



INSTRUCTION MANUAL

IR 'C' Sensors
Suspended Solids Sensor for Research Use

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1 Introduction

The pulsed infrared sensor is extremely robust and reliable due to its totally encapsulated construction with built in signal conditioning electronics. An infrared system is employed consisting of a solid state LED (light emitting diode) source and detector connected to electronics that are moulded into the sensor. No further electronic signal processing is necessary to obtain meaningful results. Power consumption and attraction of algae build up have both been dramatically reduced making it more suitable for longer monitoring.

Four infrared sensors are currently available with the following ranges

- IR100C 0-200 mg/l
- IR40C 0-1,500 mg/l
- IR15C 0-10,000 mg/l
- IR8C 0-30,000 mg/l

Note: All ranges specified are typical and may change depending on characteristics of the solids being measured.

The IRC sensors are three wire sensors designed to interface directly with a data logging device without any additional signal processing. For this application simply connect a 12 volt battery to the sensor and you will get a 0 to 5 mA current loop signal which changes with the level of suspended solids. The output is a shallow 'S' shaped curve which deviates approximately $\pm 10\%$ from a straight line, therefore, for accurate readings it is important that a calibration graph is produced for the sensor. A typical interface circuit is shown later in this document to provide a voltage signal that is compatible with most loggers.

2 Electrical Installation

The sensor cable can be extended up to 100 metres, if required, without any loss of performance. This is possible since the sensor signal is a current loop that is immune to most electrical noise. The cable attached to the sensor has four cores coloured:

- Red: +12VDC
- Black: 0VDC
- White: Signal
- Green: Do not use

The section below gives general advice on the connection of the sensor to data logging device, specific detail can be provided if we are advised of the exact make and model of the logger to be used. Alternatively Partech can provide complete logging packages including batteries, logger, remote telemetry communications and weatherproof housing.

2.1 Current signal Connection

The current signal can be connected directly to a suitable data logger or similar device with a current input connection. It may be advisable to use a capacitor to provide some signal damping if this is not available within the logging device. A 47 μ F Tantalum capacitor has been found to be suitable for this purpose.

2.2 Voltage Signal Connection

So that an error is not introduced it is best to fit the sensor resistor in the current loop close to the point where the measurement is required. This will produce a voltage proportional to the suspended solids value.

The normal value resistor is a 1000 ohms which will produce 5V when 5mA is flowing through the current loop. This is the equivalent to full scale deflection for each of the sensors above. The maximum output voltage is 5V, the output will go higher than this but you run the risk of the output stage limiting and data will become meaningless.

Higher value resistors may be fitted, which will have the effect of producing a larger output for the same level of suspended solids, since a larger voltage will be produced for the same current input. However, the 5V limit must still be observed.

Where data loggers are used it may also be necessary to fit a damping capacitor in parallel with the sensor resistor since very fast switching transients find their way through to the output. A 47 μ F Tantalum capacitor has been found to be suitable for most applications.

3 Maintenance

3.1 Regular Maintenance

The only regular maintenance required is the cleaning of the sensor. Cleaning frequency is application dependent but is typically between weekly and monthly, the user will need to make a judgement based on operational experience in the field. The operator should check the state of the sensor prior to cleaning and adjust the cleaning interval accordingly.

Cleaning should be carried out with a soft cloth and mild detergent if necessary, do not use an abrasive cleaner as this will damage the sensor optics.

3.2 Fault Finding

1. Connect the sensor to a 12V power supply, positive to red wire and negative to black wire.
2. Connect an ammeter between the white wire and the black wire. Select a range on the ammeter to measure 0 to 10mA.
3. With the sensor gap clear the current should be in the range 0 to 0.5mA.
4. With the sensor gap blocked by a metal plate the current should be in the range 5 to 6.5mA.

4 Technical Support

Technical Support is available by phone, fax, or email, the details of which are shown below.

- Phone: +44 (0) 1726 879800
- Fax: +44 (0) 1726 879801
- Email: techsupport@partech.co.uk
- Website: www.partech.co.uk

To enable us to provide quick and accurate technical support please have the following information ready when you contact us:

- Serial Number or original purchase details
- Sensor Type, and Serial Number
- Application details
- Description of fault

4.1 Returning Equipment for Repair

If equipment needs to be returned to Partech for repair or service the following address should be used:

SERVICE DEPARTMENT
PARTECH (ELECTRONICS) LTD
ROCKHILL BUSINESS PARK
HIGHER BUGLE
ST AUSTELL
CORNWALL
PL26 8RA
UNITED KINGDOM

Please include the following information with the returned equipment. Also ensure that sensors are adequately protected for transportation (Advice on packing can be provided by our service department).

- Contact name and phone number
- Return address for equipment
- Description of fault or service required
- Any special safety precautions because of nature of application

5 Technical Specification

5.1 Electrical

Operation Voltage:12 VDC
 Operating Temperature Range.....0 to 40°C
 Storage Temperature Range.....0 to 50°C
 Cable Type.....4 core, polyurethane coated
 Standard Cable Length.....10 metres
 Maximum Cable Length.....100 metres

5.2 Measurement

Measuring Principle.....Light absorption
 Light Source.....Infrared LED, 950nm
 Environmental Rating.....IP68
 Materials.....Hastelloy, PVC, Epoxy Potting Compound

Parameter	IR100	IR40	IR15	IR8
Nominal Range (mg/l)*	200	1500	10000	30000
Weight (g)	350	300	250	250
Width (mm)	160	100	75	75
Height (mm)	95	95	95	95
Depth (mm)	25	25	25	25

* The actual sensor range will depend on the solids being measured, the values quoted are based on the typical solids found on a municipal sewage treatment works.





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