Troubleshooting Guide

Snow Melt Testing

Covers 654, 670 and 671

Sensor Inputs

- Start by going through the view/status menus and ask the question am I getting accurate numbers back. If your in the middle of a New England Blizzard and the outdoor sensor says it's 90°F outside is this reasonable?
- If you are getting bad numbers download manual for detailed sensor testing instructions
- Sensors return a resistance based on temperature and wetness. For quick reference the temperature vs resistance chart is included in this guide

Snow Melt Is in WWSD and Snow Is Flying

- Am I getting an accurate numbers back from my sensors?
- Is my WWSD set too low? This setting is very much installation by installation. The question to ask is at this location at what outdoor air temperature does snow stick?
- Did you test the sensor with an ohm meter?
- Is the outdoor air temperature sensor properly placed or beside an exhaust vent causing artificial heating?
- If moving the sensor is not practical because of wiring look into 087 wireless outdoor sensor

Snow Melt is Running in a Summer Rain

- Is my WWSD set too high? This setting is very much installation by installation. The question to ask is at this location at what outdoor air temperature does snow stick?
- Did you test the sensor with an ohm meter?
- Is the outdoor sensor even connected? If there is no outdoor the sensor the control will operate as if it's 32°F (0°C) outside
- The inslab sensor is not an outdoor air temperature sensor because it gets heated by the water flowing through the slab
- If wiring an outdoor sensor is not practical look into 087 wireless outdoor sensor

Sensor Always Wet

- Check mechanical installation
- Is slab sensor sunken down and always in a wet well? Is the O-ring letting the cup the sensor in fill up with water?
- Is the drain for the sensor cup clogged?
- Is water getting into the sensor cup from below?
- Is sensor poorly placed where run off drains?
- Is the epoxy cracked and water getting in?
- Did you download the 090/094 manual and test the sensor with an ohm meter

⚠ WARNING

As with any electrical product, care should be taken to guard against potential risks, including electric shock or personal injury.

Sensor Status Never Shows Wet

- Sensor placement. Is the sensor under a carport or overgrown tree that stops the snow from getting on it?
- Did you clean the sensor to make sure there is no oily film from production/leaky car on it? To clean the sensor it is recommended to use hot soapy water (grease cutting dish soap works) and a soft bristle brush like a toothbrush. Wire bristle brushes can damage the epoxy and let water in
- If you can't move the sensor or your retrofitting an old system look at the 095 aerial sensor. This sensor hangs off a piece of pipe that can be mounted beside the driveway, side of the house etc. and will automatically start a time based melt cycle based on the manual melt time. It is recommended that we use a 072 or 073 slab temperature sensor
- Did you download the 090/094 manual and test the sensor with an ohm meter

System Pump Always Running

- Tekmar snowmelts use the system pump contact to run the pump the full melt/idle cycle and the boiler contacts to inject heat when needed. When there is no call the system pump should not be running
- Is idling turned on? Idling is generally used in commercial/industrial applications because of the cost of fuel. An example is a loading ramp at a warehouse. WWSD is 40, melting is 36 and idling is 32. When the outdoor air temp goes below 40 and sensor is dry the slab will be held at 32 until it gets wet. It will go to 36 for a melting cycle and return back to being held at 32 when done.
- Are the system pump contacts welded shut or pump wired to another control to keep it running? Time to do some wire tracing and checking with your meter

Slab Overheating

- What controls the boiler? Is it connected to the heat relay or other controls? The heat relay opens and closes to inject heat to the slab only when needed
- A common wiring practice is to use a zone relay for the system pump and use the XX contacts to fire the boiler. If the installation forces this wiring use the heat relay to run the pump so it only runs when we need to heat the slab
- What is the melting setpoint in the adjust/setting menus? Is it set too high

Slab Underheating and Not Melting Snow

- Sensor installation. Is the inslab sensor or 072/073 mounted where it gets an accurate reading?
- Is the water getting to slab hot enough? Most snowmelt applications require water between 120°F and 140°F to get enough heat transferred. This will depend on the slab construction
- What is the temperature differential between the inlet and outlet water temp on the slab? Most engineers design for a difference of 20-30°F. You may have to slow down the pump so the fluid has more time to transfer the heat to the slab

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Boiler Not Firing

- What controls the boiler? Snow melt or other controls
- When selecting type of boiler you pick the enable signal you are sending out to the boiler
- Use 1Stg when just closing TT contacts and boiler looks after itself
- Use Mod when sending a modulation signal like 0-10V or 4-20mA

Why Am I Paying so Much in Fuel?

- Is idling turned on? Use of idling is not recommended for residential because of the cost of running the system all winter.
- What is my melting point set to? Factory default is 36°F and we go up and down based on performance, slab construction, type of snow and other factors
- Are other heating loads controlled by other equipment firing the boiler all winter or is it just the snow melt?

Mixing

- The 654 and 670 can control a mixing device to regulate the water temperature going to the slab. Check the following if mixing appears to not be working
- Is the mix sensor giving an accurate number to the control?
- Is the output of the control configured properly for the mixing device?
- Check that the mixing output of snowmelt is sending the proper signal to the mixing device?
- Is mixing device receiving the signal?
- Is there an issue with the mixing device like a stuck valve?

Mixing With Variable Speed Pump

- The 670 turns a standard non ECM wet rotor pump into a variable speed pump by adjusting the voltage it sends out
- The voltage will reflect the mixing level. 100% mixing will equal 120VAC, 50% mixing 60VAC etc.
- Check pump specs to make sure the correct pump is being used
- What is mix target and mix temperature? Why turn on the mixing if it's at target?

Mixing With a Floating Action Valve

- Is the control sending out the correct signal to the valve to open and close?
- Is the actuator receiving the correct signal?
- Remove actuator from valve body. Does the actuator move freely? Is the valve itself stuck when turning by hand
- What is mix target and mix temperature? Why turn on the mixing if it's at target?

Wi-Fi

- The 670 and 671 can connect to Wi-Fi so the snowmelt can be controlled from the Watts Home App
- Is the IOT (cloud) connected in the Wi-Fi status screen? If this is not connected than the snowmelt will not connect to the tekmar server and not be visible on the app
- The 654 is not a Wi-Fi control but the tN4 can be connected to a gateway for remote access
- Use the 482 gateway to connect to a home automation system such as Crestron, Control 4 etc.
- Use the 486 to see the snow melt on the tekmarNet App
- Details for gateways are on the tekmar website
- With all the concerns about network security Wi-Fi is about more than just getting a signal these days. Routers have security settings that will let the snowmelt see the internet to get the weather but block access to the cloud
- See Wi-Fi troubleshooting page in Installation and Operation manual for more details. The issue may be a blocked port or firewall setting in the router.
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Notes

- The test procedure in the control does not test the sensors. It just cycles the outputs off and on testing the contacts. See manual for details on testing outputs
- The steps here apply to all snow melt controls. For detailed information on the menus please refer to manuals
- Not all the settings/menus in the manual will show up. Some settings/menus are turned off if that functionality is not being used. For example if not in mixing mode the mixing settings will not be seen
- Both the 090 and 094 slab sensors are the same sensor but the 090 comes with 65' (20m) and 094 comes with 208' (63m) of lead
- The temperatures mentioned are common numbers and used as a guideline. Some types of slab construction may require different temperatures
- Check pump specs for inrush current and check against the specs in the manuals. If the inrush exceeds the ratings of the on board relay than use that voltage to close a relay/contactor that will handle the load
- You can not connect multiple sensors to the snowmelt. You must use a 654 in 090 to get tandem operation
- You can not control multiple snow melt zones. One control for each zone
- The 095 aerial sensor is not compatible with some older snow melt controls. Please check documentation or contact technical support
- Application guides show standard configurations and wiring diagrams. Check this documentation to verify connections

Resistance Vs Temperature Inslab

- The sensor has a thermistor that changes resistance based on temperature
- Black to Red should read 50 ohms
- Black to Yellow is sensor temperature. Use chart on next page to check values
- Black to Brown is the slab temperature. Use chart on next page to check values
- Black to Blue dry = 2,000,000 Ohms (2 Mohms)
- Black to Blue Wet = 10,000 Ohms to 300,000 Ohms (10K to 300K)

Resistance Vs Temperature Aerial

- The sensor has a thermistor that changes resistance based on temperature
- Black to Red should read between 45 Ohms and 47 Ohms
- Black to Yellow is sensor temperature. Use chart on next page to check values
- Black to Blue dry = 2,000,000 Ohms (2 Mohms)
- Black to Blue Wet = 10,000 Ohms to 300,000 Ohms (10K to 300K)

Sensor Vs Resistance

Call customer service if you need assistance with technical details.

TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-50	-46	490,813	20	-7	46,218	90	32	7,334	160	71	1,689
-45	-43	405,710	25	-4	39,913	95	35	6,532	165	74	1,538
-40	-40	336,606	30	-1	34,558	100	38	5,828	170	77	1,403
-35	-37	280,279	35	2	29,996	105	41	5,210	175	79	1,281
-30	-34	234,196	40	4	26,099	110	43	4,665	180	82	1,172
-25	-32	196,358	45	7	22,763	115	46	4,184	185	85	1,073
-20	-29	165,180	50	10	19,900	120	49	3,760	190	88	983
-15	-26	139,403	55	13	17,436	125	52	3,383	195	91	903
-10	-23	118,018	60	16	15,311	130	54	3,050	200	93	829
-5	-21	100,221	65	18	13,474	135	57	2,754	205	96	763
0	-18	85,362	70	21	11,883	140	60	2,490	210	99	703
5	-15	72,918	75	24	10,501	145	63	2,255	215	102	648
10	-12	62,465	80	27	9,299	150	66	2,045	220	104	598
15	-9	53,658	85	29	8,250	155	68	1,857	225	107	553

Tel: 1-800-438-3903 • Fax: (250) 984-0815
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