

# OPERATING INSTRUCTIONS

# GRASSLIN™

by Intermatic

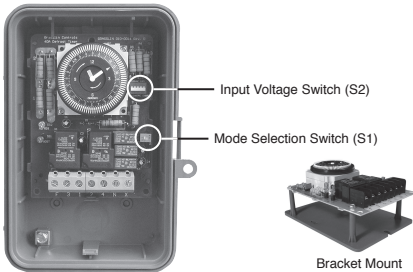
## DTMV40 Series Time Initiated, Temperature, Pressure or Time Terminated Multi-Voltage 40A Defrost Timers

### **⚠ WARNING** Risk of Fire or Electric Shock

- Disconnect power at the circuit breaker(s) or disconnect switch(es) before beginning installation or servicing.
- More than one circuit breaker or disconnect switch may be required to de-energize the equipment before servicing.
- Do not use the manual off position of the timer for equipment servicing. Always disconnect the power at the circuit breaker(s) or disconnect switch(es).
- Use COPPER conductors ONLY.
- For 40 amp loads, use #8 AWG wire, rated 90°C min.
- Wire in accordance with national and local electrical code requirements.

### **⚠ CAUTION** Risk of Damage to Timer

- Rotate timer dial clockwise only.



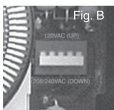
UL TYPE 3R Enclosure

#### STARTUP PROCEDURE

1. Determine model to be replaced (Grasslin or Competitors) from table below.
2. Set Mode Selection (S1 BLUE DIP Switch – Fig. A) See table below and instructions on page 5.
3. Apply corresponding Terminal Identification and Door labels –see retrofit kit instructions.
4. Set correct input voltage (S2 RED DIP Switch – Fig. B).
5. Follow installation and programming instructions.



Fig. A



The DTMV40 can be configured for either 120 or 208/240VAC. Locate RED DIP Switch to the right of timer model. For:

- 120VAC slide DIP switch UP
- 208/240VAC slide DIP switch DOWN

Paragon	Precision	Mode Selection	Wiring Diag.
TIME INITIATED, TIME TERMINATED			
8045	6045	A	5
8041	6041	A	2
8047	6047	B	4
TIME INITIATED, REMOTE TEMPERATURE OR PRESSURE TERMINATED			
8145	6145	A	1
8141	6141	A	7
8143	—	B	8
TIME INITIATED, PRESSURE TERMINATED (Separate Pressure Switch Required (see instructions))			
8245	—	A	10
8247	—	B	3
<b>Grasslin</b>			
DT040	—	A	1
DT140	—	A	1
DTMV	—	A	1
DTSX	—	A	1

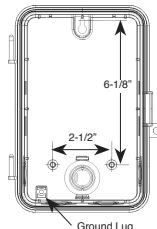
#### INSTALLATION

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.

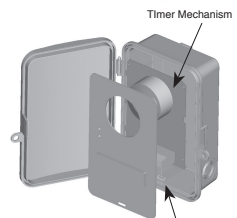
1. Open door and then remove interior protective cover by releasing spring clip on bottom.
2. Remove timer mechanism by releasing spring clip on bottom.
3. Select knockouts to be used. Remove inner 1/2" knockout by inserting a screwdriver in the slot and carefully punch knockout loose. Remove slug. If 3/4" knockout is required, remove the outer ring with pliers after removing the 1/2" knockout. Smooth edges with knife if necessary.
4. Place enclosure in desired mounting location and mark the three mounting holes (refer to diagram below). Start by placing set screw on top and attaching enclosure over keyhole; then screw in remaining two screws on bottom.
5. 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.
6. **Verify voltage selection. 120VAC – position switch UP; 208/240VAC – position switch DOWN (refer to Fig. B).**
7. Wire in accordance with National and Local Codes.
8. Grounding: Terminate all ground wires to ground lug on bottom of enclosure.
9. Replace interior protective cover.



Step 1



Ground Lug



Step 2

## Model Designation

Models	Enclosure Mount
DTMV40	24-hour, Outdoor UL TYPE 3R Enclosure
DTQMV40	24-hour w/Battery Backup, Outdoor UL TYPE 3R Enclosure
DTMV40-IM	24-hour, Indoor Metal UL TYPE 1 Enclosure

Models	Non-Enclosure Mount
DTMV40-M	24-hour, Mechanism Only
DTQMV40-M	24-hour w/Battery Backup, Mechanism Only
DTMV40-P	24-hour, Panel Mount
DTMV40-B	24-hour, Bracket Mount
DTQMV40-B	24-hour w/Battery Backup, Bracket Mount

Note: All units with Battery Backup provide up to a week of reserve carryover.

## PROGRAMMING (Synchronous and Quartz 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.

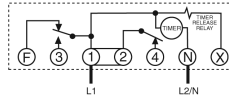
## DTMV40 TROUBLESHOOTING GUIDE MODE A (See page 1)

### In Refrigeration Mode

Arrow on timer points to current time.



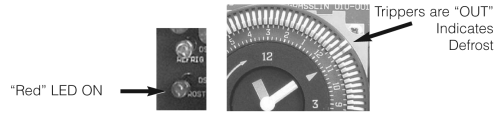
"1 & F" Make  
"1 & 3" Break



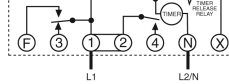
"2 & 4" Make

### In Defrost Mode

Arrow on timer points to current time.



"1 & F" Break  
"1 & 3" Make



"2 & 4" Break

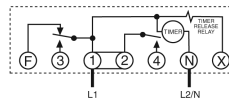
## DTMV40 TROUBLESHOOTING GUIDE MODE B (See page 1)

### In Refrigeration Mode

Arrow on timer points to current time.



"1 & F" Make  
"1 & 3" Break



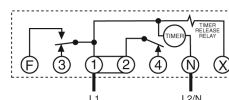
"2 & 4" Break

### In Defrost Mode

Arrow on timer points to current time.



"1 & F" Break  
"1 & 3" Make



"2 & 4" Make

## DO NOT ROTATE MINUTE HAND COUNTER-CLOCKWISE

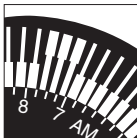
### Setting Defrost Initiation Time:

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 11:45 AM, 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.)

### Setting 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.

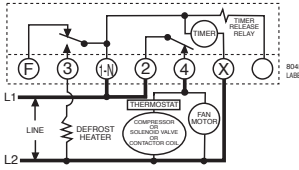


Note: It is necessary to apply power across terminals 1&N in order to perform electrical test.

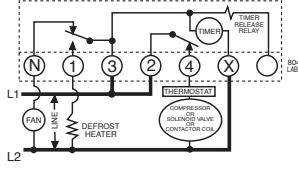
# DTMV40 - TYPICAL WIRING DIAGRAMS

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

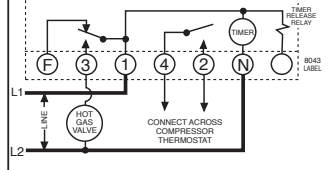
**1** 8045 Replacement  
Mode A with 8045 Label Applied



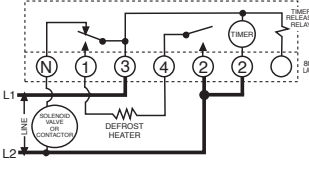
**2** 8041 Replacement  
Mode A with 8041 Label Applied



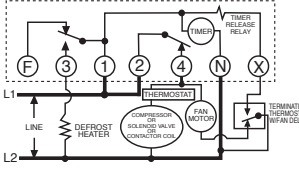
**3** 8043 Replacement  
Mode B with 8043 Label Applied



**4** 8047 Replacement—Double Pole Switching  
Mode B with 8047 Label Applied

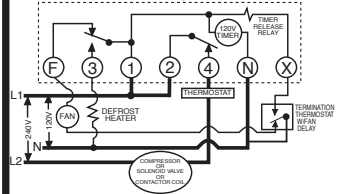


**5** 8145 Replacement  
Mode A - No Label Required

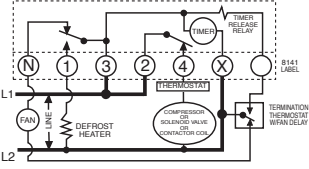


**DEFAULT (Out of the Box)**

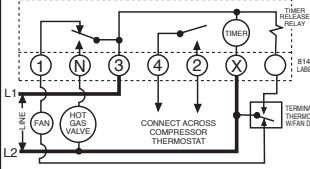
**6** 120V Fan & Defrost Heater; 240V Compressor  
Mode A - No Label Required



**7** 8141 Replacement  
Mode A with 8141 Label Applied

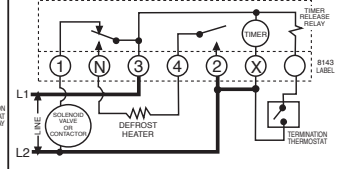


**8** 8143 Replacement  
Mode B with 8143 Label Applied

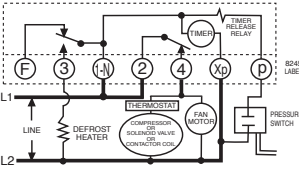


\*See Note 1, page 5

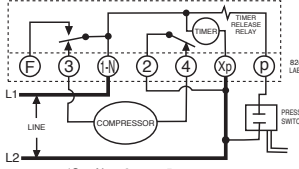
**9** 8143 Replacement—Double Pole Switching  
Mode B with 8143 Label Applied



**10** 8245 Replacement  
Mode A with 8245 Label Applied

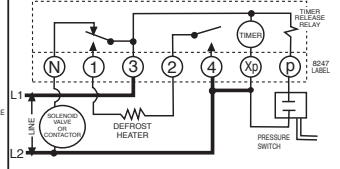


**11** 8243 Replacement  
Mode B with Trippers Reversed



\*See Note 2, page 5

**12** 8247 Replacement—Double Pole Switching  
Mode B with 8247 Label Applied



## WIRING LEGENDS

Paragon Model	Precision Model	GRASSLIN Model	S1 Mode Selector	Terminal Ident. Label	Typical Wiring Diagram	Terminal Layout (see note below)
<b>TIME INITIATED, TIME TERMINATED</b>						
8045 8046	6045	DTMV40 DTMV40	A A	None None	1	(F) (3) (N) (2) (4) (X) <small>NO CONNECTION</small>
8041	6041	DTMV40	A	8041	2	(N) (1) (3) (2) (4) (X) <small>NO CONNECTION</small>
8043	6043	DTMV40	B	8043	3	(F) (3) (1) (4) (2) (N) <small>NO CONNECTION</small>
8047	6047	DTMV40	B	8047	4	(N) (1) (3) (4) (2) (2) <small>NO CONNECTION</small>
<b>TIME INITIATED, REMOTE TEMPERATURE OR PRESSURE TERMINATED</b>						
8145	6145	DTMV40	A	None	5, 6	(F) (3) (1) (2) (4) (N) (X)
8141	6141	DTMV40	A	8141	7	(N) (1) (3) (2) (4) (X) ( )
8143	6143	DTMV40	B	8143	8, 9 <small>See Note 1</small>	(1) (N) (3) (4) (2) (X) ( )
<b>TIME INITIATED, PRESSURE TERMINATED</b> (Separate Pressure Switch Required - see instructions)						
8245	6245	DTMV40	A	8245	10	(F) (3) (N) (2) (4) (Xp) (p)
8243	6243	DTMV40	B	8243	11 <small>See Note 2</small>	(F) (3) (N) (2) (4) (Xp) (p)
8247	6247	DTMV40	B	8247	12	(N) (1) (3) (2) (4) (Xp) (p)

### APPLICATION

The DTMV40 Defrost Timer is equivalent in function, terminal identification, and wiring to the Paragon 8140 and Precision 6140 series Defrost Timers. The DTMV40 may also be used to replace Paragon 8040 and Precision 6040 series time terminated defrost timers. With the addition of a remote pressure switch, the DTMV40 can replace the Paragon 8240 series and Precision 6240 series pressure terminated defrost timers. Defrosts will be initiated by programming 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.

### DTMV40 Time Initiated, Remote Temperature, Pressure or Time Terminated:

Used in electric or hot gas defrost applications where the defrost is terminated when the coil is frost free, as sensed by a temperature or pressure switch, even

though the defrost programmed *termination time* has not been reached. The *time termination* functions as a fail-safe and will terminate the defrost if the temperature or pressure switch fails to do so. The temperature or pressure switch on the refrigeration coil has contacts which close on a temperature or pressure rise above freezing, indicating that frost and ice have melted from the coil. Typically a wide differential SPDT temperature switch is used with its normally closed contacts wired to the fans thereby delaying the fans from coming on until the coil temperature has dropped back to below freezing. In most applications, the contacts at terminals 2 and 4 are normally closed (when timer is energized) and control the fans and refrigeration equipment or compressor. For hot gas defrost, or for double pole switching, contacts 2 and 4 may be configured as normally open by selecting mode "B." Refer to wiring diagrams 1 thru 12 for additional detail.

### "F" Terminal:

The DTMV40 contains a normally closed contact between terminals 1 and F. This terminal may be used to switch the fans off during a defrost rather than terminals 2 and 4. For hot gas defrost applications, with the mode switch set to position "B", the fans may be connected to terminal "F."

**Note:** The DTMV40 is configured by default (out of the box) to replicate the 8145 wiring. For replacement of other models refer to page 3.

## REPLACING EXISTING DEFROST TIMERS

The DTMV40 will replace all models of Paragon 8040, 8140, 8240 Series or Precision 6040, 6140, 6240 Series.

### TERMINAL IDENTIFICATION:

The standard DTMV40 terminal identification is identical to the Paragon 8145 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 on page 4, select the proper label, apply to printed circuit board, and wire per the original wiring or the wiring diagrams indicated.

### MODE SELECTION (Light Blue DIP Switch):

First determine what model is being replaced (Grasslin or Competitors). The mode selector DIP switch (located at lower right side of the board) determines the configuration of terminals 2&4. In position "A", the terminals are normally closed (only when the timer is energized), and will open during a defrost. In position "B", terminals 2&4 are normally open, and will close during a defrost. Select proper position from table below and wiring diagrams indicated. To select mode simply slide the switch as follows:

Mode **A** – position switch to left;

Mode **B** – position switch to right;

**Note:** When Mode "B" is selected the DTMV40 will operate as follows:

**Refrigeration Mode** – RED & GREEN LED's will turn OFF (1&3 and 2&4 break while 1&F make)

**Defrost Mode** – RED & GREEN LED's will turn ON (1&3 and 2&4 make while 1&F break)



### 8045 REPLACEMENT:

The DTMV40 with 8045 terminal ID label applied differs from the 8045 in that terminals 1 and N are combined. This means that the DTMV40 model must be the same voltage as the defrost circuit (defrost heater, contactor coil, or hot gas valve). If used in an application where the defrost circuit is 120V and the refrigeration circuit is 240V, the DTMV40 must be configured for 120V application (RED DIP Switch Down) with 120V power connected to 1-N and X.

**Note 1 – (8143 Replacement):** When replacing a Paragon 8143 or Precision 6143, wire the termination thermostat to terminal N of the DTMV40 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 DTMV40 (with the 8143 label attached), temperature termination will not occur and may result in burnout of the DTMV40. See wiring diagrams 8 & 9.

**8240/6240 SERIES REPLACEMENT:** The DTMV40 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 DTMV40 (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 DTMV40 white tabs (trippers) for setting defrost time and defrost duration must be reversed. Pull ALL tabs outward for refrigeration. Press the tabs inward at the desired defrost initiation times, and for desired duration.

**Please Note:** The DTMV40 replaces all prior Grasslin defrost timer models such as DT040, DT140, DTMV, and DTSX.

#### SPECIFICATIONS

##### Maximum Contact Switch Rating:

40A Resistive @ 120VAC, 208–240VAC

2HP @ 208–240VAC; 1HP @ 120VAC

16FLA, 90LRA @ 120VAC

12FLA, 52LRA @ 240VAC

"F" Terminal: 30A Resistive @ 120–240VAC

1HP @ 120VAC; 2HP @ 208–240VAC

Wiring Connections: Screw box lug terminals.

Up to one #8 AWG wire

##### Environmental Ratings:

Operating Temperature Range: –40°F to 131°F (–40°C to 55°C)

Operating Humidity: 0 - 95% RH, non-condensing

Dimensions: 8.795" x 6.631" x 2.935" (H x W x D)

Shipping Weight: 3 lbs.

Agency Approvals: UL Listed

# DTMV40 Series

Time Initiated, Temperature, Pressure or Time  
Terminated Multi-Voltage 40 A Defrost Timers

**Captive Trippers  
Can't Be Lost**

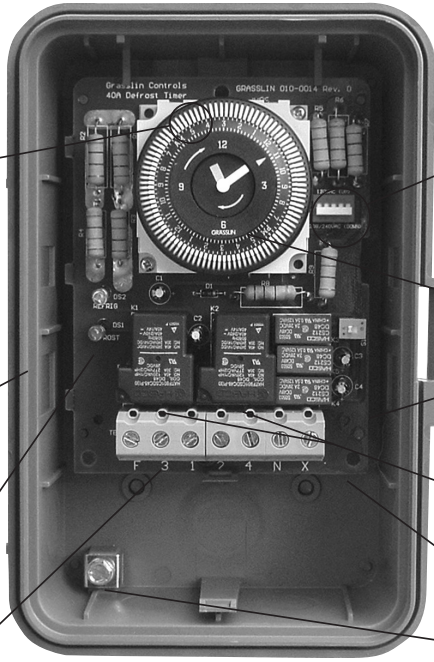


**Independently  
Adjustable Trippers  
Allow For Full or  
Partial Defrost Cycles  
on 15 Minute Intervals**


**New Compact  
UL TYPE 3R  
Outdoor Enclosure  
Replaces All Metal  
Enclosures**

**Red and Green LED  
Lights Indicate  
Defrost or Run Cycle**

**Large Screw  
Terminals for Easy Wiring  
Up to one #8 AWG wire**



**Easy Multi-Voltage  
Field Adjustable  
DIP Switch for  
120 or 208/240 VAC**



**True Clock Face**

**NO TOOLS  
REQUIRED!  
Our "GUTS" simply snap  
into existing enclosures**

**40 Amp Rated  
Contacts**

**Moisture Resistant  
Conformal Coated Board**

**Ground Lug Termination**

## FEATURES

- DTMV40 replaces over 40 competitive models
- Multi-Voltage field adjustable for 120, or 208/240VAC
- Mounts in existing enclosures, no tools required
- Box lug terminals
- Defrost times settable on quarter hour with captive trippers
- UL TYPE 3R outdoor enclosure
- 40 Amp, 2HP Rating
- Moisture resistant conformal coated board
- LED indications for defrost and refrigeration cycles
- Compact outdoor UL TYPE 3R enclosure
- Defrost cycles are programmed independently
- "Real-time" clock for quick, easy and accurate setting

**SPECIFIERS GUIDE**

Furnish and install a Grasslin DTMV40 defrost control which is field adjustable for 120V or 240V operation and shall have defrost initiation times settable to the quarter hour via captive trippers at 15 minute intervals. The defrost timer shall be housed in a UL TYPE 3R indoor/outdoor plastic enclosure. The relay output will be rated for 40A Resistive, 2HP @ 240VAC. Defrost termination to be by time (and by a remote temperature or pressure switch).

**SPECIFICATIONS:**

Maximum Contact Switch Rating:  
40A Resistive @ 120VAC, 208-240VAC  
2HP @ 208-240VAC; 1HP @ 120VAC  
16FLA, 90LRA @ 120VAC  
12FLA, 52LRA @ 240VAC

**T<sup>1</sup> TERMINAL:**  
30A Resistive @ 120-240V AC  
1HP @ 120VAC; 2HP @ 208-240VAC

**WIRING CONNECTIONS:**  
Screw box lug terminals. Up to one #8 AWG wire

**ENVIRONMENTAL RATINGS:**  
Operating Temperature Range: -40°F to 131°F (-40°C to 55°C)  
Operating Humidity: 0 - 95% RH, non-condensing

**ELECTRICAL LIFE:**  
50,000 Operations at Full Load

**DIMENSIONS:**  
8.795" x 6.631" x 2.935" (H x W x D)

**SHIPPING WEIGHT:** 3 lbs.

**AGENCY APPROVALS:** UL LISTED

## LIMITED ONE YEAR WARRANTY

If within the warranty period specified, this product fails due to a defect in material or workmanship, Intermatic Incorporated will repair or replace it, at its sole option, free of charge. This warranty is extended to the original purchaser only and is not transferable. This warranty does not apply to: (a) damage to units caused by accident, dropping or abuse in handling, acts of God or any negligent use; (b) units which have been subject to unauthorized repair, opened, taken apart or otherwise modified; (c) units not used in accordance with instructions; (d) damages exceeding the cost of the product; (e) sealed lamps and/or lamp bulbs, LED's and batteries; (f) the finish on any portion of the product, such as surface and/or weathering, as this is considered normal wear and tear; (g) transit damage, initial installation costs, removal costs, or reinstatement costs.

INTERMATIC INCORPORATED WILL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES. SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY MODIFIED TO EXIST ONLY AS CONTAINED IN THIS LIMITED WARRANTY, AND SHALL BE OF THE SAME DURATION AS THE WARRANTY PERIOD STATED ABOVE. SOME STATES DO NOT ALLOW LIMITATIONS ON THE DURATION OF AN IMPLIED WARRANTY, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

This warranty service is available by either (a) returning the product to the dealer from whom the unit was purchased, or (b) completing a warranty claim on line at [www.intermatic.com](http://www.intermatic.com). This warranty is made by: Intermatic Incorporated, Customer Service 7777 Winn Rd. Spring Grove, Illinois 60081-9698. For warranty service go to: <http://www.intermatic.com> or call 815-675-7000.