



EtherNet/IP™



Polaris

Ultrasonic Welder

EtherNet/IP

User Guide

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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 Introduction

This user guide describes the implementation of a Polaris Advanced and Core welding system within an EtherNet/IP network. The guide provides an overview of the specifications, I/O and messaging structures, and programming examples with timing charts.

The Polaris system provides standard EtherNet/IP communication over an industrial network and is fully ODVA conformant. Both real-time implicit and asynchronous explicit messaging are supported. Control and status updates are communicated cyclically via implicit messaging. Explicit messaging can be used to obtain the end-of-weld-result attributes and to configure the weld recipe parameters.

The examples provided in this guide were developed using Rockwell Automation's Studio 5000 Logix Designer® Version 32 and CompactLogix L16ER®.

1.2 Declaration of Conformity

Figure 1.1 Declaration of Conformity - Page 1 of 2



DECLARATION OF CONFORMITY

Declaration of Conformity (DOC) Reference Information

File Number: 12652.02 Part 1 of 1 Year Last Issued: 2026

Length of Validity: Continues in effect so long as the named entity (i) remains an ODVA Licensed Vendor for the ODVA technology(ies) defined by the above specification(s); (ii) continues to fulfill its user responsibilities as defined in its Terms of Usage Agreement with ODVA; and (iii) the CIP Identity for the Product(s) remains identical to those enumerated in this Declaration of Conformity.

ODVA Licensed Vendor to Whom this DOC Has Been Issued

Entity Name: Branson Ultrasonics Vendor ID: 1283

Overview of Compliant Product(s) Covered by This DOC
(The list of product(s) covered by this DOC begins on page 2.)

Network(s) Supported: EtherNet/IP

Distinctive CIP Services Supported: None

CIP Device Profile Supported: Generic Device (keyable)

Test Date: January 26, 2026

Classification of Declaration: Product Family

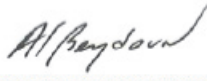
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The EtherNet/IP™ Specification (CT21)

This Declaration of Conformity issued on March 3, 2026 on behalf of ODVA by:


 Dr. Al Beydoun, President and Executive Director

Applicable Adjunct test certifications and list of product(s) covered by this DOC begin on page 2.

Figure 1.2 Declaration of Conformity - Page 2 of 2



DECLARATION OF CONFORMITY

Declaration of Conformity (DOC) Reference Information

File Number:

12652.02

Year Last Issued

2026

Part

1 of 1

Identity for Product(s) Covered Under this Declaration of Conformity

No.	Product Code	Product Name	Product Revision
1	5	Polaris Advanced	1.002
2	4	Polaris Core	1.002

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1.3 Network Settings

	NOTE
	This section provides the basic steps for configuring the network settings of the Polaris EtherNet/IP 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 EtherNet/IP system. The Polaris system is ODVA conformant and meets the requirements outlined in the CIP specifications Volumes 1 and 2.

Table 1.1 Default Network Settings

Description		Specification
Default IP Address		192.168.0.100
Connection Topology		Star, Linear, Ring, and Hybrid
Transmission Types		Unicast and Broadcast
Transmission Rate		10 and 100 Mbps Integrated Switch
Transmission Cable		Cat-6 Shielded
Implicit I/O Data	Connection Type	Exclusive Owner
	Cyclical Time	1 ms minimum
	Class 1 Connections	5
Explicit Messaging	Class 3 Connections	10
	UCMM Connections	10

1.4 LED Status Indicator

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

Figure 1.3 LED Status Indicator

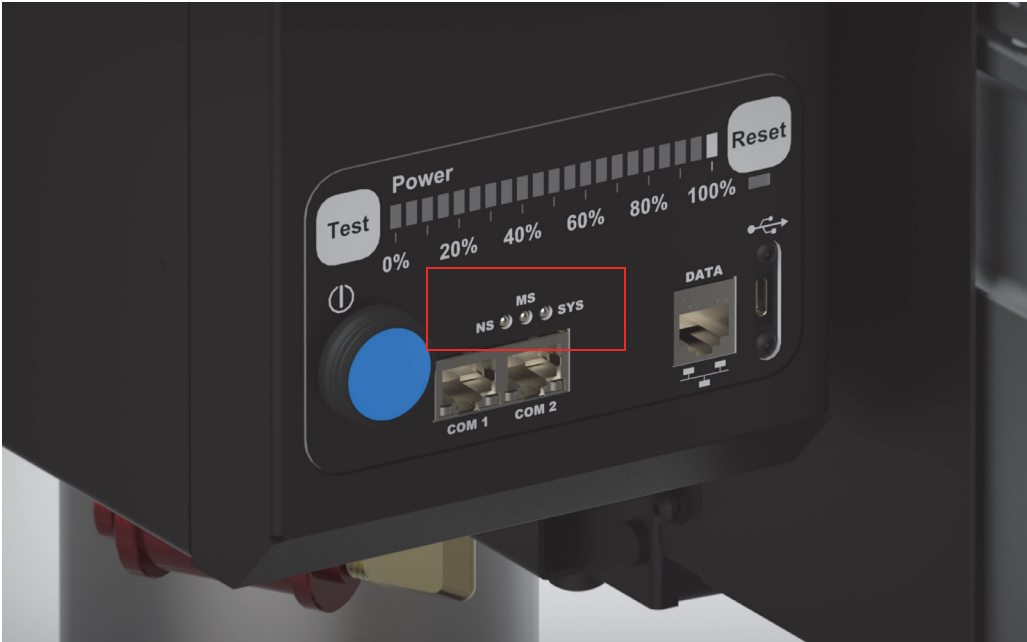


Table 1.2 LED Status Indicator

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 1.2 LED Status Indicator

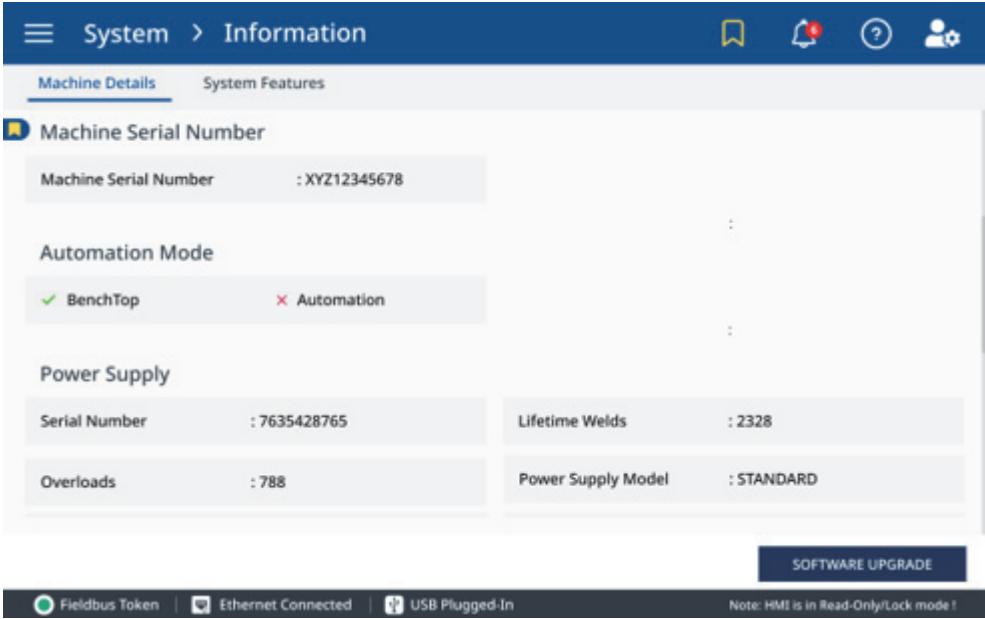
LED	Color	State	Description
MS	 Off	Off	No error.
	 Red	Flashing (1 Hz, 3 s)	DCP signal service is initiated via the bus.
	 Red	On	Watchdog timeout; channel, generic or extended diagnosis present; system error.
NS	 Off	Off	No error.
	 Red	Flashing (2 Hz)	No data exchange.
	 Red	On	No configuration; or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

1.5 Polaris Configuration and EtherNet/IP Availability

The Polaris HMI **System > Information > Machine Details** screen indicates whether the system is configured for automation or benchtop mode.

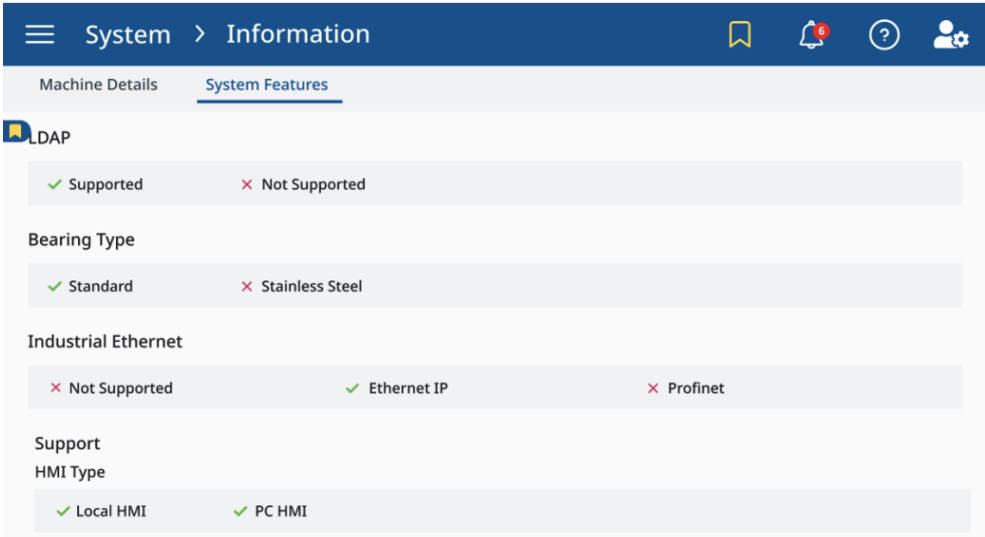
When configured for Automation mode, weld cycle and actuator down functions can be initiated through I/O implicit messaging. When configured for benchtop mode, weld cycle and actuator down functions such as Horn Down, can only be initiated using relay contacts with the actuator remote start cable.

Figure 1.4 Machine Details



The availability of EtherNet/IP is indicated in the **System > Information > System Features** screen.

Figure 1.5 System Features

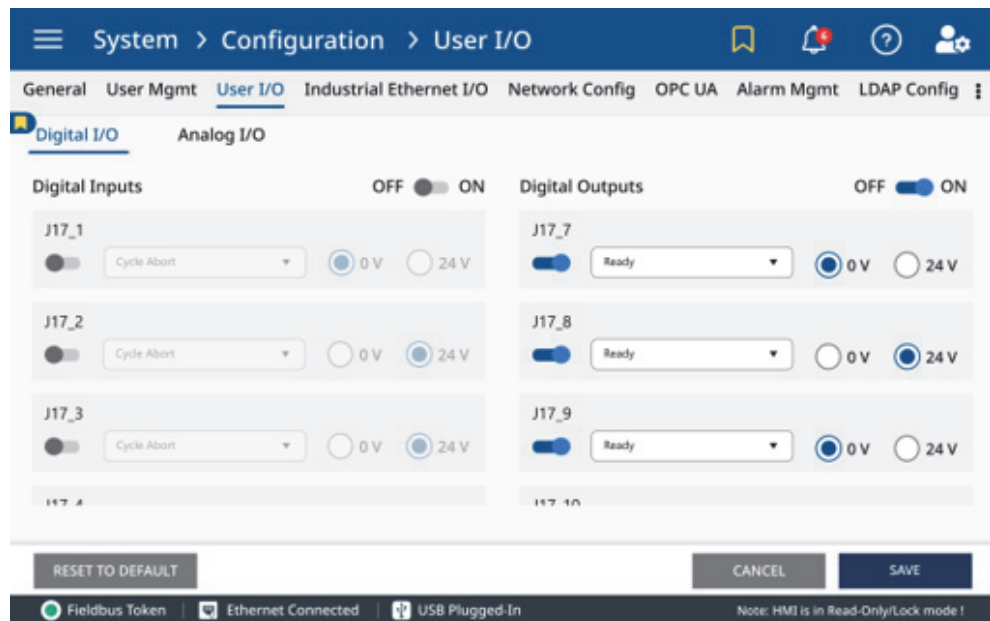


1.6 User I/O Settings

If EtherNet/IP is used for I/O control, the digital input I/O settings in the HMI System > Configuration > User I/O must be set to OFF. If the digital inputs are configured as ON, the I/O connector will control the input command functions.

The digital output settings have no effect on the EtherNet/IP I/O output. When set to ON, the I/O connector outputs are in parallel with the EtherNet/IP outputs.

Figure 1.6 User I/O Settings



1.7 Start Cable Actuator J905 Connections

The remote start cable to the Polaris actuator's connector J905 will need to be wired for either automation or benchtop mode, depending on how the system was originally configured. The diagram below illustrates the wiring for automation and benchtop mode.

1.7.1 Automation Mode

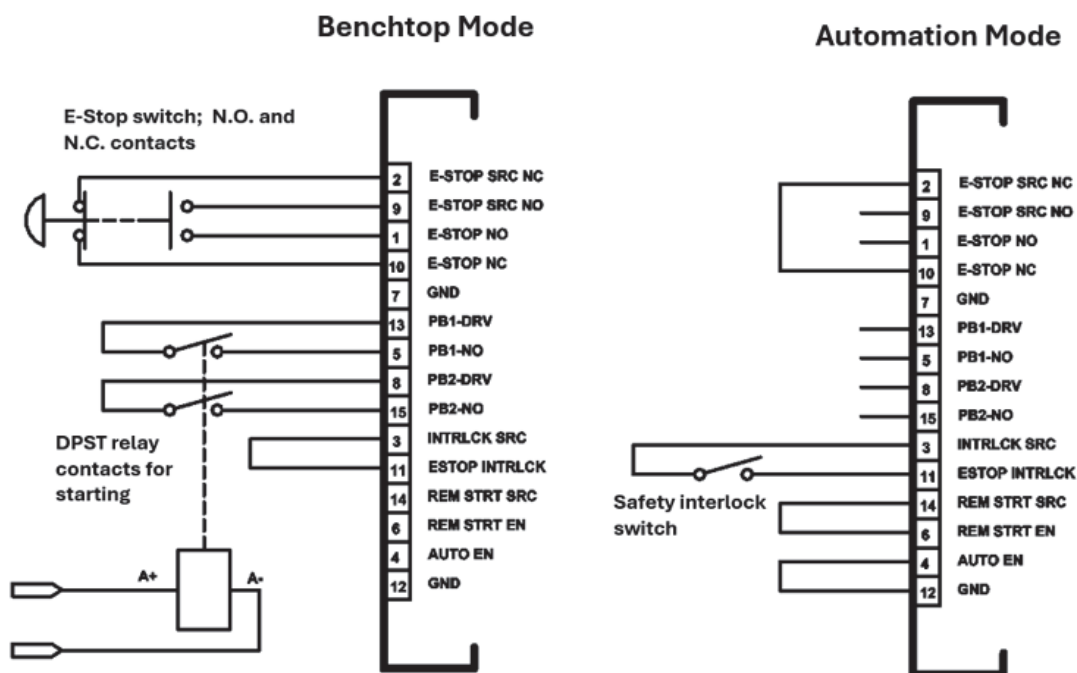
In automation mode, implicit I/O control is used for initiating weld cycles and actuator control functions, such as Horn Down. When configured for automation mode, an interlock cable is provided as part of the system. It is the user's responsibility to connect the cable to a certified safety interlock switch. This connection is necessary to activate the ultrasonic system and to uphold safety protocols during operation.

1.7.2 Benchtop Mode

In benchtop mode, relay start contacts wired to the remote start cable are required to initiate a weld cycle and move the actuator down. The system requires two start switches and one emergency stop connection.

The start switches and E-stop switches need to be electrically isolated from each other to complete their circuit closure. Solid state switches may be used if the leakage current is less than 0.1 mA. The start switches must be closed within 200 milliseconds of each other and must remain closed until the PB Release signal is logic high.

Figure 1.7 Start Cable Actuator J905 Connections



1.8 Configuring The Polaris EtherNet/IP Network Settings

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

	NOTE
	An Ethernet cable connection between the Polaris EtherNet/IP 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 EtherNet/IP system must be power-cycled for the changes to take effect.

Figure 1.8 Configuring The Polaris EtherNet/IP Network Settings

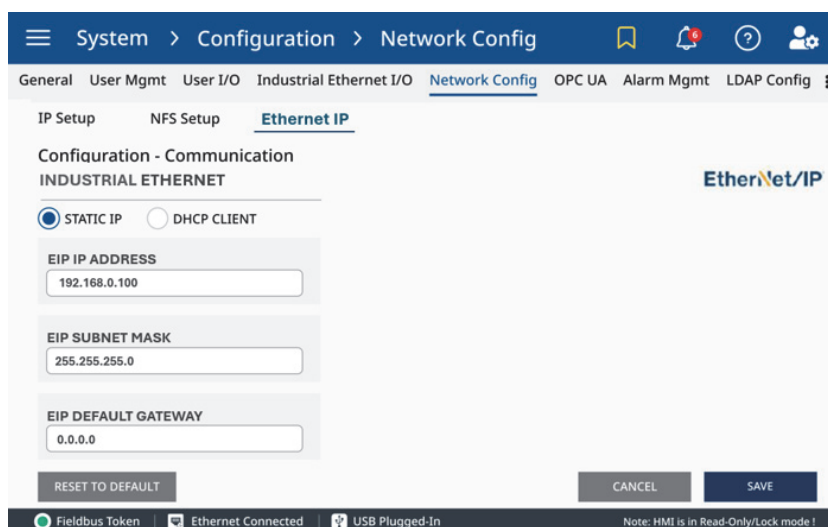


Table 1.3 Configuring The Polaris EtherNet/IP Network Settings

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 EtherNet/IP system, wait a few moments, and then turn power back on.

Table 1.4 Default Network Settings

Setting	Default
Get Dynamic IP (Enable DHCP)	Disabled
IP Address	192.168.0.100
Subnet Mask	255.255.255.0
Gateway	0.0.0.0
Name Server	0.0.0.0
Name Server 2	0.0.0.0
Domain Name	-

1.9 Polaris EtherNet/IP Connectivity Testing

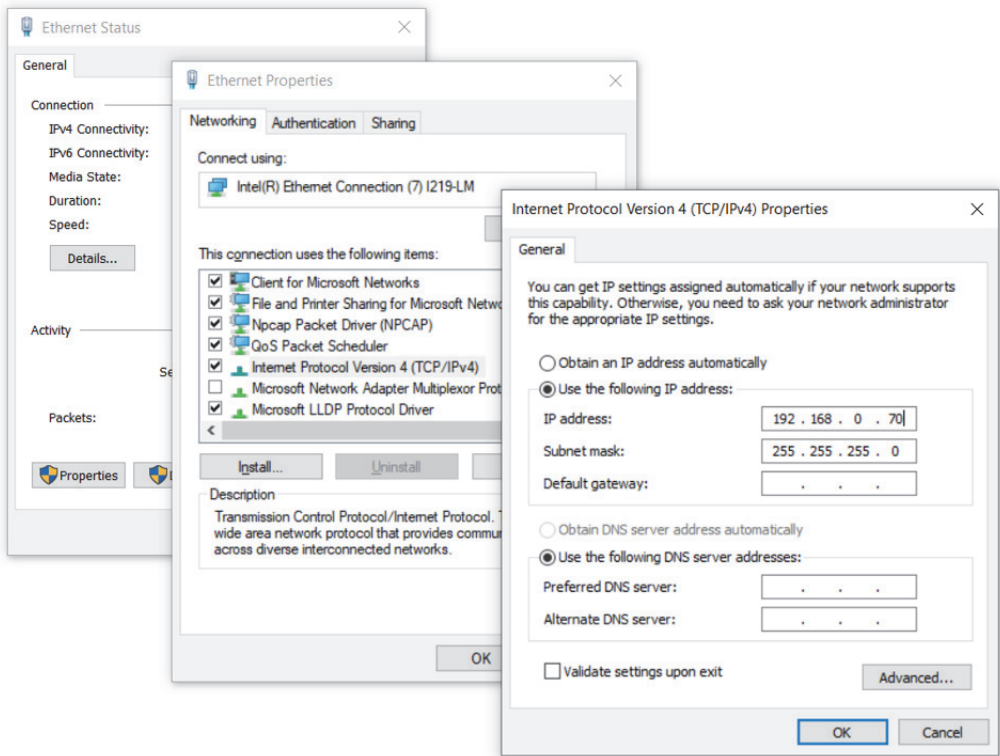
After the Polaris EtherNet/IP IP address is set, connectivity can be tested using the PC/Laptop Ping Command Prompt. Before testing, the PC/Laptop's Ethernet IP must be set to the same subnet as the Polaris EtherNet/IP address.

1.9.1 Configuring the PC/Laptop For Testing

Table 1.5 Configuring the PC/Laptop For Testing

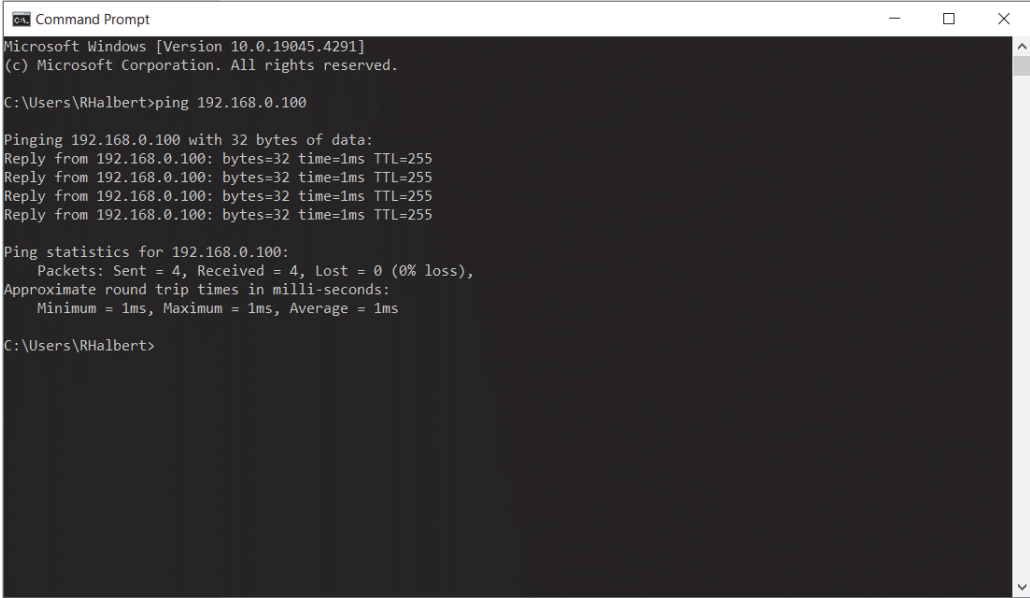
Step	Instructions
1	Connect an Ethernet cable between the Polaris EtherNet/IP port and the PC/Laptop RJ45 Ethernet port. NOTE A USB to Ethernet Adapter may be required if the PC/Laptop does not provide an RJ45 port.
2	Set the Static IP Address for the PC/Laptop: a. Go to Settings > Network & Internet > 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 192.168.0.100, set the PC/Laptop to 192.168.0.101 e. Set the Subnet Mask to 255.255.255.0 f. Select OK and Close

Figure 1.9 Configuring the PC/Laptop For Testing



1.9.2 Using Ping For Connectivity Testing

Table 1.6 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 EtherNet/IP system), e.g. Ping 192.168.0.100
3	Review the results. a. If “Reply from” is received, the connectivity is good b. If “Request timed out” is received, no connection was made: - Verify Polaris EtherNet/IP IP setting - Verify the PC/Laptop IP setting - Verify a good cable connection between the Polaris EtherNet/IP and PC/Laptop - Power cycle the Polaris system - Repeat ping command until a “Reply from” is established Figure 1.10 Using Ping For Connectivity Testing 

1.10 Polaris Generic Ethernet Module

The configuration for using the Generic Ethernet Module is shown below.



NOTE

The **Comm Format** must be set for **Data-INT**.
REAL formatted data type is not available when using the Generic Ethernet Module.

Figure 1.11 Polaris Generic Ethernet Module

GeneralConnectionModule Info

Type:ETHERNET-MODULE Generic Ethernet Module

Vendor:Rockwell Automation/Allen-Bradley

Parent:Local

Name:gsx_generic

Description:

Comm Format:Data - INT

Address / Host Name

☒ IP Address:

192 . 168 . 0 . 103

☐ Host Name:

Connection Parameters

Input:101

Assembly Instance:101

Size:36 (16-bit)

Output:100

Assembly Instance:100

Size:16 (16-bit)

Configuration:102

Assembly Instance:102

Size:0 (8-bit)

Status Input:

Status Output:

Status: Offline

OK

Cancel

Apply

Help

1.11 Polaris EtherNet/IP Electronic Data Sheet (EDS) File

The EDS file is helpful for integrating the Polaris system with an EtherNet/IP network. It enables the programmer to quickly identify and map the Polaris I/O tags within the control system.

You can download the required EDS file from the ODVA Marketplace at the following link:

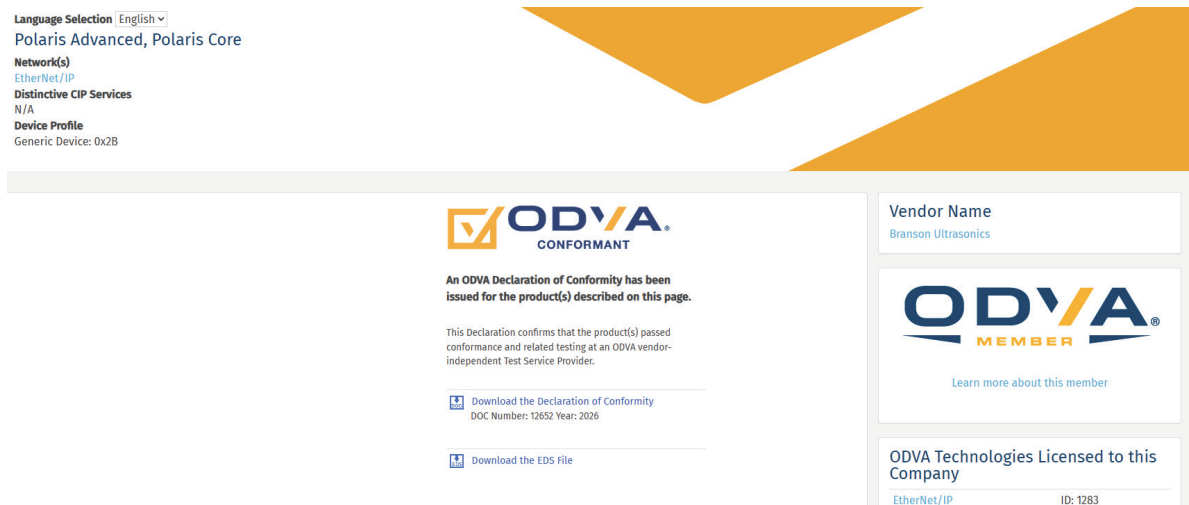
<https://marketplace.odva.org/products/2873-polaris-advanced-polaris-core>

The Polaris system is available in two configurations:

Advanced Model: Requires the installation of the **Polaris_Advanced_EIP_EDS.eds** file.

Core Model: Requires the installation of the **Polaris_Core_EIP_EDS.eds** file.

Figure 1.12 ODVA Marketplace



1.12 EDS Module Input and Output Controller Tags

Input and output tags with description and logic or numerical range values.

Table 1.7 EDS Module Input Tags

Tag Name	Data Type	Logic/Value Range
STAT0 (Status Word 0)	UINT16	
STAT1 (Status Word 1)	UINT16	
STAT2 (Status Word 2)	UINT16	
Active Recipe Number	UINT16	
Amplitude Output	UINT32	%
Current	UINT32	%
Phase	UINT32	°
Frequency	UINT32	Hz
Request Amplitude	UINT32	%
Time	REAL	ms
Power	REAL	W
Energy	REAL	J
Force	REAL	N lbs
Velocity	REAL	mm/s in/s
Absolute Distance	REAL	mm in
Collapse Distance	REAL	mm in
Last Active Alarm	UINT32	
Custom Status Data 1	REAL	
Custom Status Data 2	REAL	
Custom Status Data 3	REAL	
Emergency Stop Active	BOOL	1 = Emergency stop active
Ready State	BOOL	1 = Ultrasonics off and system is Ready
Ultrasonics Active	BOOL	1 = Ultrasonics active
Cycle OK	BOOL	1 = End cycle without error
Memory Clear	BOOL	1 = Memory offset will be set to 0
Actuator Clear	BOOL	1 = Actuator clear is enabled
Cycle Active	BOOL	1 = Weld in Progress
Seek Active	BOOL	1 = Horn Seek in progress
Hold Active	BOOL	1 = Hold is Active
Home Position	BOOL	1 = Actuator at Home position

Table 1.7 EDS Module Input Tags

Tag Name	Data Type	Logic/Value Range
PB Release	BOOL	1 = Palm buttons are released
General Alarm	BOOL	1 = Alarm is raised by the system.
Setup Mode	BOOL	1 = Actuator setup screen active
Afterburst Active	BOOL	1 = Afterbusrt is Active
Scan Active	BOOL	1 = Horn Scan in progress
Test Active	BOOL	1 = Horn Test in progress

Table 1.8 EDS Module Output Tags

Tag Name	Data Type	Logic/Value Range
CTRL0 (Control Word 0)	UINT16	
CTRL1 (Control Word 1)	UINT16	
CTRL2 (Control Word 2)	UINT16	
Set Active Recipe	UINT16	
External Weld Amplitude	UINT16	%
Custom Control Data 1	REAL	
Custom Control Data 2	REAL	
Custom Control Data 3	REAL	
U/S Disable (Disable the Ultrasonics)	BOOL	1 = Disable the Ultrasonics
Hold Delay	BOOL	Delay hold after weld is complete
HMI Lock	BOOL	1 = HMI in LOCK mode
Weld Function (FCT)	BOOL	This Bit in combination with Run Ultrasonics need to be set to 1 to start a weld
Enable Stack Function (SFCT)	BOOL	Must be 1 in conjunction with SFCT0, SFCT1, or SFCT2 to enable the stack function
SFCT0	BOOL	See Table 1.9 Stack Function
SFCT1	BOOL	
SFCT2	BOOL	
External Weld Amplitude	BOOL	1 = External weld amplitude enabled
Memory Clear	BOOL	1 = Memory offset will be set to 0
Reset Alarm	BOOL	1 = Reset all alarms
Run Ultrasonics	BOOL	1 = Will turn on ultrasonics based on combination of SFCT or FCT bits.
Cycle Abort	BOOL	abort a running cycle and returning the actuator to home position
Enable Actuator Function	BOOL	Must be 1 in conjunction with AFCT0, AFCT1, or AFCT2 to enable the actuator function.

Table 1.8 EDS Module Output Tags

Tag Name	Data Type	Logic/Value Range
ACFT0	BOOL	See Table 1.10 Actuator Function
ACFT1	BOOL	
ACFT2	BOOL	

Table 1.9 Stack Function

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

Table 1.10 Actuator Function

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

1.13 Explicit Messaging for End of Weld Results

Asynchronous explicit messaging is supported.

1.13.1 Get Messaging for End of Weld Results

The End of Weld Results data can be requested when the Ready Position bit transitions from 0 to 1. The example below uses the Get Attribute Single to request the end of weld result energy value in Joules.

Get Weld Energy Message:

Message Type = CIP Generic

Service Code = 0xE

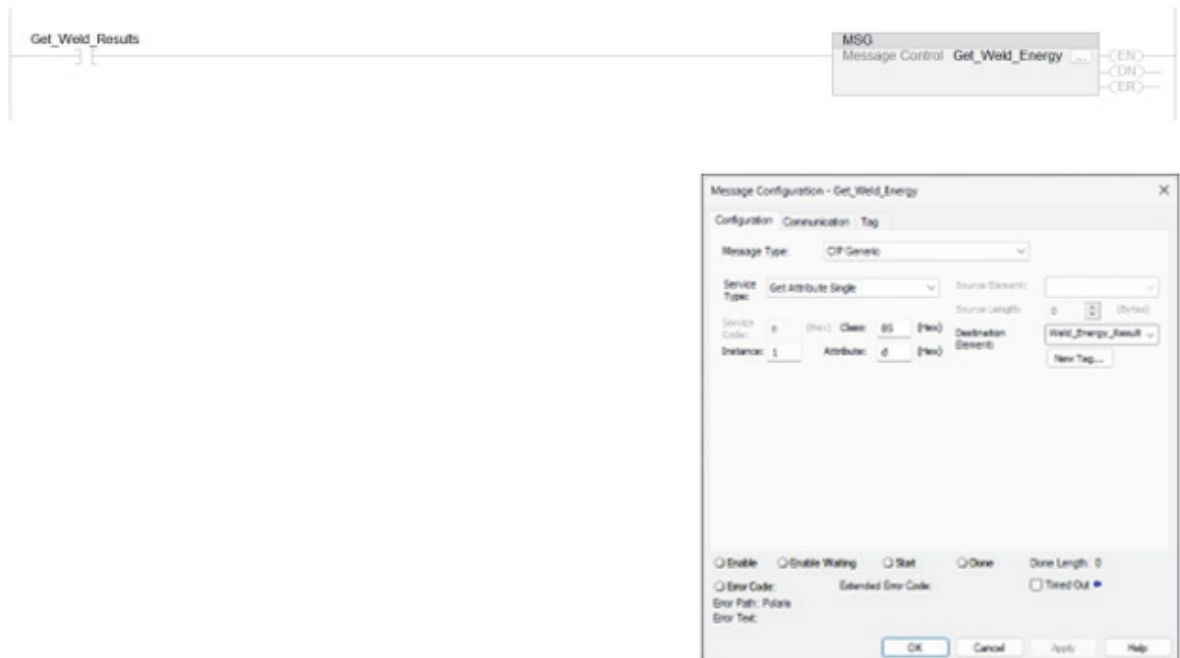
Object Class = 0x85

Instance = 1

Weld Energy Attribute = 0xd

Destination Element = Weld_Energy_Result (REAL)

Figure 1.13 Get Messaging for End of Weld Results



The end of weld results for the last completed weld are accessible after the ready state bit R_S transitions from false to true. The last weld data remains unchanged until the next weld is finished and the ultrasonic horn returns to the home position. At that point, the data for the end of weld results updates.

To minimize the delay time between when the ultrasonic horn returns to the home position and the system is in a ready state, set and save the Parallel Weld Result Storage to enabled.

Figure 1.14 End of Weld Retuls

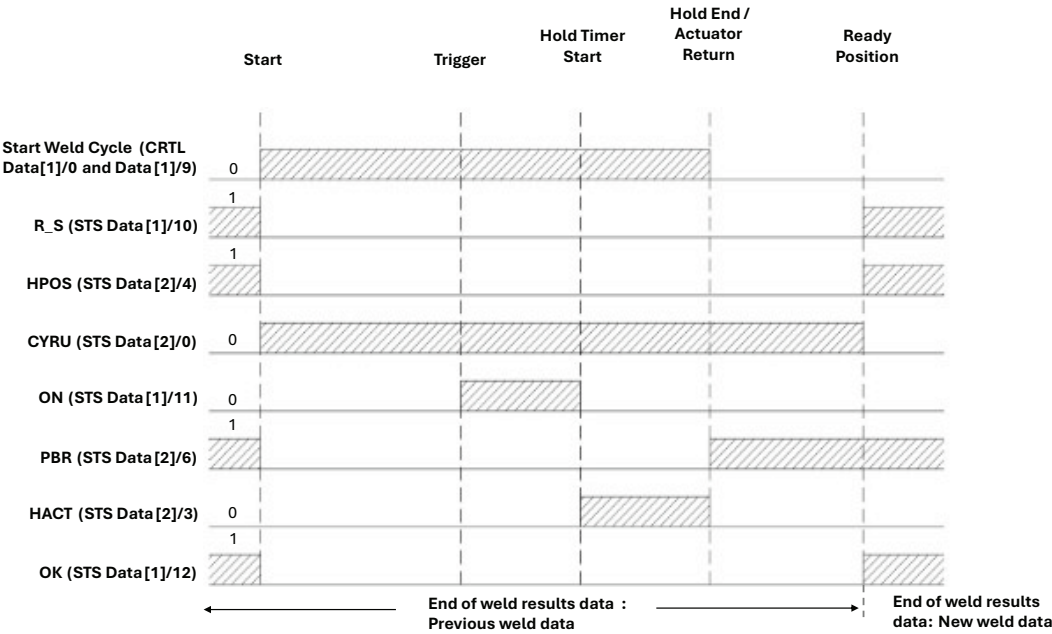
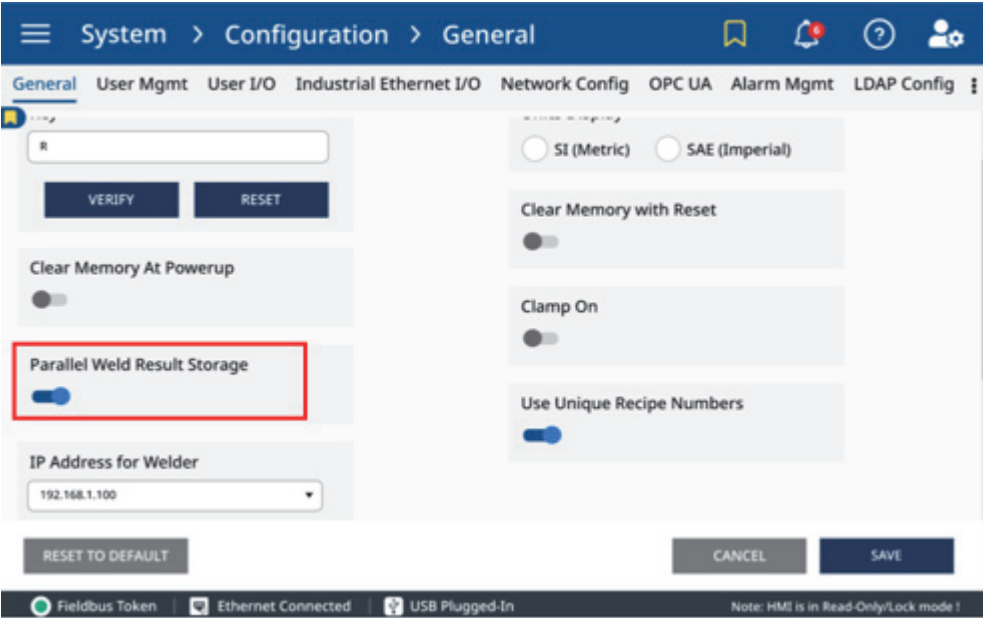


Figure 1.15 Parallel Weld Result Storage



1.14 Explicit Messaging for Setting Weld Recipe Parameters

Weld recipe parameters can be set using Explicit Messaging.

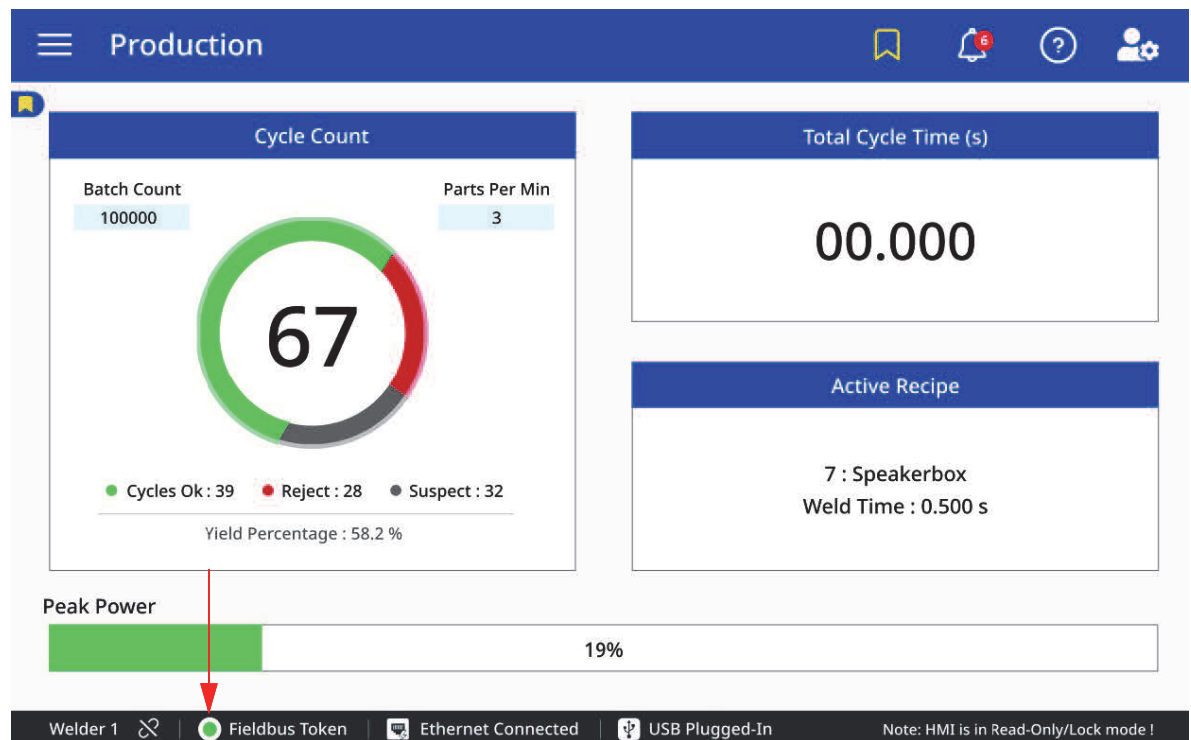
1.14.1 Set Messaging for Control Token

The value of the control token allows for recipe or configuration settings to be made locally at the Polaris HMI or remotely via explicit messaging. When the control token is set to zero, the Polaris HMI has control over parameter and system settings and remote messages are ignored. When the control token is set to one, remote messaging has control over the settings and Polaris' HMI is read only. The token must be set to one before any set messaging can be done.

The value of the control token is displayed in the bottom of the HMI. Green indicates the token value is zero and the HMI has control over the settings. Red indicates the token value is one and the HMI is read only.

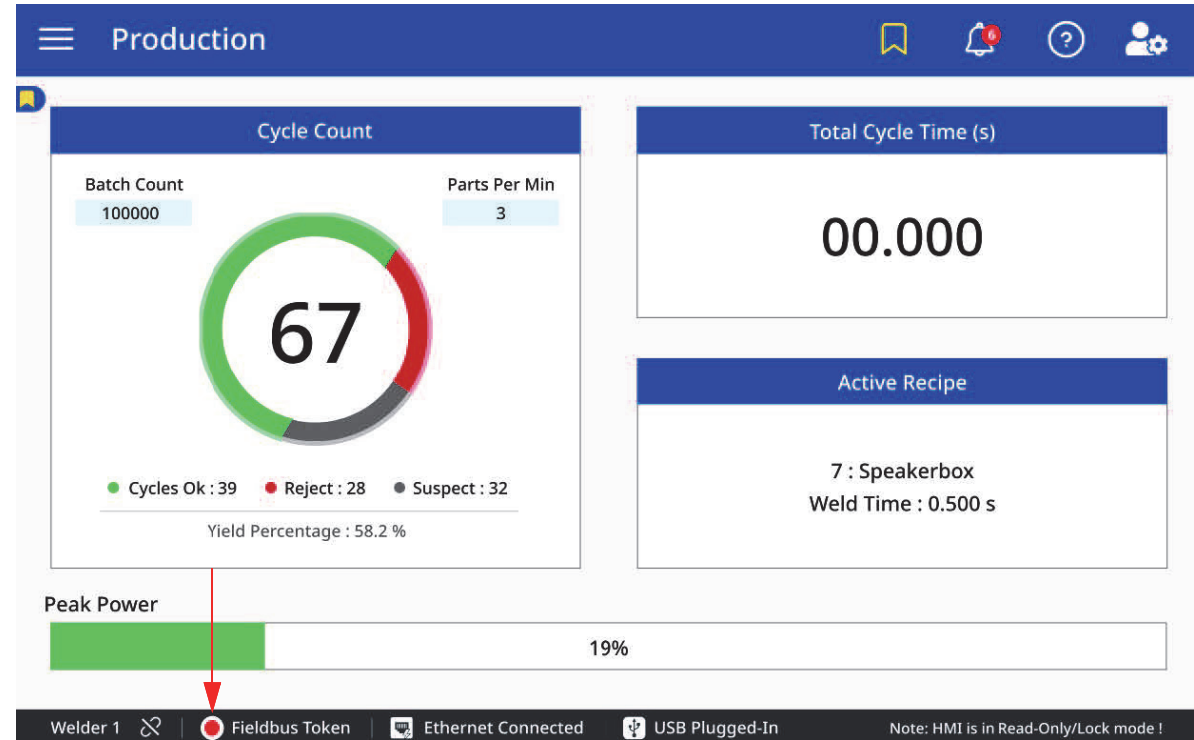
NOTE	
	Green control token indicates HMI is read/write.

Figure 1.16 Green Control Token



NOTE	
	Red control token indicates HMI is read only.

Figure 1.17 Red Control Token



Before setting a weld recipe or saving it using explicit messaging, the control token must be set to one for remote message control. The example below sets the token to one for remote control and zero for local HMI control.

Token Control Message:

Message Type = CIP Generic

Service Code = 0x10

Object Class = 0x86

Instance = 1

Attribute = 0x1

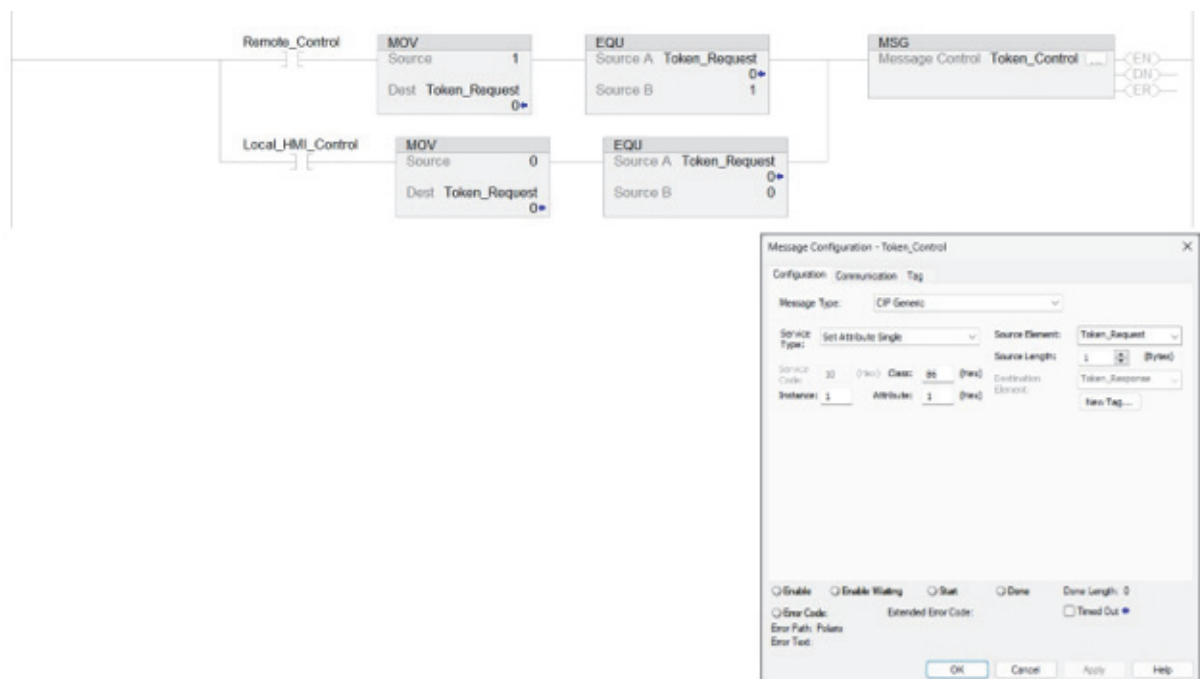
Source Element = Token_Request (SINT)

Destination Element = Token_Response (SINT)

Token_Request = 1 (SINT): Remote Messaging Control

Token_Request = 0 (SINT): Local HMI Control

Figure 1.18



1.15 Set Messaging for Weld Mode and Parameters

All weld parameters such as weld time, amplitude, and force can be set using explicit messaging.

If there's a change to the active weld mode (time, energy, collapse...etc.), the new mode must be messaged before messaging mode parameter such as milliseconds or Joules. Active recipe changes can be saved using set message instructions.

The below example messages to set the weld recipe for energy mode and the energy mode parameter to 50J. The control Token must be set to 1 before the weld mode and parameter can be messaged.

Set Weld Mode Message:

Message Type = CIP Generic

Service Code = 0x10

Object Class = 0x81

Instance = 1

Attribute = 0x4

Source Element = Weld_Mode_Number_Request (DINT)

Destination Element = Weld_Mode_Number_Response (DINT)

Weld_Mode_Number_Request = 1 Weld mode = Energy Mode

Set Mode Parameter Message:

Message Type = CIP Generic

Service Code = 0x10

Object Class = 0x81

Instance = 1

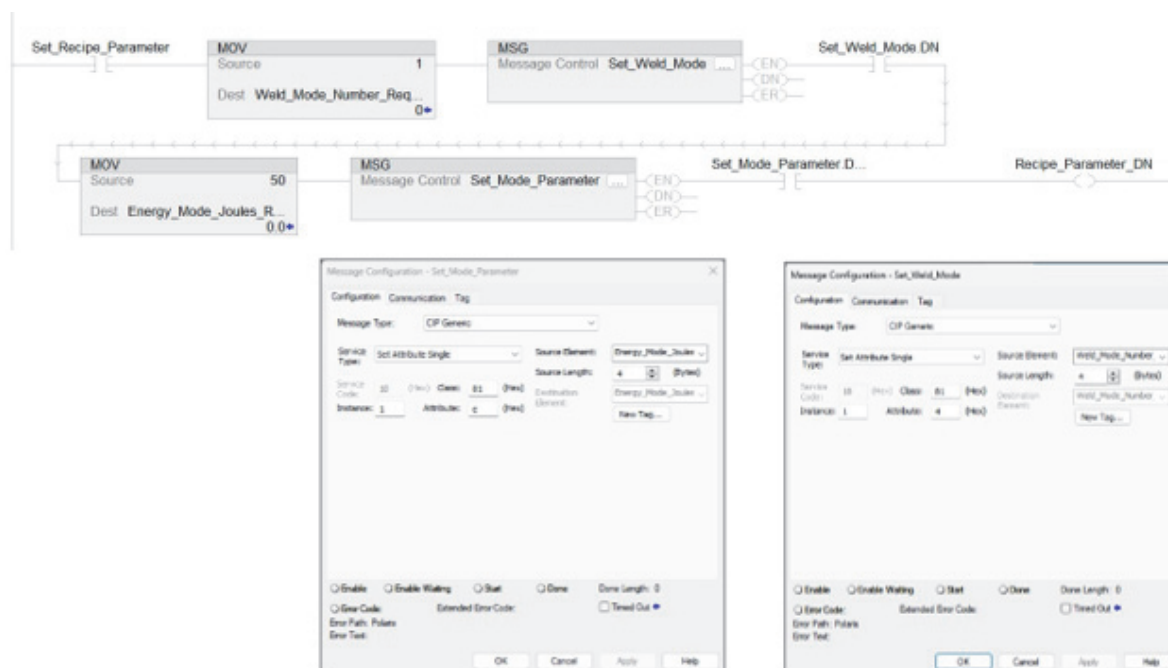
Attribute = 0xe

Source Element = Energy_Mode_Joules_Request (REAL)

Destination Element = Energy_Mode_Joules_Response (REAL)

Energy_Mode_Joules_Request = 50 Weld energy = 50 Joules

Figure 1.19



1.15.1 Set Messaging for Saving Weld Recipe

The below example messages to save the active recipe. The control Token must be set to 1 before save recipe can be messaged.

Save Recipe Message:

Message Type = CIP Generic

Service Code = 0x10

Object Class = 0x80

Instance = 1

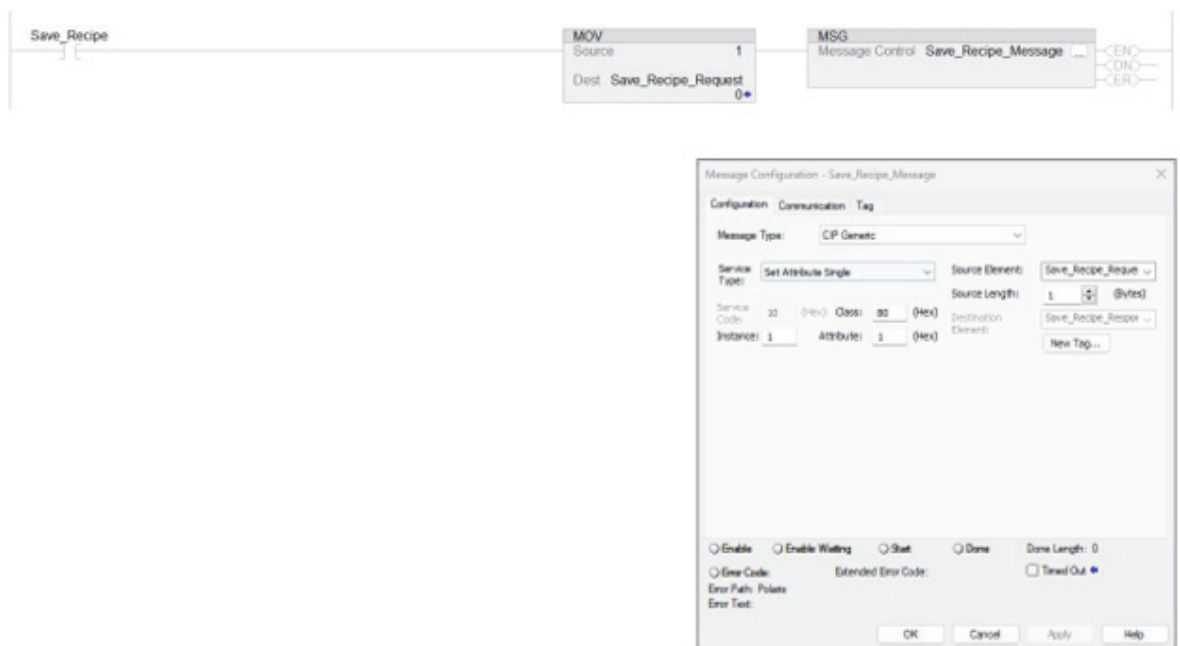
Attribute = 0x1

Source Element = Save_Recipe_Request (SINT)

Destination Element = Save_Recipe_Response (SINT)

Save_Recipe_Request = 1 Save active recipe

Figure 1.20



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Chapter 2: Explicit Messaging

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2.1 Object Classes and Attributes

Object Class and Attribute IDs for explicit messaging are listed here.

Table 2.1 Objects Available and Class ID

Object Class ID	Object Class Name	Number of Instances
0x01	Identity Object	1
0x04	Assembly Object	2
0x80	Recipe Management Object	1
0x81	Active Weld Recipe Object	1
0x82	Active Suspect and Reject Recipe Object	1
0x83	Active Stack Recipe Object	1
0x84	Weld Results History Object	200000
0x85	Last Weld Results Object	1
0x86	Token Object	1
0x87	System Configuration Object	1
0x88	System Information Object	1
0x89	Alarm Log Object	1000

2.2 Identity Object (0x01)

The Identity Object provides identification and general information about the device.

Table 2.2 Identity Object (0x01)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Data Value
1	Vendor ID	INT	16	R	1283
2	Product Type	INT	16	R	43
3	Product Code	INT	16	R	5-Apr
4	Revision	SINT	8	R	1.1
7	Product Name	STRING	32	R	POLARIS-EIP

Table 2.3 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single

2.3 Assembly Object (0x04)

The Assembly Object binds attributes of multiple objects, which allows data to or from each object to be sent or received over a single connection.

Table 2.4 Assembly Object (0x04)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access
64	Control Parameters	INT	16	W
65	Status Output	INT	36	R

Table 2.5 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x10	Set_Attribute_Single

2.4 Recipe Management Object (0x80)

The Recipe Management Object saves and validates weld recipes.

Table 2.6 Recipe Management Object (0x80)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access
1	Save Recipe	SINT	1	R/W
2	Create Recipe	SINT	1	R/W
3	Delete Recipe	INT	4	R/W
4	Rename Recipe	STRING	51	R/W
5	Copy Recipe	INT	4	R/W

Table 2.7 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x10	Set_Attribute_Single

2.5 Active Weld Recipe Object (0x81)

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

Table 2.8 Active Weld Recipe Object (0x81)

Attribute ID (Hex)	Attribute Name	Data type	Size (Bytes)	Access	Actuator Type
1	RecipeNumber	DINT	4	R	BOTH
2	WeldRecipeVerNumber	DINT	4	R/W	BOTH
3	WeldRecipeName	STRING	51	R	BOTH
4	WeldMode	DINT	4	R/W	BOTH
5	ModeValue	REAL	4	R/W	BOTH
6	CycleCount	DINT	4	R/W	BOTH
7	CyclesOK	DINT	4	R/W	BOTH
8	Reject	DINT	4	R/W	BOTH
9	Suspect	DINT	4	R/W	BOTH
A	MemoryOffset	DINT	4	R/W	BOTH
B	DigitalTune	DINT	4	R/W	BOTH
C	StackRecipeNumber	DINT	4	R/W	BOTH
D	ModeValueTime	REAL	4	R/W	BOTH
E	ModeValueEnergy	REAL	4	R/W	BOTH
F	ModeValuePeakPower	REAL	4	R/W	BOTH
10	ModeValueGroundDetect	REAL	4	R/W	BOTH
11	ModeValueAbsoluteDistance	REAL	4	R/W	ADVANCED
12	ModeValueCollapseDistance	REAL	4	R/W	ADVANCED
13	IsSaved	SINT	1	R/W	BOTH
14	BatchSetupEnable	SINT	1	R/W	BOTH
15	BatchAlarmEnable	SINT	1	R/W	BOTH
16	BatchCounter	DINT	4	R/W	BOTH
17	BatchCountLimit	DINT	4	R/W	BOTH
18	BatchID	STRING	16	R/W	BOTH
19	ActuatorType	DINT	4	R/W	BOTH
1A	WeldPressure	REAL	4	R/W	ADVANCED
1B	HoldPressure	REAL	4	R/W	ADVANCED
1C	FlowRate	REAL	4	R/W	ADVANCED
1D	HoldTime	REAL	4	R/W	BOTH
1E	MaxWeldTimeOut	REAL	4	R/W	BOTH
1F	WeldAmplitude	DINT	4	R/W	BOTH
20	NumAmpSteps	DINT	4	R/W	BOTH
21	AmplitudeStepAt	DINT	4	R/W	BOTH

Table 2.8 Active Weld Recipe Object (0x81)

Attribute ID (Hex)	Attribute Name	Data type	Size (Bytes)	Access	Actuator Type
22	AmplitudeStepValue1	REAL	4	R/W	BOTH
23	AmplitudeStepTarget1	DINT	4	R/W	BOTH
24	AmplitudeStepRamp1	REAL	4	R/W	BOTH
25	AmplitudeStepValue2	REAL	4	R/W	BOTH
26	AmplitudeStepTarget2	DINT	4	R/W	BOTH
27	AmplitudeStepRamp2	REAL	4	R/W	BOTH
28	AmplitudeStepValue3	REAL	4	R/W	BOTH
29	AmplitudeStepTarget3	DINT	4	R/W	BOTH
2A	AmplitudeStepRamp3	REAL	4	R/W	BOTH
2B	AmplitudeStepValue4	REAL	4	R/W	BOTH
2C	AmplitudeStepTarget4	DINT	4	R/W	BOTH
2D	AmplitudeStepRamp4	REAL	4	R/W	BOTH
2E	AmplitudeStepValue5	REAL	4	R/W	BOTH
2F	AmplitudeStepTarget5	DINT	4	R/W	BOTH
30	AmplitudeStepRamp5	REAL	4	R/W	BOTH
40	NumPressureSteps	DINT	4	R/W	ADVANCED
41	PressureStepAt	DINT	4	R/W	ADVANCED
42	PressureStepValue1	REAL	4	R/W	ADVANCED
43	PressureStepTarget1	DINT	4	R/W	ADVANCED
44	PressureStepRamp1	REAL	4	R/W	ADVANCED
45	PressureStepValue2	REAL	4	R/W	ADVANCED
46	PressureStepTarget2	DINT	4	R/W	ADVANCED
47	PressureStepRamp2	REAL	4	R/W	ADVANCED
48	PressureStepValue3	REAL	4	R/W	ADVANCED
49	PressureStepTarget3	DINT	4	R/W	ADVANCED
4A	PressureStepRamp3	REAL	4	R/W	ADVANCED
4B	PressureStepValue4	REAL	4	R/W	ADVANCED
4C	PressureStepTarget4	DINT	4	R/W	ADVANCED
4D	PressureStepRamp4	REAL	4	R/W	ADVANCED
4E	PressureStepValue5	REAL	4	R/W	ADVANCED
4F	PressureStepTarget5	DINT	4	R/W	ADVANCED
50	PressureStepRamp5	REAL	4	R/W	ADVANCED
60	IsCoolingValveEnabled	SINT	1	R/W	BOTH
61	TriggerType	DINT	4	R/W	ADVANCED
62	TiggerForce	REAL	4	R/W	ADVANCED

Table 2.8 Active Weld Recipe Object (0x81)

Attribute ID (Hex)	Attribute Name	Data type	Size (Bytes)	Access	Actuator Type
63	TriggerDistance	REAL	4	R/W	ADVANCED
64	PreTriggerEnabled	SINT	1	R/W	BOTH
65	PreTriggerType	DINT	4	R/W	BOTH
66	PreTriggerAmplitude	DINT	4	R/W	BOTH
67	PreTriggerTime	REAL	4	R/W	BOTH
68	PreTriggerDistance	REAL	4	R/W	ADVANCED
69	AfterBurstEnabled	SINT	1	R/W	BOTH
6A	AfterBurstAmplitude	DINT	4	R/W	BOTH
6B	AfterBurstDelay	REAL	4	R/W	BOTH
6C	AfterBurstTime	REAL	4	R/W	BOTH
6D	EnergyBreakEnabled	SINT	1	R/W	BOTH
6E	EnergyBreakAmplitude	DINT	4	R/W	BOTH
6F	EnergyBreakTime	REAL	4	R/W	BOTH
70	EnergyCompensationEnabled	SINT	1	R/W	BOTH
71	EnergyCompensationMinValue	REAL	4	R/W	BOTH
72	EnergyCompensationMaxValue	REAL	4	R	BOTH
73	TimeSeekPeriod	REAL	4	R	BOTH
74	IsTimeSeekEnabled	BOOL	1	R	BOTH
75	IsPreWeldSeekEnabled	BOOL	1	R	BOTH
76	IsPostWeldSeekEnabled	BOOL	1	R/W	BOTH
77	ScrubAmplitude	DINT	4	R/W	BOTH
78	RapidTraverse	SINT	1	R/W	ADVANCED
79	RapidTraverseDistance	REAL	4	R/W	ADVANCED
7A	TriggerLost	SINT	1	R/W	ADVANCED
7B	EnbaleActuatorClear	SINT	1	R/W	ADVANCED
7C	ActuatorClearType	DINT	4	R/W	ADVANCED
7D	ActuatorClearTime	REAL	4	R/W	ADVANCED
7E	ActuatorClearDistance	REAL	4	R/W	ADVANCED

Table 2.9 Common Services

Service Code	Service Name
0x01	Get_Attribute_All
0x0E	Get_Attribute_Single
0x02	Set_Attribute_All

Table 2.9 Common Services

Service Code	Service Name
0x10	Set_Attribute_Single

2.6 Active Suspect and Reject Recipe Object (0x82)

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

Table 2.10 Active Suspect and Reject Recipe Object (0x82)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
1	CutOffLimitsEnabled	SINT	1	R/W	BOTH
2	PeakPowerCutoffEnable	SINT	1	R/W	BOTH
3	PeakPowerCutoffValue	REAL	4	R/W	BOTH
4	TimeCutoffEnable	SINT	1	R/W	BOTH
5	TimeCutoffValue	REAL	4	R/W	BOTH
6	FrequencyLowCutoffEnable	SINT	1	R/W	BOTH
7	FrequencyLowCutoffValue	REAL	4	R/W	BOTH
8	FrequencyHighCutoffEnable	SINT	1	R/W	BOTH
9	FrequencyHighCutoffValue	REAL	4	R/W	BOTH
A	EnergyCutoffEnable	SINT	1	R/W	BOTH
B	EnergyCutoffValue	REAL	4	R/W	BOTH
C	GroundDetectCutoffEnable	SINT	1	R/W	BOTH
D	GroundDetectCutoffValue	REAL	4	R/W	BOTH
E	AbsoluteDistanceCutoffEnable	SINT	1	R/W	ADVANCED
F	AbsoluteDistanceCutoffValue	REAL	4	R/W	ADVANCED
10	CollapseDistanceCutoffEnable	SINT	1	R/W	ADVANCED
11	CollapseDistanceCutoffValue	REAL	4	R/W	ADVANCED
12	RejectLimitsEnabled	SINT	1	R/W	BOTH
13	TimeEnabled	SINT	1	R/W	BOTH
16	TimeLowLimit	REAL	4	R/W	BOTH
17	TimeHighLimit	REAL	4	R/W	BOTH
18	EnergyEnabled	SINT	1	R/W	BOTH
19	EnergyLowEnabled	SINT	1	R/W	BOTH
1A	EnergyHighEnabled	SINT	1	R/W	BOTH
1B	EnergyLowLimit	REAL	4	R/W	BOTH
1C	EnergyHighLimit	REAL	4	R/W	BOTH
1D	PeakPowerEnabled	SINT	1	R/W	BOTH
1E	PeakPowerLowEnabled	SINT	1	R/W	BOTH
1F	PeakPowerHighEnabled	SINT	1	R/W	BOTH
20	PeakPowerLowLimit	REAL	4	R/W	BOTH
21	PeakPowerHighLimit	REAL	4	R/W	BOTH
22	FrequencyEnabled	SINT	1	R/W	BOTH

Table 2.10 Active Suspect and Reject Recipe Object (0x82)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
23	FrequencyLowEnabled	SINT	1	R/W	BOTH
24	FrequencyHighEnabled	SINT	1	R/W	BOTH
25	FrequencyLowLimit	REAL	4	R/W	BOTH
26	FrequencyHighLimit	REAL	4	R/W	BOTH
27	AbsoluteDistanceEnabled	SINT	1	R/W	ADVANCED
28	AbsoluteDistanceLowEnabled	SINT	1	R/W	ADVANCED
29	AbsoluteDistanceHighEnabled	SINT	1	R/W	ADVANCED
2A	AbsoluteDistanceLowLimit	REAL	4	R/W	ADVANCED
2B	AbsoluteDistanceHighLimit	REAL	4	R/W	ADVANCED
2C	CollapseDistanceEnabled	SINT	1	R/W	ADVANCED
2D	CollapseDistanceLowEnabled	SINT	1	R/W	ADVANCED
2E	CollapseDistanceHighEnabled	SINT	1	R/W	ADVANCED
2F	CollapseDistanceLowLimit	REAL	4	R/W	ADVANCED
30	CollapseDistanceHighLimit	REAL	4	R/W	ADVANCED
31	TriggerDistanceEnabled	SINT	1	R/W	ADVANCED
32	TriggerDistanceLowEnabled	BOOL	1	R/W	ADVANCED
33	TriggerDistanceHighEnabled	BOOL	1	R/W	ADVANCED
34	TriggerDistanceLowLimit	REAL	4	R/W	ADVANCED
35	TriggerDistanceHighLimit	REAL	4	R/W	ADVANCED
36	EndWeldForceEnabled	SINT	1	R/W	ADVANCED
37	EndWeldForceLowEnabled	SINT	1	R/W	ADVANCED
38	EndWeldForceHighEnabled	SINT	1	R/W	ADVANCED
39	EndWeldForceLowLimit	REAL	4	R/W	ADVANCED
3A	EndWeldForceHighLimit	REAL	4	R/W	ADVANCED
3B	VelocityEnabled	SINT	1	R/W	ADVANCED
3C	VelocityLowEnabled	SINT	1	R/W	ADVANCED
3D	VelocityHighEnabled	SINT	1	R/W	ADVANCED
3E	VelocityLowLimit	REAL	4	R/W	ADVANCED
3F	VelocityHighLimit	REAL	4	R/W	ADVANCED
40	SuspectLimitsEnabled	SINT	1	R/W	BOTH
41	TimeEnabled	SINT	1	R/W	BOTH
44	TimeLowLimit	REAL	4	R/W	BOTH
45	TimeHighLimit	REAL	4	R/W	BOTH
46	EnergyEnabled	SINT	1	R/W	BOTH
47	EnergyLowEnabled	SINT	1	R/W	BOTH

Table 2.10 Active Suspect and Reject Recipe Object (0x82)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
48	EnergyHighEnabled	SINT	1	R/W	BOTH
49	EnergyLowLimit	REAL	4	R/W	BOTH
4A	EnergyHighLimit	REAL	4	R/W	BOTH
4B	PeakPowerEnabled	SINT	1	R/W	BOTH
4C	PeakPowerLowEnabled	SINT	1	R/W	BOTH
4D	PeakPowerHighEnabled	SINT	1	R/W	BOTH
4E	PeakPowerLowLimit	REAL	4	R/W	BOTH
4F	PeakPowerHighLimit	REAL	4	R/W	BOTH
50	FrequencyEnabled	SINT	1	R/W	BOTH
51	FrequencyLowEnabled	SINT	1	R/W	BOTH
52	FrequencyHighEnabled	SINT	1	R/W	BOTH
53	FrequencyLowLimit	REAL	4	R/W	BOTH
54	FrequencyHighLimit	REAL	4	R/W	BOTH
55	AbsoluteDistanceEnabled	SINT	1	R/W	ADVANCED
56	AbsoluteDistanceLowEnabled	SINT	1	R/W	ADVANCED
57	AbsoluteDistanceHighEnabled	SINT	1	R/W	ADVANCED
58	AbsoluteDistanceLowLimit	REAL	4	R/W	ADVANCED
59	AbsoluteDistanceHighLimit	REAL	4	R/W	ADVANCED
5A	CollapseDistanceEnabled	SINT	1	R/W	ADVANCED
5B	CollapseDistanceLowEnabled	SINT	1	R/W	ADVANCED
5C	CollapseDistanceHighEnabled	SINT	1	R/W	ADVANCED
5D	CollapseDistanceLowLimit	REAL	4	R/W	ADVANCED
5E	CollapseDistanceHighLimit	REAL	4	R/W	ADVANCED
5F	TriggerDistanceEnabled	SINT	1	R/W	ADVANCED
60	TriggerDistanceLowEnabled	SINT	1	R/W	ADVANCED
61	TriggerDistanceHighEnabled	SINT	1	R/W	ADVANCED
62	TriggerDistanceLowLimit	REAL	4	R/W	ADVANCED
63	TriggerDistanceHighLimit	REAL	4	R/W	ADVANCED
64	EndWeldForceEnabled	SINT	1	R/W	ADVANCED
65	EndWeldForceLowEnabled	SINT	1	R/W	ADVANCED
66	EndWeldForceHighEnabled	SINT	1	R/W	ADVANCED
67	EndWeldForceLowLimit	REAL	4	R/W	ADVANCED
68	EndWeldForceHighLimit	REAL	4	R/W	ADVANCED
69	VelocityEnabled	SINT	1	R/W	ADVANCED
6A	VelocityLowEnabled	SINT	1	R/W	ADVANCED

Table 2.10 Active Suspect and Reject Recipe Object (0x82)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
6B	VelocityHighEnabled	SINT	1	R/W	ADVANCED
6C	VelocityLowLimit	REAL	4	R/W	ADVANCED
6D	VelocityHighLimit	REAL	4	R/W	ADVANCED

Table 2.11 Common Services

Service Code	Service Name
0x01	Get_Attribute_All
0x0E	Get_Attribute_Single
0x02	Set_Attribute_All
0x10	Set_Attribute_Single

2.7 Active Stack Recipe Object (0x83)

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

Table 2.12 Active Stack Recipe Object (0x83)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
2	FrequencyLow	DINT	4	R/W	BOTH
3	FrequencyHigh	DINT	4	R/W	BOTH
E	WeldRampTime	REAL	4	R/W	BOTH
F	StartFrequency	DINT	4	R/W	BOTH
10	FrequencyOffset	DINT	4	R/W	BOTH
11	EndOfWeldStore	SINT	1	R/W	BOTH
12	InternalOffsetFlag	SINT	1	R/W	BOTH
13	MemoryOffset	DINT	4	R/W	BOTH
14	DigitalTune	DINT	4	R/W	BOTH

Table 2.13 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x10	Set_Attribute_Single

2.8 Weld Results History Object (0x84)

The Weld Results History Object contains all the results from previous welds.

Table 2.14 Weld Results History Object (0x84)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Unit
1	WeldResultIndex	DINT	4	R	
2	RecipeNumber	DINT	4	R	
3	WeldRecipeVerNumber	DINT	4	R	
4	DateTime	STRING	23	R	
5	StackSerialNumber	STRING	12	R	
6	PowerSupplySerialNumber	STRING	12	R	
7	ActuatorSerialNumber	STRING	12	R	
8	ASCSerialNumber	STRING	12	R	
9	CycleCounter	DINT	4	R	
A	WeldMode	DINT	4	R	See Table 2.26 Weld Mode
B	WeldTime	REAL	4	R	s
C	HoldTime	REAL	4	R	s
D	WeldEnergy	REAL	4	R	J
E	WeldPeakPower	REAL	4	R	W
F	StartFrequency	DINT	4	R	Hz
10	FrequencyChange	DINT	4	R	Hz
11	CycleTime	REAL	4	R	s
12	Username	STRING	12	R	
13	PartID	STRING	51	R	
14	BatchID	STRING	51	R	
15	TriggerPoint	REAL	4	R	mm (inch)
16	WeldSonicPoint	REAL	4	R	mm (inch)
17	HoldPoint	REAL	4	R	mm (inch)
18	AlarmID	STRING	20	R	
19	WeldStatus	DINT	4	R	
1A	RecipeStatus	DINT	4	R	
1B	WeldPressure	REAL	4	R	kPa (psi)
1C	HoldPressure	REAL	4	R	kPa (psi)
1D	MaxWeldForce	REAL	4	R	N (lbf)
1E	MaxHoldForce	REAL	4	R	N (lbf)
1F	EndHoldForce	REAL	4	R	N (lbf)
20	EndHoldForce	REAL	4	R	N (lbf)
21	WeldAbsolute	REAL	4	R	mm (inch)

Table 2.14 Weld Results History Object (0x84)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Unit
22	TotalAbsolute	REAL	4	R	mm (inch)
23	Velocity	REAL	4	R	mm/s (in/s)
24	DownSpeed	REAL	4	R	mm/s (in/s)
25	TriggerDistance	REAL	4	R	mm (inch)
26	WeldCollapseDistance	REAL	4	R	mm (inch)
27	HoldCollapseDistance	REAL	4	R	mm (inch)
28	TotalCollapseDistance	REAL	4	R	mm (inch)

Table 2.15 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x01	Get_Attribute_All

2.9 Last Weld Results Object (0x85)

The Last Weld Results Object contains all the results from the last weld.

Table 2.16 Last Weld Results Object (0x85)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Unit
1	WeldResultIndex	DINT	4	R	
2	RecipeNumber	DINT	4	R	
3	WeldRecipeVerNumber	DINT	4	R	
4	DateTime	STRING	23	R	
5	StackSerialNumber	STRING	12	R	
6	PowerSupplySerialNumber	STRING	12	R	
7	ActuatorSerialNumber	STRING	12	R	
8	ASCSerialNumber	STRING	12	R	
9	CycleCounter	DINT	4	R	
A	WeldMode	DINT	4	R	See Table 2.26 Weld Mode
B	WeldTime	REAL	4	R	s
C	HoldTime	REAL	4	R	s
D	WeldEnergy	REAL	4	R	J
E	WeldPeakPower	REAL	4	R	W
F	StartFrequency	DINT	4	R	Hz
10	FrequencyChange	DINT	4	R	Hz
11	CycleTime	REAL	4	R	s
12	Username	STRING	12	R	
13	PartID	STRING	51	R	
14	BatchID	STRING	51	R	
15	TriggerPoint	REAL	4	R	mm (inch)
16	WeldSonicPoint	REAL	4	R	mm (inch)
17	HoldPoint	REAL	4	R	mm (inch)
18	AlarmID	STRING	20	R	
19	WeldStatus	DINT	4	R	
1A	RecipeStatus	DINT	4	R	
1B	WeldPressure	REAL	4	R	kPa (psi)
1C	HoldPressure	REAL	4	R	kPa (psi)
1D	MaxWeldForce	REAL	4	R	N (lbf)
1E	MaxHoldForce	REAL	4	R	N (lbf)
1F	EndHoldForce	REAL	4	R	N (lbf)
20	EndHoldForce	REAL	4	R	N (lbf)

Table 2.16 Last Weld Results Object (0x85)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Unit
21	WeldAbsolute	REAL	4	R	mm (inch)
22	TotalAbsolute	REAL	4	R	mm (inch)
23	Velocity	REAL	4	R	mm/s (in/s)
24	DownSpeed	REAL	4	R	mm/s (in/s)
25	TriggerDistance	REAL	4	R	mm (inch)
26	WeldCollapseDistance	REAL	4	R	mm (inch)
27	HoldCollapseDistance	REAL	4	R	mm (inch)
28	TotalCollapseDistance	REAL	4	R	mm (inch)

Table 2.17 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x01	Get_Attribute_All

2.10 Token Object (0x86)

This Token Object contains the token status.

Table 2.18 Token Object (0x86)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
1	Access Token Owner	SINT	1	R/W	BOTH
2	RTC	INT	4	R/W	BOTH
3	Reserved				BOTH
4	Reserved				BOTH
5	Reserved				BOTH
6	Reserved				BOTH
7	Reserved				BOTH
8	Reserved				BOTH
9	Reserved				BOTH
A	Reserved				BOTH

Table 2.19 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x10	Set_Attribute_Single

2.11 System Configuration Object (0x87)

The System Configuration Object contains all settings for the system configuration.

Table 2.20 System Configuration Object (0x87)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
1	WelderName	STRING	21	R/W	BOTH
2	AuthorityCheck	DINT	4	R/W	BOTH
3	MemoryFullAction	DINT	4	R/W	BOTH
4	BarcodeRecallRecipePrefix	STRING	1	R/W	BOTH
5	PowerUpOption	DINT	4	R/W	BOTH
6	PartID	SINT	1	R/W	BOTH
7	Unit	DINT	4	R/W	BOTH
8	ClearMemoryAtPowerup	SINT	1	R/W	BOTH
9	ClearMemoryWithReset	SINT	1	R/W	BOTH
A	ParallelWeldResultStorageStatus	SINT	1	R/W	BOTH
B	ClampOnAlarm	SINT	1	R/W	BOTH
C	WeldRecipeUniqueSNStatus	SINT	1	R/W	BOTH

Table 2.21 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x01	Get_Attribute_All
0x10	Set_Attribute_Single
0x02	Set_Attribute_All

2.12 System Information Object (0x88)

The System Information Object contains all information of the system.

Table 2.22 System Information Object (0x88)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
1	TotalAlarmCyclesCounter	DINT	4	R	BOTH
2	LifetimeWeldCyclesCounter	DINT	4	R	BOTH
3	ActuatorCyclesRunCounter	DINT	4	R	BOTH
4	PowerSupplyOverLoadCounter	DINT	4	R	BOTH
5	SCVersion	STRING	16	R	BOTH
6	ACVersion	STRING	16	R	BOTH
7	PCVersion	STRING	16	R	BOTH
8	PowerSupplySerialNumber	STRING	12	R	BOTH
9	ActuatorSerialNumber	STRING	12	R	BOTH
A	CalibrationDate	STRING	23	R	BOTH
B	MacId	STRING	20	R	BOTH
C	SafetyVersion	STRING	16	R	BOTH
D	ConvertersCyclesRunCounter	DINT	4	R	BOTH
E	HornCyclesCounter	DINT	4	R	BOTH
F	CylinderCounter	DINT	4	R	BOTH

Table 2.23 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x01	Get_Attribute_All

2.13 Alarm Log Object (0x89)

The Alarm Log Object contains all the alarms of previous weld cycles.

Table 2.24 Alarm Log Object (0x89)

Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Actuator Type
1	WeldRecipeNumber	DINT	4	R	BOTH
2	WeldRecipeVersionNumber	DINT	4	R	BOTH
3	AlarmID	DINT	4	R	BOTH
4	Type	DINT	4	R	BOTH
5	SubType	DINT	4	R	BOTH
6	CycleCounter	DINT	4	R	BOTH
7	DateTime	STRING	23	R	BOTH
8	Machine	STRING	16	R	BOTH
9	UserName	STRING	16	R	BOTH
A	AlarmNotes	STRING	101	R	BOTH

Table 2.25 Common Services

Service Code	Service Name
0x0E	Get_Attribute_Single
0x01	Get_Attribute_All

2.14 Weld Mode and Mode Parameter

Attribute values and ranges for the Weld Mode and Weld Mode Parameters.

Table 2.26 Weld Mode

Object ID	Attribute ID (Hex)	Attribute Name	Data Type	Size in Bytes	Access	Weld Mode Attribute Number					
						Time	Energy	Peak Power	Ground Detect	Absolute Distance	Collapse Distance
0x81	4	Weld Mode	DINT	4	R/W	0	1	2	3	4	5

Table 2.27 Weld Mode Parameters (20 kHz)

Object ID	Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Weld Mode Parameter Attribute Value			Units	Weld Mode
						20 kHz				
						Default	Min	Max		
0x81	D	Mode Value	Real	4	R/W	0.01	0.01	10	s	Time
0x81	E	Mode Value	Real	4	R/W	1	1	45000	J	Energy
0x81	F	Mode Value	Real	4	R/W	150	1	1500	W	Peak Power
0x81	10	Mode Value	Real	4	R/W	0.001	0.001	0.5	s	Ground Detect
0x81	11	Mode Value	Real	4	R/W	0	0	125 (4.921)	mm (in)	Absolute Distance
0x81	12	Mode Value	Real	4	R/W	0	0	125 (4.921)	mm (in)	Collapse Distance

Table 2.28 Weld Mode Parameters (30 kHz)

Object ID	Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Weld Mode Parameter Attribute Value			Units	Weld Mode
						30 kHz				
						Default	Min	Max		
0x81	D	Mode Value	Real	4	R/W	0.01	0.01	10	s	Time
0x81	E	Mode Value	Real	4	R/W	1	1	45000	J	Energy
0x81	F	Mode Value	Real	4	R/W	150	1	1500	W	Peak Power
0x81	10	Mode Value	Real	4	R/W	0.001	0.001	0.5	s	Ground Detect
0x81	11	Mode Value	Real	4	R/W	0	0	125 (4.921)	mm (in)	Absolute Distance
0x81	12	Mode Value	Real	4	R/W	0	0	125 (4.921)	mm (in)	Collapse Distance

Table 2.29 Weld Mode Parameters (40 kHz)

Object ID	Attribute ID (Hex)	Attribute Name	Data Type	Size (Bytes)	Access	Weld Mode Parameter Attribute Value			Units	Weld Mode
						40 kHz				
						Default	Min	Max		
0x81	D	Mode Value	Real	4	R/W	0.01	0.01	10	s	Time
0x81	E	Mode Value	Real	4	R/W	1	1	24000	J	Energy
0x81	F	Mode Value	Real	4	R/W	80	1	800	W	Peak Power
0x81	10	Mode Value	Real	4	R/W	0.001	0.001	0.5	s	Ground Detect
0x81	11	Mode Value	Real	4	R/W	0	0	125 (4.921)	mm (in)	Absolute Distance
0x81	12	Mode Value	Real	4	R/W	0	0	125 (4.921)	mm (in)	Collapse Distance

Chapter 3: I/O Implicit Messaging 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)

Data	Description	Data Type		Units		Access
				Metric	Imperial	
0	Control Word 0	INT		N/A	W	
1	Control Word 1	INT				
2	Control Word 2	INT				
3	Set Active Recipe	INT				
4	External Weld Amplitude	INT		%		
5	Custom Control Data 1	Low Word	REAL	See Table 3.11 Custom User		
6		High Word				
7	Custom Control Data 2	Low Word	REAL			
8		High Word				
9	Custom Control Data 3	Low Word	REAL			
10		High Word				

3.1.1 Control Word 0

Table 3.2 Control Word 0

Data [0] Control Word 0				
Bit	Bit Name	Function Name	Description	Logic
0	USDIS	U/S Disable	Disable ultrasonics during weld cycle.	1 = Disable U/S
1	RES	Reserved	Not used	
2	RES	Reserved	Not used	
3	RES	Reserved	Not used	
4	RES	Reserved	Not used	
5	RES	Reserved	Not used	
6	RES	Reserved	Not used	
7	RES	Reserved	Not used	
8	RES	Reserved	Not used	
9	RES	Reserved	Not used	
10	RES	Reserved	Not used	
11	RES	Reserved	Not used	
12	RES	Reserved	Not used	
13	RES	Reserved	Not used	
14	RES	Reserved	Not used	
15	UILOCK	HMI Lockout	Sets HMI in lock out from user	1 = HMI in lock mode

3.1.2 Control Word 1

Table 3.3 Control Word 1

Data [1] Control Word 1				
Bit	Bit Name	Function Name	Description	Logic
0	FCT	Weld Function	This bit and bit 9 set to one to start a weld.	See Table 3.4 Stack Function
1	SFCT	Enable Stack Function	Stack function enable bit.	
2	SFCT0	Stack Function 0	Stack function bits.	
3	SFCT1	Stack Function 1		
4	SFCT2	Stack Function 2		
5	EXTWA	External Weld Amplitude	Enables external weld amplitude.	1 = External weld amplitude enabled
6	MCLR	Memory Clear	Clears frequency memory stored.	1 = Clears memory
7	RES	Reserved	Not used	
8	RST	Reset	Clears active alarms.	1 = Reset alarms
9	ON	Run ultrasonics	Runs ultrasonics based on SFCT bit setting.	See Table 3.4 Stack Function
10	CYAB	Cycle Abort	Stops a active weld cycle.	1 = Abort weld cycle
11	RES	Reserved	Not used	
12	GNDDT	Ground Detect	Ground detect weld mode. Ground detected.	1 = Ground detected
13	RES	Reserved	Not used	
14	RES	Reserved	Not used	
15	RES	Reserved	Not used	

Table 3.4 Stack Function

Control Word/Bit	Bit Name	Start Weld Cycle	Test	Scan	Seek
CTRL Data[1]/0	FCT	1	0	0	0
CTRL Data[1]/1	SFCT	0	1	1	1
CTRL Data[1]/2	SFCT0	0	1	0	0
CTRL Data[1]/3	SFCT1	0	0	1	0
CTRL Data[1]/4	SFCT2	0	0	0	0
CTRL Data[1]/9	ON	1	1	1	1

3.1.3 Control Word 2

Table 3.5 Control Word 2

Data [2] Control Word 2				
Bit	Bit Name	Function Name	Description	Logic
0	ACFT	Enable Actuator Function	Actuator function enable bit.	See Table 3.6 Actuator Function
1	ACFT0	Actuator Function 0	Actuator function bits.	
2	ACFT1	Actuator Function 1		
3	ACFT2	Actuator Function 2		
4	RES	Reserved	Not used	
5	RES	Reserved	Not used	
6	RES	Reserved	Not used	
7	RES	Reserved	Not used	
8	RES	Reserved	Not used	
9	RES	Reserved	Not used	
10	RES	Reserved	Not used	
11	RES	Reserved	Not used	
12	RES	Reserved	Not used	
13	RES	Reserved	Not used	
14	RES	Reserved	Not used	
15	RES	Reserved	Not used	

Table 3.6 Actuator Function

Control Word/Bit	Bit Name	Horn Down	Short Calibration
CTRL Data[2]/0	ACFT	1	1
CTRL Data[2]/1	ACFT0	1	1
CTRL Data[2]/2	ACFT1	1	0
CTRL Data[2]/3	ACFT2	0	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.

NOTE	
	High Word with Low Word follow IEEE-754 standard for floating point numbers.

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

Data	Description	Data Type		Units		Access
				Metric	Imperial	
0	Status Word 0	INT		N/A		R
1	Status Word 1	INT				R
2	Status Word 2	INT				R
3	Active Recipe Number	INT				R
4	Amplitude Output	Low Word	DINT	%		R
5		High Word				R
6	Current	Low Word	DINT	%		R
7		High Word				R
8	Phase	Low Word	DINT	Deg.		R
9		High Word				R
10	Frequency	Low Word	DINT	Hz		R
11		High Word				R
12	Reserved	Low Word	DINT	N/A		R
13		High Word				R
14	Reserved	Low Word	REAL	N/A		R
15		High Word				R
16	Power	Low Word	REAL	W		R
17		High Word				R
18	Energy	Low Word	REAL	J		R
19		High Word				R
20	Force (Advanced Only)	Low Word	REAL	N	lbf	R
21		High Word				R

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

Data	Description	Data Type		Units		Access
				Metric	Imperial	
22	Velocity (Advanced Only)	Low Word	REAL	mm/s	in/s	R
23		High Word				R
24	Absolute Distance (Advanced Only)	Low Word	REAL	mm	in	R
25		High Word				R
26	Collapse Distance (Advanced Only)	Low Word	REAL	mm	in	R
27		High Word				R
28	Last Active Alarm	Low Word	REAL	N/A		R
29		High Word				R
30	Custom Status 1	Low Word	REAL	See Table 3.11 Custom User		R
31		High Word				R
32	Custom Status 2	Low Word	REAL			R
33		High Word				R
34	Custom Status 3	Low Word	REAL			R
35		High Word				R

3.2.1 Status Word 0

Table 3.8 Status Word 0

Data [0] Status Word 0				
Bit	Bit Name	Function Name	Description	Logic
0	RES	Reserved		
1	ES	Emergency Stop	Emergency stop active	1 = E-Stop active
2	RES	Reserved		
3	RES	Reserved		
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		

3.2.2 Status Word 1

Table 3.9 Status Word 1

Data [1] Status Word 1				
Bit	Bit Name	Function Name	Description	Logic
0	RES	Reserved	Not used	
1	RES	Reserved	Not used	
2	RES	Reserved	Not used	
3	RES	Reserved	Not used	
4	RES	Reserved	Not used	
5	RES	Reserved	Not used	
6	RES	Reserved	Not used	
7	RES	Reserved	Not used	
8	RES	Reserved	Not used	
9	RES	Reserved	Not used	
10	R_S	Ready State	System is ready for next cycle.	1 = Ready State
11	ON	Ultrasonic On	Ultrasonic (U/S) is active.	1 = U/S active
12	OK	Cycle OK	No alarms in last weld cycle.	1 = No alarms
13	RES	Reserved	Not used	
14	MCLR	Memory Clear	Frequency memory cleared.	1 = Memory cleared
15	ACLR	Actuator Clear	Actuator clear of part.	1 = Actuator clear

3.2.3 Status Word 2

Table 3.10 Status Word 2

Data [2] Status Word 2				
Data	Bit Name	Function Name	Description	Logic
0	CYRU	Cycle Running	Weld cycle is active.	1 = Cycle running
1	SEEK	Seek Active	Horn Seek is active.	1 = Seek active
2	RES	Reserved	Not used	
3	HACT	Hold Active	Hold time is in active.	1 = Hold active
4	HPOS	Home Position	Ultrasonic horn is at home position.	1 = At home position
5	RES	Reserved	Not used	
6	PBR	Palm Button Release	Run weld cycle bits can be set off.	1 = Set start bits off.
7	GR_AL	General Alarm	Alarm occurred on last weld cycle.	1 = Alarm active
8	STP_MD	Setup Mode	Actuator is in setup mode.	1 = Setup mode active
9	RES	Reserved	Not used	
10	RES	Reserved	Not used	
11	RES	Reserved	Not used	
12	ABRST	Afterburst Active	Afterburst (AB) is active.	1 = AB is active
13	RES	Reserved	Not used	
14	H_SCAN	Horn Scan	Horn Scan is active.	1 = Horn Scan active
15	H_TEST	Horn Test	Horn Test is active.	1 = Horn Test active

3.3 Custom User

The custom control and status parameters are configured in the Polaris' HMI System Configuration/Industrial Ethernet I/O screen. Using custom control and status words, recipe parameters such as weld time and energy can be set and read through the I/O. Up to three control and three status words can be enabled.

The control and status words are enabled and assigned functions in the HMI. Parameter changes through the I/O only affect the active recipe settings.

The data types are real and split into a low and high word following IEEE-754 standard for floating point numbers.

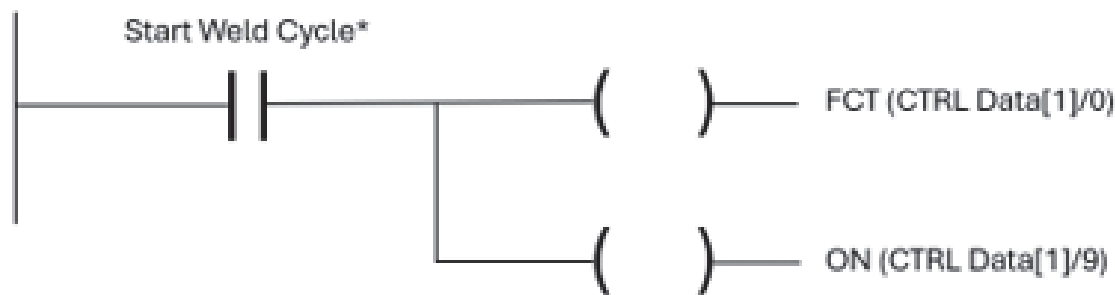
Table 3.11 Custom User

Control/Status Word	Function	Value	Polaris Availability
Not Used	Word not used	N/A	
Weld Mode	Assign and read weld mode	0 = Time Mode, 1 = Energy Mode, 2 = Peak Power Mode, 3 = Ground Detect Mode, 4 = Absolute Distance Mode, 5 = Collapse Distance Mode	Modes 0 to 3: Core/Advanced Modes 4 to 5: Advanced only
Time Mode	Weld by time value	Seconds	Core/Advanced
Energy Mode	Weld by energy value	Joules	Core/Advanced
Peak Power Mode	Weld by peak power value	Watts	Core/Advanced
Ground Detect	Weld by ground detect	Seconds	Core/Advanced
Weld Amplitude	Weld amplitude value	Percent 10-100%	Core/Advanced
Hold Time	Hold time value	Seconds	Core/Advanced
Absolute Distance Mode	Weld by absolute distance value	mm/in	Advanced
collapse Distance	Weld by collapse distance value	mm/in	Advanced
Down Speed	Down speed value	%	Advanced
Trigger Force	Trigger force value	N/lbf	Advanced
Weld Pressure	Weld pressure value	kPa/PSI	Advanced
Hold Pressure	Hold pressure value	kPa/PSI	Advanced

3.4 I/O Ladder Logic

3.4.1 Start Weld Cycle

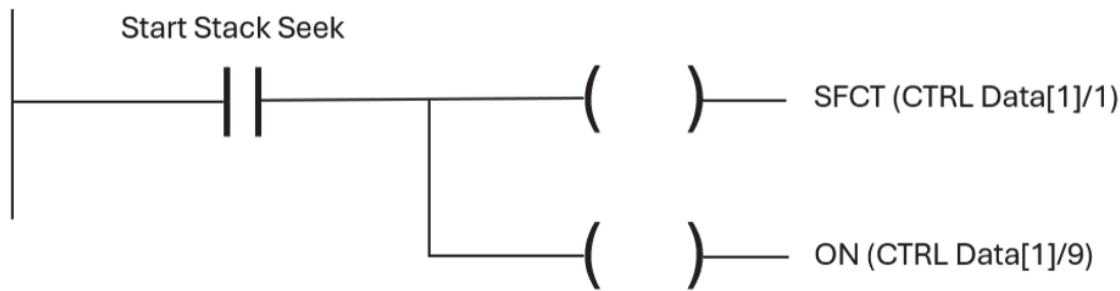
Figure 3.1 Start Weld Cycle



* Start Weld Cycle bit must be on
Until PBR (STS Data[2]/6) = 1

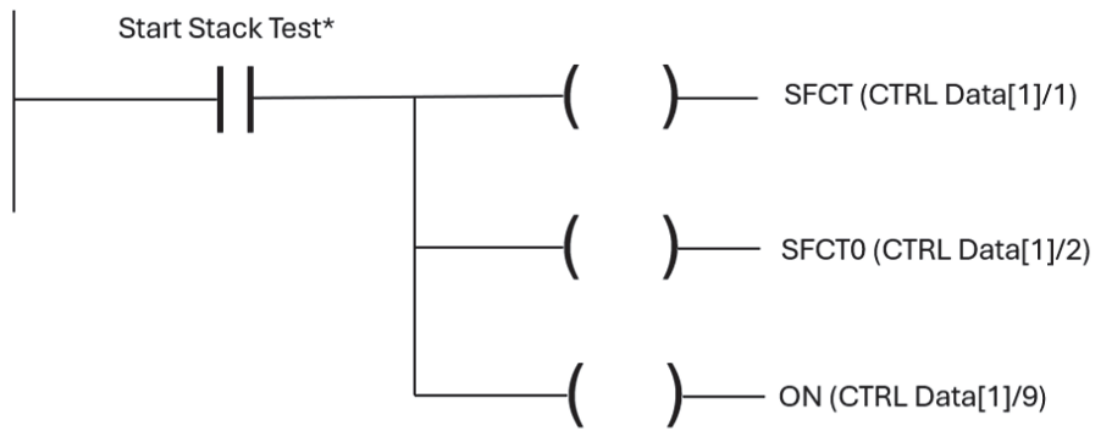
3.4.2 Start Stack Seek

Figure 3.2 Start Stack Seek



3.4.3 Start Stack Test

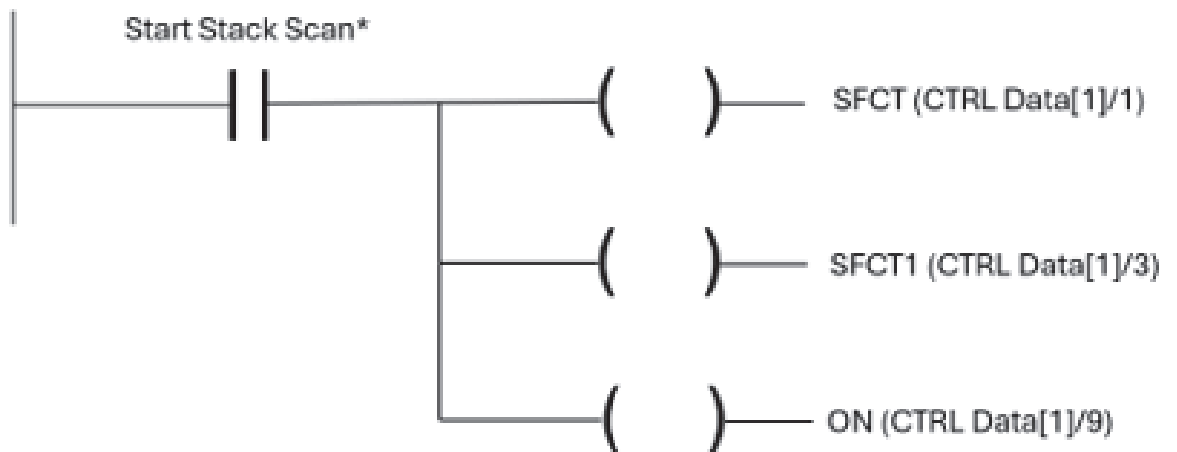
Figure 3.3 Start Stack Test



* Test will be active for the duration that the Start Stack Test bit is on.

3.4.4 Start Stack Scan

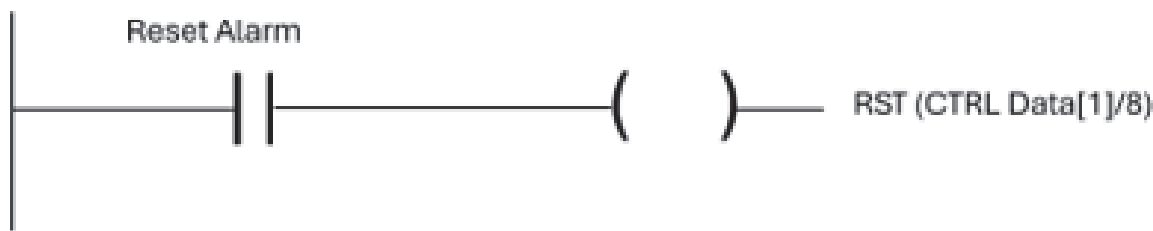
Figure 3.4 Start Stack Scan



* Start Stack Scan bit must be on for the duration of scan time.

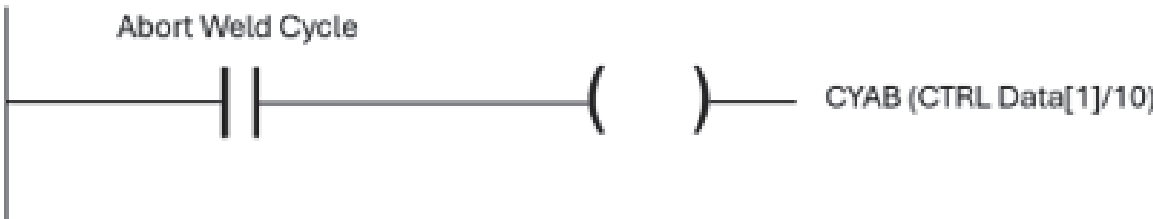
3.4.5 **Reset General Alarm**

Figure 3.5 Reset General Alarm



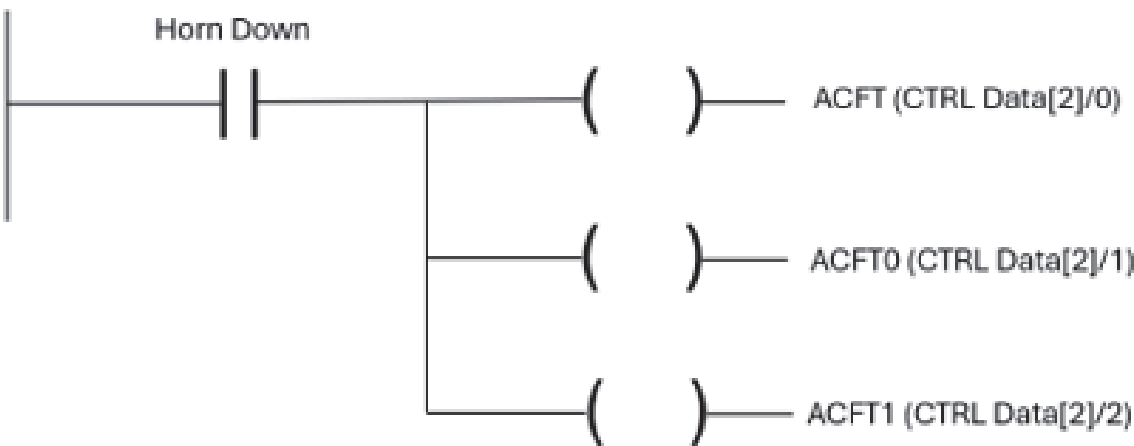
3.4.6 **Abort Weld Cycle**

Figure 3.6 Abort Weld Cycle



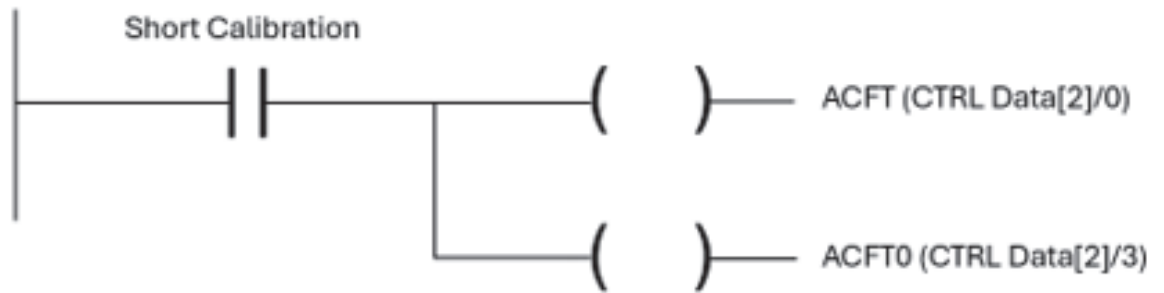
3.4.7 **Short Calibration**

Figure 3.7 Short Calibration



3.4.8 Horn Down

Horn Down



3.5 I/O Timing Charts

3.5.1 Typical Cycle Timing. No Alarms.

Figure 3.8 Typical Cycle Timing; No Alarms

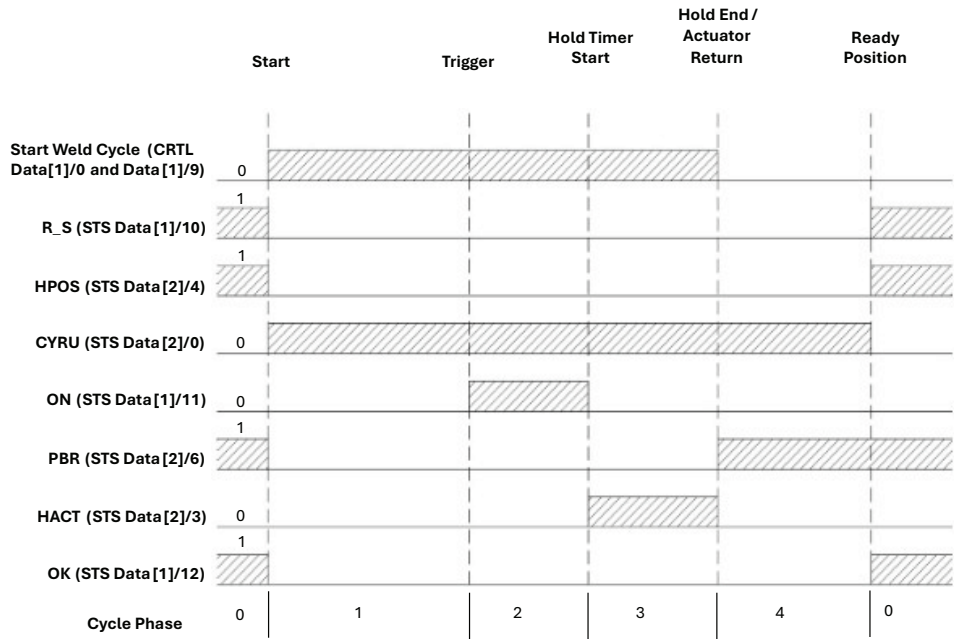
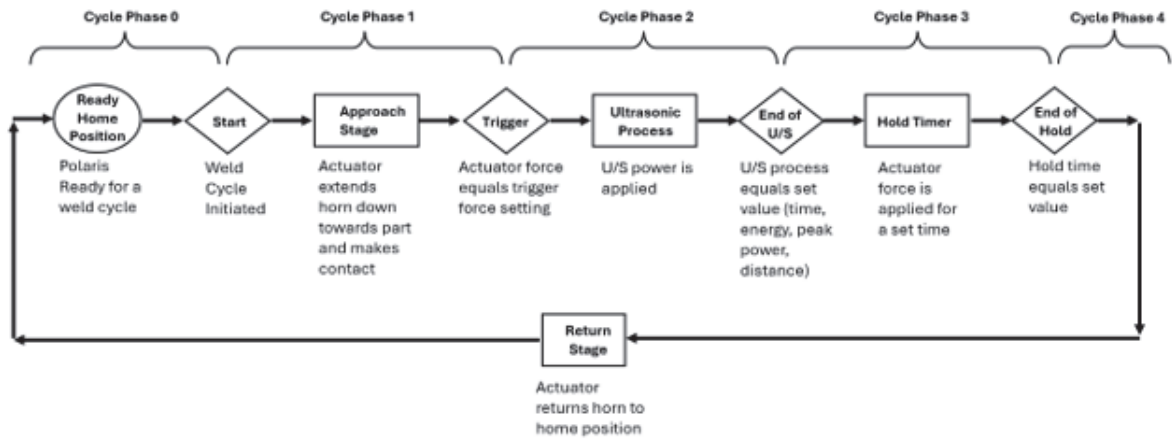


Figure 3.9 Typical Cycle Timing. No Alarms.



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