



Quick-Start Operating Guide

Document No. 1800-41

Automatic Dispensers

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Your Comprehensive Equipment Source





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Safety Notice

A thorough familiarity with all operating guidelines is essential to safe operation of the product. Failure to observe safety precautions could result in poor performance, damage to the system or other property, or serious bodily injury or death.



CAUTION

Cautions are used when failure to observe instructions could result in significant damage to equipment.

The following symbols are intended to call your attention to two levels of hazard involved in operation:



WARNING

Warnings are used when failure to observe instructions or precautions could result in injury or death.

The information presented here is subject to change without notice.

1.0 Introduction

This manual provides information on installing and operating your Terra Universal Automatic Dispensers.

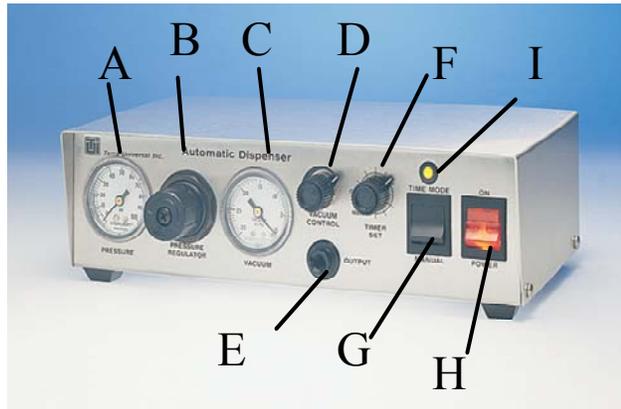
By studying this document carefully, you can be assured of a long, efficient service life from the unit.

2.0 Description

Terra's Automatic Dispensers provide precise, repeatable deposits in a wide range of microelectronic manufacturing applications, including die bonding and photoresist coating

Automatic Dispenser (Model No. 1200-00)

It administers fluids with a wide range of viscosities—from watery liquids to epoxies to thick pastes—within an extremely close tolerance without dripping between cycles. This precision and reliability help to reduce rejects and waste. A variety of disposable dispensing barrels and tips allow either dot or strip dispensing.



The unit incorporates a foot pedal for easy dispensing. The control features an adjustable venturi vacuum and an analog gauge, a solid state digital timer, and an enhanced solenoid for instant on/off response.

Before putting your Automatic Dispenser to work, take a few minutes to familiarize yourself with the controls and features of the unit.

Front Panel

- A. The Air Pressure Gauge indicates the pressure of the incoming gas that provides the force necessary to push the fluid out of the dispensing needle and to create the vacuum.

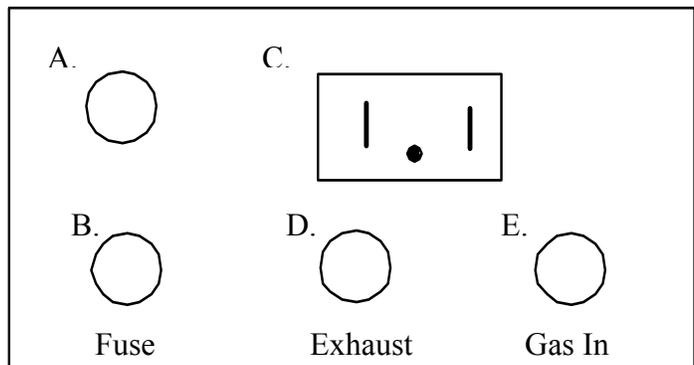


Automatic Dispensers

- B. The Air Pressure Regulator allows you to adjust the pressure of incoming gas. Varying this pressure will vary the size of dots dispensed. (Generally, the higher the pressure, the larger the dot.) The screw at the end of the regulator allows you to lock the regulator once you have made the proper setting.
- C. The Vacuum Pressure Gauge indicates the force of the vacuum generated by the system.
- D. The Vacuum Control lets you adjust the vacuum level generated by the system to allow precise dispensing of each particular fluid. (Fluids with a high viscosity generally require a lower setting than ones with a lower viscosity.) NOTE: The Series 400 Automatic Dispenser creates its own vacuum—no external vacuum supply is required.
- E. The Output Port on the front panel is for connection to the dispensing barrel.
- F. The Timer Set lets you precisely and automatically adjust the duration of dispensing.
- G. The Dispensing Selector Switch determines the mode of operation:
 - In Automatic time mode, fluid is dispensed for a preset time each time the foot pedal is depressed (the amber light indicates automatic mode);
 - In Manual mode, fluid is dispensed for as long as the pedal remains depressed.
- H. The Power Switch turns the unit ON and OFF.
- I. Time mode indicates when unit is in “Time Mode” operation.

Rear Panel

- A. The Foot Pedal Receptacle is a simple plug-connection for the foot pedal.
- B. The Fuse Holder houses the unit's 1/2-amp fuse.
- C. The Power Receptacle allows connection to a 115VAC/60Hz power outlet.
- D. The Exhaust Outlet bleeds exhaust out of the unit.
- E. The Gas Inlet is a quick-coupling that allows connection to your gas supply.



IMPORTANT APPLICATION NOTES:

- You can operate this system with either air or nitrogen. Whichever gas you use, you should make sure that your supply is properly filtered; a contaminated supply line can damage the Automatic Dispenser.
- The incoming gas line should be externally regulated if your in-house supply delivers gas at a high pressure. Ideal pressure for incoming gas is between 80-100 psi (lower pressures will reduce the potential vacuum of the



Automatic Dispensers

Automatic Dispenser). Many materials—especially low-viscosity materials—can be dispensed more easily and precisely if the unit is set at a high vacuum pressure.

The standard Automatic Dispenser (Cat. No. 1200-00) comes complete with a control unit, power cord, quick connect input, one 3cc barrel and barrel adapter assembly (other sizes can be specified), air output fittings, one each 18, 20, 21, 22, 23, 25, and 30 gauge stainless steel dispensing tips, a foot pedal with 8-foot cord, and an input voltage cord set. An assortment of optional barrel adapter assemblies, reservoirs, end caps, and dispensing tips are available.

Economy Dispenser (Model No. 1200-17)

The Series 200 Dispenser (Cat. No. 1200-17) includes all of the capabilities of the Automatic Dispenser described above except the automatic timer.

By adjusting the pressure regulator and switching the pressure on and off by means of the foot pedal, an operator can “eyeball” dispenser output to achieve the desired results.

Model No. 1200-17 includes a vacuum back-pressure function to enhance system effectiveness with low-viscosity fluids. By adjusting the vacuum pressure, you can counteract the force of gravity to assure even, controlled dispensing of liquids.

The system comes complete with a foot pedal with 8-foot cord, an input voltage cord set, air pressure regulator and gauge, vacuum air connection line with quick connect/disconnect fitting (to allow connection to supply line); one 3cc barrel and barrel adapter assembly (or other size specified), and one each 18, 20, 21, 22, 23, 25, and 30 gauge stainless steel dispensing tips.



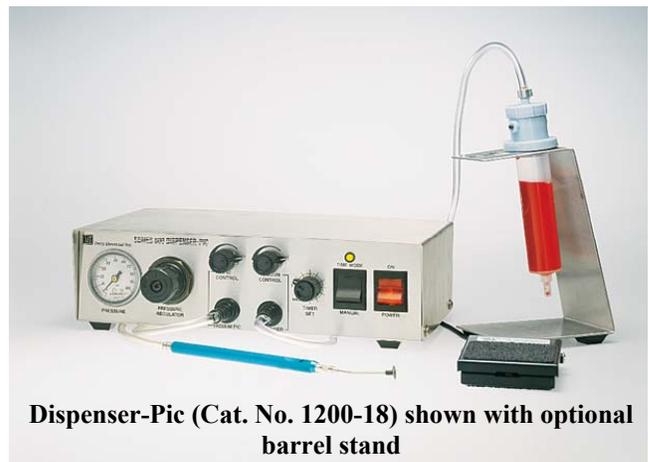
Economy Dispenser (Cat. No. 1200-17)
shown with optional barrel stand

Dispenser-Pic (Model No. 1200-18)

The Dispenser-Pic (Cat. No. 1200-18) includes all of the capabilities of the Automatic Dispenser described above, but adds a separate vacuum controller for a pick-up tool.

This additional venturi vacuum system lets you set the vacuum force for the components you're working with. An orifice on the pick-up tool controls vacuum; cover it while positioning parts, and uncover it to release them.

The complete ready-to-use system includes a controller with two adjustable venturi vacuum adjustments, a pressure regulator and analog gauge, a solid state digital timer, and an enhanced solenoid for instant on/off response.



Dispenser-Pic (Cat. No. 1200-18) shown with optional
barrel stand



The vacuum control lets you adjust the vacuum directed to the vacuum wand (or other pick-up tool); it can generate a vacuum of up to 26"Hg. The vacuum connector accommodates the vacuum wand (pick-up pencil) included with the unit, as well as other vacuum pick-up tools with the use of an adapter (call Terra Universal for more information).

The system also includes air output fittings, quick connect, one 3cc barrel adapter assembly (or other size specified), one each 18, 20, 21, 22, 23, 25 and 30 gauge stainless steel dispensing tips, a foot pedal with 8-foot cord, a vacuum pick-up tool with two angled tips and five cups, and an input voltage set.

3.0 Set-Up

1. Carefully unpack the Dispenser and check for any visible damage. All damage should be reported according to the procedures outlined on the shipping agreement. Make sure that you have received all items indicated on the packing list. Please contact Terra immediately if your order is incomplete.
2. Connect the AC Power Cord to the plug at the rear of the unit and to a 115VAC/60Hz outlet.
3. Plug the footswitch plug into the Foot Pedal jack at the rear of the unit.
4. Connect the hose barb end of the white Quick Connect plug to your house air line and then insert the other end to the white jack at the rear of the unit.



CAUTION: You should make sure that the incoming gas is properly filtered. Inflow of moisture or particles larger than 5 microns can damage the dispenser.

Incoming gas from your in-house supply should not exceed 100 psi, or damage to the unit could result. You should regulate incoming gas to between 80-100 psi with an external regulator. (Bear in mind that lower incoming pressure will result in lower vacuum pressure.) Set this pressure to 100 psi for low viscosity materials (otherwise, the system can't dispense uniform dots).

5. Press the POWER switch to the ON position.
6. Verify that the POWER lamp is lit.
7. Press the TIME MODE/MANUAL switch to the TIME MODE position (Models 1200-00 and 1200-18 only).
8. Verify that the TIME MODE lamp is lit.
9. Verify:
 - A. The PRESSURE gauge reading is 0 psi.
 - B. The VACUUM gauge reading is 0 Hg (no. 1200-00 only).
 - C. The TIMER SET adjustment is 0. (nos. 1200-00 and 1200-18 only).
10. Connect the barrel adapter tubing to the Quick Connect plug on the front of the unit (labeled "Dispenser" or "Output").
11. Attach the tip onto the barrel.
12. Fill the barrel up to the halfway point with water.



13. Insert the barrel into the barrel adapter. NOTE: Keep barrel tip facing down at all times.



CAUTION: These dispensers operate best when the barrel is 1/2 to 3/4 full. Never fill the barrel completely, or dispensing material may get on the barrel assembly. Operating the dispenser with the barrel nearly empty can result in uneven applications.

14. Adjust the PRESSURE REGULATOR knob on the front panel for a reading of 10 psi on the PRESSURE gauge. **NOTE:** You may now notice liquid dripping from the barrel tip if you are using a low viscosity liquid, like water.

15. To stop liquid from dripping from the barrel tip, slowly increase the vacuum by turning the VACUUM CONTROL knob counter-clockwise slowly until the dripping stops. **NOTE:** If the water in the barrel bubbles, the VACUUM CONTROL knob must be decreased slightly and the procedure repeated until the bubbling ceases.



CAUTION: Increase the vacuum pressure only as much as is necessary to stop the flow of the dispensing material. Increasing vacuum pressure too far will result in dispensing material being sucked back into the Automatic Dispenser resulting in possible damage to the unit. This danger is especially acute when you dispense fluids with a very low viscosity, such as water. If you see bubbles forming in the fluid, decrease the vacuum (by turning the control clockwise) until the bubbling stops.

16. For models 1200-00 and 1200-17, increase the TIMER SET knob, while pressing the footswitch, until the desired volume of liquid dispenses from the barrel tip. NOTE: If the barrel tip continues to drip liquid after the footswitch is released, the VACUUM adjustment is set too low and must be increased as in the above procedure.

17. You are now ready to dispense the liquid. For manual operation, place the selector switch in the MANUAL mode and press the foot pedal. The liquid will be dispensed as long as you keep the pedal depressed. For automatic dispensing, place the selector switch in TIME MODE (TIME MODE lamp will light), and set the timer for the time period you want. Each press of the foot pedal will activate the dispenser for a set period of time. Use a “trial and error” method with different timer settings to get a sense of how long and how much water is dispensed with each press of the foot pedal.



CAUTION: These dispensers can be damaged if low-viscosity fluids are allowed to flow backwards through the housing and into the dispenser itself. To prevent this from occurring, never lay the dispensing barrel down or tip it upward during dispensing procedures. Use Terra’s barrel stand to safely secure the barrel while it is not in use. Safety clips may be secured on the tubing to prevent backflows.

18. For Model No. 1200-18 only, connect the pick-up tool tubing connector to the “Vacuum Pic” opening on the front panel. Turn the “Pic Control” vacuum knob until the system produces adequate suction to hold the parts you are working with.

4.0 Operation

Exact gas pressure, vacuum and timer settings will depend on your particular application requirements and the viscosity of material you wish to dispense.

These operating tips provide some guidelines for precise, repeatable dispensing; study them carefully and experiment on a number of different materials (and with a number of dispensing tips). In very little time you should be able to determine the exact settings and dispensing tips to deliver the applications you require.

Gas Pressure Setting

The gas pressure setting determines the force with which fluids are dispensed.



You should regulate the gas pressure at a relatively low setting (about 10 psi) for your initial tests. Increasing the pressure increases the flow (and dot size) of the dispensing material.

The screw at the end of the regulator allows you to lock the regulator once you achieve the desired setting.

In general, you should use a lower pressure when dispensing low- viscosity fluids, and a higher setting for high- viscosity fluids.



CAUTION: When reducing the gas pressure, slowly turn the pressure regulator counterclockwise until the pressure gauge reads slightly lower than the desired pressure. Then turn the regulator clockwise to raise the pressure to the desired level.

Vacuum Control Setting (if applicable)

Some vacuum pressure is necessary when you dispense low-viscosity fluids (such as water). This vacuum pressure counteracts the force of gravity and keeps the fluid from escaping between dispensing cycles.

To set the vacuum pressure, follow the procedures outlined above. You should always begin with the vacuum pressure off (control knob fully clockwise) and then slowly increase the vacuum pressure until the fluid no longer escapes from the dispensing needle.



CAUTION: Never increase the vacuum pressure to the point that the fluid begins to bubble, or damage to the Dispenser could result.

Generally, no vacuum is necessary when dispensing high-viscosity materials.

Timer (if applicable)

The longer the dispensing cycle runs, the larger the deposit will be. You should experiment with the timer to achieve a deposit of the size you require with the particular needle and pressure settings you have selected.

Generally, you should set up your system to accommodate as short a pulse time as possible when depositing dots.

For strip deposits, use the “manual” dispensing mode. Press down on the foot pedal for as long as necessary to dispense the amount of material you require; then use the needle to “draw” the bead of fluid.

Dispensing Tips

The larger a dispensing tip, the greater the amount of material that will be deposited with each cycle. In regulating the deposit size, try to use as large a tip (and as short a deposit time) as possible.

For best results, hold the tip at approximately a 45-degree angle while dispensing.

Make sure that both dispensing tips and the dispensing barrel are clean. Dispose of dispensing needles after use.

NOTE: The barrel assembly incorporates an O-ring, which is necessary to maintain a tight seal. You should lubricate it periodically and replace it if it loses its softness or becomes contaminated.

Guidelines for Specific Applications Adhesives

The Automatic Dispenser handles fluids with a wide range of viscosities, from watery liquids to thick pastes. It's better to use a small tip size to control “stringing”; you can also dilute the adhesive with an appropriate solvent.



“Instant” Adhesives (Cyanoacrylates) and Anaerobics

When handling these materials, make sure that you avoid skin contact and do not allow the material to be sucked into the dispensing unit. This substance hardens so quickly that if it is drawn into the unit, it will severely damage it. When changing tips, use a clip on the barrel line to prevent the possibility of backflow.

Do not allow the material to bubble, or the resulting fumes could be sucked into the dispenser and cause damage. Some bubbling of anaerobics will not hurt the dispenser but could result in uneven dispensing.

Dispense cyanoacrylates in very small dots, using a minimal amount of material. You will need to change barrel tips frequently; keep in mind that dry tips are less likely to clog than moist ones.

Solder and Brazing Pastes

Keep in mind that these materials usually contain minute air pockets, so you must take special care not to trap any additional air while loading. Trapped air can result in material extruding from the barrel after a cycle is complete; for this reason, you should not use a piston to dispense these materials unless they are specifically formulated to prevent separation.

Silicons/RTV

These materials are generally cured through a process in which a solvent mixed into the substance evaporates into the surrounding air.

You can retard this evaporation (and slow hardening) by using nitrogen in the Automatic Dispenser or by using a piston as a barrier between the material and the air used to drive the dispenser. (In the latter case, you must avoid trapping air with the material, or post-cycle extrusion will result.)

Solder Resist/Solder Mask

As with Silicons, these materials are often cured through a solvent evaporation process (see description above). This hardening can be prevented through the use of nitrogen or by isolating the material from the air.

Epoxies

Dispense single-component epoxies as you would any other material. When dispensing dual-component epoxies, you must keep in mind that the viscosity decreases as the material hardens; you will therefore need longer dispensing times (and possibly a larger dispensing tip) to dispense the same amount of material. To avoid the need to change control settings, place only as much epoxy in the barrel as you can dispense before hardening begins to occur.

5.0 Troubleshooting

When operated according to these instructions, the Terra Automatic Dispenser should provide years of trouble-free service. These troubleshooting tips are intended to help you make the proper adjustments to your system to achieve the results you require. If you experience some trouble not discussed here, contact Terra Universal.

PROBLEM: Unit won't start.

POSSIBLE SOLUTIONS:

1. Check the power connections on the rear panel and at the power outlet. Make sure the unit is turned on.
2. Check the fuse, and replace if necessary.



CAUTION: Always disconnect the power before attempting to change the fuse.



PROBLEM: Deposits are uneven.

POSSIBLE SOLUTIONS:

1. Make sure the barrel is at least half full during dispensing. Deposits may be uneven when the barrel is nearly empty.
2. Make sure that the timer, pressure, and vacuum settings remain constant from one application to another.
3. If you require large deposits, vary the control settings so that you can dispense with the shortest pulse time possible. Generally, a higher pressure setting and larger dispensing tip will allow you to reduce the dispensing time.

PROBLEM: Fluid leaks from the dispensing tip between dispensing cycles.

POSSIBLE SOLUTION:

If you are using a low-viscosity fluid, increase the vacuum pressure slowly until the leaking stops.

PROBLEM: Dispensing dots are too small, or clotting occurs.

POSSIBLE SOLUTIONS:

1. First, try increasing the gas pressure.
2. Select a larger dispensing tip. This is especially important if you are using a filled material (such as conductive or aluminum-filled epoxy). The manufacturer specifications for the dispensed material should indicate the appropriate needle gauge.
3. If neither of these adjustments seems to be the problem, try increasing the dispensing time.

PROBLEM: Dispensing dots are too large.

POSSIBLE SOLUTIONS:

1. First, try reducing the dispensing time.
2. Reduce the gas pressure.
3. Select a smaller dispensing needle.

6.0 Specifications

Automatic Dispenser (No. 1200-00)

Dimensions:	11"W x 3"H x 6.5"D
Weight:	5lb. 7oz.
Power Required:	115VAC/50/60Hz, 7 watts
Foot Pedal Voltage:	24 VDC
Air Input:	No greater than 100 psi. Lower pressures reduce the vacuum.
Timing Range:	0.01-1.0 second
Mode:	Manual or Automatic Cycling (Control by foot pedal)
Air Inlet Pressure:	80-100 psi
Air Outlet Pressure:	1-100 psi

Economy Dispenser (No. 12900-17)

Dimensions:	7.5"W x 3"H x 6.5"D
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Automatic Dispensers

Weight: 4lb. 3oz.
Power Required: 115VAC/50/60Hz, 7 watts
Foot Pedal Voltage: 24 VDC
Air Input: No greater than 100 psi. Lower pressures reduce the vacuum.
Mode: Manual Cycling (Control by foot pedal)
Air Inlet Pressure: 80-100 psi
Air Outlet Pressure: 1-100 psi

Dispenser-Pic (No. 1200-18)

Dimensions: 11"W x 3"H x 6.5"D
Weight: 5lb. 7oz.
Power Required: 115VAC/50/60Hz, 7 watts
Foot Pedal Voltage: 24 VDC
Air Input: No greater than 100 psi. Lower pressures reduce the vacuum.
Timing Range: 0.01-1.0 second
Mode: Manual or Automatic Cycling (Control by foot pedal)
Air Inlet Pressure: 80-100 psi
Air Outlet Pressure: 1-100 psi



7.0 Warranty

Products Manufactured by Terra: Terra Universal, Inc., warrants products that it manufactures to be free from defects for a period of 12 months for parts and 90 days for labor, commencing from the date of shipment. Terra's sole responsibility is to repair or replace, at its option, any part of the product that proves defective or malfunctioning during this time limit. In some cases, components incorporated in Terra Universal products are covered by additional warranties from component manufacturers; obtain specific information from Terra sales representatives. This warranty is void if the equipment is abused or modified by the customer, is operated outside Terra's operating instructions or specifications, or is used in any application other than that for which it is specified. This warranty does not include routine maintenance or service procedures, breakage of quartz baths after 60 days, shipping damage, nor damage from misuse, intentional or unintentional abuse, neglect, natural disasters, or acts of God.

Products Manufactured by Others: Terra Universal, Inc., warrants that, to the best of its ability, Terra's representations of products that are manufactured by others reflect the manufacturer's representations, subject to change without notice. Sole warranty for these products is the original manufacturer's warranty that is passed forward to the purchaser and constitutes the customer's sole remedy for these products. Detailed warranties for distributed products are available through Terra sales representatives.

Freight Shortage or Damage: Upon receipt of any equipment from Terra Universal, Inc., customer shall immediately unpack and inspect for damage or shortage. The customer shall not accept a damaged package or a short shipment until the carrier makes a "damage or shortage" notation on both the carrier's and customer's copy of the freight bill or delivery receipt. Service title passes when the shipment is loaded, so customer is responsible for filing and collecting a freight claim. Any replacement products must be ordered and paid for separately. For Terra's "Policy and Procedures for Returning Goods," see Terra's Internet site: www.TerraUniversal.com.

Generally, customers can improve the chance of collecting on a freight claim by following these procedures: 1) formally requesting that the carrier inspect the shipment immediately upon suspecting damage or shortage to verify condition; 2) notifying the carrier upon discovery of concealed damage and requesting an inspection within 15 days of receipt, both in person or phone and following up via mail; 3) keeping the shipment as intact as possible, including retaining original packaging materials and keeping the product as close to the original receiving location as possible; 4) holding salvage for disposition by the carrier.

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Warranty Returns: All warranty returns must be authorized in advance by Terra Universal and approved under an RMA. Unless approved in advance for good reason, all returns must be in original condition, including all manuals, and must be packaged in original packaging materials. All returned goods are to be shipped to Terra Universal, freight prepaid at customer's expense. See Terra's "Policy and Procedure for Returned Goods."

**Thank you for ordering from
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