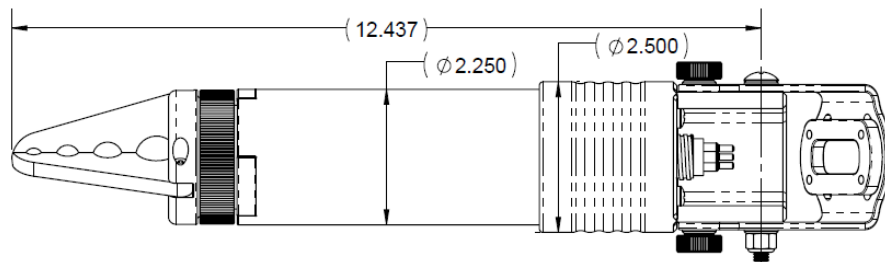
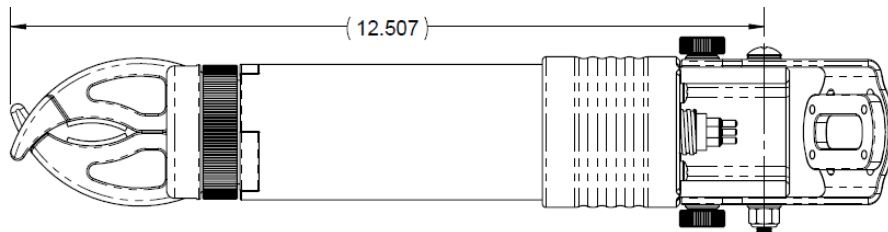


## Manipulator Manual



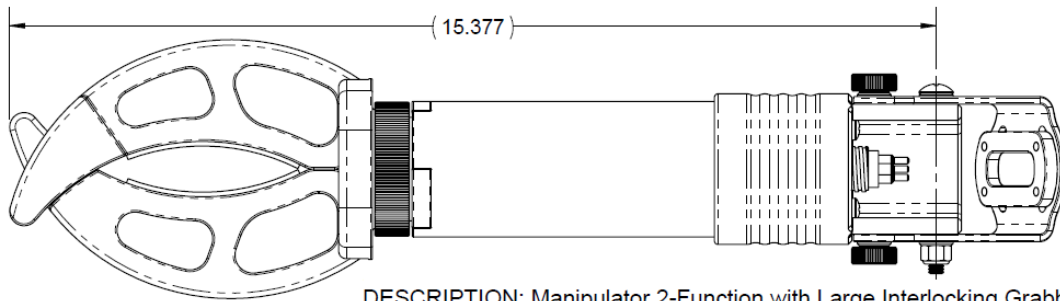
DESCRIPTION: Manipulator 2-Function with Trident Grabber  
MODEL NUMBER: MP-101

**MP-101** (Assembly)  
**MPH-101** (Tool)  
**MP-100** (Actuator)  
**MPM-100** (Mount)



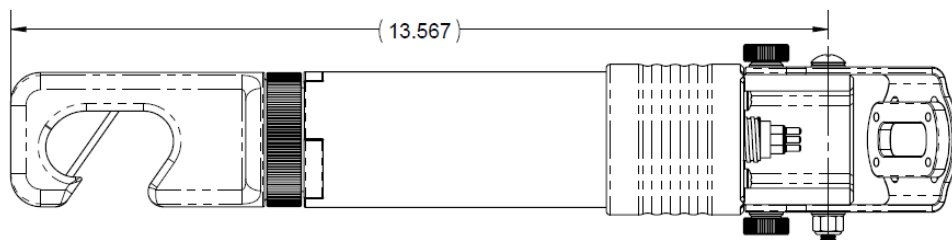
DESCRIPTION: Manipulator 2-Function with Small Interlocking Grabber  
MODEL NUMBER: MP-102

**MP-102** (Assembly)  
**MPH-102** (Tool)  
**MP-100** (Actuator)  
**MPM-100** (Mount)



DESCRIPTION: Manipulator 2-Function with Large Interlocking Grabber  
MODEL NUMBER: MP-103

**MP-103** (Assembly)  
**MPH-103** (Tool)  
**MP-100** (Actuator)  
**MPM-100** (Mount)

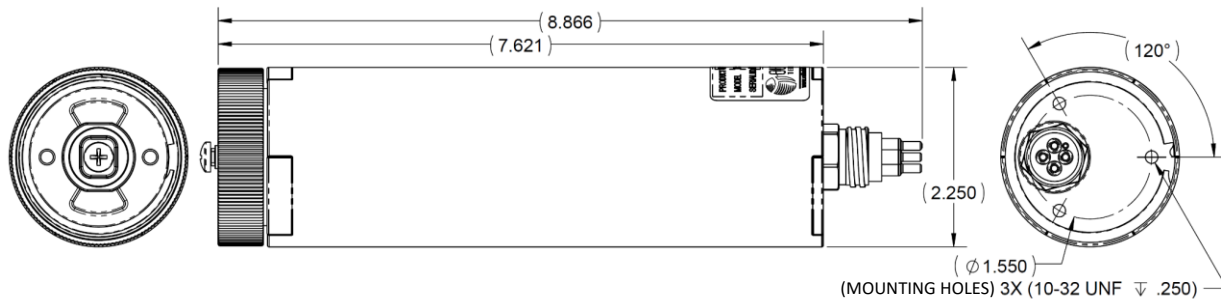


DESCRIPTION: Manipulator 2-Function with Cutter  
MODEL NUMBER: MP-104

**MP-104** (Assembly)  
**MPH-104** (Tool)  
**MP-100** (Actuator)  
**MPM-100** (Mount)

## Manipulator Manual

### Manipulator Actuator (MP-100)



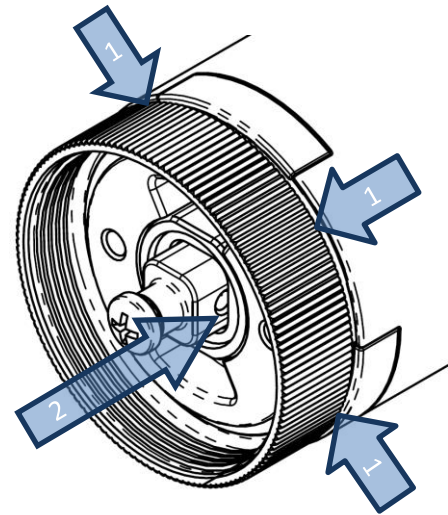
<b>MECHANICAL:</b>		<b>ELECTRICAL:</b>	
Diameter.....	2.25 in. (57 mm)	Input Voltage.....	24 VDC
Length (excluding connector).....	7.62 in. (194 mm)	Power.....	75 Watts
Weight in air.....	3.05 lb. (1.38 kg)	<b>CONNECTOR:</b>	
Weight in seawater.....	2 lb. (0.9 kg)	Standard Connector.....	MC-BH-4-M-T
Depth Rating.....	9800 ft. (3000 m)	1. Power Return	
Housing Material.....	Titanium	2. Power (+)	
		3. COMM +	
		4. COMM -	
		Mate for Standard Connector.....	MC-IL-4-F

#### Maintenance:

**Tools Required:** None

**Flush with fresh water before storage or if manipulator will not be used for 24 hours.**

1. Direct water behind the coupling ring while rotating the tool head (CW and/or CCW).
2. Direct water towards the center tool attachment screw while fully opening and closing the manipulator (if tool head is attached; if no tool head is attached move approx. 1 inch from fully retracted position). This can be done without removing the tool head. ***See water input arrow shown with each tool head in this manual.***

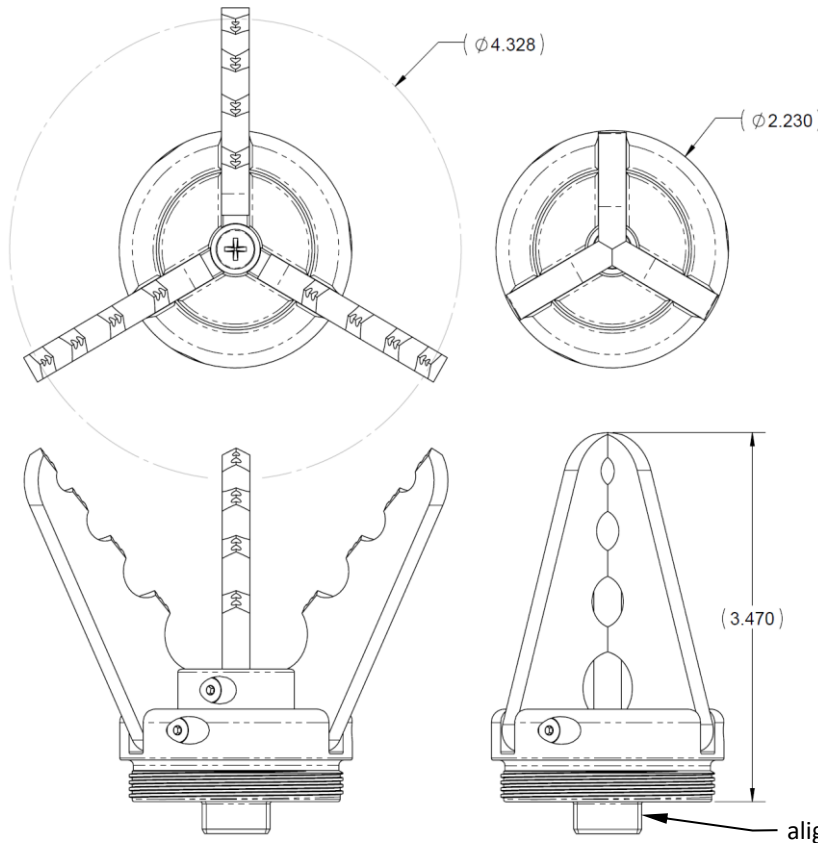


#### Tool Head Attachment Screw:

Tool heads are attached to the actuator with a #10-32 x 3/8 inch length 316 stainless steel pan head Phillips machine screw, supplied with each manipulator and extra tool.

## Manipulator Manual

### Trident Grabber Tool (MPH-101)



#### Tool Only (MPH-101)

Opening size.....4.33 in. (110 mm)  
Diameter.....2.23 in. (56.6 mm)  
Length.....3.47 in. (88 mm)  
Weight in air.....0.24 lb. (0.11 kg)  
Weight in seawater.....  
.....0.1 lb. (0.04 kg)  
Materials.....Acetal & Fiberglass  
composite

#### Tool with Actuator & Mount (MP-101)

Length.....12.44 in. (316 mm)  
(to mount pivot point)  
Weight in air.....3.9 lb. (1.8 kg)  
Weight in seawater...2.4 lb. (1.1 kg)

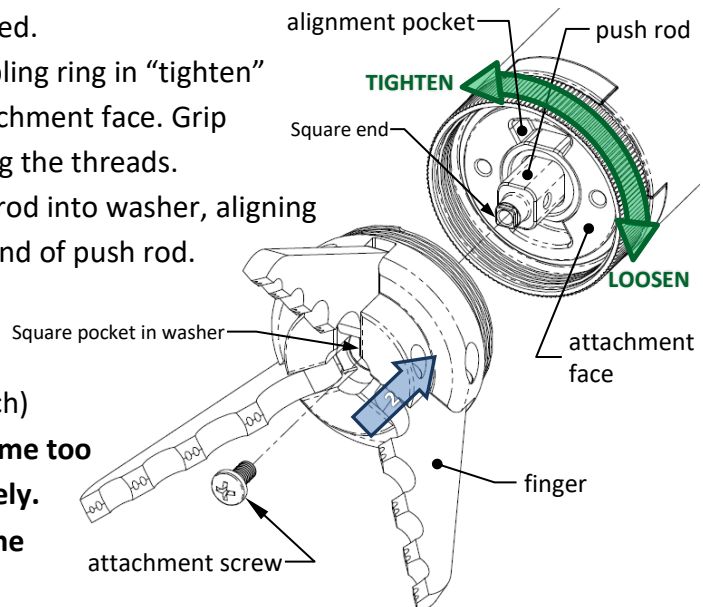
#### Tool Head Attachment: (Tool Required: Phillips #2 screwdriver)

1. Start with center push rod fully retracted.
2. Align teeth with pockets and turn coupling ring in “tighten” direction to pull tool head against attachment face. Grip coupling ring loosely to avoid squeezing the threads.
3. Open fingers on tool and extend push rod into washer, aligning square pocket in washer with square end of push rod.
4. Install attachment screw and tighten.

#### Maintenance:

**Tool Required:** 5/64” hex key (Allen wrench)

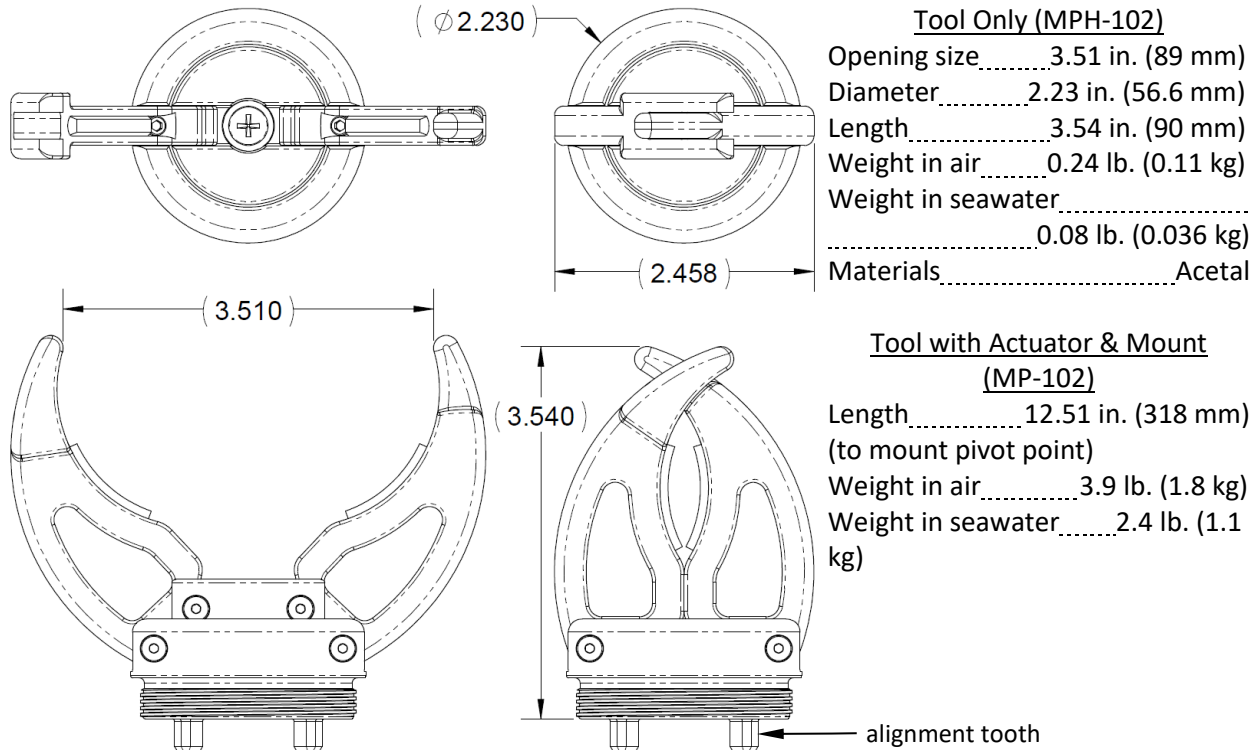
- **Replace fingers (11-0141) if they become too damaged to continue to grip adequately.**
- **Tighten shoulder screws if they become loose and the screw heads protrude out of the counterbored holes.**



**Note:** Tighten shoulder screws just to the point of contact with the mating surface, but **DO NOT** tighten past this point to prevent clamping the slots onto the fingers.

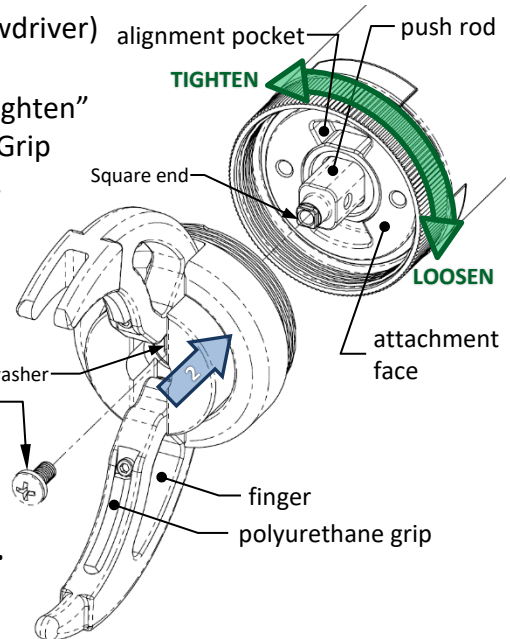
## Manipulator Manual

### Interlocking Grabber Tool - Small (MPH-102)



#### **Tool Head Attachment:** (Tool Required: Phillips #2 screwdriver)

1. Start with center push rod fully retracted.
2. Align teeth with pockets and turn coupling ring in "tighten" direction to pull tool head against attachment face. Grip coupling ring loosely to avoid squeezing the threads.
3. Open fingers on tool and extend push rod into washer, aligning square pocket in washer with square end of push rod.
4. Install attachment screw and tighten.



#### **Maintenance:**

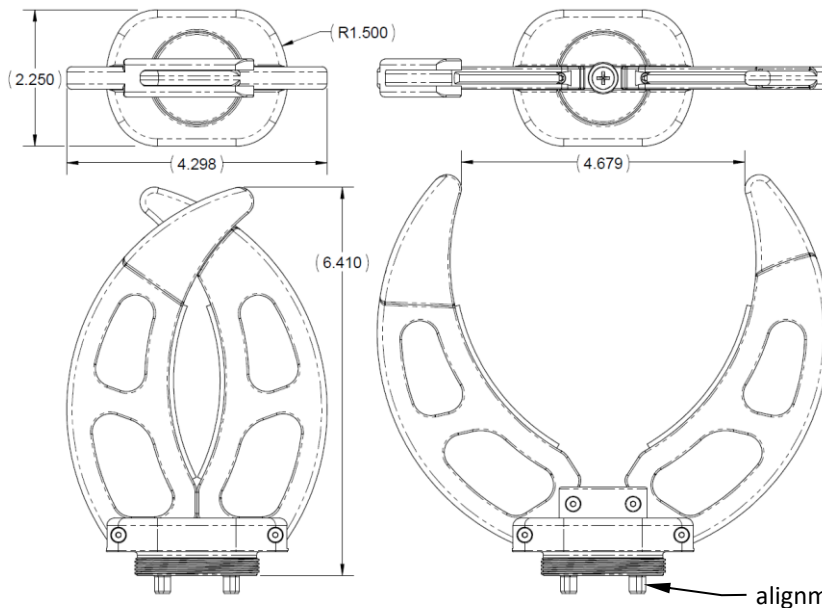
- **Replace fingers (11-0183-1/-2) if they become too damaged to grip adequately.**
- **Tighten shoulder screws if they become loose and the screws protrude out of the counterbored holes.**
- **Replace polyurethane grips (11-0189-1) in fingers if they become too damaged to grip adequately**
  1. Remove finger from tool.
  2. Remove screw next to polyurethane grip and slide worn grip out of finger.
  3. Lubricate slot with any silicone-based grease and slide new grip into finger.
  4. Reinstall screw into finger and reinstall finger into tool.

**Tools Required:** 5/64" hex key (for finger shoulder screws) and 3/32" hex key (for grip screws)

**Note:** Tighten shoulder screws just to the point of contact with the mating surface, but **DO NOT** tighten past this point to prevent clamping the slots onto the fingers.

## Manipulator Manual

### Interlocking Grabber Tool - Large (MPH-103)



#### Tool Only (MPH-103)

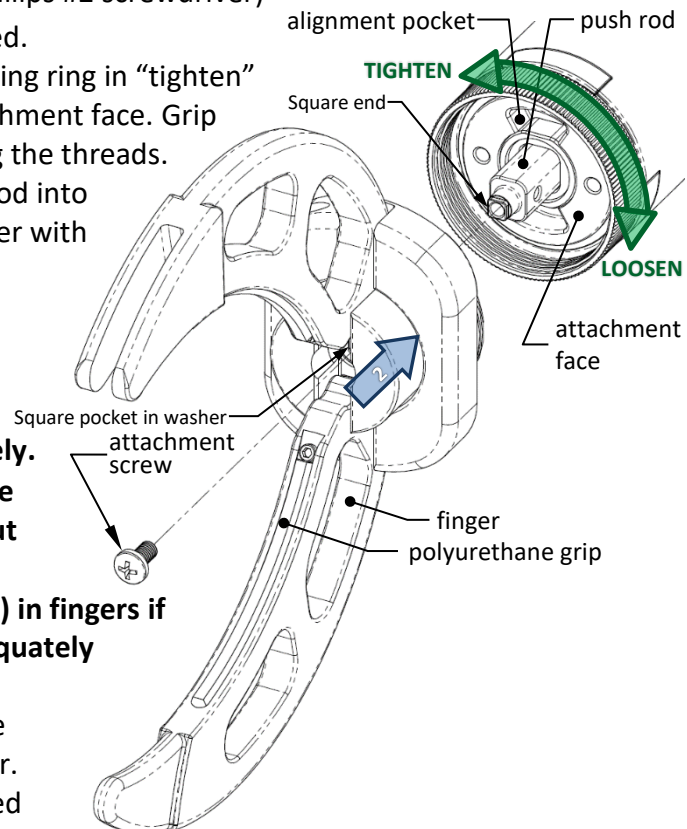
Opening size.....4.68 in. (119 mm)  
 Diameter.....3 in. (76 mm)  
 Length.....6.41 in. (163 mm)  
 Weight in air.....0.45 lb. (0.21 kg)  
 Weight in seawater.....  
 .....0.14 lb. (0.06 kg)  
 Materials.....Acetal

#### Tool with Actuator & Mount (MP-103)

Length.....15.38 in. (391 mm)  
 (to mount pivot point)  
 Weight in air.....4.1 lb. (1.9 kg)  
 Weight in seawater.....  
 .....2.44 lb. (1.11 kg)

#### Tool Head Attachment: (Tool Required: Phillips #2 screwdriver)

1. Start with center push rod fully retracted.
2. Align teeth with pockets and turn coupling ring in "tighten" direction to pull tool head against attachment face. Grip coupling ring loosely to avoid squeezing the threads.
3. Open fingers on tool and extend push rod into washer, aligning square pocket in washer with square end of push rod.
4. Install attachment screw and tighten.



#### Maintenance:

- **Replace fingers (11-0184-1/-2) if they become too damaged to grip adequately.**
- **Tighten shoulder screws if they become loose and the screw heads protrude out of the counterbored holes.**
- **Replace polyurethane grips (11-0189-2) in fingers if they become too damaged to grip adequately**
  1. Remove finger from tool.
  2. Remove screw next to polyurethane grip and slide worn grip out of finger.
  3. Lubricate slot with any silicone-based grease and slide new grip into finger.
  4. Reinstall screw into finger and reinstall finger into tool.

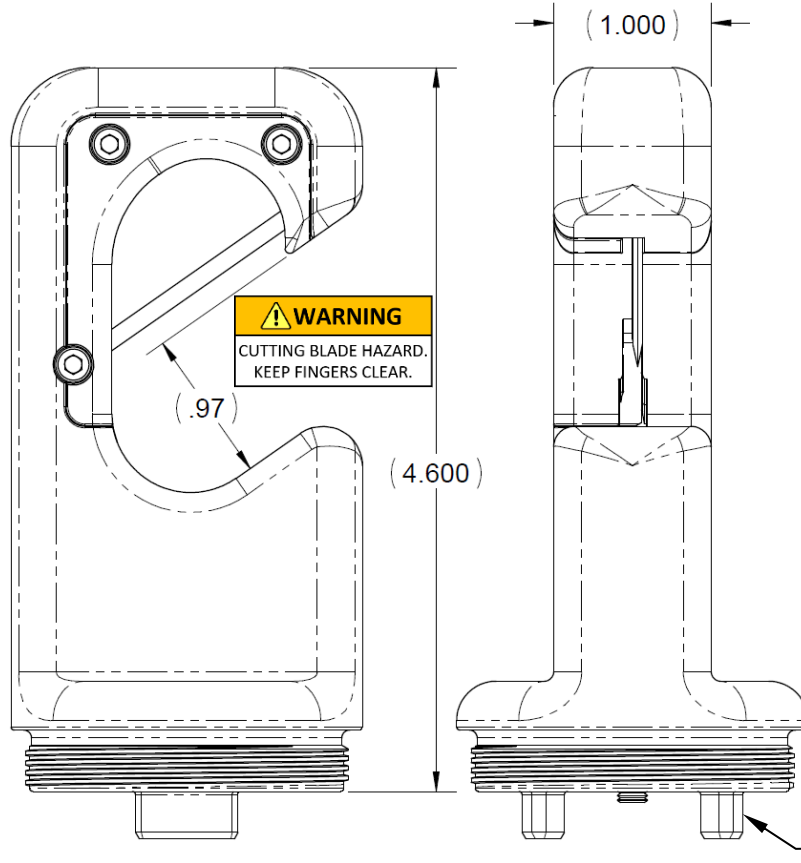
**Tools Required:** 5/64" hex key (for finger shoulder screws) and 3/32" hex key (for grip screws)

**Note:** Tighten shoulder screws just to the point of contact with the mating surface, but **DO NOT** tighten past this point to prevent clamping the slots onto the fingers.



## Manipulator Manual

### Cutting Tool (MPH-104)

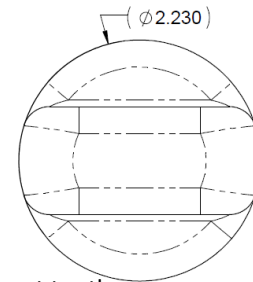


#### Tool Only (MPH-104)

Opening size..... 0.97 in. (24.6 mm)  
 Diameter..... 2.23 in. (56.6 mm)  
 Length..... 4.6 in. (117 mm)  
 Weight in air..... 0.7 lb. (0.32 kg)  
 Weight in seawater.....  
 ..... 0.42 lb. (0.19 kg)  
 Materials..... Aluminum & Acetal  
 Blade..... Stainless Steel

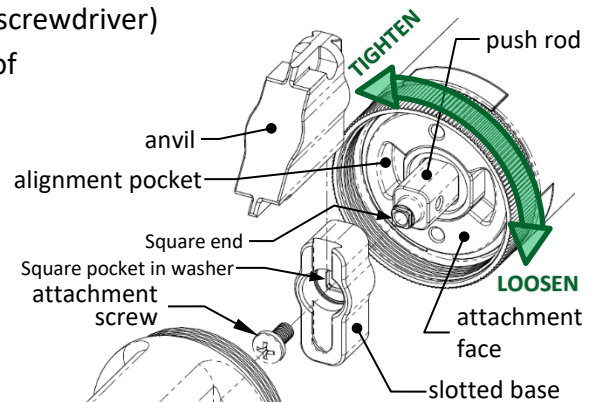
#### Tool with Actuator & Mount (MP-104)

Length..... 13.57 in. (345 mm)  
 (to mount pivot point)  
 Weight in air..... 4.4 lb. (2 kg)  
 Weight in seawater..... 2.7 lb. (1.2 kg)



#### Tool Head Attachment: (Tool Required: Phillips #2 screwdriver)

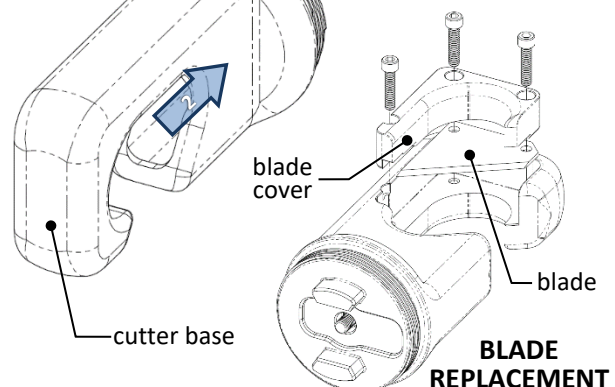
1. Align square pocket in washer with square end of push rod and install slotted base onto push rod.
2. Install attachment screw and tighten.
3. Slide anvil onto slotted base.
4. Align teeth with pockets and turn coupling ring in "tighten" direction to pull tool head against attachment face. Grip coupling ring loosely to avoid squeezing the threads.



#### Blade (11-0200) Replacement:

**Tool Required:** 7/64" hex key (Allen wrench)

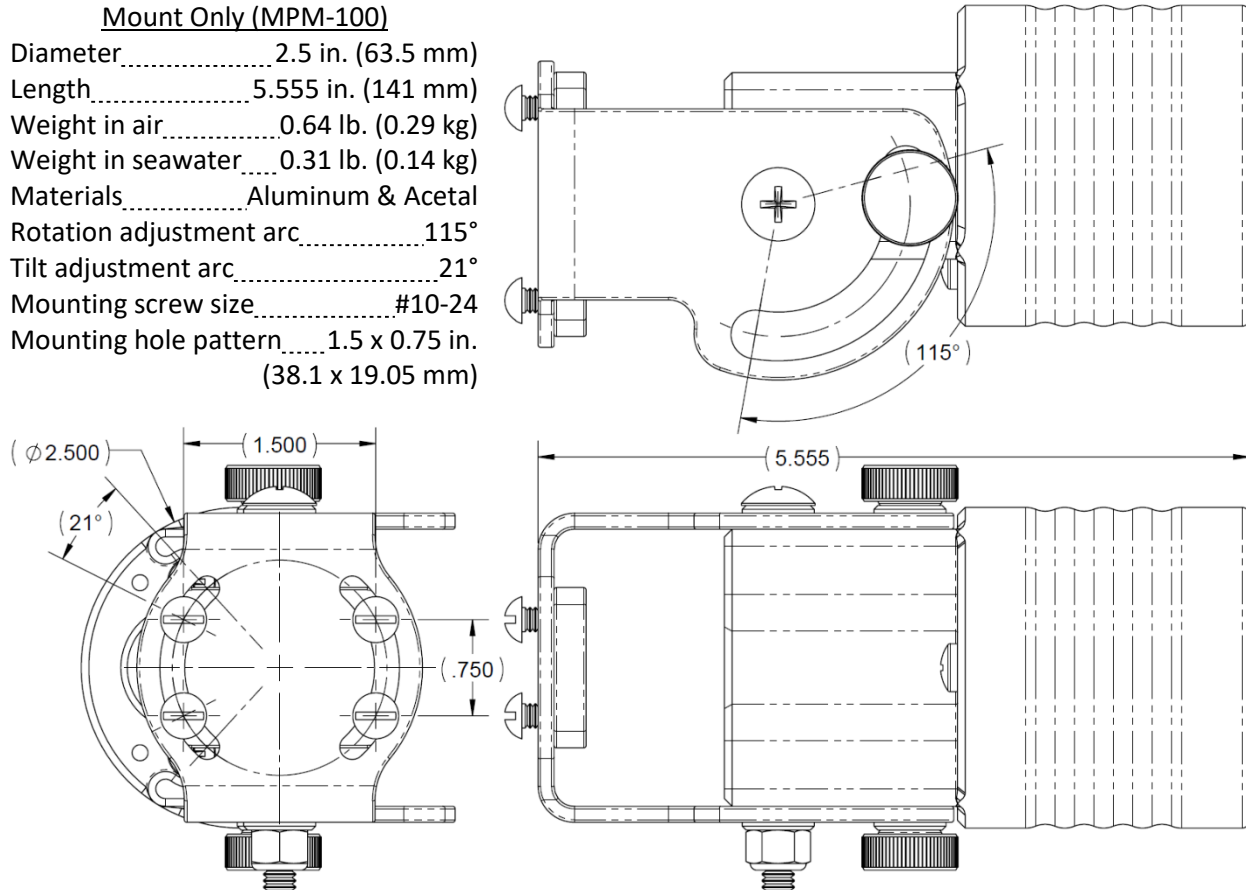
1. Remove 3 socket head cap screws.
2. Remove blade cover from cutter body.
3. Remove and replace worn blade.
4. Replace blade cover and 3 socket head cap screws. Re-apply lithium-based marine grease to screws if needed.



## ROV Manipulator Mount (MPM-100)

### Mount Only (MPM-100)

Diameter.....2.5 in. (63.5 mm)  
Length.....5.555 in. (141 mm)  
Weight in air.....0.64 lb. (0.29 kg)  
Weight in seawater...0.31 lb. (0.14 kg)  
Materials.....Aluminum & Acetal  
Rotation adjustment arc.....115°  
Tilt adjustment arc.....21°  
Mounting screw size.....#10-24  
Mounting hole pattern...1.5 x 0.75 in.  
(38.1 x 19.05 mm)



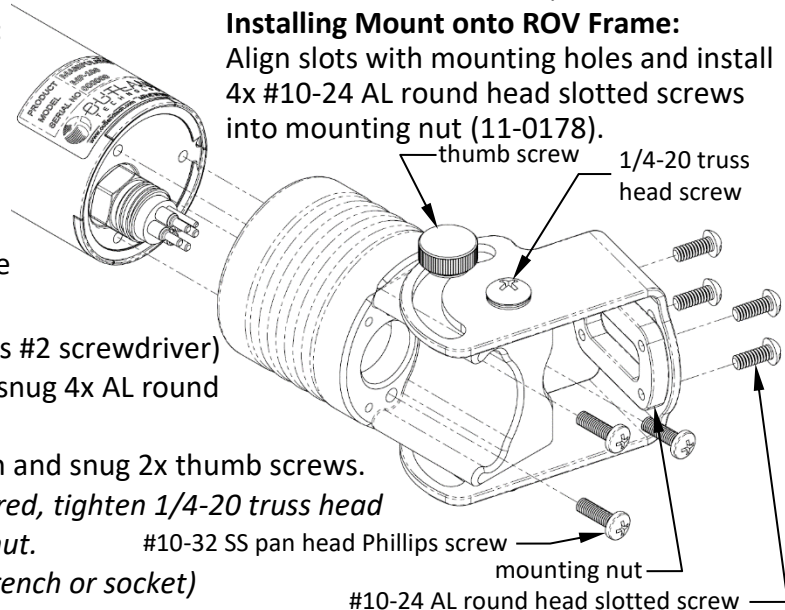
**Installation:** (Tools Required: Phillips #2 screwdriver and flathead screwdriver)

### Installing Manipulator into Mount:

1. Place connector end of Manipulator Actuator (MP-100) into mount sleeve.
2. Install 3x #10-32 SS pan head Phillips screws.
3. Connect connector through hole in mount sleeve.

### Installing Mount onto ROV Frame:

Align slots with mounting holes and install 4x #10-24 AL round head slotted screws into mounting nut (11-0178).



**Adjustment:** (Tool Required: Phillips #2 screwdriver)

**Tilt:** Adjust to desired location and snug 4x AL round head slotted screws.

**Rotation:** Adjust to desired rotation and snug 2x thumb screws.

*If additional holding torque is required, tighten 1/4-20 truss head machine screw and mating nylock nut.* #10-32 SS pan head Ph

*(Additional Tool Required: 7/16" wrench or socket)*

**Maintenance:** (Tools Required: None)

**Rinse with fresh water or soak in fresh water before storage or if manipulator will not be used for 24 hours.**