Safety Precautions for Engineer

English

Lotem 400 Family

DRAFT

<03-9999X-X>

www.creo.com

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This product is covered by one or more of the following U.S. patents:

RE37,376	5,283,140	5,517,359	5,699,740	5,969,872	6,134,393	6,283,589
4,456,924	5,291,273	5,519,852	5,708,736	5,973,801	6,136,509	6,295,076
4,500,919	5,323,248	5,526,143	5,713,287	5,986,819	6,137,580	6,299,572
4,558,302	5,325,217	5,532,728	5,742,743	5,995,475	6,147,789	6,318,266
4,743,091	5,339,176	5,561,691	5,764,374	5,996,499	6,158,345	6,340,817
4,992,864	5,343,059	5,568,595	5,764,381	5,998,067	6,159,659	6,352,816
5,049,901	5,355,446	5,576,754	5,771,794	6,003,442	6,164,637	6,353,216
5,079,721	5,359,451	5,579,115	5,785,309	6,014,471	6,180,325	6,366,339
5,081,617	5,359,458	5,592,309	5,802,034	6,016,752	6,181,362	6,371,026
5,103,407	5,367,360	5,594,556	5,813,346	6,031,932	6,181,439	6,377,739
5,111,308	5,384,648	5,600,448	5,818,498	6,043,865	6,186,068	6,387,597
5,113,249	5,384,899	5,608,822	5,854,883	6,060,208	6,189,452	6,396,422
5,122,871	5,412,491	5,615,282	5,861,904	6,063,528	6,191,882	6,396,618
5,124,547	5,412,737	5,625,766	5,861,992	6,063,546	6,204,874	6,407,849
5,132,723	5,420,702	5,636,330	5,875,288	6,072,518	6,208,369	6,414,755
5,150,225	5,420,722	5,649,220	5,894,342	6,090,529	6,214,276	6,422,801
5,153,769	5,459,505	5,650,076	5,900,981	6,096,461	6,217,965	6,435,091
5,155,782	5,473,733	5,652,804	5,934,196	6,098,544	6,252,522	
5,157,516	5,481,379	5,680,129	5,942,137	6,107,011	6,260,482	
5,208,818	5,488,906	5,691,823	5,946,426	6,112,663	6,266,080	
5,208,888	5,497,252	5,691,828	5,947,028	6,115,056	6,266,134	
5,247,174	5,508,828	5,696,393	5,958,647	6,121,996	6,267,054	
5,249,067	5,509,561	5,699,174	5,966,504	6,130,702	6,268,948	

Creo Inc.
3700 Gilmore Way
Burnaby, B.C., Canada
V5G 4M1
Tel: 1-604-451-2700
Fax: 1-604-437-9891

http://www.creo.com

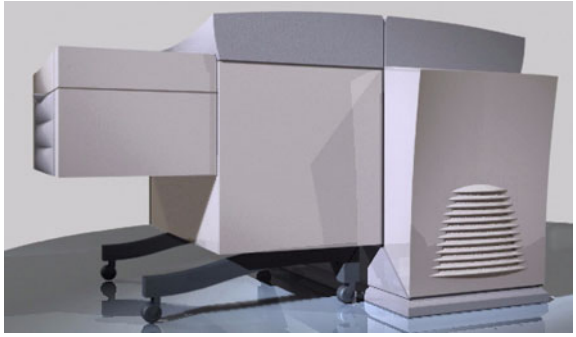
<03-9999X-X>

Revised April 2003

Laser and Safety Precautions

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Read the following safety chapter carefully before installing, operating, servicing or maintaining the Lotem 400 Family platesetter.

Read the user laser and safety precautions for the Lotem 400, an indispensable part of the service engineer's precautions. Please see the *Lotem 400 Family Safety Precautions for User,* 653-00275A.



Note: Lotem 400 Family in this document refers to the Lotemn 400 Fiber head with Omron interlocks as wel las the Lotem 400 with MCU.

This product is a **Class 1** laser product, according to IEC825-1 and USA 21 CFR 1040. This implies that there is no hazardous laser radiation, providing that the user and service safety precautions are followed.

Lotem 400 safety at a glance - how to avoid exposure



WARNING: The laser beam and radiation are invisible to the eye.

1. Keep all external doors and internal protective barriers of the platesetter complete and undamaged !
2. Never defeat the Laser interlock switches ! Motor and actuator interlock switches may be defeated only if necessary !
3. If you need to handle an optical fiber or a laser diode, follow the specific service instructions for these components and do so with extreme caution !
4. Never cut or damage the optical fibers protective tubing !
5. Never allow an optical fiber to extend from the outer enclosure or even from the Laser box !
6. Never leave any object between the laser head and the drum.
7. Do not operate the platesetter if there is any doubt regarding the above.

Extensive efforts were taken in the design and manufacturing of the platesetter to eliminate hazards for the operator and service personnel.

Follow the instructions in this chapter to ensure your safety and the safety of others when installing and servicing the platesetter. These instructions are also required for the user's safety.

General Safety Precautions

1. When servicing the platesetter, post the following sign close to the keyboard and to the platesetter: **caution: machine in service – do not operate.** This sign will caution people from operating the platesetter while it is being serviced.
2. Many service procedures can be performed when the entire platesetter or some of its assemblies are switched off. Service the platesetter when **off** whenever possible (see *Disconnection from Mains Supply* further on).
3. Never operateor electrically connect the laser unless it is properly installed inside the platesetter.
4. **The srvice engineer is not allowed under any circumstances to defeat a Laser interlock !**
5. While taking appropriate precautions, the service engineer is allowed to defeat the drum and other motor interlock switches. Do so **only** when no alternative service option is possible.



Important: If you must defeat the motor interlocks, you are **not allowed** to use any other means except the dedicated cheaters (290B2P411) that were supplied for the use of the Lotem 400 service. Use of any other interlock cheater is **forbidden.**

6. Two on/off pushbuttons (yellow) are located on rear panel on both sides of plate exit; can be used in case of emergency shutdown. When **off**, they protect from mechanical hazards in the platesetter but do not disconnect the fans.



WARNING: Injury hazard! The drum will **not stop immediately** when the yellow on/off pushbutton is pressed or main power circuit breaker is activated.

7. Prior to service, remove any piece of clothing or object that may get caught in the revolving drum or in any other moving part of the platesetter. For example, remove ties, roll up long sleeves, remove rings and bracelets, and gather long hair.
8. Remove jewelry, wristwatches and reflective objects from your hands, wrists and shirt, and use non-reflective tools. This measure reduces the chance of hazardous laser reflection if a failure occurs in the laser interlock system or in a protective barrier.

9. If there is any doubt regarding the proper functioning of the laser interlock system, or whenever you suspect that the platesetter protective cover or barrier is broken, cracked or otherwise damaged, you must turn the platesetter **off and not turn it on** again until it is checked and found to be **OK**.

Installation and Service Personnel

Installation and servicemust be performed only by authorized service personnel.

The Lotem 400 platesetter is installed and serviced exclusively by specialized technicians. These technicians are trained, authorized and certified in the proper procedures for working with, and adjusting the multi-beam, multi-optical fibers and laser diodes system, and working with the mechanical and electrical systems of the platesetter.



Note: Only certified service personnel are allowed to install or service the Lotem 400 platesetter.

Installation

Power Line and Safety Ground

Refer to the Lotem 400 Family Site Preaparation Guidelines, xxxx .

The total power consumed by your system depends on specific site configuration. All voltage settings, fuses and cords should be in full compliance with local standards.

- The Lotem 400 is rated: 200-240 Vac.
- Line voltage at site should be a 2-phase supply in 120V 25A configuration, or 1 phase in 230V 25A supply.
- Supply frequency variation up to 50/60 Hz ±2%.
- The cable connector (male, 3-pin - 2 phase & ground) is supplied with platesetter.
- Three (3) power supply connections for Brisque, Brisque monitor and PC controller monitor – 120V +6% -10% or 230V ±10%, 16A.
- An additional isolated single-phase outlet for service purposes.
- Additional power is required for **Processor**, **Pre-heat ovens,** and **Baking ovens**.

Disconnection from Mains Supply

The distribution box at the rear panel of the platesetter is equipped with 3 circuit breakers - Main power on the left, and additional circuit breakers for the drum power and drum vacuum pump.

Additional circuit breakers for the laser box and electronic box are located on their respective inner covers. Two on/off pushbuttons are located on the rear panel.

- Before dismantling any board or power supply, shut down the **main power circuit breaker** on the distribution box.
- Whenever adjusting or checking an electrical board/unit, verify that you are using the correct test point. Do not touch any unit with bare hands.



Note: For total disconnection from the mains supply: deactivate main power circuit breaker (set to "0"), or unplug main power cable from power connector. When switched **off**, use the intended metal bar attached near the main switch to prevent you from accidentally switching it to **on** position.

Lithium Battery

The platesetter contains a Lithium battery in the CPU board. The battery should be replaced only by qualified service personnel, and must **not** be replaced by the user.



DANGER: Danger of explosion if battery is incorrectly replaced.

- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose the used batteries according to the manufacturer's instructions.

Basic & Laser Safety Precautions

The basic and laser safety precautions include the following topics:

- Enclosures
- Optical fibers
- Optical head
- Laser box and laser diodes
- Interlocks
- Warning labels



WARNING: Use of controls and/or adjustments, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

The platesetter is equipped with a **highly hazardous multi-beam laser system** that exposes the media. However, it is a **Class 1 laser product**, according to IEC825-1 and the USA 21 CFR 1040. This means that the operator cannot access hazardous laser radiation if the user and service safety precautions are followed.



WARNING: The laser beam and radiation of the platesetter are invisible to the eye, but hazardous to the eye and skin. Even brief exposure of the eyes to the laser radiation or beam, or its reflections from shiny or matte objects may cause permanent loss or permanent degradation of eyesight !



WARNING: Whenever in doubt, the platesetter should never be operated until it is checked and approved for operation by an authorized service engineer.



WARNING: If you **must** enter the room where the platesetter is located when the platesetter is on, and you suspect that any of the above mentioned precautions was somehow violated, then you must **disconnect** the power supply to the platesetter before entering the room !

Enclosures

Together with the Laser interlock system, the enclosures are designed to protect anyone in the vicinity from exposure to laser radiation by enclosing the radiation within the platesetter. Enclosures include the external doors and panels, and internal protective barriers. The internal barriers prevent laser radiation from escaping through the loading/unloading openings and through the ventilation openings on the side doors and panels. This protection depends on the completeness and correct assembly of the outer enclosure and internal protective barriers.



Note: The opening of the front and rear doors is controlled by a spring loaded mechanism. Make sure your head is **not near** the door when it is opened.



WARNING: After performing any service activity and before switching **on** the platesetter, the service engineer must check and ensure that all external and internal enclosures are complete, not broken or cracked, and properly assembled to the platesetter.

WARNING:



DANGER: If the platesetter is on and the enclosure is damaged or incomplete, and even with the doors closed, then laser radiation of up to several watts at a wavelength of 810-860 nanometer may be present. Even brief exposure of the eye to this radiation or its reflection from shiny or matte objects can cause permanent degradation or permanent loss of eyesight !

Optical Fibers

Laser energy is generated in the laser diodes, located in the laser box and conducted to the plotting head through optical fibers. Up to several hundred milliwatts of invisible laser radiation at a wavelength of 810-860 nanometers may be conducted in each fiber. This laser radiation is hazardous to the eye and skin.



WARNING: The service engineer must check and ensure that:
All optical fibers are complete, not cut or broken and not abruptly bent.
No optical fiber extends from outer enclosure or even from Laser box.
The optical fiber guards are complete and unharmed.



DANGER: If one of the many optical fibers is damaged or cut inside or outside the platesetter, and even when the doors are closed, invisible laser radiation of up to several hundred milliwatts at a wavelength of 810-860 nanometer may radiate outside the platesetter through the side door openings or through other openings. This laser radiation is hazardous to the eye and skin. Even brief exposure of the eye to this radiation or its reflection from shiny or matte objects can cause permanent degradation or permanent loss of eyesight !

Optical Head

Optical fibers direct the laser radiation in the platesetter from the laser box to the plotting optical head.



DANGER: The optical head must never be activated if it is removed from its position on the guide beam. In addition, the optical head must never be activated when it is not in its proper position facing the drum, and with all the internal protective barriers assembled and all the doors closed.



WARNING: Never place any object in the path of the laser beam between the optical head and the drum.



DANGER: Up to several watts of invisible laser radiation at a wavelength of 810-860 nanometer may be present at the output of the plotting head. This laser radiation is hazardous to the eye and skin. Even brief exposure of the eye to this radiation or to its reflection from shiny or matte objects can cause permanent degradation or permanent loss of eyesight !

Laser Box

The laser diodes are in the laser box on the left side of the platesetter. The platesetter must **never** be activated when the Laser box is not in its proper location, and the Laser box door closed and properly fastened.

Before servicing the laser box, shut down the circuit breaker on the outer cover of the laser box.



WARNING: Always use **Static Electricity discharge** tool before servicing inside the Laser box or working with the Laser diodes. The **Static Electricity discharge** tool is located inside the Laser box.



WARNING: After servicing or checking the Laser box, make sure that all the laser fibers are properly connected and routed, and do not extend out of the Laser box. When closing the Laser box door, make sure you do not damage any of the fibers.



DANGER: If one of the many optical fibers is damaged or cut inside or outside the platesetter, and even when the doors are closed, invisible laser radiation of up to several hundred milliwatts at a wavelength of 810-860 nanometer may radiate outside the platesetter through the side door openings or through other openings. This laser radiation is hazardous to the eye and skin. Even brief exposure of the eye to this radiation or its reflection from shiny or matte objects can cause permanent degradation or permanent loss of eyesight !

Safety Interlocks

Safety interlocks provide the **main** protective means against the severe **laser** and **mechanical hazards** involved with the platesetter, providing that you carefully follow all the safety precautions detailed in this chapter.

Interlock switches are designed to disconnect power from the Laser system, Drum motor and other motors when:

- the upper, left or right doors are open
- the left or right internal MCU covers are open
- the rear panel is removed
- the front door is open or the MCU is dissasembled from the platesetter



DANGER: The user is not, under any circumstances, allowed to defeat any interlock switch.

- Even authorized service personnel are forbidden to defeat the write laser interlocks, but are allowed to defeat the drum and other mechanical interlocks while keeping the appropriate safety instructions.

The following table is included to provide the operator with information about the safety measures and controls included in the platesetter. The operator is strictly forbidden to defeat any interlock switch or actuate any defeat switch, or use a tool!

Platesetter Interlock Functions and Locations

Interlock Location	Interlock Function	Description of Interlock Switches	Serviceman only Defeat Allowances
Front door (loading)	Disable Lasers and Motors	2 interlock switches	None
Lower front panel	Disable Lasers and Motors	1 interlock switch	None
Platesetter upper rear door	Disable Lasers and Motors	2 interlock switches 1 motor interlock defeater	1 motor interlock **Note:** MCU covers require motor interlock defeat for each cover.
Rear panel	Disable Lasers and Motors	1 interlock switch	None
Left platesetter door	Disable Lasers and Motors	1 interlock switch	None
Right platesetter door	Disable Lasers and Motors	1 interlock switch	None

MCU Interlock Functions and Locations

Interlock Location	Interlock Function	Description of Interlock Switches	Serviceman only Defeat Allowances
Left internal cover- MCU	Disable lasers and motors	2 laser interlock switches 1 motor interlock switch	1 motor interlock switch
Right internal cover- MCU	Disable lasers and motors	2 laser interlock switches 1 motor interlock switch	1 motor interlock switch
MCU upper door	Disable lasers and motors	2 laser interlock switches 1 motor interlock switch	1 motor interlock switch
MCU cassette door	Disable motors	Magnetic mechanic interlock	None



WARNING: It may take up to two seconds for the laser interlock system to shut off the laser sources. Therefore, when opening a door, do not rush to access inside the platesetter.



DANGER: If a door or panel is open and if interlock switch is defeated, or if the interlock system failed, then severe **mechanical hazards** and invisible laser radiation of up to several watts may be present. **The laser radiation is hazardous to the eye and skin**. **Even brief exposure of the eye to this radiation or its reflection from shiny or matte objects can cause permanent degradation or permanent loss of eyesight!**



Note: The **laser** interlock system is equipped with a **buzzer**. If a failure is detected in the operation of the laser interlock system, the buzzer is activated and the laser is shut off. In any case, not every possible failure can be detected, especially failure of a single interlock switch.



WARNING: If the buzzer is activated, shut the platesetter off and do not operate it again until it has been checked and approved for operation by an authorized service engineer.

Warning Labels

The following pages show the laser and other warning labels, and their locations.

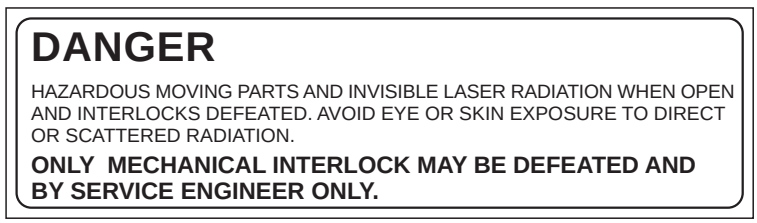
Make sure that the warning labels are in good order; notify your service engineer if a label needs to be replaced.

Note: The part numbers for English labels contain the letter A; all other languages contain the letter K instead. For example, part. no. 374A8L697 is the English label; part no. 374K8L697 is for all other languages. The following labels show the English part numbers.

Note: Some labels have the same text but the label shape or size is different. Therefore these labels have different part numbers. The labels on next page show one of these labels, but the other part numbers are also listed.

Note: When a language other than English is spoken, the service engineer should stick the translated labels (attached to the platesetter) in the relevant locations.

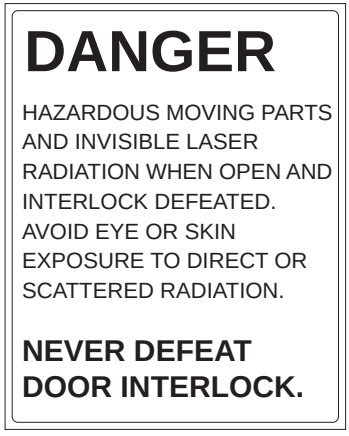
The warning labels are provided for user and service personnel safety. Do not fail to comply with the warnings!



374A7B830



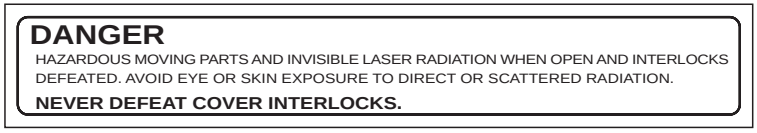
374A7B831



374A7B832



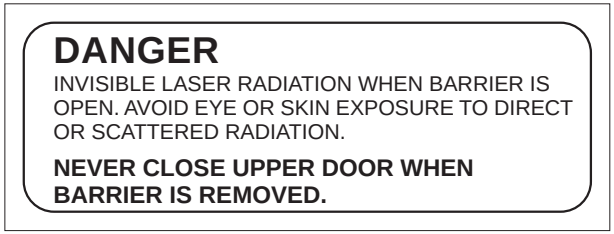
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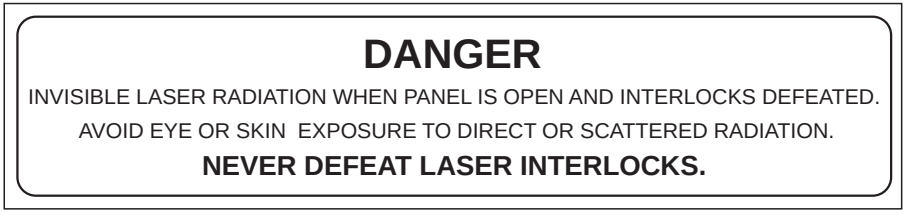
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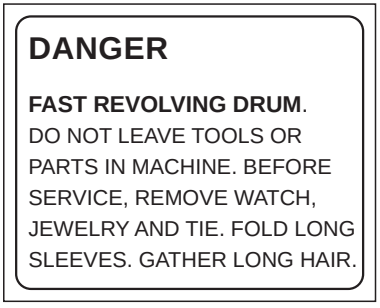
374A7L405



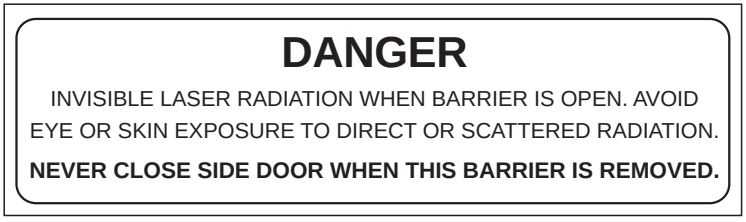
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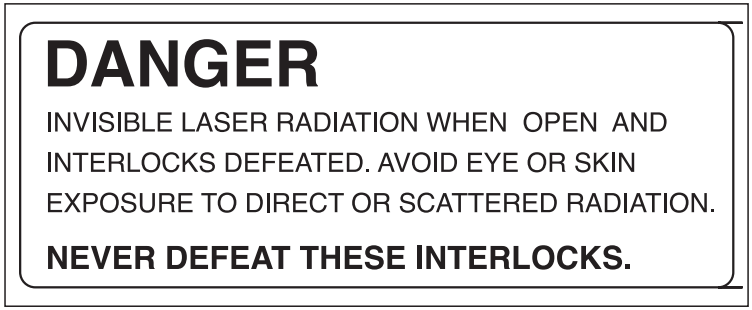
374A7L411



374A7L413 (also 374A7L412A)



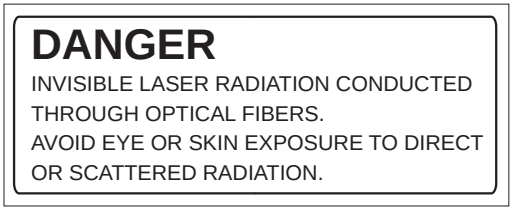
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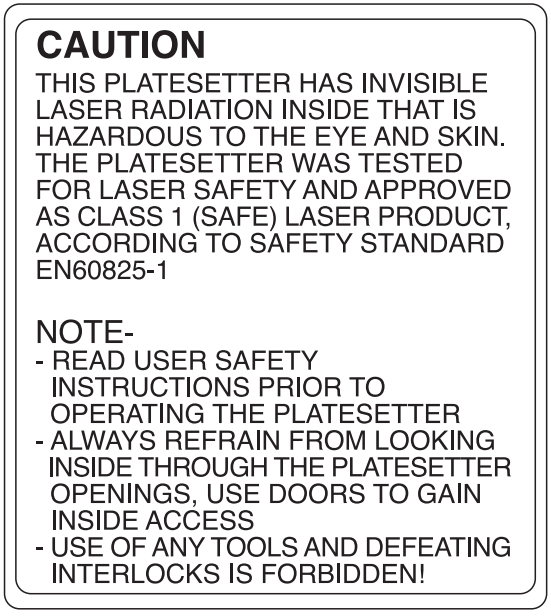
374A7L414



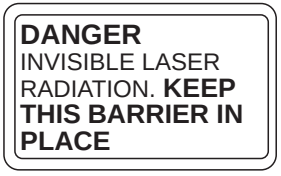
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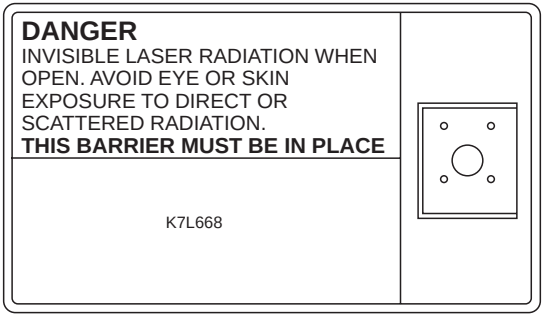
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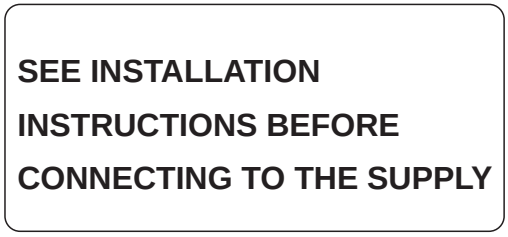
374A7L666



374A7L667



374A7L668

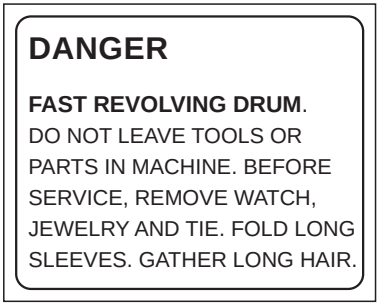


374A1F658



374A8L535

MCU Warning Labels



374A7L413



374A6B016



374A6B011



374A7B154



374A7B678



374A9C009

Lotem 400 Warning Label Locations

WARNING: Some of the figures show protective panels and internal covers removed. The operater is forbidden to dismantle any panel or cover that require a tool to do so.

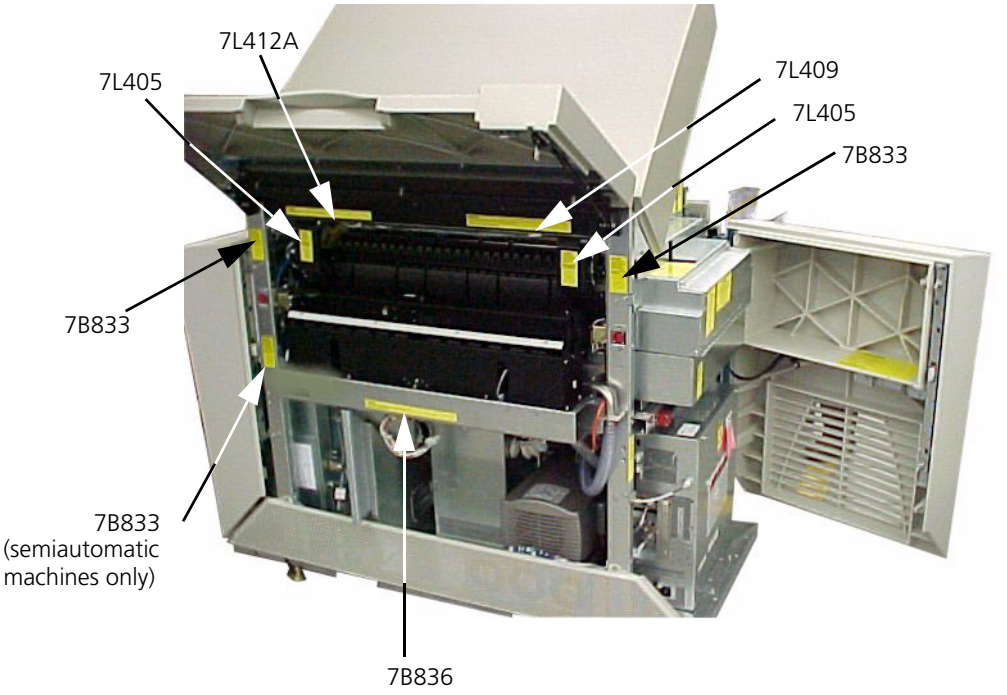


Figure 1: Front view, doors open, panels removed

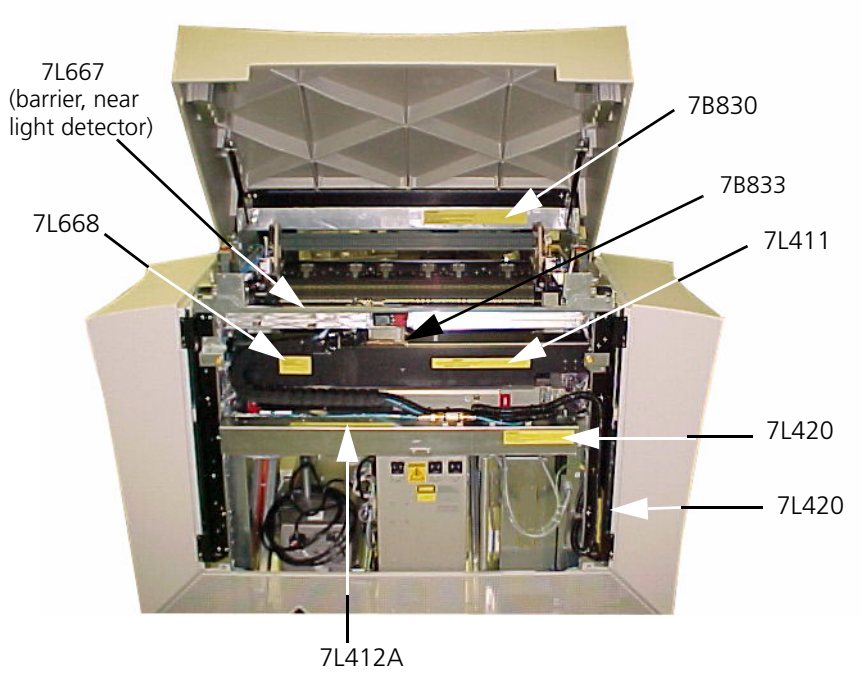


Figure 2: Rear view, upper door open, panels removed

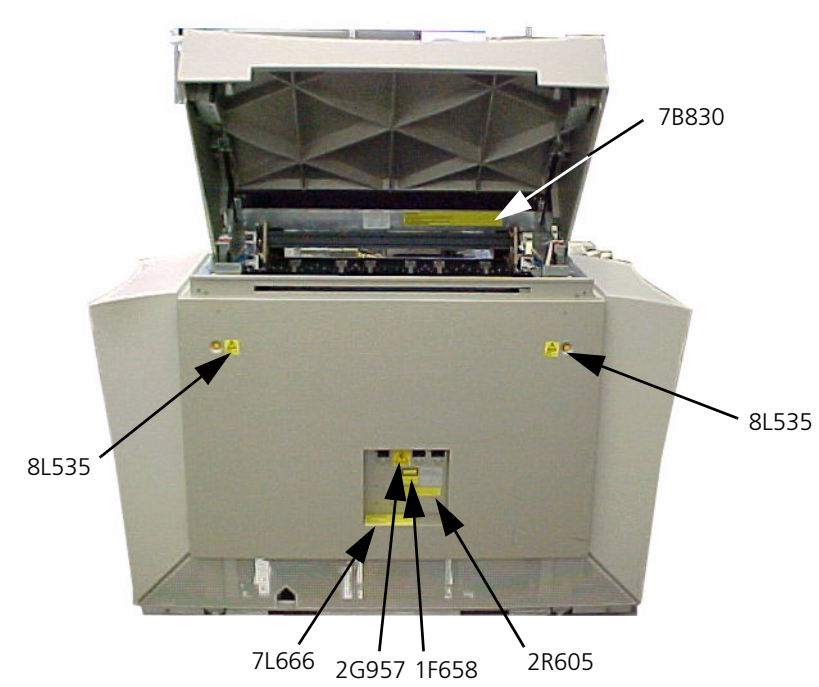


Figure 3: Rear view, upper door open

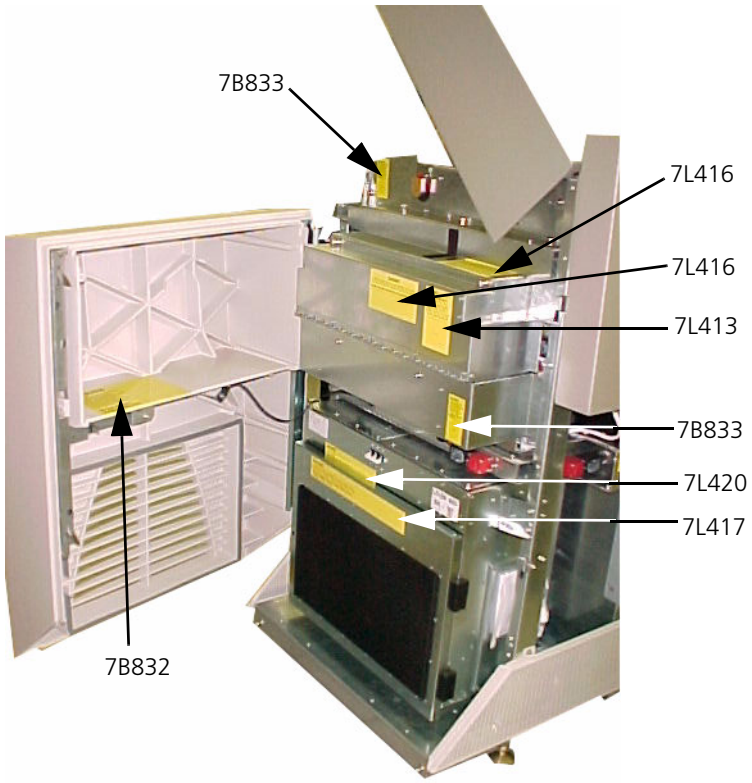


Figure 4: Left side door open

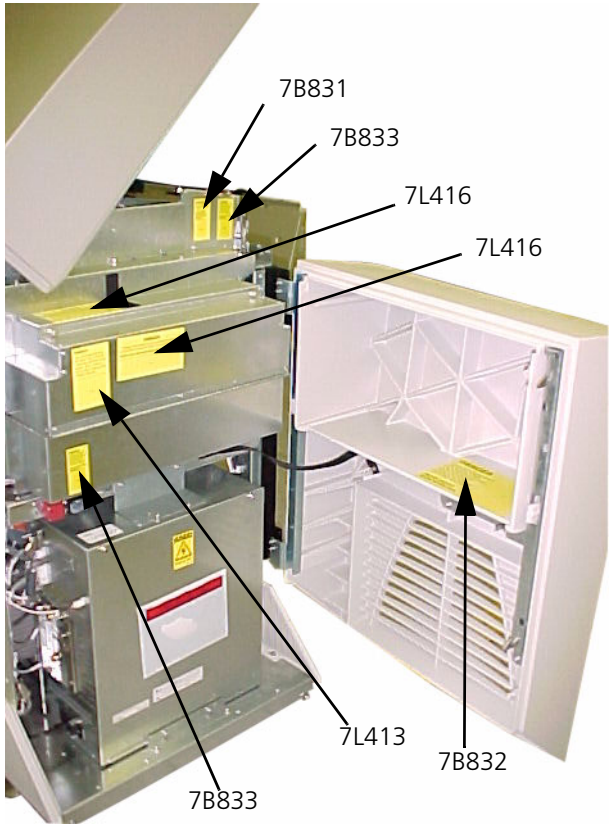


Figure 5: Right side door open

MCU Warning Label Locations



Figure 6: Lotem 400 with MCU (automatic loader)

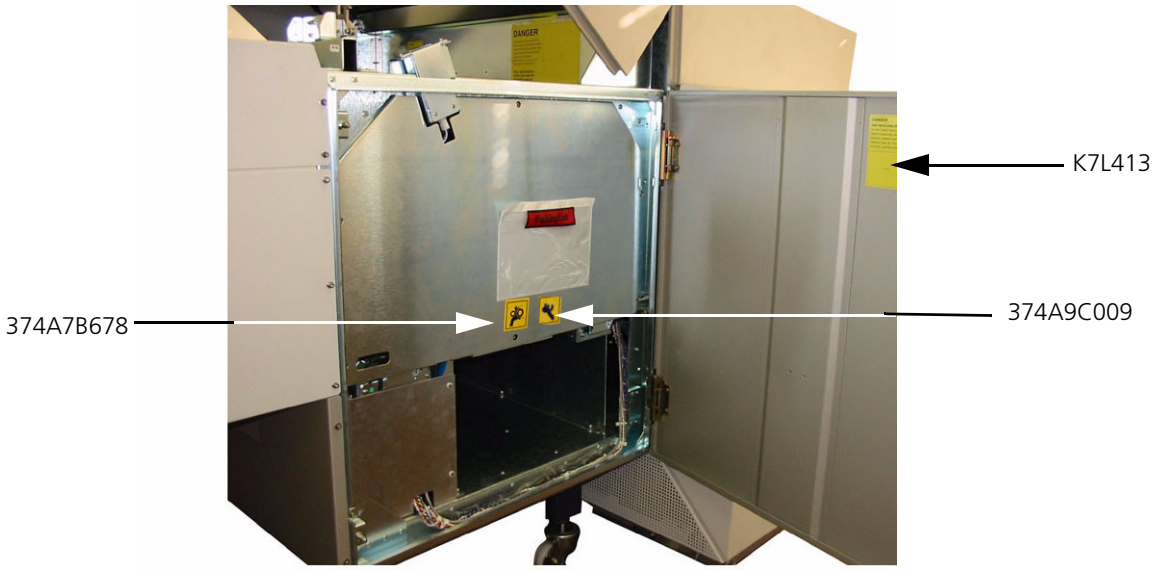


Figure 7: MCU right side door open

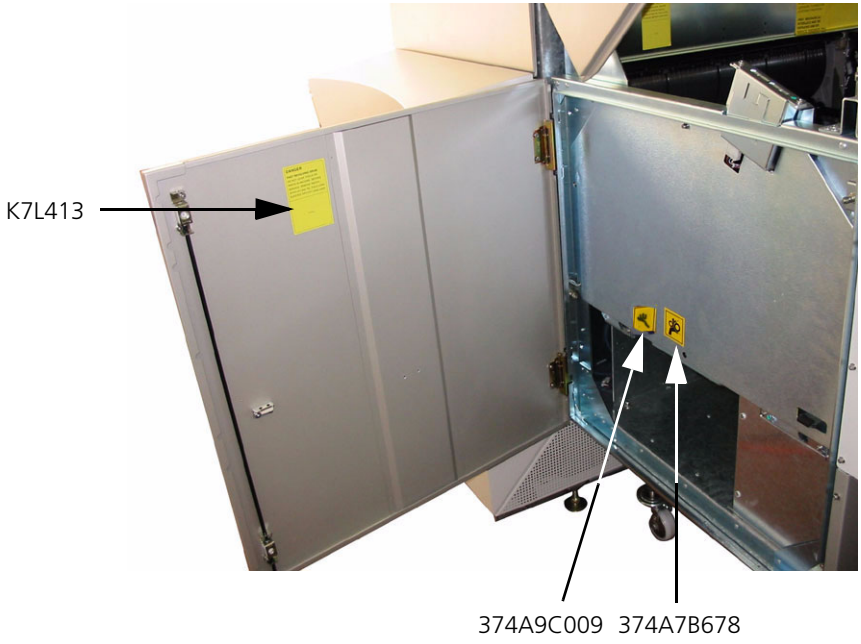


Figure 8: MCU left side door open

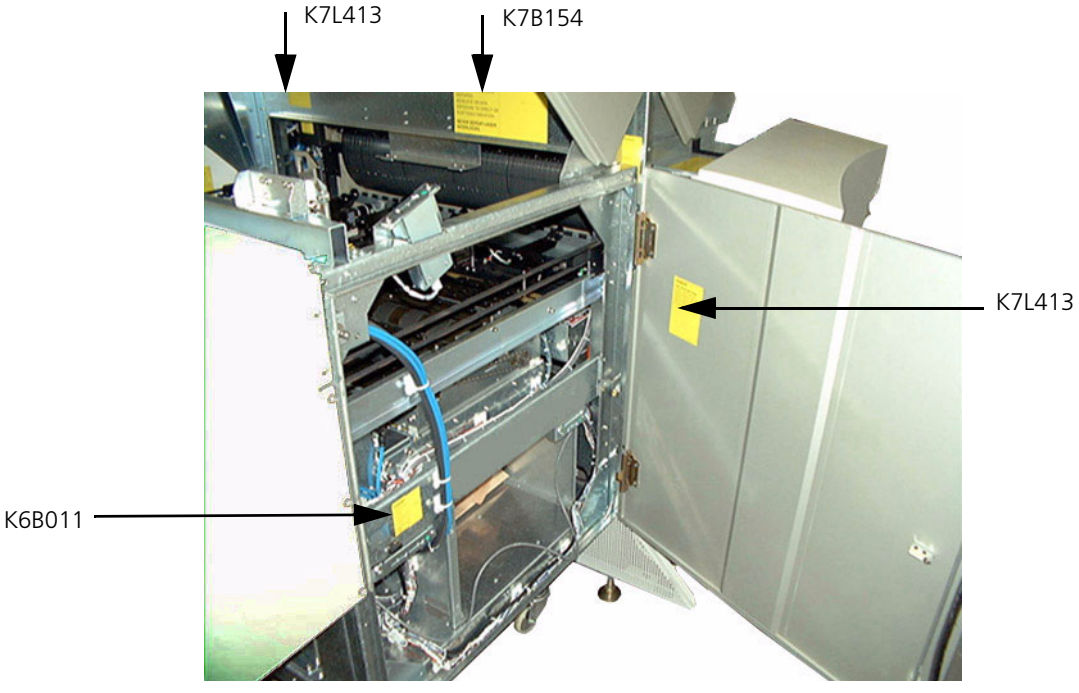


Figure 9: MCU right side view, right and upper doors open, internal right panel removed

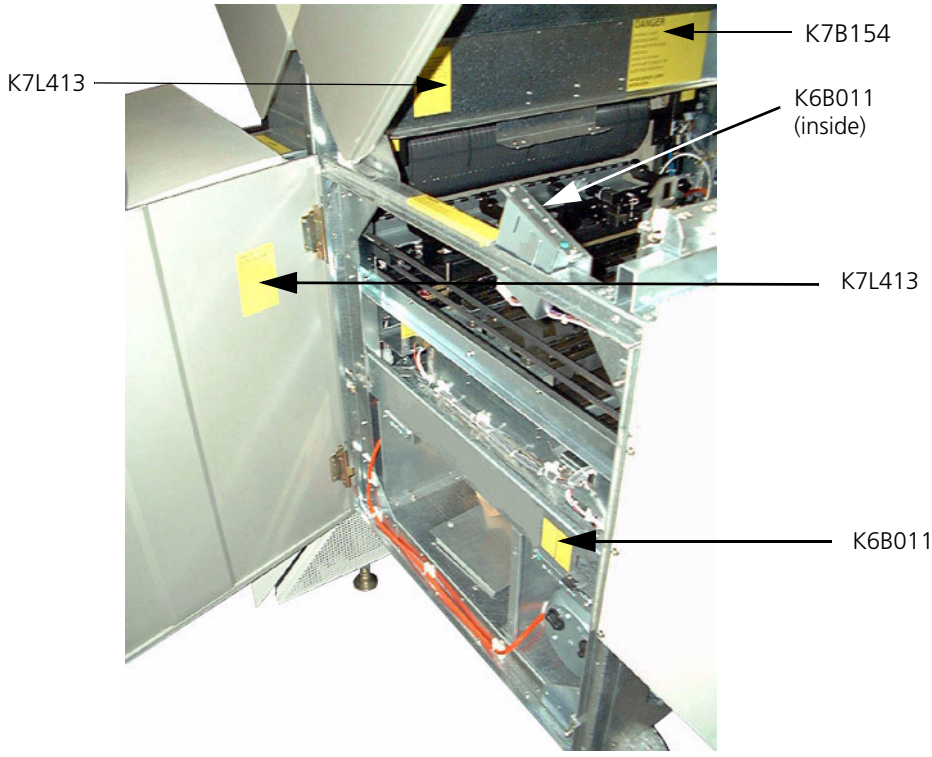


Figure 10: MCU, left side and upper doors open, internal left panel removed

Drum Safety Precautions

Plates are loaded and wrapped onto the drum located in the platesetter, exposed and then unloaded.

The drum revolves at about 1200 revolutions per minute. If an object hits the rotating drum, it may get dislodged inside the platesetter and damage the safety system, optical head, or optical fibers, or force the front or rear door to open, or penetrate through the doors.

A safety system, that includes interlock switches, is designed to ensure that when a door or panel is open the drum stops rotating and is disconnected from its power source. However, if the service engineer defeats the interlock, extra caution must be taken to reduce the hazards to the service engineer or to other people in the vicinity.

After taking the appropriate safety measures, the service engineer is allowed to defeat the motor interlock switches.



WARNING: If the motor interlock switches are defeated, you are forbidden to touch the drum (even if the drum is stationary), or any other moving part. Do not insert any tool or object near the drum.

Since serious personal injury to the operator, service engineer or anyone in the vicinity may occur if an object touches the revolving drum; the following cautions must be observed.



WARNING: Be sure not to leave any object, tool or part inside or on the platesetter enclosure. The object may get dislodged, get caught in the revolving drum or other moving parts, penetrate through the enclosure and injure a person standing nearby.



WARNING: Because of the potential danger of loose parts inside the platesetter, be sure to replace, reconnect or adjust any drum component according to the exact correct procedure.



WARNING: Before servicing, remove any piece of clothing or object that may get caught in the revolving drum or other moving parts. Remove ties, roll up long sleeves, remove jewelry and gather long hair.



WARNING: If the drum motor interlock is defeated and the front or rear door is open, make sure no one is standing in front of the drum (even if drum is stationary).



WARNING: Before touching the drum surface, make sure the drum motor circuit breaker on the Distribution box is switched off.

Gripper Actuators

Never put your hand or fingers underneath the grippers or gripper actuators.

Before working with any pneumatic component, shut down the main air pressure valve (located at the air pressure unit on the wall), and discharge the air pressure from the system.



WARNING: If air pressure remains in the system, your fingers might get caught in a pneumatic component, such as the grippers' actuators.

Handling Plates

Loading plates is done by placing the plate on the Loading tray and pressing the **Loading Plate** pushbutton on the Loading tray. When ready to expose, the plate is automatically loaded. After expose, the plate is automatically unloaded from the Plate exit at the rear side.

CAUTION: Do not touch the plate after it is placed on the Loading tray and the **Loading Plate** pushbutton is pressed.

WARNING: Since the plate is automatically unloaded from the plate exit, be sure not to stand too close to this exit.

Unloading Stuck Plates

Special precautions are required when removing a plate that got jammed inside the platesetter.

WARNING: Before removing a plate, remove objects or clothing that might get caught in the revolving drum or other moving parts, such as, ties and jewelry. Fold long sleeves and gather long hair.

WARNING: Before removing a plate, switch off the **main drum power** switch on the Distribution box.

Note: It is recommended to release the entire plate as one piece; do not attempt to cut the plate.

WARNING: Plate remnants left in the platesetter may cause mechanical and laser radiation hazards !