

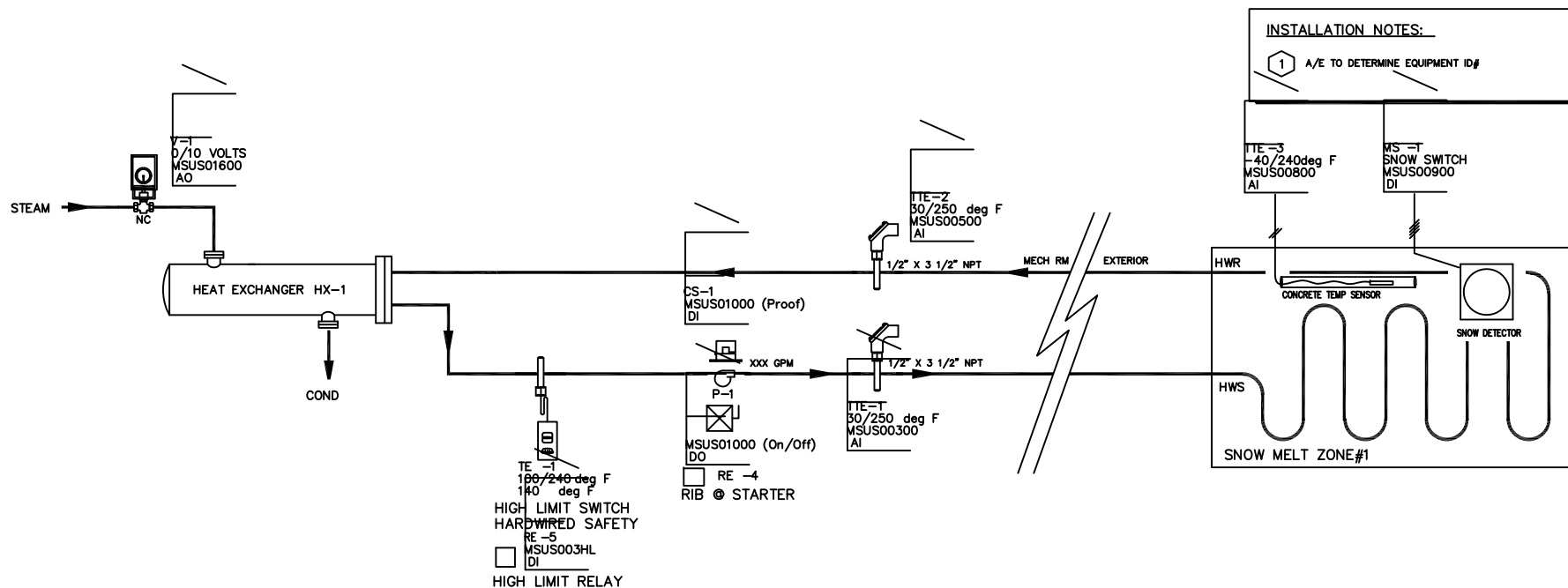
DATE
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DRAWN

REVISION
7/11/16
RLANDRUM

DETAIL NO.
XXXXXX-XX

SHEET



SNOW MELT SYSTEM CONTROL DIAGRAM

SEQUENCE OF OPERATION - SNOW MELT SYSTEM

WHEN THE SYSTEM IS ENABLED THROUGH OPERATOR INPUT THE DDC CONTROLLER MONITORS THE NOW/ICE SENSOR (MS-1) AND WHEN WATER IS DETECTED AND IF THE SYSTEM IS NOT IN "WWCO" OR "CWCO" MODES, MELTING MODE WILL BEGIN.

OPERATION USING A REMOTE ENABLE:

MELTING CAN ALSO BE INITIATED REMOTELY THROUGH OPERATOR INPUT THROUGH THE DDC SYSTEM.

MELTING MODE:

ONCE THE SYSTEM IS IN MELTING MODE, THE MELTING POINT TURNS ON, AFTER 60 SECONDS, HEAT IS APPLIED TO THE SNOW MELT SYSTEM THROUGH THE STEAM VALVE (V-1). THE SYSTEM REMAINS IN MELTING MODE UNTIL NO WATER IS DETECTED ON THE SLAB SENSOR FOR AT LEAST 4-HOURS AND THE SLAB IS UP TO TEMPERATURE FOR AT LEAST 30 MINUTES. COLD WEATHER OR WARM WEATHER CUT OFF CAN ALSO TERMINATE MELTING MODE.

IDLING MODE:

WHEN THE MELTING SYSTEM STARTS OFF FROM A COLD TEMPERATURE, THE TIME REQUIRED FOR THE SLAB TO REACH "MELTING" TEMPERATURE CAN BE EXCESSIVE. TO DECREASE THIS START UP TIME, THE SLAB WILL BE MAINTAINED AT AN "IDLING" TEMPERATURE (29DEG F, ADJUSTABLE) UNTIL MELTING IS REQUIRED, THE IDLING FEATURE IS ALSO USEFUL TO PREVENT ICE FORMATION, WHEN THE SYSTEM IS IN IDLING MODE, THE CONTROL OPERATION IS SIMILAR TO MELTING MODE EXCEPT THE "MELTING" POINT IS OFF AND THE "IDLING" POINT IS ON.

SNOW MELT SYSTEM PROTECTION FEATURES:

TO PREVENT THE SLAB FROM CRACKING DUE TO THERMAL STRESSES, THE CONTROL LIMITS THE RATE OF HEAT APPLIED TO THE SLAB THROUGH A "DELTA-T MAX" SET POINT (30DEG F, ADJUSTABLE). THE DELTA-T REPRESENTS THE DIFFERENCE BETWEEN THE SLAB SUPPLY AND RETURN FLUID TEMPERATURES WHICH ARE MEASURED BY THE SYSTEM. IF THIS TEMPERATURE DIFFERENCE APPROACHES THE "DELTA-T MAX" SET POINT, THE "MAXIMUM DELTA-T" POINT TURNS ON AND THE CONTROL OPERATES THE VALVE TO MAINTAIN THE DELTA-T AT THE "DELTA-T MAX" SET POINT.

TO PROTECT THE PIPING AND OTHER COMPONENTS IN THE SYSTEM, THE HIGH TEMPERATURE LIMIT SWITCH (TE-1) LIMITS THE SUPPLY TEMPERATURES TO A "MAXIMUM SUPPLY" SET POINT (140 DEG F, ADJUSTABLE). TE-1 IS HARD-WIRED TO STOP THE CIRCULATING PUMP AND DE-ENERGIZE THE VALVE RETURNING IT TO THE N.C. POSITION. THE DDC SYSTEM ALSO HAS AN OPERATING HIGH LIMIT SET POINT (140 DEG F, ADJUSTABLE) WHEN THE SUPPLY TEMPERATURE REACHES SET POINT, THE "MAXIMUM SUPPLY" POINT TURNS ON AND HE CONTROL OPERATES THE VALVE TO REDUCE THE SUPPLY TEMPERATURE. IN THE EVENT OF A CONTROL FAILURE THE SUPPLY TEMPERATURE HIGH LIMIT WILL DE-ENERGIZE THE VALVE RETURNING IT TO THE N.C. POSITION. THE DDC WILL HAVE A HARD SETPOINT HI LIMIT TO PREVENT THE SUPPLY WATER TEMP EXCEEDING 135 DEG F.

RAMPING THE DELTA-T DURING MELTING SYSTEM START UP:

WHEN THE SYSTEM TURNS ON THE MELTING SYSTEM, THE "TARGET DELTA-T" POINT IS SLOWLY RAMPED UP TO THE MAXIMUM DELTA-T TO PREVENT THERMAL SHOCK OF THE SLAB. THE RAMPING TIME WILL BE 20 MINUTES.

WARM WEATHER CUT OFF (WWCO):

IF THE "SLAB" AND/OR "OUTDOOR" TEMPERATURE RISE ABOVE THE "MELTING" TEMPERATURE (40DEG F, ADJUSTABLE), HEATING THE SLAB IS NO LONGER REQUIRED. THE SYSTEM WILL THEREFORE SHUT DOWN THE MELTING SYSTEM AND ENTER WWCO. DURING WWCO THE STEAM VALVE WILL BE CLOSED AND THE PUMP WILL BE OFF. DURING WWCO WHEN THE "OUTDOOR" OR "SLAB" TEMPERATURE DROPS BELOW THE "MELTING" TEMPERATURE, THE SYSTEM EXITS WWCO AND CONTINUES WITH NORMAL OPERATION.

COLD WEATHER CUT OFF (CWCO):

MAINTAINING THE SLAB AT A "MELTING" OR "IDLING" TEMPERATURE IN EXTREME COLD WEATHER CAN BE EXPENSIVE AND MAY BE IMPOSSIBLE. WHEN IT DOES SNOW AT THESE COLDER TEMPERATURES, THE SNOW IS USUALLY DRY, LIGHT, AND LESS SLIPPERY. THE SYSTEM THEREFORE TURNS THE MELTING SYSTEM OFF WHEN THE "OUTDOOR" TEMPERATURE DROPS BELOW THE "CWCO" SETTING (0DEG F, ADJUSTABLE). DURING CWCO THE VALVE REMAINS CLOSED AND THE PUMP SHUTS OFF. WHEN THE OUTDOOR TEMPERATURE RISES ABOVE THE "CWCO" TEMPERATURE, THE DDC EXITS CWCO AND IF THE SNOW/ICE SENSOR DETECTED SNOW DURING CWCO, THE CONTROL INITIATES MELTING MODE.

PUMP OPERATION:

DDC WILL MONITOR THE OPERATING STATUS OF THE PUMP THRU RESPECTIVE CURRENT SWITCH. UPON PUMP FAILURE DDC SHALL ACTIVATE FAILURE ALARM AND CLOSE THE STEAM VALVE.

ALARMING

- NORMAL**
- PUMP FAILURE
 - SUPPLY WATER TEMPERATURE
 - SLAB TEMPERATURE

"ENHANCED" 24/7