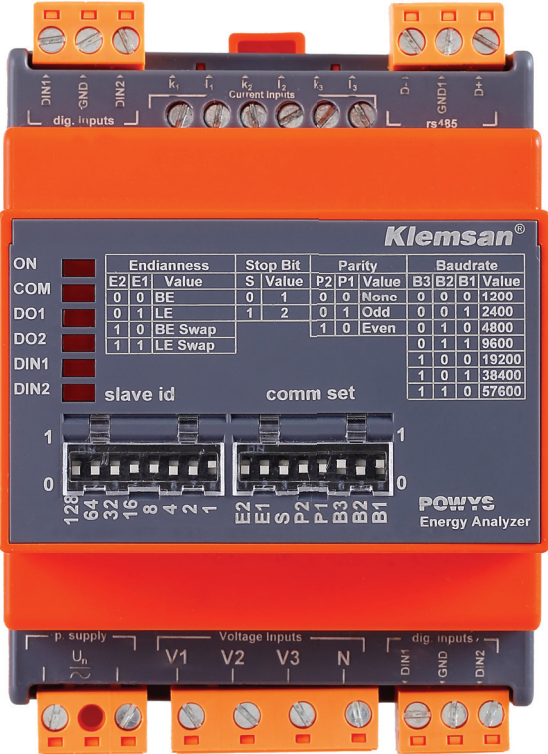


POWYS 4&5 RD User Manual



SECTION 1**GENERAL INFORMATION**

1.1 Features and Models	2
1.2 Correct Usage and Conditions For Safety	3
1.3 4 Quadrant Representation	3

SECTION 2**INSTALLATION**

2.1 Preparation for Installation	5
2.2 Mounting	5
2.3 Wiring Diagrams	5
2.3.1 Three-Phase Connection with Neutral (3P4W)	5
2.3.2 Three-Phase Connection without Neutral (3P3W)	5
2.3.3 Digital Output Connection Diagram	5
2.4 Dimensions	6
2.5 LED Notifications	7

SECTION 3**MEASURED PARAMETERS**

3.1.1 Instant Measurements	7
3.1.2 Demand Values	8
3.1.3 Energy Values	9
3.1.4 Counter Values	9
3.1.5 Input Counter Values	9
3.2 SETTINGS	10
3.2.1 Network Settings	10
3.2.2 Serial Connection Settings	12
3.2.3 Alarm Settings	13
3.2.4 Digital Input Settings	14
3.2.5 Digital Output Settings	15

SECTION 4**RS485 COMMUNICATION**

16

SECTION 5**FACTORY SETTINGS**

28

SECTION 6**TECHNICAL SPECIFICATIONS**

30

POWYS 4&5 RD

SECTION 1
GENERAL
INFORMATION

1.1 Features and Models

POWYS series devices measure current, voltage, frequency, harmonics, etc. in 3-phase systems. They are rail-mounted energy analyzers designed to measure many parameters. POWYS 4 series devices are designed with a width of 72 mm, and POWYS 5 series devices are designed with a width of 126 mm. It also has the following optional features.

- RS485 (Modbus RTU) Communication Interface
- Energy Meters
- 2nd Tariff
- Ability to store minimum, maximum and demand values
- Run hour, On hour and power interruption counters
- Digital Input/Output
- Alarm Relay Output
- Indication for phase loss and phase sequence on current and voltage inputs.
- THDV, THDI
- Up to 31 current and voltage odd harmonics

Ürün Adı	POWYS 400R	POWYS 405R	POWYS 506RD	POWYS 506RS
Stock Code	606600	606601	606602	606603
Screen Type	No Screen	No Screen	No Screen	7 Segment
Mounting Type	Rail Mount	Rail Mount	Rail Mount	Rail Mount
Enclosure Width	72 mm	72 mm	126 mm	126 mm
Voltage / Current / Frequency Measurement	✓	✓	✓	✓
Powers, CosØ, PF Measurement	✓	✓	✓	✓
Energy Measurement	✓	✓	✓	✓
Min-Max Values	✓	✓	✓	✓
Current/Voltage Unbalance	✓	✓	✓	✓
Demand Values	✓	✓	✓	✓
THD and Harmonics up to 31st	✓	✓	-	-
Run hour, On hour, Power interruption counters	✓	✓	✓	✓
Energy Meters	✓	✓	✓	✓
Digital Inputs	-	2	2	2
Digital Outputs	-	2	2	2
Relay Outputs	-	-	2	2
RS485 Communication	✓	✓	✓	✓
Number of Tariffs	1	2	2	2

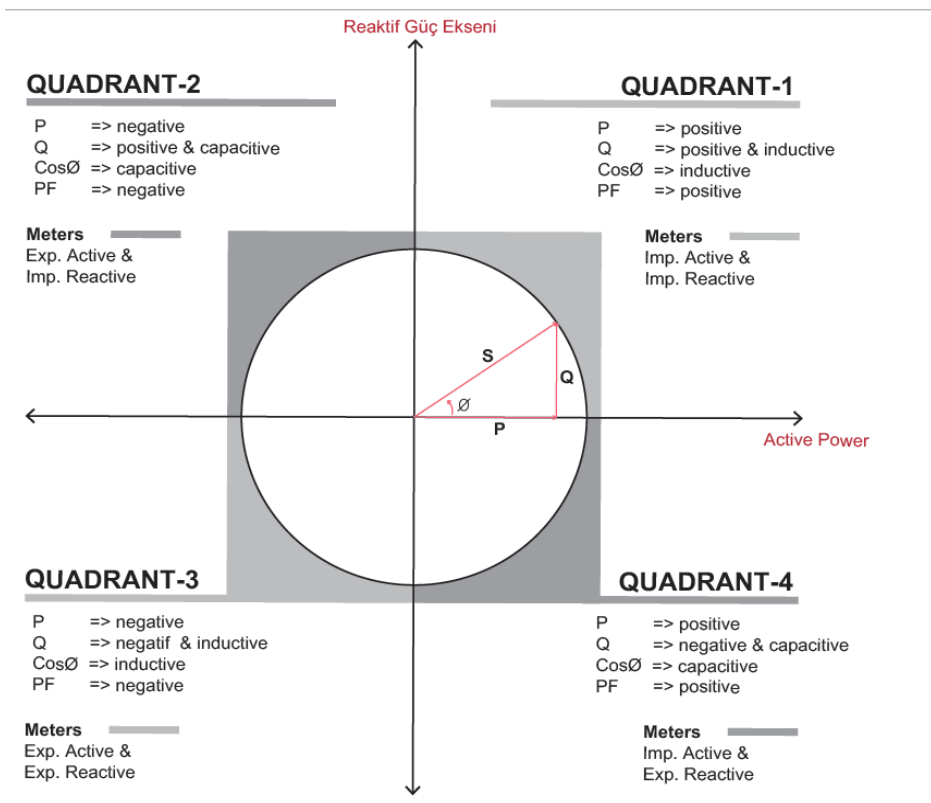
1.2 Correct Usage and Conditions For Safety

- Installation and wiring must be performed by authorized technicians in accordance with the instructions in the user manual. Do NOT commission the device before proper wiring.
- Make sure the device is de-energized before connecting to the mains.
- Short-circuit the k-l terminals of the current transformer in another location before disconnecting the current transformers. Failing to do so will cause dangerously high voltages in the secondary terminals of the current transformers.
- Use a dry cloth to clean the device. Do NOT use alcohol, thinner, or any abrasive materials.
- Make sure all wiring is properly made before commissioning the device.
- Do NOT open the device. There are no serviceable parts by the user.
- Keep the device away from humidity, water, vibrations, and dust.
- It is advisable to connect a circuit breaker or an automatic fuse between the current input of the device and the mains (2 amps).

! The manufacturer does NOT assume any responsibility for any undesired consequences if the above measures are NOT adhered to.

1.3 4 Quadrant Representation

The angle(\emptyset) between voltage and current provides us information about the direction of energy flow. A positive sign for active/reactive power indicates that active/reactive power is consumed. And also a negative sign for active/reactive power indicates that active/ reactive power is generated.



! If the signs of active and reactive power are examined, it can be defined the quadrant that Klea measures.

- e.g.;
- P= +10 kW, Q = +5 kVAr → Quadrant-1
 - P= -10 kW, Q = +5 kVAr → Quadrant-2
 - P= -10 kW, Q = -5 kVAr → Quadrant-3
 - P= +10 kW, Q = -5 kVAr → Quadrant-4

POWYS 4&5 RD

SECTION 2
INSTALLATION

2.1 Preparation for Installation

The purchased device may not include all hardware options referred in this document. This situation does not constitute an impediment to the electrical installation.

! Assembly and related connections of KLEA, must be implemented by authorized persons in accordance with the instructions of user manual. The device must not be put into service if the operator is not sure that all connections are correctly accomplished.

2.2 Mounting

Before wiring up voltage and current ends to KLEA, you must be sure that the power is cut.

! Before wiring up voltage and current ends to KLEA, you must be sure that the power is cut.
 Before disconnecting current transformer leads, be sure that they are short circuited elsewhere or connected to a parallel load which has sufficiently low impedance. Otherwise dangerously high voltages will be induced at the current transformer leads. Same phenomena also apply for putting into service.

2.3 Wiring Diagrams

2.3.1 Three-Phase Connection with Neutral (3P4W)

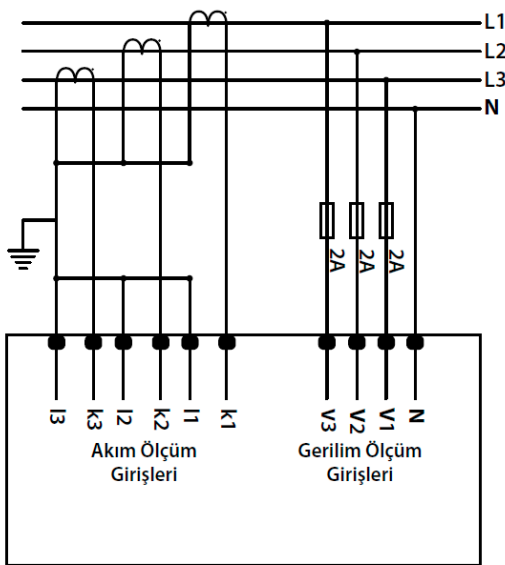


Figure 1 3P4W Connection

2.3.2 Three-Phase Connection without Neutral (3P3W)

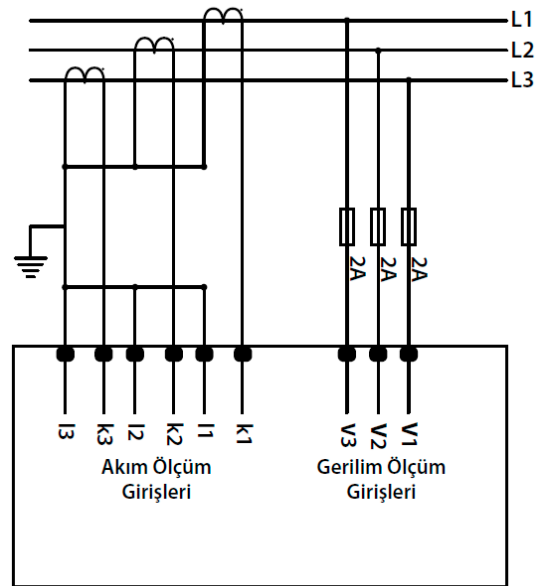
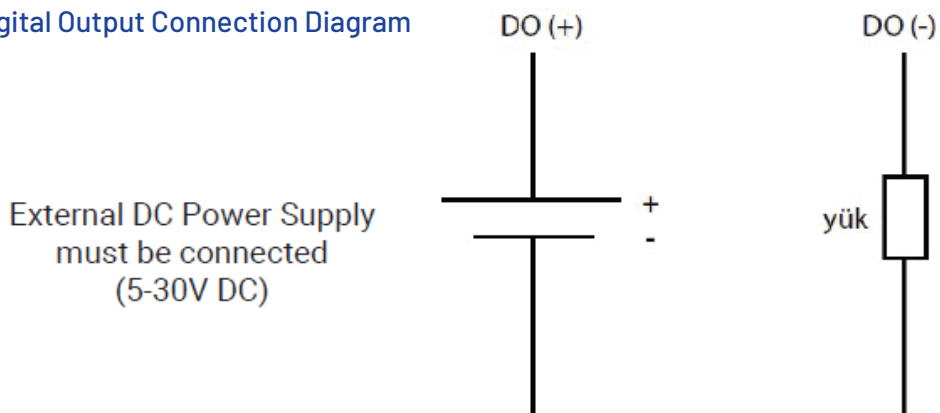
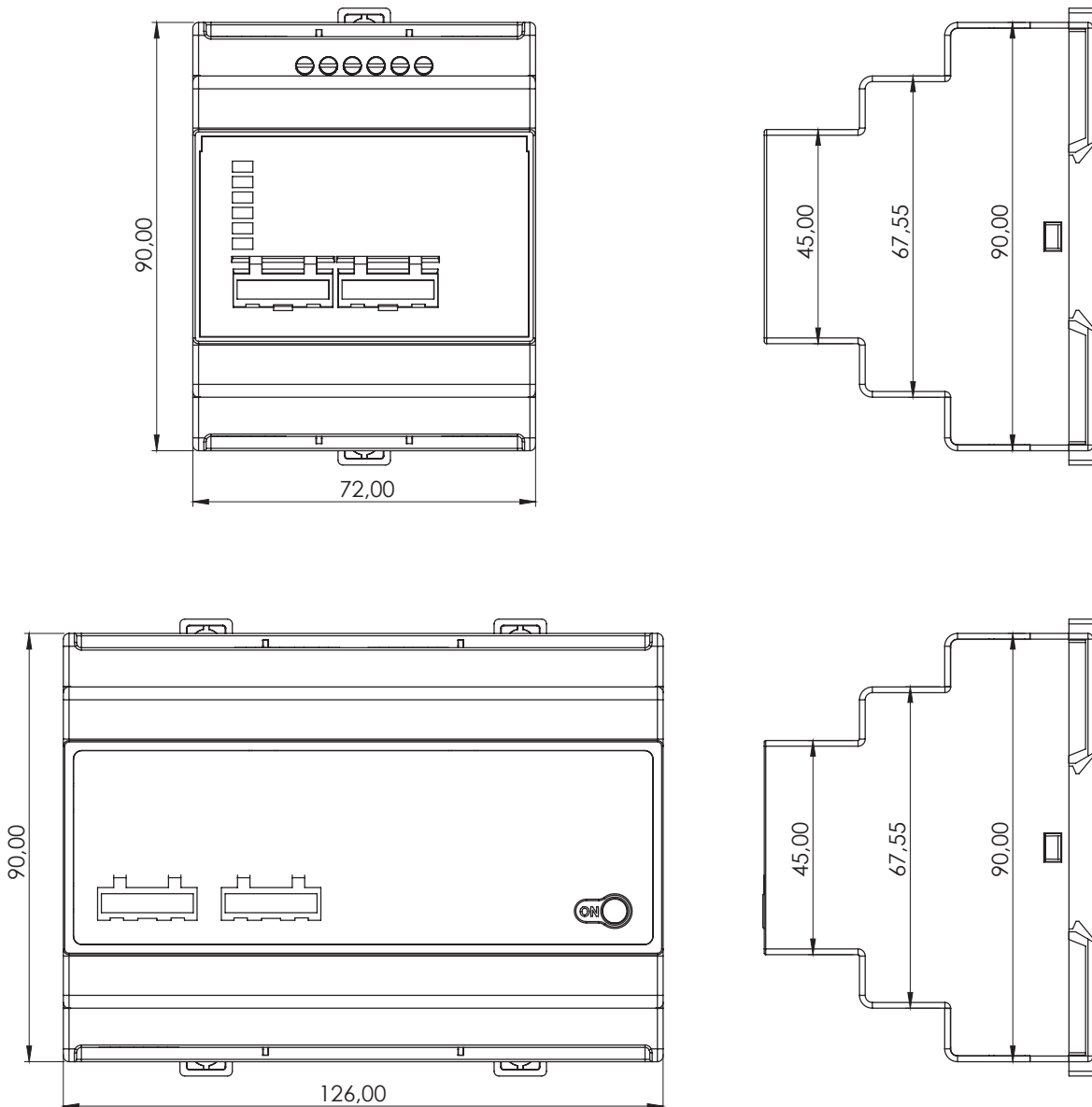


Figure 2 3P3W Connection

2.3.3 Digital Output Connection Diagram



2.4 Dimensions



2.5 LED Notifications

POWYS 4 series devices have 6 LEDs on the device.

- ON: It is active when the device is energized. The supply voltage of the device is 85-300 VAC.
- COM: Used to show the communication status. It is active in data transfer.
- DO1: Active when Digital Output 1 is active.
- DO2: Active when Digital Output 2 is active.
- DIN1: Active when Digital Input 1 is active.
- DIN2: Active when Digital Input 2 is active.

There is 1 LED in POWYS 506RD and it is active only when the device is energized.

POWYS 4&5 RD

SECTION 3
MEASURED
PARAMETERS

Measured parameters in POWYS 4 series devices designed in screenless enclosures are displayed over MODBUS RTU protocol via the RS485 interface. Reading and configuration operations can only be done via communication.

The following parameters and the average, total, maximum, and minimum values of these parameters (depending on the parameter) are displayed instantaneously on the devices.

3.1.1 Instant Measurements

The following parameters and the average, total, minimum, and maximum values of these parameters (depending on the parameter) are also shown on the instant measurements menu.

- Voltage (phase-neutral, phase-phase)
- Current
- Neutral Current
- Active Power
- Reactive Power
- Apparent Power
- Power Factor
- Frequency
- Total Harmonic Distortion for Voltage
- Total Harmonic Distortion for Current
- Voltage Unbalance

PARAMETER	INSTANT	AVERAGE	TOTAL	MAXIMUM	MINIMUM
Voltage (VLN)	✓	✓	-	✓	✓
Voltage (VLL)	✓	✓	-	✓	✓
Current	✓	✓	✓	✓	✓
Neutral Current	✓	-	-	✓	✓
Active Power	✓	✓	-	✓	✓
Reactive Power	✓	✓	-	✓	✓
Apparent Power	✓	✓	-	✓	✓
Power Factor	✓	✓	-	✓	✓
Frequency	✓	-	-	✓	✓
THDV	✓	-	-	-	-
THDI	✓	-	-	-	-
Voltage Unbalance	✓	-	-	-	-

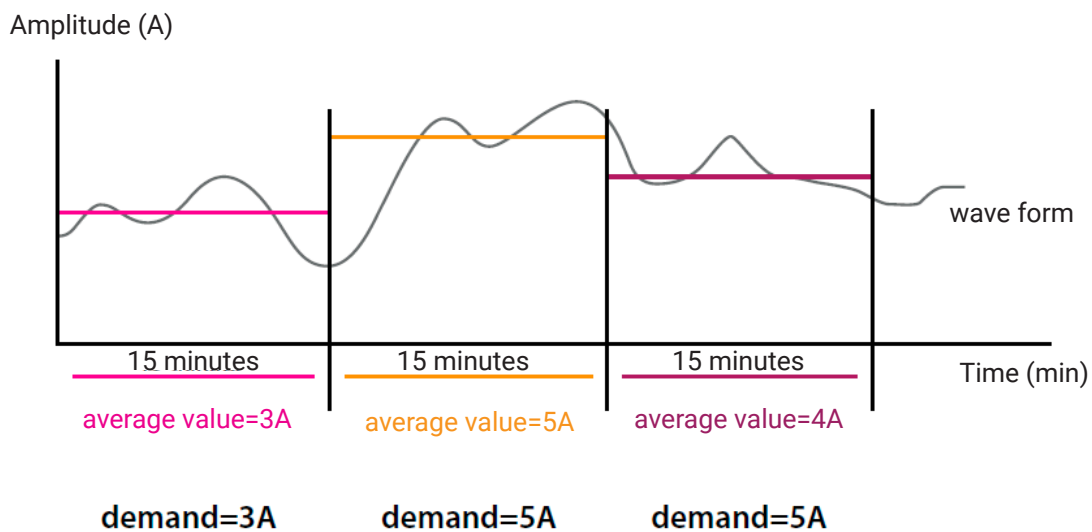
3.1.2 Demand Values

In the demand values menu, the average values of current and power values during the set demand period and the maximum values of these values are displayed.

- Current Demand (3 phase)
- Current Demand (Total)
- Import Active Power Demand (Total)
- Export Active Power Demand (Total)
- Import Reactive Power Demand (Total)
- Export Reactive Power Demand (Total)

The demand values of the above parameters are calculated at the end of the previous demand period and the maximum demand values of these parameters are calculated since the device was energized.

As an example, the graph below shows the averages (previous demand) and the max demand values of the current signal for the 15-minute demand period.



* demand period= 15 mins.

The DMD icon and the symbol of the related parameter become active in the demand menu. Switching between parameters is done with the "Λ" and "V" buttons.



Demand period setting is made in the "Demand Period" (DNBP) menu under "Network Settings".

3.1.3 Energy Values

Under this menu, there are meters for the following energy parameters.

- Import Active
- Export Active
- Import Reactive
- Export Reactive

Devices with digital inputs have 2 different tariffs. In the 1st tariff, the above parameters are displayed separately for each phase and in total. For the 2nd tariff, only the total data is displayed.



Reactive energies of the 1st Tariff are shown separately for each quadrant.

3.1.4 Counter Values

There are “On Hour Counter”, “Run Hour Counter” and, “Power Interruption Counter”.

On Hour Counter: The total on-time of the device is counted. Unit is hour. (h)

Run Hour Counter: It is the time that counted when the device measures Energy. This counter is displayed under “CNT .. RUN” menu. Unit is hour. (h)

Power Interruption Counter: It is the power interruptions count of the device.



Only the “Run Hour Counter” can be reset by the user.

3.1.5 Input Counter Values

In devices with digital inputs, if the input is set to “INPUT COUNTER”, the state changes of the related input are counted depending on the input detection edge option.

3.2 SETTINGS

The following parameters are optionally configured in the devices.

- Network Settings
- Serial Connection Settings
- Alarm Settings
- Digital Input Settings
- Digital output Settings
- Security Settings
- Clear

3.2.1 Network Settings

The network and basic settings of the device are made under this tab.

CT Primary Setting: This is the section where the primary value of the current transformers connected to the current inputs is entered. A value between 5 and 9999 can be entered.

CT Secondary Setting: This is the section where the secondary value of the current transformers connected to the current inputs is entered. 1 or 5 can be selected.

! The current values measured from the current inputs are multiplied by the ratio of the CT Primary and CT Secondary values and shown in the displays and Modbus addresses.

VT Primary Setting: This is the section where the primary value of the transformers connected to the voltage inputs is entered. A value between 100 and 9999 can be entered.

VT Secondary Setting: This is the section where the secondary value of the transformers connected to the voltage inputs is entered. A value between 100 and 500 can be entered.

! The voltage values measured from the voltage inputs are multiplied by the ratio of the VT Primary and VT Secondary values and shown in the displays and Modbus addresses.

System Frequency: It is the section where the system frequency is selected. 50 and 60 Hz frequencies are supported on the devices.

Connection Type: The connection type to the device is selected under this tab. 3P3W and 3P4W connection options are supported on the devices.

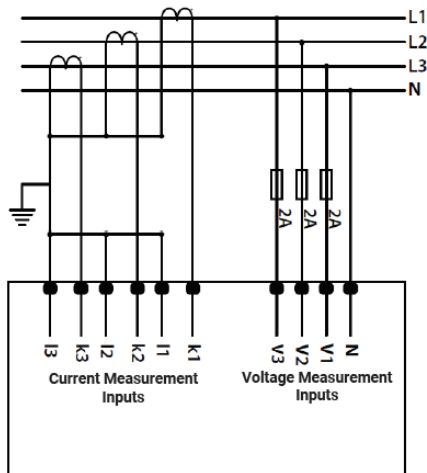


Figure3 3P4W Connection

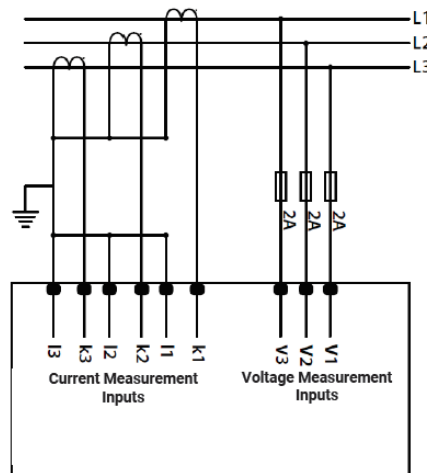


Figure4 3P3W Connection

Demand Period (DNDP): The demand period configuration is made under this tab. The period can be adjusted between 1-60 minutes.

Transformer Option (TRA): The inclusion of CT and VT ratios in the increase of the index values in the device is determined in this tab.

For example, CT ratio, VT ratio, current and voltage values are as follows.

- CT ratio: 100
- Measured 1st phase current: 100A (1A without CT ratio)
- VT ratio: 1
- Measured 1st phase voltage: 230

When the transformer option is set to "ON", the index increase after one hour for the 1st phase;
 $230 \times 100 = 23000$ (23 kWh)

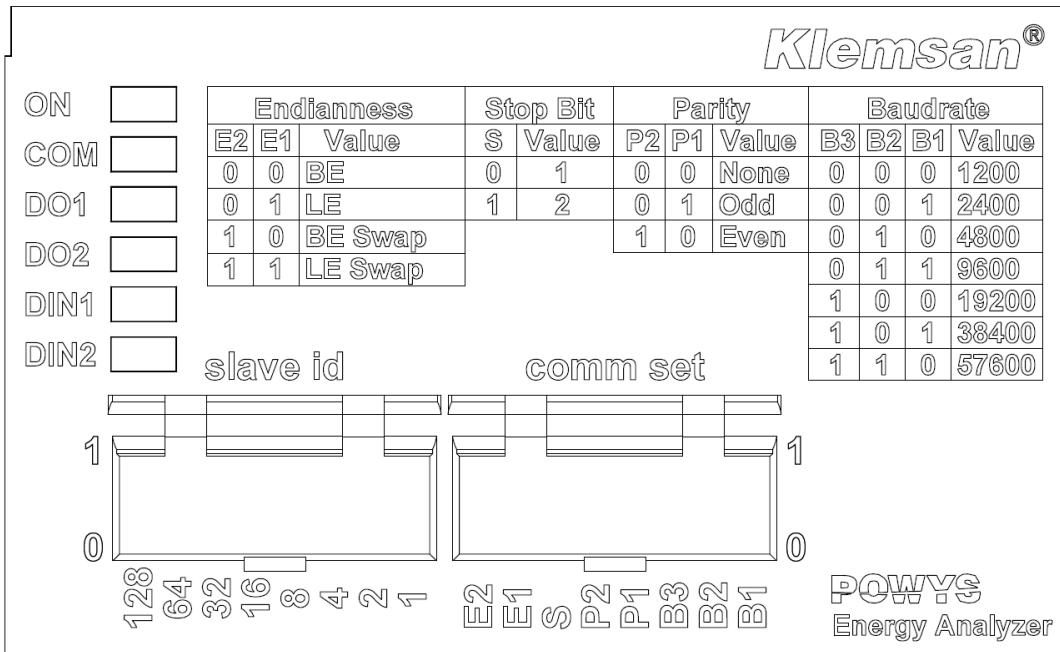
When the transformer option is set to "OFF", the index increase after one hour for the 1st phase;
 $230 \times 1 = 230$ Wh

! The Transformer Option is only for changing the increase in the index data, and the current and voltage values shown on the screen will be displayed with a multiplier independent of this parameter.

3.2.2 Serial Connection Settings (SERI)

Measured parameters in POWYS 4 series devices designed in screenless enclosures are displayed over MODBUS RTU protocol via the RS485 interface. Reading and configuration operations can only be done via communication.

Communication configurations are made with dip switches on the device. The related parameters can only be read via communication.



Slave ID: It is the setting tab where the slave ID number is selected. Values between 1 and 247 can be set. For example;

SLAVE ID								
	Dip 8 (128)	Dip 7 (64)	Dip 6 (32)	Dip 5 (16)	Dip 4 (8)	Dip 3 (4)	Dip 2 (2)	Dip 1 (1)
E.g 1	1	1	0	1	1	0	1	0
E.g 2	1	0	0	1	1	1	0	1

E.g 1 → Slave ID = (1*128)+(1*64)+(0*32)+(1*16)+(1*8)+(0*4)+(1*2)+(0*1) = 218
 E.g 2 → Slave ID = (1*128)+(0*64)+(0*32)+(1*16)+(1*8)+(1*4)+(0*2)+(1*1) = 157

Baudrate: This is the setting tab where the baudrate parameter to be communicated is selected. The devices support the following baudrate values.

- 1200
- 19200
- 2400
- 38400
- 4800
- 57600
- 9600

Parity: Parity setting is made from this tab. The following parity options are supported.

- None Parity
- Odd Parity
- Even Parity

Data Type: It is the tab where the type of Modbus data is determined. 4 different data types are supported.

- Big Endian
- Little Endian
- Big Endian Byte Swap
- Little Endian Byte Swap

3.2.3 Alarm Settings

Alarm limits, hysteresis values, delay times, and relay assignment settings are made for the following parameters under this menu.

Voltage

Low Limit: Low voltage limit setting is made.

High Limit: High voltage limit setting is made.

Delay: The delay time for the voltage alarm to be detected is set.

Hysteresis: Voltage alarm hysteresis setting is made.

Relay Assignment: Relay assignment is made for the related alarm parameter in this tab for devices with relay output

Current

Frequency

Active Power

Reactive Power

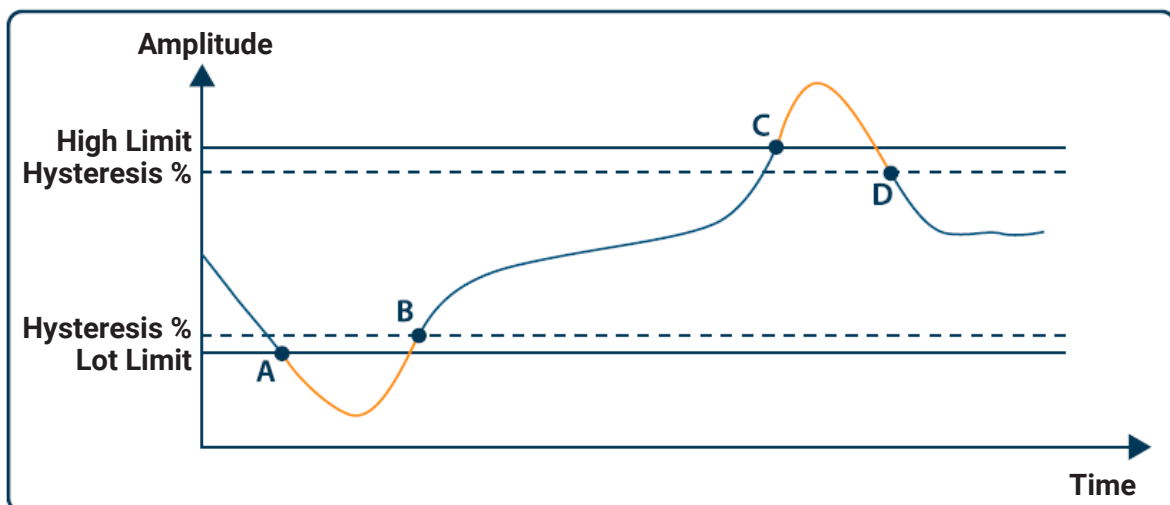
Apparent Power

Power Factor



When it is desired to set the alarm as off state for a parameter, the low and high values have to be entered as the same.

For example;



- Point A low limit alarm occurs.
- Point B, the alarm condition disappears.
- Point C high limit alarm occurs.
- Point D, the alarm condition disappears.



Alarm settings in devices are made over common Modbus addresses. The parameter to be configured for the alarm should be selected via 10750. Modbus address. Alarms can be created for all of them by selecting alarm parameters in order.

3.2.4 Digital Input Settings

There are optionally 2 digital inputs in the devices. Operating mode (Source), delay time, and detection edge settings of the inputs are made under this tab.

Digital Input Source: The operating mode configuration of the digital input is made under this tab.

There are 2 different operating modes: 2nd tariff activation and input counter.

If the source is set as 2nd tariff activation, energy values will count to 2nd tariff when the relevant input is active.

- If the source is set to input counter, it counts with each state changing depending on the detection edge.
- If rising edge detection is chosen for the detection edge, the counter will increase by 1 on each activation of the dry contact that is connected to the digital input.
- If falling edge detection is chosen for the detection edge, the counter will increase by 1 on each deactivation of the dry contact that is connected to the digital input.
- If rising and falling edges detection is chosen for the detection edge, the counter will increase by 1 on each activation and deactivation of the dry contact that is connected to the digital input.

Delay: The input is enabled or disabled based on the detection delay time which is set to account for contact spikes or noise in the digital input.

Detection Edge: Use this menu item to choose the position where the digital input is detected active or passive. This menu is available only for the digital input mode. 2nd tariff activation always uses rising edge detection.



Digital input is based on the dry contact detection principle. Never apply signal to inputs. Otherwise, there is a risk of damaging the device.

3.2.5 Digital Output Settings

There are optionally 2 digital outputs in the devices. Digital outputs are used to get pulses according to the counted energy value. In the configuration of the digital output, the energy source to get pulses, the amount of energy to be counted to get pulses and the duration of the signal must be entered.

Source): The source of the energy to get pulses is selected. 4 different energy sources can be selected.

- Import Active Energy
- Export Active Energy
- Import Reactive Energy
- Export Reactive Energy



These values are the total energy data of the 1st tariff. Energy units are Wh and VARh.

Value & Multiplier: An integer from 1 to 9 must be entered for "Value". It is multiplied by the parameter selected from the "Multiplier" section and it is determined how much energy will be counted for a pulse.

Duration: The duration that the pulse will remain active is set with this parameter. For example, D01 configurations are as follows;

- Source → Import Active Energy
- Value → 5
- Multiplier → M10 (means multiply by 10)
- Duration → 1000 (unit is msec.)

The device will give 1 pulse output for every $5 \times 10 = 50\text{Wh}$ energy. The pulse will remain active for 1000 ms (1 second).

POWYS 4&5 RD

SECTION 4
RS485
COMMUNICATION

The devices have an optional RS485 interface. Devices communicate with Modbus RTU protocol over the RS485 communication interface. The following functions are supported.

03H Function: This function reads the readable addresses in the Modbus table.

10H Function: This function writes the writable addresses in the Modbus table.

Definitions:

R / W: Can read and write the value in this address.

RO: Can only read the value in this address.

WO: Can only write to this address.

float: 32-bit floating number.

Instant Measurements						
Item	Parameter	Modbus Address	Type	Function	Read (R) / Write (W)	Unit
1	Average Phase Neutral Voltage	0	float	03H	RO	V
2	Total Current	2	float	03H	RO	A
3	Average Current	4	float	03H	RO	A
4	Neutral Current	6	float	03H	RO	A
5	Phase-Phase Voltage V12	8	float	03H	RO	V
6	Phase-Phase Voltage V23	10	float	03H	RO	V
7	Phase-Phase Voltage V31	12	float	03H	RO	V
8	Average Phase-Phase Voltage	14	float	03H	RO	V
9	Frequency	16	float	03H	RO	Hz
10	Phase 1 Voltage	18	float	03H	RO	V
11	Phase 2 Voltage	20	float	03H	RO	V
12	Phase 3 Voltage	22	float	03H	RO	V
13	Phase 1 Current	24	float	03H	RO	A
14	Phase 2 Current	26	float	03H	RO	A
15	Phase 3 Current	28	float	03H	RO	A
16	Phase 1 Active Power	30	float	03H	RO	W
17	Phase 2 Active Power	32	float	03H	RO	W
18	Phase 3 Active Power	34	float	03H	RO	W
19	Phase 1 Reactive Power	36	float	03H	RO	VAr
20	Phase 2 Reactive Power	38	float	03H	RO	VAr
21	Phase 3 Reactive Power	40	float	03H	RO	VAr
22	Phase 1 Apparent Power	42	float	03H	RO	VA
23	Phase 2 Apparent Power	44	float	03H	RO	VA
24	Phase 3 Apparent Power	46	float	03H	RO	VA
25	Phase 1 Power Factor	48	float	03H	RO	-
26	Phase 2 Power Factor	50	float	03H	RO	-
27	Phase 3 Power Factor	52	float	03H	RO	-
28	Total Active Power	54	float	03H	RO	W
29	Total Reactive Power	56	float	03H	RO	VAr
30	Total Apparent Power	58	float	03H	RO	VA
31	System Power Factor	60	float	03H	RO	-
32	Phase Sequence	62	int32_t	03H	RO	-
33	Voltage Unbalance	64	float	03H	RO	%
34	Phase 1 Cos \emptyset	66	float	03H	RO	-
35	Phase 2 Cos \emptyset	68	float	03H	RO	-
36	Phase 3 Cos \emptyset	70	float	03H	RO	-

Harmonic Measurements						
Item	Parameter	Modbus Address	Type	Function	Read (R) / Write (W)	Unit
1	THDV Phase 1	600	uint16_t	03H	RO	%
2	THDV Phase 2	601	uint16_t	03H	RO	%
3	THDV Phase 3	602	uint16_t	03H	RO	%
4	THDI Phase 1	603	uint16_t	03H	RO	%
5	THDI Phase 2	604	uint16_t	03H	RO	%
6	THDI Phase 3	605	uint16_t	03H	RO	%
7	Voltage Harmonic 1 Phase 1	606	uint16_t	03H	RO	%
8	Voltage Harmonic 3 Phase 1	607	uint16_t	03H	RO	%
9	Voltage Harmonic 5 Phase 1	608	uint16_t	03H	RO	%
10	Voltage Harmonic 7 Phase 1	609	uint16_t	03H	RO	%
11	Voltage Harmonic 9 Phase 1	610	uint16_t	03H	RO	%
12	Voltage Harmonic 11 Phase 1	611	uint16_t	03H	RO	%
13	Voltage Harmonic 13 Phase 1	612	uint16_t	03H	RO	%
14	Voltage Harmonic 15 Phase 1	613	uint16_t	03H	RO	%
15	Voltage Harmonic 17 Phase 1	614	uint16_t	03H	RO	%
16	Voltage Harmonic 19 Phase 1	615	uint16_t	03H	RO	%
17	Voltage Harmonic 21 Phase 1	616	uint16_t	03H	RO	%
18	Voltage Harmonic 23 Phase 1	617	uint16_t	03H	RO	%
19	Voltage Harmonic 25 Phase 1	618	uint16_t	03H	RO	%
20	Voltage Harmonic 27 Phase 1	619	uint16_t	03H	RO	%
21	Voltage Harmonic 29 Phase 1	620	uint16_t	03H	RO	%
22	Voltage Harmonic 31 Phase 1	621	uint16_t	03H	RO	%
23	Voltage Harmonic 1 Phase 2	622	uint16_t	03H	RO	%
24	Voltage Harmonic 3 Phase 2	623	uint16_t	03H	RO	%
25	Voltage Harmonic 5 Phase 2	624	uint16_t	03H	RO	%
26	Voltage Harmonic 7 Phase 2	625	uint16_t	03H	RO	%
27	Voltage Harmonic 9 Phase 2	626	uint16_t	03H	RO	%
28	Voltage Harmonic 11 Phase 2	627	uint16_t	03H	RO	%
29	Voltage Harmonic 13 Phase 2	628	uint16_t	03H	RO	%
30	Voltage Harmonic 15 Phase 2	629	uint16_t	03H	RO	%
31	Voltage Harmonic 17 Phase 2	630	uint16_t	03H	RO	%
32	Voltage Harmonic 19 Phase 2	631	uint16_t	03H	RO	%
33	Voltage Harmonic 21 Phase 2	632	uint16_t	03H	RO	%
34	Voltage Harmonic 23 Phase 2	633	uint16_t	03H	RO	%
35	Voltage Harmonic 25 Phase 2	634	uint16_t	03H	RO	%
36	Voltage Harmonic 27 Phase 2	635	uint16_t	03H	RO	%
37	Voltage Harmonic 29 Phase 2	636	uint16_t	03H	RO	%
38	Voltage Harmonic 31 Phase 2	637	uint16_t	03H	RO	%
39	Voltage Harmonic 1 Phase 3	638	uint16_t	03H	RO	%
40	Voltage Harmonic 3 Phase 3	639	uint16_t	03H	RO	%
41	Voltage Harmonic 5 Phase 3	640	uint16_t	03H	RO	%
42	Voltage Harmonic 7 Phase 3	641	uint16_t	03H	RO	%
43	Voltage Harmonic 9 Phase 3	642	uint16_t	03H	RO	%
44	Voltage Harmonic 11 Phase 3	643	uint16_t	03H	RO	%
45	Voltage Harmonic 13 Phase 3	644	uint16_t	03H	RO	%
46	Voltage Harmonic 15 Phase 3	645	uint16_t	03H	RO	%
47	Voltage Harmonic 17 Phase 3	646	uint16_t	03H	RO	%
48	Voltage Harmonic 19 Phase 3	647	uint16_t	03H	RO	%
49	Voltage Harmonic 21 Phase 3	648	uint16_t	03H	RO	%
50	Voltage Harmonic 23 Phase 3	649	uint16_t	03H	RO	%
51	Voltage Harmonic 25 Phase 3	650	uint16_t	03H	RO	%

Harmonic Measurements						
Item	Parameter	Modbus Address	Type	Function	Read (R) / Write (W)	Unit
52	Voltage Harmonic 27 Phase 3	651	uint16_t	03H	RO	%
53	Voltage Harmonic 29 Phase 3	652	uint16_t	03H	RO	%
54	Voltage Harmonic 31 Phase 3	653	uint16_t	03H	RO	%
55	Current Harmonic 1 Phase 1	654	uint16_t	03H	RO	%
56	Current Harmonic 3 Phase 1	655	uint16_t	03H	RO	%
57	Current Harmonic 5 Phase 1	656	uint16_t	03H	RO	%
58	Current Harmonic 7 Phase 1	657	uint16_t	03H	RO	%
59	Current Harmonic 9 Phase 1	658	uint16_t	03H	RO	%
60	Current Harmonic 11 Phase 1	659	uint16_t	03H	RO	%
61	Current Harmonic 13 Phase 1	660	uint16_t	03H	RO	%
62	Current Harmonic 15 Phase 1	661	uint16_t	03H	RO	%
63	Current Harmonic 17 Phase 1	662	uint16_t	03H	RO	%
64	Current Harmonic 19 Phase 1	663	uint16_t	03H	RO	%
65	Current Harmonic 21 Phase 1	664	uint16_t	03H	RO	%
66	Current Harmonic 23 Phase 1	665	uint16_t	03H	RO	%
67	Current Harmonic 25 Phase 1	666	uint16_t	03H	RO	%
68	Current Harmonic 27 Phase 1	667	uint16_t	03H	RO	%
69	Current Harmonic 29 Phase 1	668	uint16_t	03H	RO	%
70	Current Harmonic 31 Phase 1	669	uint16_t	03H	RO	%
71	Current Harmonic 1 Phase 2	670	uint16_t	03H	RO	%
72	Current Harmonic 3 Phase 2	671	uint16_t	03H	RO	%
73	Current Harmonic 5 Phase 2	672	uint16_t	03H	RO	%
74	Current Harmonic 7 Phase 2	673	uint16_t	03H	RO	%
75	Current Harmonic 9 Phase 2	674	uint16_t	03H	RO	%
76	Current Harmonic 11 Phase 2	675	uint16_t	03H	RO	%
77	Current Harmonic 13 Phase 2	676	uint16_t	03H	RO	%
78	Current Harmonic 15 Phase 2	677	uint16_t	03H	RO	%
79	Current Harmonic 17 Phase 2	678	uint16_t	03H	RO	%
80	Current Harmonic 19 Phase 2	679	uint16_t	03H	RO	%
81	Current Harmonic 21 Phase 2	680	uint16_t	03H	RO	%
82	Current Harmonic 23 Phase 2	681	uint16_t	03H	RO	%
83	Current Harmonic 25 Phase 2	682	uint16_t	03H	RO	%
84	Current Harmonic 27 Phase 2	683	uint16_t	03H	RO	%
85	Current Harmonic 29 Phase 2	684	uint16_t	03H	RO	%
86	Current Harmonic 31 Phase 2	685	uint16_t	03H	RO	%
87	Current Harmonic 1 Phase 3	686	uint16_t	03H	RO	%
88	Current Harmonic 3 Phase 3	687	uint16_t	03H	RO	%
89	Current Harmonic 5 Phase 3	688	uint16_t	03H	RO	%
90	Current Harmonic 7 Phase 3	689	uint16_t	03H	RO	%
91	Current Harmonic 9 Phase 3	690	uint16_t	03H	RO	%
92	Current Harmonic 11 Phase 3	691	uint16_t	03H	RO	%
93	Current Harmonic 13 Phase 3	692	uint16_t	03H	RO	%
94	Current Harmonic 15 Phase 3	693	uint16_t	03H	RO	%
95	Current Harmonic 17 Phase 3	694	uint16_t	03H	RO	%
96	Current Harmonic 19 Phase 3	695	uint16_t	03H	RO	%
97	Current Harmonic 21 Phase 3	696	uint16_t	03H	RO	%
98	Current Harmonic 23 Phase 3	697	uint16_t	03H	RO	%
99	Current Harmonic 25 Phase 3	698	uint16_t	03H	RO	%
100	Current Harmonic 27 Phase 3	699	uint16_t	03H	RO	%
101	Current Harmonic 29 Phase 3	700	uint16_t	03H	RO	%
102	Current Harmonic 31 Phase 3	701	uint16_t	03H	RO	%

Energy Measurements						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Total T1 Import Active Energy	1000	float	03H	RO	Wh
2	Total T1 Export Active Energy	1002	float	03H	RO	Wh
3	Total T1 Import Reactive Energy	1004	float	03H	RO	VArh
4	Total T1 Export Reactive Energy	1006	float	03H	RO	VArh
5	Phase 1 T1 Import Active Energy	1008	float	03H	RO	Wh
6	Phase 2 T1 Import Active Energy	1010	float	03H	RO	Wh
7	Phase 3 T1 Import Active Energy	1012	float	03H	RO	Wh
8	Phase 1 T1 Export Active Energy	1014	float	03H	RO	Wh
9	Phase 2 T1 Export Active Energy	1016	float	03H	RO	Wh
10	Phase 3 T1 Export Active Energy	1018	float	03H	RO	Wh
11	Phase 1 T1 Import Reactive Energy	1020	float	03H	RO	VArh
12	Phase 2 T1 Import Reactive Energy	1022	float	03H	RO	VArh
13	Phase 3 T1 Import Reactive Energy	1024	float	03H	RO	VArh
14	Phase 1 T1 Export Reactive Energy	1026	float	03H	RO	VArh
15	Phase 2 T1 Export Reactive Energy	1028	float	03H	RO	VArh
16	Phase 3 T1 Export Reactive Energy	1030	float	03H	RO	VArh
17	Total T11. Quadrant Reactive Energy	1032	float	03H	RO	VArh
18	Total T12. Quadrant Reactive Energy	1034	float	03H	RO	VArh
19	Total T13. Quadrant Reactive Energy	1036	float	03H	RO	VArh
20	Total T14. Quadrant Reactive Energy	1038	float	03H	RO	VArh
21	Phase 1 T11. Quadrant Reactive Energy	1040	float	03H	RO	VArh
22	Phase 2 T11. Quadrant Reactive Energy	1042	float	03H	RO	VArh
23	Phase 3 T11. Quadrant Reactive Energy	1044	float	03H	RO	VArh
24	Phase 1 T12. Quadrant Reactive Energy	1046	float	03H	RO	VArh
25	Phase 2 T12. Quadrant Reactive Energy	1048	float	03H	RO	VArh
26	Phase 3 T12. Quadrant Reactive Energy	1050	float	03H	RO	VArh
27	Phase 1 T13. Quadrant Reactive Energy	1052	float	03H	RO	VArh
28	Phase 2 T13. Quadrant Reactive Energy	1054	float	03H	RO	VArh
29	Phase 3 T13. Quadrant Reactive Energy	1056	float	03H	RO	VArh
30	Phase 1 T14. Quadrant Reactive Energy	1058	float	03H	RO	VArh
31	Phase 2 T14. Quadrant Reactive Energy	1060	float	03H	RO	VArh
32	Phase 3 T14. Quadrant Reactive Energy	1062	float	03H	RO	VArh
33	Total T2 Import Active Energy	1100	float	03H	RO	Wh
34	Total T2 Export Active Energy	1102	float	03H	RO	Wh
35	Total T2 Import Reactive Energy	1104	float	03H	RO	VArh
36	Total T2 Export Reactive Energy	1106	float	03H	RO	VArh

Counters						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	On Hour Counter	2000	uint32_t	03H	RO	Hour
2	Run Hour Counter	2002	uint32_t	03H	RO	Hour
3	Power Interruption Counter	2004	uint32_t	03H	RO	-

Digital Input Counters						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Digital Input Status	2250	uint32_t	03H	RO	-
2	Digital Input 1 Counters	2252	uint32_t	03H	RO	-
3	Digital Input 2 Counters	2254	uint32_t	03H	RO	-

Alarm Flags						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Alarm Flag	2500	uint32_t	03H	RO	-

7.bit	6.bit	5.bit	4.bit	3.bit	2.bit	1.bit
Power Factor Alarm	Apparent Power Alarm	Reactive Power Alarm	Aktif Power Alarm	Frequency Alarm	Current Alarm	Voltage Alarm

Demand Measurements						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	*PD Phase 1 Current	3000	float	03H	RO	A
2	*PD Phase 2 Current	3002	float	03H	RO	A
3	*PD Phase 3 Current	3004	float	03H	RO	A
4	*PD Total Current	3006	float	03H	RO	A
5	*PD Total Import Active Power	3008	float	03H	RO	W
6	*PD Total Export Active Power	3010	float	03H	RO	W
7	*PD Total Import Reactive Power	3012	float	03H	RO	VAr
8	*PD Total Export Reactive Power	3014	float	03H	RO	VAr
9	*PD Total Apparent Power	3016	float	03H	RO	VA
10	**MD Phase 1 Current	3018	float	03H	RO	A
11	**MD Phase 2 Current	3020	float	03H	RO	A
12	**MD Phase 3 Current	3022	float	03H	RO	A
13	**MD Total Current	3024	float	03H	RO	A
14	**MD Total Import Active Power	3026	float	03H	RO	W
15	**MD Total Export Active Power	3028	float	03H	RO	W
16	**MD Total Import Reactive Power	3030	float	03H	RO	VAr
17	**MD Total Export Reactive Power	3032	float	03H	RO	VAr
18	**MD Total Apparent Power	3034	float	03H	RO	VA

*PD: Demand data measured at the end of the previous demand period.

**MD: It is the maximum of the demand data measured in the device.

Maximum - Minimum Data						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Minimum Phase 1 Voltage	4000	float	03H	RO	V
2	Minimum Phase 2 Voltage	4002	float	03H	RO	V
3	Minimum Phase 3 Voltage	4004	float	03H	RO	V
4	Minimum Phase 1 Current	4006	float	03H	RO	A
5	Minimum Phase 2 Current	4008	float	03H	RO	A
6	Minimum Phase 3 Current	4010	float	03H	RO	A
7	Minimum Phase 1 Active Power	4012	float	03H	RO	W
8	Minimum Phase 2 Active Power	4014	float	03H	RO	W
9	Minimum Phase 3 Active Power	4016	float	03H	RO	W
10	Minimum Phase 1 Reactive Power	4018	float	03H	RO	VAr
11	Minimum Phase 2 Reactive Power	4020	float	03H	RO	VAr
12	Minimum Phase 3 Reactive Power	4022	float	03H	RO	VAr
13	Minimum Phase 1 Apparent Power	4024	float	03H	RO	VA
14	Minimum Phase 2 Apparent Power	4026	float	03H	RO	VA
15	Minimum Phase 3 Apparent Power	4028	float	03H	RO	VA
16	Minimum Frequency	4030	float	03H	RO	Hz
17	Minimum Phase-Phase Voltage V12	4032	float	03H	RO	V
18	Minimum Phase-Phase Voltage V23	4034	float	03H	RO	V
19	Minimum Phase-Phase Voltage V31	4036	float	03H	RO	V
20	Minimum Neutral Current	4038	float	03H	RO	A
21	Minimum Phase 1 Power Factor	4040	float	03H	RO	-
22	Minimum Phase 2 Power Factor	4042	float	03H	RO	-
23	Minimum Phase 3 Power Factor	4044	float	03H	RO	-
24	Maximum Phase 1 Voltage	4046	float	03H	RO	V
25	Maximum Phase 2 Voltage	4048	float	03H	RO	V
26	Maximum Phase 3 Voltage	4050	float	03H	RO	V
27	Maximum Phase 1 Current	4052	float	03H	RO	A
28	Maximum Phase 2 Current	4054	float	03H	RO	A
29	Maximum Phase 3 Current	4056	float	03H	RO	A
30	Maximum Phase 1 Active Power	4058	float	03H	RO	W
31	Maximum Phase 2 Active Power	4060	float	03H	RO	W
32	Maximum Phase 3 Active Power	4062	float	03H	RO	W
33	Maximum Phase 1 Reactive Power	4064	float	03H	RO	VAr
34	Maximum Phase 2 Reactive Power	4066	float	03H	RO	VAr
35	Maximum Phase 3 Reactive Power	4068	float	03H	RO	VAr
36	Maximum Phase 1 Apparent Power	4070	float	03H	RO	VA
37	Maximum Phase 2 Apparent Power	4072	float	03H	RO	VA
38	Maximum Phase 3 Apparent Power	4074	float	03H	RO	VA
39	Maximum Frequency	4076	float	03H	RO	Hz
40	Maximum Phase-Phase Voltage V12	4078	float	03H	RO	V
41	Maximum Phase-Phase Voltage V23	4080	float	03H	RO	V
42	Maximum Phase-Phase Voltage V31	4082	float	03H	RO	V
43	Maximum Neutral Current	4084	float	03H	RO	A
44	Maximum Phase 1 Power Factor	4086	float	03H	RO	-
45	Maximum Phase 2 Power Factor	4088	float	03H	RO	-
46	Maximum Phase 3 Power Factor	4090	float	03H	RO	-

Communication Configuration						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Slave ID	10000	uint32_t	03H/10H	R/W	1-247
2	Baudrate	10002	uint32_t	03H/10H	R/W	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600
3	Parite	10004	uint32_t	03H/10H	R/W	0 = None 1 = Odd 2 = Even
4	Stop Bit	10006	uint32_t	03H/10H	R/W	0=1 /// 1=2
5	Data Type	10008	uint32_t	03H/10H	R/W	0 = Big Endian 1 = Little Endian 2 = Big Endian Byte Swap 3 = Little Endian Byte Swap

Digital Output Configuration						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Output 1 Source	10100	uint32_t	03H/10H	R/W	0 = Import Active 1 = Export Active 2 = Import Reactive 3 = Export Reactive
2	Output 1 Value	10102	uint32_t	03H/10H	R/W	1-9
3	Output 1 Multiplier	10104	uint32_t	03H/10H	R/W	0 = 1/1000 1 = 1/100 2 = 1/10 3 = 1 4 = 10x 5 = 100x 6 = 1000x
4	Output 1 Duration	10106	uint32_t	03H/10H	R/W	30-2500
5	Output 2 Source	10108	uint32_t	03H/10H	R/W	0 = Import Active 1 = Export Active 2 = Import Reactive 3 = Export Reactive
6	Output 2 Value	10110	uint32_t	03H/10H	R/W	1-9
7	Output 2 Multiplier	10112	uint32_t	03H/10H	R/W	0 = 1/1000 1 = 1/100 2 = 1/10 3 = 1 4 = 10x 5 = 100x 6 = 1000x
8	Output 2 Duration	10114	uint32_t	03H/10H	R/W	30-2500

Digital Input Configuration

Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Input 1 Source	10300	uint32_t	03H/10H	R/W	0 = Counter 1 = Tariff
2	Input 1 Delay	10302	uint32_t	03H/10H	R/W	100-2500
3	Input 1 Edge	10304	uint32_t	03H/10H	R/W	0 = Rising 1 = Falling 2 = Both
4	Input 2 Source	10306	uint32_t	03H/10H	R/W	0 = Counter 1 = Tariff
5	Input 2 Delay	10308	uint32_t	03H/10H	R/W	100-2500
6	Input 2 Edge	10310	uint32_t	03H/10H	R/W	0 = Rising 1 = Falling 2 = Both

Network Configuration

Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	CT Primary	10400	float	03H/10H	R/W	5-9999
2	CT Secondary	10402	uint32_t	03H/10H	R/W	0 = CT1 /// 1 = CT5
3	VT Primary	10404	float	03H/10H	R/W	100-9999
4	VT Secondary	10406	float	03H/10H	R/W	100-500
5	System Frequency	10408	uint32_t	03H/10H	R/W	0 = 50 Hz 1 = 60 Hz
6	Connection Type	10410	uint32_t	03H/10H	R/W	0 = 3P4W 1 = 3P3W
7	Demand Period	10412	uint32_t	03H/10H	R/W	1-60
8	Transformer Option	10414	uint32_t	03H/10H	R/W	0 = OFF /// 1 = ON

Alarm Configuration

Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Alarm Low Limit	10700	float	03H/10H	R/W	0 = Voltage (0-500) 1 = Current (0-6) 2 = Frequency (45-65) 3 = Active Power (0-3000) 4 = Reactive Power (0-3000) 5 = Apparent Power (0-3000) 6 = Power Factor (0.00-1.00)
2	Alarm High Limit	10702	float	03H/10H	R/W	0 = Voltage (0-500) 1 = Current (0-6) 2 = Frequency (45-65) 3 = Active Power (0-3000) 4 = Reactive Power (0-3000) 5 = Apparent Power (0-3000) 6 = Power Factor (0.00-1.00)
3	Alarm Gecikme	10704	uint32_t	03H/10H	R/W	1-600 (sec)
4	Alarm Hysteresis	10706	float	03H/10H	R/W	0-20 (%)
5	Alarm Output	10708	uint32_t	03H/10H	R/W	0 = No Out 1 = Röle 1 2 = Röle 2

Read / Write Alarm Configuration						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	Alarm Parameter	10750	uint32_t	03H/10H	R/W	0 = Voltage 1 = Current 2 = Frequency 3 = Active Power 4 = Reactive Power 5 = Apparent Power 6 = Power Factor

GENERAL COMMANDS						
Item	Parameter	Modbus Address	Data Type	Function	Read (R)/ Write (W)	Unit
1	MODBUS READ PASSWORD	11000	uint32_t	16H	WO	Device Pass* (*Default 1)
2	Device Restart	11000	uint16_t	06H	WO	31488
3	Save Configuration and Restart	11000	uint16_t	06H	WO	31489
4	Default Configuration	11000	uint16_t	06H	WO	31490
5	Default Configuration and Restart	11000	uint16_t	06H	WO	31491
6	Clear Min-Max Data	11000	uint16_t	06H	WO	31492
7	Clear Demand Data	11000	uint16_t	06H	WO	31493
8	Clear Energy Data	11000	uint16_t	06H	WO	31494
9	Clear Counters Data	11000	uint16_t	06H	WO	31495
10	Clear All	11000	uint16_t	06H	WO	31496

POWYS 4&5 RD

SECTION 5
FACTORY SETTINGS

Network Settings			
Parameter	Factory Default	Unit	Settings Range/Values
CT Primary	5	-	5-9999
CT Secondary	5	-	1/5
VT Primary	230	-	100-999
VT Secondary	230	-	100-500
System Frequency	50	Hz	50/60
Connection Type	3P4W	-	3P4W / 3P3W
Demand Period	15	dk	1-60
Transformer Option	On	-	On / Off

Communication Settings			
Parameter	Factory Default	Unit	Settings Range/Values
Slave ID	1	-	1-247
Baudrate	38400	-	1200 / 4800 / 9600 / 19200 / 38400 / 57600
Parity	Yok	-	None / Odd / Even
Stop Bit	1	-	1 / 2
Data Type	BE	-	BE / LE / BESP / LESP

Digital Input Settings			
Parameter	Factory Default	Unit	Settings Range/Values
Digital Input 1			
Source	Tariff	-	Tariff / Counter
Delay	500	msec	100-2500
Edge	Rise	-	Rise / Fall / Both
Digital Input 2			
Source	Counter	-	Tariff / Counter
Delay	500	msec	100-2500
Edge	Rise	-	Rise / Fall / Both

Digital Output Settings			
Parameter	Factory Default	Unit	Settings Range/Values
Digital Output 1			
Source	Import Active	-	I. Active / I. Reactive / E. Active / E. Reactive
Value	1	-	1-9
Multiplier	1	-	1- 10 (M10)- 100 (M100)- 1000 (M1E3)- 1/1000 (D1E3)- 1/100 (D100)- 1/10 (D10)
Duration	500	msec	30-2500
Digital Output 2			
Source	Import Reactive	-	I. Active / I. Reactive / E. Active / E. Reactive
Value	1	-	1-9
Multiplier	1	-	1- 10 (M10)- 100 (M100)- 1000 (M1E3)- 1/1000 (D1E3)- 1/100 (D100)- 1/10 (D10)
Duration	500	msec	30-2500

Security Settings			
Parameter	Factory Default	Unit	Settings Range/Values
Activation	Off	-	Off / On
Password	0001	-	0001-9999

Alarm Settings			
Parameter	Factory Default	Unit	Settings Range/Values
Voltage (V)			
Low Limit	0	V	0-500
High Limit	0	V	0-500
Delay	5	sec	1-600
Hysteresis	5	%	5-20
Relay Assignment	Off	-	Off / On
Current (I)			
Low Limit	0.00	A	0.00 - 6.00
High Limit	0.00	A	0.00 - 6.00
Delay	5	sec	1-600
Hysteresis	5	%	5-20
Relay Assignment	Off	-	Off / On
Frequency (F)			
Low Limit	0	Hz	45-65
High Limit	0	Hz	45-65
Delay	5	sec	1-600
Hysteresis	5	%	5-20
Relay Assignment	Off	-	Off / On
Active Power (P)			
Low Limit	0	W	0-3000
High Limit	0	W	0-3000
Delay	5	sec	1-600
Hysteresis	5	%	5-20
Relay Assignment	Off	-	Off / On
Reactive Power (Q)			
Low Limit	0	VA _r	0-3000
High Limit	0	VA _r	0-3000
Delay	5	sec	1-600
Hysteresis	5	%	5-20
Relay Assignment	Off	-	Off / On
Apparent Power (S)			
Low Limit	0	VA	0-3000
High Limit	0	VA	0-3000
Delay	5	sec	1-600
Hysteresis	5	%	5-20
Relay Assignment	Off	-	Off / On
Power Factor (PF)			
Low Limit	0.00	-	0.00-1.00
High Limit	0.00	-	0.00-1.00
Delay	5	sec	1-600
Hysteresis	5	%	5-20
Relay Assignment	Off	-	Off / On

POWYS 4&5 RD

SECTION 6
TECHNICAL
SPECIFICATIONS

TECHNICAL SPECIFICATIONS	
Supply	
Voltage	85..300V AC/DC
Frequency	45..65 Hz
Measurement Inputs	
Voltage	10..300V RMS (L-N)
Current	0.05..6A RMS
Frequency	45..65 Hz
Relay Outputs (Optionally 2 pcs)	
Max. Switching Current	5A
Max. Switching Voltage	250 VAC
Max. Switching Power	1250 VA
Digital Input (Optionally 2 pcs)	
Input Type	Dry Contact
Digital Output (Optionally 2 pcs)	
Voltage	5..30V DC
Current	50mA
Insulation	3750V RMS
Demand Period	
1-60 dk (Adjustable)	
Ambient Conditions	
Operating Temperature	-25°C..+70°C
Storing Temperature	-30°C..+80°C
Humidity	Max. %95, no condensation
Dimensions	
Width	96 mm
Height	96 mm
Depth	45 mm
Protection Class	
Front Side	IP54
Back Side	IP20
Power Consumption	
Power Consumption	<3VA

Measurement Accuracy				
Symbol	Measured Parameter	Class according to IEC 61557-12	Measuring Range	Other Standards
P	Total Active Power	1	1 % $I_n \leq I \leq I_{max}$ 0,5 Ind to 0,8 Cap	
QV	Total Reactive Power	1	2 % $I_n \leq I \leq I_{max}$ 0,25 Ind to 0,25 Cap	
SA	Total Apparent Power	1	2% $I_n \leq I \leq I_{max}$	
EA	Total Active Energy	1	0 to 9999 MWh	IEC 62053-22 Class 1
ErV	Total Reactive Energy	2	0 to 9999 MVarh	IEC 62053-23 Class 2
f	Frequency	0,2	45 – 65 Hz	
I	Current	0,5	10 % $I_n \leq I \leq I_{max}$	
INc	Neutral Current (calculated)	0,5	10 % $I_n \leq I \leq I_{max}$	
U	Voltage	0,5	$U_{min} \leq U \leq U_{max}$	
PFA	Power Factor	0,2	0,5 Ind to 0,8 Cap	
THDV	Voltage total harmonic distortion	1	0 % to 20 %	
THDI	Current total harmonic distortion	1	0 % to 100 %	

Klemsan



Yurtiçi ve yurtdışı tüm şubeler için QR kodu okutunuz.

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