

MODBUS TABLE ORGANIZATION

| Starting Address of the Group Registers (Dec) | Starting Address of the Group Registers (Hex) | System Version (Release) | System Version (Build) | Group Name (Text) | Group Code (Hex) | Group Complexity (Hex) | Group Version (Hex) |
|---|---|--------------------------|------------------------|----------------------------------|------------------|------------------------|---------------------|
| 0 | 0 | 01 | 19 | Modbus settings | 00 01 | 10 | 01 00 |
| 4096 | 1000 | 01 | 19 | External input | 10 00 | 10 | 01 00 |
| 20480 | 5000 | 01 | 19 | Three-phase Electric Measurement | 71 03 | 40 | 01 00 |
| 20480 | 5000 | 01 | 19 | Measure configuration | 71 03 | 40 | 01 00 |
| 29696 | 7400 | 01 | 19 | Pulse measurement | 74 00 | 10 | 01 00 |

MODBUS PROTOCOL DETAILS

| Function Code (Dec) | Exception Codes (Dec) | Data Encoding |
|---|-----------------------|--|
| 2 (Read Discrete Inputs) | 1, 2, 3 | "Big Endian" (most significant byte first) |
| 1 (Read Coils) | 1, 2, 3 | "Big Endian" (most significant byte first) |
| 5/15 (Write Single/Multiple Coils) | 1, 2, 3 | "Big Endian" (most significant byte first) |
| 4 (Read Input Registers) | 1, 2, 3 | "Big Endian" (most significant byte first) |
| 3 (Read Holding register) | 1, 2, 3 | "Big Endian" (most significant byte first) |
| 6/16 (Write Single/Multiple Holding register) | 1, 2, 3, 4 | "Big Endian" (most significant byte first) |

MODBUS OVER SERIAL DETAILS

| Physical Layer | Transmission Modes | Device Addressing | Baud Rates (bit/s) | Data Bits | Data bits transmission sequence | Parity | Stop Bits |
|--|--------------------|-------------------|---|-----------|---------------------------------|--------------------------------|-----------|
| standard EIA/TIA 485 (RS-485) two-wire configuration | RTU | 1÷255 | programmable (4800, 9600, 19200, 38400) | 8 | Least significant bit first | programmable (NONE, EVEN, ODD) | 1 |

MASTER/SLAVE COMMUNICATION TIMING

| Timer Description | Timer Value (msec) |
|---|----------------------------|
| Inter-character time-out | < 1,5 character times |
| Response delay (from master request) | programmable (0 ÷ 99 ms) |
| Delay Time (between two master transmissions) | - |

REFER ALSO TO:

www.modbus.org

- MODBUS over serial line specification and implementation guide V1.02
- MODBUS APPLICATION PROTOCOL SPECIFICATION V1.1b

NOTE:

File and printed copies of this document are not subject to document change control.

| Register Number | Register Address (Dec) | Register Address (Hex) | Dimension [bit] | Description | Note | Read Function Codes (Dec) | Data Storing |
|-----------------|------------------------|------------------------|-----------------|-----------------------|------------|---------------------------|--------------|
| 4097 | 4096 | 1000 | 1 | External input | | | |
| 4097 | 4096 | 1000 | 1 | Current active tariff | See Note 1 | 2 | |

Note 1

0: Tariff 1
1: Tariff 2

| Register Number | Register Address (Dec) | Register Address (Hex) | Dimension [bit] | Description | Note | Read Function Codes (Dec) | Write Function Codes (Dec) | Data Storing |
|----------------------|------------------------|------------------------|-----------------|-------------|------|---------------------------|----------------------------|--------------|
| (no COILS available) | | | | | | | | |

| Register Number | Register Address (Dec) | Register Address (Hex) | Dimension [word] | Bit Position | Description | Type | Scale | Unit | Range | Note | Read Function Code (Dec) | Data Storing |
|-----------------|------------------------|------------------------|------------------|--------------|---|------------------|-------|------|-------|----------------------|--------------------------|--------------|
| 20481 | 20480 | 5000 | 257 | | Three-phase Electric Measurement | | | | | | | |
| 20481 | 20480 | 5000 | 2 | | Phase 1 Current Value (R) | unsigned integer | 1 | mA | | See Note 1 | 4 | |
| 20483 | 20482 | 5002 | 2 | | Phase 2 Current Value (S) | unsigned integer | 1 | mA | | See Note 1 | 4 | |
| 20485 | 20484 | 5004 | 2 | | Phase 3 Current Value (T) | unsigned integer | 1 | mA | | See Note 1 | 4 | |
| 20487 | 20486 | 5006 | 23 | | RESERVED (all return "8000h") | | | | | | | |
| 20510 | 20509 | 501D | 2 | | 1-N Voltage | unsigned integer | 1 | mV | | See Note 1 | 4 | |
| 20512 | 20511 | 501F | 2 | | 2-N Voltage | unsigned integer | 1 | mV | | See Note 1 | 4 | |
| 20514 | 20513 | 5021 | 2 | | 3-N Voltage | unsigned integer | 1 | mV | | See Note 1 | 4 | |
| 20516 | 20515 | 5023 | 2 | | 1-2 Voltage | unsigned integer | 1 | mV | | See Note 1 | 4 | |
| 20518 | 20517 | 5025 | 2 | | 2-3 Voltage | unsigned integer | 1 | mV | | See Note 1 | 4 | |
| 20520 | 20519 | 5027 | 2 | | 3-1 Voltage | unsigned integer | 1 | mV | | See Note 1 | 4 | |
| 20522 | 20521 | 5029 | 16 | | RESERVED (all return "8000h") | | | | | | | |
| 20538 | 20537 | 5039 | 1 | | Three-phase frequency | unsigned integer | 0,01 | Hz | | See Note 1 | 4 | |
| 20539 | 20538 | 503A | 2 | | Three-phase Active Power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20541 | 20540 | 503C | 2 | | Three-phase reactive power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20543 | 20542 | 503E | 2 | | RESERVED (all return "8000h") | | | | | | | |
| 20545 | 20544 | 5040 | 2 | | Threese-Phase Apparent Power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20547 | 20546 | 5042 | 2 | | RESERVED (all return "8000h") | | | | | | | |
| 20549 | 20548 | 5044 | 1 | | Three-phase Power Factor (PF) | signed integer | 0,001 | | | See Note 2 | 4 | |
| 20550 | 20549 | 5045 | 1 | | RESERVED (returns "8000h") | | | | | | | |
| 20551 | 20550 | 5046 | 1 | | Power Factor (PF) sector | unsigned integer | | | | See Note 5 | 4 | |
| 20552 | 20551 | 5047 | 2 | | Phase 1 Active Power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20554 | 20553 | 5049 | 2 | | Phase 2 Active Power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20556 | 20555 | 504B | 2 | | Phase 3 Active Power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20558 | 20557 | 504D | 2 | | Phase 1 Reactive power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20560 | 20559 | 504F | 2 | | Phase 2 Reactive power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20562 | 20561 | 5051 | 2 | | Phase 3 Reactive power | signed integer | | | | See Notes 2 and 6 | 4 | |
| 20564 | 20563 | 5053 | 6 | | RESERVED (returns "8000h") | | | | | | | |
| 20570 | 20569 | 5059 | 2 | | Phase 1 Apparent Power | unsigned integer | | | | See Notes 1 and 6 | 4 | |
| 20572 | 20571 | 505B | 2 | | Phase 2 Apparent Power | unsigned integer | | | | See Notes 1 and 6 | 4 | |
| 20574 | 20573 | 505D | 2 | | Phase 3 Apparent Power | unsigned integer | | | | See Notes 1 and 6 | 4 | |
| 20576 | 20575 | 505F | 17 | | RESERVED (returns "8000h") | | | | | | | |
| 20593 | 20592 | 5070 | 2 | | Positive Three-phase Active Energy | unsigned integer | | | | See Notes 1 and 7 | 4 | Y |
| 20595 | 20594 | 5072 | 2 | | Negative Three-phase Active Energy | unsigned integer | | | | See Notes 1 and 7 | 4 | Y |
| 20597 | 20596 | 5074 | 2 | | RESERVED (returns "80000000h") | | | | | | | |
| 20599 | 20598 | 5076 | 2 | | Positive Three-phase Reactive Energy | unsigned integer | | | | See Notes 1 and 7 | 4 | Y |
| 20601 | 20600 | 5078 | 2 | | Negative Three-phase Reactive Energy | unsigned integer | | | | See Notes 1 and 7 | 4 | Y |
| 20603 | 20602 | 507A | 2 | | RESERVED (returns "80000000h") | | | | | | | |
| 20605 | 20604 | 507C | 2 | | Positive Three-phase Active Energy (Tariff 1) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |
| 20607 | 20606 | 507E | 2 | | Negative Three-phase Active Energy (Tariff 1) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |
| 20609 | 20608 | 5080 | 2 | | Positive Three-phase Reactive Energy (Tariff 1) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |
| 20611 | 20610 | 5082 | 2 | | Negative Three-phase Reactive Energy (Tariff 1) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |
| 20613 | 20612 | 5084 | 2 | | Positive Three-phase Active Energy (Tariff 2) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |
| 20615 | 20614 | 5086 | 2 | | Negative Three-phase Active Energy (Tariff 2) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |

| | | | | | | | | | | | | |
|-------|-------|------|----|--|---|------------------|------|-------|--|----------------------|---|---|
| 20617 | 20616 | 5088 | 2 | | Positive Three-phase Reactive Energy (Tariff 2) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |
| 20619 | 20618 | 508A | 2 | | Negative Three-phase Reactive Energy (Tariff 2) | unsigned integer | | | | See Notes 1, 7 and 9 | 4 | Y |
| 20621 | 20620 | 508C | 18 | | RESERVED (returns "8000h") | | | | | | | |
| 20639 | 20638 | 509E | 2 | | Positive Three-phase Active Energy (secondary) | unsigned integer | 0,01 | kWh | | See Note 1 | 4 | Y |
| 20641 | 20640 | 50A0 | 2 | | Negative Three-phase Active Energy (secondary) | unsigned integer | 0,01 | kWh | | See Note 1 | 4 | Y |
| 20643 | 20642 | 50A2 | 2 | | RESERVED (returns "80000000h") | | | | | | | |
| 20645 | 20644 | 50A4 | 2 | | Positive Three-phase Reactive Energy (secondary) | unsigned integer | 0,01 | kVarh | | See Note 1 | 4 | Y |
| 20647 | 20646 | 50A6 | 2 | | Negative Three-phase Reactive Energy (secondary) | unsigned integer | 0,01 | kVarh | | See Note 1 | 4 | Y |
| 20649 | 20648 | 50A8 | 2 | | RESERVED (returns "80000000h") | | | | | | | |
| 20651 | 20650 | 50AA | 2 | | Positive Three-phase Active Energy (Tariff 1) (secondary) | unsigned integer | 0,01 | kWh | | See Notes 1 and 9 | 4 | Y |
| 20653 | 20652 | 50AC | 2 | | Negative Three-phase Active Energy (Tariff 1) (secondary) | unsigned integer | 0,01 | kWh | | See Notes 1 and 9 | 4 | Y |
| 20655 | 20654 | 50AE | 2 | | Positive Three-phase Reactive Energy (Tariff 1) (secondary) | unsigned integer | 0,01 | kVarh | | See Notes 1 and 9 | 4 | Y |
| 20657 | 20656 | 50B0 | 2 | | Negative Three-phase Reactive Energy (Tariff 1) (secondary) | unsigned integer | 0,01 | kVarh | | See Notes 1 and 9 | 4 | Y |
| 20659 | 20658 | 50B2 | 2 | | Positive Three-phase Active Energy (Tariff 2) (secondary) | unsigned integer | 0,01 | kWh | | See Notes 1 and 9 | 4 | Y |
| 20661 | 20660 | 50B4 | 2 | | Negative Three-phase Active Energy (Tariff 2) (secondary) | unsigned integer | 0,01 | kWh | | See Notes 1 and 9 | 4 | Y |
| 20663 | 20662 | 50B6 | 2 | | Positive Three-phase Reactive Energy (Tariff 2) (secondary) | unsigned integer | 0,01 | kVarh | | See Notes 1 and 9 | 4 | Y |
| 20665 | 20664 | 50B8 | 2 | | Negative Three-phase Reactive Energy (Tariff 2) (secondary) | unsigned integer | 0,01 | kVarh | | See Notes 1 and 9 | 4 | Y |
| 20667 | 20666 | 50BA | 59 | | RESERVED (returns "8000h") | | | | | | | |
| 20726 | 20725 | 50F5 | 1 | | Phase shift between V1 - V2 | unsigned integer | 0,1 | ° | | See Note 3 | 4 | |
| 20727 | 20726 | 50F6 | 1 | | Phase shift between V2 - V3 | unsigned integer | 0,1 | ° | | See Note 3 | 4 | |
| 20728 | 20727 | 50F7 | 1 | | Phase shift between V3 - V1 | unsigned integer | 0,1 | ° | | See Note 3 | 4 | |
| 20729 | 20728 | 50F8 | 1 | | Phase shift between U12 - U23 | unsigned integer | 0,1 | ° | | See Note 4 | 4 | |
| 20730 | 20729 | 50F9 | 1 | | Phase shift between U23 - U31 | unsigned integer | 0,1 | ° | | See Note 4 | 4 | |
| 20731 | 20730 | 50FA | 1 | | Phase shift between U31 - U12 | unsigned integer | 0,1 | ° | | See Note 4 | 4 | |
| 20732 | 20731 | 50FB | 1 | | Phase shift between I1 - I2 | unsigned integer | 0,1 | ° | | See Note 8 | 4 | |
| 20733 | 20732 | 50FC | 1 | | Phase shift between I2 - I3 | unsigned integer | 0,1 | ° | | See Note 8 | 4 | |
| 20734 | 20733 | 50FD | 1 | | Phase shift between I3 - I1 | unsigned integer | 0,1 | ° | | See Note 8 | 4 | |
| 20735 | 20734 | 50FE | 1 | | Phase shift between V1 - I1 | unsigned integer | 0,1 | ° | | See Note 1 | 4 | |
| 20736 | 20735 | 50FF | 1 | | Phase shift between V2 - I2 | unsigned integer | 0,1 | ° | | See Note 8 | 4 | |
| 20737 | 20736 | 5100 | 1 | | Phase shift between V3 - I3 | unsigned integer | 0,1 | ° | | See Note 8 | 4 | |

| | | |
|--|-------------------------|--------------|
| Note 1 | | |
| Expressed on "numeric coding"; without mark (fixed more significant bit = 0); | | |
| Note 2 | | |
| Expressed in "numeric coding"; with mark (more significant bit = mark); | | |
| Note 3 | | |
| Expressed on "numeric coding"; without mark (fixed more significant bit = 0); Only with 3N-3E | | |
| Note 4 | | |
| Expressed on "numeric coding"; without mark (fixed more significant bit = 0); Only with 3-3E or 3-2E | | |
| Note 5 | | |
| 0: power factor = 1 1: inductive 2: capacitive | | |
| Note 6 | | |
| Transformer ratio | Measurement unit | Scale |
| KTA*KTV < 5000 | W/var/VA | 0,01 |
| KTA*KTV ≥ 5000 | kW/kvar/kVA | 0,01 |
| Note 7 | | |
| Transformer ratio | Measurement unit | Scale |
| 1 ≤ KTA*KTV < 10 | kWh/kvarh | 0,01 |
| 10 ≤ KTA*KTV < 100 | kWh/kvarh | 0,1 |
| 100 ≤ KTA*KTV < 1000 | kWh/kvarh | 1 |
| 1000 ≤ KTA*KTV < 10000 | MWh/Mvarh | 0,01 |
| 10000 ≤ KTA*KTV < 100000 | MWh/Mvarh | 0,1 |
| 100000 ≤ KTA*KTV | MWh/Mvarh | 1 |
| Note 8 | | |
| Expressed on "numeric coding"; without mark (fixed more significant bit = 0); Only with 3N-3E, 3-3E or 3-2E | | |
| Note 9 | | |
| Only if the input acts as "Tariff selector" | | |
| Note 10 | | |
| Only if the input acts as "Pulse measurement" | | |

| Register Number | Register Address (Dec) | Register Address (Hex) | Dimension [word] | Bit Position | Description | Type | Scale | Unit | Range | Note | Read Function Codes (Dec) | Write Function Codes (Dec) | Data Storing |
|-----------------|------------------------|------------------------|------------------|--------------|--|------------------|-------|-------|-------------|-----------------------|---------------------------|----------------------------|--------------|
| 1 | 0 | 0 | 1 | | Modbus settings | | | | | | | | |
| 1 | 0 | 0 | 1 | | Protocol type | unsigned integer | | | | See Note 1 | 3 | 16 | Y |
| 4097 | 4096 | 1000 | 1 | | External input | | | | | | | | |
| 4098 | 4097 | 1001 | 1 | | Configuration of external input | unsigned integer | | | | See Note 2 | 3 | 16 | Y |
| 20481 | 20480 | 5000 | 223 | | Measure configuration | | | | | | | | |
| 20481 | 20480 | 5000 | 1 | | Measurement System Features | unsigned integer | | | | See Note 3 | 3 | 16 | Y |
| 20482 | 20481 | 5001 | 1 | | Phase Currents Transformation Ratio (KTA) | unsigned integer | 1 | | 1 ÷ 9999 | | 3 | 16 | Y |
| 20483 | 20482 | 5002 | 2 | | RESERVED (all return "8000h") | | | | | | | | |
| 20485 | 20484 | 5004 | 1 | | Voltage Transformation Ratio (KTV) | unsigned integer | 0,01 | | 100 ÷ 30000 | | 3 | 16 | Y |
| 20486 | 20485 | 5005 | 2 | | Calculation Settings Requirement | unsigned integer | | | | See Note 4 | 3 | 16 | Y |
| 20488 | 20487 | 5007 | 71 | | RESERVED (all return "8000h") | | | | | | | | |
| 20559 | 20558 | 504E | 2 | | Partial Positive Three-phase Active Energy | unsigned integer | | | | See Notes 5 and 10 | 3 | 16 | Y |
| 20561 | 20560 | 5050 | 2 | | Partial Negative Three-phase Active Energy | unsigned integer | | | | See Notes 5 and 10 | 3 | 16 | Y |
| 20563 | 20562 | 5052 | 2 | | RESERVED (all return "8000h") | | | | | | | | |
| 20565 | 20564 | 5054 | 2 | | Partial Positive Three-phase Reactive Energy | unsigned integer | | | | See Notes 5 and 10 | 3 | 16 | Y |
| 20567 | 20566 | 5056 | 2 | | Partial Negative Three-phase Reactive Energy | unsigned integer | | | | See Notes 5 and 10 | 3 | 16 | Y |
| 20569 | 20568 | 5058 | 4 | | RESERVED (all return "8000h") | | | | | | | | |
| 20573 | 20572 | 505C | 2 | | Partial Positive Three-phase Active Energy (secondary) | unsigned integer | 0,01 | kWh | | See Note 5 | 3 | 16 | Y |
| 20575 | 20574 | 505E | 2 | | Partial Negative Three-phase Active Energy (secondary) | unsigned integer | 0,01 | kWh | | See Note 5 | 3 | 16 | Y |
| 20577 | 20576 | 5060 | 2 | | RESERVED (all return "8000h") | | | | | | | | |
| 20579 | 20578 | 5062 | 2 | | Partial Positive Three-phase Reactive Energy (secondary) | unsigned integer | 0,01 | kvarh | | See Note 5 | 3 | 16 | Y |
| 20581 | 20580 | 5064 | 2 | | Partial Negative Three-phase Reactive Energy (secondary) | unsigned integer | 0,01 | kvarh | | See Note 5 | 3 | 16 | Y |
| 20583 | 20582 | 5066 | 54 | | RESERVED (all return "8000h") | | | | | | | | |
| 20637 | 20636 | 509C | 2 | | Total Active Power Requirement (MD) | unsigned integer | | | | See Notes 7 and 9 | 3 | 16 | |
| 20639 | 20638 | 509E | 2 | | Maximum Total Active Power Requirement (PMD) | unsigned integer | | | | See Notes 7 and 9 | 3 | 16 | Y |
| 20641 | 20640 | 50A0 | 32 | | RESERVED (all return "8000h") | | | | | | | | |
| 20673 | 20672 | 50C0 | 2 | | Maximum Total Active Power Requirement Tariff 1 (PMD T1) | unsigned integer | | | | See Notes 5, 9 and 11 | 3 | 16 | Y |
| 20675 | 20674 | 50C2 | 4 | | RESERVED (all return "8000h") | | | | | | | | |
| 20679 | 20678 | 50C6 | 2 | | Maximum Total Active Power Requirement Tariff 2 (PMD T2) | unsigned integer | | | | See Notes 5, 9 and 11 | 3 | 16 | Y |
| 20681 | 20680 | 50C8 | 16 | | RESERVED (all return "8000h") | | | | | | | | |
| 20697 | 20696 | 50D8 | 1 | | Run hour meter threshold | unsigned integer | 1/100 | % | 0 ÷ 5000 | | 3 | 16 | Y |
| 20698 | 20697 | 50D9 | 2 | | Run hour meter (TOT) | unsigned integer | | min | | See Note 6 | 3 | 16 | Y |
| 20700 | 20699 | 50DB | 2 | | Run hour meter (Tariff 1) | unsigned integer | | min | | See Notes 7 and 11 | 3 | 16 | Y |
| 20702 | 20701 | 50DD | 2 | | Run hour meter (Tariff 2) | unsigned integer | | min | | See Notes 7 and 11 | 3 | 16 | Y |
| 29697 | 29696 | 7400 | 4 | | Pulse measurement | | | | | | | | |
| 29697 | 29696 | 7400 | 1 | | Measurement unit input | unsigned integer | | | | See Note 8 | 3 | 16 | Y |
| 29698 | 29697 | 7401 | 1 | | Pulse weight input | unsigned integer | 1/100 | | 1 ÷ 10000 | | 3 | 16 | Y |
| 29699 | 29698 | 7402 | 2 | | Pulse pulse input | unsigned integer | 1/100 | | | See Note 5 | 3 | 16 | Y |

Note 1

0: Standard MAP;
1: Basic MAP.

This register is shared between the two maps. It's always possible to read and write this register.

Note 2

Bit 6 = 0: the input acts as "Tariff selector";
Bit 6 = 1: the input acts as "Pulse measurement".

Note 3

BYTE1 (MSB):

"0x11": Single-phase system 1N-1E (L1);
"0x32": Three-phase system without neutral 3-2E;
"0x33": Three-phase system without neutral 3-3E;
"0x43": Three-phase system with neutral 3N-3E.
"0x41": Three-phase system with neutral 3N-1E (balanced load). (from version 1.0.8)
"0x31": Three-phase system without neutral 3-1E (balanced load). (from version 1.0.8)

BYTE0 (LSB):

"00" **[default]**: if the active power flows in the normal/indicated direction ("upstream to downstream" or depending on the polarity indicated for the connection);

Note 4

WORD0 (LSW): calculation method
1: "sliding block interval"

WORD1 (MSW): calculation window (value in [min] (5, 8, 10, 15, 20, 30, 60), "default"=15)

Note 5

This register is writable, but only with zero

Note 6

This register is writable, but only with zero. Writing this register you will delete also the two tariffs values.

Note 7

Writing this register has no effect.

Note 8

0 : Wh (default)
1 : kWh
2 : MWh
3 : Varh
4 : kVarh
5 : MVarh
6 : VAh
7 : kVAh
8 : MVAh
9 : m³
10 : km³
11 : Mm³
12 : Nm³ (normal meter³)
13 : kNm³
14 : MNm³
15 : J
16 : kJ
17 : MJ
18 : cal
19 : kcal
20: g
21: Kg
23: T

| Note 9 | | |
|---------------------------|-------------------------|--------------|
| Transformer ratio | Measurement unit | Scale |
| $KTA \cdot KTV < 5000$ | W/var/VA | 0,01 |
| $KTA \cdot KTV \geq 5000$ | kW/kvar/kVA | 0,01 |

| Note 10 | | |
|-------------------------------------|-------------------------|--------------|
| Transformer ratio | Measurement unit | Scale |
| $1 \leq KTA \cdot KTV < 10$ | kWh/kvarh | 0,01 |
| $10 \leq KTA \cdot KTV < 100$ | kWh/kvarh | 0,1 |
| $100 \leq KTA \cdot KTV < 1000$ | kWh/kvarh | 1 |
| $1000 \leq KTA \cdot KTV < 10000$ | MWh/Mvarh | 0,01 |
| $10000 \leq KTA \cdot KTV < 100000$ | MWh/Mvarh | 0,1 |
| $100000 \leq KTA \cdot KTV$ | MWh/Mvarh | 1 |

| Note 11 | | |
|---|--|--|
| Only if the input acts as "Tariff selector" | | |