

LEGEND

DRAWING LIST

START

Start of GX Mat/Cable

GX-1

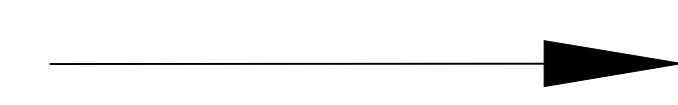
Legend/Drawing List

END

End of GX Mat/Cable

GX-2

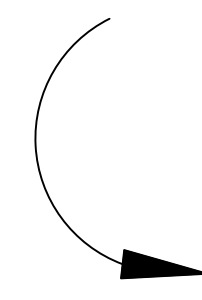
GX Specification



Direction of GX Mat

GX-3

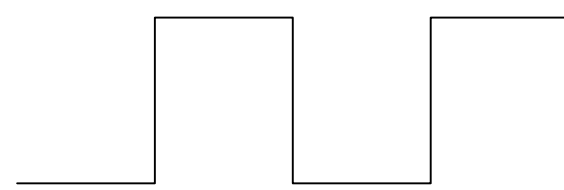
GX General Notes



Rotation of GX Mat

GX-4

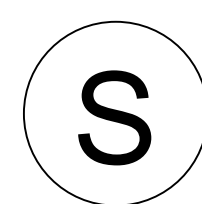
GX Concrete Installation



Loose Cable

GX-5

GX Asphalt Installation



Sensor

GX-6

GX Stonework Installation

GX-7

DS Controller Configuration

GX-8

DS to CDP-2 / DS to Contactor Panel

GX-9

GX-850M Wiring / GX-850M to Contactor Panel

GX-10

GX-850 Typical Application / Sensor Locations

GX-11

GX Typical Contactor Load Wiring

GX-12

GX Mat Modification

GX-13

GX Typical Layouts

1.	Date	Desc.
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GX General Submittal		
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Legend/Drawing List		



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2018

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Drawing No:

GX-1

GX Mat/Cable Specification

1. General
Supply and install a complete system comprised of heating cables, accessories, and controls for snow melting in ramps, slabs, sidewalks, paths, etc.
2. Material
 - 2.1. Shall be Danfoss GX dual conductor heating cable.
 - 2.2. Conductor: Copper or Copper Alloy with Nickel coating.
 - 2.3. Insulation: FEP Dupont with an average thickness not less than 0.25mm and than layer of XLPE.
 - 2.4. Shield: Tin-Coated drain wire combined with 0.050mm aluminum foil coated with 0.012mm PBT, 100% coverage.
 - 2.5. Jacket: PVC with an average thickness not less than 0.75mm.
 - 2.6. Lead free 1/4" round heating cable that is both flexible and UV protected.
 - 2.7. Shall include 20' cold lead, single point connection.
 - 2.8. Rated Temperature: 220°F (105°C), maximum voltage 600V, up to 12 W/ft (40W/m).
 - 2.9. Heating cable circuit shall be protected by a ground fault device in accordance per NEC article 426 and 427.
 - 2.10. Shall be approved to applicable UL and CSA standards.
3. System Controls

Option 1: Automatic Snow Controller
The system shall be controlled by Danfoss GX850 dual zone control panel with external digital temperature and moisture ground sensors either directly or through an appropriate contactor.

 - 3.1.1. Automatic Snow Controller shall be microprocessor based to provide effective, economical, automatic control.
 - 3.1.2. Automatic Snow Controller shall have dual zone capability.

- 3.1.3. Automatic Snow Controller shall have an adjustable timer providing up to ten hours of system operation after snowfall ceases for complete melting.
 - 3.1.4. Automatic Snow Controller shall have the following modes:
 - a. Automatic
 - b. Constant Off
 - c. Constant ON (Manual Timer)
 - 3.1.5. Automatic Snow Controller shall have adjustable parameters
 - a. Melting Temperature (33.8°F to 49°F)
 - b. Moisture Sensibility 5 to 95 (5 being the most sensitive to moisture)
 - c. Standby (Slab) temperature (-4°F to 32°F)
 - 3.1.6. Automatic Snow Controller shall be able to indicate the actual temperature and moisture levels for sensors.
 - 3.1.7. Automatic Snow Controller shall have an info-button for help/information.
 - 3.1.8. Automatic Snow Controller shall have self-diagnosis program, which will detect faults and give an alarm.
 - 3.1.9. Automatic Snow Controller shall have individual LEDs to provide a visual indication of alarm and heater operation.
 - 3.1.10. Automatic Snow Controller shall be capable of accepting four ground sensors.
 - 3.1.11. Automatic Snow Controller shall have multi-language capabilities (English, Spanish and French).
 - 3.1.12. Sensors shall include 50' lead.
- Option 2: Snow Switch Control
The system shall be controlled by Danfoss DS-2C/DS-5C pole or wall mounted temperature and moisture sensor either directly or through an appropriate contactor.
- 3.2.1. DS-2C/5C shall be microprocessor-based to provide effective, economical, automatic control.
 - 3.2.2. DS-2C/DC shall have an adjustable timer providing up to ninety minutes of system operation after snowfall ceases for complete melting.

- 3.2.3. DS-2C/5C Snow Controller shall have the following modes.
 - a. Manual ON
 - b. Automatic
 - c. Stanby/Reset
 - 3.2.4. DS-2C/5C Snow Controller shall have adjustable parameters
 - a. Melting Temperature (34°F to 44°F)
 - b. Timer (30 to 90 minutes)
 - 3.2.5. DS-2C/5C Snow Controller shall have two sensors: Moisture and Temperature.
- Option 3: Thermostat
The system shall be controlled by an ambient sensing thermostat Danfoss 088L3422 either directly or through an appropriate contactor.
4. Execution
 - 4.1. Installation
 - a. System must be installed per manufacture's recommendation using the method described in the installation guide.
 - b. Place the heating mats and sensors in the surface material as per the installation guide.
 - c. Secure the heating mat/cable to the rebar or ground.
 - d. Maker plaque must indicate presence of embedded heating cables as per NEC 426-13
 - e. Inspect the cable and controls upon receiving the shipment. Note any damage and ensure materials received match the order and shipping documents.
 - 4.2. Tests
 - a. Refer to the manufacturer's literature for requirements for testing and documenting cable resistance and insulation-to-ground readings.
 - b. Take test as outlined in the installation Manual.
 - c. If problems are discovered, consult the manufacturer.
 - d. If unable to correct problems notify the engineer before proceeding with the installation.
 - e. Keep record of all readings for inspection by the engineer or for submittal to the manufacturer to ensure a valid warranty.
 5. Warranty
 - 5.1. Manufacturer shall offer a 20-year, non-prorated warranty.

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Project: GX General Submittal		
Drawing Title: GX Specification		
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GX-2		

General Notes

Caution!

Is it important to read the instructions carefully before installing the Danfoss GX Snow Melting System.

For outdoor installation, only
Never cut the black heating cable

Extreme care must be used to ensure the GX cables are not damaged when using sharp tools, wheelbarrows, heavy machinery and paving equipment, shovels, rakes, or other implements. Avoid walking on the cables or mats during installation;

It is not recommended to install the Danfoss GX heating mats with a controller that does not contain an integrated temperature limiter;

The GX mat or GX cable must be embedded in mortar or mortar mixture, concrete, sand or similar material;

The power lead/heating cable connection and at least 1' (30 cm) of the power lead must be embedded in the paved surface;

Remaining power lead should be run through the conduit

The power lead may be extended if required;

Do not install the Danfoss GX cables in such a manner that two black heating cables touch, cross or overlap;

Remember to always measure, verify and record the actual resistance throughout the installation process:

Out of the box
After installation
Before pouring the sand/concrete/asphalt
After surface material application

Record these values in the table on the warranty card, failure to do so will void the warranty;

Measure the resistance between two live conductors as well as the resistance between each conductor and the ground wire.

Danfoss recommends using a megaohmmeter to test the insulation resistance.

Remember to check that the supply voltage matches the voltage required for your particular Danfoss GX product;

Remember to place the labels as instructed in this manual

Metal structures or materials used for the support of or on which the Danfoss GX is installed must be grounded in accordance with CSA Standard C22.1, Section 10 and the NEC.

Please consult the Danfoss Electrical Heating Division for any other questions, concerns or advice.

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GX General Submittal

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GX General Notes



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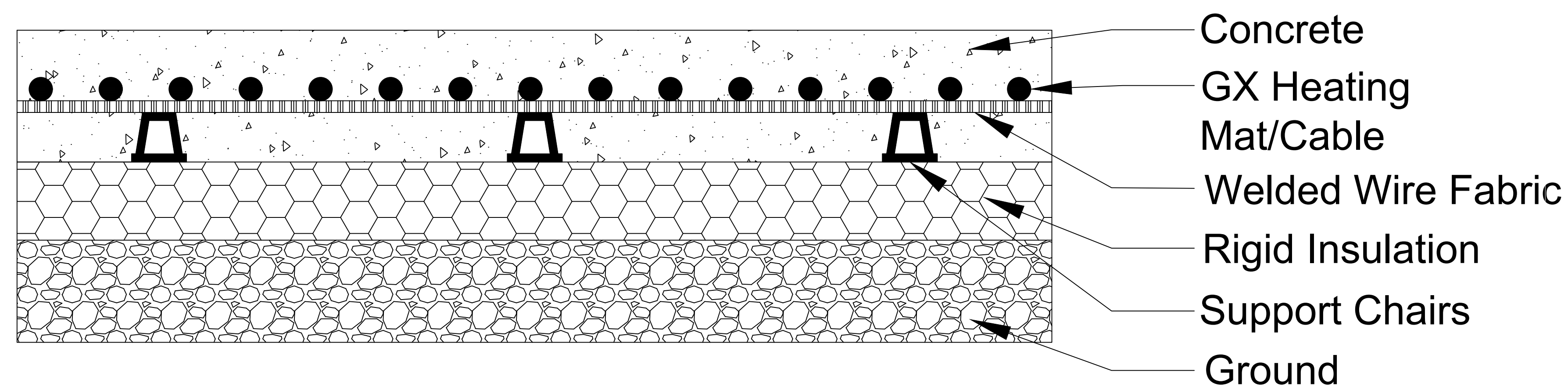
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GX-3

New Poured Concrete Installation:



Note: Danfoss GX heating cable must never be run through a control or expansion joint. Doing so may cause damage the to the cable with slab movement.

Concrete Installation

When installing Danfoss GX heating cables the following should be observed:

Begin installation as close as possible to electrical supply source. The heating cable must not be cut or shortened or exposed to strain in the areas of the cold tail/heating cable coupling.

Insulation can be installed to improve efficiency of the heating system.

Special care should be taken not to damage the heating cables with tools and machinery during the installation and application of the surface material.

Ensure that all sharp stones and debris are removed from the area where the heating cables are going to be installed.

Should the cable become damaged during the installation process it is helpful to know the location of the cold tail/heating cable connection. Take a picture or sketch to show where the connection/end cap is in case a fault needs to be found.

Connection of the heating cable must be carried out by an authorized electrician.

Note the maximum output allowed for your installation. Do not exceed it. Contact your local Danfoss GX dealer for questions/concerns.

Make sure the cable is not subjected to excess tension or strain. It should not cross an expansion joint. Where expansion joints are present, separate mats/cables should be used.

The heating cable braid must be grounded in accordance with local electrical codes.

Make sure when the cable is laid it is not pushed into the insulating material.

Ensure no air pockets exist in the surface material as this can result in damage to the cable and limit the heat transfer.

An upstream disconnect must be installed to ensure a means of de-energizing the cable or mat.

At low temperatures, the heating cable stiffens and may be difficult to work with. To overcome this, connect the cable to the mains for a brief period of time. Ensure the cable is fully rolled out when this is done.

The cables are normally covered by 2 inches of concrete. A thicker surface may be required depending on the pour and application. Make sure that the free cable is fastened at intervals of minimum 3' (45 cm), as the concrete might move the cable when it is poured.

The concrete mixture must not contain sharp stones as these may damage the cable.

The concrete should be allowed to set for 30 days before the heating cables are turned on.

It is not recommended for the GX mat or cable to cross an expansion joint.

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GX Concrete Installation



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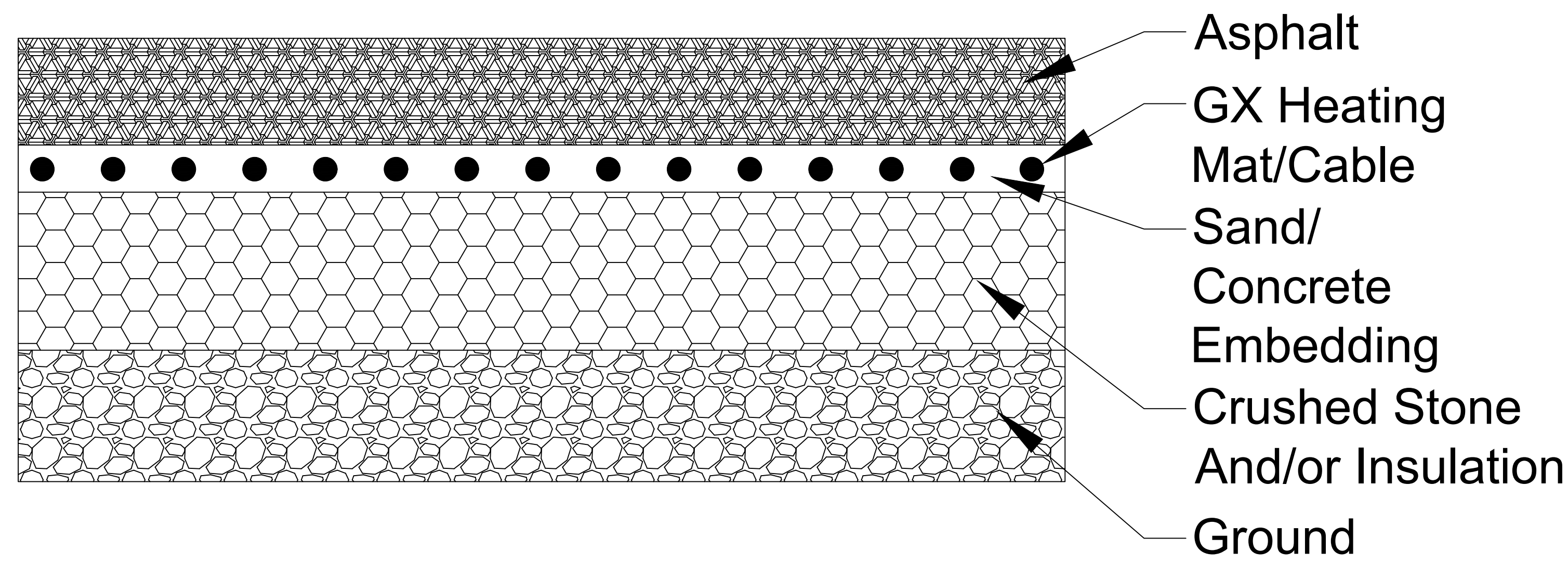
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Drawing No:

GX- 4

GX Embedded in Sand/Concrete:



Asphalt Installation

When installing heating cables the following should be observed:

Begin installation as close as possible to electrical supply source. The heating cable must not be cut or shortened or exposed to strain in the areas of the cold tail/heating cable coupling.

Install cables in a direction perpendicular to the direction that the paving rollers will pass to prevent straining or damaging the cable.

Insulation can be installed to improve efficiency of the heating system.

Special care should be taken not to damage the heating cables with tools and machinery during the installation and application of the surface material.

Ensure that all sharp stones and debris are removed from the area where the heating cables are going to be installed.

Should the cable become damaged during the installation process it is helpful to know the location of the cold tail/heating cable connection. Take a picture or sketch to show where the connection/end cap is in case a fault needs to be found.

Connection of the heating cable must be carried out by an authorized electrician.

Note the maximum output allowed for your installation. Do not exceed it. Contact your local Danfoss GX dealer for questions/concerns.

Make sure the cable is not subjected to excess tension or strain. It should not cross an expansion joint.

The heating cable braid must be grounded in accordance with local electrical codes.

Make sure when the cable is laid it is not pushed into the insulating material.

Ensure no air pockets exist in the surface material as this can result in damage to the cable and limit the heat transfer.

An upstream disconnect must be installed to ensure a means of de-energizing the cable or mat.

At low temperatures, the heating cable stiffens and may be difficult to work with. To overcome this, connect the cable to the mains for a brief period of time. Ensure the cable is fully rolled out when this is done.

It is recommended to cover the cables with a layer of sand or concrete at least 1" (2.5 cm) before the asphalt is applied to protect them from the heat of the asphalt. Use of sand or concrete will ensure an effective and efficient heat transfer through the asphalt.

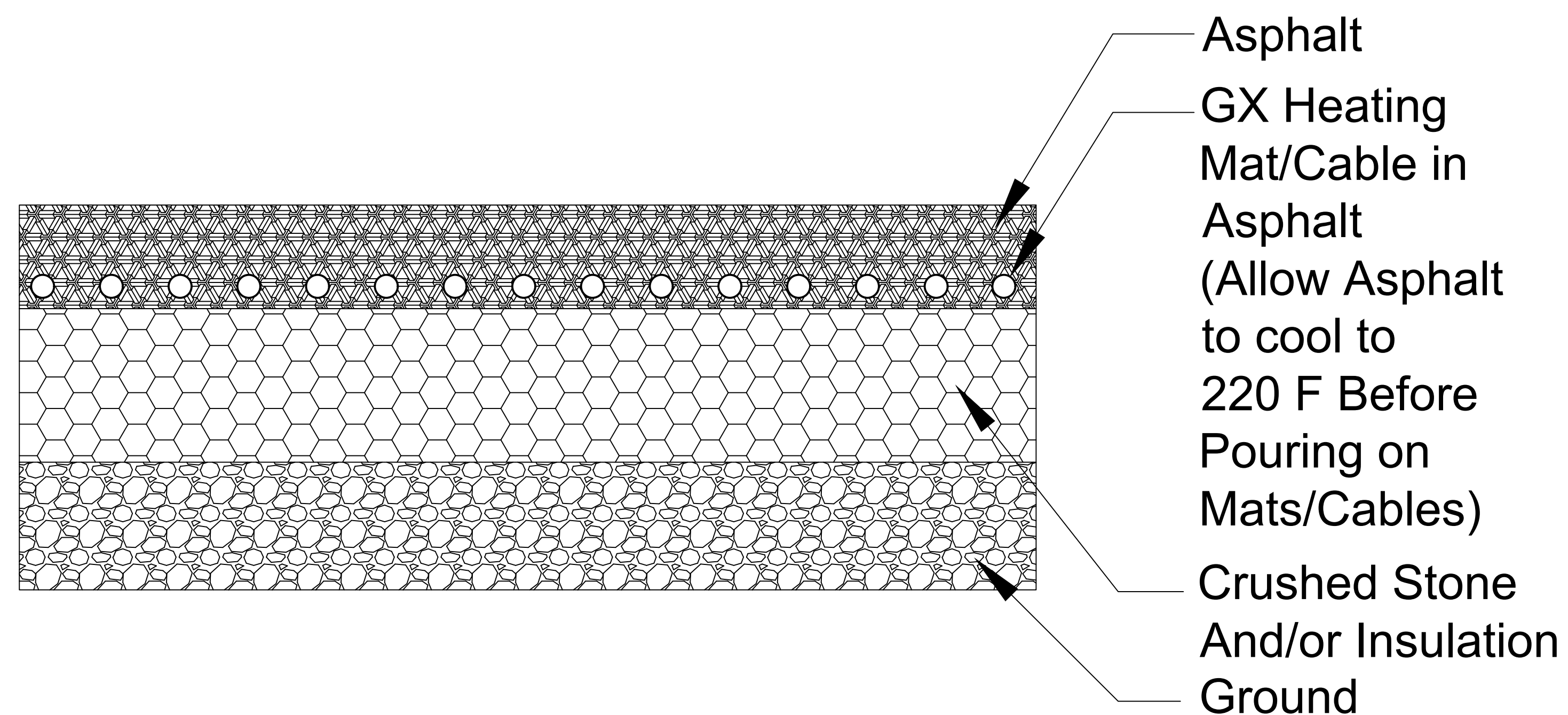
If using sand or concrete, allow the asphalt to cool to a temperature of 265°F (130°C) maximum before pouring. If using without sand or concrete, allow asphalt to cool to 220°F/ (105°C) before pouring directly on mats/cables. Ground sensors/tubes should not be exposed to temperatures above 80°C (176°F.)

The cables are normally covered by 2 inches of asphalt.

A perimeter of maximum 12" (30 cm) of asphalt should exist, unheated around the embedded cables. This allows for adjustment of the paving surface edge without damaging the heating cable.

The operating weight of the asphalt roller should not exceed 1000lbs.

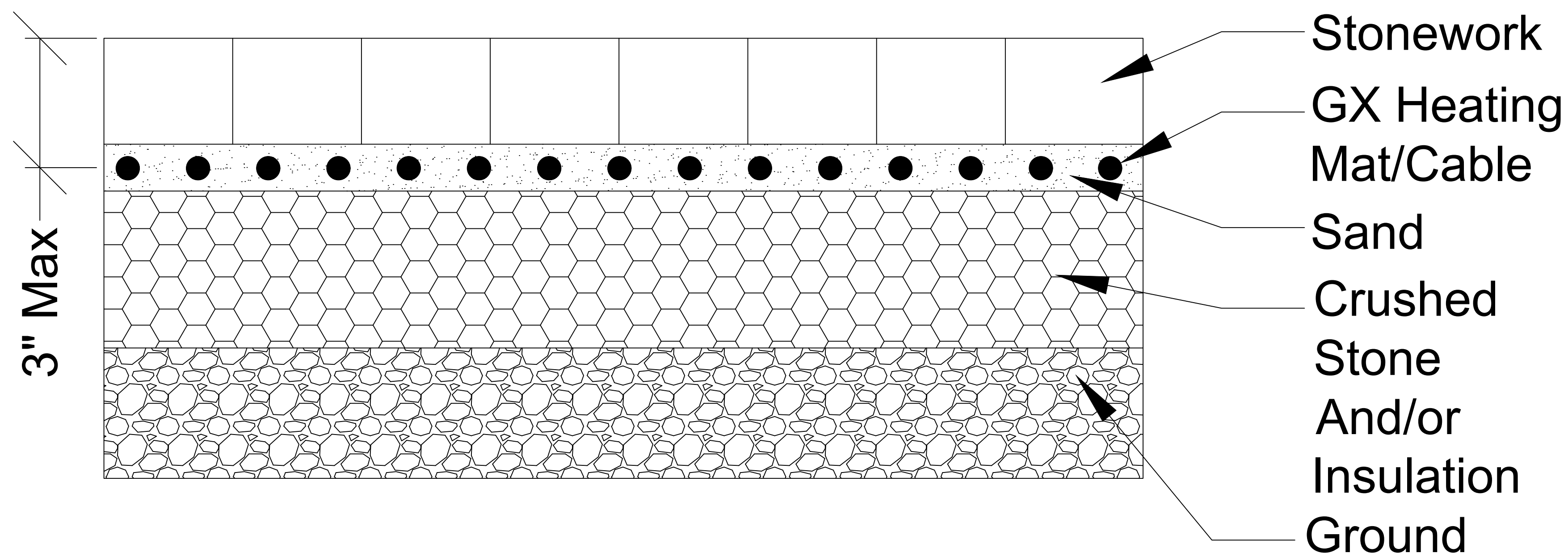
GX Embedded Directly in Asphalt:



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Stonework Installation:



Stonework Installation

When installing heating cables the following should be observed:

Begin installation as close as possible to electrical supply source. The heating cable must not be cut or shortened or exposed to strain in the areas of the cold tail/heating cable coupling.

Insulation can be installed to improve efficiency of the heating system.

Special care should be taken not to damage the heating cables with tools and machinery during the installation and application of the surface material.

Ensure that all sharp stones and debris are removed from the area where the heating cables are going to be installed.

Should the cable become damaged during the installation process it is helpful to know the location of the cold tail/heating cable connection. Take a picture or sketch to show where the connection/end cap is in case a fault needs to be found.

Connection of the heating cable must be carried out by an authorized electrician.

Note the maximum output allowed for your installation. Do not exceed it. Contact your local Danfoss GX dealer for questions/concerns.

Make sure the cable is not subjected to excess tension or strain. It should not cross an expansion joint.

The heating cable braid must be grounded in accordance with local electrical codes.

Make sure when the cable is laid, that it is not pushed into the insulating material.

Ensure no air pockets exist in the surface material as this can result in damage to the cable and limit the heat transfer.

An upstream disconnect must be installed to ensure a means of de-energizing the cable or mat.

At low temperatures, the heating cable stiffens and may be difficult to work with.

To overcome this, connect the cable to the mains for a brief period of time. Ensure the cable is fully rolled out when this is done.

Special care must be taken not to damage the heating cables when they are installed under bricks or tiles.

The area must be completely level and free of stones or other sharp objects. The heating cable must be installed close to the bricks or tiles, typically in a layer of sand (at least 1" (2.5 cm) under the brick).

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Stonework Installation



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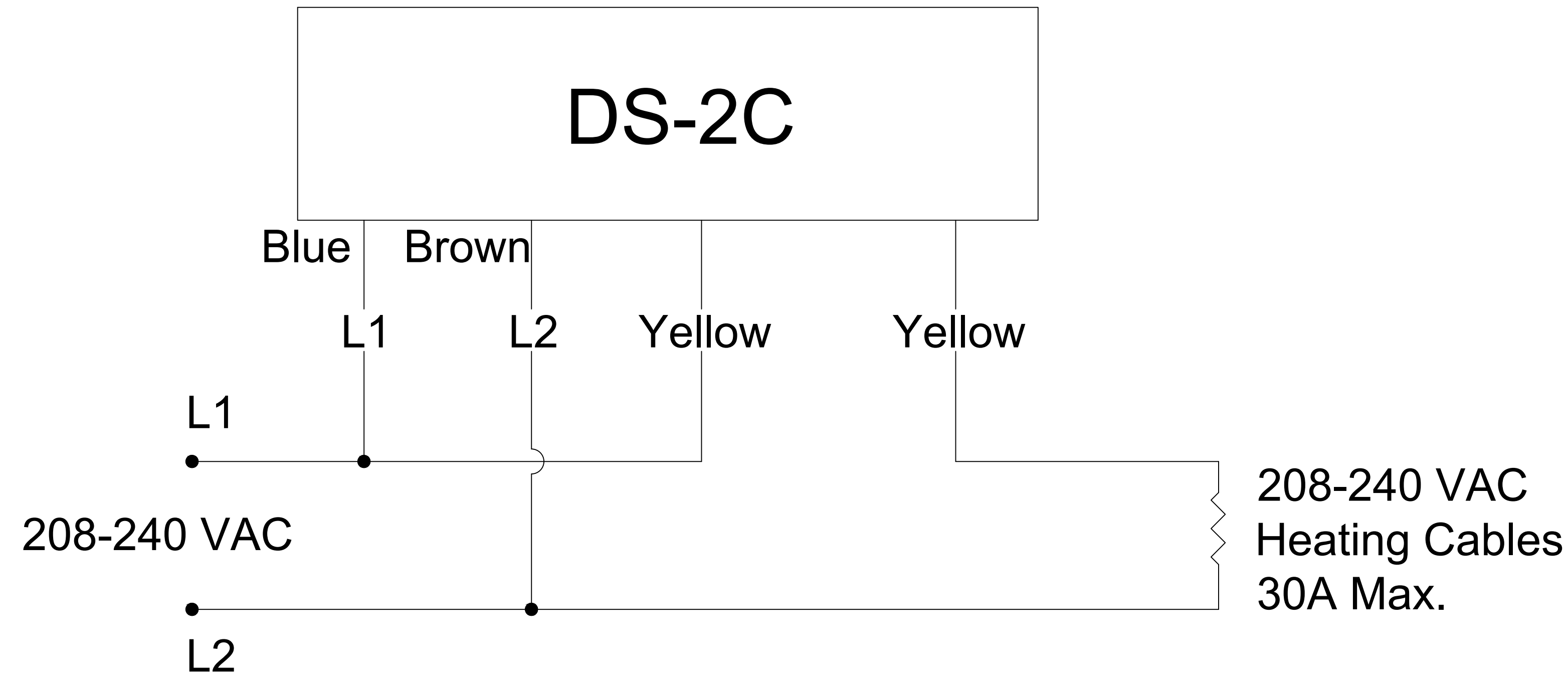
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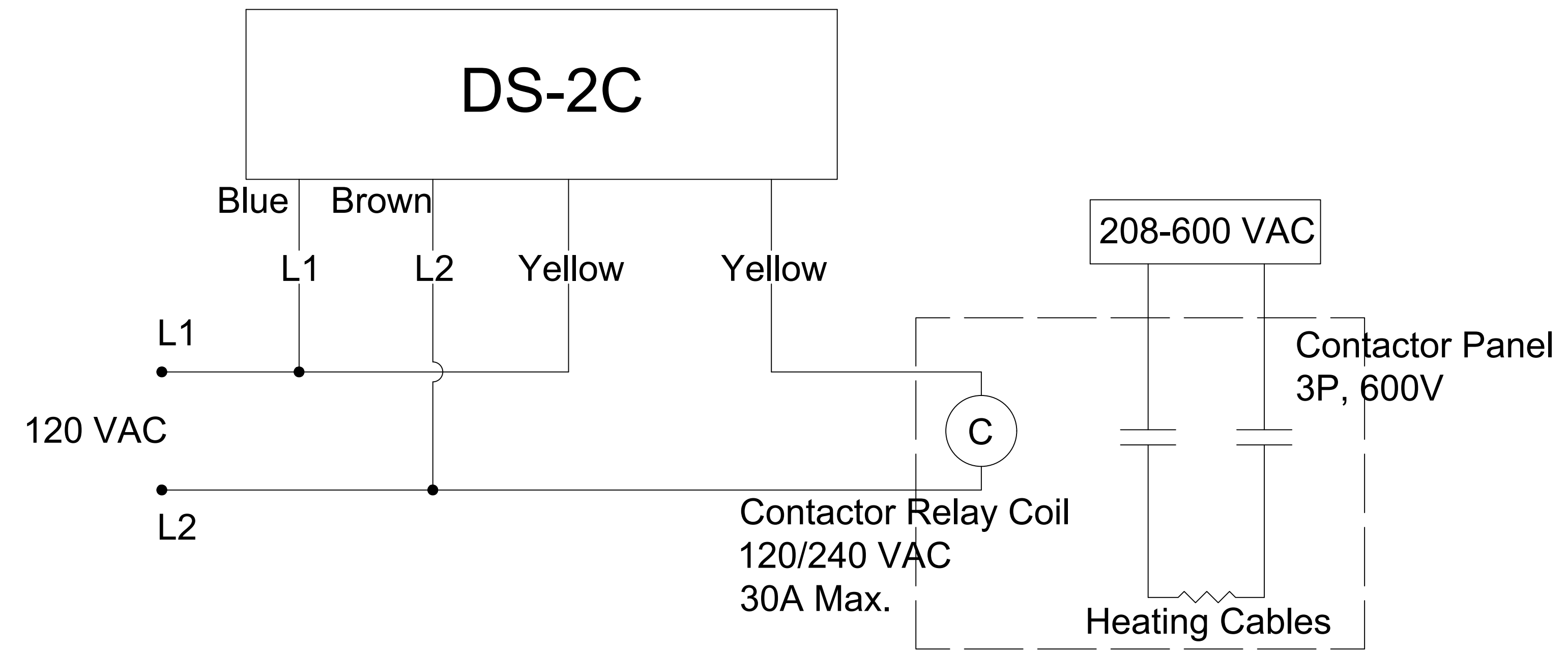
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Drawing No:
GX-6

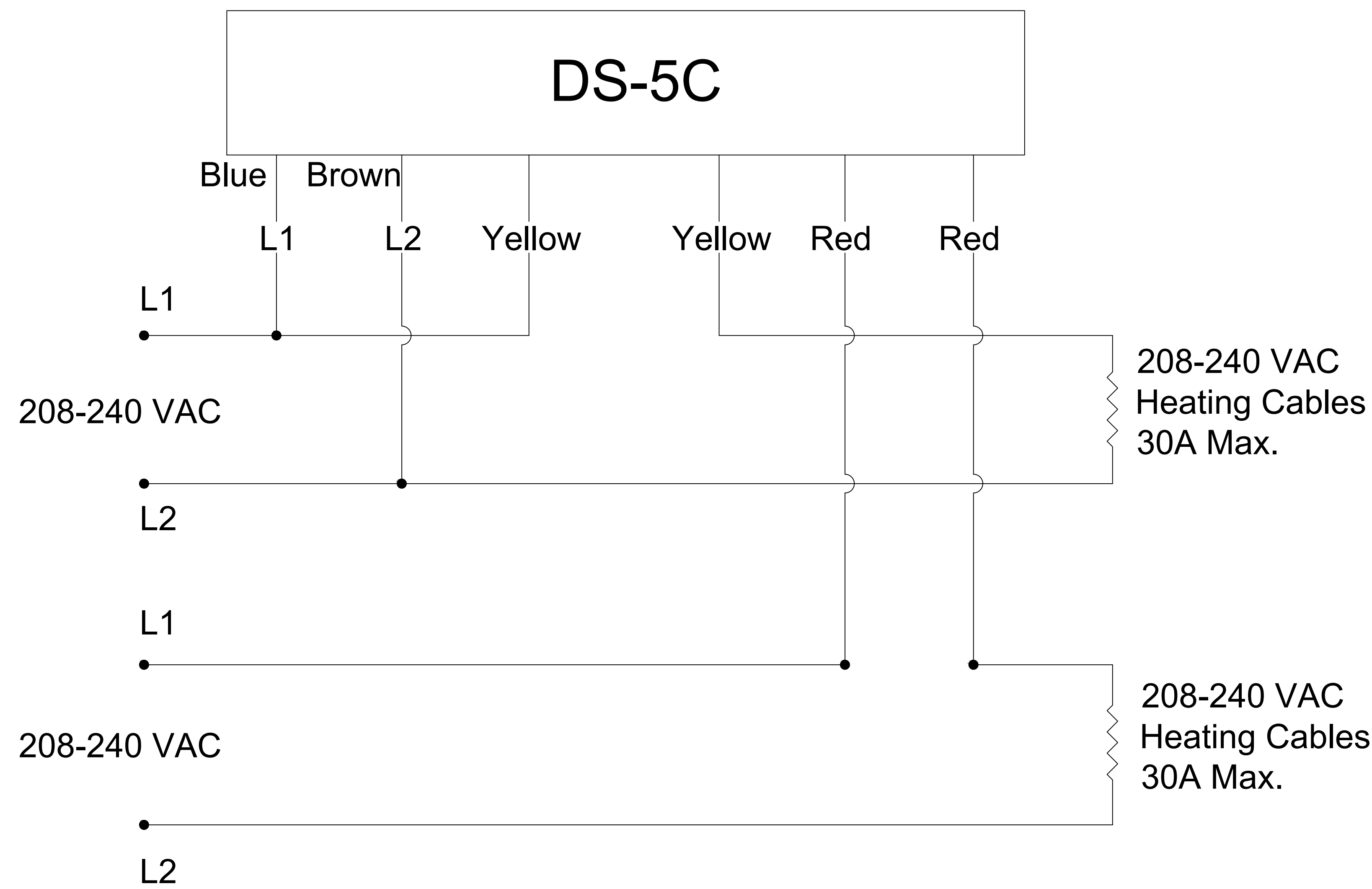
Under 30A Configuration



Greater Than 30A Configuration



DS-5C



Dual 30A @240 VAC Load Control

1.	Date	Desc.
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No: Date: Description:

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Drawing Title:

DS Wiring



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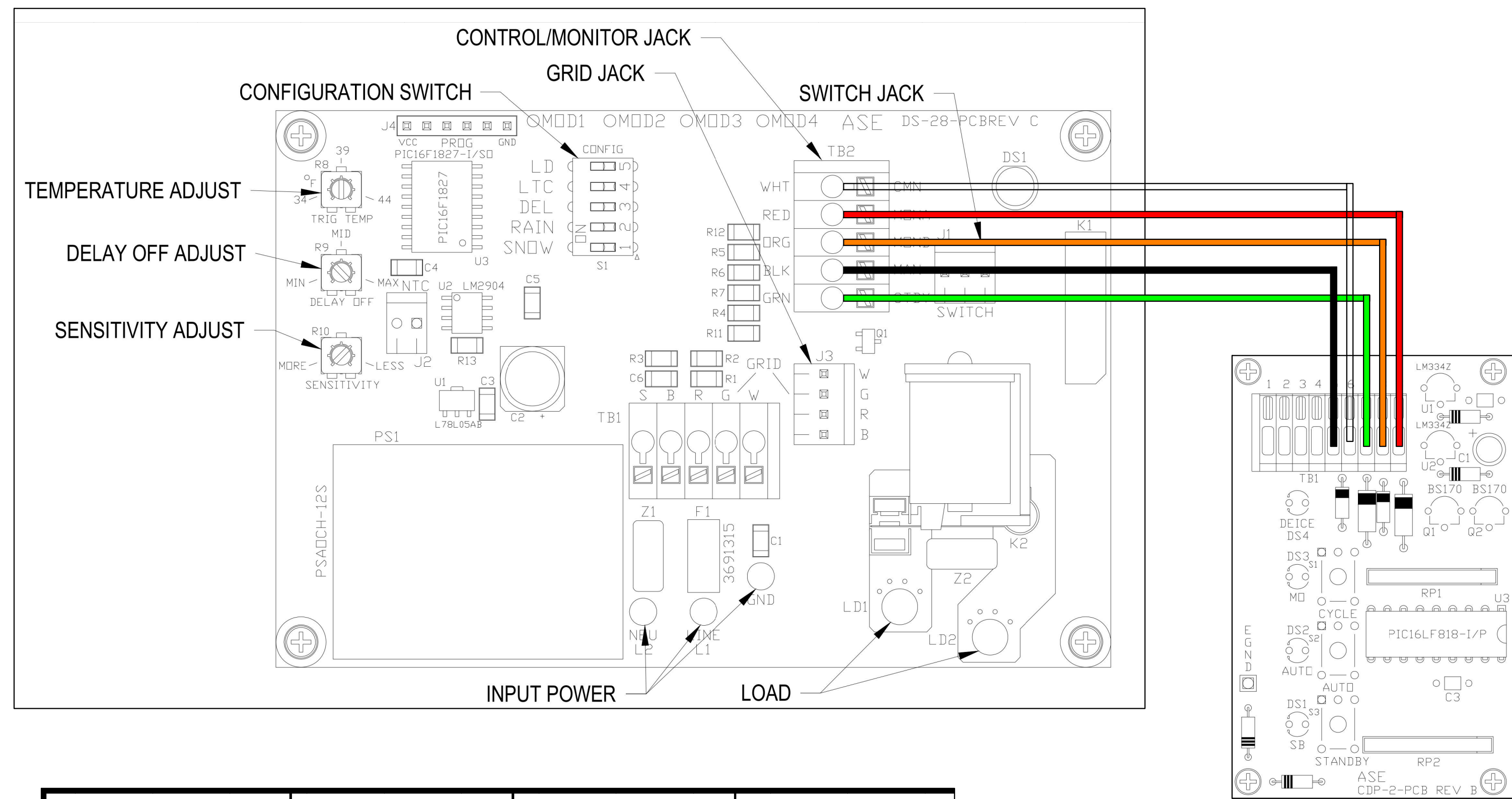
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Drawing No:

GX-7

DS Controller



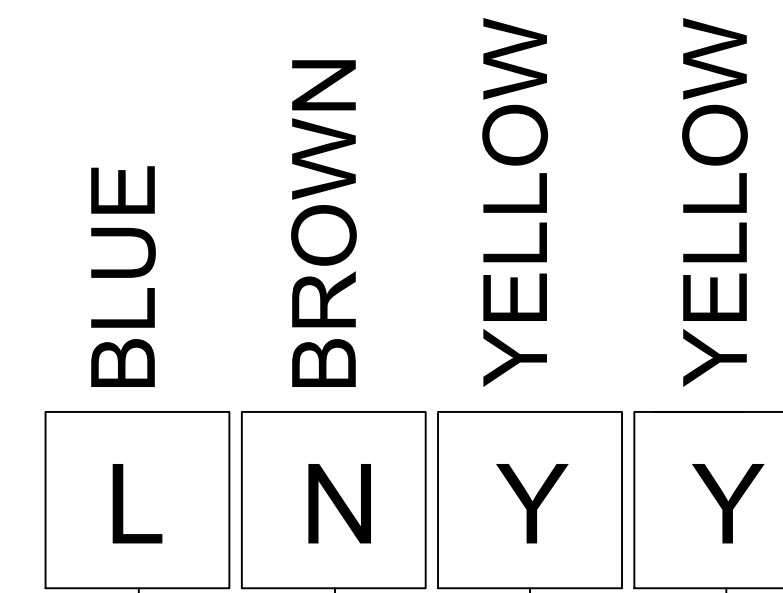
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Black	Manual On		5
White	Return		6
Green	Standby/Reset		7
Orange	Deice On Mon		8
Red	Deice On Mon		9

CDP-2

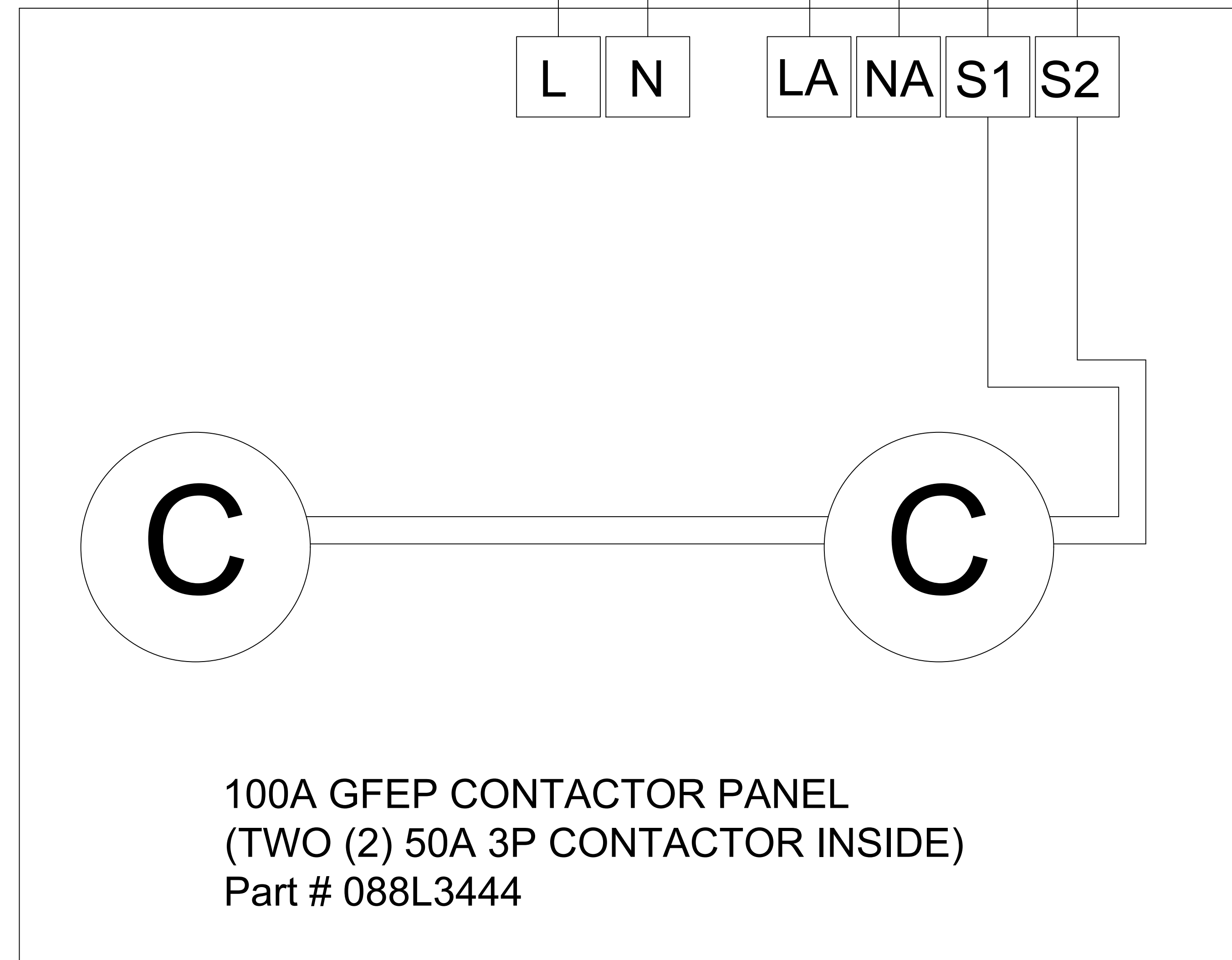
Note:

1. The cable conductors must be tinned, stranded, minimum 22AWG copper. Overall shielding is required
2. The CDP-2 can be installed as much as 500 feet away from the snow sensor if proper cable is used.

DS Controller



120V SUPPLIED BY CUSTOMER



100A GFEP CONTACTOR PANEL
(TWO (2) 50A 3P CONTACTOR INSIDE)
Part # 088L3444

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DS to CP2
DS to Contactor Panel



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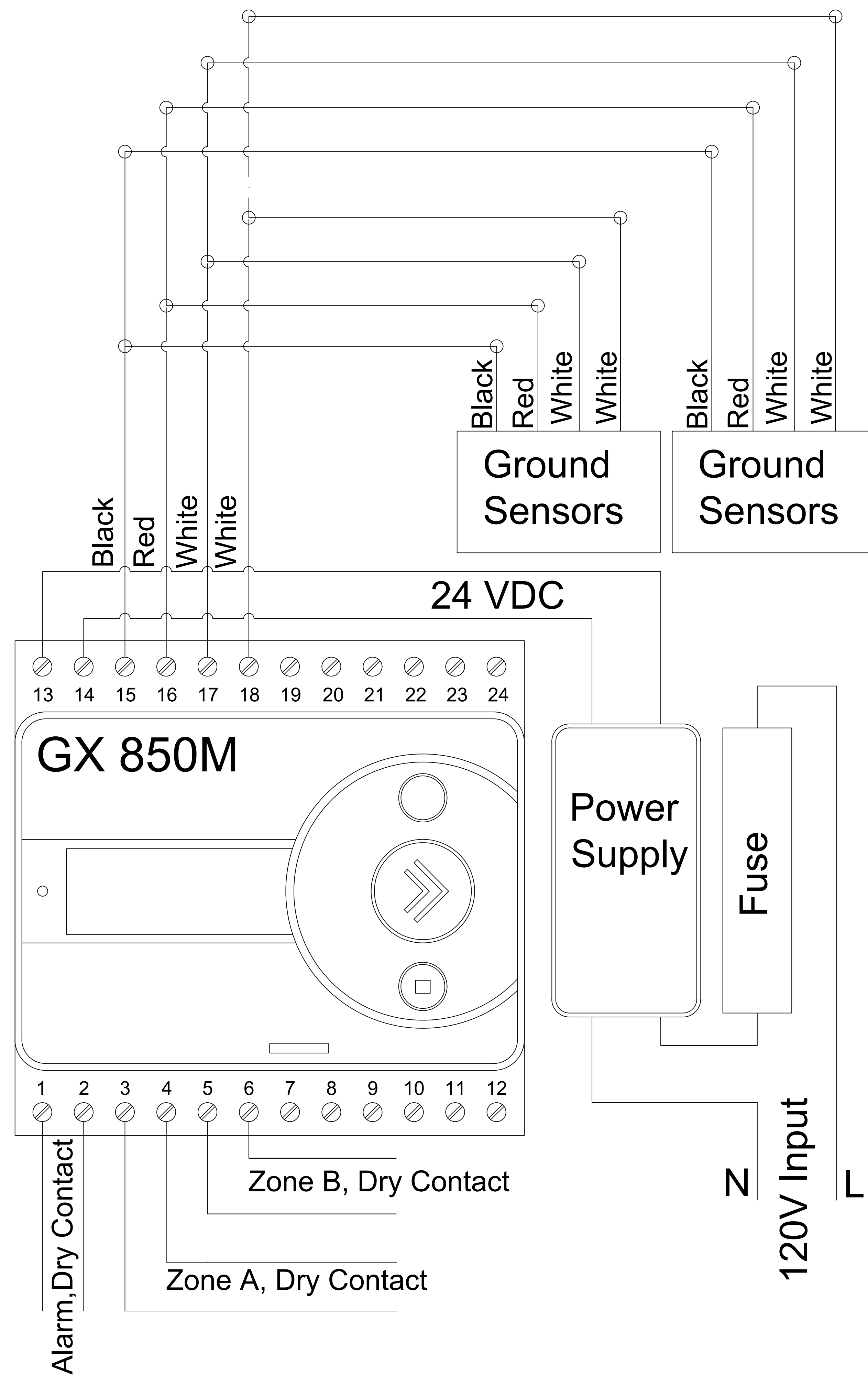
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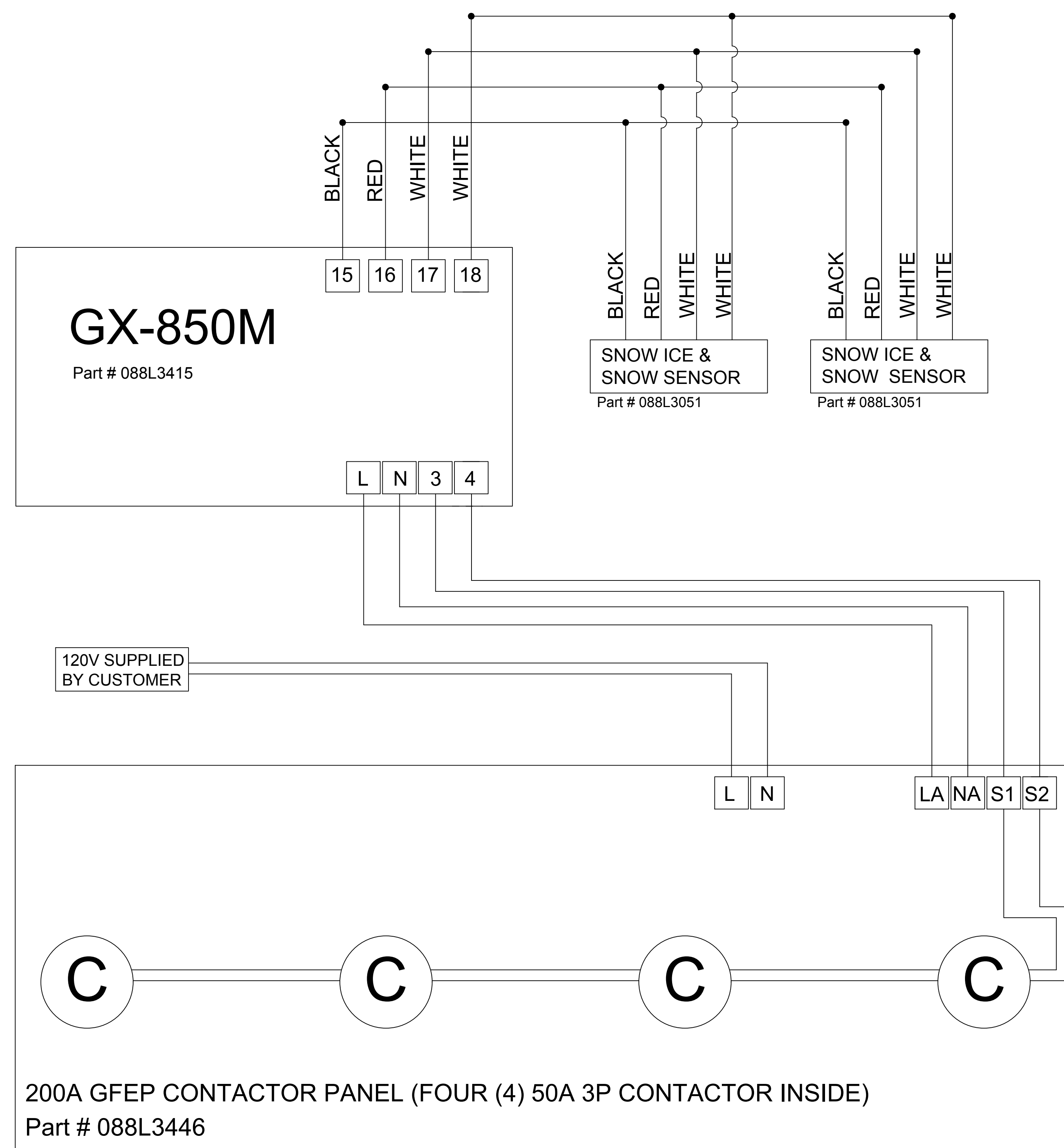
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Drawing No:

GX-8



Sensor Cable Extension			
Cable Type	# of Sensors		
	1- 2	3	4
Max Length (ft)			
16 AWG	985 ft	492 ft	262 ft
14 AWG	1476 ft	738 ft	394 ft
12 AWG	2460 ft	1247 ft	656 ft
10 Wag	3940 ft	1969 ft	1017 ft



1.	Date	Desc.
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GX-850M Wiring
GX-850M to Contactor Panel



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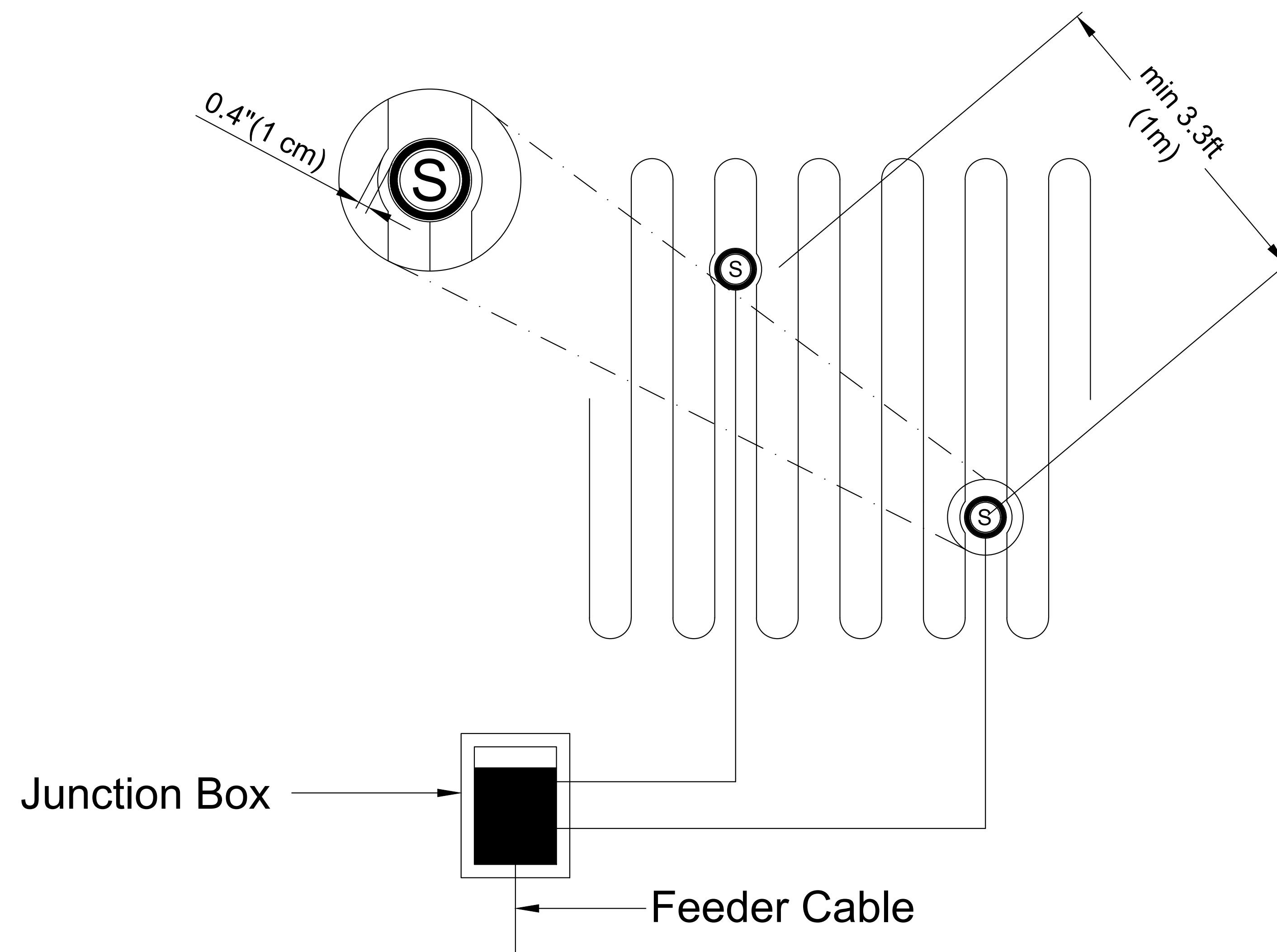
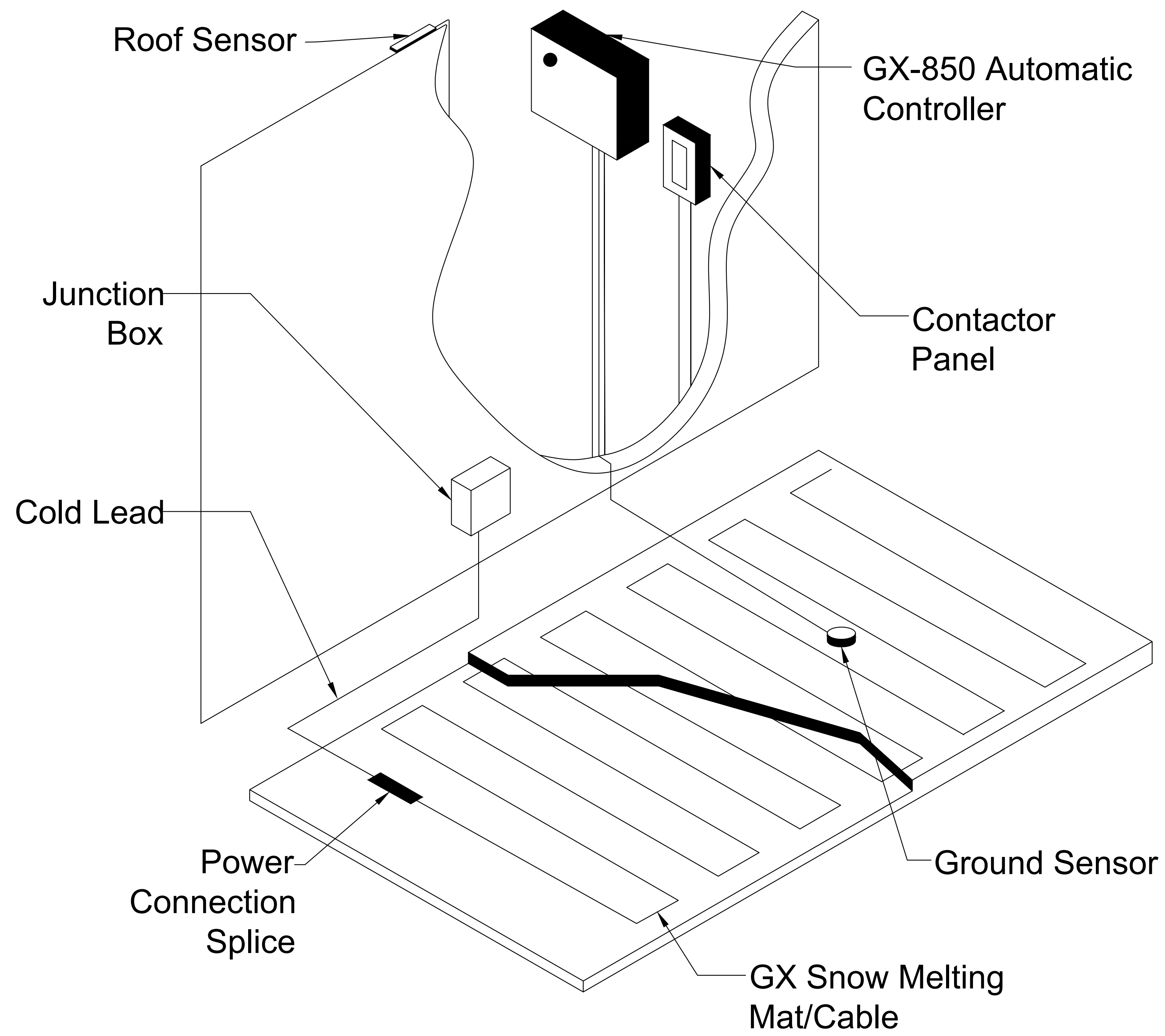
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Drawing No:
GX-9



1.	Date	Desc.
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GX General Submittal

Drawing Title:

GX-850 Typical Install
GX-850 Sensor Location



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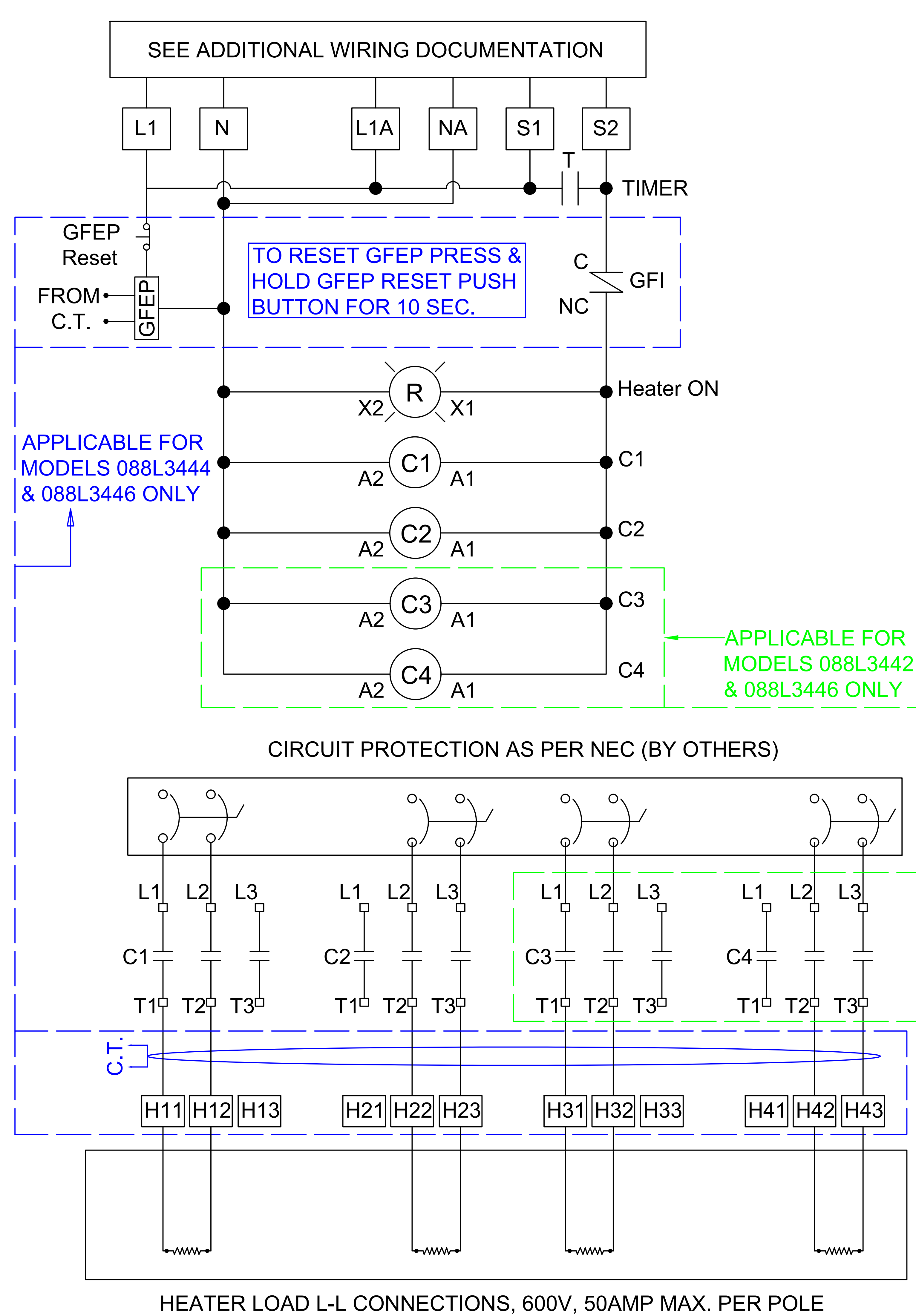
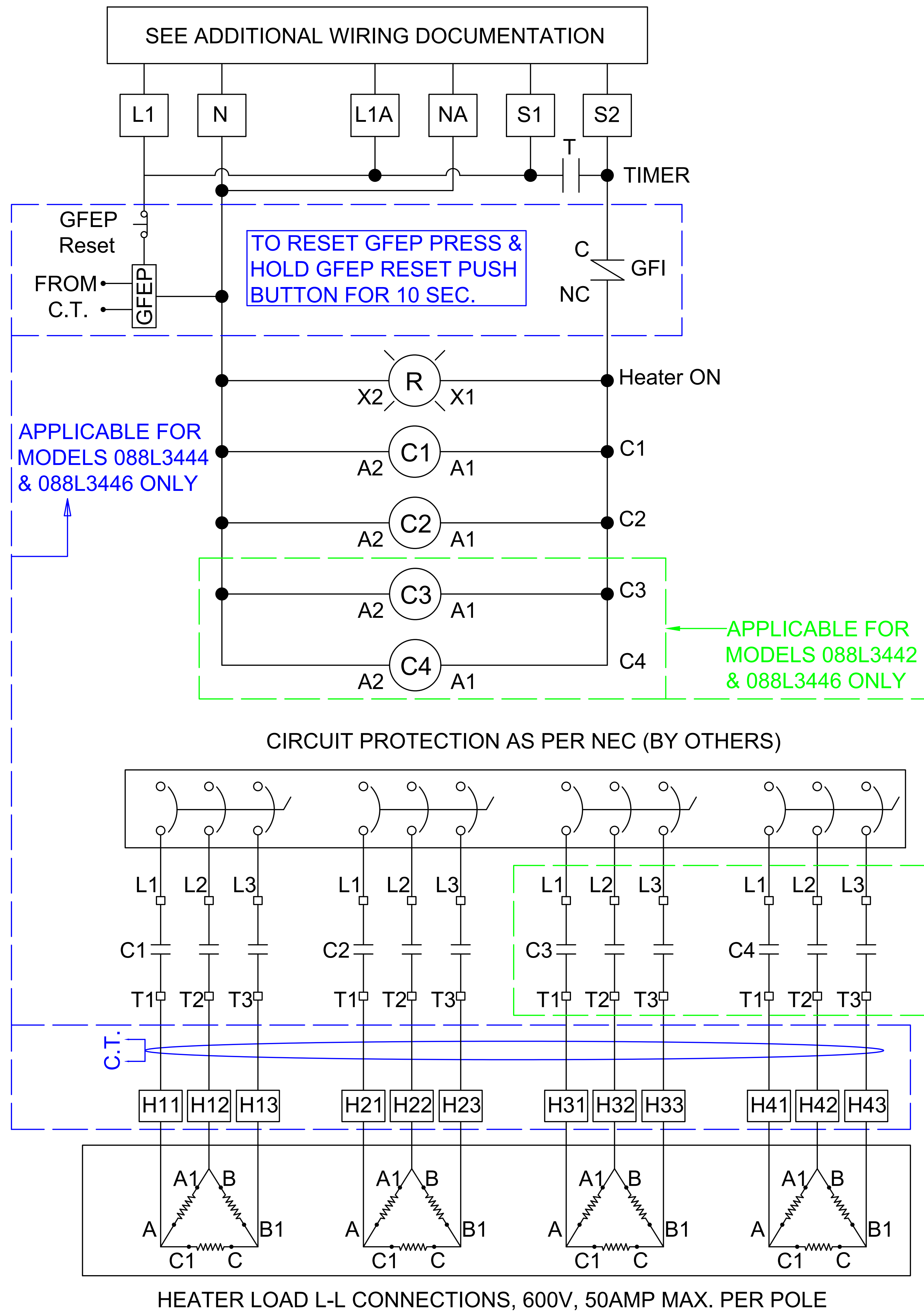
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Drawing No:

GX-10



1.	Date	Desc.
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Drawing Title:
Typical Contactor Load Wiring



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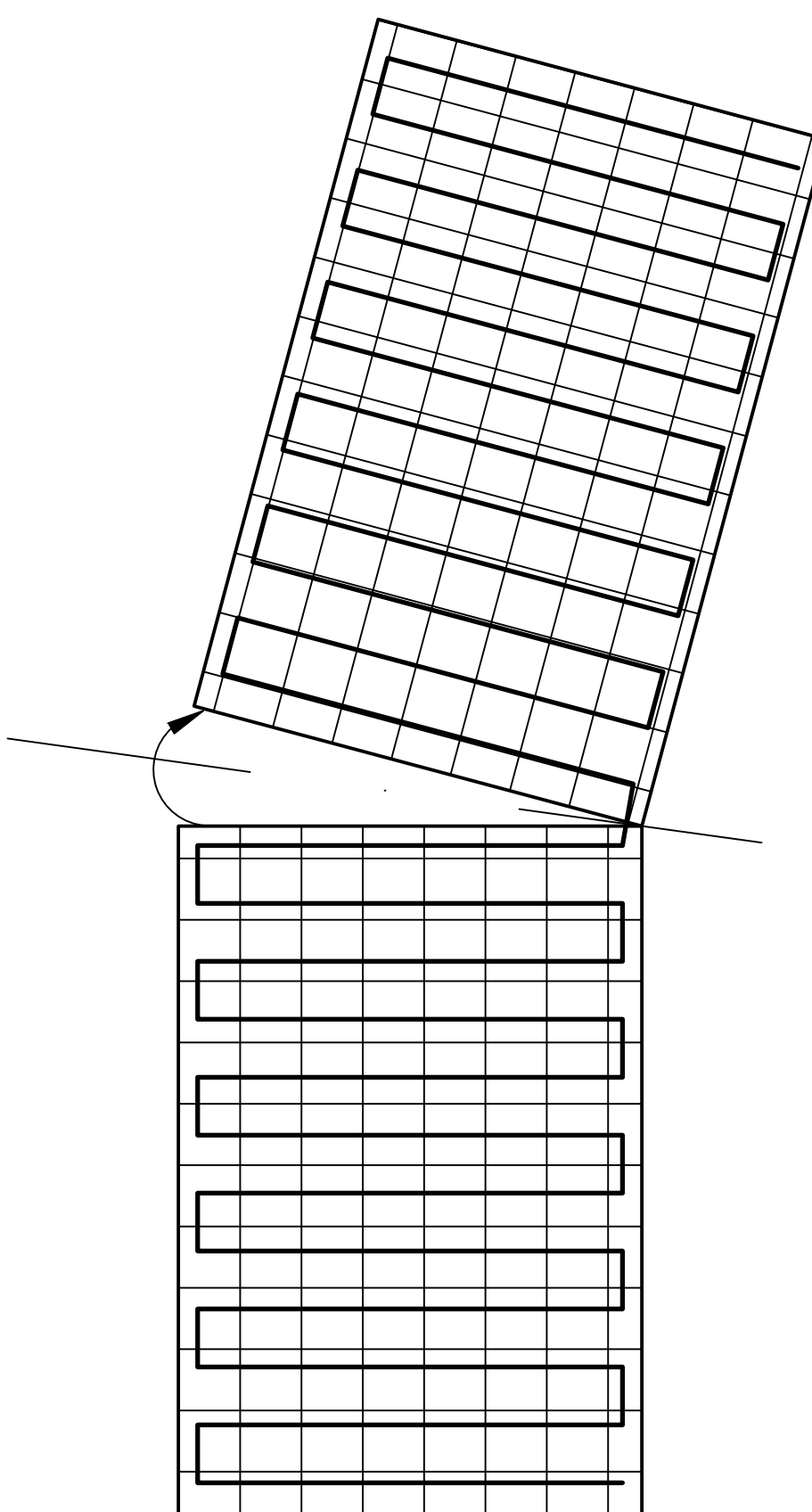
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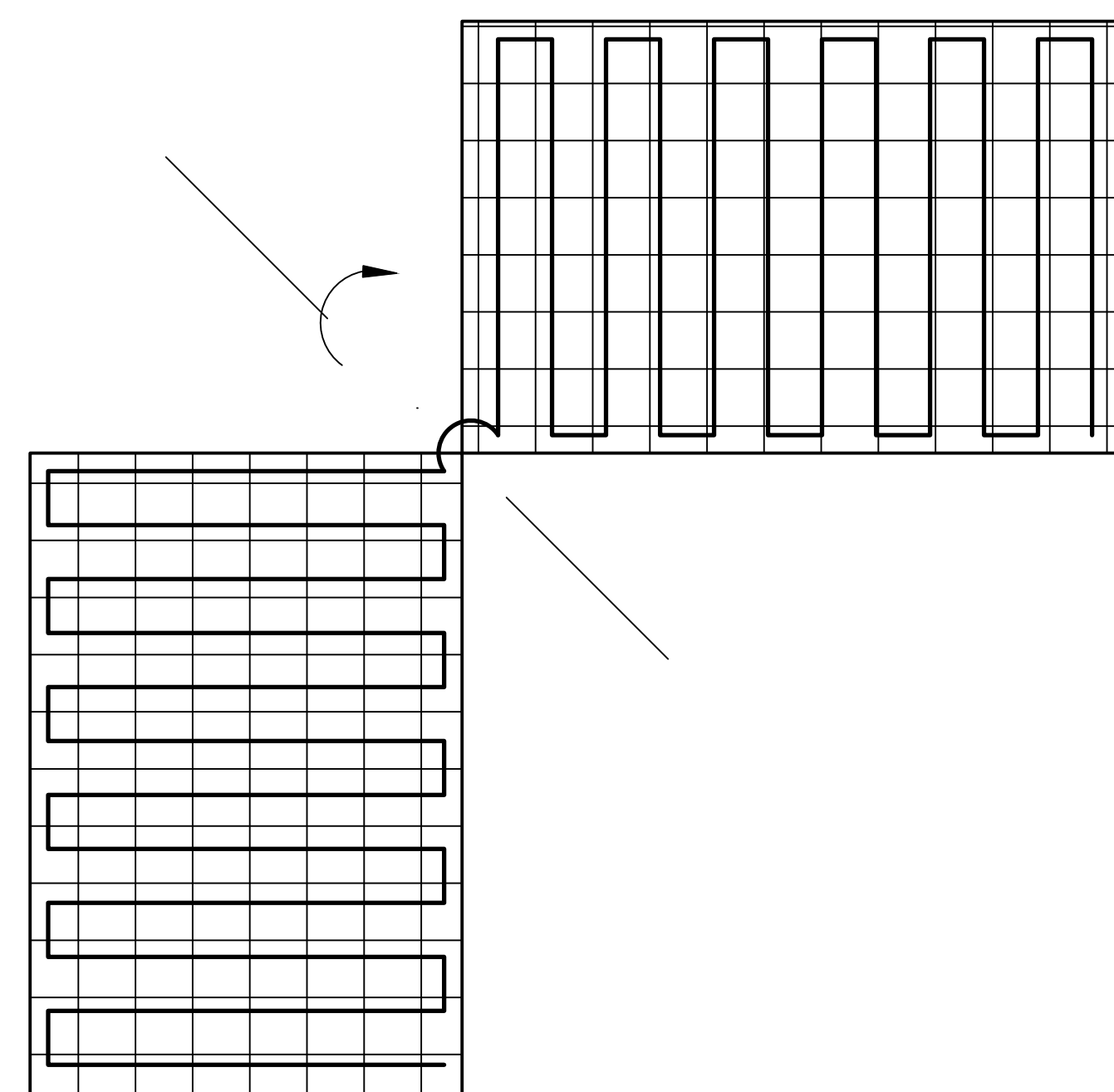
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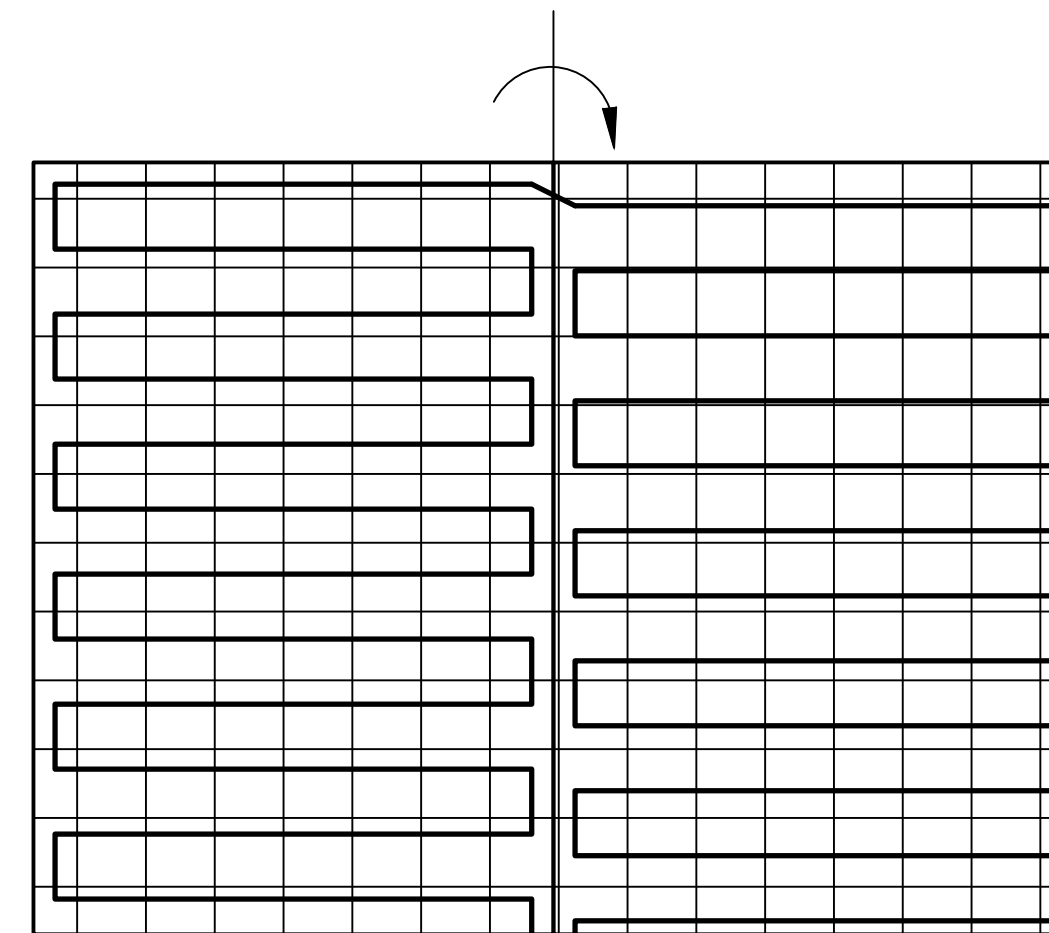
① 30° Rotation



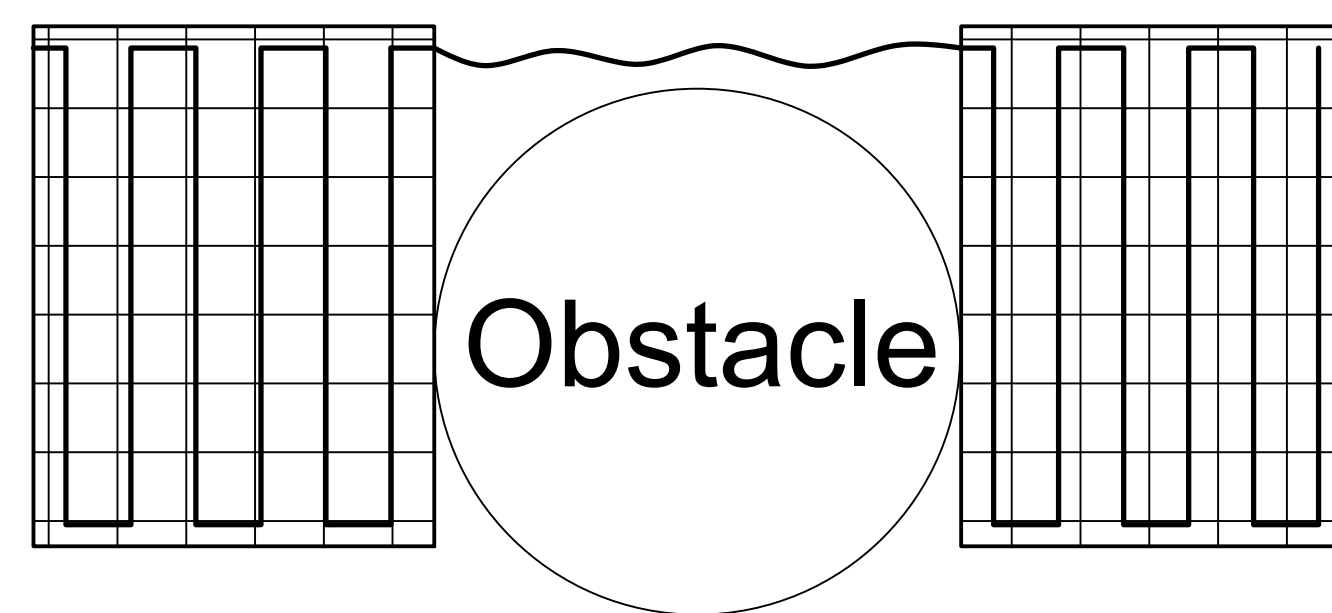
② 90° Rotation



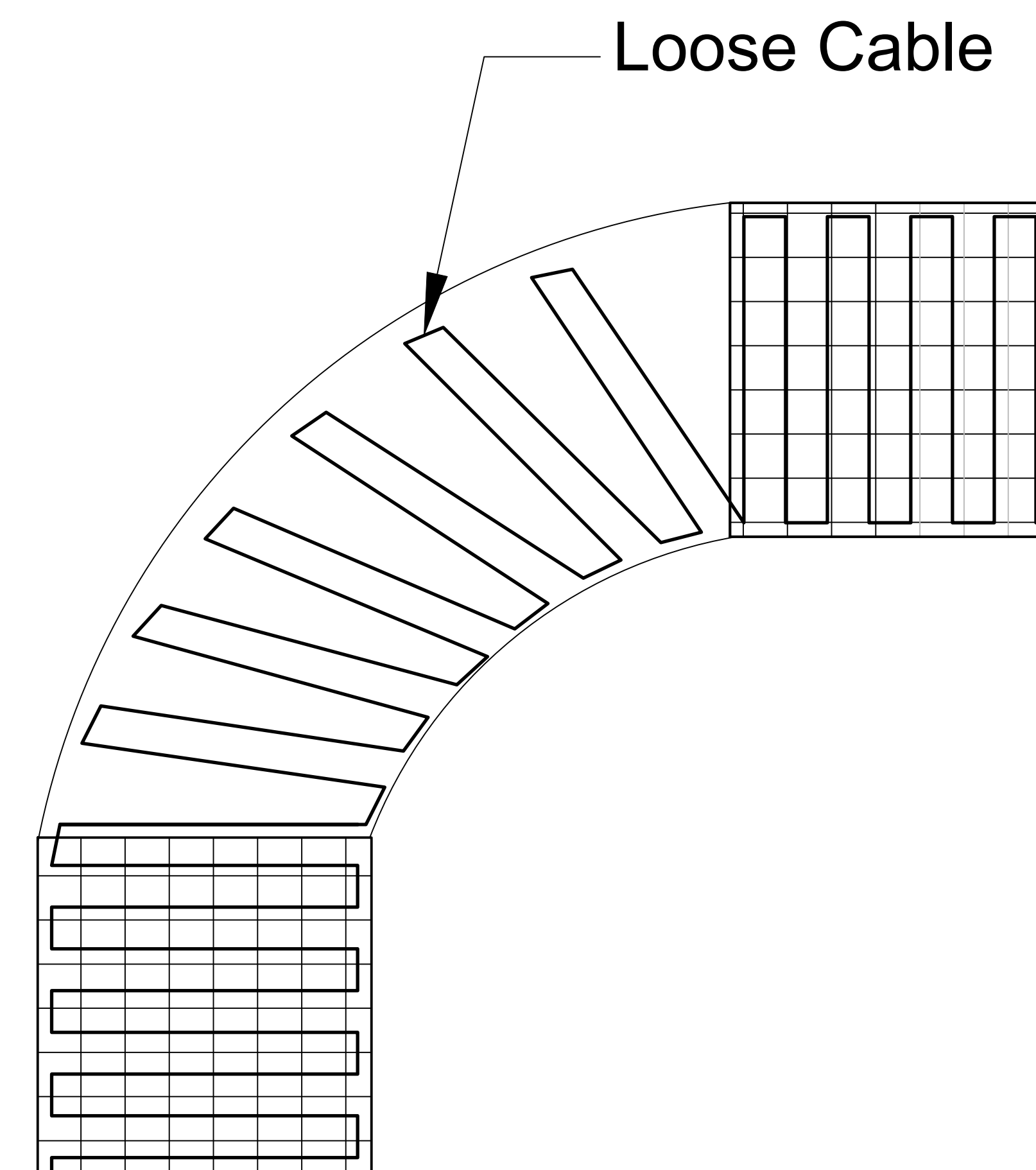
③ 180° Rotation



④ Avoiding Obstacle



⑤ Fan Rotation



NOTE:

1. To Rotate the Mat at any angle, cut the white mesh without cutting the black (heating) cable and turn it in any direction you want.
2. For some typical shapes or approaching obstacles remove some of the black heating cables from the white mesh and use hot melt glue or thin strip of tape to secure the loose cable to the floor.
3. Do not cut the **BLACK** cable.

1.	Date	Desc.
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No: Date: Description:

Issued:

Project:
GX General Submittal

Drawing Title:
GX Mat Modifications



11655 Crossroads Circle
Baltimore, MD 21220 USA
Tel: 1-888-326-3677 Fax: 1-(410) 931-8256
www.heating.danfoss.us

The Contractor shall verify all job site dimensions all drawing, details & specifications.
The Contractor shall report any discrepancies, in writing to Danfoss prior to commencing with any work.

Date: March 2018	Quote No:
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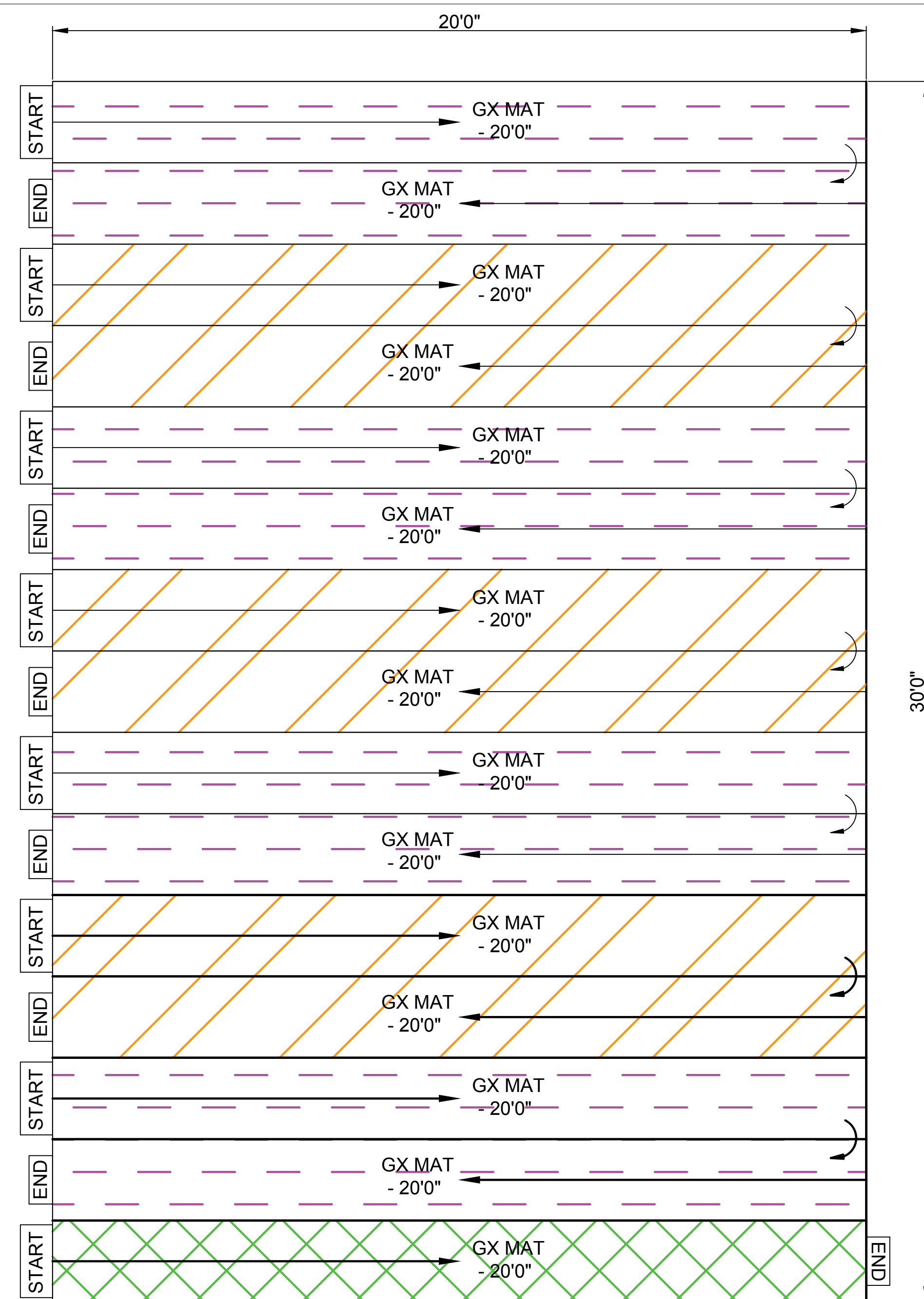
Drawn By:	Scale: N.T.S
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Drawing No:
GX-12

GX Mats

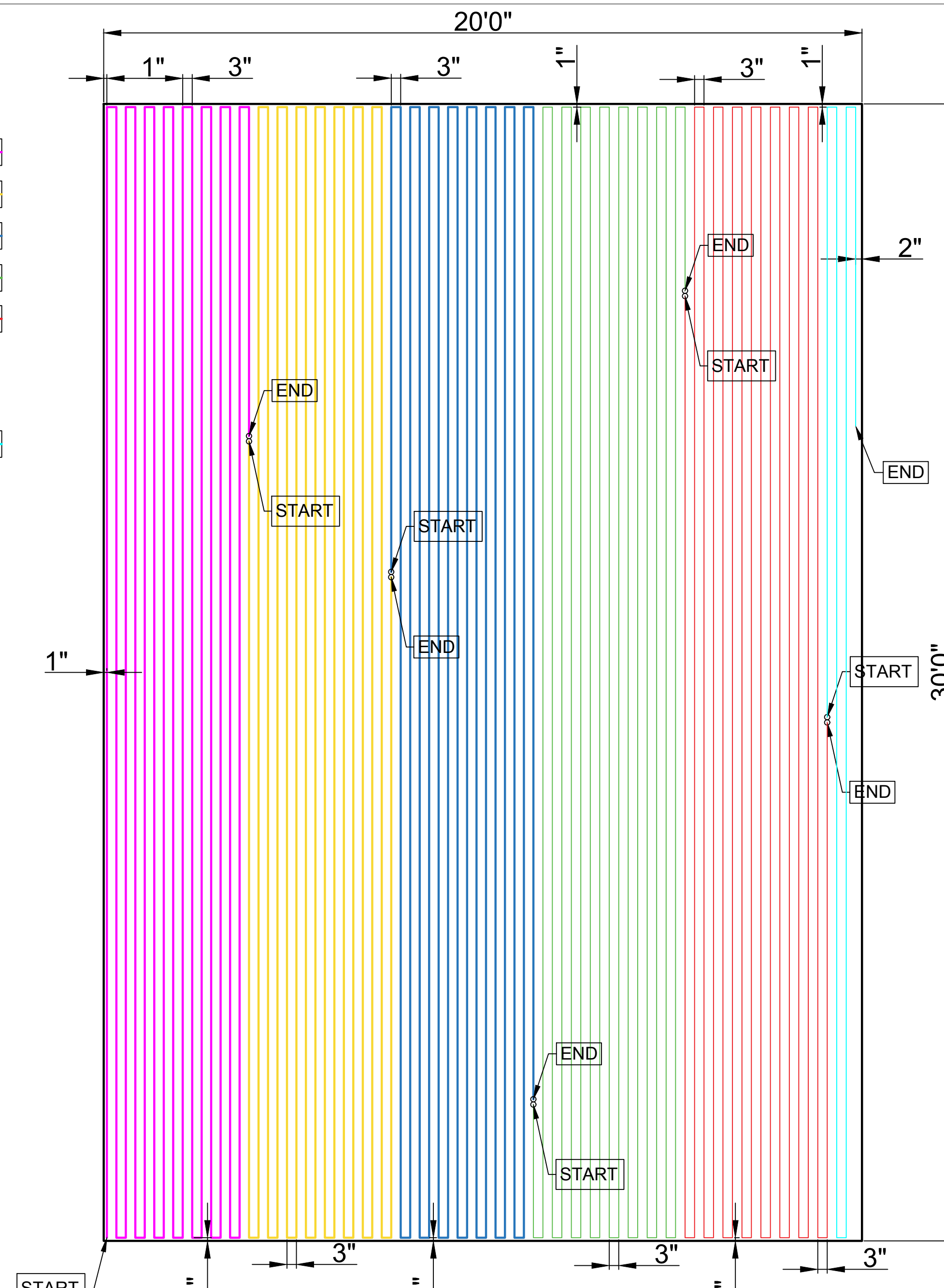
- 1. 088L3232 - 40 ft
- 2. 088L3232 - 40 ft
- 3. 088L3232 - 40 ft
- 4. 088L3232 - 40 ft
- 5. 088L3232 - 40 ft
- 6. 088L3232 - 40 ft
- 7. 088L3232 - 40 ft
- Coverage - 80sf @208V
- 8. 088L3227 - 20 ft
- Coverage - 40sf @208V

Note:
1ft Mat = 8ft Cable



GX Cables

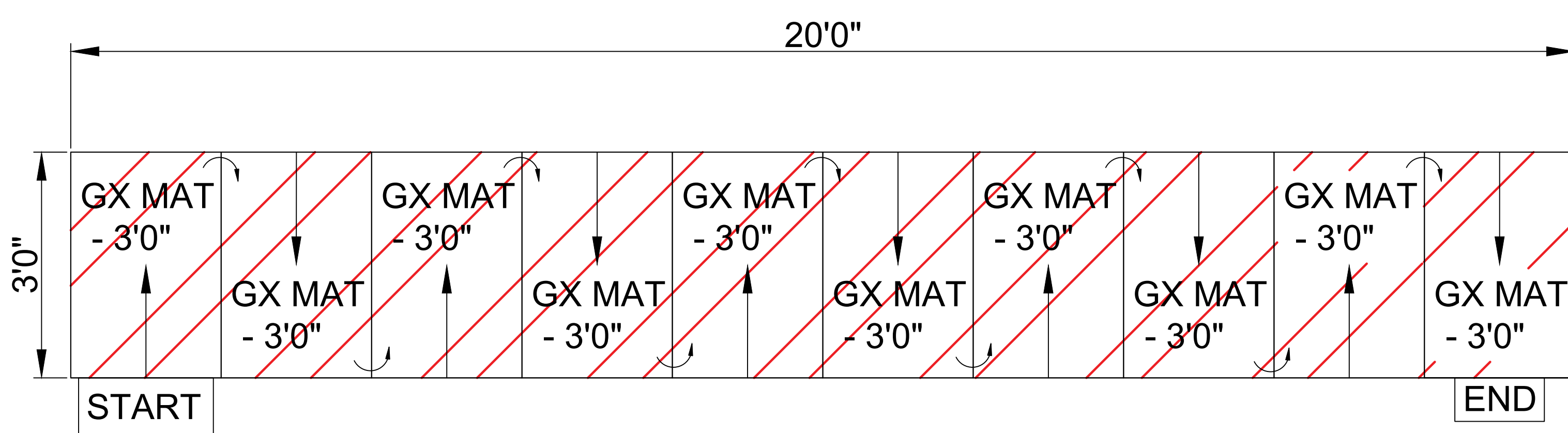
- 1. 088L3135 - 460 ft
- 2. 088L3135 - 460 ft
- 3. 088L3135 - 460 ft
- 4. 088L3135 - 460 ft
- 5. 088L3135 - 460 ft
- Coverage - 110sf @ 3" spacing, 208V
- 6. 088L3123 - 85 ft
- Coverage - 20sf @ 3" spacing, 208V



GX Mats

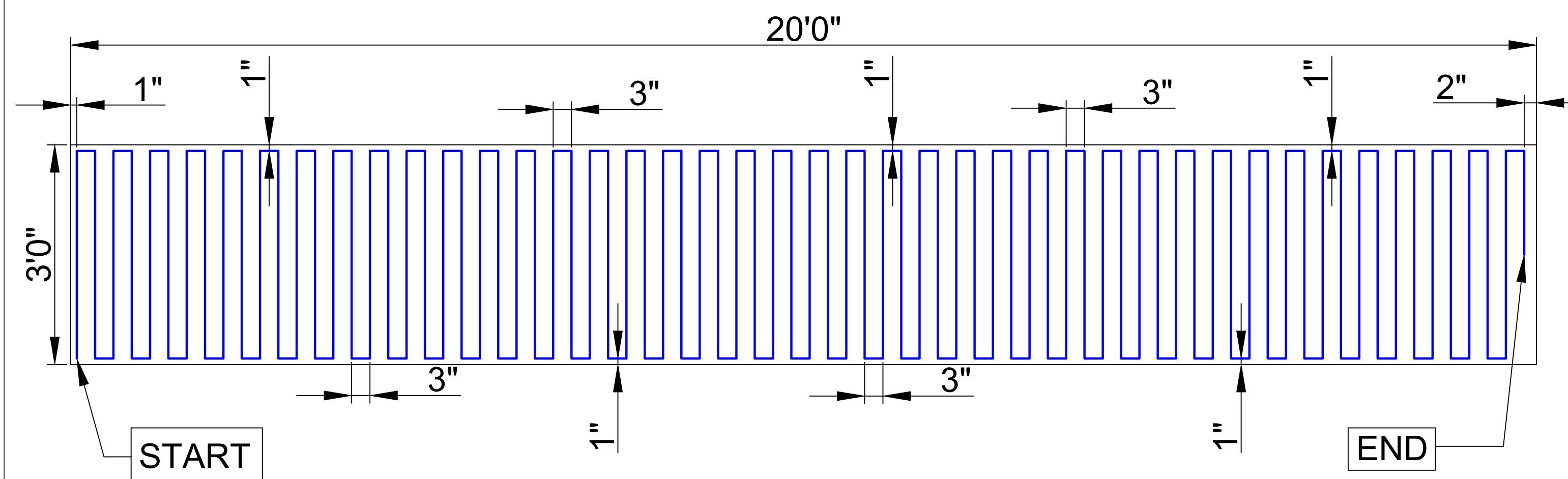
- 1. 088L3230 - 30 ft
- Coverage - 60sf @208V

Note:
1. 1ft Mat = 8 ft Cable



GX Cables

- 1. 088L3130 - 245 ft
- Coverage - 60sf @ 3" spacing, 208V



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The Contractor shall report any discrepancies, in writing to Danfoss prior to commencing with any work.

Date: March 2018
Quote No:

Drawn By: Scale: N.T.S

Drawing No: GX-13

1.	Date	Desc.
No:	Date:	Description:

Issued:

Project: GX General Submittal

Drawing Title: Typical GX Layouts