Hydris / HydroVAS PLC Integration

USING TIA PORTAL V18 AND FC_HEN_HYDRISPARSER_HYD2PLC.SCL

Notes

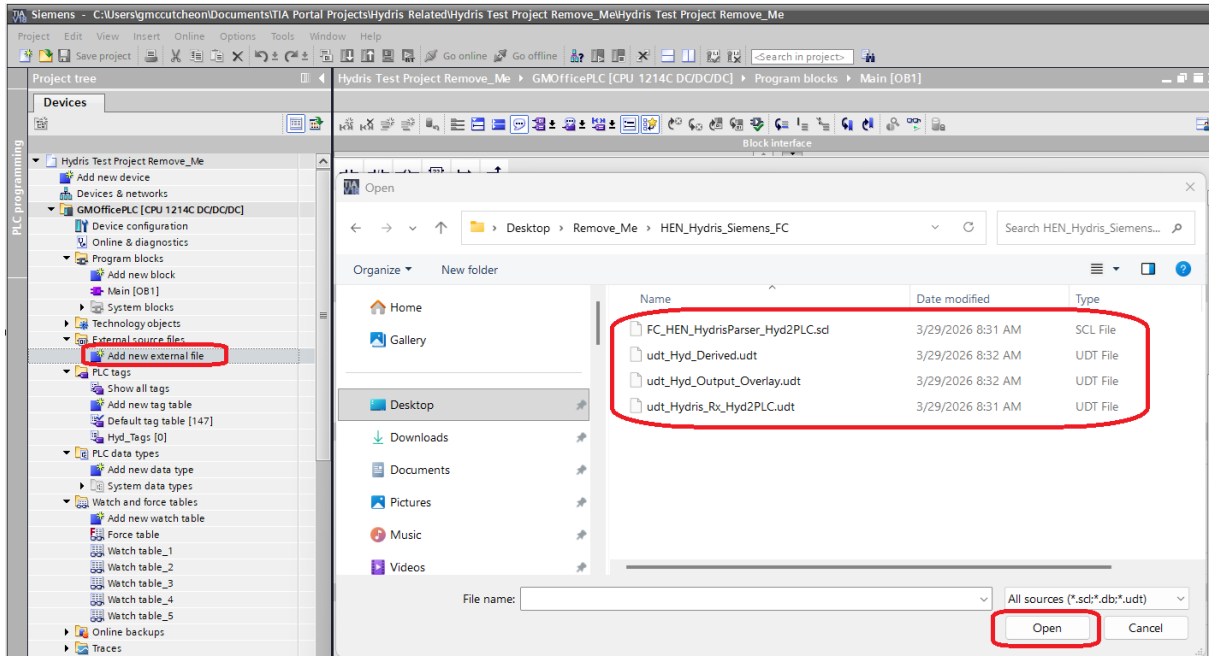
- **Required Telegram Configuration**
  - The Hydris / HydroVAS must be configured to use a **byte-aligned telegram** for proper operation with this parser.
    The default telegram is not byte-aligned and is not compatible with this implementation.
  - Ensure the correct byte-aligned telegram (high-byte version typical for Siemens implementations) is selected in the device configuration before commissioning.

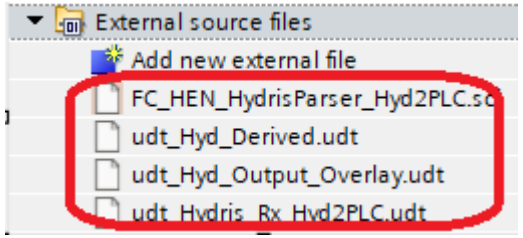
- **Overlay Address Requirement**
  - The overlay tag address must match the actual Hydris input start address configured in the device.
    If the address or telegram layout does not match, the parsed values will be incorrect.

- **Byte Order Consideration**
  - The byte order of the PLC mapping must match the Hydris telegram version (high-byte first or low-byte first).
    Using the incorrect byte order will result in invalid or misinterpreted data.

Import Function Block and UDTs

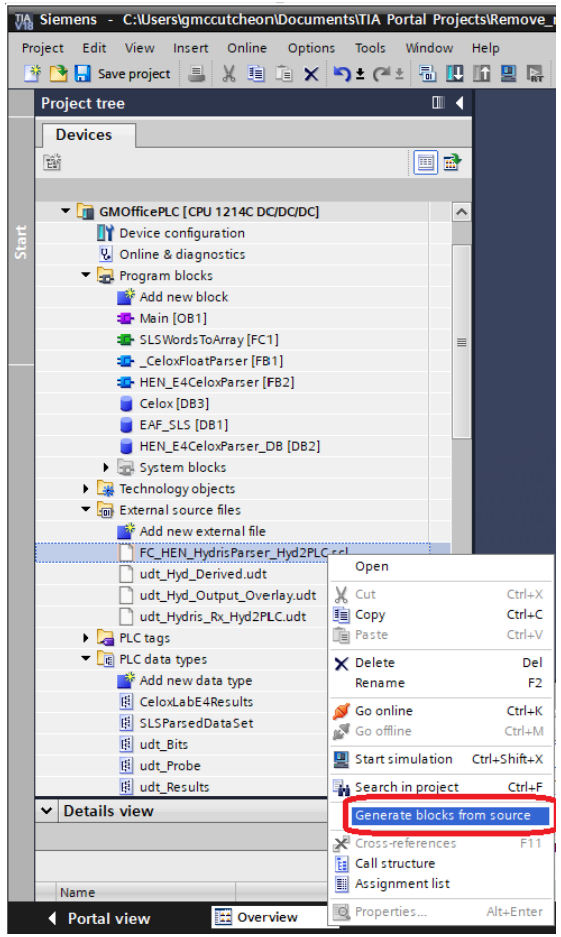
- In TIA Portal, go to Project tree.
- Navigate to External source files.
- Click **“Add new external file”** and select the following files:
  - FC_HEN_HydrisParser_Hyd2PLC.scl
  - udt_Hyd_Derived.udt
  - udt_Hyd_Output_Overlay.udt
  - udt_Hydris_Rx_Hyd2PLC.udt
- Click Open and confirm the files appear under External source files.

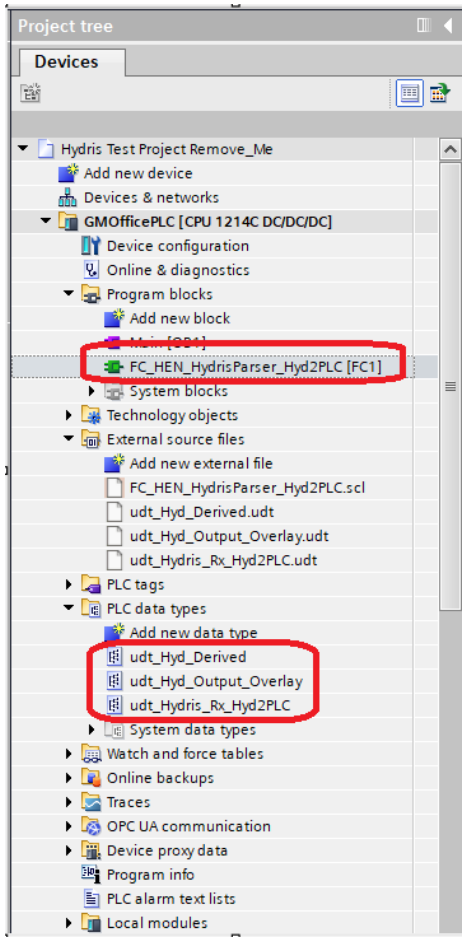




Generate Blocks from Source Files

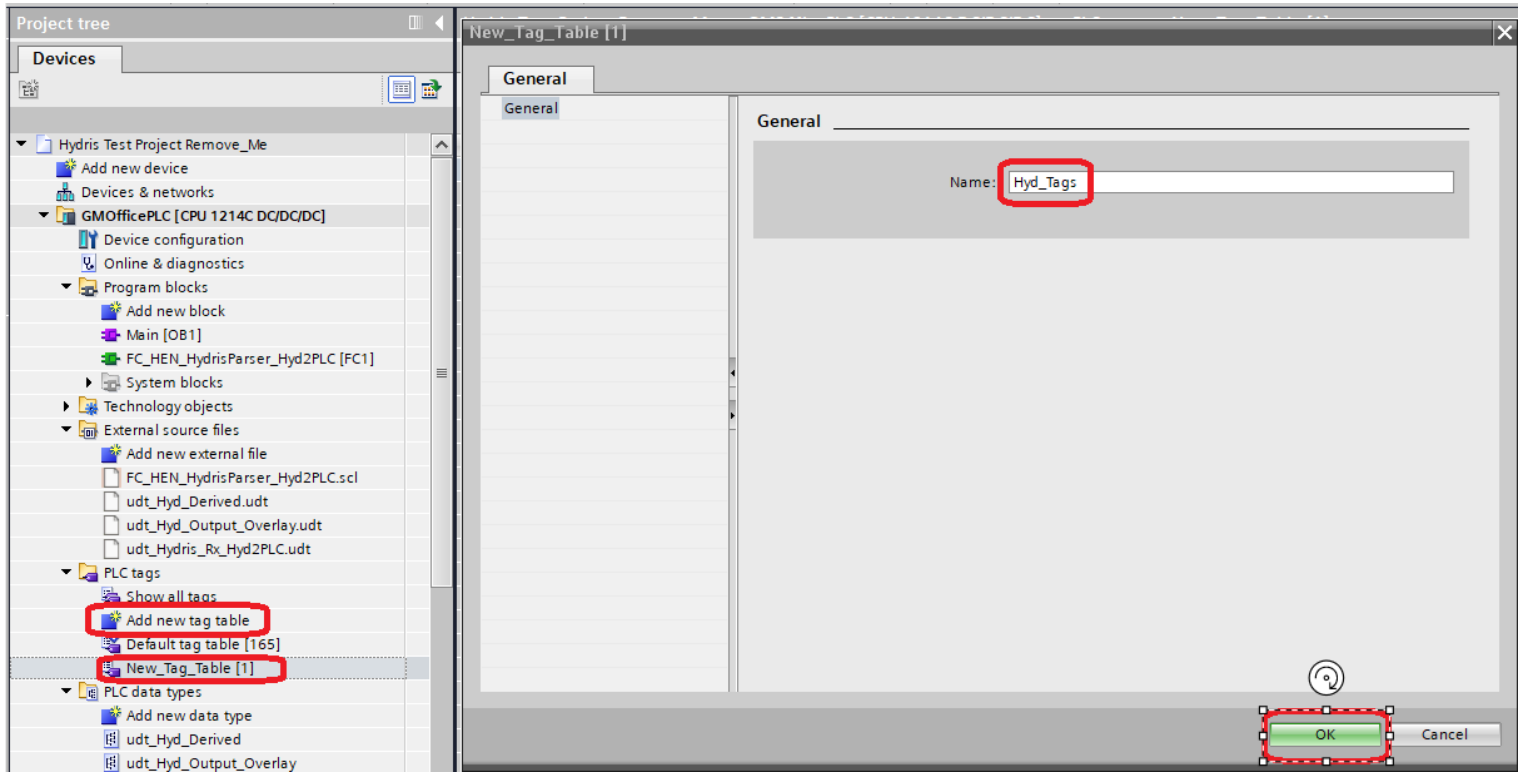
- Under External source files.
- Right-click the FC_HEN_HydrisParser_Hyd2PLC.scl file and select:
  - “Generate blocks from source”
- . Confirm that FC_HEN_HydrisParser_Hyd2PLC appears under Program blocks and the associated UDTs appear under PLC data types.
- Compile the project to ensure the UDTs and FC are available and error-free before proceeding.





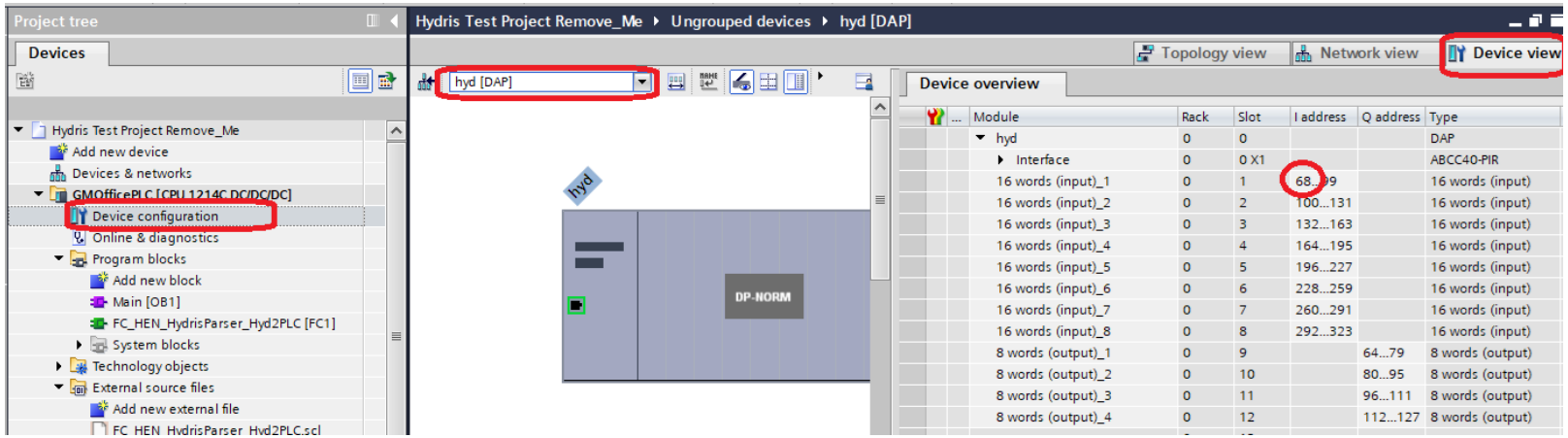
Create a PLC Tags Table

- In the Project tree, expand PLC tags.
- Click Add new tag table.
- Right-click the new tag table and select Properties.
- Rename the table to a relevant name, such as Hyd_Tags.
- Click OK.



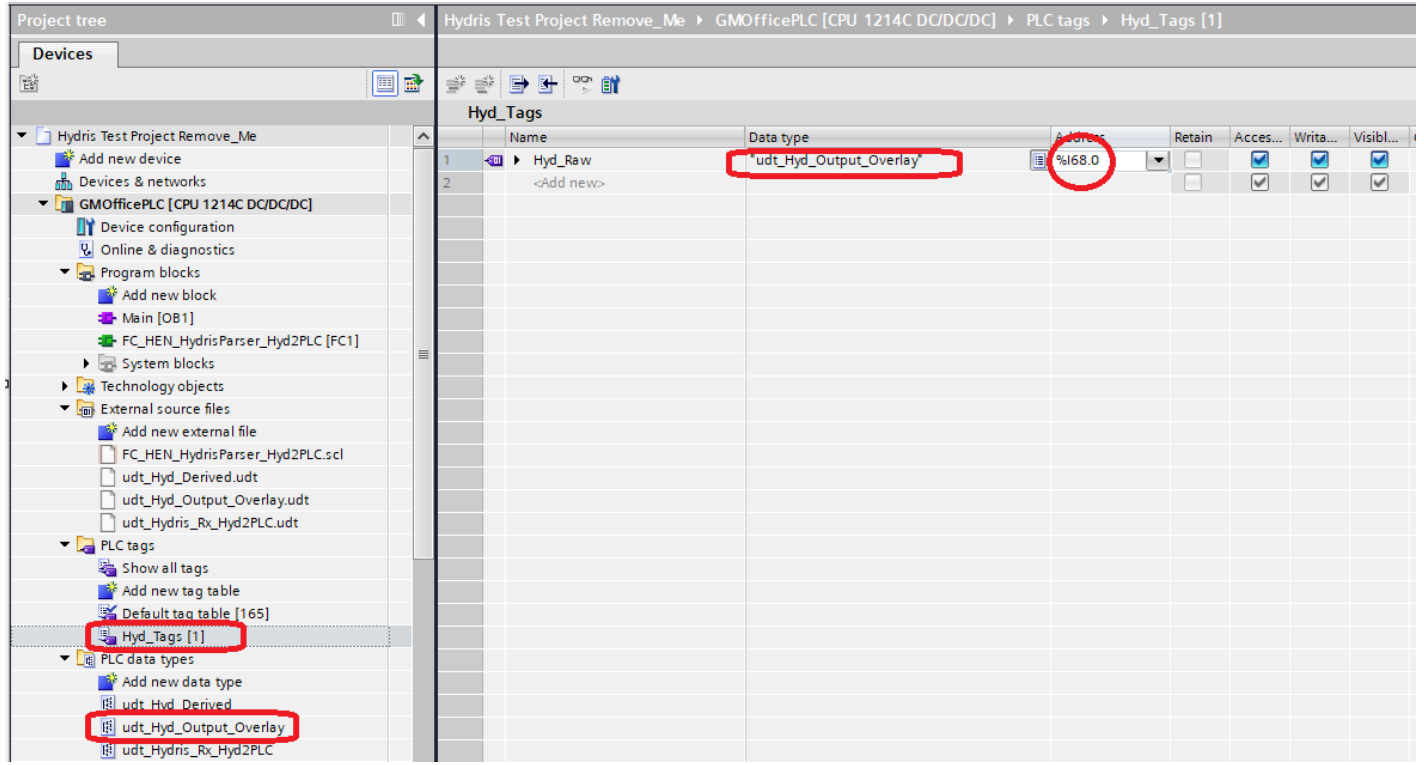
Record Starting Hydris Input Address from Device Config

- In Project tree, expand Devices & networks.
- Click the PLC (CPU) node.
- Click Device configuration.
- In the workspace, select the target device/module (e.g., hyd) so its details load.
- In the right-hand pane, open Device overview tab.
- In the Device overview table, locate the first Hydris input module.
- Record the starting I address shown for that module.
  - In this example, the starting input address is 68.



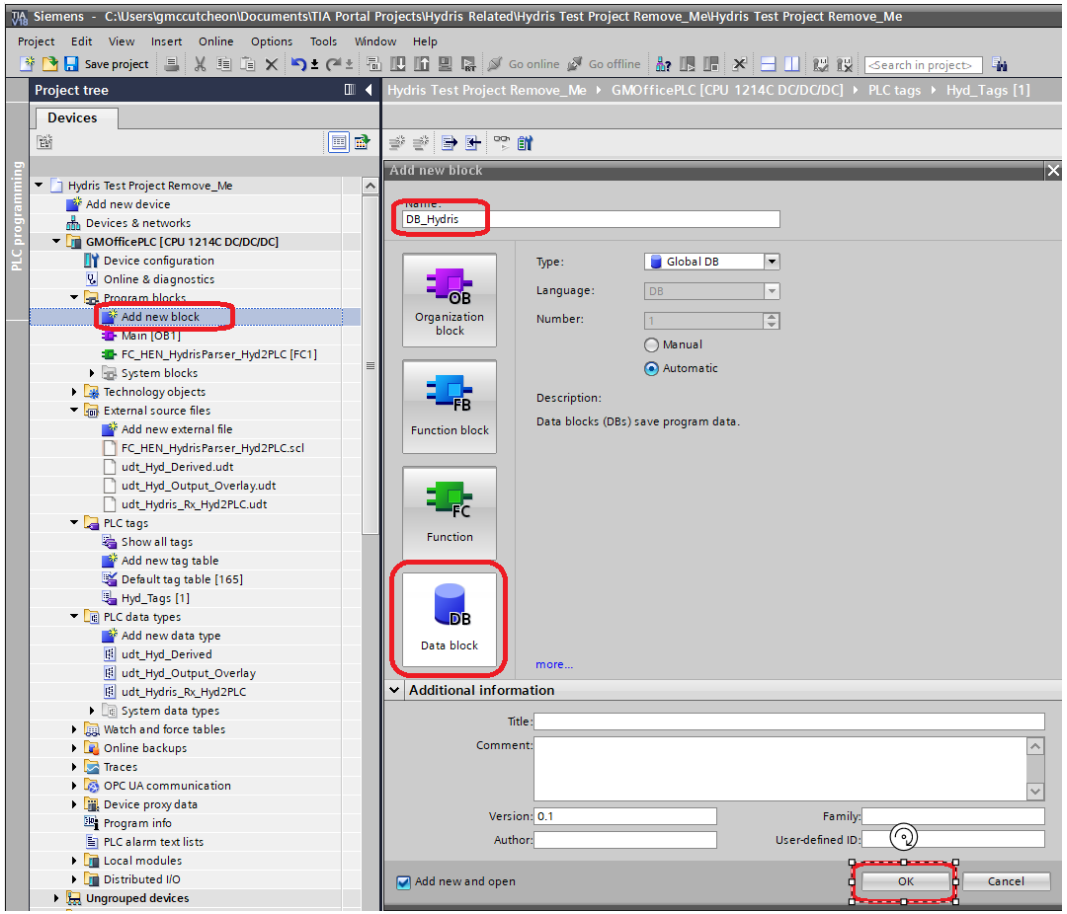
Creating the Overlay Tag in the New PLC Tag Table

- In Project tree, expand PLC tags.
- Click the tag table you just created to open it in the editor.
  - Hyd_Tags in this example.
- In the tag table, create a tag to hold the raw Hydris input data using the data type:
  - udt_Hyd_Output_Overlay.
- Name the tag:
  - Hyd_Raw is the example in the screenshot
- Assign the tag to the starting Hydris input address:
  - %I68.0 in this case
- Press Enter to accept the entry and save the row.



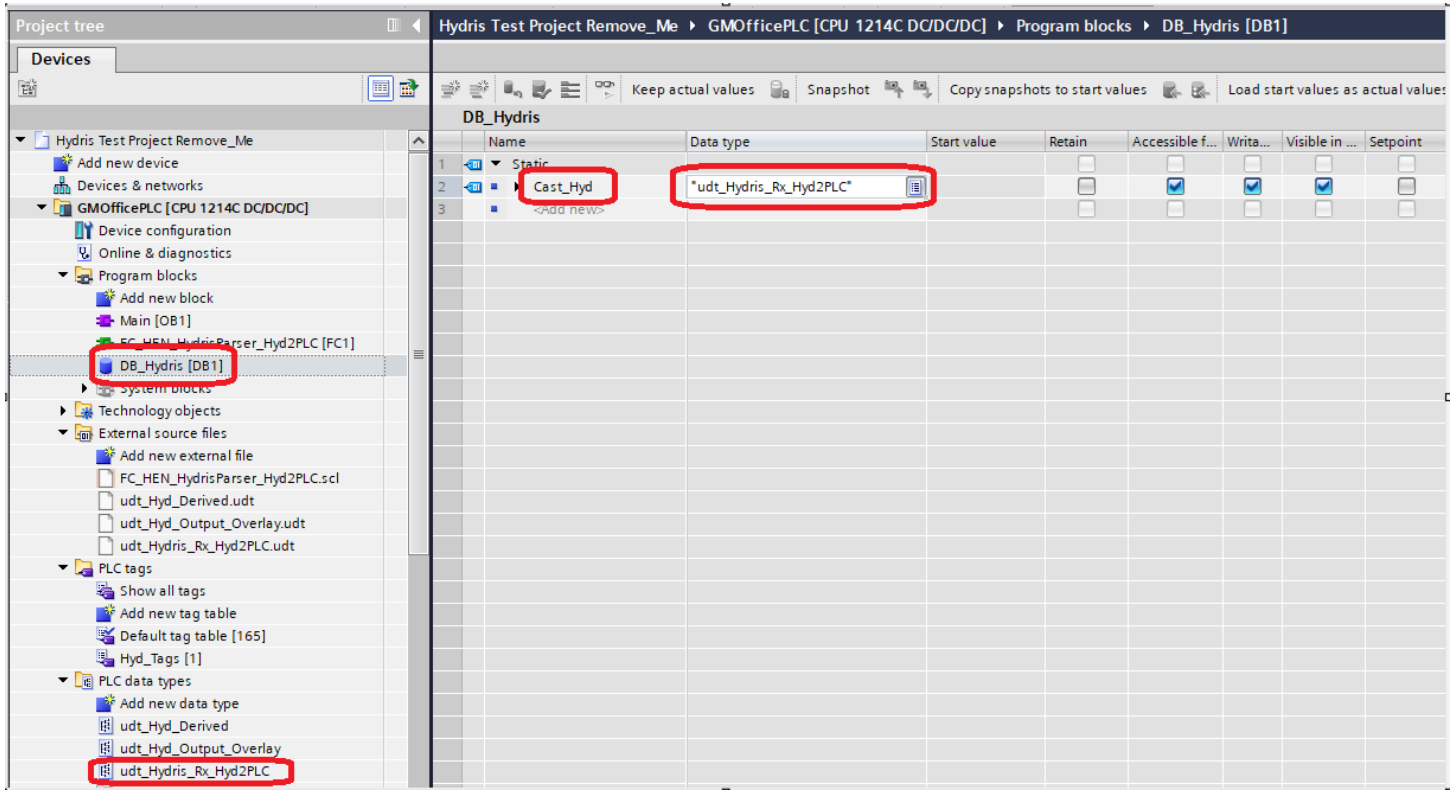
Create a new Data Block for Parsed Results

- In Project tree, expand Program blocks.
- Click Add new block and create a new Data block.
- Assign the Data block a name:
  - DB_Hydris in this case
- Click Ok.



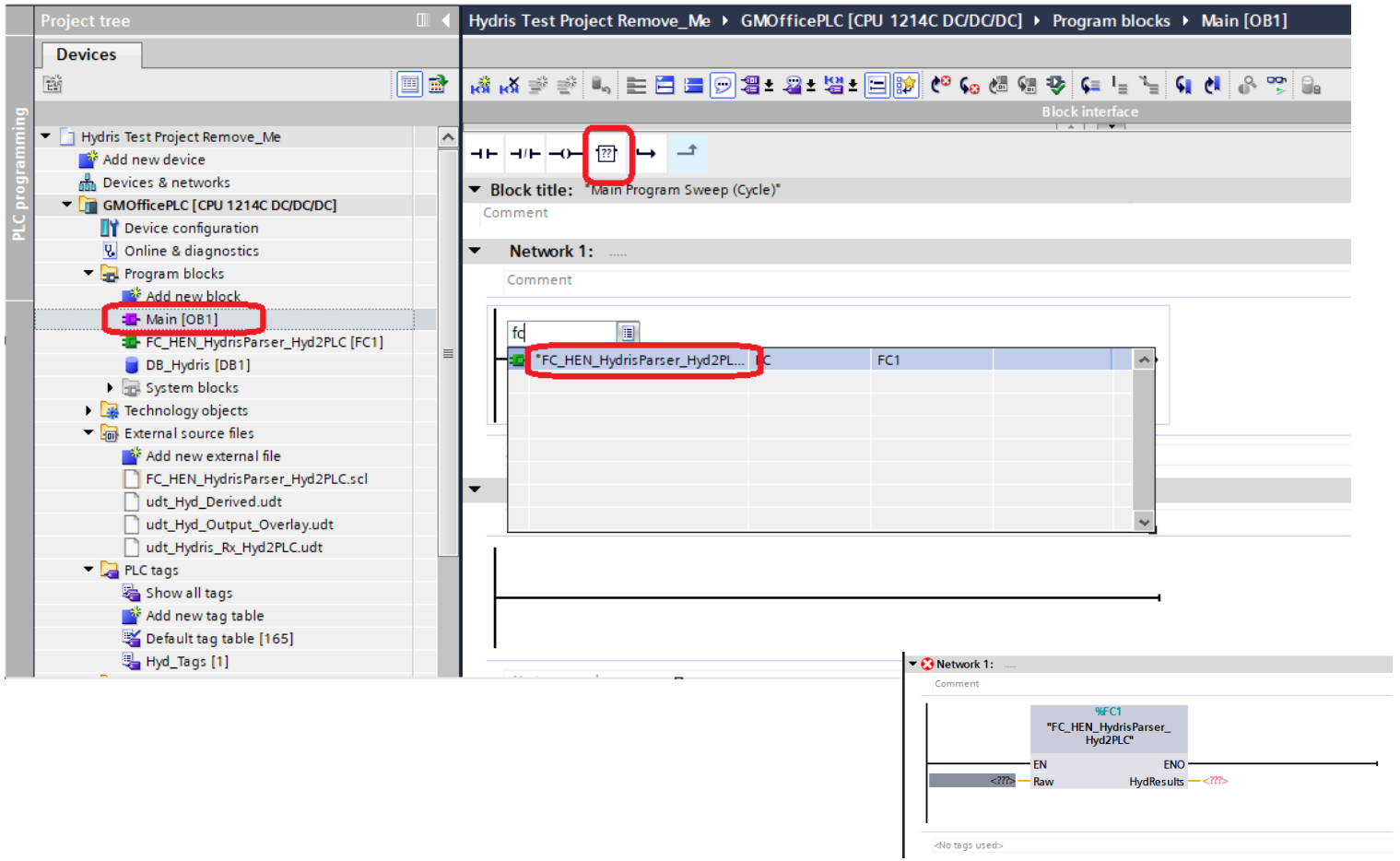
Create the Results Tag in the New Data Block

- In Project tree, expand Program blocks.
- Open the Data Block just created in the editor.
  - DB_Hydris in this example.
- Inside that data block, create a tag of the data type:
  - udt_Hydris_Rx_Hyd2PLC.
- Name the tag:
  - Cast_Hyd is the example in the screenshot
- Press Enter to accept the entry and save the row.



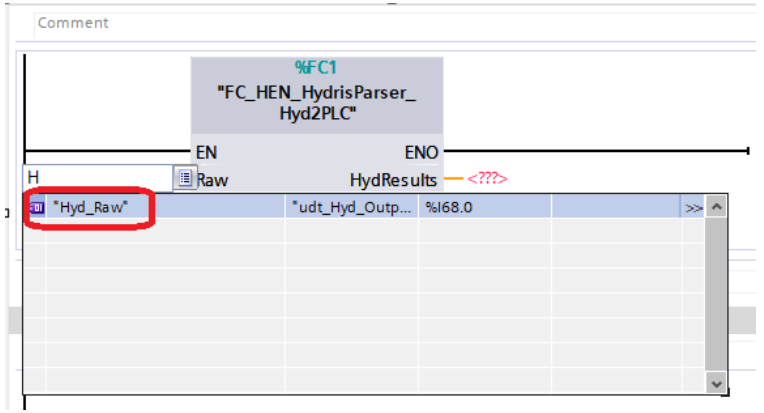
Create a Call to the Parser Function

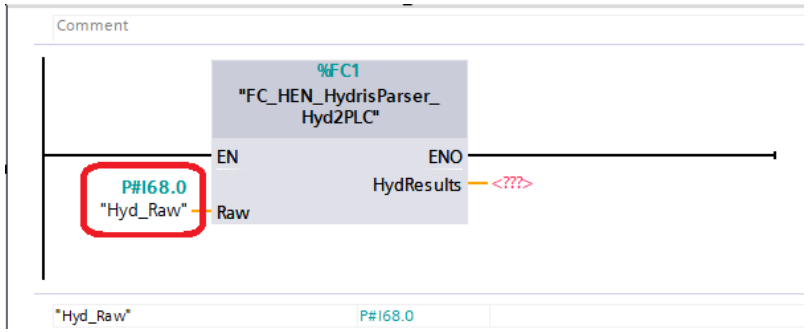
- In Project tree, expand Program blocks.
- Open the ladder block where the parser will be called:
  - Main[OB1] in this case.
  - Note that the function should be called cyclically (e.g., in OB1) to continuously update parsed values.
- Insert an empty box instruction onto a ladder rung.
- Begin typing FC_HEN_HydrisParser_Hyd2PLC.
- Press Enter to accept the function call.



Assign the Input Tag to the Parser Function

- Assign the Raw parameter to the overlay tag mapped to the Hydris input area:
  - Hyd_Raw in this case.

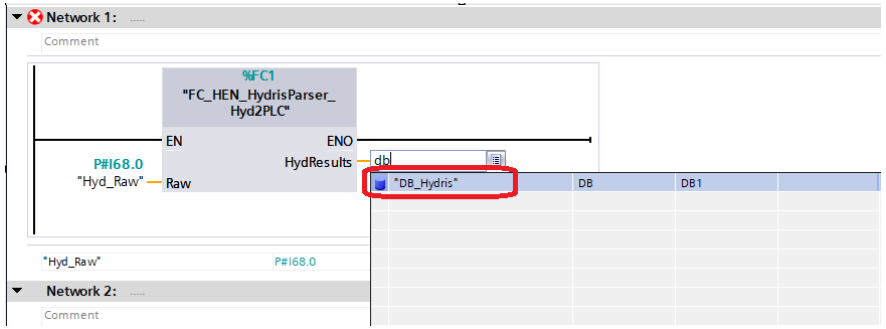


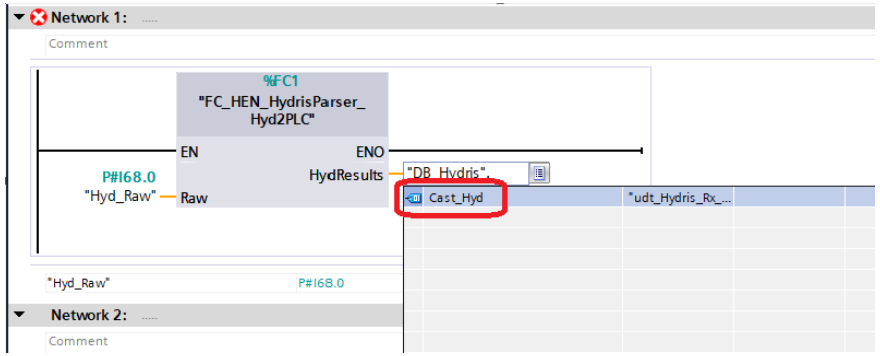


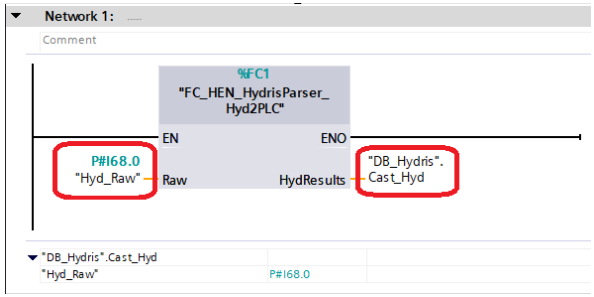
Assign the Results Tag to the Parser Function

- Assign the HydResults parameter to the parsed-results tag in the data block:
  - “DB_Hydris”.Cast_Hyd in this case.

- Save the project.
- Compile the ladder block and confirm there are no errors.
- Download to device.
- Connect to the PLC, then click Go online.

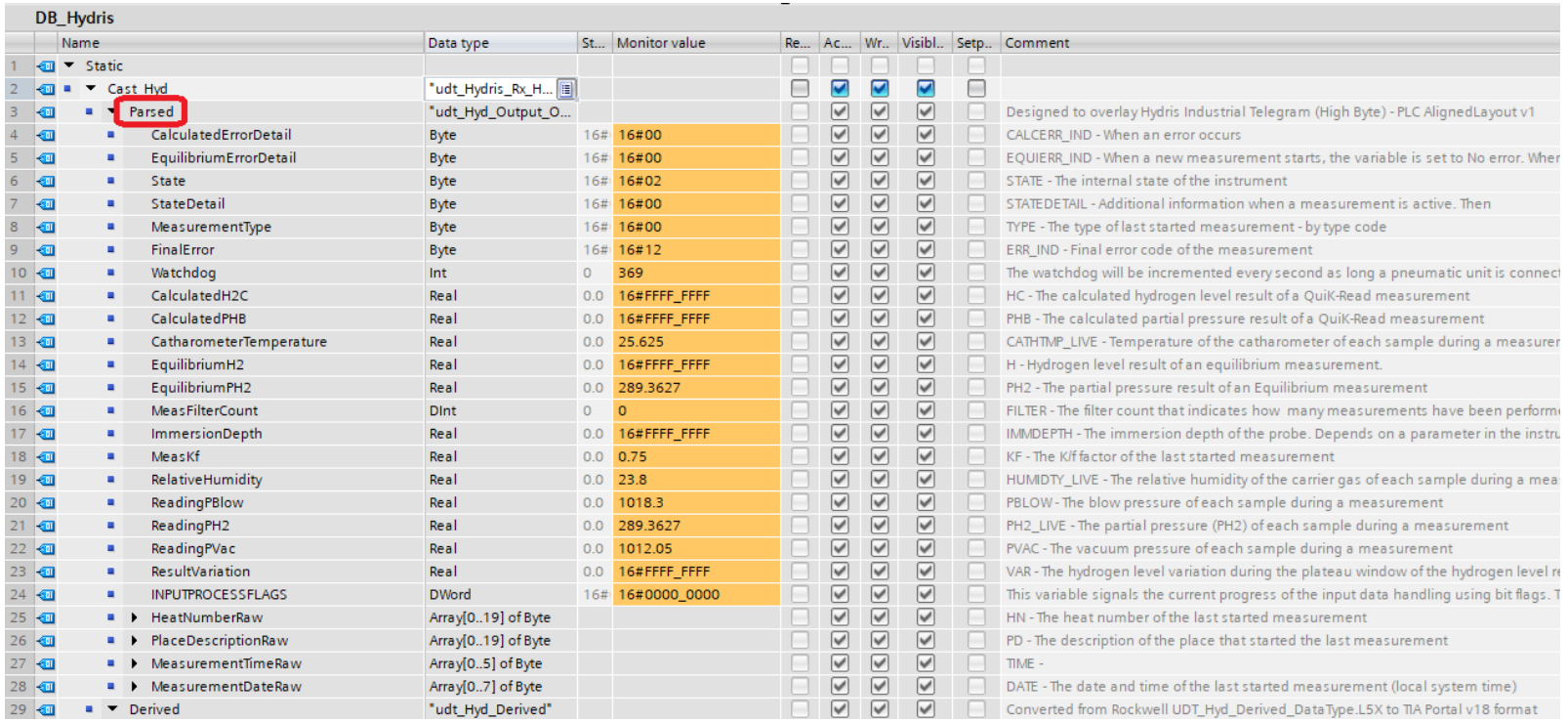






Monitor Data in New Data Block – Parsed Values

- Open the Data Block tag table:
  - DB_Hydris in this case.
- Expand the results tag's "Parsed" section to view its members.
- Monitor the values (enable monitoring/"glasses" in the tag table) and confirm the fields are updating as the device sends data.

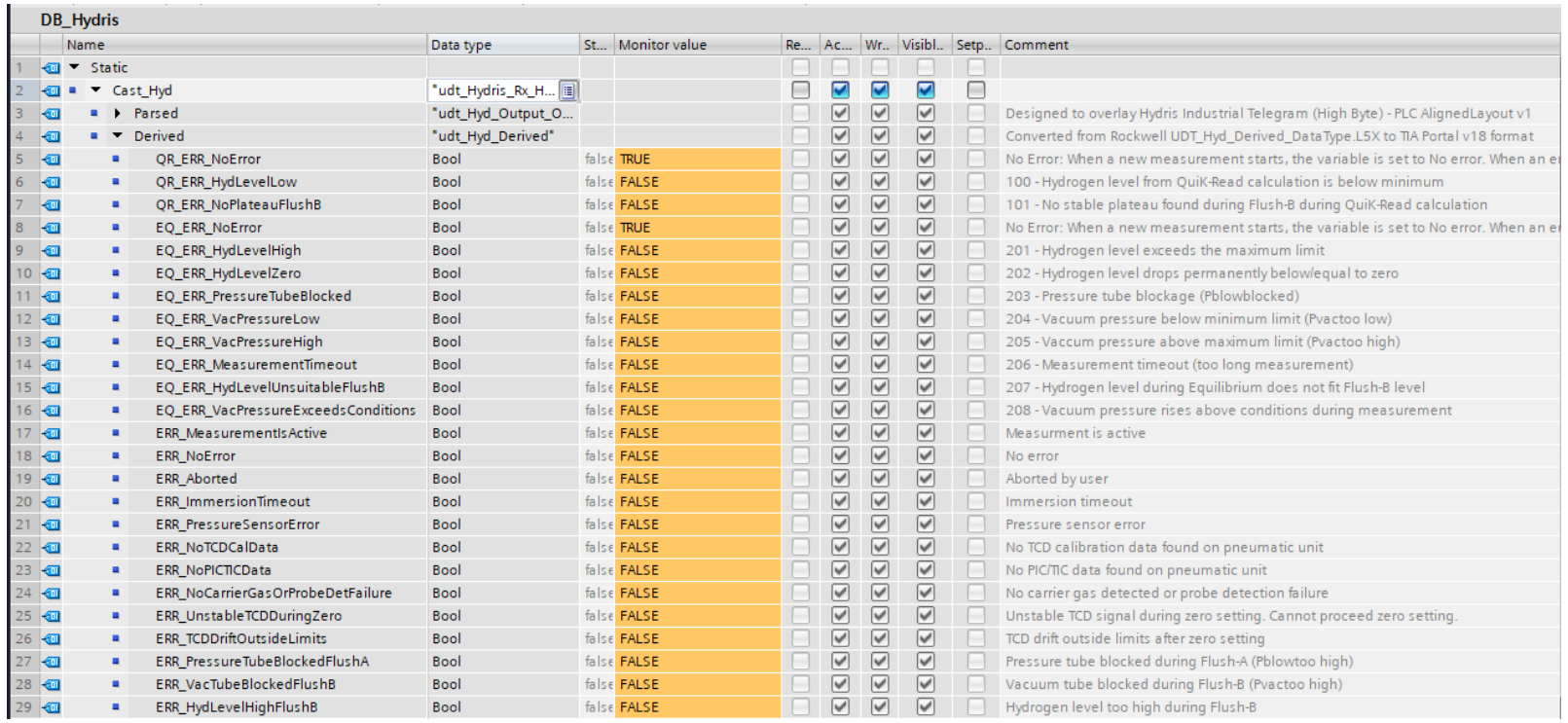


DB_Hydris

	Name	Data type	St...	Monitor value	Re...	Ac...	Wr..	Visibl..	Setp..	Comment
1	Static									
2	Cast_Hyd	"udt_Hydris_Rx_H...								
3	Parsed	"udt_Hyd_Output_O...								Designed to overlay Hydris Industrial Telegram (High Byte) - PLC AlignedLayout v1
4	CalculatedErrorDetail	Byte	16#	16#00						CALCERR_IND - When an error occurs
5	EquilibriumErrorDetail	Byte	16#	16#00						EQUIERR_IND - When a new measurement starts, the variable is set to No error. Wher
6	State	Byte	16#	16#02						STATE - The internal state of the instrument
7	StateDetail	Byte	16#	16#00						STATEDETAIL - Additional information when a measurement is active. Then
8	MeasurementType	Byte	16#	16#00						TYPE - The type of last started measurement - by type code
9	FinalError	Byte	16#	16#12						ERR_IND - Final error code of the measurement
10	Watchdog	Int	0	369						The watchdog will be incremented every second as long a pneumatic unit is connect
11	CalculatedH2C	Real	0.0	16#FFFF_FFFF						HC - The calculated hydrogen level result of a QuiK-Read measurement
12	CalculatedPHB	Real	0.0	16#FFFF_FFFF						PHB - The calculated partial pressure result of a QuiK-Read measurement
13	CatharometerTemperature	Real	0.0	25.625						CATHTMP_LIVE - Temperature of the catharometer of each sample during a measurer
14	EquilibriumH2	Real	0.0	16#FFFF_FFFF						H - Hydrogen level result of an equilibrium measurement.
15	EquilibriumPH2	Real	0.0	289.3627						PH2 - The partial pressure result of an Equilibrium measurement
16	MeasFilterCount	DInt	0	0						FILTER - The filter count that indicates how many measurements have been perform
17	ImmersionDepth	Real	0.0	16#FFFF_FFFF						IMMDEPTH - The immersion depth of the probe. Depends on a parameter in the instru
18	MeasKf	Real	0.0	0.75						KF - The K/f factor of the last started measurement
19	RelativeHumidity	Real	0.0	23.8						HUMIDTY_LIVE - The relative humidity of the carrier gas of each sample during a mea
20	ReadingPBlow	Real	0.0	1018.3						PBLOW - The blow pressure of each sample during a measurement
21	ReadingPH2	Real	0.0	289.3627						PH2_LIVE - The partial pressure (PH2) of each sample during a measurement
22	ReadingPVac	Real	0.0	1012.05						PVAC - The vacuum pressure of each sample during a measurement
23	ResultVariation	Real	0.0	16#FFFF_FFFF						VAR - The hydrogen level variation during the plateau window of the hydrogen level r
24	INPUTPROCESSFLAGS	DWord	16#	16#0000_0000						This variable signals the current progress of the input data handling using bit flags. T
25	HeatNumberRaw	Array[0..19] of Byte								HN - The heat number of the last started measurement
26	PlaceDescriptionRaw	Array[0..19] of Byte								PD - The description of the place that started the last measurement
27	MeasurementTimeRaw	Array[0..5] of Byte								TIME -
28	MeasurementDateRaw	Array[0..7] of Byte								DATE - The date and time of the last started measurement (local system time)
29	Derived	"udt_Hyd_Derived"								Converted from Rockwell UDT_Hyd_Derived_DataType.L5X to TIA Portal v18 format

Monitor Data in New Data Block – Derived Values 1

- Open the Data Block tag table:
  - DB_Hydris in this example.
- Expand the results tag's "Derived" section to view its members.
- Monitor the values (enable monitoring/"glasses" in the tag table) and confirm the fields are updating as the device sends data.



DB_Hydris

	Name	Data type	St...	Monitor value	Re...	Ac...	Wr..	Visibl..	Setp..	Comment
1	Static									
2	Cast_Hyd	"udt_Hydris_Rx_H...								
3	Parsed	"udt_Hyd_Output_O...								Designed to overlay Hydris Industrial Telegram (High Byte) - PLC AlignedLayout v1
4	Derived	"udt_Hyd_Derived"								Converted from Rockwell UDT_Hyd_Derived_DataType.L5X to TIA Portal v18 format
5	QR_ERR_NoError	Bool	false	TRUE						No Error: When a new measurement starts, the variable is set to No error. When an e
6	QR_ERR_HydLevelLow	Bool	false	FALSE						100 - Hydrogen level from QuiK-Read calculation is below minimum
7	QR_ERR_NoPlateauFlushB	Bool	false	FALSE						101 - No stable plateau found during Flush-B during QuiK-Read calculation
8	EQ_ERR_NoError	Bool	false	TRUE						No Error: When a new measurement starts, the variable is set to No error. When an e
9	EQ_ERR_HydLevelHigh	Bool	false	FALSE						201 - Hydrogen level exceeds the maximum limit
10	EQ_ERR_HydLevelZero	Bool	false	FALSE						202 - Hydrogen level drops permanently below/equal to zero
11	EQ_ERR_PressureTubeBlocked	Bool	false	FALSE						203 - Pressure tube blockage (Pblowblocked)
12	EQ_ERR_VacPressureLow	Bool	false	FALSE						204 - Vacuum pressure below minimum limit (Pvactoo low)
13	EQ_ERR_VacPressureHigh	Bool	false	FALSE						205 - Vaccum pressure above maximum limit (Pvactoo high)
14	EQ_ERR_MeasurementTimeout	Bool	false	FALSE						206 - Measurement timeout (too long measurement)
15	EQ_ERR_HydLevelUnsuitableFlushB	Bool	false	FALSE						207 - Hydrogen level during Equilibrium does not fit Flush-B level
16	EQ_ERR_VacPressureExceedsConditions	Bool	false	FALSE						208 - Vacuum pressure rises above conditions during measurement
17	ERR_MeasurementIsActive	Bool	false	FALSE						Measurment is active
18	ERR_NoError	Bool	false	FALSE						No error
19	ERR_Aborted	Bool	false	FALSE						Aborted by user
20	ERR_ImmersionTimeout	Bool	false	FALSE						Immersion timeout
21	ERR_PressureSensorError	Bool	false	FALSE						Pressure sensor error
22	ERR_NoTCDCalData	Bool	false	FALSE						No TCD calibration data found on pneumatic unit
23	ERR_NoPICTICData	Bool	false	FALSE						No PIC/TIC data found on pneumatic unit
24	ERR_NoCarrierGasOrProbeDetFailure	Bool	false	FALSE						No carrier gas detected or probe detection failure
25	ERR_UnstableTCDDuringZero	Bool	false	FALSE						Unstable TCD signal during zero setting. Cannot proceed zero setting.
26	ERR_TCDDriftOutsideLimits	Bool	false	FALSE						TCD drift outside limits after zero setting
27	ERR_PressureTubeBlockedFlushA	Bool	false	FALSE						Pressure tube blocked during Flush-A (Pblowtoo high)
28	ERR_VacTubeBlockedFlushB	Bool	false	FALSE						Vacuum tube blocked during Flush-B (Pvactoo high)
29	ERR_HydLevelHighFlushB	Bool	false	FALSE						Hydrogen level too high during Flush-B

Monitor Data in New Data Block – Derived Values 2

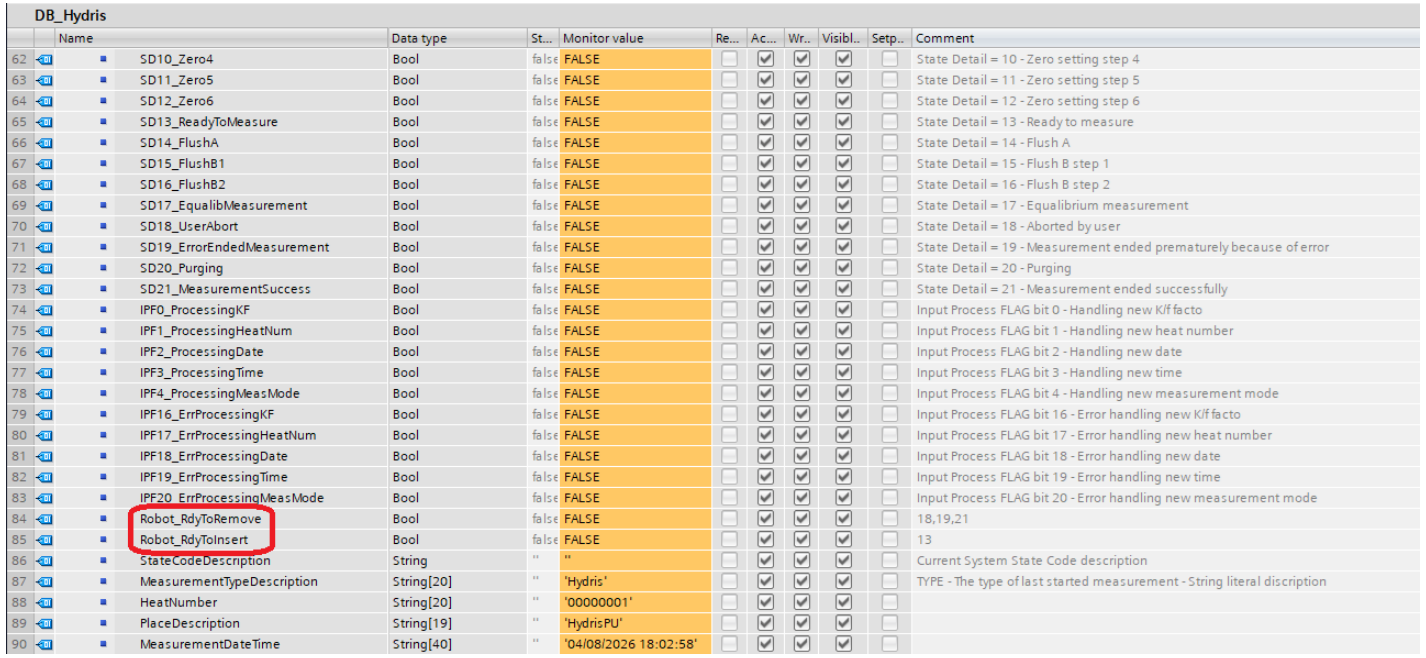
- Scrolled down to view additional Derived values.

DB_Hydris

	Name	Data type	St...	Monitor value	Re...	Ac...	Wr..	Visibl..	Setp..	Comment
31	ERR_QRorEQError	Bool	false	FALSE	☐	☑	☑	☑	☐	A QuiK-Read or Equilibrium error has occurred. Check CALCERR and EQUIERR for more
32	ERR_VacPressureHigh	Bool	false	FALSE	☐	☑	☑	☑	☐	Vacuum pressure too high
33	ERR_MeasurementCancelledLeakage	Bool	false	TRUE	☐	☑	☑	☑	☐	Measurement canceled because last leakage test was not successful
34	MEAS_Type_Hyd	Bool	false	TRUE	☐	☑	☑	☑	☐	Measurement Code = 0 - Hydris or HydroVAS measurement
35	MEAS_Type_AirTest	Bool	false	FALSE	☐	☑	☑	☑	☐	Measurement Code = 1 - Air test measurement
36	MEAS_Type_TestGas	Bool	false	FALSE	☐	☑	☑	☑	☐	Measurement Code = 2 - Test gas measurement
37	MEAS_Type_LeakTest	Bool	false	FALSE	☐	☑	☑	☑	☐	Measurement Code = 3 - Leakage Test measurement
38	MEAS_Type_Calibration	Bool	false	FALSE	☐	☑	☑	☑	☐	Measurement Code = 4 - Calibration measurement
39	ST0_PneumaticNotConnected	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 0 - No pneumatic unit connected
40	ST1_PneumaticConnected	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 1 - Pneumatic unit connected
41	ST2_Standby	Bool	false	TRUE	☐	☑	☑	☑	☐	State Code = 2 - Standby
42	ST3_MeasurementActive	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 3 - Measurement Active
43	ST4_PrepForLeakTest	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 4 - Preparation for leak test
44	ST5_LeakTestActive	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 5 - Leak test active
45	ST8_PrepForCalibration	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 8 - Preparation for calibration
46	ST9_CalibrationActive	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 9 - Calibration Active
47	ST10_PrepForAirTest	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 10 - Preparation for air test measurement
48	ST11_AirTestActive	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 11 - Air test measurement active
49	ST12_PrepForTestGas	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 12 - Preparation for test gas measurement
50	ST13_TestGasActive	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 13 - Test gas measurement active
51	ST14_ManualAccess	Bool	false	FALSE	☐	☑	☑	☑	☐	State Code = 14 - manual access active
52	SD0_NoDetail	Bool	false	TRUE	☐	☑	☑	☑	☐	State Detail = 0 - No measurement in progress
53	SD1_MeasureInit1	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 1 - Measurement init step 1
54	SD2_MeasureInit2	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 2 - Measurement init step 2
55	SD3_AirPresDetect	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 3 - Air pressure detection
56	SD4_ProbeDetect1	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 4 - Probe detection step 1
57	SD5_ProbeDetect2	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 5 - Probe detection step 2
58	SD6_ProbeDetect3	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 6 - Probe detection step 3
59	SD7_Zero1	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 7 - Zero setting step 1

Monitor Data in New Data Block – Derived Values 3

- Scrolled down to view additional Derived values.



DB_Hydris

	Name	Data type	St...	Monitor value	Re...	Ac...	Wr..	Visibl..	Setp..	Comment
62	SD10_Zero4	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 10 - Zero setting step 4
63	SD11_Zero5	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 11 - Zero setting step 5
64	SD12_Zero6	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 12 - Zero setting step 6
65	SD13_ReadyToMeasure	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 13 - Ready to measure
66	SD14_FlushA	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 14 - Flush A
67	SD15_FlushB1	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 15 - Flush B step 1
68	SD16_FlushB2	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 16 - Flush B step 2
69	SD17_EqualibMeasurement	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 17 - Equalibrium measurement
70	SD18_UserAbort	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 18 - Aborted by user
71	SD19_ErrorEndedMeasurement	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 19 - Measurement ended prematurely because of error
72	SD20_Purging	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 20 - Purging
73	SD21_MeasurementSuccess	Bool	false	FALSE	☐	☑	☑	☑	☐	State Detail = 21 - Measurement ended successfully
74	IPF0_ProcessingKF	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 0 - Handling new K/f facto
75	IPF1_ProcessingHeatNum	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 1 - Handling new heat number
76	IPF2_ProcessingDate	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 2 - Handling new date
77	IPF3_ProcessingTime	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 3 - Handling new time
78	IPF4_ProcessingMeasMode	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 4 - Handling new measurement mode
79	IPF16_ErrProcessingKF	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 16 - Error handling new K/f facto
80	IPF17_ErrProcessingHeatNum	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 17 - Error handling new heat number
81	IPF18_ErrProcessingDate	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 18 - Error handling new date
82	IPF19_ErrProcessingTime	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 19 - Error handling new time
83	IPF20_ErrProcessingMeasMode	Bool	false	FALSE	☐	☑	☑	☑	☐	Input Process FLAG bit 20 - Error handling new measurement mode
84	Robot_RdyToRemove	Bool	false	FALSE	☐	☑	☑	☑	☐	18,19,21
85	Robot_RdyToInsert	Bool	false	FALSE	☐	☑	☑	☑	☐	13
86	StateCodeDescription	String		''	☐	☑	☑	☑	☐	Current System State Code description
87	MeasurementTypeDescription	String[20]		'Hydris'	☐	☑	☑	☑	☐	TYPE - The type of last started measurement - String literal discription
88	HeatNumber	String[20]		'00000001'	☐	☑	☑	☑	☐	
89	PlaceDescription	String[19]		'HydrisPU'	☐	☑	☑	☑	☐	
90	MeasurementDateTime	String[40]		'04/08/2026 18:02:58'	☐	☑	☑	☑	☐	