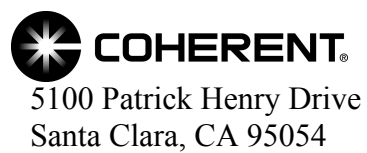


Pre-installation Manual
META Platform™
Advanced Laser Machining Center



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Technical Support

In the USA:

Should you experience any difficulties with your laser machine tool or need any technical information, please visit our web site www.Coherent.com. Additional support can be obtained by contacting our Technical Support Hotline at 800-367-7890 (408-764-4557 outside the U.S.) or e-mail at Product.Support@Coherent.com. Telephone coverage is available Monday through Friday (except U.S. holidays and company shutdowns).

If you call outside our office hours, your call will be taken by our answering system and will be returned when the office reopens.

If there are technical difficulties with your laser that cannot be resolved by support mechanisms outlined above, please E-mail or telephone Coherent Technical Support with a description of the problem and the corrective steps attempted. When communicating with our Technical Support Group, via the web or telephone, the model and Laser Head serial number of your laser system will be required by the Support Engineer responding to your request.

Outside the USA:

If you are located outside the USA, visit our web site for technical assistance or contact, by phone, our local Service Representative. Representative phone numbers and addresses can be found on the Coherent web site, www.Coherent.com.

Coherent provides telephone and web technical assistance as a service to its customers and assumes no liability thereby for any injury or damage that may occur contemporaneous with such services. These support services do not affect, under any circumstances, the terms of any warranty agreement between Coherent and the Buyer. Operation of any Coherent laser with any of its interlocks defeated is always at the operator's own risk.

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Signal Words and Symbols in this Manual and on the Laser System

This documentation may contain sections in which particular hazards are defined or special attention is drawn to particular conditions. These sections are indicated with signal words in accordance with ANSI Z-535.6 and safety symbols (pictorial hazard alerts) in accordance with ANSI Z-535.3 and ISO 7010.

Signal Words

Four signal words are used in this documentation: ***DANGER***, ***WARNING***, ***CAUTION*** and ***NOTICE***.

The signal words ***DANGER***, ***WARNING*** and ***CAUTION*** designate the degree or level of hazard when there is the risk of injury:

DANGER!

Indicates a hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING!

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION!

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

The signal word “*NOTICE*” is used when there is the risk of property damage:

NOTICE!

Indicates information considered important, but not hazard-related.

Messages relating to hazards that could result in both personal injury and property damage are considered safety messages and not property damage messages.

Symbols



This symbol is intended to alert the operator to the presence of important operating and maintenance instructions.



This symbol is intended to alert the operator to the danger of exposure to hazardous visible and invisible laser radiation.



This symbol is intended to alert the operator to the presence of dangerous voltages within the product enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



This symbol is intended to alert the operator to the danger of Electro-Static Discharge (ESD) susceptibility.



This symbol is intended to alert the operator to the danger of crushing injury.



This symbol is intended to alert the operator to the danger of a lifting hazard.



This symbol is intended to alert the operator to the danger of a fire hazard.

Preface

This manual contains pre-installation information for the META Platform Laser Machine Tool (LMT) system manufactured by Coherent. This document is provided to customers as a site and facilities preparation guide in advance of system delivery and installation.

Included with the shipment of the LMT system is the Operator's Manual. Refer to the Operator's Manual for a complete description of controls and operating instructions.

Coherent strongly recommends that the integrator or user read all safety information contained in this Pre-installation Manual and in the Operator's Manual before operating the system.



WARNING!

Read the Operator's Manual carefully before operating the LMT system for the first time. Special attention must be given to the material in "Section Two: Safety", that describes the safety features built into the LMT system.



CAUTION!

Use of controls or adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.



WARNING!

Use of the system in a manner other than that described herein may impair the protection provided by the system.

U.S. Export Control Laws Compliance

It is the policy of Coherent to comply strictly with U.S. export control laws.

Export and re-export of lasers and laser-based systems manufactured by Coherent are subject to U.S. Export Administration Regulations, which are administered by the Commerce Department. In addition, shipments of certain components are regulated by the State Department under the International Traffic in Arms Regulations.

The applicable restrictions vary depending on the specific product involved and its destination. In some cases, U.S. law requires that U.S. Government approval be obtained prior to resale, export or re-export of certain articles. When there is uncertainty about the obligations imposed by U.S. law, clarification must be obtained from Coherent or an appropriate U.S. Government agency.

SECTION ONE: SITE PREPARATION

Overview

The META Platform Laser Machining Tool (LMT) system must be installed or reinstalled by a Coherent authorized representative. To maintain the precision of the machine, advanced beam alignment and leveling must be done whenever the machine is moved or shipped.

This section contains information required to plan the installation site, unpack and inspect the system, perform the physical installation, perform alignments and verifications necessary to confirm proper system operation, and provides a list of topics to be covered during basic operator training.



Figure 1-1. META Platform LMT System



NOTICE!

Before installation, it is essential that the customer read this manual thoroughly. It is important that the customer become familiar with all aspects of the installation of the LMT system.

Pre-installation Checklist

All LMT systems are delivered with all of the hardware and software required for operation. However, there are space, environmental and specialized utility requirements that the customer must provide before installation.

Coherent provides a Pre-installation Checklist of the META Platform site requirements, which must be met prior to the installation by a Coherent service technician. The installation should be scheduled only after all listed requirements are satisfied. During the installation, the technician will precisely level the machine, confirm utilities, perform system tests and provide basic operator training.

Refer to the pages indicated in the Pre-installation Checklist for more detailed specifications for each site requirement.

The following topics follow the order of the Pre-installation Checklist.

Floor and Space Requirements

Machine Tool and Exclusion Zone

The LMT system requires a floor with a smooth, flat surface that is free from excessive vibration. Vibration-producing equipment should be dampened at the source. The machine includes leveling feet and precise leveling of the machine will be performed by the installation technician.

The LMT system requires a minimum clearance on all sides and additional space in the front and back for removing the cutting pallet (removing the pallet from the rear of the machine is optional, but allows for easier access). Additional space and clearance will be required if the optional Pallet Automation Table is used. Refer to Figure 1-2 and Figure 1-3 for operational and service clearance dimensions.



NOTICE!

Providing the recommended service access will provide ease and speed of service and repair of the LMT system.

The exhaust ducting connects to the LMT system at the left rear corner, near the bottom of the machine. Water connects to the LMT system at the center rear, near the bottom of the machine. All other utilities (AC power, air, data cable) connect at the I/O Panel, on the left side, lower rear corner.

Figure 1-2 shows the minimum space required for the LMT to allow front removal of the cutting pallet. Add another 1042 mm (41 in.) to the length if the pallet will also be loaded from the rear (See Figure 1-3).

Chiller

The chiller recommended by Coherent requires a minimum of 610 mm (24 in.) clearance on all sides and additional space to allow operation and refilling. Service and operational clearance required by other models of chiller may vary. The chiller must not be placed within the exclusion zone of the LMT system or that of any other system component or accessory.

Transformer

The transformer (if one is needed to meet the electrical requirements) must remain outside of the system's exclusion zone. Service and operational clearance required by the transformer will vary by model. Refer to the manufacturer's information for details. The transformer must not be placed within the exclusion zone of the LMT system or that of any other system component or accessory.

Exhaust Blower and/or Fume Extractor

The exhaust blower recommended by Coherent requires minimum clearance of 610 mm (24 in.) on all sides. Service and operational clearance required by other models of exhaust blower and/or fume extractor may vary. The exhaust blower must not be placed within the exclusion zone of the LMT system or that of any other system component or accessory.

Top View(s)

See Figure 1-2 and Figure 1-3.

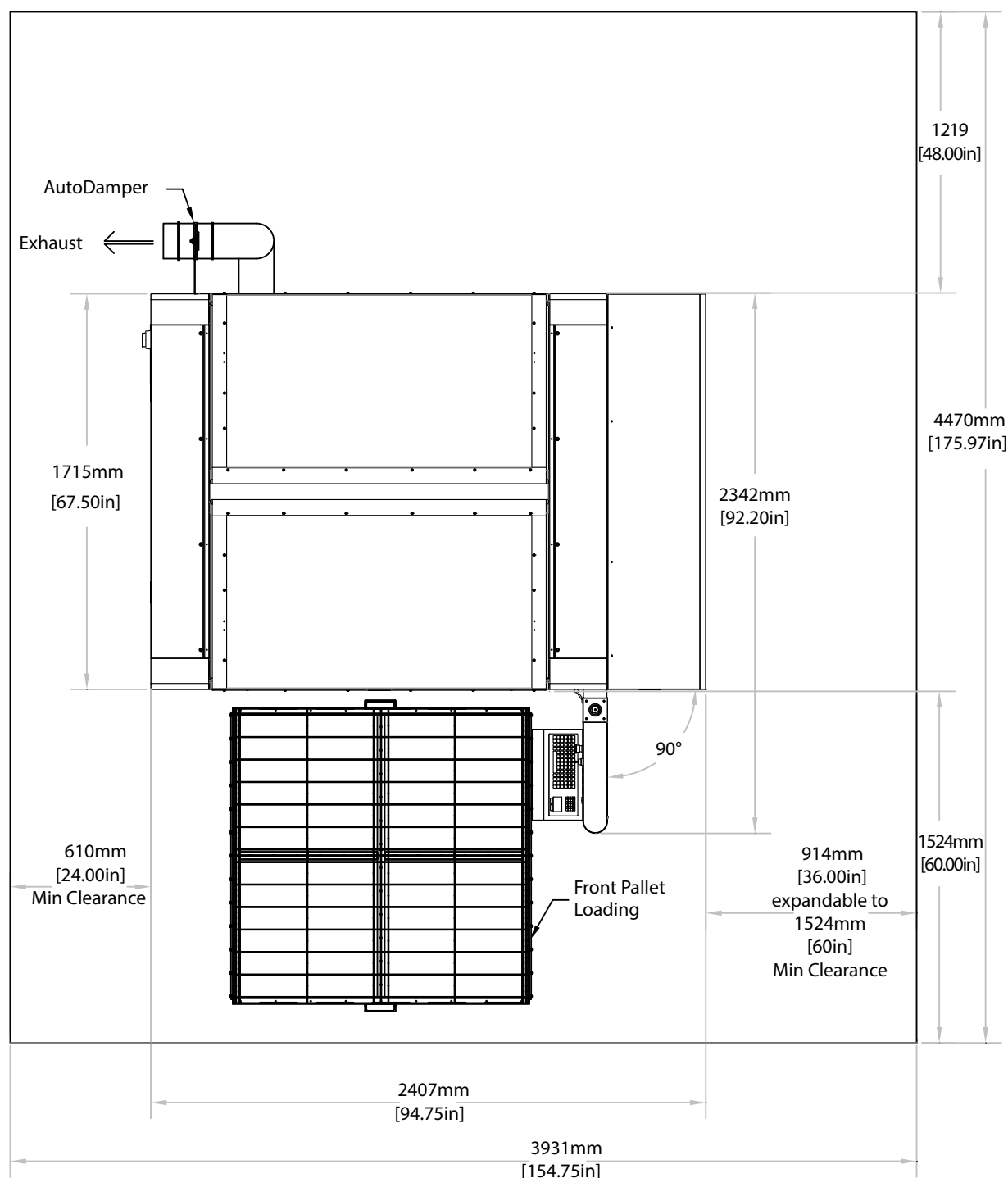


Figure 1-2. META Platform Top View with System Dimensions

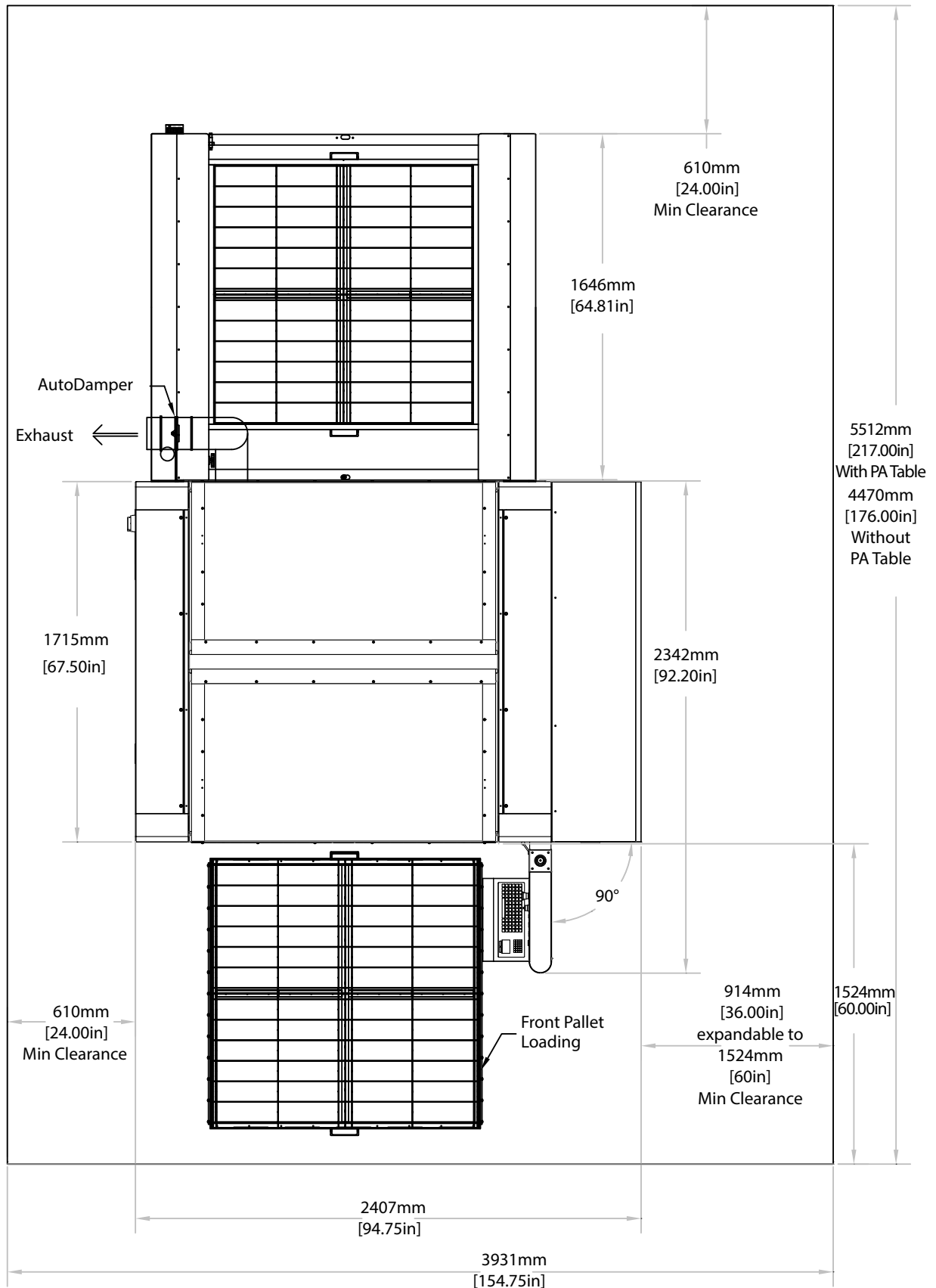


Figure 1-3. META Platform and PA Table Top View with System Dimensions

Front and Side View

See Figure 1-4.

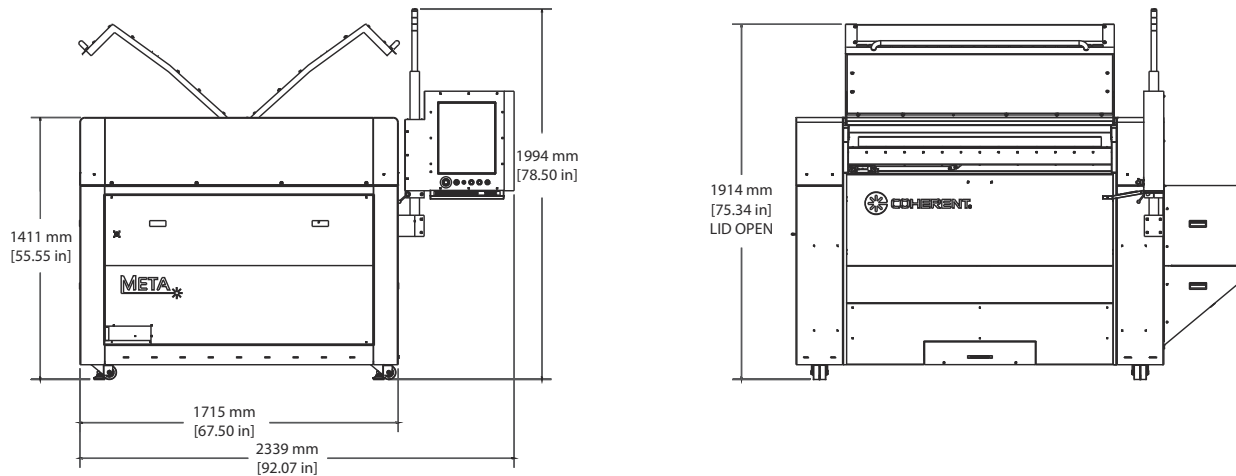


Figure 1-4. META Platform Front and Side View with System Dimensions

Control Interfaces

The I/O Panel (located on the left side of the machine at the lower, rear corner. See Figure 1-5) includes the following connections:

- Network Communications (Ethernet) Input – This is a standard RJ-45 Ethernet connector to an external PC or network.
- Remote Exhaust Relay (optional) – The LMT can control external devices such as the blower (See “Exhaust Blower and/or Fume Extractor” on page 3). This connection allows the LMT to switch an external exhaust fan that has an appropriate motor starter or relay to start the motor. The switch (pilot duty relay - dry contacts) inside the machine does not supply power and cannot pass sufficient current to run a motor directly.
- AC Input
- CDA (Control Air) Input
- N2 Gas Input
- Assist Gas Option (Process Gas 2) Input

The coolant water inputs and control air input are located in the bottom rear-center of the LMT system:

- Inlet from Chiller- $\frac{3}{4}$ ” (19.05 mm) tubing
- Outlet to Chiller - $\frac{3}{4}$ ” (19.05 mm) tubing



Figure 1-5. I/O Panel

- Compressed Air Input (Open & Closed) - tubing supplied



Figure 1-6. Coolant Water and Control Air Inputs

Fittings Table (Accessory Kit)

Table 1-1. Fitting Table

CONNECTOR	FITTING TYPE	QUANTITY
Nitrogen	3/8 FNPT	1
Assist gas option	3/8 FNPT	1
CDA	1/4 FNPT Push-lock compression fitting	1
Chiller, in Chiller, out	3/4 FNPT	2
Exhaust	125mm (6 in.) duct	as needed
Ethernet	RJ45	1

Facilities Schematic

See Figure 1-7.

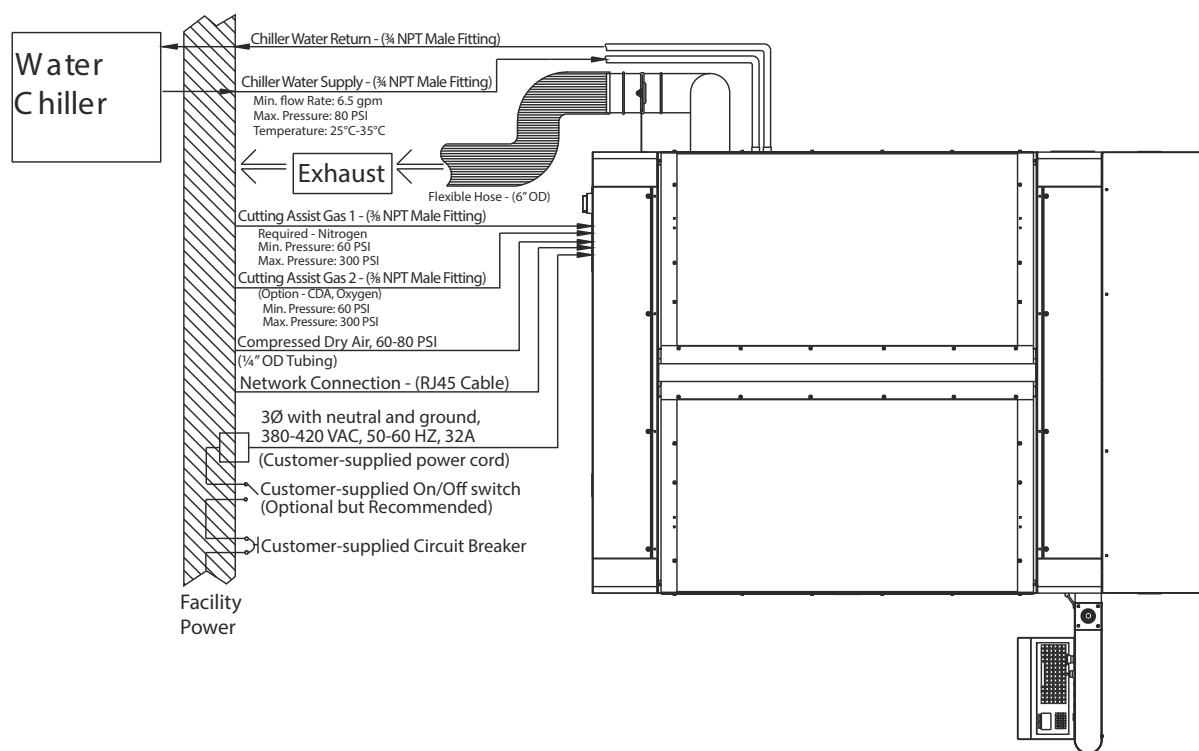


Figure 1-7. META Platform Facilities Schematic

Electrical Utilities

AC Power is connected to the LMT on the left side of the machine, near the lower, rear corner. The LMT includes a standard electrical connection box and terminals for electrical connections, but does not include external field wiring (branch circuit).

Electrical service must be provided by a qualified electrician and must meet National Electric Code (NEC) standards or local regulations, whichever take precedence.



NOTICE!

COHERENT MAKES NO RECOMMENDATION FOR PLUGS OR SOCKETS FOR ANY CONNECTION, AND ACCEPTS NO RESPONSIBILITY OR LIABILITY WHATSOEVER FOR THE ELECTRICAL CONNECTION BETWEEN THE LMT SYSTEM COMPONENTS AND PRIMARY ELECTRICAL POWER SUPPLY. IT IS SOLELY THE CUSTOMER'S RESPONSIBILITY TO EFFECT SAFE AND CODE-COMPLIANT ELECTRICAL CONNECTIONS.

The LMT requires a dedicated mains branch circuit (not shared with other loads). The LMT requires a 3-phase, 380–420 VAC, 32 Amps, 47-63 Hz electrical supply. Use 10 mm² (6 AWG), 4 conductor copper wire for the LMT main supply. Torque terminals for L1, L2, L3 to 2.0 Nm (17.5 in.-lb.) and N to 2.5 Nm (25 in.-lb.). Torque PE to 3.4 Nm (30 in.-lb.). No power cord or mating connectors are provided with the system.

Table 1-2. Electrical Requirements

	AC VOLTAGE	PHASE	FREQUENCY	CURRENT
META PLATFORM	380-420V	3/N/PE	47-63 Hz	32A

To power a laser power meter, external laptop computer, power tools and other test equipment, it is recommended to provide additional standard power receptacles near the LMT system.

Other systems (e.g. exhaust system, blower, liquid-cooling, gas supply, ventilation) will also require electrical power for operation. Refer to the manufacturer's literature for specifications and site planning recommendations.

Exhaust Blower and/or Fume Extractor

The LMT system requires an external ventilation fan (referred to as a blower) or an air cleaning system (referred to as an air scrubber). This blower can be connected to the LMT via hard or flexible ducting. For typical installations, we recommend that the blower be roof mounted. This will result in a system that has negative pressure in the ducting that is run inside the building.

The external ducting connects to a 6" diameter duct at the rear of the machine. We recommend that the ducting size be increased to 8 to 10 inches in cases where the ducting is to be run more than 10 feet from the machine.

The blower must supply adequate air flow for the internal exhaust system to work properly.

The blower must provide a minimum of 17 m³/min (600 cfm) at the inlet to the machine. A long length of ducting may impede the airflow and reduce the static pressure, requiring a bigger fan.

For typical installations involving a blower, we recommend McMaster-Carr Catalog #1953K27 or equivalent.

Supplied exhaust components (See Table 1-3) are to be connected by the customer prior to LMT installation. For detailed installation instructions, refer to the exhaust component installation documentation that is included with the META platform.

Each installation may require specific condition be met such as local regulations or heating, air conditioning and ventilation. Be sure to consult with an experienced HVAC contractor in your area for specific advice for your location.

Table 1-3. Supplied LMT Exhaust Components

QUANTITY	TITLE
2	90° Elbow
4	Clamps
1	Exhaust damper gate
1	Hose extension
1	Bracket

Liquid Cooling System

The LMT system requires an external, closed loop water cooling system. This can be satisfied by a commercially available chiller, or an existing cooling system. Coherent supplies chillers from third parties or can recommend models to match your laser power.

Table 1-4 below lists the cooling requirements and recommended models for each LMT system.

Table 1-4. Chiller Requirements

	CHILLER COOLING CAPACITY (MIN)
META PLATFORM	15 kW

The temperature of the cooling water should never be set below 77°F (25°C) or the room temperature (whichever is higher). The maximum rated operating temperature for the laser system is 95°F (35°C).

Install the filter, then connect:

- Outlet of chiller to input of LMT
- Inlet of chiller to output of LMT

Coolant Composition

The recommended coolant composition is a mixture of water and OPTISHIELD®, a low-toxicity corrosion inhibitor available from Opti Temp, Inc. and which can be shipped worldwide. Contact information is provided in Table 1-5. Visit the Opti Temp, Inc. website (www.optitemp.com) for complete product information on OPTISHIELD®.

The required mixture is a 10% solution of OPTISHIELD® and distilled water (example: 1 liter of OPTISHIELD® to 9 liters of distilled water). Contact Opti Temp, Inc. (see Table 1-5) for detailed water recommendations.

OPTISHIELD is the recommended corrosion inhibitor, however it may not be readily available outside the US, or may be regulated by local environmental legislation. Coherent suggests using TRAC100 by Nalco as an alternative. Please visit www.nalco.com for more information.



NOTICE!

The chiller temperature should never be set below the ambient dew point. Operating in this condition can cause condensation that will permanently damage the laser tube. Damage caused by condensation is not covered under warranty.

Table 1-5. Recommended Coolant for LMT Systems

PRODUCT NAME	MANUFACTURER'S NAME AND CONTACT INFORMATION	HEAT TRANSFER FLUID TYPE	REQUIRED HEAT TRANSFERRED FLUID CONTENT	FREEZING BURST PROTECTION
OPTISHIELD®	Opti Temp, Inc. www.optitemp.com US/Canada 1-213-946-2931	Corrosion Inhibited Water	10% Solution in Water	Does not reduce water freezing point.
TRAC100	Nalco www.nalco.com US (630) 305-1000	Corrosion Inhibited Water	2500 ppm in Water (2.5ml per 1l of water)	Does not reduce water freezing point!

Freeze/Burst Protection

The recommended coolant mixture does not provide freeze protection; therefore the coolant temperature must be maintained above the freezing point of water. Since lower temperatures may occur during shipment and storage, the META Platform should never be stored or transported unless the coolant has been completely removed by using a compressed air supply to blow out all coolant passages.

CDA System

The cutting head purge, pneumatic table locks and front and rear doors (Control Air) require CDA set to between 4.41-5.52 bar (60-80 PSI). Failure to maintain pressure can cause damage to the cutting head and beam path optics, the LMT doors to remain open and job parameter errors to occur. Purity of this gas should be 99.995% clean, dry, oil free. The CDA connection to the LMT is a ¼" flexible tube.

Tubing for the Control Air inputs on the lower rear of the LMT system is provided.

Nitrogen Assist Gas System

The LMT requires nitrogen to protect the cutting lens and assist in the cutting process. The assist gas connection to the LMT is a 3/8" flexible tube. The pressure set point of the assist gas must be 5.52 bar (80 PSI) and must not be allowed to drop below 4.14 bar (60 PSI) or exceed 20.68 bar (300 PSI). Purity of this gas should be 99.995% clean, dry, oil free.

Nitrogen is also used to purge the laser of the LMT system. No other gas should be used in place of Nitrogen.



DANGER!

No other gas should be used in place of Nitrogen to purge the laser of the LMT system. Using other gases may result in a fire.

Assist Gas Option System

There is another assist gas input for the customer to use other assist gasses besides nitrogen, such as CDA or oxygen. The assist gas connection to the LMT is a 3/8" flexible tube. The pressure must be regulated between 0.00 MPa (0 PSI) and 2.07 MPa (300 PSI) for CDA and between 0.00 MPa (0 PSI) and 1.0 MPa (140 PSI) for oxygen.



NOTICE!

The system does not have lockout capability for the Process Cooling Water, Compressed Dry Air and Assist Gas. The facility needs to provide the necessary lockouts for these energy sources. The lockouts need to be readily accessible, within line of sight of the operator and lockable.

Oxygen can be used for metals to assist cutting, but should not be used for non-metal materials in most cases.



WARNING!

The use of nitrogen, argon and other gases could potentially create an asphyxiating environment. This situation should not arise in normal circumstances, as long as the exhaust system is not blocked and proper airflow is maintained within the LMT system.

The flow rate for assist gas will depend on the application and machine setup.



NOTICE!

All gasses supplied to the LMT must be dry and oil-free. Moisture in the system can damage the LMT system's optics. If oil is introduced into the system, there is a risk of explosion if the laser is later used with oxygen.

Human Machine Interface (HMI) and Networking

All LMT systems include the Human Machine Interface (HMI), which consists of a computer, a touch-screen monitor, BeamHMI machine control software and a keyboard. All LMT systems are shipped with HMI software installed on the computer.

LaserLink™ is Coherent CAD/CAM software. LaserLink™ is used to import CAD files (DXF, DWG, HPGL, Gerber), raster files (BMP, JPG, PNG, GIF), edit geometry, assign machine settings from a user-editable database of settings and create process files to run jobs.

Training

Basic operator and applications training is provided at the time of installation. For more comprehensive applications and operation training, please contact Coherent. Classes are held at the Coherent facility once a month.

Receive, Unpack and Inspect

The LMT packaging has been designed for robust shipment.

Upon receiving the system, inspect the outside of all containers immediately to ensure no damage occurred in transit. If there appears to be visible damage (holes in the containers, fluid damage, crushing etc.), immediately notify Coherent and a representative of the carrier. Request that a representative of the freight company be present when unpacking the contents.

The containers might appear in good condition, but the contents may be damaged. Make sure to inspect major components as they are unpacked. Unpacking instructions are found in the Installation Procedure found later in this section.

To unpack the LMT system, at least two people and the following tools will be required:

- Scissors or a package cutting knife
- Claw hammer or crow bar
- Forklift able to lift at least 1043 kg (2300 lbs.).



NOTICE!

While in transit, shipping containers and contents may be exposed to cold temperatures. To prevent condensation from developing on and within the LMT system, move the crate(s) to a location near the installation area and allow to acclimate before opening and unpacking.

***Moving/Placing
the META
Platform***

Make sure to provide a clear path from the receiving area to the installation site. Use the fork tubes provided to avoid damaging the LMT during transportation to the installation site.

Seismic Bracing

Coherent can supply seismic bracing upon request.

***Schedule the
Installation***

Contact Coherent to schedule your META Platform installation.

Pre-installation Checklist

GENERAL REQUIREMENTS	CUSTOMER RESPONSIBILITY: CHECK IF COMPLETE
<p>Space: Review this manual for footprint dimensions and service clearance and exclusion zones around the machine and related accessories. Adequate space around system and accessories that conforms to drawing of service clearance and exclusion zones around the machine.</p> <p>See “Floor and Space Requirements” on page 2 of Pre-installation Manual.</p>	<p><input type="checkbox"/> Floor must be free from vibrations</p> <p><input type="checkbox"/> Floor must be flat up to slope of ± 12.7 mm (0.5 in.) over the installation area, including PA table area if purchased</p> <p><input type="checkbox"/> Left side clearance = 914 mm (36.00 in.)</p> <p><input type="checkbox"/> Right side clearance = 914 mm (36.00 in.), expandable to 1524 mm (60 in.) for laser service</p> <p><input type="checkbox"/> Rear clearance = 610 mm (36.00 in.)</p> <p><input type="checkbox"/> Front clearance = 1524 mm (60.00 in.)</p>
<p>Electrical: Review this manual for electrical requirements for the laser machine tool and related accessories. The electrical wiring should be connected to the machine by a licensed electrician prior to the arrival of the installation technician.</p> <p>(Optional) external circuit breakers must be rated to >32A.</p> <p>See “Electrical Utilities” on page 9 of Pre-installation Manual.</p>	<p><input type="checkbox"/> Laser machine tool electrical requirement: 380-420VAC 3PH +N +PE, 32A</p> <p><input type="checkbox"/> Main disconnect switch electrical torque specs: L1, L2, L3, N = 25in.-lb PE = 30in.-lb</p>
<p>Exhaust: Review this manual for specification of exhaust fan system requirement. The exhaust system should be installed and functional before arrival of installation technician.</p> <p>See “Exhaust Blower and/or Fume Extractor” on page 10 of Pre-installation Manual.</p>	<p><input type="checkbox"/> Volume/Flow: 17 m³/min (600 cfm)</p>

GENERAL REQUIREMENTS	CUSTOMER RESPONSIBILITY: CHECK IF COMPLETE
<p>Cooling: An external, re-circulating water cooling system is required for the LMT system. Review this manual for LMT system cooling requirements. The external cooling system should be connected to electrical, turned on and tested into a closed loop or bypass. Then it can be connected to the LMT system prior to the arrival of the installation technician.</p> <p>There are ¾ FNPT fittings on the META Platform.</p> <p>See “Liquid Cooling System” on page 10 of Pre-installation Manual.</p>	<p><input type="checkbox"/> 15 kW (51 kBTU/h) cooling capacity</p> <p><input type="checkbox"/> Distilled and 10% corrosion inhibitor coolant composition</p>
<p>Clean, Dry Air (CDA): CDA is used to purge the cutting head optics and control the pneumatic table locks and front and rear pallet doors. Review this manual for CDA requirements. These must be available and connected to the LMT system prior to arrival of the installation technician.</p> <p>There is a ¼ FNPT push-lock compression fitting on the META Platform.</p> <p>See “CDA System” on page 12 of Pre-installation Manual.</p>	<p><input type="checkbox"/> Standard compressed air</p> <p><input type="checkbox"/> 0.4 - 0.7 MPa (60 - 100 PSI) pressure at the input of the LMT system</p> <p><input type="checkbox"/> Purity of this gas should be 99.995% clean, dry, oil free.</p>
<p>Nitrogen: The LMT system requires a source of nitrogen for purging the laser. It is also used as an assist gas for some cutting applications. Review this manual for nitrogen specifications. Regulated nitrogen must be available prior to arrival of installation technician.</p> <p>There is a 3/8 FNPT fitting on the META Platform.</p> <p>See “Nitrogen Assist Gas System” on page 12 of Pre-installation Manual.</p>	<p><input type="checkbox"/> Pressure: 0.2 - 2.0 MPa (30 - 300 psi)</p> <p><input type="checkbox"/> Nitrogen purity of 99.95% clean, dry, oil free.</p>
<p>Alternative Assist Gas: The system allows for input of optional cutting assist gas other than nitrogen. This is usually CDA or oxygen. The requirements for this optional assist gas are described in this manual.</p> <p>There is a 3/8 FNPT fitting on the META Platform system.</p> <p>See “Assist Gas Option System” on page 13 of Pre-installation Manual.</p>	<p><input type="checkbox"/> Pressure; CDA: 0.0 - 2.0 MPa (0 - 300 psi)</p> <p><input type="checkbox"/> Pressure; Oxygen: 0.0 - 1.0 MPa (0 - 140 psi)</p> <p><input type="checkbox"/> Purity of this gas should be 99.995% clean, dry, oil free.</p>

Customer Signature

Customer Name

Date

