

**MILLENIUM**

**INSTALLATION MANUAL**

**NTR 735 B/E**

**Simple Automation Control Module (MAS)**

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**1. Introduction**

The MILLENIUM series has been designed for use in domestic, office and industrial applications. Each module can be used to manage all the sensors and actuators in the installation. A display on the front panel can be used to check the state of your system at any time.

The MILLENIUM series is characterised by :

- Ease of programming and parameter entry
- WINDOWS-based programming software
- Compact size
- EEPROM module backup
- Realtime clock as standard
- Output with high breaking capacity

The MILLENIUM series has been designed for simple automation control modules (examples : lighting, air conditioning, irrigation, doors, barriers, simple safety systems, greenhouses, ventilation). The realtime clock allows equipment to be programmed in hours or minutes.

## 2. Hardware description

### 2.1 Part numbers

Codes	Part numbers	Power supply	Inputs		Outputs		Dimensions mm	Weight kg
			Type	No.	Type	No.		
89 750 001	MAS 6 RCA	100 - 240V AC	100 - 240V AC	4	RELAY	2	71.2 x 90 x 55	0.2
89 750 002	MAS 10 RCA	24V DC	24V DC	6	RELAY	4		
89 750 003	MAS 10 RCD			6	RELAY	4		
89 750 013	MAS 10 TCD			6	TRANSISTOR	6		
89 750 004	MAS 20 RCA	100 - 240V AC	100 - 240V AC	12	RELAY	8	124.6 x 90 x 55	0.32*
89 750 005	MAS 20 RCD	24V DC	24V DC	12	RELAY	8		
89 750 015	MAS 20 TCD			12	TRANSISTOR	8		

### 2.2 Description of power supplies

Description	Code	Specification
Power supply	MAS x RCA	100 - 240V AC, +10% -15%, 50/60 Hz
	MAS x xCD	24V DC, +20% -15%
Micro-cuts	MAS x RCA	10ms
	MAS x xCD	5ms
Current peak	240V AC	$\leq 1.5 A$ $t < 0.3 ms$
	24 V DC	$\leq 7 A$ $t < 0.2 ms$
Maximum consumption	MAS 6 RCA, 264V AC	3 VA
	MAS 10 RCA, 264V AC	4 VA
	MAS 10 RCD, 28,8V DC	3 W
	MAS 10 TCD, 28,8V DC	2 W
	*MAS 20 RCA, 264V AC	8 VA
	*MAS 20 RCD, 28,8V DC	7 W
	*MAS 20 TCD, 28,8V DC	5 W
Typical consumption	MAS 6 RCA, 240V AC	Active I/O : 2.5 VA    Deactivated I/O : 1.5 VA
	MAS 6 RCA, 120V AC	Active I/O : 2 VA    Deactivated I/O : 1.2 VA
	MAS 10 RCA, 240V AC	Active I/O : 3 VA    Deactivated I/O : 1.5 VA
	MAS 10 RCA, 120V AC	Active I/O : 2.5 VA    Deactivated I/O : 1.2 VA
	MAS 10 RCD, 24V DC	Active I/O : 2 W    Deactivated I/O : 0.3 W
	MAS 10 TCD, 28,8V DC	Active I/O : 2 W    Deactivated I/O : 0.3 W
	*MAS 20 RCA, 240V AC	Active I/O : 5 VA    Deactivated I/O : 1.5 VA
	*MAS 20 RCA, 120V AC	Active I/O : 4 VA    Deactivated I/O : 1.2 VA
	*MAS 20 RCD, 24V DC	Active I/O : 5 W    Deactivated I/O : 0.3 W
	*MAS 20 TCD, 24V DC	Active I/O : 5 W    Deactivated I/O : 0.3 W

\* Without special connection modules.

### 2.3 Description of inputs

Description	Description of AC inputs
Input voltage	100 - 240V AC, +10% -15%, 50/60 Hz
Input impedance	≥ 800 k Ohms
Level 0	≤ 40V AC
Level 1	≥ 80V AC
Response time	25 ms min, 130 ms max.
Galvanic isolation	No
Status indication	LCD display

Description	Description of DC inputs
Input voltage	24V DC +20% -15%
Current consumption	5 mA
Level 0	≤ 4V
Level 1	≥ 18V
Response time	15 ms ± 5 ms (I 01 – I 08) 30 ms ± 10 ms (I 09 – I 12)
Galvanic isolation	No
Status indication	LCD display

Description	Description of analogue inputs
MAS 10 RCD	6 Inputs: I 01 – I 06
MAS 20 RCD	8 Inputs: I 01 – I 08
Number of bits	8
Resolution	(10000 / 250) mV
Conversion time	15 ± 5ms
Input voltage	0 – 10V DC
Input impedance	150 k Ohms max.
Precision	± 5%
Default Offset/ Gain	Offset = 0 Gain = 1 These values can be changed by the program
Temp. dependent derating	± 3 LSB on the authorised range

### 2.4 Description of relay outputs

Description	Description of relay outputs
Max. operating voltage	250V AC, 30V DC
Max. operating current	8A / point
Minimum load	10mA at 5V DC
Response time	≤ 10ms
Type of contact	Gold-plated silver
Status indication	LCD display

Category of use	Max. operating voltage	Power consumption in steady state	Durability (number of operations)	Max. ops / hour
AC15 (electromagnet)	250V AC	450 VA	100 000	600
DC13 (electromagnet) (L/R = 150 ms)	30V DC	10 W	100 000	360
AC14 (electromagnet)	250V AC	750 VA	100 000	600
AC12 (resistive)	250V AC / 110V AC	2000 VA / 1100 VA	100 000 / 30 000	1800
DC12 (resistive)	30V DC	192 W	100 000	1800

### 2.5 Description of transistor outputs

Description	Description of transistor outputs
Operating voltage	5-24V DC (+ 20 % - 5 %)
Rating current / terminals	1 A / terminal (8-24V DC) 0.1A / terminal (5-8V DC)
Minimum load	1.0 mA
Max. inductive load	1 A / 24V DC (24 W)
Resistive load	0.125 A / 24V DC (3.0 W)
Response time Ton/Toff, Toff/Ton	≤ 1 ms
Open circuit current leakage	≤ 0.1 mA / 24 V DC
Status indication	LCD display
Isolation circuit	None

## 2.6 General description

Description	Specification
Programming	Logic block or function block
Program capacity	64 blocks or 1500 bytes
Program backup	Via internal EEPROM or optional external EEPROM module
Data backup	20 days at 25° C (via capacitor)
Clock backup	20 days at 25° C (via capacitor)
LCD display	Display unit with 4 lines of 10 characters.
Real time clock accuracy	5 seconds / day

### Climatic conditions :

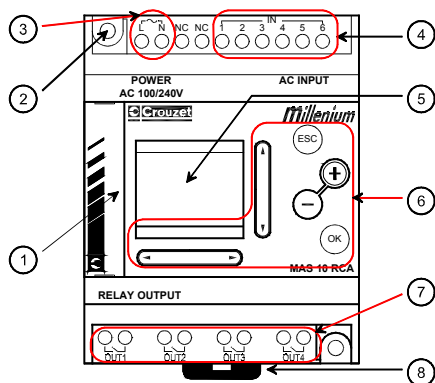
Type	Standard	Amplitude
Operating temperature		0/55 °C
Storage temperature		-30/70 °C
Humidity		35 - 85% relative humidity, without condensation
Degree of protection		IP 20
Environment		No corrosive gases. Minimum dust

### Mechanical protection :

Type	IEC Standard	Amplitude
Resistance to vibrations Direct mounting	60068-2-6	10- 57 Hz: 0.15 mm Constant amplitude Acceleration 57- 150 Hz: 19.6 m/ s <sup>2</sup> X, Y, Z : 10 times (80 minutes in each direction)
Resistance to vibrations Mounted on DIN rail	60068-2-6	10- 57 Hz: 0.075 mm Constant amplitude Acceleration 57- 150 Hz: 9.8 m/s <sup>2</sup> X, Y, Z : 10 times (80 minutes in each direction)
Resistance to shocks	60068-2-27	Acceleration : 147m/s <sup>2</sup> , duration: 11 ms X, Y, Z : 3 times in each direction

Type	Standard	Amplitude
Dielectric strength	EN 60730-1	3750V AC > 1 min between the following points : Power supply terminals / input / output terminals Between the relay outputs Between the terminals and the DIN 43880 control box or equivalent
Insulation resistance	EN 60730-1	7 Mohm at 500V DC between the following points : Power supply terminals / input / output terminals Between the relay outputs Between the terminals and the DIN 43880 control box or equivalent
Safety class		II
Certifications		CE Low Voltage directive 73/23/EEC EMC directive 89/336/EEC UL/ cUL
Conformity	UL 508 EN60730- 1 EN61010- 1 EN50081- 1 EN50082- 1 EN50082- 2	

### 3. Installation



Ref.	Description of front panel
1	Programming port EEPROM backup module
2	Fixing holes, $\varnothing$ : 4.2 mm
3	Power supply terminals
4	Input terminals
5	LCD display
6	Menu keys
7	Output terminals
8	DIN rail mounting

#### 3.1 DIN rail mounting

The modules can be mounted on a 35 mm DIN rail (DIN EN 50022).

#### 3.2 Panel mounting

Recommended diameter of fixing screws : M4.

#### 3.3 Screw terminal connection

The end of the wire should be fitted with a ferrule.

#### 3.4 Mounting instructions



The MILLENIUM series can be installed anywhere, but the following points should be taken into consideration.

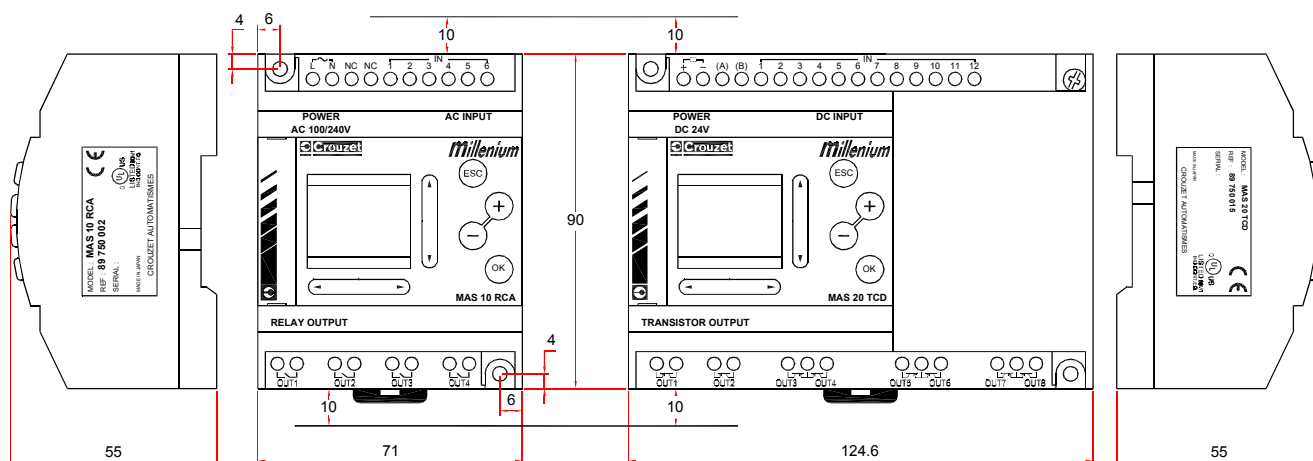
Do not install if : the atmosphere is excessively dusty, conductive, corrosive, gas-laden, damp, wet or inflammable, or subject to excessive heat\*, excessive shocks or vibrations.

Do not install the module in water or near any possible leaks.

Protect the module from external debris during installation.

Separate the cables and power equipment as far as possible. The MILLENIUM series module should be installed in cabinets which adhere to standard DIN 43880.

- For sufficient module ventilation, allow a space of 10 mm between the front of the module and the cabinet door, and likewise between the base of the cabinet and the bottom of the module.



### 4. Connection

#### 4.1 Connection instructions



The MILLENIUM series has been designed with ease of connection in mind. A technician or engineer with experience of national and local electrical standards should be able to connect MILLENIUM series modules to the sensors and actuators without difficulty.

- The input and output cables should not be in the same wiring harness.
- Keep the input/output wiring harnesses well away from the power wiring harnesses.
- Use cables which are suitable for the application.

#### 4.2 Conductor cross-section



For the inputs / outputs use conductors : 0.13 mm<sup>2</sup> - 3.31 mm<sup>2</sup> (26 - 12 AWG).

Strip back the conductor by  $7 \pm 0.5$  mm.

Undo the terminal screw to its maximum before inserting a conductor.

To be sure of correct connection, insert the wire fully in the terminal and tighten the screws.

Maximum tightening torque 0.5 Nm (5kgfcm).

Do not coat the conductor ends with tin to prevent them breaking.

#### 4.3 Power supply



For an AC power supply, the phase should be connected to the L terminal and the Neutral to the N terminal. Never connect the phase to the N terminal, as the user could receive a dangerous electric shock.

For a DC power supply, the positive conductor should be connected to the '+' terminal and the negative conductor to the '-' terminal.

The power supply terminals should not be connected to the other module terminals.



#### 4.4 Wiring diagram, MAS 6-10

<b>POWER : AC</b>	<b>INPUT : AC</b>		<p><b>FR</b> Les bornes "L" et "N" ne sont pas réversibles.  <b>GB</b> "L" and "N" terminals are not reversible.  <b>D</b> "L" und "N" - Anschlüsse sind nicht tauschbar.  <b>IT</b> I morsetti "L" e "N" non sono invertibili.  <b>SP</b> Los bornes "L" y "N" no están reversibles.  <b>NL</b> De klemmen "L" en "N" zijn niet omkeerbaar.</p>
100-240 VAC 50/60 Hz	External contact only		

Ambient temperature : 0 + 55 °C

<b>POWER : DC</b>	<b>INPUT : DC</b>	<b>NPN</b>
24 VDC + 20 % - 15 %	External contact only	
Ambient temperature : 0 + 55 °C		

<b>POWER : DC</b>	<b>INPUT : DC</b>	<b>PNP</b>
24 VDC + 20 % - 15 %	External contact only	
Ambient temperature : 0 + 55 °C		

**OUTPUT : RELAY**

Resistive load : 8 A 250 VAC 30 VDC  
 Inductive load : 125 VAC : 245 VA (1/3 hp)  
 250 VAC : 367 VA (1/2 hp)

**OUTPUT : TRANSISTOR** Resistive load : 1A / 8-24 Vcc ; 0,1A / 5-8 Vcc Inductive load : 1A / 24 Vcc (24W)

**FR** Le 0V est à relier à la borne "-" de l'alimentation du Millenium.  
**GB** Connect the 0V to "-" terminal of Millenium power supply.  
**D** Der Nulleiter ist mit der "-" Klemme der Millenium-Stromversorgung zu verbinden.  
**IT** Lo 0V deve essere collegato al morsetto "-" dell'alimentazione del Millenium.  
**SP** El 0V se ha de conectar al borne "-" de alimentación del Millenium.  
**NL** De 0V is verbonden aan de "-" klem van de voeding.

#### 4.5 Wiring diagram, MAS 20

**POWER : AC** | **INPUT : AC**

100-240 VAC 50/60 Hz

Ambient temperature : 0 + 55 °C

External contact only

**FR** Les bornes "L" et "N" ne sont pas réversibles.  
**GB** "L" and "N" terminals are not reversible.  
**D** "L" und "N" - Anschlüsse sind nicht tauschbar.  
**IT** I morsetti "L" e "N" non sono invertibili.  
**SP** Los bornes "L" y "N" no están reversibles.  
**NL** De klemmen "L" en "N" zijn niet omkeerbaar.

INPUTS: L, N, NC, NC, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**POWER : DC** | **INPUT : DC** | **NPN**

24 VDC + 20 % - 15 %

Ambient temperature : 0 + 55 °C

External contact only

INPUTS: +, -, (A), (B), 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**POWER : DC** | **INPUT : DC** | **PNP**

24 VDC + 20 % - 15 %

Ambient temperature : 0 + 55 °C

External contact only

INPUTS: +, -, (A), (B), 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

TOR + ANA, TOR

**OUTPUT : RELAY** | Resistive load : 8 A 250 VAC 30 VDC | Inductive load : 125 VAC : 245 VA (1/3 hp)  
250 VAC : 367 VA (1/2 hp)

7 mm

26-12 AWG  
0.13-3.31 mm<sup>2</sup>

**OUTPUT : TRANSISTOR** | Resistive load : 1A / 8-24 Vcc ; 0,1A / 5-8 Vcc | Inductive load : 1A / 24 Vcc (24W)

**FR** Le 0V est à relier à la borne "-" de l'alimentation du Millenium.  
**GB** Connect the 0V to "-" terminal of Millenium power supply.  
**D** Der Nulleiter ist mit der "-" Klemme der Millenium-Stromversorgung zu verbinden.  
**IT** Lo 0V deve essere collegato al morsetto "-" dell'alimentazione del Millenium.  
**SP** El 0V se ha de conectar al borne "-" de alimentación del Millenium.  
**NL** De 0V is verbonden aan de "-" klem van de voeding.

+5VDC to +24VDC

10 A

5V ≤ 0,3A  
12/24V ≤ 2A

0V

## 5. User safety and protection of equipment

- This manual contains all the diagrams and explanations which will guide the user in installing and using MILLENIUM products correctly. This manual should be read and understood prior to use or installation.
- If you have any doubts while installing MILLENIUM products or require any further information, consult your Crouzet distributor.
- This manual may be amended without prior notification.

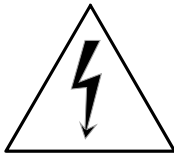
This manual is intended for use by competent personnel trained in installation of this equipment as defined in the following European directives :

Machinery (98/37/EEC)  
Low voltage (73/23/EEC)  
EMC (89/336/EEC).

Installation and electrical connections must be performed by a qualified technician.

This manual uses the symbols below to highlight information relating to the safety of personnel and the protection of equipment. Where these symbols appear, the associated comments should be read and understood.

The symbols are :



The identified danger will cause material damage.



The identified danger is liable to cause material damage.

- In no circumstances can Crouzet Limited be held responsible for damage arising as a result of installing or using this equipment.
- All examples and diagrams in this manual are intended to aid comprehension. Their application is entirely the responsibility of the user. Crouzet Limited will not accept any responsibility for actual use of this product based on these examples.
- It is up to the user to assess the suitability of this product for his applications.
- In the event of product malfunction, the integral safety features should prevent dangerous situations.
- Never modify or repair MILLENIUM products.
- Check that MILLENIUM products comply with existing national and local standards.