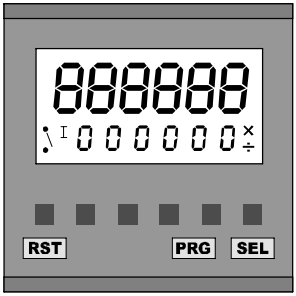
TRUMETER

Keep you in control



7931

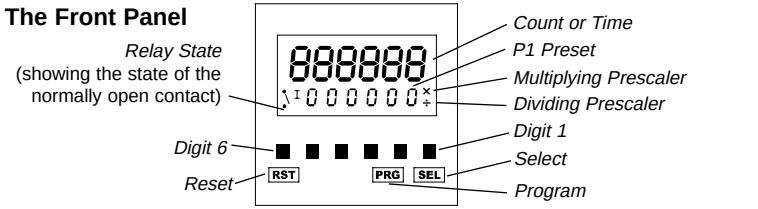
WARNING: **Read page 32 first.**
ACHTUNG: **Lesen Sie zuerst Seite 32!**
RECOMMANDATION IMPORTANTE: **Reportez-vous tout d'abord à la page 33**
ATENCIÓN: **Primero lea la página 33**
ATTENZIONE: **Leggere per prima la pagina 34.**

018372-01 Issue 2 12/99

Specification

Display
Black on green STN LCD, with yellow/green LED backlight.
Program Storage
Erase/write cycles:1,000,000
Life: 40 years min
Count Range
0 to 999999
Count Pre-scaler
Multiplier 0.00250 to 9.99999
Divider 1 to 99999
Timing Range - see page 7
Timing Acuracy ± 0.3%
Inputs (see *Inputs*)
High Speed: 10kHz max (electronic)
Duty cycle: 60:40 max
Low Speed: 30Hz max (contact closure)
External Reset response time
Max 2mSec
Relay Contacts (see *Relays*)
UL Ratings
AC 250V max, DC 125V max
250V AC: 1/6 HP max
30V DC: 5A max
General ratings
AC 1250VA max, 300V AC max
250V AC (cosø =1): 5A max
250V AC (cosø =0.4): 3A max
DC 150W max, 220V DC max
30V DC: 5A max
5A resistive load 100,000 operations
2A resistive load 1,000,000 operations
Reaction time: <20ms.
Supply *(see Connections)*
94 to 240V AC ± 10% 50/60Hz
VA Rating 3VA
or 12 to 24VDC ± 10%
typical current 100mA DC (max)
Installation Category (IEC 664)
Overvoltage category II
(Pollution degree 2)
Operating temperature
-10°C to +60°C
Storage temperature
-20°C to +70°C
Environmental protection
IP65 (panel mounting) using the sealing gasket supplied (without Screw-fixed bezel). If the seal is removed, it must be replaced with a new one.
See page 39 for cut-out dimensions
Altitude
Up to 2000m
Relative Humidity
80% max up to 31°C, decreasing to 50% max at 40°C

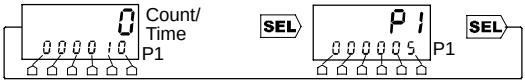
The Front Panel



The front panel buttons are used to program the counter and to display and set the P1 preset. All the buttons can be disabled by the Keyboard Inhibit input. (see *Programming on page 6*).

P1 Preset

The P1 preset can be set at any time. The minimum value possible is 000001. P1 must be greater than any multiplying prescaler value, or the unit may not operate correctly.



Press SEL, then use the Digit buttons to change P1. The display will flash. Press SEL again to accept the new value. *If SEL is not pressed within 30 seconds of the last change, P1 will revert to the original value.*

In Reset to Zero mode, the change will be accepted immediately.
In Reset to P1 mode, the change will not be accepted until after a Reset.

Auto Reset (see 1 and 3 on page 35 and 1 on page 36)

When Auto Reset is on, the counter will be automatically reset as follows:
In Reset to Zero mode, the counter will reset to zero when P1 is reached.
In Reset to P1 mode, the counter will reset to P1 when zero is reached.

Front Panel Reset and External Reset (RST / Ext. Reset)

A Reset can be caused by pressing the RST button or by applying a signal to the External Reset input. Any active relay will be returned to its normal condition.

If the operation of the External Reset is safety critical, it is recommended that the External Reset signal is derived from an independent power supply which will remain stable if the 7931's supply is interrupted.

Counter Modes (see page 35)

The diagrams show how the Relay is controlled by the Count, and by RST/Ext. Reset.

The diagrams show how the Count is controlled by the Input signal.

The diagrams show how the Count is reset to zero or P1 by Auto Reset. In all modes, the Count can be reset at any time by RST/Ext. Reset.

In Reset to Zero mode, the counter can count up to 999999. In Reset to P1 mode, the counter can count from P1 down to -99999. At these limits, the display will flash until RST/Ext. Reset.

1 ***Counter with Auto Reset on***

Note: The relay cannot be set to Latched.

2 ***Counter with Auto Reset off***

Note: If the relay is set to Latched, it will return to its normal condition at RST/Ext. Reset.

Timer Modes (see page 36)

The diagrams show how the Relay is controlled by the Timer, and by RST/Ext. Reset.

The diagrams show how the Time is controlled by the Input signal and by the Pause setting.

The diagrams show how the Time is reset to zero or P1 by Auto Reset. In all modes, the Time can be reset at any time by a RST/Ext. Reset.

In Reset to Zero mode, the timer can time up to 999999. In Reset to P1 mode, the timer can time from P1 down to zero.

1 , 2 ***Timer with Pause enabled***

Note: When the Input signal is removed, timing stops. When the Input signal is re-applied, the unit continues to time from this previous value.

3, 4 ***Timer with Pause disabled***

Note: When the Input signal is removed, timing stops. When the Input signal is re-applied, the unit resets to zero or P1, and starts timing from this value.

1, 3 ***Timer with Auto Reset on***

Note: The relay cannot be set to Latched.

2 , 4 ***Timer with Auto Reset off***

Note: On reaching P1, timing will stop, but a RST/Ext. Reset will restart it.

Note: If the relay is set to Latched, it will return to its normal condition at RST/Ext. Reset.

⚠ Connections (see pages 37 & 38)

Pin	Description	Range
1	Live	94 to 240VAC ±10% 50/60 Hz
2	Neutral	
3	Auxilliary DC Supply +ve	*Power Supply (see pages 37 & 38)* The counter can be powered by AC mains, in which case pins 3 and 11 provide an Auxilliary supply (+12V DC ±10%, 100mA max) which can be used to power sensors if required. Alternatively, the counter can be powered by an external DC source (12-24V DC ±10%, 100mA), connected to pins 3 and 11.
4	Normally Open contact	Isolated relay contacts 50/60Hz 300V AC max, 220V DC max See *Specification, page 2*
5	Common contact	
6	Normally Closed contact	
7	Not used	---------
8	High Speed Counter Input (Input CH)	Opto-isolated, 10-30 VDC See *Specification, page 2* This input can be used in Counter Mode only
9	Keyboard Disable Input (Input K)	Opto-isolated, 10-30 VDC See *Specification, page 2* This input can be used to disable the front panel buttons, but only if configured by the *Inhibit* option. See *Programming, page 6*
10	8/9 Common	See *Input Polarity, page 5*
11	Auxilliary DC Supply -ve	0V - See pin 3, above
12	Low Speed Counter/Timer Input (Input CT)	Opto-isolated, 12-240 V ±10% DC or 50/60Hz AC See *Specification, page 2* This input can be used in Counter or Timer Mode
13	External Reset Input (Input R)	Opto-isolated, 12-240 V ±10% DC or 50/60Hz AC See *Specification, page 2*
14	12/13 Common	See *Input Polarity, page 5*

High Speed Inputs

These are high speed inputs (10kHz max), suitable only for electronic signal sources, eg. transistors, proximity switches, encoders.

Low Speed Inputs

These are low speed inputs (30Hz max), suitable for contact closure sources, eg. microswitches, relays, pushbuttons. Any contact noise is removed by filtering. They can also be used for electronic signal sources.

Wire Size

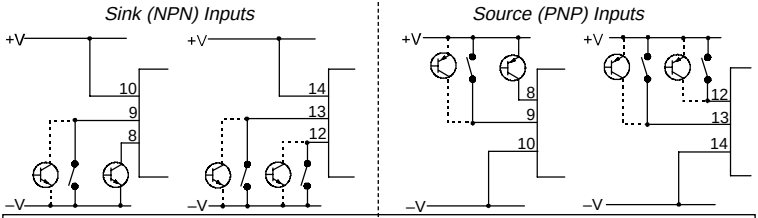
Maximum wire size the connector can accept is:
2.5mm² cross sectional area; 1.8mm diameter. (equivalent 13 AWG solid wire)

Input Polarity (see pages 37 and 38)

The opto-isolated inputs CH and K (pins 8 and 9) can be sink or source dc inputs, depending on the way they are wired, with respect to their Common input (pin 10), as shown in the examples below, and on pages 37 and 38.

The opto-isolated inputs CT and R (pins 12 and 13) can be sink or source ac or dc inputs, depending on the way they are wired, with respect to their Common input (pin 14), as shown in the examples below and on pages 37 and 38.

These two sets of inputs are completely isolated from each other, and also from the supply pins.



Note: Common Pins 10 and 14

These pins must always be correctly connected for their inputs to work.

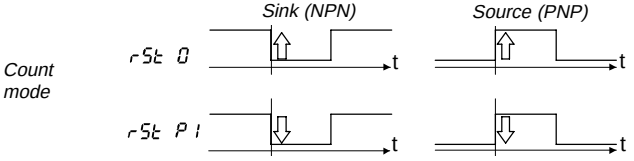
For dc signals, to +V or -V, as shown in the examples above and on page 37.
For ac signals (12/13/14 only), as shown in examples **3** *and* **4** *on page 37.*

Count and Timing Direction

In all modes, count and timing direction is dependent on Reset mode (see *Programming*).

Either Input CH or Input CT can be used in Counter mode, but only Input CT can be used in Timer mode (see *Programming*).

The edges that trigger the count in Count mode are shown by the arrows below.



Relay (see page 38)

This is a single pole double throw relay, with a common contact, a normally open contact, and a normally closed contact. The Relay State indicator on the front panel shows the state of the normally open contact.

The relay can be programmed to operate in pulsed or latched mode. In pulsed mode the relay will operate for a length of time set by the program. In latched mode (*Auto Reset Off* only) the relay will operate, and stay in that condition until RST/Ext. Reset.

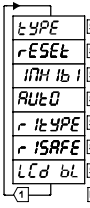
The relay can be programmed to revert to a known safe state in the event of a power failure or on entering program mode. The three alternatives are:

Current - the contacts will remain in the same state as before the event;
Reset - the contacts will revert to their normal, unoperated state;
Set - the contacts will revert to their operated state.

Programming

- *To enter Programming mode, press and hold PGM for 3 seconds. The display counts down 3..2..1.*

Main menu



- *Press Digit 1 to cycle through the menus, or PGM to exit Programming mode.*
- *Press SEL to select a menu, then Digit 1 to cycle through the options.*
- *Press SEL to select an option, or PGM to exit the menu without change.*
- *Press the Digit buttons to adjust a numerical setting, eg. pulse time.*
- *Press SEL to accept the setting, or PGM to exit the setting without change.*
- *Press PGM (up to four times) to exit Programming mode.*

If the **Type** or **Reset Mode** are changed the new configuration will not be fully effective until after exit from Program mode, AND THEN AFTER a Reset.

Reset Mode
See page 3.

Inhibit
See page 2.

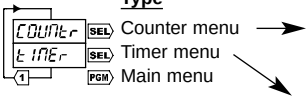
Auto Reset
See page 3.

Relay
See page 5.

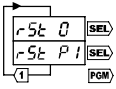
**** Auto Reset On** and **Relay Latched** cannot be set together.*

LCD Backlight:
can be on, off, or turn on for 30 seconds when a button is pressed.

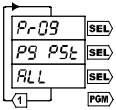
Type



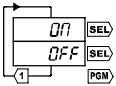
Reset Mode



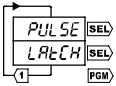
Inhibit



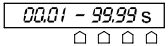
Auto Reset



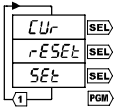
P1 Relay Type



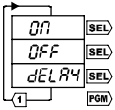
Pulsed



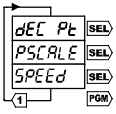
P1 Relay Safe State



LCD Backlight



Counter



Decimal Point menu
Prescaling menu
Speed menu
Type menu

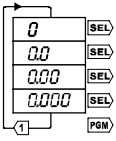
Decimal Point
The decimal point can be in one of three positions, or off.

Prescaling
A multiplying or dividing factor can be used. If a multiplying prescaler of n is used, the counter will count: 0, n, 2n, 3n etc. If a dividing prescaler of n is used, the counter will increment or decrement on every nth input pulse.

Changes in the prescaler are not effective until after exit from Program mode, AND THEN AFTER a Reset.

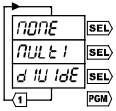
Speed
See page 4.

Decimal Point



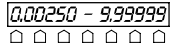
No Decimal point
1 Decimal place
2 Decimal places
3 Decimal places
Counter menu

Prescaling

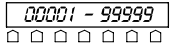


No prescaling
Multiply -------- SEL
Divide ---------- SEL
Counter menu

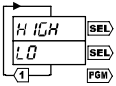
Multiply



Divide

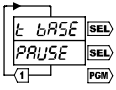


Speed



High Speed Input CH
Low Speed Input CT
Counter menu

Timer



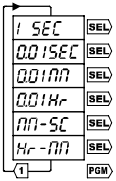
Timebase menu
Pause menu
Type menu

Timebase
The Timer can measure real time, in six different sets of units.

Changes in the timebase are not effective until after exit from Program mode, AND THEN AFTER a Reset.

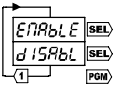
Pause
See page 3.

Timebase



Seconds
Seconds/100
Minutes/100
Hours/100
Minutes & Seconds
Hours & Minutes
Timer menu

Pause



Pause enabled
Pause disabled
Timer menu

WARNING

INSTALLATION AND MAINTENANCE MUST BE CARRIED OUT BY SUITABLY QUALIFIED PERSONNEL ONLY. HAZARDOUS VOLTAGES MAY BE PRESENT ON THE CONNECTION TERMINALS.

Installation

This product is intended to be installed in accordance with the operating and installation requirements of Overvoltage Category II and Pollution Degree 2 (as defined by IEC 664).

It must be fitted in a suitable enclosure which is accessible to qualified personnel only. See page 39 for panel cut-out dimensions.

When using an AC supply to power the unit a suitable fuse must be used. The recommended fuse is type - S504-250mA manufactured by Bussmann.

Fuse details: Antisurge 250mA, Rating 250VAC , Breaking capacity 35A @250VAC, UL recognised (file no E75865), complies with IEC127.

The relay output circuits must be fitted with fuses suitable for the voltage and current being switched.

All conductors carrying hazardous voltage should have external switching or disconnect mechanisms fitted which provide at least 3mm of contact separation in all poles.

Failure to install or operate the unit in accordance with the above requirements may result in the electrical safety of the unit being impaired.

Maintenance

Ensure that all power sources to the unit are isolated prior to maintenance, inspection or cleaning.

There are no user serviceable parts inside this unit. Under no circumstances should the case be opened.

All external wiring connections should be inspected at regular intervals. Any damaged wiring should be replaced and any loose connections should be retightened.

Cleaning should be carried out using a dry cloth to wipe the casing of the unit.

ACHTUNG

INSTALLATION UND WARTUNG DÜRFEN NUR VON ENTSPRECHEND GESCHULTEN MITARBEITERN VORGENOMMEN WERDEN. AN DEN ANSCHLUSSKLEMMEN KÖNNEN LEBENSGEFÄHRLICHE HOCHSPANNUNGEN ANLIEGEN.

Installation

Dieses Produkt ist gemäss den Betriebs- und Installationsanforderungen von Schutzklasse II und Funkstörklasse 2 (entsprechend der Definition durch IEC 664) zu installieren.

Es muss in einem geeigneten Schutzbereich aufgestellt werden, der nur für entsprechend geschulte Mitarbeiter zugänglich ist. Abmessungen der Tafelaussparung siehe S. 39.

Wenn das Gerät über eine Wechselsspannungsquelle versorgt wird, muss eine geeignete Sicherung verwendet werden. Empfohlen werden Sicherungen vom Typ S504-250mA, hergestellt von Bussmann.

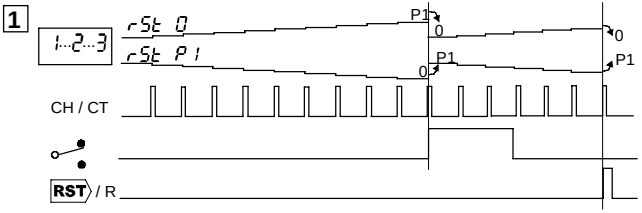
Kenndaten der Sicherung: Absicherung gegen Stromspitzen 250mA, Sicherungsbemessung 250VAC , Ausschaltleistung 35A bei 250VAC, anerkannt durch UL (Aktenzeichen E75865), entspricht IEC127.

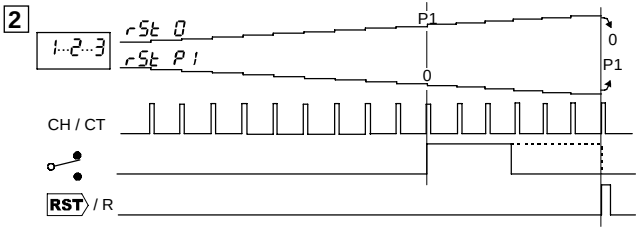
Die Ausgangsschaltkreise des Relais müssen mit geeigneten Sicherungen entsprechend den geschalteten Spannungen und Strömen versehen werden.

Alle Stromleiter, an denen gefährliche Spannungen anliegen, müssen mit externen Schalt- oder Trennvorrichtungen versehen werden, die einen Kontaktabstand von mindestens 3 mm an allen Polen herstellen.

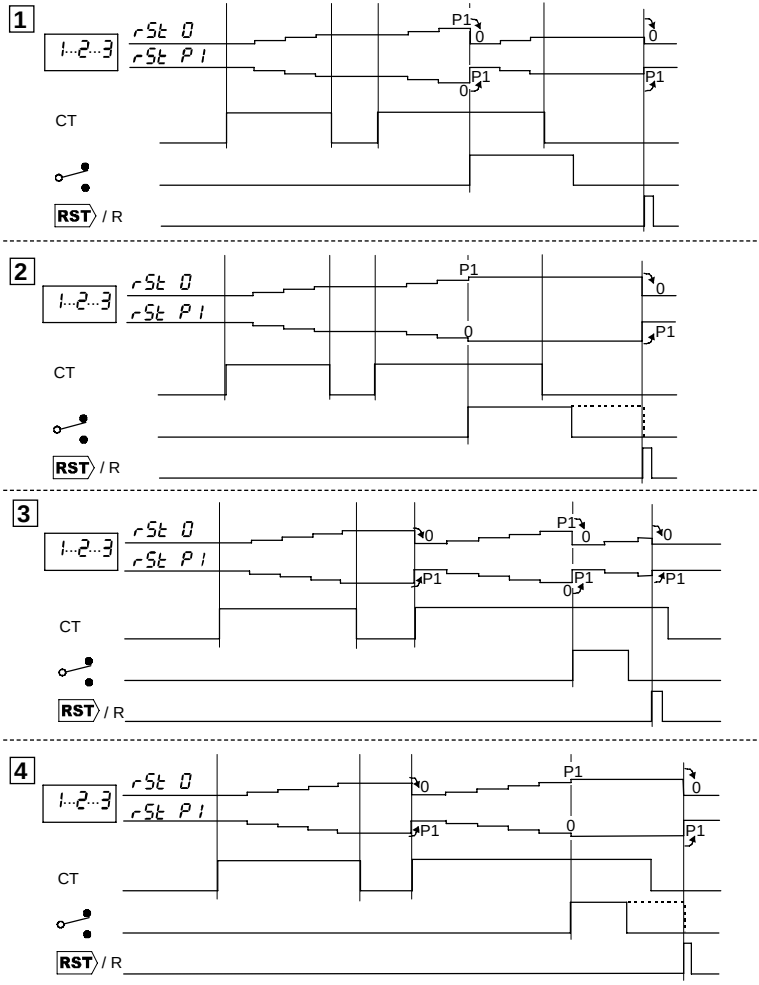
Wenn das Gerät nicht entsprechend den vorstehenden Anforderungen installiert und betrieben wird, ist die elektrische Sicherheit des Geräts nicht gewährleistet.

Count Modes, Zählermodi, Modes Compteur, Modo de Contaje, Modalità Conteggio



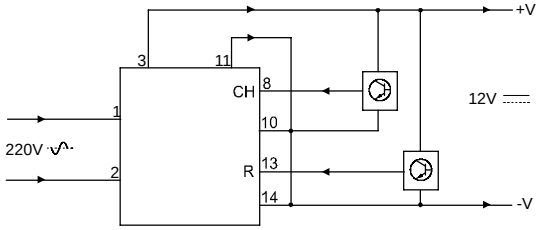


Timer Modes, Zeitzählermodi, Modes Minuteur, Modo Temporizador, Modalità Timer

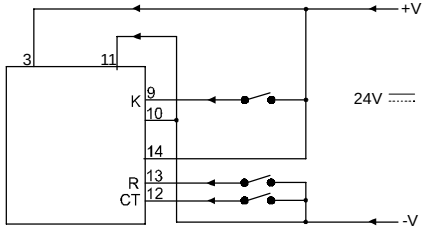


Input examples, Beispiele Eingänge, Exemples d'Entrées, Ejemplos de entrada, Esempi di ingresso

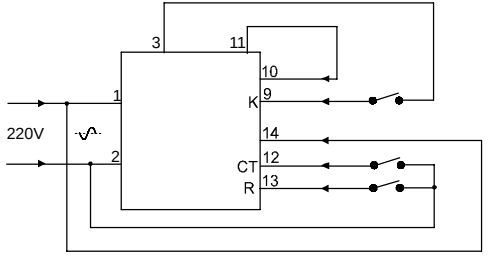
1



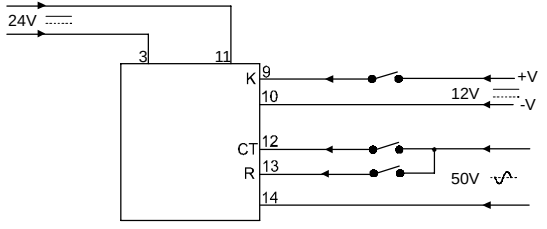
2



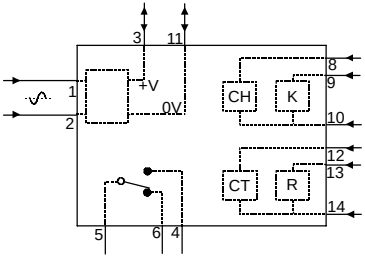
3



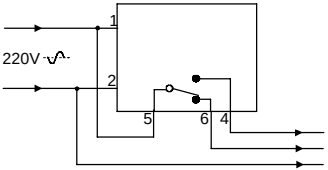
4

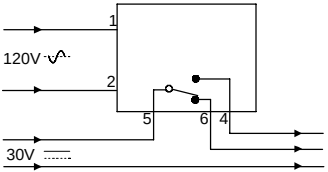


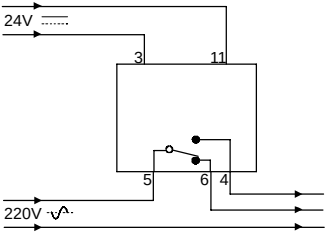
Connections, Anschlüsse, Connexions, Conexiones, Collegamenti



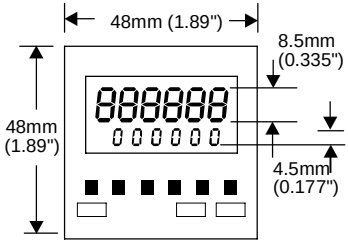
Relay examples, Beispiele Relais, Exemples de Relais, Ejemplos de Relé, Esempi di relè

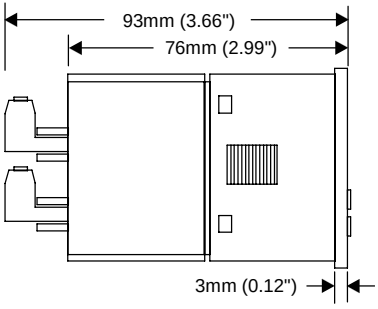


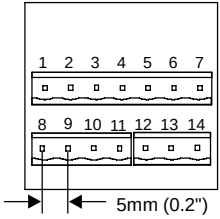


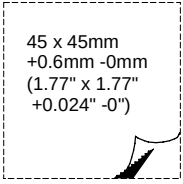


Dimensions, Abmessungen, Dimensiones, Dimensioni



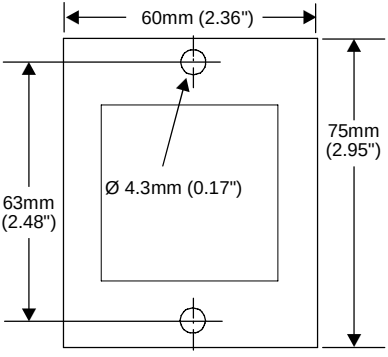


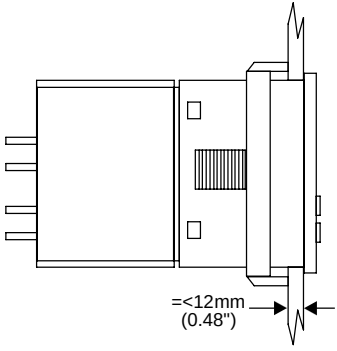




Screw-fixed bezel, Frontrahmen mit Schraubenbefestigung, Cadre à vis, Marco fijado con tornillos, Cornice a vite

Fixing Clip, Befestigungs-klammer, Clip de fixation, Clip fijación, Fermaglio di fissaggio





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