

LASER INSTALLATION MANUAL

BERG COMPANY

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Berg Part Number: 5202002

Revision : 1.00 August, 1990

Printed in U.S.A.

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BACKGROUND

Berg pioneered the liquor control system industry by patenting the first trouble-free time pressure system to deliver accurate portions. The Laser™ series, based on the same patented engineering breakthroughs, is the best system in the business in performance and communications capabilities. The reliability of this system stems from more than twenty years of field experience with thousands of units in operation.

In today's economy, there's no longer room for spills, overpours, unauthorized free drinks, or bar clutter. Berg systems eliminate those problems and deliver current information on day-to-day profitability to help managers run their operations more efficiently than ever before. The Laser system provides top performance in comfort, convenience, and dependability . . . from the sleek, hand-held dispenser with smart electronics to the simple, rugged delivery system. Never before have so many features been offered in a single system at such an affordable cost.

Berg's Laser system combined with Laser-TRAK or Infinity software permits space-age management control. From station dispensing to total control, the Berg Laser system combines proven liquor management principles with the very latest in technology.

INTRODUCTION

This manual will show you how to install and operate the Berg Laser system. Read this manual **before** you begin installation. It contains the experience of hundreds of installations by scores of installers. We guarantee you'll save yourself a great deal of time by reviewing what we've included here.

Use this manual to walk yourself through the installation step by step. Before you start installing anything, we'll take you through a pre-installation checklist of items you should review before drilling holes or cutting tubing.

We'll start actual installation in the back room by covering the rack mounting system. We'll then install the pumps and connect them to the reserves in the wall mount system. We'll then install the air delivery system including the air compressor, regulator, and air solenoid blocks.

You'll then leave the back room to run tubing and solenoid cable. After that, you'll be working at the stations themselves, installing dispensers and setting up the control unit. Next you'll go on to run the electronic pre-checks.

You then load the reserves in the back room. When the liquor is loaded, you'll see how to set up the line, including setting the regulator. Finally, you'll establish drink sizes and set counters. After a final test, it's all clean-up -- dressing tubing and wires. Finally, there's a section covering basic maintenance and trouble-shooting.

OPERATIONAL OVERVIEW

The Laser System operates on the time and pressure principle. When you select a brand, an air solenoid pressurizes a specific liquor pump. A mechanical valve in the pump closes to prevent pressurized air from entering the bottle reserve. A meter liquor solenoid then opens in the dispenser to allow liquor to flow out of the pump, through the tubing, and to the dispensing point. When the timer times out, the solenoids close. The valve in the pump opens to let the liquor in the bottles refill the pump by gravity.

The bottles empty in sequence because of the slight incline from bottle to bottle.

You may add mechanical counters to the system, or you may enhance the system with Laser-TRAK or Infinity to create computer-generated managerial reports.

PRE-INSTALLATION



"READ THIS SECTION OF THE MANUAL BEFORE ORDERING AND INSTALLING A LASER SYSTEM."

Before ordering a system from Berg, the distributor or salesperson will meet with the buyer to determine just how the system can work best at his or her particular site. Each site is different, and it takes experience to lay out a system for optimal performance. This Pre-Installation Section is the result of this experience. Read it carefully before beginning any installation.

The distributor or salesperson should sketch out the system requirements and order the components from Berg. As installer, your responsibilities are to check the salesperson's schematic and make sure that the material received from Berg complies with the layout requirements. If you're missing any components, call us before you go on-site for installation and we'll get them to you.

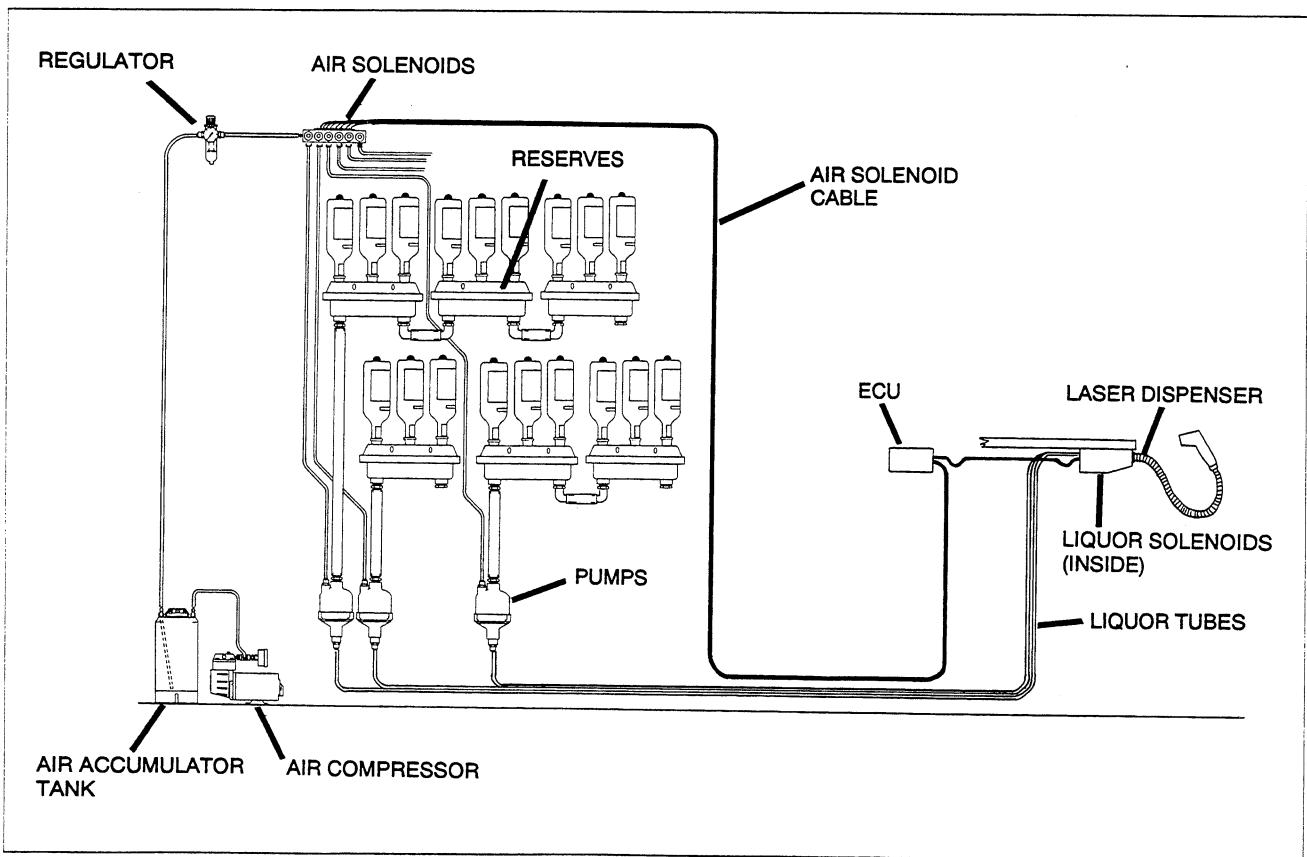


Figure #2 - 1 : Basic system schematic

LASER DISPENSER LOCATION

Locate the Laser dispenser near an ice bin, but where ice won't be resting against the dispenser.

Locate the dispenser within 8-1/2 feet of the ECU (Electronic Control Unit). 10-foot cables are standard. We also offer optional 25-foot cables (PN 8007942), see figure 2 - 2.

Plan it so the bartender can reach the soda gun and liquor gun with opposite hands at the same time.

Look for a strong, thick counter top for supporting the dispenser.

Allow 6" of clearance in back of the dispenser so the tubing can bend without straining the fittings. Use elbows where you don't have 6" of working room. We recommend that you position the dispenser so that the bar overhangs it by a half-inch. This will help keep the dispenser dry.

Allow space to run cables and tubing.

Don't locate the unit where the flex hose can drape over frequently used bottles or across the ice bin.

Leave space for the gun holder.

Avoid dishwashers and other high moisture areas.

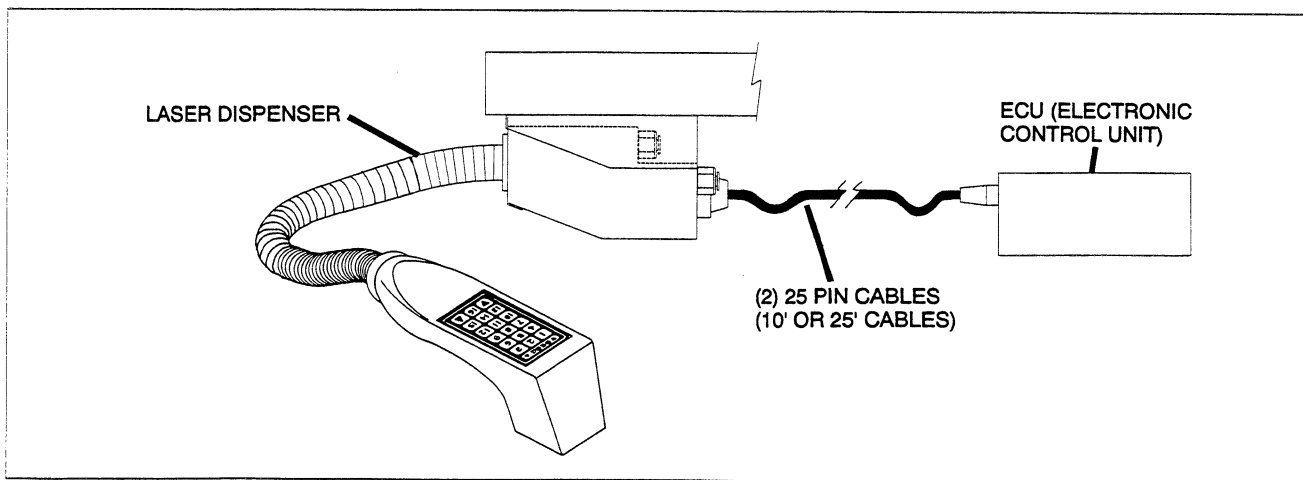


Figure # 2 - 2 : Station components

ELECTRONIC CONTROL UNIT(ECU) LOCATION

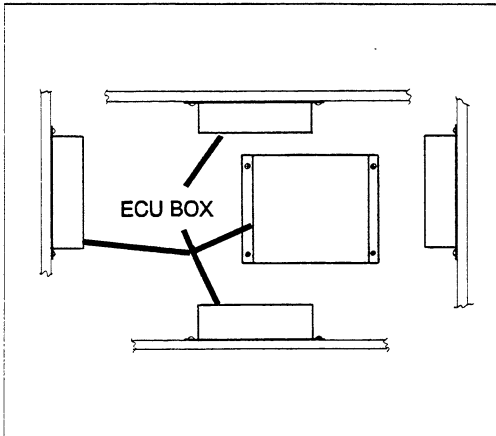


Figure # 2 - 3 : Possible ECU mounting considerations

Locate in a dry area off the floor.

Locate in an area as free from vibration as possible.

Avoid glass scrubbers, blenders, dishwashers, and so forth.

Locate in a spot not reachable by customers.

In a location accessible to service personnel, yet safely out of the way so no one will bump into it or spill anything on it.

Keep the ECU within 8 1/2 feet of the dispenser with a clear cable path. If your layout is spread out, Berg also offers an optional 25-foot cable.

Allow enough length for a drip loop at both the ECU connection and the dispenser connection. A drip loop is a downward loop of an extra few inches of cable to keep the moisture commonly found in a bar environment from running into the electronics. See figure 2 - 2.

Within 5 1/2 feet of an approved three wire grounded electrical outlet. We recommend that you have a line filter/surge suppressor on this outlet for more reliable system performance.

Where the unit door can swing open freely. If necessary, you can mount the unit on its side. See figure 2 - 3.

If you're installing the Laser system with an Infinity ECU, refer to the Infinity Installation Manual for further details about ECU mounting.

TUBING AND CABLING

To assure that you order enough cable and tubing for the installation, **READ THE FOLLOWING** guidelines before ordering.

Plan for the shortest and simplest pathway. Cement or brick walls might offer the shortest path, but not the simplest.

Order the correct air solenoid cable -
6 brand system: 10 conductor cable.
12 or 16 brand systems: 20 conductor cable.

For cable, measure the distance from the furthest station to the location of the furthest air solenoid block.



WARNING : Due to possible contaminants, keep tubing and cables off of the floor. Tubing is designed to handle liquor inside the tubing -- but may not keep contaminants on the outside from soaking in.

Avoid wrapping cabling or tubing around electric motors or transformers.

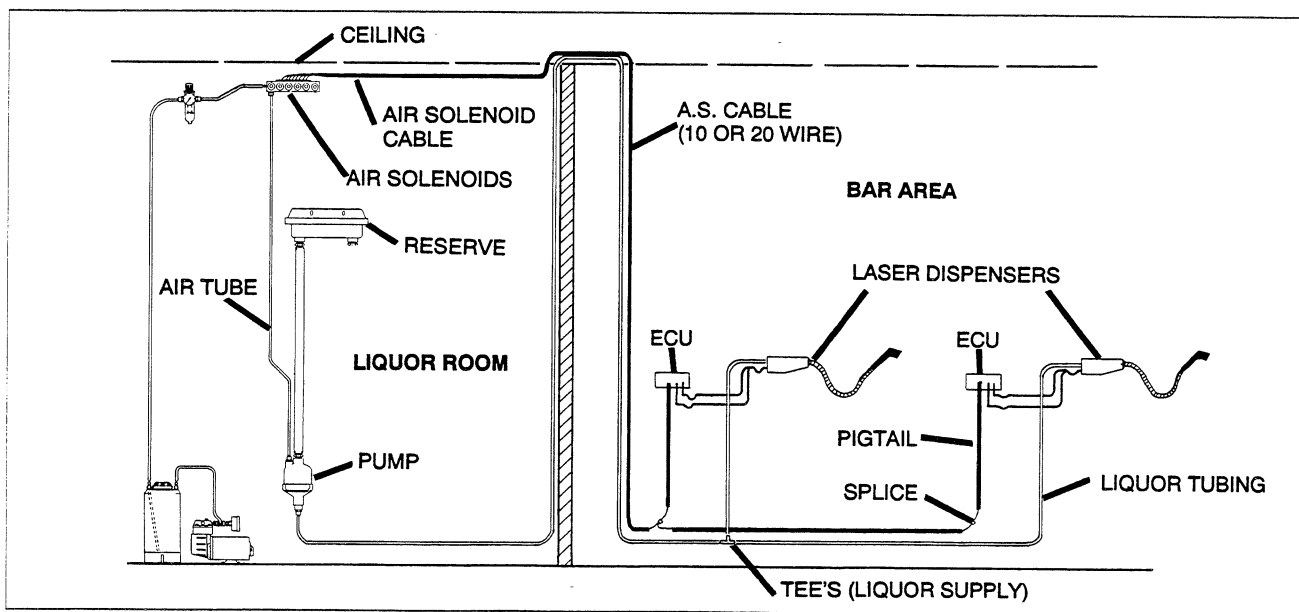


Figure 2 - 4 : Overall view of layout considerations for cable and tubing.

Avoid installing next to hot pipes, steam lines, dishwashers, light fixtures, and heating elements.

Consider obstacles behind the bar, or station to station.

For tubing, add the distance between the T's to the first station. Add a few extra feet for bends and corners and for servicing the dispenser.

The standard liquor room to bar tubing is 1/4 inch. If the installation involves high volume, long distances, or high viscosity liquors, you might shift to the optional 3/8 inch tubing and T off to 1/4" tubing for branches. Berg has a special flow simulator software program to help you determine which tubing will work best for the installation. Again, contact us for details.

Tubing should travel in a straight line at least 3" from a fitting before starting a bend. This avoids leakage at the fitting. If this is not possible, use elbows.

Do not kink the tubing. If you need to make sharp turns, use the proper elbows or Tees.

If the tubing develops a kink, replace it by splicing in a new section. Once a piece of tubing kinks, it becomes vulnerable to leakage.

NOTE : It is a good idea to carry a spare parts kit that includes T's Y's and splices. See Appendix A for further details.



DANGER

WET FLOORS PRESENT A DANGER OF ELECTRICAL SHOCK, SO AVOID THEM. THE LIQUOR ROOM AND AIR DELIVERY SYSTEM SHOULD BE INSTALLED IN A DRY LOCATION AND FREE OF ANY TOXIC CHEMICALS OR CLEANING AGENTS.

Shield the regulator from all heat sources.

Position the regulator in a secure place, since any pressure adjustments will automatically adjust portion sizes as well. Only qualified Berg installers and service personnel should adjust the pressure.

Place the compressor in an area that's as odorless as possible to avoid liquor contamination.

Don't place the compressor where the noise from its operation will be a disruption.

Install the compressor away from sources of vibration and in a clean, dry, low traffic area. Make sure that nothing can fall on top of the compressor.

Install the compressor and tank in a room that maintains a consistent temperature.

IMPORTANT ! Do not install the air supply system in a humid environment.

In some spread-out installations, you may need to order extra tubing to run between components in the air delivery system.

LOCATING THE RESERVE SYSTEM



DANGER

WET FLOORS PRESENT A DANGER OF ELECTRICAL SHOCK, SO AVOID THEM. THE LIQUOR ROOM AND AIR DELIVERY SYSTEM SHOULD BE INSTALLED IN A LOCATION FREE OF ANY TOXIC CHEMICALS OR CLEANING AGENTS.

The area must maintain a consistent temperature and be free of dirt or debris and offensive odors.

The reserve system must be mounted in a low-traffic area; hand trucks and kegs near the pumps can damage the system.

Most back rooms are located below or on the same level as the bars they service. If your installation mandates that the back room be ABOVE the bar, you'll need our Downhill Pumping Kit (PN 8009349 for 1/4", 8009395 for 3/8") for the system. Contact us for details.

Make sure you have adequate supplies of the size nozzles you will need.

To avoid returning for additional calibration, make sure the customer has an adequate supply of liquor. Allow at least 3 liters for filling the lines, pumps and reserves.

Make certain you have enough space to actually mount the system. The only way to be sure is to measure the available space and draw a detailed layout.

Your first decision is whether to go with a wall mount or a rack mount system. A wall mount system is mounted right on the wall; a rack mount is a modular system with all components (tubing, pumps, reserves, and so on) already pre-installed — it's just a matter of putting up the rack. Let's talk about some pre-installation considerations for the wall mount system.

WALL MOUNT INSTALLATION

Figure 2-5 gives you the basic layout and measurements for a Berg wall mount system. We've mounted our systems in scores of configurations over the years, and we're convinced this layout works best. The more you depart from this optimal layout, the less smoothly your system may operate. We're happy to answer your layout questions at any time.

In designing a wall mount layout, pay particular attention to:

- Elbows and bends
- 1" vs 1/2" tubing
- Daisy chain of multiple reserves
- Height for air solenoids
- Number of reserves and pumps
- Room from floor to bottom of pump
- Space between reserves (vertical and horizontal)
and space between pumps and reserves)

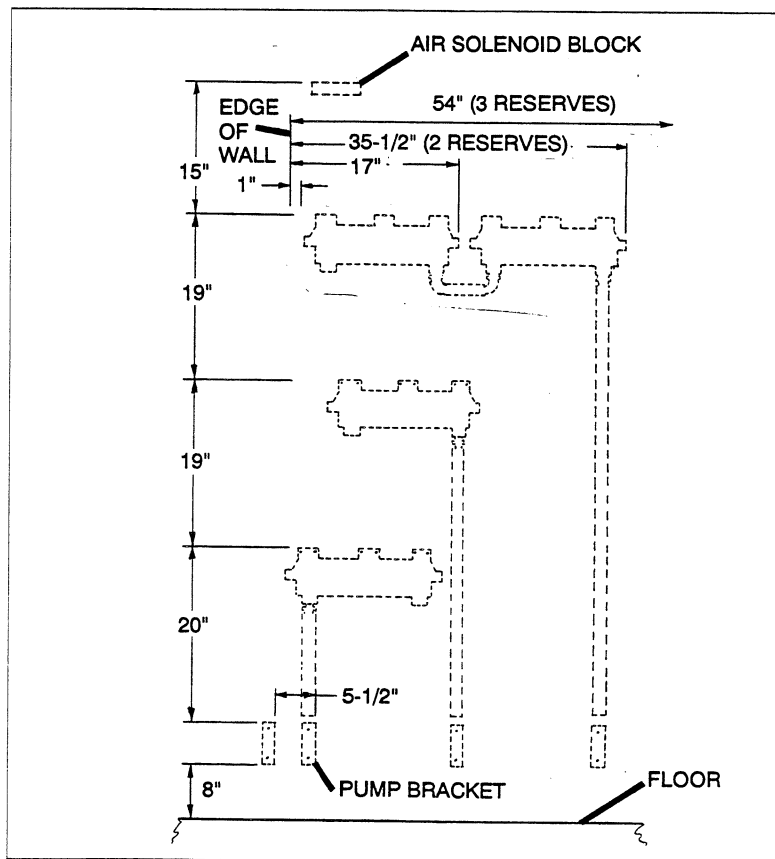


Figure #2 -5 : Dimensions for wall mount reserve system.

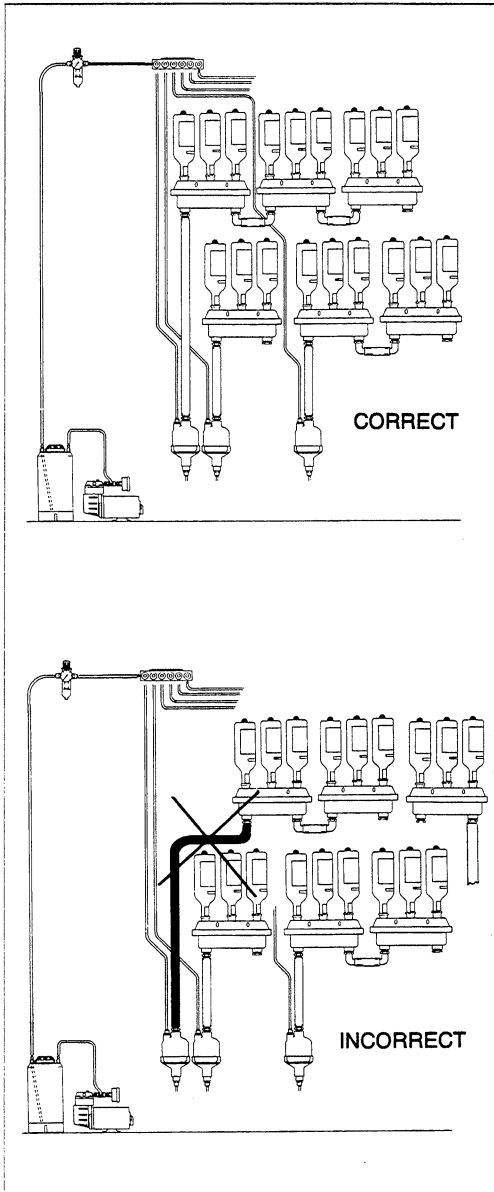


Figure # 2 - 6 : Right way / wrong way for reserve to pump tubing installation.

In overall dimensions, you'll need the following space for a wall mount reserve:

6 brands	85"H	x	40 1/2" W
12 brands	85"H	x	77 1/2" W
16 brands	85"H	x	114 1/2"W

Always place the fastest moving brands in the middle (from top to bottom) of the mounted reserves. Very fast moving brands might benefit from 1" high-capacity tubing from the reserve to the pump to speed up pump regeneration.

Make sure the tubing that runs from the reserve to the pump is as near vertical as possible.

Never run tubing from the reserve to the pump horizontally or uphill. See figure 2-6.

One other caution for a wall mount system — since 1.75 liter bottles overhang on the reserve side by 1", allow an extra 2-1/2" of space for connecting tubes to reserves placed below. See figure 2-7.

Leave space to mount the regulator assembly.

Make sure you can get to the reserves easily. It's much easier to rearrange things now than when the entire system is installed.

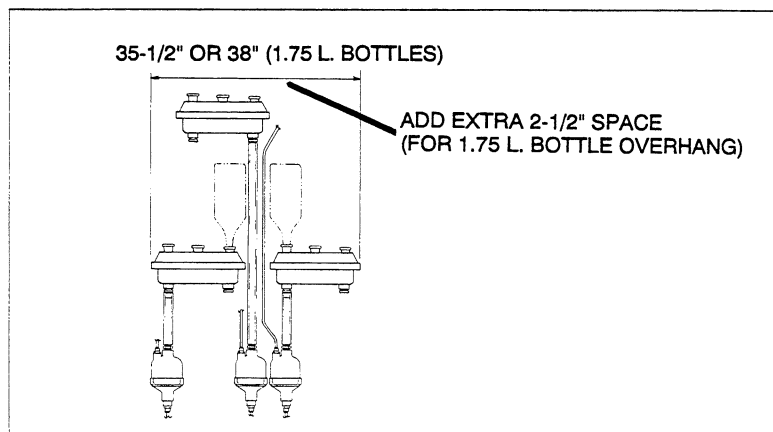


Figure # 2 - 7 : Reserve spacing for 1.75 liter bottles.

TOOLS

Tools you'll need for Laser system installation:

Slot screwdriver (1/4 and 3/16 blade)

Phillips screwdriver (#2 point)

Electric drill (1/4")

Wire stripper

Slip jaw plier

Diagonal cutter

Utility knife

Tape measure

Level

Roll of masking tape

Graduate (ounces/ml): available from Berg.

Part number: 8006072 - (ounces)

Part number: 8009396 (for ML only)

Scotchlok™ crimping tool: available from Berg.

Part number: 8008672

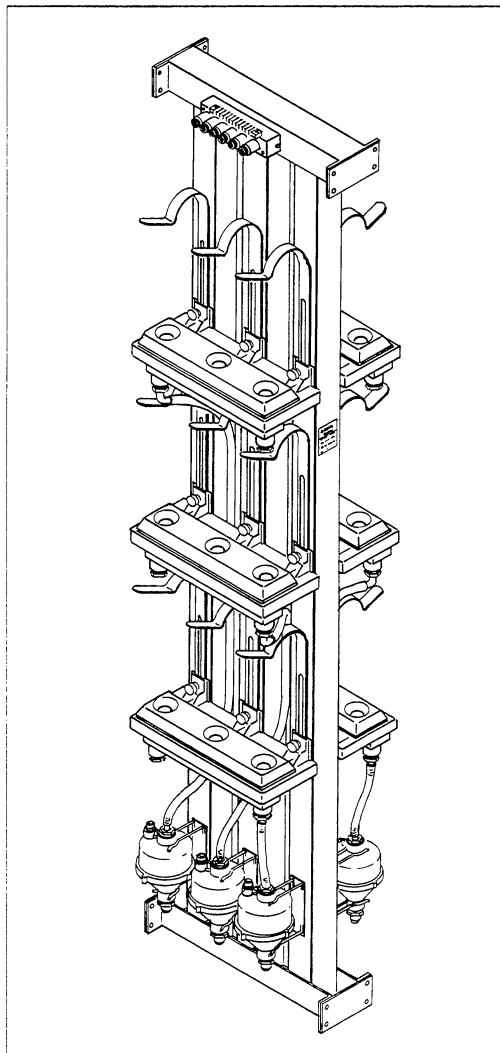
INSTALLATION: THE LIQUOR ROOM

Berg Space Saver Modular Racks are easy to mount. They come from the box ready to put up. Each modular rack holds up to eighteen bottles.

INSTALLING THE RACK-MOUNTED SYSTEM



WARNING: All racks must be mounted on a flat, smooth, and strong surface. You may need to use furring strips to provide a strong enough surface. A full reserve rack of six brands can weigh 80 pounds.



Wiring the air solenoids before installing the rack may be easier, depending on the distance from the top of the rack to the ceiling. Refer to next page for terminal block wiring instructions.

Figure # 3 - 1 : Berg Space Saver Modular Rack.

WIRING SOLENOID BLOCKS

Remove a length of insulation from the air solenoid cable, and strip the ends of each wire about 3/8". Connect the wires from the cable to the terminal block according to the color code indicated in figure 3-2. The same label is on the solenoid block itself. Always attach color to color. If you make mistakes here, you'll waste time later. Make your connections carefully.

Use the +26 VDC orange jumper wire to complete the connection. See figure 3-3.

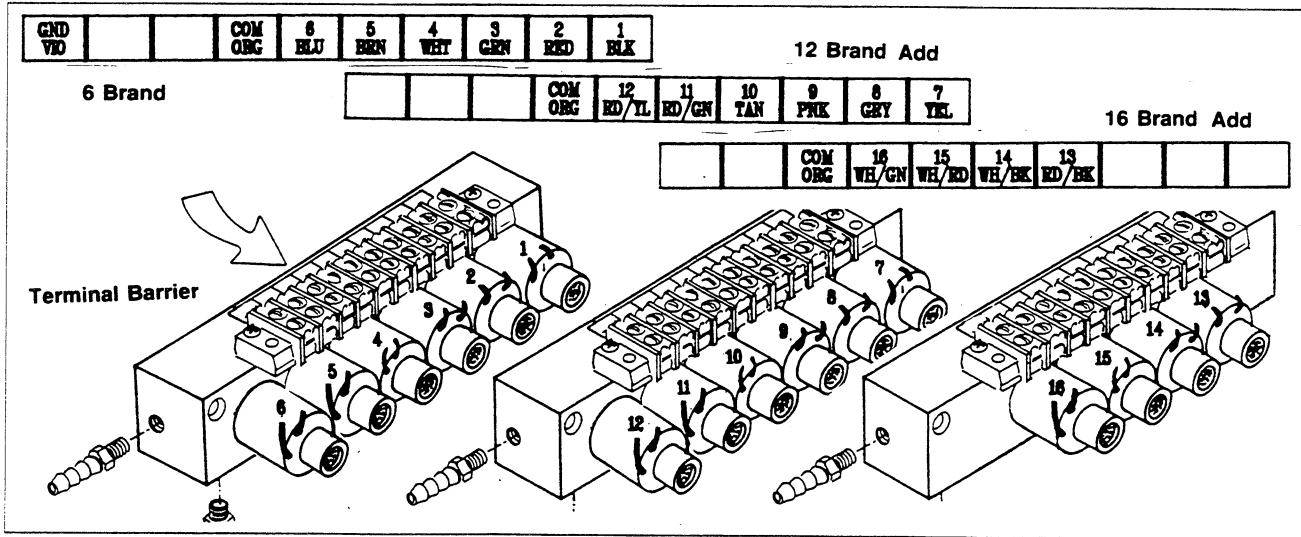


Figure # 3 -2 : Air solenoid wiring.

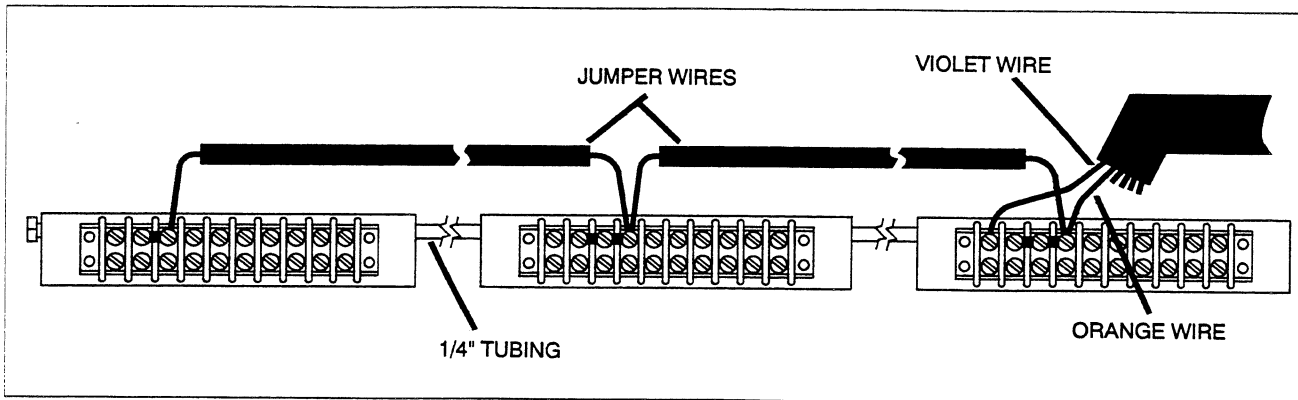


Figure # 3 -3 : Linking 12 and 16 brand solenoid blocks with jumper wire.

To mount a single rack assembly:

Align the rack with the air solenoid facing to the left. You'll see a Berg label between the top two reserve assemblies.

With the Berg label facing away from the wall, slide the rack up against the wall.

Secure the rack to the wall (top and bottom) with the screws provided in the kit bag.

To mount a multiple rack assembly (several racks together):

Allow six inches between each assembly so you can replace bottles. This means the centerline-to-centerline distance between racks must be at least 21.75 inches. If you mount several racks next to each other on the wall, leave six inches on the outside of your first and last rack for bottle-changing. See figure 3-4.

You can also mount multiple racks by connecting them together in a single row. See figure 3-5. Make absolutely sure you secure the structure to the ceiling and floor every two racks. With some back room layouts, a free-standing arrangement makes the best use of space. Free-standing racks must be securely mounted to floor and ceiling. Figure 3-6 offers an additional mounting option.

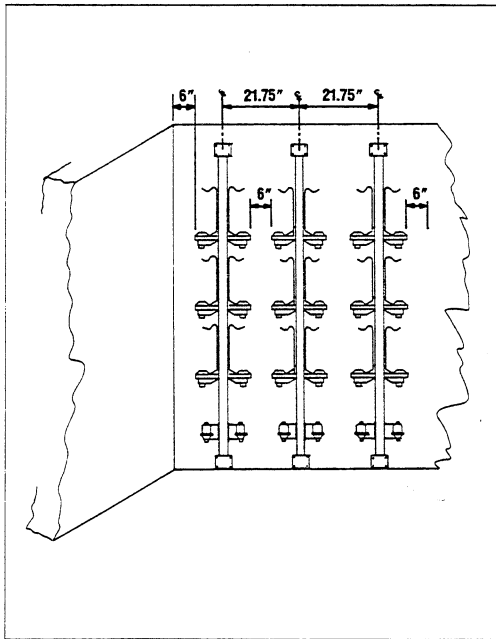


Figure # 3 - 4 : Multiple rack installation dimensions.

When this is complete, turn to page 12, to install the air supply.

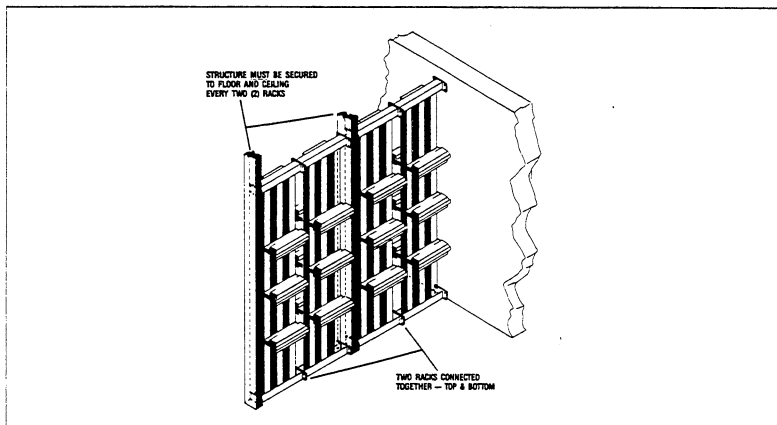


Figure # 3 - 5 : Multiple rack installation - in line.

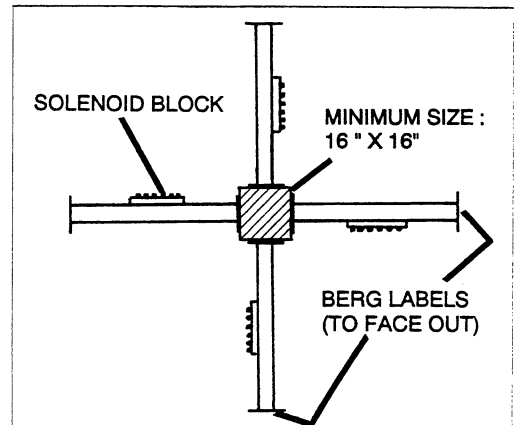


Figure # 3 - 6 : Top view of an alternative multiple rack installation configuration.

INSTALLING THE WALL-MOUNTED RESERVE SYSTEM

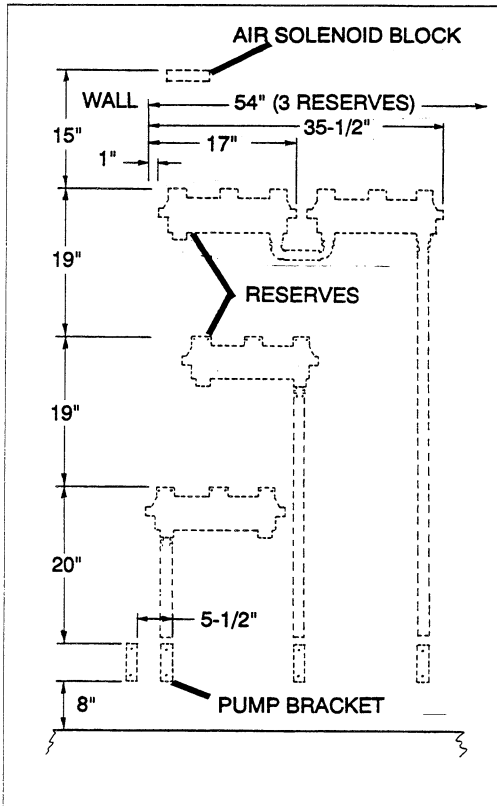


Figure # 3 - 7 : Reserve installation dimensions.

Don't make the mistake of trying to install the wall mount unit by "winging it" without a layout diagram. You'll waste time ... and chances are you'll have to get extra parts to do the installation correctly the second time around. Before you go on site for the actual installation, review your diagram carefully to make sure it's accurate and that you have all the parts you need.

Remember some of the wall mount considerations from earlier in this manual:

Place the fastest moving brands in the middle (from top to bottom) of the mounted reserves.

The reserve-to-pump tubing should be as near vertical as possible.

1.75 liter bottles overhang on the reserve side by 1", so allow extra space for connecting tubes to reserves placed below. See figure 3-7.

Make the reserves easily accessible.

Leave room to mount the regulator assembly.

Now we're ready to start assembly according to your layout. If construction is causing a dusty environment, cover all barbed fittings and breathers with masking tape to keep them clean during installation.

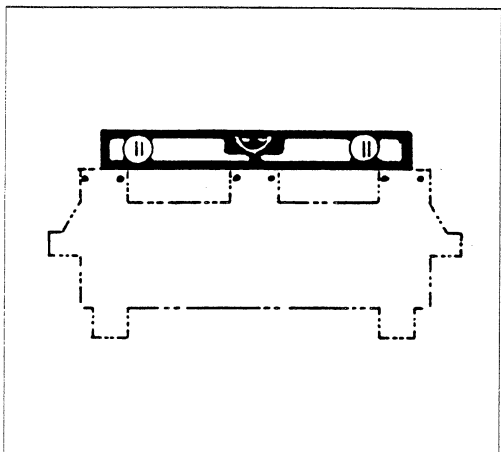


Figure # 3 - 8 : Leveling of reserve for installation.

According to your layout, position a reserve unit against the wall, level it, and then screw it in. Once it's screwed in, recheck the level. If the reserve's not level, you'll have problems with the bottles' not draining in sequence like they should. See figure 3-8.

If you need more than three bottles — in other words, if you need another reserve unit — cut two to three inches of 1" tubing and install it according to figure 3-9. Notice that you have two choices in how to install multiple reserve units.

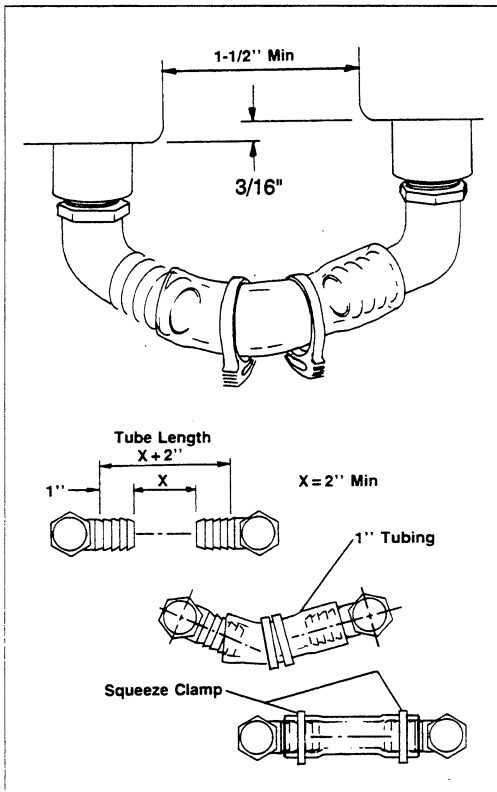


Figure # 3 - 9 : Adjoining tube installation.

Avoid rotating the fitting when installing connecting tubing. Rotating a fitting more than a sixth of a turn can cause leakage. See figure 3-9.

In parallel draining, the reserves are installed at the same height so all reserves will drain equally.

In sequential draining, the additional reserves are installed slightly higher (about 3/16 of an inch) than the first one, to a maximum height difference of 3/8" per line.

You can't allow more than 3/8" from the top of the first reserve to the top of the last reserve: more than that and the bottom reserve will overflow. See figure 3-10.

Don't remove any protective plugs until you're ready to test the system.

Install the bottle hold-downs into the reserve units as shown in figure 3-11. Install the adjusting knobs, but leave them loose for now.

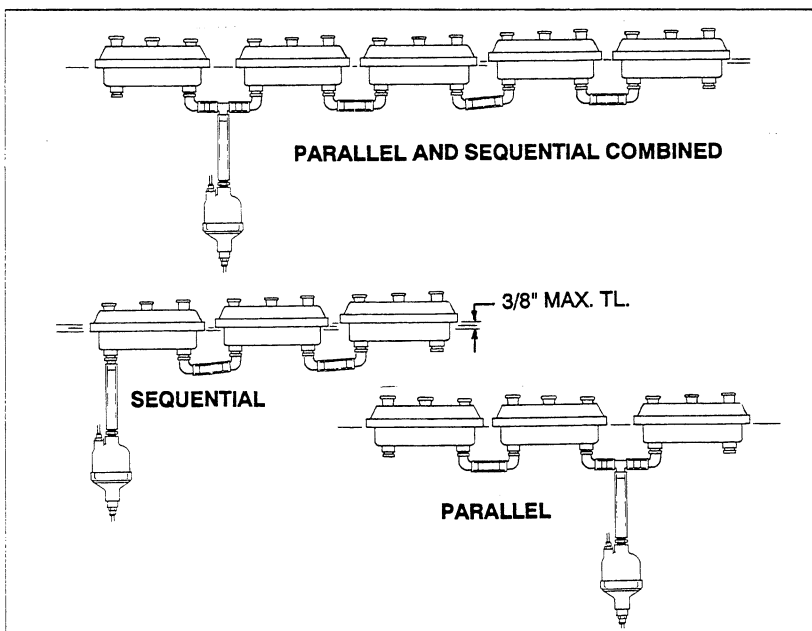


Figure # 3 - 10 : Examples of parallel and sequential draining runs.

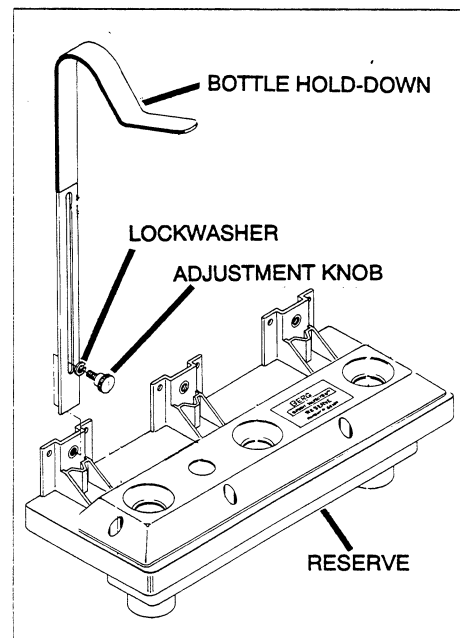


Figure # 3 - 11 : Bottle hold-down assembly.

INSTALLING THE PUMPS

Begin by referring to your layout. Install the pump brackets, making sure they're level. See figure 3-13. Each pump has its own bracket. The bottom of the pump bracket should be no closer to the floor than 8 inches; installation closer than that can lead to kinked tubing and major problems.

The flow from the pump must be absolutely unimpeded. If you can not get 8 inches from the bottom of the pump to the floor, use an elbow. See figure 3-12.

If you use the Berg JG elbows or Ts, you can install the pump bracket as close as 4 inches from the floor. In no case install the pump bracket closer than 4" to the floor.

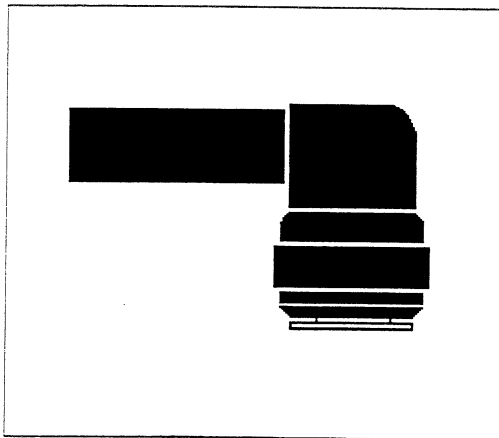


Figure # 3 - 12: Berg JG elbow -- for use when floor clearance is less than 8".

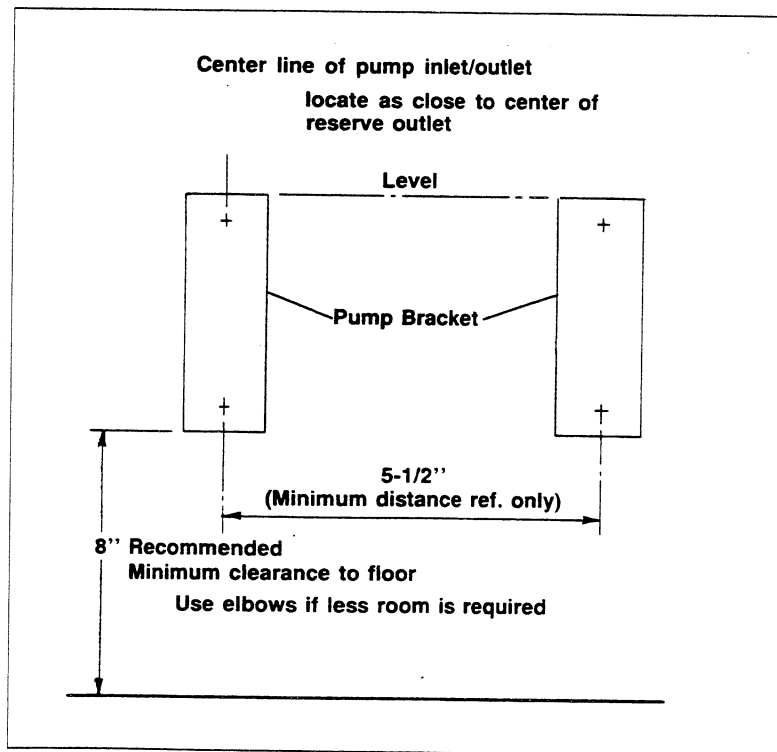


Figure #3 - 13 : Pump bracket installation

Snap the pump into the brackets with the air inlet facing out, as shown in figure 3-14.

Now tie the pumps to the brackets with nylon ties. Leave the pump's protective covers in place.

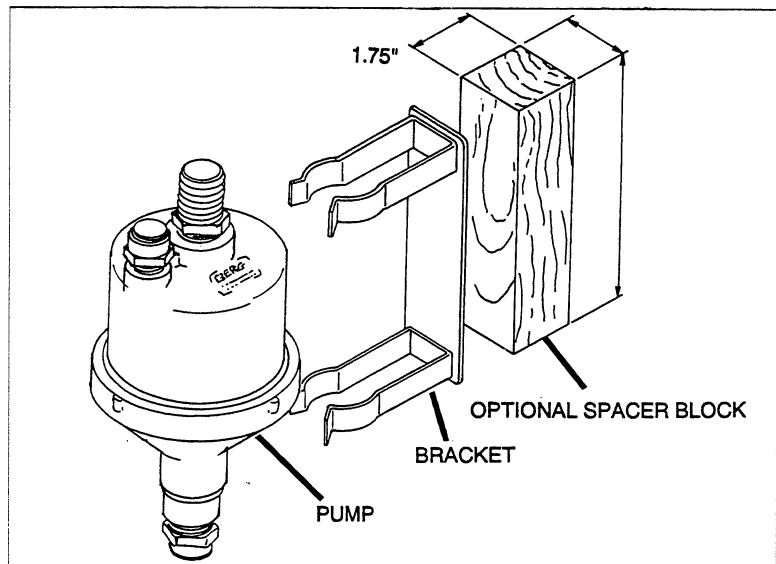


Figure #3 - 14 : Pump spacer block

If your pump is within 12 inches of the reserve, you may need to insert a wood block as a spacer (see figure 3-14) behind the bracket to improve the alignment of pump and reserve. Without the spacer, the delivery tube from reserve to pump would have to bend too sharply, and the pumps will regenerate slowly.

INSTALLING TUBING FROM RESERVE TO PUMP

First recheck your layout and make certain you have all the parts you need and that you have the right diameter tubing for the job.

Now measure the distance between the pump fitting and the reserve fitting. Allow for any bends you'll make in the tubing route, then add 2 inches so the tubing can cover the fittings. See figure 3-15. Only when you're sure measurements are accurate, cut the tubing.

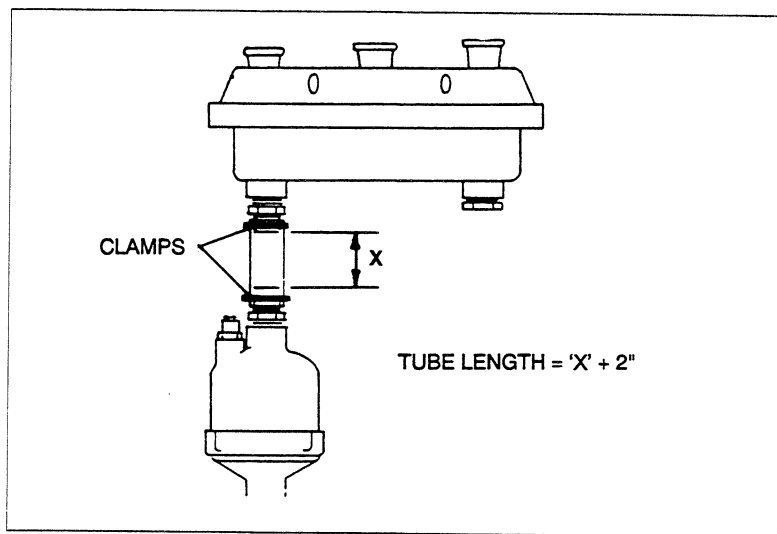


Figure # 3 - 15 : Tubing connecting the reserve and pump.

Slide the clamps loosely over the tubing. Now push the tubing over the fitting and tighten the clamp. Repeat the same steps on the other end of the connection, checking that the line contains no crimps.

Now you'll install the solenoid blocks.

INSTALLING SOLENOID BLOCKS

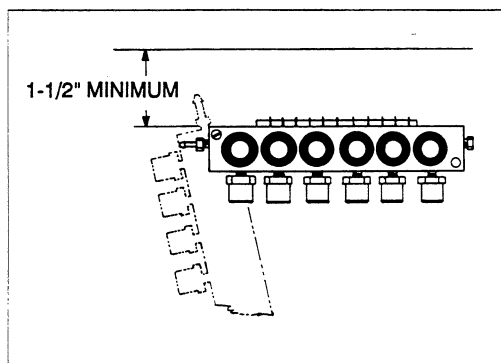
First make sure you have the blocks you need:

- | | |
|-----------|--|
| 6 brands | one 6-solenoid block |
| 12 brands | two 6-solenoid blocks |
| 16 brands | two 6-solenoid blocks and one 4-solenoid block |

Position each solenoid block at least 15 inches above the highest reserve.



CAUTION: The solenoid blocks can and should be mounted more than 15 inches above the highest reserve, if possible. This is important. Placing the solenoid blocks closer than 15 inches to the highest reserve may damage the solenoids.



Each block must also have at least 1-1/2 inches of top clearance from the ceiling. In each block, insert one screw loosely so the block swings down. See figure 3-16.

Remove insulation from the cable, and strip the ends of each wire about 3/8". Connect the wires from the air solenoid cable to the terminal block according to the color code indicated in figure 3-17. The same label is on the solenoid block itself. Always attach color to color. If you make mistakes here, you'll waste time later. Make your connections carefully.

Figure #3 - 16 : Mounting solenoid block

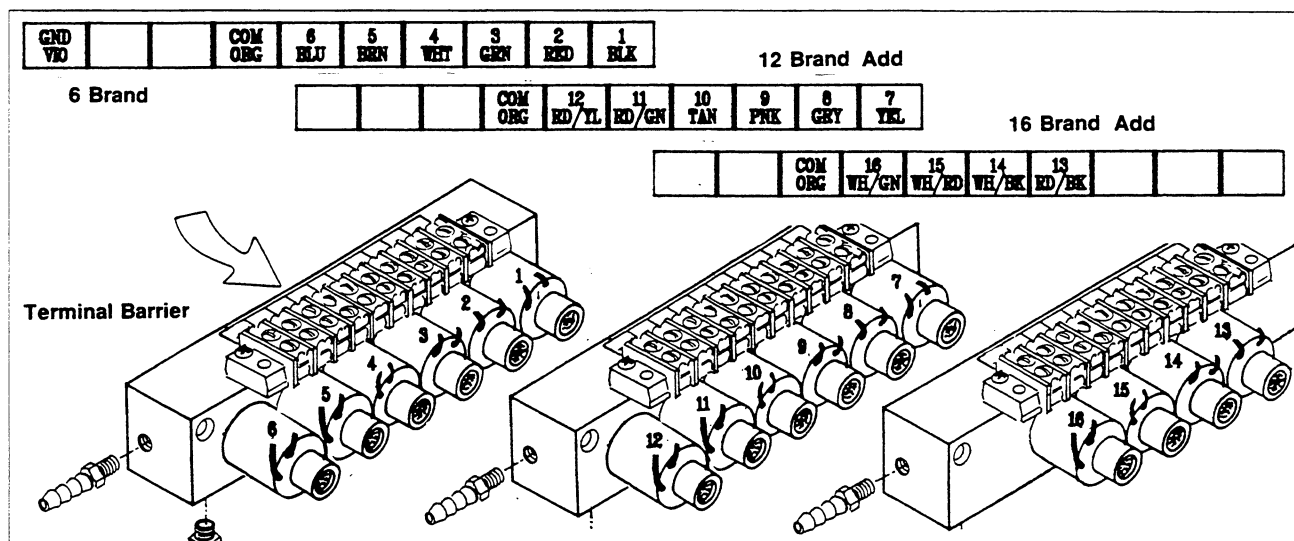


Figure #3 - 17 : Wiring the air solenoid block

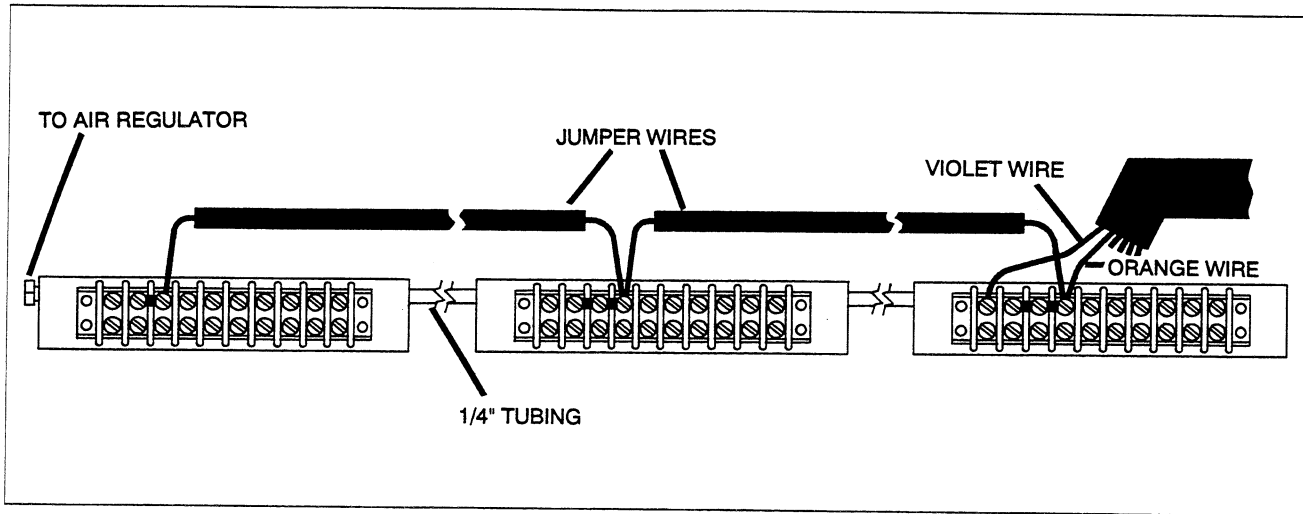


Figure # 3 - 18 : Linking 12 and 16 brand solenoid blocks with jumper wire.

Use jumper wire to connect the terminals marked COM ORG to each other and to the orange wire in the cable. Use the +26VDC orange jumper wire to complete the connection. See figure 3-18.

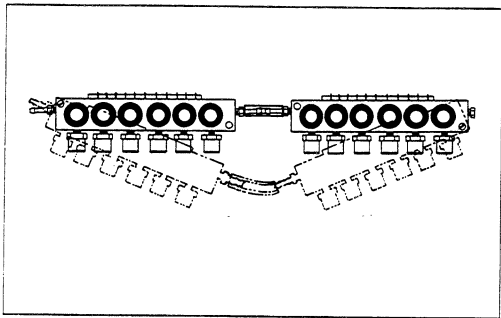


Figure # 3-19 : Installing solenoids in a tight location.

Now link the solenoid blocks in series for air, using 1/4 inch liquor tubing. Run the tubing from the barbed out fitting on block #1 to the barbed in fitting of block #2. If you're using three blocks, then also run the tubing from the out fitting on block #2 to the in fitting on block #3.

TIP: In a tight installation with multiple solenoid blocks, try this — attach the outer ends of the outer solenoid blocks and let the middle block droop down slightly (See figure 3-19). Push the tubing onto the fittings, then push the block straight up into position almost wedging the tubing between the blocks. This will force the connecting air tubing the rest of the way onto the fittings. Then secure the remainder of the mounting screws.

If you have trouble pushing the tubing over the fittings, soaking the tubing in 130 degree water for five minutes to soften tubing, will help.

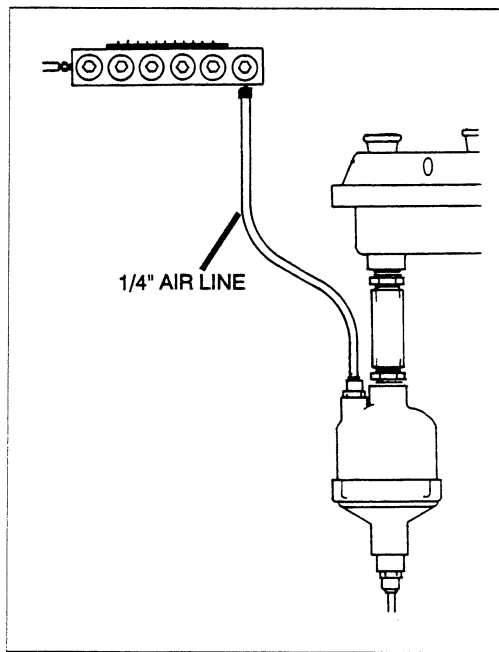


Figure # 3 - 20 : Air supply line to pump.

Measure the distance between the JG fitting on solenoid #1 and the air inlet on the pump for brand #1 (see figure 3-20). Add some extra length for bends, fastening, and fitting hookup. Cut the tubing and insert it into the quick-connect fitting on the solenoid block. Push the other end into the quick-connect fitting on the pump. Make sure the tubing is fully inserted (4/5 inch) into the fitting. Don't fasten the tubing to the wall yet. Each solenoid has its own pump, so go ahead and make the rest of these connections.

TIP: To avoid tubing/fitting problems, be sure you cut the tubing squarely. Clear the cut end of burrs, and insert tubing into the fitting as far as it will go.

Finally, dress the tubing by clamping it to the wall to keep it safely and neatly out of the way.

INSTALLING THE AIR SUPPLY



DANGER

WET FLOORS PRESENT A DANGER OF ELECTRICAL SHOCK. THE LIQUOR ROOM AND AIR DELIVERY SYSTEM SHOULD BE INSTALLED IN A LOCATION FREE OF ANY TOXIC CHEMICALS OR CLEANING AGENTS.

Humidity will shorten the life of the air delivery system. Avoid mounting the air supply in a humid environment. If need be, you can even mount it in a different room from the reserve system. See figure 3-21 for an overall view of the system flow.

Begin by referring to your layout diagram. Recall some of our earlier cautions:

Keep the regulator shielded from heat sources.

For security reasons, keep the regulator in a safe, secure place.

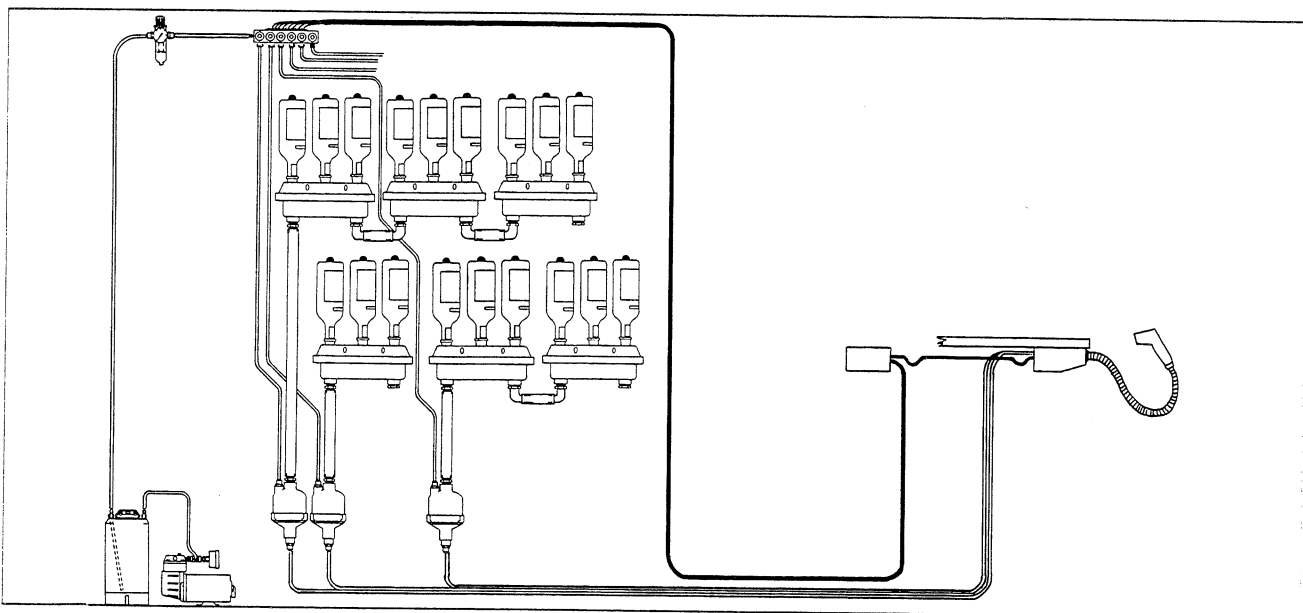


Figure #3 - 21 : Typical system flow schematic.

Don't place the compressor where the noise from its operation will cause a problem.

Place the compressor in an odorless area with a constant temperature and away from vibration.

Install the compressor in a clean and dry area.

Make sure the compressor is in a low traffic area, and that nothing can fall on top of it.

Figure 3-22 shows details of the connections. Be sure the compressor is located near a properly grounded electrical outlet. The pressure setting is preset at the factory, so no adjustment is needed.

Install the regulator mounting plate level on the wall. See figure 3-23.

Check the back of the regulator, as shown in figure 3-24, to see that you've got the flow going the right way.

Slide the air regulator into the mounting plate and tighten the mounting ring.

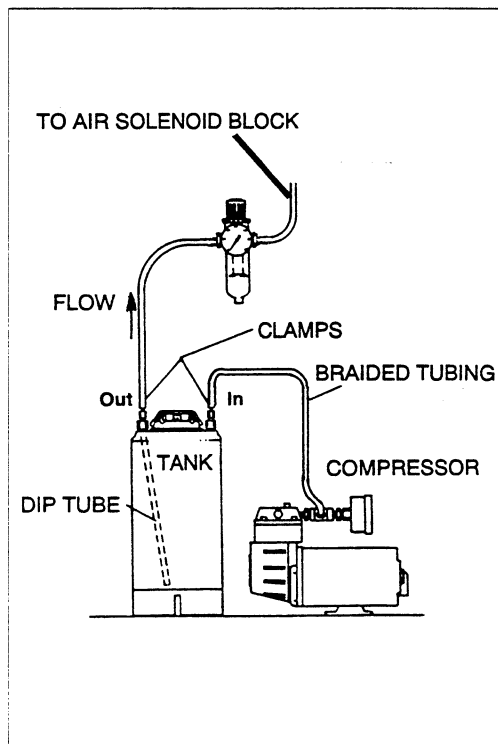


Figure # 3 - 22:: Braided tubing installation overview.

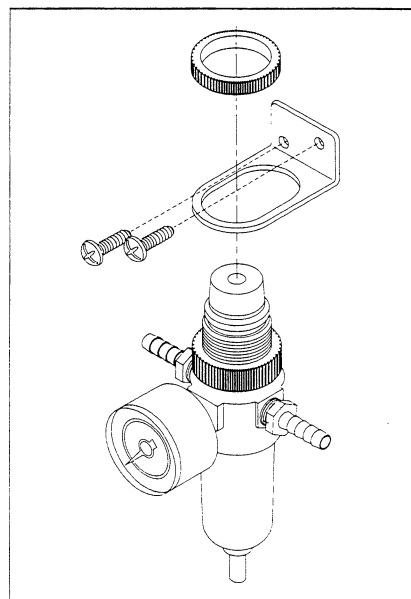


Figure # 3 - 23 : Installing regulator mounting plate.

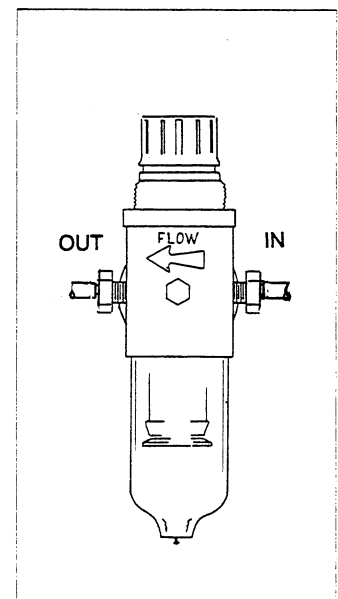


Figure # 3 - 24 : Back view air regulator.

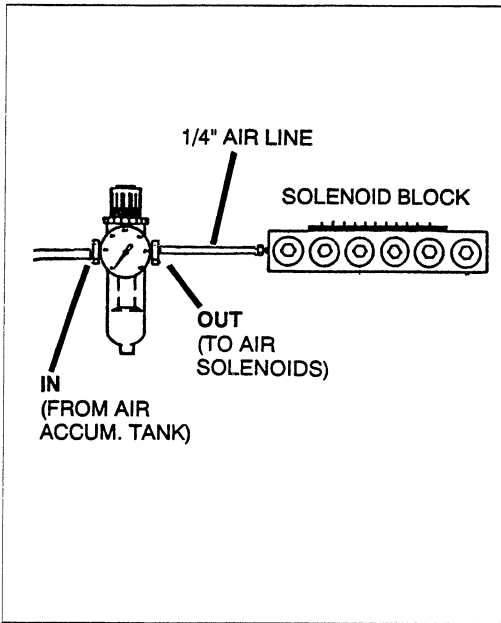


Figure # 3 - 25 : Air supply line from regulator to first solenoid.

Use a clamp (part #8006185) to secure the braided tubing (part #8009424) to the fitting on the compressor.

Run the braided tubing to the accumulator tank and clamp it to the IN fitting on the air tank.

Clamp braided tubing to the accumulator tank's OUT fitting. Now measure the distance to the air regulator, allowing extra tubing for fastening to the wall.

Clamp the tubing onto the barbed IN fitting of the air regulator. Then secure the tubing to the wall.

Measure the distance between the regulator and the first solenoid block, and cut a piece of 1/4 inch liquor tubing to connect the regulator and the first solenoid block. See figure 3-25.

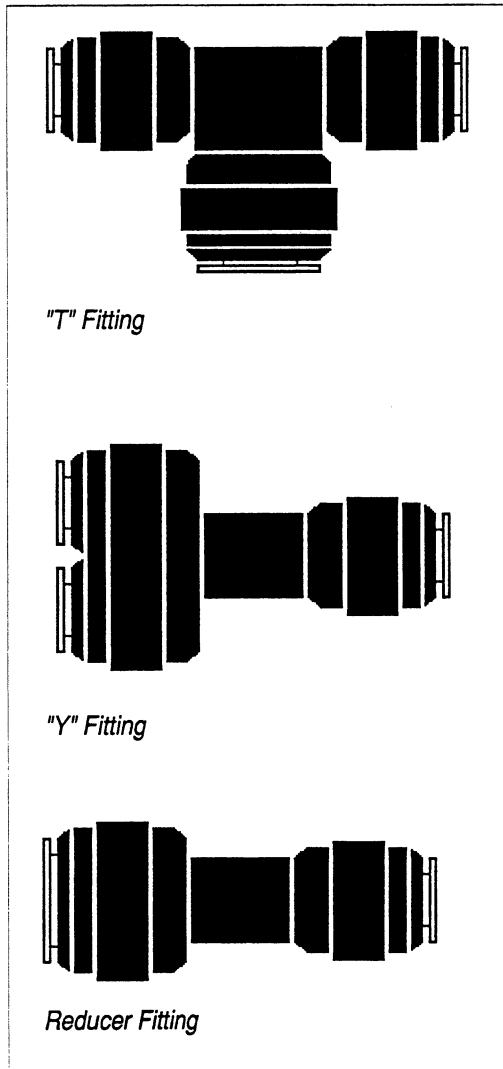
Now we'll get ready to bring air to the system. Plug in the compressor. We pre-set it at the factory to pressurize to 75PSI and then shut down. It will stay off until pressure drops to 63PSI and then restart. If the compressor keeps running and never shows 75PSI on the gauge, there's an air leak. Find the leak, repair it, and restart the procedure. Turn the regulator adjustment knob until the gauge on the air control assembly shows 15PSI. This is the gentle pressure you'll use to test the system. Working with a low pressure like this keeps the liquor from spurting during startup.

RUNNING THE TUBING AND CABLES



DANGER

**IF THE TUBING MUST RUN WHERE CHEMICALS
ARE LIABLE TO BE PRESENT, ENCLOSE THE
TUBING IN PVC PIPE.**



"T" Fitting

"Y" Fitting

Reducer Fitting

Figure # 3 - 26 : "T" 's" and "Y" 's" and Reducers.

Double check your pre-installation guidelines:

Cut tubing squarely and cleanly so that it works securely with the fittings.

Be certain your tubing route avoids all hot water lines, moving machinery and light fixtures. And, keep tubing off the floor.

Avoid kinking the tubing. Use Ts or Ys if necessary.

Plan for the shortest and simplest pathway.

When you're routing tubing to multiple stations, run it in the most convenient, direct path and use Ts or Ys as you need them. See figure 3-26 and Appendix C.

When you run tubing, always run the solenoid cable (10 conductors for 6 brands and 20 conductors for 12 or 16 brands) along with the tubing. Make sure you leave enough tubing to reach the proper pumps. Also, make sure the tubing running to the station is long enough at the station end to allow extra for installing and servicing the dispenser. The air solenoid cable must be long enough to reach the furthest solenoid block in the liquor room. At the station end of the cable, leave extra for servicing the ECU. In running cable and tubing, its better to have extra tubing or cabling than to be left a foot or two short of your destination.

If your system will use counters mounted in the back room, run the counter cable along with the others.

TIP: We recommend running an extra tube as a backup. Replacing a single non-functioning tube in a conduit will be difficult.

Tag each liquor line — start and end — with a code to show which liquor it carries. Use colored or numbered pieces of tape and create an identification chart for reference.

Bundle tubing together with tie-straps. **Don't use electrical tape, duct tape, or masking tape** — the special FDA-approved tubing can absorb the adhesive on these tapes. The same applies to a number of other chemicals.

Before you run your tubing, cover the ends of the bundle to prevent line contamination. Use a rag or plastic bag secured with a rubber band.

Make sure your holes or PCV pipe are large enough to accept the tubing you'll need to run. Here's what you'll require:

	1/4" tubing	3/8" tubing
6 brand	1 3/8" diam	1 3/4" diam
12 brand	1 3/4" diam	2 1/2" diam
16 brand	2" diam	3" diam

Avoid running tubing on the floor.

All liquor stations feature quick-connect fittings for simple installation. Cut the tubing squarely and just push the tubing 4/5" into the fitting and it will automatically lock.

Finally, splice in the air solenoid cable to the pigtail connection to the ECU. Be especially careful not to cross the orange (+26V) and purple (com) wires with any other wires.

TIP: We supply special Scotchlok™ splices for use with our cabling. With these splices, be sure you insert the cable fully into the splice. Don't strip the cable first. For two-wire splices, use the two outside holes in the splice. We recommend that you also use our special crimping tool (# 8008672) to crimp the piece so that the red button lies slightly below the level of the outside ring.

Crimping too heavily or too lightly can cause connection problems.

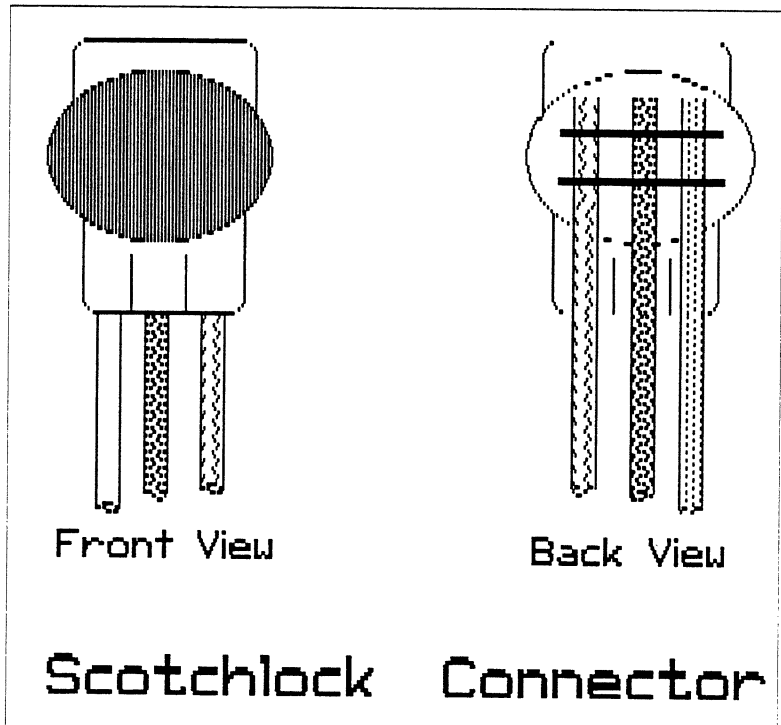


Figure # 3 - 27 : Scotchlok Wire Splice detail.

INSTALLING THE DISPENSER

First, review your system layout and recheck your pre-installation guidelines:

Mount the dispenser under a strong, thick counter top near an ice bin.

Your dispenser must be within 8 1/2 feet (23 1/2 feet if you're using 25 foot cables) of the ECU (Electronic Control Unit).

The bartender should be able to reach soda and liquor gun with opposite hands at the same time, so take this into account in your installation.

Position the dispenser so that the bar overhangs it by a half-inch. This will help keep the dispenser dry.

Remember to leave space for the gun holder.

Don't allow the flex hose to drape over bottles or across the ice bin.

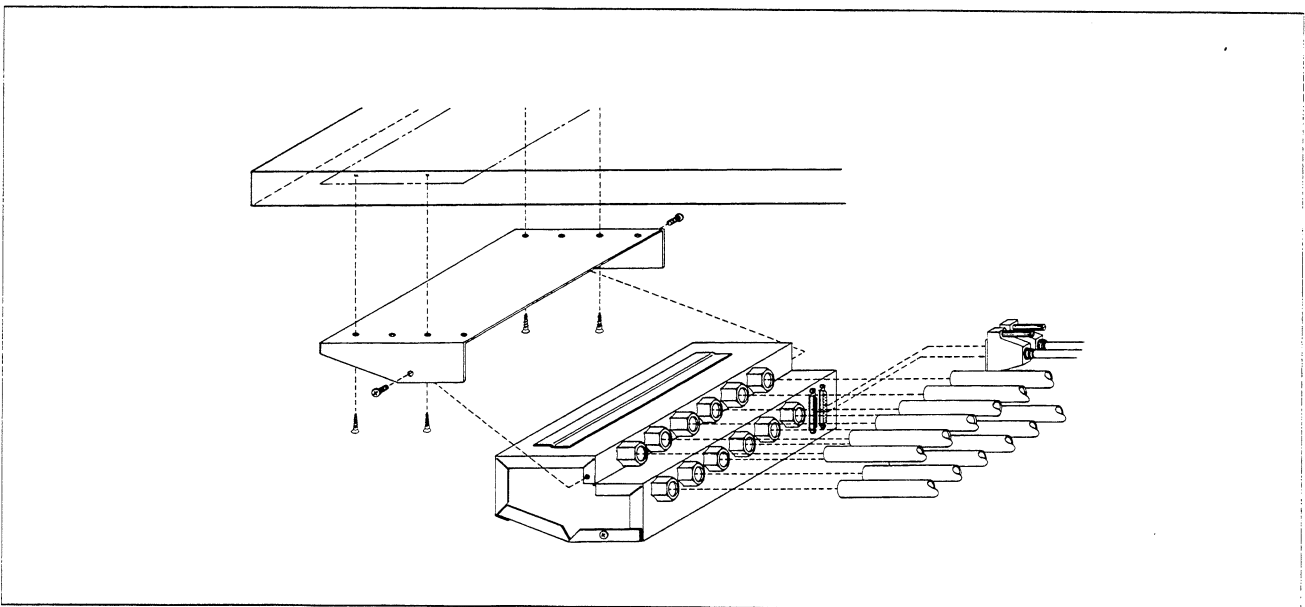


Figure # 4 - 1 : Overview of dispenser mounting.

Leave 6" of clearance in back of the dispenser for sliding unit tubes in or out.

If you have less than 6 inches of space, you'll need to use elbows for tubing connections. You'll need at least 3 inches behind the unit to make cabling and tubing connections.

Hold the mounting bracket 1/2 inch back from the front edge of the bar. Mount the bracket with the provided wood screws. See figure 4-2.

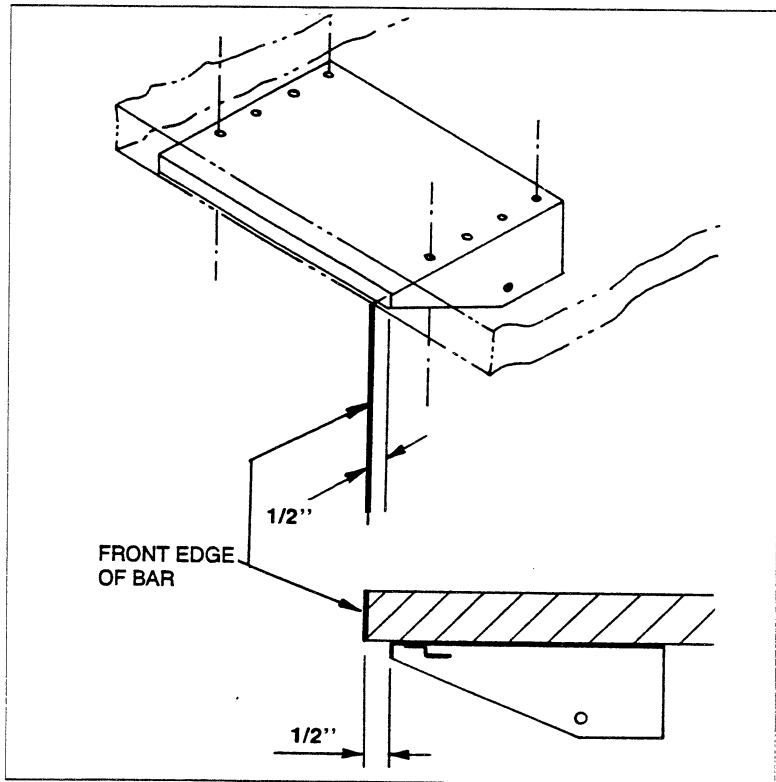


Figure #4 - 2 : Dispenser mounting bracket location.

Measure tubing so the dispenser can drop down for servicing. Set the dispenser down and plug the tubing into the quick-insert fittings according to the brand assignments you've marked on the tube ends.

NOTE: The tube should slide into the fitting 4/5 inch. If the tube doesn't go into the fitting 4/5 inch, the fitting will leak.

Figure 4-3 shows brand numbers run from the upper right to the lower left, alternating top and bottom.

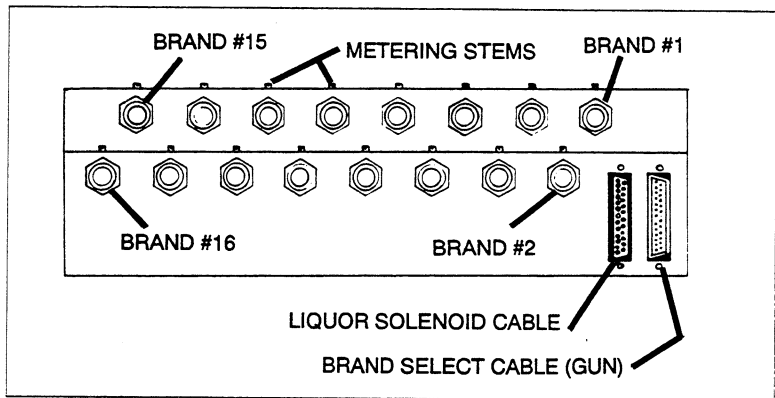


Figure # 4 - 3 : Tubing and cable connections.

Plug in the liquor solenoid cable and brand select cable. Tighten screws to secure connection.

Now lift the dispenser and hook it into its bracket from the rear. See figure 4-4.

Insert the side mounting screws and finger tighten. Don't tighten them completely at this time.

Mount the gun holder as shown in figure 4-5.

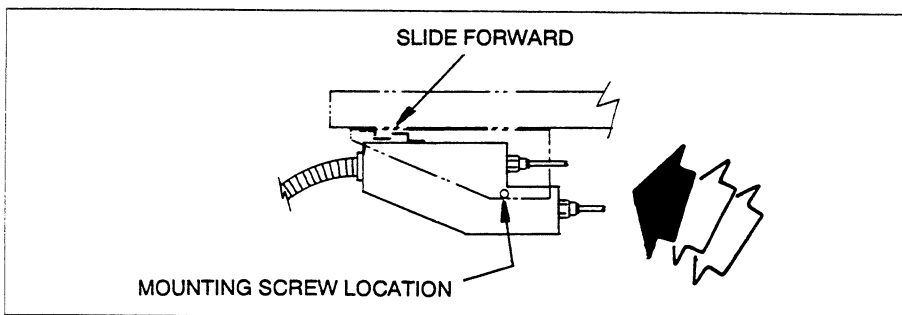


Figure: # 4 - 4 : Installing the dispenser in bracket.

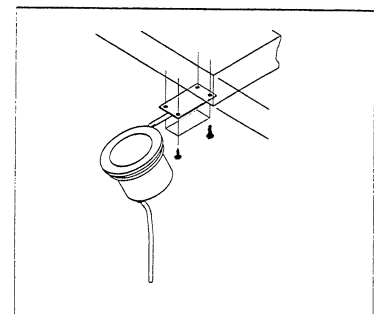


Figure # 4 - 5: Mounting gun holder.

LASER UNDERBAR SYSTEM

The Laser Underbar can be configured for a six- or twelve-brand system. The six-brand is mounted like the LASER 600. Two 25-pin D cables connect the ECU and the Underbar dispenser. Leave six inches at the back of the unit for connecting tubes.

A twelve-brand Underbar system is really a six-brand "Base unit" (the dispenser with the 25-pin connector) with a another six-brand "extension unit." Mount this extension unit on either side of the base unit or to the bottom of the base unit.

Figure 4-6 shows the bottom mount method. If you use this method, first remove the mounting bracket from the extension unit. With two #8 x 32 machine screws, attach the extension unit's mounting bracket to the base unit. The threaded inserts for attaching a mounting bracket are attached to the bottom cover of the base unit. Finally, attach the extension unit to its mounting bracket and connect the units with a 15-pin extension cable.

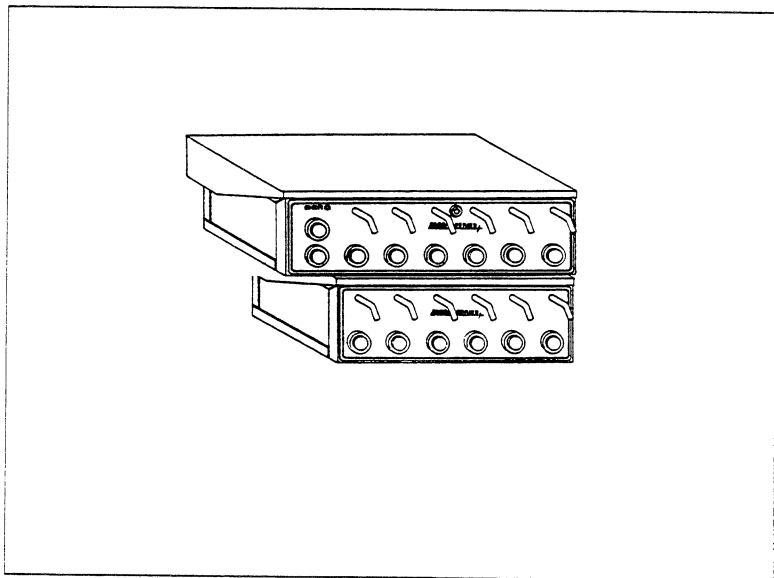


Figure # 4 - 6 : Mounting Laser Underbar with extension unit.

INSTALLING THE ECU (ELECTRONICS CONTROL UNIT)

Before beginning actual ECU installation, review the pre-installation guidelines:

Locate the ECU in a dry area off the floor and free from serious vibration. Make sure it's in a spot where it can't be bumped or spilled on.

Place it in a spot accessible to service personnel, but not reachable by customers.

Position the ECU within 8 1/2 feet of the dispenser (if you're using the standard 10 foot cable) with a clear cable path. If your layout is spread out, we offer an optional 25-foot cable that will let you separate dispenser and ECU by 23 1/2 feet.

Position the ECU within 5 1/2 feet of an approved 3-wire grounded outlet. We strongly recommend that you have a line filter on this outlet for protection against voltage surges and spikes.

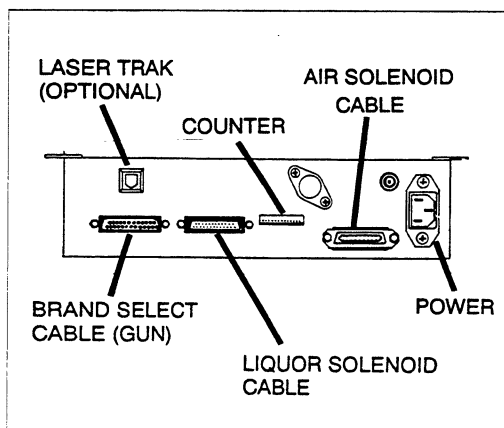


Figure # 4 - 7 : Back view of Electronic Control Unit.

Make sure the unit door can swing open freely. If necessary, you can mount the unit vertically on a side wall. One 25-PIN cable serves for brand selection, while the second provides power to the solenoids. You've already connected the tubing to the appropriate receptacles in the dispenser. Now plug the 25 pin brand-select cable into the lower left connector receptacle. Tighten down with the side screws. See figure 4-7.

Plug the dispenser 25 pin liquor solenoid cable into the connector receptacle next to where you just plugged the brand select cable. Tighten down with the side screws.

Plug the power cord into the power cord receptacle on the ECU. Don't plug any other cords into the ECU at this time. Check that your wall socket will accept the three-pronged, grounded cable. If the power outlet will not accept the power cord, have an electrician check the outlet.

Leave the "jumper plug" installed on the counter port.

Leave the air solenoid cable unplugged at this time.

RUNNING THE ELECTRONIC PRE-CHECKS

Now that you have much of the cabling job done, you'll want to be sure everything's working the way it should. It's important you follow this check-out process step-by-step. By sticking with this procedure, you'll be able to identify and remedy any problems very quickly.

1. Make sure the air solenoid cables at each ECU are unplugged.

2. If you have a Laser ECU, open the ECU and move JPR #4 to SIM. See figure 4-8 for location of JPR #4. If you have an Infinity system, see the Infinity installation manual for JPR location.

3. Plug the ECU power cord into the AC outlet and turn on the dispenser.

4. Push the large portion select button. You'll see the up arrow indicator light glow on the laser gun and/or dispenser. If the system is not equipped with LASER-Trak or Infinity, you'll also see the far right console light come on.

5. Push the small portion select button. You'll see the down arrow indicator light glow on the dispenser. If the system is not equipped with LASER-Trak or Infinity, you'll also see the far left console light come on.

6. Push each numbered brand on the dispenser gun to actuate the proper liquor solenoid. If you don't hear the solenoid actuate, refer to the troubleshooting section.

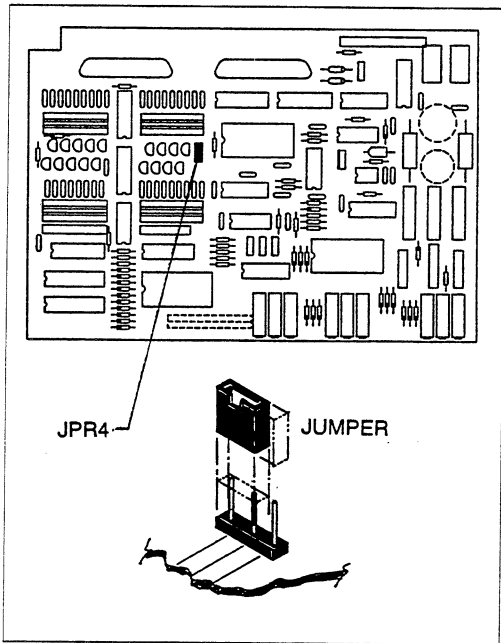


Figure # 4 - 8 : Jumper 4 location - Laser ECU.

7. Now move JPR #4 to LOCK and plug in the air solenoid cable. Go through all the brands and have someone in the liquor room verify that each air solenoid fires when you push the appropriate button on the gun.

You can leave JPR #4 in either the LOCK or SIM position. The LOCK position serves for brand lockout — if one station is pouring a particular brand, no other station can pour it at the same time. SIM will allow simultaneous pouring of the same brand by several dispensers. When two or more dispensers pour the same brand, the amount poured will drop by a few percent.

8. When all this is verified for the dispenser you're testing, unplug the air solenoid connection from the ECU.

Repeat these last eight steps for each dispenser in the system.

When all systems are firing correctly, plug all the air solenoid connectors into the ECUs.

INSTALLING BOTTLES IN THE LIQUOR ROOM



Figure # 4 -9 : Nozzle pinch-off.

You're now getting close to having the system up and running.

The first step is to make sure the proper tubes are connected to the proper pumps. As you recall, the reserve system (rack or wall mount) was installed first, then the air supply. Then you installed the liquor tubing connecting the liquor room with the dispensers, but the output of the pump was never connected to the proper liquor tube. Make sure every pump has three tubes connected to it before adding liquor to the system.

The next step is to load the bottle rack in the liquor room. In this portion of the set-up, you'll need to work with the establishment owner or manager to have liquor inventory readily accessible to get the system going.

Slide a nozzle over each bottle until the bottle seats itself inside the nozzle housing. One liter small neck bottles use nozzle #8006417; 1.75 liter and large-neck bottles use #8006486.

Bend the nozzle over with your forefinger to stop liquor flow. See figure 4-9.

Remove the protective cap from the reserve port and save it. You may need it later on to keep contamination out of the reserve during remodeling and other inactive periods.

Insert the nozzle into the reserve port and push in. Stand the bottle straight upside down.

Loosen the hold-down knob and slide the hold-down down until it touches the center of the bottle. Push down until there's firm tension, and then tighten the knob. You shouldn't have to adjust the hold-down again — just bend the nozzle shut and snap the bottle into place. To remove an empty bottle, lift up lightly on the hold-down and pull the bottle out.

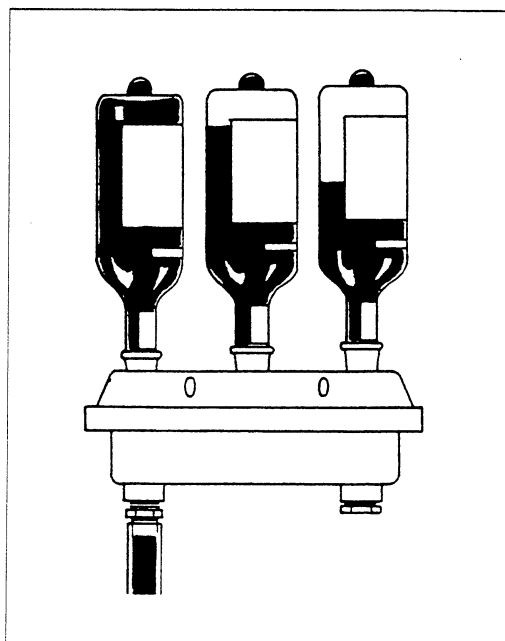


Figure # 4-10 : Sequential alignment of bottles.

If you're working with some bottles that aren't full, it makes a difference where you position them. Since bottles drain from the highest to lowest port, half-empty bottles should be moved to the highest port so they drain first. See figure 10.

To find out how much liquor is in your reserve, just check the airline tube which runs alongside the reserve. Since the air solenoid and the reserve are both open to atmospheric pressure, the reserve's liquor level will match the level in the tube running from the pump to solenoid.

When you remove the nozzle from an empty bottle, always rinse it in warm water and let it dry before putting in on another bottle. And keep an extra supply of clean nozzles on hand.



CAUTION : DO NOT USE SOAP to clean the nozzles. This shortens the life of the nozzle, and can cause the manifold to leak.

Whenever you leave a port without a bottle in it, cap the port tightly to prevent contamination entering the liquor system.

SETTING UP THE LINE

The next step in the system installation is to fill the lines with liquor and make certain the correct brand is dispensed from the appropriate gun nozzle. Check the regulator in the liquor room, making sure you're set at 15 psi at this point. Go to the furthest station from the liquor room and follow one of the two procedures listed below:

1. Press BRAND # 1 - WAIT 3 SECONDS, press # 1 AGAIN - WAIT 3 SECONDS, press # 1 AGAIN - WAIT 3 SECONDS, etc.... until liquor dispenses.

or

2. Press BRAND # 1, THEN press BRAND # 2, THEN BRAND # 1, THEN # 2 AGAIN, etc.... until liquor dispenses.

Continue the same procedure for each of the brands on the gun. Figure 5-1 shows which brand numbers are dispensed from each port on the face of the dispenser gun.

Go to the next furthest pouring station and perform the same procedure, pressing each button on each gun until the brands flow. Continue until liquor flows from all stations. If it doesn't, see the Troubleshooting Section. When all brands flow at all pouring stations, take a few minutes to check the lines for leaks. Inspect the back room, the tubing route, the ECU linkage, and the dispenser and gun. Now it's time to lock in the pressure.

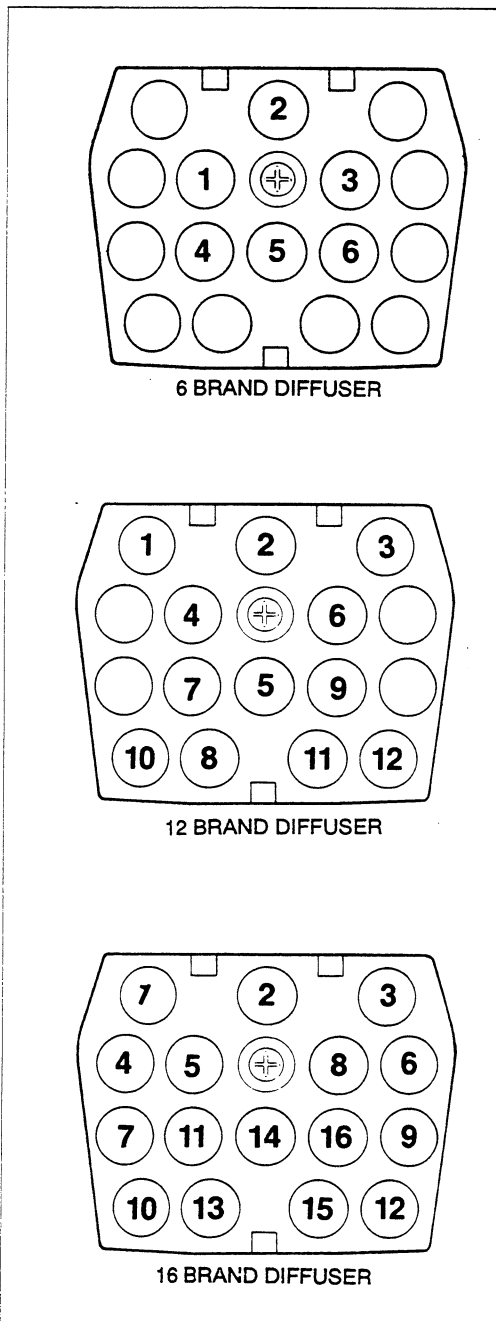


Figure # 5 - 1: Dispenser brand number location.

SETTING THE REGULATOR

For the system set-up, you set the regulator pressure to 15PSI. Now that the system's checked out, it's time to bring the pressure up to the standard operating range.

Lift the locking ring as shown in figure 5-2. Turn it **clockwise** until the gauge shows 50 PSI, then push down on ring.

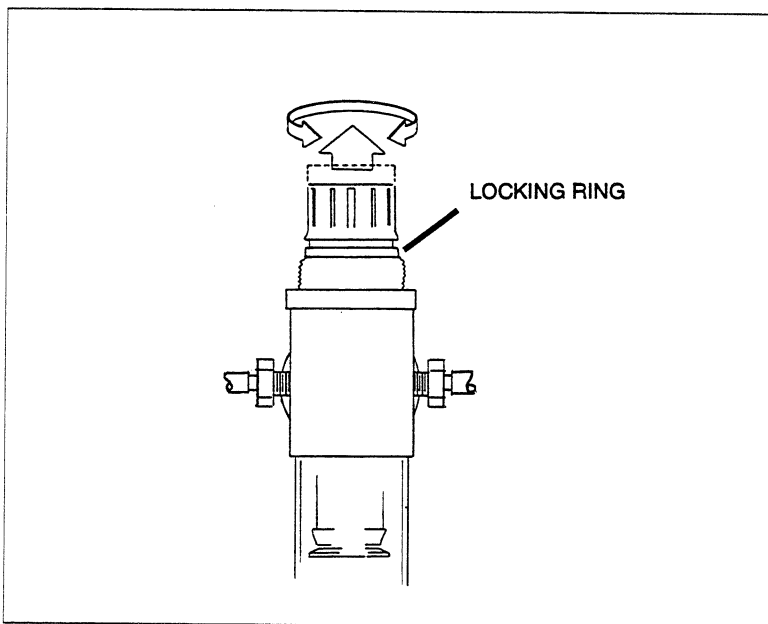


Figure # 5 - 2 : Regulator locking ring .

SETTING THE FLOW RATES

NOTE: If you have a LASER-Trak or Infinity system, you'll need to refer to that manual for instructions on determining drink sizes.

You have two ways to vary the size of your drinks: you can adjust the time that the liquor flows, or you can adjust the rate at which it flows. You set time at the potentiometer (timer set) and flow rate at the solenoid metering stems. The first step in determining drink sizes is to set the flow rate.

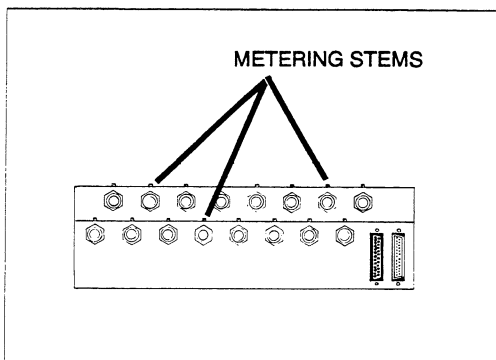


Figure # 5 - 3 :Metering stems.

Go to the dispenser which is furthest from the reserve system. Remove the screws which you've left loose, slip the dispenser out of the mounting bracket, and set it down so that you can reach the solenoid metering stems.

Now push button #1 three times. Be careful here, since the liquor might come out at a high velocity, since the system's in the process of getting adjusted. You want a fast flow of liquor, but no splash.

Adjust flow with the liquor solenoid metering stem, see figure 5-3. If you have a LASER-Trak or the Infinity system adjust each brand. If not, adjust only brand one.



CAUTION: You can only turn the solenoid meter stems 4 1/2 turns from the closed position. That's their full turning range. The stems come from our factory preset at 2 turns, so trying to turn them more than 2 1/2 turns from the preset 2 turns could cause liquor to seep out the bottom of the solenoid.

You may want the overall pressure a little lower if the system has only one dispenser, or if the dispensers are close to the liquor room. If so, adjust the regulator in the back room.

Once you established a pressure that works well throughout the system, make sure you set it with the red locking ring, and mark the setting on the label provided with the regulator.

The system electronics includes three sets of timers. Each set of timers has three potentiometers — for regular, small, and large portions. The 6-brand system uses only timer set A. 12- and 16-brand dispensers may use all three timer sets. See figure 5-4.

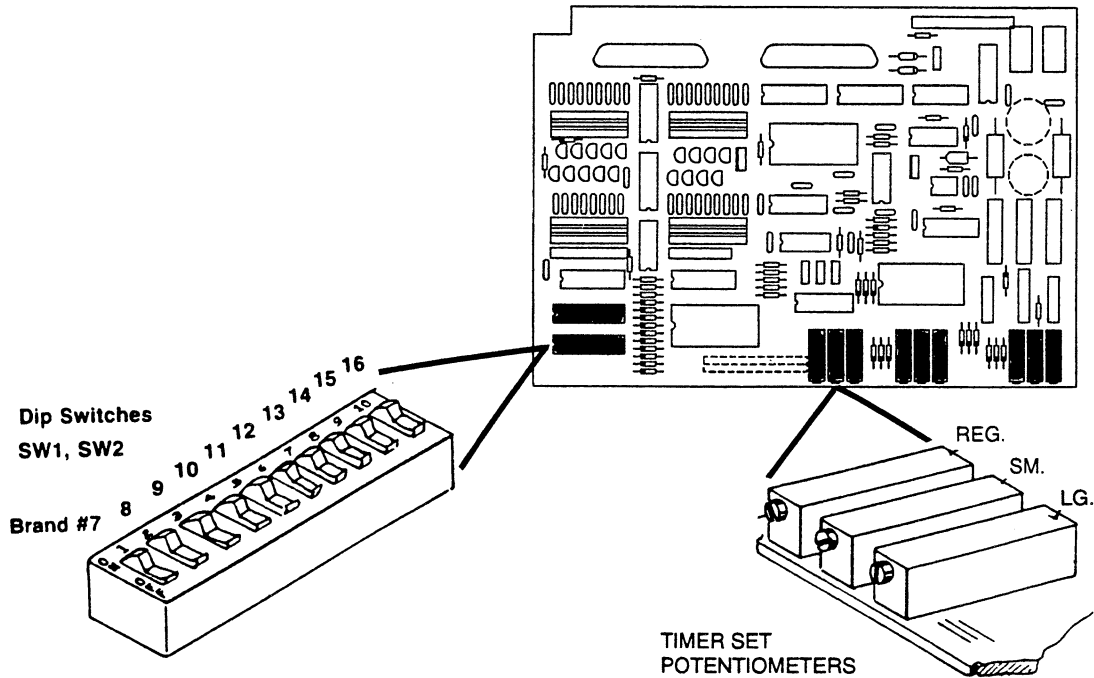


Figure # 5-4 : Electronic Control Unit circuit board.

For the basic LASER system, all regular-size timers are preset by Berg at about 1 1/3 seconds. The (small) timers are set at about 1 second, and the (large) timers are set at 2 seconds.

Timer sets control only the duration of the pour; flow rates are controlled by the solenoid metering stems.

SETTING UP THE FIRST SIX BRANDS

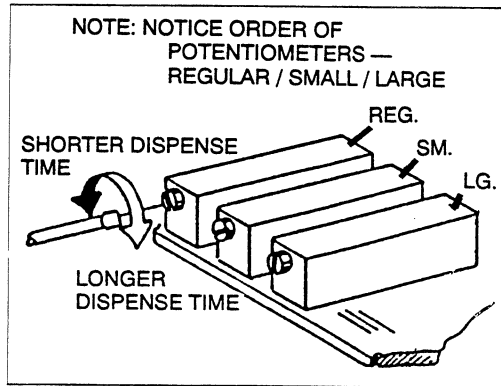


Figure # 5 - 5 : Setting a regular drink at the potentiometer

Now that you have established your flow rate for brand one, your next step is to establish regular drink size. Dispense a regular drink of brand #1 into your graduate. Decide whether this is the amount of liquor you want to dispense in a regular drink of brand #1. To change the amount of liquor dispensed, increase or decrease the time of pour by adjusting the regular timer of timer set A. See figure 5-5.

To increase the size of this drink — turn the screw on the timer of timer set A in a clockwise direction.

To reduce the size of the drink, turn counter-clockwise.

Once you've established the regular size for brand #1, you then set the small and large drink sizes for brand #1 at the small and large timers of timer set A. You've now completely set brand one for this dispenser.

To adjust each of the next five brands, you'll set their regular drink size to match that of brand #1 by adjusting the solenoid metering stems. By doing so, you'll match the flow rate of each brand with that of brand #1. Since all brands on the same timer set pour for the same time and now at the same rate of flow, you won't have to adjust small or large size drinks. You've now completely set the first six brands on the system, in regular, small, and large drink sizes.

If you have only a six-brand system, skip to "Setting Up Counters"; if you have a twelve or sixteen-brand system, continue.

TWELVE OR SIXTEEN-BRAND SYSTEMS

Bar managers and owners often want to have greater flexibility in pricing and portions as their operations become larger. The LASER system takes this desire into account. By using what we call different “timer sets,” you can add various layers or modes of pricing. Some managers want to establish different pricing levels for drinks with different costs or different viscosity. Many use these timer sets to distinguish call, well, and premium drinks.

Berg’s LASER system lets you break your drinks into three separate categories. You assign each of these groups to a different timer set, so that all drinks in a group pour for the same duration. Premium drinks could pour significantly less than well drinks, for example. Call drinks could pour less than well drinks. Bar manager/owner and installer will want to work closely together to decide on the best assignment of brands to timer sets.

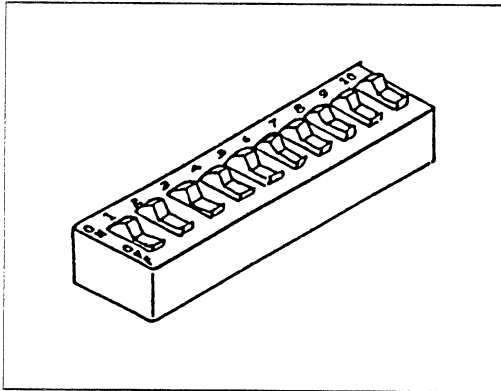


Figure # 5 - 6 : Selecting the timer set

On the first six-brands of any system, you’re restricted to timer set A. SW1 and SW2 have no effect. In a twelve-or-sixteen brand system, you have more options. If all 12 or 16 brands have the same portions and prices, continue with the procedure used for setting up brands two through six.

To set up brand #7 on timer set B, go to the first switch position in SW1 and turn it ON. Now brand #7 will be controlled by timer set B. To add additional brands to timer B, simply turn those switches on (#8, #9, #10, up to #12 or #16). Whatever switches you turn ON on SW1 will be controlled by timer set B.

To set up brands on timer set C, go to SW2 and turn ON the brands you want on timer set C.

NOTE: You can’t turn on the same brand switch on SW1 and SW2. In other words, if you turned ON brand #7 in SW1, you can’t turn on brand #7 on SW2.

Whatever switches you turn ON on SW2 will be controlled by timer set C.

Once you've distributed your drinks between timer sets B and C, you set up each of those sets just like you set up the first set of six brands.

We'll use brand #7 as an example:

- 1) establish a flow rate for brand #7 (and so for all of timer set B) at the #7 solenoid metering stem
- 2) set the regular drink size for that brand at the regular potentiometer screw of timer set B
- 3) set small and large drink sizes at timer set B
- 4) then set flow rates for the remaining brands to match # 7
- 5) finally, go to C and repeat these steps for all brands selected to use timer set C

REMINDER: To change the sizes of one brand of a set, you adjust the solenoid for that particular brand. To change the relative size of a smaller or larger portion, you adjust the potentiometer for all brands in the timer set. All brands on the same set of timers pour for the same duration.

SETTING UP COUNTERS

Drink counters are a useful option on the LASER system. We offer two types of counters:

The 3C counts drinks according to small, regular, or large sizes.

The 9C counts drinks according to both size (small, regular, and large) AND price category (for example — well, call, and premium)

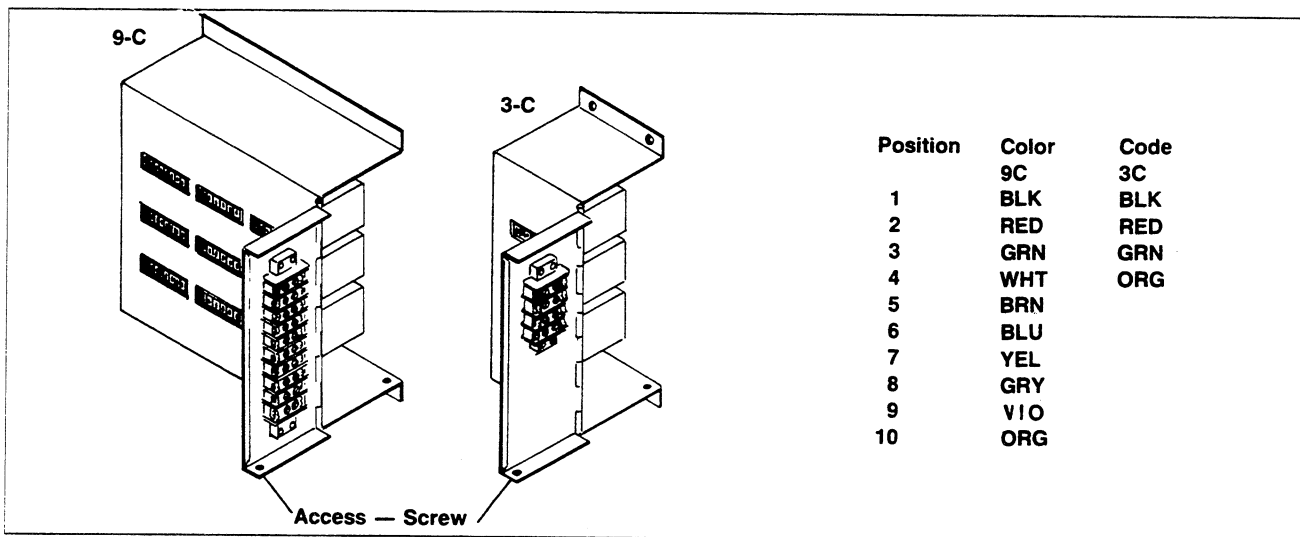


Figure # 5 - 7 : Counter options

If the customer wants more detailed pouring reports, you should discuss the advantages of the LASER-Trak or Infinity management software package.

The Berg counters operate simply. When a regular, small, or large drink is poured, the appropriate counter advances one number. The 9C counter allows monitoring by price category, as well as by drink size. Each counter is linked to a single timer potentiometer. If you used all three timer sets to determine drink sizes, the 9C counter will keep track of the brands assigned to the appropriate timer set.

To mount the counter, hold the unit level and insert the mounting screws. Don't mount counters where moisture, dirt, chemicals, or vibration might affect operation. Be sure you'll be able to open the access door on the right side of the counter.

A 10-foot cable is standard with the Berg counter. If you need to mount the counter at a greater distance from the ECU than this cable allows, you'll need to run a special cable. Contact us for details.

Before connecting the counter cable, unplug the ECU main power cord. The Berg counters are pre-wired, so installation is easy. Simply run the counter cable from the rear of the counter to the rear of the ECU. The counter port on the ECU is right next to the Berg Company label. The unit comes from the factory with a jumper plug connected in this port. Note how this plug is connected before removing it. The counter connector should be connected exactly as the jumper plug was. Once the cable's plugged in, reconnect the ECU power cord.

NOTE: Care must be taken to ensure that the counter plug is connected properly. This connector can be connected improperly. This will not damage any components, however, neither the counters nor ECU will work properly.

Finally, test each counter. Push a drink button and watch the regular drink counter advance. Repeat for small and large portion buttons.

SOME FINAL CONSIDERATIONS

Now that you have the system up and running, you can finish up some of the details. Dress all tubing in the back room — make sure tubing is secured to the wall and safely out of the way. Check that tubing and wiring around dispensers and the ECU's are neat and safe from exposure to regular bartending operations.

Make sure you have drip loops in all cables. The typical bar is a wet environment, and drip loops will protect the investment in Berg equipment.

Tighten the screws in the dispenser mounting bracket. You left these finger-tight before.

Double check that the regulator locking cap is down and locked.

Mount labels as shown in figure 5-8.

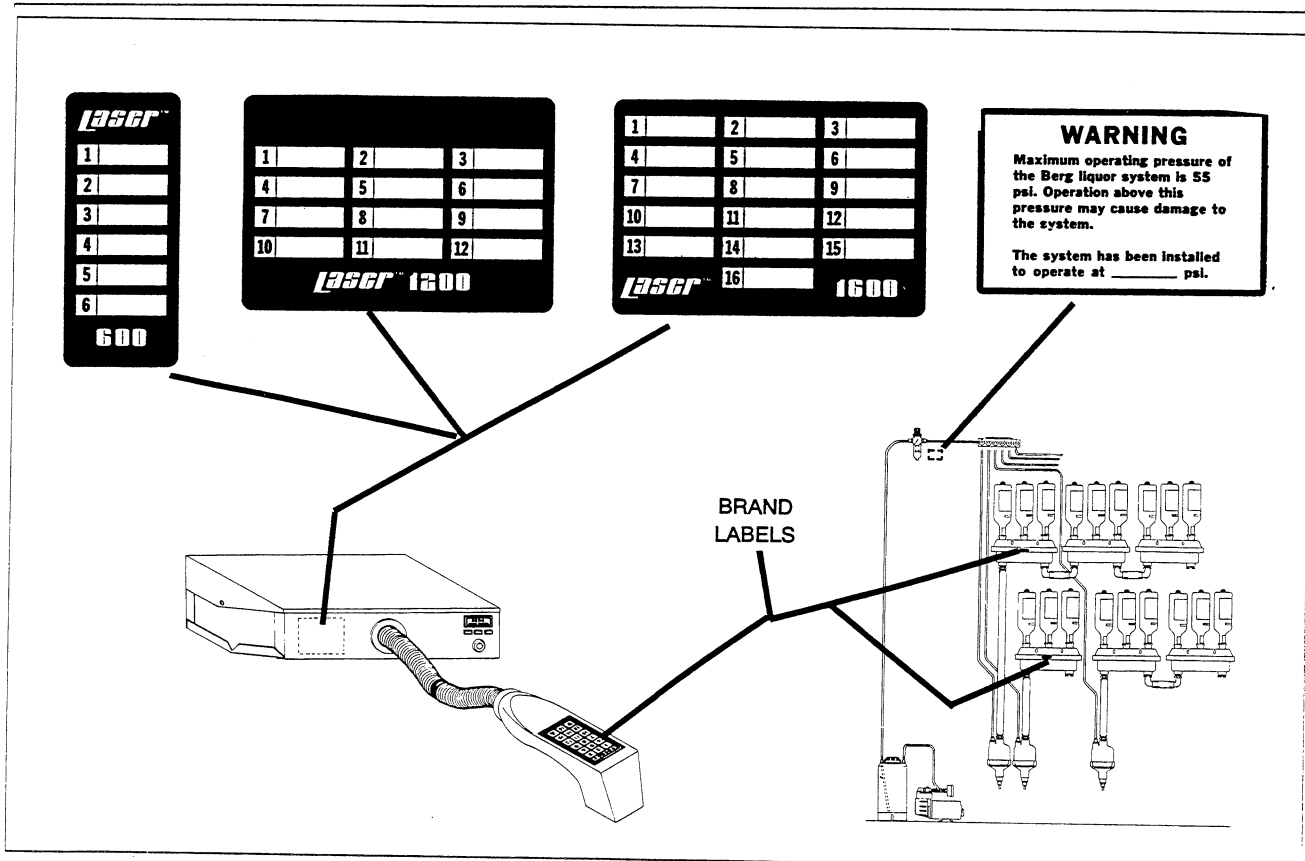


Figure # 5 - 8 : Berg system labels and positions.

CARING FOR THE LASER SYSTEM

For the cleaning covered in this section, warm water means 130 degree Farenheit or less. Never use hot water.

Rinse nozzle in clear, warm water and set it out to air dry each time a bottle is emptied. Don't use soaps: they break down the natural oils in the nozzle material. If cleaned with soap, it will eventually expand, fail to fit properly, and crack.

Keep the bottle hold-downs on the reserves tight, making sure the bottle is held on the reserve securely. When restocking the reserves, remove empty and partially empty bottles in all but the highest position in the reserves. Put the partially empty bottle in the highest position.

To clean the reserves and pumps, use warm water and a sponge. Don't get water into the breathing vents on top of the reserves and never use cleaning chemicals around them.

To clean the dispenser guns, use warm water and a mild, non-abrasive detergent. Avoid getting cleanser into the diffuser screens on the bottom of the gun.

Wash the dispenser with warm water and a sponge.



CAUTION !

Don't attempt to clean the ECU. If a spill occurs on the outside housing, unplug the power and wipe the unit with a damp sponge. If liquid gets inside the ECU, unplug the ECU, and call your Berg Dealer IMMEDIATELY.

TROUBLESHOOTING THE BERG LASER SYSTEM

This section of the Laser Installation Manual will show you how to repair some of the things that may eventually go wrong ... or appear to go wrong ... during operation of the Berg Laser system. Probably the most important principle you can understand about troubleshooting a sophisticated system like Laser is that you'll have better success solving problems if you can narrow down the source. The more parts of the system you can eliminate as potential trouble points, the more likely you'll be able to target the actual component causing the trouble and repair or replace it. At Berg, we call this **modular troubleshooting**.

Before you begin repair work on a "down" or malfunctioning Laser system, ask the customer several questions:

1. What is or isn't the system doing?
2. Where does the problem happen: is it in just one station, or are all of the stations doing the same thing?
3. When did the problem start occurring in the system.
4. How often does the problem occur?
5. Is the problem still happening?

We strongly encourage you to take a few minutes to consider the possible causes before you start work on the system. **Why** is (or isn't) the system acting this way? What is the system "thinking" to make it act this way?

Also, think for a moment, what must happen in order to pour a drink:

1. A brand button must be pushed.
2. An electrical signal must get down the 25-pin brand select cable to the ECU.
3. In order for the ECU to open or "fire" the proper air solenoid, the signal must make its way through the air solenoid pigtail and cable to the liquor room and air solenoid.
4. The air solenoid pressurizes the pump, forcing liquor through the liquor lines.
5. The ECU must open the proper liquor solenoid. The signal must make its way to the dispenser through the 25 pin liquor solenoid cable.
6. The ECU "turns off" or closes both the liquor and air solenoids.

Before you begin troubleshooting, attempt to verify the problem that the customer described. Also note that problems at one station may cause problems system-wide, so it's important you eliminate potential causes as early as you can.

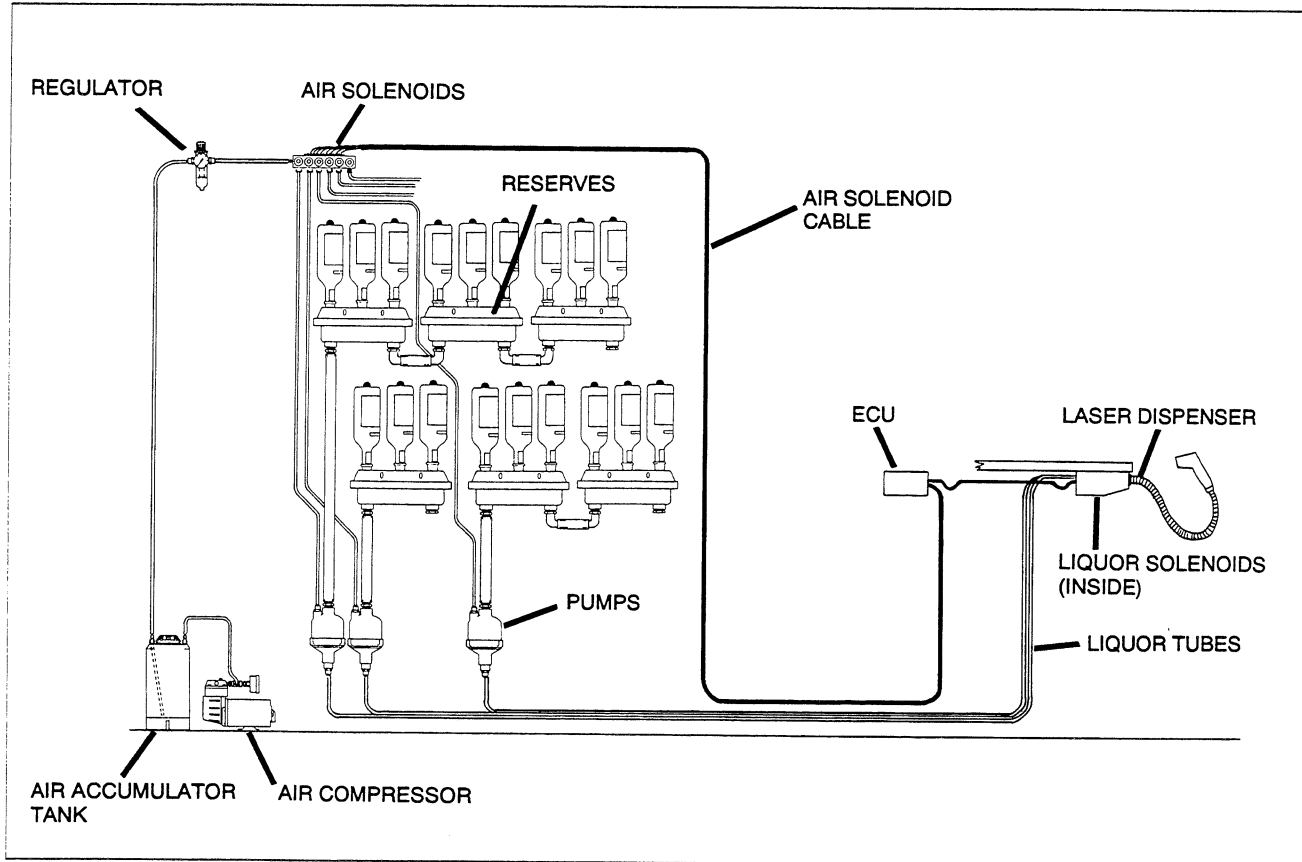


Figure # 7-1: System schematic overview.

Bring your spare parts kit when you go on the service call, as well as the tools found on page 2-10. These parts will be extremely beneficial for quickly troubleshooting and repairing the system.

We've broken down potential problems into nine major areas.

These problems are:

Problem #1. Nothing will pour from any Dispenser. Page 4.

Problem #2. One Dispenser doesn't have any lights and doesn't pour, but other Dispensers on the system are functioning. Page 6.

Problem #3. One Brand doesn't pour at any of the Dispensers. However, all other Brands pour at all Dispensers. Page 8.

Problem #4. Other Dispensers pour a Particular Brand, and this Dispenser will pour other Brands except this Particular Brand. Page 10.

Problem #5. Pouring a drink results in a dribble rather than a full drink. Page 12.

Problem #6. After pouring a drink, Liquor continues to flow from the Dispenser. Page 14.

Problem #7. After Pouring a drink, The Pump doesn't Refill with Liquor. Page 15.

Problem #8. Liquor overflows the Reserve. Page 16.

Problem #9. The Air Compressor Runs Continuously. Page 17.

PROBLEM #1. NOTHING WILL POUR FROM ANY DISPENSER.

First, check some things in the liquor room. Check to make sure the air compressor is plugged in. Does the air regulator show the pressure you've set up for the system: between 5 and 50 PSI? Even low pressure should be enough to send a dribble through the dispenser. Make sure there aren't any air leaks in the air delivery system. Are the air solenoids hooked up properly?

Check the air solenoid cable crimps, especially the orange wire. You spliced the cable at installation with ScotchLok cable crimps. If a crimp is bad, the signal may go from the gun to the ECU, but the signal may not make it to the liquor room. One bad crimp may cause more than one station from firing properly.

Examine all air solenoid cabling carefully, looking for cuts or rips in its insulation. Start in the liquor room, and follow the air solenoid cable to each of the ECUs. While examining the air solenoid cabling at the ECU's, make sure the air solenoid cabling is plugged in properly, it should be secured to the ECU using the cable hold downs on the ECU. If this cable is cut in any place, it could cause the circuit breakers to pop inside any or all of the ECU's, and it should be repaired immediately.

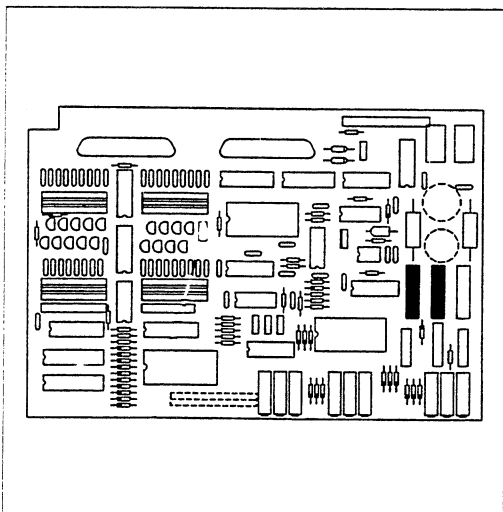


Figure # 7-2: Circuit breaker location on PCB.

Look at the printed circuit board (PCB) inside the ECUs. See figure # 7-2. The orange circuit breakers should be in the down position. If you see white, they're up and the circuit's been overloaded. If all of the ECU's have circuit breakers popped, remove all of the air solenoid connectors from the ECU's, and reset the breakers in each ECU by pushing the black button down. Make sure that they all stay on. If no breaks or rips in the cabling are found, plug the air solenoid cable into just one of the ECU's, and see if the unit will pour all brands without popping its breakers. If it doesn't pop the breakers, go to the next station, and fire all brands, and check all brands. You'll know when you find a bad ECU, because the breaker will pop.

While testing one ECU at a time, you may get to one ECU that pops its breaker, and causes the other ECUs on the system to pop their breakers. If this happens, remove all connectors except from the ECU that you last plugged the air solenoid cable into. Then, plug in only the power cord, and see if that ECU pops its breaker. If it pops its breaker, the ECU is bad.

Verify that the proper air solenoid is firing by removing the tube that goes from the air solenoid to the pump. Remove the tube at the air solenoid. Have someone at the bar fire a particular brand, brand #1 for example. Remain in the liquor room and verify that air solenoid #1 is firing. Since the tube coming out of the air solenoid has been disconnected, whenever brand #1 is fired, you should be able to feel air coming out of the solenoid. If you never feel air coming out of the air solenoid, check to make sure that no other air solenoid is firing. If another air solenoid is firing, chances are you've got some wires crossed either in your splicing with the Scotchlock connectors, or at the solenoid block.

If you get air out of the solenoid, verify the liquor linkage. The simplest way to do this is to use an empty bottle in the liquor room. First, make sure the tube that goes from the air solenoid to the tube is connected properly. Then, remove one of the liquor lines, let's say brand #2, from the Laser dispenser, and have someone at the dispenser attempt to dispense a drink of brand #2. When, and only when the solenoid fires, you should get a spurt of liquor out of the tube and into your bottle. If you don't get liquor, then you've probably got crossed, crimped, or leaky liquor tubes..

If none of these steps do not solve the problem, call Berg.

PROBLEM #2. ONE DISPENSER DOESN'T HAVE LIGHTS AND DOESN'T POUR, BUT OTHER DISPENSER ON THE SYSTEM ARE FUNCTIONING.

First, check some often overlooked things, such as:

Is the key switch on?

Is the ECU plugged into an approved grounded outlet? Check that the socket is "live" by plugging a lamp or radio into it.

Two 25-pin cables run from the back of the ECU (electronic control unit) to the Laser dispenser at the bar. One controls the gun signals, this is called the brand select cable. The other is called the liquor solenoid cable. Check to make sure they are properly connected to the ECU and to the dispenser. The cables should be secured by screwing the holddowns on the cable to the standoffs on the chassis.

See Figure #2. The ECU arrives from Berg with the counter enabled and a dummy counter plug inserted in the white 13-pin receptacle. With the counters enabled, the system will not pour unless either the dummy plug shipped with the unit or an actual counter cable are plugged into that socket. If you don't want counters on the system, you'll need to make an adjustment on jumper #6 (JPR6). See Figure #7-3. Note that there are three posts, and that the jumper plug can only cover two of them at one time. To use the unit without a counter, switch the plug to cover the two posts by the w/o label (for without counter).

If the system is installed with counters, it won't pour unless either the dummy plug is installed or a 13-pin cable runs from the back of the ECU to the counter unit. When connecting this counter cable to the ECU, the cable's wire loop must be on the side of the plug that's closest to the power cord. In addition, check that the pins are aligned properly. Sometimes the plug can appear properly plugged in when the pins are actually misaligned. Examine the connection closely.

Check the Reset button on the back of the ECU, if it's popped, reset it. If it will not stay set, remove all cables except power cord from the ECU, and try pushing the reset button. If the Reset on the ECU will not stay down with all cables removed, the ECU is bad.

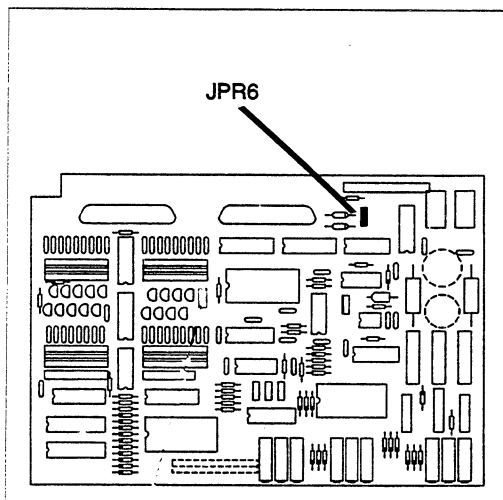


Figure # 7-3: Location of Jumper #6.

Look at the printed circuit board (PCB) . The orange circuit breakers should be in the down position. If you see white, they're up and the circuit's been overloaded. Push a popped circuit breaker back down and see if the station will operate. If the circuit breakers will not stay down, remove all cables except the power cord from the ECU, and reset the breakers. If the breakers will not stay down, the ECU is bad.

If the installation has more than one station, remove the questionable ECU, take it to a station that's working properly, and hook it up. Make sure you connect all cabling correctly. If the station continues to function properly with the questionable ECU installed, then you know the problem is not in the ECU. The problem is either the dispenser or the 25-pin cable. If the station that was functioning properly now stops working, then the ECU is clearly defective. Call Berg.

The 25-pin cables that run from the ECU to the Laser dispenser can be tested in the same manner as the ECU was tested above. Take the 2 25-pin cables from the questionable dispenser and connect them to a station that's working properly. If the station that was working continues working with the cables from the questionable cables, the cables are good. The problem remains at the dispenser of the questionable station.

If you've gone through the steps above without success, you may have a bad key switch. To check this, take a basic jumper wire with an alligator clip at each end and attach one end to each of the posts on the inside of the keyswitch . The jumper wire will bypass the key switch. If the unit now functions, then the problem was the key switch. Replace it.

If none of these steps pinpoint the problem, call Berg.

**PROBLEM #3. ONE
BRAND DOESN'T POUR
AT ANY OF THE
DISPENSERS.**

However, all other Brands
fire at all of the
Dispensers.

First check the liquor room and see the reserves contain liquor.

Check the air solenoid cable crimp, especially the wire for that particular brand (see appendix A). You spliced the cable at installation with ScotchLok cable crimps. If a crimp is bad, the signal may go from the gun to the ECU, but the signal may not make it to the liquor room. One bad crimp may cause more than one station from firing properly.

Are the 24-pin air solenoid cables properly connected to the ECU air solenoid port in each of the ECUs? They should be locked in place with cable holddowns.

Verify that the proper air solenoid is firing by removing the tube that goes from the air solenoid to the pump. Remove the tube at the air solenoid. Have someone at the bar fire a particular brand, brand #1 for example. Remain in the liquor room and verify that air solenoid #1 is firing. Since the tube coming out of the air solenoid has been disconnected, whenever brand #1 is fired, you should be able to feel air coming out of the solenoid. If you never feel air coming out of the air solenoid, check to make sure that no other air solenoid is firing.

If no other air solenoid is firing, switch solenoid wires with another solenoid on the block. Have someone fire the two brands on one of the dispensers. If the solenoid that wasn't firing still isn't firing, and the other solenoid still is firing, the solenoid is bad.

If another air solenoid is firing, chances are you've got some wires crossed either in your splicing with the Scotchlock connectors, or at the solenoid block.

If you get air out of the solenoid, verify the liquor linkage. Check for any crimped tubing or a hole a liquor tube, or a leaky fitting. The simplest way to check for this is to use an empty bottle in the liquor room. First, make sure the tube that goes from the air solenoid to the tube is connected properly. Then, remove one of the liquor lines, let's say brand #2, from the Laser dispenser, and put the tube into the empty bottle. Have someone at the dispenser attempt to dispense a drink of brand #2. When, and only when the solenoid fires, you should get a spurt of liquor out of the tube and into your bottle. If you don't get liquor, then you've probably got crossed, crimped, or leaky liquor tubes.

If none of these steps pinpoint the problem, call Berg.

**PROBLEM #4. OTHER
DISPENSERS POUR A
PARTICULAR BRAND,
AND THIS DISPENSER
WILL POUR OTHER
BRANDS EXCEPT FOR
THIS PARTICULAR
BRAND**

This problem could be traced to several components:

- The brand button, or switchpack
- The ECU
- The brand select or liquor solenoid cables
- The air solenoid cabling
- Liquor tubing problems

Here, you'll apply modular troubleshooting techniques to solve the problem.

1. Check the two 25-pin cables run from the back of the ECU (electronic control unit) to the solenoid housing at the bar. One controls the gun signal and the other the liquor solenoid. Are they properly and securely plugged in?
2. Move JPR #4 inside the ECU to the SIMUL position. While pushing brand buttons on the dispenser, see if you can hear the liquor solenoid inside of the dispenser opening and closing. If you hear the solenoid opening and closing, go to step 6. If you can't hear the liquor solenoid open or close, proceed with step 3.
3. Switch the ECU at the malfunctioning station with an ECU that you know works properly. Make sure JPR #4 is in the SIMUL position in the known good ECU. If the station that wasn't pouring a certain brand works properly after switching ECUs, The ECU is bad. If the station still doesn't open the liquor solenoid, proceed with step 4.
4. Switch the brand select and liquor solenoid cables with known good cables. If the station now fires the liquor solenoid, one or both of the cables were bad. Find out which of the two were bad by replacing the known good cables, one at a time, with the questionable cables. when the dispenser quits working, you've found the bad cable. If the liquor solenoid still doesn't fire, the problem is either the brand button (or switchpack), or the liquor solenoid. Proceed to step 5.

5. Test the switchpack removing the 25 pin brand select cable from the dispenser, and plug your switchpack from your spare parts kit into the 25 pin cable. On the good switchpack, press the brand button that wasn't working, and see if the liquor solenoid will open and close. If it does, you've got a bad brand button, or switchpack. If the liquor solenoid still doesn't fire, the liquor solenoid is bad.

6. If the liquor solenoid has been firing when pushing brand button, the problem is in the air solenoid cabling, which is probably a bad splice in the cabling. If re-crimping the splice doesn't help, examine the air solenoid cabling for cuts in the insulation. If you find cuts in the insulation, repair the cable.

7. If both air and liquor solenoids are firing properly, you've probably got a crimped liquor tube.

If these steps do not pinpoint the problem, call Berg.

PROBLEM #5. FIRING A BRAND RESULTS IN A DRIBBLE RATHER THAN A POUR. All other brands work properly.

Check the reserve levels in the back room: is there liquor to pour?

Look at the air pressure — is it too low to send liquor through the system? Increase the regulator pressure if it's below the setting you've established for this system. If the regulator will not adjust, check the air delivery system for leaks

Walk the liquor lines and look for a crimped tube or a leaking tube or fitting.

Are the tubes connected properly to the solenoids? Do the pumps match up correctly with the air solenoids? This can be a problem at installation.

Verify that the proper air solenoid is firing by removing the tube that goes from the air solenoid to the pump. Remove the tube at the air solenoid. Have someone at the bar fire a particular brand, brand #1 for example. Remain in the liquor room and verify that air solenoid #1 is firing. Since the tube coming out of the air solenoid has been disconnected, whenever brand #1 is fired, you should be able to feel air coming out of the solenoid. If you never feel air coming out of the air solenoid, check to make sure that no other air solenoid is firing.

If no other air solenoid is firing, switch solenoid wires with another solenoid on the block. Have someone fire the two brands on one of the dispensers. If the solenoid that wasn't firing still isn't firing, and the other solenoid still is firing, the solenoid is bad.

If another air solenoid is firing, chances are you've got some wires crossed either in your splicing with the Scotchlock connectors, or at the solenoid block.

If you get air out of the solenoid, verify the liquor linkage. Check for any crimped tubing or a hole a liquor tube, or a leaky fitting. The simplest way to check for this is to use an empty bottle in the liquor room. First, make sure the tube that goes from the air solenoid to the tube is connected properly. Then, remove one of the liquor lines, let's say brand #2, from the Laser dispenser, and put the tube into the empty bottle. Have someone at the dispenser attempt to dispense a drink of brand #2. When, and only when the solenoid fires, you should get a spurt of liquor out of the tube and into your bottle. If you don't get liquor, then you've probably got crossed, crimped, or leaky liquor tubes.

Check and see whether there's something stuck in the liquor solenoid itself. Also, check the diffuser block if you have a Laser gun. If its plugged, soak only the diffuser block in warm water for a few minutes.

**PROBLEM #6. AFTER
POUR, LIQUOR
CONTINUES TO FLOW
FROM THE DISPENSER.**

Check the liquor solenoid inside the dispenser — there's probably some debris preventing a tight seal. Clear out the debris and you should solve the problem. Could be something caught in the liquor solenoid. Might also be something caught in the diffuser screen on the dispenser gun.

**PROBLEM #7. AFTER
POUR, THE PUMP
DOESN'T REFILL WITH
LIQUOR**

The air solenoid may be firing continually and maintaining constant pressure to the pump. This will prevent liquor from flowing back into the pump after a drink is poured. To check this, take off the tube that runs between the pump and the air solenoid. Take the tube off at the solenoid, and check to see if air is constantly coming out of the solenoid. If you can't remove the tube, chances are that's because there's pressure present which is holding it in position. If that's the case, unplug the air the compressors power cord from the wall, and bleed the pressure off the system by using the relief valve on the air accumulator tank. Remove the tube, and then close the relief valve on the accumulator tank and plug the compressor back in. If you feel a steady flow of air, your air solenoid is firing continually.

See if the problem's electrical. If, when you remove the wire for the solenoid from the air solenoid block, the air quits coming out of the air solenoid, the solenoid is mechanically working properly. Put the wire for the solenoid back onto the solenoid block. Then, one at a time, unplug the air solenoid connector from each ECU. Each time you plug one an air solenoid connector into an ECU, check to see if the solenoid turns on. This will be evident because air will come out of the ECU. When you find out which ECU turns on the solenoid, try swapping the ECU with another that's working properly. If the same ECU still turns on the solenoid, the ECU is definitely defective.

If you remove wire from the solenoid block, and air still comes out of the air solenoid, then the problem is mechanical. The solenoid can be taken apart by removing from the solenoid terminal block the two wires that connect to the solenoid itself. Then, take a pliers and turn the solenoid body counter-clockwise, until the solenoid body itself can be removed from the solenoid block. Check to see if the slug inside the solenoid id free to move back and forth. If the slug is stuck, and will not move inside the stem of the solenoid, the solenoid and spring should be replaced.

Check the filter inside of the reserve. If it's plugged with debris, liquor can't flow from the reserve to the pump. This should be essentially the only time you would ever have to take the reserve apart.

**PROBLEM #8. THE
LIQUOR OVERFLOWS
THE RESERVE.**

Make sure the bottle holddowns are tight. If the bottles have too much “play,” air will defeat the seal and cause the bottle to empty into ... and over ... the reserve well. If bottle sizes are changes, the holddowns must be adjusted for the new bottles. Reemember: Keep the adjustment knobs tightened.

Berg has two size nozzles for bottles, and they’re not interchangeable. If you’re using the wrong size, air may get into the bottle and cause it to flow out of control. Be sure the bar is using the right nozzle size for the bottles in use. Over time, these nozzles may also become a bit stretched and misshapen. Check that the installed nozzles fit tightly over the bottle mouths.

You should be cleaning the nozzles after each bottle. In other words, each new bottle should get a new or freshly-cleaned nozzle. To clean nozzles, rinse them in clear, lukewarm water. After rinsing, leave them out to air-dry. **DO NOT USE SOAP:** this will cause the nozzles to dry out, expand, and become brittle.

After you’ve solved the overflow problem, you may need to clean the liquor spilled on the reserve cover. To do this, just take a damp cloth and wipe the liquor away. don’t use cleaning chemicals, and don’t get water down the breather of the reserve.

**PROBLEM #9. THE AIR
COMPRESSOR RUNS
CONTINUOUSLY.**

Check first for leaks in the air pressure system — inspect the tubing and fittings from the air compressor to the accumulator tank and regulator, and the air solenoids blocks for leaks. Use dish soap to spot leaks at joints. You don't need a major leak to cause trouble. A 15 PSI leak will cause the compressor to run almost constantly. Any leak can seriously affect your performance. If the compressor runs for weeks, you'll burn our the motor. It's not designed to run like that.

Check the air regulator, especially for leaks around the bottom of the glass bowl on the regulator. If the regulator is leaking from there, the regulator may have to be replaced.

Check the compressor itself for leaks by disconnecting the tube running from the air compressor to the air accumulator tank. Disconnect the tube only at the Air accumulator tank, and plug the end of the tube. The compressor should shut off within thirty seconds. If the compressor doesn't shut off, the compressor is the problem ... and you should consult your Berg dealer. The check valve keeps air from running back into the compressor, and that's probably what's bad.

Again, any time you can't solve a problem with the Berg Laser System, we're happy to answer your questions. Call Berg at (608) 221-4281.

APPENDIX A

JUMPER SETTINGS

Following are lists of jumpers, switch settings and adjustments along with a brief description of basic function. These are grouped according to fundamental purpose where possible.

JUMPERS

Phrases such as “left position”, “right position”, etc. are used assuming the board is viewed from the component side and oriented such that longest dimension of board is vertical with silkscreen legend characters readable, (i.e. not upside down). A basic system has all 7 jumpers installed in the leftmost position; as various options are installed, the appropriate jumper(s) must be moved to the right.

JPR1, JPR2, JPR3 - FRONT PANEL LITES

These three jumpers control the function of the front panel LED indicators. If communications option IS NOT installed, these three jumpers should be installed in the left position (pins 1-2), where LED function represents portion size, SML, REG, LRG.

If communications option IS installed, these three jumpers should be moved to the right (pins 2-3) where LED function represents the price level, HH, NRM, ENT.

JPR1 controls function of center (yellow) front panel
LED - REG/NRM

JPR2 controls function of leftmost (red) front panel
LED - SML/HH

JPR3 controls function of rightmost (red) front panel
LED - LRG/ENT

JPR4 - LOCKOUTS

Simultaneous pouring of the same brand by multiple stations may cause minor inaccuracies in pour size. The magnitude of this potential inaccuracy is dependent upon several factors specific to the physical configuration of the installation site.

- * number of stations driven by each delivery system
- * number of stations supplied through a single tubing run
- * the existence of extremely long tubing runs
- * extreme differences between lengths of tubing runs to different stations.

APPENDIX A

Each station is equipped with circuitry to detect pouring activity of all other stations in the system. This circuitry is provided to either allow for, or to prevent the simultaneous pouring of the same brand on multiple stations. Lockouts may be enabled in any particular station. Enabling this lockout will inhibit the pouring of a particular brand by that station if a pour of the identical brand is already in progress on another station in the system.

JPR4

enables/disables lockouts; left = lockouts enabled, right = disabled.

JPR5 - PORTION TIMER CONTROL JPR5

in the leftmost position utilizes the standard adjustable analog portion timers. If the communications option is installed, JPR5 should be moved to the rightmost position, which causes the microprocessor to generate all portion timing.

JPR6 - TAMPER PROTECTION DEFEAT

An optional counter assembly is available which accumulates all pouring activity on non-resettable counters. A mechanism has been provided which disables the operation of the station if the connector for the cable leading to this counter assembly is removed. JPR6 is provided to defeat this security feature, either for those units without the counter assembly option, or for use in those installations with counters where security is not an issue. Normally, JPR6 should be moved to the right when counter assembly is installed.

JPR6 left = defeat; right = tamper protection enabled

APPENDIX A

JPR7 - AUTO SIZE RESET DEFEAT

Note: This jumper is present only on REV-C and later boards.

Small or large portion selection is made by depressing one of the size buttons on the gun prior to dispensing. This also illuminates the appropriate indicator light. Normally, the system will automatically reset the size selection to REG (and indicator light will turn off) after one pour has been completed.

Some installations may prefer totally manual size selection (e.g. different portions during happy-hour or whatever). Therefore, it may be desirable to defeat this automatic size reset feature. Moving JPR7 to the rightmost position will defeat this auto-reset; when SML or LRG is selected, it will remain in that mode with the appropriate indicator illuminated, until manually changed.

JPR7 left = normal auto reset; right = defeat (manual size reset)

If the communications option is present in the system, this jumper has no effect; the behavior of size selections is then controlled by the microprocessor, and can be changed by downloading of software flags provided. (see Laser-Trak manual).

PORTION TRIMPOTS

If analog timers have been selected via JPR5, pour duration can be modified by adjustment of the appropriate trimpot. Trimpot function identification is as follows:

AR - TIMER SET A, REGULAR PORTION
AS - TIMER SET A, SMALL PORTION
AL - TIMER SET A, LARGE PORTION

BR - TIMER SET B, REGULAR PORTION
BS - TIMER SET B, SMALL PORTION
BL - TIMER SET B, LARGE PORTION

CR - TIMER SET C, REGULAR PORTION
CS - TIMER SET C, SMALL PORTION
CL - TIMER SET C, LARGE PORTION

APPENDIX A

DIPSWITCHES

Dipswitch settings discussed within this section are not applicable if communications option is installed, since the microprocessor generates all pour durations and records all pouring activity.

For those systems without the communications option, three sets of analog timers have been provided, with each set consisting of three timers (small, reg, large). Additionally, two different configurations of counter assemblies are available as an option.

One option consists of three counters, which total pouring activity of each of three portion sizes. A second option, with nine counters, is available which total pouring activity of three different price categories, with each category consisting of three portion sizes.

Dipswitches SW1 and SW2 are provided to assign particular brands to alternate timer-sets and alternate counter-sets. SW1 corresponds to timer/counter set-B, and is used to assign a particular brand from (default) set-A to set-B. Similarly, SW2 corresponds to timer set-C. Brands 1 through 6 are fixed, and permanently assigned to the (default) timer/counter set-A. Any of brands 7 through 16 can be assigned to timer/counter set-B or set-C.

Use of these alternate timers may be desirable in cases where extreme differences in viscosities between brands cannot be compensated for by adjustment of the variable orifice solenoids.

Additionally, since selection of an alternate timer also selects an alternate counter set, it may be desirable to make these selections based upon the price category of each brand.

APPENDIX B

WIRING REFERENCE GUIDE

GUN SIGNALS

25-pin D-connector (MALE cable) at electronics enclosure:

		16-BR	12-BR	6-BR	BERGQUIST		
					TOP	BOTT	
J6-1	SW1	4-yel	4-yel	6-blu	10	-	
J6-2	SW2	14-yel	14-yel	12-red	5	-	
J6-3	SW3	20-blk	20-blk	18-gry	2	-	
J6-4	SW4	6-blu	6-blu	8-gry	9	-	
J6-5	SW5	12-red	12-red	11-brn	6	-	
J6-6	SW6	18-gry	18-gry	19-wht	3	-	
J6-7	SW7	8-gry	8-gry		8	-	
J6-8	SW8	11-brn	11-brn		-	6	
J6-9	SW9	19-wht	19-wht		-	2	
J6-10	SW10	3-org	3-org		-	10	
J6-11	SW11	9-wht	9-wht		-	7	
J6-12	SW12	17-vio	17-vio		-	3	
J6-13	SW13	5-grn			-	9	
J6-14	SW14	13-org			-	5	
J6-15	SW15	15-grn			-	4	
J6-16	SW16	7-vio			-	8	
J6-17	LGSW	16-blu	15-grn	17-vio	4	-	
J6-18	SMSW	10-blk	5-grn	3-org	7	-	
J6-19	LGLED	24-yel	24-yel	24-yel			
J6-20	SMLLED	25-grn	25-grn	25-grn			
J6-21	GND	2-red	2-red	2-red	1/11	1	
					(formerly SPARE)		
J6-22	+26VDC					(formerly SPARE)	
J6-23	GND	21-brn	21-brn	21-brn	1/11	1	
					(formerly +12V)		
J6-24	+11V	23-org	23-org	23-org			
J6-25	GND	22-red	22-red	22-red	22 1/11	1	

APPENDIX B

LIQUOR SOLENOIDS - GUN

25-pin D-connector (FEMALE cable) at electronics enclosure:

ELEC-HSG DB-25M	SOL-HSG DB-25F
J7-1 LS1	BLACK
J7-2 LS2	BLACK
J7-3 LS3	BLACK
J7-4 LS4	BLACK
J7-5 LS5	BLACK
J7-6 LS6	BLACK
J7-7 LS7	BLACK
J7-8 LS8	BLACK
J7-9 LS9	BLACK
J7-10 LS10	BLACK
J7-11 LS11	BLACK
J7-12 LS12	BLACK
J7-13 LS13	BLACK
J7-14 LS14	BLACK
J7-15 LS15	BLACK
J7-16 LS16	BLACK
J7-17 -KEYSW	gray
J7-18 PRICESW	brown
J7-19 LFTLED	green
J7-20 CTRLED	yellow
J7-21 RTLED	blue
J7-22 +26VDC	orange (formerly +28 VAC)
J7-23 GND	violet (formerly +12 VDC)
J7-24 +11V	red
J7-25 GND	white

APPENDIX B

UNDERBAR UB600 CABLE ASSY

LIQUOR SOL CONN - DB25F FEMALE

ELEC-HSG DB-25M	UB600 DB-25FTO	WIRED
J7-1 LS1	BLACK	SOL-1
J7-2 LS2	BLACK	SOL-2
J7-3 LS3	BLACK	SOL-3
J7-4 LS4	BLACK	SOL-4
J7-5 LS5	BLACK	SOL-5
J7-6 LS6	BLACK	SOL-6
J7-7 LS7	BLK	DB15F-1
J7-8 LS8	RED	DB15F-2
J7-9 LS9	GRN	DB15F-3
J7-10 LS10	WHT	DB15F-4
J7-11 LS11	BRN	DB15F-5
J7-12 LS12	BLU	DB15F-6
J7-13 LS13	N/C	
J7-14 LS14	N/C	
J7-15 LS15	N/C	
J7-16 LS16	N/C	
J7-17 -KEYSW	GRY	FP bd J4-1
J7-18 PRICESW	TAN	FP bd J4-2
J7-19 A-LED	WHT/GRN	FP bd J4-3
J7-20 B-LED	WHT/YEL	FP bd J4-4
J7-21 C-LED	WHT/BLU	FP bd J4-5
J7-22 +26VDC	ORG	SOL-COMMON
J7-23 GND	YEL	FP bd J4-6
J7-24 +11V	PNK	FP bd J4-7
J7-25 GND	VIO	FP bd J4-8

APPENDIX B

BRAND SIGNAL CONN - DB25M MALE

ELEC-HSG DB-25F	UB600 DB-25M	WIRED TO
J6-1 SW1	BLK	SWITCH-1
J6-2 SW2	RED	SWITCH-2
J6-3 SW3	GRN	SWITCH-3
J6-4 SW4	WHT	SWITCH-4
J6-5 SW5	BRN	SWITCH-5
J6-6 SW6	BLU	SWITCH-6
J6-7 SW7	YEL	DB15F-9
J6-8 SW8	GRY	DB15F-10
J6-9 SW9	PNK	DB15F-11
J6-10 SW10	TAN	DB15F-12
J6-11 SW11	RED/GRN	DB15F-13
J6-12 SW12	RED/YEL	DB15F-14
J6-13 SW13	N/C	
J6-14 SW14	N/C	
J6-15 SW15	N/C	
J6-16 SW16	N/C	
J6-17 LGSW	RED/BLK	LRG-SW
J6-18 SMSW	WHT/BLK	SML-SW
J6-19 LGLED	WHT/RED	FP bd J1-5
J6-20 SMLED	WHT/GRN	FP bd J1-4
J6-21 GND	WHT/YEL	FP bd J1-3
J6-22 +26VDC	ORG	DB15F-7
J6-23 GND	WHT/BLU	SWITCH-COMMON
J6-24 +11V	N/C	
J6-25 GND	VIO	DB15F-15

APPENDIX B

UNDERBAR EXTENSION UB600X CABLE ASSY

UB600X DB-15F	SIG NAME	WIRE COLOR	WIRED TO
DB15F-1	LS7	BLK	SOL-7
DB15F-2	LS8	RED	SOL-8
DB15F-3	LS9	GRN	SOL-9
DB15F-4	LS10	WHT	SOL-10
DB15F-5	LS11	BRN	SOL-11
DB15F-6	LS12	BLU	SOL-12
DB15F-7	+26V	ORG	SOL-COMMON
DB15F-8	—	N/C	
DB15F-9	SW7	YEL	SWITCH-7
DB15F-10	SW8	GRY	SWITCH-7
DB15F-11	SW9	PNK	SWITCH-7
DB15F-12	SW10	TAN	SWITCH-10
DB15F-13	SW11	RED/GRN	SWITCH-11
DB15F-14	SW12	RED/YEL	SWITCH-12
DB15F-15	GND	VIO	SWITCH-COMMON

AIR SOLENOIDS

10-pin rt-angle insulation displacement FEMALE at circuit board:

J5A-1	GND	violet
J5A-2	+26VDC	orange (formerly +28 VAC)
J5A-3	AS1	black
J5A-4	AS2	red
J5A-5	AS3	green
J5A-6	AS4	white
J5A-7	AS5	brown
J5A-8	AS6	blue
J5A-9	AS7	yellow
J5A-10	AS8	gray

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8-pin rt-angle insulation displacement FEMALE at circuit board:

J5B-1	AS9	pink
J5B-2	AS10	tan
J5B-3	AS11	red/grn
J5B-4	AS12	red/yel
J5B-5	AS13	red/blk
J5B-6	AS14	wht/blk
J5B-7	AS15	wht/red
J5B-8	AS16	wht/grn
	unused	wht/yel
	unused	wht/blu

COUNTERS

13-pin rt-angle insulation displacement FEMALE at electronics enclosure:

J8-1	ARCT	red
J8-2	ASCT	black
J8-3	ALCT	green
J8-4	BRCT	brown
J8-5	BSCT	white
J8-6	BLCT	blue
J8-7	CRCT	gray
J8-8	CSCT	yellow
J8-9	CLCT	violet
J8-10	+26VDC	orange (formerly +28 VAC)
J8-11	GND	N/C
J8-12	-KEYSW	pink
J8-13	-KEYSW	pink

APPENDIX C

RECOMMENDED SERVICE PARTS LIST

This is a list of recommended parts for service and installation of the Laser System.

QTY	PART NUMBER	DESCRIPTION
2	8009482.....	BRAND ID SHEET
2	8006541.....	"BRAND" PUSH SWITCH (BLACK)
1	8007826.....	"PORTION" PUSH SWITCH (RED)
1	8009411.....	GUN TOP ASSY 16 BR. *
2	8009473.....	LIQUOR SOLENOID
2	8009447.....	AIR SOLENIOD
5	8006417.....	SMALL NOZZLE
5	8006486.....	LARGE NOZZLE
2	8009649.....	KEY SWITCH
2	8009652.....	KEY FOR SWITCH NO. 9649
2	8007829.....	KEY FOR ECU CAM LOCK
1	8007826.....	"PORTION" PUSH SWITCH (RED)
2	8006541.....	"BRAND" PUSH SWITCH (BLACK)
16	8009294.....	JG PLUG 1/4"
16	8009295.....	JG PLUG 3/8"
16	8009288.....	JG PLUG IN ELBOW 1/4"
16	8009275.....	JG PLUG IN ELBOW 3/8"
16	8009293.....	JG RED. UNION 3/8"-1/4"
16	8009290.....	JG TEE FOR 1/4" TUBING

APPENDIX C

16	8009291	.....	JG TEE FOR 3/8" TUBING
16	8009286	.....	JG UNION FOR 1/4" TUBING
16	8009287	.....	JG UNION FOR 3/8" TUBING
16	8009289	.....	JG 'Y' FOR 1/4" TUBING
16	8009292	.....	JG ELBOW FOR 1/4" TUBING
16	8009276	.....	JG ELBOW FOR 3/8" TUBING
500'	8008763	.....	1/4" I.D. TUBING
500'	8009269	.....	3/8" I.D. TUBING
100'	8007973	.....	20 CONDUCTOR CABLE
100	8007806	.....	SCOTCH LOCK 3-POS BUTT SPLICE
1	8008672	.....	SCOTCHLOCK CRIMPING TOOL
1	8009478	.....	LASER ECU CIRCUIT BOARD
1	8009379	.....	AIR REGULATOR ASSY.

GLOSSARY

Air accumulator tank;

This is a tank used to hold a reserve of air, which keeps the air compressor from running excessively. It is located between the air compressor and the air regulator.

Air compressor;

This fills the air accumulator tank to a pressure between 63 and 75 PSI.

Air regulator;

A device used to keep the air pressure constant. It is located between the air accumulator tank and the air solenoid blocks.

Air solenoid;

The “three way” solenoid in the liquor room that, when “actuated”, or “fired” by the ECU pressurizes the Turbo Flo Liquor pump.

Counters;

Mechanical non-resettable counters which can be used to count drinks poured by a dispenser according to sizes and price categories.

Down hill pumping kit;

A kit that attaches to the Turbo Flo pump. This is needed when the liquor room is located above the dispensers. It contains a valve that must be used to release pressure when the reserve and pumps are emptied.

ECU (Electronic Control Unit);

A small black Electronics box that controls the dispenser and liquor room.

JG fitting;

A “quick disconnect” fitting that is used to splice liquor tubing. These fittings are available in Ts and Ys and many other configuration. See Appendix C for a complete list of available fittings.

Liquor room;

A room away from the bar where the liquor is stored and placed on the system. This is where the liquor reserves, pumps, and air solenoids.

Liquor solenoid;

Also called metering solenoid. The solenoid is located inside the dispensers. This solenoid is "actuated" or "fired" by the ECU, and can be used to vary the flow rate for the liquor coming out of the dispenser.

Nozzles;

These are placed over the bottles that are placed on the reserves. There are two sizes of nozzles, one for one liter bottles, and one for 1.75 liter bottles, and they aren't interchangeable.

Parallel draining;

This is a reserve set-up where the reserves are all parallel to the floor, and one bottle per reserve will drain at a time.

Rack mounted system;

A liquor reserve system where the bottle reserves, Turbo Flo pumps, and air solenoids are pre-mounted on a rack. The rack then mounts to the wall.

Reserve;

Also called "bottle reserve" or "liquor reserve". This is where the liquor that is to be used on the system is placed. It is always located between the Turbo Flo pump and the air solenoids.

Sequential draining;

This means that one bottle per brand will drain at a time. If additional reserves are used, they are placed 3/16" higher than the first. No more than 3/8" of height can separate the first reserve from the last.

Scotchlok splices;

These splices are used to splice air solenoid cabling together. We recommend that these splices are used with the Scotchlok crimping tool, to make sure that you get good crimps.

Solenoid;

An electro-mechanical device used to control flow. In the Laser System, there are two different solenoids used - liquor and air solenoids.

Solenoid block;

This is what the individual air solenoids are connected to. This is also where the air solenoid cabling connects to the solenoids.

Turbo Flo pump;

This pumps the liquor from the liquor room to the dispensers. It is connected to the reserves, air solenoids, and to the liquor tube going to the dispenser.

Wall mount reserve system;

A liquor reserve system where the bottle reserves, TurboFlo pumps, and air solenoids are mounted to a wall in the liquor room.

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