

Instructions

Tektronix

**PPMS200
Fine Pitch Probing System
(PPM201B, 201C, 203B, & 203C)**

070-9092-01

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

Injury Precautions

Do Not Operate in Wet/Damp Conditions

To avoid electric shock, do not operate this product in wet or damp conditions.

Do Not Operate in Explosive Atmosphere

To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Product Damage Precautions

Use Proper Power Source

Do not operate this product from a power source that applies more than the voltage specified.

Safety Terms and Symbols

Terms in This Manual

These terms may appear in this manual:



WARNING. Warning statements identify conditions or practices that could result in injury or loss of life.



CAUTION. Caution statements identify conditions or practices that could result in damage to this product or other property.

Getting Started

This manual contains installation, operation, and replaceable parts information for the PPMS200 Probing Test Station, as well as the PPM201B, PPM201C, PPM203B, and PPM203C articulating arms.

This section contains the product description and assembly instructions.

Product Description

The PPMS200 Probing Test Station provides users with a stable environment that enables them to perform a broad spectrum of probing tasks. The PPMS200 shown in Figure 1 includes the following components for fine pitch probing:

- Circuit Board Holder
- Articulating Arm with 3 Axis Control (Two)
- Stereo Microscope with Boom Stand and Ring Lamp

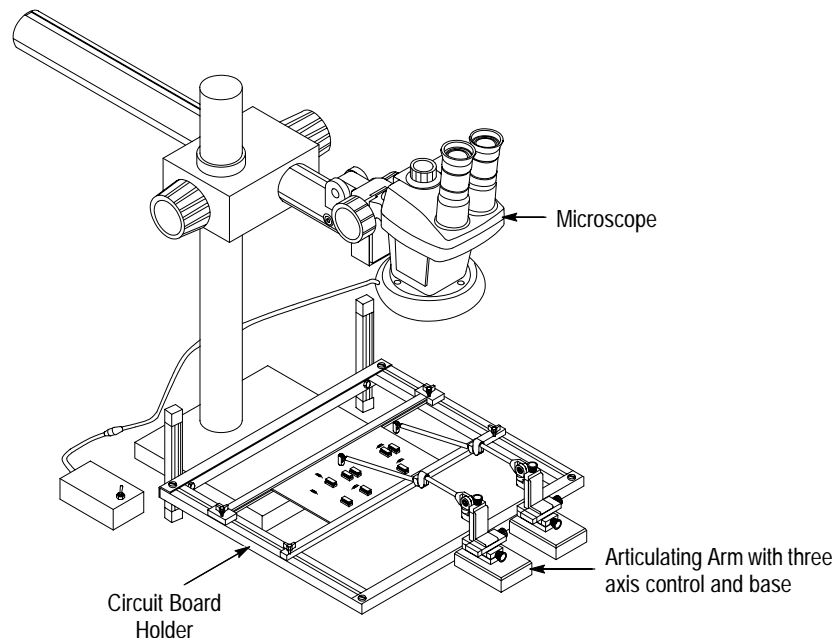


Figure 1: PPMS200 Fine Pitch Probing System

The following items are not shown in Figure 1, but are also included with the PPMS200:

- Probe Adapters
- Adjustable Ground Pin Assemblies for General Purpose and SMD probes

Assembly

The PPMS200 microscope and E-arm must be assembled for operation. Refer to Figure 2 while performing the following steps:

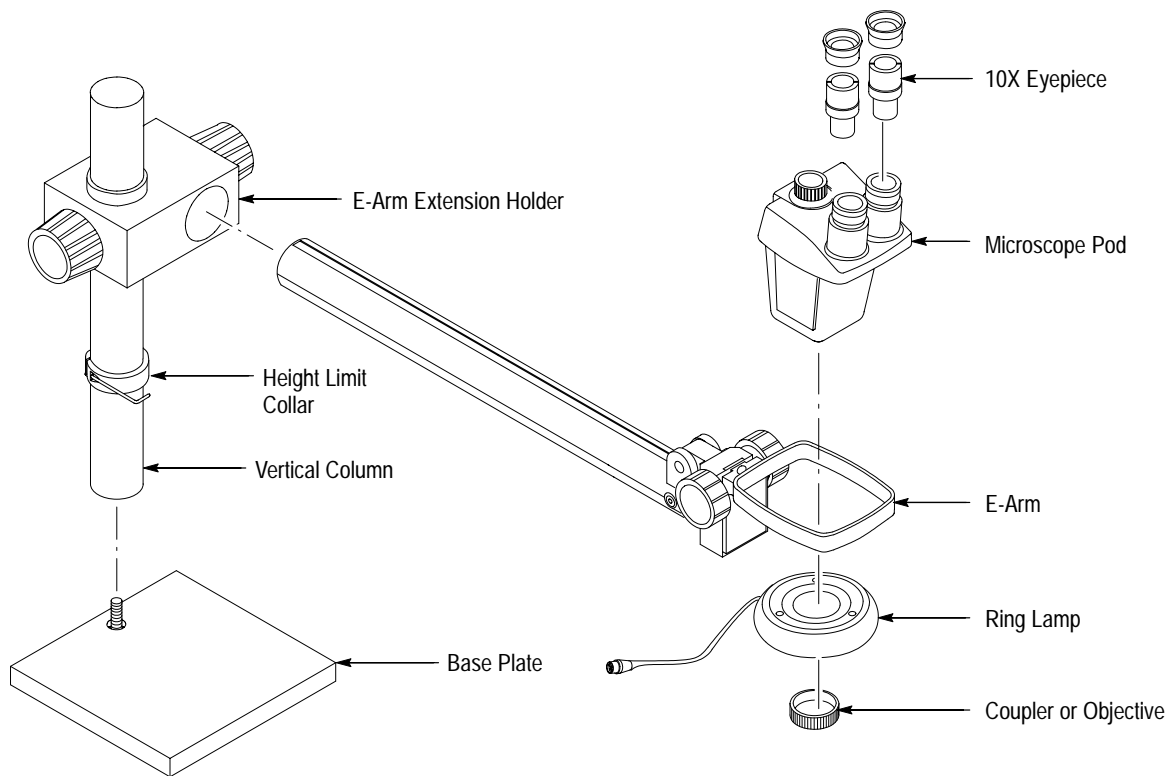


Figure 2: Microscope Assembly

1. Securely attach the vertical column to the base plate.
2. Raise the E-arm extension holder up the vertical column until it is about six inches from the top. Loosen the knob closest to the column to slide the holder, and tighten the knob when the holder is in place.

3. Slide the height limit collar up against the E-arm extension holder, and tighten the locking screw. (The collar prevents accidentally lowering the microscope too far and may be adjusted as necessary.)
4. Slide the E-arm extension into the holder (about half way) and tighten the holder knob.
5. Secure the microscope pod into the E-arm.
 - a. Rotate the two clips located on either side of the microscope away from the microscope.
 - b. Slide the microscope into the E-arm assembly.
 - c. Rotate the clips into the assembly to lock the microscope into place.
6. Attach the objective lens to the microscope.
7. Attach the ring lamp to the bottom of the pod.
 - a. Fit the ring lamp on the bottom of the microscope pod.
 - b. Screw the coupler onto the objective lense to hold the ring lamp in place.
8. Connect the ring lamp cable to the mating connector on the ring lamp power supply. You may have to rotate the ring lamp assembly so that the cable reaches the rear of the bench.
9. Attach the 10X eyepieces to the microscope.

Operating Basics

This section describes the function and operation of each of the components supplied with the PPMS200.

Microscope Assembly

Figure 3 illustrates the microscope assembly components.

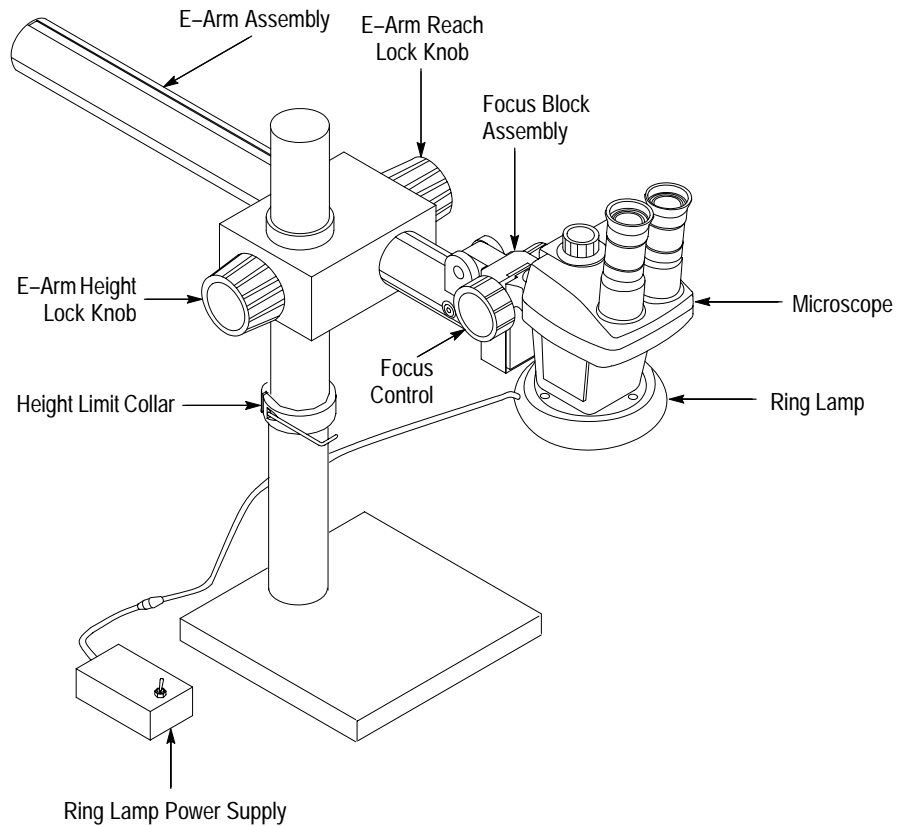


Figure 3: Microscope Assembly

E-Arm Assembly

The E-arm assembly permits the microscope to be positioned over the device under test. The assembly is mounted to a high-mass base for support.

E-Arm Reach Lock Knob

The E-arm reach lock knob permits the arm to extend in and out in order to place the microscope over the circuit.



CAUTION. To prevent damage or injury, do not extend the E-arm so far out that the assembly tips forward.

Focus Block Assembly

The focus block assembly supports the microscope and provides focus control.

Rotate the focus control knob to focus on the device under test. The control raises and lowers the microscope pod assembly. Make sure that the height limit collar is set so that the microscope cannot be lowered into the circuit.

Microscope

The microscope is a binocular microscope with variable magnification. Refer to Figure 4 as the microscope components are discussed.

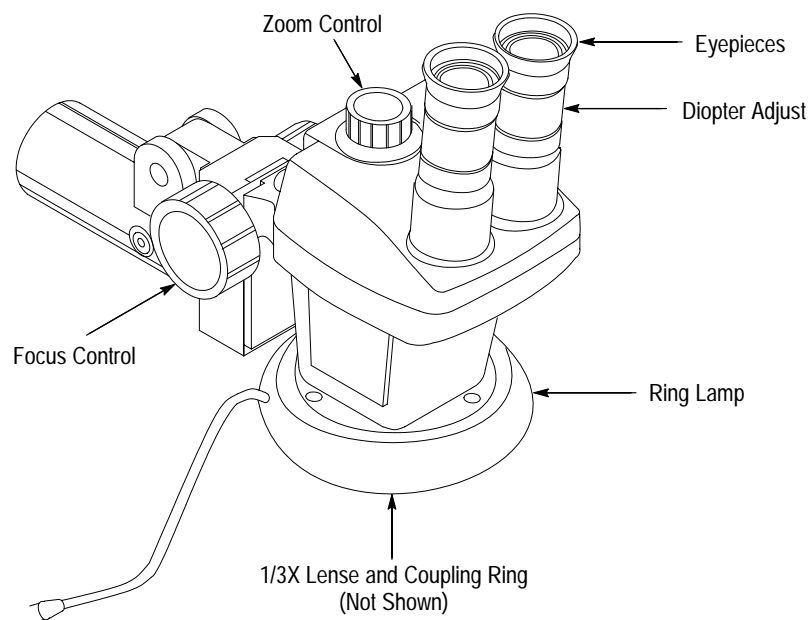


Figure 4: Microscope Features and Controls

X10 Eyepieces. The eyepieces may be moved apart or together to match the distance between your eyes. Adjust the distance so that you see a single image.

Zoom Control. The zoom control provides for variable magnification between 0.8X and 4X. Start with a high magnification of the device under test and focus the microscope; then, as you lower the magnification, you will notice that the device will remain in focus through the full magnification range.

Diopter Adjust. The diopter adjust permits users with corrective lenses to remove their glasses when using the microscope. First focus while looking through the nonadjustable eyepiece; next, view through the adjustable eyepiece and rotate the diopter adjust collar until the image is in focus.

Objective Lens (Not shown). The objective lens partially determines the degree of magnification that is provided by the microscope. The lens provided is a 1/3X objective. Increased magnification is possible if the objective lens is removed; however, the range of magnification may not be suitable for circuit board probing.

Ring Lamp

The ring lamp is a long-life fluorescent lamp that provides 360° of illumination around the object being viewed. The lamp and reflector are replaced as a single unit.

Ring Lamp Power Supply

The ring lamp power supply provides the high-voltage, low-current power that the ring lamp requires. The power supply is connected to the ring lamp with a special connector.

E-Arm Height Limit Collar

The limit collar prevents the E-arm from lowering the microscope too far. The limit collar should be carefully set so that the E-arm cannot fall too far if it is dropped while being adjusted.

E-Arm Height Lock Knob

The E-arm height lock knob is loosened in order to raise, lower, or rotate the E-arm.



CAUTION. *To prevent damage to the microscope or circuit under test, hold the E-arm securely when loosening the height lock knob. The E-arm will drop to the height limit collar unless it is supported. Make sure that the height lock knob is securely tightened once the arm is in position.*

Circuit Board Holder

The circuit board holder holds boards up to 16 by 20 inches by using an adjustable rail system. The board holder may be used lying down or standing upright. See Figure 5.

Attach the circuit board by either slipping it into the main rail slots or by attaching it to the small insulator-adapters that are provided. Gently slide the rails together to hold the board in place and tighten the adjusting knobs.

After the board and microscope are in position, the manipulator arm is moved to the point to be probed.

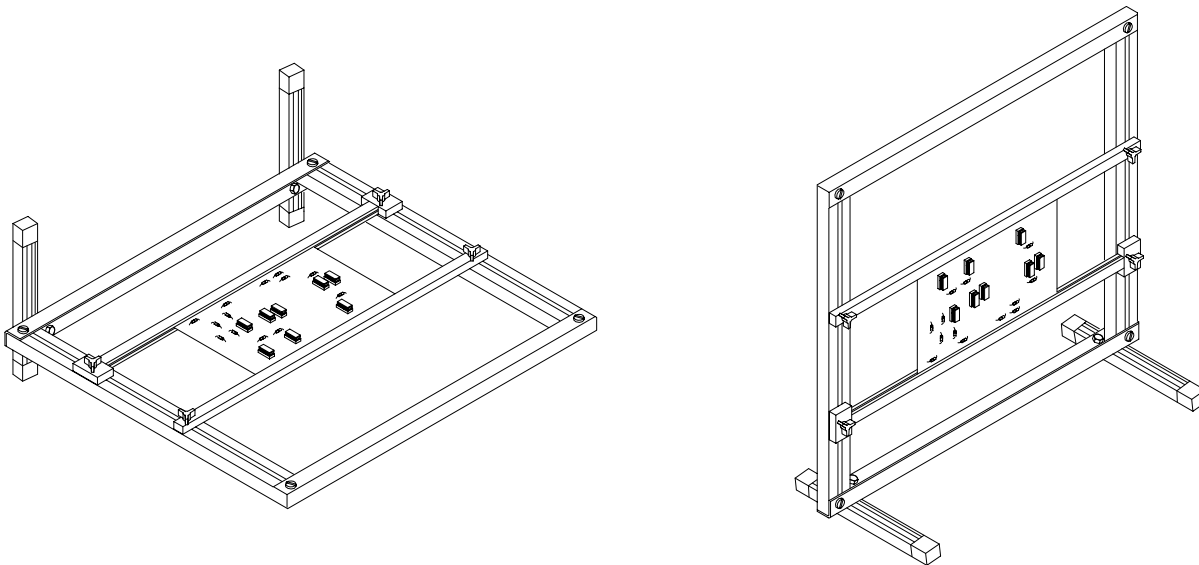


Figure 5: Circuit Board Holder

Manipulators

The PPMS200 comes with two 3-axis manipulators for fine pitched circuit board probing. Each of the manipulators is equipped with an articulating arm for probe positioning and a high mass base for stability. See Figure 6.

Manipulators are also available with clamp bases and single axis controls. Refer to Figure 17 on page 26 for illustrations and model numbers.

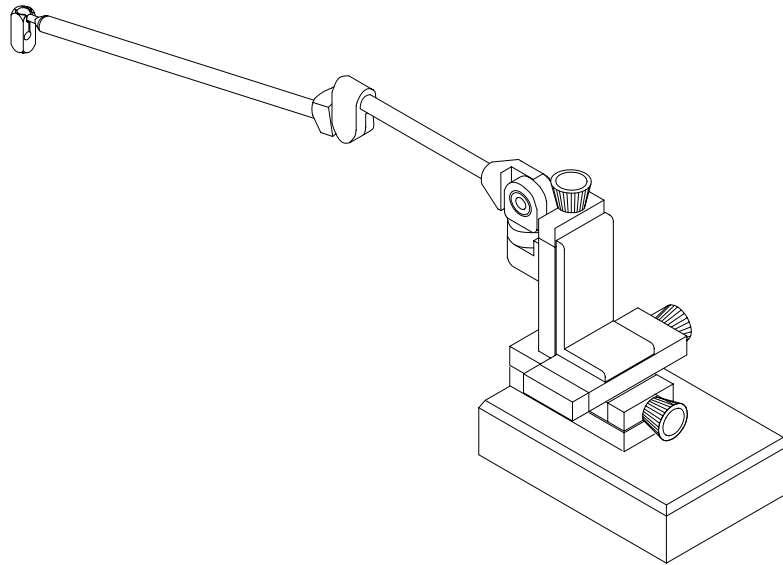
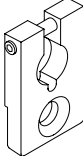
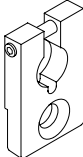
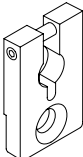
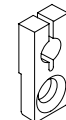
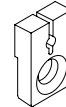
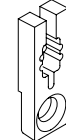
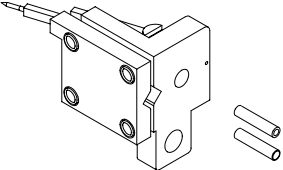
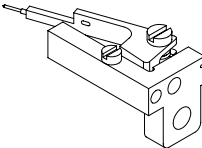


Figure 6: Fine Pitch XYZ Manipulator

Attaching Probes to the Manipulator

The PPMS200 comes with adapters to attach different styles of probes onto the articulating arms. Refer to Table 1 and the probe section of your Tektronix catalog for a complete description of probes and styles.

Table 1: Probe Adapters

	<p>5 mm Adapter. Use this adapter for holding Tektronix 5 mm (miniature style) probes. The P6204 is a typical 5 mm probe.</p>
	<p>4 mm Adapter. Use this adapter for holding Tektronix probes with 4 mm heads. The P6207 and P6217 are typical 4 mm probes.</p>
	<p>3.5 mm Adapter. Use this adapter for holding Tektronix 3.5 mm (compact style) probes. The P6139A is a typical 3.5 mm probe.</p>
	<p>2.5 mm Adapter. Use this adapter for holding Tektronix 2.5 mm (subminiature style) probes. The P6231 is a typical 2.5 mm probe.</p>
	<p>SMD Adapter. Use this adapter for holding Tektronix SMD probes. The P6563A is a typical SMD probe.</p>
	<p>P6245 Adapter. Use this adapter for holding the Tektronix P6245 probe.</p>
	<p>Adjustable Ground Pin Assembly for General-Purpose Probes. Use this assembly for holding general-purpose probes. Select the larger or smaller ferrule depending on whether you are adapting a probe with a 3.5 or 2.5 mm diameter.</p>
	<p>Adjustable Ground Pin Assembly for SMD Probes. Use this assembly for holding SMD probes.</p>

Attach the probe adapter to the articulating arm as shown in Figure 7. The adapter can be rotated to a position that is convenient to the user.

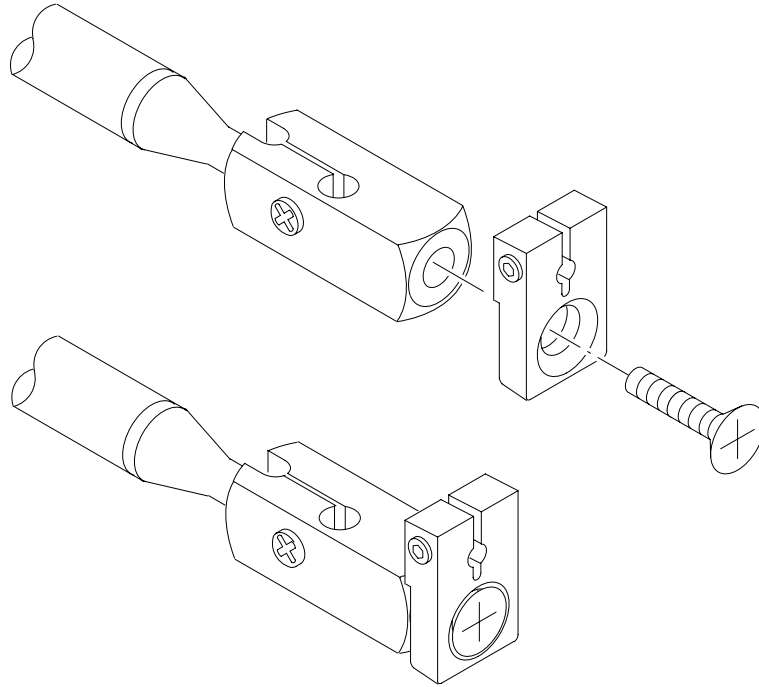


Figure 7: Attaching the Probe Adapter to the Articulating Arm

To fit a probe into an adapter, slide the probe through the hole from the back. After the probe is in position, gently tighten the clamp screw to hold the probe in place. See Figure 8.

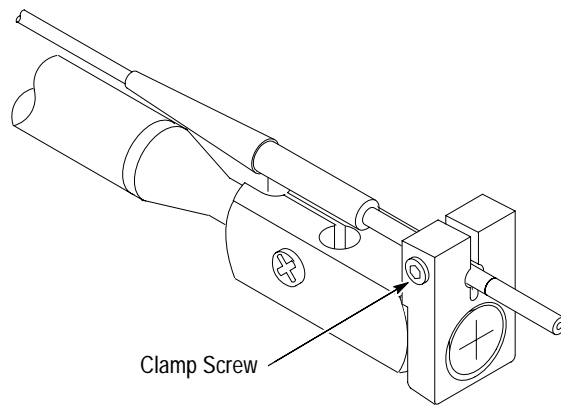


Figure 8: Attaching the Probe in the Adapter

Attach an adjustable ground pin assembly to the arm as shown in Figure 9.

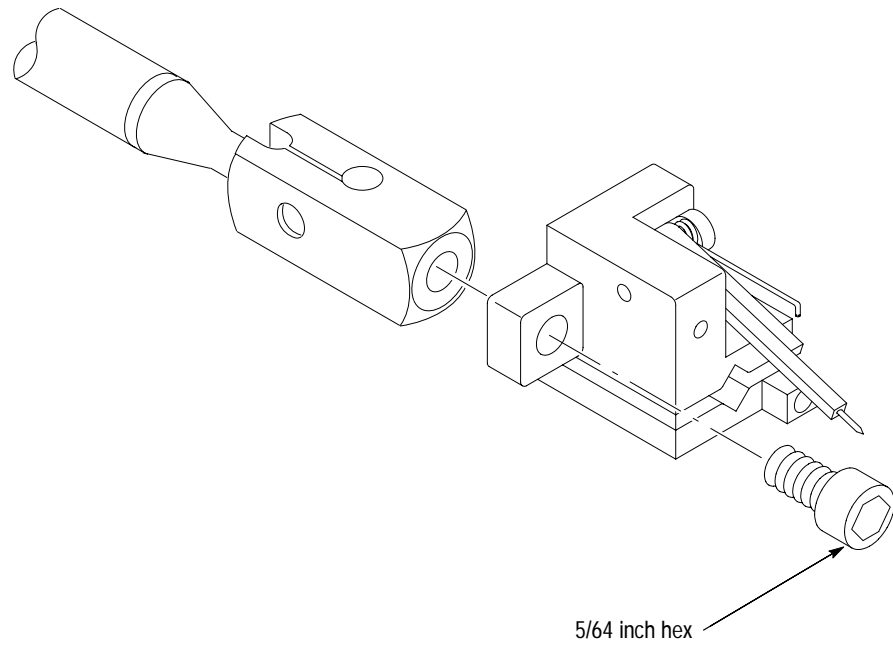


Figure 9: Attaching an Adjustable Ground Pin Assembly to the Articulating Arm

Use the following procedure to fit a probe into the adjustable ground pin assembly for SMD probes:

1. Slide the probe through the hole from the back.
2. Set the probe tip slightly behind the spring-loaded ground pin so that the ground pin will make contact and compress before the probe tip makes contact.
3. After the probe is in position, gently tighten the set screw to hold the probe in place. See Figure 10.

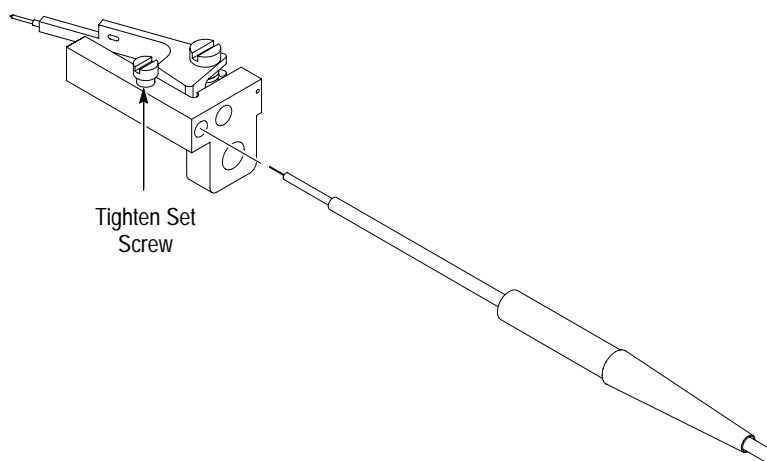


Figure 10: Securing SMD Probe in Ground Pin Assembly

Use the following procedure to fit a 3.5 mm or 2.5 mm general-purpose probe into the adjustable ground pin assembly shown in Figure 11:

1. Loosen the four screws with a 1/8 inch hex wrench.
2. If necessary, place the appropriate size ferrule (3.5 mm or 2.5 mm) around the probe shaft and put the probe in the assembly.
3. Set the probe tip slightly behind the spring-loaded ground pin so that the ground pin will make contact and compress before the probe tip makes contact.
4. When the probe is in position, tighten the four screws.

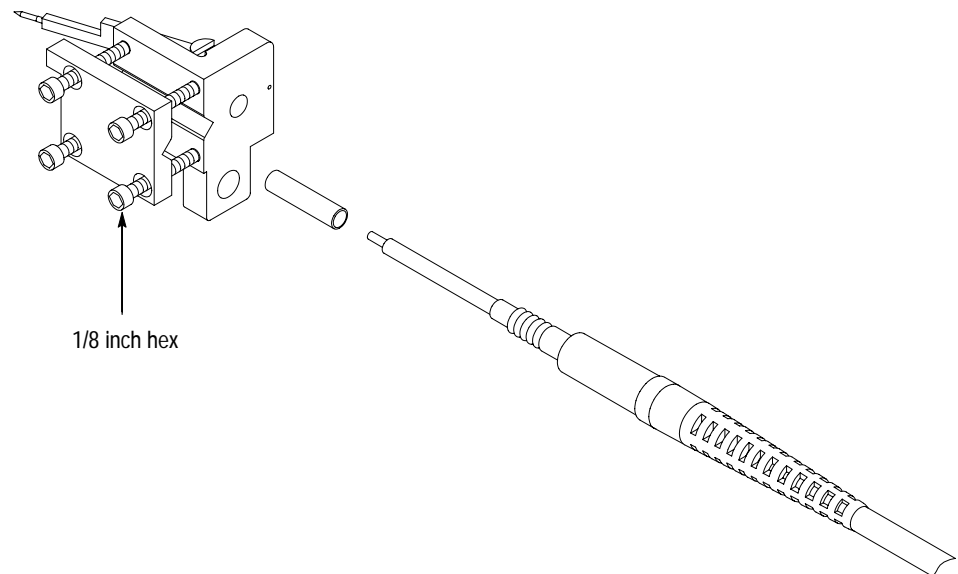


Figure 11: Securing General-Purpose Probe in the Ground Pin Assembly

For probes similar to the P6207 FET Probe, install the probe and ground spring as shown in Figure 12. Use the longer screws supplied with the assembly.

Before tightening the screws, pull the probe into the assembly to create a slight tension on the spring. This tension ensures that there is good electrical contact between the spring and the assembly.

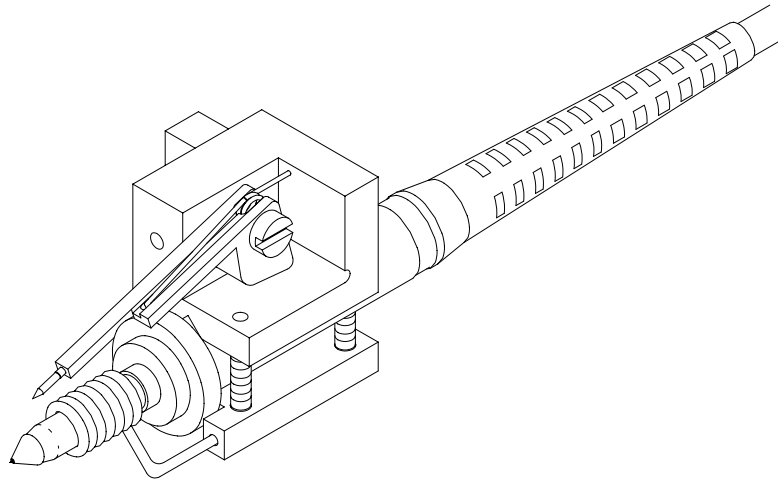


Figure 12: Securing FET Probe in the Ground Pin Assembly

Manipulator Operation

The procedure to use for operating the manipulator depends on whether you are probing a single point, or you are probing between ground and another point with an adjustable ground pin assembly.

Probing a Single Point

Use the following procedure to probe a single point:

1. Secure the probe in the appropriate probe adapter and attach the adapter to the end of the manipulator arm.
2. Adjust the coarse position of the manipulator by moving the entire assembly close to the device under test. If possible, try to keep a shallow angle in the articulating arm.
3. Gently articulate the arm so that the probe tip is close to the device under test without actually touching it.
4. Using the stereo microscope, fully magnify and focus on the device under test. You will find it easier to start probing at a lower magnification value and increase the magnification as the probe moves closer to the contact point.
5. Adjust the fine position of the manipulator by rotating the knob on each axis until the probe tip just makes contact with the circuit. The articulating arm will move slowly as each knob is rotated. See Figure 13 for the relationship between knob rotation and axis travel.



CAUTION. *Adjust the manipulator so that the probe tip just touches the device under test. Attempting continued travel against the circuit may break the probe tip or damage the circuit.*

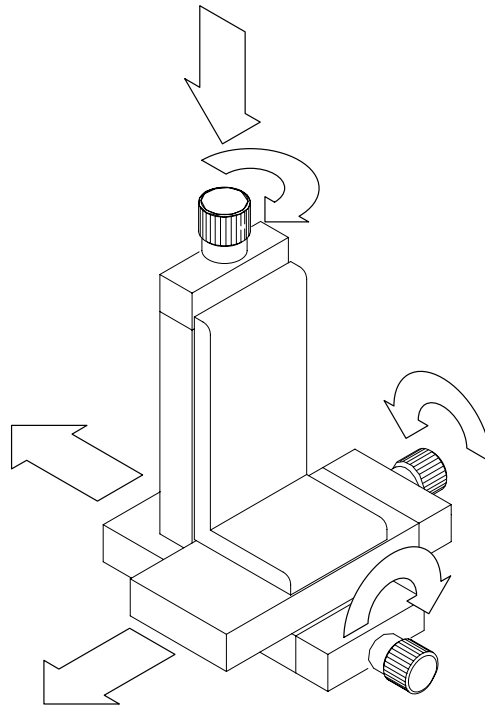


Figure 13: Manipulator Operation

Probing Between a Single Point and Ground

Use the following procedure to probe between a single point and a nearby ground:

1. Secure the probe in the appropriate ground pin assembly and attach the assembly to the end of the manipulator arm. (As explained earlier, make sure the probe tip is slightly behind the spring-loaded ground pin so that the ground pin will make contact and compress before the probe tip makes contact.)
2. Carefully thread the cable end of the adjustment control onto the assembly.
3. Affix the housing of the control to a stable work surface with the attachment strips provided.
4. Adjust the coarse position of the manipulator by moving the entire assembly close to the device under test. If possible, try to keep a shallow angle in the articulating arm.
5. Gently articulate the arm so that the probe tips are close to the device under test without actually touching it.

6. Using the stereo microscope, fully magnify and focus on the device under test. You will find it easier to start probing at a lower magnification value and then increasing the magnification as the probe tips move closer to the contact points.
7. Set the distance between the probe tip and ground pin to the desired distance by turning the adjustment on the control cable. Alternate between adjusting the manipulator and adjusting the control until the ground pin makes contact.

NOTE. *To keep the adjustment of the ground assembly from changing, avoid disturbing the cable of the control as you probe the circuit.*

8. Adjust the fine position of the manipulator by rotating the knob on each axis until the ground pin compresses and the probe tip just makes contact with the circuit. The articulating arm will move slowly as each knob is rotated. See Figure 13 for the relationship between knob rotation and axis travel.



CAUTION. *Adjust the manipulator so that the probe tip just touches the device under test. Attempting continued travel against the circuit may break the probe tip or damage the circuit.*

Maintenance

The PPMS200 requires very little maintenance beyond routine cleaning and lubrication.

The microscope assembly should be covered when not in use to prevent dust from damaging the eyepieces.

Cleaning



CAUTION. To prevent damage to component finishes, do not clean using chemicals containing benzine, benzene, toluene, xylene, acetone, or similar solvents. Light detergents or isopropyl alcohol are recommended.

Circuit Board Holder

The circuit board holder should be kept clean using isopropyl alcohol and a clean soft cloth. Wipe the holder with a dampened cloth and allow it to air dry.

Accessories

The accessories are intended for “hands-on” use and will become soiled. We recommend that the accessories be cleaned once a week or as necessary. Wipe the accessory with a clean soft cloth dampened with isopropyl alcohol, and allow the accessory to air dry.

Microscope

Cover the microscope when it is not in use. The eyepieces can be cleaned using lens cleaner and tissues available from a photography supply store. When cleaning the lenses, follow these steps:

1. Blow off dust and grit with clean air. A soft brush may be used if compressed air is not available.
2. Moisten a lens cleaning tissue with lens cleaning fluid.



CAUTION. Do not apply lens cleaning fluid directly to the lens. The fluid will run into the lens assembly and could damage internal components.

3. Wipe the lens gently with the dampened tissue.
4. Dry the lens with compressed air or by gently buffing with a dry tissue.

Lubrication

Manipulators Do not apply lubricant to the manipulator lead screws. The lead nuts are self-lubricating, and foreign lubricants will collect dust and grit.

Microscope Focus Block The microscope focus block should be lubricated twice a year or as necessary.

Raise the microscope focus block to the highest position by rotating the focus control knob. Place 3 to 4 drops of high pressure lubricant on the bottom of the ratchet. See Figure 14 for the location of the lubrication point.

Raise and lower the microscope several times using the focus control to work the lubricant onto the gear surfaces.

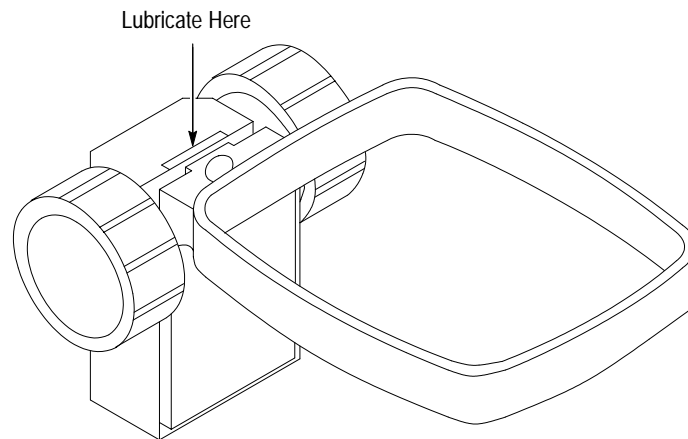


Figure 14: Focus Block Lubrication

Microscope Repair



CAUTION. To prevent microscope damage, do not attempt to disassemble the microscope for any reason. The microscope has been factory aligned, cleaned and sealed.

If you have any problems with you microscope during the warranty period, please contact your local Tektronix representative for assistance.

For additional assistance or accessories, please contact the microscope manufacturer directly:

Leica Inc.
 111 Deer Lake Road
 Deerfield IL 60015
 (800) 248-0123
 (708) 405-0123
 Fax (708) 405-0147

Table 2 lists manufacturer descriptions and part numbers for your convenience:

Table 2: Microscope Replaceable Parts

Description	Leica Part Number
StereoZoom 5 microscope	31-27-40
10X eyepieces (pair)	31-15-71-02
0.3X supplementary lense	31-27-41
Fluorescent ring illuminator (110V)	31-36-15
Replacement illuminator lamp ¹	31-31-30
Converter ring	31-36-06
Focus block assembly	31-26-59
Boom assembly	31-27-14

¹ General Electric part number 74BWW.

Specifications

Unless noted as typical, the specifications listed in tables 3 through 6 are warranted to the customer.

Table 3: Manipulator Characteristics

Travel in provided axes (minimum)	1.0 inches (2.54 cm)
Axis control	Adjusted at 10 turns per inch
Probe holders	Accepts Tektronix SMD, 2.5 mm, 3.5 mm, 4 mm, 5 mm, and P6245 style probes
Attachment method	High mass base or clamp as provided
Maximum clamping thickness	1.75 inches (4.45 cm)
Maximum Arm Reach (typical)	See Figure 15

Table 4: Circuit Card Holder Characteristics

Maximum card dimensions (typical)	12 by 18 inches (30.5 by 45.7 cm)
Maximum card thickness (typical)	0.085 inches (2.16 mm)
Material (typical)	Aluminum
Surface (typical)	Black matte

Table 5: Microscope Characteristics

Type	Binocular
Magnification range	0.8X to 4X
Eyepieces	10X
Objective	1/3X
Illuminator	120 VAC fluorescent ring, UL/CSA certified

Table 6: Transportation and Packaging

Packaged product transportation performance	The packaged product qualifies under the distribution cycle 3, assurance level II, for packaged products 100–150 pounds Tektronix design standard 062–2858–00, Rev. B, section 17
Transportation package recyclability	This product transportation package meets the requirements for recyclability Tektronix design standard 063–1290–00

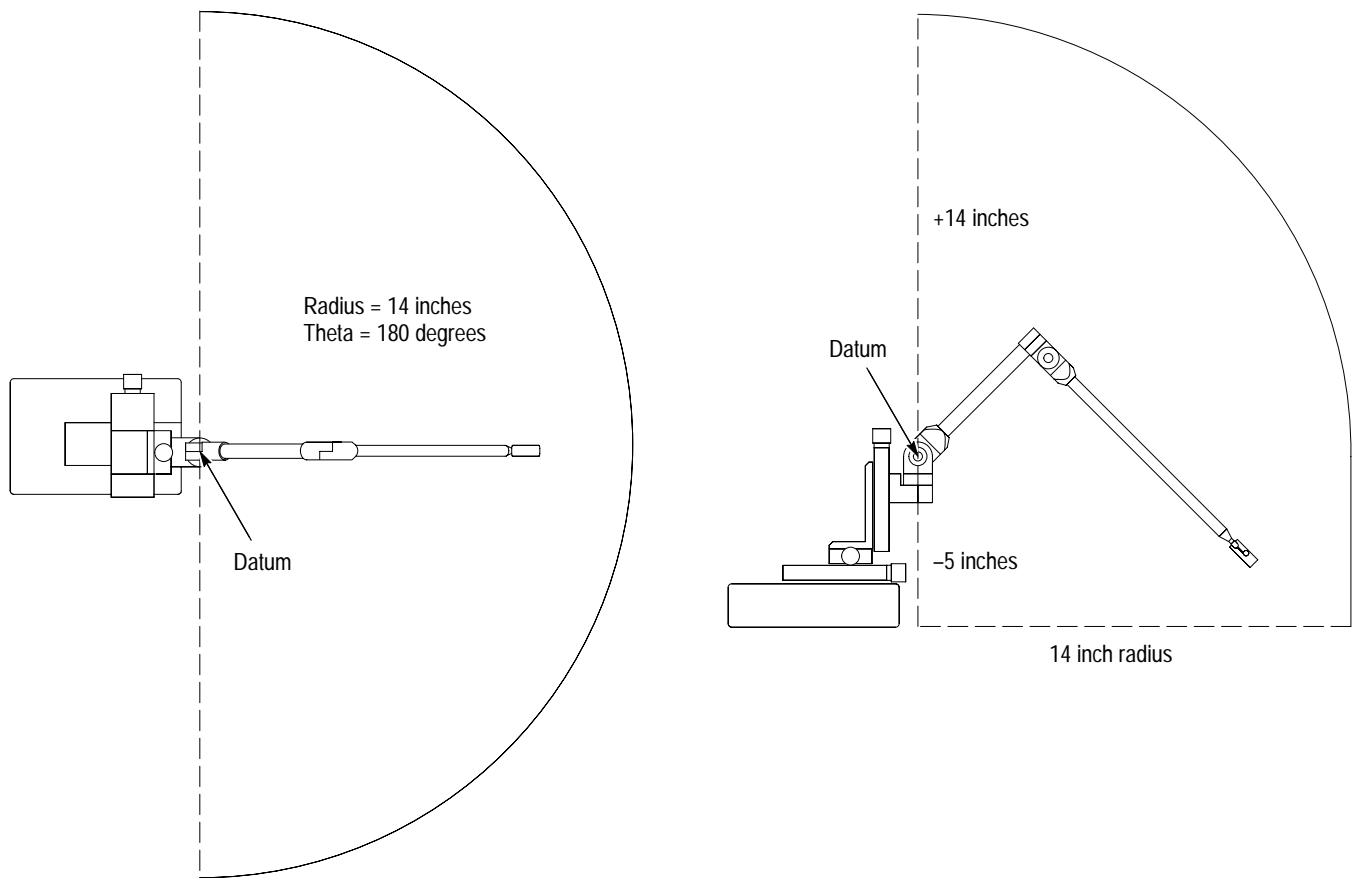


Figure 15: Typical Maximum Arm Reach

Replaceable Parts

This section contains a list of the replaceable modules for the PPMS200. Use this list to identify and order replacement parts.

Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Product type or model number
- Product serial number
- Product modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

Using the Replaceable Parts List

This section contains a list of the mechanical and/or electrical components that are replaceable for the PPMS200. Use this list to identify and order replacement parts. The following table describes each column in the parts list.

Parts List Column Descriptions

Column	Column Name	Description
1	Figure & Index Number	Items in this section are referenced by figure and index numbers to the exploded view illustrations.
2	Tektronix Part Number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial Number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entries indicates the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & Description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
7	Mfr. Code	This indicates the code of the actual manufacturer of the part.
8	Mfr. Part Number	This indicates the actual manufacturer's or vendor's part number.

Abbreviations Abbreviations conform to American National Standard ANSI Y1.1-1972.

Mfr. Code to Manufacturer Cross Index The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001

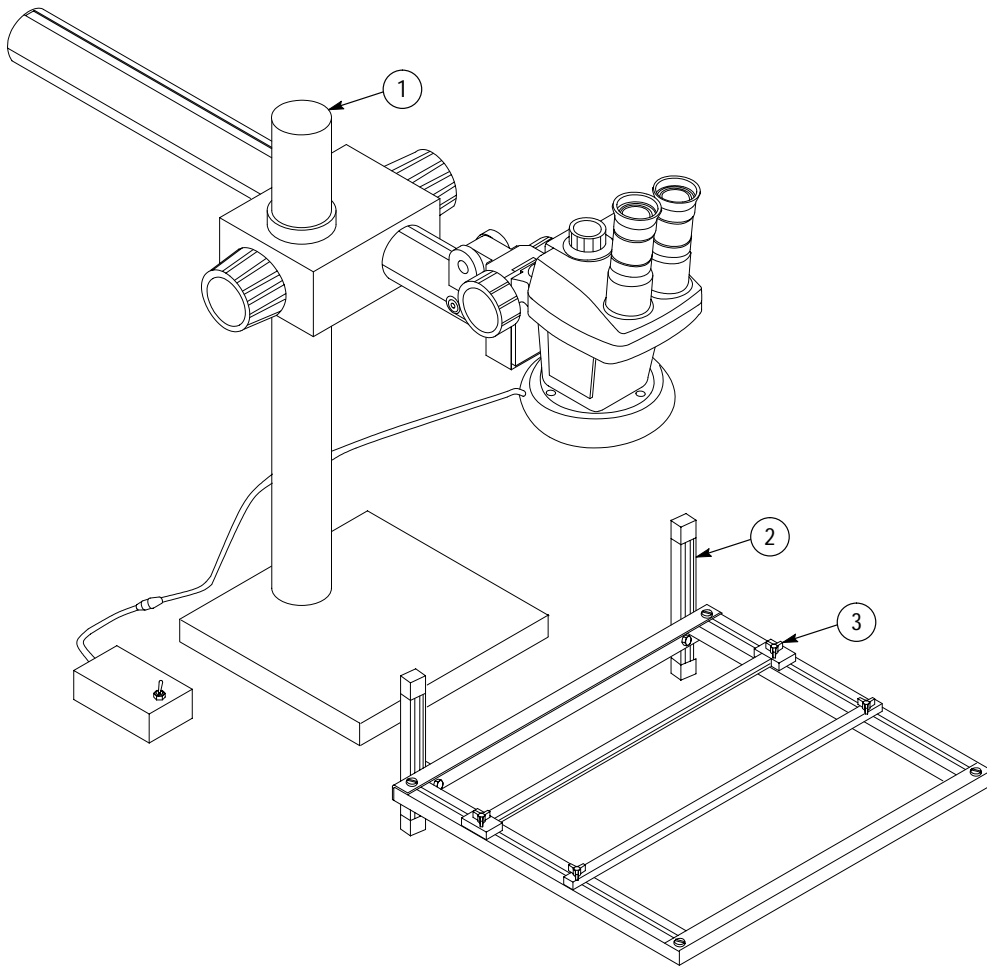


Figure 16: PPMS200 Microscope and Circuit Board Holder

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
16-1	119-4839-00			1	MICROSCOPE ASSY:BENCH TOP MICROSCOPE SYSTEM	80009	119483900
-2	119-4845-00			1	CKT BD HLDR:CIRCUIT BOARD HOLDER,BENCHTOP	80009	119484500
-3	366-0762-00			4	KNOB:CLAMPING KNOB,SET OF 2;1.125 DIA X 0.750 H X 0.50 HUB DIA	80009	366076200

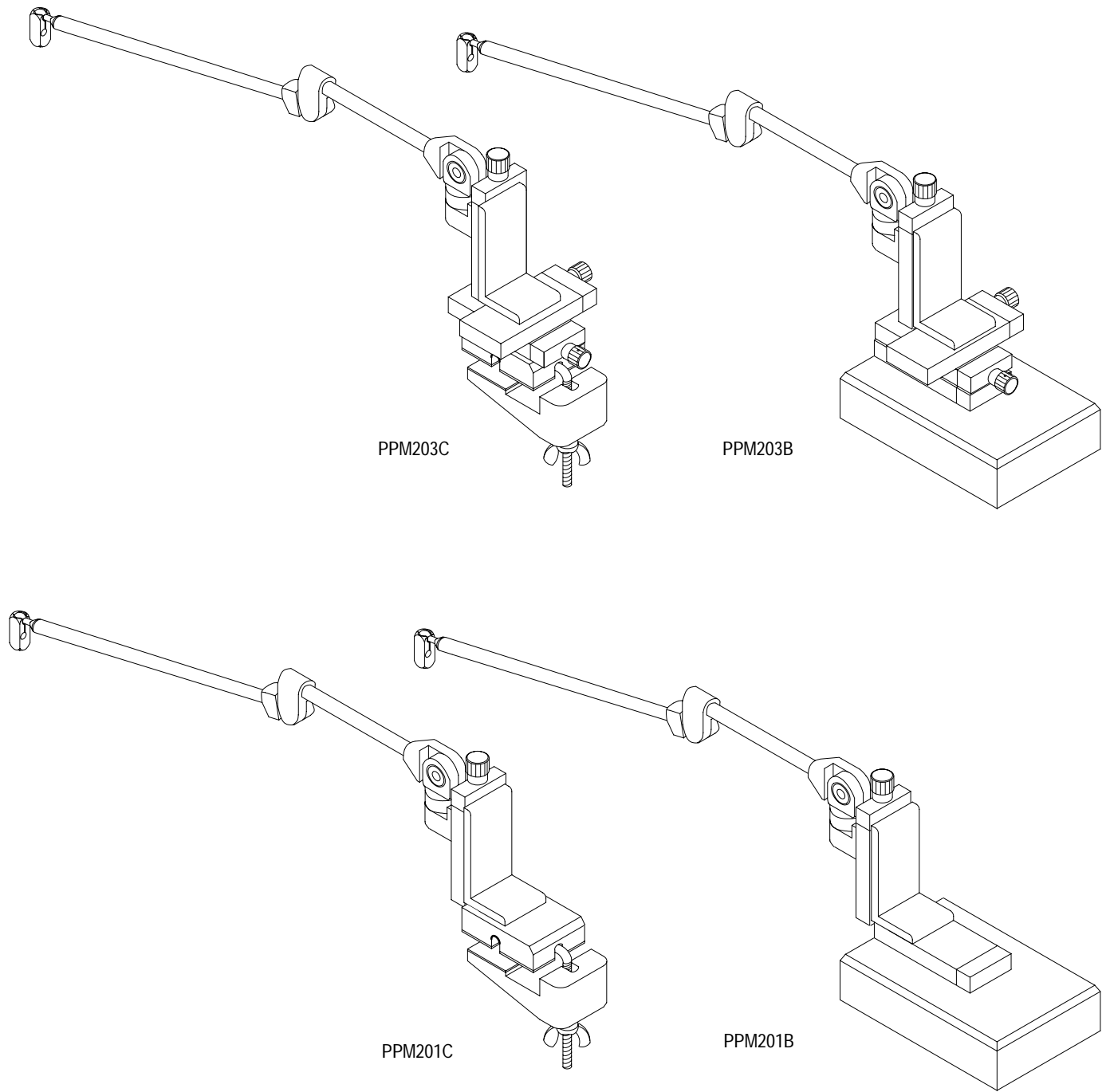


Figure 17: Articulating Arm Assemblies

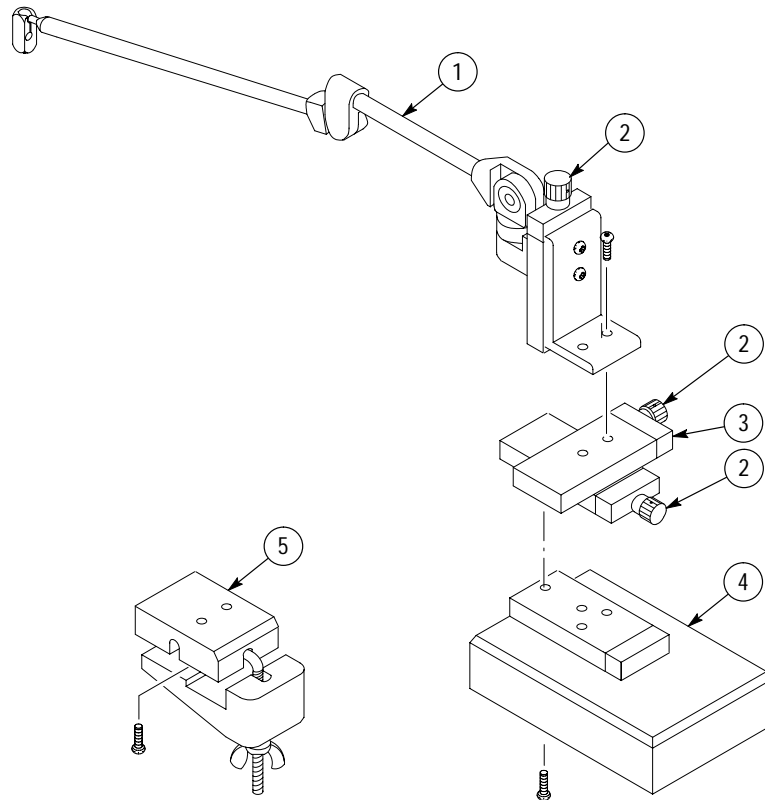


Figure 18: Articulating Arm Replacement Parts

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
18-1	119-4836-00			1	ARM:ARTICULATING ARM,W/1 AXIS MANIPULATOR	80009	119483600
-2	366-0761-00			3	KNOB:MANIPULATOR KNOB,SET OF 3,0.625 DIA X 0.750 H X 0.437ID,24 PITCH ST KNURL	80009	366076100
-3	119-4840-00			1	MANIPULATOR:MANIPULATOR,XY COARSE	80009	119484000
-4	119-4837-00			1	BASE,HI-MASS:BASE,HI-MASS	80009	119483700
-5	119-4838-00			1	CHASSIS:CHASSIS CLAMP	80009	119483800

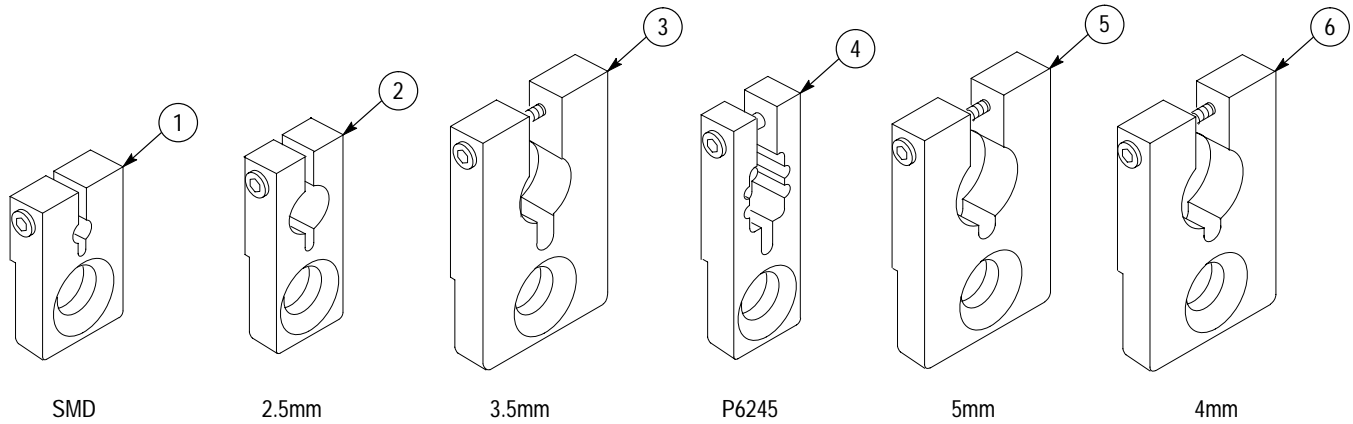


Figure 19: Probe Adapters

Fig. & Index No.	Tektronix Part No.	Serial No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
STANDARD ACCESSORIES							
19-	020-2104-00			1	ACCESSORY KIT:SET OF 6 RECEPTACLES,R-SS50-CR & SERIES SS-50B90 POGO PIN OR EQUIVALENT	80009	020210400
	020-2105-00			1	ACCESSORY KIT 2 LARGE CABLE CLIPS & 2 SMALL CABLE CLIPS	80009	020210500
	070-9092-00			1	MANUAL,TECH:INSTRUCTIONS,PPMS200,DP	80009	070909200
-1	407-4365-00			1	BRACKET,PROBE:ADAPTER BRACKET,SMD PROBE,BLK ANODIZED ALUM,0.105	80009	407436500
-2	407-4366-00			1	BRACKET,PROBE:SUBMINIATURE PROBE BRACKET ADAPTER,2.5MM,BLK ANODIZED ALUM	80009	407436600
-3	407-4367-00			1	BRACKET,PROBE:COMPACT PROBE BRACKET ADAPTER,3.5MM,BLK ANODIZED ALUM	80009	407436700
-4	407-4368-00			1	BRACKET,PROBE:P6245 PROBE BRACKET ADAPTER,0.245 X 0.475,BLK ANODIZED ALUM	80009	407436800
-5	407-4369-00			1	BRACKET,PROBE:MINIATURE PROBE BRACKET ADAPTER,5MM,BLK ANODIZED ALUM	80009	407436900
-6	407-4370-00			1	BRACKET,PROBE:ACTIVE PROBE BRACKET ADAPTER,4MM,BLK ANODIZED ALUM	80009	407437000

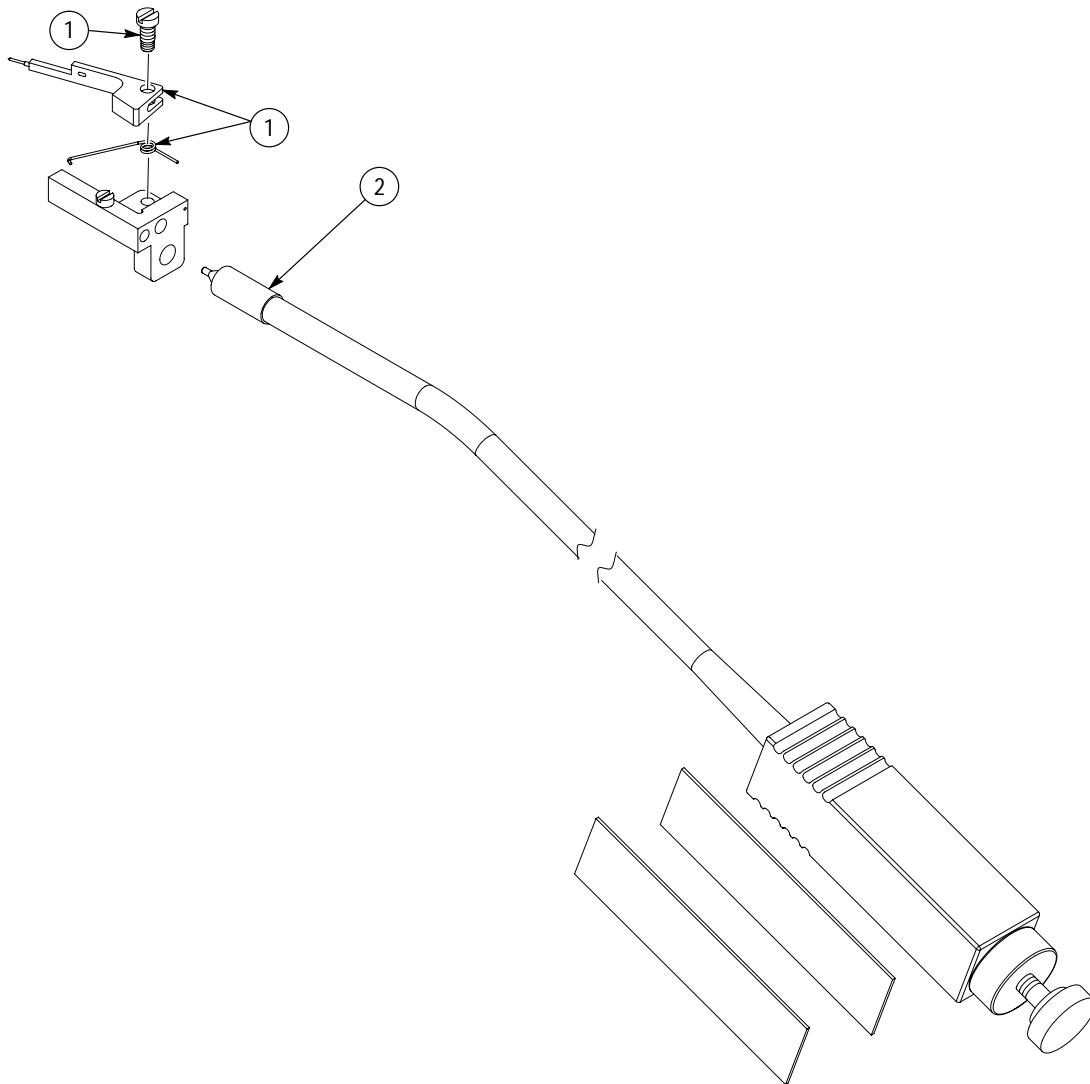


Figure 20: Adjustable Ground Pin Assembly

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
OPTIONAL ACCESSORIES							
20-	119-4841-00			1	GND PIN:ADJUSTABLE GND PIN ASSY,SMALL PROBE	80009	119484100
-1	020-2114-00			1	COMPONENT KIT:REPLACEMENT PARTS FOR PROBE GROUND,ARM,SPRING AND SCREW	80009	020211400
-2	174-3473-00			1	CA ASSY,SP:SHLD CMPST,GRD PROBE;SDI,PROBE ASSY W/ADJUSTING BLOCK,CAP & SCREW FOR PROBE GND	80009	174347300

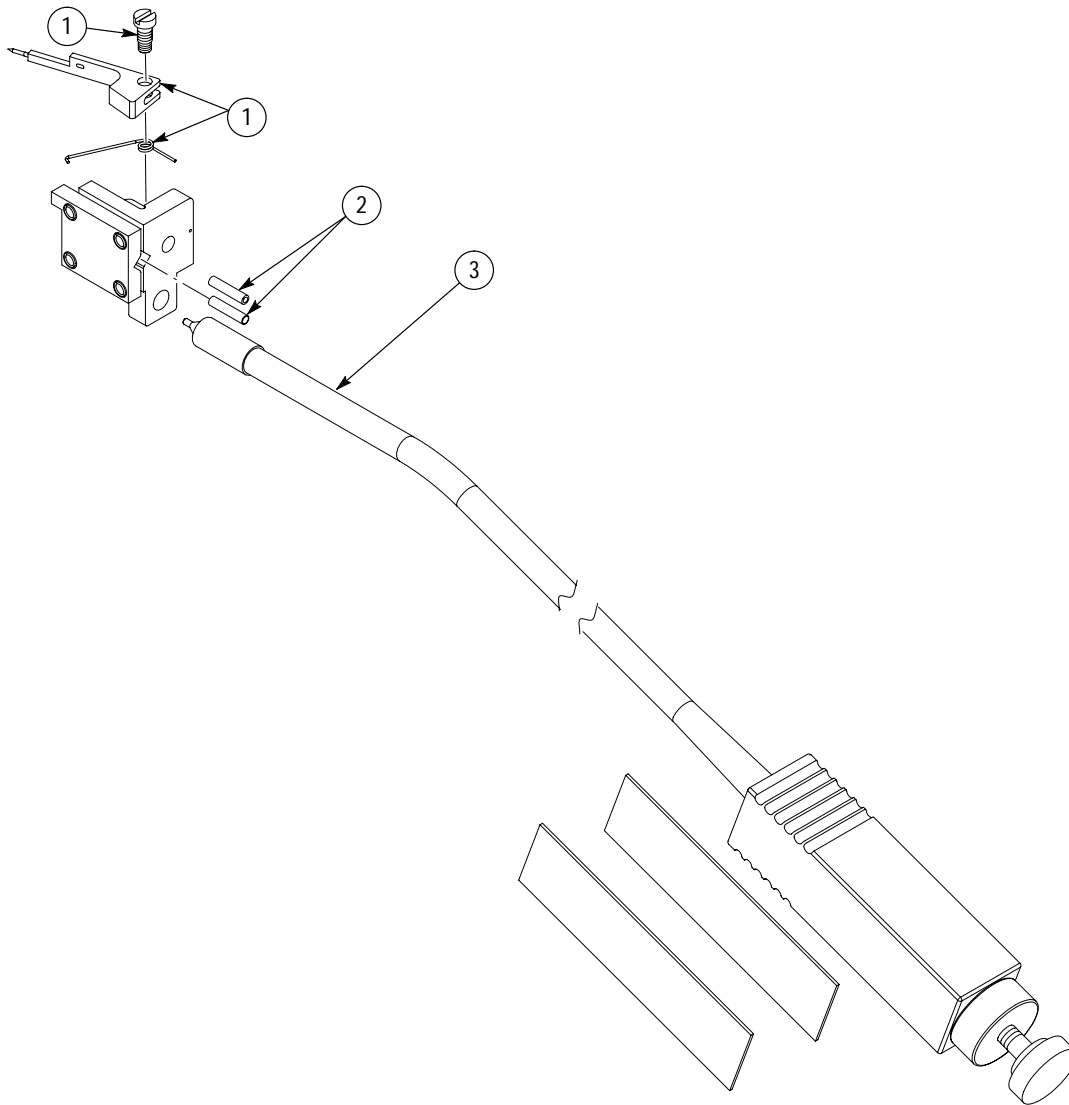


Figure 21: Adjustable Ground Pin Assembly

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
OPTIONAL ACCESORIES							
21-	119-4842-00			1	GND PIN:ADJUSTABLE GND PIN ASSY,LARGE PROBE	80009	119484200
-1	020-2114-00			1	COMPONENT KIT:REPLACEMENT PARTS FOR PROBE GROUND,ARM,SPRING AND SCREW	80009	020211400

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
-2	020-2113-00			1	COMPONENT KIT:PROBE ADAPTER,TUBE,SET OF TWO EACH 3.5MM & 2.5MM	80009	020211300
-3	174-3473-00			1	CA ASSY,SP:SHLD CMPST,GRD PROBE;SDI,PROBE ASSY W/ADJUSTING BLOCK,CAP & SCREW FOR PROBE GND	80009	174347300