



**Gurley Precision Instruments**

## **Gurley Precision Instruments Hydrological Equipment**

### **Operation and Maintenance Guide**

#### **The Company**

Gurley Precision Instruments was founded in 1845, and has sustained continuous operation to date at its original production facilities. Since its inception as a manufacturer of compasses, surveying instruments and brass castings, the company has become a leader in the field of precision measuring instruments. In April of 1968, the company became a division of Teledyne Incorporated, resulting in its ability to offer extensive experience and unusual depth of resources. Today, Gurley continues to uphold its long stood reputation for quality and progress in precision instruments.

#### **Company History**

1845 – 1968	W & L.E. Gurley
1968 – 1993	Teledyne Gurley
1993 – present	Gurley Precision Instruments

#### **Genuine Gurley™**

*Precision Instruments since 1845*

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## Overview of Guide

This manual contains complete instructions and illustrations for the assembly and maintenance of Gurley hydrological measuring equipment. Gurley Hydrological measuring outfits consist of three basic components: the meter (Price or pygmy), the suspension system (cable or rod), and the detector (headphone, Model 1100 digital flow indicator). These components must be properly assembled, maintained, and operated in order for the outfit to function as designed. Using the Hydrological Equipment Operation and Maintenance Guide, you can easily assemble, maintain and operate any measuring outfit configuration.

### *How to use this guide*

The components of Gurley hydrological systems are modular in nature, so that you can assemble the outfit that best suits a particular site. To locate the instructions that pertain to the components of your outfit, see the detailed table of contents.

The guide is divided into five parts:

- Part 1 – Assembling the complete measuring system
- Part 2 – Maintaining Price and Pygmy Meters and Headphones
- Part 3 – Using the Model 1100 Digital Flow Velocity Indicator
- Part 4 – Converting Headphone Style Meters to Digital
- Part 5 – Repair Parts

Within the first four parts are sections that describe individual tasks or components. Part 5 contains parts listed for the equipment described. Rating tables are located immediately inside the back cover.

The step-by-step instructions for completing each task are accompanied by photographs of the equipment with parts clearly labeled. Instructions appear in the right-hand page, and illustrations on the facing left-hand page.

Because the assembly and maintenance operations are relatively simple, you may need to use these detailed instructions only once or twice. From then on, refer to the guide for seldom-performed procedures, to refresh your memory, or for part numbers. Its compact size means you can carry it with you in the field.

### **Measurement procedures**

Price and pygmy meters satisfy U.S. Geological Survey requirements for Type AA current meters when used according to standard procedures. This guide does not include measurement procedures.

### **Model Comparison Chart**

<b>Model</b>	<b>Type</b>	<b>Status</b>
622A	Price – headphone (analog)	Available
622D	Price – digital	Available
625A	Pygmy–headphone (analog)	Available
625D	Pygmy – digital	Available
645*	Pygmy - old digital	Replaced by 625D
665*	Price – analog	Replaced by 622A and 622D
667*	Price – analog	Replaced by 622A and 622D
675*	Price – old digital	Replaced by 622D
700	Old style digital indicator	Replaced by 1100 indicator

\*Can be converted for use with the new model 1100 digital indicator.

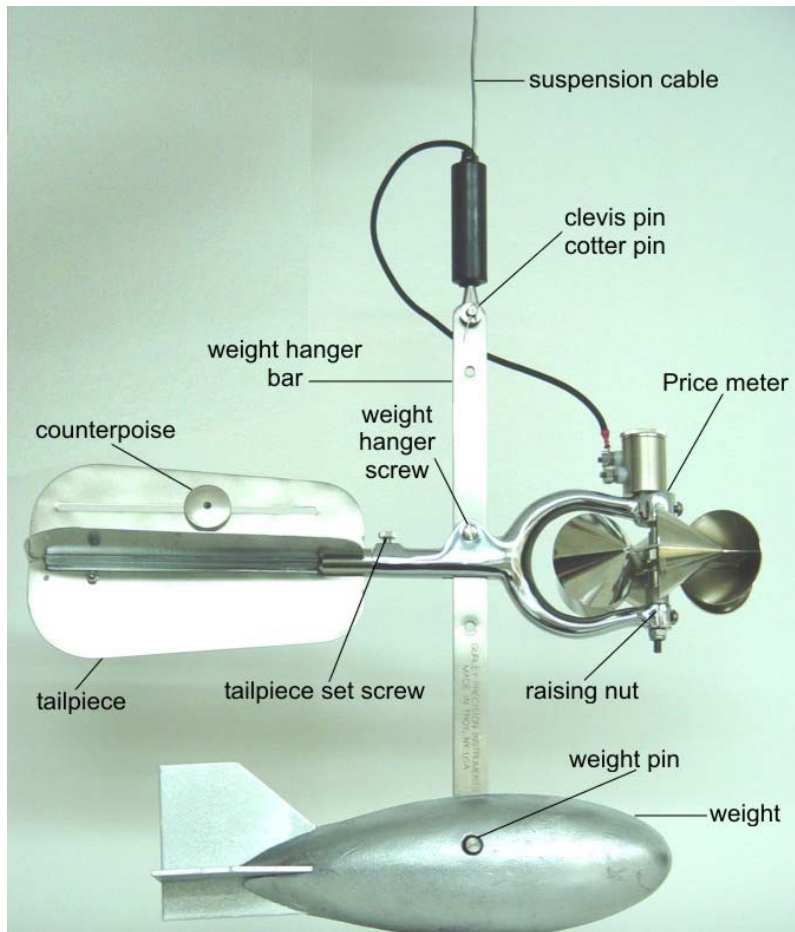
Replacement parts and service for most discontinued products is available.

**Part 1**  
**Assembling the Complete Measuring System**

To assemble a complete measuring system, you must first assemble the suspension system (cable or wading rod), and then connect the electrical leads to the detector (headphones, Model 1100).

This part of the guide has two sections – one for a cable suspension system and one for a rod suspension system. Within each of these sections are instructions for assembling the system and for connecting the electrical leads to detectors.

**Model 622AE Shown**



**CABLE SYSTEM**

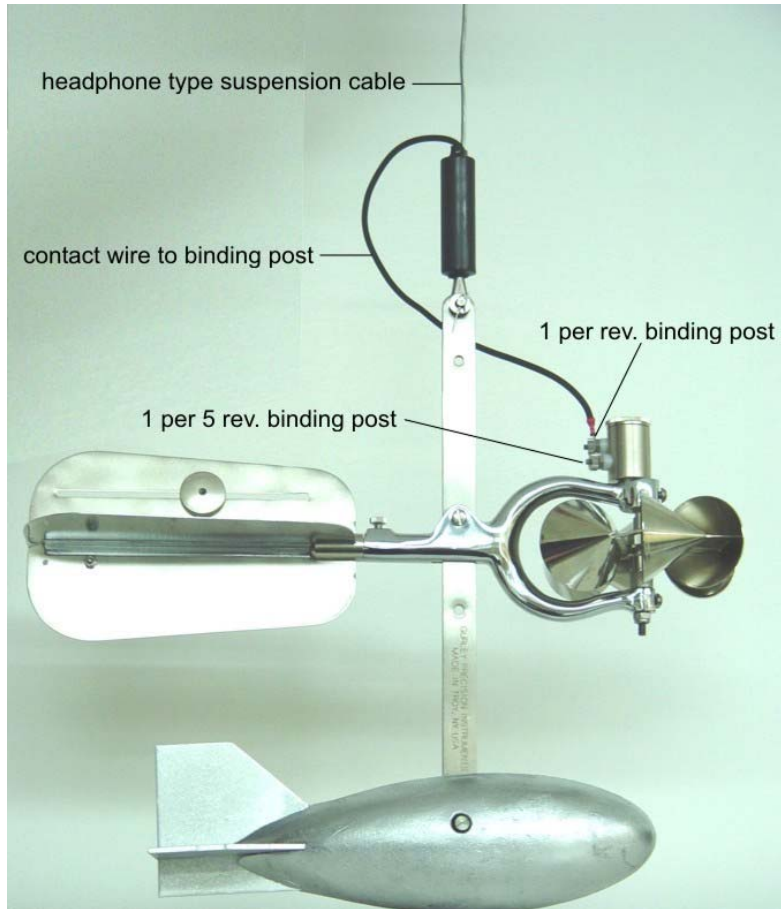
**Assembling the cable system  
(Model 622A or 622D Price Meter)**

Use the following instructions to assemble both digital and headphone style cable systems and to attach a Price meter.

1. Remove cotter and clevis pins from the forked end of the 50-foot suspension cable.
2. The weight hanger bar has holes in both ends, one threaded, one not threaded. Align the unthreaded hole with the hole in the fork, insert the clevis pin and lock it in place with the cotter pin.
3. Remove Price current meter from case. Loosen the weight hanger screw, then slide the weight hanger bar down through the slot in the frame. Lock it in place at either of the two center holes using the weight hanger screw. NOTE: New outfits come with the cable already attached to the weight hanger bar.
4. Slide the free end of the weight hanger bar into the top of the lead weight. Lock it in place with the vane catch. Insert the tailpiece assembly into the end of the meter frame and lock it in place using the tailpiece set screw.
5. Assemble tailpiece sections by sliding the vanes together and locking them in place with the vane catch. Insert the tailpiece assembly into the end of the meter frame and lock it in place using the tailpiece set screw.
6. Elevate the knurled raising nut (directly beneath bucket wheel) to allow the bearing to ride on the pivot.

Turn to the next section for instructions on connecting your Price meter to a detection device.

**Model 622AE Shown**



**Connecting Electrical Leads to Headphones**

Use the following instructions to connect headphones to your cable-suspended Price meter.

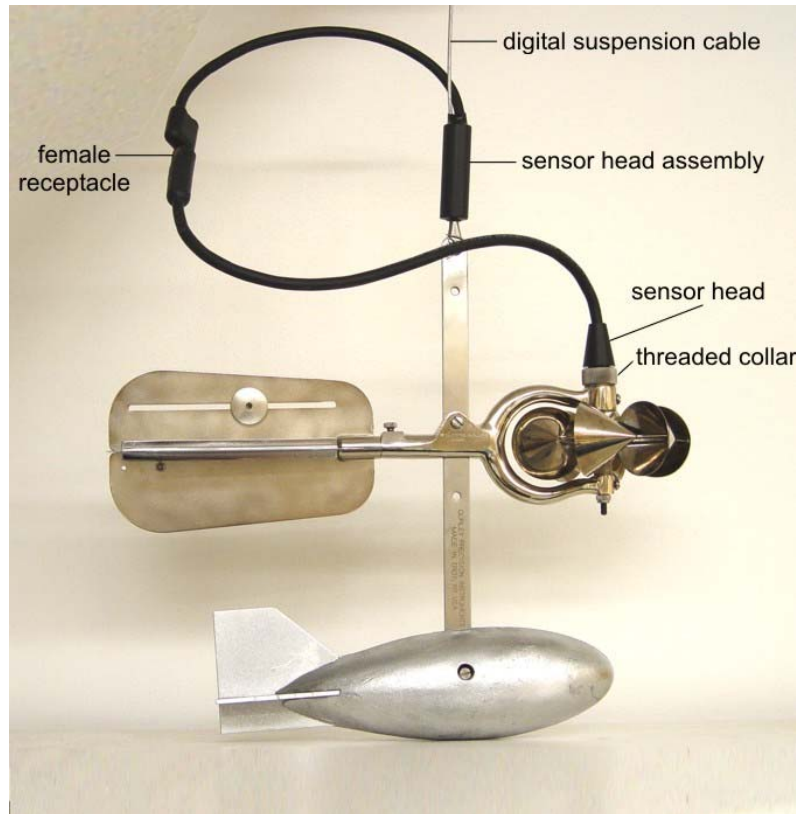
1. After the meter has been attached to the weight hanger bar, connect the spade terminal, located on the wire at the base of the suspension cable, to the desired binding post on the current meter. The upper binding post registers every fifth revolution.
2. Connect the headphone lead to the other end of the suspension cable using the male and female molded connectors.

Spinning the bucket wheel should now produce audible clicks in the headphones. If you do not hear clicks, do the following:

1. Check all electrical connections.
2. Replace the headphone battery. (See page 49)
3. Check the adjustment contact wire. (See page 31)

When using headphones with the Price meter, count the number of audible clicks over a known time period. This information can be converted to flow rate using the rating chart provided with the meter.

**Model 622DE Shown**



**Connecting electrical leads to the Model 1100 Digital Flow Velocity Indicator**

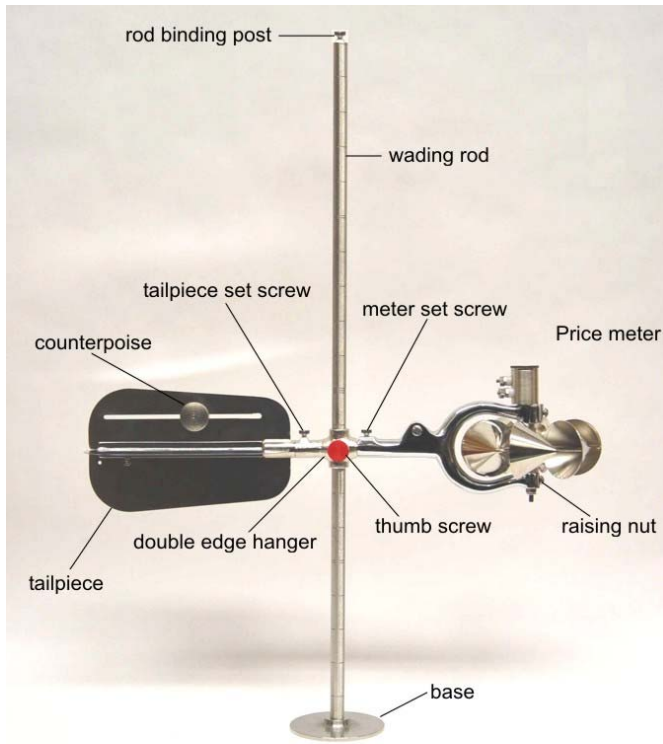
Use the following instructions to connect the Model 1100 Digital Flow Velocity Indicator to your cable-suspended Price meter.

1. After attaching the meter to the weight hanger bar, remove the current meter cap and sensor head plug. Connect the sensor head to the rotor housing on the meter. Use the threaded collar to lock it in place.
2. Insert the male end of the sensor head cable assembly into the female receptacle at the base of the digital suspension cable.
3. Insert the four-pin connector at the top of the suspension cable into the female receptacle on the side of the Model 1100; align the grooves in the female connector with the ridges on the male connector. Lock it in place using the threaded collar. (page 18)
4. Turn on the Model 1100, and then press either of the 622 buttons once.

To measure in these units:	Press this button:
feet per second	622 FS
meters per second	622 MS

Spinning the bucket wheel should now produce a velocity reading in a few seconds. For detailed operating instructions, see Part 3, "Using the Model 1100 Digital Flow Velocity Indicator", page 51.

**Model 622AF Shown**



**WADING ROD SYSTEM**

**Assembling the wading rod system  
(Model 622A or 622D Price meter)**

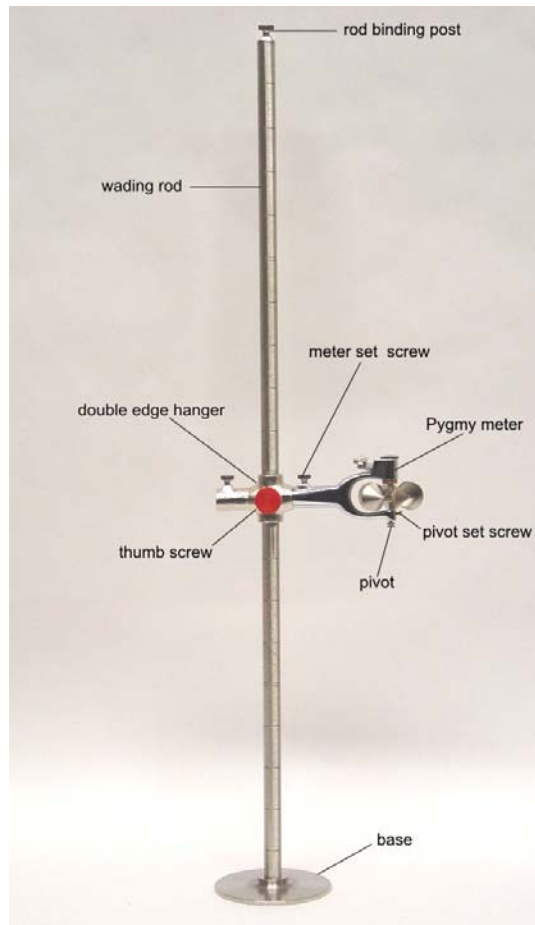
Use the following instructions to assemble either a standard wading rod system or a top-setting rod and to attach a Model 622A or 622D Price meter.

1. For *standard rod systems*, screw the rod base onto the bottom rod section, which has a fine male thread at one end. For *top-setting rods*, simply screw the base onto the bottom of the rod.
2. Slide the double end hanger over the rod to the desired depth and lock it in place with slide thumb screw. On the *top-setting rod* the hanger is built into the rod. See instructions provided with the top-setting rod for assembly and use.
3. Remove current meter from case and mount it on the hanger post. Lock it in place using meter set screw.
4. Assemble the tailpiece by sliding the vanes together and locking them in place with the vane catch. Mount the tailpiece assembly on the hanger and lock it in place by tightening the set screw. Elevate the raising nut to allow the bearing to ride on pivot.
5. *Standard rod*. Add rod sections as required, then screw the rod binding post into top of the uppermost section.

Turn to the next section for instructions on connecting your meter to a detection device.



**Model 625AF Shown**

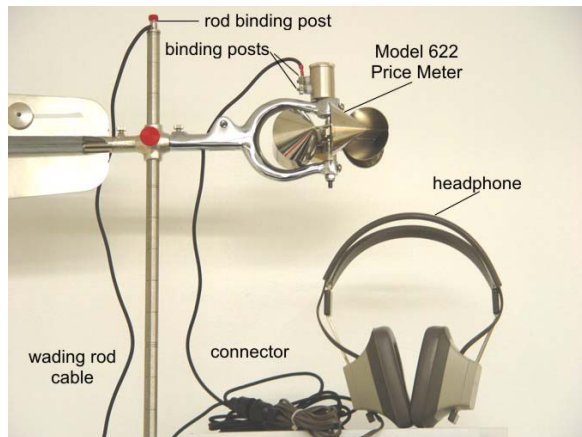
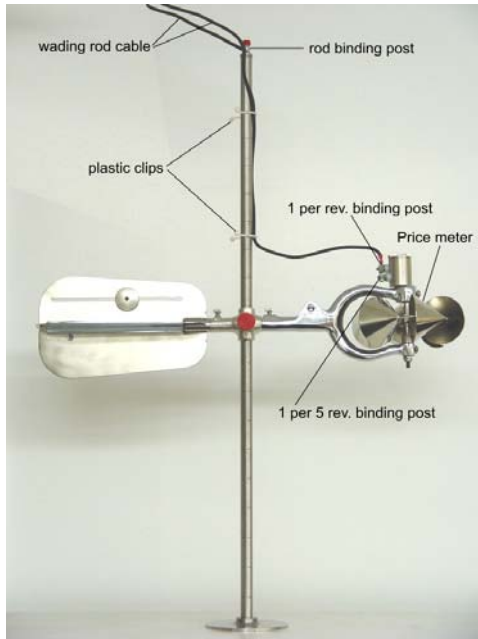


**Assembling the wading rod system  
(Model 625A and 625D pygmy meter)**

Use the following instructions to assemble either a standard wading rod system or a top-setting rod and to attach a Model 625A and 625D pygmy meter.

1. For *standard rod systems*, screw the rod base onto the bottom rod section, which has a fine male thread at one end. For *top-setting rods*, simply screw the base onto the bottom of the rod.
2. Slide the double end hanger over the rod to the desired depth and lock it in place with the slide thumb screw. On the *top-setting rod* the hanger is built into the rod. Refer to instructions provided with the top-setting rod for assembly and use.
3. Remove the Model 625A pygmy meter from case.
4. Remove the shipping pivot and install the working pivot. Face the contact chamber cap down, loosen the pivot set screw, and remove the shipping pivot. Insert the working pivot with the flat side of the shaft facing the set screw. Tighten the set screw. The bucket wheels should spin freely. (Detailed instructions for adjusting the pivot are found on page 39). New units are shipped with two factory adjusted working pivots.
5. Mount the meter on the double-end hanger post and lock it in place using the meter set screw.
6. *Standard rod*. Add rod sections as required, then screw the rod binding post into the top of the uppermost section.

Turn to the next section for instructions on connecting your meter to a detection device.



### Connecting electrical leads to headphones

Use the following instructions to connect headphones to your rod-suspended Price or pygmy meter.

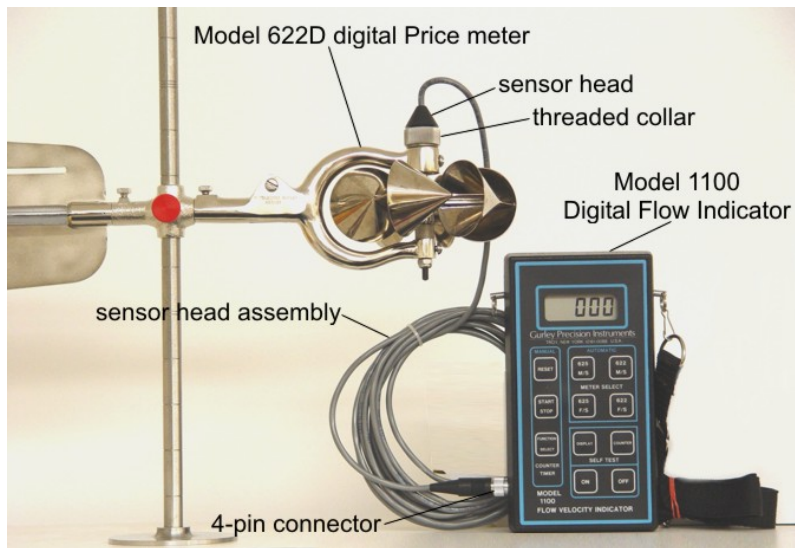
1. Connect the long lead of the wading rod cable to the appropriate meter binding post. The *Price meter* has two binding posts. The upper binding post registers every revolution, the lower post every fifth revolution. The single binding post of the *pygmy meter* registers every revolution.
2. Loosen the set screw on the rod binding post. Insert the short lead of the cable into the hole in the binding post, and lock it in place by tightening the set screw.
3. Connect the headphone lead to the other end of the cable using the male and female molded connectors. Fasten the cable to the rod using plastic clips.

Spinning the bucket wheel should now produce audible clicks in the headphones. If you do not hear clicks, do the following:

1. Check all electrical connections.
2. Replace the headphone battery. (See page 49)
3. Check the adjustment of the contact wire. (See page 31 or 43)

When using the headphones with the Price or pygmy meters, count the number of clicks from the meter over a known time period. This information can be converted to flow rate using the rating chart provided with the meter.

**Model 622DF Shown**



**Connecting electrical leads to the Model 1100 Digital Flow Velocity Indicator**

Use the following instructions to connect the Model 1100 Digital Flow Velocity Indicator to your rod-suspended digital Price or pygmy meter.

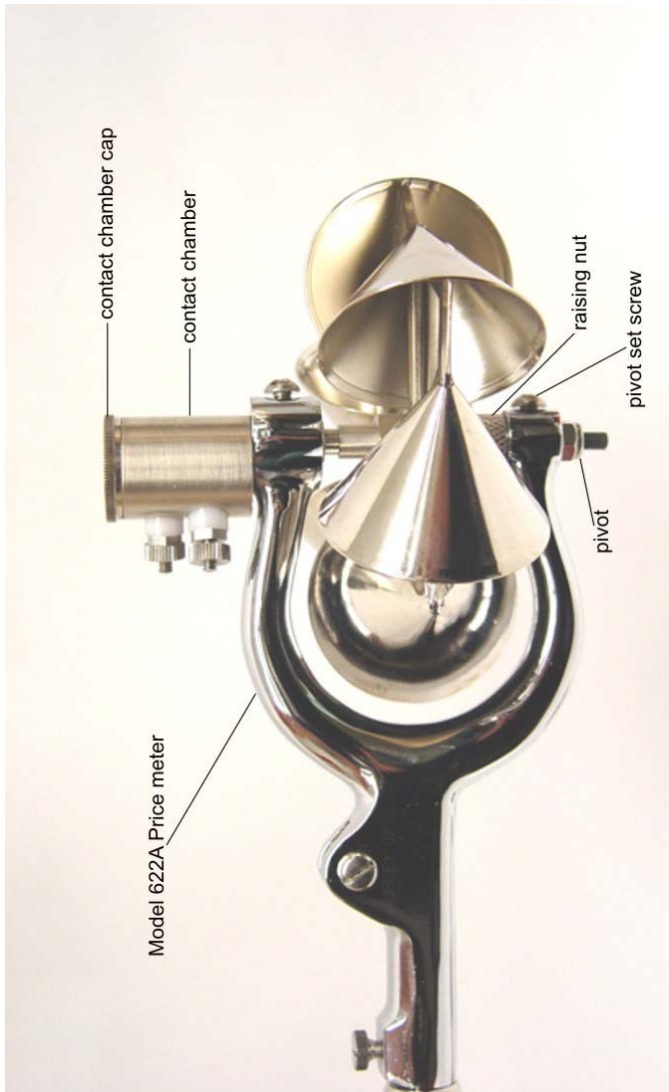
1. Remove the protective caps from the rotor housing on the meter and the sensor head on the cable.
2. Connect the sensor head on the digital wading rod cable to the rotor housing on the digital Price or pygmy meter. Use the threaded collar to lock it in place.
3. Insert the four-pin connector at the other end of the cable into the female receptacle on the side of the Model 1100; align the grooves in the female receptacle with the ridges on the male connector. Lock it in place using the threaded collar.
4. Turn on the Model 1100, and then press the appropriate meter/units button once.

To use this type of meter:	And measure in these units:	Press this button:
Price 622	feet per second	622 FS
Price 622	meters per second	622 MS
pygmy 625A	feet per second	625 FS
pygmy 625A	meters per second	625 MS

Spinning the bucket wheel should produce a velocity reading on the display within four seconds. For detailed operating instructions see Part 3, "Using the 1100 Digital Flow Velocity Indicator", page 51.

**Part 2**  
**Maintaining Price and Pygmy Meters and Headphones**

Your price meters will give you years of accurate readings if you maintain them properly. This part of the guide contains one section for Price meter maintenance and one for pygmy meter maintenance. An additional section describes how to replace the battery in the headphones.



## PRICE METER

### Cleaning and lubricating the meter

To ensure proper operation, the current meter must be cleaned and lubricated at the end of each day's use. Complete the following instructions to clean and lubricate your Price meter.

1. Remove the contact chamber map.
2. Loosen the pivot set screw and remove the pivot,.
3. Clean and dry the pivot with a soft cloth. Set it aside.
4. Clean the lower bearing with a small pointed stick or a cotton swab.
5. Hold the current meter with the contact chamber up. Place a small drop of oil in the bearing, insert the pivot with the flat side of the shaft toward the set screw, and lock it in place using the pivot set screw.
6. Hold the current meter with the contact chamber up. Oil the top of the shaft, steady bearing, worm and gear, as well as the gear bearing.
7. Replace the chamber up.

Follow this procedure after each use to help prevent rust. If the meter is to be stored for extended periods of time, cover the pivot and bearing with grease.

**NOTE:** After cleaning and lubricating the meter at the end of each day's use, lower the raising nut under the bucket wheel assembly to take pressure off the pivot.

**Adjusting the pivot  
(Model 622A Price Meter, headphone style)**

Use the following instructions to adjust the pivot on your headphone style Price meter.

1. With the contact chamber tightly in place, invert the current meter so that the top of the shaft rests against the inside of the cap.
2. Loosen both the nut on the bottom of the pivot and the set screw. With the flat side of the shaft facing the pivot set screw, insert pivot until there is no vertical play in the shaft. Lock it in place using the vertical set screw.
3. Advance the pivot-adjusting nut until it rests against the frame.
4. Loosen the set screw slightly and advance the pivot-adjusting nut one quarter of a turn, making sure the pivot is not turning. Tighten the set screw.

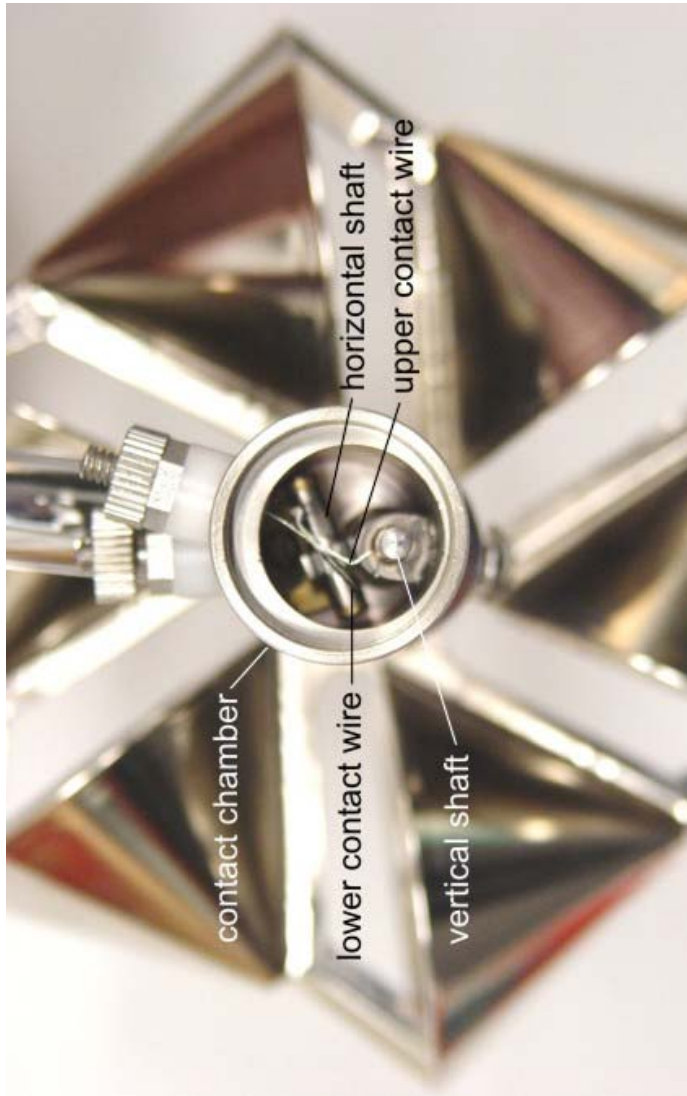
This adjustment provides an endplay of about 0.008-inch. *It is essential that this adjustment be made when replacing a pivot.*

**Adjusting the pivot  
(Model 622D Price Meter, digital style)**

Use the following instructions to adjust the pivot on your digital style Price meter.

1. Invert the current meter so that the shoulder of the hub extension rests against the bottom of the rotor housing.
2. Loosen both the nut on the bottom of the pivot and the set screw. Insert the pivot into the lower bearing with the flat side facing the pivot set screw, until there is no vertical play in the hub extension. Lock it in place using the set screw.
3. Advance the pivot adjusting nut until it rests against the frame.
4. Loosen the set screw slightly and advance the adjusting nut one quarter of a turn, making sure the pivot does not turn. Tighten the set screw.

This adjustment provides an endplay of about 0.008 inch. *It is essential that this adjustment be made when replacing a pivot*



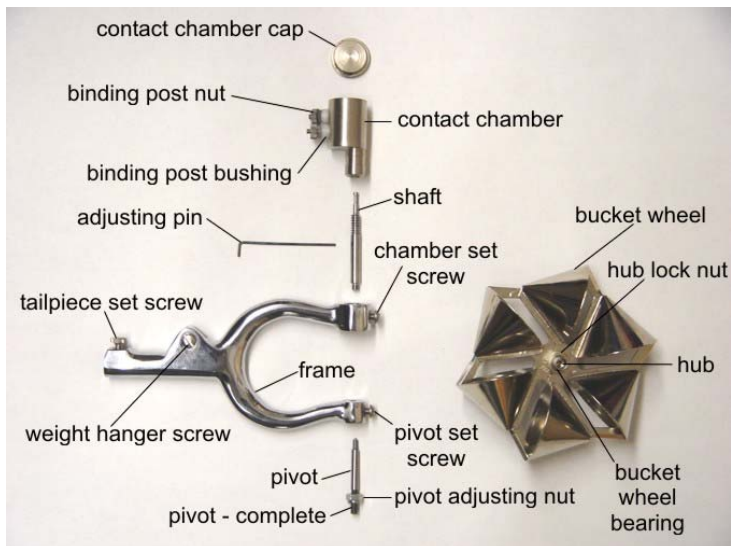
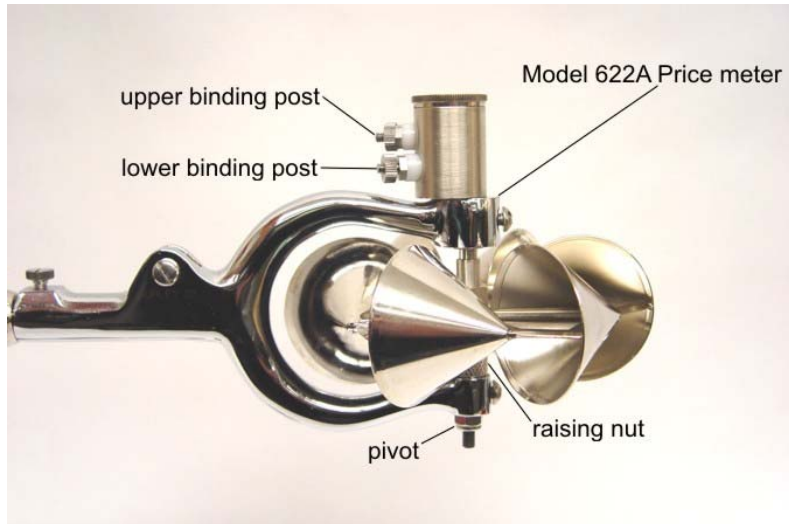
### **Adjusting the contact wire (Model 622 Price meter, headphone style)**

The contact wire should make light contact with the shaft. If pressure is too heavy, drag and wear of the shaft and wire will result. Use the following instructions to adjust the contact wire on your headphone style Price meter.

1. Assemble the meter and headphones, as described in Part 1 of this guide. (See page 7).
2. Spin the bucket wheel. Clicks should be sharp, with no dragging sound.
3. Remove the contact chamber cap. There are two contact wires in the Price meter. The wire on the vertical shaft produces one pulse per revolution of the bucket wheel. The contact wire on the horizontal shaft produces one pulse for every five revolutions of the bucket wheel. The wires must be gently adjusted to give proper signal.
4. The contact wire on the horizontal shaft is the lower contact wire. On the shaft you will see a contact lug. Use tweezers to adjust the wire so that it touches the raised lug lightly but does not touch the shaft when the raised lug is rotated.
5. The vertical shaft also has a raised lug. Adjust this contact wire to touch the lug lightly.
6. Replace contact chamber cap when finished.

With proper adjustment of pivot and contact wire, the bucket wheel should spin freely.





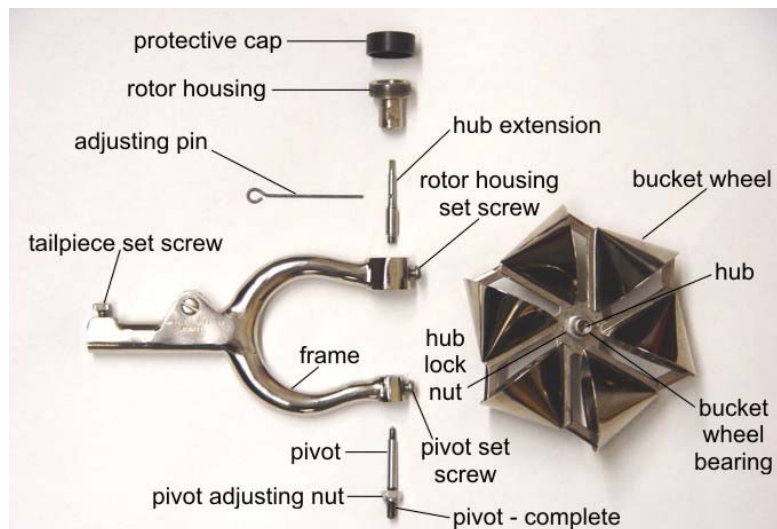
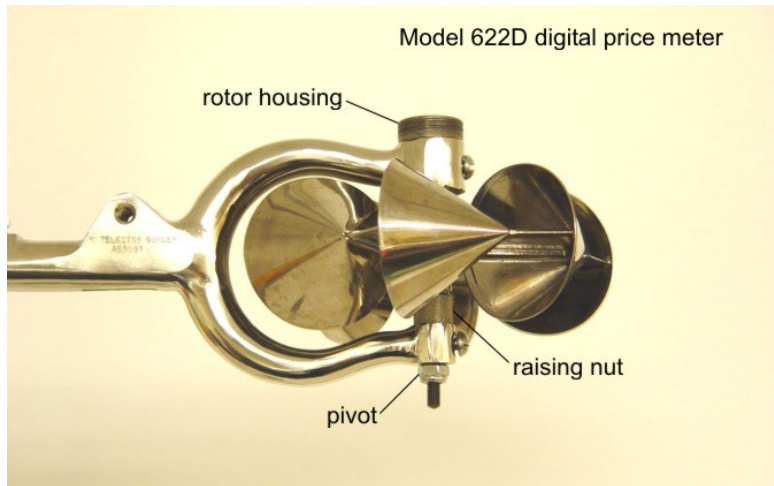
### Disassembling the meter (Model 622A Price meter, headphone style)

Although we recommend that damaged instruments be serviced at the factory, most parts can be replaced in the field.

Use the following instructions to disassemble your headphone style Price meter.

1. Remove the contact chamber map.
2. Loosen the set screws on the pivot and the contact chamber.
3. Remove the pivot.
4. Gently pull and twist to remove the contact chamber.
5. Raise the bucket wheel until the hole in the shaft is visible. Insert the adjusting pin or a nail and turn it counter-clockwise to loosen. Remove the shaft.
6. Remove the bucket wheel from the frame.
7. Remove the hub assembly from the bucket wheel by removing the hub lock nut. NOTE: Do this only if replacing the hub bearing or the bucket wheel. We recommend you return the hub assembly to the factory if bearing replacement is necessary.

Reassemble the meter by reversing the above steps.



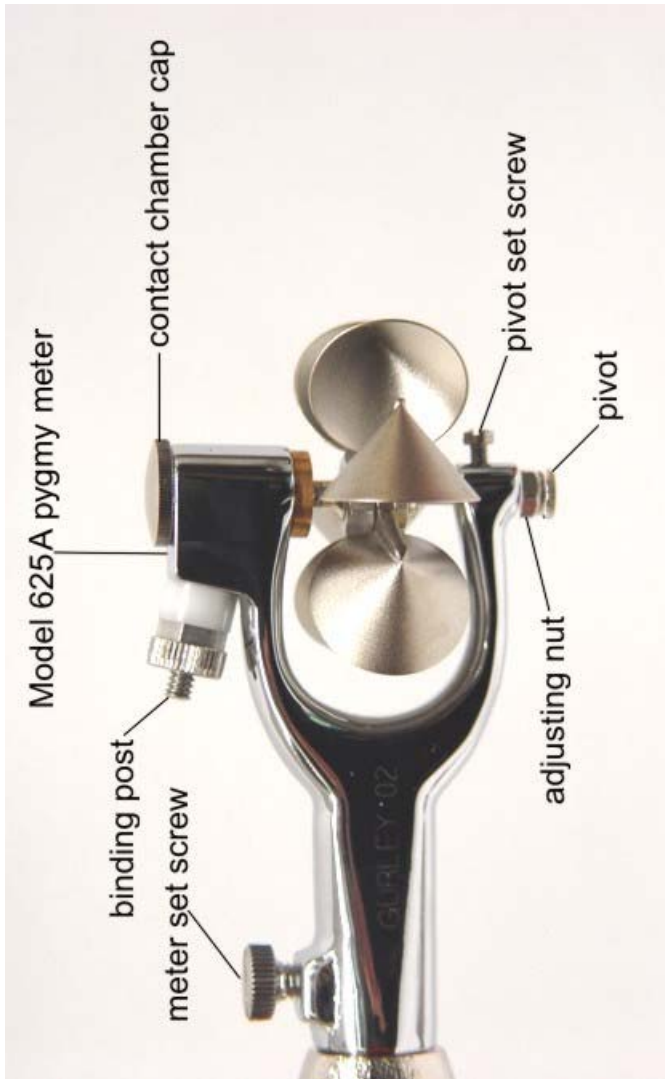
### Disassembling the meter (Model 622D Price meter, digital style)

Although we recommend that damaged instruments be serviced at the factory, most parts can be replaced in the field.

Use the following instructions to disassemble your digital Price meter.

1. Loosen the pivot set screw.
2. Remove the pivot assembly.
3. Loosen the rotor housing set screw.
4. Remove the rotor housing.
5. Raise the bucket wheel until the hole in the hub extension is visible. Place the adjusting pin or a nail through the hole and turn the hub extension counter-clockwise to loosen it. Remove the hub extension.
6. Remove the bucket wheel from the frame.
7. Remove the hub assembly from the bucket wheel by removing the hub lock nut. NOTE: Do this only if replacing the hub bearing or the bucket wheel. We recommend that you return the hub assembly to the factory if bearing replacement is necessary.

Reassemble the meter by reversing the above steps.



## PYGMY METER

### Cleaning and lubricating the meter

To ensure proper operation, the current meter must be cleaned and lubricated at the end of each day's use. Complete the following instructions to clean and lubricate your pygmy meter.

1. Remove the contact chamber cap.
2. Loosen the pivot set screw and remove the pivot assembly.
3. Clean and dry the pivot with a soft cloth. Set is aside.
4. Clean the lower bearing with a small pointed stick or a cotton swab.
5. Hold the meter with the contact chamber down. Place a small drop of oil in the bearing, insert the pivot and lock it in place using the set screw.
6. Replace the contact chamber cap.

Follow this procedure after each use to help prevent rust. If the meter is to be stored for extended periods of time, cover the pivot and bearing with grease. Clean and lubricate as above prior to use.

**NOTE:** After cleaning the meter at the end of each day's use, we recommend removing the working pivot and installing the shipping pivot to prevent pivot damage.

**Adjusting the pivot  
(Model 625A pygmy meter, headphone style)**

Use the following instructions to adjust the pivot on your headphone style pygmy meter.

1. With the contact chamber cap tightly in place, invert the current meter.
2. Loosen the pivot-adjusting nut and the pivot set screw. Insert the pivot into the lower bearing with the flat side facing the pivot set screw, until there is no vertical play in the shaft. Lock it in place using the set screw.
3. Advance the pivot adjusting nut until it rests against the frame.
4. Loosen the set screw slightly and advance the pivot adjusting nut one quarter of a turn, making sure the pivot is not turning. Tighten the set screw.

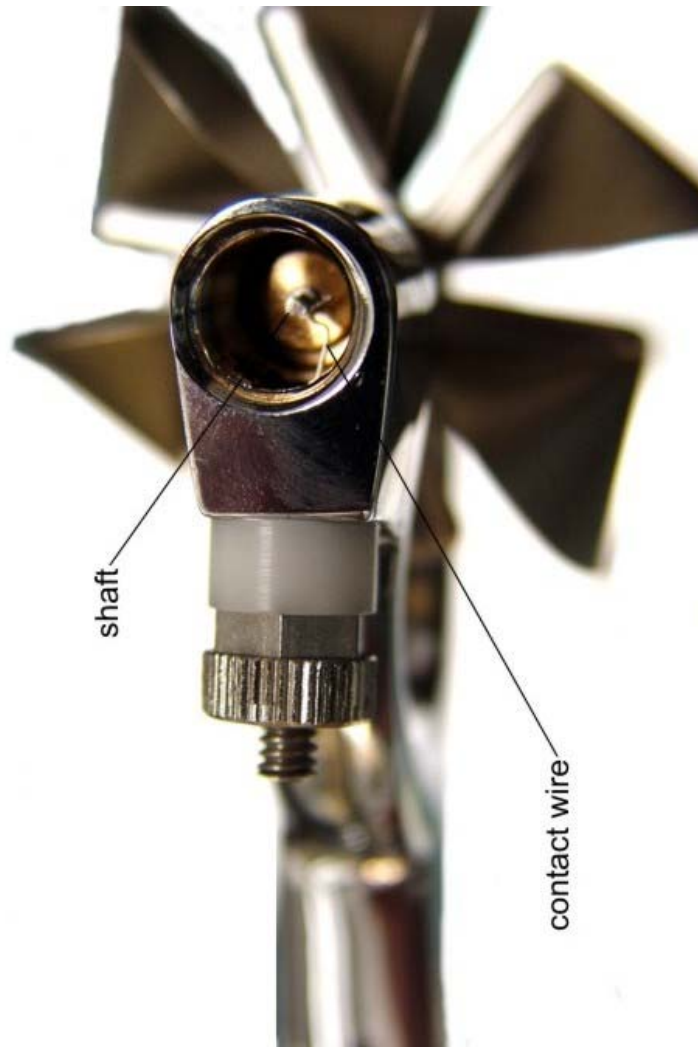
This adjustment provides an endplay of about 0.008 inch. *It is essential that this adjustment be made when replacing a pivot.*

**Adjusting the pivot  
(Model 625D pygmy meter, digital style)**

Use the following instructions to adjust the pivot on your digital style pygmy meter.

1. Invert the current meter so that the shoulder of the hub extension rests against the bottom of the rotor housing.
2. Loosen the pivot-adjusting nut and the pivot set screw. Insert the pivot into the lower bearing with the flat side facing the pivot set screw, until there is no vertical play in the hub extension. Lock it in place using the set screw.
3. Advance the pivot-adjusting nut until it rests against the frame.
4. Loosen the set screw slightly and advance the adjusting nut one quarter of a turn, making sure the pivot does not turn. Tighten the set screw.

This adjustment provides an endplay of about 0.008 inch. *It is essential that this adjustment be made when replacing a pivot.*

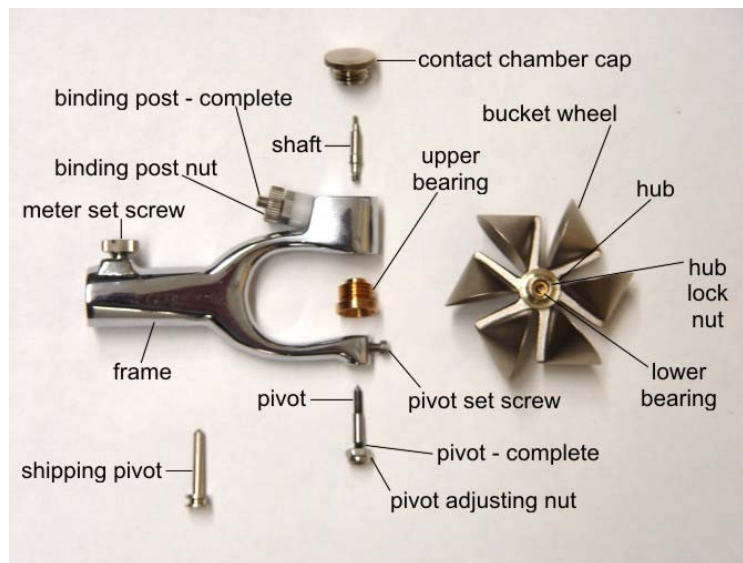
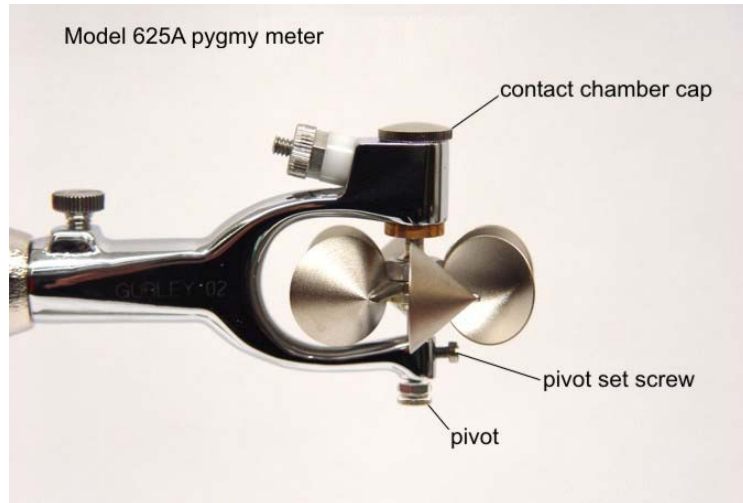


### **Adjusting the contact wire (Model 625A pygmy meter, headphone style)**

The contact wire should make light contact with the shaft. If pressure is too heavy, drag and wear of the shaft and wire will result. Use the following instructions to adjust the contact wire on you headphone style pygmy meter.

1. Assemble the meter and headphones as described in Part 1 of this guide.
2. Spin the bucket wheel. Clicks should be sharp, with no dragging sound.
3. Remove the contact chamber cap.
4. Inside the contact chamber there is a vertical shaft with a raised contact lug. With tweezers, gently adjust the contact wire so that it lightly touches the lug but does not touch the shaft when the lug is rotated.
5. Replace the contact chamber cap when finished.

When the pivot and contact wire are properly adjusted, the bucket wheel should spin freely.



### Disassembling the meter (Model 625A pygmy meter, headphone style)

Although we recommend that damaged instruments be serviced at the factory, most parts can be replaced in the field.

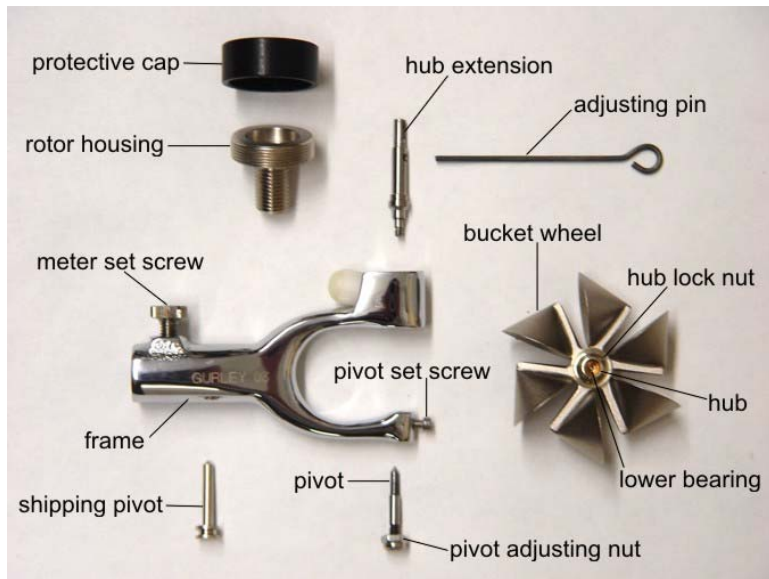
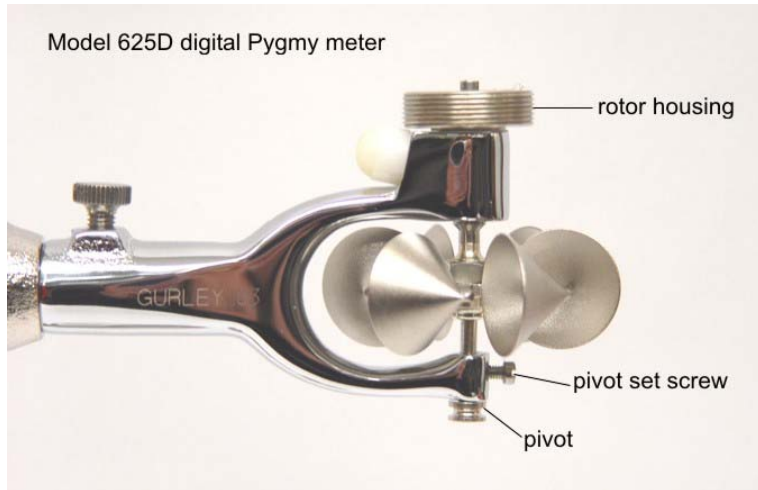
Use the following instructions to disassemble your headphone style pygmy meter.

1. Remove the contact chamber cap.
2. Loosen the pivot set screw and remove the pivot assembly.
3. The shaft has opposing flat sides directly above the bucket wheel hub. Carefully turn the shaft counter clockwise using needle-nose pliers on these flats. Remove the shaft.
4. Remove the bucket wheel from the frame.
5. Remove the upper bearing from the frame by unscrewing it.
6. Remove the hub assembly from the bucket wheel by removing the hub lock nut. Do this only if replacing the hub, bearing or bucket wheel. We recommend you return the hub assembly to the factory if bearing replacement is necessary.

Reassemble the meter by reversing the above steps.



Model 625D digital Pygmy meter



### Disassembling the meter (Model 625D pygmy meter, digital style)

Although we recommend that damaged instruments be serviced at the factory, most parts can be replaced in the field.

Use the following instructions to disassemble your digital style pygmy meter.

1. Remove the rotor housing.
2. Loosen the pivot set screw and remove the pivot.
3. Use the adjusting pin to remove the hub extension from the bucket wheel.
4. Remove the bucket wheel.
5. Remove the hub assembly from the bucket wheel by removing the hub lock nut. Note: Do this only if replacing the hub bearing or bucket wheel. We recommend that you return the hub assembly to the factory if bearing replacement is necessary.

Reassemble the meter by reversing the above steps.





## HEADPHONES

### Replacing the battery

Use the following instructions to replace the battery in your headphones.

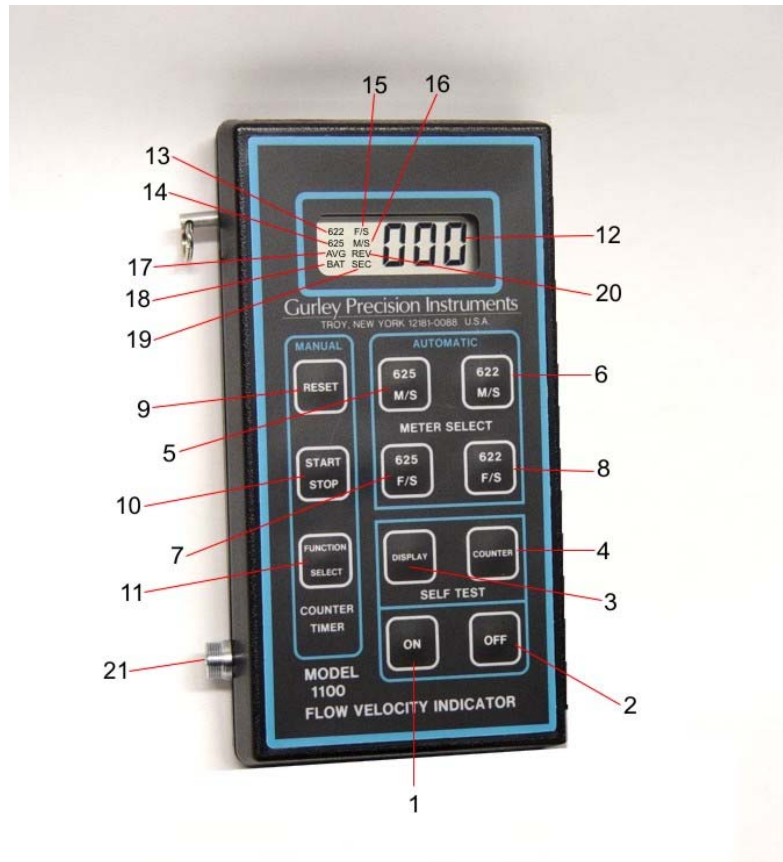
1. Disconnect the earphone cable from the suspension cable or the rod cable.
2. Remove the plastic earpiece cushion from the earpiece that does not have the cable entering it.
3. Insert a small flathead screw driver in the groove on the right side of the earpiece and gently pop the cover off the earpiece. Do not pull on the cover, or you may break the soldered connections.
4. Using the screw driver, gently pry the battery out of the battery holder.
5. Insert a new, type N battery in the battery holder. You may insert the battery in either direction.
6. Replace the earpiece cover by inserting the left side of the cover into its grooves and then pressing the right side into place.
7. Replace the plastic earpiece cushion.
8. Connect the earphone cable to the suspension cable or the rod cable.

Spinning the bucket wheel should now produce audible clicks in the headphones.

**Part 3**  
**Using the Model 1100 Digital Flow Velocity Indicator**

The Model 1100 Digital Flow Velocity Indicator attaches to either your Price or pygmy meter to quickly give you accurate current measurements.

This part of the guide contains three sections on how to use the Model 1100. The first section describes the panel of the Model 1100 and defines the function of each button. The second section describes the Model 1100's self-test functions. The last section describes how to operate the Model 1100 in each of its three modes – automatic, averaging, and manual.



### Understanding the Panel Functions

The following table describes the panel functions of the Model 1100 Digital Flow Velocity Indicator.

Item	Description
1	Power on button. Push to turn it on.
2	Power off button. Push to turn it off.
3	Display self-test button. Push to start self-diagnostics of display and internal electronics.
4	Counter self-test button. (Can be used only after display self-test). Push to start counter test.
5	625A MS Button. Push to start automatic velocity readout using pygmy 625A type meter with units in meters per second.
6	622 MS Button. Push to start automatic velocity readout using Price 622 type meter with units in meters per second.
7	625A FS Button. Push to start automatic velocity readout using pygmy meter with units in feet per second.
8	622 FS Button. Push to start automatic velocity readout using Price 622 type meter with units in feet per second.
9	Reset Button. Push to initiate manual mode and reset internal counter and timer.
10	Start/Stop Button. After reset, push to start event counter and timer. Push a second time to stop event counter and timer.
11	Function Select Button. Push to select the display of event counter (revolutions) or event timer (elapsed time in seconds). Can be pushed at any time without affecting event timer or counter. Continued pushing of the button toggles between revolutions and seconds.
12	Three digit display. (For seconds, revolutions, or velocity.)
13	622 Display. Visible whenever the unit is in the 622 automatic or averaging mode.
14	625 Display. Visible whenever the unit is counting in meters per second.
15	F/S Display. Visible whenever the unit is counting in feet per second.
16	M/S Display. Visible whenever the unit is counting in meters per second.
17	AVE Display. Visible whenever the unit is in averaging mode.
18	BAT Display. Flashes on and off when battery voltage is low and battery should be replaced. Unit has a few hours of operation remaining when this warning commences.
19	SEC Display. Visible whenever the unit is in the manual mode and the Function Select button is set to display elapsed time (seconds).
20	REV Display. Visible whenever the unit is in the manual mode and the Function Select button is set to display revolutions.
21	Connector for Price model 622 or pygmy model 625 meter with opto-electronic sensor pickup.

### Performing a self-test

The Model 1100 Digital Flow Velocity Indicator has built-in diagnostics to ensure proper operation of the unit. The diagnostics are performed in two stages: (1) operation of micro-controller/display and (2) operation of signal conditioning/counter. Complete the following instructions to perform a self-test on your Model 1100.

1. Disconnect any metering unit (622D or 625D) from the Model 1100 Indicator.
2. Press the ON button. Display will read 000.
3. Press the DISPLAY button to begin the first stage of the self-test.  
NOTE: COUNTER button has no action until display button has been pressed and the unit has completed its sequence of test. After pressing DISPLAY button, each digit of the display will count from 0 to 9, beginning with the right digit, ending with the display at 999. Next, all of the display messages, except BAT, will be visible for approximately 3 seconds, then the display returns to 999.
4. If desired, self-test mode can be cancelled at this time to enter another mode. To do so, press the OFF button. To begin the second stage of the self-test, press the COUNTER button. The counter will now begin incrementing the display at a rate of one count per second.
5. Compare the display count rate against an accurate watch for the appropriate count rate. If they are in agreement, the Model 1100 has passed its diagnostics.
6. To leave this counting mode, press the OFF button.
7. If problems persist, try substituting a different meter unit, or replace the battery.

If the voltage of the battery is low, the BAT display message will flash on and off. At this point, the unit will still have a few hours of service left. However, failure to replace the battery will result in erratic or no operation of the unit.

To replace the battery, remove the battery cover located on the rear of the Model 1100 case. Insert a new 9VDC battery and replace cover.

## Operating the Model 1100

### Automatic mode

For quick and convenient readings of flow velocity, the Model 1100 provides automatic velocity computation for the 622D and 625D meters in both feet per second and meters per second. To operate your Model 1100 in the automatic mode, use the following instructions.

1. Connect the Price 622D Meter (or pygmy 625D) to the Model 1100 Indicator using the connector on the side of the Model 1100.
2. Press the ON button.
3. Press a meter select button once to indicate the type of meter being used and the desired units (e.g. 622 MS or 625 FS).  
NOTE: After pressing the button, the display will go to 000 and the type of meter and units selected will be shown on the display.
4. Every four seconds the display will be updated showing the flow velocity.

### Averaging Mode

An averaging feature is incorporated into the Model 1100 to smooth out flow velocity variations. To operate your Model 1100 in the averaging mode, use the following instructions.

1. Connect the price 622D Meter (or pygmy 625D) to the Model 1100 Indicator using the connector on the side of the Model 1100.
2. Press the ON button. Display will read 000.
3. Press a meter select button twice to indicate the type of meter being used and the desired units (e.g., 622 FS or 625A MS). NOTE: After pressing the button twice, the display will go to 000 and the type of meter, units selected, and AVE will be shown on the display.
4. Every sixteen seconds the display will be updated showing the flow velocity averaged over four of the standard automatic samples. NOTE: Press the meter select button again to toggle the meter between standard and average modes.

## Manual mode

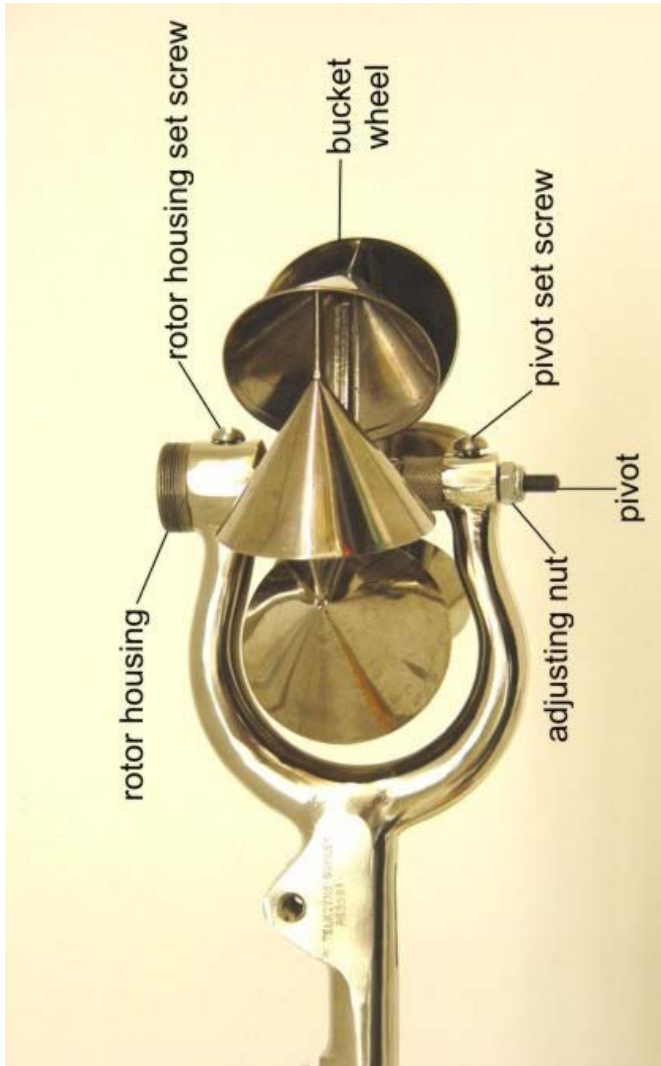
Where longer sampling periods are needed due to very low velocity, or if a higher degree of accuracy is required, we recommend that you use the manual operating mode and the rating tables to determine the flow rate. To operate your Model 1100 in the manual mode, use the following instructions.

1. Connect the Price 622D meter (or pygmy 625D) to the Model 1100 Indicator using the connector on the side of the Model 1100.
2. Press ON button.
3. Press RESET button to enter manual mode of operation.
4. When ready to begin counting revolutions and elapsed time, press the START/STOP button once. NOTE: At this time the indicator will begin counting revolutions and elapsed time. The display will show the elapsed time in seconds. To display the number of revolutions, press the FUNCTION SELECT button once. The display will show REV and the number of complete revolutions counted. Pressing the FUNCTION SELECT button causes the display to toggle between elapsed time and revolutions.
5. To stop counting and freeze elapsed time, press the START/STOP button a second time. The elapsed time and number of revolutions will be stored and can be read by using the FUNCTION SELECT button to toggle between elapsed time and revolutions. Determine the flow rate using this information and the rating table included with the meter.
6. To take another measurement, press the RESET button and repeat steps 4 and 5.

\* The Model 1100 will begin actual counting of rotations and seconds when the metering unit has rotated past the first input pulse.

**Part 4**  
**Converting Headphone Style Meters to Digital**

Headphone style Price and pygmy meters can be converted to digital meters using conversion kits available from Gurley.



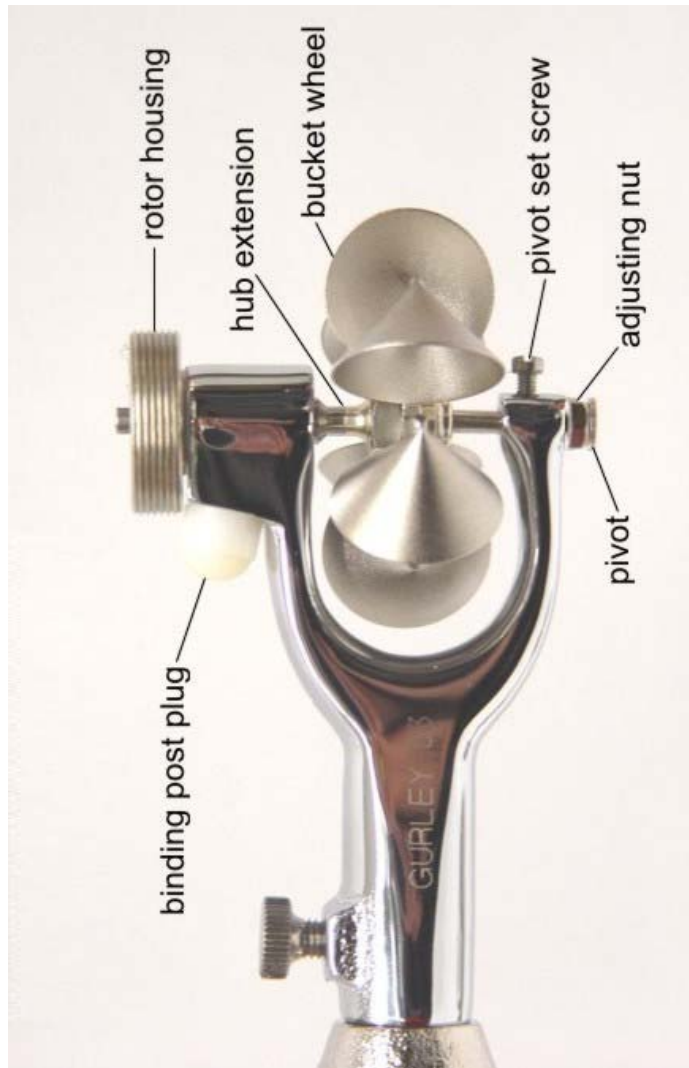
### Converting the Price 622-AA meter

Use the following instructions to convert a Price headphone style meter to a digital meter.

1. Loosen the screw holding the contact body chamber and remove the chamber by gently pulling and twisting.
2. Unscrew the shaft, remove from the bucket wheel.
3. Screw the hub extension from the conversion kit into the bucket wheel. Lift the bucket wheel to expose the through hole on the shaft; place adjusting pin or nail through this hole to tighten.
4. Place the rotor housing supplied with the conversion kit into the top of the frame with the hub extension through the center of the housing. The flat side of the rotor housing should face the set screw. Tighten the set screw.
5. Adjust the pivot (see page 29).

Conversion complete.

To use the digital Price meter, attach the sensor head assembly to the rotor housing. See page 9 for suspension type applications or page 19 for wading rod applications. NOTE: Screw the protective cover on the rotor housing and sensor head when the meter is not in use.



### Converting the pygmy 625A meter

Use the following instructions to convert a pygmy headphone style meter to a digital meter.

1. Unscrew the binding post assembly from the frame.
2. Loosen the pivot set screw and remove the pivot assembly.
3. Remove the contact chamber map.
4. Remove the shaft from the bucket wheel.
5. Remove the bucket wheel from the frame. (If the bucket wheel will not slide out, try rotating it to another position.)
6. Remove the upper bearing from the frame.
7. Place the bucket wheel in position in the frame.
8. Screw the hub extension from the conversion kit into the bucket wheel. Insert the adjusting pin through the hole to tighten.
9. Screw the rotator housing from the conversion kit into the top of the frame.
10. Reinstall the pivot assembly with the flat side of the shaft toward the set screw. Tighten the set screw.
11. Screw in the binding post plug.
12. Adjust the pivot. (See page 41)

Conversion complete.

To use the digital pygmy meter, attach the sensor head assembly to the rotor housing. See page 19. NOTE: Screw the protective cover onto the meter housing and the sensor head when the meter is not in use.

### Caring for the opto-sensor assembly

When finished using the meter, remove the detector assembly and dry the chamber and detector assembly with a soft cloth. Cover the chamber and detector assembly with the cap and plug provided.



**Part 5  
Repair Parts**

Specifications and part numbers subject to change without notice.

**WADING ROD SETS**

<b>Number</b>	<b>Description</b>
627E	English rod set, Price and pygmy meter – 8 feet
627M	Metric rod set, Price and pygmy meter – 2 feet
627F	English rod set, Price meter – 6 feet
299-309	English top setting rod – 4 feet
299-309-2	English top setting rod – 6 feet
299-309-3	English top setting rod – 8 feet
299-309-5	Metric top setting rod – 1 meter
299-309-6	Metric top setting rod – 2 meters

All 627 rod sets include: 233-17 case, 24674 double end hanger and appropriate wading rod base.

**WADING ROD PARTS AND ACCESSORIES**

<b>Number</b>	<b>Description</b>	<b>Page</b>
AXO4239	Plastic cable clips (set of 8)	19
427	Binding post	15
233-71	Canvas case	
24674	Double-end hanger	15
28962	Rod base – Price or pygmy	15
32963	24" intermediate section	
32956	½ meter intermediate section	
32957	½ meter bottom section – Price or pygmy	
32958	24" Bottom section – Price or pygmy	

**BATTERIES**

Number	Description	Page
279-204	Dry cell no. 711, 1.5 volts (earphones prior to 1990)	
AX03876	9 volts for 1100 indicator	
AX04083	Type N, 1.5 volts (headphones from 1990)	49

**CABLE SUSPENSION EQUIPMENT****Cables**

Number	Description	Page
DX00762N	50' rubber and steel cable –digital model replaces DX00676 and combinations of 34623 and DX00621 cables)	11
DX00763N	50' rubber and steel cable – headphone model (replaces DX00677 and combinations of 440	9

Both cables above come with a 395 weight hanger bar.  
Additional lengths and special cables available upon request.

**Parts**

Number	Description	Page
392	Lead weight, 15 lbs	9
393	Lead weight, 30 lbs	
394	Lead weight, 50 lbs	
395	Weight hanger, 15 lb, 30 lb	9
486	Weight hanger, 50 lb	
396	Weight pin, 15 lb, 30 lb	9
472	Weight pin, 50 lb	
AXO4089	Weight hanger screw	9
444	Lead weight, 75 lbs	
443	Lead weight, 100 lbs	

**Current meter parts, headphone style****Price Model 622**

Number	Description	Page
12	Raising Nut	25
232-125	Meter case	
AX04878	Gear	31
24148	Gear assembly	31
31493	Hub	33
31494	Pivot	33
31495	Shaft	33
31497	Hub including bearing & raising nut	33
31499	Pivot – complete	33
31987	Bucket wheel	33
32574	Upper binding post	33
32575	Lower binding post	33
33055	Counterpoise	9
33502	Tailpiece assembly	9
401	Cap	32
404	Gear holder	30
405	Frame	33
411	Contact chamber	33
455	Binding post bushing	33
X-151	Binding post nut	33
X-152	Hub lock nut	33
AX03931	Pivot adjusting nut	33
211-245-041	Gear holder screw	31
AX05237	Bucket wheel bearing	33
X-150	Tailpiece set screw	9
AX03594	Chamber/pivot set screw	33
294-112-57	Adjusting pin	35

### Pygmy Model 625A

Number	Description	Page
232-127	Meter case	
28227	Frame	37
28228	Cap	37
28231	Upper bearing	37
28232	Bucket wheel	37
28236	Hub	37
28238	Hub lock nut	37
28239	Pivot – complete	37
28240	Pivot	37
28242	Shipping pivot	
AX04875	Lower bearing	37
32574	Binding post – complete	37
33982	Shaft	37
AX3930	Pivot adjusting nut	37
AX05641	Pivot set screw	37
X-150	Meter set screw	37
X-151	Binding post nut	37
445	Binding post bushing	37

### Headphone set

Number	Description	Page
488	Headphones (includes type N battery)	19
433	Cable from earphones (or 611 counter) to Meter (622 and 625A) – 15' length	19
AX03852M	Connector, 2 prong	
AX08352F		
BX02358	Top set rod adapter case	

### Accessories

Number	Description
233-1	Canvas equipment bag
619	Stop watch

### Current meter parts, digital style

Name	Description	Page
CX00632N	18" Sensor head assembly	11
CX00621N	15' Sensor head assembly	21
CX00591	Rotor housing – model 625A	47
CX00596	Rotor housing – model 625A	35
BX00507	Hub extension – model 625A	47
BX00510	Hub extension – model 625A	35
AX05394	Rotor housing set screw – model 622	35
294-112-57	Adjusting pin	35
BX00535	Sensor head plug	35
BX00536	Current meter cap	35
1100	Model 1100 indicator	21

Call or send an email to Travis Coon (t.coon@gurley.com) for parts to convert an older headphone or digital current meter to use a new Model 1100 digital indicator.