DATA SHEET

Vibro-Meter®

VM600 AMC8 and IOC8T analog monitoring card pair

AMC8   IOC8T

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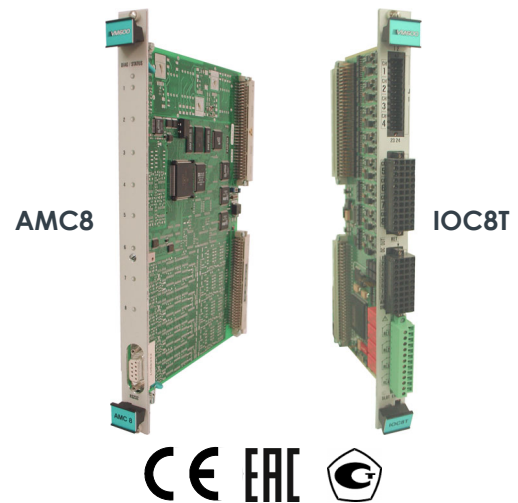
KEY FEATURES AND BENEFITS

- From the Vibro-Meter® product line

- Card pair providing 8 channels of temperature and process monitoring for VM600 systems

- 8 channels of software configurable functions: thermocouple (TC), resistance temperature detector (RTD), current and voltage inputs

- Analog signal inputs in 0 to 25 mA and 0 to 10 V range on any channel

- Cold-junction compensation (CJC) sensor processing on two selectable channels

- Current outputs (optionally, voltage outputs)

- Programmable Alert, Danger and OK set points

- Contains 4 relays which can be attributed to alarm signals, under software control

- Control outputs to RLC16 relay cards in a VM600 rack

- Front-panel LEDs indicate status and alarms

KEY BENEFITS AND FEATURES *(continued)*

- Live insertion and removal of cards (hot-swappable)

- Available in "standard" and "separate circuits" versions

APPLICATIONS

- Machinery protection and/or condition monitoring

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DESCRIPTION

AMC8 card

The AMC8 is an analog monitoring card designed for use with the VM600 rack-based systems for machinery monitoring and protection applications, from Meggitt's Vibro-Meter® product line. This versatile card is capable of measuring and monitoring up to eight analog signal inputs simultaneously.

The AMC8 card is available in two versions: a "standard" version and a "separate circuits" version, both of which function as a card pair using an appropriate IOC8T input/output card.

The AMC8 card is installed in the front of a VM600 rack (ABE04x or ABE056) and the IOC8T input/output card is installed in the rear. Both cards connect directly to the rack's backplane via two connectors.

An AMC8/IOC8T card pair provides eight channels of temperature monitoring, accepting both resistance temperature detector (RTD) and thermocouple (TC) temperature inputs, as well as process inputs. The source and type for each channel is selected when the card is configured.

Cold-junction compensation (CJC) sensor processing, used for the thermocouple temperature channels, is available on two of the eight channels and is also selected when the card is configured.

All inputs are conditioned and compared against user-configurable alarms, which are defined using the VM600 MPSx software from Meggitt.

An AMC8/IOC8T card pair is configured using the RS-232 port located on the front panel of the associated AMC8 card (that is, standalone operation). The AMC8 card can also be accessed via the VME bus by a CPUx card present in slot 0 of the VM600 rack (ABE04x only). These interfaces allow operators to configure VM600 cards, access measurement results, view detailed board status, upload firmware updates and much more.

The AMC8 card can drive four local relays on the IOC8T card, as well as any of the 16 relays on an RLC16 card using the VM600 rack's Raw bus and/or Open Collector (OC) bus.

The cards also provide current-based (0 to 25 mA) analog signal outputs. Optionally, voltage-based output is also supported.

Applications information

The AMC8/IOC8T card pair is highly suitable for machinery monitoring and protection in a wide range of industrial applications.

For further information on the use of AMC8/IOC8T card pairs in general, refer to the *VM600 machinery protection system (MPS) hardware manual* and the *VM600 MPSx software manuals*.

For specific applications, contact your local Meggitt representative.

SPECIFICATIONS

Sensor inputs

Thermocouple (TC) processing	: Accepted TC types and temperature ranges: • Type E (NiCr-CuNi): −270 to +1000°C (−454 to +1832°F). • Type J (Fe-CuNi): −210 to +760°C (−346 to +1400°F), API 670 standard. • Type K (NiCr-NiAl): −270 to +1372°C (−454 to +2501°F). • Type T (Cu-CuNi): −270 to +400°C (−454 to +752°F). • User-defined (user entry of linearising polynomial functions). Accuracy: 0.3°C (0.54°F) or 0.3% of measuring range. Resolution: 0.1°C (0.18°F).
Resistance temperature detector (RTD) processing	: Accepted RTD types and temperature ranges: • Pt100, 100 Ω at 0°C, 3-wire and 4-wire platinum RTD (alpha = 0.00385): −200 to +850°C (−328 to +1562°F), API 670 standard. • Pt100, 100 Ω at 0°C, 3-wire and 4-wire platinum RTD (alpha = 0.00392): −200 to +700°C (−392 to +1292°F). • Ni, 120 Ω, 3-wire and 4-wire nickel RTD: −80 to +260°C (−112 to +500°F). • Cu10, 10 Ω at 25°C, 3-wire and 4-wire copper RTD: −100 to +260°C (−148 to +500°F). • User-defined (user entry of linearising polynomial functions). Accuracy: 0.3°C (0.54°F) or 0.3% of measuring range, except for Cu10 (1°C (1.8°F) or 1% of measuring range). Resolution: 0.1°C (0.18°F). Accepted RTD wiring schemes: 2-, 3-, and 4-wire for any RTD type.
DC current (process input) processing	: • Total range 0 to 25 mA. • Measuring resistor 50 Ω. • Fuse-protected with 50 mA self-resetting fuse. Resistance seen from input: the sum of fuse and measuring resistor resistance is maximum 100 Ω, typically 55 Ω. • Positive polarity input only. • Accuracy: 0.5% of total range, that is, 125 µA.
DC voltage (process input) processing	: • Total range 0 to 10 V. • Input resistance 100 kΩ. • Positive polarity input only. • Accuracy: 0.5% of total range, that is, 50 mV.
Cold-junction compensation (CJC) processing	: • Uses any type of temperature sensor. • External compensation for accuracy, that is, no on-board temperature sensor. • Results can be sent to any other AMC8/IOC8T card pairs in the same VM600 rack.

Note: When an AMC8/IOC8T measurement channel is configured for operation with thermocouple (TC) sensors, the sensor input does not support line-fault detection of conditions such as an open-circuit.

Discrete signal interface (DSI) inputs

Control signal

• Alarm reset (AR)	: A closed contact between the DSI AR and RET inputs resets the alarms latched by the AMC8/IOC8T card pair
• Danger bypass (DB)	: A closed contact between the DSI DB and RET inputs inhibits (bypasses) the danger relay outputs
Operating principle	: Detection of an open circuit or a closed circuit on the input

SPECIFICATIONS *(continued)*

Processing options

Time to refresh all relays, analog and VME outputs	: ≤100 ms

Functional checking : • Detection of sensor line failures.
- Built-in-test capability to detect abnormal operating modes and board failure.
- Slot coding ensures the AMC8 does not start processing with an IOC8T in the wrong slot.
- Cards can be inserted into or removed from a powered ("hot") rack without disturbing cards in other VM600 slots.

Single-channel processing (also referred to as time domain processing) : Time parameter configurable to calculate any of the following:
- Direct output (bypass).
- Average over a period of time.
- Maximum value over a period of time.
- Minimum value over a period of time.

Multi-channel processing : Four simultaneous multi-channel processing functions are available to calculate:
- Average of 2 to 8 temperatures.
- Temperature difference on two channels.
- Minimum of between 2 and 8 temperatures.
- Maximum of between 2 and 8 temperatures.

Alarm functions : The following alarm functions are configurable and freely attributable to any channel:
- Detection of over-level (A+, D+) and under-level (A−, D−) alarms.
- Alarm levels.
- Whether the alarm is latched/unlatched.
- Alarm delay time.
- Hysteresis value (within range).
- AND, OR and NOT logical operators, with majority voting logic.
- Logical combinations, from 16 basic and 8 advanced functions.

Alarm outputs

Alarm relays : 4 per IOC8T card.
The AMC8 card can drive the four local relays on the IOC8T card, as well as relays on RLC16 relay cards and/or IRC4 intelligent relay cards using the VM600 rack's Raw bus or Open Collector (OC) bus. For IOC8T relays, see **Relay characteristics on page 5**. For RLC16 or IRC4 relays, refer to the corresponding data sheet.

Note: In a VM600 rack (ABE4x), the Open Collector (OC) bus and/or Raw bus can be used to connect up to 32 outputs from an AMC8/IOC8T card pair to RLC16 relay cards or IRC4 intelligent relay cards in the same rack, if additional relays are required.

Analog (DC) outputs

|	
Number of outputs	: 8 per IOC8T card (one per AMC8 channel)
Signal range	: 4 to 25 mA current outputs (440 Ω load)
Accuracy	: ≤± 1.5%
Linearity error	: ≤± 0.5%
Admissible load on output	: ≤440 Ω for signal range up to 25 mA.
	≤500 Ω for signal range up to 20 mA.

Note: Output units can be different from input units.

SPECIFICATIONS *(continued)*

Relay characteristics

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Relay names	: RL1 to RL4
Type	: PE014005
Contact arrangement	: 1 x COM, 1 x NC or 1 x NO contact/relay (user configurable). All relay contacts are available on J4, the relay output connector.
Nominal rated voltage	: 250 V_{AC}
Nominal rated current	: 5 A_{AC}
Maximum breaking capacity (without contact protection)	: 1250 VA

Maximum DC load breaking capacity curve:
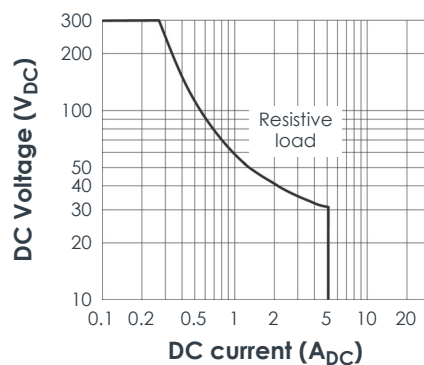
Operate / release / bounce time	: Typically 8 / 8 / 6 ms
Dielectric strength test voltages	
• Between open contacts	: 1000 V_{AC}
• Between contact and coil	: 4000 V_{AC}
Mechanical life	: 15 x 10^6 operations
Electrical life	: >10^5 operations

⚠ **When used in a VM600 slimline rack (ABE056) with a DC power supply, the relay contacts on an IOC8T card have a maximum switching voltage of 70 V_{DC} / 33 $V_{AC\ (RMS)}$ (46.7 $V_{AC\ (PEAK)}$).**

Environmental

Temperature
• Operating	: −25 to 65°C (−13 to 149°F)
• Storage	: −40 to 85°C (−40 to 185°F)

Humidity
• Operating	: 0 to 90% non-condensing
• Storage	: 0 to 95% non-condensing

SPECIFICATIONS *(continued)*

Approvals

Conformity	: CE marking, European Union (EU) declaration of conformity. EAC marking, Eurasian Customs Union (EACU) certificate/ declaration of conformity.
Electromagnetic compatibility	: IEC/EN 61000-6-2 and IEC/EN 61000-6-4. TR CU 020/2011.
Electrical safety	: IEC/EN 61010-1. TR CU 004/2011.
Vibration	: IEC 60255-21-1 (Class 2)
Insulation coordination for measuring relays and protection equipment	: Separate circuits according to IEC 60255-5 for the "separate circuits" versions of the AMC8 and IOC8T
Environmental management	: RoHS compliant
Russian federal agency for technical regulation and metrology (Rosstandart)	: Pattern approval certificate CH.C.28.004.A N° 60224

Communications

VME bus	: A24/D16 slave mode
RS-232 port	: Configuration port, proprietary protocol (see **Connectors on page 7**)
AMC8 to IOC8T bus	: Similar to industry pack (IP)

Note: The VME bus provides access to the AMC8/IOC8T card pair via a CPUx card, in order to support Ethernet and/or fieldbus communications. The RS-232 port (front-panel serial interface) provides access to the AMC8/ IOC8T card pair for standalone operation, that is, when a CPUx card is not installed in the VM600 rack. An AMC8/IOC8T card pair is software configurable via VME or RS-232 (see **Configuration on page 6)**.

Configuration

AMC8/IOC8T card pair	: Software configurable via an RS-232 or Ethernet connection, using a computer running the VM600 MPSx software. Hardware configurable using jumpers on the AMC8/IOC8T card pair.

Note: Configuration via an Ethernet connection requires a CPUx card acting as a rack controller in the VM600 rack.

Status indicators (LEDs)

AMC8

• DIAG/STATUS	: One multicolour (green/yellow/red) LED used to indicate the status of the AMC8/IOC8T card pair, such as normal operation, configuration status or internal hardware or firmware failures
• 1 to 8	: Eight multicolour (green/yellow/red) LEDs used to indicate the status of the individual measurement channels

IOC8T

• SLOT ERROR	: Used to indicate whether the IOC8T is installed in the correct slot of the VM600 rack

SPECIFICATIONS *(continued)*

Power supply to card pair (input)

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Power source : VM600 rack power supply

Supply voltages : +5 V_{DC} and ±12 V_{DC}

Consumption from +5 V_{DC} supply : <5 W maximum (sum of AMC8 and IOC8T cards)

Consumption from ±12 V_{DC} supply : <3 W maximum:
8 × 20 mA for the analog (DC) outputs on the +12 V_{DC} = 2 W,
otherwise 40 mA maximum on +12 V_{DC} and −12 V_{DC}

Connectors

AMC8

RS232 : 9-pin D-sub connector (DCE), female.
Serial connection for communication between the AMC8/IOC8T
card pair and a computer running the VM600 MPSx software.

IOC8T

• J1 : 24-pin screw-terminal connector (male),
compatible with 24-pin B2L/S2L 3.5 plug-in connectors (female).
Inputs (analog signals) for measurement channels 1 to 4.

• J2 : 24-pin screw-terminal connector (male),
compatible with 24-pin B2L/S2L 3.5 plug-in connectors (female).
Inputs (analog signals) for measurement channels 5 to 8.

• J3 : 20-pin screw-terminal connector (male),
compatible with 20-pin B2L/S2L 3.5 plug-in connectors (female).
Outputs (analog signals) for DC outputs 1 to 8.
Inputs (digital signals) for DSI control signals: AR and DB.

• J4 : 12-pin screw-terminal connector (male),
compatible with 12-pin MC/STF 3.81 plug-in connectors (female).
Outputs (contacts) for relays RL1 to RL4.

Physical

AMC8

• Height : 6U (262 mm, 10.3 in)

• Width : 20 mm (0.8 in)

• Depth : 187 mm (7.4 in)

• Weight : 0.4 kg (0.88 lb) approx.

IOC8T

• Height : 6U (262 mm, 10.3 in)

• Width : 20 mm (0.8 in)

• Depth : 125 mm (4.9 in)

• Weight : 0.25 kg (0.55 lb) approx.

ORDERING INFORMATION

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To order please specify

Type	Designation		Ordering number (PNR)
AMC8	Different versions of the VM600 analog monitoring card		
		– Standard	200-550-0SS-1Hh
		– Separate circuits	200-550-0SS-2Hh
IOC8T	Different versions of the input/output card for the AMC8		
		– Standard	200-580-000-1Hh
		– Separate circuits	200-580-000-2Hh

Notes
"SS" represents the firmware (embedded software) version and "Hh" the hardware version. "H" increments for major modifications that can affect product interchangeability. "h" increments for minor modifications that have no effect on interchangeability.

RELATED PRODUCTS

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ABE04x	VM600 system racks	: Refer to corresponding data sheet
ABE056	VM600 slimline rack	: Refer to corresponding data sheet
CPUM and IOCN	VM600 modular CPU card and input/output card Note: With a front-panel display and support for Modbus RTU/TCP or PROFINET	: Refer to corresponding data sheet
CPUR and IOCR	VM600 rack controller and communications interface card pair Note: With rack controller redundancy and support for Modbus RTU/TCP	: Refer to corresponding data sheet
CPUR2 and IOCR2	VM600 rack controller and communications interface card pair Note: With mathematical processing of fieldbus data and support for Modbus TCP and PROFIBUS	: Refer to corresponding data sheet
IRC4	VM600 intelligent relay card	: Refer to corresponding data sheet
MPC4 and IOC4T	VM600 machinery protection card pair	: Refer to corresponding data sheets
MPC4G2 and IOC4G2	VM600 machinery protection card pair	: Refer to corresponding data sheet
RLC16	VM600 relay card	: Refer to corresponding data sheet
RLC16G2	VM600 relay card	: Refer to corresponding data sheet
XMx16 and XIO16T	VM600 condition monitoring card pairs	: Refer to corresponding data sheet

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The Energy & Equipment division includes the Energy Sensing and Controls product group that specialises in sensing and monitoring solutions for a broad range of energy infrastructure, and control valves for industrial gas turbines, primarily for the Power Generation, Oil & Gas and Services markets. Energy & Equipment is headquartered in Switzerland (Meggitt SA) and incorporates the Vibro-Meter® product line, which has over 65 years of sensor and systems expertise and is trusted by original equipment manufacturers (OEMs) globally.

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