MEGGiTT
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extreme environments

AMC8 and IOC8T

VM600 analog monitoring card and input/output card

FEATURES

» From the Vibro-Meter® product line

» Two cards 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)

» Four relay outputs attributable to alarm signals under software control

» Control outputs to RLC16 relay cards in a VM600 rack

» Front panel LEDs indicate status and alarms

» Live insertion and removal of cards

» Available in 'standard' and 'separate circuits' versions

APPLICATIONS

» Machinery protection and/or condition monitoring
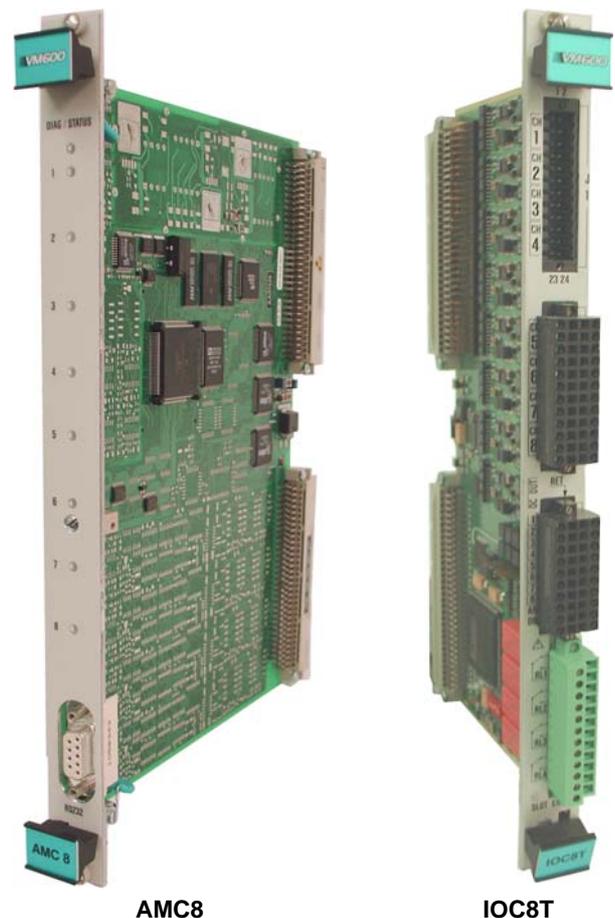
AMC8   IOC8T

CE EAC Ⓖ

DESCRIPTION

The AMC8 is an analog monitoring card designed for use with the VM600 rack-based systems for machinery monitoring and protection applications, from Meggitt Sensing Systems' 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 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 for each channel is selected during the cards' configuration.

Cold-junction compensation (CJC) sensor processing, used for the thermocouple temperature channels, is available on two of the eight channels and is selected during the cards' configuration.

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

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 CPUM card present in slot 0 of the VM600 rack. These interfaces allow operators to configure the card set, 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 or open collector (OC) bus.

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

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

Refer to the *VM600 machinery protection system (MPS) hardware manual* and the *VM600 MPSx software manuals* for further information.

For specific applications, contact your nearest Meggitt Sensing Systems 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 a measurement channel of an AMC8/IOC8T card pair 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 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−) switching.* • *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.*

Outputs

|		
Alarm relays	:	The AMC8 card can drive the 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 or open collector (OC) bus. For IOC8T card relay features, see Relay characteristics on page 5. For further information on the RLC16 relays, refer to the corresponding data sheet.
Front panel LEDs	:	The AMC8 card provides the following LEDs on the front panel: • *One red/yellow/green LED showing the board status.* • *Eight red/yellow/green LEDs showing the channel status.*
Analog outputs		• *Current output is standard, voltage output can be preset at factory.* • *Current output: 0 to 25 mA range, with 440 Ω maximum resistor, 0 to 20 mA range with 500 Ω resistor.* • *Voltage output: 0 to 10 V range, minimum load resistance of 10 kΩ.* • *Output units may be different from input units.* • *Accuracy ≤ ±0.5%.* • *Linearity ≤ ±0.5%.*

SPECIFICATIONS *(continued)*

Relay characteristics

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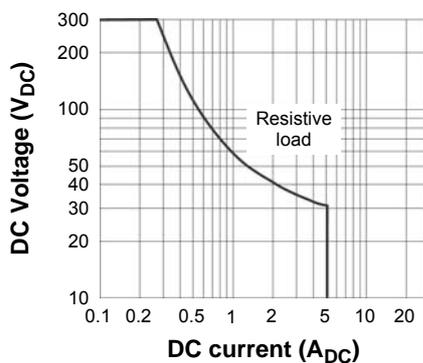
Operate / release / bounce time	: Typically 8 / 8 / 6 ms
Dielectric strength test voltages	
• *Between open contacts*	: 1000 V_{AC}
• *Between contact and coil*	: 4000 V_{AC}
Mechanical life	: 15 x 10^6 operations
Electrical life	: $>10^5$ operations

⚠ **When used in a VM600 Slimline rack (ABE056) with a DC power supply, the relay contacts on a 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.
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
Vibration	: IEC 60255-21-1 (Class 2 vibration response, Class 1 vibration endurance). IEC 60255-22-1 (Class 3). IEC 60255-22-4 (Level 4).
Environmental management	: RoHS compliant (2011/65/EU)
Russian federal agency for technical regulation and metrology (Rosstandart)	: Pattern approval certificate CH.C.28.004.A N° 60224, dated 11.11.2015

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 CPUM 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 CPUM 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 CPUM card acting as a 'rack controller' in the VM600 rack.

Status indicators (LEDs)

AMC8 card

• *DIAG/STATUS*	: 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*	: Used to indicate the status of the individual measurement channels

IOC8T card

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

Power supply to card pair (input)

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 x 20 mA for the analog output on the +12 V_{DC} = 2 W, otherwise 40 mA maximum on +12 V_{DC} and −12 V_{DC}.

SPECIFICATIONS *(continued)*

Connectors

AMC8 card

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 card

• *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 card

• *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 card

• *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

To order please specify

Type	Designation	Ordering number (PNR)
AMC8	Different versions of the VM600 analog monitoring card:	
	– Standard version	200-550-0SS-1Hh
	– Separate circuits version, in accordance with the IEC 60255-5 standard	200-550-0SS-2Hh
IOC8T	Different versions of the input/output card for the AMC8:	
	– Standard version	200-580-000-1Hh
	– Separate circuits version, in accordance with the IEC 60255-5 standard	200-580-000-2Hh

Note: '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

ABE040 and ABE042	VM600 system rack	: 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	: Refer to corresponding data sheet
MPC4 and IOC4T	VM600 machinery protection card and input/output card	: Refer to corresponding data sheets
RLC16	VM600 relay card	: Refer to corresponding data sheet

Headquartered in the UK, Meggitt PLC is a global engineering group specializing in extreme environment components and smart sub-systems for aerospace, defence and energy markets.

Meggitt Sensing Systems is the operating division of Meggitt specializing in sensing and monitoring systems, which has operated through its antecedents since 1927 under the names of ECET, Endevco, Ferroperm Piezoceramics, Lodge Ignition, Sensorex and Vibro-Meter. Today, these operations are integrated under one strategic business unit called Meggitt Sensing Systems, headquartered in Switzerland and providing complete systems, using these renowned brands, from a single supply base.

The Meggitt Sensing Systems facility in Fribourg, Switzerland operates as the legal entity Meggitt SA (formerly Vibro-Meter SA). This site produces a wide range of vibration, dynamic pressure, proximity, air-gap and other sensors capable of operation in extreme environments, electronic monitoring and protection systems, and innovative software for aerospace and land-based turbomachinery.

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