



ICON™ PORTABLE CONTROLLER

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About This Manual

This manual has been prepared to assist you in the operation and maintenance of your Eddyfi Technologies Inuktun equipment. Correct and prudent operation rests with the operator who must thoroughly understand the operation, maintenance, service and job requirements. The specifications and information in this manual are current at the time of printing.

This product is continually being updated and improved. Therefore, this manual is meant to explain and define the functionality of the product. Furthermore, schematics or pictorials and detailed functionality may differ slightly from what is described in this manual.

Eddyfi Technologies reserves the right to change and/or amend these specifications at any time without notice. Customers will be notified of any changes to their equipment.

Information in this manual does not necessarily replace specific regulations, codes, standards, or requirements of others such as government regulations.

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Description and Specifications

The ICON™ Portable Controller is an all-in-one power supply, controller, and video recording solution for EddyFi Technologies Inuktun robotic systems. The controller is built into a pelican case for ruggedness and portability, making it ideal for fast, effective, and reliable inspection deployment. The controller hosts the versatile ICON™ software on an embedded PC for control and operation of many EddyFi Technologies Inuktun robotic systems. The embedded PC and ICON software also provide SD/HD video recording and post-processing for the inspection system. The controller uses universal AC mains power input and outputs 48 VDC and 70 VDC through the tether connector for powering a system. USB Ports on the controller permit connection of a gamepad controller, keyboard and external storage drives.

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Specifications

Voltage Input	100-240VAC 50/60Hz 550W (IEC-C14 Power Cord Inlet)		
Voltage Outputs	48 / 70 VDC		
Supported OS	Windows10 Pro		
Supported Cameras	Spectrum 120HD™, Spectrum 90™, Spectrum 45™, MaggHD™		
Supported Video Formats	HD: 1080i59 / 1080p29	SD: NTSC / PAL	
Supported Vehicles	VT100™ MKII(Family), MaggHD™, MaggUT™, VT50™, MC4000™, Others		
HD Supported Tethers	HD Systems: EHRK 050462 R00 30 – 100 m (100 – 330 ft)		
Environmental Rating	Dry Use, IP40*		
Controller Weight	18 kg (40 lb), No Monitor	24 kg (53 lb), With Monitor	
Operating Temperature	0 – 40 °C	32 – 122 °F	Application Dependent
Storage Temperature (Dry)	-20 – 40 °C	-4 – 122 °F	Ambient

Precautions


IMPORTANT: When configuring a 70V system, check to see if the tracks are compatible. Older versions of 4000 series Microtracs™ are not 70V compatible. The wide input voltage symbol **W** located on the side plate of the 4000 series Microtracs™ indicates 70V compatibility.


Certifications and Directives

The product is built in accordance with:

Low Voltage Directive 2006/95/EC and Directive 2014/35/EU

Electromagnetic Compatibility Directive 2004/108/EC and Directive 2014/30/EU



Safety

- All personnel operating or maintaining this equipment must read and understand the system manual prior to operation
- All personnel operating or maintaining this equipment must be competently trained
- Appropriate personal protective equipment (PPE) must be worn while operating and maintaining this equipment
- Use safe lifting practices according to work-site regulations and local safety standards when handling equipment
- Under no circumstances should this equipment be used in a potentially explosive atmosphere



WARNING: Hazardous Voltage 48 / 70 VDC. The Controller outputs 48 and 70 volts to the tether. Do not operate the controller with a damaged tether or serious or fatal injury could occur.



WARNING: Disconnecting or connecting the tether while the power is ON can cause damage. The SYSTEM power button feeds power to the tether output. Ensure that the power is OFF before connecting or disconnecting the tether.



- Always ensure that your equipment is in good working order
- Never drop the controller; damage will result
- Repair any damages prior to system operation

System Setup

Working Environment

The ICON™ Portable Controller is intended to be used in a dry, covered environment. Designed to be rugged in nature and protected from the elements the controller is not waterproof and should be treated as, dry use only.

Outdoor Usage

In certain circumstances using the ICON™ Portable Controller outdoors is unavoidable. The following is advised for outdoor usage:

- Always work in a dry, clean, covered area
- Do not use the controller in direct sunlight
- Avoid wet, damp or extremely humid environments for extended periods of time
- Always use a GFI (Ground Fault Interrupt) AC outlet when operating the controller

Note: Direct sunlight will increase the internal temperature of the controller. This will result in decreased performance of the embedded computer.

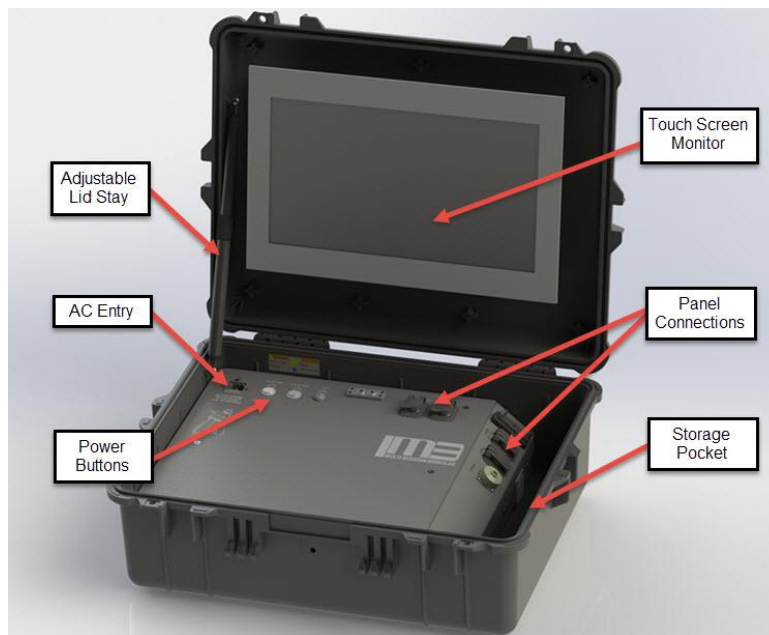
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Note: Humid environments can create condensate on the internal components, which could result in system failures. If the controller is used in these types of environments it is recommended that the controller be placed in a warm, dry location and properly dried before storage or next usage.

Thermal Considerations

The internal temperature of the ICON™ Portable Controller has to be properly managed to ensure reliable system performance. System performance will rapidly degrade if the internal temperature exceeds the maximum allowable limit. In order to achieve the best system performance in high ambient temperatures, the following is advised.

- Keep the storage pocket clear during system operation. This will allow adequate airflow for the internal fans which exhaust into the pocket area
- Turn off all system devices that are not in use, i.e. lights, lasers, etc. This will reduce the load on the power supplies and ultimately lower the internal temperatures
- Turn off the system when not in use. This will aid controller internal cooling cycles
- Do not use the controller in direct sunlight
- Work in cool/covered areas whenever possible
- Regularly check that the fans are operational

Controller Setup
Controller Layout


Controller Panel Layout



Controller Panel Connections

- AC ENTRY** The AC power cord connection is located at the top left of the controller.
- TETHER** This bayonet style connector with protective dust cap is located on the right side of the controller. Refer to the handling section for more detail on tether connection.
- AUX** The auxiliary connector on the right side of the controller is a DB25 connector with various signal output capabilities. In general, it is intended for factory testing usage.

Embedded Computer Connections

- ETHERNET** This port allows access to the embedded computers RJ45 port for LAN connection. This port is intended for LAN connection only.
- HDMI** The HDMI port allows for an additional monitor. External display options can be configured through the software settings. Refer to the software application settings for more details on monitor options and setup.
- USB2/3** The USB ports are intended for data transfer and other USB control devices, such as a mouse, gamepad, or keyboard.

Note: The external USB ports are not intended to be used for device charging during system operation. Use the USB ports only for applications specific to the ICON™ Portable Controller.



IMPORTANT: Always unplug the USB devices from their ports when not in use.

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Power Buttons

There are three power buttons located at the top of the controller.

SYSTEM This button is used to power on the “System”, i.e., a vehicle or camera. The system can be toggled ON/OFF independently of the controller and computer power. ON is indicated by an illuminated LED.

CONTROL This button is used to power on the “Controller”, i.e., monitor, fans, and computer power. In order to power on the computer, the CONTROL button will have to be toggled first. ON is indicated by an illuminated LED.

PC This momentary push button is used to power on the computer. ON is indicated by a blue LED. When the computer is ON the LED will flash representing hard drive activity.



IMPORTANT: Do not turn off the “CONTROL” button while PC is on. This may cause loss of data and/or hardware failure.

Storage Pocket

On the inside of the ICON™ Portable Controller to the right is the storage pocket. This area is used to store the keyboard, game pad, and power cord.

Note: When operating the controller remove all items from the storage pocket. This will ensure adequate airflow for the fans which exhaust into the pocketed area.



IMPORTANT: Always unplug the USB devices from their ports when transporting or packing up the controller.

Lid Stay Operation

The lid stay is used to change the viewing angle of the monitor as well as secure the lid from closing. To adjust the lid-stay, simply loosen off the adjustment collar, set to the desired position, and retighten the collar.

Note: The lid of the controller is heavy. Ensure that the lid stay is properly tightened and secure.

Monitor

17.3" Touch Screen Monitor Option

The ICON™ Portable Controller comes standard with a 17.3" touch screen monitor. Connection to the monitor is wired from the inside of the controller to the monitor through the monitor harness. The monitor harness consists of an HDMI cable, 12-volt barrel plug, and a USB cable for touch screen operation.

Monitor Harness

The monitor harness power is only intended for the provided monitor option. Do not use the barrel plug to power anything other than the provided monitor option. Only the HDMI and USB cable may be used for a client-based monitor option.

Client Based Monitor Option

If you wish to use your own monitor, power to the monitor must be provided by its own power source. The monitor may be mounted to the lids VESA plate if size permits.

System Operation

Controller Handling

The controller should be handled with care, properly cleaned, and stored in a dry warm location when not in use. If the controller is used outdoors it must be properly dried before it is stored. This can be done by running the internal fans for several minutes in a warm dry location.

Transportation

The storage pocket is provided for controller components and devices. Ensure that items are properly secured inside the pocket prior to transport. Do not store anything such as keyboard or mouse on the surface of the controller as this will cause damage to the monitor.

The Monitor has rubber pads on it, which contact the top plate of the controller when the lid is closed. These pads are to keep the monitor stable and secure during shipping and transport. Replace pads whenever necessary.

Tether Handling

The tether is one of the most important parts of the system. It feeds power and control signals to the system and returns data to the controller. If the tether is damaged from: improper use, poor handling or an accident, the system may become inoperable. This could lead to significant downtime, loss of production, and avoidable costly repairs. It is encouraged to stress the importance of the tether and its use to anyone operating or maintaining the system. For maximum tether life and reliability, Eddyfi recommends the following tether handling tips.

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- Do not step on the tether
- Do not drive over the tether
- Do not bend the tether beyond its minimum bend radius
- Do not kink the tether
- Do not snap load the tether
- Avoid loading the tether whenever possible
- Always use the cable grip strain relief if applicable to your system
- Regularly inspect the tether for damage
- Regularly clean the tether

Note: Protecting the conductors inside the tether is critical to the life and operation of the tether. Proper tether handling and care will result in extended tether life and system reliability.

Connector Handling

Connectors are an essential part of system reliability. They should be properly maintained and cared for to ensure long life and reliability. Eddyfi recommends the following steps to help prevent damage and increase the life of connectors.

- Always put the cap back on the tether bulkhead when the tether is unconnected
- Always inspect the end of the connector prior to engaging
- Never plug in a dirty or damaged connector
- Visually align key-ways or locating pins prior to engaging the connector
- Always fully engage or tighten the connector
- Secure locking collars finger tight
- Install dummy plugs on unused connectors
- Disconnect by pulling straight, not on an angle
- Do not pull on the cable to disengage the connector



IMPORTANT: Never “Hot Plug” any connector, this will result in internal damage to the electronics. Power down the system prior to connecting the inspection system tether.

Note: Never use WD-40 or similar solvent-based fluids on connectors or crawlers. The hydroscopic properties associated with this type of product can cause damage to the connector or crawler.

SubConn Connector: Lubrication and Cleaning

- Regularly apply grease before mating connectors
- Use Molykote 44 Medium grease or equivalent
- For dry mate connections, a layer of grease corresponding to 1/10 the socket depth should be applied to the female connector
- After greasing, fully mate the male and female connector and remove excess grease from the connector joint
- General cleaning and removal of sand or mud on a connector should be performed using a spray-based contact cleaner like isopropyl alcohol

Impulse Connector: Lubrication and Cleaning

- Lubricate mating surfaces regularly with 3M Silicone spray or equivalent, DO NOT GREASE
- Lubricate O-rings with Dow Corning #111 Valve Lubricant or equivalent
- Use dust caps to protect connectors wherever possible
- Clean connectors with soap and fresh water, rinse out with alcohol and allow connector to air dry

Getting Started

Setup Requirements

The following is advised for controller setup:

- Place the ICON™ Portable Controller on a solid working surface
- Tighten the Lid Stay to the desired viewing position
- Remove all components from the storage pocket



CAUTION: The lid of the controller is heavy. Ensure that the Lid Stay is always properly secured.



IMPORTANT: The storage pocket must be kept clear during operation. This is to ensure adequate airflow for the internal components.

Power ON / Power OFF

Prior to powering on the controller, ensure that all connections are properly connected.



IMPORTANT: Never “Hot Plug” connectors. Before connecting or disconnecting any system connections always power off the controller (SYSTEM).

To power on the ICON™ Portable Controller:

1. Ensure the AC power cord is connected and secure
2. Ensure the tether is connected and secure
3. Power on SYSTEM
4. Power on CONTROL
5. Power on PC

System vs Control Power

The system and control power buttons are independent of each other and have 2 distinct functions.

SYSTEM This is the power to the tether bulkhead and for the system, i.e., camera, crawler, etc. In some cases, the system needs to be power cycled during operation, setup, or trouble shooting. This can be achieved without the monitor and computer having to be shut down at the same time.

CONTROL This is the power to the embedded computer, fans, and monitor. The controller's computer can be utilized independently. This is useful in pre and post operation applications such as system setup, data transfer, and inspection review.

Note: If a system is unconnected or not in use, ensure that the SYSTEM power is OFF

ICON™ Control and Operation Software

Refer to the ICON™ Control and Operation manual for in-depth detail on setup and operation. The manual is available on the desktop or it can be accessed through the ICON Software by navigating to the "About" section.

Inspection Guidelines

The objective of an inspection is to obtain video recordings and other data for review by a client. If a recording is lost, fails to record, or is of poor quality, the inspection will likely have to be performed again. Therefore, it is in the best interest of the operator(s) to verify system operation before each inspection.

Pre / Post Operations Check

The following has been provided as a foundation for pre/post operation checks of your Eddyfi inspection system. It is the responsibility of the equipment owners to have a proper operational plan in place that meets all applicable standards and job requirements.

Pre operation inspection check list:

- Working area has been safely setup
- Lid stay properly secured
- Storage pocket has been cleared of any items
- Power cord connected and secure
- USB devices connected
- Tether connected prior to SYSTEM power up

- Power on CONTROL, LED green ON
- Power on PC, computer boots up, LED blue flashing
- Fans on and blowing
- Tether connected, power on SYSTEM, LED red ON
- Load ICON™ and test system functionality prior to inspection

Post Operations inspection check list:

- Controller functions and operations working correctly
- Controller peripherals disconnected from ports
- Items properly packed and secured in storage pocket
- Monitor area clear prior to closing lid
- Controller clean and in good working order prior to storage

Note: It is encouraged that you create your own pre and post operations checklist to ensure your equipment is always in good working order.

Maintenance

General

This is a non-serviceable controller and should not be opened or serviced in any way. Call your nearest Eddyfi service department for servicing and repair information.

Fuse Replacement

The ICON™ Portable Controller contains panel mount fuses for both AC and DC voltages. These fuses are for the safety of the operator(s) as well as to protect the equipment from damage. If a fuse blows, stop and look for possible causes. Causes might include cable damage, water incursion or improper connections.

Fuse values have been carefully selected for their application. Always replace the fuses with the same type and rating.



CAUTION: Disconnect the power source before servicing or replacing fuses.

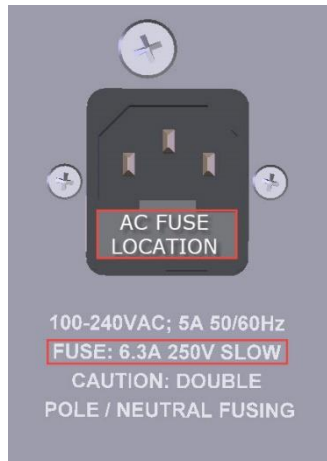
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AC Fuse Replacement

The AC fusing is double pole neutral fused and therefore requires 2 fuses to be installed or replaced. The AC fuses are located on the top of the controller. Always replace the fuses with the same type and rating.

Fuse type:

Fuse: 5mm x 20mm Time-delay glass tube
 Rating: 6.3A 250V Slow
 Recommended: Bussmann Series S506-6.3-R

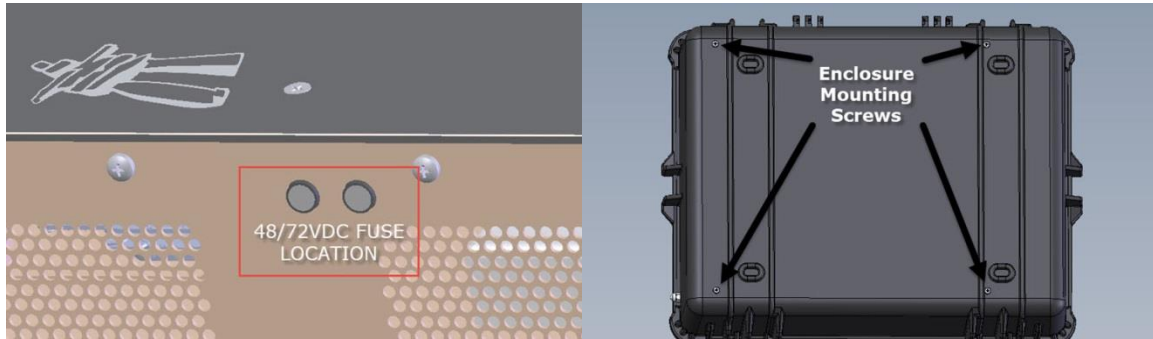


DC Fuse Replacement

The 48- and 72-volt fuses are located on the exterior of the metal enclosure. To access the fuses, remove the enclosure from the pelican case by loosening the 4 screws on the bottom of the case. Always replace the fuses with the same type and rating.

Fuse type:

Fuse: ¼" x 1 ¼" Fast-acting ceramic tube
 Rating: 7A 250V Fast
 Recommended: Bussmann Series ABC-7-R



Trouble Shooting

ICON™ Portable Controller

1. Controller not powering on
 - a. Check power cord is connected
 - b. Check fuses
2. Monitor not powering on
 - a. Check HDMI and barrel plug is connected
 - b. Check if switch is turn on (left, underside of the monitor)
3. Vehicle not powering on
 - a. Check connections
 - b. Check fuses

ICON™ Control and Operation Software

Refer to the ICON™ Control and Operation Software manual for software trouble shooting tips.

Note: It is strongly recommended that you familiarize yourself with the ICON manual. This will greatly reduce trouble shooting and controller setup down time.

Parts and Repairs

Ordering Parts / Customer Service

Spare and/or replacement parts are available for your product and can be ordered directly from your local office.

When ordering parts always make sure to quote the sales order acknowledgement (SOA) number and/or the serial number of the system component in question.

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Warranty Repairs

Warranty conditions are specified in the Warranty section. Should any conditions of the manufacturer's warranty be breached, the warranty may be considered void. All returned items must be sent prepaid to Eddyfi Technologies at the above address.

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Factory Returns to Canada

Some sub-assemblies of your Eddyfi Technologies product are not field-serviceable and may need to return to the factory for repair. Warranty claims must return to the factory for evaluation.

To return an item for evaluation or repair, first contact Eddyfi Technologies at our toll-free number or e-mail address. Eddyfi Technologies will supply a Return Merchandise Authorization (RMA) number with detailed shipping and customs instructions. Items shipped without an RMA number will be held at Eddyfi Technologies until the correct paperwork is completed. If cross-border shipments are not labelled as per the instructions, the items may be held by customs and issued additional fees.

All returned items must be sent prepaid unless other specific arrangements have been made.

When the product or system is being shipped anywhere by courier or shipping company, it must be packaged in the original packaging it was received in. This measure greatly reduces the consequences of rough handling and subsequent shipping damage.

Eddyfi Technologies cannot be held responsible for damages due to improper packaging. Shipping damage may have significant impact on repair turnaround times.

Product/System Drawing Package Availability

Mechanical assembly and electrical wiring diagram drawing packages for your equipment are available in PDF format upon request. Printed copies may also be purchased from Eddyfi Technologies. Contact your local sales contact for more information.

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Limited Warranty Policy

Eddyfi Technologies will repair or replace, at its expense and at its option, any system or component, subject to the limitations and / or exclusions specified herein, which in normal use has proven to be defective in workmanship or material provided that, within one (1) year of the purchase date, the original purchaser returns the product prepaid, accompanied by proof of purchase, from a sales agent authorized by Eddyfi Technologies, and provides Eddyfi Technologies with reasonable opportunity to verify the alleged defect by inspection.

Warranty Limitations and/or Exclusions:

1. This warranty does not apply to light bulbs.
2. Batteries, fuses, transistors, integrated circuit modules (IC's), voltage regulating devices and electrical plugs and / or connectors are warranted to be free from defects in material and workmanship for a period of ninety (90) days from the date of shipment to the original purchaser.
3. Any article purchased from, but not manufactured by, Eddyfi Technologies is sold with only such warranties as are made by the manufacturer therein. Eddyfi Technologies only warrants that it has title thereto, free of all liens or encumbrances.
4. This warranty does not apply to units which are damaged by connection to improperly wired AC receptacles.
5. Track belts, tethers, view ports and other components subject to wear through abrasion are warranted to be free from defects in material and workmanship for a period of ninety (90) days from the date of shipment to the original purchaser.
6. Any damage caused by failure to observe proper packing or to observe instructions for operation and maintenance as contained in the Instruction Manual furnished with the equipment, by accident in transit or elsewhere, will not be covered by the warranty.
7. Repairs are warranted for 90 days.

Eddyfi Technologies may require that certain components may be returned, prepaid, to a manufacturer's authorized station for inspection and repair or replacement.

Eddyfi Technologies will not be responsible for any asserted defect which has resulted from Acts of God, normal wear, misuse, abuse, improper configuration, repair, or alteration made, or specifically authorized by, anyone other than a representative of Eddyfi Technologies authorized to do so. The giving of, or failure to give, any advice or recommendation by Eddyfi Technologies shall not constitute any warranty by, or impose any liability on, Eddyfi Technologies.

The foregoing constitutes the sole and exclusive remedy of the purchaser and the exclusive liability of Eddyfi Technologies and is in lieu of any and all other warranties, express, implied or statutory as to merchantability, fitness for purpose sold, description, quality productiveness, or any other matter. Under no circumstances shall Eddyfi Technologies be liable for special, incidental or consequential damages, or for delay in performance of this warranty.

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