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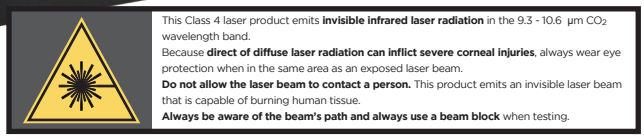
FH Flyer & v-Series High Performance CO_2 Laser Scanning Kits

FULLY CONTAINED CO_2 LASER SCANNING SUB-SYSTEM



Synrad FH Flyer and v-Series Laser Scanning Kits are fully contained systems that eliminate the hassle and worry of sourcing individual components and performing laser beam alignment. These subsystems include a v-Series laser and FH Flyer scan head specified for your application, WinMark Pro software for process control, and mechanical mounts designed to ensure out-of-box optical alignment. Many options are available to meet your application processing needs, including:

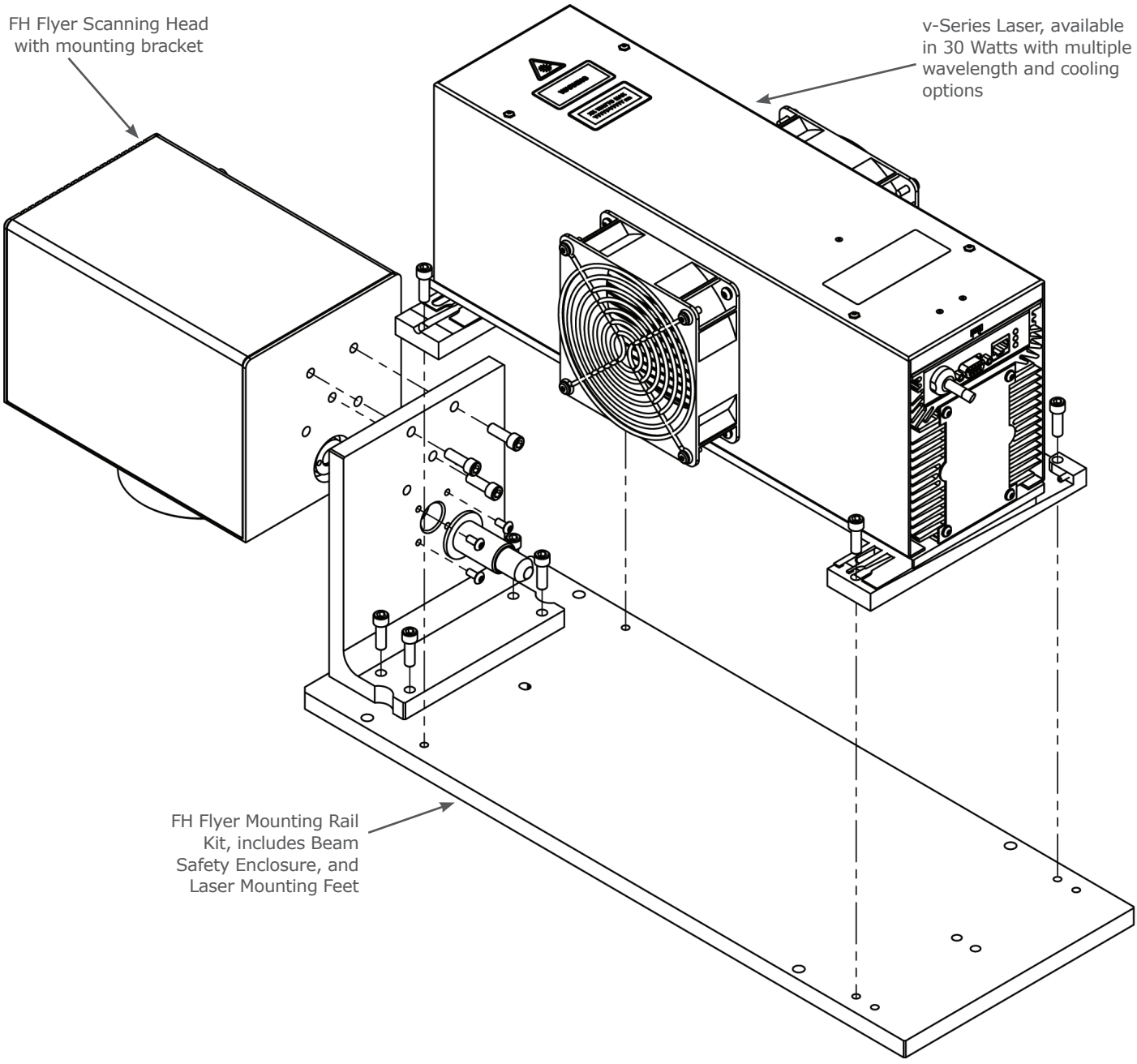
- Three (3) laser wavelengths
- Four (4) scan head field sizes
- Fan or water cooling
- Optional power supplies

Training and extended warranty packages are also available to ensure seamless implementation and optimal productivity.

Laser Scanning Sub-System

Synrad FH Flyer v-Series Scanning Kits include the key components necessary to assemble, align, and deliver a focused laser beam to your material for processing. Pre-alignment of the laser source and scan head eliminates a significant amount of engineering time and expense during setup, while the fully digital galvanometer-based scan head combines with WinMark Pro software to make operation intuitive. Each FH Flyer & v-Series Laser Scanning kit includes:

- High performance v-Series CO2 laser; available in 9.3, 10.2, or 10.6 µm models
- FH Flyer two-axis scan head
- F-theta focusing lens; available in 4 field sizes
- Laser mounting feet (factory mounted to the laser for out-of-the-box beam alignment with the scanning head)
- Mounting rail (base plate) with mounting screws
- Beam safety path enclosure
- WinMark Pro software
- 1 Year standard warranty
- Communication cables
- Optional 30 VDC power supply



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FH FLYER & v-SERIES SUB-SYSTEM COMPONENTS

FH Flyer Scanning Head

This is a two-axis, digital, galvanometer scan head. It is responsible for quickly and accurately delivering the laser beam to your material for application processing. The digital nature of this scan head allows designs or settings to be altered on-the-fly via software control for quick, seamless processing. Galvanometers refer to the high-speed motors and mirrors used to position the laser beam on the material surface. This particular model uses an f-theta focusing lens to maintain the specified spot size over the field size. Changing to a different field size is as easy as using three screws to install a new f-theta lens and selecting that lens in the WinMark software, providing excellent application flexibility.

v-Series CO_2 Laser

Synrad's v-series lasers are industry-leading lasers with 30 watts of average power for marking, engraving, and cutting applications. The advanced waveguide design guarantees exceptionally circular beam quality, perfect for demanding details and clean cuts. Three (3) wavelength options and two cooling options guarantee the v-series will be optimized to perfectly match your processing needs.

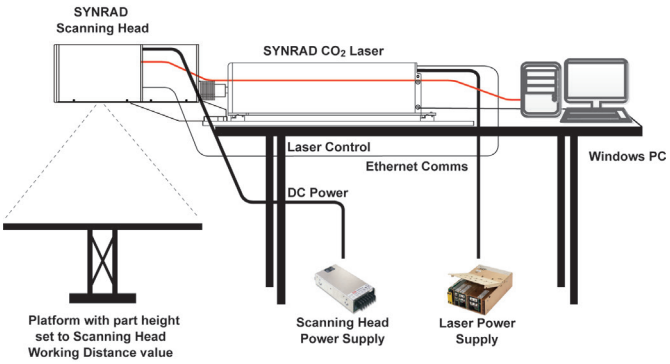
WinMark® Pro Software

WinMark Pro is custom software designed by Synrad to operate our scan heads. Files can be created within the software itself or imported from your favorite design software. Each object within the design can be assigned unique parameters to optimize application performance and allow many processes (marking, cutting, engraving, and others) to be performed within a single job file. WinMark can also be used to prepare the scan head for static or on-the-fly operation.

Accessories

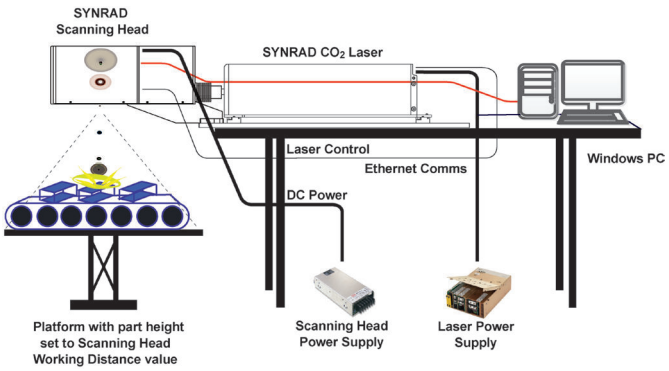
Power Supply: 30 VDC power supply can be included with your FH Flyer/v-Series Laser Scanning Kit. These power supplies are matched to both the laser and scan head to ensure optimal performance.

Mounting: All components necessary to achieve mechanical coupling and alignment of the laser and scan head. This includes a mounting rail (base plate), laser mounting feet (factory pre-aligned), beam path enclosure tube, and all necessary mounting screws.



Static System Set-Up

Static processing means that the material being processed is stationary; it is placed in position, the mark or cut is executed by the scan head, then the part is removed.



Auto-Flow System Set-Up

Auto-flow processing means that the material being processed is in motion, the mark or cut is executed by the scan head as the material passes through the scanning field.

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ADDITIONAL COMPONENTS (not included in the sub-system)

Chillers - Necessary only if the water cooled laser option was selected. Please review your laser operator's manual for chiller specifications.

Motion Systems & Parts Handling - While these scanning kits offer an incredible amount of versatility, any motion beyond the field of view (which may include part handling, mounting the kit on an XY-gantry, or roll-to-roll material feed) will be the owner's purview.

Safety Equipment - This Class 4 laser product emits invisible infrared laser radiation that can inflict injuries to personnel and damage equipment. Protective equipment is required; for further information visit: https://www.osha.gov/laser-hazards

Fume Extractors - Responsible for removing smoke and debris from the work area for cleaner processing and a safe work environment. The level of fume extraction needed will depend on the material and application.

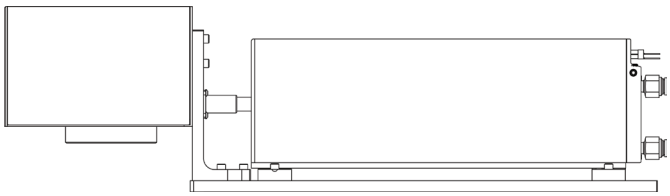
PC/Laptop - The main interface with FH Flyer is via WinMark Pro software. Note that FH Flyer can also be run in standalone mode (without a computer) for production once job files have been uploaded to the scan head.

FH FLYER & v-SERIES SUB-SYSTEM OPTIONS

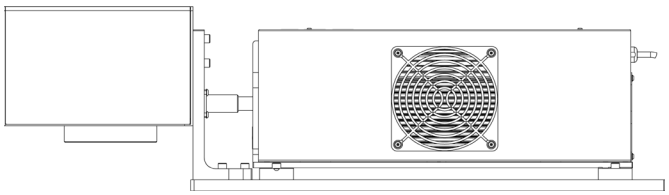
Each FH Flyer v-Series scanning sub-system will be configured to meet your specific application needs. Options to consider are listed below, and Novanta's highly experienced Sales Managers and Application Engineers are always available for guidance.

Laser Wavelength - The v-Series lasers are available in three wavelengths: 9.3 µm, 10.2 µm, and the industry standard 10.6 µm. The choice of wavelength will depend on the materials you plan to process. The highest application quality and throughput are achieved when the laser energy is efficiently absorbed by the material. For example, PET materials have higher absorption of 9.3 µm laser energy, leading to crisp marking and cleaner cut edges compared to the standard 10.6 µm wavelength. Work with your Sales Manager or Applications Engineer to ensure the best fit for your application.

Laser Cooling - v-Series lasers are available in water cooled or fan cooled versions. The fan cooled option is standard, regulating laser temperature without the use of a chiller. Water cooled options are available for those with environmental concerns, like clean room classification.



FH Flyer/v-Series Water Cooled laser scanning system *utilizes cooled water to maintain the optimum operating temperature of the laser. A chiller (not included) is required for the system. Recommended water temperature is 18 - 22°C with a flow rate of 1 GPM, <60 PSI.*



FH Flyer/v-Series Fan Cooled laser scanning system *utilizes fans to maintain optimum operating temperature of the laser. Fans are factory installed and provide the recommended air flow rate of 140 CFM.*

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FH FLYER & v-SERIES SUB-SYSTEM OPTIONS (cont.)

v-Series CO_2 Lasers

For more information and specifications visit https://novantaphotonics.com/product/fh-flyer-2-axis-scan-head/

Model	v30/FH Flyer Fan	v30/FH Flyer Water
Output Power @ Wavelength	20 W @ 9.3 µm 25 W @ 10.2 µm 30 W @ 10.6 µm	20 W @ 9.3 µm 25 W @ 10.2 µm 30 W @ 10.6 µm
Mode Quality	$M^2 \leq 1.2$	$M^2 \leq 1.2$
Rise Time	< 100 µsec	< 100 µsec
Wavelength	9.3 µm/10.2 µm/10.6 µm	9.3 µm/10.2 µm/10.6 µm
Power Stability From Cold Start (guaranteed)/after 2 min. (typical)	±5%/±3%	±5%/±3%
Cooling	Fan	Water
Heat Load (max)	450 W	450 W
Input Voltage/Current	30 VDC/15A	30 VDC/16A
Dimensions (total kit[1]) LxWxH mm (Inches)	745.4 x 203.2 x 211.5 (29.3 x 8 x 8.3)	745.4 x 203.2 x 211.5 (29.3 x 8 x 8.3)
Weight (total kit[1]) kg/lbs.	19.5 kg/43 lbs.	18.6 kg/41 lbs.

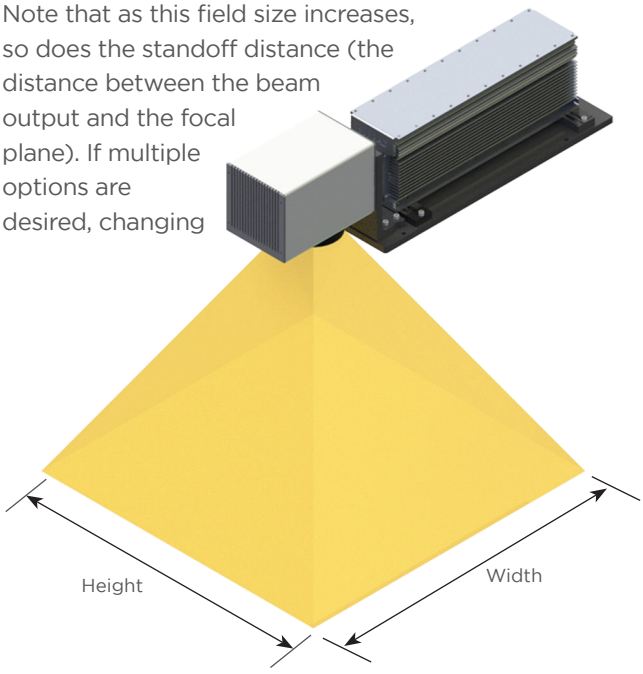
1-Total kit includes: v30 laser, mounting feet, mounting rail, L-bracket, scan head, f-theta lens, beam expander, screws, and laser communication cable.

FH Flyer Field Size & Standoff Distance

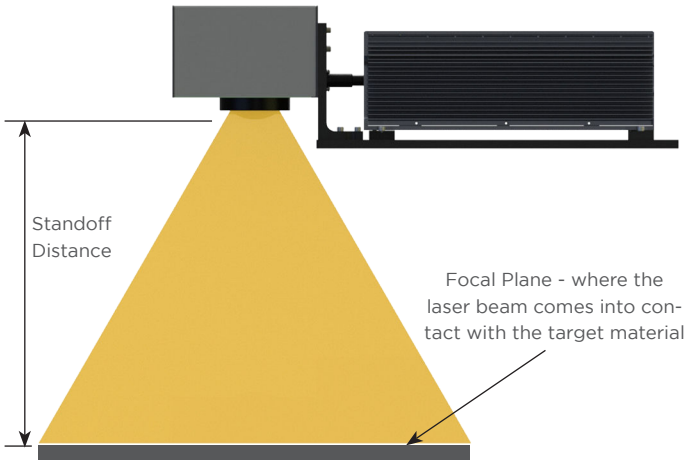
For more information and specifications visit https://www.synrad.com/marking_heads_software/FH Flyer

Field Size - the FH Flyer scan head can be paired with one of four f-theta focusing lenses, offering options on field size (the area in which the scan head can maintain consistent quality marking). Selecting the proper field size is a balance of desired working area verses necessary spot size (as field size increases, so does the focused spot size of the laser). A smaller focused spot size enables more detailed processing and due to the higher energy density, greater throughput as well.

Note that as this field size increases, so does the standoff distance (the distance between the beam output and the focal plane). If multiple options are desired, changing the field size of FH Flyer is as easy as replacing the f-theta lens and selecting the new lens in the WinMark software.



Standoff (Working) Distance - the distance between the beam output and the focal plane (were the target material is placed). As field size increases, so does the standoff distance.



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FH Flyer Field Size Options

The FH Flyer scan head can be configured to one of these field sizes:

Focusing Lens Size	370 mm	200 mm	125 mm	80 mm
Field Size, max (mm)	241 x 297	134 x 165	85.7 x 105.6	33.5 x 41.2
Spot Size $1/e^2$ (Qm)	540	290	180	116
Working Distance, typical (mm)	350 ± 5	190 ± 3	128 ± 2	74 ± 1
Depth of Field, typical (mm)	± 10	± 2.5	± 1.5	± 0.4
Scan Speed (mm sec/ips)	7620 mm/s 300 ips	7620 mm/s 300 ips	7620 mm/s 300 ips	4953 mm/s 195 ips

Throughput Speed

The throughput rate of any laser processing system is dependent on the balance of laser power, application criteria, and the absorption characteristics of the target material. For example, the same FH Flyer v-series kit set with the standard 125 mm focusing lens would mark ink-coated paperboard at many times the speed that it could cut through that same paperboard. This is an example of application criteria requiring more material removal to cut an object rather than simply creating a surface mark. Absorption characteristics can come into play with materials like PET or Polypropylene, which respectively absorb the 9.3 or 10.2 µm wavelengths better. This pairing of absorption characteristics to laser wavelength leads to higher quality processing and faster throughput.

The bottom line is that each application is unique, and testing will best determine throughput speed.

Novanta Applications Labs offer testing services to determine the optimal CO_2 laser equipment needed for a specific application. Applications Engineers will also determine the maximum throughput speeds, and provide unique how-to information to optimize laser processing for a specific application.

WARRANTY, SERVICE & SUPPORT

Novanta provides standard warranty service for its lasers, scanning heads, and accessories through a network of Novanta Service Centers (SSC). Standard warranty service is performed by Laser Service Specialists using Novanta approved parts.

Standard Warranty

Limited Warranty - Novanta warrants that its Products will be free from defects in materials and workmanship and will conform to the Specifications for the periods set forth here:

- FH Flyer / v-Series High Performance CO_2 Laser Scanning Sub-System – One (1) year

Extended Warranty Options

In addition to our Standard Warranty, Novanta offers 3 different Extended Warranty/Service Coverage options that provide guaranteed service turn-around times and a warranty on repairs. The new Extended Warranty/Service programs are available for purchase at any time for lasers and scanning heads up to 6 years old (from original ship date). While Novanta lasers are known to last many years, electronic components tend to become obsolete much faster, making repairs of older lasers costly, and in some cases impractical. Novanta recommends choosing one of our programs to ensure minimal downtime and optimal productivity for you and your customers.

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WARRANTY, SERVICE & SUPPORT (cont.)

Service

If an Extended Warranty/Service plan does not fit your needs, Novanta offers 2 service options once the Standard Warranty expires. Customers can choose between a Fixed Price option that includes a new Total Laser Validation (TLV) service, or a Minimum with Not-To-Exceed Price for specific repairs.

Technical Support

Expert technical support from Novanta is here to provide you with more information, answer any questions you may have, and offer guidance for installation, operation, and troubleshooting of your laser and scanning head. Novanta Technical Support Engineers have an average of 11 years of experience and can connect with you directly via phone or email. With four (4) regional offices located in the USA, Europe, China, and Japan, our Technical Support Engineers respond quickly with the precise information you are seeking.

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