General Motor Attributes

These are the general motor attributes that apply to all motor technologies.

Motor Catalog Number

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required	Set	SHORT STRING	-	-	-	For example, MPL-B310F

The Motor Catalog Number attribute is a string, up to 32-characters, that specifies the motor catalog number. In the controller this is a settable attribute and is used to identify a specific motor record in the Motion Database when Motor Data Source is set to Database. In the drive Motor Catalog Number is a gettable attribute and can be used to identify a specific motor when Motor Data Source is not from the Motion Database. In this case, if the Motor Catalog Number is not available to the drive, the drive sets this attribute to a Null string.

Motor Serial Number

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Optional	Get	SHORT STRING	-	-	-	For example, 0012003400560078

The Motor Serial Number attribute is a 16-character string that specifies the serial number of the motor. If the Motor Catalog Number is not available, the drive sets this attribute to a Null string.

Motor Data Source

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required	Set/GSV	USINT	0	-	-	Bits 0-3: Enum 0 = Datasheet (R) 1 = Database (O) 2 = Drive NV (O) 3 = Motor NV (O) 4-127 = Reserved 128-255 = Vendor specific

The Motor Data Source attribute specifies the source of motor data for the drive.

- **Datasheet** implies that the motor configuration attributes are entered by the user from a motor datasheet or from motor nameplate data.
- **Database** means that configuration software pulls the motor data from a motor database based on catalog number during the drive configuration process.
- **Drive NV** implies that the motor attributes are derived directly from the drive's nonvolatile memory. In this mode, only a minimal set of motor and motor feedback (Feedback 1) are required to configure the drive.
- **Motor NV** implies that the motor attributes are derived from non-volatile memory of a motor-mounted smart feedback device equipped with a serial interface. Again, in this mode, only a minimal set of motor and motor feedback (Feedback 1) are required to configure the drive.

In both Drive NV and Motor NV cases, the specific motor and motor feedback attributes that are sent or not sent to the drive during configuration are identified in the CIP Drive Set Attr Update Bits attribute table.

Motor and motor feedback attributes sent to the drive device in Drive NV or Motor NV are merely to confirm that the controller and the drive have the agreement on the values of attributes critical to scaling operation. If the NV attribute values in the drive differ from the values set by the controller, the drive will reject the values with General Status indicating an Invalid Attribute Value. The current list of motor and motor feedback attributes sent to the drive in the NV modes are as follows:

1. Motor Unit
2. Feedback 1 Unit
3. Feedback 1 Type
4. Feedback 1 Startup Method
5. Feedback 1 Cycle Resolution
6. Feedback 1 Cycle Interpolation
7. Feedback 1 Turns
8. Feedback 1 Length

Motor Device Code

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required	Set/GSV	UDINT	0 DB	0	$2^{32}-1$	

The Motor Device Code attribute is a unique number assigned to a motor catalog number. This value is used to insure that the motor and integral motor mounted feedback device configuration data delivered from the controller matches the actual motor and feedback data connected to the drive.

This comparison is only valid in the case where the Motor Data Source is Datasheet or Database driven and the motor is equipped with a smart feedback device. If the codes do not match, a negative acknowledge is given by the drive. Motor Device Codes are assigned by the motor manufacturer. A value of 0 for the Motor Device Code will be accepted by the drive without comparison.

Motor Type

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required	Set/GSV	USINT	0 DB	-	-	Enumeration 0 = Not Specified (R) 1 = Rotary Permanent Magnet (O) 2 = Rotary Induction (O) 3 = Linear Permanent magnet (O) 4 = Linear Induction (O) 5 = Rotary Interior Permanent Magnet (O) 6-127 = Reserved 128-255 = Vendor Specific

						128-255 – Vendor Specific

The Motor Type attribute is an enumeration that specifies the motor technology.

When Motor Type is set to Not Specified, all motor configuration attribute values associated with the motor are considered Not Applicable and will not be set by configuration software nor will they be sent to the drive.

If Motor Data Source is Motor NV or Drive NV, the Motor Type may not be known to the controller but is known by the drive, so the drive can operate in this case without specifying the Motor Type. In this case, the Motor Type is not sent to the drive.

If Motor Data Source is Datasheet or Database, an unspecified Motor Type, when received by the drive device during configuration, indicates that the motor configuration has not been defined and therefore results in a Configuration Fault indicating an Invalid Attribute Value.

Motor Unit

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required	Set/GSV	USINT	0	-	-	Enumeration 0 = Rev (R for Rotary motor types) 1 = Meter (R for Linear motor types) 2-127 = Reserved 128-255 = Vendor Specific

The Motor Unit attribute is a unit of measure for motor displacement. This attribute is also used for sensorless operation since the Feedback Unit in that case is not known. Motor Unit selection is based on Motor Type.

Motor Polarity

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Optional	Set/SSV*	USINT	0 DB	-	-	Enumeration 0 = Normal Polarity 1 = Inverted Polarity 2-255 = Reserved

Indicates the attribute cannot be set while the drive power structure is enabled (Power Structure Enable bit in CIP Axis Status is true).

The Motor Polarity attribute is an enumerated value used to establish the direction of motor motion when the windings are phased according to factory specification. Normal polarity is defined as the direction of motor travel when the ABC motor winding leads are hooked up according to the drives published specifications. Inverted polarity effectively switches the ABC phasing to ACB so that the motor moves in the opposite direction in response to a positive drive output.

You can use the Motor Polarity attribute to make the direction of travel agree with the user's definition of positive travel. It can be used in conjunction with the Feedback Polarity bit to provide negative feedback, when closed loop control is required. When commutating a PM motor, it is imperative that the commutation phase sequencing match the motor phase sequencing to properly control the motor.

Motor Rated Voltage

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required	Set/GSV	REAL	0 DB	0	∞	Volts (RMS)

The Motor Rated Voltage attribute is a floating point value that specifies the nameplate AC voltage rating of the motor. This represents the phase-to-phase voltage applied to the motor to reach rated speed at full load.

Motor Rated Continuous Current

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required	Set/GSV	REAL	0 DB	0	∞	Amps (RMS)

The Motor Rated Continuous Current attribute is a floating point value that specifies the nameplate AC continuous current rating of the motor. This represents the current applied to the motor under full load conditions at rated speed and voltage. Any positive number. This is a database number and should not be changed.

Motor Rated Peak Current

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required - PM Optional - IM	Set/GSV	REAL	0 DB	0	∞	Amps (RMS)

The Motor Rated Peak Current attribute is a floating point value that specifies the peak or intermittent current rating of the motor. The peak current rating of the motor is often determined by either the thermal constraints of the stator winding or the saturation limits of PM motor magnetic material.

Motor Rated Output Power

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Required - IM Optional - PM	Set/GSV	REAL	0 DB	0	∞	Power Units

The Motor Rated Output Power attribute is a floating point value that specifies the nameplate rated output power rating of the motor. This represents the power output of motor under full load conditions at rated current, speed and voltage.

Motor Overload Limit

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Optional	Set/GSV	REAL	100 DB	0	200 DB	% Motor Rated

The Motor Overload Limit attribute is a floating point value that specifies the maximum thermal overload limit for the motor. This value is typically 100%, corresponding to the power dissipated when operating at the continuous current rating of the motor, but can be significantly higher if, for example, cooling options are applied. How the Motor Overload Limit is applied by the drive depends on the overload protection method employed.

For induction motors, this attribute is often related to the Service Factor of the motor. The Service Factor is defined in the industry as a multiplier which, when applied to the rated power or current of the motor, indicates the maximum power or current the motor can carry without entering an overload condition.

Regardless of the Motor Type, if the drive applies an I^2T motor overload protection method, then exceeding the specified Motor Overload Limit results in an overload condition and activates I^2T overload protection. While the motor is overloaded, the Motor Capacity attribute value increases to indicate how much of the motor's available I^2T overload capacity has been utilized. When Motor Capacity reaches 100% of its rated capacity, the drive can optionally trigger a Motor Overload Action.

When employing an overload protection method based on a motor thermal model, the Motor Capacity attribute value represents how much of the motor's rated thermal capacity, associated with the motor thermal model, has been utilized. Once the Motor Capacity value exceeds the Motor Overload Limit, the drive can optionally trigger a predetermined Motor Overload Action.

The Motor Overload Limit can also used by the drive to determine the absolute thermal capacity limit of the motor, for example, the Motor Thermal Overload Factory Limit, that if exceeded, generates a Motor Thermal Overload FL exception.

Motor Integral Thermal Switch

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Optional	Set/GSV	USINT	0 DB	0	1	0 = No 1 = Yes

The Motor Integral Thermal Switch attribute specifies if the motor has an integral thermal switch to detect a Motor Overtemperature condition. Connection to the motor thermal switch can be through the motor feedback interface, associated with Axis I/O Status bit, Feedback 1 Thermostat, or through a discrete digital input to the drive, associated with Axis I/O Status bit, Motor Thermostat. The method of interface to the thermal switch is left to the drive vendor's discretion.

Motor Max Winding Temperature

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Optional	Set/GSV	REAL	0 DB	0	∞	°C

The Motor Max Winding Temperature attribute is a floating point value that specifies the maximum winding temperature of the motor.

Motor Winding to Ambient Capacitance

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Optional	Set/GSV	REAL	0 DB	0	∞	Joules/°C

			DB			

The Motor Winding to Ambient Thermal Capacitance attribute is a floating point value that specifies the winding-to-ambient thermal capacitance.

Motor Winding to Ambient Resistance

Usage	Access	Data Type	Default	Min	Max	Semantics of Values
Optional	Set/GSV	REAL	0 DB	0	∞	°C/Watt

The Motor Winding to Ambient Thermal Resistance attribute is a floating point value that specifies the winding-to-ambient thermal resistance.

See also

[Motor Attributes](#)

[Induction Motor Attributes](#)

[Linear PM Motor Attributes](#)

[Load Transmission and Actuator Attributes](#)

[Rotary PM Motor Attributes](#)

[How are we doing?](#)