



# SYNRAD Technical Bulletin

# 022

Technical Issue: Replacing a v30SA Laser with a Firestar OEM vi30SA Laser

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## Description:

This Technical Bulletin describes the steps involved to replace an existing Firestar v30 laser with the more compact Firestar vi30 laser. There are several differences, so please review this document or see the *Firestar OEM vi30 Reference Guide* for details before proceeding.

**Note:** OEM v30 lasers are available in air-cooled (SA), fan-cooled (SF), and water-cooled (SW) models. For the purposes of this document, the focus is on replacing an OEM v30 SA (air-cooled) model with an OEM vi30 SA laser.

This Bulletin covers the following topics:

- Mechanical
  - Dimensions
  - Beam Position
  - Laser Mounting
- Electrical
  - Operating Voltage
  - PWM/Tickle Requirements
  - I/O Connections

## Mechanical

### Dimensions

The overall length of the vi30 laser is identical to the v30 at 16.79" (42.7 cm); however, the vi30 is 1.1" (2.8 cm) narrower, 0.3" (0.8 cm) shorter, and weighs 5.0 lbs (2.3 kg) less.

### Beam Position

Most importantly, the beam exit is located 2.673" (6.789 cm) above the mounting surface, which is 0.231" (0.589 cm) lower than the v30's in order to provide the smallest possible package. Optional vi30 mounting feet, described below, bring the beam exit height up to match the v30's.

### Laser Mounting

There are three possible mounting variations for the vi30. In each case, see the *Firestar OEM vi30 Reference Guide* for Outline & Mounting drawings, mounting instructions, and torque specifications for the optional feet and the vi30 laser.



- (1) The standard baseplate provides the smallest possible footprint for mounting the vi30. Like the v30, the vi30 is designed for bottom access mounting only—up through the mounting surface into the laser baseplate. See the vi30 Outline & Mounting drawing 300-20111-01 for standard mounting dimensions.
- (2) An optional set of “tall” mounting feet (SYNRAD P/N 250-20190-01) raises the vi30 by 0.231” (0.589 cm) to exactly match the v30’s beam exit height. The “tall” mounting feet do not extend beyond the baseplate so only bottom access mounting is possible. See O&M drawing 300-20111-02 for “tall” mounting dimensions.
- (3) An optional “tall/wide” mounting kit (SYNRAD P/N 250-20190-02) raises the vi30 to exactly match the v30’s beam exit height and matches front mounting hole dimensions. Because of the location of the fastener holes, only bottom access mounting is possible. See O&M drawing 300-20111-03 for “tall/wide” mounting dimensions.

## Electrical

### Operating Voltage

The most significant change between the v30 and vi30 is the DC power supply voltage. ***The vi30 laser requires a 48 VDC power supply.*** The DC supply must be capable of supplying 48 VDC at 10 A minimum (11 A peak current for less than 1 ms). The 48 VDC supply you provide should meet the following requirements:

- Output line regulation  $\leq 0.1\%$
- Output load regulation  $\leq 1.0\%$
- Noise and ripple  $\leq 100$  mV pk-pk
- Configure units with multiple modules for current-sharing
- Automatic overload/short circuit protection recommended

### PWM/Tickle Requirements

OEM vi30 PWM Command and tickle signal requirements are identical to the v30’s. No signal changes are necessary.

### I/O Connections

The vi30’s DB-9 interface connector is identical to the v30’s DB-9 “Interface A” connector. Pin functionality and signal specifications are unchanged.

The vi30 does not include the RJ45 “Interface B” connector found on the v30 laser. If your control system currently uses the RJ45 interface, you will need to convert the system wiring as described below:

#### **Input to: RJ45, Pin 1 – PWM Positive**

Connect to Pin 1, *PWM Positive*, on the DB-9 connector. Reference PWM signal on Pin 1 to DB-9 Pin 6, *PWM Negative*. Tickle signal (+5 VDC, 1  $\mu$ s at 5 kHz) and PWM Command signal (+5 VDC, 5 kHz nominal, 25 kHz max.) specifications are unchanged.

**Output from: RJ45, Pin 2 – DC Out**

No connection. The +15 V, 250 mA auxiliary output is not available from the vi30 DB-9. If your system can be configured to accept a +5 V, 250 mA output voltage, then connect to DB-9 Pin 5, *DC Out*.

**Output from: RJ45, Pin 3 – Laser Ok**

Connect to Pin 2, *Laser Ready*, on the DB-9 connector. Logic conditions are unchanged. Pin 2 is high (+5 V) when Laser Ready (Laser Ok) and low (0 V) when not ready.

**Output from: RJ45, Pin 4 – Temperature Ok**

Connect to Pin 4, *Overtemp Fault*, on the DB-9 connector. **Logic conditions are reversed!** DB-9 Pin 4 is high (+5 V) when an over-temperature fault occurs and low (0 V) when laser temperatures are within limits.

**Output from: RJ45, Pin 5 – Voltage Ok**

Connect to Pin 7, *DC Voltage Fault*, on the DB-9 connector. **Logic conditions are reversed!** DB-9 Pin 7 is high (+5 V) if under/over voltage fault occurs and low (0 V) when input DC voltage is within limits.

**Input to: RJ45, Pin 6 – PWM Negative**

Connect to Pin 6, *PWM Negative*, on the DB-9 connector. Reference PWM signal on Pin 6 to DB-9 Pin 1, *PWM Positive*. **Do not connect PWM Negative input to GND on DB-9 Pin 8.**

**Input to: RJ45, Pin 7 – Laser Enable**

Connect to Pin 9, *Laser Enable*, on the DB-9 connector. Logic conditions are unchanged. The laser is enabled when DB-9 Pin 9 is high (+5 V) and disabled when Pin 9 is low (0 V).

**Input to: RJ45, Pin 8 – GND**

Connect to Pin 8, *GND*, on the DB-9 connector. DB-9 Pin 8 is the ground reference pin for all input/output signals **except PWM Positive**.

**\*Additional output available from DB-9**

The vi30's DB-9 I/O interface provides an additional output that was not available on the RJ45 "Interface B" connector. DB-9 Pin 3 provides a *Lase Indicator* output. This output is high (+5 V) when the vi30 is actively lasing and low (0 V) when not lasing.

For further information contact SYNRAD at 1.800.796.7231; outside the U.S., dial +1.425.349.3500 or fax us at +1.425.349.3667.