



S7-1200: Basic Controller with Advanced Functions

Online Diagnostics and Maintenance Functions

Getting Online

Online Diagnostic & Maintenance Features

Getting online

Siemens Totally Integrated Automation PORTAL

Start

- Devices & networks
- PLC programming
- Motion & technology
- Visualization
- Online & Diagnostics

Open existing project

- Open existing project
- Create new project
- Migrate project
- Close project
- Welcome Tour
- First steps
- Installed software
- Help
- User interface language

Recently used

Project	Path	Last change
S7-1200 Tabletop Demo V16 KTP700 V3.ap16	C:\Users\siemens\Desktop\S7-1200 Workshop Files\Module 1 - Intro to TIA Portal\S7-1200 Tabletop Demo V16 KTP700 V: 1/30/2020 9:55:45 PM	

Activate basic integrity check

Browse Remove

Open

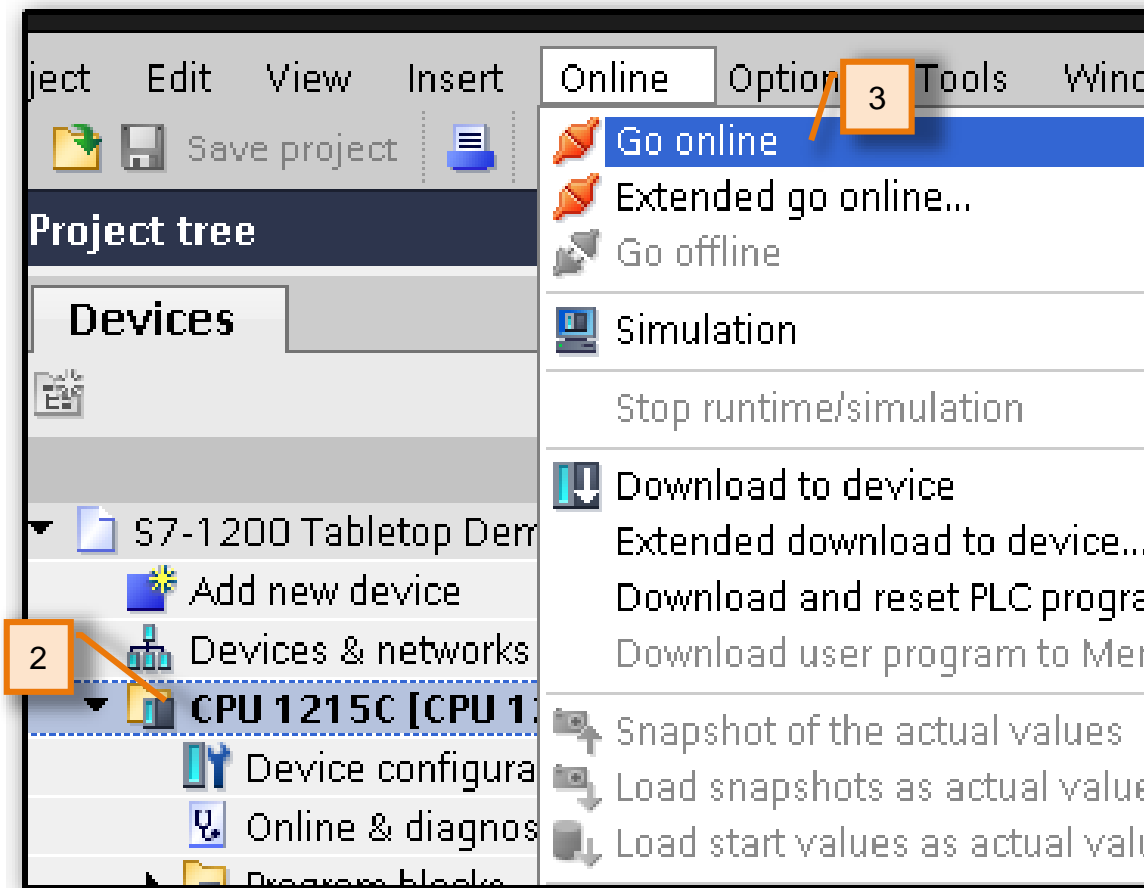
1. Open the project called 'S7-1200 Tabletop Demo KTP700 V3.ap16' by double clicking on it on the "recent projects" list.

If the project does not appear in the list, press Browse and navigate to the "`\Desktop\S7-1200 Event\S7-1200 Tabletop Demo V16 KTP700 V3.ap16`"
2. Click the "Open" Button.



Online Diagnostic & Maintenance Features

Getting online



1. **Save project under a different name/directory.**
2. Select the CPU in the project Tree
3. Select "Go online" in the "Online" menu

Note:

If the device has already been connected online, the online connection is automatically established using the previously specified settings.

If there was no previous connection or if the device address is not located in the same subnet of the laptop, the "Go online" window opens.



Online Diagnostic & Maintenance Features

Getting online

Show accessible devices

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Configured access nodes of "CPU 1215C"

Device	Device type	Slot	Interface type	Address	Subnet
CPU 1215C	CPU 1215C DC/D...	1 X1	PN/IE	192.168.0.10	PN/IE_2
CP 1243-1	CP 1243-1	101 X1	PN/IE	192.168.1.1	PN/IE_1
CPU 1215C	CP 1243-1	101	TeleService	200165	

Type of the PG/PC interface:

PG/PC interface:

Connection to interface/subnet:

1st gateway:

Select target device:

Device	Device type	Interface type	Address	Target device
CPU 1215C	CPU 1215C DC/DC/DC	PN/IE	192.168.0.10	CPU 1215C
---	---	PN/IE	Access addr...	---

Flash LED

Start search

Online status information: Display only error messages

- Found accessible device hmi ktp700
- Scan completed. 1 compatible devices of 3 accessible devices found.
- Scan and information retrieval completed.
- Retrieving device information...

GoOnline Cancel

Select the connection path:

1. Select the "PN/IE" type of interface from the "Type of the PG/PC interface" drop-down list.
2. Select the appropriate interface of your laptop from the "PG/PC interface" drop-down list. If you are unsure which to use, consult your instructor.
3. Select the "Direct at slot '1 X1' " interface from the "Connection to interface/subnet" drop-down list.
4. Select "Show all compatible devices" from the dropdown above the device list
5. Click the "Start search button.
Devices which can be reached by the set connection path are displayed in the table of the target devices. The connection line in the graphic on the left is displayed as solid.
6. Select the target device in the table
7. confirm the selection with clicking "Go online".

Result: The online connection to the selected PLC is established.



Online Diagnostic & Maintenance Features

Getting online

The screenshot displays the Siemens TIA Portal interface with the following components and callouts:

- 1:** Orange title bar of the active window.
- 2:** Orange line below the title bars of inactive windows for the relevant station.
- 3:** Orange pulsing bar at the right-hand edge of the status bar.
- 4:** Left column in the project tree indicating diagnostics status for hardware objects.
- 5:** Right column in the project tree indicating comparison status for software objects.
- 6:** "Online Tools" task card displaying runtime diagnostic information and control options.

The Online Tools panel includes:

- Options:** CPU operator panel with RUN/STOP, ERROR, and MAINT buttons.
- Cycle time:** A bar chart showing cycle time distribution with values: Shortest: 3.000 ms, Current/last: 4.000 ms, Longest: 10.000 ms.
- Memory:** Load memory (Free: 85%), Work memory (Free: 87%), and Retain memory (Free: 94%) status.

After the online connection has been established successfully, the user interface changes. The following shows if a device connected online and the corresponding user interface:

1. The title bar of the active window gets an orange background as soon as at least one of the devices currently displayed in the editor has been successfully connected online.
2. The title bars of inactive windows for the relevant station now have an orange line below them.
3. An orange, pulsing bar appears at the right-hand edge of the status bar. If the connection has been established but is functioning incorrectly, an icon for an interrupted connection is displayed instead of the bar.
4. The left column in the project tree indicates the diagnostics status for hardware objects in online mode through symbols.
5. The right column in the project tree indicates the comparison status for software objects in online mode through symbols. A comparison of the online and offline state is performed automatically. Differences between online and offline objects are displayed in the form of symbols.
6. The "Online Tools" task card displays active runtime diagnostic information and the ability to control the operating mode of the CPU between RUN, STOP, and MRES (reset memory to default values)



Editing Online Blocks

Online Diagnostic & Maintenance Features

Editing Online Blocks

Many times it is necessary to modify program logic in the CPU while keeping it in the "RUN" state so as not to disrupt other tasks/operations in the process. This is process of editing program logic, downloading, then maintaining the "RUN" status is and has always been possible in the S7 family of programmable controllers – for the S7-1200 controller this still holds true.

The program of a block can only be changed in the offline version. Therefore, If you wish to modify the online version, you must carry out the change in the offline version and subsequently download the changed block(s) to the CPU. Upon the next PLC scan cycle, the CPU will run with the new program changes.

Note: The only changes that require a CPU stop are "hardware configuration" changes (network settings, security settings, rack configuration, etc.). Therefore, changes which are considered 'program changes' (program logic, tag names and addresses, data block structures, etc.) do not require a "STOP" of the CPU.



Online Diagnostic & Maintenance Features

Editing Online Blocks

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The screenshot shows the Siemens TIA Portal software interface. The Project tree on the left lists various components, with 'Main [OB1]' highlighted. The main workspace displays the LAD editor for 'Main Program Sweep (Cycle)'. The logic consists of several networks. Network 1 is currently selected and contains a logic diagram with inputs %I0.0 (Switch 1), %I0.1 (Switch 2), and %Q8.3 (Output 1). A blue starburst icon with an exclamation mark is placed over the 'Main [OB1]' block in the Project tree, indicating a difference between the online and offline states.

To edit an online block, follow these steps:

1. Ensure you are online with the CPU (See '[getting online](#)')
2. Double-click the block to be edited, in this case we will use Main (OB1)
Program blocks > Demo > Main[OB1]
3. Monitor the block by clicking the 'monitor on/off' icon in the LAD editor toolbar
4. Click on Network 1.
5. Click the 'insert network' icon in the LAD editor toolbar

Notice the block is no longer monitoring 'online'. This is because edits must be performed offline, then subsequently downloaded. Also notice there is now a 'difference' vs online (running) CPU program, as indicated in the project tree with an icon

6. Add logic as shown into the new network
7. Click Download icon in the TIA Portal toolbar.



Online Diagnostic & Maintenance Features

Editing Online Blocks

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The screenshot displays the 'Load preview' dialog box in the top left, which is used to check for consistency before loading software to the device. The dialog contains a table with the following data:

Status	Target	Message	Action
✓	✓ CPU 1215C	Ready for loading.	Load 'CPU 1215C'
✓	✓ Test and commis...	Active test and commissioning functions could be canceled by I... The module CPU 1215C includes active test and commissioning functions.	Accept all Apply
✓	✓ Software	Download software to device	Consistent download
✓	✓ Overwrite onli...	Objects that exist online and are overwritten.	
✓	✓ Tags		<input checked="" type="checkbox"/>
✓	✓ Main [OB1]		<input checked="" type="checkbox"/>

Below the table are buttons for 'Finish', 'Load', and 'Cancel'. A blue starburst icon with an exclamation mark is placed over the 'Load' button, with a '1' in a box pointing to it. In the background, the LAD editor interface is visible, showing a project tree on the left with 'Main [OB1]' selected. A blue starburst icon with an exclamation mark is placed over the 'Main [OB1]' entry, with a '2' in a box pointing to it. The main editor area shows a ladder logic network with the following components:

- Network 1: Determine Main Scan Time
- Network 2: Ladder logic with inputs %I0.0 ("Switch1"), %I0.1 ("Switch2"), and %Q8.3 ("Output1").

After clicking download, the software will compile and a "Load Preview" dialog appears.

1. Click 'Load'



Notice the CPU did not go into "STOP" during the loading process and the project tree now indicates consistency between online and offline projects.

2. Click 'monitor on/off' icon in the LAD editor toolbar and notice the changes have been adapted and running.



System Diagnostics

Online Diagnostic & Maintenance Features

System Diagnostics

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System diagnostics



Trace



Webservice



Teleservice

In a plant a lot different faults can occur. The TIA Portal offers many ways of diagnosing of these faults.

These include the integrated System diagnostics. The system diagnostics are automatically setup when a device is configured -You don't need to write a single line of code.

If an overvoltage or short circuit on a channel occurs, for example, the device automatically detects the fault and sends the associated diagnostics data to the controller. The controller then displays the fault information via all display media, which enables you to localize the fault and troubleshoot very quickly.

Since system diagnostics are standard and integrated into the firmware, system faults are actively monitored despite the PLC operating mode (i.e. RUN / STOP).

We will explore the different methods to view system diagnostic messages including

From within TIA Portal

From the SIMATIC HMI

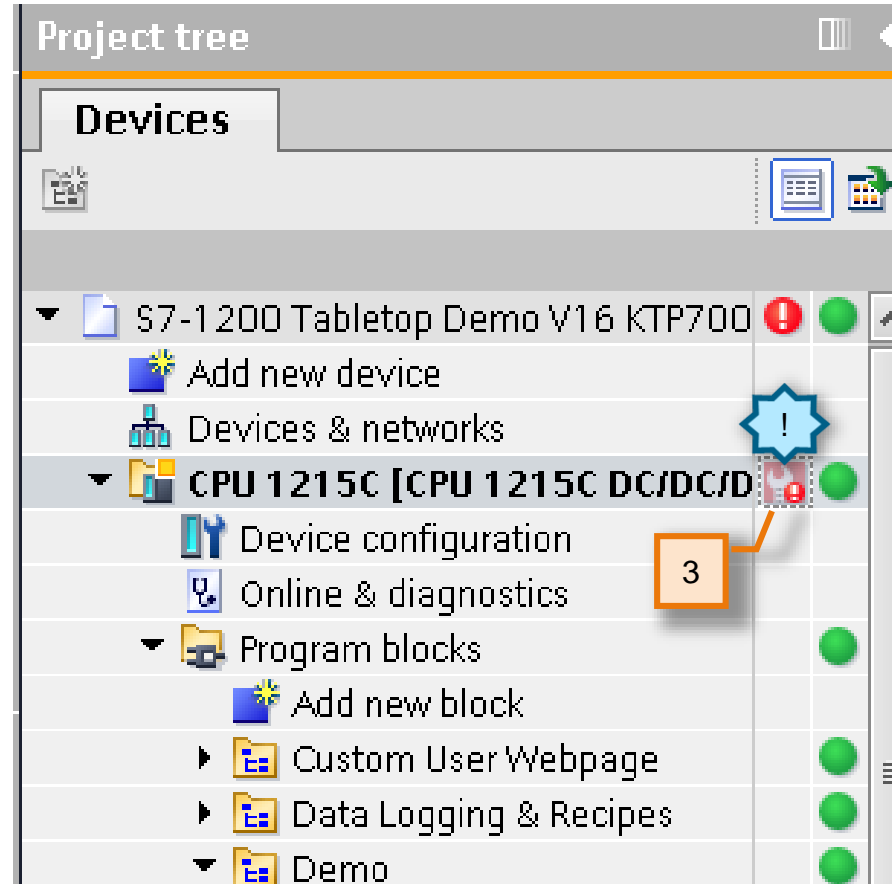
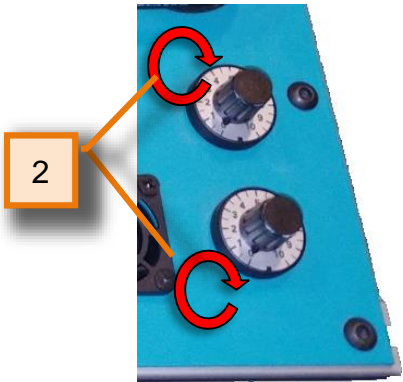
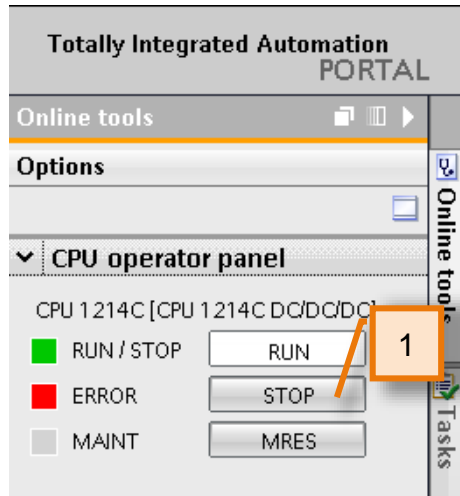
From the integrated Web Server of the CPU



Online Diagnostic & Maintenance Features

System Diagnostics via TIA Portal

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1. While still connected Online in TIA Portal, go to "Online tools" task bar and put the CPU in STOP
 2. On the Tabletop demo, rotate the potentiometers clockwise as far as they physically can.

This will generate an overvoltage fault on the analog input channel(s)
- Notice the fault indicator in the project tree, the "ERROR" LED flashing on the CPU and the CPU operator panel in the Online tools task card within TIA Portal.
3. Double-click on the fault indicator. You should be directed to "Online & Diagnostics" in the editor window.



Online Diagnostic & Maintenance Features

System Diagnostics via TIA Portal

1

2

3

Online access

Diagnostics

General

Diagnostic status

Diagnostics buffer

Cycle time

Memory

PROFINET interface [X1]

Functions

Diagnostics buffer

Events

Display CPU Time Stamps in PG/PC local time

No.	Date and time	Event	
1	1/1/2012 1:00:13.194 AM	High limit exceeded	
2	1/1/2012 1:00:08.994 AM	High limit exceeded	
3	1/1/2012 12:52:05.022 AM	New startup information - Current CPU operating mode: STOP	
4	1/1/2012 12:52:04.921 AM	Av Communication initiated request: STOP - CPU changes from RUN to STOP mode	
5	1/1/2012 12:43:06.251 AM	Av High limit exceeded	
6	1/1/2012 12:42:59.200 AM	Av High limit exceeded	
7	1/1/2012 12:42:01.513 AM	Av High limit exceeded	
8	1/1/2012 12:41:53.452 AM	Av High limit exceeded	
9	1/1/2012 12:41:50.961 AM	Av High limit exceeded	

Freeze display

Details on event:

Details on event: 1 of 46 Event ID: 16# 06:01C0

Module: CPU 1215C / CPU 1215C.AI 2/AQ 2_1

Rack/slot: Rack 0 / Slot 1.2

Description: Error: High limit exceeded on Input channel 1
CPU 1215C / CPU 1215C.AI 2/AQ 2_1

Help on event: For sensors: The measured value exceeds the measuring range.
For actors: The output value exceeds a high limit value.
Solution: Check the interaction between the module and the sensor or actuator.

Plant designation: Location ID:

Incoming/outgoing: Incoming event Event type: Error

Open in editor Save as...

1. Navigate to the Diagnostics buffer.
2. Select the latest incoming diagnostic fault message, denoted by the "incoming envelope" symbol
3. Notice the fault description in the "Help on event" section below and extended description with recommended remedy.
4. Rotate analog potentiometers counter-clockwise to remove the overvoltage condition.



Notice the ERROR LEDs stop flashing and the diagnostic message appears as an outgoing event in the diagnostics buffer, as indicated by the "outgoing envelope" symbol



Also note: the PLC is still in STOP confirming that system diagnostics are integrated into the firmware with no programming needed



Online Diagnostic & Maintenance Features

System Diagnostics via Integrated Web Server

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192.168.0.10/Portal/Portal.mwsl?PriNav=Diag

SIEMENS SIMATIC 1200 Station_1 / CPU 1215C

12:17:22 am 1/1/2012 PLC Local English

Username Login

Diagnostic Buffer

Diagnostic buffer entries 1-25

Number	Time	Date	Status	Event
1	12:00:13 am	1/1/2012	Incoming event	High limit exceeded
2	12:00:08 am	1/1/2012	Outgoing event	High limit exceeded
3	11:52:05 pm	12/31/2011	Incoming event	New startup information - Current CPU operating mode: STOP
4	11:52:04 pm	12/31/2011	Incoming event	Communication initiated request: STOP - CPU changes from R
5	11:43:06 pm	12/31/2011	Incoming event	High limit exceeded
6	11:42:59 pm	12/31/2011	Outgoing event	High limit exceeded
7	11:42:01 pm	12/31/2011	Incoming event	High limit exceeded
8	11:41:53 pm	12/31/2011	Outgoing event	High limit exceeded
9	11:41:50 pm	12/31/2011	Incoming event	High limit exceeded
10	11:41:40 pm	12/31/2011	Outgoing event	High limit exceeded
11	11:41:35 pm	12/31/2011	Incoming event	High limit exceeded
12	11:41:21 pm	12/31/2011	Outgoing event	High limit exceeded
13	11:40:32 pm	12/31/2011	Incoming event	High limit exceeded

Details:1 Event ID: 16# 06:01C0

Error: High limit exceeded
HW_ID= 263, Input channel number 1

Incoming event

1

2

3

4

The S7-1200 CPU has the ability to host an integrated web page. This integrated web server supports many functions. Among those functions, you can also see the system faults in the diagnostic buffer page. To view the system faults from the integrated web server, follow the following steps:

1. On your laptop, open the web browser of choice (Chrome, Firefox, Internet Explorer).
2. Type 192.168.0.10 into the address bar. This is the IP address of the S7-1200 controller. Click "Enter" when seeing the S7-1200 intro splash page
3. Navigate to "Diagnostic Buffer". Trigger the overvoltage fault via the analog potentiometers and notice the incoming and outgoing fault messages.

Note the webpage is designed to update every 5s. If the diagnostics message does not immediately appear, waits 5s for the page to refresh automatically or you can refresh the page manually

4. Navigate to the "Module Information" tab. Notice the fault status of the CPU.
5. Navigate to the analog input channel by clicking on "Details" where a fault is indicated



Online Diagnostic & Maintenance Features

System Diagnostics via HMI

S7-1200: Compact Controller with Advanced Capabilities

State: Idle | Lot Number: 10005 | Operator: []

Diagnostic overview \ Diagnostic buffer view

No.	Date	Time	Event
1	6/6/2020	3:07:23 PM	High limit exceeded
2	6/6/2020	3:06:50 PM	High limit exceeded
3	6/6/2020	3:06:49 PM	High limit exceeded
4	6/6/2020	3:06:25 PM	High limit exceeded
5	6/6/2020	3:06:08 PM	High limit exceeded
6	6/6/2020	3:05:35 PM	High limit exceeded
7	6/6/2020	3:05:34 PM	High limit exceeded
8	6/6/2020	3:01:42 PM	High limit exceeded
9	6/6/2020	3:01:41 PM	High limit exceeded
10	6/6/2020	3:00:55 PM	High limit exceeded
11	6/6/2020	3:00:54 PM	High limit exceeded
12	6/6/2020	3:00:52 PM	High limit exceeded
13	6/6/2020	3:00:51 PM	High limit exceeded

Diagnostic overview \ Diagnostic buffer view \ Detail view

1 6/6/2020 3:07:23 PM

Error: High limit exceeded on Input channel 1

CPU 1215C / CPU 1215C.AI 2/AQ 2_1

For sensors: The measured value exceeds the measuring range.
For actors: The output value exceeds a high limit value.

1. On the HMI, open the diagnostics screen as shown
2. Trigger the overvoltage fault via the analog potentiometers and notice the incoming fault message "High limit exceeded".
3. Select the fault message and expand details by clicking the → arrow at the bottom of the diagnostic buffer window

! Notice the detailed diagnostic information in plain text. No cryptic "error codes" to cross reference!



Integrated Signal Trace

Online Diagnostic & Maintenance Features

Integrated Trace

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System diagnostics



Trace



Webserver



Teleservice

The trace function can be used for localizing sporadic faults.

In the past, analyzing errors involved wiring and monitoring each individual device separately to oscilloscopes, for example. However, now the integrated trace function of the S7-1200 and TIA Portal can handle this task for you.

Trace recording is handled within the S7-1200 CPU firmware. This means you are able to record highly dynamic signals without missing a single scan or trigger - also, no extra hardware is required!


The recordings are saved in the system memory of the CPU or optional SIMATIC Memory Card (SMC - if used). If the optional SMC is used and the trace is configured to save to the memory card, the measurement can then be uploaded to a laptop to be analyzed, saved or converted to CSV format, if needed.



Online Diagnostic & Maintenance Features

Integrated Trace

The screenshot displays the Siemens TIA Portal interface. On the left, the project tree for 'CPU 1215C [CPU 1215C DC/DC/DC]' is shown. The 'Traces' folder is expanded, and 'MyTrace' is selected. Three orange boxes with numbers 1, 2, and 3 indicate the steps: 1 points to the 'Traces' folder, 2 points to 'MyTrace', and 3 points to the 'MyTrace' icon in the toolbar. On the right, the 'Configuration' screen for 'MyTrace' is shown, with the 'Configuration' tab selected. The screen displays options for 'Signals', 'Recording conditions', 'Sampling', 'Trigger', and 'Measurements on de...'. The 'Configuration' tab is highlighted with a blue dashed border.

1. Expand the "Traces" folder in the project tree.
2. Double-click on the already-configured offline trace "MyTrace" to open the configuration screen in the work area.
3. Transfer the trace configuration to the PLC By clicking the  button in the trace toolbar.



Online Diagnostic & Maintenance Features

Integrated Trace

	Signal r...	Name	Data type	Display format	Address	Formula	Color	...
1	\$0	"Analog Pot1"	UInt	Dec	%IW64		Red	
2	\$1	"Analog Pot2"	UInt	Dec	%IW66		Blue	
3	\$2	"Switch"	Bool	Bin	%I0.0		Green	
4		<Insert new...						

Notice the Work Area now shows a scaled trace window with various toolbar options at the top. The following describes the different toolbar options:

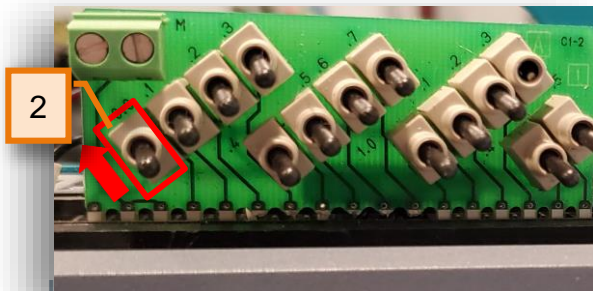
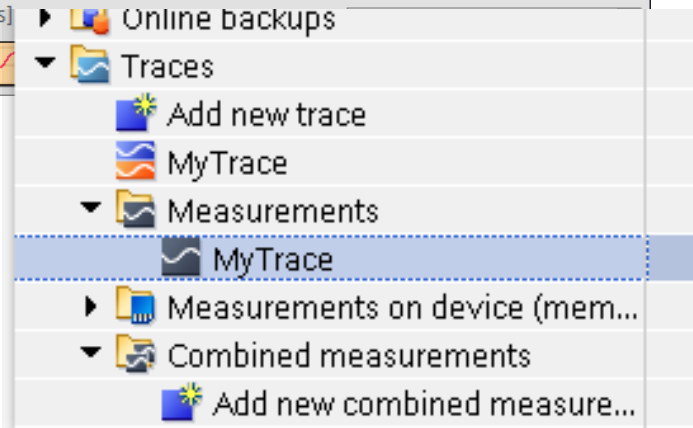
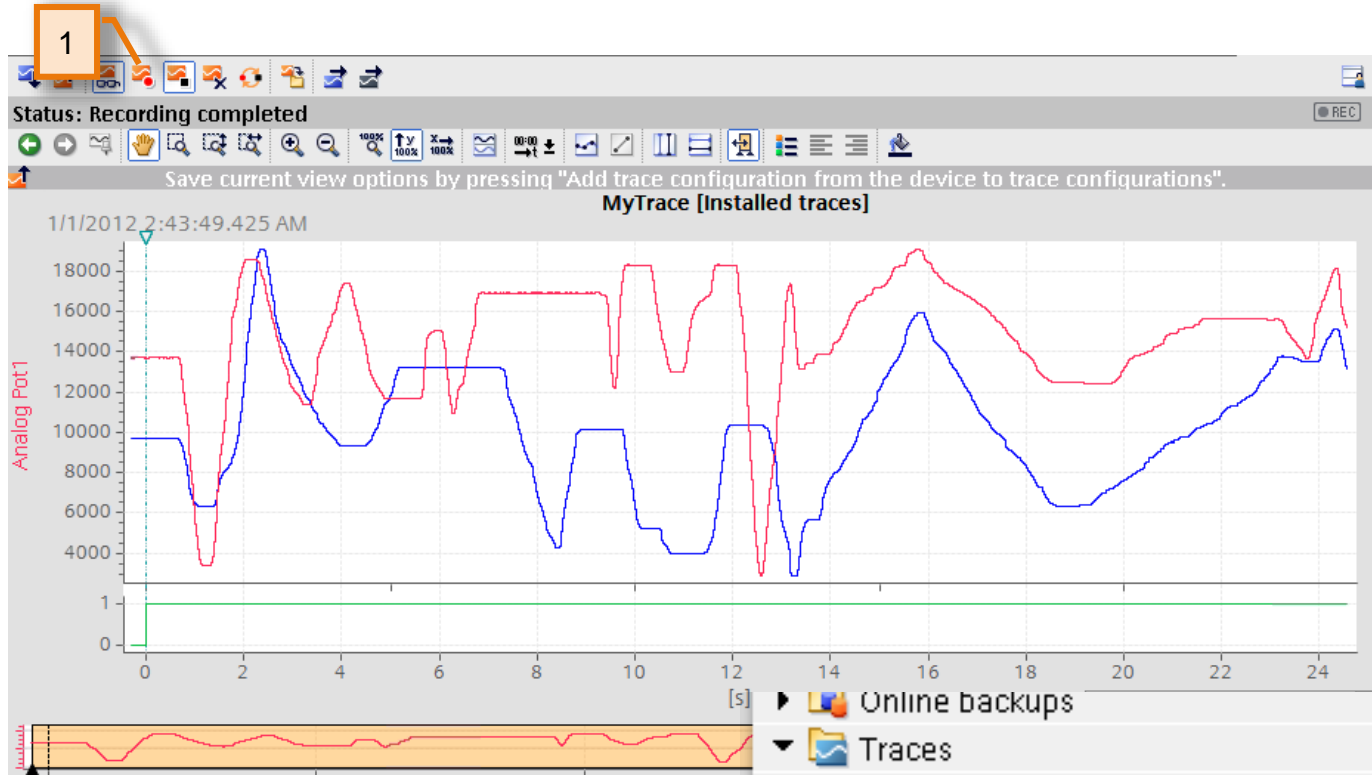
- Transfer the trace configuration to the device (you already did this in previous page)
- Transfer the configuration from the device to your TIA Portal project
- Monitor on/off
- Activate recording
Note: By activating recording, you are essentially monitoring the tags in real-time. The trace will not be measured/saved until recording is activated in TIA Portal and the trigger condition is met (if configured). Once the trigger condition is met, then recording of the measurement will proceed until the recording duration is met. However, if you have a memory card and configured the trace to save the measurements on memory card, then TIA Portal does not need to be connected in order to record & measure the values once the trigger condition is met..
- Deactivate recording
- Delete installed trace from device
- Automatically repeat trace
- Transfer the recorded measurement from the device to the offline TIA Portal project
- Export trace configuration (i.e. for use in further TIA Portal projects)
- Export measurement with the settings from the current view





Online Diagnostic & Maintenance Features

Integrated Trace

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Now we will begin the trace recording and measurement:

1. Click the "Activate Recording" button  in the trace toolbar. (If this is greyed out, select the "Monitor on/off" button  first)

Notice below the trace toolbar the status of the recording shows "Waiting for trigger". If you rotate the analog potentiometers on the demo, you can see the values changing. However, no measurements are being recorded because the system is waiting for the trigger condition to be met.

2. Switch on the first switch on the input simulator board. If the switch is already in the "ON" position, then switch off and then on again (trigger condition is set to "rising edge").

Notice the status bar changed from "Waiting for trigger" to "Recording"

3. After switching on, randomly rotate the analog potentiometers on the demo until the measurement stops recording (about 20s) or until you hit the "deactivate recording" button  in the trace toolbar.
4. Export the recording to TIA Portal by clicking the "Add to measurements" button  on the trace toolbar.

At this point you can analyze the trace within TIA Portal by double-clicking on the recorded trace measurement in the "Measurements" folder in the project tree or export the recorded values to a .csv file format for further analysis in other tools such as Microsoft Excel.

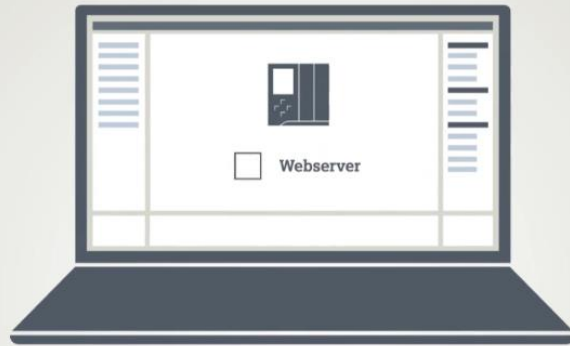


Integrated Web Server

Online Diagnostic & Maintenance Features

Integrated Web Server

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System diagnostics



Trace



Webserver



Teleservice

The web server enables monitoring and administering of the CPU by authorized users over a connected network. This allows evaluation and diagnostics over long distances without the need for TIA Portal – all you need is a web browser.

The integrated Web Server of the S7-1200 provides the following functions:

- Troubleshooting & diagnostic information
- Update firmware
- Backup/restore
- Monitor/modify tags
- Access data logs
- Access recipe files
- Create/operate custom webpage
- Upload/download custom files (manuals, prints, supporting documentation, etc.)

The web server offers the following security functions:

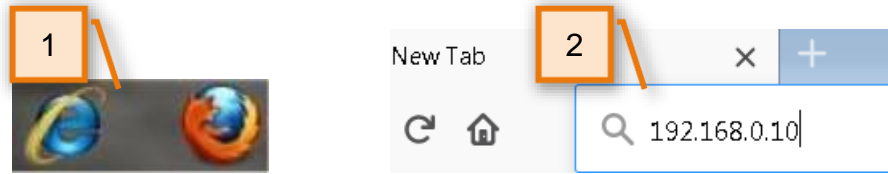
- Access via secure SSL/TLS transmission (Port 443)
- User authorization by means of custom user list
- Customizable access restrictions from certain web server functions



Online Diagnostic & Maintenance Features

Integrated Web Server

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1. In order to access the web server of the S7-1200 CPU, we open any web browser on a PC that is connected to the CPU via TCP/IP (i.e. Chrome, Firefox, Internet Explorer, etc.)
2. In the browser address bar, type the IP address of the CPU (http://192.168.0.10)
3. On the displayed webpage click 'ENTER'



Online Diagnostic & Maintenance Features Integrated Web Server – Start Page

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SIEMENS SIMATIC 1200 Station_1 / CPU 1215C

02:08:49 am 1/1/2012 PLC Local English

Username Login

Start Page

- Diagnosics
- Diagnostic Buffer
- Module Information
- Communication
- Tag status
- Watch tables
- Data Logs
- User Files
- User-defined pages
- File Browser
- Introduction

General:

Project Name: S7-1200 Tabletop Demo V16 KTP700 V3
TIA Portal: V16
Station name: SIMATIC 1200 Station_1
Module name: CPU 1215C
Module type: CPU 1215C DC/DC/DC

Status:

Operating Mode: RUN
Status: OK

CPU operator panel:

On the 'Start Page' we see general information about the PLC and its status.

You can also switch to the integrated web server of the CP 1243-1 module via the connected interface.

We can also change the operating mode of the CPU (This can be disabled for certain users – see 'Security features' module).



Online Diagnostic & Maintenance Features

Integrated Web Server - Diagnostics



SIEMENS

S7-1200 station_1 / PLC_1

11:27:3

The screenshot displays the Siemens diagnostic web interface. The main content area is titled 'Diagnostics' and has three tabs: 'Identification', 'Program protection', and 'Memory'. The 'Identification' tab is active, showing the following information:

- Order Identification:
 - Plant designation: [blurred]
 - Location identifier: [blurred]
 - Serial number: S C-E4S21500
- Order number:
 - Hardware: 6ES7 214-1AG40-0XB0
- Version:
 - Hardware: 1
 - Firmware: V04.04.00

Three callout boxes with exclamation marks highlight warning icons in the 'Diagnostics' header of the main page and the 'Identification' and 'Memory' tabs of the sub-page.

Under 'Diagnostics' we see diagnostic information on the CPU such as Identification & Maintenance data (I&M data) such as 'Plant designation' and 'Location identifier'. In addition, order number, installed firmware, and program information via separate tabs.



Online Diagnostic & Maintenance Features

Integrated Web Server – Diagnostics Buffer



S7-1200 station_1 / PLC_1

The 'Diagnostic Buffer' page displays descriptive information for all events in the CPU. Diagnostic events are recorded in a circular buffer. The most recent event is displayed in the top line.

Username

Diagnostic Buffer

Login

Diagnostic buffer entries 1-25 ▾

Number	Time	Date	Status	Event
1	05:37:23 pm	5/15/2020	Incoming event	High limit exceeded
2	05:36:59 pm	5/15/2020	Incoming event	New startup information - Current CPU operating mode: STOP
3	05:36:58 pm	5/15/2020	Incoming event	Follow-on operating mode change - CPU changes from STOP to STOP mode
4	05:36:57 pm	5/15/2020	Incoming event	New startup information - Current CPU operating mode: STOP
5	05:36:54 pm	5/15/2020	Outgoing event	High limit exceeded
6	05:29:47 pm	5/15/2020	Incoming event	High limit exceeded
7	05:29:39 pm	5/15/2020	Outgoing event	High limit exceeded
8	05:29:36 pm	5/15/2020	Incoming event	New startup information - Current CPU operating mode: STOP
9	05:29:36 pm	5/15/2020	Incoming event	Communication initiated request: STOP - CPU changes from RUN to STOP mode
10	05:28:50 pm	5/15/2020	Incoming event	High limit exceeded
11	05:28:43 pm	5/15/2020	Outgoing event	High limit exceeded
12	01:31:39 am	1/1/2012	Incoming event	Follow-on operating mode change - CPU changes from STARTUP to RUN mode
13	01:31:39 am	1/1/2012	Incoming event	Communication initiated request: WARM RESTART - CPU changes from STOP to STARTUP mode
14	01:31:39 am	1/1/2012	Incoming event	New startup information - Current CPU operating mode: STOP
15	01:31:36 am	1/1/2012	Incoming event	New startup information - Current CPU operating mode: STOP

Details:1

Error: High limit exceeded
HW_ID= 263, Input channel number 1

Incoming event



Online Diagnostic & Maintenance Features

Integrated Web Server – Module Information

SIEMENS
Ingenuity for life

The 'Module Information' page will display the status of individual modules of our S7-1200 station and remote IO (when applicable).

04:23:37 pm 1/1/2012 PLC Local English

Module Information

Module Information - SIMATIC 1200 Station_1

Slot	Status	Name	Order number	I address	Q address
1	✓	CPU_1215C	6ES7 215-1AG40-0XB0		
2	✓	DI 8x24VDC/DQ 8xRelay_1	6ES7 223-1PH30-0XB0	8	8
101	✓	CP_1243-1	6GK7 243-1BX30-0XE0		

State Identification Firmware

Rack: ---

Slot: 1

Firmware loader:

Firmware file: No file selected.

Firmware version:

Suitable for modules:

Status:



Online Diagnostic & Maintenance Features Integrated Web Server – Communication



SIEMENS

SIMATIC 1200 Station_1 / CPU 1215C

In the "Communication" page you can see details about the communication settings and statistics.

Username [Login](#)

- Start Page
- Diagnostics
- Diagnostic Buffer
- Module Information
- Communication**
- Tag status
- Watch tables
- Data Logs
- User Files
- User-defined pages
- File Browser
- Introduction

Communication

Parameter	Statistics	Connection resources	Connection
PROFINET Interface [X1]			
Network connection:			
MAC address:	E0-DC-A0-B5-FD-5F		
Name:	cpuxa1215cd4d4		
IP parameter:			
IP Address:	192.168.0.10		
Subnet mask:	255.255.255.0		
Default router:	0.0.0.0		
IP settings:	IP address set in project		
Physical properties:			
Port number	Link status	Settings	Mode
X1 P1	OK	Automatically	100 MBit/s full-duple
X1 P2	disconnected	Automatically	10 MBit/s half-duple

Parameter	Statistics	Connection resources	Connection status
Total statistics			
Sent data packages:			
Sent without errors:	88869339 Bytes		
Collision during sending attempt:	0		
Canceled due to other errors:	0		
Received data packages:			
Received without errors:	64152081 Bytes		
Rejected due to error:	0		
Rejected due to resource bottleneck:	0		
X1 P1			
Sent data packages:			
Sent without errors:	88869339 Bytes		
Collision during sending attempt:	0		
Canceled due to other errors:	0		
Received data packages:			
Received without errors:	64152081 Bytes		
Rejected due to error:	0		

Parameter	Statistics	Connection resources	Connection
Number of connections:			
Maximum connections:	128		
Connections not in use:	123		
Connections:			
	reserved	in use	
ES communication	4	0	
HMI communication	12	0	
S7 communication	8	0	
OpenUser communication	8	0	
Web communication	0	5	

Parameter	Statistics	Connection resources	Connection status
State			Local ID (Hex)
✔ Connection is established			0



Online Diagnostic & Maintenance Features

Integrated Web Server – Tag Status



SIMATIC 1200 Station_1 / CPU 1215C

03:18:15 pm 1/1/2012 PLC

In the 'Tag Status' page, you can modify or view individual tags status (like a watch table).

Username [Login](#)

Tag status

Enter the address of a tag here which you want to monitor/modify

Address	Display Format	Monitor Value	Modify Value	
Q0.3	BOOL	<input type="checkbox"/> false	<input type="text"/>	<input type="button" value="Go"/>
I0.0	BOOL	<input checked="" type="checkbox"/> true	<input type="text"/>	<input type="button" value="Go"/>
New variable				

- Start Page
- Diagnostics
- Diagnostic Buffer
- Module Information
- Communication
- Tag status**
- Watch tables
- Data Logs
- User Files
- User-defined pages
- File Browser



Online Diagnostic & Maintenance Features

Integrated Web Server – Watch Tables



SIMATIC 1200 Station_1 / CPU 1215C

03:29:10 pm 1/1/

The 'Watch Tables' page allows you to monitor or modify tag values from 'watch tables' that are created within TIA Portal.

Username

Watch tables
 Conveyor ▼

Name	Address	Display Format	Monitor Value	Modify Value	⚡	Comment
"Conveyor_Prox_Min"	%I8.4	BOOL	false		Go	
"Conveyor_Prox_Home"	%I8.5	BOOL	false		Go	
"Conveyor_Prox_Max"	%I8.6	BOOL	false		Go	
"Conveyor_Encoder"	%I0.2	BOOL	true		Go	
"Conveyor_Encoder_1"	%I0.3	BOOL	true		Go	
"Conveyor_Encoder_Count"	%ID1004	DEC+/-	0		Go	
"Conveyor_Home_Switch"	%I0.6	BOOL	false		Go	
"Conveyor_Lo_Switch"	%I0.5	BOOL	false		Go	
"Conveyor_Hi_Switch"	%I0.7	BOOL	false		Go	
"Conveyor_Pulse"	%Q0.0	BOOL	false		Go	
"Conveyor_Direction"	%Q0.1	BOOL	false		Go	
"Conveyor_IDB"."Conveyor Enable"		BOOL	false		Go	
"Conveyor_IDB".Conveyor_Encoder_Count		DEC+/-	0		Go	
"Conveyor_IDB".Conveyor_HSC_Addr						
"Conveyor_IDB".Conveyor_Homing_Mode		DEC+/-	3		Go	
"Conveyor_IDB".Conveyor_JogFWD_Command		BOOL	false		Go	
"Conveyor_IDB".Conveyor_JogREV_Command		BOOL	false		Go	
"Conveyor_IDB".Conveyor_JogVelocity_SP		Floating_Point	2.274722		Go	
"Conveyor_IDB".Conveyor_Reset_Command		BOOL	false		Go	
"Conveyor_IDB".Conveyor_Actual_Position		Floating_Point	0.0		Go	

- ▶ Start Page
- ▶ Diagnostics
- ▶ Diagnostic Buffer
- ▶ Module Information
- ▶ Communication
- ▶ Tag status
- ▶ **Watch tables**
- ▶ Online backup
- ▶ Data Logs
- ▶ User Files
- ▶ User-defined pages
- ▶ File Browser



Online Diagnostic & Maintenance Features

Integrated Web Server – Online Backup/Restore

03:31:42 pm 1/1/2012 PLC Local English

Username
 [Login](#)

Online backup

Backup PLC:

Restore PLC:
 No file selected.

Status:

- ▶ Start Page
- ▶ Diagnostics
- ▶ Diagnostic Buffer
- ▶ Module Information
- ▶ Communication
- ▶ Tag status
- ▶ Watch tables
- ▶ **Online backup**
- ▶ Data Logs
- ▶ User Files
- ▶ User-defined pages
- ▶ File Browser

Under "Online backup" you can create a backup of the project in the PLC and/or restore your PLC from a previous backup file.



Online Diagnostic & Maintenance Features

Integrated Web Server – Data Logs



SIMATIC 1200 Station_1 / CPU 1215C

03:33:48 pm 1/1/2012 PLC Local English

Username [Login](#)

Data Logs

[Refresh](#) [Off](#) [Print](#)

Name	Size	Changed	Active	Delete	Retrieve and clear
Production_Data.csv	835	07:56:12 pm 12/31/2011	Yes	X	

- ▶ Start Page
- ▶ Diagnostics
- ▶ Diagnostic Buffer
- ▶ Module Information
- ▶ Communication
- ▶ Tag status
- ▶ Watch tables
- ▶ Online backup
- ▶ **Data Logs**
- ▶ User Files
- ▶ User-defined pages

The 'Data Logs' page allows you to access data log files stored in the system memory of the CPU. This can either be in the integrated CPU memory or the optional SD Card.



Online Diagnostic & Maintenance Features

Integrated Web Server – User Files



SIEMENS

S7-1200 station_1 / 1200Bag

User: OEM [Logout](#)

User Files

Name	Size	Changed
Instruction Guide - S7-1200 Demo in a Bag.pdf	473383	11:57:20 am 3/12/2020
Passwords.txt	2134	11:59:00 am 3/12/2020
Website files - 1200.zip	262674	01:08:04 pm 2/27/2020

No file selected.

- Start Page
- Diagnostics
- Diagnostic Buffer
- Module Information
- Communication
- Tag status
- Watch tables
- Online backup
- Data Logs
- User Files**
- User-defined pages
- File Browser

The 'User Files' Page allows you to save and access files stored in the CPU memory or SD card.

This can be user-defined files such as OEM files, electrical drawings, operations manuals, etc.



Online Diagnostic & Maintenance Features

Integrated Web Server – Customer User-defined Webpage

S7-1200 Tabletop Demo

SIEN

System Status



Processor Parameters

Last Scan Time	7 ms
Average Scan Time	4.92 ms
System Tick	1779378 ms

Plant Parameters

Top Analog Pot	49.58 %	<div style="width: 49.58%; background-color: orange;"></div>
Bottom Analog Pot	57.18 %	<div style="width: 57.18%; background-color: limegreen;"></div>
Fan Speed	0 %	<div style="width: 0%; background-color: gray;"></div>
Conveyor Position	0 %	<div style="width: 0%; background-color: gray;"></div>
Production Cycle	100 %	<div style="width: 100%; background-color: black;"></div>

Production Record

Last Lot Number	10009
-----------------	-------

Custom pages are also possible to have within the integrated web server. This page(s) can be access from the "User-defined pages" page.



Online Diagnostic & Maintenance Features

Integrated Web Server – File Browser

04:21:03 pm 1/1/2012 PLC Local English

Username [Login](#)

File Browser [Refresh](#) [Off](#) [Print](#)

[SIMATIC 1200 Station_1](#)

Name	Size	Changed	Delete	Rename
 DataLogs		06:00:00 pm 12/31/2011		
 Recipes		06:00:00 pm 12/31/2011		

Directory operations:

- Start Page
- Diagnostics
- Diagnostic Buffer
- Module Information
- Communication
- Tag status
- Watch tables
- Online backup
- Data Logs
- User Files
- User-defined pages
- File Browser**

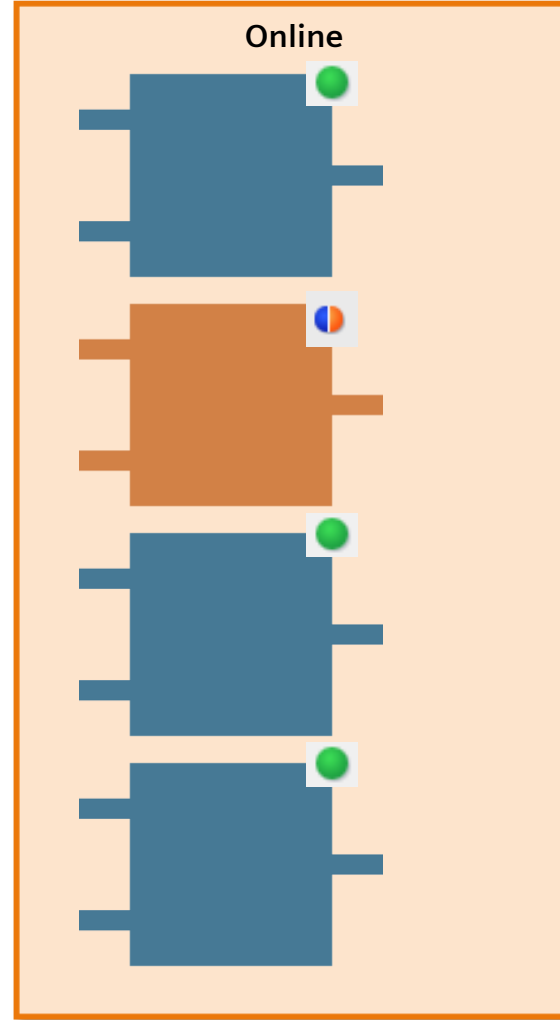
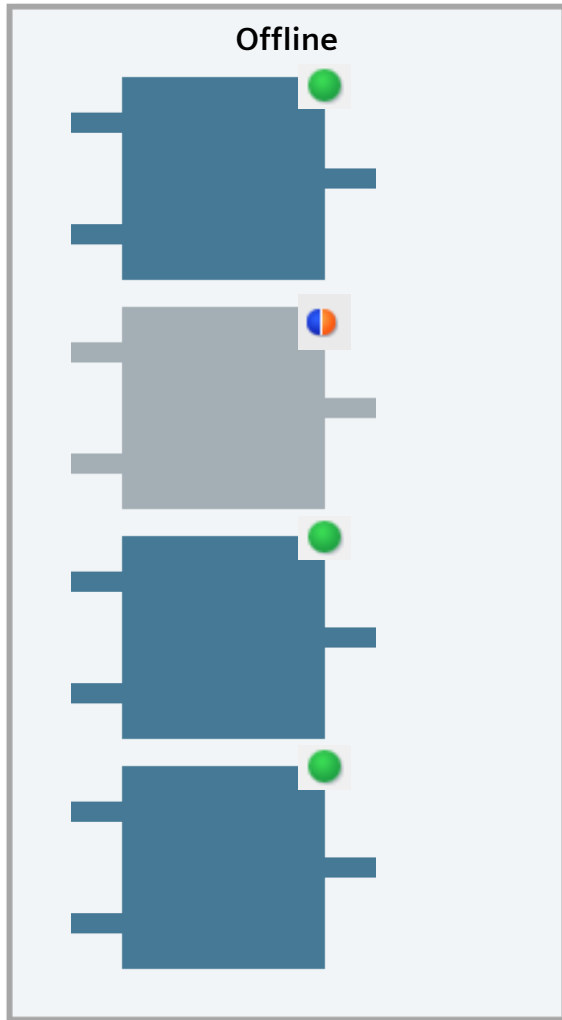
The "File Browser" page allows you to access system-generated files such as recipes and data logs files.



Block Comparison with TIA Portal

Online Diagnostic & Maintenance Features

Block Comparison



It is often important to know whether the saved data or logic in your project matches what is running in the controller. For this, TIA Portal offers a unique comparison function that allows you to see detailed differences and similarities between what is offline and what is loaded on your controller (online).

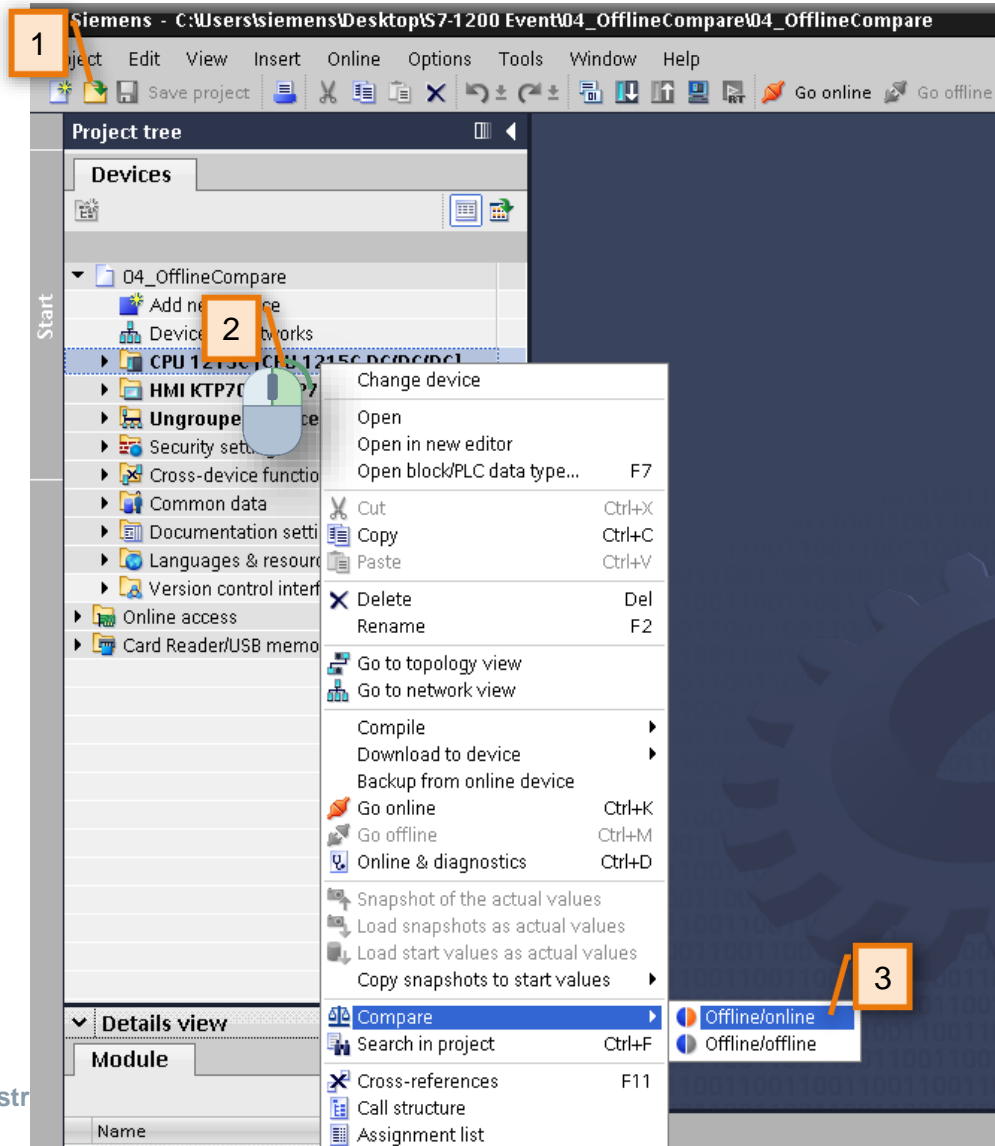
You can compare the following objects of a PLC program in order to detect any differences:

- Code blocks with other code blocks
- Data blocks with other data blocks
- PLC tags of a PLC tag table with the PLC tags of another PLC tag table
- PLC data types with other PLC data types



Online Diagnostic & Maintenance Features

Block Comparison



TIA Portal allows you to compare offline/online projects. To perform an offline/online comparison, follow these steps:

1. Open the following project in TIA Portal from the following directory:

*"\Desktop\S7-1200 Event\S7-1200
Tabletop Demo V16 KTP700 V3.ap16"*

2. In the project tree, right-click on the PLC that you want to perform an offline/online comparison.
3. Select the "Compare > Offline/online" command in the shortcut (right-click) menu.

Note: If you have not already established an online connection to this device, the "Go online" dialog opens. In this case, set all the necessary parameters for the connection and click "Connect". (for help, see '[getting online](#)')

Result: The online connection is established and the compare editor opens.



Online Diagnostic & Maintenance Features

Block Comparison

The screenshot shows the 'Compare editor online' window. It compares a local CPU 1215C (left) with an 'Online PLC' (right). The comparison table shows that the 'Main [OB1]' block is different. A detailed comparison is shown at the bottom, highlighting a difference in the 'Checksum' for the 'Code without comments' section.

Name	Address	Type	Ti...	Status	Action	Name	Address	Type	Ti...
CPU 1215C				!		CPU 1215C			
Program blocks				!					
Demo				!					
Main [O...	OB1	OB	9/...	!		Main [OB1]	OB1	OB	9/...
PLC tags				!					

Source data	Local	Online
Interface without comments	!	!
Code without comments	!	!
Checksum:	A/L3TLfZnVF79jDVTtOgme+Mko=	AgtZVzDCFyTx/hlUlfX8Pf/8+7l=
Comments (multi-language)	!	!
Language configuration	!	!

1. In the Compare editor window, select the toolbar filter icon to show only differences
2. In the compare editor window, expand the "Program blocks > Demo" folder .
You can identify the comparison status based on the symbols in the status and action area.
 - Indicates there is a difference between online and offline projects
 - Indicates no differences between online and offline project
3. While in the compare editor, select the block for which you want to perform a detailed comparison.
 - Notice underneath the comparison editor window, there is a summary of differences. The Compare tool validates program and compilation checksums, which are automatically generated by TIA portal
4. Click "Start detailed comparison" button in the toolbar or select the "Start detailed comparison" command from the shortcut (right-click) menu.



Online Diagnostic & Maintenance Features

Block Comparison

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Code block comparison (Main - Main)

CPU 1215C > Main - Offline

Main

Name	Data type	Default value	Comment
Temp			
<Add new>			

Block title: "Main Program Sweep (Cycle)"

Comment

Network 1: Determine Main Scan Time

No corresponding network found.

Network 2: Local Time for HMI Display and Data Log

Network 3: Check for Motor Start

Network 4: Check for Motor Stop

Network 5: Check for Wiper Mode

Network 6: Wiper Motor (Bottle Mode)

Main - Online

Main

Name	Data type	Default value	Comment
Temp			
Constant			

Block title: "Main Program Sweep (Cycle)"

Comment

Network 1: Determine Main Scan Time

Network 2:

Comment

Network 3: Local Time for HMI Display and Data Log

Network 4: Check for Motor Start

Network 5: Check for Motor Stop

Network 6: Check for Wiper Mode

Network 7: Wiper Motor (Bottle Mode)

Properties Info Diagnostics

Comparison result

!	Path	Location	Message	Date	Time
!	Online	NW 2	Exists only in the compared block.	6/4/2020	12:33:11 PM

Result: One instance of the program editor will be opened for each version of the block compared and the two instances are displayed side by side.

The detailed comparison allows you to identify the exact places where versions of a block differ with synchronized scrolling and zoom.

A detailed description of all the differences are shown in the 'Comparison result' tab in the inspector window below. Here you can quickly jump to the differences by double-clicking on the description in the inspector window.

The toolbar at the top also allows you to quickly jump to differences without having to scroll manually.



Online Diagnostic & Maintenance Features

Block Comparison

The screenshot displays the Siemens TIA Portal interface. On the left, a table shows the status and actions for various blocks. A callout box labeled '2' highlights the 'Download to device' action for the 'Main [OB1]' block. On the right, a toolbar contains several icons, with a callout box labeled '3' pointing to the 'Execute actions' button. Below the toolbar, an 'Upload preview' dialog box is open, showing a table of upload results. A callout box labeled '4' points to the 'Upload from device' button at the bottom of the dialog.

Signature	Status	Action	Name
	!	→	CPU 1215C
	!	→	
	!	→	
3.	!	→	Main [OB1]
		No action	
	⇒	Download to device	

Status	Target	Message	Action
↑	PLC_1	Ready for loading.	
!	Conflicts	Conflicts occurred during upload from the device.	Overwrite

1. Close the window of the detailed block comparison.
2. In the Comparison editor, an action can be selected for the block involved. Select the **"Download to device" action (→ Download to device)** for OB1
3. To execute the configured actions, click the toolbar icon to execute the actions. This will prompt an "Upload preview dialog".
4. Click 'Upload from device'.

After the upload, the block(s) selected for upload should have no differences, as indicated by the green dot in the compare editor and the project tree.

Note: you may have to reset the filter to "show all" compare results



Monitor & Modify Tags

Online Diagnostic & Maintenance Features

Monitor and modify tag values



Monitoring tag status is one the most common tools for troubleshooting programming errors, sequencing errors or testing if sensors or IO modules are faulty.

In this section we will explore the advanced online monitoring functions of tags within TIA Portal and the S-1200 controller.



Online Diagnostic & Maintenance Features

Monitor and modify tags – tag table

SIEMENS
Ingenuity for life

	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...	Monitor value
1	Conveyor_Encoder_Count	DInt	%ID1004	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
2	Fan_Speed_HSC	DInt	%ID1008	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
3	Analog Pot1	UInt	%IW64	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	16245
4	Paddle_Prox_1	Bool	%I8.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
5	Paddle_Prox_2	Bool	%I8.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
6	Paddle_Prox_3	Bool	%I8.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> TRUE
7	Paddle_Count_Reset	Bool	%I1.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
8	Paddle_Start_2	Bool	%I1.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
9	Conveyor_Prox_Min	Bool	%I8.4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
10	Conveyor_Prox_Home	Bool	%I8.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
11	Conveyor_Prox_Max	Bool	%I8.6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
12	Conveyor_Encoder	Bool	%I0.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> TRUE
13	Conveyor_Encoder_1	Bool	%I0.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
14	Conveyor_Home_Switch	Bool	%I0.6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> TRUE
15	Analog Pot2	UInt	%IW66	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	23856
16	Conveyor_Lo_Switch	Bool	%I0.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
17	Conveyor_Hi_Switch	Bool	%I0.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
18	Switch	Bool	%I0.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
19	Fan_Speed_PWM	Bool	%Q0.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
20	Paddle_Motor	Bool	%Q0.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
21	PWM_Ton	UInt	%QW1002	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
22	Paddle_Direction	Bool	%Q8.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> FALSE
23	Fan Isolation	Bool	%Q8.4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> TRUE
24	Fan_Speed_Real	Real	%MD50	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.0

The values of PLC tags can be directly monitored in the PLC tag table in online mode.

1. Double-click the corresponding PLC tag table in the project tree
2. Click the 'Monitor all' button in the toolbar.

The PLC tag table changes to online mode and the 'monitor value' column is displayed. You can now monitor the tag values



Online Diagnostic & Maintenance Features

Monitor and modify tags – data blocks (DB)

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Ingenuity for life

	Name	Data type	Start value	Monitor value	Retain	Accessible ...	Writa...	Vi...
1	Static							
2	PaddleStart	Bool	false	TRUE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3	ONS_PaddleStart	Bool	false	TRUE		<input type="checkbox"/>	<input type="checkbox"/>	
4	WiperMode	Bool	false	TRUE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
5	ONS12	Bool	false	TRUE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
6	ONS1	Bool	false	TRUE		<input type="checkbox"/>	<input type="checkbox"/>	
7	PaddleSwitchState	Bool	false	TRUE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Prox1State	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Prox2State	Bool	false	TRUE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10	Prox3State	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
11	ActiveScreen	Int	1	5		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
12	PaddleReset	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
13	PaddleDirection	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
14	PaddlePos1	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15	PaddlePos2	Bool	false	TRUE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
16	PaddlePos3	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
17	Conveyor_Position	DInt	0	2518		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
18	Conveyor_Zone_1	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
19	Conveyor_Zone_1A	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
20	Conveyor_Zone_2	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
21	Conveyor_Zone_3	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
22	Conveyor_Zone_3A	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
23	Conveyor_Zone_4	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
24	Conveyor_Zone_4A	Bool	false	FALSE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

The values of data tags can be directly monitored in the data block (DB) structure in online mode.

1. Double-click the corresponding data block (DB) in the project tree
2. Click the '*Monitor all*' button in the toolbar.

The data block structure changes to online mode and the '*monitor value*' column is displayed. You can now monitor the tag values



Online Diagnostic & Maintenance Features

Monitor and modify tags – watch tables

Name	Address	Display format	Monitor value	Modify value	Comment
// Global I/O Tags					
"Conveyor_Prox_Min"	%I8.4	Bool	FALSE		
"Conveyor_Prox_Home"	%I8.5	Bool	FALSE		
"Conveyor_Prox_Max"	%I8.6	Bool	FALSE		
"Conveyor_Encoder"	%I0.2	Bool	TRUE		
"Conveyor_Encoder_1"	%I0.3	Bool	TRUE		
"Conveyor_Encoder_Count"	%D1004	DEC+/-	-225		
"Conveyor_Home_Switch"	%I0.6	Bool	FALSE		
"Conveyor_Lo_Switch"	%I0.5	Bool	TRUE		
"Conveyor_Hi_Switch"	%I0.7	Bool	FALSE		
"Conveyor_Pulse"	%Q0.0	Bool	FALSE		
"Conveyor_Direction"	%Q0.1	Bool	FALSE		
// Conveyor instance DB tags					
"Conveyor_iDB".Conveyor_Enable"		Bool	TRUE	FALSE	
"Conveyor_iDB".Conveyor_Encoder_Count		DEC+/-	-225		
"Conveyor_iDB".Conveyor_HSC_Addr		DEC	2		
"Conveyor_iDB".Conveyor_Homing_Mode		DEC+/-	3		
"Conveyor_iDB".Conveyor_JogFWD_Command		Bool	FALSE	TRUE	
"Conveyor_iDB".Conveyor_JogREV_Command		Bool	FALSE		
"Conveyor_iDB".Conveyor_JogVelocity_SP		Floating-point nu...	0.2099613		
"Conveyor_iDB".Conveyor_Reset_Command		Bool	FALSE	TRUE	
"Conveyor_iDB".Conveyor_Actual_Position		Floating-point nu...	-1.203208		
"Conveyor_iDB".Conveyor_Home_Command		Bool	FALSE		
"Conveyor_iDB".Conveyor_Velocity_SP		Floating-point nu...	2.0		
"Conveyor_iDB".Conveyor_Target_Position		Floating-point nu...	55.0		

Watch tables are another useful way to monitor or modify tag values. Watch tables contain tags whose values can be monitored and controlled during runtime. The tags can be combined in any manner so that a specially tailored watch table can be created for each test case. Tags from data blocks, peripheral I/O tags and bit memory can be used in watch tables.

1. Open the watch table 'Conveyor' from the project tree under the folder 'Watch and force tables'.
2. Click the 'Monitor all' button in the toolbar.

The 'Monitor value' and 'Modify value' columns are displayed. Here you can see the current values of the configured tags and modify their values.



End of 'Online Diagnostic & Maintenance Features'



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