

4THAXIS

BY DRAGDYNAMICS.COM

INSTALLATION AND CONFIGURATION



DISCLAIMERS, TRADEMARKS, WARRANTY

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Drag Dynamics is not affiliated with Holley Corporation in any way – we just like using their products and developing complementary parts that work with Holley.

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Parts Included

1 – 4thAXIS Sensor Module

1 – 4' Wire Harness, DTP Connector assembled – Flying Leads

Operation:

For use with Holley Dominator, HP, Terminator X/XMAXX systems only. See “Requirements” section for minimum supported firmware versions.

3 Axis Accelerometer:

4thAXIS channels 1-3 output a highly accurate X, Y and Z axis measurement of acceleration (G forces) to +/- 4G. This is transmitted to 3 separate channels in your Holley ECU over CAN Bus where you can log the channels and use them for any other logic functions in realtime, such as power management.

Corrected Linear Acceleration

4thAXIS Channel 4 reports a Corrected Linear Acceleration value. This channel is similar to X-Axis on a typical G-Meter, minus the effects of pitch, gravity, and vibration that causes standard X-Axis data to become inaccurate or unusable. This helps with pass-to-pass repeatability regardless of chassis angle, surface preparation, etc. This is very useful to measure true acceleration values in cars that require large chassis angles for best performance.

General Information and Use:

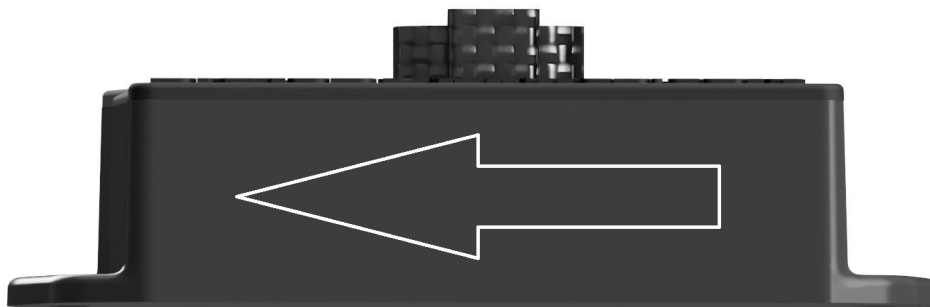
Power Consumption: The 4thAXIS uses 5 volt power and (sensor) ground directly from your Holley ECU, just like any other 5v sensors. This unit consumes no more than 0.003 amps (30 milliamps) during use.

Performance: The 4thAXIS samples chassis orientation and movement at 400khz, and generates CAN data packets at 100 samples per second, the fastest a Holley can receive and store CAN data. This results in a maximum time of .005 seconds between sensor measurement and delivery to your ECU.

Requirements: The 4thAXIS requires your Holley Dominator and HP ECU be running firmware Version 6 Build 220 or later. Holley Terminator X/XMAXX ECUs must be updated to Terminator X V2 build 70 or later.

Wiring and Installation

Mounting: Mount the 4thAXIS module on a horizontal surface in your vehicle chassis. The arrow on the top of the module must point in the forward direction the car travels during racing. The unit can be mounted just about anywhere that's relatively flat and level, but best performance comes from mounting near the chassis pivot (rear axle) as low as possible. The 4thAXIS will self-level each time power is applied, but the closer you have it mounted level in your chassis, the better. The mount can be rigid – unlike other inertia measurement systems, this one will filter high frequency noise from chassis vibrations. The unit can be mounted anywhere temperatures won't exceed 170* F continuous. The unit operates reliably in temperatures as low as 45* F continuous, and uses internal temperature compensation.



Wiring:

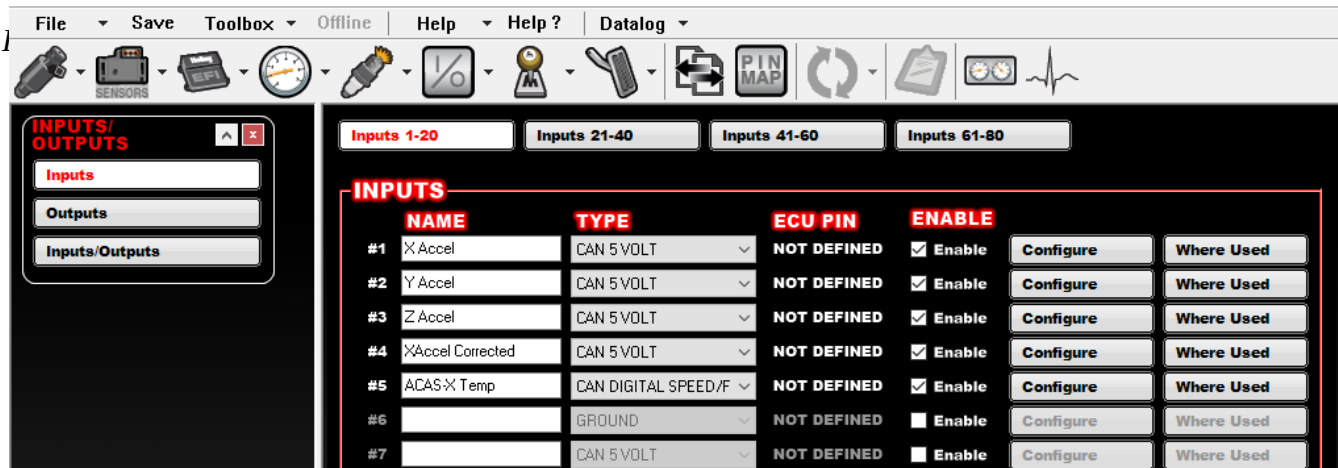
Pin:	Color:	Function:
1	Orange	+5v Power from Holley VREF +5v circuit. DO NOT CONNECT TO IGNITION POWER
2	Black	Ground – attach to Holley Sensor Ground circuit. DO NOT CONNECT TO CHASSIS OR BATTERY GROUND
3	Orange	CAN Bus Low. Connect to Holley CAN Low (also Orange)
4	Orange/Blk	CAN Bus High. Connect to Holley CAN High (Orange/Blk)



Holley Software Configuration:

Input Channels

Open a tune file you wish to configure for the 4thAXIS, or download the current tune from your car's ECU.



Open the I/O menu, select the Inputs menu option, and create four input channels input as shown in Figure 1: I/O Input Config. The first 3 channels (X, Y, and Z Accel) are set up as type “CAN 5 VOLT”. The 5th channel, 4thAXIS Temperature, is configured as type CAN DIGITAL SPEED/FREQ. Be sure to check the “enable” box for each.

If you do not see the I/O menu, add it by going to the Toolbox menu, then select “Add Individual Config”. Open the “IO” Folder, and select “Base Config – Blank IO” to add the IO option to your calibration.

X-Accel Configuration

Click the Configure button for the “X Accel” input you created above. Set up the options on this screen as seen in Figure 2. Set the Type to “Custom 5v” - make sure to set the voltage scale from 1.0v to 5.0v, and the calibration table from -4.000 to +4.000. Units should be set to the letter “G” (type units manually as there’s no drop down option). **Make sure you scale the Voltage row from 1.00v to 5.00v!**


X Accel [Back] [CAN Settings] [Sensor Settings]

SETTINGS

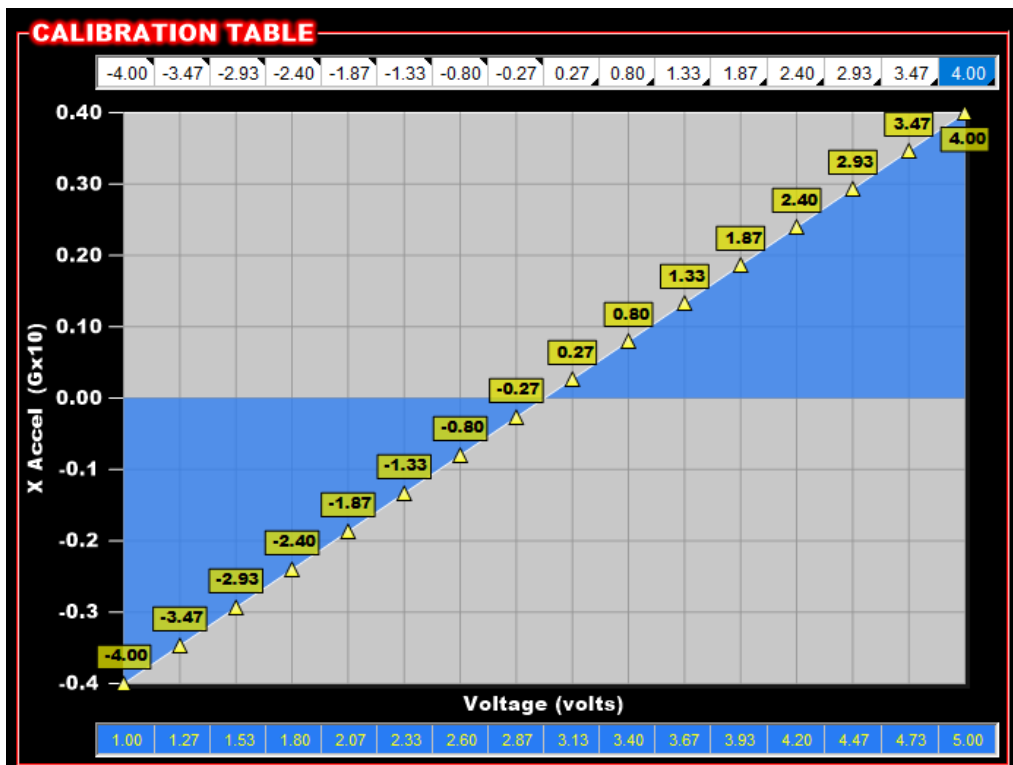
Type: Custom 5V
 Units: G
 Format: 1.23

Sensor Min: -4.00 G
 Display Min: -4.00 G
 Caution Min: -4.00 G
 Normal Min: -4.00 G

Sensor Max: 4.00 G
 Display Max: 4.00 G
 Caution Max: 4.00 G
 Normal Max: 4.00 G



Enable PC/LCD Caution Output Enable Switched Caution Output
 Enable PC/LCD Warning Output Enable Switched Warning Output
 Warning Enabled Timing Offset: 0



X-Accel (continued) CAN Settings

Click on the “CAN Settings” button to set up the X-Axis CAN input.

X Accel **Back** **CAN Settings** **Sensor Settings**

CAN SETTINGS

CAN Device	CAN I/O Module	CAN Serial	660
CAN Channel	Input #1	Broadcast Rate	100.0 Hz
CAN Bus	CAN BUS 1		

Set up your CAN settings exactly as shown above, EXCEPT you will enter the “CAN Serial” number that’s printed on the backside of your 4thAXIS sensor. **This completes setup of the X-Axis channel.**

Y-Accel Configuration

Click the Configure button for the “Y Accel” input you created above. Set up the options on this screen as seen in Figure 2. Set the Type to “Custom 5v” - make sure to set the voltage scale from 1.0v to 5.0v, and the calibration table from -4.000 to +4.000. Units should be set to the letter “G” (type units manually as there’s no drop down option). **Make sure you scale the Voltage row from 1.00v to 5.00v!**

Y Accel [Back] [CAN Settings] [Sensor Settings]

SETTINGS

Type: Custom 5V

Units: G

Format: 1.23

Sensor Min: -4.00 G

Display Min: -4.00 G

Caution Min: -4.00 G

Normal Min: -4.00 G

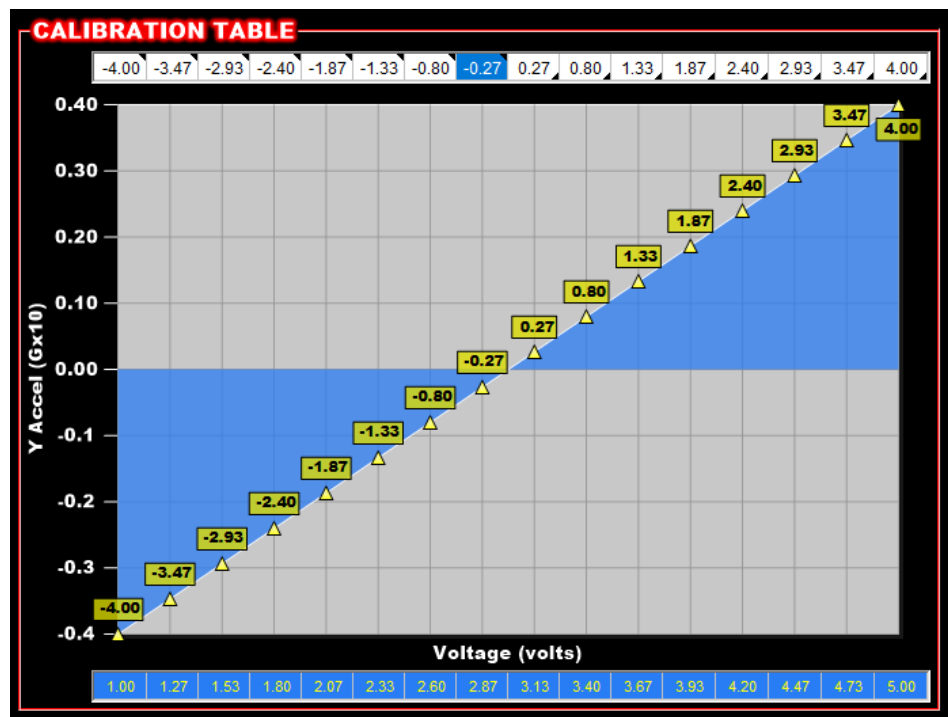
Sensor Max: 4.00 G

Display Max: 4.00 G

Caution Max: 4.00 G

Normal Max: 4.00 G

Enable PC/LCD Caution Output Enable Switched Caution Output
 Enable PC/LCD Warning Output Enable Switched Warning Output
 Warning Enabled Timing Offset: 0



Y-Accel (continued) CAN Settings

Click on the “CAN Settings” button to set up the Y-Accel CAN input.

Y Accel **Back** **CAN Settings** **Sensor Settings**

CAN SETTINGS

CAN Device	CAN I/O Module	CAN Serial	660
CAN Channel	Input #2	Broadcast Rate	100.0 Hz
CAN Bus	CAN BUS 1		

Set up your CAN settings exactly as shown above, EXCEPT you will enter the “CAN Serial” number that’s printed on the backside of your 4thAXIS sensor. **This completes setup of the Y-Axis channel.**

Z-Accel Configuration

Click the Configure button for the “Z Accel” input you created above. Set up the options on this screen as seen in Figure 2. Set the Type to “Custom 5v” - make sure to set the voltage scale from 1.0v to 5.0v, and the calibration table from -4.000 to +4.000. Units should be set to the letter “G” (type units manually as there’s no drop down option). **Make sure you scale the Voltage row from 1.00v to 5.00v!**

Z Accel Back CAN Settings Sensor Settings

SETTINGS

Type: Custom 5V

Units: G

Format: 1.23

Sensor Min: -4.00 G

Display Min: -4.00 G

Caution Min: -4.00 G

Normal Min: -4.00 G

Sensor Max: 4.00 G

Display Max: 4.00 G

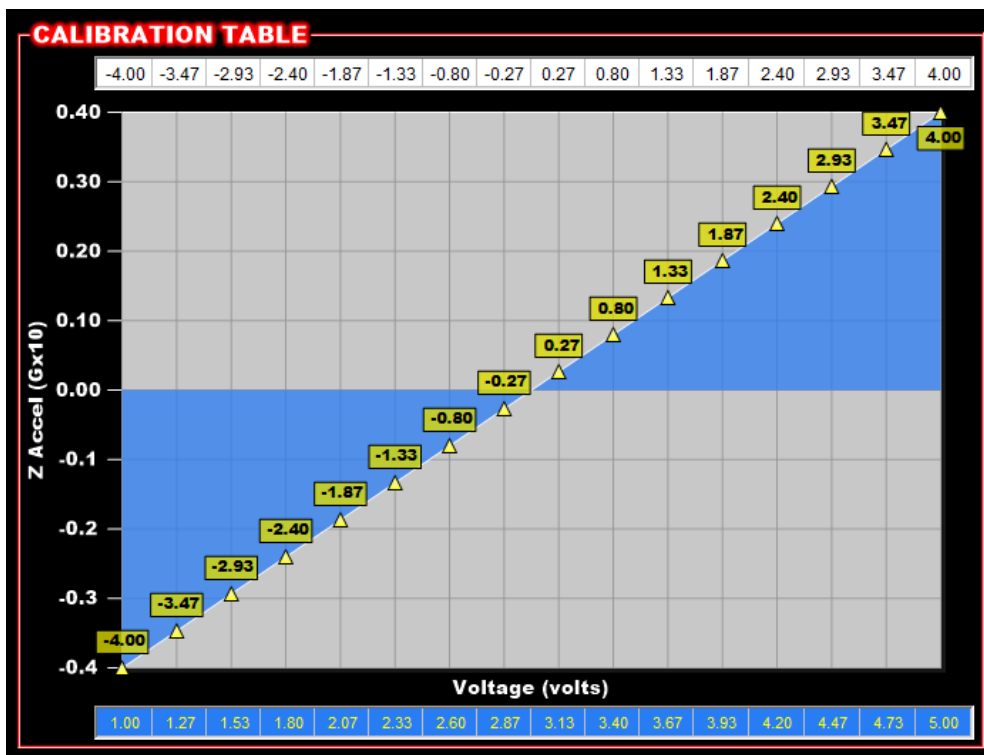
Caution Max: 4.00 G

Normal Max: 4.00 G

Enable PC/LCD Caution Output Enable Switched Caution Output

Enable PC/LCD Warning Output Enable Switched Warning Output

Warning Enabled Timing Offset: 0



Z-Accel (continued) CAN Settings

Click on the “CAN Settings” button to set up the Z-Accel CAN input.

Z Accel **Back** **CAN Settings** **Sensor Settings**

CAN SETTINGS

CAN Device	CAN I/O Module	CAN Serial	660
CAN Channel	Input #3	Broadcast Rate	100.0 Hz
CAN Bus	CAN BUS 1		

Set up your CAN settings exactly as shown above, EXCEPT you will enter the “CAN Serial” number that’s printed on the backside of your 4thAXIS sensor. This completes setup of the Z-Axis channel.

Linear Acceleration Channel Configuration

Navigate to your I/O Inputs menu, find the Linear X Accel input and click “Configure”

INPUTS						
	NAME	TYPE	ECU PIN	ENABLE		
#1	X Accel	CAN 5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable	Configure	Where Used
#2	Y Accel	CAN 5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable	Configure	Where Used
#3	Z Accel	CAN 5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable	Configure	Where Used
#4	XAccel Corrected	CAN 5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable	Configure	Where Used
#5	ACAS-X Temp	CAN DIGITAL SPEED/F	NOT DEFINED	<input checked="" type="checkbox"/> Enable	Configure	Where Used
#6		GROUND	NOT DEFINED	<input type="checkbox"/> Enable	Configure	Where Used

Set up your Corrected X-Accel sensor settings as follows: Custom 5v, Units = G, Format = 1.23, Sensor min = -4.00G sensor max = 4.00G

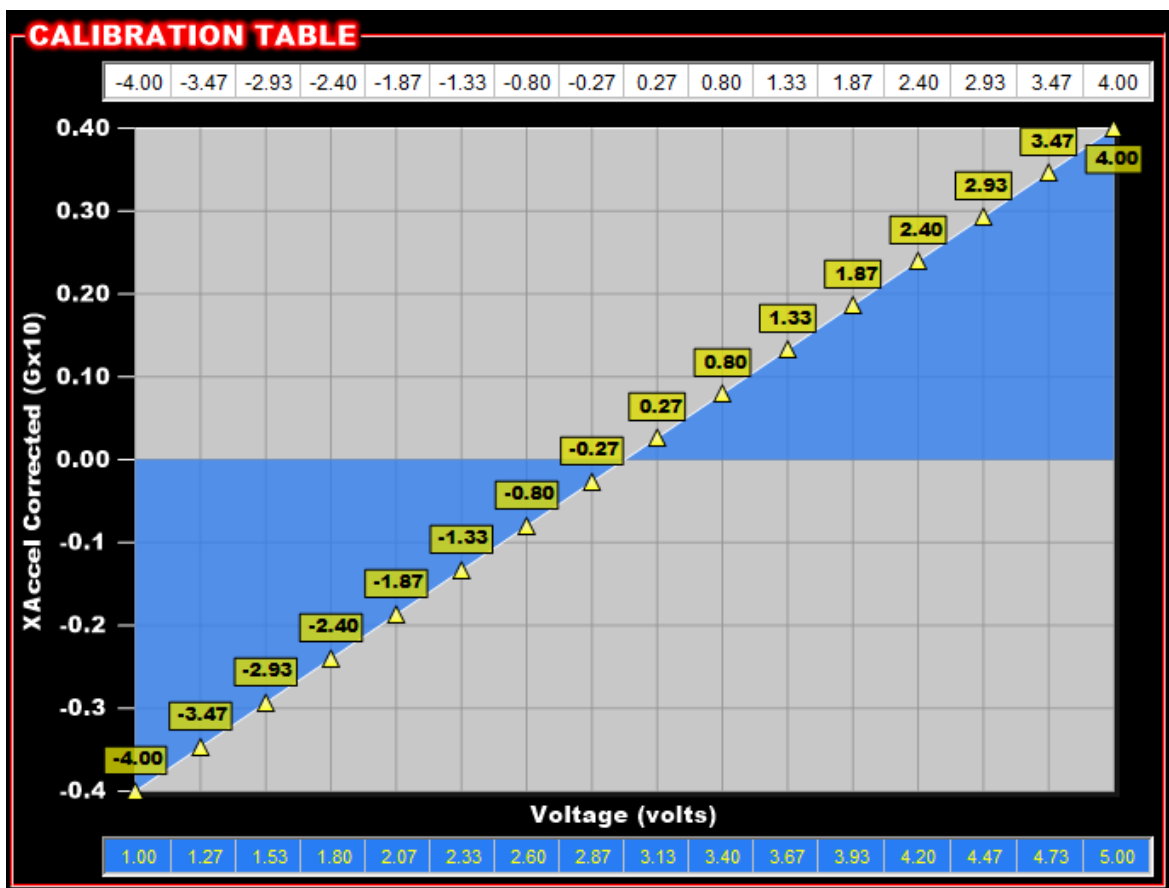
XAccel Corrected [Back](#) [CAN Settings](#) [Sensor Settings](#)

SETTINGS

Type	Custom 5V
Units	G
Format	1.23
Sensor Min	-4.00 G
Display Min	-4.00 G
Caution Min	-4.00 G
Normal Min	-4.00 G
Sensor Max	4.00 G
Display Max	4.00 G
Caution Max	4.00 G
Normal Max	4.00 G

Enable PC/LCD Caution Output Enable Switched Caution Output
 Enable PC/LCD Warning Output Enable Switched Warning Output
 Warning Enabled Timing Offset 0

Set your Corrected X-Accel Calibration Table as follows: Gs (Top) row = -4.00 to 4.00, Voltage (bottom) row 1.00v to 5.00v. **Make sure you use 1.00 to 5.00v and -4.00 to 4.00G.**



XAccel Corrected

Back **CAN Settings** Sensor Settings

CAN SETTINGS

CAN Device: CAN I/O Module CAN Serial: 660

CAN Channel: Input #4 Broadcast Rate: 100.0 Hz

CAN Bus: CAN BUS 1

Click on “CAN Settings” and configure the Corrected X-Accel CAN options as follows: **YOU WILL USE THE CAN SERIAL NUMBER PRINTED ON THE BOTTOM OF YOUR 4thAXIS**

This completes setup of the Corrected X-Accel Channel.

OPTIONAL: 4thAXIS Temperature Channel

If you wish to capture the temperature of your 4thAXIS onboard sensors, configure that input as follows. Remember to use YOUR CAN SERIAL ID NUMBER, not the one in the pictures.

ACAS-X Temp [Back] [CAN Settings] [Sensor Settings]

SETTINGS

Type: Frequency
Units: ^
Format: 1

Sensor Min: 10°
Display Min: 10°
Caution Min: 10°
Normal Min: 10°
Offset: 0.00°

Sensor Max: 250°
Display Max: 250°
Caution Max: 250°
Normal Max: 250°

Pulses to Average: 1

Enable PC/LCD Caution Output
 Enable Switched Caution Output
 Enable PC/LCD Warning Output
 Enable Switched Warning Output

ACAS-X Temp [Back] [CAN Settings] [Sensor Settings]

CAN SETTINGS

CAN Device: CAN I/O Module
CAN Channel: Input #4
CAN Bus: CAN BUS 1

CAN Serial: 105
Broadcast Rate: 5.0 Hz

This completes setup of the 4thAXIS Temperature Sensor Channel.

Dragdynamics.com Product Warranty

Limited 3-Year Warranty

Congratulations on your purchase of an 4thAXIS! We stand behind the quality of our products and are pleased to offer you a limited warranty against manufacturer defects and problems. Please read the following terms carefully.

Warranty Coverage: Drag Dynamics, LLC ("the Company") warrants that your 4thAXIS (the "Product") is free from defects in materials and workmanship for a period of three (3) years from the date of purchase, provided that the Product is used under normal conditions and for its intended purpose.

Scope of Warranty: This warranty covers any defects or malfunctions arising from the manufacturing process or materials used in the Product. The Company will, at its discretion, repair or replace the defective Product or parts, or provide a refund, within the warranty period.

Original Purchaser Coverage: This warranty is applicable only to the original purchaser of the Product and is non-transferable. To be eligible for warranty service, the original proof of purchase must be presented.

Exclusions: This warranty does not cover damage resulting from:

- Accidents, misuse, or abuse
- Unauthorized modifications or repairs
- Acts of nature, such as lightning, floods, earthquakes, etc.
- Normal wear and tear

Obtaining Warranty Service: If you believe your Product is defective and covered by this warranty, please email support@dragdynamics.com for instructions on how to proceed with the warranty claim. The Company reserves the right to require proof of purchase and may ask for the defective Product to be returned for inspection.

Limitation of Liability: To the extent permitted by law, the Company's liability under this warranty is limited to the repair, replacement, or refund of the Product, and shall not exceed the purchase price paid for the Product.

No Other Warranties: This warranty is the sole and exclusive warranty for the Product, and no other warranties, express or implied, are made, including any warranty of merchantability or fitness for a particular purpose.

Effective Date: This warranty is effective as of the date of purchase and is valid for three (3) years.

Thank you for choosing Drag Dynamics, LLC. We appreciate your trust in our products.