

S15C-B21 Process Data Function

January 14th, 2026

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 S15C-B21 sensor via an IO-Link Master to a Siemens PLC. The function covers parsing and display of the S15C-B21 sensor Process Data In.

Components

Banner S15C Library v16.zal16

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 the Open Global Library option in the Libraries tab in TIA Portal v16 or greater.



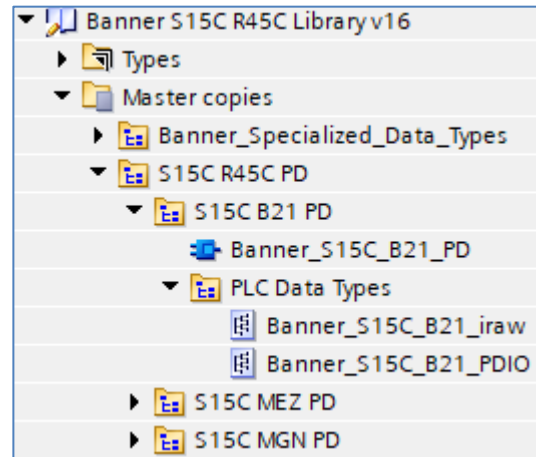
3. Switch the "Files of type" to Compressed libraries. Go to the location of the compressed library.
4. Press the Open button and the library will be uncompressed and opened.
5. The library is now accessible in the Libraries tab in v16 or greater.

Setup of S15C-B21 with a Banner DXMR

1. Go to Device and Networks to configure the DXMR. Add the DXMR if it has yet to be added to the system.
2. Open the IO-Link Generic Devices and select the proper module. The 32/32 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.

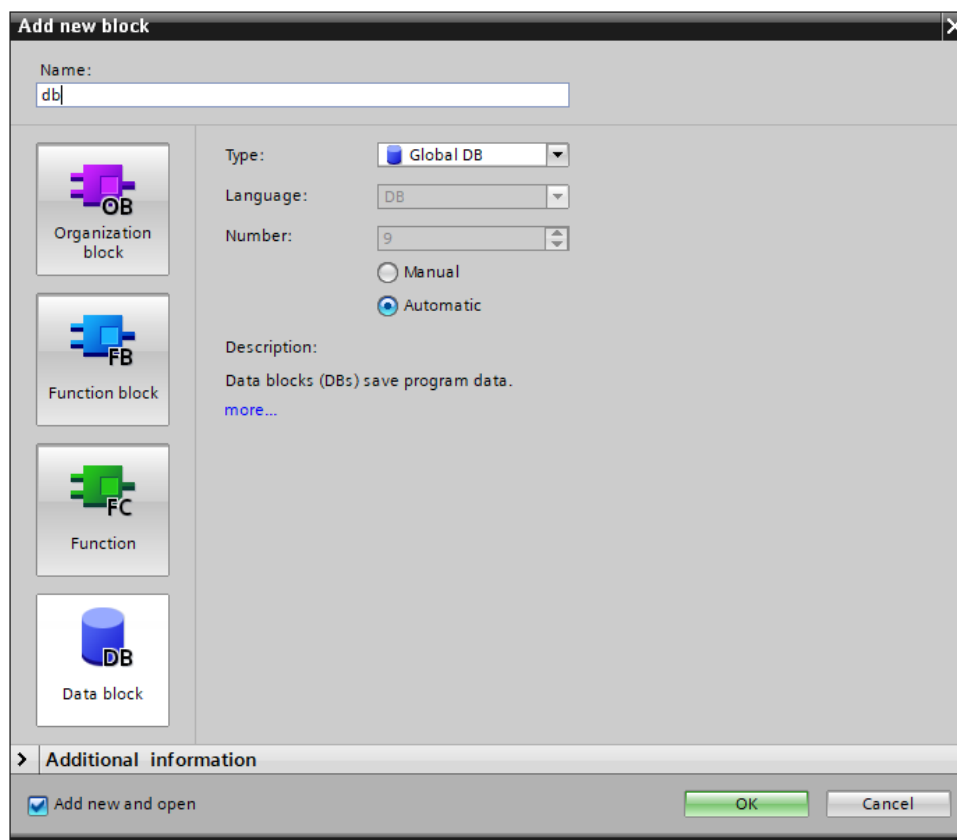
Module	Rack	Slot	I address	Q address	Type
▼ dxm	0	0			1-port Device
▶ Interface	0	0 X1			dxm
Banner IO-Link Master Info_1	0	1	1...9		Banner IO-Link Master Info
IO-Link In/Out 32/32 Byte + Status_1	0	2	10...45	1...46	IO-Link In/Out 32/32 Byte + Status

3. Drag the Banner_S15C_B21_iraw and Banner_S15C_B21_PDIO to the PLC Data Types area under your PLC.
4. Drag the Banner_S15C_B21_PD to the Program Blocks area.
5. Drag the necessary tags from Banner_Specialized_Data_Types. The tags used in this example is "Banner_32in" and "Banner_32out". These tags represent the full raw process data along with port status information.
6. Go to PLC Tags. Create four tags. Two of the tags are for the full data structure while the second set represents the raw Process Data from the IO-Link Master. In this example, Tag table_1 was created, the tags "S15C B21 01 PDI" and "S15C B21 IOLM1 01 PDO" was created using a Data Type of "Banner_32In" and "Banner_32Out". 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 set of tags use "S15C_B21_IOLM1_01_inRaw" and "Sint". These are the tags that will be used in the Function block.



Name	Data type	Address
▶ S15C B21 IOLM1 01 PDI	"Banner_32In"	%I10.0
▶ S15C B21 IOLM1 01 PDO	"Banner_32Out"	%Q1.0
▶ S15C B21 IOLM1 01 inRaw	"Banner_S15C_B21_iraw"	%I14.0
S15C B21 IOLM1 01 outRaw	SInt	%QB3

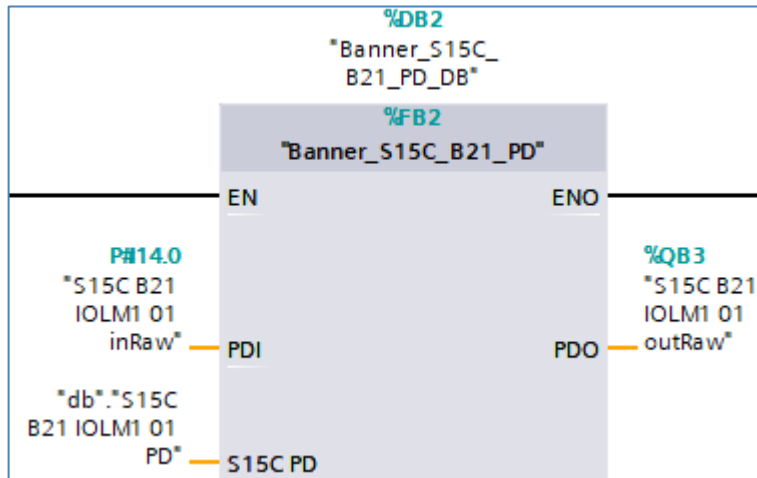
7. Go to Program blocks. Add a new Data block if necessary. In this example the new data block is named "db".



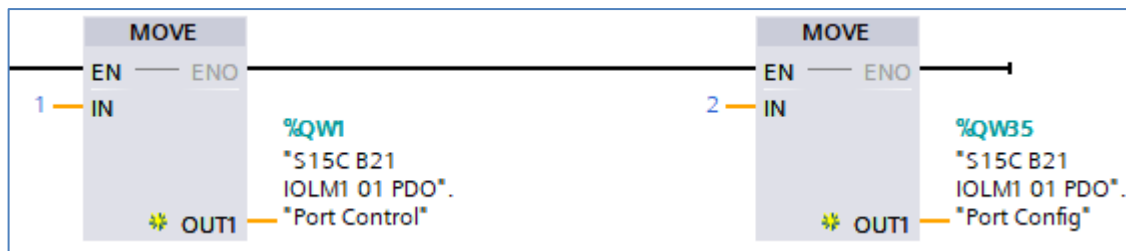
8. In the new data block, create a new tag to represent the parsed Process Data In for our LE. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type "Banner_S15C_B21_PDIO" for the new tag.

S15C B21 IOLM1 01 PD		*Banner_S15C_B21_PDIO*
■	Discrete 1 Input State	Bool
■	Discrete 2 Input State	Bool
■	PD Measurement 1	UDInt
■	PD Measurement 2	UDInt
■	PD Measurement 3	UDInt
■	PD Measurement 4	UDInt
■	Discrete 2 Output	Bool

9. Add the “Banner_S15C_B21_PD” function to an OB ladder. Link the “PDI” and “PDO” to the raw Process Data variable from step 5. Link the “S15C B21 PD” to the parsed Process Data variable from step 7.



10. The final step is to configure the IO-Link output control. This is done by sending a 1 to Port Control and a 2 to Port Config. Both parameters are part of the tag created in step 6 “S15C B21 IOLM1 01 PDO”.

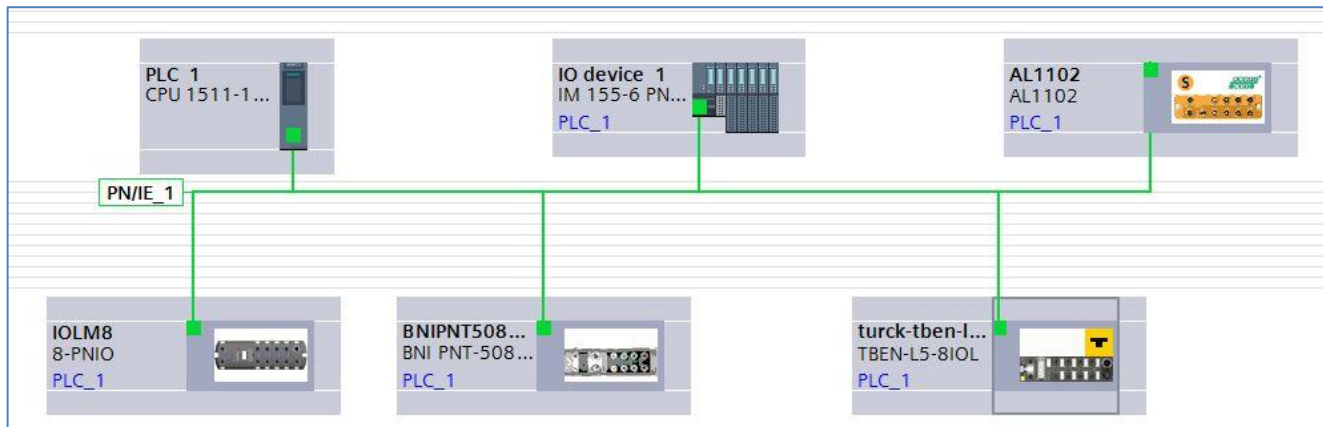
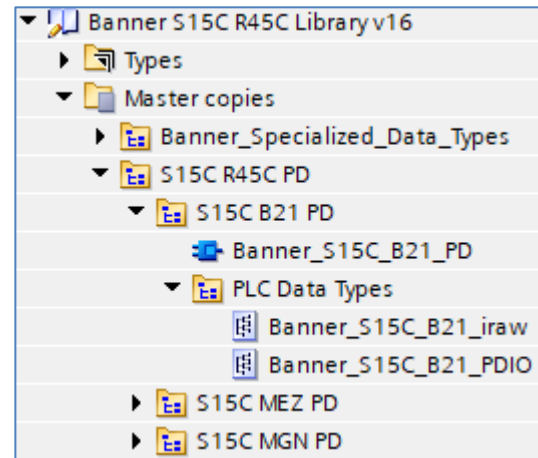


11. Process Data setup is complete.
 12. Compile and download the configuration to the PLC, then go online. Open the “db” data block and click Monitor all. You should see parsed LE Process Data In.

S15C B21 IOLM1 01 PD	"Banner_S15C_B21_PDIO"	
Discrete 1 Input State	Bool	TRUE
Discrete 2 Input State	Bool	FALSE
PD Measurement 1	UDInt	7
PD Measurement 2	UDInt	0
PD Measurement 3	UDInt	0
PD Measurement 4	UDInt	0
Discrete 2 Output	Bool	FALSE

Setup of S15C-B21 with other IO-Link Masters

1. The Banner IO-Link Library will now be in the Global Library List. Expand the Master copies section. The S15C-MUL folder contains elements for both Process Data and Parameter Data connections to a S15C-B21 sensor. As Process Data is the focus of this paper, we will concern ourselves with these items: Banner_S15C_B21_iraw, Banner_S15C_B21_PD, and Banner_S15C_B21_PDIO.
2. Drag Banner_S15C_B21_PD to the Program Blocks area under your PLC.
3. Drag Banner_S15C_B21_iraw and Banner_S15C_B21_PDIO to the PLC Data Types area under your PLC.
4. Go to the 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.

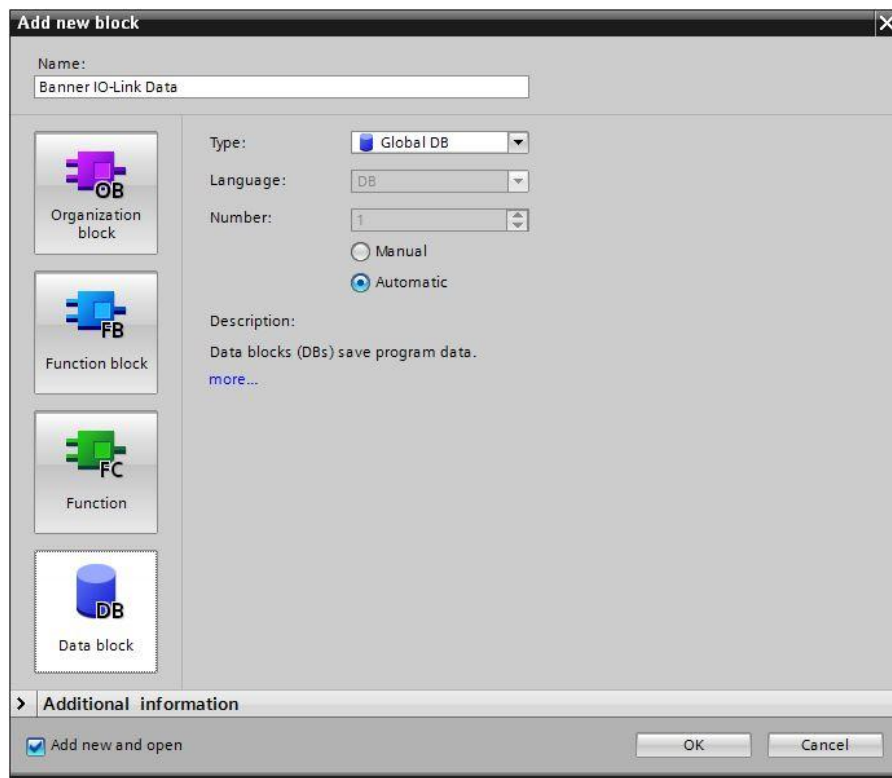


5. Click on the relevant device and configure the IO-Link Master as necessary. Refer to the documentation for the IO-Link Master. Recall that a S15C-B21 requires 18 bytes of space for the Process Data In, and 1 byte of space for the Process Data Out.
6. Record the "I" address where this S15C-B21 Process Data In is to be stored, as the address will be required in the next step. In this example, 18 bytes of Process Data In for port 1 on the IO-Link Master. The IO-Link Master allows for various sizes. The one closest for this unit is 32 bytes IN and Out. The input will be stored in I68 through I99, and output Q68 through Q99.

- Go to PLC Tags. Add a new tag table, if desired, then create a new tag to represent the raw Process Data from the IO-Link Master. In this example the tag "S15C B21 IOLM1 01 inRaw" was created using a Data Type of "Banner_S15C_B21_iraw". 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 9 is tied to this new tag.

▶ S15C B21 IOLM1 01 inRaw	"Banner_S15C_B21_iraw"	%I68.0
S15C B21 IOLM1 01 outRaw	SInt	%QB68

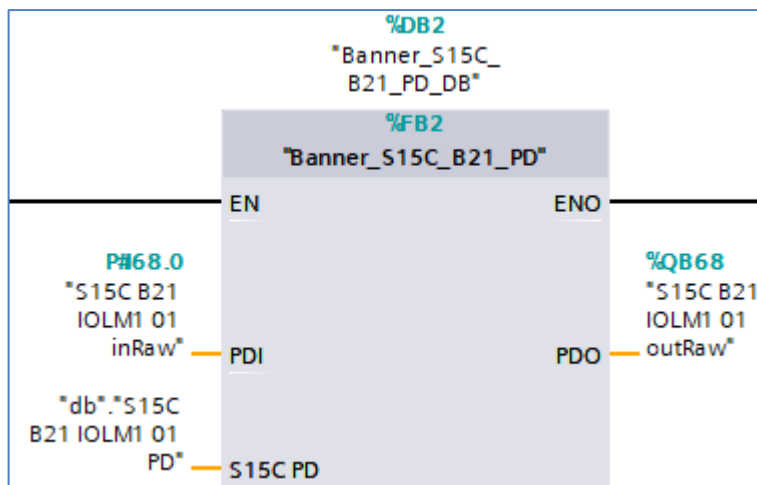
- Go to Program blocks. Add a new Data block if necessary. In this example the new data block is named "Banner IO-Link Data".



9. In the new data block, create a new tag to represent the parsed Process Data for our S15C-B21. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type “Banner_S15C_B21_PDIO” for the new tag.

▼ S15C B21 IOLM1 01 PD	"Banner_S15C_B21_PDIO"
■ Discrete 1 Input State	Bool
■ Discrete 2 Input State	Bool
■ PD Measurement 1	UDInt
■ PD Measurement 2	UDInt
■ PD Measurement 3	UDInt
■ PD Measurement 4	UDInt
■ Discrete 2 Output	Bool

10. Add the “Banner_S15C_B21_PD” function to an OB ladder. Link the “PDI” to the raw Process Data variables from step 10. Link the “S15C 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. Expand “S15C B21 IOLM1 01 PD”.

▼ S15C B21 IOLM1 01 PD	"Banner_S15C_B21_PDIO"	
■ Discrete 1 Input State	Bool	TRUE
■ Discrete 2 Input State	Bool	FALSE
■ PD Measurement 1	UDInt	7
■ PD Measurement 2	UDInt	0
■ PD Measurement 3	UDInt	0
■ PD Measurement 4	UDInt	0
■ Discrete 2 Output	Bool	FALSE

Appendix A**S15C-B21 Process Data**

The S15C-B21 has 18 bytes of Process Data In and 1 byte of Process Data Out, as shown below.

ProcessData id=PD_ProcessData**ProcessDataIn "Process Data Input" id=PD_ProcessDataIn**

bit length: 144

data type: 144-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					Discrete1 Input State	true (1) = Discrete1 Input Active
2	1	Boolean	false = Inactive, true = Active					Discrete2 Input State	true (1) = Discrete2 Input Active. Note - even if Discrete2 is configured as an output, the active state will be reflected at the input
3	16	32-bit Integer						Process Data Measurement 1	Process Data Measurement 1 Value
4	48	32-bit Integer						Process Data Measurement 2	Process Data Measurement 2 Value
5	80	32-bit Integer						Process Data Measurement 3	Process Data Measurement 3 Value
6	112	32-bit Integer						Process Data Measurement 4	Process Data Measurement 4 Value

ProcessDataOut "Process Data Output" id=PD_ProcessDataOut

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 = Off, true = On					Discrete2 Output State	true (1) = Discrete2 Output Active

Octet 0

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

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