JDA 日煬國際事業股份有限公司
JD Auspice Co., Ltd.

stringMoni®
2011
Catalogue

VIM-ANTi VIM-M VIM-O VIM-P VIM-1 VIM-S VIM-S VIM-S

stringMoni®

Energy Management - Control solution for solar PV applications

- Modular local control system for PV plants
- Up to 16 DIN modules configuration equivalent to 280mm width
- stringMoni® Soft freeware software for easy product configuration
- stringMoni® can be formed by maximum 17 units
- stringMoni® can manage in addition to VIM-M master unit up to：
  - 1 VIM-P unit；
  - max 15VIM-S units；
  - max 7 VIM-O units；
  - max 1 VIM-1.
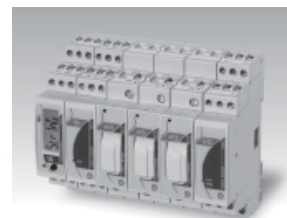
VIM-M, master module and data logger

- **Master communication capability**
- **RS485 communication port (Modbus)**
- **Local communication bus management up to 15 mixed VIM-S, VIM-P and VIM-O units**
- **Two digital inputs**
- **Two temperature inputs：Pt100 or Pt1000**
- **Single virtual or real alarm set-point connectable to any available variable**
- **Data and event stamping system**
- **Display readout：6 DGTs**
- **12 to 28 VDC power supply**
- **Dimensions：1-DIN module**
- **Protection degree (front)：IP40**

Product Description

stringMoni® is a combination of modules which performs a complete control of a photovoltaic plant. The core unit is VIM-M which performs the local bus management of VIM-S, VIM-P both measuring units and VIM-O I/O unit. VIM-M as signs the proper local unit address automatically (up to 15 units) and gathers all the local measurements coming from VIM-S and VIM-P measuring units. VIM-M can provide by means of VIM-O modules two relay outputs so to manage alarms or/and external loads (like a lighting system, a module washing system and so on) and two temperature inputs. These latter two measuring inputs can become, according to the programmed function, also two digital inputs. Housing for DIN-rail mounting, IP40 (front) protection degree.

Type Selection

Function	**4：**	Data storage 4Mbyte (*)
Power supply	**A：**	From 12 to 28VDC (*)
Communication	**S1：**	RS485 Modbus (*)
Inputs	**T2：**	two temperature inputs or two digital inputs for free of voltage reading contacts (*)
Option	**X：**	none

(*) as standard.

How to order   VIM-M 4 A S1 T2 X

Model
Function
Power supply
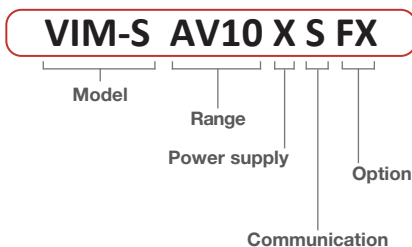Communication
Inputs
Option
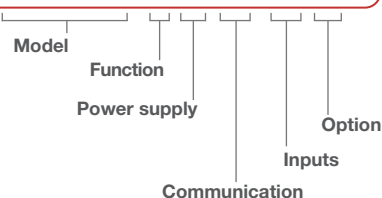
VIM-S, string measuring unit

- **Direct DC voltage measurement up to 1000V**
- **Energy measurements：kWh**
- **Direct DC current measurement up to 16A or up to 30A without fuse**
- **Instantaneous variables data format：4 DGTs**
- **Energies data format：6 DGT**
- **Instantaneous variables：V, A, W.**
- **Accuracy：Class 1 (kWh) ±0.5 RDG (current/voltage)**
- **Auxiliary power supply from VIM-M unit**
- **String alarm management by means of VIM-M unit only**
- **Fuse blow detection by means of VIM-M unit only**
- **PV module connection control by means of VIM-M unit only.**
- **Integrated 10.3x38mm fuse holder for string protection**
- **Dimensions：1-DIN module**
- **Protection degree (front)：IP40**
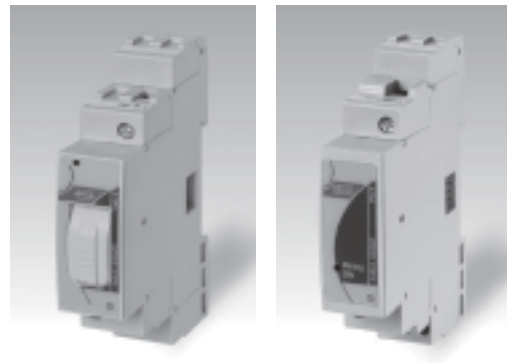
Product Description

Variables measuring unit with built-in protection fuse holder
(the fuse is not provided); particularly indicated for DC current, voltage, power and energy metering in PV solar applications. The current inputs/outputs and also the voltage inputs are made so to simplify the string common connections. Direct connection up to 16A or 30A depending on the model. Moreover the unit is provided with an auxiliary serial communication bus. Alarms, fuse blow detection, PV module connection and serial communication are managed by means of VIM-M module. Housing for DIN-rail mouning, IP40 (front) protection degree.

How to order   VIM-S AV10 X S FX

Model
Range
Power supply
Communication
Option

Type Selection

Range	**AV10：**	1000V DC, 16A (Direct connection) (*)
	AV30：	1000V DC, 30A (Direct connection) (**). In this case the"Option" is "XX".
Power supply	**X：**	from 12 to 28VDC, self-power supply from VIM-M unit
Communication	**S：**	auxiliary communicati on bus, compatible only to VIM-M module (*)
Option	**XX：**	none (no fuse holder)
	FX：	with fuse holder

(*) as standard.
(**) on request.

VIM-1, isolation enhancement unit

- **Isolation enhancement of voltage measuring inputs to earth of VIM-S: from 800VDC (without VIM-1) to 1000VDC max.**
- **Dimensions: 1-DIN module**
- **Protection degree (front): IP40**

Product Description

Isolation enhancement unit suitable to be used in combination with VIM modules. VIM-1 allows to enhance the isolation of the voltage measuring input to earth from 800Vdc to 1000Vdc. The module is to be mounted between the first VIM-S and all the other VIM modules. Housing for DIN-rail mounting, IP40 (front) protection degree.

How to order

VIM-1 1000

Standard model

Type Selection

| Standard model	**Isolation voltage 1000V:**	isolation enhancement on VIM-S voltage measuring input to earth from 800VDC (without module) to 1000VDC.

Note: only one VIM-1 is needed per stringMoni®

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VIM-P, environment variable unit

- **Measurements：PV module temperature, air temperature, sun irradiation, wind speed**
- **Two temperature inputs：Pt100 or Pt1000**
- **One 120mV or 20mA DC input with scaling capability for irradiation measurement**
- **One pulse input for wind speed measurement**
- **Auxiliary communication bus to VIM-M unit**
- **Auxiliary power supply from VIM-M unit**
- **Dimensions：1-DIN module**
- **Protection degree (front)：IP40**
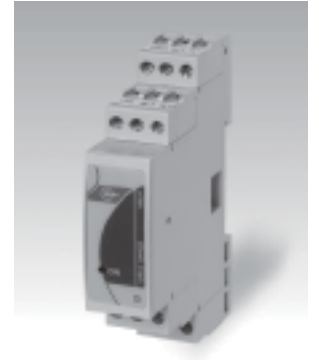
Product Description

Environment variable measurement unit particularly indicated for PV module temperature, air temperature, sun irradiation, wind speed metering in PV solar applications. Moreover the unit is provided with a specific serial communicaton bus which is managed by means of the additonal VIM-M module. Housing for DIN-rail mounng, IP40 (front) protecon degree.

Type Selection

Range	**2TIW：**	Two "Pt" temperature type probes, mV sun irradiation and wind speed measuring inputs (*)
	2TCW：	Two "Pt" temperature type probes, mA sun irradiation and wind speed measuring inputs (*)
Power supply	**X：**	from 12 to 28VDC, selfpower supply from VIM-M unit
Communication	**S：**	auxiliary communication bus, compatible only to VIM-M module (*)
Option	**Z：**	none
		(*) as standard.

How to order

VIM-P 2TIW X S X

- Model
- Range
- Power supply
- Communication
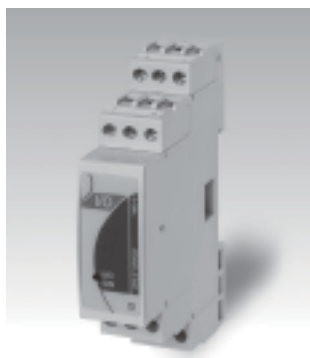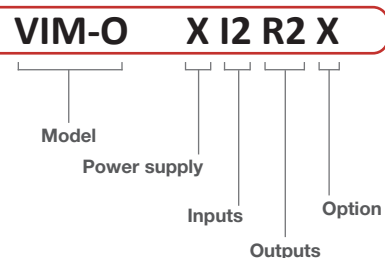- Option
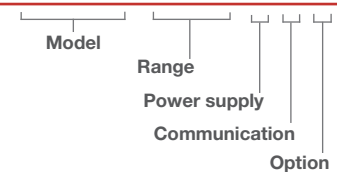
VIM-O, inputs/outputs unit

- Expansion I/O module (digital inputs and outputs)
- Two relay outputs managed by the VIM-M module
- Two digital inputs managed by the VIM-M module
- Auxiliary power supply from VIM-M module
- Dimensions：1-DIN module
- Protection degree (front)：IP40

Product Description

I/O unit suitable to be used in combination with VIM-M modules. VIM-O allows to add, for every single unit, two digital inputs and two relay outputs to a VIM-M based system. Housing for DIN-rail mounting, IP40 (front) protection degree.

How to order   VIM-O   X I2 R2 X

Model
Power supply
Inputs
Outputs
Option

Type Selection (Standard model)

Power supply	X：	from 12 to 28VDC, self-power supply from VIM-M unit
Inputs	I2：	two digital inputs (*)
Outputs	R2：	two relay output (*)
Option	X：	none

Type Selection (Antitheft model)

Power supply	X：	from 12 to 28VDC, self-power supply from VIM-M unit
Inputs	I3：	three digital inputs (*)
Outputs	R1：	one relay output (*)
Option	AT：	antitheft compability

Note:
in case of "Antitheft application" every single stringMoni[®] can manage the combination of one VIM-O.X.I3.R1.AT module and up to three VIM-O.X.I2.R2.X modules.

(*) as standard.

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# VIM-ANTi, Antitheft sensor for VIM-O with "ANTi" option

- **Plastic fibre optic sensor**
- **Sensing distance up to 200m**
- **Static output compatible with VIM-O "ANTi" option**
- **Auxiliary power supply from VIM-O "ANTi" option**
- **Dimensions: 14 x 31 x 73 mm housing**
- **Protection degree (front): IP50**

Product Description

Antitheft plastic fibre optic sensor to be used in combination with VIM-O "ANTi" I/O unit, suitable to carry out an antitheft control on PV modules which are passed by 2.2 mm plastic fibre optic. The maximum loop distance which can be covered by the sensor is 200m. Housing for DIN-rail mounting, IP50 (front) protection degree.

How to order   **VIM-ANTi X P   M C X**

- Model
- Power supply
- Plastic fibre
- 200m sensing distance
- Output
- Option
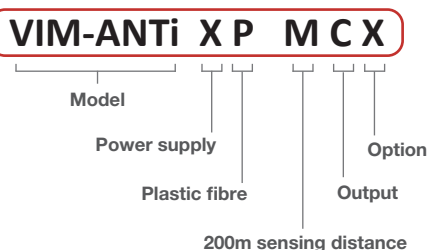
Type Selection

Power supply	**X** :	from 12 to 28VDC, self-power supply from VIM-O "ANTi" option unit	Sensing distance	**M** :	200m (*)
			Output	**C** :	open collector
Fibre optic	**FO** :	plastic (*)	Option	**M** :	none

(*) as standard.

Product Description

FO22-1000 is a specific plastic fibre optic cable which is made for VIM-ANTi sensor and is supplied in a quantity of 1000m. The working temperature is -55 to 70°C.

How to order   **FO22 1000**

- Model
- Fibre optic cable length: 1000m
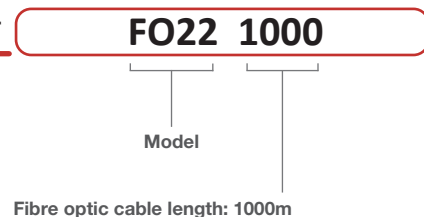
VIM-M Display and LED specification

Display

Type： LCD, h 7mm

1 line (max: 6-DGT)

Information read-out： From 4 to 6-DGT depending on the information.

LED

Type： Dual colour

Status and colour： Green steady light：the module is power supplied and there is no communication on the RS485 bus.

Green blinking light：the communication on the RS485 bus is working.

Red：alarm detected (any).

In case of alarm/communication condition the LED alternates its colour from red (alarm) to green. The blinking time is approx. 1 second.

VIM-S LED specification

LED

Type： Multicolor

Status： ON steady light：the module is power supplied and there is no alarm.

Colour AV10 range code

Green: the power supply is ON, there is a string current up to 1A; Yellow: there is a string current from 1.1 to 3A; Light orange: there is a string current from 3.1 to 6A; Orange: there is a string current from 6.1 to 8A; Dark orange: there is a string current from 8.1 to 10A; Red: there is a string current higher than 10A; White: the unit is enabled by VIM-M module for data reading and displaying. Green ⇒ OFF: module not acknowledged in the StringMoni®. Cycling from blue to any other colour listed above (from yellow to red): string alarm. Cycling from blue to green: blown fuse. Cycling from blue to violet: inverted string polarity. Cycling from white to any other colour: the unit is enabled by VIM-M module for data reading and displaying and shows the status of the module according to the colour list above. The cycling time is approx. 1 second.

Colour AV30 range code

Green: the power supply is ON, there is a string current up to 1A; Yellow: there is a string current from 1.1 to 6A; Light orange: there is a string current from 6.1 to 12A; Orange: there is a string current from 12.1 to 16A; Dark orange: there is a string current from 16.1 to 20A; Red: there is a string current higher than 20A; White: the unit is enabled by VIM-M module for data reading and displaying. Green ⇒ OFF: module not acknowledged in the StringMoni®. Cycling from blue to any other colour listed above (from yellow to red): string alarm. Cycling from blue to violet: inverted string polarity. Cycling from white to any other colour: the unit is enabled by VIM-M mod-ule for data reading and displaying and shows the status of the module according to the colour list above. The cycling time is approx. 1 second.

VIM-P LED specification

LED

Type： Multicolor

Status and colour： Green: the power supply is ON.

White: the unit is enabled by VIM-M module for data reading and displaying.

VIM-O LED specification

LED

Type：		Multicolor
Status and colour：		Green：the power supply is ON.
		White：the unit is enabled by VIM-M module for data reading and displaying.
		Red：one or both digital inputs are activated.
		Blue：one or both digital outputs are activated.
		Cycling from one colour to any other one: the unit shows the status of the module according to the colour list above.The cycling time is approx. 1 second.

VIM-ANTi LED specification

LED

Power supply status：	Green：the power supply is ON
Loop status：	Red：the optical loop is closed

VIM-M input specifications

LED

Number of inputs：	2
Working mode：	First input：detection of ON/OFF status Second input: counting of pulses coming from an energy meter
Purpose：	First input：trip of protec-tion detection, the status is transmi-tted only by means of the com-munication port. Second input：trip counter, interfacing with an energy meter (-kWh) so to measure the total efficiency of the system.
Input frequency：	20Hz max, duty cycle 50%
Pre-scaler adjustment：	From 0.001 to 10.000 kWh/pulse (only for the second input)
Contact measuring voltage：	3.3VDC
Contact measuring current：	<1mA
Contact resistance：	≤1kΩ closed contact ; ≥20kΩ open contact
Insulation：	See the table "Insulation etween inputs and out-puts"

Temperature inputs

Number of inputs：	
Temperature probe：	2
Number of wires：	Pt100, Pt1000
Wire compensation：	2 or 3-wire connection
Accuracy (Display + RS485)：	Up to 10Ω. See "Temperature input characteristics"
Temperature drift：	±150ppm/°C
Engineering unit：	Selectable °C or °F
Insulation：	See the table "Insulation between inputs and out-puts"

Key-pad

1push-button for variable scrolling and programming. Full programming can be carried out only using stringMoni® Soft.

VIM-S input specifications

Rated inputs

	Current type：	1 (shunt)
	Current range：	AV10 range：16ADC@40°C, 15A@50°C, 14A@55°C, 12A@60°C, 10A@65°C
		AV30 range：30ADC@55°C, 25ADC@60°C, 20ADC@65°C
	Voltage：	AV10 range：1000Vdc , AV30 range：1000Vdc

Accuracy

	(@25°C ±5°C, R.H. ≤60%)
AV10 range code	
Current	±(0.5%RDG+2 DGT) from 0.05A to 16A
Voltage	±(0.5%RDG+2 DGT) from 20V to 1000V
Power	±(1% RDG+ 2DGT)
Energy：	±(1% RDG)

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VIM-S input specifications (cont.)

Rated inputs

Start up current	0.05A
Start up voltage	10V
AV30 range code	
Current	±(0.5%RDG+2 DGT) from 0.2A to 30A
Voltage	±(0.5%RDG+2 DGT) from 20V to 1000V
Power	±(1%RDG+2DGT)
Energy	±(1%RDG)
Start up current	0.2A
Start up voltage	10V
Temperature drift	≤200ppm/°C
Measurement sampling time Variables format	2 sec.
	4-DGT (A, W), 5-DGT (V)
Instantaneous variables	0.1V; 0.01A; 0.01kW
Resolution	Total:5+1 DGT (0.1kwh)
Energies	
Max. and Min. data format	See "Stored set of variables coming from …
Input impedance	
AV10 range code	
Voltage	> 2.5MΩ
Current	< 0.006Ω(+ fuse impedance) @ 0.5 Nm(screw terminal torque). For current input of 16A the fuse has therefore a nominal current of 32A AC. The maximum dissipation power has not to exceed 2W
AV30 range code	
Voltage	>2.5M
Current	< 0.003Ω@0.5 Nm (screw terminal torque).

Voltage Overloads

Continuous	1100V
For 500ms	1600V
To earth	800V(extended to 1000V in case of combined use of VIM-1.1000V unit)

Current Overloads

Continuous	AV10 range: 16A , AV30 range: 30A
For 1s	AV10 range: 100A max , AV30 range: 150A max

Protection

Fuse holder	Integrated into the module
Fuse type	gPV
Fuse size	10x38mm (IEC60269-1-6)
Fuse current	Fuse NOT provided.

Note：
the fuse rated curent has to be ≥1.4 Isc at 45°C ambient temperature. See fuse manufacturer specifications for further details including de-rating caused by higher ambient temperature.

VIM-P input specifications

Temperature drift Variables format	≤200ppm/°C
Instantaneous variables	4 DGT (Temperature, solar irradiation and wind speed)
Resolution	0.1°C/0.1°F ; 1W/m² , 1W/ft² ; 0.1m/s, 0.1ft/s
Max. and Min. data format Temperature probe inputs	See "Stored set of variables coming from …
Number of inputs	2 (Input 1：PV module; Input 2：air)
Temperature probe	Pt100 or Pt1000
Number of wires	Up to 3-wire connection
Wire compensation	Up to 10Ω.
Accuracy (Display + RS485)	See table "Temperature input characteristics"
Temperature drift	±150ppm/°C
Engineering unit	Selectable°C or °F
Insulation	See the table"Insulation between inputs and communication bus"

Irradiation sensor inputs (range code: 2TIW)

Number of inputs	1
Range	0 to 120mVdc
Accuracy (@25°C ±5°C, R.H. ≤60%)	±(0.2%RDG+1DGT) 0% to 25% FS;
(Display + RS485) 25% to 120% FS.	±(0.1%RDG+1DGT)
Temperature drift Scaling factor	±150ppm/°C
Operating mode	Dual scale：Input：programmable range from 0 to 999.9(mVDC) Display：programmable range from 0.000 to 9.999 (kW/m²,kW/ft²)
Decimal point position	Fixed.
Impedance Overload	>30KΩ
Continuous	10VDC (measurement available up to 1V on both display and communication bus)
For 1s	20Vdc
Insulation	See the table "Insulation between inputs and communication bus"

Irradiation sensor input (range code: 2TCW)

Number of inputs	1
Range	0 to 20mADC
Accuracy (@25°C ±5°C, R.H. ≤60%) (Display + RS485)	±(0.2%RDG+1DGT) 0% to

VIM-P input specifications (cont.)

		Wind speed sensor inputs	
	25% FS;±(0.1%RDG+1DGT) 25% to 120% FS.	**Number of inputs**	1
Temperature drift	±150ppm/°C	**Range**	0 to 1000Hz max, duty cycle 50%
Scaling factor		**Accuracy(@25°C ± 5°C, R.H. ≤60%)**	±(0.02%RDG+1DGT) 0% to 25% FS
Operating mode	Dual scale：Input：programmable range from 0 to 25.0(mADC) Display Data format：programmable range from 0.000 to 9.999 (kW/m^2,kW/ft^2)	**(Display + RS485)**	±(0.01%RDG+1DGT) 25% to 110% FS.
		Temperature drift	±150ppm/°C
		Scaling factor	
Decimal point - position	Fixed	**Operating mode**	Dual scale：Input：programmable range from 0 to 999.9 (Hz) Display：programmable range from 0 to 299.9 (m/s,ft/s)
Impedance	≤22W	**Decimal point position**	Fixed and depending on the input /display scale.
Overload			680Ω
Continuous	50mADC (measurement available up to 25mA on both display and communication bus)	**Impedance**	2.5V$_{peak}$ to 9V$_{peak}$/
		Operating input	5mA$_{peak}$ to 35mA$_{peak}$,duty cycle 50%
For 1s	150mADC	**Impedence**	220Ω
Insulation	See the table "Insulation between inputs and communication bus"	**Overload**	
		Continuous	7V$_{RMS}$ / 25mA$_{RMS}$ (AC/DC)
		For 1s	14V$_{RMS}$ / 50mA$_{RMS}$ (AC/DC)
		Insulation	See the table "Insulation between inputs and communication bus"

VIM-M Output specifications

RS485

Type	Multidrop, bidirectional (static and dynamic variables)
Connections	2-wire. Max. distance 1000m
Addresses	247, selectable by means of the front push-button
Protocol	MODBUS /JBUS (RTU)
Data (bidirectional)	All variables, see table"Measured variables, data format and messages" in the VIM-S document
Dynamic (reading only)	All the configuration parameters.
Static (writing only)	1 start bit, 8 data bit, no parity,1 stop bit
Data format1	Selectable：9600, 19200, 38400, 115200 bits/s
Baud-rate	Parity：none
Driver input capability	1/5 unit load. Maximum 160 transceivers on the same bus.
Special functions	None
Insulation	See the table "Insulation between inputs and out puts"

Auxiliary communication bus

This is the communication bus to the VIM-S, VIM-P and VIM-O units where VIM-M performs the master function in this network.VIM-M unit can gather the following information from the bus：All variables available on the bus ; Blown protection fuse ; PV reverse voltage and current polarity.The local address in both the VIM-S, VIM-P and VIM-O units is automatically assigned by VIM-M master unit based on their positions. It can manage up to 15 different addresses (units).

Insulation	See the table "Insulation between inputs and out-puts"

VIM-O Input/Output specifications

Maximum number of modules managed by every single
VIM-M module   Up to 7
Digital inputs

Number of inputs	2
Working mode	Detection of OPEN/CLOSED contact status
Purpose	Trip of protection detection, the status is transmitted only by means of the communication port.
Input frequency	2Hz max, duty cycle 50%
Contact reading voltage	3.3VDC
Contact reading current	< 2mA
Contact resistance	≤ 300Ω closed contact ; ≥ 10kΩ open contact
Insulation	See the table "Insulation between inputs and out-puts"

Digital output

Number of outputs	2
Purpose	Alarm notification as a String alarm or as a digital input status changing (OR function); activation of a lighting system (by means of the internal clock or as a remote control); activation of a module washing system (by means of the inter-nal clock, as a remote control or as a changing of efficiency of the PV panels).
Type	Relay, SPST type AC 1-5A @ 250VAC, AC 15-1A @ 250VAC, Available by means of VIM-O module only
Insulation	See the table "Insulation between inputs and out-puts"

VIM-M and VIM-P Temperature input characteristics

Probe	Range	Accuracy	Min Indication	Max Indication
Pt100	-50°C to +200.0°C	±(0.5%RDG +5DGT)	-50.0	+200.0
Pt100	-58°F to +392°F	±(0.5%RDG +5DGT)	-58.0	+392.0
Pt1000	-50°C to +200.0°C	±(0.5%RDG +5DGT)	-50.0	+200.0
Pt1000	-58°F to +392°F	±(0.5%RDG +5DGT)	-58.0	+392.0

VIM-O with "ANTi" option, Input/Output specifications

Maximum number of module managed by every single
VIM-M module   Up to 1
Digital inputs   3

Number of inputs	Detection of ON/OFF status Detection of the output status of up to 3 VIM-ANTi
Working mode	units, the same inputs can be used also to detect standard free of voltage con-
Purpose	tacts of other devices.
Working logic	The inputs in case of Antitheft purpose selection work as an OR logic (stringMoni® Soft), if this function is not enabled every input works independe-ntly from each other.
Input frequency	2Hz max, duty cycle 50%
Contact reading voltage	3.3 Vdc
Contact reading current	< 2mA
Contact resistance	≤ 300Ω closed contact ; ≥ 10kΩ open contact
Insulation	See the table "Insulation between inputs and out-puts"

Digital output

Number of outputs	1
Purpose	Antitheft notification in case of function enabling (stringMoni® Soft) or alarm notification as a String alarm or as a digital input status changing (OR function) ; activation of a lighting system (by means of the internal clock or as a remote control) ; activation of a module washing system (by means of the internal clock, as a remote control or as a changing of efficiency of the PV modules).
Type	Relay, SPST type AC1-5A@ 250VAC, AC15-1A@250VAC
Insulation	See the table "Insulation between inputs and out puts"

VIM-ANTi Antitheft sensor specifications

Maximum number of sensors managed by every single VIM-O "AT" module   Up to 3

Optical sensing

Maximum operational distance	200m (loop)
Sensitivity	Automatic adjusted
Light source	GaAlAs, LED 660 nm
Light type	Red modulated
Operating frequency	1 Khz
Response time on fibre breaking	0.5 seconds

Fibre Optic

Material	Plastic
Diameter	2.2mm
Compatible model	PGU-CD1001-22
Working temperature	-55 to + 70°C

Digital output

Number of outputs	1
Type	Open collector
Insulation	Operational insulation only (50VACRMS)

Power Supply

Connection	12 to 28 Vdc
Cable	Lenhth：0.5m, black colour, PVC material

Main Function

Displaying

Own VIM-M module	1 parameter per page See "Stored set of vari-ables from …" and "Alarm and diagnostics messages"
When a VIM-S module is selected	All the information related to the status of the string being selected by means of the front key (see "Variable" in the table "List of the variables that can be...")
When a VIM-P module is selected	All the information related to the status of the environment probes being selected by means of the front key (see "Variable" in the table "List of the variables that can be...")
When a VIM-O module is selected	All the information related to the status of the inputs/outputs being selected by means of the front key (see "Variable" in the table "List of the variables that can be...")

Password   Numeric code of max. 4 digits; 2 protection levels of the progra-mming data:

1st level	Password"0", no protection;
2nd level	Password from 1 to 9999, all data are protected

Reset   By means of the front push-button when the relevant VIM-S is selected

Alarms

Number of alarms	One, independent for every single available variable (see the table "List of the variables that can be…")
Alarm types	Virtual alarm or real alarm
Alarm modes	Up alarm, down alarm (see the table "List of the variables that can be connected to …")
Set-point adjustment	From 0 to 100% of the display scale
Hysteresis	From 0 to full scale
On-time delay	0 to 3600s
Output status	Selectable; normally deenergized or normally energized
Min. response time	≤ 700ms, set-point on time delay: "0 s"

Main Function (Cont.)

Clock

Functions	Universal clock and calendar.
Daylight-saving enabling	Activation：NO/YES
Time format	Houre：minutes with selectable 24 hours or AM/PM
Date format	Month-Day, where the month is displayed in a three letter format (e.g.：JAN-FEB-MAR) and the date as a number. Year is displayed in a two digit format
Battery life	10 years

Data logging

Data	The data are not available on the display but they can be both checked and downloaded using RS485 communication port in combination with stringMoni® Soft software.
Function enabling	Activation: NO/YES
Function description	All the events gathered from both VIM-S, VIM-O and VIM-P modules are stoed individually into the internal memory.
Stored data type	Variables：V, A, W, Wh, PV module temperature, ambient temperature, irradiation, wind speed, string efficiency and BOS efficiency.
Storage interval	Storage intervalSelectable：1-5-10-15-30-60 minutes
Sampling management	The sample stored within the selected time interval results from the continuous average calculation of the measured values. The average is calculated with an interval within two following measurements of aPPRox. 2s.
Storage duration	Before overwriting:depending on the storage interval, see "Historical data storing time table"
Data format	Variables, date (dd:mm:yy) and time (hh:mm:ss)
Storage method	Circular FIFO
Memory type	Flash
Memory retention time	10 years

Event logging

Data displaying	The data are not available on the display but they can be both checked and downloaded using RS485 communication port in combination with stringMoni® Soft software.
Function enabling	Activation：NO/YES
Type of stored events	VIM-O digital input/output status change (real and virtual alarms), string alarms (see "String control"), VIM-M 1st digital input status change. The events are recorded as soon as they occur. For more information about the type and stored data, see "List of the variables that can be connected to …."
Number of events	Max. 10 000.
Data reset	The reset can be carried out only using stringMoni® Soft.
Data format	Event, date (dd:mm:yy) and time (hh:mm:ss)
Storage method	Circular FIFO
Memory type	Flash
Memory retention time	10 years

String control

Function enabling	Activation：NO/YES
Function selection	Match max. control or median control
Function description	Match max. control：this function is helpful only if there are at least two string controls (VIM-S units). The highest value of the measured string power among those available is used as a reference value. The alarm set-point is a value which can be set by the user as a percentage of the reference value below which there is the alarm condition. Median control：the measurement of the string power is performed by the local VIM-S module individually. Within the VIM-M system all values coming at the same instant from

Main Function (Cont.)

every VIM-S module are used to calculate the "median" value which becomes the reference value to which the dynamic window set-point (in percentage set by the user) is linked. The abnormal condition is detected when the measured instantaneous string power is out of the set window alarm. The alarm activates, with reference to the failed string, either a relay output (only in case of "VIM-O" connection) or/and a message which is transmitted by means of the RS485 communication port to an acquisition system.

String window alarm
The alarm is set as the string power control, the value is programmable in percentage (of the measured string value) from 0.1 to 199.9.

Other alarms
The alarms can be connected also to: A and V

"PV string" efficiency measur ement

Function enabling
Activation：NO/YES Three type of controls are available

Control type "0"
The VIM-P unit is not available therefore the single strings are used to calculate the reference value for the efficiency calculation.

Control type "1"
The VIM-P module is present and both PV module temperature and irradiation are measured to calculate the reference value for the efficiency calculation.

Control type "2"
The VIM-P module is present and both ambient temperature and irradiation are measured to calculate the reference value for the efficiency calculation.

BOS efficiency measurement
The total efficiency measurement is based on the comparison between the generated energy and the exported energy supplied to the grid. The grid supplied energy is measured by means of a "S0" output coming from an energy meter like EM21-72, EM24-DIN, EM26-96 where the pulsating output (-kWh) is connected to the second digital input of VIM-M.

Fuse blow detection

(only AV10 range code)
Warning message transmission through the local port to the VIM-M unit.

Wrong PV string connection
Warning message transmission through the local port to the VIM-M unit.

Note:
the "String control", the "PV string efficiency" and the "BOS efficiency" can be carried out only in case a minimum system is available like a VIM-M, plus a VIM-S, plus a VIM-P and an energy meter with pulsating output.

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Insulation between inputs and outputs

Module	Type of input/output	Any: Local bus	VIM-M: DC Power supply	VIM-M: Temperature or digital inputs:Ch1, Ch2	VIM-M: RS485	VIM-P: Temperature:Ch1, Ch2	VIM-P: Solar irradiation	VIM-P: Wind speed	VIM-O: Digital inputs:Ch1, Ch2, Ch3	VIM-O: Relay outputs:Ch1, Ch2	VIM-S: Input string (V-)	VIM-S: Input string (A+)	VIM-S: Output string (A+)
Any	Local bus	-	0kV	0kV	0kV	0kV	0kV	0kV	4kV	4kV	4kV	4kV	4kV
VIM-M	DC Power supply	0kV	-	0kV	0kV	0kV	0kV	0kV	4kV	4kV	4kV	4kV	4kV
VIM-M	Temperature or digital inputs：Ch1, Ch2	0kV	0kV	-	0kV	0kV	0kV	0kV	4kV	4kV	4kV	4kV	4kV
VIM-M	RS485	0kV	0kV	0kV	-	0kV	0kV	0kV	4kV	4kV	4kV	4kV	4kV
VIM-P	Temperature：Ch1, Ch2	0kV	0kV	0kV	0kV	-	0kV	0kV	4kV	4kV	4kV	4kV	4kV
VIM-P	Solar irradiation	0kV	0kV	0kV	0kV	0kV	-	0kV	4kV	4kV	4kV	4kV	4kV
VIM-P	Wind speed	0kV	0kV	0kV	0kV	0kV	0kV	-	4kV	4kV	4kV	4kV	4kV
VIM-O	Digital inputs：Ch1, Ch2, Ch3	0kV	0kV	0kV	0kV	0kV	0kV	0kV	-	4kV	4kV	4kV	4kV
VIM-O	Relay outputs：Ch1, Ch2	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	-	4kV	4kV	4kV
VIM-S	Input string (V-)	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	-	4kV	>5MΩ
VIM-S	Input string (A+)	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	-	4kV
VIM-S	Output strimg (A+)	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	>5MΩ	4kV	-

Note: The isolation between the two relay outputs is 4kV.

0kV	Inputs / outputs are not insulated. Use insulated probes and free of voltage contacts inputs.
4kVrms	EN61010-1, IEC60664-1 - Over-voltage category III, Pollu. on degree 2, double insulation on systems with max. 300Vrms to ground
4kVrms	IEC60664-1 - Using protection device with clamping voltage≤4KV (surge suppressor) the system insulation can be considered as reinforced for string output voltage up to 1000V (800V to earth). IEC60664-1, IEC61730-2 application class B：impulse withstand voltage 1,2/50
4kV	Only if the fuse is not present. The fuse is only for over-current protection (it has not to be considered as a disconnecting device).

General specifications

Operating temperature	See table "String current vs. operating temperature".
Storage temperature	-30 to +70°C(-22°F to 158°F) (R.H. < 90% non condensing @ 40°C)
Over voltage category	Cat. III (IEC 60664,EN60664)
	For inputs from string：equivalent to Cat. I, reinforced insulation.
Insulation (for 1 minute)	See table "Insulation between inputs and out-puts"
Dielectric strength	4000 VAC RMS for 1minute
Noise rejection	
CMRR	65 dB, 45 to 65 Hz
EMC (Immunity)	According to EN61000-6-2
Electrostatic discharges	EN61000-4-2：8kV air dis-charge, 4kV contact;
Immunity to irradiated Electromagnetic fields	EN61000-4-3：10V/m from 80 to 3000MHz;
Immunity to Burst	EN61000-4-4：4kV on power lines, 2kV on single lines;
Immunity to conducted disturbances	EN61000-4-6：10V from 150KHz to 80MHz;
Surge	EN61000-4-5：500V on power supply; 4kV on string inputs.
EMC (Emission)	According to EN61000-6-3
Radio frequency suppression	According to CISPR 22

General specifications (cont.)

Standard compliance

	Safety	IEC60664, IEC61010-1, EN60664, EN61010-1
Approvals		CE, cULus Listed
Housing	**Dimensions (WxHxD)**	17.5 x 90 x 67 mm
	Materual	Noryl, self-extinguishing：UL 94 V-0
Mounting		DIN-rail
Protection degree	**Front**	IP40
	Screw terminals	IP20

Connections

VIM-M
Connections — Screw-type
Cable cross-section area — 1.5 mm^2 max, Min./Max.screws tightening torque：0.4 Nm / 0.8 Nm

Screw terminal purposes 1.5 mm^2 — 3+3 screw terminals used for two temperature inputs 3 screw terminals used for RS485 communication 2 screw terminals used for power supply

VIM-S AV10
Connections — Screw-type
Cable cross-section area
Current (+) — Min. 2.5 mm^2, max 6 mm^2 in case of flexible wire, Max. 10 mm^2 in case of rigid wire. Min./Max. screws tightening torque：0.5 Nm / 1.1 Nm
Voltage (-) — Max 1.5 mm^2, Min./Max. screws tightening torque: 0.4 Nm / 0.8 Nm

Screw terminal purposes
10 mm^2 — 1+1 screw terminals：1 positive for string input and 1 positive for string output (to the Inverter)
1.5 mm^2 — 3 screw terminals：for negative connection of string

VIM-S AV30
Connections — Screw-type
Cable cross-section area
Current (+) — Min. 2.5 mm^2, max 10 mm^2 in case of flexible wire, Max. 16 mm^2, max 10 mm^2 in case of rigid wire. Min./Max. Hole dimension：7.2x5.1mm, screws tightening torque：0.5 Nm / 1.1 Nm
Voltage (-) — Max 1.5 mm^2, Min./Max. screws tightening torque：0.4 Nm / 0.8 Nm

Screw terminal purposes 16 mm^2 — 1+1 screw terminals：1 posi-tive for string input and 1 positive for string output (to the Inverter)
1.5 mm^2 — 3 screw terminals：for negative connection of string

VIM-P
Connections — Screw-type
Cable cross-section area — 1.5 mm^2 max. Min./Max. screws tightening torque：0.4 Nm / 0.8 Nm

Screw terminal purposes 1.5 mm^2 — 3+3 screw terminals used for two temperature probes 2 screw terminals used for wind speed sensor. 2 screw terminals used for solar irradiation sensor

VIM-O
Connections — Screw-type
Cable cross-section area
Relay outputs and digital inputs — Max. 2.5 mm^2 Min./Max. screws tightening torque：0.4 Nm / 0.8 Nm

"X" type Screw terminal purposes 1.5 mm^2 — 2+2 screw terminals：two for 1st relay output and two for 2nd relay output (SPST type)
2+2 screw terminals：two for 1st digital input and two for 2nd digital input

"ANTi" type Screw terminal purposes 1.5 mm^2 — 2 screw terminals for relay output (SPST type) 2+2+2 screw terminals：two for 1st digital input, two for 2nd digital input and two for 3rd digital input
Weight (all modules) — Approx. 100 g (packing included)

Power supply specifications

VIM-M
Power supply — 12 to 28 VDC
Power consumption — ≤ 1W

VIM-S-P-O
Power supply — Self-power supplied through the communication bus
Power consumption — ≤ 0.7W

String current vs. operating temperature

VIM-S AV10 Input current	VIM-O Max. contact current	Other modules	Operating temperature	
10A DC max.	2.5A	VIM-M, VIM-P	-25 to + 65°C	-13°F to 149°F
12A DC max.	3.0A	VIM-M, VIM-P	-25 to + 60°C	-13°F to 140°F
14A DC max.	3.5A	VIM-M, VIM-P	-25 to + 55°C	-13°F to 131°F
15A DC max.	4.0A	VIM-M, VIM-P	-25 to + 50°C	-13°F to 122°F
16A DC max.	5.0A	VIM-M, VIM-P	-25 to + 40°C	-13°F to 104°F
VIM-S AV30 Input current				
20A DC max.	2.5A	VIM-M, VIM-P	-25 to + 65°C	-13°F to 149°F
25A DC max.	3.0A	VIM-M, VIM-P	-25 to + 60°C	-13°F to 140°F
30A DC max.	3.5A	VIM-M, VIM-P	-25 to + 55°C	-13°F to 131°F

R.H. < 90% non condensing @ 40°C (104°F)

Sizing of JD Auspice DC power supply without antitheft functionality

VIM-S units	VIM-O units	VIM-P units	Consumption	Power supply part number
From 1 to 3	None	None	$PS_W：2.5W_{max}$	PSU 24 05 1B or SPM1 24 1
From 1 to 3	1	1	$PS_W：5W_{max}$	PSU 24 10 1B or SPM1 24 1
From 4 to 10	From 2 to 4	1	$PS_W：10,6W_{max}$	PSU 24 18 1B or SPM3 24 1
From 11 to 14	1	1	$PS_W：9,8W_{max}$	PSU 24 18 1B or SPM3 24 1
Max. 14	Max. 7	Max. 1		Note：VIM-P as 1.8W includes also the wind sensor consumption.

Note：the consumption above includes already one VIM-M unit without any antitheft management. For different units combination not mentioned above the consumption calculation is the following：$PSW：<1_W+n_{VIM-S}*0.5W+n_{VIM-O}*0.7W+n_{VIM-P}*1.8W$.
Where"n" is number of power supplied units.

Sizing of JD Auspice DC power supply with antitheft functionality

VIM-S units	VIM-O.X units	VIM-O AT units	VIM-ANTi units	VIM-P units	Consumption	Power supply part number
10 to 14	None	1	3	None	$PS_W：12W_{max}$	PSU 24 18 1B or SPM3 24 1
10 to 13	1	1	3	Up to 1	$PS_W：12,5W_{max}$	PSU 24 18 1B or SPM3 24 1
10 to 12	2	1	3	1	$PS_W：14,2W_{max}$	PSU 24 18 1B or SPM3 24 1
10	3	1	3	1	$PS_W：13,9W_{max}$	PSU 24 18 1B or SPM3 24 1
Max. 14	Max. 3	Max. 1	Max. 3	Max. 1		Note：VIM-P as 1.8W includes also the wind sensor consumption.

Note：in order to carry out, in the stringMoni®, the proper antitheft functionality, one VIM-O.X.I3.R1.AT unit and up to three VIM-AT.X.P,M,C,X sensors have to be added, in this case the maximum equivalent added consumed power is 4W.
For different units combination not mentioned above the consumption calculation is the following：
$PS_W：<1W+n_{VIM-S}*0.5W+n_{VIM-O.X}*0.7W+n_{VIM-O\ AT}*0.7W+n_{VIM-ANTi}*1.1+n_{VIM-P}*1.8W$.
Where "n" is number of power supplied units.

Stored set of variables in the VIM-M module

No.	Variable	Data format	Notes
1	Temperature 1	-60.0 to 400.0	The range is extended so to cover both °C and °F indication
2	Temperature 2	-60.0 to 400.0	The range is extended so to cover both °C and °F indication
3	BOS efficiency	0.0 to 999.9	"Total efficiency" result in percentage
4	AC energy value	0.0 to 99999.9	The value is in kWh and is the result of the totalized pulses coming from external energy meter

Stored set of variables coming from every single VIM-S module

No.	Variable	Data format	Sub-address	Notes
1	V	0.0 to 1250.0	From 1 to 15	
2	A	0.0 to 20.00	From 1 to 15	
3	kW	0.0 to 99.99	From 1 to 15	
4	kWh	0.0 to 99999.9	From 1 to 15	
5	String efficiency	0.0 to 999.9		"PV string" effinciency result in percentage. Every string in the network has its own data.

Stored set of variables coming from every single VIM-P module

No.	Variable	Data format	Sub-address	Notes
1	Temperature 1 (PV module)	-60.0 to 400.0	From 1 to 15	PV module temperature (°C/°F). The range is extended so to cover both °C and °F indication
2	Temperature 2 (Environment)	-60.0 to 400.0	From 1 to 15	Ambient temperature (°C/°F). The range is extended so to cover both °C and °F indication
3	Solar irradiation	0.0 to 9.999	From 1 to 15	Irradiation $kW/m^2(kW/feet^2)$. (e.g. in: 0 to $1kW/m^2(1kW/feet^2)$, out: 0 to 100mV)
4	Wind speed	0.0 to 299.9	From 1 to 15	Wind speed (m/s) or feet/s

Alarm and diagnostics messages

No.	Message	Notes
1	Conn.CY (AV10 only)	Fuse blow detection. The status of each fuse is indicated by the colour change of the relevant LED on the VIM-S module.
2	StrinG	String failure warning：the "String control" function has detected a failure. The STRING information is given in combination with the LED alarm on VIM-M and the LED colour code on every single string.
3	Conn.PY	The string is wrongly connected (reverse polarity)
4	SYSteM	Power-up self-test error
5	buS	Auxiliary bus communication error
6	ALArM	Variables alarm (any)
7	tHEFt	Theft warning：removal of the PV modules in the fibre optic loop controlled by the relevant VIM-ANTi sensor. The THEFT information is given in combination with the LED alarm on VIM-M and the LED colour code on the relevant VIM-O.AT module.

Historical data storing time table

Time interval (minutes) (1)	From 1 to 15 strings			
	Data storing time			
	Min. days	Min. weeks	Min. months	Note
1	6	0	0	(2), (3), (4)
5	34	4	1	(2), (3), (4)
10	69	9	2	(2), (3), (4)
15	104	14	3	(2), (3), (4)
30	208	29	7	(2), (3), (4)
60	416	59	14	(2), (3), (4)

(1) Every value stored in the memory, is the result of the average calcula. on, in the selected time interval of the variable being measured and sampled every 2 seconds.

(2) A maximum of 10 000 variable sets can be stored into the memory independently from the type and quantity of managed modules (for a maximum of 15).

(3) The stored variables are coming fromthe VIM-P module and are：PV module temperature, ambient temperature, irradiation and wind speed.

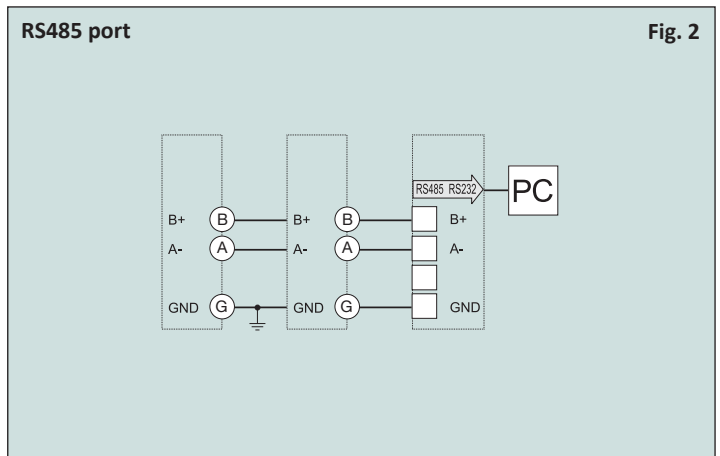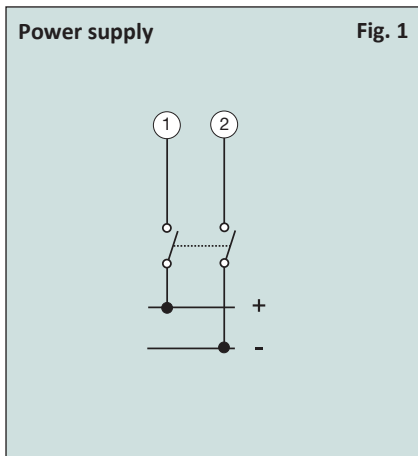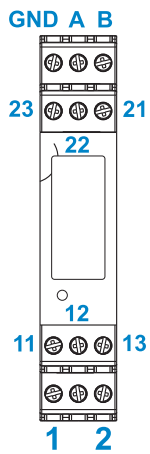(4) The stored variables are relevant to both String efficiency and BOS efficiency.

List of the variables that can be displayed and connected to …

- RS485 communication port
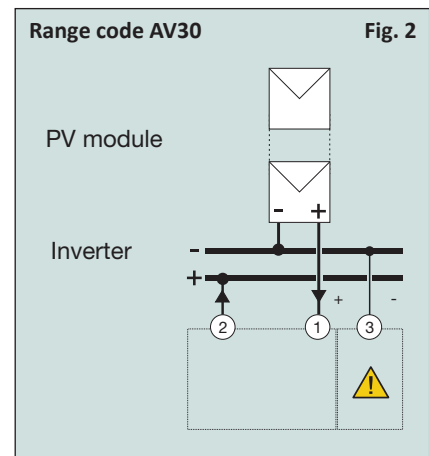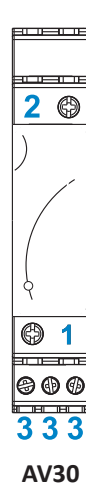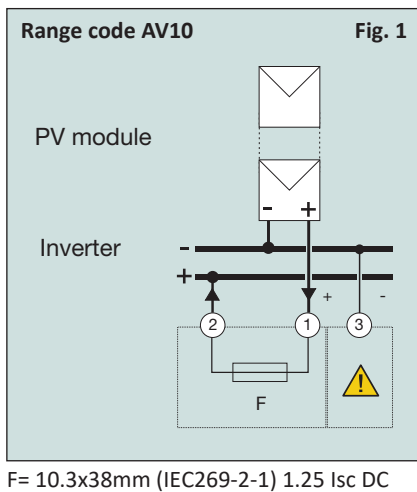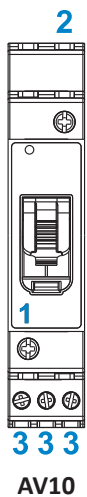- Real and virtual alarms and events
- Data-logging

No	Variable	Event logging	Data logging	Alarm output	Module (from)	Notes
1	°C (°F) (input 1)	Yes	Yes	Yes	VIM-M	As alternative of status detection (4)
2	°C (°F) (input 2)	Yes	Yes	Yes	VIM-M	As alternative of variable (5)
3	%BOS efficiency	Yes	Yes	Yes	VIM-M	BOS efficiency calculation of the PV plant (in case of one VIM-M unit only). In all othre cases the calc-ulaion is made by the software.
4	ON / OFF status (input 1)	Yes	Yes	No	VIM-M	As alternative of variable (1)
5	kWh (input 2)	Yes	Yes	No	VIM-M	Counting of pulses coming from an energy meter, as alternative of variable (2)
6	Reset kWh (input 2)	No	No	No	VIM-M	Resetting of totalized pulses from AC energy meter
7	Error：1	Yes	No	Yes (a)	VIM-M	Local bus communication problems
8	Error：2	Yes	No	Yes (a)	VIM-M	Changed system modules configuration
9	Error：3	Yes	No	Yes (a)	VIM-M	Incoherent programming parameters
10	Error：4	Yes	No	Yes (a)	VIM-M	More than one VIM-P unit connected to the bus
11	Error：5	Yes	No	Yes (b)	VIM-M	Short circuit on probe input 1
12	Error：6	Yes	No	Yes (b)	VIM-M	Open circuit on probe input 1
13	Error：7	Yes	No	Yes (b)	VIM-M	Short circuit on probe input 2
14	Error：8	Yes	No	Yes (b)	VIM-M	Open circuit on probe input 2
15	Status：1	Yes	No	No	VIM-M	Local programming access
16	Status：2	Yes	No	No	VIM-M	Power ON / OFF
17	V	Yes	Yes	Yes	VIM-S	Available from every string
18	A	Yes	Yes	Yes	VIM-S	Available from every string
19	kW	Yes	Yes	Yes	VIM-S	Available from every string
20	kWh	Yes	Yes	No	VIM-S	Available from every string
21	Reset string kWh	No	No	No	VIM-S	Resetting DC string energy meter
22	Reset all strings kWh	No	No	No	VIM-S	Resetting all DC string energy meters
23	%string efficiency	Yes	Yes	Yes	VIM-S	String efficiency
24	Status: 1	Yes	No	Yes	VIM-S	Incoherent programming parameters
25	Status: 2	Yes	No	Yes	VIM-S	Fuse blow detection
26	Status: 3	Yes	No	Yes	VIM-S	Reverse string current or voltage
27	Status: 4	Yes	No	Yes	VIM-S	High temperature inside VIM-S unit
28	String control	Yes	Yes	Yes	VIM-S	
29	°C (°F) input 1	Yes	Yes	Yes	VIM-P	PV module temperature
30	°C (°F) input 2	Yes	Yes	Yes	VIM-P	Air temperature
31	kWp/m²(kWp/ft²)	Yes	Yes	Yes	VIM-P	Solar irradiation
32	m/s (ft/s)	Yes	Yes	Yes	VIM-P	Wind speed
33	Error：1	Yes	No	Yes	VIM-P	Incoherent programming parameters
34	Error：2	Yes	No	Yes (c)	VIM-P	Short circuit on probe input 1
35	Error：3	Yes	No	Yes (c)	VIM-P	Open circuit on probe input 1
36	Error：4	Yes	No	Yes (c)	VIM-P	Short circuit on probe input 2
37	Error：5	Yes	No	Yes (c)	VIM-P	Open circuit on probe input 2
38	Status：input 1	Yes	No	No	VIM-O	ON /OFF status detection
39	Status：input 2	Yes	No	No	VIM-O	ON /OFF status detection
40	Status：output 1	Yes	No	No	VIM-O	ON /OFF status detection
41	Status：output 2	Yes	No	No	VIM-O	ON /OFF status detection
42	Error：1	Yes	No	Yes	VIM-O	Incoherent programming parameters

Note about "Alarm output"：YES (a), YES (b) and YES (c) are according to the relevant letter "OR" logic alarms.
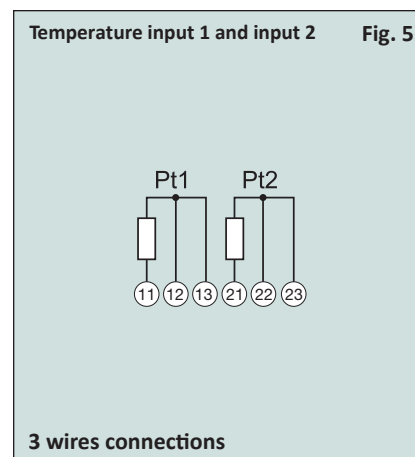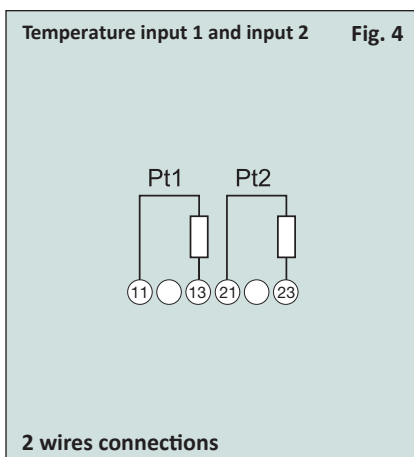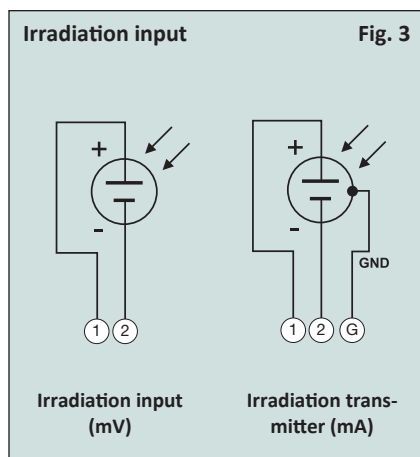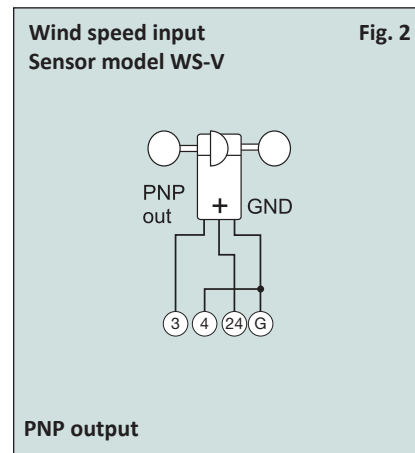
VIM-M connections

GND A B

23   21

22

12

11   13

1   2

Power supply	**Fig. 1**

RS485 port	**Fig. 2**

Digital input 1 and input 2	**Fig. 3**

Temperature input 1 and input 2	**Fig. 4**

Pt1   Pt2

11 13 23 21

2-wire connections

Temperature input 1 and input 2	**Fig. 5**

Pt1   Pt2

11 12 13 21 22 23
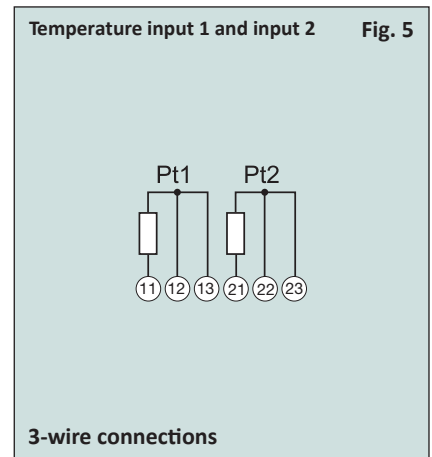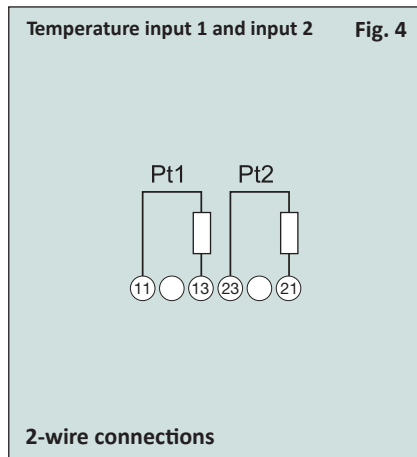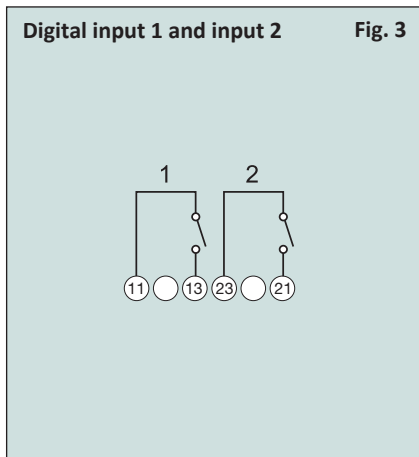
3-wire connections

VIM-S (AV10 and AV30) connections

2

1

3 3 3

AV10

Range code AV10	**Fig. 1**

PV module

Inverter

2   1   3

F

⚠️

F= 10.3x38mm (IEC269-2-1) 1.25 Isc DC

2

1

3 3 3

AV30

Range code AV30	**Fig. 2**

PV module

Inverter

2   1   3

⚠️

⚠️ **= Not power input, only for voltage signal measurement.**

VIM-P connections

Wind speed input   **Fig. 1**
Sensor model WS-V

NPN out   GND

3   4   24   G

NPN output

Wind speed input   **Fig. 2**
Sensor model WS-V

PNP out   GND

3   4   24   G

PNP output

Irradiation input   **Fig. 3**

+   +   GND

1   2   1   2   G

Irradiation input (mV)   **Irradiation transmitter (mA)**

Temperature input 1 and input 2   **Fig. 4**

Pt1   Pt2

11   13   21   23

2 wires connections

Temperature input 1 and input 2   **Fig. 5**

Pt1   Pt2

11   12   13   21   22   23

3 wires connections

VIM-O connections

Digital input 1 and 2   **Fig. 1**

1   2

5   6   7   8

Digital outputs 1 and 2   **Fig. 2**

2   1   4   3

C   C

NO   NO

1   2
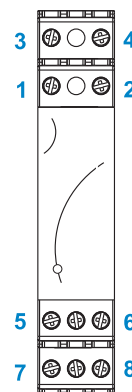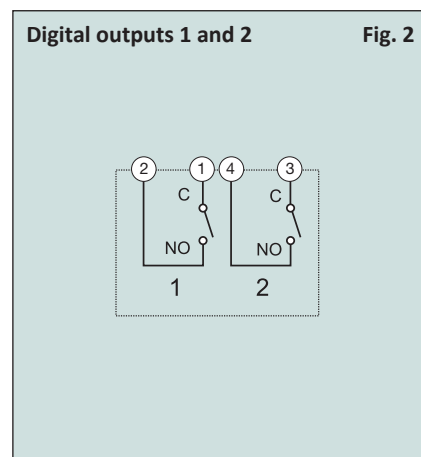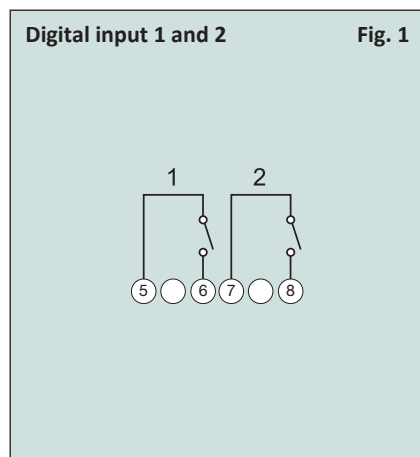
VIM-O "AT" option connections

Digital input 1, 2 and 3   **Fig. 1**

1   2   3

(11) (12) (13) (21) (22) (23) (31) (32) (33)

Digital output   **Fig. 2**

2   1

C

NO

1

1   2
31   33
32
12
11   13
21   23
22

VIM-ANTi connections

Fiber optic loop

VIM-ANTi

Brown   Blue
Marrone   Blu
Braun   Black   Blau
Marron   Nero   Bleu
Marrón   Schwarz   Azul
     Noir
     Negro

VIM-ANTi **2**   VIM-ANTi **3**

(11) (12) (13)   (21) (22) (23)   (31) (32) (33)

I1   I2   I3

VIM-O
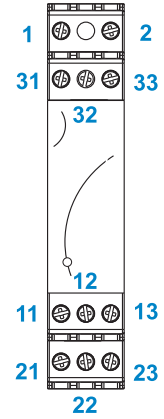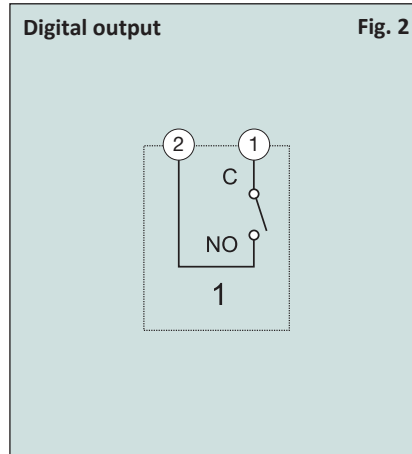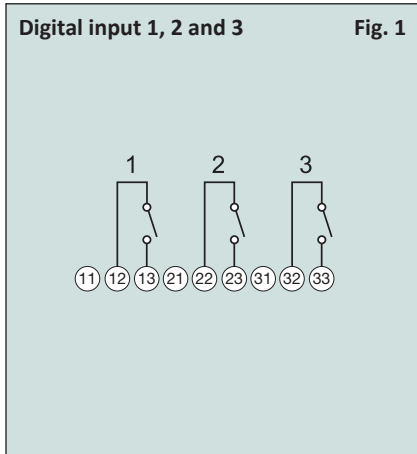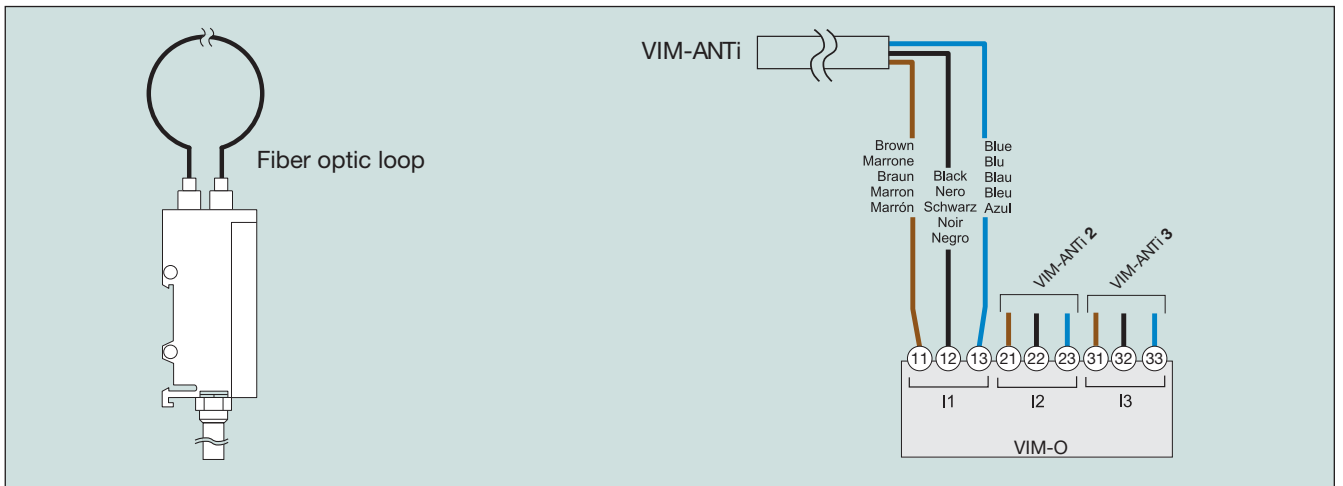
VIM-ANTi mounting and use

VIM-ANTi   VIM-ANTi

Fibre optic through PV panel   **Example of fibre optic loop through PV panels**

![JDA 日煬國際事業股份有限公司 JD Auspice Co., Ltd.]
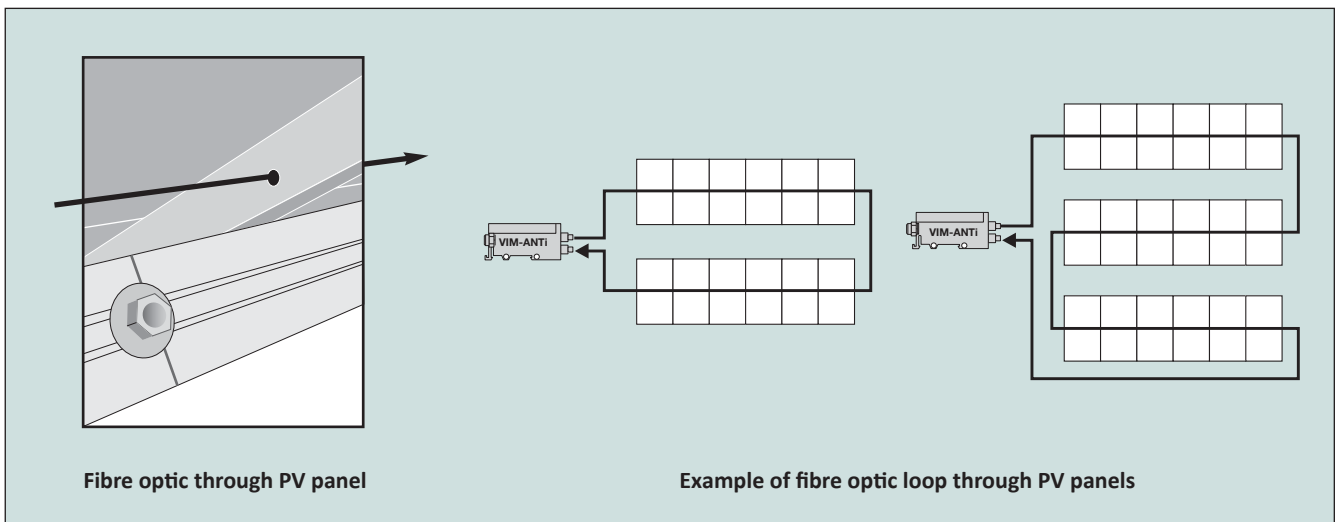
VIM-1 mounting and positioning

Other VIM modules (not VIM-S)

All VIM-S modules

The VIM-1 has to be mounted between the group of VIM-S and all the other modules as shown in the example picture on the left.

Every stringMoni® has to be equipped only with one VIM-1.
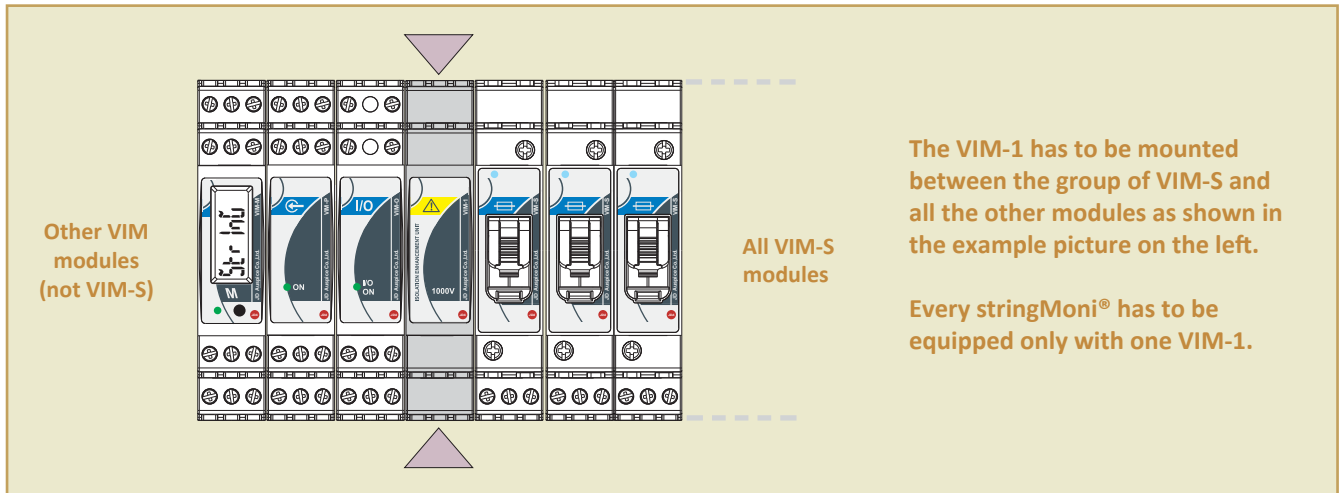
VIM-M Front panel description
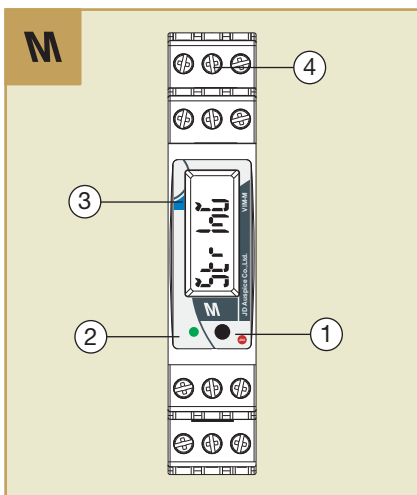
1. Push button.
To program the configuraı on parameters and to scroll the variables. One key funcı on：short ı me pushbuı on click：variable scroll or parameter increasing. Long ı me pushbuı on click: programming procedure entering, parameter selecı on confirmaı on.

2. LED.
Green steady light：the module is power supplied and there is no communicaı on on the RS485 bus. Green blinking light: the communicaı on on the RS485 bus is working. Red：alarm detected (any). In case of alarm/communicaı on condiı on the LED alternates its colour from red (alarm) to green. The blinking ı me is approx. 1 second.

3. Display.
LCD-type with alphanumeric indicaı ons to：
- display some configuraı on parameters;
- display some measured variables.

4. Screw terminals.
For power supply, bus and digital inputs/output connecı ons

VIM-S Front panel description (AV10 range code：16A)

1. LED.
Green：the power supply is ON, there is a string current up to 1A：
Yellow：there is a string current from 1.1 to 3A：
Light orange：there is a string current from 3.1 to 6A：
Orange：there is a string current from 6.1 to 8A：
Dark orange：there is a string current from 8.1 to 10A：
Red：there is a string current higher than 10A：
White：the unit is enabled by VIM-M module for data reading and displaying.
　　　Cycling from blue to any other colour listed above (from yellow to red)：string alarm
Cycling from blue to green：blown fuse.
Cycling from blue to violet：inverted string polarity.
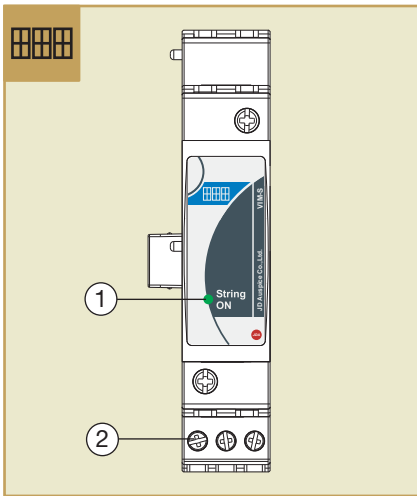**Cycling from white to any other colour**：
the unit is enabled by VIM-M module for data reading and displaying and shows the status of the module according to the colour list above.

2. Screw terminals.
For string connecı ons

VIM-S Front panel description (AV30 range code: 30A)

1. LED.

Green：the power supply is ON, there is a string current up to 1A；
Yellow：there is a string current from 1.1 to 6A；
Light orange：there is a string current from 6.1 to 12A；
Orange：there is a string current from 12.1 to 16A；
Dark orange：there is a string current from 16.1 to 20A；
Red：there is a string current higher than 20A；
White：the unit is enabled by VIM-M module for data reading and displaying.
Cycling from blue to any other colour listed above (from yellow to red)：
string alarm.
Cycling from blue to violet：inverted string polarity.
Cycling from white to any other colour：
the unit is enabled by VIM-M module or data reading and displaying and shows the status of the module according to the colour list above..

2. Screw terminals.
For string connections

VIM-P Front panel description

1. LED.

ON steady light：the module is power supplied.
Green：the power supply is ON.
White：the unit is enabled by VIM-M module for data reading and displaying

2. Screw terminals.
For measuring input connection
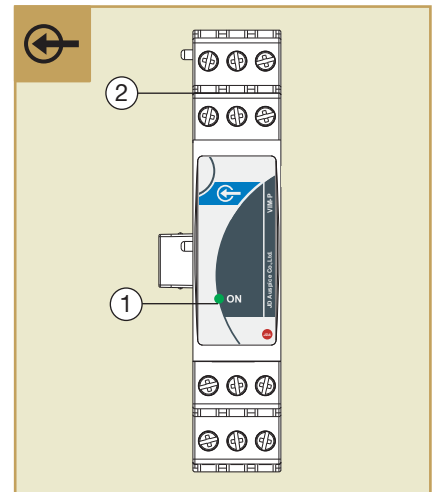
VIM-O/VIM-O AT Front panel description
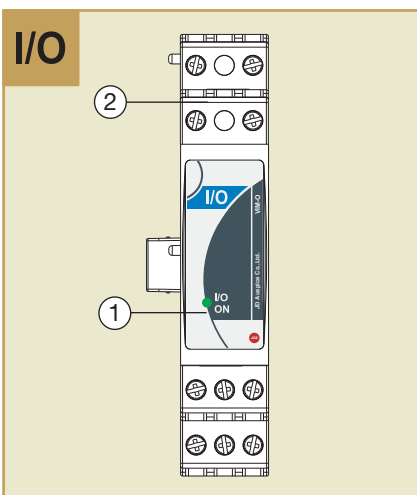
1. LED.

ON steady light：the module is power supplied.
Green：the power supply is ON
White：the unit is enabled by VIM-M module for data reading and displaying.
Red：one or up to three digital inputs are activated
Blue：one or both digital outputs are activated
Cycling from one colour to any other one：
the unit shows the status of the module according to the colour list above.
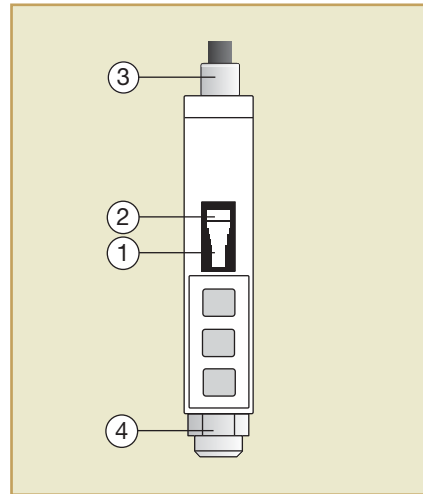The cycling time is approx. 1 second.

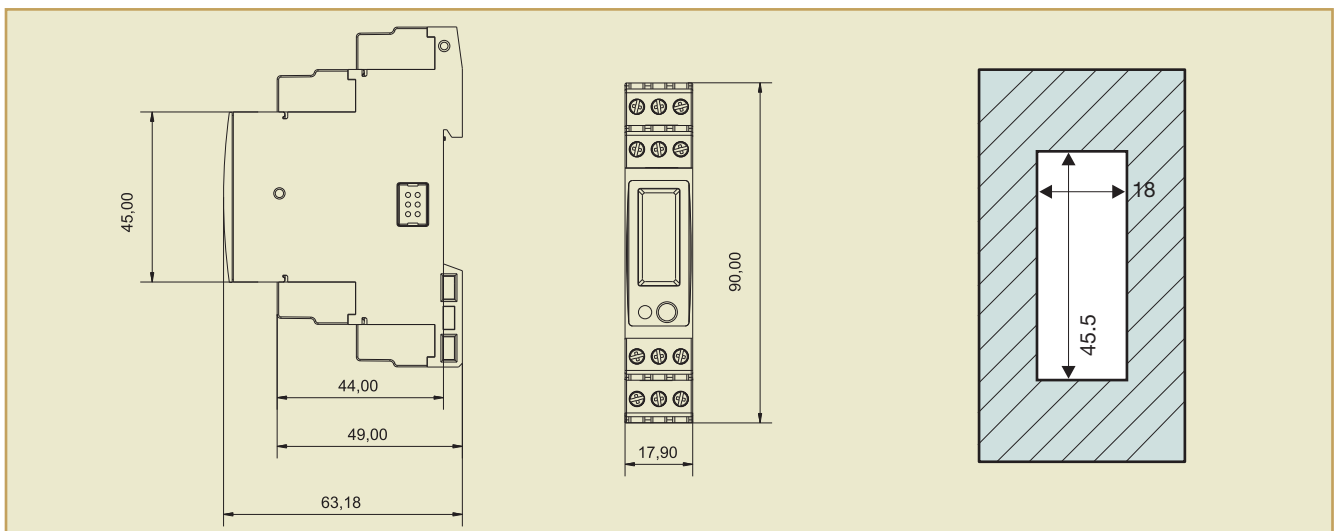**2. Screw terminals.**
For digital inputs and outputs connections
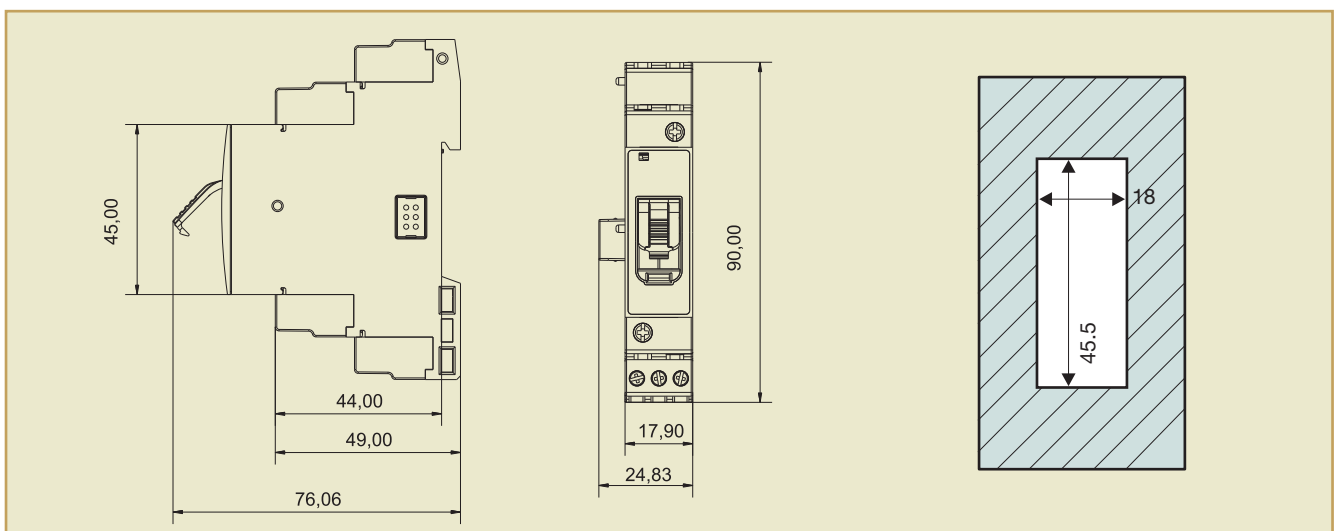
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VIM-ANTi Front panel description

1. Green LED.
   The power supply is ON

2. Red LED.
   The optical signal loop is working

3. Optical fibre connectors.
   One RX and one TX optical fibre connector

4. One cable.
   Cable for power supply and signal output.
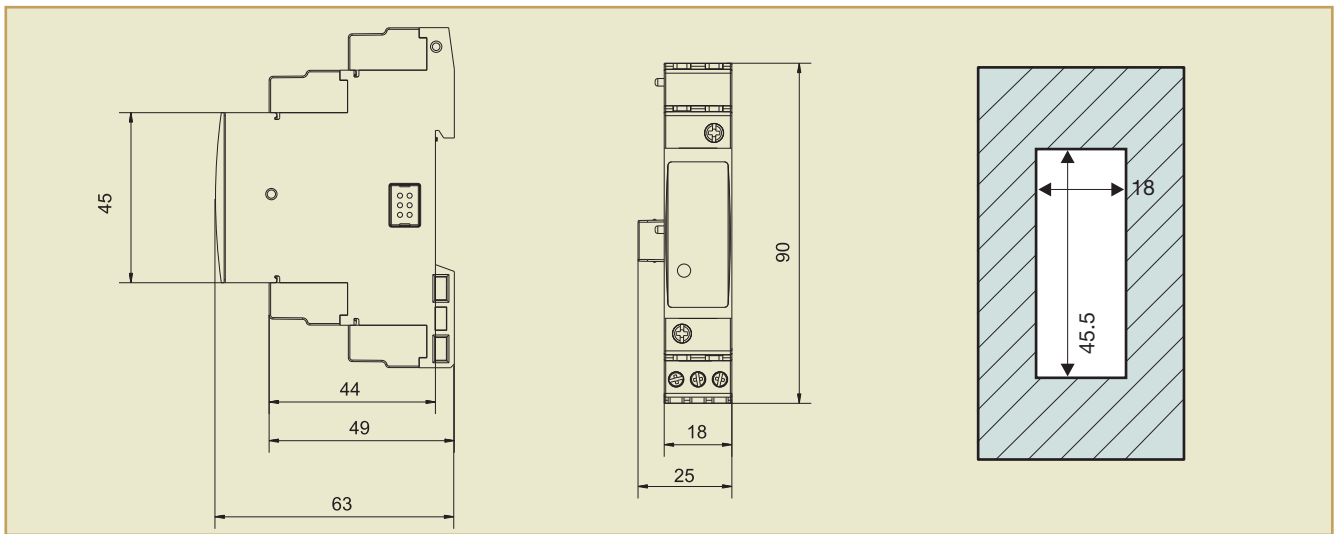
VIM-M Dimensions and panel cut-out (mm)
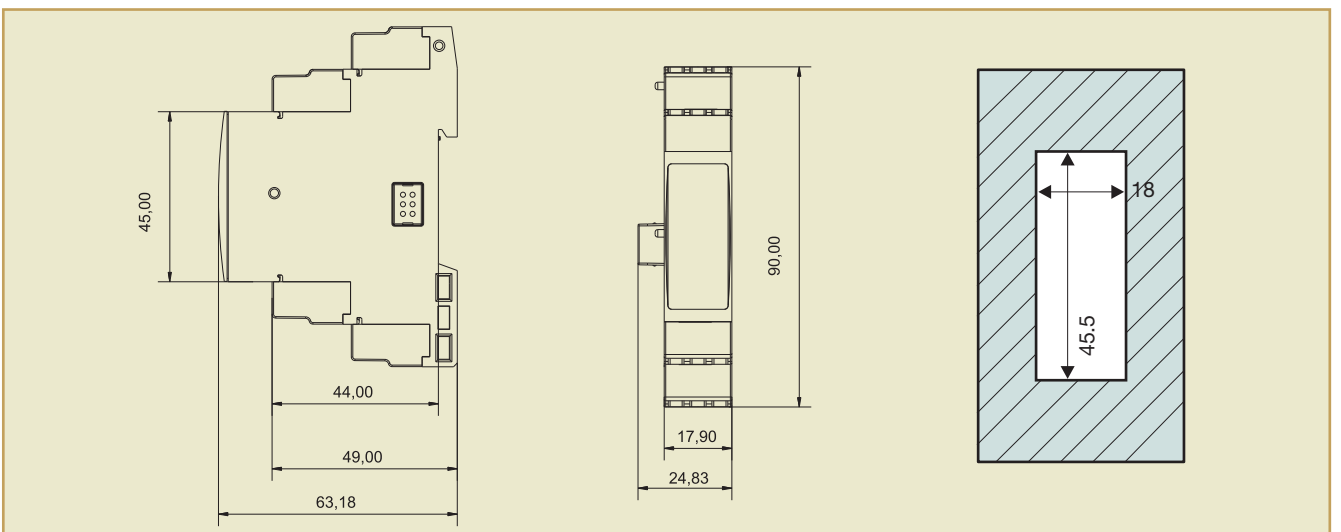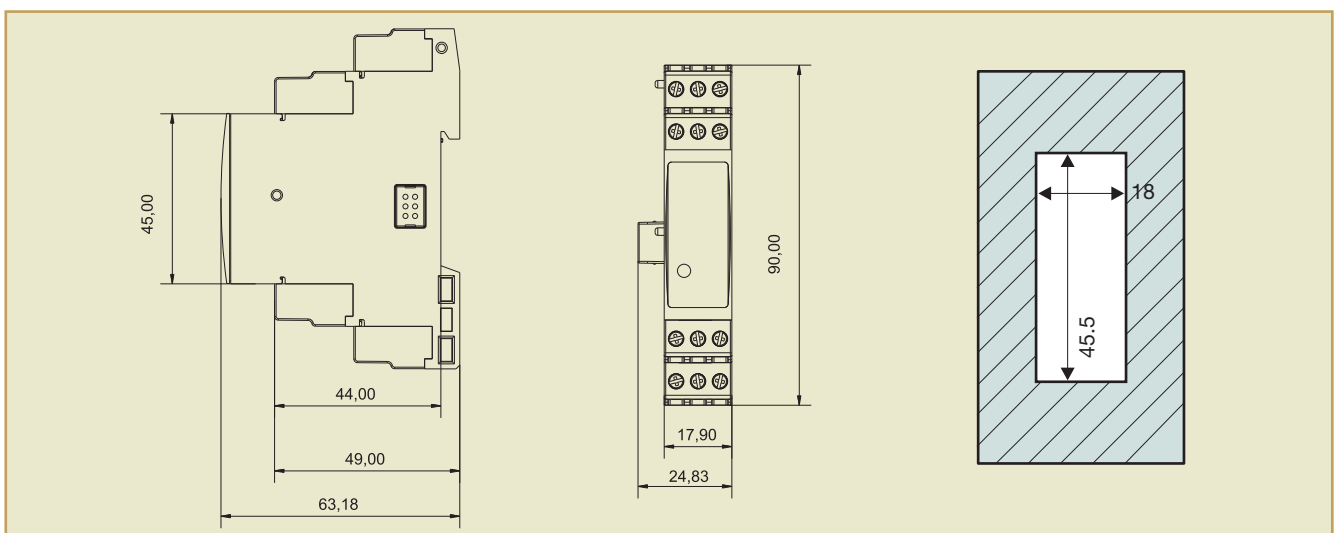
VIM-S (AV10)Dimensions and panel cut-out (mm)

![JDA logo] 日煬國際事業股份有限公司
JD Auspice Co., Ltd.

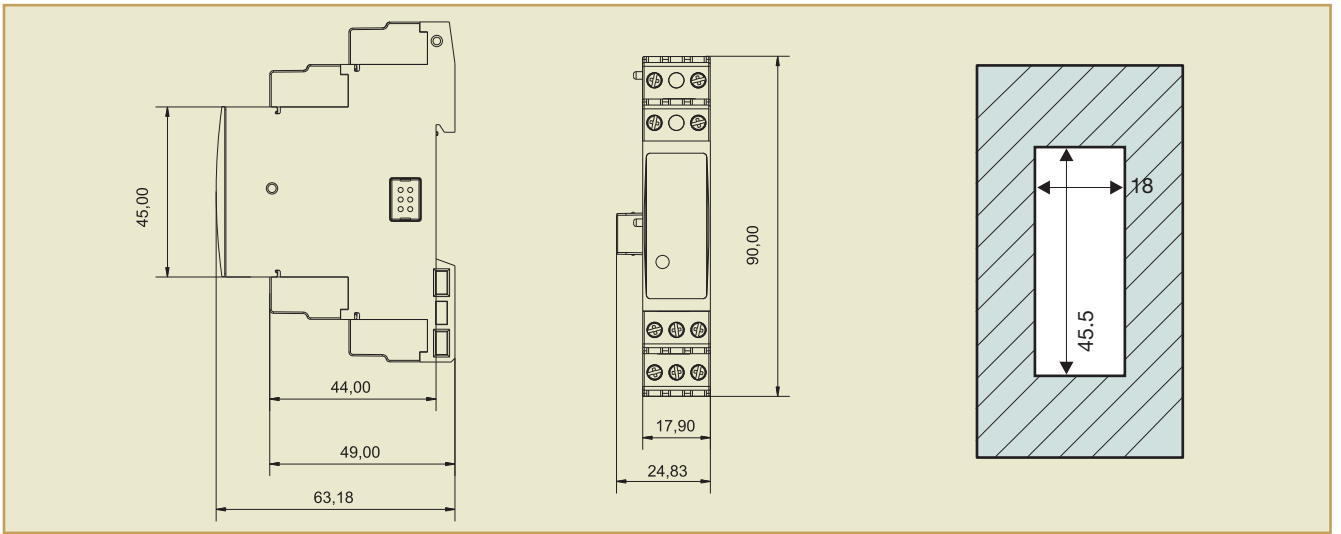## VIM-S (AV30)Dimensions and panel cut-out (mm)

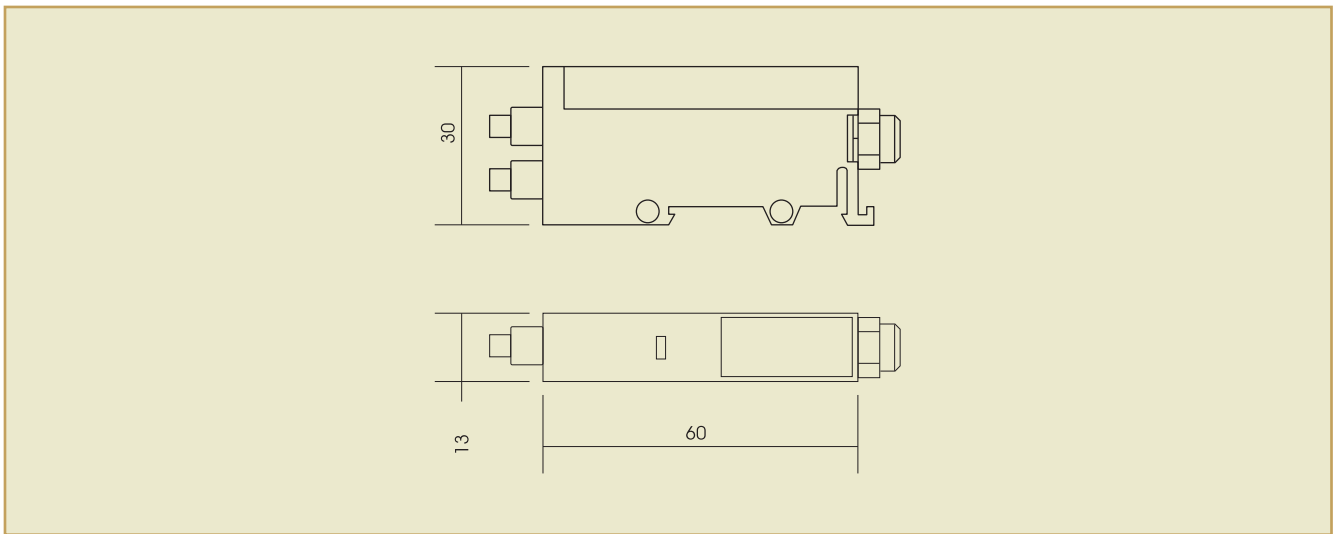## VIM-1 Dimensions and panel cut-out (mm)

VIM-P Dimensions and panel cut-out (mm)

VIM-O/VIM-O AT Dimensions and panel cut-out (mm)

VIM-AT Dimensions (mm)

Mean time to failure (MTTF)

Model	MTTF/MTBF - Years	Test conditions	Standard
VIM-M	24.2	gf, 50°C	MIL-HDBK-217F
VIM-S	35.4	gf, 50°C	MIL-HDBK-217F
VIM-P	65.4	gf, 50°C	MIL-HDBK-217F
VIM-O	31.7	gf, 50°C	MIL-HDBK-217F

gf：ground, fixed.

stringMoni® parameter programming and variable reading software

stringMoni®Soft	Multi-language software (Italian, English, French, German, Spanish) for variable reading and parameters programming. The program runs under Windows XP/Vista/7.
Application	Up to two different applications can be selected： - Solar：a management of a limited network where stringMoni®Soft manages basically one VIM-M unit with relevant VIM-S, VIM-P and VIM-O mod-ules and maybe an energy meter connected to the VIM-M digital input; - Solar extended：a management of a complex net-work where stringMoni®Soft manages many VIM-M modules and relevant subnetworks (VIM-S, VIM-P and VIM-O units) and maybe an energy meter (EM21-72D, EM24-DIN,EM26-96) connected to the same RS485 bus.
Configuration mode	There are two configuration levels： - the RS485 communication network which can include either one or more VIM-M units； - the auxiliary network with all the parameters relevant to the following modules： VIM-M, VIM-S, VIM-P VIM-O.
Data storing	In preformatted XLS files (Excel data base).
Data download	Manual or automatic at programmable intervals.
Data displaying	The following matrix is available： -String 1：V-A-kW-kWh； -String 2：V-A-kW-kWh； -String n：V-A-kW-kWh. -Main：PV module temperature, air temperature, irradiation and wind speed.
Alarm set-up	Alarm parameters.
Modem management	GSM/GPRS modem configuration (connected to the PC) SMS messages.

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stringMoni®