



**BusWorks® Series 9xxEN Modules w/Modbus/TCP**  
**BusWorks® Series XT1xx1 Modules w/ Modbus/TCP**  
**EtherStax™ Stackable I/O Family w/ Modbus/TCP**  
**10/100MB Industrial Ethernet I/O**

## **Application Note – Modbus/TCP**

**Setting Up and Communicating with Acromag**  
**Series 9xxEN-40xx and XTxxx1-xxx Modbus/TCP**  
**Modules and EtherStax™ Modbus/TCP**  
**from Ignition Software**

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## Table of Contents

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<b>COMMUNICATING WITH IGNITION SOFTWARE</b> .....	<b>3</b>
Configuring Modbus/TCP Connection on Ignition Webpage.....	<b>3</b>
Adding and Configuring BusWorks Device Tags in Ignition Designer.....	<b>5</b>
Example Views in Ignition Designer.....	<b>8</b>
<b>ABOUT ACROMAG</b> .....	<b>10</b>
<b>REVISION HISTORY</b> .....	<b>10</b>

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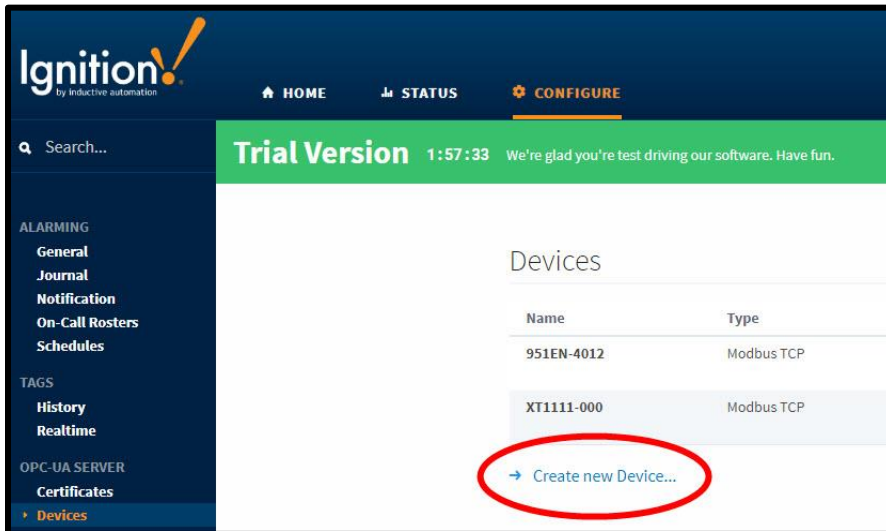
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This document illustrates a procedure for configuring OPC tags to Acromag Busworks® Modbus/TCP modules using Ignition Software. Acromag assumes no responsibility for any errors that may occur in this document, and makes no commitment to update, or keep this information current. Be sure to visit Acromag on the web at <https://www.acromag.com>.

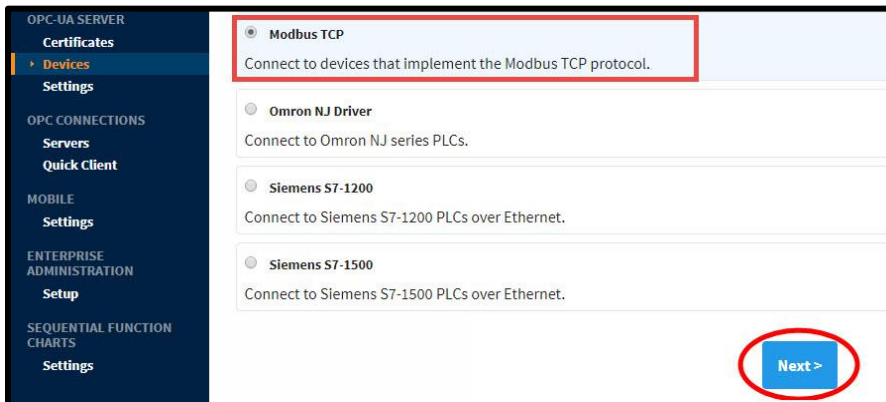
## COMMUNICATING WITH IGNITION SOFTWARE

This document illustrates a procedure for configuring OPC tags intended for Acromag Busworks® Series Modbus/TCP modules using Windows software from Inductive Automation. It is assumed that the user has a working knowledge of OPC, Modbus TCP, and Ignition software.

### Configuring Modbus/TCP Connection on Ignition Webpage



1. From the CONFIGURE tab, select Devices under OPC-UA SERVER, and select **Create new Device**.



2. In the **Add Device Step1**, select **Modbus TCP** as shown in the example, and click **[OK]**.

## Configuring Modbus/TCP Connection on Ignition Webpage...

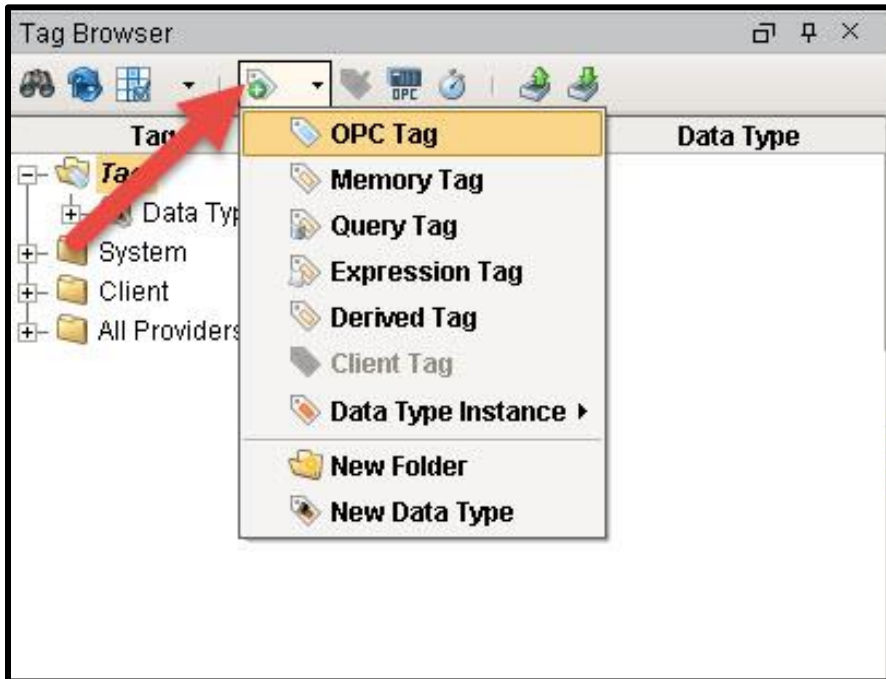
The screenshot shows the 'New Device' configuration window. It is divided into two main sections: 'General' and 'Connectivity'. In the 'General' section, the 'Name' field contains '951EN-4012' and the 'Description' field contains 'Acromag 951EN'. The 'Enabled' checkbox is checked. In the 'Connectivity' section, the 'Hostname' field contains '192.168.1.120', the 'Port' field contains '502', and the 'Communication Timeout' field contains '2000'. A 'Show advanced properties' checkbox is checked. A blue 'Create New Device' button is located at the bottom right of the form.

3. In the **New Device** window enter the **Name** and **Description** of the BusWorks® module. Next, enter the IP address of the module in the **Hostname** box. In the example at left, the IP Address of the module is 192.168.1.120, but this will vary depending on the address of your network's addressing scheme.

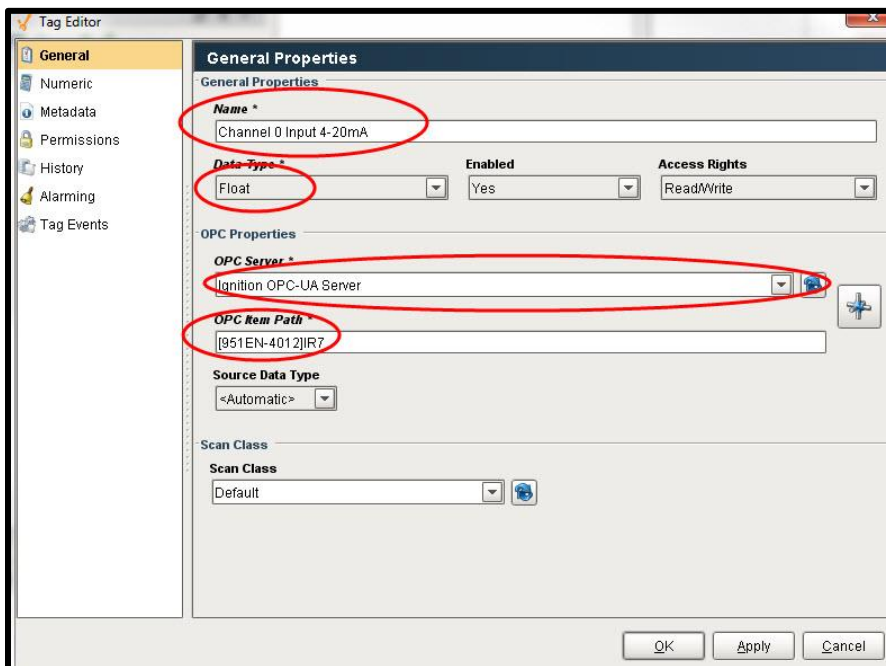
Next, select **Create New Device**.

While able to create OPC tags in the web browser, this application note will show you how to add and manipulate tags in Ignition Designer.

## Adding and Configuring BusWorks Device Tags in Ignition Designer

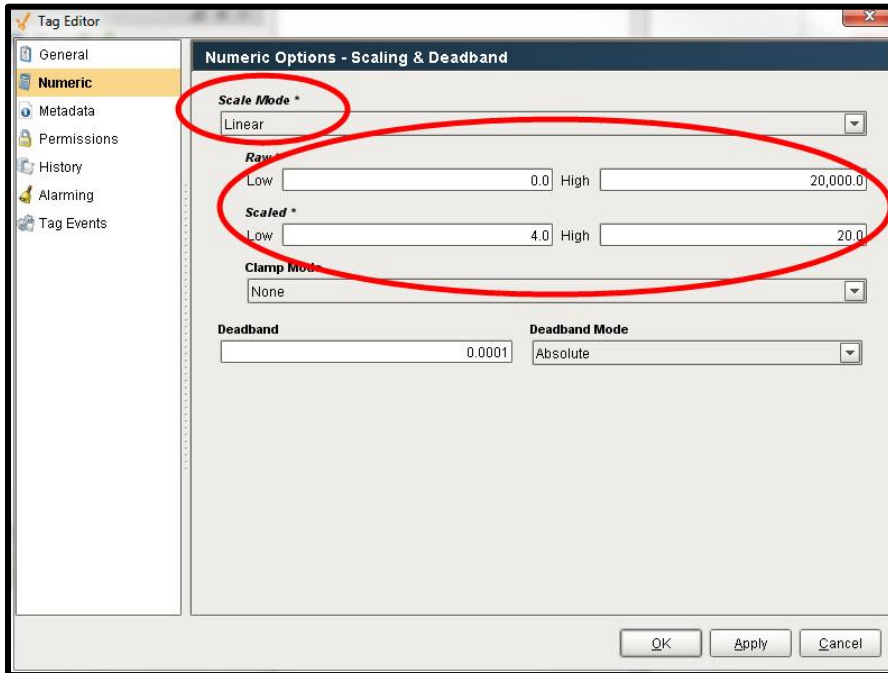


1. Once you launch Ignition Designer, either create a new project or select an existing project.
2. In the **Tag Browser**, select the **Tag** dropdown (as shown on the left) and select **OPC Tag**.



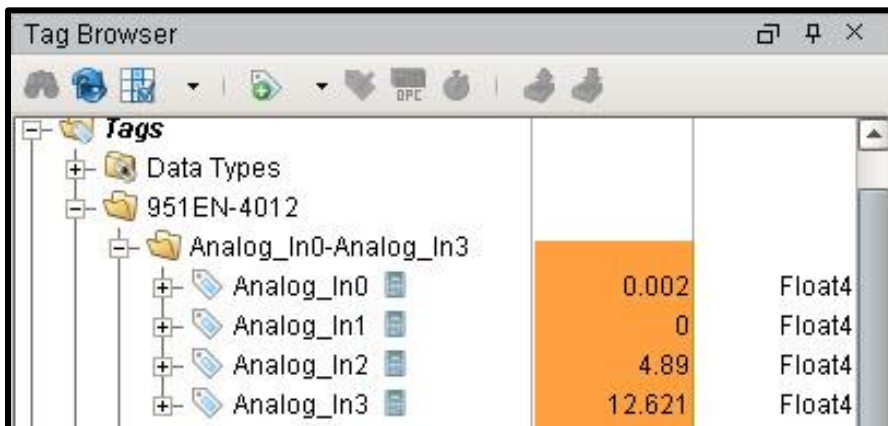
3. Enter a description for the data to be read under **Name**. For analog data, select **Float** under **Data Type**. For discrete (digital) signals, select either Boolean or integer. Next, select **Ignition OPC-UA Server** under **OPC Server**. Next, enter the Modbus register address under **OPC Item Path** (see chart on page 7 for **Data Type** and **Modbus Register Addressing**).

### Adding and Configuring BusWorks Device Tags in Ignition Designer...



- In order to properly scale analog I/O values, select the **Numeric** tab and select **Linear** under **Scale Mode**. Next, select low (zero) and high (full scale) values. Click OK when done.

The input data will be continuously updated.



## Adding and Configuring BusWorks Device Tags in Ignition Designer...

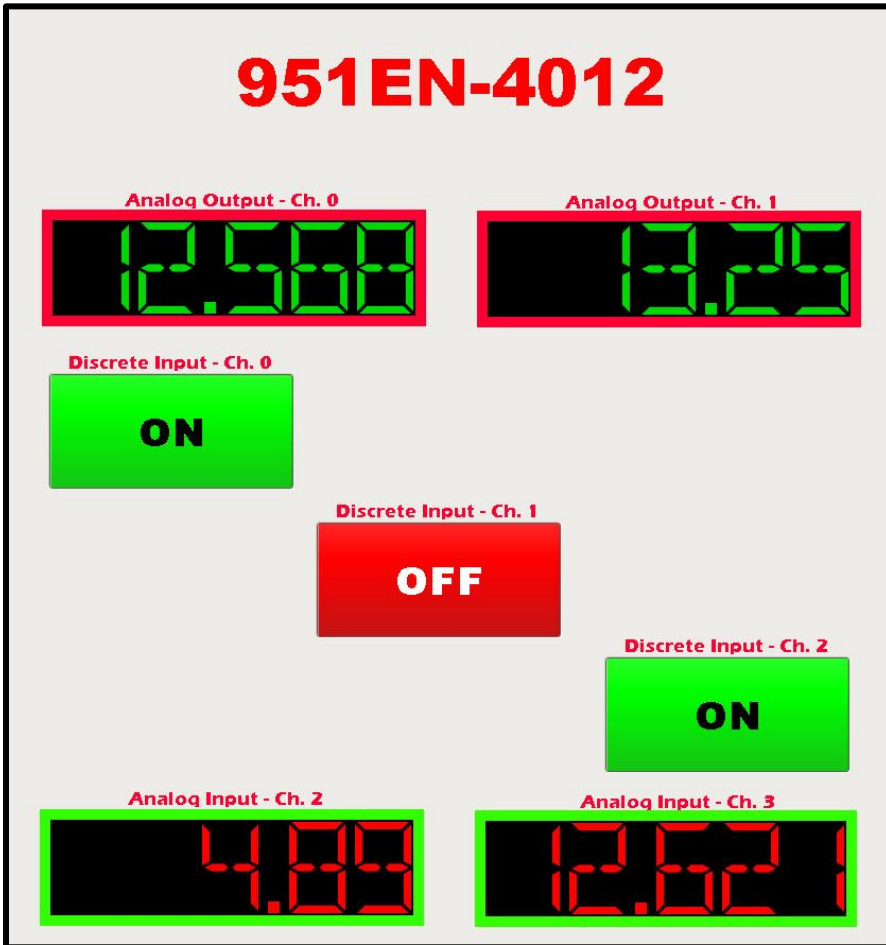
Module	Input Register (IR)		Holding Register (HR)		Coil (C)	Discrete Input (DI)
	Analog	Discrete	Analog	Discrete		
951/2EN-4012	x		x		x	x
958EN-4x16	x					
961/2EN-4006	x					
963/4EN-4012	x					
965EN-4004/6	x					
966EN-4004/6	x					
967EN-4x08	x					
968EN-4x08	x					
972/3EN-4004/6			x			
981/2/3EN-4012				x	x	x
989EN-4x16	x				x	x
993/4EN-4x16	x					
XT11x1-000		x		x		
XT12x1-000	x					
XT1531-000		x	x	x	x	x
XT1541-000		x	x	x	x	x
ES2113					x	x
ES2117					x	x
ES2151/2	x		x			
ES2153	x					
ES2161/2	x					
ES2163/4	x					
ES2171/2	x		x			

Use the chart at left when programming tags. Analog inputs and outputs can be scaled as shown in step 4 above.

Bit-level addressing is possible with all models listed.

Units with integrators / counters have their 32-bit values stored in two 16-bit registers. These can be accessed using the IRI (input registers) and HRI (output registers) designators. See Ignition user manual for details.

**Example Views in Ignition Designer**



The example shown on the left has the following tag details:

Analog Input – Ch. 2

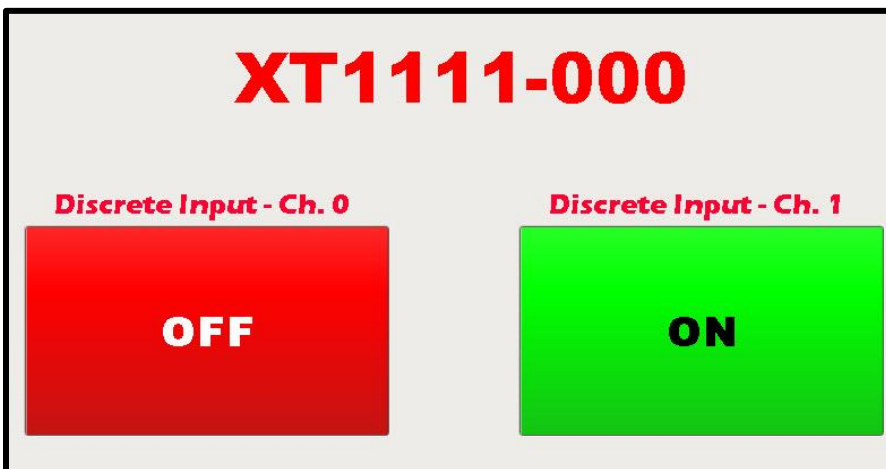
- Data Type: Float
- OPC Item Path: [951EN-4012]IR9
- Scale Mode: Linear
  - Raw Low: 0
  - Raw High: 20,000
  - Scale Low: 0
  - Scale High: 20

Discrete Input – Ch. 0

- Data Type: Boolean
- OPC Item Path: [951EN-4012]DI1

Analog Output – Ch. 1

- Data Type: Float
- OPC Item Path: [951en-4012]HR102
- Scale Mode: Linear
  - Raw Low: 0
  - Raw High: 20,000
  - Scale Low: 4
  - Scale High: 20



The example shown on the left has the following tag details (note that this example utilizes bit-level addressing):

Discrete Input – Ch. 0

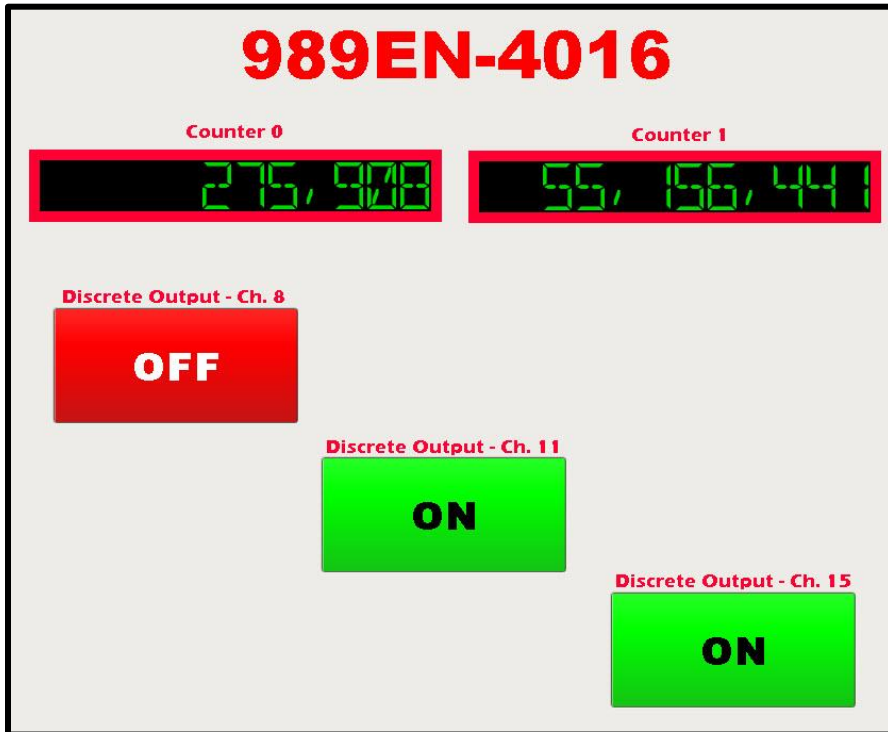
- Data Type: Boolean
- OPC Item Path: [XT1111-000]IR1.0

Discrete Input – Ch. 1

- Data Type: Boolean
- OPC Item Path: [XT1111-000]IR1.1



Example Views in Ignition Designer...



The example shown on the left has the following tag details (note that this example addresses 2 consecutive 16-bit registers with 32 bit integer conversion):

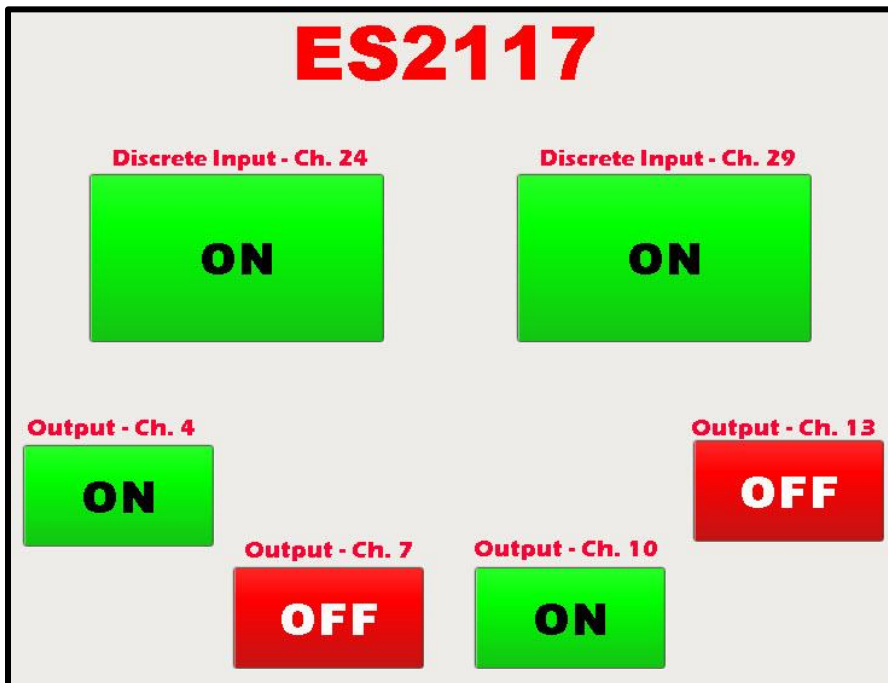
Discrete Input – Ch. 0 Counter  
 Data Type: Long  
 OPC Item Path: [989EN-4016]IRI4

Discrete Input – Ch. 1 Counter  
 Data Type: Long  
 OPC Item Path: [989EN-4016]IRI6

Discrete Output – Ch. 8  
 Data Type: Boolean  
 OPC Item Path: [989EN-4016]C9

Discrete Output – Ch. 11  
 Data Type: Boolean  
 OPC Item Path: [989EN-4016]C12

Discrete Output – Ch. 15  
 Data Type: Boolean  
 OPC Item Path: [989EN-4016]C16



The example shown on the left has the following tag details:

Discrete Input – Ch. 24  
 Data Type: Boolean  
 OPC Item Path: [ES2117]DI25

Discrete Input – Ch. 29  
 Data Type: Boolean  
 OPC Item Path: [ES2117]DI30

Discrete Output – Ch. 4  
 Data Type: Boolean  
 OPC Item Path: [ES2117]C5

Discrete Output – Ch. 7  
 Data Type: Boolean  
 OPC Item Path: [ES2117]C8

Discrete Output – Ch. 13  
 Data Type: Boolean  
 OPC Item Path: [ES2117]C14

**Notes:****ABOUT ACROMAG**

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[Acromag](#) is a multi-million-dollar international corporation that combines more than 60 years of process monitoring and control experience with a solid background in high-tech computer design.

We are focused on developing industrial I/O solutions that provide the best long-term value in the industry. A complete line of industrial I/O products including process instruments, signal conditioning equipment, data acquisition boards, distributed I/O modules, and network communication devices are available. Industries served include manufacturing, water services, power generation, mining, defense, and transportation.

Acromag I/O is ideal for a broad range of monitoring and control operations where controllers communicate with instrumentation on the plant floor or in the field.

**REVISION HISTORY**

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The following table shows the revision history for this document:

Release Date	Version	EGR/DOC	Description of Revision
12 DEC 2017	A	AS/ARP	Initial Acromag release