WINNER
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CONTROL
ENGINEERING
EDITOR'S CHOICE AWARD

MCM Catalogue

Artesis A.S. July 2002

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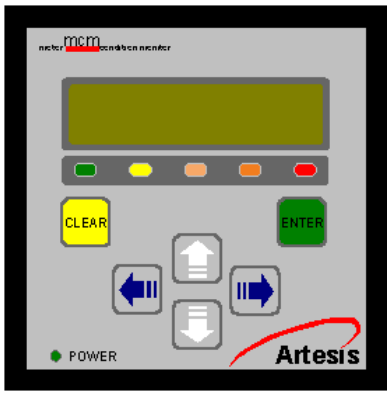
Contents



Artesis' revolutionary Motor Condition Monitor (MCM) uses the techniques of experimental modelling to assess and monitor the condition of electrical motors. Using only current and voltage signals, MCM can predict electrical and mechanical failures in both the monitored electric motors and any systems that may be connected to the motor. Detectable conditions include faulty bearings, misalignment errors, load imbalance and both rotor and stator faults.

In addition, many MCM units can be connected together into a network for remote monitoring of the status of each attached motor. A user at a remote host pc can observe the current status of all monitored units and detect immediately if a motor system begins to degrade significantly.

MCM is both easy to install and to use as a predictive maintenance tool. Using MCM, maintenance operators can schedule their work programme with confidence and at times convenient to plant operation. The more degradation a motor has suffered, the more severe the fault indication and the sooner maintenance should be scheduled.

Stand-alone usage

- Fault severity indication of both motor and driven system
- Observation of both electrical and mechanical faults
- 3 phase RMS voltage and current values
- Phase angle
- Active power
- Current and voltage phase ordering
- Current and voltage balance
- Harmonic content and total harmonic distortion up to 13th harmonic for a selected input channel

PC Networking

- Monitoring of multiple MCM units over industry standard RS 485 network.
- Monitoring and trending of selectable physical and derived parameters.
- Remote motor system fault warning by email.

PLC Monitoring

- Status monitoring using simple relay output or RS 485 serial link
- Monitoring of important physical parameters for SCADA or PAM interfacing

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Motor options

1. Low voltage motors

380 – 480 VAC (phase – phase)

Line driven motors

Max Motor current (A)	Sensor units			Power supply			MCM unit	
	Part No	Qty	Page	Part No	Qty	Page	Part No	Page
0 – 1500	User supplied current transformers	3	5	N/A	N/A	N/A	**MCM01L1-E-480-NS**	4

Inverter driven motors

Max motor current (A)	Sensor units			Power supply			MCM unit	
	Part No	Qty	Page	Part No	Qty	Page	Part No	Page
50	**ART-MCM0010**	1	5	**ART-MCM0007**	1	6	**MCM01L0-E-480-L**	4
100	**ART-MCM0011**	1	5	**ART-MCM0007**	1	6	**MCM01L0-E-480-L**	4
200	**ART-MCM0012**	1	5	**ART-MCM0007**	1	6	**MCM01L0-E-480-M**	4
300	**ART-EL30005**	3	5	**ART-MCM0007**	1	6	**MCM01L0-E-480-M**	4
500	**ART-EL30006**	3	5	**ART-MCM0008**	1	6	**MCM01L0-E-480-M**	4
1000	**ART-EL30004**	3	5	**ART-MCM0009**	3	6	**MCM01L0-E-480-H**	4
1500	**ART-EL30008**	3	5	**ART-MCM0007**	3	6	**MCM01L0-E-480-H**	4

Ordering Key:

MCM	01L	T	-	L	-	480	-	AA

Drive type: 0 Inverter; 1 Line
Sensor current: L 50/100A; M 200/300/500A; H 1000/1500; NS Not Specified

2. Medium/High voltage motors

100 VAC (phase – neutral), using voltage transformers

Line driven motors

Max motor current (A)	Sensor units			Power supply			MCM unit	
	Part No	Qty	Page	Part No	Qty	Page	Part No	Page
1500	User supplied current transformers	3	5	N/A	N/A	N/A	**MCM01H-E-L**	4
	User supplied voltage transformers	3	5				**MCM01H-E-A**	4

Ordering Key:

MCM	01H	-	E	-	T

Transformer connection type: L direct line; A aron

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Mechanical:

- Front panel mounting
- Dimensions: 96 mm (H) 96 mm(W) x 130 mm (D). Cutout 90 x 90
- Enclosure: Aluminium, RAL 7032 surface protection

Electrical:

- Voltage and current connectors: Lockable type, 28-12 AWG cabling
- Digital outputs: 1 assignable relay, user programmable. 24V NC/NO contacts
- Update period: 60-120 sec.
- Display: Backlit alphanumeric LCD, 2 lines x 16 characters
- Keypad: 6 tactile membrane keys
- Communications: 4 wire RS485, up to 19,200 Baud, proprietary protocol

Operating Environment:

- Operation: Continuous
- Ambient temperature: 0 - 40°C,above 40° loss of sensivitiy up to max 60° C
- Class: IP 20
- Humidity: %90 RH, non-condensing

Compliant standards:

- EN 55011
- EN 61000
- EN 60555
- EN 50011F
- EN 60529
- IEC 529

MCM for Low-Voltage Motors (Squirrel cage motors)

	Line type	Inverter types
Part numbers	**MCM01L1-E-480-NS**	**MCM01L0-E-480-XX**

Input line power specifications

Voltage	90 – 240 VAC	90 – 240 VAC
Power	15 W	15 W
Frequency	50 – 60 Hz	50 – 60 Hz

Measurement inputs

Nominal supply frequency, f_n	50 – 60 Hz	25 - 100 Hz
Line-Line RMS input voltages	380 – 480 VAC	380 – 480 VAC
Nominal input current range	±5A	±250 mA (depends on sensor)

Important note: MCM units for line driven systems (MCM01L1-E-480-NS) require three external 5A secondary current transformers. Inverter types (MCM01L0-E-480-XX) require external Hall effect sensors or assemblies. Please refer to the Current and Voltage Sensors section (page 5) for further details.

MCM is not recommended for use with inverter systems operating at chopping frequencies lower than 5kHz.

MCM for Medium and High-Voltage Motors

	Standard connection type	Aron connection type
Part numbers	**MCM01H-E-L**	**MCM01H-E-A**

Input power specifications

Input power Voltage	90 – 240 VAC
Power	12 W
Frequency	50 – 60 Hz

Measurement inputs

Nominal frequency, f_n	50 – 60 Hz
Nominal input voltage range	±100 V
Nominal input current range	±5A

Important note: All medium/high voltage MCM units require three external 5A secondary current transformers and three 100V secondary voltage transformers of appropriate primary inputs. Please refer to the Current and Voltage Sensors section (page 5) for further details.

Line Driven systems:

Industry standard current transformers should be chosen according to the expected current values over all line voltage ranges. Voltage transformers should be used for medium and high voltage applications but are not required for low voltage motors.

Transformer specifations:

Current Transformers	Voltage Transformers
Secondary current : 5A, Class 0.5. *Low Voltage*: IEC 60044-1, ANSI 57.13 *Medium/High Voltage*: IEC 1851987, ANSI CS71978	*Secondary voltage:* 100V, Class 0.5 *Medium/High Voltage*: IEC 1861987

Inverter systems:

Three external closed loop-Hall effect type current sensors must be used, one for each phase. The type of sensor depends on the maximum power and current of the motor to be monitored, and should be selected accordingly. For current values up to and including 200A, the specified part contains three sensors. For larger currents however, each specified part contains a single sensor. **Three such parts must be purchased, one for each phase.** Power supplies of appropriate voltage must be purchased in each case (please refer to page 6).

Three current-sensor assemblies

	50 A	100 A	200 A
Part No	**ART-MCM0010**	**ART-MCM0011**	**ART-MCM0012**
Primary nominal current	50 A_{RMS}	50 A_{RMS}	200 A_{RMS}
Secondary nominal current,I_s	50 mA_{RMS}	50 mA_{RMS}	100 mA_{RMS}
Conversion ratio	1:1000	1:1000	1:2000
Current consumption (mA)	10 (@ ±15 V) + I_s	10 (@ ±15 V) + I_s	16 (@ ±15 V) + I_s
Power supply	ART-MCM0007	ART-MCM0007	ART-MCM0007

Single current-sensor

	300 A	500 A	1000 A	1500 A
Part No	**ART-EL30005**	**ART-EL30006**	**ART-EL30004**	**ART-EL30008**
Primary nominal current	300 A_{RMS}	500 A_{RMS}	1000 A_{RMS}	2000 A_{RMS}
Secondary nominal current, I_s	150 mA_{RMS}	100 mA_{RMS}	200 mA_{RMS}	400 mA_{RMS}
Conversion ratio	1:2000	1:5000	1:5000	1:5000
Current consumption (mA)	16(@±15 V)+ I_s	24(@±18V) + I_s	20(@±24V)+I_s	30(@±15V)+ I_s
Power supply voltages	0, ± 15 V	0, ± 18 V	0, ± 24 V	0, ± 15 V
Minimum regulation	2%	2%	2%	2%
Power supplies (no of units)	ART-MCM0007 (1)	ART-MCM0008 (1)	ART-MCM0009 (3)	ART-MCM0007 (3)

Sensor Power Supplies

	±15 V	±18 V	±24 V
Part No	**ART-MCM0007**	**ART-MCM0008**	**ART-MCM0009**
External power supply for use with sensor part no:	ART-EL30005 ART-EL30008 ART-MCM0010 ART-MCM0011 ART-MCM0012	ART-EL30006	ART-EL30004
Input voltage	90 - 130 VAC	90 - 130 VAC	90 - 130 VAC
DC output voltage (V)	+15, 0, -15 (±2%)	+18, 0, -18 (±2%)	+24, 0, -24 (±2%)
Maximum output current	500 mA	500 mA	500 mA

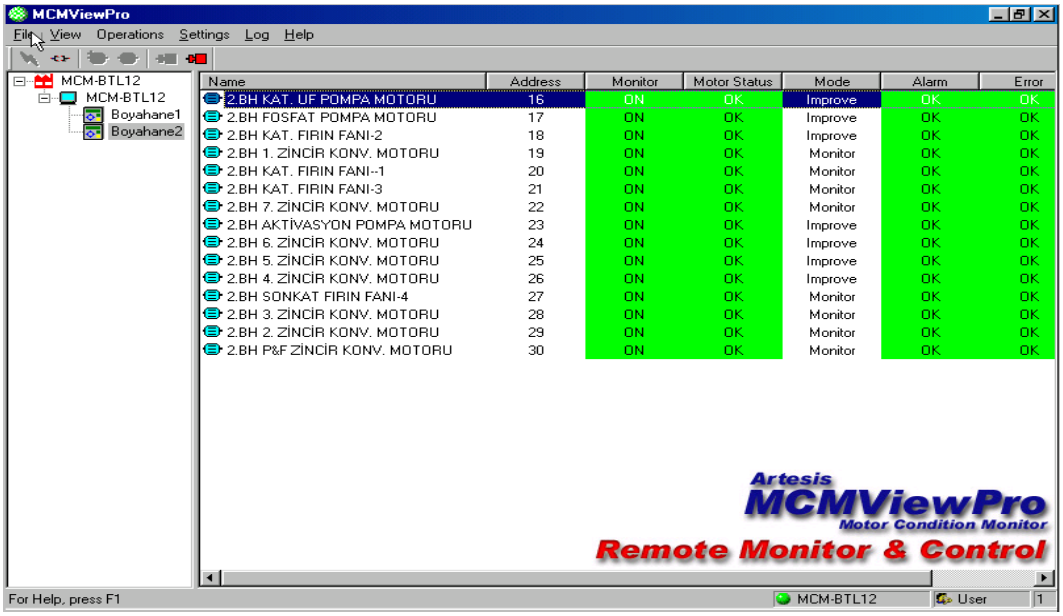
Networking Accessories

RS232-485 Converter	**Part No: ART-MCM0001**

In cases where the standard RS 232 ports of the PC are used for communications, a converter is needed between and the RS 485 network used by MCM and the serial ports. In addition to its function as a converter, this device also electrically isolates the network from the PC providing enhanced noise rejection in aggressive EMI environments

Properties:

- Supported modes: 4 wire, RS485
- Input/Output isolation: Full optical isolation on inputs and outputs
- Maximum transfer rate: 19,200 Baud



MCMViewPro is a software package for viewing and displaying data from one or more MCM units. With its graphical interface, MCMViewPro allows the user to obtain and display data in real-time from networked devices, to configure the performance of the devices and to save and subsequently retrieve data for display from its database, in a transparent and intuitive manner. Modern networking procedures permit monitoring of processes on remote machines using TCP/IP protocols over the Ethernet. MCMViewPro harnesses the power afforded by these techniques and allows remote access to the database so that the status of motors monitored by MCM can be viewed from within the local area network. Additionally, motor faults can be reported by e-mail to selected users in real-time.

Minimum PC Requirements

- Pentium III 500 MHz processor
- Windows NT 4.0 / Windows 2000 operating system
- 128 kbytes RAM
- Min. 2Gbyte hard disk
- CD Rom drive

MCMViewPro Monitoring Software	**Part No: ART-SWFULL00**

Please note that MCMViewPro requires the use of a RS 232 – 485 converter such as Artesis part number ART-MCM0001 (page 6). Additionally, repeaters may be needed under noisy line conditions or if the number of attached MCM units exceeds 31.

Customer Order Form

NAME:		**COMPANY:**	
ADDRESS:		**COUNTRY:**	
TEL:		**FAX:**	

Part No.	Item	Qty	Unit price	Total price	Comments
MOTOR CONDITION MONITOR - LINE TYPES					
MCM01L1-E-480-NS	MCM Low Voltage				
MCM01H-E-L	MCM Medium/High Voltage				
MCM01H-E-A	MCM Medium/High Voltage Aron connection				
MOTOR CONDITION MONITOR - INVERTER TYPES					
MCM01L1-E-480-L	Low voltage, 50/100A				
MCM01L1-E-480-M	Low voltage, 200/300/500A				
MCM01L1-E-480-H	Low voltage, 1000/1500A				
NETWORKING ACCESSORIES					
ART-MCM0001	RS 232-485 CONVERTER				
ART-SWFULL00	SOFTWARE				
ART-EL03005	Networking cable				
SINGLE CURRENT SENSORS					
ART-EL30005	300A				
ART-EL30006	500A				
ART-EL30004	1000A				
ART-EL30008	1500A				
TRIPLE SENSOR ASSEMBLIES					
ART-ELM0010	50A				
ART-MCM0011	100A				
ART-MCM0012	200A				
POWER SUPPLIES					
ART-MCM0007	15V for ART-EL30005, ART-EL30008, ART-ELM0010, ART-ELM0011, ART-ELM0012				
ART-MCM0008	18V for ART-EL30006				
ART-MCM0009	24V for ART-EL30004				

Disclaimer:

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