



ACSI Motor/Drive/Controller with Siemens TIA Portal PROFINET Setup Guide

ACSI Motor/Drive/Controllers with ProfiNet drive are DISCONTINUED Replacements are not available. Use this manual as reference only.

EtherNet/IP, Modbus and Basic ASCI Motor/Drive/Controllers continue with full Tolomatic Support





3600-4197_03

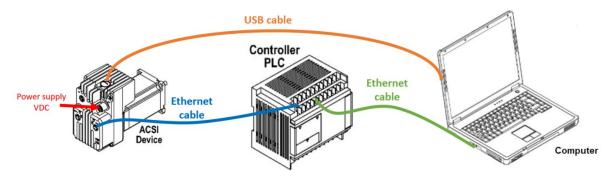
Tolomatic reserves the right to change the design or operation of the equipment described herein and any associated motion products without notice. Information in this document is subject to change without notice.

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Profinet set- up

1. Make sure you have the following connections (use tested/quality cables):



- 2. Configure ACSI in TMI via USB.
 - a. Mode Select -> **PROFINET**
 - b. Download flash
 - c. Click on **Disconnect** in the **Drive Tab**
- 3. Connect ACSI to PLC via Ethernet cable.
- 4. Open TIA SIEMENS V15.1 Software
- 5. Disable firewall on your computer and turn off WiFi
- 6. Create new project in TIA and save.
- 7. Click on "PROJECT VIEW"

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8. Go to the tool bar on the TIA Software, and click on accessible devices



PROFINET SET-UP

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- a. Select the following parameters:
 - i. Type of PG/PC interface: PN/IE
 - ii. Deploy the **PG/PC interface** drop down list and select the right connection (based on what port is the Ethernet cable connected to the computer).
 - iii. Click on Start search
 - iv. Verify that you see the following in the list of **devices**: ACSI Drive and PLC.
 - v. Select PLC

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Retrieving device			vi.		

- 9. Download GSDML file from https://www.tolomatic.com/info-center/resource-details.aspx?resourceId=897
- 10. Save the file in a known location
- 11. Install the GSDML File.
 - a. Go to OPTIONS -> Manage General Station Description files (GSD)
 - b. Look for the location the GSDML file was installed and accept
- 12. In the main screen look for the project tree, and find "Devices and Networks" and double click on it.

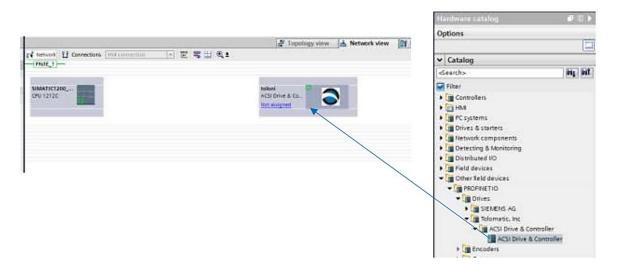
PROFINET SET-UP

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13. Click on Network view

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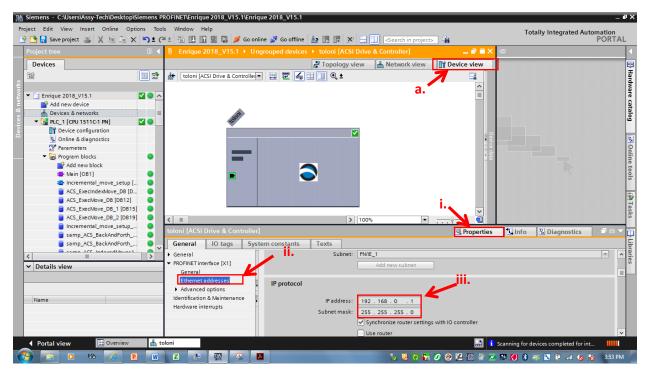
14. Drag and drop device from catalog under "Other Field Devices → PROFINET IO → Drives → Tolomatic, Inc. → ACSI Drive & Controller → ACSI Drive & Controller."



15. Click "not assigned" on the device picture and assign to the controller by selecting the controller name and network name, once connected there should be a dashed green line between controller and the device.

		🛃 Topology view 🕌 Net	twork view
toloni ACSI Drive & Co	54 Network 🗓 Connections 🕅	l converzion 📳 📰 🗮 🗨	💷
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- 16. Configure IP Address:
 - a. Double click the "toloni" device to enter **Device view** (or click device view tab and select device with dropdown)
 - b. Configure the IP address (if needed) and device name under:
 - i. Properties.
 - ii. **Ethernet addresses** and modules (the modules will automatically be configured in the ACSI device overview).
 - iii. Input desired IP Address.



15. Set PN IO update times to meet application requirements (ACSI defaults to 8ms which is set by GSDML file and 0.808%) under the **NETWORK VIEW**, highlight the PLC's **ETHERNET PORT** again, under properties tab **PROFINET INTERFACE** \rightarrow **ADVANCED OPTIONS** \rightarrow **REAL TIME OPTIONS**.

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16. Always set IP Address on PLC if necessary manually. (This can be done automatically, vendor specific tools, or PN browser in PROFINET Commander, TIA to set IP on controller in advance).

17. While on the ETHERNET PORT again, under properties tab, go to PROFINET INTERFACE \rightarrow ADVANCED OPTIONS \rightarrow INTERFACE OPTIONS and ensure that 'Use IEC V2.2 LLDP Mode' is checked for proper drive/PLC communication.

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PLC_1 CFU 1511C-1 PN FXC_1 PN/E_1 PN/E_1		Network data		
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Time synchronization Operating mode Advanced options Interface options V Limit data	ser program if communication errors occur evice replacement without exchangeable mediur werwriting of device name of all assigned IO dev infred into the network 22 LIOP mode			

18. Set or Download the device names on the PROFINET IO devices with your Engineering Configuration Tool. In TIA highlight PN Network in network view, right click \rightarrow Assign Device

Name. Assign each name to the correct device from the list. Once the device names are set, compile the configuration and download to the controller.

SIMATIC1200 CPU 1212C	PN/1E_2	toloni ACSI Drive & Co <u>SIMATIC1200_A</u>	Device configuration Change device Write IO-Device name to Micro Start device tool	Memory Card
			X Cut	Ctrl+X
			🔏 Cut 🗐 Сору	Ctrl+C
			🛅 Paste	Ctrl+V
			X Delete	Del
			Rename	F2
			🚽 Go to topology view	
			Compile	•
			Download to device	•
			💋 Go online	Ctrl+K
			🔊 Go offline	Ctrl+M
			🖳 Online & diagnostics	Ctrl+D
			Assign device name	
			Receive alarms	

NOTE: If the device names are not set correctly, the controller will not find the device at startup.

NOTE: The following rules apply for PROFINET V2.3 for device names.

1. The device name must not be longer than 240 characters. The following characters are permitted:

- a. Letters "a" to "z"
- b. Numbers "0" to "9"
- c. Hyphen or period

2. One name component in the device name . a character string between two periods . may not be longer than 63 characters.

3. The device name may not begin with a hyphen.

4. The device name may not begin with the character string "port-xyz" (x,y,z = 0 to 9).

5. The device name may not have the form n.n.n.n (n = 0 to 9)

19. In the **DEVICE NAME** window select the device you wish to assign the name to with the top dropdown button, then set the online access up to **PN/IE** and correct network card **(PG/PC interface)**.

Next click **UPDATE LIST** and uncheck all of the device filters. Once you are used to the filters can reenable them.

Assign PROFINET device	e name.		_		_	
		Configured PRO	FINET dev	ice		
		PROFINET devic Dev	ce name: vice type:	toloni_1 ACSI Drive & Controller		•
		Online access Type of the PG/PC i PG/PC i		🖳 PN/IE 🗃 Realtek USB GbE Fami	ily Controller	
		Only show		bad parameter settings		
	Accessible de	vices in the network: MAC address	Device	PROFINET device name	Status	
E	0.0.0.0	CC-22-37-80-02-D0			Status OK	
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Online status information					Jpdate list	Assign name
 Search completed 	d. 1 of 2 devices v		in a day to the		2.001	
The PROFINET dev	ice name "toloni_	1 was successfully ass	igned to MAC	address "CC-22-37-80-0"	2-00".	
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Find the device list you wish to set the name and highlight, then look at device type, click **FLASH LED** (ACSI should Flash two LEDs alternating between GREEN and RED) or check the MAC ID compared to the device housing.

Once you have confirmed the right device, click the **ASSIGN NAME** button to write the name to the device. Now the device will retain the name even after a power cycle.

PROFINET SET-UP

ssign PROFINET device	e name.						
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		Dev	/ice type:	ACSI Drive & Co	ntroller		
		Online access					
		Type of the PG/PC i	nterface	PN/IE			-
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		💽 Only show	devices of th	e same type			
		Only show	devices with	bad parameter	settings		
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			devices with	outnumes			
	Accessible de	vices in the network:					
	IP address	MAC address	Device	PROFINET device		Status	
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Online status information							
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Mine PROFINE I devi	ce name toloni	_1 was successfully ass	igned to MAG	auuress CC-22	-57-00-02-01	υ.	
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20. Back in network view, highlight the PLC station, then click **COMPILE** from the toolbar.

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Device configuration	=		
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Program blocks			
Technology objects			
External source files			
PLC tags			
PLC data types			
Watch and force tables			
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Device proxy data			\sim
Program info		K III > 100% -	

21. If everything compiled correctly, next download the configuration to the PLC. Highlight the PLC station, click **DOWNLOAD TO DEVICE**

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	Device proxy data Program info		 ★ 100% 	···· · · · · · ·

Then select the **PN/IE interface**, **Network card** and PN I/E network. Now click "Start Search".

xtended download to	device					
	Configured access no	des of "PLC_1"				
	Device	Device type	Slot	Interface type	Address	Subnet
—	PLC_1	CPU 1511C-1 PN	1 X1	PN/IE	192.168.0.2	PN/IE_1
		Type of the PG/PC inte PG/PC inte				 ▼ (€) ≅
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	Com		teway:	Directatisiot		- •
		rst gu	ce way.			
	Select target device:			[Show all compatibl	e devices 🔹
	Device	Device type	Interf	ace type Add	lress	Target device
		-	PN/IE	Acc	ess address	-
Flash LED						
Online status information	:			(Display only error	<u>Start search</u> messages

22. Once verified the ACSI device name and IP address will be set and can be found on the PROFINET network. Click **LOAD**.

PROFINET SET-UP

	Device	Device type	Slot	Interface type	Address	Subnet
—	PLC_1	CPU 1511C-1 PN	1 X1	PN/IE	192.168.0.2	PN/IE_1
		Type of the PG/PC inte PG/PC inte		PN/IE	GbE Family Controlle	•r • •
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	Select target dev	vice:			Show all compatib	ole devices
	Select target dev Device	vice: Device type	Interf	ace type Ad	Show all compatib	ole devices Target device
-			Interfa PN/IE	19	dress 92.168.0.2	
	Device	Device type		19	Idress	Target device
Flash LED	Device PLC_1	Device type	PN/IE	19	dress 92.168.0.2	Target device
	Device PLC_1 	Device type	PN/IE	19	idress 22.168.0.2 ccess address	Target device PLC_1 Start searce
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4. Using DataBlocks & FunctionBlocks

4.1 Overview

These instructions assume that the user is familiar with TIA V13 or greater programming and PROFINET communications. This document references PROFINET user guide 3600-4196 which defines PROFINET interface to the ACSI Drive/Controller/Motor

4.2 Import ACS Interface Library

1. Download **ACSI Siemens Interface Library for TIA Portal** available in Tolomatic's website, save it in a known location. Select Options->Global libraries->Retrieve library...

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Support packages	Devices & networks
Manage general station description files (GSD) Start Automation License Manager	
Show reference text	ions [http://www.sign
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	Appen library Retrieve library

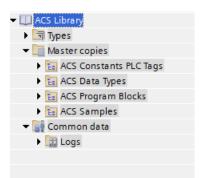
2. Browse to ACS Interface Library.zal13 archive file



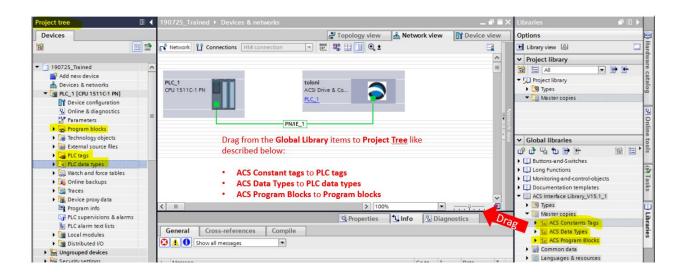
3. Select folder to extract library to



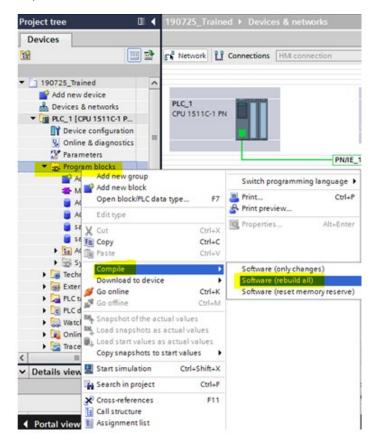
4. ACS Library will be loaded into Global Libraries sidebar



5. Drag libraries into PLC under as described below:



6. Once imported, compile the individual libraries by right clicking, selecting Compile -> Software (rebuild All).

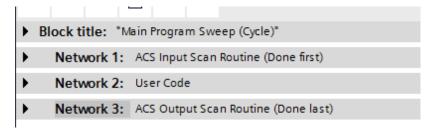


4.3 Library Overview

1. Go to the **PROJECT TREE** and find under **PLC_Name -> Program Blocks -> Main [OB1]** and double click.

Project tree		190725_Trained > PLC_1 [CPU 1511C-	-1 PN] → Program blocks → Main [OB1] =	∎×
Devices				
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	🚜 🚲 学 🔮 🐛 🖿 🚍 💬 🕾 ±	: 월 : 월 : 🖂 😥 🕫 🕼 🖑 🥵 🐨 🕻 🖓 🐨 🕻	
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Devices & networks		<	· · · · · · · · · · · · · · · · · · ·	>
▼ PLC_1 [CPU 1511C-1 PN]				
Device configuration	=			
Q Online & diagnostics	=			
Parameters		Block title: "Main Program Sweep (Cycle	·)*	
 Program blocks 		Network 1:		
💕 Add new block		Network 2:		
🏪 Main [OB1]				
ACS_ExecIndexMove_DB [DB9]		Network 3:		
ACS_ExecMove_DB [DB10]		Network 4:		
samp_ACS_BackAndForth_D				
samp_ACS_BackAndForth_D				
ACS Program Blocks				
System blocks				
Technology objects				
External source files				
PLC tags				
PLC data types				
Watch and force tables			100%	
Online backups			🖳 Properties 🚺 Info 🔒 💟 Diagnostics 📃	
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		Compiling finished (errors: 0; warnings: 0)		
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1.1 At the highest level, the program should be structured in the following way. It is important to the data flow of the program to have the Input Scan routine at the top of the program, and the Output Scan routine at the bottom.



2. Go to the **PROJECT TREE** and find under **PLC_Name -> Program Blocks -> ACS Program Blocks -> ACS Comms [DB1] and** double click.

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Devices														
	1	1	۰ 💉		L 🛃 🗮 😤 I	Keep act	ual values 🔒	Sn	apshot 🖷 🔍	Copysnaps	hots to start va	lues 🛃	B.	
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▼ 190725_Trained	^			Nan			Data type		Start value	Retain	Accessible f	Writa	Visible in	. Set
🌁 Add new device		1	-	•	Static									
📥 Devices & networks		2			ACS Drive1		"ACS_Drive"							6
PLC_1 [CPU 1511C-1 PN]		з	-	•	ACS Drive2		"ACS_Drive"	_						6
Device configuration	=	4		•	ACS Drive3		"ACS_Drive"							6
😓 Online & diagnostics	_	5			ACS Drive4		"ACS_Drive"							6
🚰 Parameters														
 Program blocks 														
📑 Add new block														
📲 Main [OB1]														
ACS_ExecIndexMove_DB [DB9]														
ACS_ExecMove_DB [DB10]														
samp_ACS_BackAndForth_D														
samp_ACS_BackAndForth_D														
ACS Program Blocks														
ACS Comms [DB1]														
ACS Program Blocks														
ACS Samples														
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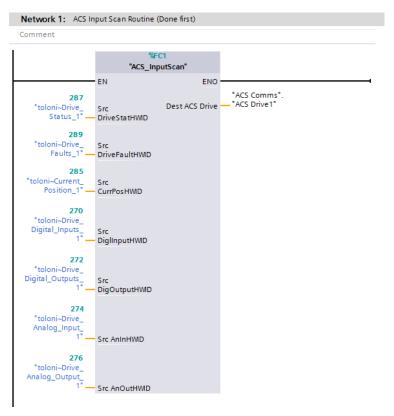
Drives are stored and referenced in the ACS_Comms data block.

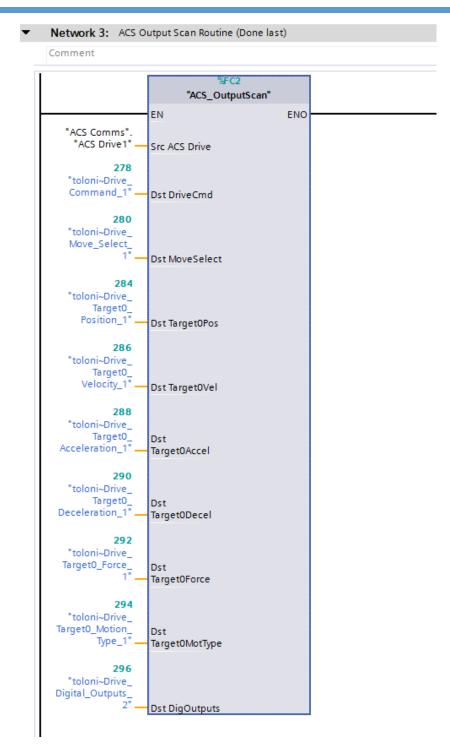
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2		•	۲	ACS Drive1	"ACS_Drive"				
З		•	۲	ACS Drive2	"ACS_Drive"				~
4	-	•	۲	ACS Drive3	"ACS_Drive"				
5	-	•	٠	ACS Drive4	"ACS_Drive"				

The ACS Synchronization Blocks contains the Input Scan and Output Scan function calls.

4.4 Step 1: Set up Input and Output Scans

The Input and Output Scan functions link the ACS_Comms Drive object to Hardware IO Modules defined by the GSD file. This mapping only takes place in the scan objects, and all of the function blocks can now reference the object instead of the modules directly. This allows for greater expandability.





4.5 Step 2: User Code

The library contains several example programs (designated with the **samp_** prefix) that show a variety of tasks, from one method of drive initialization to executing a series of pre-defined velocity moves.

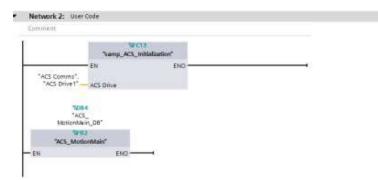
The library is essentially an encapsulation of the PROFINET Users Guide. The Drive Status and Fault bits are defined in the ACS Drive object, the Drive Commands and Motion Types are defined in Tag Tables as Constants for quick reference.

4.6 Example Program: Back and Forth

A common mode of operation for a motor is a repetitive back and forth motion. In the sample code, we have an example called **ACS_BackAndForth**. We will walk through this example here.

The first thing we do is connect up the ACS Modules to an ACS Drive Object in the **ACS_Comms** data block. (See section Set up Input and Output Scans).

Next we add an initialization routine. A basic example is supplied in the sample code.



The sample initialization code is very basic. It looks at faults, if no faults it enables the drive if it is not enabled, and homes the drive if it is not homed. If a brake is controlled by the drive, you would also check the brake status here.

The **ACS_MotionMain** is a function block that provides a space to run multiple moves in a single area. When adding the sample **BackAndForth** function block to the **MotionMain** block, it is encouraged to select Multi-instance when prompted. This allows the ability to drill down into the sample with the Block Interface when multiple samples are being executed in the same function block.

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The sample **BackAndForth** program takes in two absolute positions, a common velocity, and a common Accel/Decel value.

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nment			
	#samp_AC BackAndFor Instance	th_	
	%FB3 "samp_ACS_Back/	AndForth"	
	EN	ENO	
0.0 —	Retract Position		
140.0 —	Extend Position		
50.0 	Velocity Accel and Decel		
"ACS Comms". "ACS Drive1" —	ACS Drive		

Diving deeper into the **BackAndForth** example, we see the following.

- 1. We verify we are in a state to move back and forth (Ready To Rumble).
- 2. We calculate a midpoint value between extend and retract to maintain positional state.
- 3. Update Positional State with relation to Midpoint calculation

4. Clear Start Motion Command if we are in motion. Commands are edge triggered, so one must clear the previous command in order to issue the same command again. (if motion is too fast to detect in motion, position can be monitored and Start Motion command can be toggled with timers. Take care to hold Clear Start Motion for long enough so the drive detects this state)

5. If we are ready to move and we are not in motion, we update the profile and move to position

Conclusion

This guide and the ACS Interface Library are companions to the PROFINET Users Guide. The library encapsulates the mechanics of interfacing with the ACS Drive and Controller.

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