



INSTRUCTION MANUAL

ASLD2200 Monitor Sludge Blanket Level Monitor



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1 Introduction

1.1 General

The ASLD2200 is designed to monitor the position of a sludge blanket in a settlement tank. The system uses an infrared gap type sensor to search for and then track, the interface between the sludge and the water.

This information is then provided via both an LED display and a 4-20 mA output signal.

1.2 Output Signal

The ASLD2200 provides a 4-20 mA output signal that is proportional to the location of the top of the sludge blanket. With a normal setup the 4mA value relates to the bottom of the tank and 20 mA to the water surface.

1.3 Limit Relay

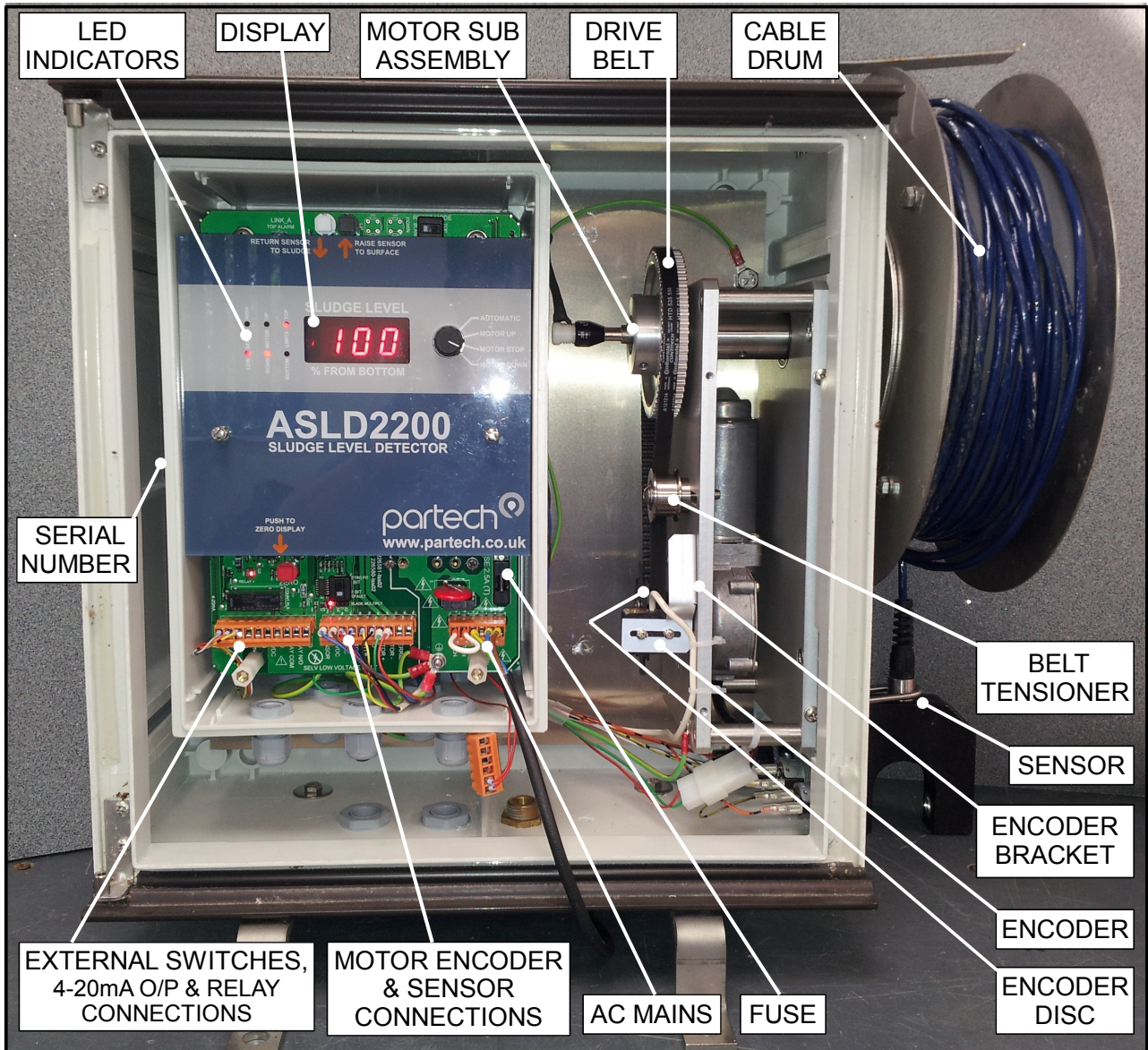
The ASLD2200 provides a relay contact closure when the display reads 100% or 0% or both.

1.4 Manual Conventions

The manual has been written on the basis that the user has a basic knowledge of instrumentation and an understanding of the type of measurement being made.

Training in the use of the ASLD2200 Monitor can be provided by Partech, please contact sales for further information.

1.5 Mechanical Overview

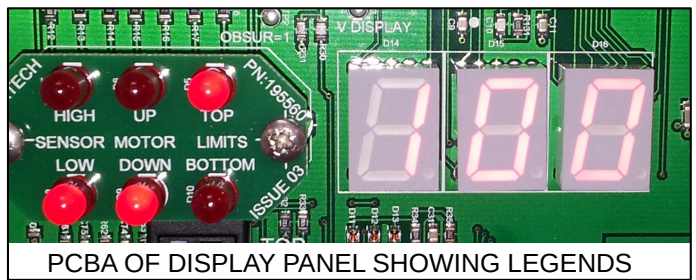
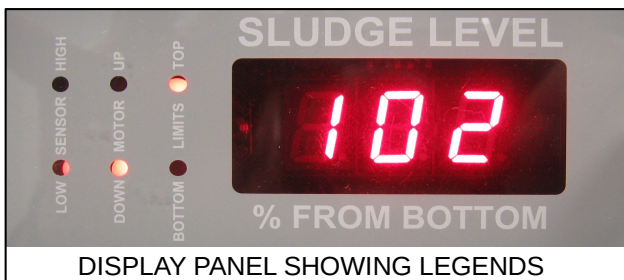


The ASLD2200 is composed of three component assemblies: The external cable drum and sensor, the motor drive and encoder assembly, and the control electronics enclosure.

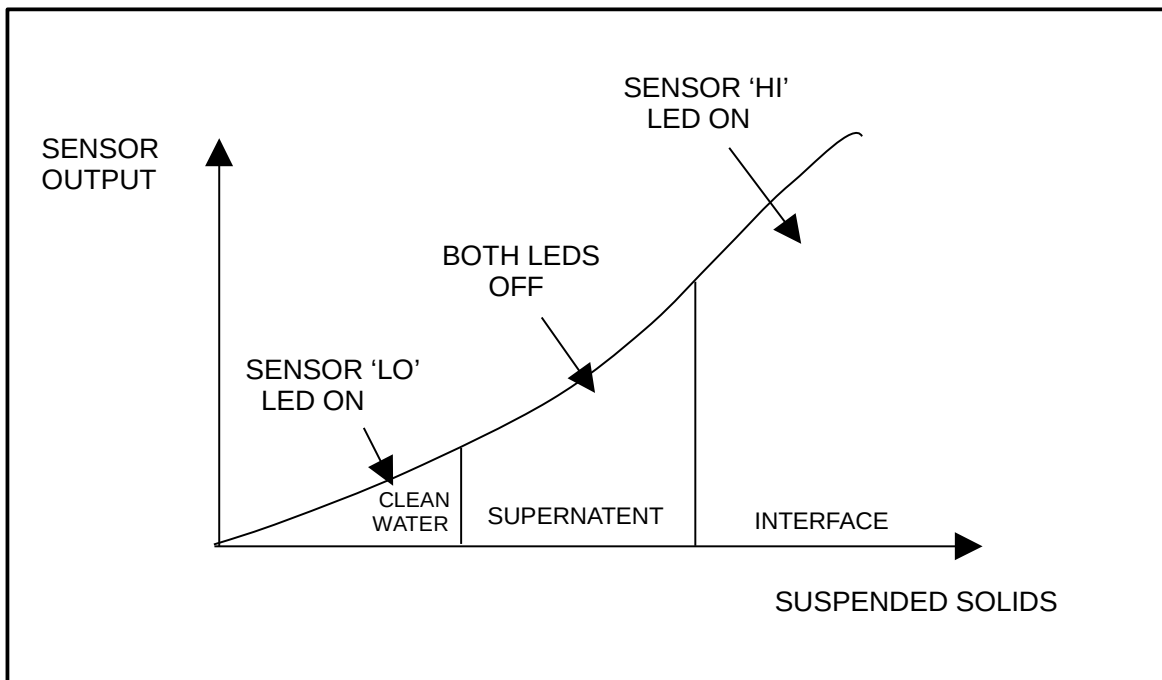
2 Principle of Operation

The ASLD2200 uses a Suspended Solids sensor to detect the density of the sludge & hence the position at which the density makes a step change (the interface): The instrument moves the sensor to a point that is just above the interface, (low SS), then lowers the sensor below the interface, (high SS), to confirm the position of said interface. The control regime operating the motor is then tasked with constantly oscillating the sensor between low & high SS readings, keeping the sensor at the point of interface. Hence detecting whether there is movement. The numeric display will show the current value of the interface position in terms of percentage of liquid level in the tank. 0% represents the bottom, and 100% is the surface the liquid.

The user is provided with information about the sensor reading by the panel of LED's on the printed circuit board assembly (PCBA).



The output of the sensor is divided as shown in the graph below:



The 'motor' LED's will come on once the related sensor LED has been on for 5 seconds and the motor will activate.

The 'limits' LED's will be used when the system reaches either 0 or 100%

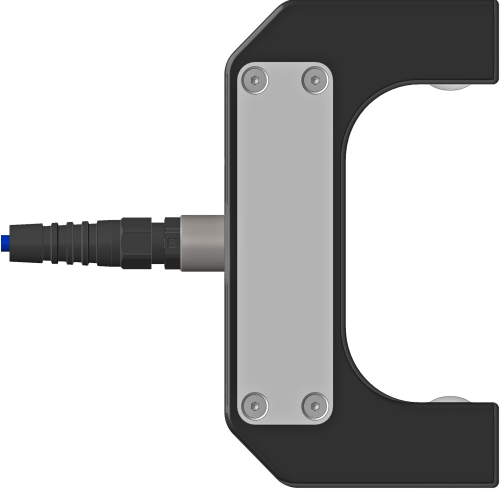
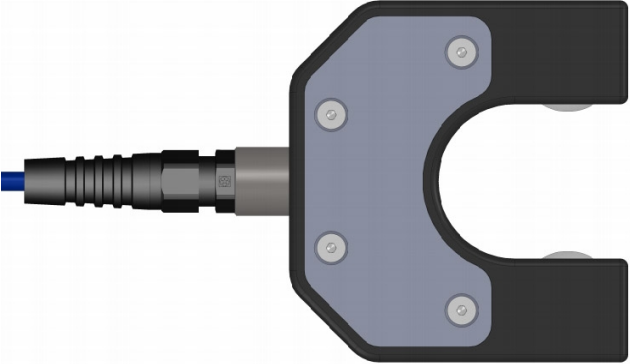
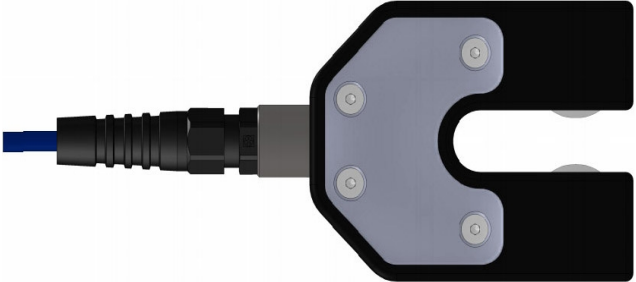
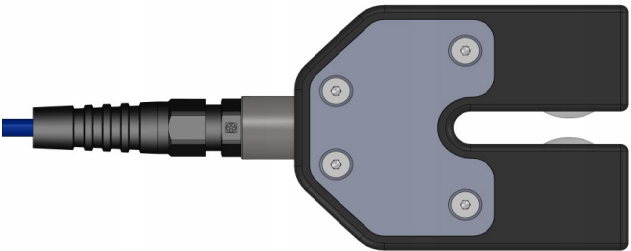
The 3 digit LED display will indicate the position of the sludge blanket as a percentage of the depth of the tank. For example if the tank is 4 metres deep and the display is showing 25%, the sludge blanket is 1 metre from the bottom of the tank

3 ASLD2200 Selection

3.1 Sensor Selection

The ASLD2200 is supplied with a IR sensor; the correct sensor should have been selected before purchase. If you are in any doubt about the sensor that has been supplied please contact Partech.

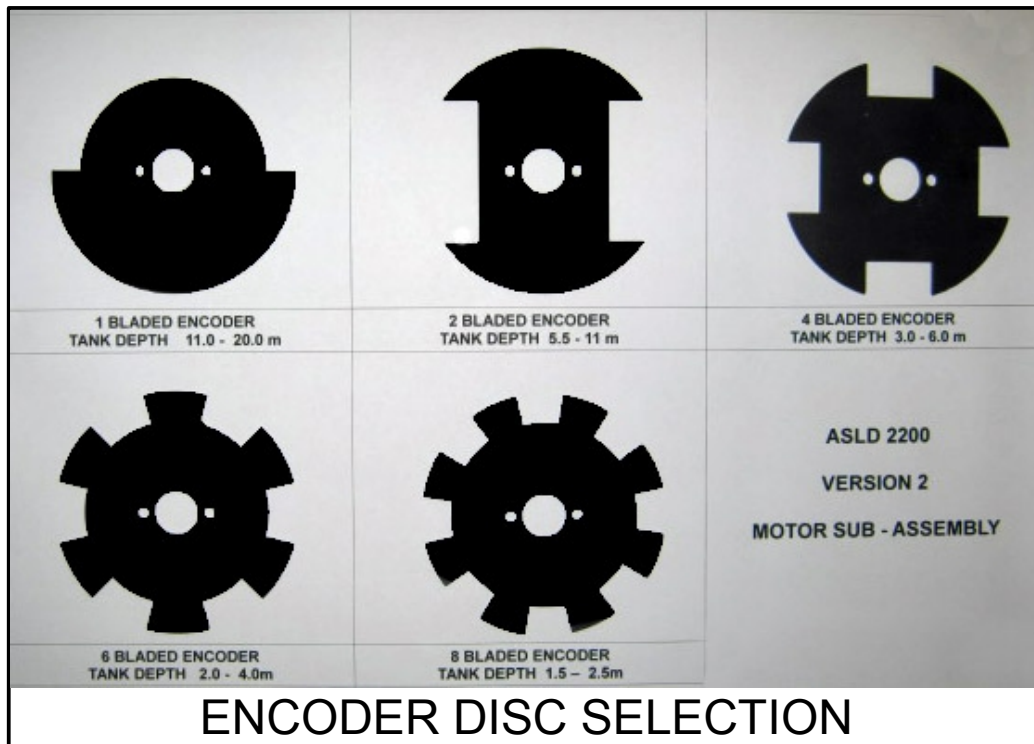
Sensor replacement in the field is easy to carry out; the table below indicates the normal application of the each of the four sensor ranges.

<p>IR100 range 0 to 200mg/l This sensor is normally used for Suspended Solids measurements and is not normally applied to Sludge Blanket measurement. The sensor should only be used if the sludge is very 'light' with very clear supernatant.</p>	
<p>IR40 range 0 to 1,500mg/l This is the most commonly used sensor and is suitable for use on final settlement tanks in sewage treatment applications and clarifiers in water treatment works.</p>	
<p>IR15 range 0 to 10,000mg/l This sensor is also regularly used for sludge blanket detection and is normally used for primary settlement in sewage treatment and sludge thickeners in water treatment.</p>	
<p>IR8 range 0 to 30,000mg/l This sensor should only be applied on sludge thickeners in sewage treatment plants.</p>	

3.2 Encoder Disc Selection

The ASLD2200 is supplied with a selection of encoder discs. The disk choice is dependant on the depth of the measurement tank.

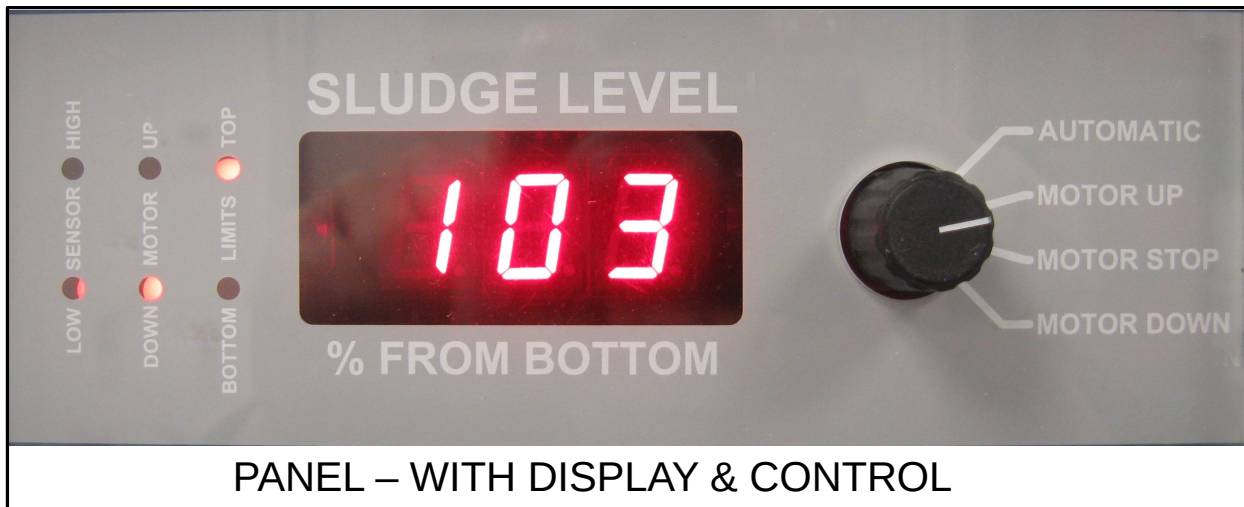
3.2.1 Encoder Disc Ranges



Number of Blades	Tank Depth (m)
1	11-20
2	5.5-11
4	3-6
6	2-4
8	1.5-2.5

4 Control Settings

The principle control during operation is the rotary switch; this allows the user to select the following operations



In '**AUTOMATIC**' mode the instrument will continually monitor the suspended solids density and will move the sensor up and down to track the sludge blanket interface. The **MOTOR UP/DOWN** and **STOP** positions are self-explanatory and are only used during the setup of the instrument.

On the circuit board there are a number of other controls, the function of these controls is explained in later sections:

Circuit Board Identity	Type of Control	Use
Zero	Push Button	Calibration
Top Limit	Potentiometer	Calibration
Bridge Clearance	Potentiometer	Scraper Clearance
VR1 - Motor Speed Control	Potentiometer	Factory setup
VR5 - 20mA Adjustment	Potentiometer	Factory setup
VR6 - 4mA Adjustment	Potentiometer	Factory setup
VR8 - 100%	Potentiometer	Factory setup
VR9 - 0%	Potentiometer	Factory setup
SW2 - Up	Push Button	Calibration and maintenance
SW1 - Down	Push Button	Calibration and maintenance
J1 - Link A	Jumper	Setup
J2 - Link B	Jumper	Setup
Reset Mode	Switch	Setup

4.1 Up and Down Buttons

The ASLD 2200 has 2 sets of Up and Down buttons; one set is on the outside of the enclosure the other set is on the main printed circuit board (protruding above the front panel). Both sets have the same function. These buttons are normally used to aid cleaning of the sensor by bringing the sensor to the surface.

Up and Stop

This button will cause the sensor to rise to the 100% point at the higher speed.

Down and Reset

This button will cause the sensor to return to automatic measurement



5 Installation

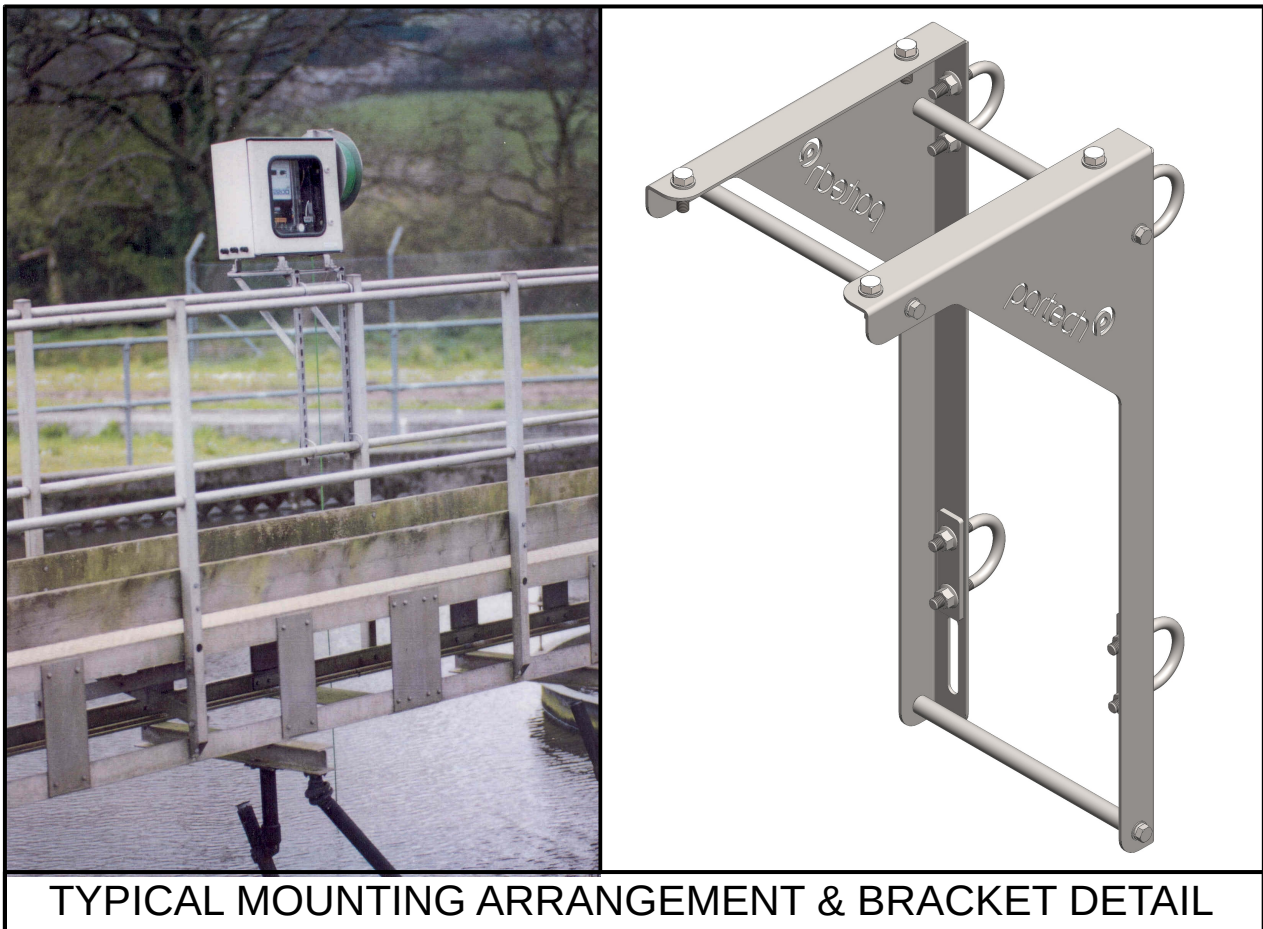
5.1 Location

The ASLD2200 is housed in an IP55 GRP outer enclosure and is suitable for mounting on the bridge of settlement tanks. The electronics for the monitor are housed within an inner IP65 enclosure.

It is recommended that the monitor be mounted approximately half way between the centre and the outside wall of the tank, on the leading edge. This offers allows the system to monitor the true settled interface whilst minimising the effect of disturbance caused by incoming sludge and by the tank scraper.

It is normal for the 4-20 mA output signal to be transmitted via slip rings to the site control system, where this is not possible Partech are happy to offer a radio telemetry system for transmission directly to the desired point.

Partech offer a mounting bracket shown below that allows easy attachment to tank handrails.



The ASLD2200 weighs 15 kg and can be difficult to handle, it is advisable to have assistance when installing this instrument.

Do not lift the ASLD2200 by its cable drum.

6 Configuration

The ASLD2200 requires very little configuration, the user must check the following details before use. If you find that the incorrect sensor or encoder disc has been purchased contact Partech to arrange a replacement.

6.1 Sensor Selection

The IR sensors are available in four ranges; which are shown below along with typical applications.

Part Number	Description	Typical Application
102201	IR100, Range 0-200 mg/l	Water Treatment Clarifiers
101901	IR40, Range 0-1,500 mg/l	Sewage Treatment Final Settlement Water Treatment Primary
101601	IR15, Range 0-10,000 mg/l	Sewage Treatment Primary Water Treatment Thickeners
148121	IR8, Range 0-30,000 mg/l	Sewage Treatment Thickeners

6.2 Depth Range Selection

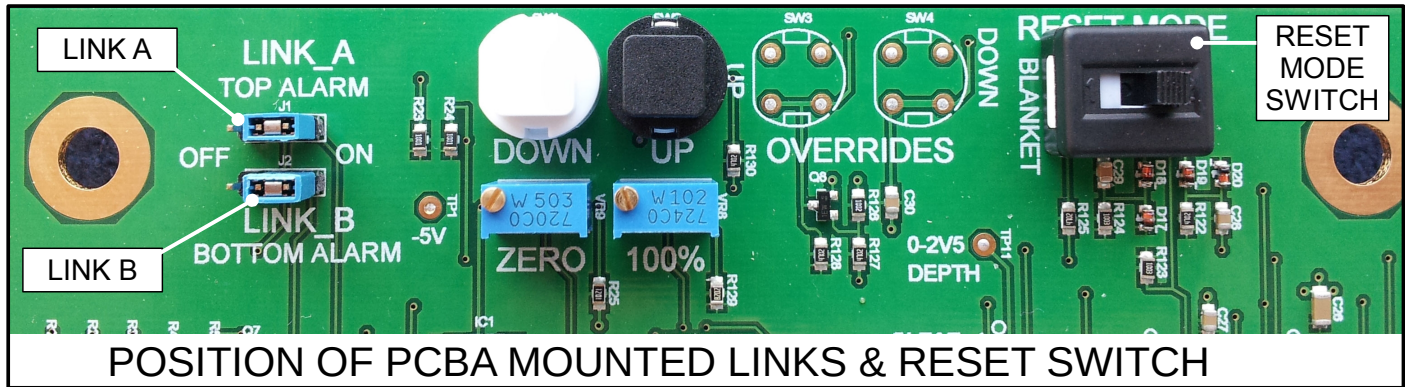
The depth range depends on the encoder disc that has been fitted to the instrument, this can be found near the motor assembly.

No of Blades	Motor Assembly Version 2 CURRENT VERSION (Thick aluminium side plates)		Motor Assembly Version 1 OLD VERSION (Thin stainless steel side plates)	
	Minimum Range (metres)	Maximum Range (metres)	Minimum Range (metres)	Maximum Range (metres)
1	11.0	20.0	5.6	13.8
2	5.5	11.0	2.8	6.9
4	3.0	6.0	1.4	3.4
6	2.0	4.0	1.0	2.2
8	1.5	2.5	0.8	1.6

The instrument will have been fitted with one of these encoder discs, and will have been selected prior to order placement. The encoder disc can be changed in the field if required, see the rear of the manual for part numbers.

6.3 Links

The circuit board has two sets of links (LINK_A & LINK_B), and a 'Reset Mode' switch that need to be set in the correct position for the application.



POSITION OF PCBA MOUNTED LINKS & RESET SWITCH

Link A

When a jumper is placed the 'ON' position the limit relay will activate when the top limit LED is on – display is reading 100%. The factory default is for this jumper to be in the 'ON' position.

Link B

When a jumper is placed the 'ON' position the limit relay will activate when the bottom limit LED is on – display is reading 0%. The factory default is for this jumper to be in the 'ON' position.

RESET MODE SWITCH

Switch to 'RIGHT' with **white ident** towards 'BLANKET' label

On power up, either during commissioning or after a power failure the sensor will immediately start to search for the sludge blanket.

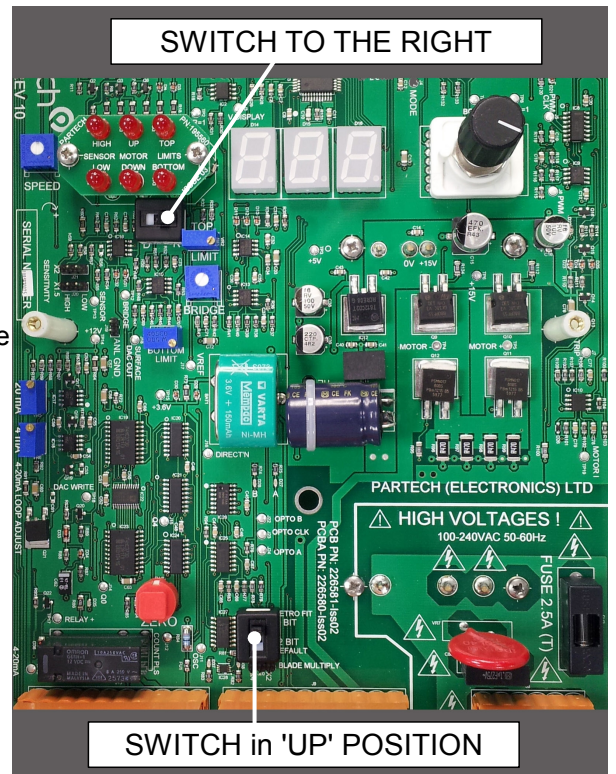
Switch to 'LEFT' with **white ident** towards 'TOP' Label

On power up, either during commissioning or after a power failure the sensor will lift to the top limit. It will then wait for the down button to be pressed.

This switch setting will only effect operation with the rotary switch on 'automatic'. Other settings of the rotary switch will override this feature.

The factory setting for this **switch** is to the **right** (with **white ident** showing towards 'BLANKET')

Switches **SW7** & **SW9** (as illustrated in the diagram on the right) are set in the position shown. **Do not move these switches**. They are intended for future enhancements of ASLD operation.



7 Calibration

Calibration is carried out in 2 stages; firstly set the zero point, then the 100% value. As the sensor is going to be lowered to the bottom of the tank it is important that attention is paid to any hazards such as moving scrapers below the surface of the tank.

NOTE: The Zero & 100% potentiometers mounted on the PCBA play no part in the calibration routine.

7.1 Set Zero

Set the rotary switch to 'motor stop' and take the sensor down to the bottom of the tank by taking loops of cable off the drum. Once the cable is close to the bottom of the tank gently raise and lower the sensor and it will be possible to 'feel' the bottom of the tank. Use the 'motor up' position of the rotary switch to move the sensor such that it is approximately 25 mm from the bottom of the tank. Press the Red Zero push button to set the zero point, it is sometimes necessary to press this button a few times to ensure a correct zero setting.

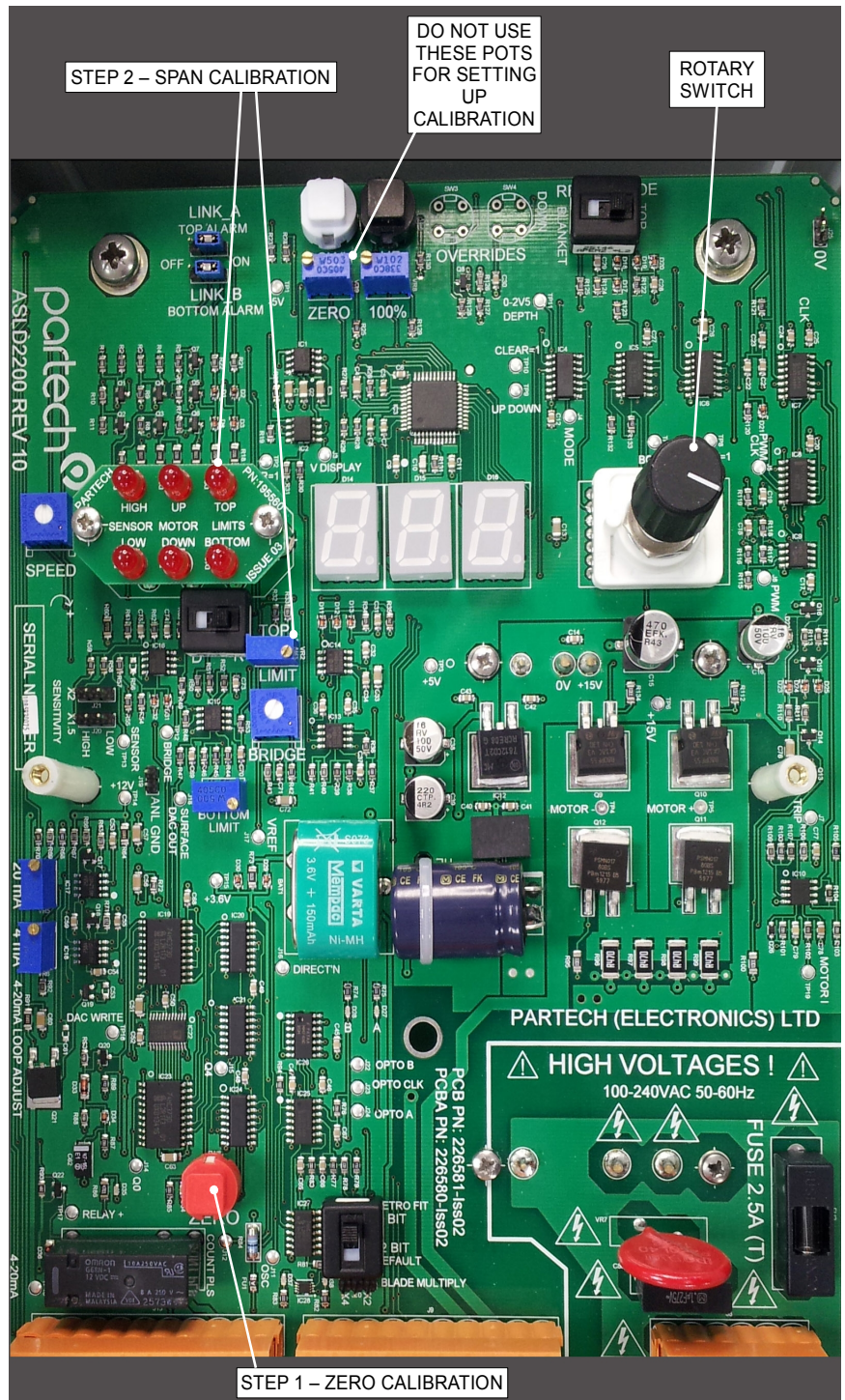
It is important that the zero point is set above the bottom of the tank, if the sensor is allowed to drag on the floor of the tank damage can occur and there is a danger that the sensor can become entangled in the scraper mechanism.

7.2 Set Span

Now use the 'motor up' position to bring the sensor to the water surface. It is normally advisable to leave the bottom part of the sensor (approximately 50 mm) under the surface.

Set the rotary switch to 'motor stop' and adjust the Top Limit potentiometer until the TOP LIMIT LED comes on (3 digit LED display should approx be 100)

It is advisable to run the instrument back down to 0 to confirm that the calibration has been performed satisfactorily.



8 Scraper Clearance

In certain applications such as those where the ASLD2200 is installed on a fixed bridge above a moving scraper it is necessary to bring the sensor above the water surface to prevent damage to the sensor.

The ASLD2200 allows the user to instruct the sensor to rise to 100% to allow the scraper to pass and then return to the tank to continue measurement.

It is recommended that the installer consult Partech before starting installation to ensure that the correct measures are taken to prevent damage to either instrument or to the scraper mechanism.

Under normal circumstance it is possible to place a detector ahead of the bridge that will provide the 'up' command and another sensor after the bridge that will provide the 'down' command.

These external sensors can be wired in parallel to the up and down button on the outside of the enclosure using terminals 1 to 3.

8.1 Bridge Clearance Control

Associated with the scraper clearance function is the Bridge Clearance adjustment, this allows the sensor to come clear of the water to allow the scraper to pass. To adjust use the following steps:

Raise the sensor to the surface using the rotary switch.

Select 'motor off'

Turn off power

Set RESET MODE SWITCH to the LEFT (White Ident to the right)

Turn on power

Select 'motor up' and turn the bridge clearance control clockwise until the sensor is raised far enough to allow the scraper to pass. This can be set to a maximum of 110%.

Return the unit to 'automatic' and press down to return to measurement.

If power is temporarily lost the sensor will rise to the surface on power up and remain there until the scraper passes after which it will return to automatic measurement.

9 Outputs

9.1 Analogue Output

The ASLD2200 has one analogue output that is directly proportional to the 0 to 100% digital display. Under normal circumstances this relates to 4 mA with the sensor at the bottom of the tank and 20 mA with the sensor at the water surface.

There is no need to make any field adjustments during commissioning. If during maintenance it is felt that the 4-20 mA signal needs calibration this can be carried out using the 4 mA and 20 mA potentiometer adjustments.

To calibrate the analogue output connect a multimeter on the mA setting. Remove J13 and connect multimeter across Pins 4 & 5. The 'motor up' and 'motor down' controls can then be used to force the output to 4 mA and 20 mA as necessary.

If the 'Up' button is pressed at any time the 4-20 mA loop will go to 12 mA until the 'Down' button is pressed and the sludge blanket is detected.

9.2 Limit Relay

The ASLD2200 is equipped with a relay that is normally open; when either the top or bottom limit is reached this contact will close. Either or both top and bottom limits can cause this relay to activate, links A and B are used to configure this feature.

It should be noted that the trip point is not adjustable.

10 Maintenance

10.1 General Precautions

- Do not lift the unit by the drum
- Check that the unit is bolted firmly to the support bracket

Warning: Isolate the mains supply before commencing any maintenance to the electronics enclosure; the external switch does not isolate the electronics

10.2 Routine Maintenance

The sensor will require routine cleaning; the frequency of cleaning is site dependent and should be determined by observation of the sensor during the first few weeks of operation.

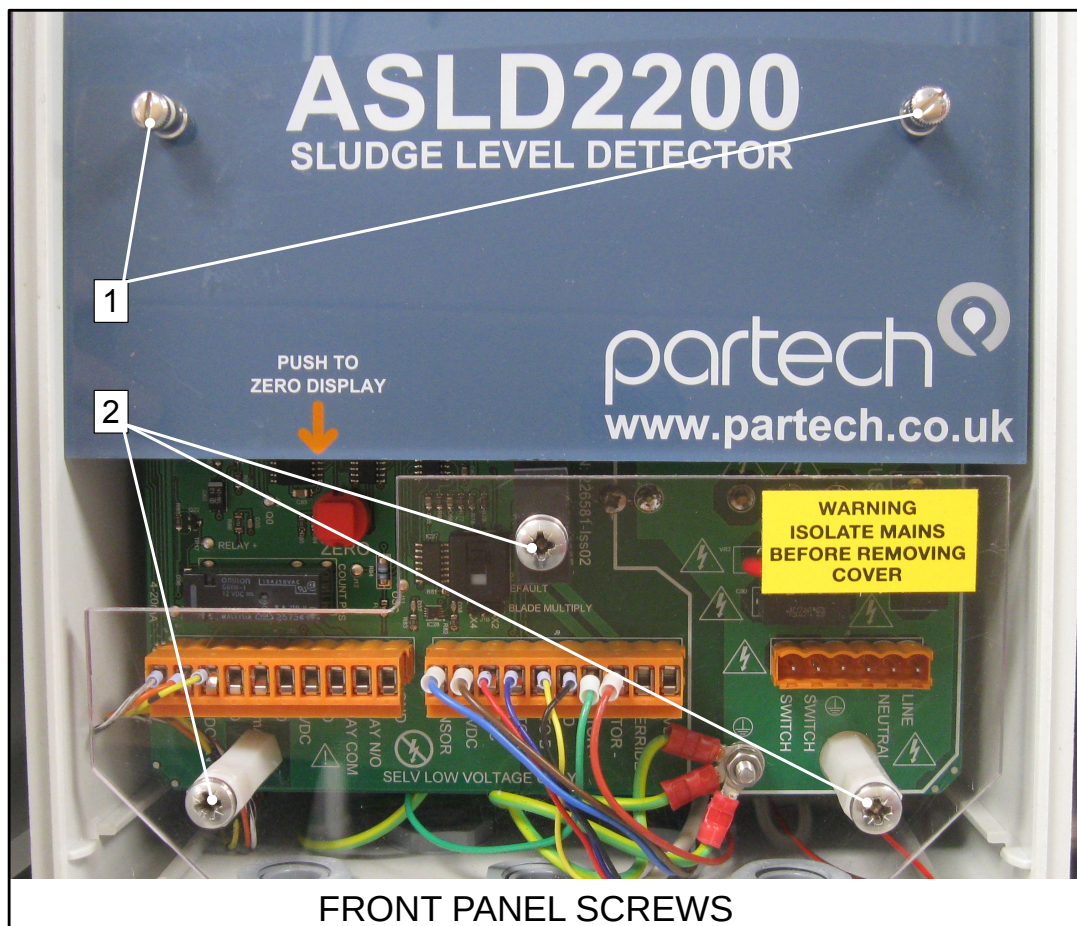
Typically the sensor should be cleaned once per fortnight, although on many sites once per month is sufficient.

The sensor can be cleaned using a soft cloth; no special cleaning materials are required.

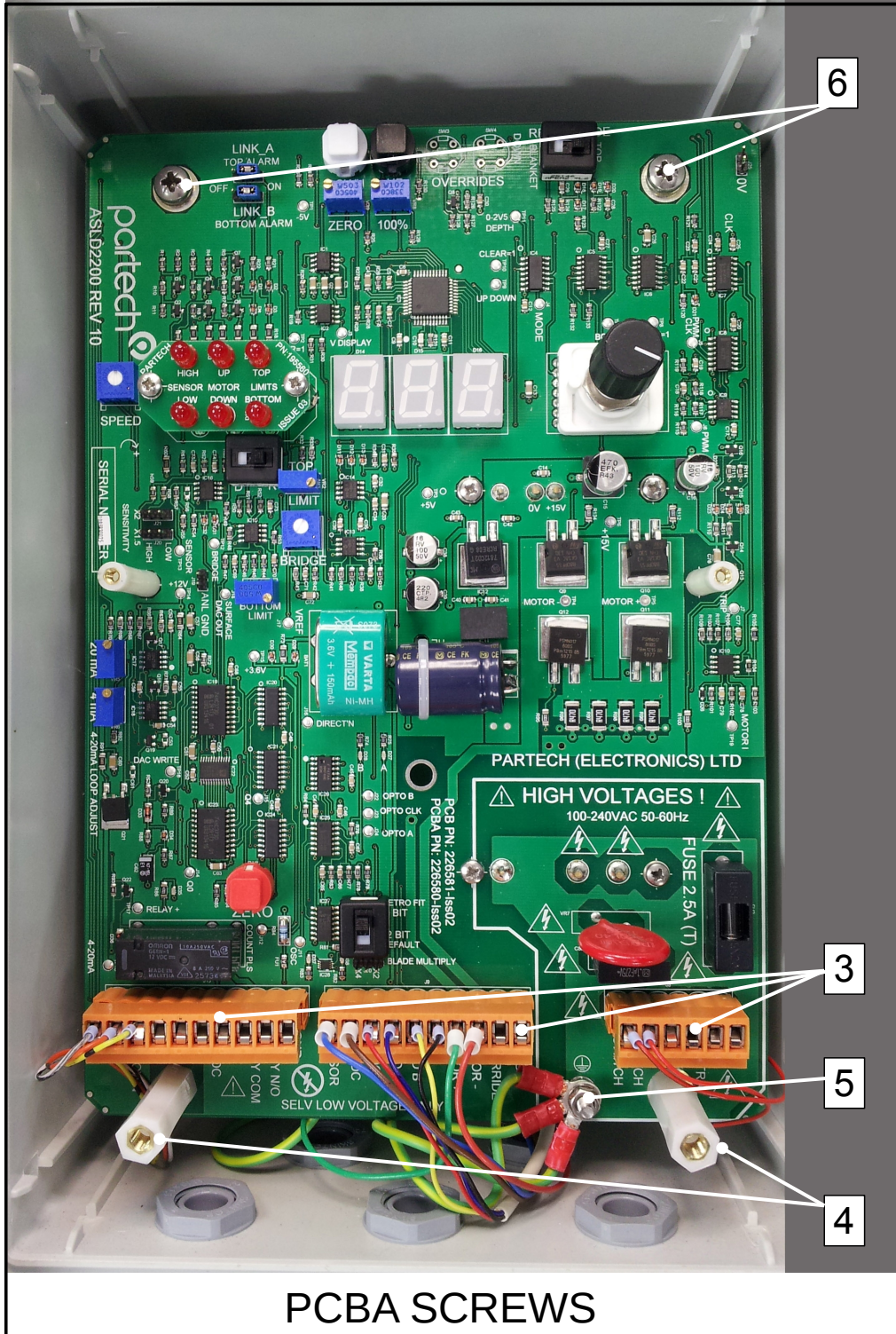
Care must be taken to ensure that no loops of cable are displaced during cleaning and the sensor should be lowered carefully into the tank after cleaning.

10.3 Removal of the Printed Circuit Board Assembly

1. Unscrew thumb screws and remove Front panel
2. Unscrew 3 pozi screws and remove terminal cover.

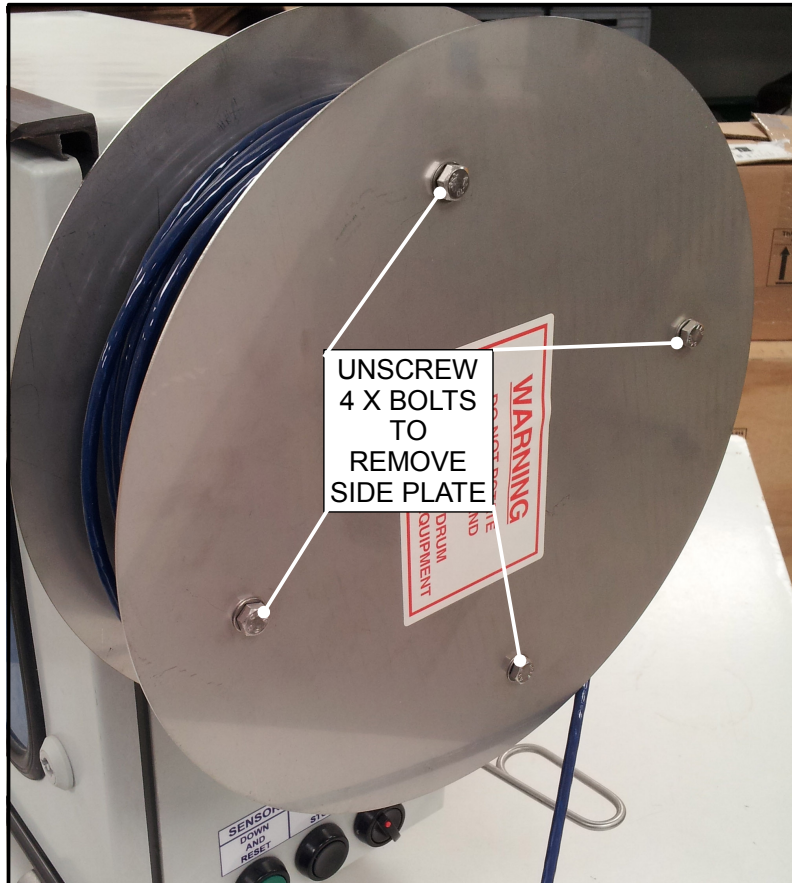


3. Remove 3x Orange connectors
4. Remove 2X Nylon pillars
5. Unscrew earth nut and remove earth wires
6. Remove 2x Posi head screws and remove printed circuit board assembly

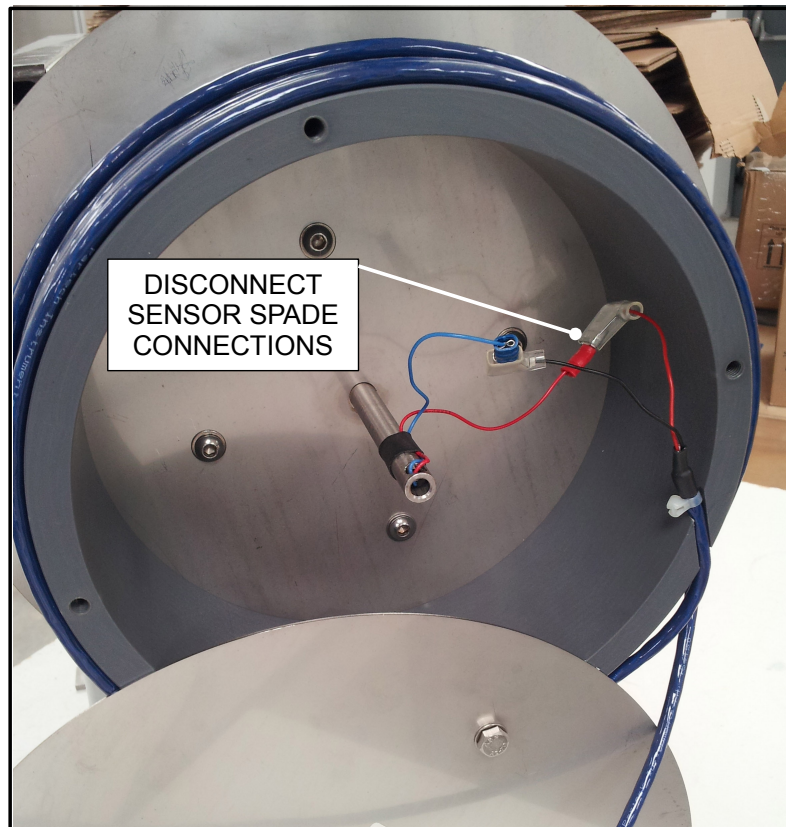


PCBA SCREWS

10.4 Sensor replacement



SIDE PLATE REMOVAL



SENSOR WIRING REMOVAL

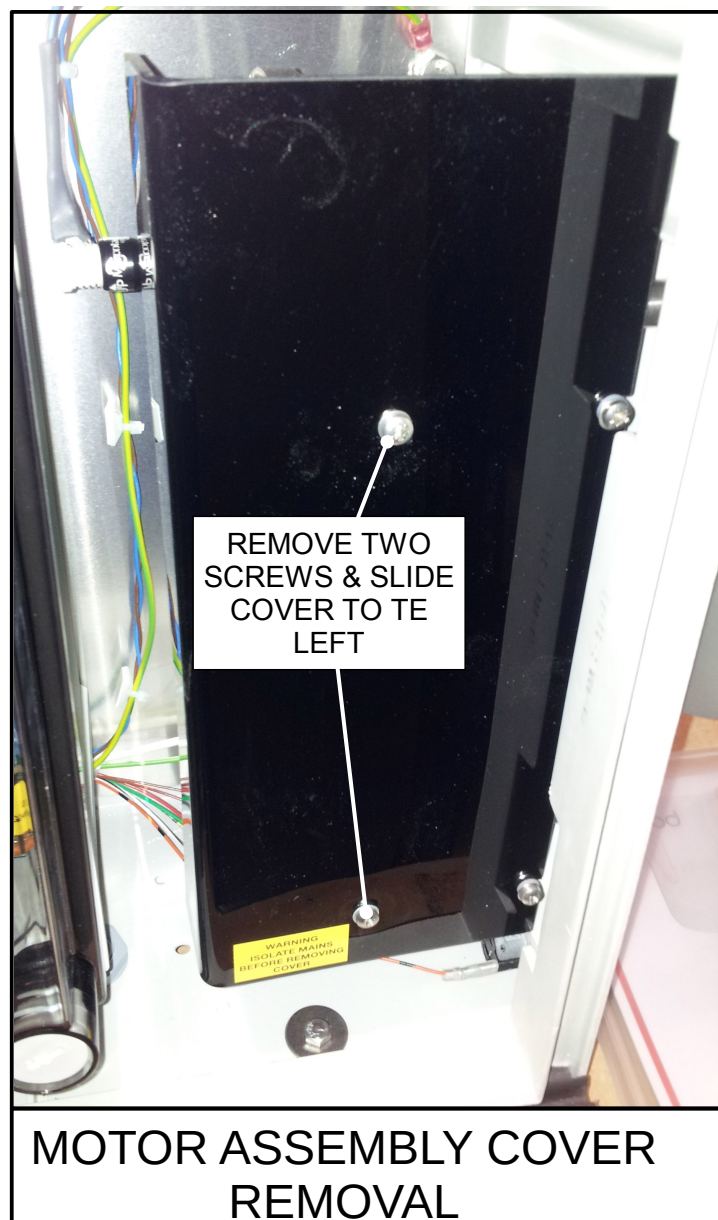
11 Fault Finding

Listed below are some of the common problems found on the ASLD2200, the list is not comprehensive and if you are in any doubt please contact your local distributor or Partech.

11.1 Symptom: Digital display changes but does not relate correctly to the sensor position

Fault: Encoder incorrectly positioned

Remove motor assembly cover as per photograph below



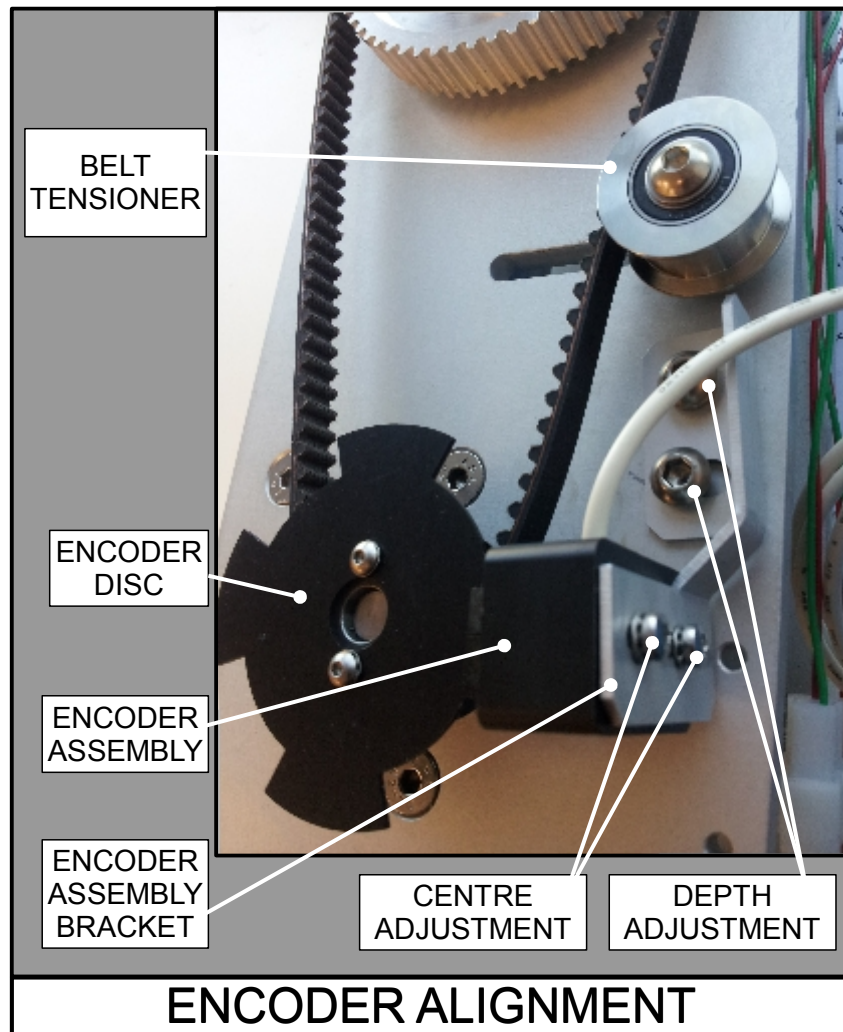
Encoder centre adjustment

Loosen 2x pozi screws on encoder bracket and slide the encoder assembly left or right until the encoder arms are positioned centrally over the blade of the encoder disc

Encoder depth adjustment

Loosen the 2x Allen screws and adjust encoder bracket so that the encoder disc blade is positioned deep into the encoder arms about 1mm clearance from the back.

After adjustment, check that disc blade is not touching any part of the encoder when the motor is moving.



11.2 Symptom: The sensor drives to the top limit.

11.2.1 Fault: Sensor is fouled

Clean the sensor.

If the problem persists after sensor cleaning then the sensor is likely to have failed. Contact Partech.

11.2.2 Fault: Faulty External UP Switch

Replace switch

11.3 Symptom: Motor does not respond to changes in the sludge blanket level; sensor working correctly.

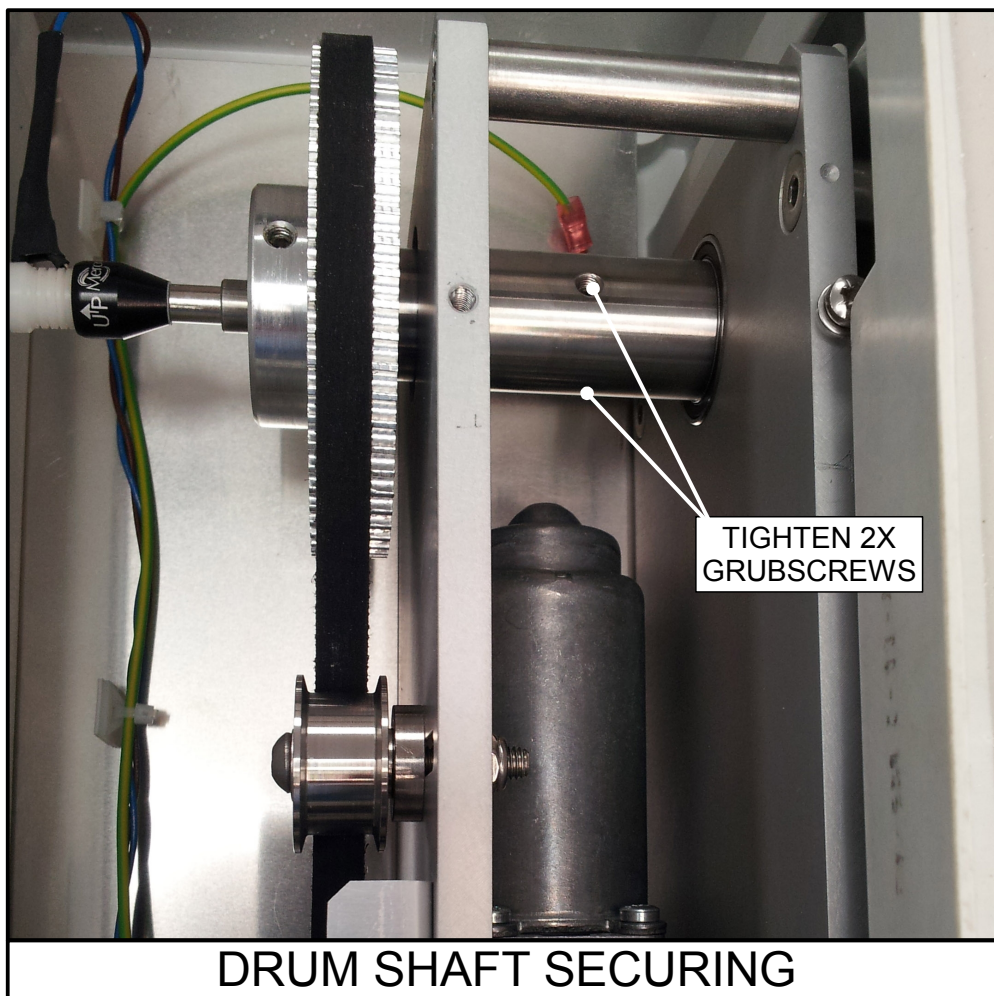
Fault: Printed circuit board assembly fault.

Remove the printed circuit board assembly as described in **section 10.3** above, and return to Partech for investigation. Pack the board carefully protecting the selector switch

11.4 Symptom: Excessive play on cable drum

Fault: Loose grub screws securing cable drum shaft

Tighten grub screws.



11.5 Sensor operation check

- Using the selector switch manually drive the sensor up or down till the display reads 80%
- Remove the sensor from the water and check the sensor operation as follows:
- Block the light path between the sensor gap and the **Hi LED** should light up
- Unblock the light path between sensor gap and the **LO LED** should light up

If this is not successful check continuity of sensor wiring between the orange terminal connector 11 & 12 (Sensor & 12v DC) and the spade connectors inside the drum.

- Red sensor wire with spade connector routes to brown wire on J9 (12V DC).
- Black wire with spade connector routes through to blue wire on J9 (Sensor)

12 Spare Parts

The parts listed below are available for the ASLD2200; it is advisable to contact your local distributor or Partech's technical support team before purchasing these parts to ensure that the correct items are purchased.

12.1 Sensor

Part No	Description
102201	IR100 Sensor for ASLD2200
101901	IR40 Sensor for ASLD2200
101601	IR15 Sensor for ASLD2200
148121	IR8 Sensor for ASLD2200

12.2 General

Part No	Description
101170	Mounting Bracket for ASLD2200
103370	Instruction Manual for ASLD2200

12.3 Repair

Part No	Description
117150	Encoder Disc 1 Bladed for ASLD2200
117160	Encoder Disc 2 Bladed for ASLD2200
117170	Encoder Disc 4 Bladed for ASLD2200
121950	Encoder Disc 6 Bladed for ASLD2200
121960	Encoder Disc 8 Bladed for ASLD2200
222326	ASLD2200 Motor Assembly Version 2
222341	Drive Belt ASLD2200 Motor Assembly Version 2
228988	Replacement PCBA ASLD2200 Rev 10 - For ASLD2200 already fitted with Rev 10 PCBA
226784	Fuse 2.5A T 250V Anti-surge

13 Technical Specifications

13.1 General

Supply Voltage	115/230 VAC, 50/60 Hz, +10/-15%
Power Consumption	25 VA
Supply Fuse	Fuse 2.5A T 250V Antisurge 5mm x 20mm Glass (Fitted to PCBA)
Operating Temperature	0 to 50°C
Storage Temperature	-20 to 70°C
Display	3 Digit LED
Sensing Speed	1 metre per minute
Manual Operation Speed	5 metres per minute
Accuracy	Dependent on depth of tank typically +/- 5%*
Resolution	+/- 100 mm*
Terminals:	Max conductor cross section 2.5 mm ²

13.2 Alarm Output

Number of Output	1 Contact Closure
Alarm Types	Zero and/or 100% fixed
Relay Rating	0.5 A @ 100 VDC

13.3 Analogue Output

Type:	4-20 mA
Resolution:	Better than 1%
4-20mA Maximum Output Load:	500 Ohms

13.4 EMC

EMC:	EN 50081-1 (1992), EN 50082-1 (1994)
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13.5 Physical Features

Dimensions:	350 x 490 x 382 mm (w x h x d)
Weight:	15 Kg
Environmental Rating:	IP55 Outer Enclosure IP65 Electronics Housing
Material:	GRP
Cable Entry:	3 x PG11
Mounting Legs	10 mm holes

14 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

14.1 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 INSTRUMENTS

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

15 Declaration of Conformity**DECLARATION OF CONFORMITY****According to EN 45014**

We, Partech Instruments, Rockhill Business Park, Higher Bugle, St Austell, Cornwall, United Kingdom, declare under our sole responsibility that the product:

Product Name: ASLD2200 Monitor
Model Number(s): 167430

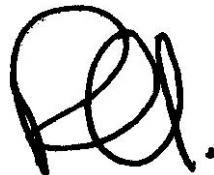
to which this declaration relates is in conformity with the standards noted below:

EN 50081-1 (1992) EMC Generic Emission Standard
Residential, commercial & light industry

EN 50082-1 (1994) EMC Generic Immunity Standard
Residential, commercial & light industry

following the provisions of European Directives:

89/392/EEC	Machinery Directive
91/368/EEC	Amending 89/392/EEC
93/44/EEC	Amending 89/392/EEC
89/336/EEC	Electromagnetic Compatibility Directive
92/31/EEC	Amending 89/336/EEC
93/68/EEC	Amending 89/336/EEC
73/23/EEC	Low Voltage Directive
93/68/EEC	Amending 73/23/EEC



Roger Henderson, Technical Director, September 2003

