Electronic Timer Handbook ML468

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1. GENERAL INSTRUCTIONS

The Electronic timer consists of an intrinsically safe Battery Pack, Timer Module containing elapsed time visual indicator and user presettable switches to define the time delay, Electrical switch to initiate the timer and a solenoid valve which is energised at the end of the timing cycle.

Principle of Operation

An electrical switch closing causes the timer circuits to power on and initiates the timer operation. The timer circuits then immediately start to function. The time delay is determined by the presettable switches mounted on the timer module. Whilst timing, the circuit provides a visual indication of elapsed time using 4 LED's. The LEDs of the timing indicator will flash in turn whilst the timer is running. LED1 will flash from 0-25% of elapsed time. LED2 will flash from 25-50% of elapsed time. LED3 will flash from 50-75% of elapsed time. LED4 will flash from 75-100% of elapsed time.

When the timer completes it activates a solenoid driver circuit which in turn energises the intrinsically safe solenoid valve for approximately 1 second.

2. SPECIFICATION

Power Supply:	Field replaceable Battery Pack Um=11.1V Intrinsically safe in accordance with IEC60079-11
Electrical Switch:	Gold contacts NO (normally open) <100 milliohm
Battery Life:	Minimum 1000 1-hour timing cycles. Maximum 3 years.
Timer Module:	Intrinsically safe in accordance with IEC60079-11
Timing preset range:	1 minute to 99 minutes
Timing Accuracy:	O to +3 seconds of preset value.
Visual timing Indicator:	45 degree Field of view. Visible in the presence of bright sunlight
Operating Temperature:	-200°C to +600°C
Humidity:	
Solenoid Valve:	Intrinsically Safe in accordance with IEC60079-11 12V 0.5W maximum.
Hazardous Area:	Suitable for use in a hazardous area Zone 1 (worldwide use).
Safety Integrity Level:	SIL 2

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3. CERTIFICATION DATA

To be certified to the following: -

Certificate	Certificate number	Equipment Ratings
IECEX	FME 10.0001X	Ex ia IIC T4 Ga Ta = -20°C to + 60°C Ex ia IIIC T101°C Da Ta = -20°C to +60°C Ex ia IIC T5 Ga Ta = -20°C to +59°C Ex ia IIIC T100°C Da Ta = -200°C to + 59°C Ex ia IIC T6 Ga Ta = -20°C to + 44°C Ex ia IIIC T85°C Da Ta = -20°C to + 44°C
ATEX	FM10ATEX0003X	
FM (Canada)	FM16CA0176X	Intrinsically safe for Class I, II and III, Division 1, Groups A, B, C, D, E, F, and G indoor hazardous (Classified) locations. Temperature Class T6 at Ta = +44°C, T5 at Ta = + 59°C and T4 at Ta = 60°C
FM (USA)	FM16US0373X	

4. APPLICATION SUITABILITY

- Timer Module is ONLY capable of driving an intrinsically safe solenoid valve rated at 12v nominal 10% tolerance.
- Suitable for use in purge timing applications where a differential pressure switch is used to power on the electronic timer.

5. INSTALLATION

General Notes

Ensure that the Timer Module is firmly secured to the base plate.

Secure the Visual indicator unit to the Mounting panel.

Connect the battery pack to the Timer Module and secure firmly to the base plate using captive screws.

Connect the cable from the timer module to the solenoid valve and electrical switch.

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6. COMMISSIONING

General Notes

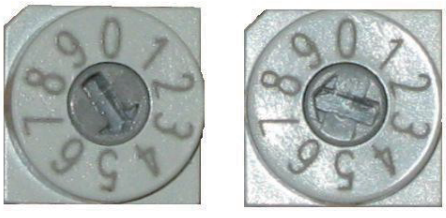
On the timer module SET the presettable switches to 1 minute. The arrow in the centre of the left-hand switch should point to 'O'. The arrow in the centre of the right-hand switch should point to '1'.

Operate the electrical switch so that the contacts are closed. On the elapsed time indicator, the LEDs should illuminate in the following sequence. The top right LED should flash immediately. This LED should then flash a further 15 times at a rate of 1 per second. The bottom right LED should then flash 15 times at a rate of 1 per second. The bottom left LED should then flash 15 times at a rate of 1 per second. The top left LED should then flash 15 times at a rate of 1 per second.

At the end of this sequence the solenoid valve should be energised for 1 second.

At this point the timing sequence is complete and the electrical switch contacts should be opened which powers down the internal circuitry.

Set the presettable switches to the required time delay. The left-hand switch determines the time delay in increments of 10 minutes. The right-hand switch sets the time delay in increment of 1 minute. The example below would set the time delay to 48 minutes.



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Verify that the time delay is correct. Operate the electrical switch so that the contacts are closed. On the elapsed time indicator, the LEDs should illuminate in the following sequence flashing at a rate of 1 per second. The top right LED should flash for 0-25% of the required time delay. The bottom right LED should then flash for 25-50% of the required time delay. The bottom left LED should then flash for 50-75% of the required time delay. The top left LED should then flash for 75-100% of the required time delay. At the end of this sequence the solenoid valve should be energised for 1 second.
Note: - If both switches are set 'O' 'O' then the top right LED should flash indefinitely.

7. MAINTENANCE

The battery pack is a consumable item. This should be changed every three years. The Electronic timer assembly should be inspected, and operation tested every 3 years. The operation of the electrical switch and solenoid valve should be included in this testing. You should verify that, on closing of the electrical switch the timer module is energised. Check that the top right LED of the visual indicator unit begins to flash. After all 4 LEDS have flashed in sequence described in section 6 that the solenoid valve operates. Verify the elapsed time between closing the electrical switch and the solenoid valve corresponds to the time delay preset as described in section 6.

8. FAULTS FINDING

- The most common fault /problem will be a flat battery. This will be indicated by the following: -
- When closing the electrical switch, the timer module is not energised. Check that the top right LED of the visual indicator does not begins to flash as expected.
- When closing the electrical switch, the timer module is energised. Check that the top right LED of the visual indicator begins to flash as expected. When all 4 LEDS have flashed in sequence described in section 6 the solenoid valve fails to operate. In addition, check that the top right LED of the visual indicator begins to flash for a second time. In this case the battery cannot provide sufficient energy to operate the solenoid driver circuit (part of the timer module) and solenoid valve. In both cases replace the Battery pack.
- On fitting a replacement battery when closing the electrical switch, the timer module is not energised. Check that the top right LED of the visual indicator does not begins to flash as expected. Replace the timer module and battery pack.

9. DRAWINGS AND DIAGRAMS

See attached drawings:

TITLE	Drawing Number
Electronic Timer Block Diagram	SD7611

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