Packing the MagAO-X Table at LCO for Shipment

This procedure describes how to pack MagAO-X optical table for shipment.

Estimate Time to Complete: 2 hrs

This document can be dowloaded as pdf:

:download:`MagAO-X Table Packing at LCO <instrument_packing.pdf>`

Initial Conditions

• [] The optical table is in the clean room, on the handling cart, fully disconnected from the control electronics.

Preparations

- [] Secure all optics for transport.
- [] Check that all components on table are securely fastened.
- [] Install dessicant.
- [] Shrink-wrap the instrument.
- [] Install the reflective blanket for solar shielding.

Prepare the Box.

• [] Move the empty box and shipping frame into the unpacking room with the forklift, placing it on 4 furniture dollies.



 $The\ instrument\ box\ is\ brought\ to\ the\ unpacking\ area\ with\ the\ forklift.$



 $\label{lem:condition} \textit{The instrument box being set down on dollies with the fork lift. Note the placement and orientation of the dollies.}$

• [] Move the box towards the inside garage door, and stage 4 more dollies to accept the lid.



Box in position to have the lid removed.

- [] Remove the front panel from the box, place out of the way (e.g. outside).
- [] Remove all bolts holding the lid to the pallet
- [] Place the straight extension on the lifting fixture, and place it in the box-lid position.
- [] Attach the lifting fixture to the lid.
- [] Lift the lid with the crane, and set it down on the dollies.



Box lid off, on dollies.

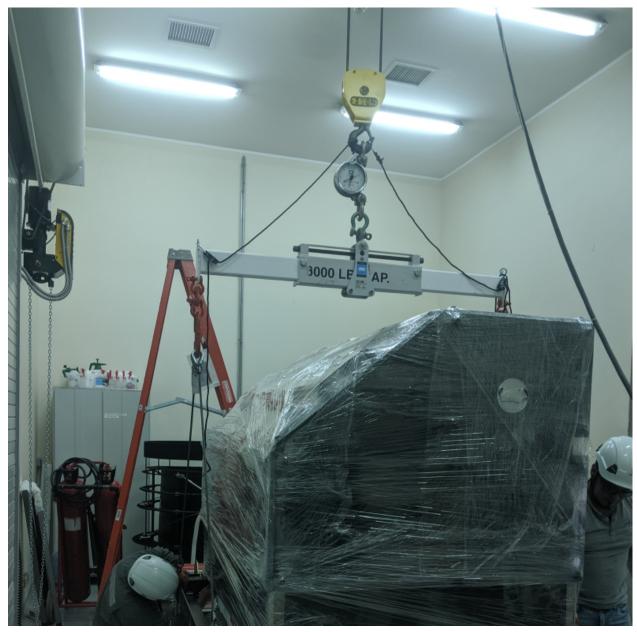
- [] Move the pallet into the clean room to make room to maneuver the lid.
- [] Then move the lid out of the way, e.g. outside on the lift.

Installing The Instrument On The Frame

- [] Move the pallet and frame towards the front of the unpacking room.
- [] Bring the instrument and cart out of the clean room.

NOTE: position the cart so that the taller heavier side of the instrument will set down on the side of the frame with the most wire-rope isolators. m

- [] Install the scale between the load spreader and the crane, and place the lifting fixture in the instrument+cart position.
- [] Install the triangle stabilizing rope ratchets, leaving them loose.



Preparation of the lifting fixture.

• [] With the crane, carefully position the load spreader over the table.

NOTE: be sure to guide both ends of the load spreader so it does not contact the instrumetn

• [] Attach the load spreader to the cart. Two shackles are used to extend the length. The hooks should be placed opening up.



 $two\ shackles\ for\ correct\ length.$



Hooks must open up on the cart to

get the correct length.

• [] Lift the instrument+cart, which weigh 1920 lbs, until all 4 wheels are off the ground. If it is out of balance, it will be necessary to manually correct.



Lifting the instrument on its cart.

- $\bullet~$ [] Adjust the load spread to find the best balance.
- $[\]$ Tighten the triangle stabilizing rope ratchets.

- [] With a person on each end stabilizing using the cart handles, lift the instrument to sufficient height to clear the shipping frame.
- [] Carefully roll the pallet and frame under the instrument
- [] Lower the instrument slowly to just touch the frame, but do not unload the crane.



The instrument on the frame.

• [] While the instrumetn is still supported by the crane, start bolts at each corner to guid the instrument down.

- [] Lower the instrument until half the weight is off the crane.
- $\bullet\,$ [] Start all bolts, including installation of the Emerson Clamp base plates.
- \bullet [] Fully lower the instrument, such that the crane is still supporting the cart weight of 320 lbs
- [] Tighten all bolts holding the instrument to the shipping frame.



 $Tightening\ the\ bolts.$

- [] Remove the 8 bolts holding the cart to the table.
- [] Lower the cart so that it rests on the pallet.



The cart lowered onto the pallet.

- [] Disassemble the cart, moving the pieces to storage area.
- [] Install the Emerson Clamps.
- [] Arm all drop-n-tells, and install the data loggers.

Install the Lid and Door

- [] Move the pallet and instrument on the dollies back into the cleanroom to make space for the lid
- [] Bring the lid back into the unpacking area and position it to be lifted on. The open side goes towards the MagAO-X label on the instrument.
- [] Put the load spreader back in the position to balance the lid, and attach it with the crane to the lid.
- [] Lift the lid, and roll the instrument under the box.
- [] Set the lid down on the pallet



 ${\it MagAO-X}$ on the shipping frame inside the box.

- [] Install the bolts along the bottom of the lid, securing it to the pallet.
- [] Bring the front door panel back inside, and lift it into position.
- [] Bolt the lid on.
- [] Remove the lifting eyes from the box lid and stow them on the lower left insspection panel.