

# Energy Management Modular DC Energy analyzer Type VIM-E and VIM-X



- Modular solution based on the combination of two units: VIM-E analysis unit and VIM-X universal power supply and RS485 communication unit.

## VIM-E, DC energy analysis unit



- Instantaneous variables: V, A, W
- Instantaneous variables data format: 4-DGTs
- Energy measurements: kWh
- Energies data format: 6 DGT
- Accuracy: class 1 (kWh),  $\pm 0.5$  RDG (current/voltage)
- Direct DC current measurement up to 20A
- External shunt DC current measurement up to 1000A
- Direct DC voltage measurement up to 400V
- Auxiliary power supply from VIM-X unit
- Dimensions: 1-DIN module
- Protection degree (front): IP40

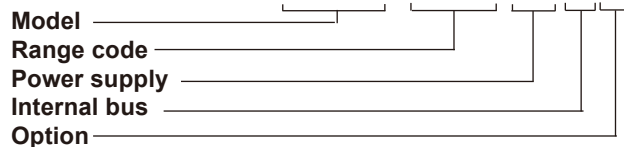
## VIM-E Product Description

DC energy analyzer unit with built-in 6 digit display and programming push-button, particularly indicated for DC current, voltage, power and energy metering. Direct connection up to 20A and with external shunt up to 1000A. Moreover the unit is provid-

ed with an auxiliary serial communication bus which is connected to the VIM-X unit so to provide an RS485 communication port. Housing for DIN-rail mounting, IP40 (front) protection degree.

## How to order

VIM-E AV00 XX X X



## Type Selection

Range code	Power supply	Internal bus	Option
<b>AV00:</b> 400V DC - 20A (Direct connection) or external shunt input for currents up to 1000A (*)	<b>XX:</b> self-power supply from VIM-X unit	<b>X:</b> internal bus compatible only to VIM-X module (*)	<b>X:</b> none

(\*) as standard.

**VIM-X, universal power supply and RS485 communication unit or static digital output**



- Power supply module for VIM-E unit
- RS485 communication port (Modbus)
- One digital output for pulse retransmission proportional to the energy being measured or for alarm control
- 38 to 265 VAC/DC power supply input
- Dimensions: 1-DIN module
- Protection degree (front): IP40

**VIM-X Product Description**

Universal power supply module suitable to be used in combination to VIM-E unit. In order to improve the communication capability of VIM-E unit, VIM-X can be

provided with either an RS485 communication port or with a static output. Housing for DIN-rail mounting, IP40 (front) protection degree.

**How to order**

**VIM-X U S1 X**



**Type Selection**

Power supply	Communication	Option	(*) as standard.
<b>U:</b> from 38 to 265VAC/DC (*)	<b>S1:</b> RS485 Modbus(*) <b>D1:</b> static digital output for pulse retransmission or alarm control (*)	<b>X:</b> none	

## VIM-E Display and LED specifications

<b>Display</b> Type Information read-out	1 line (max: 6-DGT) LCD, h 7mm From 4 to 6-DGT depending on the information.	priority on any other condition: energy consumption or communication). Green blinking light: the communication on the RS485 bus is working. Note: in case of energy counting or communication condition, the LED alternates its colour from red to green.
<b>LED</b> Type Status and colour	Dual colour Red blinking light: energy consumption; 1000 pulses/kWh (Max Frequency 16 Hz). Red steady light: alarm detected (it has the	

## VIM-X LED specification

<b>LED</b> Type	Single colour	Colour	Green: the power supply is ON.
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## VIM-E input specifications

<b>Rated inputs</b> Current input Current direct conn. range Current external shunt conn. range Voltage range	1 (internal shunt) From 0 to 20A DC From 0 to 120mV DC From 0 to 400V DC	<b>Max. and Min. indication</b>	See "VIM-E set of variables"
<b>Accuracy</b> Current direct conn. range Start up current Current external shunt conn. Start up current Voltage Start up voltage Power Energy	(@25°C ±5°C, R.H. 260%) ±(0.5%RDG+2 DGT) from 0.05A to 20A DC 50mA DC ±(0.5%RDG+2 DGT) from 0.1mV to 120mV DC 0.1mV DC ±(0.5% RDG+2 DGT) from 1V to 400V DC 10V DC ±(1% RDG+ 2DGT) ±(1% RDG)	<b>Input impedance</b> Voltage Current direct connection Current external shunt conn.	= 5MΩ < 0.006 Ω+ @0.5 Nm (screw terminal torque). > 30kΩ
<b>Temperature drift</b>	≤200ppm/°C	<b>Voltage Overloads</b> Continuous For 1s	500V 800V
<b>Measurement sampling time</b>	≤150 sec	<b>Current Overloads</b> Direct connection Continuous For 1s External shunt connection Continuous For 1s	20A DC 100A DC max 10V DC 20V DC max
<b>Key-pad</b>	1 push-button for variable scrolling and programming of the instrument working parameters.		
<b>Display read-out</b> Instantaneous variables Resolution Energy	4-DGT (V, A, W) 0.1V; 0.01A; 0.01kW (for more details see "VIM-E set of variables") Total: 6-DGT (0.1KWh)		

## VIM-X Output specifications

<b>RS485</b>			
Type	Multidrop, bidirectional (static and dynamic variables)	Type	Static: opto-mosfet;
Connections	2-wire. Max. distance 1000m	Load	V <sub>ON</sub> 2.5 VAC/DC max. 70 mA, V <sub>OFF</sub> 260 VAC/DC max.
Addresses	247, selectable by means of the front push-button	Pulse output	
Protocol	MODBUS/JBUS (RTU)	Pulse duration	≥100ms < 120msec (ON), ≥120ms (OFF)
Data (bidirectional)		Alarm output	
Dynamic (reading only)	All variables, see table "List of the variables that can be displayed and connected to ..."	Operating mode	With digital output: real alarm; with RS485: virtual alarm.
Static (writing only)	All the configuration parameters.	Alarm modes	Up alarm or down alarm
Data format	1 start bit, 8 data bit, no parity, 1 stop bit	Controlled variables	W, V, A (see the table "List of the variables that can be displayed and connected to ...")
Baud-rate	Selectable: 9600, 19200, 38400, 115200 bits/s	Set-point adjustment	Programmable on all the measuring range (see "VIM-E set of variables")
Parity	Parity: none	Hysteresis	Programmable on all the measuring range (see "VIM-E set of variables")
Driver input capability	1/5 unit load. Maximum 160 transceivers on the same bus.	On-time delay	0 to 9999s (166min)
Special functions	None	Off-time delay	0 to 9999s (166min)
Insulation	See the table "Insulation between inputs and outputs"	Min. response time	≤ 1s, set-point on-time delay: "0 s"
<b>Digital output</b>		Insulation	See the table "Insulation between inputs and outputs"
Number of outputs	1		
Purpose	Selectable either for pulse transmission proportional to the energy being measured or for alarm control on selected variable.		

## Main functions

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<b>Displaying</b>	1 variable per page. See ("VIM-E set of variables")	<b>Scaling of external shunt current input</b> Input scale  Display scale	Programmable from 0 to 120mV DC Programmable from 0 to 1000A DC
<b>Password</b>	Numeric code of max. 4 digits; 2 protection levels of the programming data: Password "0", no protection; Password from 1 to 9999, all data are protected		
1st level 2nd level			
<b>Energy reset</b>	By means of the front push-button		

## Insulation between inputs and outputs

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Module	Type of input/output	VIM-E		VIM-X	
		Measuring input	Power Supply	RS485 port	Static output
<b>VIM-E</b>	Measuring input	-	4kV	4kV	4kV
<b>VIM-X</b>	Power Supply	4kV	-	4kV	4kV
	RS485 port	4kV	4kV	-	4kV
	Static output	4kV	4kV	4kV	-

## General specifications

<b>Operating temperature</b>	-25 to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C)	<b>Immunity to conducted disturbances</b>	EN61000-4-6: 10V from 150KHz to 80MHz;
<b>Storage temperature</b>	-30 to +70°C (-22°F to 158°F) (R.H. < 90% non-condensing @ 40°C)	Surge	EN61000-4-5: 2kV on power supply; 4kV on current inputs.
<b>Installation category</b>	Cat. III (IEC 60664, EN60664)	<b>EMC (Emission) Radio frequency suppression</b>	According to EN61000-6-3 According to CISPR 22
<b>Insulation (for 1 minute)</b>	See table "Insulation between inputs and outputs"	<b>Standard compliance Safety</b>	IEC60664, IEC61010-1 EN60664, EN61010-1
<b>Dielectric strength</b>	4000 VAC RMS for 1 minute	<b>Approvals</b>	CE
<b>Noise rejection CMRR</b>	>65 dB, 45 to 65 Hz	<b>Housing Dimensions (WxHxD) Material</b>	17.5 x 90 x 67 mm Noryl, self-extinguishing: UL 94 V-0
<b>EMC (Immunity) Electrostatic discharges</b>	According to EN61000-6-2 EN61000-4-2: 8kV air discharge, 4kV contact;	<b>Mounting</b>	DIN-rail
Immunity to irradiated Electromagnetic fields	EN61000-4-3: 10V/m from 80 to 3000MHz;	<b>Protection degree Front Screw terminals</b>	IP40 IP20
Immunity to Burst	EN61000-4-4: 4kV on power lines, 2kV on single lines;		

## VIM-E connections

<b>Connections</b> Cable cross-section area Current, voltage	Screw-type  Min. 2.5 mm <sup>2</sup> , max 6 mm <sup>2</sup> in case of flexible wire, Max. 10 mm <sup>2</sup> in case of rigid wire. Min./Max. screws tightening torque: 0.5 Nm / 1.1 Nm	<b>Screw terminal purposes</b> 6/10 mm <sup>2</sup>	4 screw terminals: 1 (+) for current input, 1 (+) for current output 2 (+) external shunt input
Current shunt	Max 1.5 mm <sup>2</sup> , Min./Max. screws tightening torque: 0.4 Nm / 0.8 Nm	1.5 mm <sup>2</sup>	2 screw terminals: for negative connection
		<b>Weight</b>	Approx. 100 g (packing included)

## VIM-X connections

<b>Connections</b> Cable cross-section area	Screw-type 1.5 mm <sup>2</sup> max. Min./Max. screws tightening torque: 0.4 Nm / 0.8 Nm		nals used for static output, 2 screw terminals used for power supply
<b>Screw terminal purposes</b> 1.5 mm <sup>2</sup>	3 screw terminals used for RS485 port. 2 screw terminals used for static output,	<b>Weight</b>	Approx. 100 g (packing included)

## VIM-E power supply specifications

Power supply

Self-power supplied

through the VIM-X unit

## VIM-X power supply specifications

Power supply

38 to 265 VAC/DC

Power consumption

1.5W, 3VA (VIM-X + VIM-E)

## VIM-E set of variables

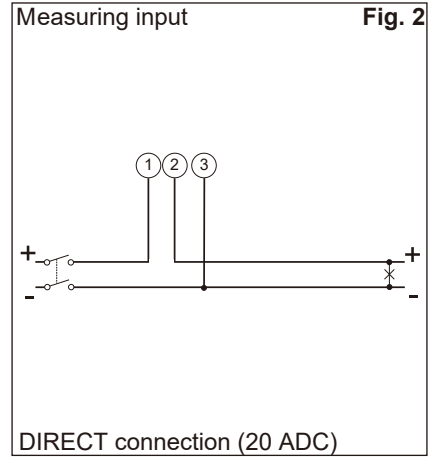
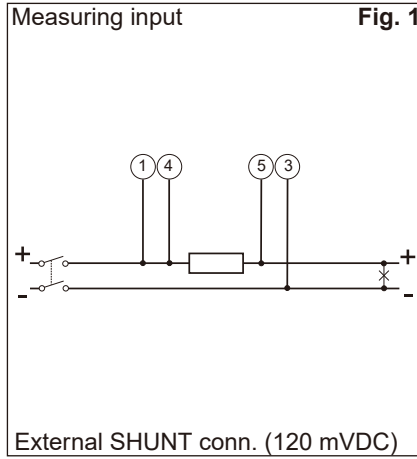
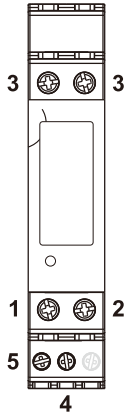
No.	Variables	Display read-out	Notes
1	V	0.0 to 999.9	
2	A	0.0 to 20.00	In case of external shunt input: 0.0 to 999.9
3	kW	0.0 to 99.99	In case of external shunt input: 0.0 to 999.9
4	kWh	0.0 to 99999.9	In case of external shunt input: 0.0 to 999999

## List of the variables that can be displayed and connected to ...

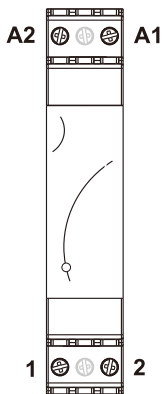
- RS485 communication port
- Alarms

No	Variable	Display	RS485	Alarm	Reset	Notes
1	V	Yes	Yes	Yes	No	
2	V min	No	Yes	No	Yes	The value is saved into E <sup>2</sup> PROM
3	V max	No	Yes	No	Yes	The value is saved into E <sup>2</sup> PROM
4	A	Yes	Yes	Yes	No	
5	A min	No	Yes	No	Yes	The value is saved into E <sup>2</sup> PROM
6	A max	No	Yes	No	Yes	The value is saved into E <sup>2</sup> PROM
7	kW	Yes	Yes	Yes	No	
8	kW min	No	Yes	No	Yes	The value is saved into E <sup>2</sup> PROM
9	kW max	No	Yes	No	Yes	The value is saved into E <sup>2</sup> PROM
10	kWh	Yes	Yes	No	Yes	The value is saved into E <sup>2</sup> PROM
11	Alarm	No	Yes	Yes	No	There is only one alarm which can be linked to the available instantaneous variables

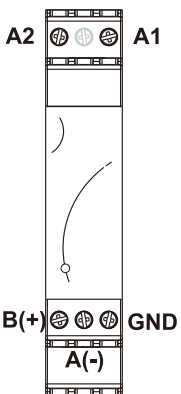
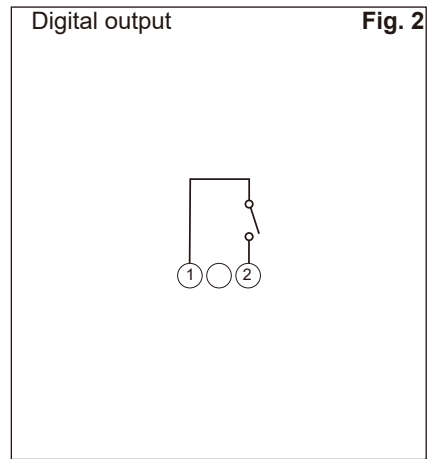
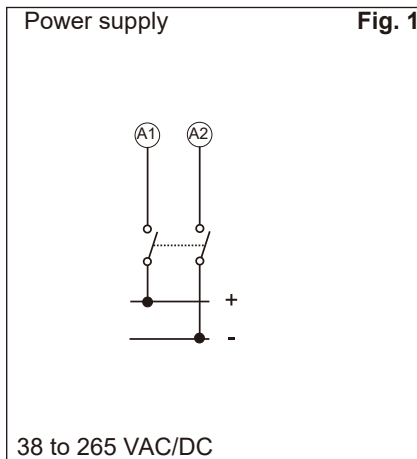
## VIM-E connections



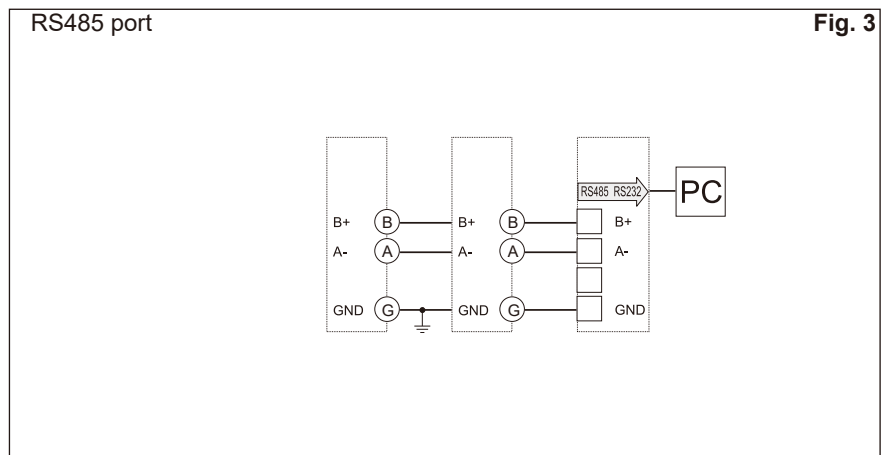
## VIM-X connections



VIM-X D1



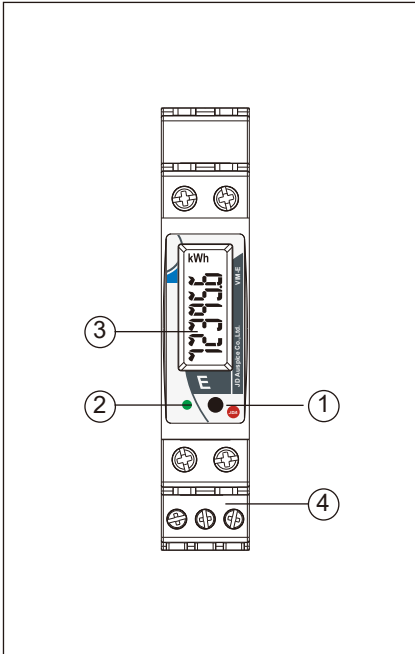
VIM-X S1





## VIM-E Frontal panel description

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**1. Push button.**

To program the configuration parameters and to scroll the variables. One key function: short time pushbutton click: variable scroll or parameter increasing. Long time pushbutton click: programming procedure entering, parameter selection confirmation.

**2. LED.**

Red blinking light: energy consumption; 1000 pulses/kWh (Max Frequency 16 Hz). Red steady light: alarm detected (it has the priority on any other condition: energy consumption or communication). Green blinking light: the communication on the RS485 bus is working. Note: in case of energy counting or communication condition, the LED alternates its colour from red to green.

**3. Display.**

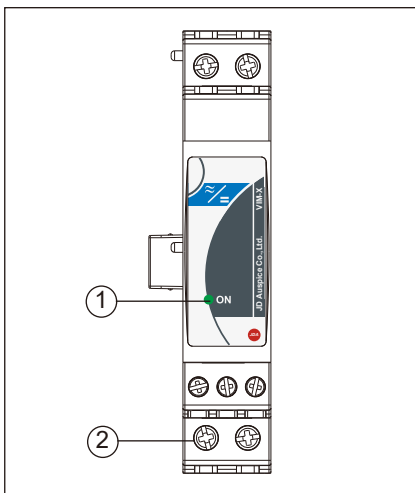
LCD-type with alphanumeric indications to:

**4. Screw terminals.**

For measuring input connections.

## VIM-X Frontal panel description

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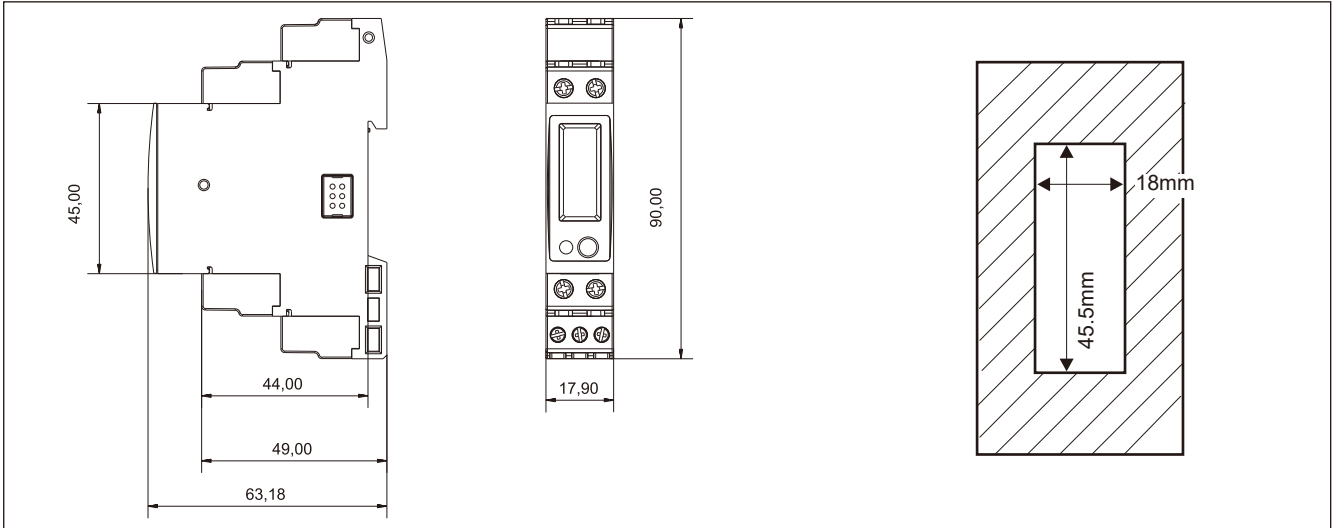
**1. LED**

Green: the power supply is ON.

**2. Screw terminals**

For power supply and either digital output or communication port connections.

### VIM-E Dimensions and panel cut-out



### VIM-X Dimensions and panel cut-out

