



Installation and
commissioning manual

MDX-I/O M2M

Additional Input/Output
module with Datalogger
function

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LEROY-SOMER reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document is therefore liable to be changed without notice.



For the user's safety, the variable speed drive to which the module covered by these instructions is fitted, must be connected to an approved earth (terminal \perp).

If accidentally starting the installation is likely to cause a risk to personnel or the machines being driven, it is essential to supply the equipment via a circuit-breaking device (power contactor) which can be controlled via an external safety system (emergency stop, detection of errors on the installation).

The variable speed drive is fitted with safety devices which, in the event of a fault, order it to stop and, at the same time, stop the motor. The motor itself can become jammed for mechanical reasons. Finally, voltage fluctuations, and in particular power cuts, may also cause the unit to stop.

The removal of the causes of the shutdown can lead to restarting, which may be dangerous for certain machines or installations. In such cases, it is essential that the user takes appropriate precautions against the motor restarting after an unscheduled stop.

The variable speed drive is designed to be able to supply a motor and the driven machine above its rated speed.

If the motor or the machine are not mechanically designed to withstand such speeds, the user may be exposed to serious danger resulting from their mechanical deterioration. Before programming a high speed, it is important that the user checks that the installation can withstand it.

The variable speed drive on which the module, covered by this manual, is fitted is designed to be integrated in an installation or an electrical machine, and can under no circumstances be considered to be a safety device. It is therefore the responsibility of the machine manufacturer, the designer of the installation or the user to take all necessary precautions to ensure that the system complies with current standards, and to provide any devices required to ensure the safety of equipment and personnel.

Using the drive for hoisting: when using this application, it is essential to follow the special instructions in an application-specific manual which is available on request. It is the responsibility of the user to obtain this manual from his usual LEROY-SOMER contact.

LEROY-SOMER declines all responsibility in the event of the above recommendations not being observed.

SAFETY AND OPERATING INSTRUCTIONS FOR VARIABLE SPEED DRIVES (in accordance with the low voltage directive 2006/95/EC)



• Throughout the manual this symbol warns of consequences which may arise from inappropriate use of the drive, since electrical risks may lead to material or physical damage as well as constituting a fire hazard.

1 - General

Depending on their degree of protection, the variable speed drives may contain unprotected live parts, which may be moving or rotating, as well as hot surfaces, during operation.

Unjustified removal of protection devices, incorrect use, faulty installation or inappropriate operation could represent a serious risk to personnel and equipment.

For further information, consult the documentation.

All work relating to transportation, installation, commissioning and maintenance must be performed by experienced, qualified personnel (see IEC 364 or CENELEC HD 384, or DIN VDE 0100 and national specifications for installation and accident prevention).

In these basic safety instructions, qualified personnel means persons competent to install, fit, commission and operate the product, and possessing the relevant qualifications.

2 - Use

Variable speed drives are components designed for integration in installations or electrical machines.

When integrated in a machine, commissioning must not take place until it has been verified that the machine conforms with directive 2006/42/EC (Machinery Directive). It is also necessary to comply with standard EN 60204, which stipulates in particular that electrical actuators (which include variable speed drives) cannot be considered as circuit-breaking devices and certainly not as isolating switches. Commissioning can take place only if the requirements of the Electromagnetic Compatibility Directive (EMC 2004/108/EC) are met.

The variable speed drives meet the requirements of the Low Voltage Directive 2006/95/EC. The harmonised standards of the DIN VDE 0160 series in connection with standard VDE 0660, part 500 and EN 60146/ VDE 0558 are also applicable.

The technical characteristics and instructions concerning the connection conditions specified on the nameplate and in the documentation provided must be observed without fail.

3 - Transportation, storage

All instructions concerning transportation, storage and correct handling must be observed. The climatic conditions specified in the technical manual must be observed.

4 - Installation

The installation and cooling of equipment must comply with the specifications in the documentation supplied with the product.

Variable speed drives must be protected against any excessive stress. In particular, there must be no damage to parts and/or modification of the clearance between components during transportation and handling. Avoid touching electronic components and contact parts.

Variable speed drives contain parts which are sensitive to electrostatic stresses and may be easily damaged if handled incorrectly. Electrical components must not be exposed to mechanical damage or destruction (risks to health!).

5 - Electrical connection

When work is performed on variable speed drives which are powered up, national accident prevention regulations must be respected.

The electrical installation must comply with the relevant specifications (for example conductor cross-sections, protection via fused circuit-breaker, connection of protective conductor). More detailed information is given in the documentation.

Instructions for an installation which meets the requirements for electromagnetic compatibility, such as screening, earthing, presence of filters and correct insertion of cables and conductors, are given in the documentation supplied with the variable speed drives. These instructions must be followed in all cases, even if the variable speed drive carries the CE mark. Adherence to the limits given in the EMC legislation is the responsibility of the manufacturer of the installation or the machine.

6 - Operation

Installations which incorporate variable speed drives must be fitted with additional protection and monitoring devices as specified in current relevant safety regulations, such as the law on technical equipment, accident prevention regulations, etc. Modifications to variable speed drives using control software are permitted.

Active parts of the device and the live power connections must not be touched immediately after the variable speed drive is powered down, as the capacitors may still be charged. In view of this, the warnings fixed to the variable speed drives must be observed.

During operation, all doors and protective covers must be kept closed.

7 - Servicing and maintenance

Refer to the manufacturer's documentation.

This manual is to be given to the end user.

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1 - GENERAL INFORMATION

1.1 - General

The MDX-I/O M2M module is used to increase the number of drive Input/Output and also has a Datalogger function. This option is fully configurable.

Details of functions:

- 2 analog inputs (including a differential analog input)
- 1 analog output
- 1 temperature sensor input
- 4 digital inputs
- 2 digital outputs
- 2 assignable relays
- 1 internal clock, making the date (day of the week - day of the month - month - year) and time (hours-minutes-seconds) available in order to:
 - Trigger actions on set dates or at set times
 - Alarm for triggering maintenance (daily, weekly, monthly)
 - Automation of operating cycles (Run/Stop, change of speed, change of direction of rotation, etc.)
 - Time-stamp an event
 - Storing the day, month, year, hours, minutes and seconds of a configurable event
- Year, month, day, hours, minutes, seconds backup mode
- Web pages: an embedded Web server allows communication with the drive via an Ethernet network (RJ45 connector)
 - Setting the drive parameters via Web pages
 - Downloading the drive parameters for backup
 - Supervising the operating parameters via a configurable Web page
 - Generating e-mails on a condition which can be configured by editing a customised text (which can include parameter values)
- Datalogger function: used to save operating data for an extended period in order to analyse how the machine is working without external equipment
 - All storable drive parameters (V, A, kW, °C, etc)
 - Sampling period configurable from 20 ms to 60 s
 - Continuous storage or on an event
 - Time-stamping data
 - Data transfer to PC by .csv file via SD* card

*4 GB SD card supplied

1.2 - Dimensions

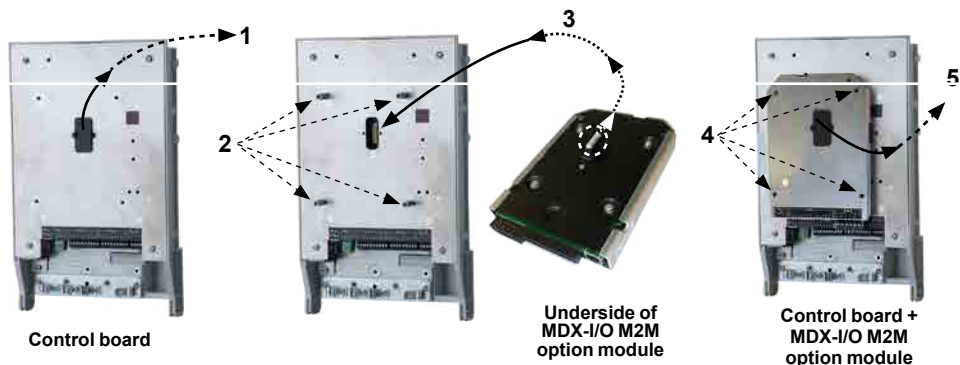
This MDX-I/O M2M option can be integrated in any product in the POWERDRIVE MD2 or FX range. The dimensions remain the same for drives in a cabinet.

2 - INSTALLATION

- ⚠ • Before carrying out any work on the drive, disconnect and padlock the isolating switch in the switchboard.
- After the drive is switched off, the external control circuits can retain a dangerous amount of voltage. Check that these circuits are powered down before working on the control cables.
- After powering down the drive, wait at least 10 min before removing the protective plates.
- Check that the DC bus voltage is below 40 V before carrying out any work (the control board power-on indicator LED must be off).
- Check that the module is in good condition: never insert a damaged module in the drive.

To install the module, follow the instructions below:

- 1 - Remove the black plastic protective cover from the drive control board (connector protection).
- 2 - Screw the four spacers supplied with the option onto the control block (tightening torque 2 N.m).
- 3 - Align the option module over the drive control board connector (the optional module connector is located on the underside of the casing) then press gently until it is fully in place.
- 4 - Screw the module onto the control board with the four screws supplied, using a maximum tightening torque of 2 N.m.
- 5 - If you wish, an additional option module can be added (e.g. MDX-ENCODER). Remove the black plastic protective cover on the MDX-I/O M2M, undo the screws inserted in step 4. Align the additional option module over the MDX-I/O M2M board connector (the additional module connector is located on the underside of the casing) then press gently until it is fully in place. Then screw the module back onto the MDX-I/O M2M board using the four screws removed earlier (2 N.m).
- 6 - To remove modules, follow the same procedure in reverse order.

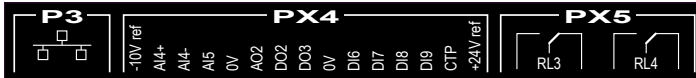


3 - CONNECTIONS AND CHARACTERISTICS

⚠ • Check that the DC bus has discharged before any work is carried out (wait at least 10 minutes after powering down). For the safety instructions relating to the drive, please refer to the manual supplied with the product.

- The inputs on the POWERDRIVE MD2 and MDX-I/O M2M board have a positive logic configuration. Using a drive with a control system which has a different control logic may cause unwanted starting of the motor.
- The POWERDRIVE MD2 control circuit is isolated from the power circuits by single insulation. Its electronic 0V is connected to the connection terminal on the outer protective conductor (earth terminal). The installer must ensure that the external control circuits are isolated against any human contact.
- If the POWERDRIVE MD2 or MDX-I/O M2M board control circuits need to be connected to circuits conforming to SELV safety requirements, additional insulation must be inserted to maintain the SELV classification.

3.1 - Connections



Connectors PX4 (terminals 1 to 15) and PX5 (terminals 1 to 6) are removable.

3.2 - Characteristics

• P3 connector

The P3 connector is an Ethernet port (RJ45 socket).

• PX4 connector

1 - 10V ref	-10V internal analog source
Voltage tolerance	± 1%
Maximum output current	10 mA continuous
Protection	Current limiting: 20 mA

CONNECTIONS AND CHARACTERISTICS

2	AI4 +	Differential analog input 4 +
3	AI4 -	Differential analog input 4 -
Factory setting		No assignment
Input type		Bipolar voltage (differential mode and common mode) or unipolar current (common mode only, connect terminal 3 to the 0V)
Resolution		11 bits + sign
Sampling period		2 ms
Voltage mode		
Full scale voltage range		$\pm 10V \pm 2\%$
Maximum voltage		27 V
Absolute maximum voltage		33 V
Input impedance		100 k Ω
Current mode		
Current range		0 to 20 mA $\pm 5\%$
Maximum voltage		27 V/0 V
Maximum current		50 mA
Input impedance		100 Ω
4	AI5	Analog input 5
Factory setting		No assignment
Input type		$\pm 10V$ bipolar analog voltage in common mode or unipolar current (0 to 20 mA, 4 to 20 mA)
Resolution		11 bits + sign
Sampling period		2 ms
Input filter bandwidth		~ 200 Hz
Voltage range in common mode		$\pm 24 V/0 V$
Voltage mode		
Input impedance		50 k Ω
Absolute maximum voltage range		$\pm 30 V$
Current mode		
Input impedance		100 Ω
Absolute maximum current		30 mA
5	0V	Logic circuit common 0V
6	AO2	Analog output 2
Factory setting		No assignment
Output type		Bipolar analog voltage in common mode or unipolar current in common mode
Resolution		13-bit
Sampling period		2 ms
Voltage mode		
Voltage range		$\pm 10 V$
Load resistance		1 k Ω minimum
Current mode		
Current range		0 to 20 mA , 4 to 20 mA
Load resistance		500 Ω maximum

CONNECTIONS AND CHARACTERISTICS

7	DO2	Digital output 2
8	DO3	Digital output 3
Factory setting		No assignment
Type		Open collector
Absolute maximum voltage		+30 V/0 V
Overload current		200 mA

9	0V	0V common
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10	DI6	Digital input 6
11	DI7	Digital input 7
12	DI8	Digital input 8
13	DI9	Digital input 9
Factory setting		No assignment
Type		Digital inputs in positive logic
Voltage range		0 to + 24 V
Absolute maximum voltage range		0 to 35V
Thresholds		0: < 5 V 1: > 10 V

14	PTC	KTY84-130 or PT100 thermal sensor
Factory setting		No assignment
Sampling period		2 ms

15	+ 24V ref	
Output current		100 mA
Accuracy		± 5%
Protection		Current limiting and setting to trip mode

• PX5 connector

1		NO relay output (RL3O)
2	RL3	RL3 relay common (RL3C)
3		NC relay output (RL3F)
4	RL4	NO relay output (RL4O)
5		RL4 relay common (RL4C)
6		NC relay output (RL4F)
Contact voltage		250 V AC
Maximum contact current		2 A, resistive load 1 A, inductive load



• Provide a fuse or overcurrent protection in the relay circuit.

4 - COMMISSIONING



- The drives use software which is adjusted by parameters.

The performance levels obtained depend on the parameter setting.

Inappropriate settings may have serious consequences for personnel and machinery.

- The drive parameters must only be set by appropriately qualified and experienced personnel.

4.1 - General

To set the **MDX-I/O M2M** module parameters, the corresponding menu is menu 19.

4.2 - Diagrams

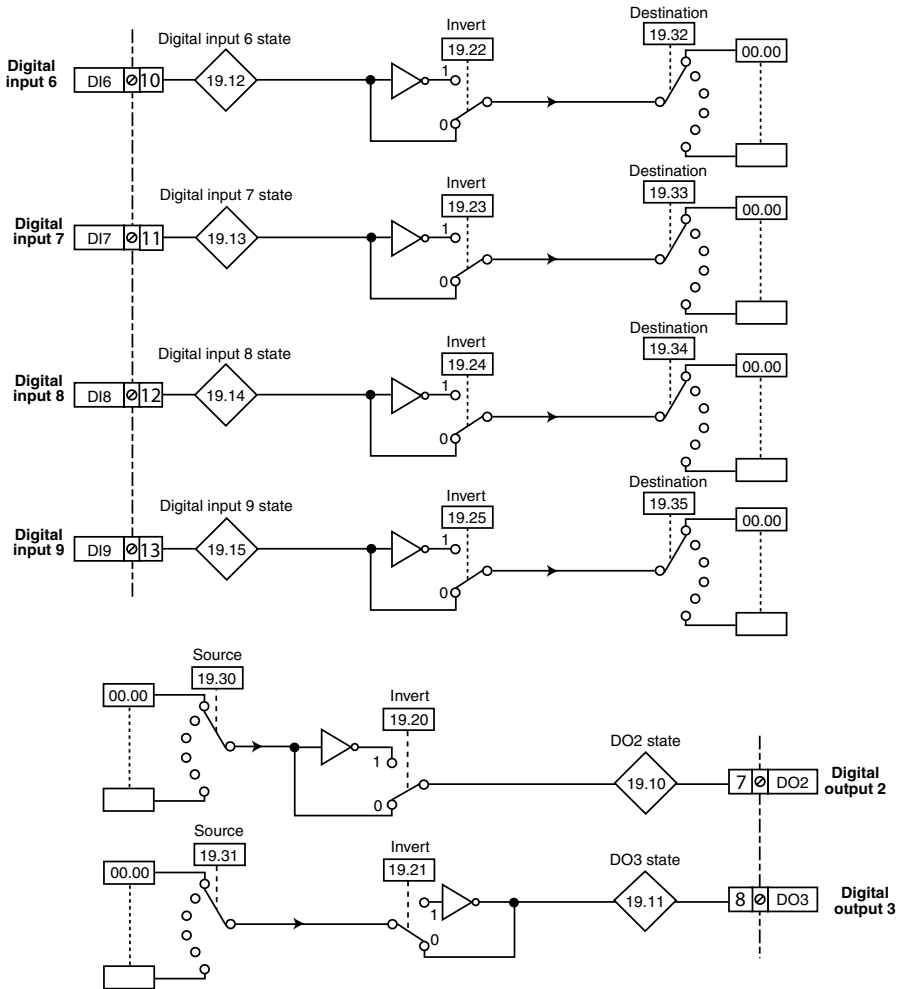


Type of option

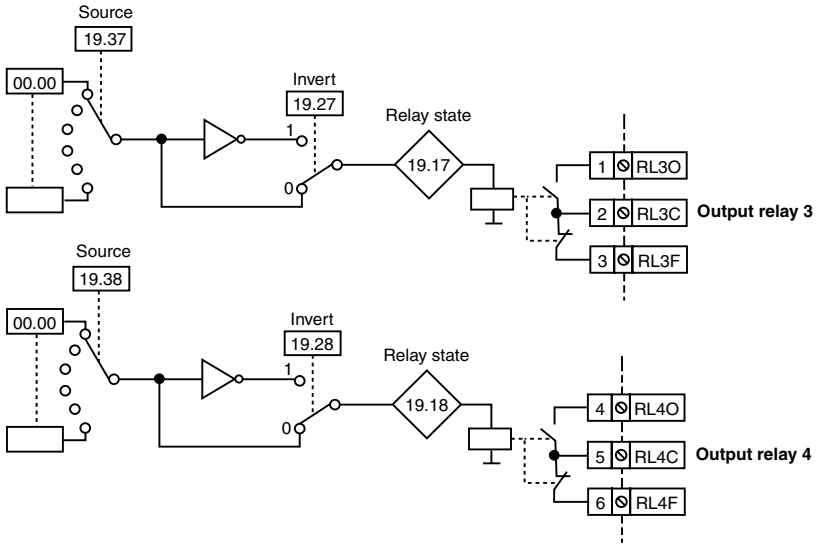


Option software version

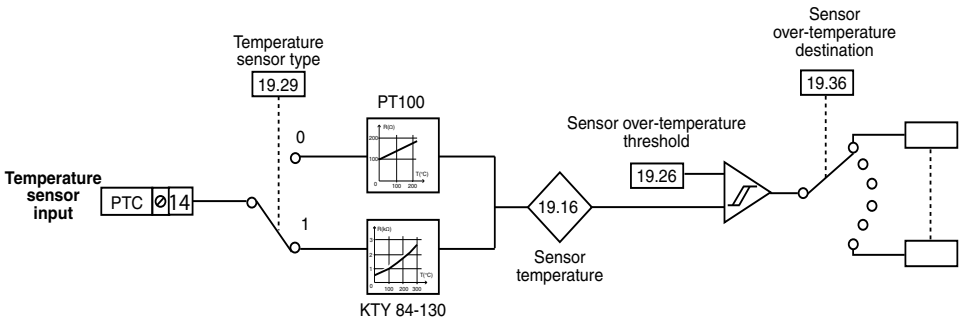
• Digital I/O



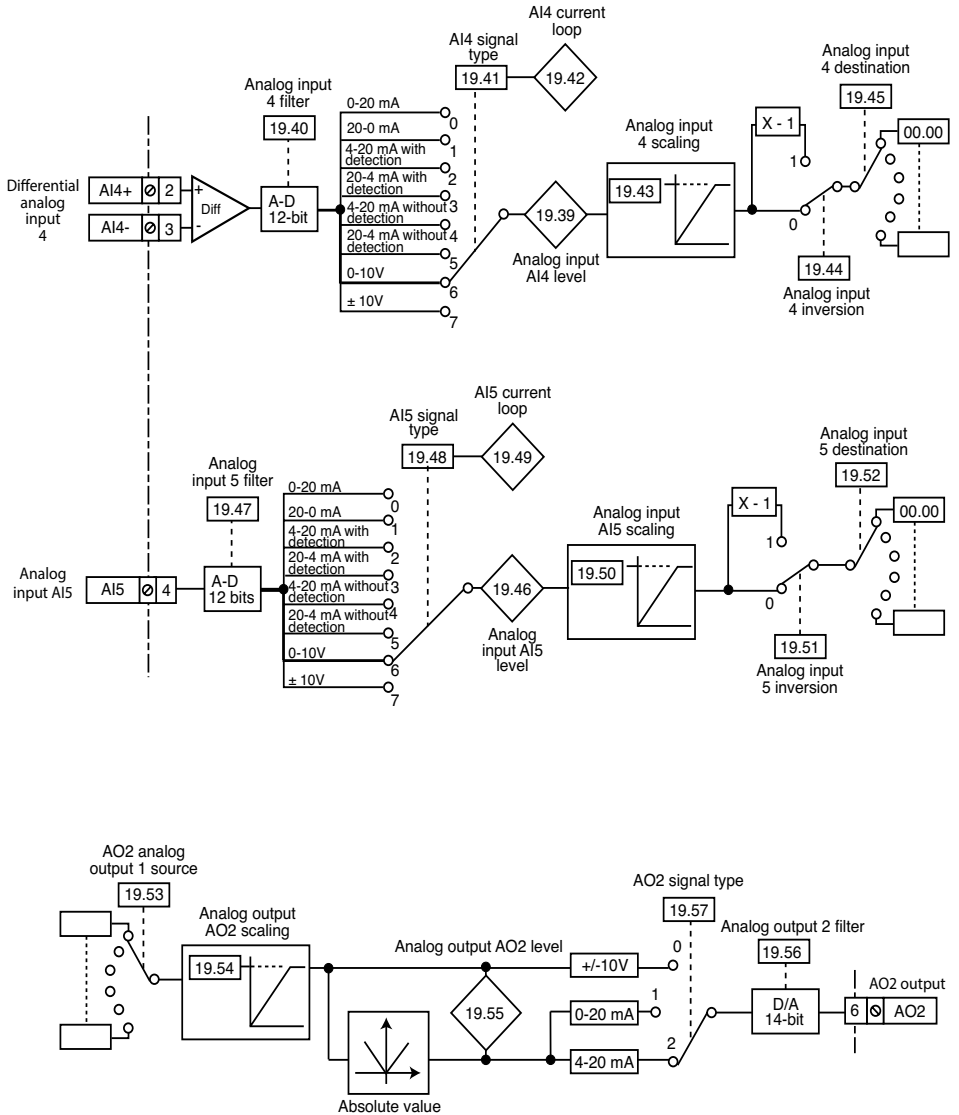
• Relay outputs



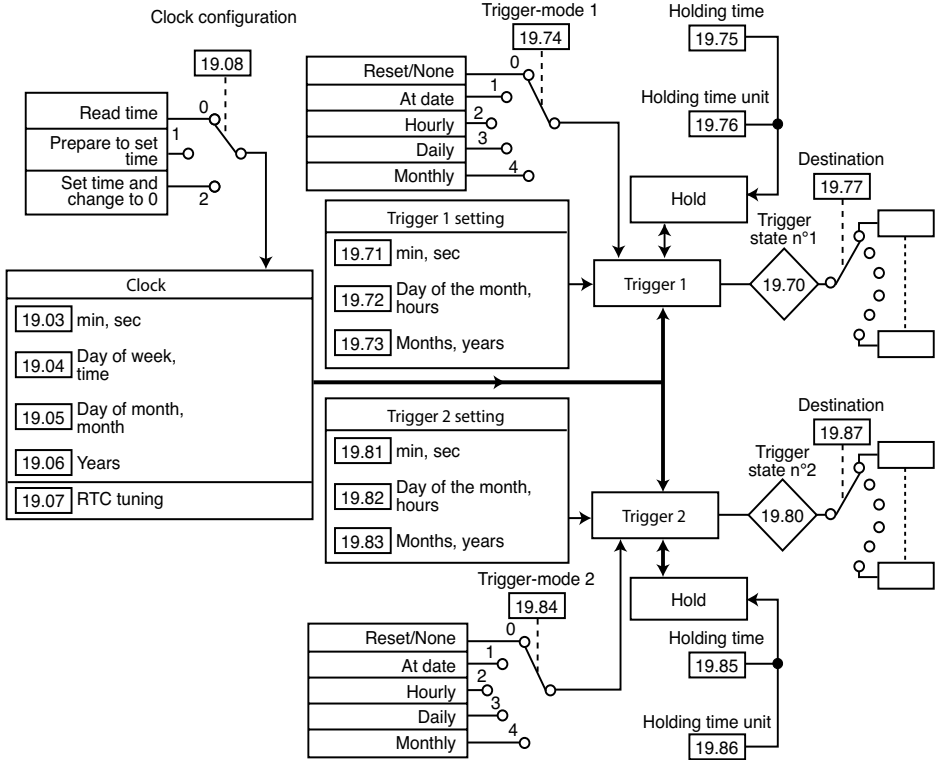
• Temperature sensor input



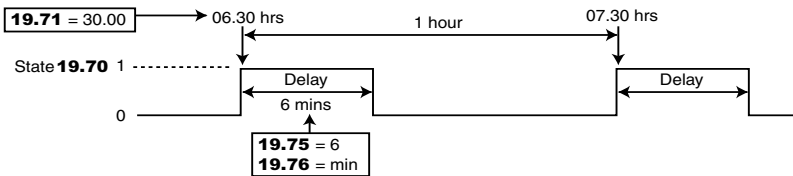
• Analog inputs and output



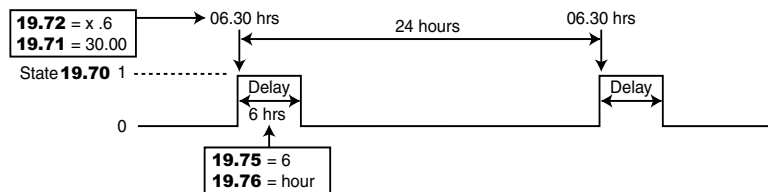
• Clock and trigger circuits



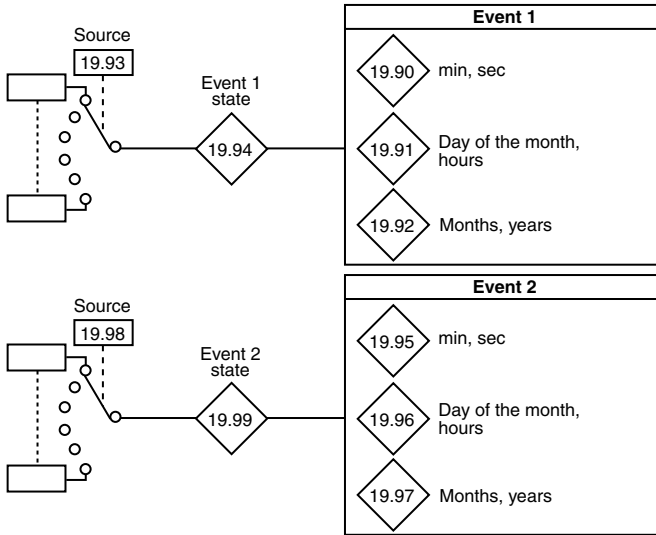
Example of hourly trigger (19.74 = 2)



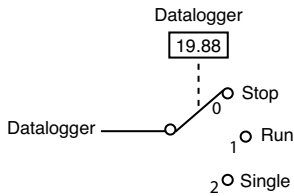
Example of daily trigger (19.74 = 3)



• Events



• Datalogger



4.3 - Explanation of parameters



19.01 : Type of option

Adjustment range : 0 to 512
 Format : 16-bit

19.01	Option module correspondence
0	No module
1	MDX-I/O



19.02 : Option software version

Adjustment range : 0 to 99.99
 Format : 16-bit
 Indicates the option software version, defined by 4 digits.



19.03 : Clock: minute, second

Adjustment range : 0 to 59.59
 Factory setting : 00.00
 Format : 16-bit
 Used to set or read the minutes and seconds on the clock.
 The 2 digits before the decimal point set the minutes, and the 2 digits after the decimal point set the seconds.



19.04 : Clock: day of week, time

Adjustment range : 1.00 to 7.23
 Factory setting : 1.00
 Format : 16-bit
 Used to set or read the day of the week and time on the clock.
 The 2 digits before the decimal point set the day of the week (1: Monday, 2: Tuesday,..., 7: Sunday), and the 2 digits after the decimal point set the hour.



19.05 : Clock: day of month, month

Adjustment range : 01.01 to 31.12
 Factory setting : 01.01
 Format : 16-bit
 Used to set or read the day of the month and month on the clock.
 The 2 digits before the decimal point set the day of the month, and the 2 digits after the decimal point set the month.



19.06 : Clock: years

Adjustment range : 2004 to 3000
 Factory setting : 2012
 Format : 16-bit
 Used to set or read the year on the clock.



19.07 : RTC tuning

Adjustment range : -156 to 314 seconds/ month
 Factory setting : 160
 Format : 16-bit
 Used to compensate for clock drift in order to increase its accuracy.
 After a month, check the minutes and seconds given by parameter **19.03**. If it is incorrect, configure **19.07** with the number of seconds/ month (positive if the clock is running fast, negative if it is running slow) corresponding to the clock drift over a month. Then, configure **19.08** as Preparing time setting (1) and set **19.03** correctly. Configure **19.08** as 2 to take account of this new value (**19.08** then automatically changes back to 0).

19.08 : Clock configuration

Adjustment range : Time reading (0),
 Preparing time setting (1),
 Time setting (2)

Factory setting : Time reading (0)

Format : 8-bit

Time reading (0):

The clock operates normally. To read the time, day, month or year, look at parameters **19.03** to **19.06**.

Preparing time setting (1):

Used to set the clock date and time. After configuring **19.08** as Preparing time setting (1), set the year in **19.06** (e.g. 2012), the day of the month and the month in **19.05** (e.g. 3.02 to indicate 3 February), the day of the week and the time in **19.04** (e.g. 7.10 to indicate Sunday 10:00), and finally the minutes and seconds in **19.03** (e.g. 33.00 to indicate 33 minutes and 0 seconds). Then, configure **19.08** as Time setting (2) to take account of the new settings. **19.08** then automatically changes back to 0.

Time setting (2):

Used to take account of the values contained in parameters **19.03** to **19.06**. **19.08** then automatically changes back to Time reading (0).

CAUTION:

RTC tuning (19.07) may be necessary after a month's operation.

19.09 : Not used

19.10 : DO2 reading

Adjustment range : Inactive (0) or Active (1)

Format : 8-bit

This parameter indicates the state of the output.

19.11 : DO3 reading

Adjustment range : Inactive (0) or Active (1)

Format : 8-bit

This parameter indicates the state of the output.

19.12 : DI6 state

19.13 : DI7 state

19.14 : DI8 state

19.15 : DI9 state

Adjustment range : Inactive (0) or Active (1)

Format : 8-bit

These parameters indicate the state of the corresponding input.

19.16 : Sensor temperature
 (KTY 84-130 or PT 100)

Adjustment range : 0 to 200°C

Format : 16-bit

Indicates the temperature given by the sensor.

19.17 : Output relay 3 state

Adjustment range : Open (0) or Closed (1)

Format : 8-bit

This parameter indicates the state of the output relay.

19.18 : Output relay 4 state

Adjustment range : Open (0) or Closed (1)

Format : 8-bit

This parameter indicates the state of the output relay.

19.19 : Not used

19.20 : Digital output 2 invert

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit

This parameter is used to invert the state of the digital output.

No (0): not inverted.

Yes (1): inverted.

19.21 : Digital output 3 invert

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit

This parameter is used to invert the state of the digital output.

No (0): not inverted.

Yes (1): inverted.

19.22 : Digital input 6 invert

19.23 : Digital input 7 invert

19.24 : Digital input 8 invert

19.25 : Digital input 9 invert

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit

These parameters are used to invert the state of the corresponding digital input.

No (0): not inverted.

Yes (1): inverted.

19.26 : Sensor over-temperature threshold (KTY 84-130 or PT 100)

Adjustment range : 0 to 200°C
 Factory setting : 150°C
 Format : 16-bit

Used to set the temperature threshold corresponding to triggering a trip selected by **19.36**.

19.27 : Output relay 3 invert

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit

This parameter is used to invert the relay state.

No (0): not inverted.

Yes (1): inverted.

19.28 : Output relay 4 invert

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit

This parameter is used to invert the relay state.

No (0): not inverted.

Yes (1): inverted.

19.29 : Temperature sensor type

Adjustment range : PT100 (0) or KTY 84(1)
 Factory setting : KTY 84(1)
 Format : 8-bit

This parameter is used to define the type of sensor connected.

19.30 : DO2 digital output source

Adjustment range : **00.00 to 21.51**

Factory setting : **00.00**

Format : 16-bit

This parameter is used to select the source for the digital output.

Any "bit" type parameter can be assigned. If an unsuitable parameter is addressed, no assignment is taken into account.

19.31 : DO3 digital output source

Adjustment range : **00.00 to 21.51**

Factory setting : **00.00**

Format : 16-bit

This parameter is used to select the source for the digital output.

Any "bit" type parameter can be assigned. If an unsuitable parameter is addressed, no assignment is taken into account.

19.32 : DI6 input destination

19.33 : DI7 input destination

19.34 : DI8 input destination

19.35 : DI9 input destination

Adjustment range : **00.00 to 21.51**

Factory setting : **00.00**

Format : 16-bit

These parameters are used to select the destination for the corresponding digital input.

Any "bit" type parameter can be assigned. If an unsuitable parameter is addressed, no assignment is taken into account.

19.36 : Sensor over-temperature destination (KTY84-130 or PT 100)

Adjustment range : **00.00 to 21.51**

Factory setting : **00.00**

Format : 16-bit

To generate a trip, configure the destination with a value likely to cause a user trip.

For example: **19.36 = 10.61**

19.37 : Output relay 3 source

19.38 : Output relay 4 source

Adjustment range : **00.00 to 21.51**

Factory setting : **00.00**

Format : 16-bit

These parameters are used to select the source for output relays 3 and 4.

Any "bit" type parameter can be assigned. If an unsuitable parameter is addressed, no assignment is taken into account.

19.39 : Analog input AI4 level

Adjustment range : $\pm 100.00\%$

Format : 16-bit

Indicates as a percentage the signal level on the differential analog input.

19.40 : Analog input 4 filter

Adjustment range : None (0), 4 ms (1), 8 ms (2),
16 ms (3), 32 ms (4).

Factory setting : 8 ms (2)

Format : 8-bit

None (0):

No filtering is applied to analog input AI4.

4 ms (1) to 32 ms (4):

Used to set the filter time constant applied to analog input AI4.

19.41 : AI4 signal type

Adjustment range : 0-20 mA (0), 20-0 mA (1),
4-20 mA with detection (2),
20-4 mA with detection (3),
4-20 mA without detection
(4), 20-4 mA without
detection (5), 0-10V (6), +/-
10V (7)

Factory setting : 0-10V (6)

Format : 8-bit

Used to define the type of signal connected to the differential analog input AI4.

19.42 : AI4 current loop

Adjustment range : Active (0) or Lost (1)

In 4-20 mA current mode with or without detection, this parameter changes to "1" when the analog signal drops below 3 mA.

19.43 : Analog input AI4 scaling

Adjustment range : 0 to 2.50

Factory setting : 1.00

Format : 16-bit

Used to supply the destination parameter with a numerical value in proportion with the input. However, in the majority of cases, this setting is not necessary since the input is automatically scaled, meaning that 100% as an input corresponds to the maximum value of the destination parameter selected in **19.45**.

19.44 : Analog input AI4 inversion

Adjustment range : No (0) or Yes (1)

Factory setting : No (0)

Format : 8-bit

Used to invert the input signal.

No (0): Input signal not inverted.

Yes (1): Input signal inverted.

19.45 : Analog input 4 destination

Adjustment range : **00.00** to **21.51**

Factory setting : **00.00**

Format : 16-bit

This parameter should contain the number of the parameter which you wish to assign to analog input AI4.

Only numerical parameters can be assigned. If an unsuitable parameter is programmed, no assignment will be taken into account.

19.46 : Analog input AI5 level

Adjustment range : $\pm 100.00\%$
 Format : 16-bit
 Indicates as a percentage the signal level on the analog input.

19.47 : Analog input 5 filter

Adjustment range : None (0), 4 ms (1), 8 ms (2),
 16 ms (3), 32 ms (4).
 Factory setting : 8 ms (2)
 Format : 8-bit

None (0):

No filtering is applied to analog input AI5.

4 ms (1) to 32 ms (4):

Used to set the filter time constant applied to analog input AI5.

19.48 : AI5 signal type

Adjustment range : 0-20 mA (0), 20-0 mA (1),
 4-20 mA with detection (2),
 20-4 mA with detection (3),
 4-20 mA without detection
 (4), 20-4 mA without
 detection (5), 0-10V (6),
 +/- 10V (7)

Factory setting : 0-10V (6)
 Format : 8-bit

Used to define the type of signal connected to the differential analog input AI5.

19.49 : AI5 current loop

Adjustment range : Active (0) or Lost (1)
 Format : 8-bit
 In 4-20 mA current mode with or without detection, this parameter changes to "1" when the analog signal drops below 3 mA.

19.50 : Analog input AI5 scaling

Adjustment range : 0 to 2.50
 Factory setting : 1.00
 Format : 16-bit

Used to supply the destination parameter with a numerical value in proportion with the input. However, in the majority of cases, this setting is not necessary since the input is automatically scaled, meaning that 100% as an input corresponds to the maximum value of the destination parameter selected in **19.52**.

19.51 : Analog input AI5 inversion

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit

Used to invert the input signal.

No (0): Input signal not inverted.

Yes (1): Input signal inverted.

19.52 : Analog input 5 destination

Adjustment range : **00.00** to **21.51**

Factory setting : **00.00**

Format : 16-bit

This parameter should contain the number of the parameter which you wish to assign to analog input AI5.

Only numerical parameters can be assigned. If an unsuitable parameter is programmed, no assignment will be taken into account.

19.53 : AO2 Analog Output 1 source

Adjustment range : **00.00** to **21.51**

Factory setting : **00.00**

Format : 16-bit

This parameter is used to select the source which you wish to assign to analog output AO2.

19.54 : Analog Output AO2 scaling

Adjustment range : 0 to 4.000

Factory setting : 1.000

Format : 16-bit

Used to provide a numerical value in proportion with the source parameter as an output. However, in the majority of cases, this setting is not necessary since the output is automatically scaled, meaning that 100% as an output corresponds to the maximum value of the source parameter selected in **19.53**.



19.55 : Analog output AO2 level

Adjustment range : $\pm 100.00\%$

Format : 16-bit

Indicates as a percentage the analog output level, before conversion into a 0-10 V or 4-20 mA signal according to **19.57**.

19.56 : Analog output 2 filter

Adjustment range : None (0), 4 ms (1), 8 ms (2),
16ms(3), 32ms (4).

Factory setting : 8 ms (2)

Format : 8-bit

None (0): No filtering is applied to the AO2 analog output.

4 ms (1) to 32 ms (4):

Used to set the filter time constant applied to analog output AO2.

19.57 : AO2 Analog Output mode

Adjustment range : $\pm 10V$ (0), 0-20 mA (1),
4-20 mA (2)

Factory setting : 4-20 mA (2) Format: 8-bit

Used to choose the type of output signal.

$\pm 10V$ (0):

$\pm 10V$ voltage output.

0 - 20 mA (1):

0 to 20 mA current output.

4 - 20 mA (2):

4 to 20 mA current output.

19.58 : Web server activation

Adjustment range : No (0) or Yes (1)
 Factory setting : Yes (1)
 Format : 8-bit
 This parameter is used to activate, or not, the embedded Web server.

CAUTION:

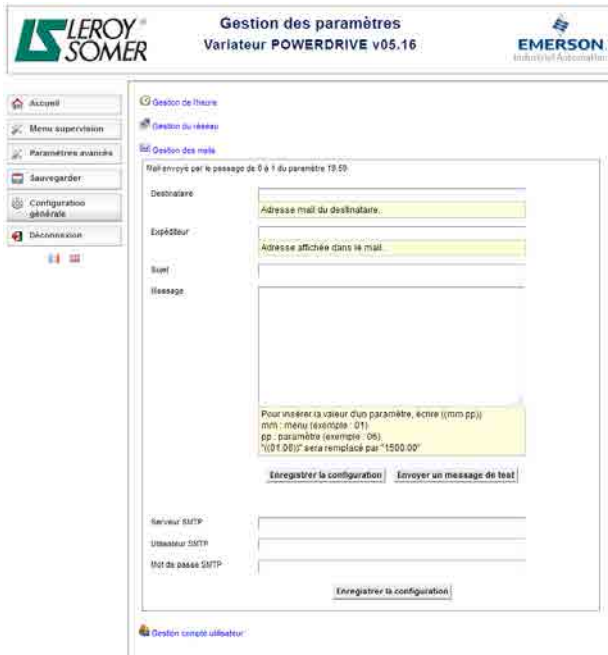
Do not modify this parameter from the Web pages, as it will not be saved in the EEPROM.

19.59 : Mail sending 1 transition 0→1

19.60 : Mail sending 2 transition 0→1

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit

When one of these parameters changes from 0 to 1, the corresponding email is sent. To define the email parameters, go to the MDX-I/O M2M module web pages and configure a valid source email address, a valid destination address, the email subject and also the text. You also need to complete the fields for the SMTP server.



19.61 : DHCP validation

Adjustment range : No (0) or Yes (1)
 Factory setting : No (0)
 Format : 8-bit
 This parameter determines whether the network should be configured manually (via the drive parameters) or automatically (via the network DHCP server).
 The DHCP server configures the IP address, the subnet mask and the default gateway.

19.62 : IP address $W_{ip} \cdot X_{ip}$

Adjustment range : 0 to 255.255
 Factory setting : 192.168
 Format : 32-bit
 This parameter defines the MDX-I/O M2M module's IP address in the format $W_{ip} \cdot X_{ip} \cdot Y_{ip} \cdot Z_{ip}$. If DHCP is enabled (see **19.61** = 1), this address is entered automatically by the DHCP server.

19.63 : IP address $Y_{ip} \cdot Z_{ip}$

Adjustment range : 0 to 255.255
 Factory setting : 1.100
 Format : 32-bit
 This parameter defines the MDX-I/O M2M module's IP address in the format $W_{ip} \cdot X_{ip} \cdot Y_{ip} \cdot Z_{ip}$. If DHCP is enabled (see **19.61** = 1), this address is entered automatically by the DHCP server.

19.64 : Subnet mask $W_{sub} \cdot X_{sub}$

Adjustment range : 0 to 255.255
 Factory setting : 255.255
 Format : 32-bit
 This parameter defines the subnet mask in the format $W_{sub} \cdot X_{sub} \cdot Y_{sub} \cdot Z_{sub}$. If DHCP is enabled (see **19.61** = 1), this address is entered automatically by the DHCP server.

19.65 : Subnet mask $Y_{sub} \cdot Z_{sub}$

Adjustment range : 0 to 255.255
 Factory setting : 255.000
 Format : 32-bit
 This parameter defines the subnet mask in the format $W_{sub} \cdot X_{sub} \cdot Y_{sub} \cdot Z_{sub}$. If DHCP is enabled (see **19.61** = 1), this address is entered automatically by the DHCP server.

19.66 : Default gateway $W_{gtw} \cdot X_{gtw}$

Adjustment range : 0 to 255.255
 Factory setting : 192.168
 Format : 32-bit
 This parameter defines the address and the gateway in the format $W_{gtw} \cdot X_{gtw} \cdot Y_{gtw} \cdot Z_{gtw}$. If DHCP is enabled (see **19.61** = 1), this address is entered automatically by the DHCP server.

19.67 : Default gateway $Y_{gtw} \cdot Z_{gtw}$

Adjustment range : 0 to 255.255

Factory setting : 1.254

Format : 32-bit

This parameter defines the address and the gateway in the format $W_{gtw} \cdot X_{gtw} \cdot Y_{gtw} \cdot Z_{gtw}$. If DHCP is enabled (see **19.61** = 1), this address is entered automatically by the DHCP server.

19.68 : Factory settings MDX-I/O module

Adjustment range : No (0) or Yes (1)

Factory setting : No (0)

Format : 8-bit

This parameter is used to set all the parameters in menu 19 to to their factory configuration. For this setting to take effect, power down and then power up again.

19.69 : MDX-I/O module reset

Reserved.

19.70 : Trigger state n°1

Adjustment range : Inactive (0) or Active (1)

Format : 8-bit

This parameter indicates the state of trigger output 1.

19.71 : Trigger 1: minute, second

Adjustment range : 00.00 to 59.59

Factory setting : 00.00

Format : 16-bit

Used to set the minutes and seconds when the state of trigger circuit 1 (**19.70**) will change to Active (1).

The 2 digits before the decimal point set the minutes, and the 2 digits after the decimal point set the seconds.

19.72 : Trigger 1: day of the month, hours

Adjustment range : 1.00 to 31.23

Factory setting : 1.00

Format : 16-bit

Used to set the day of the month and hour when the state of trigger circuit 1 will change to Active (1).

The 2 digits before the decimal point set the day of the month, and the 2 digits after the decimal point set the hour.

19.73 : Trigger 1: months, years

Adjustment range : 01.04 to 12.99

Factory setting : 01.04

Format : 16-bit

Used to set the month and year when the state of trigger circuit 1 will change to Active (1).

The 2 digits before the decimal point set the month, and the 2 digits after the decimal point set the year.

19.74 : Trigger-Mode 1

Adjustment range : Reset/None (0), At date (1),
 Hourly (2), Daily (3),
 Monthly (4),
 Factory setting : Reset/None (0)
 Format : 8-bit
 Used to select the frequency of trigger circuit 1.

Reset/None (0):

Trigger 1 is inactive. This setting resets parameter **19.70**.

At date (1):

Tripping only at the time programmed by parameters **19.71** to **19.73**.

Hourly (2):

Tripping on the hour at fixed minutes and seconds, at the time programmed by parameter **19.71**.

Daily (3):

Tripping every day at a fixed time (hour, minute and second) at the time programmed by parameters **19.71** and **19.72**.

Monthly (4):

Tripping every month at a fixed date and time (day of the month, hour, minute and second) at the time programmed by parameters **19.71** and **19.72**.

Note: For each tripping mode, set **19.71** to **19.73** to determine the start of the cycle and **19.75** and **19.76** to set the duration (see section 4.2 for operational examples).

19.75 : Trigger 1 holding time

Adjustment range : 00 to 59
 Factory setting : 00
 Format : 8-bit
 Used to set how long the trigger circuit 1 output is held in active state (1).
 The unit of time is set by parameter **19.76**.

19.76 : Trigger 1 unit holding time

Adjustment range : second (0), minute (1),
 hour (2)
 Factory setting : second (0)
 Format : 8-bit
 Used to set the unit of time used to define how long the trigger circuit 1 output is held in active state (1).

second (0):

The holding time **19.75** is expressed in seconds.

minute (1):

The holding time **19.75** is expressed in minutes.

hour (2):

The holding time **19.75** is expressed in hours.

Note: Do not set the unit to “hour (2)” if the trigger mode is “hourly (2)”.

19.77 : Trigger 1 destination

Adjustment range : **00.00** to **21.51**
 Factory setting : **00.00**
 Format : 16-bit
 Used to select the ‘bit’ parameter on which trigger circuit 1 will act.

19.78 and **19.79** : Not used

19.80 : Trigger state n°2

Adjustment range : Inactive (0) or Active (1)
 Format : 8-bit
 This parameter indicates the state of trigger output 2.

19.81 : Trigger 2: minute, second

Adjustment range : 00.00 to 59.59
 Factory setting : 00.00
 Format : 16-bit
 Used to set the minutes and seconds when the state of trigger circuit 2 (**19.80**) will change to Active (1).
 The 2 digits before the decimal point set the minutes, and the 2 digits after the decimal point set the seconds.

19.82 : Trigger 2: day of the month, hours

Adjustment range : 1.00 to 31.23
 Factory setting : 1.00
 Format : 16-bit
 Used to set the day of the month and hour when the state of trigger circuit 2 will change to Active (1).
 The 2 digits before the decimal point set the day of the month, and the 2 digits after the decimal point set the hour.

19.83 : Trigger 2: months, years

Adjustment range : 01.04 to 12.99
 Factory setting : 01.04
 Format : 16-bit
 Used to set the month and year when the state of trigger circuit 2 will change to Active (1).
 The 2 digits before the decimal point set the month, and the 2 digits after the decimal point set the year.

19.84 : Trigger-Mode 2

Adjustment range : Reset/None (0),
 At date (1), Hourly (2),
 Daily (3), Monthly (4)
 Factory setting : Reset/None (0)
 Format : 8-bit
 Used to select the frequency of trigger circuit 2.

Reset/None (0):

Trigger 2 is inactive. This setting resets parameter **19.80**

At date (1):

Tripping only at the time programmed by parameters **19.81** to **19.83**.

Hourly (2):

Tripping on the hour at fixed minutes and seconds, at the time programmed by parameter **19.81**.

Daily (3):

Tripping every day at a fixed time (hour, minute and second) at the time programmed by parameters **19.81** and **19.82**.

Monthly (4):

Tripping every month at a fixed date and time (day of the month, hour, minute and second) at the time programmed by parameters **19.81** and **19.82**.

Note: For each tripping mode, set **19.81** to **19.83** to determine the start of the cycle and **19.85** and **19.86** for the duration.

See section 4.2 for operational examples.

19.85 : Trigger 2 holding time

Adjustment range : 00 to 59
 Factory setting : 00
 Format : 8-bit
 Used to set how long the trigger circuit 2 output is held in active state (1).
 The unit of time is set by parameter **19.86**.

19.86 : Trigger 2 unit holding time

Adjustment range : Second (0), Minute (1), Hour (2)
 Factory setting : Second (0)
 Format : 8-bit

Used to set the unit of time used to define how long the trigger circuit 2 output is held in active state (1).

Second (0):

The holding time **19.85** is expressed in seconds.

Minute (1):

The holding time **19.85** is expressed in minutes.

Hour (2):

The holding time **19.85** is expressed in hours.

Note: Do not set the unit to “hour (2)” if the trigger mode is “hourly (2)”.

19.87 : Trigger 2 destination

Adjustment range : **00.00** to **21.51**
 Factory setting : **00.00**
 Format : 16-bit
 Used to select the ‘bit’ parameter on which trigger circuit 2 will act.

19.88 : Datalogger

Adjustment range : Stop (0), Run (1), Single (2)
 Factory setting : Stop (0)
 Format : 8-bit
 Used to select the appropriate operating mode.

Stop (0):

Used to stop storage at any time. The memory card can only be removed in this mode.

CAUTION:

The LED* must be off before the SD card is removed.



Run (1):

The selected variables are stored continuously. A file is created each time the trigger conditions are fulfilled. The file name and format are identical to those in “Single” mode (2). The number of storage operations is only limited by the memory card capacity.

Note: If a trigger condition is present but the previous storage operation has not finished, it is not taken into account.



Single (2):

Storage of selected variables stops as soon as the trigger conditions are fulfilled. A single storage file is created. This file is saved in the SD card root directory. It is in the format log_YY-YY-MM-DD_hh-mm-ss: Year-Month-Day_hour-minute-second.

Note: If no trigger mode has been selected, storage only stops when “Stop” mode has been selected or when the maximum number of lines in the file is reached.



* For more information on the LED operation, its location and the Datalogger function, see section 5.

19.89 : Not used

19.90 : Event 1: minute, second

Adjustment range : 00.00 to 59.59
 Format : 16-bit
 Used to display the time when **19.94** changes to Active (1) state, corresponding to event 1, in minutes and seconds (the last event is the one taken into account).
 The 2 digits before the decimal point correspond to the minutes, and the 2 digits after the decimal point to the seconds.

19.91 : Event 1: day of the month, hours

Adjustment range : 01.00 to 31.23
 Format : 16-bit
 Used to display the time when **19.94** changes to Active (1) state, corresponding to event 1, as a date (day of the month) and in hours (the last event is the one taken into account).
 The 2 digits before the decimal point correspond to the day of the month, and the 2 digits after the decimal point to the hours.

19.92 : Event 1: months, years

Adjustment range : 01.04 to 12.99
 Format : 16-bit
 Used to display the time when **19.94** changes to Active (1) state, corresponding to event 1, in months and years (the last event is the one taken into account).
 The 2 digits before the decimal point correspond to the month, and the 2 digits after the decimal point to the year.

19.93 : Event source 1

Adjustment range : **00.00** to **21.51**

Factory setting : **00.00**

Format : 16-bit

This parameter is used to select the “bit” parameter assigned to the source of the event 1 function.

If an unsuitable parameter is addressed, no assignment is taken into account.

19.94 : Event 1 state

Adjustment range : Inactive (0) or Active (1)

Format : 8-bit

This parameter indicates the state of the event 1 input.

If the source **19.93** is assigned to a logic input, it is the rising edge of the signal which will cause parameter **19.94** to change to 1.

19.95 : Event 2: minute, second

Adjustment range : 00.00 to 59.59

Format : 16-bit

Used to display the time when **19.99** changes to Active (1) state, corresponding to event 2, in minutes and seconds (the last event is the one taken into account).

The 2 digits before the decimal point correspond to the minutes, and the 2 digits after the decimal point to the seconds.

19.96 : Event 2: day of the month, hours

Adjustment range : 01.00 to 31.23

Format : 16-bit

Used to display the time when **19.99** changes to Active (1) state, corresponding to event 2, as a date (day of the month) and in hours (the last event is the one taken into account).

The 2 digits before the decimal point correspond to the day of the month, and the 2 digits after the decimal point to the hours.

19.97 : Event 2: months, years

Adjustment range : 01.04 to 12.99

Format : 16-bit

Used to display the time when **19.99** changes to Active (1) state, corresponding to event 2, in months and years (the last event is the one taken into account).

The 2 digits before the decimal point correspond to the month, and the 2 digits after the decimal point to the year.

19.98 : Event source 2

Adjustment range : **00.00** to **21.51**

Factory setting : **00.00**

Format : 16-bit

This parameter is used to select the “bit” parameter assigned to the source of the event 2 function.

If an unsuitable parameter is addressed, no assignment is taken into account.

 **19.99** : Event 2 state

Adjustment range : Inactive (0) or Active (1)

Format : 8-bit

This parameter indicates the state of the event 2 input.

If the source **19.98** is assigned to a logic input, it is the rising edge of the signal which will cause parameter **19.99** to change to 1.

5 - DATALOGGER FUNCTION

5.1 - General

MDX-I/O M2M modules incorporate a Datalogger function which can be used to store the change over time in values which can be selected from the list of POWERDRIVE parameters. These can be stored continuously or triggered on configurable conditions. Data files in .csv format are stored on a 4 GB SD memory card supplied with the MDX-I/O M2M option.


5.2 - Characteristics

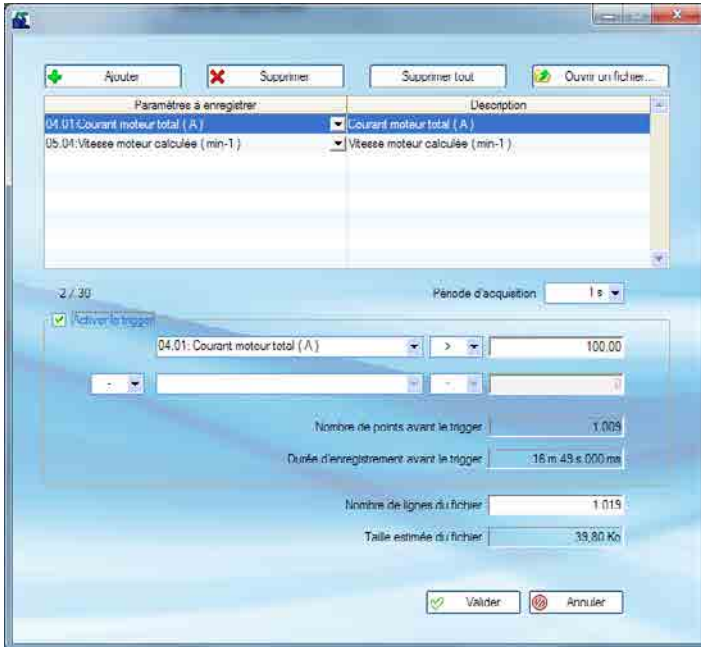
- Maximum number of storable parameters: 30
- Sampling interval: 20 ms to 60 s
- Maximum number of storage lines per file: 100,000 (when the limit is reached, Datalogger opens a new file)
- One storage line consists of:
 - Line number: 1 to 100,000 (1 to 6 bytes + 1 space byte)
 - Storage time-stamp: Day/month/year hour/minutes/seconds (19 bytes + 1 space byte)
 - Storage of selected parameter 1
 - Storage of selected parameter 2 ...up to a possible 30

Notes:

- The number of bytes used for a parameter corresponds to the number of digits in the parameter + 1 space byte (a decimal point counts as 1 byte).
 - To determine the total number of bytes per line, simply add up the total number of bytes as indicated below.
- Maximum number of files: depending on the memory card capacity.

5.3 - Storage configuration and trigger conditions

- Insert the 4 GB memory card supplied with the drive in the PC SD port.
- Open the MDX Soft program (version 1.9 or later)
- Click on the Datalogger icon.
- Select the variables you wish to store with the button  Ajouter



- For storage triggered on configurable conditions, tick the box: “Activate the trigger” as shown above.

- Storage trigger conditions can only be placed on stored variables
- Conditions can be >, ≥, <, ≤, = or ≠ to configurable thresholds
- Conditions can be placed on 2 values with “And” or “Or” condition
- Examples of use of trigger mode:
 - Storage if the drive is running and the current is higher than 250 A (**10.02** =1 and **04.02** > 250). In this case, parameters **10.02** and **04.02** should be placed in the list of parameters to be stored.
 - Storage if the motor speed is between 1500 min⁻¹ and 2000 min⁻¹ (**05.04** >1500 and **05.04** < 2000). In this case, parameter **05.04** should be placed in the list of parameters to be stored.

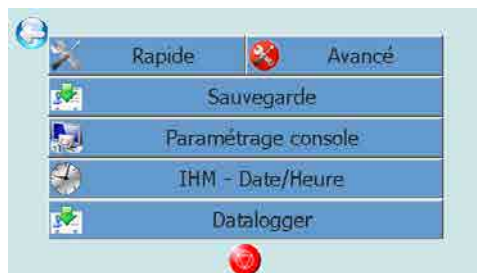
- After confirming, the configuration file to be used must be saved in the memory card root directory with the name “**conf.ini**”.

5.4 - Use

- Insert the SD card in the dedicated port on the MDX-I/O M2M board
- Storage can be launched from parameter **19.88** or directly via the Datalogger menu icons on the HMI:



HMI parameter-setting screen of a drive with no MDX-I/O M2M module

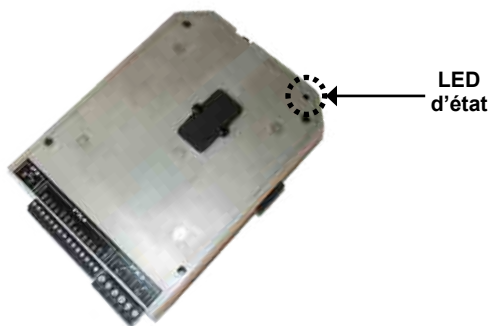


HMI parameter-setting screen of a drive with a MDX-I/O M2M module

For more information about parameter **19.88**, see section 4.3: Explanation of parameters.

5.5 - Datalogger function status LED

This LED, situated on the top right of the MDX-I/O M2M card, gives the user an indication of the status of the Datalogger function.



Indications of the various LED states:

LED off: no SD card detected or **19.88** at 0 (Stop).

LED steady orange: card present, no configuration file on the SD card.

LED steady green: card present, no storage in progress.

LED flashing orange: storage in progress, DO NOT remove the SD card during this phase.

LED red: an error has been detected on the SD card.

6 - DIAGNOSTICS

No.	Trip name	Cause	Remedies
51	MDX-I/O DO2 overload	The DO2 output load current is > 200 mA	Check that DO2 is not short-circuited
52	MDX-I/O DO3 overload	The DO3 output load current is > 200 mA	Check that DO3 is not short-circuited
53	MDX-I/O link	Communication problem between the drive and the MDX-I/O M2M	Check the MDX-I/O M2M mounting
69	MDX-I/O 24V overload	The 24V load current is too high	Check the MDX-I/O M2M option I/O wiring
70	4mA loss on MDX-I/O AI4	Loss of the current reference on analog input AI4	Check the wiring and input source of the MDX-I/O M2M option
71	4mA loss on MDX-I/O AI5	Loss of the current reference on analog input AI5	Check the wiring and input source of the MDX-I/O M2M option

7 - MAINTENANCE

The MDX-I/O M2M module incorporates a 3 V, Ø 16 mm lithium battery (type BR1632) to power the clock. It will last for around 4 years. To change it, follow the steps below.

For other maintenance operations, refer to the drive installation manual.

NB: Make sure you remove the battery before recycling the module.

Procedure for changing the battery:

Power down the drive, taking care to follow the warnings in sections 2 and 3.

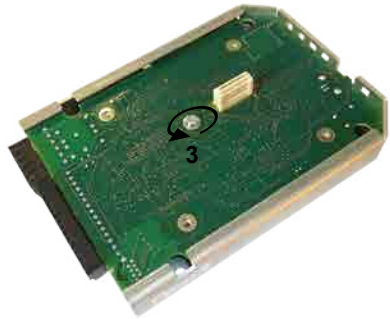
Disconnect the MDX-I/O M2M module (if necessary, refer to section 2).

1 - Using a Torx screwdriver, undo and then remove the four screws located on the underside of the board as indicated below.

2 - Then remove the black plate from the module, tilting it slightly to one side.



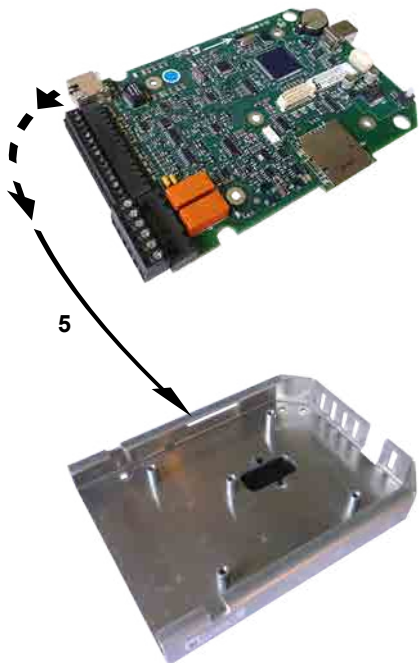
3 - Using a Torx screwdriver, undo and remove the final screw in the centre of the electronic board and then remove the board from the casing and turn it over.



4 - Remove the battery and replace it with a new one (recycle the old one in accordance with current standards in the country of use).



5 - Replace the electronic board in the casing
(components facing inside the board)



6 - Then follow the same procedure in reverse to re-fit the electronic board inside its casing.

At the end of this procedure, the option parameter settings will need to be reviewed, since the parameters will have reverted to their default value, and the clock time will need to be reset (refer to section 4).

! • **LEROY-SOMER declines all responsibility for deterioration seen in an electronic board after a battery has been changed.**

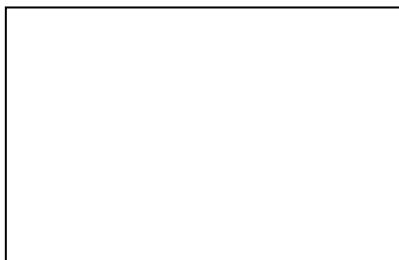
Nidec

All for dreams



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