

Maintenance

Service and Supplies



Improved Sensor Performance & Longevity

Broadley-James® Maintenance Supplies, Designed to make your job easier.

The primary components of a Dissolved Oxygen or pH measurement loop are the sensors and the transmitters. The sensors are designed to be as robust as possible, but still require regular inspection and maintenance. Some items, such as membrane cartridges, are consumables and need to be replaced on a frequent basis. Others, such as 4-pin connectors, provide a safe and repeatable method of restoring a damaged sensor back to "as new" condition. Still others, such as o-rings and gaskets, ensure that the effects of normal wear and tear are eliminated and optimum performance is restored. On the following pages you will find a wide variety of supplies to keep your sensors in optimum condition. If you need something not shown, just call. Broadley-James may have the item in stock or be able to direct you to where it can be found.

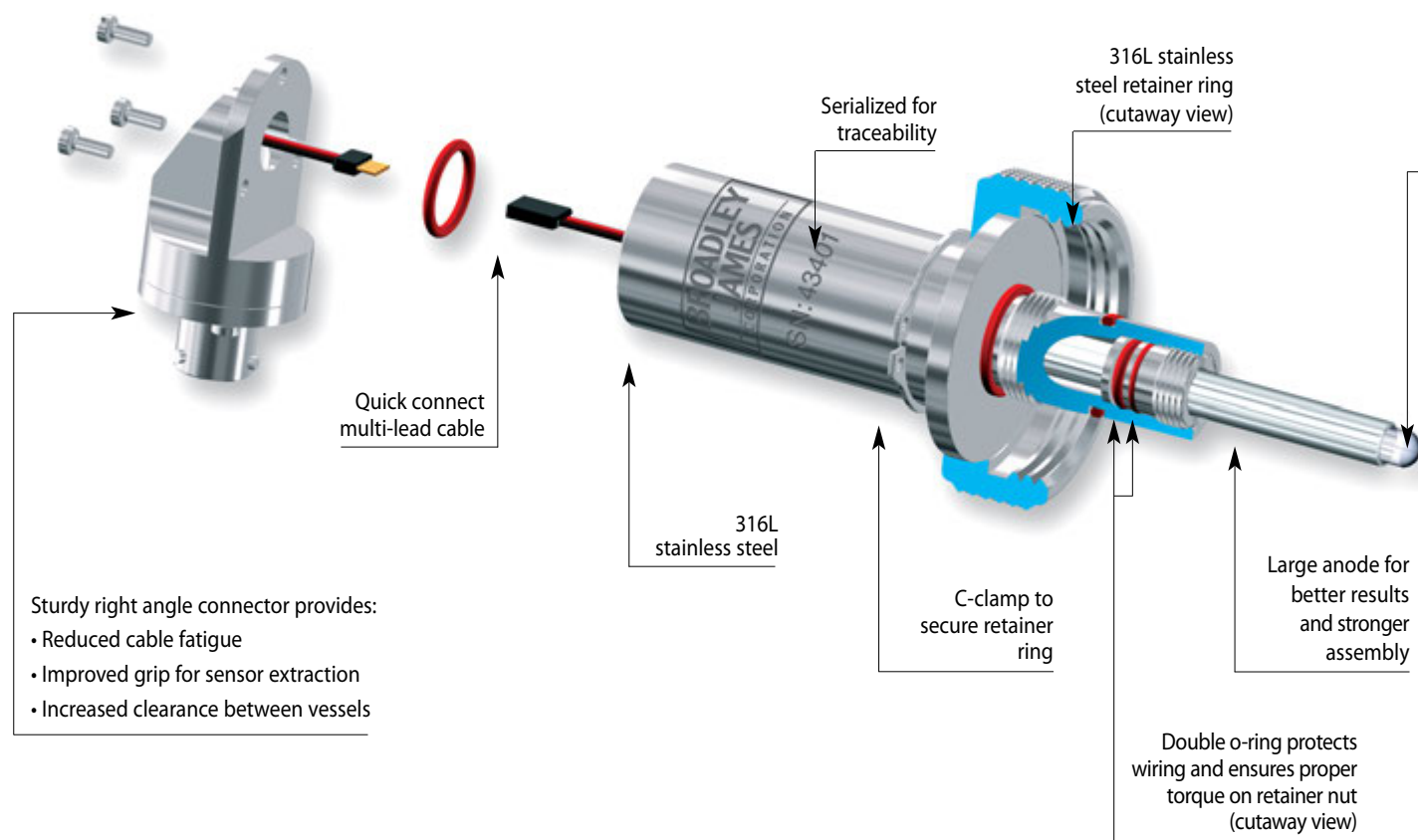
25 mm Membrane Cartridges

The OxyProbe® 25 mm membrane cartridges are a rather complex item. The body is composed of a chemical resistant polymer with a unique silicone internal bladder which contains the internal electrolyte. The shape of this bladder, combined with the shape of the polymer body, allows for the expansion of the electrolyte during the sterilization cycle without distortion of the actual sensing membrane. The sensing membrane is reinforced with an internal stainless steel mesh. Rather than use a nickel-plated brass membrane retainer ring, Broadley-James uses a 316L stainless steel retainer. The combined effect of these improvements is a durable, yet precise and repeatable, membrane cartridge assembly. Each membrane is individually leak tested and visually inspected under high magnification prior to packaging in its own protective vial.

O-rings

One of the smallest parts plays one of the biggest roles. O-rings are the first and only defense against contamination. To properly perform their intended function o-rings must have the proper fit, compression, elasticity, chemical resistance, and durability. All of our o-rings are compatible with steam sterilization and are highly chemical resistant. The sealing materials are all in accordance with FDA guidelines. Documentation of the o-ring compliance is available upon request. Over two pages of this catalog are devoted to just o-rings — every size, material, and quantity that you might need to regularly service your pH housings and D.O. sensors. An interesting and perhaps little known fact about our o-ring catalog pages is that the items are shown actual size! If you have an o-ring and are not sure of the type, just place it on top of the image in the catalog. If it matches then you have found your part.

Complete Rebuild Service for 25 mm, 19 mm and 12 mm D.O. Sensors



Broadley-James provides complete D.O. sensor rebuild service. This service includes rebuilding, testing, polishing and certifying any of the D.O. sensor designs for the cost of 1 hour of labor plus parts. While the modular design of the 25 mm and 19 mm OxyProbe D.O. sensors facilitates rapid rebuilding of the sensor by the customer, it is recommended that 12 mm D.O. sensors always be rebuilt by Broadley-James due to the difficulty in removing the anode/cathode assembly.

The Rebuild Service Consists of These 7 Steps:

1. Inspect the Connector Plug and Wiring

Occasionally the connector pins become bent or broken during use, so the connector will be replaced if necessary. The optional right angle connector minimizes cable fatigue and makes it easier to remove the sensor. Its low profile will also provide additional clearance between vessels. Any D.O. sensor with a straight connector can easily be converted to this right angle style.

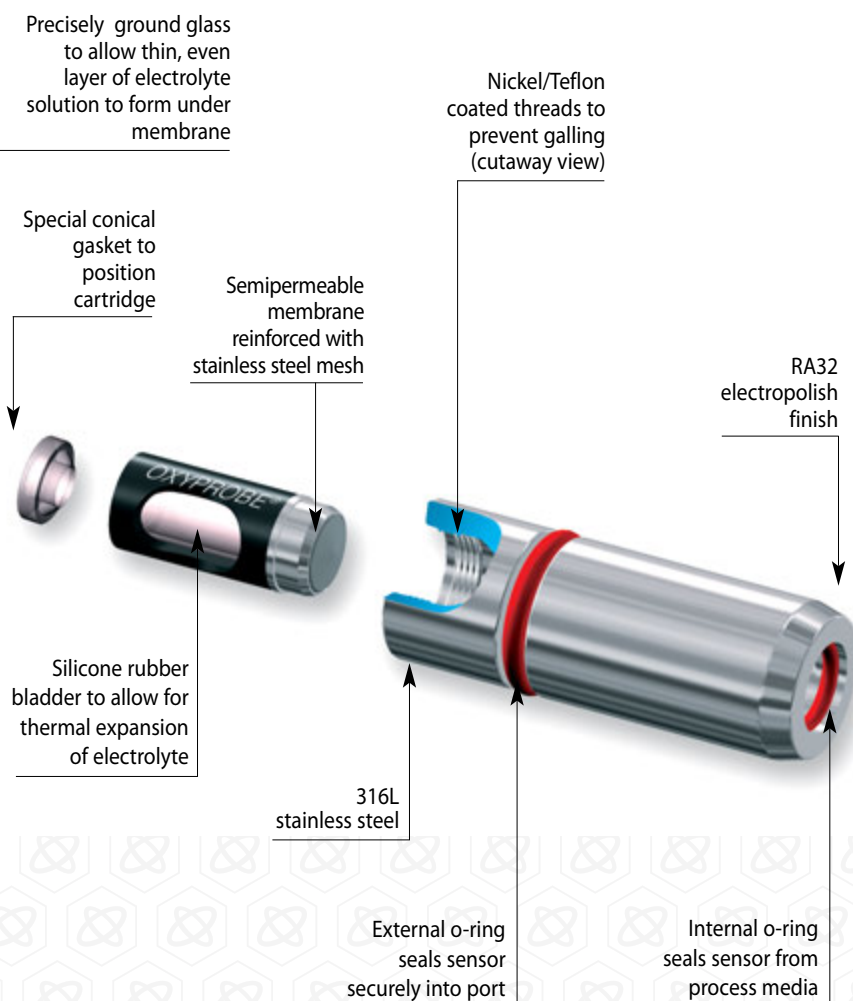
2. Replace Cathode Assembly

This is the heart of the sensor. The glass tip should never be bumped or hit. Imperfections in the polish or curve of the tip will affect sensor readings and calibration. For example, nicks in the glass allow pools of electrolyte to form. During the process, oxygen will collect in these same spots and interfere with the reading. If a pool of electrolyte is near the platinum wire of the cathode, the sensor will not zero.

3. Replace all O-rings

All o-rings are replaced during rebuild. The unique feature of the Broadley-James D.O. sensor is that all seals are mechanical seals. There are no adhesive sealants to leak or fail while the sensor is in process.

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5. Replace Membrane Cartridge

The silicone membrane is reinforced with stainless steel mesh and can easily be damaged. Just a bump on a hard surface can ruin its integrity. Eventually it will become clogged, stretched or damaged, so it should be changed regularly. Inspection and calibration of the sensor will determine when to change the cartridge. Broadley-James has designed a membrane testing kit to confirm that the membrane has not been compromised prior to use. The membrane cartridge is replaced during rebuild service.

6. Refill Electrolyte Solution

It is recommended that the electrolyte be changed after every run for the sensor to work at optimum reliability. The surface of the cathode assembly is ground to allow a thin layer of electrolyte to be trapped between the membrane and the glass. It is this solution which completes the circuit of the sensor. The electrolyte, along with the membrane, is replaced during rebuild.

7. Provide Quality Assurance Certificate and 1 -Year Warranty

As a final step, Broadley-James Corporation will heat sterilize the sensor and test it to ensure it is working correctly. A QA certificate is provided which includes the date of rebuild and calibration results. The serial numbers of the sensor and cathode are kept on file. This documentation will serve as the new warranty against manufacturer's defects in parts and workmanship.

It is much easier to replace o-ring seals rather than sealant. With sealant, it is necessary to eliminate all residue before re-applying another seal. Always inspect o-rings for wear prior to use. Good o-ring seals are critical to sensor performance for the following reasons:

- To keep moisture out of the wiring pocket allowing the sensor to withstand washdowns and autoclaving.
- To prevent the process from contaminating the sensor and wiring.
- To seal the sensor securely into the port to prevent leakage.

4. Polish the Outer Body

The sensor is polished down to the base metal. Dirt, tarnish and steam scorch marks are removed from the surface. The body of the sensor is fabricated from 316L stainless steel to withstand repeated exposure to both CIP and SIP conditions. Anything less would allow pitting and corrosion of the metal over time. The extra polishing step ensures the sensor is as clean as possible before returning it to service after the rebuild.

Replacement Parts for 25 mm and 19 mm D.O. Sensors

Cathode
Tool



Cathode Removal Tool

The two notches in the bottom of this stainless steel tool fit into the grooves of the cathode retainer nut to quickly remove the nut and the cathode assembly. The knurled handle provides sufficient grip to tighten the retainer nut to the proper torque eliminating the need for additional tools.

Part Number

AM-9213

Cathode
Retainer
Nut

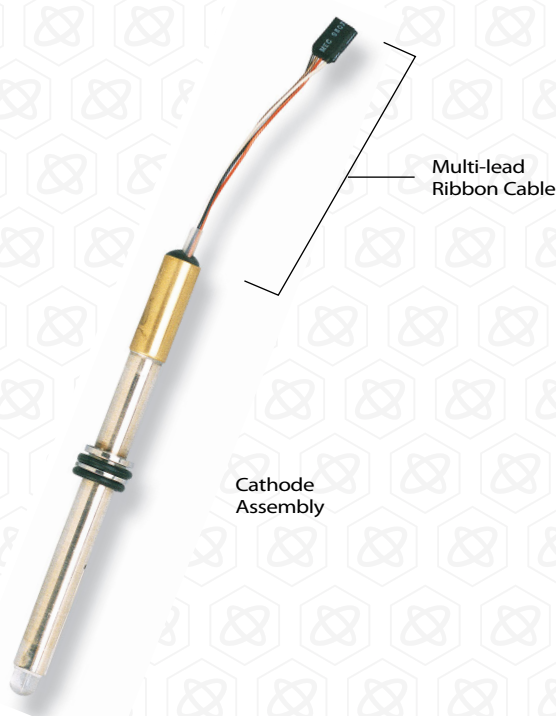


Cathode Retainer Nut

This retainer nut secures the cathode assembly into the sensor body. The mechanical seals on the Broadley-James electrode keep this retainer nut clean and dry. It is reusable and unlikely to need replacing unless accidentally lost during rebuild.

Part Number

AM-9210



Cathode Assembly for 25 mm and 19 mm Sensors

This part number includes the cathode assembly and both o-rings required to seal it into the sensor body. The only difference between each of the models listed below is the length of the multi-lead ribbon cable. The ribbon cable connects the assembly to the sensor's 4-pin connector.

Part Number Sensor Length

CT25-PT-050MP	70 mm
CT25-PT-130MP	150 mm
CT25-PT-200MP	220 mm
CT25-PT-300MP	320 mm
CT25-PT-400MP	420 mm

Connectors for 25 mm, 19 mm and 12 mm D.O. Sensors

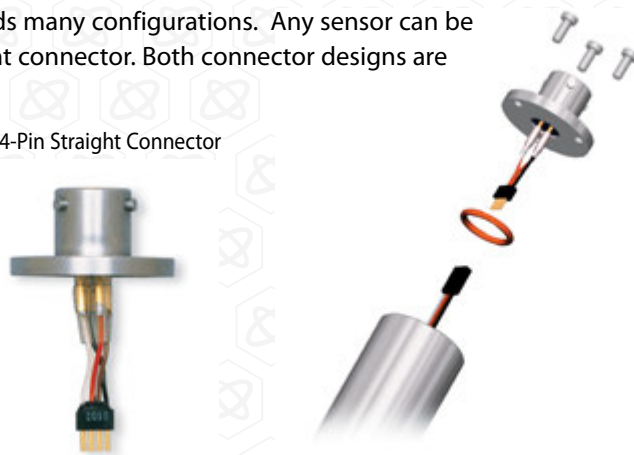
Sensor Connectors

The modular design of Broadley-James OxyProbe® sensors affords many configurations. Any sensor can be quickly converted to or from a right angle connector or a straight connector. Both connector designs are useful; choose whichever one works best for the application.

Straight 4-Pin Connector

Part Number	Description
AM-9202	25 mm Sensor
AM-9203	19 mm Sensor or 12 mm Sensor

4-Pin Straight Connector



Right Angle 4-Pin Connector Assembly

The 4-pin right angle connector assembly is comprised of 2 components, the straight connector and the right angle adapter. These parts can be purchased individually or as a set. To convert from a straight connector to a right angle connector, the 4-pin straight connector listed above needs to be replaced. The 4-pin connector used with the right angle adapter has longer connector wires to accommodate the bend in the right angle adapter. The opening in the extended elbow is a great place to easily attach a dust cap or permanent identification tag to the sensor.

25 mm Sensors

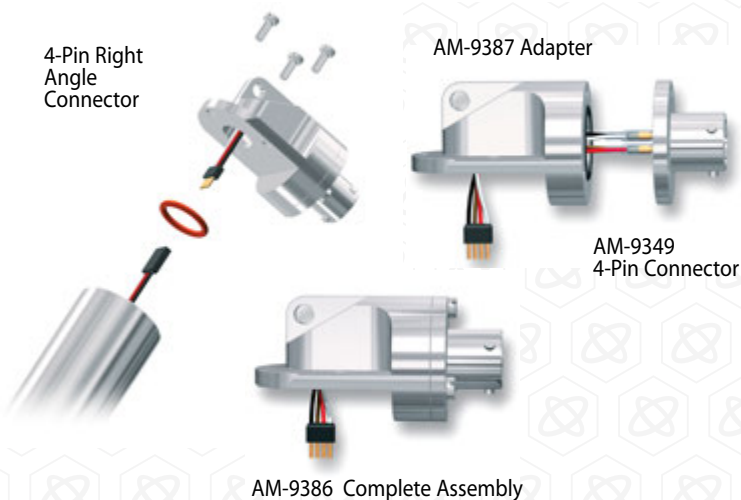
Part Number	Description
AM-9349	4-pin connector
AM-9387	Adapter
AM-9386	Right angle assembly

19 mm or 12 mm Sensors

Part Number	Descriptions
AM-9349	4-pin connector
AM-9392	Adapter
AM-9393	Right angle assembly

4-Pin Right
Angle
Connector

AM-9387 Adapter



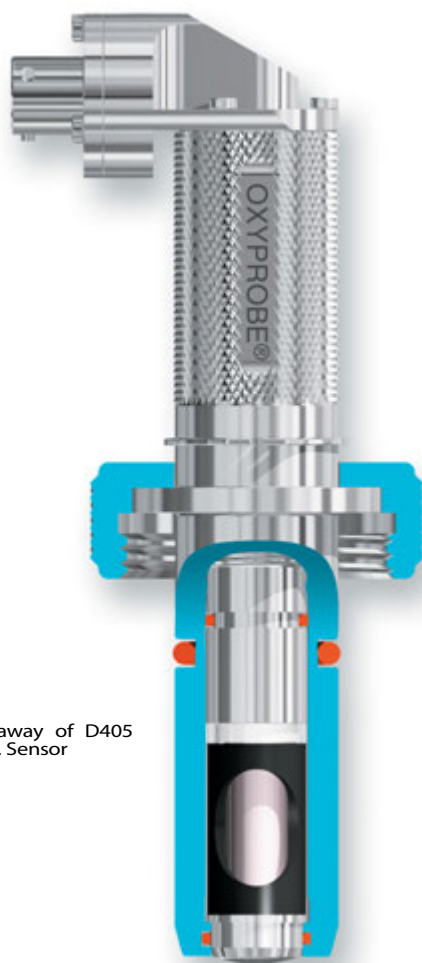
AM-9386 Complete Assembly

TIPS & HINTS

Right Angle 4-Pin Connector Assembly

The right angle connector keeps the sensor from rolling off of the table or laboratory bench and prevents cable stress caused by tight bends as the cable exits the sensor. A sensor with the old style straight connector can be easily retrofitted to use the new right angle connector, which also has a place to attach the connector dust cap and an identification tag. The right angle connector combines form and function to help make the sensors more useful and extend their life.

Membrane Cartridges for 25 mm and 19 mm D.O. Sensors



Cutaway of D405 D.O. Sensor



Membrane Cartridge for 25 mm and 19 mm D. O. Sensors

Single Cartridge Kit

This kit includes everything required to replace the membrane cartridge and internal o-rings on one 25 mm or 19 mm OxyProbe®.

This kit includes:

- One 25 ml bottle of electrolyte
- One membrane cartridge
- One set of internal o-rings



Part Number

KA2501

Four Cartridge Kit

This kit contains everything required to replace four membrane cartridges on any combination of 25 mm or 19 mm OxyProbes. Everything is conveniently packed in one box for easy storage.

This kit includes:

- One 25 ml bottle of electrolyte
- Four membrane cartridges
- Four sets of internal o-rings



Part Number

KA2504

25 Piece Cartridge Kit

This convenient bulk pack is the most popular among large volume users. It contains 25 membrane cartridges in one easy-to-store box. **Internal o-rings, gaskets and electrolyte must be ordered separately.**



Part Number

KA2525



Membrane Cartridges for 12 mm D.O. Sensors



Model D145
D. O. Sensor

Cartridge threads
directly onto
12 mm D.O.
Sensor

Membrane Cartridge
for 12 mm D. O.
Sensor

Single Cartridge Kit

This kit includes everything required to replace the membrane cartridge and internal o-rings on one 12 mm OxyProbe®.

This kit includes:

- One 25 ml bottle of electrolyte
- One membrane cartridge
- One set of internal o-rings



Part Number

KA1201

Four Cartridge Kit

This kit contains everything required to replace four membrane cartridges on a 12 mm OxyProbe. Everything is conveniently packaged in one box for easy storage.

This kit includes:

- One 25 ml bottle of electrolyte
- Four membrane cartridges
- Four sets of internal o-rings



Part Number

KA1204

25 Piece Cartridge Kit

This convenient bulk pack is the most popular among large volume users. It contains 25 membrane cartridges in one easy-to-store box. **Internal o-rings, gaskets and electrolyte must be ordered separately.**



Part Number

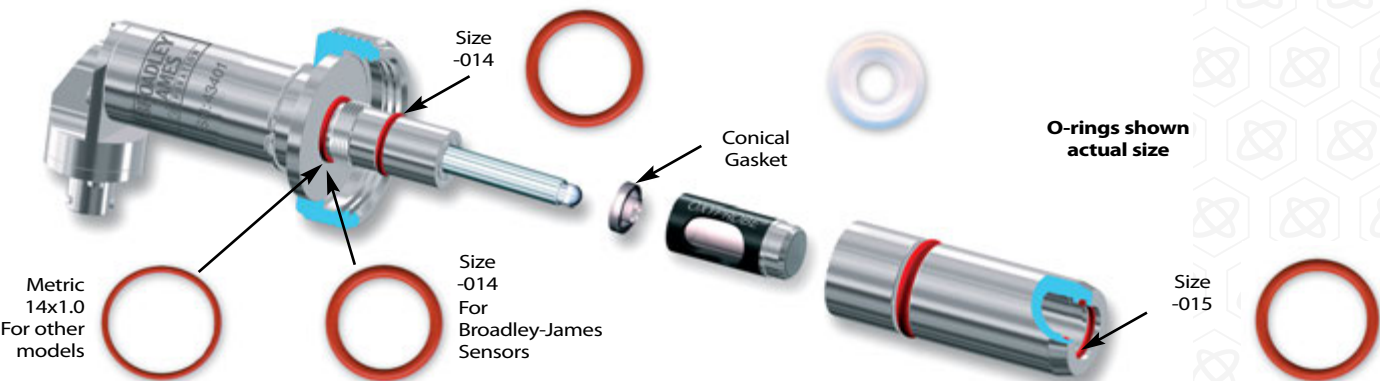
KA1225

O-rings for D.O. Sensors

Internal O-rings for 19 mm and 25 mm D.O. Sensors

O-rings need to be replaced over time. Internal o-rings for 19 mm and 25 mm D.O. sensors are included with each membrane kit. However, bulk packs are also available.

Part Number	Description	Quantity
AG-9206-10	4 internal o-rings, 1 gasket	10 sets



TIPS & HINTS

O-ring kits

The Broadley-James D.O. o-ring kit contains five o-rings, but the sensor only has four sealing points. The difference is at the first sealing point (see above). There is a bevel at the very end of the inside threads of a Broadley-

James endcap. This bevel creates a pocket into which the o-ring seats securely. Some manufacturers do not have such a pocket, therefore, only a very small, thin o-ring will fit. An extra, thin o-ring is provided to fit these sensors.

Internal O-rings for 12 mm D.O. Sensors

O-rings should be on hand when changing the membrane cartridge of a D.O. sensor. These internal o-rings are included in membrane cartridge kits. However, membrane cartridge bulk packs do not include o-rings or electrolyte solution. These items must be purchased separately.

Part Number	Description	Quantity
AG-E011-25	Internal o-rings for 12 mm D.O.	25

Shown actual size

Size -011 EPDM



12 mm D.O. Sensor and Cartridge



O-rings for D.O. Sensors

Part Number	Quantity
AG-S016-50	50
AG-S016-25	25
AG-S016-10	10

19 mm External O-rings

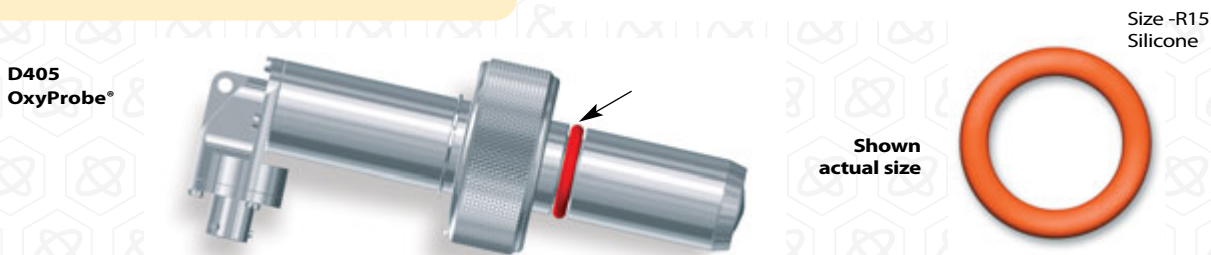
This silicone o-ring will fit the external groove of any 19 mm D.O. sensor or housing. It should be replaced regularly to ensure that the housing or sensor fits securely into the port.



Part Number	Quantity
AG-SR15-50	50
AG-SR15-25	25
AG-SR15-10	10

Standard 25 mm External O-rings

The external silicone o-ring on a 25 mm D.O. sensor is the same as the one found on a 25 mm housing. It should be replaced regularly to ensure that the sensor fits securely into the port.



Part Number	Quantity
AG-E117-50	50
AG-E117-25	25
AG-E117-04	4

25 mm B. Braun Biotech External O-rings

The B. Braun Biotech D.O. sensors and housings have an EPDM o-ring seal. The internal diameter is slightly larger and the cross-section is slightly smaller than the external silicone o-rings found on other Broadley-James 25 mm housings and D.O. sensors.



O-rings for D.O. Sensors and pH Electrodes

External O-rings for 12 mm D.O. Sensors and FermProbe® pH Electrodes

The Viton o-ring and Teflon washer found on 12 mm D.O. sensors is the same as those found on FermProbes with metric threads. These seals should last the lifetime of the sensor or electrode, but replacements can be purchased in sets of three.

Part Number	Compatible Probes	Quantity
300-P101	F-600, F-607 and F-615 FermProbes	3 sets
300-P102	F-695 and F-635 Fermprobes and 12 mm D.O. OxyProbes®	3 sets

Replacement Set Shown Actual Size



Size
-111 Viton



Teflon
Washer



F-635
FermProbe



F-600
FermProbe



D145
OxyProbe

TIPS & HINTS

FermProbe O-ring Sets

The difference between the above two sets of o-rings is the Teflon washer. Electrodes with the Pg13.5 metric threads require a beveled Teflon washer, which allows the o-ring

and electrode to seat better when threaded into a metric threaded port or headplate. A bevel is not required for a FermProbe to seal correctly in a standard housing.

O-rings for FermProbe Connectors

In order to keep moisture out of the connector during autoclaving, FermProbes have a small o-ring gasket at the base of the connector. These o-rings should last the lifetime of the electrode. However, they may need to be replaced on occasion due to loss during handling.

Part Number	Description	Quantity
AG-S013-04	FermProbe connector o-ring	4
AG-S013-25	FermProbe connector o-ring	25



F-615
FermProbe



F-635
FermProbe



Size -013
Silicone

Actual Size
O-ring

O-rings for 25mm Housings

Standard 25 mm Housing O-rings

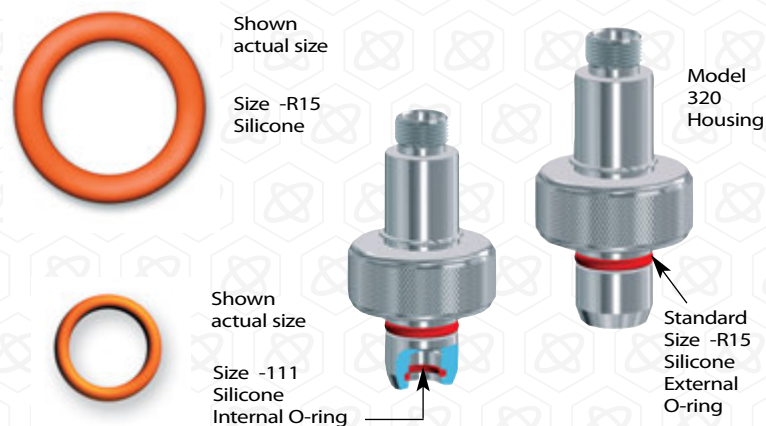
Broadley-James Models 320, 330, 370 housings use the same set of o-rings. O-rings should be inspected regularly and replaced at the first sign of wear.

External O-rings

Part Number	Quantity
AG-SR15-50	50
AG-SR15-25	25
AG-SR15-10	10

Internal O-rings

Part Number	Quantity
AG-S111-50	50
AG-S111-25	25
AG-S111-10	10



B. Braun Biotech Housing O-rings

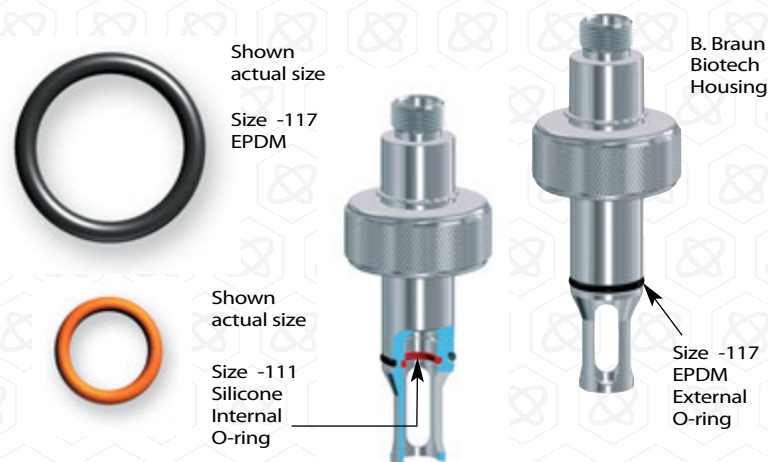
The external EPDM o-ring on the B. Braun Biotech housings, Models 322, 326 and 336, has a slightly smaller cross section than those found on other Broadley-James housings. The internal silicone o-ring is the same on all Broadley-James housings. Regular inspection and replacement is recommended. Do not use grease on any housing o-ring.

External O-rings

Part Number	Quantity
AG-E117-50	50
AG-E117-25	25
AG-E117-04	4

Internal O-rings

Part Number	Quantity
AG-S111-50	50
AG-S111-25	25
AG-S111-10	10



Oversized 25 mm O-rings

Broadley-James also offers a thicker, more pliable o-ring for certain applications. It has a larger o.d., but is more compressible than other silicone o-rings. It can be used on any standard 25 mm housing or D.O. sensor. This unique o-ring was designed to compensate for port imperfections such as a port that is out-of-round or has an i.d. slightly greater than 25 mm.

Part Number	Quantity
AG-SF25-10	10

