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1.0 Product Specifications

WarmlyYours Heating Cable is designed for outdoor driveways, walkways, stairs and patios. It is well suited for large areas like driveways.

The Heating Cable is comprised of a dual, multistrand heating element with a primary insulation of Fluoropolymer. The insulated core is then protected with a woven metal braid and an outer jacket of PVC, EPR or Zero Halogen Polyolefin based compound to make it sturdier and to provide corrosion protection. These cables are terminated with 20' (6.1m) for 120V/240V or 50' (15.2m) for 208V/277V long standard cold leads. The hot and cold junction is uniquely designed to make it 100% fool proof.

The Snow Melting Mat is a cable in mat (1.25" x 1.25" mesh openings) construction which consists of the Heating Cable taped on a Polypropylene (PP) mat. The Heating Cable is laid in a serpentine fashion so that it is equally spaced and distributed on the (PP) mat.

Available in a wide range of capacities and sizes to suit your requirements, the Snow Melting Mats and Heating Cables are identified as indicated below.

Item Number: AAAA-BBB-CCCC

Ex: Item Number: WHMA-240-0250

(product type) (voltage) (width & length = 2'x50')

- AAAA = WHMA for Snow Melting Mat, WHCA for Snow Melting Cable
- BBB = Operating Voltage available in 120V, 208V, 240V and 277V
- CCCC = Mat width in ft. (first two digits) and Mat length in ft. (third and fourth digits) for Snow Melting Mat, Cable length in ft. for Snow Melting Cable

The available sizes of Snow Melting Mats are shown in Appendix A. The available lengths of Snow Melting Cables are shown in Appendix B. Both Appendices include the following attributes for each Item Number.

- Product Type
- Operating Voltage
- Cable Length
- Mat Width and Length
- Total Ohms
- Total Watts
- Watts/Ft for Cable or Watts/Sq Ft for Mats
- Amps

2.0 Selection of the Heating System

Selection of your Heating System will depend on the application. The following can be taken as a general guide:

Install Chart

Application	Watts per Sq.Ft. (per Sq.M.) - Cable spacing inches (mm)	Multiplier at given spacing
Outdoor Snow Melting	45 to 55 W/ft ² (484 to 592 W/m ²) Recommended spacing 3" (76mm).	4.0 at 3" (76mm)

Formula: Area of Application x Multiplier at given cable spacing = Heated Cable Length required

Example 1 (English): 100 sq.ft of Outdoor Snow Melting x 4.0 at 3" spacing = 400 feet of Heated Cable required

Example 2 (Metric): 9.3 sq.m of Outdoor Snow Melting x 4.0 at 76mm spacing = 122m of Heated Cable required

Please note the above-indicated values are meant as a general guide. Your values may vary depending on a number of factors. Please consult your Account Manager for assistance.

3.0 Important Instructions before Installing the System

1. Heating Cable must not cross or overlap itself at any point. This could cause the Cable to overheat, requiring replacement.
2. The Heating Cable length should not be cut or altered under any circumstances. This may cause over-heating resulting in damage to the Cable.
3. The cold lead can be cut or extended with a conventional splice, inside of an accessible junction box (weatherproof if outdoors).
4. Take precautions to avoid damage to Heating Cable during installation. Do not drive over cable. Duct tape the ends of shovels. Do NOT saw expansion joints, without having lines marked off clearly with spray paint, where installer has verified that Heating Cables will not be cut. Do NOT damage Cables with heavy equipment, machinery or vehicles. Do not walk on splices, do not bend splices.
5. Heating Cables should be separated from other heat sources such as luminaries and chimneys.

6. Do not install the Heating Cable below 5° F (-15° C) ambient temperature.
7. Minimum bending radius of the Heating Cable shall not be less than 10 times its diameter.
8. Minimum spacing of Cables is 3" (76 mm) and maximum spacing of Cables is 3.5" (89 mm). As spacing distance of wire increases, watts per square foot decrease.
9. Twin Conductor Heating Cable has a ground braid (metal sheath) to be connected to ground and 2 conductors which are to be connected to the power supply.
10. Double check the voltage and wattage of the Heating Cable received against the project specifications on your custom installation plan. These are marked on the packing box of the product. A qualified electrician should connect the Heating System.
11. A digital Ohm meter and a Megohmmeter (Insulation Tester) will be needed to properly install the system. Check the continuity, resistance and insulation resistance of the Heating Cable before installing and also after installing. Resistance value should match the value shown in Appendix A on page 9 & 10. A tolerance of -5% to +10% is allowed. Insulation resistance should be infinity.
12. Keep high voltage power wires in a separate conduit from low voltage wires.
13. Allow sufficient drying or curing period of the concrete / asphalt after installing the Heating System and before energizing the Heating System.
14. For easy reference, affix a label at the power distribution board indicating the location of the heating units installed.
15. The National Electric code requires that the heating cables be installed over a base of at least 2" of substantial masonry or asphalt, and have at least 1.5" of the same installed over the cable. Our recommendations are based on these NEC standards.

WARNING

16. The Cable must NOT be shortened or cut in any manner or subjected to strain at the splice joint.
17. NEVER power-up Heating Cables prior to being buried in concrete, asphalt or in mortar (even for testing purposes). This will prevent premature failure of the Heating Cable.



Heating Cable must not cross or overlap itself at any point. This could cause the Cable to overheat, requiring replacement.

4.0 Installation for Snow Melting

4.1 Control of Snow Melting System

A control suitable for Snow Melting systems with pavement mounted or aerial mounted sensor should be used for Snow Melting applications, when not using a Timer.

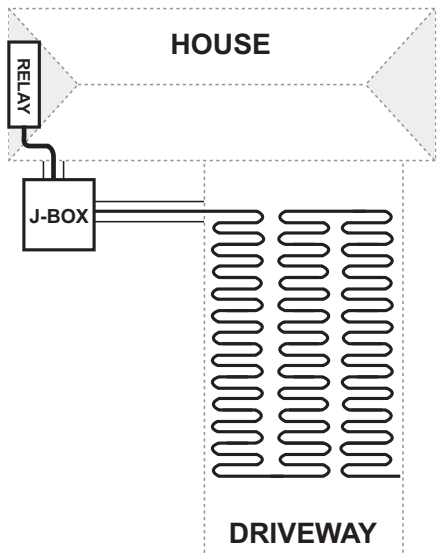
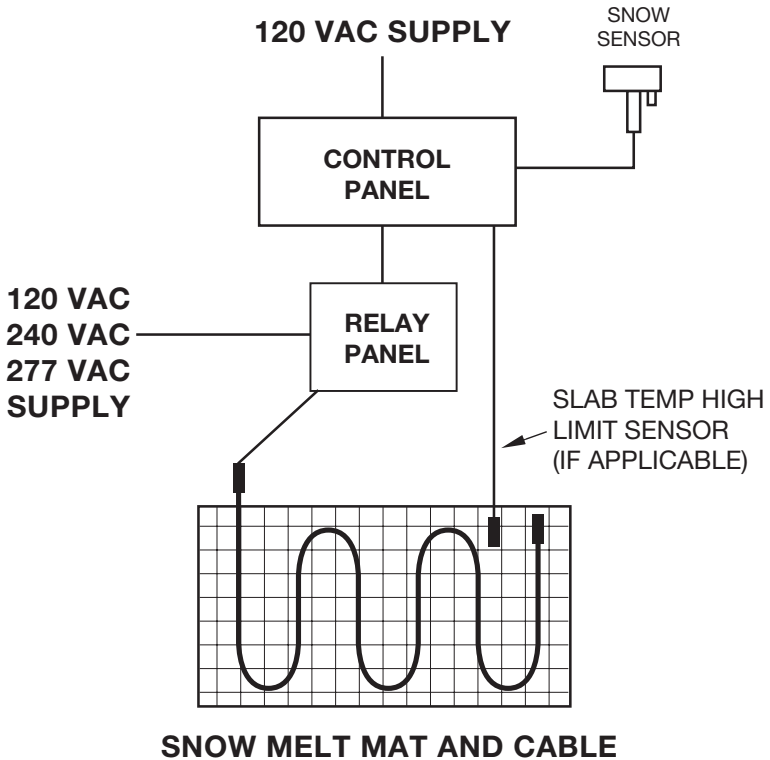
4.2 Electrical Provisions for the Systems

The National Electric Code requires that the heating cables and mats must be supplied power by a GFEP (30mA) protected circuit.

The Snow Melting system installation wiring shall be in accordance with the National Electric Code and prevailing local codes.

The snow / moisture sensor cable and the Heating Cable cold leads shall be routed to the power connection box in separate conduits.

Breaker Size (Amps)	Max Design Load (Amps)
40	32
30	24
20	16
15	12



4.3 Installation under Asphalt

1. Ensure that the paving contractor has a solid base of 4" to 8" (102 mm to 203 mm) of crushed rock aggregate tamped down and ready to receive the asphalt.
2. It is extremely important that the paving installer does NOT use any heavy equipment, machinery, or vehicles over the exposed Heating Cable. Any tracked mechanical spreaders or dump trucks must be prohibited from running over exposed Heating Cable.
3. During this process of laying asphalt, installing the heating product, and laying more asphalt, it is the responsibility of the electrician to use a 500 VDC megohmmeter and a multi-meter to continuously check the Heating Cables that are being worked on top of, to ensure they have not been damaged.
- 4a. The paving installer should lay down the binder / base coat of asphalt and roller it smooth. The paving installer must decide if this binder coat of asphalt is allowed to cool before finishing with the top coat of asphalt. This should be coordinated with the installer of the Heating Cable or Mats. When working on top of hot asphalt, please consider pre-making "wire mesh heating Mats". This means rolling out the reinforcing wire mesh (provided by electrician) and pre-attaching the Heating Cable to it using wire ties (like rebar wire ties) that will not melt from the hot asphalt. These "wire mesh heating Mats" could be left in the yard next to the driveway while the first binder coat is poured. While the asphalt is still hot, two people could carry / drag each "wire mesh heating mat" over the hot asphalt, have it flipped over so that it is wire-side-down / mesh-side-up, and then staked down to the hot binder coat (stakes provided by electrician).
- 4b. If the paving installer decides to let the binder / base coat of asphalt cool prior to finishing with the top coat, then wire mesh is only needed for free-form type Heating Cable installations. WarmlyYours Snow Melting Mats may be staked down to the binder coat without using any wire mesh (stakes may only pierce the black plastic mesh, and should never make direct contact with the Heating Cable itself). Again, it's recommended that the Snow Melting Mat be laid down so it is wire-side-down / mesh-side-up, to help protect it from damage by shovels. When installing free-form type Heating Cable, stake wire mesh down to the binder / base coat first, and then attach the Heating Cable to it using wire ties. This means it is wire-side-up / mesh-side-down, so extra care must be taken by the paving installer to avoid damaging the Heating Cables with shovels or rakes used to spread the top coat of asphalt.
- 4c. When the binder coat is in place, it is sometimes easier (especially when installing tire track coverage) to have one person hold the roll of heating mat (wire side down) as hot asphalt is shoveled over it. as the area is covered the installer slowly unrolls the product until the remaining area is completed.
5. Once the heater cables are in place, the electrician must route the cold lead(s), (20' (6.1m) for 120V/240V or 50' (15.2m) for 208V and 277V provided per each Mat/Cable) through rigid metal conduit(s) or other approved means, to get back to an accessible weatherproof junction box(s). The electrician may supply junction boxes which can be accessed from above, so the rest of the box is buried to avoid damage by lawn mowers and/or vehicles. Care must be taken by the electrician so that none of the heated section of Cable enters the conduit(s). If a slab-mounted snow sensor will be used, this is the best time for placement. It should be located in an open area, away from trees or bushes, so that snow will easily fall directly on it. Separate conduit should be used to protect the low voltage sensor wire and must NOT be shared with any high voltage cold lead from the Heating Cables / Mats.
6. Once the Heating Cables and conduits are in place, and are attached by the methods listed, above the final top coat of asphalt may be poured. At least 2" (51mm) of material must cover the Heating Cable. The paving installer will be required to spread this around evenly with shovels and rakes. Shovels should be duct taped so the blade ends are less sharp. Again, the topping coat should be spread manually to avoid use of heavy machinery. The only time it is acceptable to use a mechanical asphalt spreader would be when it can straddle tire track coverage used for longer sloped driveways. Tire track coverage allows the spreader machine to be used without it ever making any direct contact with the Heating Cables.
7. Once the top coat of asphalt is spread over the Heating Cables evenly with at least 2" (51 mm) thick coverage, it may be rolled over with the steam roller to finish / flatten the driveway. Again, each Heating Cable / Mat must be tested with a multi-meter and 500 VDC megohmmeter to verify that they have not been damaged, and to ensure they will be ready for activation (final test) after the asphalt has cured. These values should be recorded on the warranty card on page 35.

4.4 Installation under Concrete

1. Ensure that the concrete contractor has installed a solid base of 4" to 8" (102 mm to 203mm) of crushed rock aggregate base and that it is tamped down and ready for the concrete pour. The dimensions of the openings in the snow melt rolls are 1 1/4" x 1 1/4". Use 3/4" or smaller aggregate in concrete when pouring over snow melt rolls.
2. It is extremely important that the concrete installer does NOT use any heavy equipment, machinery, or vehicles over the exposed Heating Cable. During concrete pours, it is recommended that care be taken to avoid stepping on the transition portion of cable, where the hot section (green) meets the cold section (black). This is the location of the factory splice. During this process of installing the heating product and pouring concrete, it is the responsibility of the electrician to use a 500 VDC megohmmeter and a multi-meter to keep checking on the Heating Cables that are currently being worked on top of, to ensure they have not been damaged, and will be ready for action once the concrete slab has cured.
3. For installations in stairs and ramps that will include hand rails, it is strongly recommended that the concrete installer pre-sleeve for the posts to avoid any and all drilling of the concrete. The Heating Cable must be routed around these sleeves or posts to avoid any direct contact with them. Heating Cables or Mats must not be allowed to pass thru expansion joint locations. It is recommended that lines are spray painted on the finished concrete surface by the electrician to mark off exactly where expansion joints may be located. It is the responsibility of the electrician and the concrete installer to coordinate their efforts so they avoid saw-cutting or drilling thru Heating Cables that are no longer visible beneath the concrete. Following the proposed installation plan from WarmlyYours will help to ensure this process goes smoothly.
- 4a. For Two-Pour Installations: The concrete installer pours the first 2" to 3" (51mm to 76mm) of concrete. While this first pour is still wet, rebar or wire-mesh should be placed on top of the first pour. The Snow Melting Mats / Cables should be attached to the rebar / mesh with plastic zip ties, using 3" to 4" (76mm to 102mm) spacing for free-form type cable. At this time, the electrician must route the cold lead(s) thru rigid metal conduit(s) or other approved means, to get back to an accessible weatherproof junction box(es). Care must be taken by the electrician so that none of the heated section enters any conduit. If a slab-mounted snow sensor will be used, this is the best time for placement. It should be located in an open area away from trees or bushes so that snow will easily fall directly on it. Separate conduit should be used to protect the low voltage sensor wire and must NOT be shared with any high voltage cold lead from the Heating Cables / Mats. Once conduits & sensor(s) are placed, the topping pour of concrete can be finished. Again, the concrete installer(s) must take care not to walk on the hot-cold splice point, and to avoid damaging the Heating Cables with shovels and rakes. Taping up the shovel blades helps make them less sharp. Like with asphalt, it's recommended that Mats be placed so the mesh faces up, keeping the wire-side-down to help protect it from shovels.
- 4b. For Single-Pour Installations: The wire mesh or rebar is first placed by the concrete installer or electrician. The electrician then must attach the Heating Cable to the rebar / mesh with plastic zip ties using 3" to 4" (51mm to 76mm) spacing for free-form type cable. Then the rebar / mesh must be propped up with concrete rubble, wire chairs, or brick pavers to the appropriate depth so that Heating Cable / Mat ends up 2" to 3" (51mm to 76mm) from finished surface and no deeper. Once rebar / mesh / Heating Cable is all propped up, the electrician must route the cold leads(s) thru rigid metal conduit(s) or other approved means, to get back to an accessible weatherproof junction box (es). Care must be taken so that none of heated section enters any conduit. If a slab-mounted snow sensor will be used, this is the best time for placement. It should be located in an open area, away from trees or bushes, so that snow will easily fall directly on it. Separate conduit should be used to protect the low voltage sensor wire and must NOT be shared with any high voltage cold lead from the Heating Cables / Mats. Once conduits & sensor(s) are placed, the pour of the concrete can be finished in one step. The concrete installer(s) must take care not to walk on the hot-cold splice and to avoid damaging the Heating Cables with shovels and rakes. Mats should be placed mesh facing up, keeping the wire-side-down, to help protect it from the shovels and rakes.
5. The electrician needs to complete final testing of all the Heating Cables / Mats with a multi-meter and a megohmmeter to verify and record that each Heating Cable has survived the pour of concrete and is ready for action once the concrete is cured. These values must be recorded on the warranty card on page 35.

4.5 Installation under Pavers (Stone or Brick)

1. Ensure that there is a solid base of 4" to 8" (102mm to 203mm) of crushed rock aggregate base and that it is tamped down and ready to receive the mortar pour.
2. It is extremely important that the paver installer does NOT use any heavy equipment, machinery, or vehicles over the exposed Heating Cable. During the paver installation process, it is recommended that care be taken to avoid stepping on the hot-cold factory splice portion of cable (green meets black). It is the responsibility of the electrician to use a 500 VDC megohmmeter and a multi-meter to continuously check on the Heating Cables that are currently being worked on top of, to ensure they have not been damaged, and will be ready for action once the mortar pour has cured.
3. For installations in stairs and ramps that will include hand rails, it is strongly recommended that the paver installer pre-sleeve for the posts to avoid any and all drilling of the mortar. The Heating Cable must be routed around these sleeves or posts to avoid any direct contact with them. It is the responsibility of the electrician and the paver installer to coordinate their efforts so they avoid saw-cutting or drilling thru Heating Cables that are no longer visible beneath the mortar.
4. The paver installer or electrician should place wire mesh (like would be used in concrete) down on top of the crushed rock aggregate. The mesh should be staked down firmly to the crushed rock so it remains flat. Next, the Heating Cable or Mats should be attached to the mesh using wire ties to maintain proper depth and spacing, 3" (76mm) for free-form type Cable. Reference the WarmlyYours custom installation plan provided with quotation so that this process goes smoothly.
5. At this time, the electrician must route the cold lead(s) thru rigid metal conduit(s) or other approved means, to get back to an accessible weatherproof junction box(es). Care must be taken by the electrician so that none of the heated section (green) enters any conduit. For this type of application, we recommend using an aerial mounted snow sensor to avoid having to cut around a circular slab mounted sensor (this could cause a trip hazard or premature paver crumble). Once the conduit(s) is in place, the product is ready to receive the mortar pour or sand, or limestone screenings.
6. Care must be taken by the paver installer so the mortar covers the Heating Cables / Mats and they will not make direct contact with the pavers. We recommend that at least 1" (25mm) thick mortar is poured over the Heating Cables / Mats, but no more than 1.5"(38mm). If using sand or limestone screenings, cover to an uncompacted depth of 1.5" (38mm), leveled to grade.

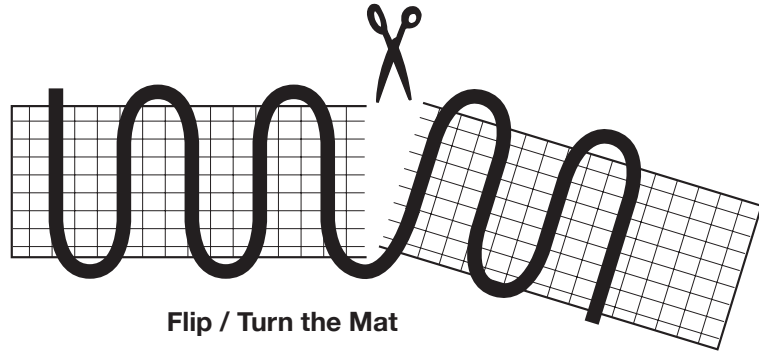
7. The paver installer(s) must take care not to walk on the hot-cold factory splice and to avoid damaging the Heating Cables with shovels or rakes. Mats should be placed mesh facing up, keeping the wire-side-down, to help protect them from shovels.
8. The electrician needs to complete final testing of all the Heating Cables / Mats with a multi-meter and a megohmmeter to verify and record that each Heating Cable has survived the pour of mortar, and is ready for action once the mortar is cured. These values must be recorded on the warranty card on page 35.
9. If sand or limestone screenings are used instead of mortar, avoid dropping pavers onto the surface, as doing so may damage the heating cables.

WARNING

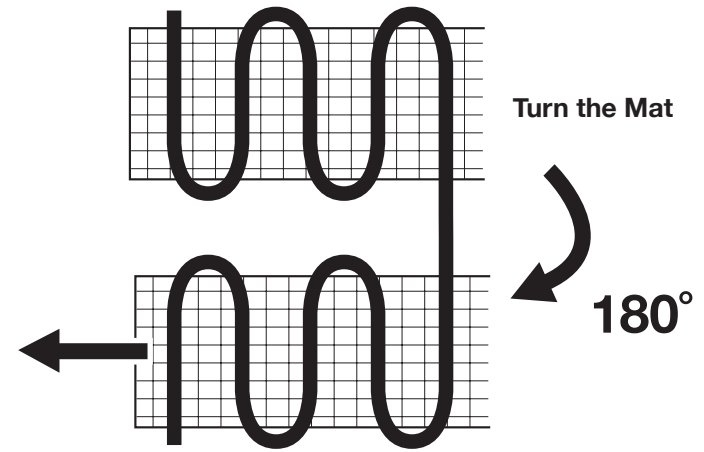
1. Brick and Stone Pavers must NOT be any thicker than 2.5" (63.5mm).
2. We do not recommend tire track coverage when using pavers

4.6 Installation of Snow Melting Mat

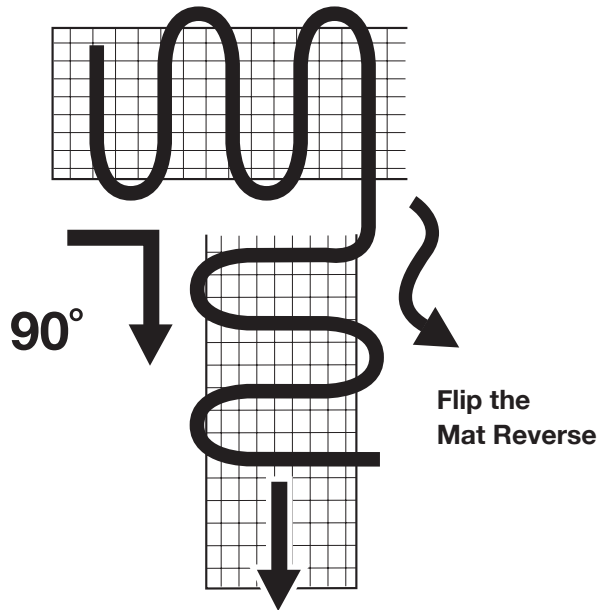
Use scissors to cut the Mat. NEVER cut the Heating Cable



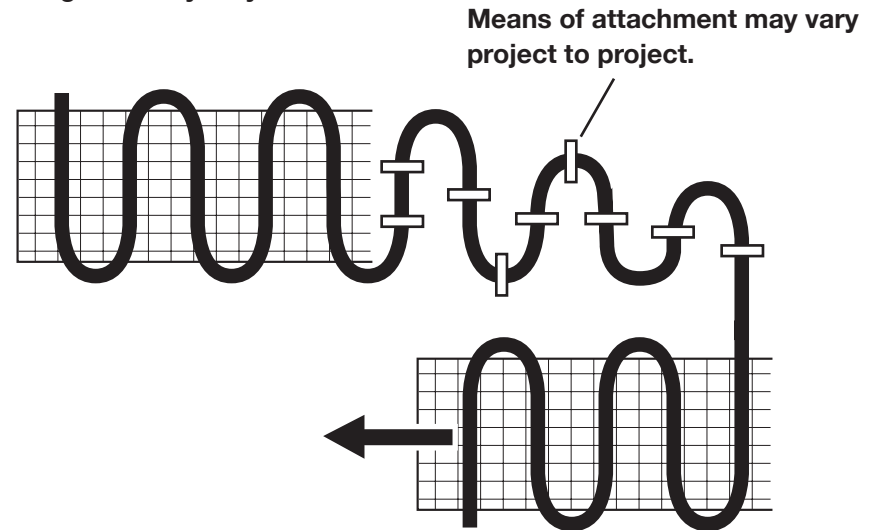
For 180 Degree Turn



For 90 Degree Turn



For other shapes, detach Cable from Mat to required length and lay only Cable.



5.0 Testing the Mats and Cable

5.1 Test One: Insulation Resistance (Megohmmeter Required)

1. Connect one meter clamp to the cold lead (pigtail) inner conductors and the other meter clamp to the metal cable braided sheath (ground) of the Heating Cable.
2. Test in accordance with the meter manufacturer's instructions. Recommended meter is a 500 VDC megohmmeter.
3. Megohmmeter reading should read infinity.
4. Record measured values on the warranty card on page 36. Perform this test before, during and after installation of the Heating Cables.

5.2 Test Two: Total Cable Resistance (Multi-Meter Required)

1. Connect one meter clamp to one cold lead (pigtail) inner conductor and the other meter clamp to the other cold lead (pigtail) inner conductor.
2. Test in accordance with the meter manufacturer's instructions and record this ohm value on the warranty card on page 36.
3. Total nominal cable resistance information is found on the CSA label, the bill of materials and Appendix A, or can be obtained by calling your WarmlyYours Account Manager. Actual reading should be within -5% - +10% of the cable resistance.
4. Record measured values on the warranty card on page 36. Perform this test before, during and after installation of the Heating Cables.
5. Please be sure that you write in the full part number of the Cable or Mat next to your results.

6.0 Warranty

WarmlyYours provides a warranty for the Heating Cables for a period of 10 years from date of purchase, covering the materials and workmanship under normal operating conditions.

In case of defective material, WarmlyYours obligation will be limited to the repair or supply of new material, free of charge to the customer.

The warranty does not cover installations made by unqualified persons or faults caused by incorrect design by others / misuse / damage caused by others / damage in transit / incorrect installation and any other subsequent damage that may occur. Costs related to repair / replacement will be fully chargeable to the customer if the damage is due to of any of the above reasons.

WarmlyYours is under no circumstances liable for consequential damages or losses including without limitations the loss or profit arising from any cause whatsoever. The guarantee is a material warranty only and does not cover field labor.

The warranty is void if there is any payment default and if data is not filled in on attached warranty card.

7.0 APPENDIX A:

WARMLYYOURS SNOW MELTING MATS (SUITABLE FOR ASPHALT, CEMENT AND UNDER PAVERS)

Part #	Size (ft/m)	Voltage	Area (ft ² /m ²)	Cable Length (ft/m)	Total Ohms	Total Watts	Watts/ft ² (W/m ²)	Amps
WHMA-120-0205	2' x 5' (0.61 x 1.52m)	120	10.0 (.93m ²)	42.77 (13.04m)	28.80	500	50.00 (538W/m ²)	4.17
WHMA-120-0305	3' x 5' (0.91 x 1.52m)	120	15.0 (1.39m ²)	62.78 (19.14m)	19.20	750	50.00 (538W/m ²)	6.25
WHMA-120-0210	2' x 10' (0.61 x 3.05m)	120	20.0 (1.86m ²)	85.54 (26.07m)	14.40	1,000	50.00 (538W/m ²)	8.33
WHMA-120-0310	3' x 10' (0.91 x 3.05m)	120	30.0 (2.79m ²)	125.56 (38.27m)	9.60	1,500	50.00 (538W/m ²)	12.50
WHMA-120-0215	2' x 15' (0.61 x 4.57m)	120	30.0 (2.79m ²)	128.31 (39.11m)	9.60	1,500	50.00 (538W/m ²)	12.50
WHMA-120-0315	3' x 15' (0.91 x 4.57m)	120	45.0 (4.18m ²)	188.34 (57.41m)	6.40	2,250	50.00 (538W/m ²)	18.75
WHMA-240-0210	2' x 10' (0.61 x 3.05m)	240	20.0 (1.86m ²)	85.54 (26.07m)	57.60	1,000	50.00 (538W/m ²)	4.17
WHMA-240-0215	2' x 15' (0.61 x 4.57m)	240	30.0 (2.79m ²)	128.31 (39.11m)	38.40	1,500	50.00 (538W/m ²)	6.25
WHMA-240-0220	2' x 20' (0.61 x 6.10m)	240	40.0 (3.72m ²)	171.08 (52.15m)	28.80	2,000	50.00 (538W/m ²)	8.33
WHMA-240-0230	2' x 30' (0.61 x 9.14m)	240	60.0 (5.57m ²)	256.63 (78.22m)	19.20	3,000	50.00 (538W/m ²)	12.50
WHMA-240-0240	2' x 40' (0.61 x 12.19m)	240	80.0 (7.43m ²)	342.17 (104.29m)	14.40	4,000	50.00 (538W/m ²)	16.67
WHMA-240-0250	2' x 50' (0.61 x 15.24m)	240	100.0 (9.29m ²)	427.71 (130.37m)	11.50	5,000	50.00 (538W/m ²)	20.87
WHMA-240-0310	3' x 10' (0.91 x 3.05m)	240	30.0 (2.79m ²)	125.56 (38.27m)	38.40	1,500	50.00 (538W/m ²)	6.25
WHMA-240-0315	3' x 15' (0.91 x 4.57m)	240	45.0 (4.18m ²)	188.34 (57.41m)	25.60	2,250	50.00 (538W/m ²)	9.38
WHMA-240-0320	3' x 20' (0.91 x 6.10m)	240	60.0 (5.57m ²)	251.12 (76.54m)	19.20	3,000	50.00 (538W/m ²)	12.50
WHMA-240-0330	3' x 30' (0.91 x 9.14m)	240	90.0 (8.36m ²)	376.68 (114.81m)	12.80	4,500	50.00 (538W/m ²)	18.75

WARMLYYOURS SNOW MELTING CABLES (SUITABLE FOR ASPHALT, CEMENT AND UNDER PAVERS)

Part #	Voltage	Cable Length	Total Ohms	Total Watts	Watts/Ft	Amps
WHCA-120-0043	120	42.77' (13.04m)	28.80	500	11.69 (38W/m)	4.17
WHCA-120-0063	120	62.78' (19.14m)	19.20	750	11.95 (39W/m)	6.25
WHCA-120-0086	120	85.54' (26.07m)	14.40	1,000	11.69 (38W/m)	8.33
WHCA-120-0126	120	125.56' (38.27m)	9.60	1,500	11.95 (39W/m)	12.50
WHCA-120-0188	120	188.34' (57.41m)	6.40	2,250	11.95 (39W/m)	18.75
WHCA-240-0086	240	85.54' (26.07m)	57.60	1,000	11.69 (38W/m)	4.17
WHCA-240-0128	240	128.31' (39.11m)	38.40	1,500	11.69 (38W/m)	6.25
WHCA-240-0171	240	171.08' (52.15m)	28.80	2,000	11.69 (38W/m)	8.33
WHCA-240-0188	240	188.34' (57.41m)	25.60	2,250	11.95 (39W/m)	9.38
WHCA-240-0251	240	251.12' (76.54m)	19.20	3,000	11.95 (39W/m)	12.50
WHCA-240-0342	240	342.17' (104.29m)	14.40	4,000	11.70 (38W/m)	16.67
WHCA-240-0377	240	376.68' (114.81m)	12.80	4,500	11.95 (39W/m)	18.75
WHCA-240-0428	240	427.71' (130.37m)	11.50	5,000	11.69 (38W/m)	20.87

WARMLYYOURS SNOW MELTING CABLES 208V (SUITABLE FOR ASPHALT, CEMENT AND UNDER PAVERS)

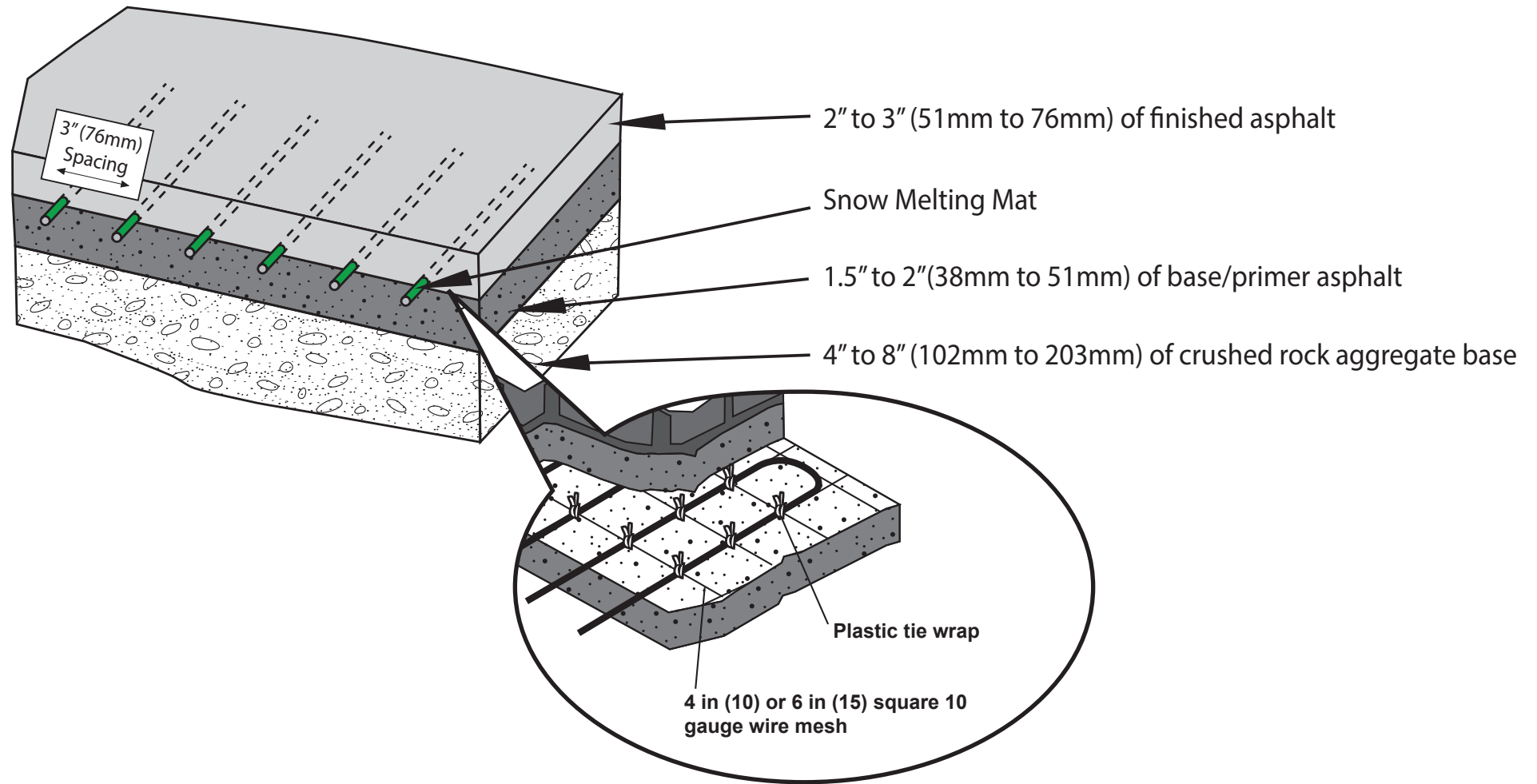
Part #	Voltage	Cable Length (feet)	Total Ohms	Total Watts	Watts/ft	Amps
WHCA-208-0100	208	100'	36.05	1,200	12	5.8
WHCA-208-0128	208	128'	28.28	1,530	11.9	7.4
WHCA-208-0171	208	171'	21.63	2,000	11.6	9.7
WHCA-208-0200	208	200'	18.03	2,400	12	11.6
WHCA-208-0251	208	251'	14.42	3,000	11.9	14.5
WHCA-208-0342	208	342'	10.82	4,000	11.6	19.3
WHCA-208-0377	208	377'	9.61	4,500	11.9	21.7

WARMLYYOURS SNOW MELTING CABLES 277V (SUITABLE FOR ASPHALT, CEMENT AND UNDER PAVERS)

Part #	Voltage	Cable Length (feet)	Total Ohms	Total Watts	Watts/ft	Amps
WHCA-277-0100	277	100'	63.94	1,200	12	4.4
WHCA-277-0128	277	128'	50.15	1,530	11.9	5.6
WHCA-277-0171	277	171'	38.36	2,000	11.6	7.3
WHCA-277-0200	277	200'	31.97	2,400	12	8.7
WHCA-277-0251	277	251'	25.58	3,000	11.9	10.9
WHCA-277-0342	277	342'	19.18	4,000	11.6	14.5
WHCA-277-0377	277	377'	17.05	4,500	11.9	16.3
WHCA-277-0428	277	428'	15.35	5,000	11.6	18.1
WHCA-277-0502	277	502'	12.79	6,000	11.9	21.7

APPENDIX B:

CROSS-SECTION OF SNOW MELTING CABLE IN ASPHALT

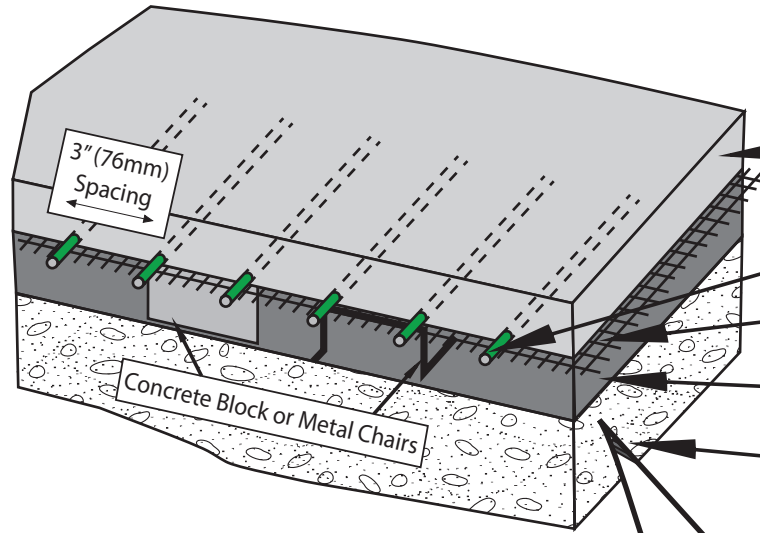


Note: Cables may be tied to reinforcement type mesh and then the mesh should be staked down to the base/primer pour.

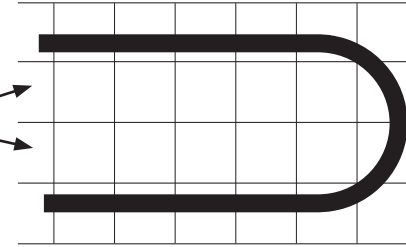
APPENDIX C:

CROSS-SECTION OF SNOW MELTING CABLE IN CONCRETE

SNOW MELTING MAT IN CONCRETE



1 1/4" x 1 1/4" Squares



3/4" Concrete aggregate or smaller required

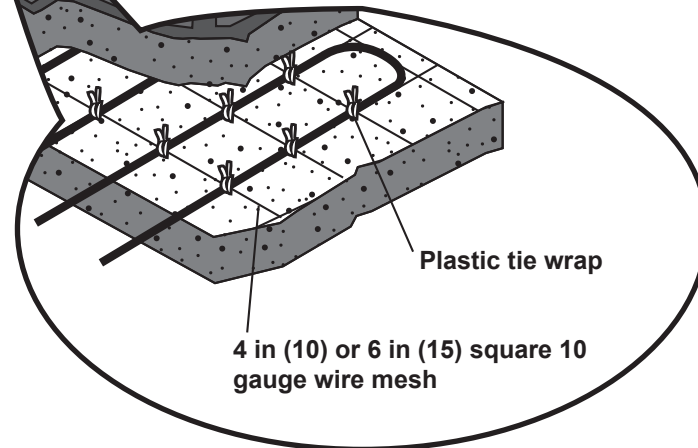
2" to 3" (51mm to 76mm) of finished concrete

Heating Cable run (tied to rebar or wire mesh with plastic tie wraps)

Rebar or wire mesh supported by bricks or metal chairs
(Heating Cable ties to rebar or wire mesh with plastic tie wraps)

2" to 3" (51mm to 76mm) of concrete

4" to 8" (102mm to 203mm) of crushed rock aggregate base

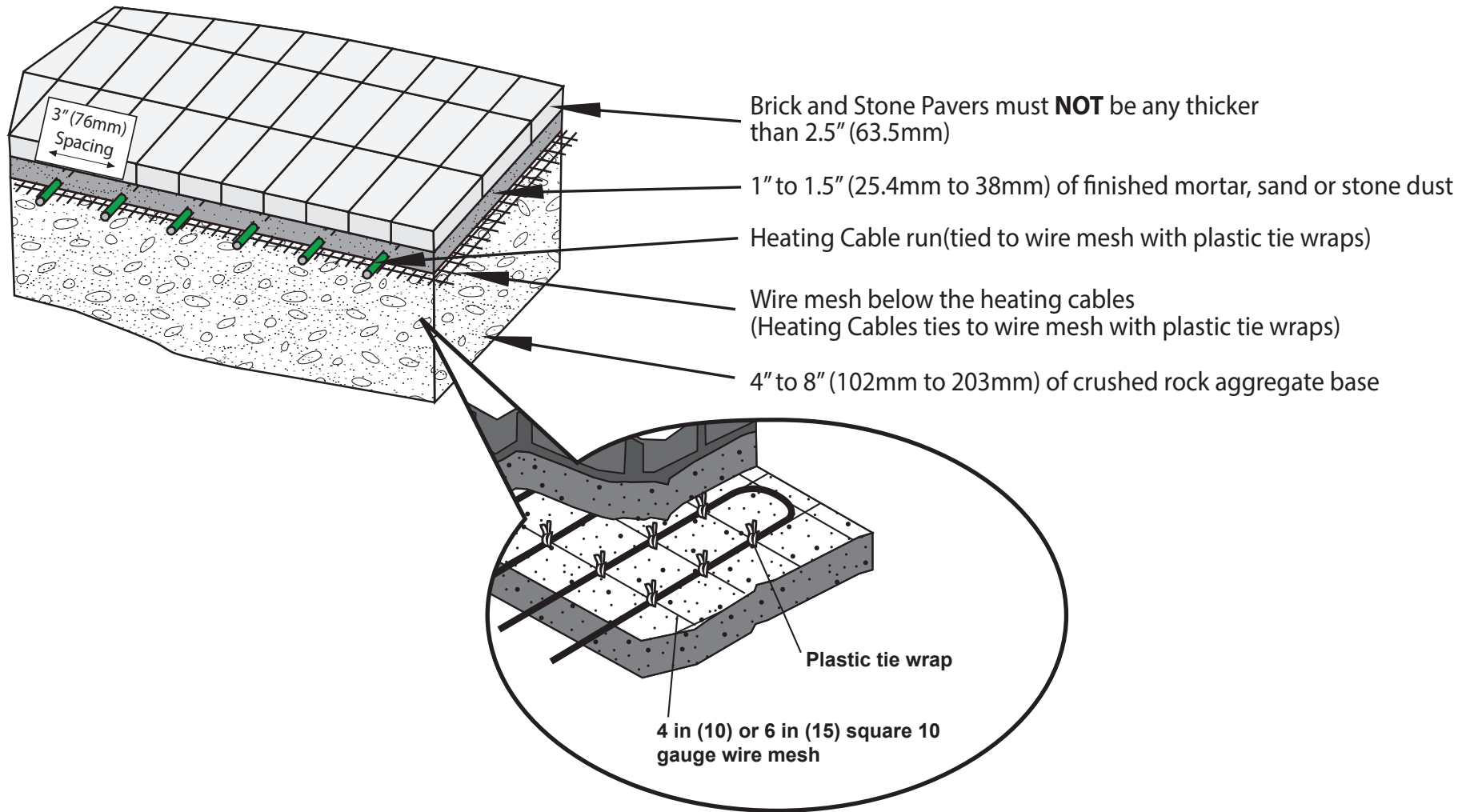


Plastic tie wrap

4 in (10) or 6 in (15) square 10 gauge wire mesh

APPENDIX D:

CROSS-SECTION OF SNOW MELTING CABLE IN MORTAR BED UNDER PAVERS

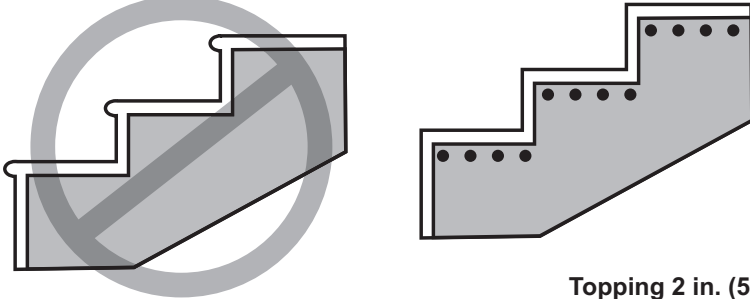


Note: Cables may be tied to reinforcement type mesh and then the mesh should be staked down to the base/crushed rock aggregate.

APPENDIX E:

CROSS-SECTION OF SNOW MELT CABLE IN STAIRS

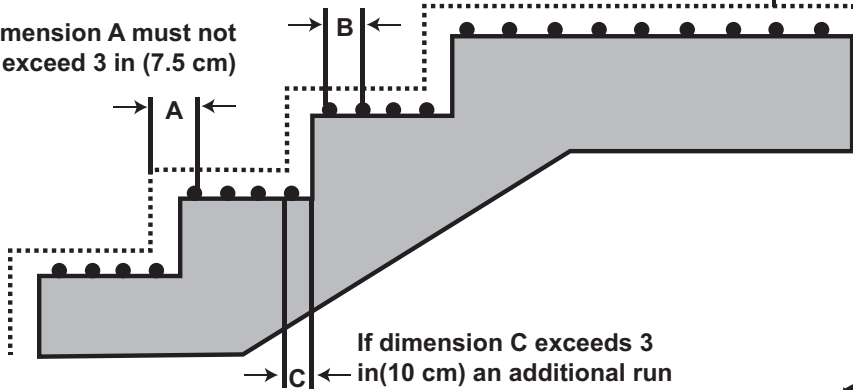
Pavers - No lip overhang



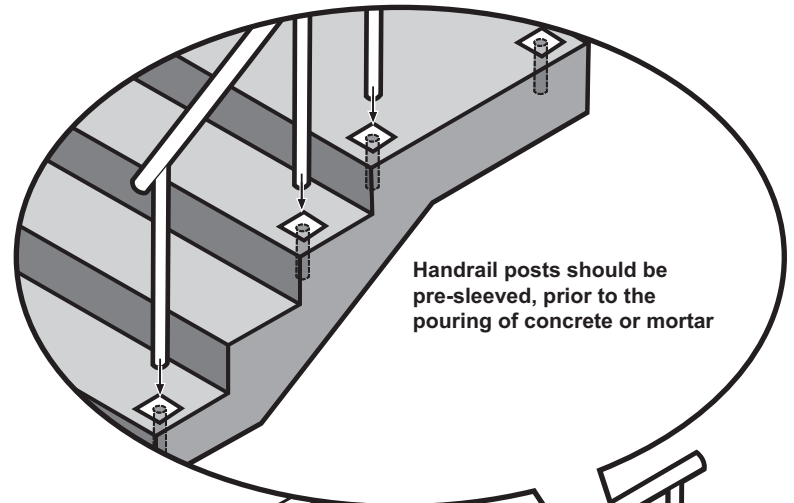
Topping 2 in. (5.0 cm) minimum, to 3 in. (7.5 cm) maximum thickness

Dimension B must not exceed 3.5 in (8.9 mm)

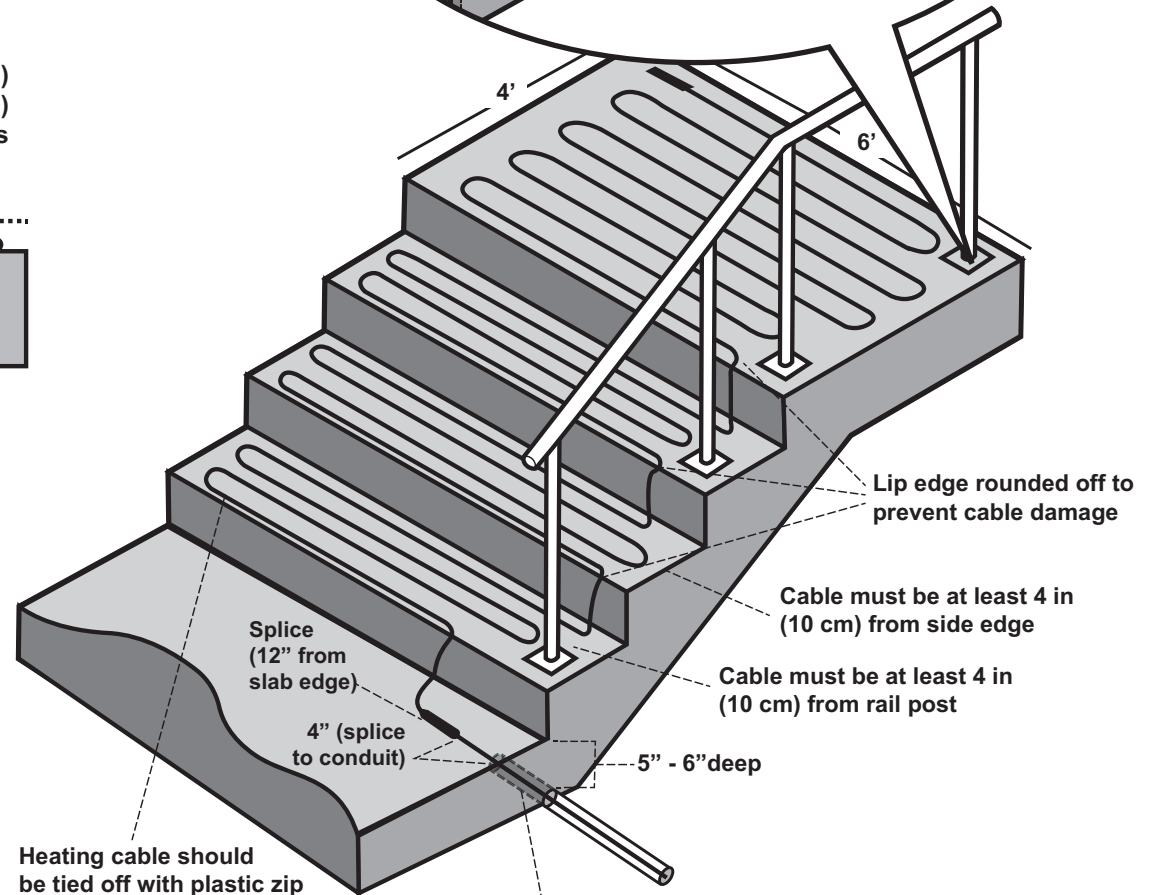
Dimension A must not exceed 3 in (7.5 cm)



If dimension C exceeds 3 in (10 cm) an additional run of cable must be used



Handrail posts should be pre-sleeved, prior to the pouring of concrete or mortar



Lip edge rounded off to prevent cable damage

Cable must be at least 4 in (10 cm) from side edge

Cable must be at least 4 in (10 cm) from rail post

Splice (12" from slab edge)

4" (splice to conduit)

5" - 6" deep

Heating cable should be tied off with plastic zip ties to a heavy gauge wire mesh that has been staked down to the base.

Cold leads protected with 3/4" diameter rigid metal conduit or other approved means. The conduit should be at the bottom of slab and coming into the slab approximately 6"

Estimators' example:

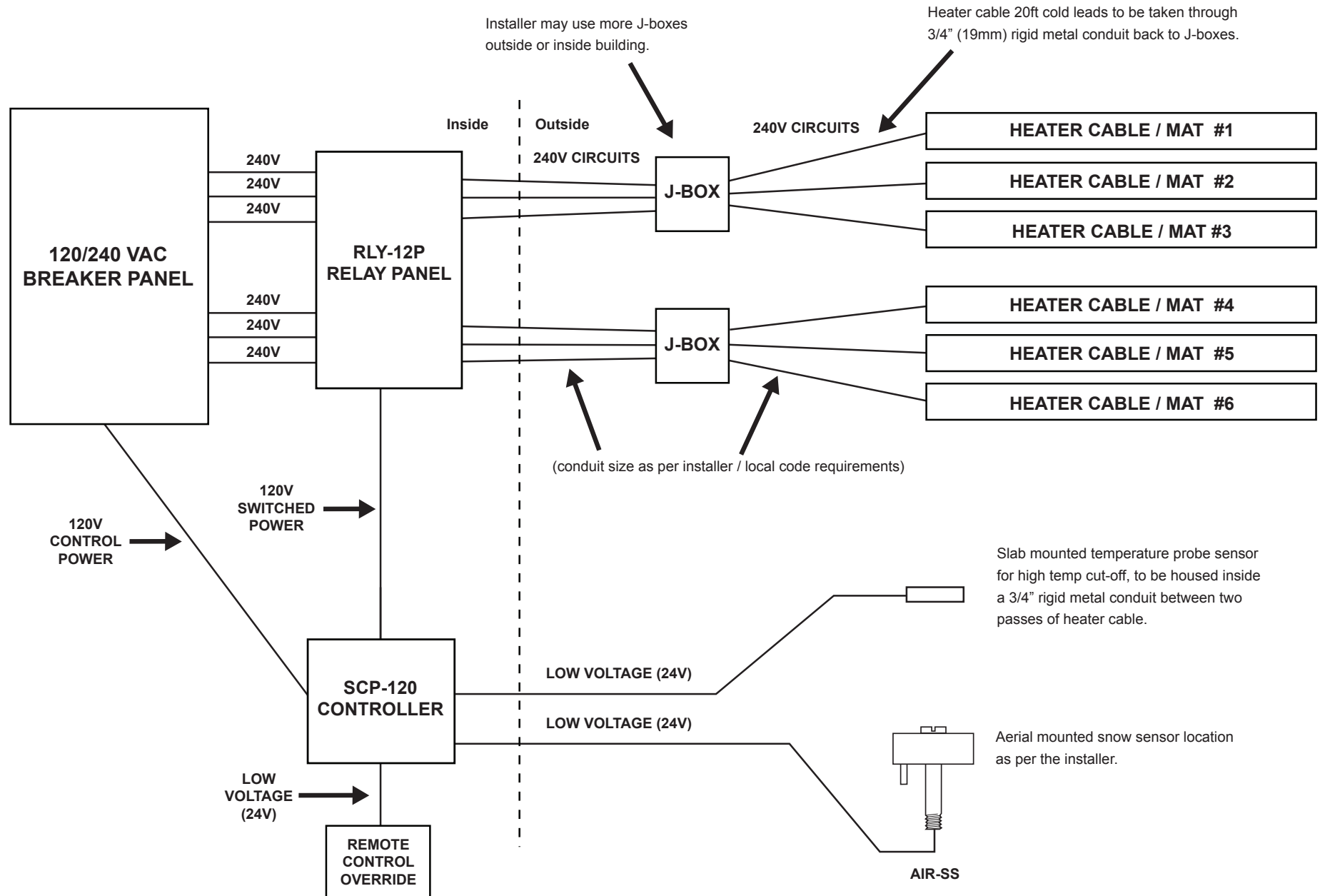
Stair treads have to be 11-12" deep.
 Landing = 4' x 6' = 24 sq.ft X 4 = 96 FT
 3 steps (12" x 6' each) ... we want 4 passes of cable per tread.
 Subtract 3" from each side (making room for hand rail posts)
 5.5' X 4 = 22 FT plus 3 FT = 25 FT per tread
 3 FT is the amount needed for curves and tread riser.

Solution: 96 FT + 25 FT + 25 FT + 25 FT = **171 FT**

Pick closest cable match = **WHCA-240-0171**

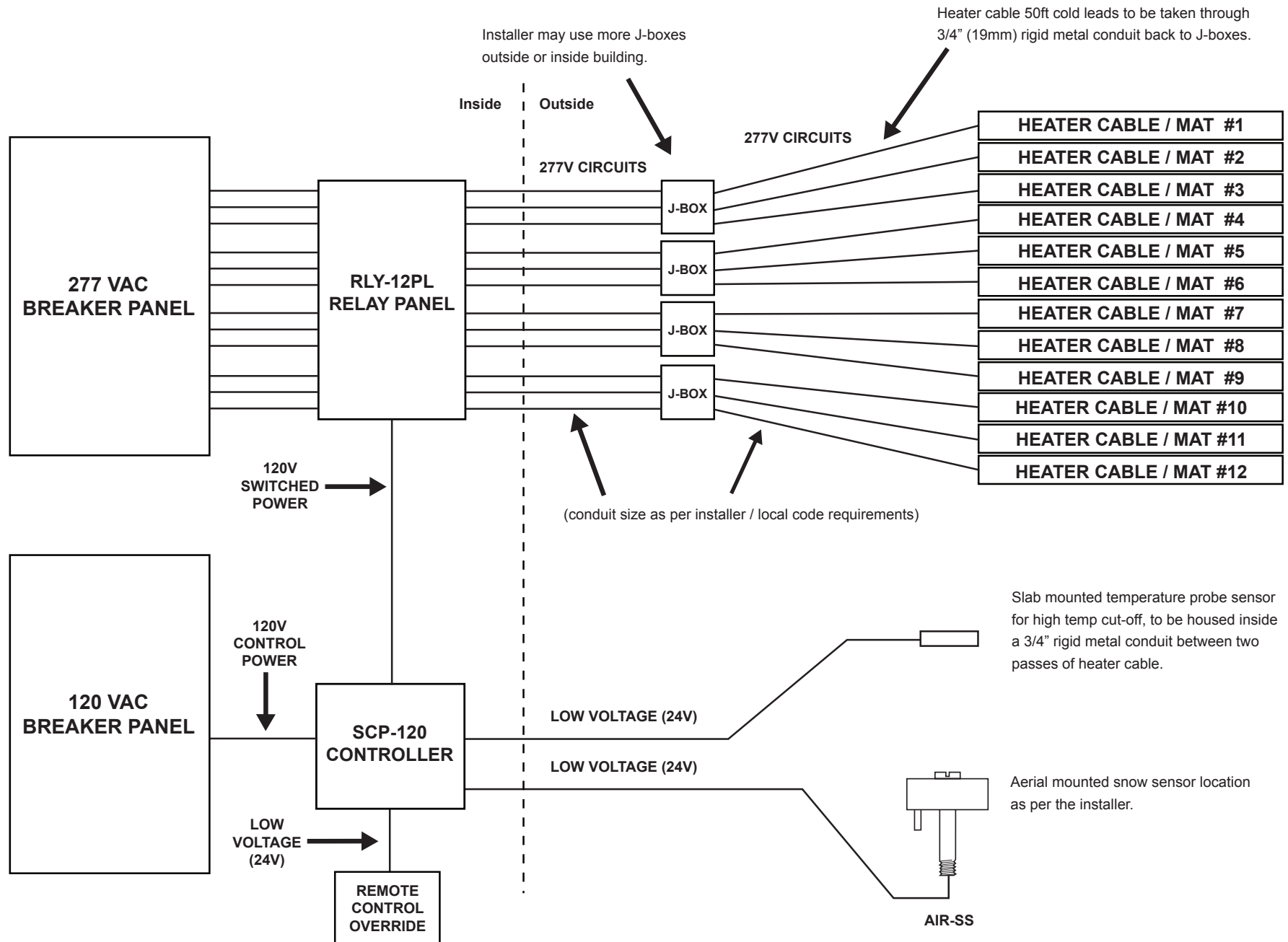
APPENDIX F:

SNOW MELT DIAGRAM 240V - TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH PREMIUM CONTROL



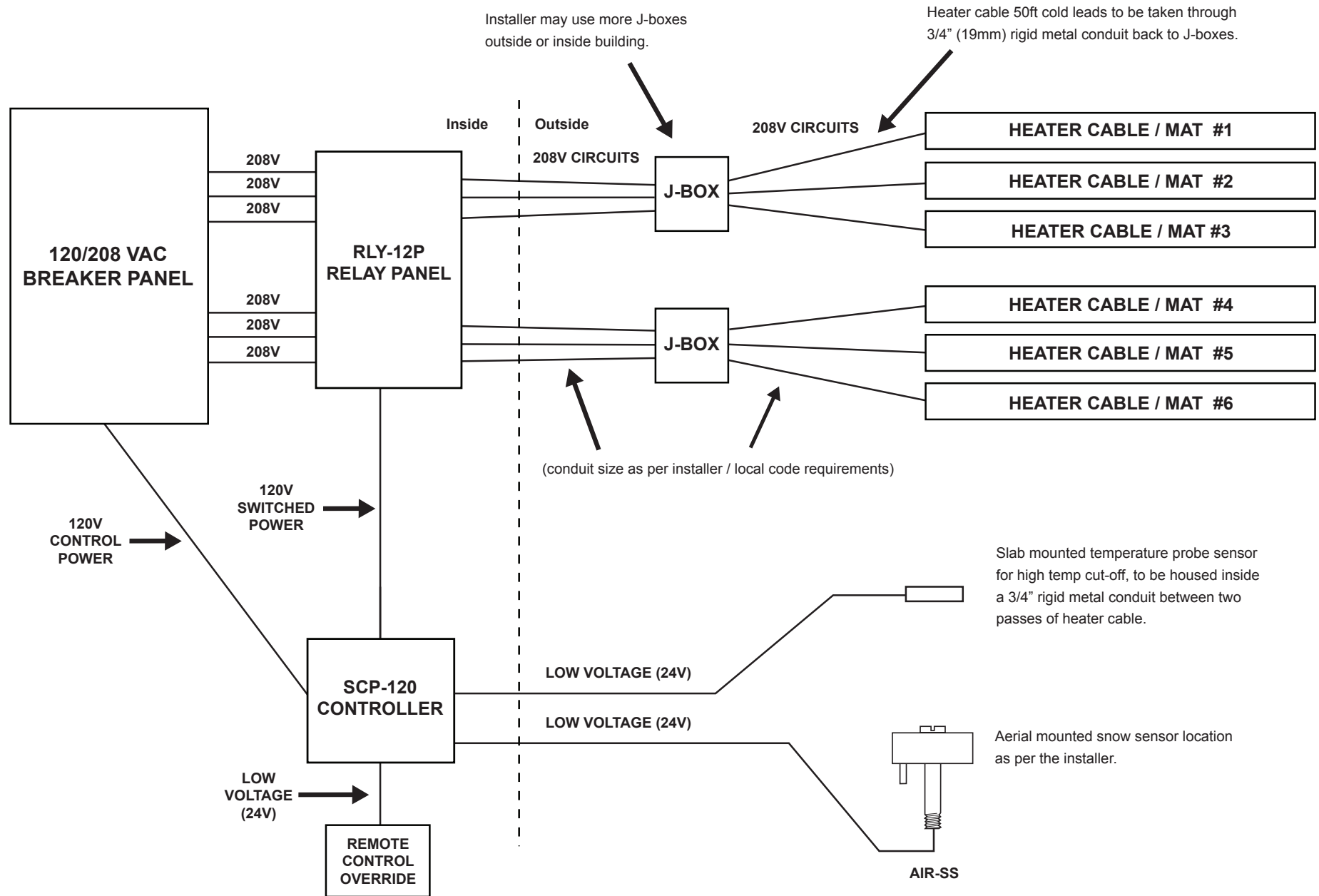
APPENDIX G:

SNOW MELT DIAGRAM 277V - TYPICAL LINE DIAGRAM (FOR 12 CIRCUITS/CABLES) WITH PREMIUM CONTROL



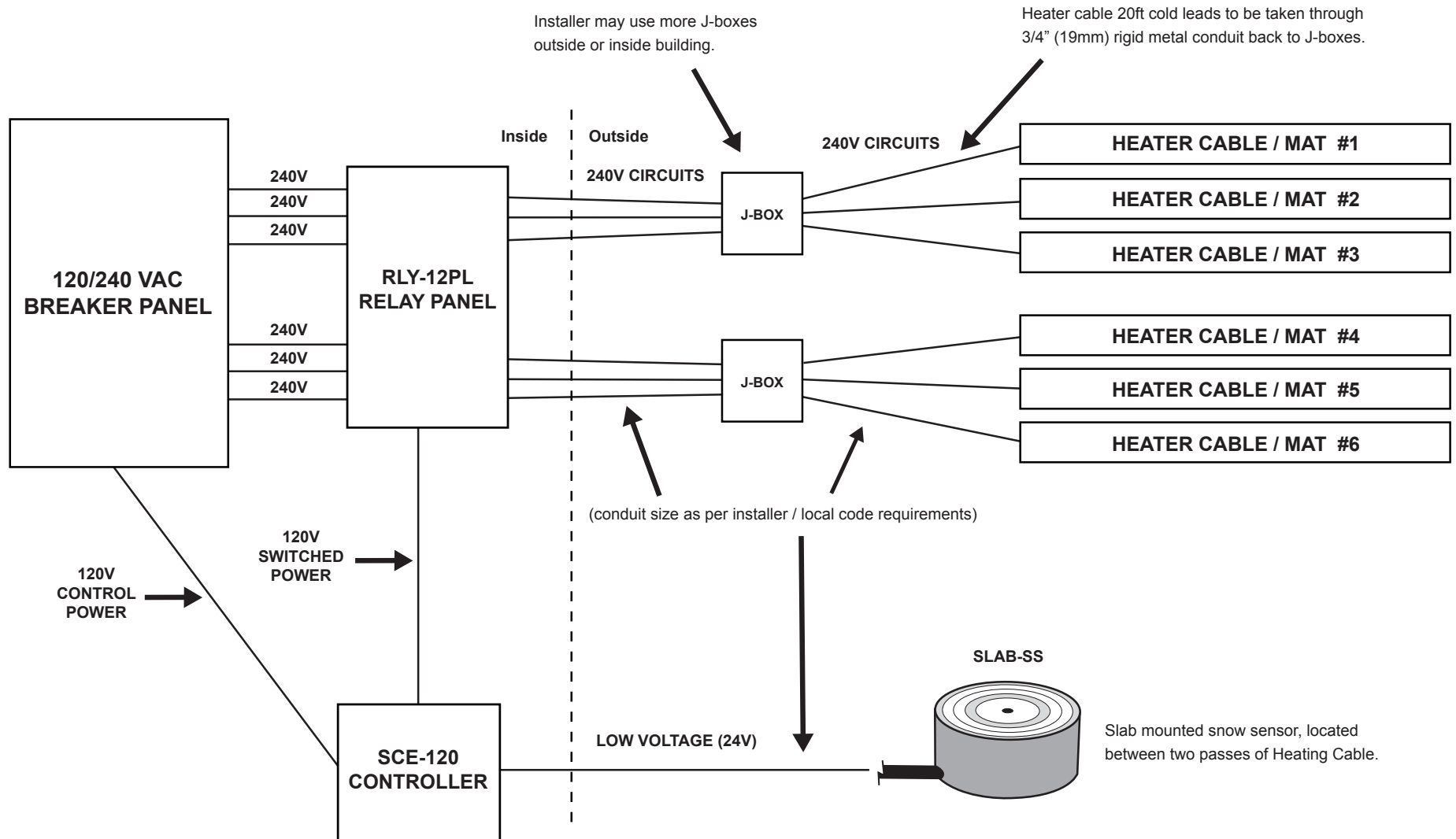
APPENDIX H:

SNOW MELT DIAGRAM 208V - TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH PREMIUM CONTROL



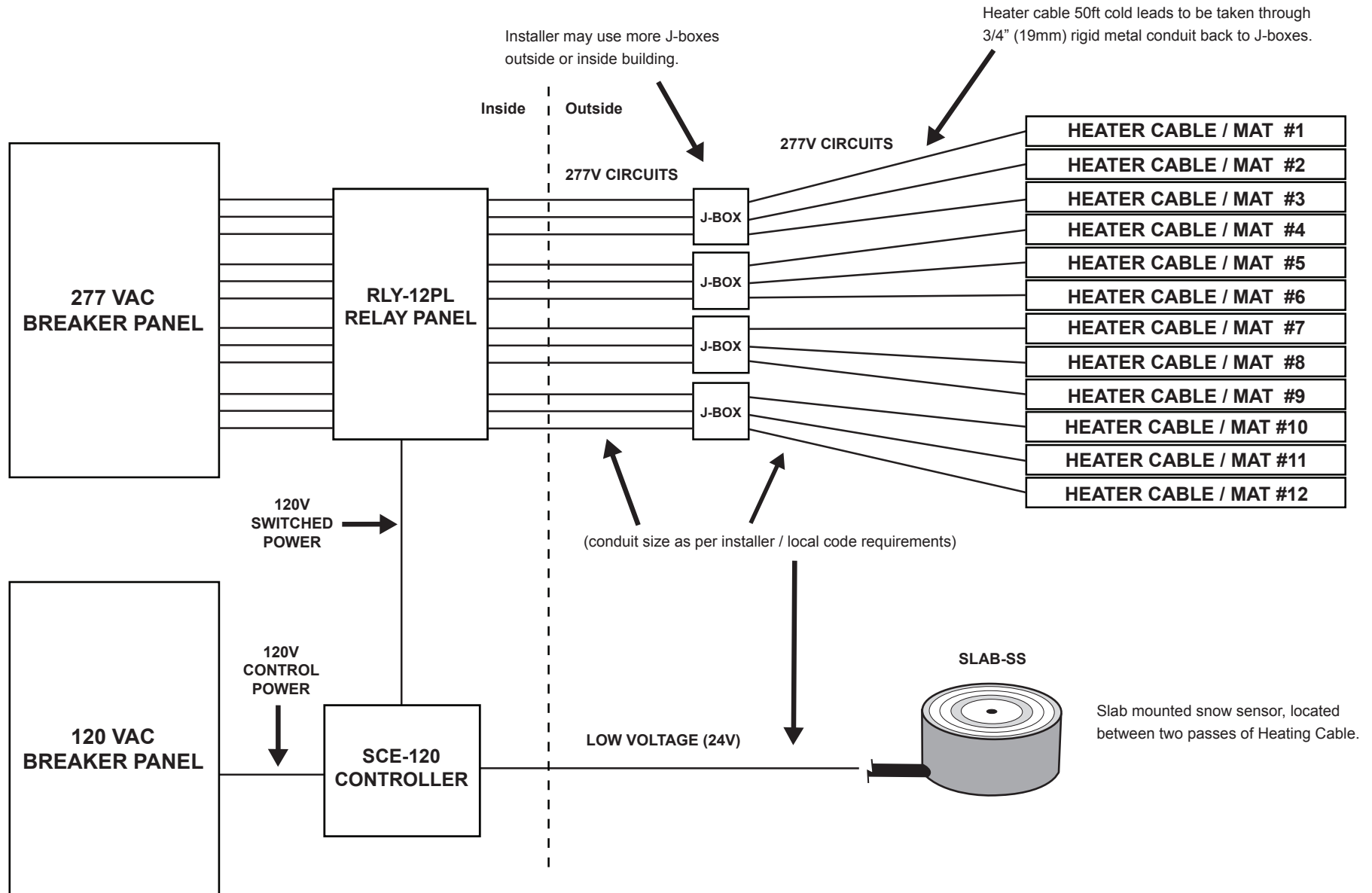
APPENDIX I:

SNOW MELT DIAGRAM 240V - TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH ECONOMY CONTROL



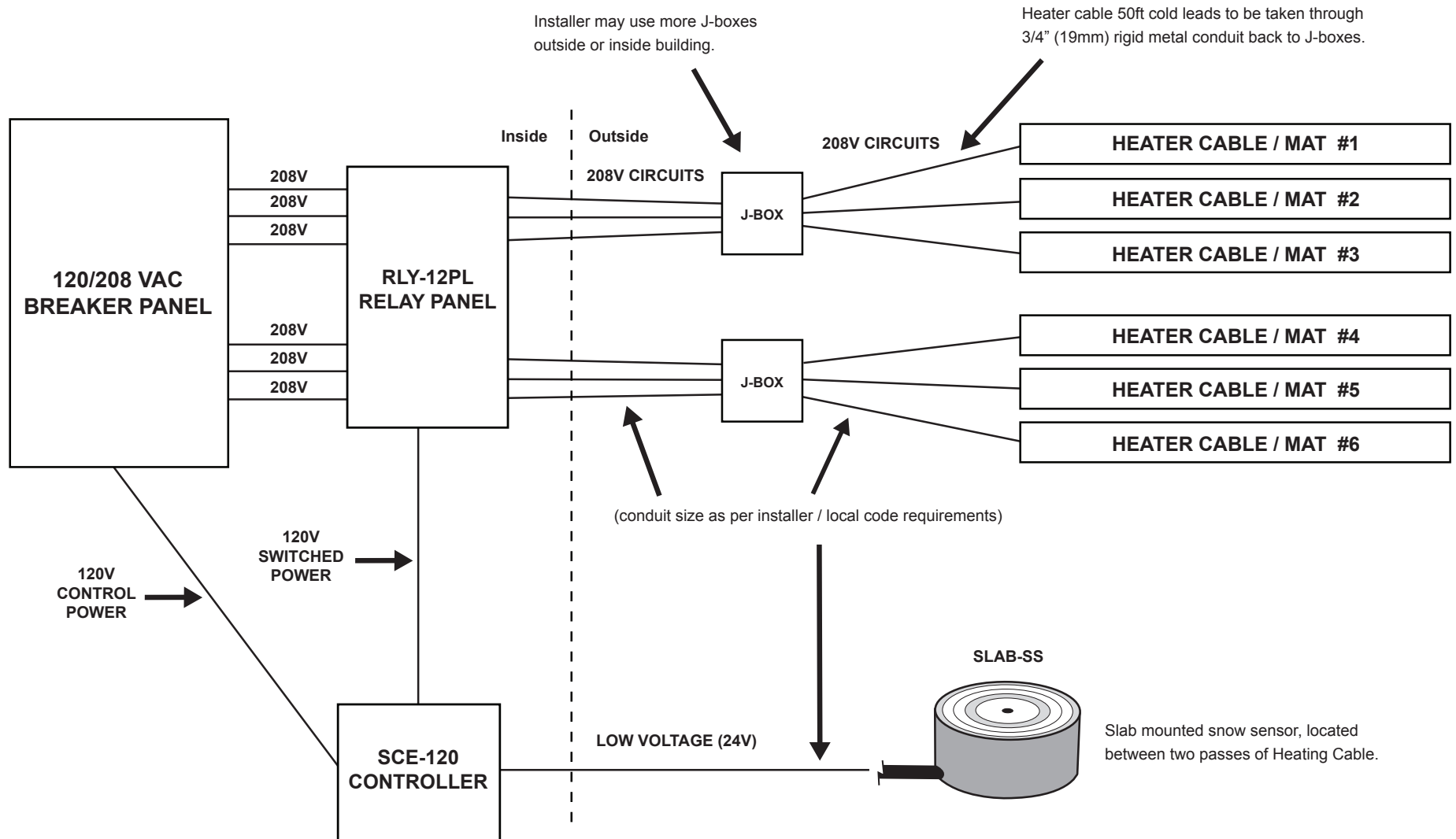
APPENDIX J:

SNOW MELT DIAGRAM 277V - TYPICAL LINE DIAGRAM (FOR 12 CIRCUITS/CABLES) WITH ECONOMY CONTROL



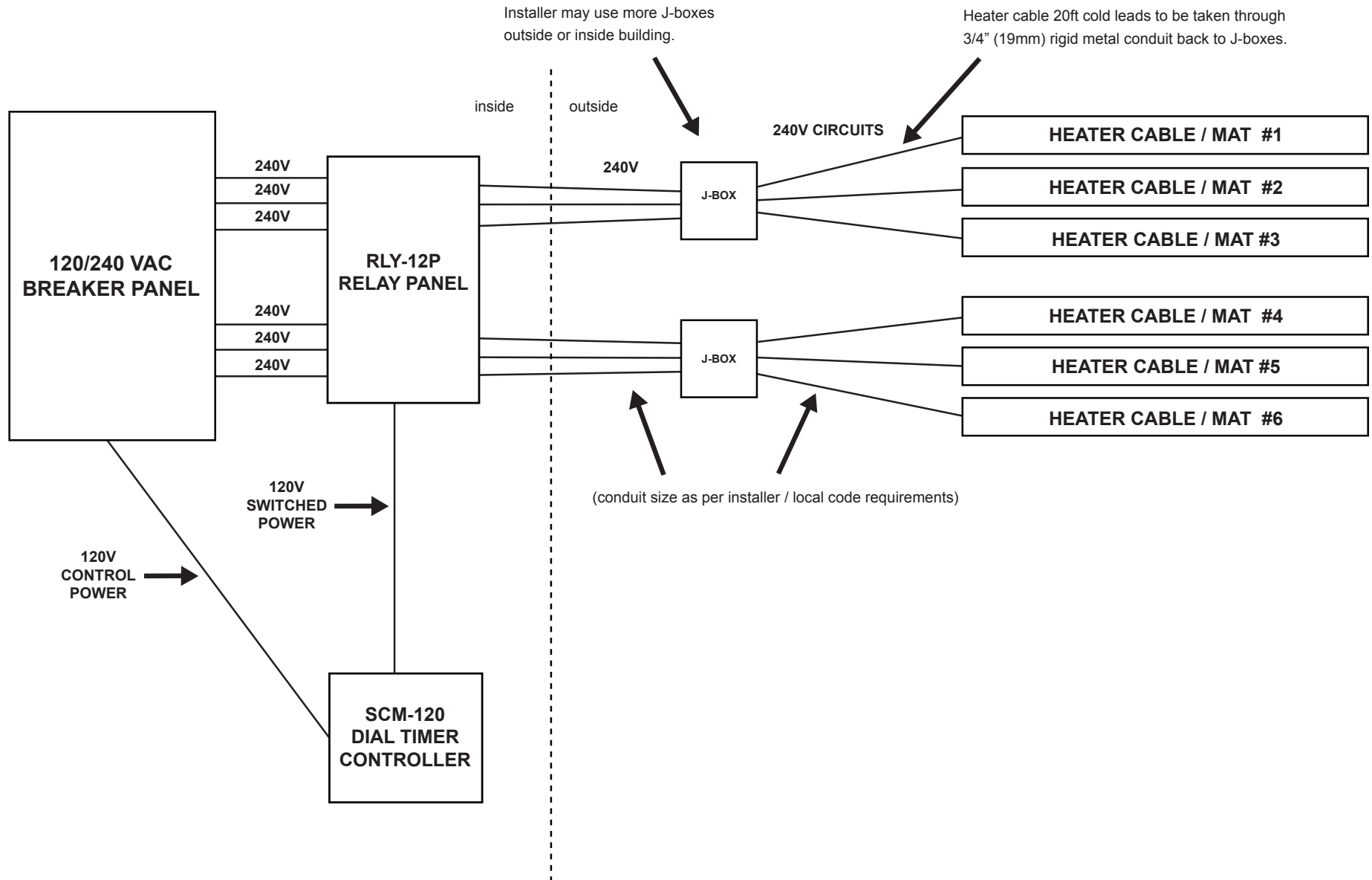
APPENDIX K:

SNOW MELT DIAGRAM 208V - TYPICAL LINE DIAGRAM (FOR 12 CIRCUITS/CABLES) WITH ECONOMY CONTROL



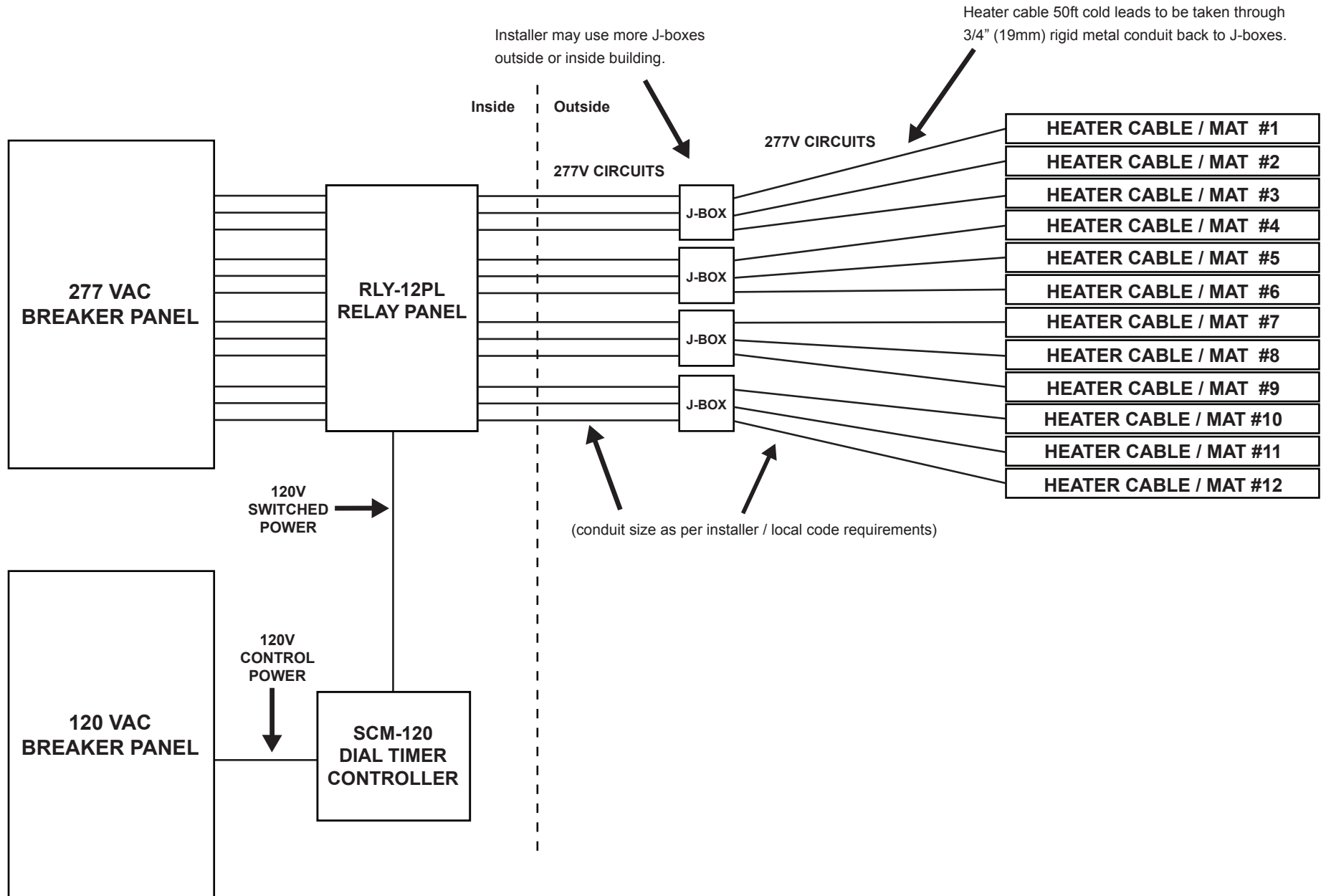
APPENDIX L:

SNOW MELT DIAGRAM 240V - TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH MANUAL CONTROL



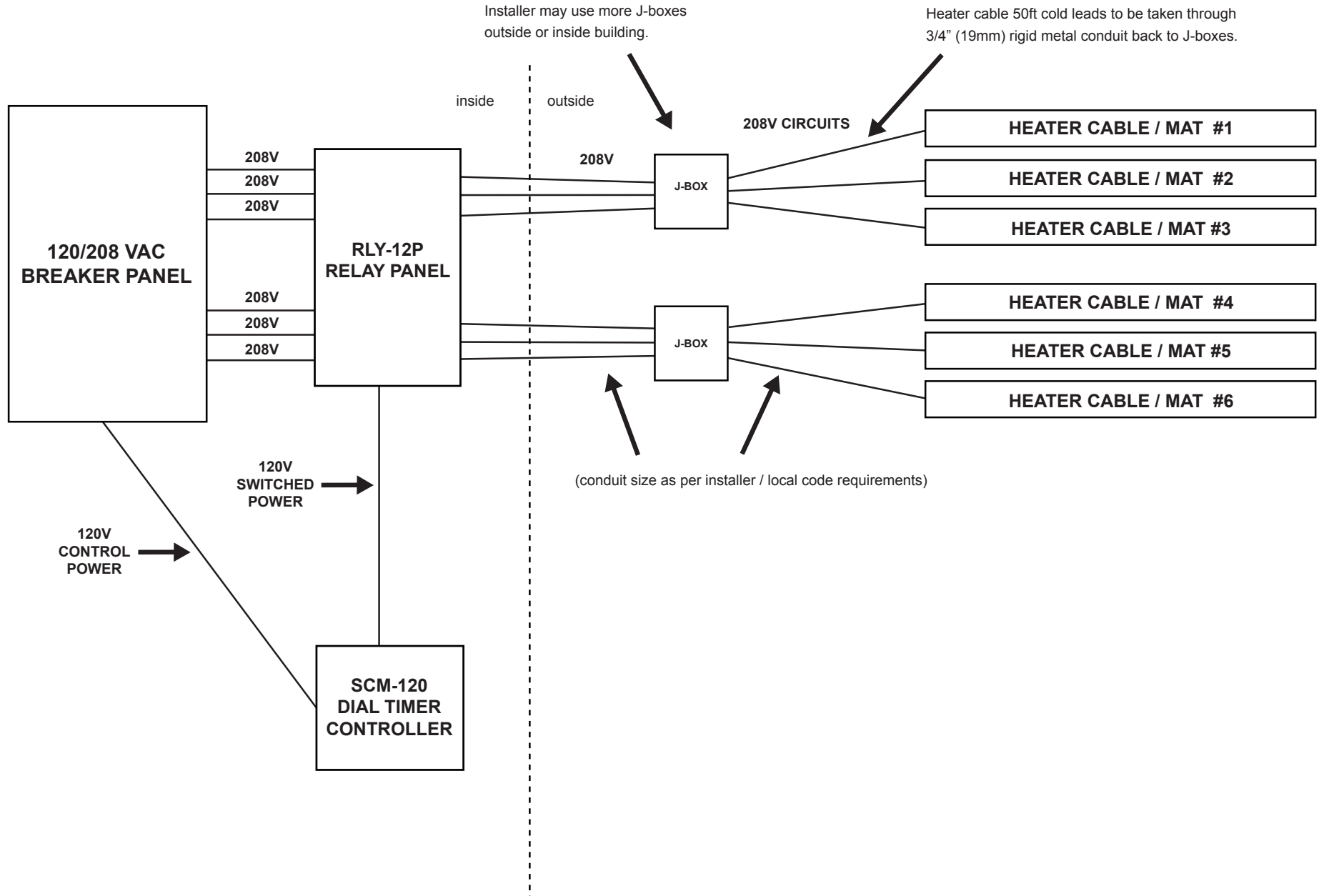
APPENDIX M:

SNOW MELT DIAGRAM 277V - TYPICAL LINE DIAGRAM (FOR 12 CIRCUITS/CABLES) WITH MANUAL CONTROL



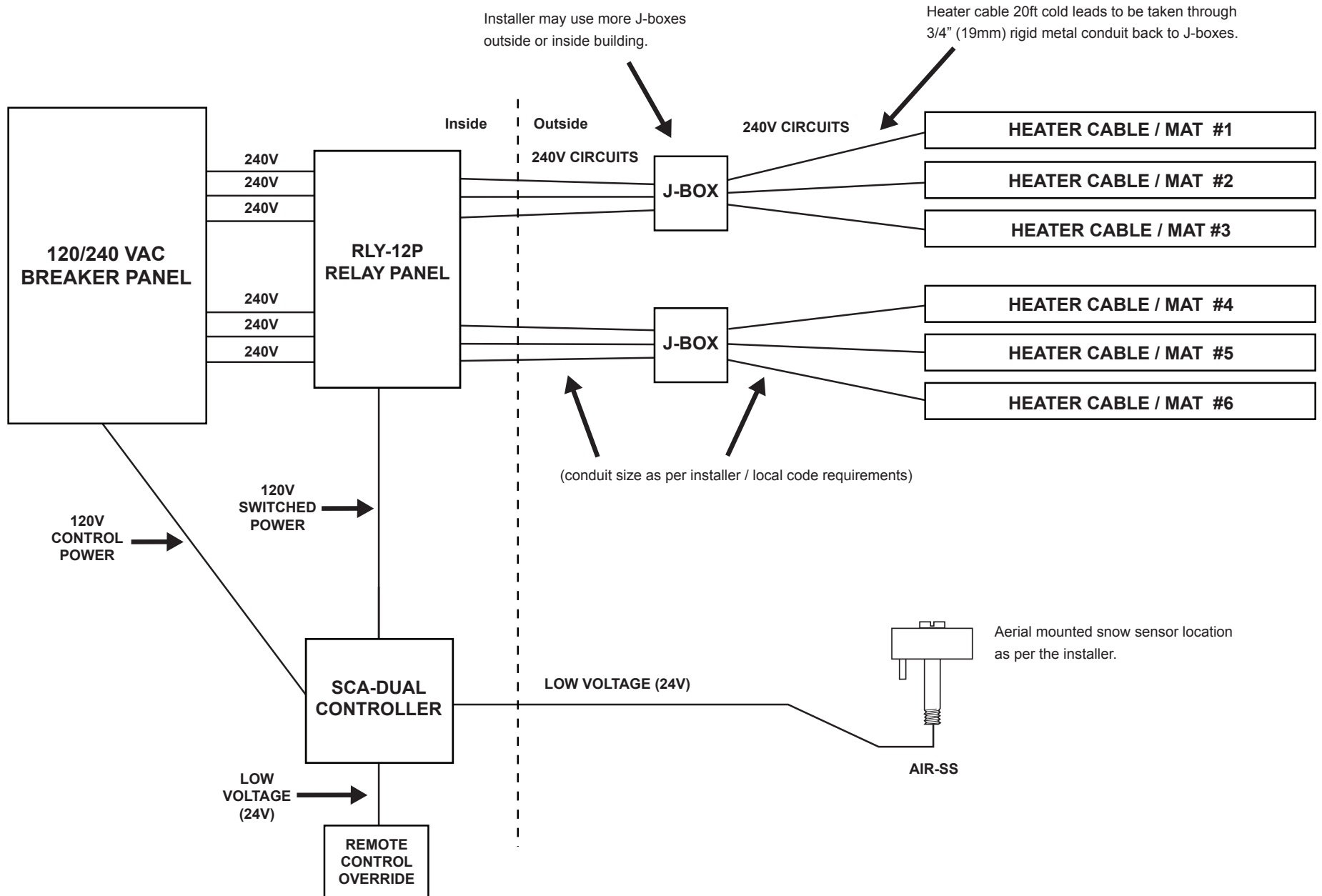
APPENDIX N:

SNOW MELT DIAGRAM 208V - TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH MANUAL CONTROL



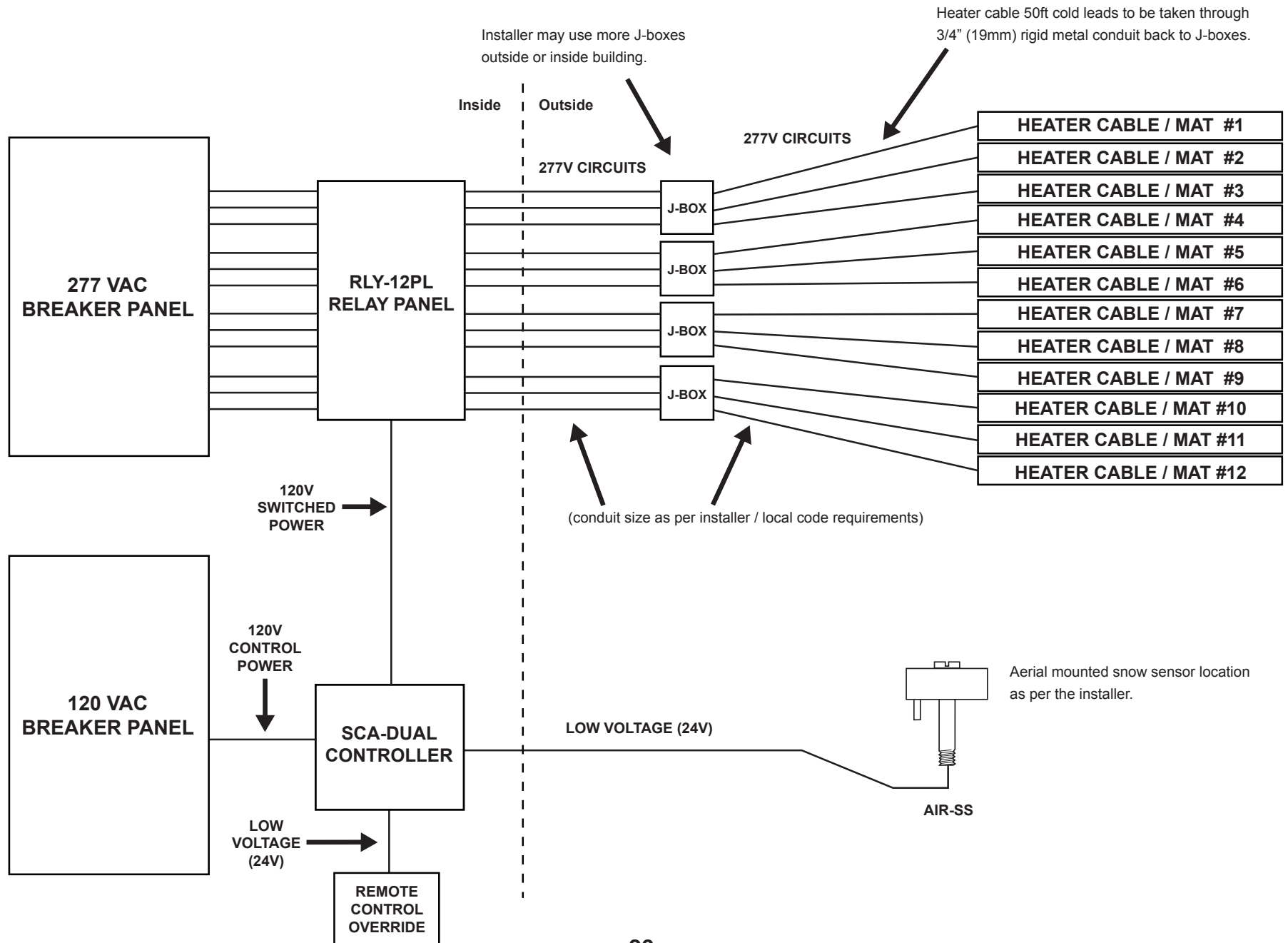
APPENDIX O:

SNOW MELT DIAGRAM 240V - TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH SCA-DUAL



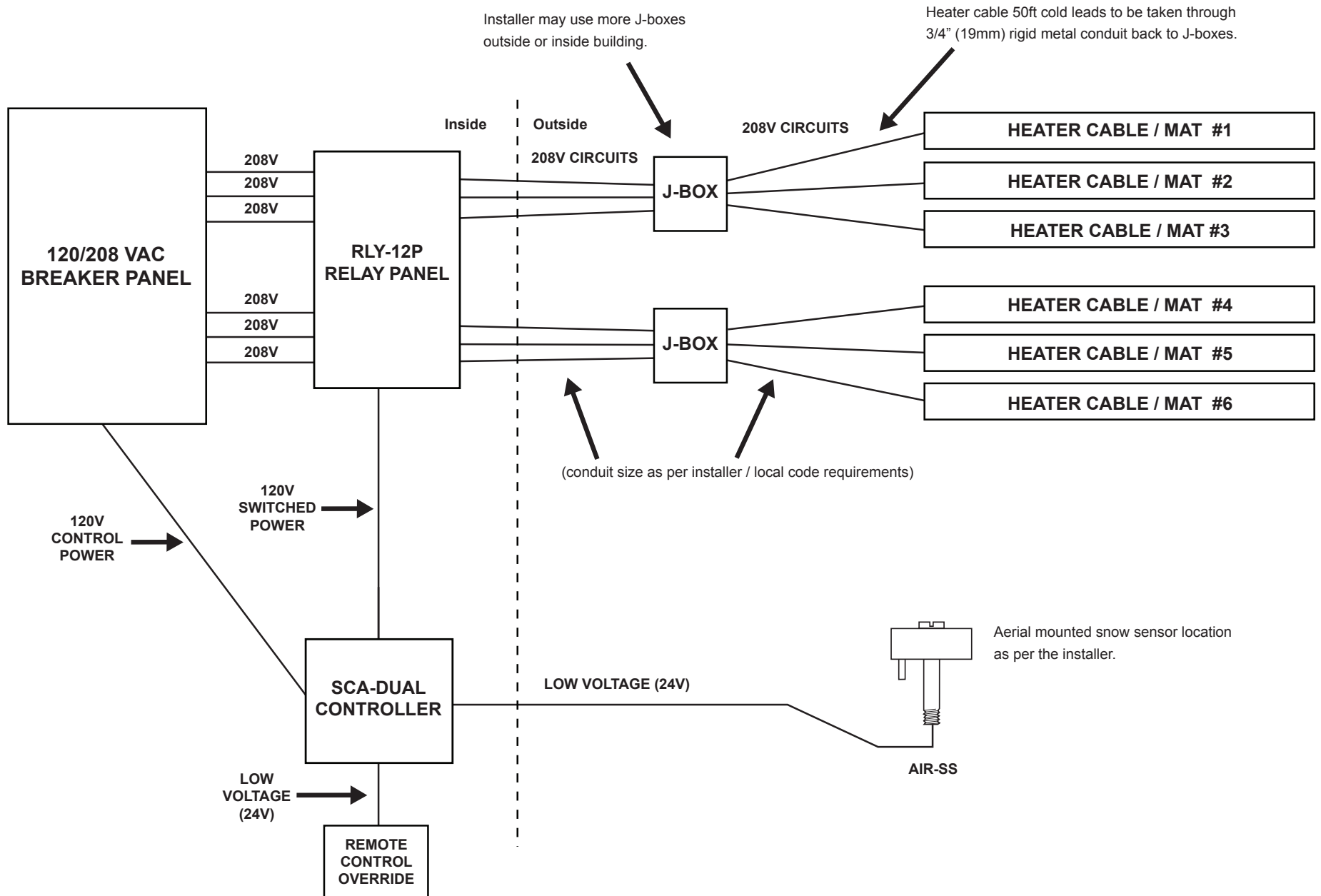
APPENDIX P:

SNOW MELT DIAGRAM 277V - TYPICAL LINE DIAGRAM (FOR 12 CIRCUITS/CABLES) WITH SCA-DUAL



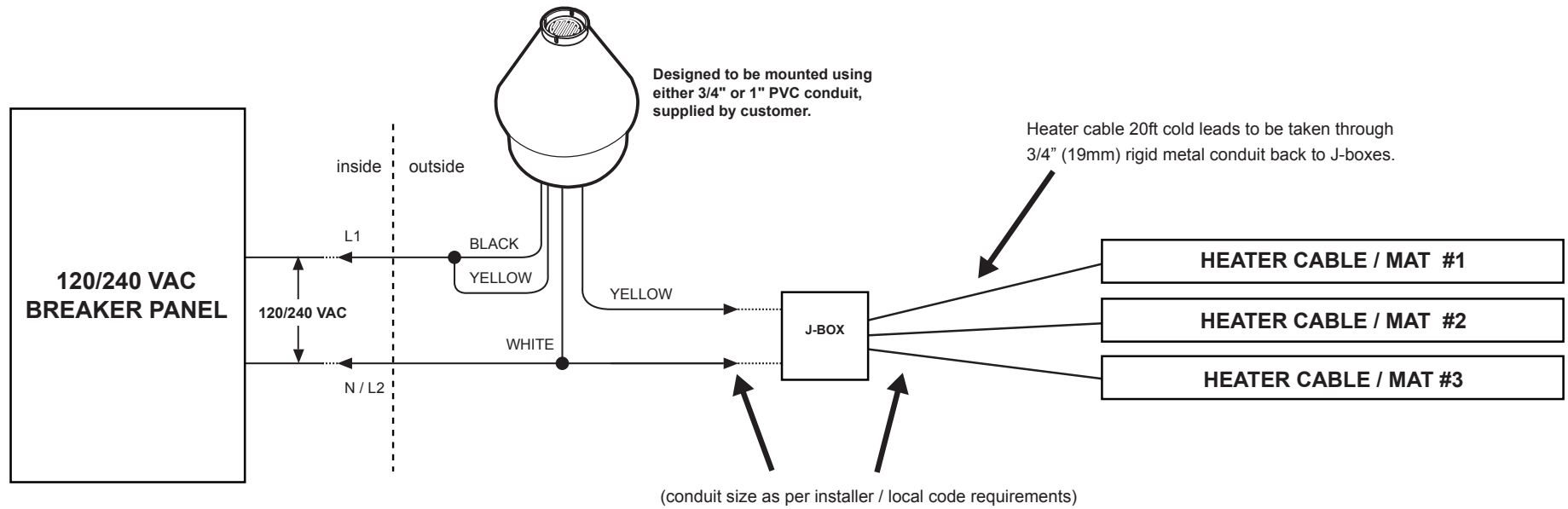
APPENDIX Q:

SNOW MELT DIAGRAM 208V - TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH SCA-DUAL



APPENDIX R:

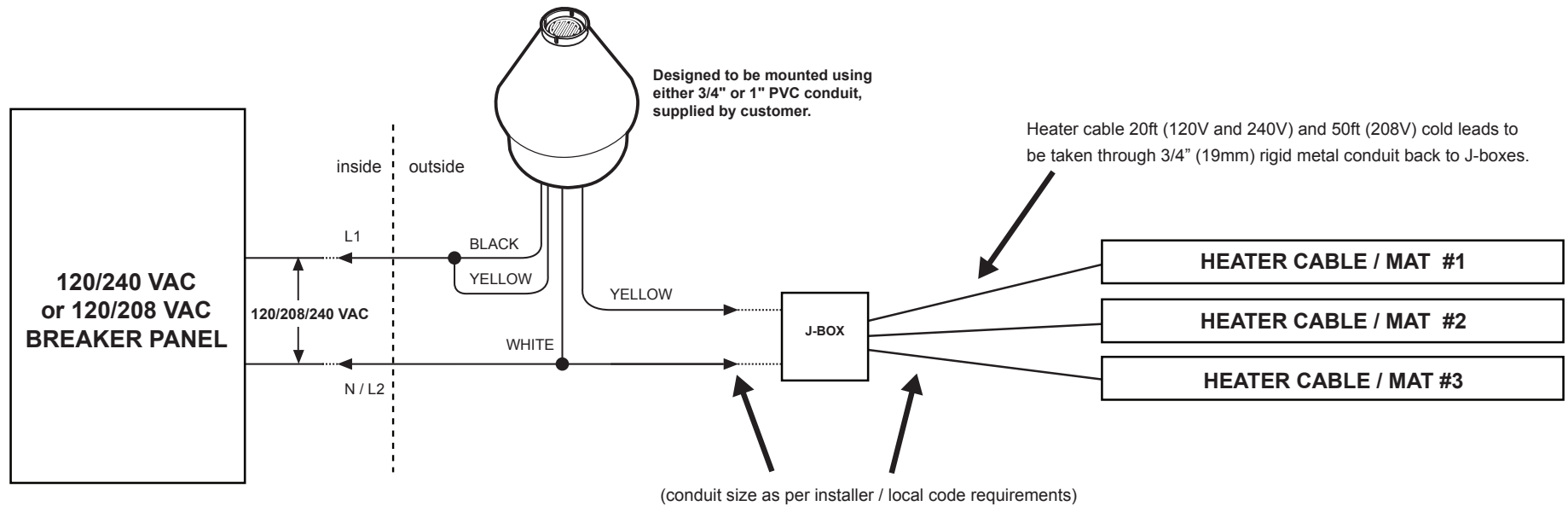
SNOW MELTING DIAGRAM: 240V - TYPICAL LINE DIAGRAM (FOR 3 CIRCUITS/CABLES) WITH SCV-DUAL WITHOUT RELAY



INSTALL IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPLICABLE ELECTRICAL AND BUILDING CODES AND REGULATIONS. ENSURE THAT ALL CONDUIT/CABLE TERMINATIONS ARE WATERTIGHT.

APPENDIX S:

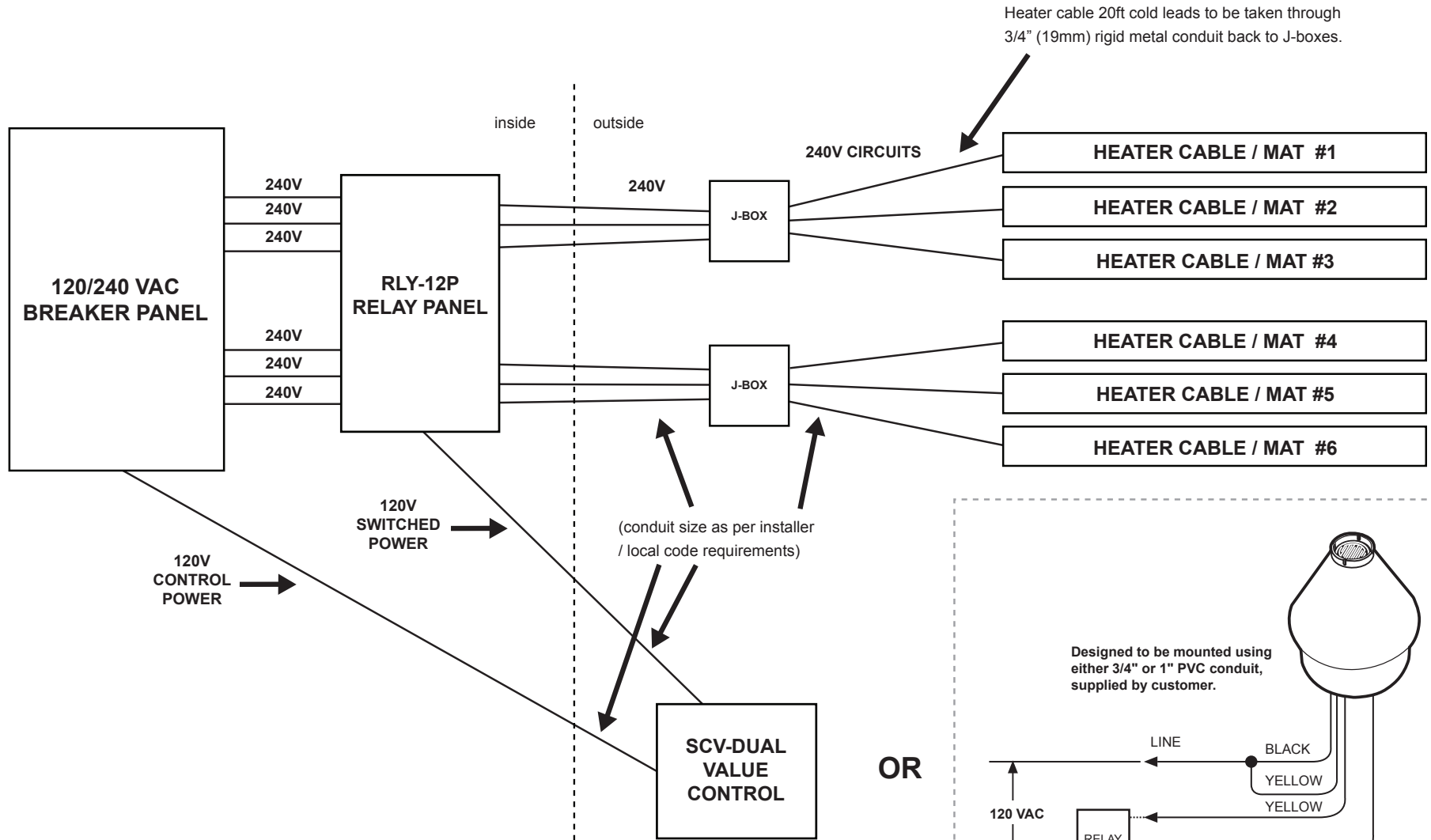
SNOW MELTING DIAGRAM: 208V - TYPICAL LINE DIAGRAM (FOR 3 CIRCUITS/CABLES) WITH SCV-DUAL WITHOUT RELAY



INSTALL IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPLICABLE ELECTRICAL AND BUILDING CODES AND REGULATIONS. ENSURE THAT ALL CONDUIT/CABLE TERMINATIONS ARE WATERTIGHT.

APPENDIX T:

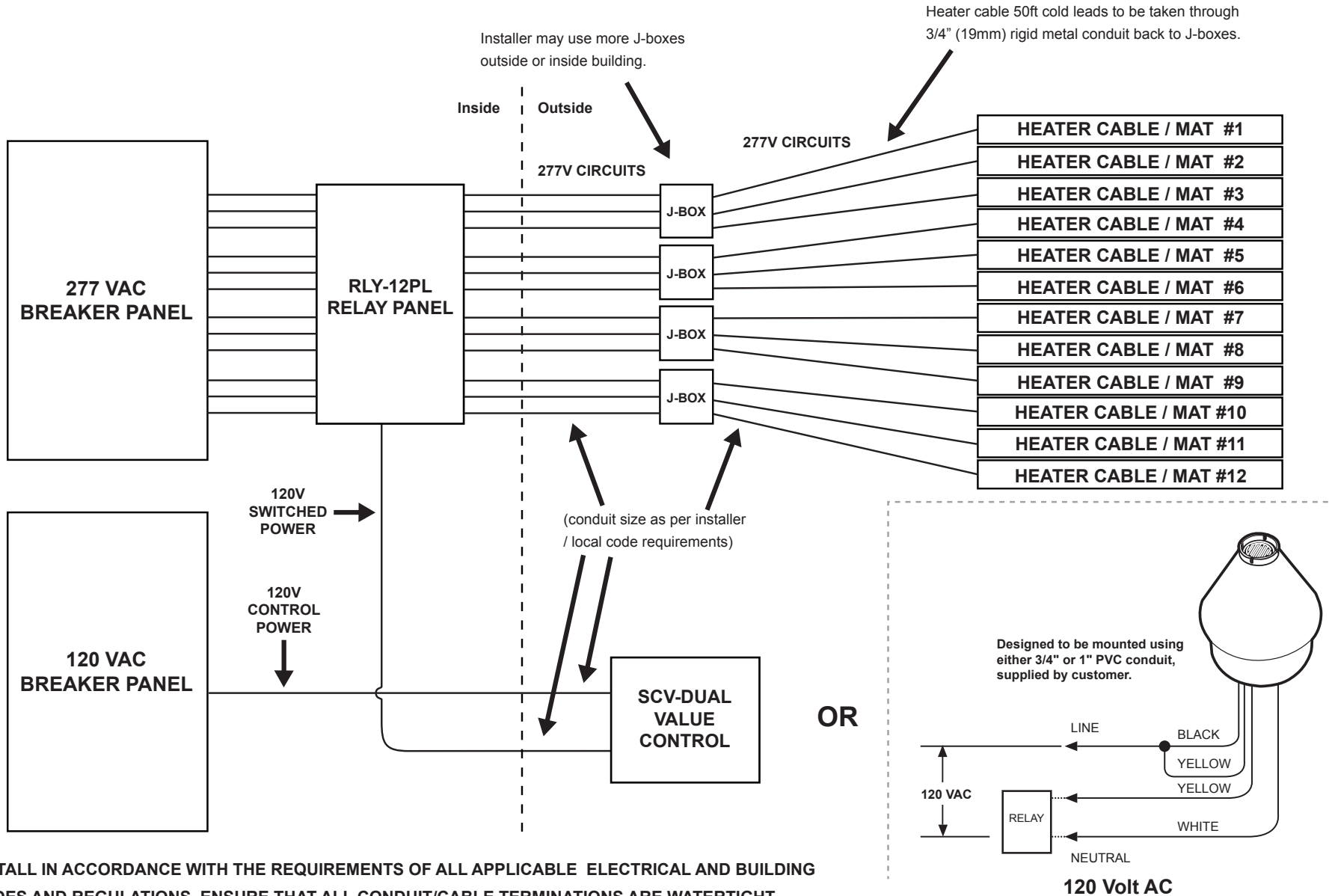
SNOW MELTING DIAGRAM: TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH SCV-DUAL WITH RELAY



INSTALL IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPLICABLE ELECTRICAL AND BUILDING CODES AND REGULATIONS. ENSURE THAT ALL CONDUIT/CABLE TERMINATIONS ARE WATERTIGHT.

APPENDIX U:

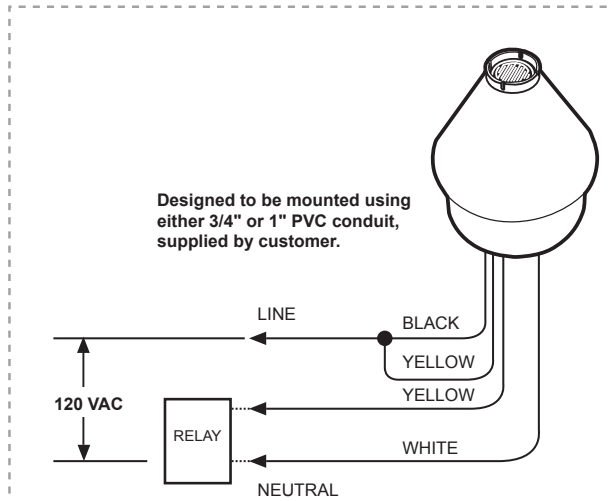
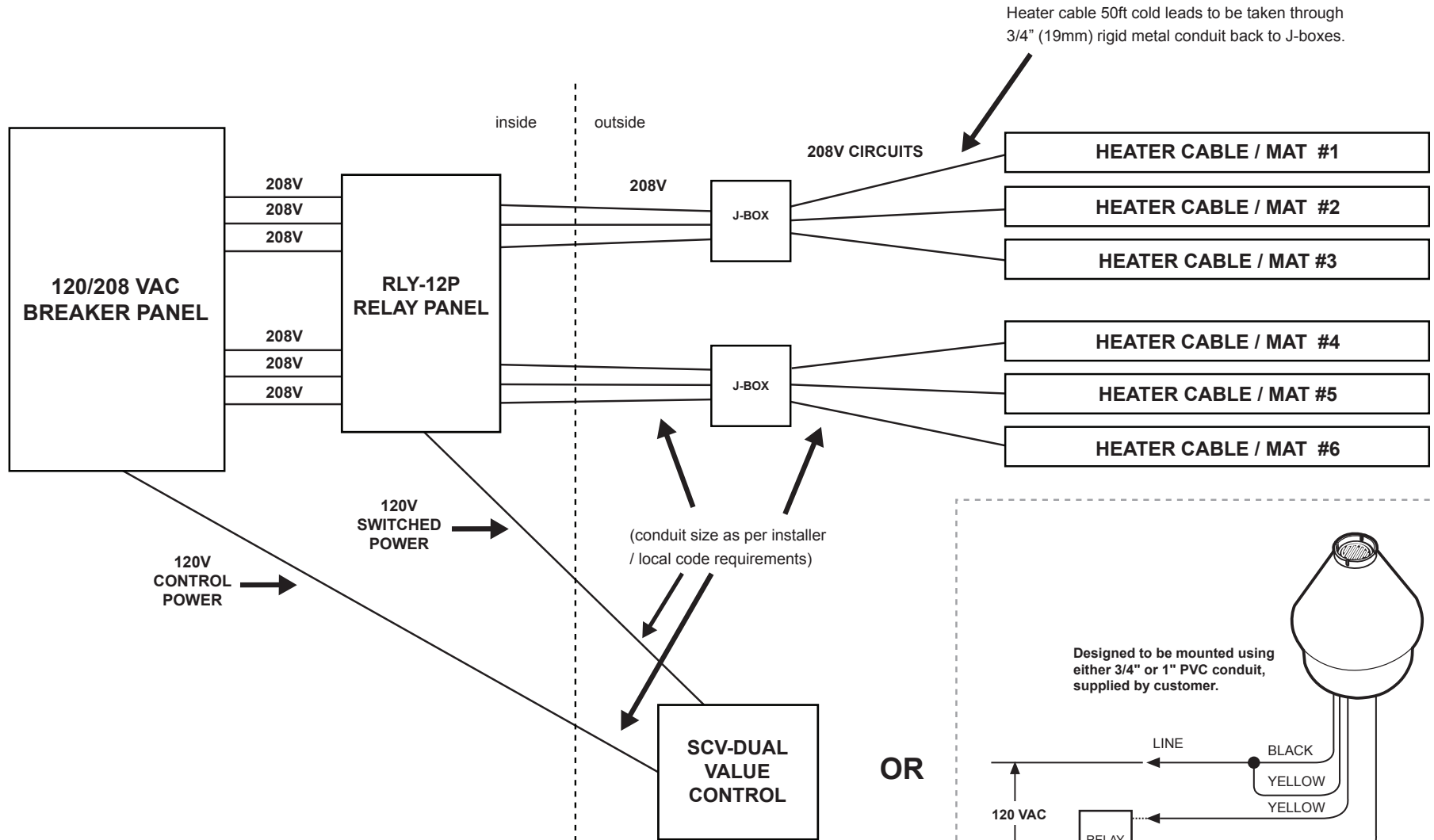
SNOW MELTING DIAGRAM: TYPICAL LINE DIAGRAM (FOR 12 CIRCUITS/CABLES) WITH SCV-DUAL WITH RELAY



INSTALL IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPLICABLE ELECTRICAL AND BUILDING CODES AND REGULATIONS. ENSURE THAT ALL CONDUIT/CABLE TERMINATIONS ARE WATERTIGHT.

APPENDIX V:

SNOW MELTING DIAGRAM: TYPICAL LINE DIAGRAM (FOR 6 CIRCUITS/CABLES) WITH SCV-DUAL WITH RELAY

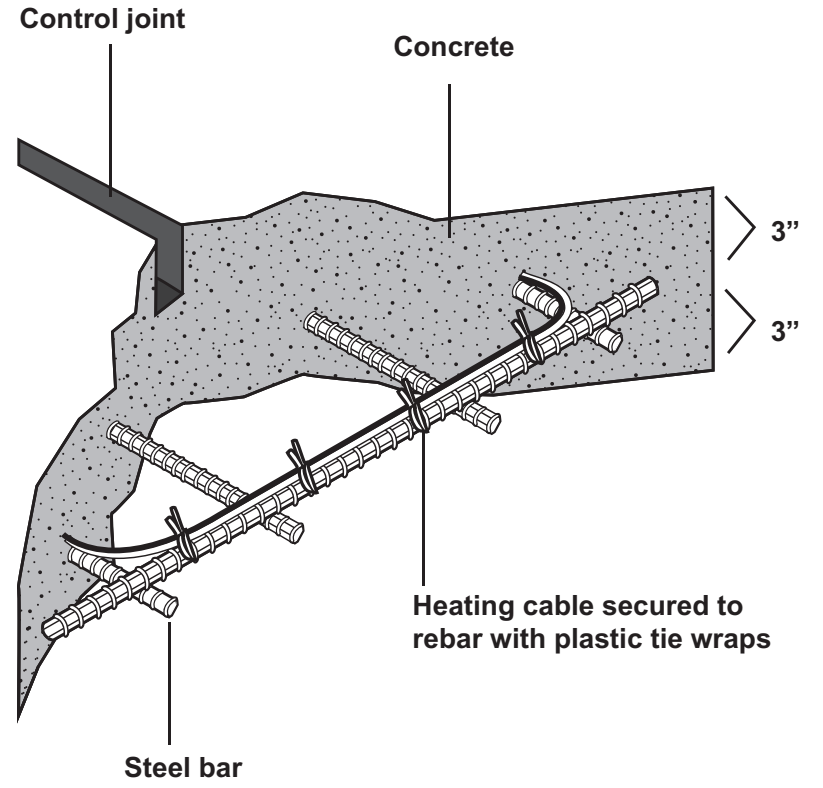
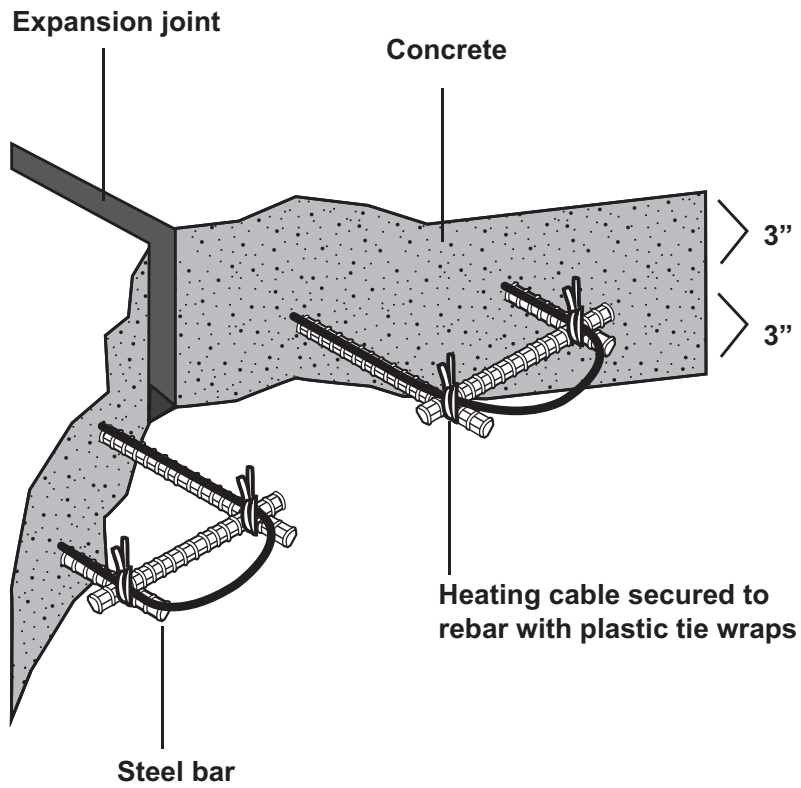


120 Volt AC

INSTALL IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPLICABLE ELECTRICAL AND BUILDING CODES AND REGULATIONS. ENSURE THAT ALL CONDUIT/CABLE TERMINATIONS ARE WATERTIGHT.

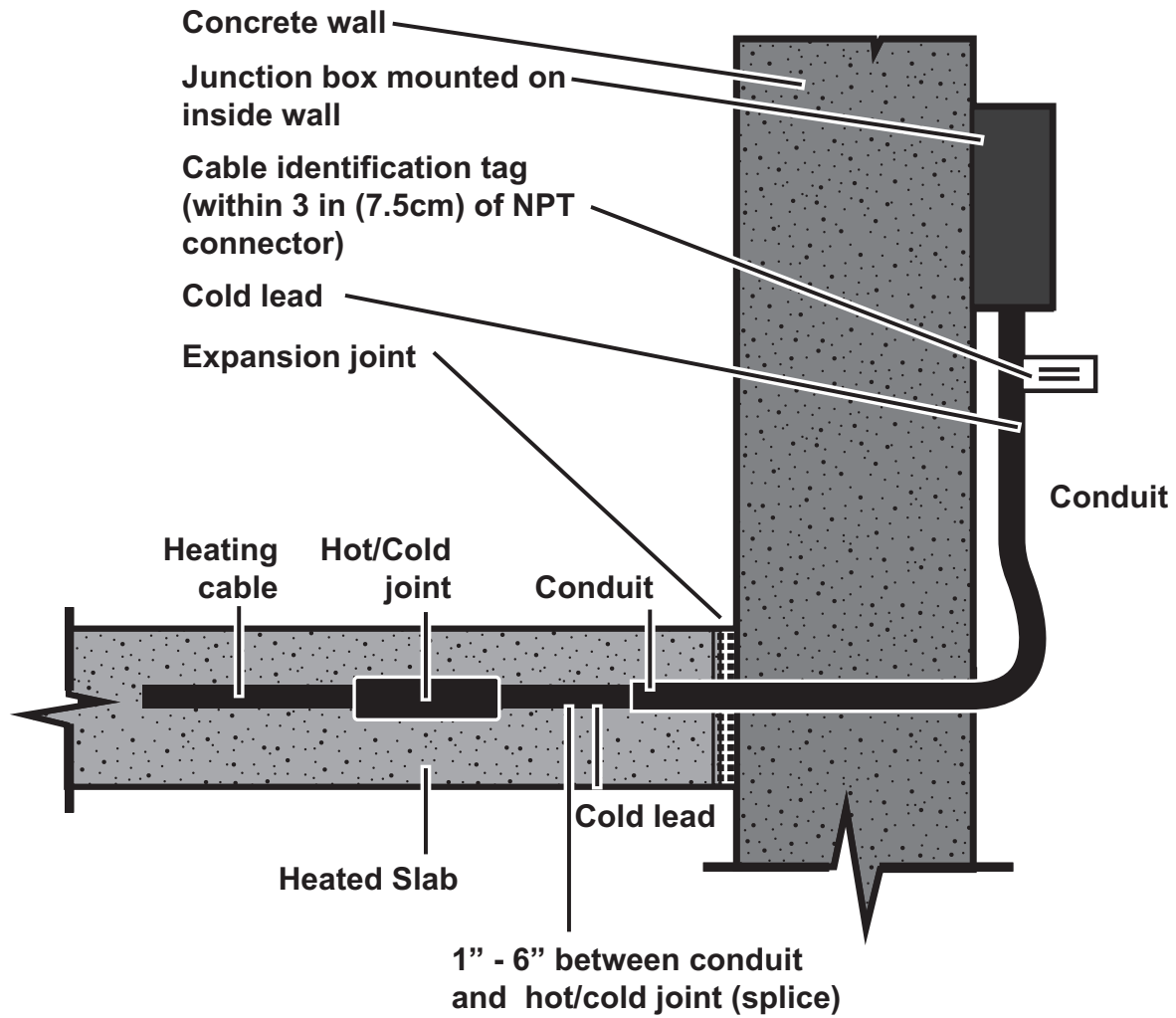
APPENDIX W:

EXPANSION AND CONTROL JOINT CROSS SECTION



APPENDIX X:

SNOW MELTING DIAGRAM: JUNCTION BOX MOUNTING



Snow Melting Troubleshooting Guide

SYSTEM NOT MELTING SNOW

1. **Do an amp draw test on the cables to verify proper operation.**
2. **What is the ambient air temperature?**
 - a. In sub-zero temperatures it is simply too cold to make operation practical. The system may run all day and night and not melt any snow at 17 degrees or less. The system can't generate enough BTUs to overcome the heatloss generated by very low temperatures.
 - b. Verify that LOW TEMPERATURE LOCK-OUT is not active on controller. The low temperature lock-out function disables unit operation in temperatures less than 17°F (-8.33°C) in those climates or during those seasons where it is simply too cold to make operation practical. The factory default low temperature lock-out setting is Off, meaning that the unit will try to activate the heaters regardless of ambient temperature.
3. **Slab sensor/control (if present) set at too low of a temperature.**
Adjust to higher temperature. This will cause the system to shut off prematurely at a less-than-optimum slab temperature, leaving snow or water present on the surface.
4. **Severe Weather. Manually activate system to clear snow and water..**
 - a. A very deep snow event will often take extra time to melt. Residential systems sometimes cannot keep up with very heavy snowfalls. Heavy snowfalls, followed by very cold temperatures can cause partial melting.
5. **Insufficient watt density. Verify spacing of product vs the design plan.**
 - a. The more distance between the heating wire, the lower the watts per square foot. The lower the watts per foot, the less satisfactory the performance. This type of system will have to run longer amounts of time, and may never melt snow.
6. **Wrong voltage is being supplied to heating cable. Verify ohms of heating product.**
Do amp draw test to verify proper operation.
 - a. Is 120V being supplied to a 240V or 277V cable?
 - b. Do the ohms match the data sheet for installed product?
 - c. Is the installed product drawing the correct amount of amps?
7. **Test ohms of heating product**
 - a. Verify proper ohms per roll/cable
 - b. Verify no shorts
8. **Inspect breaker/reset**
9. **Inspect wiring and connections inside junction boxes**

NO POWER TO HEATING PRODUCT

1. **Test ohms of heating cables/rolls**
 - a. Verify proper ohms per roll/cable
 - b. Verify no shorts
 - c. Verify no open circuits
2. **Inspect breaker/reset**
 - a. Verify proper operation
 - b. Verify proper amperage rating per install plan
 - c. Verify proper mA rating of breaker
 - d. Replace defective breaker
 - e. Verify use of dual pole breakers for 208 & 240V heaters
3. **Inspect Relay panel (if present)**
 - a. Inspect/replace any faulty wiring
 - b. Inspect/redo/replace any faulty wiring terminals
 - c. Inspect/replace relay
 - d. Verify proper trigger voltage entering relay panel/trigger relay
4. **Inoperative snow melt controller**
 - a. Verify proper connections and power to controller
 - b. Verify proper voltage to controller
 - c. Verify proper setup/programming of controller
 - d. Test/inspect sensor/s for proper operation (see troubleshooting guide for controller)
 - e. Replace defective controller or sensor
5. **Wrong voltage is being supplied to heating cable.**
 - a. Is 280V, 240V, or 277V being supplied to a 120V product?
 - b. Do the ohms match the data sheet for installed product?
 - c. Repair/replace damaged heating product
6. **Inspect wiring between breaker box and control, between control and sensor/s, control and relay panel (if present), and between relay panel and outside junction box/es.**
7. **Inspect heater connections inside all junction boxes.**

Snow Melting Troubleshooting Guide

MEGA-OHM INSULATION READINGS LOWER THAN SPEC

1. Rain or high humidity present

- a. Dry wires at test point
- b. Check for water ingress at junction boxes
- c. Dry connections and re-test.

2. Physical damage to cold lead, splice, or heating product

- a. Inspect installation area. Has any work been done in area by trade personnel? Is there visible damage to the concrete, slab, or pavers?
- b. Use troubleshooting kit and thermal camera to locate damage
- c. Repair damaged area of cable
- d. Replace damaged heating product

HEATING PRODUCT RESISTANCE LOWER THAN SPECIFICATION

1. Conductor shorted to ground somewhere in heating cable

- a. Test for ohms across conductors to ground and compare to spec for that product
- b. Use troubleshooting kit (from conductor to ground) and thermal camera to locate fault
- c. Repair damaged area of heating product

2. Both conductors shorted together somewhere in heating cable

- a. Test for ohms across conductors and compare to spec for that product
- b. Use troubleshooting kit (from conductor to conductor) and thermal camera to locate fault
- c. Repair damaged area of heating product

HEATING PRODUCT RESISTANCE HIGHER THAN SPECIFICATION

1. Conductor shorted to ground somewhere in heating cable

- a. Test for ohms across conductors to ground and compare to spec for that product
- b. Use troubleshooting kit (from conductor to ground) and thermal camera to locate fault
- c. Repair damaged area of heating product

2. Both conductors shorted together somewhere in heating cable

- a. Test for ohms across conductors and compare to spec for that product
- b. Use troubleshooting kit (from conductor to conductor) and thermal camera to locate fault
- c. Repair damaged area of heating product

3. Cold lead damaged

- a. Inspect exposed coldlead

- b. Inspect installation area. Has any work been done in area by trade personnel? Is there visible damage to the concrete, slab, or pavers?
- c. Use troubleshooting kit and thermal camera to locate damage
- d. Repair damaged area of lead
- e. Replace damaged heating product

HEATING PRODUCT RESISTANCE INFINITE

1. Open circuit

- a. Use troubleshooting kit (from conductor to conductor) and thermal camera to locate fault
- b. Repair damaged area of heating product

HEATING PRODUCT RESISTANCE ZERO

1. Conductor/s shorted to ground at factory splice

- a. Use troubleshooting kit and thermal camera to locate fault
- b. Remove factory splice and repair damaged area of heating product
- c. Contact WarmlyYours for instructions on returning Factory Splice for inspection

RESETTING CIRCUIT BREAKER

1. Test ohms of heating cables/rolls

- a. Verify proper ohms per roll/cable
- b. Verify no shorts
- c. Verify no open circuits
- d. Use troubleshooting kit and camera to locate fault
- e. Repair fault

2. Inspect breaker/reset

- a. Verify proper operation
- b. Verify proper amperage rating per install plan (re-calculate circuit load)
- c. Verify proper mA rating of breaker (30 mA GFEP breaker required by code)
- d. Replace defective breaker
- e. Verify use of dual pole breakers for 208 & 240V heaters

3. Inspect all connections

- a. Correct any incorrect wiring at all connections in the power feed

4. Inspect Junction Box/es

- a. Install drains in boxes if required
- b. Dry connections and re-connect
- c. Replace any faulty junction boxes

WarmlyYours Snow Melting Warranty

WarmlyYours, Inc. warrants the WarmlyYours snow melting cables and mats (“the Product”) to be free from defects in materials and workmanship for ten years from the date of purchase, provided that the Product is installed in accordance with the WarmlyYours product installation guide, any special written or oral design or installation guidelines provided by WarmlyYours for the specific project that the Product is intended, the provisions of the National Electric Code (NEC), and all applicable local building and electrical codes. If the Product is determined to be defective in materials and workmanship, and has not been damaged as a result of misuse, misapplication or improper installation, WarmlyYours will replace the Product or refund the original cost of the Product. Controls sold under the WarmlyYours name are warranted for two years from date of purchase. Should the control be defective or malfunction, return the control to WarmlyYours and it will be repaired or replaced (at WarmlyYours’ option). The warranty does not cover removal or reinstallation costs. See entire warranty in packaging. Other controls carry their manufacturer’s warranty.

WarmlyYours Inc. assumes no responsibility under this warranty for any damage to the Product prior to or during installation by anyone, including, but not limited to trades people or visitors to the job site, or damage caused as a result of post installation work. Call our toll free number, (800) 875-5285, if you have any questions about installation. The Limited Warranty is null and void if the Product owner or his representative attempts to repair the Product without receiving authorization. Upon notification of an actual or possible problem, WarmlyYours will issue an Authorization to Proceed under the terms of the Limited Warranty. WarmlyYours reserves the right to void said warranty, if the product owner repairs any heating wire, for any reason.

Warranty Subject to the Following Conditions: 1. The warranty of the snow melting system must be registered by completing and returning the attached ‘WarmlyYours Warranty Registration’ card to WarmlyYours, Inc. within thirty days of date of purchase. Please keep your invoice, as proof of date of purchase will be required in the event of a claim. 2. The snow melting cables or mats must be installed properly under concrete, asphalt or in mortar under pavers 3. The snow melting system must be electrically grounded and protected by a GFI (Ground Fault Interrupter). 4. The installation must comply with all national and local electrical and building codes, as well as any other applicable statutory requirements. 5. The manufacturer hereby reserves the right to inspect the installation site at any reasonable time. 6. The warranty is not automatically transferred with change of ownership, but the manufacturer may, on application, transfer the warranty for the period remaining. This transfer is solely at the discretion of the manufacturer. 7. The snow melting should be used strictly in accordance with the following: 7a. Hard wire the snow melting cables and mats to a dedicated circuit. The voltage of the circuit should match the voltage of the snow melting system, and the size of the circuit should be such that the system does not occupy more than 80% of the circuit capacity. 7b. Should you feel no warmth from the surface that the system is installed within 60 minutes, verify that there is power to the control or thermostat. Contact WarmlyYours after verifying that there is power to the system. Under no circumstances should you or anyone else tamper with or attempt to repair the snow melt system - this will render the warranty null and void. 7c. Switch the system on and off as you would any conventional electric heater, although timers or thermostats may be used if preferred. 7d. Use reasonable care in the operation of the system. Do not drop heavy articles, pierce or cut the surface that the heating system is installed. 7e. All restrictions and warnings detailed in the installation guide must be strictly followed.

WARMLYYOURS, INC. DISCLAIMS ANY WARRANTY NOT PROVIDED HEREIN, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. WARMLYYOURS FURTHER DISCLAIMS ANY RESPONSIBILITY FOR SPECIAL, INDIRECT, SECONDARY, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM OWNERSHIP OR USE OF THIS PRODUCT, INCLUDING INCONVENIENCE OR LOSS OF USE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE OF THIS DOCUMENT. NO AGENT OR REPRESENTATIVE OF WARMLYYOURS HAS ANY AUTHORITY TO EXTEND OR MODIFY THIS WARRANTY UNLESS SUCH EXTENSION OR MODIFICATION IS MADE IN WRITING BY A CORPORATE OFFICER.

WarmlyYours Snow Melt Warranty Registration

Thank you for purchasing your new WarmlyYours Snow Melting System. Once the report form is completed, please copy the form and attach a copy to the main breaker box, or give to the homeowner or business owner.

Please send a copy to WarmlyYours via mail, FAX at (800) 408-1100, or scan and send via e-mail to: sales@warmlyyours.com.

HOMEOWNER/JOB LOCATION INFORMATION			
Name		Phone	
Address		Email	
City	State	ZIP	
Order Number		Job Name	

ELECTRICIAN INFORMATION			PAVING/CONCRETE INSTALLER INFORMATION		
Company Name			Company Name		
Address			Address		
City	State	ZIP	City	State	ZIP
Installer Name		Phone	Installer Name		Phone

Install Date:	Installed Under: <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> Pavers <input type="checkbox"/> Other If Pavers, thickness of the Paver: _____ [2.5" (64mm) Max]									
Material Depth Below Cable [2" (51mm) Min.]:				Material Depth Above Cable [1.5" (38mm) Min.]:						
	Cable/Mat 1	Cable/Mat 2	Cable/Mat 3	Cable/Mat 4	Cable/Mat 5	Cable/Mat 6	Cable/Mat 7	Cable/Mat 8	Cable/Mat 9	Cable/Mat 10
Zone ID										
OHM Reading 1 - Before Install										
*MegOHM Reading 1 - Before Install										
OHM Reading 2 - During Install										
*MegOHM Reading 2 - During Install										
OHM Reading 3 - After Install										
*MegOHM Reading 3 - After Install										
PART #										
Serial Number - Internal Use Only										
QC MEGOHM - Internal Use Only										
QC OHM - Internal Use Only										

Megohms readings are done across the assembly's green, ground wire to each conductor separately. Remember to keep a copy of this form with your warranty.

*If at any time a reading does not exceed 10 Megohms, please halt installation and contact WarmlyYours.