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Bulletin No. PAXCK-E
Drawing No. LP0524
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MODEL PAX-1/8 DIN PRESET TIMER (PAXTM) & REAL-TIME CLOCK (PAXCK)

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IND. CONT. EQ.
51EB

- *6-DIGIT 0.56" RED SUNLIGHT READABLE DISPLAY*
- *4 SEPARATE DISPLAYS (Timer, Counter, Real-Time Clock, and Date)*
- *CYCLE COUNTING CAPABILITY*
- *PROGRAMMABLE FUNCTION KEYS/USER INPUTS*
- *FOUR SETPOINT ALARM OUTPUTS (W/Plug-in card)*
- *COMMUNICATIONS AND BUS CAPABILITIES (W/Plug-in card)*
- *BUS CAPABILITIES: DEVICENET, MODBUS and PROFIBUS-DP*
- *PC SOFTWARE AVAILABLE FOR METER CONFIGURATION*
- *NEMA 4X/IP65 SEALED FRONT BEZEL*

GENERAL DESCRIPTION

The PAXTM (PAX Timer) and PAXCK (PAX Clock/Timer) offer many features and performance capabilities to suit a wide range of industrial applications. Both can function as an Elapsed Timer or Preset Timer, while the PAXCK also offers Real-Time Clock with Date capability. The Plug-in option cards allow the opportunity to configure the meter for the present application, while providing easy upgrades for future needs.

Both units can function as an Elapsed Time Indicator. By using two separate signal inputs and 23 selectable timer ranges, the meters can be programmed to meet most any timing application. With the addition of a Plug-in Setpoint card, they can easily become a dual or quad output preset timer.

The PAXCK can also operate as a Real-Time Clock (RTC), with the Real-Time Clock Card already installed. The meter is capable of displaying time in 12 or 24-hour time formats. The 12-hour format can be displayed in hours and minutes, with or without an AM/PM indication or in hours, minutes, and seconds. The 24-hour format can be displayed in hours and minutes or in hours, minutes, and seconds. The PAXCK is also capable of a calendar display in which the day, month and/or year can be displayed. The meter will recognize leap years, and can automatically adjust for Daylight Savings Time. The Real-Time Clock has the ability to externally synchronize with other PAXCK meters to provide a uniform display network throughout the plant.

If the application calls for both a Preset Timer and a Real-Time Clock at the same time, the PAXCK can handle this requirement as well. The meter provides up to four different displays, accessed via front panel push buttons or external inputs. The displays are Timer (TMR), which displays the current timer value; Count (CNT), which displays the current cycle counter value; Date (DAT), which displays the current programmed date; and Real-Time Clock, which displays the current time. A battery-backed Real-Time Clock plug-in card is provided with the PAXCK. This card, which includes a lithium coin-cell battery, will maintain the time and date when main power is removed.

The meters accept inputs from a variety of sources including switch contacts and outputs from CMOS or TTL circuits. The input can be configured to trigger on the edge or level of the incoming pulse. Internal jumpers are available to allow the selection for sinking inputs (active low) or sourcing inputs (active high).

The front panel keys and three user inputs are programmable to perform various meter functions. One of the functions includes exchanging parameter lists, allowing for two separate listings of setpoint values, timer start/stop values, counter start/stop values and RTC daily on and off values.

The meters can have up to four setpoint outputs, determined by the optional plug-in cards. The setpoint plug-in cards provide dual FORM-C relays (5A), quad FORM-A relays (3A) or either quad sinking or quad sourcing open collector logic outputs. The outputs can be assigned to the timer, counter, RTC date, and RTC time. The outputs can also be independently configured to suit a variety of control and alarm requirements.

Plug-in cards can also provide serial communications. These include RS232, RS485, Modbus, DeviceNet, and Profibus-DP. Display values, setpoint alarm values and setpoint states can be controlled through serial communications. With the RS232 or RS485 communication card installed, it is possible to configure the meter using a Windows® based program. The meter configuration data can be saved to a file for later recall.

Once the meters have been initially configured, the parameter list may be locked out from further modification entirely, or the setpoint, timer start/stop values, counter start/stop values, RTC time SET, and Display Intensity can be made accessible. This lockout is possible through a security code or user input.

The meters have been specifically designed for harsh industrial environments. With a NEMA 4X/IP65 sealed bezel and extensive testing to meet CE requirements, the meter provides a tough yet reliable application solution.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in this literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

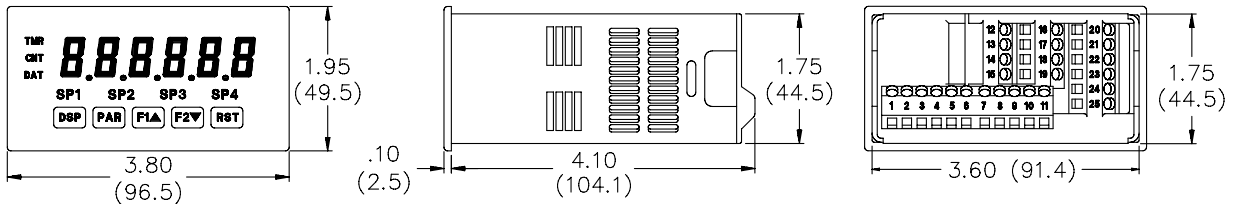
Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.

CAUTION: Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.

DIMENSIONS In inches (mm)

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.4) H x 5" (127) W.



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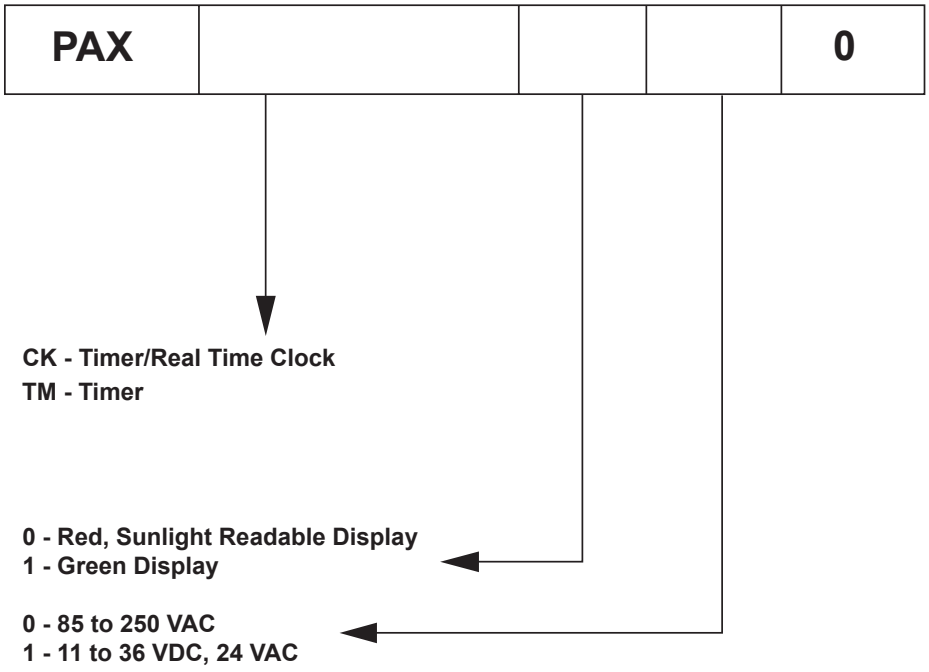
Ordering Information

Meter Part Numbers



Option Card and Accessories Part Numbers

TYPE	MODEL NO.	DESCRIPTION	PART NUMBERS
Optional Plug-In Cards	PAXCDS	Dual Setpoint Relay Output Card	PAXCDS10
		Quad Setpoint Relay Output Card	PAXCDS20
		Quad Setpoint Sinking Open Collector Output Card	PAXCDS30
		Quad Setpoint Sourcing Open Collector Output Card	PAXCDS40
	PAXCDC	RS485 Serial Communications Output Card with Terminal Block	PAXCDC10
		Extended RS485 Serial Communications Output Card with Dual RJ11 Connector	PAXCDC1C
		RS232 Serial Communications Output Card with Terminal Block	PAXCDC20
		Extended RS232 Serial Communications Output Card with 9 Pin D Connector	PAXCDC2C
		DeviceNet Communications Card (Terminal Block)	PAXCDC30
		Modbus Communications Card	PAXCDC40
		Extended Modbus Communications Card with Dual RJ11 Connector	PAXCDC4C
		Profibus-DP Communications Card	PAXCDC50
	PAXRTC	Real-Time Clock Card (Replacement Only)	PAXRTC00
Accessories	SFPAX*	PC Configuration Software for Windows 3.x and 95/98 (3.5" disk)	SFPAX

*Software can be downloaded from www.redlion.net

General Meter Specifications

1. **DISPLAY**: 6 digit, 0.56" (14.2 mm) red sunlight readable or standard green LED
2. **POWER**:
   AC Versions (PAXCK000, PAXTM000):
   AC Power: 85 to 250 VAC, 50/60 Hz, 18 VA
   Isolation: 2300 Vrms for 1 min. to all inputs and outputs. (300 V working)
   DC Versions (PAXCK010, PAXTM010):
   DC Power: 11 to 36 VDC, 14 W
   (Derate operating temperature to 40°C if operating <15 VDC and three Plug-in cards are installed)
   AC Power: 24 VAC, ± 10%, 50/60 Hz, 15 VA
   Isolation: 500 Vrms for 1 min. to all inputs and outputs (50 V working)
3. **SENSOR POWER**: 12 VDC, ±10%, 100 mA max. Short circuit protected.
4. **ANNUNCIATORS**:

TMR - Timer Display	SP1 - Setpoint 1 Output
CNT - Cycle Counter Display	SP2 - Setpoint 2 Output
DAT - Real-Time Clock Date Display	SP3 - Setpoint 3 Output
- Real-Time Clock Time Display	SP4 - Setpoint 4 Output

5. **KEYPAD**: 3 programmable function keys, 5 keys total.
6. **TIMER DISPLAY**:
   Timer Range: 23 Selectable Ranges
   Timing Accuracy: ± 0.01%
   Minimum Digit Resolution: 0.001 Sec.
   Maximum Least Significant Digit Resolution: 1 Hr.
   Maximum Display: 999999
7. **CYCLE COUNTER DISPLAY**:
   Counter Range: 0 to 999999
   Digit Resolution: 1 cycle
   Maximum Count Rate: 50 Hz
8. **REAL-TIME/DATE DISPLAY (PAXCK)**:
   Real-Time Display: 5 display formats
   Hr/Min/Sec (12 or 24 Hr. format); Hr/Min (24 Hr.); Hr/Min (12 Hr. with or without AM/PM indication)
   Date Display: 7 display formats
   Month/Day or Day/Month (numeric or 3-letter Month format); Month/Day/Year or Day/Month/Year (all numeric);
   Day of Week/Day (3-letter Day of Week format)
9. **REAL-TIME CLOCK CARD**: Field replaceable plug-in card
   Time Accuracy: ± 5 secs./Month (1 min./year) with end-user calibration
   Battery: Lithium 2025 coin cell
   Battery Life Expectancy: 10 yrs. typical
   Synchronization Interface: Two-wire multi-drop network (RS485 hardware), 32 units max., operates up to 4000 ft.
   Isolation To Timer & User Input Commons: 500 Vrms for 1 min.
   Working Voltage: 50 V. Not isolated from all other commons.
10. **TIMER INPUTS A and B**:
    Logic inputs configurable as Current Sinking (active low) or Current Sourcing (active high) via a single plug jumper.
    Current Sinking (active low): V_{IL} = 0.9 V max., 22KΩ pull-up to +12 VDC.
    Current Sourcing (active high): V_{IH} = 3.6 V min., 22KΩ pull-down, Max. Continuous Input: 30 VDC.
    Timer Input Pulse Width: 1 msec min.
    Timer Start/Stop Response Time: 1 msec max.
    Filter: Software filtering provided for switch contact debounce. Filter enabled or disabled through programming.
    If enabled, filter results in 50 msec start/stop response time for successive pulses on the same input terminal.
11. **USER INPUTS**: Three programmable user inputs
    Logic inputs configurable as Current Sinking (active low) or Current Sourcing (active high) through a single plug jumper.
    Current Sinking (active low): V_{IL} = 0.9 V max., 22KΩ pull-up to +12 VDC.
    Current Sourcing (active high): V_{IH} = 3.6 V min., 22KΩ pull-down, Max. Continuous Input: 30 VDC.
    Isolation To Timer Input Common: Not isolated
    Response Time: 10 msec
12. **MEMORY**: Non-volatile E^2PROM retains all programming parameters and display values.
13. **ENVIRONMENTAL CONDITIONS**:
    Operating Temperature Range: 0 to 50°C (0 to 45°C with all three plug-in cards installed)
    Storage Temperature Range: -40 to 60°C
    Operating and Storage Humidity: 0 to 85% max. RH non-condensing
    Altitude: Up to 2000 meters
14. **CERTIFICATIONS AND COMPLIANCE**:
    SAFETY
    UL Recognized Component, File # E179259, UL3101-1, CSA C22.2 No. 1010-1
    Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
    UL Listed, File # E137808, UL508, CSA C22.2 No. 14-M95
    LISTED by Und. Lab. Inc. to U.S and Canadian safety standards
    Type 4X Enclosure rating (Face only), UL50
    IECEE CB Scheme Test Certificate # US/7470C/UL
    CB Scheme Test Report # 03ME09282-08292003
    Issued by Underwriters Laboratories, Inc.
    IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
    IP65 Enclosure rating (face only), IEC 529
    IP20 Enclosure rating (rear of unit), IEC 529
    ELECTROMAGNETIC COMPATIBILITY

Immunity to EN 50082-2		
Electrostatic discharge	EN 61000-4-2	Level 3; 8 Kv air
Electromagnetic RF fields	EN 61000-4-3	Level 3; 10 V/m 80 MHz - 1 GHz
Fast transients (burst)	EN 61000-4-4	Level 4; 2 Kv I/O Level 3; 2 Kv power
RF conducted interference	EN 61000-4-6	Level 3; 10 V/rms 150 KHz - 80 MHz
Emissions to EN 50081-1		
RF interference	EN 55022	Enclosure class B Power mains class B

    Note:
    Refer to the EMC Installation Guidelines section for more information.
15. **CONNECTIONS**: High compression, cage-clamp terminal block
    Wire Strip Length: 0.3" (7.5 mm)
    Wire Gage: 30-14 AWG copper wire
    Torque: 4.5 inch-lbs (0.51 N-m) max.
16. **CONSTRUCTION**: This meter is rated for NEMA 4X/IP65 outoor use. IP20 Touch safe. Installation Category II, Pollution Degree 2. One piece bezel/case. Flame resistant. Synthetic rubber keypad. Panel gasket and mounting clip included.
17. **WEIGHT**: 10.1 oz. (286 g)

OPTIONAL PLUG-IN CARDS AND ACCESSORIES

WARNING: Disconnect all power to the unit before installing Plug-in cards.

Adding Option Cards

The PAX and MPAX series meters can be fitted with up to three optional plug-in cards. The details for each plug-in card can be reviewed in the specification section below. Only one card from each function type can be installed at one time. The function types include Setpoint Alarms (PAXCDS), Communications (PAXCDC), and Real-Time Clock Card (PAXRTC). The plug-in cards can be installed initially or at a later date.

COMMUNICATION CARDS (PAXCDC)

A variety of communication protocols are available for the PAX and MPAX series. Only one of these cards can be installed at a time. When programming the unit via RLCPro, a Windows® based program, the RS232 or RS485 Cards must be used.

PAXCDC10 - RS485 Serial (Terminal)
PAXCDC1C - RS485 Serial (Connector)
PAXCDC20 - RS232 Serial (Terminal)
PAXCDC2C - RS232 Serial (Connector)
PAXCDC30 - DeviceNet
PAXCDC40 - Modbus (Terminal)
PAXCDC4C - Modbus (Connector)
PAXCDC50 - Profibus-DP

SERIAL COMMUNICATIONS CARD

Type: RS485 or RS232
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. Not Isolated from all other commons.
Data: 7/8 bits
Baud: 300 to 19,200
Parity: No, Odd or Even
Bus Address: Selectable 0 to 99, Max. 32 meters per line (RS485)
Transmit Delay: Selectable for 2 to 50 msec or 50 to 100 msec (RS485)

DEVICENET™ CARD

Compatibility: Group 2 Server Only, not UCMM capable
Baud Rates: 125 Kbaud, 250 Kbaud, and 500 Kbaud
Bus Interface: Phillips 82C250 or equivalent with MIS wiring protection per DeviceNet™ Volume I Section 10.2.2.
Node Isolation: Bus powered, isolated node
Host Isolation: 500 Vrms for 1 minute (50 V working) between DeviceNet™ and meter input common.

MODBUS CARD

Type: RS485; RTU and ASCII MODBUS modes
Isolation To Sensor & User Input Commons: 500 Vrms for 1 minute. Working Voltage: 50 V. Not isolated from all other commons.
Baud Rates: 300 to 38,400.
Data: 7/8 bits
Parity: No, Odd, or Even
Addresses: 1 to 247.
Transmit Delay: Programmable; See Transmit Delay explanation.

PROFIBUS-DP CARD

Fieldbus Type: Profibus-DP as per EN 50170, implemented with Siemens SPC3 ASIC
Conformance: PNO Certified Profibus-DP Slave Device
Baud Rates: Automatic baud rate detection in the range 9.6 Kbaud to 12 Mbaud
Station Address: 0 to 126, set by the master over the network. Address stored in non-volatile memory.
Connection: 9-pin Female D-Sub connector
Network Isolation: 500 Vrms for 1 minute (50 V working) between Profibus network and sensor and user input commons. Not isolated from all other commons.

PROGRAMMING SOFTWARE

The SFPAX is a Windows® based program that allows configuration of the PAX meter from a PC. Using the SFPAX makes it easier to program the PAX meter and allows saving the PAX program in a PC file for future use. On-line help is available within the software. A PAX serial plug-in card is required to program the meter using the software.

SETPOINT CARDS (PAXCDS)

The PAX and MPAX series has 4 available setpoint alarm output plug-in cards. Only one of these cards can be installed at a time. (Logic state of the outputs can be reversed in the programming.) These plug-in cards include:

PAXCDS10 - Dual Relay, FORM-C, Normally open & closed
PAXCDS20 - Quad Relay, FORM-A, Normally open only
PAXCDS30 - Isolated quad sinking NPN open collector
PAXCDS40 - Isolated quad sourcing PNP open collector

DUAL RELAY CARD

Type: Two FORM-C relays
Isolation To Timer & User Input Commons: 2300 Vrms for 1 min.
Working Voltage: 240 Vrms
Contact Rating:
One Relay Energized: 5 amps @ 120/240 VAC or 28 VDC (resistive load), 1/8 HP @120 VAC, inductive load
Total current with both relays energized not to exceed 5 amps
Life Expectancy: 100 K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads
Response Time: 5 msec. nominal with 3 msec. nominal release
Timed Output Accuracy: ±0.01% -10 msec.

QUAD RELAY CARD

Type: Four FORM-A relays
Isolation To Timer & User Input Commons: 2300 Vrms for 1 min.
Working Voltage: 250 Vrms
Contact Rating:
One Relay Energized: 3 amps @ 250 VAC or 30 VDC (resistive load), 1/10 HP @ 120 VAC, inductive load
Total current with all four relays energized not to exceed 4 amps
Life Expectancy: 100K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads
Response Time: 5 msec. nominal with 3 msec. nominal release
Timed Output Accuracy: ±0.01% -10 msec.

QUAD SINKING OPEN COLLECTOR CARD

Type: Four isolated sinking NPN transistors.
Isolation To Timer & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. Not Isolated from all other commons.
Rating: 100 mA max @ V_{SAT} = 0.7 V max. V_{MAX} = 30 V
Response Time: 400 µsec. nominal with 2 msec. nominal turnoff
Timed Output Accuracy: ±0.01% -10 msec.

QUAD SOURCING OPEN COLLECTOR CARD

Type: Four isolated sourcing PNP transistors.
Isolation To Timer & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. Not Isolated from all other commons.
Rating: Internal supply: 24 VDC ± 10% , 30 mA max. total
External supply: 30 VDC max., 100 mA max. each output
Response Time: 400 µsec. nominal with 2 msec. nominal turnoff
Timed Output Accuracy: ±0.01% -10 msec.