

QM30VT3 Process Data Function

February 4th, 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 QM30VT3 sensor via an IO-Link Master to a Siemens PLC. The function covers parsing and display of the QM30VT3 sensor Process Data In.

Components

Banner QM30VT3 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.



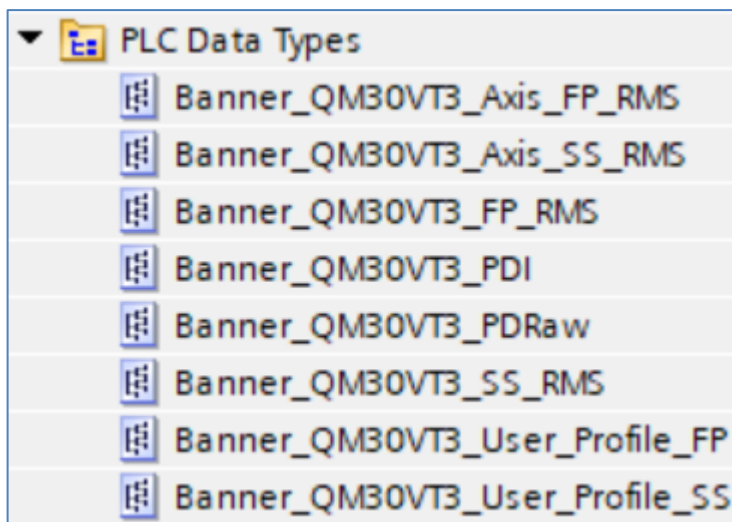
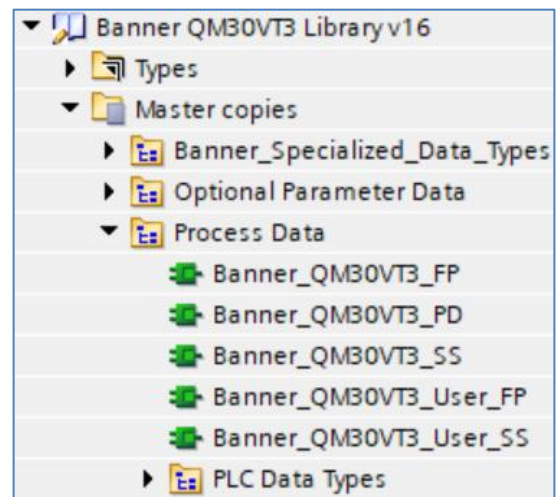
3. Switch the “Files of type” to Compressed libraries. Go to the location of the compressed library.
4. Press the Open button and the library will be uncompressed and opened.
5. The library is now accessible in the Libraries tab in v16 or greater.

Setup of QM30VT3 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. Add Banner IO-Link Master Info to Slot 1. This sets the DXMR for IO-Link mode.
3. 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 Input starts at 10. The other number needed is I14. The data for the port starts at that point (I14). The previous four bytes represent 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

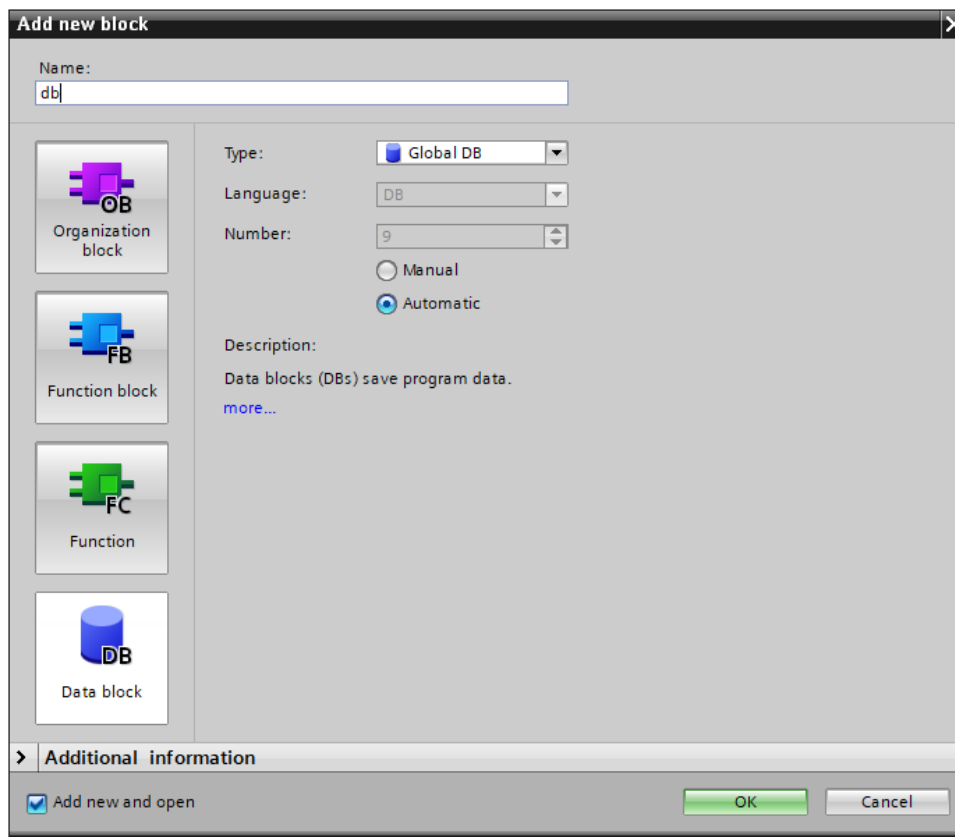
4. Drag the Banner_QM30VT3_Axis_FP_RMS, Banner_QM30VT3_Axis_SS_RMS, Banner_QM30VT3_FP_RMS, Banner_QM30VT3_PDI, Banner_QM30VT3PDRaw, Banner_QM30VT3_SS_RMS, Banner_QM30VT3_User_Profile_FP, and Banner_QM30VT3_User_Profile_SS to the PLC Data Types area under your PLC.
5. Drag the Banner_QM30VT3_FP, Banner_QM30VT3_PD, Banner_QM30VT3_SS, Banner_QM30VT3_User_FP, and Banner_QM30VT3_User_SS to the Program Blocks area.
6. Drag the necessary tag from Banner_Specialized_Data_Types. The tag used in this example is "Banner_32in". This tag represents the full raw process data along with port status information.



7. 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 "QM30VT3 IOLM1 01 PDI" was created using a Data Type of "Banner_32In". 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 "QM30VT3 IOLM1 01 iRaw" of the type "Banner_QM30VT3_PDRaw". This is the tag that will be used in the Function block.

Name	Data type	Address
▶ QM30VT3 IOLM1 01 PDI	"Banner_32In"	%I10.0
▶ QM30VT3 IOLM1 01 iRaw	"Banner_QM30VT3_PDRaw"	%I14.0

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



9. In the new data block, create a new tag to represent the parsed Process Data In for our QM30VT3. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type "Banner_QM30VT3_PDI" for the new tag.

▼ QM30VT3 IOLM1 01 PD	"Banner_QM30VT3_PDI"
■ ▶ 0-FP RMS	"Banner_QM30VT3_FP_RMS"
■ ▶ 1-SS RMS	"Banner_QM30VT3_SS_RMS"
■ ▶ 2-FP RMS	"Banner_QM30VT3_FP_RMS"
■ ▶ 3-SS RMS	"Banner_QM30VT3_SS_RMS"
■ ▶ 4-User Profile	Array[1..7] of "Banner_QM30VT3_User_Profile_FP"
■ ▶ 5-User Profile	Array[1..7] of "Banner_QM30VT3_User_Profile_SS"

▼ 0-FP RMS	"Banner_QM30VT3_FP_RMS"
■ ▼ X	"Banner_QM30VT3_Axis_FP_RMS"
■ Total RMS Ve...	Real
■ High Freque...	Real
■ Velocity Acu...	Bool
■ Velocity Acu...	Bool
■ Velocity Chr...	Bool
■ Velocity Chr...	Bool
■ HiFreq Accel...	Bool
■ HiFreq Accel...	Bool
■ HiFreq Accel...	Bool
■ HiFreq Accel...	Bool
■ ▶ Y	"Banner_QM30VT3_Axis_FP_RMS"
■ ▶ Z	"Banner_QM30VT3_Axis_FP_RMS"
■ Temperature	Real
■ Temp Warning	Bool
■ Temp Alarm	Bool

10. Add the “Banner_QM30VT3_PD” function to an OB ladder. Link the “PDI” raw process data variable from step 7. The tag name again calls out the type of device, IO-Link Master, and the port number. The “QM30VT3” needs to be linked to the variable created in step 9. It was called “db”. “QM30VT3 IOLM1 01 PD” for this example.

The last variable, “Operational Mode”, allow the function to correctly interpret the Process Data.

There are two ways to achieve this goal. We can simply type in the correct number for entries (see Fig. 1), or we can link this QM30VT3 Function to the QM30VT3 Data Function Block Data (see Fig. 2).

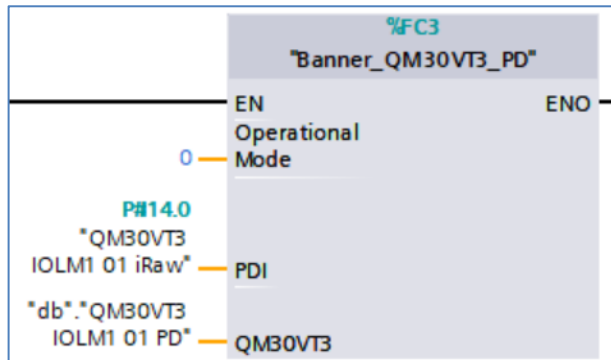


Figure 1: Hand typed correct numbers for Process Data Layout

NOTE: if you type in the incorrect number, you will get incorrectly displayed Process Data information.

Process Data Layout: the options here are “0” (FP Imperial Units), “1” (SSP Imperial Units), “2” (FP Metric Units), “3” (SSP Metric Units), “4” (FP User Define), and “5” (SSP User Define). The default is “0”.

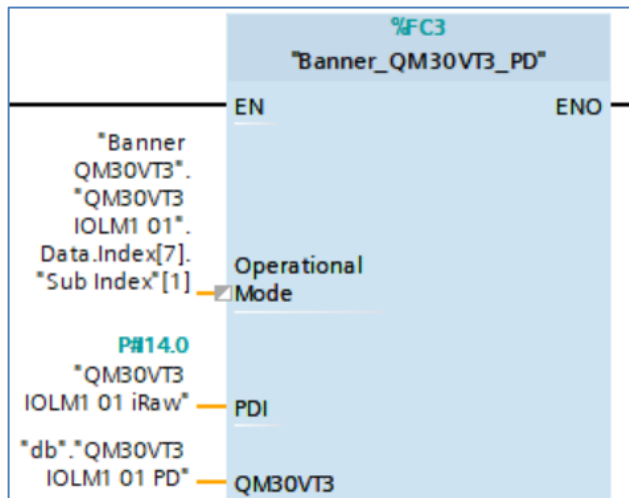
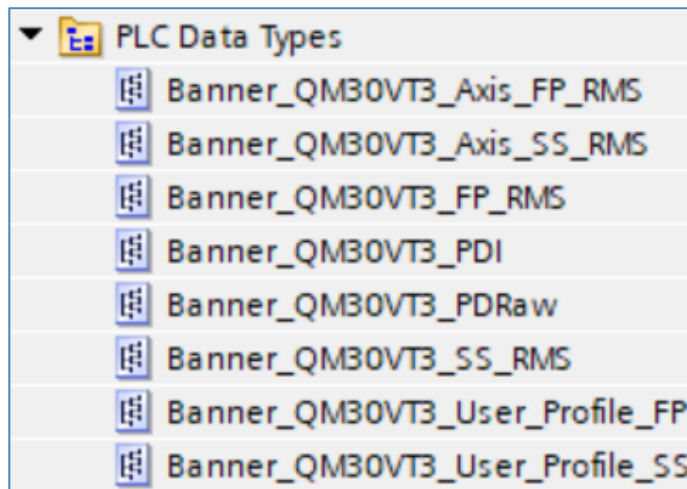
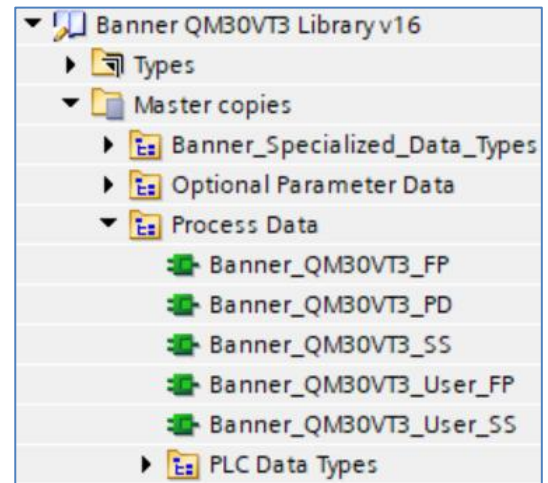


Figure 2: Linking Process Data Layout variable to Q90R2KU Parameter Data Function Block

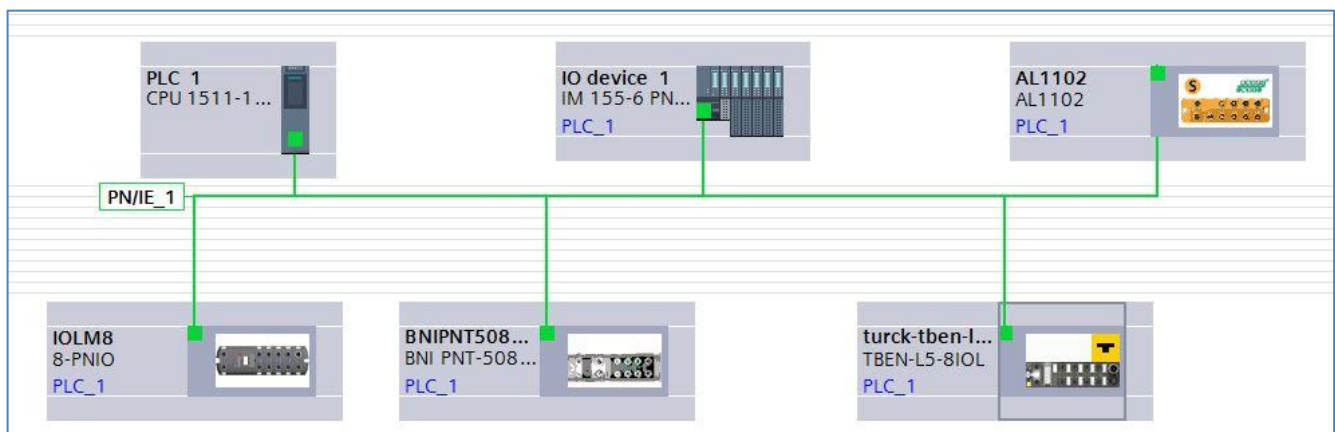
11. Process Data setup is complete.
12. Compile and download the configuration to the PLC, then go online. Open the “db” data block and click Monitor all. You should see parsed Q90R2KU Process Data In, like that shown below.

Setup of QM30VT3 with other IO-Link Masters

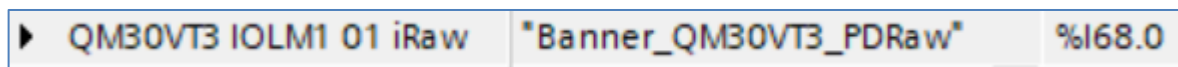
1. The Banner QM30VT3 Library will now be in the Global Library List. Expand the Master copies section.
2. Drag Banner_QM30VT3_FP, Banner_QM30VT3_PD, Banner_QM30VT3_SS, Banner_QM30VT3_User_FP, and Banner_QM30VT3_User_SS to the Program Blocks area under your PLC.
3. Drag Banner_QM30VT3_Axis_FP_RMS, Banner_QM30VT3_Axis_SS_RMS, Banner_QM30VT3_FP_RMS, Banner_QM30VT3_PDI, Banner_QM30VT3_PDRaw, Banner_QM30VT3_SS_RMS, Banner_QM30VT3_User_Profile_FP, and Banner_QM30VT3_User_Profile_SS to the PLC Data Types area under your PLC.



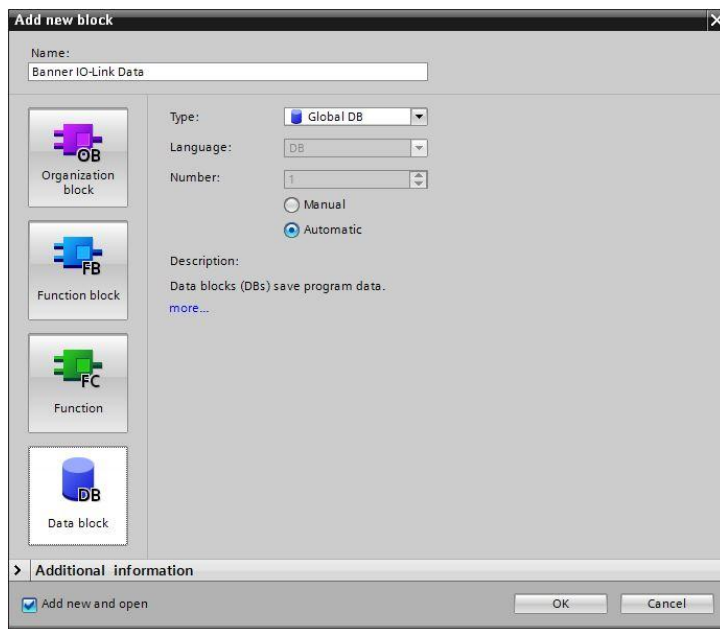
4. Go to Devices and networks to configure the system as necessary. Below is an example of what a configuration might look like. This example shows 5 different IO-Link Masters connected to the same PLC.



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 QM30VT3 requires 32 bytes of space for the Process Data In.
6. Record the “I” address where this QM30VT3 Process Data In is to be stored, as the address will be required in the next step. In this example, 32 bytes of Process Data In for port 1 on the IO-Link Master will be stored in I68 through I100.
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 “QM30VT3 IOLM1 01 iRaw” was created using the custom Data Type of “Banner_QM30VT3_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.



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”.

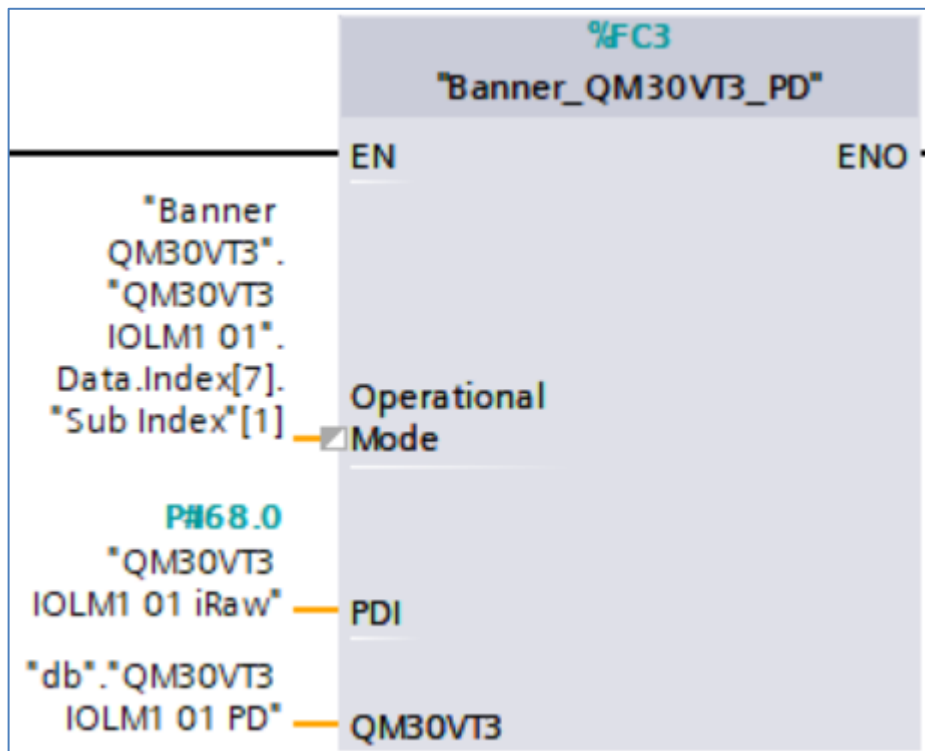
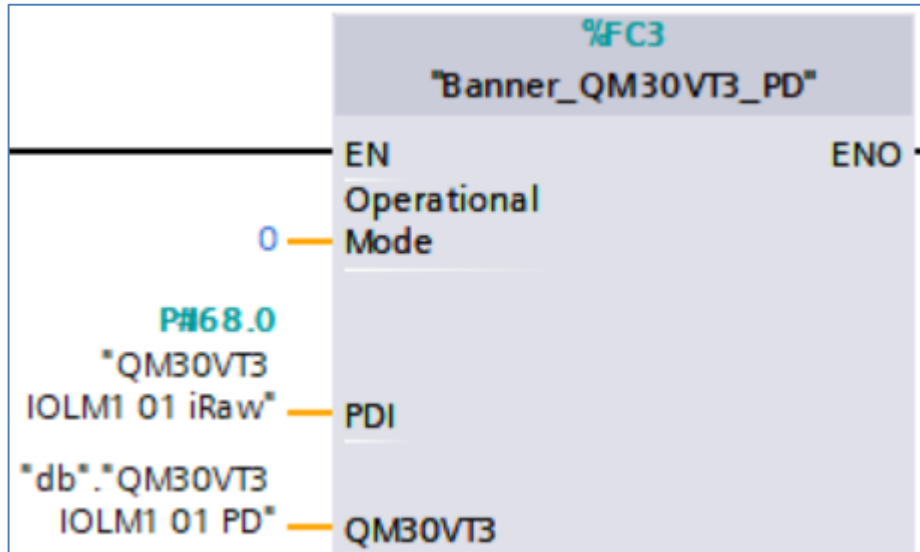


9. In the new data block, create a new tag to represent the parsed Process Data for our QM30VT3. The tag name again calls out the type of sensor, the IO-Link Master, and the port number. Use the data type "Banner_QM30VT3_PDI" for the new tag.

▼ QM30VT3 IOLM1 01 PD	"Banner_QM30VT3_PDI"
■ ▶ 0-FP RMS	"Banner_QM30VT3_FP_RMS"
■ ▶ 1-SS RMS	"Banner_QM30VT3_SS_RMS"
■ ▶ 2-FP RMS	"Banner_QM30VT3_FP_RMS"
■ ▶ 3-SS RMS	"Banner_QM30VT3_SS_RMS"
■ ▶ 4-User Profile	Array[1..7] of "Banner_QM30VT3_User_Profile_FP"
■ ▶ 5-User Profile	Array[1..7] of "Banner_QM30VT3_User_Profile_SS"

▼ 0-FP RMS	"Banner_QM30VT3_FP_RMS"
■ ▼ X	"Banner_QM30VT3_Axis_FP_RMS"
■ Total RMS Ve...	Real
■ High Freque...	Real
■ Velocity Acu...	Bool
■ Velocity Acu...	Bool
■ Velocity Chr...	Bool
■ Velocity Chr...	Bool
■ HiFreq Accel...	Bool
■ HiFreq Accel...	Bool
■ HiFreq Accel...	Bool
■ HiFreq Accel...	Bool
■ ▶ Y	"Banner_QM30VT3_Axis_FP_RMS"
■ ▶ Z	"Banner_QM30VT3_Axis_FP_RMS"
■ Temperature	Real
■ Temp Warning	Bool
■ Temp Alarm	Bool

10. Add the “Banner_QM30VT3_PD” function to an OB ladder. For the “Operational Mode” decision, you need to tell the function which of the three modes the sensor is in. See Appendix A for more information. Link “PDI” to the raw Process Data variables from step 7. Link the “QM30VT3” to the parsed Process Data variable from step 9.



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 Q90R2KU Process Data In, like that shown below.

Appendix A**QM30VT3 Process Data**

The QM30VT3 has 32 bytes of Process Data In, as shown below. There are xis modes for this Process Data In, called: FP Imperial Units (mode 0, the default), SSP Imperial units (mode 1), FP Metric Units (mode 2), SSP Metric Units (mode 3), FP User Define (mode 4), and SSP User Define (mode 5).

ProcessDataIn "Process Data Input" id=PDin_Primary_FP_RMS_insec									
bit length: 256									
data type: 256-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						X-Axis RMS Velocity (in/sec) (6-1000Hz)	X-Axis Total RMS Velocity in in/s
2	32	Float32						Y-Axis RMS Velocity (in/sec) (6-1000Hz)	Y-Axis Total RMS Velocity in in/s
3	64	Float32						Z-Axis RMS Velocity (in/sec) (6-1000Hz)	Z-Axis Total RMS Velocity in in/s
4	96	Float32						X-Axis High Frequency RMS Acceleration (G) (1000-5300Hz)	X-Axis Total HF RMS Accel in G
5	128	Float32						Y-Axis High Frequency RMS Acceleration (G) (1000-5300Hz)	Y-Axis Total HF RMS Accel in G
6	160	Float32						Z-Axis High Frequency RMS Acceleration (G) (1000-5300Hz)	Z-Axis Total HF RMS Accel in G
7	192	Float32						Temperature (°F)	Temperature Farenheight
8	224	Boolean						X Vel Acute Warning	X-Axis Velocity Acute Warning
9	225	Boolean						X Vel Acute Alarm	X-Axis Velocity Acute Alarm
10	226	Boolean						X Vel Chronic Warning	X-Axis Velocity Chronic Warning
11	227	Boolean						X Vel Chronic Alarm	X-Axis Velocity Chronic Alarm
12	228	Boolean						X HiFreq Accel Acute Warning	X-Axis High Frequency Acceleration Acute Warning
13	229	Boolean						X HiFreq Accel Acute Alarm	X-Axis High Frequency Acceleration Acute Alarm
14	230	Boolean						X HiFreq Accel Chronic Warning	X-Axis High Frequency Acceleration Chronic Warning
15	231	Boolean						X HiFreq Accel Chronic Alarm	X-Axis High Frequency Acceleration Chronic Alarm

Figure 3: PDI Mode 0, "FP Imperial Units"

This Process Data is mapped to a specific group of PROFINET addresses.

The "SSP Imperial Units" mode for the QM30VT3 Process Data In is shown below.

ProcessDataIn "Process Data Input" id=PDin_Primary_SS_RMS_insec									
bit length: 256									
data type: 256-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	16-bit UInteger						X-Axis RMS Velocity (in/sec) (6-1000Hz)	X-Axis Total RMS Velocity in in/s
2	16	8-bit Integer						Scale	Scale
3	24	Boolean						X Vel Acute Warning	X-Axis Velocity Acute Warning
4	25	Boolean						X Vel Acute Alarm	X-Axis Velocity Acute Alarm
5	26	Boolean						X Vel Chronic Warning	X-Axis Velocity Chronic Warning
6	27	Boolean						X Vel Chronic Alarm	X-Axis Velocity Chronic Alarm
7	32	16-bit UInteger						Y-Axis RMS Velocity (in/sec) (6-1000Hz)	Y-Axis Total RMS Velocity in in/s
8	48	8-bit Integer						Scale	Scale
9	56	Boolean						Y Vel Acute Warning	Y-Axis Velocity Acute Warning
10	57	Boolean						Y Vel Acute Alarm	Y-Axis Velocity Acute Alarm
11	58	Boolean						Y Vel Chronic Warning	Y-Axis Velocity Chronic Warning
12	59	Boolean						Y Vel Chronic Alarm	Y-Axis Velocity Chronic Alarm
13	64	16-bit UInteger						Z-Axis RMS Velocity (in/sec) (6-1000Hz)	Z-Axis Total RMS Velocity in in/s
14	80	8-bit Integer						Scale	Scale
15	88	Boolean						Z Vel Acute Warning	Z-Axis Velocity Acute Warning
16	89	Boolean						Z Vel Acute Alarm	Z-Axis Velocity Acute Alarm
17	90	Boolean						Z Vel Chronic Warning	Z-Axis Velocity Chronic Warning
18	91	Boolean						Z Vel Chronic Alarm	Z-Axis Velocity Chronic Alarm

Figure 4: PDI Mode 1, " Rectangular "

The "FP Metric Units" mode for the QM30VT3 Process Data In is shown below.

ProcessDataIn "Process Data Input" id=PDin_Primary_FP_RMSmmsec									
bit length: 256									
data type: 256-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						X-Axis RMS Velocity (mm/sec) (6-1000Hz)	X-Axis Total RMS Velocity in mm/s
2	32	Float32						Y-Axis RMS Velocity (mm/sec) (6-1000Hz)	Y-Axis Total RMS Velocity in mm/s
3	64	Float32						Z-Axis RMS Velocity (mm/sec) (6-1000Hz)	Z-Axis Total RMS Velocity in mm/s
4	96	Float32						X-Axis High Frequency RMS Acceleration (G) (1000-5300Hz)	X-Axis Total HF RMS Accel in G
5	128	Float32						Y-Axis High Frequency RMS Acceleration (G) (1000-5300Hz)	Y-Axis Total HF RMS Accel in G
6	160	Float32						Z-Axis High Frequency RMS Acceleration (G) (1000-5300Hz)	Z-Axis Total HF RMS Accel in G
7	192	Float32						Temperature (°C)	Temperature Celcius
8	224	Boolean						X Vel Acute Warning	X-Axis Velocity Acute Warning
9	225	Boolean						X Vel Acute Alarm	X-Axis Velocity Acute Alarm
10	226	Boolean						X Vel Chronic Warning	X-Axis Velocity Chronic Warning
11	227	Boolean						X Vel Chronic Alarm	X-Axis Velocity Chronic Alarm
12	228	Boolean						X HiFreq Accel Acute Warning	X-Axis High Frequency Acceleration Acute Warning
13	229	Boolean						X HiFreq Accel Acute Alarm	X-Axis High Frequency Acceleration Acute Alarm
14	230	Boolean						X HiFreq Accel Chronic Warning	X-Axis High Frequency Acceleration Chronic Warning
15	231	Boolean						X HiFreq Accel Chronic Alarm	X-Axis High Frequency Acceleration Chronic Alarm

Figure 5: PDI Mode 2, "FP Metric Units"

The "SSP Metric Units" mode for the QM30VT3 Process Data In is shown below.

ProcessDataIn "Process Data Input" id=PDin_Primary_SS_RMS_mmsec									
bit length: 256									
data type: 256-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	16-bit UInteger						X-Axis RMS Velocity (mm/sec) (6-1000Hz)	X-Axis Total RMS Velocity in mm/s
2	16	8-bit Integer						Scale	Scale
3	24	Boolean						X Vel Acute Warning	X-Axis Velocity Acute Warning
4	25	Boolean						X Vel Acute Alarm	X-Axis Velocity Acute Alarm
5	26	Boolean						X Vel Chronic Warning	X-Axis Velocity Chronic Warning
6	27	Boolean						X Vel Chronic Alarm	X-Axis Velocity Chronic Alarm
7	32	16-bit UInteger						Y-Axis RMS Velocity (mm/sec) (6-1000Hz)	Y-Axis Total RMS Velocity in mm/s
8	48	8-bit Integer						Scale	Scale
9	56	Boolean						Y Vel Acute Warning	Y-Axis Velocity Acute Warning
10	57	Boolean						Y Vel Acute Alarm	Y-Axis Velocity Acute Alarm
11	58	Boolean						Y Vel Chronic Warning	Y-Axis Velocity Chronic Warning
12	59	Boolean						Y Vel Chronic Alarm	Y-Axis Velocity Chronic Alarm
13	64	16-bit UInteger						Z-Axis RMS Velocity (mm/sec) (6-1000Hz)	Z-Axis Total RMS Velocity in mm/s
14	80	8-bit Integer						Scale	Scale
15	88	Boolean						Z Vel Acute Warning	Z-Axis Velocity Acute Warning
16	89	Boolean						Z Vel Acute Alarm	Z-Axis Velocity Acute Alarm
17	90	Boolean						Z Vel Chronic Warning	Z-Axis Velocity Chronic Warning
18	91	Boolean						Z Vel Chronic Alarm	Z-Axis Velocity Chronic Alarm

Figure 6: PDI Mode 3, "SSP Metric Units"

The "FP User Define" mode for the QM30VT3 Process Data In is shown below.

ProcessDataIn "Process Data Input" id=PDin_User_Profile_FP_mmsec									
bit length: 256									
data type: 256-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						Metric 1	Metric 1
2	32	Float32						Metric 2	Metric 2
3	64	Float32						Metric 3	Metric 3
4	96	Float32						Metric 4	Metric 4
5	128	Float32						Metric 5	Metric 5
6	160	Float32						Metric 6	Metric 6
7	192	Float32						Metric 7	Metric 7
8	224	Boolean						M1 Chan 1 Warning	M1 Chan 1 Warning
9	225	Boolean						M1 Chan 2 Alarm	M1 Chan 2 Alarm
10	226	Boolean						M2 Chan 1 Warning	M2 Chan 1 Warning
11	227	Boolean						M2 Chan 2 Alarm	M2 Chan 2 Alarm
12	228	Boolean						M3 Chan 1 Warning	M3 Chan 1 Warning
13	229	Boolean						M3 Chan 2 Alarm	M3 Chan 2 Alarm
14	230	Boolean						M4 Chan 1 Warning	M4 Chan 1 Warning
15	231	Boolean						M4 Chan 2 Alarm	M4 Chan 2 Alarm
16	232	Boolean						M5 Chan 1 Warning	M5 Chan 1 Warning
17	233	Boolean						M5 Chan 2 Alarm	M5 Chan 2 Alarm
18	234	Boolean						M6 Chan 1 Warning	M6 Chan 1 Warning
19	235	Boolean						M6 Chan 2 Alarm	M6 Chan 2 Alarm
20	236	Boolean						M7 Chan 1 Warning	M7 Chan 1 Warning
21	237	Boolean						M7 Chan 2 Alarm	M7 Chan 2 Alarm

Figure 7: PDI Mode 4, "FP User Define"

The "SSP User Define" mode for the QM30VT3 Process Data In is shown below.

ProcessDataIn "Process Data Input" id=PDin_User_Profile_FP_mmsec									
bit length: 256									
data type: 256-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						Metric 1	Metric 1
2	32	Float32						Metric 2	Metric 2
3	64	Float32						Metric 3	Metric 3
4	96	Float32						Metric 4	Metric 4
5	128	Float32						Metric 5	Metric 5
6	160	Float32						Metric 6	Metric 6
7	192	Float32						Metric 7	Metric 7
8	224	Boolean						M1 Chan 1 Warning	M1 Chan 1 Warning
9	225	Boolean						M1 Chan 2 Alarm	M1 Chan 2 Alarm
10	226	Boolean						M2 Chan 1 Warning	M2 Chan 1 Warning
11	227	Boolean						M2 Chan 2 Alarm	M2 Chan 2 Alarm
12	228	Boolean						M3 Chan 1 Warning	M3 Chan 1 Warning
13	229	Boolean						M3 Chan 2 Alarm	M3 Chan 2 Alarm
14	230	Boolean						M4 Chan 1 Warning	M4 Chan 1 Warning
15	231	Boolean						M4 Chan 2 Alarm	M4 Chan 2 Alarm
16	232	Boolean						M5 Chan 1 Warning	M5 Chan 1 Warning
17	233	Boolean						M5 Chan 2 Alarm	M5 Chan 2 Alarm
18	234	Boolean						M6 Chan 1 Warning	M6 Chan 1 Warning
19	235	Boolean						M6 Chan 2 Alarm	M6 Chan 2 Alarm
20	236	Boolean						M7 Chan 1 Warning	M7 Chan 1 Warning
21	237	Boolean						M7 Chan 2 Alarm	M7 Chan 2 Alarm

Figure 8: PDI Mode 5, "SSP User Define"