QS18EAF Process Data Function

11/30/2022

This document covers the installation and use of a function for Siemen's TIA Portal software package. This function handles cyclic IO-Link Process Data In from a Banner QS18EAF sensor via an IO-Link Master to a Siemens PLC. The function covers parsing and display of the QS18EAF sensor Process Data In.

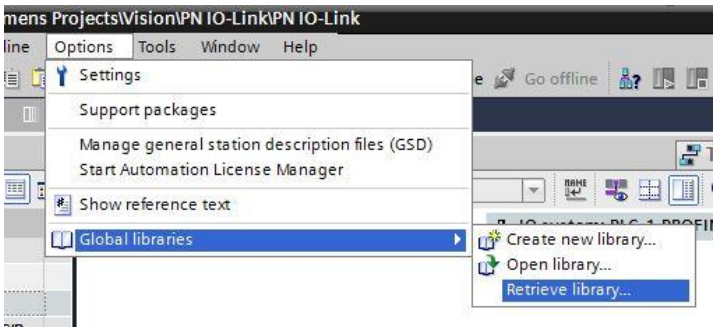
Components

Banner QS18 Library.zal14

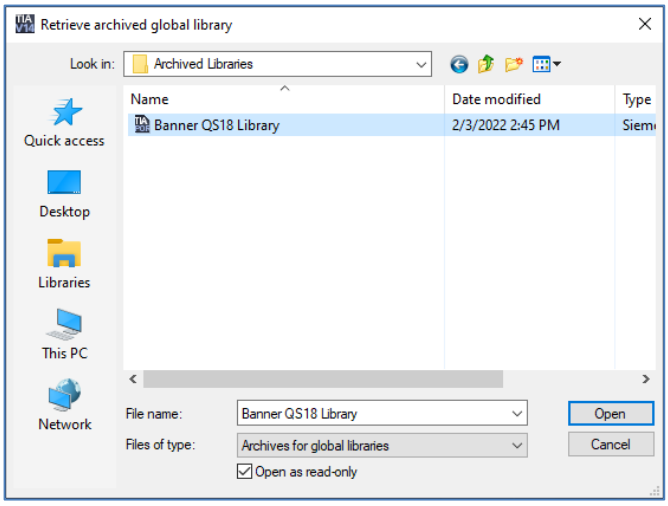
There are two methods for the process data. The first is used when creating a connection to Banner's IO-Link masters. The second set of instructions are for systems using other manufacturer's IO-Link masters.

Installation Instructions

1. Open a project.
2. Go to Options > Global Libraries > Retrieve Library.



3. Select the Banner QS18 Library. Click Open.



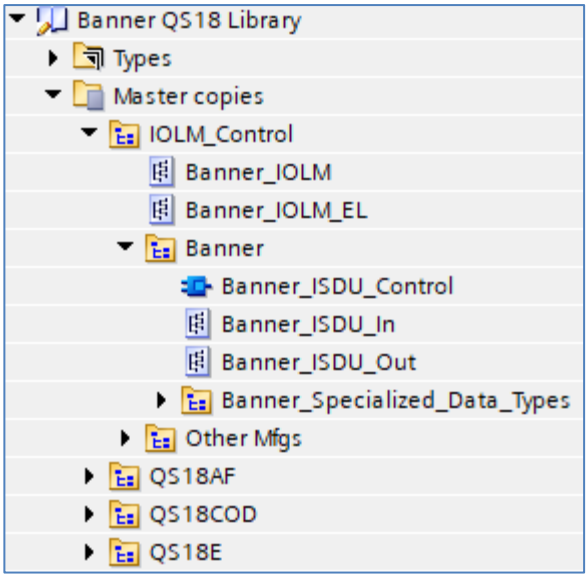
4. The library is now accessible in the Libraries tab.
5. Go to page 3 for Banner IO-Link Masters and to page 7 for all other IO-Link Masters.

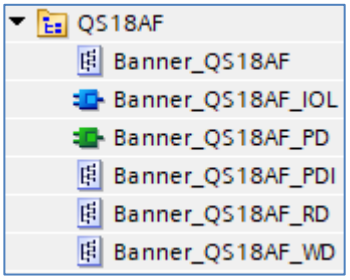
Setup of QS18E with a Banner DXMR90-4K

1. Go to Device and Networks to configure the DXMR90-4K. Add the DXMR90-4K if it has yet to be added to the system.
2. Add Banner IO-Link Master Info to Slot 1. This sets the DXMR90-4K for IO-Link mode.
3. Open the IO-Link Generic Devices and select the proper module. The 1/1 byte option has been selected for port 1. Make note of the I address for the Slot 2 which represents Port 1. Slot 2 starts are 10. The other number needed is I14. The data for the port start at that point (I14). The previous four bytes represents Port Status, Process Data In Size, and Process Data Out Size.

Module	Rack	Slot	I address	Q address	Type
dxm	0	0			1-port Device
Interface	0	0 X1			dxm
Banner IO-Link Master Info_1	0	1	1...9		Banner IO-Link Master Info
IO-Link In/Out 1/ 1 Byte + Status_1	0	2	10...14	1...15	IO-Link In/Out 1/ 1 Byte + Status

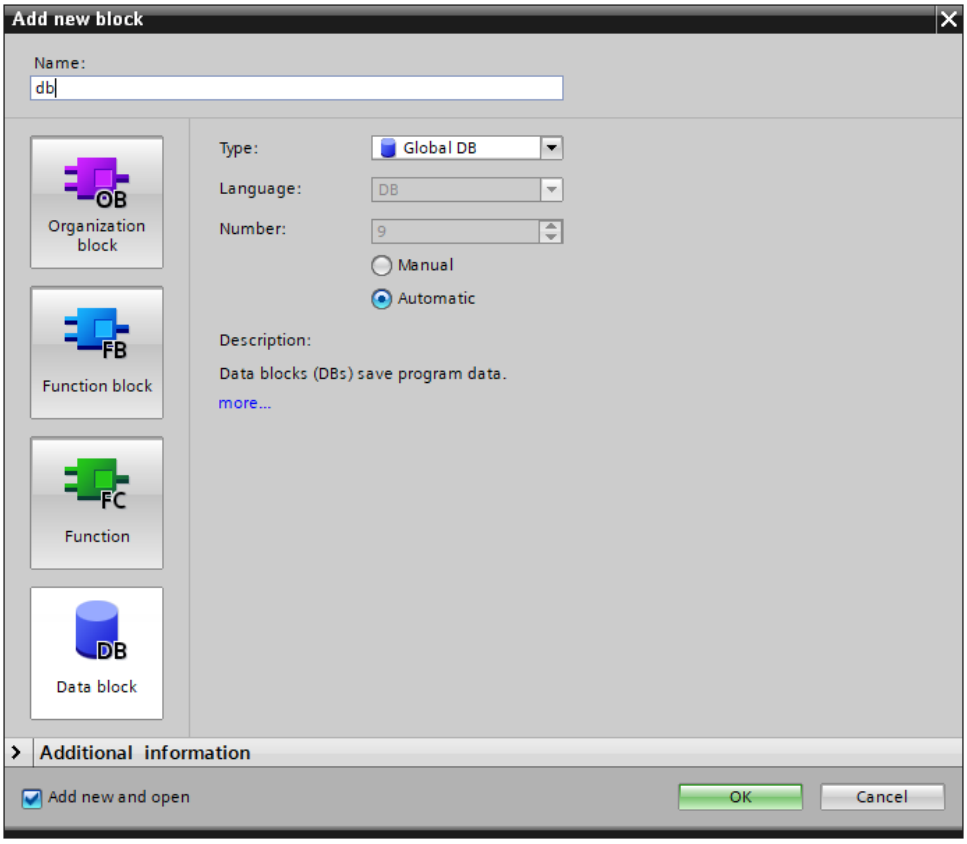
4. Drag the Banner_QS18E_PDIO to the PLC Data Types area under your PLC. Banner_ QS18E _PDI is found in the LM folder in the library. Drag the Banner_ QS18E _PD to the Program Blocks area.
5. Drag the necessary tags from IOLM_Control > Banner > Banner_Specialized_Data_Types. The tags used in this example is “Banner_4in” and “Banner_4out”. This tag represents the full raw process data along with port status information.
6. Go to PLC Tags. Create two tags. One tag is for the full data structure while the second creates a tag to represent the raw Process Data from the IO-Link Master. In this example, Tag table_1 was created, then the tag “QS18EAF IOLM1 01 PDI” was created using a Data Type of “Banner_1In”. This naming convention calls out the type of sensor in question as well as the specific IO-Link Master and port number where the sensor is connected. A different IO-Link Master might be named IOLM2 or IOLM3, for instance, and other specific sensors may be connected to different port numbers. The “I” address found in step 2 is tied to this new tag. The second is “QS18EAF IOLM1 01 inRaw”. This is the tag that will be used in the Function block.





Name	Data type	Address
QS18EAF IOLM1 01 PDI	"Banner_1In"	%I10.0
QS18EAF IOLM1 01 inRaw	USInt	%IB14

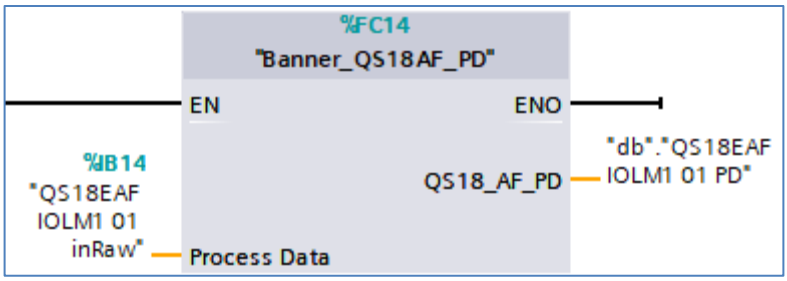
7. Go to Program blocks. Add a new Data block if necessary. In this example the new data block is named “db”.



8. In the new data block, create a new tag to represent the parsed Process Data In for our QS18EAF. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type “Banner_QS18AF_PDI” for the new tag.

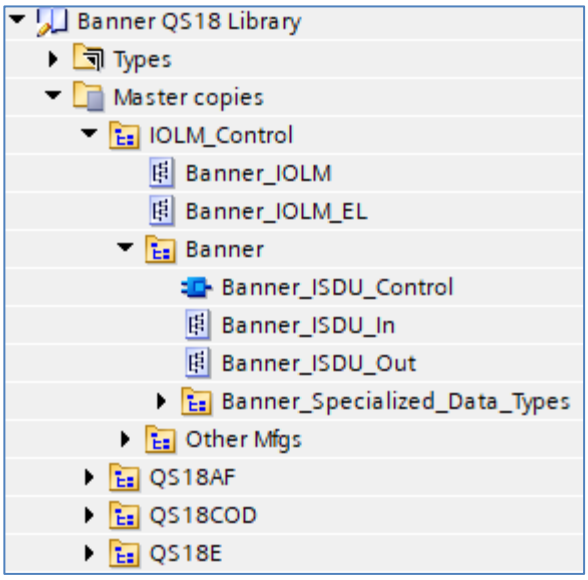
Name	Data type
Static	
QS18EAF IOLM1 01 PD	"Banner_QS18AF_PDI"
Output State	Bool
Marginal Signal	Bool

9. Add the “Banner_QS18AF_PD” function to an OB ladder. Link the “Process Data” to the raw process data variable from step 5. The tag name again calls out the type of device, IO-Link Master, and the port number. The “QS18_AF_PD” needs to be linked to the variable created in step 7. It was called “db”.”QS18EAF IOLM1 01 PD” for this example.

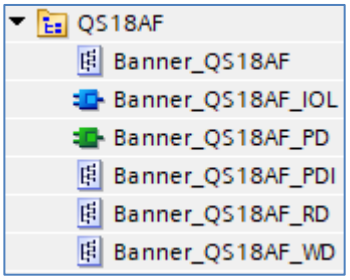


10. Process Data setup is complete.
11. Compile and download the configuration to the PLC, then go online. Open the “db” data block and click Monitor all. You should see parsed QS18EAF Process Data In.

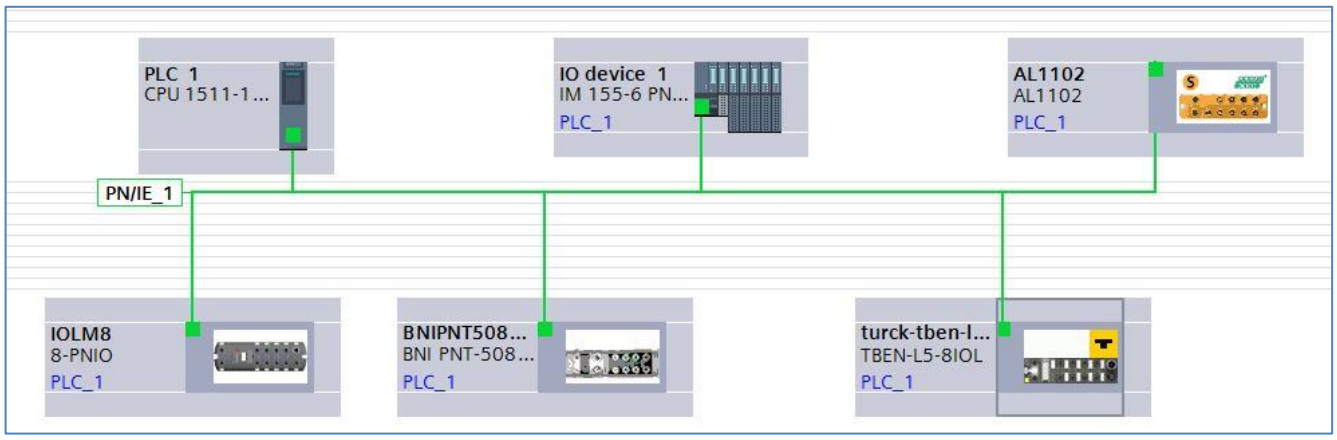
Setup of QS18E with other IO-Link Masters



1. The Banner QS18 Library will now be in the Global Library List. Expand the Master copies section. The QS18EAF folder contains elements for both Process Data and Parameter Data connections to a QS18EAF sensor. As Process Data is the focus of this paper, we will concern ourselves with these two items: Banner_QS18AF_PD and Banner_QS18AF_PDI.
2. Drag Banner_QS18AF_PD to the Program Blocks area under your PLC.
3. Drag the Banner_QS18AF_PDI to the PLC Data Types area under your PLC.

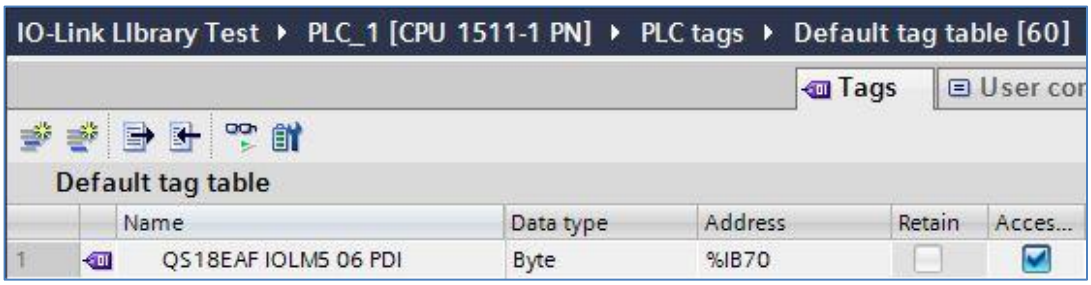


4. Go to Devices and networks to configure the system as necessary. Below is an example of what a configuration might look like. This example shows 5 different IO-Link Masters connected to the same PLC.

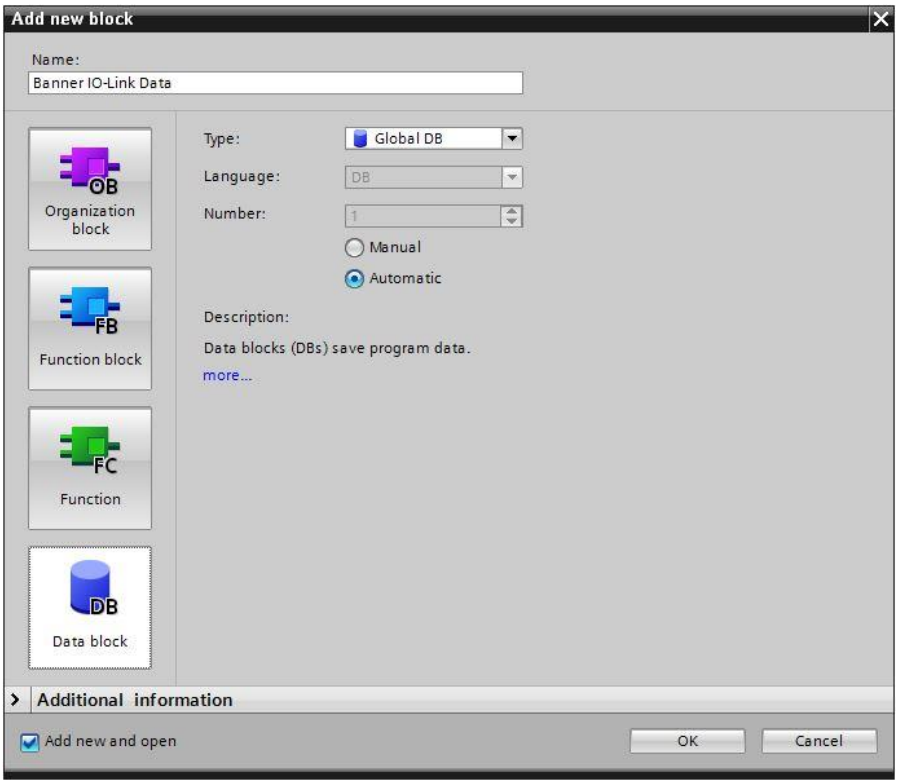


5. Click on the relevant device and configure the IO-Link Master as necessary. Refer to the documentation for the IO-Link Master. Recall that a QS18EAF requires 1 byte of space for the Process Data.
6. Record the "I" address where this QS18EAF Process Data is to be stored, as the address will be required in the next step. In this example, 1 byte of Process Data In for port 6 on the IO-Link Master will be stored in I70.

7. Go to PLC Tags. Add a new tag table, then create a new tag to represent the raw Process Data from the IO-Link Master. In this example, Tag table_1 was created, then the tag “QS18EAF IOLM5 06 PDI” was created using a Data Type of “Byte”. This naming convention calls out the type of sensor in question as well as the specific IO-Link Master and port number where the sensor is connected. A different IO-Link Master might be named IOLM1 or IOLM2, for instance, and other specific sensors may be connected to different port numbers. The “I” address found in step 9 is tied to this new tag.

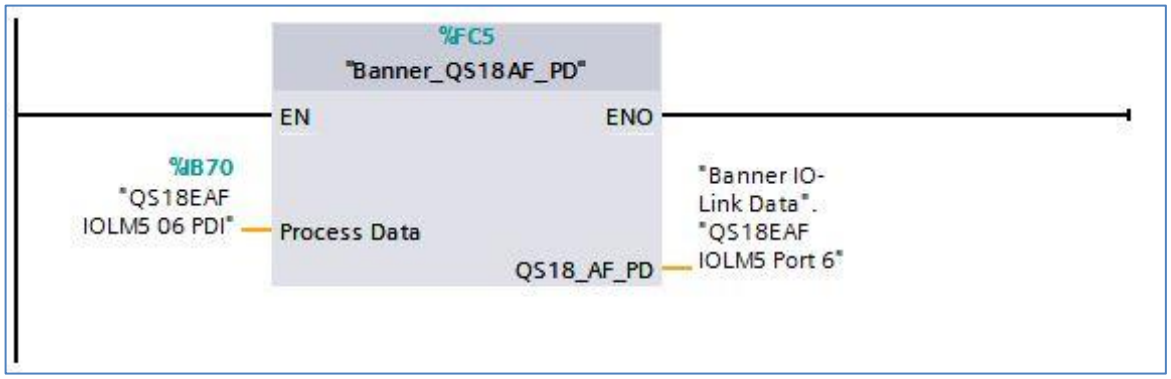


8. Go to Program blocks. Add a new Data block if necesary. In this example the new data block is named “Banner IO-Link Data”.



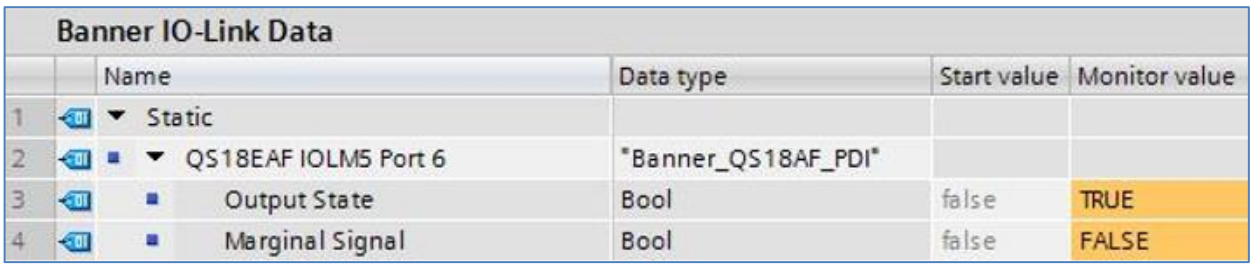
9. In the new data block, create a new tag to represent the parsed Process Data In for our QS18EAF. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type “Banner_QS18AF_PDI” for the new tag.

10. Add the “Banner_QS18AF_PD” function to an OB ladder. Link the “Process Data Word” to the raw Process Data variable from step 10. Link the “QS18_AF_PD” to the parsed Process Data variable from step 12.



11. Process Data setup is complete.

12. Compile and download the configuration to the PLC, then go online. Open the “Banner IO-Link Data” data block and click Monitor all. You should see parsed QS18EAF Process Data In, like that shown below.



Appendix A QS18EAF Process Data

The QS18EAF has 1 byte of Process Data In, as shown below.

ProcessDataIn "Process Data" id=PD_ProcessDataIn

bit length: 8
data type: 8-bit Record (subindex access not supported)

subindex	bit offset	data type	allowed values	default value	acc. restr.	mod. other var.	excl. from DS	name	description
1	0	Boolean	false = Inactive, true = Active					Output State	
2	1	Boolean	false = Normal, true = Marginal					Marginal Signal	

Octet 0

bit offset	7	6	5	4	3	2	1	0
subindex							2	1

This Process Data is mapped to a specific group of addresses. The 8-bits of Process Data actually encode two separate pieces of information. Bit 0 is the state of BDC1 (Binary Data Channel 1, also known simply as Output State). Bit 1 is the Marginal Signal indicator.

This function intelligently parses this Process Data into its component pieces.