

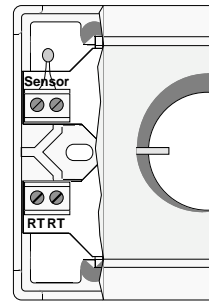
The tekmar RTU's (Room Temperature Units) combine a sensor and an adjustment for indoor temperature control when used with a tekmar heating system control. Outside dimensions: 4-1/2" H x 2-3/4" W x 7/8" D (114 H x 70 W x 22 D mm)

### RTU's 305, 307, 309, 310, 312

RTU type	Application	Thermistor	For tekmar control type	Temperature adjustment range
305	General comfort control	2000Ω @ 77°F (25°C), Curve 7 NTC thermistor	228 — 233, 245, 251, 252, 354	40 to 80°F (4 to 27°C)
307	General comfort control		228 — 233, 245, 251, 252, 354 240	62 to 75°F (16 to 24°C) 59 to 79°F (15 to 26°C)
309	Warehouse, etc.		240 only	32 to 72°F (0 to 22°C)
310	Swimming pool deck		228 — 233, 245, 251, 252, 354	68 to 104°F (20 to 40°C)
312	Greenhouse		240 only	50 to 90°F (10 to 32°C)

#### Installation

- The RTU is normally installed on an interior wall of the building. Do not mount the RTU near a heat source (e.g. sunlight through a window, a fireplace, etc.) or in a drafty area (e.g. near an exterior door or a window) unless the sensor element is mounted remotely in a suitable location.
- Remove the cover of the RTU by grasping and pulling at its top and bottom. The base can be attached to the wall or a standard electrical box by two screws.
- Connect a two wire conductor to the RTU at the terminals labelled "RT & RT", and connect the other end of these wires to the terminals of the control. (See the control's data brochure).
- Install the cover of the RTU back onto the base. Set the RTU to the desired room temperature.

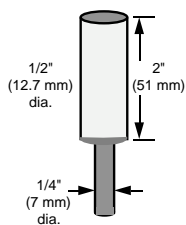


Types 305, 307, 309, 310, 312 connections

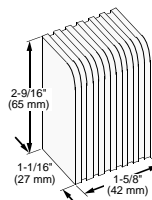
#### Option

- For remote temperature measurement away from the RTU's location remove the thermistor from the terminals labelled "Sensor" and connect a remote sensor type 313, 317, 318, 321 or 324 to those terminals.

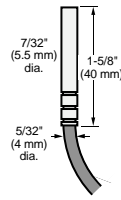
### Sensors 313, 317, 318, 321, 324



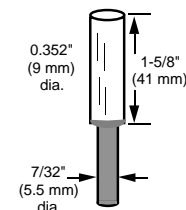
**Type 313 Slab Sensor**  
2kΩ at 77°F(25°C) NTC thermistor embedded in an epoxy filled plastic case. • Supplied with 20 ft (6 m) of teflon jacketed cable. • Maximum cont. cable temperature 250°F (125°C). • Operating temperature range -60 to 200°F (-50 to 95°C).



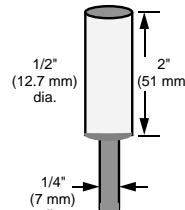
**Type 317 Outdoor Sensor**  
White polycarbonate enclosure with terminal block and 2kΩ at 77°F(25°C) NTC thermistor. • Maximum continuous case temperature 160°F (70°C). • Operating temperature range -60 to 160°F (-50 to 70°C).



**Type 318 Sensor**  
2kΩ at 77°F(25°C) NTC thermistor in a copper case. • Supplied with 6 ft (1.8 m) of cable. • Maximum continuous cable temperature 185°F (85°C). • Operating temperature range -5 to 195°F (-20 to 90°C).



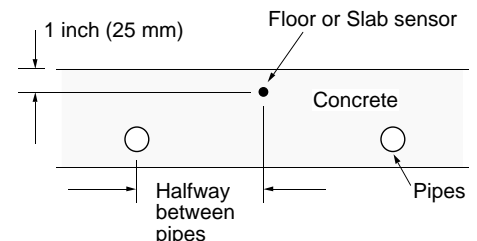
**Type 321 Sensor**  
2kΩ at 77°F(25°C) NTC thermistor embedded in an epoxy filled aluminum case. • Supplied with 6 ft (1.8 m) of PVC cable. • Maximum continuous cable temperature is 195°F (90°C). • Operating temperature range -5 to 195°F (-20 to 90°C).



**Type 324 Slab Sensor**  
2kΩ at 77°F(25°C) NTC thermistor embedded in an epoxy filled plastic case. • Supplied with 40 ft (12 m) of teflon jacketed cable. • Maximum cont. cable temperature 250°F (125°C). • Operating temperature range -60 to 200°F (-50 to 95°C).

#### Special note for installation of a sensor in a floor or driveway

Install the Slab Sensor type 313 or 324 in the heated surface halfway between the heating pipes and 1 inch below the surface as shown in the adjacent diagram. The sensor should be approximately 3 feet (1 m) away from the edge of the heated area, in the travelled area, and not under a planter or some furniture. The surface should be finished so that a puddle doesn't form above the sensor, otherwise the evaporated water will cool that small floor area and the control will compensate by increasing the temperature of the whole heated area.



## Testing the RTU's and Sensors

### For testing the installed RTU:

- Turn the dial of the RTU to its **mid-range position** and unplug the tekmar control from its socket.
- With an ohmmeter, measure between the terminals where the RTU wires are connected to the controls' socket. At various sensor (room) temperatures the ohmmeter readings should be as listed in the following table; if not, then check that the thermistor or sensor is properly connected in the terminals marked "sensor".

**Caution:** Check for voltage at the RTU wires by disconnecting the wires from the control and measuring between the RTU wires themselves and between the RTU wires and ground. Voltage should never be present under these conditions.

RTU type	Temperature	Resistance	Temperature	Resistance	Temperature	Resistance
305	40°F (4°C)	2700 ohms	60°F (15°C)	2350 ohms	80°F (27°C)	2000 ohms
307	50°F (10°C)	3210 ohms	68°F (20°C)	2420 ohms	86°F (30°C)	1870 ohms
309	32°F (0°C)	2920 ohms	50°F (10°C)	2470 ohms	68°F (20°C)	2050 ohms
310	68°F (20°C)	3530 ohms	86°F (30°C)	2770 ohms	104°F (40°C)	2260 ohms
312	50°F (10°C)	3000 ohms	70°F (21°C)	2420 ohms	90°F (32°C)	1960 ohms

### To test the sensors:

- Using an ohmmeter measure the resistance between the sensor wires.
- The table below lists the expected resistance values at various sensor temperatures.
- The resistance between ground (the pipes) and the wires should be greater than 1,000,000 ohms.

**Caution:** Check for voltage at the sensor wires. When the sensor wires are disconnected from the control, no voltage should ever be present between the sensor wires themselves or between the sensor wires and ground.

Sensor temperature		Resistance	Sensor temperature		Resistance	Sensor temperature		Resistance
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-50	-45	59,000	50	10	3,700	150	65	500
-30	-35	33,000	70	20	2,400	170	76	360
-10	-23	17,000	90	32	1,500	190	88	250
10	-12	10,000	110	43	1,000	210	100	180
30	0	5,600	130	54	720	230	110	140

## Limited Warranty and Product Return Procedure

**Limited Warranty:** tekmar warrants to the original purchaser each tekmar product against defects in workmanship and materials when the product is installed and used in compliance with tekmar's instructions. This limited warranty covers the cost of parts and labour provided by tekmar to correct defects in materials and/or workmanship. Returned products that are fully operational are not considered a warranty case. tekmar also does not cover parts or labour to remove, transport or reinstall a defective product. tekmar will not be liable for any damage other than repair or replacement of the defective part or parts and such repair or replacement shall be deemed to be the sole remedy from tekmar. This warranty shall not apply to any defects caused or repairs required as a result of unreasonable or negligent use, neglect, accident, improper installation, or unauthorized repair or alterations. In case of defect, malfunction or failure to conform to warranty, tekmar will, for a warranty period of 24 months from the date of invoice to the original purchaser or 12 months from the date of installation of the product, whichever occurs first, repair, exchange or give credit for the defective product. Any express or implied warranty which the purchaser may have, including merchantability and fitness for a particular purpose, shall not extend beyond 24 months from the date of invoice or 12 months from the date of installation of the product, whichever occurs first.

**Replacements:** tekmar can send replacement products if requested. All replacements are invoiced. Any possible credit for the replacement will only be issued once the replaced product has been returned to tekmar.

**Product Return Procedure:** Products that are believed to have failed must be returned to tekmar Control Systems Ltd. 4611-23rd Street, Vernon B.C. Canada V1T 4K7 when agreed to by tekmar. The installer or other qualified service person must, at the owner's expense, determine which component has failed. The product must be returned complete with

all of its components (sensors, base, etc.). Products must be returned together with the proof of purchase to the original purchaser who then returns the product to tekmar after receiving a Return Goods Authorization (RGA) number from tekmar.

Please include the following information with the product. The full address of the original purchaser, the RGA number and a description of the problem.

From the U.S.A., in order to avoid customs charges, products must be returned via US Post with the package clearly marked with the RGA number, product type and the statement "Canadian Product returned for repair". For shipping purposes the product can be valued at one half list price.

- 1) If returned during the warranty period and the product is defective, tekmar will issue full credit for the returned product less cost of missing parts.
- 2) If returned during the warranty period and the product is fully operational, tekmar will return the product to the original purchaser for a testing cost of \$30.00 plus postage.
- 3) If returned during the warranty period and the product is not damaged and is fully operational, tekmar can take back the product for a return charge of 40% of the product's net value. This request has to be specified otherwise the product will be returned with a testing cost of \$30.00 plus postage.
- 4) If returned after the warranty period and the product needs repair, tekmar will repair and return the product. Repair and postage costs will be invoiced. tekmar's repair costs are calculated at \$30.00 / hour plus the cost of parts. If the repair costs will be more than \$60.00 a repair estimate will be sent to the original purchaser.

<b>In North America:</b>	tekmar Control Systems Ltd., Canada tekmar Control Systems, Inc., U.S.A. Head Office: 4611 - 23rd Street Vernon, B.C. Canada V1T 4K7 Tel. (604) 545-7749 Fax. (604) 545-0650
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