



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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■ Renewable energies



■ Water treatment



■ Industrial machines



www.millenium3.crouzet.com

***Millenium³** Standard & Custom*

The right solution - whatever the application!

Millenium3

With Millenium 3...

The right solution - whatever the application!



■ Millenium 3 Standard
"Compact range"



■ Millenium 3 Standard
"Expandable range"



■ Millenium 3 Standard
"Communication range"



■ New features
"Millenium 3 Standard"



■ New features
"Millenium 3 Custom"

Our company at a glance



Always one step ahead of market trends and customer requirements, Crouzet is continually developing its range of both standard and customised automation components and solutions to cover all the latest commercial and industrial applications and meet the needs expressed by manufacturers of automated equipment and machinery.

Headquartered in Moorpark, California-USA, Custom Sensors & Technologies (CST) is made up of the leading brands of Crouzet, Kavlico and Crydom, as well as the former divisions of BEI Technologies, including Newall and Systron Donner. CST provides sensors, controls, and actuation products to the transportation, industrial, and aerospace & defense markets. This new organization means even better service and technical solutions for our customers.

With Micro-control, Crouzet is a specialist provider of complete solutions tailored to meet your needs in terms of:

- Time management
- Management of physical and electrical values
- Counting

The entire range is marketed through a global distribution network working hand in hand with local sales forces dedicated to Micro-control applications.

3rd generation of logic controllers at the core of your industry.

With the new Millenium 3, you can take advantage of all the most recent developments in the latest generation of logic controllers. An innovative product, developed, industrialised and marketed by Crouzet, Millenium 3 is the successful synthesis of our expertise in automation systems acquired over a period of more than 40 years.

With the aim of matching your applications even more closely, Crouzet is expanding its **Millenium 3 Standard** logic controller offer which was originally launched in 2006:





- New software functions (sunrise/sunset, etc.)
- New accessories (pressure control solution, levels, flow, broader range of power supplies, remote display/keypad, improved communication extension performance, etc.)

In addition to its **Millenium 3 Standard** logic controllers for today's automation needs, Crouzet is also able to offer its **Millenium 3 Custom** logic controllers for specific applications (water treatment, geothermal systems, etc.), or for use in severe environments.

Whatever the application, Crouzet is able to offer you bespoke products that work in complete harmony with your equipment.



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Millenium3



■ Fountain

Pump control with variable flow for different water jet and mood effects, regulation of water neutrality (pH) and disinfecting of water in fountain (ORP).



■ Field irrigation

Irrigation control based on temperature, humidity, and day/night cycle.



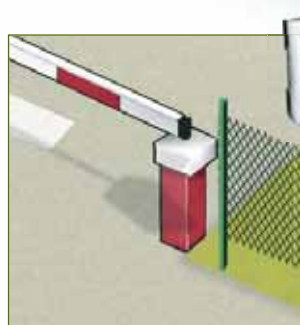
■ Hydraulic solar heating

Automation of operation and heating regulation plus remote management of the installation via GSM modem.



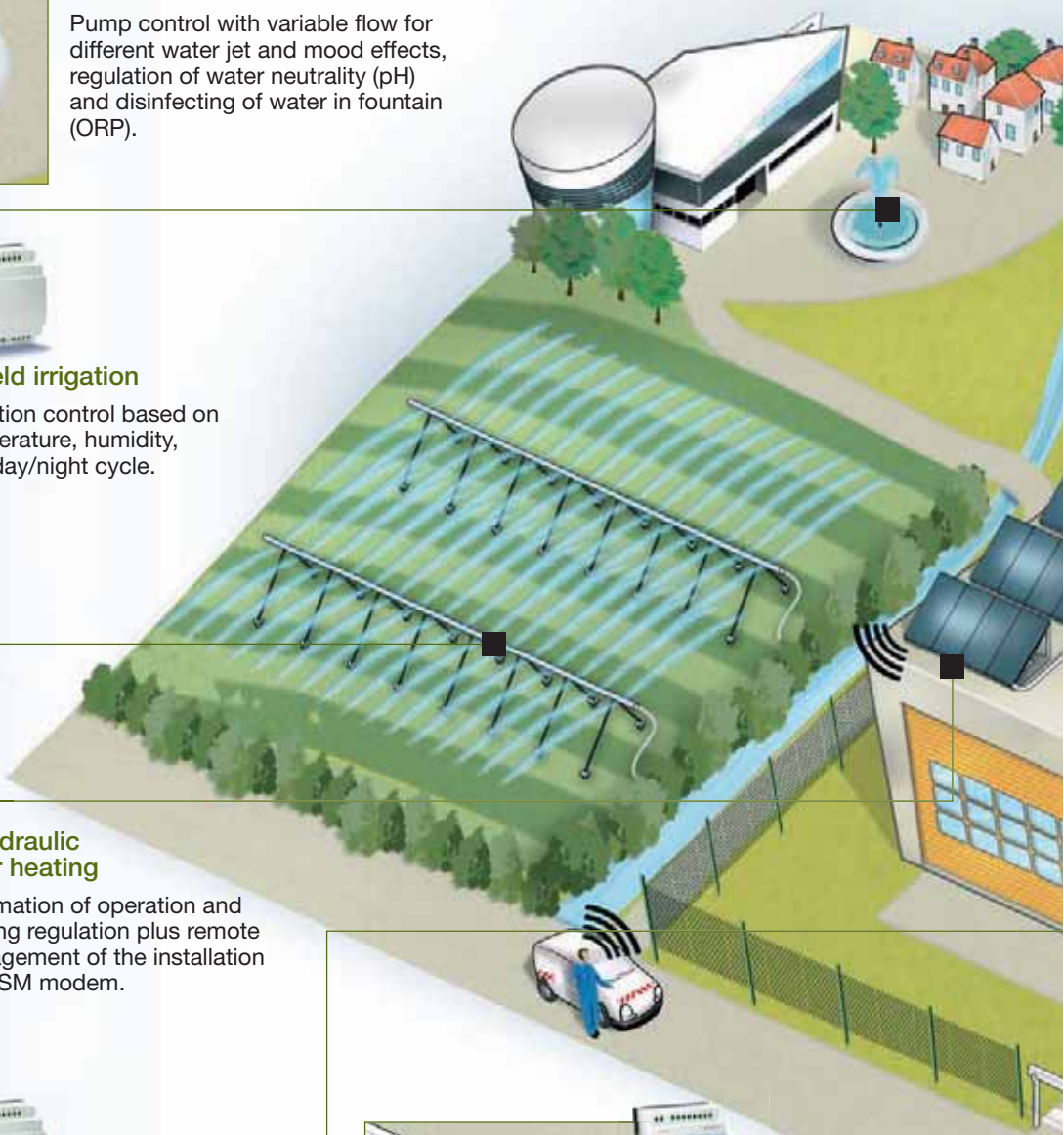
■ Opening control for industrial sectional doors

Opening control for doors and associated security devices for restricting access. Synchronisation between the various doors.



■ Automatic barrier

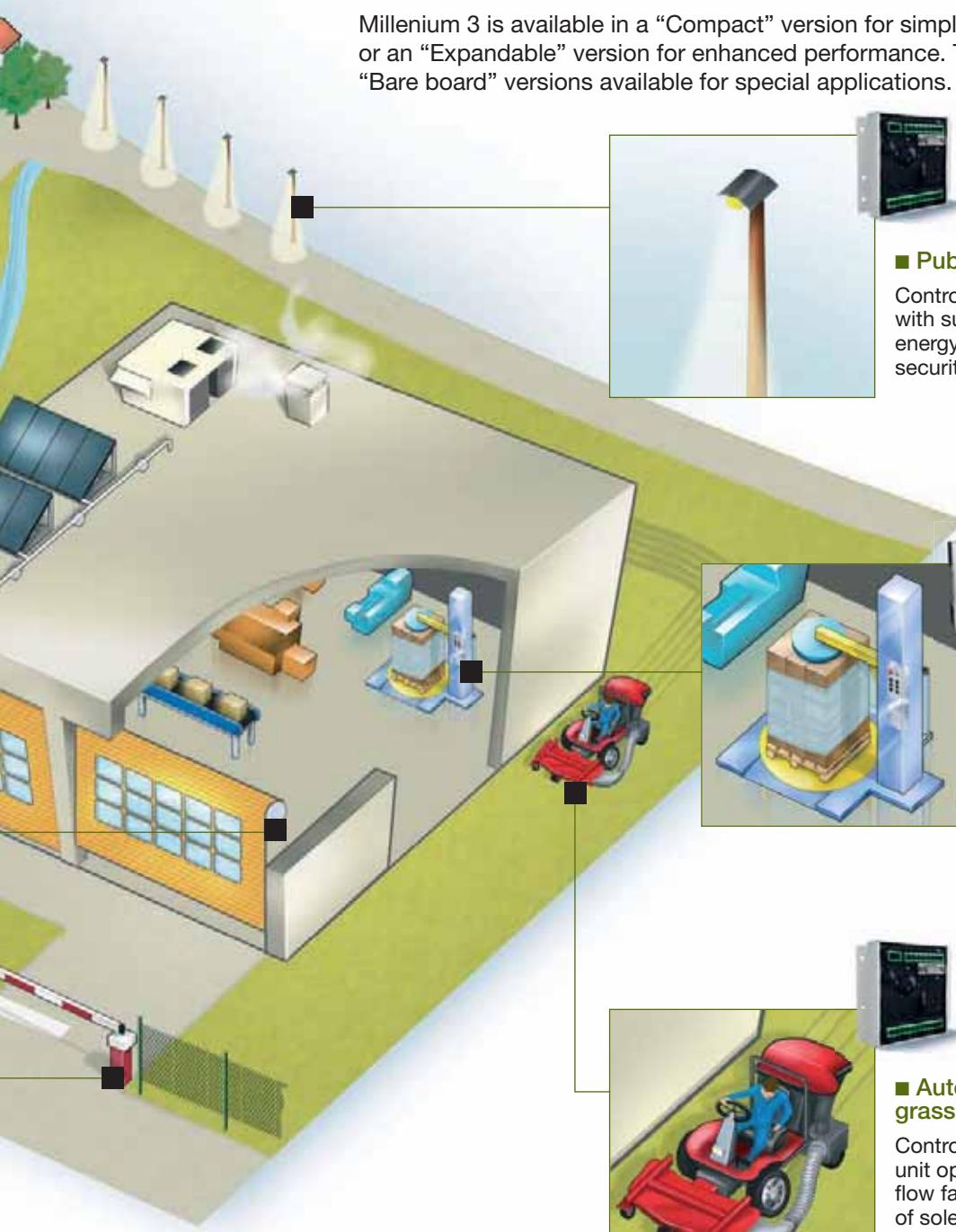
Opening control of barriers with automatic vehicle detection and function for selecting opening times/days.



What is a **logic controller** used for?

The Millennium 3 logic controller can be used to automate small devices requiring between 10 and 50 I/O. Millennium 3's logic functions can be used in numerous applications, including packing, access control, vending, irrigation, pump management and HVAC control.

Millennium 3 is available in a "Compact" version for simple automation systems or an "Expandable" version for enhanced performance. There are also "Resin" or "Bare board" versions available for special applications.



■ Public lighting

Control of public lighting to coincide with sunrise/sunset in order to save energy whilst ensuring optimum security levels.



■ Stretch wrapping machine

Controls the motor that unrolls the packing film, controls cutting of the film after heat sealing, and determines the duration of the motor cycles.



■ Automation of industrial on-board grass-cutter

Control of machine automation and cutting unit operating conditions: control of reverse flow fan (filter cleaning function), control of solenoid valves for locking rear wheels in a straight line, control of cylinders/start function/lights/horn.

Millenium3

More possibilities



■ Supplying power



■ Sensing



■ Operator dialogue



■ Communicating



■ Actuating

PROCESSING

Millenium 3 functions

- **Timing:** 5 types of timer
- **Counting:** 3 types of counter
- **Regulating:** Hysteresis cycle, PID, etc.
- **Archiving/saving:** 10-year data backup function, even after a power failure
- **Calculating:** Maths functions
- **Logic operations:** AND, OR, NAND, NOR, XOR, NOT, etc.
- **Creating sequential programs:** Grafset, cam timer, etc.
- **Triggering events:** Year, month, day, hour, minute, etc.

The inputs (digital, potentiometer or 10-bit analogue) of the Millenium 3 logic controller are compatible with most sensors on the market: temperature sensors, pressure transmitters, level detectors, flow sensors, etc.

Sensing

Supplying power

12 and 24 V DC voltages available.
Several power supply ranges from 7.5 to 240 W.



Operator dialogue

To make it easier for the operator during parameter setting or operation, Millenium 3 has a built-in, backlit screen (4 lines of 18 characters, drop-down screen, bar chart).

It is equally possible to use the remote LED screen (via Modbus extension XN06) or the LCD screen.

NEW Backlit LCD screen/keypad with 4 lines of 18 characters and featuring 6 keys or 10 keys with 4 LEDs (direct communication with the Millenium 3 via the programming port).

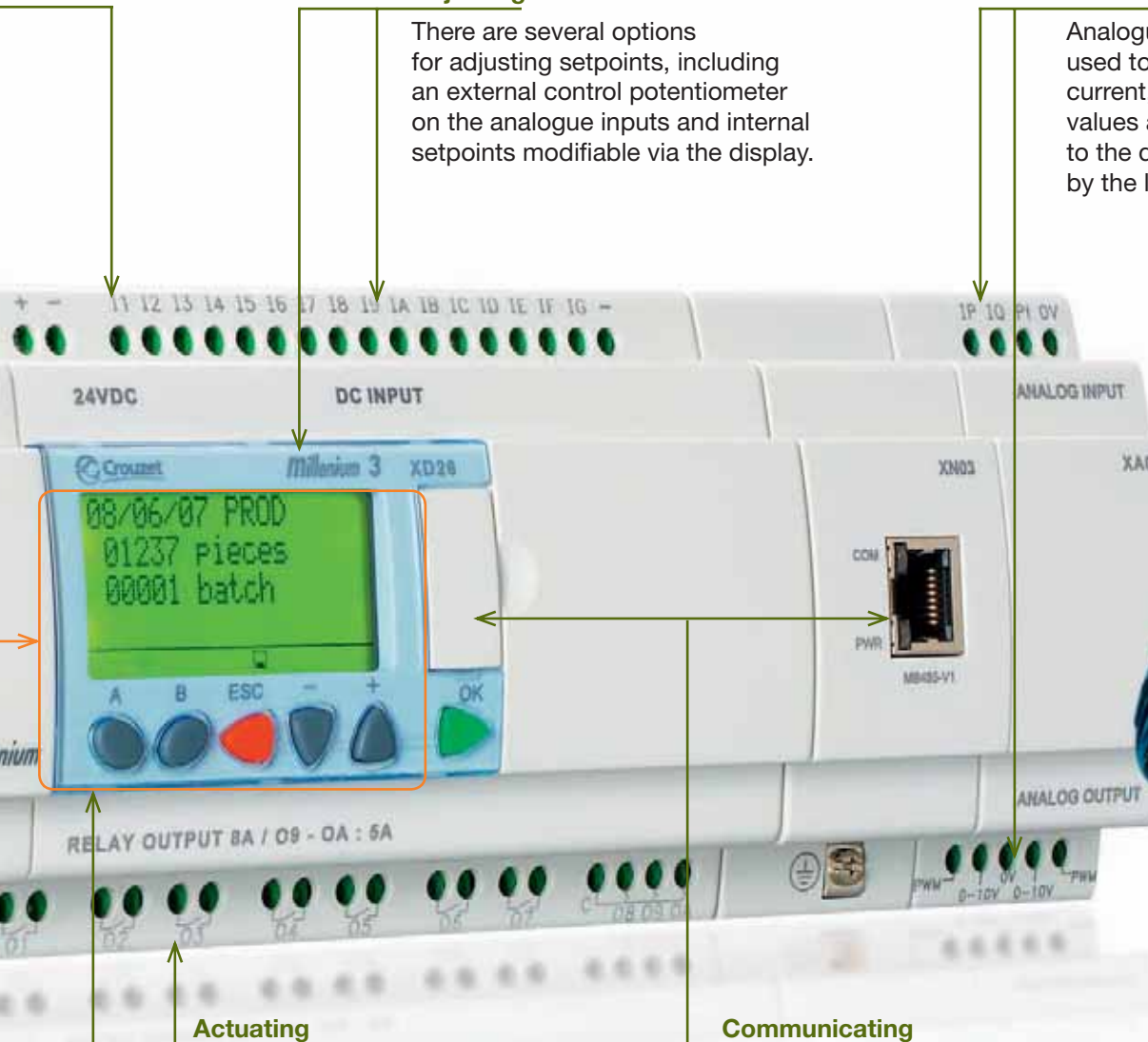
What is a **logic controller** used for?

Adjusting

There are several options for adjusting setpoints, including an external control potentiometer on the analogue inputs and internal setpoints modifiable via the display.

Converting

Analogue extensions are used to acquire or provide current, voltage or temperature values and convert them to the digital signals needed by the logic controller.



Actuating

Millenium 3 can be used to drive devices such as brushless motors, solenoid valves and pumps (relay, solid state or PWM outputs).

Communicating

Millenium 3 offers the option of supervising and connecting your devices (PC, remote screens/ keyboards, etc.) by linking the logic controllers to fieldbuses (Modbus, Ethernet) or via a modem: STN or GSM.

Millenium3



The benefits of the new range



■ Modularity



■ Optimised wiring time



■ Ergonomic display



■ Mounting on DIN rail or using screws



■ Networked offer

▶ Millenium 3 “Compact” range

■ With display

■ Without display



CD12



CD20



CB12



CB20

▶ Millenium 3 “Expandable” range

■ With display

■ Without display **NEW**



XD10



XD26



XB10



XB26

▶ Millenium 3 communication solutions

■ Plug & Play solutions for modem communication

■ Communication extensions for 24 V DC expandable controller



STN

GSM

M3MOD



XN03

4-word Modbus extension

XN05

Ethernet extension

XN06

8-word Modbus extension

NEW

Product offer overview



“Compact range” starter kits with display

■ Digital “Sandwich” extension



XE10

■ Digital extensions



XR06



XR10



XR14

■ Analogue extension



XA04



“Expandable range” starter kits with display

See page 76 for other analogue “application” extensions.

If you have specific needs, see page 62.

“ Millenium 3 is a very rational range, offering a high degree of consistency and true continuity over time. It’s particularly useful when you have equipment life cycles lasting several years.

Mickaël, Technical Director



Millenium3

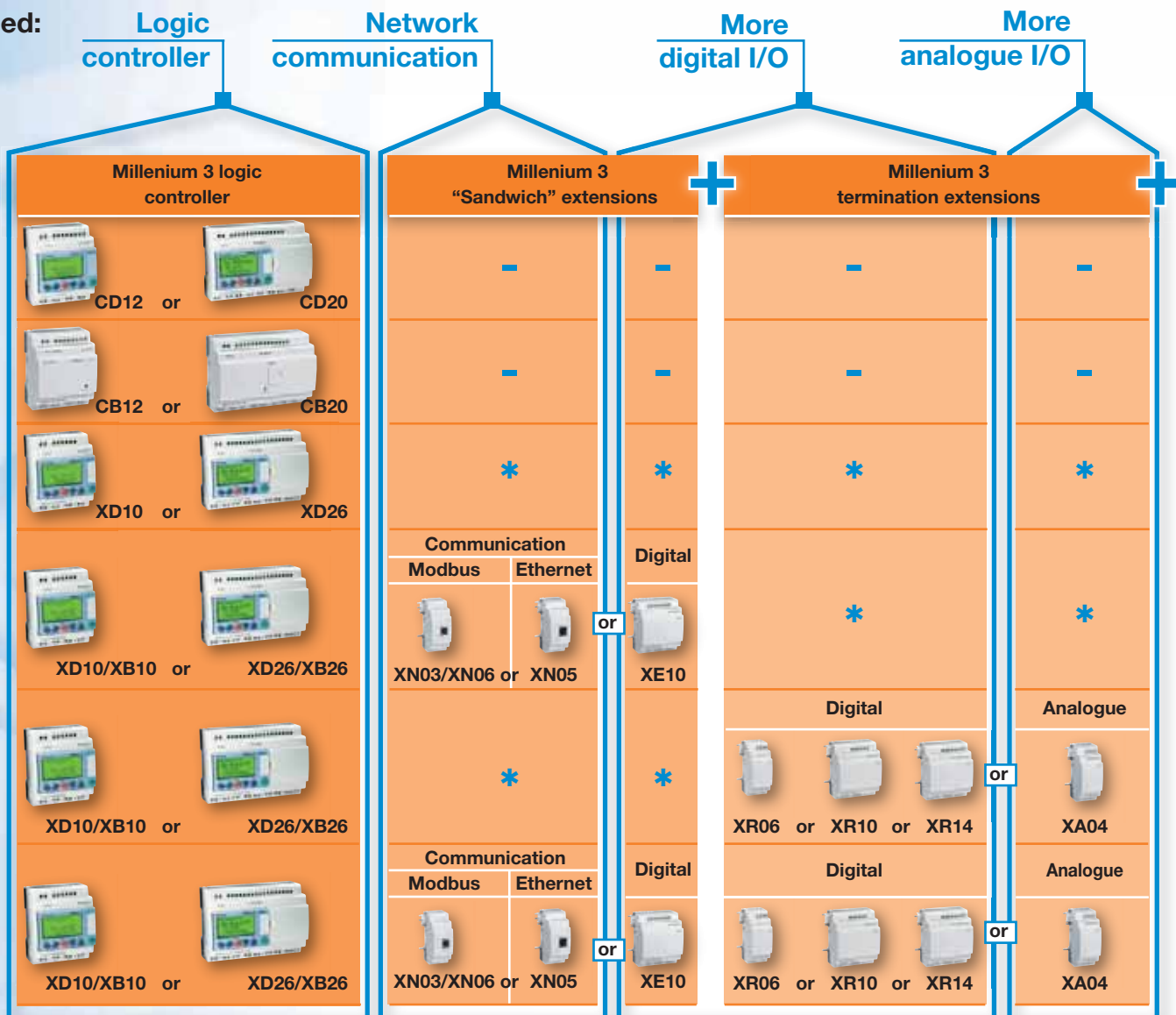


More configuration options

Find the best solution to meet your needs,

[Overview of Millenium 3 Combinations](#)

You need:



■ Example Millenium 3 combination: XD26 + XE10 + XR14



Product offer overview

all thanks to the modularity of Millenium 3.

Modem communication

Plug & Play solutions for modem communication



Compatible with M3MOD + GSM/STN modem

Number of I/O available								
CD12 only				or	CD20 only			
12					20			
CB12 only				or	CB20 only			
12					20			
XD10/XB10 only				or	XD26/XB26 only			
10					26			
XD10/XB10 with					XD26/XB26 with			
XE10	XN03	XN05	XN06	XE10	XN03	XN05	XN06	
20	10	10	10	36	26	26	26	
XD10/XB10 with					XD26/XB26 with			
XR06	XR10	XR14	XA04	XR06	XR10	XR14	XA04	
16	20	24	14	32	36	40	30	
XD10/XB10 with					XD26/XB26 with			
XN, XE, XR or XA					XN, XE, XR or XA			
20 to 34					36 to 50			

NB: For voltage selection, see pages 26-27 and 30-31.

■ : Extension not compatible

* : Not used

“ With Millenium 3, I buy what I actually need!

No matter what specification the technical team draws up in terms of I/O or supply voltage for example, I can find the right product in the Millenium 3 range.

As a result, thanks to this modularity, I always get the best cost-effectiveness ratio.

Catherine, Automation Component Purchasing Manager



Millenium 3 Standard





For greater efficiency



■ Sprinklers



■ Drink vending machines



■ Telemaintenance for a pumping station



■ Sliding gate

▶ Plug & Play solutions for modem communication

With the networked logic controller, you can control your installations remotely.

Using the M3MOD communication interface, you can monitor and control your installations remotely while reducing your maintenance costs:

- Perform pre-diagnostics.
- Avoid pointless visits.
- Define priorities before responding.

The M3MOD interface can be used with two 2 modems - the **STN** modem for wired networks or the **GSM** modem for wireless communication.

On site with a mobile phone:

- Receive SMS alerts containing up to 160 characters and able to include a digital and/or analogue value: if one mobile phone is unavailable, the alarm is automatically redirected to another mobile phone.
- Send commands to a remote Millenium 3 logic controller (you control Millenium 3 outputs remotely).
- Interrogate the status of application components and remotely modify the digital and/or analogue value of a program component.

In the office with the M3 ALARM software:

- Take advantage of the same functions as on your mobile phone with all the comfort of a PC environment.
- Manage the composition of your maintenance teams.
- Organise your alarms easily so that you can file, archive, sort or export them.



■ GSM modem communication solution

Product offer overview

► Overview of other Millenium 3 communication solutions

Easy-to-use, high-performance tools able to communicate with new forms of technology

Millenium Web Server, the Embedded Web SCADA solution:

(Part no.: 88950124)

- Remote supervision and monitoring from any system with an Internet browser (PC, mobile telephone, PDA, etc.)
- Intuitive programming of supervision pages without the need for prior knowledge of programming languages
- Automatic generation of supervision web pages (up to 20 pages)
- Automatic alerts by e-mail/SMS/fax regarding any change in monitored status
- Fieldbus management (Modbus master)
- Analogue (temperatures, etc.) or digital (alarms, etc.) data archiving, with text-based data evaluation using spreadsheets

*For more information on this Embedded Web supervision solution, please visit the dedicated website:
www.webserver.crouzet.com*

Other communication options:

- Ethernet (Modbus TCP protocol) and Modbus slave extensions with up to:
 - 8 input data words (read/write)
 - 8 output data words (read)
- Programming via serial cable, USB, Bluetooth interface, memory card or modem



■ Millenium Web Server



■ Communication extensions



■ Programming accessories

“ In the case of extremely remote equipment, the fact that we can access the Millenium 3 controller remotely means we can optimise our response times. And the wireless link is a real bonus when it comes to controlling the automatic gates we have installed!

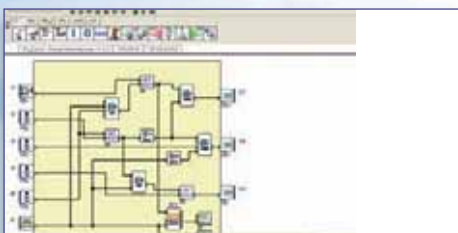
Roberto, Operations Maintenance Manager ”





6 steps to greater simplicity

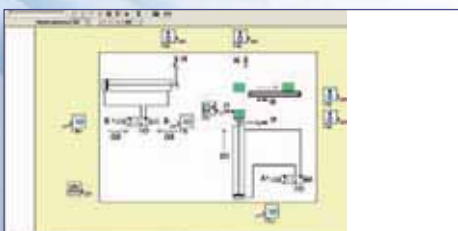
Example of programming in FBD/Grafcet SFC



■ Creating



■ Simulating



■ Supervising

Two programming languages

With Millenium 3, programming mirrors how you work.

Whether you are an electrical engineer or a control systems engineer, you can select the programming language you prefer. With **Ladder or FBD/Grafcet language**, everything is intuitive, quick and safe.

Millenium 3 is capable of reading and converting programs created on the Millenium 2 logic controller.

For quick, simple programming, the Millenium 3 software prioritises **dedicated application-specific functions** such as pump switching, PID control, movement, pressure, level and flow.

All the basic functions, such as counting, timing, comparison and display, are also available.

The **M3 SOFT** programming software incorporates error checking, so that when the slightest data entry error is made, it flags the incorrect item in red.

The **M3 SOFT** software is multilingual, offering English, French, Italian, German and Spanish.

■ Programming

You can choose between two different languages: **Ladder and FBD/Grafcet**.

■ Creation

You can select the physical or internal I/O and the **preprogrammed functions** you need for your application.

■ Simulation

You can test the result of your programming in real time.

■ Downloading

You can transfer your programs directly to the controllers using local wired or wireless (**Bluetooth**) equipment or transfer them remotely using **modem solutions**.

■ Supervision

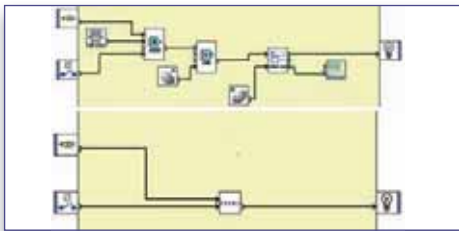
You can view the status of your application, locally or remotely, thanks to the communication solutions.

■ Development

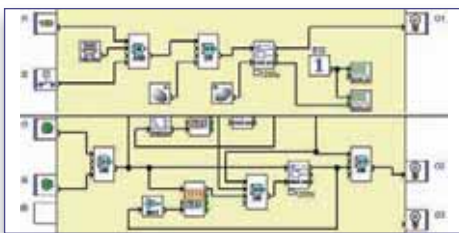
You can develop your program to keep pace with modifications to your installation.

Introduction to **programming** software

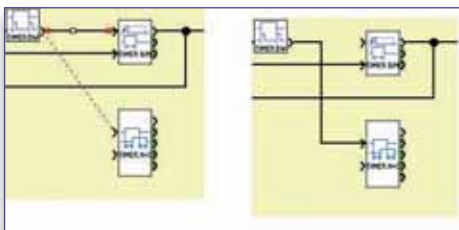
▶ **Software innovations** for easier programming



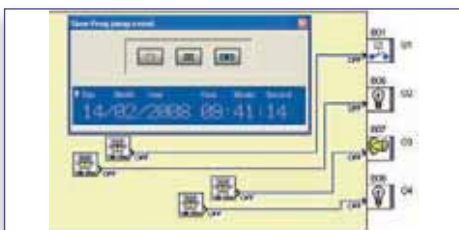
■ **Macro function**



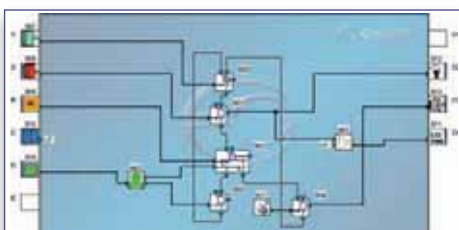
■ **Division of screen**



■ **Moveable links**



■ **Time simulator**



■ **Visual customisation**

■ **Macro function**

Integrating your repetitive functions into dedicated macro functions saves time and makes your life easier, as it enables you to reuse your expertise directly within your programs. You can access and modify the content of your macro functions, or choose to protect them with a password.

■ **Division of the wiring sheet into several edit windows**

This kind of division makes it possible to display two different sections of the wiring sheet on the same screen. This makes it easier to carry out debugging and wiring for your program.

■ **Easy moving of links**

The fact that you can move the links means you can develop your program by replacing function blocks but without losing your existing links.

■ **Simulating program timing**

The “Next event” key enables the user to set the time of the time simulator to the start of next timed event that has been programmed.

■ **Customising your program with your own images**

The software enables you to import images into your program so you can customise your wiring sheet, your input/output icons and your macro functions.



Programming that is even more natural



FBD/Grafcet SFC language

With the M3 SOFT CD-ROM, you can take advantage of unrivalled programming flexibility and a huge processing capacity (up to 700 function blocks).

■ 27 preprogrammed FBD functions

■ Timing/clock



TIMERS

A/C function: Delay on and off

BW function: Pulse on a rising or falling edge

B/H function: Adjustable pulsed signal

Li/L function: Pulse generator (ON/OFF setting)

Totalizer function

When these functions have preset parameters, they can be adjusted in real time from an external setpoint.



PRESET H-METER

Preset hour counter (preselection of hour, minute).



TIME PROG

Daily, weekly, monthly and yearly time programmer.

■ Counting



UP/DOWN COUNT

External preset up/down counter.



PRESET COUNT

Preset up/down counter.

■ Logic processing



BISTABLE

Impulse relay function.



SET - RESET

Bistable memory - Priority assigned to either SET or RESET.



BOOLEAN

Creation of logic equations between connected inputs.



CAM TIMER

Controls a group of 8 integral cam wheels.

■ Digital processing



ADD-SUB

Simple operations on integers: Addition and/or Subtraction.



DEC/BIN

Breaks down an integer type input (16 bits) into 16 bit type outputs.



ARCHIVE

Used to save two values simultaneously with the information relating to their time-stamping.



MUL-DIV

Simple operations on integers: Multiplication and/or Division.



BIN/DEC

Makes up an integer type output (16 bits) from 16 bit type inputs.



MUX

Multiplexing function on 2 analogue values.



GAIN

Used to convert an analogue value by changing the scale and offset.

■ Detection



COMPARE IN ZONE

Used to compare a value between two setpoints (the MIN and MAX values determine the zone).



SCHMITT TRIGGER

Used to monitor an analogue value in relation to two thresholds.



STATUS

Allows the user to access the controller states and modify the behaviour of its FBD and/or SFC program depending on these states.



COMPARE

Used to compare two analogue values using the =, >, <, ≥, ≤, ≠ operators.



MIN MAX

Used to save the minimum and maximum values of a variable signal.

■ Display



DISPLAY ON THE LCD SCREEN

Display of digital and analogue data, date, time, messages for human-machine interface (Bar chart function available).



TEXT

Display of a page of text and/or numerical values (current value, preset value, etc.) on the LCD display.



STANDARD MACRO

Used to obtain examples of preprogrammed macros for scrolling 4 or 15 "DISPLAYS". These examples can be modified and configured with different parameters.

Introduction to programming software

■ Communication



SLIN (SERIAL LINK INPUT)

Writing via serial link of data stored in the controller's fixed addresses.



SLOUT (SERIAL LINK OUTPUT)

Reading via programming port of data stored in the controller's fixed addresses.



MESSAGE

When activated, the Message function block can be used to:

- send alarm messages to mobile phones, to the Millenium 3 Alarm tool or to e-mail addresses via the M3MOD communication interface.
- provide remote access to a digital variable and/or a numerical variable, in order to read or modify them.

■ 20 specific preprogrammed FBDC functions

In addition to the basic function blocks, Crouzet's M3 SOFT CD-ROM (Part no. 88970111) also contains a library with specific functions adapted to your requirements and your application (water management, HVAC, etc.).

■ Timing/clock



NEW HOUR/MINUTE

Provides the time from the controller (hour and minutes).



NEW TIMER SET RESET SWITCHING

Triggers operation of a particular device at a fixed time for a period set by the user.



NEW SUNRISE/SUNSET TIME

Calculates the sunrise and sunset time in relation to the latitude and longitude read on the function block inputs. It is used to generate high levels on these "Morning Pulse" and "Evening Pulse" outputs according to the user parameters.

■ Counting



FAST COUNT

Counts the pulses arriving at the input at rates in excess of one pulse every 10 ms.



HIGH SPEED COUNT

Counts the pulses arriving at the inputs of a controller powered by a DC supply at rates in excess of one pulse every 6 ms.

■ Digital processing



ARCHIVE

Saves a value between -32768 and 32767.



STORE

Storage of data values with an average value.



DEM (DEMULTIPLEXER)

Demultiplexing of integers. Used to direct the value of the input to one of the 4 OUTPUTS.



MUX (MULTIPLEXER)

Multiplexing WORD inputs. Used to direct the value of one of the selected inputs to a predefined output.

■ Logic processing



BOOLEAN (SIX INPUTS/TWO OUTPUTS)

Management of two Boolean equations.

For details of any other specific function, see pages 66-67.

“ We constantly need to update the various automation configurations according to the environment in which our equipment is used.

With **more than 50 function blocks available, Millenium 3** gives us this flexibility. What's more, I can connect up to 700 function blocks in the same program. This enables me to devise highly complex applications.

Steve, Moulding Press Manufacturer ”





■ 20 specific preprogrammed FBDC functions (continued)

■ SFC



WAIT SFC STEP

Sets up a wait phase or step for a PLC or a device.



MOVE SFC STEP

Sets up a move step for a motor controlled by the PLC to a position specified on the TARGET input.



MOTOR MULTIPLEXER

Combines the motor control signals produced by two linked MOVE SFC steps.

■ Sensor



NEW GAIN

Acts as the interface between the Crouzet pressure transmitters and the Millenium 3 logic controller.



NEW LEVEL

Calculates the level of liquid in an open or closed tank, with or without constant density, using pressure sensors.



NEW FLOW

Calculates the flow of a liquid in a pipe using a differential pressure element or by measuring the dynamic pressure.



NEW 5 THRESHOLDS

This function compares a value against 5 thresholds.

■ Regulation



ANALOGUE PID

Temperature control (pressure or other) with analogue output.



PID PWM

Temperature control (pressure or other) with digital output.



PUMP MANAGEMENT

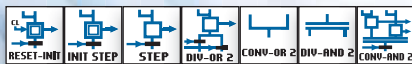
Pump rotation function

■ Application

For details of any other specific function, see pages 66-67.

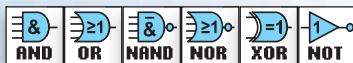
■ 7 Grafcet SFC functions

For sequential automation systems (Sequential Function Chart).



■ 6 logic functions

AND, OR, NAND, NOR, XOR, NOT.



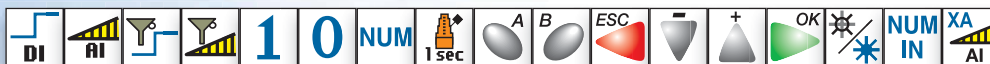
■ 5 output functions

Physical outputs (relay, solid state or PWM) and internal outputs (backlighting).



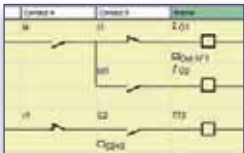
■ 17 input functions

Physical inputs (digital, potentiometer or 10-bit analogue) and internal inputs (buttons, constants).

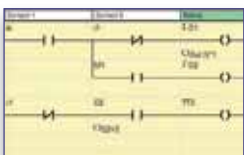


Introduction to programming software

Ladder language



■ Electrical symbols



■ Ladder symbols

The M3 SOFT CD-ROM contains all the symbols used in Ladder language. You can choose between two types of graphic representation: Ladder or electrical symbols.

■ 13 Ladder functions

■ Inputs



DIGITAL INPUTS

This contact represents the state of the controller input connected to a sensor (pushbutton, switch, detector, etc).



A/B BUTTONS

The A and B buttons behave exactly like physical inputs. They correspond to the grey A and B buttons on the front of the controller.



SUMMER WINTER

This function output is in the OFF state for the whole of wintertime and changes to the ON state for the whole of summertime.

■ Outputs



DIGITAL OUTPUTS

The digital outputs correspond to the controller output relay coils (connected to the actuators).



AUXILIARY RELAYS

The auxiliary relays, marked M, behave exactly like digital outputs, but do not have an output electrical contact. They can be used as internal variables.

■ Timer/clock



TIMERS

The TIMERS function block provides access to the following functions: delaying or prolonging actions for a predefined time, management of flashing cycles, creating pulses, etc.



CLOCKS

The Clocks or Time Prog function is used to enable time slots during which it will be possible to execute actions.

■ Counter



COUNTERS

Upcounts or downcounts pulses.



HIGH-SPEED COUNTER

Counts pulses up to a frequency of 1 kHz.



COUNTER COMPARATORS

Compares the current counter value of two counters or of one counter and a constant value.

■ Display



LCD BACKLIGHTING

The screen Backlighting output is used to control the LCD display lighting via the program.



TEXT BLOCKS

The Text automation function is used to display text and/or numerical values (current value, preset value, etc.) on the LCD display rather than on the INPUTS-OUTPUTS screen.

■ Communication



MESSAGE

When activated, the Message function block can be used to:

- send alarm messages to mobile phones, to the M3 Alarm tool or to e-mail addresses via the M3MOD communication interface.
- provide remote access to a digital variable and/or a numerical variable, in order to read or modify them.

“ I wasn't really into programming at first. Here at least, I can choose the language that suits me best. As I am an electrical engineer by training, with Ladder language, it's what I understand!

Olivier, Electrical Installer





Whatever your activity



■ Building Management Systems



■ Industry



■ Advertising hoardings



■ Water treatment



■ Renewable energies

Millenium 3 offers the most suitable solution for your application.

▶ Building Management Systems

- Lighting control systems
- Air conditioning and heating systems
- Lifts, hoists and escalators
- Automatic doors and barriers

▶ Industry

- Packing machines
- Woodworking machines
- Conveyors
- Moulding machines

▶ Commercial equipment

- Automatic washing equipment
- Vending machines
- Advertising hoardings
- Toll barriers

▶ Water treatment/Agriculture

- Farm machinery
- Irrigation/sprinkler systems
- Pump management

▶ Renewable energies

- Solar panels
- Wind turbines
- Heat pumps

Applications

▶ Focus on the “**compressor**” application



Pressure transmitter: Easily avoid breakdowns!

- The pressure transmitter measures the compressor’s **supply and outlet pressures** to control the motor according to the required displayed pressure, thereby ensuring maximum efficiency.
- **Ready-to-use**, the pressure transmitter’s reference and specifications are preset in the Millenium 3 logic controller, allowing **safe, speedy and effective installation**, using dedicated function blocks.

Millenium 3: The logic controller at the heart of your equipment!

- The Millenium 3 logic controller has everything you need to **control your compressors effectively**: easy to operate, preset applications, adapted function blocks.
- The Millenium 3 gathers and processes data such as relative **humidity, temperature and pressure** to co-ordinate operation of one or more compressors.
- A dedicated function ensures simultaneous **management of 4 or more compressors**, in order to extend their working life.

“ By opting for a Millenium 3 automation solution, **I get the benefit of perfect synchronisation** between logic controller, probes, sensors, control relays, timers and, defrost relays.

This is a real plus for us! We are able to derive significant benefits in terms of design, integration and installation.

*Edith, Quality Manager
for compressor manufacture*



Millenium 3 Standard

→ General characteristics

- Millenium 3 Compact Range
- Millenium 3 Expandable Range
- Millenium 3 Communication Options



Millenium 3 range

General environment characteristics for CB, CD, XD, XB, XR and XE product types

Certifications ●	UL, CSA GL: except for 88 970 32x (pending)
Conformity with the low voltage directive	In accordance with 73/23/EEC: EN (IEC) 61131-2 (Open equipment)
Conformity with the EMC directive ●	In accordance with 89/336/EEC: EN (IEC) 61131-2 (Zone B) EN (IEC) 61000-6-2, EN (IEC) 61000-6-3 (*) EN (IEC) 61000-6-4
(*) Except configuration (88 970 1.1 or 88 970 1.2) + (88 970 250 or 88 970 270) + 88 970 241 class A (class B: using in metallic cabinet)	
Earthing	None
Protection rating ●	In accordance with IEC/EN 60529: IP40 on front panel IP20 on terminal block
Overvoltage category	3 in accordance with IEC/EN 60664-1
Pollution	Degree: 2 in accordance with IEC/EN 61131-2
Maximum utilisation altitude	Operation: 2000 m Transport: 3.048 m
Mechanical resistance ●	Immunity to vibrations IEC/EN 60068-2-6, Fc test Immunity to shock IEC/EN 60068-2-27, Fa test
Resistance to electrostatic discharge	Immunity to ESD IEC/EN 61000-4-2, level 3
Resistance to HF interference	Immunity to radiated electrostatic fields IEC/EN 61000-4-3, Immunity to fast transients (burst immunity) IEC/EN 61000-4-4, level 3 Immunity to shock waves IEC/EN 61000-4-5 Radio frequency in common mode IEC/EN 61000-4-6, level 3 Voltage dips and breaks (~) IEC/EN 61000-4-11 Immunity to damped oscillatory waves IEC/EN 61000-4-12
Conducted and radiated emissions	Class B (*) in accordance with EN 55022/11 group 1
(*) Except configuration (88 970 1.1 or 88 970 1.2) + (88 970 250 or 88 970 270) + 88 970 241 class A (class B in metallic cabinet)	
Operating temperature	-20 → +55°C (+40°C in a non-ventilated enclosure) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
Storage temperature	-40 → +70°C in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
Relative humidity	95% max. (no condensation or dripping water) in accordance with IEC/EN 60068-2-30
Mounting	On symmetrical DIN profile, 35 x 7.5 mm and 35 mm x 15 or panel (2 x 4 mm Ø)
Screw terminals connection capacity	Flexible wire with ferrule = 1 conductor: 0.25 to 2.5 mm ² (AWG 24...AWG 14) 2 conductors 0.25 to 0.75 mm ² (AWG 24...AWG 18) Semi-rigid wire = 1 conductor: 0.2 to 2.5 mm ² (AWG 25...AWG 14) Rigid wire = 1 conductor: 0.2 to 2.5 mm ² (AWG 25...AWG 14) 2 conductors 0.2 to 1.5 mm ² (AWG 25...AWG 16) Tightening torque = 0.5 N.m (4.5 lb-in) (tighten using screwdriver diam. 3.5 mm)

● : For adapted products, see page page 64-65

Processing characteristics of CB, CD, XD & XB product types

LCD display	CD, XD: Display with 4 lines of 18 characters
Programming method	Ladder or function blocks/SFC (Grafcet)
Program size	Ladder: 120 lines Function blocks: CB, CD: typically 350 blocks XB, XD: typically 700 blocks
Program memory	Flash EEPROM
Removable memory	EEPROM
Data memory	368 bits/200 words
Back-up time in the event of power failure	Program and settings in the controller: 10 years Program and settings in the plug-in memory: 10 years Data memory: 10 years
Cycle time	Ladder: typically 20 ms Function blocks: 6 → 90 ms
Response time	Input acquisition time + 1 to 2 cycle times
Clock data retention	10 years (lithium battery) at 25°C
Clock drift	Drift < 12 min/year (at 25°C) 6 s/month (at 25°C with user-definable correction of drift)
Timer block accuracy	1% ± 2 cycle times
Start up time on power up	< 1.2 s

Characteristics of products with AC power supplied

Supply	24 V ~ (88970..4)	100 → 240 V ~ (88970..3)
Nominal voltage ●	24 V ~	100 → 240 V ~
Operating limits ●	-15% / +20% or 20.4 V ~ → 28.8 V ~	-15% / +10% or 85 V ~ → 264 V ~
Supply frequency range	50/60 Hz (+4% / -6%) or 47 → 53 Hz/57 → 63 Hz	50/60 Hz (+4% / -6%) or 47 → 53 Hz/57 → 63 Hz
Immunity from micro power cuts	10 ms (repetition 20 times)	10 ms (repetition 20 times)
Max. absorbed power	CB12-CD12-XD10-XB10: 4 VA CB20-CD20: 6 VA XD10 with extension - XD26-XB26: 7.5 VA XD26-XB26 with extension: 10 VA	CB12-CD12-XD10-XB10: 7 VA CB20-CD20: 11 VA XD10-XB10 with extension-XD26-XB26: 12 VA XD26-XB26 with extension: 17 VA
Isolation voltage	1780 V ~	1780 V ~
Inputs	24 V ~ (88970..4)	100 → 240 V ~ (88970..3)
Input voltage ●	24 V ~ (-15% / +20%)	100 → 240 V ~ (-15% / +10%)
Input current ●	4.4 mA @ 20.4 V ~ 5.2 mA @ 24.0 V ~ 6.3 mA @ 28.8 V ~	0.24 mA @ 85 V ~ 0.75 mA @ 264 V ~
Input impedance ●	4.6 kΩ	350 kΩ
Logic 1 voltage threshold ●	≥ 14 V ~	≥ 79 V ~
Making current at logic state 1 ●	> 2 mA	> 0.17 mA
Logic 0 voltage threshold ●	≤ 5 V ~	≤ 20 V ~ (≤ 28 V ~ : XE10, XR06, XR10, XR14)
Release current at logic state 0 ●	< 0.5 mA	< 0.5 mA
Response time with LADDER programming	50 ms - State 0 → 1 (50/60 Hz)	50 ms - State 0 < 1 (50/60 Hz)
Response time with function blocks programming	Configurable in increments of 10 ms 50 ms min. up to 255 ms State 0 → 1 (50/60 Hz)	Configurable in increments of 10 ms 50 ms min. up to 255 ms State 0 → 1 (50/60 Hz)
Maximum counting frequency	In accordance with cycle time (Tc) and input response time (Tr) : $1 / ((2 \times Tc) + Tr)$	In accordance with cycle time (Tc) and input response time (Tr) : $1 / ((2 \times Tc) + Tr)$
Sensor type	Contact or 3-wire PNP	Contact or 3-wire PNP
Input type	Resistive	Resistive
Isolation between power supply and inputs	None	None
Isolation between inputs	None	None
Protection against polarity inversions	Yes	Yes
Status indicator	On LCD screen for CD and XD	On LCD screen for CD and XD
Characteristics of relay outputs common to the entire range		
Max. breaking voltage ●	5 → 30 V ~ 24 → 250 V ~	
Breaking current ●	CB-CD-XB10-XD10-XR06-XR10: 8 A XD26-XB26: 8 x 8 A relays, 2 x 5 A relays XE10: 4 x 5 A relays XR14: 4 x 8 A relays, 2 x 5 A relays	
Max. Output Common Current	12A for O8, O9, OA	

● : For adapted products, see page page 64-65

Millenium 3 Standard

Electrical durability for 500 000 operating cycles	Usage category DC-12: 24 V, 1.5 A Usage category DC-13: 24 V (L/R = 10 ms), 0.6 A Usage category AC-12: 230 V, 1.5 A Usage category AC-15: 230 V, 0.9 A
Minimum switching capacity	10 mA (at minimum voltage of 12 V)
Minimum load	12 V, 10 mA
Maximum rate	Off load: 10 Hz
Mechanical life	10.000.000 operations (cycles)
Voltage for withstanding shocks	In accordance with IEC/EN 60947-1 and IEC/EN 60664-1: 4 kV
Response time	Make 10 ms Release 5 ms
Built-in protections	Against short-circuits: None Against overvoltages and overloads: None
Status indicator	On LCD screen for CD and XD

Characteristics of product with DC power supplied

Supply	12 V $\overline{\text{---}}$ (88970..5 & 88970814 & 88970840)	24 V $\overline{\text{---}}$ (88970..1 & 88970..2)
Nominal voltage ●	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$
Operating limits ●	-13% / +20% or 10.4 V $\overline{\text{---}}$ < 14.4 V $\overline{\text{---}}$ (including ripple)	-20% / +25% or 19.2 V $\overline{\text{---}}$ < 30 V $\overline{\text{---}}$ (including ripple)
Immunity from micro power cuts	≤ 1 ms (repetition 20 times)	≤ 1 ms (repetition 20 times)
Max. absorbed power	CB12 with solid state outputs: 1.5 W CD12: 1.5 W CD20: 2.5 W XD26-XB26: 3 W XD26-XB26 with extension: 5 W XD26 with solid state outputs: 2.5 W	CB12-CD12-CD20 with solid state outputs - XD10-XB10 with solid state outputs: 3 W XD10-XB10 with relay outputs: 4 W XD26-XB26 with solid state outputs: 5 W CB20-CD20 with relay outputs-XD26 with relay outputs: 6 W XD10-XB10 with extension: 8 W XD26-XB26 with extension: 10 W
Protection against polarity inversions	Yes	Yes
Digital inputs (I1 to IA and IH to IY)	12 V $\overline{\text{---}}$ (88970..5 & 88970814 & 88970840)	24 V $\overline{\text{---}}$ (88970..1 & 88970..2)
Input voltage ●	12 V $\overline{\text{---}}$ (-13% / +20%)	24 V $\overline{\text{---}}$ (-20% / +25%)
Input current ●	3.9 mA @ 10.44 V $\overline{\text{---}}$ 4.4 mA @ 12.0 V $\overline{\text{---}}$ 5.3 mA @ 14.4 V $\overline{\text{---}}$	2.6 mA @ 19.2 V $\overline{\text{---}}$ 3.2 mA @ 24 V $\overline{\text{---}}$ 4.0 mA @ 30.0 V $\overline{\text{---}}$
Input impedance ●	2.7 k Ω	7.4 k Ω
Logic 1 voltage threshold ●	≥ 7 V $\overline{\text{---}}$	≥ 15 V $\overline{\text{---}}$
Making current at logic state 1 ●	≥ 2 mA	≥ 2.2 mA
Logic 0 voltage threshold ●	≤ 3 V $\overline{\text{---}}$	≤ 5 V $\overline{\text{---}}$
Release current at logic state 0 ●	< 0.9 mA	< 0.75 mA
Response time	1 → 2 cycle times	1 → 2 cycle times
Maximum counting frequency	I1 & I2: Ladder (1 kHz) & FBD (Up to 6 kHz) I3 to IA & IH to IY: in accordance with cycle time (Tc) and input response time (Tr) : 1/ ((2 x Tc) + Tr)	I1 & I2: Ladder (1 kHz) & FBD (Up to 6 kHz) I3 to IA & IH to IY: in accordance with cycle time (Tc) and input response time (Tr) : 1/ ((2 x Tc) + Tr)
Sensor type	Contact or 3-wire PNP	Contact or 3-wire PNP
Conforming to IEC/EN 61131-2	Type 1	Type 1
Input type	Resistive	Resistive
Isolation between power supply and inputs	None	None
Isolation between inputs	None	None
Protection against polarity inversions	Yes	Yes
Status indicator	On LCD screen for CD and XD	On LCD screen for CD and XD
Analogue or digital inputs (IB to IG)	12 V $\overline{\text{---}}$ (88970..5 & 88970814 & 88970840)	24 V $\overline{\text{---}}$ (88970..1 & 88970..2)
CB12-CD12-XD10-XB10	4 inputs IB → IE	4 inputs IB → IE
CB20-CD20-XB26-XD26	6 inputs IB → IG	6 inputs IB → IG
Inputs used as analogue inputs		
Measurement range ●	(0 → 10 V) or (0 → V power supply)	(0 → 10 V) or (0 → V power supply)
Input impedance ●	14 k Ω	12 k Ω
Input voltage ●	14.4 V $\overline{\text{---}}$ max	30 V $\overline{\text{---}}$ max
Value of LSB ●	14 mV, 4 mA	29 mV, 4 mA
Input type	Common mode	Common mode
Resolution	10 bit at maximum input voltage	10 bit at maximum input voltage
Conversion time	Controller cycle time	Controller cycle time
Accuracy at 25°C	±5%	±5%
Accuracy at 55°C	± 6.2%	± 6.2%
Repeat accuracy at 55 °C	± 2%	± 2%
Isolation between analogue channel and power supply	None	None
Cable length	10 m maximum, with shielded cable (sensor not isolated)	10 m maximum, with shielded cable (sensor not isolated)
Protection against polarity inversions	Yes	Yes

● :For adapted products, see page page 64-65

Potentiometer control	2.2 k Ω /0.5 W (recommended) 10 k Ω max.	2.2 k Ω /0.5 W (recommended) 10 k Ω max.
Inputs used as digital inputs		
Input voltage ●	12 V $\overline{\text{---}}$ (-13% / +20%)	24 V $\overline{\text{---}}$ (-20% / +25%)
Input current ●	0.7 mA @ 10.44 V $\overline{\text{---}}$ 0.9 mA @ 12.0 V $\overline{\text{---}}$ 1.0 mA @ 14.4V $\overline{\text{---}}$	1.6 mA @ 19.2 V $\overline{\text{---}}$ 2.0 mA @ 24.0 V $\overline{\text{---}}$ 2.5 mA @ 30.0 V $\overline{\text{---}}$
Input impedance ●	14 k Ω	12 k Ω
Logic 1 voltage threshold ●	≥ 7 V $\overline{\text{---}}$	≥ 15 V $\overline{\text{---}}$
Making current at logic state 1 ●	≥ 0.5 mA	≥ 1.2 mA
Logic 0 voltage threshold ●	≤ 3 V $\overline{\text{---}}$	≤ 5 V $\overline{\text{---}}$
Release current at logic state 0 ●	≤ 0.2 mA	≤ 0.5 mA
Response time	1 \rightarrow 2 cycle times	1 \rightarrow 2 cycle times
Maximum counting frequency	In accordance with cycle time (Tc) and input response time (Tr) : 1/ ((2 x Tc) + Tr)	In accordance with cycle time (Tc) and input response time (Tr) : 1/ ((2 x Tc) + Tr)
Sensor type	Contact or 3-wire PNP	Contact or 3-wire PNP
Conforming to IEC/EN 61131-2	Type 1	Type 1
Input type	Resistive	Resistive
Isolation between power supply and inputs	None	None
Isolation between inputs	None	None
Protection against polarity inversions	Yes	Yes
Status indicator	On LCD screen for CD and XD	On LCD screen for CD and XD
Characteristics of relay outputs common to the entire range		
Max. breaking voltage ●	5 \rightarrow 30 V $\overline{\text{---}}$ 24 \rightarrow 250 V \sim	
Breaking current ●	CB-CD-XD10-XB10-XR06-XR10: 8 A XD26-XB26: 8 x 8 A relays, 2 x 5 A relays XE10: 4 x 5 A relays XR14: 4 x 8 A relays, 2 x 5 A relays	
Max. Output Common Current	12A for O8,O9,OA	
Electrical durability for 500 000 operating cycles	Usage category DC-12: 24 V, 1.5 A Usage category DC-13: 24 V (L/R = 10 ms), 0.6 A Usage category AC-12: 230 V, 1.5 A Usage category AC-15: 230 V, 0.9 A	
Minimum switching capacity	10 mA (at minimum voltage of 12 V)	
Minimum load	12 V, 10 mA	
Maximum rate	Off load: 10 Hz At operating current: 0.1 Hz	
Mechanical life	10.000.000 operations (cycles)	
Voltage for withstanding shocks	In accordance with IEC/EN 60947-1 and IEC/EN 60664-1: 4 kV	
Response time	Make 10 ms Release 5 ms	
Built-in protections	Against short-circuits: None Against overvoltages and overloads: None	
Status indicator	On LCD screen for CD and XD	
Digital / PWM solid state output	12-24 V$\overline{\text{---}}$ (88970814 & 88970840)	24 V$\overline{\text{---}}$ (88970..2)
PWM solid state output*	CB12: O4 XD26: O4 \rightarrow O7	CD12-XD10-XB10: O4 CD20-XD26-XB26: O4 \rightarrow O7
* Only available with "FBD" programming language		
Breaking voltage ●	10.4 \rightarrow 30 V $\overline{\text{---}}$	19.2 \rightarrow 30 V $\overline{\text{---}}$
Nominal voltage ●	12-24 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$
Nominal current ●	0.5 A	0.5 A
Max. breaking current ●	0.625 A	0.625 A
Voltage drop	≤ 2 V for I = 0.5 A (at state 1)	≤ 2 V for I = 0.5 A (at state 1)
Response time	Make ≤ 1 ms Release ≤ 1 ms	Make ≤ 1 ms Release ≤ 1 ms
Built-in protections	Against overloads and short-circuits: Yes Against overvoltages (*) : Yes Against inversions of power supply: Yes	Against overloads and short-circuits: Yes Against overvoltages (*) : Yes Against inversions of power supply: Yes
(*) In the absence of a volt-free contact between the output of the logic controller and the load		
Min. load	1 mA	1 mA
Maximum incandescent load	0.2 A / 12 V $\overline{\text{---}}$ 0.1 A / 24 V $\overline{\text{---}}$	0.1 A / 24 V $\overline{\text{---}}$
Galvanic isolation	No	No
PWM frequency	14.11 Hz - 56.45 Hz - 112.90 Hz - 225.80 Hz - 451.59 Hz - 1806.37 Hz	14.11 Hz - 56.45 Hz - 112.90 Hz - 225.80 Hz - 451.59 Hz - 1806.37 Hz
PWM cyclic ratio	0 \rightarrow 100% (256 steps for CD, XD and 1024 for XA)	0 \rightarrow 100% (256 steps for CD, XD and 1024 for XA)
PWM accuracy at 120 Hz	$< 5\%$ (20% \rightarrow 80%) load at 10 mA	$< 5\%$ (20% \rightarrow 80%) load at 10 mA
PWM accuracy at 500 Hz	$< 10\%$ (20% \rightarrow 80%) load at 10 mA	$< 10\%$ (20% \rightarrow 80%) load at 10 mA
Status indicator	On LCD screen for XD	On LCD screen for CD and XD

● :For adapted products, see page page 64-65