VideoRay

Rotating Manipulator

Diagnostic Manual

Copyright Notice

Table of Contents

About this Document

Document Conventions

Several symbols are used throughout this documentation to add emphasis and to assist in relocating important information. The following table describes these symbols and their uses.

SYMBOL	DESCRIPTION
DANGER	The Danger icon is used to indicate there is a potential risk of personal injury or death. Extra care should be taken to understand the risks, and all personnel should exercise caution. It may also be appropriate to warn others in the immediate vicinity.
CAUTION	The Caution icon is used to indicate there is a potential risk of damage to the equipment or surrounding property. Personnel should receive training in the appropriate procedures before attempting to operate or maintain the equipment.
⚠	The Note icon is used to emphasize a specific detail or point of information.
💡	The Tip icon is used to highlight a suggestion.

Beyond this Document

There is no substitute for experience and/or training, especially with respect to the real purpose for which you plan to use this equipment. We encourage you to explore options beyond the scope of these materials to expand your knowledge and skills necessary to support your applications. In addition to this documentation, VideoRay offers training and technical support and hosts a general user discussion forum and user image gallery.

We also realize that collectively, users of our products spend considerably more time operating our systems than we do ourselves. Users also encounter more diverse operating environments across an extremely broad range of applications. We highly value this vast experience base, and invite and encourage you to share your experiences and suggestions with us. Please feel free to contact us by any of the methods listed below.

Quality Commitment

VideoRay strives to design, manufacture, deliver and support the highest quality products and services, including this documentation. We have made every effort to ensure that this documentation is accurate and provides you with the most up-to-date information.

If you find any errors in this documentation or have suggestions for improvements, each page contains a "Help us improve this document" feedback link in the left margin (you must be connected to the Internet to use this link).

Address
VideoRay LLC
212 East High Street
Pottstown, PA 19464
USA

Email
info@videoray.com   General Information and Sales
support@videoray.com Technical Support

Telephone
+1 610-458-3000   Office
+1 610-458-3010   Fax

Disclaimer

This document is deemed accurate at the time of its writing, however it is not a legal contract and the information contained herein should not be construed to represent any form of commitment. This document as well as the associated products and services are subject to change without notice.

Online Manual

The full version of this manual is available online in the following formats:

- http://download.videoray.com/documentation/_rotating_manipulator_vital for viewing the HMTL online.

- http://download.videoray.com/documentation/rotating_manipulator_vital/pdf/videoray_doc__rotating_manipulator_vital.pdf for viewing the PDF online.

- http://download.videoray.com/documentation/rotating_manipulator_vital/zip/videoray_doc__rotating_manipulator_vital.exe for downloading the HTML and PDF files.

How to Get Help

Help for your Rotating Manipulator is available through several channels.

All Hours Self-Service / Crowd-Source Tools

Operator's Manuals and Standard Operating Procedures	www.videoray.com/support/manuals.html
Software Downloads	www.videoray.com/support/downloads.html
Frequently Asked Questions	www.rovfaq.com
ROV User Forum	www.rovinfo.com

Global Support

Email	support@videoray.com
Phone	+1 610-458-3000 (*select option* 1)
Skype	videoray.support (*by appointment*)
Remote Sessions	www.videoray.com/support/remote-support.html (*by appointment*)

Regional Support

VideoRay Authorized Service Centers and Dealers	www.videoray.com/dealer.html

Training

Operator Training	www.videoray.com/learn-more/training.html
Advanced Maintenance Training	www.videoray.com/learn-more/advanced-maintenance-courses.html

Operational Strategies and Tactics Support

If you need help understanding how to apply your system to a specific project, contact VideoRay or you local VideoRay dealer. We can provide guidance or help you find a certified consultant.

VideoRay's Interactive Technical Assistance Library

VITAL is the easiest way to check your VideoRay system's "vital signs" when it seems like it is not working properly.

VITAL is an interactive diagnostics system to help troubleshoot problems with your VideoRay ROV or accessories.

Often, many problems are simple issues that can be resolved in the field with a little diagnostic investigation and appropriate corrective action. VITAL will help you determine the cause of your problem, find a solution and get operational again quickly. It's the next best thing to having a VideoRay certified technician look over your shoulder and recommend what to check or do next.

If a problem is beyond the scope of the diagnostics available through VITAL, the information uncovered in the process can facilitate improved communications with a VideoRay certified technician. This information can also be used narrow down the affected components to get repair parts shipped to you quicker, or reduce the cost of sending the entire system to VideoRay or a VideoRay Authorized Service Center for further diagnostics and repair.

FAQ (Frequently Asked Questions)

1. **Can VITAL identify and help me solve all of the issues with my equipment?**

   VITAL is designed to handle as many of the known issues as possible and is updated regularly, but it may not be able to solve every possible issue.

2. **How much experience do I need to use VITAL?**

   VITAL does not require any experience, but some of the diagnostic procedures may require experience. In these cases, VITAL will provide an indication of the level of experience required using the VITAL rating system. See the Vital Rating Page for more information.

3. **What should I do if VITAL does not identify the issue?**

   If VITAL cannot identify the issue, you will be instructed to contact VideoRay Support for further assistance. See the How to Get Help page for VideoRay Support information.

Using VITAL

Safety First

Do <u>NOT</u> use your system or VITAL if there is any risk of fire or electric shock, for example, if you see smoke, sparks, or flames, or if any of these were observed when the problem originated. Turn off the power switch and unplug the power cord if it is safe to do so, or cut power to the outlet. Contact VideoRay Customer Care or your local VideoRay Authorized Service Center for a complete diagnosis and repair.

Do <u>NOT</u> use a system with a damaged power cord or tether.

Prior to Using VITAL

Before using VITAL, make sure that you have followed the standard set-up and pre-dive inspection procedures and have checked the obvious along the way. VITAL assumes that you have a basic operational understanding of the system and expects you to make sure the system is plugged in to a known working power source and is turned on.

VITAL Procedures

VITAL will present you with a question and a list of possible responses. Click on the response that best answers the question. Each response will result in either another question to narrow the problem down further, or a diagnosis and recommended solution.

Each solution presented by VITAL is rated based upon the required knowledge and skill required to perform the repair procedure. These ratings (🔧🖥️) can help you decide if you should attempt the repair yourself or seek more qualified help. If you decide that a repair procedure exceeds your technical expertise, contact VideoRay Customer Care for further support.

Tips for Getting to the Root Cause of Problems Quicker

Diagnostics is often as much of an art as it is a science, but there are some practices that can help you solve problems faster. Of course the number one way to avoid user related problems is to read the manual and participate in training.

General

- Use a checklist when setting up and operating systems to avoid making simple mistakes.
- Check and double-check the obvious.
- Don't work from assumptions - verify the facts.
- Understand the way the system is supposed to work to identify the real symptoms.
- Divide and conquer - use each diagnostic test to eliminate at least one issue or component.
- Don't try to change too many variables at once.
- Try to determine if the problem is consistent or intermittent.
- If the problem is intermittent, look for specific conditions that cause or eliminate the problem.
- Use alternate components when available to isolate symptoms to specific components.
- Check with the manufacturer for known problems and updated versions.
- Check the power source.

VideoRay specific questions that may lead to isolating the problem

- Does the problem only happen with the ROV in the water?
- Are there other specific conditions that cause or eliminate the problem. Examples:
  - Depth
  - Temperature

- Time
- What type of power are you using - land-based, generator, battery with an inverter?

Recommended Expertise Requirements Ratings

The ratings associated with each solution provide an indication of the level of recommended knowledge or skill required to perform the repair procedure. There are two ratings categories, one for VideoRay specific knowledge, and one for general computer knowledge.

Recommended VideoRay Expertise Required*	
0 Wrenches	No VideoRay Expertise Needed
🔧	Novice Operator
🔧🔧	Basic Operator
🔧🔧🔧	Technician
🔧🔧🔧🔧	Advanced Technician

Recommended Computer Expertise Required	
0 Computers	No Computer Expertise Needed
🖥	Novice User
🖥🖥	Average User
🖥🖥🖥	Power User

* See the Micro-ROV User Certificate Program for more information about the expectations associated with each rating level and how to achieve these levels.

VITAL Diagnostic Map

2 - Action Required

Purpose	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
We need to start from a known baseline.	Before conducting any tests, make sure you have followed the standard system set up and pre-dive inspection procedures.	🔧	🖥

Have you followed the standard system set-up and pre-dive inspection procedures?

- Yes [Go to Item 8]
- No [Go to Item 5]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

5 - Action Required

Purpose	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
Without following a standard test protocol, VITAL may not be able to diagnose problems reliably. VITAL therefore considers non-standard procedures to be a probable cause of a problem.	Follow the standard pre-dive inspection and system set-up procedures to see if the problem is still present.	🔧	🖥

Did following the standard pre-dive procedures resolve the problem?

- Yes [Go to Item vital_resolved]
- No [Go to Item 8]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

8 - Is the problem related to buoyancy or operation?

- Buoyancy [Go to Item 11]
- Operation [Go to Item 22]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

11 - What seems to be the problem?

- The ROV is sinking. [Go to Item 15]
- The ROV is too buoyant. [Go to Item 16]
- The ROV is pitched nose up or nose down. [Go to Item 17]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

15 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
You are using the wrong float, or there is too much ballast weight (ballast and or counterbalance weight).	Make sure you are using the correct float and have removed any excess weights.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Installation

16 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
You are using the wrong float, or there is not enough ballast weight (ballast and or counterbalance weight).	Make sure you are using the correct float and have added sufficient weight.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Installation

17 - Are you using the manip with a sonar?

- Yes [Go to Item 20]
- No [Go to Item 21]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

20 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
You should not use the counterbalance weight.	Make sure the counterbalance weight is not used and adjust any ROV weights as necessary to achieve the desired pitch.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Installation

21 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
You need to use the counterbalance weight.	Make sure the counterbalance weight is used and adjust any ROV weights as necessary to achieve the desired pitch	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Installation

22 - Is the control reversed (pressing the Open button on the hand controller causes the manipulator to Close)?

- Yes [Go to Item 25]
- No [Go to Item 26]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

25 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The VideoRay Cockpit configuration for the	Activate the correct configuration by		None

| Articulating Manipulator is not correct. | using the desktop shortcuts. | 🔧 | |

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Software Management

26 - Action Required

Purpose	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The Articulating Manipulator requires VideoRay Cockpit 1.11.0.1 or later.	Check the version of VideoRay Cockpit.	🔧	None

Is the version of VideoRay Cockpit greater than 1.11.0.1?

- Yes [Go to Item 29]
- No [Go to Item 47]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

For more information, see:

- Requirements

29 - Action Required

Purpose	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The Articulating Manipulator Communications may be an issue.	Check the status of the Articulating Manipulator in the communications diagnostic window.	None	None

Is the Articulating Manipulator Window displayed in the communications diagnostic window and is it blue?

- Yes, it is displayed and it is blue. [Go to Item 33]
- Yes, it is displayed but it is not blue. [Go to Item 45]
- No, it is not displayed. [Go to Item 46]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

For more information, see:

- Pro 4 Communications

33 - Does the Articulating Manipulator instrument show a response to hand controller input?

- Yes [Go to Item 36]
- No [Go to Item 40]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

36 - Are the jaws or rotator physically restricted?

- Yes [Go to Item 39]
- No [Go to Item vital_unresolved]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

39 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The jaws or rotator appear to be obstructed.	Clear the jaws or rotator as necessary.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]

- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

40 - Do the hand controller buttons for the Articulating Manipulator actions work in Windows game controller diagnostics?

- Yes [Go to Item 43]
- No [Go to Item 44]
- I am not sure how to perform this action or how to answer this question [Go to: VITAL Unsure]

43 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The VideoRay Cockpit configuration for the Articulating Manipulator is not correct.	Activate the correct configuration by using the desktop shortcuts.	🔧	🖥️

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Software Management

44 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The hand controller may be malfunctioning.	Contact VideoRay Support for assistance.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

45 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The communications may need to be reset.	Reset the communications.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Pro 4 Communications

46 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
It appears that the Articulating Manipulator software is not installed or not configured properly.	Check the software installation and activate the correct configuration by using the desktop shortcuts.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]

- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Software Management

47 - Preliminary Diagnosis

Possible Cause	Recommended Action(s)	VideoRay Expertise Required	Computer Expertise Required
The Articulating Manipulator requires VideoRay Cockpit 1.11.0.1 or later.	Upgrade VideoRay Cockpit to 1.11.0.1 or greater.	🔧	None

Do you think this diagnosis corrrectly identified the problem?

- Yes [Go to VITAL Identified]
- No [Go to VITAL Unresolved]
- I am not sure [Go to VITAL Unsure]
- I am not sure how to perform this action or how to answer this question [Go to VITAL Unable]

For more information, see:

- Requirements

VITAL Resolved

We are glad that you have been able to identify the source of the problem and resolve it. If you need to order any parts or send any components to VideoRay or a regional Factory Authorized Service Center for service, see the How to Get Help page.

If the problem reoccurs, please make a note of any conditions that seem to be consistent with the problem. Use the procedures and recommended questions in the Tips section to help identify possible causes.

Once you have collected this information, contact VideoRay Customer Care so that we can analyze the situation and continue to improve our products.

> Please help us improve our products, documentation and training by letting us know how you got here.
> Send an email to support@videoray.com - include the product name and Item number of the last step before reaching this point.

VITAL Identified

We are glad that you have been able to identify the source of the problem. If you need to order any parts or send any components to VideoRay or a regional Factory Authorized Service Center for service, see the How to Get Help page.

If the problem reoccurs, please make a note of any conditions that seem to be consistent with the problem. Use the procedures and recommended questions in the Tips section to help identify possible causes.

Once you have collected this information, contact VideoRay Customer Care so that we can analyze the situation and continue to improve our products.

> Please help us improve our products, documentation and training by letting us know how you got here.
> Send an email to support@videoray.com - include the product name and Item number of the last step before reaching this point.

VITAL Unresolved

It appears that VITAL is unable to determine the specific cause for the symptoms you are reporting.

We are equally concerned that your problem has not been resolved by using this system. We suggest that you review the symptoms carefully and re-initiate the diagnostic process to double check your results.

If double checking your results does not lead to a resolution, please contact VideoRay Customer Care and provide as much information as you can about the symptoms, the diagnostics steps that you have performed so far and the results. This information should help us resolve your problem and improve the capabilities of this system to better diagnose these symptoms

and provide a recommended solution in the future.

To contact VideoRay, see the How to Get Help page.

> Please help us improve our products, documentation and training by letting us know how you got here.
> Send an email to support@videoray.com - include the product name and Item number of the last step before reaching this point.

VITAL Unable

We are equally concerned that you have not been able to resolve the problem by using this system or complete the repair.

If you do not know how, or do not feel comfortable attempting the diagnosis or repair, please contact VideoRay Customer Care and provide as much information as you can about the symptoms, the diagnostics steps that you have performed so far and the results. A VideoRay certified technician will be happy to help you conduct more tests or determine whether to send the equipment to VideoRay or a Factory Authorized Service Center for a more complete diagnosis and repair.

To contact VideoRay, see the How to Get Help page.

> Please help us improve our products, documentation and training by letting us know how you got here.
> Send an email to support@videoray.com - include the product name and Item number of the last step before reaching this point.

VITAL Unsure

We are equally concerned that you have not been able to identify the problem by using this system.

If you are unsure how to conduct a test or answer a question, please contact VideoRay Customer Care and provide as much information as you can about the symptoms, the diagnostics steps that you have performed so far and the results. A VideoRay certified technician will be happy to help you conduct more tests or determine whether to send the equipment to VideoRay or a Factory Authorized Service Center for a more complete diagnosis and repair.

To contact VideoRay, see the How to Get Help page.

> Please help us improve our products, documentation and training by letting us know how you got here.
> Send an email to support@videoray.com - include the product name and Item number of the last step before reaching this point.