DTSX Time Initiated, Temperature, Pressure or Time Terminated 40A Defrost Timers

**Specifications**

**Electrical Ratings:**
- [1] & [3] Contacts: @120–240VAC @120–240VAC @120–240VAC
- [1] & [F] Contacts: 1HP @ 120VAC 1HP @ 120VAC 1HP @ 120VAC
- [2] & [F] Contacts: 2HP @ 240VAC 2HP @ 240VAC 2HP @ 240VAC

**Environmental Ratings:**
- Ambient Temperature: -40°F to 130°F
- Humidity: 0–95% non-condensing

**Wiring Connections:**
- Screw clamp terminals: Use #10 AWG wire with 90°C rating for 30A loads.
- Use #8 AWG wire with 90°C rating for 40A loads.

**Enclosures:**
- Plastic NEMA 3R Raintight Indoor/Outdoor
- Metal NEMA 1 Indoor

**LED Indication:**
- Green LED when in refrigeration mode
- Red LED when in defrost mode

**Application**

The DTSX Defrost Timer is identical in function, terminal identification, and wiring to the Paragon 8140 and Precision 6140 series Defrost Timers. The DTSX may also be used to replace Paragon 8040 and Precision 6240 series time-terminated defrost timers. With the addition of a remote pressure switch, the DTSX can replace the Paragon 8240 series and Precision 6240 series pressure-terminated defrost timers.

Defrosts will be initiated at the times set on the timer, which will accept from 1 to over 24 defrost initiation settings per day at 15 minute intervals (8:00AM, 8:15AM, 8:30AM, etc.). Defrost duration is settable in 15 minute intervals from a minimum of 15 minutes up to several hours (15 minutes, 30 minutes, 45 minutes, 1 hour, 1 hour-15 minutes, etc.). The defrost duration determines the termination time.

In standard configuration, the contacts between terminals 1 and 3 are normally open and close during a defrost to energize defrost heaters; the contacts between terminals 2 and 4 are normally closed (when timer is energized) and open during a defrost to de-energize refrigeration and fans.

**Installation**

Note: For outdoor locations, Raintight or wet location conduit hubs that comply with requirements of UL 514B (standard for fittings for conduit and outlet boxes) are to be used.

1. Remove 2 screws retaining the interior cover panel and remove panel by prying out with a thin blade (NEMA3R).
2. Select knockouts to be used. Remove the inner (1/2”) knockout by inserting a screwdriver in the slot and carefully punch knockout loose. Remove slug. If the 3/4” knockout is required, remove the outer ring with pliers after removing the 1/2” knockout. Smooth edges with knife if necessary.
3. Place enclosure in desired mounting location and mark the three mounting holes.
4. Drill holes for #10 screws, start screws in holes.
5. Place enclosure over screws and tighten screws.
6. Connect conduit hubs to conduit before connecting the hubs to the enclosure. After inserting hubs into enclosure, carefully tighten hub lock nut. Do not over-torque.
7. If using NEMA 1 Metal Enclosure connect ground wires to ground lug on bottom of enclosure. (Not applicable for NEMA3R plastic enclosure).
8. Wire in accordance with National and Local Codes.
9. Replace interior cover panel and 2 screws (NEMA3R).

**Grounding:**

NEMA3R enclosure is of plastic construction and does not require a ground connection or bonding. NEMA3R enclosure does not provide grounding between conduits. When using non-metallic conduit or cable, connect the ground wires of all cables together with a wire nut. When metallic conduit is used, use grounding type bushings and a jumper wire between each conduit.

**CAUTION:** Do not check circuits by parking wires to terminals. Damage to the defrost timer may result.
PROGRAMMING (Synchronous and Quartz Electromechanical Models)

Setting the Time:
Turn the minute hand clockwise until the time of day (and AM or PM) on the outer dial is aligned with the triangle marker on the inner dial.

DO NOT ROTATE MINUTE HAND COUNTER-CLOCKWISE!

Setting Defrost Initiation Time:
Move a white tab (tripper) on the outer dial outward at each desired initiation time. For example, to set defrost initiation times at 6:00AM, 11:30AM, 4:30PM and 11:00PM, move the tab adjacent to the “M” in AM on the dial (6:00AM), the tab that lies between 11:30AM and 11:45AM, the tab between 4:30PM and 4:45PM, and the tab adjacent to the 11:00-11:15PM marks. (See note for 8243/6243 replacement.)

IMPORTANT INFORMATION: The Normally Closed contacts between terminals 2 and 4 are only closed when the defrost timer is energized. The 2-4 contacts are the Normally Open contacts of relay K2. (Normal Open relay contacts are more reliable than Normally Closed). When checking continuity of the control with no voltage applied, the 2-4 contacts will appear as open; this is normal. The 1-3 contacts will appear as open and the 1-F contacts will appear as closed. We recommend that the control be tested by using a volt-meter, with rated voltage applied.

Note: A definite purpose contactor must be used to switch loads greater than the following maximum loads:

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Max. Fan &amp; Compressor Load:</td>
<td>120V: 1HP</td>
<td>208/240V: 2HP</td>
<td>208/240V: 2HP</td>
</tr>
</tbody>
</table>

**TYPICAL WIRING DIAGRAMS**

All switch positions are shown in refrigeration cycle operation, and change position upon initiation of a defrost.

- **Settings Maximum Defrost Duration:** Different defrost durations may be set for each defrost initiation setting. Each white tab (tripper) provides a 15 minute interval. The tabs that set the initiation time provide a minimum of 15 minutes of defrost. For longer defrost duration, move additional tabs (following in time) from the initiation tab. For example, if a 45 minute defrost is to start at 7:00AM, move the tab outward that lies between 7:00 and 7:15 on the AM side of the dial, and the tabs adjacent to 7:15-7:30 and 7:30-7:45. (3 tabs moved outward). The defrost will initiate at 7:00AM and time terminate at 7:45AM (if temperature termination does not occur first).

For electronic models, refer to separate programming instructions.

**Note:** Remove Bridge Between 3-4 Connect Bridge Between 2-X

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**Diagram 1:** DTSX Time/Time - Electric Defrost Wiring Diagram

- **8045 Replacement**
  - S1 Position A with 8045 Label Applied

**Diagram 2:** DTSX Time/Time - Electric Defrost Wiring Diagram

- **8041 Replacement**
  - S1 Position A with 8041 Label Applied

**Diagram 3:** DTSX Time/Time - Hot Gas Defrost Wiring Diagram

- **8043 Replacement**
  - S1 Position B with 8043 Label Applied

**Diagram 4:** DTSX Time/Time - Electric Defrost Wiring Diagram

- **8047 Replacement - Double Pole Switching**
  - S1 Position B with 8047 Label Applied

**Diagram 5:** DTSX Time/Temp. - Electric Defrost Wiring Diagram

- **8145 Replacement**
  - S1 Position A - No Label Required

**Diagram 6:** DTSX Time/Temp. - Electric Defrost Wiring Diagram

- **120V Fan & Defrost Heater, 240V Compressor**
  - S1 Position A - No Label Required

**Diagram 7:** DTSX Time/Temp. - Electric Defrost Wiring Diagram

- **8143 Replacement**
  - S1 Position B with 8143 Label Applied

**Diagram 8:** DTSX Time/Temp. - Electric Defrost Wiring Diagram

- **8143 Replacement - Double Pole Switching**
  - S1 Position B with 8143 Label Applied

Note: Move Bridge to 2-2

*See Note 1*
REPLACING EXISTING DEFROST TIMERS

IMPORTANT: When replacing a Grasslin DT-040 model with a DTSX, the power connections must be made to terminals N and 1 on the DTSX. No connection must be made to the X terminal or damage to the unit will result. Disconnect the power wire from terminal X on the DT-040 and connect it to terminal N on the DTSX. Disconnect the other power wire from terminal N on the DT-040 and connect it to terminal 1 on the DTSX. All other wires should be connected to the DTSX the same as on the DT-040.

The DTSX will replace all models of Paragon 8040, 8140, 8240 Series or Precision 6040, 6140, 6240 Series.

TERMINAL IDENTIFICATION
The standard DTSX terminal identification is identical to the Paragon 8143 with the addition of the "F" terminal. Terminal identification labels are provided for the other models to be placed over the printed numbers on the printed circuit board. From the table below, select the proper label, apply to printed circuit board, and wire per the original wiring or the wiring diagrams indicated.

MODE SELECTION (Blue Jumper)
The mode selector jumper S1 (located at lower right side of the board) determines the configuration of contacts 2-4. In position "A" the contacts are normally closed (only when the timer is energized), and will open during a defrost. In position "B" the 2-4 contacts are normally open, and will close during a defrost. Select proper position from table below, and wiring diagrams indicated. To move jumper, pull straight away from board, and reinset over the top two pins for position "B" or the bottom two pins for position "A".

Note: When S1 jumper is in "B" position the DTSX will operate as follows. Refrigeration Mode: RED & GREEN LED's will turn ON (1&3 and 2&4 break while 1&F make) Defrost Mode: RED & GREEN LED's will turn OFF (1&3 and 2&4 make while 1&F break)

8045 REPLACEMENT:
The DTSX with 8045 terminal ID label applied differs from the 8045 in that terminals 1 and N are combined. This means that the DTSX model must be the same voltage as the defrost circuit (defrost heater, contactor coil, or hot gas valve). If being used in an application where the defrost circuit is 120V and the refrigeration circuit is 240V, the DTSX must be configured for 120V application (all red jumpers inserted) with 120V power connected to 1-N and X, and the bridge jumper between 1-N and 2 must be removed.

NOTE 1: 8143 Replacement When replacing a Paragon 8143 or Precision 6143, wire the termination thermostat to terminal X of the DTSX and the adjacent blank terminal. The Paragon and Precision timers are wired to terminal N and the blank terminal. If the termination thermostat is wired to terminal N of the DTSX (with the 8143 label attached), temperature termination will not occur and may result in burnout of the DTMV. See wiring diagrams 8 & 9.

8240/6240 SERIES REPLACEMENT:
The DTSX may be used to replace the Paragon 8240 or Precision 6240 series defrost timers with integral pressure termination by the addition of a remote pressure switch wired to terminals Xp and p of the DTSX (with an 8240 series terminal label applied). There must be no external voltage connected to the pressure switch. Set pressure switch cut-in to the same value as set on the Paragon or Precision defrost timer being replaced. Set cut-out 6 to 14psi below cut-in. See wiring diagrams 10, 11, and 12.

Recommended Pressure Switches: Johnson/Penn P170, Ranco 010 series, or Danfoss KP1 series. Pressure range approximately 35-110psi, CUT-IN ON PRESSURE RISE.

NOTE 2: 8243 Replacement When replacing a Paragon 8243 or Precision 6243, the DTSX white tabs (trippers) for setting defrost time and defrost duration must be reversed. Pull all tabs outward. Press the tabs inward at the desired defrost initiation times, and for desired duration.

<table>
<thead>
<tr>
<th>Paragon Model</th>
<th>Precision Model</th>
<th>GRASSLIN Model</th>
<th>S1 Mode Selector</th>
<th>Terminal Ident. Label</th>
<th>Typical Wiring Diagram</th>
<th>Terminal Layout (see note below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME INITIATED, TIME TERMINATED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8045</td>
<td>6045</td>
<td>DTSX</td>
<td>A</td>
<td>None</td>
<td>1</td>
<td>F 3 1 N 2 4 X NO CONNECTION</td>
</tr>
<tr>
<td>8046</td>
<td></td>
<td>DTSX</td>
<td>A</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8041</td>
<td>6041</td>
<td>DTSX</td>
<td>A</td>
<td>8041</td>
<td>2</td>
<td>N 1 3 2 4 X NO CONNECTION</td>
</tr>
<tr>
<td>8043</td>
<td>6043</td>
<td>DTSX</td>
<td>B</td>
<td>8043</td>
<td>3</td>
<td>F 3 1 4 2 N NO CONNECTION</td>
</tr>
<tr>
<td>8047</td>
<td>6047</td>
<td>DTSX</td>
<td>B</td>
<td>8047</td>
<td>4</td>
<td>N 1 3 4 2 X NO CONNECTION</td>
</tr>
</tbody>
</table>

| TIME INITIATED, REMOTE TEMPERATURE OR PRESSURE TERMINATED |
| 8145          | 6141           | DTSX           | A                | None                 | 5, 6                   | F 3 1 2 4 N X |
| 8143          | 6143           | DTSX           | B                | 8143                 | 7, 8, 9                | N 1 3 2 4 X |

| TIME INITIATED, PRESSURE TERMINATED |
| 8245          | 6245           | DTSX           | A                | 8245                 | 10                     | F 3 1 2 4 Xp |
| 8243          | 6243           | DTSX           | B                | 8243                 | 11                     | F 3 1 2 4 Xp |
| 8247          | 6247           | DTSX           | B                | 8247                 | 12                     | N 1 3 2 4 Xp |

NOTE: In "Terminal Layout," the connecting lines between terminals indicate the correct positions of the bridges for each model. The heavy line indicates the bridge must be installed as shown. The light line indicates the bridge may be removed if different voltages are used at each switch.
NEW STYLE

1. Disconnect power.
2. Remove and save insulator from Paragon timer.
3. Disconnect wiring.
4. Remove Paragon mechanism from enclosure.
5. Remove Grasslin DT model from its enclosure.
6. If necessary, move S1 jumper and apply terminal identification label from plastic bag to DT model as per table on previous page.
7. Locate metal clip in plastic bag and assemble it to printed circuit board at notch in right side.
8. Engage tabs on left side of printed circuit board in enclosure, and swing PCB into place until tab on metal clip engages tang on Paragon enclosure.
9. Reconnect wires, tighten terminal screws securely.
10. Assemble insulator from plastic bag to Paragon insulator by interleaving as shown.
11. Place insulator assembly over mechanism, with notch and tab over retaining clip, and engaging tab in slot in tang to retain insulator.

OLD STYLE and BRACKET MOUNT

1. Disconnect power.
2. Remove and save insulator from Paragon timer.
3. Disconnect wiring.
4. Remove and save the 6-32 screw. Remove and discard two metal posts retaining Paragon mechanism.
5. Remove Paragon mechanism from enclosure.
6. Remove Grasslin DT model from its enclosure, and with pliers, break off the 3 tabs on left side of printed circuit board.
7. Remove contents of plastic bag.
8. If necessary, move S1 jumper and apply terminal identification label to DT model as per table on previous page.
9. Locate plastic 3/4” long standoff with internal threads, and using screw from Paragon timer, assemble standoff on top of upper center hole in DT board with screw through back of board.
10. Place board in Paragon enclosure with standoff aligned under hole in the enclosure’s upper flange.
11. Assemble the 6-32 x 1/4” screw through the tapped hole in the enclosure’s flange and into the tapped hole in the standoff. (Hold board and standoff firmly up against the flange while driving the screw).
12. Assemble the two plastic insulator retainer posts with screwdriver at two locations where metal posts were removed.
13. Reconnect wires, tighten terminal screws securely.
14. Assemble insulator from plastic bag to Paragon insulator by interleaving as shown.
15. Place insulator assembly over mechanism and press onto plastic posts.

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CAUTION: If the Defrost Timer board assembly is not assembled to the bracket exactly as shown above, a short may occur which will destroy the defrost timer.