

THEO

By **MAX** PHOTONICS



MA1 Series Handheld **Laser** Welder

//// THEO. A Max Photonics Brand

02

2004

Founded in 2004, Max Photonics is a leading global provider of high-performance fibre lasers and laser solutions

Max Photonics Headquarters based in Shenzhen, China, holds a **strong presence** in many countries **across the globe.**

// **Delivering cutting-edge solutions to customers worldwide**

Products and Services

Max Photonics specialises in offering a wide range of high quality products and services, such as:

Fibre Lasers: Max Photonics provides a comprehensive portfolio of fibre lasers, including continuous wave (CW) fibre lasers, pulsed fibre lasers, ultra fast fibre lasers and high power fiber lasers. These lasers cater to a vast range of applications, including material processing, healthcare, optical transmission, sensing and research.

Laser Solutions: Max Photonics delivers turnkey laser solutions and customised systems for a myriad of industries like automotive, aerospace, electronics and semi conductors. These solutions enable customers to achieve improved efficiency, productivity and cost effectiveness.

Engineering Services: With a highly skilled and knowledgeable team of engineers, Max Photonics offers technical consulting, system integration and customer training services, ensuring that customers receive the best value and optimal performance from their laser systems.

// **Driving innovation**

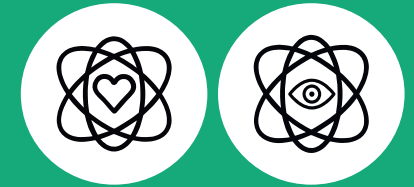


Research and Development

Max Photonics continually invests in R&D, driving technological advancements and product innovation. The company's in-house R&D team collaborates with leading research institutions and universities, exploring new technologies and materials to create breakthroughs in the field of photonics.



// **Developing state-of-the-art products**



Core Values and Vision

Max Photonics core values revolve around innovation, customer focus and excellence. The company is dedicated to pushing the boundaries of photonic technology and delivering cutting edge, reliable and customised solutions that exceed customer expectations.

The company's vision is to become a global industry leader in advanced fibre lasers, expand its product portfolio and provide advanced photonic solutions that empower businesses to achieve revolutionary improvements in their operations, ultimately contributing to a better world.

CE UK
CA



RoHS
2002/95/EC

THEO is dedicated to providing **world class** quality products and services to its customers.

// **Laser welding with THEO hand held fibre laser welding equipment**

Wilkinson Star Limited are proud to be the exclusive partners for THEO hand held laser welding equipment in the UK & Ireland.

Targeted at sheet metal fabrication industries, this technology has now been adopted into a growing list of applications including nuclear, aerospace, pharmaceutical and catering to name but a few.

THEO fibre laser technology is a great supplement to conventional welding methods in most fabrication workshops. This technology can offer many advantages over conventional welding methods.

Advantages Over Conventional Welding

- Fast welding speeds
- Minimal heat affected zone
- Minimal material distortion
- High precision and neat welding seams
- Up to 4 times faster than TIG
- Low consumable usage
- High repeatability
- Minimal training required
- Uniform weld bead
- Ability to weld various materials as well as dissimilar materials
- Improves production efficiency
- Reduced post weld cleaning times
- Easy to use
- Low application costs
- Efficient energy usage
- High welding strength
- Excellent welding performance

LIGHTER // SMALLER // PORTABLE // HIGH PERFORMANCE

//// Introduction

04

The new generation of THEO hand held fibre laser welders adopts advanced air cooling technology, which ensures long term stability and reliability, whilst maintaining a neat, compact design. The THEO series of machines are supplied as standard with a 7" intelligent graphical user interface, with 32 pre-set programs and the ability to store a further 32 user defined programs. This allows quick, easy use and set up for multiple operators with high repeatability. The compact and ergonomically designed torch allows for comfortable welding for the operator, whilst still being robust enough to withstand the pressures of use in most fabrication environments.

Welding modes including continuous wave, pulse and shooting mode offers flexibility for different welding applications such as spot welding. The wobble function can work in a frequency range of 0 - 280 Hz and the wire feed can be controlled directly via the graphical user interface on the power source. High beam stability ensures consistent high welding quality.

All THEO hand held fibre laser welders are supplied with an exclusive separate wire feed unit complete with 4 roll drive motor, offering smooth wire feeding performance.

The MA1 series of machines are equipped with an external interface for two channel security. There is also the option for external interface control, allowing for compatibility with automated systems. 8 point security check ensures maximum safety protection.

All THEO hand held fibre laser welding equipment are certified to CE and UKCA standards including EN 60825-1 and EN ISO 11553.

Wilkinson Star Limited are an established company of over 50 years within the welding industry and can offer full laser welding solutions with the THEO fibre laser welder technology.

Wilkinson Star Limited are committed to offering safe solutions and guidance to their customers.

All THEO hand held fibre laser welders supplied by Wilkinson Star Limited are supplied complete with a 2 year power source warranty and 12 month warranty on the torch.

Wilkinson Star Limited have also adopted a loan unit system, with a team of engineers available to visit site and swap over the power source in the unlikely event there is an issue which cannot be rectified on site, keeping you welding!



// Hand held fibre laser welding safety guidance

Lasers are classified into several classes depending on the level of hazard they present and the risk to the operator and others within the surrounding area, with the highest Class 4 representing the most hazardous lasers available. EN-60825-1 outlines the classification and safety guidance of laser products.

Handheld fibre laser welding machines are classified as hazardous, Class 4 laser products, but with the required PPE to protect the operator and a purpose built Kyrus Automation Class 4 laser welding enclosure, this technology is safe to use. Users can enjoy the many benefits that handheld fibre laser welding offers over traditional welding methods.

The difference between laser welding and traditional arc welding processes is that laser energy is used instead of an electrical arc to form the weld pool. As such, additional/process specific safety measures must be considered when operating this equipment.

It is mandatory that businesses with class 4 laser appliances on site have carried out a suitable and sufficient risk assessment and have appointed a competent person to undertake these tests. It is advised that the company has a Laser Safety Officer (LSO) or a Laser Protection Advisor (LPA).

NEW Dedicated Laser Welding Helmet with ADF

- Shell Material:
Special material mix, no lining
- Certification: ISO 16321EN 207,
Helmet shell: D LB 6 OD6,
ADF: D LB 7 OD7
1000 - 1100nm
- Impact Rating: E
- Weight: +/- 490g
- Airkos PAPR solution available



 **weltek**

INTRODUCING THEO ACADEMY LASER WELDING SAFETY KNOWLEDGE ACCESSIBLE FOR ALL

- THEO Academy is your go-to resource for laser welding safety knowledge. It's designed for both THEO customers and the broader welding community to learn essential safety practices efficiently.
- With THEO Academy, gain quick access to expert guidance that enhances your skills and ensures a safe welding environment. Stay sharp, stay safe — THEO Academy makes it easy.

THEO
ACADEMY

// Laser Radiation



Exposure to laser light can inflict severe retina and/or cornea injuries leading to permanent eye damage and may cause skin damage. Some laser light is invisible. Safety protocols must be followed to prevent accidental exposure to invisible, direct and reflected beams. The system must only be operated in a Laser Controlled Area.



// Personal Protection



Appropriately certified eyewear must be worn which is suitable for the laser output wavelength, by both the operator and anyone within the enclosed working environment. The standards for such protection are governed by EN-207:2017.



The key aspects of eye and face protection when using a class 4 laser are the LB and OD ratings. The Laser Barrier (LB) rating is reference to the level of protection the face shield or glasses can provide against a direct hit from a laser beam. There will always be a letter stated before the LB reference, which in the case of hand held laser welders should be 'D' (Continuous Wave). The Optical Density (OD) rating is reference to the level of protection the filter of the glasses/lens can provide and the level of light able to pass through the filter and reach your eyes. EN 207 encompasses the full protection of the helmet or glasses, including the face shield or frame.



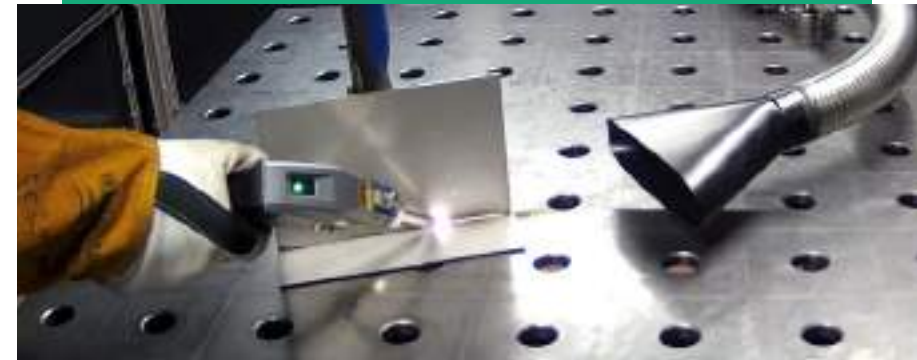
All THEO laser welders are supplied with glasses certified to EN 207 D LB6 OD8. The Kapio laser helmet offers full face protection to EN 207 D LB 6 OD6 with the ADF offering protection to D LB 7 OD7. The Kapio laser helmet is also available as a personal air powered respirator system (PAPR) to offer full protection for the operator. Operators and all personnel working within the Laser Controlled Area must wear protective clothing including laser-resistant and heat resistant gloves, caps, leather apron and other laser-resistant and heat-resistant clothing.

// Fume Hazards



As with all welding processes, there is a fume hazard present. The appropriate measures should be taken to ensure safety, with the most effective method being an extraction hood coupled with a personal air powered respirator system for the operator. It is important that any filtration is matched to the welding process/material.

Wilkinson Star Limited offer an extensive range of extraction and PPE under the F-Tech and Weltek brands. Further information is available at www.wilkinsonstar247.com.



// Class 4 Enclosures by Kyrus Automation

The required safety and personal protection measures must not be overlooked whilst capitalising on the productivity gains that hand held fibre laser welding offers. When using a Class 4 laser welder it is imperative that you use a suitable Class 4 enclosure.

Wilkinson Star Limited together with our integrator Kyrus Automation offer full Class 4 laser welding enclosure solutions to offer protection to all workers within the workspace.

A Kyrus Laser Welding Enclosure helps mitigate the hazards of hand held laser welders by providing a safe and contained working environment.

Kyrus have designed a standard “plug and play” range that provides this safe working environment.

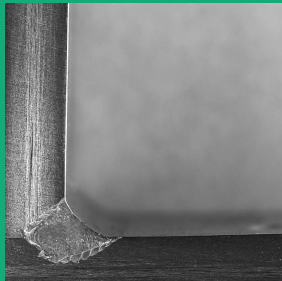
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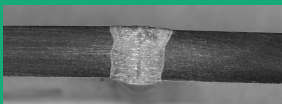
//// Application Materials

08

Stainless Steel

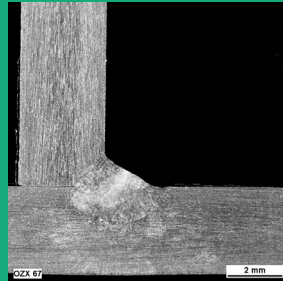


3mm Fillet weld

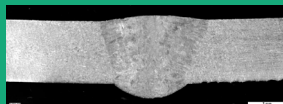


3mm Butt weld

Aluminium

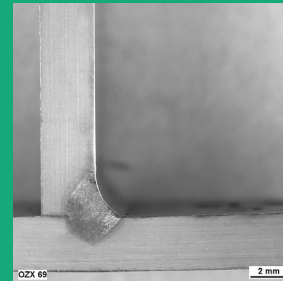


3mm Fillet weld



3mm Butt weld

Carbon Steel



3mm Fillet weld



3mm Butt weld

Galvanised



Copper



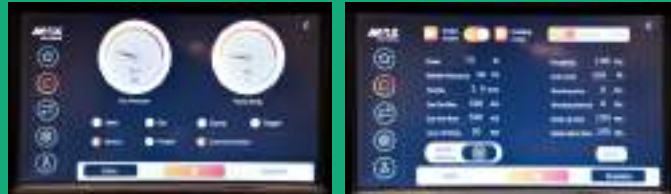
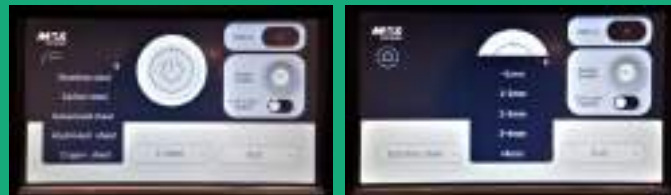
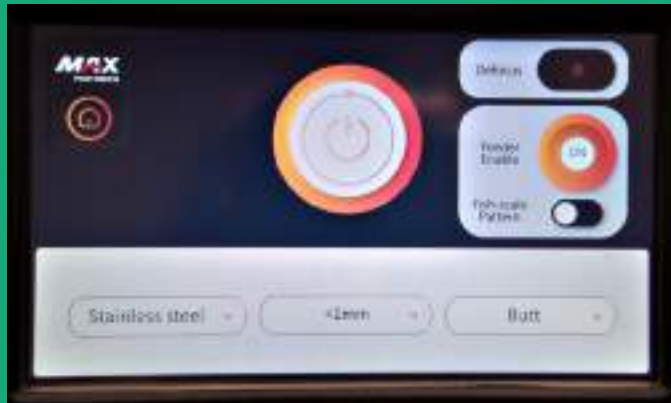
Brass



// **APPROVED**
WITH  **WELD STAR®**
CONSUMABLES

// **ABILITY TO WELD VARIOUS MATERIALS**
AS WELL AS DISSIMILAR MATERIALS

//// Interface



// SIMPLE AND EASY TO USE

// Key Features

- Embedded with 32 pre-set modes for various materials
- Ability to store up to 32 user defined programs
- Minimal training time needed for beginners to operate the welding system
- Synergic interface allows the user to select the material, plate thickness and joint configuration for quick set up
- Advanced user menu for user defined set up for advanced operators
- Detailed warning page for easy diagnosis
- Full control over external wire feed system
- Password protected advanced service menu
- Fish scale welding mode
- Easily switch between CW, pulse and shooting modes

7 INCH TOUCH SCREEN

// 800W Power



// Key Features

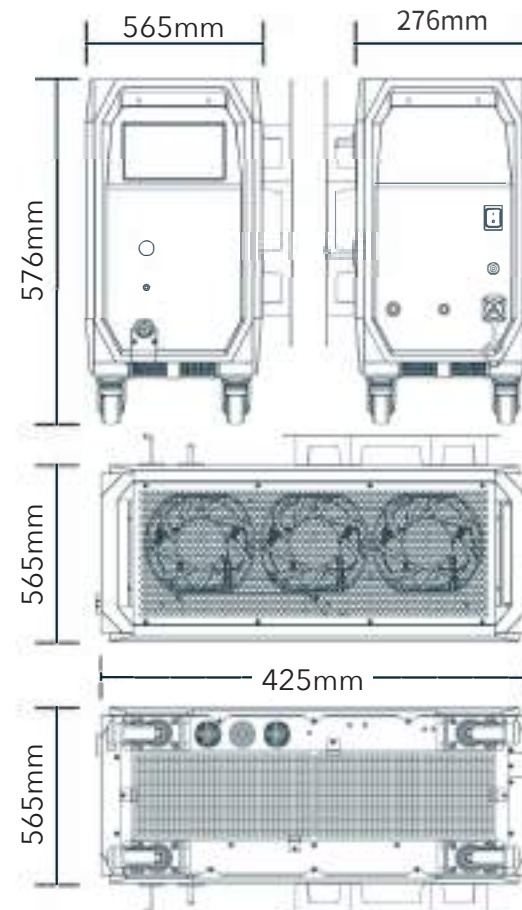
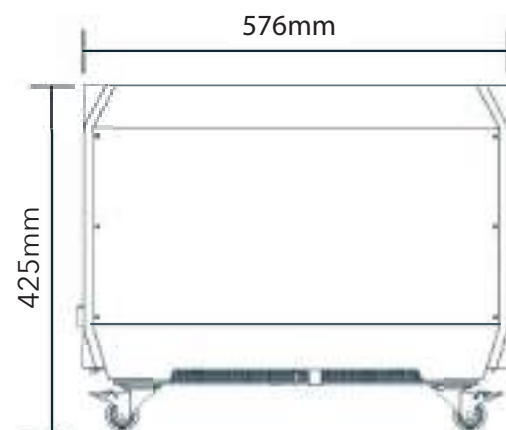
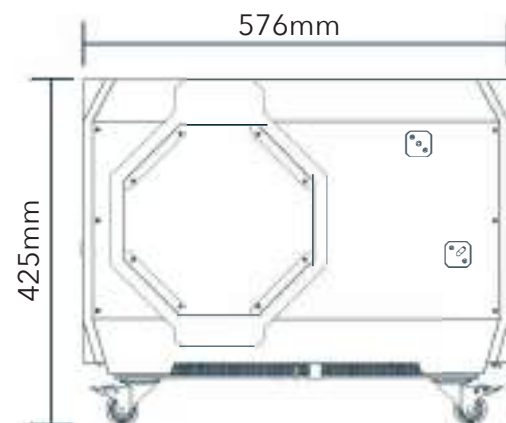
- Portable design
- Compact handheld welding torch
- Stable performance and reliable quality
- Six layers of safety protection
- Simple operating system
- Easy installation and operation
- Bespoke wire feed unit
- External interface with dual channel safety interlock
- Ability to enable the feeder on/off via the torch
- Top mounted control panel for enhanced user experience
- Includes 4.3m torch
- Product demonstrations available

// Product Specification

Material	One Sided Limit Welding Seam
Stainless Steel	up to 3.5 mm
Carbon Steel	up to 3.5 mm
Aluminium	up to 3 mm
Galvanised Steel	up to 3.5 mm
Brass	up to 2.5 mm

// Product Specification

Input Power	230Vac / 50Hz / 32A (Max 3KW)
Operating Ambient Temperature (°C)	0 - 40 °C
Operating Ambient Humidity	10 - 85 %
Storage Temperature (°C)	-10 - 60 °C
Output (100% CW)	800W
Power Regulation Range	10 - 100 %
Laser Cooling Method	Phase change heat dissipation (air)
Tip Cooling Method	Nitrogen / Argon
Operation Mode	CW / Modulated
Polarisation	Random
Central Wavelength	1080 nm
Fibre Width	20µm
Wobble Width	0 - 4mm
Wobble Frequency	0 - 280Hz
Continuous Light Output Time (S)	Light 120S, Stop 6S
Weight	29 KG
Dimensions	588 x 265 x 512 mm
Length Of Optical Fibre Armoured Cable	4.35m



// 1200W Power



// Key Features

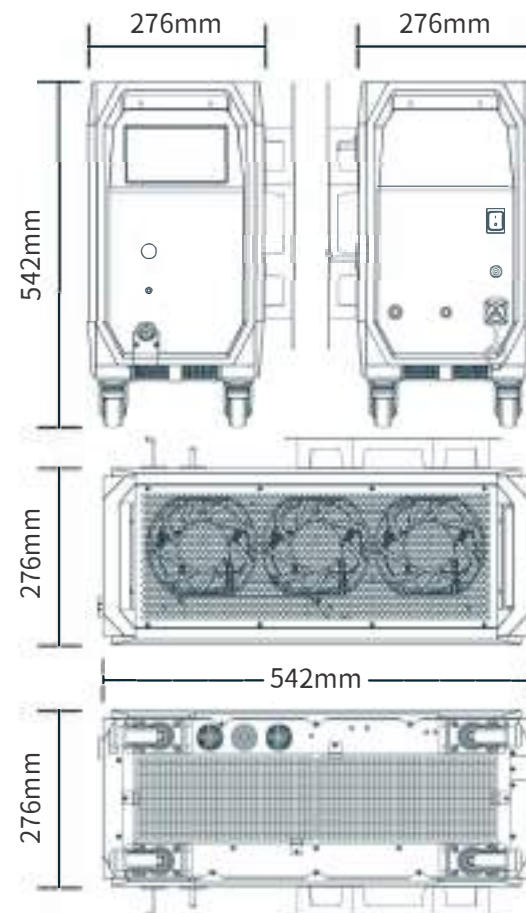
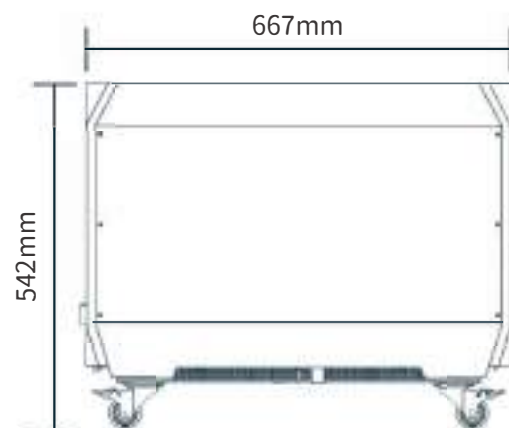
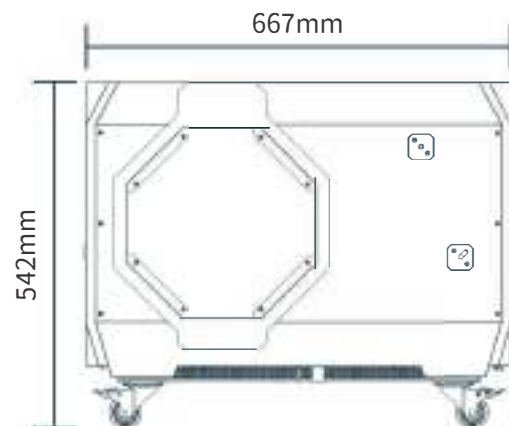
- Portable design
- Compact handheld welding torch
- Stable performance and reliable quality
- Six layers of safety protection
- Simple operating system
- Easy installation and operation
- Bespoke wire feed unit
- External interface with dual channel safety interlock
- Includes 5.6m torch
- Product demonstrations available

// Product Specification

Material	One Sided Limit Welding Seam
Stainless Steel	up to 4.5 mm
Carbon Steel	up to 4.5 mm
Aluminium	up to 4 mm
Galvanised Steel	up to 4.5 mm
Brass	up to 3.5 mm
Copper	up to 1.5 mm

// Product Specification

Input Power	230Vac / 50Hz / 32A (Max 4.8KW)
Operating Ambient Temperature (°C)	0 - 40 °C
Operating Ambient Humidity	10 - 85 %
Storage Temperature (°C)	-10 - 60 °C
Output (100% CW)	1200W
Power Regulation Range	10 - 100 %
Laser Cooling Method	Phase change heat dissipation (air)
Tip Cooling Method	Nitrogen / Argon
Operation Mode	CW / Modulated
Polarisation	Random
Central Wavelength	1080 nm
Fibre Width	20µm
Wobble Width	0 - 4mm
Wobble Frequency	0 - 280Hz
Continuous Light Output Time (S)	Light 120S, Stop 6S
Weight	38 KG
Dimensions	667 x 276 x 542 mm
Length Of Optical Fibre Armoured Cable	5.6m



// **1500W Power**



// **Key Features**

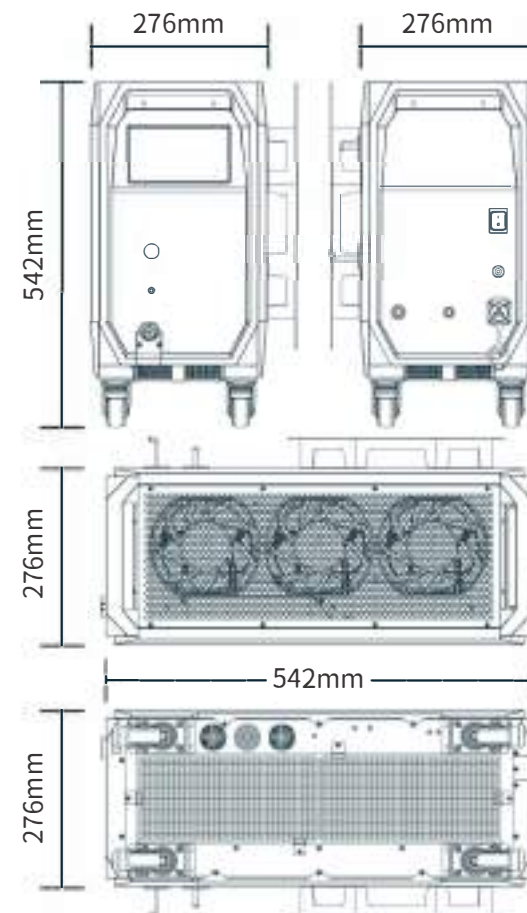
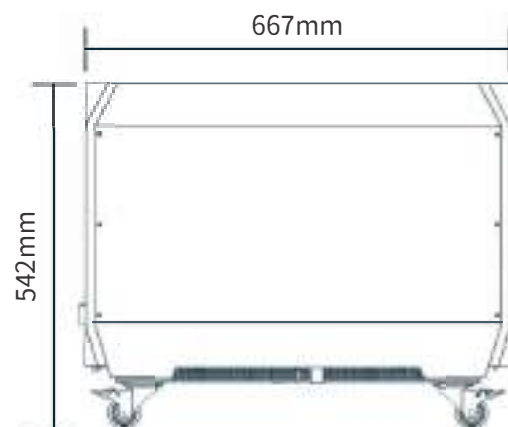
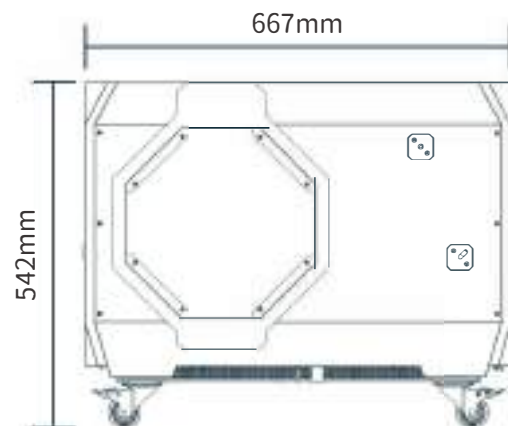
- Portable design
- Compact handheld welding torch
- Stable performance and reliable quality
- Six layers of safety protection
- Simple operating system
- Easy installation and operation
- Bespoke wire feed unit
- External interface with dual channel safety interlock
- External interface suitable for automated applications
- Includes 5.6m torch
- Product demonstrations available

// **Product Specification**

Material	One Sided Limit Welding Seam
Stainless Steel	up to 6.5 mm
Carbon Steel	up to 6.5 mm
Aluminium	up to 5.5 mm
Galvanised Steel	up to 6.5 mm
Brass	up to 4.5 mm
Copper	up to 3 mm

// Product Specification

Input Power	230Vac / 50Hz / 32A (Max 6KW)
Operating Ambient Temperature (°C)	0 - 40 °C
Operating Ambient Humidity	10 - 85 %
Storage Temperature (°C)	-10 - 60 °C
Output (100% CW)	1500W
Power Regulation Range	10 - 100 %
Laser Cooling Method	Phase change heat dissipation (air)
Tip Cooling Method	Nitrogen / Argon
Operation Mode	CW / Modulated
Polarisation	Random
Central Wavelength	1080 nm
Fibre Width	20µm
Wobble Width	0 - 4mm
Wobble Frequency	0 - 280Hz
Continuous Light Output Time (S)	Light 120S, Stop 6S
Weight	38 KG
Dimensions	667 x 276 x 542 mm
Length Of Optical Fibre Armoured Cable	5.6m



//// Packing List

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// MA1-35

No	Name of Fittings	Description	Unit	Qty
1	Hand Held Laser	MA1-35	Pc	1
2	Welding Torch	Torch	Pc	1
3	Power Cable	5m	Pc	1
4	Ground Cable	5m	Pc	1
5	Goggle	Support the 0D7+	Pc	2
6	Hanging Welding Torch Frame	Hexagon flowered countersunk head screws with socket (4pcs)	Pc	1
7	Armoring Cable Rack	Hexagon flowered countersunk head screws with socket (8pcs)	Pc	1
8	Gun Nozzle	Brass nozzle 1, 3, A, B and flat nozzle each	Pc	5
9	Protective Lens	φ20*3	Pc	5
10	Lock Ring Wrench	/	Pc	1
11	Wire Outlet Assembly	0.8/1.0/1.2/1.6mm wire feeding nozzle and wire feeding frame	Pc	1
12	Cotton Swabs 1	25 pcs	Pc	1
13	Cotton Swabs 2	25 pcs	Pc	1
14	Wire Feeder (Individually packaged)	Including wire feeding conduit, wire feeding wheel	Pc	1
15	Acoustic Earplugs	3M brand	Pc	5
16	Dust Mask	Advanced dust	Pc	2
17	Screwdriver	Hex Wrench	Pc	1
18	Safe Return Route	3m	Pc	1
19	Silicone Sleeve	/	Pc	1
20	Reel	/	Pc	1
21	Trachea	φ6, 5m	Pc	1
22	Two Vent Quick Plug Connector	φ6 to φ10	Pc	1
23	Live Ore Desiccant	/	Pc	2

// MA1-45 & MA1-65

No	Name of Fittings	Description	Unit	Qty
1	Hand Held Laser	MA1-45 / MA1-65	Pc	1
2	Welding Torch	Torch	Pc	1
3	Power Cable	10m	Pc	1
4	Ground Cable	10m	Pc	1
5	Goggle	Support the 0D7+	Pc	2
6	Hanging Welding Torch Frame	Hexagon flowered countersunk head screws with socket (4pcs)	Pc	1
7	Armoring Cable Rack	Hexagon flowered countersunk head screws with socket (8pcs)	Pc	1
8	Gun Nozzle	Brass nozzle 1, 3, A, B and flat tips	Pc	5
9	Protective Lens	φ20*3	Pc	5
10	Lock Ring Wrench	/	Pc	1
11	Wire Outlet Assembly	0.8/1.0/1.2/1.6mm wire feeding nozzle and wire feeding frame	Pc	1
12	Spear Jig	The collimating focusing lens is disassembled and used	Pc	1
13	Cotton Swabs 1	25 pcs	Pc	1
14	Cotton Swabs 2	25 pcs	Pc	1
15	Wire Feeder (Individually packaged)	Including wire feeding conduit, wire feeding wheel	Pc	1
16	Acoustic Earplugs	3M brand	Pc	5
17	Dust Mask	Advanced dust	Pc	2
18	Screwdriver	Allen	Pc	1
19	Ground Wire	3m	Pc	1
20	Graphene Wire Feed Tube	3m	Pc	1

//// Laser Welding Torch

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// **680 grams**

// **Ergonomic Design**

// **Status Indicator**

// **Robust**

// **Single Trigger Operation**

// **QCS Fibre Optic Cable**

// **Wire Feed On/Off Switch**

The use of collimated QCS interface greatly reduces the size and weight of the welding torch, only 680g. The optical design is perfectly matched with the QCS output head, the transmission efficiency is high, and the heat generation is small. The welding torch design is ergonomic, comfortable to hold and easy to operate. In addition, the torch has a built-in swing function that allows the operator to consistently and safely perform high-quality welds throughout the day with dual safety light buttons.

// **THE LIGHTEST AND SMALLEST HANDHELD WELDING TORCH IN THE INDUSTRY**

//// T1 Wire Feed Unit






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- Exclusive wire feed unit developed and built by THEO for the MA1 series of machines
- 4 roll drive system ensures smooth wire feeding
- Controlled via user interface of the power source
- Wire inching and retraction control
- Wire spool size D200/D300 up to 25Kg
- Quick release liner connection
- Supports wire feeding speeds from 2-100mm/s
- Continuous and pulse wire feeding options











//// Accessories

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Part No.	709901151	701602178	709901148	709901150	101113452
Description	V Groove Wire Feed Roller		U Groove Wire Feed Roller		QR Wire Feeding Arm
Wire Diameter (mm)	0.8mm/1.0mm	1.2mm/1.6mm	0.8mm/1.0mm	1.2mm/1.6mm	
					

Part No.	701601883	101113543	101113544	101113545	101113546
Description	Nozzle Connecting Pipe	Wire Feeding Nozzle	Wire Feeding Nozzle	Wire Feeding Nozzle	Wire Feeding Nozzle
Wire Diameter (mm)		0.8mm	1.0mm	1.2mm	1.6mm
					

Part No.	101112238	101112236	101112239	101112237	101112240
Description	Nozzle A	Nozzle 1	Nozzle B	Nozzle 3	Flat Nozzle
Wire Diameter (mm)	Up to 1.2mm		1.6mm/Aluminium Wire		
					

Part No.	109902039	103100010	103100011	701601825	723100141
Description	2.5mm Steel Liner	4m Steel Liner	3m Teflon Liner	Protective Lens	Laser Safety Goggles
Wire Diameter (mm)		0.8mm	1.0mm		1080mm OD7+
					

//// Enclosures

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The required safety and personal protection measures must not be overlooked whilst capitalising on the productivity gains that hand held fibre laser welding offers. When using a Class 4 laser welder it is imperative that you use a suitable Class 4 enclosure.

Wilkinson Star Limited supply Class 4 laser welding enclosure solutions to offer protection to all workers within the workspace.

A Kyrus Laser Welding Enclosure helps mitigate the dangers of hand held laser welders by providing a safe and contained working environment.

Kyrus have designed a standard "plug and play" range that provides this safe working environment.



On site laser welding system and enclosure, Wilkinson Welding Academy, Manchester, UK

//// Enclosures

// Key Features

- Specifically designed for use with the new generation of hand held laser welders, and comply to IEC 60825-4 standards
- Integrates with the built in safety systems of your laser welding equipment
- Fully integrated “plug and play” electronics including door interlock, power distribution, cable trunking and LED lighting
- Modular design, allowing for interchangeable positions and future expansion capabilities
- Supplied as flat pack and can be easily installed (or for peace of mind we offer installation as a service)
- Floor seals to prevent visible reflections
- Illuminated laser warning signage
- Available with three external viewing options: CCTV with live screen (recommended), 4K CCTV with live screen (recommended for demonstration areas) or optical viewing window
- Light-tight services connection
- Enclosed roof option
- Sliding and hinged door options
- Bespoke enclosure packages/sizes available on request



//// Kyrus Enclosures

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// Hand Held Laser Welding Enclosure - 3m x 2m

Order Code	Description
KY-LENC-001	3m x 2m Enclosure, with 1.2m Hinge Door c/w power distribution, lighting, safety interlock & laser on signage
KY-LENC-001A	3m x 2m Enclosure, with 1.3m Sliding Door c/w power distribution, lighting, safety interlock & laser on signage
KY-LENC-3020H12	3m x 2m Enclosure, with 1.2m Hinge Door c/w safety interlock and laser on signage only
KY-LENC-3020S13	3m x 2m Enclosure, with 1.3m Sliding Door c/w safety interlock and laser on signage only
ASM-000137	Option: Roofing Module
ASM-000136	Option: CCTV Module (recommended)
OS-000030	Option: Optical Viewing Window



// Hand Held Laser Welding Enclosure - 3m x 3m

Order Code	Description
KY-LENC-002	3m x 3m Enclosure, with 1.2m Hinge Door c/w power distribution, lighting, safety interlock & laser on signage
KY-LENC-003	3m x 3m Enclosure, with 1.3m Sliding Door c/w power distribution, lighting, safety interlock & laser on signage
KY-LENC-3030H12	3m x 3m Enclosure, with 1.2m Hinge Door c/w safety interlock and laser on signage only
KY-LENC-3030S13	3m x 3m Enclosure, with 1.3m Sliding Door c/w safety interlock and laser on signage only
ASM-000138	Option: Roofing Module
ASM-000136	Option: CCTV Module (recommended)
OS-000030	Option: Optical Viewing Window

//// Kyrus Enclosures

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// Hand Held Laser Welding Enclosure - 4m x 3m

Order Code	Description
KY-LENC-004	4m x 3m Enclosure, with 1.3m Hinge Door c/w power distribution, lighting, safety interlock & laser on signage
KY-LENC-3040S13	4m x 3m Enclosure, with 1.3m Sliding Door c/w safety interlock and laser on signage only
ASM-000140	Option: Roofing Module
ASM-000136	Option: CCTV Module (recommended)
OS-000030	Option: Optical Viewing Window



// Hand Held Laser Welding Enclosure - 4m x 4m

Order Code	Description
KY-LENC-005	4m x 4m Enclosure, with 2m Sliding Door c/w power distribution, lighting, safety interlock & laser on signage
KY-LENC-4040S20	4m x 4m Enclosure, with 2m Sliding Door c/w safety interlock and laser on signage only
ASM-000139	Option: Roofing Module
ASM-000136	Option: CCTV Module (recommended)
OS-000030	Option: Optical Viewing Window



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Demonstrations available at our facility
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