

# Laser Accessories

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Successful laser-based applications are largely dependent on proper laser selection and system integration, and choosing the right accessories to go with that system will not only enhance and improve your results, but also provide additional safety while working with the laser. Important categories of products to enhance your laser application are:

- **Laser Diagnostics**
- **Process Observation & Verification**
- **Laser Safety**
- **Optomechanical Components**

# LASER DIAGNOSTICS

*Laser diagnostic devices ensure that lasers are operating as programmed, resulting in more consistent process results. Diagnostic tools are also vital for troubleshooting when a process is out of limits.*

## POWER MEASUREMENT

The simplest method of checking laser performance is to measure its power or energy output which directly affects its ability to successfully complete a process.

Laser measurement systems are generally made up of two pieces of equipment: a sensor and a meter. AMADA WELD TECH has selected a range of sensors to measure the average power or energy of its various product lines.

The sensors are thermal sensors with broadband absorbers (0.19-20  $\mu\text{m}$ ) and ideal for measuring average power of many laser sources.

Sensors are laser dependent and are selected based on the maximum laser energy/power output to be measured. Meters, on the other hand, are laser independent.



*Pictured: Power Meter - Advanced and Power Sensor -Welder <30 W*

To build a power measurement system - select 1 item from group A and 1 item from group B:

Group	Item	Part No.	Description	Associated Lasers
A	<b>Power meter – USB*</b>	270-591	Connects power sensor to computer for readout	All
A	<b>Power meter – basic</b>	270-628	Read output laser power on handheld device	All
A	<b>Power meter – advanced</b>	270-438	Read output laser power on handheld device, data logging	All
B	<b>Power sensor – markers</b>	270-595	Detects output power and sends to reader	LM-F100A Series
B	<b>Power sensor – welder &lt;30 W</b>	270-592	Measures output power, 40 mW-150 W, 26 mm aperture, air cooled	ML-2051A, ML-2050A, ML-2351A, ML-8150A
B	<b>Power sensor – welder &lt;400 W</b>	270-598	Measures output power up to 300 mW-400 W, Energy range 75 mJ-600 J, fan cooled	ML-2351A, ML-2351AF, ML-2350A, ML-2350AF, ML-2450A, ML-2551A, LF-250A, LF-300A
B	<b>Power sensor – welder &lt;1000 W</b>	270-594	Measure output power 5 W - 1000 W, Energy range 300 mJ-300 J, 34 mm aperture, water cooled	ML-2550A, ML-2651B, ML-2650B, LF-500A, LF-700A

*\*requires computer/laptop with USB port and include software*

## BEAM PROFILE

A smooth spatial beam profile is desirable for most applications; an asymmetrical beam may cause the weld to fail. A simple, low-cost way to check the beam profile is with burn paper. This paper can give a quick indication if something is misaligned or damaged. These are used with Pulsed Nd:YAG lasers only.

Item	Part No.
<b>Burn paper</b>	900-381

# PROCESS OBSERVATION AND VERIFICATION

Verifying that the laser welding, marking, or cutting process has been completed as expected is key to its success. The following laser accessories are ideal for manufacturing or laboratory use to observe and verify laser processes.

## MAGNIFICATION

In many cases, laser processes are smaller than what is visible to the human eye, thus magnification is key to properly observing results. AMADA WELD TECH offers a range of magnification devices to look at the weld, mark, or cut more closely and at the required resolution.

With magnification up to 200X the portable **USB microscope** can produce an extremely detailed view of the process. Microscope includes built-in adjustable lighting. This USB microscope requires a computer with USB port and acquisition software.



The **Model TMMWC (Trinocular Mounted Microscope with Camera)** Stereo Zoom Microscope is supplied with 10X Eyepieces and a 0.5X Objective Lens. It provides magnification which is adjustable from 4.0-25X and a working distance of 211 mm.



*USB Microscope*

An **eye loupe** is an indispensable item for quick observation. This pocket sized tool will magnify the process 10x and allows for the first line of inspection.



*Eye Loupe*



The **Model IVSC (Inspection Vision System with Camera)** is a standalone system and contains a Macro video lens on extended post stand with HD Measurement camera and defused LED ring light. Includes 23 in LCD monitor and Flash Card for saving images.

Item	Part No.
Eye loupe	475-549
USB microscope with stand	8-453-01
IVSC	10-441-01

# PROCESS OBSERVATION AND VERIFICATION



## DPM BARCODE IMAGING

Handheld DPM (direct part marking) imager reads both 1D (All standard, MicroPDF, PDF417, GS1 Databar) and 2D matrices (Data matrix, QR, Micro QR, and Aztec) as small as 0.005 in (125  $\mu$ m). Ideal for decoding low contrast symbols directly marked on metals, castings, plastics, and electronic components.

A successful read is indicated by green light, vibration, and audible sound.

- Dual field optics for both wide and high density barcodes
- X-Mode technology for reading direct part marks
- USB 2.0 communication
- Low power draw

Item	Part No.
DPM barcode imager	270-597

## PULL TESTER

One of the most direct methods for testing weld strength is by pulling the two joined materials apart. The PT-200 pull tester can be configured for tension or compression testing applications up to 200 lbf (1.5 kN). Designed for both laboratory and production needs, PT-200 comes with a motorized test stand, force gauge, and standard wedge grips. The platform is customizable for specific applications.

- Up to 200 lbf (1.5 kN)
- High-speed 7,000 Hz sampling rate
- USB, RS-232, Mitutoyo, and analog outputs
- Large backlit graphic displays
- 1,000-point data memory with statistics and outputs

This model will cover most laser welding geometries for sheet metals and wires

Item	Part No.
Pull tester	10-420-01



# LASER SAFETY

Protecting yourself and others from laser radiation is critical and should be a primary concern for laser users. Furthermore, laser interaction with materials can expel harmful debris into the air; these sometimes toxic fumes must be extracted and properly filtered for the protection of laser operators.



## LASER EYEWEAR

Lasers have bright, harmful radiation that can cause serious damage to eyes and skin without proper protection. The laser safety glasses listed here are designed specifically for protection from the lasers offered by AMADA WELD TECH and include styles to fit individuals who may or may not wear prescription eyewear.

Item	Part No.	Protected Wavelength	Laser
Green *	475-118	7+ OD @ 1064 nm	Good for all ML, LF, and LM-F lasers excluding ML-8150A
Green over glasses	475-160	7+ OD @ 1064 nm	
Amber	475-156	7+ OD @ 1064 nm and 532 nm	Good for all IR or Green lasers including ML-8150A
Amber over glasses	475-157	7+ OD @ 1064 nm and 532 nm	

\*pictured

## FUME EXTRACTION

Laser marking, laser welding, and laser cutting are processes that can eject material of various sizes from the part. Fume extractors are necessary to remove those harmful airborne particles from the environment, protecting operators and engineers from unnecessary exposure. Sometimes toxic fumes also need to be collected and properly filtered. Use the following table to identify the best fume extractor for a given process:



Part Name	Part No.	Process
Fume extractor - large	720-225	Marking – heavy duty Welding – medium, and heavy duty (up to 600 W)
Fume extractor - WL-100A	8-400-01	Marking – light, medium, and heavy duty Welding – light, medium duty
	Contact factory	Cutting – light, medium, and heavy duty

\*includes 2 in diameter tubing, length 10 ft



# OPTO-MECHANICAL ACCESSORIES AND MORE

*Opto-mechanical components are used for quick fixturing and tooling of parts. Great for proof-of-principle testing!*



## LAB JACKS & TOOLING PLATES

Parts come in many different shapes and sizes, making it necessary to create a unique fixture for each and every part to be held in focus.

Opto-mechanical components can be used as tooling, or a platform to mount tooling and parts, and provide height adjustment for quick and easy process verification before going to the expense of building a specific tool.

Part	Part No.	Description	Use
Lab jack	524-062	Height adjustment of 1.75 in, minimum height 2.5 in and maximum height of 4.25 in, ¼ in-20 hole pattern	Fine height adjustment of part
Tooling plate	4-64702-01	8 in x 8 in tooling plate with ¼ in-20 holes separated by 1 in	Mounting of parts or tooling
Lab jack and tooling plate	8-442-01	8 in x 8 in tooling plate with ¼ in-20 hole pattern, 1.75 in height adjustment	Part and tool mounting and height adjustment
Basic tooling kit - metric	285-171	Metric threaded tooling kit including corner stops, clamps, and posts. Designed for use with WL-100A	Basic mounting of files
Basic tooling kit - English	285-172	English threaded tooling kit including corner stops, clamps, and posts	Basic mounting of files



## CHILLERS

Water chillers are necessary for cooling higher powered lasers when water cannot be supplied through building facilities. The following chillers provide the necessary cooling capacity for the associated models running at full power and duty cycle.

Electrical Requirements: 208-220 V, 3 phase, 60 Hz

Item	Capacity	Part No.	Associated Items
OTC-1.0 A chiller	8,520 BTU	4-66736-02	ML-2351A, ML-2350A (water cooled versions)
OTC-2.0 A chiller	17,280 BTU	4-66736-05	ML-2450A
OTC-5.0 A chiller	40,320 BTU	4-66736-07	ML-2551A, ML-2550A
OTC-7.5 A chiller	80,040 BTU	4-66736-09	ML-2651B, ML-2650B
Water connector kit, small	N/A	4-69984-01	For OTC-1.0, OTC-2.0, OTC-5.0 chillers
Water connector kit, large	N/A	4-69985-01	For OTC-7.5 chiller

## AUTO FOCUS KITS

The auto focus feature allows the part height to be determined by non-contact sensor. The height is fed into the laser and the focal height is adjusted.

Depending on the focal length of the f-theta lens, there are two sensor options 100 mm for f-100 mm and f-160 mm and 300 mm for f-254 mm.

In the picture on the right, the sensor and mounting bracket are shown. Each of these are sold separately. In this case, the height is determined outside of the marking area.



Note: The depth sensor can also be integrated into a motion system, such that it drives the height of the z-axis.

Part	Part No.	Description
<b>Kit AF sensor 100 mm focal length</b>	8-921-01	Kit 100 mm focal length sensor - for adjustable focus models with 100 mm or 160 mm f-theta only
<b>Kit AF sensor 300 mm focal length</b>	8-921-02	Kit 300 mm focal length sensor - for adjustable focus models with 254 mm f-theta only
<b>Kit mounting AF sensor</b>	8-922-01	Mounting kit for AF sensor

## ACCESSORY STARTER KITS

Starting new laser projects can seem daunting at first. Not only do you need to purchase the laser equipment, but also consider peripherals to ensure that the process is successful and safe. To simplify this process, AMADA WELD TECH offers the following accessory starter kits. In addition, we have laser spares kits available for all lasers:

Kit	Laser Marking	Laser Welding <30 W	Laser Welding 50-400 W	Laser Welding 400-1000 W
<b>Part No.</b>	8-410-01	8-411-01	8-412-01 (ML Series) 8-414-01 (LF Series)	8-413-01 (ML Series) 8-415-01 (LF Series)
<b>Includes</b>	<ul style="list-style-type: none"> <li>• Power meter - USB*</li> <li>• Power sensor</li> <li>• Tissue</li> <li>• Optical lens</li> <li>• Lens cleaner</li> <li>• Safety glasses</li> <li>• Loupe</li> </ul>	<ul style="list-style-type: none"> <li>• Power meter - USB*</li> <li>• Power sensor</li> <li>• Tissue</li> <li>• Optical lens</li> <li>• Lens cleaner</li> <li>• Safety glasses</li> <li>• Loupe</li> </ul>	<ul style="list-style-type: none"> <li>• Power meter - USB*</li> <li>• Power sensor</li> <li>• Tissue</li> <li>• Optical lens</li> <li>• Lens cleaner</li> <li>• Safety glasses</li> <li>• Loupe</li> <li>• Burn paper (not included in 8-414-01)</li> </ul>	<ul style="list-style-type: none"> <li>• Power meter - USB*</li> <li>• Power sensor</li> <li>• Tissue</li> <li>• Optical lens</li> <li>• Lens cleaner</li> <li>• Safety glasses</li> <li>• Loupe</li> <li>• Burn paper (not included in 8-415-01)</li> </ul>
<b>Laser</b>	LM-F100A Series	ML-2051A, ML-2050A, ML-2150A  For ML-8150A, select 8-416-01	ML-2351A, ML-2350A, ML-2450A, ML-2551A  LF-250A, LF-300A	ML-2550A, ML-2651B, ML-2650B  LF-500A, LF-700A, LF-1000A

\*Connector from power sensor to computer, requires computer/laptop with USB; includes software.



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