

## Add-On Instructions for VDM28 Sensors

### Configuration and Process Data Using IO-Link Masters

#### Introduction

Add-On instructions are easy-to-use function blocks designed for RSLogix/Studio 5000. The instructions allow IO-Link parameters to be read and written by simple logic. Process data is also displayed in the correct format with the help of the parameter data.

#### Available Instructions

Instruction	Description
<b>PF_VDM28_INT_IOLINK2</b>	Configuration and Process Data display of VDM28 measurement sensor, PDI INT format
<b>PF_VDM28_SINT_IOLINK2</b>	Configuration and Process Data display of VDM28 measurement sensor, PDI SINT format

#### Supported IO-Link Masters

IO-Link Master	Description
<b>ICE1-8IOL-G60L-V1D</b>	8-port Pepperl+Fuchs IO-Link master in metal housing
<b>ICE1-8IOL-G30L-V1D</b>	8-port Pepperl+Fuchs IO-Link master in compact metal housing
<b>ICE2-8IOL-G65L-V1D</b>	8-port Pepperl+Fuchs IO-Link master in plastic housing
<b>ICE2-8IOL-K45P-RJ45</b>	8-port Pepperl+Fuchs Panel Mount IO-Link master, spring terminals
<b>ICE2-8IOL-K45S-RJ45</b>	8-port Pepperl+Fuchs Panel Mount IO-Link master, screw terminals

<b>1734-4IOL</b>	Allen-Bradley® Point-IO IO-Link Master
<b>1732E-8IOLM12R</b>	Allen-Bradley ArmorBlock® IO-Link Master

## Version

All Add-Ons were created in Studio 5000 V24. The instructions were also copied, pasted, and exported to a version 16 project. This allows the instructions to work on all PLC versions.

## Add-On

These instructions have the ability to read and write all IO-Link parameters, reset all parameters to default, and display the process data in the correct format.

## Reading and Writing IO-Link Parameters

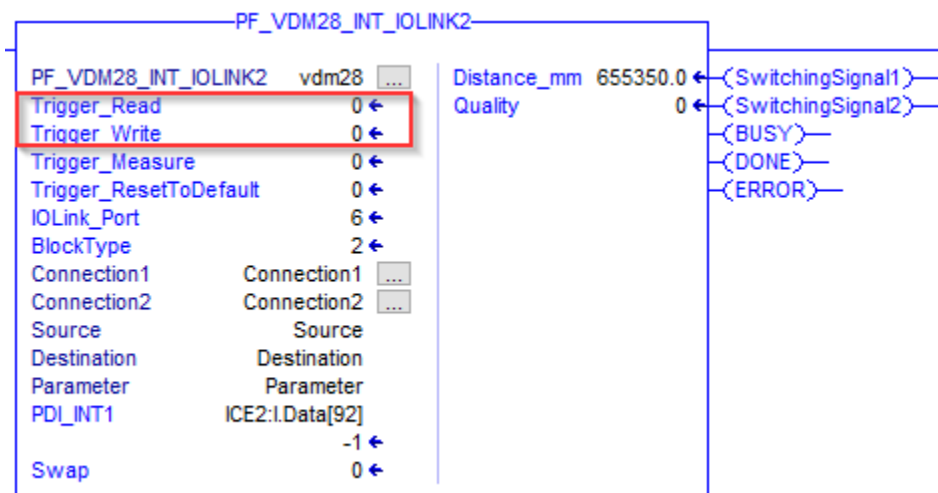


Figure 1: Trigger commands to read or write parameters

When all triggers are low, the “Busy, Done, and Error” bits will go low. Only one trigger can be issued at a time. The command is executed in the off-to-on transition and is complete when either a DONE or ERROR bit turns on. When complete, the parameter data is displayed in the Parameter User Defined Variable type. The Description of each variable is listed and marked as read only (ro) or read/write (rw). Additionally, the index and subindex are listed to allow access to each variable separately.

Suggested order of operations to change parameters:

1. Read Parameters
2. Make changes
3. Write Parameters

# Parameter.Identification

Parameter	[...]	PF_VDM281	
Parameter Identification	[...]	PF_VDM28Identification	
Parameter Identification.Vendor_Name	ASCII	SINT[32]	ro, 16-0
Parameter Identification.Vendor_Text	ASCII	SINT[32]	ro, 17-0
Parameter Identification.Product_Name	ASCII	SINT[32]	ro, 18-0
Parameter Identification.Product_ID	ASCII	SINT[32]	ro, 19-0
Parameter Identification.Product_Text	ASCII	SINT[64]	ro, 20-0
Parameter Identification.Serial_Number	ASCII	SINT[32]	ro, 21-0
Parameter Identification.Hardware_Revision	ASCII	SINT[32]	ro, 22-0
Parameter Identification.Firmware_Revision	ASCII	SINT[64]	ro, 23-0
Parameter Identification.App_Specific_Tag	ASCII	SINT[32]	rw, 24-0
Parameter Identification.User_Tag_1	0 Decimal	DINT	rw, 192
Parameter Identification.User_Tag_2	0 Decimal	INT	rw, 193
Parameter Identification.Minimum_Cycle_Time	23 Decimal	SINT	ro, 0-2
Parameter Identification.Master_Cycle_Time	40 Decimal	SINT	ro, 0-1
Parameter Identification.IOLink_Version	16#10 Hex	SINT	ro, 0-4
Parameter Configuration	[...]	PF_VDM28Configurati...	
Parameter Diagnostics	[...]	PF_VDM28Diagnostics	

# Parameter.Configuration

Parameter	[...]	PF_VDM281	
Parameter Identification	[...]	PF_VDM28Identification	
Parameter Configuration	[...]	PF_VDM28Configurati...	
Parameter Configuration.Switching_Sig1_Near_Threshold	5000 Decimal	DINT	rw 64-1, Switching signal 1 far threshold, default 5000
Parameter Configuration.Switching_Sig1_Near_Hysteresis	150 Decimal	DINT	rw 64-2, Switching signal 1 far Hysteresis, default 150
Parameter Configuration.Switching_Sig1_Far_Threshold	10000 Decimal	DINT	rw 64-3, Switching signal 1 far threshold, default 10000
Parameter Configuration.Switching_Sig1_Far_Hysteresis	150 Decimal	DINT	rw 64-4, Switching signal 1 far Hysteresis, default 150
Parameter Configuration.Switching_Sig1_Logic	0 Decimal	SINT	rw, 112-1, 0 = Non Inverted, 1 = Inverted
Parameter Configuration.Switching_Sig1_Mode	0 Decimal	SINT	rw, 96-1, 0 = Inactive, 1 = Threshold, 2 = Window, 3 = Hysteresis, default=0
Parameter Configuration.Switching_Sig1_Time	0 Decimal	SINT	rw, 112-5, 0 = No Delay, 1 = 50ms Delay, 2 = 100ms Delay, default=0
Parameter Configuration.Sig1_IOType	0 Decimal	SINT	rw, 112-3, 0=push-pull
Parameter Configuration.Switching_Sig2_Near_Threshold	10000 Decimal	DINT	rw 65-1, Switching signal 1 far threshold, default 5000
Parameter Configuration.Switching_Sig2_Near_Hysteresis	150 Decimal	DINT	rw 65-2, Switching signal 1 far Hysteresis, default 150
Parameter Configuration.Switching_Sig2_Far_Threshold	15000 Decimal	DINT	rw 65-3, Switching signal 1 far threshold, default 10000
Parameter Configuration.Switching_Sig2_Far_Hysteresis	150 Decimal	DINT	rw 65-4, Switching signal 1 far Hysteresis, default 150
Parameter Configuration.Switching_Sig2_Logic	0 Decimal	SINT	rw, 112-2, 0 = Non Inverted, 1 = Inverted
Parameter Configuration.Switching_Sig2_Mode	0 Decimal	SINT	rw, 96-2, 0 = Inactive, 1 = Threshold, 2 = Window, 3 = Hysteresis, default=0
Parameter Configuration.Switching_Sig2_Time	0 Decimal	SINT	rw, 112-6, 0 = No Delay, 1 = 50ms Delay, 2 = 100ms Delay, default=0
Parameter Configuration.Analog_Sig2_Near_Limit	2000 Decimal	DINT	rw, 66-1, Analog Near Limit, default 2000
Parameter Configuration.Analog_Sig2_Far_Limit	50000 Decimal	DINT	rw, 66-2, Analog Far Limit, default 50000
Parameter Configuration.Analog_Sig2_Mode	0 Decimal	SINT	rw, 96-3, 0 = Rising Ramp, 1 = Falling Ramp, 2 = Linear Ramp, 16 = Rising Ramp with Substitution Values, 17 = Falling Ramp with Substitution Values, 18 = Linear ...
Parameter Configuration.Sig2_IOType	4 Decimal	SINT	rw, 112-4, 0 = Push-Pull, 1 = Low-Side, 2 = High-Side, 3 = High Impedance, 4 = Analog Signal
Parameter Configuration.ProcessData_Config	0 Decimal	SINT	rw, 99-2, 0 = Distance, 1 = Distance, Switching Signals, 2 = Distance, Signal Quality, 3 = Distance, Signal Quality, Switching Signals, default=0
Parameter Configuration.ProcessData_Resolution	3 Decimal	SINT	rw, 99-3, 0 = 1 mm / Bit, 1 = 2 mm / Bit, 2 = 5 mm / Bit, 3 = 10 mm / Bit; default=3
Parameter Configuration.ProcessData_Mode	0 Decimal	SINT	rw, 99-1, 0 = Relative, 1 = Normalized; default=0
Parameter Configuration.Measurement_Offset	0 Decimal	DINT	rw, 67-0, -81500 to 81500, default=0
Parameter Configuration.Measurement_Normalized_Distance	50000 Decimal	DINT	rw, 68-0, Normalized Distance; default=50000
Parameter Configuration.Measurement_Averaging	0 Decimal	SINT	rw, 98-0, 0 = Averaging 10ms, 1 = Averaging 20ms, 2 = Averaging 50ms, 3 = Averaging 100ms, default=0
Parameter Configuration.Event_Config_Invalid	0 Decimal	SINT	rw, 116-1, 0=disabled, 1=lost target event enabled, default=0
Parameter Configuration.DeviceAccessLocks	0 Decimal	SINT	rw, 113-0, 0=unlock, 1=locked, default=0
Parameter Configuration.Local_Control_Yellow_LED_Indicator	0 Decimal	SINT	rw, 126-0 0=Q1 indication, 1=Q2 indication, default=0
Parameter Diagnostics	[...]	PF_VDM28Diagnostics	

Source: (Type) <PF\_VDM28Configuration.Switching\_Sig1\_Logic>  
rw, 112-2, 0 = Non Inverted, 1 = Inverted

# Parameter.Diagnostics

Parameter	[...]	PF_VDM281	
Parameter Identification	[...]	PF_VDM28Identification	
Parameter Configuration	[...]	PF_VDM28Configurati...	
Parameter Diagnostics	[...]	PF_VDM28Diagnostics	
Parameter Diagnostics.Operating_Hours	172 Decimal	DINT	224-0, Total Operating hours
Parameter Diagnostics.Temperature_Indicator	0 Decimal	SINT	225-0, shows the overall hours of operation, 0 = safe operation temperature, 1 = critical high ambient temperature, 2 = temperature above specified limit, 3 = critic...
Parameter Diagnostics.Minimum_Detection_Range	500 Decimal	DINT	232-0 First INT
Parameter Diagnostics.Maximum_Detection_Range	81500 Decimal	DINT	232-0 Second INT
Parameter Diagnostics.Measurement_Value	1170 Decimal	DINT	72, first 32 bit, 4294967295 = No Target detected, 0, 4294967294
Parameter Diagnostics.Signal_Quality	3 Decimal	SINT	0 = insufficient, 1 = acceptable, 2 = good, 3 = excellent
Parameter Diagnostics.Switching_Signals	0 Decimal	SINT	0 = Signal: 1 inactive / 2 inactive, 1 = Signal: 1 active / 2 inactive, 2 = Signal: 1 inactive / 2 active, 3 = Signal: 1 active / 2 active
Parameter Diagnostics.Last_Event	[...]	SINT[3]	ro 33 Last event that Occurred
Parameter Diagnostics.Error_Count	0 Decimal	INT	ro, 32
Parameter Diagnostics.Threshold_Status	0 Decimal	SINT	73, 0 = Success, 1 = In Progress, 255 = Failure
Parameter Diagnostics.Threshold_Quality	0 Decimal	SINT	73, 0..100
Parameter Diagnostics.Threshold_Value	0 Decimal	DINT	73
Parameter Diagnostics.Switch_Position	0 Decimal	SINT	ro, 115, first four bits 0 = Run, 1 = AQ1, 2 = BQ1, 3 = AQ2, 4 = BQ2, bit 1 shows button state
Parameter Diagnostics.IO_Feature	3 Decimal	INT	239-0, 0=none, 1=analog pin 2, 2=second in, out pin 2, 3=second signal in, analog pin 2, 5=Analog pin2, in signal pin 5, 6=second sig out pin 2, in sig pin 5, 7=se...
Parameter Diagnostics.Indicator_Control	0 Decimal	SINT	rw, 127-0 Flashes the LEDs so you can better identify the product.
Parameter Diagnostics.Device_Operation	0 Decimal	SINT	rw, 114-0, default 0, 1 disables the emitter for diagnostic test.

## Trigger Reset to Default

Resetting the sensor to default will reset all the sensor's parameters to default. Read the parameters after to see the default settings, then make changes as necessary.

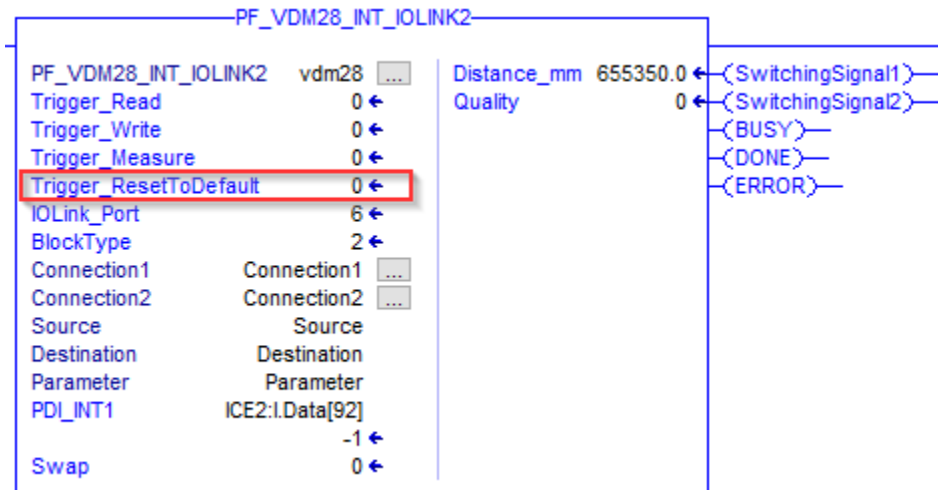


Figure 2: Trigger command to reset all parameters to default

## Port Number and Module Type

The port number, IOLink\_Port, indicates the port to which the sensor is connected. The Pepperl+Fuchs modules have ports numbered 1–8, and the Allen-Bradley master has ports labeled 0–3 or 1–8, depending on the version.

The BlockType defines the type of IO-Link master being used.

- BlockType = 0 > ICE1... IO-Link Masters
- BlockType = 1 > Allen-Bradley IO-Link Masters
- BlockType = 2 > ICE2... IO-Link Masters

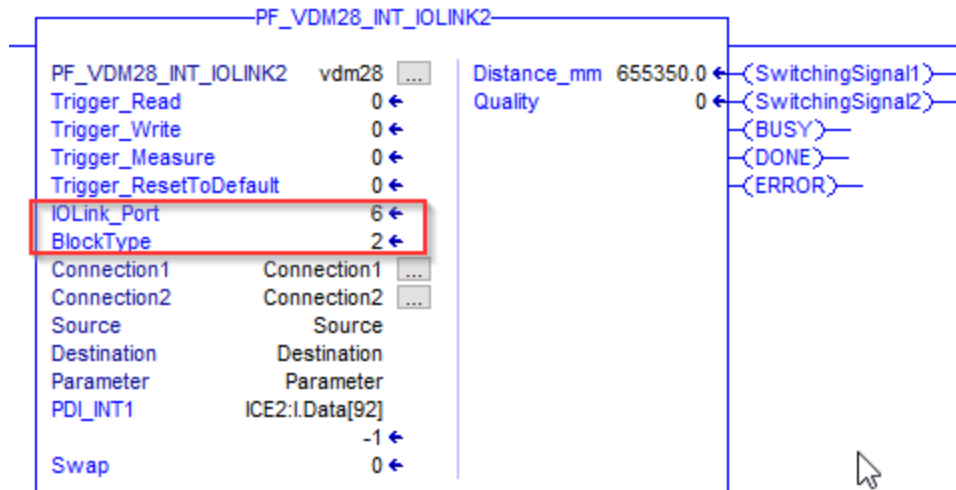


Figure 3: IO-Link\_Port and BlockType configuration

## Process Data In

Process data is the cyclically updated data that shows Distance, Quality, and Setpoints. The variable ProcessData\_Config determines what data is mapped, and the variable ProcessData\_Resolution indicates the resolution of the position data that is returned. These parameters must be properly read in or configured before the process data is used. Simply execute a “Trigger\_Read” command and wait for a DONE signal with no ERROR. These parameters will then be filled in automatically.

[-] Parameter Configuration.ProcessData_Config	0   Decimal	SINT	rw, 99-2; 0 = Distance, 1 = Distance, Switching Signals, 2 = Distance, Signal Quality, 3 = Distance, Signal Quality, Switching Signals, default=0
[-] Parameter Configuration.ProcessData_Resolution	3   Decimal	SINT	rw, 99-3; 0 = 1 mm / Bit, 1 = 2 mm / Bit, 2 = 5 mm / Bit, 3 = 10 mm / Bit; default=3

Figure 4: Parameters used to configure the process data

Once the parameters are filled in correctly, use the correct Add-On for the process data that will be used. If the process data is mapped as an Integer, use the PF\_VDM28\_INT\_IOLINK2 Add-ON. If the Process Data is mapped as a Short Integer, use the PF\_VDM28\_SINT\_IOLINK2 Add-ON.

Name	Size
Read/Write All Ports	Input: 144 Output: 128

Figure 5: Process data mapped as Integer

Name	Size	Tag Suffix
Status/Ctrl + IOL32 + IOL State/Event	Input: 430 Output: 260	1

Figure 6: Process data mapped as Short Integer

The process data will be of size INT or SINT and will be used as an Input variable of the Add-On. Verify the location where the process data for the VDM28 is mapped before using the Add-On. There are

description files for the ICE1 IO-Link masters and a description file generator for the ICE2 Add-Ons. Contact technical support for assistance.

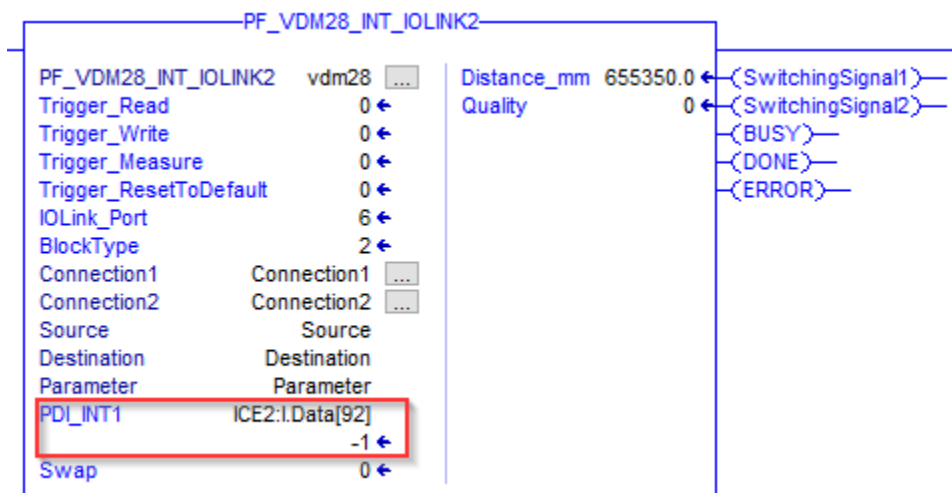


Figure 7: One Integer of process data used by ..INT\_ Add-On

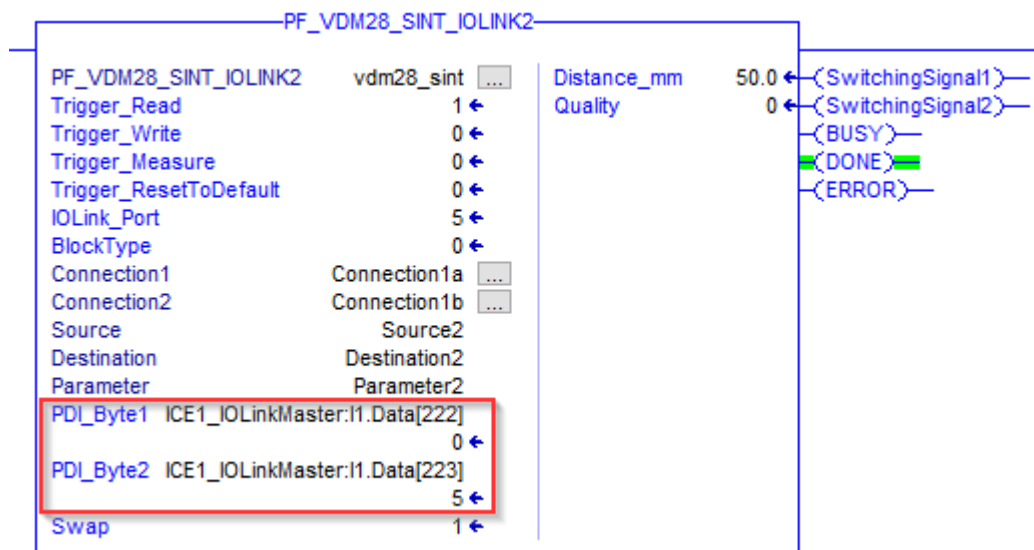


Figure 8: Two Bytes of process data for the \_...SINT... Add-On

## Swap

Byte swapping is used if the process data is not already swapped by the IO-Link master. The ICE1 IO-Link masters do not swap the data, so swapping should be enabled. If the ICE2 process data has been swapped already, then no additional swapping is necessary.

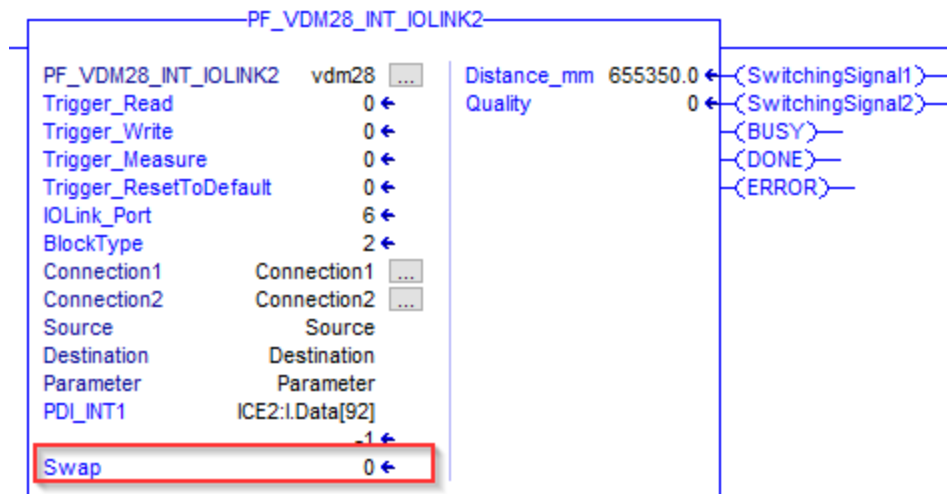


Figure 9: Swapping used when the IO-Link master does not swap the process data

## Process Data Display

The only Add-On that has the process data built in is the VDM28. In order for the process data formatting to be correct, you must read all parameters first! This guarantees that the formatting of the process data displays correctly on the screen. Depending on the formatting of the data, the Quality and Switching Signals 1 and 2 may or may not be used.

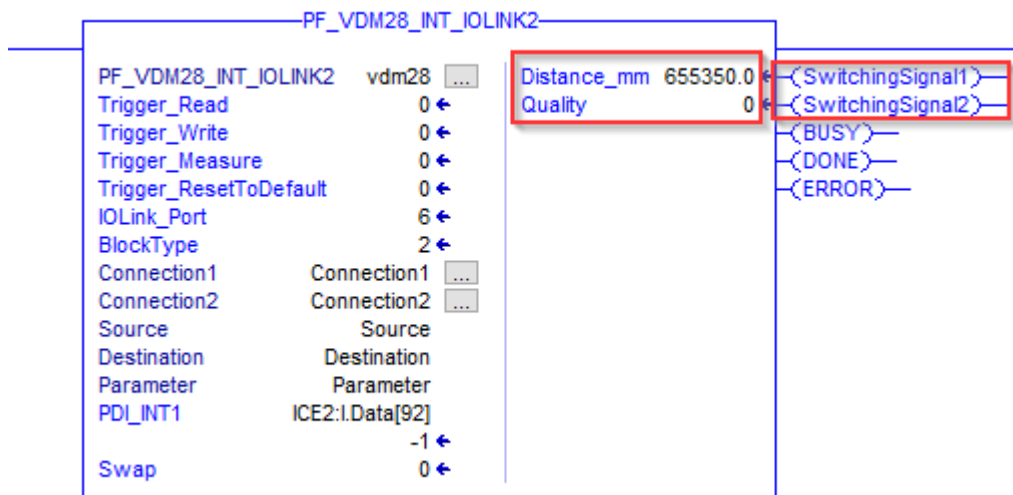


Figure 10: VDM28 with process data displayed

## Other Variables

The remaining variables are used by the block only. Valuable information is not accessible from the outside.

## Connections

These are the connection messages used to read and write the parameters. Only four parameters in each must be set. The service code will depend on what BlockType is used.

Connection 1 > Service Code 4B for BlockType 0, and 2  
Service Code 4D for BlockType 1

Connection 2 > Service Code 4C for BlockType 0, and 2  
Service Code 4E for BlockType 1

