

# *INSTRUCTION MANUAL*

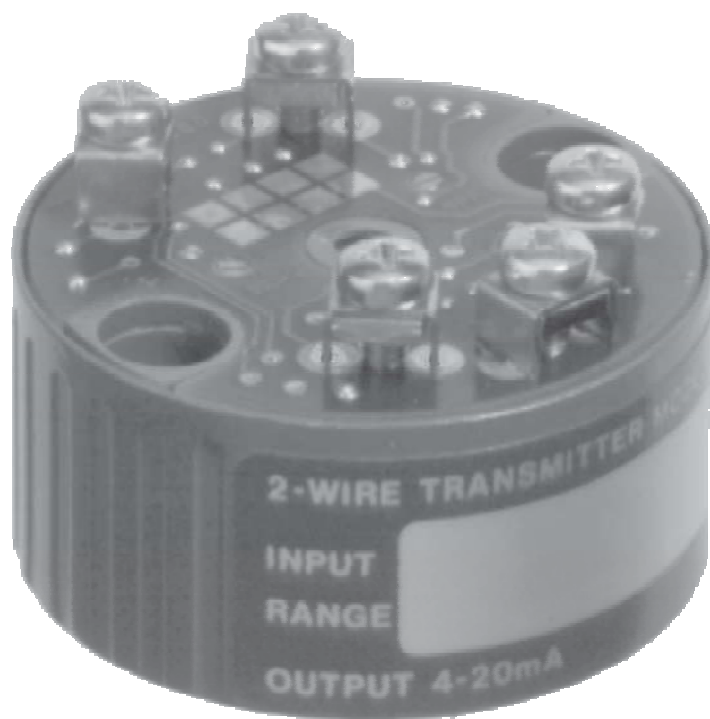
*R82000*

*T82000*

*P82000*

*P82000 FR*

*(including ATEX & HF)*



# SPECIFICATIONS

## GENERAL INTRODUCTION:

The 82000 series are highest quality free to scale 2-wire transmitters.  
The range is set with an external solder link on top of the transmitter. Can even be re-scaled in the field.  
Fine ZERO and SPAN adjustments using independent precision potentiometers.  
Electronics are completely sealed in rugged epoxy-coated metal housing.  
RTD (Pt-100) units are completely linearized and thermocouple units are voltage linear.  
The Potentiometer transmitter represents a 0...100% setting  
Off-the-Shelf availability for RTD (Pt-100) and thermocouples type K and J.  
Other Thermocouple inputs and an Intrinsically safe version is available.

Specifications at  $V_{nom}$  24VDC;  $T_{amb}$  25°C and Span nom. RTD=100°C; T/C=250°C

## GENERAL

Output	4-20 mA
Power supply*	12-36 VDC
Zero Drift	±0.02%/°C
Span drift	±0.02%/°C
Supply Voltage Effect	±0.002%/V
Open Circuit Detection	Upscale >23 mA, limited to 40 mA
Load Capability	(Vbat-12V) / 20 mA
Ambient Temp.	-20° to 80°C (-4° to 160°F)
Storage Temp.	-20° to 100°C (-4 to 210°F)
Frequency Effect	<1% (typ.)
Dimensions	43mm Dia. x 25mm H. (1.7"x1.0")
Degree of protection	IP20

## Pt100(alpha=0.00385)

### Model R82000

Zero Adjustment	between -50° and +50°C (-60° and +120°F), 20 turn Potentiometer adjustment
Span Adjustment	-50° to 800°C (90° to 1440°F) divided into 4 parts. Scaleable via solder-link on top of unit. Fine adjustment via 20-turn Potentiometer.
Sensor Lead Resistance Effect	0.01°C/Ohm; max. 500 Ohm

Linearization

0.1%

## Thermocouple

### Model T82000

Model T82000-K	Thermocouple K
Model T82000-J	Thermocouple J
Zero Adjustment	approx. 50 °C (60°F) via 20-turn potentiometer
Span Adjustment	Type K 150° to 1200°C (270° to 2160°F) divided in 3 parts. Type J 150° to 600°C (270 to 1080°F) divided in 2 parts.

Cold Junction drift

0.03°C/°C

Lead Resistance

10 K Ohm max.

Output

Voltage Linear

## Potentiometer

### Model P82000 FR

Minimum potentiometer	1 kiloOhm
Maximum potentiometer	50 kiloOhm
Range	0...100% = 4...20 mA Fixed Range

## Variable Resistor

### Model P82000

Range	Factory set; specify Resistor
-------	-------------------------------

Our **Models R83000** and **T83000** are the factory calibrated versions of R82000 and T82000.  
These part numbers are no longer in our program.

## \*NOTE:

**For ATEX approved equipment different power requirements may apply!**

# ATEX

## GENERAL:

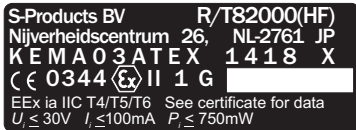
The R/T82000 is available in an intrinsically safe version and meets the requirements of the ATEX directive 94/9/EC.



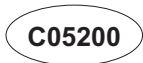
## MARKING:

All ATEX approved R/T82000 units carry the following labels:

### R/T82000 (HF)



Year of production  
Serial No. i.e.:



### General product label



**Certificate No.** R/T82000 (HF): KEMA 03ATEX 1418 X

### Parameters:

Connect to a Zenerbarrier with the following maximum values:

- $U_o = 30$  V DC
- $I_o = 100$  mA
- $P_o = 750$  mW

CE 0344 II 1 G  
 EEx ia IIC  
 T4 (T<sub>amb</sub> -20...+80°C)  
 T5 (T<sub>amb</sub> -20...+80°C)  
 T6 (T<sub>amb</sub> -20...+50°C)

### R82000 & T82000

#### supply circuit KL1, KL2:

- $U_i = 30$  V DC
- $I_i = 100$  mA
- $P_i = 750$  mW
- $L_i = 22$   $\mu$ H
- $C_i = 15$  nF

#### input circuit KL3, KL4, KL5:

- $U_o = 30$  V DC
- $I_o = 100$  mA
- $P_o = 750$  mW
- $L_o = 3,4$   $\mu$ H
- $C_o = 40$  nF

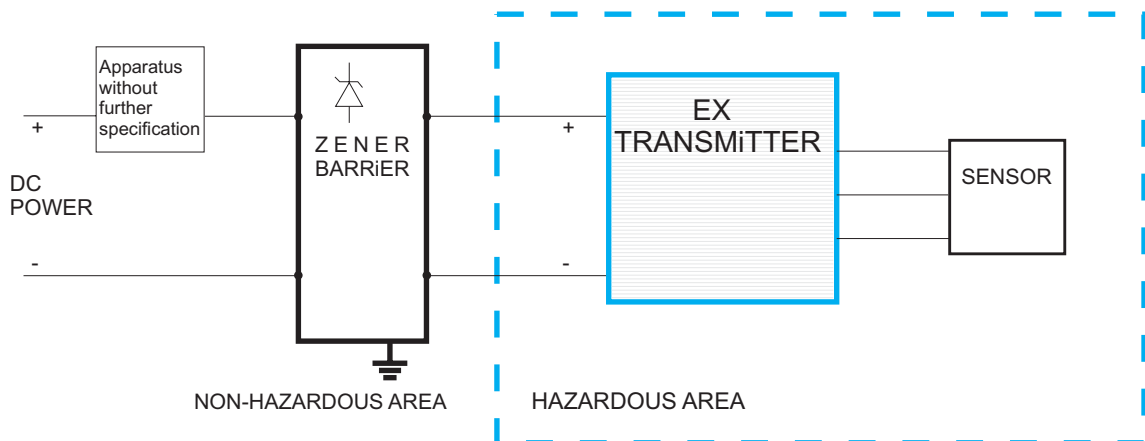
### R82000 HF & T82000 HF

#### supply circuit KL1, KL2:

- $U_i = 30$  V DC
- $I_i = 100$  mA
- $P_i = 750$  mW
- $L_i = 55$   $\mu$ H
- $C_i = 58$  nF

#### input circuit KL3, KL4, KL5:

- $U_o = 30$  V DC
- $I_o = 100$  mA
- $P_o = 750$  mW
- $L_o = 3,4$   $\mu$ H
- $C_o = 8$  nF



## **NORMATIVE REFERENCE:**

The transmitters R82000 (HF) and T82000 (HF) have an EC Type examination certificate issued by KEMA and have been approved to the following standards:

EN 50014  
EN 50020  
EN 50284

## **SPECIAL CONDITIONS FOR SAFE USE:**

For electrical data and temperature data see EC-Type examination certificate KEMA 03ATEX1418 X

## **INSTALLATION REQUIREMENTS**

- ATEX approved equipment is only to be connected to a Zenerbarrier.

The Temperature Transmitter must be mounted in an enclosure providing a degree of ingress protection of at least IP20 per EN 60529.

This enclosure must be in conformance with Clauses 4.3 and 4.4 of EN 50284, when the Temperature Transmitter is mounted in an area where the use of category 1 G apparatus is required.

This enclosure must be in conformance with Clauses 7.3 and 8.1 of EN 50014, when the Temperature Transmitter is mounted in an area where the use of category 2 G apparatus is required.

The mentioned Clauses describe how to avoid danger of ignition due to electrostatic charges.

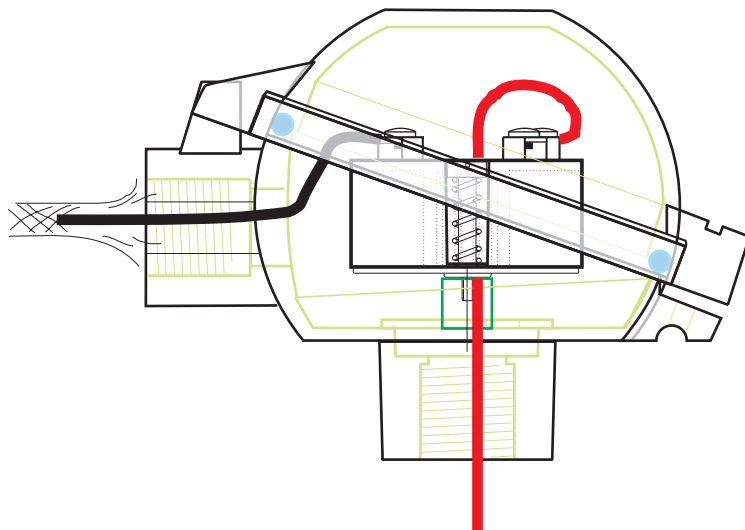
- All 82000 series transmitters have an ingress protection of IP20.

This requires usage in a dry, clean and well controlled environment.

Mount the transmitter in a (DAN) head as described below..

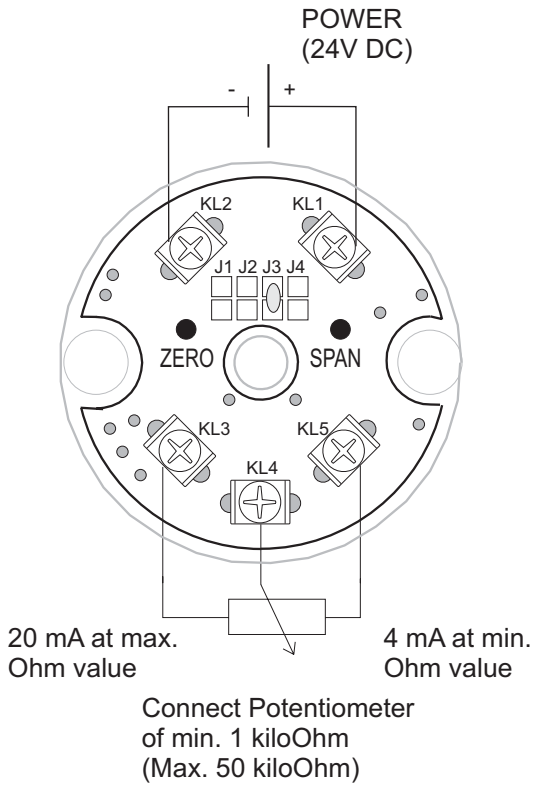
- Use twisted pair, shielded cable to connect the transmitter to its power supply in order to obtain the best immunity to Electromagnetic signals.

On the power supply side connect the shield to the power supply's earthing point, on the transmitter side connect the shield to the grounded head somewhere close to the transmitter. Make sure the transmitter is firmly connected to the head.

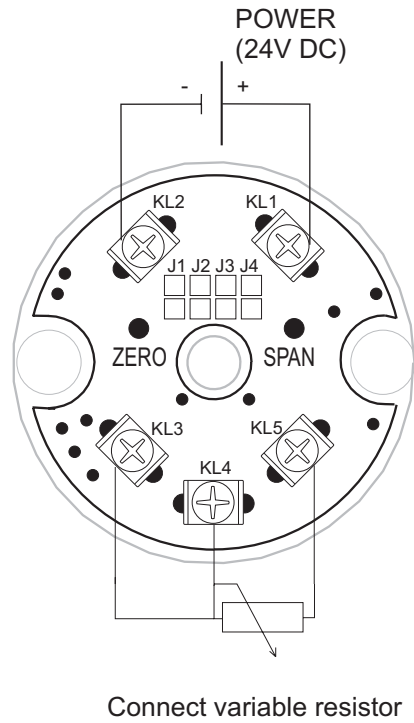


# CONNECTIONS

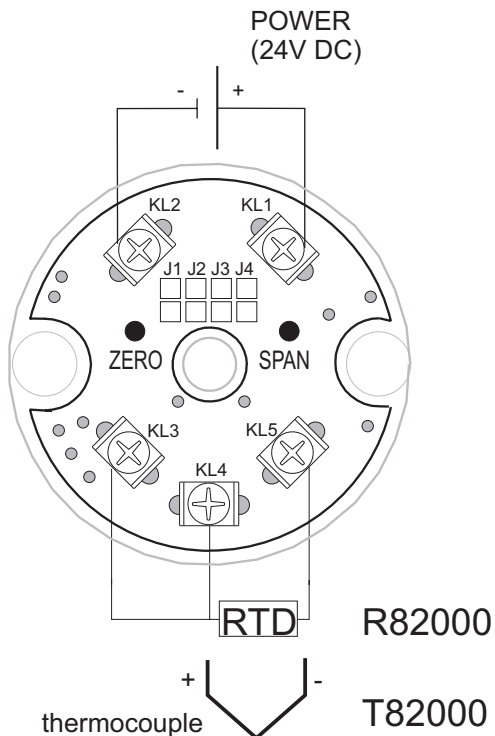
## P82000 FR



## P82000



## R/T82000



RANGE	table 1 [°C]																	
	Pt100	Thermocouple																
connect		K J																
J1 J2 J3 J4																		
<table border="1"> <tr><td>↑</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>↑</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>↑</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>↑</td></tr> </table>	↑	□	□	□	□	↑	□	□	□	□	↑	□	□	□	□	↑	50...100	150...300 150...300
↑	□	□	□															
□	↑	□	□															
□	□	↑	□															
□	□	□	↑															
<table border="1"> <tr><td>□</td><td>□</td><td>□</td><td>↑</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> </table>	□	□	□	↑	□	□	□	□	□	□	□	□	□	□	□	□	100...200	300...600 300...600
□	□	□	↑															
□	□	□	□															
□	□	□	□															
□	□	□	□															
<table border="1"> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> </table>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	200...400	600..1200
□	□	□	□															
□	□	□	□															
□	□	□	□															
□	□	□	□															
<table border="1"> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> <tr><td>□</td><td>□</td><td>□</td><td>□</td></tr> </table>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	400...800	
□	□	□	□															
□	□	□	□															
□	□	□	□															
□	□	□	□															

## INTRODUCTION

The series R/T82000 are highest quality free to scale 2-wire temperature transmitters. The P82000 FR is for connecting a Potentiometer.

The range is set with an external solder link. The P82000 FR is Fixed Range.

Fine adjustment of the range can be done by potentiometers located on the top of the transmitter

With this transmitter the following ranges are covered:

MODEL	INPUT	ZERO	SPAN
R82000	RTD (Pt100)	-50...+50°C	50.....800°C
T82000-K	Thermocouple K	0°C	150...1200°C
T82000-J	Thermocouple J	0°C	150.....600°C
P82000 FR	Potentiometer	0	100%

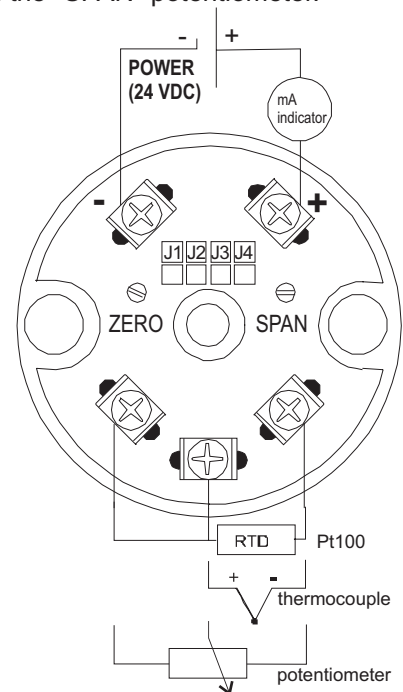
or consult factory for other ranges or input sensors.

## PROGRAMMING AND CALIBRATION INSTRUCTIONS R82000 & T82000

In order to calibrate the transmitter you will need a welder and solder, 24V power supply with mA indicator (Model TL245 is recommended as a fast and simple calibration tool) and an input simulator (Pt100 or TC)

1. Select the desired Span from table 1. Please note if, for example, -50°...+150° is required the span is 200°, and not 150°. Link the two pads with solder.
2. Connect a power supply (24 V DC) and a digital milli amperemeter to the transmitter.
3. Connect an input simulator (Pt100 or Thermocouples with cold junction compensation) as shown in the connection diagram.
4. Simulate the required Zero and adjust the loop current to 4 mA with the "ZERO" potentiometer.
5. Simulate the maximum input value and adjust the loop current to 20 mA with the "SPAN" potentiometer.
6. Repeat step 4 and 5 until the correct reading is achieved.
7. Remove the input simulator and power supply.  
Fill in the label with a permanent marker (fibrepoint).

The transmitter is now ready to build in a connection head.



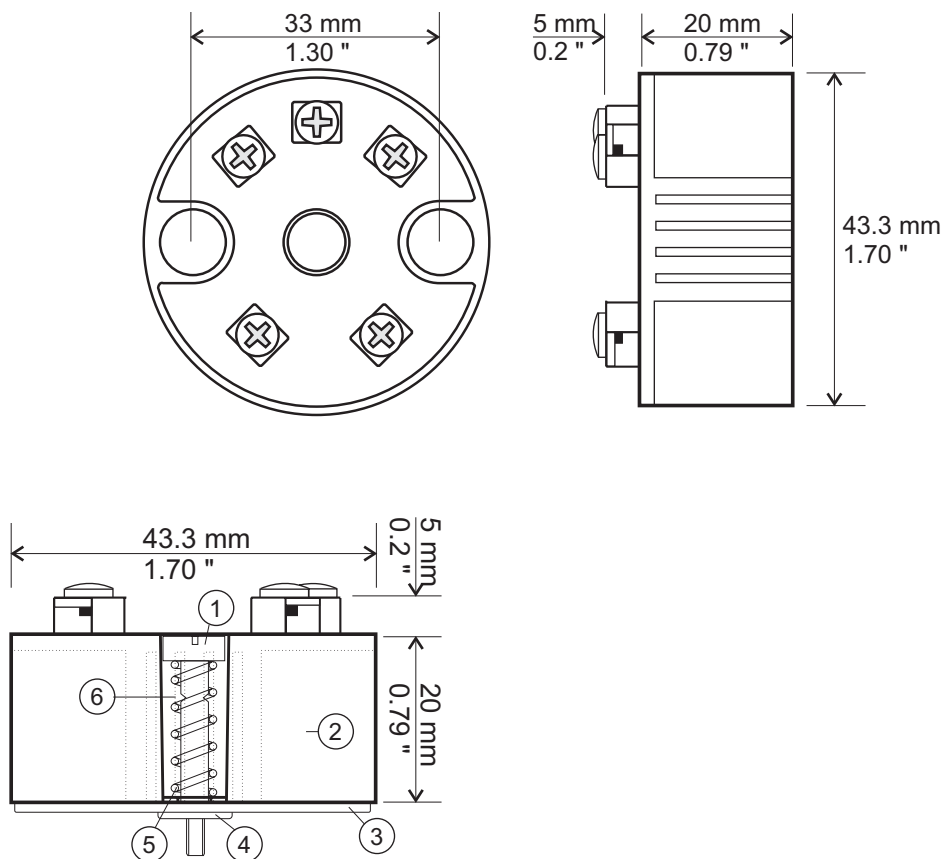
## PROGRAMMING AND CALIBRATION INSTRUCTIONS P82000 FR

In order to calibrate the transmitter you will need a 24V power supply with mA indicator

(Model TL245 is recommended as a fast and simple calibration tool) and an input simulator (Potentiometer)

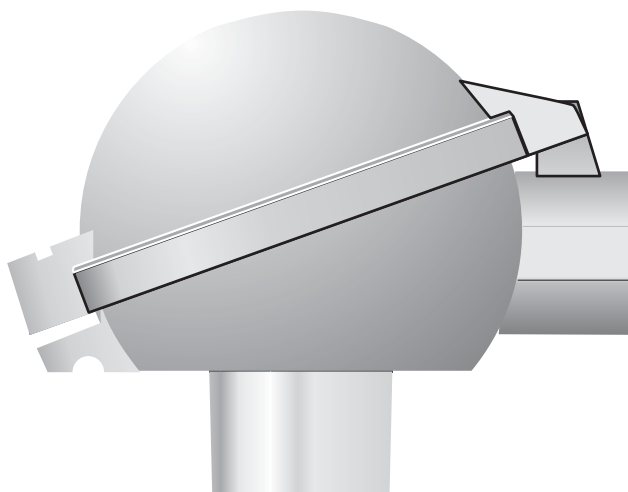
1. Connect any potentiometer with a value between 1 kΩ and 50 kΩ as shown in the connection diagram..
2. Connect a power supply (24 V DC) and a digital milli amperemeter to the transmitter.
3. Simulate the required Zero and adjust the loop current to 4 mA with the "ZERO" potentiometer.
4. Simulate the maximum input value and adjust the loop current to 20 mA with the "SPAN" potentiometer.
5. Repeat step 3 and 4 until the correct reading is achieved.
6. Remove the input simulator and power supply. Fill in the label with a permanent marker (fibrepoint).

## DIMENSIONS



### MOUNTING in CONNECTION HEAD

1. Screw M4
2. Transmitter
3. Measuring insert plate
4. Ferrule
5. Spring
6. Notch



## WARRANTY

Our transmitters have a 5 year warranty.  
Follow usage instruction in this manual.  
Do not try to open the transmitters.  
In case of malfunction return to your supplier.

