INSTRUCTION MANUAL

IR Sensor

Suspended Solids and Sludge Blanket Sensor

partech

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1 Introduction

This manual covers the IR range of Sensors. This manual should always be read with the appropriate manual covering either the ASLD2200, 7100, 7200, 8100 or 8200 Monitors. Whilst every attempt has been made to ensure that the instructions are correct, common sense and good engineering practice should always be used to adapt to specific site details. If you are in any doubt, please contact Partech or your local distributor for further information.

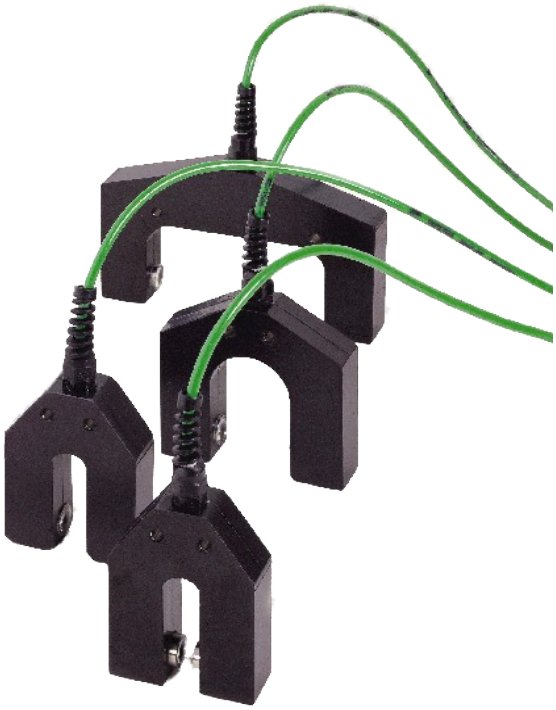


Fig 1 IR Sensor

1.1 IR Sensors

All IR Sensors use an infrared light source, which offers long-term stability, low maintenance and high reliability. The principle of operation is described below.

1.1.1 Light Absorption

The IR Sensor family is intended to monitor suspended solids in four predetermined nominal ranges.

IR100 Sensor - Range 0-200mg/l

IR40 Sensor - Range 0-1500mg/l

IR15 Sensor - Range 0-10,000mg/l

IR8 Sensor - Range 0-30,000mg/l

No internal adjustment is possible, but measurement outside these ranges is sometimes possible and maybe determined by experimentation. All range statements are based on solids present on a typical sewage treatment works, and although they are useful as guidance, the ranges will be affected by the nature of the solids being monitored.

The sensor uses the light absorption principle, with the light source an infrared LED operating at 880nm. In simple terms, the Sensor detects solids by comparing the amount of light emitted by the LED with the amount received by the photo-diode. The amount of solids present is inferred from the reduction in received light.

The sensor has been designed to monitor Suspended Solids and Sludge Blankets throughout the treatment process.

1.1.2 Mounting Options

A range of mounting options are available for the IR Sensors, which will allow the user to apply the sensor in a wide variety of locations. This manual addresses Sludge Blanket Detection applications. Please contact Partech for other types of application. When assessing mounting options, attention should be paid to the accessibility of the Sensor for calibration and maintenance, stability of the Sensor in the flow conditions present on site and to ensuring the Sensor is fully submerged at all times. It is recommended that the Sensor is located in an area where there is sufficient movement to keep the solids in suspension and where any turbulence provides minimum impact on the Sensors.

2 Mechanical Installation

2.1 Location

Reliable accurate measurement from any instrument can only be achieved by correct installation of the measuring device; in the case of suspended solids, this is particularly important. If you are in any doubt, contact Partech or your local distributor for advice.

Below are some points that should be considered before installing the IR Sensor, and if the sensor is failing to obtain the results expected.

- Avoid areas of extreme flow or turbulence; air bubbles will disturb the reading.
- The sensor should be mounted in such a way as to allow easy access for calibration and maintenance. It should be possible to remove the sensor from the process without the need to shut the process down.
- To allow a single technician to calibrate and maintain the system the sensor should be placed within sight of the monitor. Although cable runs of up to 100 metres are possible, operational problems can be caused.

2.2 Partech Brackets

Partech offer a mounting bracket, PN171290 for the installation of the IR Sensors which suits most applications.

Fig 2 Handrail Bracket

2.3 Customer Supplied Brackets

When creating brackets to mount the IR Sensor, care should be taken to ensure that the following guidelines are observed:

- The bracket must be strong enough to support the sensor with minimum movement when installed into the sample.
- When attachments to the sensor are made, these should be done using the threaded area at the top of the sensor housing or by clamping around the sensor body.
- Consideration should be given to enable simple removal and replacement of the sensor for the inspection, calibration and servicing to be carried out.

3 Electrical Installation

The IR Sensor can be connected to a wide range of Partech Monitors, both current and supported versions. The information below provides the physical installation instructions; please refer to the monitor instruction manual for complete setup details.

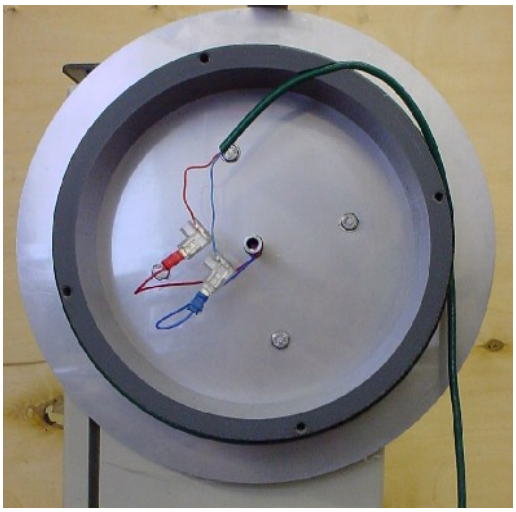
When using the IR Sensor as a replacement for an IR sensor the IR Sensor will operate in exacting the same manner as the equivalent IR sensor.

3.1 Cable Routing

Care should be taken to ensure that the cable routing does not cause problems with the sensor measurement; good engineering practice should be followed with particular attention being paid to the following points;

- The sensor cable should be kept to the minimum length possible.
- Sufficient spare cable should be provided to allow complete and easy removal of the sensor from the process.
- Any spare cable should be safely stored.
- The sensor cable should be kept separate form mains cable.

3.2 ASLD2200



Sensor Cable:

Red Wire - Red Male Spade Connector

Black Wire - Blue Male Spade Connector

Green Wire - Blue Male Spade Connector

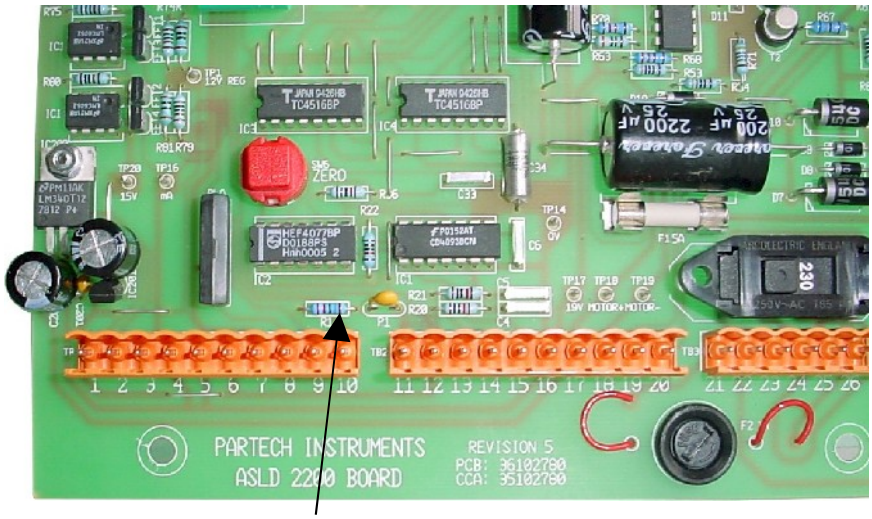
White Wire - Not Used

Screen - Not Used

Modifications Required:

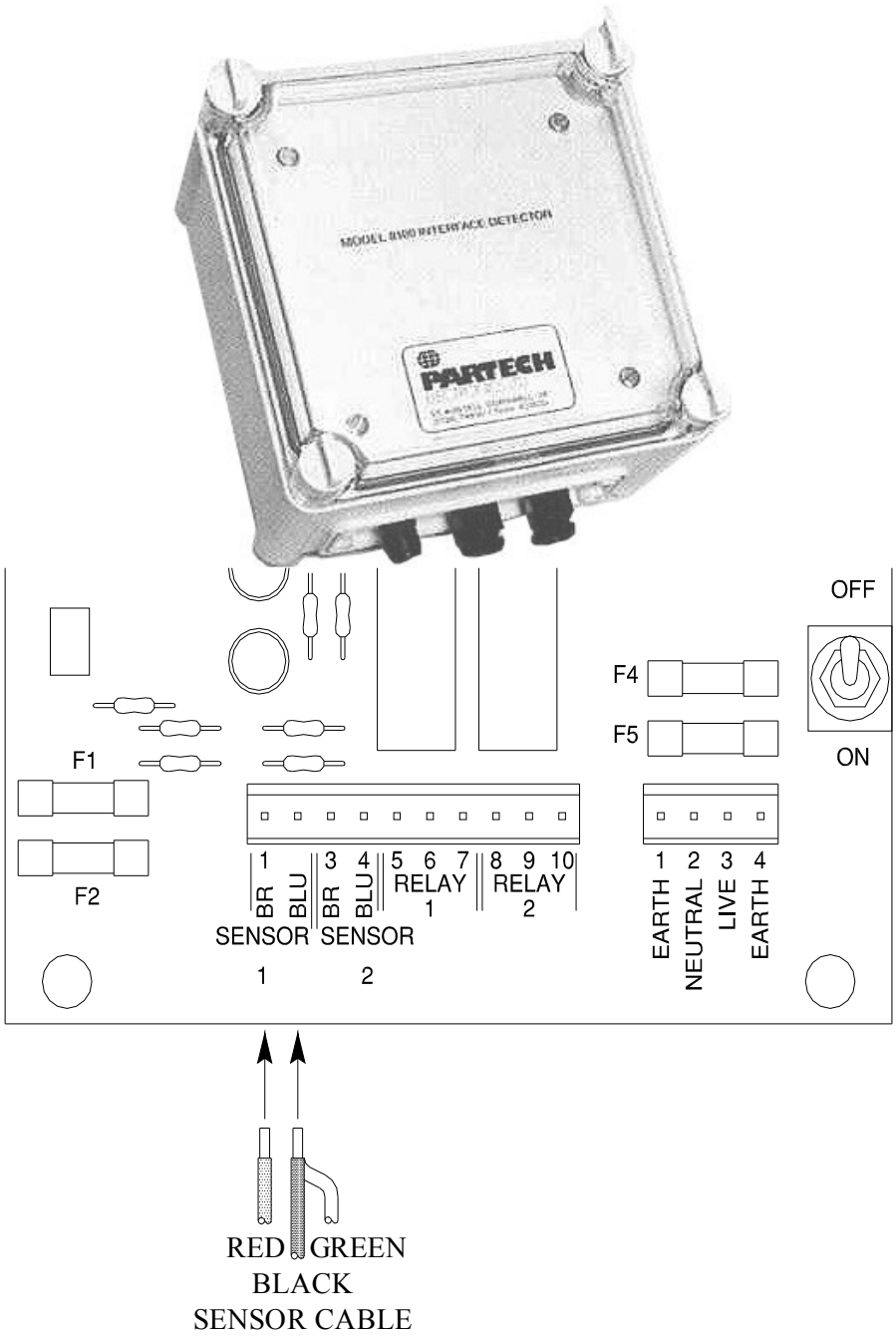
The value of R1 on the CCA should be 3.9Ω. The IR Sensor is provided with a 3.9Ω resistor for modification of earlier versions of the ASLD2200.

Some early versions of the ASLD2200 do not have a component ident, however the picture below provides sufficient detail to allow the modification to be made.



Resistor R1

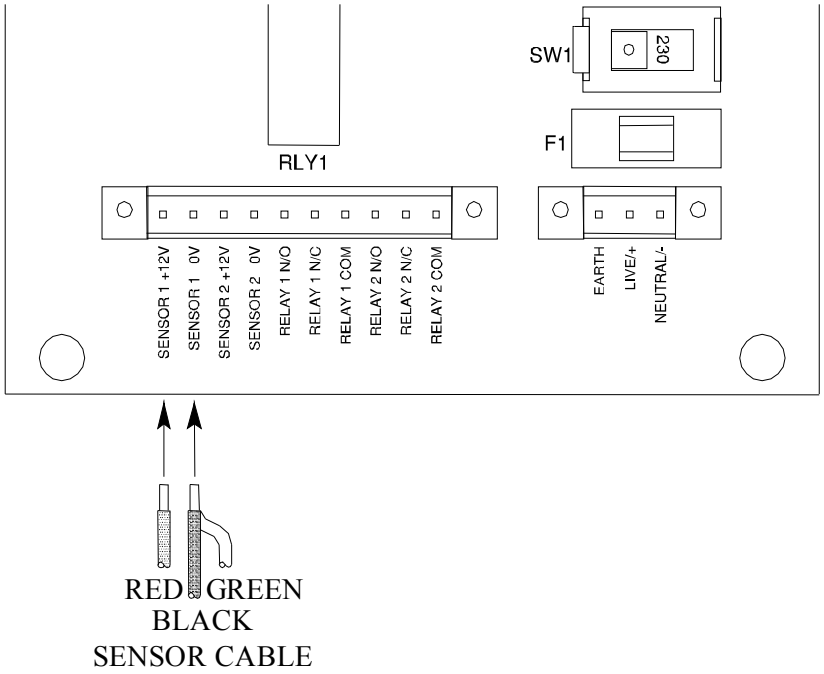
3.3 8100 and 8200 Version 1



Sensor Cable: -

Red Wire -	Terminal marked “BR”
Black Wire -	Terminal marked “BLU”
Green Wire -	Terminal marked “BLU”
White Wire -	Not Used
Screen -	Not Used

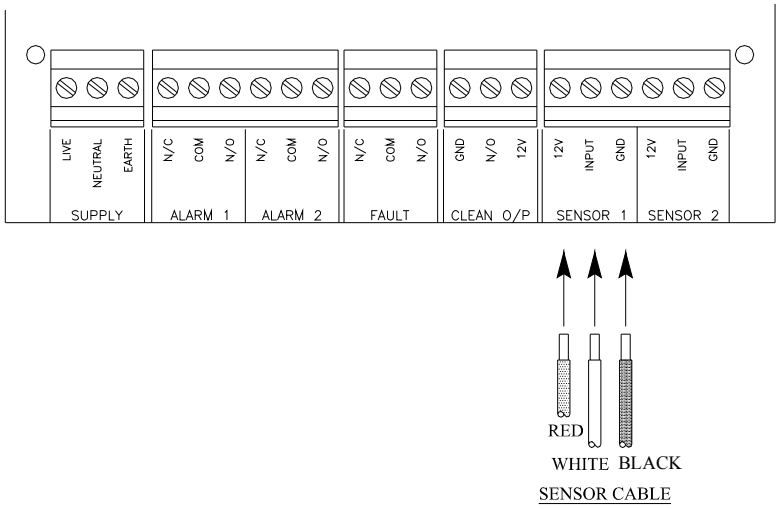
3.4 8100 and 8200 Monitor Version 2



Sensor Cable:

Red Wire -	Terminal marked “+12V”
Black Wire -	Terminal marked “0V”
Green Wire -	Terminal marked “0V”
White Wire -	Not Used
Screen -	Not Used

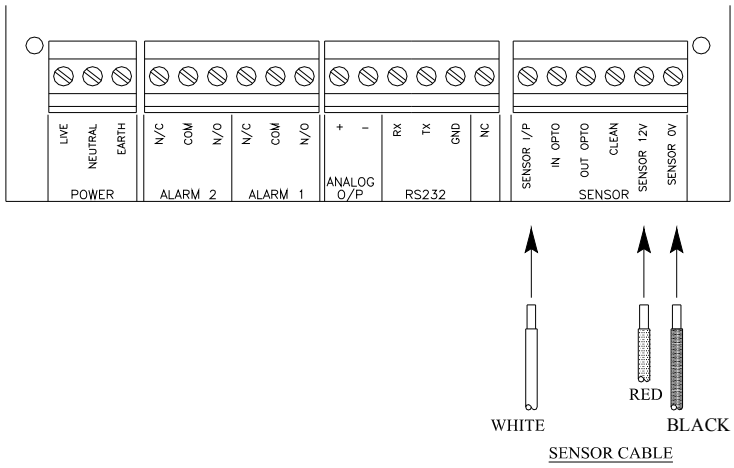
3.5 8100 and 8200 Monitor Version 3



Sensor Cable:

Red Wire -	Terminal marked “+12V”
Black Wire -	Terminal marked “GND”
Green Wire -	Not Used
White Wire -	Terminal marked “INPUT”
Screen -	Not Used

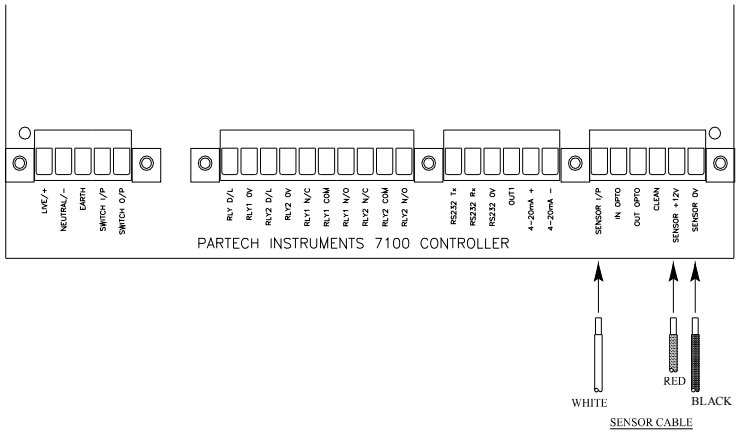
3.6 7200 Monitor



Sensor Cable:

Red Wire -	Terminal marked “SENSOR 12V”
Black Wire -	Terminal marked “SENSOR 0V”
Green Wire -	Not Used
White Wire -	Terminal marked “SENSOR I/P”
Screen -	Not Used

3.7 7100 Controller



Sensor Cable:

Red Wire -	Terminal marked “SENSOR 12V”
Black Wire -	Terminal marked “SENSOR 0V”
Green Wire -	Not Used
White Wire -	Terminal marked “SENSOR I/P”
Screen -	Not Used

4 Configuration

4.1 Calibration – General

When a new system is installed, a period of 4 hours should be allowed for the equipment to stabilise before calibration commences. This is to enable the system to adjust and stabilise to the new ambient conditions. Any containers used to store calibration samples should be cleaned before use. This is particularly important when performing the zero point calibration on a low range sensor.

The most accurate method of calibration is using a primary standard, i.e. calibration in the actual solution against a lab result. Where this is not possible or where the trend of the reading is more important than the absolute value it is acceptable to use a secondary standard.

It is normally preferable to perform the calibration operation with the damping on the controller set to zero.

5 Maintenance

5.1 Sensor Cleaning

The frequency of cleaning and servicing of the sensor is dependant upon the application in which it is being used, and the conditions present on site. Its advisable that sensor is regularly observed in the period after installation. It is from these observations that the cleaning intervals should be determined to suit the level of fouling experienced in the particular installation.

The sensor is not self-cleaning and the optical surfaces will be subject to fouling. It is advisable that fouling is not allowed to build up to such an extent that it affects the sensor ability to make the required measurement.

Cleaning should be carried out with a soft non-abrasive cloth. Where fouling is particularly bad or where the fouling has dried onto the optical surface, a detergent or weak acid solution can be used. Care must be taken not to damage the optical surface.

5.2 Inspection

It is envisaged that an inspection of the sensor will include the following:

- Check security of mountings.
- Check for damage to cable.
- Cleaning the sensor using a suitable detergent and removal of debris.
- Inspection of the glass lenses for staining, scouring, cracks or chips.
- Check for moisture/signs of leakage inside the glass lens.

5.3 Fault Finding

Any faults that occur which are not a result of incorrect system configuration can be due to the following:

- Excessive fouling of the sensor lens – remove sensor, manually clean and re-install.
- Check the lens assembly is not damaged.
- There is a poor connection in the sensor cable – check all connections between the sensor and controller.
- A fault has occurred with the measurement system in the sensor.
- Further faultfinding is contained in the monitor instruction manual.

6 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

6.1 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

CHARLESTOWN

ST AUSTELL

CORNWALL

PL25 3NN

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

7 Technical Specification

7.1 General

Operation Voltage: .....12Vdc (Supplied by Monitor)
Maximum Pressure.....10 bar
Operating Temperature Range.....-10 to 60°C
Storage Temperature Range.....-20 to +80°C
Environmental Rating.....IP68
Cable Type.....Marin spec, 4 core, loosely twisted, Polyurethane
Materials.....316 Stainless Steel, Acetyl Co-polymer, Polyurethane, Nitrile 'O' rings, Glass
Weight.....0.7 Kg (without bracket)
Dimensions.....See table below
Standard Cable Length.....10 metres
Maximum Cable Length.....100 metres (20 metres for ASLD2200)
EMC Emissions.....EN 50081-1
EMC Immunity.....EN 50082-1
Light Source.....Infrared LED, 880nm
Measuring Principle.....Light Absorption
Linearity.....±2% FSD (Linearised by controller)
Accuracy.....±5% FSD (Actual Sample)
Repeatability.....±1% FSD

7.2 Measuring Ranges*

		Minimum Range	*Maximum Range*	*Application*
IR100 Sensor	*Range 0-200*	*0-20*	*0-200*	*Clarifier*
IR40 Sensor	*Range 0-1500*	*0-150*	*0-1,500*	*Final Settlement Tanks*
IR 15 Sensor	*Range 0-10000*	*0-1,000*	*0-10,000*	*Primary Settlement Tanks*
IR8 Sensor	*Range 0-30,000*	*0-3,000*	*0-30,000*	*Sludge Thickeners*

- *The measuring range varies according to the nature of the solids.*

7.3 Weight & Dimensions

	IR100	**IR40**	**IR15**	**IR8**
*Nominal Range (mg/l) **	200	1500	10,000	30,000
Optical Path (mm)	100	40	15	8
Weight (g)	350	300	250	250
Width (mm)	160	100	75	75
Height (mm)	95	95	95	95
Depth (mm)	25	25	25	25

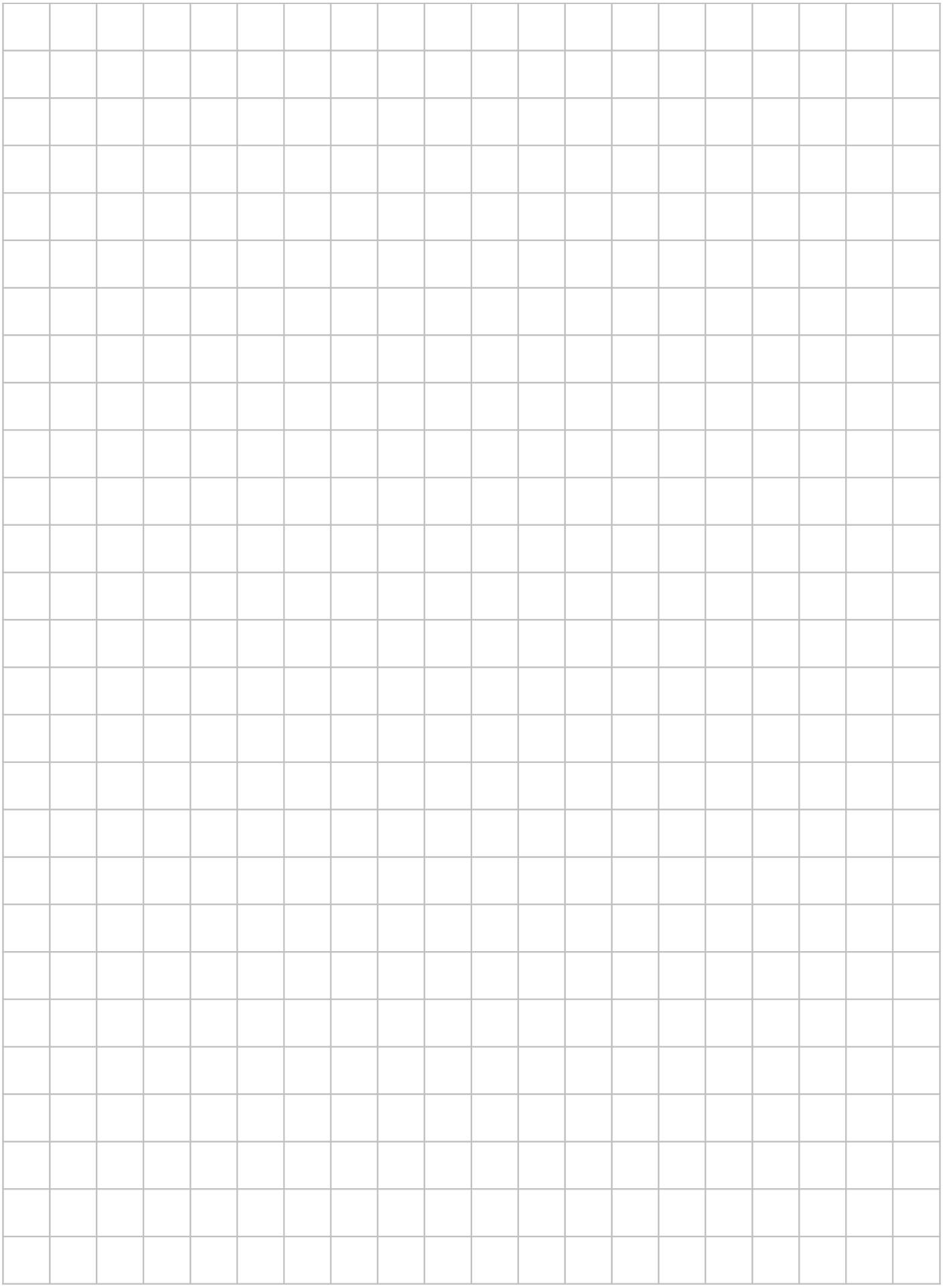
8 Spare Parts List

8.1 Sensors

102200	IR100 Sensor – Range 0-200mg/l
101900	IR40 Sensor – Range 0-1,500mg/l
101600	IR15 Sensor – Range 0-10,000mg/l
148120	IR8 Sensor – Range 0-30,000mg/l
102201	IR100 Sensor – Range 0-200mg/l
101901	IR40 Sensor – Range 0-1,500mg/l, for ASLD 2200
101601	IR15 Sensor – Range 0-10,000mg/l, for ASLD 2200
148121	IR8 Sensor – Range 0-30,000mg/l, for ASLD 2200

8.2 Miscellaneous

224070	Instruction Manual IR Sensor



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