Tolomatic
EXCELLENCE IN MOTION

Technical Note

Using ACS Add-On Instructions

Using Tolomatic, Inc.'s Add-On Instructions for Studio 5000 Logix Designer / RSLogix 5000

Contents

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Overview

These instructions assume that the user is very familiar with Studio 5000 Logix Designer / RSLogix 5000 programming and EtherNet/IP communications. This document references the EtherNet/IP Users Guide 3600-4168 which defines the EtherNet/IP interface to the ACS drive and controller. Basic set-up instructions can be found in the Technical Note "Setting Up the Allen Bradley Studio 5000 Logix Designer / RSLogix 5000 Software for EtherNet/IP Communication to Tolomatic's ACS Drive" #3600-4171.

Step 1: Import Add-On Instructions

The first step to using the ACS Add-On Instructions is to import them into your Studio 5000 Logix Designer / RSLogix 5000 program.

1. In your Controller Organizer tree view, right click on Add-On Instructions and select Import Add-On Instruction.
2. Browse to the directory which contains the ACS Add-On Instructions
3. Select the instruction you wish to import
4. The default configuration should be ok, click 'OK'
5. Repeat for all instructions you wish to use.

NOTE: IF YOU ARE PLANNING ON USING THE MOTION ADD-ON INSTRUCTIONS, YOU WILL ALSO NEED THE START MOTION, AND CLEAR START MOTION INSTRUCTIONS.

Step 2: Add ACS Drives to Project

You will now want to add the ACS Drive(s) to your project.

Tolomatic has created an EDS based Add-On Profile which works hand-in-hand with the Add-On Instructions. The EDS files are included in the Add-On Instructions download. EDS file 36043187 is for ACS servo and stepper drives. EDS file 36043188 is for ACSI integrated motor/drive/controller.

1. Click on Tools->EDS Hardware Installation Tool
2. Follow the RSLogix EDS wizard to Register an EDS file
3. When prompted, browse to the EDS file (36043187_ACS_DRIVE.eds) or (36043188_ACSI_DRIVE.eds)
4. Once completed, Right click on the Ethernet Port Controller in your controller organizer window
5. Select 'New Module'
6. In the Catalog, search 'Tolomatic'
7. Assign a Name and Description for each drive
8. Assign an IP Address (default Drives snip in DHCP mode)

Step 3: Create Start Motion Timer Rungs

According to the EtherNet/IP users guide, in order to continuously make motion, you must strobe the Start Motion bit in the Output Assembly. The drive detects the rising edge of the bit, so if you want to make a move after you have already made a move, you must bring the bit low, before you again assert it to start motion. To accomplish this, you use a timer to force down a Clear Start Motion command after a Start Motion Command has been sent. To enforce this logic, we do the following for each drive:

1. In the Program Tags, add a StartMotionTimerEnable BOOL tag
2. In the Program Tags, add a StartMotionTimer TIMER tag

Now create the following rungs in your program:

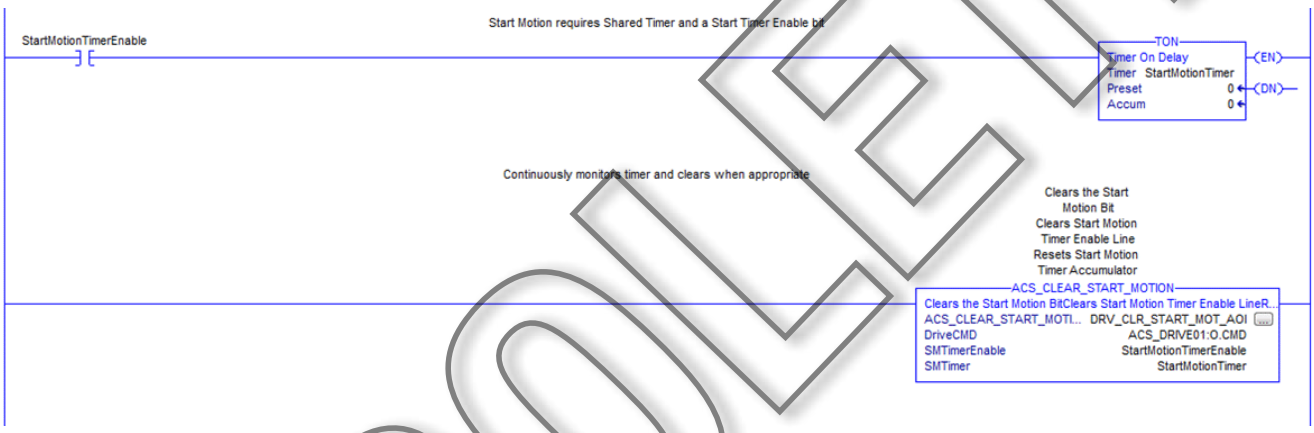

Figure 1 - Start Motion

You may want different logic in your application, so the add-on instructions give you this control. The basic thing to remember is that the drive must detect the start motion bit LOW before the PLC sets it high again. This means that the Start Motion Timer must be longer than the RPI, and you should not command another move before the Clear ACS Start Motion command has a chance to be sent to the drive.

Motion Example

The following is an example of a Force Move (Servo Only), but Absolute and Incremental Moves have the same inputs.

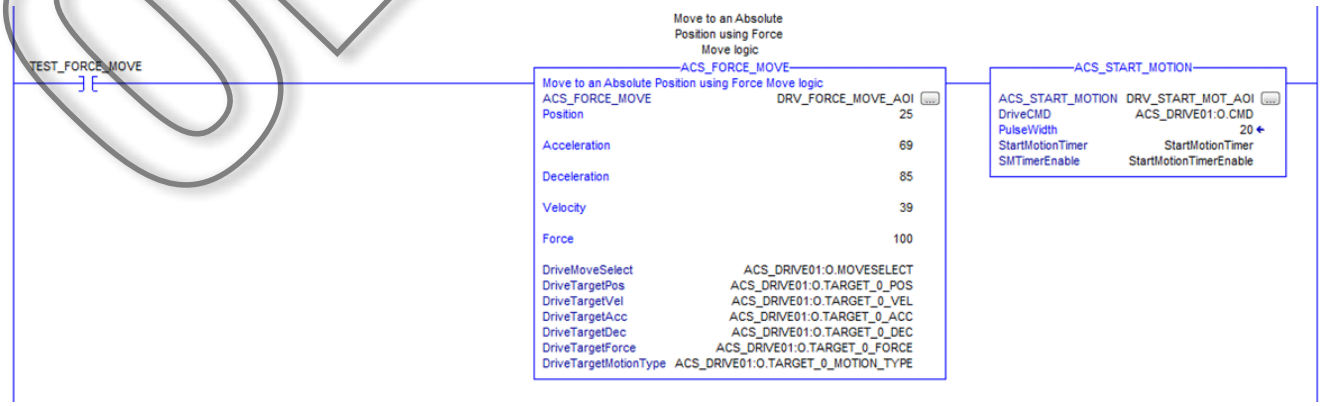

Figure 2 - Force Move Example

In this application, the move is immediately initiated when the TEST_FORCE_MOVE bit is set high. The move is set up and the Drive Target Variables are mapped to the specific variables in the Controller Tags for a given drive.

Once the move is set up, the ACS Start Motion command is sent. We reference the Start Motion Timer program tag, the Start Motion Timer Enable semaphore program tag, and specify the pulse width of the Enable line. For this to be work correctly, the pulse width should be approximately 2x the RPI of the drive. In this instance, it is 20ms.

Add-On Instruction Variable	Controller Tag Reference	Description
DriveCMD	[ACS Drive]:O.CMD	Command Register of Drive[1, 2]
DriveMoveSelect	[ACS Drive]:O.MOVESELECT	Index Move to Execute – 0 uses Target_0 settings, otherwise the indexed positions are configured in the Tolomatic Motion Interface
DriveTargetPos	[ACS Drive].O.TARGET_0_POS	Index 0 Target Position[4]
DriveTargetVel	[ACS Drive].O.TARGET_0_VEL	Index 0 Target Velocity[4]
DriveTargetAcc	[ACS Drive].O.TARGET_0_ACC	Index 0 Target Acceleration[4]
DriveTargetDec	[ACS Drive].O.TARGET_0_DEC	Index 0 Target Deceleration[4]
DriveTargetForce	[ACS Drive].O.TARGET_0_FORCE	Index 0 Force %
DriveTargetMotionType	[ACS Drive].O.TARGET_0_MOTION_TYPE	Motion Type Register[3]
DriveDigitalOutput	[ACS Drive].O.DIGITAL_OUTPUT	Set Digital Output Pins register mask
[Unused]	[ACS Drive].I.CPOS	Current Position[4]
[Unused]	[ACS Drive].I.STAT	Drive Status Register[5]
DriveFaults	[ACS Drive].I.FAULTS	Drive Faults Register[5]
[Unused]	[ACS Drive].I.INPUT_BITS	Read Digital Inputs
[Unused]	[ACS Drive].I.OUTPUT_BITS	Read Digital Outputs
[Unused]	[ACS Drive].I.AIN	Read Analog Input
[Unused]	[ACS Drive].I.AOUT	Read Analog Output

[1]The individual bits in this register should not be changed independently of each other. There are some combinations that are invalid, and the drive will not recognize these commands. The following are accepted: 0x0 – Disable Drive; 0x1 – Enable Drive; 0x3 – Start Motion; 0x5 – Home; 0x8 – Software Stop (Estop); 0x11 – Stop Motion

[2]To clear start motion manually, simply send it another valid command. Typically the Enable Drive Command. If the drive is already enabled, the drive will stay enabled.

[3]Valid motion types for network controlled ACS Drives: 0x0 – Absolute; 0x1 – Increment Position; 0x2 – Decrement Position; 0x9 – Force Move (Servo Only) 0xB – Increment Position (Rotary); 0xC – Decrement Position (Rotary); 0xD – Velocity Forward (Rotary); 0xE – Velocity Reverse (Rotary)

[4]All distance is in drive default millimeters; Speed is in mm/s; Acceleration is mm/s2

[5]Drive Status and Fault Register Masks are defined in the ACS Drive Ethernet/IP Programmers Guide, Section 3.2 Input Assembly (3600-4168).