

PIPE DEBONDING TOOL 4" TO 12" MODEL

LARGE PROPANE DEBONDER

UNGLUES PVC, CPVC, & ABS PIPE

A Product of Debonding Systems, Inc.
PVC Pipe Debonder

Operating Manual

Warnings

Read and understand this entire manual and your employer's safety procedures before operating or servicing this tool. **CAUTION: The burner reaches temperatures over 1000 degrees F and can cause severe burns or ignite flammables. After a heating cycle, the burner and surrounding metal parts remain above 120 degrees for several minutes and if touched, will burn flesh. Make certain that the burner, gas mixing chamber, and other metal parts of the Debonder are not allowed to touch any flammable material or contact the operator until it has cooled. Do not put a hot debonder in the tool box until it has fully cooled.**

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Record the following information for warranty purposes.

Where purchased _____

Purchase date _____

Serial no. _____

The pipe debonder removes a broken piece of PVC, CPVC, or ABS pipe from any fitting it is glued into without requiring that the fitting be replaced or the manifold it is attached to scrapped or rebuilt. Using a process of tightly controlled heat, the original bond will loosen and the old pipe can be removed without any damage to the fitting allowing a new joint to be made with the integrity of the original glue joint. This saves the fitting and most of the labor to replace it. A broken pipe near a tee can be repaired using one coupling, a short piece of pipe, and three glue joints. The alternative requires 3 couplings (or unions), 3 pieces of pipe, a new tee, and 9 glue joints.

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Section 1: Introduction to Pipe Debonding, a new technology

Debonding Systems, Inc. is the world leader in PVC Debonding Technology. Debonding Systems developed the concept of an automated system that allows solvent cement welded PVC pipe to be removed from PVC fittings without damage to the fitting. Beginning in 2005 and through years of testing and development, The Large Pipe Debonder Tool has been developed and brought to market allowing PVC, CPVC, and ABS piping systems to be repaired easily and quickly saving complex manifolds from having to be rebuilt when one pipe breaks. The Large Debonder Tool can salvage any glued fitting from 4 inch to 12 inch, any schedule (wall thickness). The Large Debonder is a robust, industrial grade tool.

Debonding Systems also manufactures a mid size electric Debonder that debonds 4 and 6 inch schedule 20, 40, & 80 pipe at a much lower cost than the Large Debonder Tool. In addition, a Small Debonder Tool, called the Toilet (Closet) Flange Repair Tool is available that debonds all schedules of PVC, CPVC, and ABS from ½ inch to 3 inches plus 4 inch ABS toilet flanges.

Plumbing contractors who have a boneyard of expensive fittings such as flanges, valves, sensors, etc. that have been saved, but cannot be used, now have a way to salvage and reuse these otherwise wasted parts and inventory.

Debonding Systems has debonded the same fitting as many as 100 times without damage to the fitting. Schools now have a way to actually build 10 and 12 inch piping systems economically by not only teaching how to build them, but to actually build them in class. Not only is that beneficial, the students can now learn how to take apart glued fittings and reuse expensive fittings, something never before possible! Even high school students are now learning how to build and repair large PVC piping systems with the latest technology. Plumbers of the future will have this new technology when they enter the workforce.

Customers who have had deformed pipe ends from being stacked for years outdoors use the Debonder to re-round the pipe simply by heating it and allowing it to go back to its natural round shape.

Diagram 1

- 1—Debonding tool
- 2—Key pad & display
- 3—Power cord
- 4—Extraction tool

Diagram 2

- 2-3—Key pad and display
 - a. Schedule - selects wall thickness (schedule) of broken pipe
 - b. Diameter - selects size (diameter) of broken pipe
 - c. Start - tells the control unit to immediately begin a heating cycle
 - d. Off - stops heating cycle and powers off the control unit

Section 2: Safety Precautions – Read before use

1-1: Pipe Debonding General Hazards

- Only qualified persons should operate, maintain, and repair this unit.
- Prepare the work area so that you have a safe place to hold the Debonder during the heating cycle and identify a place to put it after heating and during the pipe removal process. Depending on the size of the pipe, cycles can take up to 10 minutes.
- Check Debonder for damage before each use. The Debonder is designed to be robust and needs little maintenance.
- The control unit key pad is not waterproof.
- When the power cord is plugged in, the Debonder automatically is switched on.
- Do not use if Debonder is damaged or not completely functional.

1-2: Fire Hazards

- Hot parts can cause severe burns. **Do not touch hot parts!** Allow up to 20 minutes cooling period before servicing heater head.
- Never touch burner to see if it is hot. The burner reaches temperatures that cause severe burns within 5 seconds of cycle start. The burner can cause combustibles to catch fire – liquids or solids. In addition, all of the metal parts on the Large Debonder heads get hot during a debonding cycle and wearing heavy leather gloves is required to protect hands from burns.
- All of the metal parts on the Large Debonder heads get very hot during debonding cycles. Wearing heavy leather gloves is required to protect hands from burns.
- Be sure there is no combustible or flammable material in the work area. Any material that cannot be removed must be protected.
- Use in a well ventilated area. Heating PVC, and more so, CPVC to its softening point may cause limited scorching to the inside of the pipe being removed. If this happens, some smoke may be evident. Do not breathe this smoke. Use a fan to remove vapors or wear respirator approved for smoke and organic vapors if needed.
- Keep a fire extinguisher nearby.

1-3: Protective Clothing and Gear

- Wear safety glasses with side shields when using unit.
- Avoid breathing smoke or vapors produced by the Debonder during use.

1-4: Work Area

This is a propane fired gas device. Do not use in explosive atmospheres, such as flammable liquids, gases, or dust. Replace damaged gas hose.

Section 3 Care of Unit – Read before use

2-1: Maintenance

Other than replacement of the gas hose and straightening bent extraction tool prongs, all repairs should be performed at the factory. If used in the rain, dry off with towel before storage and leave the lid to the case open until all moisture evaporates. Store unit only in a dry condition.

2-2: Cleaning

- To remove soil, use only a damp cloth to wipe unit down. Unit will not rust as it is made of anodized aluminum and stainless steel.
- Discoloration of the burner and heat guards is normal. Scrape off any melted PVC that sticks to the element to prevent smoke during next heating cycle.
- The use of any abrasive material will damage the finish on the parts.
- Do not use any organic solvents to clean as they may damage the unit, particularly the key pad. Remove oil and grease with a dry cloth.
- Do not flood or immerse control unit or key pad. They are not waterproof.

2-3: Repairs

- If the Debonder unit needs repairs, contact the factory to see if the problem can be solved by phone. If it can't, an RMA will be issued for returning it, freight paid, to the factory for service. The Debonder unit cannot be repaired in the field. Contact information is found in section 6 at the back of this manual.

Section 4: Statement of Warranty

Limited warranty: Debonding Systems, Inc. (hereinafter "Debonding") warrants that its products will be free of defects in workmanship or material. Should any defect in workmanship or materials occur within 24 months of purchase, the defective item should be returned to Debonding for evaluation and repair, prepaid by Customer. Should Debonding determine that defective material or workmanship is valid, Debonding will replace or repair the defects at no charge to Customer. Return freight to Customer will be paid by Debonding. Should Debonding, in its sole discretion, determine that the defects were caused by abuse, neglect, or misuse of the item not in accordance with this manual, Debonding will alert Customer of cost to repair or replace damaged unit and require Customer approval to do the repairs before proceeding. If Customer does not approve the repairs or does not respond within 30 days, Debonding will return the unit without repairs to Customer. This warranty is exclusive and is in lieu of any warranty of merchantability or fitness for a particular purpose.

Limitation of liability: Debonding shall not under any circumstances be liable for special or consequential damages, such as, but not limited to, damage or loss of purchased or replacement goods, or claims of customers of distributor (hereinafter "Customer") for service interruption. The remedies of the Customer set forth herein are exclusive and the liability of Debonding with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any

goods covered by or furnished by Debonding whether arising out of contract, negligence, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based.

This warranty is invalid if replacement parts or accessories are used which may impair the safety or performance of any Debonding product.

All parts are warranted for 24 months from the date of purchase.

Section 5: Detailed Step-by-Step Operating Instructions

1. Gain access to fitting with the broken pipe. Leave enough room around fitting so heating unit can be aligned with broken pipe. Heating head must be able to fit inside the broken pipe so that it is centered by orange centering clamps.
2. Obtain a short section of the size pipe you are going to debond. Have it available at the debonding site for possible use after the cycle is completed if the roundness of the debonded fitting is in question. Instructions for how to do this are found later in this document.
3. Cut off broken pipe so that it sticks out from the fitting 1/4 to 1/2 inch. Do not cut flush to fitting end or extraction is more difficult.
4. Drain or remove liquid (wires, if conduit) from fitting. Once pipe is dry you may proceed with removal.
5. Make certain there are no flammable liquids or gasses in the pipe system. If so, block the legs of the pipe system with appropriate means. Remember to remove these blocks after the pipe is debonded and before the repair is completed. Damp towels work well. **CUSTOMER IS RESPONSIBLE TO DETERMINE THE CORRECT AND SAFE SOLUTIONS FOR ANY POTENTIALLY HAZARDOUS SITUATION.**
6. Remove the controller module from the case.
7. Screw the gas bottle into the piping system of the controller by removing the Velcro strap and tilting the whole piping assembly out to the front far enough to align the threads of the bottle with the fitting. Reattach the Velcro strap around the gas bottle.
8. The gas hose is 5 feet long. Determine where to put the controller near the fitting to be debonded such that the hose will reach.
9. Remove the Debonding head required for the job. There are two heads, the small one on the right is for pipe sizes 4" to 6". It comes completely assembled.
10. The large head is for sizes 8" through 12". The large head is packed in the case in two pieces, the burner assembly and the guard. Once both are removed from the case, attach the guard to the burner assembly on the side of the large plate without the Debonder logo. It threads into the burner bearing rods with self retained thumbscrews. When installed, the heat shield should be up when the Debonder logo is up. The heat shield protects from overheating the back of the fitting and also overheating the fitting at the 12:00 position (on horizontal debonds). It is not used for vertical down debonding.
11. Remove the gas hose from the lid of the case and attach it to the controller unit and to the debonding head. Be extra careful not to let the hose ends get in the dirt or the carburetor gas orifice could plug and render the unit inoperative.

12. Adjust the head clamps to the size of pipe to be debonded. Pulling up on the roll pin on the clamp allows the clamp to slide on the rail to 2 to 4 positions. On the large head, the outside position is for 12" pipe and the inside position is for 8" pipe. Verify that the latch on the clamp at the 2:00 position is open by slightly pulling up on the orange knob under the right handle and moving the handle clockwise. Back out the three sharp screws in the clamps so the head will fit over the fitting.

13. Now attach the Debonding head to the fitting to be debonded. Center the head in the fitting and tighten the sharp screws until they contact the fitting. Then move the right handle by pulling up the orange knob under the handle and moving the handle towards the center of the head. It moves about 1 inch. Don't stretch the springs.

14. Fine adjust the sharp clamp screws until the head is centered both left and right and up and down. Check that the mounting is secure on the fitting and that the head won't come loose during the cycle.

15. Press the "1" key on the controller. The controller boots up and the display will scroll "PIPE dEbondEr".

16. Select the schedule (wall thickness) of the broken pipe (not the fitting) by pressing the key with the curved line between arrow heads. Press the key again until the proper schedule is displayed on the screen. The choices are:

- P 20 for Schedule 20 PVC
- P 40 for Schedule 40 PVC
- P 80 for Schedule 80 PVC
- C 40 for Schedule 40 CPVC
- C 80 for Schedule 80 CPVC

17. Pressing the schedule key again advances to the next choice in the menu. The schedule on the display is the one selected.

18. Select the pipe size of the broken pipe by pressing the circle with radial arrows key repeatedly until the proper diameter is displayed. The first selection is 4". Pressing the pipe size key again advances to the next size in the menu up to 12". The diameter on the display is the one selected. Note that measuring the pipe diameter could lead to selecting the wrong debonding cycle because the measured pipe diameter is always larger than the actual pipe size.

19. Make sure the burner is pulled back on its slides to be completely outside the pipe to be debonded. Do this by pushing down on the wire spring on the right side of the burner assembly and sliding with only your right hand.

20. Pick up the lighter, press the solid green circle key to start the cycle. Immediately use the lighter to light the burner. It should ignite within 2-3 seconds.

21. In very windy situations, you may have to protect the burner from blowing out until it gets hot. This takes about 30 seconds.

22. The display reads :30 indicating 30 seconds for the warm up phase. Also, as soon as the green start key is pressed, the blue light in the controller comes on indicating that the solenoid valve is open and the gas is flowing.

23. Check that all windows in the burner have a blue flame initially that quickly turns to glowing red / orange after a few seconds. Relight any window that is not glowing.

24. When the ignite cycle has counted down to zero, immediately push the locking spring on the mixing chamber down and slide the burner fully into the pipe. Push the burner in only with the right hand or it may bind and be difficult to slide. The debonding

cycle starts and the display will show the total minutes required for the cycle. For cycles longer than 10 minutes, only the minutes display until the count down timer goes under 10 minutes and the minutes and seconds display the time remaining in the cycle.

25. If there is a wider gap around the large plate than $\frac{1}{2}$ ", or if there is high wind, or if there is high air flow in the pipe system, heat will be extracted from the process and debonding may not be successful. In these conditions, block the pipe from heat loss with non-flammable materials such as wet towels, etc. Putting a wet towel around the gap between the pipe and the large plate stops most heat losses.

26. During the cycle, noises come from the gas regulator motor as it automatically adjusts the gas pressure to match the cycle selected. It automatically compensates for temperature effects and gas bottle pressure changes. The display counts down to zero at which time the heating part of the cycle is complete. When this happens, the Debonder beeps, the display flashes "0:00" for several seconds and then reads donE.

27. During the heating cycle, some smoke is produced. Do not breathe this smoke. Be certain there is ventilation. Stand up stream from the smoke.

28. If excessive smoke is produced, the heater head is likely positioned off center. Stop the cycle by pressing the red key, remove the head and inspect the ID of the pipe to see where it is scorched. If scorching is all around the pipe, the wrong cycle may have been selected.

29. If scorching occurred primarily in one position, re-insert the head to align in the center of the pipe left to right and slightly below center up and down. Restart the cycle. Because the cycle was partially run, the second cycle will complete before the timer runs to zero. Use "TEST" procedure from step 31 to know when to stop the 2nd cycle.

30. If at any time during the cycle, the burner flame goes out, use gloves to slide the burner out of the pipe and relight. Slide the burner back into the pipe as soon as it relights.

31. When the cycle is approximately 75% finished, follow this "TEST" procedure to determine when the pipe is ready to be extracted.

"TEST" the softened pipe at the 3:00 or 9:00 position by pushing the extraction tool into outside wall of the pipe that protrudes from the fitting. Push it towards the center of the pipe to separate it from the fitting. The pipe should dent easily, but when it is ready to remove, it should be relatively easy to separate at that spot. Ready to extract occurs when the pipe easily separates at 9:00 or 3:00 on horizontal debonds. This should happen at the end of the programmed cycle.

32. Sometimes the pipe is ready before the cycle times out. Experience will tell you when it is best to debond early. Extremely cold conditions or where there is high wind or high air flow in the pipe can cause too much heat loss so the pipe doesn't get hot enough during the programmed cycle. If this happens, simply run another cycle of the same size (or next size smaller) and same schedule and use the "TEST" to know when to stop the cycle.

33. When you are satisfied that the pipe is ready to be debonded either by passing the "TEST" or the cycle timer decreasing to zero, release the clamp by pulling slightly up on the orange knob under the right handle and rotate the handle to the right. Gently remove the Debonder head from the pipe and set it in a safe place to cool down where it won't burn or melt anything. The heater will stay hot enough to burn skin for about 10 minutes.

34. When the pipe is ready to be removed, separate the pipe from the fitting by pressing the extraction tool into the pipe at the 11:00 or 1:00 position (just offset from the hottest spot) until you have separation 1-2 inches down into the glue joint. With the second prong of the

tool inside the pipe, parallel the extraction tool with the pipe and push it into the gap as far as you can. Then pry the pipe away from the fitting deeper into the glue joint by the bullet tip pushing against the pipe. Then push the extraction tool deeper into the joint. Continue this procedure until the prongs of the extraction tool are completely through the pipe and the body of the extraction tool touches the end of the pipe. Do not pierce the pipe with the extraction tool. Be careful not to scar or gouge the fitting wall. The extraction tool is inserted near the top of the joint because heat rises and the top, being the hottest, is where the pipe is the softer and therefore easier to separate. This makes the insertion of the extraction tool easier. The reason the extraction tool is not inserted at 12:00 is because the top is the softest, the pipe wall is the most prone to tear at that point. For horizontal debonds of ABS pipe, insert the extraction tool at 3:00 or 9:00 for better results.

35. Keeping the extraction tool parallel to the pipe, pull the handle out from the knuckle and bend the tool 90 degrees. Slide the handle to the stop to create a double handled wrench like a cross shaped tire iron. Rotate the extraction tool to wind up the softened pipe around the extraction tool and remove the broken piece of pipe. While rotating the extraction tool, keep the prongs straight into the pipe so the pipe wraps straight on itself. This keeps from scratching the fitting wall.

36. If the pipe tears during extraction, reinsert the extraction tool a few inches away and try again, but turn slowly enough that the pipe doesn't tear. If it still tears, the pipe likely isn't hot enough and will need more heat to release. Push the pipe that has been separated back into place as best you can so the debonder head will fit inside the pipe again and run a new cycle until the "PASS" test is successful. Insert the extraction tool in a new location away from the tear.

37. If the extraction tool won't insert all the way in, the pipe is too cold to debond. Make sure the heat shield on the end of the burner is mounted properly for the size pipe being debonded. Re-run the cycle.

38. If the fitting roundness is questioned, insert the cold piece of pipe from step 2 approximately 1/2" into the fitting to hold it round while it cools.

39. You may stop the cycle at any time by pressing the red key. This turns off the flow of gas and turns off power to the controller.

40. You generally have about one minute to extract the pipe after the cycle ends. If you take too long to insert the tool and break the joint, the pipe will cool and you will have to use another cycle or part of one. To do this, simply begin another cycle and use the removal tool to TEST readiness for removal.

41. If the fitting softens and flexes during extraction, too much heat has been applied. Generally extraction is very easy when this happens, but the round shape of the fitting is distorted. This usually happens when debonding schedule 80 pipe from a schedule 40 fitting. However, the fitting wants to go back to round and if you follow step 38 immediately after removal, you can usually make the fitting usable.

42. If the removal tool gouges the fitting joint surface, there is risk that the repair will leak thru the gouge. It is advised to remove that fitting and replace it. Be careful to insert the removal tool in such a way that the pipe gets scarred, but not the fitting inside surface. If the prongs are parallel to the pipe when inserted, no scarring will occur.

Section 6: Extreme cold and when the cycle isn't sufficient to debond.

Time is a more important factor in determining the proper heating cycle than temperature of the heater. If the set cycle doesn't allow the joint to be debonded, it is better to select a longer cycle (usually the next schedule of the same pipe size) than it is to select a hotter cycle (a larger pipe size). CPVC cycles require more heat than ABS and PVC. In the case of SCH 80, CPVC you don't have any choice but to go to the next larger size, but stay with SCH 80 and test for separation before the cycle is completed.

In extreme cold conditions or where there is significant air flow in the fitting to be debonded, restricting air flow in the pipe system will increase success. Also, wrapping the opening between the debonder and the pipe with non-flammable insulation will improve results. A wet towel works well for this purpose.

Section 8: Basic Troubleshooting Guide.

1. Burner will not shut off.

Disconnect battery at once and unscrew gas bottle from controller.

Defective control unit.....Return to factory for repair.

Important message:

Do not use the Debonder until this problem is fixed. The factory will test the control unit to determine the cause of the failure and will repair or replace the unit.

2. Blank display

Battery too low on charge.....Recharge battery

Battery not fully seated in holder.....Seat battery

3. Cycle time doesn't count down.....Press red key and restart cycle

4. Pipe doesn't get hot enough to debond.....Try next larger size pipe cycle

5. Burner blows out.....Protect burner from wind and relight

6. Control unit or heater head gets dropped in water or other liquid

- Towel dry
- Remove keypad lid with 4 phillips screws.
- Drain out any liquid inside enclosure.
- Blow with compressed air any remaining liquids or dusts from the circuit boards in the enclosure.
- Inspect for any corrosion. Remove any corrosion with dry toothbrush. Allow to air dry for twenty-four hours with cover open.
- Replace enclosure top making sure no wires get pinched.
- Remove battery from holder and completely dry battery connections.
- If unit fails to operate, return to factory for repair.

7. Unit gets dropped in organic liquid or solvent (i.e. gasoline, kerosene, alcohol, diesel fuel, oil etc.)
- Disconnect battery immediately.
 - Return to repair center for repair or replacement. Do not use until the unit has been checked out and repaired. The unit could burst into flames. Do not try a cycle unless you are certain no flammable is on or in the controller other than the gas bottle.
8. Unit gets dropped on hard surface, run over by vehicle, caught in door etc.
Send to factory if not 100% sure of safety. This unit very durable, but it can be damaged and may not work properly if dented or smashed. If unsure of safety, return to factory for repairs.

Section 9: Contact Information for Debonding Systems, Inc.

- Order units
- Order parts or accessories
- Report trouble with your unit
- Return your unit for repairs
- Offer suggestions
- Ask questions about other model debonders such as Toilet (Closet) Flange Repair Tool
- Have interest in becoming a dealer for Debonding tools

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