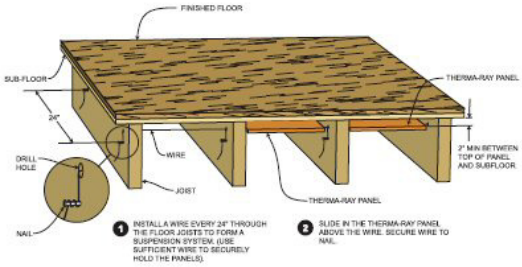
Under Floor Warming Installation Guide Using

ThermaRay Ceiling Panels

Whether you're a contractor, architect, builder or homeowner, creating the perfect indoor environment has always been a challenge. ThermaRay, the world's #1 name in thermal comfort systems introduces you to the ultimate heating solution.. Please take the time to read this installation guide carefully before you begin. Remember, accurate measurements are the key to success for a proper installation!



Install a wire every 24" through the floor joist to form a suspended system. Use sufficient wire to securely hold the panels.

Slide the ThermaRay panel above wire. Secure wire to the nail.

Drill holes in joists near the ThermaRay panel lead wires and connect wiring.

NOTE: This application is used in existing homes where the owner wants warm floors but does not want to replace the floor covering. The existing finished floor can be any type of wood flooring or natural stone finish such as ceramic tile, stone, slate, etc or vinyl flooring. Please check with the manufacturer of the floor covering for suitability for this application. Use under properly installed ceramic tile, stone or slate is perfectly acceptable.

This method is not recommended for floors with carpets.

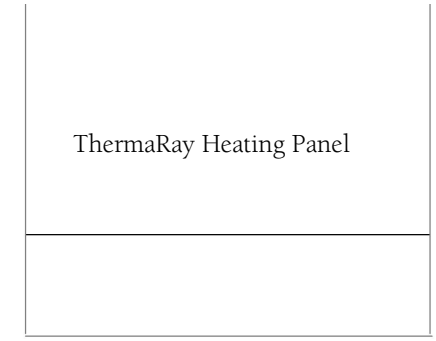
MECHANICAL INSTALLATION

ThermaRay panels are placed between the floor joists. Panels are to be installed in open, unobstructed floor joists. The panels are held in place by a wire (0.5cm). The panels must be a minimum of 2 inches from the floor. Drill holes through the joists so that you can install wire every 24 inches. Be sure to use sufficient wire to securely hold the panels in place. The number of panels needed should fill the floor joist spaces in the area to be heated. Do not install panels below cabinet, appliances etc. Slide the ThermaRay Ceiling Panels above the wire. Once the panels are in place, secure the wire to a nail or hook.

BRANCH CIRCUIT CONNECTION

Drill holes in the joists near the lead wires of the ThermaRay panel.

ThermaRay panels are connected in parallel to the branch circuit. Canadian installation shall be made according to the provision of Section 62 of the Canadian Electrical Code, part 1 and to regulations of all authorities having jurisdiction. U.S. installations are to be made in accordance with the National Electrical Code and local codes where applicable. Installations outside North America should conform to applicable local codes. The heater load, once determined, can be divided into as many circuits as needed. 12AWG (2.0 mm) copper conductor, non-metallic sheathed cable is recommended for installation of panels. In areas where type NM cable is not permitted, metal enclosures are available for use with rigid or flexible, metallic conduit or tubing. (See Installation Instructions Supplement for Metal Wiring Enclosures.) When determining the number of branch circuits required to accommodate the heating load, note that the branch circuit must be de-rated in accordance with either the Canadian Electric Code, National Electrical Code, or local coded as applicable. It is not recommended that wire size greater than 12AWG (2.0 mm) be used to connect the panels to the branch circuit. After the panels are secured in



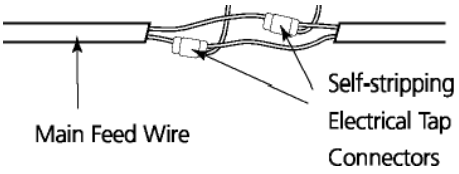
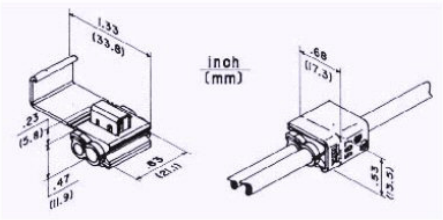
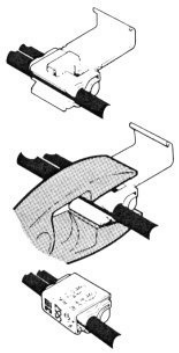


Diagram 2 *Connection the main feed to the individual panel is easily done using tap-on connectors. Note that ONLY the outer insulation jacket of the main feed is removed.*

3M567 Self Stripping Electrical Tap Connectors





INSTRUCTIONS

Use only with insulated wire. Do not strip insulation.

1. Slip circuit (run) wire into side slot. Insert fixture (tap) wire up to stop.
2. Make connection with 9" electrician's (lineman's) pliers, by driving "U" contact down flush with top of connector.
3. Close hinged cover until it locks.

place and the number of branch circuits determined, they are connected to the branch circuit. For proper performance ensure the supply voltage matches the voltage stamped on the panel. DO NOT connect heating panel to a higher voltage. Connection to lower voltages is permitted, but will cause the panel to operate at a reduced wattage and may lead to a system with insufficient capacity to heat the intended area. The supply wire of 12AWG (2.0mm) non-metallic cable is connected to the transient lead (pigtail lead) of the heater panels with 3M Scotchlok® self-stripping electrical tap connectors (Type 567). **(See Diagram 2).** Upon completion of the wiring assembly, the panel connectors are visible and available for inspection by local authorities.

PANEL OPERATION TEST

Each heater has been individually checked at the factory. After panel installation, the entire circuit should be tested, to check the on-site electrical work. Two methods of testing will be discussed in the following paragraphs.

Full Power Available- Apply rated voltage to the heater load circuit. Branch loads are to be read with a suitable ammeter. The ammeter value should be the same as that calculated for the heating load and, if the values agree, all panels are operating. If the values do not agree, installation should be re-checked. For a physical check without a meter, it is only necessary to feel the panels. If they are warm, they are working.

Without Power Available- This check of the panel installation requires the use and knowledge of an ohmmeter. A resistance measurement is taken at the load circuit, with all other circuits isolated. This will give the total resistance of the heater load. Knowing the total heater load of the panel in watts and heater rated voltage, a simple calculation will give the same values as that read on the ohmmeter.

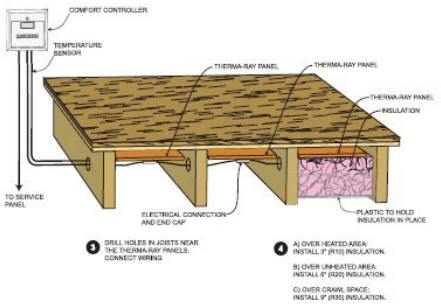
Example: for the branch circuit of 1500 watts and panel rated voltage of 240, the resistance will be 38.4 ohms:

$$\text{Formula: } \frac{\text{voltage} \times \text{voltage}}{\text{Wattage}} = \text{resistance in ohms, Example: } \frac{240 \times 240}{1500} = 38.4 \text{ ohm}$$

Final Installation

After inspection and completion of the equipment check, the wiring enclosure (Endcap) is completely filled with drywall ready-mixed compound, quick-setting drywall compound, or fireproof caulking compound. The Endcap is then placed over the connector and slid onto the panel. Alternatively, a bulk-loading caulking gun may be used to completely fill the enclosure from each end, after it has been mechanically attached to the panel.

To attach the Endcap to the panel, slide the Endcap over the panel, connectors and feed wire. Align the hole in the Endcap with the Fastener Line marked on the panel. The Fastener Line is located between (and marks the location of) the two cold panel connection leads. Then use the screw supplied with the Endcap to secure the Endcap to the panel. (Endcap, screw and connectors are available from the distributor for each panel).



The use of high quality ThermaRay Comfort Controllers are recommended for proper system performance and warranty. The sensor must be placed over a panel with a heat shield. The heat shield could be something as simple as a piece of aluminum foil. The heat shield stops the radiant heat from directly affecting the sensor, which in turn would affect temperature accuracy. The ThermaRay Comfort Controller can be placed anywhere that is convenient for the owner. Warning sticker must be attached to the electrical service panel. Ensure that all branch circuits supplying radiant heating are clearly marked as such.

Panel installation is now complete. Insulation must then be installed over an A) heated area use 3" (R10) insulation B) unheated area use 6" (R20) insulation C) crawl space use 9" (R30) insulation.

CAUTION:

- Panels must be turned off until joint compound has fully cured.
- ThermaRay panels must not be placed over wood framing members, partitions, cupboards, or other obstructions or come in contact with plastic piping.
- Cellulose insulation is not recommended unless it meets or exceeds standard CGSB 510GP-60M or equivalent and must not contact face of heater panel.
- Use only copper conductor supply wire.
- Do not install heating panels under a room over an unheated crawl space unless floor is properly insulated.

RESISTANCE TEST

WATTS	220V OHMS	230V OHMS	240V OHMS	WATTS	220V OHMS	230V OHMS	240V OHM	WATTS	220V OHMS	230V OHMS	240V OHMS
105	460.95	503.81	548.57	1300	37.23	40.69	44.30	2700	17.93	19.59	21.33
125	387.20	423.20	460.80	1350	35.85	39.19	42.66	2750	17.60	19.24	20.94
150	322.67	352.67	384.00	1400	34.57	37.79	41.14	2800	17.29	18.89	20.57
175	276.57	302.29	329.14	1450	33.38	36.48	39.72	2850	16.98	18.56	20.21
200	242.00	264.50	288.00	1500	32.27	35.27	38.40	2900	16.69	18.24	19.86
225	215.11	235.11	256.00	1550	31.23	34.13	37.16	2950	16.41	17.93	19.52
250	193.60	211.60	230.40	1600	30.25	33.06	36.00	3000	16.13	17.63	19.20
275	176.00	192.36	209.45	1650	29.33	32.06	34.90	3050	15.87	17.34	18.88
300	161.33	176.33	192.00	1700	28.47	31.12	33.88	3100	15.61	17.06	18.58
350	138.29	151.14	164.57	1750	27.66	30.23	32.91	3150	15.37	16.79	18.28
400	121.00	132.25	144.00	1800	26.89	29.39	32.00	3200	15.13	16.53	18.00
450	107.56	117.56	128.00	1850	26.16	28.59	31.13	3250	14.89	16.28	17.72
500	96.80	105.80	115.20	1900	25.47	27.84	30.31	3300	14.67	16.03	17.45
550	88.00	96.18	104.72	1950	24.82	27.13	29.53	3350	14.45	15.79	17.19
600	80.67	88.17	96.00	2000	24.20	26.45	28.80	3400	14.24	15.56	16.94
650	74.76	81.38	88.61	2050	23.61	25.80	28.09	3450	14.03	15.33	16.69
700	69.14	75.57	82.28	2100	23.05	25.19	27.42	3500	13.83	15.11	16.45
750	64.53	70.53	76.80	2150	22.51	24.60	26.79	3550	13.63	14.90	16.22
800	60.50	66.13	72.00	2200	22.00	24.05	26.18	3600	13.44	14.69	16.00
850	56.94	62.24	67.76	2250	21.51	23.51	25.60	3650	13.26	14.49	15.78
900	53.78	58.78	64.00	2300	21.04	23.00	25.04	3700	13.08	14.30	15.56
950	50.95	55.68	60.63	2350	20.60	22.51	24.50	3750	12.91	14.11	15.36
1000	48.40	52.90	57.60	2400	20.17	22.04	24.00	3800	12.74	13.92	15.15
1050	46.10	50.38	54.85	2450	19.76	21.59	23.51	3850	12.57	13.74	14.96
1100	44.00	48.09	52.36	2500	19.36	21.16	23.04	3900	12.41	13.56	14.76
1150	42.09	46.00	50.08	2550	18.98	20.75	22.58	3950	12.25	13.39	14.58
1200	40.33	44.08	48.00	2600	18.62	20.35	22.15	4000	12.10	13.23	14.40
1250	38.72	42.32	46.08	2650	18.26	19.96	21.73				

FLOOR PANEL SYSTEM

CATALOGUE#	WATTS	LENGTH '	WIDTH "	WEIGHT LBS
RC8A130-240	130	8	9	10.2
RC6A095-240	95	6	9	7.7
RC4A070-240	70	4	9	5.1
RC7B150-240	150	7	12	11.9
RC6B130-240	130	6	12	10.2
RC5B105-240	105	5	12	8.5
RC4B085-240	85	4	12	6.8
RC3B070-240	70	3	12	5.1
RC7C230-240	230	7	18	17.9
RC6C195-240	195	6	18	15.3
RC5C160-240	160	5	18	12.8
RC4C130-240	130	4	18	10.2
RC3C095-240	95	3	18	7.7
RC2C070-240	70	2	18	5.1

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100, 120, 200, 208, 220, 230, 240, 277 volts available.

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ACCESSORIES

PC-1	Plastic Endcap
MC-2	Metal Endcap for use with conduit
3M567	Connector for #12-2 wire
SR Sensor	15' sensor
SR-LV	ThermaRay Comfort Controller Low Voltage (Note: must be used with ThermaRay Distribution panels.)
SR-240/120	ThermaRay Comfort Controller c/w power module (240/120 V)

ThermaRay Distribution Panels:

SRDP2-10-10	10 communication ports for controls & 10 relays
SRDP2-10-20	10 communication ports for controls & 20 relays
SRDP2-20-20	20 communication ports for controls & 20 relays