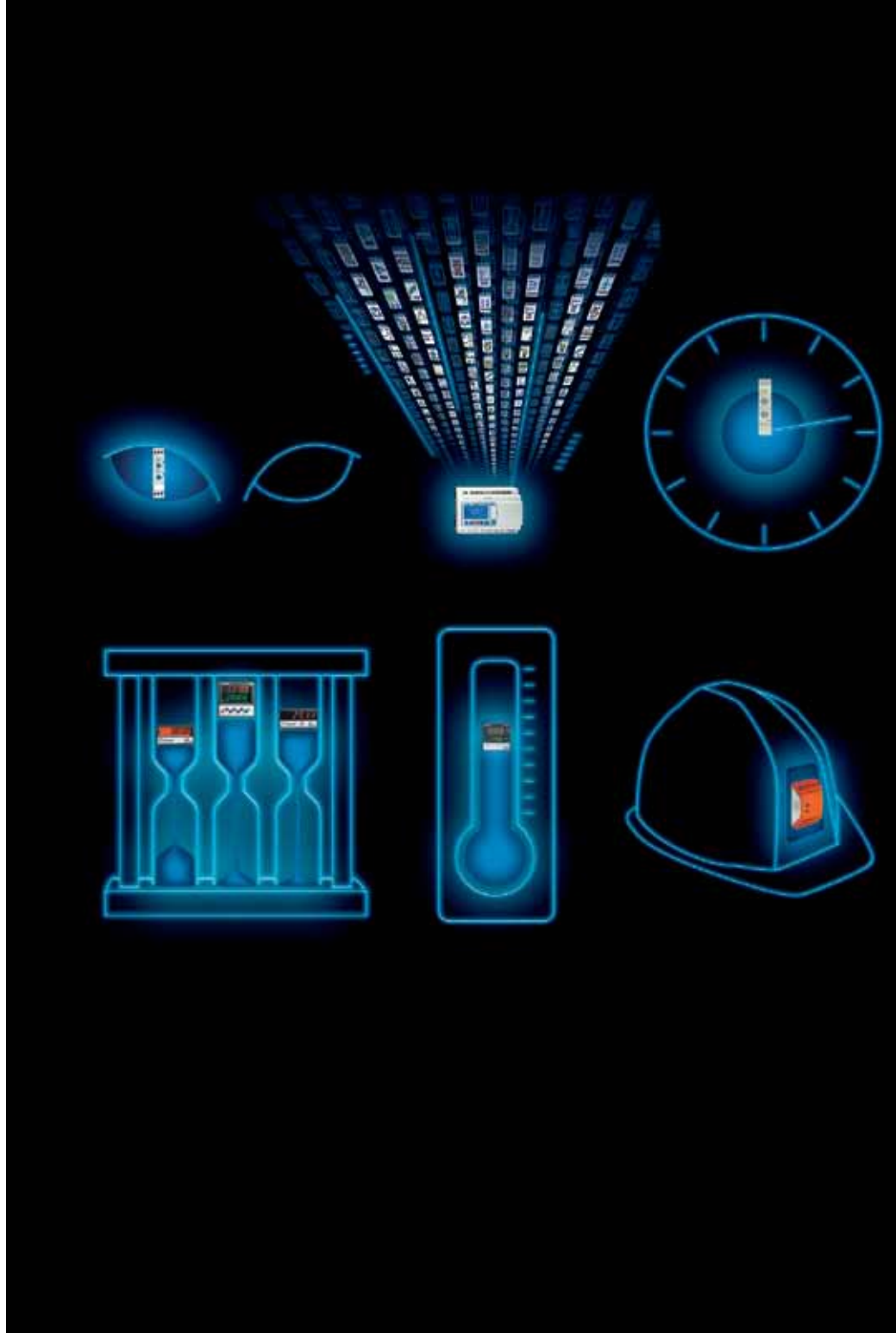# CROUZET

- Timers

- Control relays

- Counters and Ratemeters

- Temperature controllers

- Safety relays

- Logic controllers

# Control & Automation Overview

Behind every project,
technologies and expertise

A brand of
CST
CUSTOM SENSORS & TECHNOLOGIES

# Contents

**To order:** Customer Service
Tel : 01 256 318 900 - **info@crouzet.co.uk**

## CROUZET CONTROL

Widely recognised for over 50 years as the specialist in electromechanical, electronic technology and software engineering, Crouzet Control experience in time management, physical and mechanical values has resulted in an extensive automation components offer that includes logic controllers, timers, control relays, counters, ratemeters, machine safety equipment, and temperature controllers.

Simple to use, Crouzet Control products are easy to program and install.

**With operations around the globe,** Crouzet Control is constantly monitoring its customers' needs. Its sales teams, technicians and designers combine all their skills to adapt products to customer specifications, both in terms of the application and cost.

Crouzet Control also ensures that its products are manufactured in compliance with quality and environmental standards (factories certified ISO 9001, 14001 and OHSAS 18001, eco-design).

With its industrial and logistic flexibility Crouzet Control is able to deliver products, whether small-scale or mass production items, in the best possible timescale.

**In this new Panorama, Crouzet Control presents:**

A new range of **redesigned Safety Relays** for machine safety applications with new functions and easy installation.

**New Chronos 2 timers** (17.5 mm) substituting the existing range with an improved electronic and mechanical design allowing added robustness and reliability.

## CROUZET AUTOMATION

Crouzet Automation, supported by an **experienced sales and technical team** and an **easy-to-use software**, is the adaptable alternative for any automation solution. Crouzet Automation is the perfect solution for any specialized or demanding need.

These products are specifically suited for integration in a **wide range of applications** such as waste and water treatment, access control, renewable energies, building equipment, industrial machines and transportation.

## Custom Sensors & Technologies (CST),

# is a specialist in sensing, control and motion products.

Through its brands, BEI Kimco, BEI Sensors, BEI PSSC, Crouzet, Crydom, Kavlico, Newall and Systron Donner Inertial, CST offers **customizable, reliable and efficient components** for mission-critical systems in Aerospace & Defense, Transportation, Energy & Infrastructure, Medical, Food and Beverage and Building Equipment markets.

Focused on premium value offers and committed to excellence, CST, with **4,400 employees worldwide** and **sales of $604M US** in 2012, is the dependable and adaptable partner for the most demanding customers.

**www.cstsensors.com**

Crouzet Control / Crouzet Automation team worldwide.
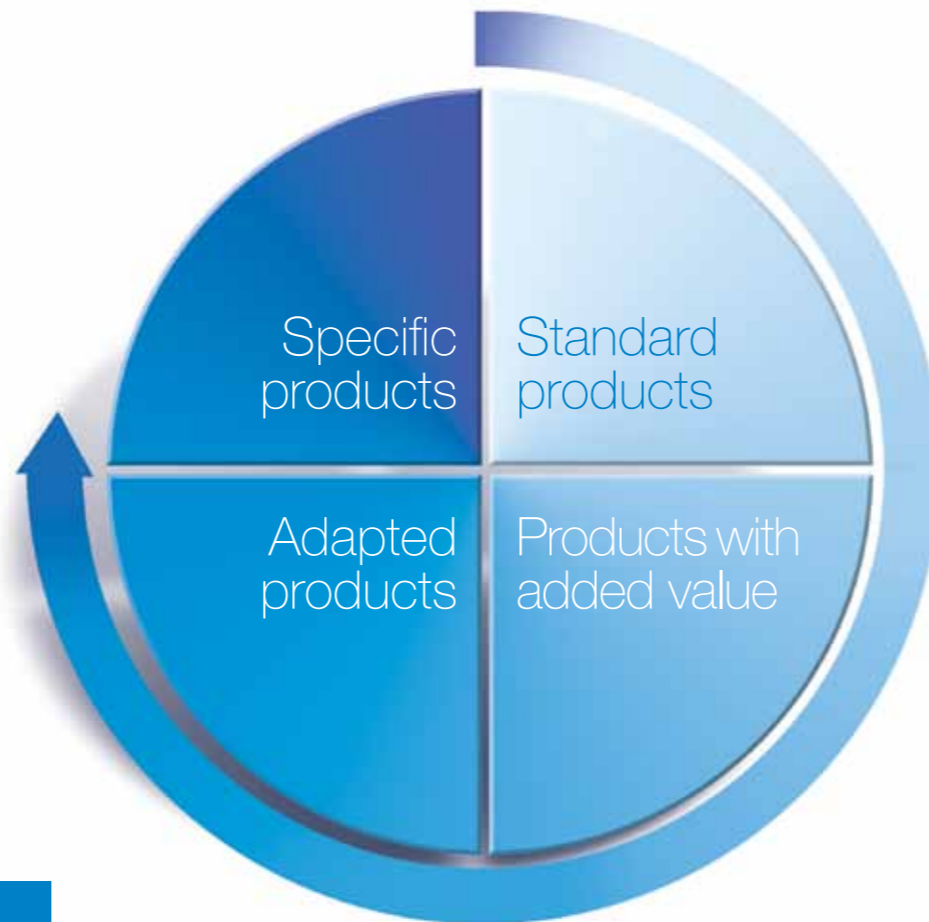
○ Production
● Sales subsidiaries

# Expertise

## The Crouzet Control process

**In addition to high-performance products, advice and support, Crouzet Control offers tailor-made solutions for any application.**

### A multi-skilled team

- Application-based marketing
- Electronic and software design
- Prototyping
- Mechanical engineering
- Production
- EMC tests and approvals
- Sales and logistics follow-up

### Analysis of customer requirements

**Expertise:**

- UNDERSTANDING how applications work.
- INTEGRATING environmental constraints and quality requirements.
- PROPOSING technical and economic solutions which fully meet the needs of customers.

### Production

**Expertise:**

- MEETING all needs, standard or specific, small-scale or mass production, thanks to the industrial flexibility of Crouzet's factories.
- GUARANTEEING the quality and reliability of products: all Crouzet's production sites are certified ISO 9001 and ISO 14001, and use quality tools such as 6 SIGMA.
- INTEGRATING eco-design into manufacturing processes to MINIMIZE the environmental impact of products throughout their life cycle.

Specific products | Standard products
Adapted products | Products with added value

### Customer Adaptation Centre and Design Office

**Expertise:**

- CAPITALISING on the expertise of Crouzet engineers in mechanical, electrical and electronic engineering, software engineering and networks.
- ADAPTING products to ensure innovation and differentiation.
- DEVELOPING AND INDUSTRIALIZING custom products.
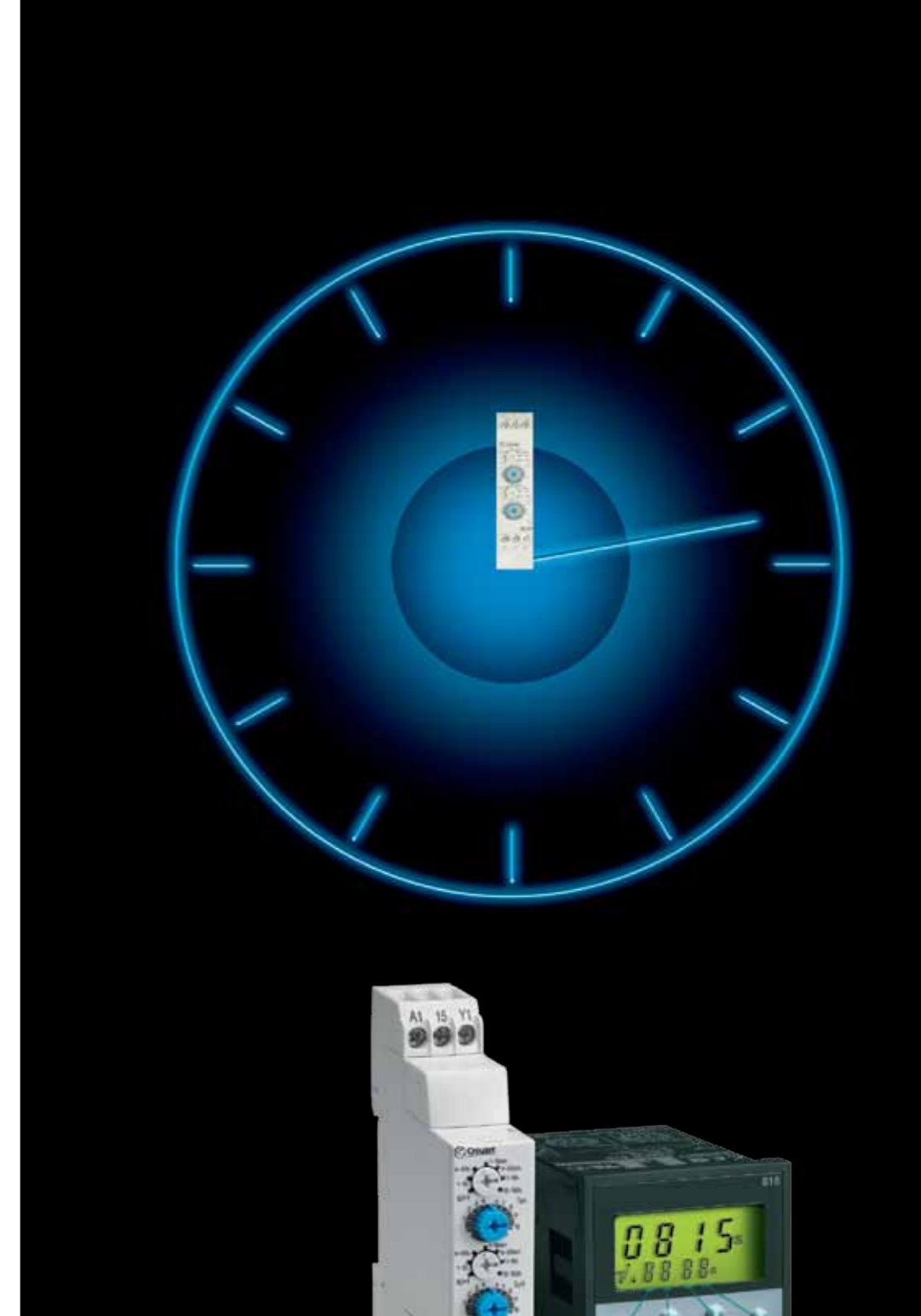
### Logistics and After-Sales Service

**Expertise:**

- PROVIDING an optimum level of service and GUARANTEEING a prompt delivery schedule, whatever the type of order: small-scale or mass production, standard or adapted products.
- TRACKING all orders in real time on www.crouzet.com

## Crouzet Control
# Behind every project, technologies and expertise

- **Local** support for all industrial projects.
- A **multi-skilled team**.
- A sales presence in over **40 countries**.
- A Premium offer designed to ensure **the excellence** of products and services.
- **Eco-design integrated** in Crouzet's "Offer Creation Process".
- Certifications: **ISO 9001, ISO 14001, OHSAS 18001**.
- Products which **comply with international standards** (UL, CSA, EC).
- A **dynamic R&D department**.

In addition to this catalogue, the **www.crouzet.com** website offers the latest tools, available as free downloads, including, technical data sheets and installation manuals for each product.

# Timers
Time management

## A timer
# How can it be defined in simple terms?

**A timer** is a simple automation component which is used to manage actions over a period of time or control how long actions last.The timer is a control device which triggers an action according to a time and a function. After a predefined time has elapsed, the timer closes or opens one or more contacts.

Timing cycles, whether single shot or repetitive, are started by latching inputs or pulsed inputs, allowing a wide variety of functions to be created.

## A timer
# To execute which actions?

| **Triggering, Actuating** | **Triggering** |
|---|---|
| A timer can be used to **trigger** an action according to a predefined time. It can also be used to stagger **actions** over a period of time. | |
| **Delaying, Flashing** | **Actuating** |
| In any time-related application, the timer can play a role and can be used to: <br>• Run installations according to times that can be adjusted by the user. <br>• Calibrate a machine running time. <br>• Allow or prevent an action. <br>• **Delay** an action. <br>• Manage stopping/starting of a motor, pump, etc. (star delta). <br>• Make an LED **flash**. | **Delaying**<br><br>**Flashing** |

In addition to this catalogue, the **www.crouzet.com** website offers technical data sheets and installation manuals for each product, available as free downloads.

## Crouzet Control, timers
# A panel mounted range and a DIN rail mounted range



Setpoint settings

Mode

Reset + enable

Timing range 1

Time setting 1

Timing range 2

Time setting 2

Power supply LED

**815 timer**

**MLR1**

## Crouzet Control, timers
# Their features:

• Available in **mono** or **multifunction** versions (analogue or digital, with or without memory), to meet the specific needs of each application.

• **A timing range** of up to 9,999 hrs to cope with prolonged processing operations.

• A **range of supply voltages** from 12 to 240 V in one unit for optimised stocks.

• Recognised **quality** and **reliability** ensures the correct operation of equipment.

## Crouzet Control, timers
# Where are they found?

In electrical cabinets associated with other automation functions for the following markets:

- Food industry
- Industrial automation systems
- Lighting
- Building equipment
- HVAC
- Small or large industrial machines

### Ice maker

Managing the duration of refrigeration.

TIMER
TUR1, MUR1, MAR

### Drink vending machine

Timed management of delivery of drinks.

TIMER
TMR48, TIMER 81X

### Packaging

Controlling heat sealing times on blister packs, packaging bags, etc.

TIMER
MUR1, MXR1, MAR1

### Illuminated signs

Managing flashing on illuminated signs.
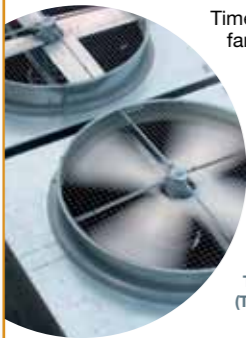
TIMER
MLR

### Lighting for mobile homes

Managing the duration of outdoor lighting of a mobile home if the light switch is left switched on.

TIMED IMPULSE RELAY
MXR

### Machine tools

Control of maintenance periods.

TIMER
TMR48, TIMER 81X

### Fan

Time management for delayed fan start-up.

TIMER
(TMR48, TIMER 81X)

### Dosage

Time management for distribution of glue, varnish ...

TIMER
MBR1

### Sensing on assembly line

Managing the operation of a conveyor belt based on the time interval between products on the belt.

TIMER
MCR1

### Remote machinery

Managing maintenance of the power supply in the event of a mains power failure, switching on an external backup power source for a given time.

TIMER
TK2R1

# Selection guide

## Chronos 2 DIN rail mounted, Timers

### DIN rail modular casings

| Casing width (mm) | Connections | Functions | Type of output | Output(s) | Timing | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| 17.5 | Screw terminals | A / At / B / C / H / Ht<br>Di / D / Ac / Bw<br>A / At<br>B<br>C<br>H / Ht<br>L / Li | Relay | 1 x 8 A changeover | 0.1 s ⇒ 100 h | 24 V ⎓ / 24 ⇒ 240 V ∿ | 88 827 105 | MUR1 |
| | | | | | | | 88 827 115 | MAR1 |
| | | | | | | | 88 827 125 | MBR1 |
| | | | | | | | 88 827 135 | MCR1 |
| | | | | | | | 88 827 145 | MHR1 |
| | | | | | | 12 V ∿ | 88 827 150 | MLR4 |
| | | | | | | 24 V ⎓ / 24 ⇒ 240 V ∿ | 88 827 155 | MLR1 |
| 17.5 | Screw terminals | A / At / B / C / H / Ht<br>Di / D / Ac / Bw | Relay | 1 x 8 A changeover | 0.1 s ⇒ 100 h | 12 V ∿ | 88 827 100 | MUR4 |
| | | | | | | 12 ⇒ 240 V ∿ | 88 827 103 | MUR3 |
| | Spring terminals | | | | | | 88 827 503 | MURc3 |
| | Screw terminals | Ad / Ah / N / O / P<br>Pt / TL / Tt / W | | | | 24 V ⎓ / 24 ⇒ 240 V ∿ | 88 827 185 | MXR1 |
| 17.5 | Screw terminals | A / At / B / C / H / Ht<br>Di / D / Ac / Bw<br>A<br>H / Ht<br>L / Li | Solid state | 0.7 A | 0.1 s ⇒ 100 h | 24 ⇒ 240 V ∿ | 88 827 004 | MUS2 |
| | | | | | | 24 ⇒ 240 V ⎓ | 88 827 014 | MAS5 |
| | | | | | | 24 ⇒ 240 V ∿ | 88 827 044 | MHS2 |
| | | | | | | 24 ⇒ 240 V ∿ | 88 827 054 | MLS2 |
| 17.5 | Screw terminals | A | Relay | 1 x 5A changeover | 0.1 s ⇒ 20 h | 240 V ∿ | 88 829 117 | EMAR7 |
| | | | | | | 110 V ∿ | 88 829 112 | EMAR2 |
| | | | | | | 24 V ⎓ | 88 829 119 | EMAR9 |
| | | A / At / B / C / H / Ht<br>Di / D / W / Pe | | | | 12 ⇒ 240 V ⎓ /<br>24 ⇒ 240 V ∿ | 88 829 198 | EMER8 |
| 17.5 | Screw terminals | Ac / Ad / Bw / Cx / N / O / Tt | Relay | 1 x 5 A changeover | 0.1 s => 20 h | 12 ⇒ 240 V ⎓ /<br>24 ⇒ 240 V ∿ | 88 829 108 | EMYR8 |

### DIN rail industrial casings

| Casing width (mm) | Connections | Functions | Type of output | Output(s) | Timing | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| 22.5 | Screw terminals | A / At / B / C / H / Ht<br>Di / D / Ac / Bw<br>A / At<br>B<br>C<br>H / Ht<br>L / Li<br>Q<br>K | Relay | 1 x 8 A changeover | 0.1 s ⇒ 100 h | 24 V ⎓ / 24 ⇒ 240 V ∿ | 88 865 105 | TUR1 |
| | | | | | | | 88 865 115 | TAR1 |
| | | | | | | | 88 865 125 | TBR1 |
| | | | | | | | 88 865 135 | TCR1 |
| | | | | | | | 88 865 145 | THR1 |
| | | | | | | | 88 865 155 | TLR1 |
| | | | | | | | 88 865 175 | TQR1 |
| | | | | | | | 88 866 175* | RQR1* |
| | | | | 2 x 8 A changeover | 0.1 s ⇒ 160 s | | 88 865 265 | TK2R1 |
| 22.5 | Screw terminals | A / At / B / C / H / Ht<br>Di / D / Ac / Bw | Relay | 1 x 8 A changeover<br>1 inst. or timed 8 A | | 12 V ∿ | 88 865 300 | TU2R4 |
| | | | | | | | 88 866 300* | RU2R4* |
| | | | | 1 x 8 A changeover | 0.1 s ⇒ 100 h | | 88 865 100 | TUR4 |
| | | A / At | | 2 x 8 A changeover | | 24 V ⎓ / 24 ⇒ 240 V ∿ | 88 865 215 | TA2R1 |
| | | | | | | | 88 866 215* | RA2R1* |
| | Spring terminals | A / At / B / C / H / Ht<br>Di / D / Ac / Bw | | 1 x 8 A changeover | | 12 ⇒ 240 V ∿ | 88 865 103 | TUR3 |
| | | | | | | | 88 865 503 | TURc3 |
| 22.5 | Screw terminals | Ad / Ah / N / O / P<br>Pt / TL / Tt / W | Relay | 1 x 8 A changeover<br>1 inst. or timed 8 A | | 24 V ⎓ / 24 ⇒ 240 V ∿ | 88 865 385 | TX2R1 |
| | | | | | | | 88 866 385* | RX2R1* |
| | | | | | | | 88 865 185 | TXR1 |
| | | Q | | 1 x 8 A changeover | 0.1 s ⇒ 100 h | 230 ⇒ 440 V ∿ | 88 865 176 | TQR6 |
| | | | | | | | 88 866 176* | RQR6* |
| | | A / At / B / C / H / Ht<br>Di / D / Ac / Bw | | 1 x 8 A changeover<br>1 inst. or timed 8 A | | 12 ⇒ 240 V ∿ | 88 865 303 | TU2R3 |
| | | | | | | | 88 866 303* | RU2R3* |
| | | | | | | 24 V ⎓ / 24 ⇒ 240 V ∿ | 88 865 305 | TU2R1 |
| | | | | | | | 88 866 305* | RU2R1* |

\* Available in 2014. The casing of the new range will be different from the ones presented here.
Further information can be found on the data sheets available at www.crouzet.com

## Plug-in industrial casings

| Casing width (mm) | Connections | Functions (detail on pages 20 to 23) | | Type of output | Output(s) | Timing | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 35 | Plug-in 8-pin base | A / At / B / C / H / Ht Di / D / Ac / Bw | | Relay | 1 x 8 A changeover | 0.1s ⇒ 100 h | 24 V ⎓ / 24 ⇒ 240 V ∼ | 88 867 105 | OUR1 |
| | | A | | | 2 x 8 A changeover | | | 88 867 215 | OA2R1 |
| | | C | | | | | | 88 867 135 | OCR1 |
| | | L / Li | | | 1 x 8 A changeover | | | 88 867 155 | OLR1 |
| | | A / At / B / C / H / Ht Di / D / Ac / Bw | | | | | 12 V ∼ | 88 867 100 | OUR4 |
| | | | | | | | 12 ⇒ 240 V ∼ | 88 867 103 | OUR3 |
| 35 | Plug-in 11-pin base | A / At / B / C / H / Ht Di / D / Ac / Bw | | Relay | 1 x 8 A changeover 1 inst. or timed 8 A | 0.1s ⇒ 100 h | 24 V ⎓ / 24 ⇒ 240 V ∼ | 88 867 305 | PU2R1 |
| | | A | | | | | | 88 867 415 | PA2R1 |
| | | C | | | 2 x 8 A changeover | | | 88 867 435 | PC2R1 |
| | | L / Li | | | | | | 88 867 455 | PL2R1 |
| | | A / At / B / C / H / Ht Di / D / Ac / Bw | | | 1 x 8 A changeover 1 inst. or timed 8 A | | 12 V ∼ | 88 867 300 | PU2R4 |
| | | | | | | | 12 ⇒ 240 V ∼ | 88 867 303 | PU2R3 |
| 21 | Plug-in 8-pin base | A | | Relay | 2 x 5 A changeover | 0.1s ⇒ 100 h | 12 V ⎓ | 88 895 201 | RTMA2 |
| | | | | | | | 24 V ⎓ | 88 895 202 | RTMA2 |
| | | | | | | | 24 V ∼ | 88 895 203 | RTMA2 |
| | | | | | | | 110 V ∼ | 88 895 206 | RTMA2 |
| | | | | | | | 230 V ∼ | 88 895 207 | RTMA2 |
| | Plug-in 14-pin base | | | | 4 x 3 A changeover | | 12 V ⎓ | 88 896 201 | RTMA4 |
| | | | | | | | 24 V ⎓ | 88 896 202 | RTMA4 |
| | | | | | | | 24 V ∼ | 88 896 203 | RTMA4 |
| | | | | | | | 110 V ∼ | 88 896 206 | RTMA4 |
| | | | | | | | 230 V ∼ | 88 896 207 | RTMA4 |

## "Panel mounted", Timers

### Analogue - TMR48 series

| Dimensions (mm) | Connections | Functions (Detail on pages 20 to 23) | | Type of output | Output(s) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| 48 x 48 | Plug-in 11-pin base | L / Li - G / Gi | | Relay | 2 timed changeover 2 x 5 A | 12 ⇒ 240 V ⎓ 24 ⇒ 240 V ∼ | 88 886 516 | TMR 48 L |
| | | A, B, C, W, G, Ac, Bw | | | | | 88 886 016 | TMR 48 U |
| | | A | | | | | 88 886 106 | TMR 48 A |
| | Plug-in 8-pin base | A1, A2, H1, H2, Q1, Q2, D-Di | | | 2 timed changeover or 1 timed and 1 instantaneous (2 x 5 A) | | 88 886 116 | TMR 48 X |

### Digital

| Dimensions (mm) | Connections | Functions (Detail on pages 20 to 23) | | Type of output | Output(s) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| 48 x 48 | Plug-in 8-pin base | A | | Relay | 2 timed changeover 2 x 5 A | 24 V ∼ | 88 857 409 | Timer 812 |
| | | | | | | 110 V ∼ | 88 857 406 | Timer 812 |
| | | | | | | 220 ⇒ 240 V ∼ | 88 857 400 | Timer 812 |
| | | A, B, C, D, Di, H | | | 1 x 8 A timed changeover | 12 V ⎓ / 24 ⇒ 48 V ∼ | 88 857 003 | Timer 814 |
| | | | | | | 24 V ∼ / 110 ⇒ 240 V ∼ | 88 857 005 | Timer 814 |
| 48 x 48 | Plug-in 11-pin base | A, B, C, D, Di, H | | Relay | 1 x 8 A timed changeover | 12 V ⎓ / 24 ⇒ 48 V ∼ | 88 857 103 | Timer 814 |
| | | | | | | 24 V ∼ / 110 ⇒ 240 V ∼ | 88 857 105 | Timer 814 |
| | | A1, A2, AM, AMt | | | 2 timed changeover or 1 timed and 1 instantaneous (2 x 8 A) | 12 V ⎓ / 42 ⇒ 48 V ∼ | 88 857 302 | Timer 815 |
| | | | | | | 24 V ∼ / 110 V ∼ | 88 857 307 | Timer 815 |
| | | | | | | 24 V ⎓ / 220 ⇒ 240 V ∼ | 88 857 301 | Timer 815 |
| 48 x 48 | Plug-in 11-pin base | A1, A1C, A2, A2C, AM, AMt, B, BM, C, CM, D, Di, DiM, Dpause, H, HM, T,TM, W, WM | | Relay | 2 timed changeover or 1 timed and 1 instantaneous (2 x 5 A) | 12-24 V ∼ / 100⇒240 V ∼ | 88 857 311 | Timer 815E |
| 48 x 48 | Plug-in 8-pin base | A, B, C, D, Di, H | | Relay | 1 x 8 A timed changeover | 24 V ∼ / 48 V ∼ | 88 857 604 | Timer 816 |
| | | | | | | 24 V ∼ / 110 V ∼ | 88 857 607 | Timer 816 |
| | | | | | | 24 V ∼ / 220 ⇒ 240 V ∼ | 88 857 601 | Timer 816 |
| | Plug-in 11-pin base | | | | | 24 V ∼ / 48 V ∼ | 88 857 704 | Timer 816 |
| | | | | | | 24 V ∼ / 110 V ∼ | 88 857 707 | Timer 816 |
| | | | | | | 24 V ∼ / 220 ⇒ 240 V ∼ | 88 857 701 | Timer 816 |

Accessories available: base socket 8-pin for DIN Rail mount 25 622 130, base socket 11-pin for DIN Rail mount 25 622 080.

The timer accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com

## MBA series

| Casing width (mm) | Connections | Functions (Detail on pages 20 to 23) | Type of output | Output(s) | Timing | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| 22 (diameter) | Screw terminals | A | Solid state | 400 mA | 0.1 s ⇨ 1 s | 100 ⇨ 240 V ∿ | 88 901 308 | MBA2F |
| | | | | | 0.5 s ⇨ 10 s | | 88 901 328 | MBA2F |
| | | | | | 3 s ⇨ 60 s | | 88 901 348 | MBA2F |
| | | | | | 0.5 min ⇨ 10 min | | 88 901 378 | MBA2F |
| | | | | | 3 min ⇨ 60 min | | 88 901 398 | MBA2F |
| 22 (diameter) | Screw terminals | A | Solid state | 200 mA | 0.1 s ⇨ 1 s | 24 V ⎓ | 88 901 302 | MBA3F |
| | | | | | 0.5 s ⇨ 10 s | | 88 901 322 | MBA3F |
| | | | | | 3 s ⇨ 60 s | | 88 901 342 | MBA3F |
| | | | | | 0.5 min ⇨ 10 min | | 88 901 372 | MBA3F |
| | | | | | 3 min ⇨ 60 min | | 88 901 392 | MBA3F |

## Electromechanical - Top 2000 range

| Casing width (mm) | Connections | Functions (Detail on pages 20 to 23) | Type of output | Output(s) | Timing | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| 48 x 48 | Screw terminals | 2-3-4 | Relay | 1 timed changeover and 1 timed instantaneous (2 x 5 A) | 6 s ⇨ 12 mn | 24 V ∿ | 88 226 013 | Top 2000 |
| | | | | | | 42 ⇨ 48 V ∿ | 88 226 019 | Top 2000 |
| | | | | | | 110 ⇨ 127 V ∿ | 88 226 012 | Top 2000 |
| | | | | | | 220 ⇨ 240 V ∿ | 88 226 011 | Top 2000 |
| | Plug-in 8-pin base | | | | | 24 V ∿ | 88 226 501 | Top 2000 |
| | | | | | | 42 ⇨ 48 V ∿ | 88 226 502 | Top 2000 |
| | | | | | | 110 ⇨ 127 V ∿ | 88 226 503 | Top 2000 |
| | | | | | | 220 ⇨ 240 V ∿ | 88 226 504 | Top 2000 |
| 48 x 48 | Screw terminals | 2-3-4 | Relay | 1 timed changeover and 1 timed instantaneous (2 x 5 A) | 6 mn ⇨ 12 h | 24 V ∿ | 88 226 016 | Top 2000 |
| | | | | | | 24 V ∿ | 88 226 505 | Top 2000 |
| | | | | | | 42 ⇨ 48 V ∿ | 88 226 017 | Top 2000 |
| | | | | | | 42 ⇨ 48 V ∿ | 88 226 506 | Top 2000 |
| | Plug-in 8-pin base | | | | | 110 ⇨ 127 V ∿ | 88 226 015 | Top 2000 |
| | | | | | | 110 ⇨ 127 V ∿ | 88 226 507 | Top 2000 |
| | | | | | | 220 ⇨ 240 V ∿ | 88 226 014 | Top 2000 |
| | | | | | | 220 ⇨ 240 V ∿ | 88 226 508 | Top 2000 |

## Manual reset

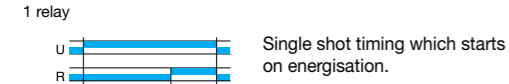| Casing width (mm) | Connections | Functions (Detail on pages 20 to 23) | Type of output | Output(s) | Timing | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| 55 | Faston connectors 6.35 mm | A | Relay | 1 x 16 A timed changeover | 5 min (Max.display time: 4 min 40 s) | 127 / 230 V ∿ 50 Hz | 88 256 401 | 88 256 4 |
| | | | | | 15 min (Max.display time: 14 min) | | 88 256 402 | 88 256 4 |
| | | | | | 30 min (Max.display time: 28 min) | | 88 256 403 | 88 256 4 |
| | | | | | 60 min (Max.display time: 56 min) | | 88 256 404 | 88 256 4 |
| | | | | | 120 min (Max.display time: 1 h 53 min) | | 88 256 405 | 88 256 4 |
| | | | | | 5 h (Max.display time: 4 h 43 min) | | 88 256 406 | 88 256 4 |
| | | | | | 15 h (Max.display time: 14 h 10 min) | | 88 256 407 | 88 256 4 |
| | | | | | 30 h (Max.display time: 28 h 20 min) | | 88 256 408 | 88 256 4 |
| 55 | Faston connectors 6.35 mm | A | Relay | 2 x 16 A timed changeover | 5 min (Max.display time: 4 min 40 s) | 127 / 230 V ∿ 50 Hz | 88 256 506 | 88 256 5 |
| | | | | | 15 min (Max.display time: 14 min) | | 88 256 507 | 88 256 5 |
| | | | | | 30 min (Max.display time: 28 min) | | 88 256 508 | 88 256 5 |
| | | | | | 60 min (Max.display time: 56 min) | | 88 256 509 | 88 256 5 |
| | | | | | 120 min (Max.display time: 1 h 53 min) | | 88 256 510 | 88 256 5 |
| | | | | | 5 h (Max.display time: 4 h 43 min) | | 88 256 511 | 88 256 5 |
| | | | | | 15 h (Max.display time: 14 h 10 min) | | 88 256 512 | 88 256 5 |
| | | | | | 30 h (Max.display time: 28 h 20 min) | | 88 256 513 | 88 256 5 |
| 55 | Faston connectors 6.35 mm | A | Relay | 3 x 16 A timed changeover | 5 min (Max.display time: 4 min 40 s) | 127 / 230 V ∿ 50 Hz | 88 256 906 | 88 256 9 |
| | | | | | 15 min (Max.display time: 14 min) | | 88 256 907 | 88 256 9 |
| | | | | | 30 min (Max.display time: 28 min) | | 88 256 908 | 88 256 9 |
| | | | | | 60 min (Max.display time: 56 min) | | 88 256 909 | 88 256 9 |
| | | | | | 120 min (Max.display time: 1 h 53 min) | | 88 256 910 | 88 256 9 |
| | | | | | 5 h (Max.display time: 4 h 43 min) | | 88 256 911 | 88 256 9 |
| | | | | | 15 h (Max.display time: 14 h 10 min) | | 88 256 912 | 88 256 9 |
| | | | | | 30 h (Max.display time: 28 h 20 min) | | 88 256 913 | 88 256 9 |

The timer accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com
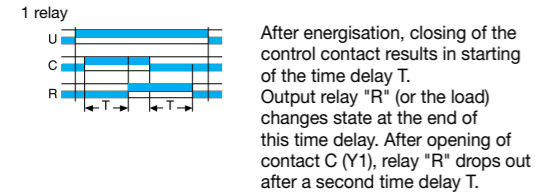
# Function diagrams

## Generic functions

U : Supply
R : Output relay
 or load
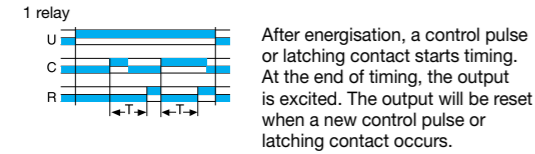T : Timing
∞ : Infinity
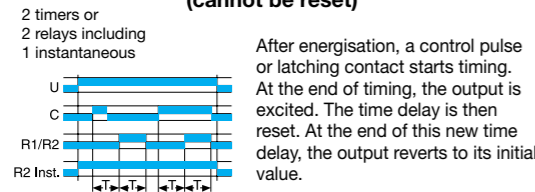C (Y1) : Command

**• A function: Delay on energisation**

1 relay

Single shot timing which starts on energisation.

**• Ac function: Timing after closing and opening of control contact**

1 relay

After energisation, closing of the control contact results in starting of the time delay T.
Output relay "R" (or the load) changes state at the end of this time delay. After opening of contact C (Y1), relay "R" drops out after a second time delay T.

**• Ad function: Delay on energisation (cannot be reset)**

1 relay

After energisation, a control pulse or latching contact starts timing. At the end of timing, the output is excited. The output will be reset when a new control pulse or latching contact occurs.

**• Ah function: Single shot flip-flop (cannot be reset)**
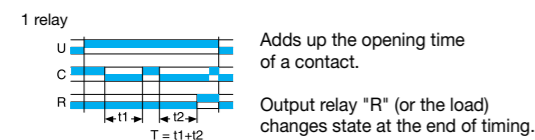
2 timers or
2 relays including
1 instantaneous

After energisation, a control pulse or latching contact starts timing. At the end of timing, the output is excited. The time delay is then reset. At the end of this new time delay, the output reverts to its initial value.

**• At function: Timing on energisation with memory**

1 relay

Adds up the opening time of a contact.
Output relay "R" (or the load) changes state at the end of timing.

T = t1+t2

**• A1 function: Delay on energisation**

1 timer
1 instantaneous relay

t1<T t2<T

**• A2 function: Delay on energisation**

2 timers.

t1<T t2<T

**• AM function: Delay on energisation**

Latching during the time delay.

t1 t2 t T   T=t1+t2

**• AMt function: Delay on energisation**

Latching during and after the time delay.

t1 t2 T   T=t1+t2
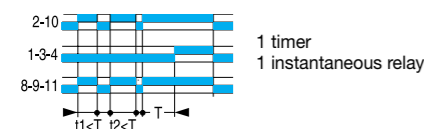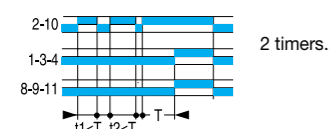
**• B function: Timing on impulse (one shot) - Shaping (cannot be reset)**

1 relay

After energisation, an impulse (≥ 50 ms) or a latching contact causes a change in state of the output relay "R" (or the load) which drops out at the end of timing.

**• Bw function: Pulse output (adjustable)**

1 relay

On closing and opening of the control contact C (Y1), the output relay "R" (or the load) changes state for as long as the time delay lasts.

2 timers or
2 relays including 1 instantaneous
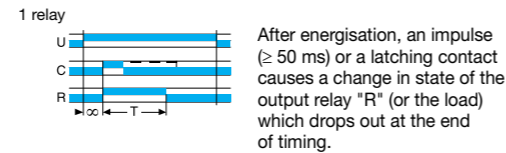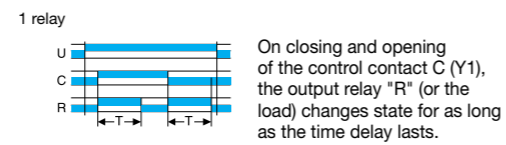
**• C function: Timing after impulse True delay off (without auxiliary power supply)**

1 relay

After energisation, closing of the control contact C (Y1) results in the change of state of output relay "R" (or the load).
Timing will only start when this contact opens.
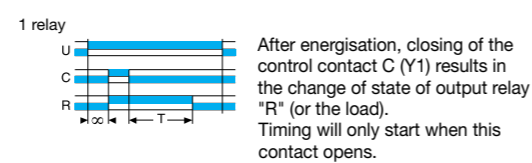
**• D or Di functions: Symmetrical flashing**

Repetitive cycle which alternately sets the output relay "R" (or the load) to operating and rest position for equal periods of time.

1 relay

**D function:**
The cycle starts with relay "R" in rest position.

1 relay

**Di function:**
The cycle starts with relay "R" in operating position.

U : Supply
R : Output relay
 or load
T : Timing
∞ : Infinity
C (Y1) : Command

**• H function: Timing on energisation - Pulse output (adjustable)**

1 relay

On energisation, the output relay "R" (or the load) changes state, and stays there for the whole duration of the time delay and drops out at the end of the single shot cycle.

**• Ht function: Delay on energisation with memory**

1 relay

Adds up the total opening time of a contact.
On energisation, the output relay "R" (or the load) changes state, and stays there for the whole duration of the time delay and drops out at the end of the single shot cycle.

T = t1+t2

**• K function: Delay on de-energisation True delay off (without auxiliary power supply)**

1 relay

On energisation, the output relay "R" (or the load) changes state. On de-energisation timing starts and the relay "R" will only drop out at the end of this time delay.

**• L function: Asymmetrical flashing**

1 relay

Repetitive cycle with two times which can be set independently. Each time delay alternates with a different state of the output relay "R" (or the load).

2 timers or
2 relays including
1 instantaneous

*Note: The cycle starts with the relay "R"in the rest position.*

**• Li function: Asymmetrical flashing**

1 relay

Repetitive cycle with two times which can be set independently.

**• N function: "Safe-guard"**

On the first control pulse, the output is excited.
If the interval between two impulses is longer than the timing value, this occurs normally and the output relay "R" (or the load) will change state at the end of timing. Otherwise, relay "R" stays in its original state until the condition is fulfilled.

**• O function: "Delayed safe-guard"**

On energisation, a first timer runs and the output relay "R" (or the load) changes state.
On the appearance of a control pulse, relay "R" returns to its initial position and stays there as long as the time interval between 2 impulses is less than the timing value. Otherwise, relay "R" will change state at the end of timing.
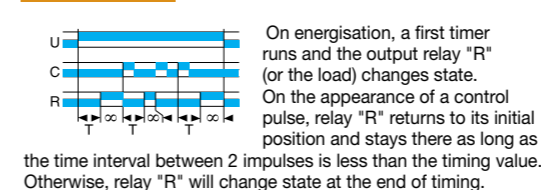
**• P and Pe functions: Impulse counter (delay on)**

**P function:**
Timing starts on energisation.
At the end of timing, the output relay "R" (or the load) changes state for approximately 500 ms.

P = 500 ms

**Pe function:**
On energisation.
At the end of timing, the output relay "R" (or the load) changes state for approximately 1 s.

P = 1s
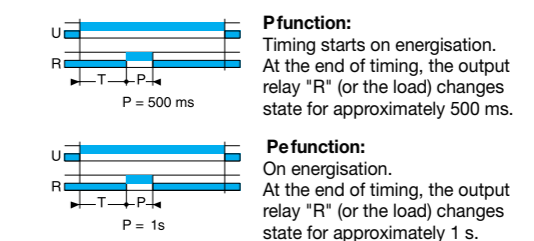
**• Pt function: Impulse counter (delay on)**

Adds up the total opening time of a contact.
At the end of timing, the output is excited for approximately 500 ms.

T=t1+t2

**• Q function: "Star-delta" starting**

On energisation, the "star" contact closes instantaneously and timing starts.
At the end of timing the Ti "star" contact opens. After a pause of 40 to 100 ms the "delta" contact closes.

**• TL function: Impulse relay**

After energisation, a control pulse or latching contact closes the relay. A second control pulse opens the relay.

**• Tt function: Timed impulse relay**

After energisation, a control pulse or latching contact closes the relay and starts timing.
The relay opens at the end of timing or on a second control pulse.

**• W function: Timing after pulse on control contact**

After energisation, opening of the control contact results in a change in the state of output "R" (or the load) and timing starting.
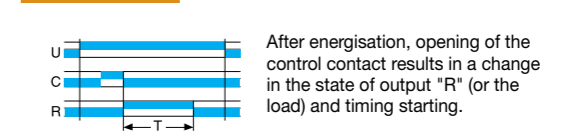
## 815E dedicated functions

U : Supply
R : Output relay
 or load
T : Timing
∞ : Infinity
C (Y1) : Command
Start : Start timing
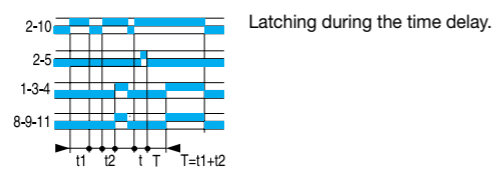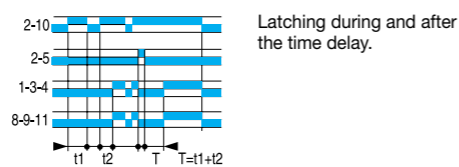Reset : Reset to zero

• **A2 function:** Delay on energisation

• **A2c function:** Delay on energisation

• **AM function:** Delay on energisation

T = t1 + t2

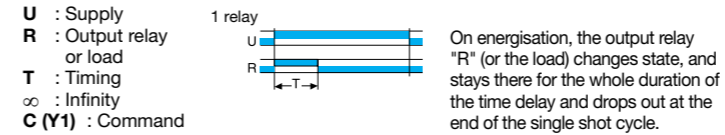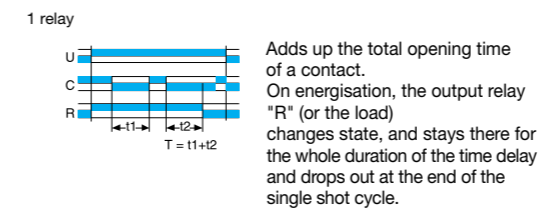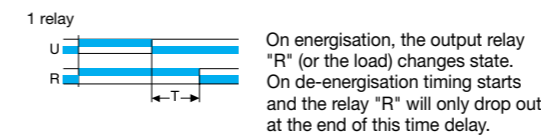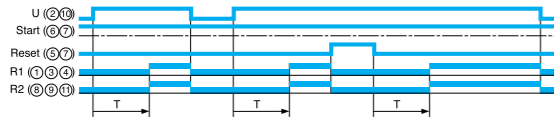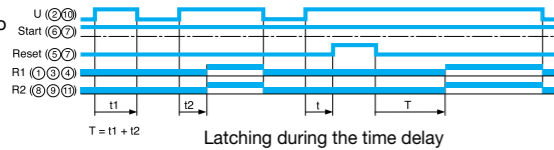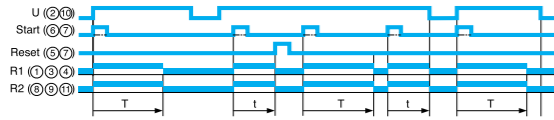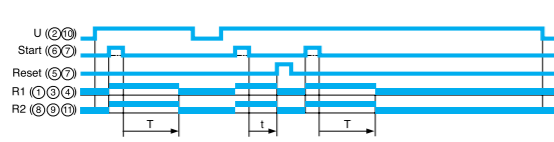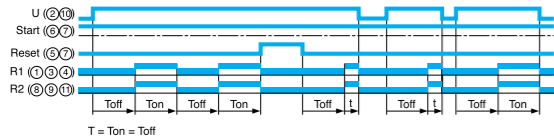Latching during the time delay

• **AMt function:** Delay on energisation

T = t1 + t2

Latching during the time delay

• **B function:** Timing on impulse (one shot)

• **B function with latching:** Timing on impulse (one shot)

• **C function:** Timing after impulse

• **C function with latching:** Timing after impulse

• **D function:** Flip-flop

T = Ton = Toff

• **Di function:** Flip-flop

T = Ton = Toff = t1 + t2

• **Di function with latching:** Flip-flop

T = Ton = Toff
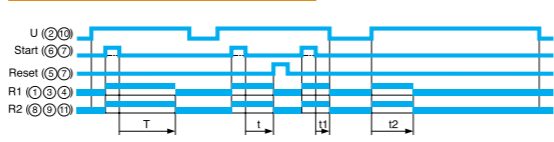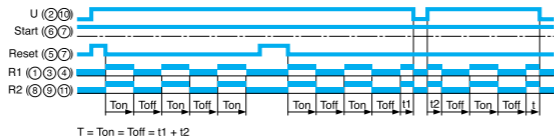
• **D pause function:** Flip-flop
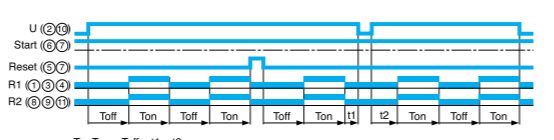
T = Ton = Toff = t1 + t2

• **H function:** Timing on energisation

• **H function with latching:** Timing on energisation

T = t1 + t2

• **T function:** Timing on energisation

T = t1 + t2 + t3

• **T function with latching:** Timing on energisation

T = t1 + t2 + t3
t2 = t2A + t2B
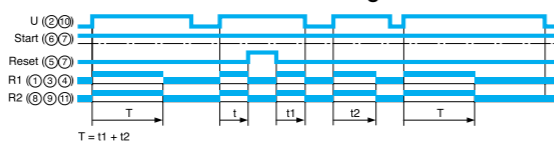
• **W function:** Off-delay
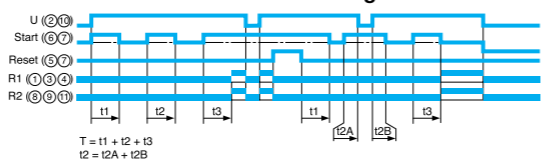
• **W function with latching:** Off-delay timer

## TMR48 dedicated functions

U : Supply
R : Output relay
 or load
T : Timing
∞ : Infinity
C (Y1) : Command

• **TMR48 A A function:** Delay on energisation
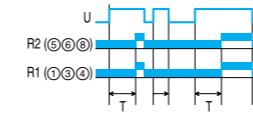
• **TMR48 U A function:** On-delay
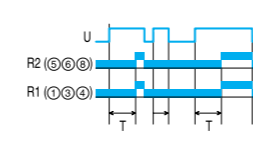
• **A1 function:** Delay on energisation
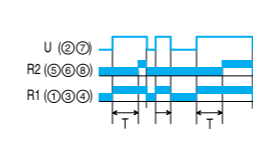
• **A2 function:** Delay on energisation
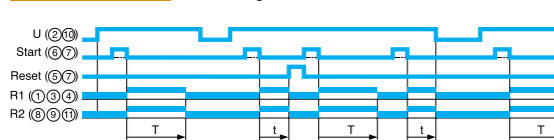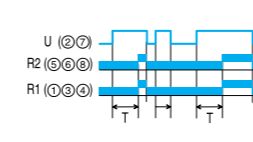
• **D-Di function:** Symmetrical flashing
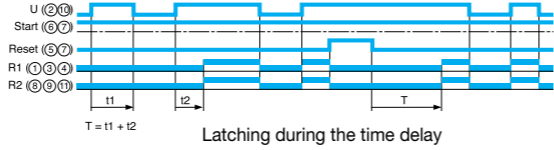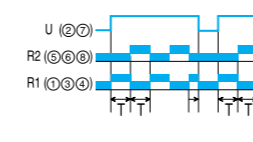
• **H1 function:** Timing on energisation
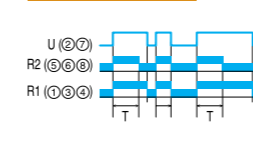
• **H2 function:** Timing on energisation
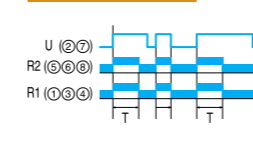
• **Q1 function:** Star-delta "starting"
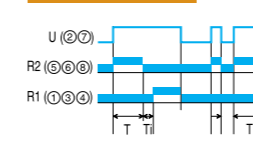
• **Q2 function:** "Star-delta 2" starting
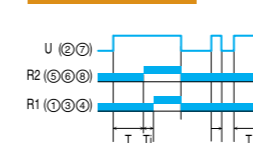
• **Ac function:** Timing after closing and opening of control contact
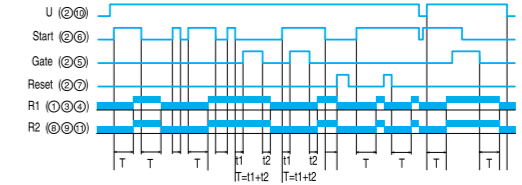
T=t1+t2

• **B function:** Timing on impulse (one shot)

T=t1+t2

• **Bw function:** Pulse output (adjustable)

T=t1+t2
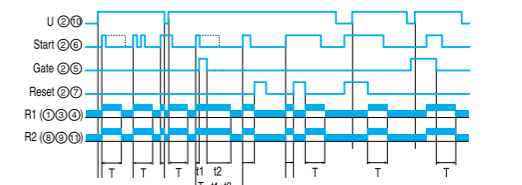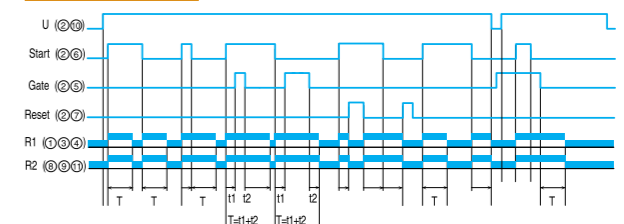
• **C function:** Off-delay

T=t1+t2
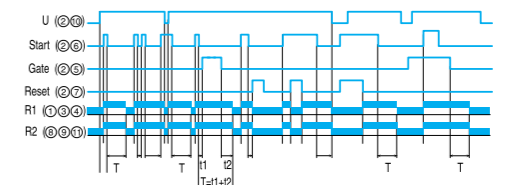
• **G function:** Cyclical function

T = t1+t2
P = t1+t3+t4
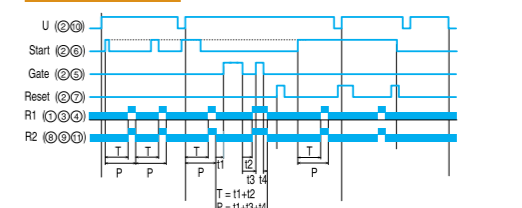
• **L/LiG/Gi function:** Cyclical flashing timers

Ton = t1+t4
P=t1+t2+4H

Ton = t1+t2
P=t1+t2+t3+t4H

• **W function:** Off-delay

T=t1+t2

## Crouzet Control

# Behind every project, technologies and expertise

- **Local** support for all industrial projects.
- A **multi-skilled team**.
- A sales presence in over **40 countries**.
- A Premium offer designed to ensure **the excellence** of products and services.
- **Eco-design integrated** in Crouzet's "Offer Creation Process".
- Certifications: **ISO 9001, ISO 14001, OHSAS 18001**.
- Products which **comply with international standards** (UL, CSA, EC).
- A **dynamic R&D department**.

In addition to this catalogue, the **www.crouzet.com** website offers the latest tools, available as free downloads, including technical data sheets and installation manuals for each product.

# Control relays

Instinctive control
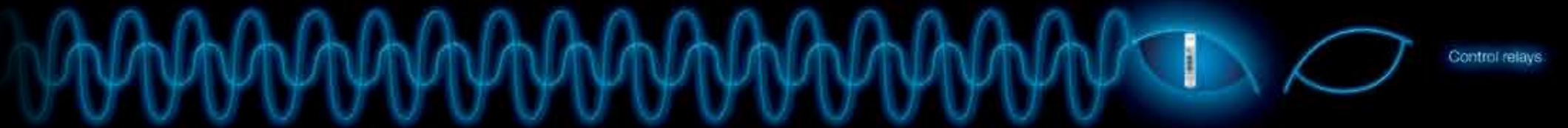
Control relays

## A control relay
# How can it be defined in simple terms?

**The control relay** is an electronic device which can be used to detect and monitor physical values or electrical values.
If a device is found to be operating abnormally, the control relay trips to halt its operation.

## A control relay
# To execute which actions?

### Protecting, Monitoring

The control relay is used to **protect** machines by monitoring values such as current, voltage, phase presence and sequence, levels, etc.

The control relay ensures total availability of equipment, a major challenge for industries keen to improve their productivity and operating profits.

It is one of the indispensable **monitoring** components for ensuring continuity of service of each installation.

### Sensing, Alerting

If a fault is **detected**, the machine is not allowed to run and the user is informed of the anomaly by a visual signal.

Thus **alerted,** the user can then correct any malfunctions. This avoids expensive breakdowns, synonymous with production delays and loss of profitability.

### Controlling, Triggering

In level **control**, the control relay takes on a different role: it controls the pump in order to manage the level of water in a container (tank, swimming pool, sink, etc). Directly interfacing with probes, it **triggers** a signal and thus safeguards against machine breakdowns due to threshold adjustment.

**Protection**

**Monitoring**

**Sensing**

**Alerting**

**Controlling**

**Triggering**

In addition to this catalog, the **www.crouzet.com** website offers technical data sheets and installation manuals for each product, available as free downloads.

## Crouzet Control, control relays
# C-Lynx modular housing and E, F, L industrial housing



Operating mode
Threshold
Hysteresis
Timing
Power supply LED
Relay output LED

**MUS (C-Lynx)**

Operating mode
Sensitivity
Relay output LED
Power supply LED
Threshold
Timing

**ENRM (E, F, L)**
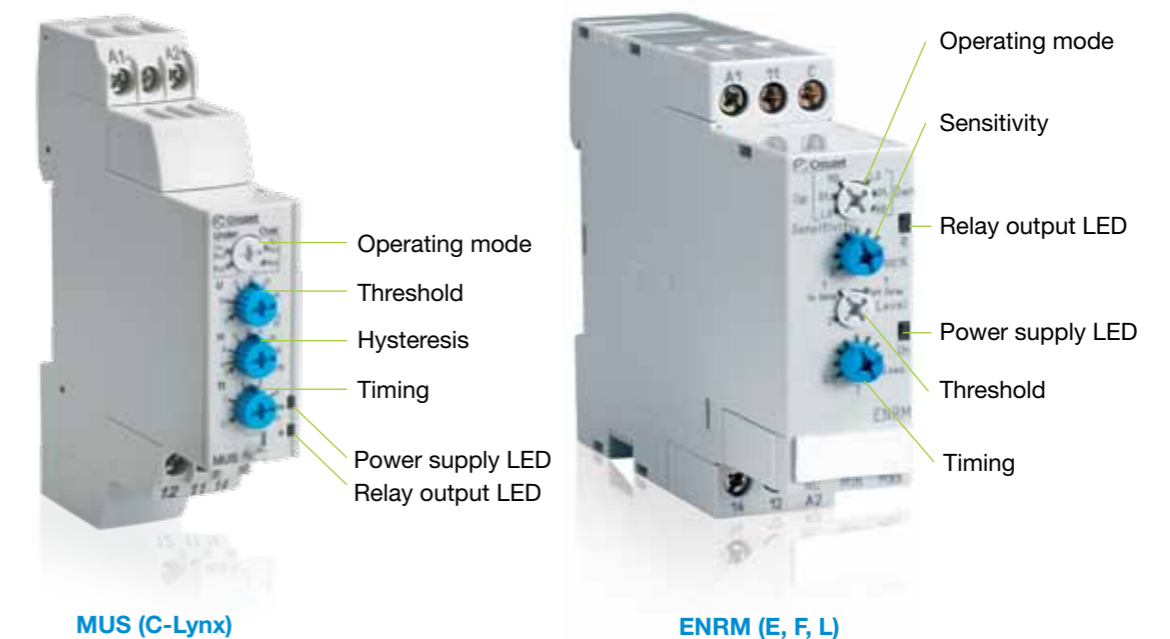
## Crouzet Control, control relays
# Their features:

- **Positive logic output** to protect installations in the event of a power failure.
- **True RMS** guaranteed regardless of inter-ference on the electrical supply.
- Better integration in industrial and commercial cabinets thanks to **modular casings and industrial casings.**
- Simplified installation thanks to a **power supply** for single-phase products and a **self-powered** version for three-phase products.

- The **combination of a number of control functions** in one unit **optimises** wiring time and simplifies installation.
- A range of power supplies from 24 to 240 V in one unit **for optimised stocks.**

## Crouzet Control, control relays
# Where are they found?

In electrical cabinets associated with other automation functions for the following markets:

- Food industry
- Industrial automation systems
- Quarries
- Building equipment
- Water treatment
- Transport

Control relays

### Lift

Monitoring the internal temperature of the PTC probe. For lift machine rooms, monitoring the temperature between 4° and 40°C according to standard EN81.

C-LYNX THERMOCONTROL
RELAYS FOR LIFTS
HWT81

### Ice maker

Fluid management: cold management compressor current control.

CURRENT CONTROL RELAY
MUS

### Cranes

Monitoring overcurrent in the event of motor overload. When too high an overload occurs, the current exceeds the fixed threshold and the relay contact closes.

CURRENT CONTROL RELAY
MIC

### Pump management

Protecting the pump: detection of no-load operation by undercurrent control, detection of jamming by overcurrent control.

CURRENT CONTROL RELAY
HIH

### Generating set

Frequency control in generating sets or detection of backup units.

C-LYNX CONTROL RELAY
(UNDERFREQUENCY/
OVERFREQUENCY)
HHZ

### Fountains

Maintaining an adequate water level for the pumps or water jet to work properly, preventing no-load operation (which often irreparably damages the pumps, and always stops the water jet effect).

CONTROL RELAY
HNM

### Motors

Control of mains voltage (prevents overheating, destruction of insulation and change of direction). Motor protection, detection of anomalies (temperature too high, motor stopping).

MOTOR TEMPERATURE
CONTROL RELAY
HWTM

### Crushers

Detection of obstruction or jamming.

CURRENT CONTROL RELAY
HIH

### Escalators

Control/detection of phase sequence and failure on motors.

PHASE CONTROL RELAY
HWUA

### Steam systems

Level control (maintaining a constant level).

LEVEL CONTROL RELAYS
ENRM

## C-Lynx modular housing, Control relays

### Phase control (3-phase supply)

**Phase failure**

| Regeneration | Sequence / Asymmetry | Overvoltage / Undervoltage | Timing | | Output(s) | Casing width (mm) | Meas. range (Self-powered) | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| With 70 % regeneration | Yes / No | No / No | No | | 1 x 5 A changeover | 17.5 | 208 ⇨ 480 V ∼ - 50 / 60 Hz | 84 873 022 | MWG |
| | | No / -20 % ⇨ -2 % | | | | | | 84 873 023 | MWU |
| | Yes / 5 ⇨ 15 % | No / No | 0.1 ⇨ 10 s | | | | | 84 873 024 | MWA |
| | | Window +2 ⇨ +20 % -20 ⇨ -2 % | | | | | | 84 873 025 | MWUA |
| Without regeneration | Yes / No | No / No | No | | 1 x 5 A changeover | 17.5 | 208 ⇨ 480 V ∼ - 50 / 60 Hz | 84 873 020 | MWS |
| | | | | | 1 x 5 A changeover | | | 84 903 020 | EMWS |
| | | | | | 2 x 5 A changeover | | 208 ⇨ 440 V ∼ - 50 / 60 Hz | 84 873 021 | MWS2 |
| | No / No | +2 ⇨ +20% / -20 ⇨ -2 % | 0.3 ⇨ 30 s | | 1 x 5 A changeover | | 208 ⇨ 480 V ∼ - 50 / 60 Hz | 84 873 222 | M3US |
| | Yes / 5 ⇨ 15% | | 0.1 ⇨ 10 s | | 2 x 5 A changeover | 35 | 220 ⇨ 480 V ∼ - 50 / 60 Hz | 84 873 026 | HWUA |
| | No / No | | 0.3 ⇨ 30 s | | | | | 84 873 220 | H3US |

**Loss of phase and neutral**

| Regeneration | Sequence / Asymmetry | Overvoltage / Undervoltage | Timing | | Output relay | Casing width (mm) | Meas. range (Self-powered) | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| Without regeneration | No / No | +2 ⇨ +20 % / -20 ⇨ -2 % | 0.3 ⇨ 30 s | | 2 x 5 A changeover | 35 | 120 ⇨ 277 V ∼ - 50 / 60 Hz | 84 873 221 | H3USN |

### Motor temperature control and phase sequence and failure

| Sensor | Test | Latching | Supply voltage | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| PTC | No | No | 24 ⇨ 240 V ∼≈ | | 2 x 5 A NO | 35 | 208 ⇨ 480 V ∼ | 84 873 027 | HWTM |
| | Reset on front panel | Yes | | | | | | 84 873 028 | HWTM2 |

### Single-phase DC voltage control with selectable latching

| Measurement range | Functions | Hysteresis | Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 9 ⇨ 15 V ⎓ | Over / Undervoltage | 5 % ⇨ 20 % | 0.1 ⇨ 10 s | | 1 x 5 A changeover | 17.5 | Monitors its own supply voltage | 84 872 140 | MUS |
| 20 ⇨ 80 V ≈ | | | | | | | | 84 872 141 | MUS |
| 65 ⇨ 260 V ≈ | | | | | | | | 84 872 142 | MUS |
| 0.2 ⇨ 60 V ≈ | Over or Undervoltage | 5 % ⇨ 50 % | 0.1 ⇨ 3 s | | 2 x 5 A changeover | 35 | 24 ⇨ 240 V ≈ | 84 872 120 | HUL |
| 15 ⇨ 600 V ≈ | | | | | | | | 84 872 130 | HUH |
| 20 ⇨ 80 V ≈ | Window | 3% fixed | 0.1 ⇨ 10 s | | 1 x 5 A changeover | 17.5 | Monitors its own supply voltage | 84 872 151 | MUSF |
| 65 ⇨ 260 V ≈ | | | | | | | | 84 872 152 | MUSF |

### Current control (over or undercurrent)

| Measurement range | Built-in CT | Hysteresis | Latching / Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 2 ⇨ 20 A ∼ | Yes | 15% fixed | No / No | | 1 x 5 A changeover | 17.5 | 24 ⇨ 240 V ≈ | 84 871 122 | MIC |
| 2 ⇨ 500 mA ≈ | No | 5 % ⇨ 50 % | Yes / 0.1 ⇨ 3 s | | 2 x 5 A changeover | 35 | | 84 871 120 | HIL |
| 0.1 ⇨ 10 A ≈ | | | | | | | | 84 871 130 | HIH |

The control relay accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com

## Frequency control with window

| Measurement range | Selectable latching | Hysteresis | Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 40 ⇨ 70 Hz | Yes | 0.3 Hz fixed | 0.1 ⇨ 10 s | | 2 x 5 A changeover | 35 | 120 ⇨ 277 V ∿ | 84 872 501 | HHZ |

## Level control

| Probe | Emptying / Filling | Level / Measurement range | Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| Resistive | Yes / Yes | 1 or 2 / 250 ⇨ 1 MΩ | 0.1 ⇨ 5 s | | 2 x 5 A changeover | 35 | 24 ⇨ 240 V ≂ | 84 870 700 | HNM |
| Digital or PNP / NPN | | 1 or 2 / None | | | 1 x 5 A changeover | | | 84 870 710 | HNE |
| Digital | No / Yes | 1 / None | | | | 17.5 | | 84 870 720 | MNS |

## Over/underspeed control

| Sensor | Measurement range | Hysteresis | Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 3-wire NPN/PNP sensor, 0 ⇨ 30 V, NAMUR Volt-free contact | 0.05 s ⇨ 10 min | 5 % fixed | 0.6 ⇨ 60 s | | 1 x 5 A changeover | 35 | 24 ⇨ 240 V ≂ | 84 874 320 | HSV |

## Temperature control with window (lifts) according to EN81

| Sensor | Built-in phase control | Measurement range | Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 3-wire Pt100 | | Low threshold -1 ⇨ +11°C High threshold +34 ⇨ +46°C | 0.1 ⇨ 10 s | | 1 x 5 A changeover | 35 | 24 ⇨ 240 V ≂ | 84 874 110 | HT81 |
| 3-wire Pt100 | No | | | | 2 x 5 A NO | | | 84 874 120 | HT81-2 |
| 3-wire Pt100 | Yes 480 V | | | | 2 x 5 A NO | | | 84 874 130 | HWT81 |

# Industrial housing E, F, L, Control relays

## Phase sequence or phase failure control

| Regeneration | Sequence / Asymmetry | Overvoltage / Undervoltage | Timing | | Output relay | Casing width (mm) | Meas. range (Self-powered) | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| None | Yes / No | No / No | No | | 1 x 8 A changeover | 22.5 | 200 ⇨ 500 V ∿ | 84 892 299 | EWS |
| | | | | | 2 x 8 A changeover | | 200 ⇨ 460 V ∿ | 84 873 004 | EWS2 |

## Voltage control with selectable latching

| Measurement range | Functions | Hysteresis | Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 0.2 ⇨ 60 V ≂ | Over / Undervoltage | 5 % ⇨ 50 % | 0.1 ⇨ 3 s | | 1 x 8 A changeover | 22.5 | 24 V ⎓ | 84 872 020 | EUL |
| | | | | | | | 24 V ∿ | 84 872 021 | EUL |
| | | | | | | | 120 V ∿ | 84 872 023 | EUL |
| | | | | | | | 230 V ∿ | 84 872 024 | EUL |
| 15 ⇨ 600 V ≂ | Over / Undervoltage | 5 % ⇨ 50 % | 0.1 ⇨ 3 s | | 1 x 8 A changeover | 22.5 | 24 V ⎓ | 84 872 030 | EUH |
| | | | | | | | 24 V ∿ | 84 872 031 | EUH |
| | | | | | | | 120 V ∿ | 84 872 033 | EUH |
| | | | | | | | 230 V ∿ | 84 872 034 | EUH |

The control relay accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com

Control relays

## Current control (over / undercurrent)

| Measurement range | With CT | Hysteresis | Latching / Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| 2 ⇨ 500 mA | No | 5 % ⇨ 50 % | Yes / 0.1 ⇨ 3 s | | 1 x 8 A changeover | 22.5 | 24 V ⎓ | 84 871 020 | EIL |
| | | | | | | | 24 V ∼ | 84 871 021 | EIL |
| | | | | | | | 48 V ∼ | 84 871 022 | EIL |
| | | | | | | | 120 V ∼ | 84 871 023 | EIL |
| | | | | | | | 230 V ∼ | 84 871 024 | EIL |
| 0.1 ⇨ 10 A | No | 5 % ⇨ 50 % | Yes / 0.1 ⇨ 3 s | | 1 x 8 A changeover | 22.5 | 24 V ⎓ | 84 871 030 | EIH |
| | | | | | | | 24 V ∼ | 84 871 031 | EIH |
| | | | | | | | 48 V ∼ | 84 871 032 | EIH |
| | | | | | | | 120 V ∼ | 84 871 033 | EIH |
| | | | | | | | 230 V ∼ | 84 871 034 | EIH |
| 10 ⇨ 100 A | 26 852 304 | 5 % ⇨ 50 % | Yes / 0.1 ⇨ 3 s | | 1 x 8 A changeover | 22.5 | 24 V ⎓ | 84 871 040 | EIT |
| | | | | | | | 24 V ∼ | 84 871 041 | EIT |
| | | | | | | | 48 V ∼ | 84 871 042 | EIT |
| | | | | | | | 120 V ∼ | 84 871 043 | EIT |
| | | | | | | | 230 V ∼ | 84 871 044 | EIT |

## Level control

| Probe | Emptying / Filling | Level / Measurement range | Timing | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| Resistive | Yes / Yes | 1 or 2 / 5 ⇨ 100 KΩ | No | | 1 x 8 A changeover | 22.5 | 24 V ∼ | 84 870 201 | ENR |
| | | | | | | | 48 V ∼ | 84 870 202 | ENR |
| | | | | | | | 120 V ∼ | 84 870 203 | ENR |
| | | | | | | | 230 V ∼ | 84 870 204 | ENR |
| | | | | | | | 24 ⇨ 240 V ∼ | 84 870 200* | ENR* |
| Resistive | Yes / Yes | 2 / 250 Ω ⇨ 1 MΩ | 0.1 ⇨ 5 s | | 1 x 8 A changeover | 22.5 | 24 V ∼ | 84 870 211 | ENRM |
| | | | | | | | 48 V ∼ | 84 870 212 | ENRM |
| | | | | | | | 120 V ∼ | 84 870 213 | ENRM |
| | | | | | | | 230 V ∼ | 84 870 214 | ENRM |
| | | | | | | | 24 ⇨ 240 V ∼ | 84 870 210* | ENRM* |
| Resistive | Yes / Yes | 1 or 2 / 5 ⇨ 100 KΩ | No | | 1 x 8 A changeover | 39 Plug-in 8-pin base | 24 V ∼ | 84 870 301 | LN |
| | | | | | | | 120 V ∼ | 84 870 303 | LN |
| | | | | | | | 230 V ∼ | 84 870 304 | LN |
| | | | | | | 39 Plug-in 11-pin base | 24 V ∼ | 84 870 306 | LN |
| | | | | | | | 120 V ∼ | 84 870 308 | LN |
| | | | | | | | 230 V ∼ | 84 870 309 | LN |
| Resistive | Combined with monitoring of wells | 2 / 5 ⇨ 100 KΩ | No | | 1 x 8 A changeover | 39 Plug-in 11-pin base | 24 V ∼ | 84 870 401 | L2N |
| | | | | | | | 120 V ∼ | 84 870 403 | L2N |
| | | | | | | | 230 V ∼ | 84 870 404 | L2N |
| Resistive | Yes / Yes + Alarm | 2 / 5 ⇨ 100 KΩ | No | | 2 changeover | 45 | 24 V ∼ | 84 870 501 | FN |
| | | | | | | | 48 V ∼ | 84 870 502 | FN |
| | | | | | | | 120 V ∼ | 84 870 503 | FN |
| | | 2 / 250 Ω ⇨ 5 KΩ | | | | | 230 V ∼ | 84 870 504 | FN |
| | | | | | | | | 84 870 803 | FN LS |

\* Available in 2014. The casing of the new range will be different from the ones presented here. Further information can be found on the data sheets available at www.crouzet.com

## Motor temperature control

| Sensor | Test | Latching | Manual reset | | Output relay | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| PTC | No | Yes | No | | 1 x 8 A NO | 22.5 | 24 V ∼ | 84 874 015 | ETM |
| | | | | | | | 120 V ∼ | 84 874 013 | ETM |
| | | | | | | | 230 V ∼ | 84 874 014 | ETM |
| | | Yes | Yes | | 1 x 8 A changeover | | 24 V ∼ | 84 874 025 | ETM 2 |
| | | | | | | | 120 V ∼ | 84 874 023 | ETM 2 |
| | | | | | | | 230 V ∼ | 84 874 024 | ETM 2 |
| PTC | No | Yes | Yes | | 2 x 8 A changeover | 22.5 | 24 V ∼ | 84 874 035 | ETM 22 |
| | | | | | | | 120 V ∼ | 84 874 033 | ETM 22 |
| | | | | | | | 230 V ∼ | 84 874 034 | ETM 22 |

The control relay accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com

## Crouzet Control

# Behind every project, technologies and expertise

- **Local** support for all industrial projects.

- A **multi-skilled team**.

- A sales presence in over **40 countries**.

- A Premium offer designed to ensure **the excellence** of products and services.

- **Eco-design integrated** in Crouzet's "Offer Creation Process".

- Certifications: **ISO 9001, ISO 14001, OHSAS 18001**.

- Products which **comply with international standards** (UL, CSA, EC).

- A **dynamic R&D department**.

In addition to this catalogue, the **www.crouzet.com** website offers the latest tools, available as free downloads, including technical data sheets and installation manuals for each product.

# Counters and Ratemeters
Counting accuracy

## A counter, a ratemeter
# How can they be defined in simple terms?

**A counter** can be used to count a number of actions or events.
It thus participates in production management and preventive maintenance.
**A ratemeter** can be used to display the speed of rotation of a motor in real time.

## A counter, a ratemeter
# To execute which actions?

### Up counting, Down counting

For **up counting** or **down counting** a number of parts, events, a running time, the counter is the ideal solution. There are different types of counter with the following functions: up/down counter, batch counter, ratemeter, chronometer, multi-totalizer, elapsed time counter, impulse counter.

### Informing, Displaying

A counter can allow a user to be **informed** and to **display** data and quantities easily. The data displayed can be read directly on the front panel.

### Triggering, Actuating

A counter can be used to **trigger** an action or an intervention on a machine. The outputs **actuate** directly and/or transmit data to the control system.

### Measuring, Chronometer timing

A counter can be used to schedule preventive maintenance. The machine running time is **measured** and the duration of an action **timed with a chronometer**.

**Up counting**

**Down counting**

**Informing**

**Displaying**

**Triggering**

**Actuating**

**Measuring**

**Chronometer timing**

In addition to this catalogue, the **www.crouzet.com** website offers technical data sheets and installation manuals for each product, available as free downloads.

## Crouzet Control, counters and ratemeters
# A digital range and an electromechanical range



Operating time    Power used

Preset settings

Enable

Mode

**CTR48**

**CEM48**

Counters and Ratemeters

## Crouzet Control, counters and ratemeters
# Their features:

- For fast count applications, a high-speed counting frequency: up to **50 kHz**.
- A **two-colour or backlit LCD dual display** for ease of reading.
- Considerable space saving due to **dual-function** electromechanical and electronic ranges.
- A **complete** output operating **logic** to cover complex applications.
- **Easier maintenance** thanks to removable connectors (CTR48).
- An enhanced **multifunction** electronic range **for optimised stocks**.

## Crouzet Control, counters and ratemeters
# Where are they found?

In electrical cabinets associated with other automation functions for the following markets:

- Industrial automation systems
- Building equipment
- Industrial machines
- Medical

### Tachometer systems
Speed measurement and control on shrink wrapping machine.

ELECTRONIC COUNTER
CTR24L 2511

### Counting quantities
Managing quantities - Packaging by unit, batch or series of batches.

ELECTRONIC COUNTER
CTR48

### Length measurement
Calculation of cut length on wood and paper machines.

ELECTRONIC COUNTER
CTR48

### Position control
Managing quantities - Calculation of distance of travel.

ELECTRONIC COUNTER
CTR48

### Compressors
Counting operating hours and counting the number of starts.

ELECTROMECHANICAL HOUR AND IMPULSE COUNTER
CMM48

### Dehumidifiers
Counting operating hours, energy consumption.

ELECTROMECHANICAL HOUR AND ENERGY COUNTER
CEM48

### Assembly line speed
Control of conveyor movement speed.

RATEMETER
CTR24L 2511

### Milling machine
Combined ratemeter and counter for controlling the position and speed of a router.

ELECTRONIC RATEMETER AND COUNTERS
CTR24L 2513

### Lifts
Combined impulse and hour counters - Maintenance. Start counters and operating time counters.

ELECTRONIC COUNTER
CTR24L 2514

### UV lamp
Counting and display of operating times. Event management, wear control.

HOUR COUNTER
CTR24 2323

Counters and Ratemeters

## Electronic counters

### 24 x 48 multifunction counters without preselection

| Functions | Modes | Multiplication coefficient | Decimal point | Max. counting speed | | Display | Counting capacity | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|---|
| Totalizer or Hour counter or Ratemeter | Dir / up.dn / up.up Ph / 2-ph / 4-ph | Yes | Yes | 50 kHz (DIR mode) | | LED | 999,999 | 10 ⇒ 30 V ⎓ | 87 623 570 | CTR24L - 2511 |
| | Start / Stop | No | Yes | 999,999 hrs | | | 0.001 s ⇒ 999,999 hrs | | | |
| | sec $^{-1}$ / min $^{-1}$ | Yes | Yes | 50 kHz | | | 999,999 | | | |
| Double totalizer Independent inputs (A and B) | Counting A / B / A-B / A+B AdivB / %AB | Yes | Yes | 25 kHz | | LED | 999,999 | 10 ⇒ 30 V ⎓ | 87 623 571 | CTR24L - 2512 |
| Totalizer and Ratemeter Independent inputs | Dir / up.dn / up.up Ph / 2-ph / 4-ph | Yes | Yes | 30 kHz | | LED | 999,999 | 10 ⇒ 30 V ⎓ | 87 623 572 | CTR24L - 2513 |
| | sec $^{-1}$ / min $^{-1}$ | | | | | | | | | |
| Double totalizer Common input | Counting (total / partial) | Yes | Yes | 50 kHz | | LED | 999,999 | 10 ⇒ 30 V ⎓ | 87 623 573 | CTR24L - 2514 |
| Totalizer + Ratemeter or Totalizer + Totalizer or Totalizer + Hour or Hour + Hour | Counting + sec $^{-1}$ / min $^{-1}$ | Yes | Yes | 35 kHz | | LED | 999,999 | 10 ⇒ 30 V ⎓ | 87 623 574 | CTR24L - 2515 |
| | Counting | | | 50 kHz | | | | | | |
| | Counting + Start / Stop | | | 40 kHz | | | 999,999 0.001 s ⇒ 999,999 hrs | | | |
| | | | | 999,999 hrs | | | | | | |
| | Start / Stop | No | Yes | 999,999 hrs | | | 0.001 s ⇒ 999,999 hrs | | | |

### 24 x 48 counters without preselection

| Functions | Inputs / Reset | Max. counting speed | Display | | Counting capacity | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|
| Hour | PNP / Contact | 99,999.99 hrs | LCD | | 0.1 s ⇒ 99,999.99 hrs | Lithium battery | 87 622 161 | CTR24 - 2223 |
| | NPN or contact / Contact | | | | | | 87 622 162 | CTR24 - 2233 |
| | Voltage / Contact | | | | | | 87 622 170 | CTR24 - 2224 |
| Hour | PNP / Contact | 99,999.99 hrs | Orange (backlit) | | 0.1 s ⇒ 99,999.99 hrs | Lithium battery | 87 622 181 | CTR24 - 2323 |
| | NPN or contact / Contact | | | | | | 87 622 182 | CTR24 - 2333 |
| | Voltage / Contact | | | | | | 87 622 190 | CTR24 - 2324 |
| Totalizer | PNP / Contact | 99,999,999 | LCD | | 99,999,999 | Lithium battery | 87 622 061 | CTR24 - 2241 |
| | NPN or contact / Contact | | | | | | 87 622 062 | CTR24 - 2251 |
| | Voltage / Contact | | | | | | 87 622 070 | CTR24 - 2242 |
| Totalizer | PNP / Contact | 99,999,999 | Orange (backlit) | | 99,999,999 | Lithium battery | 87 622 081 | CTR24 - 2341 |
| | NPN or contact / Contact | | | | | | 87 622 082 | CTR24 - 2351 |
| | Voltage / Contact | | | | | | 87 622 090 | CTR24 - 2342 |

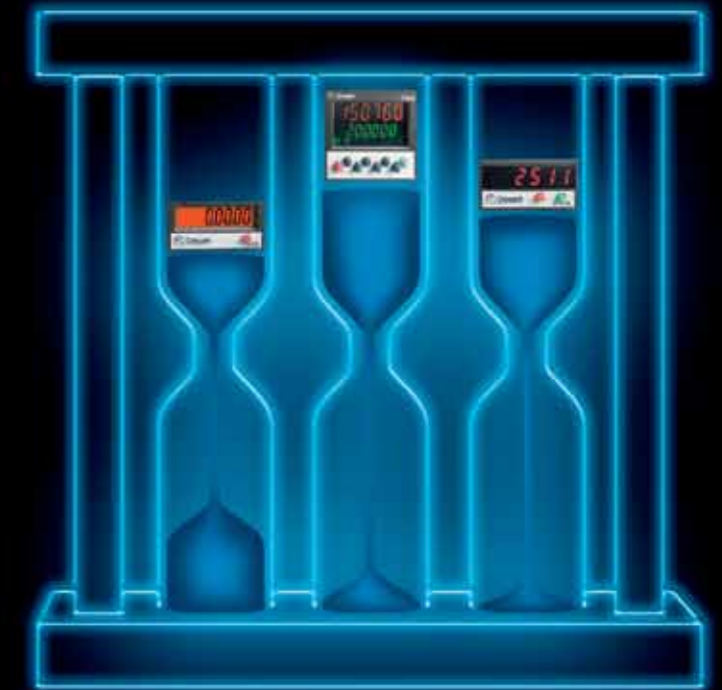The counters and ratemeters accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com

# Selection guide

## 48 x 48 multifunction counters with preselection

| Functions | Number of preset(s) | Max. counting speed | Display | | Counting capacity | Outputs | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| Preselection counter Ratemeter Chronometer Multi-totalizer | 1 | 40 KHz | Backlit LCD (orange) extra-bright 2 lines | | -999,999 ⇒ 999,999 | 1 x 5 A changeover 1 solid state | 10 ⇒ 30 V === | 87 621 111 | CTR48 |
| | | | | | | | 24 V ∿ | 87 621 112 | CTR48 |
| | | | | | | | 90 ⇒ 260 V ∿ | 87 621 115 | CTR48 |
| Preselection counter Ratemeter Chronometer Multi-totalizer Batch counter | 2 | | | | | 1 x 5 A changeover 1 x 5 A NO 2 solid state | 10 ⇒ 30 V === | 87 621 121 | CTR48 |
| | | | | | | | 24 V ∿ | 87 621 122 | CTR48 |
| | | | | | | | 90 ⇒ 260 V ∿ | 87 621 125 | CTR48 |
| Preselection counter Ratemeter Chronometer Multi-totalizer | 1 | 40 KHz | Two-colour LCD (red and green) 2 lines | | -999,999 ⇒ 999,999 | 1 x 5 A changeover 1 solid state | 10 ⇒ 30 V === | 87 621 211 | CTR48 |
| | | | | | | | 24 V ∿ | 87 621 212 | CTR48 |
| | | | | | | | 90 ⇒ 260 V ∿ | 87 621 215 | CTR48 |
| Preselection counter Ratemeter Chronometer Multi-totalizer Batch counter | 2 | | | | | 1 x 5 A changeover 1 x 5 A NO 2 solid state | 10 ⇒ 30 V === | 87 621 221 | CTR48 |
| | | | | | | | 24 V ∿ | 87 621 222 | CTR48 |
| | | | | | | | 90 ⇒ 260 V ∿ | 87 621 225 | CTR48 |
| Preselection counter Chronomètre | 1 | 5 KHz | Backlit LCD (green) 2 lines | | -999,999 ⇒ 999,999 | 1 x 3 A changeover | 11 ⇒ 30 V === | 87 629 111 | CTR48E |
| | | | | | | | 115 V ∿ | 87 629 113 | CTR48E |
| | | | | | | | 230 V ∿ | 87 629 114 | CTR48E |
| | 2 | | | | | 1 x 3 A changeover 1 x 3 A NO | 11 ⇒ 30 V === | 87 629 121 | CTR48E |
| | | | | | | | 115 V ∿ | 87 629 123 | CTR48E |
| | | | | | | | 230 V ∿ | 87 629 124 | CTR48E |

## Electromechanical counters

### Hour counters

| Dimensions (mm) | Counting capacity | | Frequency | Supply | Part number | Type |
|---|---|---|---|---|---|---|
| 48 x 48 | 99,999.99 | | 50 Hz ∿ | 20 ⇒ 30 V ∿ | 99 772 710 | CHM48 |
| | | | | 42 ⇒ 48 V ∿ | 99 772 711 | CHM48 |
| | | | | 100 ⇒ 130 V ∿ | 99 772 712 | CHM48 |
| | | | | 360 ⇒ 440 V ∿ | 99 772 713 | CHM48 |
| | | | | 187 ⇒ 264 V ∿ | 99 772 714 | CHM48 |
| | | | 60 Hz ∿ | 20 ⇒ 30 V ∿ | 99 772 718 | CHM48 |
| | | | | 42 ⇒ 48 V ∿ | 99 772 719 | CHM48 |
| | | | | 100 ⇒ 130 V ∿ | 99 772 715 | CHM48 |
| | | | | 187 ⇒ 264 V ∿ | 99 772 716 | CHM48 |
| | | | | 360 ⇒ 440 V ∿ | 99 772 717 | CHM48 |
| 48 x 48 | 999,999.99 | | === | 10 ⇒ 30 V === | 99 772 810 | CHM48 |
| | | | | 36 ⇒ 80 V === | 99 772 811 | CHM48 |
| | | | | 100 ⇒ 130 V === | 99 772 812 | CHM48 |
| 24 x 48 | 99,999.99 | | 50 Hz ∿ | 20 ⇒ 30 V ∿ | 99 782 710 | CHM24 |
| | | | | 100 ⇒ 130 V ∿ | 99 782 712 | CHM24 |
| | | | | 187 ⇒ 264 V ∿ | 99 782 714 | CHM24 |
| | | | 60 Hz ∿ | 20 ⇒ 30 V ∿ | 99 782 718 | CHM24 |
| | | | | 100 ⇒ 130 V ∿ | 99 782 715 | CHM24 |
| | | | | 187 ⇒ 264 V ∿ | 99 782 716 | CHM24 |
| | 999,999.99 | | === | 10 ⇒ 30 V === | 99 782 810 | CHM24 |
| 15 x 32 | 99,999.99 | | === | 4.5 ⇒ 35 V === | 99 792 810 | CHM15 |
| Modular Rail Din 35 mm | 99,999.99 | | 50 Hz ∿ | 24 V ∿ | 99 793 710 | CHMDR |
| | | | | 115 V ∿ | 99 793 712 | CHMDR |
| | | | | 230 V ∿ | 99 793 714 | CHMDR |
| | | | === | 10 ⇒ 27 V === | 99 793 810 | CHMDR |

Counters and Ratemeters

The counters and ratemeters accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com

# Selection guide

## Impulse counters

| Dimensions (mm) | Reset to zero | | Counting capacity | Supply | Part number | Type |
|---|---|---|---|---|---|---|
| 15 x 32 Clip-fixing | No | | 9,999,999 | 24 V ∼ - 50 / 60 Hz | 99 778 710 | CIM15 |
| | | | | 115 V ∼ - 50 / 60 Hz | 99 778 712 | CIM15 |
| | | | | 230 V ∼ - 50 / 60 Hz | 99 778 714 | CIM15 |
| | | | | 5 V ⎓ | 99 778 805 | CIM15 |
| | | | | 12 V ⎓ | 99 778 806 | CIM15 |
| | | | | 24 V ⎓ | 99 778 810 | CIM15 |
| 24 x 48 Clip-fixing | No | | 999,999 | 24 V ∼ - 50/60Hz | 99 777 710 | CIM 24 |
| | | | | 230 V ∼ - 50/60Hz | 99 777 714 | CIM 24 |
| | | | | 12 V ⎓ | 99 777 815 | CIM 24 |
| | | | | 24 V ⎓ | 99 777 810 | CIM 24 |
| 24 x 48 Clip-fixing | Yes | | 99,999 | 24 V ∼ - 50/60Hz | 99 777 720 | CIM 24 |
| | | | | 230 V ∼ - 50/60Hz | 99 777 724 | CIM 24 |
| | | | | 12 V ⎓ | 99 777 825 | CIM 24 |
| | | | | 24 V ⎓ | 99 777 820 | CIM 24 |
| 24 x 48 Screw-fixing | No | | 999,999 | 24 V ∼ - 50/60Hz | 99 776 904 | CIM 24 x 48 |
| | | | | 115 V ∼ - 50/60Hz | 99 776 902 | CIM 24 x 48 |
| | | | | 230 V ∼ - 50/60Hz | 99 776 901 | CIM 24 x 48 |
| | | | | 24 V ⎓ | 99 776 907 | CIM 24 x 48 |
| | | | | 110 V ⎓ | 99 776 905 | CIM 24 x 48 |
| 24 x 48 Screw-fixing | Yes | | 999,999 | 24 V ∼ - 50/60Hz | 99 776 924 | CIM 24 x 48 |
| | | | | 115 V ∼ - 50/60Hz | 99 776 922 | CIM 24 x 48 |
| | | | | 230 V ∼ - 50/60Hz | 99 776 921 | CIM 24 x 48 |
| | | | | 24 V ⎓ | 99 776 927 | CIM 24 x 48 |
| 36 x 37 Screw-fixing | No | | 999,999 | 24 V ∼ - 50/60Hz | 99 776 604 | CIM 36 x 37 |
| | | | | 115 V ∼ - 50/60Hz | 99 776 602 | CIM 36 x 37 |
| | | | | 230 V ∼ - 50/60Hz | 99 776 601 | CIM 36 x 37 |
| | | | | 24 V ⎓ | 99 776 607 | CIM 36 x 37 |
| | | | | 110 V ⎓ | 99 776 605 | CIM 36 x 37 |
| 36 x 37 Screw-fixing | Yes | | 999,999 | 24 V ∼ - 50/60Hz | 99 776 613 | CIM 36 x 37 |
| | | | | 115 V ∼ - 50/60Hz | 99 776 611 | CIM 36 x 37 |
| | | | | 230 V ∼ - 50/60Hz | 99 776 610 | CIM 36 x 37 |
| | | | | 24 V ⎓ | 99 776 616 | CIM 36 x 37 |
| 36 x 48 Screw-fixing | No | | 999,999 | 24 V ∼ - 50/60Hz | 99 776 704 | CIM 36 x 48 |
| | | | | 115 V ∼ - 50/60Hz | 99 776 702 | CIM 36 x 48 |
| | | | | 230 V ∼ - 50/60Hz | 99 776 701 | CIM 36 x 48 |
| | | | | 24 V ⎓ | 99 776 707 | CIM 36 x 48 |
| | | | | 48 V ⎓ | 99 776 736 | CIM 36 x 48 |
| | | | | 110 V ⎓ | 99 776 705 | CIM 36 x 48 |
| 36 x 48 Screw-fixing | Yes | | 999,999 | 24 V ∼ - 50/60Hz | 99 776 713 | CIM 36 x 48 |
| | | | | 115 V ∼ - 50/60Hz | 99 776 711 | CIM 36 x 48 |
| | | | | 230 V ∼ - 50/60Hz | 99 776 710 | CIM 36 x 48 |
| | | | | 24 V ⎓ | 99 776 716 | CIM 36 x 48 |

Counters and Ratemeters

## Dual function 48 x 48 counters

| Functions | Reset to zero | Counting capacity | | Frequency | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|
| Impulse Hour | No | 9,999,999 99,999.99 hrs | | 50 Hz ∼ | 20 ⇒ 30 V ∼ | 99 779 710 | CMM48 |
| | | | | | 100 ⇒ 130 V ∼ | 99 779 712 | CMM48 |
| | | | | | 187 ⇒ 264 V ∼ | 99 779 714 | CMM48 |
| | | | | 60 Hz ∼ | 20 ⇒ 30 V ∼ | 99 779 718 | CMM48 |
| | | | | | 100 ⇒ 130 V ∼ | 99 779 715 | CMM48 |
| | | | | | 187 ⇒ 264 V ∼ | 99 779 716 | CMM48 |
| | | 9,999,999 / 999,999.99 hrs | | ⎓ | 10 ⇒ 30 V ⎓ | 99 779 810 | CMM48 |
| Power Hour | No | 9,999,999 99,999.99 kw/hrs | | 50/60 Hz ∼ | 115 V ∼ | 99 780 712 | CEM48 |
| | | | | | 230 V ∼ | 99 780 714 | CEM48 |

The counters and ratemeters accessories guide is available on the product data sheets which can be downloaded from the website www.crouzet.com

## CTR24 counters
# Connections

### Hour counters
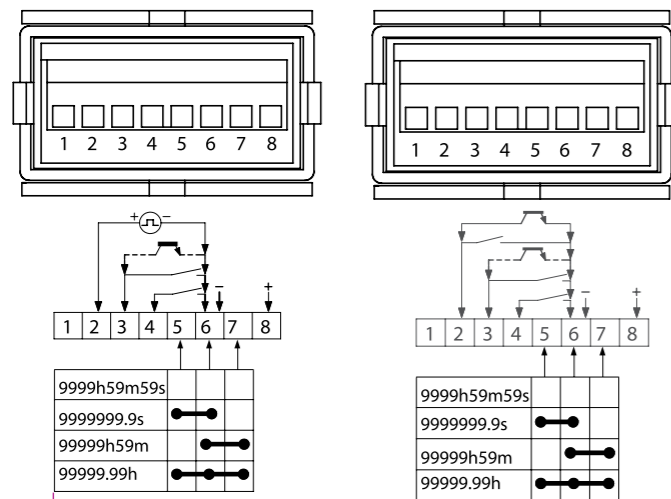


**Types 2223 and 2323:**
**Part numbers:**
• 87 622 161
• 87 622 181

**Types 2233 and 2333:**
**Part numbers:**
• 87 622 162
• 87 622 182

1. NC
2. Start / Stop input
3. Reset input
4. Enable front panel Reset
5. Mode 1 (Time selection)
6. GND / Optional backlighting - (only 23xx)
7. Mode 2 (Time selection)
8. Optional backlighting + (only 23xx)



**Types 2224 and 2324:**
**Part numbers:**
• 87 622 170
• 87 622 190
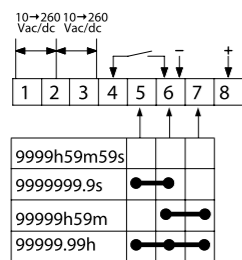
1. Common ∿
2. Start / Stop input
3. Reset input
4. Enable front panel Reset
5. Mode 1 (Time selection)
6. GND / Optional backlighting - (only 23xx)
7. Mode 2 (Time selection)
8. Optional backlighting + (only 23xx)

### Impulse counters



**Types 2241 and 2341:**
**Part numbers:**
• 87 622 061
• 87 622 081

**Types 2251 and 2351:**
**Part numbers:**
• 87 622 062
• 87 622 082

1. Fast count
2. Slow count
3. Reset input
4. Enable front panel Reset
5. Counting (counting direction)
6. GND
7. Optional backlighting - (only 23xx)
8. Optional backlighting + (only 23xx)
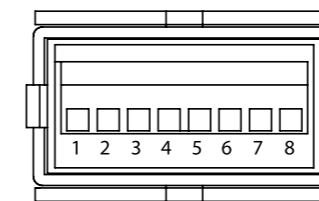


**Types 2242 and 2342:**
**Part numbers:**
• 87 622 070
• 87 622 090
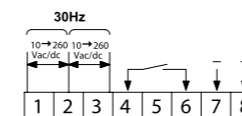
1. Fast count
2. Common ∿
3. Reset input
4. Enable front panel Reset
5. NC
6. GND
7. Optional backlighting - (only 23xx)
8. Optional backlighting + (only 23xx)

Counters and Ratemeters

## CROUZET
### CONTROL

### Crouzet Control
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# Temperature controllers
A degree of constancy

## A temperature controller
# How can it be defined in simple terms?

**A temperature controller** is an electronic device which is used to monitor and ensure a constant temperature according to a setpoint.

## A temperature controller
# To execute which actions?

| Measuring |
| --- |
| The temperature controller is used to **measure** and maintain the temperature of a room, an enclosure, a liquid. |
| It guarantees a constant temperature and ensures optimum use of the systems in which it is found: ovens, baths, cold rooms, machines. |

**Measuring**

**Controlling**

| Controlling, Displaying, Alerting |
| --- |
| Directly interfacing with probes, the temperature controller **controls** and **displays** the temperature of the enclosure. |
| It can be used to set an **alert** in the event of an anomaly (low and/or high temperature). |

**Displaying**

| Monitoring |
| --- |
| The temperature controller action is not limited to **monitoring**. It senses and controls the temperature, acting on the system heating or cooling. |
| If the controlled temperature does not conform to the setpoint, the controller **implements** a heating or cooling action. |

**Alerting**

**Monitoring**

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## Crouzet Control, temperature controllers
# A complete range

Functions

Programming mode

Setpoint settings

Temperature controllers

**CTD46**

## Crouzet Control, temperature controllers
# Their features:

- **Adaptive tuning products** which manage their parameters independently: **PID**, temperature rise and inertia curve to simplify the installation.
- A **sophisticated** control **algorithm** to obtain a temperature as close as possible to the setpoint.
- A **dual display** makes it user-friendly and easy to use.
- Compatibility with all types of probe thanks to a **"Multi-technology probe input".**
- **Multiple outputs** (logic and/or relay) for optimum integration in **any** system.

## Crouzet Control, temperature controllers
## Where are they found?

In electrical cabinets associated with other automation functions for the following markets:

- Industrial automation systems
- Building equipment
- Food industry

### Packaging
Monitoring the heating temperature of the various packages.

TEMPERATURE CONTROLLER
MIC48

### Fluid management
Maintaining the temperature of a ceramic oven.

TEMPERATURE CONTROLLER
CTD43

### Brewing
Managing cooling of fermentation tanks.

TEMPERATURE CONTROLLER
MIC48

### Cooking
Control of industrial ovens.

TEMPERATURE CONTROLLER
CTD46

### Chocolate factory
Managing the temperature of the liquid chocolate before it is poured into a mould.

TEMPERATURE CONTROLLER
CTD43

### Bain-Marie
Maintaining the temperature of a bain-marie during cooking.

TEMPERATURE CONTROLLER
CTD46

### Oven
Managing the temperature of an oven with change of setpoint possible via MODBUS.

TEMPERATURE CONTROLLER
MIC48

### Cold room
Maintaining a storage room at freezing temperature.

TEMPERATURE CONTROLLER
CTD46

### Air treatment plant
Maintaining forced air at the correct temperature.

TEMPERATURE CONTROLLER
MIC48

### Spray booth
Temperature control for "paint curing" in the motor vehicle industry.

TEMPERATURE CONTROLLER
CTD46

Temperature controllers

# Selection guide

## Temperature controllers

### 48 x 48 digital

| Functions | Type of control | Alarm | | Input | Output | Display | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|
| Heating or Cooling | PID with auto-tune and adaptive tune | 1 alarm | | 3-wire Pt100 or Thermocouple J, K, L, N | 1 x 3 A output 1 x 1 A output | 1 line (3 digits) | 24 V ≈ | 89 421 102 | CTD43 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 421 108 | CTD43 |
| | | | | | 1 voltage logic 1 x 1 A relay | | 24 V ≈ | 89 421 112 | CTD43 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 421 118 | CTD43 |
| Heating or Cooling | PID with auto-tune and adaptive tune | 1 alarm | | 3-wire Pt100 or Thermocouple J, K, L, N | 1 x 3 A output 1 x 1 A output | 2 lines (3 digits) | 24 V ≈ | 89 422 102 | CTD46 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 422 108 | CTD46 |
| | | | | | 1 voltage logic 1 x 1 A relay | | 24 V ≈ | 89 422 112 | CTD46 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 422 118 | CTD46 |
| Heating and Cooling | PID with auto-tune and adaptive tune | No | | 3-wire Pt100 or Thermocouple J, K, L, N | 1 x 3 A output 1 x 1 A output | 2 lines (3 digits) | 24 V ≈ | 89 422 502 | CTH46 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 422 508 | CTH46 |
| | | | | | 1 voltage logic 1 x 1 A relay | | 24 V ≈ | 89 422 512 | CTH46 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 422 518 | CTH46 |
| Heating and / or Cooling | PID with auto-tune and adaptive tune Load break monitoring | 2 alarms | | 3-wire Pt100 or Thermocouple J, K, R, S,T, L, N or voltage or current | 1 x 3 A output 1 x 1 A output | 2 lines (4 digits) | 24 V ≈ | 89 422 002 | MIC48 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 422 008 | MIC48 |
| | | | | | 1 voltage logic 1 x 1 A relay | | 24 V ≈ | 89 422 012 | MIC48 |
| | | | | | | | 100 ⇨ 240 V ∼ | 89 422 018 | MIC48 |

### Accessories

| Description | Part number |
|---|---|
| Current transformer for MIC 48 (10 A / 50 mA) | 26 852 301 |
| Current transformer for MIC 48 (25 A / 50 mA) | 26 852 302 |
| Current transformer for MIC 48 (50 A / 50 mA) | 26 852 303 |
| Current transformer for MIC 48 (100 A / 50 mA) | 26 852 304 |
| Thermocouple probe J with nickel-plated brass eyelet - max: 400°C | 79 696 030 |
| Thermocouple probe J with 304 stainless steel casing - max: 600°C | 79 696 031 |

### Accessories (continued)

| Description | Part number |
|---|---|
| Thermocouple probe J with 316 stainless steel sheath - diameter 6 mm - max: 400°C | 79 696 032 |
| Thermocouple probe J with 316 stainless steel sheath - diameter 5 mm - max: 400°C | 79 696 033 |
| Thermocouple probe K with 304 stainless steel casing - max: 1100°C | 79 696 034 |
| Pt100 probe Class B with 316 stainless steel sheath - max: 200°C | 79 696 035 |
| Pt100 probe Class B with 316 stainless steel sheath - max: 400°C | 79 696 036 |
| Pt100 probe Class B with aluminium V6 sheath - max: 200°C | 79 696 037 |

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# Safety relays
## User protection

## A safety relay
# How can it be defined in simple terms?

**A safety relay** is an automation component which is part of a machine's safety system, thus contributing to the safety of people around it.

It is essential for compliance with machine safety standards (EN ISO 13849-1 and IEC/EN 62061).

## A safety relay
# To execute which actions?

| | |
|---|---|
| **Protecting, Controlling** | **Protecting** |
| The safety relay **protects** people. It **controls** a user's action to ensure that this does not lead to anything that may damage his health, either voluntarily or accidentally. | **Controlling** |
| **Monitoring, Sensing** | **Monitoring** |
| When a machine may be dangerous for the user, it is necessary to **monitor** all hazardous operations, and **detect** the slightest anomaly. | **Sensing** |
| **Actuating** | |
| It is then necessary to **actuate** safety contacts to stop cutting, rotating, burning items, etc which could be hazardous for the user. | **Actuating** |

In addition to this catalogue, technical data sheets for each product are available as free downloads on the **www.crouzet.com** website.

## Crouzet Control, safety relays
# A relevelling range and a machine safety range



Power supply LED

Relay output LED

KNA3-YS

Power supply LED

Relay output LED

Error indication LED

KSW3-JS
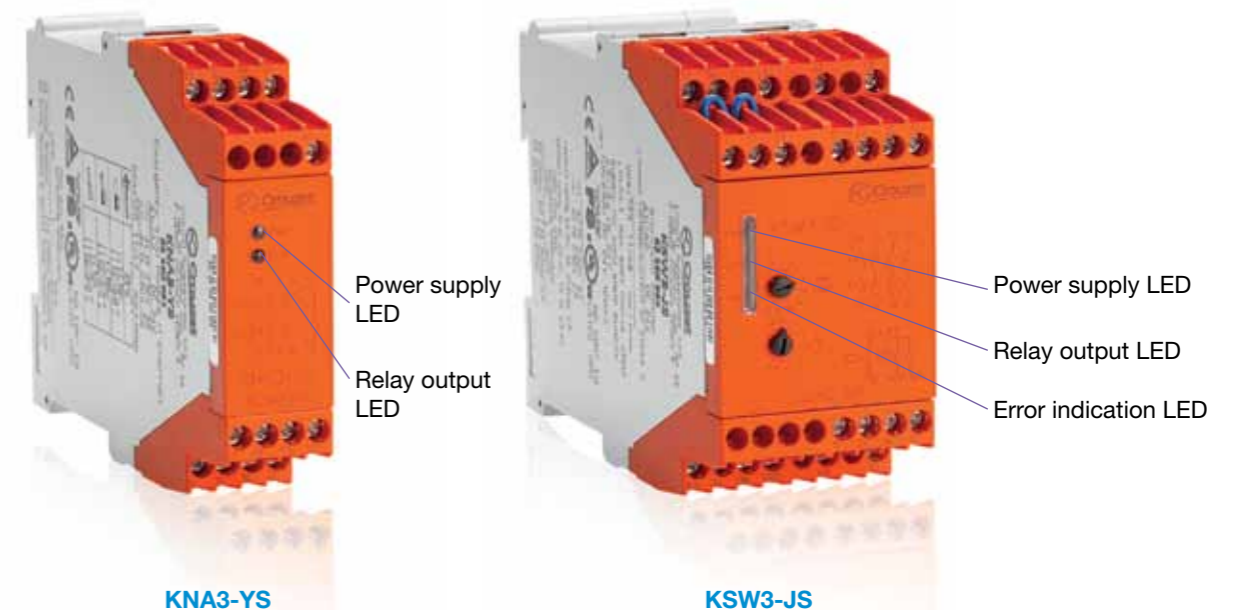
Safety relays

## Crouzet Control, safety relays
# Their features:

- A range covering **machine applications**: emergency stop and mobile guard monitoring, emergency stop with timed contact, two-hand control, zero speed monitoring, expansion module and power supply accessory. A relevelling **control relay** for the lift market.
- A safety component with **one or two channels.**

- Prohibition of machine starting if a problem becomes apparent through **self-checking of the integrity of the control devices.**
- A range conforming to:
  - **Performance Level (PL) e** and **category 4** according to EN ISO 13849-1
  - **Limit value SIL 3 (SIL CL)** according to IEC/EN 62061

## Crouzet Control, safety relays,
# How to choose?

### Machine safety

| | Function(s) | Safety category | Safety contacts | Data contact | | Connection | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|---|
| | Emergency stop & Safety guard monitoring with 1 channel | 3 | 3 x NO | 1 x NC | | Screw terminals | 22.5 | 24 V ⎓ | 85 102 031 | KNA3-YS |
| | | | | | | | | 110 V ∿ | 85 102 034 | |
| | | | | | | | | 230 V ∿ | 85 102 035 | |
| | | | | | | Removable spring terminals | | 24 V ⎓ | 85 103 031 | KNAC3-YS |
| | | | | | | | | 110 V ∿ | 85 103 034 | |
| | | | | | | | | 230 V ∿ | 85 103 035 | |
| | Emergency stop & Safety guard monitoring with 2 channels | 4 | 3 x NO | 1 x NC | | Screw terminals | 22.5 | 24 V ⎌ | 85 102 436 | KNE3-YS |
| | | | | | | | | 110 - 115 V ∿ | 85 102 434 | |
| | | | | | | | | 230 V ∿ | 85 102 435 | |
| | | | | | | Removable spring terminals | | 24 V ⎌ | 85 103 436 | KNEC3-YS |
| | Timed contacts 1 ⇨ 10 s | 4 | 2 x NO (instantaneous) 1 x NO (timed) | - | | Screw terminals | 22.5 | 24 V ⎌ | 85 102 736 | KZR3-YS |
| | Expansion module for safety relays | 4 (combined with a level 4 safety relay) | 5 x NO | 1 x NC (feedback loop) | | Screw terminals | 22.5 | 24 V ⎌ | 85 102 956 | KZE5-YS |
| | | | | | | | | 110 - 115 V ∿ | 85 102 954 | |
| | | | | | | | | 230 - 240 V ∿ | 85 102 955 | |
| | Zero speed monitoring | 4 | 3 x NO 1 x NC | 1 x NO 2 x solid state outputs | | Screw terminals | 45 | 24 V ⎓ | 85 102 331 | KSW3-JS |
| | Two-hand control | 4 | 2 x NO | - | | Screw terminals | 22.5 | 24 V ⎓ | 85 102 621 | KZH2-Y2 |
| | | | 3 x NO | 1 x NC | | | | 24 V ⎓ | 85 102 631 | KZH3-YS |
| | | | | | | | | 24 V ∿ | 85 102 632 | |
| | Power supply for 24 V ⎓ safety relays | - | - | - | | Screw terminals | 22.5 | 85 ⇨ 265 V ⎌ | 85 102 208 | KPS0-YS |

### Relevelling control according to EN 81-1, -2 (lift standard)

| | Function(s) | Safety category | Safety contacts | Data contact | | Connection | Casing width (mm) | Supply | Part number | Type |
|---|---|---|---|---|---|---|---|---|---|---|
| | Relevelling zone control for lifts | 4 | 2 x NO | - | | Removable screw terminals | 22.5 | 24 V ⎌ | 85 102 826 | KZHNU-YS |
| | | | | 1 x NC | | | | 24 V ⎌ | 85 102 526 | KZHNV-YS |

Safety relays

# Applications

## Crouzet Control, safety relays
# Where are they found?

### Emergency stop and guard monitoring

Emergency stop modules with 1 or 2 channels

**KNA3-YS and KNE3-YS, KNAC3-YS and KNEC3-YS SAFETY RELAYS**

### Relevelling lift cars

Levelling the landing and the lift car

**KZHNU-YS and KZHNV-YS SAFETY RELAYS**

They can be found in electrical cabinets, associated with other automation functions in the following markets:

• Building equipment

• Industrial automation systems

### Zero speed monitoring

Sensorless control for stopping electric motors

**SINGLE OR THREE-PHASE KSW3-JS SAFETY RELAYS**

### Two-hand control

Control of two-hand control console

**KZH2-YS and KZH3-YS SAFETY RELAYS**

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Safety relays

# Notes

CROUZET
AUTOMATION

## Logic controllers

Concentrated performance

***Millenium3** Smart & Essential*

## A logic controller
# How can it be defined in simple terms?

**A logic controller** is a programmable module which is used to control small automation systems or small installations. It is an electronic device which combines all of Crouzet's historic expertise.

The logic controller is a **plural solution** in a control system since it contains solutions that can replace a number of products: timers, counters, control relays, temperature controllers, impulse relays, etc.

The logic controller operates as the **brain of applications**. It is capable of retrieving information and triggering actions; it can be adapted to suit the needs of customer applications.

## A logic controller
# To execute which actions?

| Controlling |
|---|
| The logic controller **controls** and automates a set of actuators according to the state of the sensors, the passing of time and the program created using the M3 Soft software. |

**Controlling**

| Measuring, Operator dialogue |
|---|
| The logic controller integrates a local screen, a true operator interface, where the user can view the **measured** values. The buttons on the front panel are configurable and can be used in programs. The M3 Soft software can be used to design an installation easily, test it using simulation mode and **communicate** with the application with monitoring mode. |

**Measuring**

**Operator dialogue**

| Managing |
|---|
| The logic controller easily performs and **manages** complex control system sequences, by means of integrated functions. |

**Managing**

| Communicating, Triggering |
|---|
| The logic controller can be used to **communicate** remotely with PCs or mobile phones via SMS across a network. It also incorporates a calendar to ensure the setting and **triggering** of actions. |

**Communicating**

**Triggering**

## Crouzet Automation Logic Controllers
# Millenium 3, concentrated performance

The **Millenium 3 Smart** logic controller is a programmable logic controller which enables the control and monitoring of machines or automation installations with up to 50 I/O.



Timers + Control relays + Counters + Temperature controllers + **more**

Power supply terminals

Input terminals

Blue screen with 4 lines of 18 characters

Programming port

6 programmable buttons

Output terminals

**LEVEL** — Calculation of level of liquid in a tank

**UP DOWN COUNT** — External preset Up/Down counter

**TIMERS** — Timers

**LEVER COUCHER** — Sunrise Sunset Time

**Regulat** — Digital or adaptive tune PID regulation

To tackle simpler applications that still require a powerful logic controller, Crouzet Automation offers the Millenium 3 **"Essential"** range. The 12 VDC or 24 VDC Millenium 3 Essential range includes a variety of versions and is compatible with a large range of accessories. It is the right solution for simple needs.

Logic controllers

## Crouzet Automation Logic Controllers
# The Millenium 3 Smart range

- **Multiple configuration options** derived from an extensive product range with numerous accessories

- **Simplified connectivity** making integration of communication systems easy

- **Easy implementation** supported by free, user-friendly programming software (M3 Soft)

- **Application-specific solutions** thanks to dedicated and easy to use specific function blocks

- **Enhanced visibility** on the display with high contrast, blue back lit LCD screen

### Expandable versions

XD26          XB26          XD10          XB10          Expandable kit

### Compact versions

CD20          CB20          CD12          CB12          Compact kit

## Crouzet Automation Logic Controllers
# Accessories

Sensors, power supplies, converters, remote screens and communication accessories offer solutions to control your automation systems with the greatest ease of use.

Sensors

NTC temperature probes

Ventilation duct temperature sensor

Light sensor

Potentiometer

Accessories

Ambient temperature sensor

Memory cartridge

Power supplies from 7.5 to 240 W 5, 12 or 24 V

Power supplies

Bluetooth® interface

Communication solutions

Temperature and current/voltage converters

STN and GSM modems

Converters

Programmable touchpanels

Logic controllers

Remote screens

# Communication solutions

## Crouzet Automation Logic Controllers
## Extensive Connectivity Options

## Solutions with close proximity to your installation

### Millenium 3 Virtual Display - Bluetooth® or USB

**Your requirements**

- **Viewing** setpoints on a panel less than 10 m away
- **Changing and modifying** setpoints
- **Locating the** Millenium 3 **display unit** remotely
- **Reading** counters in the vicinity

**Our solution**
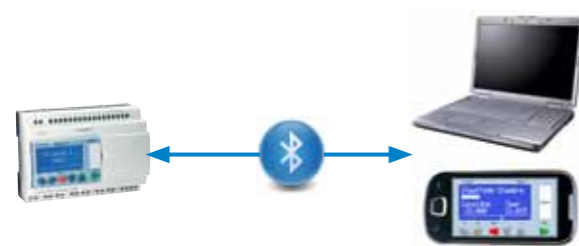
**Main functions**

- **Remote viewing** of the Millenium 3 **display unit**
  - on an Android smartphone via Bluetooth®
  - on a PC via Bluetooth® or USB
- **Display/modification** of program setpoints
- Access to a **virtual panel** (Millenium 3 without display unit)

**In summary**

- **Bluetooth® interface** (10 m): Millenium 3 accessory
- Two versions: **Lite** (ESC/ENTER buttons disabled) & **Standard**

### MTP programmable touch panels - RS232 cable

**Your requirements**

- **Displaying** data on a graphic panel
- **Modifying setpoints** from the touch panel
- **Taking control of the** remote panel from a distance

**Our solution**

VNC link (1)

Option
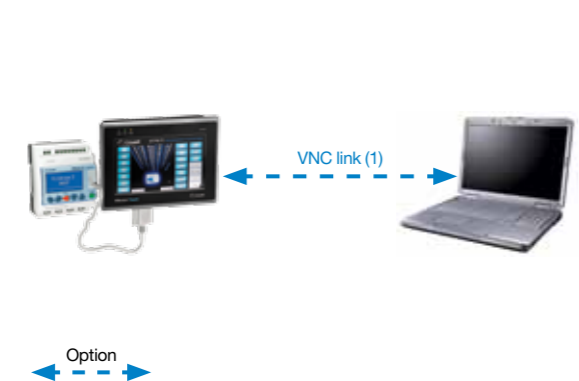
**Main functions**

- **Supervision** of your installation
- **Use** of Millenium 3 internal data, processing alarms and recipes
- **Display** of text, data, graphics, animations
- **Archiving** of data
- **Customization** of interfaces (picture library)
- **Remote control** of panel

**In summary**

- **Storage**: 128 MB flash memory, SD card and USB key
- **Direct communication** using the Millenium 3 programming port
- **Programmable** with EB software (compatible with Windows 2000/XP/Vista/7)
- **Extensive connectivity**

(1) VNC: Virtual Network Computing. Allows a device to be controlled remotely.

## Wide Area Network (WAN) solutions

### M3MOD - GSM modem communication interface

**Your requirements**

- Receiving **remote early warning** of an event
- **Consulting a value** or an internal state
- **Occasionally modifying** setpoints

**Our solution**

GSM
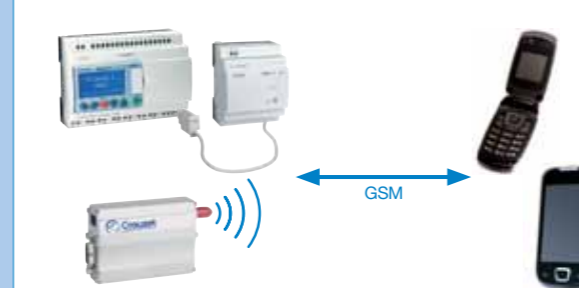
**Main functions**

- **Automatic notification** of alarms via SMS
- Input and output states, as well as all program values, **can be polled and controlled remotely**
- **Reports** can be produced using the available variables
- Management of **telephone contacts**

**In summary**

- Reliable **plug & play** solution that is simple to install
- Solution managed using **M3 Soft** software
- Option **to send SMS messages** via a telecom operator service

### Remote management solutions with HMS(2) - Cloud

**Your requirements**

- **Supervising and monitoring** installations with up to 50 remote I/O
- **Managing an installed base of machines**
- Accessing your data remotely, **24/7**
- Optimizing your **maintenance operations**

**Our solution**

Millenium 3 Netbiter EC220

Millenium 3 Netbiter EC150

Modbus

GPRS

Internet (via router or ADSL box)
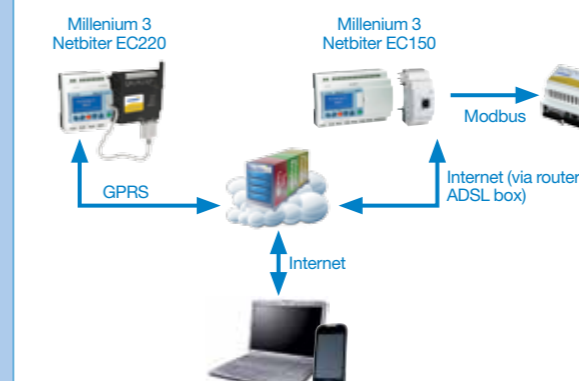
Internet

**Main functions**

- **Remote control** of an automated application
- **Display** of Millenium 3 program parameters and values **via the internet**
- **Remote** setpoint **modification**
- **Data logging**
- Management of **events** sent **via emails or SMS**

**In summary**

- **Direct communication** between Netbiter and Millenium 3 via the SLin/SLout protocol or via Modbus
- **GPRS**: SIM card procured via HMS
- **Cloud solution**: secure remote server
- **Easy** to set up and use
- **Several Millenium 3** can be connected via Modbus

(2) Partnership solutions with the HMS company, validated by Crouzet Automation and HMS. Information relating to the products has been provided by the supplier of each product respectively, and they are wholly responsible for its accuracy in addition to supplying and providing backup for their products.

## Local Area Network (LAN) solutions

### Programmable touch panels and communication extensions – Modbus networks

**Your requirements**

- **Managing a group of machines** or an installation on a local area network
- **Centralizing** data
- **Displaying** data on a graphic panel
- **Modifying setpoints** from the panel
- Accessing the system locally **in real time**

**Our solution**
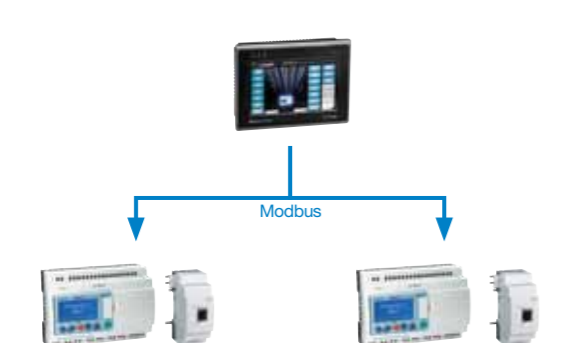
Modbus

**Main functions**

- See MTP programmable touch panels solution
- **Management** and **centralizing** of data in a single place
- **Display** of Millenium 3 program values
- **Remote** setpoint **modification**

**In summary**

- MTP panel **Modbus master**
- XN05 extension: **Modbus Ethernet TCP/IP**
- XN06 extension: **Modbus RS485 RTU**

### Communication extensions - Modbus RS485 or Modbus Ethernet TCP/IP

**Your requirements**

- **Managing a group of machines** or an installation on a local area network
- **Centralizing** data
- Accessing the system locally **in real time**

**Our solution**
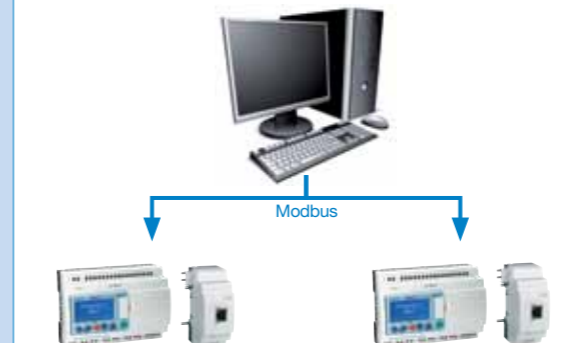
Modbus

**Main functions**

- Can be **combined with distributed automation**
- Management and **centralizing of data** in a single place
- **Display** of Millenium 3 program values
- **Remote** setpoint **modification**

**In summary**

- Uses **Modbus protocol**
- XN05 extension: **Modbus Ethernet TCP/IP**
- XN06 extension: **Modbus RS485 RTU**
- **Compatible** with standard supervisors

Logic controllers

## Crouzet Automation Logic Controllers
# Millenium 3 and M3 Soft

The M3 Soft is a **high-performance** software platform used to program the Millenium 3 logic controller and **optimize** design times.

### Free

The Millenium 3 programming software (M3 Soft) can be **downloaded free of charge** from the Crouzet website at **www.crouzet.com**
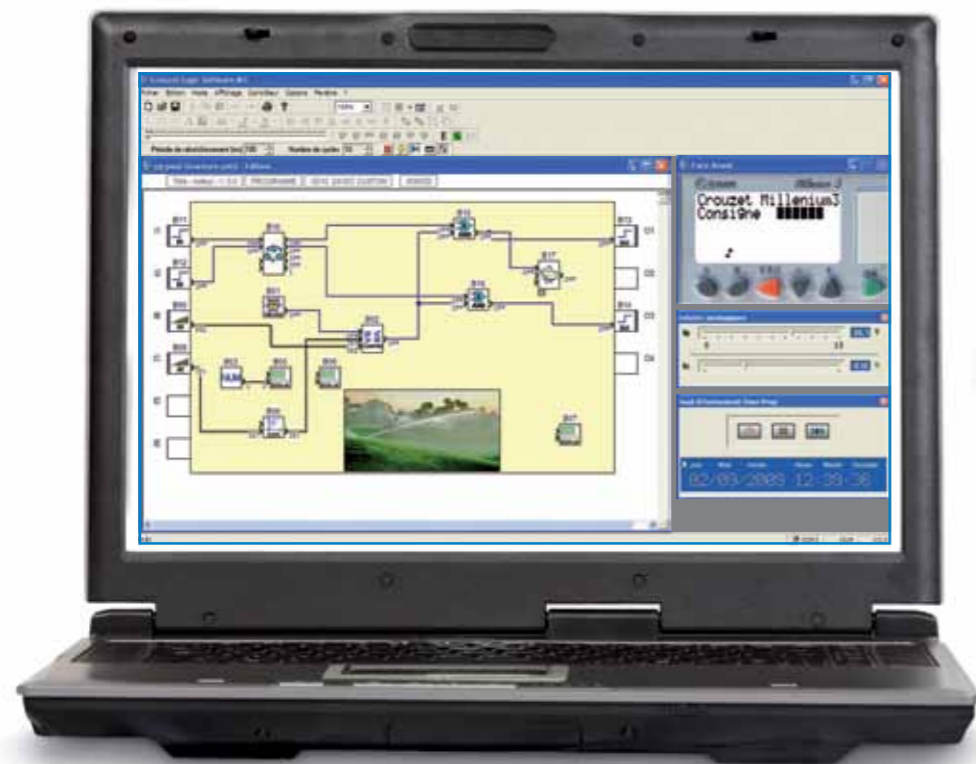
**Blocks can be wired in wiring mode or text mode**

**Move one or more blocks without disconnecting the wires**

**Choice of programming language**

**Clear work area**

**Customized password protection**

## M3 Soft software
# Its features

### Simple

- **Quick, simple and intuitive programming** requires no specialist knowledge
- Self-teaching made easier thanks to a **user-friendly online help guide** and programming examples
- A **simulation mode** that **consistently represents** controller operation

### Powerful

- A complete range of **basic functions**: counting, timing, comparison, display, logic, gain, sin/cos, etc are also available
- A wide range of **dedicated functions:** pump rotation, PID regulation, movement, pressure, level, water ratio, solar tracking, and flow

### User-friendly and ergonomic

- Software available in **5 languages:** English, French, Italian, German and Spanish
- Function block **programming** is **fun** and **very visual**
- **Blocks simply organized** by function for quick access
- **Help** associated with each function block accessible **at the click of a button**
- Programming langages: **FBD** (Function Bloc Diagram) and **SFC** (Sequential Function Chart/Grafcet) or **LD** (Ladder Diagram)

### User-definable and effective

- Possibility of creating and saving **custom macros** in the macro tab allowing the user to simplify programs and utilize their expertise
- Possibility of protecting macros by locking them with a password for **greater security**

Logic controllers

## APPLICATION

| | | |
|---|---|---|
| | Cam Bloc | Control of a group of 8 integral cam wheels. |
| | Angular Cam Timer | Cam timer with the angle made by the cams as the command input. |
| | Pumps management | Pumps Management (Tank Management with circular pump changeover). |
| | Sunrise Sunset Time | Calculation of the sunrise and sunset time in relation to the latitude and longitude. |
| | Solar Tracking one Axis | Calculation of the sun's position so that a sun dial can be placed. |
| | Analog PID Regulation (8 bits) | Temperature control (pressure or other) with 8 bitsanalog output. |
| | PWM PID Regulation (8 bits) | Temperature control (pressure or other) with 8 bitsdigital output. |
| | Pressure Gain | Interface between a Pressure Sensor and the Millenium 3 logic controller. |
| | Flow | Calculation of the flow of a liquid in a pipe using a differential pressure element or by measuring the dynamic pressure. |
| | Level | Calculation of the level of a liquid with or without constant density, in an open or closed tank, using pressure sensors. |
| | CTN 1 | Temperature measurement It is dedicated to CTN1 (-25 to +85 °C). |
| | CTN 2 | Temperature measurement. It is designed for CTN2 type CTNs (-35°C to +120°C). |
| | CTN 3 | Temperature measurement. It is designed for CTN3 type CTNs (0°C to +200°C). |
| | LUX-I | Light measurement It is designed for photoresistors and internal light meters. |
| | Twilight | Calculation of the sunrise and sunset times and also the twilight times in relation to the latitude and longitude read on the function block inputs. |
| | Solar Tracking Dual Axis | Calculation of the sun's position so that a sun dial can be placed. This positioning depends on the two angles calculated by the function: the elevation angle and the azimuth angle. |
| | Swimming Pool Filtration | Filtration time information in relation to the water temperature. |
| | Defrost | Defrost cycle management |
| | Heat Curve | Modulation of the heating water temperature according to the atmospheric conditions. The function uses automatic regulation depending on the temperature outdoors called the temperature curve or "water ratio". |
| | Analog PID Regulator (Auto-tuning) | Auto-tuning proportional-integral-derivative (PID) controller. |

## PROG

| | | |
|---|---|---|
| | Constant On | Constant On |
| | Constant Off | Constant Off |
| | Yes Bit | Copy of the input to the output. (very helpful when macros are being used) |
| | Numerical Constant | Integer with a value between -32768 and +32767. |
| | Yes Num | Copy of the input to the output. (very helpful when macros are being used) |
| | Memory | Saving of a value between -32768 and 32767. |
| | Storage | Storage of data values with an average value. |
| | Archive | Saving of two values simultaneously with the information relating to their time-stamping. |
| | Random | Generation of a pseudo-random value between the min and max values set by the user. |

## CALCUL

| | | |
|---|---|---|
| | Gain | Conversion of an analog value by changing the scale and offset. |
| | Add/Subb | Simple operations on integers: Addition and/or Subtraction. |
| | Mul/Div | Simple operations on integers: Multiplication and/or Division. |
| | ADD/SUB 2 Inputs | The ADD-SUB (Addition or Subtraction) function is used to perform simple operations on integers. |
| | Sin/Cos | Calculation of the cos and sin of an angle between 0° and 90°. |
| | Square Root | Calculation of the square root of the number present as an input with accuracy to two decimal points. |
| | Bit Multiplexer | Copy of the selected A or B input to the outputs Q and/Q. |
| | Multiplexer A B | Multiplexing function on 2 analog values. |
| | Demultiplexer | Demultiplexing of integers. Used to direct the value of the input to one of the 4 outputs. |
| | Multiplexer | Multiplexing word inputs. Used to direct the value of one of the selected inputs to a predefined output. |
| | Dec/Bin | Break down of an integer type input (16 bits) into 16 bit type outputs. |
| | Bin/Dec | Make up of an integer type output (16 bits) from 16 bit type inputs. |
| | SPLIT 16 bits to 4 | Split of a 16-bit word into four 16-bit words with values between 0 and 15. |
| | SPLIT 16 bits to 2 | Split of a 16-bit word into two 16-bit words with values between 0 and 255. |
| | Word Shift Register | Shifting of the 16-bit words on each rising edge of the clock. |
| | Shift Register | Shifting of information by saving it to the memory (shifting of bits in a 16-bit word on each rising edge of the clock). |
| | Transfer Function | Table of correspondence between the X input and the Y output. The table of correspondence is created from a csv file |
| | Transfer Function 50 values | Table of correspondence between the X input and the Y output. The table of correspondence (50 rows max) is created from a sv file |
| | Timer Transfer Function | Correspondence table for the Minutes operating time and the Y output. |
| | Timer Transfer Function 50 values | Correspondence table for the Minutes operating time and the Y output. (50 Values) |

## PROG

| | | |
|---|---|---|
| | Hour Minute | Indication of the time from the controller (hour and minutes). |
| | Hr Mn Converter | Conversion of a time period in the "hour : minute" format to minutes and vice versa. |
| | Controller Status | Access to the controller states and modify the behaviour of its FBD and/or SFC program depending on these states. |
| | Summertime | Active function throughout summer time, and inactive throughout winter time. |

## MACROS

| | | |
|---|---|---|
| | Display 15 texts | Display of 15 texts one after each other with 15 Displays Function Blocs |
| | Scroll 4 lines | Scroll down of a text of four lines on the screen of the Controller |
| | My Macro | Possibility to create a personal macro library and to store them in the Macro tab. |

## INPUTS/OUTPUTS

| | | | | | |
|---|---|---|---|---|---|
| | Discrete Input | | | Integer Input | |
| | Filtered Digital Input | | | Discrete Output | |
| | Analog Input 0..10V | | | PWM Output | |
| | Filtered Analog Input | | | Analog Output Expansions 10 bits | |
| | Analog Input Expansion 10 bits | | | Integer Output | |
| | Analog Input Expansion 12 bits | | | | |

## HMI

| | | | | | |
|---|---|---|---|---|---|
| | Display | | | B Button | |
| | Text | | | ESC Button | |
| | Menu Scroll | | | Minus Button | |
| | LCD Backlight Output | | | Plus Button | |
| | A Button | | | OK Button | |

## COMMUNICATION

| | | |
|---|---|---|
| | SL In | Writing via serial link of data stored in the controller's fixed addresses |
| | SL_In S (saved) | Data transmission via a programming port to memory space in the controller's fixed addresses. Data is protected in the event of disconnection of the controller |
| | SL Out | Reading via programming port of data stored in the controller's fixed addresses. |
| | Alarm | Control of 10 alarm levels and distribution of a serial data to a digital output, connected to a modem digital input. For example to send a SMS. |
| | Message | distribution of alarm messages to mobile phones, to the Millenium 3 Alarm tool or to e-mail addresses via the M3MOD |

## GRAFCET SFC

| | | |
|---|---|---|
| | Resettable Initial Step | When RESET function is activated, activation of the STEP OUTPUT for the function, which is the initial step, and reinitialization of all of the ther active steps. |
| | Initial Step | Initial step of an SFC chart |
| | Step | A step of an SFC chart. |
| | Or Divergence Step | Transition of one step to be simultaneously made toward one or two steps. |
| | Or Convergence | Transition of one to four step(s) to be simultaneously made toward one step. |
| | And Divergence | Transition of one or two steps to be simultaneously made toward two steps. |
| | And Convergence Step | Transition of two steps to be simultaneously made toward one step. |
| | Wait SFC Step | Set up of a wait phase or step for a PLC or a device. |
| | Move SFC Step | Set up of a move step for a motor controlled by the PLC to a position specified on the TARGET input. |
| | Motor Multiplexer | Combination of the motor control signals produced by two linked MOVE SFC steps. |

## CONTROL

| | | |
|---|---|---|
| | Timer | Large set of timer functions (A/C, BW, B/H,Li/L, Totalizer) |
| | Schmitt Trigger | Monitoring of an analog value in relation to two thresholds. |
| | Timer A | Delay of actions for a predefined time. |
| | Bistable | Impulse relay function. |
| | Set Reset | Bistable memory - Priority assigned to either SET or RESET. |
| | Timer Set Reset | Trigger of operation of a particular device at a fixed time for a period set by the user. |
| | One Second Clock | The blinking input function is active every second. |
| | Compare in Zone | Comparison of a value between two setpoints (the MIN and MAX values determine the zone). |
| | Compare | Comparison of two analog values using the =, >, <, >=, <=, =/= operators. |
| | MULTI COMPARE | Activation of the output corresponding to the value present on the "Value" input. |
| | HL Switch | Comparison of a value against 5 thresholds. |
| | Min Max | Saving of the minimum and maximum values of a variable signal. |
| | Reduced Average | Update of the configured average of a number of values by deleting the minimum and maximum values. |
| | Time Prog | Daily, weekly, monthly and yearly time programmer. |
| | Weekly Time Prog | Daily, weekly, monthly and yearly time programmer. |
| | Preset Counter | Preset up/down counter |
| | Up Down Counter | External preset up/down counter. |
| | Preset H Meter | Preset hour counter (preselection of hour, minute). |
| | High speed count | Counting of the pulses arriving at the inputs of a controller powered by a DC supply at rates in excess of one pulse every 6 ms. |
| | Fast count | Counting of the pulses arriving at the input at rates in excess of one pulse every 10 ms. |

## LOGIC

| | | | | | |
|---|---|---|---|---|---|
| | Not | | | Or 6 Inputs | |
| | And 2 Inputs | | | Nand 4 Inputs | |
| | And 4 Inputs | | | Nor 4 Inputs | |
| | And 6 Inputs | | | Xor 2 Inputs | |
| | Or 2 Inputs | | | Boolean 6 Inputs/2 Outputs | |
| | Or 4 Inputs | | | Boolean | |

**Function block marked in red:**

| | | |
|---|---|---|
| | CTN 1 | Available only for the Millenium 3 Smart Range |

Logic controllers

# Applications

## Crouzet Automation Logic Controllers

# Where are they found?

### Buidling Equipment
Access Control

**Opening control for doors**

Opening control for doors and other associated security devices for restricting access; synchronization between the various doors

**BOOLEAN OR LOGIC**
Create logic equations between the connected inputs

**Automatic barriers**

Control barriers with automatic detection of vehicles. Function for selecting opening times / days.

**UP/DOWN COUNTER**
Up/Down counter with external preset

HVAC

**Heat pump**

Management of various parameters such as heating, cooling, fluid temperatures, operation, calendar-based function, frost protection mode, alarm management, etc

**WATER RATIO**
Water temperature control
**CLOCK**
Weekly and yearly time programmer

**Air treatment plant**

Maintaining forced air at the correct temperature

**NTC1**
Temperature measurement
**REGULATION**
Analog PID regulation
**GAIN**
Conversion of an analog value by changing the scale and datum point

Building Automation

**Solar water heating**

Automation of operation and heating regulation, remote management of the installation

**TEMPERATURE CONTROL**
(pressure or other)

**Illuminated signs**

Managing flashing on illuminated signs

**WEEKLY TIME PROGRAMMER**
Programming of time slots during which it will be possible to execute actions
**LUX-I**
Measurement of the light level
**TWILIGHT**
Calculation of the sunrise and sunset times

## Infrastructure and Energy
Fluid management

**Swimming pools, fountains, spas**

Managing circulation pumps, monitoring levels, temperature and conductivity of the water

**FILTRATION**
Filtration duration settings depending on the water temperature

**Irrigation/Sprinklers**

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

**PUMP MANAGEMENT**
Pump rotation function

Water treatment

**Reverse osmosis**

Circulation pumps management, supervision of flow pressure and temperature of osmosis processed water

**FLOW**
Calculation of the flow of a liquid in a pipe
**CTN**
Temperature measurement (-35 to +120 °C)

**Pump management**

Circulation pumps management, supervision of levels and pressure

**GAIN**
Conversion of an analog value by changing the scale and datum point
**LEVEL**
Calculation of the level of liquid in a tank

## Industrial OEMs
Packing machines

**Stretch wrapping machines**

Controlling the motor that unrolls the packing film. Controls cutting of the film after heat sealing and monitors the duration of the motor cycles

**GRAFCET SFC FUNCTIONS**
For sequential automation systems (Sequential Function Chart)
**TIMERS (TEMPORISATEURS)**
A/C function - BW function - B/H function - Li/L function

**Packaging**

Controlling heat sealing times on blister packs, packaging bags, etc

**HIGH SPEED COUNT**
Counting of pulses
**AND**
Logical AND with 2 inputs

**Other typical applications:**
**Medical, Solar, Agricultural Equipment, Transportation, Hoisting, Handling…**

Logic controllers

# Millenium 3 range

| Type | | Part number | Supply | Inputs | Outputs | Available in 12 V | Available in 24 V | Available with Solid State Output 0.5 A/PWM | Available in / compatible with the Essential version ** |
|---|---|---|---|---|---|---|---|---|---|
| **M3 Smart kits** | Kit 12 Smart* | 88 974 080 | 24 V | 8 (4 configurable as analog) | 4 relays 8 A | | | | |
| | Kit 12 Smart* | 88 974 081 | 100 ⇒ 240 V ~ | 8 | 4 relays 8 A | | | | |
| | Kit 20 Smart* | 88 974 082 | 24 V | 12 (6 configurable as analog) | 8 relays 8 A | | | | |
| | Kit 20 Smart* | 88 974 083 | 100 ⇒ 240 V ~ | 12 | 8 relays 8 A | | | | |
| | Kit 26 Smart* | 88 974 084 | 24 V | 16 (6 configurable as analog) | 8 relays 8 A and 2 relays 5 A | | | | |
| | Kit 26 Smart* | 88 974 085 | 100 ⇒ 240 V ~ | 16 | 8 relays 8 A and 2 relays 5 A | | | | |
| **Compact versions** | | | | | | | | | |
| With display | CD12 Smart* | 88 974 041 | 24 V | 8 (4 configurable as analog) | 4 relays 8 A | • | | • | • |
| | CD12 Smart* | 88 974 043 | 100 ⇒ 240 V ~ | 8 | 4 relays 8 A | | • | | |
| | CD20 Smart* | 88 974 051 | 24 V | 12 (6 configurable as analog) | 8 relays 8 A | • | | • | • |
| | CD20 Smart* | 88 974 053 | 100 ⇒ 240 V ~ | 12 | 8 relays 8 A | | • | | |
| Without display | CB12 Smart* | 88 974 021 | 24 V | 8 (4 configurable as analog) | 4 relays 8 A | • | | | • |
| | CB12 Smart* | 88 974 023 | 100 ⇒ 240 V ~ | 8 | 4 relays 8 A | | • | | |
| | CB20 Smart* | 88 974 031 | 24 V | 12 (6 configurable as analog) | 8 relays 8 A | | | | • |
| | CB20 Smart* | 88 974 033 | 100 ⇒ 240 V ~ | 12 | 8 relays 8 A | | • | | |
| **Expandable versions** | | | | | | | | | |
| With display | XD10 Smart* | 88 974 141 | 24 V | 6 (4 configurable as analog) | 4 relays 8 A | • | | • | • |
| | XD10 Smart* | 88 974 143 | 100 ⇒ 240 V ~ | 6 | 4 relays 8 A | | • | | |
| | XD26 Smart* | 88 974 161 | 24 V | 16 (6 configurable as analog) | 8 relays 8 A and 2 relays 5 A | • | | • | • |
| | XD26 Smart* | 88 974 163 | 100 ⇒ 240 V ~ | 16 | 8 relays 8 A and 2 relays 5 A | | • | | |
| Without display | XB10 Smart* | 88 974 131 | 24 V | 6 (4 configurable as analog) | 4 relays 8 A | • | | • | • |
| | XB10 Smart* | 88 974 133 | 100 ⇒ 240 V ~ | 6 | 4 relays 8 A | | • | | |
| | XB26 Smart* | 88 974 151 | 24 V | 16 (6 configurable as analog) | 8 relays 8 A and 2 relays 5 A | • | | • | • |
| | XB26 Smart* | 88 974 153 | 100 ⇒ 240 V ~ | 16 | 8 relays 8 A and 2 relays 5 A | | • | | |
| **With Removable Terminal Blocks** | | | | | | | | | |
| | CD12 RBT Smart* | 88 974 441 | 24 V | 8 (4 configurable as analog) | 4 relays 8 A | | | | |
| | XD26 RBT Smart* | 88 974 561 | 24 V | 16 (6 configurable as analog) | 8 relays 8 A and 2 relays 5 A | | | | |
| **Sandwich extensions** | | | | | | | | | |
| Communication | XN05 Modbus TCP/IP | 88 970 270 | 24 V | | | | | | • |
| | XN06 Modbus RS485 | 88 972 250 | 24 V | | | | | | • |
| | XN07 Master RS485 | 88 974 250 | 24 V | | | | | | |
| Digital | XE10 | 88 970 321 | 24 V | 6 | 4 relays 5 A | | | | • |
| | XE10 | 88 970 323 | 100 ⇒ 240 V ~ | 6 | 4 relays 5 A | | • | | • |
| **Termination Extensions** | | | | | | | | | |
| Digital | XR06 | 88 970 211 | 24 V | 4 | 2 relays 8 A | • | | | • |
| | XR06 | 88 970 213 | 100 ⇒ 240 V ~ | 4 | 2 relays 8 A | | • | | • |
| | XR10 | 88 970 221 | 24 V | 6 | 4 relays 8 A | • | | | • |
| | XR10 | 88 970 223 | 100 ⇒ 240 V ~ | 6 | 4 relays 8 A | | • | | • |
| | XR14 | 88 970 231 | 24 V | 8 | 4 relays 8 A and 2 relays 5 A | • | | | • |
| | XR14 | 88 970 233 | 100 ⇒ 240 V ~ | 8 | 4 relays 8 A and 2 relays 5 A | | • | | • |
| Analog | XA03 3xPt100 | 88 970 800 | 24 V | 3 analog (Pt100) | | | | | |
| | XA04 2AI/2AO | 88 970 241 | 24 V | 2 analog 0-10V/0-20mA (1 Pt100) | 2 analog 0-10V/PWM | | | | • |
| **Bare board and resin board versions** | | | | | | | | | |
| Bare board | NB12 | 88 970 001 | 24 V | 8 (4 configurable as analog) | 4 relays 8 A | • | | | |
| | NB12 | 88 970 003 | 100 ⇒ 240 V ~ | 8 | 4 relays 8 A | | | | |
| | NB20 | 88 970 011 | 24 V | 12 (6 configurable as analog) | 8 relays 8 A | | | | |
| | NB20 | 88 970 013 | 100 ⇒ 240 V ~ | 12 | 8 relays 8 A | | | | |
| Resin board | NBR12 | 88 973 001 | 24 V | 8 (4 configurable as analog) | 4 relays 8 A | • | | • | |
| | NBR26 | 88 973 061 | 24 V | 16 (6 configurable as analog) | 10 relays 8 A | • | | • | |
| | NBR32 | 88 973 211 | 24 V | 20 (6 configurable as analog) | 12 relays 8 A | • | | | |
| | NBR40 | 88 973 231 | 24 V | 24 (6 configurable as analog) | 16 relays 8 A | • | | | |

* Millenium 3 Smart: backlit blue LCD display. Extended operating temperature range and function block library
**Millenium 3 Essential: Logic Controller with green screen and industrial temperature range

# Millenium 3 accessories

## Power supplies and DC/DC converters in modular casings

| Part number | Tension d'entrée | Input voltage | Nominal power | Output current |
|---|---|---|---|---|
| 88 950 303 | 100 ⇒ 240 V ~ | 24 V | 7.5 W | 0.3 A |
| 88 950 304 | 100 ⇒ 240 V ~ | 24 V | 15 W | 0.6 A |
| 88 950 307 | 100 ⇒ 240 V ~ | 24 V | 30 W | 1.2 A |
| 88 950 302 | 100 ⇒ 240 V ~ | 24 V | 60 W | 2.5 A |
| 88 950 305 | 100 ⇒ 240 V ~ | 5 V | 20 W | 4 A |
| 88 950 306 | 100 ⇒ 240 V ~ | 12 V | 24 W | 2 A |
| 88 950 320 | 9.2 ⇒ 18 V | 12 V | 10 W | 0.8 A |
| 88 950 321 | 9.2 ⇒ 36 V | 24 V | 6 ⇒ 10 W | 0.4 A |

## Connection accessories, tools and programming software

| Part number | Name |
|---|---|
| 88 970 111 | M3 Soft: Millenium 3 programming software (CD-ROM) |
| 88 970 108 | Memory cartridge for transfer and saving of programms |
| 88 970 102 | 3 m serial link cable: PC DB9 F ⇒ Millenium 3 |
| 88 974 104 | Millenium 3 ⇒ Bluetooth® interface (class A 10 m) |
| 88 970 109 | 3 m USB link cable: PC ⇒ Millenium 3 |
| 88 970 110 | Bluetooth® adaptor ⇒ USB (class A 10 m) |
| 88 970 123 | 1.80 m serial link cable: DB9 M/DB9 F |
| 88 970 510 | 0.5 m serial link cable: Millenium 3 ⇒ DB9 M |
| 88 974 106 | Ready to use Millenium 3 Smart democase including: - a CD12 Smart, a CTN probe, a LDR probe, an I/O simulator - a 3 m USB link cable: PC ⇒ Millenium 3, a M3 Soft CD - a power supply 110 V-230 V~ |

| Name |
|---|
| **Millenium 3 Virtual Display** |
| Android smartphone and tablet as well as Windows XP/7 PC application |
| **Man/Machine interface** |
| TFT-LCD compact 4.3" and 7" resistive touch panels - MTP6/50 (Réf 88 970 492), MTP8/50 (Réf 88 970 494) & MTP8/70 (Réf 88 970 496)* |
| Plug & Play remote LCD displays/keypads (Réf 88 970 410)* |
| Remote LED display - Input 0-10 V (Réf 88 950 400)* |
| **Remote control communication solutions** |
| Modem communication solutions M3MOD (Réf 88 970 117), GSM Modem (Réf 88 970 119) and STN Modem (Réf 88 970 118)* |
| **Temperature probes and light sensors** |
| NTC Temperature probes CTN2 PVC (Réf 89 750 174) / CTN2 Inox (Réf 89 750 182) / CTN3 Silicone (Réf 89 750 186)* |
| LDR Light sensors (Réf 89 750 183)* |
| 0-10 V Temperature sensors (Réf 89 750 150 / 89 750 151 / 89 750 152 / 89 750 153)* |
| Temperature probes Pt100 & Thermocouple (Réf 79 696 030 / 79 696 031 / 79 696 032 / 79 696 033 / 79 696 034 / 79 696 035 / 79 696 036) |
| **Temperature and signal converters** |
| Thermocouple Pt100/Pt1000 ⇒ 0-10 V (Réf 88 950 150 / 88 950 151 / 88 950 152 / 88 950 153 / 88 950 154 / 88 950 155)* |
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| **Other accessories and kits** |
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* Data sheets can be downloaded from the website www.crouzet.com

Logic controllers

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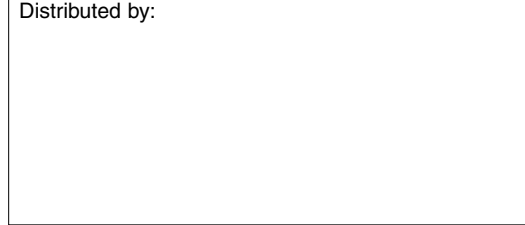| PART NUMBER | DESCRIPTION | TYPE | PAGES |
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10/2013

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