Energy monitoring solution

	Aggregation server	Aggregation server
Types	**Em²-Server**	**VMU-Y EM**
Dimensions		2-DIN module
Description	Em²-Server is a cloud solution capable of aggregating information from up to 100 installations powered by VMU-C EM units. Data from the plants are transmitted through Internet, stored inside the embedded database and presented by the integrated web interface. Em²-Server + VMU-C EM is a solid, reliable and plug'n play architecture aimed at managing multiple sites projects	VMU-Y EM is an embedded solution capable of aggregating information from up to 10 installations powered by VMU-C EM units. Data from the plants are transmitted through Internet, stored inside the embedded database and presented by the integrated web interface. VMU-Y EM + VMU-C EM is a solid, reliable and plug'n play architecture aimed at managing multi-site installations
Type	Virtual Machine Software	Micro PC
Storage memory		32 GB
Back-up memory		Micro-SD / Micro-SDHC / USB

Compatibility

Host Operating System	Operating system compatible with VMWARE 64 bit technology	
Virtual Machine Compatibility	VMWARE 64 bit	
Hardware compatibility	64 bit architecture compatible with VMWARE 64 bit	
Cloud compatibility	Hosting providers compatible with VMWARE technology	

Software/Firmware specification

Data acquisition	By means of Carlo Gavazzi's DP (Data push) protocol	By means of Carlo Gavazzi's DP (Data push) protocol
Integrated operating system	64 bit Linux	Embedded Linux
Integrated Data Base	Industrial class SQL relational database	Industrial class SQL relational database
User Interface	Integrated multi-user, multilingual web interface	Integrated multi-user, multilingual web interface

LED

Status and colour		One led with different colors for modem communication, data synchronization, alarms and power supply

Communication port and Output specifications

Ethernet		1 port for Internet / LAN connection
USB		1 USB "A" (for USB stick) and 1 USB "mini-A" (service port)

Connections

Ethernet		RJ-45 connector (10 / 100 Base-T)
USB		High Speed USB 2.0

General specifications

Managed VMU-C PV units	From 20 to 100	Up to 10
Software installation	By DVD containing the Em²-Server Virtual machine	
Licensing	Perpetual license based on connected VMU-C EM units	
Voltage supply		From 12 to 28 VDC
Power consumption		≤ 5 W
Approvals / Marks		CE - cULus listed

References

For ordering key details, please refer to www.productselection.net

Controls

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PV monitoring solution

	Web-server	USB dongle connection module
Types	**VMU-C EM**	**VMU-D**
Dimensions HxWxD (mm)	2-DIN module	2-DIN module
Description	Web-server which controls and supervises any electrical installation acquiring information from energy meters, power analyzers and VMU I/O modules. It provides information via Internet, so data are available anywhere	Accessory module for connecting third party USB dongle modems (3G or 4G) approved by Carlo Gavazzi to VMU-C or VMU-Y systems
Type	Micro PC	USB dongle connection module
Storage memory	4 GB	
Back-up memory	Micro-SD / Micro-SDHC / USB	

Mobile communication specifications

SIM card		Depending on the modem unit
Compatibility		Compatible with USB modems (3G or 4G) approved by Carlo Gavazzi
Supported services		Internet communication; SMS

LED

Status and colour	One LED with different colours for internal BUS communication, communication ports, alarms and power supply	Single colour green for Power supply status

Communication port and Output specifications

RS485	1 port for VMU I/O modules, 1 port for power analyzers and energy meters	
Ethernet	1 port for Internet / LAN connection	
USB	1 USB "A" (for USB stick) and 1 USB "mini-A" (service port)	1 USB "A" (for USB dongle modem connection)

Antenna

Connector		Depending on the modem unit
Type		Depending on the modem unit

Connections

RS485	3 screw terminals per port	
Ethernet	RJ-45 connector (10 / 100 Base-T)	
USB	High Speed USB 2.0	

General specifications

Voltage supply	From 12 to 28 VDC	From 12 to 28 VDC
Power consumption	≤ 5 W	IN/OUT connection to supply also the VMU-C / VMU-Y unit; consumption depending on the connected optional modules (range: from 8.6W to 18.6W)
Approvals / Marks	CE - cULus listed	CE - cULus listed

References

For ordering key details, please refer to www.productselection.net

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Controls

Energy monitoring solution

VMU I/O optional modules

Types	VMU-M EM	VMU-P EM	VMU-O EM
Dimensions	1-DIN module	1-DIN module	1-DIN module
Description	Master unit 6-DGT readout	Environment variable measurement unit	Inputs / outputs unit
Function	VMU-M performs the local bus management of VMU-P both measuring units and VMU-O I/O unit	2 temperatures, 1 analogue and 1 pulse rate output	VMU-O allows to add, for every single unit, available in the local bus two digital inputs and two relay outputs

Input specifications

Range code	2 Pt100 or Pt1000, 3-wires (-50.0 to +200.0°C) or one digital input and one pulse input, for local management	2 Pt100 or Pt1000, 3-wires 1 analogue input (20 mA or 120 mV). 1 pulse rate input (0 to 1000 Hz max.) [2TIW]	2 digital inputs for "Protection trip detection or others"
Accuracy	±(0.5%RDG + 5DGT)	±(0.2%RDG + 1DGT)	

Output specifications

Alarm	Real and virtual alarm management of all variables coming from VMU-M and VMU-P with local event logging		2 digital outputs for alarm notification of local alarms or as a digital input status changing. SPST relay type
Serial communication	Local bus: up tu 1 VMU-P and 3 VMU-O units RS485 communication port (Modbus)	Local bus: one VMU-P unit per bus	Local bus: up to 3 VMU-O units
Others		Front multicolour LED to show the status of the unit	Front multicolour LED to show the status of the unit

General specifications

Power supply	12 to 28 VDC power supply	Self-power supply from VMU-M unit	Self-power supply from VMU-M unit
Approvals / Marks	cULus approved	cULus approved	cULus approved

References

For ordering key details, please refer to www.productselection.net

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PV monitoring solution

	Aggregation server	Aggregation server
Types	Eos-Server	VMU-Y PV
Dimensions		2-DIN module
Description	Eos-Server is a cloud solution capable of aggregating information from up to 100 PV plants powered by VMU-C PV units. Data from the plants are transmitted through Internet, stored inside the embedded database and presented by the integrated web interface. Eos-Server + VMU-C PV is a solid, reliable and plug'n play architecture aimed at managing portfolios of plants	VMU-Y PV is an embedded solution capable of aggregating information from up to 10 PV plants powered by VMU-C PV units. Data from the plants are transmitted through Internet, stored inside the embedded database and presented by the integrated web interface. VMU-Y PV + VMU-C PV is a solid, reliable and plug'n play architecture aimed at managing portfolios of plants
Type	Virtual Machine Software	Micro PC
Storage memory		32 GB
Back-up memory		Micro-SD / Micro-SDHC / USB

Compatibility

Host operating system	Operating system compatible with VMWARE 64 bit technology	
Virtual machine compatibility	VMWARE 64 bit	
Hardware compatibility	64 bit architecture compatible with VMWARE 64 bit	
Cloud compatibility	Hosting providers compatible with VMWARE technology	

Software/Firmware specification

Data acquisition	By Means of Carlo Gavazzi's DP protocol	By Means of Carlo Gavazzi's DP (Data push) protocol
Integrated operating system	64 bit Linux	Embedded Linux
Integrated Data Base	Industrial class SQL relational database	Industrial class SQL relational database
User Interface	Integrated multi-user, multilingual web interface	Integrated multi-user, multilingual web interface

LED

Status and colour		One led with different colors for modem communication, data synchronization, alarms and power supply

Communication port and Output specifications

Ethernet		1 port for Internet / LAN connection
USB		1 USB "A" (for USB stick) and 1 USB "mini-A" (service port)

Connections

Ethernet		RJ-45 connector (10 / 100 Base-T)
USB		High Speed USB 2.0

General specifications

Managed VMU-C PV units	From 20 to 100	Up to 10
Software installation	By DVD containing the Eos-Server Virtual machine	
Licensing	perpetual license based on connected VMU-C PV units	
Voltage Ssupply		From 12 to 28 VDC
Power consumption		≤ 5 W
Approvals / Marks		CE - cULus listed

References

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Controls

PV monitoring solution

	Web-server	USB dongle connection module
Types	**VMU-C PV**	**VMU-D**
Dimensions HxWxD (mm)	2-DIN module	2-DIN module
Description	VMU-C is a Web-server which controls and supervises a photovoltaic installation acquiring information from Eos-Array groups, inverters and energy meters. The VMU-C provides information via Internet so data are available wherever you are. VMU-C is also capable of M2M communication by scheduling FTP uploads or by interacting with its HTTP API.	Accessory module for connecting third party USB dongle modems (3G or 4G) approved by Carlo Gavazzi to VMU-C or VMU-Y systems
Type	Micro PC	USB dongle connection module
Storage memory	4 GB	
Back-up memory	Micro-SD / Micro-SDHC / USB	
Mobile communication specifications		
SIM card		Depending on the modem unit
Compatibility		Compatible with USB modems (3G or 4G) approved by Carlo Gavazzi
Supported services		Internet communication; SMS
LED		
Status and colour	One led with different colors for internal BUS communication, communication ports, alarms and power supply	Single colour green for Power supply status
Communication port and Output specifications		
RS485	1 port for Eos-Arrays, 1 port for inverters and energy meters	
Ethernet	1 port for Internet / LAN connection	
USB	1 USB "A" (for USB stick) and 1 USB "mini-A" (service port)	1 USB "A" (for USB dongle modem connection)
Antenna		
Connector		Depending on the modem unit
Type		Depending on the modem unit
Connections		
RS485	3 screw terminals per port	
Ethernet	RJ-45 connector (10 / 100 Base-T)	
USB	High Speed USB 2.0	
General specifications		
Voltage supply	From 12 to 28 VDC	From 12 to 28 VDC
Power consumption	≤ 5 W	IN/OUT connection to supply also the VMU-C / VMU-Y unit; consumption depending on the connected optional modules (range: from 8.6W to 18.6W)
Approvals / Marks	CE - cULus listed	CE - cULus listed
References		
	For ordering key details, please refer to www.productselection.net	

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PV monitoring solution

EOS-Array solar control solution

Types	VMU-M	VMU-S	VMU-P
Dimensions HxWxD (mm)	1-DIN module	1-DIN module	1-DIN module
Description	Master unit 6-DGT readout	String unit, with built-in protection fuseholder	Environment variable measurement unit
Function	VMU-M performs the local bus management of VMU-S, VMU-P both measuring units and VMU-O I/O unit	Variables measuring unit, DC current, voltage, power and energy metering. String control and efficiency mesurement	PV module temperature, air temperature, sun irradiation and wind speed metering
Input specifications			
Range code	2 Pt100 or Pt1000, 3-wire (-50.0°C to +200.0°C) or one digital input and one pulse input. [T2]	Direct connections 16 A / 1000 VDC [AV10]. Measurements: V, A, W, Wh	2 Pt100 or Pt1000, 3-wire (PV and air temperature). 1 irradiance input (up to 120 mV [2TIW] or 4-20 mA [2TCW]). 1 wind speed input (0 to 1000 Hz max.)
Accuracy	±(0.5% RDG + 5DGT)	±(0.5% RDG + 2DGT)	±(0.2% RDG + 1DGT)
Output specifications			
Alarm	Real and virtual alarm management of all variables coming from VMU-M, VMU-S, and VMU-P with event logging		
Serial communication	Local bus: up tu 15 mixed VMU-S, VMU-P and VMU-O units RS485 communication port (Modbus) [S1]	Local bus: up tu 15 VMU-S units in the same bus [S]	Local bus: one VMU-P unit per bus [S]
Others	Data logger (V, A, W, PV cell and air temperature, irradiation, wind speed) DC/AC efficiency	Diagnostics functions: antitheft control, fuse blow detection, wrong PV panel connection. Front multicolour LED to show the status of the unit	Front multicolour LED to show the status of the unit
General specifications			
Power supply	12 to 28 VDC power supply [A]	Self-power supply from VMU-M unit [X]	Self-power supply from VMU-M unit [X]
Approvals / Marks	CE - cULus Listed	CE - cULus Listed	CE - cULus Listed
References			
	For ordering key details, please refer to www.productselection.net		

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PV monitoring solution

EOS-Array solar control solution

Types	VMU-O...AT	VMU-AT
Dimensions HxWxD (mm)	1-DIN module	1-DIN module
Description	Inputs/outputs unit	Optical fiber anti-theft sensor
Function	VMU-O allows to add, for every single unit, available in the local bus two digital inputs and two relay outputs. Optical fiber anti-theft alarm [I3R1AT] with VMU-AT module	Optical fiber interruption alarm. Up to 200 m lenght of optical fiber loop

Input specifications

Range code	2 digital inputs for "Protection trip detection or others" [I2]	Optical fiber plastic type PF0221000

Output specifications

Alarm	2 digital outputs for alarm notification as string alarm or as a digital input status changing. SPST relay type. [R2]	NPN or PNP
Serial communication	Local bus: up to 7 VMU-O units	
Others	Front multicolour LED to show the status of the unit	

General specifications

Power supply	Self-power supply from VMU-M unit [X]	Self power supply through VMU-O AT unit [X]
Approvals / Marks	CE - cULus Listed	CE

References

For ordering key details, please refer to www.productselection.net

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PV monitoring solution

EOS-Array Lite solar control solution

Types	VMU-ML	VMU-S0	VMU-P
Dimensions HxWxD (mm)	1-DIN module	1-DIN module	1-DIN module
Description	Master unit 6-DGT readout	String unit, with built-in protection fuseholder	Environment variable measurement unit
Function	VMU-ML performs the local bus management of VMU-S0, VMU-P both measuring units and VMU-O output unit	Variables measuring unit, DC current and voltage	PV module temperature, air temperature, sun irradiation
Input specifications			
Range code		Direct connections 16 A / 1000 VDC [AV10]. Measurements: V, A	1 Pt100 or Pt1000, 3-wire (PV and air temperature). 1 irradiation input (up to 120 mV [1TI] or 4 - 20 mA [2TCW])
Accuracy		±(0.5%RDG + 2DGT)	±(0.2%RDG + 1DGT)
Output specifications			
Alarm	Single real or virtual alarm management of all variables coming from VMU-ML, VMU-S0, and VMU-P with event logging		
Serial communication	Local bus: up tu 15 mixed VMU-S0, VMU-P and VMU-O units RS485 communication port (Modbus) [S1]	Local bus: up tu 15 VMU-S0 units in the same bus [S]	Local bus: one VMU-P unit per bus [S]
Others	Front dual colour LED to show the status of the unit	Diagnostics functions: wrong PV panel connection	Front multicolor LED to show the status of the unit
General specifications			
Power supply	12 to 28 VDC power supply [A]	Self-power supply from VMU-ML unit [X]	Self-power supply fromVMU-ML unit [X]
Approvals / Marks	CE - cULus Listed	CE - cULus Listed	CE - cULus Listed
References			
	For ordering key details, please refer to www.productselection.net		

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Controls