

Navigator ADS551

Low level dissolved oxygen



Replacement / Upgrade procedures – wet section spares, kit references:

- flowcell
- tundish
- flowmeter
- drain valve
- Modbus cable

Measurement made easy

Navigator ADS551
wet section

1 Introduction

This publication details replacement / upgrade procedures for the following Navigator ADS551 wet section spares:

Before carrying out any procedures, read Section 3 – Health & Safety. These procedures must be carried out by a suitably-trained technician.

Tools required

- Pozidrive screwdriver
- Slot-head terminal screwdriver
- Anti-static strap
- Spanners (adjustable)

2 For more information

Further information is available from: www.abb.com/analytical

or by scanning these codes:



Sales



Service

3 Health & Safety

WARNING – Bodily injury

These procedures must be carried out by a trained technician.



Chemical

- Ensure personal protective equipment (PPE) such as gloves and eye protection are worn during any maintenance.
- Observe all health and safety procedures for handling chemicals.
- To familiarize yourself with handling precautions, dangers and emergency procedures, always review the Material Safety Data Sheets prior to handling containers, reservoirs and delivery systems that contain chemical reagents and standards.
- Take care if cleaning any spillages and observe all relevant safety instructions. Wipe up any spillages using clean water.



Electrical

- Isolate all high voltage supplies to the transmitter before performing replacement procedures.
- The wet-section is vulnerable to electrostatic damage. Wear an anti-static strap or dismantle the wet-section on an anti-static workbench.
- Ensure all electrical connections are kept dry at all times.



General

- Shut off the external sample supply to the wet-section and drain the flowcell - refer to the wet-section Operating instructions (OI/ADS550-EN) for flowcell drainage options.
- When a procedure is complete, restore power to the transmitter and sample to the wet-section at the correct flow rate. If necessary, calibrate the wet-section – refer to the wet-section Operating Instructions (OI/ADS550-EN) for calibration instructions.
- Perform general cleaning of the wet section using a damp cloth only – mild detergent can be used as a cleaning aid. Do not use Acetone or any organic solvents.

4 Overview

Flowcell PCB assembly, PCB housing cover, PCB housing gasket (replacement – page 4):

- AW502 228 flowcell PCB housing gasket
- AW502 227 flowcell PCB housing cover
- AW502 225 PCB assembly

Tundish assembly (replacement – page 5):

- AW502 065 tundish assembly

Flowmeter assembly (replacement – page 5 / upgrade – page 9):

- AW502 250 flowmeter assembly (upgrade kit)
- AW502 060 flowmeter assembly (replacement kit)

Drain valve assembly (replacement – page 6 / upgrade – page 10):

- AW502 240 drain valve assembly (upgrade kit)
- AW502 056 drain valve assembly (replacement kit)

Temperature sensor assembly (replacement – page 6):

- AW502 220 temperature sensor assembly

Modbus cable assembly (replacement – page 7):

- AW502 090 1.5 m (4.9 ft. cable)
- AW502 091 5 m (16.4 ft. cable)
- AW502 092 10 m (32.8 ft. cable)

Flow control valve (replacement – page 8 / upgrade – page 11):

- AW502 270 flow control valve assembly (upgrade kit – imperial)
- AW502 275 flow control valve assembly (upgrade kit – metric)
- AW502 068 flow control valve assembly (replacement kit – imperial)
- AW502 069 flow control valve assembly (replacement kit – metric)

5 Overview

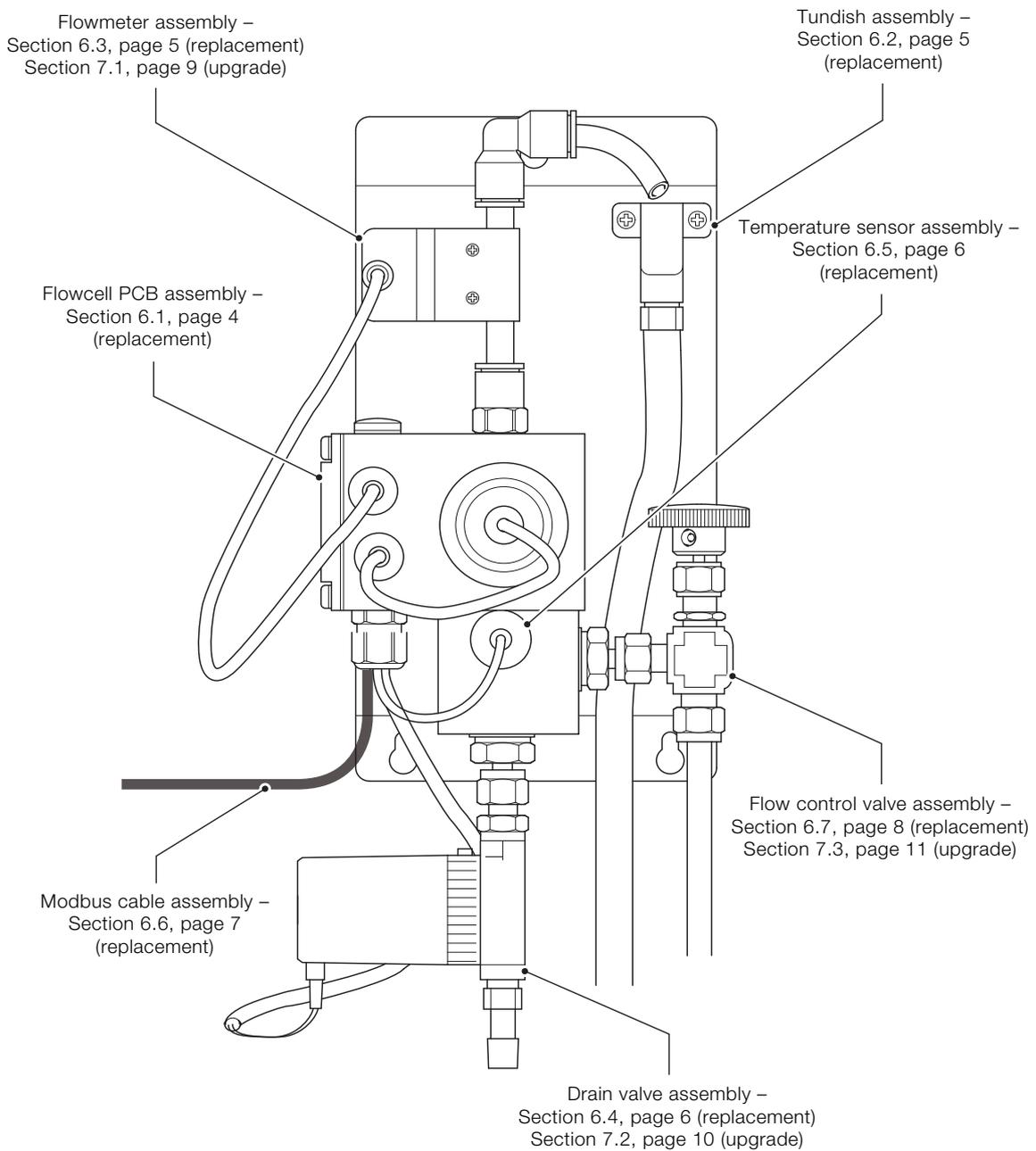


Fig. 5.1 ADS551 Wet section spares – item locations

6 Replacement procedures

6.1 Replacing the flowcell PCB housing gasket, PCB housing cover and PCB

Part numbers:

- AW502 228 flowcell PCB housing gasket
- AW502 227 flowcell PCB housing cover
- AW502 225 PCB assembly

Referring to Fig. 6.1:

1. Remove and retain 4 flowcell PCB cover fixing screws and washers (A) and remove PCB cover (B).
2. Remove flowcell PCB housing gasket (C). If replacing the gasket, discard.
3. If replacing PCB assembly (D), disconnect all cables from the terminal block on the PCB assembly, loosen all cable glands then remove cables. It is necessary to partially remove the glands, blanking plugs and the LLDO connector to remove PCB assembly (D).
4. Remove and retain 2 PCB fixing screws and fibre washers (E) and remove PCB assembly (D). Take care not to lose 2 spacers (F) fitted on the screw threads behind the PCB assembly.

IMPORTANT (NOTE)

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To secure the new PCB into the flowcell PCB housing, pass 2 PCB fixing screws and fibre washers (E) through the PCB mounting holes, fit the spacers (F) onto the screw threads.

5. Carefully offer PCB assembly (D) up into the flowcell PCB housing and tighten 2 PCB fixing screws.
6. Remake cable connections (disconnected at step 3) – refer to Fig. 6.2 and Table 6.1 for terminal connections.
7. Tighten the cable glands, plugs and LLDO connector into the flowcell PCB housing to ensure a watertight seal.

8. Refit, or for new items, fit flowcell PCB housing gasket (C) and cover (B) using 4 PCB cover fixing screws and washers (A). (Ensure flowcell PCB gasket (C) is located correctly.)

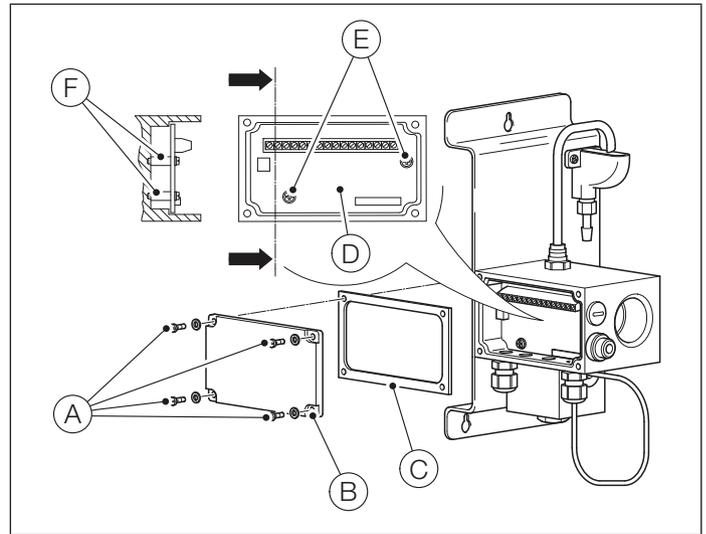


Fig. 6.1 Replacing the flowcell PCB housing gasket, PCB housing and PCB

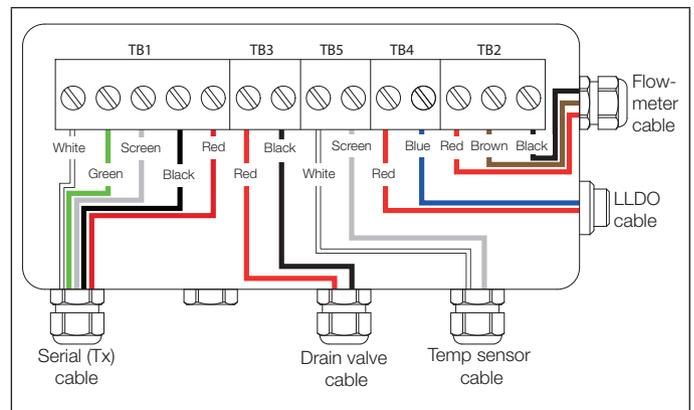


Fig. 6.2 Cable connections to transmitter – ADS551

Cable	Color	Terminal block ID	Description
Serial	White	TB1	Data -ve
	Green		Data +ve
	Screen		Screen
	Black		0 V
	Red		24 V
Drain valve	Red	TB3	+ve
	Black		-ve
Temp sensor	White	TB5	Pt1000
	Screen		Pt1000
LLDO sensor	Red	TB4	+ve LLDO sensor
	Blue		-ve LLDO sensor
Flowmeter	Red	TB2	+ve
	Brown		GND
	Black		-ve

Table 6.1 Cable connections to transmitter – ADS551

6.2 Replacing the tundish assembly

Part number:

— AW502 065 tundish assembly

Referring to Fig. 6.3:

1. Rotate sample outlet tube (A) until the open end is free of tundish assembly (B).
2. Disconnect drain tube (C) from tundish assembly (B).
3. Unscrew and remove 2 tundish retaining screws (D) taking care to retain spacers (E) located between the rear of the tundish assembly and the main case.
4. Remove old tundish assembly (B).
5. Fit the new tundish assembly by reversing the removal procedure.

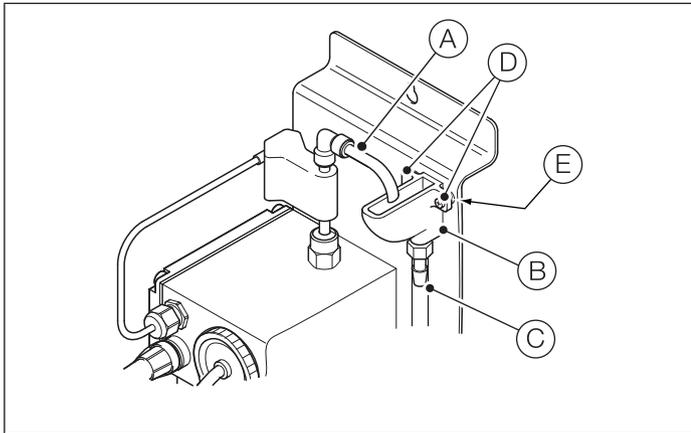


Fig. 6.3 Replacing the tundish assembly

6.3 Replacing the flowmeter assembly

Part number:

— AW502 060

Referring to Fig. 6.4:

1. Depress manual override button (A) on the drain valve assembly to drain the flowcell.
2. Remove the flowcell PCB cover as detailed in step 1 of Section 6.1, page 4.
3. Loosen cable gland (B) at the flowcell PCB housing (C).
4. Disconnect flowmeter cable (D) from wet-section PCB terminals TB2 – see Fig. 6.7, page 7 and remove cable.
5. Depress the QD coupling collar (E) on QD coupling (F) and lift the top QD coupling (F) complete with sample outlet tube (G) away from the flowmeter (H).
6. Depress the QD coupling collar (K) on QD coupling (L) and lift the flowmeter away.
7. Fit the replacement flowmeter into the QD coupling (L) and refit QD coupling (F) to the flowmeter outlet.

i IMPORTANT (NOTE)

Ensure orientation of the flow arrow on the flowmeter is upwards.

8. Pass the flowmeter cable through the cable gland (B) at the flowcell PCB housing (C) and terminal connections to PCB terminals TB2 – Fig. 6.7, page 7.
9. Tighten cable gland (B) and refit the PCB cover as detailed in step 1 of Section 6.1, page 4.
10. Ensure the sample outlet tube (G) is located correctly in the tundish assembly (J).

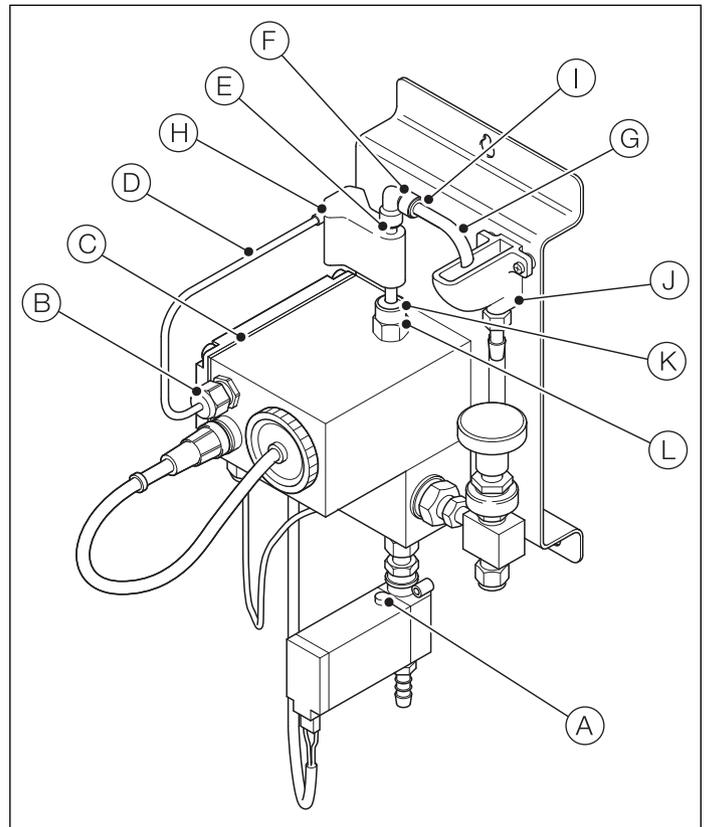


Fig. 6.4 Replacing the flowmeter assembly

6.4 Replacing the drain valve assembly and drain valve cable assembly

Part number:

— AW502 056

Referring to Fig. 6.5:

1. Depress manual override button (A) on drain valve (B) to drain the wet-section.
2. Disconnect clip-on cable connector (C) from the end of the drain valve coil housing by depressing clip (D).
3. Disconnect the drain tube from barbed outlet connector (E) on the bottom of drain valve (B).
4. Lock hex coupling (G) and rotate nut (H) clockwise to release couplings. Remove the valve assembly, complete with coupling (G). Remove coupling (G) from the valve assembly and fit to new valve, complete with new bonded seal (I).
5. If fitting a new drain valve cable assembly, remove the wet-section cover as detailed in step 1 of Section 6.1, page 4, loosen the drain valve cable gland in the wet-section PCB housing and proceed with steps 6, 7 and 8 (below). If using the existing cable, re-connect the clip-on cable connector (C) to the end of the drain valve coil housing.
6. Disconnect the drain valve cable from the terminal block – see Fig. 6.7, page 7 and discard the cable.
7. Feed the replacement drain valve cable through the cable gland and make connections to PCB wet-section terminals TB3 (see Fig. 6.3, page 5) and at the transmitter (see Operating instruction OI/ADS550-EN).
8. Connect the drain valve clip-on cable connector (C) to the end of the drain valve coil housing.
9. Reconnect the drain tube to barbed outlet connector (E) on bottom of drain valve (B).

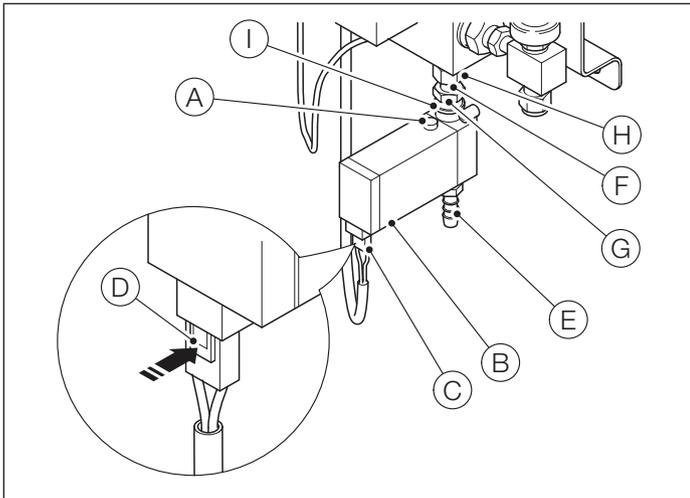


Fig. 6.5 Replacing the drain valve assembly and drain valve cable assembly

6.5 Replacing the temperature sensor assembly

Part number:

— AW502 220

Referring to Fig. 6.5:

1. Depress manual override button (A) on drain valve (B) to drain the wet-section.

Referring to Fig. 6.6, page 7:

2. Remove and retain 4 flowcell PCB cover fixing screws and washers (C) and remove PCB cover (D).
3. Remove flowcell PCB housing gasket (E).
4. Loosen cable gland (F).
5. Loosen terminal screws (G) and disconnect temperature sensor cables (H) from TB5.
6. Withdraw sensor cables (H) from flowcell PCB housing (I) through cable gland (F).
7. Unscrew the knurled nut on temperature sensor assembly (J) and carefully withdraw the temperature sensor from flowcell housing (K).

IMPORTANT (NOTE)



Check existing small O-ring (L) fitted on the end of the temperature sensor is withdrawn along with temperature sensor assembly (J).

8. Ensure a new O-ring (L) is securely located on the new temperature sensor, insert the sensor into flowcell housing (K) and tighten the knurled nut on temperature sensor assembly (J) finger-tight.
9. Feed cables from the new temperature sensor through cable gland (F), make connections correctly at TB5 and tighten screws (G).
10. Tighten cable gland (F).
11. Refit flowcell PCB housing gasket (E) ensuring it is located correctly.
12. Refit PCB flowcell cover (D) and secure with 4 flowcell PCB cover fixing screws and washers (C).

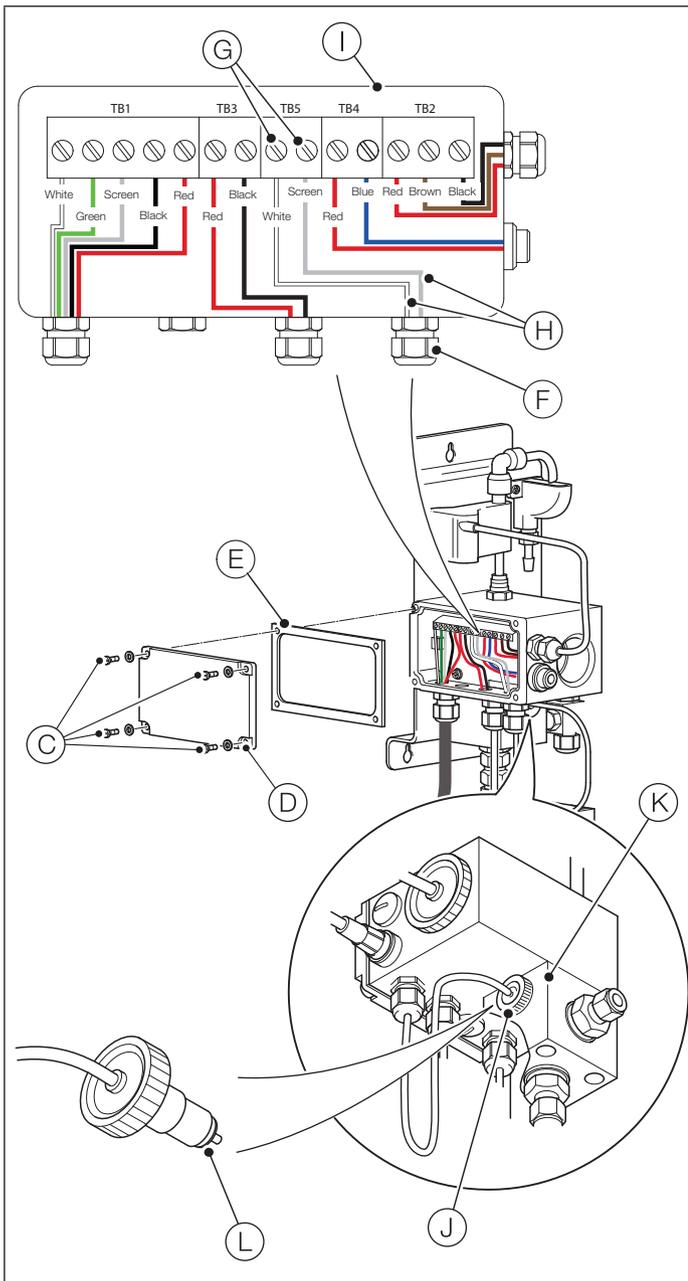


Fig. 6.6 Replacing the temperature sensor assembly

6.6 Replacing the Modbus cable assembly

Part numbers:

- AW502 090 / 1.5 m (4.9 ft.)
- AW502 091 / 5 m (16.4 ft.)
- AW502 092 / 10 m (32.8 ft.)
- AW502 093 / 20 m (65.6 ft.)

Referring to Fig. 6.1, page 4:

1. Remove the PCB cover.

Referring to Fig. 6.7:

2. Loosen cable gland (A) at the wet-section PCB housing (B) and disconnect the Modbus cable (C) from terminal block connections (D) (TB1) marked white, green, screen, black and red.
3. Withdraw Modbus cable (C) from the PCB housing and flowcell case assembly and discard.
4. Feed the replacement Modbus cable through cable gland (A) and remake connections to the (TB1) white, green, screen, red and black terminal connections at the wet section PCB and at the transmitter.
5. Refit the PCB cover by reversing the removal procedure.

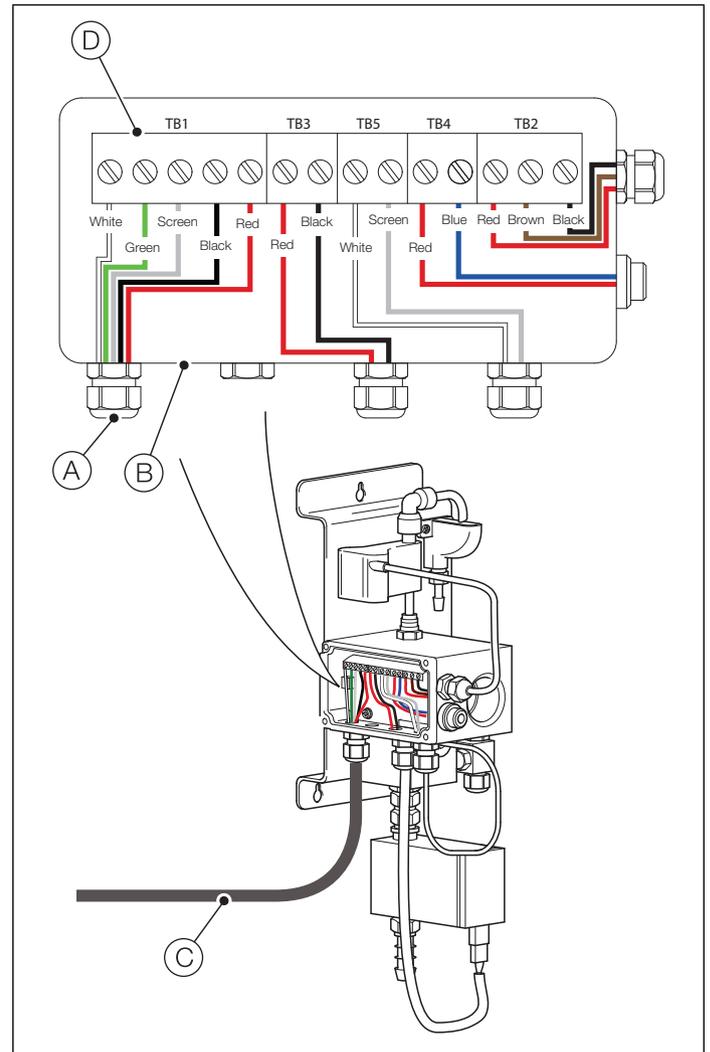


Fig. 6.7 Replacing the Modbus cable assembly

6.7 Replacing the flow control valve assembly

Part number:

- AW502 068 (imperial, for 1/4 in. pipe)
- AW502 069 (metric, for 6 mm pipe)

IMPORTANT (NOTE)

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- Ensure the correct kit has been ordered (6 mm pipe or 1/4 in. pipe).
- Before proceeding, shut off flow to the flowcell assembly.

Referring to Fig. 6.8:

1. Depress manual override button (A) on drain valve (B) to drain the wet-section.
2. Unscrew coupling nut (C) at the flow control valve inlet and remove sample feed pipe (D).
3. Unscrew coupling nut (E) and remove old flow control valve (F).
4. Offer up replacement flow control valve (F) to inlet stub (G) on flowcell assembly (H) and with the flow control valve in the vertical position, lightly nip up coupling nut (E) – do not tighten at this stage.
5. Push sample feed pipe (D) into the base of replacement flow control valve (F) and lightly nip up coupling nut (C) – do not tighten at this stage.
6. Check that sample feed pipe (D) and flow control valve (F) are in the correct orientation.
7. Tighten coupling nut (E) (on the valve outlet side) and coupling nut (C) (on the sample inlet pipe) finger-tight, then turn another 1 to 1 1/4 turns using a spanner.
8. Turn the flow control valve (F) to the shut position; reintroduce the sample upstream at a low flow rate initially and check for leakage. If any leaks are detected, slowly tighten coupling nuts (E) and (C) until no further leakage is detected.
9. Open the feed line upstream to the required volume flow rate and check for leaks. If no leaks are detected, open flow control valve (F) until the required flow rate is present.

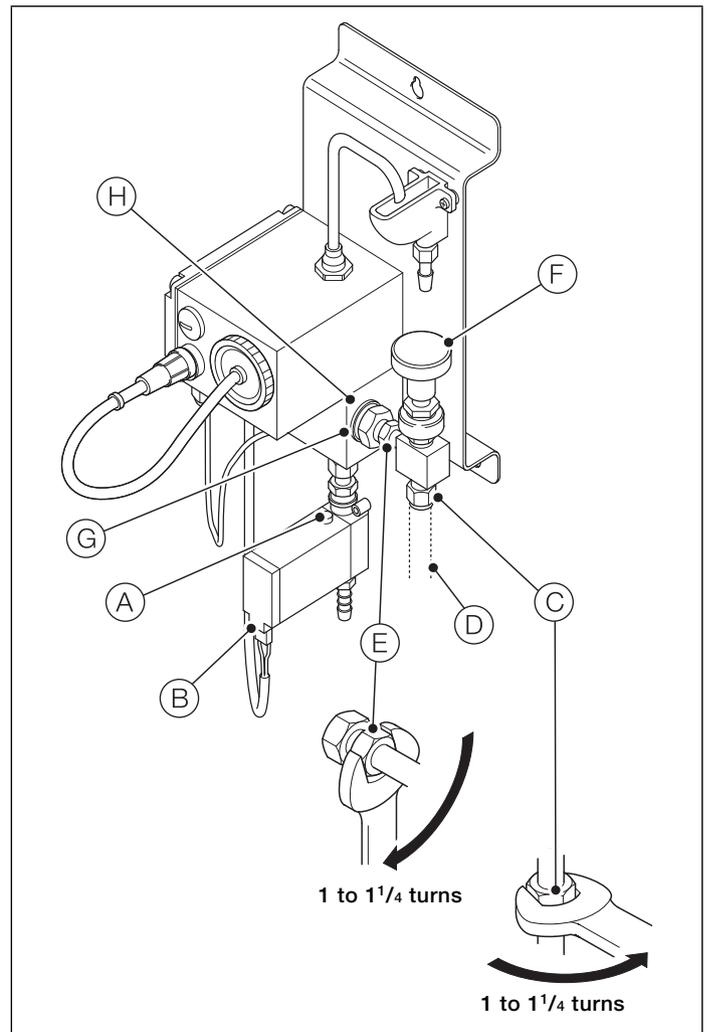


Fig. 6.8 Replacing the flow control valve assembly

7 Upgrade procedures

7.1 Upgrading the flowmeter

Part number:
— AW502 250

Referring to Fig. 7.1:

1. Depress manual override button (A) on the drain valve assembly to drain the flowcell.
2. Remove outlet tube (B) from QD coupling (C) by depressing collar (D) on QD coupling (C) and pulling tube (B) up.
3. Unscrew and remove QD coupling (C) and wipe up any water spillage.
4. Screw new QD coupling (C) in and fit:
 - flowmeter (E)
 - (upper) QD coupling (F)
 - sample outlet tube (G)

i **IMPORTANT (NOTE)**
Ensure sample outlet tube (G) is located correctly over tundish assembly (H).

5. Remove the flowcell PCB cover as detailed in step 1 of Section 6.1, page 4.
6. Remove blanking plug (I) from front of flowcell PCB housing (J) and replace with supplied cable gland (and O-ring) (K).
7. Pass flowmeter cable (L) through cable gland (K) at flowcell PCB housing (J) and make connections to PCB terminal block TB2 – refer to Fig. 6.7, page 7.
8. Tighten cable gland (K) to form a watertight seal.
9. Check sample outlet tube (G) is located correctly over tundish assembly (H) and restart sample flow.

Referring to Operating instruction OI/ADS550-EN:

10. Configure the transmitter to read the output from the flowmeter by selecting Sensor Setup, scrolling to Flowmeter and selecting Enabled.
(This enables auto calibrations to be configured.)

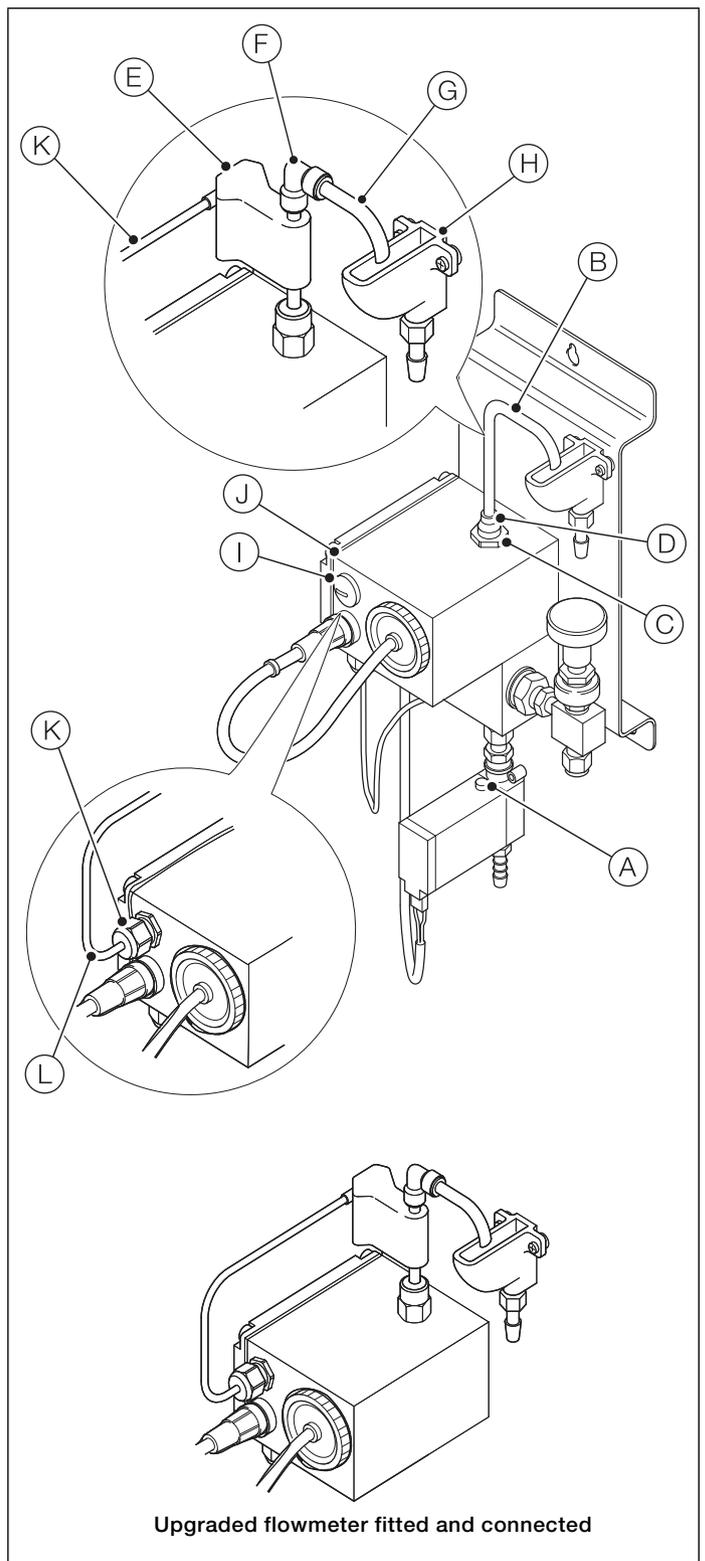


Fig. 7.1 Upgrading the flowmeter assembly

7.2 Upgrading the drain valve assembly

Upgrade kit part number:

— AW502 240

Referring to Fig. 7.2:

1. Unscrew and remove blanking plug (A) (with O-ring) at base of flowcell assembly (B).

IMPORTANT (NOTE)



There will be sample left in the flowcell so it is advisable to have a beaker or similar receptacle to catch the sample.

2. Fit sealing washer (C) to male adaptor coupling (D), screw this assembly into flowcell base (B) and tighten.
3. Fit Boded seal (E) onto thread of male stud coupling (F), screw into the upstream port of the drain solenoid valve (G) and tighten – note arrow position on valve body.
4. Wrap PTFE tape around the thread of barbed connector (H) and screw into the outlet port of the drain solenoid valve (G).
5. Offer drain solenoid valve assembly (G) up to male adaptor coupling (D) and push onto spigot; orientate the valve (as shown in Fig. 7.2) and tighten couplings (D) and (F) together – ensure couplings are fully tightened.
6. Fit the supplied length of drain tube (I) onto the barbed connector (J) on drain valve (G) and route as short and straight as possible to a suitable drain.
7. Remove blanking plug (K) from the underside of flowcell PCB housing (L) and replace with supplied cable gland and O-ring (M).
8. Feed cable (N) from drain solenoid valve assembly (G) through the cable gland (M) and make connections to PCB terminal block TB3 – refer to Fig. 6.7, page 7.
9. Tighten cable gland (M) to form a watertight seal.

Referring to Fig. 7.1, page 9:

10. Check sample outlet tube (G) is located correctly over tundish assembly (H) and restart sample flow.

Referring to Operating instruction OI/ADS550-EN:

11. Configure the transmitter by selecting **Sensor Setup**, scrolling to **Calibration Valve** and selecting **Enabled**. (This enables auto calibrations to be configured.)

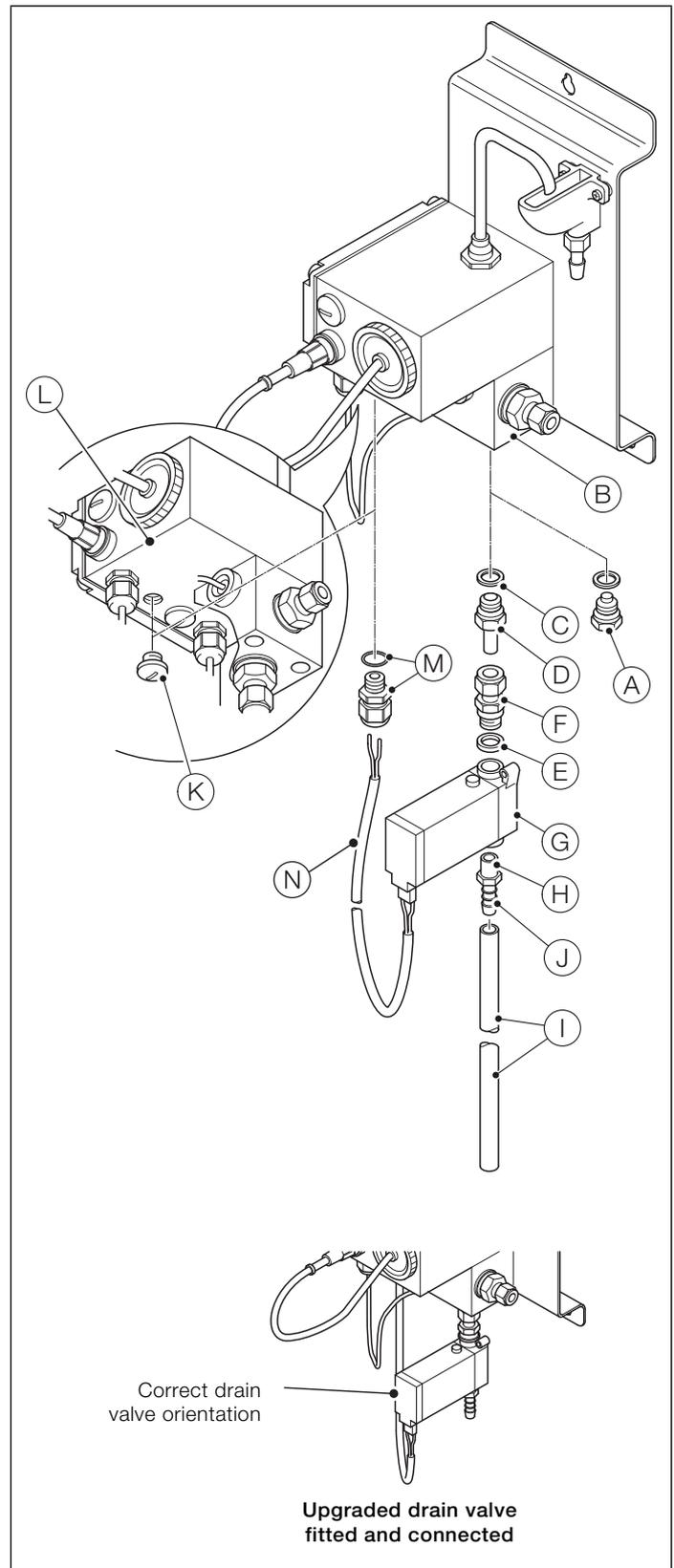


Fig. 7.2 Upgrading the drain valve assembly

7.3 Upgrading the flow control valve assembly

Part number:

- AW502 270 (imperial, for 1/4 in. pipe)
- AW502 275 (metric, for 6 mm pipe)

IMPORTANT (NOTE)

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- Ensure the correct kit has been ordered (6 mm pipe or 1/4 in. pipe).
- Before proceeding, shut off flow to the flowcell assembly.

Referring to Fig. 7.3:

1. Depress manual override button (A) on drain valve (B) to drain the wet-section.
2. Unscrew coupling nut (C) on sample inlet coupling (D) and remove sample feed pipe (E).
3. Unscrew the remainder of coupling (D) from the side of flowcell assembly (F) and remove along with nylon washer (G).
4. Fit new 3/8 in. BSP x 6 mm or 1/4 in. coupling (D) and new nylon washer (G) into flowcell inlet port block (H) and tighten.

IMPORTANT (NOTE)

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Take care not to overtighten as this may strip the thread in the inlet port block (H).

5. Offer up flow control valve (I) to the inlet stub (J) of coupling (D) (above), and with the valve in the vertical position, lightly nip up coupling nut (K) – do not tighten at this stage.
6. Push the sample feed pipe into the base of flow control valve (I) and lightly nip up coupling nut (L) – it may be necessary to cut or bend the pipe to arrange it into the correct orientation for mating with the flow control valve.
7. Check that sample feed pipe (E) and flow control valve (I) are in the correct orientation.
8. Tighten coupling nuts (K) (on the valve outlet side) and (L) (on the sample inlet pipe) finger-tight and then turn another 1 to 1 1/4 turns using a spanner.
9. Turn flow control valve (I) to the shut position; reintroduce the sample upstream at a low flow rate initially and check for leakage. If any leaks are detected, slowly tighten coupling nuts (L) and (K) until no further leakage is detected.
10. Open the feed line upstream to the required volume flow rate and check for leaks. If no leaks are detected, open flow control valve (I) until the required flow rate is present.

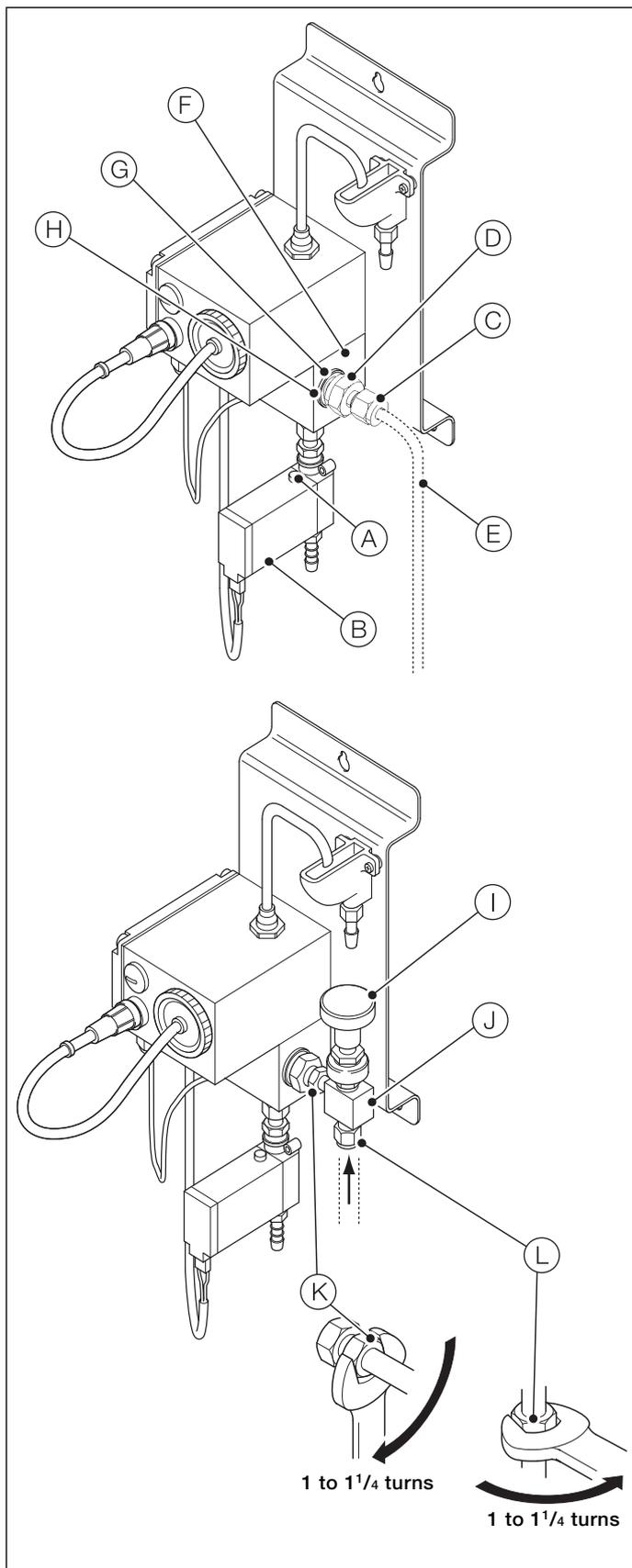


Fig. 7.3 Upgrading the flow control valve assembly

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