to the specific instructions I157F).
    AND
  o The "HMI sensors" software for the configuration of your sensor. (refer to the specific instructions I158A).
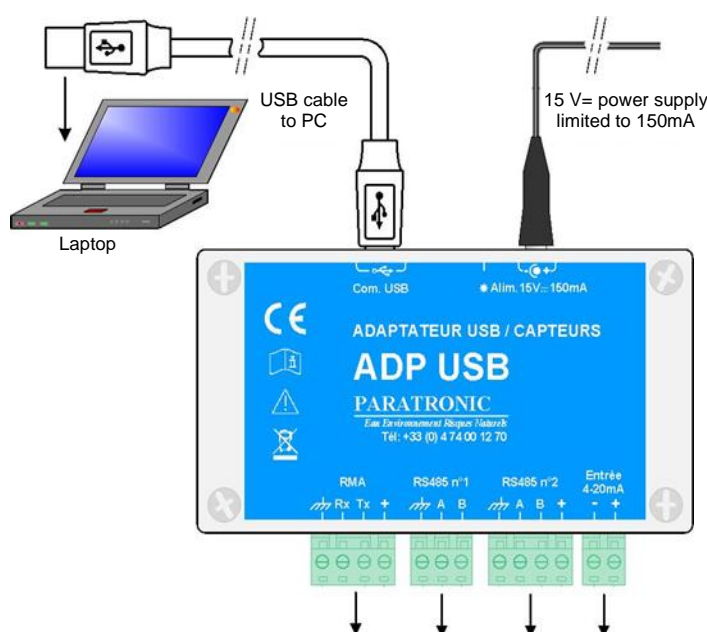
N.B.:
For the first use, you will need to install the software and its driver:

To be able to install PARATRONIC "HMI sensors" software, you must be the computer Administrator.

Download the latest software version at www.paratronic.fr/catalogue on the pages of compatible sensors.
Run, as administrator, the "setup.exe" application to install the software. Follow the instructions on the screen and refer to document I158A "HMI sensors".

After installing "HMI sensorss", you also need to install the drivers for the USB port.
For this purpose, use (as administrator) the executable "Paratronic_drivers_USB.exe" contained in the "HMI sensorss" folder. Follow the instructions on the screen and refer to document I158A "HMI sensors".

5   JBUS ADDRESS TABLE

JBUS address (decimal)	Data	JBUS function
0	Model = 00C7h	3, 4
1	Version	3, 4
2	Power supply voltage (V/10)	3, 4
3	Temperature (°C)	3, 4
4	Quality 1s (1) (3)	3, 4
5	Distance 1s (2) (3)	3, 4
6	Quality 4s (1) (3)	3, 4
7	Distance 4s (2) (3)	3, 4
8	Quality 16s (1) (3)	3, 4
9	Distance 16s (2) (3)	3, 4
100	Standby / reactivation command (4)	6
65524	Minimum clearance (mm)	6
65525	Maximum clearance (mm)	6
65529	Clearance specified with fault (mm)	6
65533	Sensitivity (5)	6
65535	Slave number (*)	6

(*) 1 by default. If the existing slave number is unknown, use the slave number 0 to enter the desired slave, connecting only one slave to the RS485 line.

(1) Details of distance measurement quality:
  [15-8] = echo amplitude, 0 to 255
  [7] = presence of parasitic echoes
  [6-4] = sensitivity, 0 to 7
  [3-0] = number of valid echoes out of 1s, 0 to 15

(2) Details of distance measurement:
  65535 (-1) = measurement in progress (following reactivation)
  65534 (-2) = measurement in progress (internal VCO reset)
  65533 (-3) = no echo
  65532 (-4) = power supply voltage too low

65530 (-6) = echo removed by filtering (false echo)
65529 (-7) = incorrect echo shape
65528 (-8) = Echo outside authorised range
0 – 30000 = valid measurement available (mm)

(3) The radar makes several measurements per second, and the averages over 1s, 4s and 16s. The 3 values are available in the JBUS addressable space. The same applies for data relating to the quality of this measurement.

(4) By default, the radar is activated. Enter the value 256 at the address 100 to put the radar to sleep and 0 to reactivate it. When the radar is on standby, the first JBUS query may not get a response. In this case, the master must repeat its request within 2s.

(5) Most significant byte, from 0 to 7

6   SAFETY SYMBOLS AND MARKS

⚠ : Hazard risk. Important information. Refer to the instructions for use.

📖 : Read the instructions for use.

CE : Compliant with European Union and EFTA directives.

🗑 : European Directive 2002/96/EC of 27 January 2003 on waste electrical and electronic equipment (WEEE Directive) was transposed in France by Decree No. 2005-829 of 20 July 2005.
 Electrical or electronic appliances, and their spare parts and consumables must never be disposed of in household waste.
PARATRONIC has undertaken to set up an Individual Collection System.
PARATRONIC waste electrical and electronic equipment should be returned by customers (End users) to our company's head office, at the following address:

PARATRONIC - Zone Industrielle - Rue des Genêts, 01600 REYRIEUX, France
Service Recyclage DEEE

7   SAFETY INSTRUCTIONS

⚠ : WARNING: The protection offered may be compromised if this appliance is not used as specified.

The specifications described in this document are subject to change by the manufacturer without notice.