Proposal to configure through Modbus

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# Setting Pulse Output

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function** | **Start Reg** | **Size** | **Description** | **Read / Write** |
| Digital output | 0x8C10 | 1 | The physical I/O port on which the pulses are sent out. | R / W |
| Type of Energy | 0x8C11 | 1 | Quantity according Table 1 | R / W |
| Set the frequency | 0x8C12 | 2 | The pulse frequency measured in pulses/MWh or Mvarh. | R / W |
| Pulse length | 0x8C14 | 2 | The duration of a pulse measured in milliseconds. | R / W |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Function** | **Start Reg** | **Size** | **Definition** | **Description** | **Read / Write** |
| Digital output | 0x8C10 | 1 |  | The physical I/O port on which the pulses are sent out. | R / W |
| Setting pulse output  (size 5 register) | 0x8C11 | 1 | Type of Energy | Quantity according Table 1 | R / W |
| 2 | Set the frequency | The pulse frequency measured in pulses/MWh or Mvarh. |
| 2 | Pulse length | The duration of a pulse measured in milliseconds. |

1. To configure the physical I/O port with pulse output, it must send all registers in the same frame.
2. To read the configuration of the physical I/O port first must write the slot number in the register 0x8C10 then read the other register. If the physical I/O port functionality is not pulse output, all the register will return 0xFF.

## Table 1

|  |  |
| --- | --- |
| Quantity | Code |
| Inactive pulse output | 1 |
| Active energy import total | 2 |
| Active energy export total | 3 |
| Reactive energy import total | 4 |
| Reactive energy export total | 5 |
| Apparent Energy | 6 |
| Active energy import export | 7 |
| Reactive energy import export | 8 |
| Apparent energy import export | 9 |

# Setting Alarm

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function** | **Start Reg** | **Size** | **Description** | **Read / Write** |
| Alarm Number | 0x8C60 | 1 | The number (identifier) for the alarm to configure | R / W |
| Parameter | 0x8C61 | 1 | The parameter to monitor | R / W |
| Threshold ON | 0x8C62 | 4 | Thresholds to use to decide when the alarm is active | R / W |
| Hysteresis | 0x8C66 | 1 | Hysteresis to be applied to the turn off threshold | R / W |
| Delay | 0x8C67 | 1 | Delay, defining the time that the measured value must be above/below the configured thresholds before the alarm triggers | R / W |
| Type | 0x8C68 | 1 | The type of alarm: cross up or down | R / W |
| Action | 0x8C69 | 2 | Actions to perform when alarm is triggered | R / W |

1. The FW will update the link of the slot according with the last entrance.

|  |  |  |  |
| --- | --- | --- | --- |
| Register | Bit number | Description | Possible values |
| 0x8C69 | 0 (least significant bit) | Write entry to log | 1 = use this action  0 = don’t use |
| 1 | Set output | 1 = use this action  0 = don’t use |
| 2 | Set bit in alarm status register | 1 = use this action  0 = don’t use |
| 0x8C6A | (Entire register) | Number of the output to turn on. Ignored if Set output bit above is set to 0. |  |

Table 2 alarm parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter monitored by alarm** | **Nr of Parameter** | **Alarm threshold range** | **Scaler** |
| Voltage L1 | 1 | 0-999000 | 0.1 |
| Voltage L2 | 2 | 0-999000 | 0.1 |
| Voltage L3 | 3 | 0-999000 | 0.1 |
| Voltage L1-L2 | 4 | 0-999000 | 0.1 |
| Voltage L2-L3 | 5 | 0-999000 | 0.1 |
| Voltage L1-L3 | 6 | 0-999000 | 0.1 |
| Current L1 | 7 | 0-999000 | 0.01 |
| Current L2 | 8 | 0-999000 | 0.01 |
| Current L3 | 9 | 0-999000 | 0.01 |
| Current N | 10 | 0-999000 | 0.01 |
| Active power total | 11 | 0-999000 | 1 |
| Active power L1 | 12 | 0-999000 | 1 |
| Active power L2 | 13 | 0-999000 | 1 |
| Active power L3 | 14 | 0-999000 | 1 |
| Rective power total | 15 | 0-999000 | 1 |
| Rective power L1 | 16 | 0-999000 | 1 |
| Rective power L2 | 17 | 0-999000 | 1 |
| Rective power L3 | 18 | 0-999000 | 1 |
| Apparent power total | 19 | 0-999000 | 1 |
| Apparent power L1 | 20 | 0-999000 | 1 |
| Apparent power L2 | 21 | 0-999000 | 1 |
| Apparent power L3 | 22 | 0-999000 | 1 |
| Power factor total | 23 | 0-0,99 | 0.001 |
| Power factor L1 | 24 | 0-0,99 | 0.001 |
| Power factor L2 | 25 | 0-0,99 | 0.001 |
| Power factor L3 | 26 | 0-0,99 | 0.001 |
| Frequency | 27 | 0-999000 | 0.01 |

# Reading I/O Setting

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Function | Start Reg | Size | Description | Read / Write |
| I/O port 1 | 0x8C0C | 1 | Function of the I/O port 1 | R |
| I/O port 2 | 0x8C0D | 1 | Function of the I/O port 2 | R |
| I/O port 3 | 0x8C0E | 1 | Function of the I/O port 3 | R |
| I/O port 4 | 0x8C0F | 1 | Function of the I/O port 4 | R |

## Table Functionality

|  |  |  |
| --- | --- | --- |
| Item | Functionality | Observation |
| 0 | Disabled |  |
| 1 | IO |  |
| 2 | Alarm | The I/O will be defined during alarm setting. |
| 3 | Complex alarm |  |
| 4 | Tariff |  |
| 5 | Pulse | The I/O will be defined during pulse setting. |
| 6 | Always on |  |
| 7 | Always off |  |
| 8 | Communication |  |

# Setting other functionalities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function** | **Start Reg** | **Size** | **Description** | **Read / Write** |
| IO | 0x8C16 | 1 | The physical I/O port. Table Bitwise physical port | R / W |
| Always on | 0x8C17 | 1 | The physical I/O port. Table Bitwise physical port | R / W |
| Always off | 0x8C18 | 1 | The physical I/O port. Table Bitwise physical port | R / W |
| Communication | 0x8C19 | 1 | The physical I/O port. Table Bitwise physical port | R / W |

## Table Bitwise physical port

|  |  |  |  |
| --- | --- | --- | --- |
| **Register Nr** | **Bit Nr** | **Description** | **Definition** |
| 0x8C16  0x8C17  0x8C18  0x8C19 | 0 | The physical I/O port 1. | 1 = link to the port.  0 = not linked |
| 1 | The physical I/O port 2. | 1 = link to the port.  0 = not linked |
| 2 | The physical I/O port 3. | 1 = link to the port.  0 = not linked |
| 3 | The physical I/O port 4. | 1 = link to the port.  0 = not linked |
| 4 - 7 | Not used | 0 |

### Examples:

|  |  |  |
| --- | --- | --- |
| **Start Reg** | Value | Meaning |
| 0x8C16 | 0x0000 | Doesn’t have IO function enable. |
| 0x8C16 | 0x0001 | The physical I/O port 1 is defined as IO. |
| 0x8C16 | 0x0003 | The physical I/O port 1 and 2 are defined as IO. |
| 0x8C19 | 0x000F | The physical I/O port 1, 2, 3 and 4 are defined as communication (remote control). |