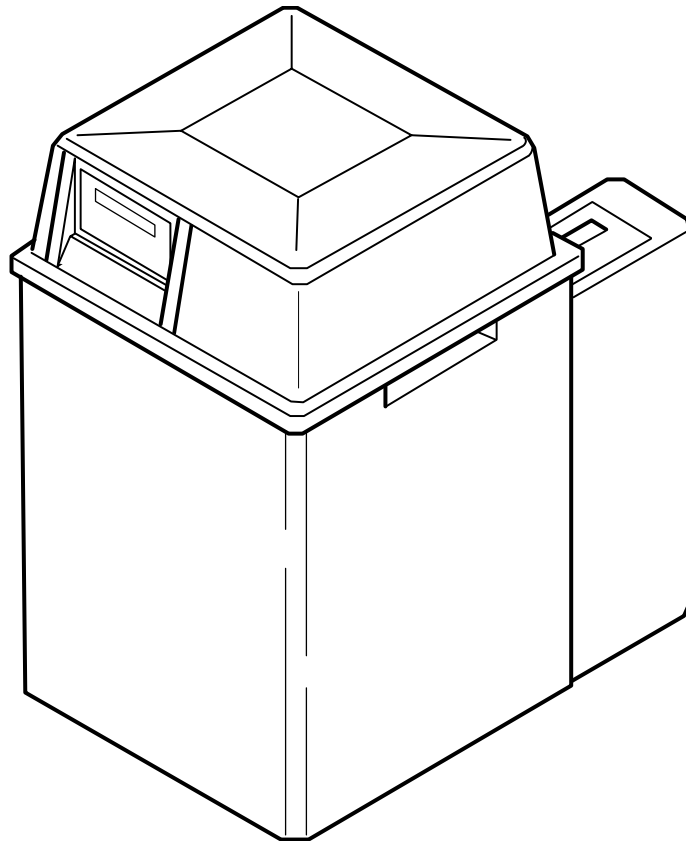




616/632

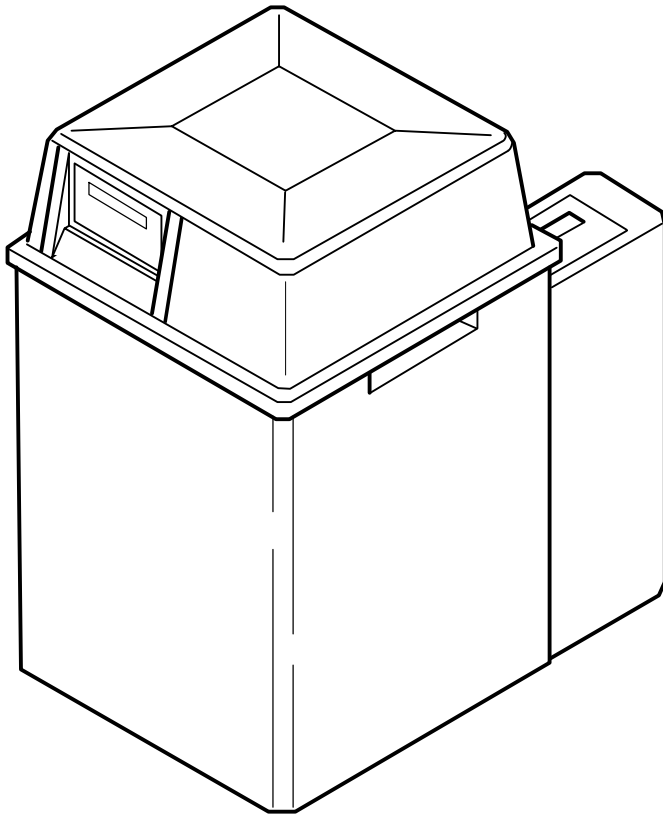
Silver Recovery System



Operation Manual

616/632

Silver Recovery Systems



Operation Manual

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Dear Customer,

Congratulations! We at X-Rite are proud to present you with the **616/632 Silver Recovery Unit (SRU)**. The models are designed and manufactured to the highest possible standards by X-Rite, Incorporated, a leading manufacturer of silver recovery units, and precise instrumentation for measuring color appearance and optical density. Construction features include a rugged gearmotor, non corrosive materials, a uniquely designed tank, and heavy duty pumps.

The 616 was designed to meet the silver recovery needs of the photographic market, including minilabs and low-to-medium volume photolabs (up to 150 rolls/day). The 632 was designed for higher volume applications (up to 300 rolls/day). The 616/632 can be used for batching, or it can be connected directly to your processor.

To fully appreciate and protect your investment, we suggest that you take the time to read and thoroughly understand this operation manual. As always, X-Rite stands behind your SRU with a one year limited warranty and a dedicated service organization. If the need arises, please don't hesitate to call on us.

Thank you for your trust and confidence.

X-Rite, Incorporated

Proprietary Notice

The information contained in this manual is derived from patent and proprietary data of X-Rite, Incorporated. This manual has been prepared expressly for the purpose of assisting in operation of the SRU.

Publication of this information does not imply any rights to reproduce or use this manual for purposes other than, installing, operating, or maintaining the Omni SRU.

The SRU is covered by the following U.S. and Foreign patents. U.S. Patent #3,875,032 and other patents pending.

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Limited Warranty

X-Rite warrants each silver recovery unit manufactured to be free of defects in material and workmanship for a period of twelve months. THERE ARE NO WARRANTIES OF MERCHANTABILITY OR FITNESS. THIS WARRANTY OBLIGATION IS LIMITED TO SERVICING THE UNIT RETURNED TO X-RITE FOR THAT PURPOSE. The unit shall be returned with transportation charges prepaid. If the fault has been caused by misuse or abnormal conditions of operations, repairs will be billed at a nominal cost. In this case, an estimate will be submitted before work is started, if requested.

Always include serial number in any correspondence concerning the unit. The serial number is located at the rear of the unit.

Important Notices

CAUTION:

To prevent risk of electrical shock, disconnect all power supply cords before lifting or removing SRU head.

Always disconnect the inlet hose to the SRU when you clean/purge your processor tank. Never let the contaminated cleaning solution left over from cleaning your processor tank flow into the SRU. Doing so will cause sulfiding, a build up of tar or fungus inside the SRU, and inhibit the SRU from proper automatic operation.

If you have to desilver aerated (old) solution, mix 25% aerated solution with 75% unaerated solution.

To achieve best results **DO NOT** lift the SRU head during operation. If you must lift the SRU head do so only in the **STANDBY** mode or while the unit is off. If you lift the SRU head during the desilver cycle automatic operation will be inhibited, because the SRU makes computations every five minutes to achieve automatic operation—if you lift the head during the decision making period (for example, 1:04-1:06, 1:09-1:11, 1:14-1:16, etc.) automatic operation will be interrupted.

If you are processing at a rate that exceeds the capacity of the recovery unit, it is OK to connect a second SRU (OMNI 16 or 32 depending on excess) in series with your SRU. This can be accomplished by connecting the overflow of the primary SRU to the overflow of the secondary SRU.

Do not attempt to desilver waterless solution from only the Film processor or only the Paper processor. *They must be mixed!*

If unit is in standby mode *do not* pour either of the above solutions into the tank, unless the A.C. power is first turned OFF so that the solutions can mix—*do not* attempt to desilver Black and White fixer.

Notice

This product may or may not be supplied with a detachable power cord. Use an IEC320/C7 or IEC320/C13 detachable power cord from an approved agency in your region to meet your power requirements.

Hinweis

Dieses Produkt ist mit und ohne abnehmbares Stromkabel erhältlich. Verwenden Sie das abnehmbare Kabel IEC320/C7 oder IEC320/C13 (je nach Stromversorgung), welches Sie bei einem autorisierten Händler erhalten können.

Nota

Este producto se suministra con o sin cable extraíble. Use un cable extraíble de potencia IEC320/C7 o IEC320/C13 de un proveedor autorizado en su región para adecuarse a los requisitos de potencia.

Nota

Questo prodotto viene consegnato con o senza cavo di potenza staccabile. Usare un cavo approvato IEC320/C7 o IEC320/C13 da un'agenzia autorizzata nella vostra regione per essere conforme ai requisiti di potenza.

Observação

Este produto é fornecido com ou sem cabo descartável de potência. Use um cabo aprovado IEC320/C7 ou IEC320/C13 de uma agência autorizada em sua região para atender aos requerimentos para potência.

Avis

Un câble d'alimentation électrique amovible peut être inclus avec ce produit. Utilisez un câble d'alimentation électrique amovible IEC320/C7 ou IEC320/C13 approuvé par une institution reconnue dans votre région pour satisfaire à vos exigences en matière d'alimentation électrique.

通告

本产品可能未提供可拆式电源线。请使用您所在地区的已认证机构所提供的 IEC320/C7 或 IEC320/C13 可拆式电源线，以满足您的电源要求。参见部分认证机构的清单。

使用上の注意

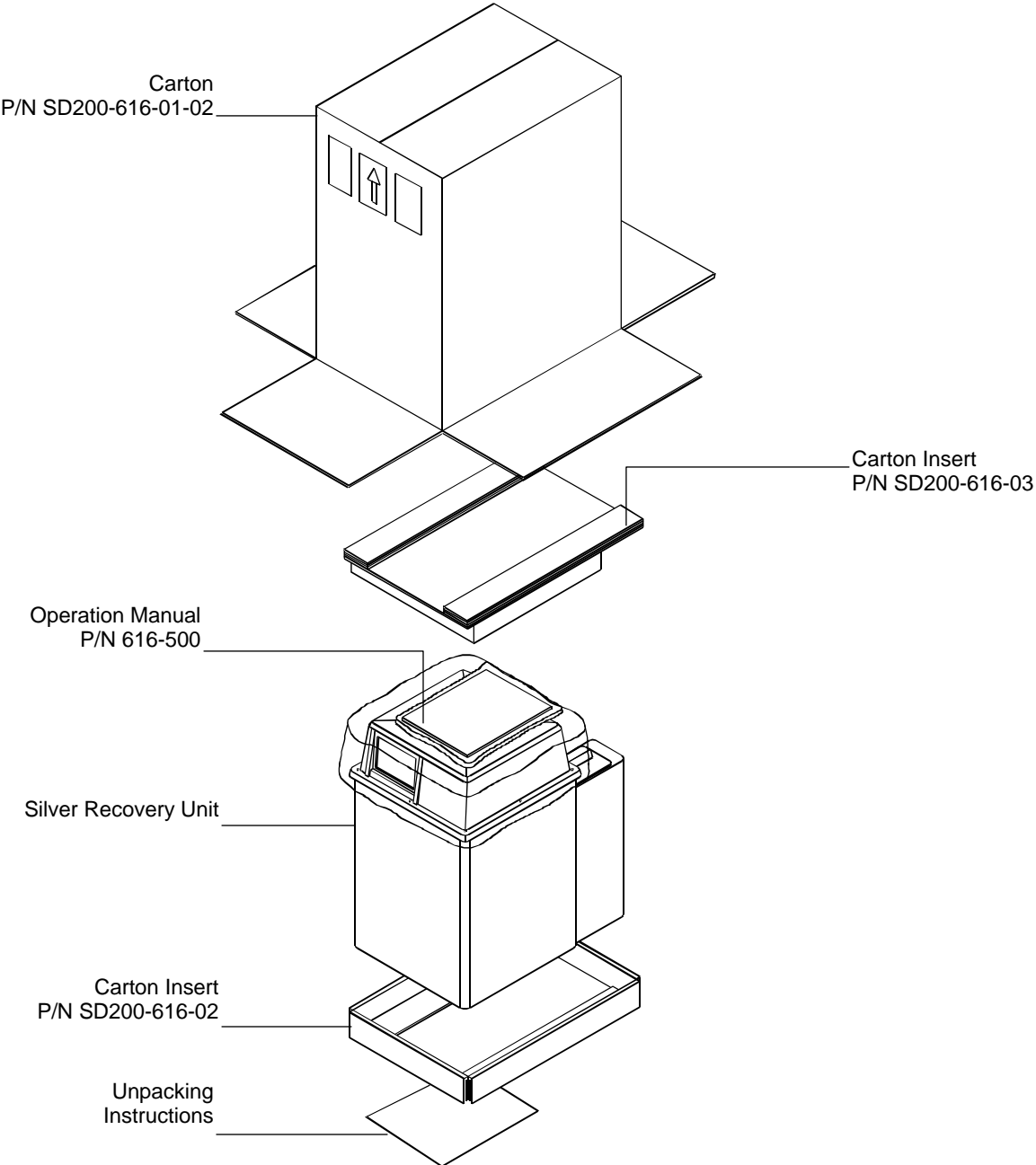
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1 Packaging

After removing the SRU from the shipping carton, inspect for possible damage. If any damage is noted, contact the transportation company immediately. Do nothing more until the carrier's agent has inspected the damage. If damage is not evident, check to make sure that all items are included.

Your SRU was packaged and shipped in a specially designed carton to ensure against damage. If reshipment is necessary, the unit should only be repackaged in the original carton. If the original carton is not available, a new package can be obtained from X-Rite. Refer to the packaging drawing below for packaging part numbers. (Figure 1.1)

Figure 1.1



2 General Description

The 616/632 is a Silver Recovery Unit (SRU). It consists of a silver recovery head and one tank, which itself consists of an inner and outer reservoir.

The inner reservoir is the area where solution is desilvered. It holds approximately four (4) gallons of solution. The outer reservoir stores the solution *waiting* to be desilvered. It holds approximately nine (9) gallons of solution. (Figure 2.1)

The outer reservoir can be filled manually, or it can be connected directly to a processor. When the outer reservoir is filled with approximately four gallons of solution and the inner reservoir is empty, the SRU automatically pumps the solution from outer to inner reservoir for desilvering.

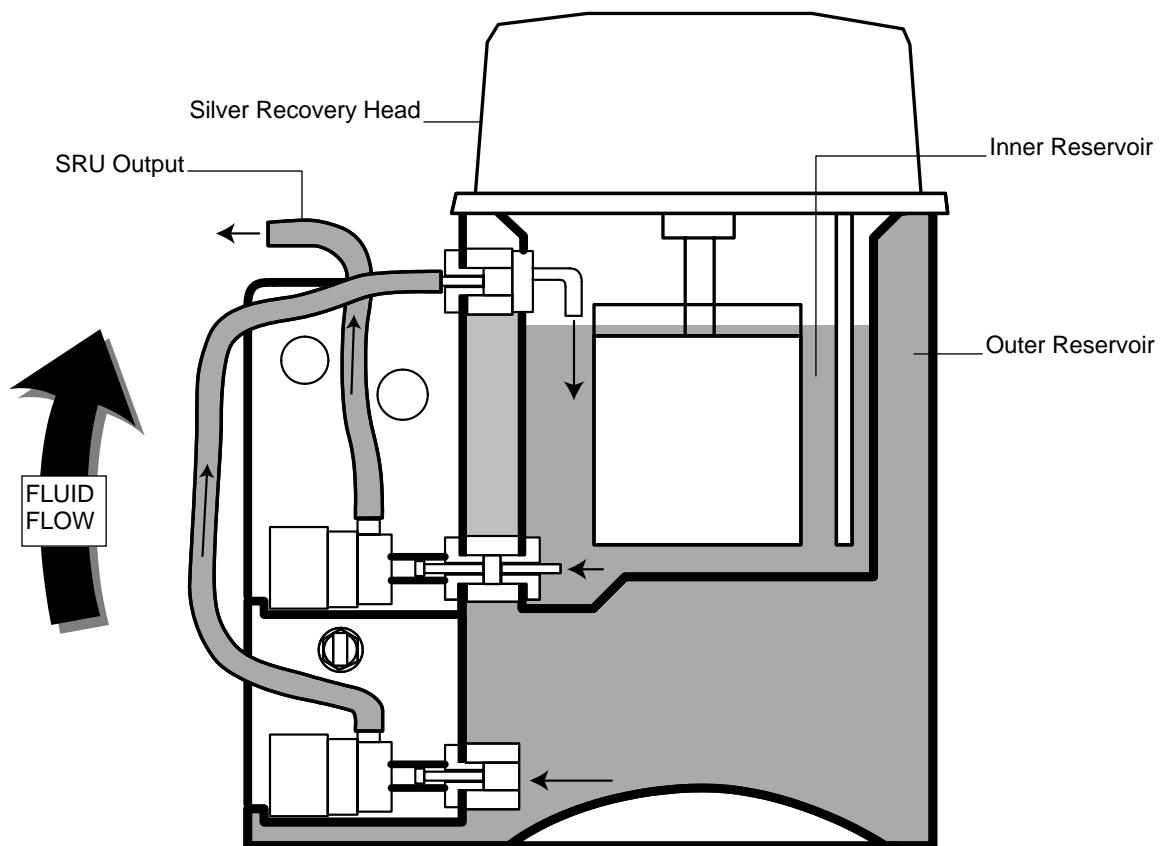
The silver recovery process is completely automatic for all types of bleach fix solutions, including waterless. A special version (CBS6) is available for B/W solutions. There are no time-consuming manual adjustments—all you do is pour the solution in and the SRU does the rest.

A special sampling process developed by X-Rite[®], Incorporated allows complete automatic control of the process. The sampling process recognizes the type of solution within a period of five to 40 minutes. After the sampling process, the desilver process reduces the silver concentration to an acceptable low level, and then automatically shuts down. The amount of time required to desilver the solution depends on the silver content, solution characteristics, and line voltage. The maximum recovery time for the 616 is approximately 12 hours; approximately seven hours for the 632.

After the desilver process has ended, the solution is pumped out of the inner reservoir through the outlet hose. At that point the solution must be disposed of according to your local regulations.

Another unique feature the SRU offers is automatic Remove Silver Indication, informing you when it's time to remove the silver from the drum.

Figure 2.1



3 Installation

CAUTION:

To prevent risk of electrical shock, disconnect all power supply cords before lifting or removing SRU head.

The SRU can be used for “batching” (manually pouring in solution), or it can be connected directly to a processor that has a pump outlet.

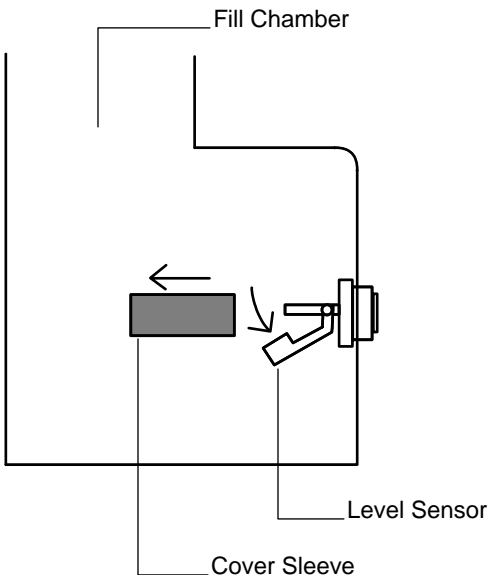
3.1 Releasing the Level Sensor

The Fill Chamber has a Level Sensor float switch that engages the pump when the chamber fills. The Sensor is shipped with a cover sleeve. Before adding solution to the fill tank, remove the Fill Cover, then reach in and remove the sleeve from the Level Sensor. (Figure 3.1)

3.2 Batching

When a batching process is used, no hookup is required between the processor and the SRU. The waste solution must be manually removed from the processor and poured into the SRU inlet. When the chamber fills, the level sensor engages and the SRU auto-matically pumps the solution to the inner reservoir and desilvers the solution.

Figure 3.1



To manually pour in solution (Figure 3.2):

1. Make sure power is off—and you have performed Step 3.1—before adding solutions. This will allow the solutions to mix thoroughly before desilvering.
2. Remove the Fill Cover. Pour solution into Inlet. If the solution gets accidentally spilled onto the floor, immediately wipe clean.

CAUTION:

When manually adding solution to SRU, use a funnel in the tank inlet and/or a plastic bag to cover the SRU Head. Spilling solution on SRU Head can cause internal damage.

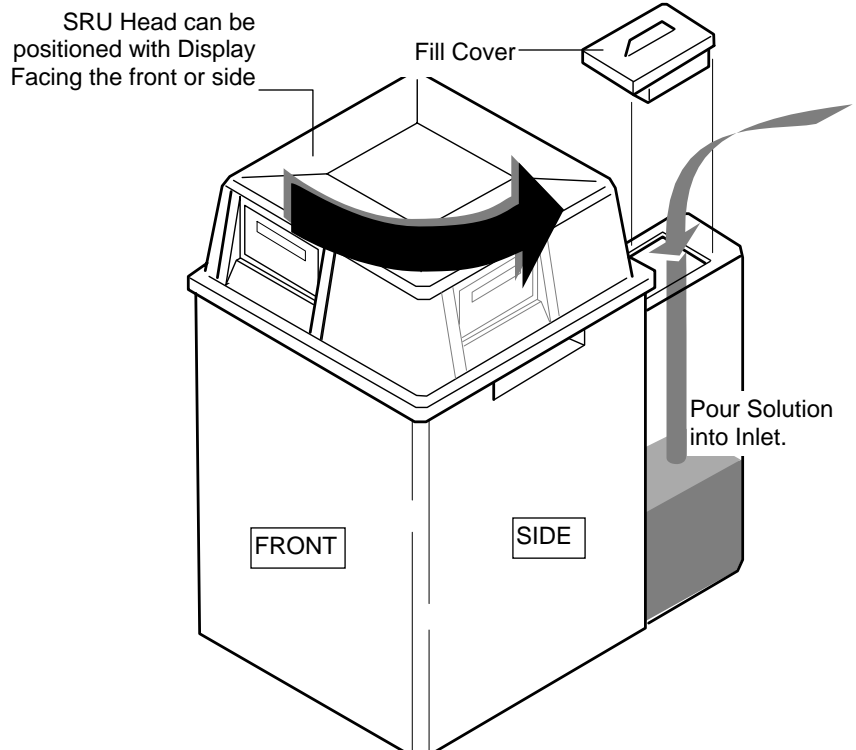
Important:

DO NOT attempt to recover silver if developer is in the solution.

Important:

The SRU Display should face the operator at all times. The SRU Head can be installed with the display facing the front or the side of the unit, whichever is most convenient for the installation location.

Figure 3.2



3.3 Connecting to a Processor

The SRU can be connected directly to the output pump of your processor using 3/4" PVC tubing. If the processor hose is not 3/4", you must purchase the appropriate adapter for proper connection. For overflow protection, you should also connect the SRU to an emergency overflow (see Section 3.3). The required 3/4" PVC tubing and 3/4" hose clamp can be purchased at your local hardware store.

To connect the SRU to a processor:

1. Unplug the SRU AC line cord from the wall outlet.
2. Remove the Fill Chamber Cover.
3. Remove the Inlet Bulkhead Fitting from the *left* fill chamber hole by unscrewing the Bulkhead Nut *inside* the chamber. Make sure the O-Ring remains on the Inlet Bulkhead Fitting. (Figure 3.3a)
4. Using a screwdriver, remove the punch-out end of the Bulkhead Fitting. (Figure 3.3a inset)

5. Turn the Bulkhead Fitting around and re-insert it through the hole from inside the chamber. The O-Ring on the fitting should be positioned inside the chamber.
6. Secure the Bulkhead Fitting in place by screwing the Bulkhead Nut onto the fitting from outside the chamber. (Figure 3.3b)
7. Secure the 3/4" Processor Hose to the end of the Bulkhead Fitting with a 3/4" Hose Clamp.
8. Connect the other end of the Processor Hose to the processor.

3.4 Connecting to Emergency Overflow

A piece of 3/4" PVC tubing can be connected to the secondary bulkhead fitting for emergency overflow protection. The required 3/4" tubing and clamp can be purchased at your local hardware store.

To connect to emergency overflow: Repeat the steps in Section 3.2 to connect the Emergency Overflow Hose to the *right* fill chamber hole. (Figures 3.3a and 3.3b).

Place the other end of the Emergency Overflow Hose into the overflow can or tank.

Figure 3.3a

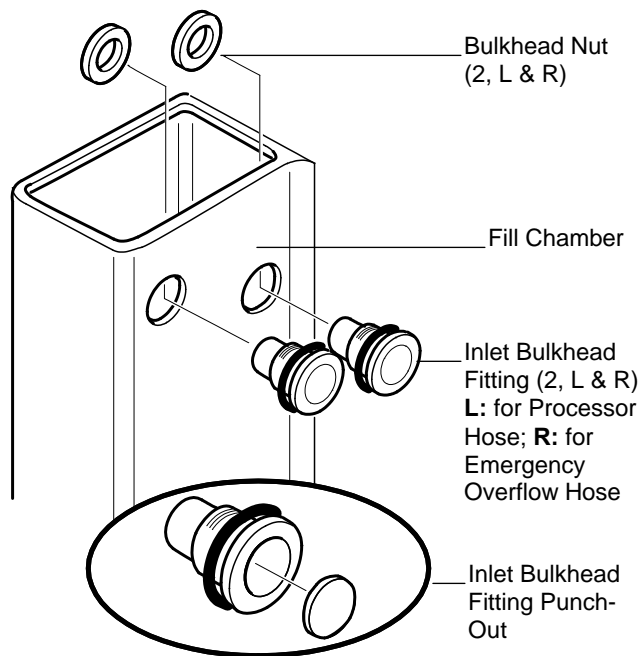
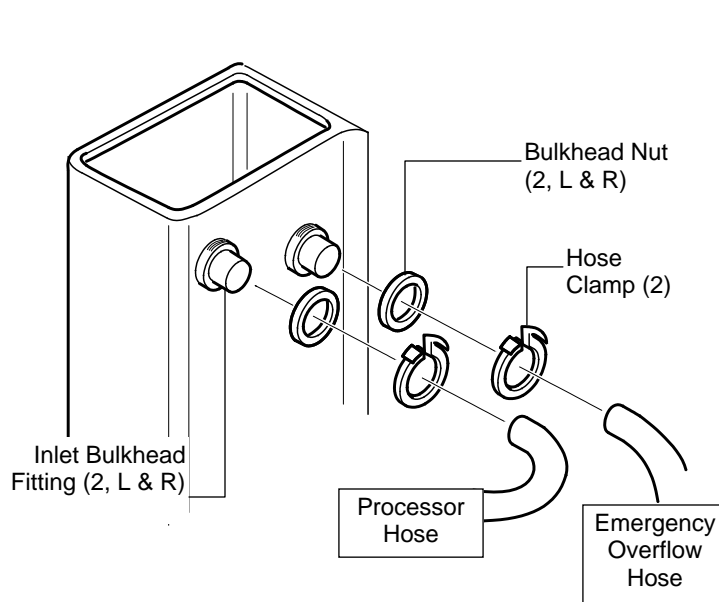


Figure 3.3b



3.5 Connecting the SRU Outlet

The 1/2" outlet hose should be connected to an appropriate storage container for proper solution output. (Figure 3.5)

In most cases, the container should be a 13 gallon or larger tank. If the tank is smaller, the SRU could overflow if it is completely filled (for example, if there are four gallons in the inner reservoir and nine gallons in the outer reservoir); and the unit is left on overnight for desilvering. If you need to use a smaller storage tank, you must closely track and empty the tank when it fills (usually after each batch).

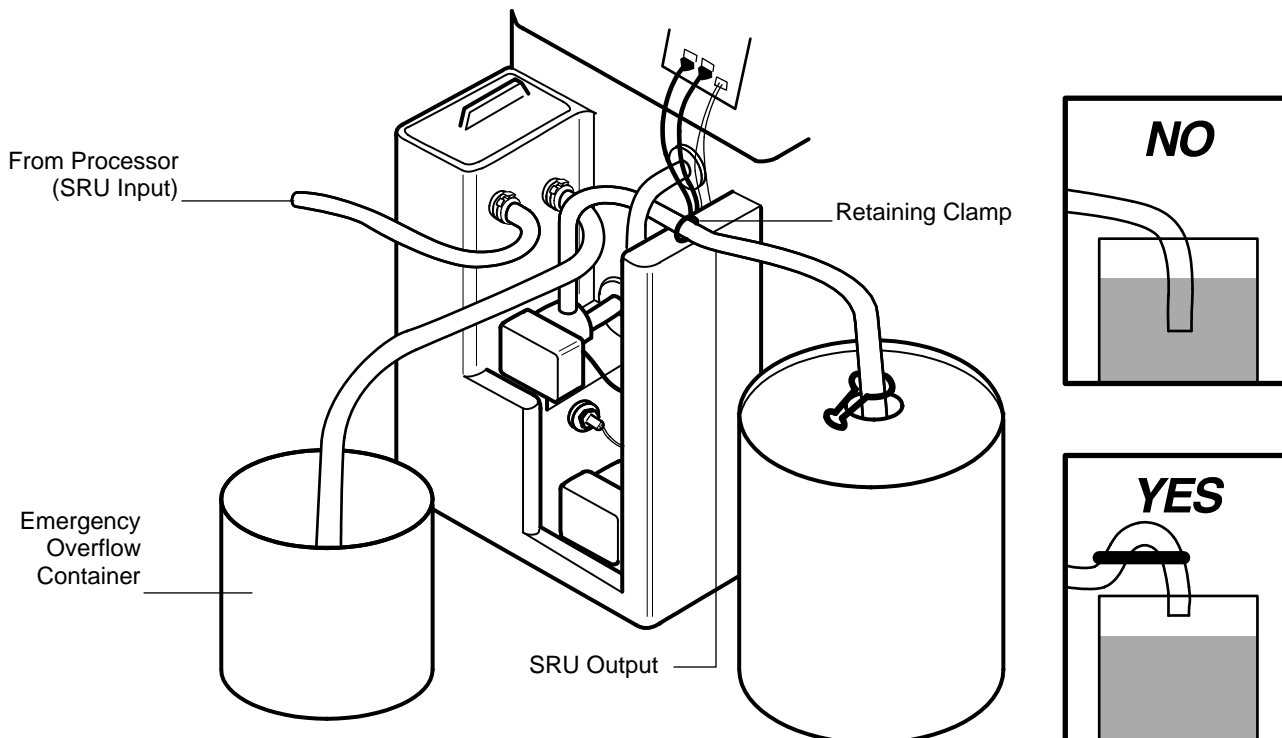
Important:

There must be an air gap between the end of the SRU output hose and the solution. If there is no gap, a siphoning effect will occur, causing solution to flow from the SRU during the desilver operation. To ensure an air gap, secure the hose to the top—using a clamp or tape as shown in Figure 3.5—so that the hose end remains approximately 1" above the highest possible solution fill line. (Figure 3.5)

Important:

Always keep a part of the output hose above the edge of the tank to avoid draining the inner tank. A retaining clamp on top of the unit's rear stability wall holds the output hose in the correct position. (Figure 3.5)

Figure 3.5



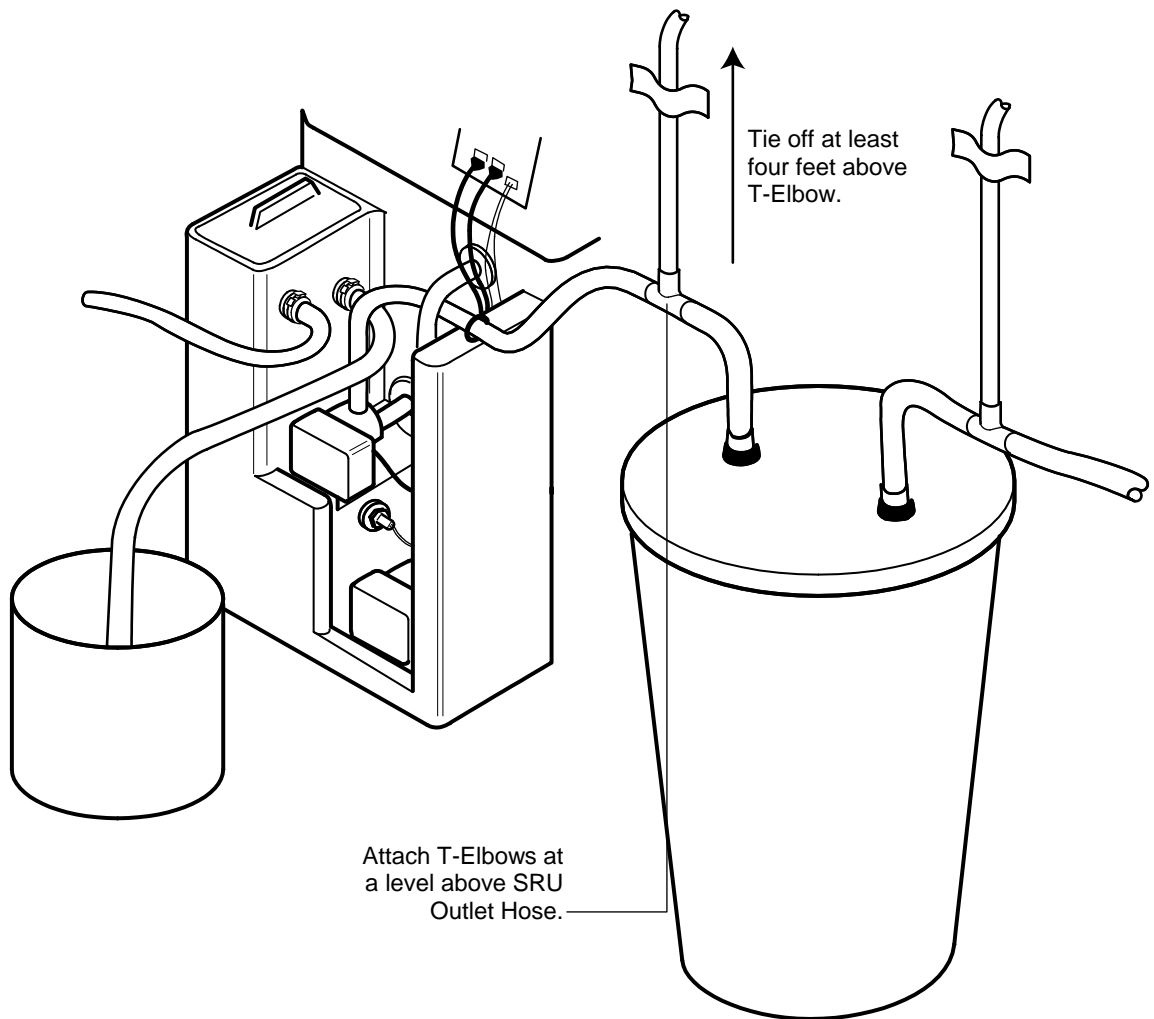
3.6 Connecting to a High Volume Cartridge

The SRU can recover up to approximately 98% of the total silver content from the solution, which should be an acceptable amount in most installations. However, where local waste water districts require less silver effluent, a High Volume Cartridge can be installed on the SRU outlet. This provides the most economical method of lowering the silver concentration. The example below illustrates how to use the High Volume Cartridge. If properly managed, tailing the SRU with the cartridge will bring the silver concentration into compliance with most local regulations—less than 5/ppm. The cartridge has a capacity of 20 gallons; a flow rate up to 4 gallons per minute (depending on silver concentration and type of chemistry or wash water); and works with all fixers, bleach fixers, LoFlo, and wash water.

Connect the High Volume Cartridge as shown in Figure 3.6. Note that the SRU Outlet Hose must be below the Cartridge T-Elbows. Tie or tape off the T-Elbow openings at least four feet above the T-Elbow. (Figure 3.6)

Important:
Make sure you set up the High Volume Cartridge to prevent siphoning using the same method shown in section 3.5 (see **Important** note).

Figure 3.6



4 Applying Power

The 616/632 operates from a standard 3-wire grounded 115VAC/60Hz line source and the 616X/632X from a 230VAC/50Hz line source. *Always plug the unit into a 3-wire receptacle!*

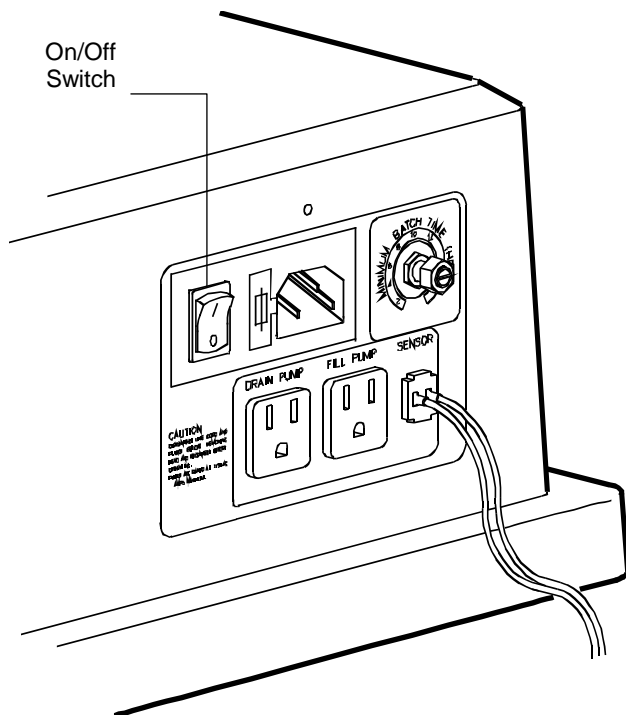
CAUTION:

DO NOT use a 3-prong adapter (“cheater”) plug to plug the SRU into a 2-wire outlet. Doing so could cause an electrical shock hazard.

To apply power:

1. Plug the detachable line cord into the SRU head and then into a grounded AC wall receptacle.
2. Connect the drain, fill, and sensor plugs to the SRU head if they are not connected. **NOTE:** The plug with the red dot (fill plug) connects to the receptacle with the red dot.
3. Turn the unit ON by toggling the power switch to the “I” position.
4. From initial shipment the SRU will startup in the STANDBY mode, and the Batch Count set to zero. Thereafter, each time the SRU is turned on it will startup in the last mode that was activated.

Figure 4.1



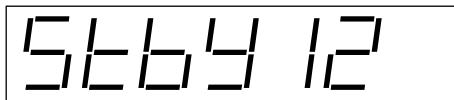
5 Operation

5.1 Modes of Operation

The SRU has four modes of operation: STANDBY, FILL, DESILVER, and DRAIN.

STANDBY

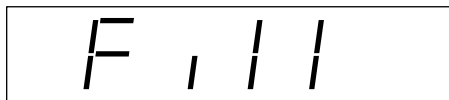
In this mode, the SRU is waiting for the outer reservoir to fill to 4 gallons of solution. Standby allows you to check the silver content of the solution. The Batch Count is also displayed in Standby mode. Standby is displayed as:



Batch Count

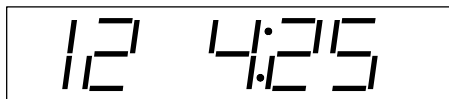
FILL

In this mode, the SRU is pumping the solution from the outer reservoir to the inner reservoir for desilvering. Fill is displayed as:



DESILVER

In this mode, the SRU is removing the silver from the solution. The time it takes is dependent upon the silver content, solution characteristics, and mixture. The Desilver Amperage and Time elapsed is displayed during Desilver operation. Desilver is displayed as:



Amps Time Elapsed

DRAIN

In this mode, the SRU pumps the desilvered solution out of the inner reservoir via the outlet hose. Drain is displayed as:



The SRU automatically lets you know when its time to remove the silver from the drum. The Remove Silver Indicator is displayed after 40 batches of bleach-fix solution have been desilvered, or 80 batches of black/white fixer has been desilvered. Remove silver will also flash if power goes off for more than five minutes during a batch. To reset the Batch Counter and clear "rSil," refer to Section 5.4. Remove Silver is displayed by flashing:



5.2 Estimating Silver Content of Batch (Before and After Desilvering)

CAUTION:

To prevent risk of electrical shock, disconnect all power supply cords before lifting or removing SRU head.

Each SRU is shipped with a sample booklet of Silver Estimating Test Papers. These papers are used to estimate the silver content of the batch before *or* after desilvering the solution.

Important:

After desilvering, the silver content should only be checked while the unit is in STANDBY mode. If you want to force the SRU into STANDBY, see Section 5.5.

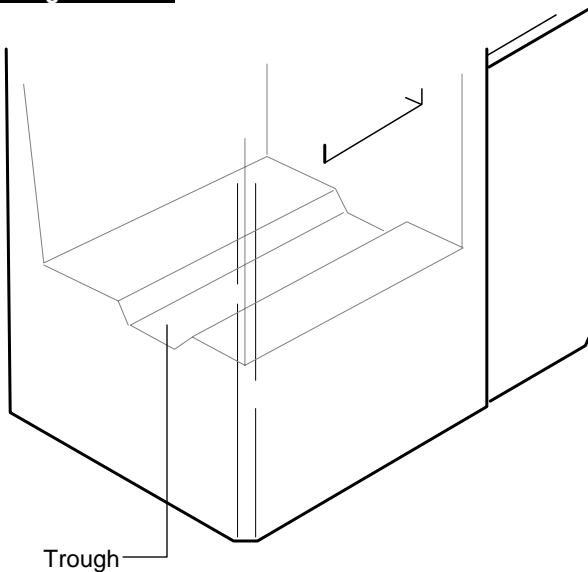
To check silver content with test paper *before* desilvering:

1. Lift the inlet cover, then dip a piece of test paper into the solution. Carefully shake off the excess solution.
2. Close the inlet cover.

To check silver content with test paper *after* desilvering:

1. While in STANDBY mode, partially lift the SRU head, then dip a piece of test paper into the solution in the trough of the inner reservoir. Carefully shake off the excess solution. (Figure 5.2a)
2. Replace the SRU head.

Figure 5.2a



To estimate the silver content of batch:

1. (With bleach-fix *only*.) Quickly after you dipped the test paper into the solution, dip the same portion of the paper into water. Carefully shake off excess water. (Figure 5.2b)
2. Place the test paper onto a sheet of white paper, then wait for five seconds. (Figure 5.2c)
3. Compare the test paper to the test chart. Compare with the nearest two adjacent color patches, then use the closest match. (Figure 5.2d)

Figure 5.2b

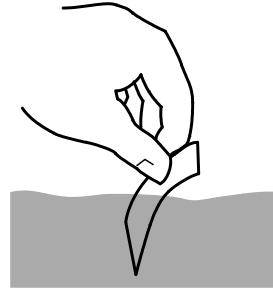


Figure 5.2c

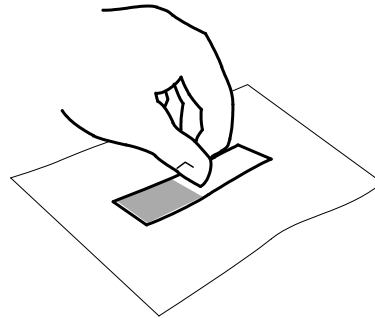
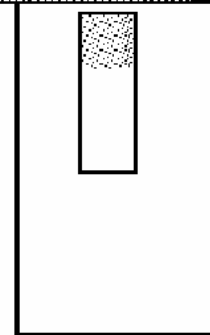


Figure 5.2d

0	0.1	0.21	0.31	0.42	0.63	0.84	1.25
0	1	1.75	2.5	3.5	5	7	10

TROY OZ./GAL.
GRAMS/LITER



5.3 Removing Silver from Drum

CAUTION:

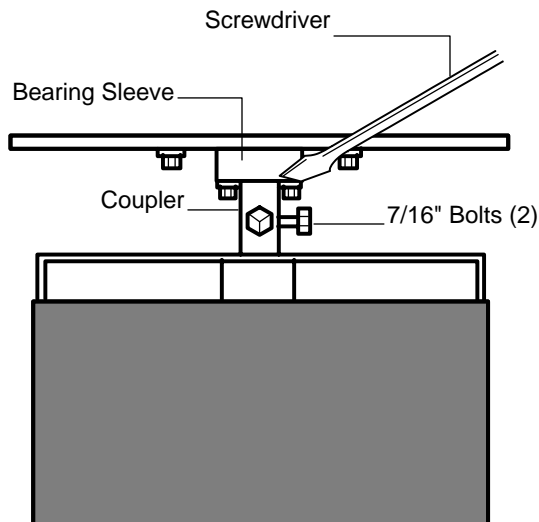
To prevent risk of electrical shock, disconnect all power supply cords before lifting or removing SRU head.

As the number of desilver cycles accumulate, residue builds on the drum, and silver “fingers” grow and fall from the drum. Therefore, silver should be removed from the drum after 40 batches of solution have been desilvered. If you do not remove the silver and reset the Batch Counter, the display will flash between “Stby” and “r Sil” until you do so. **After silver has been removed from the drum, refer to Section 8.4 for Inner Tank Cleaning Procedure.**

To remove silver from drum:

1. Lift SRU head out of tank and place on flat surface.
2. Remove drum from SRU head by loosening two 7/16" bolts on coupler, and prying between coupler and bearing sleeve with a flatblade screwdriver until drum is free. (Figure 5.3a)

Figure 5.3a



3. Remove silver from drum by peeling silver away with putty knife. (Figure 5.3b)
- TIP:** Place the drum into a large plastic bag during silver removal.
4. Before installing drum, clean the three anodes. Scrub anodes with a Scotch-Brite pad or use a wire brush. Rinse clean with water.
 5. Install drum onto SRU head by aligning flat areas of shaft with the bolts, then tighten bolts. Make sure the bolts are tight! (Figure 5.3c)
 6. Install SRU head back onto tank.
 7. Reset Batch Counter, referring to Section 5.4.
 8. Plug the connectors back into SRU. Note that the Fill plug and associated socket are marked with a red dot.

Figure 5.3b

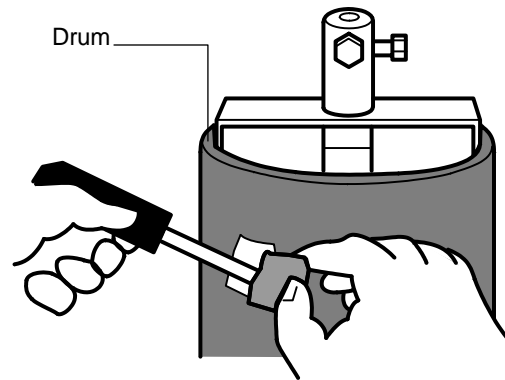
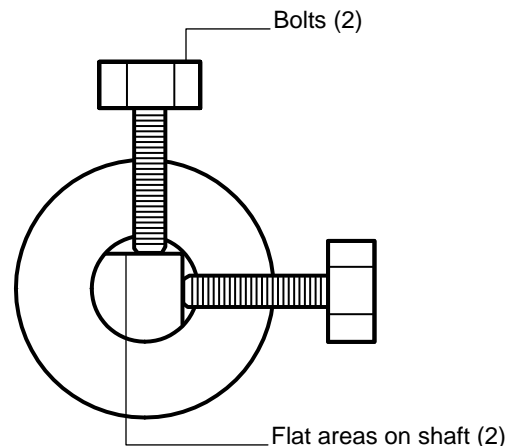


Figure 5.3c

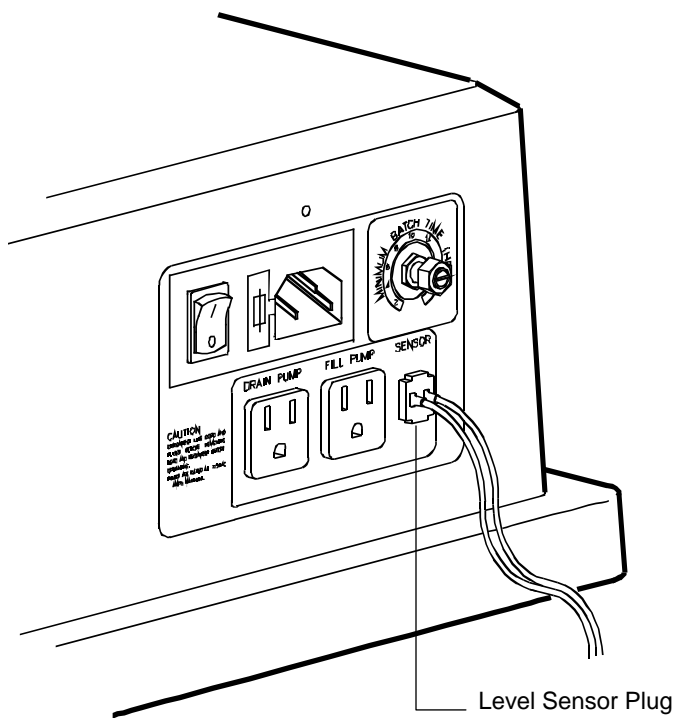


5.4 Resetting the Batch Counter

To reset the batch counter:

1. With the unit turned ON in the standby mode, unplug the Level Sensor connector located on the back of the unit. (Figure 5.4)
2. At this point, **Plug** will be flashing, indicating that the plug is disconnected.
3. After approximately 10 seconds, **Reset** will be displayed for one second. Then, **Plug** will flash again.
4. Plug the Level Sensor back into the back of the unit. The unit will go into Standby mode with a batch count of 00.

Figure 5.4



5.5 Aborting the Desilver Cycle

CAUTION:

To prevent risk of electrical shock, disconnect all power supply cords before lifting or removing SRU head.

1. To abort the desilver cycle and to force the SRU into the Standby mode, follow the procedure below:
2. Turn off the SRU.
3. Drain the inner reservoir by disconnecting the drain plug from the back panel of the SRU and connecting it to a 115v outlet.
4. Check the drum. If a black residue or long fingers exist on the drum, clean it thoroughly.
5. At this point you may check the silver content of the batch. Plug the drain plug back into the back panel of the SRU.
6. When the SRU's power is turned back on it will go into Standby mode and you can start a new batch.

6 Display Messages and Interrupts

6.1 Flashing Display Messages

CAUTION:

To prevent risk of electrical shock, disconnect all power supply cords before lifting or removing the SRU head.

The SRU normally flashes display messages when a problem occurs. When you see a flashing display message, you should take action to resolve the problem right away. For this reason, you should always position the SRU so that these messages can be easily read, with the display facing the operator at all times.

- **r SIL** flashes when it is time to remove the silver from the drum, or whenever a five minute-or-greater power interrupt occurs.
- **FAIL 1** flashes when there is a problem with the fill cycle. This occurs when fluid is not detected in the inner reservoir after three minutes into the fill cycle. To correct this problem, check the fill pump operation, and for any restrictions in the tubing connected to the fill pump. Also check for worn brushes or dirty anodes.
- **FAIL 2** flashes when there is a problem with the drain cycle. This occurs when fluid is detected in the inner reservoir after 12 minutes into the drain cycle. To correct this problem, check the drain pump for proper operation or any restriction in the tubing connected to the drain pump.
- **PLUG** flashes when the level sensor is unplugged in Standby mode. This is normal operation when you are resetting the Batch Counter.
- **RESET** flashes for one second during reset of the Batch Counter, indicating that the Batch Counter has been set to 00.
- **notE 1** flashes when an EPROM failure occurs, indicating a defective printed circuit board. Return the unit or PC board for service.
- **notE 2** flashes when the temperature sensor detects that the fluid temperature is too high or low. If fluid temperature is within acceptable limits, the fault is a defective temperature sensor. Return unit for service.
- **FAIL** displays when an electronic problem occurs on the printed circuit board. Return unit or PC board for service.

Important:

The drain and fill pumps can be checked by plugging them directly into a 115vac outlet. If the pump operates, the problems was most likely caused by a defective printed circuit board located under the SRU cover. When reconnecting the drain and fill plugs back into the SRU, not that the fill plug and fill socket are marked with a red dot.

Important:

Any time a FAIL 1 or FAIL 2 occur, you must follow the procedure below after you correct the fault:

1. Turn the SRU off.
2. Drain the inner reservoir by disconnecting the drain pump plug from the back panel of the SRU and connecting it to a 115vac outlet.
3. Check the drum. If it has a black residue on it, or long silver “fingers” exist, clean it thoroughly.
4. Plug the drain pump plug into the back panel.
5. When the SRU’s power is turned back ON, it automatically goes into Standby mode and increment the Batch Counter by one. At this point, the problem has been corrected and you are ready to start a new batch.

6.2 Power Interrupts

The SRU has been designed with the most sophisticated electronic design and computer control to handle most common power interrupts. We have broken power interrupts into two categories: Short Interrupts lasting 5 minutes or less; and Long Interrupts lasting over 5 minutes. In either case, the SRU completely resolves these conditions.

SHORT INTERRUPTS If a short interrupt occurs, normal silver recovery is not interrupted. However, any fraction of a minute is lost and the unit resets the desilver time back to the whole hour. For example, if the desilver time was 7:55 when power was lost, the time would be reset to 7:00.

LONG INTERRUPTS If a long interrupt occurs the unit will automatically extend the maximum desilver time by 10 hours. The total desilver time will not exceed 18 hours. If 8 hours had already been completed the unit would add on 10 hours and the total desilver time would be 18 hours. However, if the SRU recognizes that the solution is completely desilvered at an earlier time the desilver cycle will be halted respectively. Long interrupts automatically cause the r-sil flag.

7 Adjusting Minimum Batch Time

There is an adjustment potentiometer located on the back panel just above the level sensor plug. This potentiometer allows you to set the minimum number of hours that a batch will run. The system still operates as an automatic unit, and batch times may run longer than the minimum setting. Batch times will not drain out any sooner than the minimum batch time setting.

The Minimum Batch Time is preset at the factory to obtain maximum silver recovery under most conditions. However, under some conditions (due to chemistry types, mixture of solutions, replenish rates, etc.), the Minimum Batch Time may need to be adjusted. The Minimum Batch Time *should not* be adjusted until several batches have been desilvered, and only then a problem occurs. Refer to the following information to determine if Minimum Batch Time should be adjusted:

DO NOT adjust the Minimum Batch Time unless one of the following occurs:

When you are removing silver from the drum, inspect the silver. *Do not* adjust the Minimum Batch Time unless the silver is either

- Thin;
- very hard;
- shiny;
- hard to remove; or
- black and soft.

If at least one of these characteristics is present, you may need to change the minimum batch time. There are some simple checks you can make that will help you determine if you should change the minimum batch time setting. These checks are only approximations, since they are affected by the chemistry types, how they are mixed, the replenish rate, and how the color strips are read. However, they will give you an indication if a change is needed.

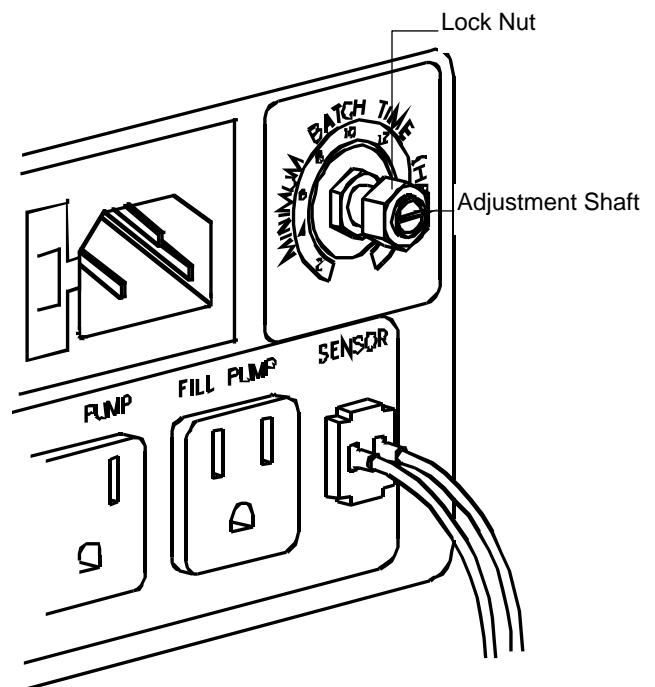
7.1 Adjusting the Potentiometer (if required)

If the steps and tables in the following sections 7.2 and 7.3 indicate that you need to adjust minimum batch time, you may do so by adjusting the potentiometer. (Figure 7.1)

To adjust the potentiometer:

1. Loosen the lock nut.
2. Turn the adjustment shaft completely counter-clockwise using a flat-blade screwdriver.
3. Adjust from that point to desired setting.
4. Re-tighten lock nut.

Figure 7.1



7.2 Determining Silver Weight for Number of Batches

To determine whether or not the Minimum Batch Time should be set, you should first determine if the weight of the silver removed from the drum is low, compared with the amount of solution going into the SRU. To check this, measure the silver level of the solution (before desilvering) using a silver test strip. This procedure is described in Section 5.2.

Use this value of grams per liter—along with the number of batches normally run before silver removal—to get an idea of how much silver you should have on the drum. For example, 4.0 grams of silver per liter of solution running 40 batches should yield approximately 4.6 pounds of silver (see shaded area of Table 7.2 for example). (Table 7.2)

Table 7.2

Input silver level in g per l	1.7	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
No. of Batches	Approximate silver weight (lbs.) per number of batches								
6	0.3	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.5
8	0.4	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.0
10	0.5	0.6	0.9	1.1	1.4	1.7	2.0	2.3	2.6
12	0.6	0.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1
14	0.7	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6
16	0.8	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1
18	0.9	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6
20	1.0	1.1	1.7	2.3	2.8	3.4	4.0	4.5	5.1
22	1.1	1.3	1.9	2.5	3.1	3.7	4.4	5.0	5.6
24	1.2	1.4	2.0	2.7	3.4	4.1	4.8	5.4	6.1
26	1.2	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7
28	1.3	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2
30	1.4	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7
32	1.5	1.8	2.7	3.6	4.5	5.4	6.4	7.3	8.2
34	1.6	1.9	2.9	3.9	4.8	5.8	6.8	7.7	8.7
36	1.7	2.1	3.1	4.1	5.1	6.1	7.2	8.2	9.2
38	1.8	2.2	3.2	4.3	5.4	6.5	7.6	8.6	9.7
40	1.9	2.3	3.4	4.6	5.7	6.8	8.0	9.1	10.2
42	2.0	2.4	3.6	4.8	6.0	7.1	8.4	9.5	10.8
44	2.1	2.5	3.7	5.0	6.2	7.5	8.7	10.0	11.2

Since the silver level of the solution, along with other conditions will change over the number of batches being desilvered, this is only an approximate value. In most cases, if the amount of silver you normally remove from the drum is close to the amount shown in the table, the minimum batch time will not need to be altered. However, if the amount of silver normally removed is substantially less, corrective action should be taken by proceeding to Section 7.3.

7.3 Determining Batch Time

Once you have determined silver weight for number of batches, check the current amperage level at which the unit is operating.

To determine batch time:

- Section 5.1 demonstrates the display message when the unit is in the desilver cycle. The two left-hand numbers display the current amperage. The three right-hand numbers tell how long that batch has been running (for example, 1:23 is 1 hour and 23 minutes). To determine batch time, check the current amperage after the unit has been running between 20 (0:20) and 45 (0:45) minutes in the desilver cycle.
- If the current amperage is at or below the minimum value (10 amps on a 16 Amp SRU; and 14 amps on a 32 Amp SRU), the unit will desilver at that minimum current. If the current is *higher* than the minimum, you must allow the current (amps) to remain at an unchanged value for 15 minutes before determining your normal current (amps) level.
- Once the current has stabilized, determine how long the batches are running. If they are running over six hours, you should not be required to increase the minimum batch time. You can determine how long a batch should run by finding the silver level of the solution before desilvering (see Section 5.2), and the current amperage (see Section 5.1).

4. Next, refer to Table 7.3 to find out the approximate minimum time that batch should run for. For example, if a 16 Amp SRU has 4.0 grams per liter at 10 amps, it should run for approximately 5.1 hours; if a 32 Amp SRU has 4.0 grams per liter at 14 amps, it should run for approximately 3.7 hours. If the batch time is shorter than it should be, increase the minimum batch time to a value that is a bit less than the value in Table 7.3. The example of 5.1 hours highlighted in the table should be set to 4 hours.

5. If after several batches, the drum is not getting very dark, re-check the steps in Sections 7.2 and 7.3 to determine if the minimum batch time should be increased.

If the drum is black and soft, the minimum batch time may need to be *decreased*. Keep in mind that the condition of the solution (old, aerated, low silver, developer carry over, etc.) can also cause the drum to blacken.

Table 7.3

Input silver level in g per l	1.7	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
Amps	Approximate silver weight (lbs.) per number of batches								
10	2.2	2.6	3.8	5.1	6.4	7.7	9.0	10.3	11.5
11	2.0	2.3	3.5	4.7	5.8	7.0	8.2	9.3	10.5
12	1.8	2.1	3.2	4.3	5.3	6.4	7.5	8.5	9.6
13	1.7	2.0	3.0	3.9	4.9	5.9	6.9	7.9	8.9
14	1.6	1.8	2.7	3.7	4.6	5.5	6.4	7.3	8.2
15	1.5	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7
16	1.4	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2
17	1.3	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8
18	1.2	1.4	2.1	2.8	3.6	4.3	5.0	5.7	6.4
19	1.1	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.1
20	1.1	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8
21	1.0	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.5
32	1.0	1.2	1.7	2.3	2.9	3.5	4.1	4.7	5.2
23	0.9	1.1	1.7	2.2	2.8	3.3	3.9	4.5	5.0
24	0.9	1.1	1.6	2.1	2.7	3.2	3.7	4.3	4.8
25	0.9	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6
26	0.8	1.0	1.5	2.0	2.5	3.0	3.5	3.9	4.4
27	0.8	0.9	1.4	1.9	2.4	2.8	3.3	3.8	4.3
28	0.8	0.9	1.4	1.8	2.3	2.7	3.2	3.7	4.1
29	0.8	0.9	1.3	1.8	2.2	2.7	3.1	3.5	4.0
30	0.7	0.9	1.3	1.7	2.1	2.6	3.0	3.4	3.8
31	0.7	0.8	1.2	1.7	2.1	2.5	2.9	3.3	3.7
32	0.7	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6

From these conditions, you can determine if the minimum time should be changed. If the weight of silver or batch time is close to the values found in the tables, changing the minimum batch time will have little effect.

Important:

Whenever changes are made to the minimum batch time, the drum condition must be watched closely.

Important:

If batches are forced to run too long because the "Minimum Batch Time" is set too high, sulfiding may occur giving a soft black build-up on the drum. Batch times may run longer than the value derived from the table without any problem. However, you should check the drum condition periodically for sulfiding.

8 Maintenance

CAUTION:

To prevent risk of electrical shock, disconnect all power supply cords before lifting or removing SRU head.

8.1 General Maintenance

The SRU is covered by a one year warranty and should be referred to X-Rite for repair within the warranty period. Attempts to make repairs within this period may void the warranty.

Shipping costs shall be paid by the customer and the unit shall be submitted in its original shipping carton, as a complete unaltered unit.

8.2 Exterior Cleaning

The SRU can be cleaned with a cloth moistened with a mild soap and water solution. Always unplug line cord before cleaning.

8.3 Fuse Replacement

NOTICE:

Your SRU may have a "twist-off" type fuse(s) carrier not shown on this page. If this is the case, replace fuse(s) with the follow type(s):

616—250VAC-3AG 2.5 amp Slo-Blo
616X—250VAC-3AG 1.8 amp Slo-Blo
632—250VAC-3AG 3.2 amp Slo-Blo
632X—250VAC-3AG 2.5 amp Slo-Blo

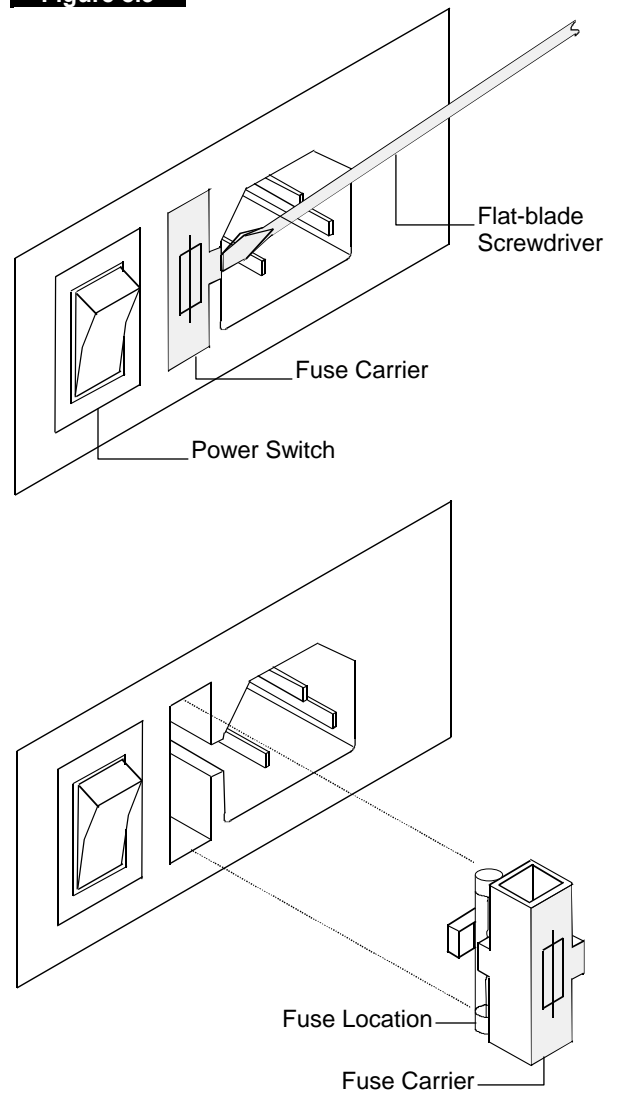
Replacement Fuse

P/N SE49-0315 (5mm x 20mm 3.15A, 250V time-delay fuse)

To replace the fuse:

1. Turn power off (O) and remove detachable line cord.
2. Insert small flat-blade screwdriver into right edge of fuse carrier and pry out.
3. Remove blown fuse from carrier clip and discard.
4. Remove spare fuse from carrier compartment and place in fuse clip.
5. Reinsert fuse carrier into fuse cavity. Make sure carrier is firmly seated.
6. Reinstall detachable line cord.

Figure 8.3



8.4 General Inner Tank Cleaning

Each time the silver is removed from the drum, the inner tank and drum assembly should be wiped clean with a damp cloth. Additionally, you should inspect the inner tank and drum assembly for any fungus or tar build up, or for silver "fingers" that may be deposited in the bottom of the inner tank. If any of these problems exist, refer to Section 8.5.

Fungus or tar build up can cause poor desilvering and inhibit automatic operation. Fungus, tar, and silver fingers can be caused by:

- Desilvering aerated (old) solution. If you must desilver aerated solution, mix 25% of aerated solution with 75% unaerated solution.
- By cleaning/purging your processor tank and letting the contaminated cleaning mixture flow into the SRU. Always disconnect the inlet of the SRU from the processor when cleaning the processor tank.

8.5 Comprehensive Inner Tank Cleaning

CAUTION:

It is very important to thoroughly rinse out tank with water before and after cleaning. Mixing a sodium hypochlorite with acidic solutions such as stop bath releases toxic chlorine gas.

1. Unplug the SRU AC cord from the wall socket, unplug both the inlet and outlet pump cords from the SRU head.
2. Empty the inner and outer reservoirs of the SRU. This can be accomplished by inserting the SRU outlet hose into a separate holding tank and plugging the outlet pump and inlet pump into a 115 VAC outlet. Pump all solution into the holding tank.
3. Remove the SRU inlet cover and flush out the complete system with water: insert a garden type hose into the SRU inlet, insert the SRU output hose into the drain, turn water on, plug both pumps into a 115 VAC outlet. Let the system run for approximately 15 minutes or until water runs clean.
4. Empty the inner and outer reservoirs by repeating Step 2.
5. Fill the outer reservoirs with hot water and then pour in the amount of cleaning solution (approximately two tablespoons) as recommended by the manufacturer of your processor solution.
6. Insert the SRU outlet hose into the SRU inlet.
7. Plug both the inlet and outlet pumps into a 115 VAC outlet. Let the SRU circulate for approximately 30 minutes.
8. Repeat Steps 2 and 3.

9 Specifications

616 & 616X

Automatic Operation

- **Amperage:** 16 Amp (Bleach Fix), 10 Amp (Waterless)
- **Recovery Capacity:** 150 rolls/day—Photographic 16 gallons/day
- **Tank Size:** Inner—4 Gallons; Outer—9 Gallons
- **Batch Size:** 4 gallons
- **Cathode Size:** 4.375" high x 6.5" diameter drum
- **Anode Size:** 3 anodes—.5" thick x 3.5" wide x 7.125" high
- **Power Requirements:** 616—115VAC 60Hz
616X—230VAC 50Hz
- **Dimensions:** 26" high x 15" wide x 21.5" deep
- **Shipping Weight:** Approximately 52 pounds
- **Applications:** Photographic, Mini-labs, Photolabs
- **Workable Solutions:** All types of Bleach solutions (including waterless)*

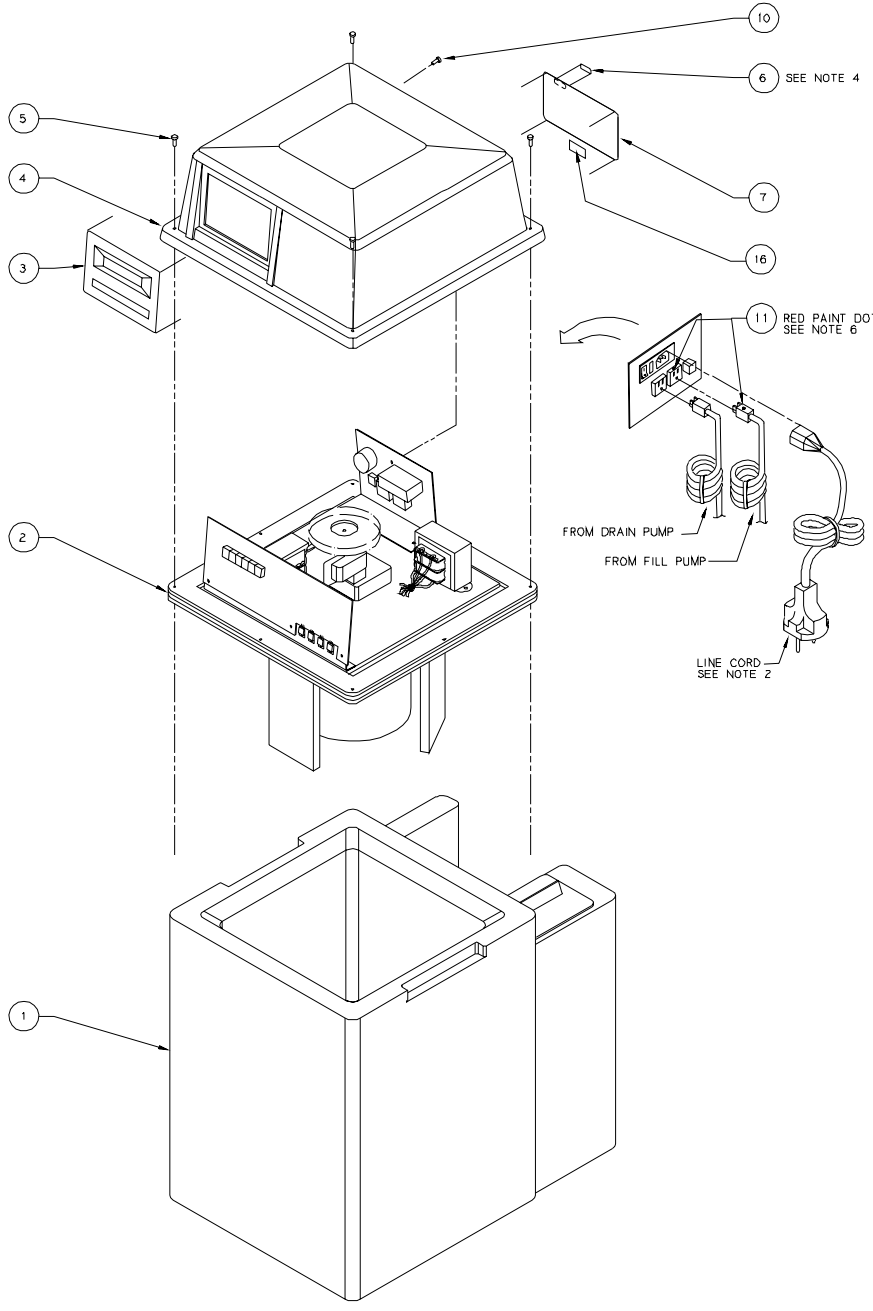
*Do not attempt to recover silver from developer.

632 & 632X

Automatic Operation

- **Amperage:** 32 Amp (Bleach Fix), 14 Amp (Waterless)
- **Recovery Capacity:** 300 rolls/day—Photographic 32 gallons/day
- **Tank Size:** Inner—4 Gallons; Outer—9 Gallons
- **Batch Size:** 4 gallons
- **Cathode Size:** 6.5" high x 6.5" diameter drum
- **Anode Size:** 3 Anode—.5" thick x 3.5" wide x 9.25" high
- **Power Requirements:** 632—115VAC 60Hz
632X—230VAC 50Hz
- **Dimensions:** 26" high x 15" wide x 21.5" deep
- **Shipping Weight:** Approximately 52 pounds
- **Applications:** High Volume Photographic, Mini-labs, Photolabs
- **Workable Solutions:** All types of Bleach solutions (including waterless)*

*Do not attempt to recover silver from developer.



X-Rite Incorporated GRANDVILLE, MICHIGAN, U.S.A.	
TITLE SILVER RECOVERY SYSTEM	
DATE 11/28/01	BY T. J. M.
SCALE NONE	REC. JF MS DVB
WELL	PROP
DATE 11/28/01	BY T. J. M.
SCALE NONE	REC. JF MS DVB
WELL	PROP
ALL THE COMPONENTS APPLIED TO THIS DRAWING SHALL BE IDENTIFIED BY PART NUMBER AND QUANTITY. THE DRAWING CONTAINS INFORMATION THAT IS NOT TO BE DISCLOSED TO OTHERS WITHOUT THE WRITTEN AUTHORIZATION FROM AN OFFICE OF X-RITE, GRANDVILLE.	

CLASS	DRG NO.	REV	1 OF 1
PA	632CX-00-01		
REVISION			
REV	DATE	BY	APP
1	12-03-01	JAM	A
ECU 10162 04-20-02 TLM WPS ITEM 6 SD43-170 WAS SD43-0324-02. REVISE NOTES PER ECU. REMOVE ITEM 11. SM60-25 IS PART OF NOTE 6			

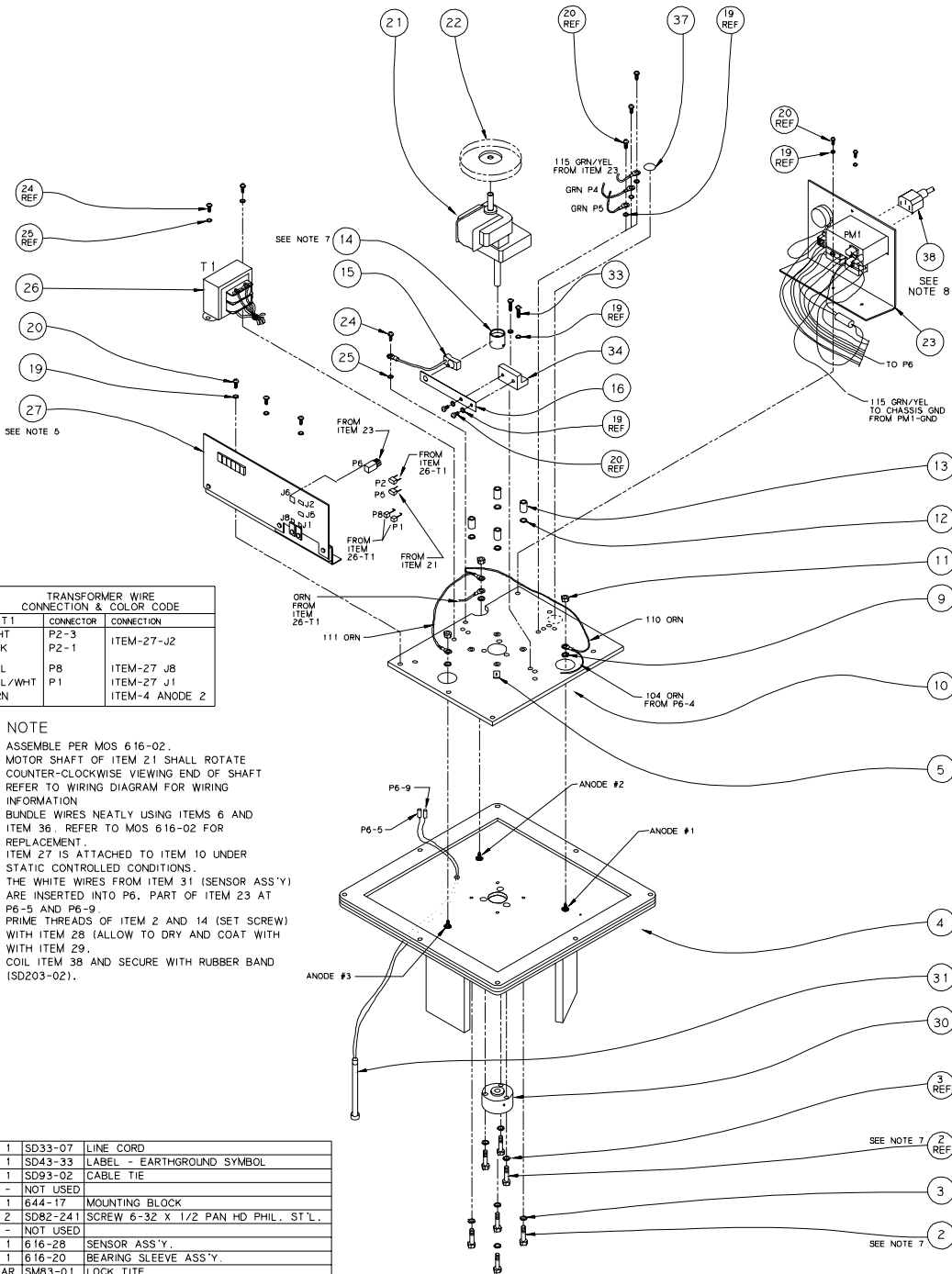
ITEM	QTY	PART NUMBER	DESCRIPTION
16	1	SD43-84	LABEL - SURGE SUPPRESSION
15	-	NOT USED	
14	-	NOT USED	
13	-	NOT USED	
12	-	NOT USED	
11	-	NOT USED	
10	1	SD82-158	SCREW, 6-32 X 3/8 PAN HD PHIL DR SS
9	-	NOT USED	
8	-	NOT USED	
7	1	SD43-616CX-03	BACK LABEL
6	1	SD43-170	LABEL - BLANK (MODEL/SERIAL No.)
5	4	SD82-284	SCREW, 10-16 X 1/2 PAN HD PHIL DR SELF THD SS
4	1	632-08	COVER
3	1	SD43-632-01	FRONT LABEL
2	1	632CX-02	BASEPLATE ASSEMBLY
1	1	616-13	TANK ASSEMBLY

PARTS LIST

NOTE

- ASSEMBLE PER SPECIFICATION MOS 616-00-01.
- PLACE COILED LINE CORD IN PUMP CAVITY OF TANK.
- APPLY 4 DIGIT DATE CODE TO LIP OF COVER, CENTERED BELOW ITEM 7, USING RUBBER STAMP WITH SM352-01, INK-BLACK
- ITEM 6 TO BE PRINTED USING MOS LABELS FOR MODEL/SERIAL NUMBERS
- APPLY 4 DIGIT DATE CODE TO LIP OF COVER, CENTERED BELOW ITEM 7 USING STAMP WITH SM352-01, BLACK INK
- USING RED PAINT MARKER (SM60-25), ADD DOT TO PLUG ON FILL PUMP LINE CORD AND FILL PUMP OUTLET AS SHOWN.

UNCONTROLLED WHEN PRINTED



TRANSFORMER WIRE CONNECTION & COLOR CODE		
T 1	CONNECTOR	CONNECTION
WHT	P2-3	ITEM-27-J2
BLK	P2-1	
YEL	P8	ITEM-27 J8
YEL/WHT	P1	ITEM-27 J1
ORN		ITEM-4 ANODE 2

NOTE

- ASSEMBLE PER MOS 616-02.
- MOTOR SHAFT OF ITEM 21 SHALL ROTATE COUNTER-CLOCKWISE VIEWING END OF SHAFT
- REFER TO WIRING DIAGRAM FOR WIRING INFORMATION
- BUNDLE WIRES NEATLY USING ITEMS 6 AND ITEM 36. REFER TO MOS 616-02 FOR REPLACEMENT.
- ITEM 27 IS ATTACHED TO ITEM 10 UNDER STATIC CONTROLLED CONDITIONS.
- THE WHITE WIRES FROM ITEM 31 (SENSOR ASS'Y) ARE INSERTED INTO P6, PART OF ITEM 23 AT P6-5 AND P6-9.
- PRIME THREADS OF ITEM 2 AND 14 (SET SCREW) WITH ITEM 28 (ALLOW TO DRY AND COAT WITH ITEM 29).
- COIL ITEM 38 AND SECURE WITH RUBBER BAND (ISD203-02).

ITEM	QTY	PART NO.	DESCRIPTION
38	1	SD33-07	LINE CORD
37	1	SD43-33	LABEL - EARTHGROUND SYMBOL
36	1	SD93-02	CABLE TIE
35	-	-	NOT USED
34	1	644-17	MOUNTING BLOCK
33	2	SD82-241	SCREW 6-32 X 1/2 PAN HD PHIL. ST'L.
32	-	-	NOT USED
31	1	616-28	SENSOR ASS'Y.
30	1	616-20	BEARING SLEEVE ASS'Y.
29	AR	SM83-01	LOCK TITE
28	AR	SM84-01	LOCK QUICK
27	1	616-105	P. C. BOARD ASS'Y.
26	1	616-25	TRANSFORMER ASS'Y.
25	3	SD83-11	#8 LOCK WASHER, EXT.
24	3	SD82-283	SCREW #8-32 x 1/4 PAN PHIL ST'L.
23	1	616C-103	BACK PANEL ASS'Y.
22	1	SD47-03	MOTOR FAN
21	1	615-17	MOTOR ASS'Y.
20	10	SD82-182	SCREW #6-32 x 1/4 PAN PHIL. ST'L.
19	12	SD83-07	LOCKWASHER, No. 6. INT.
18	-	-	NOT USED
17	-	-	NOT USED
16	1	644-16	LEAF SPRING
15	1	SD99-08	CARBON BRUSH
14	1	603-16	COMMUTATOR RING ASS'Y.
13	4	SD12-52	STANDOFF
12	4	SD85-39	INSULATOR WASHER
11	3	SD96-19	1/4-20 HEX NUT ST'L.
10	1	616-109	MOTOR PLATE
9	3	SD83-01	LOCK WASHER 1/4 ST'L INT.
8	-	-	NOT USED
7	-	-	NOT USED
6	3	SD93-01	CABLE TIE
5	1	SD04-01	TIE WRAP MOUNT
4	1	616-21	BASE PLATE SUB-ASS'Y
3	7	SD85-17	#10 FLAT WASHER S.S.
2	7	SD82-177	SCREW #10-32 x 1 1/2 HEX HD S.S.
1	1	615-07	CATHODE DRUM ASS'Y

PARTS LIST

X-Rite Incorporated
GRANDVILLE, MICHIGAN, U.S.A.

BASEPLATE ASSEMBLY

DATE: 01-03-02 BY: T. J. M. REV: REC GLK DVB

SCALE: NONE

CLASS: PA DRG NO: 616C-02 SH: 1 of 1

REVISION: RELEASED 01-10-02

REVISION: 1

DATE: 01-03-02 BY: T. J. M. REV: REC GLK DVB

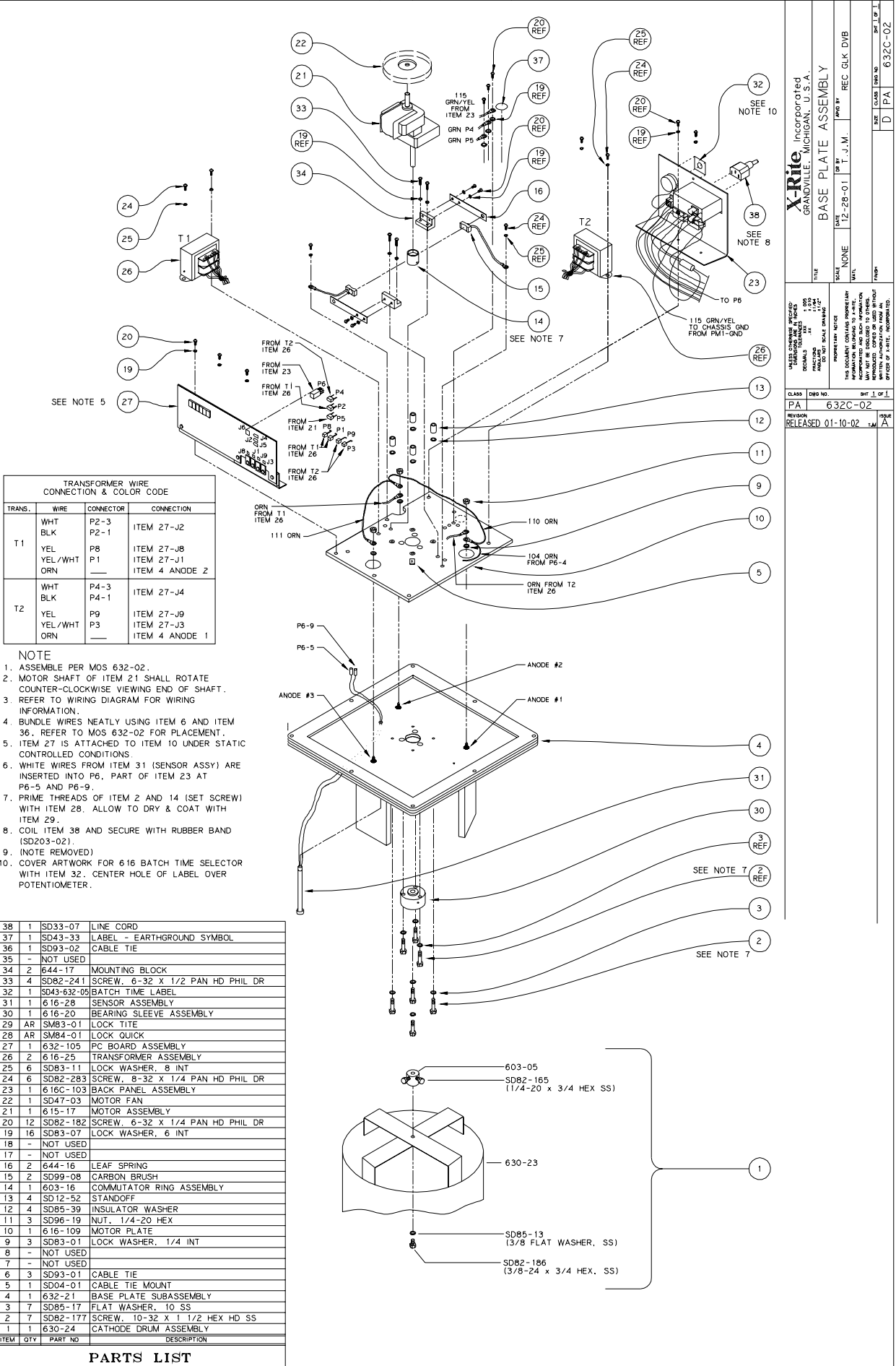
SCALE: NONE

CLASS: PA DRG NO: 616C-02 SH: 1 of 1

REVISION: RELEASED 01-10-02

REVISION: 1

UNCONTROLLED WHEN PRINTED



TRANSFORMER WIRE CONNECTION & COLOR CODE

TRANS.	WIRE	CONNECTOR	CONNECTION
T1	WHT	P2-3	ITEM 27-J2
	BLK	P2-1	
	YEL	P8	ITEM 27-J8
	YEL/WHT	P1	ITEM 27-J1
	ORN		ITEM 4 ANODE 2
T2	WHT	P4-3	ITEM 27-J4
	BLK	P4-1	
	YEL	P9	ITEM 27-J9
	YEL/WHT	P3	ITEM 27-J3
	ORN		ITEM 4 ANODE 1

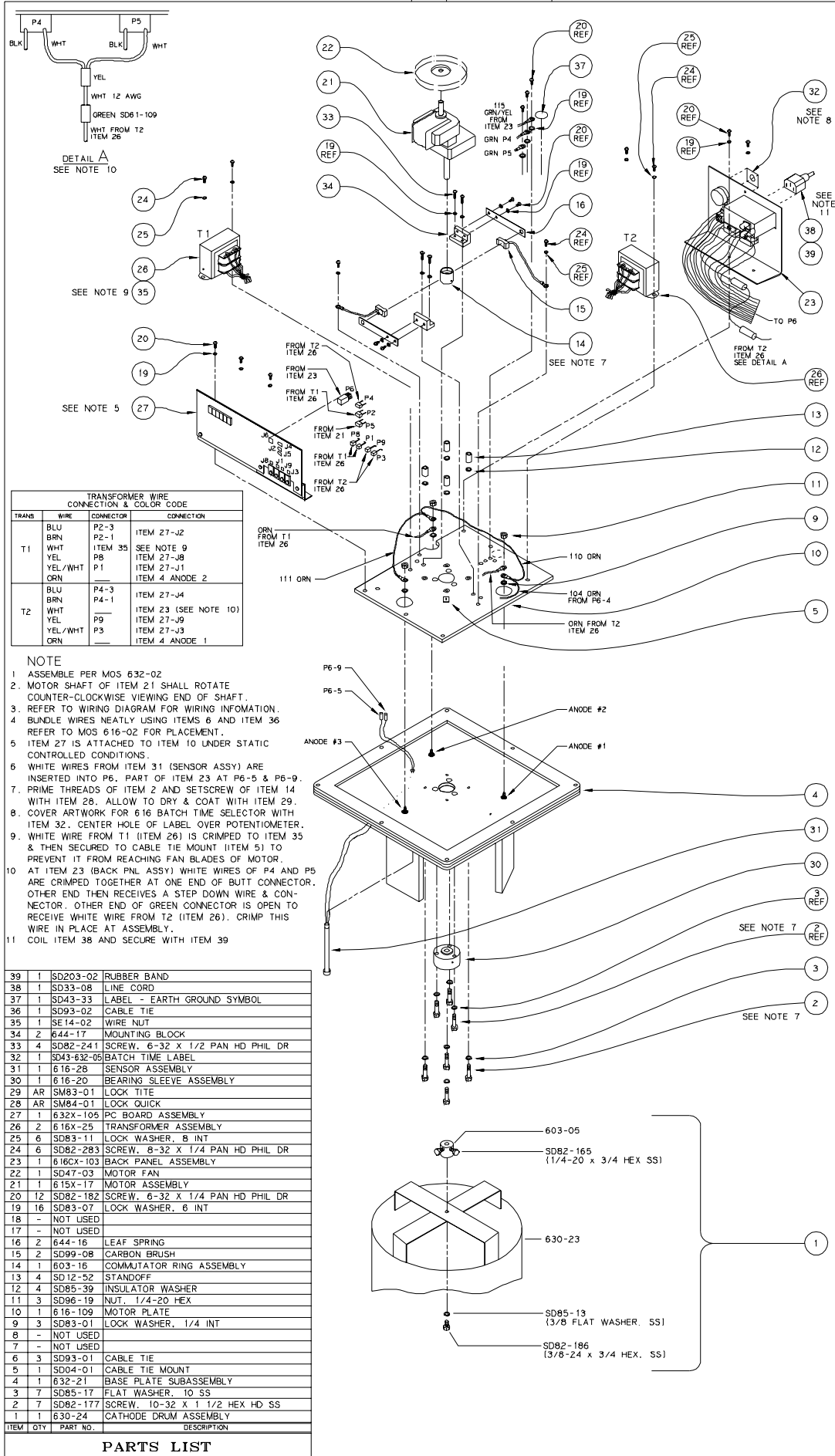
- NOTE**
- ASSEMBLE PER MOS 632-02.
 - MOTOR SHAFT OF ITEM 21 SHALL ROTATE COUNTER-CLOCKWISE VIEWING END OF SHAFT.
 - REFER TO WIRING DIAGRAM FOR WIRING INFORMATION.
 - BUNDLE WIRES NEATLY USING ITEM 6 AND ITEM 36. REFER TO MOS 632-02 FOR PLACEMENT.
 - ITEM 27 IS ATTACHED TO ITEM 10 UNDER STATIC CONTROLLED CONDITIONS.
 - WHITE WIRES FROM ITEM 31 (SENSOR ASSY) ARE INSERTED INTO P6, PART OF ITEM 23 AT P6-5 AND P6-9.
 - PRIME THREADS OF ITEM 2 AND 14 (SET SCREW) WITH ITEM 28. ALLOW TO DRY & COAT WITH ITEM 29.
 - COIL ITEM 38 AND SECURE WITH RUBBER BAND (SD203-02).
 - (NOTE REMOVED)
 - COVER ARTWORK FOR 616 BATCH TIME SELECTOR WITH ITEM 32. CENTER HOLE OF LABEL OVER POTENTIOMETER.

ITEM	QTY	PART NO.	DESCRIPTION
38	1	SD33-07	LINE CORD
37	1	SD43-33	LABEL - EARTHGROUND SYMBOL
36	1	SD93-02	CABLE TIE
35	-	-	NOT USED
34	2	644-17	MOUNTING BLOCK
33	4	SD82-241	SCREW, 6-32 X 1/2 PAN HD PHIL DR
32	1	SD43-632-05	BATCH TIME LABEL
31	1	616-28	SENSOR ASSEMBLY
30	1	616-20	BEARING SLEEVE ASSEMBLY
29	AR	SM83-01	LOCK TITE
28	AR	SM84-01	LOCK QUICK
27	1	632-105	PC BOARD ASSEMBLY
26	2	616-25	TRANSFORMER ASSEMBLY
25	6	SD83-11	LOCK WASHER, 8 INT
24	6	SD82-283	SCREW, 8-32 X 1/4 PAN HD PHIL DR
23	1	616C-103	BACK PANEL ASSEMBLY
22	1	SD47-03	MOTOR FAN
21	1	615-17	MOTOR ASSEMBLY
20	12	SD82-182	SCREW, 6-32 X 1/4 PAN HD PHIL DR
19	16	SD83-07	LOCK WASHER, 6 INT
18	-	-	NOT USED
17	-	-	NOT USED
16	2	644-16	LEAF SPRING
15	2	SD99-08	CARBON BRUSH
14	1	603-16	COMMUTATOR RING ASSEMBLY
13	4	SD12-52	STANDOFF
12	4	SD85-39	INSULATOR WASHER
11	3	SD96-19	NUT, 1/4-20 HEX
10	1	616-109	MOTOR PLATE
9	3	SD83-01	LOCK WASHER, 1/4 INT
8	-	-	NOT USED
7	-	-	NOT USED
6	3	SD93-01	CABLE TIE
5	1	SD04-01	CABLE TIE MOUNT
4	1	632-21	BASE PLATE SUBASSEMBLY
3	7	SD85-17	FLAT WASHER, 10 SS
2	7	SD82-177	SCREW, 10-32 X 1 1/2 HEX HD SS
1	1	630-24	CATHODE DRUM ASSEMBLY

PARTS LIST

CLASS	DRW NO.	SHT	1 of 1
PA	632C-02		
REVISION	RELEASED 01-10-02		

<p>X-Rite Incorporated GRANDVILLE, MICHIGAN, U.S.A.</p> <p>BASE PLATE ASSEMBLY</p> <p>SCALE: NONE DATE: 12-28-01 DESIGNED BY: T. J. M. DRAWN BY: REC GLK DVB</p>	<p>DATE: 12-28-01 DESIGNED BY: T. J. M. DRAWN BY: REC GLK DVB</p>	<p>SIZE: CLASS: DRW NO.: D PA 632C-02</p>
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TRANSFORMER WIRE CONNECTION & COLOR CODE

TRANS	WIRE	CONNECTOR	CONNECTION
T1	BLU	P2-3	ITEM 27-J2
	BRN	P2-1	SEE NOTE 9
	WHT	ITEM 35	ITEM 27-J8
	YEL	P8	ITEM 27-J1
T2	YEL/WHT	P1	ITEM 4 ANODE 2
	ORN		
	BLU	P4-3	ITEM 27-J4
	BRN	P4-1	ITEM 23 (SEE NOTE 10)
	WHT	P9	ITEM 27-J9
	YEL	P3	ITEM 27-J3
	YEL/WHT		ITEM 4 ANODE 1

- NOTE
- ASSEMBLE PER MOS 632-02
 - MOTOR SHAFT OF ITEM 21 SHALL ROTATE COUNTER-CLOCKWISE VIEWING END OF SHAFT.
 - REFER TO WIRING DIAGRAM FOR WIRING INFORMATION.
 - BUNDLE WIRES NEATLY USING ITEMS 6 AND ITEM 36 REFER TO MOS 616-02 FOR PLACEMENT.
 - ITEM 27 IS ATTACHED TO ITEM 10 UNDER STATIC CONTROLLED CONDITIONS.
 - WHITE WIRES FROM ITEM 31 (SENSOR ASSY) ARE INSERTED INTO P6. PART OF ITEM 23 AT P6-5 & P6-9.
 - PRIME THREADS OF ITEM 2 AND SETSCREW OF ITEM 14 WITH ITEM 28. ALLOW TO DRY & COAT WITH ITEM 29.
 - COVER ARTWORK FOR 616 BATCH TIME SELECTOR WITH ITEM 32. CENTER HOLE OF LABEL OVER POTENTIOMETER.
 - WHITE WIRE FROM T1 (ITEM 26) IS CRIMPED TO ITEM 35 & THEN SECURED TO CABLE TIE MOUNT (ITEM 5) TO PREVENT IT FROM REACHING FAN BLADES OF MOTOR.
 - AT ITEM 23 (BACK PNL ASSY) WHITE WIRES OF P4 AND P5 ARE CRIMPED TOGETHER AT ONE END OF BUTT CONNECTOR. OTHER END THEN RECEIVES A STEP DOWN WIRE & CONNECTOR. OTHER END OF GREEN CONNECTOR IS OPEN TO RECEIVE WHITE WIRE FROM T2 (ITEM 26). CRIMP THIS WIRE IN PLACE AT ASSEMBLY.
 - COIL ITEM 38 AND SECURE WITH ITEM 39

ITEM	QTY	PART NO.	DESCRIPTION
39	1	SD203-02	RUBBER BAND
38	1	SD33-08	LINE CORD
37	1	SD43-33	LABEL - EARTH GROUND SYMBOL
36	1	SD93-02	CABLE TIE
35	1	SE14-02	WIRE NUT
34	2	644-17	MOUNTING BLOCK
33	4	SD82-241	SCREW, 6-32 X 1/2 PAN HD PHIL DR
32	1	SD43-632-05	BATCH TIME LABEL
31	1	616-28	SENSOR ASSEMBLY
30	1	616-20	BEARING SLEEVE ASSEMBLY
29	AR	SM83-01	LOCK TITE
28	AR	SM84-01	LOCK QUICK
27	1	632X-105	PC BOARD ASSEMBLY
26	2	616X-25	TRANSFORMER ASSEMBLY
25	6	SD83-11	LOCK WASHER, 6 INT
24	6	SD82-283	SCREW, 8-32 X 1/4 PAN HD PHIL DR
23	1	616CX-103	BACK PANEL ASSEMBLY
22	1	SD47-03	MOTOR FAN
21	1	615X-17	MOTOR ASSEMBLY
12	12	SD82-182	SCREW, 6-32 X 1/4 PAN HD PHIL DR
19	16	SD93-07	LOCK WASHER, 6 INT
18	-	NOT USED	
17	-	NOT USED	
16	2	644-16	LEAF SPRING
15	2	SD99-08	CARBON BRUSH
14	1	603-16	COMMUTATOR RING ASSEMBLY
13	4	SD12-52	STANDOFF
12	4	SD85-39	INSULATOR WASHER
11	3	SD96-19	NUT, 1/4-20 HEX
10	1	616-109	MOTOR PLATE
9	3	SD83-01	LOCK WASHER, 1/4 INT
8	-	NOT USED	
7	-	NOT USED	
6	3	SD93-01	CABLE TIE
5	1	SD04-01	CABLE TIE MOUNT
4	1	632-21	BASE PLATE SUBASSEMBLY
3	7	SD85-17	FLAT WASHER, 10 SS
2	7	SD82-177	SCREW, 10-32 X 1 1/2 HEX HD SS
1	1	630-24	CATHODE DRUM ASSEMBLY

PARTS LIST

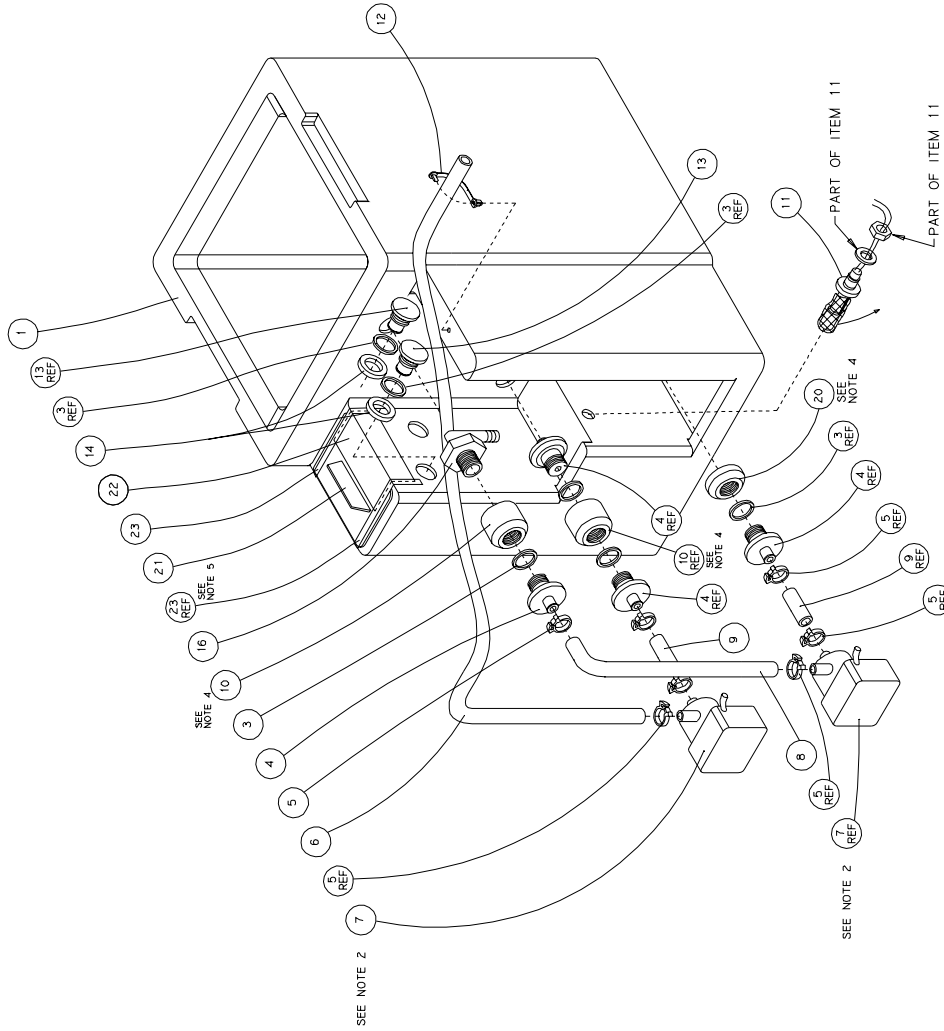
X-Rite Incorporated
 GRANDVILLE, MICHIGAN, U.S.A.

BASE PLATE ASSEMBLY

SCALE: NONE
 DATE: 11-26-01
 DRAWN BY: T. J. M.
 REC. JF. DVB
 FILE NO. 632CX-02

CLASS PA DRW NO 632CX-02

REVISION: 12-04-01
 632CX-02
 RELEASED 12-04-01
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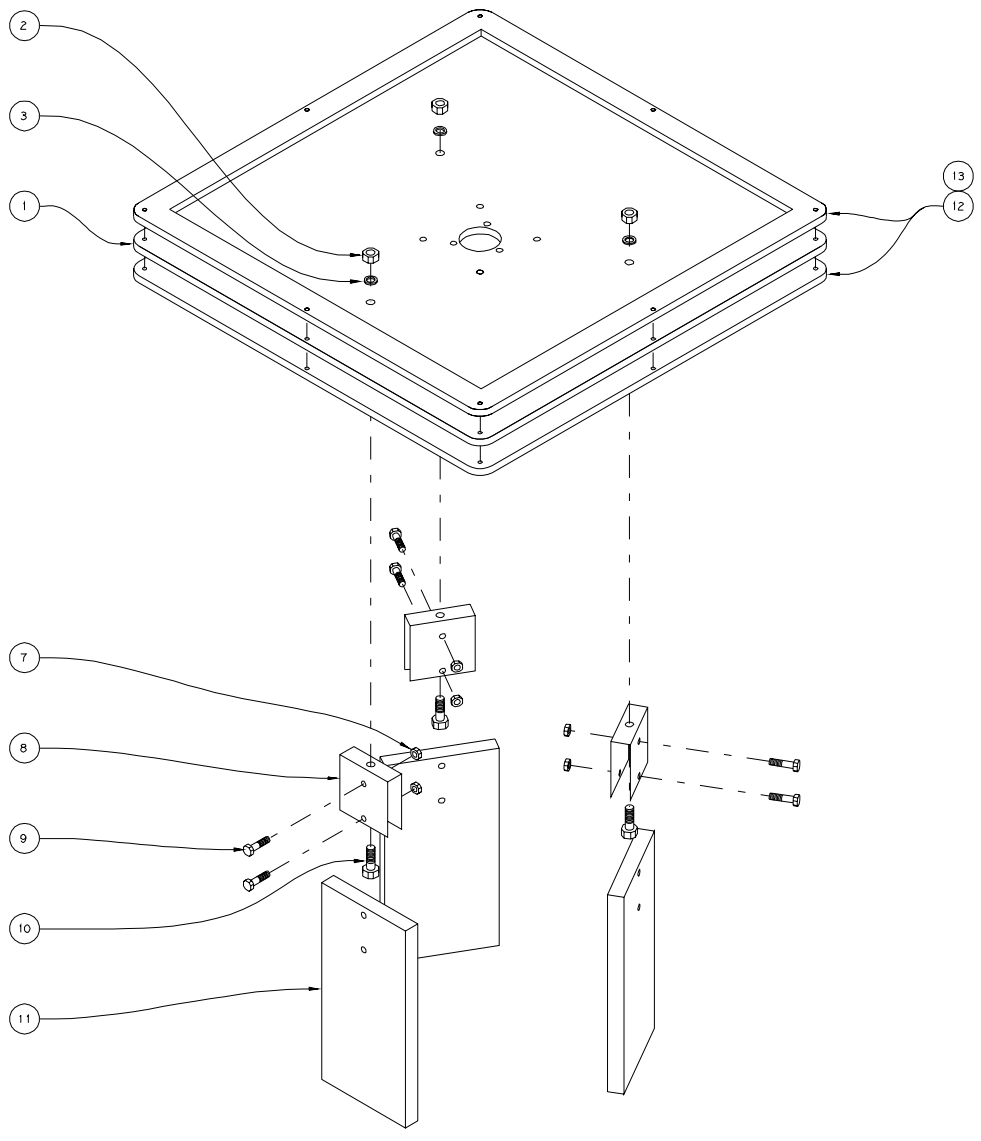
NOTE

1. ASSEMBLE PER MOS 616-13
2. SECURE EACH PUMP LINE CORD 2 PLACES AS REQUIRED.
3. REMOVE
4. BEVELLED END OF BULKHEAD NUT (ITEM 20) AND BULKHEAD COUPLINGS (ITEM 10) FACE TOWARDS PUMPS AS SHOWN
5. PLACE ITEM 22 OVER ONE SIDE OF ITEM 21 & LAPPING OVER SIDE OF ITEM 1 AS SHOWN. SECURE ITEM 21 & 22 TO TANK WITH ITEM 23 AS SHOWN. TO INSURE ITEM 22 IS REMOVED FIRST BEFORE ITEM 21.

ITEM	QTY	PART NUMBER	DESCRIPTION
23	AR	SM04-02	STRAPPING TAPE (QTY 2 @ T 1/2in)
22	1	616-0	HOSE PLUG NOTICE
21	1	616-24	BULK COVER
20	1	630-29	BULKHEAD NUT
19	-	NOT USED	
18	-	NOT USED	
17	1	SD89-24	ELBOW
16	1	NOT USED	
15	2	616-36	HOLE PLUG NUT
14	2	616-38	HOSE PLUG / 3/4in ADAPTOR
13	1	SD04-02	HOSE RETAINER
12	1	616-22	LIQUID LEVEL SENSOR ASSY
11	2	616-17	BULKHEAD COUPLING
10	2	616-33	PVC HOSE
9	1	616-34	PVC HOSE
8	2	SD07-03	PUMP
7	2	SD07-03	PUMP
6	7	616-35	HOSE
5	4	616-18	HOSE PLUG
4	1	616-18	FLANGED BULKHEAD FITTING
3	6	SD35-07	O-RING
2	-	NOT USED	
1	1	616-12	TANK - MACHINED

PARTS LIST

X-rite Incorporated GRANDVILLE, MICHIGAN, U.S.A.	
TITLE: TANK ASSEMBLY	
SCALE: NONE	DATE: 05-29-87
DRAWN BY: M. D. D.	
CHECKED BY: M. P. S.	
APPROVED BY: M. P. S.	
CLASS PA	DWG NO. 616-13
REV. NO. 1	REV. DATE 06-05-87
REV. NO. 2	REV. DATE 07-06-87
REV. NO. 3	REV. DATE 07-26-87
REV. NO. 4	REV. DATE 08-16-87
REV. NO. 5	REV. DATE 10-12-87
REV. NO. 6	REV. DATE 10-12-87
REV. NO. 7	REV. DATE 10-12-87
REV. NO. 8	REV. DATE 10-12-87
REV. NO. 9	REV. DATE 10-12-87
REV. NO. 10	REV. DATE 10-12-87
REV. NO. 11	REV. DATE 10-12-87
REV. NO. 12	REV. DATE 10-12-87
REV. NO. 13	REV. DATE 10-12-87
REV. NO. 14	REV. DATE 10-12-87
REV. NO. 15	REV. DATE 10-12-87
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REV. NO. 18	REV. DATE 10-12-87
REV. NO. 19	REV. DATE 10-12-87
REV. NO. 20	REV. DATE 10-12-87
REV. NO. 21	REV. DATE 10-12-87
REV. NO. 22	REV. DATE 10-12-87
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REV. NO. 24	REV. DATE 10-12-87
REV. NO. 25	REV. DATE 10-12-87
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REV. NO. 97	REV. DATE 10-12-87
REV. NO. 98	REV. DATE 10-12-87
REV. NO. 99	REV. DATE 10-12-87
REV. NO. 100	REV. DATE 10-12-87



X-Rite Incorporated
 GRANDVILLE, MICHIGAN, U.S.A.

FILE: BASEPLATE SUBASSEMBLY
 SCALE: NONE
 DATE: 05-15-87
 BY: M.D.D.
 CHECKED BY: M.P.S. TB BJB

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CLASS PA DWG NO 616-21 SH 1 OF 1

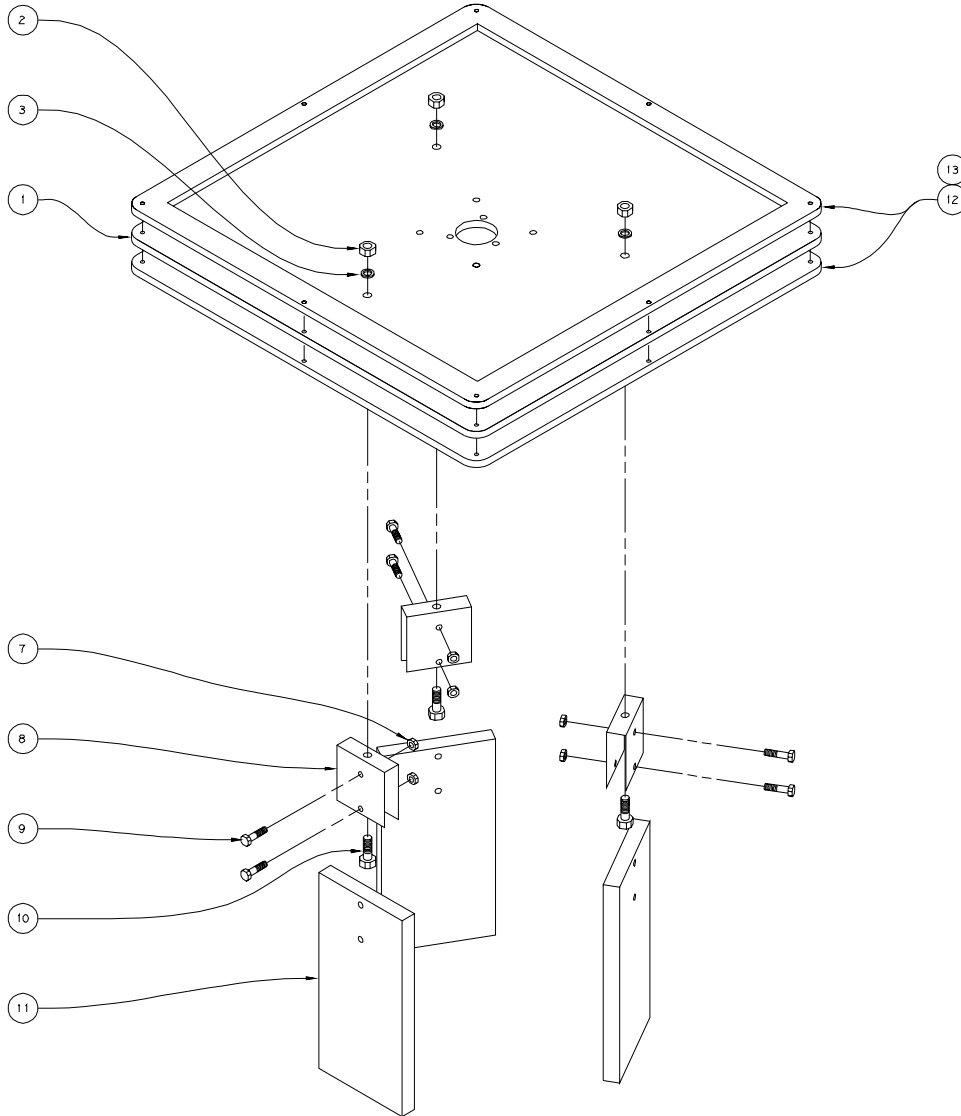
REVISIONS

NO.	DATE	BY	DESCRIPTION
1	05-20-87	J.M.	RELEASED
2	07-01-87	T.M.	ECO 2927
3	01-01-87	J.M.	DEL ITEM 4: 616-20
4	02-08-87	M.P.S.	DEL ITEM 5: SD85-17
5	02-08-87	M.P.S.	DEL ITEM 6: SD85-17
6	09-04-87	J.H.	ECO 2996
7	09-04-87	J.H.	ADD ITEM 7: 616-14
8	09-04-87	J.H.	ADD ITEM 8: SD82-85
9	09-04-87	J.H.	ADD ITEM 9: SD85-55
10	09-04-87	J.H.	ADD ITEM 10: SD96-07
11	09-04-87	J.H.	ADD ITEM 11: SM04-34
12	11-23-88	T.M.	ECO 3176
13	03-31-89	M.D.D.	ITEM 13: SM04-34 WAS SMO2-01
14	03-31-89	M.D.D.	REVISION NOTE 2
15	03-31-89	M.D.D.	ECO 10164
16	03-31-89	M.D.D.	REVISION NOTE 1

ITEM	QTY	PART NUMBER	DESCRIPTION
13	AR	SM04-34	ADHESIVE TRANSFER TAPE (4 @ 14in)
12	2	616-14	GASKET
11	3	616-19	CARBON ANODE
10	3	SD82-85	SCREW, 1/4-20 x 1 HEX HD SS
9	6	SD85-55	SCREW, 10-24 x 3/4 HEX HD TIT
8	3	100-32	ANODE BRACKET
7	6	SD96-07	NUT, 10-24 HEX TIT
6	-	-	NOT USED
5	-	-	NOT USED
4	-	-	NOT USED
3	3	SD85-08	FLAT WASHER, 1/4 SS
2	3	SD96-19	NUT, 1/4-20 HEX SS
1	1	616-06	BASEPLATE

PARTS LIST

NOTE
 1. ASSEMBLE PER MOS 616-21.
 2. BEFORE PLACING ITEM 12 APPLY ITEM 13 TO ITEM 1 AROUND TOP & BOTTOM OUTSIDE EDGE BETWEEN MOUNTING HOLES.



X-Rite, Incorporated GRANDVILLE, MICHIGAN, U.S.A.	
TITLE: BASEPLATE SUBASSEMBLY	
DATE: 09-04-87	DESIGNED BY: J. H.
SCALE: NONE	CHECKED BY: MFS TB BJB
DRAWN BY:	PART NO:
PROPOSED BY:	PART 1 OF 1
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RELEASED 09-04-87 EEO 316: 11-25-88 TIT ITEM 13: 3304-03 WAS SUE2-01 REUSE NOTE 7, WAS APPLY A READ OF ITEM 13 AROUND OUT- SIDE EDGE OF ITEM 1 BEFORE PLACING ITEM 13 EEO 10184 03-31-99 MOD REUSE NOTE 1	A B C

ITEM	QTY	PART NUMBER	DESCRIPTION
13	AR	SM04-34	ADHESIVE TRANSFER TAPE (4 @ 14in)
12	2	616-14	GASKET
11	3	632-19	CARBON ANODE
10	3	SD82-85	SCREW, 1/4-20 x 1 HEX HD SS
9	6	SD82-55	SCREW, 10-24 x 3/4 HEX HD TIT
8	3	100-32	ANODE BRACKET
7	6	SD96-07	NUT, 10-24 HEX TIT
6	-	-	NOT USED
5	-	-	NOT USED
4	-	-	NOT USED
3	3	SD85-08	FLAT WASHER, 1/4 SS
2	3	SD96-19	NUT, 1/4-20 HEX SS
1	1	616-06	BASEPLATE

PARTS LIST

NOTE
 1. ASSEMBLE PER MOS 616-21.
 2. BEFORE PLACING ITEM 12 APPLY ITEM 13 TO ITEM 1 AROUND TOP & BOTTOM OUTSIDE EDGE BETWEEN MOUNTING HOLES.



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