RADICAL INS 2 Advanced Stabilization Operation Manual v1.0

NOVEMBER 2021

⚠WARNING

To minimize risk of serious injury, death or damage, before using MotoCrane RADICAL INS 2, all drivers and operators must read this Operation Manual and all on-product labels.

All practices and procedures stated herein are required for the proper and safe operation of the RADICAL INS 2.

If there are any questions, please contact MotoCrane Support at support@motocrane.com.

Keep this Operation Manual near your RADICAL INS 2 for future reference.

Safety Signal Words

This manual and the safety labels attached to this equipment utilize signal words that signify safety hazards with different levels of severity. The words are preceded by a triangle signifying that these are safety related. Below are the words used and the definitions for these words:

- **⚠WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury or damage
- **⚠CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or damage
- ***NOTICE*** is used to address practices not related to physical injury

The terms IMPORTANT and NOTE are also used to describe ideas for better and more efficient use of the RADICAL INS 2.

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Before the First Drive

Do the following before using RADICAL INS 2 Advanced Stabilization for the first time.

1. Read this entire Operation Manual
2. Read the Warranty in the Terms of Sale
3. Watch the Video Tutorials at www.motocrane.com/support
4. Recommended: Attend MotoCrane Training for in-person demonstration

IMPORTANT PRODUCT AND SAFETY INSTRUCTIONS

Safety

The RADICAL INS 2 Advanced Stabilization upgrade is not a toy and can cause serious injury, death or damage if not used properly. You must exercise caution during use of the RADICAL INS 2 to ensure a safe filming environment for everyone. This Operation Manual describes safe operation and should be read in conjunction with the applicable online training videos or additional in-person training.

IMPORTANT: Restricted Use Statement

The RADICAL INS 2 Advanced Stabilization upgrade must only be used by trained operators 18 years of age or older when properly mounted on an appropriate motor vehicle driven on a closed course with paved or finished surfaces (for example, asphalt, concrete, or tarmac) or moderate off-road (for example, gravel or dirt roads) conditions. In addition, the speed and acceleration of the motor vehicle must not exceed system ratings for RADICAL INS 2 as set forth in this Operation Manual.

Do not modify or adjust the RADICAL INS 2 assembly. The RADICAL INS 2 has been calibrated before it is shipped to you. No modification or adjustment to the RADICAL INS 2 is allowed without the express written approval of MotoCrane, LLC.

Disclaimer and Limitations of Liability

You agree that you are responsible for your own conduct and any content created while using the RADICAL INS 2, and for any consequences thereof. You agree to use this product only for purposes that are proper and in accordance with local laws, regulations or other legal requirements.

You also agree:

1. Any part of this disclaimer is subject to change without prior notice. Refer to www.motocrane.com/support for the latest version.

2. MotoCrane, LLC reserves the right of final interpretation of this disclaimer.

3. MotoCrane, LLC has no control over the use, setup, assembly, modification or misuse of the RADICAL INS 2, and therefore no liability shall be assumed or accepted by MotoCrane, LLC for any resulting damage, death, or injury incurred directly or indirectly from the use of the RADICAL INS 2. By the act of use, setup or assembly, the operator accepts all resulting liability.

Limited Warranty

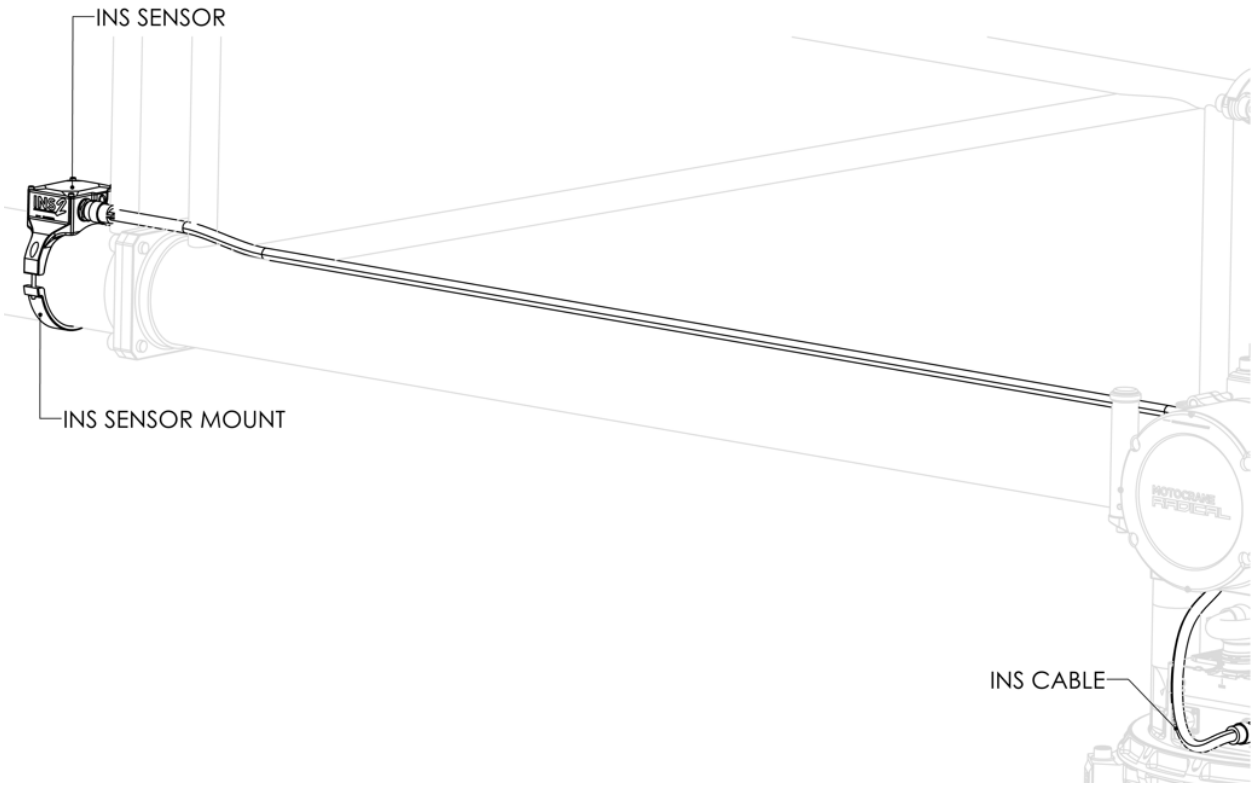
The RADICAL INS 2 has a limited manufacturer's warranty on parts and assembly. See the Terms and Conditions of Sale for your RADICAL INS 2 for a complete description of this limited warranty. This Limited Warranty is incorporated by reference into this Operation Manual.

Intellectual Property

Parts of the RADICAL INS 2

- 1 pc RADICAL INS 2 Sensor + mount
- 1 pc RADICAL INS 2 Cable
- 2 pc M4 x 35mm SHCS

RADICAL INS 2 System Overview

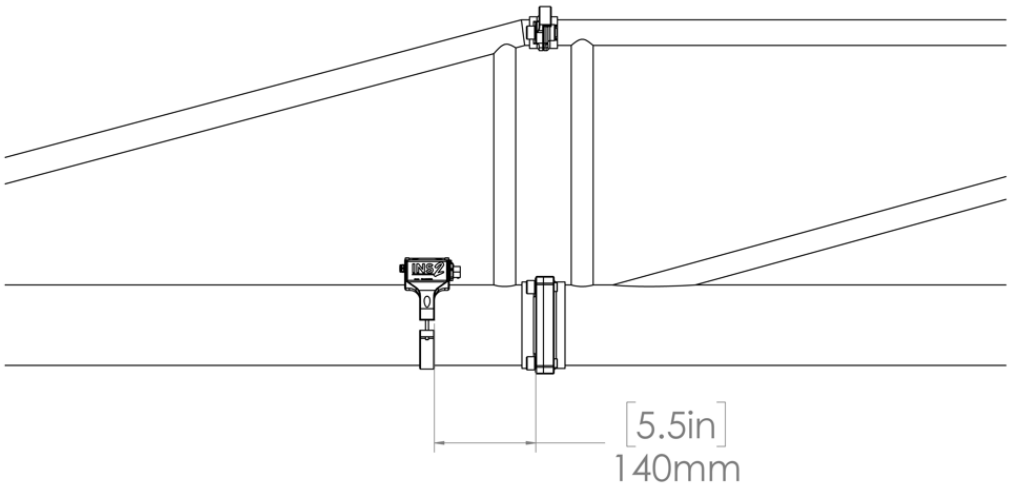


Setting up RADICAL INS 2 Advanced Stabilization

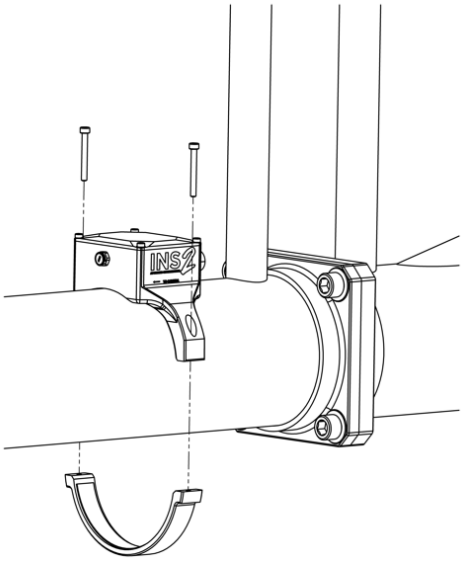
Follow these steps to set up and configure your RADICAL INS 2 Advanced Stabilization.

1. Installing the RADICAL INS 2 Sensor

1. The RADICAL INS 2 Sensor will be placed on the front boom section that is closest to the middle boom. Loosely place the unit on the boom as shown, with about 140mm between the RADICAL INS 2 Sensor and the boom mounting features (this dimension is not critical, but should be +/- 5 mm).



2. Fasten the unit to the boom using the provided M4 fasteners - make sure the top of the housing is horizontal (this is not *critical*, but the more accurate it is, the better the performance will be - visual alignment should be sufficient)



2. Electrical Connections

1. Connect the RADICAL INS 2 Cable between the RADICAL INS 2 Module and the 'SERIAL' connector on the RADICAL Base. Secure the RADICAL INS 2 Cable to the fulcrum leg, handle and the boom tube using a velcro strap or elastic tie, so it does not get caught or snagged. Make sure that the cable will not be pulled or strained during full upwards and downwards Lift Axis movements.

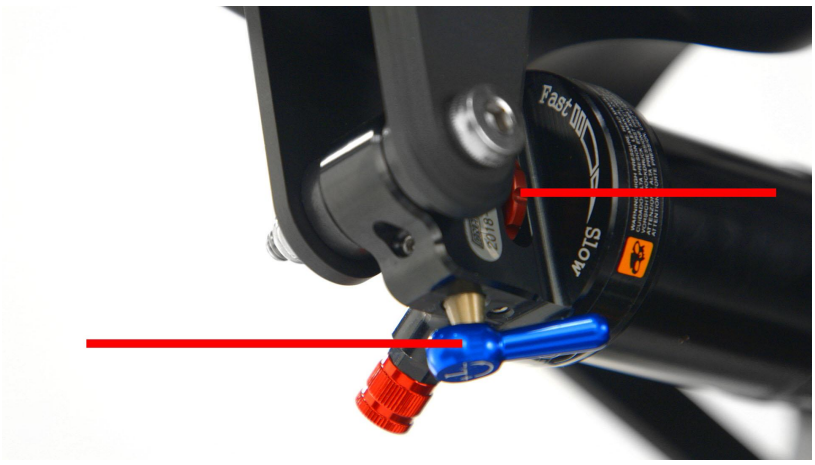
3. Startup Sequence and Configuration

1. Make sure that the full RADICAL system is set up according to the instructions in the RADICAL Operation Manual, and that the proper payload and counterweight are installed and correctly balanced

⚠CAUTION RADICAL INS 2 setup/configuration should occur only after complete RADICAL setup, with all booms, payload and counterweight attached. See RADICAL Operation Manual for more information.

⚠CAUTION Make sure the safety pin (Labeled "Remove Before Flight") is **removed** from the RADICAL Fulcrum before attempting to drive or move the system - this can be done at any later stage ***before*** movement is attempted, but DO NOT FORGET!

2. Confirm that the Z-Axis Air Shock damping is adjusted to 100% "Slow" (fully damped), and that the blue lockout is in the "-" (disengaged) position



3. Power up RADICAL (Turn ON the SYSTEM POWER switch on RADICAL PSU)
4. On the Command Console, navigate to the INS2 Control Panel and wait (up to 15 seconds) for the INS 2 sensor to come online (status indications will turn green, and the graphs will be showing real-time data) - if data is not present, but the sensor is connected, try to power cycle again

5. If using RADICAL INS 2 for the first time, start at the DEFAULT values for tuning (press the DEFAULT button)
6. Set the TUNING parameters for the recommended default values for your payload (found later in this document)
7. Turn RADICAL INS 2 Stabilization ON (either with the toggle switch in the INS 2 Control Panel, or via the 'MODE' Control Panel)
8. Carefully release the E-STOP button to activate the system - BE READY TO E-STOP/DISARM IN THE EVENT OF SUDDEN MOVEMENT OR OSCILLATION!

DO NOT TURN ON RADICAL INS 2 STABILIZATION BEFORE CONFIRMING THAT TUNING PARAMETERS HAVE BEEN PROPERLY CONFIGURED FOR YOUR SETUP!

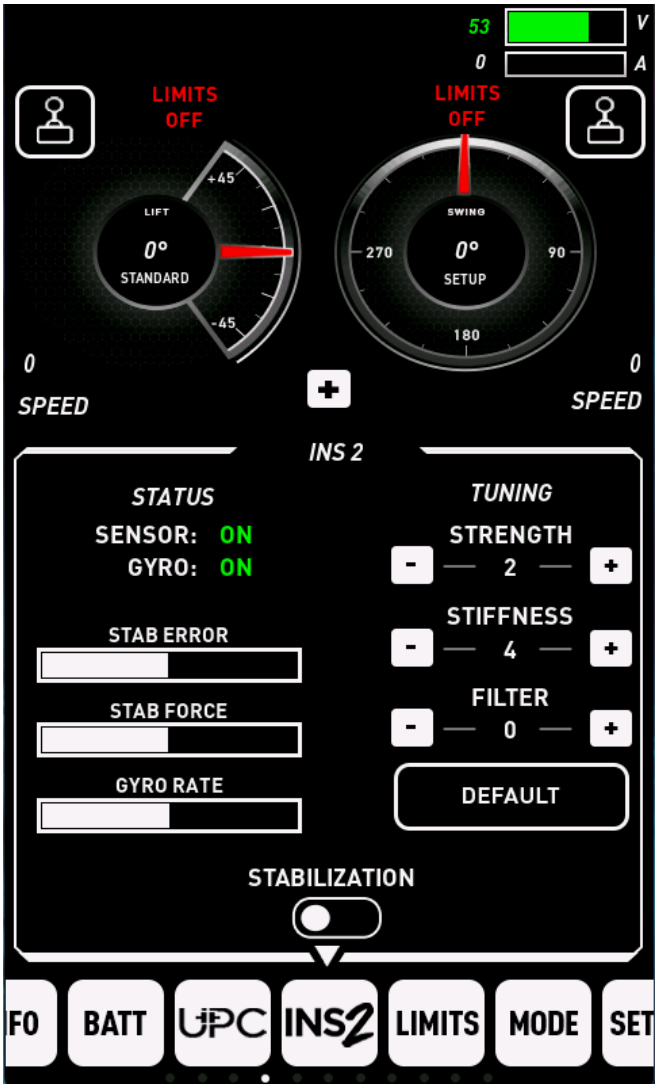
9. Check for performance and oscillation, and adjust tuning parameters as needed
10. Recommended: set Lift Axis Limits for INS 2 - Lift Axis Limits are not required for INS 2 Stabilization, but are highly recommended

When RADICAL INS 2 Stabilization is turned ON, and the system is ARMED (E-STOP released), the arm will actively compensate the Lift Axis angle against incoming disturbances from terrain or vehicle chassis movements

⚠WARNING Failure to follow these Instructions and those below can result in serious injury, death or damage.

These Instructions will be demonstrated in our training videos and found online at https://motocrane.com/knowledge-base. All terminology is referred to in the above diagrams.

RADICAL INS 2 Control Panel Layout



Within the RADICAL INS 2 Control Panel, there is a STATUS section, Performance Monitoring Gauges and adjustable TUNING parameters

Status

This region shows the connection status of the RADICAL INS 2 Sensor and GYRO, and any active warnings or errors.

Performance Monitoring Gauges

The three bar graphs demonstrate the stabilization performance. In an ideal situation, Stabilization Error should remain in the center (zero), while the Stabilization Force and Gyro Rate graphs should move smoothly together. These illustrate the corrective action that is taking place to maintain a constant boom angle during disturbances.

Tuning

The tuning section provides an interface to configure the performance characteristics of the stabilization. Read the following sections to understand more about what these values do, and how to configure them for optimal performance.

Basic RADICAL INS 2 Tuning

Recommended Initial Tuning Values

Use the following chart as a starting point when tuning RADICAL INS 2 for the first time

PAYLOAD	STRENGTH	STIFFNESS	FILTER
15lbs/18kg	2	3	0
25lbs/20kg	2	3	0
*35lbs/23kg	2	4	0
**45lbs/25kg	3	5	0

"HIGH" RADICAL INS 2 tuning values are those at or above the recommended values.
"MEDIUM" RADICAL INS 2 tuning values are those a few points below recommended values.
"LOW" RADICAL INS 2 tuning values are those at or half or less than recommended values.

**Default Setting*
***Requires RADICAL Heavylift Upgrade Kit.*

Description of Settings

The most important tuning parameters are STRENGTH and STIFFNESS. Together, these 2 values directly control how quickly and to what degree RADICAL INS 2 corrects the Lift Axis angle.

STRENGTH

Controls the magnitude of the correction applied to the Lift Axis based on position error - maintains target angle of the Boom. Typically adjusted along with STIFFNESS.

STIFFNESS

Controls the speed of the correction applied in order to minimize angular rate changes of the Boom - improves the rate of response. Typically adjusted along with STRENGTH.

FILTER

Default set to "0". Normally adjustment is not required for successful operation of the system. In certain rare situations, it may be necessary to add more filtering to the data to prevent or reduce oscillations. Do not adjust this unless you have specifically been advised to do so, as increasing filter values too much can lead to a slower response time, and in some cases, system instability, depending on the STRENGTH and STIFFNESS settings.

Understanding INS Advanced Stabilization

High-frequency vs. High-amplitude

The standard RADICAL Passive Isolator is built to buffer against high-frequency disturbances. For example, continuously rough terrain like gravel, or sharp thuds/hits on terrain like cracks, potholes, etc. There are inherent limitations to the disturbance amplitude that the Passive Isolator can correct against.

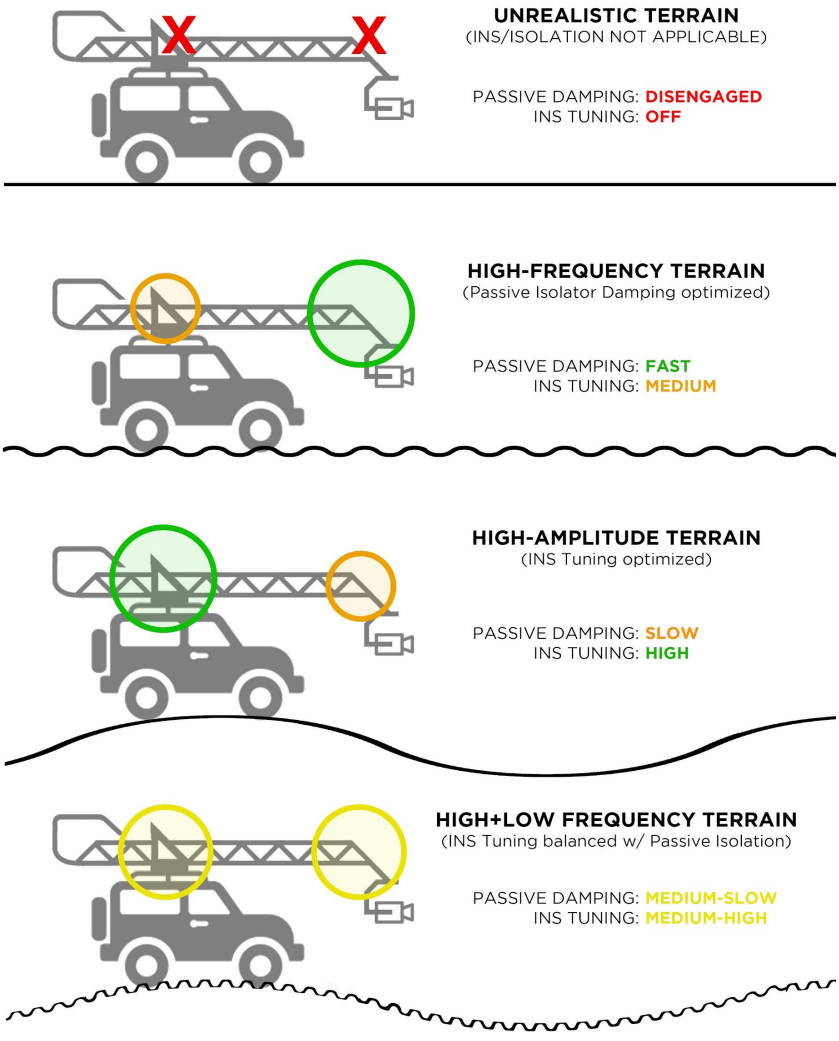
Conversely, RADICAL INS 2 Advanced Stabilization actively corrects against high-amplitude disturbances and vehicle movements. For example, driving up and down a ramp or over rolling hills at moderate speeds. There are inherent limitations to the frequency at which the Lift-Axis can be moved in order to correct against disturbances.

Referring to the image on the right, you can see how the Passive Isolator damping and RADICAL INS 2 Tuning can be optimized for various terrain scenarios.

High *frequency* terrains are best suited by an Isolator with damping set to 80-100% FAST. This, however, prevents RADICAL INS 2 Tuning from reaching HIGH Levels.

High *amplitude* terrains are best suited by an Isolator with damping set to SLOW. This allows RADICAL INS 2 Tuning to reach HIGH Levels with oscillations.

Mixed terrains are best suited by an intermediate combination of Passive Isolator Damping and RADICAL INS 2 Tuning. This allows both systems to reach moderate levels of performance.



Optimizing RADICAL INS 2 Tuning

Passive Isolator Tuning

In order for RADICAL INS 2 tuning to be optimized, the Passive Isolator Damping must be dialed as "SLOW" as possible. This is to eliminate the tendency of the Lift-Axis to self-excite (oscillate) at higher tuning values. Keep in mind that based on the terrain you are operating in, it may be more useful to speed up Passive Isolator Damping while adjusting RADICAL INS 2 tuning values to MEDIUM or LOW levels.

Strength to Stiffness Ratio

In attempting to maximize the performance of RADICAL INS 2 Stabilization, it is important to maintain a relatively consistent ratio between STRENGTH and STIFFNESS. In general, the STIFFNESS value should be roughly 2X that of the STRENGTH value. Do not significantly increase or decrease one value while leaving the other unchanged, unless E-STOP is applied, as this could cause unwanted and potentially dangerous oscillations. Increasing or decreasing these values together is recommended.

Oscillation vs. Performance

Oscillation refers to the tendency of the boom to rapidly fluctuate around a certain position, causing unwanted and sometimes dangerous results. Oscillation generally happens when the STRENGTH and STIFFNESS values are too high for the specific combination of payload, Passive Isolator tuning and/or structural rigidity of the system to which RADICAL is mounted. Some stabilized heads, such as the Ronin 2, have a structural design that is not very stiff in the vertical (Z-axis) direction. Because of this, and the bandwidth achievable by RADICAL and INS 2, the arm can "lock-on" to the resonant frequency of the stabilized head, and induce self-excitation. Normally, this condition can easily be detected during INS 2 operation by simply moving the Lift Axis upwards and downwards a few times using the Command Console joystick. If the Lift Axis is vibrating or oscillatory during these movements, and generally feels *unstable*, this is a sign that the STRENGTH and STIFFNESS should probably be reduced (keeping in mind the STRENGTH/STIFFNESS ratio mentioned above). Once a tuning is achieved that feels satisfactory, in terms of user control, this is a good starting point.

In general, if the system is oscillating too much, first make sure that the Passive Isolator Damping is set to the slowest setting possible, given the terrain conditions you are operating in (refer to the figure in the *High-frequency vs. High-amplitude section*). Then, make sure that all rigging and connections between RADICAL modules are tight and secure. Finally, if this does not solve the problem, begin by reducing both STRENGTH and STIFFNESS (keeping in mind the 2X ratio mentioned above).

There is always a tradeoff between stability (no oscillations) and performance. Just like with stabilized heads, lower tuning values will be less prone to self-excitation/oscillation,

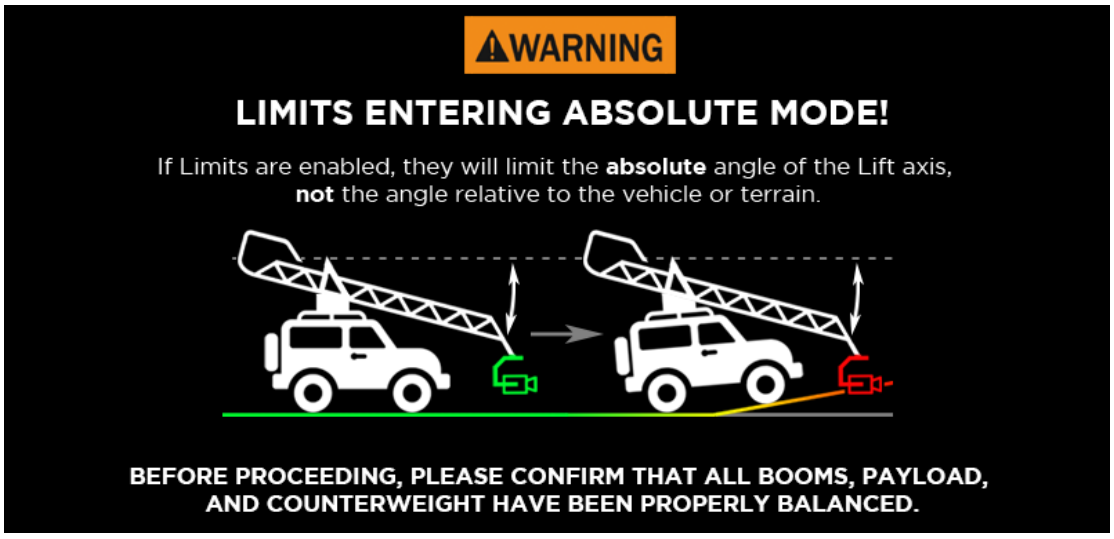
but may be limited in the speed and bandwidth of response. Conversely, high tuning values may achieve high stabilization performance, but are likely to self-excite and oscillate and generally feel less comfortable in terms of user control. Experimentation with your particular setup is key to fine-tuning and optimizing RADICAL INS 2 Stabilization, in addition to understanding the performance and operation of the system.

Recommended- Flowcine Tranquilizer

In our testing, we have found that the Flowcine Tranquilizer assists in reaching the highest levels of RADICAL INS 2 Tuning. The damping properties of the Tranquilizer help by absorbing energy in the mid to high frequency bands, which reduces oscillation tendencies and minimizes wear and heat generation in the Lift motor. With the addition of the Tranquilizer, you should generally be able to increase tuning values for STRENGTH by 1 or 2 points, and tuning values for STIFFNESS by 1 to 4 points, before unwanted oscillations start to occur during normal operation and movement.

Range of Motion Limits in RADICAL INS 2 Stabilization Mode

When Lift limits are enabled, RADICAL INS 2 Stabilization uses limits that are absolute to the outside world, where 0 degrees is horizontal and perpendicular to the direction of gravity. This is in contrast to relative limits that are used during standard operation without RADICAL INS 2 Stabilization. Relative limits operate on the relative angle measured from the encoder between the RADICAL Fulcrum and Base. For this reason, the operator must be aware of the implications and how this influences the behavior of the Boom during various terrain changes. The image here visually describes the operation of absolute limits, and one potential type of terrain risk. This screen is displayed upon turning ON the RADICAL INS 2 Stabilization feature to remind the operator. Knowledge of the system and consistent practice with the RADICAL INS 2 Stabilization feature are critical to minimize risk in operation. For more general Limits information, refer to the RADICAL Operation Manual.

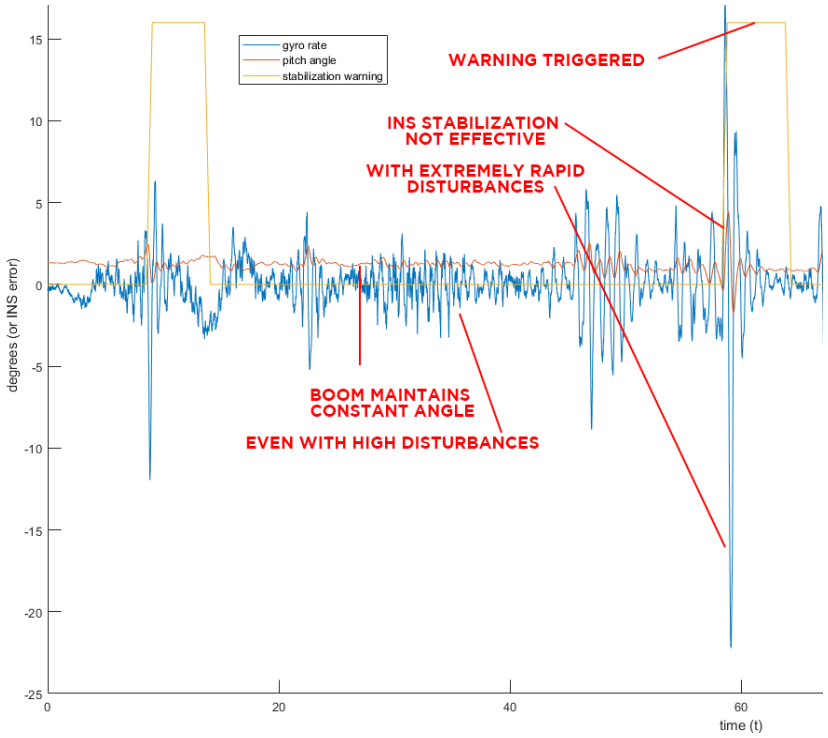


RADICAL INS 2 Restrictions

Every control system has a physical limit. If the vehicle enters terrain at high speeds that causes high frequency and high amplitude disturbances, RADICAL INS 2 may not be able to accurately stabilize the system, and in some cases could actually worsen the situation.

If the upper limit of stabilization performance is being reached, RADICAL INS 2 Advanced Stabilization provides notifications to the operator via the Command Console. The upper limit of stabilization performance is directly dependent on the degree to which the tuning values (Strength and Stiffness) have been optimized.

For most shooting conditions, RADICAL INS 2 Advanced Stabilization provides a substantial difference in minimizing vertical translations seen by the camera (Passive Isolator tuning is a key component of this equation).



In the figure above, the orange line represents the Lift Axis (boom) angle, the blue line represents the gyro rate, and the yellow line represents the warning that the vehicle is driving in conditions where stabilization is not as effective. Notice at the :58 second mark, the RADICAL INS 2 warning is triggered, alerting the operator that incoming disturbance has surpassed what the RADICAL INS 2 tuning is capable of.

From around 10 to 40 seconds the boom angle differs by less than 1 degree, even in the face of high disturbances. In this particular run, the vehicle entered off road terrain at high speed at around 55 seconds. You can see that there are large spikes in gyro rate, and the stabilization controller can no longer adequately compensate, causing the boom angle position to vary much more.

Useful Tips

- Balance - Proper balancing of the payload and counterweight should be done before using RADICAL INS 2. Ideally, the operator should be running a familiar setup that is known to be well-balanced. For new setups, always refer to the balancing chart in the RADICAL Operation Manual, and use the BALANCE TEST mode to fine-tune. If the balance is not set up properly, stabilization effectiveness will suffer and the Lift Axis motor will work harder than necessary in order to maintain a proper Boom angle. This could cause excess heat and accelerated wear on components.

- Limits - After Installing RADICAL INS 2 for the first time, Lift limits should be set up again, while the RADICAL INS 2 Sensor is connected and properly functioning. It is recommended to set up limits BEFORE using RADICAL INS 2 for the first time. It is recommended to set up limits with the vehicle on a flat, horizontal surface.

- Mounting and Rigging - Loose or sloppy rigging, and the mounting of the RADICAL Base, Booms, and Fulcrum, directly contribute to the performance of RADICAL INS 2 Stabilization, and directly limit the upper end of tuning possible. Make sure that all mounting points are tight and checked regularly. Sloppy rigging and loose connections between the Base, Booms, or Fulcrum may cause oscillations and poor performance.

- System Stability - The RADICAL INS 2 Stabilization system is built to accommodate a wide range of vehicles, payloads, and terrain conditions. It may be possible to tune the system to levels that are not stable and exhibit frequent oscillations during vehicle maneuvers as well as operator movements of the Lift Axis. If this type of behavior is present, it is recommended to tune down both STRENGTH and STIFFNESS to a more stable level, so that it feels smooth to make typical Lift Axis movements in RADICAL INS 2 Stabilization mode.

Known Hazards

⚠WARNING The following list represents known hazards that exist when operating the RADICAL INS 2. This is not exhaustive, but represents some common hazards to watch out for.

- Lift Motor Temperature at rest. If the DISARM button is released while stationary for long periods of time, the Lift Motor and Brake may accumulate heat faster than it can be dissipated, and Lift Motor Temperature warnings may be triggered. This is more likely to occur in higher ambient temperatures. Avoided by pressing the DISARM button whenever stationary, or whenever the arm is not in use.

- Extreme Lift angles. If the Lift Axis is positioned at extremely high or low angles, the Fulcrum may "bottom out" and make contact with the internal limit switches, causing an exit from INS 2 Stabilization mode and triggering a warning. This means that the system is close to its range of motion limits and further movement cannot be made, in order to protect the system from colliding with itself.

- Motor stall on terrain, rigging, etc. If the arm makes contact with the terrain, vehicle rigging, or other objects, the RADICAL INS 2 Lift Motor may stall and momentarily draw extremely high amounts of power. RADICAL has extensive self-protection measures in place to detect stall and immediately reduce power, but under extremely rapid stalls, it is still a possibility that the power electronics and motor drivers sustain damage.

- Proper RADICAL INS 2 Tuning. Proper RADICAL INS 2 tuning is key to achieving good stabilization performance, but also for preventing potentially damaging shock loads to the system. The stabilization capabilities are directly related to the strength and stiffness of the tuning, and therefore this can limit the type of terrain the system can safely handle if not tuned well. Extreme or sudden vehicle movements that greatly exceed the stabilization capabilities of the system can potentially inflict mechanical damage that can limit the usable life of the system.

- RADICAL INS 2 mounting. The RADICAL INS 2 Sensor should be mounted rigidly with the appropriate threadlocker and torque specs, as per MotoCrane Instructions. This can be disregarded if the RADICAL INS 2 Sensor installation was done by MotoCrane.

- Extreme/Off-Road Terrain. As mentioned earlier, the RADICAL INS 2 stabilization is not as effective for extreme terrain and high amplitude, high frequency conditions. The system will inform the operator if these

conditions are being approached. Learn the differences where RADICAL INS 2 stabilization should and should not be used.

- RADICAL INS 2 Cable. Ensure the RADICAL INS 2 Cable is properly installed and locked on to the sockets on both ends.

- Operator awareness. The operator should be aware of the different RADICAL INS 2 parameters, warnings and errors displayed on the MotoCrane Controller.

Transporting the RADICAL INS 2

- Disconnect and store the RADICAL INS 2 cable if transporting the module in the flight case. The INS 2 Sensor can remain attached to the Boom during transport.

Troubleshooting RADICAL INS 2 Advanced Stabilization

Diagnosing with LEDs

The RADICAL INS 2 Sensor module contains a green LED to indicate it is receiving power. This LED is the first indication of whether or not the connection is good. If RADICAL INS 2 functionality is absent or causing warnings or errors, and the green LED is ON, please refer to the next section for more detailed troubleshooting information.

Diagnosing with GUI Warning and Error Messages

RADICAL has multiple internal sensors and an error reporting system built into the GUI. The RADICAL INS 2 shares this error and warning reporting infrastructure and allows the operator to monitor these events via the MotoCrane Command Console. If an active error or warning is present, the respective red or yellow icon will be displayed. A yellow icon indicates a warning, and the MotoCrane Command Console will beep once to alert the operator. A red icon indicates an error, and the MotoCrane Command Console will beep repeatedly until the icon is touched or the DISARM physical switch is pressed by the operator. Touching the error or warning icon will bring you to the STATUS Control Panel, where you can see a list of active errors and warnings. If you are experiencing an intermittent issue, and the warning or error is not currently active, you can review events by navigating to the LOG. The LOG will also provide a list of errors and warnings that have occurred, along with the time since the event occurred. Note that the LOG will only hold the most recent 10 events. From either the STATUS or LOG Control Panel, you can access the

Code Lookup Table, which will provide you with a short description of the error or warning and a recommended first step for troubleshooting and clearing the issue.

Code	Description	Service	Details
203	RADICAL INS 2 Stabilization Disabled From Error	• Power cycle system and attempt re-enable	As RADICAL INS 2 Advanced Stabilization is autonomous and controls boom movement without operator intervention, it is highly dependent on internal sensors to maintain safe operation. If any condition arises that could potentially cause unsafe operation, RADICAL INS 2 Stabilization will be disabled and this error will occur. Power cycling the RADICAL system will clear this error. If the error persists, contact Customer Support and note any other corresponding error codes that occur along with it.
205	RADICAL INS 2 Data Timeout Warning	• Use caution - contact Customer Support if warning is persistent	In order to provide accurate and effective stabilization, the RADICAL INS 2 system requires data at a consistent, rapid rate. In the event that this data stream becomes compromised or interrupted frequently, this warning will occur. The system will still function properly, but the warning should be investigated. Contact Customer Support if it persists.
206	RADICAL INS 2 Data Timeout Error	• Power cycle - contact Customer Support if the error persists	In order to provide accurate and effective stabilization, the RADICAL INS 2 system requires data at a consistent, rapid rate. In the event that this data stream becomes compromised or interrupted often, or for extended periods of time, this error will occur. Contact Customer Support if it persists and cannot be cleared.
209	RADICAL INS 2 Data Invalid	• Power cycle - contact Customer Support if error persists	In addition to timing checks, the RADICAL INS 2 system ensures data integrity by comparing all new data for plausibility and discontinuities. In the event that multiple erroneous data values are seen, this error

			occurs and the RADICAL INS 2 system is turned off until power cycling. Contact Customer Support if the error persists.
211	RADICAL INS 2 Stabilization Capabilities Exceeded	• Turn off stabilization if this warning is persistent	As mentioned in this manual, RADICAL INS 2 Advanced Stabilization has a limit to what it can correct for. If vehicle movements are too extreme for the capabilities of RADICAL INS 2 stabilization, this warning will trigger. If this warning keeps occurring, RADICAL INS 2 stabilization should be turned off until terrain or maneuvers become less intense.
223	RADICAL INS 2 Heartbeat Timeout	• Power cycle system and attempt to re-enable	In order to ensure reliable communication, the RADICAL INS 2 Sensor sends a periodic heartbeat message. If communication is lost, this error will trigger and RADICAL INS 2 stabilization will be turned off until power cycle. Contact Customer Support if this error is persistent.

If these steps don't fix your problem, please contact us at support@motocrane.com. We can help troubleshoot and diagnose the issue. If we determine that a manufacturing defect exists in a part and it is covered under the Limited Warranty, we will repair the unit at no cost to you. If your system is experiencing general wear and tear, we can advise on your options to get your system back to 100%. This includes potential upgrades, component replacement, or sending your unit back to MotoCrane Headquarters for a tune up.

Maintenance

None required - contact Customer Support if you believe the unit requires service or maintenance.

Weather & Water

The RADICAL INS 2 is IP67 rated and can withstand the same conditions as the rest of the IP-rated RADICAL modules.

Specifications

Mechanical

Module Weight
RADICAL INS 2: 2lbs

Electrical

RADICAL INS 2 Input/Output: 5V power, RS232 Signal
Certifications: CE, RoHS

Revision History

Revision	Date	Description
1.0	NOV 2021	Initial Release

MotoCrane Support
support@motocrane.com

This content is subject to change.

Download the latest version from
www.motocrane.com/knowledge-base

If you have any questions about this document, please contact MotoCrane, LLC by sending a message to contact@motocrane.com.