

## Laser Marking Faceplates

**The laser for this application had to be flexible enough to ablate the coated area, mark directly into the base aluminum on another part of the plate, and engrave the aluminum to a depth of several thousands of an inch**

Metering devices for the gas, electricity, and water industries require marking a faceplate with various texts and graphics, including logos, model and serial numbers, and machine-readable barcode data.



The faceplates are commonly made of anodized aluminum with some areas silk-screen coated.

Rofin Laser Marking Systems can be used to ablate the coated area providing permanent marks with high contrast and good reliability. Other marking fields may require direct marking into the base aluminum. Such marking creates good contrast through a thermal process created by the high average and peak power of the beam which darkens the aluminum through oxidation. In addition, the laser used in the production meter plate marking system can perform engraving of the aluminum to a depth of several thousands of an inch.

The laser marker for this application had to be flexible enough to mark both surfaces with good contrast and at a speed to match the high-volume production requirements for these devices. Rofin's solution; a RSM 20E Nd:YVO<sub>4</sub> diode-pumped laser operating at a wavelength of 1064 nm and 20 watts.

The laser is activated by a fiber-coupled diode pack, which has an average operating life of up to 30,000 hours. ON a two-shift, five-day-a-week schedule, the diode packs will operate for up to about eight years. Laser parameters to enable marking of meter faceplate consist of laser power, pulse rate, and pulse width. The laser output beam is expanded to achieve the designed minimum focal spot and energy density. The 160mm flat field lens will achieve a marking field of 150mm diameter. Changing the laser or focusing variables will result in a different effect on the aluminum plate. Reducing the pulse rate increases the peak power, which increases the depth of the mark. Increasing the pulse rate will produce a smoother mark but can also increase the marking speed. Changing the focus position will change the focus spot diameter, which will reduce the power density of the laser.

Preventive maintenance for the laser is minimal and consists of periodically replacing the cooling water and filter. The diode pack is not an item that the customer will need to keep in stock. The cover glass plate protecting the flat field lens requires periodic wiping with an appropriate lens cleaning cloth and isopropyl alcohol. Maintenance of the mechanical transport system for the tags is also minor



Tag Marking Workstation  
with the RSM 20E Laser  
Inside

with the most important task being to remove the accumulation of a small amount of dust from the plates transport mechanism.

The turnkey CDRH Class 1 system marks nameplates utilizing an automated handling system for several models of nameplates. The workstation also houses the laser control components, automated nameplate handling system, barcode reader/verification system, and all necessary power distribution and control components. Interchangeable cassettes hold a minimum of several hundred nameplates. The cassettes automatically signal the marking system to select the proper program, which updates serial numbers and other pertinent information. A color sensor verifies the correct nameplate's color during auto-loading. The system also contains a reject station.