



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical Information

EngyVolt RV12 and RV15

Multifunction electrical energy meters
for top-hat rail installation or panel mounting



Application

For measuring voltage, frequency, current, power, as well as imported and exported active and reactive power

- in low-voltage systems with a maximum nominal voltage of 500 V L-L (289 V L/N)
- in single-phase and three-phase power systems with 3 or 4 wires

Your benefits

- Multifunction
- Pulse output and/or MODBUS module
- Top-hat rail installation or panel mounting
- Easy to use

Function and system design

Measuring principle

The multifunction electrical energy meters are designed to record, display and transmit electrical measured values in low-voltage systems with a maximum nominal voltage of 500 V L-L (289 V L/N), current connected via low-voltage current converter $\times/5$ A at a nominal frequency of 45 to 66 Hz. They are suitable for use in single-phase power systems, and in three-phase power systems with three or four wires.

Among other values, the multifunction electrical energy meters measure the voltage, frequency, current, power, power factor, total harmonic distortion (THD) as well as active power and reactive power.

The EngyVolt RV12 with housing according to DIN 43880 is designed for mounting on a top-hat rail, while the EngyVolt RV15 is designed for installation in a panel.

Input

Measured variable

Measured process variables

Current (L1, L2, L3,), voltage (L1/N, L2/N, L3/N or L1/L2, L2/L3, L3/L1 respectively), frequency in low-voltage systems

Calculated process variables

EngyVolt RV12: active, reactive and apparent power, power factor (Cos-Phi), imported and exported active and reactive energy, total harmonic distortion (current L1, L2, L3; voltage L1/N, L2/N, L3/N or L1/L2, L2/L3, L3/L1 respectively), neutral current, max. current (L1, L2, L3, N)¹⁾, max. active power¹⁾.

EngyVolt RV15: active, reactive and apparent power, total harmonic distortion (current L1, L2, L3; voltage L1/N, L2/N, L3/N or L1/L2, L2/L3, L3/L1 respectively), active and reactive energy, neutral current, max. current (L1, L2, L3, N)¹⁾, max. active power¹⁾.

Measuring range

Nominal voltage	100 to 289 V AC L-N (173 to 500 V AC L-L)
Voltage measuring range	25 to 600 V
Maximum short-duration overvoltage	2 x nominal voltage for 1-second application repeated 5 times in 5-minute intervals
Nominal current (secondary)	5 A AC RMS
Secondary current measuring range	0.05 to 6 A
Maximum short-duration overcurrent	10 x nominal current for 1-second application repeated 5 times in 5-minute intervals
Primary current measuring range	1 to 9 999 A (per phase)
Frequency	45 to 66 Hz
Nominal power (secondary)	1 445 W (3-phase 4 325 W)
Power measuring range (secondary)	14.45 to 2 080 W (3-phase: 43.25 to 6 228 W) ¹⁾
Power measuring range (primary)	5 to 12 450 000 W (12.45 MW) ¹⁾
Power consumption voltage circuits	<0.2 VA per phase
Power consumption current circuits	<0.6 VA per phase

1) depending on CT

Energy counter

0 to 9 999 999.9 Wh, kWh, MWh / varh, kvarh, Mvarh

1) calculated from the integrated averages and representation as maximum value over an adjustable interval of 5, 8, 10, 15, 20, 30, 60 min

Output

Output signal

Pulse output

Number	EngyVolt RV12: 1 EngyVolt RV15: max. 2 (optional, via extension modules)
Contact load	50 mA maximum at 250 V AC
Version	Semiconductor relay

RS485 MODBUS

Number	EngyVolt RV12: 1 EngyVolt RV15: 1 (optional, via extension module)
Type	Two-wire, half-duplex
Baud rate	2400, 4800, 9600, 19200, 38400

Power supply

Supply voltage

AC nominal voltage	110 to 400 V AC ± 10 %
DC nominal voltage	120 to 350 V DC ± 20 %

Power consumption

5 VA

Electrical connection

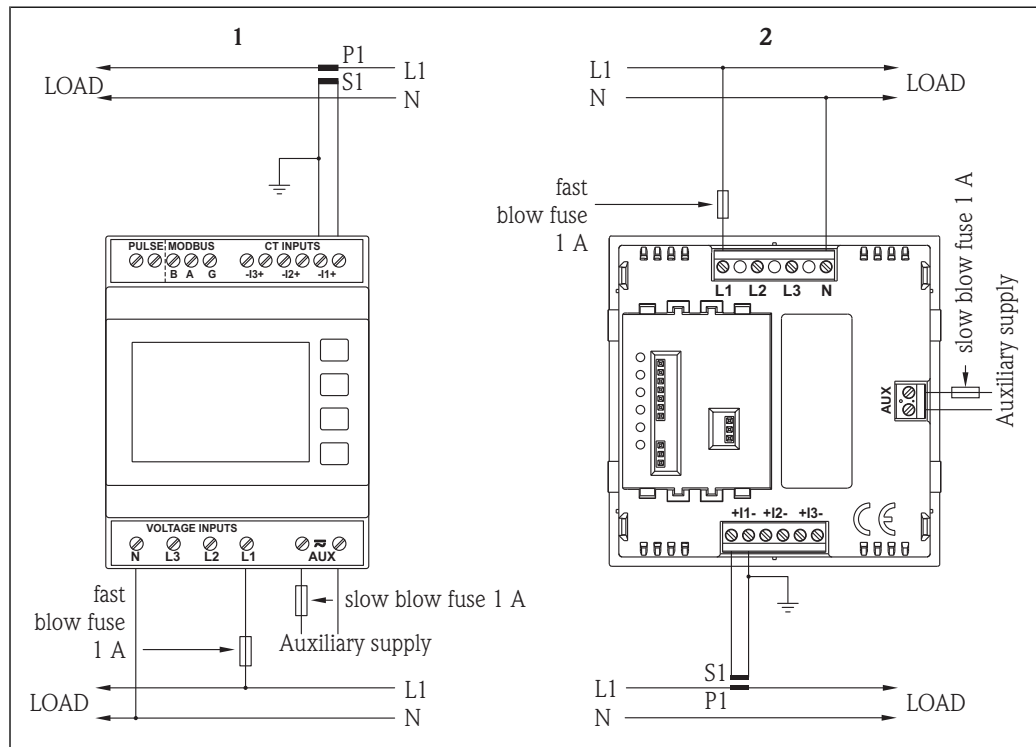


The measuring device is designed exclusively for operation on external current converters.

The multifunction EngyVolt RV12 and RV15 electrical energy meters are suitable for single-phase and three-phase power systems with 3 or 4 wires.

The "S2" secondary terminals of the current converters are connected in the electrical energy meter. Only one protective ground connection $\oplus$ is provided for this reason.

Connection to 1-phase, 2-wire



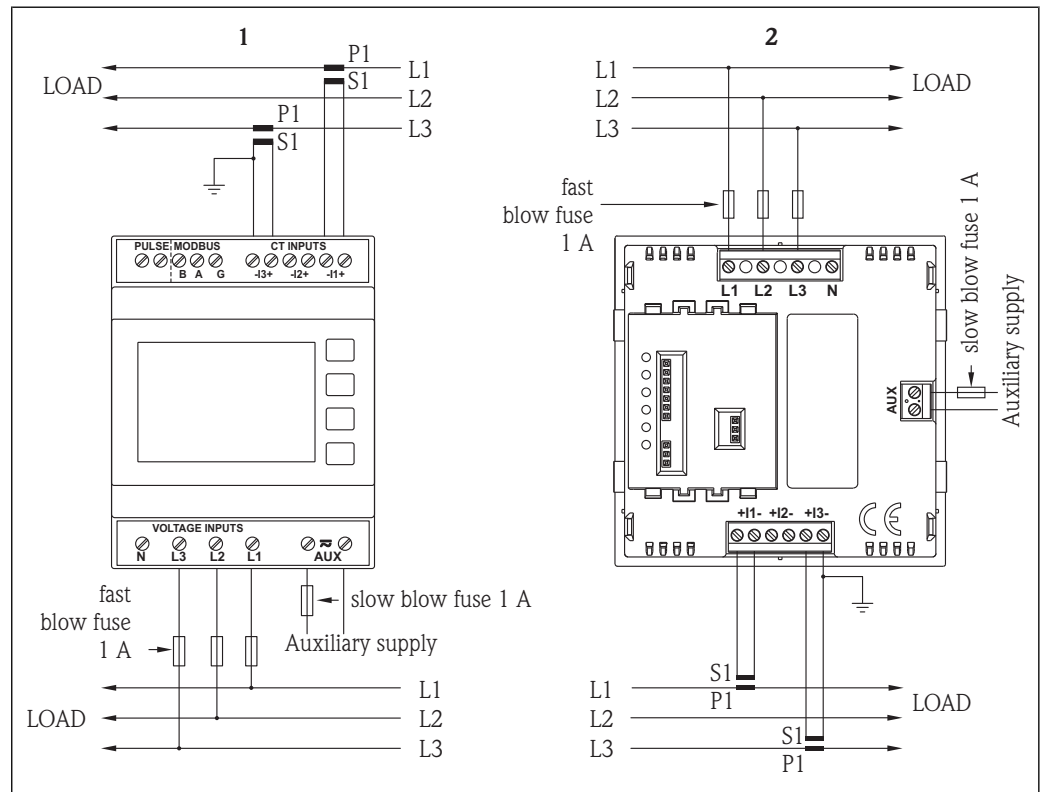
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1 Electrical connection for 1-phase, 2-wire

1 Connection for top-hat rail device

2 Connection for panel-mounted device

Connection to 3-phase, 3-wire



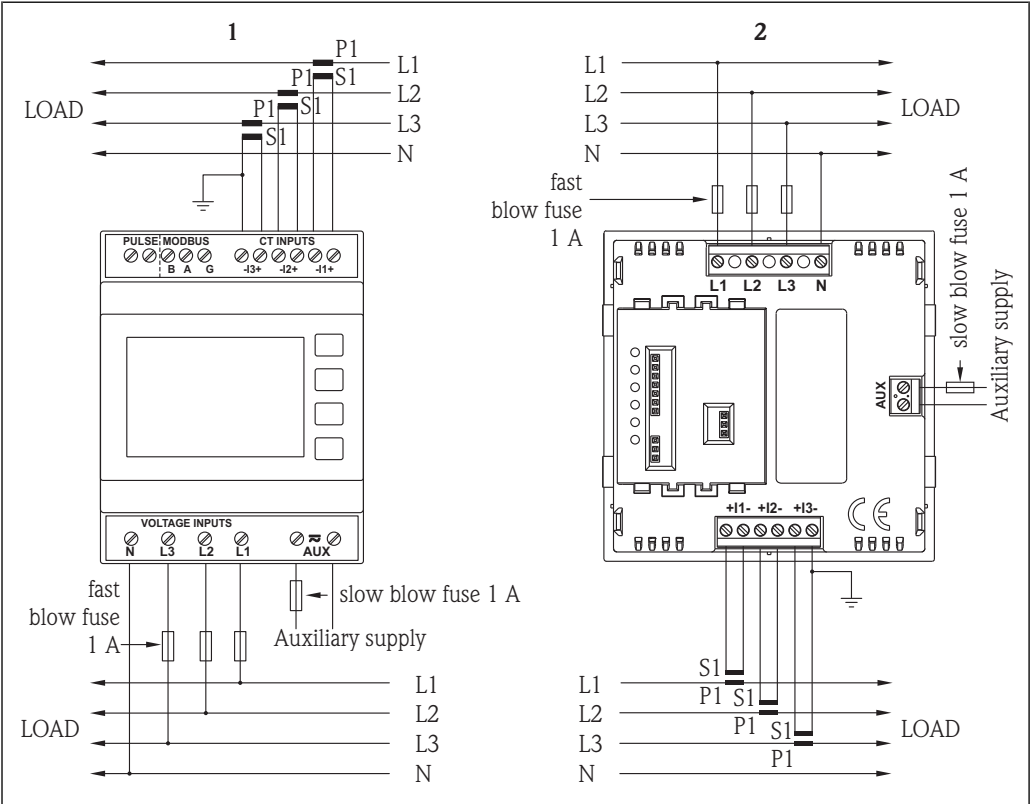
A0016366-EN

2 Electrical connection for 3-phase, 3-wire

1 Connection for top-hat rail device

2 Connection for panel-mounted device

Connection to 3-phase, 4-wire

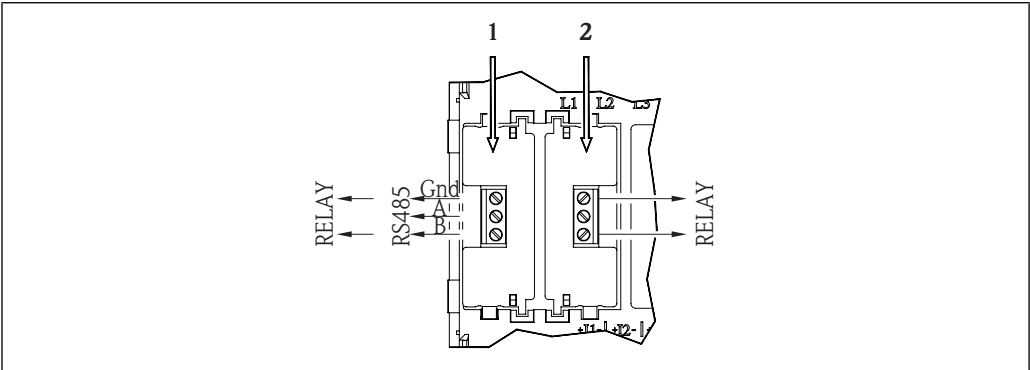


A0016367-EN

3 Electrical connection for 3-phase, 4-wire

- 1 Connection for top-hat rail device
- 2 Connection for panel-mounted device

Connection of extension modules for EngyVolt RV15



A0016374-EN

4 Extension module connection

- 1 RS485 / pulse module
- 2 Pulse module

Terminals

Screw-clamp terminals 0.05 to 2.5 mm² (30 to 14 AWG)

Performance characteristics

Reference operating conditions	Reference temperature	23 °C ±1 °C (73.4 °F ±1.8 °F)
	Input wave form	50 or 60 Hz ±2 %
		Sinusoidal (distortion factor < 0.005)
	Supply voltage	Nominal voltage ±1 %
	Supply voltage frequency (with AC)	Nominal frequency ±1 %
	Supply voltage wave form	Sinusoidal (distortion factor < 0.05)

Maximum measured error Extended measured error: IEC 688: 1992

Current (A)	0.5 % of nominal current
Voltage (V)	0.5 % of max. nominal voltage (4 % for I2 in 3-phase 3-wire operation)
Calculated neutral current (A)	4 % of nominal current
Frequency (Hz)	0.1 Hz
Power factor (PF = Cos-Phi)	0 to 1 Power factor is only indicated when the measured VA is over 3 % of range maximum
Active power (W)	±1 % of nominal power
Reactive power (var)	±1 % of nominal power
Apparent power (VA)	±1 % of nominal power
Active energy (kWh)	Class 1 (IEC 62053-21)
Reactive energy (kvarh)	±1 % of measuring range
THD	1 % up to 31st harmonic

Display repetition rate

1 s typically up to >99 % of the full scale value

Measurement and calculation interval

Max. 300 ms (maximum with %THD measurement)

Influence of ambient temperature	Current and voltage: 0.013 %/°C (0.0072 %/°F) of nominal value
	Power: 0.018 %/°C (0.01 %/°F) of measuring range

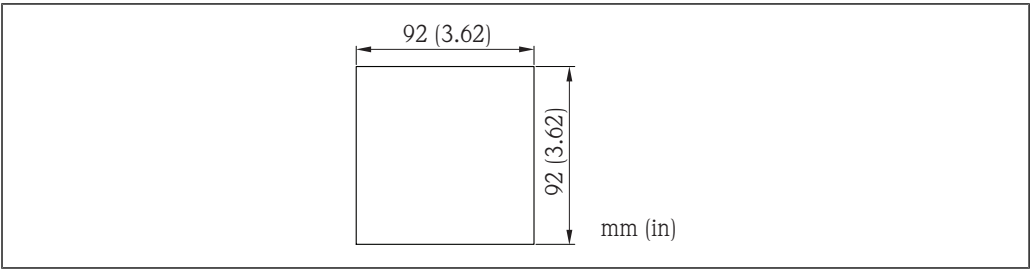
Error change due to variation of an influence quantity in the manner described in Section 6 of IEC 688:1992 2 x error allowed for the reference condition applied in the test. Error due to temperature variation as above.

Error in measurement when a measurand is within its measuring range, but outside its reference range 2 x error allowed at the end of the reference range adjacent to the section of the measuring range, where the measurand is currently operating / being tested.

Warm-up period 1 minute

Installation

Mounting location	EngyVolt RV12 Housing for top hat rail mounting as per DIN 43880
	EngyVolt RV15 Housing for panel installation as per DIN 96, max. panel thickness 5 mm (0.2 in) The device is secured using the snap-on fastening unit which is integrated in the housing. When mounting, make sure there is sufficient room to connect cables and wires on all sides of the measuring device.



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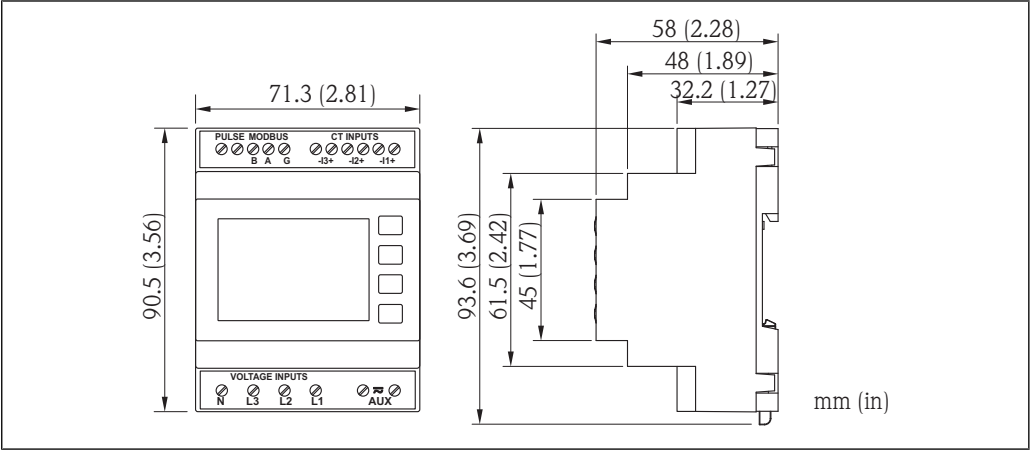
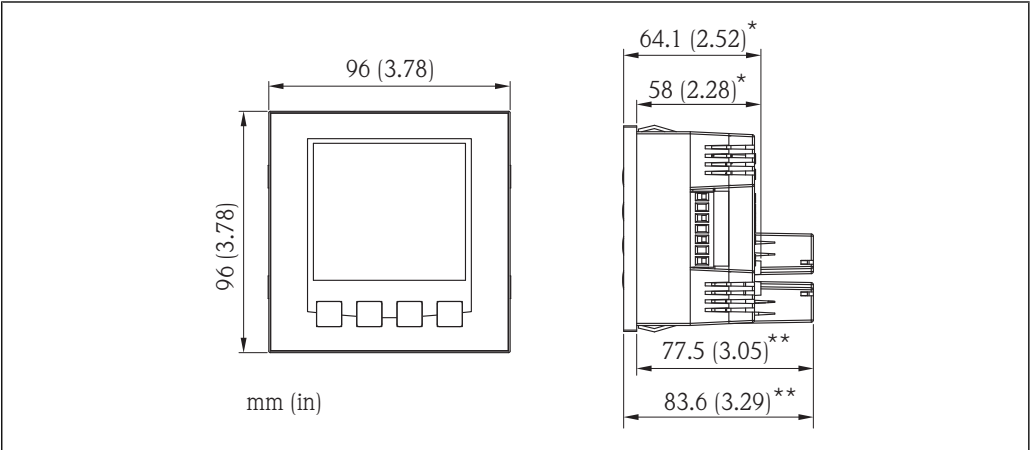
 5 Dimensions for panel cutout

Orientation	Vertical
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Environment

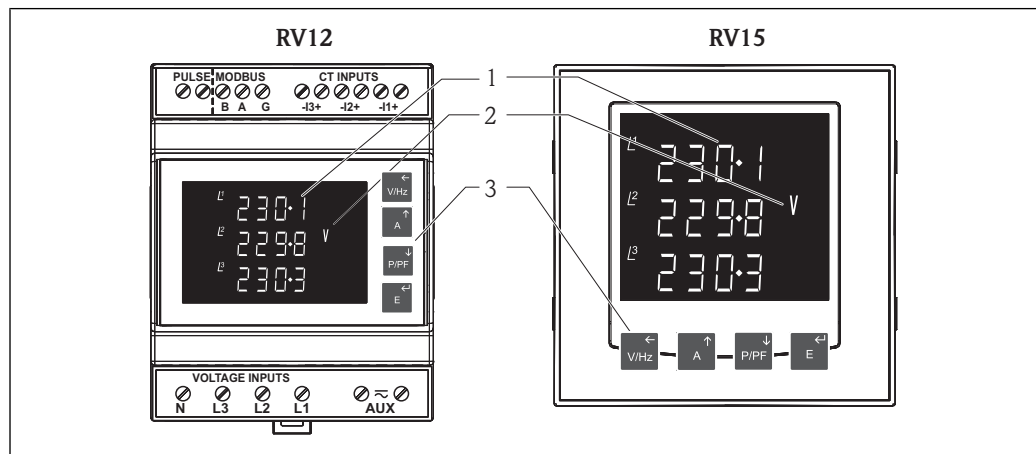
Ambient temperature range	−10 to 55 °C (14 to 131 °F)	
Storage temperature	−20 to 70 °C (−4 to 158 °F)	
Humidity	0 to 90 %, non-condensing	
Altitude	Up to 2000 m (6560 ft)	
Degree of protection	EngyVolt RV12	EngyVolt RV15
	IP30 minimum	Degree of protection at front IP52
		Degree of protection at rear IP30
Shock resistance	30 g in 3 planes	
Vibration resistance	10 to 50 Hz, IEC 60068-2-6, 2 g	
Electromagnetic compatibility	EMC emissions: BS EN 61326, Class A	
	Interference immunity: BS EN 61326, Class A	
Dielectric strength	3.25 kV for 1 minute between communication outputs and measuring inputs, communication outputs and supply voltage. Supply voltage and measuring inputs	

Mechanical construction

Dimensions	EngyVolt RV12 (top-hat rail)  6 Device dimensions A0016363 EngyVolt RV15 (panel-mounted)  7 Device dimensions * Basic device ** Basic device with extension module Panel thickness 1 to 5 mm (0.04 to 0.2 in.) A0016361 <tr><td>Weight</td><td>300 g (0.66 lb)</td></tr> <tr><td>Materials</td><td>Polycarbonate as per UL94V0</td></tr>	Weight	300 g (0.66 lb)	Materials	Polycarbonate as per UL94V0
Weight	300 g (0.66 lb)				
Materials	Polycarbonate as per UL94V0				

Operability

Local operation



A0016505

8 Display and operating elements of the EngyVolt devices

- 1 Three-line display
- 2 Symbol for parameter displayed
- 3 Operating keys

The display screen is used in 2 operating modes:

- Display mode to indicate measured values
- Configuration mode of the multifunction electrical energy meter

Display mode

The measured values are shown on the backlit liquid crystal display. The user can call up and run through 15 different views using the operating elements on the front panel.

Configuration mode

The abbreviation for the parameter is displayed in the top display row in the configuration mode. The middle row displays the parameter value. The bottom row is used to confirm the set value of the parameter. Generally speaking, the "A" and "P/PF" keys change the value of the parameter; the "E" key confirms the change / setting and skips to the next display screen (next parameter).

Certificates and approvals

CE mark

Declaration of Conformity

The product meets the requirements of the harmonized European standards.

As such, it complies with the legal specifications of the EC directives.

The manufacturer confirms successful testing of the product by affixing to it the CE mark.

Other standards and guidelines

- IEC 60529:
Degrees of protection provided by enclosures (IP code)
- IEC 61010-1: 2001
Safety requirements for electrical equipment for measurement, control and laboratory use

Ordering information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select device → Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.endress.com/worldwide



Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Documentation

- Operating Instructions EngyVolt RV12: BA01039K/09
- Operating Instructions EngyVolt RV15: BA01040K/09
- System components brochure, "Indicators with and without control unit for field and panel mounting, power supplies, barriers, transmitters, energy managers, batch controllers, and surge arresters": FA016K/09

For more Endress+Hauser product please visit: www.ainstru.com

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