



PROFI[®]
NET



Polaris

Ultrasonic Welder

PROFINET

User Guide

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BRANSON

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User Manual Change Information

At Branson, we strive to maintain our position as the leader in ultrasonics plastics joining, metal welding, cleaning and related technologies by continually improving our products. These improvements are incorporated as soon as they are developed and thoroughly tested.

This User Guide is supplemental to and should be used in conjunction with the documentation set for the Polaris system.

Information concerning any improvements will be added to the appropriate technical documentation at its next revision. Therefore, when requesting service assistance for specific units, note the revision information found on this document.

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1.1 Acronyms & Glossary

Table 1.1 Acronyms & Glossary

Acronyms & Terms	Definitions
GSDML	Generic Station Description Markup Language file
TIA	Totally Integrated Automation
PLC	Programmable Logic Controller
IEC	International Electrotechnical Commission
RT	Real Time
DCP	Discovery and Configuration Protocol
I&M	Identification and Maintenance
IP	Internet Protocol
LED	Light Emitting Diode
HZ	Hertz
BF	Bus Fault
SF	System Fault
SYS	System Status
PNC	PROFINET Controller
HMI	Human-Machine Interface.
PC	Personal Computer
PN	PROFINET
GSX	Signed GSDML file package
I/O	Input Output
H/W	Hardware
API	Application Programming Interface.
DAP	Device Access Point

1.2 Introduction

This user guide describes the implementation of the Polaris ultrasonic welding system within a PROFINET network. It provides an overview of the system specifications, GSDML file installation, I/O and communication structures, and programming examples with timing charts.

The Polaris system offers standard PROFINET communication over an industrial Ethernet network and is fully compliant with PROFINET Conformance Class B. It supports both real-time cyclic and acyclic messaging. Control and status data are exchanged cyclically through cyclic data, while acyclic data enables access to end-of-weld result attributes and the configuration of weld recipe parameters.

This guide includes detailed instructions for installing the GSDML file in Siemens TIA Portal V19, as well as the selection and configuration of dynamic modules based on the machine type (Advanced/Core) allowing for flexible system integration tailored to specific applications.

It also explains how to configure both the Polaris PROFINET device and the controller side (PLC), ensuring correct setup and reliable communication between the two.

Additionally, the manual demonstrates how to read from and write to both single-instance modules, such as the active weld recipe, and multiple-instance modules, such as non-active weld recipes, enabling comprehensive data handling for runtime and configuration scenarios.

The examples provided in this guide were developed using Siemens TIA Portal Version 19.

1.3 Network Settings

	NOTE
	This section provides the basic steps for configuring the network settings of the Polaris PROFINET system for installation on an Ethernet network. The actual process may require additional steps by your network administrator, depending on the requirements of your specific network configuration.

1.3.1 Communication Specifications

The data below applies to the Polaris PROFINET system. The Polaris PROFINET system is certified by PROFIBUS & PROFINET International (PI) and complies with the specifications defined in the PROFINET standard as outlined in IEC 61158 and IEC 61784.

Table 1.2 Default Network Settings

Description	Specification
PROFINET Version	V2.43
Conformance Class	Class B
Netload Class	II
Transmission Rate	100 Mbps
Real-Time Communication	RT Class 1 (Real-Time)
IP Addressing	Static IP or DCP (via PLC/engineering tool)
Number of Slots	11
I/O Data Size (Cyclic)	Input: 22 Bytes Output: 72 Bytes
Explicit Messaging Support	Yes (Read/Write Records)
Alarm Handling	Supported (Process and Diagnostics alarms)
I&M Data Support	I&M0 to I&M3 supported
Cycle Time (Update Rate)	1ms
Default IP Address	IP: 192.168.1.50 Subnet: 255.255.255.0 Gateway: 192.168.1.1
Default Station Name	bransonpndevice
Connection Topology	Star, Linear, Ring

1.4 LED Status Indicator

To get a fast overview about the status of the Polaris PROFINET system, three LEDs are placed on the front of the unit. The subsequent table describes the meaning of the LEDs.

Figure 1.1 LED Status Indicator

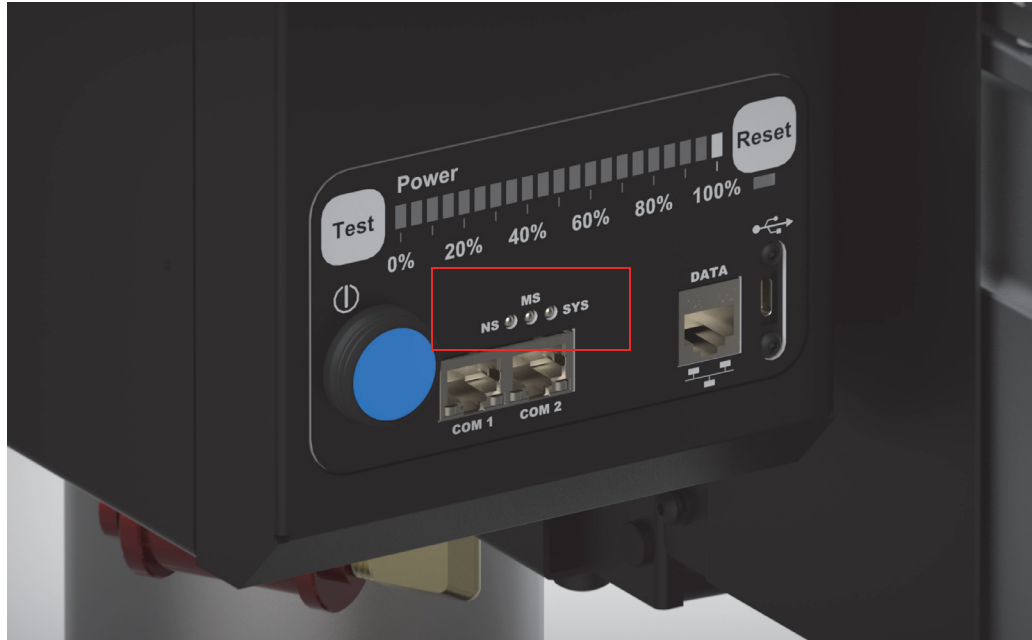


Table 1.3 LED Status Indicator

LED	Color	State	Description
SYS	 Green	On	Operating system running.
	 Green/Yellow	Flashing (green/yellow)	Bootloader is waiting for firmware.
	 Yellow	On	Bootloader is waiting for software.
	 Off	Off	Power supply for the device is missing or hardware defect.

Table 1.3 LED Status Indicator

LED	Color	State	Description
MS	 Off	Off	No error.
	 Red	Flashing (1 Hz, 3 s)	DCP signal service is initiated via the bus.
	 Red	On	Watchdog timeout; channel, generic or extended diagnosis present; system error.
NS	 Off	Off	No error.
	 Red	Flashing (2 Hz)	No data exchange.
	 Red	On	No configuration; or low speed physical link; or no physical link.

1.5 Configuring The Polaris PROFINET Network Settings

The Polaris ultrasonic welding system supports flexible configuration of its PROFINET network settings to simplify integration into industrial automation environments.

For this setup, the device's IP address and station name can be configured using two methods:

1. Via the Local HMI Screen: The Polaris device allows manual entry of the PROFINET station name and IP address directly through the integrated HMI.
2. Via DCP Protocol from the PROFINET Controller (PNC): The device also supports automatic configuration using the Discovery and Basic Configuration Protocol (DCP) initiated by the PROFINET controller. During commissioning, the controller can assign the device name and IP address based on the configuration in the engineering tool (e.g., Siemens TIA Portal). This enables seamless integration without manual intervention.

Both configuration methods ensure that the Polaris system is uniquely identifiable and correctly addressable on the PROFINET network.

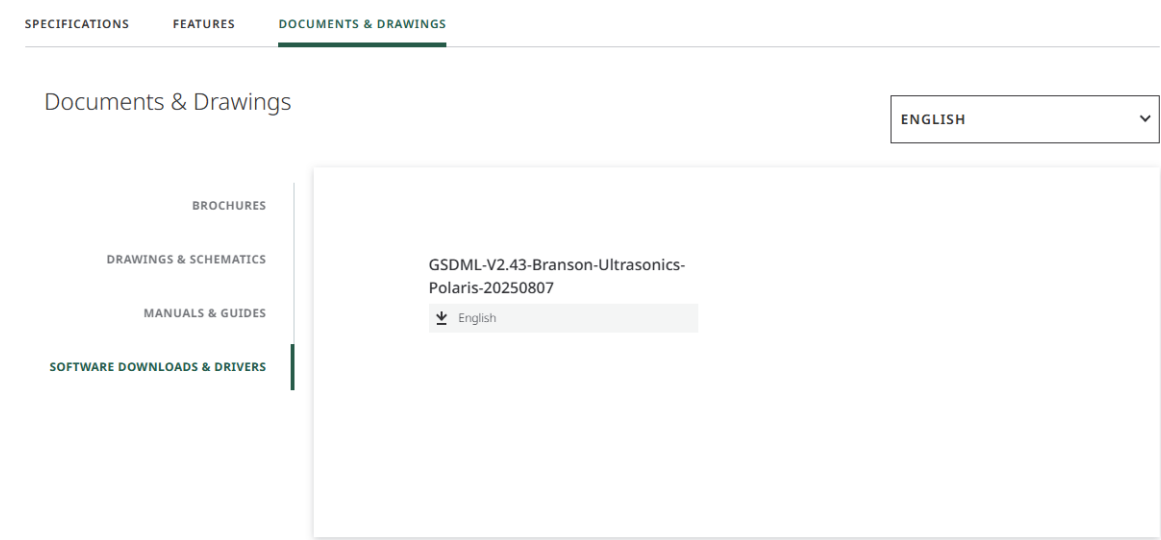
1.6 Polaris GSDML File

The GSDML file is helpful for integrating the Polaris system with a PROFINET network. It enables the programmer to quickly identify and map the Polaris I/O tags within the control system.

You can download the required GSDML file at the following link:

<https://www.branson.emerson.com/en/products/branson-polaris-power-supplies>

Figure 1.2 Polaris GSDML File

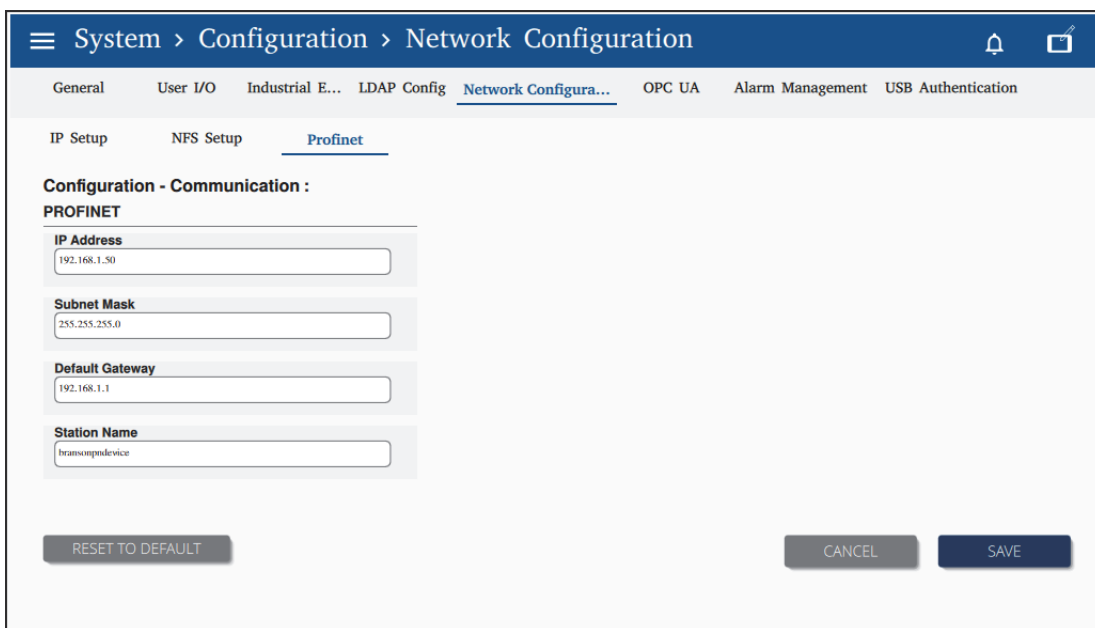


1.6.1 Configuration Via Local HMI Screen

The Polaris IP settings for EtherNet/IP is found in **System > Configuration > Network Configuration > Industrial Ethernet** screen. The IP Address, Subnet Mask, and Station Name settings can be changed here.

	NOTE
	An Ethernet cable connection between the Polaris PROFINET system and a PC or PLC is required before the IP Address can be viewed or modified. After making changes to the network settings, the Polaris PROFINET system must be power-cycled for the changes to take effect.

Figure 1.3 Configuring Network Settings



The screenshot shows the 'System > Configuration > Network Configuration' menu. Under 'Network Configuration', the 'Profinet' tab is selected. The 'Configuration - Communication : PROFINET' section contains four input fields: 'IP Address' with value 192.168.1.50, 'Subnet Mask' with value 255.255.255.0, 'Default Gateway' with value 192.168.1.1, and 'Station Name' with value bransondevice. At the bottom, there are three buttons: 'RESET TO DEFAULT', 'CANCEL', and 'SAVE'.

Table 1.4 Configuring The Polaris EtherNet/IP Network Settings

Step	Instructions
1	From the main menu, go to System > Configuration > Network Configuration > Industrial Ethernet.
2	Change the network settings as needed for compatibility with your network configuration.
3	Press the Save button to save the new settings.
4	Turn off the Polaris PROFINET system, wait a few moments, and then turn power back on.

1.6.2 Default Network Settings

Figure 1.4 Default Network Settings

System > Configuration > Network Configuration

GeneralUser I/OIndustrial E...LDAP ConfigNetwork Configura...OPC UAAlarm ManagementUSB Authentication

IP SetupNFS SetupProfinet

Configuration - Communication :
PROFINET

IP Address

192.168.1.50

Subnet Mask

255.255.255.0

Default Gateway

192.168.1.1

Station Name

bransonpndevice

RESET TO DEFAULT

CANCEL

SAVE

Table 1.5 Default Network Settings

Setting	Default
IP Address	192.168.1.50
Subnet Mask	255.255.255.0
Gateway	192.168.1.1
Station Name	bransonpndevice

16

BU-4001429 REV. 01

1.6.3 Configuring The Polaris Device Using DCP (PROFINET Commander Tool)

The POLARIS ultrasonic welding system supports configuration of its PROFINET network settings using the DCP (Discovery and Basic Configuration Protocol). This functionality can be validated or demonstrated using third-party tools such as PROFINET Commander.

In this example, the PROFINET Commander tool was used to:

- Discover the POLARIS device on the local PROFINET network
- Assign a station name (e.g., POLARIS001)
- Set a static IP address (e.g., 192.168.0.100)
- Confirm that the device accepted the new settings and was reachable

Table 1.6

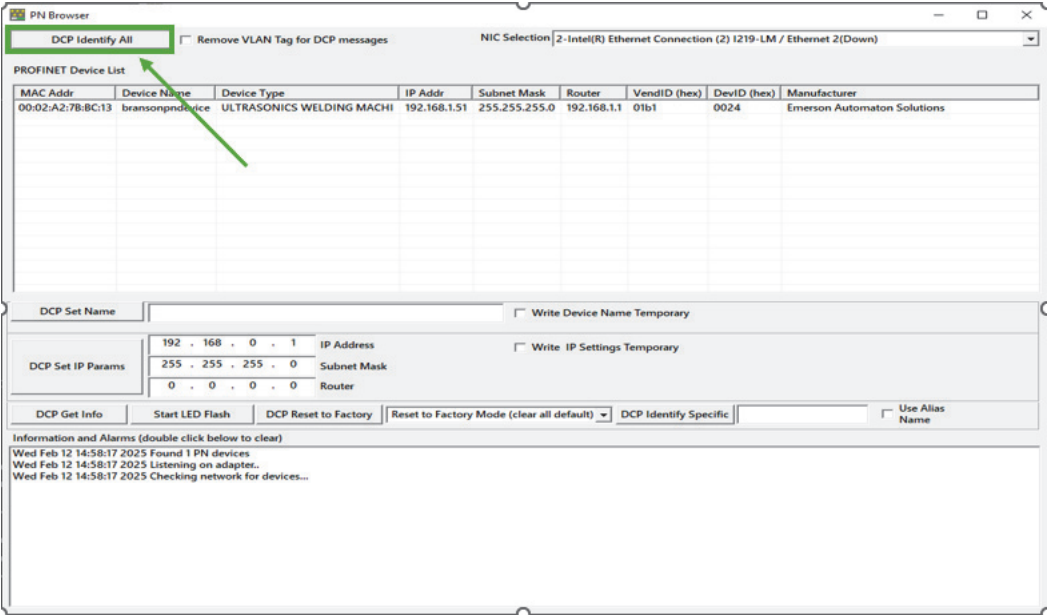
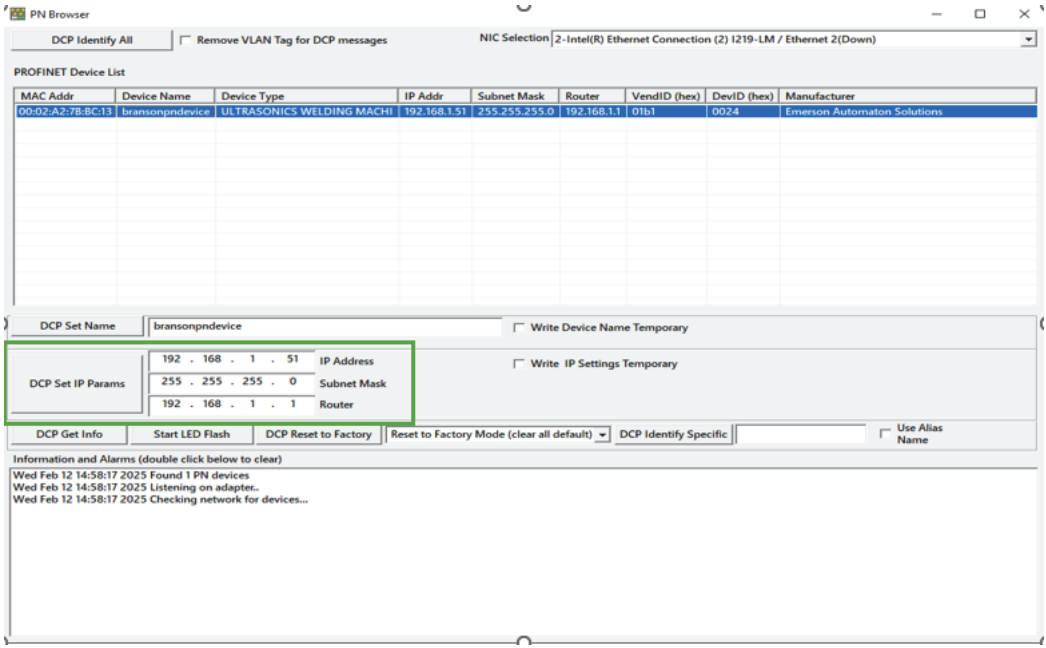
Step	Instructions
1	Launch PROFINET Commander and scan for available devices. Figure 1.5 
2	Select the Polaris device from the discovered list.

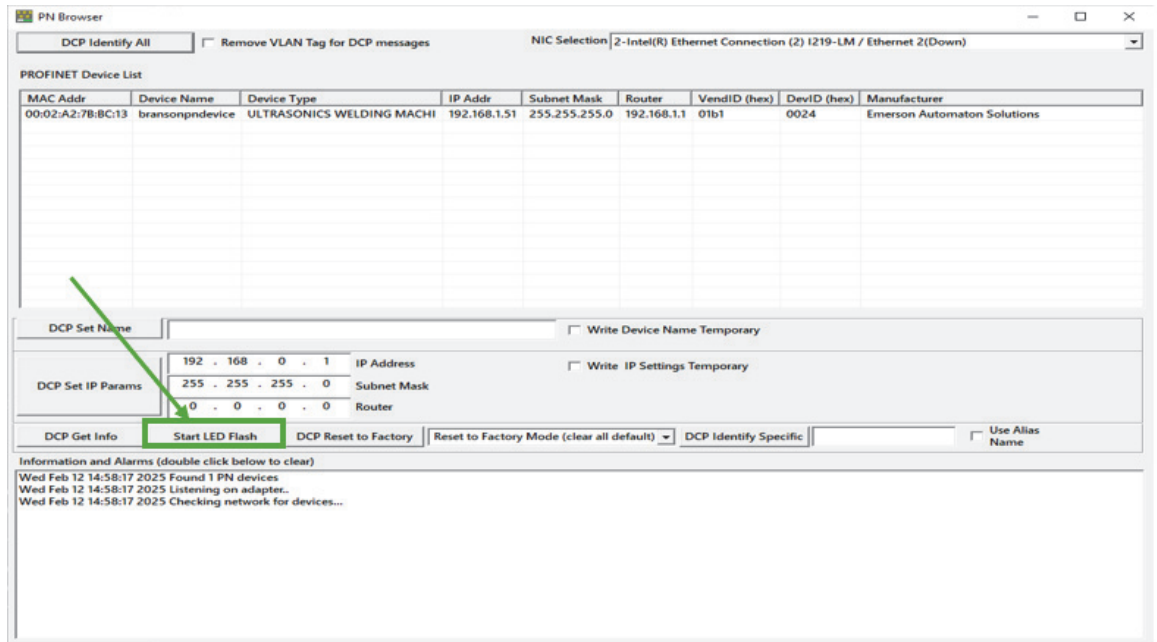
Table 1.6

Step	Instructions
	Use the DCP configuration panel to set: • Station Name: POLARIS001 • IP Address: 192.168.0.100 • Subnet Mask: 255.255.255.0 Figure 1.6  3
4	Click Apply/Send DCP Packet to assign the configuration.
5	Verify the new settings were applied successfully.

1.6.4 Identify The Device In Network Using LED Flash Feature

The PROFINET LED Flash feature is a diagnostic and identification tool defined in the PROFINET standard. It allows users and commissioning tools to visually identify a specific PROFINET device on the network by triggering an LED Flash.

Figure 1.7 Start LED Flash



1.7 Polaris PROFINET Connectivity Testing

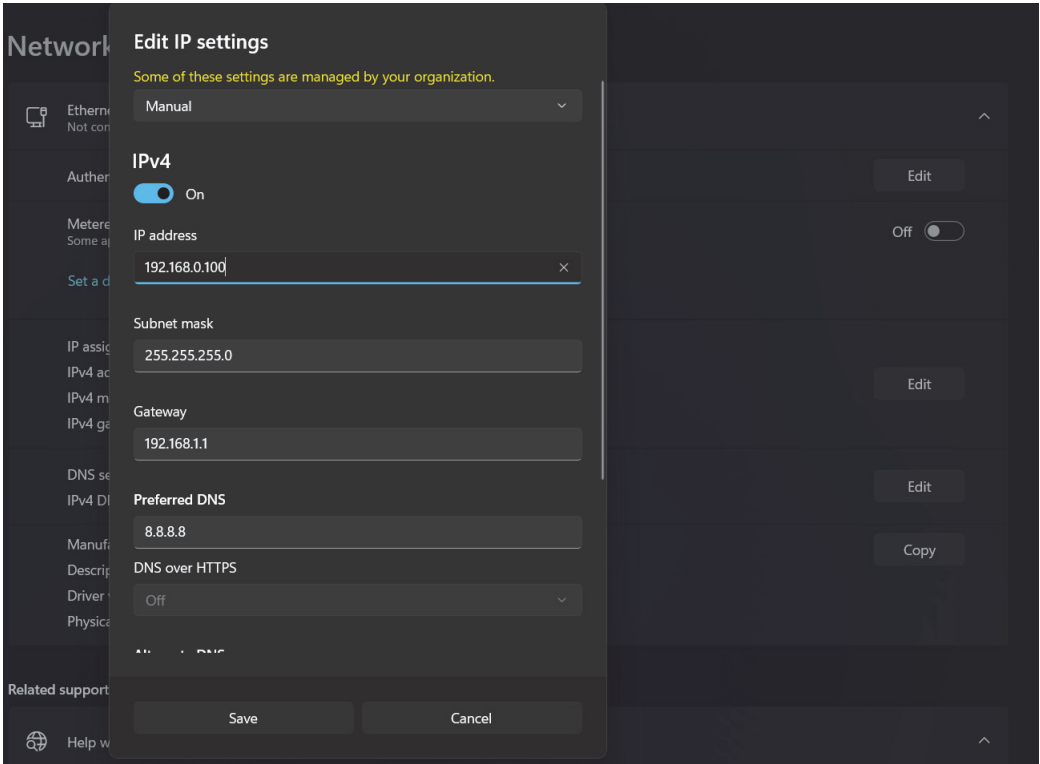
After the Polaris PROFINET IP address and Station Name is set, connectivity can be tested using the PC/Laptop Ping Command Prompt. Before testing, the PC/Laptop's Ethernet IP must be set to the same subnet as the Polaris PROFINET address.

1.7.1 Configuring the PC/Laptop for Testing

Table 1.7 Configuring the PC/Laptop for Testing

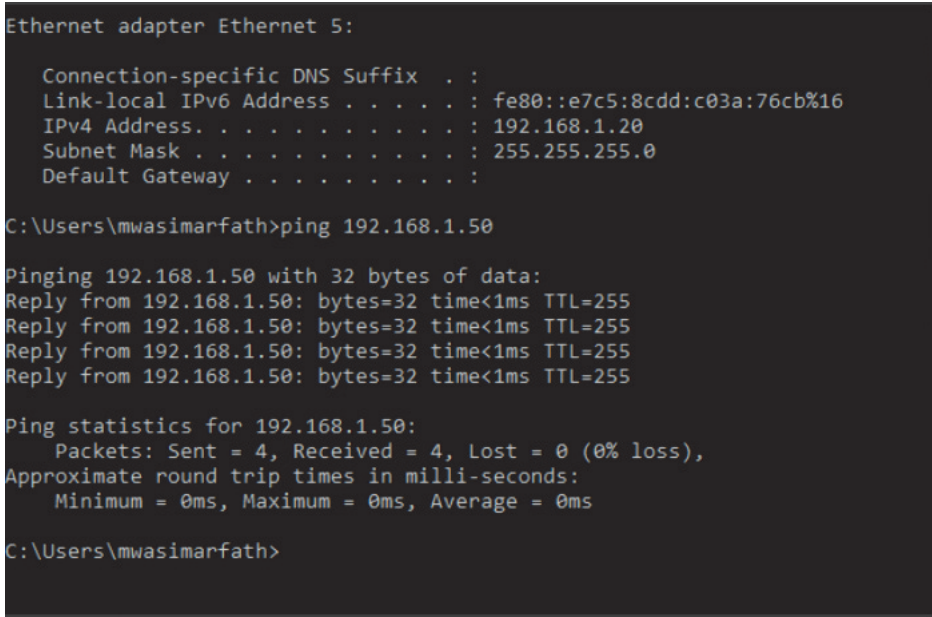
Step	Instructions
1	Connect an Ethernet cable between the POLARIS Profinet port and the PC/Laptop RJ45 Ethernet port. A USB to Ethernet Adapter may be required if the PC/Laptop does not provide an RJ45 port.
2	Set the Static IP Address for the PC/Laptop: a. Go to Settings > Network & Internet > Change Adapter Options b. Double click on the Local Area Network icon and select Properties c. Double click on Internet Protocol Version 4 (TCP/IPv4) d. Change the last octet of the IP address to be different than the POLARIS setting. For example, if the POLARIS is 192.168.1.50, set the PC/Laptop to 192.168.1.100 e. Set the Subnet Mask to 255.255.255.0 f. Select OK and Close

Figure 1.8



1.7.2 Using Ping for Connectivity Testing

Table 1.8 Using Ping for Connectivity Testing

Step	Instructions
1	In the Windows Start Menu type “cmd” to bring up the Command Prompt and open it.
2	In the Command Prompt type: Ping (IP Address of the Polaris PROFINET), e.g. Ping 192.168.1.50
3	Review the results. - If “Reply from” is received, the connectivity is good - If “Request timed out” is received, no connection was made: - Verify Polaris IP setting - Verify the PC/Laptop IP setting - Verify a good cable connection between the Polaris and PC/Laptop - Power cycle the Polaris - Repeat ping command until a “Reply from” is established Figure 1.9  <pre> Ethernet adapter Ethernet 5: Connection-specific DNS Suffix . : Link-local IPv6 Address : fe80::e7c5:8cdd:c03a:76cb%16 IPv4 Address. : 192.168.1.20 Subnet Mask : 255.255.255.0 Default Gateway : C:\Users\mwasimarfath>ping 192.168.1.50 Pinging 192.168.1.50 with 32 bytes of data: Reply from 192.168.1.50: bytes=32 time<1ms TTL=255 Reply from 192.168.1.50: bytes=32 time<1ms TTL=255 Reply from 192.168.1.50: bytes=32 time<1ms TTL=255 Reply from 192.168.1.50: bytes=32 time<1ms TTL=255 Ping statistics for 192.168.1.50: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 0ms, Average = 0ms C:\Users\mwasimarfath> </pre>

1.8 Integrating Polaris Device In TIA Portal V19

Table 1.9 Polaris Device Configuration Using TIA

Step	Instructions
1	Start TIA Portal.
2	Create a new project with Start->Create New Project->Create
3	Click open the project view.
4	Double click on the left “Devices and Networks”.

Under the catalog on the right hand side select PC Systems\Communication modules\PROFINET\PN Driver<part #> (ex: 6ES7 195-3AA00-0YA1) V3.1 (see notes in install section if you do not see the object), then drag and drop the object into the network view window. Note that V2.2 / 6ES7 195-3AA01-0YA0 will also work for most situations and is compatible.

Figure 1.10

5

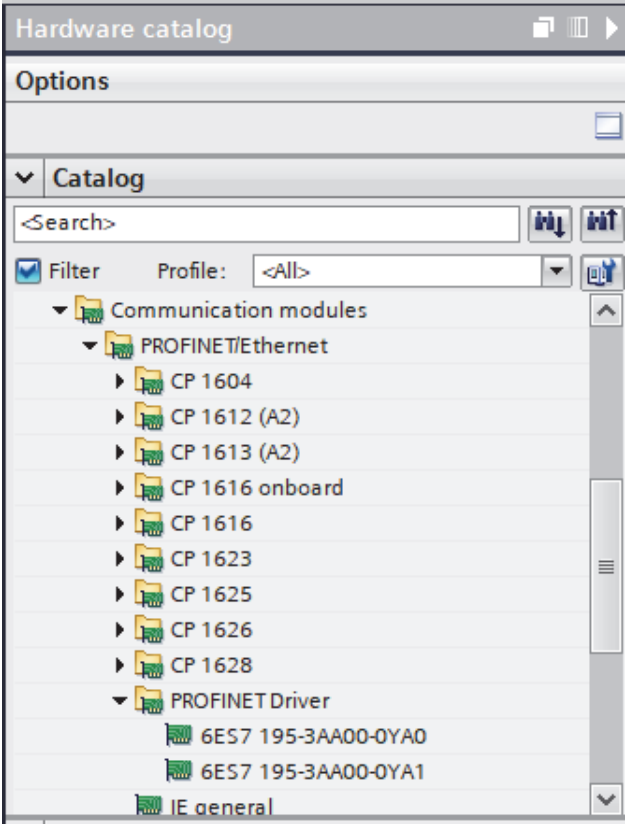


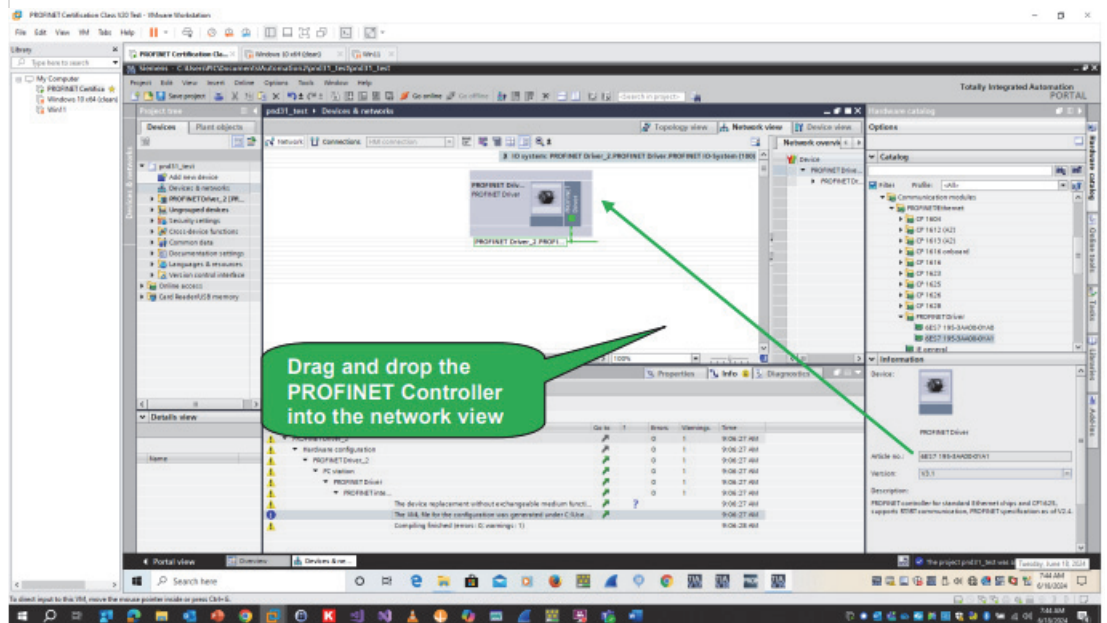
Table 1.9 Polaris Device Configuration Using TIA

Step	Instructions
------	--------------

Next, double click on the PN Controller object in the network view to open the device view.

Figure 1.11

6



Under communication modules\PROFINET\Interface Submodules double click the Windows object to add the network interface of the controller.

Figure 1.12

7

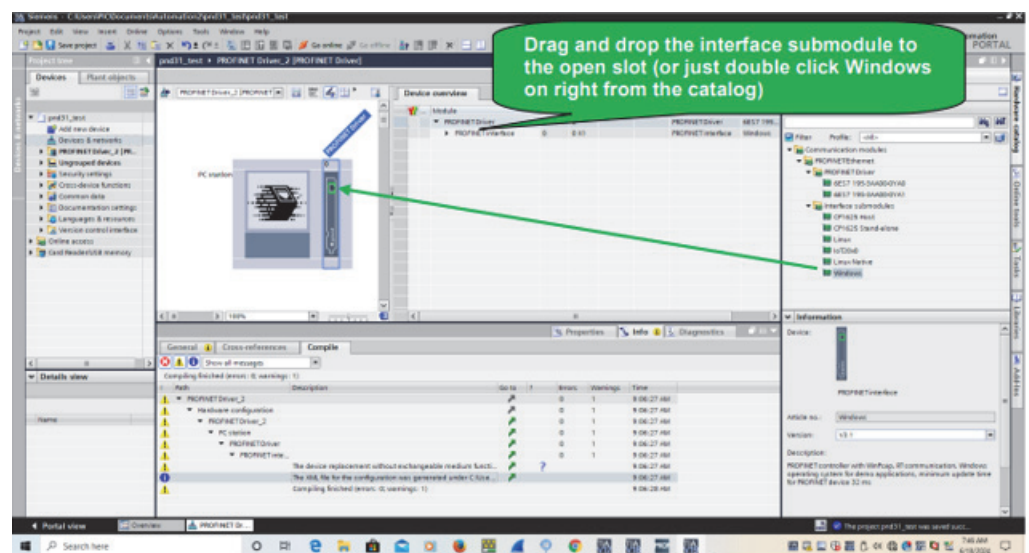
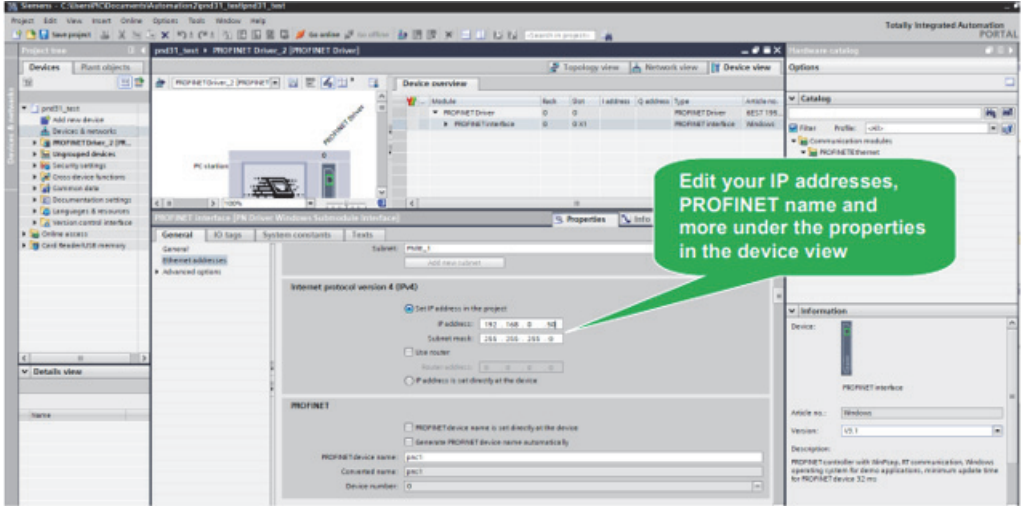


Table 1.9 Polaris Device Configuration Using TIA

Step	Instructions
8	Double-click on the interface module and then in the bottom window select Ethernet addresses. Click Add new subnet. Then set the IP Address for the controller in the configuration. Then uncheck the generate name automatically box and set the PROFINET name to pnc1. Figure 1.13 
9	Click on the network view tab again or double click on devices and networks.
10	Install necessary PROFINET GSD files by clicking Options->Manage general station description files (GSD). Ensure the files Installed correctly. Make sure you include .bmp file in the same folder if you wish to have a graphical picture of the device. The catalog will update after installing the files and they will be stored under the “Other field devices” category in the network view. The latest version of TIA supports GSD or GSX (Signed GSD package).

Go to options -> Manage general station description files and delete the old gsdml and install latest gsdml file, it will take few seconds to install new file.

Figure 1.14

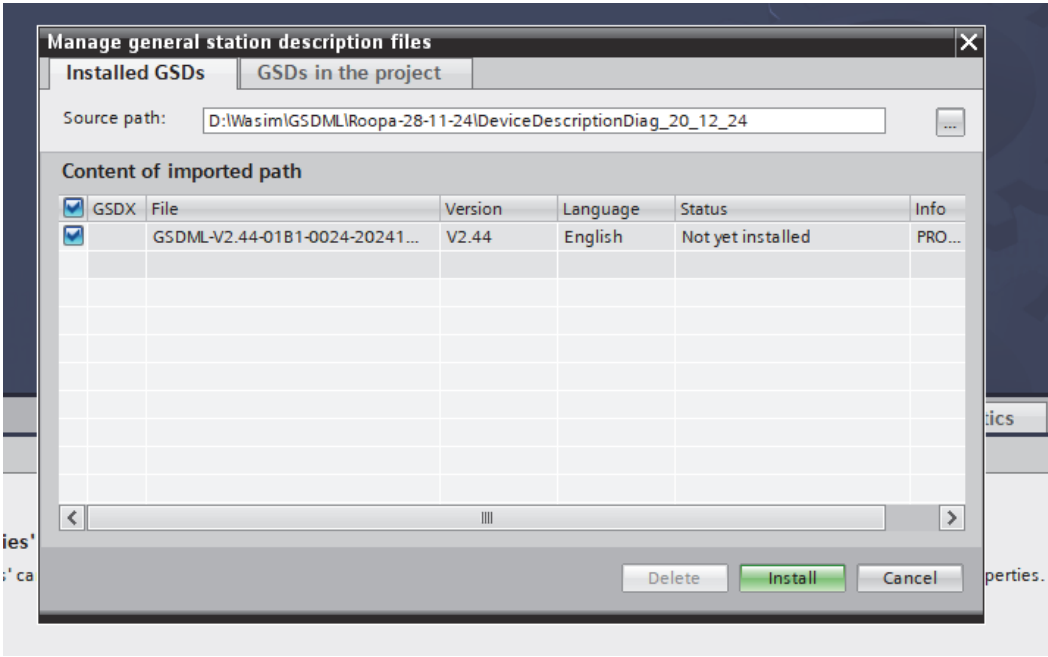
11	
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Table 1.9 Polaris Device Configuration Using TIA

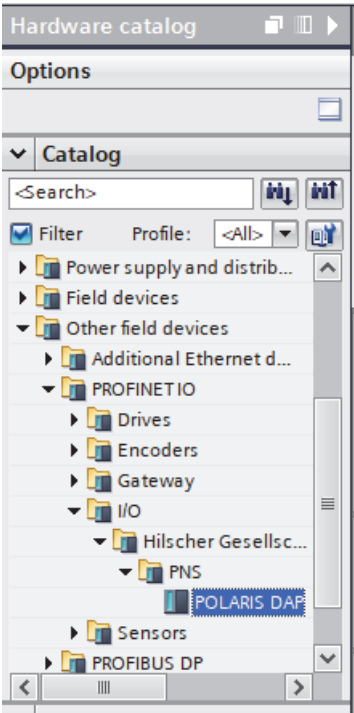
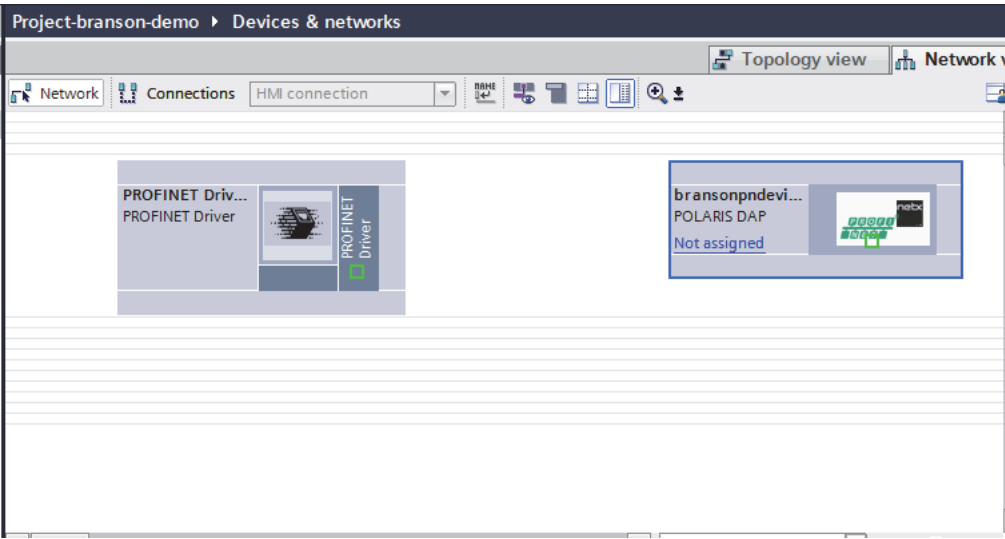
Step	Instructions
12	As GSDML file is installed, now go to hardware catalog > Other Field devices -> PROFINET IO -> I/O -> select the Device then drag and drop the PN device under Devices & Network window. Figure 1.15 
13	Click on "not assigned" on the device picture and assign it to the controller by selecting the controller's name and network name, once connected there should be a dashed green line between the controller and device. Figure 1.16 
14	Double click on the device to enter device view and configure the IP address (if needed) and device name (under properties->Ethernet addresses) and modules (in case we have a modular device).

Table 1.9 Polaris Device Configuration Using TIA

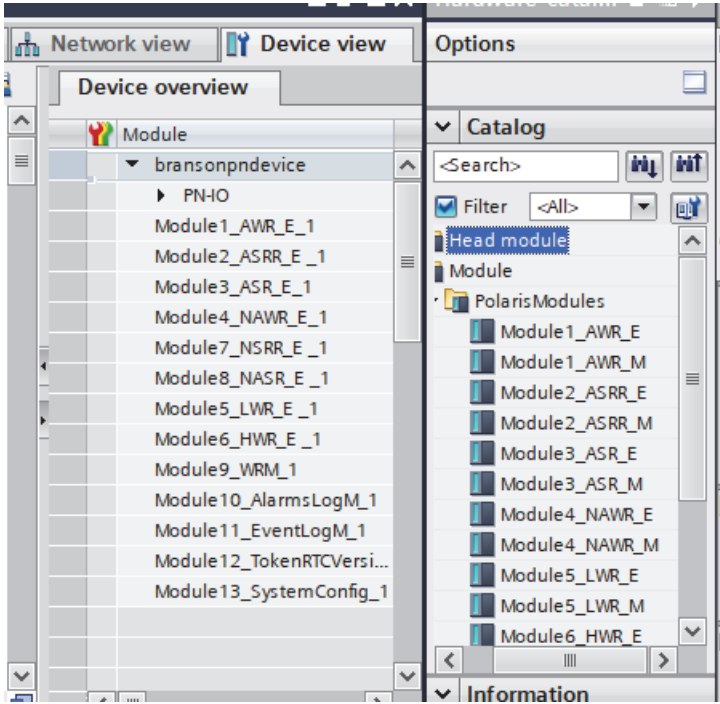
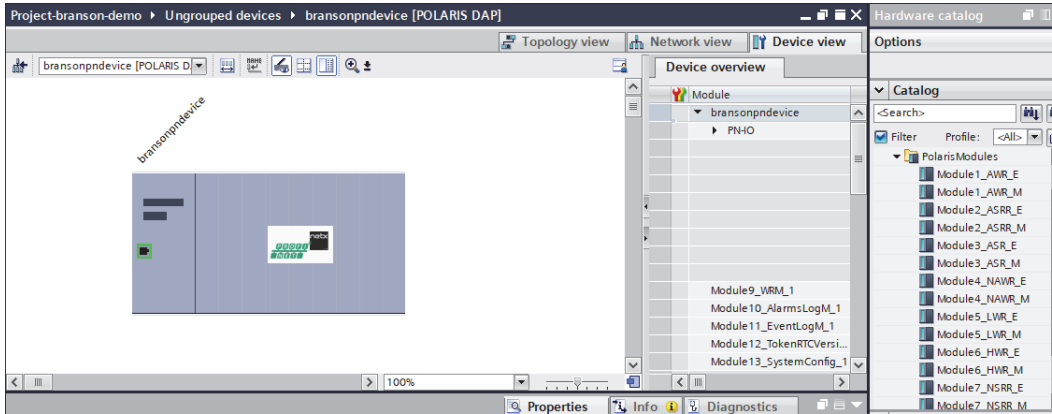
Step	Instructions
15	Drag and drop the modules according to the machine configured i.e. Advanced or Core as mentioned below _E modules are for Advanced machine and _M modules are for Core. Figure 1.17 
16	Before Module selection. Figure 1.18 
17	Back in the network view, make sure that the devices are attached to the controller by left clicking on “not assigned” on the device and select the controller. Also, double clicks are that all the modules have been set up and parameterized correctly in the device view.
18	Click the PROFINET device in the network view and go to properties -> Ethernet addresses to display its properties and set the device name. All PN devices must have a unique device name. The device name must match the name in the physical device.

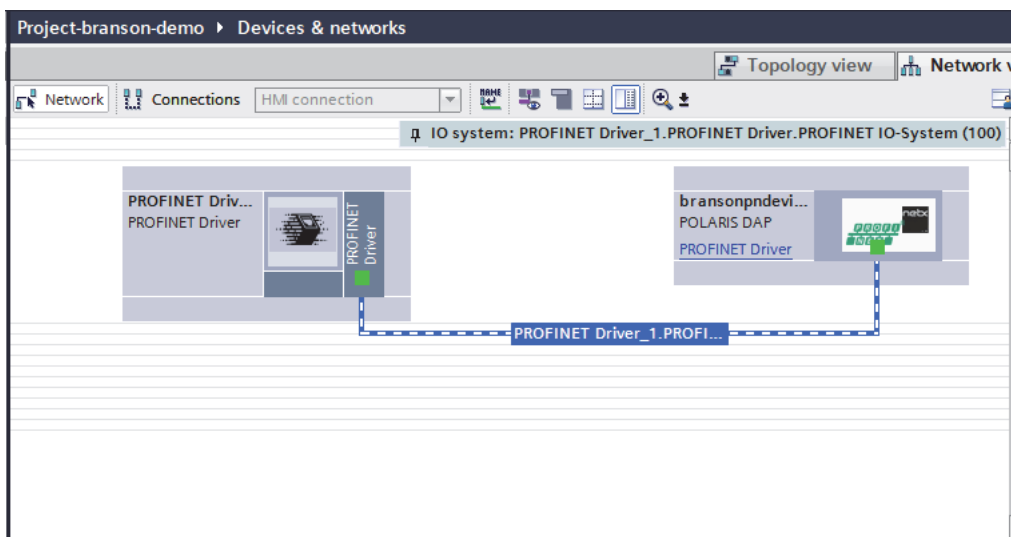
Table 1.9 Polaris Device Configuration Using TIA

Step

Instructions

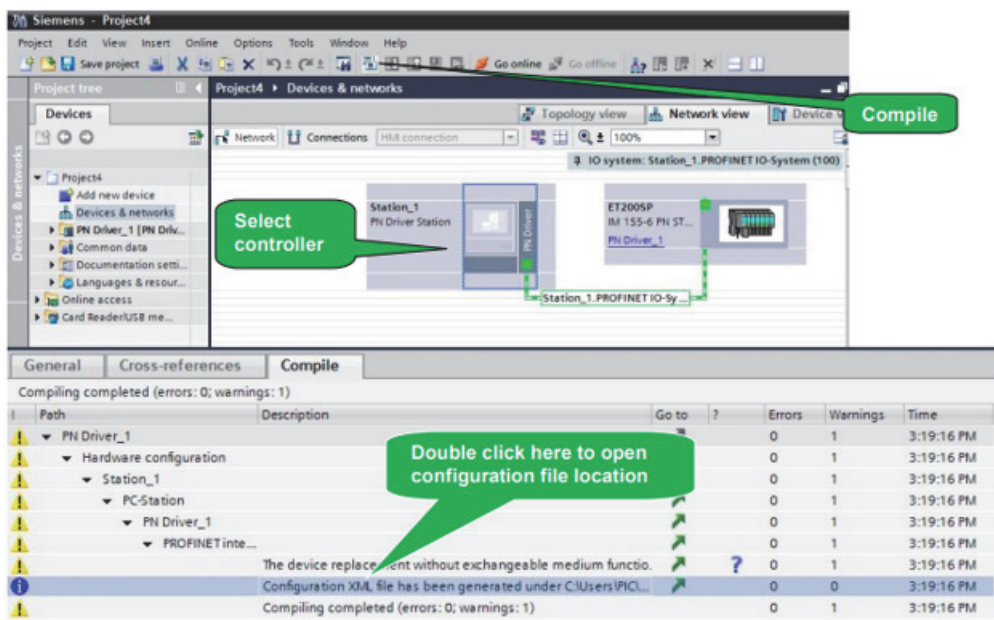
When the IO controller starts communicating with the IO device, it finds the device by name and automatically sets the IP address to this configured value using PROFINET DCP, unless you disable automatic name setting via the controller.

Figure 1.19



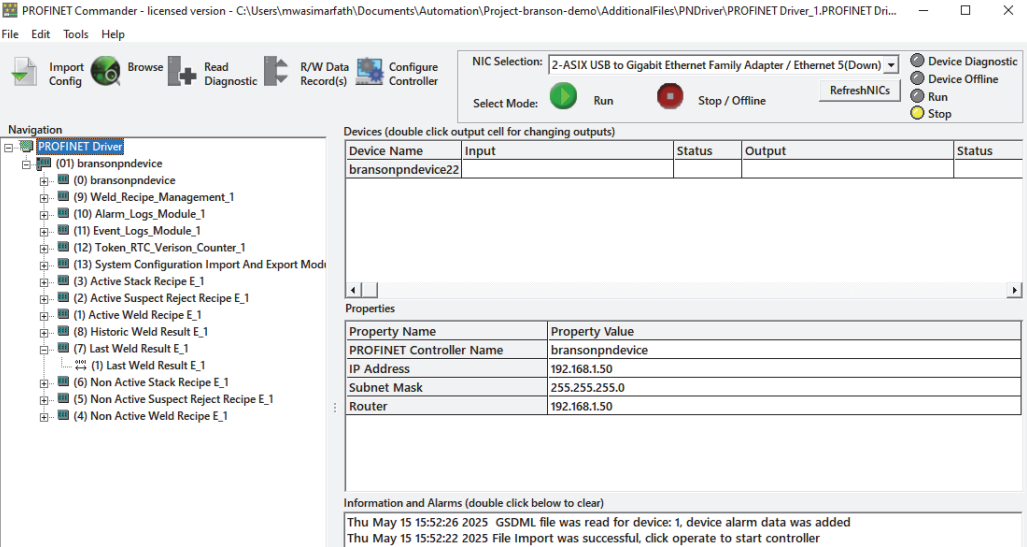
Save and compile the project HW configuration by selecting the controller from the network view as shown. This will create a project configuration XML file which will be used for import into PROFINET controller tool or flash into PLC. If you double, click on the generated file for the log window and it will open the file location automatically in file explorer.

Figure 1.20



Path	Description	Go to	Errors	Warnings	Time
PN Driver_1			0	1	3:19:16 PM
Hardware configuration			0	1	3:19:16 PM
Station_1			0	1	3:19:16 PM
PC-Station			0	1	3:19:16 PM
PN Driver_1			0	1	3:19:16 PM
PROFINETinte...			0	1	3:19:16 PM
The device replace...	ment without exchangeable medium functio...		0	1	3:19:16 PM
Configuration XML file has been generated under C:\Users\PICL...			0	0	3:19:16 PM
Compiling completed (errors: 0; warnings: 1)			0	1	3:19:16 PM

Table 1.9 Polaris Device Configuration Using TIA

Step	Instructions
21	Import the generated xml file into Profinet Commander or any PROFINET testing tool to work with the PROFINET device. Figure 1.21  The screenshot displays the PROFINET Commander application window. The title bar reads 'PROFINET Commander - licensed version - C:\Users\mwasmirath\Documents\Automation\Project-branson-demo\AdditionalFiles\PNDriver\PROFINET Driver_1.PROFINET Dri...'. The menu bar includes 'File', 'Edit', 'Tools', and 'Help'. The toolbar contains icons for 'Import Config', 'Browse', 'Read Diagnostic', 'R/W Data Record(s)', and 'Configure Controller'. On the right, there are controls for 'NIC Selection' (set to '2-ASIX USB to Gigabit Ethernet Family Adapter / Ethernet 5(Down)'), 'Select Mode' (with 'Run' selected), and buttons for 'Device Diagnostic', 'Device Offline', 'Run', and 'Stop'. The main interface is divided into three sections: 'Navigation' on the left, 'Devices' in the center, and 'Properties' on the right. The 'Navigation' tree shows a hierarchy starting with 'PROFINET Driver', followed by '(01) bransonpndevice', and then various modules like '(9) Weld_Recipe_Management_1', '(10) Alarm_Logs_Module_1', etc. The 'Devices' section has a table with columns 'Device Name', 'Input', 'Status', 'Output', and 'Status'. It lists 'bransonpndevice22'. The 'Properties' section shows a table with 'Property Name' and 'Property Value', including 'PROFINET Controller Name' (bransonpndevice), 'IP Address' (192.168.1.50), 'Subnet Mask' (255.255.255.0), and 'Router' (192.168.1.50). At the bottom, the 'Information and Alarms' section shows two log entries: 'Thu May 15 15:52:26 2025 GSDML file was read for device: 1, device alarm data was added' and 'Thu May 15 15:52:22 2025 File Import was successful, click operate to start controller'.

1.9 Cyclic Data Handling

1.9.1 Output Data To I/O Controller

Table 1.10 Output Data To I/O Controller

Description	Start Byte	End Byte
STAT0 (Status Word 0)	1	2
STAT1 (Status Word 1)	3	4
STAT2 (Status Word 2)	5	6
Active Recipe Number	7	8
Amplitude	9	12
Current	13	16
Phase	17	20
Frequency	21	24
Request Amplitude	25	28
Time	29	32
Power	33	36
Energy	37	40
Force	41	44
Velocity	45	48
Absolute Distance	49	52
Collapse Distance	53	56
Active Alarm	57	60
Custom Status Word 1	61	64
Custom Status Word 2	65	68
Custom Status Word 3	69	72

1.9.1.1 Status Word 0

Table 1.11 Status Word 0

Bit	Function Name	Description
0	Emergency Stop Active	1 = Emergency stop active
1	Reserved	-
2	Reserved	-
3	Reserved	-
4	Reserved	-
5	Reserved	-
6	Reserved	-
7	Reserved	-
8	Reserved	-
9	Reserved	-
10	Reserved	-
11	Reserved	-
12	Reserved	-
13	Reserved	-
14	Reserved	-
15	Reserved	-

1.9.1.2 Status Word 1

Table 1.12 Status Word 1

Bit	Function Name	Description
0	Reserved	-
1	Reserved	-
2	Reserved	-
3	Reserved	-
4	Reserved	-
5	Reserved	-
6	Reserved	-
7	Reserved	-
8	Reserved	-
9	Reserved	-
10	Ready State	1 = Ultrasonics off and system is Ready
11	Ultrasonics Active	1 = Ultrasonics active
12	End of Weld Cycle Without Error	1 = End cycle without error
13	Reserved	-
14	Memory Clear	1 = Memory offset will be set to 0
15	Actuator Clear	1 = actuator clear is enabled

1.9.1.3 Status Word 2

Table 1.13 Status Word 2

Bit	Function Name	Description
0	Cycle Running	1 = Weld is in progress
1	Horn Seek In progress	1 = Horn Seek is in progress
2	Reserved	-
3	Hold Active	1 = Ultrasonic horn is active
4	Home Position	1 = Actuator at Home position
5	Reserved	-
6	PB Release	1 = Palm buttons are released
7	General Alarm	1 = Alarm is raised by the system.
8	Setup Mode	1 = Actuator setup screen active
9	Reserved	-
10	Reserved	-
11	Reserved	-
12	Afterburst Active	1 = Afterburst is Active
13	Reserved	-
14	Horn Scan In progress	1 = Horn Scan in progress
15	Horn Test In progress	1 = Horn Test in progress

1.9.2 Input Data From I/O Controller

Table 1.14 Input Data From I/O Controller

Description	Start Byte	End Byte
Control Word 0	1	2
Control Word 1	3	4
Control Word 2	5	6
Active Recipe Number	7	8
External Weld Amplitude	9	10
Custom Control Word 1	11	14
Custom Control Word 2	15	18
Custom Control Word 3	19	22

1.9.2.1 Control Word 0

Table 1.15 Control Word 0

Bit	Function Name	Description
0	U/S Disable	Disable ultrasonics from operating during the weld cycle.
1	Reserved	-
2	Reserved	-
3	Reserved	-
4	Reserved	-
5	Reserved	-
6	Reserved	-
7	Reserved	-
8	Reserved	-
9	Reserved	-
10	Reserved	-
11	Reserved	-
12	Reserved	-
13	Reserved for Hold Delay	To delay the start of the hold cycle after the weld cycle is complete.
14	Reserved	-
15	Reserved	-

1.9.2.2 Control Word 2

Table 1.16

Bit	Function Name	Description
0	Enable Actuator Function	Must be 1 in conjunction with AFCT0, AFCT1, or AFCT2 to enable the actuator function.
1	To perform a specific actuator function, the ACFT bits shall be set in accordance with the Actuator Function table below.	Horn Down/Horn Clamp/short calibration
2		
3		
4	Reserved	-
5	Reserved	-
6	Reserved	-
7	Reserved	-
8	Reserved	-
9	Reserved	-
10	Reserved	-
11	Reserved	-
12	Reserved	-
13	Reserved	-
14	Reserved	-
15	Reserved	-

1.9.3 Stack Function

Table 1.17 Stack Function

Tag Name	Test	Scan	Seek
SFCT0	1	0	0
SFCT1	0	1	0
SFCT2	0	0	0

1.9.4 Actuator Function

Table 1.18

Tag Name	Horn Down	Horn Clamp	Short Calibration
ACFT	1	1	1
ACFT0	1	0	1
ACFT1	1	0	0
ACFT2	0	1	1

1.10 Ladder Examples Using Cyclic Data

1.10.1 Basic Weld Program

The below program runs a weld cycle for the active recipe. The output - Local: 1:O.Data.8 energizes an external DPST relay for the start switches to the Polaris actuator.

Table 1.19 Basic Weld Program

Controller/Local Tags	Description	Logic
POLARIS:I.Ready_State	POLARIS system is in a ready to run state.	1 = POLARIS is in ready state
POLARIS:I.PB_Release	Palm Button Release - The start switches can be opened in the weld cycle.	1 = Start switches can be opened
POLARIS:O.Cycle_Abort	About weld cycle.	1 = Aborts weld cycle
POLARIS:I.Emergency_Stop_Active	Emergency stops are active.	1 = Emergency Stop active
Local:1:O.Data.8	Digital Output of PLC.	1 = 24 VDC
Manual_Start_Weld	Manually initiate a weld cycle.	1 = Start weld cycle
Part_In_Place	The part to be welded is in the nest and ready for welding.	1 = Part is ready
Auto_Start_Weld	Automatic cycle initiates a weld cycle.	1 = Start weld cycle
Manual_Open_Switch	Manuals unlatch the Start Switch bit.	1 = Unlatch Start_Weld_Switch
Safety_Systems	Safety systems around the POLARIS and machine.	1 = Safe condition to run POLARIS
Start_Weld_Switch	Latch/Unlatch Start_Weld_Switch bit to close the external start switches.	1 = Start weld switch active
Ready_Position_Start_Switch	Ready_Position_Start_Switch bit to close the external start switches.	1 = Ready start switch active
Home_Position_Start_Switch	Home_Position_Start_Switch bit to close the external start switches.	1 = Home start switch active
Manual_Start	Manual switch to close start switch.	1 = Manual start active

1.10.2 Go To Ready Position Program

The below program moves the carriage to the ready position before welding. The output - Local: 1:O.Data.8 energizes an external DPST relay for the start switches to the Polaris actuator.

Table 1.20 Go To Ready Position Program

Controller/Local Tags	Description	Logic
POLARIS:I.Ready_State	POLARIS system is in a ready to run state.	1 = POLARIS is in ready state
POLARIS:O.Go_Ready_Position	Go to Ready Position - Commands to send the ultrasonic horn to ready position when the start switches are closed.	1 = Configure to send ultrasonic horn to ready position
POLARIS:I.Ready_Position	Ready Position - The ultrasonic horn is at the ready position.	1 = Ultrasonic horn at ready position
POLARIS:I.Emergency_Stop_Active	Emergency stop is active.	1 = Emergency Stop active
Local:1:O.Data.8	Digital Output of PLC.	1 = 24 VDC
Manual_Ready Position	Manually initiate go to ready position.	1 = Start movement to position
Ready_Position_Start_Switch	Latch/Unlatch Start_Switch bit to close the external start switches.	1 = Start switch active
Auto_Ready_Position	Automatic cycle initiates go to ready position.	1 = Start movement to position
Manual_Open_Switch	Manual unlatch.	1 = Unlatch Go_Ready_Position and Ready_Position_Start_Switch
Safety_Systems	Safety systems around the POLARIS and machine.	1 = Safe condition to weld

1.10.3 Reset, Disable Ultrasonics, Find Part Contact, Frequency Seek Program

The below example illustrates using implicit messaging for resetting alarms, disabling ultrasonics during a weld (dry weld), activating a frequency seek, and enabling find part contact.

Table 1.21 Reset, Disable Ultrasonics, Find Part Contact, Frequency Seek Program

Controller/Local Tags	Description	Logic
Reset	Clears and resets POLARIS alarms.	1 = Clear alarms
POLARIS:O.Reset_Alarm	Clears and resets POLARIS alarms.	1 = Clear alarms
Disable_Ultrasonics	Disable ultrasonics during the weld cycle.	1 = Disable ultrasonics
POLARIS:O.Disable_U_S	Disable ultrasonics during the weld cycle.	1 = Disable ultrasonics
Set_Part_Contact	Enable find part contact.	1 = Enable find part contact
POLARIS:O.Enable_Actuator_Function	Enable find part contact.	1 = Enable find part contact
Start_Frequency_Seek	Active ultrasonic seek.	1 = Active ultrasonic seek
POLARIS:O.Enable_Stack_Function	Active ultrasonic seek.	1 = Active ultrasonic seek

1.11 Acyclic Data Handling In Profinet

In this ultrasonic welding machine, acyclic data communication over PROFINET is used for parameterization, diagnostics, and configuration. This communication is performed via Record Data Access, using index-based addressing as defined in the device's GSDML file.

Reading parameter data from a module does not require any special privileges and can be done without setting a token. However, to write or modify parameters, a token must first be set. This token mechanism is used to manage access control, ensuring that only an authorized user or controller with the token can change configuration data on the module. Acquiring the token grants writes privileges, allowing the user to safely perform parameter updates.

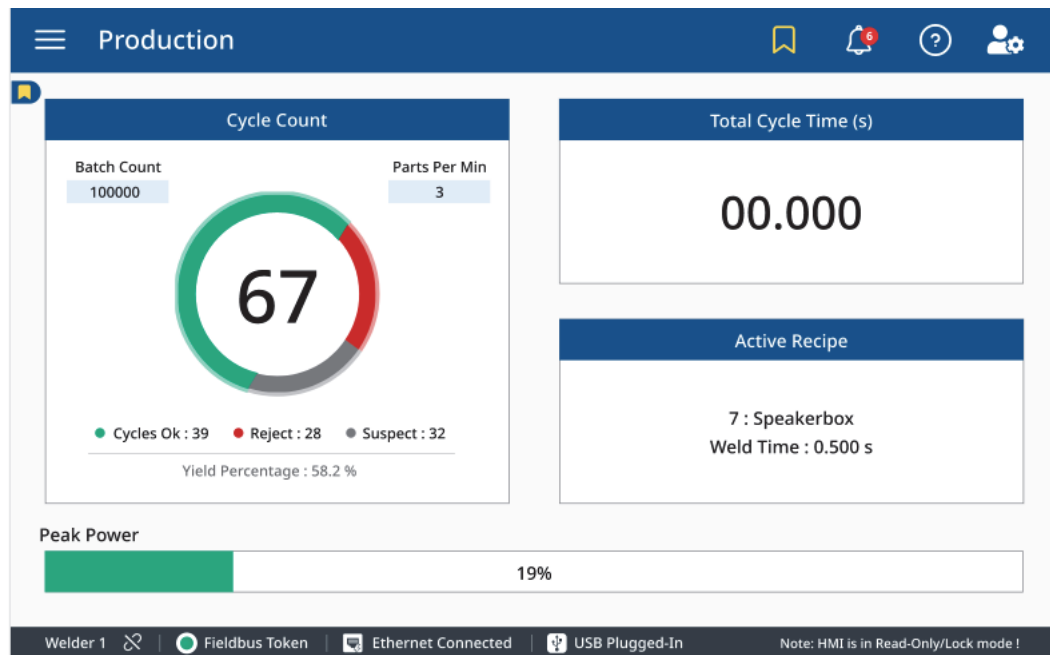
1.11.1 Set Fieldbus Token

The fieldbus token determines which interface-local (Polaris HMI) or remote (via PROFINET explicit messaging) has control over recipe and configuration settings.

- When the token value is set to 0, the Polaris HMI has full control over parameter and system settings. In this state, any incoming remote messages (e.g., from the controller) are ignored, ensuring local-only access.
- When the token value is set to 1, control is granted to the remote controller via explicit messaging. The Polaris HMI becomes read-only, allowing monitoring but preventing local changes.

The current value of the fieldbus token is always displayed in the footer of the Polaris HMI, providing clear visibility of the active control mode.

Figure 1.22 Fieldbus Token



1.11.2 Module Structure

- The system consists of 11 modules, each with a unique Index value.
- These indexes are used to read or write parameter data via acyclic communication services.

Table 1.22 Index-Based Parameter Access

Operation Type	Index Value Used	Description
Read/Write all parameters	1	Read/Write all parameters for a module.
Read/Write single parameter	>1	Read/Write a specific parameter based on its index.
Set instance number (for multi-instance modules)	Last index value of the module	Used to send the instance number before reading from a multi-instance module.

To access data, the controller sends a request with the following fields:

- API
- Slot
- Subslot
- Index
- Read Length

Refer to the GSDML file for the mapping of Index values to their corresponding modules and parameters.

1.11.3 Record Data Access Services

Used to read parameters from modules.

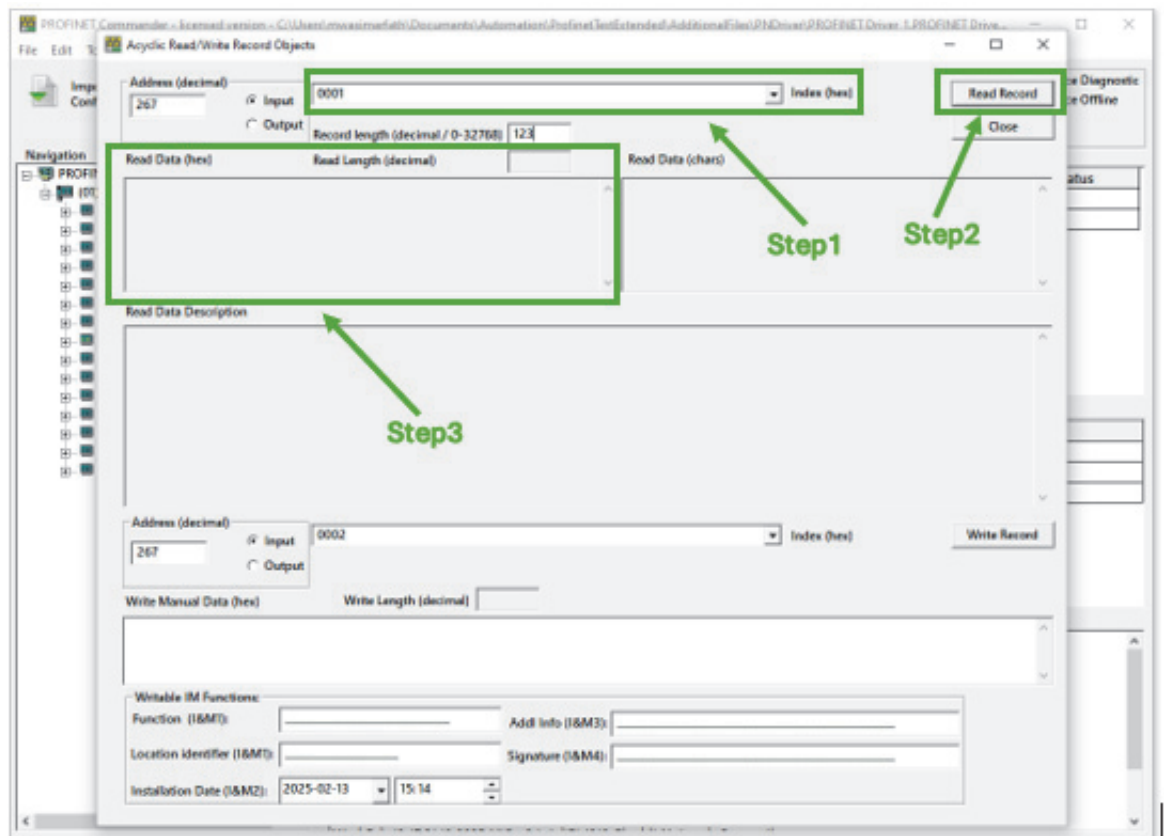
- Fields Sent from Controller:
 - API
 - Slot
 - Subslot
 - Index
 - Read Length

1.11.4 Read Record Data For Active Modules

The data is directly readable using Read Record service.

1. Enter the index number in the designated field.
2. Give the length of data to be read, refer GSDML file.
3. Click the Read Record button.
4. The Read Data section will display the retrieved output.

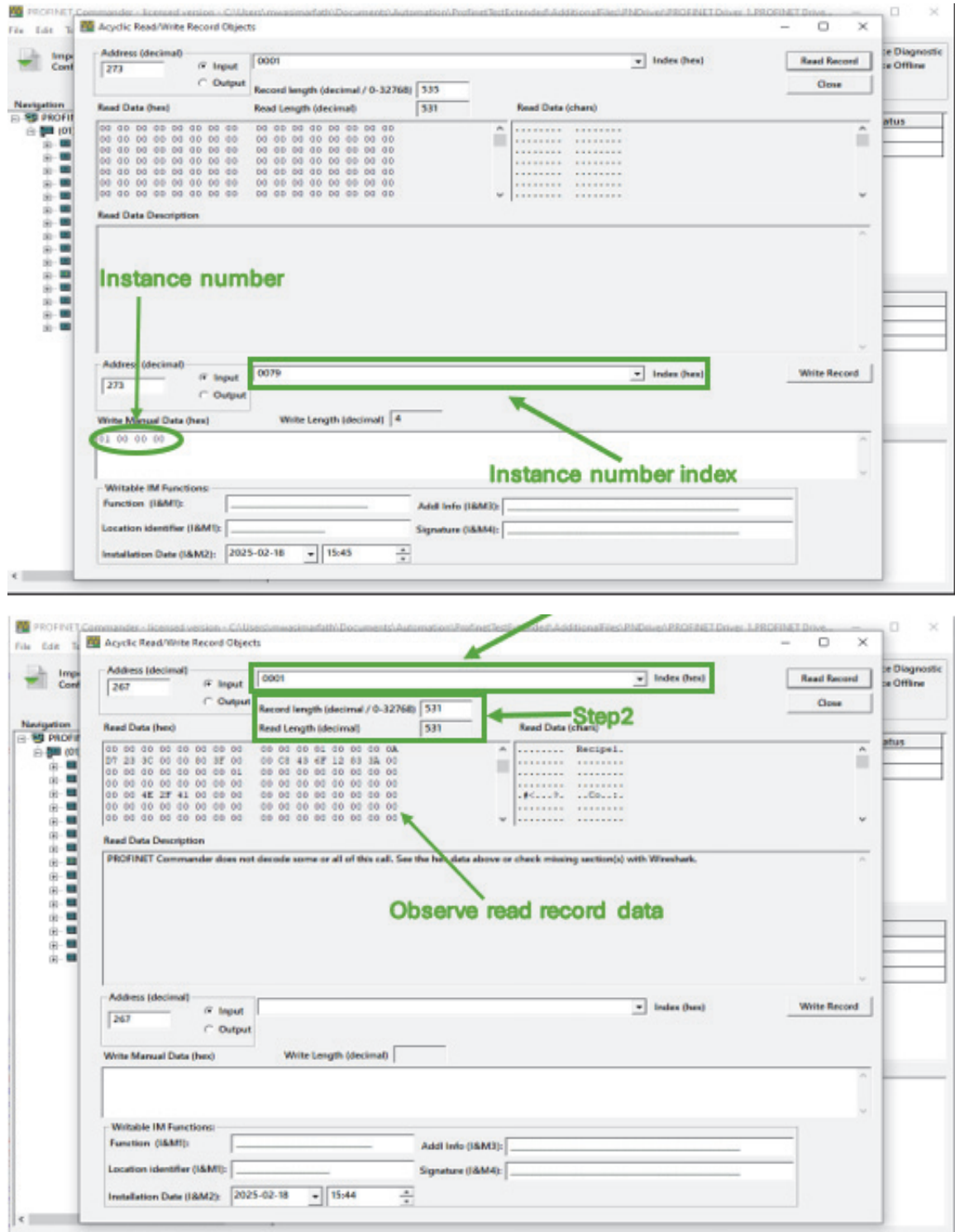
Figure 1.23 Read Record Data For Active Modules



1.11.5 Read Record Data For Non-Active or Multi-Instance Modules

- These modules may not include instance-specific data in the Read Record request.
- The controller must first select the instance number using a Write Record (see below), followed by a Read Record.

Figure 1.24 Read Record Data For Non-Active or Multi-Instance Modules



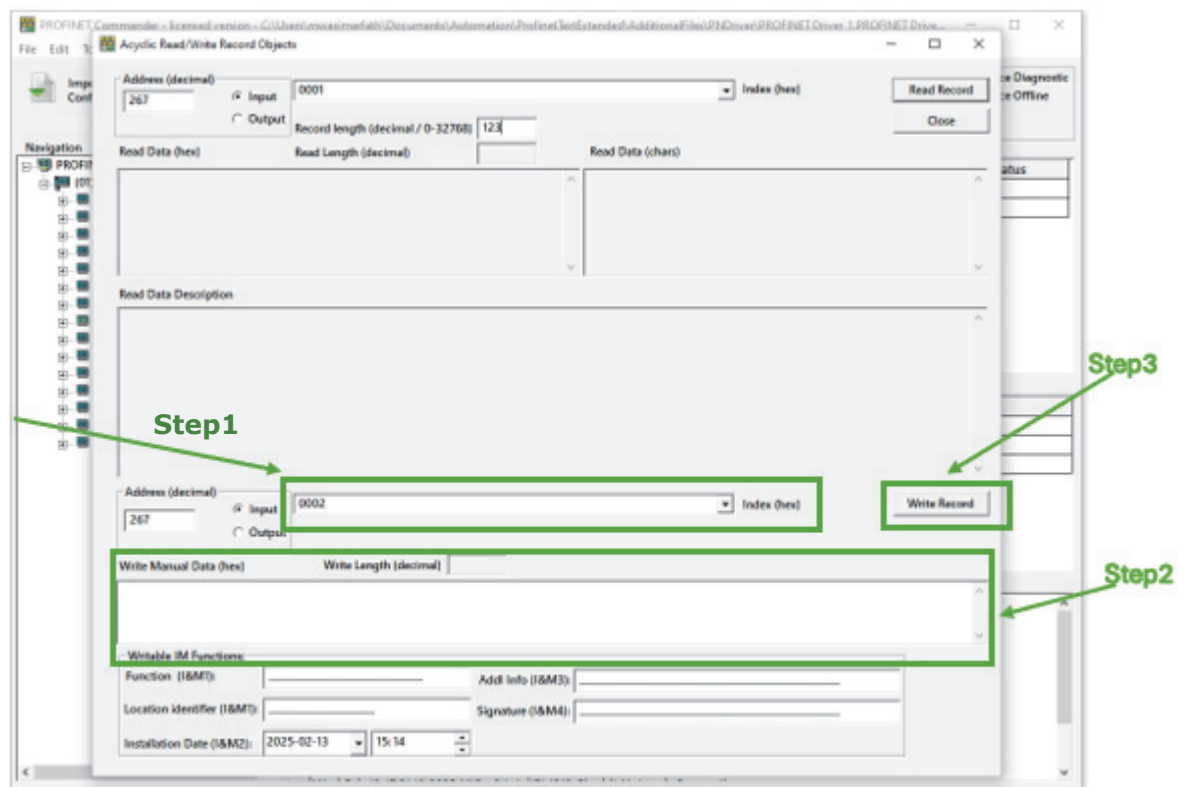
1.11.6 Write Record Service

Used to write parameter data to a module, or to specify an instance number when dealing with multi-instance modules.

1.11.6.1 Write Record Data For Single-Instance Modules

- Fields Sent:
 - API
 - Slot
 - Sub-slot
 - Index
 - Write Length
 - Data Payload
1. Enter the index number in the designated field.
 2. Enter the data into write data field shown in below figure, refer GSDML file for parameter.
 3. Press the “Write Record” button to save the entered manual data to the device.

Figure 1.25 Write Record Data For Single-Instance Modules

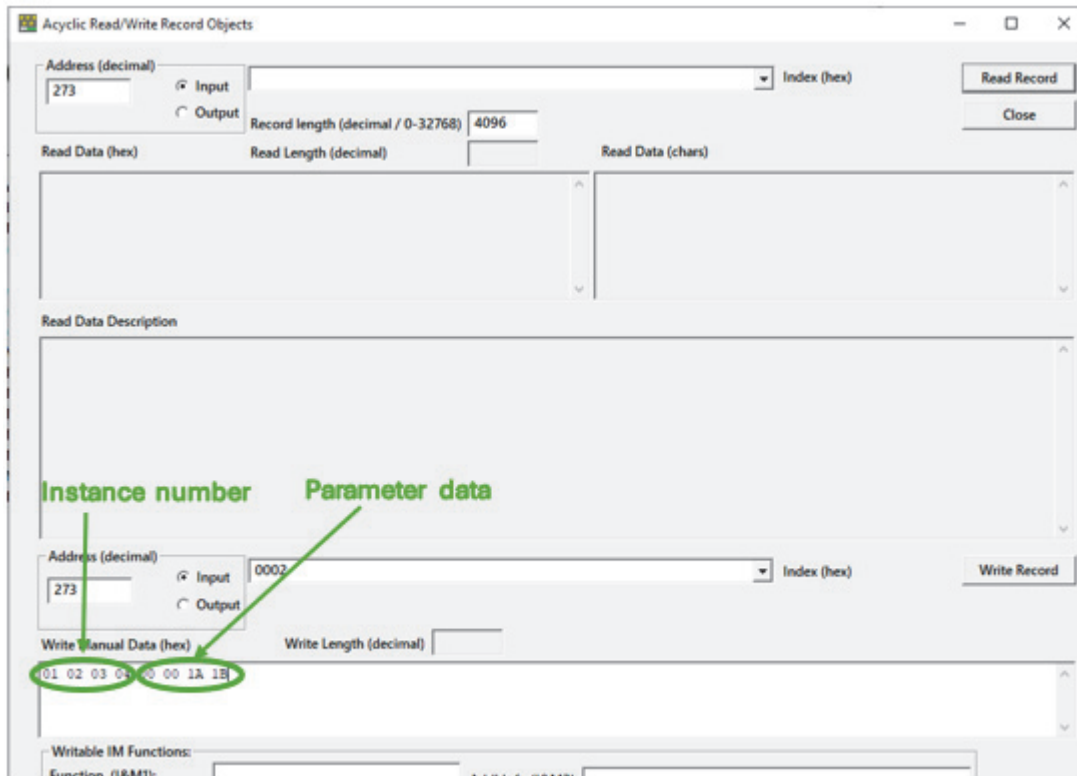


1.11.6.2 Write Record Data For Multi-Instance Modules

The same Write Record service is used, with a slight difference in the data payload:

- The first 4 bytes of the payload represent the instance number.
- This informs the application which instance's data is to be accessed.
- After this, a standard Read Record request is used to retrieve data for the selected instance.

Figure 1.26 Write Record Data For Multi-Instance Modules



This mechanism ensures that multiple instances of the same module can be individually addressed and managed, even when they are not actively transmitting data.

1.12 I&M Records In PROFINET

In PROFINET, I&M (Identification and Maintenance) records are a standardized way to store and access essential information about a device. These records allow both users and systems to identify, configure, and manage devices throughout their life cycle, from installation to maintenance.

I&M records are especially useful for asset management, diagnostics, and traceability in industrial automation environments. They are stored directly on the device and can be read or written via engineering tools or diagnostic software.

Table 1.23 I&M Records

Record	Name	Access	Description
I&M0	Device Identification	Read-only	Manufacturer name, order ID, hardware/software revision, serial number.
I&M1	Function & Location	Read/Write	Information about device function and physical or logical location.
I&M2	Installation Date	Read/Write	Date and time of installation. Useful for lifecycle management.
I&M3	Additional Information	Read/Write	Free-form field for user-defined details or notes (e.g., maintenance logs).

1.12.1 Reading and Writing I&M Records (I&M0 to I&M3)

This section outlines the steps to read and write Identification & Maintenance (I&M) data on a PROFINET device using PROFINET Commander. Supported records include I&M0 (read-only), and I&M1 to I&M3 (read/write depending on device capabilities).

1.12.1.1 Reading I&M Records

To read I&M records from a connected PROFINET device, follow the steps below:

1. Select the Record Type

From the dropdown menu, choose the desired I&M record type (e.g., AFF3/45043 I&M1, I&M2, or I&M3). Note that I&M0 is read-only.

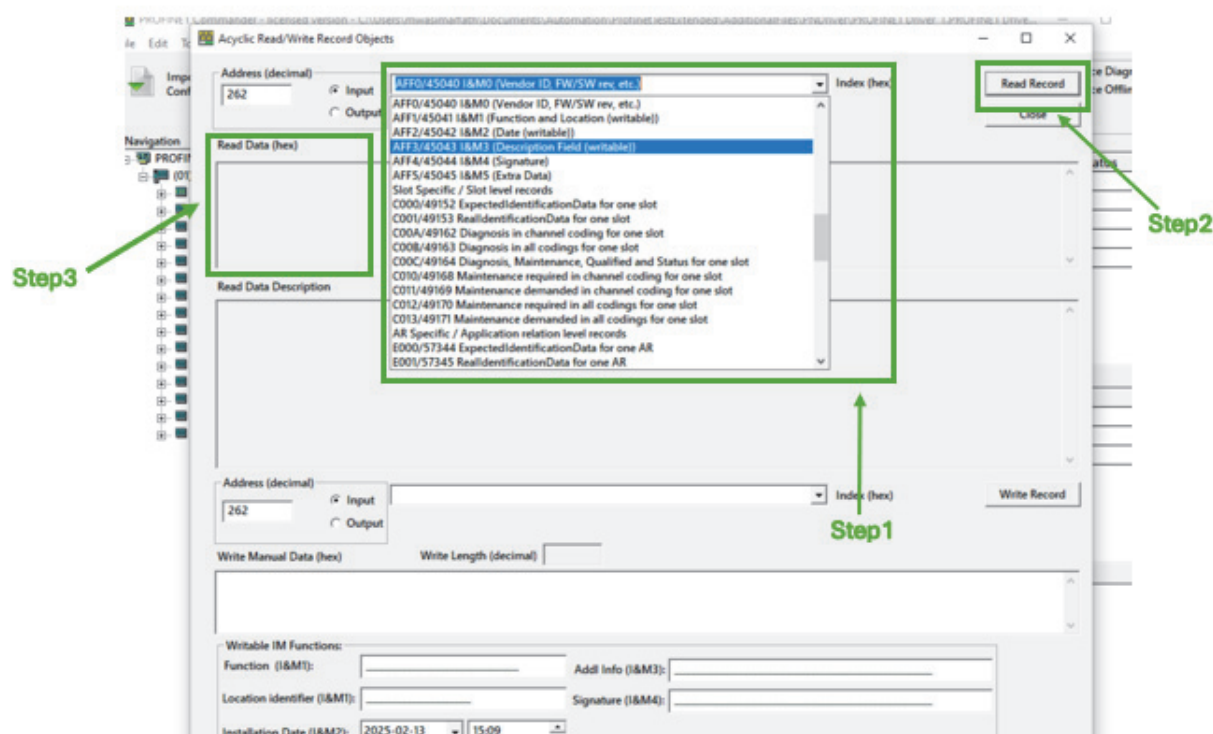
2. Click “Read Record”

Press the Read Record button to retrieve the selected I&M data from the device.

3. View Retrieved Data

The read data will be displayed in the designated data display area. Review the values to ensure correct device information.

Figure 1.27 Reading I&M Records



1.12.1.2 Writing I&M Records

To write I&M1, I&M2, or I&M3 records to the device, proceed as follows:

1. Select the Record Type

From the dropdown menu, choose a writable record:

- I&M1 (Function and Location)
- I&M2 (Installation Date)
- I&M3 (Additional Information)

2. Enter Writable Fields

Fill in the appropriate fields based on the selected I&M record type:

I&M1

- Function: Enter the function or role of the device (e.g., "Conveyor Motor").
- Location Identifier: Specify the physical or logical location (e.g., "Zone 3A").

I&M2

- Installation Date: Input the installation date and time in the correct format (typically YYYY-MM-DD HH:MM: SS).

I&M3

- Additional Info: Enter any supplemental or descriptive information relevant to the device.

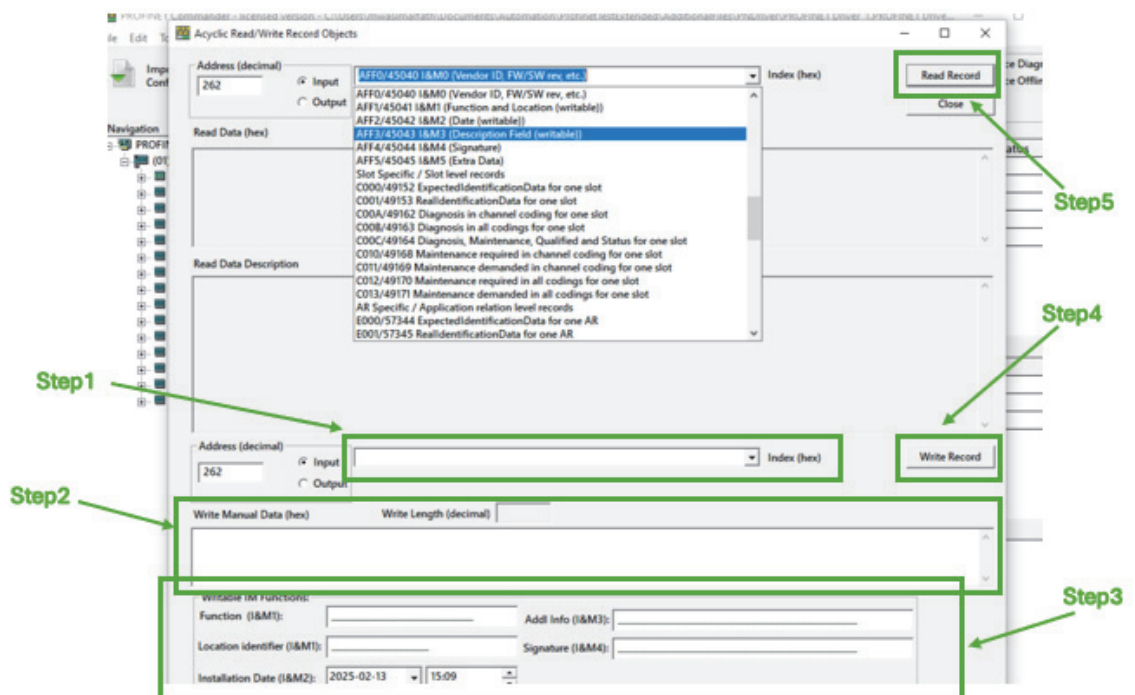
3. Click "Write Record"

Press the Write Record button to transmit and store the data to the device.

4. Verify Written Data

Use the Read Record function to confirm that the values were written successfully and are correctly reflected on the device.

Figure 1.28 Writing I&M Records



1.13 Diagnostics

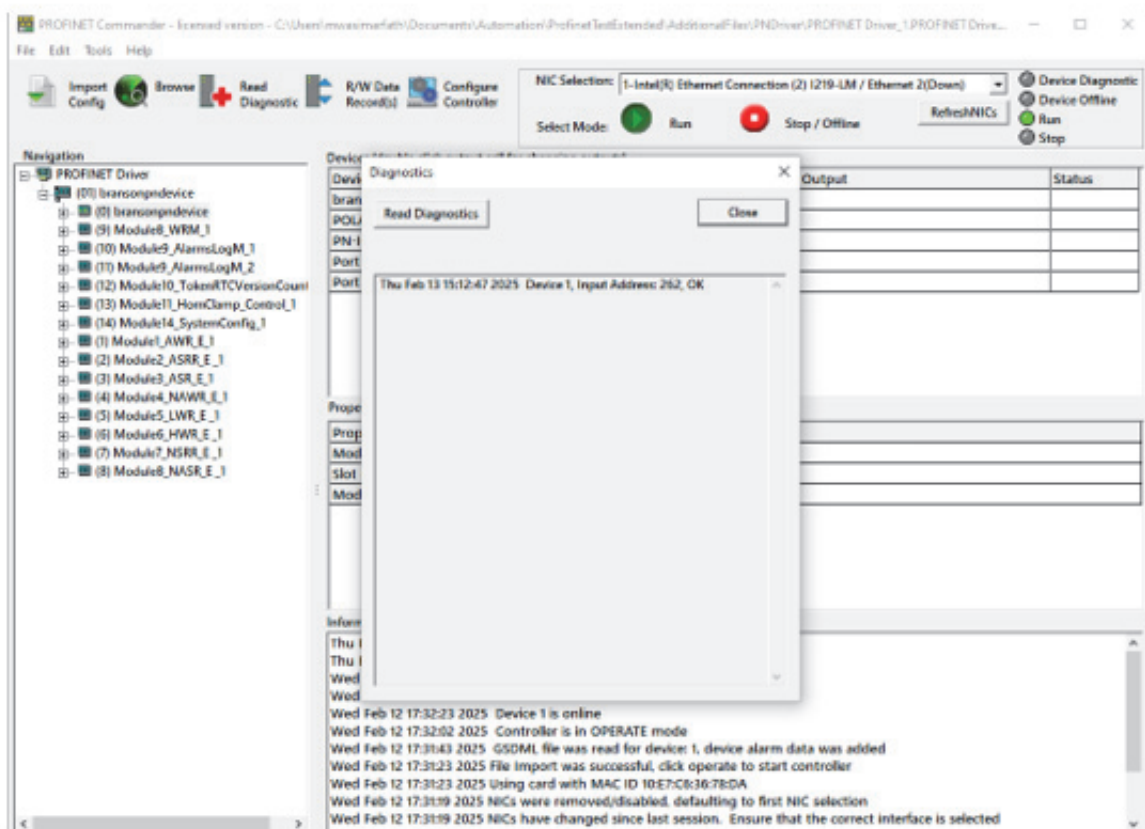
The diagnostics feature in PROFINET allows users to monitor the operational status of connected devices and identify any potential issues. Example is shown using PROFINET Commander, you can easily retrieve and view diagnostic data to support troubleshooting and maintenance activities.

1.13.1 Steps to Read Diagnostics in PROFINET Commander

Follow the steps below to read diagnostic information from a PROFINET device:

1. Select the DAP Module
 - In the device tree, select the DAP (Device Access Point) module, typically listed as Module 0.
2. Open the Diagnostics Window
 - Click on the "Read Diagnostic" button located in the main toolbar to open the Diagnostics window.
3. Initiate Diagnostic Read
 - In the Diagnostics window, click the "Read Diagnostics" button to retrieve the current diagnostic data from the selected device.
4. View Diagnostic Information
 - The diagnostic information will be displayed in the window.
5. Close the Diagnostics Window
 - After reviewing the diagnostic data, click the "Close" button to exit the Diagnostics window.

Figure 1.29 Steps to Read Diagnostics in PROFINET Commander



1.13.2 Process Alarms In PROFINET

In addition, PROFINET devices can actively notify the controller or engineering tool of critical events using the Process Alarm Service.

- When a process alarm condition is detected (e.g., fault, error, or abnormal operating state), the device automatically generates a process alarm.
- The process alarm is sent asynchronously to the controller or diagnostic tool to alert operators of the issue.
- These alarms help ensure faster fault detection and support real-time troubleshooting.

	NOTE
	Process alarms are typically triggered by device-specific conditions and are defined in the device's GSDML file.

Reference to GSDML File

To accurately interpret diagnostic messages and process alarm codes, refer to the device's GSDML (General Station Description Markup Language) file.

The GSDML file contains:

- Definitions of diagnostic alarm structures.
- Definitions of process alarm structures.

1.14 I/O Timing Charts

1.14.1 Typical Cycle Timing; No Alarms

Figure 1.30 Typical Cycle Timing; No Alarms

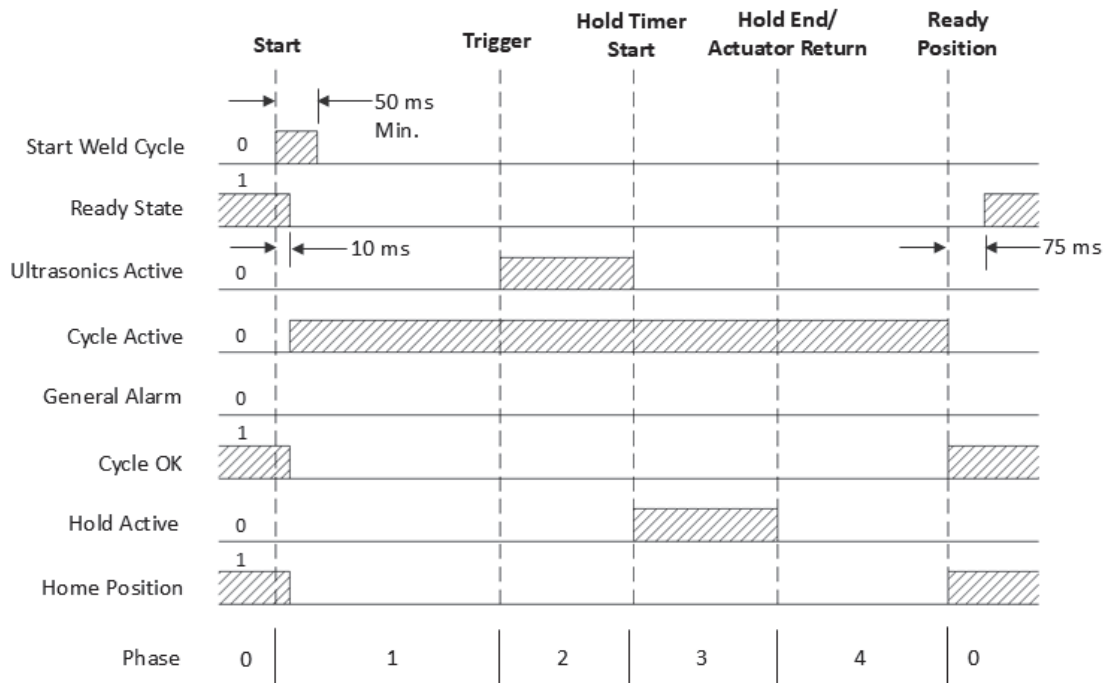


Table 1.24 Typical Cycle Timing; No Alarms

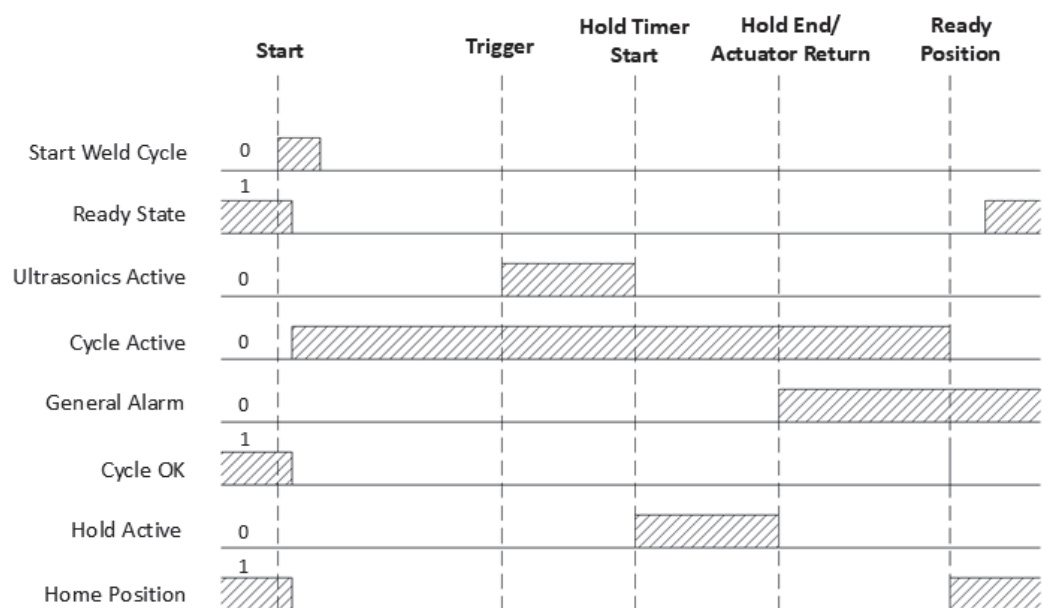
Phase	Event Markers		Definition
	Begin	End	
0	Ready Position	Start	The system is in a ready state. The cycle has not been initiated.
1	Start	Trigger	The cycle has been initiated. The actuator extends the ultrasonic horn down to the part.
2	Trigger	Hold Timer Start	The ultrasonic horn contacts the part and triggers the ultrasonics weld mode. The ultrasonics is on until the weld mode is complete.
3	Hold Timer Start	Hold End/Actuator Return	The ultrasonic weld mode is complete and the hold timer starts. The ultrasonic horn maintains part contact until the hold time ends.
4	Hold End/Actuator Return	Ready Position	The hold time has ended and the actuator returns the ultrasonic horn to the ready position. After reaching the ready position, the system returns to the ready state. House keeping time is 75 ms before Ready_State turns true.

1.14.2 Cycle with General Alarm; Alarm Reset Not Required

If the System/Configuration/Alarm Management - Reset Required option is not enabled and an alarm occurs, the system goes to a ready state when the ultrasonic horn returns and reaches its ready position. The General Alarm output transitions from 1 to 0 when the ultrasonic horn reaches the ready position. The Cycle OK output will be at 0.

NOTE	
	When Reset Required is set Off in the alarm configuration screen, the Last_Active_Alarm_ID is not available.

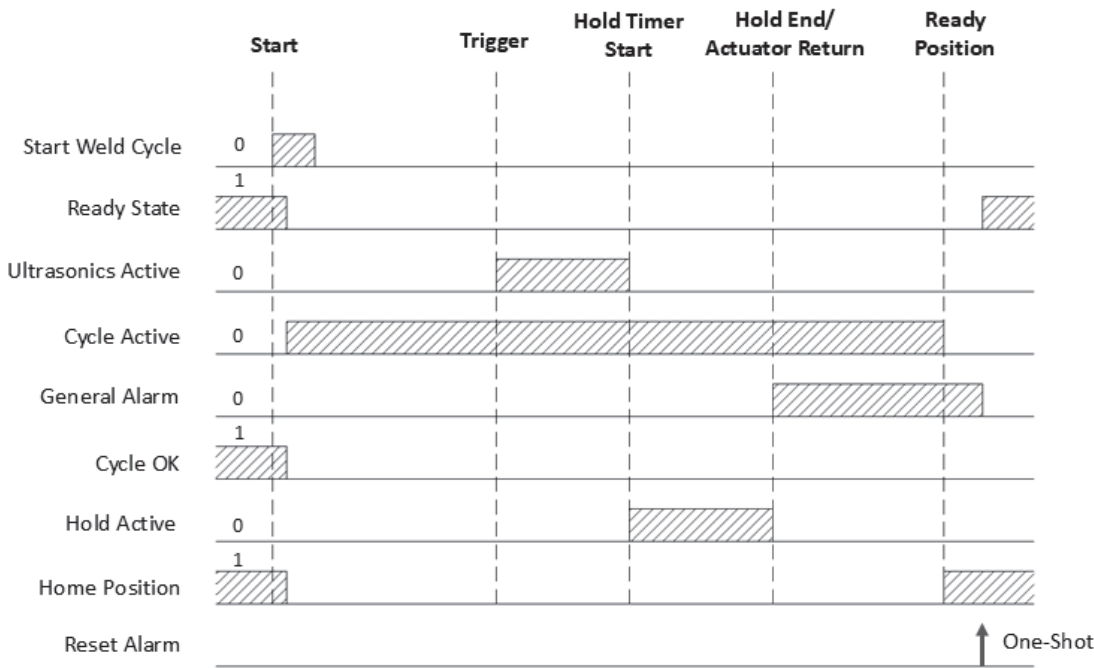
Figure 1.31 Cycle with General Alarm; Alarm Reset Not Required



1.14.3 Cycle with General Alarm; Alarm Reset Required

If the System/Configuration/Alarm Management - Reset Required option is enabled and an alarm occurs, the system doesn't return to a ready state until the Reset input is applied. The General Alarm output transitions from 1 to 0 when the Reset is given. The Cycle OK output will be at 0.

Figure 1.32 Cycle with General Alarm; Alarm Reset Required



Chapter 2: Acyclic Data

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2.1 Modules and Attributes

Module and attribute IDs for Acyclic Data are listed here.

Table 2.1 Modules Available and Slot Number

Slot	Module Name	Number of Instances
1	Active Weld Recipe Module	1
2	Active Suspect and Reject Recipe Module	1
3	Active Stack Recipe Module	1
4	Non-Active Weld Recipe Module	1000
5	Non-Active Suspect and Reject Recipe Module	1000
6	Non-Active Stack Recipe Module	1000
7	Last Weld Results Module	1
8	Weld Results History Module	200,000
9	Weld Recipe Management Module	1
10	Alarm Log Module	1
11	Event Log Module	1
12	Token RTC Version Counter Module	1
13	System Configuration Import and Export Module	1

2.2 Active Weld Recipe Module (1 Instance)

The Active Weld Recipe Module contains all the parameters from the current or active recipe.

Table 2.2 Active Weld Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
1	1	1	AllAttributes	-	541	R/W	Advanced	
					358	R/W	Core	
1	1	2	RecipeNumber	INT32	4	R	Both	
1	1	3	WeldRecipeVerNumber	INT32	4	R	Both	
1	1	4	WeldRecipeName	STRING	51	R/W	Both	
1	1	5	WeldMode	INT32	4	R/W	Both	
1	1	6	ModeValueTime	REAL	4	R/W	Both	
1	1	7	ModeValueEnergy	REAL	4	R/W	Both	
1	1	8	ModeValuePeakPower	REAL	4	R/W	Both	
1	1	9	ModeValueGroundDetect	REAL	4	R/W	Both	
1	1	10	ModeValueAbsoluteDistance	REAL	4	R/W	Advanced	
1	1	11	ModeValueCollapseDistance	REAL	4	R/W	Advanced	
1	1	12	IsSaved	BOOL	1	R/W	Both	
1	1	13	CycleCount	INT32	4	R	Both	
1	1	14	CyclesOK	INT32	4	R	Both	
1	1	15	RejectCount	INT32	4	R	Both	
1	1	16	SuspectCount	INT32	4	R	Both	
1	1	17	BatchSetupEnable	BOOL	1	R/W	Both	
1	1	18	BatchAlarmEnable	BOOL	1	R/W	Both	
1	1	19	BatchCounter	UINT32	4	R	Both	
1	1	20	BatchCountLimit	UINT32	4	R/W	Both	
1	1	21	BatchID	STRING	16	R/W	Both	
1	1	22	ActuatorType	INT32	4	R	Both	
1	1	23	WeldPressure	REAL	4	R/W	Advanced	
1	1	24	HoldPressure	REAL	4	R/W	Advanced	
1	1	25	FlowRate	REAL	4	R/W	Advanced	
1	1	26	HoldTime	REAL	4	R/W	Both	
1	1	27	MaxWeldTimeOut	REAL	4	R/W	Both	
1	1	28	WeldAmplitude	UINT32	4	R/W	Both	
1	1	29	NumAmpSteps	UINT32	4	R/W	Both	
1	1	30	AmplitudeStepAt	INT32	4	R/W	Both	
1	1	31	AmplitudeStepValue1	REAL	4	R/W	Both	
1	1	32	AmplitudeStepTarget1	UINT32	4	R/W	Both	

Table 2.2 Active Weld Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
1	1	33	AmplitudeStepRamp1	REAL	4	R/W	Both	
1	1	34	AmplitudeStepValue2	REAL	4	R/W	Both	
1	1	35	AmplitudeStepTarget2	UINT32	4	R/W	Both	
1	1	36	AmplitudeStepRamp2	REAL	4	R/W	Both	
1	1	37	AmplitudeStepValue3	REAL	4	R/W	Both	
1	1	38	AmplitudeStepTarget3	UINT32	4	R/W	Both	
1	1	39	AmplitudeStepRamp3	REAL	4	R/W	Both	
1	1	40	AmplitudeStepValue4	REAL	4	R/W	Both	
1	1	41	AmplitudeStepTarget4	UINT32	4	R/W	Both	
1	1	42	AmplitudeStepRamp4	REAL	4	R/W	Both	
1	1	43	AmplitudeStepValue5	REAL	4	R/W	Both	
1	1	44	AmplitudeStepTarget5	UINT32	4	R/W	Both	
1	1	45	AmplitudeStepRamp5	REAL	4	R/W	Both	
1	1	46	AmplitudeStepValue6	REAL	4	R/W	Both	
1	1	47	AmplitudeStepTarget6	UINT32	4	R/W	Both	
1	1	48	AmplitudeStepRamp6	REAL	4	R/W	Both	
1	1	49	AmplitudeStepValue7	REAL	4	R/W	Both	
1	1	50	AmplitudeStepTarget7	UINT32	4	R/W	Both	
1	1	51	AmplitudeStepRamp7	REAL	4	R/W	Both	
1	1	52	AmplitudeStepValue8	REAL	4	R/W	Both	
1	1	53	AmplitudeStepTarget8	UINT32	4	R/W	Both	
1	1	54	AmplitudeStepRamp8	REAL	4	R/W	Both	
1	1	55	AmplitudeStepValue9	REAL	4	R/W	Both	
1	1	56	AmplitudeStepTarget9	UINT32	4	R/W	Both	
1	1	57	AmplitudeStepRamp9	REAL	4	R/W	Both	
1	1	58	AmplitudeStepValue10	REAL	4	R/W	Both	
1	1	59	AmplitudeStepTarget10	UINT32	4	R/W	Both	
1	1	60	AmplitudeStepRamp10	REAL	4	R/W	Both	
1	1	61	NumPressureSteps	UINT32	4	R/W	Advanced	
1	1	62	PressureStepAt	INT32	4	R/W	Advanced	
1	1	63	PressureStepValue1	REAL	4	R/W	Advanced	
1	1	64	PressureStepTarget1	UINT32	4	R/W	Advanced	
1	1	65	PressureStepRamp1	REAL	4	R/W	Advanced	
1	1	66	PressureStepValue2	REAL	4	R/W	Advanced	
1	1	67	PressureStepTarget2	UINT32	4	R/W	Advanced	

Table 2.2 Active Weld Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
1	1	68	PressureStepRamp2	REAL	4	R/W	Advanced	
1	1	69	PressureStepValue3	REAL	4	R/W	Advanced	
1	1	70	PressureStepTarget3	UINT32	4	R/W	Advanced	
1	1	71	PressureStepRamp3	REAL	4	R/W	Advanced	
1	1	72	PressureStepValue4	REAL	4	R/W	Advanced	
1	1	73	PressureStepTarget4	UINT32	4	R/W	Advanced	
1	1	74	PressureStepRamp4	REAL	4	R/W	Advanced	
1	1	75	PressureStepValue5	REAL	4	R/W	Advanced	
1	1	76	PressureStepTarget5	UINT32	4	R/W	Advanced	
1	1	77	PressureStepRamp5	REAL	4	R/W	Advanced	
1	1	78	PressureStepValue6	REAL	4	R/W	Advanced	
1	1	79	PressureStepTarget6	UINT32	4	R/W	Advanced	
1	1	80	PressureStepRamp6	REAL	4	R/W	Advanced	
1	1	81	PressureStepValue7	REAL	4	R/W	Advanced	
1	1	82	PressureStepTarget7	UINT32	4	R/W	Advanced	
1	1	83	PressureStepRamp7	REAL	4	R/W	Advanced	
1	1	84	PressureStepValue8	REAL	4	R/W	Advanced	
1	1	85	PressureStepTarget8	UINT32	4	R/W	Advanced	
1	1	86	PressureStepRamp8	REAL	4	R/W	Advanced	
1	1	87	PressureStepValue9	REAL	4	R/W	Advanced	
1	1	88	PressureStepTarget9	UINT32	4	R/W	Advanced	
1	1	89	PressureStepRamp9	REAL	4	R/W	Advanced	
1	1	90	PressureStepValue10	REAL	4	R/W	Advanced	
1	1	91	PressureStepTarget10	UINT32	4	R/W	Advanced	
1	1	92	PressureStepRamp10	REAL	4	R/W	Advanced	
1	1	93	IsCoolingValveEnabled	BOOL	1	R/W	Both	
1	1	94	ExternalAmplitude	BOOL	1	R/W	Both	
1	1	95	TriggerType	INT32	4	R/W	Advanced	
1	1	96	TiggerForce	REAL	4	R/W	Advanced	
1	1	97	TriggerDistance	REAL	4	R/W	Advanced	
1	1	98	PreTriggerEnabled	BOOL	1	R/W	Both	
1	1	99	PreTriggerType	INT32	4	R/W	Both	
1	1	100	PreTriggerAmplitude	INT32	4	R/W	Both	
1	1	101	PreTriggerTime	REAL	4	R/W	Both	
1	1	102	PreTriggerDistance	REAL	4	R/W	Advanced	

Table 2.2 Active Weld Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
1	1	103	AfterBurstEnabled	BOOL	1	R/W	Both	
1	1	104	AfterBurstAmplitude	INT32	4	R/W	Both	
1	1	105	AfterBurstDelay	REAL	4	R/W	Both	
1	1	106	AfterBurstTime	REAL	4	R/W	Both	
1	1	107	EnergyBreakEnabled	BOOL	1	R/W	Both	
1	1	108	EnergyBreakAmplitude	INT32	4	R/W	Both	
1	1	109	EnergyBreakTime	REAL	4	R/W	Both	
1	1	110	EnergyCompensationEnabled	BOOL	1	R/W	Both	
1	1	111	EnergyCompensationMinValue	REAL	4	R/W	Both	
1	1	112	EnergyCompensationMaxValue	REAL	4	R	Both	
1	1	113	TimeSeekPeriod	REAL	4	R	Both	
1	1	114	IsTimeSeekEnabled	BOOL	1	R	Both	
1	1	115	IsPreWeldSeekEnabled	BOOL	1	R	Both	
1	1	116	IsPostWeldSeekEnabled	BOOL	1	R/W	Both	
1	1	117	ScrubAmplitude	UINT32	4	R/W	Both	
1	1	118	RapidTraverse	BOOL	1	R/W	Advanced	
1	1	119	RapidTraverseDistance	REAL	4	R/W	Advanced	
1	1	120	TriggerLost	BOOL	1	R/W	Advanced	
1	1	121	EnbaleActuatorClear	BOOL	1	R/W	Advanced	
1	1	122	ActuatorClearType	INT32	4	R/W	Advanced	
1	1	123	ActuatorClearTime	REAL	4	R/W	Advanced	
1	1	124	ActuatorClearDistance	REAL	4	R/W	Advanced	

Table 2.3

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter
3	Set Single Parameter
4	Set All Parameter

2.3 Active Suspect and Reject Recipe Module (1 Instance)

The Active Suspect and Reject and Cutoff Module contains all the suspect and reject parameters from the current or active recipe.

Table 2.4 Active Suspect and Reject Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
2	1	1	AllAttributes	-	241	R/W	Advanced	
					121	R/W	Core	
2	1	2	CutOffLimitsEnabled	BOOL	1	R/W	Both	
2	1	3	PeakPowerCutoffEnable	BOOL	1	R/W	Both	
2	1	4	PeakPowerCutoffValue	REAL	4	R/W	Both	
2	1	5	TimeCutoffEnable	BOOL	1	R/W	Both	
2	1	6	TimeCutoffValue	REAL	4	R/W	Both	
2	1	7	FrequencyLowCutoffEnable	BOOL	1	R/W	Both	
2	1	8	FrequencyLowCutoffValue	REAL	4	R/W	Both	
2	1	9	FrequencyHighCutoffEnable	BOOL	1	R/W	Both	
2	1	10	FrequencyHighCutoffValue	REAL	4	R/W	Both	
2	1	11	EnergyCutoffEnable	BOOL	1	R/W	Both	
2	1	12	EnergyCutoffValue	REAL	4	R/W	Both	
2	1	13	GroundDetectCutoffEnable	BOOL	1	R/W	Both	
2	1	14	GroundDetectCutoffValue	REAL	4	R/W	Both	
2	1	15	AbsoluteDistanceCutoffEnable	BOOL	1	R/W	Advanced	
2	1	16	AbsoluteDistanceCutoffValue	REAL	4	R/W	Advanced	
2	1	17	CollapseDistanceCutoffEnable	BOOL	1	R/W	Advanced	
2	1	18	CollapseDistanceCutoffValue	REAL	4	R/W	Advanced	
2	1	19	RejectLimitsEnabled	BOOL	1	R/W	Both	
2	1	20	RejectTimeEnabled	BOOL	1	R/W	Both	
2	1	21	RejectTimeLowEnabled	BOOL	1	R/W	Both	
2	1	22	RejectTimeHighEnabled	BOOL	1	R/W	Both	
2	1	23	RejectTimeLowLimit	REAL	4	R/W	Both	
2	1	24	RejectTimeHighLimit	REAL	4	R/W	Both	
2	1	25	RejectEnergyEnabled	BOOL	1	R/W	Both	
2	1	26	RejectEnergyLowEnabled	BOOL	1	R/W	Both	
2	1	27	RejectEnergyHighEnabled	BOOL	1	R/W	Both	
2	1	28	RejectEnergyLowLimit	REAL	4	R/W	Both	
2	1	29	RejectEnergyHighLimit	REAL	4	R/W	Both	
2	1	30	RejectPeakPowerEnabled	BOOL	1	R/W	Both	
2	1	31	RejectPeakPowerLowEnabled	BOOL	1	R/W	Both	

Table 2.4 Active Suspect and Reject Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
2	1	32	RejectPeakPowerHighEnabled	BOOL	1	R/W	Both	
2	1	33	RejectPeakPowerLowLimit	REAL	4	R/W	Both	
2	1	34	RejectPeakPowerHighLimit	REAL	4	R/W	Both	
2	1	35	RejectFrequencyEnabled	BOOL	1	R/W	Both	
2	1	36	RejectFrequencyLowEnabled	BOOL	1	R/W	Both	
2	1	37	RejectFrequencyHighEnabled	BOOL	1	R/W	Both	
2	1	38	RejectFrequencyLowLimit	REAL	4	R/W	Both	
2	1	39	RejectFrequencyHighLimit	REAL	4	R/W	Both	
2	1	40	RejectAbsoluteDistanceEnabled	BOOL	1	R/W	Advanced	
2	1	41	RejectAbsoluteDistanceLowEnabled	BOOL	1	R/W	Advanced	
2	1	42	RejectAbsoluteDistanceHighEnabled	BOOL	1	R/W	Advanced	
2	1	43	RejectAbsoluteDistanceLowLimit	REAL	4	R/W	Advanced	
2	1	44	RejectAbsoluteDistanceHighLimit	REAL	4	R/W	Advanced	
2	1	45	RejectCollapseDistanceEnabled	BOOL	1	R/W	Advanced	
2	1	46	RejectCollapseDistanceLowEnabled	BOOL	1	R/W	Advanced	
2	1	47	RejectCollapseDistanceHighEnabled	BOOL	1	R/W	Advanced	
2	1	48	RejectCollapseDistanceLowLimit	REAL	4	R/W	Advanced	
2	1	49	RejectCollapseDistanceHighLimit	REAL	4	R/W	Advanced	
2	1	50	RejectTriggerDistanceEnabled	BOOL	1	R/W	Advanced	
2	1	51	RejectTriggerDistanceLowEnabled	BOOL	1	R/W	Advanced	
2	1	52	RejectTriggerDistanceHighEnabled	BOOL	1	R/W	Advanced	
2	1	53	RejectTriggerDistanceLowLimit	REAL	4	R/W	Advanced	
2	1	54	RejectTriggerDistanceHighLimit	REAL	4	R/W	Advanced	
2	1	55	RejectEndWeldForceEnabled	BOOL	1	R/W	Advanced	
2	1	56	RejectEndWeldForceLowEnabled	BOOL	1	R/W	Advanced	

Table 2.4 Active Suspect and Reject Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
2	1	57	RejectEndWeldForceHighEnabled	BOOL	1	R/W	Advanced	
2	1	58	RejectEndWeldForceLowLimit	REAL	4	R/W	Advanced	
2	1	59	RejectEndWeldForceHighLimit	REAL	4	R/W	Advanced	
2	1	60	RejectVelocityEnabled	BOOL	1	R/W	Advanced	
2	1	61	RejectVelocityLowEnabled	BOOL	1	R/W	Advanced	
2	1	62	RejectVelocityHighEnabled	BOOL	1	R/W	Advanced	
2	1	63	RejectVelocityLowLimit	REAL	4	R/W	Advanced	
2	1	64	RejectVelocityHighLimit	REAL	4	R/W	Advanced	
2	1	65	SuspectLimitsEnabled	BOOL	1	R/W	Both	
2	1	66	SuspectTimeEnabled	BOOL	1	R/W	Both	
2	1	67	SuspectTimeLowEnabled	BOOL	1	R/W	Both	
2	1	68	SuspectTimeHighEnabled	BOOL	1	R/W	Both	
2	1	69	SuspectTimeLowLimit	REAL	4	R/W	Both	
2	1	70	SuspectTimeHighLimit	REAL	4	R/W	Both	
2	1	71	SuspectEnergyEnabled	BOOL	1	R/W	Both	
2	1	72	SuspectEnergyLowEnabled	BOOL	1	R/W	Both	
2	1	73	SuspectEnergyHighEnabled	BOOL	1	R/W	Both	
2	1	74	SuspectEnergyLowLimit	REAL	4	R/W	Both	
2	1	75	SuspectEnergyHighLimit	REAL	4	R/W	Both	
2	1	76	SuspectPeakPowerEnabled	BOOL	1	R/W	Both	
2	1	77	SuspectPeakPowerLowEnabled	BOOL	1	R/W	Both	
2	1	78	SuspectPeakPowerHighEnabled	BOOL	1	R/W	Both	
2	1	79	SuspectPeakPowerLowLimit	REAL	4	R/W	Both	
2	1	80	SuspectPeakPowerHighLimit	REAL	4	R/W	Both	
2	1	81	SuspectFrequencyEnabled	BOOL	1	R/W	Both	
2	1	82	SuspectFrequencyLowEnabled	BOOL	1	R/W	Both	
2	1	83	SuspectFrequencyHighEnabled	BOOL	1	R/W	Both	
2	1	84	SuspectFrequencyLowLimit	REAL	4	R/W	Both	
2	1	85	SuspectFrequencyHighLimit	REAL	4	R/W	Both	
2	1	86	SuspectAbsoluteDistanceEnabled	BOOL	1	R/W	Advanced	

Table 2.4 Active Suspect and Reject Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
2	1	87	SuspectAbsoluteDistanceLowEnabled	BOOL	1	R/W	Advanced	
2	1	88	SuspectAbsoluteDistanceHighEnabled	BOOL	1	R/W	Advanced	
2	1	89	SuspectAbsoluteDistanceLowLimit	REAL	4	R/W	Advanced	
2	1	90	SuspectAbsoluteDistanceHighLimit	REAL	4	R/W	Advanced	
2	1	91	SuspectCollapseDistanceEnabled	BOOL	1	R/W	Advanced	
2	1	92	SuspectCollapseDistanceLowEnabled	BOOL	1	R/W	Advanced	
2	1	93	SuspectCollapseDistanceHighEnabled	BOOL	1	R/W	Advanced	
2	1	94	SuspectCollapseDistanceLowLimit	REAL	4	R/W	Advanced	
2	1	95	SuspectCollapseDistanceHighLimit	REAL	4	R/W	Advanced	
2	1	96	SuspectTriggerDistanceEnabled	BOOL	1	R/W	Advanced	
2	1	97	SuspectTriggerDistanceLowEnabled	BOOL	1	R/W	Advanced	
2	1	98	SuspectTriggerDistanceHighEnabled	BOOL	1	R/W	Advanced	
2	1	99	SuspectTriggerDistanceLowLimit	REAL	4	R/W	Advanced	
2	1	100	SuspectTriggerDistanceHighLimit	REAL	4	R/W	Advanced	
2	1	101	SuspectEndWeldForceEnabled	BOOL	1	R/W	Advanced	
2	1	102	SuspectEndWeldForceLowEnabled	BOOL	1	R/W	Advanced	
2	1	103	SuspectEndWeldForceHighEnabled	BOOL	1	R/W	Advanced	
2	1	104	SuspectEndWeldForceLowLimit	REAL	4	R/W	Advanced	
2	1	105	SuspectEndWeldForceHighLimit	REAL	4	R/W	Advanced	
2	1	106	SuspectVelocityEnabled	BOOL	1	R/W	Advanced	
2	1	107	SuspectVelocityLowEnabled	BOOL	1	R/W	Advanced	
2	1	108	SuspectVelocityHighEnabled	BOOL	1	R/W	Advanced	
2	1	109	SuspectVelocityLowLimit	REAL	4	R/W	Advanced	
2	1	110	SuspectVelocityHighLimit	REAL	4	R/W	Advanced	

Table 2.5

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter
3	Set Single Parameter
4	Set All Parameter

2.4 Active Stack Recipe Module (1 Instance)

The Active Stack Recipe Module contains all the parameters from the current or active stack recipe.

Table 2.6 Active Stack Recipe Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
3	1	1	AllAttribute	-	74	R/W	Both	
3	1	2	StackRecipeNumber	INT32	4	Read	Both	
3	1	3	FrequencyLow	INT32	4	R/W	Both	
3	1	4	FrequencyHigh	INT32	4	R/W	Both	
3	1	5	PhaseLimitTime	REAL	4	R/W	Both	
3	1	6	PhaseLimit	INT32	4	R/W	Both	
3	1	7	ControlMode	INT32	4	R/W	Both	
3	1	8	BlindTimeWeld	REAL	4	R/W	Both	
3	1	9	AmpProportionalGain	INT32	4	R/W	Both	
3	1	10	AmpIntegralGain	INT32	4	R/W	Both	
3	1	11	AmpDerivativeGain	INT32	4	R/W	Both	
3	1	12	PhaseProportionalGain	INT32	4	R/W	Both	
3	1	13	PhaseIntegralGain	INT32	4	R/W	Both	
3	1	14	PhaseDerivativeGain	INT32	4	R/W	Both	
3	1	15	WeldRampTime	REAL	4	R/W	Both	
3	1	16	StartFrequency	INT32	4	R/W	Both	
3	1	17	MemoryOffset	INT32	4	R	Both	
3	1	18	DigitalTune	INT32	4	R/W	Both	
3	1	19	FrequencyOffset	INT32	4	R/W	Both	
3	1	20	EndOfWeldStore	BOOL	1	R/W	Both	
3	1	21	InternalOffsetFlag	BOOL	1	R/W	Both	

Table 2.7

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter
3	Set Single Parameter
4	Set All Parameter

2.5 Non-Active Weld Recipe Module (1000 Instances)

The Non-Active Weld Recipe Module contains all the parameters from the current or active recipe.

Table 2.8 Non-Active Weld Recipe Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
4	1	1	AllAttribute	-	358	R/W	Advanced	
					245	R/W	Core	
4	1	2	RecipeNumber	INT32	8	R	Both	
4	1	3	WeldRecipeVerNumber	INT32	8	R	Both	
4	1	4	WeldRecipeName	STRING	55	R/W	Both	
4	1	5	WeldMode	INT32	8	R/W	Both	
4	1	6	ModeValueTime	REAL	8	R/W	Both	
4	1	7	ModeValueEnergy	REAL	8	R/W	Both	
4	1	8	ModeValuePeakPower	REAL	8	R/W	Both	
4	1	9	ModeValueGroundDetect	REAL	8	R/W	Both	
4	1	10	ModeValueAbsoluteDistance	REAL	8	R/W	Advanced	
4	1	11	ModeValueCollapseDistance	REAL	8	R/W	Advanced	
4	1	12	IsSaved	BOOL	5	R/W	Both	
4	1	13	CycleCount	UINT32	8	R/W	Both	
4	1	14	CyclesOK	INT32	8	R/W	Both	
4	1	15	RejectCount	INT32	8	R/W	Both	
4	1	16	SuspectCount	INT32	8	R/W	Both	
4	1	17	BatchSetupEnable	BOOL	5	R/W	Both	
4	1	18	BatchAlarmEnable	BOOL	5	R/W	Both	
4	1	19	BatchCounter	UINT32	8	R/W	Both	
4	1	20	BatchCountLimit	UINT32	8	R/W	Both	
4	1	21	BatchID	STRING	55	R/W	Both	
4	1	22	ActuatorType	INT32	8	R/W	Both	
4	1	23	WeldPressure	REAL	8	R/W	Advanced	
4	1	24	HoldPressure	REAL	8	R/W	Advanced	
4	1	25	FlowRate	REAL	8	R/W	Advanced	
4	1	26	HoldTime	REAL	8	R/W	Both	
4	1	27	MaxWeldTimeOut	REAL	8	R/W	Both	
4	1	28	WeldAmplitude	UINT32	8	R/W	Both	
4	1	29	NumAmpSteps	UINT32	8	R/W	Both	
4	1	30	AmplitudeStepAt	INT32	8	R/W	Both	
4	1	31	AmplitudeStepValue1	REAL	8	R/W	Both	
4	1	32	AmplitudeStepTarget1	UINT32	8	R/W	Both	

Table 2.8 Non-Active Weld Recipe Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
4	1	33	AmplitudeStepRamp1	REAL	8	R/W	Both	
4	1	34	AmplitudeStepValue2	REAL	8	R/W	Both	
4	1	35	AmplitudeStepTarget2	UINT32	8	R/W	Both	
4	1	36	AmplitudeStepRamp2	REAL	8	R/W	Both	
4	1	37	AmplitudeStepValue3	REAL	8	R/W	Both	
4	1	38	AmplitudeStepTarget3	UINT32	8	R/W	Both	
4	1	39	AmplitudeStepRamp3	REAL	8	R/W	Both	
4	1	40	AmplitudeStepValue4	REAL	8	R/W	Both	
4	1	41	AmplitudeStepTarget4	UINT32	8	R/W	Both	
4	1	42	AmplitudeStepRamp4	REAL	8	R/W	Both	
4	1	43	AmplitudeStepValue5	REAL	8	R/W	Both	
4	1	44	AmplitudeStepTarget5	UINT32	8	R/W	Both	
4	1	45	AmplitudeStepRamp5	REAL	8	R/W	Both	
4	1	46	AmplitudeStepValue6	REAL	8	R/W	Both	
4	1	47	AmplitudeStepTarget6	UINT32	8	R/W	Both	
4	1	48	AmplitudeStepRamp6	REAL	8	R/W	Both	
4	1	49	AmplitudeStepValue7	REAL	8	R/W	Both	
4	1	50	AmplitudeStepTarget7	UINT32	8	R/W	Both	
4	1	51	AmplitudeStepRamp7	REAL	8	R/W	Both	
4	1	52	AmplitudeStepValue8	REAL	8	R/W	Both	
4	1	53	AmplitudeStepTarget8	UINT32	8	R/W	Both	
4	1	54	AmplitudeStepRamp8	REAL	8	R/W	Both	
4	1	55	AmplitudeStepValue9	REAL	8	R/W	Both	
4	1	56	AmplitudeStepTarget9	UINT32	8	R/W	Both	
4	1	57	AmplitudeStepRamp9	REAL	8	R/W	Both	
4	1	58	AmplitudeStepValue10	REAL	8	R/W	Both	
4	1	59	AmplitudeStepTarget10	UINT32	8	R/W	Both	
4	1	60	AmplitudeStepRamp10	REAL	8	R/W	Both	
4	1	61	NumPressureSteps	UINT32	8	R/W	Advanced	
4	1	62	PressureStepAt	INT32	8	R/W	Advanced	
4	1	63	PressureStepValue1	REAL	8	R/W	Advanced	
4	1	64	PressureStepTarget1	UINT32	8	R/W	Advanced	
4	1	65	PressureStepRamp1	REAL	8	R/W	Advanced	
4	1	66	PressureStepValue2	REAL	8	R/W	Advanced	
4	1	67	PressureStepTarget2	UINT32	8	R/W	Advanced	

Table 2.8 Non-Active Weld Recipe Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
4	1	68	PressureStepRamp2	REAL	8	R/W	Advanced	
4	1	69	PressureStepValue3	REAL	8	R/W	Advanced	
4	1	70	PressureStepTarget3	UINT32	8	R/W	Advanced	
4	1	71	PressureStepRamp3	REAL	8	R/W	Advanced	
4	1	72	PressureStepValue4	REAL	8	R/W	Advanced	
4	1	73	PressureStepTarget4	UINT32	8	R/W	Advanced	
4	1	74	PressureStepRamp4	REAL	8	R/W	Advanced	
4	1	75	PressureStepValue5	REAL	8	R/W	Advanced	
4	1	76	PressureStepTarget5	UINT32	8	R/W	Advanced	
4	1	77	PressureStepRamp5	REAL	8	R/W	Advanced	
4	1	78	PressureStepValue6	REAL	8	R/W	Advanced	
4	1	79	PressureStepTarget6	UINT32	8	R/W	Advanced	
4	1	80	PressureStepRamp6	REAL	8	R/W	Advanced	
4	1	81	PressureStepValue7	REAL	8	R/W	Advanced	
4	1	82	PressureStepTarget7	UINT32	8	R/W	Advanced	
4	1	83	PressureStepRamp7	REAL	8	R/W	Advanced	
4	1	84	PressureStepValue8	REAL	8	R/W	Advanced	
4	1	85	PressureStepTarget8	UINT32	8	R/W	Advanced	
4	1	86	PressureStepRamp8	REAL	8	R/W	Advanced	
4	1	87	PressureStepValue9	REAL	8	R/W	Advanced	
4	1	88	PressureStepTarget9	UINT32	8	R/W	Advanced	
4	1	89	PressureStepRamp9	REAL	8	R/W	Advanced	
4	1	90	PressureStepValue10	REAL	8	R/W	Advanced	
4	1	91	PressureStepTarget10	UINT32	8	R/W	Advanced	
4	1	92	PressureStepRamp10	REAL	8	R/W	Advanced	
4	1	93	IsCoolingValveEnabled	BOOL	5	R/W	Both	
4	1	94	ExternalAmplitude	BOOL	5	R/W	Both	
4	1	95	TriggerType	INT32	8	R/W	Advanced	
4	1	96	TiggerForce	REAL	8	R/W	Advanced	
4	1	97	TriggerDistance	REAL	8	R/W	Advanced	
4	1	98	PreTriggerEnabled	BOOL	5	R/W	Both	
4	1	99	PreTriggerType	INT32	8	R/W	Both	
4	1	100	PreTriggerAmplitude	INT32	8	R/W	Both	
4	1	101	PreTriggerTime	REAL	8	R/W	Both	
4	1	102	PreTriggerDistance	REAL	8	R/W	Advanced	

Table 2.8 Non-Active Weld Recipe Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
4	1	103	AfterBurstEnabled	BOOL	5	R/W	Both	
4	1	104	AfterBurstAmplitude	INT32	8	R/W	Both	
4	1	105	AfterBurstDelay	REAL	8	R/W	Both	
4	1	106	AfterBurstTime	REAL	8	R/W	Both	
4	1	107	EnergyBreakEnabled	BOOL	5	R/W	Both	
4	1	108	EnergyBreakAmplitude	INT32	8	R/W	Both	
4	1	109	EnergyBreakTime	REAL	8	R/W	Both	
4	1	110	EnergyCompensationEnabled	BOOL	5	R/W	Both	
4	1	111	EnergyCompensationMinValue	REAL	8	R/W	Both	
4	1	112	EnergyCompensationMaxValue	REAL	8	R	Both	
4	1	113	TimeSeekPeriod	REAL	8	R	Both	
4	1	114	IsTimeSeekEnabled	BOOL	5	R	Both	
4	1	115	IsPreWeldSeekEnabled	BOOL	5	R	Both	
4	1	116	IsPostWeldSeekEnabled	BOOL	5	R/W	Both	
4	1	117	ScrubAmplitude	UINT32	8	R/W	Both	
4	1	118	RapidTraverse	BOOL	5	R/W	Advanced	
4	1	119	RapidTraverseDistance	REAL	8	R/W	Advanced	
4	1	120	TriggerLost	BOOL	5	R/W	Advanced	
4	1	121	EnbaleActuatorClear	BOOL	5	R/W	Advanced	
4	1	122	ActuatorClearType	INT32	8	R/W	Advanced	
4	1	123	ActuatorClearTime	REAL	8	R/W	Advanced	
4	1	124	ActuatorClearDistance	REAL	8	R/W	Advanced	
4	1	125	Recipe number/Instance number	UINT32	8	W	Both	

Table 2.9

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter
3	Set Single Parameter
4	Set All Parameter

2.6 Non-Active Suspect and Reject Module (1000 Instances)

The Non-Active Suspect and Reject and Cutoff Module contains all the suspect and reject parameters from the current or active recipe.

Table 2.10 Non-Active Suspect and Reject Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
5	1	1	AllAttribute	-	245	R/W	Advanced	
					125	R/W	Core	
5	1	2	CutOffLimitsEnabled	BOOL	5	R/W	Both	
5	1	3	PeakPowerCutoffEnable	BOOL	5	R/W	Both	
5	1	4	PeakPowerCutoffValue	REAL	8	R/W	Both	
5	1	5	TimeCutoffEnable	BOOL	5	R/W	Both	
5	1	6	TimeCutoffValue	REAL	8	R/W	Both	
5	1	7	FrequencyLowCutoffEnable	BOOL	5	R/W	Both	
5	1	8	FrequencyLowCutoffValue	REAL	8	R/W	Both	
5	1	9	FrequencyHighCutoffEnable	BOOL	5	R/W	Both	
5	1	10	FrequencyHighCutoffValue	REAL	8	R/W	Both	
5	1	11	EnergyCutoffEnable	BOOL	5	R/W	Both	
5	1	12	EnergyCutoffValue	REAL	8	R/W	Both	
5	1	13	GroundDetectCutoffEnable	BOOL	5	R/W	Both	
5	1	14	GroundDetectCutoffValue	REAL	8	R/W	Both	
5	1	15	AbsoluteDistanceCutoffEnable	BOOL	5	R/W	Advanced	
5	1	16	AbsoluteDistanceCutoffValue	REAL	8	R/W	Advanced	
5	1	17	CollapseDistanceCutoffEnable	BOOL	5	R/W	Advanced	
5	1	18	CollapseDistanceCutoffValue	REAL	8	R/W	Advanced	
5	1	19	RejectLimitsEnabled	BOOL	5	R/W	Both	
5	1	20	RejectTimeEnabled	BOOL	5	R/W	Both	
5	1	21	RejectTimeLowEnabled	BOOL	5	R/W	Both	
5	1	22	RejectTimeHighEnabled	BOOL	5	R/W	Both	
5	1	23	RejectTimeLowLimit	REAL	8	R/W	Both	
5	1	24	RejectTimeHighLimit	REAL	8	R/W	Both	
5	1	25	RejectEnergyEnabled	BOOL	5	R/W	Both	
5	1	26	RejectEnergyLowEnabled	BOOL	5	R/W	Both	
5	1	27	RejectEnergyHighEnabled	BOOL	5	R/W	Both	
5	1	28	RejectEnergyLowLimit	REAL	8	R/W	Both	
5	1	29	RejectEnergyHighLimit	REAL	8	R/W	Both	
5	1	30	RejectPeakPowerEnabled	BOOL	5	R/W	Both	
5	1	31	RejectPeakPowerLowEnabled	BOOL	5	R/W	Both	

Table 2.10 Non-Active Suspect and Reject Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
5	1	32	RejectPeakPowerHighEnabled	BOOL	5	R/W	Both	
5	1	33	RejectPeakPowerLowLimit	REAL	8	R/W	Both	
5	1	34	RejectPeakPowerHighLimit	REAL	8	R/W	Both	
5	1	35	RejectFrequencyEnabled	BOOL	5	R/W	Both	
5	1	36	RejectFrequencyLowEnabled	BOOL	5	R/W	Both	
5	1	37	RejectFrequencyHighEnabled	BOOL	5	R/W	Both	
5	1	38	RejectFrequencyLowLimit	REAL	8	R/W	Both	
5	1	39	RejectFrequencyHighLimit	REAL	8	R/W	Both	
5	1	40	RejectAbsoluteDistanceEnabled	BOOL	5	R/W	Advanced	
5	1	41	RejectAbsoluteDistanceLowEnabled	BOOL	5	R/W	Advanced	
5	1	42	RejectAbsoluteDistanceHighEnabled	BOOL	5	R/W	Advanced	
5	1	43	RejectAbsoluteDistanceLowLimit	REAL	8	R/W	Advanced	
5	1	44	RejectAbsoluteDistanceHighLimit	REAL	8	R/W	Advanced	
5	1	45	RejectCollapseDistanceEnabled	BOOL	5	R/W	Advanced	
5	1	46	RejectCollapseDistanceLowEnabled	BOOL	5	R/W	Advanced	
5	1	47	RejectCollapseDistanceHighEnabled	BOOL	5	R/W	Advanced	
5	1	48	RejectCollapseDistanceLowLimit	REAL	8	R/W	Advanced	
5	1	49	RejectCollapseDistanceHighLimit	REAL	8	R/W	Advanced	
5	1	50	RejectTriggerDistanceEnabled	BOOL	5	R/W	Advanced	
5	1	51	RejectTriggerDistanceLowEnabled	BOOL	5	R/W	Advanced	
5	1	52	RejectTriggerDistanceHighEnabled	BOOL	5	R/W	Advanced	
5	1	53	RejectTriggerDistanceLowLimit	REAL	8	R/W	Advanced	
5	1	54	RejectTriggerDistanceHighLimit	REAL	8	R/W	Advanced	
5	1	55	RejectEndWeldForceEnabled	BOOL	5	R/W	Advanced	
5	1	56	RejectEndWeldForceLowEnabled	BOOL	5	R/W	Advanced	

Table 2.10 Non-Active Suspect and Reject Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
5	1	57	RejectEndWeldForceHighEnabled	BOOL	5	R/W	Advanced	
5	1	58	RejectEndWeldForceLowLimit	REAL	8	R/W	Advanced	
5	1	59	RejectEndWeldForceHighLimit	REAL	8	R/W	Advanced	
5	1	60	RejectVelocityEnabled	BOOL	5	R/W	Advanced	
5	1	61	RejectVelocityLowEnabled	BOOL	5	R/W	Advanced	
5	1	62	RejectVelocityHighEnabled	BOOL	5	R/W	Advanced	
5	1	63	RejectVelocityLowLimit	REAL	8	R/W	Advanced	
5	1	64	RejectVelocityHighLimit	REAL	8	R/W	Advanced	
5	1	65	SuspectLimitsEnabled	BOOL	5	R/W	Both	
5	1	66	SuspectTimeEnabled	BOOL	5	R/W	Both	
5	1	67	SuspectTimeLowEnabled	BOOL	5	R/W	Both	
5	1	68	SuspectTimeHighEnabled	BOOL	5	R/W	Both	
5	1	69	SuspectTimeLowLimit	REAL	8	R/W	Both	
5	1	70	SuspectTimeHighLimit	REAL	8	R/W	Both	
5	1	71	SuspectEnergyEnabled	BOOL	5	R/W	Both	
5	1	72	SuspectEnergyLowEnabled	BOOL	5	R/W	Both	
5	1	73	SuspectEnergyHighEnabled	BOOL	5	R/W	Both	
5	1	74	SuspectEnergyLowLimit	REAL	8	R/W	Both	
5	1	75	SuspectEnergyHighLimit	REAL	8	R/W	Both	
5	1	76	SuspectPeakPowerEnabled	BOOL	5	R/W	Both	
5	1	77	SuspectPeakPowerLowEnabled	BOOL	5	R/W	Both	
5	1	78	SuspectPeakPowerHighEnabled	BOOL	5	R/W	Both	
5	1	79	SuspectPeakPowerLowLimit	REAL	8	R/W	Both	
5	1	80	SuspectPeakPowerHighLimit	REAL	8	R/W	Both	
5	1	81	SuspectFrequencyEnabled	BOOL	5	R/W	Both	
5	1	82	SuspectFrequencyLowEnabled	BOOL	5	R/W	Both	
5	1	83	SuspectFrequencyHighEnabled	BOOL	5	R/W	Both	
5	1	84	SuspectFrequencyLowLimit	REAL	8	R/W	Both	
5	1	85	SuspectFrequencyHighLimit	REAL	8	R/W	Both	
5	1	86	SuspectAbsoluteDistanceEnabled	BOOL	5	R/W	Advanced	
5	1	87	SuspectAbsoluteDistanceLowEnabled	BOOL	5	R/W	Advanced	
5	1	88	SuspectAbsoluteDistanceHighEnabled	BOOL	5	R/W	Advanced	

Table 2.10 Non-Active Suspect and Reject Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
5	1	89	SuspectAbsoluteDistanceLowLimit	REAL	8	R/W	Advanced	
5	1	90	SuspectAbsoluteDistanceHighLimit	REAL	8	R/W	Advanced	
5	1	91	SuspectCollapseDistanceEnabled	BOOL	5	R/W	Advanced	
5	1	92	SuspectCollapseDistanceLowEnabled	BOOL	5	R/W	Advanced	
5	1	93	SuspectCollapseDistanceHighEnabled	BOOL	5	R/W	Advanced	
5	1	94	SuspectCollapseDistanceLowLimit	REAL	8	R/W	Advanced	
5	1	95	SuspectCollapseDistanceHighLimit	REAL	8	R/W	Advanced	
5	1	96	SuspectTriggerDistanceEnabled	BOOL	5	R/W	Advanced	
5	1	97	SuspectTriggerDistanceLowEnabled	BOOL	5	R/W	Advanced	
5	1	98	SuspectTriggerDistanceHighEnabled	BOOL	5	R/W	Advanced	
5	1	99	SuspectTriggerDistanceLowLimit	REAL	8	R/W	Advanced	
5	1	100	SuspectTriggerDistanceHighLimit	REAL	8	R/W	Advanced	
5	1	101	SuspectEndWeldForceEnabled	BOOL	5	R/W	Advanced	
5	1	102	SuspectEndWeldForceLowEnabled	BOOL	5	R/W	Advanced	
5	1	103	SuspectEndWeldForceHighEnabled	BOOL	5	R/W	Advanced	
5	1	104	SuspectEndWeldForceLowLimit	REAL	8	R/W	Advanced	
5	1	105	SuspectEndWeldForceHighLimit	REAL	8	R/W	Advanced	
5	1	106	SuspectVelocityEnabled	BOOL	5	R/W	Advanced	
5	1	107	SuspectVelocityLowEnabled	BOOL	5	R/W	Advanced	
5	1	108	SuspectVelocityHighEnabled	BOOL	5	R/W	Advanced	
5	1	109	SuspectVelocityLowLimit	REAL	8	R/W	Advanced	
5	1	110	SuspectVelocityHighLimit	REAL	8	R/W	Advanced	
5	1	111	Recipe number/Instance numner	UINT32	8	W	Both	

Table 2.11

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter
3	Set Single Parameter
4	Set All Parameter

2.7 Non-Active Stack Recipe Module (1000 Instances)

The Non-Active Stack Recipe Module contains all the parameters from the current or active stack recipe.

Table 2.12 Non-Active Stack Recipe Module (1000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
6	1	1	AllAttribute	-	78	R/W	Both	
6	1	2	StackRecipeNumber	INT32	8	R	Both	
6	1	3	FrequencyLow	INT32	8	R/W	Both	
6	1	4	FrequencyHigh	INT32	8	R/W	Both	
6	1	5	PhaseLimitTime	REAL	8	R/W	Both	
6	1	6	PhaseLimit	INT32	8	R/W	Both	
6	1	7	ControlMode	INT32	8	R/W	Both	
6	1	8	BlindTimeWeld	REAL	8	R/W	Both	
6	1	9	AmpProportionalGain	INT32	8	R/W	Both	
6	1	10	AmpIntegralGain	INT32	8	R/W	Both	
6	1	11	AmpDerivativeGain	INT32	8	R/W	Both	
6	1	12	PhaseProportionalGain	INT32	8	R/W	Both	
6	1	13	PhaseIntegralGain	INT32	8	R/W	Both	
6	1	14	PhaseDerivativeGain	INT32	8	R/W	Both	
6	1	15	WeldRampTime	REAL	8	R/W	Both	
6	1	16	StartFrequency	INT32	8	R/W	Both	
6	1	17	MemoryOffset	INT32	8	R/W	Both	
6	1	18	DigitalTune	INT32	8	R/W	Both	
6	1	19	FrequencyOffset	INT32	8	R/W	Both	
6	1	20	EndOfWeldStore	BOOL	5	R/W	Both	
6	1	21	InternalOffsetFlag	BOOL	5	R/W	Both	
6	1	22	Recipe number/Instance number	UINT32	8	R/W	Both	

Table 2.13

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter
3	Set Single Parameter
4	Set All Parameter

2.8 Last Weld Results Module (1 Instance)

The Weld Results Module contains all the weld result characteristics of the last completed weld.

Table 2.14 Last Weld Results Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
7	1	1	AllAttribute	-	333	R	Advanced	
					277	R	Core	
7	1	2	WeldResultIndex	INT32	4	R	Both	
7	1	3	RecipeNumber	INT32	4	R	Both	
7	1	4	WeldRecipeVerNumber	INT32	4	R	Both	
7	1	5	DateTime	STRING	23	R	Both	
7	1	6	StackSerialNumber	STRING	12	R	Both	
7	1	7	PowerSupplySerialNumber	STRING	12	R	Both	
7	1	8	ActuatorSerialNumber	STRING	12	R	Both	
7	1	9	ASCSerialNumber	STRING	12	R	Both	
7	1	10	CycleCounter	INT32	4	R	Both	
7	1	11	WeldMode	INT32	4	R	Both	See Weld Mode Table
7	1	12	WeldTime	REAL	4	R	Both	
7	1	13	HoldTime	REAL	4	R	Both	
7	1	14	WeldEnergy	REAL	4	R	Both	
7	1	15	WeldPeakPower	REAL	4	R	Both	
7	1	16	StartFrequency	UINT32	4	R	Both	
7	1	17	FrequencyChange	INT32	4	R	Both	
7	1	18	CycleTime	REAL	4	R	Both	
7	1	19	Username	STRING	12	R	Both	
7	1	20	PartID	STRING	51	R	Both	
7	1	21	BatchID	STRING	51	R	Both	
7	1	22	TriggerPoint	REAL	4	R	Both	mm (inch)
7	1	23	WeldSonicPoint	REAL	4	R	Both	mm (inch)
7	1	24	HoldPoint	REAL	4	R	Both	mm (inch)
7	1	25	AlarmID	STRING	20	R	Both	
7	1	26	WeldStatus	INT32	4	R	Both	
7	1	27	RecipeStatus	INT32	4	R	Both	See Table Alarm Table
7	1	28	WeldPressure	REAL	4	R	Both	
7	1	29	HoldPressure	REAL	4	R	Both	

Table 2.14 Last Weld Results Module (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
7	1	30	MaxWeldForce	REAL	4	R	Both	N (lbf)
7	1	31	MaxHoldForce	REAL	4	R	Both	N (lbf)
7	1	32	EndHoldForce	REAL	4	R	Both	N (lbf)
7	1	33	EndHoldForce	REAL	4	R	Both	N (lbf)
7	1	34	WeldAbsolute	REAL	4	R	Both	mm (inch)
7	1	35	TotalAbsolute	REAL	4	R	Both	mm (inch)
7	1	36	Velocity	REAL	4	R	Both	
7	1	37	DownSpeed	REAL	4	R	Both	
7	1	38	TriggerDistance	REAL	4	R	Both	mm (inch)
7	1	39	WeldCollapseDistance	REAL	4	R	Both	mm (inch)
7	1	40	HoldCollapseDistance	REAL	4	R	Both	mm (inch)
7	1	41	TotalCollapseDistance	REAL	4	R	Both	mm (inch)

Table 2.15

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter

2.9 Weld Results History Module (200,000 Instances)

The Weld Results Module contains all the weld result characteristics of prior welds.

Table 2.16 Weld Results History Module (200,000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
8	1	1	AllAttribute	-	333	R	Advanced	
					277	R	Core	
8	1	2	WeldResultIndex	INT32	4	R	Both	
8	1	3	RecipeNumber	INT32	4	R	Both	
8	1	4	WeldRecipeVerNumber	INT32	4	R	Both	
8	1	5	DateTime	STRING	23	R	Both	
8	1	6	StackSerialNumber	STRING	12	R	Both	
8	1	7	PowerSupplySerialNumber	STRING	12	R	Both	
8	1	8	ActuatorSerialNumber	STRING	12	R	Both	
8	1	9	ASCSerialNumber	STRING	12	R	Both	
8	1	10	CycleCounter	INT32	4	R	Both	
8	1	11	WeldMode	INT32	4	R	Both	See Weld Mode Table
8	1	12	WeldTime	REAL	4	R	Both	
8	1	13	HoldTime	REAL	4	R	Both	
8	1	14	WeldEnergy	REAL	4	R	Both	
8	1	15	WeldPeakPower	REAL	4	R	Both	
8	1	16	StartFrequency	UINT32	4	R	Both	
8	1	17	FrequencyChange	INT32	4	R	Both	
8	1	18	CycleTime	REAL	4	R	Both	
8	1	19	Username	STRING	12	R	Both	
8	1	20	PartID	STRING	51	R	Both	
8	1	21	BatchID	STRING	51	R	Both	
8	1	22	TriggerPoint	REAL	4	R	Both	mm (inch)
8	1	23	WeldSonicPoint	REAL	4	R	Both	mm (inch)
8	1	24	HoldPoint	REAL	4	R	Both	mm (inch)
8	1	25	AlarmID	STRING	20	R	Both	
8	1	26	WeldStatus	INT32	4	R	Both	
8	1	27	RecipeStatus	INT32	4	R	Both	See Table Alarm Table
8	1	28	WeldPressure	REAL	4	R	Both	
8	1	29	HoldPressure	REAL	4	R	Both	

Table 2.16 Weld Results History Module (200,000 Instances)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type	Unit
8	1	30	MaxWeldForce	REAL	4	R	Both	N (lbf)
8	1	31	MaxHoldForce	REAL	4	R	Both	N (lbf)
8	1	32	EndHoldForce	REAL	4	R	Both	N (lbf)
8	1	33	EndHoldForce	REAL	4	R	Both	N (lbf)
8	1	34	WeldAbsolute	REAL	4	R	Both	mm (inch)
8	1	35	TotalAbsolute	REAL	4	R	Both	mm (inch)
8	1	36	Velocity	REAL	4	R	Both	
8	1	37	DownSpeed	REAL	4	R	Both	
8	1	38	TriggerDistance	REAL	4	R	Both	mm (inch)
8	1	39	WeldCollapseDistance	REAL	4	R	Both	mm (inch)
8	1	40	HoldCollapseDistance	REAL	4	R	Both	mm (inch)
8	1	41	TotalCollapseDistance	REAL	4	R	Both	mm (inch)
8	1	42	Recipe number/Instance number	UINT32	4	W	Both	

Table 2.17

Service Number	Service Name
1	Get Single Parameter
2	Get All Parameter
3	Set Single Parameter

2.10 Weld Recipe Management Module (1 Instance)

The Recipe Management Module saves and validates weld recipes.

Table 2.18 Weld Recipe Management Module (1 Instance)

Slot	Subslot	Index	Parameter Name	Data Type	Size in Bytes	Access
9	1	1	CreateNewRecipe	UINT8	1	W
9	1	3	DeleteInactiveRecipe	UINT32	6	W
9	1	2	DestinationRecipeNumber	UINT32	8	W
9	1	4	WeldRecipeName	STRING	55	W
9	1	5	ReadStatus	BOOL	1	R

Table 2.19

Service Number	Service Name
1	Get Single Parameter
2	Set Single Parameter

2.11 Alarm Log Module (1 Instance)

The Alarm Logs Module provides alarm information about the device.

Table 2.20 Alarm Log Module (1 Instance)

Slot	Subslot	Index	Parameter Name	Data Type	Size in Bytes	Access
10	1	1	LogIndexNumber	UINT32	4	R
			RecipeNumber	INT32	4	
			WeldRecipeVersionNumber	INT32	4	
			AlarmID	INT32	4	
			AlarmType	INT32	4	
			AlarmSubType	INT32	4	
			CycleCounter	INT32	4	
			DateTime	STRING	23	
			MachineName	STRING	16	
			Username	STRING	16	
			AlarmNotes	STRING	101	
10	1	2	LogIndexNumber	UINT32	4	

Table 2.21

Service Number	Service Name
1	Get All Parameter
2	Set Single Parameter

2.12 Event Log Module (1 Instance)

The Event Logs Module provides event information about the device.

Table 2.22 Event Log Module ((1 Instance)

Slot	Subslot	Index	Parameter Name	Data Type	Size in Bytes	Access
11	1	1	LogIndexNumber	UINT32	4	R
			EventID	INT32	4	
			ParameterID	STRING	100	
			DateTime	STRING	23	
			Username	STRING	16	
			OldParameters	STRING	16	
			NewParameters	STRING	16	
			SourceOfEvent	STRING	30	
			PSSerialNumber	STRING	12	
			ASCSerialNumber	STRING	12	
			HMISerialNumber	STRING	12	
			Comment	STRING	64	
11	1	2	LogIndexNumber	UINT32	4	

Table 2.23

Service Number	Service Name
1	Get All Parameter
2	Set Single Parameter

2.13 Token RTC Version Counter Module (1 Instance)

The Version/RTC/Counters/Access Token Module configures the setting of the control token.

Table 2.24 Token RTC Version Counter Module (1 Instance)

Slot	Subslot	Index	Parameter Name	Data Type	Size in Bytes	Access
12	1	1	AccessToken	UINT8	2	R/W
12	1	2	RTC	UINT32	4	R/W
12	1	3	ACVersion	STRING	16	R
			SCVersion	STRING	16	
			PCVersion	STRING	16	
12	1	4	LifetimeWeldCyclesCounter	UINT32	8	
			TotalAlarmCyclesCounter	UINT32	8	
			ActuatorCyclesRunCounter	UINT32	8	
			ConverterCyclesRunCounter	UINT32	8	
			HornCyclesCounter	UINT32	8	
			CylinderCounter	UINT32	8	
			PowerSupplyOverloadCounter	UINT32	8	
			PartsPerMinuteCounter	UINT32	8	

Table 2.25

Service Number	Service Name
1	Get All Parameter
2	Set Single Parameter

2.14 System Configuration Import and Export (1 Instance)

The system configuration general module parameters are below.

Table 2.26 System Configuration Import and Export (1 Instance)

Slot	Subslot	Index	Attribute Name	Data Type	Size in Bytes	Access	Actuator Type
13	1	1	WelderName	STRING	21	R/W	Both
13	1		AuthorityCheck	UINT32	4	R/W	Both
13	1		MemoryFullAction	UINT32	4	R/W	Both
13	1		BarcodeRecallRecipePrefix	STRING	1	R/W	Both
13	1		PowerUpOption	UINT32	4	R/W	Both
13	1		PartID	BOOL	1	R/W	Both
13	1		Unit	UINT32	4	R/W	Both
13	1		ClearMemoryAtPowerup	BOOL	1	R/W	Both
13	1		ClearMemoryWithReset	BOOL	1	R/W	Both
13	1		ParallelWeldResultStorageStatus	BOOL	1	R/W	Both
13	1		ClampOnAlarm	BOOL	1	R/W	Both
13	1		WeldRecipeUniqueSNStatus	BOOL	1	R/W	Both
13	1		ASCIPAddress	INT32	4	R/W	Both

Table 2.27

Service Number	Service Name
1	Get All Parameter
2	Set All Parameter

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Chapter 3: Cyclic Data

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3.1 I/O Control Words (Polaris Inputs/PLC Outputs)

Table 3.1 I/O Control Words (Polaris Inputs/PLC Outputs)

Control Words				
Data	Description	Data Type	Unit	Access
0	Control Word 0	UINT	NA	W
1	Control Word 1			
2	Control Word 2			
3	Active Recipe			
4	External Weld Amplitude		%	
5	Custom Control Data 1	REAL		
6	Custom Control Data 2	REAL		
7	Custom Control Data 3	REAL		

3.1.1 Control Word 0

Table 3.2 Control Word 0

Data [0] Control Word 0				
Bit	Bit Name	Function Name	Description	Logic
Bit	Bit Name	Function Name	Description	Logic
0	USDIS	U/S Disable	Disable ultrasonics from during the weld cycle.	1 = Disable ultrasonics
1	ES	E-Stop	Not used.	-
2	HPOS	Home Position	Not used.	-
3	RPOS	Ready Position	Not used.	-
4	HFS0	Stack Recipe Number 0	Not used.	-
5	HFS1	Stack Recipe Number 1	Not used.	-
6	HFS2	Stack Recipe Number 2	Not used.	-
7	HFS3	Stack Recipe Number 3	Not used.	-
8	RCPB0	Weld Recipe Bit 0	Not used.	-
9	RCPB1	Weld Recipe Bit 1	Not used.	-
10	RCPB2	Weld Recipe Bit 2	Not used.	-
11	RCPB3	Weld Recipe Bit 3	Not used.	-
12	RCPB4	Weld Recipe Bit 4	Not used.	-
13	HDEL	Reserved for Hold Delay	to delay the start of the hold cycle after the weld cycle is complete.	-
14	MA	Manual/Auto	Not used.	-
15	UILOCK	HMI Lock	HMI in Lock Mode	1 = HMI in LOCK mode

3.1.2 Control Word 1

Table 3.3 Control Word 1

Control Word 1				
Bit	Bit Name	Function Name	Description	Logic
Bit	Bit Name	Function Name	Description	Logic
0	FCT	Weld Function	This Bit in combination with Bit 9 needs to be set to 1 to start a weld.	
1	SFCT	Enable Stack Function	Must be 1 in conjunction with SFCT0, SFCT1, or SFCT2 to enable the stack function	
2	SFCT0	To perform a specific stack function, the SFCT bits shall be set in accordance with the Stack Function table below.	1 = Set Test in progress	See Stack Function Table
3	SFCT1		1 = Set Horn Scan in progress	
4	SFCT2		1 = Set Seek in progress	
5	EXTWA	External Weld Amplitude	1 = External weld amplitude enabled	
6	MCLR	Memory Clear	1 = Memory offset will be set to 0	
7	RES	Reserved	Not used	
8	RST	Reset	1 = Reset all alarms	1 = Clear All alarms
9	ON	Run Ultrasonics	1 = Will turn on ultrasonics based on combination of SFCT or FCT bits.	
10	CYAB	Cycle Abort	abort a running cycle and returning the actuator to home position.	1 = Aborts weld cycle
11	RES	Reserved		
12	GNDDT	Ground Detect	1 = Ground has been detected	
13	APROF	Amplitude Profile	1 = Switch from amplitude 1 to amplitude 2(future implementation scope) Polaris - step -1 to 10	
14	RES	Reserved		
15	RES	Reserved		

Table 3.4 Stack Function

Stack Function (SFCT bits in Control Word 1)				
Bit	Name	Test	Scan	Seek
CTRL1/1	SFCT	1	1	1
CTRL1/2	SFCT0	1	0	0
CTRL1/3	SFCT1	0	1	0
CTRL1/4	SFCT2	0	0	0

3.1.3 Control Word 2

Table 3.5 Control Word 2

Control Word 2				
Bit	Bit Name	Function Name	Description	Logic
0	ACFT	Enable Actuator Function	Must be 1 in conjunction with AFCT0, AFCT1, or AFCT2 to enable the actuator function.	See Actuator Function table.
1	ACFT0	To perform a specific actuator function, the ACFT bits shall be set in accordance with the Actuator Function table below.	Find Part Contact	
2	ACFT1		Horn Down	
3	ACFT2		Short/Quick Calibration	
4	RES	Reserved		
5	RES	Reserved		
6	RES	Reserved		
7	RES	Reserved		
8	RES	Reserved		
9	RES	Reserved		
10	RES	Reserved		
11	RES	Reserved		
12	RES	Reserved		
13	RES	Reserved		
14	RES	Reserved		
15	RES	Reserved		

Table 3.6 Actuator Function

Actuator Function (AFCT bits in Control Word 2)				
Bit	Name	Horn Down	Horn Clamp	Short Calibration
CTRL2/1	ACFT	1	1	1
CTRL2/2	ACFT0	1	0	1
CTRL2/3	ACFT1	1	0	0
CTRL2/4	ACFT2	0	1	1

3.2 I/O Status Words (Polaris Outputs/PLC Inputs)

NOTE	
	Imperial or Metric units are set in the system configuration screen. The I/O units automatically configure to match the unit setting in the system configuration screen.

Table 3.7 I/O Status Words (Polaris Outputs/PLC Inputs)

Status Word					
Data	Description	Data Type	Access	Unit	
				Metric	Imperial
0	STAT0 (Status Word 0)	UINT16	R	NA	
1	STAT1 (Status Word 1)				
2	STAT2 (Status Word 2)				
3	Active Recipe Number				
4	Amplitude Output	UINT32		%	
5	Current			%	
6	Phase			°	
7	Frequency			Hz	
8	Request Amplitude			%	
9	Time	REAL		ms	
10	Power			W	
11	Energy			J	
12	Force			N	lbs
13	Velocity			mm/s	in/s
14	Absolute Distance			mm	in
15	Collapse Distance			mm	in
16	Last Active Alarm	UINT32		NA	
17	Custom Status Data 1	REAL			
18	Custom Status Data 2				
19	Custom Status Data 3				

3.2.1 Status Word 0

Table 3.8 Status Word 0

Status Word 0				
Bit	Bit Name	Function Name	Description	Logic
0	NO-B	Non Cycle Overload Group B		
1	ES	Emergency Stop Active	1 = Emergency stop active	
2	TEE	Reserved		
3	HFSE	Reserved		
4	HFS0	Stack Preset Number 0		
5	HFS1	Stack Preset Number 1		
6	HFS2	Stack Preset Number 2		
7	HFS3	Stack Preset Number 3		
8	RCPB0	Weld Preset Number 0		
9	RCPB1	Weld Preset Number 1		
10	RCPB2	Weld Preset Number 2		
11	RCPB3	Weld Preset Number 3		
12	RCPB4	Weld Preset Number 4		
13	PSCA	Preset Change Complete	1 = Preset change complete	
14	MA	Manual/Auto Mode Active	1 = Auto Mode	
15	OL-0	Overload Group 0	1 = Overload has occurred	

3.2.2 Status Word 1

Table 3.9 Status Word 1

Status Word 1				
Bit	Bit Name	Function Name	Description	Logic
0	SE-2	Setup Group 2	1 = Setup alarm has occurred	
1	CM-3	Cycle Modified Group 3	1 = Cycle modified alarm has occurred	
2	WA-4	Warning Group 4	1 = Warning alarm has occurred	
3	EQ-6	Equipment Failure Group 6	1 = Equipment failure alarm has occurred	
4	NC-7	No Cycle Group 7	1 = No cycle alarm has occurred	
5	CF-8	Communication Failure Group 8	1 = Communication alarm has occurred	
6	HW-A	Hardware Group A	1 = Hardware alarm has occurred	
7	CU-1	Cutoff Group 1	1 = Cutoff alarm has occurred	
8	TP-9	Reserved		
9	SM	Reserved		
10	R_S	Ready State	1 = Ultrasonics off and system is Ready	
11	ON	Ultrasonics Active	1 = Ultrasonics active	
12	OK	End of Weld Cycle Without Error	1 = End cycle without error	
13	LM-5	Limit Group 5	1 = Limit alarm has occurred	
14	MCLR	Memory Clear	1 = Memory offset will be set to 0	
15	ACLR	Actuator Clear	1 = Actuator clear is enabled	

3.2.3 Status Word 2

Table 3.10 Status Word 2

Status Word 2				
Bit	Bit Name	Function Name	Description	Logic
0	CYRU	Cycle Running	1 = Weld in Progress	
1	SEEK	Horn Seek In progress	1 = Horn Seek in progress	
2	WACT	Weld Active	1 = Weld is Active	
3	HACT	Hold Active	1 = Hold is Active	
4	HPOS	Home Position	1 = Actuator at Home position	
5	RPOS	Ready Position	1 = Actuator at Ready position	
6	PBR	PB Release	1 = Palm buttons are released	
7	GR_AL	General Alarm	1 = Alarm is raised by the system.	
8	STP_MD	Setup Mode	1 = Actuator setup screen active.	
9	VAL_R	Validated Recipe		
10	S_AL	Suspect Alarm		
11	R_AL	Reject Alarm		
12	ABRST	Afterburst Active	1 = Afterbusrt is Active	
13	FPC	Find Part Contact In progress	1 = Part contact in progress	
14	H_SCAN	Horn Scan In progress	1 = Horn Scan in progress	
15	H_TEST	Horn Test In progress	1 = Horn Test in progress	

3.3 Custom Status Data

The following table shows the available drop-down list from HMI screen for configurable status words.

Table 3.11 Custom Status Data

Status Word Disable (Default)
Weld Mode
Time Mode
Energy Mode
Peak Power Mode
Ground Detect Mode
Absolute Distance Mode (Polaris Advanced Only)
Collapse Distance Mode (Polaris Advanced only)
Weld Amplitude
Downspeed (Polaris Advanced only)
Trigger Force (Polaris Advanced only)
Weld Pressure (Polaris Advanced only)
Hold Time
Hold Pressure (Polaris Advanced only)

Table 3.12 Custom Control Data

Control Word Disable (Default)
Weld Mode
Time Mode
Energy Mode
Peak Power Mode
Ground Detect Mode
Absolute Distance Mode (Polaris Advanced only)
Collapse Distance Mode (Polaris Advanced only)
Weld Amplitude
Downspeed (Polaris Advanced only)
Trigger Force (Polaris Advanced only)
Weld Pressure (Polaris Advanced only)
Hold Time
Hold Pressure (Polaris Advanced only)

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