
Chapter 6

Maintenance

This section contains information for you, the owner and/or user, about how to properly care for your 400 Series Analyzer. Adherence to the suggested maintenance schedule will minimize the need for repairs over the life of your product.

Information is also included to help you repair/replace external sub-assemblies or leads and minimize the need for on-site service. If on-site service is required, information on how to contact Service is provided.

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Troubleshooting

Preventive Maintenance Schedule

Weekly Maintenance

1. Check calibration gas bottle pressure. Replace bottle if gauge reads 20 PSI or less.
2. Inspect all cooling fan foam filters. Wash with soapy water and air dry.
3. Inspect water trap/filter bowl. Wipe bowl with damp, soapy rag.
4. Replace the secondary gas filter if it looks dirty. For best performance, replace both filters as a set. If desired, wash the mesh pre-filter in warm soapy water.
5. Check the printer paper supply. Replace as necessary.
6. Perform "Leak Check" and "Gas Calibration" procedures.

Monthly Maintenance

1. Inspect printout quality. Replace the ribbon if quality is poor.
2. Inspect casters for damage. Replace any broken casters immediately to prevent serious analyzer damage.
3. Clean and inspect all test leads, probes, hoses, etc. Contact an authorized service center for replacement leads if required.
4. Clean the outside surfaces of the cabinet with a non-abrasive household cleaner.

Annual Maintenance

1. Contact Service for updates which may be available.

Software Problems

If experiencing software problems, print out a copy of the Diagnostic Report (see "Module Tests" and "Update Module Status Information" in Chapter 5) before calling an authorized service representative. The service representative will ask you to read back information from the diagnostic report before attempting to diagnose a problem.

How to Obtain Service

If service is required on the analyzer, refer to the nearest authorized service center noted on the decal attached to rear of the analyzer, or call:

1-800-288-2327

or

1-800-833-3377

Warranty repairs will be considered only if proof of sale is presented to an authorized service center.

Gas Bottle Service

NOTE **IMPORTANT:** The gas values listed on any replacement bottle must match those on the old bottle. If they do not, call Service for bottle replacement.

Make sure that the bottles are installed correctly in the analyzer. The "Low Gas" bottle should be placed inside the left-hand bottle compartment, and the "High Gas" bottle should be placed in the right-hand compartment.

1. Turn gas bottle valve off (see Figure 6-1).
2. Loosen regulator nut and remove regulator assembly from bottle.
3. Place new bottle inside cabinet and install regulator assembly on new bottle. Tighten regulator nut with a wrench. Do not over-tighten the nut.

NOTE **REMEMBER:** Conserve calibration gas by turning the gas off after every gas calibration procedure!

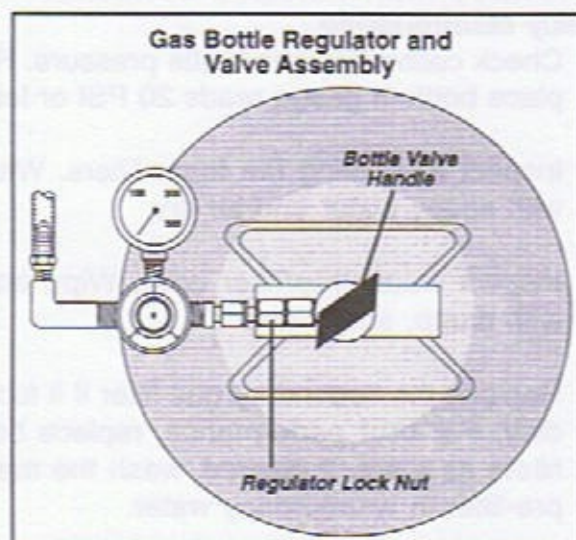


Figure 6-1

Filters

Exhaust Sample Filters

Your analyzer is equipped with one of two different types of exhaust gas sample filter assemblies. The following pages describe both types and give instructions for disassembling and cleaning or replacing filter elements for each type.

Replace the exhaust sample filter whenever the filter looks dirty or whenever the screen displays the "LOW FLOW" message during calibration procedures. Sample filters are low-cost insurance to protect the analyzer. **DO NOT WAIT FOR "LOW FLOW" MESSAGE TO APPEAR - Change the filters whenever they look dirty.** (See next page for replacement procedure.)

NOTE

Always perform a leak check after you clean or replace any filters to verify proper sealing.

Tri-Filter Assembly (Figures 6-2 and 6-3)

The filter element should be replaced at least every two weeks, whenever the filter looks dirty, or whenever the screen displays the "Low Flow" message during calibration procedures.

Gas Bench Components

- A - Filter Housing Mounting Screws
- B - High Gas Port
- C - Low Gas Port
- D - Zero Air Inlet
- E - Sample Hose Connector Fitting
- F - Water Drain Hose
- G - Exhaust Gas Hose
- H - Oxygen Sensor
- I - O2 Sensor Wiring Connector

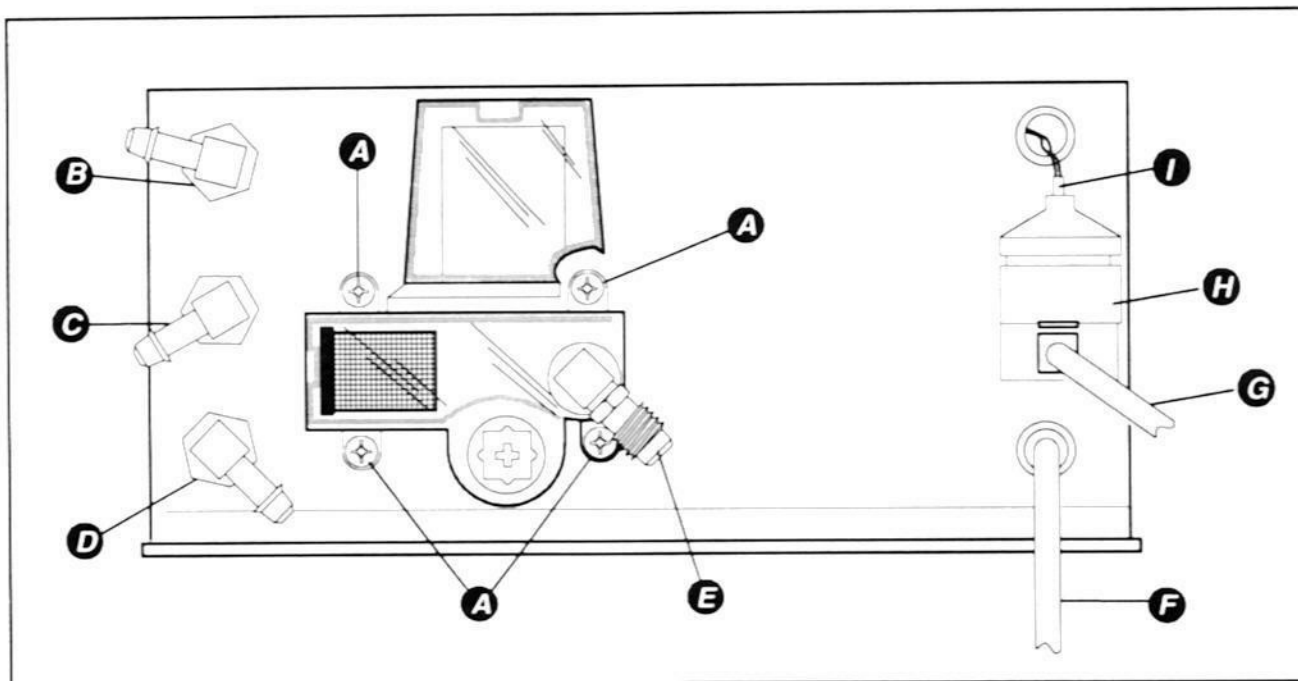


Figure 6-2

Tri-Filter Assembly Components

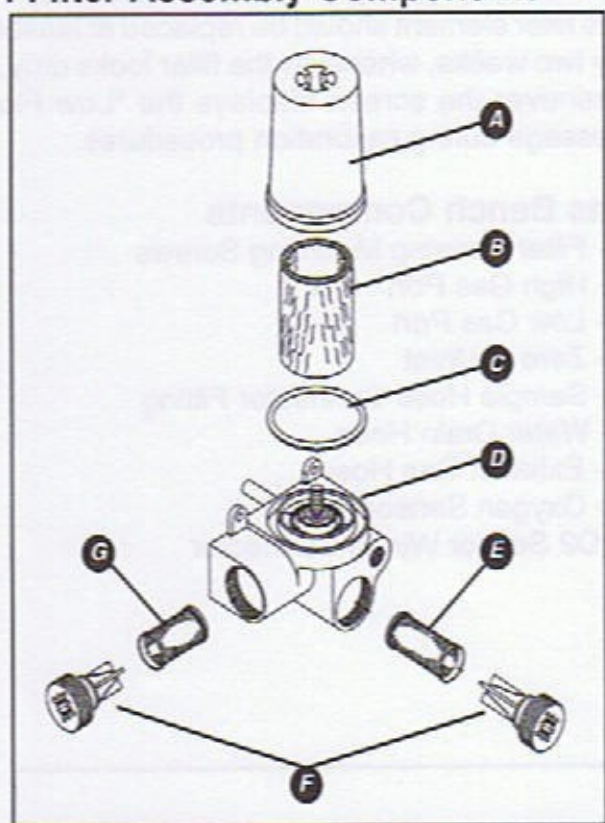



Figure 6-3

- A - Filter Bowl
- B - Filter Element
- C - Gasket, Filter Bowl
- D - Housing, Filter
- E - Water Screen Filter
- F - Filter Plug With O-ring
- G - Gas Screen Filter

Exhaust Sample Filter Replacement

1. To remove the filter housing from the bench, remove the four (4) screws (A) holding the filter housing in place (refer to Figure 6-2).
 2. Insert a 3/8" ratchet drive into the recessed openings provided to remove the filter plugs or the filter bowl from the filter housing (refer to Figure 6-3, items A and F).
 3. Pull the filters out of the housing.
 4. Discard the secondary filter (see Figure 6-3, item B, the uppermost filter). The secondary filter is not washable.
 5. Wipe out the filter bowl with a damp soapy rag.
- CAUTION**  Using a solvent to clean out the filter bowl will cause excessive HC hang-up to occur.
6. Clean the mesh filters (G) and (E) with warm soapy water, or, for best results, replace the filters.
 7. Reassemble the filter housing. Hand tighten the upper bowl (A). Do not use a ratchet.

Water-Trap Filter Assembly

The second type of filter assembly is composed of a primary water-trap filter and a disposable secondary filter (see Figure 6-4). The primary filter can be cleaned and reused. Replace the secondary filter every two weeks or whenever the screen displays a "Low Flow" message during calibration. Sample filters are low-cost insurance to protect the analyzer — replace the secondary filter regularly.

NOTE Air flow in the secondary filter is from inside to outside. When the outside of the filter begins to change color, it is time to change the filter.

CAUTION Failure to change the disposable (secondary) filter and clean the screen (primary) filter may damage your unit and void your warranty.

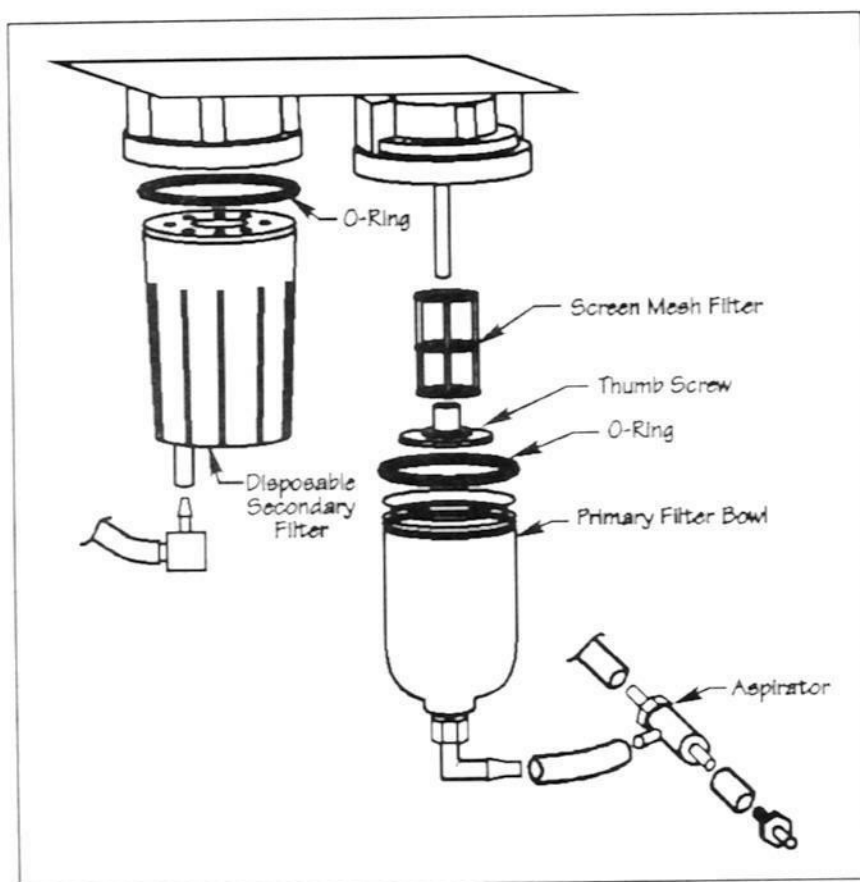


Figure 6-4

Chapter 6 - Maintenance

Water-Trap Filter Assembly—continued

Procedure — Cleaning the Primary Filter

1. Disconnect the plastic hose from the elbow on the bottom of the primary filter bowl (see Figure 6-4).
2. Unscrew and remove the clear plastic filter bowl.
3. Wipe the filter bowl with a damp soapy rag.

NOTE Using solvent to clean the filter bowl will cause HC contamination and may cloud the bowl.

4. Remove the plastic thumb screw and screen.
5. Wash the screen in warm soapy water, then rinse it thoroughly.
6. Reinstall the screen, thumb screw and filter bowl. Reattach the hose.

Procedure — Replacing the Secondary Filter

1. (see Figure 6-5) Gently pull the elbow (B) out of the tube on the bottom of the filter bowl assembly (A).
2. Unscrew the filter bowl assembly until it disengages. Discard the old assembly.
3. Install a new filter bowl assembly.

CAUTION Do **NOT** overtighten the filter bowl!

4. Firmly push the elbow up into the tube on the bottom of the new filter bowl.

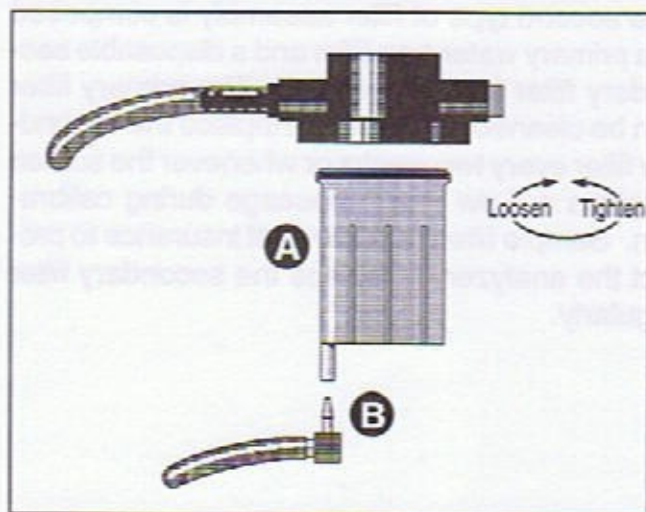


Figure 6-5

Cleaning the Aspirator

The aspirator removes excess fluid from the sample system. Inspect it once per week to make sure it is free of restrictions.

Procedure

1. Remove the hoses from the aspirator (see Figure 6-4).
2. Unscrew the aspirator tip.
3. Clean the aspirator and tip with warm soapy water until the metered passageways inside the aspirator are clean. Rinse thoroughly.

CAUTION The use of sharp instruments or wire to clean the passageways could damage the aspirator and render it inoperative!

4. Reassemble the aspirator and reconnect the hoses.

Cooling Fan Filter

Figure 6-6 shows the location of the analyzer module fan filter. Pry up one edge of the filter retainer and carefully snap the retainer off of the housing. Pull the foam filter out of the retainer and wash it in soapy water. Air dry the filter, insert the filter into the retainer and reinstall the retainer.

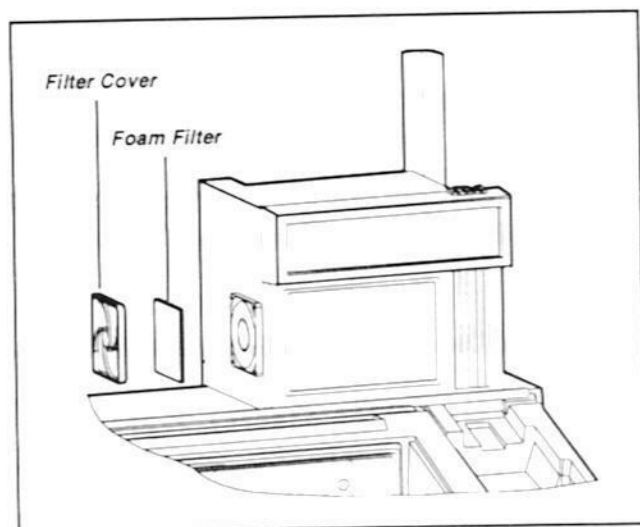


Figure 6-6

Fuse Replacement

Remove the fuse carrier with a flat bladed screw-driver.

120-Volt Operation

- 4.0 Amp/250V .25 X 1.25 Slow-Blow
(Part Number 624-64594)

230-Volt Operation

- 5Amp, 5x20mm, Slo-Blo
(Part Number 624-64594)

Printer Ribbon Removal (Okidata)

1. Open the printer cover.
2. Lift off the access cover.
3. Push the print head to the center of the carriage so it is away from the bail rollers. Make sure the bail is closed (lever back - see Figure 6-7).

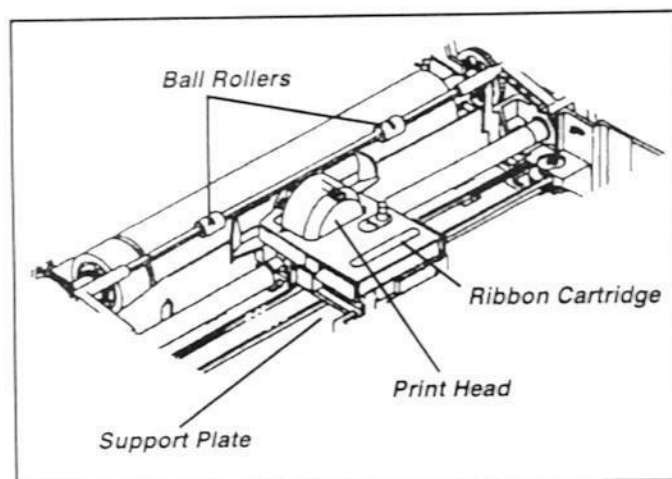


Figure 6-7

4. To remove the cartridge, slide the print head away from the rollers, grasp the cartridge on both sides and lift the cartridge off.

Printer Ribbon Replacement

NOTE Okidata printer cartridges for Model 380 are slightly different from cartridges used in the earlier Model's 182, 184, 192, and 320. The 380 cartridge is identical in size, but has a pair of small guide pins moulded into the bottom plastic housing next to the ribbon advance mechanism ratchet screw.

The correct ribbon cartridge part numbers for the printer models are:

696-98449	Okidata 380
697-91076	Okidata 182, 184, 192, & 320

1. With the knob facing up, tilt the ribbon cartridge onto the printhead plate so it slides into the area of the plate is closest to the front of the printer (see Figure 6-8).

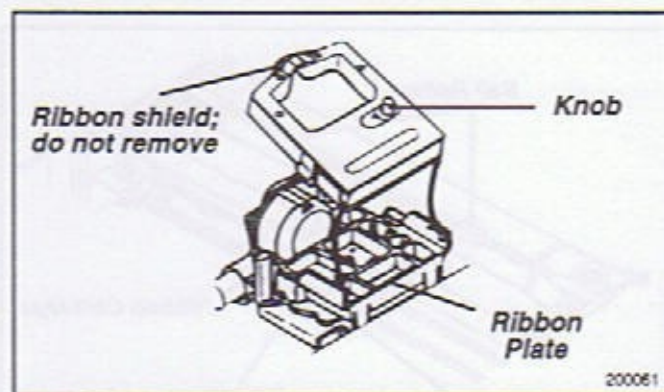


Figure 6-8

NOTE If the ribbon won't load easily, turn the blue knob slightly until the x-shaped notch on the bottom of the ribbon cartridge aligns with the x-shaped insert on the ribbon plate.

2. Lower the ribbon shield over the printhead, aligning the tabs with the inserts on the printhead plate (see Figure 6-9).

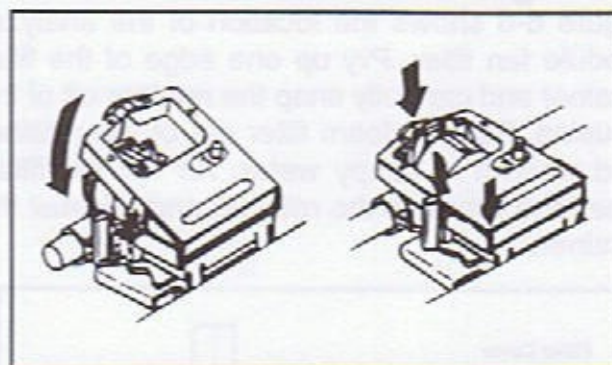


Figure 6-9

NOTE Do not remove the clear plastic ribbon shield from the ribbon cartridge.

3. Press on the cartridge until it snaps into place.
4. Turn the knob in the direction of the arrow to take up slack in the ribbon (see Figure 6-10).

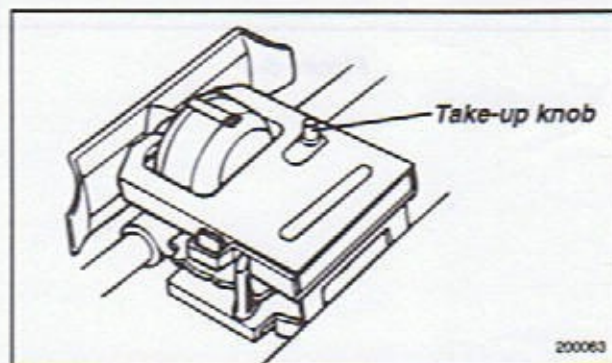


Figure 6-10

CAUTION Do NOT touch the printhead directly after printing. Allow five minutes for it to cool.

Vacuum / Pressure Transducer O-Ring

Your Analyzer is shipped with three O-rings. If the vacuum/pressure transducer develops a leak at the quick disconnect fittings, replace the O-rings inside the quick disconnect fittings.

Use a dental pick or awl to pull the old O-ring out of the fitting and then slide a new ring into place.

General Cleaning

Video Display

Use a common household window cleaning solution. Clean with a soft damp cloth and light pressure.

Analyzer Surfaces

Clean unit at least once a month; more often under dusty conditions. Use a cloth dampened with a mild dishwashing detergent and water mix.



DO NOT use solvents containing petroleum distillates, or kerosene or gasoline. Static buildup on plastic surfaces can be reduced with anti-static sprays available at electronics supply stores.

Replacement Parts

	Description	Part Number
Leads	PROBE, RPM (#1 Green)	534-00904
	HARNESS, Secondary (High Tension)	634-99983
	HARNESS, Primary Cable	617-99984
	PROBE, Amp	617-99982
	PROBE, Low Current	617-99817
	ASSEMBLY, Vacuum Transducer	517-00517
	PROBE, Temperature	534-00691
	HARNESS, Volt/Ohms	534-00501
	HARNESS, Accessory Probe	534-00904
	ASSEMBLY, Timing Light	617-88201
	HARNESS, DIS Secondary	634-99981
	CLIP, Crocodile, Black	651-96315
	CLIP, Crocodile, Red	651-96316
	PROBE, Exhaust Gas Analyzer	617-97041
	END, Flexible, Sample Probe	680-92442
	CAP, Probe Tip	697-85986
	ASSEMBLY, Dual Pick-Up Hose	617-97138
	ADAPTER, Coil Wire	634-98128
	ADAPTER, H-Clip	697-89427
	ADAPTER, Toyota	617-94158
	ADAPTER, GM HEI	617-66433
	VACUUM TRANSDUCER FITTING	817-00458
Miscellaneous	FUSE, 4.0 Amp, Slow-Blow (2 Req'd)	624-97430
	GAS, Low Calibration CO/HC/CO ₂	00045233
	GAS, High Calibration CO/HC/CO ₂	00045234
	REGULATOR, Pressure, Calibration Gas	697-97109
	PLIERS, High Tension	616-30238
	TRI-FILTER, Gas	597-00878
	FILTER, Gas Screen	597-00876
	FILTER, Water Screen	597-00877
	FILTER, Water Trap	00047470
	FILTER, In-Line Disposable	697-97146
	FILTER, Air Cooling Fan	617-89238
	RIBBON, Printer, Okidata 182, 184, 192, 320	697-91076
	RIBBON, Printer, Okidata 380	696-98449
	PAPER, Printer (Box)	697-97894

To Order Parts or Service:

To obtain a **Service Parts Catalog** illustrating and listing all available customer-serviceable parts for A.D. products, order part number 820-02878. To place an order for this catalog or for other parts, or to obtain Service on your products, call

1-800-288-2327

or

1-800-833-3377

To Order Parts or Service:

To obtain a Service Parts Catalog illustrating and listing all available customer service parts for A.B. products, order part number 800-02878. To place an order for the catalog or for other parts or to obtain Service on your products, call:

1-800-288-2327

or

1-800-833-3377

Positive (red) Secondary Clip on Positive Polarity Cylinder

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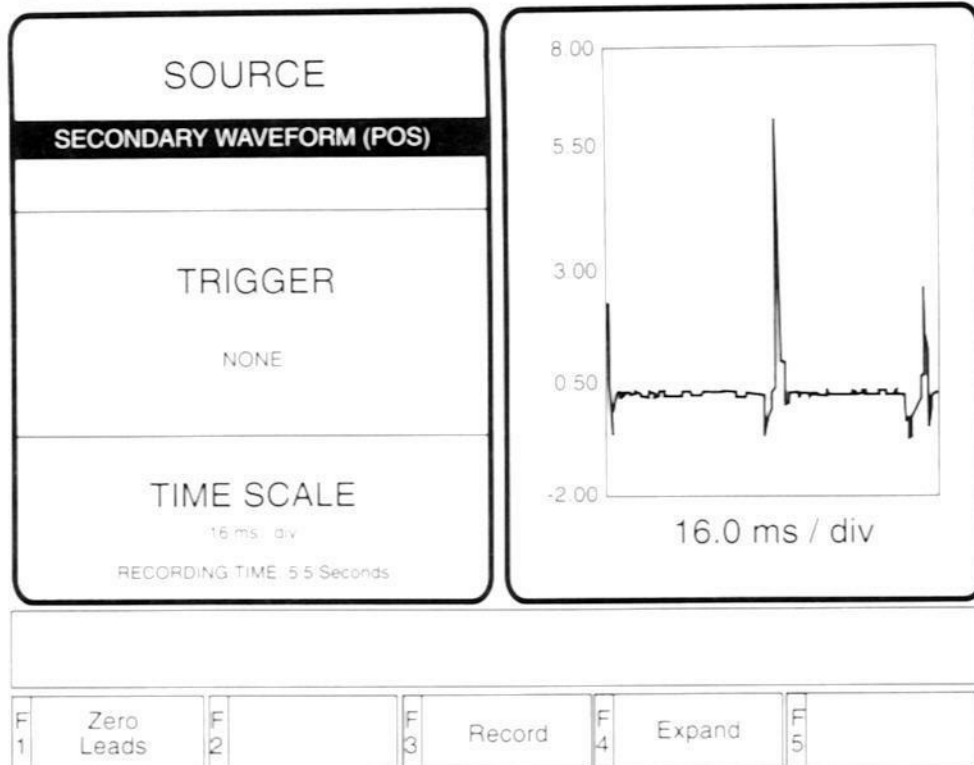


Figure 1

Positive (red) Secondary Clip on Negative Polarity Cylinder

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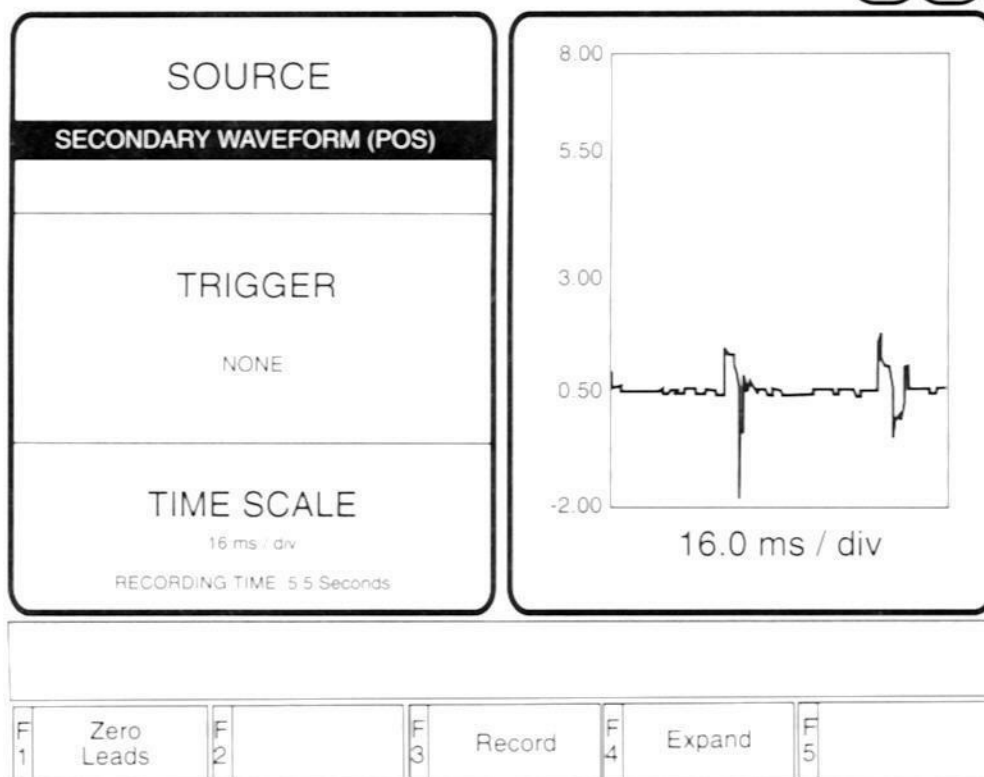


Figure 2

AUTOMOTIVE DIAGNOSTICS

A division of SPX Corporation

Technical Information — 400 Series Version 3.0 DIS Polarity Testing

(Addendum to Operator's Manual)

Over the course of the last several years, vehicle manufacturers have added many different DIS vehicles to their product lines. We make every effort to confirm our database information on all vehicles. You may on rare occasions encounter a vehicle that has different cylinder firing polarities from those found in our database. Please use the procedures below to determine the correct polarities.

NOTE For the following procedures, it is assumed that your 400 Series Analyzer is working properly and the display problems are caused by the test vehicle, or incorrect polarity programming, not lead failures. Handle and route leads carefully to avoid damage, and inspect and clean your lead sets daily to ensure long life and accurate signal inputs.

Procedure

Follow these steps if you are experiencing problems with Sync, Ignition signals or Cylinder Performance functions on a 400 Series Engine Analyzer.

Lead Status Check

Press [F7] to display the Lead Status screen and determine which input is **FAULTY**.

- **If the Green #1 signal is FAULTY**, perform the following while checking the lead status:
 - 1) Check for proper installation of the sync probe on the cylinder #1 ignition wire. If no problem is detected, proceed to Step 2.
 - 2) Install the Green #1 probe on a different spark plug wire to determine if cylinder #1 has a faulty ignition signal.
 - If the Green #1 probe displays "OK" there is a problem with cylinder #1 ignition components, for example, plug, wire, coil secondary, ignition module.
 - If the Green #1 probe still displays "FAULTY" try connecting to another ignition wire. If possible, connect to another known-good vehicle to verify unit is functioning properly.
- **If the Secondary signal is FAULTY**, proceed with the following steps.

- 1) Remove all Secondary clips.

- 2) Select **Multi-Analyzer Menu** from **Service Tools** menu.
- 3) Select **Uniscope** from **Multi-Analyzer** menu.
- 4) Select the following setup from the **Uniscope** menu:
 - a) **Source** = **SECONDARY WAVE FORM (POS)**
 - b) **Trigger** = **NONE**
 - c) **Time Scale** = **16 ms/div**
- 5) Verify and write down Firing Order of engine.
- 6) Install 1(one) **RED** Secondary clip on any spark plug wire.
- 7) Start engine, and determine polarity of KV spike displayed on Scope Display.

NOTE Please see Figures 1 and 2 on page two for spike polarity illustrations.

- 8) Record polarity of that cylinder.
 - 9) **To ensure personal safety, STOP ENGINE.**
 - 10) Move Secondary clip to each of the remaining plug wires in the firing sequence and determine polarity of each cylinder.
- NOTE** Remember to stop engine each time before moving secondary clip.
- 11) Edit specs of vehicle to match cylinder polarities as determined by this test process.
 - 12) Reconnect secondary clips to match the new polarity.

You have now completed the testing process.