Safety Precautions for Engineers

English

ThermoFlex Narrow

731-00170A-EN

www.creo.com

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RE37,376	5,325,217	5,532,728	5,742,743	5,996,499	6,158,345	6,353,216
4,558,302	5,339,176	5,561,691	5,764,374	5,998,067	6,159,659	6,366,339
4,743,091	5,343,059	5,568,595	5,764,381	6,003,442	6,164,637	6,371,026
4,992,864	5,355,446	5,576,754	5,771,794	6,014,471	6,180,325	6,377,739
5,049,901	5,359,451	5,579,115	5,785,309	6,016,752	6,181,362	6,387,597
5,079,721	5,359,458	5,592,309	5,813,346	6,031,932	6,181,439	6,396,422
5,103,407	5,367,360	5,594,556	5,818,498	6,043,865	6,186,068	6,396,618
5,111,308	5,384,648	5,600,448	5,854,883	6,060,208	6,189,452	6,407,849
5,113,249	5,384,899	5,608,822	5,861,904	6,063,528	6,191,882	6,414,755
5,122,871	5,412,491	5,615,282	5,861,992	6,063,546	6,204,874	6,422,801
5,124,547	5,412,737	5,625,766	5,875,288	6,072,518	6,208,369	6,435,091
5,132,723	5,420,702	5,636,330	5,894,342	6,090,529	6,214,276	6,441,914
5,150,225	5,420,722	5,649,220	5,900,981	6,096,461	6,217,965	6,450,092
5,153,769	5,459,505	5,650,076	5,934,196	6,098,544	6,260,482	6,456,396
5,155,782	5,473,733	5,652,804	5,942,137	6,107,011	6,266,080	6,476,931
5,157,516	5,481,379	5,680,129	5,946,426	6,112,663	6,266,134	6,477,955
5,208,818	5,488,906	5,691,823	5,947,028	6,115,056	6,267,054	6,509,903
5,208,888	5,497,252	5,691,828	5,958,647	6,121,996	6,268,948	6,541,181
5,247,174	5,508,828	5,696,393	5,966,504	6,130,702	6,283,589	6,545,772
5,249,067	5,509,561	5,699,174	5,969,872	6,134,393	6,295,076	6,564,018
5,283,140	5,517,359	5,699,740	5,973,801	6,136,509	6,299,572	
5,291,273	5,519,852	5,708,736	5,986,819	6,137,580	6,318,266	
5,323,248	5,526,143	5,713,287	5,995,475	6,147,789	6,352,816	

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ThermoFlex Narrow Safety Precautions for Engineer

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Read the following safety chapter carefully before installing, operating, servicing or maintaining the ThermoFlex Narrow platesetter.

Read the user laser and safety precautions for the ThermoFlex Narrow, an indispensable part of the service engineer's precautions. Please refer to the *ThermoFlex Mid/Narrow Safety Precautions for User, catalog # 399Z1N020B*.

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.

ThermoFlex Narrow safety at a glance - how to avoid exposure



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 optical 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). When switched **off**, use the intended metal bar attached near the main switch to prevent you from accidentally switching it to **on** position.
3. **You are not allowed under any circumstances to defeat a Laser interlock** !
4. While taking appropriate precautions, you are allowed to defeat the drum and other motor interlock switches. Do so **only** when no alternative service option is possible.



Important Note: If you must defeat the motor interlocks, you are **not allowed** to use any other means except the dedicated cheaters (CreoScitex No. 290B2P411) that were supplied for the use of the ThermoFlex Narrow service. Use of any other interlock cheater is **forbidden.**

5. Two on/off pushbuttons (yellow) are located on front 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.



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

6. 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.
7. 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.

8. 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 must be performed only by authorized service personnel.

The ThermoFlex Narrow 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.

Only certified service personnel are allowed to install or service the ThermoFlex Narrow platesetter.

Power Line

The total power consumed by the system is determined by the selected system configuration. Remember to allow sufficient margin for system expansion when calculating the required electrical capacity. Prior to connecting the electrical power supply, ensure that all voltage settings, fuses and cords are in full accordance with local standards.

Machine Connections

- Line voltage at customer site should be a 2 phase supply in 120V 25A configuration, or 1 phase in 220V 25A supply.
- Supply voltage of 200-240 Vac ±10%.
- Supply frequency variation up to 50/60 Hz ±2%.
- The cable connector (male, 3-pin - 2 phase and ground) is supplied with the platesetter; the customer should supply the wall connector. The wall connector should be **32A 6h** (female 3-pin – 2 phase and ground).

The Laser box - Brisque cable has a wide plug so you should allow at least 70 mm for cable routing.

Vacuum pump connection

- One 3Ph outlet – 400/230 Vac 3-phase 16A slow reacting fuse.
- The connector to be supplied by customer (male & female). The electrician at customer's site should connect the 3Ph R.S.T. Outlet plug should have a 5-pin connector – 3Ph R.S.T, neutral & GND.

General Connections

- Three (3) power supply connections for Brisque, Brisque monitor and PC Controller monitor – 120V ±10% or 220V ±10%, 16A.
- An additional isolated single-phase outlet for service purposes.

Power Line Disturbances

The reliable operation of computer systems depends on the availability of relatively noise-free AC power.

Lighting, line faults, or power switching, commonly found in machinery or equipment in office or factory environments, can generate line transients which far exceed the peak value of the applied voltage. If not attenuated, these micro-second pulses can disrupt system operation.



The use of a power stabilizer is highly recommended in such cases.

Disconnection from Mains Supply

The Distribution box at the front 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 front 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.



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 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.

Laser Safety Precautions

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.

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 !

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

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 !

The laser safety precautions include the following topics:

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

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.



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.



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.



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 !**

Interlocks

Interlock switches are designed to disconnect power from **all** Laser sources and from mechanically hazardous parts when a door is open or a panel is removed.



The service engineer is forbidden under **any** circumstances to **defeat** any of the Laser interlock switches.

All doors (front and two side doors) and the two panels (front and rear) have laser and motor interlocks that disable the laser system and motors. The motor and actuators (mechanical) interlock consists of one interlock switch. The laser interlock consists of two switches placed together in a designated metal box.

The service engineer is allowed to defeat the motors and actuators interlock switches, only after taking appropriate safety measures.

Important note: If you must defeat the motor interlocks, you are **not allowed** to use any other means except the dedicated cheaters (CreoScitex No. 290B2P411) that are supplied for the use of the ThermoFlex Narrow service. Use of any other interlock cheater is **unsafe** and **forbidden**.

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 in the interlock system can be detected.

If a door or panel is open and if the laser interlock system is defeated, or if it failed but the laser did not shut off, invisible laser radiation of up to several hundred milliwatts at a wavelength of 810-860 nanometer may be present in each of the optical fibers, and up to several watts at the output of the plotting head (between the plotting head and drum). This 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 !

It takes up to one second for the Laser interlock system to shut off the laser sources. Therefore, when opening a door or a panel, do not rush to access inside the platesetter.

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.

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.

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.

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.

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

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.

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.

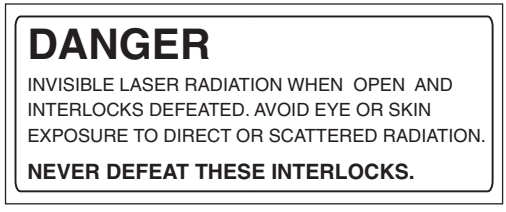
After servicing or checking the Laser box, make sure that all the laser fibers are properly connected and routed, and do not extend out of the Laser box. When closing the Laser box door, make sure you do not damage any of the fibers.

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 !

Warning Labels

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

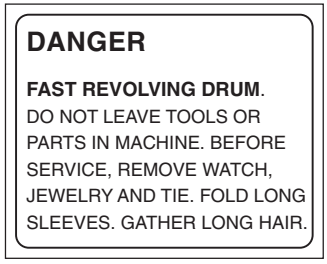
The catalog numbers for English labels contain the letter A; all other languages contain the letter K instead. For example, cat. no. 374A8L697 is the English label; cat. no. 374K8L697 is for all other languages. The following labels show the English catalog numbers.
Some labels have the same text but the label shape or size is different. Therefore these labels have different catalog numbers. The labels below show one of these labels, but the other catalog numbers are also listed



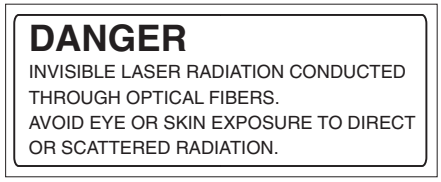
374A7L414 (also 374A8L697, 374A7L415)



374A7L407 (also 374A7L408)



374A7L413 (also 374A7L412A)



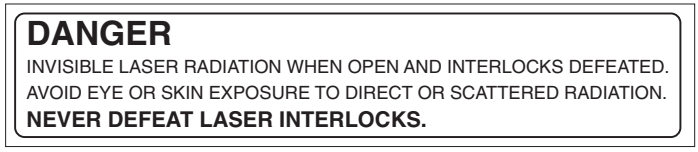
374A7L420



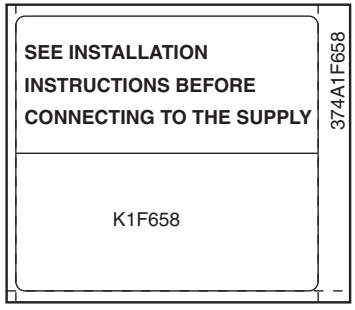
374A7L411



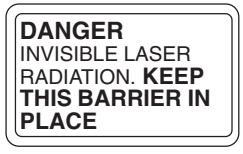
374A7L405



374A7L409A



374A1F658



374A7L667

CAUTION

THIS PLATESETTER HAS INVISIBLE LASER RADIATION INSIDE THAT IS HAZARDOUS TO THE EYE AND SKIN. THE PLATESETTER WAS TESTED FOR LASER SAFETY AND APPROVED AS CLASS 1 (SAFE) LASER PRODUCT, ACCORDING TO SAFETY STANDARD EN60825-1

NOTE-
- READ USER SAFETY INSTRUCTIONS PRIOR TO OPERATING THE PLATESETTER
- ALWAYS REFRAIN FROM LOOKING INSIDE THROUGH THE PLATESETTER OPENINGS, USE DOORS TO GAIN INSIDE ACCESS
- USE OF ANY TOOLS AND DEFEATING INTERLOCKS IS FORBIDDEN!

374A7L666

DANGER

INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED.
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.

NEVER DEFEAT LASER INTERLOCKS.

374A7L410

DANGER

INVISIBLE LASER RADIATION CONDUCTED THROUGH OPTICAL FIBERS.
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.

BEFORE CLOSING SIDE DOOR, VERIFY FIBERS ARE NOT CUT, DEVIATED OR FAULTY.

374A7L417

DANGER

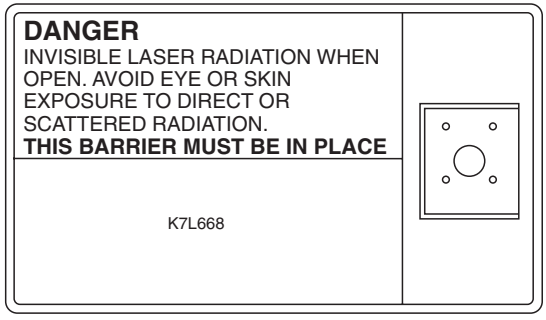
INVISIBLE LASER RADIATION WHEN BARRIER IS OPEN. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.

NEVER CLOSE SIDE DOOR WHEN THIS BARRIER IS REMOVED.

374A7L416



374A8L535



374A7L668

See the following figures for locations of warning labels

Make sure that all warning labels are in good order; renew warning labels if needed.

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

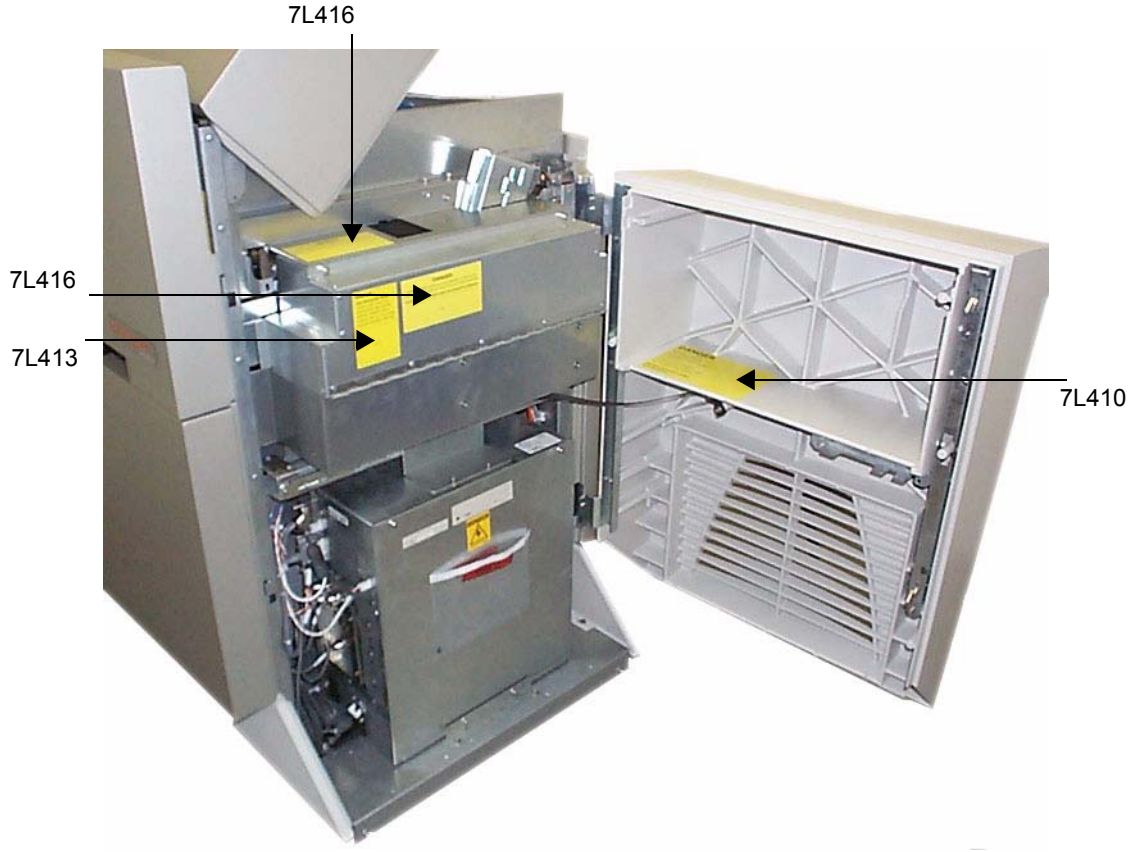


Figure 1. Right side door open

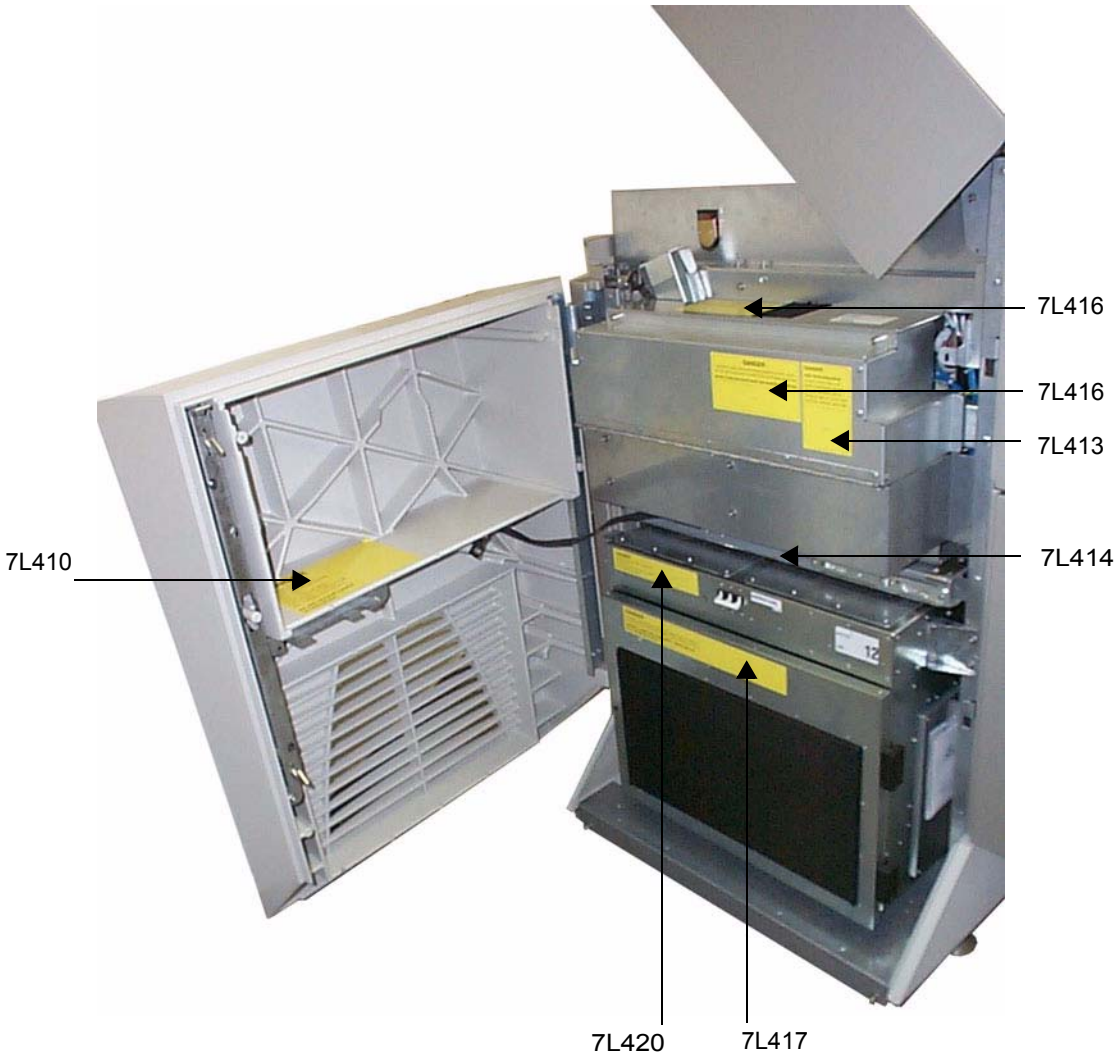


Figure 2. Left door open

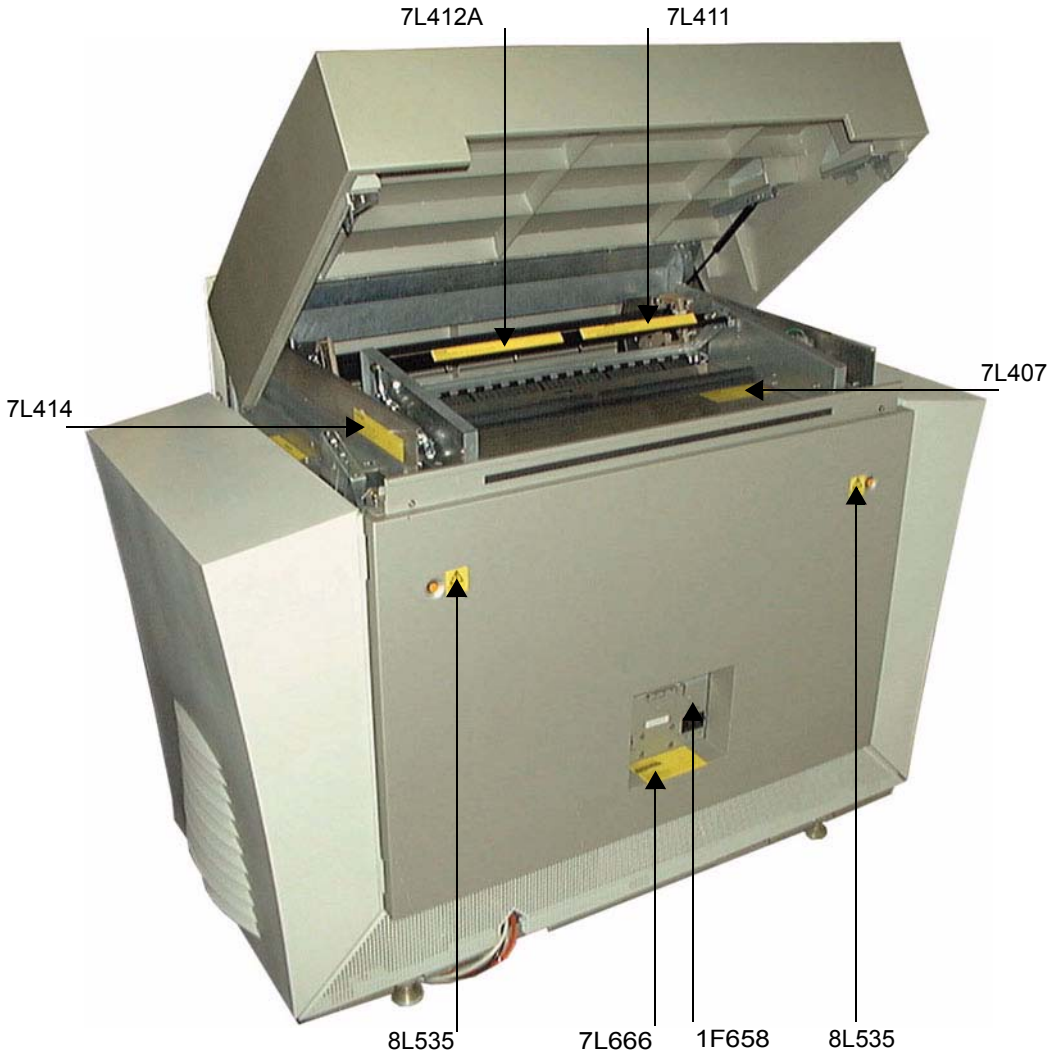


Figure 3. Front view, rear door open

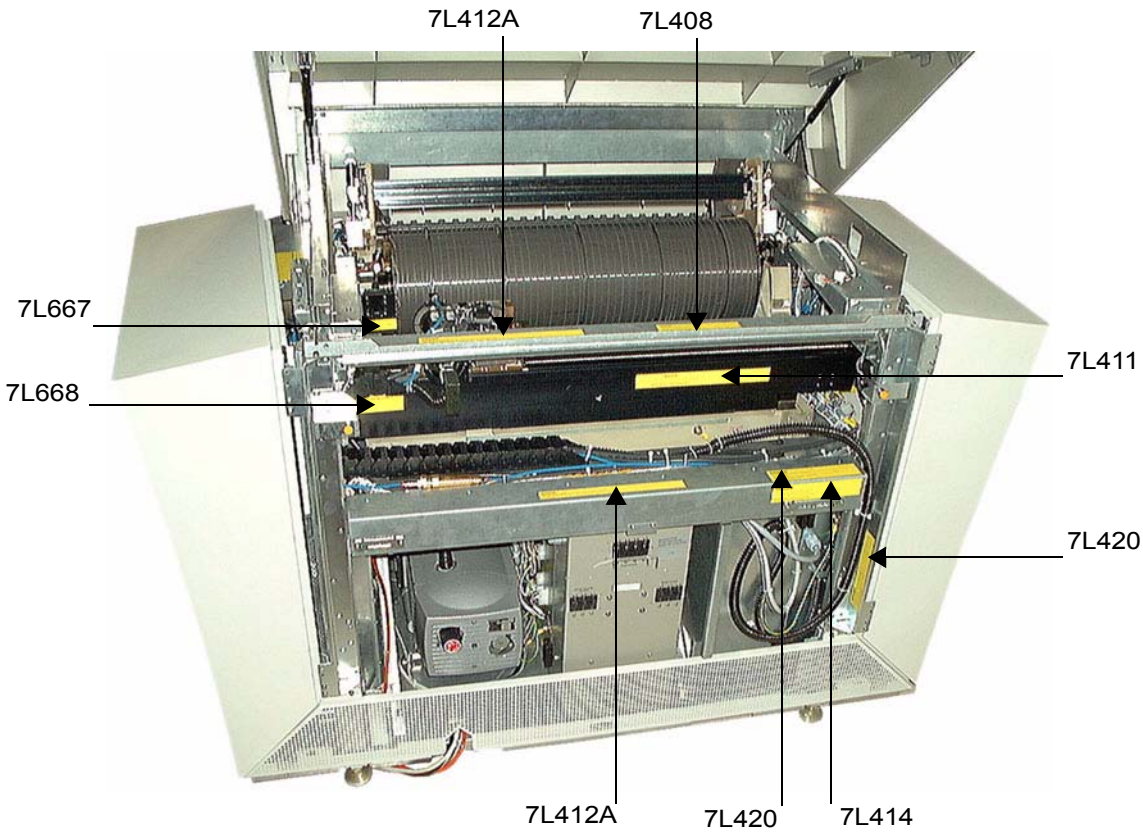


Figure 4. Front door panels removed

Other Safety Precautions

Drum

The ThermoFlex Narrow platesetter contains a drum that revolves inside the platesetter. The plates are loaded and unloaded manually. Special safety precautions that include solenoids and interlock system are implemented in order to prevent rotation of the drum while the user is loading or unloading media. An electro mechanical relay, driven by one of the laser interlock switches cuts the power to the drum motor when a door is open or a panel removed. This interlock switch, as the other machine laser interlock switches must never be defeated.



The upper doors opening is initiated from the platesetter Controller. This activates the solenoids that release the upper door locks, thus enabling the user to open the door. By this time, the drum must be almost stationary. If, after the door is unlocked, it takes **more than 5 seconds** for the drum to become completely stationary, the machine must be repaired. Shut off the machine and call your service engineer.



If the buzzer is activated when a door is open this indicates that drum or laser interlock system have failed and the machine must be repaired. Remove your from the drum, shut off the machine and call your service engineer.

The drum revolves at approximately 200 revolutions per minute. If an object hits the rotating drum, the object may get dislodged inside the platesetter and cause damage (including damage to the safety system, optical head, or optical fibers), or force the upper doors to open, or penetrate through the doors.

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.



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.



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.



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.

Vacuum Pump

The vacuum pump connected to the platesetter is part of the ThermoFlex Narrow configuration. The vacuum pump contains a filtering device that extracts dust, fumes, contaminants and solvent vapors that appear within the platesetter during normal operation and need to be removed.



The filtering device has been constructed according to recognized technical safety regulations. Nevertheless, danger to life and limb of the user or third parties or damage to the filtering device or other property can occur during operation, especially in case of incorrect or improper use and application.

For proper operation and maintenance of the vacuum pump filtering device, please refer to the manufacturer's *Operating Instructions*.