

AA-02: Perform Startup/Shutdown on CO2 Laser

SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Follow all Caterpillar and manufacturer's Laser Safety Requirements.

EQUIPMENT

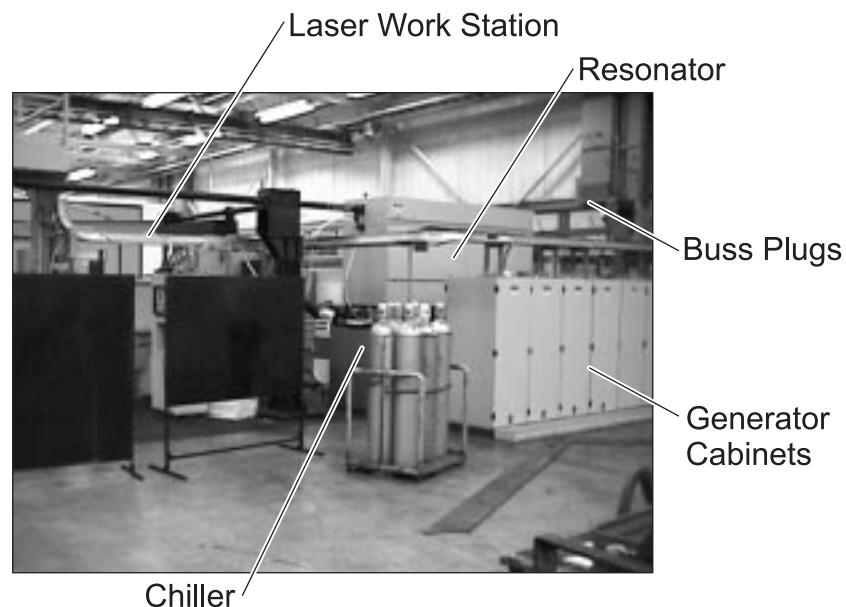
- Basic Electrician hand tools

RESOURCES

- Trumpf TLF5000 Operating Manual (or specific manual for the laser)

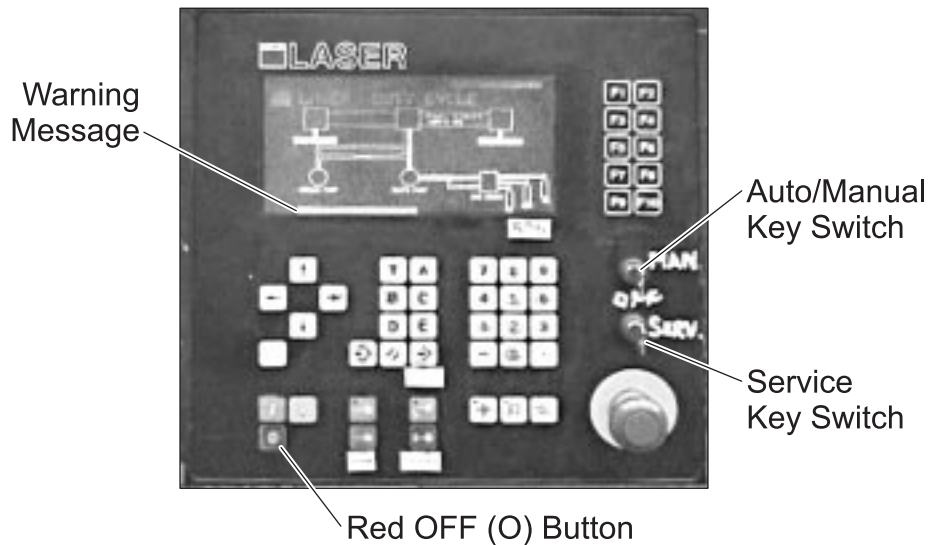
Shut Down CO2 Laser

Warning: Different laser machines have different safety requirements. Follow any specific safety regulations specified for the machine you are working on. Failure to follow safety requirements may result in injury or possible fatality to personnel.



1. Turn off power at the operator's panel.

- Press the red [O] button.
- Observe the warning message stating that the main switch should not be turned off yet.
- DO NOT turn off the main switch.

**2. The pressure should read 999.9 hPA and the warning message disappears.**

Caution: Failure to follow these steps in the proper sequence could result in damage to the laser.

Note: Lockout/tagout each disconnect and buss plug as you shut them off.

3. Turn off main laser disconnect.

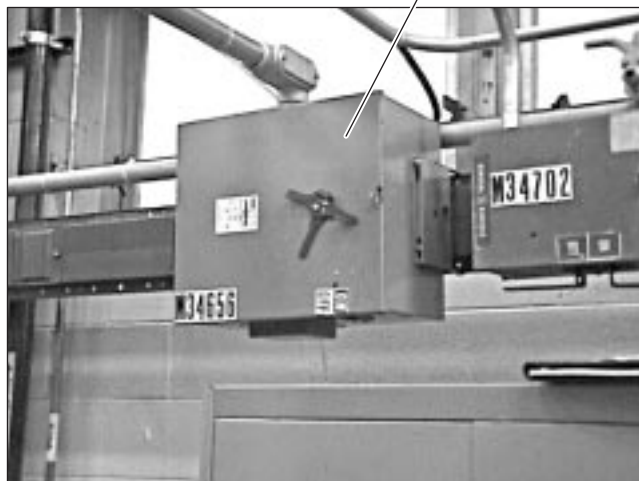


Main Laser Disconnect



4. Turn off main power at the buss plug.

Buss Plug for Main Power



5. Turn off chiller disconnect.



Chiller Disconnect

6. Turn off chiller power at the buss plug.



Chiller Buss Plug

7. Close the valve(s) on the three compressed gases (Nitrogen, Carbon Dioxide, and Helium).



Nitrogen

Carbon Dioxide

Helium

- Depending upon the type of mixing system used, some CO₂ lasers only use one bottle of gas.

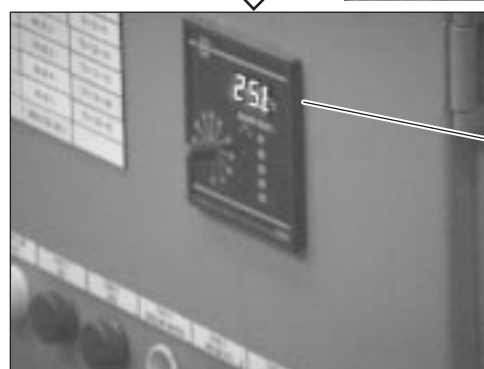


Multiple Gas Valve

Start Up CO2 Laser

1. **Turn on chiller buss plug.**
2. **Turn on chiller disconnect.**
3. **Open the compressed gases.**
 - Verify usage of the correct gas and that the regulator pressure is set according to the specifications for the laser (80 psi for the Trumpf; pressures vary with other manufacturer's CO2 lasers).
4. **Verify cooling tower water supply is open.**
5. **Turn on main power buss plug.**
6. **Turn on main power disconnect.**
 - Listen for the cooling fan and the transformer to "kick" on.

Chiller Operator's Panel



Verify Chiller Operator's Panel Turns On

7. Turn on the laser at the Operator's panel and wait for pressure to decrease and rebuild.

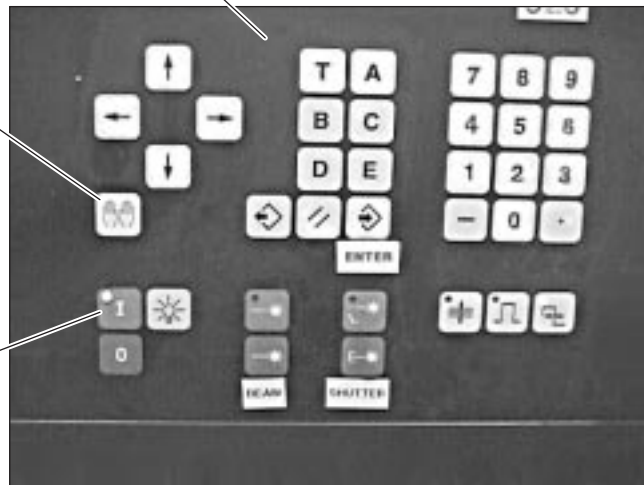
- Press the [hands] icon and the green [I] at the same time.



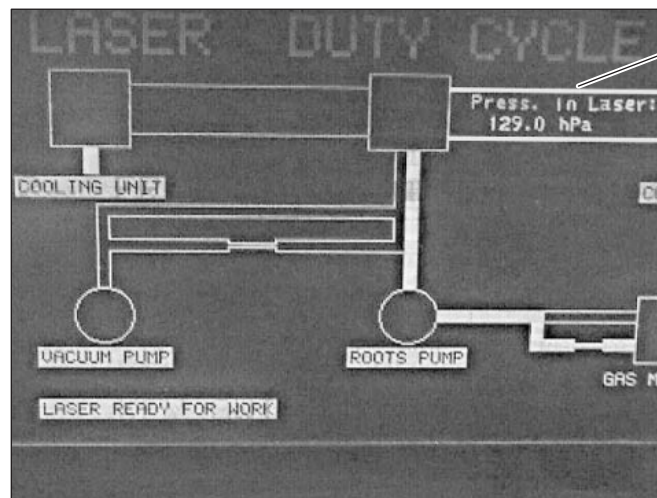
Laser Operator's Panel

Hands Icon Button

Green "I" Button



- Observe as the laser pressure decreases to approximately 10 hPa and then backfills to 130 hPa over a few minutes.



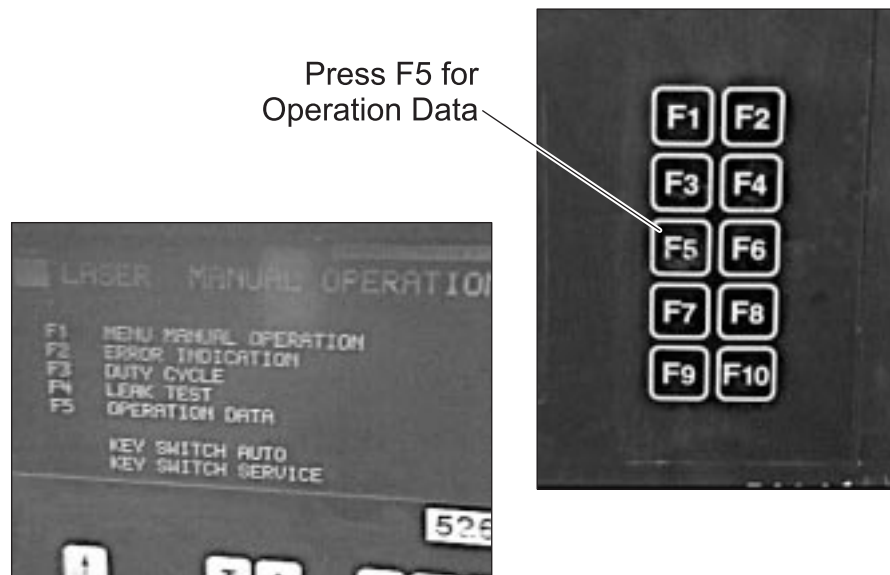
Observe Pressure in Laser

8. Check and set the power and frequency value.

- Turn the keyswitch to the right to MAN.



- Press F5 to view Operation Data and verify power reads 100%.



- Arrow down to the Frequency setting.
- Type 50 and press the Enter key.

9. Verify the shutter is off.

- The light on the Shutter Open icon must be off.



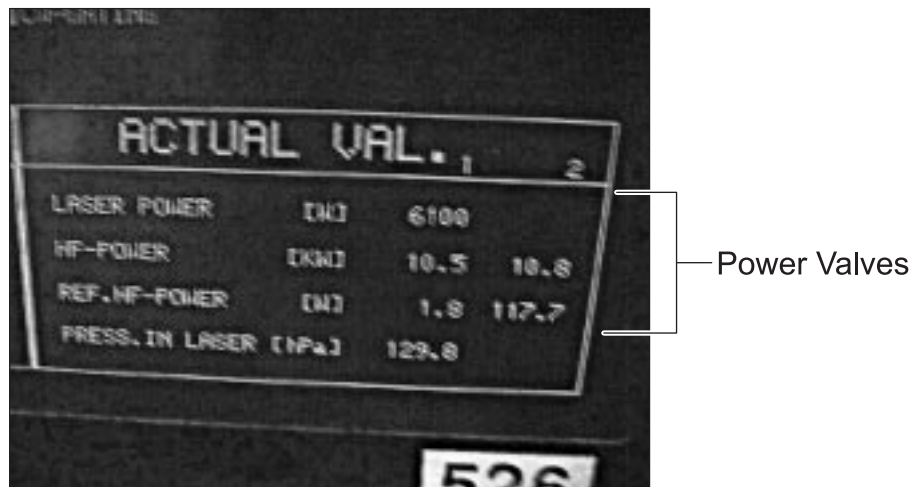
Verify Shutter
Icon Lamp is OFF

**10. Turn the beam ON.**

- Press the [hands] button and the green Beam On button at the same time.

Green Beam ON Buutton



11. Check the power values under the Actual Value screen.

- Verify Laser Power is approximately 6000 watts.
- Verify the HF Power is approximately 11 kilowatts on all four generators.
- Verify the Ref. HF Power is less than 150 watts.
- Press the <F10> key to toggle between generators 1 & 2 and generators 3 and 4.

12. Press the red Beam button to turn off the beam.**13. Turn the key switch to AUTO.****14. Press F4 to return to Operator Interface screen.**