

# Service Options



- **Electrostatic Classifier**  
3082
- **Differential Mobility Analyzers (DMAs)**  
3081(A), 3083, 3085(A), and 3086
- **Aerosol Neutralizers**  
3077, 3077A, and 3088

TSI® service, performed on an annual basis, helps to keep your instruments in proper working order. For the 3082 Electrostatic Classifiers and for all models of DMA's, TSI® offers two levels of service:

Clean and Calibrate, and Repair, Clean and Calibrate. For the aerosol neutralizers, since no calibration is possible, TSI offers slightly different service options. Read the following pages to learn what is included in each service.



# Service Options

## Electrostatic Classifier

3082



3082 Clean and Calibrate Service includes:

**Maintain**

- Clean sheath ports, and impactors (if returned)

**Replace**

**Parts**

- Replace internal flowmeter, internal filters, o-rings and fan filter media. Replace internal tubing as needed

**Firmware**

- Ensure latest firmware update is installed

**Calibrate**

- Touchscreen, voltages, sheath flow, impactors (if returned), and sensors for absolute sheath pressure, differential pressure across impactor, temperature, and RH

**Leak check**

- Sheath system, as well as entire classifier with DMA installed

**Test**

**Zero checks:**

**Check #1**

- Use a CPC to confirm that the classifier-DMA releases zero particles with voltage off and sheath flow on

**Check #2:**

- Conduct an SMPS scan of filtered air, confirm 0 #/cm<sup>3</sup> is measured

**Aerosol tests**

- Confirm size accuracy and resolution, as well as concentration accuracy and stability, using aerosolized 100 nm polystyrene latex spheres (PSL). For dual-polarity classifiers, this test is conducted once for each polarity

**Does NOT Include**

**Broken parts**

- Ex.: blower, high voltage supply

**Physical damage**

- Physical damage to frame or housing

### 3082 Repair, Clean and Calibrate Service includes:

<b>Repair</b>	▪ Repair or replace broken parts
<b>Clean and Calibrate</b>	▪ All actions in a standard 'Clean and Calibrate' service are then performed
<b>Does NOT Include</b>	▪ Physical damage to frame or housing

### 3082IMP Clean and Calibrate Service (for 3082 Inlet Impactors) includes:

<b>Maintain</b>	▪ Clean impactor nozzle and plate
<b>Test</b>	<b>Leak check</b> <ul style="list-style-type: none"><li>▪ Expose all three impactors to -0.75 bar gauge pressure for 5 minutes; ensure the measured pressure changes by &lt; 5% / hour</li></ul> <b>Calibration</b> <ul style="list-style-type: none"><li>▪ Each impactor is calibrated at six pressure drops within the flow range prescribed for that nozzle size. Calibration is written to the chip on the impactor body</li></ul>
<b>Does NOT Include</b>	<b>Physical damage</b> <ul style="list-style-type: none"><li>▪ If an impactor is found to be damaged to an extent that negatively affects its function, it is replaced and the customer is billed appropriately. Impactors are not replaced due to cosmetic imperfections</li></ul>

### Request Service

Specify	Description
CL-3082	Clean and Calibrate
RP-3082	Repair, Clean and Calibrate
CL-3082IMP	Clean and Calibrate

*TSI® Service uses your inlet impactors, DMA, and 3088 neutralizer during the 3082 Classifier service procedure, provided those component(s) were sent in along with your 3082. Those components can be used in a serviced or unserviced state during the 3082 procedure. If you would like the inlet impactors, DMA, and/or 3088 neutralizer to be serviced prior to their use in the 3082 procedure, please be sure to order the appropriate services for the inlet impactors, DMA, and/or 3088 neutralizer; refer to the following pages. If any of these components is sent along with a 3082, but no service is ordered for that component, TSI® will contact you for permission to bill the separate service.*

# Service Options

## Differential Mobility Analyzers (DMAs)

3081(A), 3083, 3085(A), and 3086

3081, 3081A, 3083, 3085, 3085A, 3086 DMA's  
Clean and Calibrate Service includes:

- |          |  |
|----------|--|
| Maintain | <ul style="list-style-type: none"><li>▪ Disassemble DMA while wearing powder-free gloves. Hand-clean and sonicate parts as appropriate in residue-free detergent. Clean parts further with alcohol wipes and dry with particle-free air. Clean Dacron screen by soaking in acetone and blowing dry with particle-free air</li><li>▪ Model-specific: clean narrow openings with size-specific brushes</li></ul> |
|----------|--|

- |         |  |
|---------|--|
| Replace | <ul style="list-style-type: none"><li>▪ Replace internal o-rings during re-assembly, applying grease where appropriate</li><li>▪ Replace fittings if needed</li><li>▪ Model-specific: replace Dacron screen in 3086. For all other DMA models, replace Dacron screen as needed</li></ul> |
|---------|--|

### Electrical continuity

- Measure electrical resistance across the DMA at various points to confirm that electrical connections are correct following reassembly

### Leak check

- Verify DMA holds a vacuum

### Test

#### Zero check

- Confirm the DMA releases zero particles when operated at 1.5 L/min aerosol flow, 15 L/min sheath flow, -9600V (using the customer's 3082 classifier and/or 3088 neutralizer, if available)

#### Aerosol challenge

- Conduct both monodisperse and polydisperse challenge aerosol tests to confirm sizing accuracy

### Does NOT Include

#### Broken parts

- Ex.: high voltage supply

#### Physical damage

- Ex.: cosmetic scratches



3081, 3081A, 3083, 3085, 3085A, 3086 DMA's  
 Repair, Clean and Calibrate Service includes:

Repair

- Repair or replace broken parts

Clean and Calibrate

- All actions in a standard 'Clean and Calibrate' service are then performed

Does NOT Include

- Physical damage: ex.: cosmetic scratches

### Request Service

#### Specify

CL-3081, CL-3081A,  
 CL-3083, CL-3085  
 CL-3085A, CL-3086

#### Description

Clean and Calibrate

#### Specify

RP-3081, RP-3081A.  
 RP-3083, RP-3085,  
 RP-3085A, RP-3086

#### Description

Repair, Clean and Calibrate

# Service Options

## Aerosol Neutralizers

3077, 3077A and 3088

TSI offers two service options for the Advanced Aerosol Neutralizer 3088: **Clean and Calibrate (CL-3088)** and **Replace X-Ray Source (RO-3088)**. In CL-3088, the unit is examined by an experienced technician to determine what repairs are needed. You are then contacted before any work proceeds. In RO-3088, the soft x-ray source is replaced; this is followed by all the actions included in the CL-3088 service. Read below to learn what is offered in each service.

### 3088 Clean and Calibrate Service includes:

Maintain	<ul style="list-style-type: none"><li>• Clean aerosol-exposed parts in a sonicating bath and by hand</li></ul>
Replace	<ul style="list-style-type: none"><li>• Firmware: ensure latest firmware update is installed</li></ul>
Test	<ul style="list-style-type: none"><li>• Radiation: confirm performance of x-ray source</li><li>• Radiation exposure: confirm emitted radiation of finished unit &lt; 0.8<math>\mu</math> Sv/hr</li><li>• Leak check: ensure reassembled instrument holds vacuum</li></ul>
Does NOT Include	<p><b>Physical damage</b></p> <ul style="list-style-type: none"><li>• Ex.: scratches on the exterior case</li></ul>

### RO-3088 Replace X-Ray Source Service includes:

Replace	<ul style="list-style-type: none"><li>• Replace the Soft X-ray source inside the 3088</li></ul>
Also Included	<ul style="list-style-type: none"><li>• All actions appropriate to a CL-3088 service are then performed</li></ul>

### Request Service

Specify	Description
CL-3088	Quote
RO-3088	Replace X-Ray Source



For radioactive **Aerosol Neutralizers** there are no cleaning, calibration, or repair services available; only return and transfer services are available.]

Radioactive neutralizers have a limited lifetime (both 3077 and 3077A have a half-life of 10.7 years.) After one half-life has passed, TSI® recommends purchasing a new radioactive neutralizer to ensure adequate aerosol charge conditioning. The old neutralizer must, according to government regulations, be returned to TSI® Incorporated. In such cases, please request a return service using the information in the 'Request Service' box below. After you order the return service, TSI® will contact you with the procedure.

Government regulations also require that you notify TSI Incorporated if you wish to transfer a radioactive neutralizer to a different facility for continued use. This is true even if the second facility belongs to the same party (i.e. company, organization). TSI is required by law to assist you with this process. After you order the transfer service as noted below, TSI will contact you with the procedure for transfer.

### **Request Service**

#### **Specify**

RO-3077DISP

RO-3077A DISP

RO-3077TRNSFR

RO-3077ATRNSFR

#### **Description**

Return a 3077

Return a 3077A

Transfer a 3077 to a new facility for continued use

Transfer a 3077A to a new facility for continued use

## What Makes TSI® Service Valuable?

As a result of TSI® service, you are returned an optimally performing and updated instrument. The service is performed by TSI's experienced technicians. All CL-, RP-, and RO- services are performed for a fixed price. This simple service process allows you to stay focused on the work that is important to you.

Calibration of TSI® DMA's and 3082 Electrostatic Classifiers is traceable to NIST and other accepted values of physical constants. TSI's calibration process for the 3082 includes tests for particle size accuracy, size resolution, and number concentration in accordance with Chapter 7 of ISO 15900:2009. TSI is registered to ISO-9001:2005.

These TSI services come with a 90-day warranty on labor performed, or parts used, during the service.

Call, or visit  
[tsi.com/requestservice](https://www.tsi.com/requestservice)



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**TSI Incorporated** - Visit our website [www.tsi.com](https://www.tsi.com) for more information.

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