AKD™

Using AKD EtherNet/IP with RSLogix Manual

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Valid for Hardware Revision C

Patents Pending

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Keep all manuals as a product component during the life span of the product.
Pass all manuals to future users/owners of the product.

Record of Document Revisions:

Revision	Remarks
A, 10/2011	Launch version

Technical changes which improve the performance of the device may be made without prior notice.

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1 Introduction

This manual provides an easy start guide for using AKD with RSLogix, an overview on how to import and configure the AKD Add-On instructions using RSLogix5000 version 16 or later, as well as a reference to the Add-On instructions.

On our website, www.kollmorgen.com, you can find RSLogix sample projects and add-on instructions, which demonstrate an EtherNet/IP network with a CompactLogix controller and the AKD.

The sample projects are based on an L32E CompactLogix controller, which easily can be changed to another controller which supports RSLogix.

This document assumes that the reader has a basic knowledge of EtherNet/IP protocols, AKD drives, and Rockwell RSLogix5000.

1.1 Add-On Instructions

The AKD Add-On Instructions are RSLogix instructions that define AKD drives and axis configurations. These instructions are made to be imported into an RSLogix5000 project. Once defined in a project, they function just as a native RSLogix instruction. The add-on instructions encapsulate the most commonly used logic for AKD axes. They provide easily reusable tools to operate drives and axes, promoting consistency across different projects.

Note that the native MSG instruction is used in RSLogix for sending Explicit Messages.

A set of Add-On instructions are provided for easy creation of AKD programs with RSLogix. The instructions are written to mirror the native instructions, leveraging existing knowledge of the software. They provide easy control of IO Assembly messages.

Add-On Instructions include:

- AKD_Enable
- AKD_Disable
- AKD_Home
- AKD_Jog
- AKD_Move
- AKD_Set_Home_Mode
- AKD_Set_Mode
- AKD_Shutdown
- AKD_Shutdown_Reset
- AKD_Stop_Smooth
- AKD_Get_Attribute
- AKD_Get_Parameter
- AKD_Set_Attribute
- AKD_Set_Parameter
- AKD_Set_Units

2 AKD Installation and Setup

See the following manuals for installation and setup of an AKD drive:

- AKD Quick Start (also available in hard copy). This guide provides instructions for basic drive setup and connection to a network.
- AKD Installation Manual (also available in hard copy). This manual provides instructions for installation and drive setup.
- AKD Parameter and Command Reference Guide. This guide provides documentation for the parameters and commands used to program the AKD
- AKDEtherNet/IP Communication Guide. This guide describes the communication profile and use of EtherNet/IP with the AKD.

3 Quick Start with the AKD Sample Project

The sample project AKD_Sample_Project.ACD demonstrates the correct setup of an axis and runs a program loop which demonstrates point-to-point position moves, motion tasking control, and jogging.

This project can help you to learn:

- how to enable the drive
- how to write/read a parameter via the acyclic channel
- how the cyclic data exchange is done
- how to run motion in position or velocity mode
- how to clear faults
- how to load and execute motion task sequences

3.1 Setup

1. Start RSLogix5000 and open the file AKD_Sample_Project.ACD in the installer directory.
2. You will most likely need to update the controller properties to match your specific installation. Right click on the controller ("AKD_Controller") at the top of the tree and select "Properties" (Figure 3 1: Opening Controller Properties).
    a. Note that you can also use the Controller Properties button located above the tree.

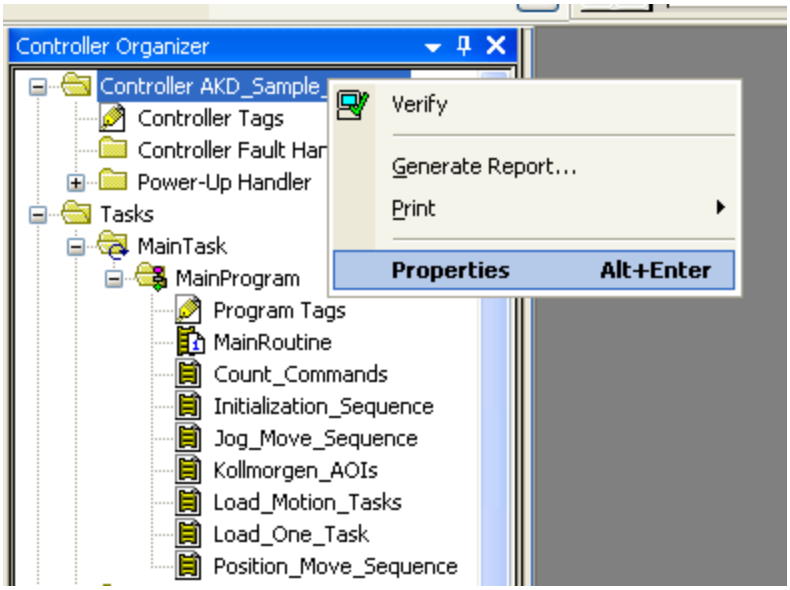


Figure 3-1: Opening Controller Properties

3. Update any controller properties in order for the controller to match your specific hardware setup, most notably any communication settings and/or the controller type, and then close the controller properties window (Figure 3-2: Controller Properties).

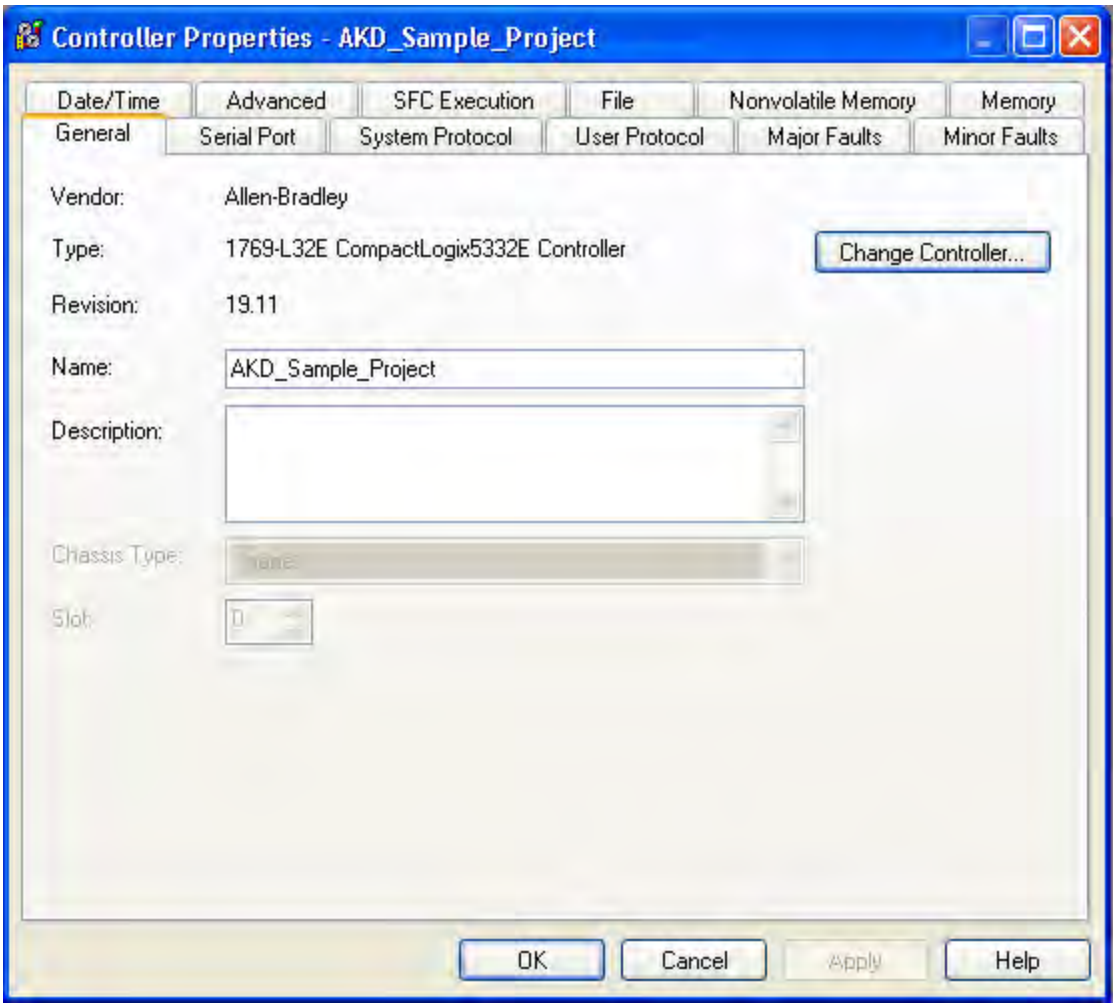


Figure 3-2: Controller Properties

4. Next, open the Ethernet-Module setup for the axis' communications by right clicking on "ETH-ERNET-MODULE AKD_Axis" in the "I/O Configuration" tree under the Ethernet port (Figure 3 3: Opening Ethernet Module Properties).

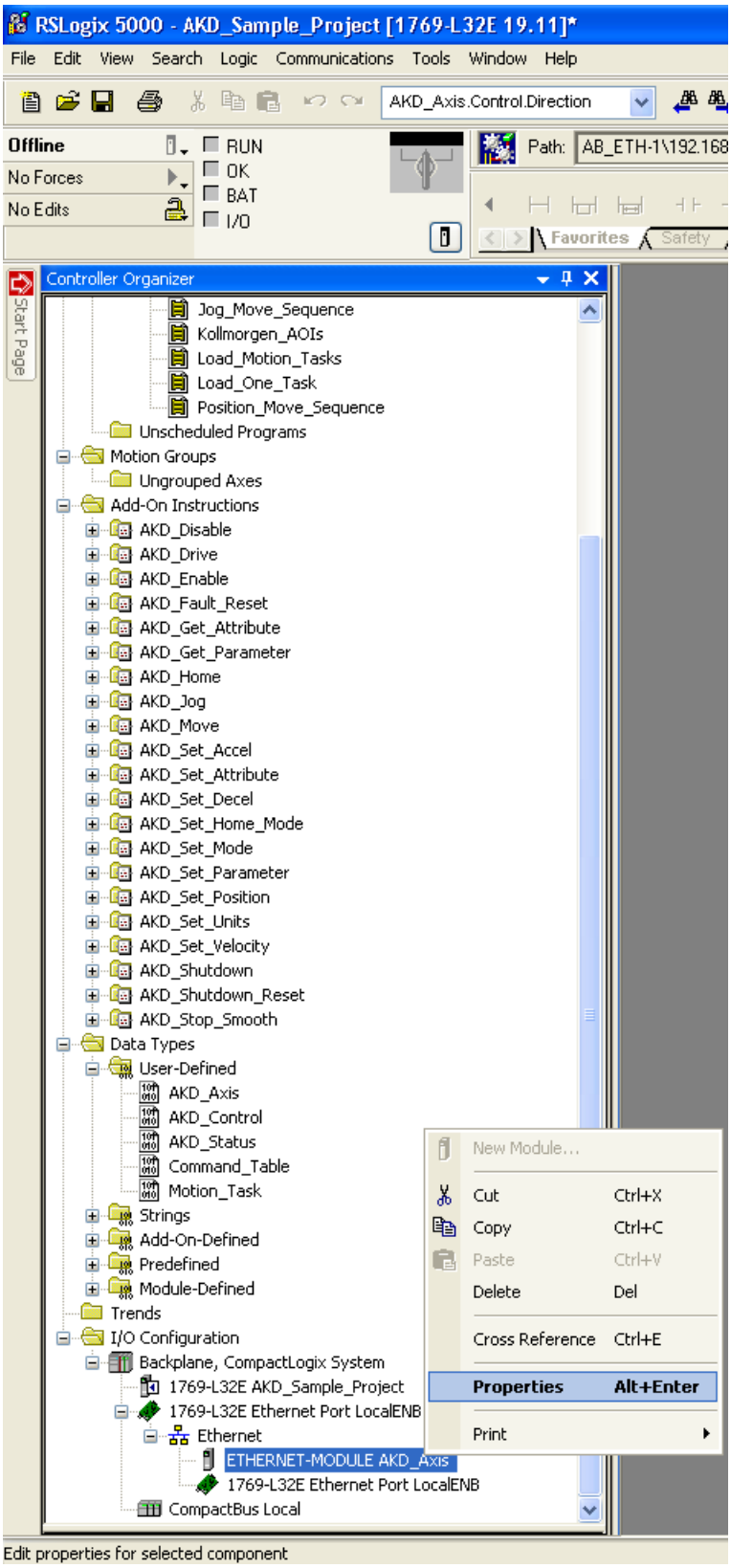


Figure 3-3: Opening Ethernet Module Properties

5. Update any specific module properties in order for the module to match your specific hardware setup, most notably the IP address, and then close the module properties window (Figure 3 4: Ethernet Module Properties).

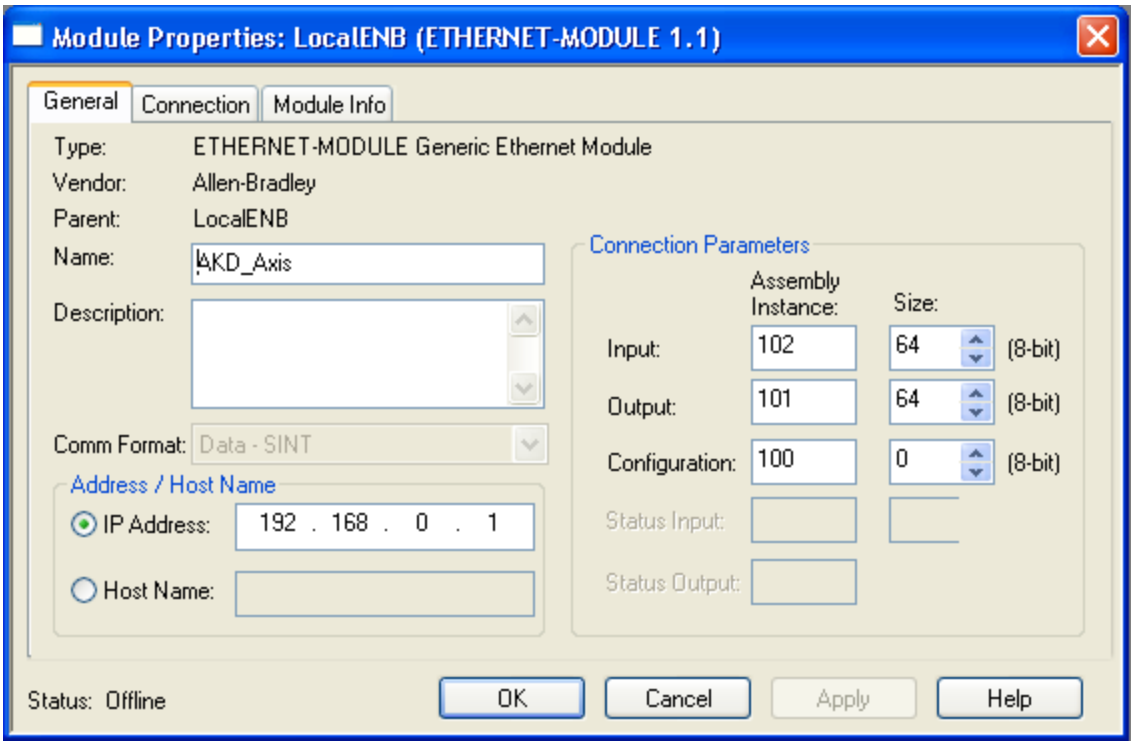


Figure 3-4: Ethernet Module Properties

6. Once you have updated all of the configuration settings to match your specific hardware setup, you can download the program to the controller and use the project to test any of the axis commands.

3.2 Running the Main Program Loop

The top level of the program is in the subroutine “Tasks > MainTask > MainProgram > MainRoutine.”

The sample program has two modes. When the tag Active_Command.Control_Mode=0, the program is setup to execute a continuous test loop. The second mode (tag value=1) is used for testing individual commands, and is described in the next section of the manual.

To begin executing the continuous test loop, set the tag Active_Command.Control_Mode=0, then set the tag Main_Sequence_Step = 1.

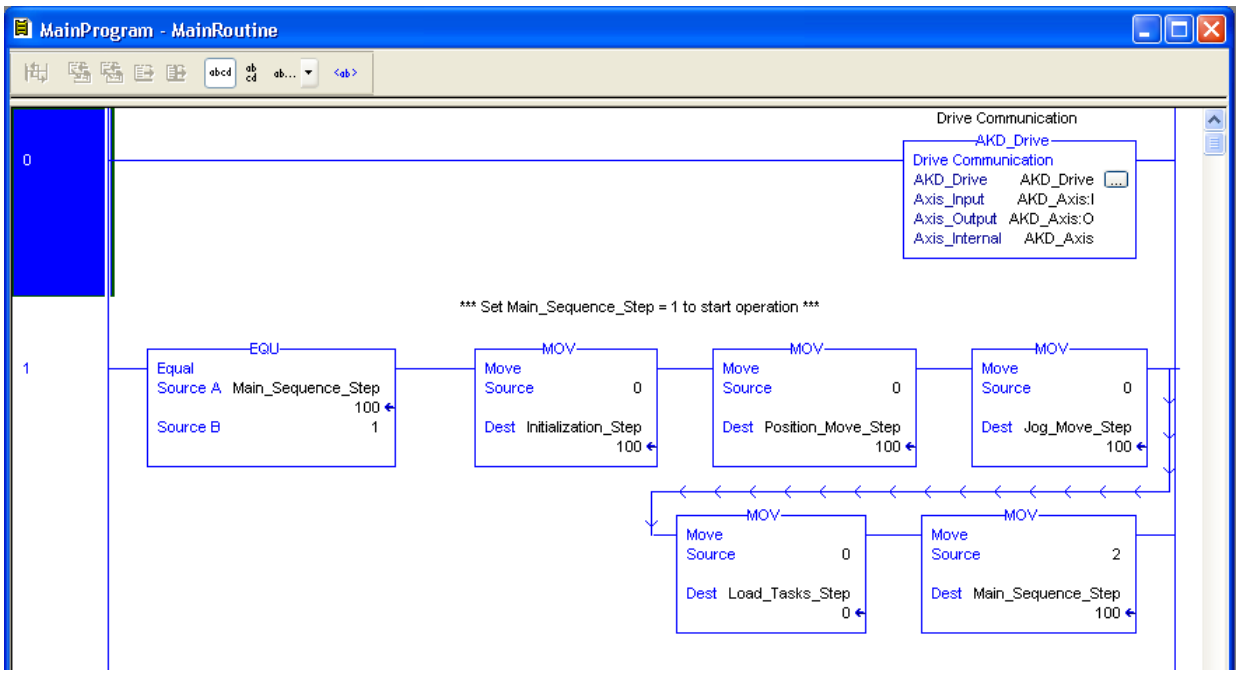


Figure 3-5: Main Program of AKD Sample Project

3.2.1 Test Sequence

Step 1: Setup sequence tags for test subroutines.

Step 2: Initialization_Sequence.

1. Disable and clear faults
2. Set units to default
3. Demonstrate how to set a drive configuration value using the cyclic message channel
4. Read the value back and verify correctness
5. Set homing mode to default (set current position as home)
6. Enable the drive

Step 3: Position_Move_Sequence

1. Set operation mode to Position
2. Home the axis
3. Make a forward absolution position move
4. Check actual position using status data from the cyclic message
5. Make a reverse incremental move

Step 4: Load_Motion_Tasks

1. Load two motion tasks from a controller data structure into the drive. Motion task 1 is configured to execute motion task 2 after it completes.
2. Execute motion task 1
3. Confirm that both motion tasks execute properly

Step 5: Jog_Move_Sequence

1. Set operation mode to velocity
2. Jog forward 500ms
3. Read torque using an explicit message (MSG instruction)
4. Perform hard stop
5. Clear hard stop and enable
6. Jog reverse 1000ms
7. Check target velocity and confirm
8. Check actual velocity is in range
9. Stop

Step 6: Loop to step 1

3.3 Testing Individual Instructions

All of the instruction calls are in the Kollmorgen_AOIs subroutine, which you can open from “Tasks > Main Task > MainProgram > Kollmorgen_AIOs” (Figure 3 5: AKD Instruction Subroutine).

To test individual instructions, set the tag Active_Command.Control_Mode=1 so that the Kollmorgen_ AOIs subroutine will be called from MainRoutine.

Make sure to review “Chapter 5: AKD Instructions” below for a complete understanding of the instructions and their operation before executing any instructions in the example program.

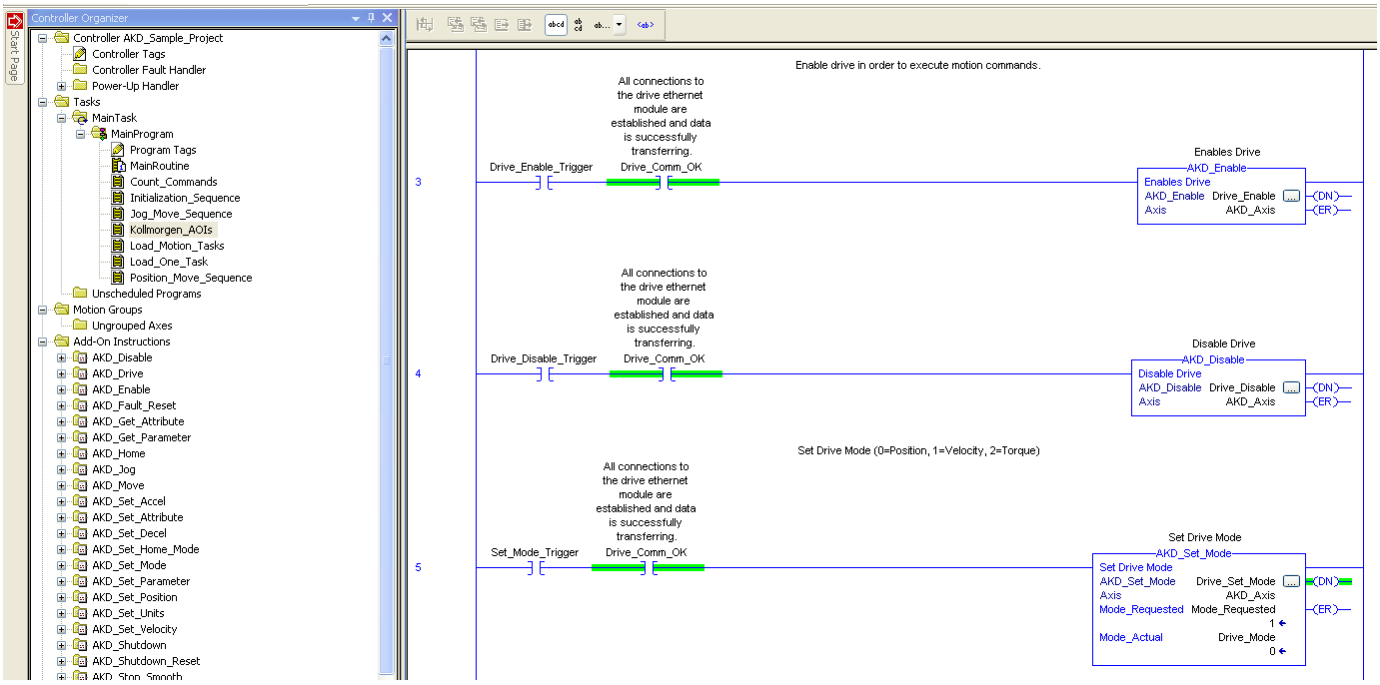


Figure 3-5: AKD Instruction Subroutine

All of the instructions have their own individual trigger coils. To call an instruction, toggle its trigger coil (Figure 3-6: Toggling a Trigger Coil)

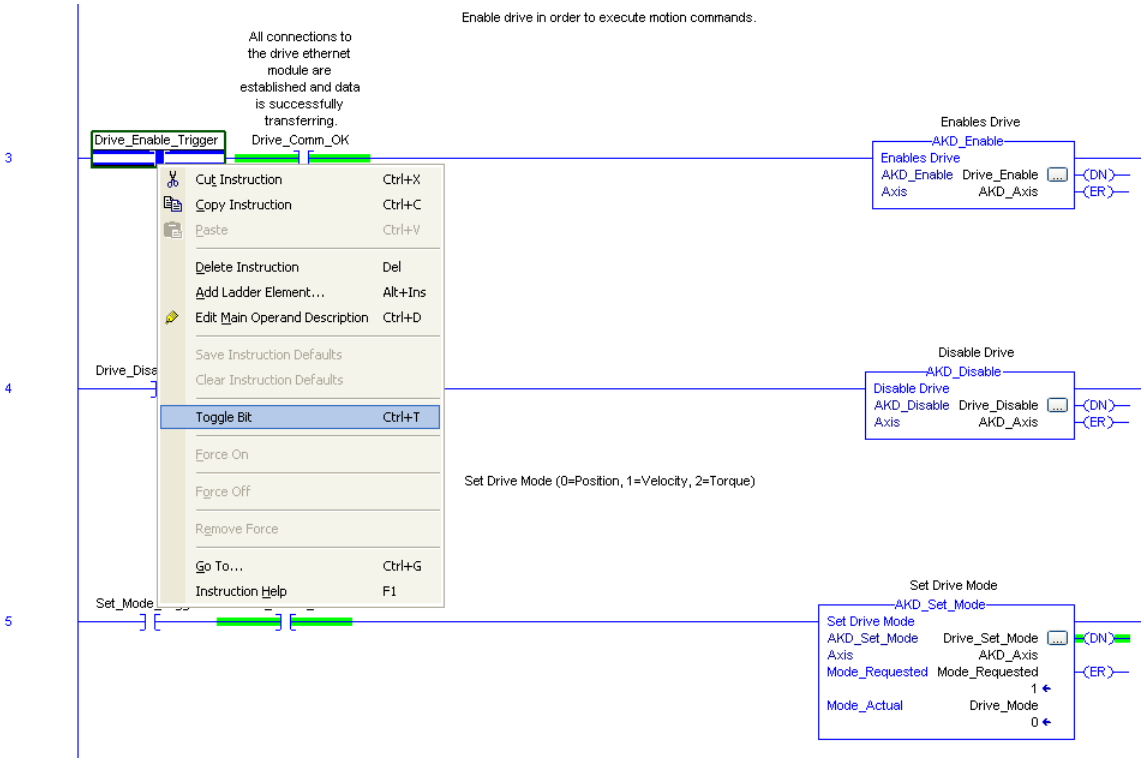


Figure 3-6: Toggling a Trigger Coil

4 Adding AKD Support to a New or Existing Project

4.1 Adding the Ethernet IO Module for AKD Communication

These basic instructions can be used for any Rockwell PLC that uses RSLogix5000 and supports EtherNet/IP.

1. Start RSLogix5000 and open the project with which you want to use the AKD drive.
2. Right click on the Ethernet port in the I/O Configuration and select “New Module…” (Figure 4 1: Adding New Module)

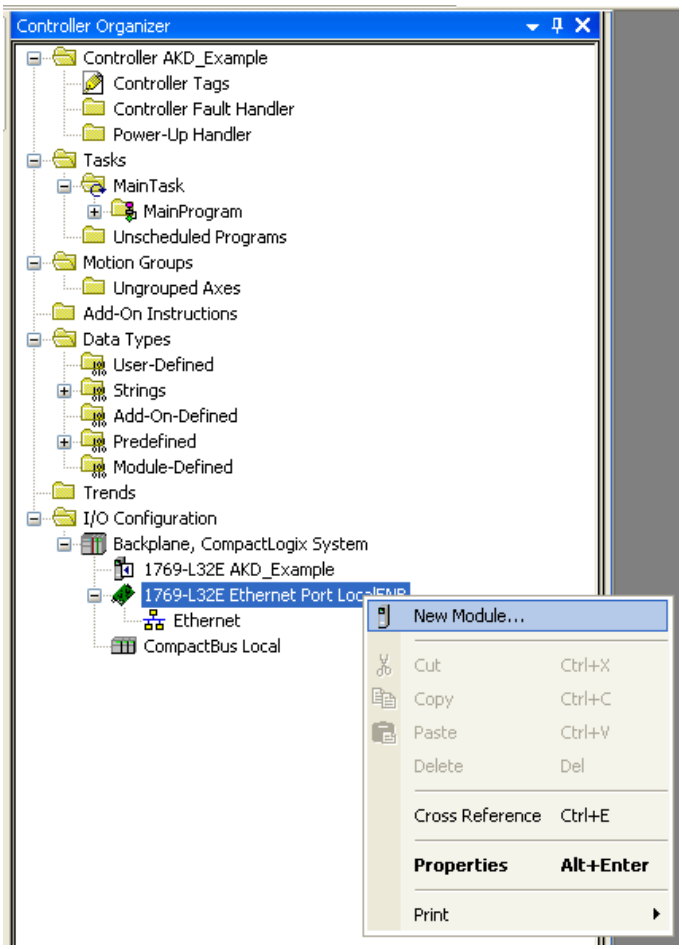


Figure 4-1: Adding New Module

3. Select “ETHERNET-MODULE” under “Communications” and click OK (Figure 4 2: Selecting Module Type)

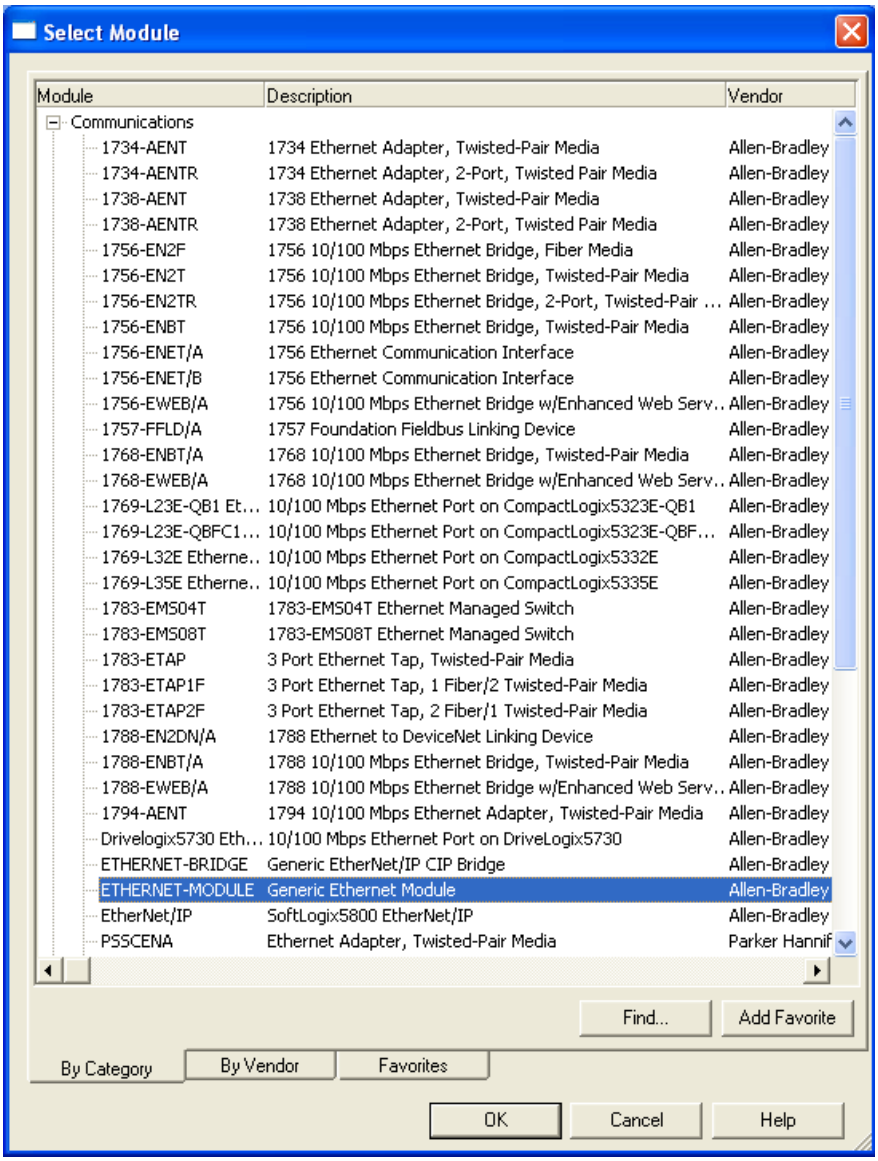


Figure 4-2: Selecting Module Type

4. Enter the settings for the new module as described below, make sure the “Open Module Properties” checkbox is checked, and click OK (Table 4-1: Module Setting Values & Figure 4-3: Entering Module Settings)

Field	Value
Name	AKD_Drive
Description	Text description for drive
Comm Format	Data--SINT
IP Address	Ethernet IP address for drive
Input Assembly Instance	102
Input Size	64
Output Assembly Instance	101
Output Size	64
Configuration Assembly Instance	100
Configuration Size	0

Table 4-1: Module Setting Values

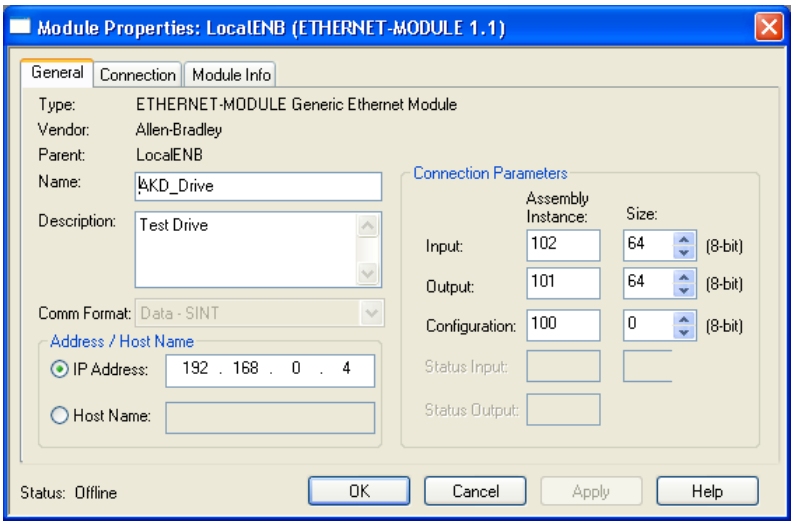


Figure 4-3: Entering Module Settings

5. The “New Module” window now appears as a “Module Properties: ENB” window with the Connection tab selected. Set the “Requested Packet Interval (RPI)” value to 20.0 ms (this can be reduced to 10.0ms when not using Workbench in combination with EtherNet/IP). If an option “Use Unicast Connection over EtherNet/IP” is visible, make sure it is unchecked. Click OK. (Figure 4-4: Setting Module RPI).

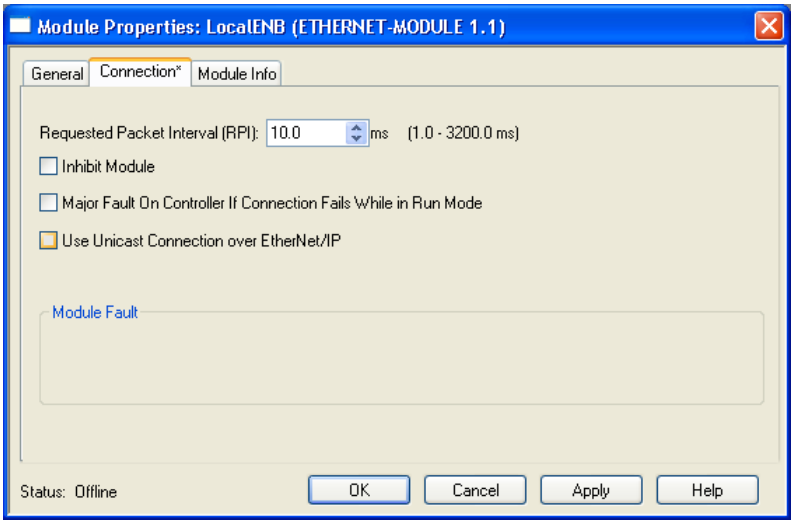


Figure 4-4: Setting Module RPI

6. The drive should now be configured and will show up under the Ethernet Port (Figure 4 5: Module Successfully Added to Project)

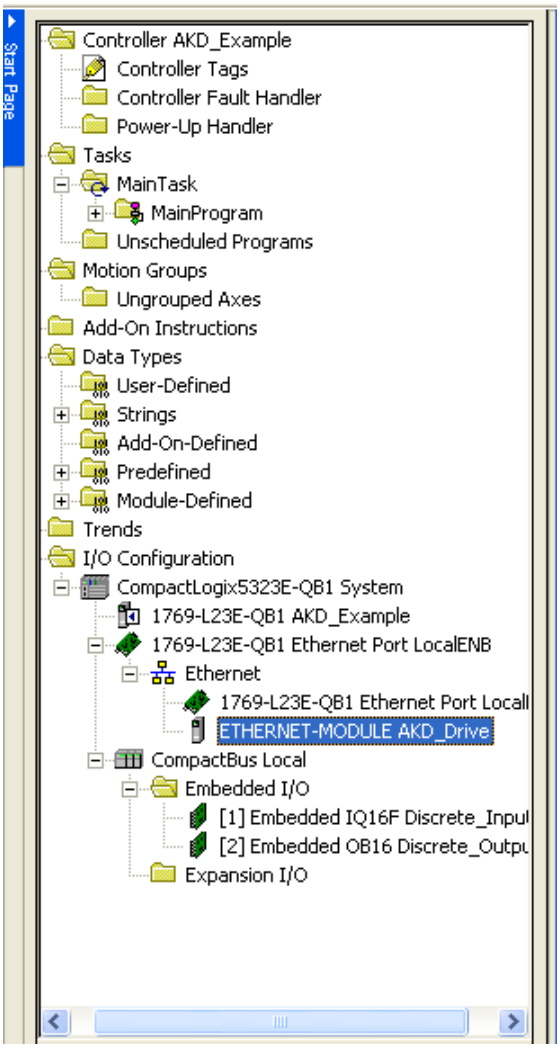


Figure 4-5: Module Successfully Added to Project

7. Make sure that the Ethernet port for your controller is setup with a compatible IP address on the same subnet. This can be configured by right-clicking on 1769-L23E-QB1 Ethernet Port Local and selecting properties. See your controller user manual for more information.

4.2 Importing the AKD Add-On Instructions to a Project

Important: The User Defined Data Types must be imported before the Add-On Instructions.

1. Right click the "User-Defined" folder under "Data Types" and select "Import Data Type…" (Figure 4-6: Importing Data Types)

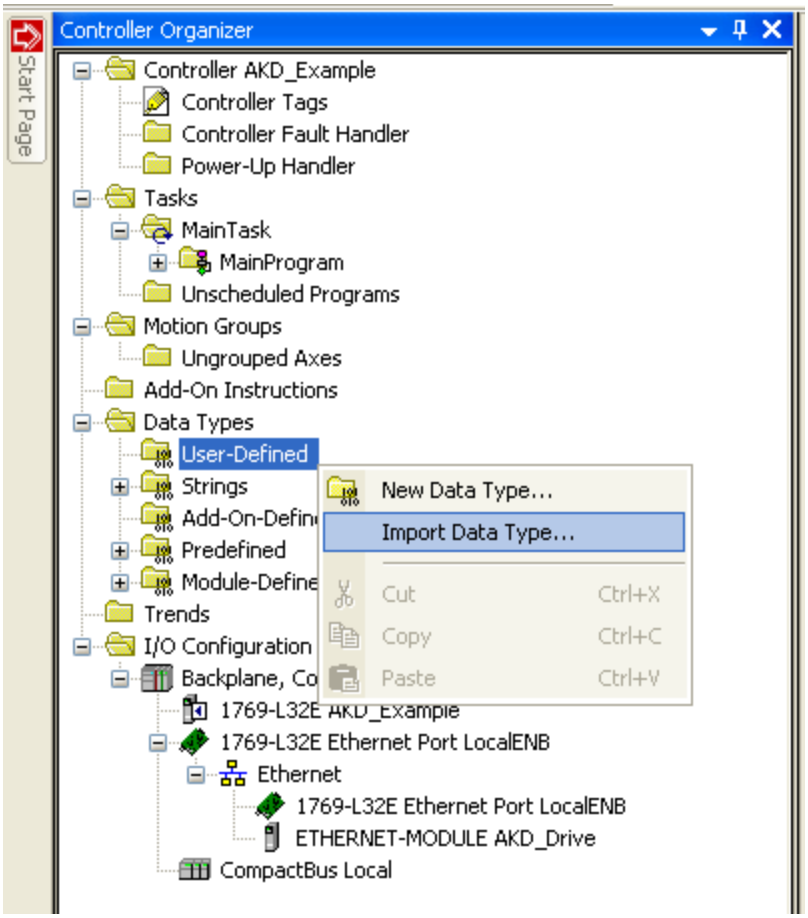


Figure 4-6: Importing Data Types

2. Browse to the location of the AKD User Defined Data Type library and select the desired User Defined Data Type then click “Import…” (Figure 4 7: Selecting a UDT)
    a. Import the data types in the order show in Table 4 2: UDT Import Order.

Figure 4-7: Selecting a UDT

Order	File	Descrption
1	AKD_Control_UDT.L5X	Control message for sending to axis
2	AKD_Status_UDT.L5X	Status message for updating from axis
3	AKD_Axis_UDT.L5X	Axis definition
4	Motion_Task_UDT.L5X	Motion Task data table structure

Table 4-2: UDT Import Order

3. Click OK on the import configuration dialog, if one appears. Repeat for all files in “Table 4 2: UDT Import Order” to import all of the needed data types

4. The data types should now show up under the “Data Types > User-Defined” folder (Figure 4-8: Data Types Successfully Imported)

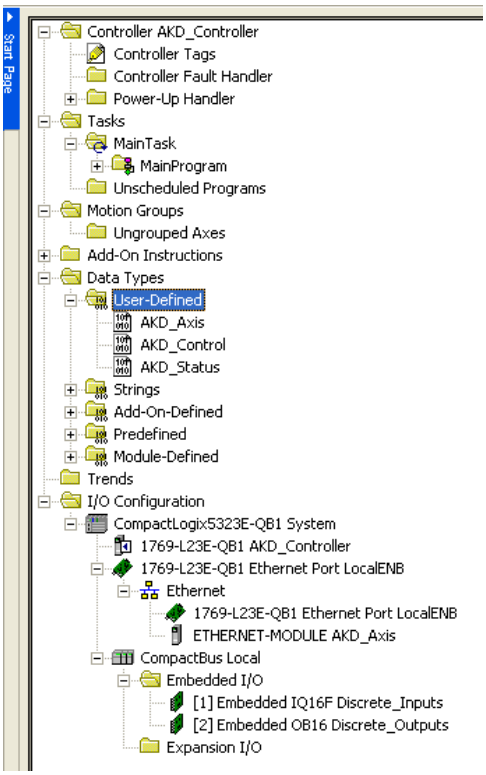


Figure 4-8: Data Types Successfully Imported

5. Next, to import the add-on instructions, right click on the “Add-On Instructions” folder and select “Import Add-On Instruction…” (Figure 4-9: Importing Add-On Instructions)

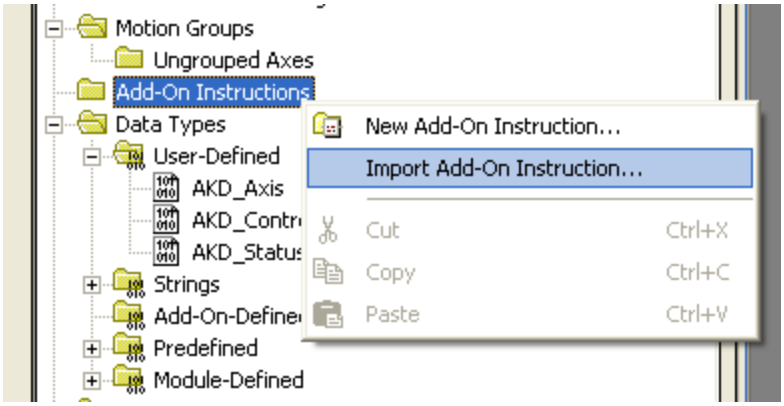


Figure 4-9: Importing Add-On Instructions

6. Browse to the location of the AKD Add On Instruction library and select the desired AOI then click "Import…" (Figure 4 10: Selecting an AOI)
    a. For complete functionality, import all of the files listed in "Table 4 3: All Add On Instructions"

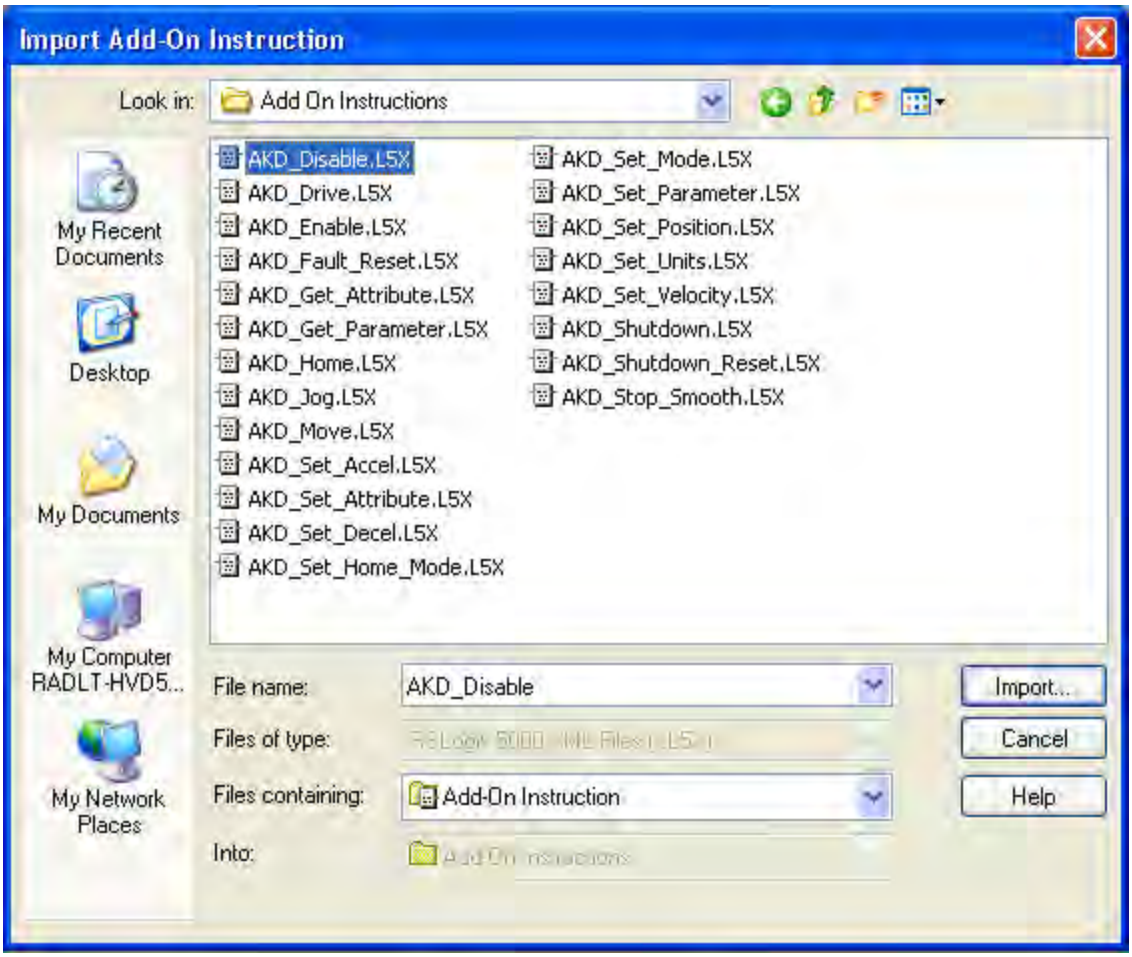


Figure 4-10: Selecting an AIO

File	Description
AKD_Disable_AOI.L5X	Motion Axis Off
AKD_Drive_AOI.L5X	Drive Communication
AKD_Enable_AOI.L5X	Motion Axis On
AKD_Fault_Reset_AOI.L5X	Motion Axis Fault Reset
AKD_Get_Attribute_AOI.L5X	Get Axis Attribute
AKD_Get_Parameter_AOI.L5X	Get Axis Parameter
AKD_Home_AOI.L5X	Motion Axis Home
AKD_Jog_AOI.L5X	Motion Axis Jog
AKD_Move_AOI.L5X	Motion Axis Move
AKD_Set_Accel_AOI.L5X	Motion Axis Set Acceleration
AKD_Set_Attribute_AOI.L5X	Set Axis Attribute
AKD_Set_Decel_AOI.L5X	Motion Axis Set Deceleration
AKD_Set_Home_Mode_AOI.L5X	Motion Axis Set Home Mode

File	Description
AKD_Set_Mode_AOI.L5X	Motion Axis Set Mode
AKD_Set_Parameter_AOI.L5X	Set Axis Parameter
AKD_Set_Position_AOI.L5X	Motion Axis Set Position
AKD_Set_Units_AOI.L5X	Motion Axis Set Units
AKD_Set_Velocity_AOI.L5X	Motion Axis Set Velocity
AKD_Shutdown_AOI.L5X	Motion Axis Shutdown
AKD_Shutdown_Reset_AOI.L5X	Motion Axis Shutdown Reset
AKD_Stop_Smooth_AOI.L5X	Motion Axis Smooth Stop

Table 4-3: All Add On Instructions

7. Click OK on the import dialog, if any appear. Repeat for all files in "Table 4-3: All Add On Instructions" to import all of the needed instructions for full functionality
8. The instructions should now show up under the "Add-On Instructions" folder (Figure 4-11: AOI's Successfully Imported)

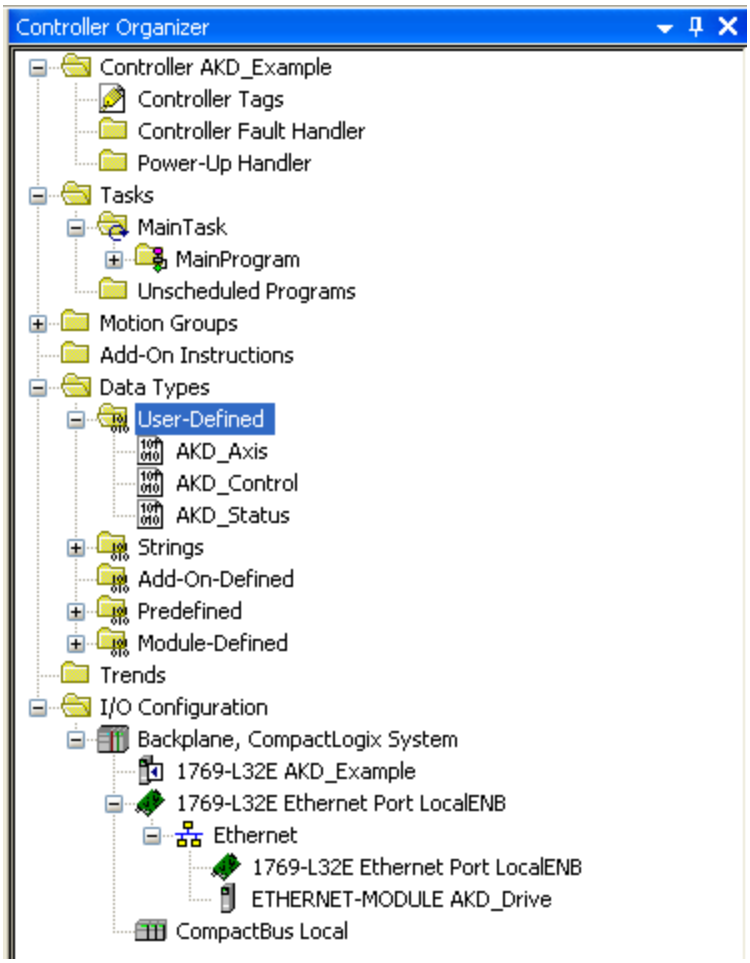


Figure 4-11: AOI's Successfully Imported

4.3 Using the AKD Add-On Instructions in a Project

In any project where you want to use the AKD Add-On instructions, you will need to include one instance of the Drive Communication logic for each axis (AKD_Drive instruction).

1. Add the AKD_Drive instruction to your ladder diagram.

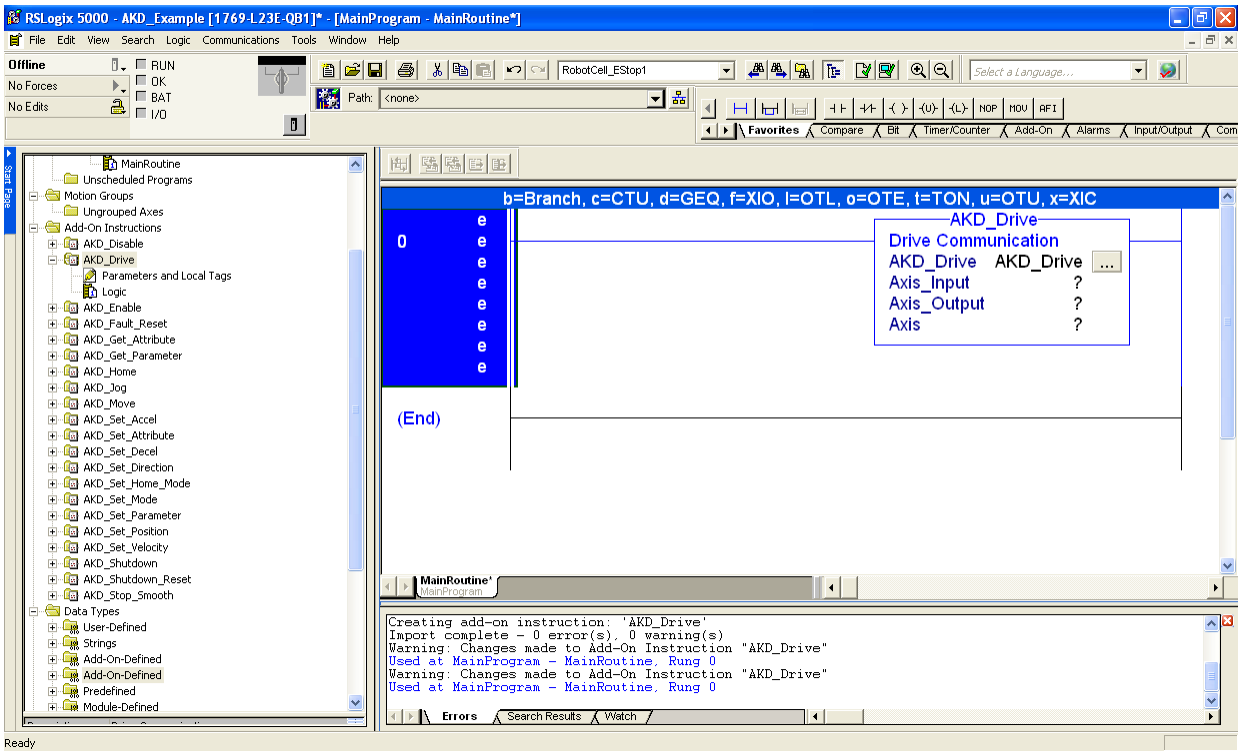


Figure 4-17: AKD_Drive Instruction Tags

2. Right click the AKD_Drive parameter (first question mark) in the AKD_Drive instruction, and select New Tag…

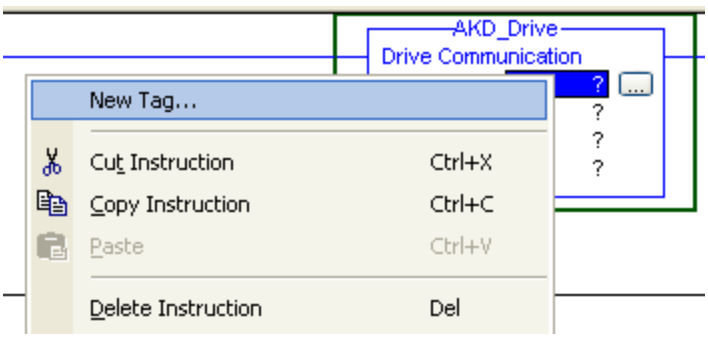


Figure 4-12: Add New Instruction Tag

3. Fill in a name and description. The data type should be AKD_Drive.

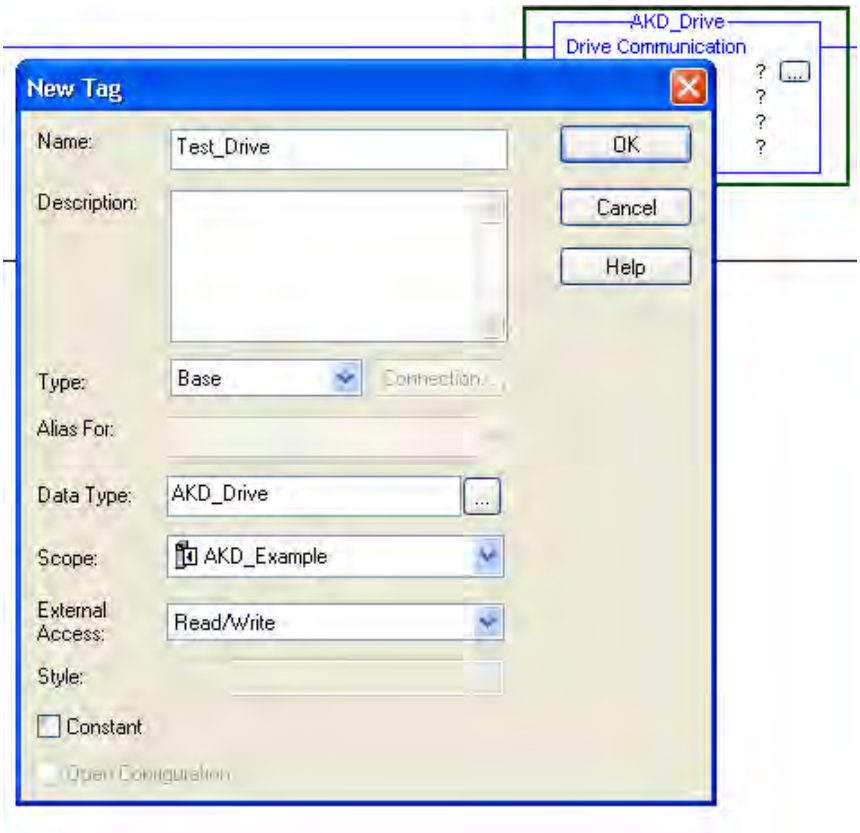


Figure 4-13: Adding Drive Communication

4. Click OK in the New Tag window to create your tag. It will now show up in your controller under "Controller Tags"

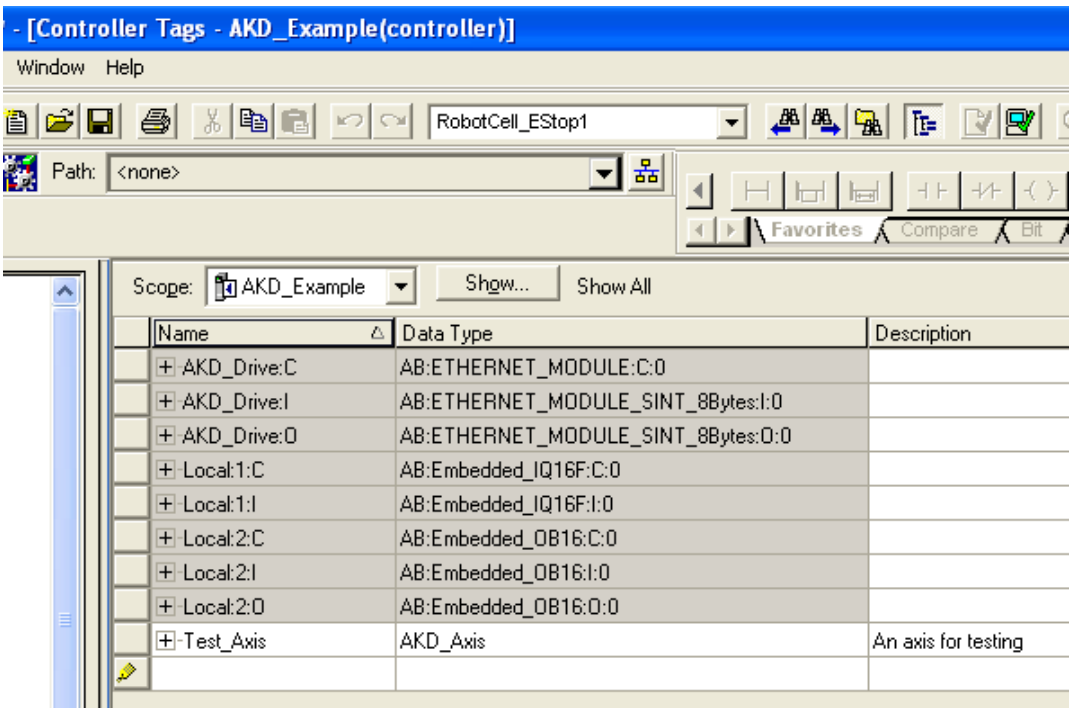


Figure 4-15: Tag Added to Program

5. Repeat steps 2-4 to add a new tag to the Axis_Internal parameter of the instruction, with a data type of AKD_Axis.

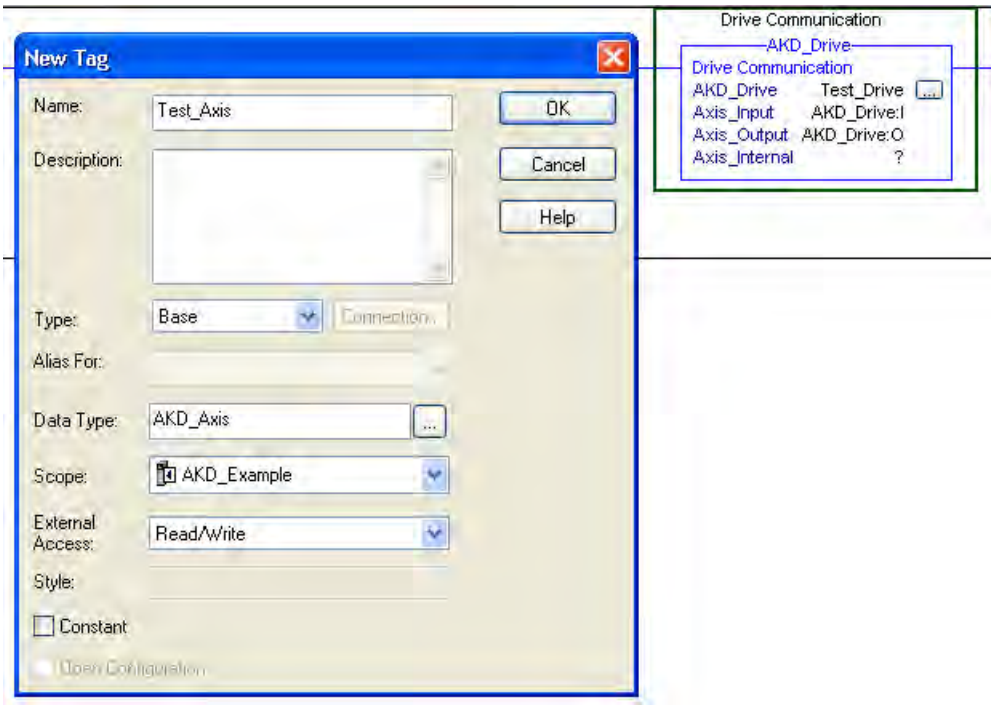


Figure 4-21: Adding Axis_Internal Parameter

6. Set the Axis_Input parameter to the input data of the axis for which you are setting up communication (Figure 4 18: Axis Communication Input). The input data tag corresponds to the "ETHERNET-MODULE" object you created in the I/O Configuration of the project.

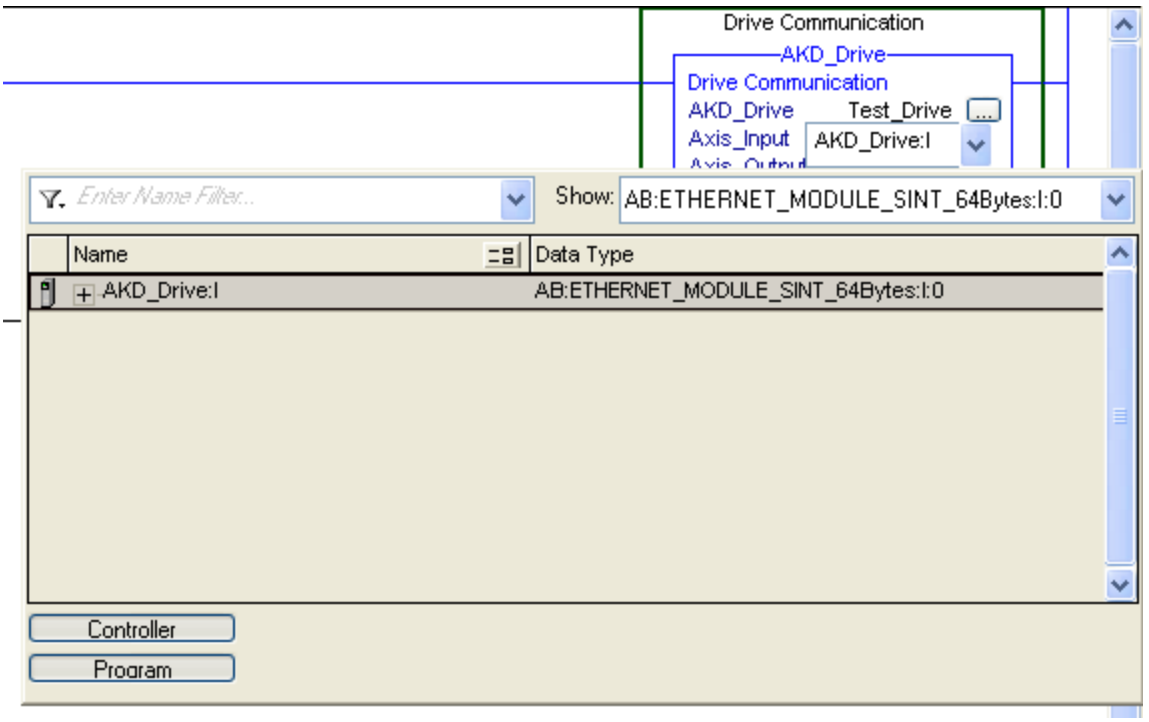


Figure 4-18: Axis Communication Input

7. Set the Axis_Output parameter to the output data of the axis for which you are setting up communication (Figure 4-19: Axis Communication Output). The output data tag corresponds to the "ETHERNET-MODULE" object you created in the I/O Configuration of the project.

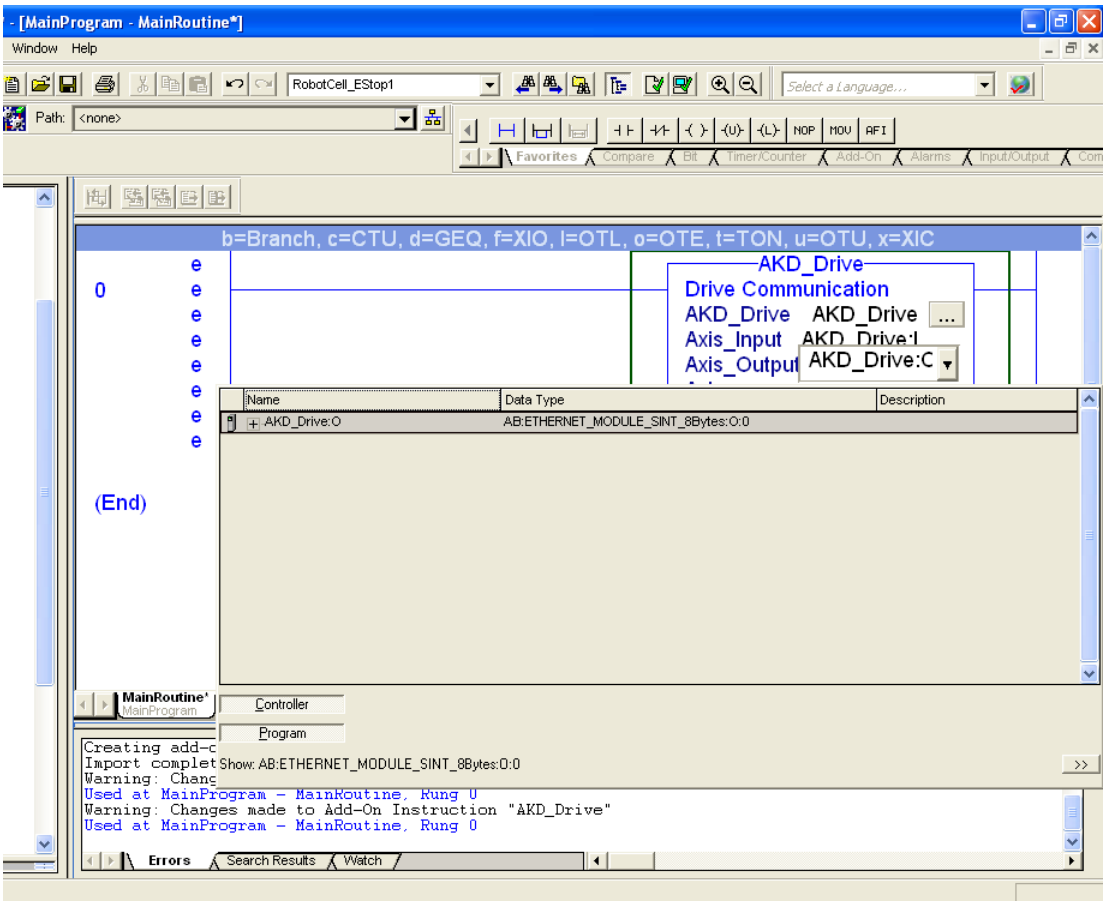


Figure 4-19: Axis Communication Output

8. Once you have configured the drive communication block, you should be able to use any of the other AKD Add-On instructions as you would the native RSLogix instructions.
9. For more information on each instruction, see "Section 5: AKD Instructions" below.

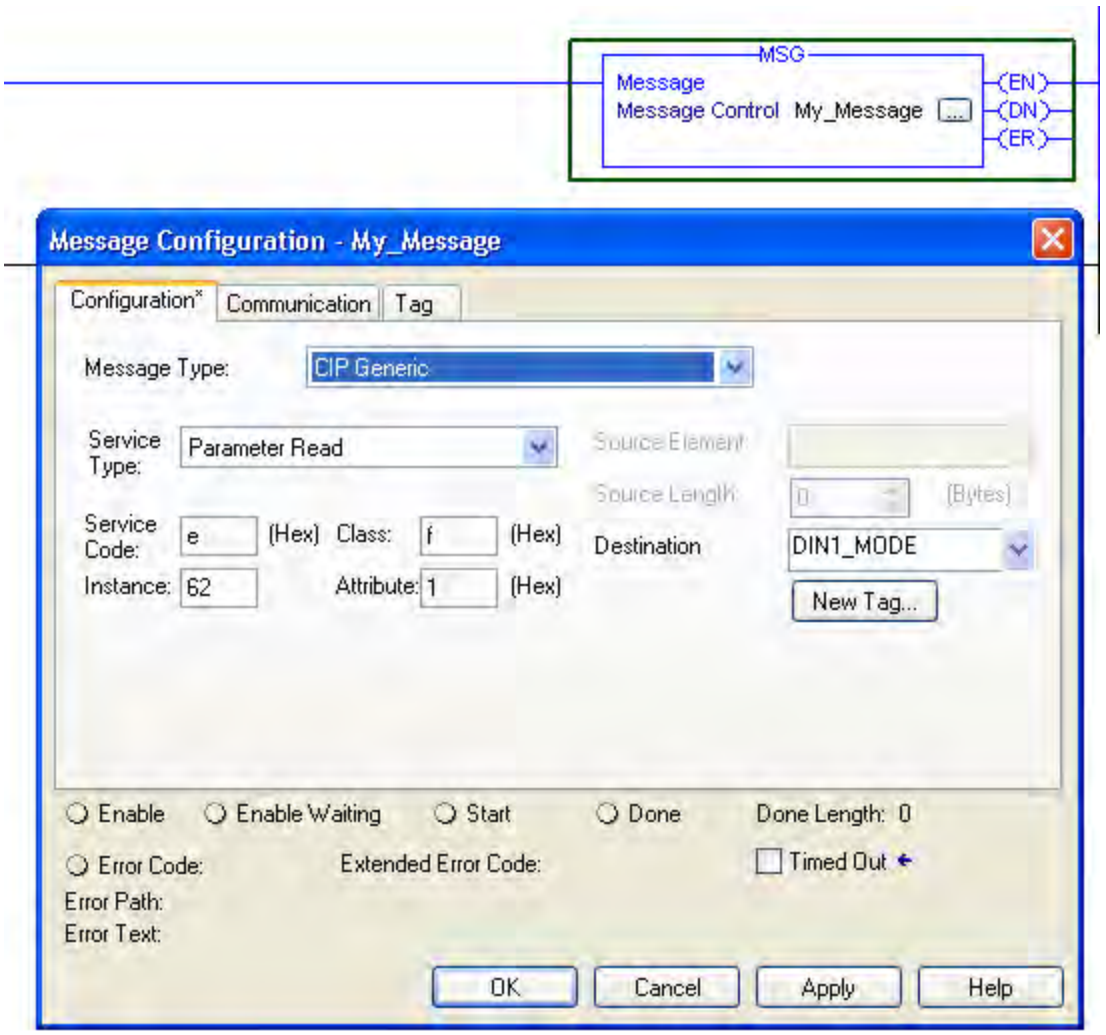
4.4 Reading and Writing Drive Parameters

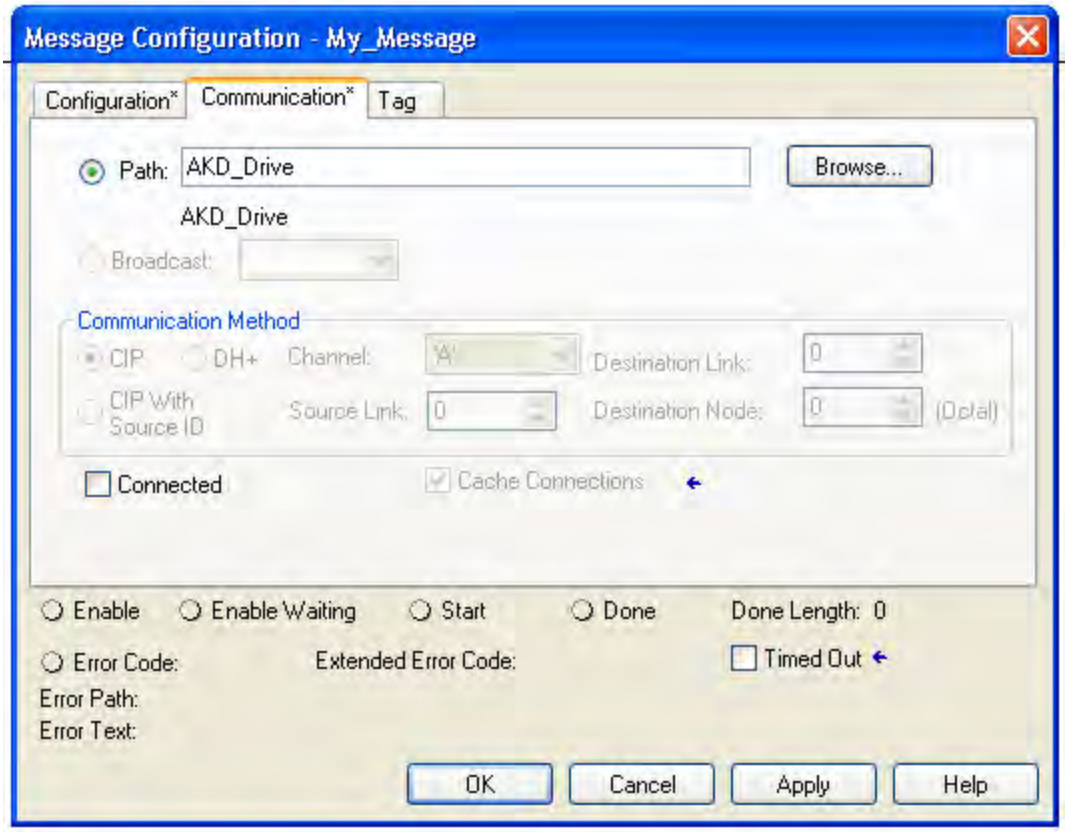
In addition to the Add-On instructions listed in this manual, almost all drive parameters can be read or set through the use of a MSG instruction.

Appendix B provides a list of parameters which are available.

To read a parameter, create a MSG instruction with the following settings:

Field	Value
Message Type	CIP Generic
Service Type	Parameter Read
Service Code	e (Hex)
Class	f (Hex)
Instance	Parameter Instance from Appendix B
Attribute	1
Destination	Create a tag to hold the value
Communication > Path	Name of the ETHERNET-MODULE for the AKD axis. Use the Browse button.





To set a parameter, create a MSG instruction with the following settings:

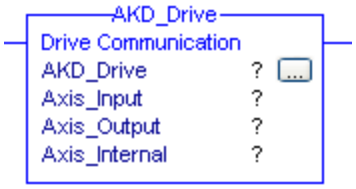
Field	Value
Message Type	CIP Generic
Service Type	Parameter Write
Service Code	10 (Hex)
Class	f (Hex)
Instance	Parameter Instance from Appendix B
Attribute	1
Source Element	Create a tag to hold the value
Source Length	Parameter size from Appendix B
Communication > Path	Name of the ETHERNET-MODULE for the AKD axis. Use the Browse button.

To execute a command, create a MSG instruction to write to the command:

Field	Value
Message Type	CIP Generic
Service Type	Parameter Write
Service Code	10 (Hex)
Class	f (Hex)
Instance	Parameter Instance from Appendix B
Attribute	1
Source Element	Create a tag to hold the value. Any actual value may be used - it is ignored.
Source Length	1 byte
Communication > Path	Name of the ETHERNET-MODULE for the AKD axis. Use the Browse button.

5 AKD Instructions

5.1 Motion Axis Drive Communication (AKD_Drive)



5.1.1 Description

Use the motion axis drive communication (AKD_Drive) instruction to initiate communication for an axis. This command is required for all other AKD commands to function properly.

5.1.2 Operands

Operand	Type	Format	Description
AKD_Drive	AKD_DRIVE	Tag	Control tag for this instruction.
Axis_Input	AB:ETHERNET_MODULE_SINT_8Bytes:I:0	Tag	Input memory space for axis.
Axis_Output	AB:ETHERNET_MODULE_SINT_8Bytes:O:0	Tag	Output memory space for axis.
Axis_Internal	AKD_AXIS	Tag	The name of the axis to initialize. This tag is an input parameter for all AKD instructions.

5.1.3 AKD_DRIVE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.

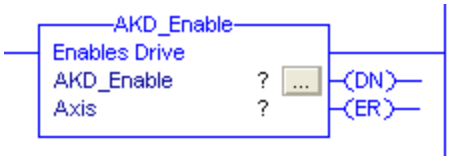
5.1.4 Execution

Condition	Ladder Diagram Action
Instruction execution	Read response message and send command message to axis.

5.1.5 Changes to Axis Status Bits

Bit Name	Meaning
All	All axis status bits are updated from drive.

5.2 Motion Axis On (AKD_Enable)



5.2.1 Description

The Motion Axis On (AKD_Enable) instruction directly activates the drive and enables the configured servo loops associated with a physical servo axis. It can be used anywhere in a program. Corresponds to the MSO instruction in Rockwell drives.

The AKD_Enable instruction automatically enables the specified axis by activating the drive and by activating the associated servo loop.

The most common use of this instruction is to activate the servo loop for the specified axis in its current position in preparation for commanding motion.

NOTE The AKD_Enable instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module and time for the drive output to stabilize and the servo loop to activate. The Done (.DN) bit is not set immediately, but only after the axis is in the Enabled state.

5.2.2 Operands

Operand	Type	Format	Description
AKD_Enable	AKD_ENABLE	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to enable.

5.2.3 AKD_ENABLE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the enable instruction completes.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.
.Axis	AKD_AXIS	The axis being enabled.

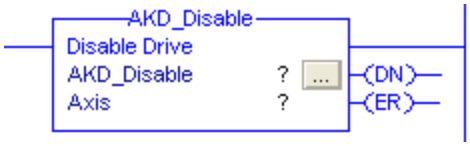
5.2.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Set enable bit in the command message to the drive if the drive does not have any faults. Then, set the done bit when the enabled response is returned. If the drive has a general fault or there is a communication time-out, set the error bit.

5.2.5 Changes to Axis Status Bits

Bit Name	State	Meaning
Enable	True	Axis is in Enabled state with the servo loop active.

5.3 Motion Axis Off (AKD_Disable)



5.3.1 Description

The Motion Axis Off (AKD_Disable) instruction directly and immediately turns off drive output and disables the servo loop on any physical servo axis. This places the axis in the Disabled state. The AKD_Disable instruction also disables any motions that may be active at the time of execution. Corresponds to the MSF instruction in Rockwell drives.

The AKD_Disable instruction requires no parameters - simply enter the desired axis. Use the Tag Editor to create and configure a new axis.

You can use the AKD_Disable instruction to turn servo action OFF when you must move the axis by hand. Since the position continues to be tracked even with the servo action Off, when the servo loop is turned On again by the AKD_Enable instruction, the axis is again under closed-loop control, at the new position.

NOTE The AKD_Disable instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module and time for the drive output and servo loop to be fully deactivated. The Done (.DN) bit is not set until this message has been successfully transmitted and the axis transitions to the Disabled state.

5.3.2 Operands

Operand	Type	Format	Description
AKD_Disable	AKD_DISABLE	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to disable.

5.3.3 AKD_DISABLE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the disable instruction completes.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.
.Axis	AKD_AXIS	The axis being disabled.

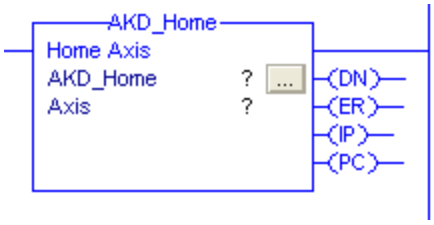
5.3.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset enable bit in the command message to the drive. Then, set the done bit when the disabled response is returned. If the drive has a general fault or there is a communication timeout, set the error bit.

5.3.5 Changes to Axis Status Bits

Bit Name	State	Meaning
Enable	False	Axis is in Disabled state with the servo loop active.

5.4 Motion Axis Home (AKD_Home)



5.4.1 Description

The Motion Axis Home (AKD_Home) instruction triggers the axis to home using the currently configured homing mode. See the AKD user manual for homing modes and setting instructions. This command triggers the drive to start the procedure and monitors for the process to complete. Similar to the MAH instruction in Rockwell drives.

Drive must be enabled in order to execute this instruction.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

NOTE The AKD_HOME instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module and time for the drive to perform the homing procedure.

5.4.2 Operands

Operand	Type	Format	Description
AKD_Home	AKD_HOME	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to home.

5.4.3 AKD_HOME Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the homing instruction completes.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.
.IP (In Process)	BOOL	The in process bit is set when the command is enabled and remains true until the command completes or is terminated.
.PC (Process Complete)	BOOL	The process complete bit is set when the homing command has successfully completed.

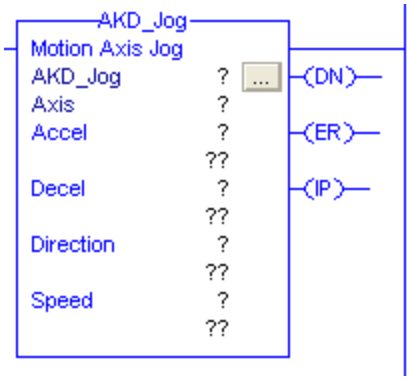
5.4.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Set the home command in the command message to the drive. Then, set the done bit when the command has initiated. The in process bit is set during execution and the process complete bit is set when the command has successfully completed. If the drive has a general fault or there is a communication timeout, set the error bit.

5.4.5 Changes to Axis Status Bits

Bit Name	State	Meaning
Home_Level	True	Level of home input.
Profile_In_Progress	True	Profile move is in progress (this bit may be set and cleared during instruction execution).

5.5 Motion Axis Jog (AKD_Jog)



5.5.1 Description

Use the motion axis jog (AKD_Jog) instruction to move the axis at a constant speed until you tell it to stop. Corresponds to the MAJ instruction in Rockwell drives.

Drive must be enabled and in velocity mode in order to execute this instruction.

5.5.2 Operands

Operand	Type	Format	Description	
AKD_Jog	AKD_JOG	Tag	Control tag for this instruction.	
Axis	AKD_AXIS	Tag	The name of the axis to enable.	
Accel	DINT	Immediate	Acceleration rate of the axis.	
Decel	DINT	Immediate	Deceleration rate of the axis.	
Direction	DINT	Immediate	**For this jog direction:**	**Enter:**
			Forward	1
			Reverse	0
Speed	DINT	Immediate	Speed to move the axis.	

5.5.3 AKD_JOG Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the jog instruction is successfully initiated.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.
.IP (In Process)	BOOL	The in process bit is set when the command is enabled and remains true until the jog is stopped or terminated.

5.5.4 Programming Guidelines

Guideline	Details
In ladder diagram, toggle the rung condition each time you want to execute the instruction.	This is a transitional instruction. In ladder diagram, toggle the rung-condition-in from cleared to set each time you want to execute the instruction.
Use an AKD_Stop_Smooth instruction to stop the jog.	See the AKD_Stop_Smooth instruction for more details.

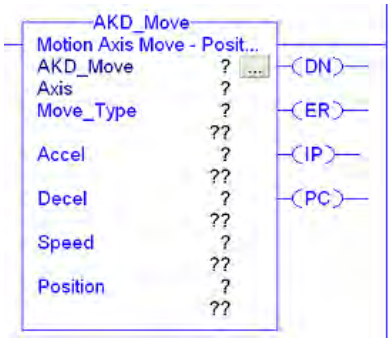
5.5.5 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Reset in progress bit when axis profile is no longer in progress.
Instruction execution	Reset done and error bits, then set accel, decel, direction, and speed. Start move and set the done bit to indicate command started and set the in progress bit to indicate that the command is running. If the motion stops, clear the in progress bit, then reset the motion and reset the done and error bits. If a general fault occurs or there is a communication response timeout, set the error bit.

5.5.6 Changes to Axis Status Bits

Bit Name	State	Meaning
Current_Direction	<Input Defined>	Velocity mode direction (False = Reverse, True = Forward) set based on parameter input.
Profile_In_Progress	True	Profile move is in progress.

5.6 Motion Axis Move (AKD_Move)



5.6.1 Description

Use the motion axis move (AKD_Move) instruction to move an axis to a specified relative or absolute position. Corresponds to the MAM instruction in Rockwell drives.

Drive must be enabled, homed, and in position mode in order to execute this instruction.

5.6.2 Operands

Operand	Type	Format	Description	
AKD_Move	AKD_MOVE	Tag	Control tag for this instruction.	
Axis	AKD_AXIS	Tag	The name of the axis to enable.	
Move Type	SINT	Immediate	**For this move mode**	**Enter:**
			Absolute	0
			Relative to Command Position	1
Accel	DINT	Immediate	Acceleration rate of the axis.	
Decel	DINT	Immediate	Deceleration rate of the axis.	
Speed	DINT	Immediate	Speed to move the axis.	
Position	DINT	Immediate	Target position for move.	

5.6.3 AKD_MOVE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the move instruction is successfully initiated.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.
.IP (In Process)	BOOL	The in process bit is set when the command is enabled and remains true until the move completes or is terminated.
.PC (Process Complete)	BOOL	The process complete bit is set when the command is complete.

5.6.4 Programming Guidelines

Guideline	Details
In ladder diagram, toggle the rung condition each time you want to execute the instruction.	This is a transitional instruction. In ladder diagram, toggle the rung-condition-in from cleared to set each time you want to execute the instruction.
Use the AKD_Move instruction to change one that is already in progress.	You can change the position target, speed, acceleration, or deceleration limits and the change will take place immediately. The axis will move to the updated position, possibly even changing direction, without stopping at the old end position.

5.6.5 Choosing a Move Type

See the AKD User Guide for more information on position move types.

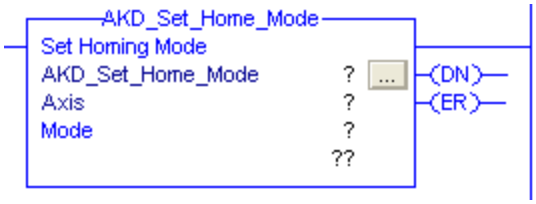
5.6.6 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Reset in process bit when axis profile is no longer in progress. Set process complete bit when move command successfully completes.
Instruction execution	Reset done and error bits, then set accel, decel, speed, and position. Start move and set the done bit to indicate command started and set the in process bit to indicate that the command is running. If the motion stops, clear the in process bit. Set process complete bit when move command successfully completes. If a general fault occurs or there is a communication response timeout, set the error bit.

5.6.7 Changes to Axis Status Bits

Bit Name	State	Meaning
Profile_In_Progress	True	Profile move is in progress.
On_Target_Position	True	True once current position equals last target position.

5.7 Motion Axis Set Home Mode (AKD_Set_Home_Mode)



5.7.1 Description

Use the motion axis set home mode (AKD_Set_Home_Mode) instruction to set the homing mode used by the drive when the AKD_Home command is called.

NOTE The AKD_Set_Home_Mode instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module. The Done (.DN) bit is not set immediately, but only after the home mode is set.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.7.2 Operands

Operand	Type	Format	Description	
AKD_Set_ Home_Mode	AKD_SET_ HOME_MODE	Tag	Control tag for this instruction.	
Axis	AKD_AXIS	Tag	The name of the axis to modify.	
Mode	SINT	Immediate	**For Mode**	**Enter:**
			Current Position	0
			Limit Input	1
			Limit/Zero Angle	2
			Limit/Index	3
			Home Input	4
			Home/Zero Angle	5
			Home/Index	6
			Zero Angle	7
			Position Error	8
			Position Error/Zero Angle	9
			Position Error/Index	10
			Index	11
			Home OR Position Error	12

5.7.3 AKD_SET_HOME_MODE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the mode is successfully set.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

5.7.4 Homing Modes

See the AKD User Manual for a full description of each homing mode. This value corresponds to the drive parameter HOME.MODE.

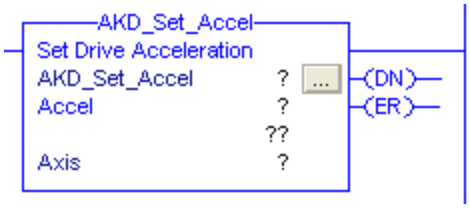
5.7.5 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset the done and error bits and set homing mode when instruction is enabled. Set done bit when axis homing mode is set. If a general fault occurs or there is a communication response timeout, set the error bit.

5.7.6 Changes to Axis Status Bit

Bit Name	State	Meaning
(none)		

5.8 Motion Axis Set Acceleration (AKD_Set_Accel)



5.8.1 Description

Use the motion axis set acceleration (AKD_Set_Accel) instruction to set the axis acceleration parameter used with axis moves.

NOTE The AKD_Set_Accel instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module. The Done (.DN) bit is not set immediately, but only after the acceleration is set.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.8.2 Operands

Operand	Type	Format	Description
AKD_Set_Accel	AKD_SET_ACCEL	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to modify.
Accel	DINT	Immediate	Acceleration parameter for axis moves.

5.8.3 AKD_SET_ACCEL Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the acceleration is successfully set.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

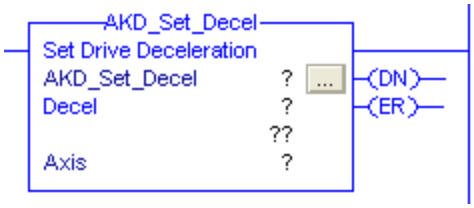
5.8.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset done and error bits and send acceleration command when instruction is enabled. Set done bit when axis command response received. If a general fault occurs or there is a communication response timeout, set the error bit.

5.8.5 Changes to Axis Status Bits

Bit Name	State	Meaning
(none)		

5.9 Motion Axis Set Deceleration (AKD_Set_Decel)



5.9.1 Description

Use the motion axis set deceleration (AKD_Set_Decel) instruction to set the axis deceleration parameter used with axis moves.

NOTE The AKD_Set_Decel instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module. The Done (.DN) bit is not set immediately, but only after the deceleration is set.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.9.2 Operands

Operand	Type	Format	Description
AKD_Set_Decel	AKD_SET_DECEL	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to modify.
Decel	DINT	Immediate	Deceleration parameter for axis moves.

5.9.3 AKD_SET_DECEL Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the deceleration is successfully set.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

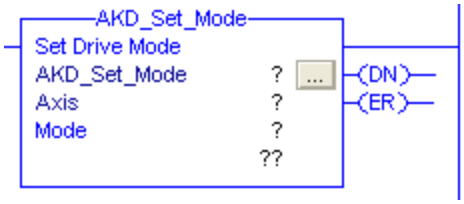
5.9.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset done and error bits and send deceleration command when instruction is enabled. Set done bit when axis command response received. If a general fault occurs or there is a communication response timeout, set the error bit.

5.9.5 Changes to Axis Bits

Bit Name	State	Meaning
(none)		

5.10 Motion Axis Set Mode (AKD_Set_Mode)



5.10.1 Description

Use the motion axis set mode (AKD_Set_Mode) instruction to set the operation mode for the axis' servo loop control.

NOTE The AKD_Set_Mode instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module. The Done (.DN) bit is not set immediately, but only after the mode is set.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.10.2 Operands

Operand	Type	Format	Description	
AKD_Set_Mode	AKD_SET_MODE	Tag	Control tag for this instruction.	
Axis	AKD_AXIS	Tag	The name of the axis to modify.	
Move Type	SINT	Immediate	**For Mode**	**Enter:**
			Position	0
			Velocity	1
			Torque	2

5.10.3 AKD_SET_MODE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the mode is successfully set.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

5.10.4 Operation Modes

Mode	Description
Position (0)	Axis will operate to match current position to target position.
Velocity (1)	Axis will operate to match current velocity to target velocity.
Torque (2)	Axis will operate to match current torque to target torque.

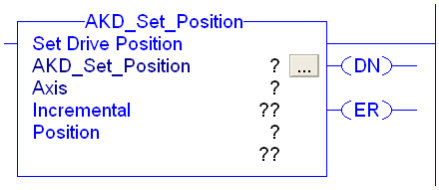
5.10.5 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset done and error bits and send mode command when instruction is enabled. Set done bit when axis command response received. If a general fault occurs or there is a communication response timeout, set the error bit.

5.10.6 Changes to Axis Status Bits

Bit Name	State	Meaning
(none)		

5.11 Motion Axis Set Position (AKD_Set_Position)



5.11.1 Description

Use the motion axis set position (AKD_Set_Position) instruction to set an axis' position target for the servo position control mode loop.

NOTE The AKD_Set_Position instruction initiates axis motion the same as the AKD_ Move instruction. It is recommended to use AKD_Set_Position instruction only for updating the target position of a move already in progress or for repeating the previous move with a new target position. Use the AKD_Move for all other position motion.

To successfully execute an AKD_Set_Position instruction, the drive must be enabled, homed, and in position mode.

NOTE The AKD_Set_Position instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module. The Done (.DN) bit is not set immediately, but only after the position is set.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.11.2 Operands

Operand	Type	Format	Description	
AKD_Set_ Position	AKD_SET_ POSITION	Tag	Control tag for this instruction.	
Axis	AKD_AXIS	Tag	The name of the axis to modify.	
Incremental	BOOL	Immediate	**For this position value**	**Enter:**
			Absolute	0
			Incremental	1
Position	DINT	Immediate	Position value for axis position control loop.	

5.11.3 AKD_SET_POSITION Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the position is successfully set.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

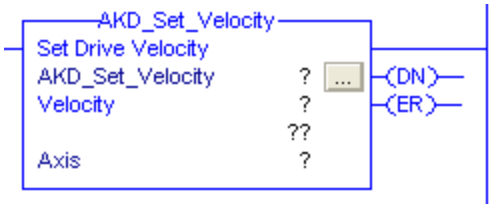
5.11.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset done and error bits and send position command when instruction is enabled. Set done bit when axis command response received. If a general fault occurs or there is a communication response timeout, set the error bit.

5.11.5 Changes to Axis Status Bits

Bit Name	State	Meaning
Profile_In_Progress	True	Profile move is in progress.
On_Target_Position	True	True once current position equals last target position.

5.12 Motion Axis Set Velocity (AKD_Set_Velocity)



5.12.1 Description

Use the motion axis set velocity (AKD_Set_Velocity) instruction to set an axis' velocity setpoint for the servo control loop.

NOTE The AKD_Set_Velocity instruction initiates axis motion the same as the AKD_Jog instruction, when in velocity mode. It is recommended to use AKD_Set_Velocity instruction only for updating the target speed of a jog already in progress and the AKD_Jog for all other constant speed motion.

To successfully execute an AKD_Set_Velocity instruction, the drive must be enabled, homed, and in velocity mode.

NOTE The AKD_Set_Velocity instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module. The Done (.DN) bit is not set immediately, but only after the velocity is set.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.12.2 Operands

Operand	Type	Format	Description
AKD_Set_Velocity	AKD_SET_VELOCITY	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to modify.
Velocity	DINT	Immediate	Set velocity for axis control loop.

5.12.3 AKD_SET_VELOCITY Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the velocity is successfully set.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

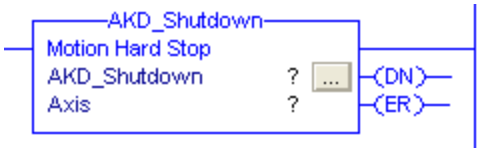
5.12.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset done and error bits and send velocity command when instruction is enabled. Set done bit when axis command response received. If a general fault occurs or there is a communication response timeout, set the error bit.

5.12.5 Changes to Axis Status Bits

Bit Name	State	Meaning
Profile_In_Progress	True	Profile move is in progress.
On_Target_Position	True	True once current position equals last target position.

5.13 Motion Axis Shutdown (AKD_Shutdown)



5.13.1 Description

The motion axis shutdown (AKD_Shutdown) instruction executes a controlled stop, then disables the servo loop, disables drive output, and places the axis into the Shutdown state. This instruction is also referred to as a hard stop. The shutdown state disables the drive output and deactivates the servo loop.

Another action initiated by the AKD_Shutdown instruction is the clearing of all motion processes in progress and the clearing of all the motion status bits. Associated with this action, the command also clears all motion instruction IP bits that are currently set for the targeted axis.

Another characteristic of the Shutdown state is that any instruction that initiates axis motion is blocked from execution. Attempts to do so result in an execution error. By executing the Shutdown Reset instruction or disabling and re-enabling the drive motion can be successfully initiated again.

The axis will remain in the shutdown state until a Motion Axis Shutdown Reset (AKD_Shutdown_Reset) instruction executes or the drive is disabled and re-enabled. Corresponds to the MASD instruction in Rockwell drives.

NOTE The AKD_Shutdown instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module. The Done (.DN) bit is not set immediately, but only after the shutdown is set.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.13.2 Operands

Operand	Type	Format	Description
AKD_Shutdown	AKD_SHUTDOWN	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to shut down.

5.13.3 AKD_SHUTDOWN Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the axis is successfully shutdown.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

5.13.4 Execution

Condition	Ladder Diagram Action
rung-condition-in is false	Clears hard stop command.
instruction execution	Send hard stop command when instruction is enabled. Set done bit when profile in progress is cleared. If a general fault occurs set the error bit.

5.13.5 Changes to Axis Status Bits

Bit Name	State	Meaning
Profile_In_Progress	True	No move is in progress
Enable	True	Axis is in Disabled state with the servo loop inactive.

5.14 Motion Axis Shutdown Reset (AKD_Shutdown_Reset)

5.14.1 Description

Use the motion axis shutdown reset (AKD_Shutdown_Reset) instruction to transition an axis from the Shutdown state to the Disabled ready state. All faults associated with the specified axis are automatically cleared. Corresponds to the MASR instruction in Rockwell drives.

NOTE The AKD_Shutdown_Reset instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module and time for the drive to execute the command. The Done (.DN) bit is not set immediately, but only after the drive is reset.

This is a transitional instruction:

- In ladder diagram, toggle the rung-condition-in from cleared to set each time the instruction should execute.

5.14.2 Operands

Operand	Type	Format	Description
AKD_Shutdown_Reset	AKD_SHUTDOWN_RESET	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to reset.

5.14.3 AKD_SHUTDOWN_RESET Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the axis is successfully reset.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

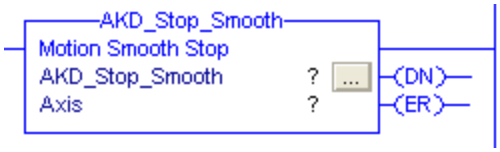
5.14.4 Execution

Condition	Ladder Diagram Action
Prescan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Reset done and error bits, disable axis, and reset faults. Set done bit when all axis command responses received. If a general fault occurs or there is a communication response timeout, set the error bit.

5.14.5 Changes to Axis Status Bits

Bit Name	State	Meaning
General_Fault	False	No general fault is present.
Enable	False	Axis is disabled.
FE_Fault	False	No following error fault is present.
Block_Fault	False	No block execution fault is present.

5.15 Motion Axis Smooth Stop (AKD_Stop_Smooth)



5.15.1 Description

Use the motion axis smooth stop (AKD_Stop_Smooth) instruction to end any controlled motion in process for the axis with a decelerated stop. The instruction stops the motion without disabling the servo loop. This command defaults to stop at the deceleration rate set for the current motion. Corresponds to the MAS instruction in Rockwell drives.

Use the instruction to:

- Stop a specific motion process such as jogging or moving
- Stop the axis completely

NOTE The AKD_Stop_Smooth instruction execution may take multiple scans to execute because it requires transmission of a message to the motion module and time for the drive to execute the command. The Done (.DN) bit is set immediately.

5.15.2 Operands

Operand	Type	Format	Description
AKD_Stop_Smooth	AKD_STOP_SMOOTH	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to stop.

5.15.3 AKD_STOP_SMOOTH Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the stop command has been initiated.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

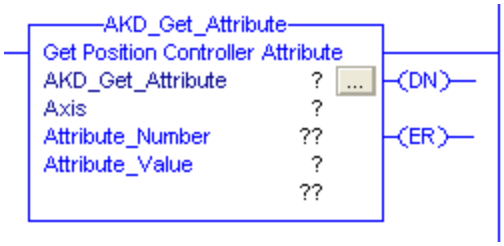
5.15.4 Execution

Condition	Ladder Diagram Action
Rung-condition-in is false	Initialize variables.
Instruction execution	Send smooth stop to axis. Set done bit when axis command is sent. If a general fault occurs, set the error bit.

5.15.5 Changes to Axis Status Bits

Bit Name	State	Meaning
Profile_In_Progress	False	No profile move executing.

5.16 Motion Axis Get Position Controller Attribute (AKD_Get_Attribute)



5.16.1 Description

Use the motion axis get attribute (AKD_Get_Attribute) instruction to query a Position Controller attribute from an axis. This instruction provides quick access to a special set of drive parameters which can always be accessed in one communication cycle. The output value will be updated with live values each cycle as long as this instruction is enabled.

NOTE This instruction must not be enabled at the same time as the AKD_Get_Parameter instruction.

See Appendix A: Position Controller Object Attributes for a list of available attributes and numbering.

5.16.2 Operands

Operand	Type	Format	Description
AKD_Get_Attribute	AKD_GET_ATTRIBUTE	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to query.
Attribute_Number	INT	Immediate	(See Appendix A: Position Controller Object Attributes)
Attribute_Value	DINT	Tag	Output tag to which the value of the attribute is passed.

5.16.3 AKD_GET_ATTRIBUTE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the get attribute command has been completed.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

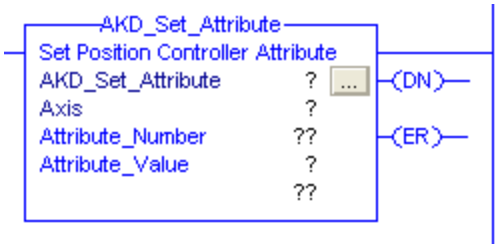
5.16.4 Execution

Condition	Ladder Diagram Action
Pre-scan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Send command to axis to request value. Set done bit and copy response to attribute value output when axis response is received. If a general fault or timeout occurs, set the error bit.

5.16.5 Changes to Axis Status Bits

Bit Name	State	Meaning
(none)		

5.17 Motion Axis Set Position Controller Attribute (AKD_Set_Attribute)



5.17.1 Description

Use the motion axis set attribute (AKD_Set_Attribute) instruction to set a Position Controller attribute for an axis. This instruction provides quick access to a special set of drive parameters which can always be set in one communication cycle. See Appendix A: Position Controller Object Attributes for a list of available attributes and numbering.

5.17.2 Operands

Operand	Type	Format	Description
AKD_Set_Attribute	AKD_SET_ATTRIBUTE	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to modify.
Attribute_Number	INT	Immediate	(See Appendix A: Position Controller Object Attributes)
Attribute_Value	DINT	Immediate	Value to which the specified attribute will be set.

5.17.3 AKD_SET_ATTRIBUTE Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the set attribute command has been completed.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

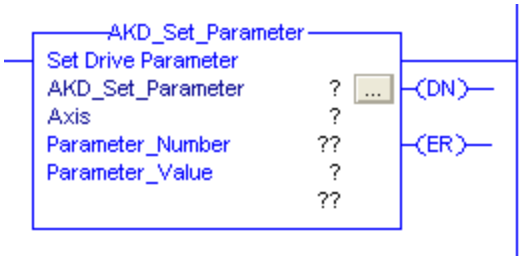
5.17.4 Execution

Condition	Ladder Diagram Action
Pre-scan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Send command to axis to set value. Set done bit when axis response is received. If a general fault or timeout occurs, set the error bit.

5.17.5 Changes to Axis Status Bits

Bit Name	State	Meaning
(none)		

5.18 Motion Axis Set Parameter (AKD_Set_Parameter)



5.18.1 Description

Use the motion axis set parameter (AKD_Set_Parameter) instruction to modify a drive parameter or execute a drive command on an axis. The time required to execute the command is highly dependent on the particular parameter. See Appendix B: AKD Parameters for a list of available parameters and numbering.

5.18.2 Operands

Operand	Type	Format	Description
AKD_Set_Parameter	AKD_SET_PARAMETER	Tag	Control tag for this instruction.
Axis	AKD_AXIS	Tag	The name of the axis to modify.
Parameter_Number	INT	Immediate	(See Appendix B: AKD Parameters)
Parameter_Value	DINT	Immediate	Value to which the specified parameter will be set.

5.18.3 AKD_SET_PARAMETER STRUCTURE

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the set parameter command has been completed.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

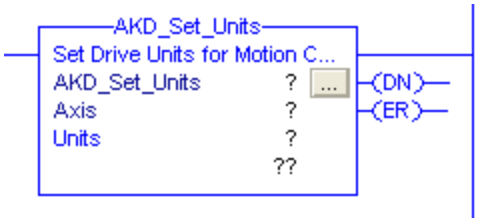
5.18.4 Execution

Condition	Ladder Diagram Action
Pre-scan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Send command to axis to set value. Set done bit when axis response is received. If a general fault or timeout occurs, set the error bit.

5.18.5 Changes to Axis Status Bits

Bit Name	State	Meaning
(none)		

5.19 Motion Axis Set Units (AKD_Set_Units)



5.19.1 Description

Use the motion axis set units (AKD_Set_Units) instruction to set the current unit system used on an axis.

At the moment, only mode 0 (EIP.POSUNIT=65536 and EIP.PROFUNIT=65536) is available. These scaling values can also be modified directly through EtherNet/IP or Workbench. See the AKD EtherNet/IP User Manual for more information about unit scaling.

5.19.2 Operands

Operand	Type	Format	Description	
AKD_Set_Units	AKD_SET_UNITS	Tag	Control tag for this instruction.	
Axis	AKD_AXIS	Tag	The name of the axis to modify.	
Units	SINT	Immediate	**For units**	**Enter:**
			Counts	0

5.19.3 AKD_SET_UNITS Structure

Mnemonic	Data Type	Description
.EnableIn	BOOL	The enable input bit indicates that the instruction is enabled. It remains set until the instruction completes and the rung-condition-in goes false.
.EnableOut	BOOL	The enable output bit is the output of the enable input bit.
.DN (Done)	BOOL	The done bit indicates when the set units command has been completed.
.ER (Error)	BOOL	The error bit indicates if the instruction detects an error.

5.19.4 Execution

Condition	Ladder Diagram Action
Pre-scan	Initialize variables and clear timeout.
Rung-condition-in is false	Initialize variables and clear timeout.
Instruction execution	Send command to axis to set units and if necessary update settings. Set done bit when axis response is received. If a general fault or timeout occurs, set the error bit.

5.19.5 Changes to Axis Status Bits

Bit Name	State	Meaning
(none)		

6 Troubleshooting

Communication Timeout

The instructions share a common “timeout” value in the controller tag AKD_Axis.CommandTimeout. This value is used to count down when a command is sent using an explicit message, to ensure a response is received as expected. In some project configurations, this timeout may need to be increased, such as if the rung for an Add-On instruction is only scanned once per second. In this case, increase the value of CommandTimeout.

7 Appendix A: Supported EtherNet/IP Objects and Attributes

7.1 Position Controller Class 0x25

Attribute ID	Name	Access Rule	Type	Description
1	Number of Attributes	Get	USINT	Returns the total number of attributes supported by this object in this device.
2	Attribute List	Get	Array of USINT	Returns an array with a list of the attributes supported by this object in this device.
3	Mode	Get/Set	USINT	Operating mode. 0 = Position mode(default), 1 = Velocity mode, 2 = Torque mode.
4	Position Units	Get/Set	DINT	Position Units ratio value is the number of actual position feedback counts equal to one position unit (default 1).
5	Profile Units	Get/Set	DINT	Profile Units ratio value is the number of actual position feedback counts per second or second2 equal to one velocity, acceleration or deceleration unit (default 1).
6	Target Position	Get/Set	DINT	Returns 1 for the AKD (only one axis support).
7	Target Velocity	Get/Set	DINT	General fault flag.
8	Acceleration	Get/Set	DINT	Not used yet.
9	Deceleration	Get/Set	DINT	Not used yet.
10	Incremental Position Flag	Get/Set	BOOL	Incremental Position Flag 0 := absolute, 1:= incremental.
11	Load Data/Profile Handshake	Get/Set	BOOL	Used to Load Command Data, Start a Profile Move, and indicate that a Profile Move is in progress.
17	Enable	Get/Set	BOOL	Enable Output (same as DRV.EN).
25	Torque	Get/Set	DINT	Output torque.
58	Load Data Complete	Get/Set	BOOL	Indicates that valid data for a valid I/O command message type has been loaded into the position controller device.
100	Home Mode	Get/Set	INT	See home mode section of the AKD User Manual
101	Home Move	Set	BOOL	Initiate a home move.

8 Appendix B Parameter Listing

The parameters in this list correspond to drive parameters available in Workbench and are described in the Workbench help documentation.

Position values are scaled according to the Position Units attribute 4 of the Position Controller Object.

Velocity and Acceleration values are scaled according to the Profile Units attribute 5 of the Position Controller Object.

Other floating point values are multiplied by 1000, such that a value displayed in Workbench as 1.001 will be transmitted through EtherNet/IP as 1001.

Instance	Parameter	Data Size	Data Type
1	AIN.CUTOFF	4 Byte	Float
2	AIN.DEADBAND	2 Byte	Float
3	AIN.ISCALE	4 Byte	Float
4	AIN.OFFSET	2 Byte Signed	Float
5	AIN.PSCALE	8 Byte	Position
7	AIN.VALUE	2 Byte	Float
8	AIN.VSCALE	4 Byte	Velocity
9	AIN.ZERO	Command	None
10	AOUT.ISCALE	4 Byte	Float
11	AOUT.MODE	2 Byte	Integer
12	AOUT.OFFSET	2 Byte Signed	Float
13	AOUT.PSCALE	8 Byte	Position
15	AOUT.VALUE	8 Byte Signed	Float
17	AOUT.VALUEU	8 Byte Signed	Float
19	AOUT.VSCALE	4 Byte	Velocity
20	BODE.EXCITEGAP	1 Byte	Integer
21	BODE.FREQ	4 Byte	Float
22	BODE.IAMP	2 Byte Signed	Float
23	BODE.INJECTPOINT	1 Byte	Integer
24	BODE.MODE	1 Byte	Integer
25	BODE.MODETIMER	4 Byte	Integer
26	BODE.PRBDEPTH	1 Byte	Integer
27	BODE.VAMP	8 Byte Signed	Velocity
28	CAP0.EDGE	1 Byte	Integer
29	CAP0.EN	1 Byte	Integer
30	CAP0.EVENT	1 Byte	Integer
31	CAP0.FILTER	1 Byte	Integer
32	CAP0.MODE	1 Byte	Integer
33	CAP0.PLFB	8 Byte Signed	Position
35	CAP0.PREEDGE	1 Byte	Integer
36	CAP0.PREFILTER	1 Byte	Integer
37	CAP0.PRESLECT	1 Byte	Integer
38	CAP0.STATE	1 Byte	Integer

Instance	Parameter	Data Size	Data Type
39	CAP0.T	4 Byte	Integer
40	CAP0.TRIGGER	1 Byte	Integer
41	CAP1.EDGE	1 Byte	Integer
42	CAP1.EN	1 Byte	Integer
43	CAP1.EVENT	1 Byte	Integer
44	CAP1.FILTER	1 Byte	Integer
45	CAP1.MODE	1 Byte	Integer
46	CAP1.PLFB	8 Byte Signed	Position
48	CAP1.PREEDGE	1 Byte	Integer
49	CAP1.PREFILTER	1 Byte	Integer
50	CAP1.PRESELECT	1 Byte	Integer
51	CAP1.STATE	1 Byte	Integer
52	CAP1.T	4 Byte	Integer
53	CAP1.TRIGGER	1 Byte	Integer
54	CS.DEC	8 byte	Acceleration
56	CS.STATE	1 Byte	Integer
57	CS.TO	4 Byte	Integer
58	CS.VTHRESH	8 Byte	Velocity
59	DIN.ROTARY	1 Byte	Integer
60	DIN.STATES	1 Byte	Array
61	DIN1.INV	1 Byte	Integer
62	DIN1.MODE	2 Byte	Integer
63	DIN1.PARAM	8 Byte Signed	Varies
65	DIN1.STATE	1 Byte	Integer
66	DIN2.INV	1 Byte	Integer
67	DIN2.MODE	2 Byte	Integer
68	DIN2.PARAM	8 Byte Signed	Varies
70	DIN2.STATE	1 Byte	Integer
71	DIN3.INV	1 Byte	Integer
72	DIN3.MODE	2 Byte	Integer
73	DIN3.PARAM	8 Byte Signed	Varies
75	DIN3.STATE	1 Byte	Integer
76	DIN4.INV	1 Byte	Integer
77	DIN4.MODE	2 Byte	Integer
78	DIN4.PARAM	8 Byte Signed	Varies
80	DIN4.STATE	1 Byte	Integer
81	DIN5.INV	1 Byte	Integer
82	DIN5.MODE	2 Byte	Integer
83	DIN5.PARAM	8 Byte Signed	Varies
85	DIN5.STATE	1 Byte	Integer
86	DIN6.INV	1 Byte	Integer
87	DIN6.MODE	2 Byte	Integer
88	DIN6.PARAM	8 Byte Signed	Varies
90	DIN6.STATE	1 Byte	Integer

Instance	Parameter	Data Size	Data Type
91	DIN7.INV	1 Byte	Integer
92	DIN7.MODE	2 Byte	Integer
93	DIN7.PARAM	8 Byte Signed	Varies
95	DIN7.STATE	1 Byte	Integer
96	DOUT.CTRL	1 Byte	Integer
97	DOUT.RELAYMODE	1 Byte	Integer
98	DOUT.STATES	1 Byte	Array
99	DOUT1.MODE	1 Byte	Integer
100	DOUT1.PARAM	8 Byte Signed	Float
102	DOUT1.STATE	1 Byte	Integer
103	DOUT1.STATEU	1 Byte	Integer
104	DOUT2.MODE	1 Byte	Integer
105	DOUT2.PARAM	8 Byte Signed	Float
107	DOUT2.STATE	1 Byte	Integer
108	DOUT2.STATEU	1 Byte	Integer
109	DRV.ACC	8 Byte	Acceleration
111	DRV.ACTIVE	1 Byte	Integer
112	DRV.CLRFAULTHIST	Command	None
113	DRV.CLRFAULTS	Command	None
114	DRV.CMDSOURCE	1 Byte	Integer
115	DRV.DBILIMIT	2 Byte	Float
116	DRV.DEC	8 Byte	Acceleration
118	DRV.DIR	1 Byte	Integer
119	DRV.DI	Command	None
120	DRV.DISMODE	1 Byte	Integer
121	DRV.DISSOURCES	2 Byte	Integer
122	DRV.DISTO	4 Byte	Integer
123	DRV.EMUEDIR	1 Byte	Integer
124	DRV.EMUEMODE	2 Byte	Integer
125	DRV.EMUEMTURN	4 Byte	Integer
126	DRV.EMUERES	4 Byte	Integer
127	DRV.EMUEZOFFSET	2 Byte	Integer
128	DRV.EN	Command	None
129	DRV.ENDEFAULT	1 Byte	Integer
130	DRV.HANDWHEEL	4 Byte	Integer
131	DRV.HWENMODE	1 Byte	Integer
132	DRV.ICONT	2 Byte Signed	Float
133	DRV.IPEAK	2 Byte Signed	Float
134	DRV.IZERO	2 Byte	Float
135	DRV.MOTIONSTAT	4 Byte	Integer
136	DRV.OPMODE	1 Byte	Integer
137	DRV.RSTVAR	Command	None
138	DRV.STOP	Command	None
139	DRV.TYPE	1 Byte	Integer

Instance	Parameter	Data Size	Data Type
140	DRV.ZERO	1 Byte	Integer
141	FB1.BISSBITS	1 Byte	Integer
142	FB1.ENCRES	4 Byte	Integer
143	FB1.IDENTIFIED	1 Byte	Integer
144	FB1.INITSIGNED	1 Byte Signed	Integer
145	FB1.MECHPOS	4 Byte	Integer
146	FB1.OFFSET	8 Byte Signed	Position
148	FB1.ORIGIN	8 Byte	Position
150	FB1.PFIND	1 Byte	Integer
151	FB1.PFINDCMDU	2 Byte	Float
152	FB1.POLES	2 Byte	Integer
153	FB1.PSCALE	1 Byte	Integer
154	FB1.RESKTR	2 Byte	Float
155	FB1.RESREFPHASE	4 Byte Signed	Float
156	FB1.SELECT	1 Byte Signed	Integer
157	FB1.TRACKINGCAL	1 Byte	Integer
158	FBUS.PARAM01	4 Byte	Integer
159	FBUS.PARAM02	4 Byte	Integer
160	FBUS.PARAM03	4 Byte	Integer
161	FBUS.PARAM04	4 Byte	Integer
162	FBUS.PARAM05	4 Byte	Integer
163	FBUS.PARAM06	4 Byte	Integer
164	FBUS.PARAM07	4 Byte	Integer
178	FBUS.PLLTHRESH	2 Byte	Integer
179	FBUS.SAMPLEPERIOD	1 Byte	Integer
180	FBUS.SYNCACT	4 Byte	Integer
181	FBUS.SYNCDIST	4 Byte	Integer
182	FBUS.SYNCWND	4 Byte	Integer
183	FBUS.TYPE	1 Byte	Integer
184	GEAR.ACCMAX	8 Byte	Acceleration
186	GEAR.DECMAX	8 Byte	Acceleration
188	GEAR.IN	2 Byte	Integer
189	GEAR.MODE	2 Byte	Integer
190	GEAR.MOVE	Command	None
191	GEAR.OUT	2 Byte signed	Integer
192	GEAR.VMAX	8 Byte	Velocity
193	HOME.ACC	8 Byte	Acceleration
195	HOME.AUTOMOVE	1 Byte	Integer
196	HOME.DEC	8 Byte	Acceleration
198	HOME.DIR	2 Byte	Integer
199	HOME.DIST	8 Byte Signed	Position
201	HOME.FEEDRATE	2 Byte	Integer
202	HOME.IPEAK	4 Byte Signed	Float
204	HOME.MODE	2 Byte	Integer

Instance	Parameter	Data Size	Data Type
205	HOME.MOVE	Command	None
206	HOME.P	8 Byte Signed	Position
208	HOME.PERRTHRESH	8 Byte Signed	Position
210	HOME.SET	Command	None
211	HOME.V	8 Byte	Velocity
212	HWLS.NEGSTATE	1 Byte	Integer
213	HWLS.POSSTATE	1 Byte	Integer
214	IL.BUSFF	2 Byte Signed	Float
215	IL.CMD	2 Byte Signed	Float
216	IL.CMDU	2 Byte Signed	Float
217	IL.FB	2 Byte Signed	Float
218	IL.FF	2 Byte	Float
219	IL.FOLDFTHRESH	2 Byte	Float
220	IL.FOLDFTHRESHU	4 Byte Signed	Float
221	IL.FOLDWTHRESH	4 Byte Signed	Float
222	IL.FRICTION	4 Byte	Float
223	IL.IFOLDS	4 Byte	Float
224	IL.IUFB	2 Byte Signed	Float
225	IL.IVFB	2 Byte Signed	Float
226	IL.KACCFF	4 Byte Signed	Float
227	IL.KBUSFF	4 Byte	Float
228	IL.KP	2 Byte	Float
229	IL.KPDRATIO	4 Byte	Float
230	IL.KVFF	4 Byte Signed	Float
231	IL.LIMITN	4 Byte Signed	Float
232	IL.LIMITP	4 Byte Signed	Float
233	IL.MFOLDD	4 Byte	Float
234	IL.MFOLDR	4 Byte	Float
235	IL.MFOLDT	4 Byte	Float
236	IL.MIFOLD	4 Byte	Float
237	IL.OFFSET	4 Byte Signed	Float
238	IL.VCMD	2 Byte Signed	Integer
239	IL.VUFB	2 Byte Signed	Integer
240	IL.VVFB	2 Byte Signed	Integer
241	MOTOR.AUTOSET	1 Byte	Integer
242	MOTOR.BRAKE	1 Byte	Integer
243	MOTOR.BRAKERLS	1 Byte	Integer
244	MOTOR.CTF0	4 Byte	Float
245	MOTOR.ICONT	4 Byte	Float
246	MOTOR.IDDATAVALID	1 Byte	Integer
247	MOTOR.INTERTIA	4 Byte	Float
248	MOTOR.IPEAK	4 Byte	Float
249	MOTOR.KT	4 Byte	Float
250	MOTOR.LQLL	4 Byte	Float

Instance	Parameter	Data Size	Data Type
251	MOTOR.PHASE	2 Byte	Integer
252	MOTOR.PITCH	4 Byte	Float
253	MOTOR.POLES	2 Byte	Integer
254	MOTOR.R	4 Byte	Float
255	MOTOR.RTYPE	1 Byte	Integer
256	MOTOR.TBRAKEAPP	2 Byte	Integer
257	MOTOR.TBRAKERLS	2 Byte	Integer
258	MOTOR.TEMP	4 Byte	Integer
259	MOTOR.TEMPFAULT	4 Byte	Integer
260	MOTOR.TEMPWARN	4 Byte	Integer
261	MOTOR.TYPE	1 Byte	Integer
262	MOTOR.VMAX	2 Byte	Integer
263	MOTOR.VOLTMAX	2 Byte	Integer
264	MT,ACC	8 Byte	Acceleration
266	MT.CLEAR	2 Byte Signed	Integer
267	MT.CNTL	4 Byte	Integer
268	MT.CONTINUE	Command	None
269	MT.DEC	8 Byte	Acceleration
271	MT.EMERGMT	2 Byte Signed	Integer
272	MT.LOAD	Command	None
273	MT.MOVE	2 Byte Command	None
274	MT.MTNEXT	1 Byte	Integer
275	MT.NUM	1 Byte	Integer
276	MT.P	8 Byte Signed	Position
278	MT.SET	1 Byte Command	None
279	MT.TNEXT	2 Byte	Integer
280	MT.TNUM	1 Byte	Integer
281	MT.TPOSWND	8 Byte Signed	Position
283	MT.TVELWND	8 Byte	Velocity
284	MT.V	8 Byte	Velocity
285	MT.VCMD	8 Byte Signed	Velocity
286	PL.CMD	8 Byte	Position
288	PL.ERR	8 Byte	Position
290	PL.ERRMODE	1 Byte	Integer
291	PL.ERRFTHRESH	8 Byte	Position
293	PL.ERRWTHRESH	8 Byte	Position
295	PL.FB	8 Byte Signed	Position
297	PL.FBSOURCE	1 Byte	Integer
298	PL.INTINMAX	8 Byte	Position
300	PL.INTOUTMAX	8 Byte	Position
302	PL.KI	4 Byte	Float
303	PL.KP	4 Byte	Float
304	PL.MODP1	8 Byte Signed	Position
306	PL.MODP2	8 Byte Signed	Position

Instance	Parameter	Data Size	Data Type
308	PL.MODPDIR	1 Byte	Integer
309	PL.MODPEN	1 Byte	Integer
310	PLS.EN	2 Byte	Integer
311	PLS.MODE	2 Byte	Integer
312	PLS.P1	8 Byte Signed	Position
314	PLS.P2	8 Byte Signed	Position
316	PLS.P3	8 Byte Signed	Position
318	PLS.P4	8 Byte Signed	Position
320	PLS.P5	8 Byte Signed	Position
322	PLS.P6	8 Byte Signed	Position
324	PLS.P7	8 Byte Signed	Position
326	PLS.P8	8 Byte Signed	Position
328	PLS.RESET	2 Byte	Integer
329	PLS.STATE	2 Byte	Integer
330	PLS.T1	2 Byte	Integer
331	PLS.T2	2 Byte	Integer
332	PLS.T3	2 Byte	Integer
333	PLS.T4	2 Byte	Integer
334	PLS.T5	2 Byte	Integer
335	PLS.T6	2 Byte	Integer
336	PLS.T7	2 Byte	Integer
337	PLS.T8	2 Byte	Integer
338	PLS.UNITS	1 Byte	Integer
339	PLS.WIDTH1	8 Byte Signed	Position
341	PLS.WIDTH2	8 Byte Signed	Position
343	PLS.WIDTH3	8 Byte Signed	Position
345	PLS.WIDTH4	8 Byte Signed	Position
347	PLS.WIDTH5	8 Byte Signed	Position
349	PLS.WIDTH6	8 Byte Signed	Position
351	PLS.WIDTH7	8 Byte Signed	Position
353	PLS.WIDTH8	8 Byte Signed	Position
355	REC.ACTIVE	1 Byte	Integer
356	REC.DONE	1 Byte	Integer
357	REC.GAP	2 Byte	Integer
358	REC.NUMPOINTS	2 Byte	Integer
359	REC.OFF	Command	None
360	REC.STOPTYPE	1 Byte	Integer
361	REC.TRIG	Command	None
362	REC.TRIGPOS	1 Byte	Integer
363	REC.TRIGPRMLIST	-	String
364	REC.TRIGSLOPE	1 Byte	Integer
365	REC.TRIGTYPE	1 Byte	Integer
366	REC.TRIGVAL	8 Byte Signed	Varies
368	REGEN.POWER	8 Byte	Integer

Instance	Parameter	Data Size	Data Type
370	REGEN.REXT	2 Byte	Integer
371	REGEN.TEXT	4 Byte	Float
372	REGEN.TYPE	1 Byte Signed	Integer
373	REGEN.WATTEXT	2 Byte	Integer
374	SM.I1	2 Byte Signed	Float
375	SM.I2	2 Byte Signed	Float
376	SM.MODE	2 Byte	Integer
377	SM.MOVE	Command	None
378	SM.T1	2 Byte	Integer
379	SM.T2	2 Byte	Integer
380	SM.V1	8 Byte Signed	Velocity
381	SM.V2	8 Byte Signed	Velocity
382	STO.STATE	1 Byte	Integer
383	SWLS.EN	2 Byte	Integer
384	SWLS.LIMIT0	8 Byte Signed	Position
386	SWLS.LIMIT1	8 Byte Signed	Position
388	SWLS.STATE	2 Byte	Integer
389	UNIT.ACCLINEAR	1 Byte	Integer
390	UNIT.ACCROTARY	1 Byte	Integer
391	UNIT.PIN	4 Byte	Integer
392	UNIT.PLINEAR	1 Byte	Integer
393	UNIT.POUT	4 Byte	Integer
394	UNIT.PROTARY	1 Byte	Integer
395	UNIT.VLINEAR	1 Byte	Integer
396	UNIT.VROTARY	1 Byte	Integer
397	VBUS.CALGAIN	4 Byte	Float
398	VBUS.OVFTHRESH	2 Byte	Integer
399	VBUS.OVWTHRESH	2 Byte	Integer
400	VBUS.RMSLIMIT	1 Byte	Integer
401	VBUS.UVFTHRESH	2 Byte	Integer
402	VBUS.UVMODE	1 Byte	Integer
403	VBUS.UVWTHRESH	2 Byte	Integer
404	VBUS.VALUE	4 Byte	Float
405	VL.ARPF1	4 Byte	Float
406	VL.ARPF2	4 Byte	Float
407	VL.ARPF3	4 Byte	Float
408	VL.ARPF4	4 Byte	Float
409	VL.ARPQ1	4 Byte	Float
410	VL.ARPQ2	4 Byte	Float
411	VL.ARPQ3	4 Byte	Float
412	VL.ARPQ4	4 Byte	Float
413	VL.ARTYPE1	1 Byte	Integer
414	VL.ARTYPE2	1 Byte	Integer
415	VL.ARTYPE3	1 Byte	Integer

Instance	Parameter	Data Size	Data Type
416	VL.ARTYPE4	1 Byte	Integer
417	VL.ARZF1	4 Byte	Float
418	VL.ARZF2	4 Byte	Float
419	VL.ARZF3	4 Byte	Float
420	VL.ARZF4	4 Byte	Float
421	VL.ARZQ1	4 Byte	Float
422	VL.ARZQ2	4 Byte	Float
423	VL.ARZQ3	4 Byte	Float
424	VL.ARZQ4	4 Byte	Float
425	VL.BUSFF	8 Byte Signed	Velocity
426	VL.CMD	8 Byte Signed	Velocity
427	VL.CMDU	8 Byte Signed	Velocity
428	VL.ERR	8 Byte Signed	Velocity
429	VL.FB	8 Byte Signed	Velocity
430	VL.FBFILTER	8 Byte Signed	Velocity
431	VL.FBSOURCE	1 Byte	Integer
432	VL.FF	8 Byte Signed	Velocity
433	VL.GENMODE	2 Byte	Velocity
434	VL.KBUSFF	4 Byte	Float
435	VL.KI	4 Byte	Float
436	VL.KO	4 Byte	Float
437	VL.KP	4 Byte	Float
438	VL.KVFF	4 Byte	Float
439	VL.LIMITN	8 Byte Signed	Velocity
440	VL.LIMITP	8 Byte	Velocity
441	VL.LMJR	4 Byte	Float
442	VL.MODEL	8 Byte Signed	Velocity
443	VL.OBSBW	4 Byte	Float
444	VL.OBSMODE	4 Byte	Integer
445	VL.THRESH	8 Byte Signed	Velocity
446	WS.ARM	Command	None
447	WS.DISTMAX	8 Byte Signed	Position
449	WS.DISTMIN	8 Byte Signed	Position
451	WS.IMAX	2 Byte Signed	Float
452	WS.MODE	1 Byte	Integer
453	WS.NUMLOOPS	1 Byte	Integer
454	WS.STATE	1 Byte	Integer
455	WS.T	2 Byte	Integer
456	WS.TDELAY1	2 Byte	Integer
457	WS.TDELAY2	2 Byte	Integer
458	WS.TDELAY3	2 Byte	Integer
459	WS.VTHRESH	8 Byte Signed	Velocity
460	DIN1.FILTER	2 Byte	Integer
461	DIN2.FILTER	2 Byte	Integer

Instance	Parameter	Data Size	Data Type
462	DIN3.FILTER	2 Byte	Integer
463	DIN4.FILTER	2 Byte	Integer
464	DIN5.FILTER	2 Byte	Integer
465	DIN6.FILTER	2 Byte	Integer
466	DIN7.FILTER	2 Byte	Integer
467	FB1.HALLSTATEU	1 Byte	Integer
468	FB1.HALLSTATEV	1 Byte	Integer
469	FB1.HALLSTATEW	1 Byte	Integer
470	DRV.NVSAVE	Command	None
471	MODBUS.DIO	4 Byte	Integer
472	MODBUS.DRV	4 Byte	Integer
473	MODBUS.DRVSTAT	4 Byte	Integer
474	MODBUS.HOME	4 Byte	Integer
475	MODBUS.MOTOR	4 Byte	Integer
476	MODBUS.MT	2 Byte	Integer
477	MODBUS.SM	4 Byte	Integer
478	DRV.FAULT1	2 Byte	Integer
479	DRV.FAULT2	2 Byte	Integer
480	DRV.FAULT3	2 Byte	Integer
481	DRV.FAULT4	2 Byte	Integer
482	DRV.FAULT5	2 Byte	Integer
483	DRV.FAULT6	2 Byte	Integer
484	DRV.FAULT7	2 Byte	Integer
485	DRV.FAULT8	2 Byte	Integer
486	DRV.FAULT9	2 Byte	Integer
487	DRV.FAULT10	2 Byte	Integer
488	MODBUS.PIN	4 Byte	Integer
489	MODBUS.POUT	4 Byte	Integer
490	MODBUS.PSCALE	2 Byte	Integer
491	MODBUS.UNITLABEL	-	String
492	MOTOR.HFPHASEREAD	2 Byte	Integer
493	FB2.ENCRES	4 Byte	Integer
494	FB2.MODE	2 Byte	Integer
495	FB2.SOURCE	2 Byte	Integer
496	MOTOR.TBRAKETO	2 Byte	Integer
497	MODBUS.MSGLOG	1 Byte	Integer
498	USER.INT1	4 Byte Signed	Integer
499	USER.INT2	4 Byte Signed	Integer
500	USER.INT3	4 Byte Signed	Integer
501	USER.INT4	4 Byte Signed	Integer
502	USER.INT5	4 Byte Signed	Integer
503	USER.INT6	4 Byte Signed	Integer
504	USER.INT7	4 Byte Signed	Integer
505	USER.INT8	4 Byte Signed	Integer

Instance	Parameter	Data Size	Data Type
506	USER.INT9	4 Byte Signed	Integer
507	USER.INT10	4 Byte Signed	Integer
508	USER.INT11	4 Byte Signed	Integer
509	USER.INT12	4 Byte Signed	Integer
510	USER.INT13	4 Byte Signed	Integer
511	USER.INT14	4 Byte Signed	Integer
512	USER.INT15	4 Byte Signed	Integer
513	USER.INT16	4 Byte Signed	Integer
514	USER.INT17	4 Byte Signed	Integer
515	USER.INT18	4 Byte Signed	Integer
516	USER.INT19	4 Byte Signed	Integer
517	USER.INT20	4 Byte Signed	Integer
518	USER.INT21	4 Byte Signed	Integer
519	USER.INT22	4 Byte Signed	Integer
520	USER.INT23	4 Byte Signed	Integer
521	USER.INT24	4 Byte Signed	Integer
522	DRV.NVCHECK	8 Byte	Integer
523	FB3.MODE	2 Byte	Integer
524	FB3.P	8 Byte	Integer
525	MODBUS.SCALING	1 Byte	Integer
526	DRV.EMUEPULSEWIDTH	4 Byte	Float
527	DRV.EMUECHECKSPEED	1 Byte	Integer

About Kollmorgen

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giaving machine builders an irrefutable marketplace advantage.

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