

Raritan PX2/PX3 Modbus Interface

Introduction

The PX2 device can act as a Modbus/TCP server. The Modbus service can be enabled in the Network Services section of the Device Settings menu in the web UI.

Supported Products

This document applies to the following product families:

- Raritan PX2, PX3, PXC and PXE intelligent PDUs
- Raritan PX3TS transfer switches
- Legrand intelligent PDUs
- Servertech PRO3X intelligent PDUs

Additionally this document describes the register set available at the main controller unit ID of Raritan BCM2 and PMC branch circuit monitors. **Note:** Only the [Basic PDU Parameters](#) and [Peripheral Sensors](#) sections apply to those products. The Modbus interface for power meters and panels is described in a separate document.

Supported Modbus Functions

The following Modbus function codes are supported:

- General Commands:
 - Read Device Identification (2Bh)
- Bit Access:
 - Read Coils (01h)
 - Write Single Coil (05h)
 - Write Multiple Coils (0Fh)
- 16-bit Word Access:
 - Read Holding Registers (03h)
 - Write Single Register (06h)
 - Write Multiple Registers (10h)
 - Mask Write Register (16h)

Feature Set

The following features of the PX2/PX3 are available via Modbus:

- Sensor readings for inlets and overcurrent protectors
- Outlet sensor readings (PX2-4K, PX2-5K, PX3-4K and PX3-5K series)
- Outlet control (PX2-2K, PX2-5K, PX3-2K, and PX3-5K series)
- Transfer switch status and control (PX3TS series)
- Peripheral sensor readings
- Peripheral actuator control

Register Layout

Conventions

- All register or coil addresses are hexadecimal, indicated by a `h` suffix.
- Data types which span multiple 16-bit registers are big-endian, i.e. the lowest register address contains the most significant bits.
- The following data types are supported for holding registers:
 - Word: 16-bit unsigned integer
 - DWord: 32-bit unsigned integer (two registers, big-endian)
 - QWord: 64-bit unsigned integer (four registers, big-endian)
 - Float: IEEE 32-bit floating point value (two registers, big-endian)
 - Bit Mask: 16 individual bits
- The access flags column can have the following values:
 - R: Read-only register
 - W: Write-only register (writing triggers an action, always reads 0)
 - R/W: Read-write register
- Reading a reserved register usually yields zero, but the meaning may change in future versions.
- Reserved bits in bit mask registers should always be written as 0.

Register Addresses and Numbers

The Modbus standard supports up to 65536 entities of each register type (input registers, holding register, coils, etc.). Entity addresses range from 0 to 65535 decimal (`FFFFh` hexadecimal). All register addresses listed in this document refer to these entity addresses.

Some Modbus software uses a 5- or 6-digit entity *number* convention where the first digit indicates the entity type:

| Type | First Digit | 5-Digit Numbers | 6-Digit Numbers |
|------------------|-------------|-----------------|-----------------|
| Coil | 0 | 00001 - 09999 | 000001 - 065536 |
| Discrete Input | 1 | 10001 - 19999 | 100001 - 165536 |
| Input Register | 3 | 30001 - 39999 | 300001 - 365536 |
| Holding Register | 4 | 40001 - 49999 | 400001 - 465536 |

Software packages using the 5-digit convention can only address 9999 entities of each type, so they can only access a limited range of the registers provided by the PX2/PX3 Modbus service. Most notably, the inlet and outlet register blocks are located outside of this range and cannot be accessed.

Software using the 6-digit convention can address all registers provided by the PX2/PX3 Modbus service.

To convert a holding register address from this document to a 5- or 6-digit register number, add 40001 or 400001 to the decimal value of the address. To convert a coil address from this document, just add 1. Some examples:

| Register/Coil | Address (hex) | Address (dec) | 5-Digit Number | 6-Digit Number |
|--------------------------|---------------|---------------|----------------|----------------|
| Number of Outlets | 0003h | 3 | 40004 | 400004 |
| Peripheral Sensor 4 Type | 0830h | 2096 | 42097 | 402096 |

| | | | | |
|---------------------|-------|-------|-------|--------|
| Inlet 1 RMS Current | 300Ah | 12298 | --- | 412299 |
| Outlet 1 Relay Coil | 0100h | 256 | 00257 | 000257 |

Holding Register Map

Each PDU component (inlet, outlet, etc.) occupies a block of holding registers starting at a base address. See the referenced sections below for a description of registers inside each block.

| Start | End | Function | See Section |
|-------|-------|------------------------------|--|
| 0000h | 0010h | Basic parameters, PDU layout | Basic PDU Parameters |
| ... | | | |
| 0800h | 080Fh | Peripheral sensor 1 | Peripheral Sensors |
| 0810h | 081Fh | Peripheral sensor 2 | |
| ... | | | |
| 09F0h | 09FFh | Peripheral sensor 32 | |
| ... | | | |
| 2000h | 20FFh | Transfer switch 1 | Transfer Switch |
| ... | | | |
| 3000h | 303Fh | Inlet 1 | Inlets |
| 3040h | 306Fh | Inlet 1 pole 1 | Poles |
| 3070h | 309Fh | Inlet 1 pole 2 | |
| 30A0h | 30CFh | Inlet 1 pole 3 | |
| 30D0h | 30FFh | Inlet 1 pole 4 | |
| 3100h | 31FFh | Inlet 2 (incl. poles) | |
| ... | | | |
| 3F00h | 3FFFh | Inlet 16 (incl. poles) | |
| 4000h | 403Fh | Overcurrent protector 1 | Overcurrent Protectors |
| 4040h | 406Fh | OCP 1 pole 1 | Poles |
| 4070h | 409Fh | OCP 1 pole 2 | |
| 40A0h | 40CFh | OCP 1 pole 3 | |
| 40D0h | 40FFh | OCP 1 pole 4 | |
| 4100h | 41FFh | OCP 2 (incl. poles) | |
| ... | | | |
| 7F00h | 7FFFh | OCP 64 (incl. poles) | |
| 8000h | 80FFh | Outlet 1 | Outlets |
| 8040h | 806Fh | Outlet 1 pole 1 | Poles |
| 8070h | 809Fh | Outlet 1 pole 2 | |
| 80A0h | 80CFh | Outlet 1 pole 3 | |
| 80D0h | 80FFh | Outlet 1 pole 4 | |
| 8100h | 81FFh | Outlet 2 (incl. poles) | |

| | | | |
|-------|-------|--------------------------|--|
| ... | | | |
| FF00h | FFFFh | Outlet 128 (incl. poles) | |

Coil Map

Coils are used to reflect the trip status of overcurrent protectors or the relay control state of switched outlets.

| Coil Address | Access | Function |
|--------------|--------|---------------------------------|
| 0000h | R | Overcurrent protector 1 status |
| 0001h | R | Overcurrent protector 2 status |
| ... | | |
| 003Fh | R | Overcurrent protector 64 status |
| ... | | |
| 0100h | R/W | Outlet 1 state |
| 0101h | R/W | Outlet 2 state |
| ... | | |
| 017Fh | R/W | Outlet 128 state |

Basic PDU Parameters

| Address | Type | Access | Parameter |
|---------|------|--------|---|
| 0000h | Word | R | Register set version (8 bit major, 8 bit minor) |
| 0001h | Word | R | Number of inlets |
| 0002h | Word | R | Number of overcurrent protectors |
| 0003h | Word | R | Number of outlets |
| 0004h | Word | R | Number of transfer switches |

Peripheral Sensors

Up to 32 peripheral sensors are supported. Each sensor occupies a block of 16 holding registers. The base address of a sensor's register block is determined by the following formula, with i being a sensor number between 0 and 31:

$$\text{base address} = 0800\text{h} + i * 10\text{h}$$

The full register address is determined by adding the offset from the table below to this base address. For example the reading of the third peripheral sensor ($i = 2$) is in register:

$$\begin{aligned} \text{register address} &= \text{base address} + \text{offset} \\ &= 0800\text{h} + 2 * 10\text{h} + 02\text{h} \\ &= 0822\text{h} \text{ (or } 2082 \text{ decimal)} \end{aligned}$$

| Offset | Type | Access | Parameter |
|--------|------|--------|---|
| 00h | Word | R | Sensor type: <ul style="list-style-type: none"> • 0: unassigned • 1: Temperature in °C • 2: Relative humidity in % • 3: Air flow in m/s • 4: Air pressure in Pa • 5: Contact closure (0: off, 1: on) • 6: Vibration in G • 7: Water leak (0: normal, 1: alarm) • 8: Smoke detector (0: normal, 1: alarm) • 9: Ambient light in lux • 10: Dry contact (actuator, 0: off, 1: on) • 11: Magnetic contact (0: off, 1: on) • 12: Passive IR motion detector (0: off, 1: on) • 13: Tamper detector (0: normal, 1: alarm) • 14: Powered dry contact (actuator, 0: off, 1: on) • 15: Absolute humidity in g/m³ • 16: Acceleration in G • 17: Door state (0: open, 1: closed) • 18: Door lock state (0: open, 1: closed) • 19: Door handle lock switch (0: open, 1: closed) |

| | | | |
|-----------|-------|-----|--|
| 01h | Word | R | <p>State</p> <ul style="list-style-type: none"> • For numeric sensors: <ul style="list-style-type: none"> • 0: unavailable • 1: normal • 2: below lower critical threshold • 3: below lower warning threshold • 4: above upper warning threshold • 5: above upper critical threshold • For discrete sensors: <ul style="list-style-type: none"> • FFFFh: unavailable • Type-specific state (see above) |
| 02h - 03h | Float | R | Sensor reading (for numerical sensors, see above for unit) |
| 04h | Word | R/W | Actuator control |
| 05h - 0Fh | | | Reserved |

Transfer Switch

For PX3TS models the transfer switch information is held in a register block starting at address 2000h.

| Address | Type | Access | Parameter |
|---------------|----------|--------|---|
| 2000h | Bit Mask | R | Transfer switch capabilities (supported sensors): <ul style="list-style-type: none"> • Bit 0: Inlet voltage phase difference sensor • Bits 1~15: Reserved |
| 2001h | Word | R | Active inlet: <ul style="list-style-type: none"> • 0: No active inlet • 1: Inlet 1 • 2: Inlet 2 |
| 2002h | Word | R | Preferred inlet: <ul style="list-style-type: none"> • 1: Inlet 1 • 2: Inlet 2 |
| 2003h | Word | W | Transfer to inlet. If the new inlet is available, it will become both active and preferred. <ul style="list-style-type: none"> • Bits 0~30: New active inlet (1 or 2) • Bit 31: Force switch even if the phase difference between the inlets is too large |
| 2004h | Bit Mask | R | Fault flags: <ul style="list-style-type: none"> • Bit 0: Inlet phases out of sync • Bit 1: Overload alarm • Bits 2~15: Reserved |
| 2005h | Bit Mask | R | Inlet 1 fault flags: <ul style="list-style-type: none"> • Bit 0: +12 V power supply fault • Bit 1: Fuse blown • Bit 2: MOV surge protector fault • Bit 3: Switch open • Bit 4: Switch short • Bits 5~15: Reserved |
| 2006h | Bit Mask | R | Inlet 2 fault flags (see above) |
| 2007h | | | Reserved |
| 2008h - 2009h | Float | R | Inlet phase sync angle in degrees |

| | | | |
|---------------|----------|-----|---|
| 200Ah | Word | R | Inlet phase sync angle status <ul style="list-style-type: none"> • 0: unavailable • 1: normal • 2: below lower critical threshold • 3: below lower warning threshold • 4: above upper warning threshold • 5: above upper critical threshold |
| 200Bh - 201Fh | | | Reserved |
| 2020h | Bit Mask | R/W | Transfer settings: <ul style="list-style-type: none"> • Bit 0: Enable automatic retransfer • Bit 1: Suppress automatic retransfer on phase sync alarm • Bit 2: Enable manual transfer front panel button • Bits 3~15: Reserved |
| 2021h | Word | R/W | Automatic retransfer wait time in seconds |
| 2022h | Bit Mask | R/W | Inlet 1 enabled voltage thresholds: <ul style="list-style-type: none"> • Bit 0: Lower critical threshold enabled • Bit 1: Lower warning threshold enabled • Bit 2: Upper warning threshold enabled • Bit 3: Upper critical threshold enabled • Bits 4~15: Reserved |
| 2023h | Word | R/W | Inlet 1 lower critical voltage threshold (0.01 V) |
| 2024h | Word | R/W | Inlet 1 lower warning voltage threshold (0.01 V) |
| 2025h | Word | R/W | Inlet 1 upper warning voltage threshold (0.01 V) |
| 2026h | Word | R/W | Inlet 1 upper critical voltage threshold (0.01 V) |
| 2027h | Word | R/W | Inlet 1 voltage assertion timeout (seconds) |
| 2028h | Word | R/W | Inlet 1 voltage deassertion hysteresis (0.01 V) |
| 2029h | Bit Mask | R/W | Inlet 1 enabled frequency thresholds: <ul style="list-style-type: none"> • Bit 0: Lower critical threshold enabled • Bit 1: Lower warning threshold enabled • Bit 2: Upper warning threshold enabled • Bit 3: Upper critical threshold enabled • Bits 4~15: Reserved |
| 202Ah | Word | R/W | Inlet 1 lower critical frequency threshold (0.01 Hz) |
| 202Bh | Word | R/W | Inlet 1 lower warning frequency threshold (0.01 Hz) |
| 202Ch | Word | R/W | Inlet 1 upper warning frequency threshold (0.01 Hz) |
| 202Dh | Word | R/W | Inlet 1 upper critical frequency threshold (0.01 Hz) |
| 202Eh | Word | R/W | Inlet 1 frequency assertion timeout (seconds) |

| | | | |
|---------------|----------|-----|---|
| 202Fh | Word | R/W | Inlet 1 frequency deassertion hysteresis (0.01 Hz) |
| 2030h | Bit Mask | R/W | Inlet 2 enabled voltage thresholds: <ul style="list-style-type: none"> • Bit 0: Lower critical threshold enabled • Bit 1: Lower warning threshold enabled • Bit 2: Upper warning threshold enabled • Bit 3: Upper critical threshold enabled • Bits 4~15: Reserved |
| 2031h | Word | R/W | Inlet 2 lower critical voltage threshold (0.01 V) |
| 2032h | Word | R/W | Inlet 2 lower warning voltage threshold (0.01 V) |
| 2033h | Word | R/W | Inlet 2 upper warning voltage threshold (0.01 V) |
| 2034h | Word | R/W | Inlet 2 upper critical voltage threshold (0.01 V) |
| 2035h | Word | R/W | Inlet 2 voltage assertion timeout (seconds) |
| 2036h | Word | R/W | Inlet 2 voltage deassertion hysteresis (0.01 V) |
| 2037h | Bit Mask | R/W | Inlet 2 enabled frequency thresholds: <ul style="list-style-type: none"> • Bit 0: Lower critical threshold enabled • Bit 1: Lower warning threshold enabled • Bit 2: Upper warning threshold enabled • Bit 3: Upper critical threshold enabled • Bits 4~15: Reserved |
| 2038h | Word | R/W | Inlet 2 lower critical frequency threshold (0.01 Hz) |
| 2039h | Word | R/W | Inlet 2 lower warning frequency threshold (0.01 Hz) |
| 203Ah | Word | R/W | Inlet 2 upper warning frequency threshold (0.01 Hz) |
| 203Bh | Word | R/W | Inlet 2 upper critical frequency threshold (0.01 Hz) |
| 203Ch | Word | R/W | Inlet 2 frequency assertion timeout (seconds) |
| 203Dh | Word | R/W | Inlet 2 frequency deassertion hysteresis (0.01 Hz) |
| 203Eh - 20FFh | | | Reserved |

Inlets

Up to 16 inlets are supported. Each inlet occupies a block of 256 holding registers. The base address of an inlet's register block is determined by the following formula, with i being an inlet number between 0 and 15:

$$\text{base address} = 3000\text{h} + i * 100\text{h}$$

The full register address is determined by adding the offset from the table below to this base address. For example the line frequency of the first inlet ($i = 0$) is in register:

$$\begin{aligned} \text{register address} &= \text{base address} + \text{offset} \\ &= 3000\text{h} + 0 * 100\text{h} + 22\text{h} \\ &= 3022\text{h} \text{ (or 12322 decimal)} \end{aligned}$$

The sensor readings listed in the table are inlet-global readings. In case of three-phase inlets the per-phase readings can be found in the pole blocks starting at offsets 40h, 70h, A0h and D0h. See section [Poles](#) below for details.

| Offset | Type | Access | Parameter |
|--------|----------|--------|---|
| 00h | Bit Mask | R | Inlet capabilities (supported sensors): <ul style="list-style-type: none"> • Bit 0: RMS voltage • Bit 1: RMS current • Bit 2: Peak current • Bit 3: Reserved • Bit 4: Unbalanced current • Bit 5: Active power • Bit 6: Apparent power • Bit 7: Power factor • Bit 8: Active energy counter • Bit 9: Apparent energy counter • Bit 10: Phase angle • Bit 11: Line frequency • Bit 12: Reactive power • Bit 13: Reactive energy counter • Bit 14: Power quality • Bit 15: Surge protector status |
| 01h | Bit Mask | R | Inlet capabilities (continued): <ul style="list-style-type: none"> • Bit 0: Residual current • Bit 1: Residual DC current • Bit 2: Residual AC current • Bits 3~15: Reserved |
| 02h | Word | R | Number of inlet poles |
| 03h | Word | R | Minimum voltage rating in V |

| | | | |
|-----------|-------|---|---|
| 04h | Word | R | Maximum voltage rating in V |
| 05h | Word | R | Current rating in A |
| 06h - 07h | | | Reserved |
| 08h - 09h | Float | R | RMS voltage reading in V In case of a three-phase inlet this is the smallest voltage between any two phases. |
| 0Ah - 0Bh | Float | R | RMS current reading in A In case of a three-phase inlet this is the maximum of the individual phase currents. |
| 0Ch - 0Fh | | | Reserved |
| 10h - 11h | Float | R | Unbalanced current reading in % |
| 12h - 13h | Float | R | Active power reading in W In case of a three-phase inlet this is the total power of all phases. |
| 14h - 15h | Float | R | Apparent power reading in VA |
| 16h - 17h | Float | R | Power factor reading (no unit) |
| 18h - 1Bh | QWord | R | Active energy counter in Wh |
| 1Ch - 1Fh | QWord | R | Apparent energy counter in VAh |
| 20h - 21h | Float | R | Phase angle between voltage and current in degrees |
| 22h - 23h | Float | R | Line frequency reading in Hz |
| 24h - 25h | Float | R | Reactive power reading in var |
| 26h - 29h | QWord | R | Reactive energy counter in varh |
| 2Ah | Word | R | Power quality: <ul style="list-style-type: none"> • 0: Unknown • 1: Normal • 2: Warning • 3: Critical |
| 2Bh - 2Fh | | | Reserved |
| 30h | Word | R | Surge protector status: <ul style="list-style-type: none"> • 0: OK • 1: Alarm |
| 31h | Word | R | Residual current status: <ul style="list-style-type: none"> • 0: Unknown • 1: Normal • 2: Warning • 3: Critical • 4: Self-Test • 5: Failure |
| 32h - 33h | Float | R | Residual current reading in A |
| 34h - 35h | Float | R | Residual DC current reading in A |

| | | | |
|-----------|----------|---|---|
| 36h - 37h | Float | R | Residual AC current reading in A |
| 38h - 39h | | | Reserved |
| 3Ah | Bit Mask | R | <p>Status 1</p> <ul style="list-style-type: none"> • One 4-bit value per sensor: <ul style="list-style-type: none"> • 0: unavailable • 1: normal • 2: below lower critical threshold • 3: below lower warning threshold • 4: above upper warning threshold • 5: above upper critical threshold • Bits 0~3: RMS voltage • Bits 4~7: RMS current • Bits 8~11: Peak current • Bits 12~15: Reserved |
| 3Bh | Bit Mask | R | <p>Status 2</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Unbalanced current • Bits 4~7: Active power • Bits 8~11: Apparent power • Bits 12~15: Power factor |
| 3Ch | Bit Mask | R | <p>Status 3</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Active energy • Bits 4~7: Apparent energy • Bits 8~11: Phase angle • Bits 12~15: Line frequency |
| 3Dh | Bit Mask | R | <p>Status 4</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Reactive power • Bits 4~7: Reactive energy • Bits 8~15: Reserved |
| 3Eh | Bit Mask | R | <p>Status 5</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Residual current • Bits 4~7: Residual DC current • Bits 8~11: Residual AC current |
| 3Fh | | | Reserved |
| 40h - 6Fh | | | Pole 1 (see Poles) |

| | | | |
|-----------|--|--|--------|
| 70h - 9Fh | | | Pole 2 |
| A0h - CFh | | | Pole 3 |
| D0h - FFh | | | Pole 4 |

Overcurrent Protectors

Up to 64 overcurrent protectors (OCP) are supported. Each OCP occupies a block of 256 holding registers. The base address of an OCP's register block is determined by the following formula, with i being an OCP number between 0 and 63:

$$\text{base address} = 4000\text{h} + i * 100\text{h}$$

The full register address is determined by adding the offset from the table below to this base address. For example the RMS current reading of the fourth OCP ($i = 3$) is in register:

$$\begin{aligned} \text{register address} &= \text{base address} + \text{offset} \\ &= 4000\text{h} + 3 * 100\text{h} + 0\text{Ah} \\ &= 430\text{Ah} \text{ (or } 17162 \text{ decimal)} \end{aligned}$$

The OCP trip states are reflected in a coils ranging from 0000h (OCP 1) to 003Fh (OCP 64). A coil value of 1 indicates a closed (good) OCP, a coil value of 0 indicates an open (tripped) OCP. Trip status coils are read-only.

| Offset | Type | Access | Parameter |
|-----------|----------|--------|---|
| 00h | Bit Mask | R | Capabilities (supported sensors): <ul style="list-style-type: none"> • Bit 0: Reserved • Bit 1: RMS current • Bit 2: Peak current • Bits 3~14: Reserved • Bit 15: Trip detection |
| 01h | | | Reserved |
| 02h | Word | R | Number of overcurrent protector poles |
| 03h - 04h | | | Reserved |
| 05h | Word | R | Current rating in A |
| 06h - 09h | | | Reserved |
| 0Ah - 0Bh | Float | R | RMS current reading in A |
| 0Ch - 0Dh | Float | R | Peak current reading in A |
| 0Eh - 39h | | | Reserved |

| | | | |
|-----------|----------|---|--|
| 3Ah | Bit Mask | R | Status <ul style="list-style-type: none"> • One 4-bit value per sensor: <ul style="list-style-type: none"> • 0: unavailable • 1: normal • 2: below lower critical threshold • 3: below lower warning threshold • 4: above upper warning threshold • 5: above upper critical threshold • Bits 0~3: Reserved • Bits 4~7: RMS current • Bits 8~11: Peak current • Bits 12~15: Reserved |
| 3Bh - 3Fh | | | Reserved |
| 40h - 6Fh | | | Pole 1 (see Poles) |
| 70h - 9Fh | | | Pole 2 |
| A0h - CFh | | | Pole 3 |
| D0h - FFh | | | Pole 4 |

Outlets

Up to 128 outlets are supported. Each outlet occupies a block of 256 holding registers. The base address of an outlet's register block is determined by the following formula, with i being an outlet number between 0 and 127:

$$\text{base address} = 8000\text{h} + i * 100\text{h}$$

The full register address is determined by adding the offset from the table below to this base address. For example the RMS current reading of the fourth outlet ($i = 3$) is in register:

$$\begin{aligned} \text{register address} &= \text{base address} + \text{offset} \\ &= 8000\text{h} + 3 * 100\text{h} + 0\text{Ah} \\ &= 830\text{Ah} \text{ (or } 33546 \text{ decimal)} \end{aligned}$$

In case of switched outlets the relay status is reflected and can be controlled by reading or writing a coil. Outlet coil addresses range from 0100h (outlet 1) to 017Fh (outlet 128). A coil value of 1 indicates the outlet is switched on, a coil value of 0 indicates the outlet is switched off. Whether or not an outlet is switched can be determined by checking bit 15 of the respective outlet's capabilities register.

| Offset | Type | Access | Parameter |
|-----------|----------|--------|---|
| 00h | Bit Mask | R | Outlet capabilities (supported sensors): <ul style="list-style-type: none"> • Bit 0: RMS voltage • Bit 1: RMS current • Bits 2~3: Reserved • Bit 4: Unbalanced current • Bit 5: Active power • Bit 6: Apparent power • Bit 7: Power factor • Bit 8: Active energy counter • Bit 9: Apparent energy counter • Bit 10: Phase angle • Bit 11: Line frequency • Bit 12: Reactive power • Bit 13: Reactive energy counter • Bit 14: Reserved • Bit 15: Outlet control coil (switchable) |
| 01h | | | Reserved |
| 02h | Word | R | Number of outlet poles |
| 03h | Word | R | Minimum voltage rating in V |
| 04h | Word | R | Maximum voltage rating in V |
| 05h | Word | R | Current rating in A |
| 06h - 07h | | | Reserved |
| 08h - 09h | Float | R | RMS voltage reading in V |

| | | | |
|-----------|----------|---|--|
| 0Ah - 0Bh | Float | R | RMS current reading in A |
| 0Ch - 0Fh | | | Reserved |
| 10h - 11h | Float | R | Unbalanced current reading in % |
| 12h - 13h | Float | R | Active power reading in W |
| 14h - 15h | Float | R | Apparent power reading in VA |
| 16h - 17h | Float | R | Power factor reading (no unit) |
| 18h - 1Bh | QWord | R | Active energy counter in Wh |
| 1Ch - 1Fh | QWord | R | Apparent energy counter in VAh |
| 20h - 21h | Float | R | Phase angle between voltage and current in degrees |
| 22h - 23h | Float | R | Line frequency reading in Hz |
| 24h - 25h | Float | R | Reactive power reading in var |
| 26h - 29h | QWord | R | Reactive energy counter in varh |
| 2Ah - 39h | | | Reserved |
| 3Ah | Bit Mask | R | <p>Status 1</p> <ul style="list-style-type: none"> • One 4-bit value per sensor: <ul style="list-style-type: none"> • 0: unavailable • 1: normal • 2: below lower critical threshold • 3: below lower warning threshold • 4: above upper warning threshold • 5: above upper critical threshold • Bits 4~7: RMS current • Bits 8~15: Reserved |
| 3Bh | Bit Mask | R | <p>Status 2</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Unbalanced current • Bits 4~7: Active power • Bits 8~11: Apparent power • Bits 12~15: Power factor |
| 3Ch | Bit Mask | R | <p>Status 3</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Active energy • Bits 4~7: Apparent energy • Bits 8~11: Phase angle • Bits 12~15: Line frequency |

| | | | |
|-----------|----------|---|---|
| 3Dh | Bit Mask | R | Status 4 <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Reactive power • Bits 4~7: Reactive energy • Bits 8~15: Reserved |
| 3Eh - 3Fh | | | Reserved |
| 40h - 6Fh | | | Pole 1 (see Poles) |
| 70h - 9Fh | | | Pole 2 |
| A0h - CFh | | | Pole 3 |
| D0h - FFh | | | Pole 4 |

Poles

Poles contain per-line sensor readings for multi-phase inlets or outlets. They are embedded in the holding register blocks listed above. The number of poles for an inlet or outlet can be found at register offset 02h in the respective block.

The base addresses for inlet i poles are ($i=0..15$):

- Pole count: $3002h + i * 100h$
- Pole 1: $3040h + i * 100h$
- Pole 2: $3070h + i * 100h$
- Pole 3: $30A0h + i * 100h$
- Pole 4: $30D0h + i * 100h$

The base addresses for outlet i pole blocks are ($i=0..127$):

- Pole count: $8002h + i * 100h$
- Pole 1: $8040h + i * 100h$
- Pole 2: $8070h + i * 100h$
- Pole 3: $80A0h + i * 100h$
- Pole 4: $80D0h + i * 100h$

| Offset | Type | Access | Parameter |
|--------|----------|--------|---|
| 00h | Bit Mask | R | Pole capabilities (supported sensors): <ul style="list-style-type: none"> • Bit 0: RMS voltage • Bit 1: RMS current • Bit 2: Peak current • Bit 3: Reserved • Bit 4: Residual AC current • Bit 5: Active power • Bit 6: Apparent power • Bit 7: Power factor • Bit 8: Active energy counter • Bit 9: Apparent energy counter • Bit 10: Phase angle • Bit 11: Reserved • Bit 12: Reactive power • Bit 13: Reactive energy counter • Bit 14: Residual current • Bit 15: Residual DC current |
| 01h | | | Reserved |

| | | | |
|-----------|----------|---|--|
| 02h | Bit Mask | R | <p>Status 1</p> <ul style="list-style-type: none"> • One 4-bit value per sensor: <ul style="list-style-type: none"> • 0: unavailable • 1: normal • 2: below lower critical threshold • 3: below lower warning threshold • 4: above upper warning threshold • 5: above upper critical threshold • Bits 4~7: RMS current • Bits 8~11: Peak current • Bits 12~15: Reserved |
| 03h | Bit Mask | R | <p>Status 2</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Residual AC current • Bits 4~7: Active power • Bits 8~11: Apparent power • Bits 12~15: Power factor |
| 04h | Bit Mask | R | <p>Status 3</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Active energy • Bits 4~7: Apparent energy • Bits 8~11: Phase angle • Bits 12~15: Reserved |
| 05h | Bit Mask | R | <p>Status 4</p> <ul style="list-style-type: none"> • One 4-bit value per sensor (see above) • Bits 0~3: Reactive power • Bits 4~7: Reactive energy • Bits 8~11: Residual current • Bits 12~15: Residual DC current |
| 06h - 07h | | | Reserved |
| 08h - 09h | Float | R | RMS voltage reading in V |
| 0Ah - 0Bh | Float | R | RMS current reading in A |
| 0Ch - 0Dh | Float | R | Peak current reading in A |
| 0Eh - 0Fh | | | Reserved |
| 10h - 11h | Float | R | Residual AC current reading in A |
| 12h - 13h | Float | R | Active power reading in W |
| 14h - 15h | Float | R | Apparent power reading in VA |
| 16h - 17h | Float | R | Power factor reading (no unit) |

| | | | |
|-----------|-------|---|---|
| 18h - 1Bh | QWord | R | Active energy counter in Wh |
| 1Ch - 1Fh | QWord | R | Apparent energy counter in VAh |
| 20h - 21h | Float | R | Phase angle between voltage and current in degrees |
| 22h - 23h | Float | R | Line frequency reading in Hz |
| 24h - 25h | Float | R | Reactive power reading in var |
| 26h - 29h | QWord | R | Reactive energy counter in varh |
| 2Ah | Word | R | Residual current status: <ul style="list-style-type: none"> • 0: Unknown • 1: Normal • 2: Warning • 3: Critical • 4: Self-Test • 5: Failure |
| 2Bh - 2Ch | Float | R | Residual current reading in A |
| 2Dh - 2Eh | Float | R | Residual DC current reading in A |
| 2Fh | | | Reserved |