

# LPM200 Field Indicator

## Loop powered indicator K-TEK Products



### Introduction

The operation and instruction manual provides the following information:

- Calibration procedure - see page 4
- Field wiring connection - see page 7

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## 1.0 GENERAL DESCRIPTION

The LPM200 is a two-wire, digital indicator, in an explosion proof housing, that provides local process indication on a 3-1/2 digit liquid crystal display. The Indicator features 1/2" high, easy to read digits and is powered directly from the 4 to 20mA input loop, dropping less than 1 volt across the input terminals.

The LPM200 provides a digital readout directly proportional to the current input. The indicator is calibrated at the factory to read 0 to 100.0% for a 4 to 20mA input. However; it can easily be recalibrated in the field to read directly in engineering units, such as temperature or flow. Each indicator comes with a selection of stick-on labels of commonly used engineering units such as GPM, PSI, etc. These labels can be attached to the display so that a user can immediately determine what the indicator is reading.

Recalibration of the LPM200 is easily accomplished through the use of switches and trimpots. Information on switch positions for the various span and zero calibrations can be found printed on a label attached to the inside wall of the indicator housing. The display can be adjusted from 0 to 3998 counts in three switch selectable ranges and the zero offset can be adjusted from -1999 to +1999 counts also in three switch selectable ranges. Fine adjustment of span and zero is made on two 15 turn trimpots. The span and zero pots are non interactive and provide resolutions of better than one count. Some sample display calibrations for a 4 to 20mA input are as follows:

- 000 to 1999 (forward acting)
- 1999 to 000 (reverse acting)
- -1999 to 1999 (zero center)
- 230 to 1735 (positive offset)
- -720 to 850 (negative offset)

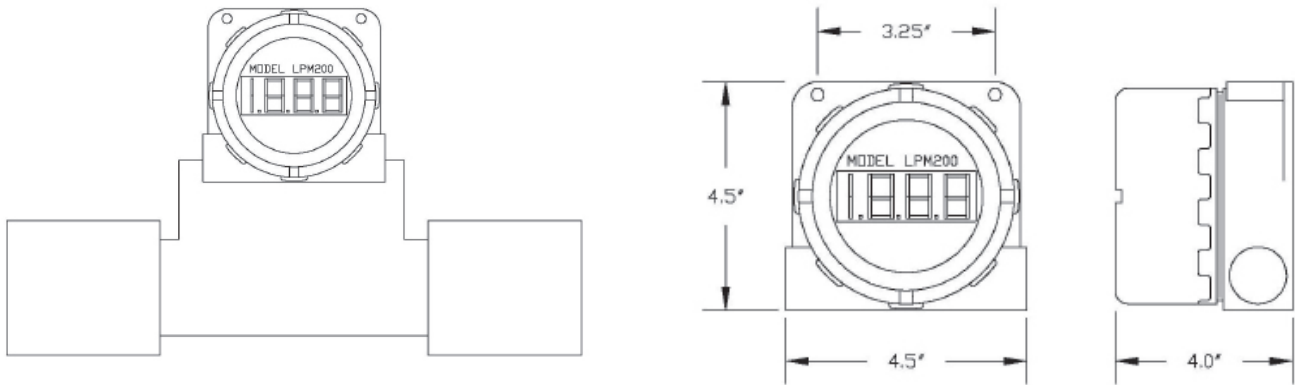
Negative polarity indication is available when required. The negative sign is enabled or disabled through the use of a switch and can be used when displaying quantities such as -350 to 1000°F. Reverse action is achieved by disabling the negative sign and applying the appropriate negative offset. Decimal point selection is also available. Three decimal point positions or no decimal point can be selected through the use of switches.

An additional feature of the LPM200 is the internal calibrator. The indicator can be field calibrated while installed in a working 4 to 20mA loop, regardless of the current through the loop, simply by switching into the calibrate mode. The indicator can also be calibrated on the bench by using a conventional calibrator or by connecting a 1.5 volt flashlight battery across the input terminals and switching to the calibrate mode.

To gain access to the indicator assembly, unscrew the cover from the housing, remove the round plastic label from around the display. Grasping two diagonal corners of the display, pull the indicator assembly out to the housing. The indicator is attached to the bottom of the housing. Field wiring connections are made to a two pint, compression type, terminal block located on the base board.

The housing is ruggedly constructed of sand-cast, copper-free aluminum. Two 1/2" NPT hubs are provided for entrance into the housing which is rated NEMA 4 and NEMA 7, and is classified for use in Division 1, Class I, Groups B, C, and D and Division, Class II, Groups E, F, and G hazardous locations.





**Fig. 1 General Dimensions and Field Wiring**

## 2.0 CALIBRATION PROCEDURE

### 2.1 Set Input Voltage Drop (Factory Calibration)

Input 20mA at the input terminals of the indicator. Adjust pot "P2" on the lower PC board for a voltage drop of 0.95 volts between the input terminals.

### 2.2 Zero Adjustment (Factory Calibration)

To prevent the interaction of the span and zero pots the 4mA offset is compensated for at the output of amplifier "U1". To do this, input 4mA into the indicator, set switch 1, position 1, on the lower PC board to the normal operating position, and then adjust pot "P1", also on the lower PC board, for 0.000 volts at the output of amplifier "U1" (measure between common and the blue wire).

### 2.3 Calibration of internal Calibrator (Factory Calibration)

Calibrate display to read 00.0 to 100.0 for a 4 to 20mA input following the instructions for the calibration of the display. With the indicator operating (the value of the input current doesn't matter) flip switch 1, position 1, on the lower PC board to the calibrate position. Flip switch 1, position 2 to the span calibrating position and adjust pot "p4" on the lower PC board until the display reads 100.0. Return switch 1, position 1 to the normal operating position. Note that the input current has no effect on the display while switch 1 is in the calibrate position.

### 2.4 Calibrate Display

To calibrate the LPM200, remove the front cover and label to expose the calibrating switches, and the span and zero pots located on the top PC board (Figs. 2 and 3). Input a 4 to 20mA signal and calibrate the indicator as follows:

1. Determine desired display for a 4 to 20mA input.  
Example: -30.0 to 195.0°F.
2. Set span switches S1 and S for proper span range.  
Example: Span = 1950 - (300) = 2250 counts; set S1 OFF, S2 OFF.
3. Set zero switches S3 and S4 for proper zero range.  
Example: Zero = -300 counts; set S3 OFF, S4 OFF.
4. Select decimal point.  
Example Select P3 decimal point; set S8 ON, S6 OFF, S7 OFF.
5. Enable or disable negative polarity indication.  
Example: Enable negative sign; set S5 ON.
6. Input 4mA and set "zero pot" for bottom of range.  
Example: Adjust zero pot to display -30.0.
7. Input 20mA and set "span pot" for top of range.  
Example: Adjust span pot to display 195.0.
8. The indicator is now calibrated.

## 2.5 Use of Internal Calibrator

The LPM200 can be calibrated using the internal calibrator, while installed in a working loop, or it can be calibrated on the bench using a 1.5 volt flash light battery connected across the input terminals as a power source.

To use the internal calibrator follow the following procedures:

1. Set the calibrating switches (Fig.2) for the desired span and offset ranges as described in the preceding section
2. Set switch 1, position 1 (Fig. 4) located on the lower PC board to the calibrate position.
3. Set switch 1, position 2 to the “cal. zero” position, then adjust the “zero pot” located on the top PC board until the display displays the bottom of the range.
4. Set switch 1, position 2 to the “cal. span” position, then adjust the “span pot” located on the top PC board until the display displays the top of the range.
5. Return switch 1, position 1 to the normal operate position. The indicator is now calibrated.

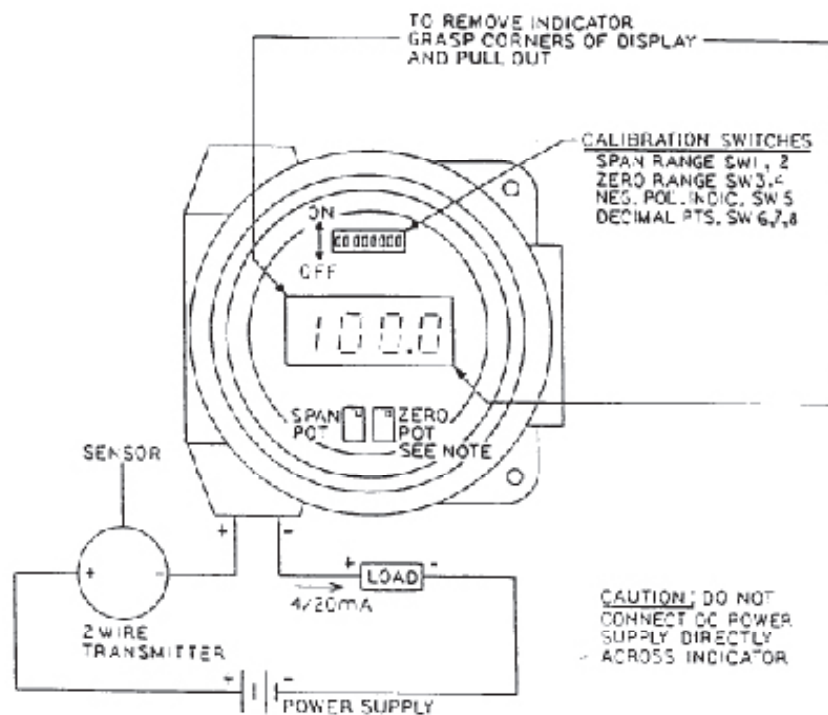
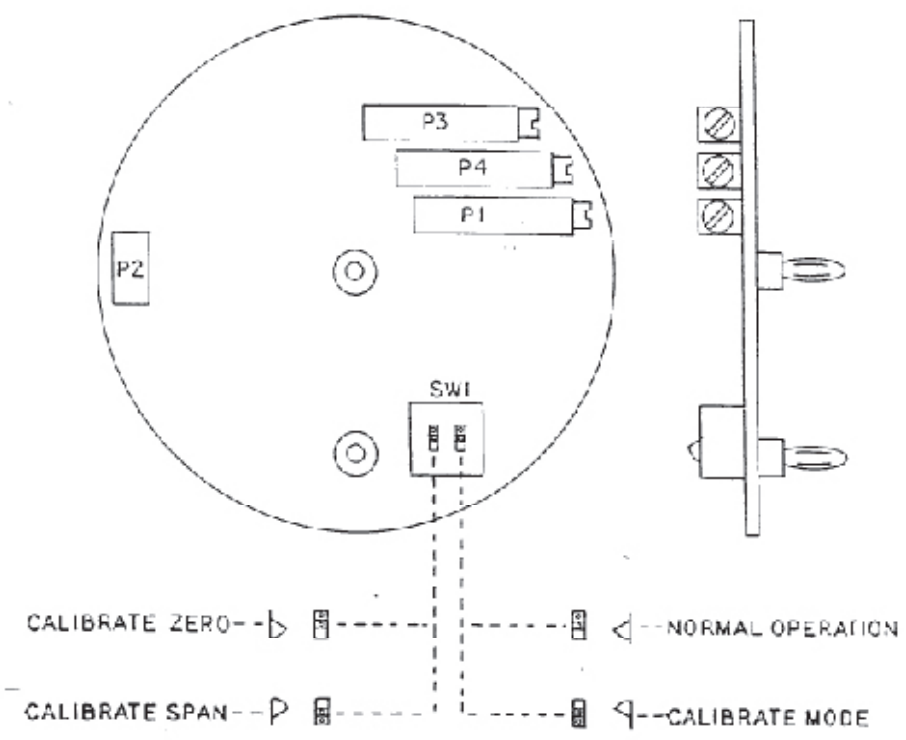


Fig. 2 Typical Field Wiring Connections and Location of Calibration Switches and Pots

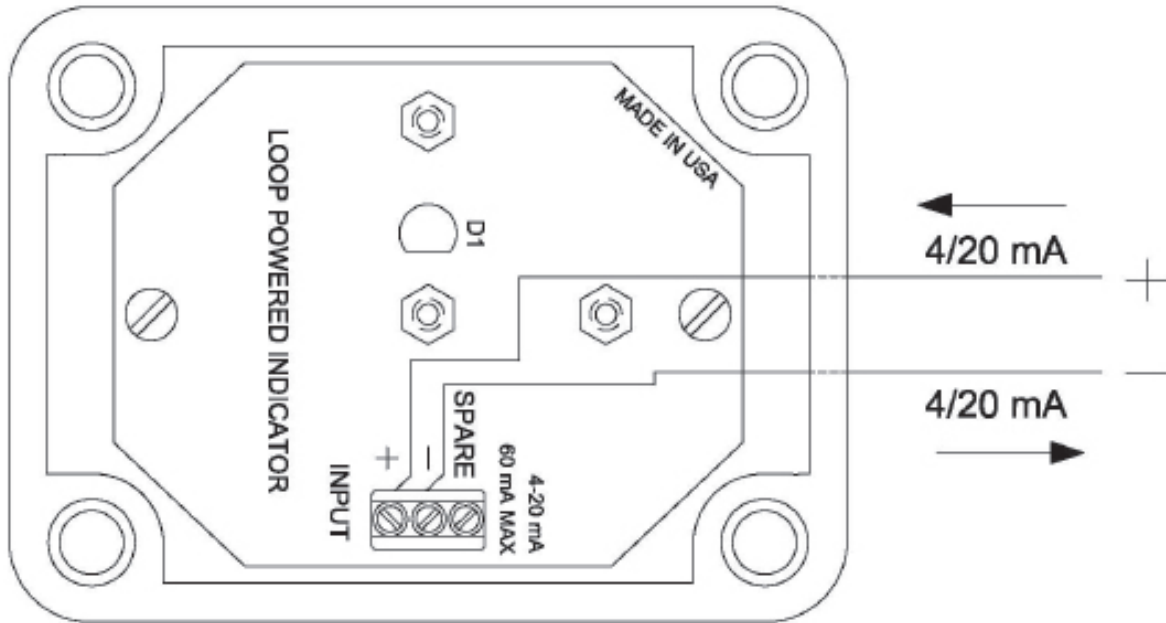
CALIBRATION SWITCH SETTING					
SPAN	S1	S2	ZERO	S3	S4
4000 / 2470	ON	OFF	2000 / 573	OFF	ON
2470 / 1530	OFF	OFF	573 / -573	OFF	OFF
1530 / 000	OFF	ON	-573 / -2000	ON	OFF
ENABLE DECIMAL POINT			TO ENABLE NEGATIVE POLARITY INDICATION		
1.999	S6	ON		S5	ON
19.99	S7	ON			
199.9	S8	ON			

Fig. 3 Table of Calibration Switch Settings for Span, Zero, Decimal Points, and Polarity

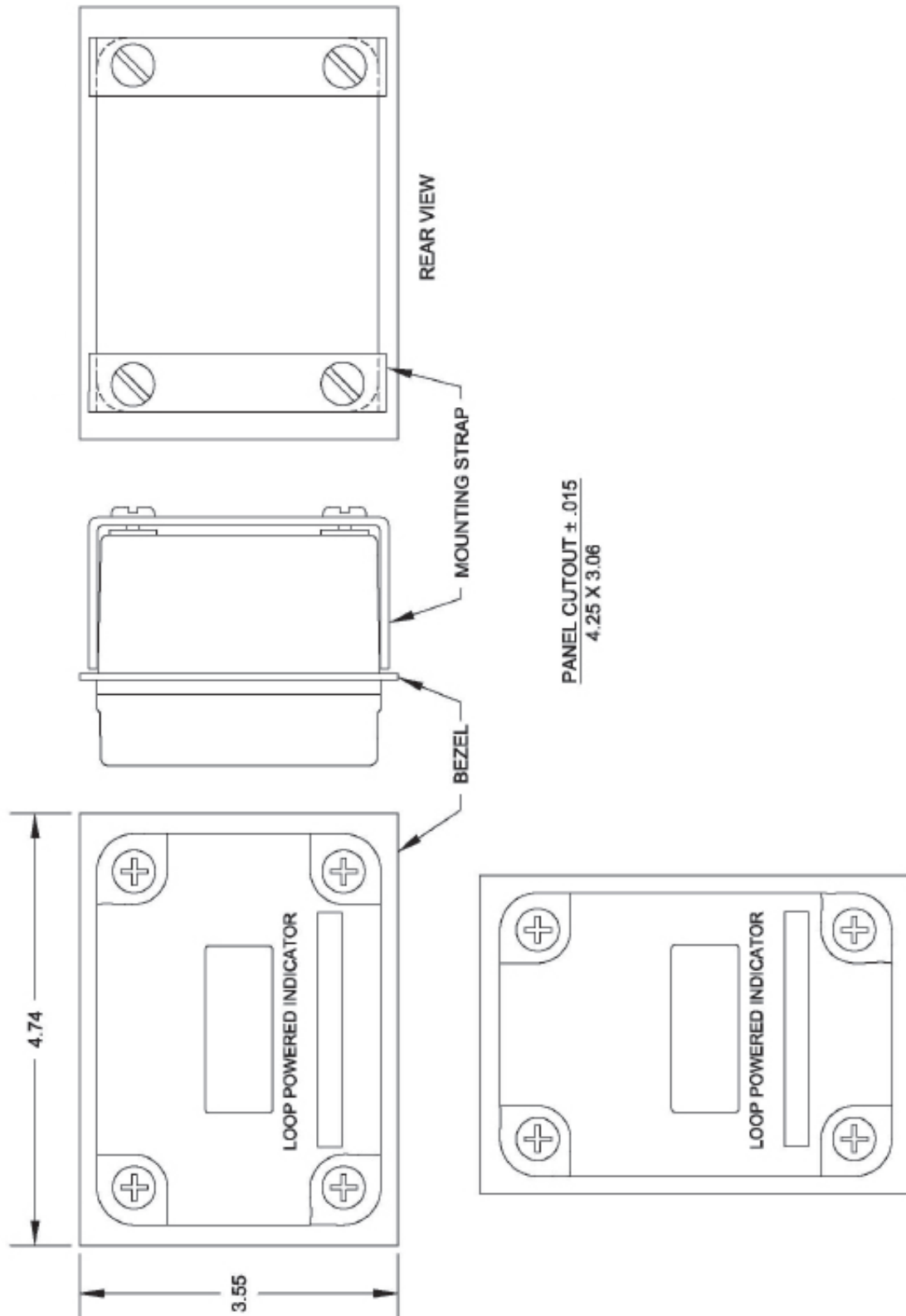


**Fig. 4 Lower PC Board with Switch Settings for Internal Calibrator**

### 3.0 FIELD WIRING CONNECTION

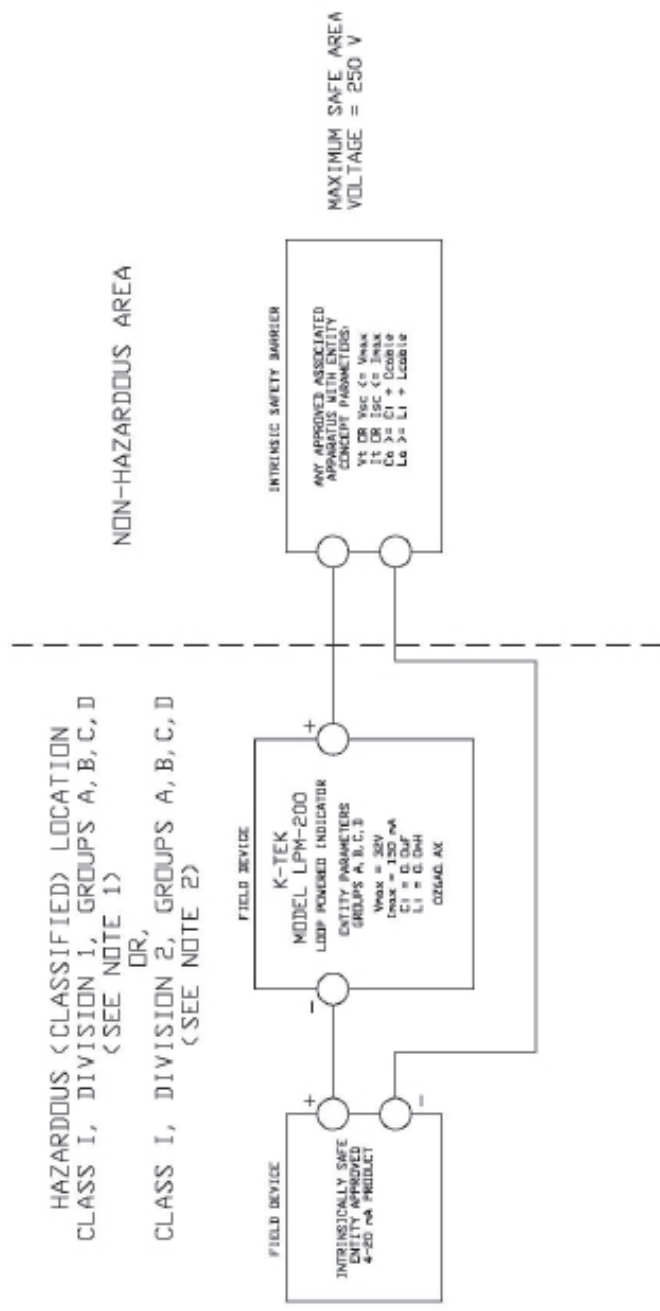


## 4.0 GENERAL DIMENSIONS LPM200





# 5.0 INTERCONNECTION DIAGRAM TO INTRINSICALLY SAFE APPARATUS

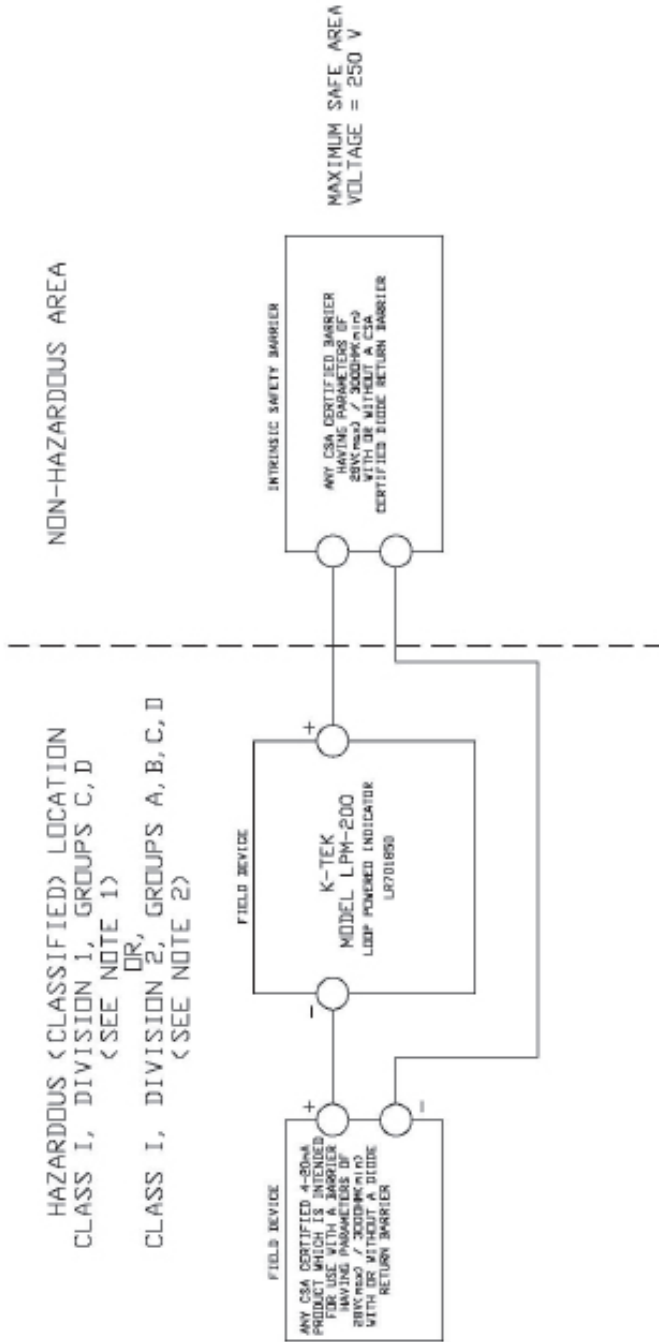


- NOTES:
- 1) FOR INSTALLATION IN A DIVISION 1 HAZARDOUS LOCATION, THE WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, NFPA 70 ARTICLE 504 AND ISA RP-12.6
  - 2) FOR INSTALLATION IN A DIVISION 2 HAZARDOUS LOCATION, THE INTRINSIC SAFETY BARRIER IS NOT REQUIRED. HOWEVER, SUITABLE DIVISION 2 WIRING PRACTICE MUST BE MAINTAINED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, NFPA 70, ARTICLE 501-4(b). MAXIMUM RATED INPUT = 32V.
  - 3) DO NOT CONNECT ANY MEASURING EQUIPMENT TO THE FIELD DEVICE TERMINALS UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS.
  - 4) WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.



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## 6.0 CSA INTERCONNECTION DIAGRAM INTRINSICALLY SAFE APPARATUS



- NOTES:
- 1) FOR INSTALLATION IN A DIVISION 1 HAZARDOUS LOCATION, THE WIRING MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
  - 2) FOR INSTALLATION IN A DIVISION 2 LOCATION WITH A  $V_{max}$  OF 30 V, BARRIER IS NOT REQUIRED.
  - 3) DO NOT CONNECT ANY MEASURING EQUIPMENT TO THE FIELD DEVICE TERMINALS UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS.
  - 4) WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
- AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.



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## 7.0 CUSTOMER SUPPORT

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Website: [ktekcorp.com](http://ktekcorp.com)

7.1 ABB RMA Form



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 Fax: +1 (225) 673-2525  
 Email: service@ktekcorp.com  
 Toll Free: (800) 735-5835

**\*\*\* IMPORTANT CUSTOMER NOTICE: PLEASE READ PRIOR TO RETURNING PRODUCTS TO ABB\*\*\***

Be sure to include the Return Authorization (RA) number on the shipping label or package to the attention: Customer Service. A copy of this document should also be included with the packing list. ABB wants to maintain a safe work environment for its employees. In the event, the returned product or material has been in contact with a potentially hazardous chemical, per federal regulations, the customer must provide evidence of decontamination and the related chemical composition and characteristics. In order to expedite your return, please include the applicable Material Safety Data Sheets (MSDS) and decontamination tags by affixing these documents in close proximity to the shipment label for identification purposes. (January 18, 2006)

**Return Authorization Form**

Customer:	Date:
Contact Name:	Product:
Contact Email:	Serial No:
Contact Phone:	Job No:
Contact Fax:	Service Rep:

**Completed by Customer**

Reason:

---

Problem Found: None

Action            None

Requested:

Is expedited return shipping requested?  Yes

*If yes, please provide a purchase order or your shipper's account number (ex FedEx or UPS).  
 ABB pays return transport via standard ground shipments only.*

Account #:	
------------	--

**If purchase order is issued, a copy of purchase order must be included with return authorization documentation.**

Is ABB authorized to repair items determined to be non-warranty?  Yes

*If yes, a copy of purchase order must be included with return authorization documentation.*

Customer PO#:		Date:	
---------------	--	-------	--

Has product been in contact with any potentially hazardous chemical?  Yes

*If yes, documentation product and forward MSDS to ABB. "ATTN: Customer Service"*

**Return Repaired Product to Address**

Shipping Address:	Billing Address:
	Ship Via:

## 8.0 WARRANTY

### 5 YEAR WARRANTY FOR:

KM26 Magnetic Liquid Level Gauges; MagWave Dual Chamber System; LS Series Mechanical Level Switches (LS500, LS550, LS600, LS700, LS800 & LS900); EC External Chambers, STW Stilling Wells and ST95 Seal Pots.

### 3 YEAR WARRANTY FOR:

KCAP300 & KCAP400 capacitance switches.

### 2 YEAR WARRANTY FOR:

AT100, AT100S and AT200 series transmitters; RS80 and RS85 liquid vibrating fork switches; RLT100 and RLT200 reed switch level transmitters; TX, TS, TQ, IX and IM thermal dispersion switches; IR10 and PP10 External Relays; MT2000, MT5000, MT5100 and MT5200 radar level transmitters; RI100 Repeat Indicators; KP paddle switches; A02, A75 & A77 RF capacitance level switches and A38 RF capacitance level transmitters; Buoyancy Level Switches (MS50, MS10, MS8D & MS8F); Magnetic Level Switches (MS30, MS40, MS41, PS35 & PS45).

### 1 YEAR WARRANTY FOR:

KM50 gauging device; AT500 and AT600 series transmitters; LaserMeter and SureShot series laser transmitters; LPM200 digital indicator; DPM100 digital indicators; APM100 analog indicators; KVIEW series digital indicators and controllers; SF50 and SF60 vibrating fork switches, KB Electro-Mechanical Continuous Measuring Devices, KSONIK ultrasonic level switches, transmitters & transducers, ChuteMaster Microwave Transmitter / Receiver and TiltMaster Switches.

### SPECIAL WARRANTY CONSIDERATIONS:

ABB does not honor OEM warranties for items not manufactured by ABB (i.e. Palm Pilots). These claims should be handled directly with the OEM.

ABB will repair or replace, at ABB's election, defective items which are returned to ABB by the original purchaser within the period specified above from the shipment date of the item and which is found, upon examination by ABB, to its satisfaction, to contain defects in materials or workmanship which arose only under normal use and service and which were not the result of either alterations, misuse, abuse, improper or inadequate adjustments, applications or servicing of the product. ABB's warranty does not include onsite repair or services. Field service rates can be supplied on request.

If a product is believed to be defective, the original purchaser shall notify ABB and request a Returned Material Authorization before returning the material to ABB, with transportation prepaid by the purchaser. (To expedite all returns/repairs from outside of the United States, consult ABB's customer service team ([service@ktekcorp.com](mailto:service@ktekcorp.com)) to determine an optimal solution for shipping method and turnaround time.) The product, with repaired or replaced parts, shall be returned to the purchaser at any point in the world with transportation prepaid by ABB for best-way transportation only. ABB is not responsible for expedited shipping charges. If the product is shipped to ABB freight collect, then it will be returned to the customer freight collect.

If inspection by ABB does not disclose any defects in material or workmanship, ABB's normal charges for repair and shipment shall apply (minimum 250.00 USD).

The materials of construction for all ABB products are clearly specified and it is the responsibility of the purchaser to determine the compatibility of the materials for the application.

THE FOREGOING WARRANTY IS ABB'S SOLE WARRANTY AND ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE, ARE EXCLUDED AND NEGATED TO THE MAXIMUM EXTENT PERMITTED BY LAW. NO PERSON OR REPRESENTATIVE IS AUTHORIZED TO EXTEND ANY OTHER WARRANTY OR CREATE FOR ABB ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ABB'S PRODUCTS. THE REMEDIES SET FORTH IN THIS WARRANTY ARE EXCLUSIVE OF ALL OTHER REMEDIES AGAINST ABB. ABB SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR SPECIAL DAMAGES OF ANY KIND. ABB'S SOLE OBLIGATION SHALL BE TO REPAIR OR REPLACE PARTS (FOUND TO BE DEFECTIVE IN MATERIALS OR WORKMANSHIP) WHICH ARE RETURNED BY THE PURCHASER TO ABB.





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