

A faint, light gray world map is visible in the background, composed of a grid of small squares.

UNI-LINE® PRODUCT KNOWLEDGE

TIMERS





PRODUCT LINES – COMMERCIAL REFRIGERATION

- DEFROST TIMERS
- SERVICE COMPONENTS
- PRESSURE CONTROLS
- TEMPERATURE CONTROLS



DEFROST TIMERS

AGENDA FOR DEFROST TIMERS

- Applications
- Refrigeration System
- Why Defrost Control?
- Existing Product Line
- UL873 Vs. UL917
- Relay Information
- Manufacturer Comparison
- Q&A

WHY DO I NEED A PARAGON® DEFROST TIMER?

- Both mechanical and electronic controls are rated to UL873 commercial refrigeration standards ie. 30,000 cycles
- Controls allow for a more precise termination of the defrost cycle based on temperature or pressure value
- Manufactured products for the refrigeration industry since 1905
- Controls are often called defrost timers because most popular method of defrosting equipment is based on a time schedule
- Easy to install and program especially in retrofit applications



PARAGON®

Robertshaw®

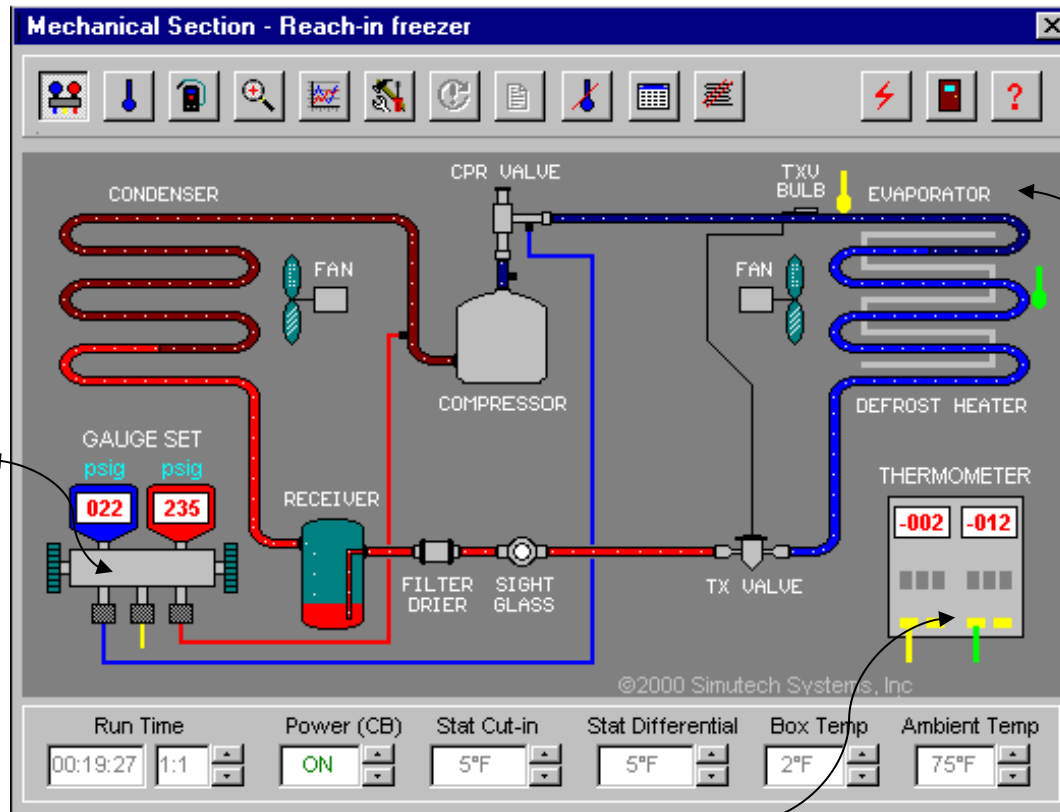
DEFROST TIMER APPLICATIONS

Commercial Refrigeration Applications

- Refrigeration equipment
- Reach-In Coolers or Walk-In Freezers
- Prevents unwanted build-up of frost or ice
- Shuts off the compressor electric or alters its function (hot gas defrost)
- Helps maintain the refrigeration equipment's ability to remove heat from the controlled space



REFRIGERATION SYSTEM



Pressure Control



Defrost Control

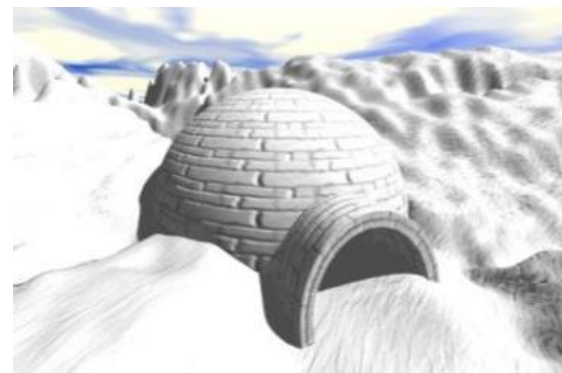


Temperature Control



Robertshaw

WHY DO I NEED DEFROST CONTROL?



- Ice is a great insulator
- Reduce costly inventory spoilage
- Frost build-up on evaporator coil makes it less efficient
- Defrost control will determine when to stop cooling to allow the frost/ice build-up to thaw
- Decision is based either on
 - Time schedule (defrost timer)
 - Precise reading of the temperature or pressure (defrost controller)

HOW TO GET RID OF FROST AND ICE?

- Manual Defrost
- Off Cycle Defrost
- Timed Off Cycle Defrost
- Heat Defrost
 - Electrical
 - Hot Gas



THE LATEST PARAGON® DEFROST TIMER

- Universal Defrost Timers (UDT)
- Works with multiple voltages
- Removes built up of ice and frost
- Easy to install
- Simple to program
- Part 9145-00 temp terminated
- Part 9045-00 time terminated
- Available as mechanism only without case
 - Add M to end of part number
 - 9145-00M



WHY DO I NEED A PARAGON[®] DEFROST TIMER?

- Both mechanical and electronic controls are rated to UL873 commercial refrigeration standards
- Controls allow for a more precise termination of the defrost cycle based on a temperature or pressure value
- Manufactured products for the refrigeration industry since 1905
- Controls are often called defrost timers because most popular method of defrosting equipment is based on a time schedule
- Easy to install and program even in retrofit applications

PARAGON[®] UNIVERSAL DEFROST TIMER (UDT)

The Paragon electronic defrost control matches traditional mechanical defrost controls and adds a number of advantages

- ✓ Multi-Voltage control is smart voltage
- ✓ Designed to fit into existing enclosures
- ✓ Certified to UL873 Standards
- ✓ Built-in power loss protection
- ✓ No pins or trippers to lose
- ✓ Manual defrost option
- ✓ LED status indication
- ✓ Real time clock
- ✓ Backlit display



UNIVERSAL DEFROST TIMER (UDT)

FEATURES

- Easy Installation
- Certified to UL873
- Switches rated at 30,000 cycles
- Last 16 years longer at 4 defrosts per day
- Initiate 15 minute manual defrost
- Lighted display
- 100 hours of power loss protection
- Simple Programming
- Designed to fit Paragon® enclosures
- Withstands most rigorous applications
- Wires to 120V AC, 208V AC or 230V AC
- Display has defrost time and duration
- System status indicators
- Real-time clock

PARAGON[®] FEATURES

Why are these features important?

Feature	Benefit
Multi-Voltage	The universal voltage (120/208-240 VAC) requires no switch selection or different terminals
Fits into existing enclosures	There is no need to bend or replace conduit or run new wire. Replacement can be as easy as <i>wire up, wire down</i> on the same terminals
Certified UL873	Designed specifically for use with refrigeration equipment and to refrigeration standards. Tested at 30,000 cycles vs. 6,000
Built in power-loss protection	There are no batteries to buy or replace. All program and time settings are maintained for a minimum of 100 hours

PARAGON[®] FEATURES CONTINUED

Why are these features important?

Feature	Benefit
No pins or trippers to lose	LCD Display gives indication of defrost start and stop time without pins that might slip or fall off
Manual defrost	15 minute manual defrost is perfect for <i>between</i> cycles or system maintenance
LED status	Green LED for Defrost and Red for Refrigerate
Real-time clock	Intuitive clock display that reads <i>clockwise</i> and indicates time of day with a flashing cursor
Backlit display	No need for torches or flashlights in dark mechanical rooms

WHAT'S THE BIG DEAL ABOUT UL873?

- UL873 sets specific functional and life cycle standards for equipment used in temperature regulation (refrigeration)
- UL873 insures the equipment will maintain safe and proper operation in commercial refrigeration environments
- Competitive products (timers) use a different standard
- UL917 is for clock-operated switches
- Paragon universal defrost products are the only multi-voltage defrost controls rated to UL873 standards

HOW DOES UL873 DIFFER FROM UL917?

Standard	UL873	UL917
Life Cycle	30,000 Cycles	6,000 cycles
Switch events-per-day	12 per day	4 per day
Environment	-30°F to 130°F (-34°C to 54°C)	room temperature
Load Requirements	Maximum load (30A) allowed by contacts	No load required

- Paragon® controls rated to UL873 are made to last five times longer than timers rated to UL917 standards

PARAGON[®] UNIVERSAL DEFROST TIMER (UDT)

Paragon Universal Defrost Timers are the only defrost timers engineered to refrigeration standards.

9145-00

- Time Initiated
- Temperature or Pressure Terminated

9045-00

- Time Initiated
- Time Terminated



RELAY INFORMATION FOR 9145 SERIES

- The Paragon 9145-00 is general purpose defrost control that can both
 - Time Initiate/Time Terminate
 - Time Initiate / Temperature or Pressure Terminate
- Most refrigeration applications do not need more than 30 Amps

Part Number and Relay Information

Relay Contacts	SPDT NC Contact	SPDT NO Contact	SPST Common Contact
Relay Rating	15 A resistive @ 120V AC to 240V AC ¼ HP @ 120V AC, ½ HP @ 208V AC to 240V AC	30 A resistive @ 120V AC to 240V AC 1 HP @ 120V AC 2 HP @ 208V AC to 240V AC	30 A resistive @ 120V AC to 240V AC 1 HP @ 120V AC 2 HP @ 208V AC to 240V AC
Device Connection	Fan (Typical) Compressor (Optional)	Defrost Device (Typical)	Compressor (Typical) Fan (Optional)

RELAY INFORMATION FOR 9045 SERIES

- The Paragon 9045-00 is a general purpose defrost control that is used for
 - Time Initiate/Time Terminate only defrost cycles

Part number and Relay Information

Relay Contacts	SPST #1 NC Contact	SPST #2 Common Contact
Relay Rating	30 A resistive @ 120V AC to 240V AC 1 HP @ 120V AC 2 HP @ 208V AC to 240V AC	30 A resistive @ 120V AC to 240V AC 1 HP @ 120V AC 2 HP @ 208V AC to 240V AC
Device Connection	Compressor (Typical)	Defrost Device (Typical)

WHY PARAGON[®] ELECTROMECHANICAL DEFROST TIMERS?

- Paragon Electrical Products are high quality time switches with sealed synchronous motors and metal gears
- Commercial Refrigerators store valuable products
- Refrigeration failures are costly in terms of lost product and business
- Paragon Defrost Timers are UL certified as refrigeration controls, not as time switches



8000 SERIES TIMERS (D80)

- 40 Amps
- Time Initiated, Time Terminated
- All are 60 Hz, some 50 Hz units available

Part Number	Volts / 60 Hz	Contact 2-4	Contact 3-N	Application
8041-00	120	Closed	Closed	Electric Heat Defrosting
8041-20	208-240	Closed	Closed	Electric Heat Defrosting
8045-00	120	Closed	None	Electric, Hot Gas, Compressor
8045-20	208-240	Closed	None	Electric, Hot Gas, Compressor
8047-00	120	Open	Closed	Electric Heat Defrosting
8047-20	208-240	Open	Closed	Electric Heat Defrosting

8100 SERIES (D81)

- 40 Amp switches
- Time Initiated, Temperature or Pressure Terminated
- Provides three defrost cycles with mechanical timer
- Pump-down, defrost, and fan delay



Part Numbers	Volts / 60 Hz	Contact 3-N	Contact 1-3	Content 2-4
8141-00	120	Closed	Open	Closed
8141-20	208-240	Closed	Open	Closed
8143-00	120	Open	Closed	Open
8143-20	208-240	Open	Closed	Open
8145-00	120	None	Open	Closed
8145-20	208-240	None	Open	Closed

TOP FIVE PARAGON[®] DEFROST TIMERS

1. 8145-20
2. 8141-00
3. 8145-00
4. 8045-20
5. 8045-00



MANUFACTURERS OF ELECTRO-MECHANICAL DEFROST TIMERS

- Paragon®
- Intermatic / Grasslin (DTMV)
- Supco
- Old Manufacturers
 - Precision Timer Co. Inc

PARAGON®

INTERMATIC®

Supco

Precision Timer Co, Inc.

..... **Robertshaw®**

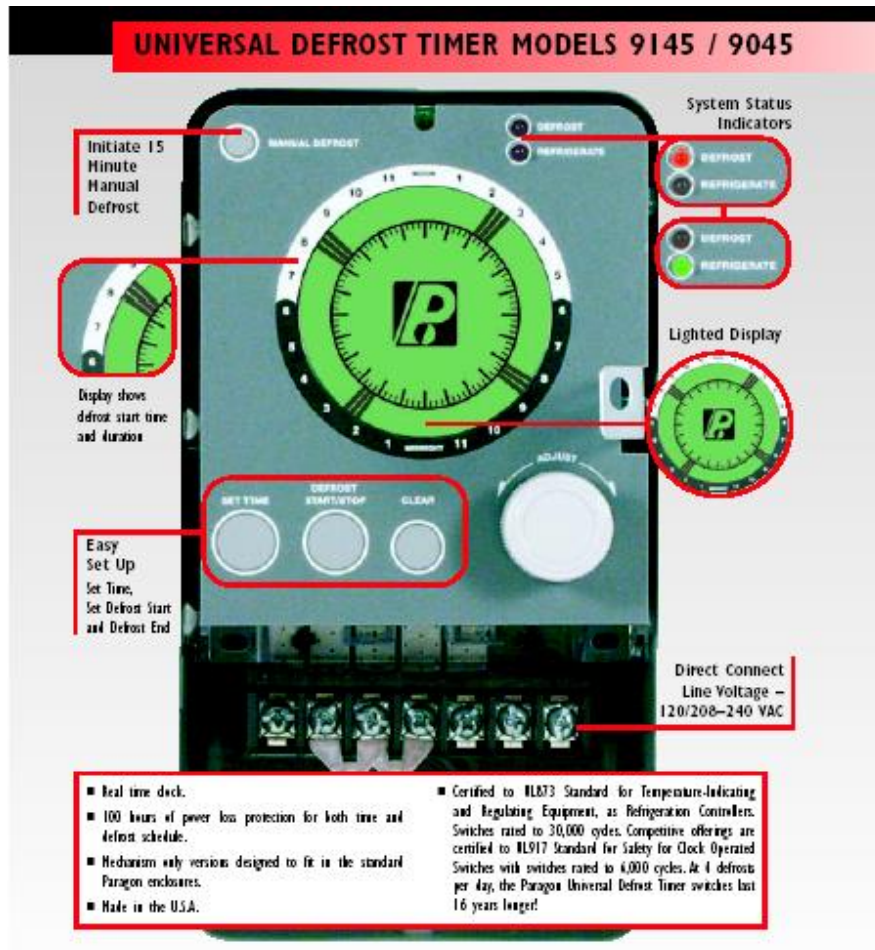
MANUFACTURER ANALYSIS



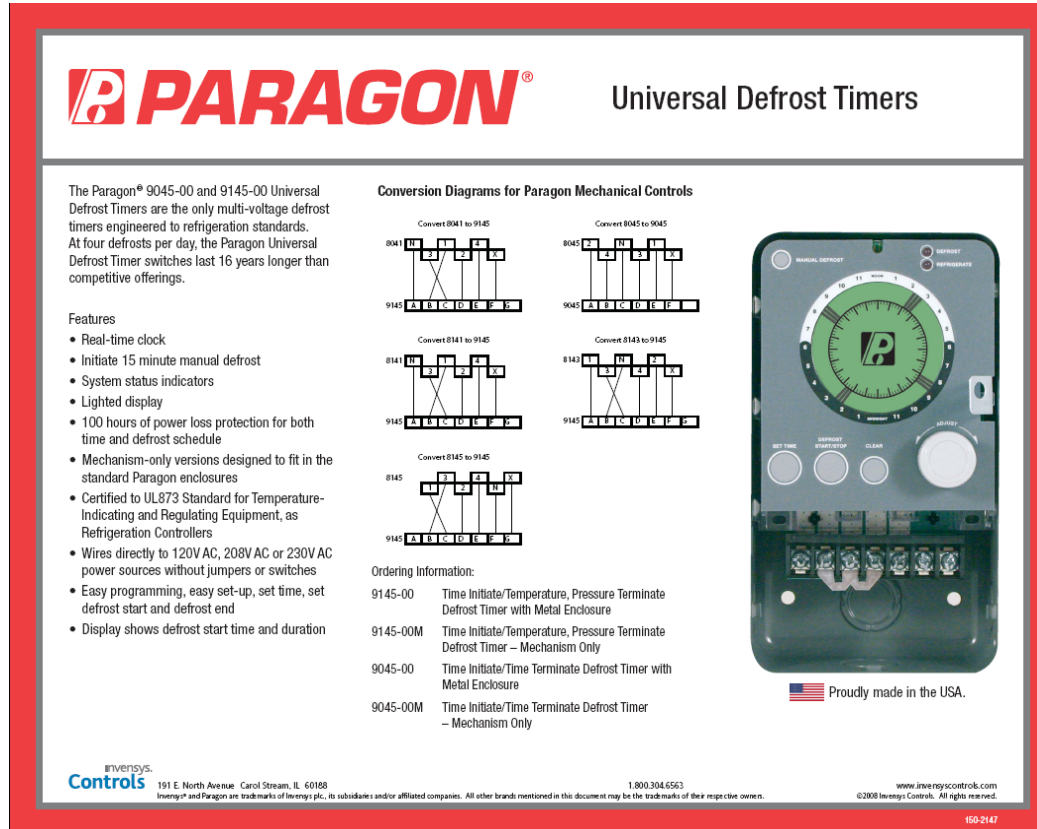
Feature	Paragon® UDT	Grasslin DTMV40
Multi-Voltage (120/208-230)	Yes - direct wire to terminals	Yes - requires switch setting
UL Listed	Yes - as a Defrost Controller. UL873 Temperature Regulating Device. Requires life test to 30,000 cycles at temperature extremes.	Yes - as a light switch UL917 Clock Operated Switch. Requires life test to 6,000 cycles at room temperature.
System Status Indicators	Yes	Yes
Backlit	Yes	No
Real Time Clock	Yes - Electronic	Yes - Electromechanical
Power loss protection	Yes - clock maintained by capacitor for 100 hours of lost power. Schedule stored in flash memory	Optional, can order battery backup which requires replacement
Manual Defrost Initiation	Yes	No
Intuitive Display	Yes - Time and defrost schedule easy to understand	No - Defrost duration is CCW
Switch Ratings	Compressor - 1hp@120V, 2hp@240V Defrost Htr - 30 Amps Resistive Fan - 1/4hp @120V, 1/2hp @240V 15 Amps resistive	Compressor - 1hp@120V, 2hp@240V Defrost Htr - 40 Amps Resistive Fan - 1 hp@120V, 2 hp@240V 30 Amps Resistive
Warning of DT failure	Yes - see Terminal G error code	No

FEATURE SET BROCHURE

- Brochure highlights major features of Universal Defrost Timer

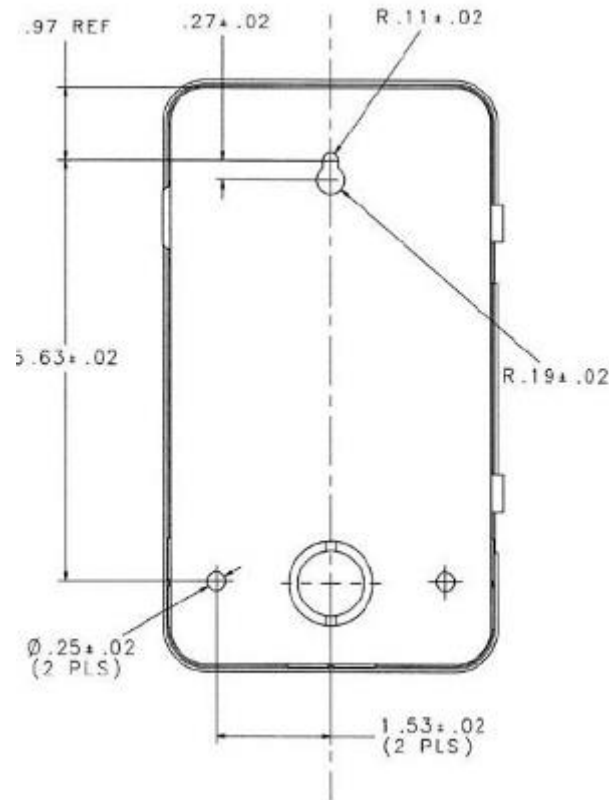


- Part Number 150-2147 in Publication Zone

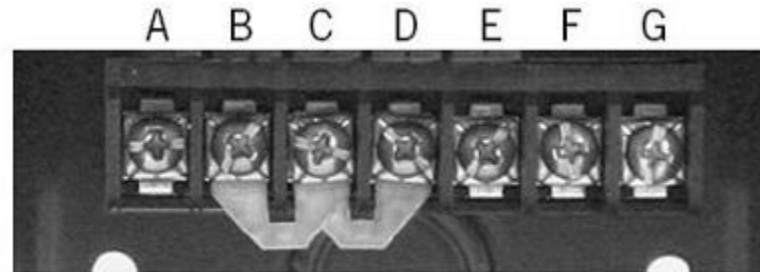


LAB – MECHANICAL INSTALLATION

- Universal Defrost Timer mounts in previous legacy boxes
- Perfect for aftermarket applications



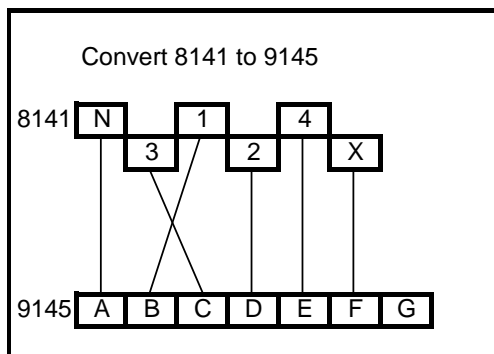
LAB – ELECTRICAL INSTALLATION



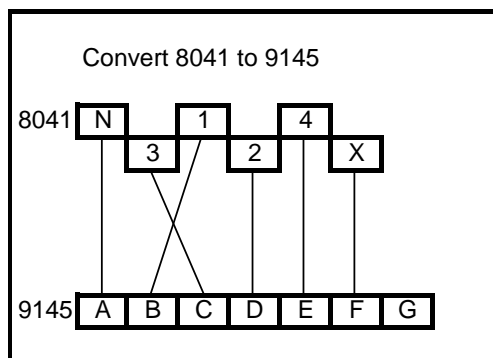
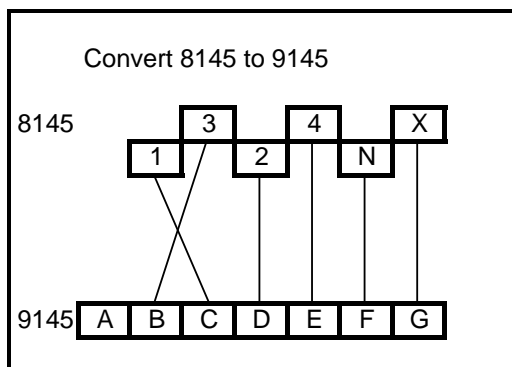
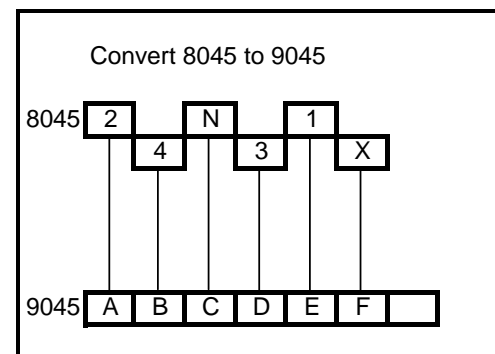
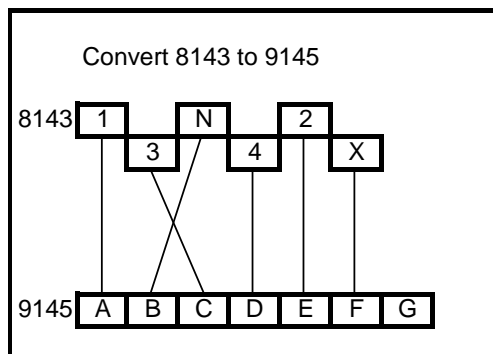
1. Turn off AC power
2. Open metal case to access control connectors
3. Connect wires from compressor to terminal A
4. Connect heater or hot gas solenoid to Terminal E
5. Connect wire to Terminal C from L1 – 120 VAC or 208-240 VAC line
6. Jumper Terminal C to Terminals B and D
7. Connect wire from L2/N to Terminal F

LAB - UDT WIRING

Convert to 9145

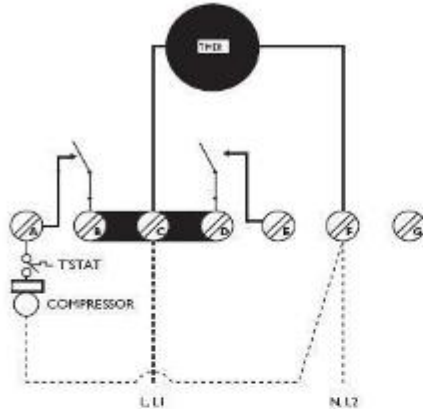


Convert to 9045

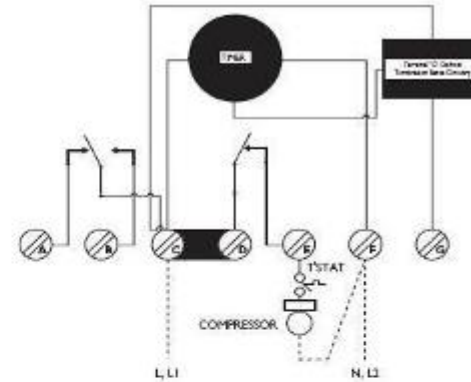


- Time or Temperature Terminated in Electric Defrost

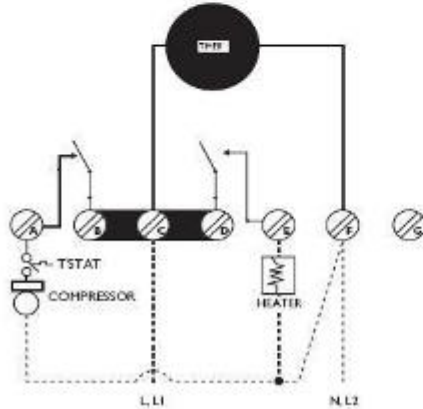
9045
AIR
DEFROST
Time Initiated
Time Terminated



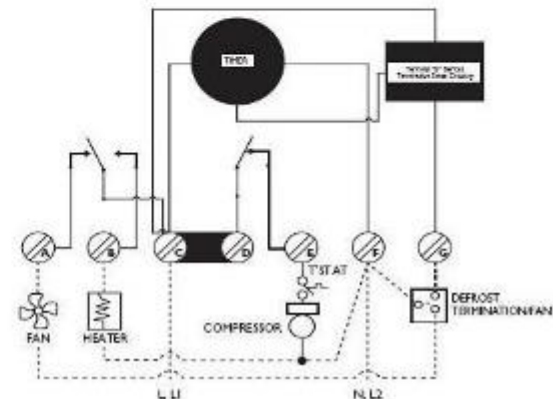
9145
AIR
DEFROST
Time Initiated
Time Terminated



9045
ELECTRIC
DEFROST
Time Initiated
Time Terminated



9145
ELECTRIC
DEFROST
Time Initiated
Temperature
Terminated



LAB - HOW TO PROGRAM UDT

Flashes at
12:00 Noon

Refrigerate
LED is on



LAB - THE EASY PART: SET DEFROST



1. Scroll cursor to desired defrost start time



2. Press “Defrost Start/Stop” once

LAB - STILL EASY PART: CLEAR DEFROST



1. Rotate cursor to the first segment in the defrost



2. Press "Clear"

LAB - RESET PROGRAM, YOUR CTRL-ALT-DEL!



- Press, hold and release all four buttons to clear the program
- The Defrost Timer will return to its original power up state

QUIZ QUESTION # 1

The UL standard used for temperature regulating refrigeration equipment is UL873?

☐ True ☐ False

QUIZ QUESTION # 2

The Paragon 9145-00 defrost control will terminate a defrost cycle based on which of these inputs?

- ☐ Pressure ☐ Temperature ☐ Time ☐ All of the above

QUIZ QUESTION # 3

Which input voltage will not power a Paragon electronic UDT?

- ☐ 24 VAC ☐ 120 VAC ☐ 208 VAC ☐ 240 VAC



ELECTRIC TIMERS

AGENDA

- Background
- Applications & Technical Concepts
- Product Line & Features
- Competition
- Sales Materials
- Contact Information
- Q&A



APPLICATIONS FOR ELECTRIC TIMERS

- Business Remodel
- Business Merger
- Grocery Markets
- Small Delicatessens
- Liquor Stores
- Convenience Stores
- Irrigation Systems
- Recorded Messages
- Storage Companies
- Interior Lighting
- Electrical Motors
- HVAC Equipment
- Parking Lot Lighting
- Billboard Lighting
- Process Equipment
- Livestock Cooling Systems

PARAGON[®] CROSS REFERENCE

Paragon Part Number	Tork [®] / Uni-Line [®] Part Number	Description
4001-00	1101	24 Hr Electromech Timer - SPST - 120V - 40 Amps - Metal Encl
4002-71	1102	24 Hr Electromech Timer - SPST - 208-277V - 40 Amps - Metal Encl
4003-00	1103	24 Hr Electromech Timer - DPST - 120V - 40 Amps - Metal Encl
4004-71	1104	24 Hr Electromech Timer - DPST - 208-277V - 40 Amps - Metal Encl
42011-00	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
42013-00	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
42013-20	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
44005-00	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
EC4000/120V	E120B	24 Hr Electronic Timer - SPDT - 120-208-277V - 40 Amps - Plastic Encl
EC4000PC/120V	E120B	24 Hr Electronic Timer - SPDT - 120-208-277V - 40 Amps - Plastic Encl
EC4004/120V	E101B	24 Hr Electronic Timer - SPST - 120-208-277V - 40 Amps - Plastic Encl
EC4004/208-277V	E101B	24 Hr Electronic Timer - SPST - 120-208-277V - 40 Amps - Plastic Encl
EC4004PC/120V-RT	E101B	24 Hr Electronic Timer - SPST - 120-208-277V - 40 Amps - Plastic Encl

PARAGON[®] CROSS REFERENCE

Paragon Part Number	Tork [®] / Uni-Line [®] Part Number	Description
P101-00	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P101-00M	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P101-00P	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P101-00PC-RT	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P103-00	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P103-00M	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P103-00P	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P103-00PC-RT	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P104-71	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P104-71M	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P104-71P	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P104-71PC-RT	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
P104-71RT	TU40	Universal Multi-Voltage 24 Hr Electromech Timer
TRIPPERS FOR 1100 Series	P47	Extra Trippers for 1100 Series Timers

PARAGON[®] CROSS REFERENCE

Paragon Part Number	Tork [®] / Uni-Line [®] Part Number	Description
7007-00	W200	7 Day Electromech Timer - DPST - 120V - 40 Amps - Metal Encl
7008-00	W220	7 Day Electromech Timer - DPDT - 120V - 40 Amps - Metal Encl
7008-71	W222	7 Day Electromech Timer - DPDT - 208-277V - 40 Amps - Metal Encl
EC7000PC/120V-RT	EW120B	7 Day Electronic Timer - SPDT - 120-208-277V - 40 Amps - Plastic Encl
EC7001/208-277V	EW120B	7 Day Electronic Timer - SPDT - 120-208-277V - 40 Amps - Plastic Encl

TIMER CATEGORIES

- 24 Hour Timers
 - 1100 Series Electromechanical
 - TU40 Multi-voltage
 - E100B Electronic Multi-voltage
- 7 Day Timers
 - W Series Electromechanical
 - EW Series Electronic Multi-voltage



TORK® TIMERS



1101
1102
1103
1104
P47



TU40



E101B
E120B



W200
W220
W222
P69



EW120B

1100 SERIES

- 24 Hour Clock Dial
- 20 Min ON Min Setting
- 75 Min OFF Min Setting
- Manual Override
- 12 Max ON/OFF Events per day
- Switch Types SPST and DPST
- 40 AMP Rating



TU40

- Multi-Voltage Input
 - Automatic Detection
- 24 Hour Real Time Clock Face
- Minimum setting 15 Minutes
- Captive trippers
- 4 in 1 DPDT contacts
 - Includes SPST, SPDT, DPST
- Load ON Red LED Indicator
- Power on Green LED Indicator
- ON/OFF/AUTO Switch



E100B SERIES

- Multi-Voltage Input
 - 24/120/208/240/277
- 20 ON/OFF Operations
- Manual Override
- SPST, DPST, SPDT Load Contacts
- 30A Output Contact
- 100 hour Super Capacitor Back-Up



W SERIES

- 7 Day Clock Dial
- 60 Min ON Minimum
- 120 Min OFF Minimum
- Manual Override
- 2 Max ON/OFF Events Per Day
- SPST, SPDT, DPST, 3PST, 4PST
- 40 Amp Rating



EW SERIES

- Multi-Voltage Input
- 24/120/208/240/277
- 20 ON/OFF Operations
- 7 Day Scheduling
- Manual Override
- SPST DPST SPDT Load Contacts
- 30A Output Contact
- 100 hour Super Capacitor Back-Up



MANUFACTURERS OF ELECTRIC TIMERS

- Tork (Purchased by NSi Industries)
- Distributed by Uni-Line®
- Intermatic - Grasslin Timers
- Myriad of small players

TORK®

INTERMATIC®

TORK® / UNI-LINE® SALES SUPPORT

Attention HVAC Wholesalers!

TorkTimers now available from Robertshaw.

MULTIPURPOSE CONTROLS

E100B SERIES ^{cULus} MULTIPURPOSE CONTROLS 1 CHANNEL

MULTI-VOLTAGE INPUT 120-277VAC
PATENTED 40 AMP CONTACTS
INDOOR/OUTDOOR ENCLOSURE STANDARD

APPLICATIONS:

24 HOUR

- Signs
- Lighting
- Air Conditioning
- Sump Pumps
- Ventilating Fans

7 DAY

- Outdoor Signs
- Display Lighting
- Security Systems
- Heating and Air Conditioning

FEATURES

DISPLAY: LCD

PROGRAMMING: Simple, with brief easy-to-follow instructions.

DAYLIGHT SAVING TIME: Automatic (can be changed or omitted)

MANUAL OVERRIDE: Until the next regularly scheduled ON or OFF when automatic operation then resumes or permanently if desired.

CLOCK FORMAT: AM/PM

POWER OUTAGE BACKUP: Permanent Schedule Retention. Supercapacitor maintains real time clock for 100 hours.

E101B EW101B
E103B EW103B
E120B EW120B



SUPERCAPACITOR BACKUP!

PERMANENT SCHEDULE RETENTION!

24 HOUR

Capable of some schedules each day of the week

ON & OFF SET POINTS: 20 per day, minimum setting is one minute.

7 DAY

Capable of different schedules each day of the week

ON & OFF SET POINTS: 20 per day or week, minimum setting is one minute.

MEETS CALIFORNIA
ENERGY COMMISSION'S
TITLE 24 REQUIREMENTS ^{ASHRAE}
90.1 1999

SPECIFICATIONS

TIMING ACCURACY: Line Frequency

OPERATING TEMPERATURE:

-40° to +149°F (-40° to +65°C.)

STORAGE TEMPERATURE:

-40° to +158°F (-40° to +70°C.)

RELATIVE HUMIDITY: 0 to 90% RH

ENCLOSURE: Indoor/Outdoor NEMA 3R plastic is standard

INPUT VOLTAGE: 120-277VAC, 50/60Hz (automatic detection)

POWER CONSUMPTION: 6VA max.

OTHER MOUNTINGS:

Metal Indoor, add suffix Y

Plastic Indoor/Outdoor with clear window

NEMA 3R: add suffix C

Metal Indoor/Outdoor - NEMA 3: add suffix O

Flush with lock and key: add suffix FLG

Bracket mounting - specify mechanism only with bracket

TORK

A DIVISION OF **NSI** INDUSTRIES, LLC

Robertshaw

POLL QUESTION # 1

Which of the following timers are 7-day electromechanical timers?

- A. 1101 and 1104
- B. TU40
- C. E101B and E120B
- D. W222 and EW120B

POLL QUESTION #2

Which timer is a universal multi-voltage 24-hour timer?

- A. 1101
- B. TU40
- C. W222

CONTACTS FOR TORK®

Tork® Technical Service

Telephone 1.888.500.4598

Fax 1.888.500.4599

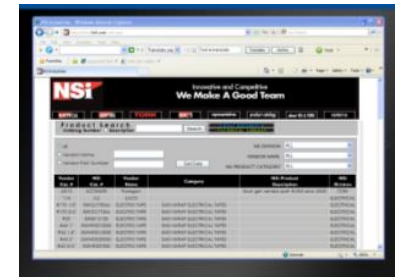
For Tork® Email

techsupport@nsiindustries.com

For Tork® Cross Reference

www.nsiindustries.com/CrossReference

TORK®



WHEN YOU HAVE UNI-LINE® QUESTIONS

Telephones:

Technical Service 1-800-445-8299

Technical Service Fax 1-630-260-7294

Customer Service 1-800-304-6563

Customer Service Fax 1-800-426-0804

Websites:

Uni-Line® Catalog: www.robertshaw.com/Uni-Line

Cross Reference: www.robertshaw.com/Products/Cross-Reference

Toolbox: www.robertshaw.com/toolbox/Toolbox-Main

General Information for:

Robertshaw®, Paragon®, Ranco®, Uni-Line® and Publication Zone®



Robertshaw®, Paragon®, Ranco®, Uni-Line®, and Make the Connection™ are propriety marks of Robertshaw or its subsidiaries.

All third party trademarks and service marks are the proprietary marks of their respective owners.

© 2016 Robertshaw. All rights reserved.

QUESTIONS AND ANSWERS?

