TIA Portal includes Modbus-TCP-Server function blocks which provide MB Server functionality for S7 PLC’s. This could be used to read/write IO’s and values from PLC by powermanager.

1.0 S7-1200

1.1 Configuration

Settings of hardware and communication.
1.2 Function MB_SERVER

The "MB_SERVER" instruction communicates as a Modbus TCP server via the Ethernet connection of the S7 PLC and handles the Modbus TCP client connection requests from powermanager.

"MB_HOLD_REG" defines the holding register which is accessible by Modbus TCP. In the attached example project this is defined as Array "MB_Data[0..31]" of Real values.
Powermanager –
Read/Write data from S7-1200/1500 PLC by Modbus TCP

Please find further information for functionality and detailed parameter settings in TIA online help:
2.0 Powermanager

2.1 Creating device

Add a „Generic modbus device“ for PLC in powermanager.

2.2 Communication settings

IP settings corresponding to PLC IP address.

Deactivate „Use area settings“. This is required for further configuration steps.
2.3 Define variables for read

Each „Generic modbus device“ provides reading for 10 digital states (alert), 50 values and 5 counter values. In this example one counter, two values and two digital states are selected.

Enable „Address“ and „Display“ for all selected values.

Description for available groups:

Energy values: Typically associated with counter values which are permanently increasing. E.g.: Wh. Values of this group are always archived. Additional consumption values corresponding to the time periods 15 min., 1 hour and 1 day are created.

Measured values: For any kind of instantaneous measured values. E.g.: W, °C, m³/h. Values of this group are only captured and archived (if archive option is activated).

Power interval: If a device directly provides average power values they can assigned to this group. Technically, the power interval equals to the values from the group of measured values, but with the difference that the value is read out periodically every 15 minutes. The respective power interval value has as a time stamp the end of the time period. When power interval values have the additional designation (EM) in the element name the start of the time period is the time stamp.
2.4 Define variable for write

Each “Generic modbus device” provides commands for 10 digital outputs and 10 values. In this example two values and two digital outputs are selected.
2.5 Configure defined variables for read

All defined values must be configured for Modbus communication by function code and address (Index).

Digital states:
Transformation: boolean
Function code: FC2 Read input discretes (Read process image input)
Index: 1† This links to I0.0 of S7 PLC
Index: 2† This links to I0.1 of S7 PLC
etc...

Values:
Transformation: float (regarding the format used PLC for this value)
Function code: FC3 Read multiple registers
Index: 1 † Address of the first register of the float value which is stored in MB_Data[0]
Index: 3† Address of the first register of the float value which is stored in MB_Data[1]
etc...

Remarks:
Index numbers always depends to one Modbus register which contains 16 Bit (Word). To get some 32 Bit Float values two registers are required. This caused that the next index number must be increased about +2.

There are some different names for same format types to SIMATIC and Modbus:
Real = Float (32 Bit floating value)
LReal = Double (64 Bit floating value)
Int = Int 16
DInt = Int 32
LInt = Int 64
2.6 Configure defined variables for write

All defined values must be configured for Modbus communication by function code and address (Index).

**Digital outputs:**
- **Transformation:** boolean
- **Function code:** FC15 Force multiple coils
- **Index:** 1 † This links to O0.0 of S7 PLC
- **Index:** 2 † This links to O0.1 of S7 PLC
- etc...

**Values:**
- **Transformation:** float (regarding the format used PLC for this value)
- **Function code:** FC16 Write multiple registers
- **Index:** 1 † Address of the first register of the float value which is stored in MB_Data[0]
- **Index:** 3 † Address of the first register of the float value which is stored in MB_Data[1]
- etc…
2.7 Test communication

Save all settings and set communication active. Check if all configured values are displayed correct.