E090-32-880
Issue G

Instruction Manual

AUTO 306 accessories:
Manual Source Shutter and
Electromagnetic Source Shutter

Volume 1 - Installation and Maintenance Instructions

Description	*Item Number*
Manual Source Shutter	*E090-32-000*
Electromagnetic Source Shutter	*E090-44-000*
Electromagnetic Source Shutter Control Panel	*E090-45-000*

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Illustrations

Associated publications

Publication title	Publication Number
Vacuum leadthroughs	E090-99-880

1 INTRODUCTION

1.1 Scope and definitions

This manual is supplied in two volumes; Volume 1 provides installation and maintenance instructions for the Manual and Electromagnetic Source Shutter accessories for the AUTO 306, Volume 2 provides operating instructions. You must use the Manual and Electromagnetic Source Shutter accessories for the AUTO 306 as specified in this manual.

Read this volume of the manual before you install and maintain the Manual and Electromagnetic Source Shutter accessories for the AUTO 306. Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS is defined below.

WARNING
Warnings are given where failure to observe the instruction could result in injury or death to people.

CAUTION
Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

In accordance with the requirements of IEC 1010, the following symbols may appear on the Electromagnetic Source Shutter and Control Panel:

Caution - risk of electric shock.

Alternating current.

Earth (ground).

The units used throughout this manual conform to the SI international system of units of measurement.

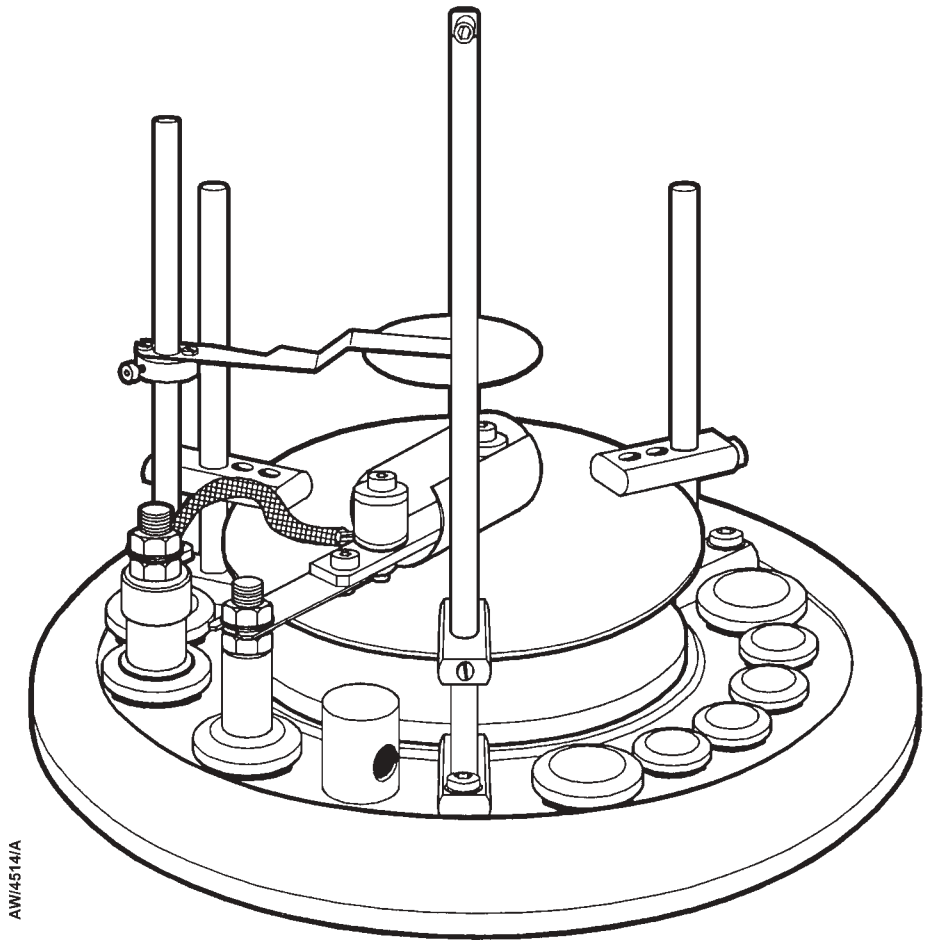


Figure 1 - Source Shutter mounted on the AUTO 306 baseplate

1.2 Description

1.2.1 Manual Source Shutter

You use the Manual Source Shutter to cover a deposition source which is mounted inside the vacuum chamber. The shutter pan both prevents deposition of the evaporant on the substrate when the source is degassed and covers the deposition source until it is required for the deposition process cycle. You can either expose the deposition source to start the deposition cycle or you can cover the deposition source to stop the cycle to give consistent and repeatable results.

You can manually operate the shutter with the lever mounted outside the vacuum chamber. The shutter pan is fixed on the shutter arm which is secured to the shaft of a rotary leadthrough. You may adjust the position of the shutter arm vertically on the shaft to cover sources located at different positions inside the vacuum chamber.

1.2.2 Electromagnetic Source Shutter

The Electromagnetic Source Shutter is supplied as two separate accessories; the Electromagnetic Source Shutter and the Electromagnetic Source Shutter Control Panel. You may purchase each accessory separately. You may control one or two Electromagnetic Source Shutters with one Electromagnetic Source Shutter Control Panel.

- You will install the Electromagnetic Source Shutter on the AUTO 306 baseplate. The Electromagnetic Source Shutter has a solenoid operated shutter, a sealed rotary leadthrough and interconnecting cables. You may use this accessory to cover your deposition source inside the vacuum chamber to prevent deposition on the substrate until the required time in your process cycle. You can then accurately start and stop your deposition process to give a consistent and repeatable deposition. The shutter will also prevent heat radiation and volatile substances from reaching the substrate when you degas the deposition source.

  You will operate the shutter with the solenoid mounted below the vacuum chamber. The action of the solenoid is transferred to the stainless steel shutter pan through a sealed rotary shaft. You may position the shutter pan in different positions on the shaft to cover any source that you install inside the vacuum chamber.

- You will install the Electromagnetic Source Shutter Control Panel in the AUTO 306 electrical control cabinet. You use the Electromagnetic Source Shutter Control Panel to control one or more Electromagnetic Source Shutters. You may either operate the shutter with the pushbuttons on the panel (manual operation) or connect the Electromagnetic Source Shutter Control Panel to a film thickness monitor such as the FTM6 or FTM7 (automatic operation).

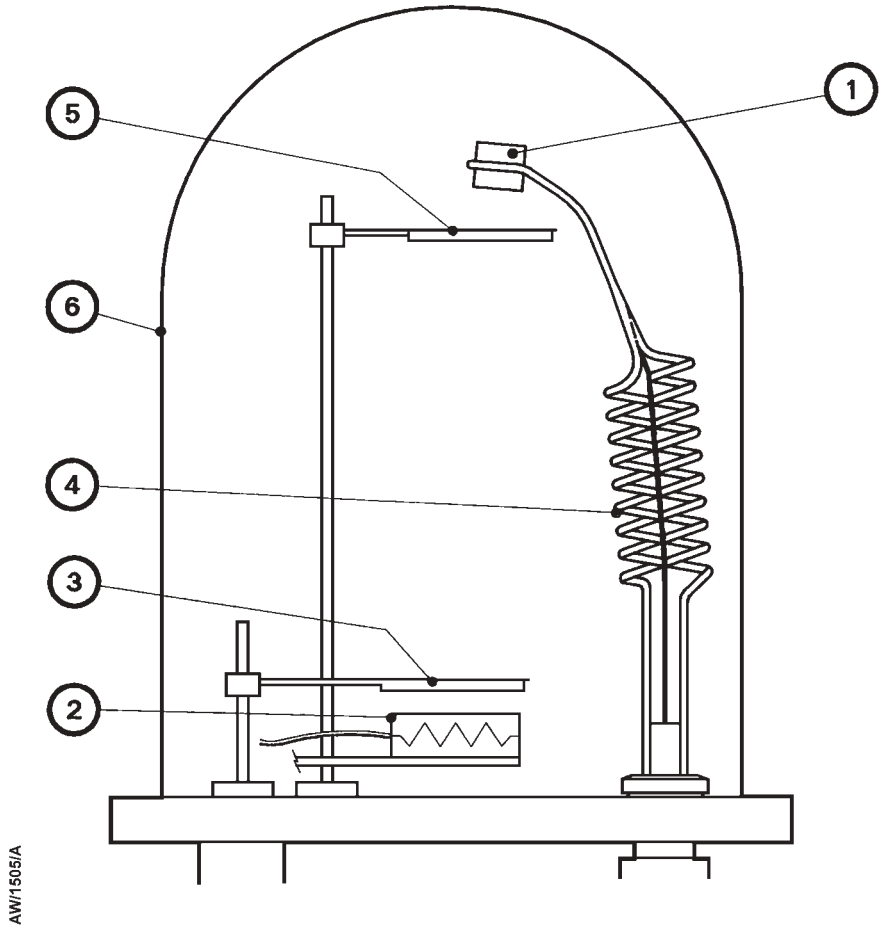
  You must not connect the solenoid of the Electromagnetic Source Shutter directly to the contacts of a film thickness monitor (such as the FTM6 or FTM7) because the relays may not be suitable for the high current drawn by the solenoid. When you connect the film thickness monitor to the Electromagnetic Source Shutter Control Panel as described in this instruction manual, the film thickness monitor will only drive the low-current-drain relays in the Electromagnetic Source Shutter Control Panel.

1.3 Applications

You may fit only one Mechanical Source Shutter to the AUTO 306 baseplate because you must fit the lever through the slot in the side of the front baseplate cover.

You may fit one or two Electromagnetic Source Shutters to the AUTO 306 baseplate.

Source shutters may also be used to cover other components in the vacuum system such as the crystal head of a Water-cooled Crystal Holder. A typical installation for two shutters is shown in Figure 2.



1. Crystal head
2. Source
3. Source shutter
4. Water cooled crystal holder
5. Source shutter
6. Bell jar

Figure 2 - Typical installation of two source shutters

2 TECHNICAL DATA

2.1 Operating conditions

Maximum operating temperature	5 to 40 ^{o}C
Maximum operating humidity	80 % up to 31 ^{o}C, 50 % up to 40 ^{o}C

2.2 Operating data

2.2.1 Manual Source Shutter

Shutter pan material	Stainless steel
Shaft size	8 mm

2.2.2 Electromagnetic Source Shutter

Operating voltage	200 to 250 V, 50 or 60 Hz
Shutter pan material	Stainless steel
Shaft size	8 mm

3 INSTALLATION

3.1 Unpack and inspect

Remove all packing materials and protective covers and check the accessory.

If the accessory is damaged, notify your supplier and the carrier in writing within three days; state the Item Number of the accessory together with your order number and your supplier's invoice number. Retain all packing materials for inspection. Do not use the accessory if it is damaged.

Check that your package contains the items listed below. If any of these items is missing, notify your supplier in writing within three days.

Manual Source Shutter

Qty	Description	Check (✓)
1	Shaft seal assembly with collar	❑
1	Shutter pan	❑
1	Shutter lever with knob	❑
1	Leadthrough instruction manual	❑

Electromagnetic Source Shutter

Qty	Description	Check (✓)
1	Shutter assembly and shutter pan	❑
1	Plug-in relay	❑
5	Cable ties	❑
1	Leadthrough instruction manual	❑

Electromagnetic Source Shutter Control Panel

Qty	Description	Check (✓)
1	Panel assembly	❑
2	Solenoid electrical supply cables	❑
5	Cable ties	❑

If the accessory is not to be used immediately, replace the protective covers. Store the accessory in suitable conditions, as described in Section 5.

3.2 Installation safety

Read the following general information and safety instructions before you install your accessory.

> WARNING
>
> Obey the safety instructions given below and take note of appropriate precautions. If you do not, you can cause injury to people and damage to equipment.

- Read this instruction manual and instruction manuals supplied with other AUTO 306 accessories before you install any accessories.
- Switch off the electrical supply and disconnect the AUTO 306 from the electrical supply before you start installation work.
- These accessories have been designed for installation and use on the BOC Edwards AUTO 306 vacuum coater with its comprehensive safety features. If they are installed and used on any other equipment, you must install devices to ensure that you adequately support, safely enclose, insulate, interlock, and provide short circuit protection as appropriate.
- Ensure that the electrical installation of the accessory conforms with your local and national safety requirements. It must be connected to a suitably fused and protected electrical supply and a suitable earthing (grounding) point.
- Ensure that installation is done by a suitably trained and supervised technician. Obey your local and national safety requirements.
- Do not touch any part of the liquid nitrogen reservoir or connecting pipes (if fitted) in the AUTO 306. Do not allow liquid nitrogen vapour to touch your skin. These surfaces and vapour are at very low temperature and can cause tissue damage.
- Instructions to open the AUTO 306 electrical control cabinet and to remove the covers are given in the AUTO 306 instruction manual. It is important that you follow these instructions carefully to prevent damage to components such as the chamber leak valve.

3.3 Install the Manual Source Shutter on the baseplate

Refer to Figure 3:

1. Remove the front baseplate cover from the AUTO 306 and open the electrical control cabinet (see Figure 4).

2. Remove the blanking-plug from baseplate leadthrough hole 3. You must mount the Manual Source Shutter in this position.

3. Remove the collars (1 and 9), nut (11), thrust washer (10) and washer (12) from the rotary leadthrough (4) and fit the rotary leadthrough through the underside of baseplate leadthrough hole 3. When the rotary leadthrough is in position, ensure that the 'O' ring is in the correct position on the underside of the baseplate. Secure the rotary leadthrough with the nut (11) and washer (12). Refit the thrust washer (10) and collars (1 and 9).

4. Connect the earth (ground) wire (8) to a vacant earth (ground) terminal on terminal block TB1 in the base of the AUTO 306 electrical control cabinet (refer to Figure 4 for the location of TB1 and Figure 5 for the route of the earth (ground) wire).

5. Position the collar (6) so that when the lever arm (7) is fitted, it will align with the left hand side of the front baseplate cover. The lever arm will then align with the slot in the front baseplate cover when you refit it.

6. Refit the front baseplate cover to the AUTO 306; screw the lever arm and knob (7) into the collar (6) on the shaft of the rotary leadthrough (4).

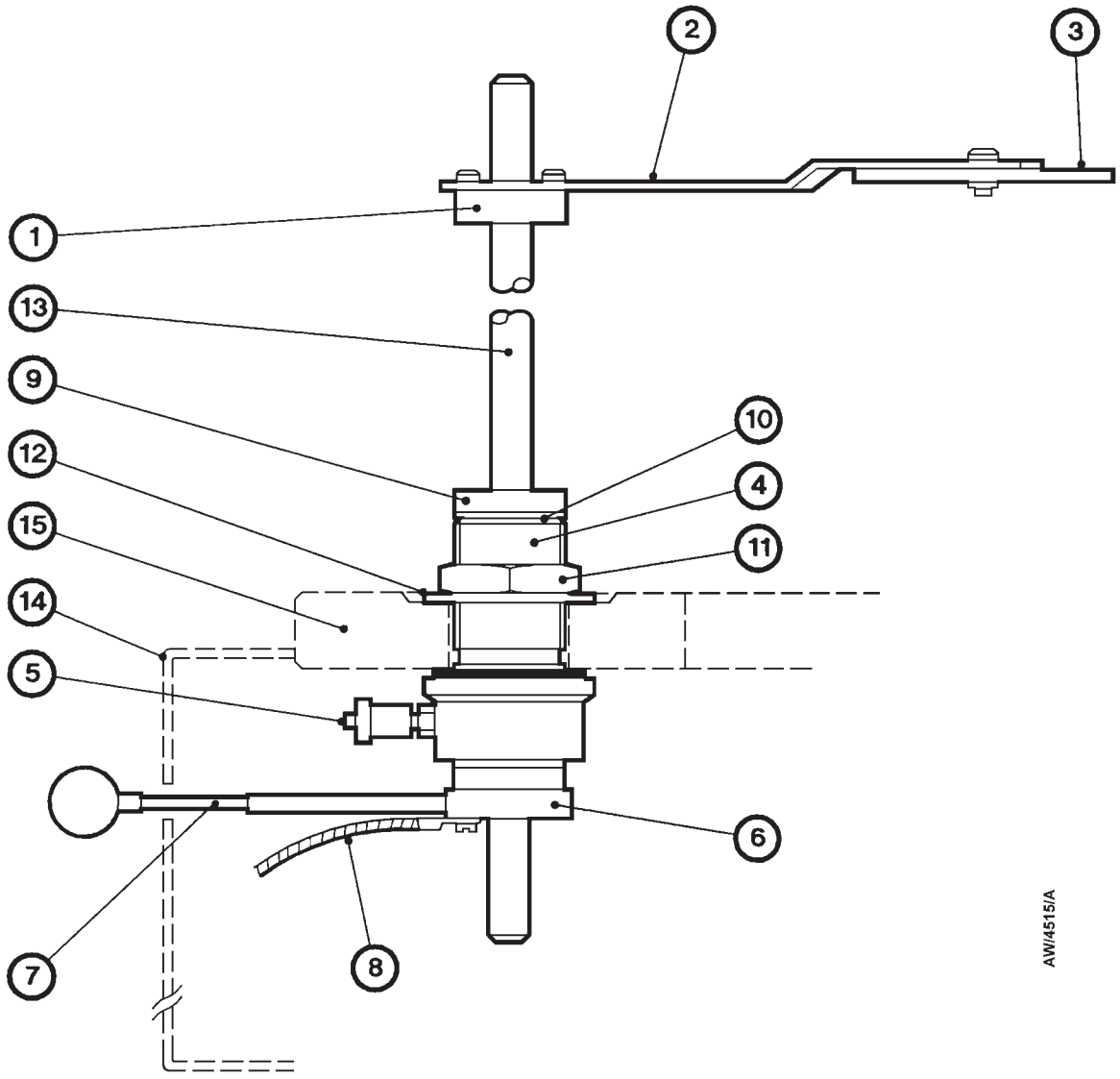
7. Slide the shutter arm (2) onto the rotary leadthrough shaft; ensure that the collar (1) is below the shutter arm as shown in Figure 3.

8. Loosen the screws in the collar (1) that hold the shutter arm (2).

9. Loosen the clamping screw in the collar (1) and position the shutter arm (2) so that the shutter pan (3) is just above the source.

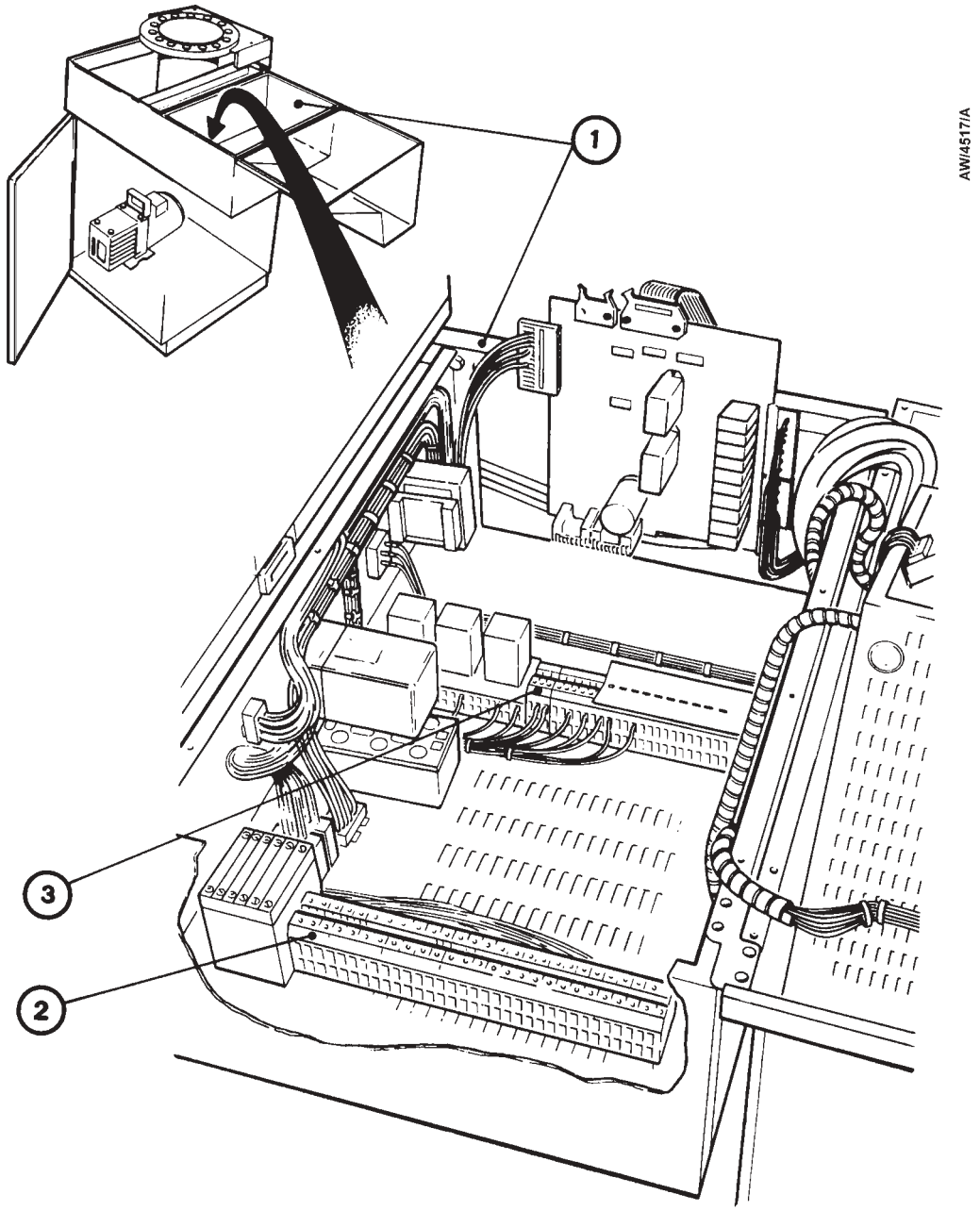
10. Tighten the clamping screw in the collar (1) and tighten the screws in the collar (1) that hold the shutter arm (2).

The Manual Source Shutter is supplied to work with central source evaporation; if your source is in a position other than the centre of the baseplate or if you require a different shape shutter pan, refer to Section 3.6.



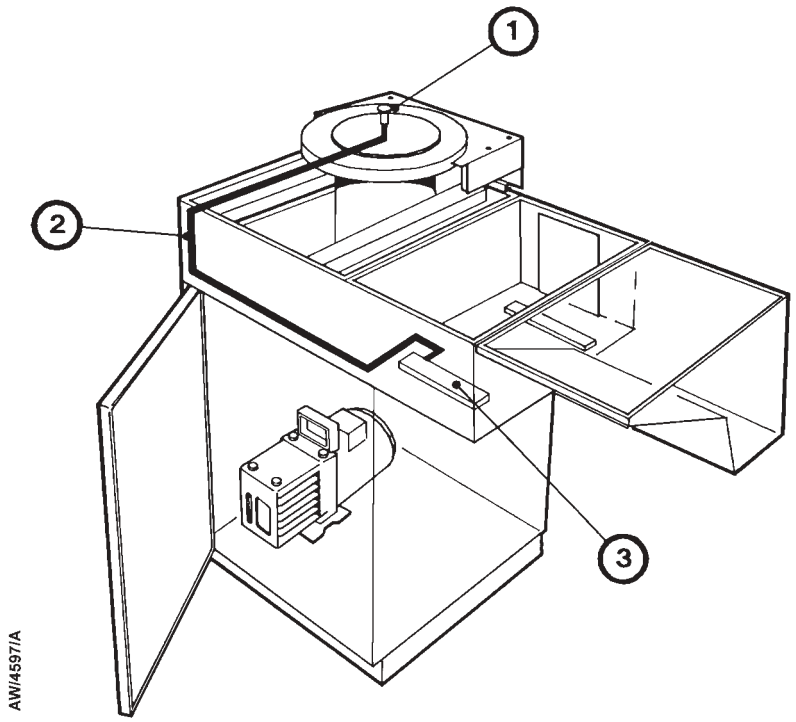
1. Collar
2. Shutter arm
3. Shutter pan
4. Rotary leadthrough
5. Grease cap
6. Collar cover
7. Lever and knob
8. Earth wire
9. Collar
10. Thrust washer
11. Nut
12. Washer
13. Shaft
14. Front baseplate cover
15. Baseplate

Figure 3 - Install the Manual Source Shutter



1. AUTO 306 electrical control cabinet
2. Terminal block 1 (TB1)
3. Terminal block 2 (TB2)

Figure 4 - Location of terminal blocks in the base of the AUTO 306 electrical control cabinet



1. Baseplate leadthrough
2. Earth (ground) wire
3. Terminal block TB1

Cable Name	Wire Number	From	To
Earth (ground) wire	E	Rotary leadthrough	Terminal block TB1, earth (ground) terminal

Figure 5 - Route for Manual Source Shutter earth (ground) wire

3.4 Install the Electromagnetic Source Shutter

You must disassemble the components of the Electromagnetic Source Shutter before you can fit it to the AUTO 306 baseplate because the support channel for the pump obstructs the leadthrough holes. Use the procedure given below; refer to Figure 6:

1. Remove the front baseplate cover from the AUTO 306 and open the electrical control cabinet (See Figure 4).

2. Remove the blanking-plug from a suitable baseplate leadthrough hole; baseplate position 3 is recommended for shutter 1.

3. Remove the two screws (9) which secure the top bracket (6) to the bottom bracket (10). Slide apart the drive coupling (7) to separate the solenoid (8) from the rotary leadthrough (4).

4. Remove the collars (1 and 12), thrust washer (13), washer (14) and nut (15) from the rotary leadthrough (4) and then fit the rotary leadthrough through the underside of baseplate leadthrough hole 3. When the rotary leadthrough (4) is in position, ensure that the 'O' ring is in the correct position on the underside of the baseplate. Refit the washer (14) and secure the rotary leadthrough with the nut (15).

5. Slide together the two halves of the drive coupling. Ensure that the drive coupling (7) mates correctly and that the solenoid is orientated to allow access to the bracket screws (9) and grease cap (5). Reassemble the top and bottom brackets (6 and 10) and secure with the screws (9). Check that the solenoid is free to rotate and, if you have a liquid nitrogen trap on your AUTO 306, ensure that the liquid nitrogen filler tube does not obstruct the solenoid.

6. Refit the thrust washer (13) and collar (12) and secure to the shaft of the rotary leadthrough (4).

7. Slide the shutter arm (2) onto the rotary leadthrough shaft; ensure that the collar (1) is below the shutter arm as shown in Figure 6.

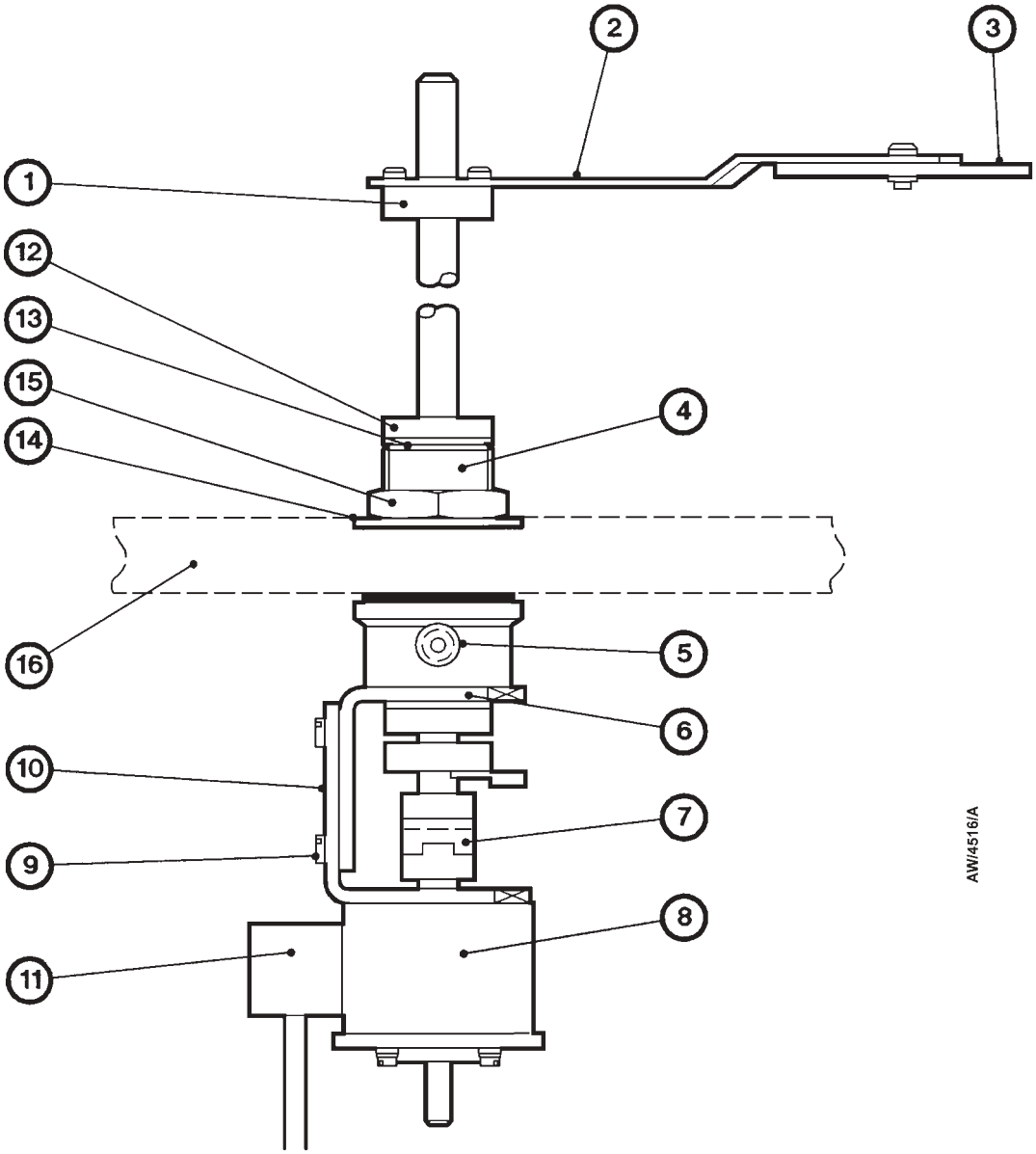
8. Loosen the screws in the collar (1) that hold the shutter arm (2) and loosen the clamping screw in the collar (1).

9. Position the shutter arm (2) so that the shutter pan (3) is just above the source, then tighten the clamping screw in the collar (1) and tighten the screws in the collar (1) that hold the shutter arm (2).

10. Fit the solenoid connector (11) to the solenoid (8) and route the cable through the AUTO 306 cabinet as shown in Figure 7; you will connect the free end of the cable when you install the Electromagnetic Source Shutter Control Panel (see Section 3.5).

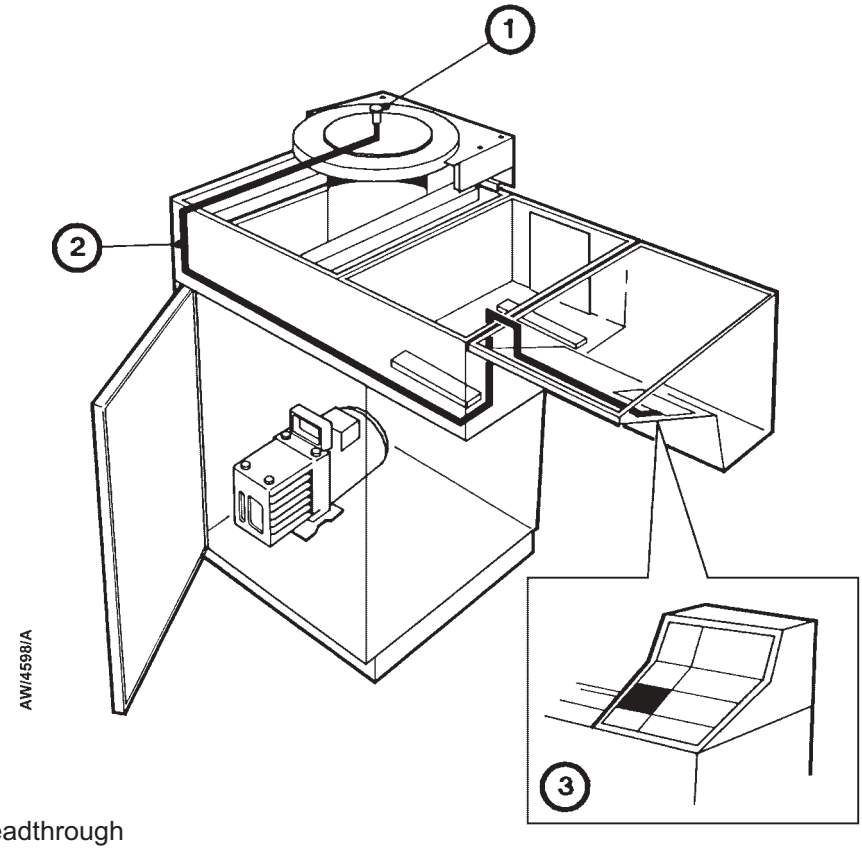
The Electromagnetic Source Shutter is supplied to work with central source evaporation; if your source is not in the centre of the baseplate or if you require a different shape shutter pan, refer to Section 3.6.

If you want to install a second shutter, follow Steps 2 to 10 in the procedure above, but use a different baseplate position for shutter 2.



1. Collar
2. Shutter arm
3. Shutter pan
4. Rotary leadthrough
5. Grease cap
6. Top bracket
7. Drive coupling
8. Solenoid
9. Bracket screw
10. Bottom bracket
11. Solenoid connector
12. Collar
13. Thrust washer
14. Washer
15. Nut
16. Baseplate

Figure 6 - Install the Electromagnetic Source Shutter



1. Baseplate leadthrough
2. Solenoid electrical supply cable
3. Panel position

Source Shutter 1

Cable Name	Wire Number	From	To
Solenoid electrical supply cable	- (blue)	Solenoid connector	Control Panel, Overvoltage device SS1 -ve out
	- (brown)	Solenoid connector	Control Panel, Overvoltage device SS1 +ve out
	- (green/yellow)	Solenoid connector	Control Panel, Overvoltage device SS1 earth (ground)

Source Shutter 2 (if fitted)

Cable Name	Wire Number	From	To
Solenoid electrical supply cable	- (blue)	Solenoid connector	Control Panel, Overvoltage device SS1 -ve out
	- (brown)	Solenoid connector	Control Panel, Overvoltage device SS1 +ve out
	- (green/yellow)	Solenoid connector	Control Panel, Overvoltage device SS1 earth (ground)

Figure 7 - Cable route for the Electromagnetic Source Shutter

3.5 Install the Electromagnetic Source Shutter Control Panel

> CAUTION
>
> If you use the Electromagnetic Source Shutter with the FTM6 or FTM7 Film Thickness Monitor (or other similar monitor), you must connect the FTM6/7 'shutter' terminals through the Electromagnetic Source Shutter Control Panel. If you do not, you will damage the FTM6/7.

You use the Electromagnetic Source Shutter Control Panel to control one or two Electromagnetic Source Shutters. You may either operate the shutter with the pushbuttons on the panel (manual operation) or connect the Electromagnetic Source Shutter Control Panel to a film thickness monitor / controller (automatic operation). A schematic diagram for the Electromagnetic Source Shutter is given in Figure 10.

Connect the Electromagnetic Source Shutter Control Panel as described below:

1. Remove the front baseplate cover from the AUTO 306 and open the electrical control cabinet (See Figure 4).

2. Remove a blank panel from the AUTO 306 electrical control cabinet; a typical position is shown in Figure 8. Fit the Electromagnetic Source Shutter Control Panel in the vacant position.

3. Connect wires #7 and #14 from the Panel to terminals 7 and 14 respectively on terminal block 1 (TB1) in the base of the AUTO 306 electrical control cabinet. The location of TB1 is shown in figure 4. Route the cable as shown in Figure 8.

4. Connect wires #52 and #53 from the Panel to terminals 52 and 53 respectively on terminal block 2 (TB2) in the base of the AUTO 306 electrical control cabinet. The location of TB2 is shown in figure 4. Route the cable as shown in Figure 8.

5. Refer to Figure 9, detail B. Connect the three wires at the end of the solenoid electrical supply cable (5) for shutter 1, to the terminals on the overvoltage device SS1 (4); connect the wires to the terminals as specified in Figure 7. Fit the 3-pin connector (6) on the end of the cable to the socket on the base of the electromagnetic shutter assembly (C).

6. If you will use the Electromagnetic Source Shutter with a film thickness monitor, connect the 'shutter' terminal on the film thickness monitor to pins 1 and 2 on the circuit board remote plug (Figure 9, detail A, item 2) to control shutter number 1, or to pins 3 and 4 to control shutter number 2.

7. If you have a second Electromagnetic Source Shutter to install, continue at Step 8, otherwise continue at Step 10.

(Continued on page 16)

8. Refer to Figure 9, detail B. Connect the three wires at the end of the solenoid electrical supply cable (5) for shutter 2, to the terminals on the overvoltage device SS2 (3); connect the wires to the terminals as specified in Figure 7. Fit the 3-pin connector (6) on the end of the cable to the socket on the base of the electromagnetic shutter assembly (C).

9. Secure all cables and wires to convenient anchor points on the AUTO 306 cabinet.

3.6 Prepare the shutter pan for use

Refer to Figure 3 or 6. To replace the shutter pan (3); remove the nut and bolt which secures the shutter pan to the shutter arm (2) and then replace the shutter pan with a different shutter pan.

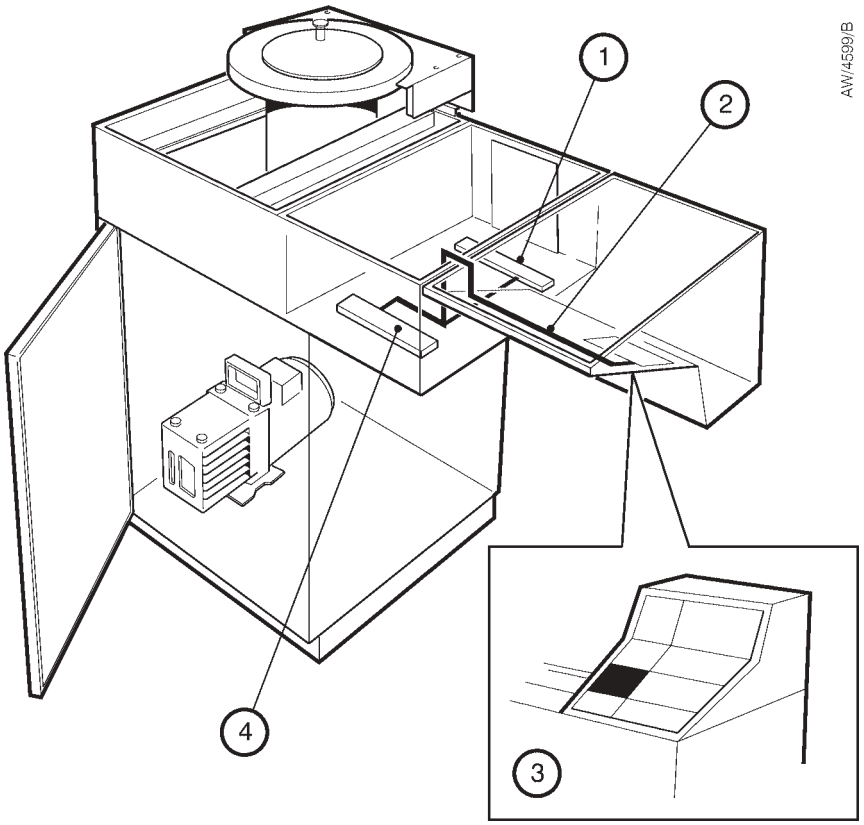
To reposition the shutter pan on the shutter arm, use the procedure given below:

1. Remove the nut and bolt which secures the shutter pan to the shutter arm.

2. Determine the new position of the shutter pan on the shutter arm and mark the fixing hole position on the shutter arm.

3. Drill a 4.2 mm diameter hole through the shutter arm at the new position.

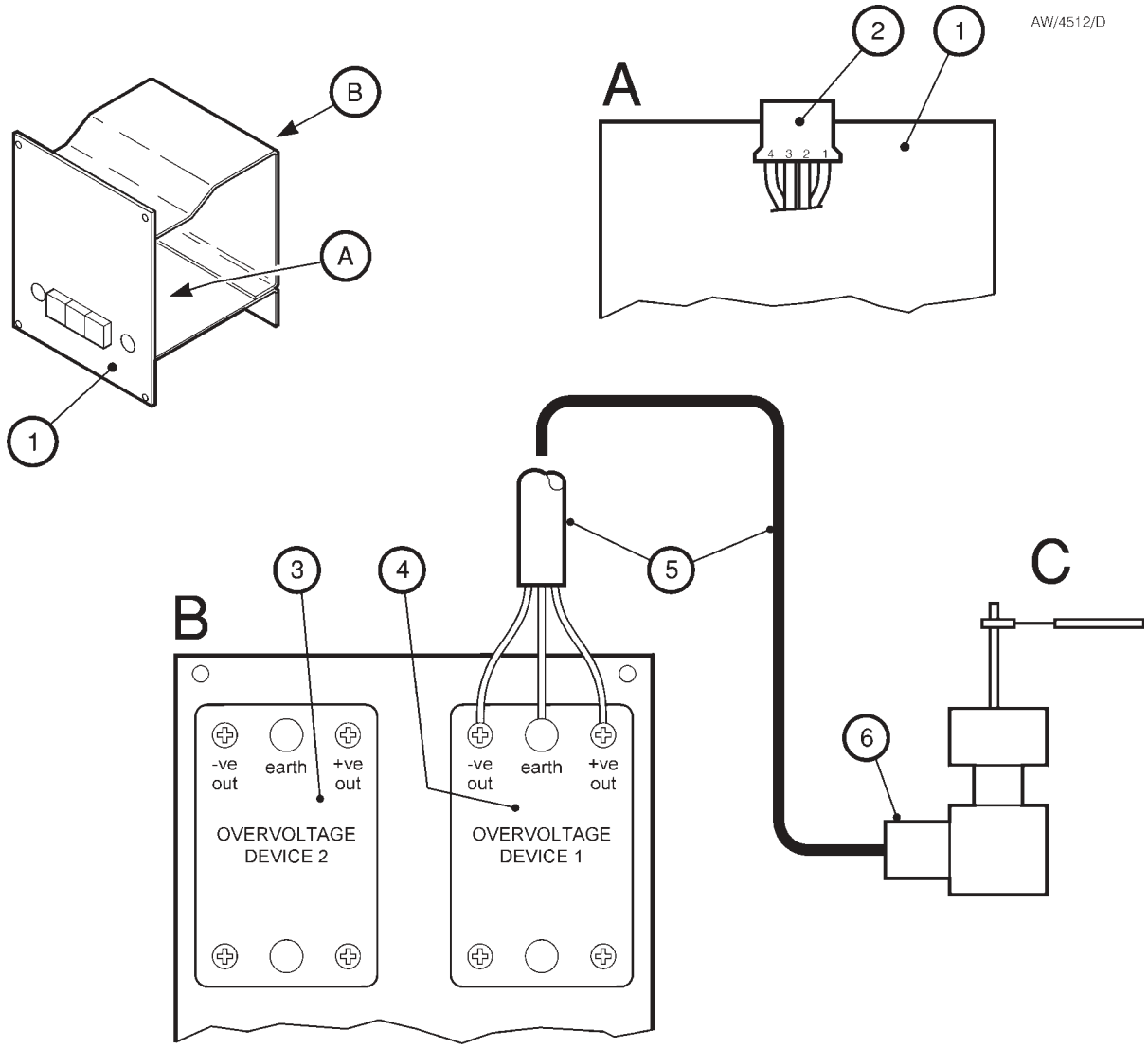
4. Refit the shutter pan to the shutter arm in the new position; secure with the nut and bolt removed in Step 1.



1. Terminal block TB2
2. Panel-to-terminal block cable
3. Panel position
4. Terminal block TB1

Cable Name	Wire Number	From	To
Panel-to-terminal block cable	#7	Control Panel	Terminal Block TB1, terminal 7
	#14	Control Panel	Terminal Block TB1, terminal 14
	#52	Control Panel	Terminal Block TB2, terminal 52
	#53	Control Panel	Terminal Block TB2, terminal 53

Figure 8 - Cable route for the Electromagnetic Source Shutter Control Panel



A Shutter relay bases and remote plug
B Overvoltage devices
C Electromagnetic Source Shutter

1 Electromagnetic Source Shutter Control Panel
2 Remote plug (see Figure 10 for connection details)
3 Overvoltage device SS2
4 Overvoltage device SS1
5 Solenoid electrical supply cable
6 Solenoid connector

Figure 9 - Connection of solenoid electrical supply cable to the Control Panel circuit board

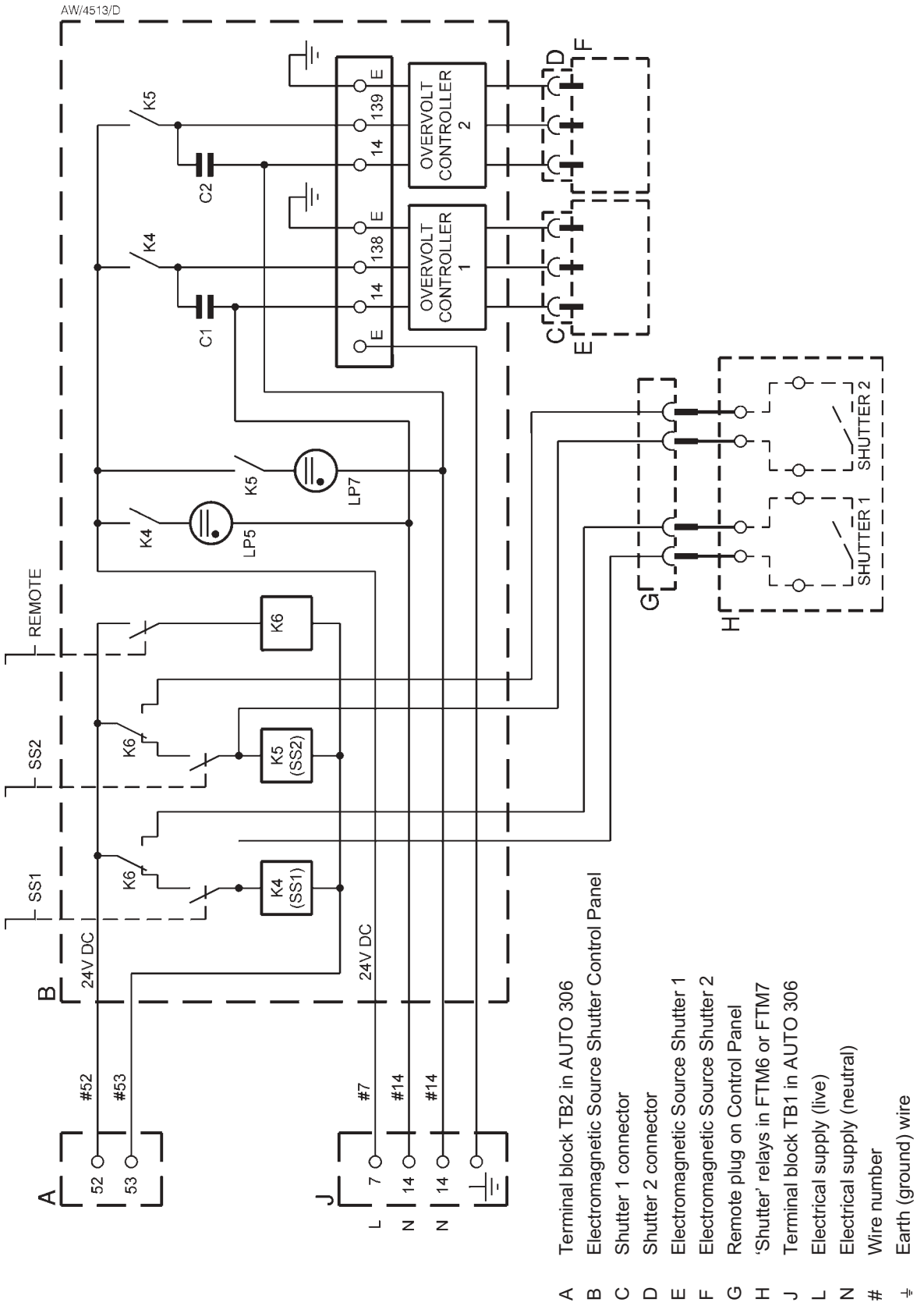


Figure 10 - Electromagnetic Source Shutter schematic installation diagram

4 MAINTENANCE

4.1 Safety information

WARNING

Obey the safety instructions given below and take note of appropriate precautions. If you do not, you can cause injury to people and damage to equipment.

- Switch off and disconnect the electrical supply from the AUTO 306 before you start any maintenance work.
- Do not touch surfaces inside the AUTO 306 which are very hot or very cold.
- Do not use wire wool to clean accessories, as the fine wires break away and can cause damage to 'O' rings and the seal on the high vacuum valve.
- Check electrical connections periodically to ensure that they are not loose and that the wires are not damaged or overheated.
- Use glass bead blasting to clean chamber components. If this is not available, use a mild abrasive cleaner such as 3M 'Scotchbright'.
- Take adequate precautions when you clean the accessories if dangerous substances have been processed. Ensure that you wear suitable protective clothing including gloves and goggles. If toxic materials have been used in the process, we recommend that you clean any components removed from the workchamber in a fume extraction cabinet or other well ventilated area.

4.2 Leadthroughs

You must regularly remove the grease cap (Figures 3 and 6, item 5) and fill the reservoir with lubricant. The type of lubricant and the method of filling the reservoir are described in the instruction manual for the leadthrough supplied with these accessories.

5 STORAGE AND DISPOSAL

5.1 Storage

1. Return the accessory to its protective packaging.
2. Store in a cool dry place.

5.2 Disposal

Dispose of the accessory safely in accordance with your local and national safety and environmental requirements.

6 SPARES AND ACCESSORIES

6.1 Introduction

BOC Edwards products, spares and accessories are available from BOC Edwards companies in Belgium, Brazil, China, France, Germany, Israel, Italy, Japan, Korea, Singapore, United Kingdom, U.S.A, and a world-wide network of distributors. The majority of these centres employ Service Engineers who have undergone comprehensive BOC Edwards training courses.

Order spare parts and accessories from your nearest BOC Edwards company or distributor. When you order, please state for each part required:

- Model and Item Number of your equipment
- Serial number (if any)
- Item Number and description of the part

6.2 Spares

Description	Item Number
NW25 fluoroelastomer 'O' ring (pack of 5)	H021-24-035
Rotary shaft seal (8RK25)	E100-44-080
Fluoroelastomer lip seal	H021-09-111
Bearing (Du Bush)	E100-44-086
Grease, Apiezon N (25 gm)	H023-01-011
Electromagnetic source shutter relay	E219-14-019

6.3 Accessories

Description	Item Number
Solenoid electrical supply cable	E090-45-008

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BOC EDWARDS

Form HS1

Return of BOC Edwards Equipment - Procedure

INTRODUCTION

Before returning your equipment, you must warn BOC Edwards if substances you used (and produced) in the equipment can be hazardous. This information is fundamental to the safety of our Service Centre employees and will determine the procedures employed to service your equipment.

Complete the Declaration (HS2) and send it to BOC Edwards before you dispatch the equipment. It is important to note that this declaration is for BOC Edwards internal use only, and has no relationship to local, national or international transportation safety or environmental requirements. As the person offering the equipment for shipment, it is your responsibility to ensure compliance with applicable laws.

GUIDELINES

- Equipment is '**uncontaminated**' if it has not been used, or if it has only been used with substances that are not hazardous. Your equipment is '**contaminated**' if it has been used with any substances classified as hazardous under EU Directive 67/548/EEC (as amended) or OSHA Occupational Safety (29 CFR 1910).
- If your equipment has been used with radioactive substances, biological or infectious agents, mercury, polychlorinated biphenyls (PCB's), dioxins or sodium azide, you must decontaminate it before you return it to BOC Edwards. You must send independent proof of decontamination (for example a certificate of analysis) to BOC Edwards with the Declaration (HS2). Phone BOC Edwards for advice.
- If your equipment is contaminated, you must either:
  - Remove all traces of contamination (to the satisfaction of laws governing the transportation of dangerous/hazardous substances).
  - Or, properly classify the hazard, mark, manifest and ship the equipment in accordance with applicable laws governing the shipment of hazardous materials.

Note: Some contaminated equipment may not be suitable for airfreight.

PROCEDURE

1. Contact BOC Edwards and obtain a Return Authorisation Number for your equipment.
2. Complete the Return of BOC Edwards Equipment - Declaration (HS2).
3. If the equipment is contaminated, you must contact your transporter to ensure that you properly classify the hazard, mark, manifest and ship the equipment, in accordance with applicable laws governing the shipment of contaminated/hazardous materials. As the person offering the equipment for shipment, it is your responsibility to ensure compliance with applicable law. **Note: Equipment contaminated with some hazardous materials, such as semiconductor by-products, may not be suitable for airfreight - contact your transporter for advice.**
4. Remove all traces of hazardous gases: pass an inert gas through the equipment and any accessories that will be returned to BOC Edwards. Where possible, drain all fluids and lubricants from the equipment and its accessories.
5. Seal up all of the equipment's inlets and outlets (including those where accessories were attached) with blanking flanges or, for uncontaminated product, with heavy gauge tape.
6. Seal equipment in a thick polythene/polyethylene bag or sheet.
7. If the equipment is large, strap the equipment and its accessories to a wooden pallet. If the equipment is too small to be strapped to a pallet, pack it in a suitable strong box.
8. Fax or post a copy of the Declaration (HS2) to BOC Edwards. The Declaration must arrive before the equipment.
9. Give a copy of the Declaration (HS2) to the transporter. You must tell your transporter if the equipment is contaminated.
10. Seal the original Declaration in a suitable envelope: attach the envelope securely to the outside of the equipment package, in a clear weatherproof bag.
    WRITE YOUR RETURN AUTHORISATION NUMBER CLEARLY ON THE OUTSIDE OF THE ENVELOPE OR ON THE OUTSIDE OF THE EQUIPMENT PACKAGE.

BOC EDWARDS

Form HS2

Return of BOC Edwards Equipment - Declaration

Return Authorisation Number:

You must:

- Know about all of the substances which have been used and produced in the equipment before you complete this Declaration
- Read the Return of BOC Edwards Equipment - Procedure (HS1) before you complete this Declaration
- Contact BOC Edwards to obtain a Return Authorisation Number and to obtain advice if you have any questions
- Send this form to BOC Edwards before you return your equipment

SECTION 1: EQUIPMENT

Equipment/System Name_____

Part Number _____

Serial Number_____

Has the equipment been used, tested or operated ?

YES ❑ Go to Section 2 NO ❑ Go to Section 4

IF APPLICABLE:

Tool Reference Number_____

Process _____

Failure Date_____

Serial Number of Replacement Equipment_____

SECTION 2: SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Are any substances used or produced in the equipment:

- Radioactive, biological or infectious agents, mercury, poly chlorinated biphenyls (PCBs), dioxins or sodium azide? (if YES, see Note 1) YES ❑ NO ❑
- Hazardous to human health and safety? YES ❑ NO ❑

Note 1 : BOC Edwards will not accept delivery of any equipment that is contaminated with radioactive substances, biological/infectious agents, mercury, PCB's, dioxins or sodium azide, unless you:

- Decontaminate the equipment
- Provide proof of decontamination

YOU MUST CONTACT BOC EDWARDS FOR ADVICE BEFORE YOU RETURN SUCH EQUIPMENT

SECTION 3: LIST OF SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Substance name	Chemical Symbol	Precautions required (for example, use protective gloves, etc.)	Action required after a spill, leak or exposure

SECTION 4: RETURN INFORMATION

Reason for return and symptoms of malfunction _____

_____

If you have a warranty claim:

- who did you buy the equipment from ? _____
- give the supplier's invoice number_____

SECTION 5: DECLARATION

Print your name:_____Print your job title:_____

Print your organisation:_____

Print your address:_____

_____

Telephone number: _____Date of equipment delivery: _____

I have made reasonable enquiry and I have supplied accurate information in this Declaration. I have not withheld any information, and I have followed the Return of BOC Edwards Equipment - Procedure (HS1).

Note: Please print out this form, sign it and return the signed form as hard copy.

Signed: _____Date_____

E090-32-880
Issue G

Instruction Manual

AUTO 306 accessories: Manual Source Shutter and Electromagnetic Source Shutter

Volume 2 - Operating Instructions

Description	*Item Number*
Manual Source Shutter	*E090-32-000*
Electromagnetic Source Shutter	*E090-44-000*
Electromagnetic Source Shutter Control Panel	*E090-45-000*

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CONTENTS (Volume 2)

Illustrations

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1 INTRODUCTION

1.1 Scope and definitions

This manual is supplied in two volumes; Volume 1 provides installation and maintenance instructions for the Manual and Electromagnetic Source Shutter accessories for the AUTO 306, Volume 2 provides operating instructions. You must use the Manual and Electromagnetic Source Shutter for the AUTO 306 as specified in this manual.

Read this volume of the manual before you use the Manual and Electromagnetic Source Shutter accessories with the AUTO 306. Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS is defined below.

WARNING

Warnings are given where failure to observe the instruction could result in injury or death to people.

CAUTION

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

2 OPERATION

2.1 Operator safety

WARNING

Obey the safety instructions given below and take note of appropriate precautions. If you do not, you can cause injury to people and damage to equipment.

- Read all of the relevant instructions before you operate any accessories.
- Do not touch any part of the liquid nitrogen reservoir or connecting pipes (if fitted) in the AUTO 306. Do not allow liquid nitrogen vapour to touch your skin. These surfaces and vapour are at a very low temperature and can cause tissue damage.
- Intense light can be emitted from evaporation sources. Always use dark safety glasses when you look at hot sources.
- The shutter pan may become hot after use. Ensure that you allow sufficient time for the pan to cool after an evaporation cycle before you touch it.

2.2 Manual Source Shutter

1. Move the shutter arm to one end of the slot in the front baseplate cover to cover the evaporation source.
2. Check the position of the shutter pan. The distance that you place the shutter from the source will depend on the type of source that you use. A typical distance is 15 mm but you need a greater distance for a magnetically focussed electron beam source.
3. Evacuate your vacuum chamber and operate your evaporation source. Move the shutter lever to expose the source; look to ensure that the source is properly exposed.
4. Vent the vacuum chamber and adjust the shutter position if necessary.

2.3 Electromagnetic Source Shutter

The front panel of the Control Panel is shown in Figure 1. There are three switches on the panel:

- SS1 - press to operate source shutter 1
- SS2 - press to operate source shutter 2 (if fitted)
- remote - use this switch to change between remote operation mode (that is, with the switch in the 'in' position) or manual operation mode (that is, with the switch in the 'out' position). When the Electromagnetic Source Shutter is in the remote operation mode, both shutters will be operated by a remote control instrument such as a film thickness monitor or deposition controller.

When you press SS1 or SS2, the appropriate shutter moves away from the source and the lamp next to the switch will illuminate to show that the substrate is exposed to the source.

1. Prepare the AUTO 306 for operation in accordance with the AUTO 306 instruction manual; do not evacuate the vacuum chamber.

2. Ensure that the remote switch is in the 'out' position (for manual operation).

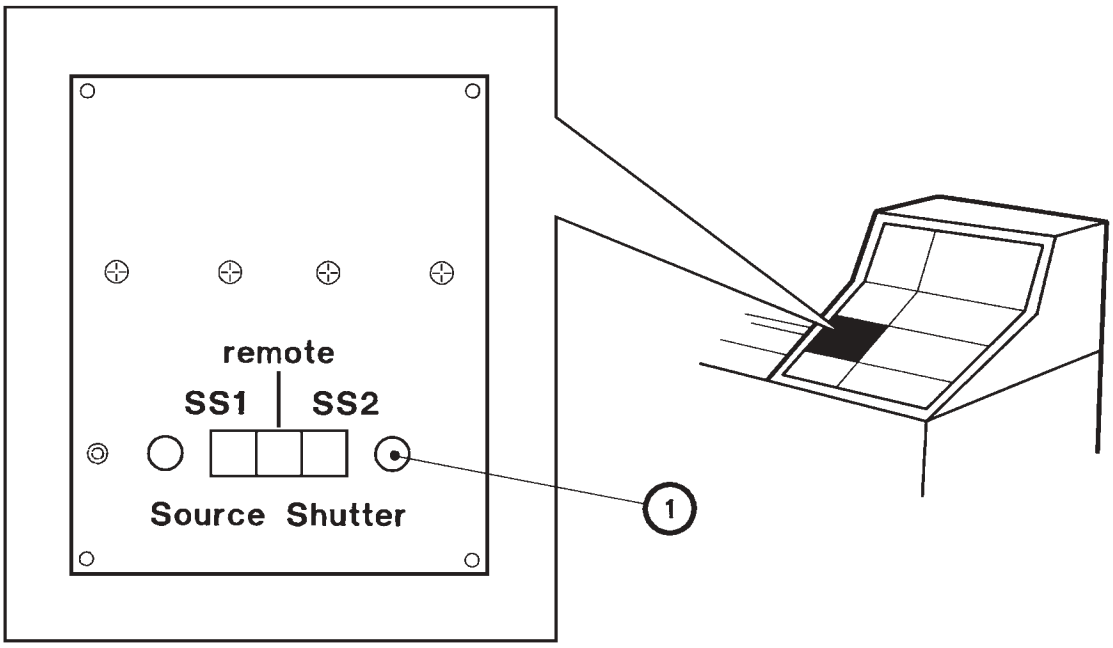
3. Press either SS1 or SS2 (depending on which shutter you will use) to operate the shutter.

4. Check the position of the shutter pan. The distance that you place the shutter from the source will depend on the type of source that you use. A typical distance is 15 mm but you need a greater distance for a magnetically focussed electron beam source.

5. Set the shutter to the closed position. Evacuate the vacuum chamber and operate your evaporation source. Press the shutter button (SS1 or SS2) to open the shutter; check that the source is properly exposed.

6. Vent the vacuum chamber and adjust the shutter position if necessary.

7. If you will use a film thickness monitor (such as the FTM6 or FTM7), press the remote switch (so that it is latched in the 'in' position). Details on how one or two shutters are controlled by the FTM6 or FTM7, which depends on the FTM6/7 mode selected, are given in the manual supplied with the FTM6 or FTM7.



AW/1509/A

1. Indicator lamp

Figure 1 - Front Panel of Electromagnetic Source Shutter Control Panel

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