# YASKAWA

# Add-On Instruction (AOI) for Logix Designer/RSLogix 5000 User Guide

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.

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# 1 Preface and Safety

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## 2 Product Overview

### About this Product

This document is designed to assist the user in configuration and application of Yaskawa Logix Add-On Instruction (AOI).

This document is intended for use by those familiar with the configuration of communication networks for industrial and commercial applications. The user should be familiar with Logix Designer/RSLogix software and Yaskawa AC drives.

The Yaskawa Logix AOI facilitates the integration of Yaskawa drives into a Rockwell Automation Logix environment by providing automatic tag generation for data being received from the drive and a single location to view the information sent between the controller and the drive.

## Terms

Note: Indicates supplemental information that is not related to safety messages.

Drive: Yaskawa Drive

AOI: Add-On Instruction

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# 3 Importing AOI

NOTICE: Yaskawa AOI requires Logix Designer or RSLogix 5000 version 16 or later.

**1.** Download and unzip the Yaskawa AOI zip file from the Yaskawa website at http://www.yaskawa.com.

**Note:** Please note the directory of the unzipped file. The location is important to the AOI import process in Logix.

Open RSLogix 5000/Logix Designer and right-click on "Add-On Instructions" in the Controller Organizer tree then select "Import Add-On Instruction..."



Figure 1 Import Add-On Instruction in the Controller Organizer Tree

Refer to AOI Selection on page 17 to select the correct AOI based on the application.
 NOTICE: Use the correct AOI. Using incorrect AOI could result in incorrectly mapped data or AOI set-up problems.

3. Navigate to the unzipped file directory from Step 1, select the AOI file and click the "Import..." button as shown in *Figure 2*.

🗱 Import Add-On Instruction						
Look in:	📙 AOI Export (25M	Nar15)	- G 🕫 🛙	୭ ⊞ ▼		
Pa	Name	^	-	Date modified	Туре	
	HAI_Assy_70_7	71_20_21_EIP_Hz.L5X <		3/25/2015 4:58 PM	Logix [	Designer XML File
Recent Places	B YAI_Assy_70_7	71_22_23_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
	B YAI_Assy_70_7	71_101_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
	Terror YAI_Assy_70_71_116_EIP_Hz.L5X			3/25/2015 4:58 PM	Logix Designer XML File	
Desktop	* YAI_Assy_72_7	73_20_21_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
	B YAI_Assy_72_7	73_22_23_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
	B YAI_Assy_72_7	73_101_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
Libraries	B YAI_Assy_72_7	73_116_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
	B YAI_Assy_151	_20_21_EIP_Hz.L5X		3/25/2015 4:57 PM	Logix [	Designer XML File
	B YAI_Assy_151	_22_23_EIP_Hz.L5X		3/25/2015 4:57 PM	Logix [	Designer XML File
Computer	B YAI_Assy_151	_101_EIP_Hz.L5X		3/25/2015 4:57 PM	Logix [	Designer XML File
	B YAI_Assy_151	_116_EIP_Hz.L5X		3/25/2015 4:57 PM	Logix [	Designer XML File
	* YAI_Assy_166_20_21_EIP_Hz.L5X			3/25/2015 4:58 PM	Logix [	Designer XML File
Network	B YAI_Assy_166	_22_23_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
	B YAI_Assy_166	_101_EIP_Hz.L5X		3/25/2015 4:57 PM	Logix [	Designer XML File
	B YAI_Assy_166	_116_EIP_Hz.L5X		3/25/2015 4:58 PM	Logix [	Designer XML File
	•		111			4
	File name: YAI_Assy_70_71_20_21_EIP_Hz.L5X			•	Import	
	Files of type: RSLogix 5000 XML Files (*.L5X)				-	Cancel
	Files containing: GAdd-On Instruction				•	Help
	Into:	Add-On Instructions			-	

Figure 2 Import the AOI File

#### 3 Importing AOI

**4.** The "Import Configuration" window will display the AOI import properties and notify the user of any warnings or errors. Click "OK" in the "Import Configuration" window.

Import Configuration	
Find: Find Within: Final Name	▼ 着 🖏 Find/Replace
Import Content:	
Add-On Instructions     Add-On Instructions     YAI_Assy_70_71_20_21_EIP_Hz     Page Parameters and Local Tags     Parameters     Caleforences     Data Types     Second Data Types     Second Data Types     Second Data Types	Configure Add-On Instruction Properties         Import Name:       YAI_Assy_70_71_20_21_EIP_Hz         Operation:       Oreate           Import Name:       YAI_Assy_70_71_20_21_EIP_Hz       Import Adds         Import Name:       YAI_Assy_70_71_20_21_EIP_Y       Properties         Final Name:       YAI_Assy_70_71_20_21_EIP_Y       Properties         Description:       YAI_Assembly 70/71 and 20/21
	Revision:     v1.0       Revision Note:     Vendor:       Yaskewa America, Inc.
< <b>H</b>	
	OK Cancel Help
Ready	

Figure 3 Import Configuration Window

**5.** The imported AOI now appears under the "Add-On Instructions" folder of the Controller Organizer tree.



Figure 4 Imported AOI in the Controller Organizer Tree

# 4 Setting Up the AOI

**1.** Incorporate the imported AOI into the Logix program.

Either drag and drop the file from the Controller Organizer tree as shown in Figure 5.

KsLogix 5000 - AOI_Import_25Mar15 [1756-L72	2 20.11]*
File Edit View Search Logic Communication	ons Tools Window Help
Offline     Image: Constraint of the second se	Path: <none></none>
Controller Organizer	MainProgram - MainRoutine* 타 5월 1월 18章
MainTask     MainProgram     MainProgram Tags     MainRoutine     Duscheduled Programs     Motion Groups     Ourgrouped Axes     Add-On Instructions	e         YAI_Assy_70_71_20_21_EIP_Hz           YAI_Assembly 70/71_and 20/21         YAI_Assembly 70/71_and 20/21           YAI_Assy_70_71_20_21         ?           YAI_Assy_70_71_20_21         ?           Node_Input_Assy         ?           RunFwd         ??           RunRev         ??           FaultReset         ??           Freq_Ref         ??           Output_Freq         ??
VAI_Assy_70_71_20_21_EIP_Hz	



Or click on the file name in the "Add-On" tab as shown in Figure 6.



Figure 6 Click on the the AOI in the Add-On Tab

#### 4 Setting Up the AOI

**2.** Define a tag for the AOI.

Click on the "?" next to the "..." button on the tag for which the AOI should be assigned.

ſ	🗎 MainProgram - MainRoutine*	
	E E E E E E E E E E E E E E E E E E E	
	0 e e e e e e e e e e e e e e e e e e e	YAL_Assy_70_71_20_21_EIP_Hz         YAL_Assy_70_71_20_21_EIP_Hz         YAL_Assy_70_71_20_21         YAL_Assy_70_71_20_21         YAL_Assy_70_71_20_21         Node_Input_Assy         Node_Output_Assy         RunFwd         RunRew         FaultReset         YOUTPUT_Freq         YY         YAL_Assy_70_71_20_21         RunRew         YAL_Assy_70_71_RungRev         YAL_Assy_70_71_RungRev

#### Figure 7 Define the Tag

**Note:** The assigned tag name will be used throughout the program and should reflect the application. For example, the name "Chilled\_Water\_Pump\_01" would be appropriate for an application where the drive operates a chilled water pump.

In this procedure, the example assigned name will be "AOI\_Name" as shown in Figure 8.

When the tag assigned to the AOI does not exist, proceed to Step 3 to create a new variable.

If the tag assigned to the AOI already exists, skip to Step 5.

YAI_Assy_70_71_20_2	1_EIP_Hz	
YALAssy_70_71_20_21	AOI_Name	-(Faulted)
Node_Output_Assy	?	-(RunningFwd)
RunFwd RunRev	??	-(RunningRev)
FaultReset Freg Ref	?? ??	-(NetRefStatus)-
Output_Freq	??	-(At_Speed)

Figure 8 Assign the Tag Name

**3.** Right-click on the tag ("AOI\_Name" in this example), then select "New 'AOI\_Name" as shown in *Figure 9*to bring up the "New Tag" window.



Figure 9 Create a New Variable

#### 4 Setting Up the AOI

**4.** The information shown in the "New Tag" window will define the new tag. Confirm the information as shown in *Figure 10* and click "Create".

New Tag		X
Name:	AOI_Name	Create 🗸
Description:	•	Cancel
		Help
Туре:	Base   Connection	
Alias For:	•	
Data Type:	YAI_Assy_70_71_20_21_EIP_Hz	
Scope:	D AOI_Import_25Mar15	
External Access:	Read/Write	
Style:	•	
Constant		
🗌 Open Confi	guration	

Figure 10 New Tag Window

- **5.** Direct the AOI to where it will read and write data.
- **Note:** The Yaskawa drive must be added to the I/O configuration prior to determining AOI read and write locations. Refer to application note AN.AFD.09 for details on adding Yaskawa drives into Logix. AN.AFD.09 is posted on the Yaskawa website, www.yaskawa.com.

Cick the "?" next to "Node\_Input\_Assy" as shown in *Figure 11* to assign the input assembly (from drive to PLC) data.

Y	AI Assembly 70/71				Exter
	and 20/21				Read
YAI_Assy_70_	/1_20_21_EIP_Hz 1 and 20/21				Read,
YAI Assy 70 71 2	0 21 AOL Name	-(Faulted)			Bead
Node_Input_Assy	Yaskawa_Drive:I 🚽	-(Warning)-		(71 and 20/21	Read
RunFwd	Y. Enter Name Filter	✓ Show:	AB:ETHER	NET_MODULE_I	V 👻
RunRev FaultReset	Name	==	Data Type		
Freq_Ref	🖞 🕂 Yaskawa_Drive:I		AB:ETHER	NET_MODULE_IN	VT_4Byt
Output_Freq					
	Controller				
	Program				

Figure 11 Assign the Input Assembly

Click the "?" next to "Node\_Output\_Assy" as shown in *Figure 12* to assign the output assembly (PLC to drive) data. **NOTICE:** *If the "Node\_Input\_Assy" or "Node\_Output\_Assy" fields do not appear in the AOI block, the node has not yet been created. The fields will automatically appear when the node is created.* 

			-	
YAI	Assembly 70/71			Externe
	and 20/21			Read/V
YALAssembly 70/71	_20_21_EIP_Hz			Read/V
YAI Assy 70 71 20	21 AOI Name	Faulted)		Bead/V
Node_Input_Assy	Yaskawa Drive I	Warning)—	71 and 20/21	DeedW
Node_Output_Assy	Yaskawa_Drive:0 👻 🧲	RunningFwd)	71 and 20/21	Read/v
RunFwd	🔽 Entar Nema Filtar	- Show ADIETI		
FaultReset	<b>Y.</b> <i>LINE TYCHICT MET.</i>	▼ ONOW. AD.E IF	HERINE I _ MODULE_IN	· •
Freq_Ref	Name	== Data 1	уре	
Output_Freq	H Yaskawa_Drive:O	AB:ET	HERNET_MODULE_IN	T_4Byt
	Controller			
	Drogram			
	Filogiani			

Figure 12 Assign the Output Assembly

6. The AOI setup is now complete and the AOI is ready to be used in the program.





# 5 Using the AOI

The following sections outline the more useful features of the AOI.

## Creating Tags

When the AOI is implemented it will automatically create additional tags for use in the PLC logic.

<b>2</b>	Contro	ller Tags - AOI_Import_2	5Mar15	(controller)
So	cope:	🔁 AOI_Import_25Mar1 🔻	Show:	All Tags
	Nam	e		
	E-A0	I_Name		
	4	401_Name.EnableIn		
		40I_Name.EnableOut		
	/	401_Name.RunFwd		
	/	40I_Name.RunRe∨		
	/	401_Name.FaultReset		
	/	AOI_Name.Net_Control		
	-/	AOI_Name.Net_Ref		
	-	40I_Name.Freq_Ref		
	AOI_Name.Faulted			
	AOI_Name.Warning			
	/	AOI_Name.RunningFwd		
	/	40I_Name.RunningRev		
	/	401_Name.Ready		
		AOI_Name.NetRefStatus		
	-AOI_Name.NetCtrlStatus			
	-AOI_Name.At_Speed			
	AOI_Name.Output_Freq			
	⊞·Yaskawa_Drive:C			
	±-Yaskawa_Drive:I			
	± Yaskawa_Drive:0			
1				

Figure 14 Tags Associated with AOI Names YAI\_Assy\_70\_71\_20\_21\_EIP\_Hz

## Test Run

The AOI can test run the motor to which it is connected and help verify communication to the desired drive prior to creating any type of logic.

Observing the output bits of the AOI while online with the PLC allows users to view the status of the drive. The corresponding tag displays green when the bit is high.

Users can also enter values into the AOI to send commands through the function block.

For example, enter a value of "1" in the "RunFwd" section to send a forward run command to the drive, and it will set the forward run command bit high. The "RunningFwd" output bit then turns green to indicate that the drive is running.



Figure 15 Test Run Information on AOI Block

### Troubleshooting

The AOI block can help troubleshoot communications between the PLC and drive.

The AOI block will display the status of the AOI tags being used. The block displays the command being issued to the drive and the drive status information being received from the drive.



Figure 16 AOI Block Displaying Status

# 6 AOI Selection

Input Assembly	Output Assembly	Correct AOI			
70 or 71	20 or 21	YAI_Assy_70_71_20_21_EIP_Hz			
70 or 71	22 or 23	YAI_Assy_70_71_22_23_EIP_Hz			
70 or 71	101	YAI_Assy_70_71_101_EIP_Hz			
70 or 71	116	YAI_Assy_70_71_116_EIP_Hz			
72 or 73	20 or 21	YAI_Assy_72_73_20_21_EIP_Hz			
72 or 73	22 or 23	YAI_Assy_72_73_22_23_EIP_Hz			
72 or 73	101	YAI_Assy_72_73_101_EIP_Hz			
72 or 73	116	YAI_Assy_72_73_116_EIP_Hz			
151	20 or 21	YAI_Assy_151_20_21_EIP_Hz			
151	22 or 23	YAI_Assy_151_22_23_EIP_Hz			
151	101	YAI_Assy_151_101_EIP_Hz			
151	116	YAI_Assy_151_116_EIP_Hz			
166	20 or 21	YAI_Assy_166_20_21_EIP_Hz			
166	22 or 23	YAI_Assy_166_22_23_EIP_Hz			
166	101	YAI_Assy_166_101_EIP_Hz			
166	116	YAI_Assy_166_116_EIP_Hz			

#### Table 1 AOI Selection Table

# 7 AOI Data Tag Description

*Table 2* gives descriptions of tags found in the various AOIs.

#### Table 2 AOI Data Tags

Тад	Description		
Alarm	Drive is in an alarm (not faulted) state.		
Analog_Input_1_Level	Signal level of analog input 1 (AI1) in %.		
Analog_Output_1	Signal level of analog output 1 (AO1) in %.		
Analog_Output_2	Signal level of analog output 2 (AO2) in %.		
At_Speed	Drive output frequency is at the level set by frequency reference.		
Custom_In_1	Data read from custom data defined by F7-33.		
Custom_In_1_Error	Error reading custom data defined by F7-33.		
Custom_In_10	Data read from custom data defined by F7-42.		
Custom_In_10_Error	Error reading custom data defined by F7-42.		
Custom_In_2	Data read from custom data defined by F7-34.		
Custom_In_2_Error	Error reading custom data defined by F7-34.		
Custom_In_3	Data read from custom data defined by F7-35.		
Custom_In_3_Error	Error reading custom data defined by F7-35.		
Custom_In_4	Data read from custom data defined by F7-36.		
Custom_In_4_Error	Error reading custom data defined by F7-36.		
Custom_In_5	Data read from custom data defined by F7-37.		
Custom_In_5_Error	Error reading custom data defined by F7-37.		
Custom_In_6	Data read from custom data defined by F7-38.		
Custom_In_6_Error	Error reading custom data defined by F7-38.		
Custom_In_7	Data read from custom data defined by F7-39.		
Custom_In_7_Error	Error reading custom data defined by F7-39.		
Custom_In_8	Data read from custom data defined by F7-40.		
Custom_In_8_Error	Error reading custom data defined by F7-40.		
Custom_In_9	Data read from custom data defined by F7-41.		
Custom_In_9_Error	Error reading custom data defined by F7-41.		
Custom_Out_1	Data to be written to custom data defined by F7-23.		
Custom_Out_1_Error	Error writing to custom data defined by F7-23.		
Custom_Out_10	Data to be written to custom data defined by F7-32.		
Custom_Out_10_Error	Error writing to custom data defined by F7-24.		
Custom_Out_2	Data to be written to custom data defined by F7-24.		
Custom_Out_2_Error	Error writing to custom data defined by F7-25.		
Custom_Out_3	Data to be written to custom data defined by F7-25.		
Custom_Out_3_Error	Error writing to custom data defined by F7-26.		
Custom_Out_4	Data to be written to custom data defined by F7-26.		
Custom_Out_4_Error	Error writing to custom data defined by F7-27.		
Custom_Out_5	Data to be written to custom data defined by F7-27.		
Custom_Out_5_Error	Error writing to custom data defined by F7-28.		
Custom_Out_6	Data to be written to custom data defined by F7-28.		
Custom_Out_6_Error	Error writing to custom data defined by F7-29.		
Custom_Out_7	Data to be written to custom data defined by F7-29.		
Custom_Out_7_Error	Error writing to custom data defined by F7-30.		
Custom_Out_8	Data to be written to custom data defined by F7-30.		
Custom_Out_8_Error	Error writing to custom data defined by F7-31.		
Custom_Out_9	Data to be written to custom data defined by F7-31.		
Custom_Out_9_Error	Error writing to custom data defined by F7-32.		
DC Bus Volt	Drive DC bus voltage in Vdc.		

Тад	Description		
Digital Output 1	Digital output one status (M1-M2).		
Digital Output 2	Digital output two status (M3-M4).		
Digital Output 3	Digital output three status (M5-M6).		
Digital Output Fault	Digital output status of the fault contact (MA-MB-MC).		
Digital Output Fault Enable	Bit to enable to the ability to control the fault contact via the network.		
Drive State	Status code of the drive state		
Error Code	Custom data error code provides additional information on the cause of the custom error bit.		
External Fault	Activating this bit will trigger an EFO fault in the drive.		
Faulted	Drive is in a faulted state		
FaultReset	Activating this bit will reset a fault in the drive (if resettable).		
Freq Cmd	Commanded frequency reference from the network.		
Freq Ref	Frequency reference command that is sent to the drive via the network.		
MFI 3	Activating this bit will execute the function programmed for S3.		
MFI 4	Activating this bit will execute the function programmed for S4.		
MFI 5	Activating this bit will execute the function programmed for S5		
MFI 6	Activating this bit will execute the function programmed for S6		
MFI 7	Activating this bit will execute the function programmed for S7.		
MFI 8	Activating this bit will execute the function programmed for S8.		
MFO 1	Activating this bit will change the status of multi-function output 1 (M1-M2).		
MFO 1 Status	Status of multi-function output 1 (M1-M2).		
MFO 2	Activating this bit will change the status of multi-function output 2 (M3-M4).		
MFO 2 Status	Status of multi-function output 2 (M3-M4)		
MFO 3	Activating this bit will change the status of multi-function output 3 (M5-M6)		
MFO 3 Status	Status of multi-function output 3 (M5-M6)		
Motor Rated Torg	Motor rated torque as defined by the motor. Enter this value to scale the torque command. Enter "100.0" for a range of 0-100.0%.		
Motor Speed	Motor output speed in Hz.		
Net Control	Activate the bit if start/stop control is desired through the network when $b1-02 \neq 3$ .		
Net Ref	Activate the bit if speed reference control is desired through the network when $b1-03 \neq 3$ .		
NetCtrlStatus	Bit is active if start/stop control is through the network.		
NetRefStatus	Bit is active if the speed reference is through the network.		
Node Input Assy	Input assembly data fed into the AOI. Define this data for the AOI to operate.		
Node Output Assy	Output assembly data fed into the AOI. Define this data for the AOI to operate.		
OPE	oPE alarm is present in the drive.		
Output Current	Output current of the drive in amps.		
Output Freq	Output frequency of the drive in Hz.		
PG Count	Encoder feedback counter. The value in guadrature counts of the encoder.		
Ready	Drive is in the ready state.		
Reset	Fault reset to the drive is active.		
RunFwd	Activate the bit to run the drive in the forward direction.		
Running	Drive is in run mode.		
RunningFwd	Drive is running in the forward direction.		
RunningRev	Drive is running in the reverse direction.		
RunRev	Activate the bit to run the drive in the reverse direction.		
Tora Ref Limit	Torque reference or limit that is being sent to the drive. Scaled by Motor Rated Torq.		
Torque Actual	Torque value (U1-09) from that drive. Scaled by Motor Rated Torq.		
UV	Drive is in an under voltage condition.		
Warning	Drive is in a warning (alarm) state.		
ZSP	Drive is currently at zero speed.		
ZSV	Zero servo is activated in the drive.		
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### **Revision History**

The revision dates and the numbers of the revised manuals appear on the bottom of the back cover.



Date of Publication	Revision Number	Section	Revised Content
May 2015	-	-	First Edition. This manual supports software version 2.0.0.

# Add-On Instruction (AOI) for Logix Designer/RSLogix 5000 User Guide

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