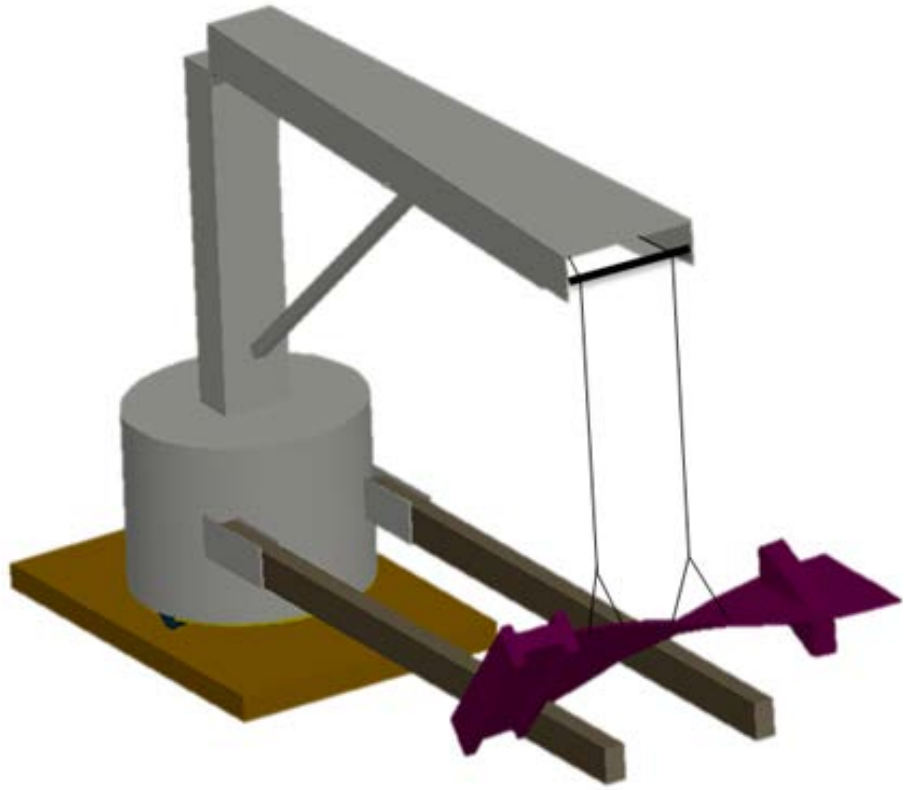


# 64K Blade Handling Device

## OPERATIONAL MANUAL

# TECT Power



This manual is designed to educate and instruct the reader on the transportation, loading, and orientation device designed for the 64K blades in the initial root machining area. The system as a whole, its parts, its use, and its functionality as well as replacement parts and maintenance needs will be addressed and be available in this report for both initial and extended use of this system.

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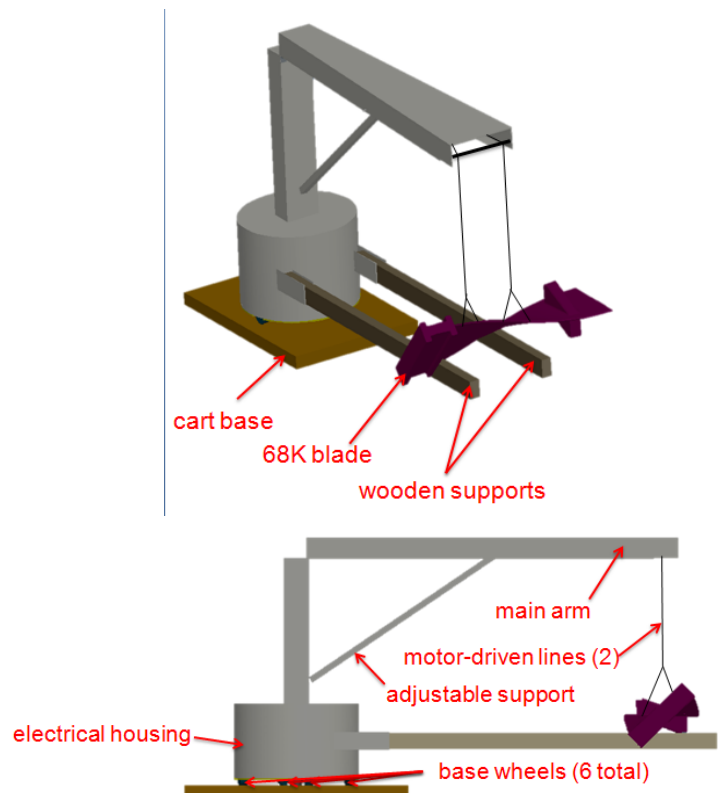


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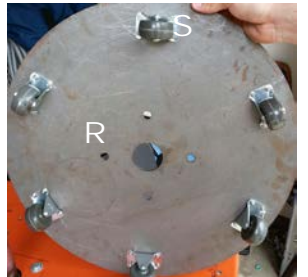
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## SYSTEM SPECIFICATIONS

<b>Overall System</b>	
Weight	400 lb
Height	6-12 ft
Depth	4 ft
Width	3.5 ft
<b>Cart</b>	
Weight	250 lb
Minimum height	3.5 ft
Maximum height	6 ft
Load Capacity	2,000 lbs
<b>Electrical Components</b>	
Operating voltage	24 V (12 V x2)
Charge capacity	44 Ah (22 Ah x2)
Charging rate	2.5 A
<b>Operating Information</b>	
Maximum line speed	10.5 in·min <sup>-1</sup>
Minimum line speed	3 in·min <sup>-1</sup>
Maximum load per line	1,500 lbs



# SYSTEM COMPONENTS



## Part

- A – Cart handle
- B – Cart tabletop
- C – Cylindrical electrical housing
- D – Rectangular tube shaft
- E – Wooden support arm brace
- F – Hinge
- G – Hydraulic pump

- H – Pulley housing (main arm)
- I – End pulleys
- J – Pulley housing door
- K – Batteries
- L – Battery chargers
- M – Winches
- N – Winch controllers

- O – Internal pulleys
- P – Bearing
- Q – Pivot shaft
- R – Turntable plate
- S – Base wheels

## INSTRUCTIONS FOR NORMAL OPERATION

The system operates using two remote-controlled winches to draw the lines inward and outwards as well as manually adjustable components: a pulley track arm, a turntable, a hydraulic lift, and the translational cart. The system is designed to be native and simple to use. Though these instructions provide a detailed view into how the system operates and how to accurately use the system, it was designed to be able to be operated after a simple examination as the components are simple and familiar. A flowchart can be found following this report detailing the steps taken in operating the system and may be used for reference during regular operation.

### OPERATING THE CART

The cart is a simple push cart with a four-wheel base and a hydraulic lifting mechanism built into it. The cart can be turned from the handle by applying differential force upon the handle bar, much like a shopping cart. The cart should be pushed by its removable handle at all times for efficiency and ergonomics. To remove the handle, first turn the knobbed screws on the sheaths which the handlebar connects to counterclockwise to loosen them. Then forcibly pull the bar outwards while simultaneously jiggling the bar to loosen it as it is removed from the system. To replace the bar, place the ends back into the sheaths and tighten the knobbed screws again until the screw is set on the bar.

The lifting mechanism is operated by a foot-pump found underneath the handlebar. A single pump will lift the tabletop, and thus the crane system atop it, about one inch. Continuous pumping can raise the tabletop to its maximum height of 6 ft. Once the maximum height is reached, the table will no longer rise. To lower the table, lift the foot-pump pedal upwards. The tabletop will slowly lower as the pedal is held upwards until it reaches its lowest height of 3.5ft.

### ADJUSTING THE CRANE

The crane system is mounted atop the cart with a bearing system that turns the cylindrical housing for the electrical components into a turntable. The entire crane can be pivoted by either pushing the end of the crane or grasping the central area with two hands and turning it. The tabletop can rotate in either direction without end or need to be retracted.

The aluminum pulley housing can be adjusted by first lifting it up (with no blade attached) to release the support from its current notched slot located inside of the housing and then moving the support into the new, desired slot. Once the support is placed inside the new, desired slot, the housing can be released and allowed to fall onto the support which then locks the support into place.

### ATTACHING AND DETACHING THE BLADE

The blade is fitted to the device by the two winch cables that attach to a harness fitted around the blade. To fix the harness to the blade, place it around the blade with the small, rectangular openings around the midspans and the single strap towards the root. Because the blade is not symmetric between its two sides, the harness may need to be flipped to fit each side of the harness to its respective side of the blade. The harness can then be buckled with the clips going across the blade and then fastened tightly by pulling on the excess strap length until resistance is made. The harness can be removed by first lifting the buckles to release some of the tension in the straps and then unbuckling each clip.

To attach the harness to the lines, clip the carabineers to the desired loops along the harness. The loops will be indicated on the harness for each machine need. Once all the carabineers are secure, pull on the lines to verify that they will not detach. To remove the lines, press in on the carabineer's lever and slide the hook off of the loop on the harness. The blade may be placed upon the removable wooden support arms to adjust the attachments on the blade or the harness while on the machining floor. These supports can be placed in the support slots and locked in place by their pins.

## OPERATING THE WINCHES

The winches are operated with two separate, labeled controllers. The controllers have a forward, reverse, and stop buttons which yield line, retract line, and stop the line motion respectively. To raise the blade, operate both controllers simultaneously and press the reverse buttons until the blade is at the desired height. To lower the blade, similarly to raising the blade, operate both controllers simultaneously and press the forward buttons until the blade is at the desired height. To apply an angle to the blade while it is hanging – this is useful for loading the blade into the vices on the mills – use a controller individually to either raise or lower the desired end of the blade.

## MAINTENANCE INFORMATION

The entire system is durable and low-maintenance. Only minor daily and bi-yearly maintenance is required to keep the system operating smoothly.

<b>Task</b>	<b>Frequency</b>	<b>Duration</b>
Charging the batteries	Daily – off-shifts	~6hr from 0 charge
Oil the bearing	Every 6 months	~2 min
Cleaning entire system	Every 6 months	~30 min

## REPLACEMENT OF PARTS

<b>Part Name</b>	<b>Retailer</b>	<b>Model #</b>
Hinge	McMaster-Carr	2505T12
Angle bracket	McMaster-Carr	9017K474
0.5" screw	McMaster-Carr	91772A128
0.5" nut	McMaster-Carr	91831A006
0.75" screw	McMaster-Carr	91500A831
0.75" nut	McMaster-Carr	90715A115
0.375" screw	McMaster-Carr	95373A161
0.375" nut	McMaster-Carr	90490A031
0.375" washer	McMaster-Carr	98970A131
0.5625" screw	McMaster-Carr	92240A761
0.5625" nut	McMaster-Carr	91845A315
Winch	Amazon	400920
Battery	At-Batt	AP/12220EV
Chargers	Amazon	1205SRJ

# FLOWCHART

Below is a simplified flow diagram of the system. It encompasses the basic operations of the cart and crane system. It assumes that the user is aware of regular facility operation and safety procedure as well as the layout of the machining area and the surrounding areas and the process at which the blade moves. By following the logic of the flowchart, it is possible to operate the system. This diagram should be examined before operation of the device and can be referenced during operation.

