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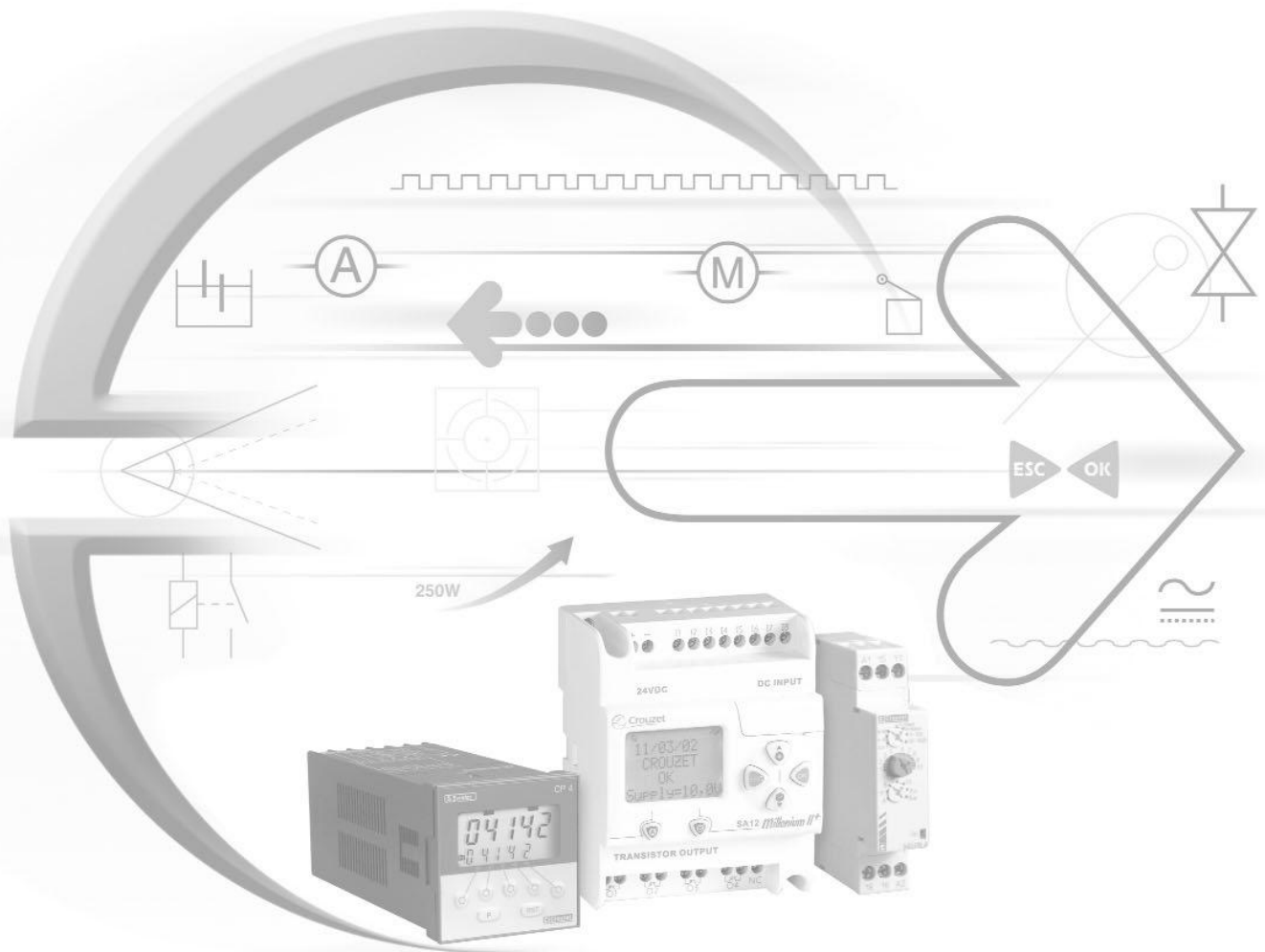
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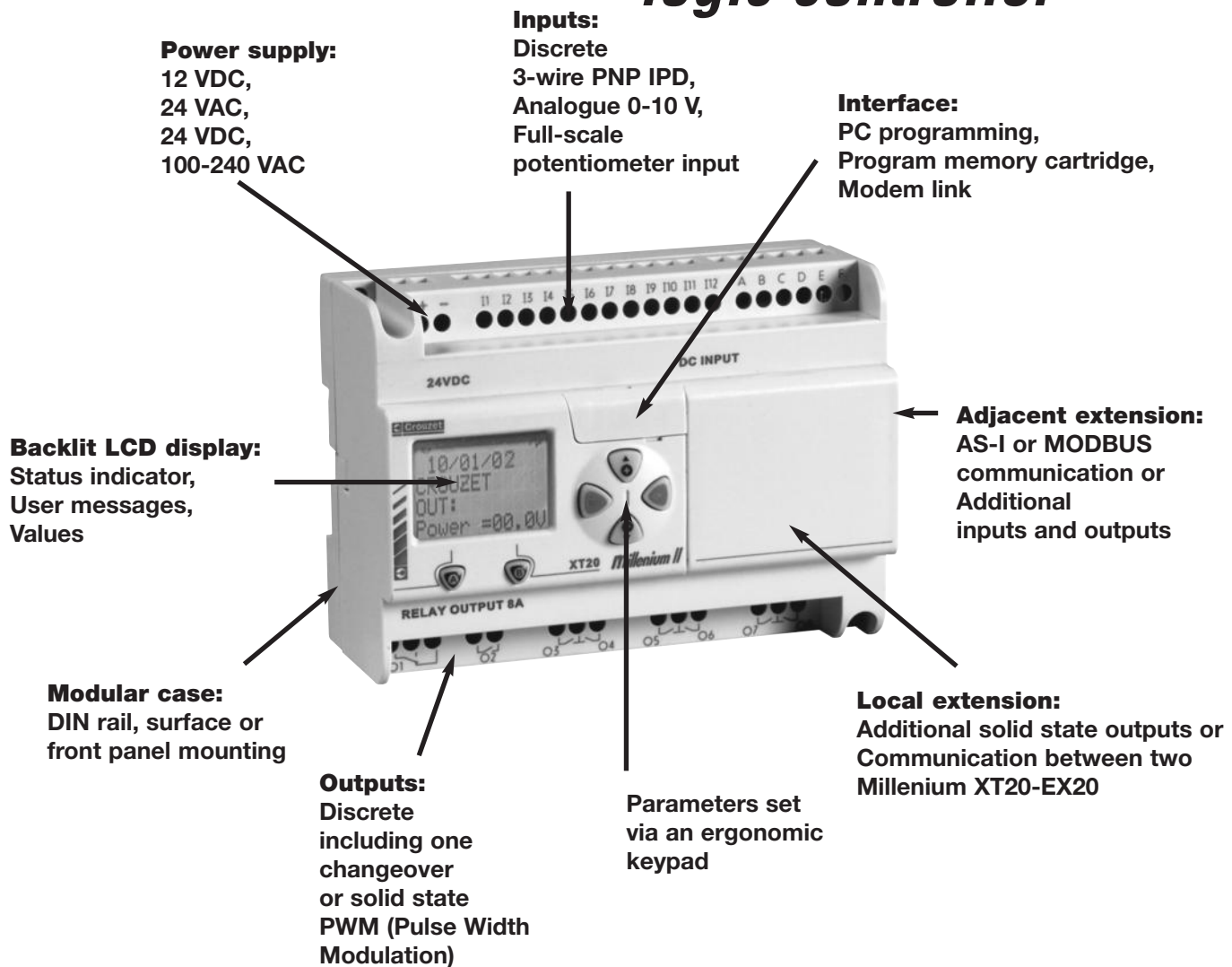
Millenium Controllers



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Millenium II+ logic controller



Your open, adaptable configuration

Millenium 2 consists of a complete range with versions which are:

- user-definable from the front panel
- low-cost (no displays and parameter-setting buttons)
- bare boards for mass-production applications
- numerous extensions (I/O, communication, etc)

Your pre-programmed functions

Millenium 2 incorporates the most extensive function library on the market, which now includes application-specific functions (calculation, pump rotation, Cam timer, etc). Moreover, Crouzet will offer to design the function which is perfect for your application.

Your flexibility for programming

Millenium 2 is the only logic controller to combine flexible programming using function blocks with the added benefit of sequential flow chart blocks. Its user-oriented design simplifies the process of designing your programs.

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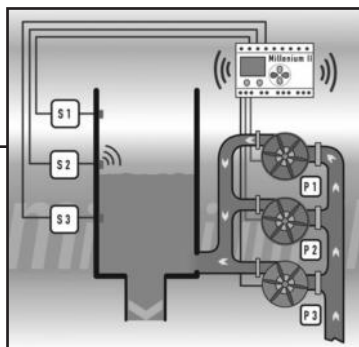
Your applications already pre-programmed with our application-specific functions!

CROUZET offers you a library of application-specific functions which can be added to according to your requirements:

- **Calculation function**
Multiplication/Division
Addition/Subtraction
- **Data archiving function**
- **Cam timer function**
- **Clock function with parameter modification**
- **Pump rotation function**
- **Up/down counter with calculation function**

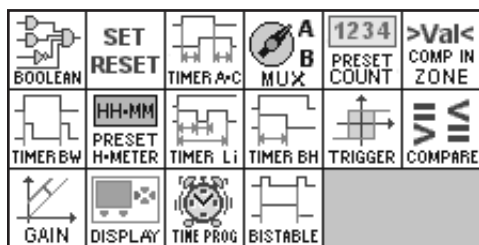
Example of application-specific function: Rotation of 3 pumps

The pump rotation function is used to manage the water level in a tank by means of 3 sensors and 3 pumps.



Function toolbar

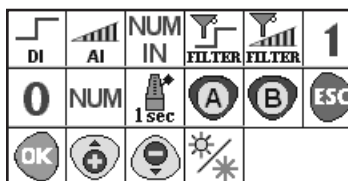
► FBD functions



21 pre-programmed functions are available for counting, timing, comparison, multiplexing, timer programming and display.

	BOOLEAN Used to create logic equations between connected inputs.		TIMER Li Pulse generator (ON setting, OFF setting).
	SET - RESET Bistable memory - Priority assigned to either SET or RESET.		TIMER B/H Timer. Function BH. (adjustable impulse signal).
	TIMER A/C Timer - Function A/C (On-delay and off-delay).		TRIGGER Defines an activation zone with Hysteresis.
	MUX Multiplexing functions on 2 analogue values.		COMPARE Comparison of 2 analogue values using =, >, <, ≥, ≤ operators.
	PRESET COUNT Up/down counter.		GAIN Used to convert an analogue value by changing scale and offset.
	COMP IN ZONE Zone comparison (MIN ≤ VALEUR ≤ MAX).		DISPLAY Display of digital and analogue data, date, time, messages for man-machine interface.
	TIMER B/W Timer - Function BW (impulse on a rising or falling edge).		TIME PROG Hourly, weekly and annual programmer.
	PRESET H-METER Hour counter (presetting of hour, minute).		BISTABLE Impulse relay function.

► Inputs



You can connect physical inputs, whether discrete, analogue or potentiometer. There are also internal inputs such as the keypad, constants, etc.

► Outputs



You have two types of output:

- physical: discrete, solid state with PWM (Pulse Width Modulation),
- internal: display backlighting.

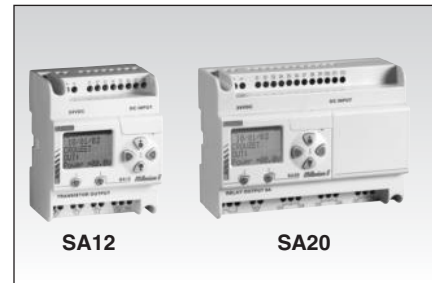
► Logic functions



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

Standard versions

- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc
- Application-specific functions: rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Backlit LCD display
- Program protected by a password
- Calendar program clock
- User-definable from the front panel



Type	Input	Output	Power supply	Part Number
SA12	8	4 relay	24 VDC	88 950 041
	8	4 relay	100 - 240 VAC	88 950 043
	8	4 relay	24 VAC	88 950 044
	8	4 solid state/4 PWM	24 VDC	88 950 042
	8 NPN	4 relay	24 VDC	88 950 049
	8	4 relay	12 VDC	88 950 045
SA20	8	4 solid state/4 PWM	12 VDC	88 950 046
	12	8 relay	24 VDC	88 950 051
	12	8 relay	100 - 240 VAC	88 950 053
	12	8 relay	24 VAC	88 950 054
	12	8 solid state/6 PWM	24 VDC	88 950 052
	12 NPN	8 relay	12 VDC	88 950 059
	12	8 relay	12 VDC	88 950 055
12	8 solid state/6 PWM	12 VDC	88 950 056	

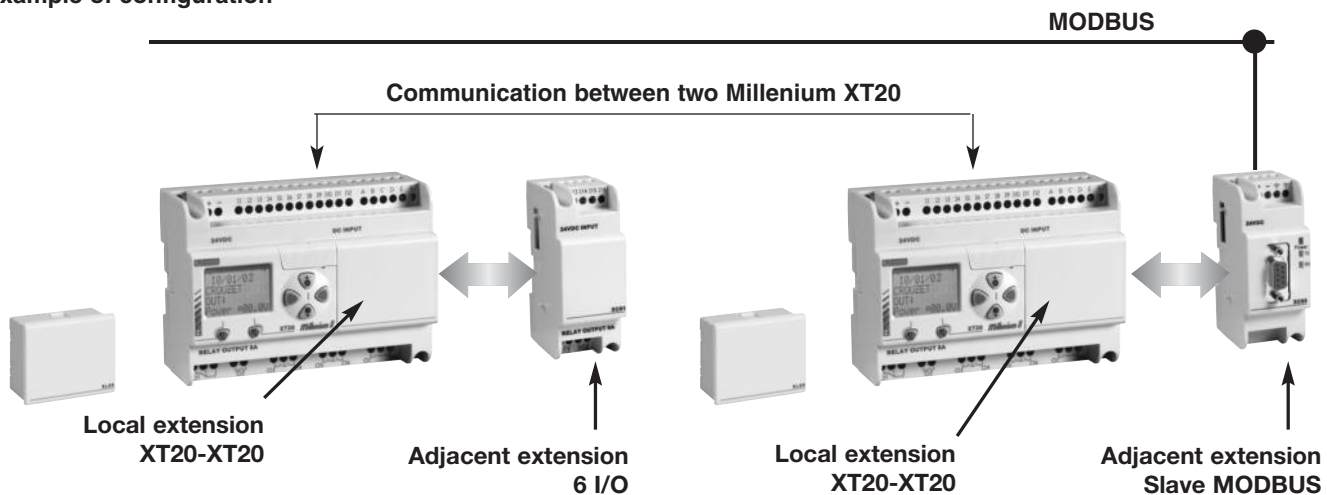
Expandable version

- Expandable: communication, inputs/outputs, etc
- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc
- Application-specific functions: load rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Backlit LCD display
- Program protected by a password
- Calendar program clock
- User-definable from the front panel
- Can take an XC adjacent extension and an XL local extension



Type	Input	Output	Power supply	Part Number
XT20	12	8 relay	24 VDC	88 950 061
	12	8 relay	100 - 240 VAC	88 950 063
	12	8 relay	24 VAC	88 950 064
	12	8 solid state/6 PWM	24 VDC	88 950 062
	12 NPN	8 relay	24 VDC	88 950 069
	12	8 relay	12 VDC	88 950 065
	12	8 solid state/6 PWM	12 VDC	88 950 066

Example of configuration



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Expandable Economy

- Performs the same as the XT 20 but without the Display or the Front Panel
- Ideal for use in applications where modifications of the parameters from the front panel is not a requirement



Type	Input	Output	Power supply	Part Number
EX20	12 PNP	8 relay	24 VDC	88 950 831
	12	8 relay	110 - 240 VAC	88 950 833
	12	8 relay	24 VAC	88 950 834
	12 PNP	8 solid state	24 VDC	88 950 832
	12 NPN	8 relay	24 VDC	88 950 839

Local extensions

- For EX & XT 20 only (1 local extension per module)
- Millenium – Millenium local link
- Doubles the hardware and software capacities
- Transparent communication between 2 EX & XT 20
- Max. distance between 2 EX & XT 20: 10 meters
- Cable type: screened twisted pair
- 4 Solid State Outputs on XL05



Type	Description	Part Number
XL01	M2 – M2 local link (2 modules)	88 950 200
XL05	4 solid state outputs	88 950 204
XL06	2 relays	88 950 810

Adjacent extensions

- For use with XT 20 Models (one adjacent extension per module)
- Communication using MODBUS or AS-i protocol (Slave module)
- 6 additional inputs/outputs on XC03



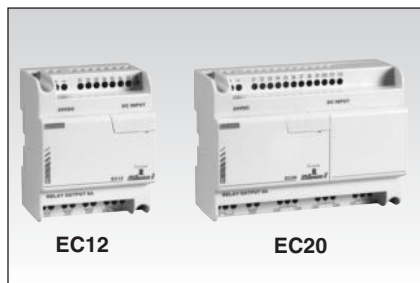
Type	Description	Part Number	
XC01	4 inputs 2 relay outputs	24 VDC	88 950 210
	4 inputs 2 relay outputs	24 VAC	88 950 211
	4 inputs 2 relay outputs	110 - 240 VAC	88 950 212
	4 inputs 2 relay outputs	12 VDC	88 950 215
	4 NPN inputs 2 relay outputs	12 VDC	88 950 219
XC02	AS-i exchange unit	24 VDC	88 950 213
XC03	MODBUS exchange unit	24 VDC	88 950 214
Modems	RTC		88 950 106
	GSM		88 950 107

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Economy versions

- No display or parameter-setting buttons
- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc
- Application-specific functions: load rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Program protected by a password
- Calendar program clock



Type	Input	Output	Power supply	Part Number
EC12	8	4 relay	24 VDC	88 950 021
	8	4 relay	100 - 240 VAC	88 950 023
	8	4 relay	24 VAC	88 950 024
	8	4 solid state/4 PWM	24 VDC	88 950 022
	8 NPN	4 relay	24 VDC	88 950 031
	8	4 relay	12 VDC	88 950 032
EC20	12	8 relay	24 VDC	88 950 031
	12	8 relay	100 - 240 VAC	88 950 033
	12	8 relay	24 VAC	88 950 034
	12	8 solid state/6 PWM	24 VDC	88 950 032
	12 NPN	8 relay	24 VDC	88 950 039
	12	8 relay	12 VDC	88 950 035
	12	8 solid state/6 PWM	12 VDC	88 950 036

Starter kit

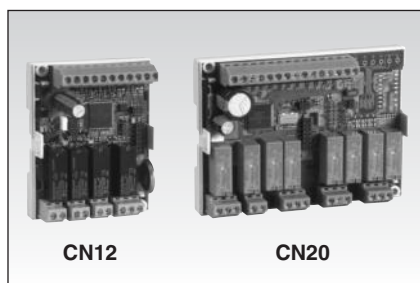
- Each kit includes:
 - a standard or expandable Millenium 2
 - a PC/Millenium 2 link interface
 - an interactive CD-Rom including the software workshop, tutorial, application library and technical brochures



Type	Input	Output	Power supply	Part Number
KIT SA 12	8	4 relay	24 VDC	88 950 070
	8	4 relay	100 - 240 VAC	88 950 071
KIT SA 20	12	8 relay	24 VDC	88 950 072
	12	8 relay	100 - 240 VAC	88 950 073
KIT XT 20	12	8 relay	24 VDC	88 950 074
	12	8 relay	100 - 240 VAC	88 950 075

Bare board versions

- For mass-production applications
- Intuitive programming via function block (FBD) or grafcet (SFC)
- Function: timing, counting, etc.
- Application-specific functions: load rotation, cam timers, calculation, etc.
- Discrete, analogue or potentiometer inputs
- Relay or solid state with PWM outputs
- Program protected by a password
- Calendar program clock



**Consult factory
for availability.**

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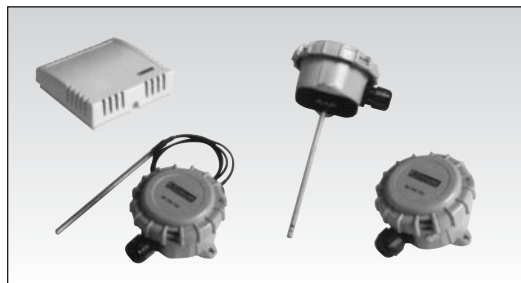
Temperature sensors

Technical Specifications

Supply voltage	24 VDC (±10%)
Output	0 → 10 VDC
Temperature coefficients	
Derating	0.01% / °C of full scale
Offset	1.5 mV / °C

Ambient temperature	-10 → +60°C
Ambient humidity	5 → 95% RH
Casing material	Self-extinguishing

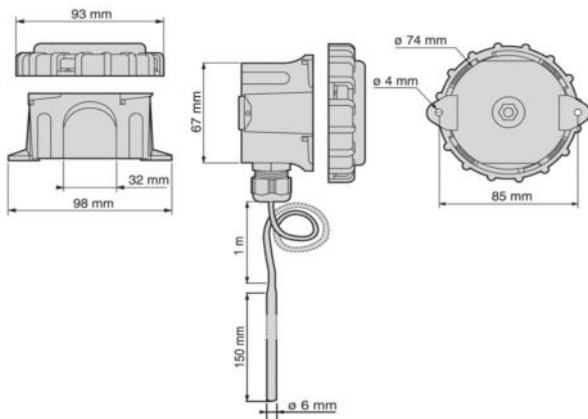
- Built-in converter: 0-10V DC output
- Applications: Industrial, Services



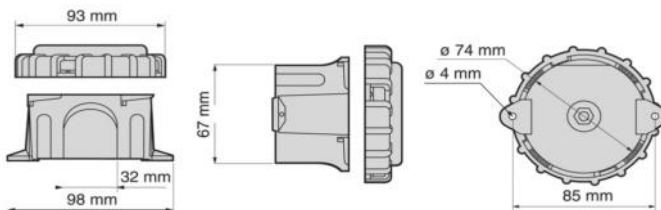
Types	Range	Accuracy	Protection	Part numbers
Zone	-10 → +40°C	-0.2°C + 1.2°C (-10 → +40°C)	IP 30 casing	89 750 150
Ventilation duct	-10 → +60°C	-0.2°C + 1.9°C (-10 → +60°C)	IP 65 casing	89 750 151
			IP 30 probe	
Outdoor	-10 → +40°C	-0.2°C + 1.2°C (-10 → +40°C)	IP 65 casing	89 750 152
Remote/submersible probe	-10 → +150°C	-0.2°C + 1.9°C (-10 → +150°C)	IP 65 casing	89 750 153
			IP 68 probe	
Remote	-40 → +20°C	-0.2°C + 1.9°C (-40 → +20°C)	IP 65 casing	89 750 155
			IP 68 probe	
Accessories				Code
Copper protective sleeve for 89 750 153				89 750 146
Stainless steel (316) protective sleeve for 89 750 153				89 750 147
Heat transfer compound				18 372 112

Connection/Dimensions

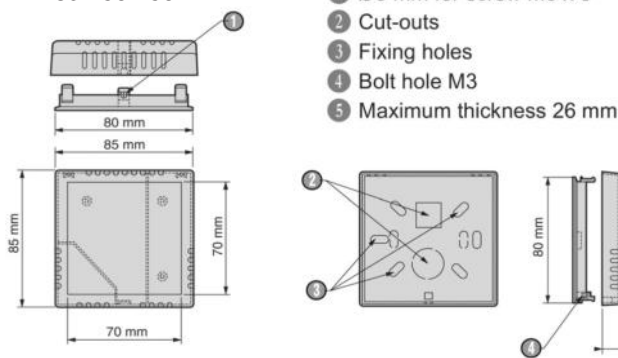
89 750 153



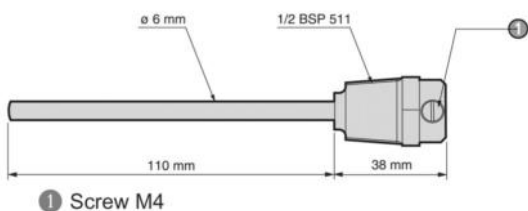
89 750 152



89 750 150



Accessory 89 750 146 and 89 750 147



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Specialty Kits

- Discover the possibilities of the Millenium II + with these complete kits for your individual applications. Each kit includes:
 - 1 SA12 Millenium II +
 - Liquid Level Detector (24 VAC)
 - Liquid Level Adaptor
 - Liquid Level Control Kit (24 VAC)
 - 1 CD software
 - 1 Millenium II + programming cable
 - Liquid Level Adaptor
 - 4 Liquid Level sensors S7



Liquid Level Detector



Liquid Level Control Kit

Type	Input	Output	Power supply	Part Number
SA12 Liquid Level Detector	8	4 relay	24 VAC	88 950 813
SA12 Liquid Level Control Kit	8	4 relay	24 VAC	88 950 076

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Power Supplies

- Potentiometer allows for the regulation of the output from 100 to 120% to compensate for fluctuation in the voltage lines.
- LED indicator for output status, automatic restart after fault is cleared
- Regulated and protected against short circuits and voltage spikes
- Fits easily into established panels and conforms with the MII line
- CE UL/cUL CSA TUV and C-Tick Certified

12VDC



24VDC

Specifications

Type	Input	Output	Consumed Power	Part Number
PS12	100 – 240 VAC	12 VDC adjustable from 100 – 120%	22W	88 950 300
PS24	100 – 240 VAC	24 VDC adjustable from 100 – 120%	30W	88 950 301
		Conforms to the standards	EN 50081-1, EN 50082-1, IEC 61000-8-2 & IEC 950	



Cabling

Cables

		Part Number
PC – Millenium cabling	PC – Millenium II cable DB9	88 950 102
	PC – Millenium II cable USB	88 950 105



Programming

Software

		Part Number
Software	MII Software on CD	88 950 100
	MII modem installation CD	88 950 113
Memory Module	EEPROM memory module	88 950 101



Converters

Converters

		Part Number
0-20mA → 0 – 10VDC converter	Input module converts 0 – 20mA to 0 – 10 VDC	88 950 108
PWM → 0 – 10VDC converter	Output module converts PWM to 0 – 10 VDC	88 950 112



Covers / Faceplates

Covers / Faceplates

		Part Number
Faceplates	Mounting faceplate for EC-12 / SA-12	89 750 103
	Mounting faceplate for EC-20 / SA-20 / XT-20 / EX-20	89 750 109
Water tight Covers	Water tight covers for SA12 / EC12	89 750 160
	Water tight covers for SA20 / XT20 / EC20 / EX20	89 750 161
	Water tight covers for SA20 / XT20 / EX20 / EC20 + 1 adjacent extension	89 750 162

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Technical characteristics

Insulation	7 M Ω
Safety class	0 industrial / II domestic casing
Earthing	None
Protection	IP20/Terminal block IP40 IP00 for CN12 and CN20
Certification	CE, UL, cUL
Compliance	EN 60947-1 EN 60730-1 EN 60601-1
Programming method	Function blocks/SFC
Program size	128 blocks
Program memory	Flash EEPROM

Removable memory	EEPROM
Data memory	256 bits/words backed up for 10 years
LCD display	Display with 4 lines of 12 characters
Real-time clock	Drift < 1 min/month at 25°C with user-definable correction of drift Data retention: 10 years (lithium battery)
Storage temperature	-40 → +70°C
Operating temperature	-5 → +55°C
Relative humidity (without condensation)	90 → 95%
Dimensions (w x h x d)	SA12-EC12: 72 x 90 x 60 mm SA20-XT-EC20: 125 x 90 x 60 mm CN12: 72 x 90 x 42 mm CN20: 125 x 90 x 42 mm

Electrical characteristics

100 - 240 VAC power supply

Operating voltage	100 VAC → 240 VAC (+10% – 15%) 50/60 Hz
Operating limits	85 VAC → 264 VAC
Immunity from micro power cuts	10 ms
Maximum inrush current	7 A
Maximum power consumption	SA12-EC12-CN12: 6 VA SA20-EC20-CN20: 6.5 VA XT20-EX20: 8 VA

24 VAC power supply

Operating voltage	24 VAC +20% – 15% 50/60 Hz
Operating limits	20.4 VAC → 28.8 VAC
Immunity from micro power cuts	10 ms
Maximum inrush current	7 A
Maximum power consumption	SA12-EC12-CN12: 6 VA SA20-EC20-CN20: 6.5 VA XT20-EX20: 8 VA

24 VDC power supply

Operating voltage	24 VDC +20% – 15%
Operating limits	20.4 VDC → 28.8 VDC
Immunity from micro power cuts	1 ms
Maximum inrush current	7 A
Maximum power consumption	SA12-EC12-CN12: 3.5 W SA20-EC20-CN20: 4 W XT20-EX20: 5 W

Analogue inputs (24 VDC model only)

CN12-SA12-EC12	4 inputs from I5 to I8
CN20-SA20-EC20-XT20	8 inputs from I5 to I12
Measuring range	(0 → 10 V) or (0 → Power supply V)
Resolution	8 bits
Conversion time	10 ms
Max. input voltage	28.8 VDC
Input impedance (k Ω)	> 10
Precision	+/- 5%
Temperature drift	+/- 3 LSB
Potentiometer control	2.2 K Ω /0.5 W

100 - 240 VAC input

Input voltage	100 - 240 (+10% / -15%) VAC
Operating frequency	50/60 Hz
Input impedance	700 k Ω
Pull-in voltage at logic state 1	≥ 80 VAC
Drop-out voltage at logic state 0	≤ 40 VAC
Status indicator	On LCD screen for SA12, SA20, XT20

24 VAC input

Input voltage	24 (+10% / -15%) VAC
Operating frequency	50/60 Hz
Input impedance	4 k Ω
Pull-in voltage at logic state 1	≥ 15 VAC
Drop-out voltage at logic state 0	≤ 5 VAC
Status indicator	On LCD screen for SA12, SA20, XT20

24 VDC input

Input voltage	24 (+20% – 15%) VDC
Input current	3.2 mA/5.5 mA max
Pull-in voltage at logic state 1	≥ 15 VDC
Drop-out voltage at logic state 0	≤ 5 VDC
Response time	10 ms
Sensor type	Contact – 3-wire PNP
Status indicator	On LCD screen for SA12, SA20, XT20

Relay outputs

Max. voltage breaking capacity	250 VAC
Max. current breaking capacity	8 A
Service life	8 A / 250 VAC resistive (100,000 operations)
Min. load	10 mA / 5 VDC
Response time	10 ms
Status indicator	On LCD screen for SA12, SA20, XT20

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12 VDC power supply

Operating voltages	12 VDC +30% – 15% (+30% – 11% for XT20 relais 88 950 065)
Operating Limits	10.2 VDC >15.6 VDC (10.68 VDC >15.6 VDC pour XT20 relais 88 950 065)
Immunity to micro cuts	1 ms
Maximum inrush current	6 A
Maximum power consumption	SA12-EC12-CN12:2.2 W SA20-EC20-CN20:4.5 W XT20-EX20:5.5 W

Discrete/PWM solid state outputs

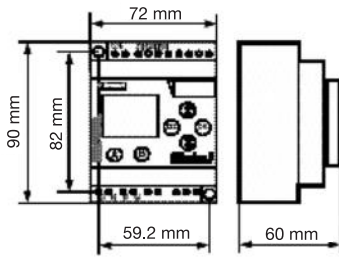
PWM solid state outputs	SA12-EC12-CN12: 01 to 04 SA20-XT20-EC20-CN20: 01 to 06
Voltage breaking capacity	5-28.8 VDC
Current breaking capacity	0.7 A / 5-28.8 VDC
Min. load	1 mA
Max. inductive load	0.7 A
Max. incandescent load	0.1 A
Off-state leakage	0.1 mA / 24 VDC

12 VDC input

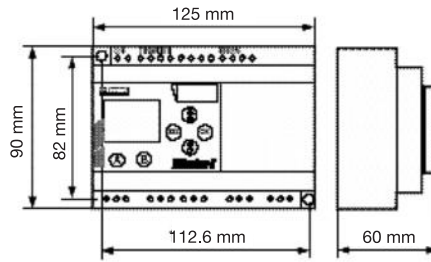
Input voltage	12(+30%–15%) VDC Except XT20R +30%–11%)
Input current	1.9 mA/2.3 mA max.
Pull in voltage at logic state 1	> 8 VDC
Drop out voltage at logic state 0	≤ 3 VDC
response	10 ms
Sensor type	Contact or PNP / NPN 3 wire
Status Indicator	On LCD display for SA12, SA20, & XT20

Response time	1ms
Isolated	no
PWM frequency	120 Hz to 1,920 Hz (user-definable)
PWM Cyclic ratio	0 to 100% (256 steps)
PWM precision at 120 Hz	< 5% (15% to 85%) load at 10 mA
PWM precision at 500 Hz	< 10% (20% to 80%) load at 10 mA
Status indicator	On LCD screen for SA12, SA20, XT20

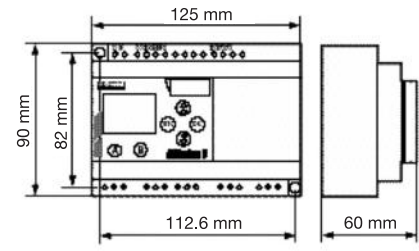
SA 12



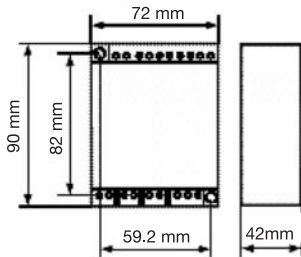
SA 20



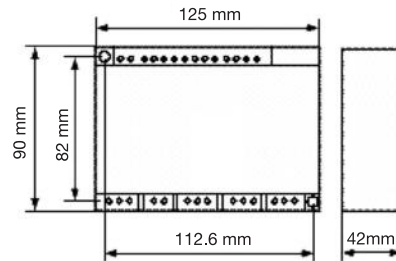
XT 20



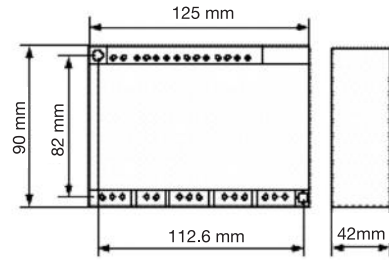
CN12



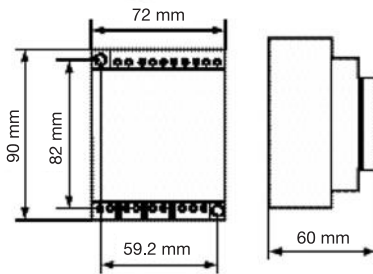
CN20



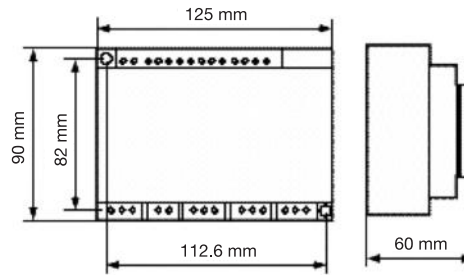
EX 20



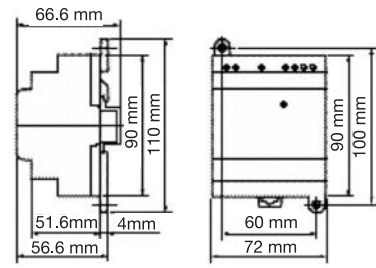
EC 12



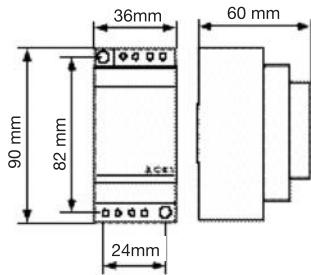
EC 20



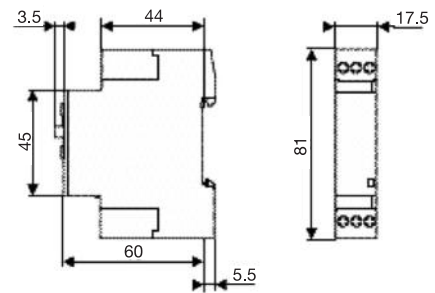
PS 12 / PS 24



Adjacent Extension

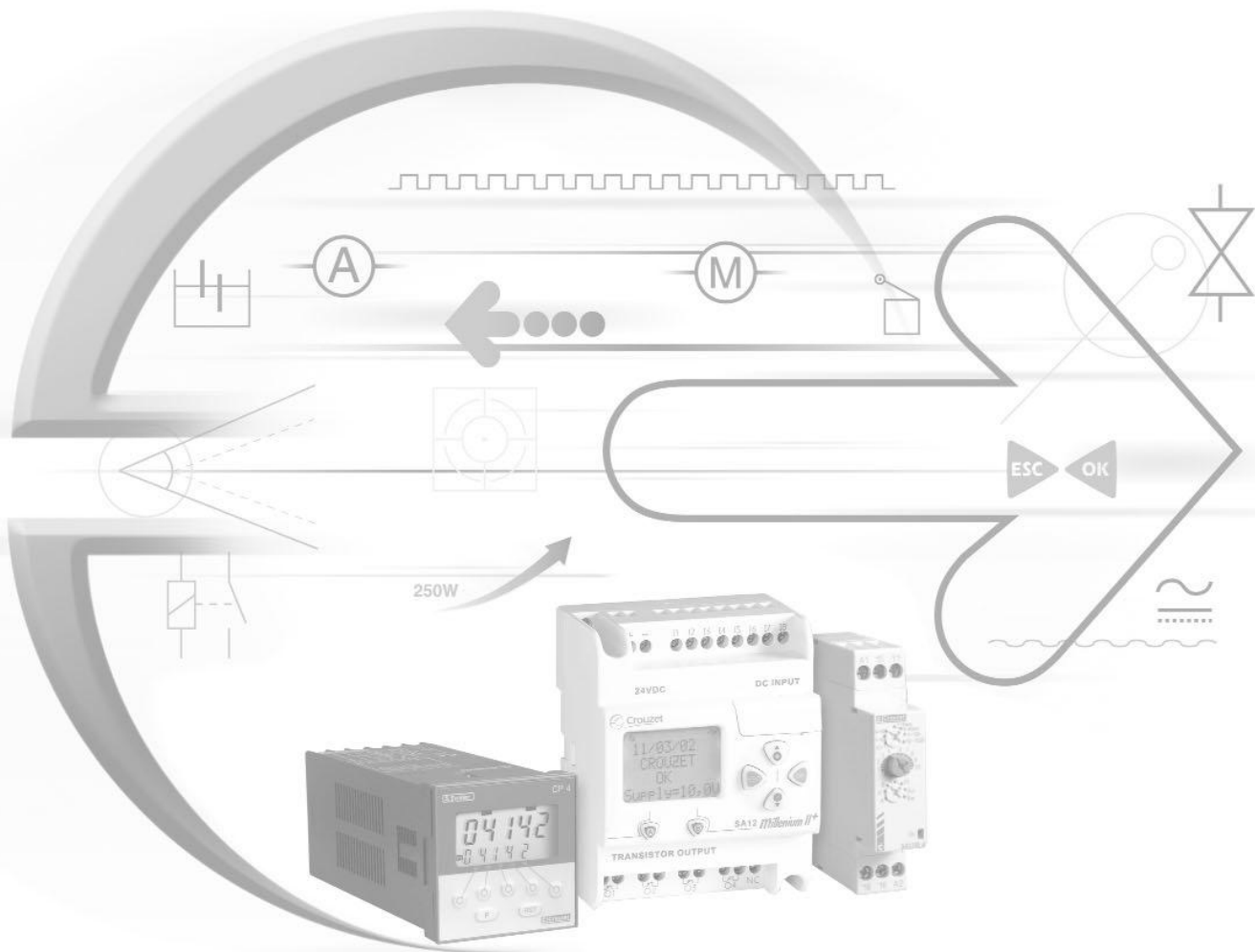


Liquid Level Control



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Timers

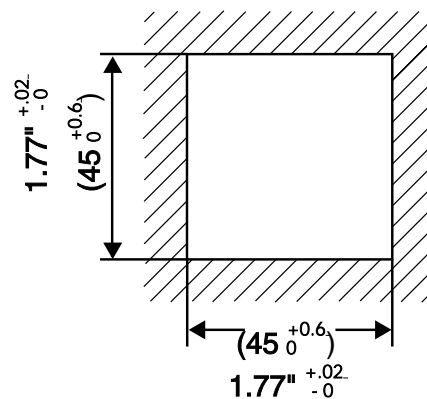
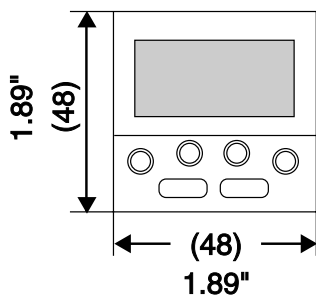
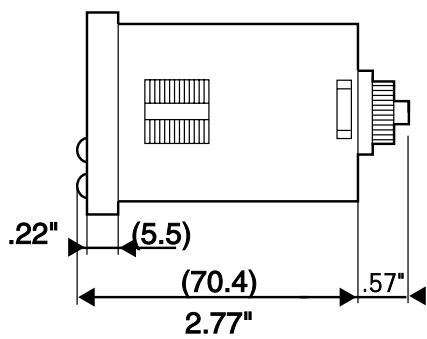


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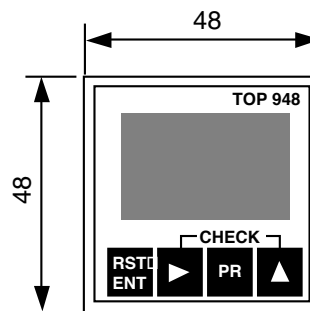
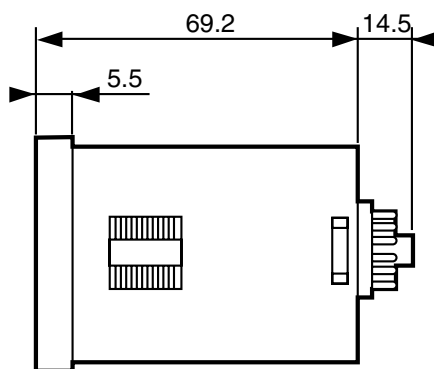
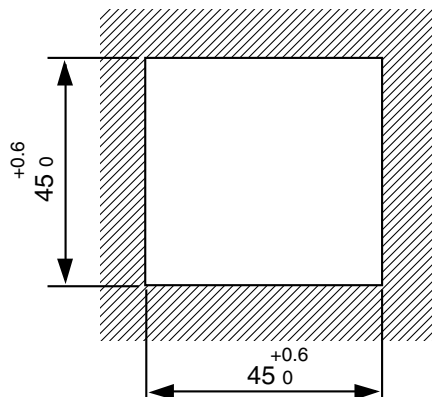
812, 814, 815, 816 Series

Panel cut-out



88857 Series

Cut-out



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816 SERIES MULTIFUNCTION TIMER

UL listed CSA recognized

- Red LCD Backlit Actual Timing Display
- High Contrast LCD Setpoint Display
- 6 Modes of Operation
- 11 Selectable Time Ranges



The 816 Series Timer is a multifunction timer with a red backlit LCD display showing actual process time and a high contrast LCD display showing setpoint time. The 816 Timer has eleven selectable time ranges (.01 sec to 9999 hours) and is housed in a 1/16 DIN (48 x 48mm) style enclosure. Easy programming from the front panel push buttons allows selection of up or down timing. 6 different timing functions (Delay on Make, Delay on Break, Interval, Single Shot, Repeat Cycle ON Time First and Repeat Cycle OFF Time First) and 11 different timing ranges. The LCD display also shows relay output, power input and initiate switch status. Slide switch on side of unit provide lock-out of front panel access to operating mode programming.

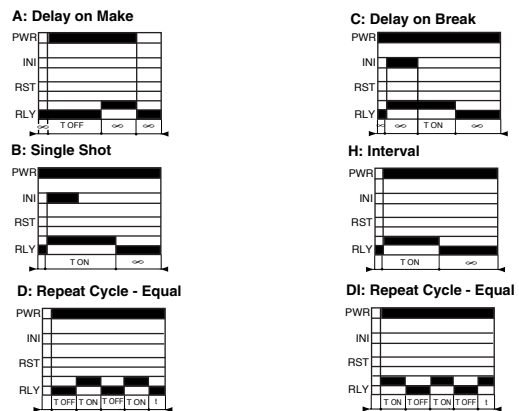
SPECIFICATIONS:

Input Power	220 VAC, 110 VAC, 24 VAC/DC, +10%, -15%
Input Power Consumption ..	1 VA at 24 VAC, 4 VA at 110 VAC, 12 VA at 230 VAC, .5 W at 24 VDC
Display	7 mm High, 4 Digit Backlit LCD
Initiate Switch Input	Dry Contact (50 ms min.)
Output	
Output	SPDT
Max Switching Current/Voltage	8 Amp 250 VAC
Max Power Rating	200 VA/190 W
Min Switch Current	100 mA
Electrical Life of Relay	10 ⁶ Operations at full load
Time Ranges	99.99 s 999.9 s 9999 s 99 min 59 s 99.99 min 999.9 min 9999 min 9h 59 min 99.99 hrs 999.9 hrs 9999 hrs
	Note: The 99.99 s time range is not available in the Repeat Cycle Mode
Front Panel Rating	NEMA 12
Repeat Accuracy	±0.03%, ±20 ms
Reset Time	50 ms during timing 50 ms after timing
Insulation Resistance	100 mΩ min @ 500 VAC to IEC 255.5
Dielectric Strength	2000 VAC @ 50 Hz for 1 min to VDE 0435
Noise Immunity/Interference ..	IEC 1000.4.4 Level IV (Direct 4 KV) IEC 1000.4.3 Level III (10 V/m)
Operating Temperature	+14°F to +140°F (-10°C to +60°C)
Weight	3.5 oz. (100g)
Panel Cutout	45 x 45mm (+0.6)

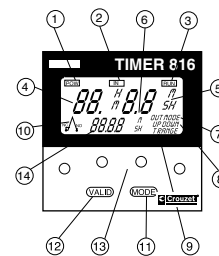
ORDERING INFORMATION:

	VOLTAGE		
	VOLTAGE		
VOLTAGE		PART NUMBER	PART NUMBER
		8 PIN	11 PIN
		8 PIN VERSION	11 PIN VERSION
110 VAC/24 VAC/DC		88 857 607	88 857 707
220 VAC/24 VAC/VDC		88 857 601	88 857 701

MODE OF OPERATIONS:

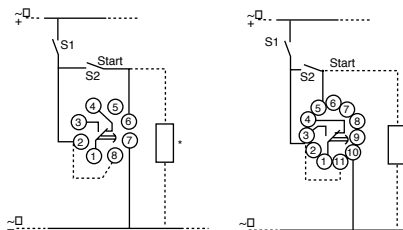


PROGRAMMING:



- 1: Power On Indicator
- 2: Initiate Switch Indicator
- 3: Timing Indicator
- 4: Timing Display
- 5: Timing Range Unit
- 6: Decimal Point
- 7: Mode of Operation
- 8: Up or Down Timing
- 9: Timing Range
- 10: Relay Output Status
- 11: Program Mode
- 12: Validation
- 13: Preset Keyboard
- 14: Preset Value Display

WIRING:



For 24 VAC/VDC service voltage for 8 pin versions jumper terminals 2 and 8. For 24 VAC/VDC service voltage for 11 pin versions jumper terminals 2 and 11.

*Load, such as light bulb or contractor, can be connected in parallel with the start switch
DIMENSIONS
See page 2/14

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

814 SERIES MULTIFUNCTION TIMER

UL listed CSA recognized

- **DIN-Sized (48 x 48mm) Housing**
- **6 Modes of Operation**
- **Large LCD Display**
- **Up or Down Timing**
- **SPDT 10 Amp Relay Output**
- **NEMA 12 Front Panel**

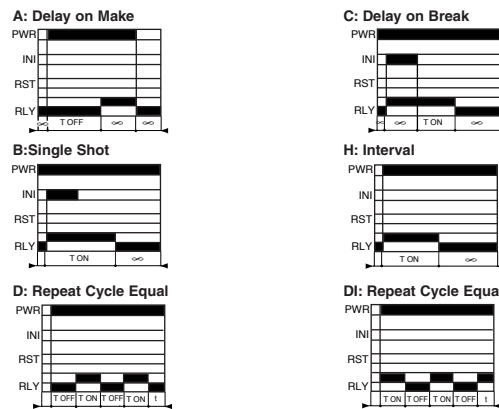


The 814 Series Timer is a multifunction timer with multi-time ranges (0.01 sec to 9999 hours) housed in a 1/16 DIN (48 x 48mm) style enclosure. Easy programming from the front panel push buttons allows selection of up or down timing, 6 different timing functions (Delay on Make, Delay on Break, Interval, Single Shot, Repeat Cycle ON Time First and Repeat OFF Time First) and 11 different timing ranges. A large 4-digit LCD display indicates current and preset values as well as relay output, power input, and initiate switch status. Load such, as light bulb or contactor can be connected to the start switch. Slide switch on side of unit provides lockout of front panel access to operating mode programming.

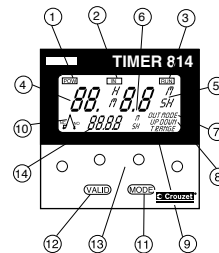
SPECIFICATIONS:

Input Power	220 VAC, 115 VAC, 48 VAC/DC, 24 VAC/DC 12 VDC, 50/60 Hz, ±15%
Input Power Consumption	11 VA at 220 VAC 0.5 W at 24 VDC 4 VA at 110 VAC 0.5 W at 12 VDC 1 VA at 24 VAC
Display	Timing Display .3" (7.5mm) High 4 Digit LCD Preset Display .18" (4.5mm) High 4 Digit LCD
Initiate Switch Input	Dry Contact (50 ms min.)
Output	
Output	SPDT Relay
Max. Switching Current/Voltage	8 pin Version: 10 Amp 250 VAC 11 pin Version: 8 Amp 250 VAC
Max. Power Rating	2000 VA/50 W
Min. Switch Current	100 mA
Electrical Life of Relay	2 x 10 ⁵ Operations
Time Ranges	99.99 s, 999.9 s 9999 s, 99 min, 59 s 99.99 min 999.9 min 9999 min 99h 59 min 99.99 hrs 999.9 hrs 9999 h
	Note: The 99.99 s time range is not available in the Repeat Cycle Mode
Front Panel Rating	NEMA 12
Repeat Accuracy	±0.03%
Reset Time	50 ms during timing 50 ms after timing
Insulation Resistance	100 MΩ min @ 500 VAC to IEC 255.5
Dielectric Strength	2000 VAC @ 50 Hz for 1 min to VDE 0435
Operating Temperature	+14°F to +140°F (-10°C to +60°C)
Weight	3.5 oz. (100g)
Panel Cutout	45 x 45mm (+0.6)

MODE OF OPERATIONS:

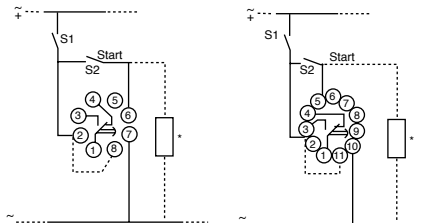


PROGRAMMING:



- 1: Power On Indicator
- 2: Initiate Switch Indicator
- 3: Timing Indicator
- 4: Timing Display
- 5: Timing Range Unit
- 6: Decimal Point
- 7: Mode of Operation
- 8: Up or Down Timing
- 9: Timing Range
- 10: Relay Output Status
- 11: Program Mode
- 12: Validation
- 13: Preset Keyboard
- 14: Preset Value Display

WIRING:



For 24 VAC/VDC service voltage for 8 pin versions jumper terminals 2 and 8. For 24 VAC/VDC service voltage for 11 pin versions jumper terminals 2 and 11.

*Load, such as light bulb or contractor, can be connected in parallel with the start switch

ORDERING INFORMATION:

	VOLTAGE VOLTAGE	PART NUMBER	PART NUMBER	DIMENSIONS See page 2/14
		8 PIN	11 PIN	
VOLTAGE		8 PIN VERSION	11 PIN VERSION	
220/110 VAC/24 VAC/DC		88 857 005	88 857 105	
48/24 VAC/DC/12 VDC		88 857 003	88 857 103	

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

812 SERIES DELAY ON MAKE TIMER

UL listed CSA recognized



- **DIN-Sized (48 x 48mm) Housing**
- **Dual LCD Display Shows Setpoint and Actual**
- **Up or Down Timing**
- **DPDT Output Relay**
- **Popular Octal Socket Relay**

The 812 Timer is a Delay on Make digital timer with a DPDT output relay in the industry standard octal socket plug-in base. The series has a large, easy to read LCD display that shows actual and preset time values as well as relay output relay output status. Easy programming from front panel allows selection of eleven time ranges from .01 sec. to 9999 hours.

SPECIFICATIONS:

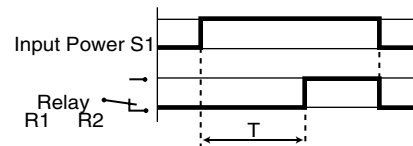
Input Power	110 VAC, 220 VAC, 24 VAC/DC, +10%, -15% 50/60 Hz
Input Power Consumption	0.5 W at 24 V 3.5 VA at 110 V 11 VA at 230 V
Display	Timing Display .3" (7.5mm) High 4 Digit LCD Preset Display .18" (4.5mm) High 4 Digit LCD
Output	DPDT
Output Rating	5 Amp/250 VAC resistive load
Maximum Power Rating	1200 VA/120 W
Min. Switch Current	100 mA
Mechanical Life of Relay	5 x 10 ⁶
Electrical Life of Relay	10 ⁵ at max. rated load and at 10 cycles per minute max.
Time Ranges	99.99 s 999.9 s 9999 s 99 min 59 s 99.99 min 999.9 min 9999 min 99 h 59 min 99.99 hrs 999.9 hrs 9999 hrs
Front Panel Rating	NEMA 12
Repeat Accuracy	±0.03%, ±20 ms
Reset Time	50 ms
Insulation Resistance	100 MΩ min @ 500 VAC to IEC 255.5
Dielectric Strength	2000 VAC @ 50 Hz for 1 min to VDE 0435
Operating Temperature	+14°F to +140°F (-10°C to 60°C)
Storage Temperature	-22°F to 150°F (-30°C to 70°C)
Weight	140 grams
Dimensions	48 x 48 x 85mm
Panel Cutout	45 x 45mm (+0.6)

ORDERING INFORMATION:

<u>Voltage</u>	<u>Part Number</u>
24 VAC/DC	88 857 409
110 VAC	88 857 406
220 VAC	88 857 400

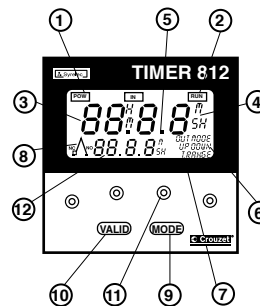
MODES OF OPERATION:

Delay on Make



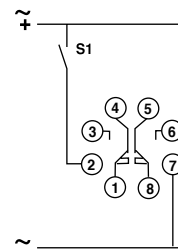
When input power (S1) is applied, the timer delay begins. DPDT relay energizes after the timing period. Interruption of input power resets timer. Timer is supplied with relay status indicator on LCD display.

PROGRAMMING:



- 1: Power On Indicator
- 2: Timing Indicator
- 3: Timing Display
- 4: Timing Range Unit
- 5: Decimal Point
- 6: Up or Down Timing
- 7: Timing Range
- 8: Relay Output Status
- 9: Program Mode
- 10: Validation
- 11: Preset Keyboard
- 12: Preset Value Display

WIRING:



DIMENSIONS See page 2/14

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

815 SERIES DELAY ON MAKE TIMER WITH MEMORY

UL listed CSA recognized

- Retains Cycle Progress During Power Interruptions
- DIN-Sized (48 x 48mm) Housing
- 2 Delayed SPDT or 1 Delayed SPDT and 1 instantaneous SPDT
- Up or Down Timing



The 815 Timer is a Delay on Make digital timer with memory and can be programmed to retain cycle progress during power interruption. Output relays can be programmed either as 2 SPDT delayed outputs or 1 SPDT instantaneous output and 1 SPDT delayed output. The 815 Series has a large, easy to read LCD display that shows actual and preset time values as well as relay output status. Easy programming from front panel allows selection of eleven time ranges from .01 sec. to 9999 hrs. Termination is for 11 pin round socket.

SPECIFICATIONS:

Input Power	110 VAC, 220 VAC, 12 VAC/DC 24 VAC/DC; +10%, -15%
	50/60 Hz
Input Power Consumption	1 W at 24 V 3.5 VA at 110 V 11 VA at 230 V
Display	Timing Display .3" (7.5mm) High 4 Digit LCD Preset Display .18" (4.5mm) High 4 Digit LCD
DIMENSIONS: (mm)	
Output	
Output	2-SPDT
Output Rating	8 Amp/250 VAC resistive load
Max. Power Rating	2000 VA / 190 W
Min. Switch Current	100 mA
Mechanical Life of Relay	5 x 10 ⁶
Electrical Life of Relay	10 ⁶ at max. rated load and at 10 cycles per minute max.
Time Ranges	99.99 s 999.9 s 9999 s 99 min 59 s 99.99 min 999.9 min 9999 min 99h 59 min 99.99 hrs 999.9 hrs 9999 hrs
Front Panel Rating	NEMA 12
Repeat Accuracy	±0.03%, ±20 ms
Reset Time	50 ms
Insulation Resistance	100 MΩ min @ 500 VAC to IEC 255.5
Dielectric Strength	2000 VAC @ 50 Hz for 1 min to VDE 0435
Operating Temperature	+14°F to 140°F (-10°C to +60°C)
Storage Temperature	-22°F to 150°F (-30°C to 70°C)
Weight	140 grams
Dimensions	48 x 48 x 85mm
Panel Cutout	45 x 45m (+0.6)

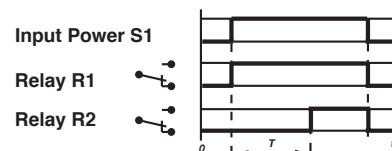
ORDERING INFORMATION:

Voltage	Part Number
12 VAC/DC & 48 VAC/DC	88 857 302
24 VAC/DC & 110 VAC	88 857 307
24 VAC/DC & 220 VAC	88 857 301

MODES OF OPERATION:

Function A1 - Delay On Make

1 SPDT Instantaneous Output (R1), 1 SPDT Delayed Output (R2)



Function A2 Delay On Make

2 SPDT Output Relays Programmed for Delayed Output



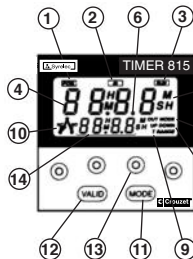
Function AM-Delay On Make-Memory During Timing Period

Timer retains cycle progress during power outage and resumes timing when power returns. Timer resets when in timed out state when power outage occurs.

Function AMt-Delay On Make-Memory During and After Timing Period

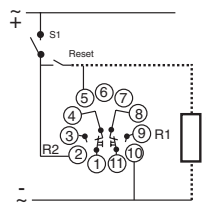
Timer retains cycle progress during power outage and resumes timing when power returns. If power interruption occurs after time out, the timer will return to the timed out state when power returns.

PROGRAMMING:



- 1: Power On Indicator
- 2: Initiate Switch Indicator
- 3: Timing Indicator
- 4: Timing Display
- 5: Timing Range Unit
- 6: Decimal Point
- 7: Mode of Operation
- 8: Up or Down Timing
- 9: Timing Range
- 10: Relay Output Status
- 11: Program Mode
- 12: Validation
- 13: Preset Keyboard
- 14: Preset Value Display

WIRING:



For 12 VAC/DC service voltage (Part Number 88-857-302) and for 24 VAC/DC service voltage (Part Numbers 88-857-307 & 88-857-301) jumper terminals 2 and 7.

1) Load, such as light bulb or contactor can be connected in parallel with the start switch.

DIMENSIONS See page 2/14

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

TOP 948

LCD MULTI-FUNCTION TIMER

UL listed CSA recognized

- 8 Timing Functions
- Multi-timing Range
- DIN-Sized (48 x 48mm) Housing
- Large LCD Display
- NEMA 4 Front Panel
- 10 year EEPROM Memory



GENERAL FEATURES:

The 88 857 Series is a programmable timer with multi-time ranges (0.01s to 999.9 hrs) housed in 1/16 DIN (48 x 48mm) style enclosure. The 8 available functions — On Delay, Interval, Single Shot, Repeat Cycle... the large 4 Digit display and the NEMA 4 front panel will fit most industrial applications. The large LCD permits easy programming and monitoring of status such as time remaining, preset value, output relay, time range, function, etc.

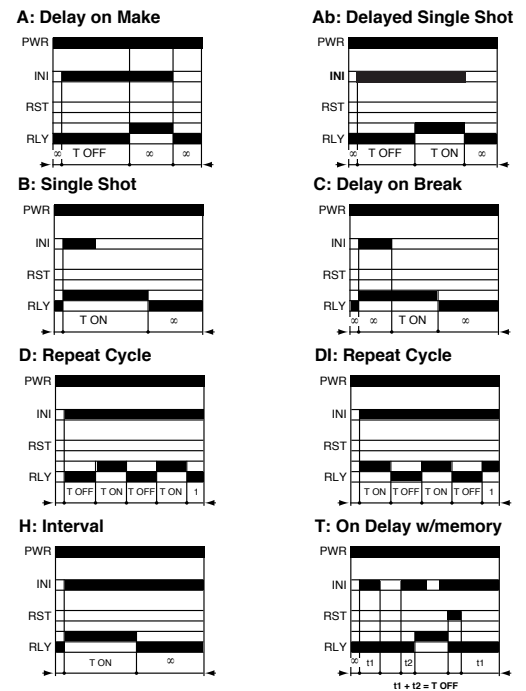
SPECIFICATIONS:

Input Power	220 VAC, 110 VAC, 24/48 VAC, 50/60 Hz $\pm 15\%$ 24/12 VDC $\pm 10\%$
Input Power Consumption	8 VA at 115 VAC, 0.5 W at 12 VDC
Display	4 Digit .3" (8mm) High LCD
Memory	10 years (EEPROM)
Repeat Accuracy	$\pm 0.05\%$
Protection Rating	NEMA 4 (IP 65)
Dielectric Strength	3000V (IEC 255-5)
Initiate Switch Input	
Initiate Switch Input	Dry Contact, PNP Open Collector, Voltage
Minimum Initiate Closure Time	50 ms
Output	
Output	SPDT Relay
Maximum Switching Current	8 Amp AC Resistive, 8 Amp DC Resistive
Maximum Switching Voltage	250 VAC, 250 VDC
Maximum Power Rating	1250 VA, 30 W
Mechanical Life of Relay	2 x 10 ⁷ Operations
Electrical Life of Relay	1 x 10 ⁵ Operations
Time Ranges	99.99 sec, 999.9 sec, 99.99 min, 999.9 min, 999.9 hrs, 99 min, 59 sec, 99 hrs, 99 min
Weight	1.77 oz.
Operating Temperature	14°F to 122°F
Storage Temperature	13°F to 158°F

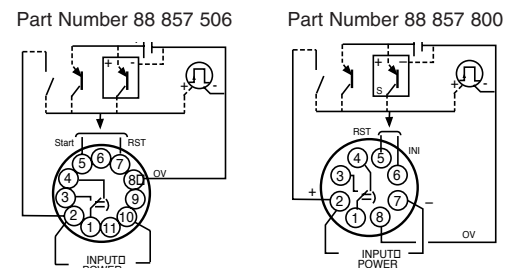
ORDERING INFORMATION:

Voltage	Part Number	Part Number
↓	8-PIN VERSION	11-PIN VERSION
VOLTAGE	8-PIN VERSION	11-PIN VERSION
12/24 VDC		88 857 502
24/48 VAC		88 857 504
110 VAC	88 857 800	88 857 506
110/220 VAC		88 857 508

FUNCTIONS:



WIRING DIAGRAM:



DIMENSIONS See page 2/14

Products and specifications subject to change without notice.

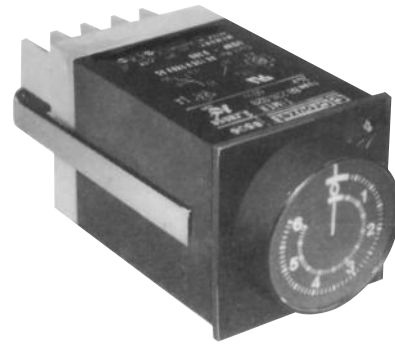
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

88220 SERIES

MULTIFUNCTION MOTOR

TIMER WITH MEMORY

UL listed CSA recognized



- **Five Functions in One Unit**
- **Timing Range from 0.3 sec to 12 hours**
- **DIN-Rail, Plug-in, or Panel Mounting**

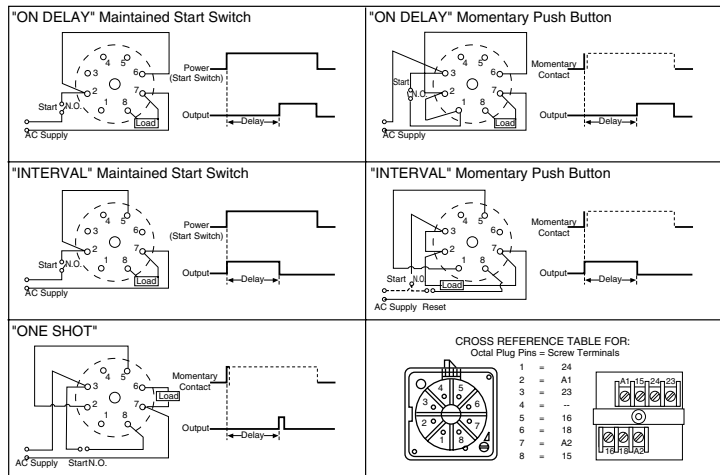
DESCRIPTION:

The 88220 Series is a synchronous motor driven reset timer. The timer is available in 2 standard time ranges from 0.3 sec to 12 hours. Time ranges are knob adjustable and all have a progress pointer which displays the remaining time. Different functions (ON Delay, Interval, One Shot) selectable through external wiring.

SPECIFICATIONS:

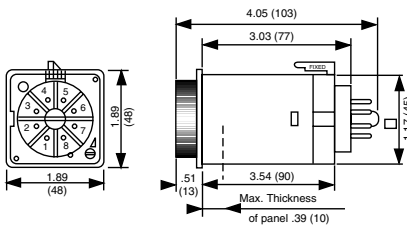
Input Power	24 VAC, 110 VAC, 220 VAC
	±10%, 60 Hz
Maximum power consumption	3 VA
Output	1 x SPST Relay & 1 x SPDT Relay
Contact material	AgCdO
Maximum loading	8 Amp 1/3 HP
Maximum switching voltage	220 VAC
Mechanical life of relay	2.5 million operations
Repeat accuracy	±1.5% (except 4% on 6 sec range)
Setting Accuracy	±2% (except 5% on 6 sec range)
Reset time	200 ms
Storage temp. rating	-20° to +70°C (-4° to 158°F)
Operating temp. rating	-20° to +55°C (-4° to 131°F)

FUNCTION AND WIRING DIAGRAMS:
(Octal plug-in mounting shown)

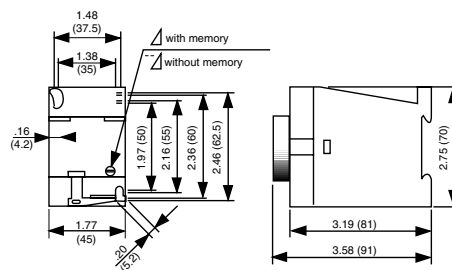


DIMENSIONS: inches (mm)

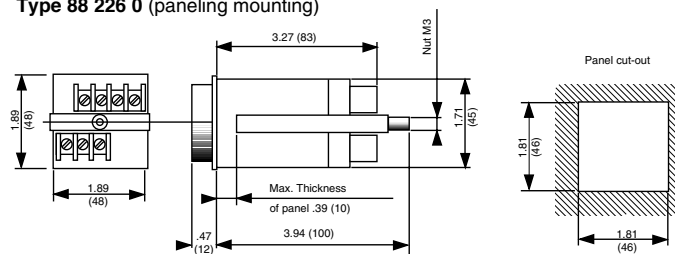
Type 88 226 5 (octal plug-in)



Type 88 225 0 (DIN - rail mounting)



Type 88 226 0 (paneling mounting)



Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

GENERAL FEATURES:

MULTI-FUNCTION

on-delay, interval and single shot in on timer

MULTI-RANGE

2 model/3 time ranges each cover from 0.3 sec to 12 hours

TRANSIENT IMMUNITY
Built-in

CYCLE PROGRESS

dial shows time remaining in cycle

±2% SETTING ACCURACY

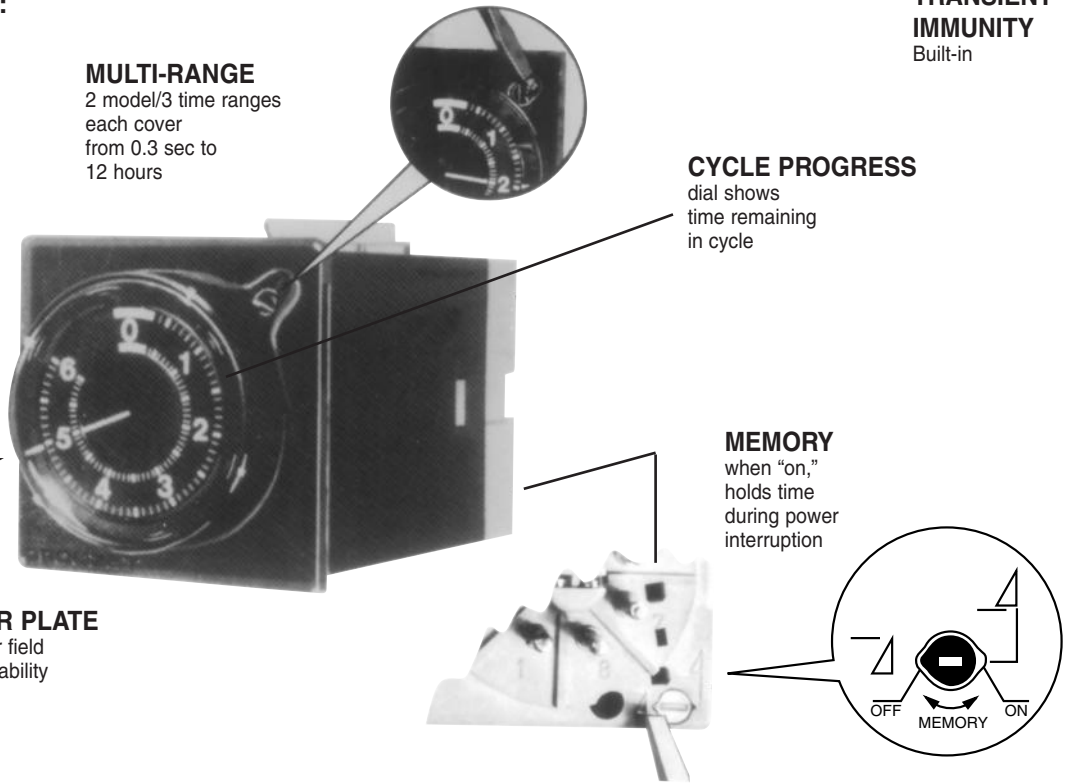
±1.5% REPEAT ACCURACY

ADAPTER PLATE

available for field interchangeability (not shown)

MEMORY

when "on," holds time during power interruption



TIME RANGES

Model 1 (12 min.): .3 to 6 s, .5 to 12 min.
Model 2 (12 hrs.): .3 to 6 min., 3 to 60 min, .5 to 12 hrs.

ORDERING INFORMATION:

When ordering, select model, voltage/frequency and mounting to determine part number in chart below

EXAMPLE

MODEL 1 (12 MIN.), 115V/60Hz, OCTAL PLUG-IN, 88 226 510

MODEL	VOLTAGE/FREQ.*	MODELING		
		OCTAL PLUG-IN (PART NUMBER)	PANEL MOUNTING (PART NUMBER)	BASE MOUNTING (PART NUMBER)
MODEL 1 (12 MIN.)	24 V/60 Hz	88 226 509	88 226 029	88 225 029
MODEL 1 (12 MIN.)	115 V/60 Hz	88 226 510	88 226 030	88 225 030
MODEL 1 (12 MIN.)	220 V/60 Hz	88 226 511	88 226 031	88 225 031
MODEL 1 (12 MIN.)	220 V/50 Hz	88 226 504	88 226 011	88 225 011
MODEL 2 (12 HRS.)	24 V/60 Hz	88 226 512	88 226 032	88 225 032
MODEL 2 (12 HRS.)	115 V/60 Hz	88 226 513	88 226 033	88 225 033
MODEL 2 (12 HRS.)	220 V/60 Hz	88 226 514	88 226 034	88 225 034
MODEL 2 (12 HRS.)	220 V/50 Hz	88 226 508	88 226 014	88 225 014

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com



TMR 48 Analog Timers



- **Multi-function or monofunction**
- **Multi-timing ranges from 0.02 Sec to 300 Hrs**
- **Multi voltage from 12-240 Vdc / 24-240 Vac**
- **Time setting displayed on dial**
- **2 output relays 5A / 250 Vac**
- **2 LED indicators 1 for power and 1 for relay status**

Type	Functions	Output	Supply Voltage	Part Number
TMR 48 U	A, B, C, W, Ac, Bw	2 SPDT relays, 11 pin plug in 5A / 250 Vac	12 - 250 Vdc 24 - 240 Vac	88 886 016
TMR 48 A	A	2 SPDT relays, 8 pin plug in 5A / 250 Vac	12 - 250 Vdc 24 - 240 Vac	88 886 106
TMR 48 X	A1, A2, H1, H2, Q1, Q2, D-Di	2 SPDT relays, 8 pin plug in 5A / 250 Vac 2 timed or 1 timed & 1 instantaneous	12 - 250 Vdc 24 - 240 Vac	88 886 116
TMR 48 L	L, Li, G, Gi	2 SPDT relays, 11 pin plug in 5A / 250 Vac	12 - 250 Vdc 24 - 240 Vac	88 886 516

General Specifications

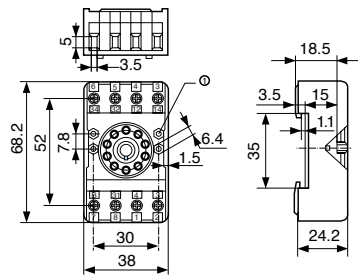
Supply Voltage Un	12 - 250 Vdc 24 - 240 Vac
Operating Range	+/- 10% DC Supply -15% / +10% AC Supply
Frequency	50 / 60 Hz
Power Consumption	4.8 VA / 230 Vac 2.5 VA / 110 Vac 1.1 VA / 24 Vac 0.5 W / 24 Vdc 0.8 W / 12 Vdc
14 Timing Ranges Available	0.02 - 1.2 s 0.2 - 12 m 0.2 - 12 H 0.05 - 3 s 0.5 - 3 m 0.3 - 5 H 0.2 - 1.2 s 2 - 12 m 2 - 12 H 0.5 - 30 s 5 - 300 m 5 - 300 H 2 - 120 s 5 - 300 s
Repetition Accuracy	+/- 0.5% of full scale at 25°C (typical with constant parameters)
Temperature drift according to IEC / EN 61812	+/- 0.05% of full scale
Display Accuracy	+/-5% of full scale at 25°C
Minimum required START pulse duration	25ms
Minimum required GATE pulse duration	60ms
Minimum required RESET pulse duration	60ms
Minimum required START pulse duration	50ms
Output Specifications	
Nominal Rating	2 x 5A
Nominal insulation voltage	250Vac
Rated power (resistive load)	2000VA
Minimum Current	10mA
Electrical life at max / Vac resistive (# of operations)	10 ⁶
Mechanical Life	30 x 10 ⁶
Function & Use	
Display of output state by 2 LED's	Green : Power ON, Flashing during timing Yellow : On output ON, OFF output OFF
Operating Temperature range	-20 to +55°C
Storage Temperature range	-40 to +70°C
Breakdown Voltage	2 KV
Protection Class (IEC 60529) - Panel Mounted	IP 50
Protection Class (IEC 60529) - Casing	IP40
Housing Material	Self extinguishing
Weight (g)	140

Products and specifications subject to change without notice.

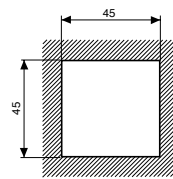
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Dimensions

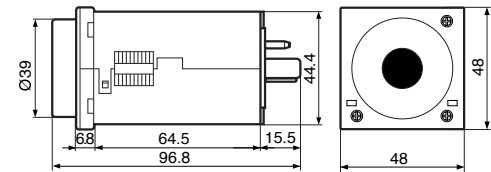
35 mm DIN rail base with clips 79 237 739



Panel cut-out

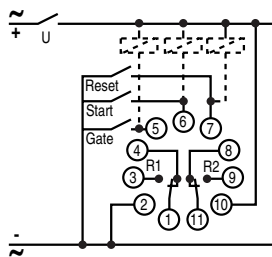


TMR 48 U / A / X / L

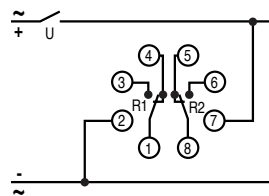


Connections

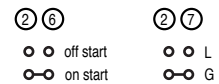
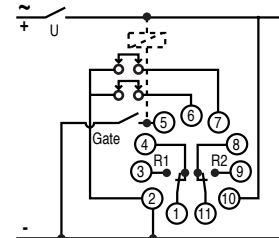
TMR 48 U



TMR 48 A/X



TMR 48 L



TMR 48 Covers

Decorative Covers

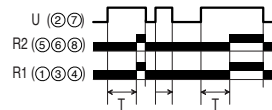
Color	Part Numbers
Black	79 237 783
Grey	79 237 784

Other colors available by special order.

Time Function Curves

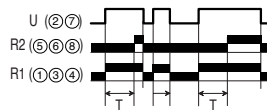
Function A (TMR 48 A)

Delay on make (delay on energisation)



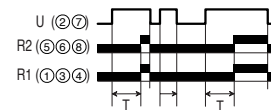
Function A1

Delay on make (delay on energisation)



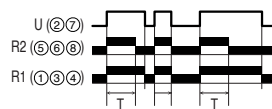
Function A2

Delay on make (delay on energisation)



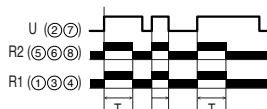
Function H1

Timing on energisation – interval



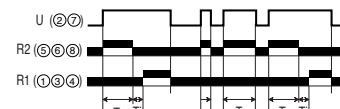
Function H2

Timing on energisation – interval



Function Q1

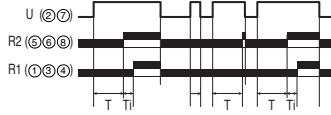
Star-delta



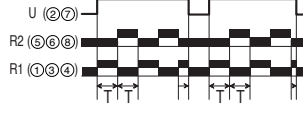
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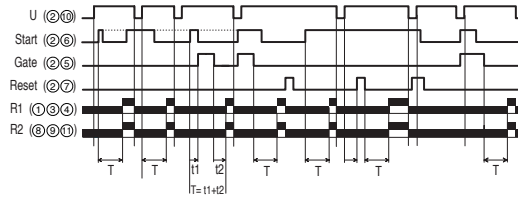
Function Q2
Star-delta 2



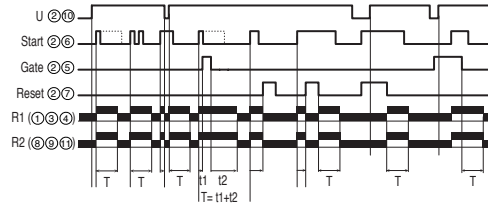
Function D-Di
Cyclic timing : repeat cycle : symetric recycler



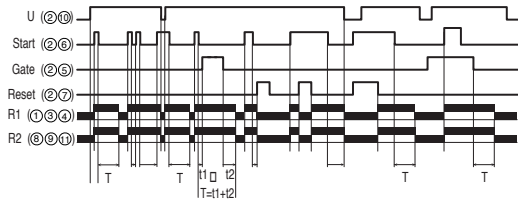
Function A (TMR 48U)
Delay on make (delay on energisation)



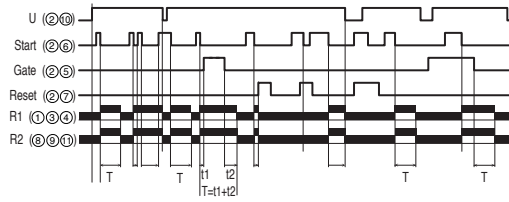
Function B
Timing on impulse : single shot



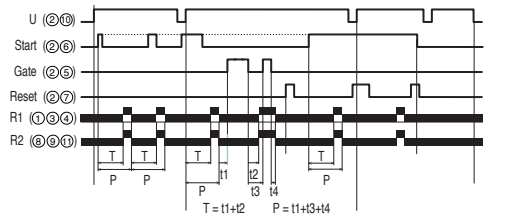
Function C
Timing after impulse - Delay on break - Delay off w/constant supply



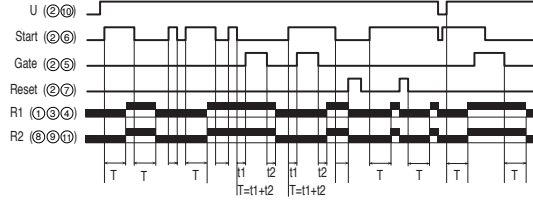
Function W
Timing after impulse on control contact



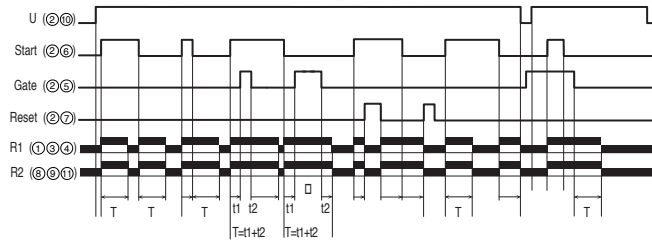
Function G
Cyclic function



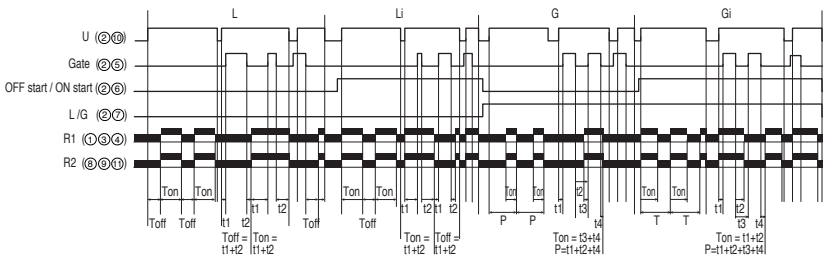
Function Ac
Timing after closing and opening of control contact



Function Bw
Pulse output (adjustable)



Function L/Li - G/Gi
Cyclic timing : asymetrical recycler



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TOP 36 SERIES DELAY ON MAKE TIMER

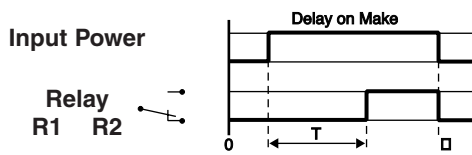
UL listed CSA recognized

- **DIN-Sized (36 x 36mm) Housing**
- **Low Cost**
- **Solid State Technology**
- **5 Amp DPDT Relay**
- **LED Power On Indicator**

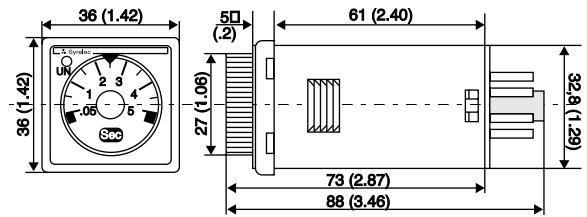


Function: A2

DIMENSIONS:



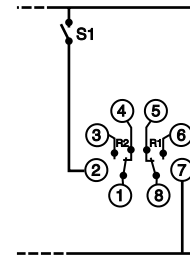
When input power (S1) is applied, the relay delays the preset time (T) period prior to energizing. Interrupt power to unlatch the relay.



SPECIFICATIONS:

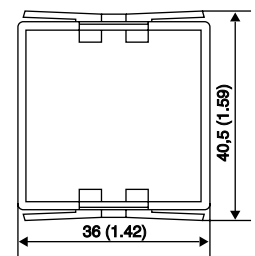
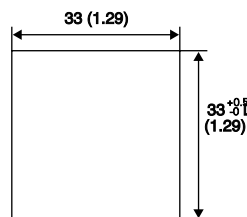
Input Power	24 VAC/DC, 110 VAC	
	220 VAC ±15% 50/60 Hz	
Max. Power Consumption	24 VDC: 0.6 W	110 VAC: 3.5 VA
	24 VAC: 1 VA	220 VAC: 7 VA
Output	DPDT Relay	
Contact Material	AgCdO	
Max. Loading	5 Amp AC resistive	5 Amp DC resistive
Min. Loading	100 mA AC resistive	
Max. Switching Voltage	240 VAC	250 VDC
Max. Power Rating	1200 VA	150 W
Mechanical Life of Relay	20 million operations	
Electrical Life of Relay	100,000 operations at 1200 VA	
Repetition Accuracy	±1% at constant temperature	
Setting Error	±10%	
Reset Time	50 ms after Timing	
	100 ms during Timing	
Operating Temperature	+14°F to +140°F (-10°C to +60°C)	
Humidity	35 to 85%	
Dielectric Strength	2000 VAC 50 Hz for 1 min.	
Weight	1.9 oz. (60g)	

WIRING DIAGRAM:



CUT OUT: inches (mm)

MOUNTING CLIP:



ORDERING INFORMATION: (10 pcs. minimum)

Part Number			Time Range
24 VAC/VDC Version	110 VAC Version	220 VAC Version	
88 888 111	88 888 115	88 888 117	.05 to 5 sec
88 888 131	88 888 135	88 888 137	.6 to 60 sec
88 888 151	88 888 155	88 888 157	3 to 300 sec
88 888 171	88 888 175	88 888 177	.3 to 30 min

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

88 901 SERIES

DELAY ON MAKE TIMER

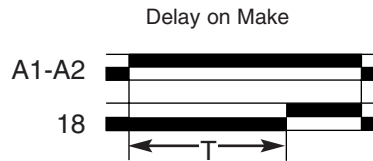


- 22mm Panel Mount Timer
- 2 Wire AC or 3 Wire DC
- PLC Compatible
- NEMA 4 Rating

DESCRIPTION:

The 88 901 Series is a front panel mount analog timer with a NEMA 4 front panel. The unit is available in a 2 wire AC (110/220 V) or 3 Wire DC (24 V PNP Transistor) Configuration. The unit can drive a contactor or be connected, for the 3 wire DC version, between the input and the output of a PLC for remote setting of a time variable. The delay on make timer is available in 10 different time ranges from 1 sec. to 30 min. The device is protected against reverse polarity and short-circuit.

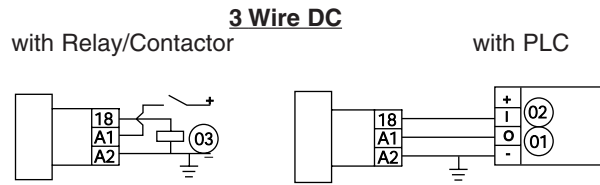
FUNCTION:



SPECIFICATIONS:

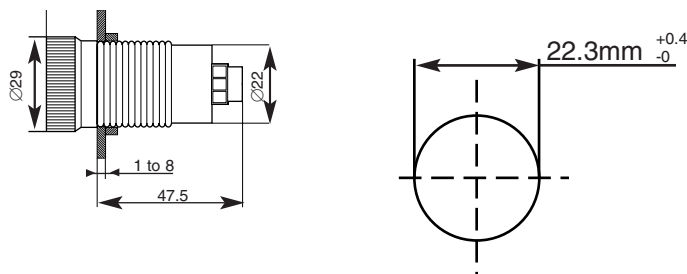
	3 Wire	2 Wire
Input Power	24 VDC	90 to 260 VAC
Output	PNP Open Collector	SCR
Max. Current at 20°C	200 mA	400 mA
Off State Voltage Drop	< 3 VDC	< 4 VAC
Derating	1.5 mA/°C	2.5 mA/°C
Off State Leakage Current	< 1 mA	< 4 mA
Max. Reset Time: during timing	20 ms	120 ms
after timing	20 ms	15 ms
Display Accuracy	±5%	±5%
Repeat Accuracy	±0.2%	±0.2%
Dielectric Strength	1500 V/1 min.	1500 V/1 min.
Power Consumption	1 W	1.5 VA
Connections	Screw Terminals	
Temperature Range	-4°F to 140°F	
Weight	8 oz.	

WIRING:



01 - Output of programmable controller
 02 - Input of programmable controller
 03 - Load

DIMENSIONS: (mm)



ORDERING INFORMATION: (10 pcs. minimum)

Part Number	
24 VDC Version	110/220 VAC Version
88 901 302	88 901 308
88 901 322	88 901 328
88 901 342	88 901 348
88 901 372	88 901 378
88 901 392	88 901 398

Time Range

- .05 to 1 sec
- .5 to 10 sec
- 3 to 60 sec
- .5 to 10 min
- 3 m to 60 min

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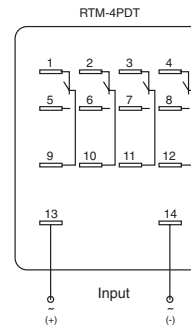
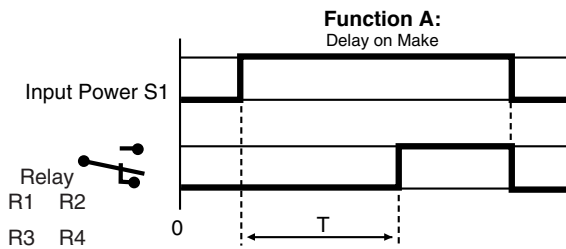
RTM SERIES DELAY ON MAKE TIMER

UL listed CSA recognized

- Subminiature 21 x 27mm Enclosure
- Multi timing Range (0.55 to 100 hrs)
- Low Cost
- 2PDT or 4PDT Relay Output
- LED Power On Indicator
- LED Relay Indicator



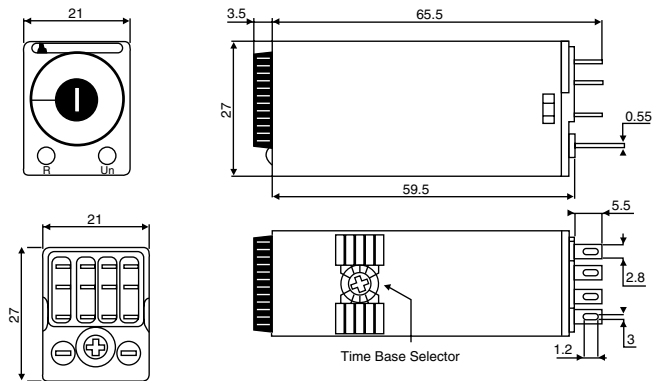
WIRING DIAGRAM:



SPECIFICATIONS:

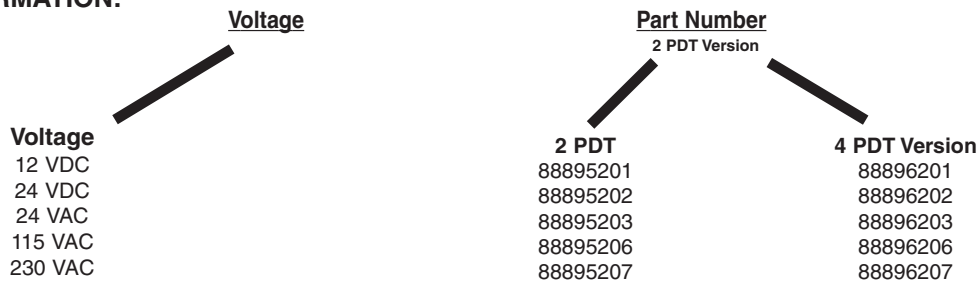
Input Power	230 VAC, 115 VAC, ±15%, 50/60Hz
Power consumption	3 VA at 230 VAC 3 VA at 115 VAC
Output Rating	
Maximum load	5 Amp
Maximum switching voltage	100 m Amp
Maximum power rating	240 VAC
Electrical life at 240 VAC	2 x 10 ⁵ operations
Mechanical life	10 ⁷ operations
Setting error	±20%
Repeat accuracy	±0.5%
Reset time	50 msec. after timing 100 msec. during timing
Dielectric strength	2KV VAC between coil and contact 1000 VAC between contacts
Noise Immunity	Consult Factory
Operating temperature	-20°C to +60°C
Weight	50 grams
Note:	When Time Base Selector is on "Inst.," the output relays will turn on instantaneously

DIMENSIONS: (mm)



See "Accessories" section for PC Board and DIN-Rail sockets

ORDERING INFORMATION:



Products and specifications subject to change without notice.

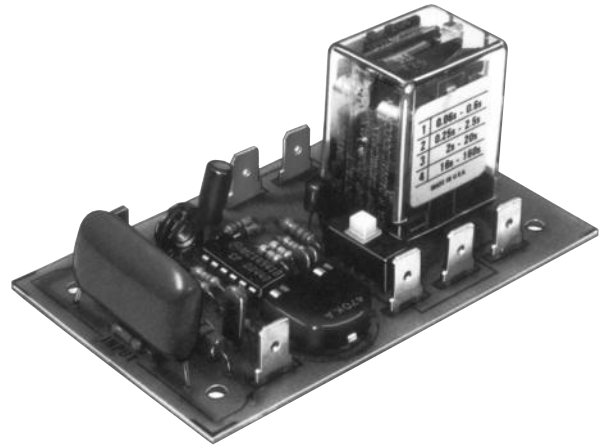
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

NAR2 SERIES

OPEN BOARD TIMER

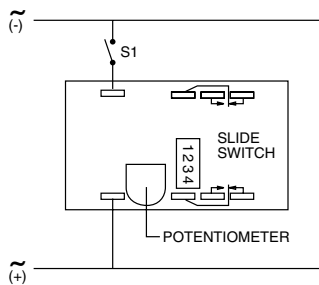
UL listed

Consult factory for custom open-board timers.

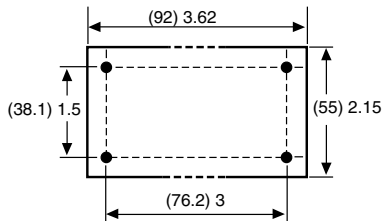


2

WIRING DIAGRAM:



DIMENSIONS: inches (mm)



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Chronos 2 electronic timers - 17.5 mm

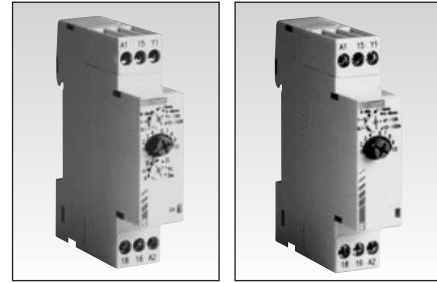
- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- SPDT relay output: 10A - 250V
- Screw or spring terminals
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option

Technical specifications

Timing	
Repetition accuracy (with constant parameters)	± 0.5 % (CEI 1812-1)
Drift	
- Temperature	± 0.05 % / °C
- Voltage	± 0.2 % / V
Display precision according to IEC 1812-1	±10 % / 25 °C
Minimum pulse duration	
- Typically (relay version)	30 ms
- Typically (solid state version)	50 ms
- Typically under load (relay version)	100 ms
Maximum reset time by de-energisation	
- Typically (relay version)	100 ms
- Typically (solid state version)	350 ms
Immunity to breaks in supply voltage: typically	>10 ms
Power supply	
Multi-voltage power supply	depending on version, see pages 6/2, 6/3
Frequency	50/60 Hz
Operating range	85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
Load factor	100 %
Maximum power consumption	0.6 W 24V AC/DC 1.5 W 230V AC 32 VA 230V AC
Output elements relay output	
1 or 2 changeover relays, AgNi (cadmium-free)	2000 VA / 80 W
Rated power	2000 V A / 80W
Maximum breaking current	10 A AC 10 A DC
Minimum breaking current	10 mA / 5 VDC
Voltage breaking capacity	250V AC/VDC
Electrical life	10 ⁵ operations 8 A 250V resistive
Mechanical life	5 x 10 ⁶ operations
Breakdown voltage acc. to IEC 1812-1	2.5 kV / 1min / 1 mA /50Hz
Impulse voltage acc. to IEC 664-1 IEC 1812-1	5 kV, wave 1.2 / 50 µs
Display	
State displayed by 1 LED	
- Flashing green when on	
Green LED operation indicator	
▬▬▬▬ Pulsing:	
- timer on, no timing in progress (except functions Di-D and Li-L)	
▬▬▬▬ Flashing:	
- timing in progress	
▬▬▬▬ Permanently lit:	
- Relay waiting, no timing in progress	
Input type	
- Volt-free contact	
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply	0.4 V

Other information

For special features, functions etc. please contact us.



Timing	0.1s • 100h	0.1s • 100h
Types		
Screw terminals	MUR1	MAR1
Spring terminals	—	—
Part numbers and voltage		
24V ~ / 24 • 240V ~	88 826 105	88 826 115
12 V ~ / ~	—	—
12 • 240 V ~ / ~	—	—
Functions		
	Multi-function	Bifunction
	A - At - B - C - H - Ht -	A - At
	Di - D - Ac - Bw	
Nominal current		
	10 A SPDT	10 A SPDT

Timing ranges (7 ranges)

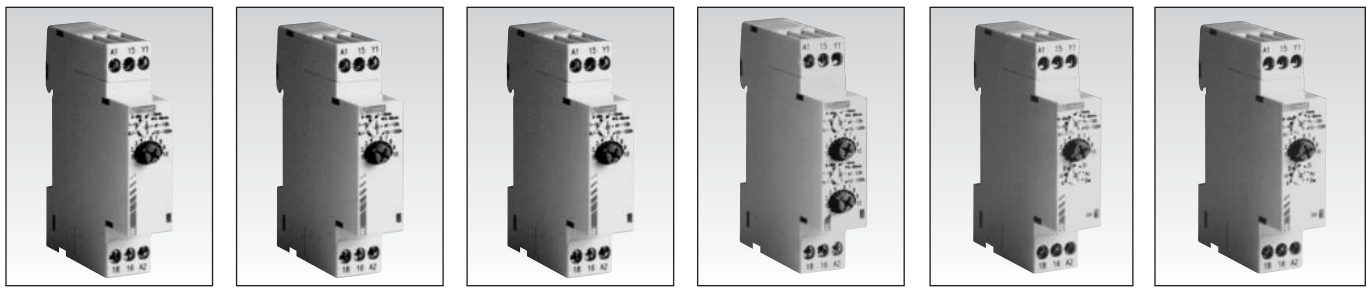
1s - 10 s - 1 min - 10 min - 1 h - 10 h - 100 h

General specifications

Conforming to standards IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)	
Approvals cUL listed UL listed CSA recognized	
Temperatures limits	
- use	-20 °C + 60 °C
- stored	-30 °C + 60 °C
Installation category (acc. to IEC 664-1)	Voltage surge category
Creepage distance and clearance acc. to IEC 664-1	4 kV / 3
Degree of protection acc. to IEC 529	
- terminal block	IP 20
- casing	IP 40
- front face (except Tk2R1)	IP 50
Vibration resistance acc. to IEC 68-2-6	f = 10 • 55 Hz A = 0.35 mm
Relative humidity acc. to IEC 68-2-3 without condensation	93 %
Electromagnetic compatibility	Level III
- Immunity to electrostatic discharges acc. to IEC 1000-4-2	(Air 8 kV / Contact 6 kV)
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)	Level III 10V/m: 80 MHz to 1 GHz)
- Immunity to rapid transient bursts acc. to IEC 1000-4-4	Level III (direct 2kV/ Capacitive coupling clamp 1 kV)
- Immunity to shock waves on power supply acc. to IEC 1000-4-5	Level III (common mode 2 kV / residual current mode 1kV)
- Immunity to radiofrequency in common mode acc. to ENV	Level III (10V rms: 0.15 MHz to 80 MHz)
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11	30 % / 10 ms 60 % / 100 ms > 95 % / 5 s
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)	Class B
Fixing: Symmetrical DIN rail (EN 50022)	35 mm
Connection capacity	
- without ferrule	2 x 2.5 mm ²
- with ferrule	2 x 1.5 mm ²
Spring terminals, 2 terminals per connection point	
- flexible wire	1.5 mm ²
- rigid wire	2.5 mm ²
Casing material	Self-extinguishing
Weight: 17.5 mm casing	60 g

Products and specifications subject to change without notice.

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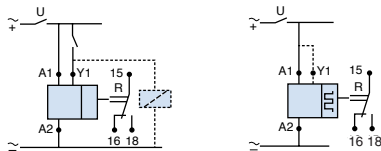


0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h
MBR1	MCR1	MHR1	MLR1	MUR4	MUR3
					MURc3
88 826 125	88 826 135	88 826 145	88 826 155	—	—
—	—	—	—	88 826 100	—
—	—	—	—	—	88 826 103 88 826 503
Mono-function	Mono-function	Bifunction	Bifunction	Multi-function	Multi-function
B	C	H - Ht	Li - L	A - At - B - C - H - Ht - Di - D - Ac - Bw	A - At - B - C - H - Ht - Di - D - Ac - Bw
10 A SPDT	10 A SPDT	10 A SPDT	10 A SPDT	10 A SPDT	10 A SPDT

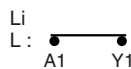
Function diagrams

<p>Function A Delay on Make 1 relay</p>	<p>Function H Interval 1 relay</p>	<p>Function Li Repeat Cycle On Time First</p>	<p>Function C Delay on Break 1 relay</p>
<p>Function At Accumulative Delay on Make 1 relay</p>	<p>Function Ht Accumulative Interval 1 relay</p>	<p>Function D Repeat Cycle. Equal On/Off Time. Off Time First Pause start</p>	<p>Function Bw Pulse output (adjustable) 1 relay</p>
<p>Function B Single Shot 1 relay</p>	<p>Function L Repeat Cycle Offtime First</p>	<p>Function Di Repeat Cycle Equal On/Off Time. On Time First</p>	<p>Function Ac Combo Delay on Make/Delay on Break. Equal On/Off Time 1 relay</p>

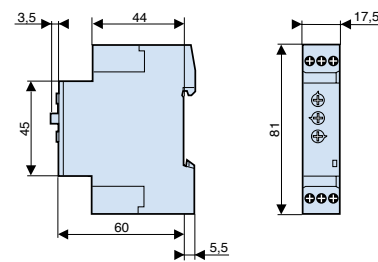
Connections (Y1 = C, Function diagrams)



Functions:
A - At / H - Ht / B / C
Di - D / Ac / Bw



Dimensions



To order, specify:

1 Type **2** Part number
Example: Chronos 2 Timers MUR1 88 826 105

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Chronos 2 electronic timers - 17.5 mm

Solid state output

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- Solid state output: 0.7 A - 250 V (0.5 A UL)
- Screw or spring terminals
- 1 LED status indicator

Technical specifications

Timing	
Repetition accuracy (with constant parameters)	± 0.5 % (CEI 1812-1)
Drift	
- Temperature	± 0.05 % / °C
- Voltage	± 0.2 % / V
Display precision according to IEC 1812-1	±10 % / 25 °C
Minimum pulse duration	
- Typically (relay version)	30 ms
- Typically (solid state version)	50 ms
- Typically under load (relay version)	100 ms
Maximum reset time by de-energisation	
- Typically (relay version)	100 ms
- Typically (solid state version)	350 ms
Immunity to breaks in supply voltage: typically	>10 ms
Power supply	
Multi-voltage power supply	depending on version, see page 6/5
Frequency	50/60 Hz
Operating range	85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
Load factor	100 %
Maximum power consumption	0.6 W 24V AC/DC 1.5 W 230V AC 32 VA 230V AC
Output elements: Solid state output	
Rated power	0.7 A AC/DC 20 °C (0,5A UL)
Derating	5 mA / °C
Maximum admissible current	20 A ≤ 10 ms
Minimum breaking current	10 mA
Off-state leakage	< 5 mA
Voltage breaking capacity	250V AC/VDC
Maximum voltage drop at terminals	3 fils 4V - 2 fils 8V
Electrical life	10 ⁸ operations
Mechanical life	10 ⁸ operations
Breakdown voltage acc. to IEC 664, IEC 255-5	2.5 kV to 1 mA / 1 min.
Display	
State displayed by 1 LED	
- Flashing green when on	
Green LED operation indicator	
<ul style="list-style-type: none"> ▬▬▬▬ Pulsing: - timer on, no timing in progress (except functions Di-D and Li-L) ▬▬▬▬ Flashing: - timing in progress ▬▬▬▬ Permanently lit: - Relay waiting, no timing in progress 	
Input type	
- Volt-free contact	
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply	0.4 V

Other information

For special features, functions etc. please contact us.

Timing

Types

Part numbers and voltage

24 • 240 V ~ 50 • 60 Hz
24 • 240 V ~ ∴ 50 • 60 Hz

Functions

Nominal current

Timing ranges (7 ranges)

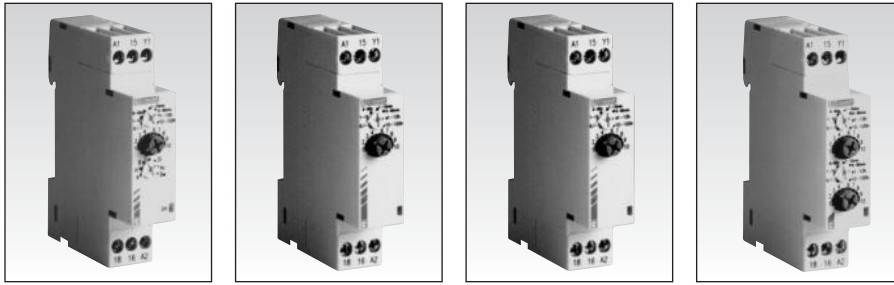
1s - 10 s - 1 min - 10 min - 1 h - 10 h - 100 h

General specifications

Conforming to standards IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)	
Approvals UL cUL listed CSA recognized	
Temperatures limits	
- use	-20 °C + 60 °C
- stored	-30 °C + 60 °C
Installation category (acc. to IEC 664-1)	Voltage surge category
Creepage distance and clearance acc. to IEC 664-1	4 kV / 3
Degree of protection acc. to IEC 529	
- terminal block	IP 20
- casing	IP 40
- front face (except Tk2R1)	IP 50
Vibration resistance acc. to IEC 68-2-6	f = 10 • 55 Hz A = 0.35 mm
Relative humidity acc. to IEC 68-2-3 without condensation	
93 %	
Electromagnetic compatibility	
- Immunity to electrostatic discharges acc. to IEC 1000-4-2	
Level III (Air 8 K / Contact 6 KV)	
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)	
Level III 10V/m: 80 MHz to 1 GHz)	
- Immunity to rapid transient bursts acc. to IEC 1000-4-4	
Level III (direct 2kV/ Capacitive coupling clamp 1 KV)	
- Immunity to shock waves on power supply acc. to IEC 1000-4-5	
Level III (common mode 2 KV / residual current mode 1KV)	
- Immunity to radiofrequency in common mode acc. to ENV	
Level III (10V rms: 0.15 MHz to 80 MHz)	
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11	
30 % / 10 ms 60 % / 100 ms > 95 % / 5 s	
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)	
Class B	
Fixing: Symmetrical DIN rail (EN 50022)	
35 mm	
Connection capacity	
- without ferrule	2 x 2.5 mm ²
- with ferrule	2 x 1.5 mm ²
Spring terminals, 2 terminals per connection point	
- flexible wire	1.5 mm ²
- rigid wire	2.5 mm ²
Casing material	Self-extinguishing
Weight: 17.5 mm casing	60 g

Products and specifications subject to change without notice.

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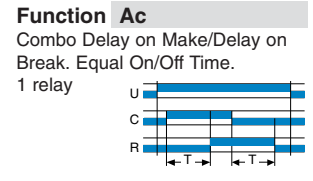
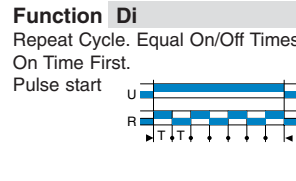
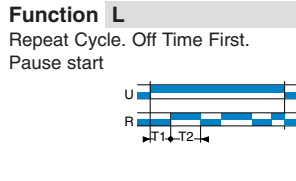
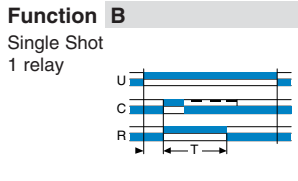
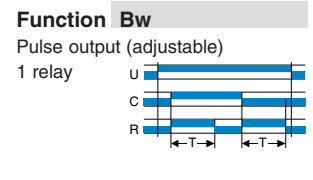
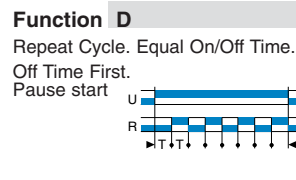
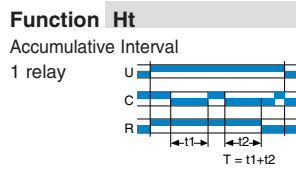
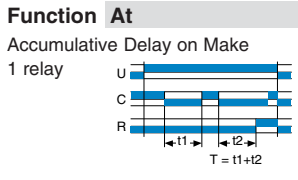
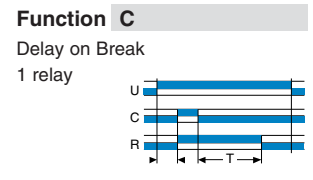
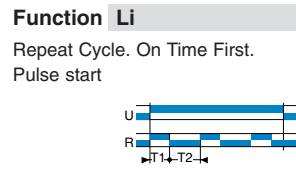
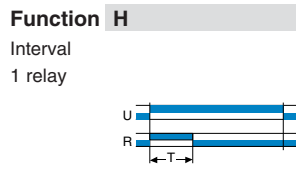
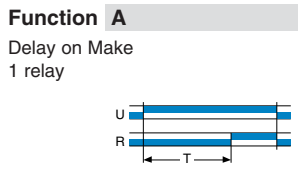


0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h
MUS2	MAS5	MHS2	MLS2

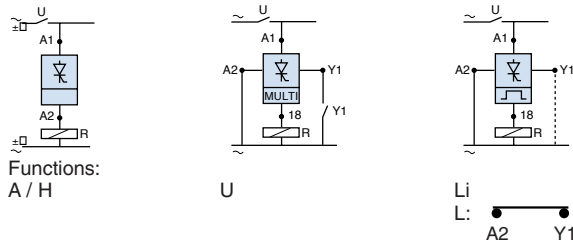
1
2

88 826 004	—	88 826 044	88 826 054
—	88 826 014	—	—
Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Mono-function A	Mono-function H	Bifunction Li - L
0.7 A, 0.5 A (UL)	0.7 A, 0.5 A (UL)	0.7 A, 0.5 A (UL)	0.7 A, 0.5 A (UL)

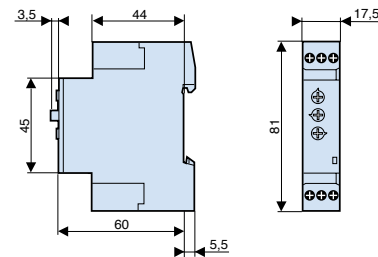
Function diagrams



Connections (Y1 = C, Function diagrams)



Dimensions



To order, specify:

1 Type **2** Part number
Example: Chronos 2 Timers MUS2 88 826 004

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Chronos 2 electronic timers - 22.5 mm

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- SPDT relay output: 10 A - 250 V
- Screw or spring terminals
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option

Technical specifications

Timing	
Repetition accuracy (with constant parameters)	± 0.5 % (CEI 1812-1)
Drift	
- Temperature	± 0.05 % / °C
- Voltage	± 0.2 % / V
Display precision according to IEC 1812-1	±10 % / 25 °C
Minimum pulse duration	
- Typically (relay version)	30 ms
- Typically (solid state version)	50 ms
- Typically under load (relay version)	100 ms
Maximum reset time by de-energisation	
- Typically (relay version)	100 ms
- Typically (solid state version)	350 ms
Immunity to breaks in supply voltage: typically	>10 ms
Power supply	
Multi-voltage power supply	depending on version, see pages 6/6, 6/7
Frequency	50/60 Hz
Operating range	85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
Load factor	100 %
Maximum power consumption	0.6 W 24V AC/DC 1.5 W 230V AC 32 VA 230V AC
Output elements relay output	
1 or 2 changeover relays, AgNi (cadmium-free)	2000 VA / 80 W
Rated power	2000 V A / 80W
Maximum breaking current	10 A AC 10 A DC
Minimum breaking current	10 mA / 5 VDC
Voltage breaking capacity	250V AC/VDC
Electrical life	10 ⁵ operations 8 A 250V resistive 5 x 10 ⁶ operations
Mechanical life	5 x 10 ⁶ operations
Breakdown voltage acc. to IEC 1812-1	2.5 kV / 1min / 1 mA /50Hz
Impulse voltage acc. to IEC 664-1 IEC 1812-1	5 kV, wave 1.2 / 50 µs
Display	
State displayed by 1 LED	
- Flashing green when on	
Green LED operation indicator	
■■■■■ Pulsing:	
- timer on, no timing in progress (except functions Di-D and Li-L)	
■■■■■ Flashing:	
- timing in progress	
■■■■■ Permanently lit:	
- Relay waiting, no timing in progress	
Input type	
- Volt-free contact	
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply	0.4 V

Other information

For special features, functions etc. please contact us.



Timing	0.1s • 100h	0.1s • 100h	0.1s • 100h
Types			
Screw terminal	TUR1	TAR1	TBR1
Spring terminal	—	—	—
Part numbers and voltage			
24V ~ / 24 • 240V ~	88 865 105	88 865 115	88 865 125
12 V ~ / ~	—	—	—
12 • 240 V ~ / ~	—	—	—
Functions			
	Multi-function	Bifunction	Mono-function
	A-At - B - C - H-Ht	A - At	B
	Di-D - Ac - Bw		
Nominal current			
	10 A SPDT	10 A SPDT	10 A SPDT

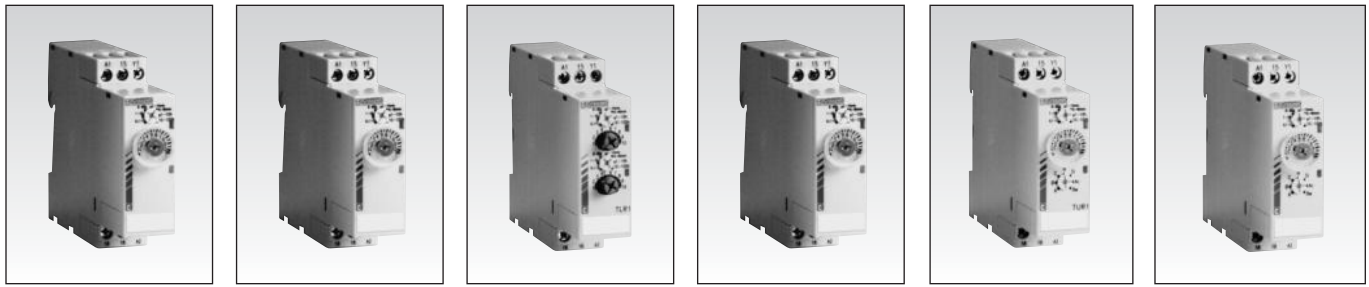
Timing ranges (7 ranges) 0.1s-1s-10s-1 min-10 min-1 h-10 h-100 h
TQR1: Selectable switching time 20 / 40 / 60 / 80 / 100 / 120 / 140 ms

General specifications

Conforming to standards	
IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)	
Approvals	
UL cUL listed	CSA recognized
Temperatures limits	
- use	-20 °C + 60 °C
- stored	-30 °C + 60 °C
Installation category (acc. to IEC 664-1)	
Creepage distance and clearance acc. to IEC 664-1	
Degree of protection acc. to IEC 529	
- terminal block	IP 20
- casing	IP 40
- front face (except Tk2R1)	IP 50
Vibration resistance acc. to IEC 68-2-6	
f = 10 • 55 Hz	
A = 0.35 mm	
Relative humidity acc. to IEC 68-2-3 without condensation	
93 %	
Electromagnetic compatibility	
Level III	
- Immunity to electrostatic discharges acc. to IEC 1000-42	
(Air 8 K / Contact 6 KV)	
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)	
Level III 10V/m: 80 MHz to 1 GHz)	
- Immunity to rapid transient bursts acc. to IEC 1000-4-4	
Level III (direct 2kV/ Capacitive coupling clamp 1 KV)	
- Immunity to shock waves on power supply acc. to IEC 1000-4-5	
Level III (common mode 2 KV / residual current mode 1KV)	
- Immunity to radiofrequency in common mode acc. to ENV	
Level III (10V rms: 0.15 MHz to 80 MHz)	
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11	
30 % / 10 ms	
60 % / 100 ms >	
95 % / 5 s	
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)	
Class B	
Fixing: Symmetrical DIN rail (EN 50022)	
35 mm	
Connection capacity	
- without ferrule	2 x 2.5 mm ²
- with ferrule	2 x 1.5 mm ²
Spring terminals, 2 terminals per connection point	
- flexible wire	1.5 mm ²
- rigid wire	2.5 mm ²
Casing material	
Self-extinguishing	
Weight: 22.5 mm casing	
90 g	

Products and specifications subject to change without notice.

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0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h
TCR1	THR1	TLR1	TQR1	TUR4	TUR3
—	—	—	—	—	TURc3
88 865 135	88 865 145	88 865 155	88 865 175	—	—
—	—	—	—	88 865 100	—
—	—	—	—	—	88 865 103 88 865 503
Mono-function C	Bifunction H - Ht	Bifunction Li - L	Mono-function Q	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw
10 A SPDT	10 A SPDT	10 A SPDT	10 A SPDT	10 A SPDT	10 A SPDT

Function diagrams

<p>Function A Delay on Make 1 relay</p>	<p>Function H Interval 1 relay</p>	<p>Function Li Repeat Cycle. On Time First. Pulse start</p>	<p>Function C Delay on Break 1 relay</p>	
<p>Function At Accumulative Delay on Make 1 relay</p>	<p>Function Ht Accumulative Interval 1 relay</p>	<p>Function D Repeat Cycle. Equal On/Off Time. Off Time First. Pause start</p>	<p>Function Bw Pulse output (adjustable) 1 relay</p>	
<p>Function B Single Shot 1 relay</p>	<p>Function L Repeat Cycle. Off Time First Pause start</p>	<p>Function Di Repeat Cycle. Equal On/Off Time. On Time First. Pulse start</p>	<p>Function Ac Combo Delay on Make/Delay on Break. Equal On/Off Time. 1 relay</p>	
<p>Function Q Star-delta</p>	<p>Connections (Y1 = C, Function diagrams)</p> <p>Functions: A - At / H - Ht / B / C Di - D / Ac / Bw</p> <p>LIQ L : A1 Y1</p>			<p>Dimensions</p>

To order, specify:

1 Type	2 Part number
Example: Chronos 2 Timers TAR1 88 865 115	

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Chronos 2 electronic timers - 22.5 mm

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- DPDT relay output, 10A - 250V including 1 instantaneous
- Screw terminals
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option

Technical specifications	
Timing	
Repetition accuracy (with constant parameters)	± 0.5 % (CEI 1812-1)
Drift	
- Temperature	± 0.05 % / °C
- Voltage	± 0.2 % / V
Display precision according to IEC 1812-1	±10 % / 25 °C
Minimum pulse duration	
- Typically (relay version)	30 ms
- Typically (solid state version)	50 ms
- Typically under load (relay version)	100 ms
Maximum reset time by de-energisation	
- Typically (relay version)	100 ms
- Typically (solid state version)	350 ms
Immunity to breaks in supply voltage: typically	>10 ms
Power supply	
Multi-voltage power supply	depending on version, see page 6/9
Frequency	50/60 Hz
Operating range	85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
Load factor	100 %
Maximum power consumption	0.6 W 24V AC/DC 1.5 W 230V AC 32 VA 230V AC
Output elements relay output	
1 or 2 changeover relays, AgNi (cadmium-free)	2000 VA / 80 W
Rated power	2000 V A / 80W
Maximum breaking current	10 AAC 10 A DC
Minimum breaking current	10 mA / 5 VDC
Voltage breaking capacity	250V AC/VDC
Electrical life	10 ⁵ operations 8 A 250V resistive
Mechanical life	5 x 10 ⁶ operations
Breakdown voltage acc. to IEC 1812-1	2.5 kV / 1min / 1 mA /50Hz
Impulse voltage acc. to IEC 664-1 IEC 1812-1	5 kV, wave 1.2 / 50 μs
Display	
State displayed by 1 LED	
- Flashing green when on	
Green LED operation indicator	
■■■■■ Pulsing:	
- timer on, no timing in progress (except functions Di-D and Li-L)	
■■■■■ Flashing:	
- timing in progress	
■■■■■ Permanently lit:	
- Relay waiting, no timing in progress	
Input type	
- Volt-free contact	
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply	0.4 V

Other information

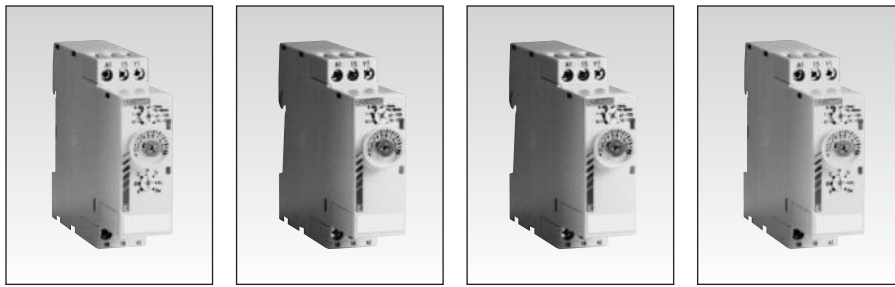
For special features, functions etc. please contact us.

Timing
Types
Part numbers and voltage
24V ≡ / 24 • 240V ~
12V ~ / ≡
Functions
Nominal current
Timing ranges (7 ranges)
0.1s - 1s - 10s - 1 min - 10 min - 1 h - 10 h - 100 h
TK2R1 (4 ranges)
0.06s - 0.6s - 2.5s - 20s - 160s

General specifications	
Conforming to standards	
IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)	
Approvals	
UL listed cUL listed CSA recognized	
Temperatures limits	
- use	-20 °C + 60 °C
- stored	-30 °C + 60 °C
Installation category (acc. to IEC 664-1)	Voltage surge category
Creepage distance and clearance acc. to IEC 664-1	4 kV / 3
Degree of protection acc. to IEC 529	
- terminal block	IP 20
- casing	IP 40
- front face (except Tk2R1)	IP 50
Vibration resistance acc. to IEC 68-2-6	f = 10 • 55 Hz A = 0.35 mm
Relative humidity acc. to IEC 68-2-3 without condensation	93 %
Electromagnetic compatibility	
- Immunity to electrostatic discharges acc. to IEC 1000-42	
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)	Level III (Air 8 K / Contact 6 KV) Level III 10V/m: 80 MHz to 1 GHz)
- Immunity to rapid transient bursts acc. to IEC 1000-4-4	Level III (direct 2kV/ Capacitive coupling clamp 1 KV)
- Immunity to shock waves on power supply acc. to IEC 1000-4-5	Level III (common mode 2 KV / residual current mode 1KV)
- Immunity to radiofrequency in common mode acc. to ENV	Level III (10V rms: 0.15 MHz to 80 MHz)
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11	30 % / 10 ms 60 % / 100 ms > 95 % / 5 s
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)	Class B
Fixing: Symmetrical DIN rail (EN 50022)	
Connection capacity	
- without ferrule	35 mm
- with ferrule	2 x 2.5 mm ²
Casing material	2 x 1.5 mm ²
Weight: 22.5 mm casing	Self-extinguishing 90 g

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0.1s • 100h 0.1s • 100h 0.06s - 160s 0.1s • 100h

TU2R1 TA2R1 TK2R1 TU2R4

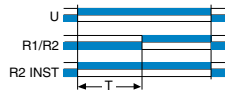
88 865 305 88 865 215 88 865 265 88 865 300

Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Bifunction A - At	Mono-function K	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw
10 A DPDT	10 A DPDT	10 A DPDT	10 A DPDT
1 Relay Timed and 1 Relay Timed or Instant	2 Timers	2 Timers	1 Relay Timed and 1 Relay Timed or Instant

Function diagrams

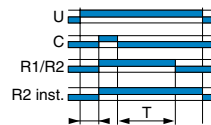
Function A

Delay on Make
1 Relay Timed and
1 Relay Timed or Instant



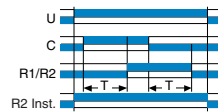
Function C

Delay on Break
1 Relay Timed and
1 Relay Timed or Instant



Function Ac

Combo Delay on Make/Delay on
Break. Equal On/Off Time
1 Relay Timed and
1 Relay Timed or Instant



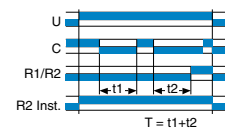
Function K

True delay OFF
2 relays



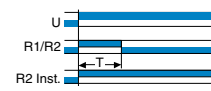
Function At

Accumulative Delay on Make
1 Relay Timed and
1 Relay Timed or Instant



Function H

Interval
1 Relay Timed and
1 Relay Timed or Instant



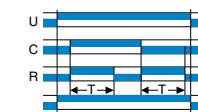
Function D

Repeat Cycle
Equal On/Off Time. Off Time First.
1 Relay Timed and
1 Relay Timed or Instant



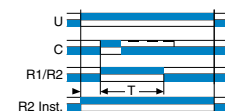
Function Bw

Pulse output (adjustable)
1 Relay Timed and
1 Relay Timed or Instant



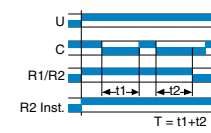
Function B

Single Shot
1 Relay Timed and
1 Relay Timed or Instant



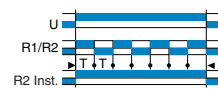
Function Ht

Accumulative Interval
1 Relay Timed and
1 Relay Timed or Instant

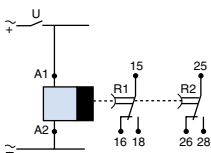
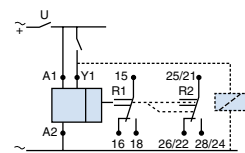


Function Di

Repeat Cycle
Equal On/Off Time. On Time First.
1 Relay Timed and
1 Relay Timed or Instant



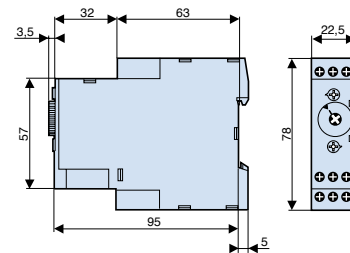
Connections (Y1 = C, Function diagrams)



Functions:
A - At / H - Ht / B / C
Di - D / Ac / BW

K

Dimensions



To order, specify:

1 Type

2 Part number

Example: Chronos 2 Timers TA2R1 88 865 215

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Chronos 2 electronic timers - Plug-in 8-pin (35 mm)

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- SPDT or DPDT relay output 10A - 250V
- Plug-in
- 1 LED status indicator
- Option of connecting a small cord to the control input
- 3-wire sensor control option



Technical specifications

Timing	
Repetition accuracy (with constant parameters)	± 0.5 % (CEI 1812-1)
Drift	
- Temperature	± 0.05 % / °C
- Voltage	± 0.2 % / V
Display precision according to IEC 1812-1	±10 % / 25 °C
Minimum pulse duration	
- Typically	30 ms
- Typically under load	
	100 ms
Maximum reset time by de-energisation	
- Typically	100 ms
Immunity to breaks in supply voltage: typically	
	>10 ms
Power supply	
Multi-voltage power supply	depending on version, see page 6/10, 6/11
Frequency	50/60 Hz
Operating range	85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
Load factor	100 %
Maximum power consumption	0.6 W 24V AC/DC 1.5 W 230V AC 32 VA 230V AC
Output elements relay output	
1 or 2 changeover relays, AgNi (cadmium-free)	2000 VA / 80 W
Rated power	2000 V A / 80W
Maximum breaking current	10 A AC 10 A DC
Minimum breaking current	10 mA / 5 VDC
Voltage breaking capacity	250V AC/VDC
Electrical life	10 ⁵ operations 8 A 250V resistive
Mechanical life	5 x 10 ⁶ operations
Breakdown voltage acc. to IEC 1812-1	2.5 kV / 1min / 1 mA /50Hz
Impulse voltage acc. to IEC 664-1 IEC 1812-1	5 kV, wave 1.2 / 50 µs
Display	
State displayed by 1 LED	
- Flashing green when on	
Green LED operation indicator	
▬▬▬▬ Pulsing:	
- timer on, no timing in progress (except functions Di-D and Li-L)	
▬▬▬▬ Flashing:	
- timing in progress	
▬▬▬▬ Permanently lit:	
- Relay waiting, no timing in progress	
Input type	
- Volt-free contact	
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply	0.4 V

Other information

For special features, functions etc. please contact us.

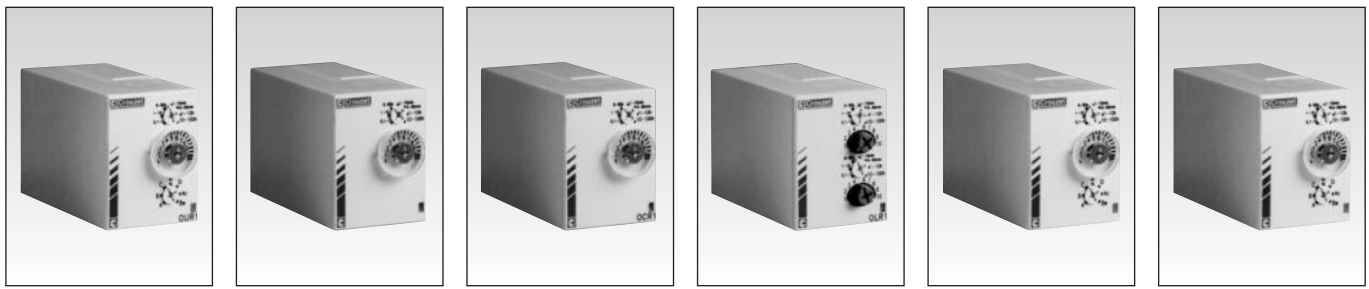
Timing	0.1s • 100h
Types	OL2R1
Part numbers and voltage	
24V ~ / 24 • 240V ~	88 867 801
12 V ~ / ~	—
12 • 240 V ~ / ~	—
Functions	Monofunction L
Nominal current	8 A DPDT
Accessories	
8-pin connector base (for the whole range)	S-08
	2 timers
Timing ranges (7 ranges)	
0.1s - 1s - 10s - 1 min - 10 min - 1 h - 10 h - 100 h	

General specifications

Conforming to standards	
IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)	
Approvals	
UL cUL listed	CSA recognized
Temperatures limits	
- use	-20 °C + 60 °C
- stored	-30 °C + 60 °C
Installation category (acc. to IEC 664-1)	Voltage surge category
Creepage distance and clearance acc. to IEC 664-1	4 kV / 3
Degree of protection acc. to IEC 529	IP 20
- terminal block	IP 40
- casing	IP 50
- front face (except Tk2R1)	f = 10 • 55 Hz A = 0.35 mm
Vibration resistance acc. to IEC 68-2-6	
Relative humidity acc. to IEC 68-2-3 without condensation	93 %
Electromagnetic compatibility	Level III
- Immunity to electrostatic discharges acc. to IEC 1000-42	(Air 8 K / Contact 6 KV)
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)	Level III 10V/m: 80 MHz to 1 GHz)
- Immunity to rapid transient bursts acc. to IEC 1000-4-4	Level III (direct 2kV/ Capacitive coupling clamp 1 KV)
- Immunity to shock waves on power supply acc. to IEC 1000-4-5	Level III (common mode 2 KV / residual current mode 1KV)
- Immunity to radiofrequency in common mode acc. to ENV	Level III (10V rms: 0.15 MHz to 80 MHz)
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11	30 % / 10 ms 60 % / 100 ms > 95 % / 5 s
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)	Class B
Fixing: plug-in bases	8-pin
Casing material	Self-extinguishing
Weight: plug-in casing	80 g

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

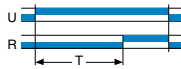


0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h
OUR1	OA2R1	OCR1	OLR1	OUR4	OUR3
88 867 105	88 867 215	88 867 135	88 867 155	88 867 100	88 867 103
Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Mono-function A	Mono-function C	Bifunction Li - L	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw
10 A SPDT	10 A DPDT	10 A SPDT	10 A SPDT	10 A SPDT	10 A SPDT
1 relay	2 relays	1 relay	1 relay	1 relay	1 relay

Function diagrams

Function A

Delay on Make
1 relay

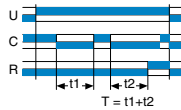


2 relays



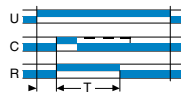
Function At

Accumulative Delay on Make
1 relay



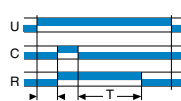
Function B

Single Shot
1 relay



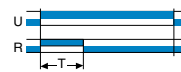
Function C

Delay on Break
1 relay



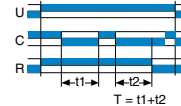
Function H

Interval
1 relay



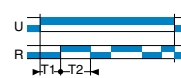
Function Ht

Accumulative Interval
1 relay



Function L

Repeat Cycle. Off Time First
Pause start



Function Li

Repeat Cycle. On Time First.
Pulse start



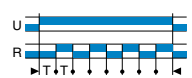
Function Ac

Combo Delay on Make/Delay on Break. Equal On/Off Time.
1 relay



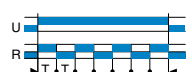
Function D

Repeat Cycle. Equal On/Off Time.
Off Time First.
Pause start



Function Di

Repeat Cycle. Equal On/Off Time.
On Time First.
Pulse start

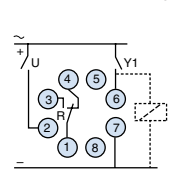


Function Bw

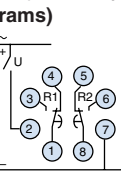
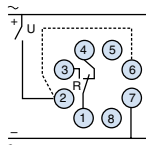
Pulse output (adjustable)
1 relay



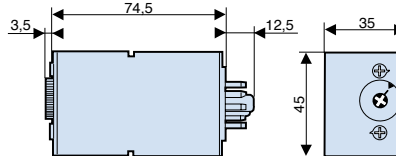
Connections: 8-pin 1 relay



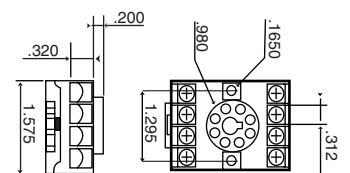
8-pin 2 relay (Y1 = C, Function diagrams)



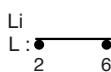
Dimensions



Accessories



Functions:
A - At / H - Ht / B / C
Di - D / Ac / Bw



A

To order, specify:

1 Type

2 Part number

3 Part number

Example: Chronos 2 Timers OUR1 88 867 105

8-pin connector base S08

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Chronos 2 electronic timers - Plug-in 11-pin (35 mm)

- Multi-function or mono-function
- Multi-range (7 ranges, available options)
- Multi-voltage
- DPDT Relay output 10A - 250V
- Plug-in
- 1 LED status indicator
- Option of connecting a small cord supply to the control input
- 3-wire sensor control option

Technical specifications

Timing	
Repetition accuracy (with constant parameters)	± 0.5 % (CEI 1812-1)
Drift	
- Temperature	± 0.05 % / °C
- Voltage	± 0.2 % / V
Display precision according to IEC 1812-1	±10 % / 25 °C
Minimum pulse duration	
- Typically (relay version)	30 ms
- Typically (solid state version)	50 ms
- Typically under load (relay version)	100 ms
Maximum reset time by de-energisation	
- Typically (relay version)	100 ms
- Typically (solid state version)	350 ms
Immunity to breaks in supply voltage: typically	>10 ms
Power supply	
Multi-voltage power supply	depending on version, see page 6/13
Frequency	50/60 Hz
Operating range	85 to 110 % Un (85 to 120 % Un for 12V AC/DC)
Load factor	100 %
Maximum power consumption	0.6 W 24V AC/DC 1.5 W 230V AC 32 VA 230V AC
Output elements relay output	
1 or 2 changeover relays, AgNi (cadmium-free)	2000 VA / 80 W
Rated power	2000 V A / 80W
Maximum breaking current	10 A AC 10 A DC
Minimum breaking current	10 mA / 5 VDC
Voltage breaking capacity	250V AC/VDC
Electrical life	10 ⁵ operations 8 A 250V resistive
Mechanical life	5 x 10 ⁶ operations
Breakdown voltage acc. to IEC 1812-1	2.5 kV / 1min / 1 mA /50Hz
Impulse voltage acc. to IEC 664-1 IEC 1812-1	5 kV, wave 1.2 / 50 µs
Display	
State displayed by 1 LED	
- Flashing green when on	
Green LED operation indicator	
<ul style="list-style-type: none"> ▬▬▬▬ Pulsing: - timer on, no timing in progress (except functions Di-D and Li-L) ▬▬▬▬ Flashing: - timing in progress ▬▬▬▬ Permanently lit: - Relay waiting, no timing in progress 	
Input type	
- Volt-free contact	
- 3-wire PNP output control option maximum residual voltage: 0.4 V whatever the timer power supply	0.4 V

Other information

For special features, functions, etc. please contact us.

Timing

Types

Part numbers and voltage

24V $\overline{\text{---}}$ / 24 • 240V \sim

12V \sim / $\overline{\text{---}}$

12 • 240V \sim / $\overline{\text{---}}$

Functions

Nominal current

Accessories

11-pin connector base (for the whole range)

S11

Timing ranges (7 ranges)

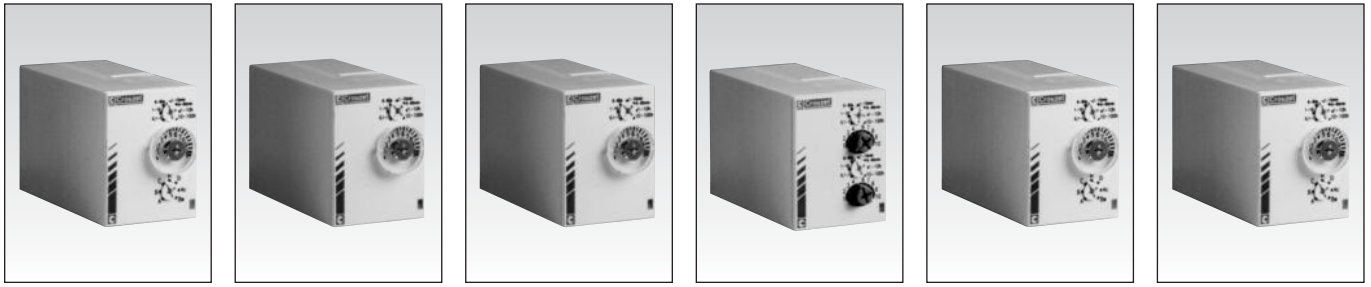
0.1s - 1s - 10s - 1 min - 10 min - 1 h - 10 h - 100 h

General specifications

Conforming to standards	
IEC 1812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC (89/336/EEC + IEC 669-2-3 (17.5 mm)	
Approvals	
UL cUL listed CSA recognized	
Temperatures limits	
- use	-20 °C + 60 °C
- stored	-30 °C + 60 °C
Installation category (acc. to IEC 664-1)	Voltage surge category
Creepage distance and clearance acc. to IEC 664-1	4 kV / 3
Degree of protection acc. to IEC 529	
- terminal block	IP 20
- casing	IP 40
- front face (except Tk2R1)	IP 50
Vibration resistance acc. to IEC 68-2-6	f = 10 • 55 Hz A = 0.35 mm
Relative humidity acc. to IEC 68-2-3 without condensation	93 %
Electromagnetic compatibility	
Immunity to electrostatic discharges acc. to IEC 1000-42	
- Immunity to electrostatic fields acc. to ENV 50140/204 (IEC 1000-4-3)	Level III (Air 8 K / Contact 6 KV)
- Immunity to rapid transient bursts acc. to IEC 1000-4-4	Level III 10V/m: 80 MHz to 1 GHz)
- Immunity to shock waves on power supply acc. to IEC 1000-4-5	Level III (direct 2kV/ Capacitive coupling clamp 1 KV)
- Immunity to radiofrequency in common mode acc. to ENV	Level III (common mode 2 KV / residual current mode 1KV)
- Immunity to voltage dips and breaks acc. to IEC 1000-4-11	Level III (10V rms: 0.15 MHz to 80 MHz)
- Mains-borne and radiated emissions acc. to EN 55022 (EN 55011 Group 1)	30 % / 10 ms 60 % / 100 ms > 95 % / 5 s
Fixing: plug-in bases	Class B
Casing material	11-pin
Weight: plug-in casing	Self-extinguishing 80 g

Products and specifications subject to change without notice.

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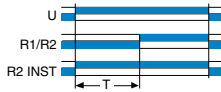


0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h	0.1s • 100h
PU2R1	PA2R1	PC2R1	PL2R1	PU2R4	PU2R3
88 867 305	88 867 415	88 867 435	88 867 455	-	-
-	-	-	-	88 867 300	-
Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Bifunction A - At	Mono-function C	Bifunction Li - L	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw	Multi-function A - At - B - C - H - Ht - Di - D - Ac - Bw
10 A DPDT	10 A DPDT	10 A DPDT	10 A DPDT	10 A DPDT	10 A DPDT
1 Relay Timed and 1 Relay Timed or Instant	2 relays	2 relays	2 relays	1 Relay Timed and 1 Relay Timed or Instant	1 Relay Timed and 1 Relay Timed or Instant

Function diagrams

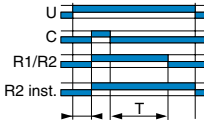
Function A

Delay on Make
1 Relay Timed and
1 Relay Timed or Instant



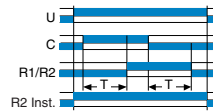
Function C

Delay on Break
1 Relay Timed and
1 Relay Timed or Instant



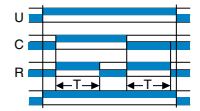
Function Ac

Combo Delay on Make/Delay on
Break. Equal On/Off Time.
1 Relay Timed and
1 Relay Timed or Instant



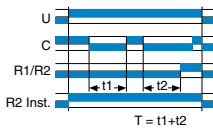
Function Bw

Pulse output (adjustable)
1 Relay Timed and
1 Relay Timed or Instant



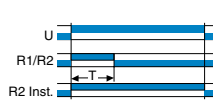
Function At

Accumulative Delay on Make
1 Relay Timed and
1 Relay Timed or Instant



Function H

Interval
1 Relay Timed and
1 Relay Timed or Instant



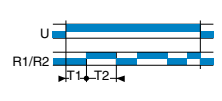
Function D

Repeat Cycle
Equal On/Off Time. Off Time First.
1 Relay Timed and
1 Relay Timed or Instant



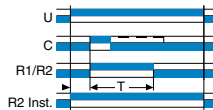
Function L

Repeat Cycle.
Off Time First.
2 relays



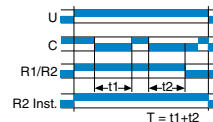
Function B

Single Shot
1 Relay Timed and
1 Relay Timed or Instant



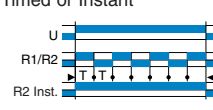
Function Ht

Accumulative Interval
1 Relay Timed and
1 Relay Timed or Instant



Function Di

Repeat Cycle.
On Time First.
1 Relay Timed and
1 Relay Timed or Instant

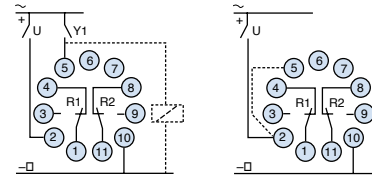


Function Li

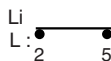
Repeat Cycle.
On Time First.
2 relays



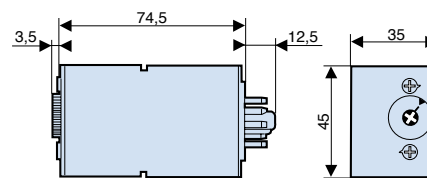
Connections (Y1 = C, Function diagrams)



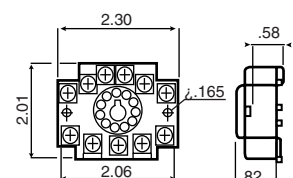
Functions:
A - At / H - Ht / B / C
Di - D / Ac / BW



Dimensions



Accessories



11-pin connector base
S11

To order, specify:

1 Type **2** Part number **3** Accessories
Example: Chronos 2 Timers PU2R1 88 867 305 11-pin connector base S11

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Cross Reference (For Chronos to Chronos 2)

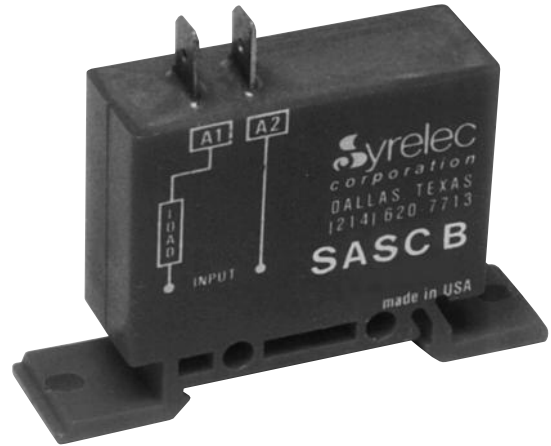
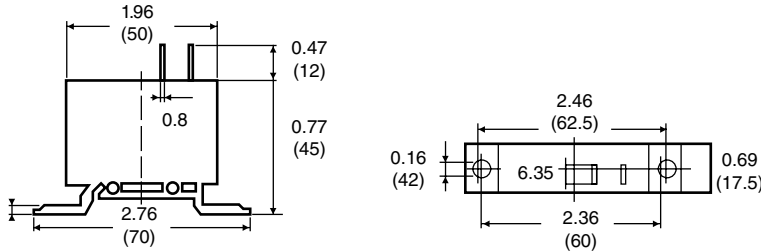
Old Part #	New Part #	Alternative	Old Part #	New Part #
BAR U 12D	88826100		OHR2 U 12D	Call for assistance
BAR U 48A	88826115	88865115	OHR2 U 24AD	Call for assistance
BAR U 110A	88826115	88865115	OHR2 U 110A	Call for assistance
BAR U 220A	88826115	88865115	OHR2 U 220A	Call for assistance
BAS U MAD	88826014		OLR U 12D	88867100
BBR U 12D	88826100	88865100	OLR U 48A	88867105
BBR U 48A	88826125	88865125	OLR U 110A	88867105
BBR U 110A	88826125	88865125	OLR U 220A	88867105
BBR U 220A	88826125	88865125	OLS U MA	Call for assistance
BCR U 12D	88826100	88865100	TAR2 U 12D	88867300
BCR U 48A	88826135	88865135	TAR2 U 110A	88867415
BCR U 110A	88826135	88865135	TBR2 U 12D	88867300
BCR U 220A	88826135	88865135	TBR2 U 48A/24AD	88867305
BDR U 12D	Call for assistance		TBR2 U 110A	88867305
BDR U 48A	88826155	88865155	TBR2 U 220A	88867305
BDR U 110A	88826155	88865155	TCR2 U 12D	88867300
BDR U 220A	88826155	88865155	TCR2 U 48A	88867435
BDRI U 12D	Call for assistance		TCR2 U 110A	88867435
BDRI U 110A	88826155	88865155	TCR2 U 220A	88867435
BDRI U 220A	88826155	88865155	TDR2 U 12D	Call for assistance
BLR U 12D	88826100	88865100	TDR2 U 48A	88867455
BLR U 48A	88826105	88865105	TDR2 U 110A	88867455
BLR U 110A	88826105	88865105	TDR2 U 220A	88867455
BLR U 220A	88826105	88865105	TDRI2 U 12D	Call for assistance
BLS U MA	88826004		TDRI2 U 48A	88867455
OAR U 12D	88867100		TDRI2 U 110A	88867455
OAR U 48A	88867215		TDRI2 U 220A	88867455
OAR U 110A	88867215		TLR2 U 12D	88867300
OAR U 220A	88867215		TLR2 U 48A	88867305
OAR2 U 12D		88867300	TLR2 U 110A	88867305
OAR2 U 24AD	88867215		TLR2 U 220A	88867305
OAR2 U 48A	88867215		88893003	88865305
OAR2 U 110A	88867215		88893115	88826115
OAR2 U 220A	88867215		88893135	88865215
OAS U MAD	Call for assistance		88893335	88865305
OBR U 12D	88867100		88893525	Call for assistance
OBR U 48A	88867105		88893715	Call for assistance
OBR U 110A	88867105		88893823	88865265
OBR U 220A	88867105		88893916	88865175
OCR U 12D	88867100			
OCR U 48A	88867135			
OCR U 110A	88867135			
OCR U 220A	88867135			
ODR U 12D	Call for assistance			
ODR U 48A	88867155			
ODR U 110A	88867155			
ODR U 220A	88867155			
ODRI U 12D	Call for assistance			
ODRI U 110A	88867155			
ODR2 U 12D	Call for assistance			
ODR2 U 48A	88867801			
ODR2 U 110A	88867801			
ODR2 U 220A	88867801			
ODRI1 U 12D	Call for assistance			
ODRI2 U 110A	88867801			
ODRI2 U 220A	88867801			
OHR U 12D	88867100			
OHR U 110A	88867105			
OHR U 220A	88867105			

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

GENERAL DETAILS OF TYPE S TIMERS

S series are compact, low cost, precision devices designed to the most demanding specifications. The small size, epoxy filled case is highly resistant against dust, vibrations, shock or humidity. Creep and strike distance according to VDE 0110 Group C 250V. Case protection IP66. Case material - Polymid.

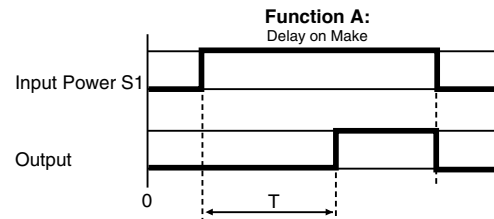
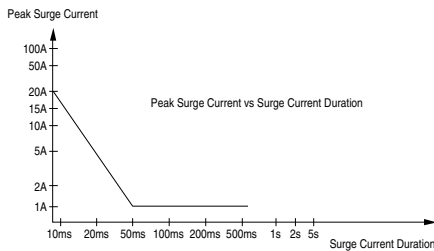


SAS SERIES DELAY ON MAKE TIMER WITH SOLID STATE OUTPUT

UL listed CSA recognized

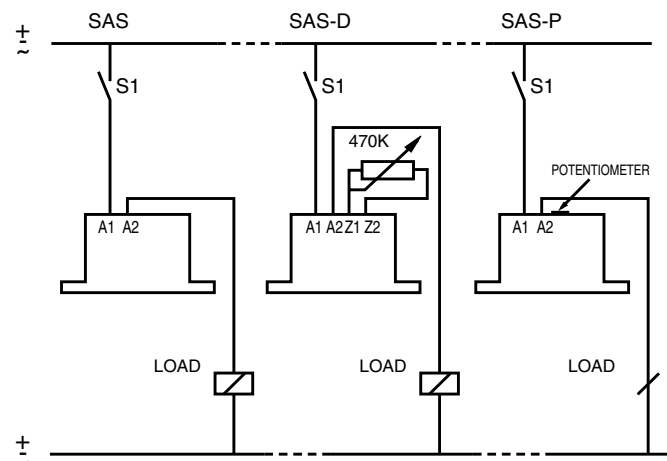
SPECIFICATIONS:

Input Power	24 VAC/DC, 110 VAC/DC 220 VAC/DC, ±15%, 50/60 Hz
Output Rating	max.: 0.7 A at 20°C min.: 10 mA
Repetition accuracy	±0.5% at a constant ambient
Temp rise derating	5 mA / °C
Reset time SAS & SAS-D	25 ms after timing 100 ms during timing
SAS-P	100 ms during timing
Leakage current during timing	5 mA max
Peak surge current	20 A < 10 ms
Peak surge voltage	1400 V, 10 μs
Terminals	1/4" (6.35mm) quick connect
Operating temperature	-22°F to +140°F (-30°C to +60°C)
Weight	1.9 oz. (55g)



Function A: When input power is applied, timing (t) begins. At the end of the preselected time, the solid state SCR output turns on. The output turns off when the input power is removed, resetting the timer for the next cycle.

WIRING DIAGRAM:



ORDERING INFORMATION: (500 pcs. minimum order, 250 pcs. minimum release)

S MOUNTING	AS-D SERIES	100S TIME RANGE	220 AD INPUT POWER
MOUNTING S = Encapsulated requiring DIN-Rail, Panel Adapter or use Base Mounting Holes	SERIES AS = standard relay AS-D = remote potentiometer AS-P = internal potentiometer	TIME RANGE AS = Fixed .1 sec - 1 min AS-D = .1 sec - 60 min Ex: = 10-100 sec maintain 10:1 ratio AS-P = .1 sec - 10 sec 1-100 sec maintain 100:1 ratio	INPUT POWER 24AD = 24 VAC/DC 110AD = 110 VAC/DC 220AD = 220 VAC/DC

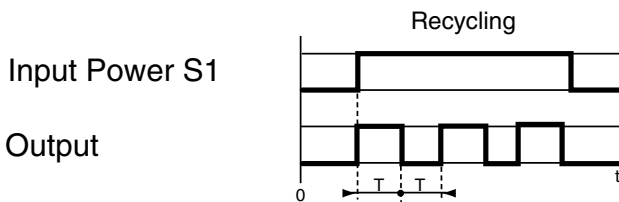
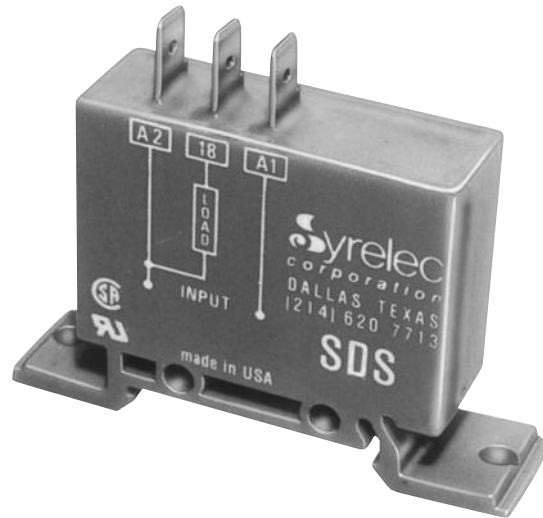
Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

SDS SERIES REPEAT CYCLE TIMER

UL listed CSA recognized

- Shock Resistant
- SCR Solid State Output
- Optional Remote Potentiometer
- DIN-Rail or Base Mounting

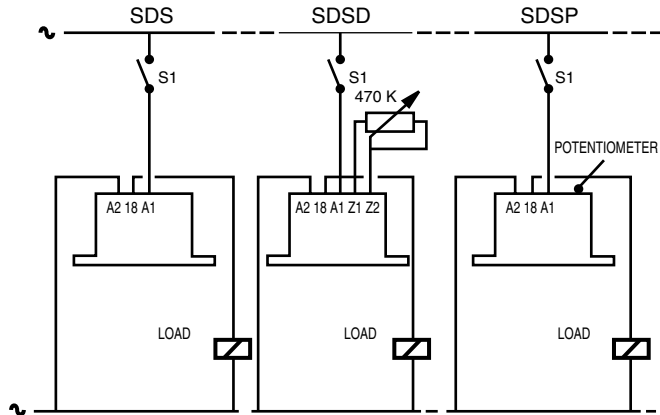


When input power S1 is applied, the solid state output turns on immediately for the timer period specified. It then turns OFF for that same time period and repeats continuously while power is applied.

SPECIFICATIONS:

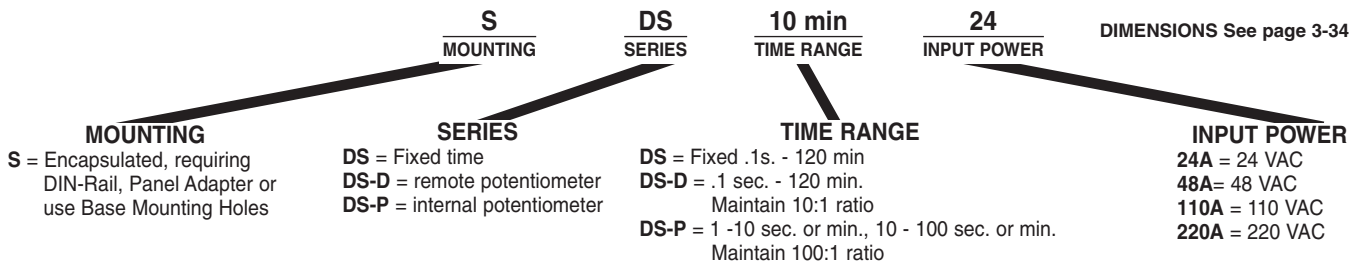
Input	24 VAC, 48 VAC, 110 VAC 220 VAC, ±15%, 50/60 Hz
Maximum power consumption	24 VAC: 0.2 VA 48 VAC: 0.3 VA 110 VAC: 0.6 VA 220 VAC: 1.2 VA
Output	SCR
Output Rating	max.: 0.7 A at 20°C min.: 10 mA
Repetition accuracy	±0.5% at a constant ambient
Temp. rise derating	5 mA / °C
Reset time	100 ms after timing 150 ms during timing
Leakage current during timing	2 mA max.
Peak surge current	20 A < 10ms
Peak surge voltage	1400 V, 100 µs
Terminals	Faston 1/4" (6.35mm)
Operating temperature	-22°F to +140°F -30°C to +60°C
Weight	1.9 oz. (55g)

WIRING DIAGRAM:



ORDERING INFORMATION: (500 pcs. minimum order, 250 pcs. minimum release)

P.S.: Specify maximum time for "D" and "P" versions.



Products and specifications subject to change without notice.

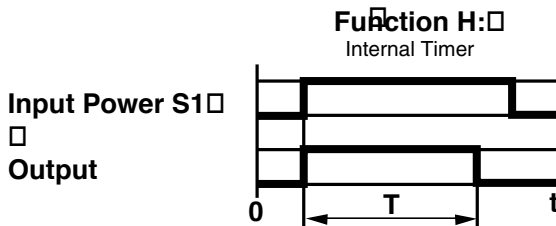
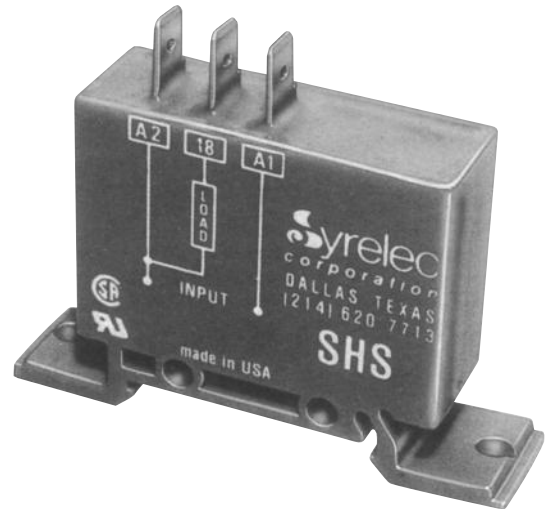
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

SHS SERIES

INTERVAL TIMER WITH SOLID STATE OUTPUT

UL listed CSA recognized

- Epoxy Encapsulated
- DIN-Rail or Base Mounting
- Internal or External Time Set
- Fixed Time

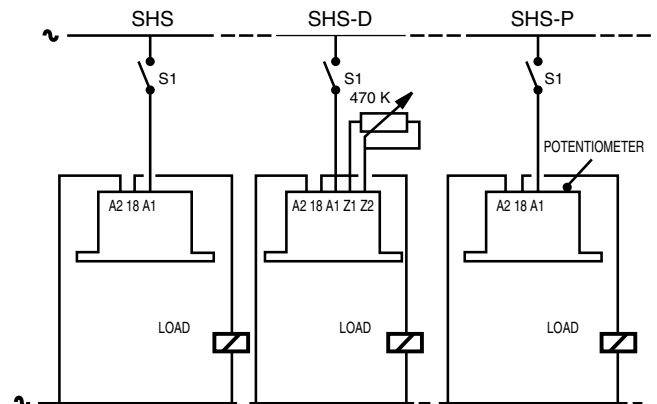


The solid state output turns on when the input power (S1) is applied. The output turns off at the end of time (T). The timer is reset when the input power is removed.

SPECIFICATIONS:

Input	24 VAC, 48 VAC, 110 VAC 220 VAC, ±15%, 50/60 Hz
Maximum power consumption	24 VAC: 0.2 VA 48 VAC: 0.3 VA 110 VAC: 0.6 VA 220 VAC: 1.2 VA
Output	SCR
Output Rating	max.: 0.7 A at 20°C min.: 10 mA
Repetition accuracy	±0.5% at a constant ambient
Temp. rise derating	5 mA / °C
Reset time	100 ms after timing 150 ms during timing
Leakage current during timing	2 mA max.
Peak surge current	20 A < 10 ms
Peak surge voltage	1400 V, 100 µs
Terminals	Faston 1/4" (6.35mm)
Operating temperature	-22°F to +140°F -30°C to +60°C
Weight	1.9 oz. (55g)

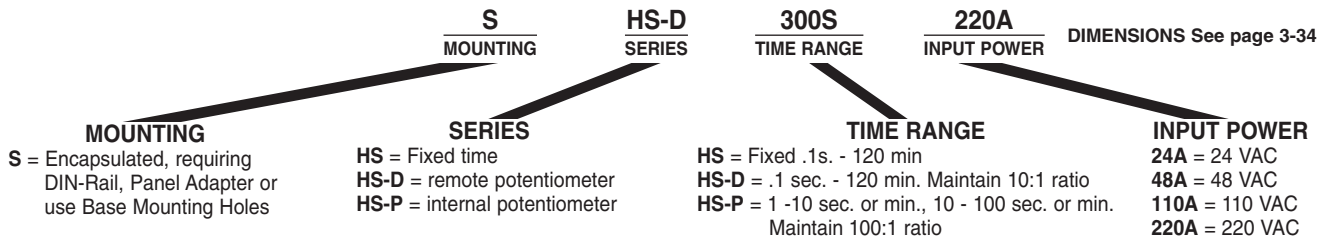
WIRING DIAGRAM:



Note: Available with internal potentiometer in HS-P Series.

ORDERING INFORMATION: (500 pcs. minimum order, 250 pcs. minimum release)

P.S.: Specify maximum time for "D" and "P" versions.

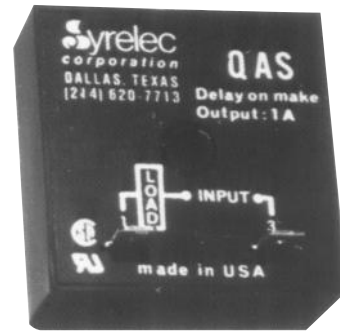
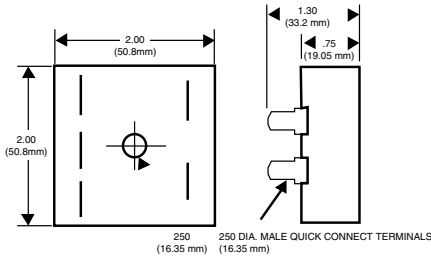


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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

GENERAL DETAILS OF TYPE Q TIMERS

Q series timers are compact, low cost, precision devices designed to the most demanding specifications. The small size, epoxy filled case is highly resistant against dust, vibrations, shock and humidity. Creep and strike distance according to VDE 0110 Group C 250V. Case protection IP66. Case material - Phenolic.



Consult factory for Q TIMER specifications.



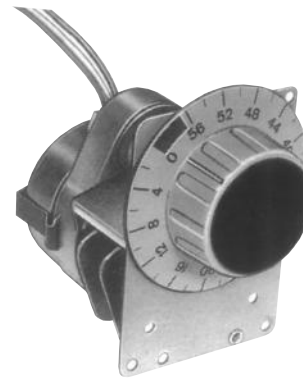
Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

88 256.4 and 88 256.5 SERIES

MANUALLY SET INTERVAL TIMER

UL listed CSA recognized



- **Standard Motor**
- **Standard Switches**
- **Easy to use and troubleshoot**

DESCRIPTION:

An adjustable knob with a graduated dial is mounted on the motor output shaft. A friction clutch allows it to be rotated manually.

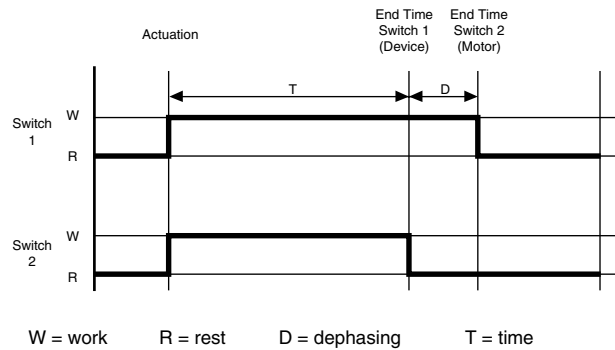
In the case of the Single Pole version, the molded cam is set to operate the switch when the zero position is reached.

In the case of the Double Pole version, the second switch (No. 2) changes over after the first switch (No. 1). The second switch (No. 2) controls the motor.

T = desired time.

Dephasing is equal to 3% of total max. time range on switch #2.

WIRING DIAGRAM:



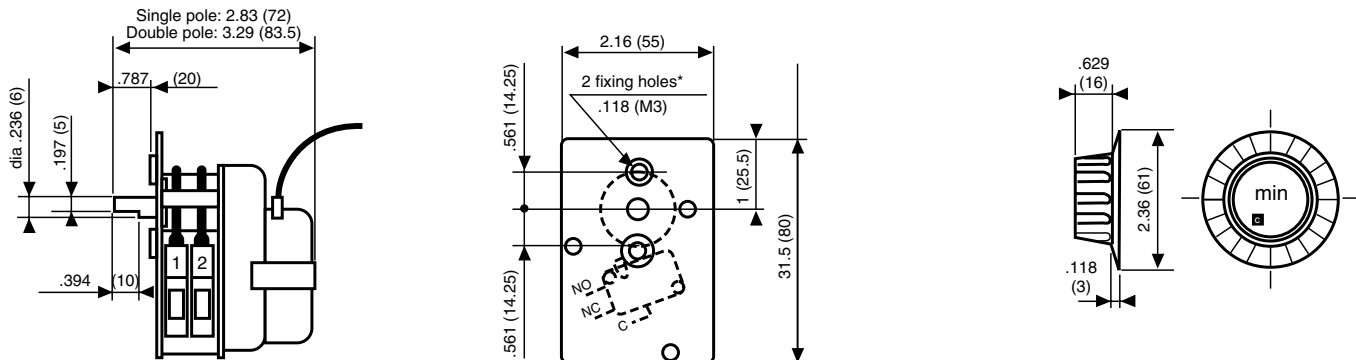
SPECIFICATIONS:

- Standard Voltage 115 V - 60 Hz
- Input Power 3.5 Watts
- Other voltages on request
- Motor 82 344 (Crouzet)
- Output Circuit Switch 83 160.0 (Crouzet)
- Contact material AgCdO
- Rating 8 Amp, 125/250 AC
- Connections 1/4" spade terminals
- Ambient Limits 23°F to 158.0°F (-5°C to +70°C)

UL components recognized

NOTE: If motor connected to constant supply, timer becomes a recycle timer.

DIMENSIONS: inches (mm)



* (2) screws supplied

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

**SERIES 88 256.4 AND 88 256.5
MANUALLY SET INTERVAL TIMERS**

PART NUMBER	NUMBER OF CAMS	MODEL	MAXIMUM TIME RANGE	ACCURACY OF SETTING _±	DEPHASING OF SWITCHES	VOLTAGE
88 256 455	1	60 sec.	56 sec.	2.5 sec	–	115 VAC - 60 hz
88 256 456	1	30 min.	28 min.	1 min.	–	115 VAC - 60 hz
88 256 457	1	1 hr.	56 min.	2.5 min.	–	115 VAC - 60 hz
88 256 562	2	60 sec.	56 sec.	2.5	2 sec.	115 VAC - 60 hz
88 256 563	2	5 min.	4 min. 40 sec.	15 sec.	9 sec.	115 VAC - 60 hz
88 256 564	2	15 min.	14 min.	30 sec.	27 sec.	115 VAC - 60 hz
88 256 565	2	1 hr.	56 min.	2.5 min.	1 min. 48 sec.	115 VAC - 60 hz
88 256 4.30 HR	1	30 hr.	28 hr.	1 hr.	–	115 VAC - 60 hz
88 256 4.30 SEC	1	30 sec.	28 sec.	1 sec.	–	115 VAC - 60 hz
88 256 4.5 HR	1	5 hr.	4 hr. 43 min.	15 min.	–	220 VAC - 60 hz
88 256 4.5 MIN	1	5 min.	4 min. 40 sec.	15 sec.	–	115 VAC - 60 hz
88 256 5.15 SEC	2	15 sec.	14 sec.	.5 sec.	.45 sec.	115 VAC - 60 hz
88 256 5.30 SEC	2	30 sec.	28 sec.	1 sec.	.9 sec.	115 VAC - 60 hz

For other Time & Voltage requirements contact factory.

IMPORTANT NOTE:

The maximum time setting is equal to 17/18 of the maximum dial range.

ORDERING INFORMATION:

Specify Part number
Example: 88 256 4.3 HR

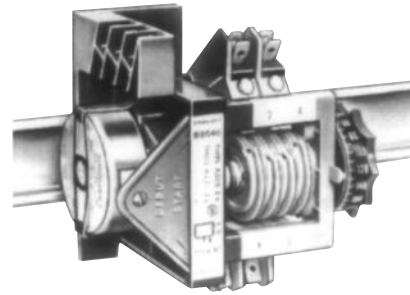
Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com



88 646 SERIES CAM TIMERS

UL listed CSA recognized



88 646 SERIES is specifically adapted for applications requiring 2 to 4 circuits. The switches are mounted on both sides of frame to give minimum overall length. Precision SPDT switches rated at 6 Amps, 1/3 H.P., 125/250V AC. are standard. Switches are individually removable. Adjustable cams are simple and quick setting. Adjustable cam key comes as standard.

STANDARD CAMS FOR SINGLE ON/OFF OPERATION PER CYCLE:

Cams are adjusted by using red plastic key supplied. Each cam consists of two sections, one red half and one grey half. The grey section is normally adjusted for "START" and the red section for "STOP." Each cam has a notch which will match the tab on the adjusting key. With the key positioned so the "START" side is facing the knob, the grey cam section can be adjusted by inserting the tab of the key into the notch in the cam while turning the knob. Reversing the key so the "STOP" side faces the knob, the red cam can be adjusted.

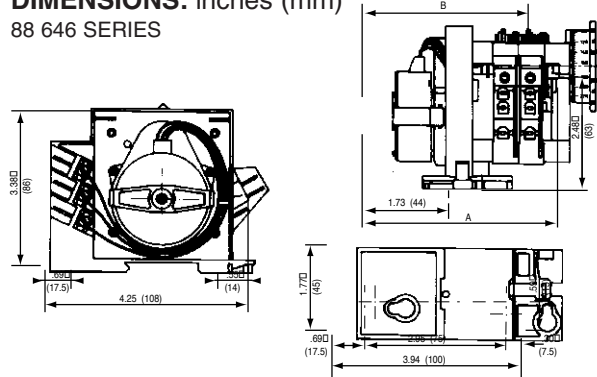
STEP 1. Insert Cam Adjusting Key into No. 1 cam (grey section) having the word "START" on tool facing adjusted knob and turn knob until the degree reading matches the first transfer point on your time chart for that cam.

STEP 2. Insert Cam Adjusting Key into No. 1 (red section) having the word "STOP" on tool now facing cam adjusting knob and turn knob until the degree reading matches the next transfer point on your time chart for that same cam. This completes setting of No. 1 cam.

STEP 3. Repeat steps 1 and 2 for each additional circuit of your cam timer.

NOTE: All switches have single pole, double throw circuitry. On each circuit where the load should be energized for less than 180° of cam shaft rotation, use the NO switch terminal.

DIMENSIONS: inches (mm) 88 646 SERIES



Type	Cams	Circuits	A inch (mm)	B inch (mm)	Weight oz (g)
88 646 0	2	2	3.74 (95)	3.15 (80)	8.18 (250)
88 646 2	4	4	4.25 (108)	3.66 (93)	10.58 (300)

88 646 series mounted by clipping onto an INTERNATIONAL DIN-RAIL, or by two screws fastened by built in ears.

SPECIFICATIONS:

GENERAL

Voltage	220 VAC, 115 VAC, 24 VAC, (+10 -15%) 50-60 Hz
Input Power	
88 646 (Crouzet motor 82 344)	2.6 W
Operating Temperature	-5°C +60°C (23°F +140°F)
Storage Temperature	-40°C +80°C (-40°F +178°F)
Duty Cycle	100%
Circuitry	SPDT
Output Switches (Crouzet 83 160 080)	6 A, 1/3 H.P., 125/250
Wiring Connections	
Gear Motors	1/4" spade terminal block
Gear Motors	1/4" spade terminal block
Direction	CW direction is standard

CAMS

Minimum Notch or Pulse (Electrical)	12° (1/20 of cycle)
Rise	
Electrical	12° (1/20 of cycle)
Maximum Cam Speed	30 RPM
Setting Accuracy	1°
Repeat Accuracy	
Adjustable and Programmable	
Cams	±1° (±.25% of cycle time)
Cut Cams	±0.5% (±.125% of cycle time)
Cam Construction	
Adjustable	split type - made of delrin

OPTIONAL:

P: Programmable Cams: For multiple on/off operations per cycle see page 2/53 for details.

C: Cut Cams: For multiple or non-tamperable operations per cycle, consult factory with time charts for cams.



ORDERING INFORMATION:

SERIES	NO. OF CAMS	TYPE OF CAM	SPEED/CYCLE TIME S=s - M=min. - H=Hr	ELECTRICAL
SERIES 88 646	NO. OF CAMS 002 = 2 cam 204 = 4 cam	TYPE OF CAM S=Standard cam P=Programmable cam C=Cut cam	SPEED/CYCLE TIME Select one of these: 2S 6S 15S 60S 4M 30M 4H 3S 10S 20S 2M 10M 1H 12H 4S 12S 30S 3M 15M 2H 24H	ELECTRICAL AS =115 VAC - 60hz ES =220 VAC - 50hz AH =220 VAC - 60hz EL =24 VAC - 50hz AL = 24 VAC - 60hz CS =110 VAC - 50hz

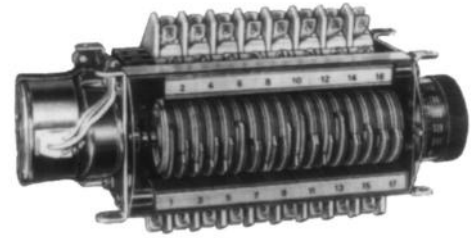
EXAMPLE: 88646002.S.6S.AS ie: 88 646 cam timer with 2 standard cams, 6 second cycle time, and 115 VAC - 60hz

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

88 645 SERIES CAM TIMERS

UL listed CSA recognized



88 645 Series is specifically adapted for applications requiring 1 to 22 circuits. The switches are mounted on both sides of frame to give minimum overall length. Precision SPDT switches rated at 6 Amps, 1/3 H.P., 125/250 V AC are standard. Switches are individually removable. Adjustable cams, simple and quick setting. Adjustable cam key comes as standard.

STANDARD CAMS FOR SINGLE ON/OFF OPERATION PER CYCLE:

Cams are adjusted by using red plastic key supplied. Each cam consists of two sections, one red half and one grey half. The grey section is normally adjusted for "start" and the red sections for "stop." Each cam has a notch which will match the tab on the red adjusting key. With the key positioned so the "start" side is facing the knob, the grey cam section can be adjusted by inserting the tab of the key into the notch in the cam while turning the knob. Reversing the key so the "stop" side faces the knob, the red cam can be adjusted.

STEP 1. Insert Cam Adjusting Key into No. 1 cam (grey section) having the word "start" on tool facing adjusted knob and turn knob until the degree reading matches the first transfer point on your time chart for that cam.

STEP 2. Insert Cam Adjusting Key into No. 1 (red section) having the word "stop" on tool now facing cam adjusted knob and turn knob until the degree reading matches the next transfer point on your time chart for that same cam. This complete setting of No.1 cam.

STEP 3. Repeat steps 1 and 2 for each additional circuit of your cam timer.

note: All switches have single pole, double throw circuitry. On each circuit where the load should be energized for less than 180° of cam shaft rotation, use the NC switch terminal. On each circuit where the load should be energized for more that 180° of cam shaft rotation, use the NO switch terminal.

SPECIFICATIONS:

GENERAL

Voltage 220 VAC, 115 VAC, 24 VAC (+10-15%), 50-60 Hz

Input Power

88 645 (Crouzet motor 82 334) 2.3 W

Operating Temperature -5°C to +60°C (23°F to +140°F)

Storage Temperature -40°C to +80°C (-40°F to +178°F)

Duty Cycle 100%

Circuitry SPDT

Output Switches (Crouzet 83 160 080) 6 A, 1/3 H.P., 125/250

Wiring Connections

Gear Motor 1/4" spade terminal block

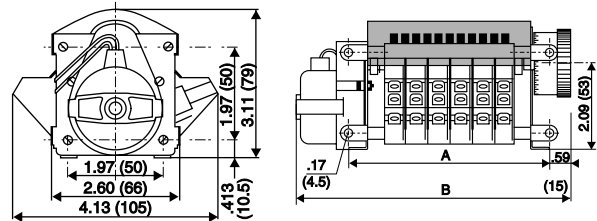
Switches 1/4" spade terminals

Direction CW direction is standard

CAMS

Minimum Notch or Pulse

DIMENSIONS: inches (mm) 88 645 SERIES



Type	Cams	Circuits Avail.	A inch (mm)	B oz (g)	Weight
88 645 0	7	1 to 7	3.23 (82)	5.12 (130)	19.40 (550)
88 645 2	12	8 to 12	4.57 (116)	6.46 (164)	26.45 (750)
88 645 4	17	13 to 17	5.83 (148)	7.72 (196)	31.75 (900)
88 645 6	22	18 to 22	7.09 (180)	8.98 (228)	35.27 (1000)

- (Electrical) 12° (1/20 of a cycle)
- Rise (Electrical) 12° (1/20 of a cycle)
- Maximum Cam Speed 30 RPM
- Setting Accuracy 1°
- Repeat Accuracy Adjustable and Programmable
- Cam +1° (±.25% of cycle time)
- Cut Cams ±.5° (±.125% of cycle time)
- Cam Construction Adjustable split type - made of delrin

OPTIONAL:

P: Programmable Cams: For multiple on/off operations per cycle see page 2/53 for details.

C: Cut Cams: For multiple or non-tamperable operations per cycle, consult factory with time charts for cams.



ORDERING INFORMATION:

SERIES	NO. OF CAMS	TYPE OF CAM	SPEED/CYCLE TIME				ELECTRICAL				
			S=sec	M=min.	H=Hr						
88 645	007 = 7 cam	S= Standard cam	Select one of these				AS = 115 VAC - 60 Hz				
	212 = 12 cam	P= Programmable cam	2S	6S	15S	60S	4M	30M	4H	AH = 220 VAC - 60 Hz	ES = 220 VAC - 50 Hz
	417 = 17 cam	C= Cut cam	3S	10S	20S	2M	10M	1H	12H	AL = 24 VAC - 60 Hz	EL = 24 VAC - 50 Hz
	622 = 22 cam		4S	12S	30S	3M	15M	2H	24H		CS = 110 VAC - 50 Hz

EXAMPLE: 88645002.P.10S.AS ie: 88 645 cam timer with 2 programmable cams, 10 second speed/cycle time, and 115 VAC - 60hz.

Products and specifications subject to change without notice.

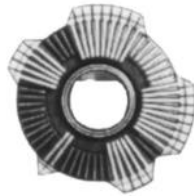
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

A cam timer is a simple timing device comprised of a frame which holds a series of cams on a shaft. The shaft is driven by a motor with a gear train that is set to rotate 360° over a certain time period. During this time period the cams actuate snap-acting SPDT (Single Pole Double Throw) switches. The switches can be wired to be either NC (normally Closed) or NO (Normally Open) so that when the individual cam actuates the individual switch, its output changes from Open to Closed. This change will happen once and go back to the rest position once in 360° with the standard cam. Maximum differential per standard cam is 180°.

If multiple tripping of the switch is required, the cam must be changed to either a programmable cam or a custom cut-cam (in large quantities). With the programmable cam, Programmable Cam Pins must also be used and plugged-in at the required 6° intervals to create the desired effect.



Standard cam



Programmable cam with pins



Custom cut-cam

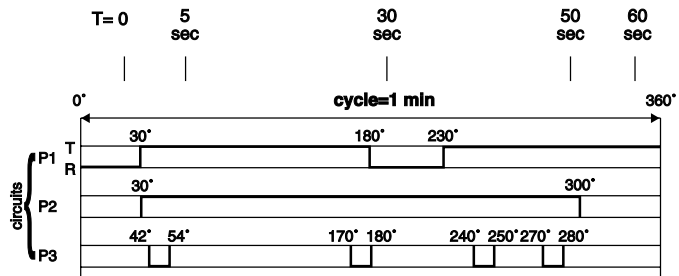
NOTE: Replacement red cam adjustment tool for 88 645 and 88 646 with standard cams: Part Number 79 221 702

NOTE: Programmable cams can be combined with standard cams for the most economical results of a required pattern by the user. See opposite page for more detail.

EXAMPLE:

PROGRAMMING A CAM TIMER:

It is best to create a time chart as shown. Use “T” as the trip-point and “R” as rest for each cam (P1, P2, P3, etc.) and draw throw/off pattern for each movement of the switch. This will make the final adjustment very easy.



STANDARD CYCLE TIMES:

<u>TIME</u>	<u>MOTOR SPEED</u>	<u>TIME</u>	<u>MOTOR SPEED</u>
2 sec	30 RPM	1 min	1 RPM
3 sec	20 RPM	2 min	1/2 RPM
4 sec	15 RPM	3 min	1/3 RPM
6 sec	10 RPM	4 min	1/4 RPM
10 sec	6 RPM	10 min	1/10 RPM
12 sec	5 RPM	12 min	1/12 RPM
15 sec	4 RPM	15 min	1/15 RPM
20 sec	3 RPM	24 min	1/24 RPM
30 sec	2 RPM	30 min	1/30 RPM
60 sec	1 RPM		

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

PROGRAMMABLE CAMS
(for 88 645 & 88 646)
INSTALLATION & INFORMATION

Disconnect timer from power sources (motor and switches) before installing programmable cams.

DESCRIPTION:

CROUZET programmable cams should be used whenever multiple actuations are required from the same cam during one timing cycle. Any number of adjustable cams can be replaced with programmable cams.

INSTALLATION:

It is suggested that the programmable cams be installed in timer before the programming pins are installed on the cam. To install cam(s), refer to instructions for your particular model.

MODEL 88 645 SERIES:

1. Remove snap ring and slide knob from cam shaft.
2. Remove the two screws from gray end bracket and slide from cam shaft. Note correct position before removing for reassembly.
3. Loosen two screws on clutch assembly (opposite knob end) and slide shaft assembly free.

NOTE: On some models it may be necessary to run motor to allow access to screws. Position screws for easy access.

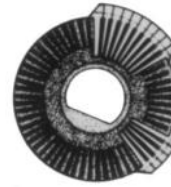
4. The adjustable cam(s) can now be removed by sliding them toward knob end of cam shaft.
5. Replace the adjustable cam(s) with programmable cam(s) making sure the total number of adjustable and programmable cams is equal to original number of cams.

NOTE: When replacing adjustable cams, be sure red cam half is facing knob end of cam shaft.

6. There should not be any space between the cams and the first cam should be against the shoulder on cam shaft.
7. Replace gray end bracket on cam shaft noting it is facing same direction as when removed.
8. Replace knob and snap ring on shaft making sure snap ring is square to and against knob. Shaft should rotate freely in bracket; if not, move snap ring away from knob slightly.
9. Replace entire assembly into cam timer with clutch assembly on motor shaft and aligning holes in end bracket with mounting holes. Replace the two end bracket screws and tighten. Tighten clutch assembly screws.

79 222 640
79 222 641

Programmable Cam (1 piece)
Programmable Cam Pins (1 bag)
1 bag = 30 pieces total
10-Rise/Fall pins
20 intermediate pins



MODEL 88 645

1. Remove snap on protective cover.
2. Loosen hex nut in center of knob and slide cover knob from shaft.
3. Remove the four screws securing the end bracket to timer frame and remove end bracket.
4. Loosen two screws on clutch assembly (end opposite knob) and slide cam shaft assembly free.

NOTE: On some timers it may be necessary to run motor to position screws for easy access.

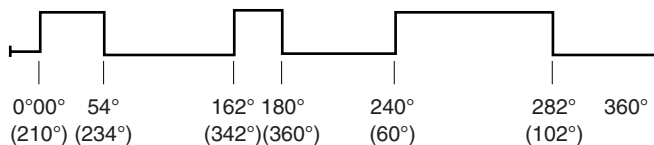
5. Remove snap ring (knob end).
6. The adjustable cams can now be removed by sliding them toward the knob end of the cam shaft.
7. Replace the adjustable cam (s) with programmable cam(s) making sure total number of adjustable and programmable cams is equal to the original number of cams.

NOTE: When replacing adjustable cam, make sure red cam half is facing knob end of cam shaft.

8. There should not be any space between the cams and the first cam should be against the shoulder on cam shaft.
9. Replace snap ring on cam shaft making sure it is square and against the last cam.
10. Replace cam shaft assembly in timer so clutch assembly is on motor shaft.
11. Replace end bracket and secure with four screws.
12. Tighten screws on clutch assembly.
13. Replace knob and tighten hex nut.

PROGRAMMING CAMS

Each slot on the programmable cam is 6° apart. Any operation requires a minimum of one "rise" and one "fall" program pin; therefore, the minimum pulse that can be obtained is 12° or 1/30 of the cycle time. (Cycle time being time for one complete revolution of timer.) It is suggested a timing chart be made for each cam to make programming easier. The chart should be from 0° to 360°. Indicate on the chart each "on" and "off" point. Since the programmable cam has slots every 6°, the "on" and "off" degree points must be divisible by 6.



The following sample program illustrates a circuit with three pulses per cycle.

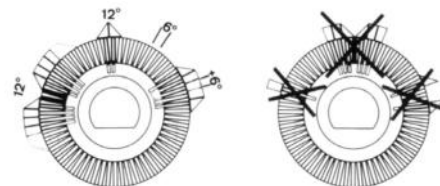
When pins are insert on programmable cam, they are inserted from top of timer which will put the pins 180° from the actual switching point. To compensate for this, you simply add 180° to each of your actuation points.

IMPORTANT: A "rise" and "fall" pin must always be used at the beginning and end of actuation. Therefore, the minimum pulse will be 12° or 1/30 of total time cycle. For ever intermediate pin used, the time of the pulse will be increased by 6 or 1/60 of time cycle.

In example shown, first pulse will require 1 rise, 1 fall, 2 flat top pins.

NOTE: Rise and fall pins are the same pins, the direction in which they are inserted determines whether it is a "rise" or "fall."

When programmable cams are complete, the adjustable cams may be adjusted in standard manner.

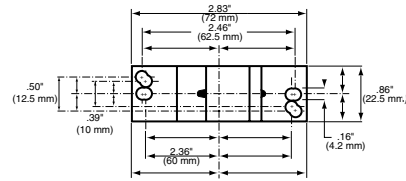


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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

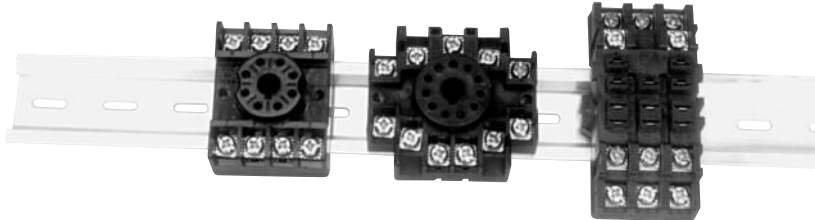
P – PANEL MOUNTING ADAPTER

This panel adapter is a rugged, black, auto extinguishable polycarbonate material. It is mounted with two 6/32 screws. A timer is mounted by clipping to the adapter or panel. Order part number P ADAPT.



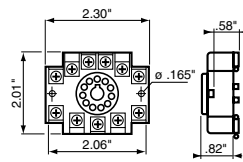
DR – DIN-RAIL

The DR-DIN-Rail material is an extruded aluminum material of the standard configuration, 35mm. Timers and Controls conveniently snap onto the track. Order part number “DR” which is available in 1 meter (39”) lengths. Shown with S08, S11 and K11 sockets.

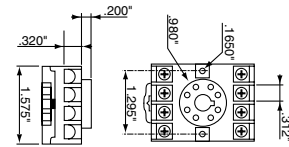


S08, S11 & SCREW TERMINAL SOCKETS

The S08, and S11 are 8 and 11 pin sockets fabricated from a rugged, durable polycarbonate.* The color is grey to match the majority of accessories available. Mounting is with two 6/32 screws .250 or on .30 DIN-Rail, DR. Order part “S08” or “S11.”



S11

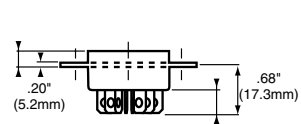
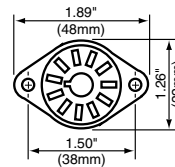


S08

S08-600: 600V, 10A rated 8 pin socket-UL and CSA

S12 & S15 SOLDER TERMINAL SOCKETS

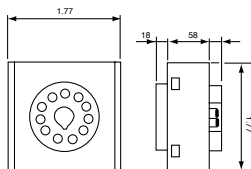
The S12 and S15 are 11 and 8 pin solder terminal sockets fabricated from a rugged, durable polycarbonate. They are black and connections are made by soldering to the tabs or by 3/16” (4.8mm) push-on connectors. Order Part Number “S12” (11 pin) and “S15” (8 pin)



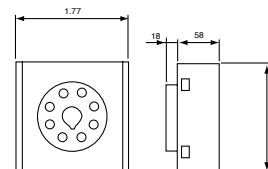
SA8 & SA11 - Back connecting Socket



SA11NN



SA8NN

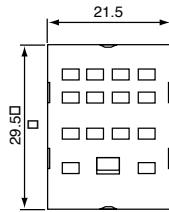
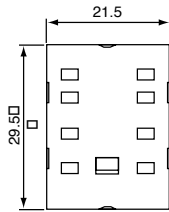


Products and specifications subject to change without notice.

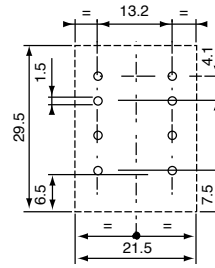
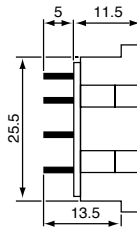
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

ACCESSORIES FOR RTM TIMER

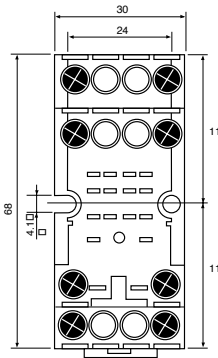
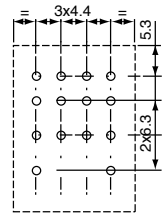
SOCKETS PC Board Sockets (mm)



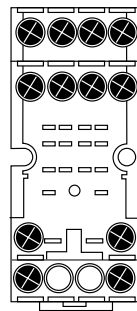
2 Poles
Ref: 26532709



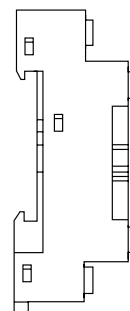
4 Poles
Ref: 26532708



2 Poles
Ref: 26532707

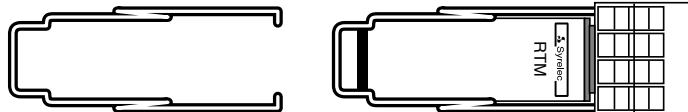


4 Poles
Ref: 26532706



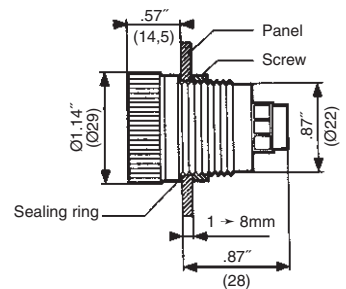
Mounting Clip for DIN-Rail Sockets

Ref: 26532702



79 238 250 (Part Number)
PANEL MOUNT REMOTE POTENTIOMETER
 470K Ohm ±10% / 0.2 W / linearity ±10%

DIMENSIONS: inches (mm)



Products and specifications subject to change without notice.

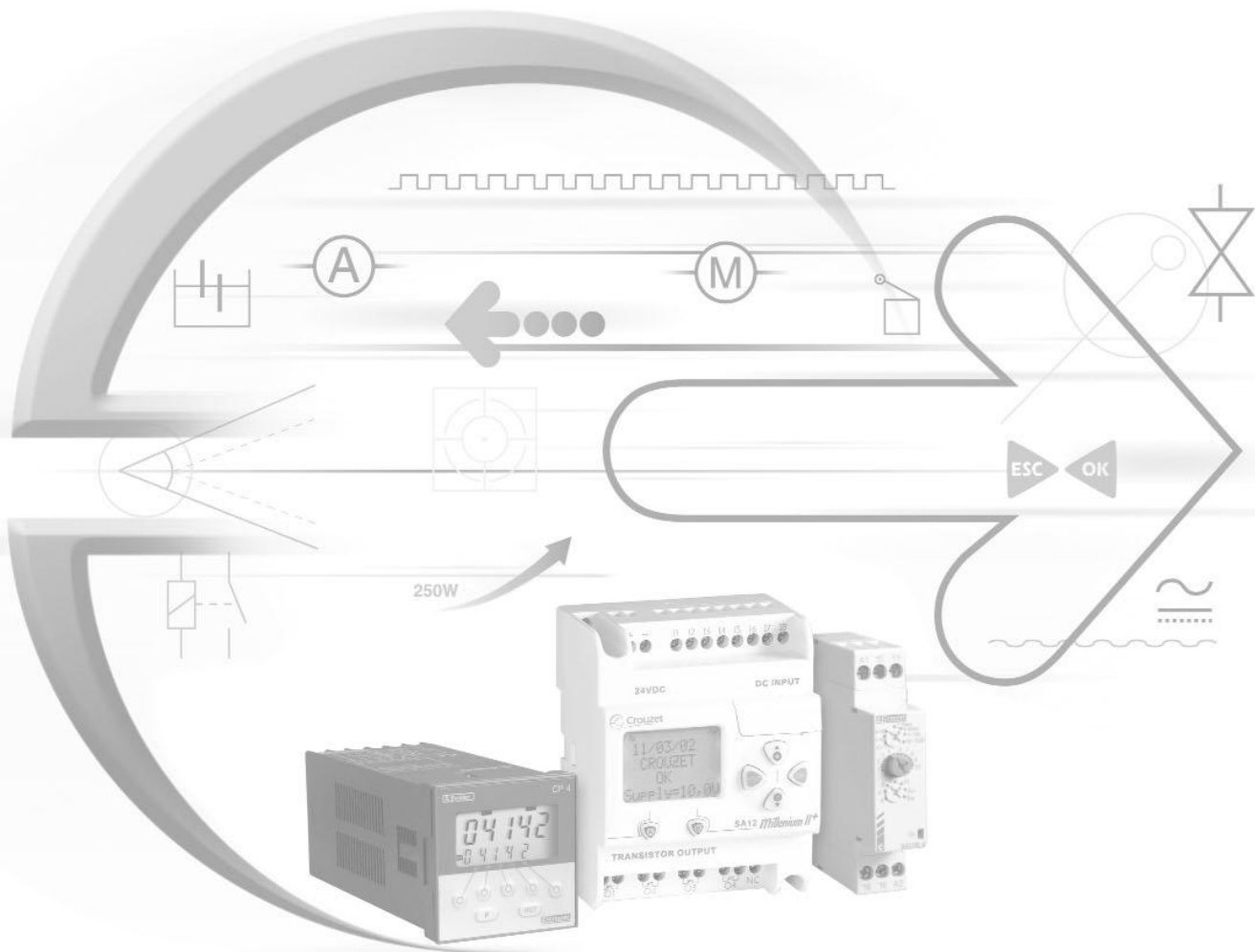
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Control Relays



Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

CTD 46 AND 43 SERIES TEMPERATURE CONTROLLER

UL listed CSA recognized

- 1/16 DIN-Sized Enclosure
- 5 Temperature Control Modes
- Multiple Temperature Range (°F and °C)
- Auto-tuning
- Built-in Alarm
- Soft Start Function
- NEMA 4X Front Panel



DESCRIPTION:

The CTD Series is a temperature controller available in two basic models: The CTD 43 is a single display unit and the CTD 46 is a dual display unit. Both models have a temperature range of -199 to 999°F or -199 to 999°C and will accept J, K, L, or N type thermocouples and RTD's as temperature sensors. Control modes include ON-OFF or proportioning action (PID, P, PI, PD). The main output can be programmed for direct (cooling) or inverse (heating) and the relay alarm output programmed to 16 different alarm configurations. The auto-tuning "Smart" function will calculate and set automatically the optimum values for the PID mode to insure the closest control of any heating or cooling load.

SPECIFICATIONS:

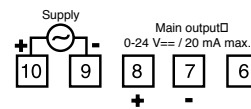
Input Power 100 to 240 VAC, 50/60 Hz +15% - 10%
 24 VAC, 50/60 Hz, +15% - 10%
 24 VDC, +15% - 10%

Display
 CTD 43
 Measure/Preset Display 3 Digit (10mm) Red Leds
 CTD 46
 Measure Display 3 Digit (10mm) Red Leds
 Preset Display 3 Digit (7.5mm) Green Leds

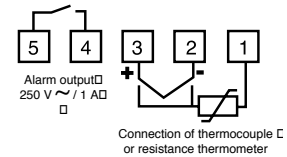
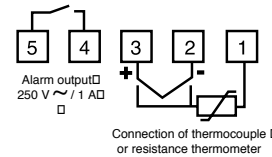
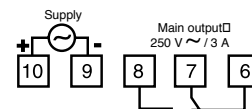
Output
Main Output Relay: SPDT, 3 Amp 250 VAC
 Logic: Level 1: 24 VDC/1mA
 14 VDC/20 mA
 Level O: 0.5 VDC Max/0 mA
Alarm Output Relay: SPST N.O. 1 Amp 250 VAC
Display Accuracy +/- 0.3% of full scale range
Reference Function Derating 0.1 deg C/deg C
Max. Power Consumption 5 VA
Insulation Resistance > 100 M ohm
Dielectric Strength 1500 Vrms
Sampling Period 0.5 sec
NEMA Rating NEMA 4x
Wiring Connection Screw Terminals
Weight 11 oz. (300g)
Operating Temperature 32°F to 122°F

WIRING DIAGRAM:

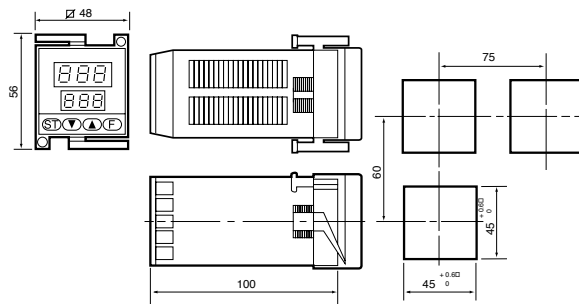
Voltage output



Relay output



DIMENSIONS: (mm)



ORDERING INFORMATION:

VOLTAGE	OUTPUT	PART NUMBER
VOLTAGE	OUTPUT	PART NUMBER
110/220 VAC	Relay	CTD43 CTD46
110/220 VAC	Transistor	89421108 89422108
24 VAC/DC	Relay	89421118 89422118
24 VAC/DC	Transistor	89421102 89422102
		89421112 89422112

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

CTH 46 SERIES TEMPERATURE CONTROLLER

UL listed CSA recognized

- **Dual Heat/Cooling Function**
- **1/16 DIN-Sized Enclosure**
- **Set Point and Actual Temperature Displayed**
- **Auto-Tuning**
- **NEMA 4X Front Panel**



DESCRIPTION:

The CTH accepts inputs from various types of sensors (thermocouple and RTD). The CTH provides dual outputs for heating and cooling. The CTH has a temperature range from -199 to 999 degrees Fahrenheit or -199 to 999 degrees Centigrade and will accept J K L or N types thermocouples and RTDs as temperature sensors. Control modes include ON-OFF or proportioning action (PID, P, PI, PD). The auto-tuning "Smart" function will calculate and set automatically the optimum values for the PID mode to insure the closest control of any heating or cooling load.

SPECIFICATIONS:

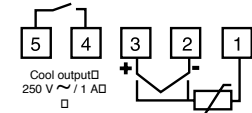
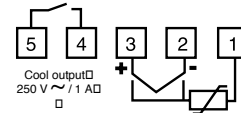
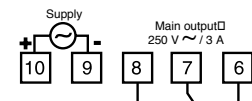
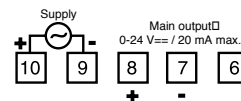
Input Power	100 to 240 VAC, 50/60 Hz +15% - 10%
	24 VAC, 50/60 Hz, +15% - 10%
Power Consumption	5 VA
Display	
Measure Display	3 Digit (10mm) Red Leds
Preset Display	3 Digit (7.5mm) Green Leds
Output	
Main Output	Relay: SPDT, 3 Amp 250 VAC Logic: Maximum load is 700 ohm Level 0 : <0.5 VDC Level 1 : 14 VDC @ 20 mA 24 VDC @ 1 mA
Cool Output	NO-1A contact, 250 VAC resistive
Accuracy	± .3% of full scale range
Insulation Resistance	> 100 M ohm
Dielectric Strength	1500 Vrms
Sampling Period	0.5 sec
Wiring Connection	Screw Terminals
Operating Temperature	32°F to 122°F
NEMA Panel Rating	NEMA 4X
Weight	11 oz. (300g)

WIRING DIAGRAM:

CTH 46

Voltage output

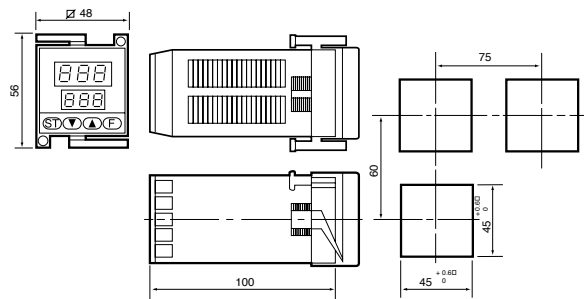
Relay output



Connection of thermocouple or resistance thermometer

Connection of thermocouple or resistance thermometer

DIMENSIONS: (mm)



ORDERING INFORMATION:

VOLTAGE	OUTPUT	PART NUMBER
VOLTAGE	OUTPUT	PART NUMBER
100 to 240 VAC	Relay	89422508
100 to 240 VAC	Transistor	89422518
24 VAC/VDC	Relay	89422502
24 VAC/VDC	Transistor	89422512

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

- Heating and/or cooling function
- 2 independent alarms
- Load break detection
- 2nd setpoint which can be selected remotely
- Manual/automatic power adjustment
- RS 485 / MODBUS - JBUS serial communication option



Type

MIC 48

		Part Number	Part Number
		Without RS 485 link	With RS 485 link
Output	Input Power		
Relay	100 – 240 Vac	89 422 008	89 422 408
Logic	100 – 240 Vac	89 422 018	89 422 418
Relay	24 Vac / Vdc	89 422 002	89 422 402
Logic	24 Vac / Vdc	89 422 012	89 422 412

Inputs

Thermocouples	J, K, R, S, & N	Conforms to IEC 584-1
	L	Conforms to Din 43710
Reference Junction	Automatic cold junction compensation 0-50°C	
Reference junction drift	0.1°C / °C	
Input Impedance	> 1MΩ	
Calibration	Conforms to IEC 584-1	
RTD	3 wire PT 100	
Line Resistance		20Ω Max
Input types and standard range		
Input types	Temp Scale in °C	Temp Scale in °F
TC L	0 / 400.0°C	0 / 1650°F
TC L	0 / 900°C	
TC J	0 / 400.0°C	0 / 1830°F
TC J	0 / 1000°C	
TC K	0 / 400.0°C	0 / 2190°F
TC K	0 / 1200°C	
TC N	0 / 1400°C	0 / 2500°F
TC R	0 / 1760°C	0 / 3200°F
TC S	0 / 1760°C	0 / 3200°F
RTD Pt100	-199.9 / 400.0°C	-199.9 / 400.0°F
RTD Pt100	-200 / 800.0°C	-330 / 1470°F
Configurable mA & V inputs	Input	Impedance
	0 – 20mA	< 5Ω
	4 – 20mA	
	0 – 60mV	> 1MΩ
	12 – 60mV	
	0 – 5V	> 200KΩ
	1 – 5V	
	0 – 10V	> 400KΩ
2 – 10V		
Measurement Range	-1999 to +4000	
Decimal Point	adjustable	0000, 000.0, 00.00, 0.000

Outputs

Output Type	discontinuous	
Action Type	can be programmed for heating and/or cooling	
Power output	heating action	adjustable from 0 to 100%
limit:	heating/cooling	adjustable from -100
SOFT-START	action	to +100%
Note: this function is only active on starting if the measurement is less than the setpoint.		
Output element		
OUT1	N/O contact	3A 250 Va resistive
Main	(N/C contact is possible via a jumper)	
Output	logic	Level 0: < 0.5 V ∓ Level 1: 14 V ∓ ±20% @ 20 mA max 24 V ∓ ±20% @ 1 mA max
Main output cycle time	1 s to 99 s	
OUT2	N/O -2A contact, 250 V~ resistive	
Cool output or alarm 1 output		
OUT3	N/O -2A contact, 250 V~ resistive	
Load break output and/or Alarm 2 output		
Automatic/manual mode		
It is possible to force the heat or cool output power by pressing the key on the front panel.		
Manual adjustment of the output power	Heat	0 to 99%
	Cool	0 to 99%
Disabling the power status		
It is possible to disable the power output. In this case, the controller operates as a simple temperature display unit. This option is frequently used during machine adjustment.		
General Specifications		
Power Supply	100 – 240 Vac, 24 Vac / Vdc	
Frequency	50 / 60 Hz	
Tolerance	-15% / +10% Vin	
Power consumption	8VA max	
Display	Measurement	4 digits, Red LED's, 7 segment, 10 mm height
	Setpoint	4 digits, Green LED's, 7 segment, 7.5mm height

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Display

Lower display:

- setpoint
- output power
- heating element consumption (in amps)
- abbreviation of the parameter selected during programming.

Upper display:

- measurement
- parameter values during programming

Main output status LED, lit when the output is active.

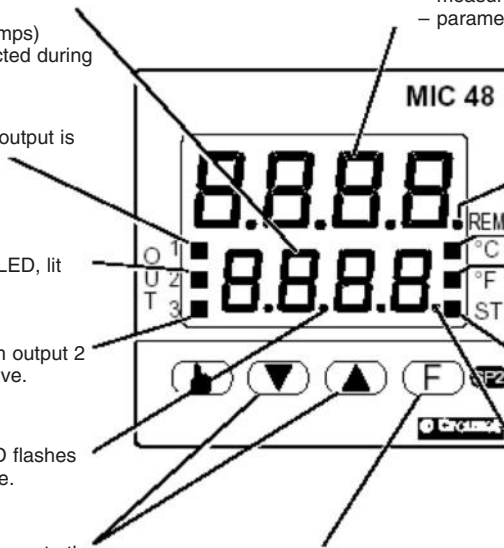
Cool output or alarm 1 output status LED, lit when the output is active.

Load break alarm output and/or alarm output 2 status LED, lit when the output is active.

Manual/automatic operation. The LED flashes when the controller is in manual mode.

Parameter modification and direct access to the setpoint.

Parameter selection and validation in configuration and parameter definition modes. This key is also used to display the output power and the heating element consumption.



REM LED on when the controller is communicating via the RS485 serial link

When the sensor input is connected to a thermocouple or a Pt100, the LED corresponding to the selected unit of measurement is lit.

LED indicating the SMART function

■ adaptive tune

* auto-tune

SP2 LED flashes slowly when control occurs at setpoint SP2.

SP2 LED flashes rapidly when the setpoint value is programmed via the RS485 serial link

Inputs		
Current Transformer input for monitoring the load break		
Measurement range with transformer	10A to 100A	
Resolution	10 to 20A	0.1A
	21 to 100A	1A
Measurement logic	relay output	NO or NC
Threshold	logic output	level 1 or 0
Measurement update period	50 ms	
Setpoints		
2 setpoints are available	main setpoint	SP
	auxiliary setpoint	SP2
SP/SP2 selection point	50 mA~ selection via external n/c type contact	
N.B.: The 50mA AC input is used either as a load break monitoring input (with an associated current transformer), or as a control input for the 2nd setpoint.		
Selection between these two functions is made in configuration mode.		

Serial Link	
Type	RS 485
Protocol	MODBUS, J.BUS
Address	1 to 255
Transmission speed	600 to 19 200 Baud
Output power	Number of data bits
Parity	even, odd, no
Stop bit	1

Alarms	
In addition to its main output, the MIC 48 has two other outputs which can be configured:	
OUT2	cool output or alarm 1 output
OUT3	load break output and/or alarm 2 output

Description of alarms 1 and 2	
Note:	
These 2 alarms can be configured independently of each other.	
Output type	direct or reverse
Functions	absolute alarm
	band alarm
	deviation alarm
Reset	manual
	automatic
Inhibition	can be configured

Note:		
Each alarm can be configured using an inhibition sequence. This function means it is possible to ignore any temperature threshold overshoots at the start of the process and after each setpoint change.		
	absolute alarm	absolute value independent from SP
Alarm threshold	band alarm	value relative to SP, adjustable from 0 to 500°C/°F
	deviation alarm	value relative to SP, adjustable from -500 °C/°F (negative deviation) to +500°C/°F (positive deviation)
Alarm		0.1 to 10.0% of scale amplitude

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Control characteristics

Control algorithm	PID with auto-tune and adaptive tune: SMART	
Control type	heat or cool heat - cool	
Sampling time	linear input	250 ms
	TC and RTD input	500 ms
Proportional band	heat or cool	1.0 to 100%
Pb		of scale amplitude
	heat - cool	1.5 to 100%
		of scale amplitude
Note: if Pb = 0%	discrete action	
Hysteresis (during discrete action)	0.1 to 10% of scale amplitude	
Integral time ti	20s to 20 min	
Note: if ti > 20 min:	integral action is inactive	
Derivative time td	1 s to 10 min	
Note: if td = 0:	derivative action is inactive	
Cycle time	heating	1 to 200 s
	cooling	1 to 200 s
Heat-cool control	Cool proportional	rC x heat
	band	proportional band
	rC : relative gain	0.20 to 1.00
	dead/overlap band	-20% to +50% of the heat proportional band

Note:

The MIC 48 offers the following parameters directly, depending on the cooling medium used:

fluid	rc relative gain	cooling cycle time
air	1.00	10 s
oil	0.80	4 s
water	0.40	2 s

These parameters can be adjusted depending on the limitations of the process.

Presentation and environment

Insulation resistance	conforming to IEC 348	> 100 M
Insulation voltage	conforming to IEC 348	1500 V
Immunity to interference	conforming to IEC 801-	Level 3
		4
	conforming to IEC 801-	8000 V
		2
Accuracy	±0.2% of the full measurement scale	
	±1 digit at an ambient temperature of 25°C at Un	
Temperature limits	operation	0 to +50°C
	storage	-20° to +70°C
Relative humidity	20 to 85% Rh without condensation	
Housing		
Housing material	self-extinguishing UL94 grade VO	
Front panel made from	polycarbonate membrane	
Protection class	IP54, conforming to IEC 529	
Connection	screw terminals	
Weight	250 grams	

Protection

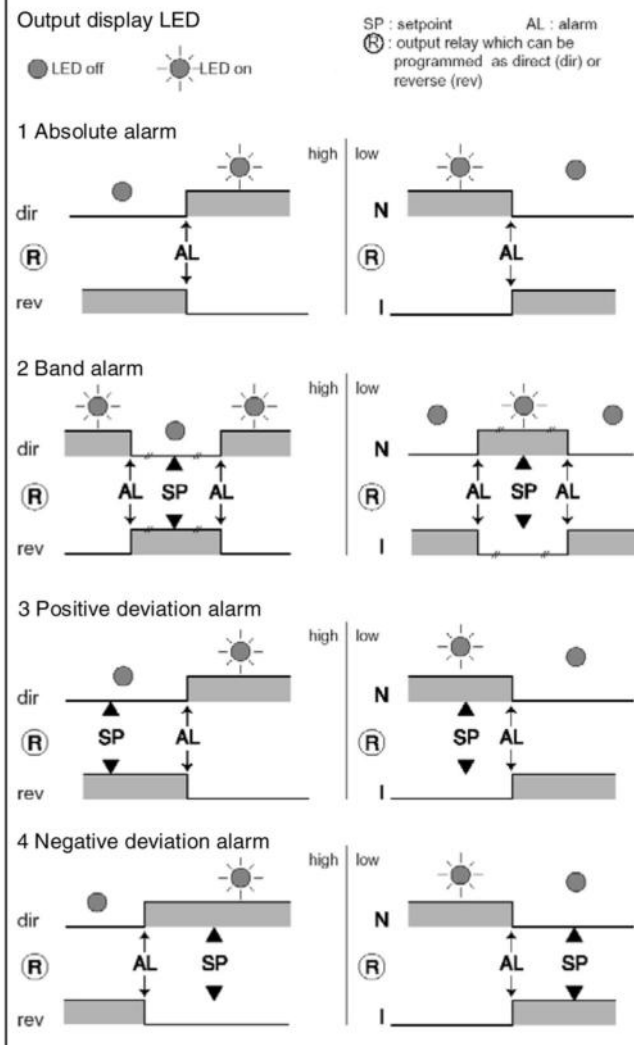
Watchdog	detects a fault in the equipment caused by external interference and activates automatic reset without modification of the process.
Switch	the configuration and calibration are accessed via an internal switch, which can only be accessed when the device is unplugged.

Approvals

UL / CSA	in progress
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Operating modes

Summary of the various configurations

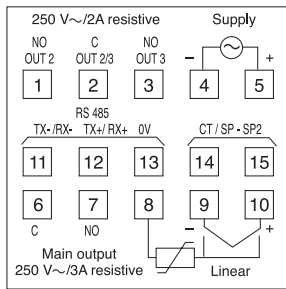


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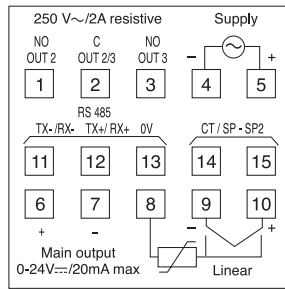
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Wiring diagrams

Relay output



Logic output



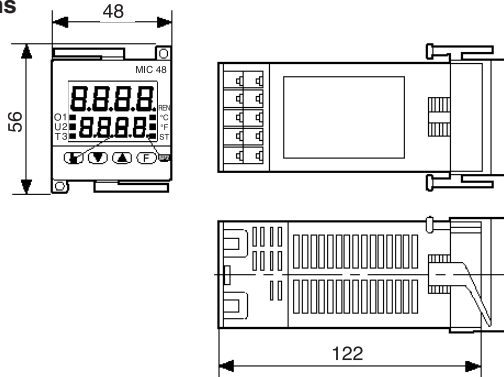
Terminal identification

11 - 12 - 13 - Serial link

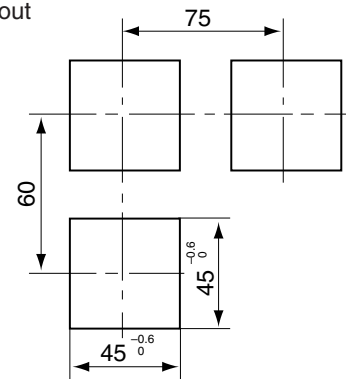
14 - 15 - Input 50 mAa*

* Current transformer connected for load break monitoring or selection of 2nd setpoint

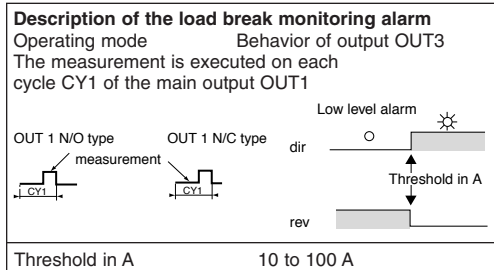
Dimensions



Panel cut-out



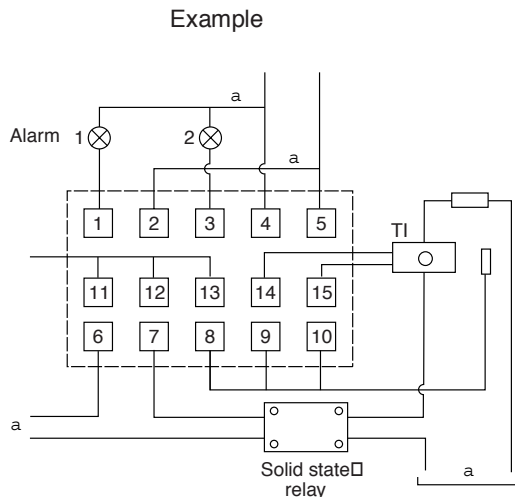
Current Transformer



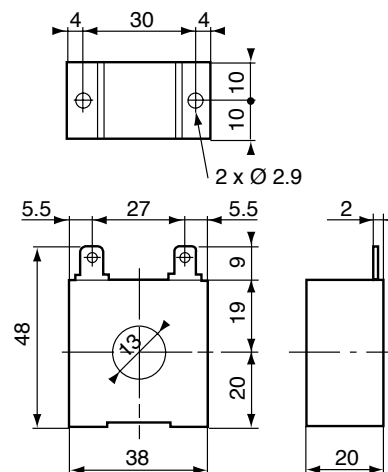
Part numbers

10 A / 50 mA	26 852 301
25 A / 50 mA	26 852 302
50 A / 50 mA	26 852 303
100 A / 50 mA	26 852 304

Wiring diagram



Dimensions



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- Accepts J, K, R, S, T, L, N, type Thermocouples and PT100 2 and 3 wire RTD
- PID Algorithm, Smart Function, Inverse or Direct action and Soft Start for preheating
- 2 outputs Contact or Solid State
- 2 Independent ramps for switching from 1 set point to another



Type

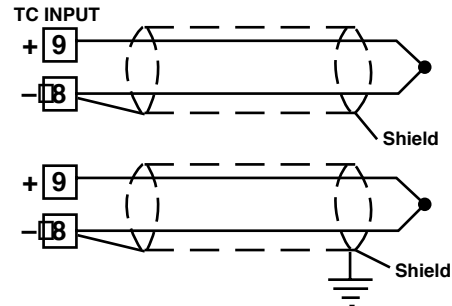
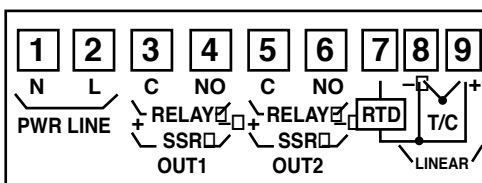
Output 1	Output 2	Input Power	Part Number
Relay 3 A – 250V resistive load	Relay 3 A – 250V resistive load	100 – 240 Vac	89 422 708
Relay 3A – 250V resistive load	Relay 3 A – 250V resistive load	24 Vac / Vdc	89 422 702
Logic 14V – 20mA	Relay 3 A – 250V resistive load	100 – 240 Vac	89 422 718
Logic 14V – 20mA	Relay 3 A – 250V resistive load	24 Vac / Vdc	89 422 712
Logic 14V – 20mA	Logic 14V – 20mA	100 – 240 Vac	89 422 728
Logic 14V – 20mA	Logic 14V – 20mA	24Vac / Vdc	89 422 722

Specifications:

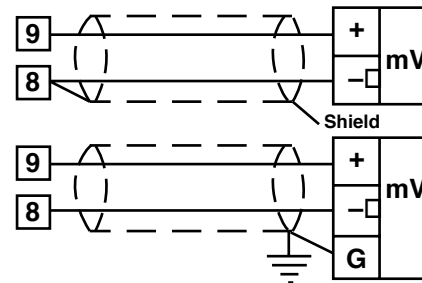
Display	4 Digit
Thermocouples	J (–100.0 / 999.9°C) (–150 / 1830°F) K (–100 / 1370°C) (–150 / 2500°F) R (–50 / 1760°C) (–60 / 3200°F) S (–50 / 1760°C) (–60 / 3200°F) T (–199.9 / 400°C) (–330 / 750°F) L (–100.0 / 900.0°C) (–150 / 1650°F) N (–100 / 1400°C) (–150 / 2550°F) PT 100 2 & 3 wire (–199.9 / 850.0°C) (–330 / 1560°F) Linear 0-60mV, 12-60mV
Dimensions	24 x 48 x 102mm
Front Panel	NEMA 4X, IP 65
Functions	PID Algorithm SMART Function Auto Tuning Direct (cooling) or Inverse (heating) Action Soft Start Function for Preheating
2 Reference Points	Used with the Ramp Function
Alarms	Configurable Control Loop Monitoring

NOTES:

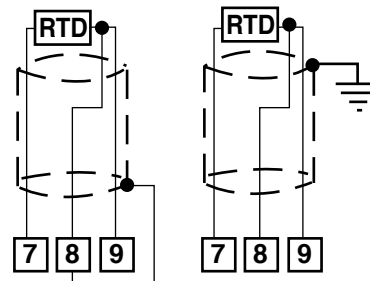
1. Never run input cables together with power cables.
2. When a shielded cable is used it should be connected at one point only.
3. For TC sensors it is preferred to use shielded cables.
4. For RTD's use low resistance wires and ensure that all 3 wires are the same resistance.
5. For Linear inputs use only low resistance wires.



LINEAR INPUT



RTD INPUT



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- Accepts J or K type Thermocouples (Type PT100 can be made available on demand)
- 2 operational modes ON/OFF or PD (Proportional Derivative)
- 8 Pin Plug-in, Relay Output, 1/16 Din, Panel mount



Specifications:

Supply Voltage:	230/240Vac	50/60Hz	+/-15%
Max Power Consumption	2 VA		

Inputs:		
Thermocouple	IAW IEC 584	J or K types
Max line resistance	150Ω	

Derating with regard to setpoint	Per 10°C Variation in Ambient Temp.	≤1°C
	Per 10Ω of line Resistance Variation	≤1°C
	Per 10% variation In supply voltage	≤0.1%

PT100	IAW IEC 751	2 Wire
Derating following line resistance	1°C/0.4Ω	

Derating with regard to setpoint	Per 10°C Variation in Ambient Temp.	≤1°C
	Per 10% variation In supply voltage	≤0.1%

Operation

ON/OFF output	Fixed Hysteresis	0.4%
PD output	Fixed proportional	3%
	Band (% of full scale)	
	Period proportional band	22 s

Type

Part Number

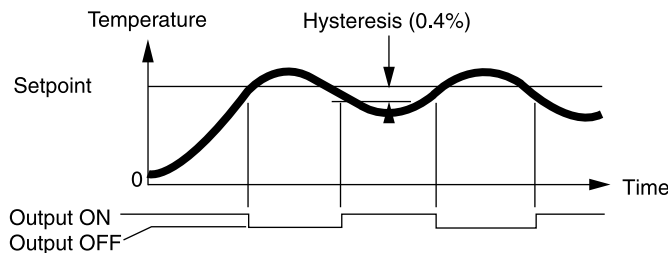
Temperature Range / Scale Divisions	Thermocouple	Part Number
0 to +250°C / 5°C	Type J	89 420 047
0 to +450°C / 10°C	Type J	89 420 067
0 to +650°C / 10°C	Type J	89 420 097
0 to +800°C / 20°C	Type K	89 420 077
0 to +1000°C / 20°C	Type K	89 420 087

Outputs:

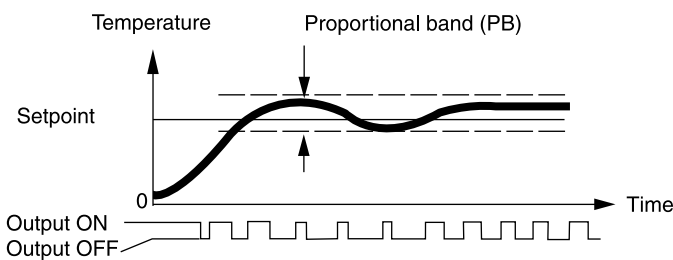
Contact relay	.....SPDT	.....5A / 250Vac max
Mechanical life	.....	.....3 x 10 ⁵ operations
Scale resolution	.....	.....80mm
Display accuracy	.....J - K (full scale)	.....±2%
	.....PT 100 (full scale)	.....±1.5%
Temperature limits	.....Operational	.....0°C + 55°C
	.....Storage	.....-20°C + 70°C
Front Panel Rating	.....IP 41	
Case	.....IP 20	
Weight	.....	.....350g

Function diagrams

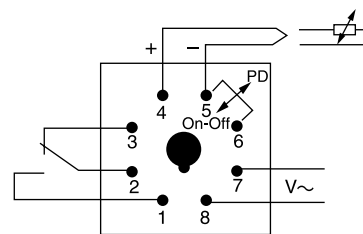
ON/OFF output action



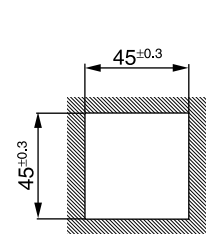
Proportional derivative (PD) action



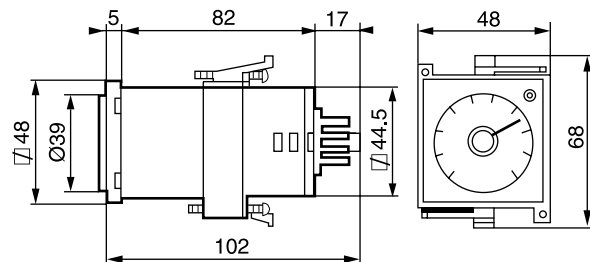
Connections



Panel cut-out



Dimensions - mounting



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- Adjusting two levels (min./max.)
- Monitoring filling (UP) or emptying (DOWN), selected by a switch on the front panel.
- Probes supplied with AC current.
- Sensitivity adjustable on front panel from 5 kΩ to 100 kΩ.



Specifications

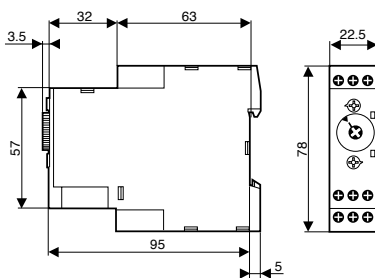
Type	Characteristics	Voltages	Code
ENR	Monitoring filling UP	24 V AC	84 870 201
	Monitoring emptying DOWN	48 V AC	84 870 202
		120 V AC	84 870 203
		230 V AC	84 870 204

General characteristics

Operating range	0.85 → 1.10 x Un
Maximum power consumption	3 VA
Adjustable sensitivity	5 kΩ → 100 kΩ
Measurement accuracy (at maximum sensitivity)	±30%
Electrode voltage (max)	24 V AC (50/60 Hz)
Electrode current (maximum)	1 mA (50/60 Hz)
Maximum cable capacity	10 nF
Response time high level	300 ms
Response time low level	500 ms
Output relay (according to AC1 resistive load)	1 AgNi changeover relay 8 A AC max.
Galvanic isolation via transformer (4 kV, 8 mm creepage distance)	Class II VDE 0551
Isolation of contacts and electrodes from power supply	2.5 kV AC
Operating temperature range (°C)	-20 → +50°C
Storage temperature range (°C)	-40 → +70°C
Weight (g)	150

Dimensions

ENR

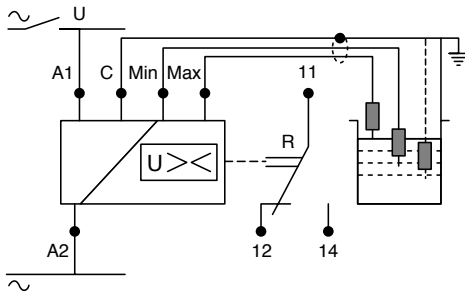


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Connections

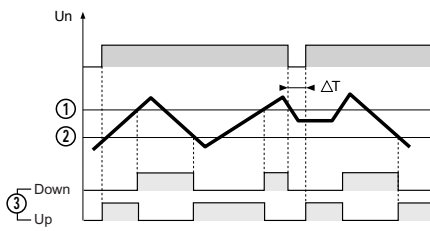
ENR



A1-A2: power supply

Principles

Monitoring filling or emptying ENR



- ① Maximum level
- ② Minimum level
- ③ Output relay: Down or Up

Operating principle

Monitoring maximum and/or minimum levels of conductive liquids (tap water, sea water, waste water, chemical solutions, coffee, etc).

The principle is based on measuring the apparent resistance of the liquid between two submerged probes. When this value is lower than the preset threshold displayed on the unit's front panel, the output relay changes state. To prevent any occurrences of electrolysis, an AC current is passed through the probes. Areas of application include the agri-food, chemical and other industries.

Adjusting two levels: Minimum/Maximum

The output relay changes state when the level of liquid reaches the maximum electrode, with the minimum electrode submerged. It returns to its initial state when the minimum probe is no longer in contact with the liquid.

Note

If the power break T lasts for 1 second or more, the relay reenergises instantly when in "UP" mode and is de-energised when in "DOWN" mode.

Other information

The probe cable (maximum length 100 meters) does not have to be shielded, but avoid mounting it in parallel with the power supply cables. A shielded cable can be used with the shielding connected to the common terminal.

- Adjusting one or two levels (min./max.)
- Monitoring filling (UP) or emptying (DOWN), selected by a switch on the front panel.
- Probes supplied with AC current.
- Sensitivity adjustable on front panel from 250 Ω to 1 MΩ.
- Time delay preventing wave effect adjustable from 0.1 to 5s.



Specifications

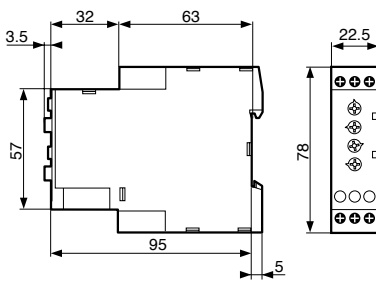
Type	Characteristics	Voltages	Code
ENRM	Monitoring filling UP	24 V AC	84 870 211
	Monitoring emptying DOWN	48 V AC	84 870 212
		120 V AC	84 870 213
		230 V AC	84 870 214

General characteristics

Operating range	0.85 → 1.10 x Un
Maximum power consumption	3 VA
Adjustable sensitivity	250 Ω → 1 MΩ
Measurement accuracy (at maximum sensitivity)	±30%
Electrode voltage (max)	24 V AC (50/60 Hz)
Electrode current (maximum)	1 mA (50/60 Hz)
Maximum cable capacity	10 nF
Response time high level	300 ms
Response time low level	500 ms
Output relay (according to AC1 resistive load)	1 AgNi changeover relay 8 A AC max.
Galvanic isolation via transformer (4 kV, 8 mm creepage distance)	Class II VDE 0551
Isolation of contacts and electrodes from power supply	2.5 kV AC
Operating temperature range (°C)	-20 → +50°C
Storage temperature range (°C)	-40 → +70°C
Weight (g)	150

Dimensions

ENRM

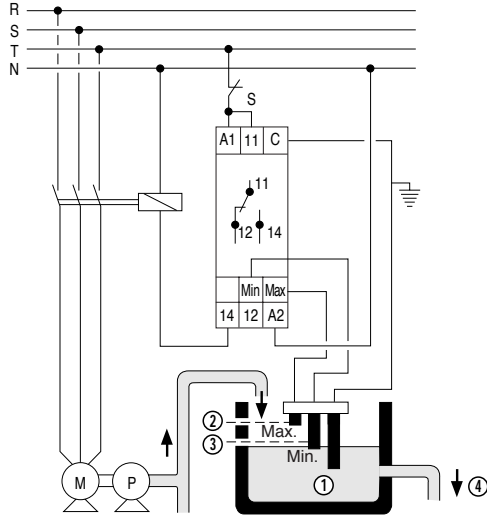


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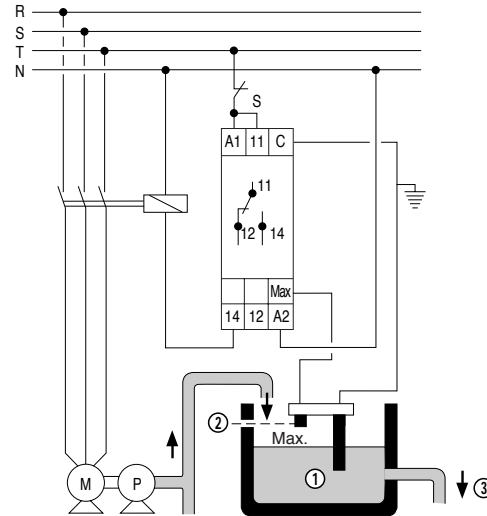
Connections

Adjusting two levels Monitoring filling "Up"



- ① Common
 - ② Off
 - ③ On
 - ④ Output
- A1-A2: power supply

Monitoring emptying "Down"



- ① Common
 - ② Off
 - ③ Output
- A1-A2: power supply

Principles



Operating principle

General principle:

The ENRM monitors the levels of conductive liquids. The principle is based on measuring the apparent resistance of the liquid between two submerged probes. When this value is lower than the preset threshold displayed on the unit's front panel, the relay changes state. To prevent any occurrences of electrolysis, an AC current is passed through the probes. A rotary switch on the front panel can be used to select the desired function and sensitivity range. A level can be monitored using the 2nd rotary switch.

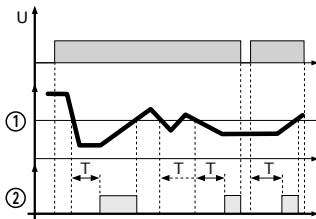
In this instance, the max. probe remains above the liquid and an adjustable time delay prevents the wave effect.

A green LED indicates that the supply voltage is present.

A yellow LED indicates the output relay's state.

When the green and yellow LEDs are flashing, this indicates an incompatible adjustment position.

Rotary switch in mode 2 - Activation time - Filling function



- ① Level
- ② Relay

Monitoring a level, filling function, activation time

(level: 1 - on delay, function Up LS (Low Sensitivity: 250 W to 5 kW), Up St (Standard Sensitivity: 5 kW to 100 kW), Up HS (High Sensitivity: 50 kW to 1 MW).

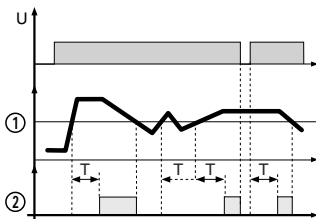
When the level of liquid drops below the probe for a period exceeding the value of time delay T set on the front panel, the relay energizes and remains on until the level of liquid reaches the probe again.

If the level of liquid returns above the level set before the time delay elapses, the relay does not come on.

Note

When the power returns after a power break, the output relay only energizes after time delay T if the level of liquid is below the threshold.

Rotary switch in mode 2 - Activation time - Emptying function



- ① Level
- ② Relay

Monitoring a level, emptying function, activation time

(level: 1 - on delay, function Dwn LS (Low Sensitivity: 250 W to 5 kW), Dwn St (Standard Sensitivity: 5 kW to 100 kW), Dwn HS (High Sensitivity: 50 kW to 1 MW).

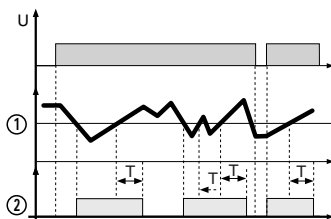
When the level of liquid rises above the probe for a period exceeding the value of time delay T set on the front panel, the relay energizes and remains on until the level of liquid drops back below the probe.

If the level of liquid drops back below the level set before the time delay elapses the relay does not come on.

Note

When the power returns after a power break, the output relay only energizes after time delay T if the level of liquid is above the threshold.

Rotary switch in mode 3 - Deactivation time - Filling function



- ① Level
- ② Relay

Monitoring a level, filling function, activation time

(level: 1 - off delay, function Up LS (Low Sensitivity: 250 W to 5 kW) or Up St (Standard Sensitivity: 5 kW to 100 kW) or Up HS (High Sensitivity: 50 kW to 1 MW).

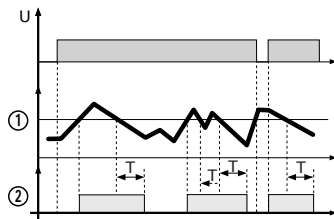
When the liquid level drops below the probe the relay energizes immediately and remains on until the level of liquid reaches the probe again and remains above it for a period exceeding time delay T set on the front panel.

If the level of liquid drops back below the level set before the time delay elapses, the relay remains on.

Note

When the power returns after a power break, the output relay only energizes immediately if the liquid is below the threshold.

Rotary switch in mode 3 - Deactivation time - Emptying function



- ① Level
- ② Relay

Monitoring a level, emptying function, deactivation time

(level: 1 - off delay, function Dwn LS (Low Sensitivity: 250 W to 5 kW), Dwn St (Standard Sensitivity: 5 kW to 100 kW) or Dwn HS (High Sensitivity: 50 kW to 1 MW).

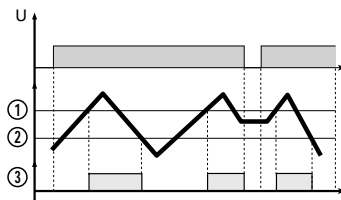
When the level of liquid rises above the probe the relay energizes immediately and remains on until the level of liquid drops back below the probe for a period exceeding the value of time delay T set on the front panel.

If the level of liquid returns above the level set before the time delay elapses the relay remains on.

Note

When the power returns after a power break, the output relay energizes immediately if the level of liquid is above the threshold.

Monitoring two levels, emptying function



- ① Maximum level
- ② Minimum level
- ③ Output relay: Down

Monitoring two levels, emptying function

(level: 2 - function Dwn LS (Low Sensitivity: 250 W to 5 kW), Dwn St (Standard Sensitivity: 5 kW to 100 kW), Dwn HS (High Sensitivity: 50 kW to 1 MW).

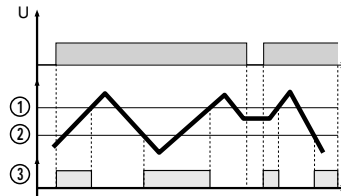
The output relay remains open as long as the level of liquid has not reached the maximum probe. Once the maximum level is reached the contact closes and the tank can then be emptied (valve opened, pump started, etc). When the level drops below the minimum level the contact opens and interrupts the emptying process.

Note: When monitoring two levels the time delay preventing the wave effect is not in operation.

Note

When the power returns after a power break, the output relay energizes immediately if the level of liquid is above the threshold.

Monitoring two levels, filling function



- ① Maximum level
- ② Minimum level
- ③ Output relay: Up

Monitoring two levels, filling function

(level: 2 - function Up LS (Low Sensitivity: 250 W to 5 kW), Up St (Standard Sensitivity: 5 kW to 100 kW) or Up HS (High Sensitivity: 50 kW to 1 MW).

The output relay remains on as long as the level of liquid has not reached the maximum probe. As soon as the maximum level is reached the contact opens and pumping stops. When the level drops below the minimum level the contact closes again and pumping restarts to bring the level of liquid back up.

Note: When monitoring the two levels the time delay preventing the wave effect is not in operation.

Note

When the power returns after a power break, the output relay energizes immediately if the level of liquid is below the threshold.

Other information

The probe cable (maximum length 100 meters) does not have to be shielded, but avoid mounting it in parallel with the power supply cables. A shielded cable can be used with the shielding connected to the common terminal.

L2N

LIQUID LEVEL CONTROL DUAL PUMP DOWN/PUMP UP

UL listed

- **Monitors Emptying and Filling Operations**
- **Prevents Pump Running Dry**
- **5 kΩ to 100 kΩ sensitivity**

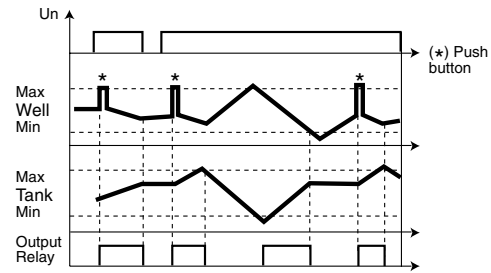


OPERATING PRINCIPLE:

Combined Fill/Empty Function

The output relay changes state when the level of liquid in the tank reaches the “max” electrode, with the “min” electrode submerged. It returns to its initial state when the “min” sensor is no longer in contact with the liquid. When the level of liquid in the well reaches the “min” electrode, the pump stops.

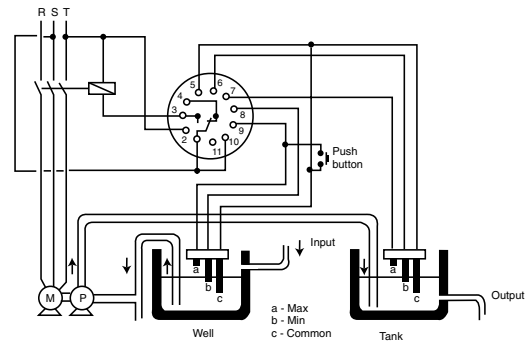
If, on power-up or after a power break, the “max” electrode in the tank is above the surface, reset the device by pressing the PB pushbutton.



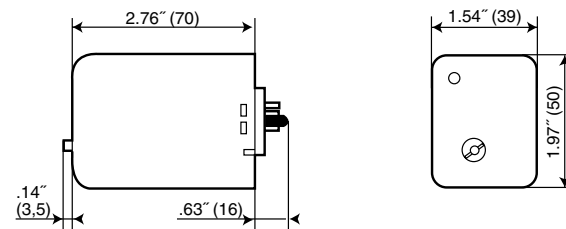
SPECIFICATIONS:

Input power	24, 110, 230 VAC ±15%, 50/60 Hz
Max. power consumption	3 VA
Adjustable sensitivity	5 K ohm to 100 K ohm
Measurement accuracy (at maximum sensitivity)	0 to 30%
Electrode voltage (maximum)	24 VAC, 50/60 Hz
Electrode current (maximum)	1 mA 50/60 Hz
Maximum cable capacity	10 nF
Response time:	high level: 300 ms low level: 500 ms
Galvanic insulation by transformer (4 KV, 8mm creepage distance)	Class II VDE 0551
Insulation of contacts and electrodes from power supply	2.5 K VAC
Output	SPDT relay
Contact material	AgCdO
Maximum loading	8 Amp resistive
Minimum switching voltage	250 VAC
Operating temperature	-4°F to 140°F, (-20°C to 60°C)
Storage temperature	-22°F to 158°F, (-30°C to 70°C)
Weight	4.9 oz. (140g)

WIRING:



DIMENSIONS: inches (mm)



ORDERING INFORMATION:

Voltage	Part Number
24 VAC	84 870 401
120 VAC	84 870 403
230 VAC	84 870 404

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NNR SERIES

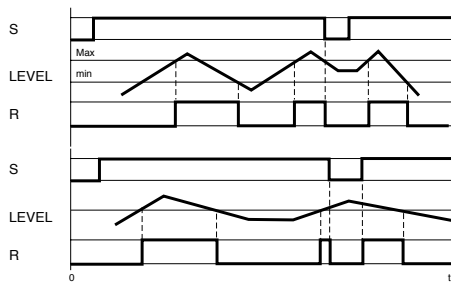
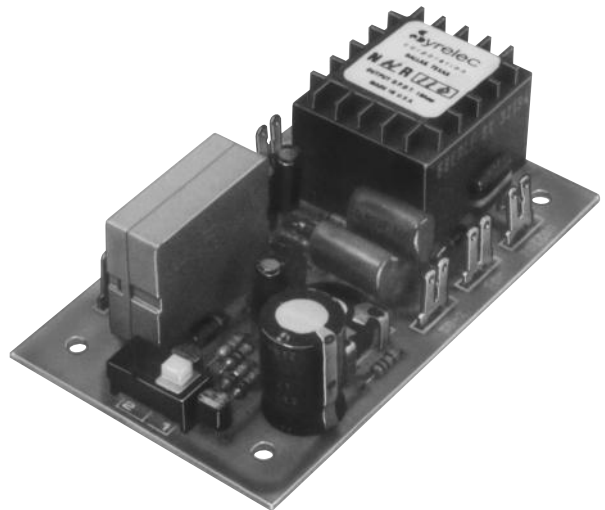
LIQUID LEVEL CONTROL

PUMP UP OR DOWN

SWITCH SELECTABLE

UL listed CSA recognized

- 10 Amp SPDT Rated
- Sensitivity Adjustment 4.7 kΩ to 47 kΩ
- One, Two or Three Probe Operation
- 24 VAC to 220 VAC Voltages



A - Pump down function: the output relay energizes when the liquid level reaches the high or max. probe. It remains energized until the level is below the low or min probe. The relay will remain de-energized until the high level is again reached. This control may also be used with only two probes by connecting the maximum and common terminals together. The output is energized when the low probe is in contact with the liquid.

B - Pump up function: when power is supplied to the unit, the output relay is energized. When the level reaches the high probe the relay is de-energized. The relay is energized again when the level falls below the low probe. The control may also be used with only two probes by connecting the maximum and common terminals together. The output is de-energized when the level reaches the low probe.

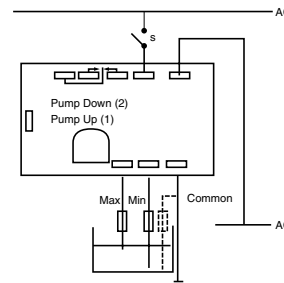
In both functions, If the container is conductive, It may be used as the common probe in some applications

SPECIFICATIONS:

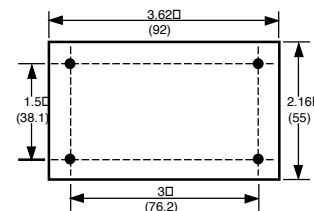
Input	24, 48, 110, 220 VAC
	±15% (50/60 Hz)
Maximum power consumption	24 VAC: 1.5 VA
	48 VAC: 1.7 VA
	110 VAC: 2 VA
	220 VAC: 2 VA
Output	SPDT relay
Contact material	AgCdO (90/10)
Maximum loading	10 A AC resistive 1A DC inductive
Maximum switching voltage	250 VAC 30 VDC
Relay maximum power rating	2500 VA 30 VDC
Mechanical life of relay	3 x 10 ⁷ operations
Electrical life of relay	2 x 10 ⁶ at 2200 VA resistive load
Probe isolation	Switching contact: 2000 VA
	Electrodes: 2000 VAC
Probe sensitivity	4.7 K ohm to 47 K ohm
Probe voltage	24 VAC, 60 Hz
Probe current	2 mA max.
Operating temperature	+14°F to 140°F -10°C to +60°C
Weight	4.6 oz. (130g)

Note: For best results use shielded cable with the probes and do not run probe cables with other wires.

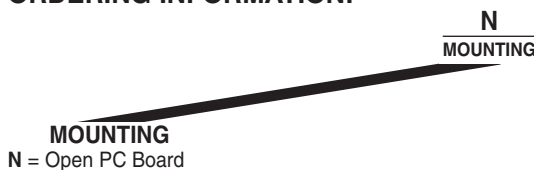
WIRING DIAGRAM:



DIMENSIONS:



ORDERING INFORMATION:



- INPUT POWER**
- 24A = 24 VAC
 - 48A = 48 VAC
 - 110A = 110 VAC
 - 220A = 220 VAC

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

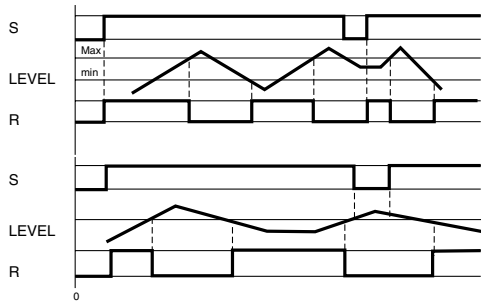
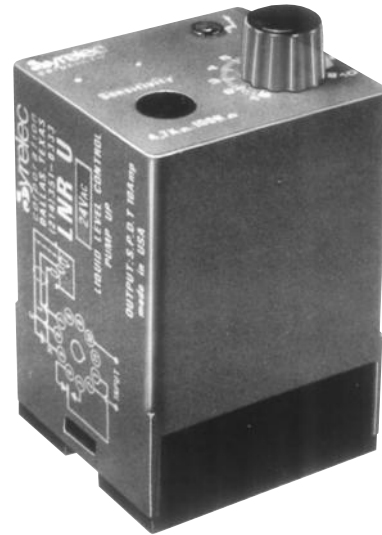
NRU SERIES

LIQUID LEVEL CONTROL

PUMP UP

UL listed CSA recognized

- LED Relay Indicator
- Three Styles
- Pump Up Control
- 4.7 kΩ to 100 kΩ Sensitivity
- 10 Amp SPDT Relay



Control of conductive liquids (tap water, sea water, sewage, chemical solutions, coffee, ice cream, etc.)

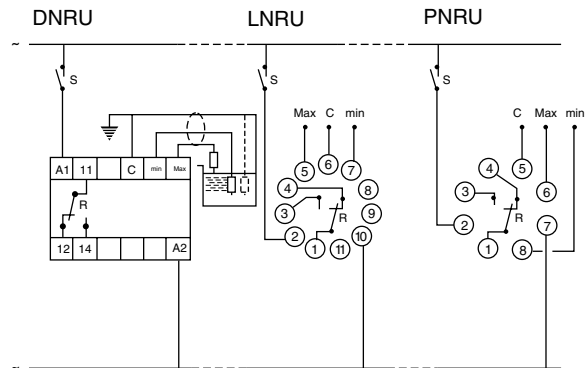
The relay is energized when the level falls below the low level probe. It de-energizes when the high level probe is reached. The NRU will also control a single level. In this case, a single probe is used and the relay operates when the probe is not immersed. The Max terminal is connected to common with a jumper.

In either case, a common electrode is needed if the container is non-conductive.

SPECIFICATIONS:

Input Power	.24, 48, 110, 220 VAC, ±15% (50/60 Hz)	
Maximum voltage	.24 VAC: 1.5 VA	
	48 VAC: 1.7 VA	
	110 VAC: 2 VA	
	220 VAC: 2 VA	
Output	SPDT Relay	
Contact material	AgCdO	
Maximum loading	.10A AC resistive	8A DC resistive
Maximum switching voltage	.250 VAC	80 VDC
Maximum power rating	.2500 VA	80 W
Electrical life	.2 x 10 ⁶ at 2200 VA resistive load	
Mechanical life	.3 x 10 ⁷ operations	
Probe isolation	Electrodes: 2000 VAC	
Probe sensitivity	.4.7 K to 100 K ohms	
Probe voltage	.24 VAC, 60 Hz	
Probe current	.2 mA max.	
Operating temperature	+14°F to +140°F	-10°C to +60°C
Weight	.7 oz. (200g)	

WIRING DIAGRAM:



Note: The cable for probes (max 300ft) should be run in separate conduit. A shielded cable is recommended.

ORDERING INFORMATION:



Products and specifications subject to change without notice.

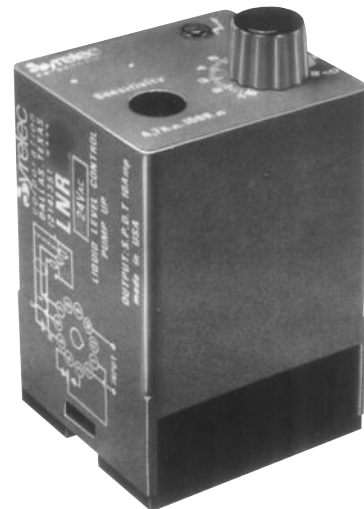
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

NR SERIES

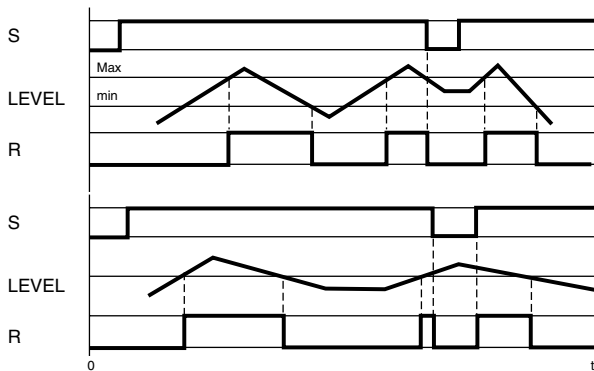
LIQUID LEVEL CONTROL

PUMP DOWN

UL listed CSA recognized



- **24 VAC to 220 VAC Operating Voltages**
- **4.7 kΩ to 100 kΩ Sensitivity**
- **LED Relay Indicator**
- **10 Amp SPDT Relay**

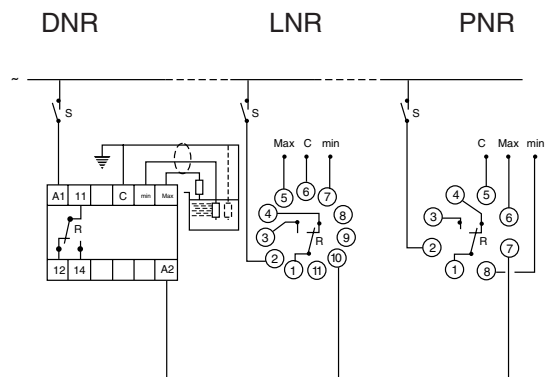


The output relay energizes when the liquid level reaches the high probe. The relay de-energizes when the liquid falls below the low probe. This control can also be used with only two probes by connecting the maximum and common terminals together. The output is energized when the level reaches the low probe. In both functions, if the container is conductive, it may be used as the common probe in some applications.

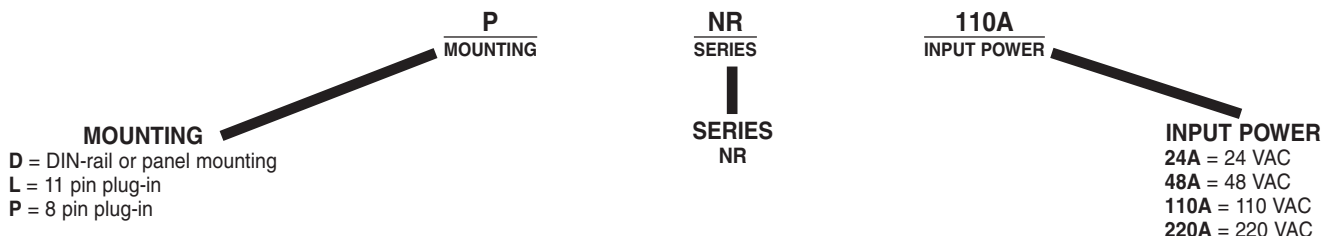
SPECIFICATIONS:

Input	24, 48, 110, 220 VAC ±15% (50/60 Hz)
Maximum power consumption	24 VAC: 1.5 VA 48 VAC: 1.7 VA 110 VAC: 2 VA 220 VAC: 2 VA
Output	SPDT relay
Contact material	AgCdO
Maximum loading	10A AC resistive 8A DC inductive
Maximum switching voltage	250 VAC 250 VDC
Relay maximum power rating	2500 VA 80 W
Mechanical life of relay	3 x 10 ⁷ operations
Electrical life of relay	2 x 10 ⁶ at 2200 VA resistive load
Probe isolation	Electrodes: 2000 VAC
Probe sensitivity	4.7 K to 100 K ohms
Probe voltage	24 VAC, 60 Hz
Probe current	2 mA max.
Operating temperature	+14°F to 140°F -10°C to +60°C
Weight	4.6 oz. (130g)

WIRING DIAGRAM:



ORDERING INFORMATION:



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NRT SERIES

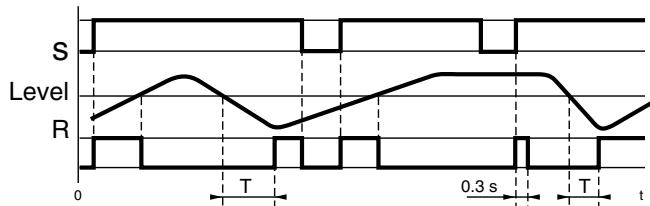
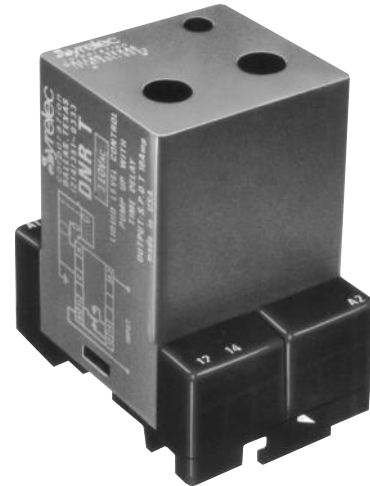
LIQUID LEVEL CONTROL

CONSTANT LEVEL

PUMP UP

UL listed CSA recognized

- **100 kΩ Sensitivity**
- **10 Amp SPDT Relay**
- **Maintain Constant Level**
- **Four Mounting Options**

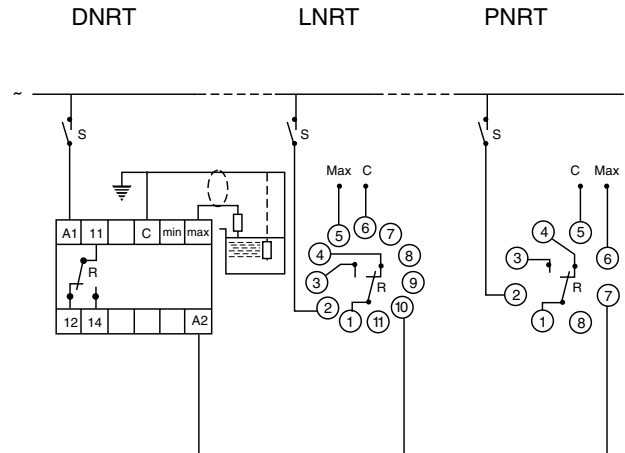


The NRT series is applied for maintaining a constant level of conductive liquid. When the liquid decreases below the probe, the relay is energized after a 4 second time delay to avoid wave disturbances. The relay de-energizes when the liquid reaches the probe. A common electrode is needed if the container is non-conductive.

SPECIFICATIONS:

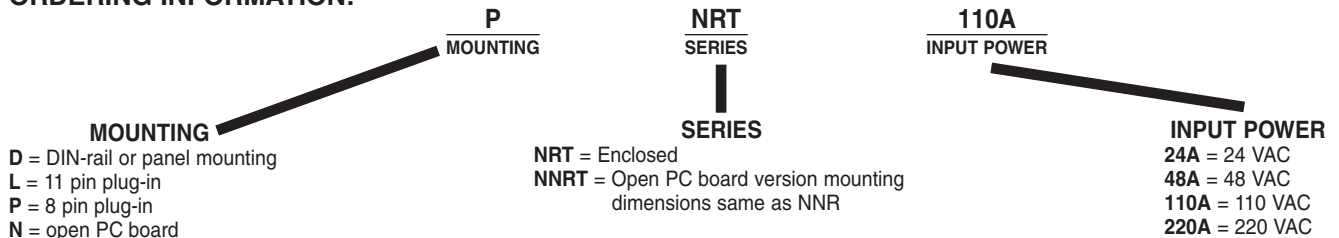
Input	24 VAC, 48 VAC, 110 VAC
	220 VAC, ± 15%, 50/60 Hz
Maximum power consumption ...	24 VAC: 1.5 VA
	48 VAC: 1.7 VA
	110 VAC: 2 VA
	220 VAC: 2 VA
Output	SPDT Relay
Contact material	AgCdO
Maximum loading	10 A AC resistive 8 A Dc resistive
Maximum switching voltage	250 VAC 250 VDC
Relay maximum power rating	2500 VA 80 W
Mechanical life of relay	3 x 10 ⁷ operations
Electrical life of relay	2 x 10 ⁵ at 2200 VA resistive load
Probe isolation	Switching contact 2000 VAC
	Electrodes: 2000 VAC
Probe sensitivity	100 kΩ
Probe voltage	24 VAC, 60 Hz
Probe current	1 mA max.
Operating temperature	+14°F to +140°F -10°C to +60°C
Weight	7 oz. (200g)

WIRING DIAGRAM:



Note: The probe cables (max. 300ft) need not be shielded; however, it is not advisable to run the probe cables with power cables. If shielded cable is used, the shield and common should be connected.

ORDERING INFORMATION:



Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

JR SERIES ALTERNATING RELAY

UL listed CSA recognized



- Duplex Alternating Control
- SPDT or DPDT Control Relay
- 10 Amp Rated
- Externally Controlled

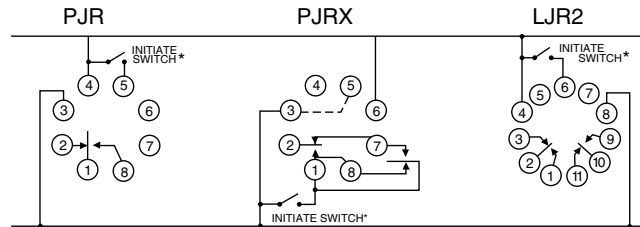
The electronic alternating relay is designed to replace mechanical style devices used in control applications requiring a duplexing or alternating action of the control circuits to operate pumps, compressors, etc. This is achieved by activating a control switch which is common to one side of the input control voltage. The output contact of the relay(s) change state when this switch is opened

(on de-energization of the control circuit). When the control initiate switch is actuated and released or opened, the relay will change state. The next time the initiate switch is actuated and released it will change back to its original state. Two red LED's located on the top of the dust resistant enclosure provide the status of the relay.

SPECIFICATIONS:

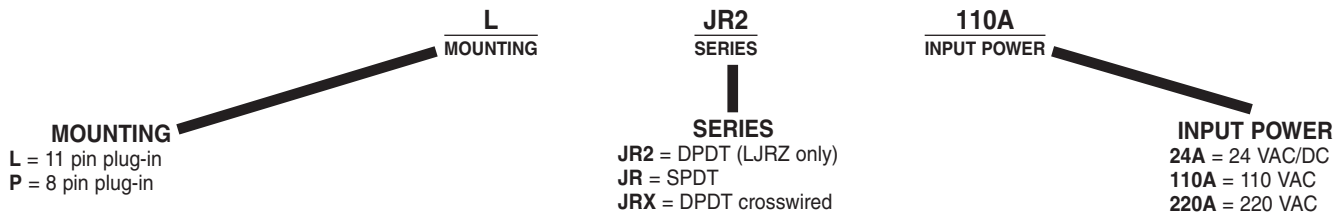
Input	24 VAC/DC, 110, 220 VAC
	± 15%, 50/60 Hz
Maximum power consumption ...	24 VAC: 1.5 VA
	110 VAC: 5 VA
	220 VAC: 11 VA
Output	SPDT 10 A resistive
	DPDT 10 A resistive
	DPDT 10 A crosswired
Minimum pulse	30 ms
Contact material	AgCdO
Maximum loading	10 A AC resistive 8 A DC inductive
Maximum switching voltage	250 VAC 250 VDC
Relay maximum power rating ...	2200 VA 80 W
Mechanical life of relay	3 x 10 ⁶ operations
Electrical life of relay	2 x 10 ⁵ at 2200 VA resistive load
Operating temperature	14°F to 140°F -10°C to +60°C
Weight	2.8 oz. (100g)

WIRING DIAGRAM:



* INITIATE SWITCH must be isolated from other circuits

ORDERING INFORMATION:



Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

JRS SERIES

ALTERNATING RELAY WITH SELECTOR SWITCH

UL listed

- Duplex Alternating Control
- SPDT or DPDT Control Relay
- 10 Amp Rated
- Externally Controlled
- Selection of Lead or Lag Load



2

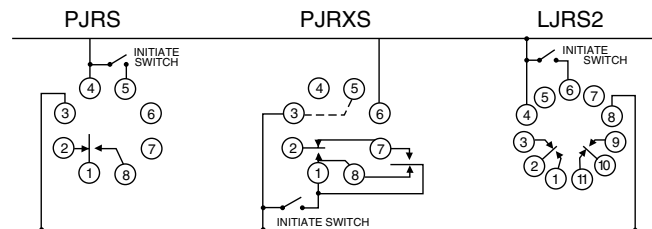
The electronic alternating relay is designed to replace mechanical style devices used in control applications requiring a duplexing or alternating action of the control circuits to operate pumps, compressors, etc. This is achieved by activating a control switch which is common to one side of the input control voltage. The output contact of the relay(s) change state when this switch is opened (on de-energization of the control circuit). When the control

initiate switch is actuated and released or opened, the relay will change state. The next time the initiate switch is actuated, it will change back to its original state. Two red LED's located on the top of the dust resistant enclosure provide the status of the relay. A 3 Position Selector switch is installed for selection of normal operation (alternating) or selection of lead or lag load.

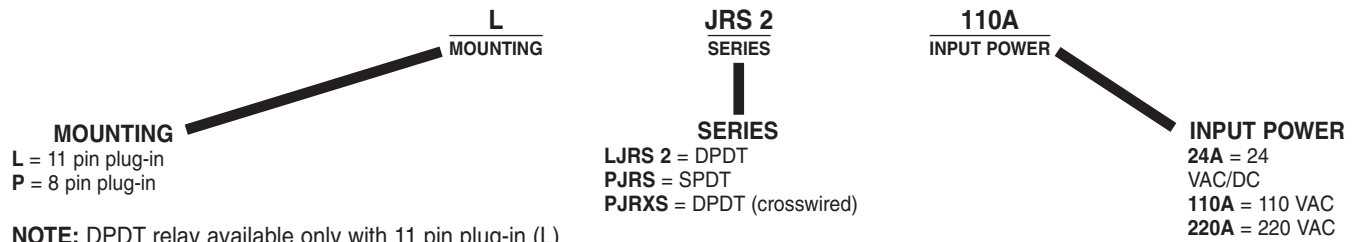
SPECIFICATIONS:

Input	24 VAC/DC, 110, 220 VAC
	±15%, 50/60 Hz
Maximum power consumption ...	24 VAC: 1.5 VA
	110 VAC: 5 VA
	220 VAC: 11VA
Output	SPDT 10 A resistive
	DPDT 10 A resistive
	DPDT 10 A crosswired
Minimum pulse	30 ms
Contact material	AgCdO
Maximum loading	10 A AC resistive 8 A DC inductive
Maximum switching voltage	250 VAC 250 VDC
Relay maximum power rating	2200 VA 80 W
Mechanical life of relay	3 x 10 ⁶ operations
Electrical life of relay	2 x 10 ⁵ at 2200 VA resistive load
Operating temperature	14°F to 140°F -10°C to +60°C
Weight	2.8 oz. (100g)

WIRING DIAGRAM:



ORDERING INFORMATION:



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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

FW SERIES PHASE CONTROL RELAY

UL cUL listed CSA recognized

- **Monitors and Protects Against**
 - Phase Loss of One or More Phases
 - Phase Reversal
 - Undervoltage
- **Rugged Construction for Over Voltage and Transient Protection**



GENERAL FEATURES:

The unit has two front dial settings. The upper dial is used for the three phase nominal voltage settings that exists in the application. The lower dial setting is for an adjustable time delay to prevent nuisance tripping of the unit. The FW has a space saving 45mm wide DIN-rail mount/surface mount enclosure and LED power-on and relay status indication.

SPECIFICATIONS:

Model No.	84873010	84873011	84873015	84873016
Input Power	3 x 230VAC	3 x 380VAC	3 x 480VAC	3 x 600VAC
Threshold Adjustment	184 - 264VAC	310 - 337VAC	384 - 552VAC	460 - 661VAC
Maximum Voltage	264VAC	337VAC	552VAC	661VAC
Minimum Voltage	184VAC	304VAC	384VAC	460VAC
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz

Max. Power Consumption	6 VA [Powered from L1 & L2]
Immunity from micro power cuts	10 ms
Delay on pick-up	500 ms
Isolation coordination	Category III Degree of pollution 2 acc. to IEC 664-1 VDE 0110 : 4 KV/2
Measurement input resistance	1 kΩ x input power
Regeneration rate	max 70% of present threshold
Undervoltage detection (symmetrical drop)	~15% of front dial settings
Threshold display accuracy	±10%
Output relay	DPDT (Ag CdO)
Breaking capacity	2000 VA/AC 80 W/DC
Maximum breaking current	8 A
Minimum breaking current	100 mA
Maximum breaking voltage	250 V AC resistive
Electrical Life	AC12: 2000 VA - 10 ⁵ operations AC15: cos φ = 0.3 - 6000 operations DC13: L/R = 300 ms - 6000 operations
Mechanical Life	5 x 10 ⁵ operations
Maximum rate (at full load)	360 operations / hr
Time delay in the event of a fault	0.2 to 10 s (0 • +50 %) [Only for loss of L3]
Display Voltage presence	green LED
Relay	yellow LED
Casing	Self-extinguishing
Terminals Without ferrule	2 x 2.5mm ²
With ferrule	2 x 1.5mm ²
Tightening	0.6 mN max.
Temperature Use	-20°C to +60°C
Limits Stored	-30°C to +70°C
Relative humidity	93% without condensation
Vibration Amplitude	0.35mm
Frequency	10 - 55 Hz
Isolation resistance	>100 mΩ at 500 V
Dielectric strength	3 kV at 1 mA for 1 minute / 50 Hz
Weight	350 g

ORDERING INFORMATION:	Voltage	Part Number
	3 x 230 VAC	84873010
	3 x 380 VAC	84873011
	3 x 480 VAC	84873015
	3 x 600 VAC	84873016

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

OPERATING PRINCIPLE:

In a 3-phase network, the FW simultaneously monitors phase sequencing, loss of phase with a maximum regeneration rate of 70% of the displayed by a potentiometer on the front face, and the voltage drop on the 3 phases of less than 15% of the preset value. When the 3 phases succeed one another, the output relay is activated and indicated via a yellow LED. The output relay de-energizes (LED off) after a time delay T, adjustable between 0.2 and 10 seconds on the front face, if one of the following faults is present :

- reversed direction of phase rotation
- absence of one or more phases
- voltage drop

CONFORMITY:

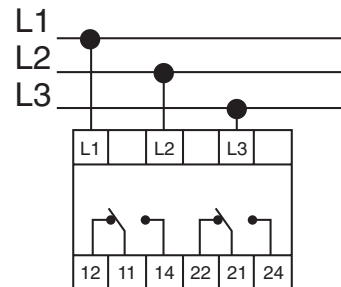
Immunity to interference and noise (EMC)

- IEC 1000.4.5 Surge immunity: Level 3
- IEC 1000.4.2 Electrostatic discharges: Level 3
- IEC 255.5 Damped oscillated waves: Level 3
- IEC 1000.4.3 Radiated disturbance Level 3
- IEC 1000.4.4 Fast transient Level 3
- IEC 1000.4.6 Conducted RF: Level 3 (ENV 50141)

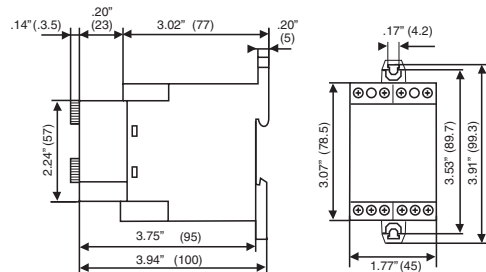
RF Emissions (EMC)

CENELAC EN 55022; Class A

WIRING:



DIMENSIONS: Inches (mm)



WRL SERIES PHASE CONTROL RELAY

UL listed CSA recognized



- **Monitors**
 - Phase Sequence**
 - Loss of Any Phase even if Induced Voltage reaches 95% of Nominal Voltage**
- **Under Voltage Detection**
- **Trip Delay Timer Built-in**
- **LED Relay Status Indicator**



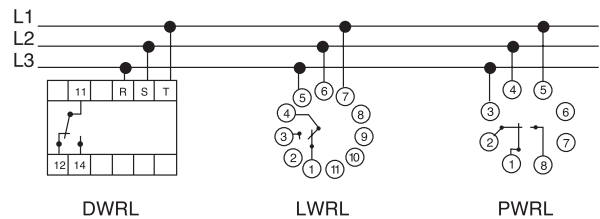
MODE OF OPERATION:

The WRL Phase Control Relay monitors the sequence loss or reversal of three phase power supplies. The output relay is energized when the phase sequence is correct and the phase voltage is above the voltage threshold set by the front knob. The output relay will de-energize after 2 seconds (built-in timer) when the phase voltage drops under the voltage threshold or when phase sequence is lost. The WRL Series is available in three voltage ranges: 230 VAC, 380 VAC and 480 VAC.

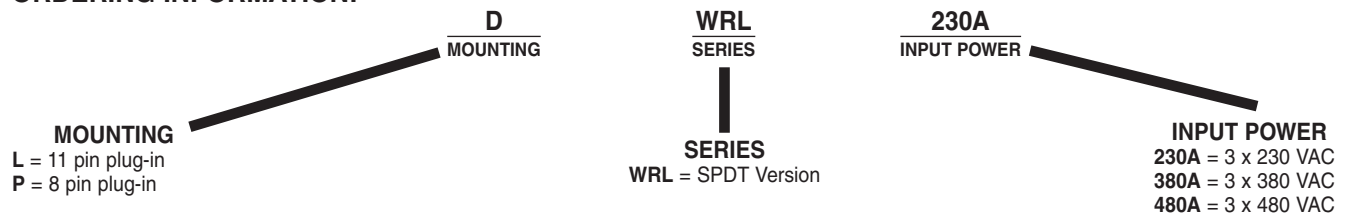
SPECIFICATIONS:

Input Power	3 x 230 (50/60 Hz)
	3 x 380 (50/60 Hz)
	3 x 480 (50/60 Hz)
Maximum voltage	3 x 280 VAC
	3 x 420 VAC
	3 x 530 VAC
Minimum voltage	3 x 160 VAC
	3 x 260 VAC
	3 x 340 VAC
Threshold adjustment range	160 to 230 VAC
	260 to 380 VAC
	340 to 480 VAC
Max power consumption	2 VA
Dial accuracy	±10%
Temperature De-rating	±0.04%/°C
Dead Band	4% of 480 VAC
Response Time	300 ms on Make
	2 sec on Break
Output	
SPDT Version (WRL) Series)	10 Amp 250 VAC
Max. power consumption	2000 VA
Max. voltage	250 VAC
Electrical life	2 x 10 ⁷ operations
Mechanical life	1 x 10 ⁶ operations
Operating temperature	-10°C to +60°C
Weight	3.5 oz. (100g)

WIRING DIAGRAM:



ORDERING INFORMATION:



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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

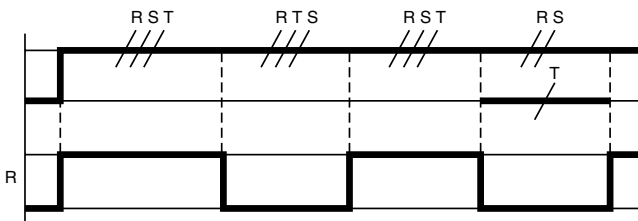
WRA SERIES PHASE CONTROL RELAY

UL listed CSA recognized (220 VAC Version Only)



- **Monitors**
 - Phase Sequence**
 - Loss of Any Phase even if Induced Voltage reaches 95% of Nominal Voltage**
- **LED Relay Status Indicator**
- **SPDT 10 Amp Relay Output**

MODE OF OPERATION:



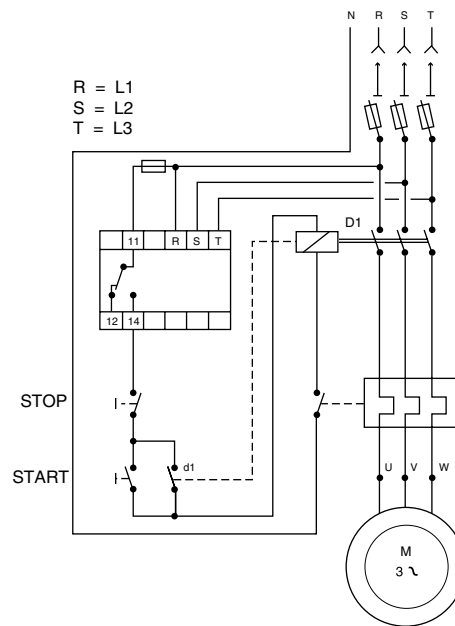
The WRL Phase Control Relay monitors the sequence loss or reversal of three phase power supplies. The output relay is energized when the phase sequence is correct and is de-energize when the phase sequence is wrong or one phase is lost. It monitors the symmetry of 3 voltages and a loss of phase even when the voltage is reinjected through a machine. The rate of asymmetry is controlled between 5% and 15% by a top mounted potentiometer.

SPECIFICATIONS:

Input Power Directly	3 x 220 60 Hz	
from controlled voltage ±15%	3 x 380 60 Hz	
	3 x 440 60 Hz	
Power consumption	3 VA at 220 V	
Output	SPDT relay	
Contact material	AgCdO	
Maximum Loading	10 AC resistive	8A DC inductive
Maximum switching voltage ..	250 VAC	250 VDC
Relay max. power rating	220 VA	80 W
Mechanical life of relay	30 x 10 ⁶ operations	
Electrical life of relay	2 x 10 ⁶ operations at 2200VA resistive load	
Operating temperature	+14°F to +140°F	-10°C to +60°C
Weight	7 oz. (200g)	

Note: The alarm threshold adjustment is 5% to 15% of asymmetry between the phases. The initial response time is .1 seconds at 5% asymmetry and 1 second at 15% after input power is applied. When a phase loss or failure occurs, the "off delay" response time is 100 ms.

WIRING DIAGRAM:



DWRA	11	12	14	R	S	T
LWRA	1	4	3	5	6	7
PWRA	1	2	8	3	4	5

ORDERING INFORMATION:

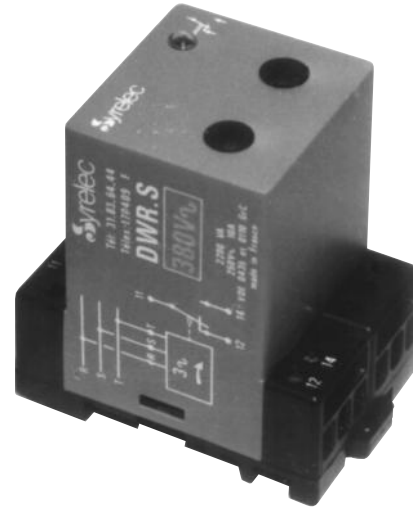


Products and specifications subject to change without notice.

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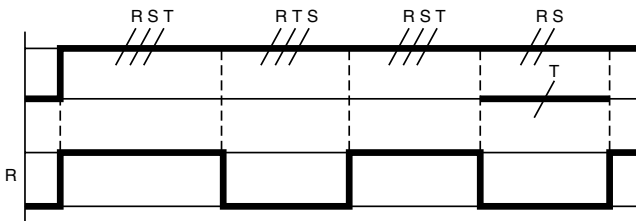
WRS SERIES PHASE CONTROL RELAY

UL listed CSA recognized



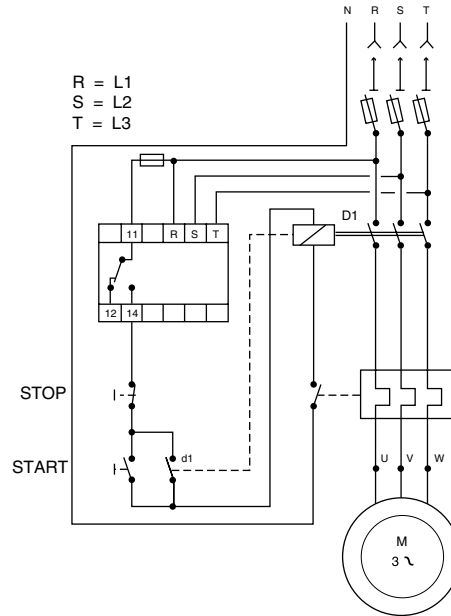
- **Monitors**
 Phase Sequence
 Loss of Any Phase
- **LED Indicator**
- **10 Amp SPDT Output**
- **Low Cost**

MODE OF OPERATION:



The WRS Phase Control Relay monitors the sequence loss or reversal of three phase power supplies. The output relay is energized when the phase sequence is correct and is de-energize when the phase sequence is wrong or one phase is lost.

WIRING DIAGRAM:



SPECIFICATIONS:

Input Power Directly	3 x 220 60 Hz	
from controlled voltage ±15%	3 x 380 60 Hz	
	3 x 440 60 Hz	
Power consumption	3 VA at 220 V	
Output	SPDT relay	
Contact material	AgCdO	
Maximum Loading	10 AC resistive	1 A SC inductive
Maximum switching voltage	250 VAC	250 VDC
Relay max. power rating	2200 VA	30 W
Mechanical life of relay	30 x 10 ⁶ operations	
Electrical life of relay	2 x 10 ⁶ operations at 2200 VA resistive load	
Operating temperature	+14°F to +140°F	-10°C to +60°C
Weight	7 oz. (200g)	

DWRS	11	12	14	R	S	T
LWRS	1	4	3	5	6	7
PWRS	1	2	8	3	4	5

ORDERING INFORMATION:



Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

HDI SERIES

CURRENT CONTROL RELAY WITH DISPLAY

UL cUL listed

- 3 Digit LCD Display
- Monitors AC and DC Current
- Type HDIL Measures from 2 to 500 mA
- Type HDIH Measures from .1 to 10 A



TWO PRODUCT TYPES: HDIL (2 TO 500 mA) and HDIH (.1 TO 10 A) PROVIDE SELECTABLE OVER OR UNDER CURRENT CONTROL.

Control of AC / DC current without memory

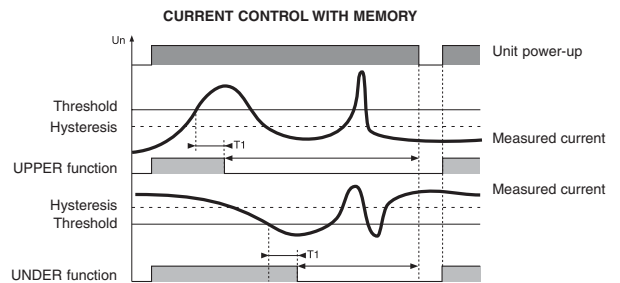
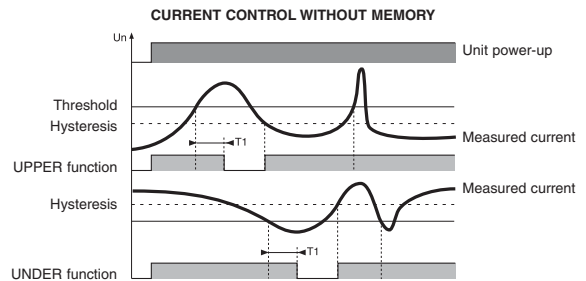
When the value of the measured current, AC or DC, reaches the threshold the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

Once the current drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC current with memory

When the value of the measured current, AC or DC, reaches the threshold displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

MODE OF OPERATION:



SPECIFICATIONS:

Input power	24 VDC, 24, 120, 230 VAC
	±15%, 50/60 Hz
Max. power consumption	3 VA
Frequency of measured signal (AC)	40 to 500 Hz
Setting accuracy – threshold	±10% of selected threshold
Hysteresis selection	5 to 50% of displayed threshold
Repeat accuracy	±0.1% with constant parameters
Delay on threshold overrun	0.1 to 3 sec. – adjustable
Output	SPDT
Maximum loading	5 Amp resistive
Minimum loading	100 mA
Maximum switching voltage	250 VAC
Electrical life of relay	500,000 operation at full load
Mechanical life of relay	5,000,000 operations
Protection	Casing IP 40
	Terminal IP 20
Operating temperature	-4°F to 140°F, (-20°C to 60°C)
Storage temperature	-22°F to 158°F, (-30°C to 70°C)
Weight	11.2 oz. (320g)

MEASUREMENT RANGE:

TYPES		HDIL			HDIH		
Inputs		E1-M	E2-M	E3-M	E1-M	E2-M	E3-M
Measurement range	Sensitivity	2 to 20 mA	10 to 100 mA	50 to 500 mA	.1 to 1 A	.5 to 5 A	1 to 10 A
	Input resistance	5 Ω	1 Ω	.2 Ω	.1 Ω	.02 Ω	.01 Ω

***Important:** 24 VDC input version. The input voltage and the measured current must be from separate sources. The "negative" poles of the auxiliary power supply and the measurement circuit are connected inside the unit.

ORDERING INFORMATION:

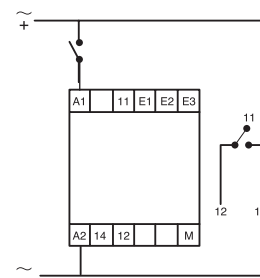
Part Number	Type	Supply Voltage	Measurement Range
84 871 301	HDIL	24 VDC*	2 to 500 mA
84 871 302	HDIL	24 VAC	2 to 500 mA
84 871 304	HDIL	120 VAC	2 to 500 mA
84 871 305	HDIL	230 VAC	2 to 500 mA
84 871 306	HDIH	24 VDC*	.1 to 10 A
84 871 307	HDIH	24 VAC	.1 to 10 A
84 871 309	HDIH	120 VAC	.1 to 10 A
84 871 310	HDIH	230 VAC	.1 to 10 A

*See "Important" in Specifications

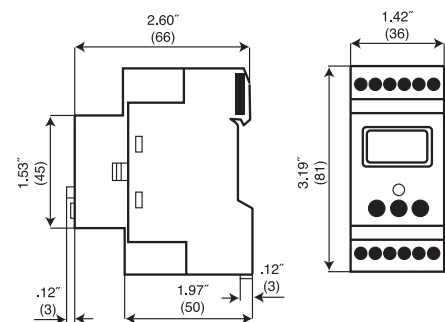
Products and specifications subject to change without notice.

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WIRING:



DIMENSIONS: inches (mm)

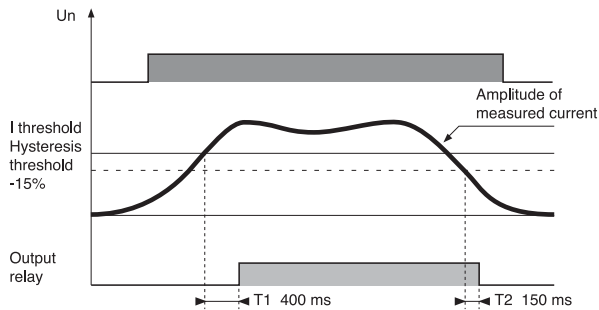


MCI SERIES

CURRENT CONTROL RELAY

UL listed cUL listed

- Simple to Install
- Built in Current Transformer
- 1 to 20 Amp Current Control
- Space Saving 17.5mm Wide Enclosure



When the value of the controlled AC current reaches the threshold displayed on the front face, the output relay changes state at the end of T1 (400 ms fixed). It returns to its initial position at the end of T2 (150 ms fixed), when the controlled current drops below the displayed threshold minus the fixed hysteresis of 15%.

Simple to install. 1.) Run the electric cable through the current transformer on the unit. 2.) Set the over current control threshold between 1 and 20 A. 3.) Connect power to the MCI.

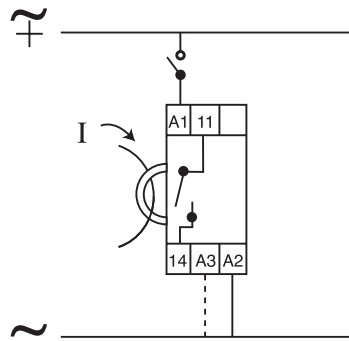
SPECIFICATIONS:

Input power	24 VAC/VDC, 110 to 240 VAC, 50/60 Hz
Input power operating range	24 VAC/VDC ±15% 90 to 260 VAC
Maximum power consumption	10 VA
Hysteresis	Fixed at -15% Threshold
Display accuracy of preset threshold	±10% of full scale
Repetition accuracy with constant parameters	±.5%
Temperature drift	0.08%
Voltage drift	0.01%/degree C
Power up delay	150 ms max.
Delay on threshold overrun T1	400 ms
Delay on downward crossing on threshold T2	150 ms
Output relay	SPST NO
Maximum output rating	5 Amp
Operating relay	+14° to +140°F (-10°C to 60°C)
Storage temperature	-22° to +150°F (-30°C to 70°C)
Weight	3 oz. (85g)
Conformity to EC Standards	Level 3 according to EN 1000-4-2 Level 3 according to EN 1000-4-3 Level 3 according to EN 1000-4-4 Level 3 according to EN 1000-4-5

ORDERING INFORMATION:

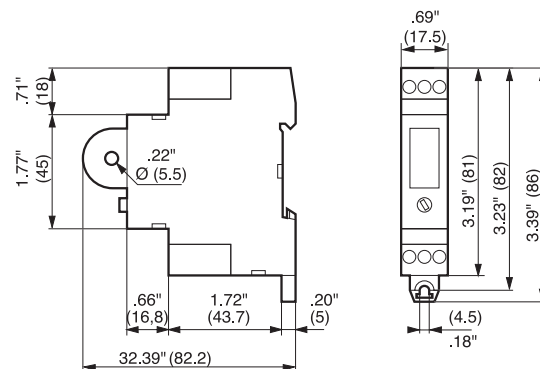
Voltage	Part Number
24 VAC/VDC	84 871 102
110 - 240 VAC	

WIRING DIAGRAM:



Input Voltage Connection: A1&A2 is 110 TO 240VAC
A1&A3 is 24 VDC/VAC

DIMENSIONS: inches (mm)



Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

EI SERIES CURRENT CONTROL RELAY

UL cUL listed

- **3 Product Types for Measurement Accuracy**
- **Under or Over Current - Selectable**
- **Space Saving 22.5mm Wide**
- **DIN-Rail / Surface Mount**



Three product types; EIL (2 to 500 mA), EIH (.1 to 10A) and EIT (10 to 100A with current transformers) provide selectable over or under current control.

AC/DC control without memory.

When the value of the controlled current, either AC or DC, reaches the threshold displayed on the front face, the output relay change state at the end of time delay T1. It returns to the initial state instantly when the current drops below the hysteresis threshold, or when the power supply is disconnected.

AC/DC control with memory.

When the value of the controlled current reaches the displayed threshold, the output relay changes status at the end of time period T1 and remains locked in this position. To reset the memory function the auxiliary supply must be disconnected.

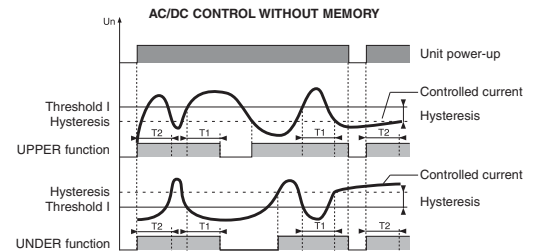
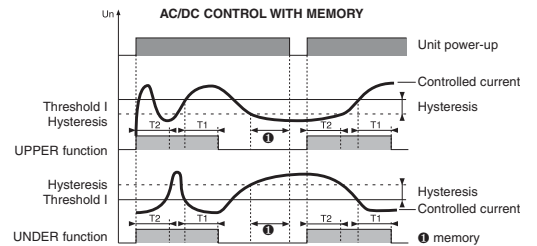
Over-current function (UPPER).

The power-on time delay T2 prevents current peaks due to motor starting. The delay on upward crossing of threshold T1 provides immunity to transients and other interference, thereby preventing spurious triggering of the output relay.

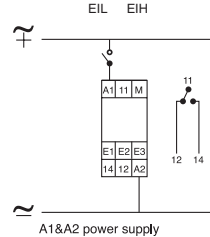
Under-current function (UNDER).

The power-on delay T2 prevents the occurrence of current troughs. The delay on downward crossing of threshold T1 provides immunity to random dips, thereby preventing spurious triggering of the output relay.

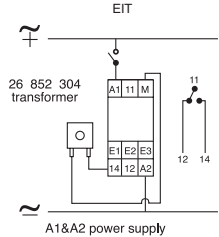
Note: In underload function, the absolute value of the hysteresis cannot be greater than the measurement range maximum.



WIRING DIAGRAM EIL EIH



WIRING DIAGRAM EIT



SPECIFICATIONS:

- Input power** 24 VDC, 24, 110 to 230 VAC ±15%, 50/60 Hz
- Power Consumption** 3 VA
- Hysteresis Selection** 5 to 50% of Displayed Threshold
- Threshold Value** 10 to 100% of Measurement Range
- Setting Accuracy-Threshold** ±10%
- Repeat Accuracy** ±0.1% with constant parameters
- Voltage drift** ±0.1% (±10% of input voltage)
- Temperature drift** ±0.02%
- Power up delay T2** 1 s to 20 s, ±30%
- Delay on threshold overrun T1** 0.1 s to 3 s, ±20%
- Output relay** SPDT Relay
- Contact Material** AgCdO
- Maximum Loading** 8A AC resist
- Operating temperature** to 140°F, -20°C to 60°C
- Storage temperature** -30°C to 70°C
- Weight** (140g)

	Types	EIL			EIH			EIT
		E1-M	E2-M	E3 M	E1-M	E2-M	E3 M	E1-M
Measurement range	Sensitivity	2 to 20 mA	10 to 100 mA	50 to 500 mA	.01 to 1 A	.5 to 5 A	1 to 10 A	10 to 100 A
	Input resistance	5 Ω	1 Ω	0.2 Ω	0.1 Ω	0.02 Ω	0.01 Ω	20 Ω

Note: 24VDC input power version. The input voltage and the measured current must be from separate sources. The "negative" poles of the auxiliary power supply and the measurement circuit are connected inside the unit

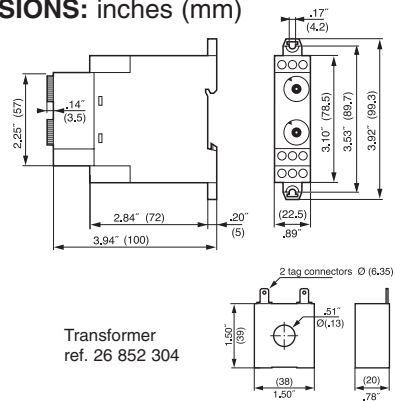
PART NUMBER FOR ORDERING

Type	EIL	EIH	EIT
Measurement range	2 to 500 mA	0.1 to 10 A	10 to 100 A with current transformer
Supply voltage			
24 VDC	84 871 020	84 871 030	84 871 040
24 VAC	84 871 021	84 871 031	84 871 041
48 VAC	84 871 022	84 871 032	84 871 042
120 VAC	84 871 023	84 871 033	84 871 043
230 VAC	84 871 024	84 871 034	84 871 044
Current transformer			26 852 304

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DIMENSIONS: inches (mm)



IR.T SERIES CURRENT CONTROL RELAY

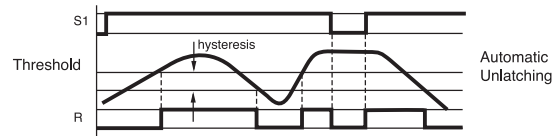
UL listed CSA recognized



- Automatic or Manual Control
- Start-up Inhibit
- Adjustable Hysteresis
- Multiple Voltages
- LED Relay Status Indicator

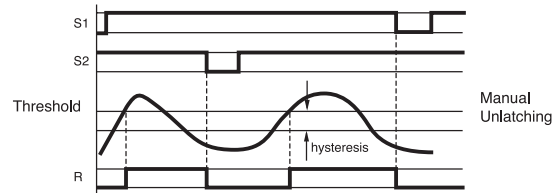
1. AC Current Control Without Latching:

The output relay is energized when the current (peak current on AC) overshoots the level selected on the potentiometer. It de-energizes when the current falls below the normal current by 5 to 50% or when input power breaks. The hysteresis is controlled by a top mounted potentiometer and its selection does not change the chosen current level.



2. AC Current Control With Latching:

The output relay is energized when the current reaches the selected value and stays latched. The contact between terminal B1 and B2 (or 11 and 9) should be opened or input power to the device interrupted to reset. In this case, it is preferable to reduce the hysteresis 5%.



SPECIFICATIONS:

Input 24 VDC, 24, 48, 110, 220 VAC
±15%, 50/60 Hz

Power consumption 3 VA maximum

CONTROL RANGE		INPUT RESISTANCE	PERMITTED PERMANENTLY	OVERLOAD LESS THAN 1 sec Peak
DC CURRENT	AC CURRENT			
5 to 100 mA	3.5 to 70.7 mA	1 ohm	1.5 V	5 A
0.05 to 1 A	0.035 to 0.707 A	0.1 ohm	5 A	17 A
0.5 to 10 A	0.35 to 7.07 A	0.01 ohm	15 A	55 A

Hysteresis selection 5 to 50% of input current

Repeat accuracy ±2% at a constant ambient

Response time 100 ms On Make
200 ms On Break

Output Relay SPDT Relay

Contact material AgCdO

Maximum loading 10 A AC resistive 1 A DC inductive

Maximum switching voltage 250 VAC or DC

Relay maximum power rating 2500 VA 30W

Mechanical life of relay 30 x 10⁴ operations

Electrical life of relay 2 x 10⁵ at 2500 VA resistive load

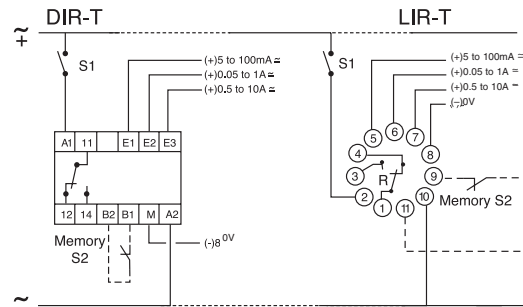
Operating temperature +14°F to +140°F -10°C to +60°C

Weight 7 oz. (200g)

Option: 24 VDC power - the voltage and the measured current must be from separate sources.

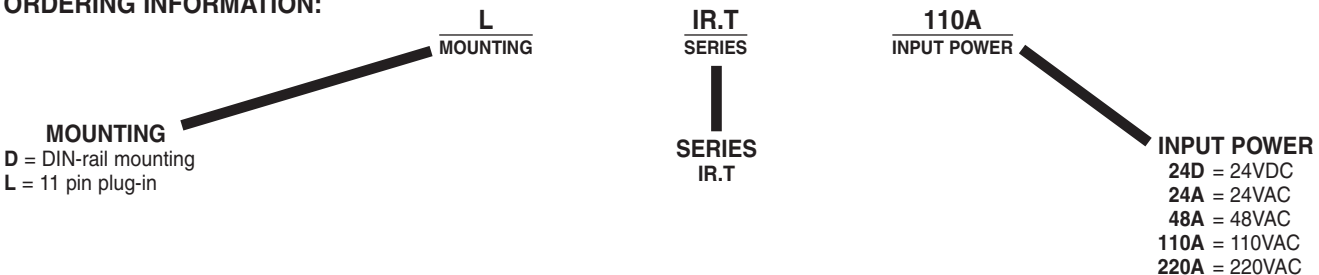
Note: It is recommended that the unit be adequately fused.

WIRING DIAGRAM:



Note: Upon energization of the current control IR.T Series Relay, the time delay, which is adjustable from .1 to 10 seconds, inhibits the output relay during start-up periods. The delay time is adjustable via a potentiometer located on the side of the case. Applies to both versions, with and without latching.

ORDERING INFORMATION:



Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

IAR.T SERIES CURRENT CONTROL RELAY

UL listed CSA recognized



- **Automatic or Manual Control**
- **Start-up Inhibit**
- **Adjustable Hysteresis**
- **Multiple Voltages**
- **5 to 100 Amp RMS**

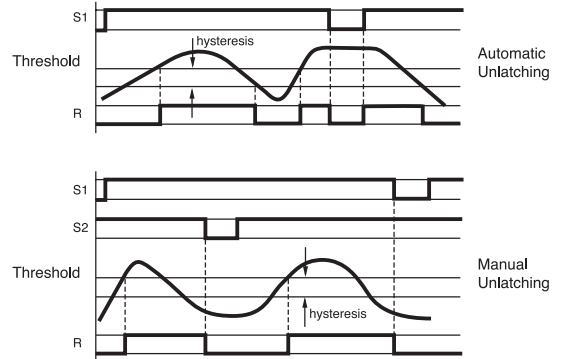
The DIAR.T is a current control which is capable of sensing up to 100 Amps. If requires a stepdown transformer, T1 100. The transformer has a 0.4" diameter center hole through which a current carrying lead is routed. Automatic or manual unlatching is available in each unit.

1. AC Current Control Without Latching:

The output relay is energized when the AC current overshoots the level selected on the potentiometer. It de-energizes when the current falls below the selected current by 5 to 50% or when input power breaks. The hysteresis is controlled by a top mounted potentiometer and its selection does not change the chosen current level.

2. AC Current Control With Latching:

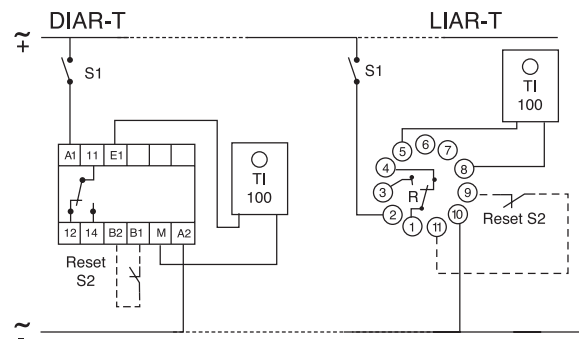
The output relay is energized when the current reaches the selected value and stays latched. The contact between terminal B1 and B2 (or 11 and 9) should be opened or input power to the device interrupted to reset. In this case, it is preferable to reduce the hysteresis 5%.



SPECIFICATIONS:

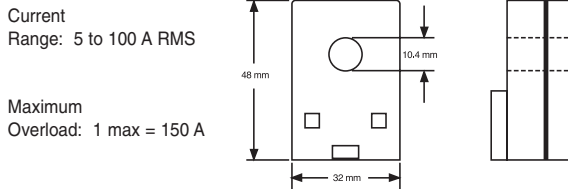
Input	24 VDC, 24, 48, 110, 220 VAC	
	±15%, 50/60 Hz	
Power consumption	3 VA maximum	
Hysteresis selection	5 to 50% of input current	
Repeat accuracy	±2% at a constant ambient	
	±5% with temperature variation	
	VDE 0435	
Response time	100 ms On Make	
	200 ms On Break	
Output Relay	SPDT Relay	
Contact material	AgCdO	
Maximum loading	10 A AC resistive	1 A DC inductive
Maximum switching voltage	250 VAC	30 VDC
Relay maximum power rating	2500 VA	30 W
Mechanical life of relay	30 x 10 ⁴ operations	
Electrical life of relay	2 x 10 ⁵ at 2500 VA resistive load	
Operating temperature	+14°F to +140°F	-10°C to +60°C
Weight	7 oz. (200g)	

WIRING DIAGRAM:



Note: Upon energization of the current control IAR.T Series Relay, the time delay, which is adjustable from .1 to 10 seconds, inhibits the output relay during start-up periods. The delay time is adjustable via a potentiometer located on the side of the case. For additional current transformer see "Accessories" section: L595 Series. Page 2/99

TRANSFORMER: (Part Number 74 525 305)



ORDERING INFORMATION:



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HDU SERIES

VOLTAGE CONTROL RELAY WITH DISPLAY

UL cUL listed



- 3 Digit LCD Display
- Monitors AC and DC Voltages
- Type HDUL Measures from .2 to 60 Volts
- Type HDUH Measures from 10 to 600 Volts

TWO PRODUCT TYPES: HDUL (.2 TO 60 V) and HDUH (10 TO 600 V) PROVIDE SELECTABLE OVER OR UNDER VOLTAGE CONTROL.

Control of AC / DC voltage without memory

When the value of the measured voltage, AC or DC, reaches the threshold U_e the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

Once the voltage drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC voltage with memory

When the value of the measured voltage, AC or DC, reaches the threshold U_e the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

SPECIFICATIONS:

Input power	24 VDC, 24, 120, 230 VAC ±15%, 50/60 Hz
Max. power consumption	3 VA
Frequency of measured signal (AC)	40 to 500 Hz
Setting accuracy – threshold	±10% of selected threshold
Hysteresis	5 to 50% of displayed threshold
Display accuracy	±10% of full scale
Delay on threshold overrun	.1 to 3 sec.
Output	SPDT relay
Contact material	AgCdO
Maximum loading	5 Amp resistive
Minimum loading	100 mA
Maximum switching voltage	250 VAC
Electrical life of relay	500,000 operation at full load
Mechanical life of relay	5,000,000 operations
Protection	Casing IP 40 Terminal IP 20
Operating temperature	-4°F to 140°F, (-20°C to 60°C)
Storage temperature	-22°F to 158°F, (-30°C to 70°C)
Weight	11.2 oz. (320g)

MEASUREMENT RANGE

TYPES	HDUL			HDUH		
	E1-M	E2-M	E3-M	E1-M	E2-M	E3-M
Input						
Sensitivity	0.2 to 2 V	1 to 10 V	6 to 60 V	15 to 150 V	30 to 300 V	60 to 600 V
Input resistance	2 kΩ	10 kΩ	60 kΩ	100 kΩ	300 kΩ	600 kΩ

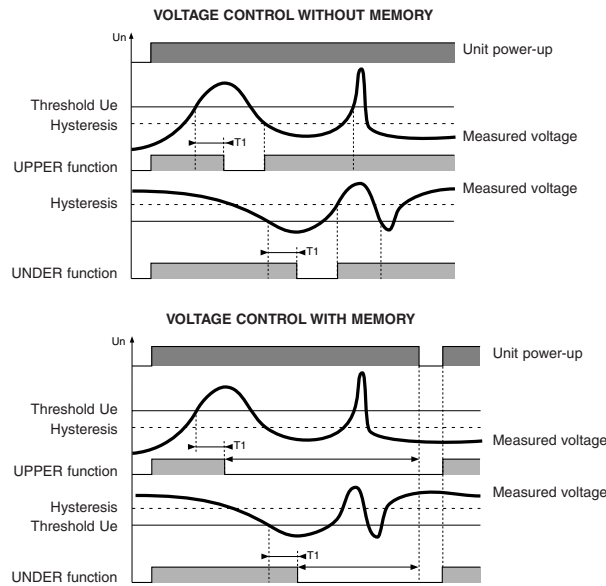
***Important:** For 24 VDC Input power models, the supply voltage and the measured voltage must be from separate sources. The "negative" poles of the auxiliary power and the measurement circuit are connected inside the unit.

ORDERING INFORMATION:

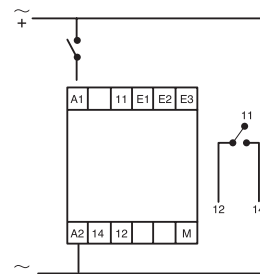
Part Number	Type	Supply Voltage	Measurement Range
84 872 301	HDUL	24 VDC*	.2 to 60 V
84 872 302	HDUL	24 VAC	.2 to 60 V
84 872 304	HDUL	120 VAC	.2 to 60 V
84 872 305	HDUL	230 VAC	.2 to 60 V
84 872 306	HDUH	24 VDC*	10 to 600 V
84 872 307	HDUH	24 VAC	10 to 600 V
84 872 309	HDUH	120 VAC	10 to 600 V
84 872 310	HDUH	230 VAC	10 to 600 V

*See "Important" in Specifications

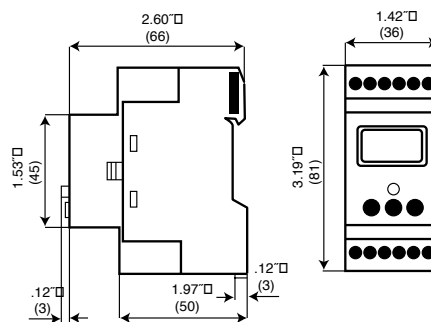
MODE OF OPERATION:



WIRING:



DIMENSIONS: inches (mm)



Products and specifications subject to change without notice.

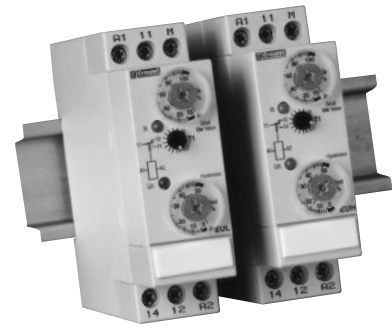
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

EU SERIES

VOLTAGE CONTROL RELAY

UL cUL listed

- **2 Product Types - .2 to 60 V and 10 to 600 V**
- **Selectable Under or Over Voltage Modes**
- **Space Saving 22.5mm Wide Enclosure**
- **DIN-Rail / Surface Mount**



TWO PRODUCT TYPES: EUL (.2 TO 60V) AND EUH (10 TO 600V) PROVIDE SELECTABLE OVER OR UNDER VOLTAGE CONTROL.

Control of AC / DC voltage without memory

When the value of the controlled voltage, AC or DC, reaches the threshold U_e displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

Once the voltage drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC voltage with memory

When the value of the controlled voltage, AC or DC, reaches the threshold U_e displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

SPECIFICATIONS

Input power	24 VDC, 24, 120, 230 VAC
	±15%, 50/60 Hz
Max. power consumption	3 VA
Frequency of measured signal	40 to 500 Hz
Threshold value	1 to 100% of measurement range
Hysteresis	5 to 50% of displayed threshold
Display Accuracy	±10% of full scale
Delay on threshold overrun	.1 to 3 sec.
Output	SPDT relay
Contact material	AgCdO
Maximum loading	8 Amp resistive
Maximum switching voltage	250 VAC
Operating temperature	-4°F to 140°F, (-20°C to 60°C)
Storage temperature	-22°F to 158°F, (-30°C to 70°C)
Weight	4.9 oz. (140g)

MEASUREMENT RANGE

TYPES	EUL			EUH		
	E1-M	E2-M	E3-M	E1-M	E2-M	E3-M
Input						
Sensitivity	0.2 to 2 V	1 to 10 V	6 to 60 V	15 to 150 V	30 to 300 V	60 to 600 V
Input resistance	2 kΩ	10 kΩ	60 kΩ	100 kΩ	300 kΩ	600 kΩ

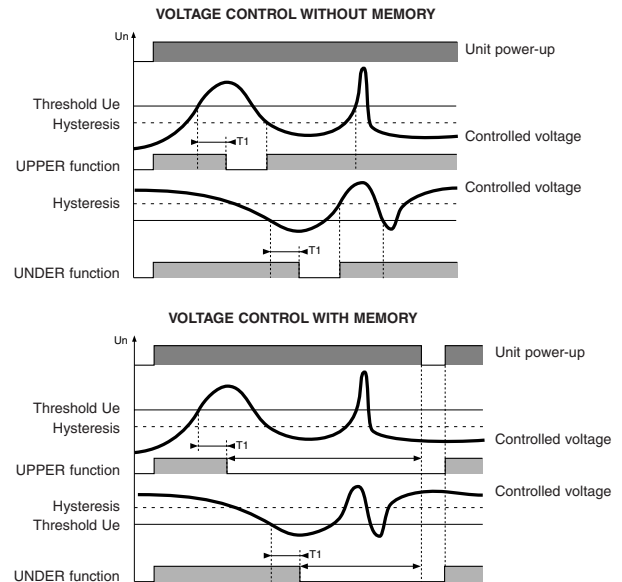
***Important:** For 24 VDC Input power models, the supply voltage and the measured voltage must be from separate sources. The "negative" poles of the auxiliary power and the measurement circuit are connected inside the unit.

ORDERING INFORMATION:

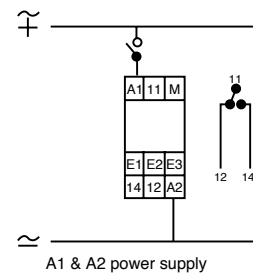
Part Number	Type	Supply Voltage	Measurement Range
84 872 020	EUL	24 VDC*	.2 to 60 V
84 872 021	EUL	24 VAC	.2 to 60 V
84 872 023	EUL	120 VAC	.2 to 60 V
84 872 024	EUL	230 VAC	.2 to 60 V
84 872 030	EUH	24 VDC*	10 to 600 V
84 872 031	EUH	24 VAC	10 to 600 V
84 872 033	EUH	120 VAC	10 to 600 V
84 872 034	EUH	230 VAC	10 to 600 V

*See "Important" in Specifications

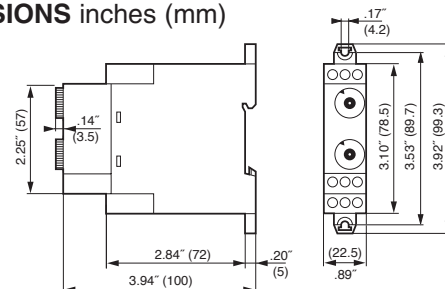
MODE OF OPERATION



WIRING



DIMENSIONS inches (mm)



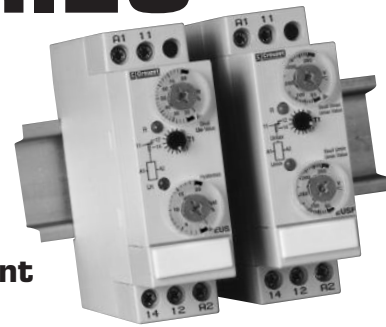
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EUS and EUSF SERIES

VOLTAGE CONTROL RELAY

UL cUL listed



- Units Check Their Own Supply Voltage Level
- EUS SERIES – Over or Under Voltage Selectable
- EUSF SERIES – Monitors High and Low Voltage
- Space Saving 22.5mm Wide – DIN-Rail / Surface Mount

OPERATING PRINCIPLE:

EUS SERIES

Control of AC / DC voltage without memory

When the value of the controlled voltage, AC or DC, reaches the threshold U_e displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

Once the voltage drops below 5 to 50% of the threshold (hysteresis), the output relay changes state again instantly. Changing the hysteresis on the front face does not therefore modify the value of the preset threshold.

Control of AC / DC voltage with memory

When the value of the controlled voltage, AC or DC, reaches the threshold U_e displayed on the front face, the output relay changes state at the end of a time delay T which can be set on the front face at between 0.1 and 3 s, and stays locked in this position.

EUSF SERIES

The EUSF window threshold relay monitors an electrical voltage which acts as its own power supply (simplified wiring). When the value of the controlled voltage, AC or DC, goes outside the window, the output relay deenergises at the end of a time delay T which can be set on the front face at between 0.1 and 3 s.

It switches back on when the voltage returns within the window and stays between the upper and lower thresholds displayed by two potentiometers on the front face. Fixed hysteresis ensures bounce-free relay switching around the thresholds.

Note: Time delay T_1 on crossing the upper and lower thresholds offers immunity to transient phenomena, thus preventing spurious triggering of the output relay.

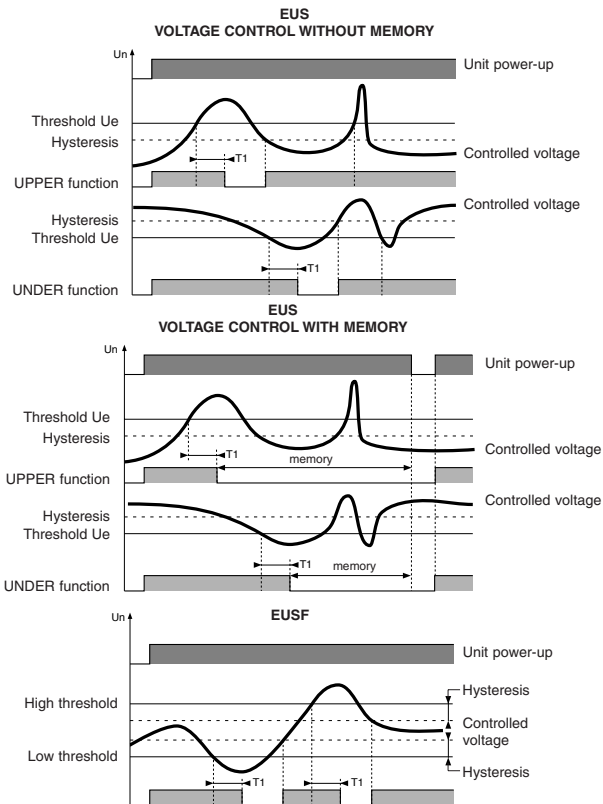
SPECIFICATIONS:

Input power	EUS: 12 VDC, 20 to 80 VAC/VDC 90 to 270 VAC/VDC	EUSF: — 20 to 80 VAC/VDC 90 to 270 VAC/VDC
Max. power consumption	3.5 VA	
Frequency of measured signal	50/60 Hz	
Threshold value	EUS: 9.6 to 15.6 VDC 20 to 80 VAC/VDC 65 to 260 VAC/VDC	EUSF: — 20 to 80 VAC/VDC 65 to 260 VAC/VDC
Hysteresis	EUS: 5 to 20% Adjustable	EUSF: Fixed at 5%
Display accuracy	±10% of full scale	
Delay on threshold overrun	.1 to 3 sec.	
Output	SPDT relay	
Contact material	AgCdO	
Maximum loading	8 Amp resistive	
Maximum switching voltage	250 VAC	
Operating temperature	-4°F to 140°F, (-20°C to 60°C)	
Storage temperature	-22°F to 158°F, (-30°C to 70°C)	
Weight	4.9 oz. (140g)	

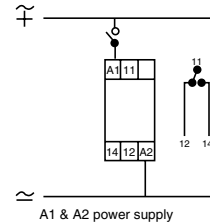
ORDERING INFORMATION:

Part Number	Type	Supply Voltage
84 872 040	EUS	12 VDC
84 872 046	EUS	20 to 80 VAC/VDC
84 872 047	EUS	90 to 270 VAC/VDC
84 872 056	EUSF	20 to 80 VAC/VDC
84 872 057	EUSF	90 to 270 VAC/VDC

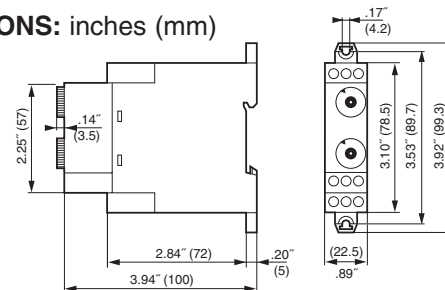
MODE OF OPERATION:



WIRING:



DIMENSIONS: inches (mm)

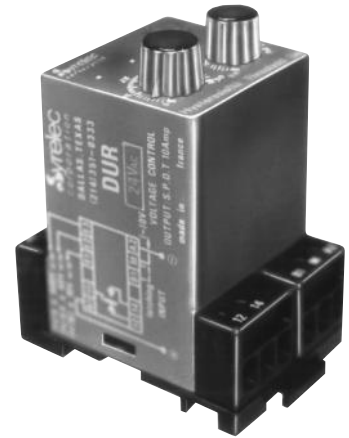


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UR SERIES VOLTAGE CONTROL RELAY

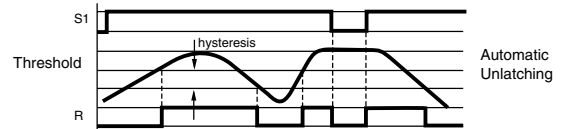
UL listed CSA recognized



- **AC or DC Voltage Control**
- **Manual or Automatic Operation**
- **Adjustable Threshold**
- **5 to 50% Hysteresis Range**
- **LED Relay Status Indicator**

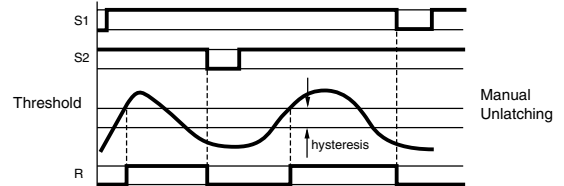
1. AC/DC voltage control without latching:

The output relay is energized when the voltage (AC peak voltage) exceeds the selected threshold. It de-energizes when the voltage falls below the hysteresis setting (5 to 50%) or when supply breaks. The hysteresis is controlled by a potentiometer and its selection does not change the chosen threshold.



2. AC/DC voltage control with latching:

The output relay is energized when the voltage reaches the selected threshold and stays latched in this position. The contact between terminal B1 and M (or 8 or 9) should be opened or the input power of the device interrupted to reset.

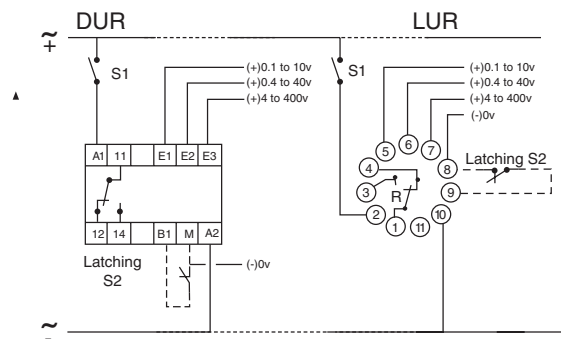


SPECIFICATIONS:

Input	24 VDC, 24, 48, 110, 220 VAC		
	±15%, 50/60 Hz		
Power consumption	24 VAC: 1 VA		
	48 VAC: 1.2 VA		
	110 VAC: 3.5 VA		
	220 VAC: 7 VA		
Control Range	Input Resistance	Acceptance load (input)	
AC or DC		Permanent (max)	Less than 10ms peak max.
0.1 to 10 V	10 kΩ	50 V	100 V
0.4 to 40 V	40 kΩ	100 V	300 V
4 to 400 V	400 kΩ	440 V	750 V
Hysteresis selection	5 to 50% of set point		
Repeat accuracy	±2% at a constant ambient		
Output Relay	SPDT Relay		
Contact material	AgCdO		
Maximum loading	10 A AC resistive 8 A DC inductive		
Maximum switching voltage	250 VAC		250 VDC
Relay maximum power rating	2200 VA		
Transient protection	2500 volts		30 W
Mechanical life of relay	30 x 10 ⁶ operations		
Electrical life of relay	2 x 10 ⁵ at 2400 VA resistive load		
Repetition accuracy	±0.5% at a constant ambient		
Response time	100 ms on make		
	200 ms on break		
Operating temperature	-4°F to +140°F		-20°C to +60°C
Weight	7 oz. (200g)		

Option: 24 VDC power – the voltage and the measured current must be from separate sources.

WIRING DIAGRAM:



ORDERING INFORMATION:

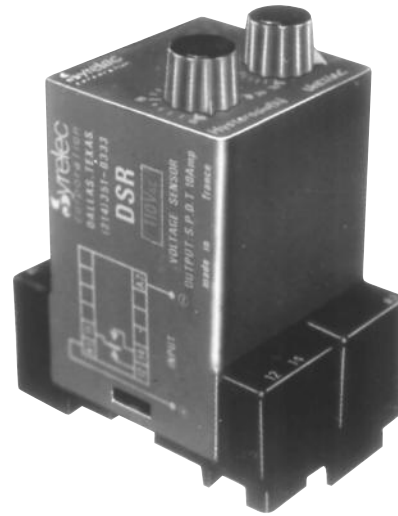


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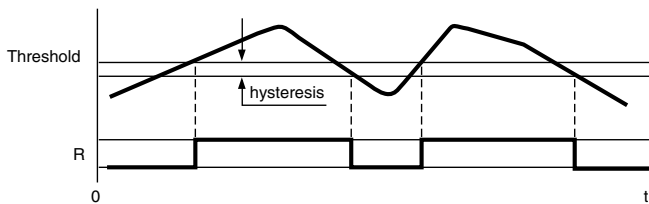
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SR SERIES UNDER VOLTAGE RELAY

UL listed CSA recognized



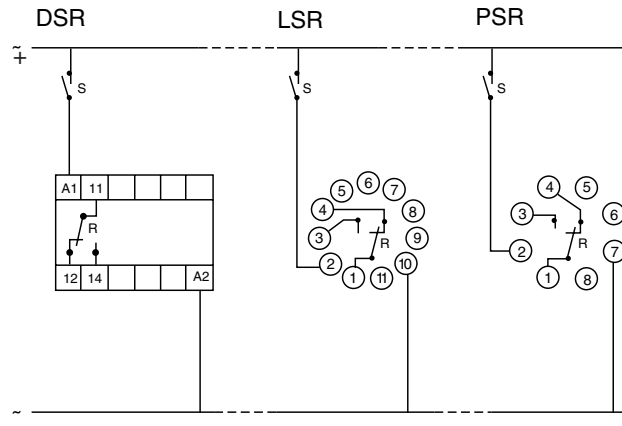
- Multiple AC/DC Voltages
- 5 to 20% Hysteresis Adjustment
- Automatic Operation
- Adjustable Threshold



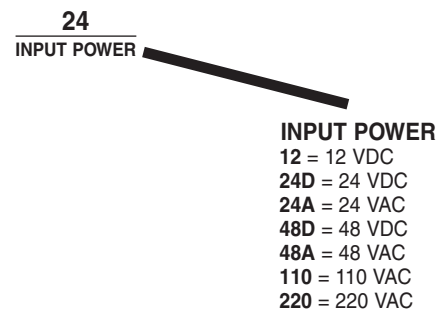
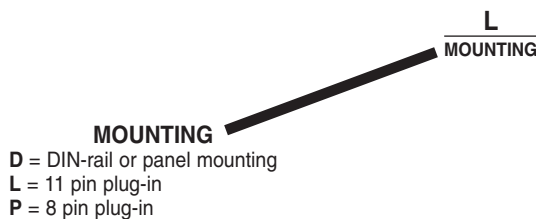
The voltage threshold SR Relay controls a voltage supply which is its own supply. The output relay is energized when the supply (effective for AC) exceeds the selected threshold. It de-energizes when the controlled supply falls below (5 to 20% Hysteresis) of the supply voltage or when the input power breaks. Hysteresis is controlled by a potentiometer and its selection does not change the chosen threshold. Pulses or drops of 100ms or less are ignored.

SPECIFICATIONS:

Input	.12 VDC, 24 VAC, 24 VDC, 48 VAC 48 VDC, 110 VAC, 220 VAC, 50/60 Hz -20% to +30% DC, -30% to +15% AC
Maximum power consumption	.24 VAC: 1.5 VA 24 VDC: .6 W 48 VAC: 2 VA 24 VDC: .8 W 110 VAC: 5 VA 48 VDC: 1.8 W 220 VAC: 11 VA
Residual ripple	<Hysteresis value
Output relay	.SPDT Relay
Contact material	AgCdO
Maximum loading	.10 A AC resistive 8 A DC inductive
Maximum switching voltage	.250 VAC 250 VDC
Maximum power rating	.2200 VA 80 W
Mechanical life of relay	.30 x 10 ⁶ operations
Electrical life of relay	.2 x 10 ⁶ at 2200 VA resistive load
Operating temperature	+14°F to 140°F -10°C to +60°C
Weight	.2.8 oz. (100g)



ORDERING INFORMATION:



Products and specifications subject to change without notice.

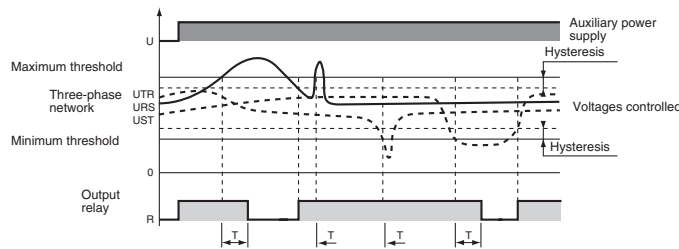
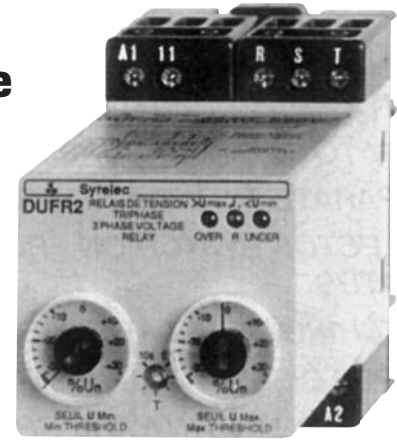
Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

UFR2 SERIES

VOLTAGE CONTROL RELAY - 3 Phase

UL listed CSA recognized

- Over/Under Voltage Control
- Min. & Max. Threshold Adjustment
- Three LED Indicators
- SPDT IOA Relay
- Adjustable Time Inhibit .1 to 10 seconds



SPECIFICATIONS:

Input Power 24, 110, 230, 400, 440 VAC, $\pm 15\%$ 50/60 Hz
Max. Power Consumption 3 VA

Voltage Inputs

Three-phase networks measured:

AC voltage (rms) between phases	Measurement range of min. and max. thresholds. Rms voltage between phases	Input resistance	Peak overload, less than 10 ms
3 x 230 V	161 V to 299 VAC	400 k Ω	600 V
3 x 400 V	280 V to 520 VAC	400 k Ω	700 V
3 x 440 V	308 V to 572 VAC	400 k Ω	800 V

Input Voltage Frequency 50/60 Hz
Hysteresis set to 3% of displayed threshold
Display Accuracy $\pm 10\%$
Repeat Accuracy $\pm 0.5\%$
Output Relay SPDT 10 Amp Resistive
Operating Temperature +14°F to 140°F (-10°C to +60°C)
Storage Temperature -4°F to 158°F (-20°C to +70°C)
Weight 200g

GENERAL FEATURES:

The output relay is activated when the values of the three voltages between phases lie within the minimum and maximum thresholds (adjusted separately using two potentiometers on the front panel). If one or more voltages between phases lies outside the window constituted by the minimum and maximum thresholds, the output relay de-energizes at the end of time T (adjustable between 0.1 and 10 seconds via front panel).

A set 3% hysteresis ensures clean switching of the output relay at each threshold.

Auxiliary power supply.

The unit is not affected by the sequence of the phases or harmonic distortion.

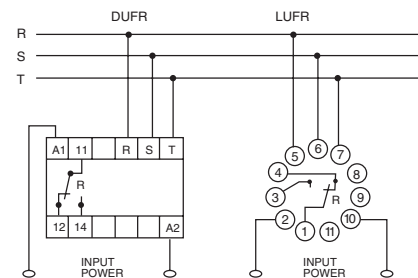
Application: Protecting electrical installations against variations in mains supply.

NOTE: One red LED displays undervoltage.

A green LED displays the status of the relay LED "ON"= relay "ON". A second red LED displays overvoltage.

Since the operating principle of this relay is based on measuring two voltages between phases in relation to a third, it is preferable, where a neutral is present, to use DUFRN2 and LUFRN2 for very unequal three-phase networks.

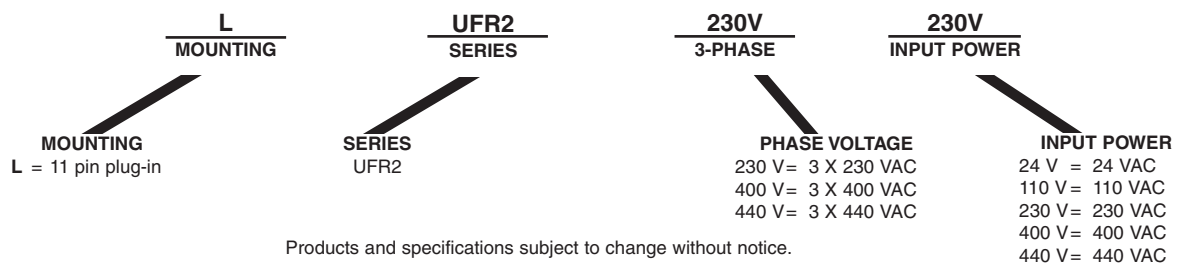
WIRING DIAGRAM:



NOTE: The input power can be connected between two phases of the three phase network being monitored. Tolerance is $\pm 15\%$ of the selected voltage.

The maximum threshold must be greater than the minimum threshold for proper operation.

ORDERING INFORMATION:



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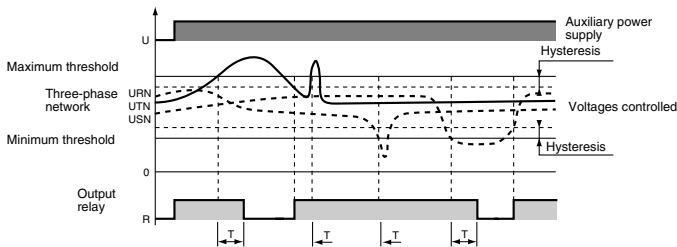
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UFRN2 SERIES

VOLTAGE CONTROL RELAY

Three Phase with Neutral

- Over/Under Voltage Control
- Min. & Max. Threshold Adjustment
- Three LED Indicators
- Detects Absence of Neutral
- Adjustable Time Inhibit .1 to 10 seconds



GENERAL FEATURES:

The output relay is activated when the values of the three voltages between phases and neutral lie within the minimum and maximum thresholds (adjusted separately using two potentiometers on the front panel). If one or more voltages between phases lies outside the window constituted by the minimum and maximum thresholds, the output relay de-energizes at the end of time T (adjustable between 0.1 and 10 seconds via front panel). A set 3% hysteresis ensures clean switching of the output relay at each threshold.

Auxiliary power supply.
The unit is not affected by the sequence of the phases or harmonic distortion.

Application: Protecting electrical installations against variations in mains supply.

NOTE: One red LED displays undervoltage. A green LED displays the status of the relay LED "ON"= relay "ON". A second red LED displays overvoltage.

SPECIAL CASE: Relays DUFRN2 and LUFRN2 can control a **SINGLE PHASE** voltage. For this application, the single phase voltage is connected between terminals R, S, T (5, 6, 7) wired together, and terminal N (11).

SPECIFICATIONS:

Input Power 24, 110, 230, 400, 440 VAC, $\pm 15\%$ 50/60 Hz
Max. Power Consumption 3 VA

Voltage Inputs

Three-phase networks measured:

AC voltage (rms) between phases	Measurement range of min. and max. thresholds. Rms voltage between phases-Neutral	Input resistance	Peak overload, less than 10 ms
3 x 230 V + N	92 V to 172 VAC	220 k Ω	600 V
3 x 400 V + N	161 V to 300 VAC	400 k Ω	700 V
3 x 440 V + N	177 V to 330 VAC	400 k Ω	800 V

Input Voltage Frequency 50/60 Hz
Hysteresis set to 3% of displayed threshold
Display Accuracy $\pm 10\%$
Repeat Accuracy $\pm 0.5\%$
Output Relay SPDT 10 Amp Resistive
Operating Temperature +14°F to 140°F (-10°C to +60°C)
Storage Temperature -4°F to 158°F (-20°C to +70°C)
Weight 200g

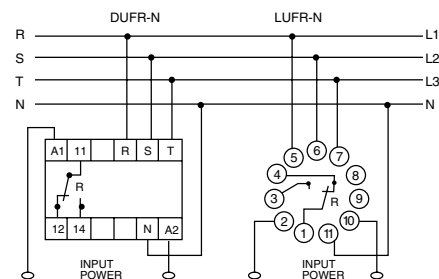
AVAILABLE PART NUMBERS

- DUFRN230A110A
- DUFRN2440A440A
- LUFRN230A110A
- LUFRN2230A230A

ORDERING INFORMATION:



WIRING DIAGRAM:



NOTE: The input power can be connected between a phase and neutral or between phases of the three phase network being monitored. Tolerance is $\pm 15\%$ of the selected voltage.

The maximum threshold must be greater than the minimum threshold for proper operation.

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- Control of underspeed, stopping, running speed, or jamming of a motor.
- Data collected by three-wire or NAMUR sensor, or by contact or voltage.
- Delay adjustable from 100 ms to 10 min in 4 sub-ranges.
- Delay on energisation adjustable from 0.3 to 30 sec.
- LEDs indicate power supply and state of output relay.



Operating principle

The FRL control relay can be used to solve underspeed problems : conveyor belts, conveyors, etc where the crossing of a low speed threshold should trigger an alarm.

Speed data is collected via a sensor such as a three-wire output proximity sensor, a NAMUR sensor or by volt-free contact or voltage.

On power-up, to allow the process which is being controlled to reach its operating speed, control is inhibited for a time of between 0.3 and 30 sec, which can be adjusted on the front face.

If starting requires an inhibition time above 30 seconds, external contact S2 must be closed during starting to inhibit the FRL (during this time the yellow LED flashes), then opened when the nominal speed has been reached.

On each cycle of the process being controlled, the sensor sends a pulse to the FRL.

Each of these pulses resets the internal time delay of the FRL.

If the time between two pulses is less than the value set on the FRL, the delay is reset on each pulse and the output relay remains closed.

If the speed of the process decreases, the time between pulses increases.

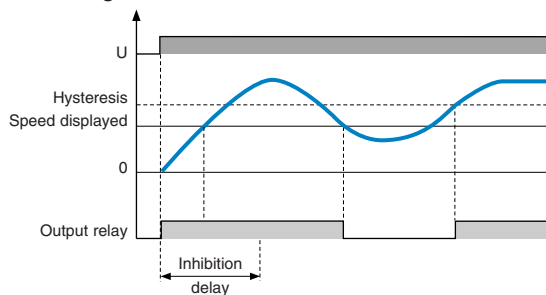
When the time between two pulses is greater than the value set on the FRL, the controlled process is in underspeed mode, the output relay of the FRL changes state (opens).

The output relay closes again when the speed of the controlled process exceeds the preset value plus the hysteresis (5 % of the value displayed).

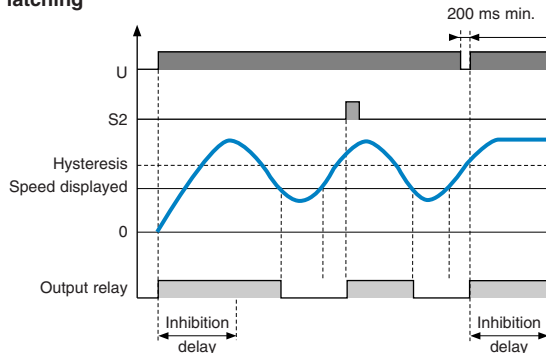
If "memory" mode is activated, the relay remains open when an underspeed fault is detected. In this case, the output relay can only close again after a manual reset has been performed by closing external contact S2.

A yellow LED indicates the state of the relay.
A green LED indicates the presence of the power supply.

Without latching



With latching



To order, specify :

1 Part number

Example : Underspeed control relay FRL -
84 874 304

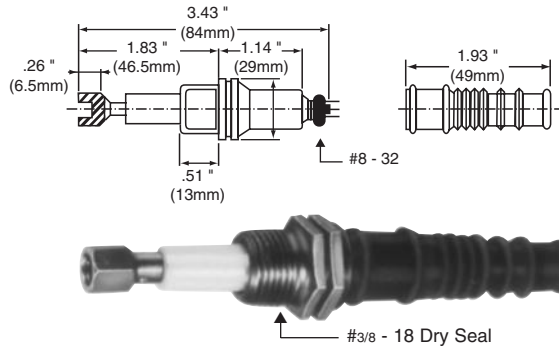
Type		FRL
Part numbers (and voltages)		1
24 V \equiv		84 874 300
24 V \sim		84 874 301
110 V \sim		84 874 303
230 V \sim		84 874 304
Power supply characteristics		
Supply voltage Un		24, 120, 230 V \sim 50/60 Hz Galvanic isolation via transformer 24 V \equiv without galvanic isolation
Supply tolerance		0.85 to 1.15 Un
Maximum power consumption		Version \sim 3.5 VA max. at Un and 5 VA at Un + 15 % Version \equiv 1 W max. at Un and 1.5 W at Un + 15 %
Immunity to micro power cuts		10 ms
Insulation coordination		Category III, degree of pollution 2 conforming to IEC 664.1 / VDE 0110 : 4 kV/2
Control / input circuit characteristics		
Input circuit		3-wire sensors 24 V PNP (50 mA max.) NAMUR sensor 8.2 V on 1 k Ω Contact Volt-free Voltage input 30 V max.
Input resistance		16 k Ω except for NAMUR 1 k Ω
High state		Min. 4.5 V, max. 30 V
Low state		Min. 0 V, max. 1 V
Breaking frequency		200 Hz
Minimum pulse time		5 ms
Minimum time between pulses		5 ms
Selection of delay and memory function		8-position switch on front face
No memory		0.1 to 1 s, 1 to 10 s, 0.1 to 1 min, 1 to 10 min
With memory		0.1 to 1 s, 1 to 10 s, 0.1 to 1 min, 1 to 10 min
Hysteresis		5 % of threshold displayed
Display accuracy		10 % of full scale (@ 25 °C)
Repetition accuracy		\pm 0.5 % with constant parameters \pm 0.05 % / °C
Temperature-dependent drift		\pm 1 % / V
Voltage-dependent drift		\pm 1 % / V
Reset time		200 ms minimum
Reset time S2		100 ms minimum
Inhibition delay		0.3 to 30 s \pm 10 %
Output characteristics		
Output		1 AgCdO changeover
Breaking capacity		2000 VA 80 W
Maximum breaking current		8 A \sim 8 A \equiv
Minimum breaking current		100 mA \sim 100 mA \equiv
Maximum breaking voltage		100 V \sim 100 V \equiv
Mechanical life		5 x 10 ⁶ operations
Electrical life		AC12 2000 VA - 10 ⁵ operations AC15 Cos φ = 0.3 - 6000 operations DC13 L/R = 300 ms - 6000 operations
Maximum rate		360 operations / hour at full load
General characteristics		
Casing material		Self-extinguishing
Terminal capacity		2 x 1.5 mm ² with ferrule 2 x 2.5 mm ² without ferrule
Temperature limits		Use - 20 °C to + 60 °C (conforming to IEC 68.1.14) Stored - 30 °C to + 70 °C (conforming to IEC 68.1.1/2)
Relative humidity		93 % (+2 % ; -3 %) without condensation
Weight		255 g approximately

S5 LEVEL PROBE HOLDER

Single probe holder for use with probe rod of various lengths. This probe is particularly suitable for high temperature and/or high pressure applications. It is capable of operating at temperatures up to 200°C (392°F) and pressures up to 700PSI. Order part # S5.

3/8" Threaded Rod. Order part number S5/1.

NOTE: Internal Threading: 1/4 x 20

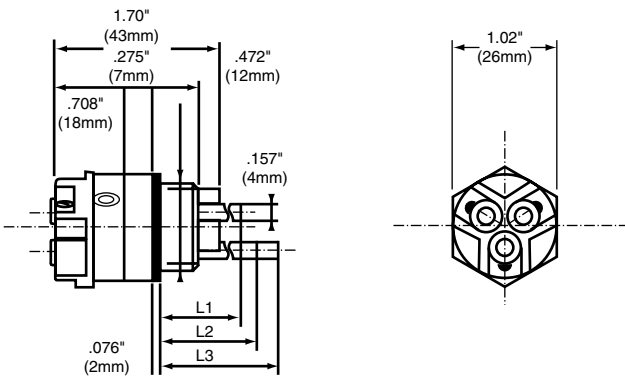
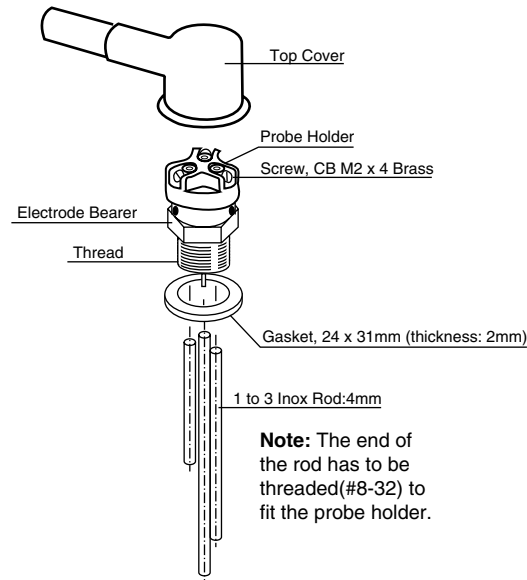
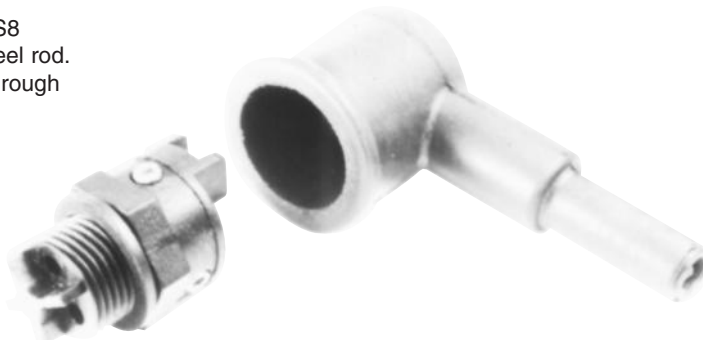


S8 LEVEL PROBE

The S8 probe will hold one, two or three 4mm probes. The S8 comes with three (3) one meter lengths of 4mm stainless steel rod. It comes equipped with a black SBS rubber protective top through which the leads are routed at a 90° angle.

SPECIFICATIONS:

- Material - Holder** Polyamide
- Material - Top Boot** SBS (Styrene Butadiene)
- Wire Terminal** Stainless Steel with M2 x 4 brass screws
- Probe Holder** Stainless steel
- Gasket** BB701 (Butadiene)
- Thread Size** 1/2" NPT
- Operating Temp** 176°F (80°C)
- Max Pressure** 2 Kg/CM² (28 PSI)

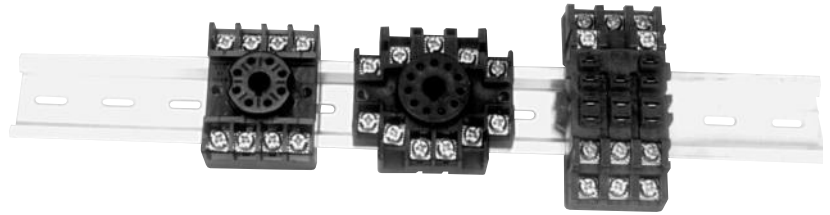


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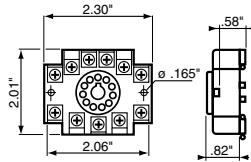
DR – DIN-RAIL

The DR-DIN-Rail material is an extruded aluminum material of the standard configuration, 35mm. Timers and Controls conveniently snap onto the track. Order part number “DR” which is available in 1 meter (39”) lengths. Shown with S08, S11 and K11 sockets.

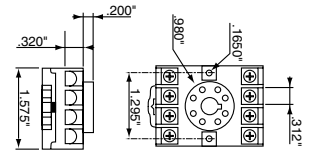


S08, S11 SCREW TERMINAL SOCKETS

The S08, and S11 are 8 and 11 pin sockets fabricated from a rugged, durable polycarbonate.* Mounting is with two 6/32 screws .250 or on .30 DIN-Rail, DR. Order part “S08” or “S11.”



S11



S08

S08-600: 600 V, 10 A rated 8 pin socket-UL and CSA

L595 SERIES CURRENT TRANSFORMER

- 20 to 400 Amps
- Compatible with IAR.T Series

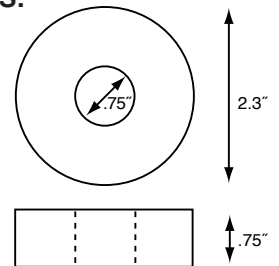
SPECIFICATIONS:

Input Current	20 to 400 Amps AC 50/60 Hz
Output Current	100 mA AC
Connections	#20 AWG 24” long wires
Insulation Class	600 VAC
Enclosure	Fiberglass reinforced resin

ORDERING INFORMATION:

Part Number	Input Current
L595-020	20 Amps
L595-050	50 Amps
L595-100	100 Amps
L595-200	200 Amps
L595-300	300 Amps
L595-400	400 Amps

DIMENSIONS:



L546 SERIES CURRENT TRANSFORMER

- 50 to 500 Amps
- Compatible with F3I and FWIT Series

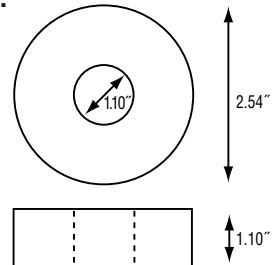
SPECIFICATIONS:

Input Current	50 to 500 Amps AC 50/60 Hz
Output Current	5 Amps AC
Connections	#16 AWG 24” long wires
Insulation Class	600 VAC
Enclosure	Molded thermoplastic

ORDERING INFORMATION:

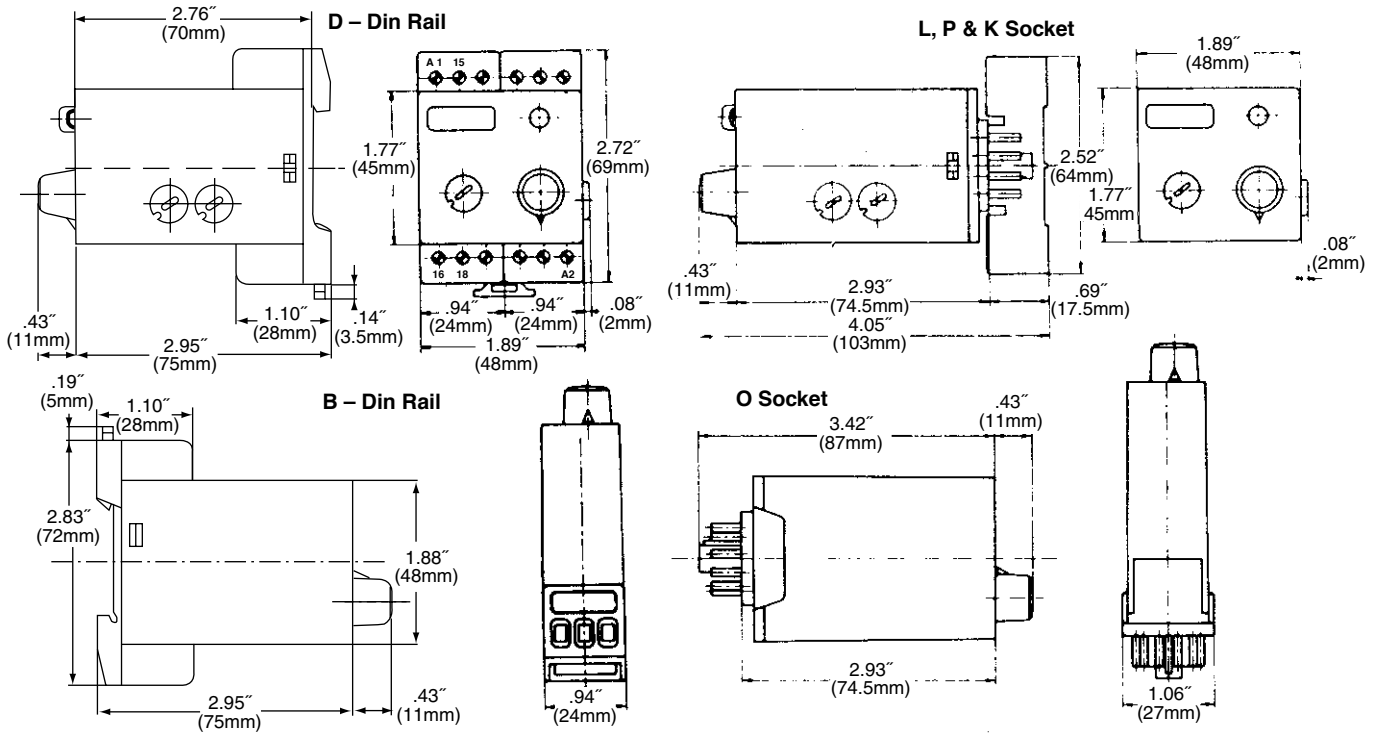
Part Number	Input Current
L546-050	50 Amps
L546-100	100 Amps
L546-200	200 Amps
L546-500	500 Amps

DIMENSIONS:



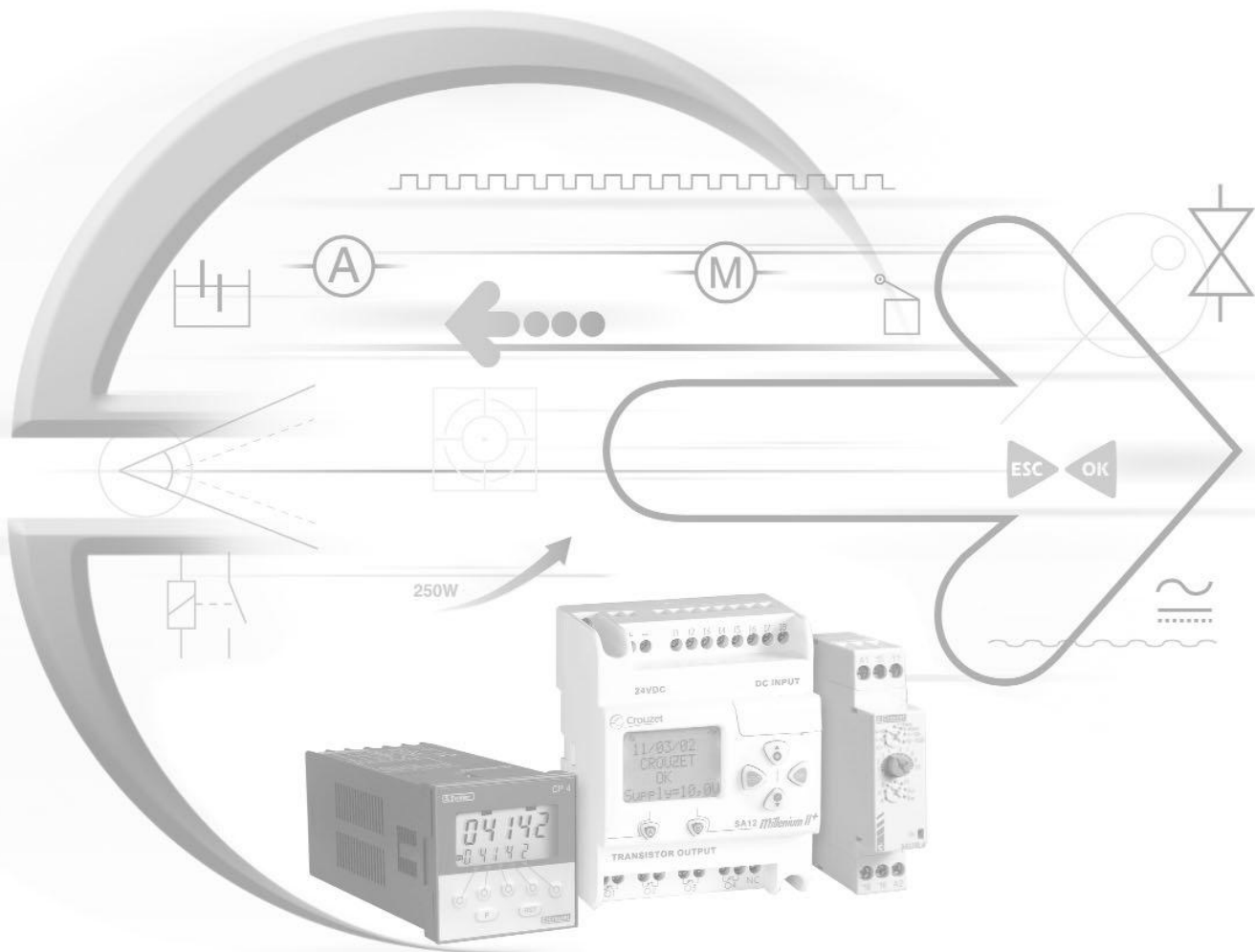
Products and specifications subject to change without notice.

Dimensions



Products and specifications subject to change without notice.

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Safety Relays



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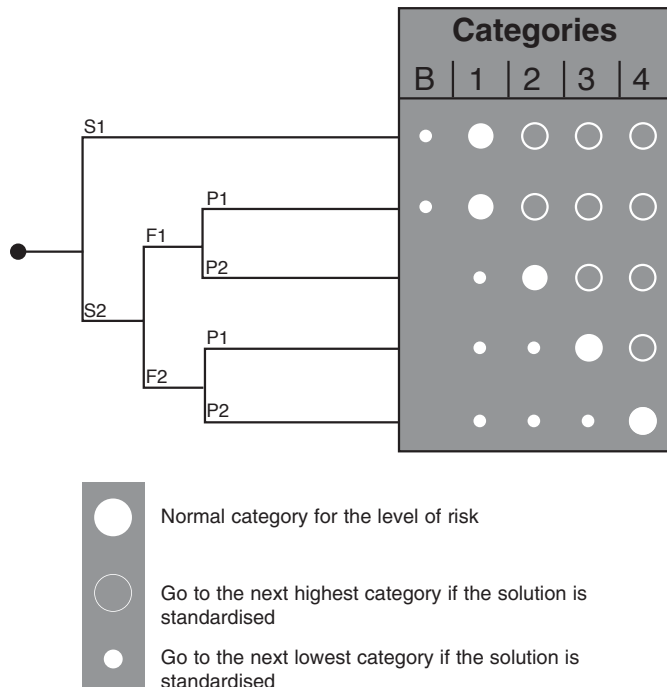
Safety category for control systems (according to EN 954-1)

Categories	Summary of requirements	System behaviour	Main basis of safety
B	The part of the machine control system relating to safety and/or protective devices, as well as its components, must be designed, selected, assembled and combined using the most advanced methods in order to be able to cope with expected influences.	- If a fault occurs, it may cause the loss of the safety function. - Certain faults are not detected.	By selecting components and safety principles
1	The requirements of B apply. Proven components and safety principles must be used.	As described for category B, but with greater reliability in relation to the safety of the safety function.	
2	The requirements of B and the use of proven safety principles apply. The safety function must be checked at suitable intervals by the machine control system. Note: suitable times will depend on the application and the type of machine.	- The appearance of a fault may cause the loss of the safety function between checking intervals. - the fault is detected by the check.	By structure
3	The control system must be designed so that: a) a single fault in control does not cause the loss of the safety function. b) if reasonably possible, the single fault must be detected by suitable measures using the most advanced technology.	- When there is a single fault, the safety function continues to operate. - Certain faults are detected, but not all. - The accumulation of non-detected faults may lead to the loss of the safety function.	
4	The requirements of B and the use of proven safety principles apply. The control system must be designed so that: a) a single fault in control does not cause the loss of the safety function, and b) if possible, the single fault should be detected, by the next call to the safety function, or c) if b) is not possible, an accumulation of faults should not cause the loss of the safety function.	- When faults appear, the safety function continues to operate. - Faults will be detected in time to avoid the loss of the safety function.	

Estimation of the risk in the event of a fault and selection of a suitable category (according to EN 954-1)

Starting point for estimating the risk for the part of the control system relating to safety.

- S Seriousness of injury**
S1 Slight injury
S2 Serious, irreversible injury to one or more person(s) or death
- F Frequency and duration of exposure**
F1 Rare to quite frequent
F2 Frequent to continuous
- P Possibility of avoiding the dangerous phenomenon**
P1 Possible under certain conditions
P2 Rarely possible
- B. 1-4:** Categories for the parts of the control system relating to safety



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Guide to selecting a safety relay

Function	Safety contacts	Data contacts	Safety level	Type	Page
Emergency stop and/or mobile guards	3	1	4	KNA3-RS	2/106
	3	1	3	KNA3-XS	2/104
	3	1	4	KZP3-RS	2/108
2-hand control	2	0	4	KZH2-XS	2/114
	3	1	4	KZH3-RS	2/116
Timed contacts	3	1	4 - 3 *	KZR3-RS	2/110
Zero speed monitoring	2	0	4	KSW2-RS	2/112
Extension unit	3	0	**	KZE3-XS	2/118

* Level 4 on instantaneous contact / level 3 on timed contacts

** Depending on the wiring to the main unit

Conformity

European "Machinery" Directive 89/392/EEC	•
French Decree 92/765-766-768	•
European "Usage" Directive 89/655/EEC	•
French Decree 93-40 / 93-41	•
European "EMC" Directive 89 336/EEC	•
IEC 61496-1	•
IEC 664-1	•
EN 50081-2	•
EN 50082-2	•
EN 60204-1	•
EN 292-1 and 2	•
EN 574 / 97	• Type III C (KZH2-XS and KZH3-RS)
EN 954-1	•
EN 418	•
EN 1088	•
UL 508	• UL
C22-2 No. 14-M91	• (C) UL
GS-ET-20	• BG

Harmonised European standards

These standards have been developed to enable designers, manufacturers or any other person to interpret the essential requirements of the directives in order to ensure conformity with European law.

The standards are designed as a framework and general guide for producing machines which will be safe under normal operating conditions.

Main harmonised standards relating to safety

EN 292-1/2	Machine safety Basic concepts General design principles	EN 418	Machine safety Emergency stop equipment Functional aspects
EN 60 204-1	Machine safety Electrical machine equipment	EN 1088	Machine safety Latching and interlocking mechanisms Mobile guards
EN 954-1	Machine safety Parts of control systems relating to safety Tables of risks and categories	EN 574	Machine safety 2-hand control device

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"KNA3-XS" safety relay (22.5 mm)

- "Emergency stop" and "mobile guard monitoring" functions
- "CE" conforming product / BG approved
- Control device with one or two channels
- Safety via redundancy and self-checking
- 3 "N/O" safety contacts with linked contacts - 6 A / 250 ~
- 1 "N/C" signalling contact
- Can be used to obtain level 3 according to NF.EN 954-1

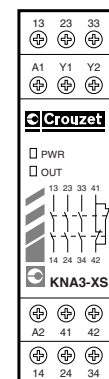


Technical characteristics	
Power supply	
Power supply voltage	~ 24 V 50/60 Hz = 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~ -15% / +15% of Un for =
Power on Indicator	Green LED – PWR
Accuracy	
Reset time	< 25 ms
Maximum response time on emergency stop	< 50 ms
Output specification	
Type	Volt-free outputs
No. of safety circuits	3 "N/O" AgSnO ₂ contacts
No. of data circuits	1 "N/C" AgSnO ₂ contacts
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁵ operations at 1500 VA resistive 5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations
Operation and use	
Max. absorbed power	AC 1.6 VA / DC 2 W
Relay on Indicator	Green LED – Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V=
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III
EMC immunity according to EN 50082-2	
Rapid transients	2 kV directly acc. to IEC 1000.4.4 2 kV when coupled
Radiated electromagnetic field	10 V/m Level 3 acc. to IEC 1000.4.3 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	8 kV in the air acc. to IEC 1000.4.2
Shock waves	Common mode 1 kV according to IEC1000.4.5
Radio frequencies in common mode	10 V rms Level 3 according to IEC 1000.4.6 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s Un-60% for 100 ms every 1 s according to IEC 61496-1/97 Un-100% for 10 ms every 100 ms*
	Un-50% for 20 ms every 200 ms*
* the device operates normally	
** the device has not failed dangerously	Un-50% for 500 ms every 5 s**
Casing	
Material	Polycarbonate Self-extinguishing - UL94 class VO
Degree of protection	Casing: IP40 Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule 2 X 2.5 mm ² solid conductor
Weight	310 g

Type	KNA3-XS
Part number (and voltage)	
24 V ~/=	85 100 036
40/260 V ~/=	85 100 037
Conformity	
European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
NF-EN 60204-1	●
NF-EN 292-1 and 2	●
NF-EN 954-1	● Category 3
NF-EN 418	●
NF-EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

1

Connections



- Key**
- A1-A2 : Power supply Control device(s)
 - Y1-Y2 : Start / validation
 - 13-14/23-24/33-34 : "N/O" safety contacts
 - 41-42 : "N/C" signalling contacts

To order, specify:
<p>1 Part number</p> <p>Example: KNA3-XS safety relay: 85 100 036</p>

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Control devices:

Depending on the degree of safety required, KNA3-XS can receive the following components as inputs:

- emergency stop pushbuttons with one or two contacts (A1-A2)
- position sensors (limit switches) with one or two contacts (A1-A2)
- pushbutton for start or validation (Y1-Y2)

A positive break operation device must be used if a single channel is used. (diagram 1)

To increase the degree of safety, one "N/C" auxiliary contact per power contactor is wired in series with the start (or validation) pushbutton, to ensure self-checking in this part of the installation. (diagram 2)

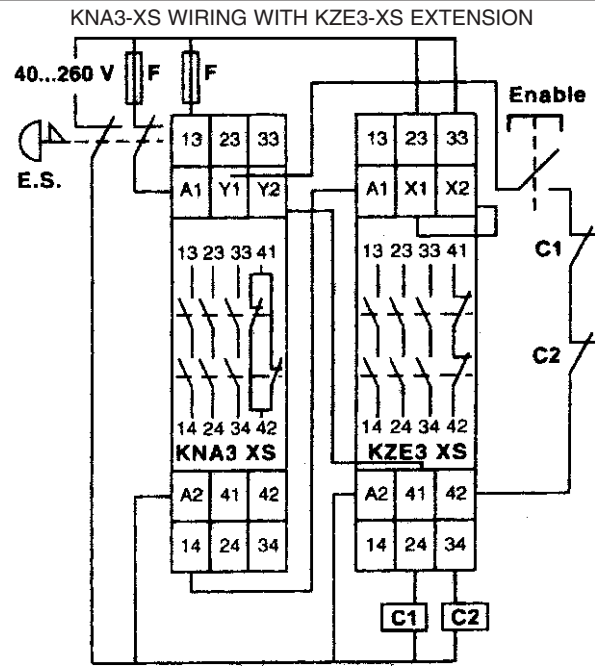
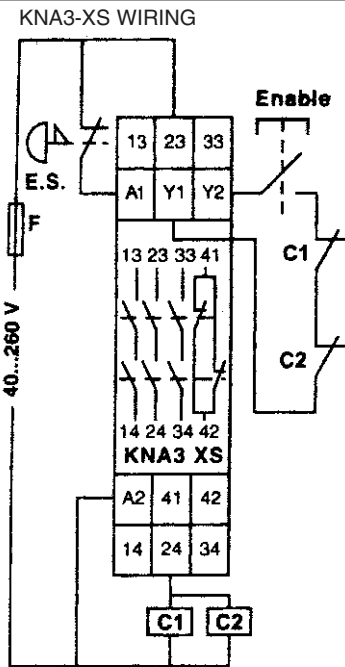
Control devices:

The KNA3-XS has three "N/O" safety contacts (13-14/23-24/33-34) and one "N/C" signalling contact (41-42). One or more control devices may be wired (diagram 1 and 2) up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KNA3-XS, it is advisable not to exceed 10 A thermal for all three contacts. The signalling contact cannot be used as a safety contact. The signalling contact can be wired on a PLC input or integrated into a fault signalling system.

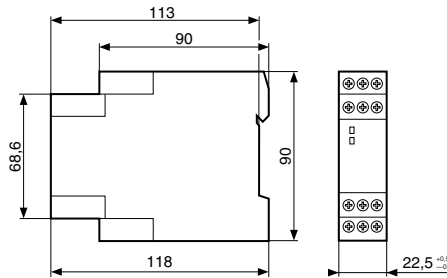
Extending the number of contacts:

The number of contacts of the KNA3-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS (see page 18).

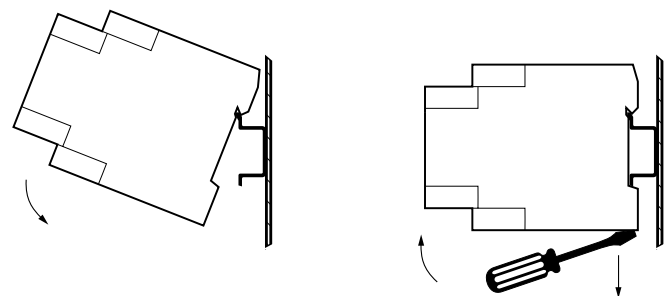
Examples of use



Dimensions



Mounting - Removing



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"KNA3-RS" safety relay (45 mm)

- "Emergency stop" and "mobile guard monitoring" functions
- "CE" conforming product / BG approved
- Control device with one or two channels
- Safety via redundancy and self-checking
- Integrity check on control devices
- 3 "N/O" safety contacts with linked contacts - 6 A / 250 ~
- 1 "N/C" signalling contact
- Separate return loop
- Can be used to obtain level 4 according to NF.EN 954-1



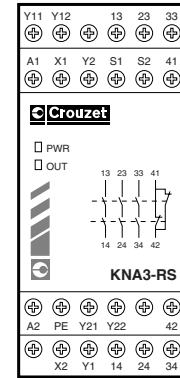
Technical characteristics	
Power supply	
Power supply voltage	~ 24 V 50/60 Hz = 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~ -15% / +15% of Un for =
Power on Indicator	Green LED – PWR
Accuracy	
Reset time	< 25 ms
Maximum response time on emergency stop	< 50 ms
Output specification	
Type	Volt-free outputs
No. of safety circuits	3 "N/O" AgSnO ₂ contacts
No. of data circuits	1 "N/C" AgSnO ₂ contacts
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁶ operations at 1500 VA resistive 5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations
Operation and use	
Max. absorbed power	AC 1.6 VA / DC 2 W
Relay on Indicator	Green LED – Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V=
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III
EMC immunity according to EN 50082-2	
Rapid transients	2 kV directly acc. to IEC 1000.4.4 4 kV directly for the 230 V~ version 2 kV when coupled
Radiated electromagnetic field	30 V/m Level X acc. to IEC 1000.4.3 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	15 kV in the air acc. to IEC 1000.4.2
Shock waves	Level 3 according to IEC 1000.4.5 Common mode 4 kV for 230 V~ 2 kV residual current mode Common mode 2 kV for 24 V= and 24 V~
Radio frequencies in common mode	30 V rms Level X acc. to IEC 1000.4.6 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s Un-60% for 100 ms every 1 s according to IEC 61496-1/97 Un-100% for 10 ms every 100 ms* Un-50% for 20 ms every 200 ms*
* the device operates normally	
** the device has not failed dangerously	Un-50% for 500 ms every 5 s**
Casing	
Material	Polycarbonate Self-extinguishing - UL94 class VO
Degree of protection	Casing: IP40 Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule 2 X 2.5 mm ² solid conductor
Weight	310 g 24 AC DC 410 g 115/230 AC

Type	KNA3-RS
Part number (and voltage)	
24 V ~/=	85 100 436
115 V~	85 100 434
230 V~	85 100 435

1

Conformity	
European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
IEC 61496-1	●
IEC 664-1	●
EN 50081-2	●
EN 50082-2	●
EN 60204-1	●
EN 292-1 and 2	●
EN 954-1	● Category 4
EN 418	●
EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

Connections



Key

- A1-A2 : Power supply
- Y11-Y12 and Y21-Y22 : Redundant inputs with differentiated voltage for control devices
- Y1-Y2 : Start / validation
- S1-S2 : Short-circuit protection on start / validation input
- X1-X2 : Return loop
- 13-14/23-24/33-34 : "N/O" safety contacts
- 41-42 : "N/C" signalling contacts

To order, specify:	
1	Part number
Example: KNA3-RS safety relay: 85 100 434	

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Control devices:

- Depending on the degree of safety required, KNA3-RS can receive the following components as inputs:
- emergency stop pushbuttons with two contacts (Y11-Y12 and Y21-Y22)
 - position sensors (limit switches) with one or two contacts (Y11-Y12 and Y21-Y22)
 - pushbutton for start or validation (Y1-Y2)

A positive break operation device must be used if a single contact is used.
 To increase the degree of safety, one "N/C" auxiliary contact per power contactor is wired on terminals X1-X2 to ensure self-checking in this part of the installation.

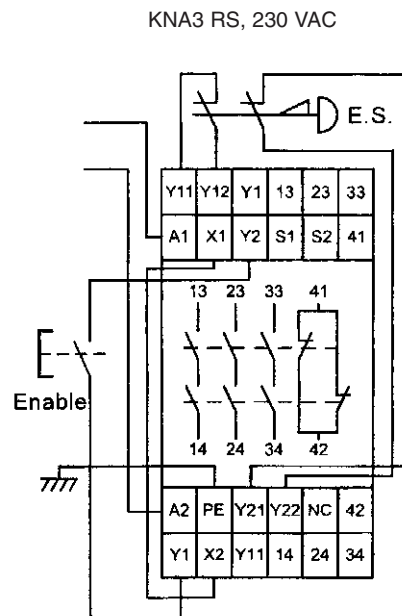
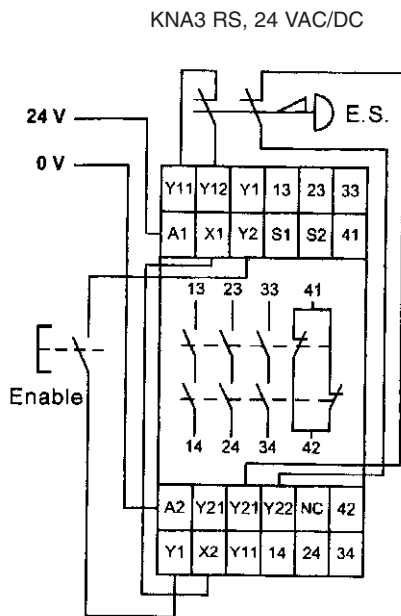
Control devices:

The KNA3-RS has three "N/O" safety contacts (13-14/23-24/33-34) and one "N/C" signalling contact (41-42). One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KNA3-RS, it is advisable not to exceed 10 A thermal for all three contacts. The signalling contact cannot be used as a safety contact.
 The signalling contact can be wired on a PLC input or integrated into a fault signalling system.

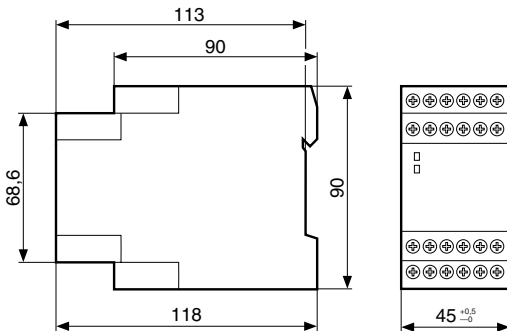
Extending the number of contacts:

The number of contacts of the KNA3-RS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS (see page 2/118).

Examples of use



Dimensions



Mounting - Removing see page 2/105

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

"KZP3-RS" safety relay (45 mm)

- "Emergency stop" and "mobile guard monitoring" functions
- "CE" conforming product / BG approved
- Four input circuits for control device with one or two channels
- Safety via redundancy and self-checking
- Integrity check on control devices
- 3 "N/O" safety contacts with linked contacts - 6 A / 250 ~
- 1 "N/C" signalling contact
- Can be used to obtain level 4 according to NF.EN 954-1

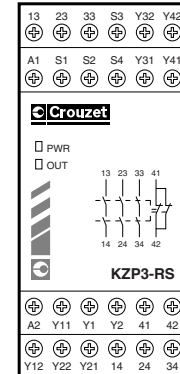


Technical characteristics	
Power supply	
Power supply voltage	~ 24 V 50/60 Hz = 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~ -15% / +15% of Un for =
Power on Indicator	Green LED – PWR
Accuracy	
Reset time	< 25 ms
Maximum response time on emergency stop	< 50 ms
Output specification	
Type	Volt-free outputs
No. of safety circuits	3 "N/O" AgSnO ₂ contacts
No. of data circuits	1 "N/C" AgSnO ₂ contacts
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁶ operations at 1500 VA resistive 5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations
Operation and use	
Max. absorbed power	AC 3 VA / DC 3 W
Relay on Indicator	Green LED – Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V=
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III
EMC immunity according to EN 50082-2	
Rapid transients	2 kV directly acc. to IEC 1000.4.4 4 kV directly for the 230 V~ version 2 kV when coupled
Radiated electromagnetic field	30 V/m Level X acc. to IEC 1000.4.3 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	15 kV in the air acc. to IEC 1000.4.2
Shock waves	Level 3 according to IEC 1000.4.5 Common mode 4 kV for 230 V~ Common mode 2 kV for 24 V= and 24 V~
Radio frequencies in common mode	30 V rms Level X acc. to IEC 1000.4.6 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s Un-60% for 100 ms every 1 s according to IEC 61496-1/97 Un-100% for 10 ms every 100 ms* Un-50% for 20 ms every 200 ms*
* the device operates normally	
** the device has not failed dangerously	Un-50% for 500 ms every 5 s**
Casing	
Material	Polycarbonate Self-extinguishing - UL94 class VO
Degree of protection	Casing: IP40 Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule 2 X 2.5 mm ² solid conductor
Weight	410 g

Type	KZP3-RS
Part number (and voltage)	
24 V ~/=	85 100 536
Conformity	
European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
IEC 61496-1	●
IEC 664-1	●
EN 50081-2	●
EN 50082-2	●
EN 60204-1	●
EN 292-1 and 2	●
EN 954-1	● Category 4
EN 418	●
EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

1

Connections



Key

- A1-A2 : Power supply
- Y11-Y12 and Y21-Y22 : Redundant inputs with differentiated voltage for control devices
- Y31-Y32 and Y41-Y42 : Redundant inputs with differentiated voltage for control devices
- Y1-Y2 : Start / validation
- S1-S2 and S3-S4 : Short-circuit protection on start / validation input
- 13-14/23-24/33-34 : "N/O" safety contacts
- 41-42 : "N/C" signalling contacts

To order, specify:	
1	Part number
Example: KZP3-RS safety relay: 85 100 536	

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Control devices:

The KZP3-RS is used to obtain and maintain a category 4 level of safety for an installation with two control devices (see wiring example). Depending on the degree of safety required, KZP3-RS can receive the following components as inputs:

- emergency stop pushbuttons with two contacts (Y11-Y12 / Y21-Y22 and Y31-Y32 / Y41-Y42)
- position sensors with one or two contacts (Y11-Y12 / Y21-Y22 and Y31-Y32 / Y41-Y42)
- pushbutton for start or validation (Y1-Y2)

A positive break operation device must be used if a single contact is used.

To increase the degree of safety, one "N/C" auxiliary contact per power contactor is cabled in series with the start (or validation) pushbutton, to ensure self-checking in this part of the installation.

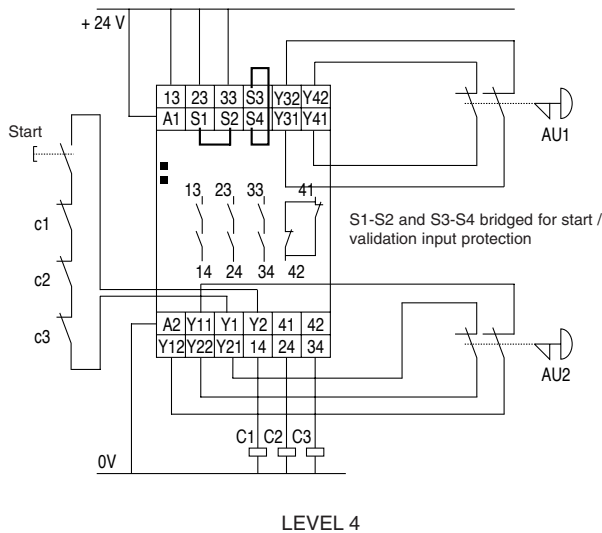
Control devices:

The KZP3-RS has three "N/O" safety contacts (13-14/23-24/33-34) and one "N/C" signalling contact (41-42). One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KZP3-RS, it is advisable not to exceed 10 A thermal for all three contacts. The signalling contact cannot be used as a safety contact. The signalling contact can be wired on a PLC input or integrated into a fault signalling system.

Extending the number of contacts:

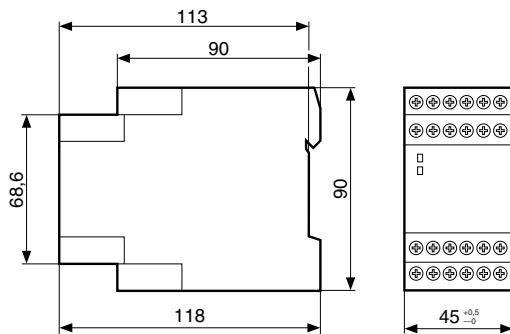
The number of contacts of the KZP3-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

Examples of use



NOTE: If a mobile guard is used instead of an ES with automatic starting, the contact which closes first on terminals Y11-Y12 (if the guard is connected on Y11-Y12 on Y21-Y22) or terminals Y41-Y42 (if it is connected on Y31-Y32 and Y41-Y42) must be connected.

Dimensions



Mounting - Removing see page 2/105

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

"KZR3-RS" safety relay (45 mm)

- "Emergency stop" and "mobile guard monitoring" functions
- Safety timer function from 0.5 s to 30 s
- "CE" conforming product / BG approved
- Safety via redundancy and self-checking
- Integrity check on control devices
- 1 "N/O" instantaneous safety contact with linked contacts - 6 A / 250 V~
- 1 "N/O" timed safety contact with linked contacts - 6 A / 250 V~
- 1 "N/C" timed safety contact with linked contacts- 6 A / 250 V~
- 1 "N/C" timed signalling contact
- Can be used to obtain level 4 according to NF.EN 954-1

Technical characteristics

Power supply

Power supply voltage	~ 24 V 50/60 Hz
	≡ 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~
	-15% / +15% of Un for ≡
Power on Indicator	Green LED – PWR

Accuracy

Reset time	< 25 ms
Maximum response time on emergency stop	< 50 ms

Output specification

Type	Volt-free outputs
No. of instantaneous safety circuits	1 "N/O" AgSnO ₂ contact
No. of timed safety circuits	1 "N/O" + 1 "N/C" AgSnO ₂ contact
No. of data circuits	1 "N/C" AgSnO ₂ contact
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁵ operations at 1500 VA resistive
	5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations

Operation and use

Max. absorbed power	AC 1.6 VA / DC 2 W
Relay on Indicator	Green LED Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V≡
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III
EMC immunity according to EN 50082-2	
Rapid transients	2 kV directly acc. to IEC 1000.4.4
	2 kV when coupled
Radiated electromagnetic field	30 V/m Level X acc. to IEC 1000.4.3
	80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	15 kV in the air acc. to IEC 1000.4.2
Shock waves	Level 3 according to IEC 1000.4.5
	Common mode 4 kV for 230 V~
	Common mode 2 kV for 24 V≡ and 24 V~
Radio frequencies in common mode	30 V rms Level X acc. to IEC 1000.4.6
	150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s
	Un-60% for 100 ms every 1 s according to IEC 61496-1/97
	Un-100% for 10 ms every 100 ms*
	Un-50% for 20 ms every 200 ms*

* the device operates normally

** the device has not failed dangerously

Casing

Material	Polycarbonate
	Self-extinguishing - UL94 class VO
Degree of protection	Casing: IP40
	Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule
	2 X 2.5 mm ² solid conductor
Weight	410 g



Type

KZR3-RS

Part number (and voltage)

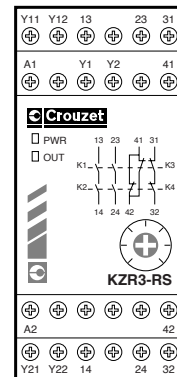
24 V ~/≡ **85 100 736**

Conformity

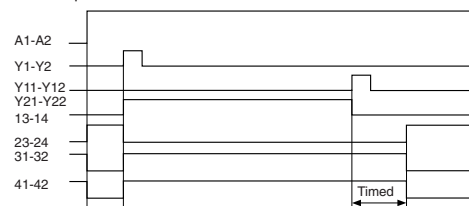
European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
IEC 61496-1	●
IEC 664-1	●
EN 50081-2	●
EN 50082-2	●
EN 60204-1	●
EN 292-1 and 2	●
EN 954-1	● Category 4 *
EN 418	●
EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

* instantaneous outputs. Category 3 according to EN 954 1 on timed outputs

Connections



Power-up



Key

A1-A2	: Power supply
Y11-Y12 and Y21-Y22	: Redundant inputs with differentiated voltage for control devices
Y1-Y2	: Start / validation
13-14	: "N/O" instantaneous safety contact
23-24	: "N/O" timed safety contact
31-32	: "N/C" timed safety contact
41-42	: "N/C" timed data contact

To order, specify:

1 Part number

Example: KZR3-RS safety relay: 85 100 736

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Control devices:

Depending on the degree of safety required, KZR3-RS can receive the following components as inputs:

- emergency stop pushbuttons with two contacts (Y11-Y12 and Y21-Y22)
- position sensors (limit switches) with one or two contacts (Y11-Y12 and Y21-Y22)
- auxiliary contact for electromagnetic lock (Y11-Y12 and Y21-Y22)
- pushbutton for start or validation (Y1-Y2)

A positive break operation device must be used if a single contact is used.

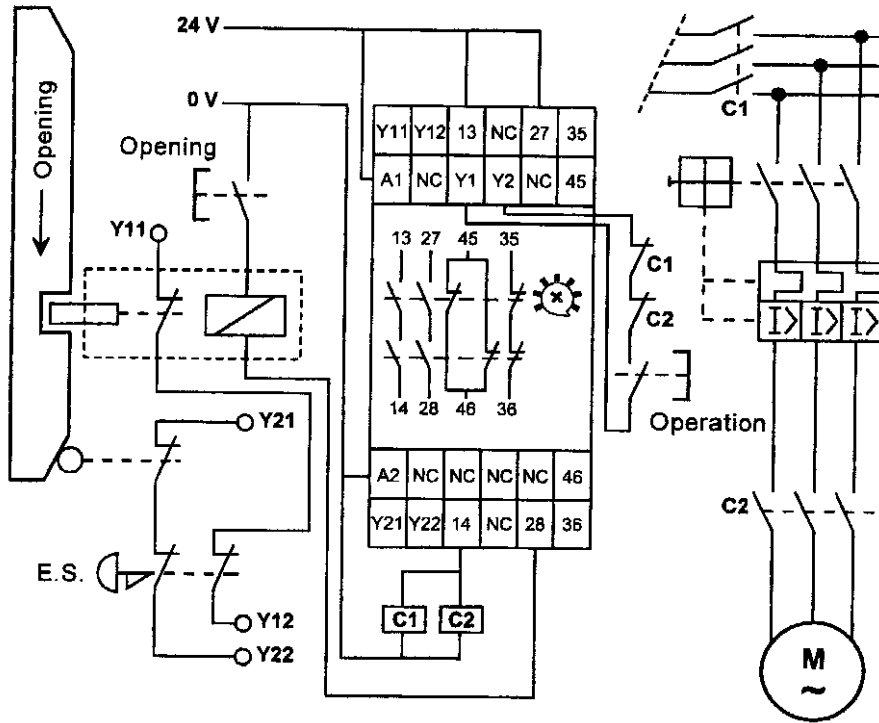
Control devices:

The KZR3-RS has one "N/O" instantaneous safety category 4 contact (13-14), one "N/O" timed safety category 3 contact (23-24) and one "N/C" (31-32) timed safety category 3 contact, and one "N/C" (41-42) signalling contact. One or more control devices may be wired (diagram 1 and 2) up to the breaking capacity of the safety contacts: 1500 VA.

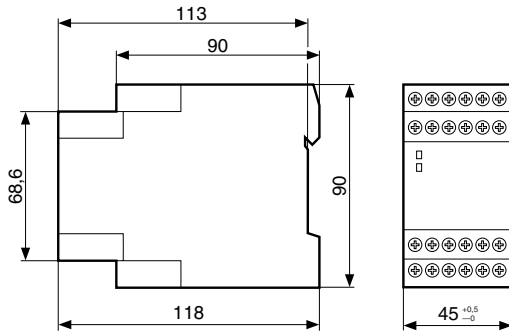
Extending the number of contacts:

The number of contacts of the KZR3-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

Examples of use



Dimensions



Mounting - Removing see page 2/105

"KSW2-RS" safety relay (45 mm)

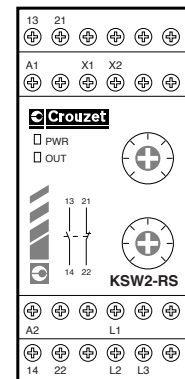
- "Zero speed monitoring" function for a single or 3-phase motor
- Detection of actual stopping by measuring remanent voltages
- "CE" conforming product / BG approved
- Safety via redundancy and self-checking
- Wiring integrity check
- Galvanic isolation
- 1 "N/O" safety contact with linked contacts - 6 A / 250 V~
- 1 "N/C" safety contact with linked contacts - 6 A / 250 V~
- Separate return loop
- Can be used to obtain level 4 according to NF.EN 954-1



Technical characteristics	
Power supply	
Power supply voltage	~ 24 V 50/60 Hz = 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~ -15% / +15% of Un for =
Power on Indicator	Green LED – PWR
Accuracy	
Reset time	3 s (self-test)
Setting for channels 1 and 2	From 20 mV to 500 mV +/- 15%
Synchronisation difference	< 3 s
Hysteresis	40% +/- 50%
Output specification	
Type	Volt-free outputs
No. of safety circuits	1 "N/O" + 1 "N/C" AgSnO ₂ contact
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁵ operations at 1500 VA resistive 5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations
Operation and use	
Max. absorbed power	AC 1.6 VA / DC 2 W
Relay on Indicator	Green LED – Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V=
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III
EMC immunity according to EN 50082-2	
Rapid transients	2 kV directly acc. to IEC 1000.4.4 2 kV when coupled
Radiated electromagnetic field	30 V/m Level X acc. to IEC 1000.4.3 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	15 kV in the air acc. to IEC 1000.4.2
Shock waves	Level 3 according to IEC 1000.4.5 Common mode 2 kV for 24 V= and 24 V~
Radio frequencies in common mode	30 V rms Level X acc. to IEC 1000.4.6 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s Un-60% for 100 ms every 1 s according to IEC 61496-1/97 Un-100% for 10 ms every 100 ms* Un-50% for 20 ms every 200 ms*
* the device operates normally	
** the device has not failed dangerously	Un-50% for 500 ms every 5 s**
Casing	
Material	Polycarbonate
Degree of protection	Self-extinguishing - UL94 class VO Casing: IP40 Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule 2 X 2.5 mm ² solid conductor
Weight	410 g

Type	KSW2-RS
Part number (and voltage)	
24 V ~/=	85 100 326
Conformity	
European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
IEC 61496-1	●
IEC 664-1	●
EN 50081-2	●
EN 50082-2	●
EN 60204-1	●
EN 292-1 and 2	●
EN 954-1	● Category 4
EN 418	●
EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

Connections



- Key**
- A1-A2 : Power supply
 - X1-X2 : Return loop
 - L1-L2 : Input channel 1 (motor winding)
 - L2-L3 : Input channel 2 (motor winding)
 - 13-14 : "N/O" safety contacts
 - 21-22 : "N/C" safety contacts

To order, specify:	
1	Part number
Example: KSW2-RS safety relay: 85 100 326	

Products and specifications subject to change without notice.

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Self-test:

When terminals A1-A2 are powered up, a test sequence is initiated: the output relays (terminals 13-14 and 21-22) are energised for 1.5 s then separate for 1.5 s. If no fault is detected, the relays reattach. This test checks:

- failure of the output contacts (terminals 13-14 and 21-22)
- breaking of one of the phases (L1, L2 or L3)
- the validity of the return loop (X1-X2)
- the failure of an internal component

Safety function:

When an electric motor rotates while no longer supplied with power, it behaves like a generator, supplying voltage (called remanent) to the terminals of its windings. This voltage varies according to several parameters: speed of rotation, the motor characteristics, remanent magnetisation, inertia of the mechanical assembly. The KSW2-RS measures this voltage and interprets it so that the doors and mobile guards can only be opened once the motor has actually stopped.

Setting:

Both channels are set on the front of the KSW2-RS using two potentiometers. This mitigates the effects of any imbalance between the windings or remanent voltages. Setting is within a range of 20 mV to 500 mV in order to adapt a threshold to a slow or zero speed, which is not dangerous for the operator.

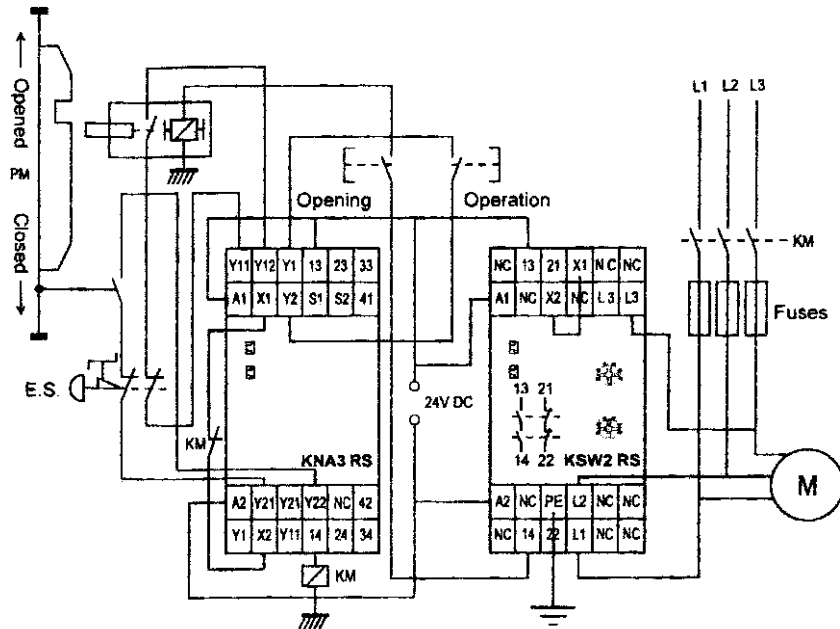
Control devices:

The KSW2-RS has one "N/O" (13-14) and one "N/C" (21-22) safety contact. One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA.

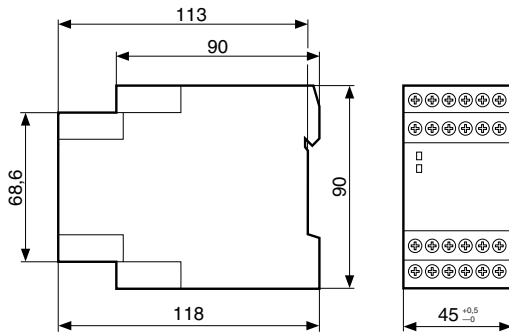
Extending the number of contacts:

The number of contacts of the KSW2-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

Examples of use



Dimensions



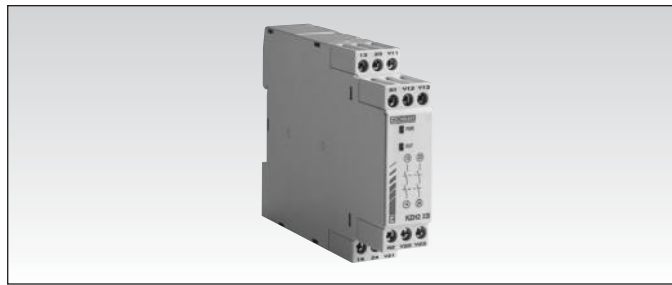
Mounting - Removing see page 2/105

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

"KZH2-XS" safety relay (22.5 mm)

- Type III C "2-hand control" functions according to EN 574/97
- "CE" conforming product with type-examination
- BG approved product
- INRS certification: Q3.99
- Control device with two channels
- Safety via redundancy and self-checking
- Integrity check on control devices
- 2 "N/O" safety contacts with linked contacts - 6 A / 250 V~
- Can be used to obtain level 4 according to NF.EN 954-1



Technical characteristics

Power supply

Power supply voltage	~ 24 V 50/60 Hz = 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~ -10% / +15% of Un for =
Power on Indicator	Green LED – PWR

Accuracy

Synchronisation difference	< 500 ms
Response time on release of control device	< 20 ms

Output specification

Type	Volt-free outputs
No. of safety circuits	2 "N/O" AgSnO ₂ contacts
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁶ operations at 1500 VA resistive 5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations

Operation and use

Max. absorbed power	AC 1.5 VA / DC 1.5 W
Relay on Indicator	Green LED – Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V=
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III

EMC immunity according to EN 50082-2

Rapid transients	2 kV directly acc. to IEC 1000.4.4 2 kV when coupled
Radiated electromagnetic field	30 V/m Level X acc. to IEC 1000.4.3 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	15 kV in the air acc. to IEC 1000.4.2
Shock waves	Level 3 according to IEC 1000.4.5 Common mode 2 kV for 24 V= and 24 V~
Radio frequencies in common mode	10 V rms on inputs / Level 3 according to IEC 1000.4.6 30 V rms on supp. / Level X according to IEC 1000.4.6 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s Un-60% for 100 ms every 1 s according to IEC 61496-1/97 Un-100% for 10 ms every 100 ms*

* the device operates normally

** the device has not failed dangerously

Casing

Material	Polycarbonate Self-extinguishing - UL94 class VO
Degree of protection	Casing: IP40 Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule 2 X 2.5 mm ² solid conductor
Weight	230 g

Type

KZH2-XS

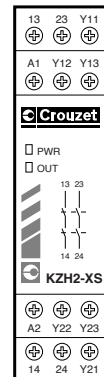
Part number (and voltage)

24 V ~/= 85 100 626

Conformity

European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
European "EMC" Directive 89 336/EEC	●
IEC 61496-1	●
IEC 664-1	●
EN 50081-2	●
EN 50082-2	●
EN 60204-1	●
EN 292-1 and 2	●
EN 574 / 97	● Type III C
EN 954-1	● Category 4
EN 418	●
EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

Connections



Key

A1-A2	: Power supply
Y11-Y12-Y13 and Y21-Y22-Y23	: Redundant inputs with differentiated voltage for control devices
13-14 / 23-24	: "N/O" safety contacts

To order, specify:

1 Part number

Example: KZH2-XS safety relay: 85 100 626

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Control devices:

The KZH2-XS can receive the following components as inputs:

- two pushbuttons with two positions "N/O" + "N/C" (Y11-Y12-Y13 and Y21-Y22-Y23)
- one or two emergency stop pushbuttons with one or two channels (A1-A2).

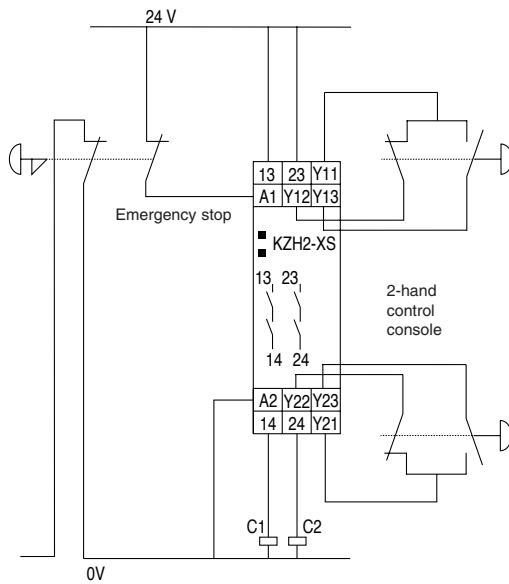
Control devices:

The KZH2-XS has two "N/O" safety contacts (13-14/23-24). One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KZH2-XS, it is advisable not to exceed 8 A thermal for both contacts.

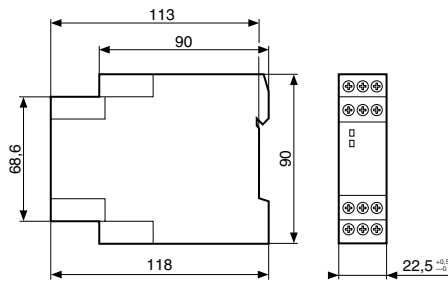
Extending the number of contacts:

The number of contacts of the KZH2-XS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

Examples of use



Dimensions



Mounting - Removing see page 2/105

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

"KZH3-RS" safety relay (45 mm)

- Type III C "2-hand control" functions according to EN 574/97
- "CE" conforming product with type-examination
- BG approved product
- INRS certification: Q3.99
- Control device with two channels
- Safety via redundancy and self-checking
- Integrity check on control devices
- 3 "N/O" safety contacts with linked contacts - 6 A / 250 V~
- 1 "N/C" signalling contact
- Can be used to obtain level 4 according to NF.EN 954-1



Technical characteristics

Power supply

Power supply voltage	~ 24 V 50/60 Hz = 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~ -10% / +15% of Un for =
Power on Indicator	Green LED – PWR

Accuracy

Reset time	< 500 ms
Maximum response time on emergency stop at Un	< 20 ms

Output specification

Type	Volt-free outputs
No. of safety circuits	3 "N/O" AgSnO ₂ contacts
No. of data circuits	1 "N/C" AgSnO ₂ contacts
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁶ operations at 1500 VA resistive 5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations

Operation and use

Max. absorbed power	24 AC 1.5 VA / 24 DC 1.5 W / 115-230 AC 3.2 VA
Relay on Indicator	Green LED – Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V=
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III
EMC immunity according to EN 50082-2	
Rapid transients	2 kV directly acc. to IEC 1000.4.4 4 kV directly for the 230 V~ version 2 kV when coupled
Radiated electromagnetic field	30 V/m Level X acc. to IEC 1000.4.3 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	15 kV in the air acc. to IEC 1000.4.2
Shock waves	Level 3 according to IEC 1000.4.5 Common mode 4 kV for 230 V~ 2 kV residual current mode Common mode 2 kV for 24 V= and 24 V~
Radio frequencies in common mode	10 V rms on inputs / Level 3 according to IEC 1000.4.6 30 V rms on supp. / Level X according to IEC 1000.4.6 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s Un-60% for 100 ms every 1 s according to IEC 61496-1/97 Un-100% for 10 ms every 100 ms* Un-50% for 20 ms every 200 ms* * the device operates normally ** the device has not failed dangerously
	Un-50% for 500 ms every 5 s**

Casing

Material	Polycarbonate Self-extinguishing - UL94 class VO
Degree of protection	Casing: IP40 Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule 2 X 2.5 mm ² solid conductor
Weight	310 g 24 AC/DC 410 g 115-230 AC

Type

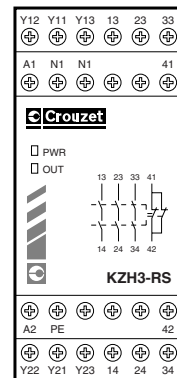
Part number (and voltage)

Part number (and voltage)	KZH3-RS
24 V ~/=	85 100 636
115 V~	85 100 634
230 V~	85 100 635

Conformity

European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
European "EMC" Directive 89 336/EEC	●
IEC 61496-1	●
IEC 664-1	●
EN 50081-2	●
EN 50082-2	●
EN 60204-1	●
EN 292-1 and 2	●
EN 574 / 97	● Type III C
EN 954-1	● Category 4
EN 418	●
EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

Connections



Key

A1-A2	: Power supply
Y11-Y12-Y13 and Y21-Y22-Y23	: Redundant inputs with differentiated voltage for control devices
13-14/23-24/33-34	: "N/O" safety contacts
41-42	: "N/C" signalling contacts

To order, specify:

1 Part number

Example: KZH3-RS safety relay: 85 100 634

Control devices:

The KZH3-RS can receive the following components as inputs:
 - two pushbuttons with two positions "N/O" + "N/C" (Y11-Y12-Y13 and Y21-Y22-Y23)
 - one or two emergency stop pushbuttons with one or two channels (A1-A2).

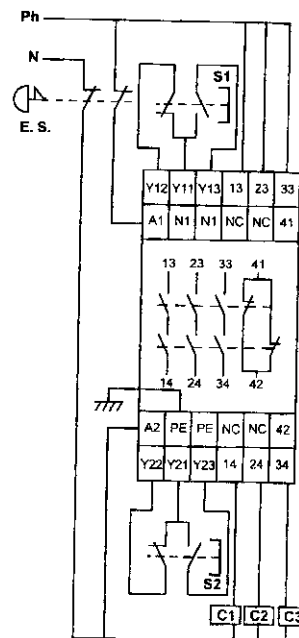
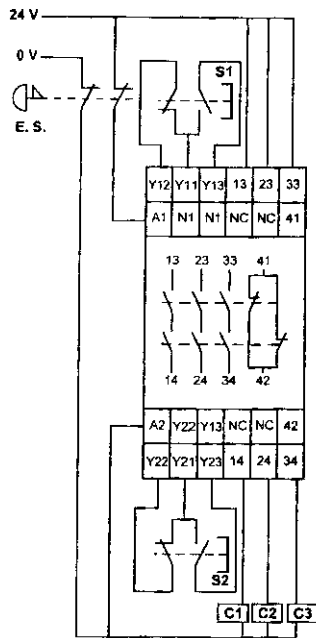
Extending the number of contacts:

The number of contacts of the KZH3-RS can be extended and the breaking capacity thus increased. To do this, use the KZE3-XS.

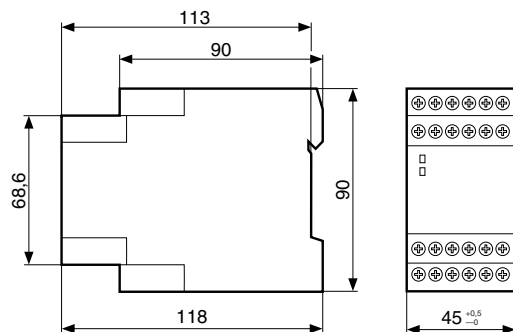
Control devices:

The KZH3-RS has three "N/O" safety contacts (13-14/23-24/33-34) and one "N/C" signalling contact (41-42). One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KZH3-RS, it is advisable not to exceed 10 A thermal for all three contacts.

Examples of use



Dimensions



Mounting - Removing see page 2/105

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Extension for "KZE3-XS" safety relay (22.5 mm)

- Extending the number of contacts in a safety relay
- Used to increase the breaking capacity of the main unit
- "CE" conforming product / BG approved
- Safety via redundancy and self-checking
- 3 "N/O" safety contacts with linked contacts - 6 A / 250 V~
- 1 "N/C" return loop

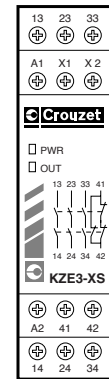


Technical characteristics	
Power supply	
Power supply voltage	~ 24 V 50/60 Hz = 24 V max. ripple 10%
Operating range	-15% / +10% of Un for ~ -15% / +15% of Un for =
Power on Indicator	Green LED – PWR
Accuracy	
Synchronisation difference	< 25 ms
Maximum response time on emergency stop at Un	50 ms
Output specification	
Type	Volt-free outputs
No. of safety circuits	3 "N/O" AgSnO ₂ contacts
Return loop	1 "N/C" AgSnO ₂ contact
Breaking capacity	1500 VA resistive
Max. current breaking capacity	6.0 A
Max. voltage breaking capacity	250 VAC
Electrical life	10 ⁵ operations at 1500 VA resistive 5.10 ⁵ operations at 500 VA resistive
Mechanical life	10 ⁷ operations
Operation and use	
Max. absorbed power	AC 1.6 VA / DC 2 W
Relay on Indicator	Green LED – Out
Operating temperature	0°C to +50°C acc. to IEC 68-2-14
Storage temperature	-20°C to +70°C acc. to IEC 68-1/2
Internal voltage	24 V=
Dielectric strength	2.95 kV according to IEC 664-1
Resistance to tracking	Material group III
EMC immunity according to EN 50082-2	
Rapid transients	2 kV directly acc. to IEC 1000.4.4 2 kV when coupled
Radiated electromagnetic field	10 V/m Level 3 acc. to IEC 1000.4.3 80 MHz to 1 GHz / 900 MHz (ENV 50140/204)
Electrostatic discharges	8 kV in the air acc. to IEC 1000.4.2
Shock waves	Common mode 1 kV according to IEC1000.4.5
Radio frequencies in common mode	10 V rms Level 3 acc. to IEC 1000.4.6 150 kHz to 80 MHz (ENV 50141) according to IEC 1000.4.11
Drop-out / short breaks / microbreaks	Un-30% for 10 ms every 1 s Un-60% for 100 ms every 1 s according to IEC 61496-1/97 Un-100% for 10 ms every 100 ms* Un-50% for 20 ms every 200 ms* Un-50% for 500 ms every 5 s**
* the device operates normally ** the device has not failed dangerously	
Casing	
Material	Polycarbonate Self-extinguishing - UL94 class VO
Degree of protection	Casing: IP40 Terminal: IP20
Terminal capacity	2 X 1.5 mm ² multicore with ferrule 2 X 2.5 mm ² solid conductor
Weight	310 g

Type	KZE3-XS
Part number (and voltage)	
24 V ~/=	85 100 936
40/260 V ~	85 100 937
Conformity	
European "Machinery" Directive 89/392/EEC	●
French Decree 92/765-766-768	●
European "Usage" Directive 89/655/EEC	●
French Decree 93-40 / 93-41	●
NF-EN 60204-1	●
NF-EN 292-1 and 2	●
NF-EN 954-1	●
NF-EN 418	●
NF-EN 1088	●
UL 508	● UL
C22-2 No. 14-M91	● (C) UL
GS-ET-20	● BG

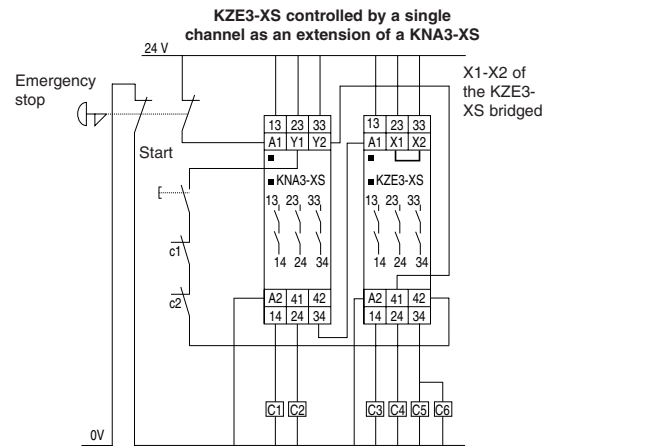
1

Connections



- Key**
- A1-A2 : Power supply
 - 41 - 42 : Control device(s)
 - 13-14/23-24/33-34 : "N/O" safety contacts
 - X1-X2 : Internal return loop

Example of wiring



To order, specify:

1 Part number
Example: Extension for KZE3-XS safety relay: 85 100 936

Products and specifications subject to change without notice.

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Control devices:

Depending on the degree of safety required, the KZE3-XS can be controlled by one or two channels. In most cases, control by one channel will be sufficient. Please consult your inspection office for further information.

Control devices:

The KZE3-XS has three "N/O" safety contacts (13-14/23-24/33-34) and a return loop (X1-X2) which must be included in the "start /

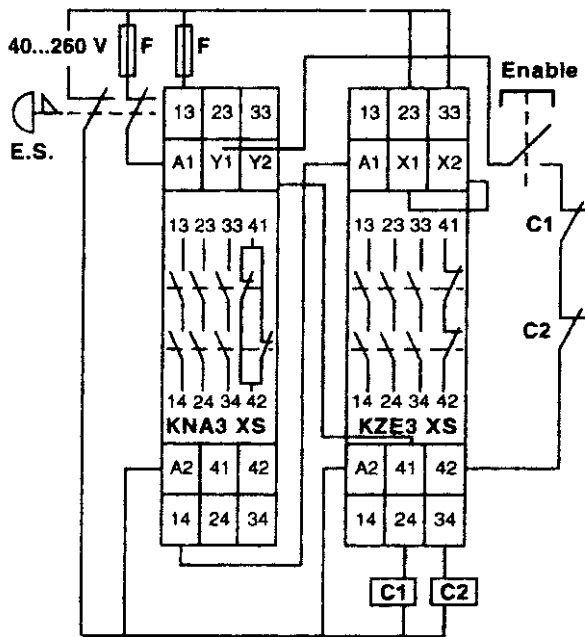
validation" line (Y1-Y2) of the main unit. One or more control devices may be wired up to the breaking capacity of the safety contacts: 1500 VA. However, to limit internal heating in the KZE3-XS, it is advisable not to exceed 10 A thermal for all three contacts.

Extending the number of contacts:

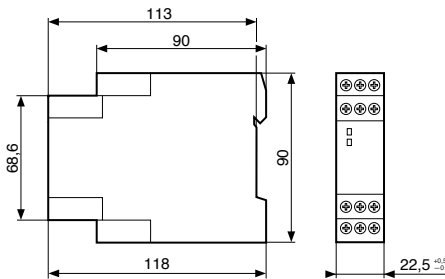
It is possible to wire several extension KZE3-XS units in cascade. All the return loops (X1-X2) will be in series with the "start / validation" line (Y1-Y2) of the main unit.

Examples of use

WIRING FOR KNA3-XS WITH A KZE3-XS RELAY EXTENSION UNIT



Dimensions



Mounting - Removing see page 2/105

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Illuminated indicator banks

■ Modular illuminated indicator banks

1 to 5 lens units



General characteristics

Environment

Certifications	In normal operation: CSA, UL: ~ 240 V maximum
Protective treatment	In normal operation: "TC" treatment

Ambient air temperature	Use	-10°C, +55°C
	Stored	-20°C, +70°C
Electric shock protection		Direct mounting: class II. Tube mounting: class I according to IEC 536 and NF C 20-030

Degree of protection		IP 42 according to IEC 529 and NF C 20-010, vertical, base unit underneath
----------------------	--	--

Materials	Lens units	Polycarbonate
	Base and cover	Glass polyamide
	Tube	Anodised aluminium
	Pedestal	Polycarbonate or aluminium

Electrical characteristics

Assigned insulation voltage	Ui = 250 V according to IEC 947-1
-----------------------------	-----------------------------------

Assigned impulse voltage	Uimp = 4 kV according to IEC 947-1
--------------------------	------------------------------------

Type of bulb	Fixed signalling lens unit: BA15d base fitting bulbs, power 10 W
--------------	--

Terminal labelling	1 terminal labelled "NC" (C) common to the 5 units, 1 or 5 terminals labelled from 1 to 5 according to the number of units
--------------------	--

Connection	On protected and open terminals with captive screw clamps: max. clamping capacity: 2 x 2.5 mm ²
------------	--

Part numbers

Illuminated lens units

Green	83 895 201
Red	83 895 202
Orange	83 895 203
Blue	83 895 204
Clear	83 895 205
Yellow	83 895 206

Audible alarms

Buzzer 24 VDC	83 895 211
Buzzer 120-230 VAC Black	83 895 212

Mounting accessories

100 mm tube, supplied with clamping system on base	83 895 207
400 mm	83 895 213
800 mm	83 895 214

Pedestal on horizontal support, for tube mounting	83 895 208
---	------------

Pedestal on vertical support Direct mounting on base or pedestal	83 895 209
---	------------

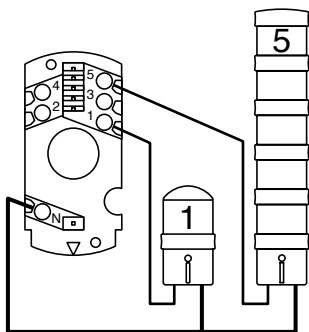
Base with axial or lateral cable entry and cover	83 895 210
--	------------

Incandescent bulbs

BA 15 d base fitting*, 10 W	24 V	79 214 586
BA 15 d base fitting*, 10 W	120 V	79 214 587
BA 15 d base fitting*, 10 W	230 V	79 214 588

*Bulbs must purchase in lots of ten (10)

Connection diagram



To order, specify:

1 Part number **2** Accessory **3** Bulb
 Example: Blue lens unit 83 895 204 - Pedestal 83 895 209 - Bulb 79 214 588

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

General information

Type **83 895 2** indicator banks are optical signalling devices used in particular for 360° remote signalling of the various states and sequences of a machine or installation.

Examples: operation, machine stop, missing materials, paging personnel, fault signalling, etc

The indicator bank is modular

It forms an assembly which can be constructed to form several different versions with between one and five lens units, and is not assembled on delivery (to be assembled by the customer).

It comprises:

- 1 - A base with a removable connection terminal block and an axial or lateral cable entry.
- 2 - One to five green, red, orange, blue, clear or yellow lens units.
- 3 - A cover on the top section.

The lens units fit together easily by stacking one on top of the another and can be locked and unlocked using a built-in peripheral nut.

Electrical connection of the various parts is automatic.

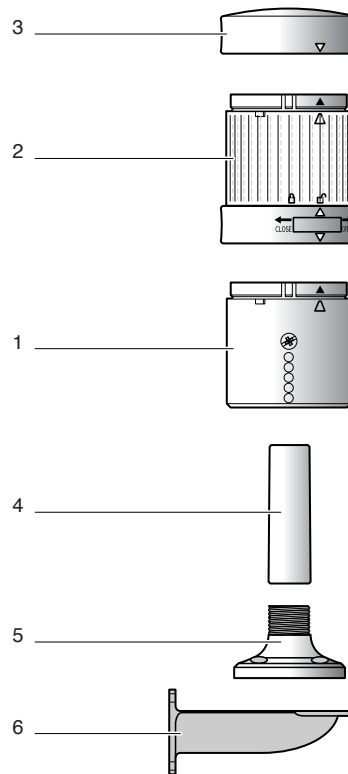
Accessories:

- 4 - 100 mm tube.
- 5 - Pedestal screwed onto the tube for fixing it to the horizontal support.
- 6 - Pedestal for fixing to the vertical support.

Installation

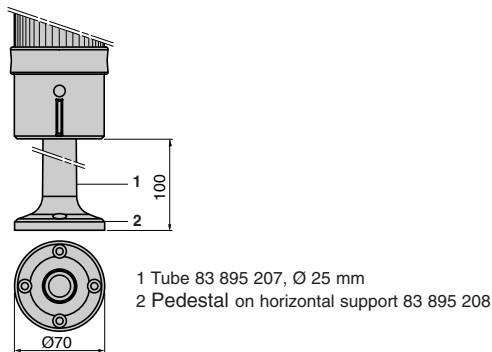
Fixing: direct fixing of the base to the support using 2 screws or using a pedestal screwed onto the tube.

Wiring: this is carried out on the removable connection terminal block which is built into the base (to make wiring easier). The terminals are protected to make the screw clamps captive and to avoid any contact with live parts.

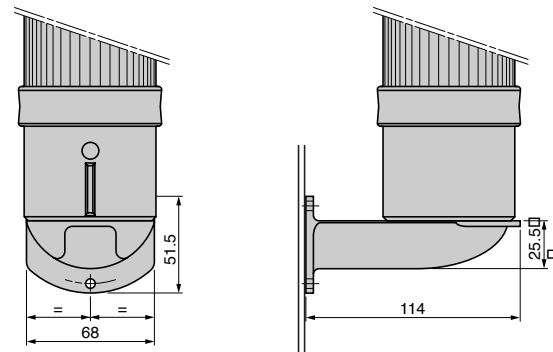


Dimensions

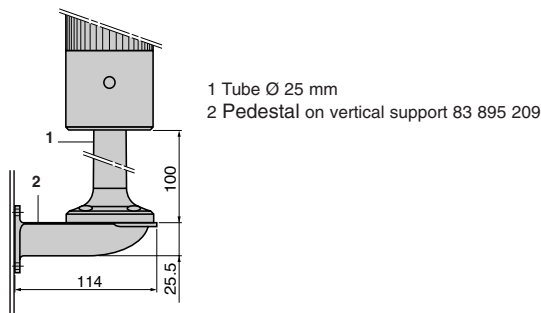
Tube **83 895 207** and pedestal **83 895 208**



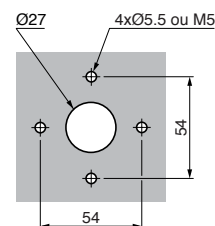
Pedestal **83 895 209**, direct mounting on base



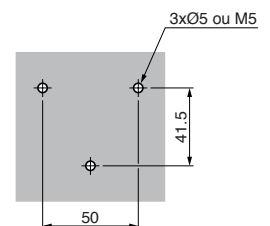
Mounting using pedestal **83 895 208** screwed onto tube **83 895 207**



Drilling of horizontal support for fixing on pedestal **83 895 208**



Drilling of vertical support for fixing on pedestal **83 895 207**



Other information

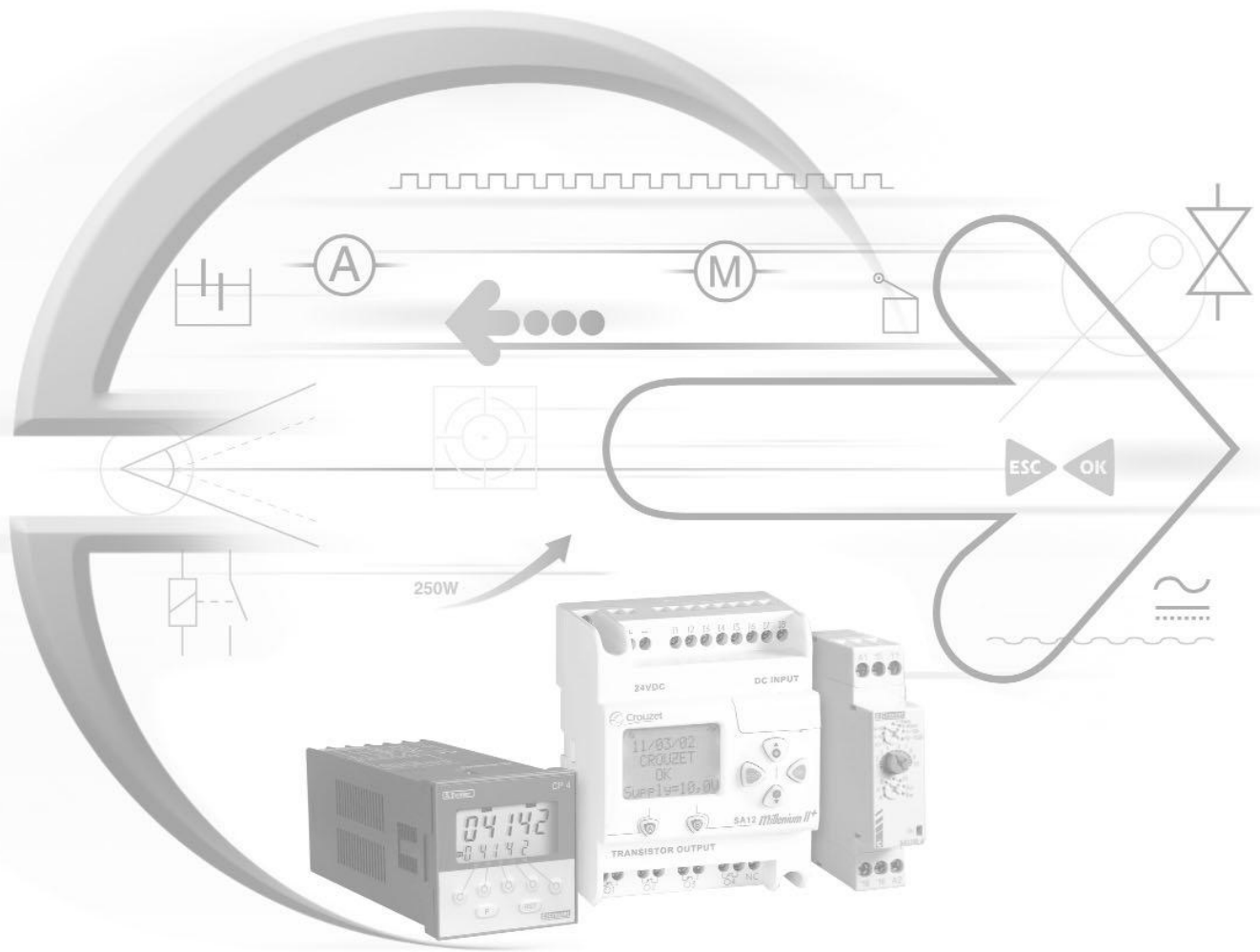
Products and specifications subject to change without notice.

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Counters

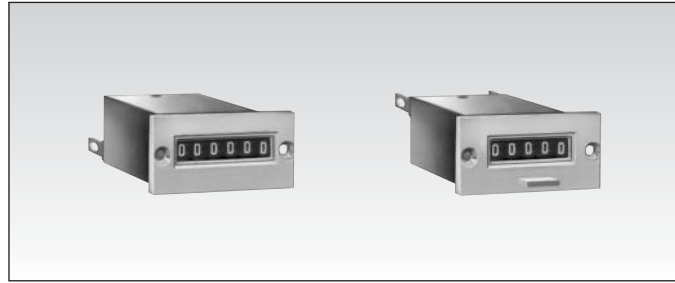


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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Electro-mechanical impulse counters totalizing - 24 x 48

- Front panel 24 x 48 mm
- 6 or 5 digits, 4 mm in height
- With or without manual zero reset
- White digits on black background



Characteristics

Counting capacity	999 999 imp without zero reset 99 999 imp with zero reset 4 mm
Height of digits	~ 18 imp/s
Max. count rate	~ 25 imp/s
Min. count rate	~ 28 ms
Min. pause time between 2 pulses	~ 20 ms
Max. pulse length (count coil)	~ 28 ms
Voltage variation	~ 20 ms
Operation factor	No limit
Absorbed power	+10% / -15% from Un 100% 1.1 VA 2.1 VA 0.8 W
Mechanical life (count function)	> 50 x 10 ⁶ operations
Voltage tests to IEC 255 100	U ≤ 60 V : 500 V U > 60 V : 2000 V
Protection	Case IP 40 Terminal IP 00
Environmental protection	Metal parts protected (by surface treatment) or non-corroding
Maintenance	None
Operates in any position	Yes
Temperature limits	- 10 + 60 °C - 40 + 80 °C
Connections	Use Stored
Mounting	6.35 faston connectors or link screws 2 x M3 screws - F90° on front panel
Weight	50 g

Other voltages : please consult us

Part numbers (and voltages)

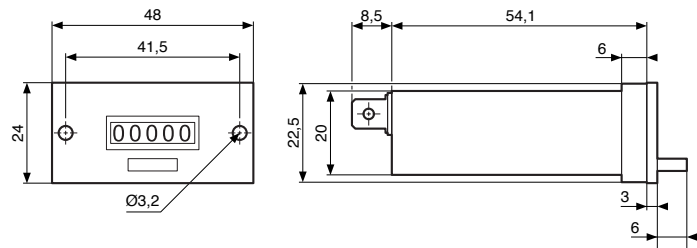
Reset	Without (A)	Manual (B)
230 V - 50 • 60 Hz	99 766 901	99 766 921
115 V - 50 • 60 Hz	99 766 902	99 766 922
24 V - 50 • 60 Hz	99 766 904	99 766 924
24 V ~	99 766 907	99 766 927

N.B.

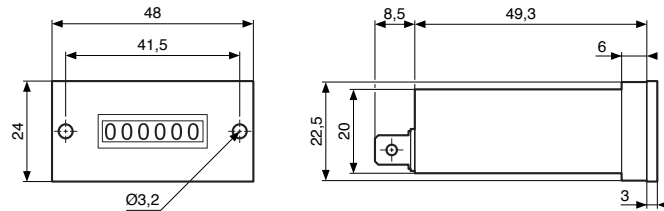
No count pulse must be received during the zero reset time. If a pulse is received damage may be caused.

Dimensions

24 x 48 - 5 decades **99 766 92●**

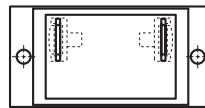


24 x 48 - 6 decades **99 766 90●**

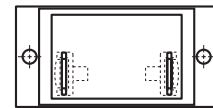


Rear panels

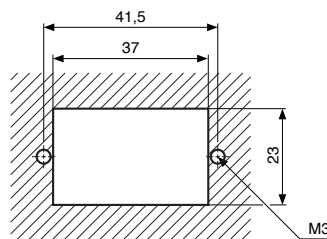
99 766 92●



99 766 90●



Panel cut-out **99 766 9●●**



To order, specify :

1 Part number

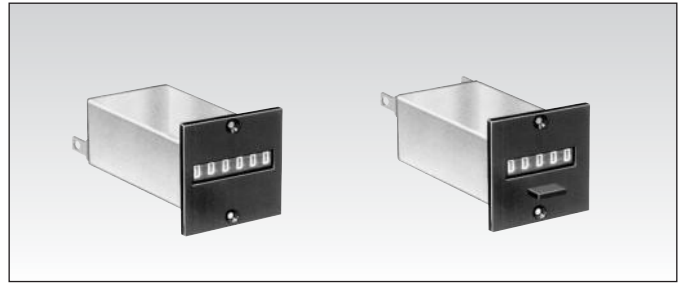
Example : Electro-mechanical impulse counters totalizing -
6 decades - 99 766 901

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Electro-mechanical impulse counters totalizing - 36 x 37

- Front panel 36 x 37 mm
- 6 or 5 digits, 4 mm in height
- With or without manual zero reset
- White digits on black background



Characteristics

Counting capacity	999 999 imp without zero reset 99 999 imp with zero reset
Height of digits	4 mm
Max. count rate	~ 18 imp/s ~ 25 imp/s
Min. count rate	~ 28 ms ~ 20 ms
Min. pause time between 2 pulses	~ 28 ms ~ 20 ms
Max. pulse length (count coil)	No limit
Voltage variation	+10% / -15% from Un
Absorbed power	24 V~ / 115 V~ 2.1 VA
Mechanical life (count function)	0.8 W > 50 x 10 ⁶ operations
Voltage tests to IEC 255-5	U ≤ 60 V : 500 V U > 60 V : 2000 V
Protection	Case IP 40 Terminal IP 00
Environmental protection	Metal parts protected (by surface treatment) or non-corroding
Maintenance	None
Operates in any position	Yes
Temperature limits	Use: - 10 + 60 °C Stored: - 40 + 80 °C
Connections	6.35 faston connectors or link screws
Mounting	2 x Ø 2.5 screws - F90° on front panel
Weight	50 g

Other voltages : please consult us

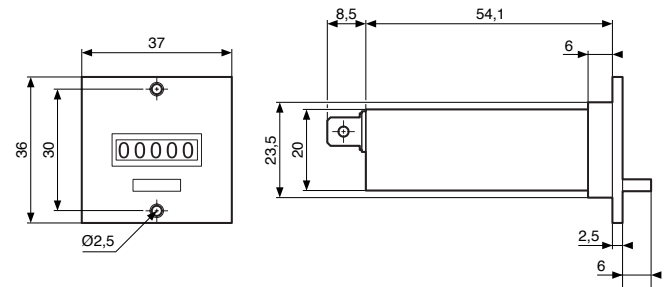
Part numbers (and voltages)

	Without zero reset	With manual zero reset
230 V ~ - 50 • 60 Hz	99 766 601	99 766 610
115 V ~ - 50 • 60 Hz	99 766 602	99 766 611
24 V ~ - 50 • 60 Hz	99 766 604	99 766 613
24 V ~	99 766 607	99 766 616

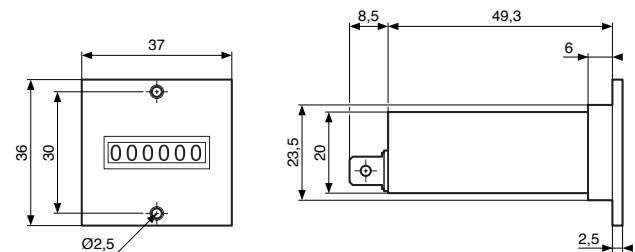
N.B.
No count pulse must be received during the zero reset time. If a pulse is received, damage may be caused.

Dimensions

36 x 37 - 5 decades 99 766 61●

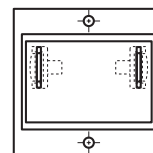


36 x 37 - 6 decades 99 766 60●

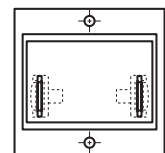


Rear panels

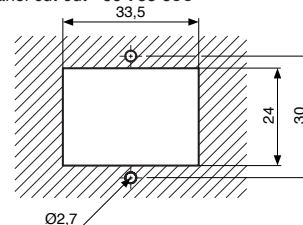
99 766 61●



99 766 60●



Panel cut-out 99 766 6●●



To order, specify :

1 Part number

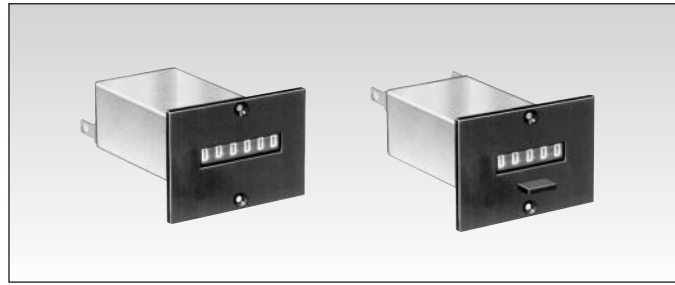
Example : Electro-mechanical impulse counters totalizing - 6 decades - 99 766 601

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Electro-mechanical impulse counters totalizing - 36 x 48

- Front panel 36 x 48
- 6 or 5 digits, 4 mm in height
- With or without manual zero reset
- White digits on black background



Characteristics

Counting capacity	999 999 imp without zero reset 99 999 imp with zero reset
Height of digits	4 mm
Max. count rate	~ 18 imp/s ∞ 25 imp/s
Min. count rate	∞ 28 ms ∞ 20 ms
Min. pause time between 2 pulses	~ 28 ms ∞ 20 ms
Max. pulse length (count coil)	No limit
Voltage variation	+10% / -15% from Un
Absorbed power	24 V~ / 115 V~ 230 V~ 24 V∞
Mechanical life (count function)	1.1 VA 2.1 VA 0.8 W > 50 x 10 ⁶ operations
Voltage tests to IEC 255-5	U ≤ 60 V : 500 V U > 60 V : 2000 V
Protection	Case IP 40 Terminal IP 00
Environmental protection	Metal parts protected (by surface treatment) or non-corroding
Maintenance	None
Operates in any position	Yes
Temperature limits	Use Stored - 10 + 60 °C - 40 + 80 °C
Connections	cosses Faston 6,35 ou vis cavalier
Mounting	2 x Ø 2.5 screws - F90° on front panel
Weight	50 g

Other voltages : please consult us

Part numbers (and voltages)

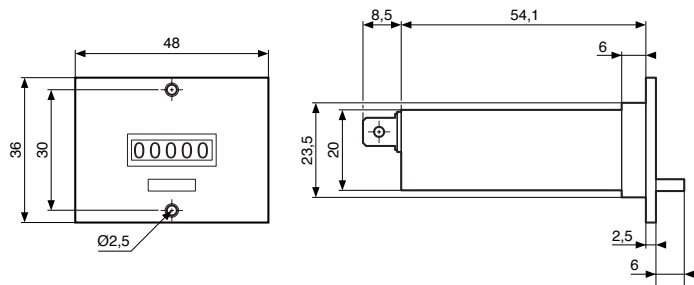
	Without zero reset (A)	With manual zero reset (B)
230 V - 50 • 60 Hz	99 766 701	99 766 710
115 V - 50 • 60 Hz	99 766 702	99 766 711
24 V - 50 • 60 Hz	99 766 704	99 766 713
24 V ∞	99 766 707	99 766 716

N.B.

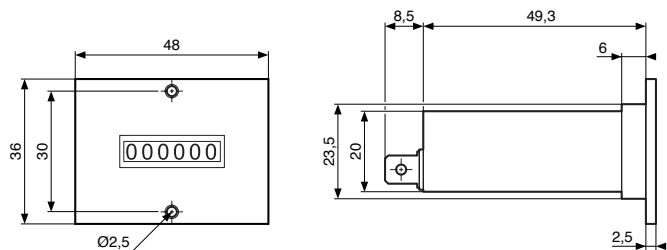
No count pulse must be received during the zero reset time. If a pulse is received, damage may be caused.

Dimensions

36 x 48 - 5 decades **99 766 71●**

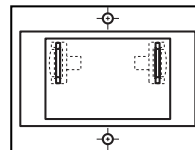


36 x 48 - 6 decades **99 766 70●**

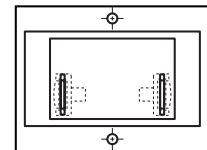


Rear panels

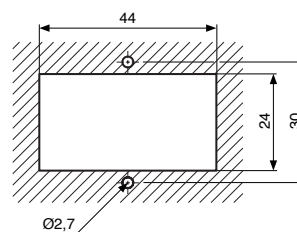
99 766 71●



99 766 70●



Panel cut-out **99 766 7●●**



To order, specify :

1 Part number

Example : Electro-mechanical impulse counters totalizing - 6 decades - 99 766 701

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2108 SERIES TOTALIZING COUNTER

- 8 Digit 7mm High LCD Display
- Replaceable Lithium Battery - 8 Year Life
- Compact Size

24 x 48mm (.95" x 1.89") Front Panel
37.5mm (1.48") Depth



GENERAL FEATURES:

The 2108 Series is a totalizing counter housed in a DIN-sized (24 x 48mm) enclosure. The 2108 has an eight digit 7mm high LCD display. The count input (slow speed) and reset input can be by contact closure and by NPN open collector transistor. The high speed input (7 kHz max) requires a 4 to 30 VDC voltage pulse and is compatible with 2 and 3 wire DC proximity switches and encoders. The unit is powered by a 3 volt lithium battery with an eight year life. When changing the battery, the current count value is retained long enough to allow battery replacement without losing the count value. The unit can be set remotely or from the front panel. The front panel reset can be enabled or disabled with jumpering of terminals on back of unit.

SPECIFICATIONS:

Power	Lithium battery, 8 year life
Count Inputs	Contact Closure (slow speed) NPN open collector (slow speed) Voltage input (high speed)
Low Speed	40 Hz
Minimum Pulse	12 ms
Current Consumption	52 µA max.
Leakage Current	0.2 µA max.
Residual Voltage	0.4 V max.
High Speed	7 kHz max.
1 State	4 to 30 VDC
0 State	0 to 1 VDC
Absorbed current	6 mA at 24 VDC
Reset Remote	Contact Closure NPN open collector 12 ms min.
Reset Pushbutton	Activate with jumper across terminals 2 & 4
Memory	Yes, 1 lithium battery - 8 year life
Protection	Front Panel IP64 Terminal IP20
Connections	Screw terminals 2 x 1.5mm ² capacity
Operating temperature	+32 to 131°F (0 to +55°C)
Storage temperature	-13° to 158°F (-25°C to 70°C)
Weight	2.1 oz. (60g)

CONFORMITY:

Electromagnetic environment

Radiated field	IEC 1000-4-3, level 3, 10 V/M, 26 MHz to 1 GHz
Fast transients	IEC 1000-4-4, level 3, 1 KV
Damped oscillatory wave	IEC 255.4, level 3, 1 KV
Electrostatic discharge	IEC 1000-4-2, level 3, 8 KV

ORDERING INFORMATION:

87 610 340

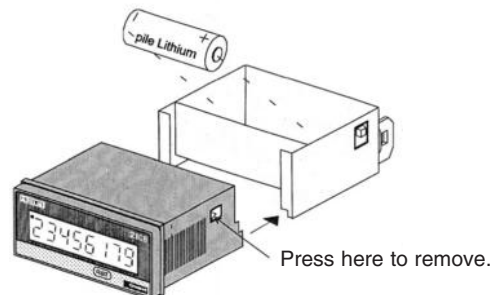
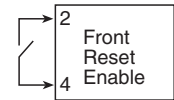
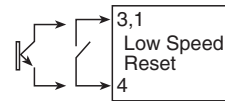
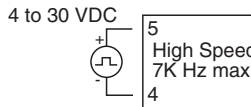
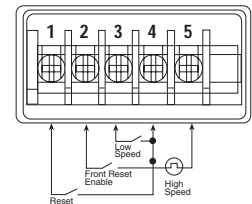
Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

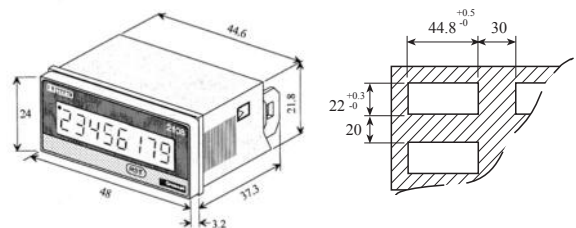


WIRING:

- 87 610 340
- 1- Reset Input
 - 2- Front Panel Reset Enable
 - 3- Low Speed Input
 - 4- OV
 - 5- High Speed Input



DIMENSIONS: (mm)



2108H SERIES ELAPSED TIME INDICATOR

- 6 Digit .3" High LCD Display
- 4 Selectable Time Ranges
 - Hours, 1/10 Hours
 - Minutes, 1/10 Minutes
 - Seconds, 1/10 Seconds
 - Hours, Minutes, Seconds



GENERAL FEATURES:

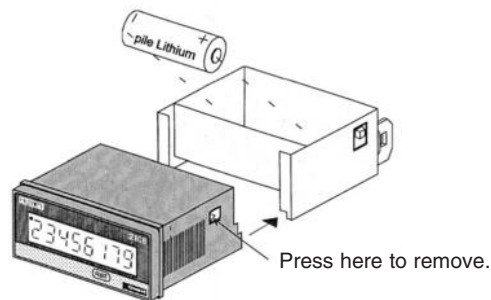
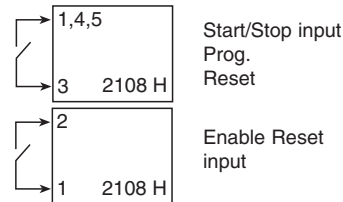
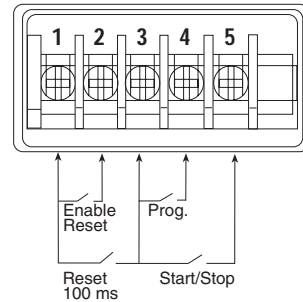
The 2108H Series is an elapsed time indicator in a DIN-sized 24 x 48mm (.95" x 1.89") enclosure. Unit is compact with a 37.5mm (1.48") depth. The start/stop input can be a contact closure or an NPN open collector transistor. The unit is powered by a replaceable lithium battery.

SPECIFICATIONS:

Power Supply	Replaceable lithium battery, 5 year life
Display	6 Digit LCD
Display height	0.3"
Accuracy	+50 PPM (Quartz)
Input	
Start/Stop and Reset Inputs	Dry Contact NPN open collector transistor
Min. Closure Time	40 ms (start/stop), 100 ms (reset)
Memory	Yes, 5 year life
Connection	Screw terminal
Front panel rating	IP64
Operating temperature	+32 to 131°F (0 to 55°C)
Storage temperature	-13 to 158°F (-25 to 70°C)
Weight	2.1 oz. (60g)

WIRING:

- 87 610 440
- 1- Reset Input
 - 2- Enable Reset
 - 3- Common
 - 4- Prog.
 - 5- Start/Stop

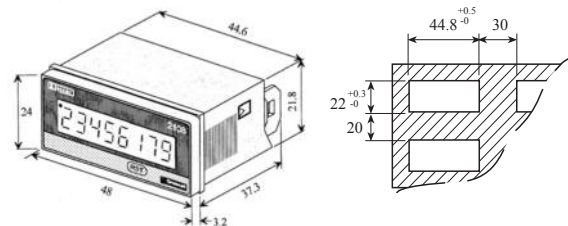


CONFORMITY:

Electromagnetic environment

Radiated field	IEC 1000-4-3, level 3, 10 V/M, 26 MHz to 1 GHz
Fast transients	IEC 1000-4-4, level 3, 1 KV
Damped oscillatory wave	IEC 255.4, level 3, 1 KV
Electrostatic discharge	IEC 1000-4-2, level 3, 8 KV

DIMENSIONS: (mm)



ORDERING INFORMATION:

87 610 440

Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

87 610 150 SERIES

ELAPSED TIME INDICATOR

- Voltage Input Version
- 6 Digit .3" High LCD Display
- 4 Selectable Time Ranges:
 - Hours, 1/10 Hours
 - Minutes, 1/10 Minutes
 - Seconds, 1/10 Seconds
 - Hours, Minutes, Seconds
- NEMA 4 Front Panel



GENERAL FEATURES:

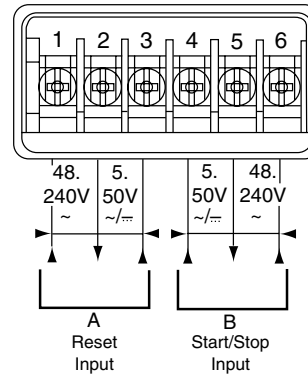
The 87 610 150 Series is an elapsed time indicator in a DIN-sized (24 x 48mm) enclosure. The start/stop input can be a 5 to 50 VAC/DC and 48 to 240 VAC voltage pulse. The unit is powered by an internal lithium battery which can be disconnected via a dip-switch for storage purposes.

WIRING:

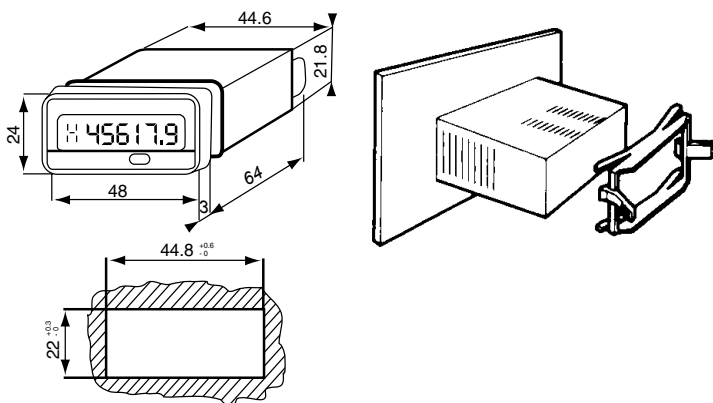
- 87 610 150**
- 1 - 48 to 240 VAC Reset Input
 - 2 - OV Reset Input
 - 3 - 5 to 50 VAC/DC Reset Input
 - 4 - 5 to 50 VAC/DC Start/Stop Input
 - 5 - OV Start/Stop Input
 - 6 - 48 to 240 VAC Start/Stop Input

SPECIFICATIONS:

Display	6 Digit LCD
Display Height	0.3"
Accuracy	±50 PPM
Input	
Start/Stop and Reset Inputs	5 to 50 VAC/DC 48 to 240 VAC
Min. Closure Time	40 ms
Power Supply	Internal lithium battery (5 year life)
Connection	Screw Terminal
Front Panel Rating	NEMA 4 (IP66)
Operating Temperature	+14 to 122°F (-10 to 50°C)
Storage Temperature	-13 to 158°F (-25 to 70°C)
Weight	2.1 oz. (60g)



DIMENSIONS: (mm)



ORDERING INFORMATION:

Voltage Input Version 87 610 150

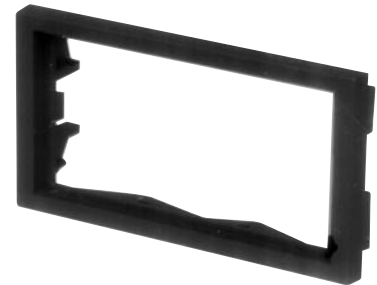
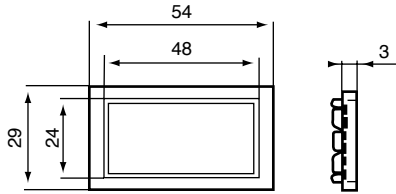
Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

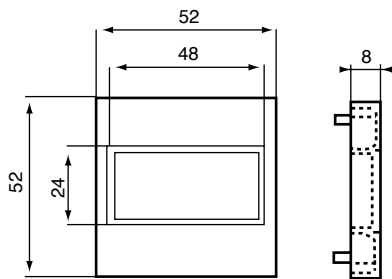
ACCESSORIES FOR TOTALIZING COUNTERS AND ELAPSED TIME INDICATORS

Retrofit Panel Plates will retrofit most of the popular electromechanical totalizing counters and elapsed time indicators and discontinued 6108 Series.

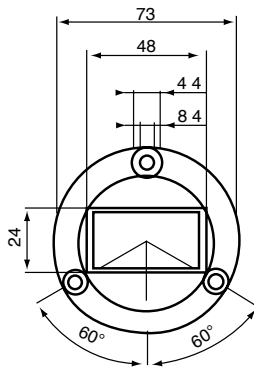
26 546 829: Retrofits 25 x 50mm cut-outs



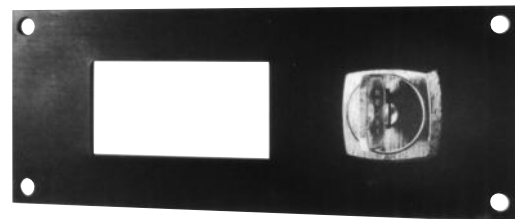
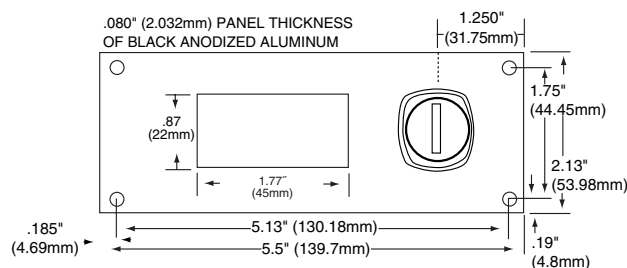
26 546 830: Retrofits 45 x 45mm cut-outs



26 546 831: Retrofits 50mm Ø cut-outs



10071 Retrofit Panel Plate with Keylock Reset



The 10071 panel plate comes complete with 6072 SPST key lock. It will retrofit following models:

RETROFIT INFORMATION

Redington	P102 Series
Veeder Root	1205, 1981, 7443, 7995 7997
Durant	Key lock resettable RMF, MF, YP, 54000 Series

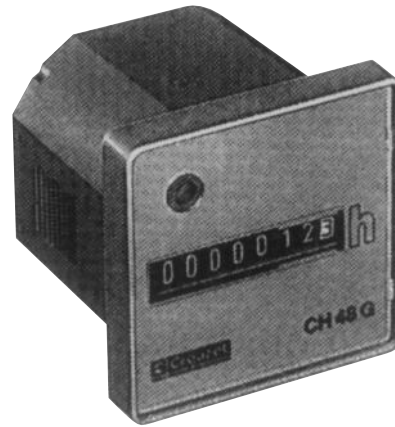
Products and specifications subject to change without notice.

Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

99761 SERIES ELAPSED TIME INDICATOR

UL-E47668 CSA-LR44080

- 7 Digit .15" High Display
- Front Panel Mounting
- Low Cost
- Capacity: 99999.99 Hours
- DIN-Sized (48 x 48mm) with Bezel



GENERAL FEATURES:

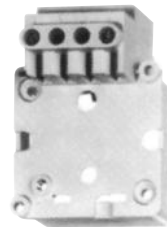
The 99761 Elapse Time Indicators are AC synchronous Hour Meters which are ruggedly constructed true time mechanisms for recording the "ON" time of electrical equipment and machinery. The instrument is connected in parallel with the equipment being monitored to determine maintenance intervals, routine and component life.

SPECIFICATIONS:

Display	7 Digit .15" high
Capacity	99999.99 Hours
Input Power	24 VAC, 110 VAC, 220 VAC +10%, -15% 60 Hz (50 Hz Special Order)
Vibration Resistance	5 G (10-2000 Hz)
Digit Color	Hours: white on black Decimals: red on black
Body Material	Noryl
Weight	2 oz. (60g)

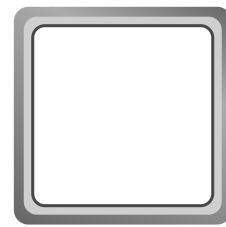
ACCESSORIES:

- DIN-Rail Adapter



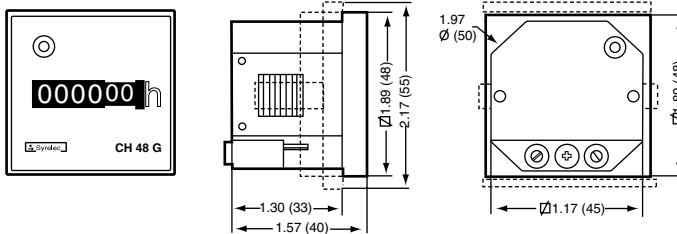
Order: 26 546 803

- Square Bezel

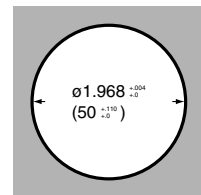
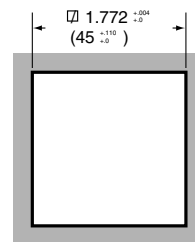


Order: 26 546 805

DIMENSIONS:

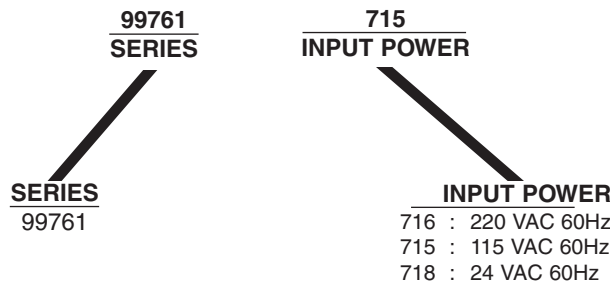


MOUNTING:



NOTE: Round cutout is only possible if square bezel accessory is used.

ORDERING INFORMATION:



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CP4 SERIES UP/DOWN COUNTER

- Backlit Green LCD or Red Illuminated Display
- Displays Actual and Preset Count
- 1/16 DIN-Sized (48 x 48mm) Housing
- Single or Dual Preset



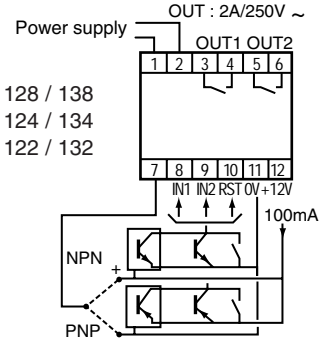
The CP4 Series of 1/16 DIN-sized digital counters offers the choice of a large green backlit LCD display or a large red illuminated display. The CP4 Series includes one and two presets versions. The large LCD display permits easy programming and monitoring of status such as counts preset values output scaling factor. Front panel reset can be enabled or disabled. Data such as counts, preset values, setup data are saved in case of a power failure by a 10 year EEPROM memory. The front panel is rated NEMA 12.

SPECIFICATIONS:

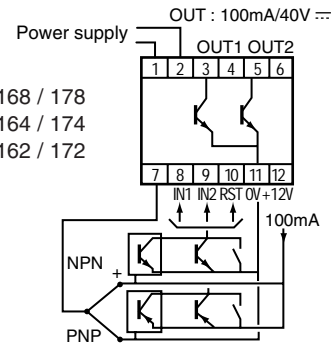
Input Power	80 to 260 VAC 20 to 55 VAC 10 to 30 VDC
Sensor Supply	12 VDC 100 mA
Display	5 digit, Green backlit LCD 5 digit, Red Illuminated
Display digit height	8mm - actual 4mm - preset
Count Inputs	2 Inputs, IN1, IN2 Contact Closure, DC Voltage, NPN/PNP transistor Low Level: 0 to 1 VDC High Level: 4 to 30 VDC Impedance: 10 KΩ Low Speed: 30 KHz Max. High Speed: 5 kHz
Input Modes	Up IN1 - Count input DN IN1 - Count input IND IN1 - one direction IN2 - opposite direction DIR IN1 - Count input IN2 - Change in direction input CUMUL IN1 - Input IN2 - Same direction input Phase; Quadrature Up/Down Mode
Reset Input	Dry contact, voltage, solid state: NPN/PNP, front panel
Scale factor	Programmable from 0.001 to 99.999
Output	
1 Preset Version	2 Amp SP N.O. Relay 100 mA 40 VDC NPN transistor
2 Preset Version	2 x 2 Amp SP N.O. Relay
Output Modes	Repeat or single cycle Maintained or pulsed output of 500 ms
Connections	Screw terminals: 2 x 1.5mm ²
Front Panel Rating	NEMA 12, IP54

WIRING:

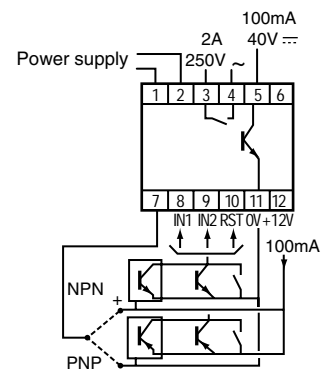
- 87 618 028 / 038 / 128 / 138
- 87 618 024 / 034 / 124 / 134
- 87 618 022 / 032 / 122 / 132



- 87 618 068 / 078 / 168 / 178
- 87 618 064 / 074 / 164 / 174
- 87 618 062 / 072 / 162 / 172



- 87 618 018 / 118
- 87 618 014 / 114
- 87 618 012 / 112



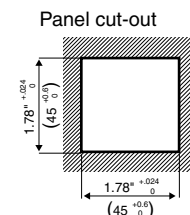
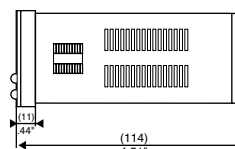
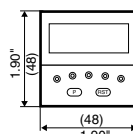
CONFORMITY:

Immunity to interference and noise (EMC)	
IEC 1000.4.2	Level 3
IEC 1000.4.3 Radiated disturbance	Level 3
IEC 1000.4.4 Fast transient	Level 3
IEC 255.4	Level 3

RF Emissions (EMC)
CENELEC EN 55022; Class A

Vibration limits (in 3 axes)
IEC 68-2-6; 10-55Hz/.0375mm

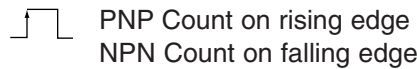
DIMENSIONS: inches (mm)



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Input Modes



1-Input IN1□ □ 2-Display

① ②

0	1	2	3	4	5	6
---	---	---	---	---	---	---

1-Input IN1□ □ 2-Display

① ②

0	1	2	3	4	5	6
---	---	---	---	---	---	---

1- Input IN1 count in the direction of the cycle
2- Input IN2 count in the opposite direction from the cycle
3- Display (0 → P)
4- Display (P → 0)

① ② ③

0	1	2	3	2	1	0
---	---	---	---	---	---	---

 ④

n	n-1	n-2	n-3	n-2	n-1	n	n-1
---	-----	-----	-----	-----	-----	---	-----

1- Input IN1 pulses
2- Input IN2 change of direction of count
3- Display (0 → P)
4- Display (P → 0)

① ② ③

0	1	2	3	2	1	0	1
---	---	---	---	---	---	---	---

 ④

n	n-1	n-2	n-3	n-2	n-1	n	n-1
---	-----	-----	-----	-----	-----	---	-----

1- Input IN1 count in the direction of the cycle
2- Input IN2 count in the direction of the cycle
3- Display (0 → P)
4- Display (P → 0)

① ② ③

0	1	3	4	5	7...
---	---	---	---	---	------

 ④

n	n-1	n-3	n-4	n-5	n-7...
---	-----	-----	-----	-----	--------

Ind

dir

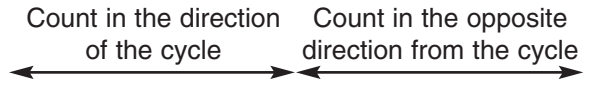
CUMUL

Ph

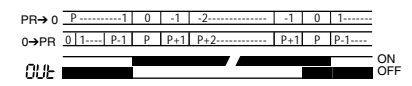
ORDERING INFORMATION

Part Number	Input Voltage	Presets	Input Modes	Display	Output
87618018	80 to 250VAC	1	UP, DN, PH	Backlit, Green	Contact and Solid State
87618014	20 to 50VAC	1	UP, DN, PH	Backlit, Green	Contact and Solid State
87618012	10 to 30VDC	1	UP, DN, PH	Backlit, Green	Contact and Solid State
87618028	80 to 250VAC	2	UP, DN, PH	Backlit, Green	Contact
87618024	20 to 50VAC	2	UP, DN, PH	Backlit, Green	Contact
87618022	10 to 30VDC	2	UP, DN, PH	Backlit, Green	Contact
87618038	80 to 250VAC	2	DR, IND, CUMUL, PH	Backlit, Green	Contact
87618034	20 to 50VAC	2	DR, IND, CUMUL, PH	Backlit, Green	Contact
87618032	10 to 30VDC	2	DR, IND, CUMUL, PH	Backlit, Green	Contact
87618118	80 to 250VAC	1	UP, DN, PH	Red Illuminated	Contact and Solid State
87618114	20 to 50VAC	1	UP, DN, PH	Red Illuminated	Contact and Solid State
87618112	10 to 30VDC	1	UP, DN, PH	Red Illuminated	Contact and Solid State
87618128	80 to 250VAC	2	UP, DN, PH	Red Illuminated	Contact
87618124	20 to 50VAC	2	UP, DN, PH	Red Illuminated	Contact
87618122	10 to 30VDC	2	UP, DN, PH	Red Illuminated	Contact
87618138	80 to 250VAC	2	DR, IND, CUMUL, PH	Red Illuminated	Contact
87618134	20 to 50VAC	2	DR, IND, CUMUL, PH	Red Illuminated	Contact
87618132	10 to 30VDC	2	DR, IND, CUMUL, PH	Red Illuminated	Contact

Output Modes

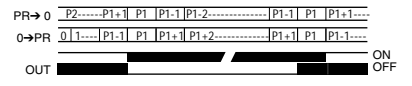


Single Shot *MANU*

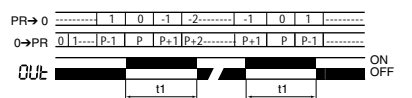


Maintained

4142/4342 - 4144/4344

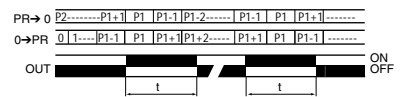


4141/4341



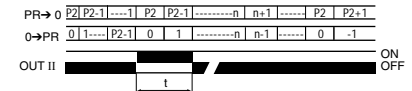
Pulsed (t=500 ms)
(transient pulse)

4142/4342 - 4144/4344



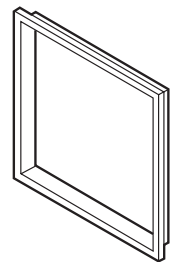
Repetitive Cycle *AUTO*

Pulsed with auto reset to value of P2 (or P for 4141/4341) (t=500 ms)



Accessory

Adaptor frame: 79 237 807 to replace 1000PA Series cutout



ø 49 x 50.5 mm

Products and specifications subject to change without notice.

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CP4-92 SERIES

UP/DOWN COUNTER, BATCH COUNTER CHRONOMETER AND RATE CONTROLLER



- Backlit Green LCD or Red Illuminated Display
- Displays Actual and Preset Count
- 1/16 DIN-Sized (48 x 48mm) Housing



The CP4-92 Series is a programmable dual preset up/down counter, batch counter, chronometer and rate controller with relay outputs. The CP4-92 display shows both actual and preset values. Both count and preset values are saved in EEPROM memory. The unit provides a built-in sensor power supply of 12 VDC, 100mA and will accept contact or solid state inputs.

SPECIFICATIONS:

Input Power	80 to 260 VAC 20 to 55 VAC 10 to 30 VDC
Sensor Supply	12VDC 100mA
Display	5 digit, Green backlit LCD 5 digit, Red Illuminated -9999 to +99999
Display digit height	8mm - actual 4mm preset
Presets	2
Count Inputs	2 Inputs, IN1, IN2 Contact Closure, DC Voltage, NPN/PNP transistor Low Level: 0 to 1 VDC High Level: 4 to 30 VDC Impedance: 10 KΩ Low Speed: 30 Hz Max. High Speed: 5 kHz
Input Modes	Up IN1 - Count input DN IN1 - Count input IND IN1 - one direction IN2 - opposite direction DIR IN1 - Count input IN2 - Change in direction input CUMUL IN1 - Input IN2 - Same direction input Phase; Quadrature Up/Down Mode Phase x 2, Phase x 4
Reset Input	Dry contact, voltage, solid state: NPN/PNP front panel
Scale factor	Programmable from 0.001 to 99.999
Output	2 x 2 Amp SP N.O. Relay
Output Modes	Repeat or single cycle Maintained or pulsed output of 500ms.
Connections	Screw terminals: 2 x 1.5mm ²
Front Panel Rating	NEMA 12, IP54

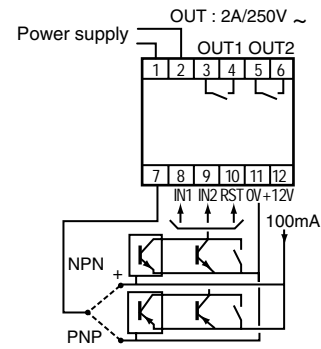
CONFORMITY:

Immunity to interference and noise (EMC)	
IEC 1000.4.2	Level 3
IEC 1000.4.3 Radiated disturbance	Level 3
IEC 1000.4.4 Fast transient	Level 3
IEC 255.4	Level 3

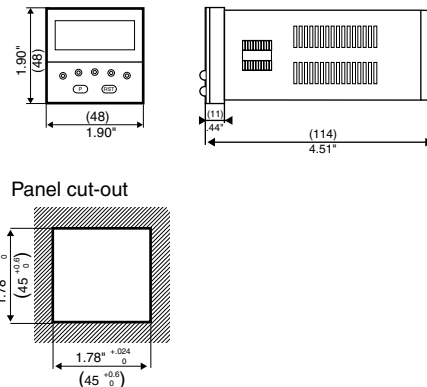
RF Emissions (EMC)
CENELEC EN 55022; Class A

Vibration limits (in 3 axes)
IEC 68-2-6; 10-55Hz/.0375mm

WIRING:



DIMENSIONS: inches (mm)



ORDERING INFORMATION:

Part Number	Input Voltage	Display
87 618 228	80 to 260 VAC	Backlit Green
87 618 224	20 to 55 VAC	Backlit Green
87 618 222	10 to 30 VDC	Backlit Green
87 618 328	80 to 260 VAC	Red Illuminated
87 618 324	20 to 55 VAC	Red Illuminated
87 618 322	10 to 30 VDC	Red Illuminated

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Order/Technical Support – Tel: (800) 677-5311 / FAX: (800) 677-3865 / www.crouzet-usa.com

Batch counter function

Principle

P1 is the "batch" preset.

When P2 is displayed, the value displayed on the upper digits represents the current counter value (reset to P2).

In this configuration the "RST" key on the front panel reinitializes the current value.

When P1 (batch preset) is displayed, the value displayed on the upper digits represents the value of the Batch counter.

In this configuration the "RST" key on the front panel resets the batch counter.

An "electrical" reset (RST terminal) still resets the current counter value and that of the batch counter.

Example

On a packing line, bottles need to be counted into packs of 6 bottles and then dispatched in a box containing a batch of 4 packs.

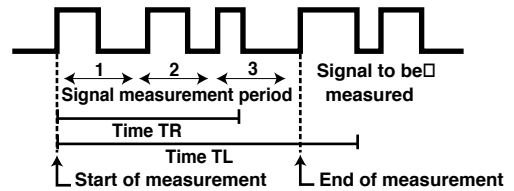
P2: current counter preset value: 00006
P1: batch counter preset value: 00004



Tachometer function

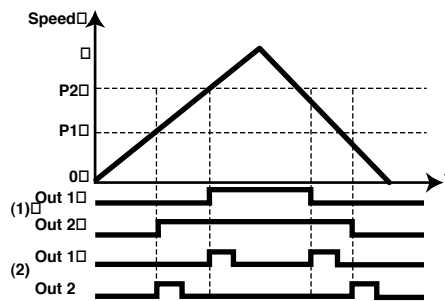
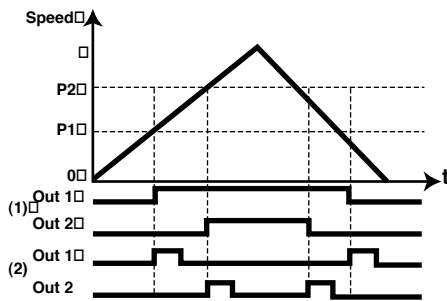
Measurement principle

Measurement begins on a rising edge of the signal to be measured. The measurement time is greater than TR, but less than TL. Measurement stops at the end of the current period (3), after TR. If the period (3) does not end before TL, the measurement result will be zero (0).



Measurement precision: $100 + (200 / TR)$ PPM
Example: for TR = 1s \rightarrow 300 PPM (0.03%)

The outputs are updated each time measurement ends according to the selected output mode.
– **Maintained output:** output active if the measured speed is greater than the preset speed.
– **Pulsed output:** output activated during time T, when the preset threshold is crossed.



(1) Maintained output (2) Pulsed output

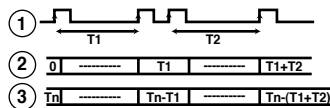
Chronometer function (Precision: 150 ppm)



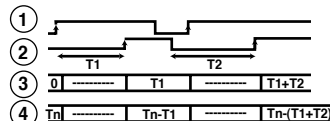
- 1 - Input IN1
- 2 - Display (0 \rightarrow PR), 1-channel pulse measurement
- 3 - Display (PR \rightarrow 0), 1-channel pulse measurement



- 1 - Input IN1
- 2 - Display (0 \rightarrow PR), 1-channel pulse measurement
- 3 - Display (PR \rightarrow 0), 1-channel pulse measurement

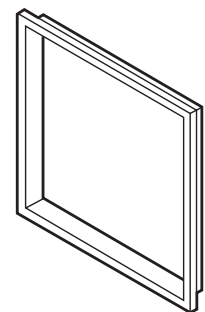


- 1 - Input IN1 (start counting)
- 2 - Input IN2 (stop counting)
- 3 - Display (0 \rightarrow PR), measurement on 2 separate channels
- 4 - Display (PR \rightarrow 0), measurement on 2 separate channels



Accessory

Adaptor frame: 79 237 807



ø 49 x 50.5 mm

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CP7 SERIES UP/DOWN COUNTER

- Green backlit LCD or Red Illuminated Display
- Displays Actual and Preset Count
- 72x72mm Housing
- Single or Dual Preset



The CP7 Series of 72 x 72mm DIN-sized digital counters offers the choice of a large green backlit LCD display or a large red illuminated display. The CP7 Series includes one and two presets versions. The large LCD display permits easy programming and monitoring of status such as counts, preset, values, output scaling factor. The programmed selections are shown continuously in the RUN mode. Front panel reset can be enabled or disabled. Data such as counts, preset values, setup data are saved in case of a power failure by a 10 year EEPROM memory. The front panel is rated NEMA 12.

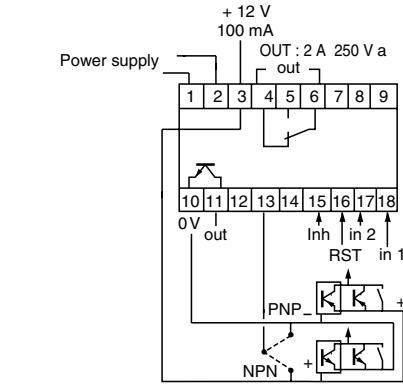
WIRING: 87 619 018 / 014 / 012 - 87 619 118 / 114 / 112

SPECIFICATIONS:

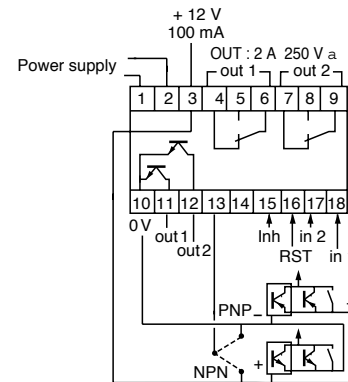
Input Power	80 to 260 VAC 20 to 55 VAC 10 to 30 VDC
Sensor Supply	12 VDC 100mA
Display	6 digit, Green backlit LCD 6 digit, Red Illuminated
Display digit height	10mm - actual 5.5mm preset
Count Inputs	2 Inputs, IN1, IN2 Contact Closure, DC Voltage, Solid State: NPN and PNP Low Level: 0 to 1 VDC High Level: 4 to 30 VDC Impedance: 10K Low Speed: 30 Hz Max. High Speed: 5 kHz
Input Modes	Up IN1 - Count input DN IN1 - Count input IND IN1 - one direction IN2 - opposite direction DIR IN1 - Count input IN2 - Change in direction input CUMUL IN1 - Input IN2 - Same direction input Phase; Quadrature Up/Down Mode Phase x 2 Phase x 4
Reset Input	Dry contact, voltage, solid state: NPN front panel
Scale factor	Programmable from 0.0001 to 99.9999
Output	
1 Preset Version	2 Amp SPDT Relay 100 mA 40 VDC NPN transistor
2 Preset Version	2 x 2 Amp SPDT Relay 2 x 100 mA 40 VDC NPN transistor
Output Modes	Repeat or single cycle Maintained or pulsed output of 500 ms.
Connections	Screw terminals: 2 x 1.5mm ²
Front Panel Rating	NEMA 12, IP54

CONFORMITY:

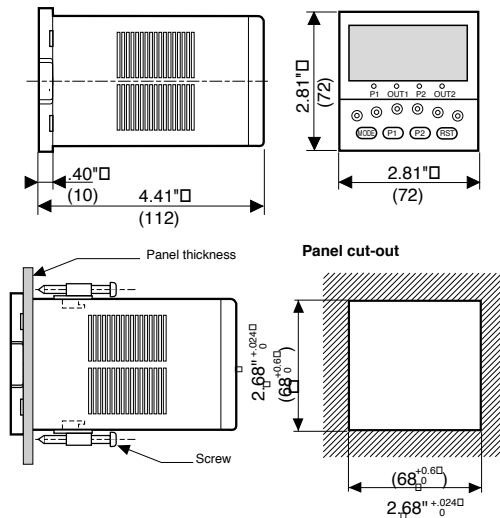
Immunity to interference and noise (EMC)	
IEC 1000.4.2	Level 3
IEC 1000.4.3 Radiated disturbance	Level 3
IEC 1000.4.4 Fast transient	Level 3
IEC 255.4	Level 3
RF Emissions (EMC)	
CENELEC EN 55022; Class A	
Vibration limits (in 3 axes)	
IEC 68-2-6, 10-55Hz/.0375mm	



87 619 028 / 024 / 022 - 87 619 128 / 124 / 122



DIMENSIONS: inches (mm)



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Input Modes

PNP Count on rising edge
NPN Count on falling edge

1-Input IN1 ① UP

2-Display ②

0	1	2	3	4	5	6
---	---	---	---	---	---	---

1-Input IN1 ① dn

2-Display ②

n	n-1	n-2	n-3	n-4	n-5	n-6
---	-----	-----	-----	-----	-----	-----

1- Input IN1 count in the direction of the cycle CAMUL

2- Input IN2 count in the opposite direction from the cycle

3- Display (0 → P) ③

0	1	2	3	2	1	0
---	---	---	---	---	---	---

4- Display (P → 0) ④

n	n-1	n-2	n-3	n-2	n-1	n
---	-----	-----	-----	-----	-----	---

1- Input IN1 count in the direction of the cycle dir

2- Input IN2 count in the direction of the cycle

3- Display (0 → P) ③

0	1	3	4	5	7...
---	---	---	---	---	------

4- Display (P → 0) ④

0	n-1	n-3	n-4	n-5	n-7...
---	-----	-----	-----	-----	--------

1- Input IN1 pulses Ph

2- Input IN2 change of direction of count

3- Display (0 → P) ③

0	1	2	3	2	1	0	1
---	---	---	---	---	---	---	---

4- Display (P → 0) ④

0	n-1	n-2	n-3	n-2	n-1	n	n-1
---	-----	-----	-----	-----	-----	---	-----

1- Input IN1 } Signals 90° out of phase

2- Input IN2 }

3- Display (0 → P) ③

=0	1	2	3	4	3	2
----	---	---	---	---	---	---

4- Display (P → 0) ④

=0	n-1	n-2	n-3	n-4	n-3	n-2
----	-----	-----	-----	-----	-----	-----

1- Input IN1, counts on rising and falling edges Ph4

2- Input IN2, direction of count reversed if IN2 in advance of IN1

3- Display (0 → P) ③

0	1	2	3	4	5	4	3	2
---	---	---	---	---	---	---	---	---

4- Display (P → 0) ④

n	n-1	n-2	n-3	n-4	n-5	n-4	n-3	n-2
---	-----	-----	-----	-----	-----	-----	-----	-----

1- Input IN1, counts on rising and falling edges

2- Input IN2, counts on rising and falling edges, direction of count reversed if IN2 in advance of IN1

3- Display (0 → P) ③

0	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

4- Display (P → 0) ④

0	n-1	n-2	n-3	n-4	n-5	n-6	n-7
---	-----	-----	-----	-----	-----	-----	-----

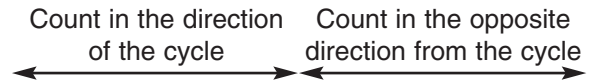
ORDERING INFORMATION

Part Number	Input Voltage	Presets	Display
87619018	80 to 250VAC	1	Backlit LCD, Green
87619014	20 to 50VAC	1	Backlit LCD, Green
87619012	10 to 30VDC	1	Backlit LCD, Green
87619028	80 to 250VAC	2	Backlit LCD, Green
87619024	20 to 50VAC	2	Backlit LCD, Green
87619022	10 to 30VDC	2	Backlit LCD, Green
87619118	80 to 250VAC	1	Red Illuminated
87619114	20 to 50VAC	1	Red Illuminated
87619112	10 to 30VDC	1	Red Illuminated
87619128	80 to 250VAC	2	Red Illuminated
87619124	20 to 50VAC	2	Red Illuminated
87619122	10 to 30VDC	2	Red Illuminated

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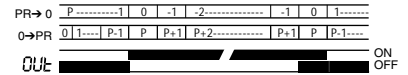
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Output Modes



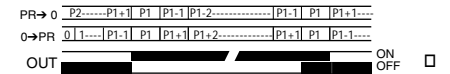
Single Shot *PRnU*

7141/7341

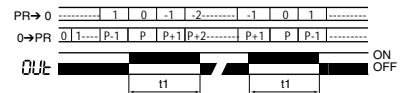


Maintained

7142/7342

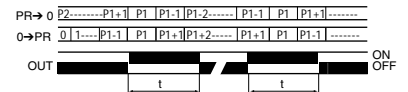


7141/7341



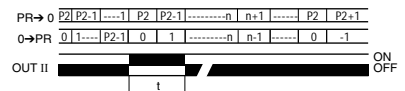
Pulsed (t=500 ms)
(transient pulse) □

7142/7342



Repetitive Cycle *PRnU*

Pulsed with auto reset to value of P2 (or P for 4141/4341)
(t=500 ms)



CP7-92 SERIES

UP/DOWN COUNTER, BATCH COUNTER CHRONOMETER AND RATE CONTROLLER



- Backlit Green LCD or Red Illuminated Display
- Displays Actual and Preset Count
- 72 x 72mm Housing



The CP7-92 Series is a programmable dual preset up/down counter, batch counter, chronometer and rate controller with relay outputs. The CP7-92 is 72 x 72mm DIN-sized and offers the choice of a large green backlit LCD display or a large red illuminated display. The CP7-92 display shows both actual and preset values. Both count and preset values are saved in EEPROM memory. The unit provides a built-in sensor power supply of 12 VDC, 100 mA and will accept contact or solid state inputs. Front panel reset can be enabled or disabled. The front panel is rated NEMA 12.

SPECIFICATIONS:

Input Power	80 to 260 VAC 20 to 55 VAC 10 to 30 VDC
Sensor Supply	12VDC 100mA
Display	6 digit, Green backlit LCD 6 digit, Red Illuminated -99,999 to +999,999
Display digit height	10mm - actual 6mm preset
Count Inputs	2 Inputs, IN1, IN2 Contact Closure, DC Voltage, Solid State: NPN and PNP Low Level: 0 to 1 VDC High Level: 4 to 30 VDC Impedance: 10KΩ Low Speed: 30 Hz Max. High Speed: 5 kHz
Input Modes	Up IN1 - Count input DN IN1 - Count input IND IN1 - one direction IN2 - opposite direction DIR IN1 - Count input IN2 - Change in direction input CUMUL IN1 - Input IN2 - Same direction input Phase; Quadrature Up/Down Mode Phase x 2 Phase x 4
Reset Input	Dry contact, DC voltage, Solid State: NPN/PNP front panel
Scale factor	Programmable from 0.0001 to 99.9999
Output	2 x 2 Amp SPDT Relay (2 Amps resistive @ 250 VAC) 2 x 100 mA 40 VDC NPN transistor
Output Modes	Repeat or single cycle Maintained or pulsed output (.9 to 9.9 s)
Connections	Screw terminals: 2 x 1.5mm ²
Front Panel Rating	NEMA 12, IP54
Operating temperature	0°F to 131°F, (0 to 55°C)
Storage temperature	-13°F to 158°F, (-25°C to 70°C)
Weight	10.2 oz. (290g)

ORDERING INFORMATION:

Part Number	Input Voltage	Display
87619228	80 to 260VAC	Backlit, Green
87619224	20 to 55VAC	Backlit, Green
87619222	10 to 30VDC	Backlit, Green
87619328	80 to 260VAC	Red Illuminated
87619324	20 to 55VAC	Red Illuminated
87619322	10 to 30VDC	Red Illuminated

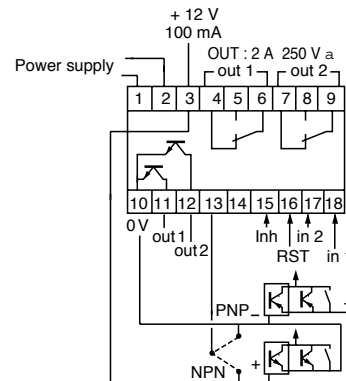
CONFORMITY:

Immunity to interference and noise (EMC)	
IEC 1000.4.2	Level 3
IEC 1000.4.3 Radiated disturbance	Level 3
IEC 1000.4.4 Fast transient	Level 3
IEC 255.4	Level 3

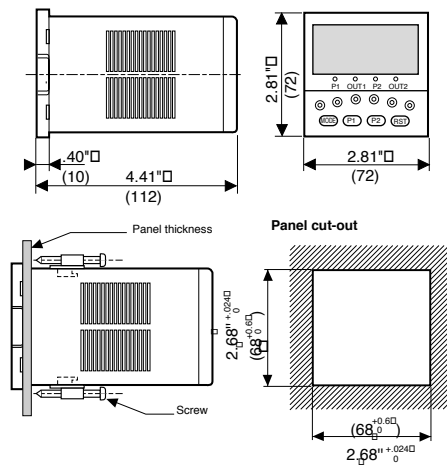
RF Emissions (EMC)
GENELEC EN 55022; Class A

Vibration limits (in 3 axes)
IEC 68-2-6, 10-55Hz/.0375mm

WIRING:



DIMENSIONS: inches (mm)



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Batch counter function

Principle

P1 is the "batch" preset.

When P2 is displayed, the value displayed on the upper digits represents the current counter value (reset to P2).

In this configuration the "RST" key on the front panel reinitializes the current value.

When P1 (batch preset) is displayed, the value displayed on the upper digits represents the value of the Batch counter.

In this configuration the "RST" key on the front panel resets the batch counter.

An "electrical" reset (RST terminal) still resets the current counter value and that of the batch counter.

Example

On a packing line, bottles need to be counted into packs of 6 bottles and then dispatched in a box containing a batch of 4 packs.

P2: current counter preset value: 00006
P1: batch counter preset value: 00004



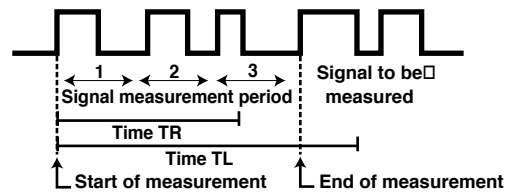
Tachometer function

Measurement principle

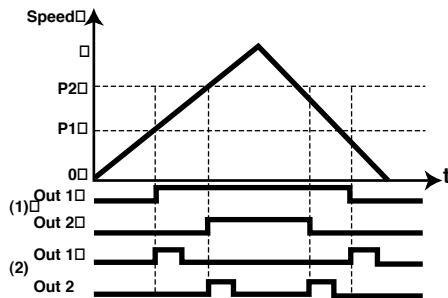
Measurement begins on a rising edge of the signal to be measured. The measurement time is greater than TR, but less than TL. Measurement stops at the end of the current period (3), after TR. If the period (3) does not end before TL, the measurement result will be zero (0).

The outputs are updated each time measurement ends according to the selected output mode.

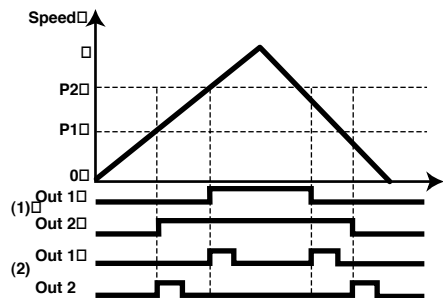
- **Maintained output:** output active if the measured speed is greater than the preset speed.
- **Pulsed output:** output activated during time T, when the preset threshold is crossed.



Measurement precision: $100 + (200 / TR)$ PPM
Example: for TR = 1s → 300 PPM (0.03%)



(1) Maintained output (2) Pulsed output



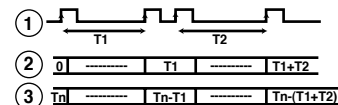
Chronometer function (Precision: 150 ppm)



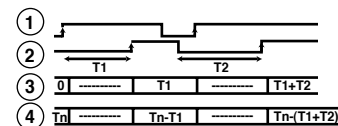
- 1 - Input IN1
- 2 - Display (0 → PR), 1-channel pulse measurement
- 3 - Display (PR → 0), 1-channel pulse measurement



- 1 - Input IN1
- 2 - Display (0 → PR), 1-channel pulse measurement
- 3 - Display (PR → 0), 1-channel pulse measurement



- 1 - Input IN1 (start counting)
- 2 - Input IN2 (stop counting)
- 3 - Display (0 → PR), measurement on 2 separate channels
- 4 - Display (PR → 0), measurement on 2 separate channels



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