1000 OHM 385 PLATINUM RTD RANGEABLE TRANSMITTER

MODEL T85U

DESCRIPTION

The **Kele T85U 1000Ω RTD rangeable transmitter** is a range selectable, two-wire 4-20 mA RTD transmitter used with Type 85 1000Ω platinum RTD sensors. The transmitter is available in six standard ranges, or it can be set for any range between -30° to 280°F (-34° to 156°C) with a minimum span of 40°F (22°C).

To adjust the **T85U**, set the DIP switches to match the desired range, and use the zero and span pots to fine tune. A high accuracy digital ohmmeter and decade box are required.

The **T85U** has a special 20 mA loop calibration test signal to provide easy system verification. Simply move the bottle plug jumper from norm to 20, and the transmitter will output a constant 20 mA. The loop-up LED provides power indication for the 4-20 mA output.

T85U

T85U-13-WE-XTD

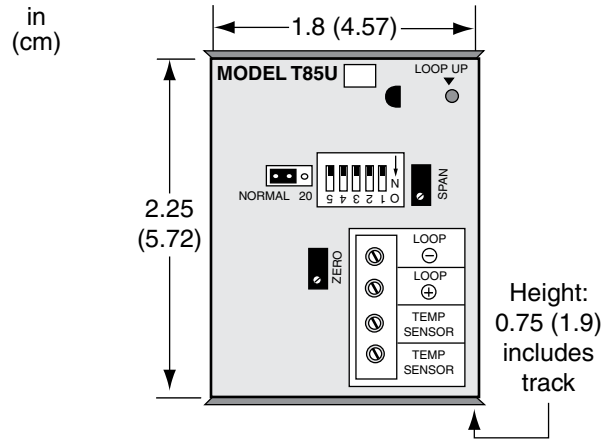
FEATURES

- ***Class A Sensors***
- ***Dip switch rangeable***
- ***Loop calibration test signal***
- ***Low cost***
- ***Snap-track mounting***
- ***Loop-powered LED indication***
- ***Fits into card slot of ST-U85 housing***
- ***CE approved (commercial and industrial)***
- ***Available as a complete assembly***
- ***Conformal coated***

APPLICATIONS

- ***Duct***
- ***OSA***
- ***Immersion***
- ***Averaging***

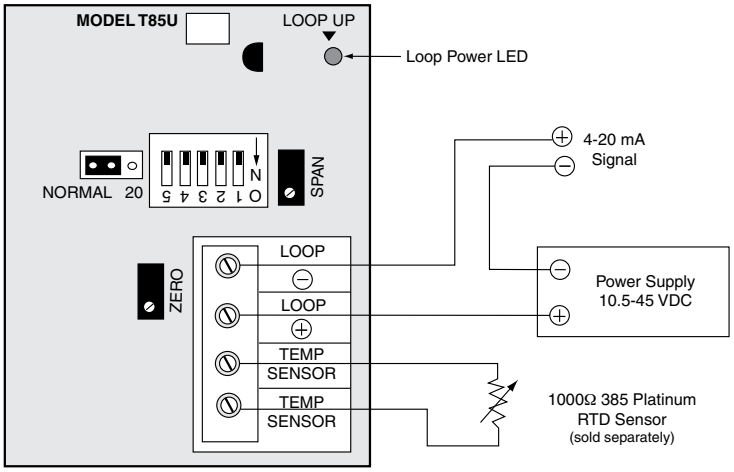
DIMENSIONS



SPECIFICATIONS

Supply Voltage	10.5-45 VDC
Signal Output	4-20 mA, two-wire, loop-powered, Limit 25 mA
Maximum Output Impedance	675Ω @ 24 VDC
Sensor Accuracy	DIN Class A, ±0.27°F (±0.15°C)
Transmitter Accuracy	±0.02°F (±0.01°C) at 77°F (25°C)
Rangeability	-30° to 250°F (-34° to 121°C) Minimum span of 40°F (22°C)
Rangeability	
Zero	-30° to 210°F (-34.4° to 98.9°C)
Minimum Span	40°F (4.4°C)
Usable Range	-30° to 250°F (-34.4° to 121.1°C)
Loop Calibration Output	20 mA ± 0.2%
Sensor Element	1000Ω platinum TCR 0.00385 Ω/Ω/°C
Operating Humidity	0% to 95% non-condensing
Operating Temperature	0° to 140°F (-18° to 60°C)
Wiring Terminations	Terminals
Approvals	CE (EN50081-1, EN50082-1) Optional CE (EN50081-2, EN50082-2) Industrial RF/EM Hardened
Weight	0.16 lb (0.07 kg) w/o options
Warranty	18 months

WIRING



ORDERING INFORMATION

MODEL	DESCRIPTION
T85U	4-20 mA RTD transmitter standard rangeability
	CE CERTIFICATION
–	Commercial CE (EN50081-1 and EN50082-1)
EMC	Industrial CE, RF/EM hardened (EN50081-2 & EN50082-2) (Add **-S** to end of model number)
	RANGE
2	-20° to 140°F (-29° to 60°C)
3	0° to 100°F (-18° to 38°C)
4	30° to 240°F (-1° to 116°C)
12	-22° to 113°F (-30° to 45°C)
13	32° to 212°F (0° to 100°C)
14	32° to 122°F (0° to 50°C)
XR†	Special Range (See previous page for rangeability limits)
	SENSOR TYPE
—	Transmitter only
D	**ST-D85-XW** duct sensor*
O	**ST-O85** outside air sensor*
W	**ST-W85-XW** immersion sensor* with brass well
WE	**ST-W85-E-XW** immersion sensor* without well
WS	**ST-W85-S-XW** immersion sensor* with stainless steel well
AV	**ST-AV85H** averaging sensor*
XTD	Digital display option for (D) duct or (W) immersion sensors
XWM	Single gang weather resistant box (Mounted without sensor)

T85U — [ ] — **2** — **D**

Example: **T85U-2-D** Transmitter with range of -20° to 140°F (-29° to 60°C) mounted and wired in duct sensor enclosure

† Indicate at time of order

* Includes sensor mounted and wired. Check temperature limits in the catalog for each probe.

RELATED PRODUCTS

		PAGE
DCPA-1.2	Power supply, 120 VAC IN to 24 VAC/24 VDC OUT	**994**
DCP-1.5-W	Power supply, 24 VAC IN to 24 VDC OUT	**995**

RANGE CALIBRATION (All units are factory calibrated before shipping)

The **T85U** RTD transmitter can be field-calibrated by using the ZERO and SPAN potentiometers and DIP switches. Use the step-by-step instructions below to calibrate the **T85U** to the desired temperature range. For information about accuracy, see Special Notes on Field Calibration on the reverse side.

Step 1 Assemble required equipment: temperature transmitter, 24 VDC power supply, decade box [**Model RSU-280 (Newark)** or equal], digital VOM [**Fluke Model 87 (Newark)** or equal], trim screwdriver, RTD Resistance vs.Temperature Chart (see *Temperature* section of Kele catalog).

Step 2 Using the RTD Resistance vs. Temperature Chart for 1000Ω Platinum 375 Curve, select and record the resistance values for the high and low temperatures in the desired range. Designate these values as LOW TEMP OHMS and HIGH TEMP OHMS.

Step 3 Calculate the calibration factor using the ohms recorded in Step 2:

$$\text{CAL FACTOR} = \frac{\text{HIGH TEMP OHMS} - \text{LOW TEMP OHMS}}{16}$$

Step 4 Using the resistance decade box, select a resistance value within one ohm of the low temperature ohms in Step 2. **Do not use a lower value.** Measure this resistance with the VOM and record the actual value accurate to hundredths of an ohm. This value will be referred to as MIN REF OHMS.

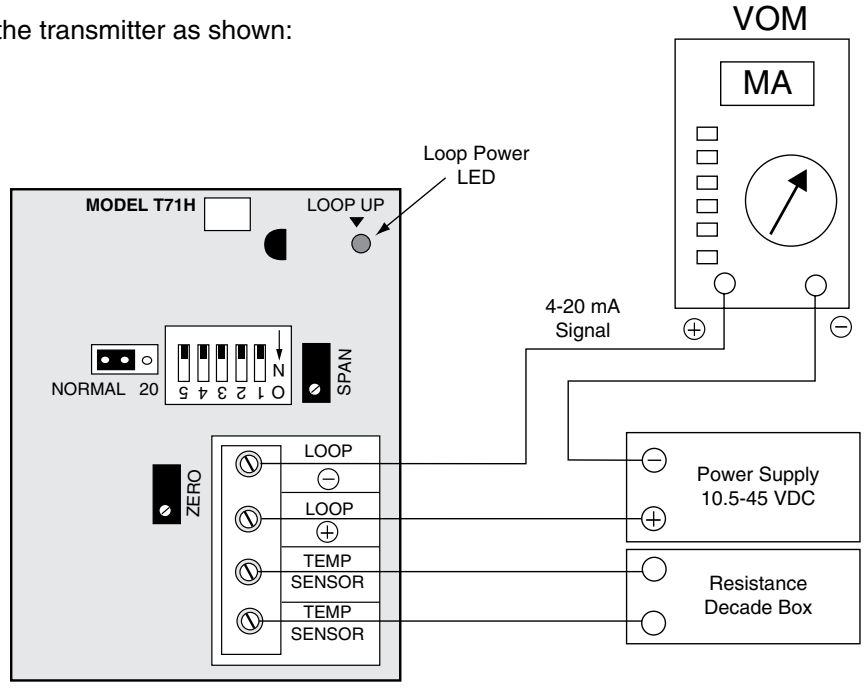
Select a resistance value within one ohm of the high temperature ohms in Step 3. **Do not use a higher value.** Measure this resistance with the VOM and record the actual value accurate to hundredths of an ohm. This value will be referred to as MAX REF OHMS.
Calculate the low mA reference:

$$\text{LOW MA REF} = \frac{\text{MIN REF OHMS} - \text{LOW TEMP OHMS}}{\text{CAL FACTOR}} + 4$$

Calculate the high mA reference:

$$\text{HIGH MA REF} = \frac{\text{MAX REF OHMS} - \text{LOW TEMP OHMS}}{\text{CAL FACTOR}} + 4$$

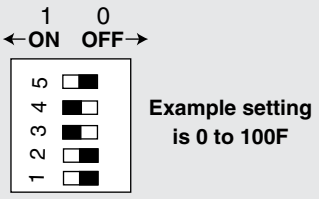
Step 5 Connect the transmitter as shown:



Step 6 Set DIP switches 1-5 by following these two steps:

6a **Set DIP switches 1 and 2 according to desired ZERO setting.**

DESIRED ZERO	SWITCH 1	SWITCH 2
-30° to 30°F (-34° to -1°C)	Off	Off
30° to 90°F (-1° to 32°C)	Off	On
90° to 150°F (32° to 66°C)	On	Off
150° to 210°F (66° to 99°C)	On	On



Example setting is 0 to 100F

Note: If the desired ZERO is very close to a range boundary and after Step 7 you cannot adjust the ZERO to the desired setting, change the switch setting to the next range and readjust the potentiometer.

6b **Set DIP switches 3, 4, and 5 according to desired SPAN (HIGH TEMP - LOW TEMP) setting:**

DESIRED SPAN (Hi-Lo) = Span	SWITCH 3	SWITCH 4	SWITCH 5
40° to 90°F (22° to 50°C)	On	On	On
90° to 120°F (50° to 67°C)	On	On	Off
120° to 150°F (67° to 83°C)	On	Off	On
150° to 180°F (83° to 100°C)	On	Off	Off
180° to 200°F (100° to 111°C)	Off	On	On
200° to 230°F (111° to 128°C)	Off	On	Off
230° to 250°F (128° to 139°C)	Off	Off	On
250° to 280°F (139° to 156°C)	Off	Off	Off

Note: If the desired SPAN is very close to a range boundary and you cannot adjust the SPAN to the desired setting, change the switch setting to the next range and readjust the potentiometer.

Examples: **Desired Range:** **0° to 100°F (-18° to 38°C) Set switches 1-5; 00110**
-20° to 140°F (-29° to 60°C) Set switches 1-5; 00100
30° to 240°F (-1° to 116°C) Set switches 1-5; 00010
-10° to 90°F (-23° to 32°C) Set switches 1-5; 00110

Preset: T91U-2 (00100), T91U-3 (00110), T91U-4 (00010)

Special Notes on Field Calibration

The accuracy of a field-calibrated RTD transmitter is highly dependent on the accuracy of the ohmmeter used to measure the sensor substitution resistances (MIN and MAX REF OHMS). **The percent accuracy of the calibrated RTD transmitter is <u>not</u> the same as the percent accuracy of the ohmmeter.**

OHMMETER ACCURACY	TRANSMITTER ACCURACY	
(% of reading)	Low Temp	High Temp
1%	±4°F	±7°F
0.5%	±2°F	±3.5°F
0.25%	±1°F	±1.8°F
0.1%	±0.4°F	±0.7°F
0.05%	±0.2°F	±0.36°F

A Fluke Model 87 should provide an accuracy of approximately ±1.4°F at low temperatures and ±1.9°F at high temperatures.
A Fluke Model 8060 should provide an accuracy of approximately ±0.4°F at low temperatures and ±0.6°F at high temperatures.