

# S15S-TH Process Data Function

---

January 15<sup>th</sup>, 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 and Process Data Out from a Banner S15S-TH sensor via an IO-Link Master to a Siemens PLC. The function covers parsing and display of the S15S-TH sensor Process Data In and Process Data Out.

## **Components**

Banner S15S TH 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.



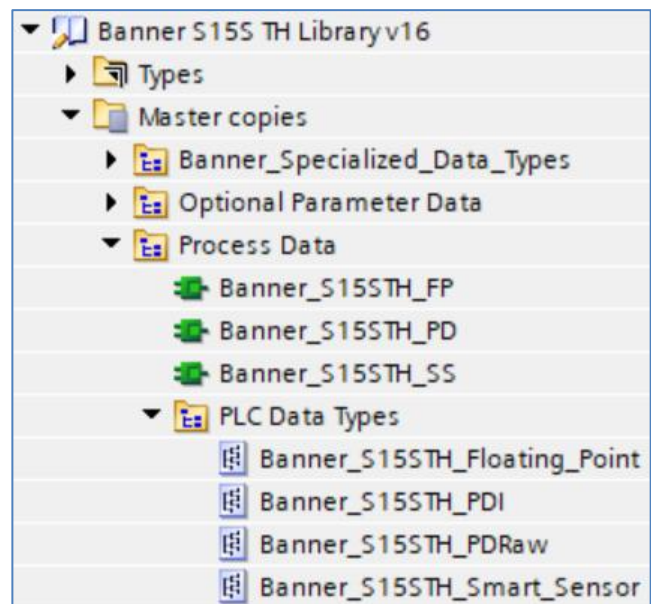
3. Switch the “Files of type” to Compressed libraries. Go to the location of the compressed library.
4. Press the Open button and the library will be uncompressed and opened.
5. The library is now accessible in the Libraries tab in v16 or greater.

**Setup of S15S-TH 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 16/16 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 1. The other number needed is I5. 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.

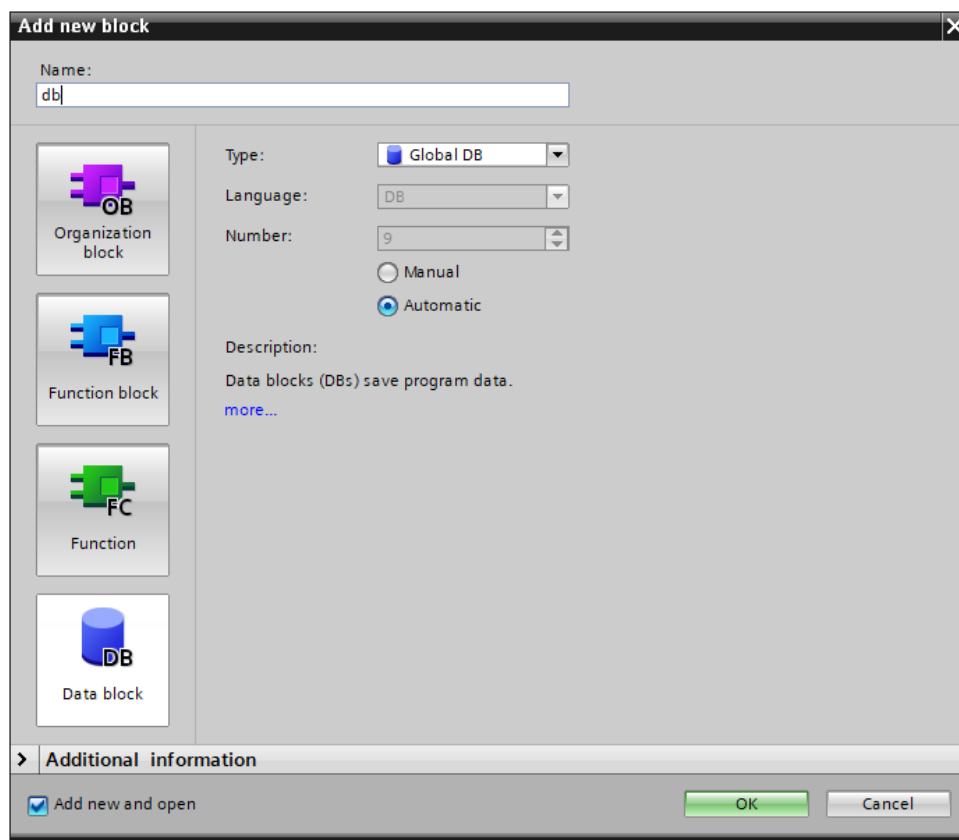
IO-Link In/Out 16/16 Byte + Status_1	0	2	1...20	1...30	IO-Link In/Out 16/16 Byte + Status
--------------------------------------	---	---	--------	--------	------------------------------------

3. Drag the Banner\_S15STH\_Floating\_Point, Banner\_S15STH\_PDI, Banner\_S15STH\_PDRow, and Banner\_S15STH\_Smart\_Sensor to the PLC Data Types area under your PLC.
4. Drag the Banner\_S15STH\_FP, Banner\_S15STH\_PD, and Banner\_S15STH\_SS to the Program Blocks area.
5. Drag the necessary tags from Banner\_Specialized\_Data\_Types. The tag used in this example is "Banner\_16In". These tags represent the full raw process data along with port status information.
6. Go to PLC Tags. Create two tags. In this example, Tag table\_1 was created, the tags "S15STH 01 PDI" and "S15STH IOLM1 01 iRaw" was created using a Data Type of "Banner\_16In" and "Banner\_S15STH\_PDRow". 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.



Name	Data type	Address
▶ S15STH IOLM1 01 PDI	"Banner_16In"	%I1.0
▶ S15STH IOLM1 01 iRaw	"Banner_S15STH_PDRow"	%I5.0

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 S15S TH. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type "Banner\_S15STH\_PDI" for the new tag.

▼ S15STH IOLM1 01 PD	"Banner_S15STH_PDI"
■ ► 1-Smart Sensor F	"Banner_S15STH_Smart_Sensor"
■ ► 2-Smart Sensor C	"Banner_S15STH_Smart_Sensor"
■ ► 3-Floating Point F	"Banner_S15STH_Floating_Point"
■ ► 4-Floating Point C	"Banner_S15STH_Floating_Point"

9. Add the “Banner\_S15STH\_PD” function to an OB ladder. Link “PDI” to the raw Process Data variable from step 6. Link the “S15STH” to the parsed Process Data variable from step 8.

The last variable, “Operational Mode”, allow the function to correctly interpret the Process Data Out. In the case of the S15S-TH , there are four user-selected modes for the Process Data Out. This function needs to know what choice has been made in the S15S-TH for this Operational Mode variable.

There are two ways to achieve this goal. We can simply type in the correct number for Operational Mode (see Fig. 1), or we can link this S15S-TH Process Data Function to the S15S-TH Parameter Data Function Block (see Fig. 2).

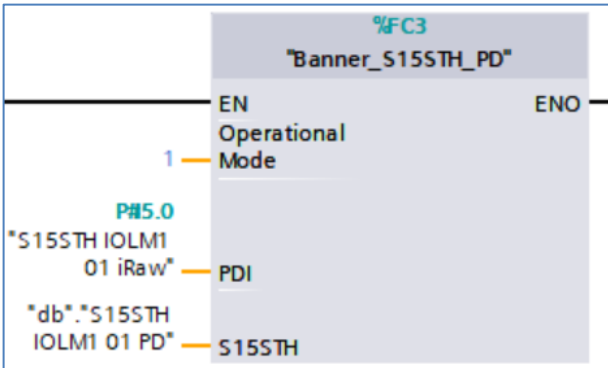


Figure 1: Hand type correct number for Operational Mode

**NOTE:** if you type in the incorrect number (i.e. it does not match the tower light’s current Operational Mode configuration) you will get incorrectly displayed Process Data Out information.

**Operational Mode:** the options here are “1” (Smart Sensor Fahrenheit Mode), “2” (Smart Sensor Celsius Mode), “3” (Floating Point Fahrenheit Mode), and “4” (Floating Point Celsius Mode); where the entire tower light behaves as a level indicator). The default is “1”.

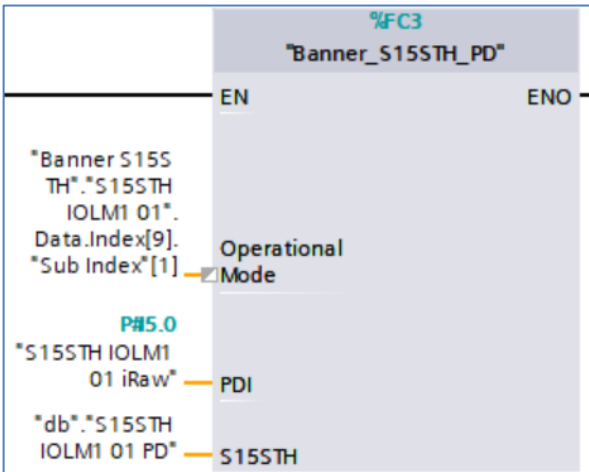


Figure 2: Linking Operational Mode variable to S15S-TH Parameter Data Function Block

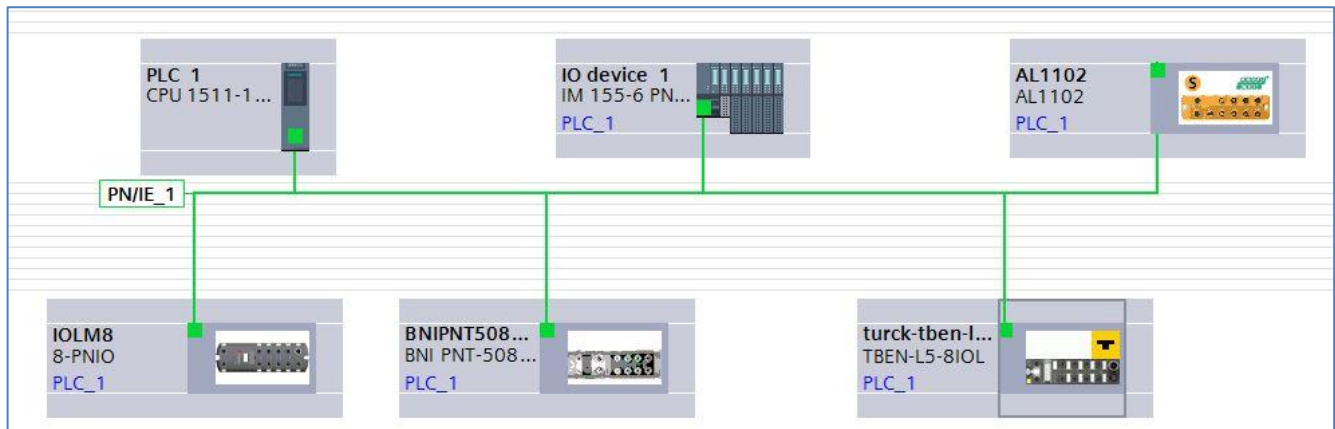
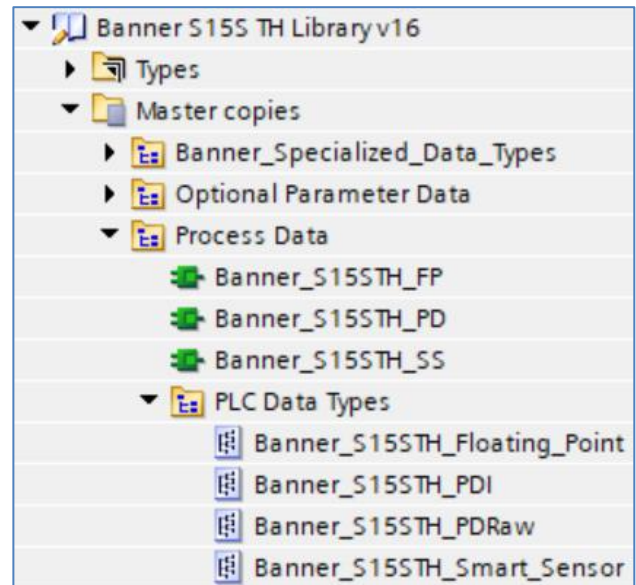
January 15<sup>th</sup>, 2026

## S5S-TH Process Data Function

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 S15S-TH Process Data.

### **Setup of S15S-TH with other IO-Link Masters**

1. The Banner IO-Link Library will now be in the Global Library List. Expand the Master copies section.
2. Drag Banner\_S15STH\_FP, Banner\_S15STH\_PD, and Banner\_S15STH\_SS to the Program Blocks area under your PLC.
3. Drag Banner\_S15STH\_Floating\_Point, Banner\_S15STH\_PDI, Banner\_S15STH\_PDRaw, and Banner\_S15STH\_Smart\_Sensor 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 S15S-TH requires 16 bytes of space for the Process Data In.
6. Record the "I" address where this S15S-TH Process Data In is to be stored, as the address will be required in the next step. In this example, 16 bytes of Process Data In for port 1 on the IO-Link Master will be stored starting at I68.

7. 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 “S15STH IOLM1 01 iRaw” was created using a Data Type of “Banner\_S15STH\_PDRaw”. 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 6 is tied to this new tag.

▶ S15STH IOLM1 01 iRaw	"Banner_S15STH_PDRaw"	%I68.0
------------------------	-----------------------	--------

8. 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 S15STH. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type “Banner\_S15STH\_PDI” for the new tag.

▼ S15STH IOLM1 01 PD	"Banner_S15STH_PDI"
■ ▶ 1-Smart Sensor F	"Banner_S15STH_Smart_Sensor"
■ ▶ 2-Smart Sensor C	"Banner_S15STH_Smart_Sensor"
■ ▶ 3-Floating Point F	"Banner_S15STH_Floating_Point"
■ ▶ 4-Floating Point C	"Banner_S15STH_Floating_Point"



10. Add the “Banner\_S15STH\_PD” function to an OB ladder. Link the “PDI” to the raw Process Data variables from step 7. Link the “S15STH” to the variable from step 9.

The last variable, “Operational Mode”, allow the function to correctly interpret the Process Data Out. In the case of the S15S-TH , there are four user-selected modes for the Process Data Out. This function needs to know what choice has been made in the S15S-TH for this Operational Mode variable.

There are two ways to achieve this goal. We can simply type in the correct number for Operational Mode (see Fig. 3), or we can link this S15S-TH Process Data Function to the S15S-TH Parameter Data Function Block (see Fig. 4).

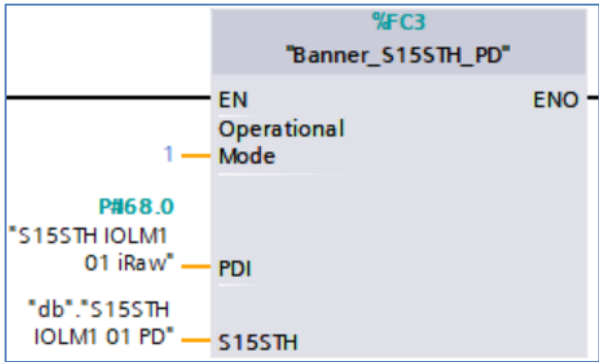


Figure 3: Hand type correct number for Operational Mode

**NOTE:** if you type in the incorrect number (i.e. it does not match the tower light’s current Operational Mode configuration) you will get incorrectly displayed Process Data Out information.

**Operational Mode:** the options here are “1” (Smart Sensor Fahrenheit Mode), “2” (Smart Sensor Celsius Mode), “3” (Floating Point Fahrenheit Mode), and “4” (Floating Point Celsius Mode); where the entire tower light behaves as a level indicator). The default is “1”.

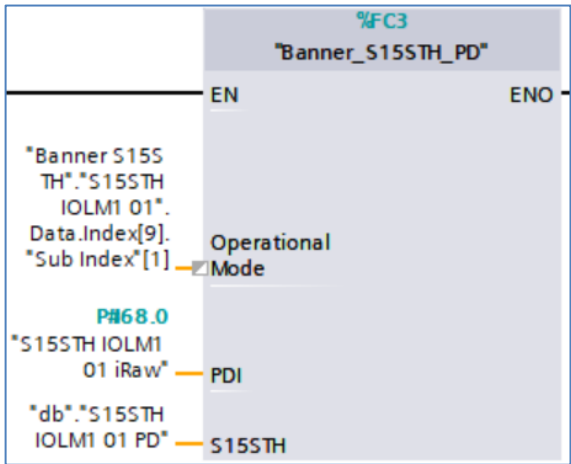


Figure 4: Linking Operational Mode variable to S15S-TH Parameter Data Function Block

January 15<sup>th</sup>, 2026

## S5S-TH Process Data Function

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 "S15STH IOLM01 PD". This shows all the Process Data for the device.

**Appendix A****S15S TH Process Data**

The S15S-TH has 16 bytes of Process Data In. There are three Sets of Data for the MVT.

**Mode 1**

ProcessDataIn "Process Data In" id=V_PDIn_SmartSensorFahrenheit_DataRef									
bit length: 112									
data type: 112-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	80	16-bit Integer						Temperature Value	
2	72	8-bit Integer						Temperature Scale	
3	65	Boolean						Temperature Under Threshold	
4	64	Boolean						Temperature Over Threshold	
5	48	16-bit Integer						Relative Humidity Value	
6	40	8-bit Integer						Relative Humidity Scale	
7	33	Boolean						Relative Humidity Under Threshold	
8	32	Boolean						Relative Humidity Over Threshold	
9	16	16-bit Integer						Dew Point Value	
10	8	8-bit Integer						Dew Point Scale	
11	1	Boolean						Dew Point Under Threshold	
12	0	Boolean						Dew Point Over Threshold	

**Mode 2**

ProcessDataIn "Process Data In" id=V_PDIn_SmartSensorCelsius_DataRef									
bit length: 112									
data type: 112-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	80	16-bit Integer						Temperature Value	
2	72	8-bit Integer						Temperature Scale	
3	65	Boolean						Temperature Under Threshold	
4	64	Boolean						Temperature Over Threshold	
5	48	16-bit Integer						Relative Humidity Value	
6	40	8-bit Integer						Relative Humidity Scale	
7	33	Boolean						Relative Humidity Under Threshold	
8	32	Boolean						Relative Humidity Over Threshold	
9	16	16-bit Integer						Dew Point Value	
10	8	8-bit Integer						Dew Point Scale	
11	1	Boolean						Dew Point Under Threshold	
12	0	Boolean						Dew Point Over Threshold	

## Mode 3

**ProcessDataIn "Process Data In" id=V\_PDIn\_FloatingPointFahrenheit\_DataRef**

bit length: 112

data type: 112-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	Float32						Temperature Value	
2	32	Float32						Relative Humidity Value	
3	64	Float32						Dew Point Value	
4	96	Boolean						Temperature Under Threshold	
5	97	Boolean						Temperature Over Threshold	
6	98	Boolean						Relative Humidity Under Threshold	
7	99	Boolean						Relative Humidity Over Threshold	
8	100	Boolean						Dew Point Under Threshold	
9	101	Boolean						Dew Point Over Threshold	

## Mode 4

**ProcessDataIn "Process Data In" id=V\_PDIn\_FloatingPointCelsius\_DataRef**

bit length: 112

data type: 112-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	Float32						Temperature Value	
2	32	Float32						Relative Humidity Value	
3	64	Float32						Dew Point Value	
4	96	Boolean						Temperature Under Threshold	
5	97	Boolean						Temperature Over Threshold	
6	98	Boolean						Relative Humidity Under Threshold	
7	99	Boolean						Relative Humidity Over Threshold	
8	100	Boolean						Dew Point Under Threshold	
9	101	Boolean						Dew Point Over Threshold	