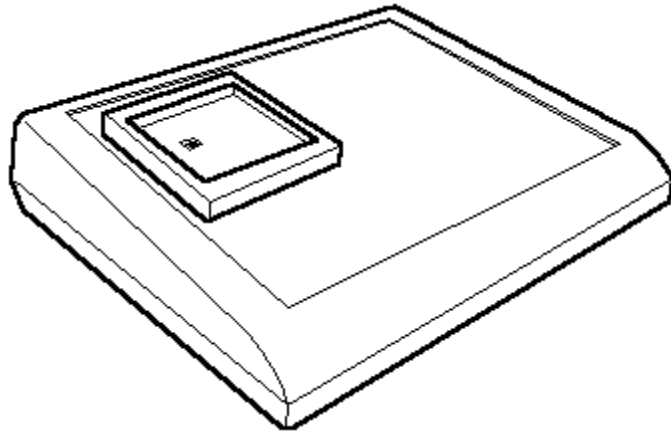


### Features and Benefits

- RS-232 serial interface
- 16-bit voltage measurement
- 12-bit voltage adjustment
- Compact design
- Internal or external supply voltage
- 4 lead SIP (50mil)
- RJ45 External Connector
- High-level functions in firmware



### Applications

- Lab and prototype use
- Production use

### Ordering Information

#### Part No.

PTC-01  
PTC-SA35 (included)

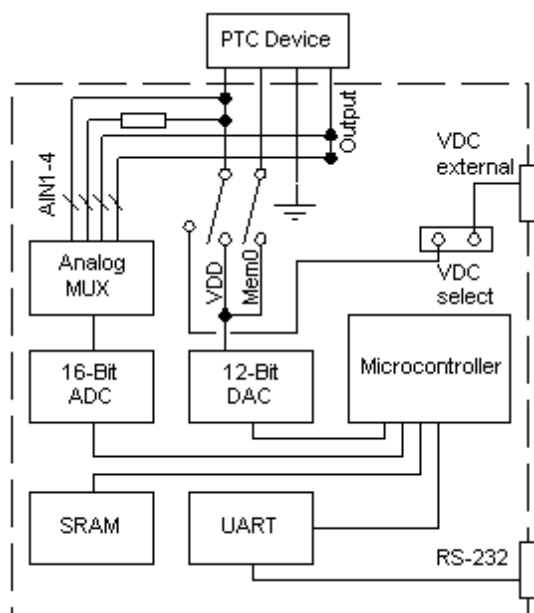
#### Description

Programmer Unit  
1A 24VDC supply (auto, 100-240VAC 50/60Hz)

### Accessories

PTC01 software (for windows NT, 95, and later)  
MLX90215 Development Kit

### Functional Diagram



### Description

The PTC-01 programmer was designed for efficient and precise calibration of the Melexis family of programmable ICs. The programmer is designed to be easily adapted to a standard PC to allow calibration of programmable sensor ICs within the operating environment. The PTC-01 programmer contains its own programmable power supply and measurement circuitry. The programmer is similar to a standard EEPROM programmer, but adds special features such as 16 bit voltage and current measurement capability, and a configuration options that will accommodate users from the prototyping phase directly into production. An IBM compatible PC is required (not included) to load software to the programmer and control the functions of the programmer. DOS and Windows platforms are available, as well as source code and firmware. Communication is done through a standard RS-232 null modem cable to a COM port of the PC. The PC requires no custom configuration, allowing the programmer to be used with any PC with a COM port speed of 19.2kbs or better.

### Programmable Supply Voltage (DAC)

<i>Parameter</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Units</i>
Number of DAC channels	-	2	-	channels
Output voltage range	0	-	20	volts
Output current range channel 1	-	30	-	mA
Output current range channel 2	-	300	-	mA
Digital Resolution of DAC	-	12	-	bits
Analog Resolution of DAC	-	4.88	-	mV/LSB
Internal 5V Reference	4.995	5.000	5.005	V

### Explanation of 2 Analog Output Channels

The internal DAC provides two 12-bit analog output channels from 0V to 20V.

Both analog output channels are short circuit protected .

Both analog output channels are specifically designed to provide the level shifting of V<sub>dd</sub> and V<sub>out</sub> to make possible programming of a Melexis PTC device.

It is not recommended that the analog output channels be used for any purpose other than programming Melexis PTC devices.

### Current Limits

Both channels have a fixed current limit which is not adjustable or programmable.

Channel 1 (DA1) is limited to 30mA and does not allow measurement of current.

Channel 2 (DA2) is limited to 300mA and allows measurement of current with the internal ADC.

### External Power Connections

External jack for +24VDC 300mA for modular supply (supplied by Melexis as standard power supply)

External banana jacks for +24VDC and optional +5.000V precision power supply.

### Internal Voltages

The PTC-01 uses a regulated (LM317) 22VDC linear voltage source for main power.

Two regulated 5VDC voltage sources are also used for analog and digital 5V.

### Voltage References

The DAC-ADC calibration is generated by a 2.5V internal reference.

Calibration is done digitally, with calibration parameters stored in non-volatile RAM. Calibration is recommended every 12 months at the Melexis facility.

An external precision 5VDC reference can be used by enabling the external supply. If the external 5V option is used, it will only be used during analog measurement of V<sub>dd</sub> and V<sub>out</sub>. The internal reference is always used for digital functions of the programmer.

### Voltage Measurement Circuit (ADC)

<i>Parameter</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Units</i>
Number of ADC channels	-	4*	-	channels
Input voltage range (AIN1, AIN2, AIN4)	0.25	-	20	volts
Input current range (AIN3)	0	-	300	mA
Digital Resolution of ADC	-	15	-	bits
Voltmeter Resolution	-	305	-	uV/LSB
Currentmeter Resolution	-	4.5	-	uA/LSB

\* Single channel A/D converter multiplexed to 4 channels

### Explanation of Analog Measurement Channels

The internal voltmeter of the PTC-01 is a 16-bit A/D converter with a range of 25mV -20V. The resolution is therefore approximately 0.3mV per step.

The ADC is multiplexed to 4 analog input channels (AIN1 – AIN4) Their function is described below:

<b>ADC MUX Channel</b>	<b>Function</b>	<b>PTC Pin</b>
AD1	Voltage measurement of DA1	Vout
AD2	Voltage measurement of DA2	Vdd
AD3	Current measurement of DA2	Vdd
AD4	Voltage measurement output	Vout

All 4 channels are over-voltage and short-circuit protected

### Typical Performance Characteristics

<i>Parameter</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Units</i>
Voltmeter Absolute Accuracy	-5		5	mV
Ammeter Absolute Accuracy	-100	-	100	uA
Programmable Power Supply Absolute Accuracy	-50		50	mV
Operating Temperature	20	25	30	°C

#### Note:

*Melexis reserves the right to make changes without further notice to any products herein to improve reliability, function or design. Melexis does not assume any liability arising from the use of any product or application of any product or circuit described herein.*

### Why use the PTC01

The PTC01 has been optimized specifically for calibration of Melexis PTC devices. It was designed as a cost effective replacement for high priced ATEs. The Embedded firmware allows programmers to quickly create custom software on any platform. The PTC01 was designed to meet the requirements of most sensor applications and adapt to most production environments. Please contact Melexis for support if any additional requirements are necessary.

### General Description

The PTC-01 programmer was specifically designed to program the Melexis family of programmable sensor ICs. At the heart of the programmer is a microprocessor which generates the two-channel level shifting protocol which allows 3-pin programming. The programmer can generate two independent precision waveforms from 0-20V such as needed for programming Melexis linear Hall ICs. Hall IC digital patterns are included in the standard firmware release which is pre-loaded into non-volatile RAM at the factory. Melexis also uses the PTC-01 hardware as a hardware platform for some other Melexis ASIC products, which require special firmware, not included in the standard release. Upgrade information is available at [www.melexis.com](http://www.melexis.com).

### Communication

The PTC-01 programmer uses a standard serial interface with RS-232 protocol. Connection to the communications port is done with a null modem cable to a standard COM port (see page 8). Because the standard is RS-232, the PTC-01 is not limited to any a particular platform. The firmware commands can be executed in any language which permits serial communications.

### COM settings for PTC-01

**Baud Rate:** 19200  
**Data Bits:** 8  
**Parity:** None  
**Stop Bits:** 1  
**Flow Control:** None

### Linear Power Supply

The high current switching supplies of the SDAP-02 are replaced with a single 300mA 24V linear supply. The result is lower noise in the analog circuitry. The PTC-01 can be used with the 24V supply as above, or can be connected to an external 24V and 5V precision supply if desired. The external supply option allows the user to utilize precision voltage supplies which may be already implemented in an existing test platform. (This is illustrated on page 6.)

### Optimized Firmware

The PTC-01 has utilized the firmware to help make some common tasks more efficient. Firmware functions are used for voltage measurements, current measurements, and return multiple sets of data. The advanced firmware functions simplify software development and reduce test time. Further details can be found in the PTC-01 software documentation.

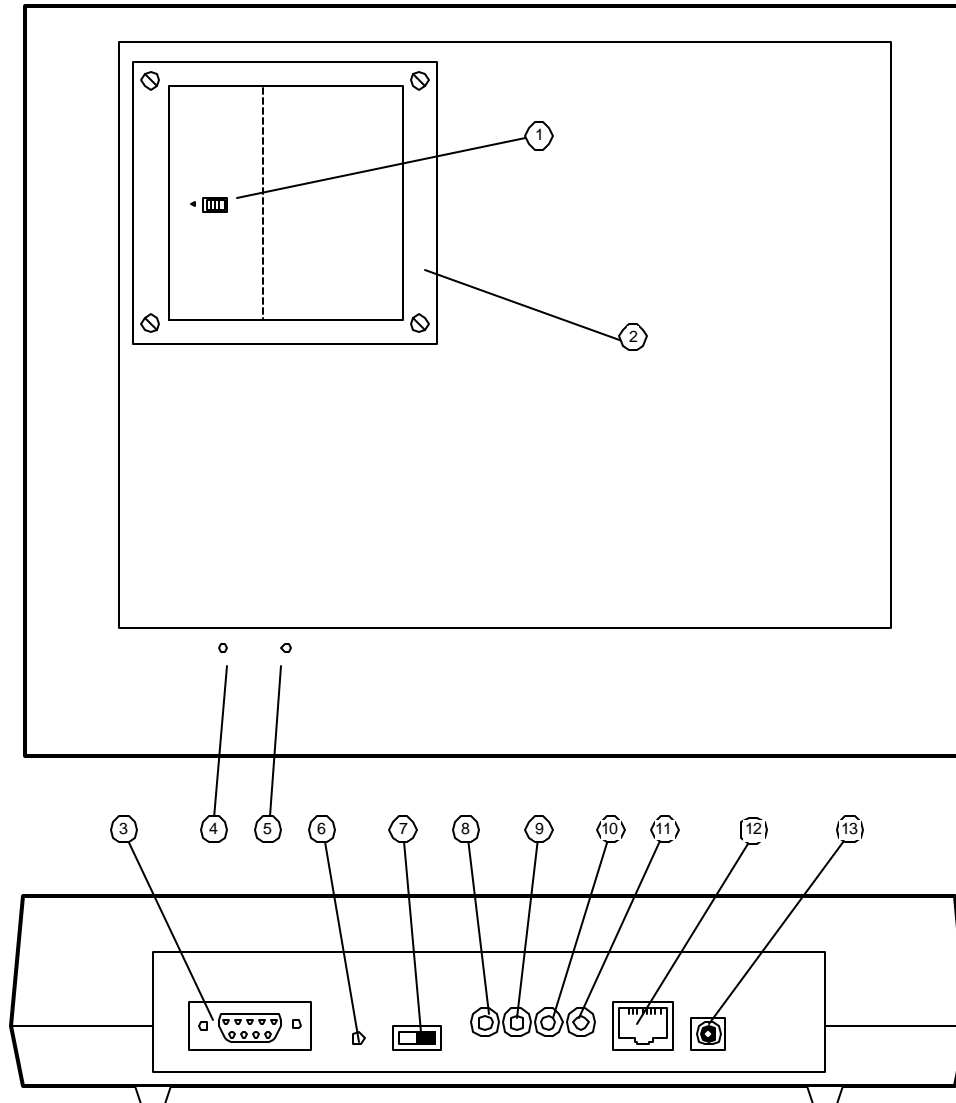
### Versatile Design

The programmer's physical design has been greatly improved for flexibility and portability. The integrated device socket is mounted to the top of the unit for convenience. A sensor can also be connected to the programmer via the RJ45 connector to allow remote calibration. Since the PTC-01 has been entirely constructed onto a single PC board, the unit can be stripped of its plastic case and mounted into a card rack or chassis easily.

### PC Requirements

The PTC-01 requires a PC capable of RS-232 serial communications of 19200 baud. The minimum PC requirements include a 486 or higher processor with 8MB of RAM and 4MB of available disk space.

Note: The Melexis supplied software may have additional PC requirements.

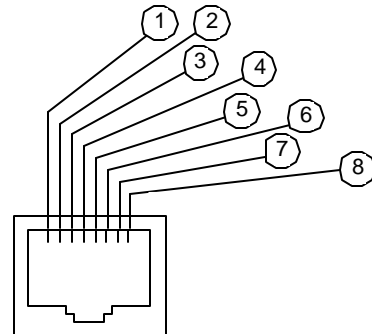


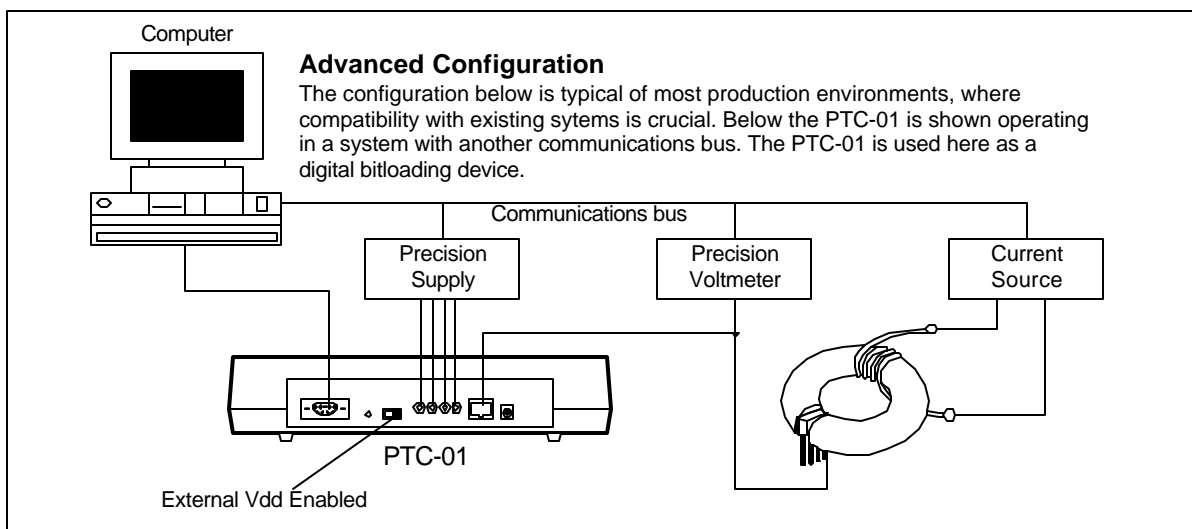
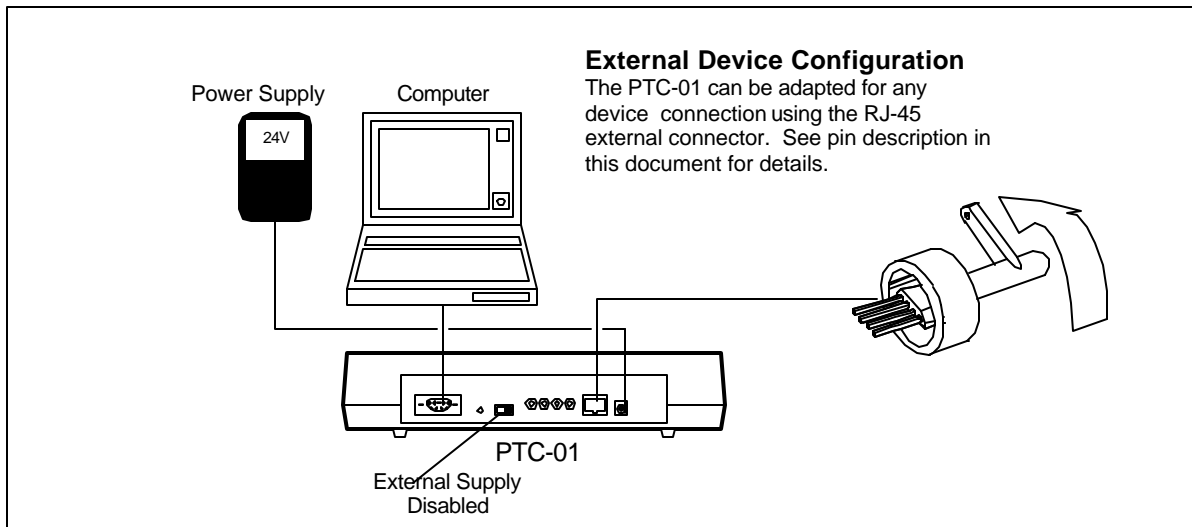
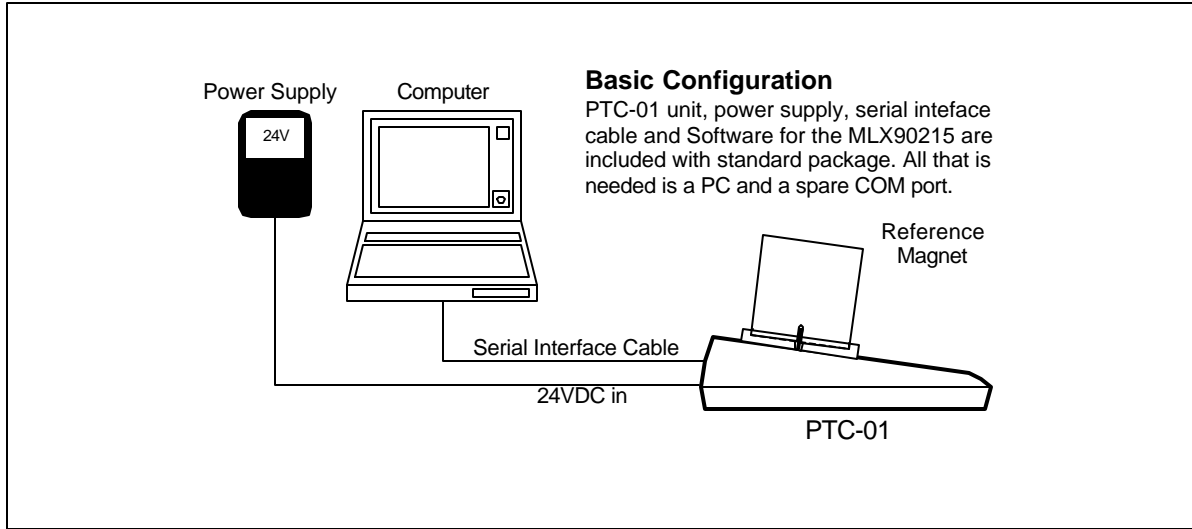
### PTC-01 Features

- 1.) DUT socket
- 2.) Reference magnet fixture
- 3.) RS-232 port
- 4.) Busy Indicator
- 5.) Power Indicator
- 6.) Reset Switch
- 7.) VDD select switch
- 8.) External precision 5V supply input
- 9.) 5V GND
- 10.) External 24VDC input
- 11.) 24V GND
- 12.) RJ-45 connector for external device socket
- 13.) 24VDC power connector

### RJ-45 (Ext. PTC) Pinout

- 1) VOUT
- 2) VOUT GND
- 3) VDD GND
- 4) Memo
- 5) Memo GND
- 6) VDD
- 7) NC
- 8) NC





### PTC-01 Configurations

The previous page shows three different system configurations, from the portable lab setup to the precise fully automated production setup.

The first two configurations illustrate the PTC-01 used as a sole instrument, utilizing the internal DACs and ADCs, and also the included 24V supply. These configurations are suitable for low-volume programming and system prototyping. In these examples the supplied software is more than adequate

Configuration 3 is an example of the PTC-01 being used only as the digital communication for a fully automated calibration/test system. In high volume production systems there is often an existing software/hardware platform that is preferred. The PTC01 is utilized through an existing test setup and controlled by custom software. The example shown is calibrating a Hall-Effect current sensor, with all analog measurement performed by precision meters on the communications bus. The communications bus also controls the input parameters (ie the current source) to evaluates the sensor assembly. The PTC-01 provides the digital and analog waveforms for programming and calibrating the Melexis sensor.

### Software

Melexis supplies software for the Windows platform and will assist in other software solutions. Melexis provides full support for its hardware and firmware. Source code is available at request.

### Note:

*Firmware and source code is available free of charge at request. Melexis does not directly support source code development. However, Melexis will assist in the formulation of algorithms and calibration techniques related to the application. Melexis also has contacts with professional software developers. These individuals are very familiar with the Melexis programmer and industrial software applications. Please contact Melexis for any questions related to software or software development.*

### Quick Set-up

**First, unpack the programmer from the carton. The contents should be:**

- 1 PTC-01 unit
- 1 Serial Communication cable (null modem)
- 1 PTC-SA35 power supply
- 1 MLX-RM-10 reference magnet
- 1 Software Diskette or CD ROM

#### 1. ) Plug the power cord into the programmer.

There is no power switch on the PTC-01, the unit can be powered on or off by unplugging the unit from the line voltage. The green LED on the front will illuminate to indicate the programmer is powered.

#### 2.) Plug in the serial cable.

One end into the DB-9 jack on the programmer, the other into the serial COM port of the PC.

#### 3.) Run the software.

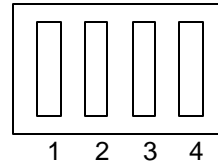
Configure the software according to the instructions provided. The yellow LED on the front panel will begin blinking to indicate communication between the PC and programmer.

#### 4.) Insert the sensor.

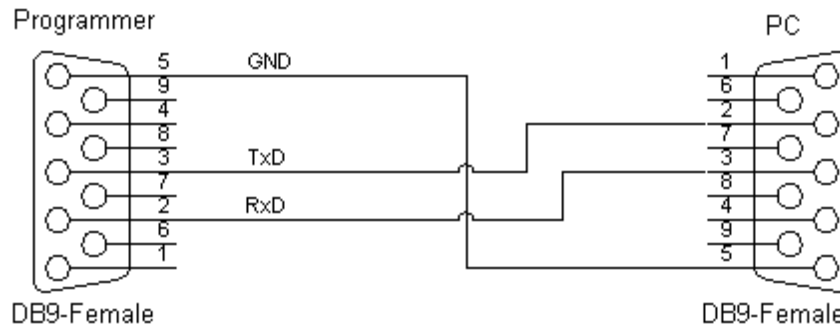
Connect the sensor according to sensor instructions. The programmer is now ready for use. More detailed programming instructions are the sensor datasheets, PTC-01 software documentation, and Melexis applications notes.

**DUT Socket**

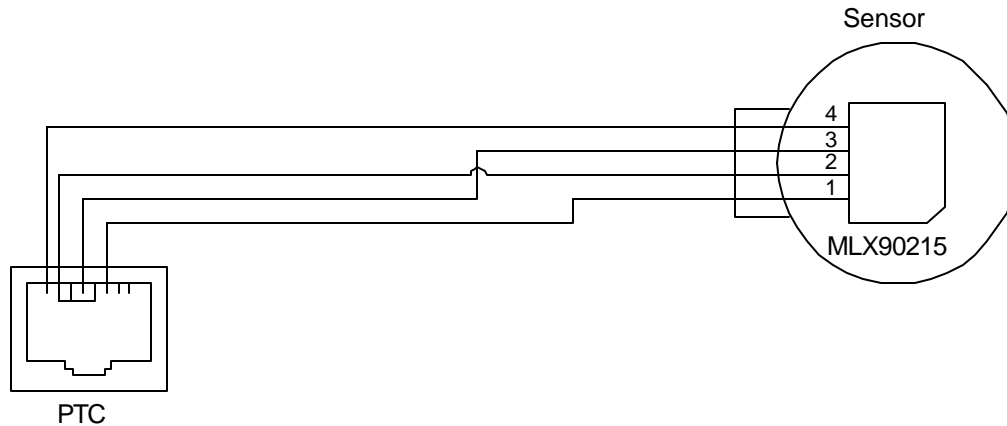
- 1) Vdd
- 2) Memo
- 3) GND
- 4) Vout



**RS232 Communications Cable**



**External Application Cable**



**Note:**

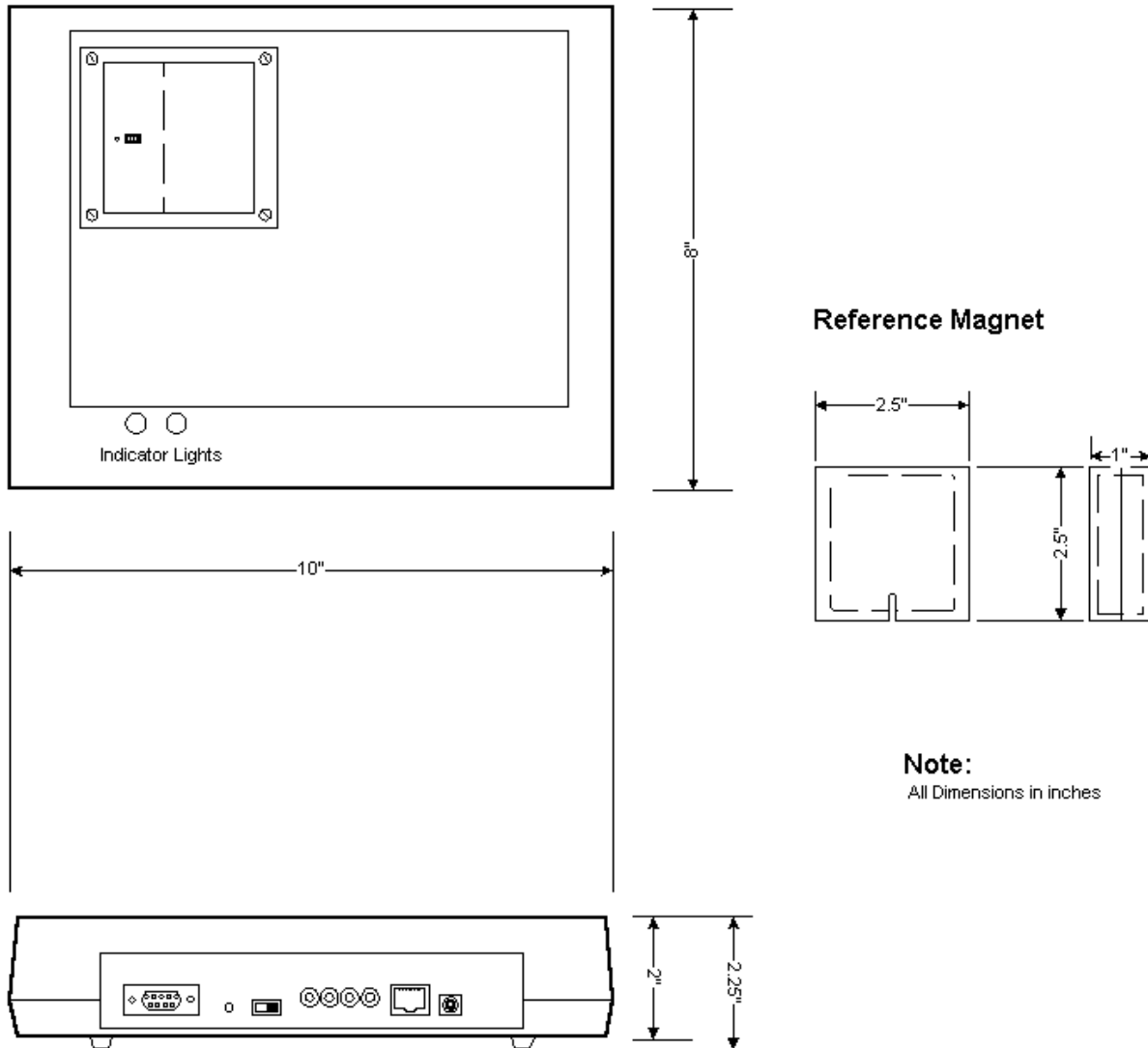
All ground connections used for twisted pair cable are shorted inside the PTC01. Either pin two, three, or five, on the RJ45 can be connected to the sensor ground.

Shielded cable is recommended for long cable lengths (larger than 1 meter) and for severe industrial environments. Cable lengths should not exceed 3 meters in lengths.

Connection to pin two on the MLX90215 (memo) is optional and alternatively may be shorted ground. Please refer to the MLX90215 datasheet for specific wiring instructions.



**PTC-01 Physical Characteristics**



**Note:**  
All Dimensions in inches

*For the latest version of this document,  
Go to our website at:*

**WWW.melexis.com**

Or for additional information

Contact Melexis Direct:

Europe and Japan

E-mail: [sales\\_europe@melexis.com](mailto:sales_europe@melexis.com)

Phone: 011-32-13-670-780

USA and rest of the world

Email: [sales\\_usa@melexis.com](mailto:sales_usa@melexis.com)

Phone: (603)-223-2362