

[Instruction Set](#) > [CIP Axis Attributes](#) > Inertia Test Configuration Attributes

Search

- ▷ [Quick Start Steps](#)
- ▷ [Logix Designer](#)
- ▷ [Module Information](#)
- ◀ [Instruction Set](#)

[Logix 5000 Controllers](#)

[Instruction and Application Considerations](#)

[Logix Designer Application Instruction Set](#)

[Interpret the Attribute Tables](#)

[Array Concepts](#)
- ◀ [CIP Axis Attributes](#)

[AXIS_CIP_DRIVE Diagrams](#)

[AXIS_CIP_DRIVE Structure](#)

▷ [Accessing Attributes](#)

[AC Line Condition Attributes](#)

[Acceleration Control Attributes](#)

[Acceleration Control Configuration Attributes](#)

[Additional Error Code Information](#)

▷ [APR Fault Attributes](#)

[Auto-Tune Configuration Attributes](#)

▷ [Axis Exception Action Configuration Attributes](#)

[Axis Info Attributes](#)

[Axis Safety Status Attributes](#)

[Axis Statistical Attributes](#)

[CIP Axis Status Attributes](#)

[CIP Error Codes](#)

[CIP Motion Axis Control Modes](#)

▷ [Command Reference Generation Attributes](#)

[Configuration Fault Attributes](#)

[Control Mode Attributes](#)

[Converter AC Line Configuration Attributes](#)

[Converter AC Line Monitoring Attributes](#)

[Converter AC Line Source Configuration Attributes](#)

[Converter Bus Voltage Control Configuration Attributes](#)

[Converter Bus Voltage Control Signal Attributes](#)

[Converter Control Mode Attributes](#)

Inertia Test Configuration Attributes

These are the attributes that are associated with inertia test configuration applied to a Motion Control Axis.

Tuning Select

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - C	Set/SSV#		USINT	0	-	-	Enumeration 0 = Total Inertia 1 = Motor Inertia 2...255 = Reserved

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

This enumerated attribute is used by the Auto-tuning software to determine where the measured inertia results of the test are to be stored. If set to 'motor test', the measured inertia is stored in the Rotary Motor Inertia attribute or Linear Motor Mass attribute. If set to 'total inertia', the measured inertia is applied to the Total Inertia attribute or Total Mass attribute.

Tuning Direction

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - C	Set/SSV#		USINT	0	-	-	Enumeration 0 = Unidirectional Forward 1 = Unidirectional Reverse 2 = Bidirectional Forward 3 = Bidirectional Reverse 4...255 = Reserved

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

This enumerated value determines the direction of the motion profile initiated by the Inertia Test service associated with the Motion Run Axis Tuning (MRAT) instruction.

Tuning Travel Limit

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
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Required - C	Set/SSV#		REAL	0	0	maxpos	Position Units

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

The Tuning Travel Limit attribute is used by the Inertia Test service, associated with the MRAT instruction, to limit the excursion of the axis during the test. If, while performing the Inertia Test motion profile, the drive determines that the axis will not be able to complete the profile before exceeding the Tuning Travel Limit, the drive will terminate the profile and report that the Tuning Travel Limit was exceeded through the Tune Status attribute. This does not mean that the Tuning Travel Limit was actually exceeded, but that had the tuning process gone to completion that the limit would have been exceeded.

Tuning Speed

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - C	Set/SSV#		REAL	0	0	∞	Position Units / Sec

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

The Tuning Speed attribute value determines the maximum speed used by the Inertia Test service initiated motion profile. This attribute should be set to the desired maximum operating speed of the motor prior to running the test. The tuning procedure will measure maximum acceleration and deceleration rates based on ramps to and from the Tuning Speed. Thus, the accuracy of the measured acceleration and deceleration capability is reduced by tuning at a speed other than the desired operating speed of the system.

Tuning Torque

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - C	Set/SSV#		REAL	100	0	∞	% Rated

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

The Tuning Torque attribute value determines the maximum torque used by the Inertia Test service initiated motion profile. This attribute will be set to the desired maximum safe torque level prior to running the test. The default value is 100%, which yields the most accurate measure of the acceleration and deceleration capabilities of the system. In some cases a lower tuning torque limit value may be desirable to limit the stress on the mechanics during the tuning procedure. In this case the acceleration and deceleration capabilities of the system are extrapolated based on the ratio of the tuning torque to the maximum torque output of the system. Note that the extrapolation error increases as the Tuning Torque value decreases.

Load Ratio

[Attributes](#)

[Converter Current Control Configuration Attributes](#)

[Converter Current Control Signal Attributes](#)

[Converter Current Reference Configuration Attributes](#)

[Converter Current Reference Signal Attributes](#)

[Converter Output Attributes](#)

[Converter Reactive Power Control Attributes](#)

[Converter Types](#)

[Current Control Signal Attributes](#)

[Current Control Configuration Attributes](#)

[Cyclic Read and Cyclic Write](#)

[DC Bus Condition Attributes](#)

[Device Function Codes](#)

[Device Commissioning Attributes](#)

[Drive General Purpose I/O Attributes](#)

[Drive Output Attributes](#)

[Drive Parameters](#)

[Event Capture Attributes](#)

[Exception Factory Limit Info Attributes](#)

[Exception User Limit Configuration Attributes](#)

[Exception, Fault and Alarm Attributes](#)

[Exceptions](#)

[Fault and Alarm Behavior](#)

[Feedback Interface Types](#)

[Feedback Configuration Attributes](#)

[Frequency Control Configuration Attributes](#)

[Frequency Control Signal Attribute](#)

[General Feedback Info Attributes](#)


[General Feedback Signal Attributes](#)

[General Linear Motor Attributes](#)

[General Motor Attributes](#)

[General Permanent Magnet Motor Attributes](#)

[General Rotary Motor](#)

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - C	Set/SSV#		REAL	0 DB	0		Rotary Motor: Load Ratio = (total inertia / motor inertia) - 1. Linear Motor: Load Ratio = (total mass / motor mass) - 1.

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).


The Load Ratio attribute's value represents the ratio of the load inertia or mass to the motor inertia or mass.

The value for Load Ratio may be known by the user or may be measured as part of a software initiated Autotune process.

When Use Load Ratio bit is set in the Gain Tuning Configuration Bits attribute, configuration software uses the value of Load Ratio to compute Total Inertia/Mass and System Inertia attributes.

The Load Ratio value may also be used in calculations associated with System Damping attribute.


Total Inertia

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - C (Rotary Motor)	Set/SSV#		REAL	FD	0		Inertia Units

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

Total Inertia represents the combined inertia of the rotary motor and load in engineering units.

Total Mass

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - C (Linear Motor)	Set/SSV#		REAL	FD	0		Mass Units

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

Total Mass represents the combined mass of the linear motor and load in engineering units.

[Attributes](#)

[Guard Safety Attributes](#)

[Guard Safety Status Attributes](#)

[Hookup Test Configuration Attributes](#)

[Hookup Test Result Attributes](#)

[Identify Motion Axis](#)

[Attributes Based on Device Function Codes](#)

[Induction Motor Attributes](#)

[Inertia Test Configuration Attributes](#)

[Inertia Test Result Attributes](#)

[Initialization Faults Attributes](#)

[Interior Permanent Magnet Motor Attributes](#)

[Linear PM Motor Attributes](#)

[Load Transmission and Actuator Attributes](#)

[Local Mode Configuration Attribute](#)

[Module/Node Fault and Alarm Attributes](#)

▷ [Motion Control Axis](#)

[Behavior Model](#)

[Motion Control Configuration Attributes](#)

[Motion Control Interface Attributes](#)

[Motion Control Methods](#)

[Motion Control Modes](#)

[Motion Control Signal Attributes](#)

[Motion Control Status Attributes](#)

[Motion Database Storage Attributes](#)

[Motion Dynamic Configuration Attributes](#)

[Motion Fault and Alarm Exceptions](#)

[Motion Homing Configuration Attributes](#)

[Motion Instruction Compatibility](#)

[Motion Planner Configuration Attributes](#)

[Motion Planner Output Attributes](#)

▷ [Motion Scaling Attributes](#)

[Motor Attributes](#)

[Motor Attributes Model](#)

5/1/2021

Total DC Bus Capacitance

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - G	Set/SSV#		REAL	FD	0	∞	∞F

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

Total DC Bus Capacitance attribute represents the combined capacitance of the regenerative converter and external DC Bus capacitance.

External DC Bus Capacitance

Usage	Access	T	Data Type	Default	Min	Max	Semantics of Values
Required - G	Set/SSV#		REAL	0	0	∞	∞F

Indicates the attribute cannot be set while the tracking command (Tracking Command bit in CIP Axis Status is true).

External DC Bus Capacitance represents the combined capacitance of all the external devices that share the DC Bus output of the regenerative converter.

See also

[Motor Test Result Attributes](#)

[Hookup Test Result Attributes](#)

[Hookup Test Configuration Attributes](#)

[Inertia Test Result Attributes](#)

[Auto-Tune Configuration Attributes](#)

[Motor Attributes Model](#)

- [Motor Test Result Attributes](#)
- [No Control Mode](#)
- [Position Control Mode](#)
- [Position Loop Signal Attributes](#)
- [Position Loop Configuration Attributes](#)
- [Power and Thermal Management Configuration Attributes](#)
- [Power and Thermal Management Status Attributes](#)
- [Replicated Attributes](#)
- [Required vs. Optional Axis Attributes](#)
- [Reset an APR Fault](#)
- [Rockwell Automation Specific CIP Axis Alarm Names](#)
- [Rockwell Automation Specific Exceptions](#)
- [Rockwell Automation Specific CIP Axis Fault Names](#)
- [Rockwell Automation Specific Initialization Faults](#)
- [Rockwell Automation Specific Start Inhibits](#)
- [Rotary PM Motor Attributes](#)
- [Standard CIP Axis Fault and Alarm Names](#)
- [Standard Exceptions](#)
- [Rotary PM Motor Attributes](#)
- [Standard Initialization Faults](#)
- [Standard Start Inhibits](#)
- [Start Inhibits Attributes](#)
- [State Behavior](#)
- ▷ [Stopping and Braking Attributes](#)
- [Torque Control Mode](#)
- [Torque/Force Control Configuration Attributes](#)
- [Torque/Force Control Signal Attributes](#)
- [Velocity Control Mode](#)
- [Velocity Loop Configuration Attributes](#)
- [Velocity Loop Signal Attributes](#)
- ▷ [Module Configuration Attributes](#)

[Bit Addressing](#)

[Common Attributes](#)

[Data Conversions](#)

[Elementary data types](#)

[LINT data types](#)

[Floating Point Values](#)

[Immediate values](#)

[Index Through Arrays](#)

[Math Status Flags](#)

[Motion Error Codes \(.ERR\)](#)

[Structures](#)

- ▷ [Equipment Sequence instructions](#)
- ▷ [Equipment Phase Instructions](#)
- ▷ [Alarm Instructions](#)
- ▷ [Advanced Math Instructions](#)
- ▷ [Array_\(File\)/Misc Instructions](#)
- ▷ [Array_\(File\)/Shift Instructions](#)
- ▷ [ASCII Conversion Instructions](#)
- ▷ [ASCII Serial Port Instructions](#)
- ▷ [ASCII String Instructions](#)
- ▷ [Bit Instructions](#)
- ▷ [Compare Instructions](#)
- ▷ [Debug Instructions](#)
- ▷ [Drives Instructions](#)
- ▷ [Drive Safety Instructions](#)
- ▷ [For/Break Instructions](#)
- ▷ [Filter Instructions](#)
- ▷ [Function Block Attributes](#)
- ▷ [Structured Text Attributes](#)
- ▷ [Compute/Math Instructions](#)
- ▷ [Move/Logical Instructions](#)
- ▷ [Input/Output Instructions](#)
- ▷ [License Instructions](#)
- ▷ [Math Conversion Instructions](#)
- ▷ [Metal Form Instructions](#)
- ▷ [Motion Configuration Instructions](#)
- ▷ [Motion Event Instructions](#)
- ▷ [Motion Group Instructions](#)
- ▷ [Motion Move Instructions](#)
- ▷ [Motion State Instructions](#)
- ▷ [Multi-Axis Coordinated Motion Instructions](#)
- ▷ [Logical and Move Instructions](#)
- ▷ [Program Control Instructions](#)
- ▷ [Sequencer Instructions](#)
- ▷ [Special Instructions](#)
- ▷ [Timer and Counter Instructions](#)
- ▷ [Trigonometric Instructions](#)
- ▷ [Process Control Instructions](#)

- ▷ [Select/Limit Instructions](#)
- ▷ [Sequential Function Chart \(SFC\) Instructions](#)
- ▷ [Statistical Instructions](#)
- ▷ [Safety Instructions](#)
- ▷ [Studio 5000 Logix Designer Glossary](#)

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[How are we doing?](#)