

***P20***

## **OPERATION AND MAINTENANCE MANUAL**



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21-30134 REV A

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## **WARRANTY**

ROS, Inc. (hereinafter called "**ROS**") warrants its products as stated below subject to the conditions specified.

**ROS** warrants its products, when operated under normal conditions, to be free from defects in material or workmanship for a period of one year from the date of purchase provided that inspection by **ROS** discloses that such defects developed under normal and proper use. **ROS** products repaired or replaced pursuant to this warranty shall be warranted for the unexpired portion of the warranty applying to the original product. The liability of **ROS** under this warranty shall exist subject to the following conditions:

- (a) Purchaser properly notifies ROS of such defects and the defective product is returned to ROS, transportation charges paid by Purchaser.
- (b) ROS shall be released from all obligations under its warranty in the event repairs or modifications are made by persons not authorized by ROS.
- (c) Representations and warranties made by any person, including distributors and representatives of ROS, which are inconsistent or conflict with the terms of this warranty, shall not be binding upon ROS unless reduced to writing and approved by an officer of ROS. ROS shall in no event be liable for other direct, special, incidental, consequential, indirect or penal damages.
- (d) The laws of the State of California shall govern this warranty.

In the event the defect is determined to be within the terms of this warranty then **ROS** agrees to repair and/or replace (at **ROS**' discretion) the product or defective portion at no charge to the Purchaser. This warranty does not apply to expendable items or to normal wear-and-tear, and is conditional upon performance of normal preventative maintenance procedures.

Our commitment to quality and customer service directs us to constantly strive to improve our products. The materials and specifications presented in our manuals and data sheets are correct and accurate to the best of our knowledge, and are presented in good faith. However, the information is not guaranteed and is subject to change without notice.

### **LIMITATIONS OF REMEDIES**

Purchaser assumes all risk and liability for results obtained in any installation, operation, or use of the product. Purchaser's sole remedy for any breach of warranty by vendor shall be limited to the "express remedies" set forth above. Otherwise, in no event shall vendor, its agents, or employees be liable to the original purchaser or any third party for any consequential or incidental damages or expenses of any nature arising directly out of or in connection with the use of vendor projects, even if vendor has been advised of the possibility of such damages or expenses. In any event, unless otherwise contrary to state law, vendor liability under this limited warranty shall not exceed the purchase price of the product.

## CUSTOMER ASSISTANCE

ROS, Inc. uses a worldwide network of stocking distributors and representatives who are familiar with our products and are able to provide assistance during installation and/or operation of these products.

If you have any questions or problems with this product that are not covered by this manual or instruction, please contact our agent in your area, or contact us directly by phone or FAX or e-mail.

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## CHANGE RECORD

<u>REV</u>	<u>DESCRIPTION</u>	<u>DATE</u>
A	PRODUCTION RELEASE (EC-01968)	02APR14

## 1 WARNINGS



**WARNING: Assembly, disassembly, connecting cables, or disconnection of cables, must only occur when the P20 is disconnected from the power source.**

- Be careful when handling the positioner and/or cables due to exposed male pins on the connectors. The pins can be damaged if they are bumped excessively. Any damage may result in difficulty when connecting cables or possible flooding for those connections that are underwater.
- When handling the cables, do not pull or tug on the cables more than necessary. Connector damage may result.

## 2 DESCRIPTION

The model P20 Pan and Tilt is designed to remotely orient underwater or in-air video and photographic cameras, lights, acoustic equipment, and other instrumentation. It is designed to handle moderately heavy loads, and provides an output torque of 10 foot pounds on each axis.

The housing, end plates, and all machined internal components of the P20 are made of 6061-T6 aluminum, which is hard anodized for corrosion protection. Other external hardware such as screws and retaining rings are made of stainless steel. An all titanium version is also available.

The drive train for each axis of the pan and tilt uses a reversible stepper motor coupled to low backlash harmonic gearing. The output gear of the harmonic reducer is bolted directly to the output shaft. The output shafts are each supported by two heavy-duty ball bearings to withstand heavy side and end loads. The basic design of the drive train is very compact, and it offers high reliability and minimum backlash.

If the P20 is oil-filled, it is pressure compensated by use of a Bellofram seal. This provides a slight internal pressure to minimize shaft seal drag and potential leakage problems due to hydrostatic pressure. The oil also provides continual lubrication and cooling to the internal components.

The P20 is equipped with internal limit switches and precision feedback potentiometers on both axes. These potentiometers sense the pan and tilt orientation angles for display at the surface control station.

### 3 PART NUMBER CONFIGURATION

PART NUMBER	FILL OPTION	ANODE OPTION	CONNECTOR OPTION
21-30082	A=AIR FILLED B=OIL FILLED	(BLANK)=ANODE N=NO ANODE T= TITANIUM HOUSING (NO ANODE)	01=MCBH-4-MP SS <i>SUBCONN</i> 02=LPMBH-4-MP BRASS <i>IMPULSE</i>
<u>Example:</u> 21-30082-A01 = P20 - AIR FILLED WITH ANODE, MCBH-4-MP CONNECTOR			

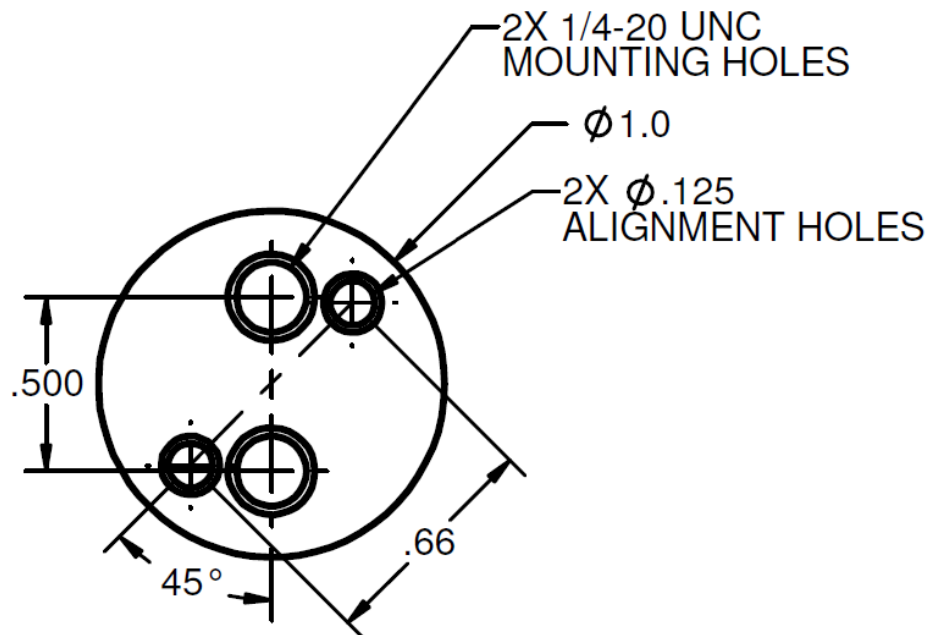
### 4 PRODUCT SPECIFICATIONS

Mechanical	
Housing Material (optional)	Hard Anodized 6061 AL (6AL-4V TI)
Dimensions	Air: 8.1" L x 10.4" H x 3" D Oil: 9.8" L x 10.4" H x 3" D
Mounting Options	2X ¼-20 Mounting Bolts on each axis Optional Mounting Plate and Yoke available
Weight in Air	Air: 10.0Lb (4.5Kg) Oil: 11.4Lb (5.2Kg)
Weight in Salt Water	Air: 6.7Lb (3.0Kg) Oil: 8.4Lb (3.7Kg)
Rotation Speed	5°/sec-20°/sec
Rotation Limit	360°
Torque	10Ft-Lb
Max Mechanical Backlash	±50 arc minutes
Resolution	±30 arc minutes
Compensator Fluid	Shell Tellus 10 or eq.
Environmental	
Depth Rating	Air: 100ft (30.5m) Oil: 20000ft (6000m)
Min/Max Operating Temperature	0°C to 50°C
Storage Temperature	-20°C to 60°C
Electrical	
Max Power Draw	2A
Input Voltage Ranges	24-28 VDC
Control System	Half duplex RS-485 (standard), Supported baud rates 9.6K, 19.2K, 57.6Kbps (factory set)
Communication Protocol	ROS 21-30022

## 5 INSTALLATION/ GENERAL FUNCTIONALITY

Your new positioner is intended for years of service free use. The positioner is not intended to be serviced or troubleshot for major issues in the field, a troubleshooting guide for minor issues is provided in Section 8. Please contact your sales representative for any issues with your new positioner.

To install your new positioner, use the bolt pattern provided on each output shaft or an available ROS mounting bracket. Note that your connector configuration will have a specific wiring configuration. The wiring for your positioner will be designated on the supplied test certification, but the standard wiring configuration can be found in Section 6.



**Figure 1: Output Shaft Bolt Pattern**



## 6 CONNECTOR WIRING/CONFIGURATIONS



**CAUTION:** Do not apply power to RS-485 pins as it will damage the RS-485 driver electronics.

<u>PIN NUMBER</u>	<u>FUNCTION</u>
1	COMMON
2	+24VDC
3	RS-485A
4	RS-485B
5	GROUND(OPTIONAL)

**Note:** If a connector has more pins than is listed in the table above, all other pins that are not listed are not connected.

<b>-01 MCBH-5-MP SS SUBCONN</b>	<b>-02 LPMBH-4-MP BRASS IMPULSE</b>

## 7 ROUTINE MAINTENANCE

The P20 is intended to be maintenance free. Be sure to clean your positioner with fresh water after each deployment. A visual inspection is always helpful in assessing the integrity of the positioner. In the event the positioner stops working, please contact ROS customer service. For troubleshooting see Section 8.

## 8 TROUBLESHOOTING

<b>Problem</b>	<b>Typical Causes</b>	<b>Action</b>
Product won't power on	Not connected properly	Check cables and power supply
		Check wiring
		Verify your have serial communication
Communication issues	Not connected properly	Verify proper input power
		Verify RS-485 to RS-232 converter is plugged in correctly
Product is leaking oil	Seal damage	Verify correct COM port
		Return to ROS for repair

## 9 REFERENCE DOCUMENTS

<b>DOC NUMBER</b>	<b>ROS DOCUMENT DESCRIPTION</b>
10-00234	APPLICATION NOTE, INTERCONNECTING RS-485 COMPONENTS
21-30022	RS-485 COMMUNICATION PROTOCOL
21-30034	HELIOS CONTROL SOFTWARE
21-30135	INSTALLATION AND OUTLINE DRAWING
21-03030	HELIOS MANUAL