WARMFLO®
ANALYZER
WF-ANZ7

NEW UNIT FOR
FORCED AIR & TS BOILERS

Warranty XX017

ELECTRO INDUSTRIES
Monticello, Minnesota
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Table of Contents

WarmFlo V4.xx Handheld

Configuration Information – Read First

This is an upgrade for the WF-ANZ5, but this unit complies with all WarmFlo units shipped.
- Original board with 28-pin chip
- WarmFlo II board with 40-pin chip
- WarmFlo Plus board with 40-pin chip
- WarmFlo Select board with 40-pin chip
- WarmFlo TS Boiler with 40-pin chip
    EB boards include:
        EB-WA, EB-WO, EB-MA, EB-MO
        EB-S, EB-CA, EB-CO, EB-MS

The analyzer can communicate with different WarmFlo boards. This is done by setting the rotary switch to the board type you want to communicate with before connecting the analyzer to the board.
   NOTE: For the original WarmFlo board with the 28-pin chip, select the 'Forced-Air' switch setting.
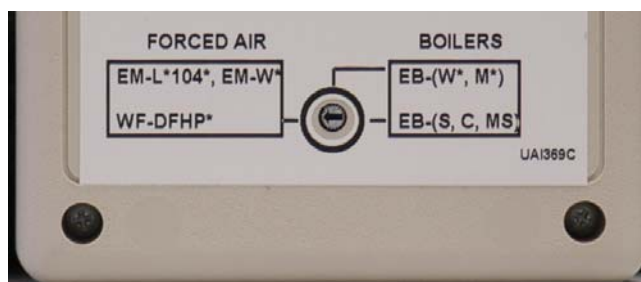
When the analyzer is connected the display will have "WF-ANZ7" in the top row and the analyzer software version in the bottom row. After approximately 3 seconds the analyzer will display the type of WarmFlo board the switch is set to for approximately 3 seconds then "PRESS MON" will appear.

When "PRESS MON" appears, press the 'MON' button to continue or if you hold the 'SHIFT' key and press the '0' key, the handheld will read the software version currently in the WarmFlo board connected. The version will stay in the display until you press any key (except 'SHIFT'). "PRESS MON" will then re-appear. You can press the 'MON' key now to continue or press 'SHIFT' '0' again to read the software version.
If you are connected to a WarmFlo Plus board with software version 10.xx or 12.xx or a WarmFlo Select board (version 18.xx), the configuration switch position will be displayed in parenthesis following the version number.

After the 'MON' key is pressed, the analyzer will check the software version against the rotary switch position on the back of the analyzer. If you are connected to a boiler board and you have the switch in the wrong position the display will show "SWITCH SETTING" in the top line and the boiler board software version in the bottom line. You must disconnect the analyzer, change the switch setting and then re-connect.

Because of the different communications protocol between the boiler boards and the forced air boards, the analyzer can not determine if you have the rotary switch in the forced air position when connected to a boiler board and vice versa. If the analyzer gets locked up or displays "weird" numbers then the switch is probably not set correctly.

The boiler boards have a polling scheme for communications, so it will take longer for reading and writing to these boards.

There is an internal timer in the handheld that will display "-----ERROR-----" if, during monitoring, reading or writing, no response is received within 10 seconds. To clear the error, press any key (except 'SHIFT') to restart the handheld.

If you enter a value that is not within the acceptable range the analyzer will display
"OUT OF RANGE" (on the same line as the bad entry) when you try to write to the board you are connected to.

In addition to the two-line display, the added field programmable functions are shown on the following pages grouped according to the 3 switch settings.

WarmFlo V4.xx Handheld

The keyboard, "SHIFT" is to allow added control functions. Similar to a typewriter keyboard, "SHIFT" refers to the upper designated key function and must be held down while pressing the other key.
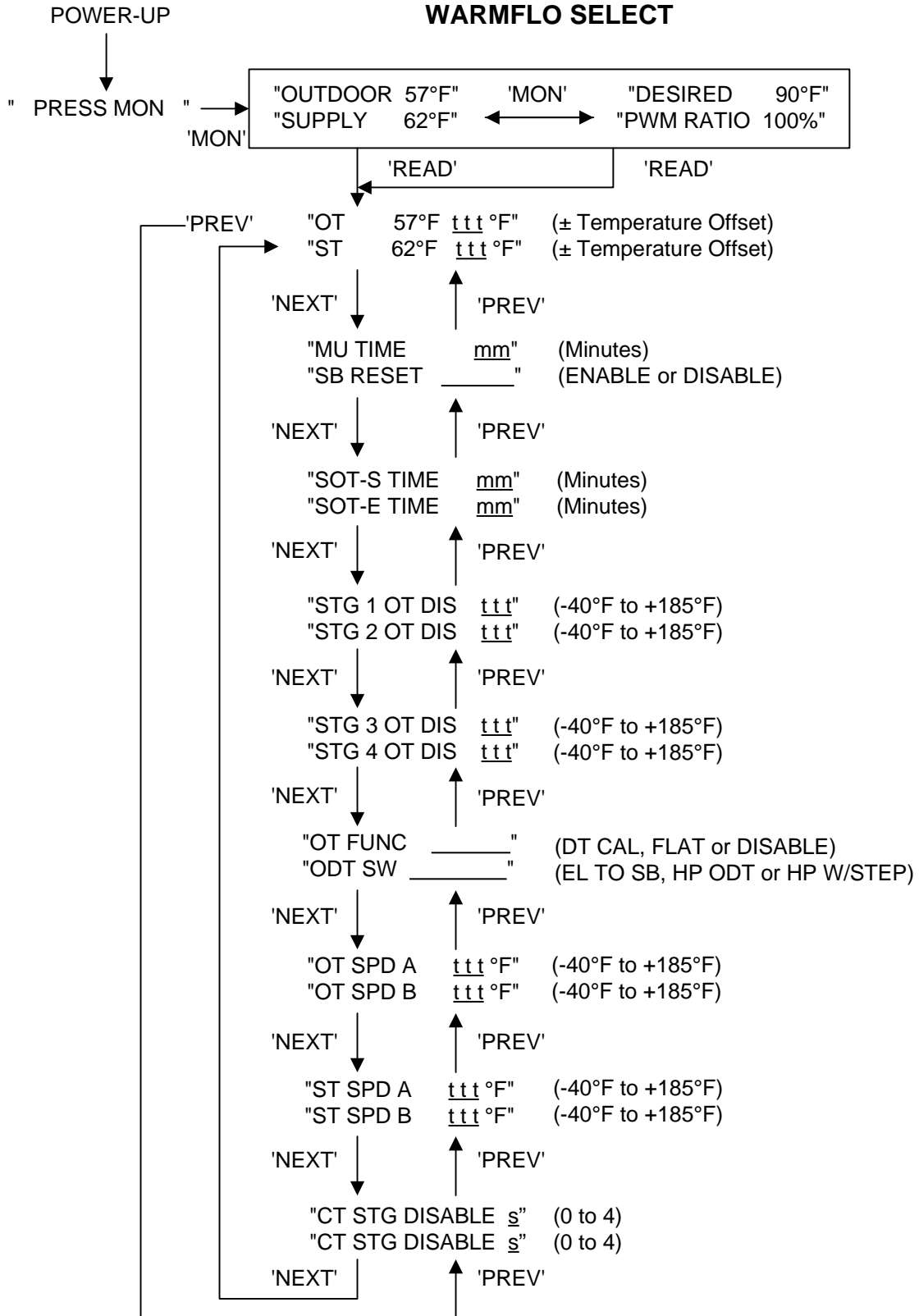
Read Mode:
1) Press and hold the 'SHIFT' key, then press the 'READ' key to enter the read mode.
2) Pressing 'MON' at any time will go to the real time monitor mode.
3) Use the LEFT and RIGHT arrow keys to move between digits in a field or if a field contains a word choice use these keys to toggle or change the choice.
4) Use the UP/DOWN arrow key to move between the 2 lines of the display.
5) The 'CLR' key can be used to zero all digits on the display line the cursor is currently on. This key will not change any word choices.
6) The 'SHIFT' + the 'SAVE' key will write the data currently displayed to the WarmFlo board.

When in the MONITOR mode pressing 'MON' again will toggle between 2 displays. Press the 'SHIFT' key plus the 'READ' key to exit the monitor mode and go into the data entry mode.

If the sensor is not used by the program you will see 'N/A' instead of the temperature for that sensor. If the sensor is detected as bad, you will see 'BAD' instead of the temperature for that sensor. This pertains only to the TS Boiler boards and WarmFlo boards with a 40-pin chip.

Forced Air

WARMFLO II
WARMFLO PLUS
WARMFLO SELECT

POWER-UP

" PRESS MON " ────▶ | "OUTDOOR 57°F"   'MON'   "DESIRED   90°F" |
'MON' | "SUPPLY   62°F" ◀────▶   "PWM RATIO 100%" |

                         'READ'   'READ'

'PREV'   "OT   57°F t t t °F"   (± Temperature Offset)
          "ST   62°F t t t °F"   (± Temperature Offset)

'NEXT' ↓   ↑ 'PREV'

          "MU TIME   mm"   (Minutes)
          "SB RESET _____"   (ENABLE or DISABLE)

'NEXT' ↓   ↑ 'PREV'

          "SOT-S TIME   mm"   (Minutes)
          "SOT-E TIME   mm"   (Minutes)

'NEXT' ↓   ↑ 'PREV'

          "STG 1 OT DIS   t t t"   (-40°F to +185°F)
          "STG 2 OT DIS   t t t"   (-40°F to +185°F)

'NEXT' ↓   ↑ 'PREV'

          "STG 3 OT DIS   t t t"   (-40°F to +185°F)
          "STG 4 OT DIS   t t t"   (-40°F to +185°F)

'NEXT' ↓   ↑ 'PREV'

          "OT FUNC   _____"   (DT CAL, FLAT or DISABLE)
          "ODT SW   _____"   (EL TO SB, HP ODT or HP W/STEP)

'NEXT' ↓   ↑ 'PREV'

          "OT SPD A   t t t °F"   (-40°F to +185°F)
          "OT SPD B   t t t °F"   (-40°F to +185°F)

'NEXT' ↓   ↑ 'PREV'

          "ST SPD A   t t t °F"   (-40°F to +185°F)
          "ST SPD B   t t t °F"   (-40°F to +185°F)

'NEXT' ↓   ↑ 'PREV'

          "CT STG DISABLE s"   (0 to 4)
          "CT STG DISABLE s"   (0 to 4)

'NEXT'   'PREV'

Forced Air

Monitor Mode:
    1) Pressing 'READ' at any time will go to the data entry or read mode.
    2) Use the 'MON' key to toggle between the 2 displays.
    3) The displayed data is automatically updated every 7 seconds.

While in the monitor mode you can also hold the 'SHIFT' key and press '9' to get to the CFM setup (see page 9).

The monitor mode data consists of:
    OUTDOOR (Outdoor Temperature, OT)
    SUPPLY (Supply Temperature, ST)
    DESIRED (Desired Temperature, DT)
    PWM RATIO

Within the WarmFlo operating module DT is calculated based upon the "Min. Warm Air" switch setting and/or the heat loss curve built into the software. This heat loss curve takes the same shape as a typical building heat loss plot. The curve's slope or point-by-point relationship between OT and ST is determined by specific WarmFlo chip codes or by the setting of the center "Temperature" switch. In other words, this either represents "min. warm air" for mid or higher outdoor temperatures or the slope (heat loss) for the lower OT values requiring DT above the "min. warm air". Thus DT is the delivery temperature required to "heat the house" at a specific outdoor temperature.

PWM Ratio is the percentage of time stage 1 output is on. As the ST gets closer to the DT the PWM Ratio will decrease.

OT and ST (Outdoor and Supply Temperature)

(OT and ST Offset Entry)

Enter an offset to be added or subtracted from the OT and ST temperatures read from the sensors. Use the '–' key to enter an offset to be subtracted from the sensor reading.

MU TIME

(Makeup Time)
(Enter 0-99 minutes)
An entry of 00 disables the timer.
The make up timer starts counting down when all electric stages are full on (PWM = 100%) and ST (Supply Temperature) is less than DT (Desired Temperature) by more than 2°F. When the timer reaches 0 the board will go into the standby mode until the Y input is removed.

SB RESET

(Standby Reset)
(Select Enable or Disable)
When the WarmFlo board goes into a standby mode, it sets a timer for 5 minutes. After this timer has expired, it checks the ST temperature. If the ST temperature is less than 80°F, the unit will reset itself. Select 'Enable' if you want the board to do this and 'Disable' if you do not want the board to reset.
NOTE: Unless the WarmFlo board has software version 2.21 or greater the disable function will be ignored.
      It will always be enabled.

SOT-S TIME

(Enter 0-99 minutes)
An entry of 00 disables the timer.
This timer starts counting down at the beginning of heat active. If the timer reaches 0 during a continuous heat active cycle, the board will go into the standby mode until the Y input is removed.
If both SOT-S and SOT-E times are used, SOT-S time should be greater than SOT-E time.

SOT-E TIME

(Enter 0-99 minutes)
An entry of 00 disables the timer.
This timer starts counting down at the beginning of heat active. If the timer reaches 0 during a continuous heat active cycle, the board will default to a flat DT/HL until the Y input is removed.
If both SOT-S and SOT-E times are used, SOT-E time should be less than SOT-S time.
(See the definition of Flat under the OT Sensor Function below.)

Forced Air

STG 1-4 OT DIS
(Stage 1-4 OT Disable Temperature)
(Enter a temperature within the range of -40°F to +185°F)
The OT sensor is used to determine summer or air conditioning function and keeps the electric elements and stand-by off even though there may be a Y input.
Whenever the OT is greater than or equal to the entered value the stage is kept off.

OT FUNC
(OT Sensor Function)
Note: If V10.xx, V12.xx or V18.xx 'DT CAL' or 'DISABLE' will be displayed and cannot be changed.
Select from 3 choices: **DT CAL**, **FLAT** or **DISABLE**.
  DT CAL
    OT sensor will be read and its reading will be used to calculate DT.
  FLAT
    (Flat DT/HL)
    Any heat call will step-up to a flat DT/HL (High Limit temperature).
    In other words the high limit temperature will become the DT.
    (The OT sensor will still be read but its reading will not be used.)
  DISABLE
    Electronic Aquastat mode.
    The OT sensor is not read.
    When changing <u>TO</u> this mode from one of the other 2 modes, or when changing <u>FROM</u> this mode to one of the other 2 modes, you must cycle power on the WarmFlo board.

ODT SW
(ODT Switch Mode)
Select from 3 choices: **EL TO SB**, **HP ODT** or **HP W/STEP.**
  EL TO SB
    If OT is less than the ODT dial switch setting, the board will go into the standby mode.
  HP ODT
    (HP ODT Only)
    If OT is less than the ODT dial switch setting, the HP-ODT interrupt is activated.
  HP W/STEP
    (HP ODT With Step-Up)
    Same as "HP ODT" plus the stages step-up to a flat DT/HL.

OT SPD A and B
ST SPD A and B
(Software version 2.30 and greater only)
Note: If V10.xx or 12.xx, OT SPD A and ST SPD A will display 'N/A' and cannot be changed.
(Enter a temperature within the range of -40°F to +185°F)
During heat active (including E), non-standby, SPD A and/or SPD B outputs are turned on if OT is **less than**
the temperature values for SPD A and/or B.
Once on, the outputs are left on until the end of the heat cycle.
During heat active (including E), non-standby, SPD A and/or SPD B outputs are turned on if ST is **greater than**
the temperature values for SPD A and/or B.
Once on, the outputs are left on until the end of the heat cycle.
ST check is done only after 30 seconds after the start of a heat cycle.
This only applies to Dual Heat I/F modules plugged into J2 (full 10 pin cable).
The temperature entered can control the furnace or air handler blower speed.
  NOTE: WarmFlo Plus and WarmFlo Select have OT/ST SPD B output (tab connection)

Forced Air

CT STG DISABLE
(Software version 10.xx, 12.xx or 18.xx only)
(Enter 0, 1, 2, 3 or 4)
Enter one or two stage numbers to disable when the CT input senses 10 amps or more.
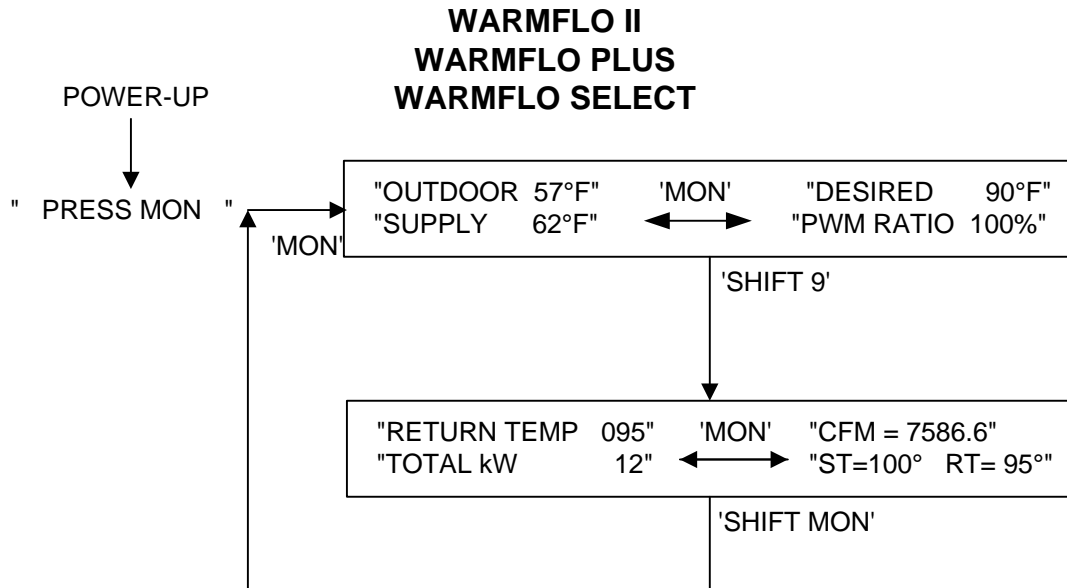These stages will turn OFF immediately.
When the CT input senses 5 amps or less, the stages will be re-enabled and come back ON if necessary.
If no stages are to be disabled, enter '0'.
When a CT input of 10 amps or more is sensed, a 30 second timer is started and the stages entered are disabled. The CT input is now ignored until the timer expires and then the input is read again and if still active the timer restarts and the input is again ignored for 30 seconds. This continues until the CT input senses 5 amps or less, then the input is continuously read until 10 amps or more is sensed and the timer starts again.

Forced Air

- CFM -

WARMFLO II
WARMFLO PLUS
WARMFLO SELECT

POWER-UP

↓

"   PRESS MON   "

'MON'

```
┌─────────────────────────────────────────────────┐
│ "OUTDOOR  57°F"    'MON'    "DESIRED      90°F"   │
│ "SUPPLY     62°F"  ◄────►   "PWM RATIO 100%"      │
└─────────────────────────────────────────────────┘
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'SHIFT 9'

↓

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┌─────────────────────────────────────────────────┐
│ "RETURN TEMP  095"   'MON'   "CFM = 7586.6"       │
│ "TOTAL kW          12"  ◄────►  "ST=100°  RT= 95°"│
└─────────────────────────────────────────────────┘
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'SHIFT MON'

CFM mode

Whenever either monitor screen is displayed, press and hold the 'SHIFT' key, then press the number '9' key.
Enter the return temperature and the total kW.
Press the 'MON' key.
The calculated CFM will be displayed along with the ST temperature obtained from the circuit board and the return temperature (RT) that you entered.
The ST temperature will be read every 5 seconds and a new calculation will be performed.
If you need to change the RT temperature, press the 'MON' key and you will be returned to the entry screen.
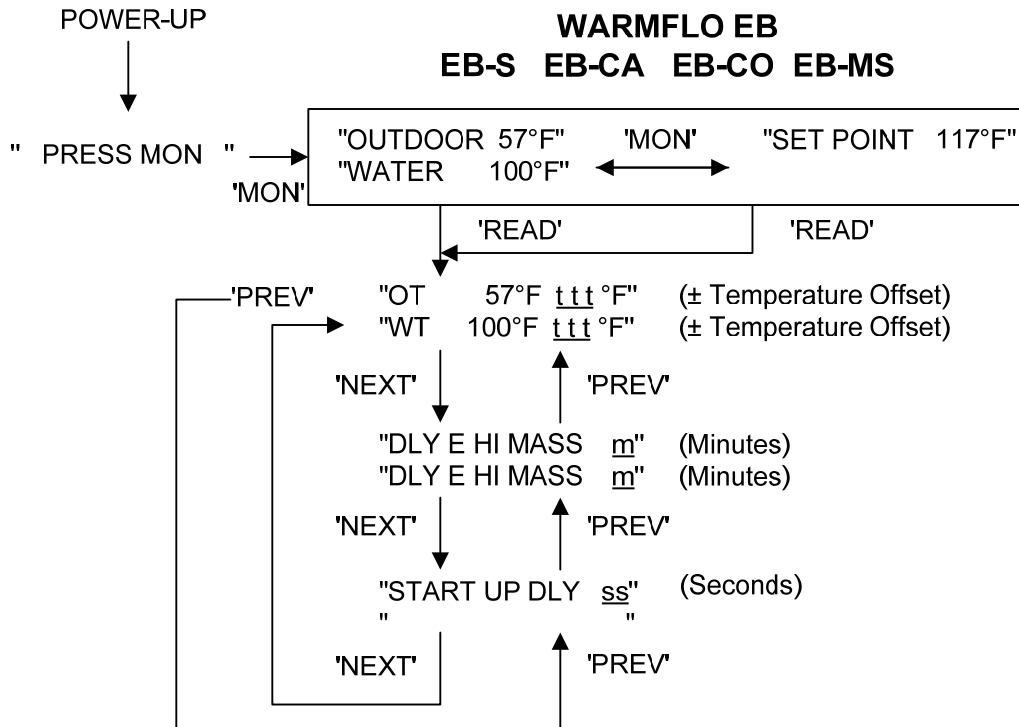The 'MON' key will toggle you between the entry screen and the CFM screen.
To exit the CFM mode press the 'MON' key while holding down the 'SHIFT' key.
This will bring you back to the monitor screen.
The only way to enter the CFM mode is from either one or the two monitor screens.

POWER-UP

WARMFLO EB
EB-S   EB-CA   EB-CO   EB-MS

"   PRESS MON   " ⟶

"OUTDOOR 57°F"   'MON'   "SET POINT   117°F"
"WATER   100°F" ⟷

'MON'

'READ'   'READ'

'PREV'   "OT   57°F t t t °F"   (± Temperature Offset)
           "WT   100°F t t t °F"   (± Temperature Offset)

'NEXT'   'PREV'

           "DLY E HI MASS   m"   (Minutes)
           "DLY E HI MASS   m"   (Minutes)

'NEXT'   'PREV'

           "START UP DLY   ss"   (Seconds)
           "   "

'NEXT'   'PREV'

Note: TS Boiler EB-S and EB-CA models do not use the outdoor sensor so the temperature displayed
        for "OUTDOOR" will read "N/A".

Monitor Mode:
    1) Pressing 'READ' at any time will go to the data entry or read mode.
    2) Use the 'MON' key to toggle between the 2 displays.
    3) The displayed data is automatically updated every 5 seconds.

The monitor mode data consists of:
    OUTDOOR (Outdoor Temperature, OT)
    WATER (Water Temperature, WT)
    SET POINT (Set Point Temperature)

For models EB-S, EB-CA and EB-MS:
    The Set Point Temperature is determined by the position of the temperature selector switch on the boiler's front panel.
For model EB-CO:
    Within the TS Boiler operating module, SET POINT is calculated based upon the heat loss curve built into the software.
    This heat loss curve takes the same shape as a typical building heat loss plot. The curve's slope or point-by-point
    relationship between OT and WT is determined by the setting of the "Temperature Selection" switch on the front of the
    boiler. This dial switch allows field selection of 8 "curve slopes". The setting reference point is the controlled outlet
    temperature (WT) at 0°F outside. Thus SET POINT is the delivery temperature required to "heat the house" at a specific
    outdoor temperature.

OT and WT (Outdoor and Water Temperature)
(OT and WT Offset Entry)
Enter an offset to be added or subtracted from the OT and WT temperatures read from the sensors. Use the '–' key to enter an
offset to be subtracted from the sensor reading.

* DELAY E HI MASS
(Enter 0 to 9 minutes)
Every 'Delay E' cycle the WT temperature is compared to the set point temperature to determine if any more or any less stages
should be on. The set point switch settings that are 'Hi Mass' are positions 0 thru 4.

* **DELAY E LO MASS**
(Enter 0 to 9 minutes)
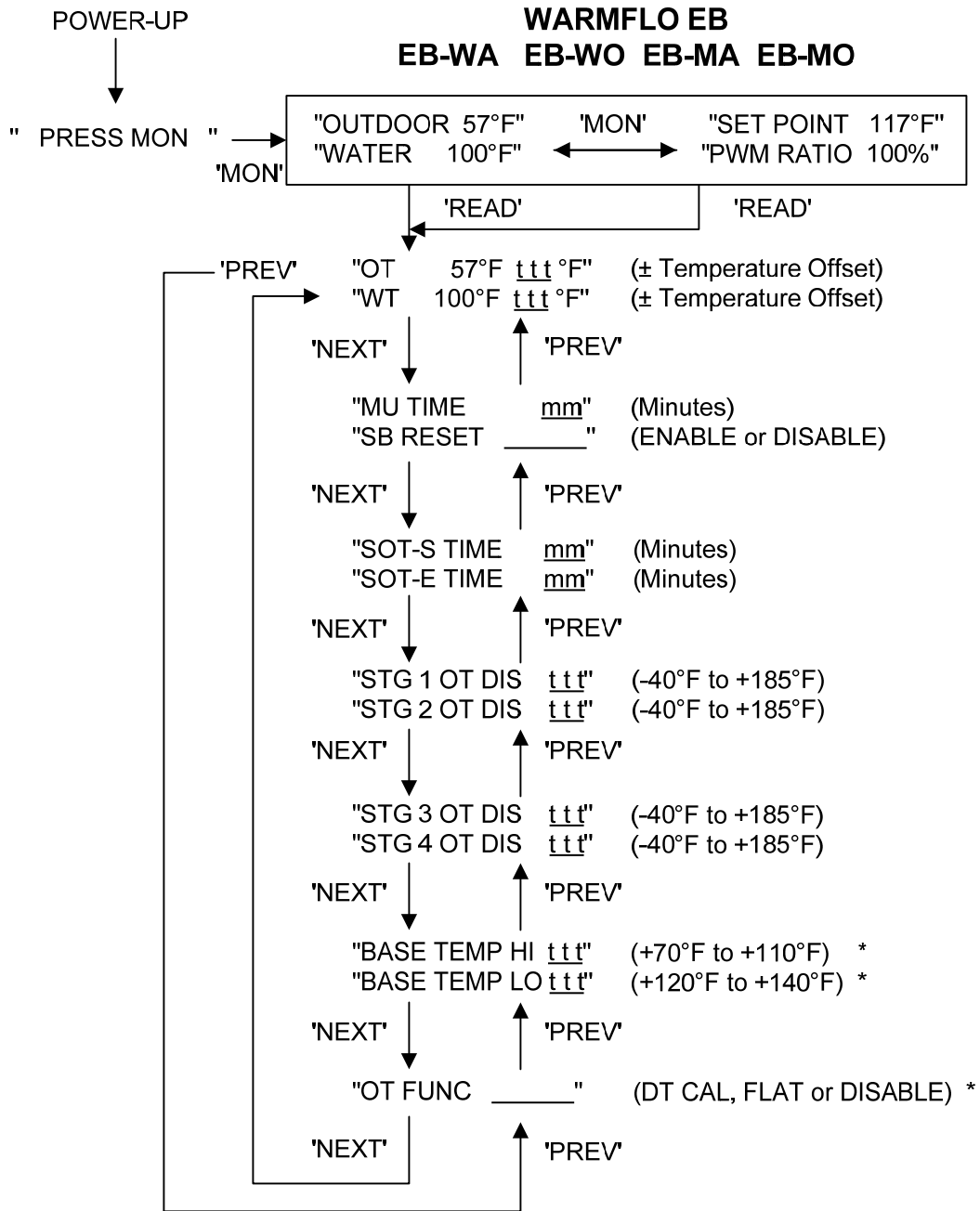Same as 'Delay E Hi Mass' except the set point switch settings for 'Lo Mass' are positions 5 thru 7.

* **START UP DELAY**
(Enter 0 to 99 seconds)
This is the delay at the beginning of a 'W' heat call before determining whether or not any stages should be turned on.

* Typically these are factory only settings.

TS Boiler EB-WA EB-WO EB-MA EB-MO

POWER-UP

WARMFLO EB
EB-WA   EB-WO EB-MA EB-MO

" PRESS MON " → "OUTDOOR 57°F"   'MON'   "SET POINT   117°F"
'MON'   "WATER   100°F" ◄──────► "PWM RATIO 100%"

'READ'   'READ'

'PREV'   "OT   57°F t t t °F"   (± Temperature Offset)
          "WT   100°F t t t °F"   (± Temperature Offset)

'NEXT' ↓   ↑ 'PREV'

          "MU TIME   mm"   (Minutes)
          "SB RESET _____"   (ENABLE or DISABLE)

'NEXT' ↓   ↑ 'PREV'

          "SOT-S TIME   mm"   (Minutes)
          "SOT-E TIME   mm"   (Minutes)

'NEXT' ↓   ↑ 'PREV'

          "STG 1 OT DIS   t t t"   (-40°F to +185°F)
          "STG 2 OT DIS   t t t"   (-40°F to +185°F)

'NEXT' ↓   ↑ 'PREV'

          "STG 3 OT DIS   t t t"   (-40°F to +185°F)
          "STG 4 OT DIS   t t t"   (-40°F to +185°F)

'NEXT' ↓   ↑ 'PREV'

          "BASE TEMP HI t t t"   (+70°F to +110°F)   *
          "BASE TEMP LO t t t"   (+120°F to +140°F) *

'NEXT' ↓   ↑ 'PREV'

          "OT FUNC _____"   (DT CAL, FLAT or DISABLE) *

'NEXT'   ↑ 'PREV'

* Only EBWO and EBMO Version 6.23 or greater.

Note: TS Boiler EB-WA and EB-MA models do not use the outdoor sensor so the temperature displayed
      for "OUTDOOR" will read "N/A".

TS Boiler EB-WA EB-WO EB-MA EB-MO

Monitor Mode:
    1) Pressing 'READ' at any time will go to the data entry or read mode.
    2) Use the 'MON' key to toggle between the 2 displays.
    3) The displayed data is automatically updated every 5 seconds.

The monitor mode data consists of:
    OUTDOOR (Outdoor Temperature, OT)
    WATER (Water Temperature, WT)
    SET POINT (Set Point Temperature)
    PWM RATIO

For model EB-WA and EB-MA:
    The Set Point Temperature is determined by the position of the temperature selector switch on the boiler's front panel.
For model EB-WO and EB-MO:
    Within the TS Boiler operating module, SET POINT is calculated based upon the heat loss curve built into the software. This heat loss curve takes the same shape as a typical building heat loss plot. The curve's slope or point-by-point relationship between OT and WT is determined by the setting of the "Temperature Selection" switch on the front of the boiler. This dial switch allows field selection of 8 "curve slopes". The setting reference point is the controlled outlet temperature (WT) at 0°F outside. Thus SET POINT is the delivery temperature required to "heat the house" at a specific outdoor temperature.

PWM Ratio is the percentage of time stage 1 output is on. As the ST gets closer to the DT the PWM Ratio will decrease.

OT and ST (Outdoor and Supply Temperature)
(OT and ST Offset Entry)
Enter an offset to be added or subtracted from the OT and ST temperatures read from the sensors. Use the '–' key to enter an offset to be subtracted from the sensor reading.

MU TIME
(Makeup Time)
(Enter 0-99 minutes)
An entry of 00 disables the timer.
The make up timer starts counting down when all electric stages are full on (PWM = 100%) and ST (Supply Temperature) is less than DT (Desired Temperature) by more than 2°F. When the timer reaches 0 the board will go into the standby mode until the Y input is removed.

SB RESET
(Standby Reset)
(Select **Enable** or **Disable**)
When the TS Boiler board goes into a standby mode, it sets a timer for 5 minutes. After this timer has expired, it checks the ST temperature. If the ST temperature is less than 80°F, the unit will reset itself. Select 'Enable' if you want the board to do this and 'Disable' if you do not want the board to reset.

SOT-S TIME
(Enter 0-99 minutes)
An entry of 00 disables the timer.
This timer starts counting down at the beginning of heat active. If the timer reaches 0 during a continuous heat active cycle, the board will go into the standby mode until the Y input is removed.
If both SOT-S and SOT-E times are used, SOT-S time should be greater than SOT-E time.

SOT-E TIME
(Enter 0-99 minutes)
An entry of 00 disables the timer.
This timer starts counting down at the beginning of heat active. If the timer reaches 0 during a continuous heat active cycle, the board will default to a flat DT/HL until the Y input is removed.
If both SOT-S and SOT-E times are used, SOT-E time should be less than SOT-S time.

TS Boiler EB-WA EB-WO EB-MA EB-MO

STG 1-4 OT DIS
(Stage 1-4 OT Disable Temperature)
(Enter a temperature within the range of -40°F to +185°F)
The OT sensor is used to determine summer or air conditioning function and keeps the electric elements and stand-by off even though there may be a Y input.
Whenever the OT is greater than or equal to the entered value the stage is kept off.

BASE TEMP HI
(See Fig. 1)
(Only EBWO and EBMO software version 6.23 or greater)
(Enter a temperature between 70° and 110°F)
This is the outdoor 65°F reference or starting ramp up point for Hi Mass. The modulation supply water sensing starts at this entry point and ramps up to the front dial 0°F reference point.

BASE TEMP LO
(See Fig. 2)
(Only EBWO and EBMO software version 6.23 or greater)
(Enter a temperature between 120° and 140°F)
This is the outdoor 65°F reference or starting ramp up point for Lo Mass. The modulation supply water sensing starts at this entry point and ramps up to the front dial 0°F reference point.

OT FUNC
(Only EBWO and EBMO software version 6.23 or greater)
(OT Sensor Function)
Select from 3 choices: **DT CAL**, **FLAT** or **DISABLE**.
  DT CAL
    OT sensor will be read and its reading will be used to calculate DT.
  FLAT
    (Flat DT/HL)
    Any heat call will step-up to a flat DT/HL (High Limit temperature).
    In other words the high limit temperature will become the DT.
    (The OT sensor will still be read but its reading will not be used.)
  DISABLE
    (See Table 1 and Table 2)
    The OT sensor is not read.
    When changing <u>TO</u> this mode from one of the other 2 modes, or when changing <u>FROM</u> this mode to one of the other 2 modes, you must cycle power on the WarmFlo board.
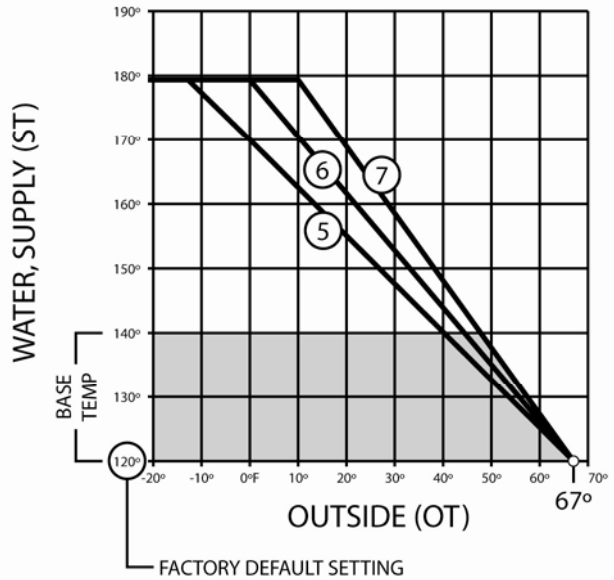
Fig. 1 - High Mass
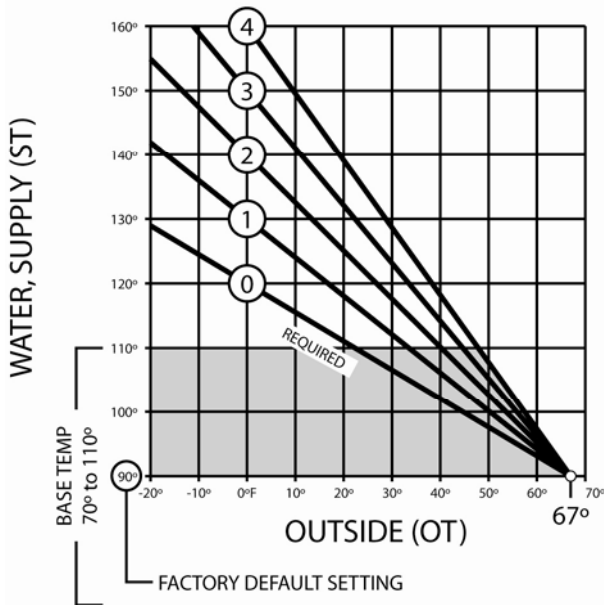
Fig. 2 - Low Mass

ART-139 1.1

TABLE 1

Temperature Dial Settings

Dial#	Mass	EB(M,W)O @ 0°
0	High	120°
1	High	130°
2	High	140°
3	High	150°
4	High	160°
5	Low	170°
6	Low	180°
7	Low	FULL

UAI839 C

ART-140 1.2
Temperature settings with OT sensor **ENABLED**

TABLE 2

Temperature Dial Settings

Dial#	Mass	EB(M,W)A on/off
0	High	90°
1	High	102°
2	High	114°
3	High	126°
4	High	138°
5	Low	144°
6	Low	160°
7	Low	180°

UAI843 A

ART-141 1.0
Temperature settings with OT sensor **DISABLED**

Electro Industries, Inc. Residential
Limited Product Warranty
Effective November 1, 2009

Electro Industries, Inc. warrants to the original owner, at the original installation site, for a period of two (2) years from date of original purchase, that the product and product parts manufactured by Electro Industries, Inc. are free from manufacturing defects in materials and workmanship, when used under normal conditions and when such product has not been modified or changed in any manner after leaving the plant of Electro Industries, Inc. If any product or product parts manufactured by Electro Industries, Inc. are found to have manufacturing defects in materials or workmanship, such will be repaired or replaced by Electro Industries, Inc. Electro Industries, Inc., shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Electro Industries, Inc. may request that the materials be returned to Electro Industries, Inc. at owner's expense for factory inspection. The determination as to whether product or product parts shall be repaired, or in the alternative, replaced, shall be made by Electro Industries, Inc. or its authorized representative.

Electro Industries, Inc. will cover labor costs according to the Repair / Replacement Labor Allowance Schedule for a period of ninety (90) days from the date of original purchase, to the original owner, at the original installation site. The Repair / Replacement Labor Allowance is designed to reduce the cost of repairs. This Repair / Replacement Labor Allowance may not cover the entire labor fee charged by your dealer / contractor.

TWENTY YEAR (20) LIMITED WARRANTY ON BOILER ELEMENTS AND VESSELS
Electro Industries, Inc. warrants that the boiler elements and vessels of its products are free from defects in materials and workmanship through the twentieth year following date of original purchase. If any boiler elements or vessels are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. will replace them.

TWENTY YEAR (20) LIMITED WARRANTY ON SPIN FIN ELEMENTS
Electro Industries, Inc. warrants that the spin fin elements of its products are free from defects in materials and workmanship through the twentieth year following date of original purchase. If any spin fin elements are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. will replace them.

FIVE YEAR (5) LIMITED WARRANTY ON OPEN WIRE ELEMENTS

Electro Industries, Inc. warrants that the open wire elements of its products are free from defects in materials and workmanship through the fifth year following date of original purchase. If any open wire elements are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. will replace them.

ELECTRO INDUSTRIES
Monticello, Minnesota
800.922.4138
www.electromn.com

THESE WARRANTIES DO NOT COVER:

1. Costs for labor for removal and reinstallation of an alleged defective product or product parts, transportation to Electro Industries, and any other materials necessary to perform the exchange, except as stated in this warranty. Replacement material will be invoiced to the distributor in the usual manner and will be subject to adjustment upon verification of defect.

2. Any product that has been damaged as a result of being improperly serviced or operated, including, but not limited to, the following: operated with insufficient water or airflow, allowed to freeze, subjected to flood conditions, subjected to improper voltages or power supplies, operated with airflow or water conditions and/or fuels or additives which cause unusual deposits or corrosion in or on the product, chemical or galvanic erosion, improper maintenance or subject to any other abuse or negligence.

3. Any product that has been damaged as a result of natural disasters, including, but not limited to, the following: lightning, fire, earthquake, hurricanes, tornadoes or floods.

4. Any product that has been damaged as a result of shipment or handling by the freight carrier. It is the receiver's responsibility to claim and process freight damage with the carrier.

5. Any product that has been defaced, abused, or suffered unusual wear and tear as determined by Electro Industries or its authorized representative.

6. Workmanship of any installer of the product. This warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.

7. Transportation charges for any replacement part or component, service calls, normal maintenance; replacement of fuses, filters, refrigerant, etc.

CONDITIONS AND LIMITATIONS:

1. If at the time of a request for service the original owner cannot provide an original sales receipt or a warranty card registration then the warranty period for the product will have deemed to begin thirty (30) days after the date of manufacture and **NOT** the date of installation.

2. The product must have been sold and installed by a licensed electrical contractor, a licensed plumbing contractor, or a licensed heating contractor.

3. The application and installation of the product must be in compliance with Electro Industries' specifications as stated in the installation and instruction manual, and all state and federal codes and statutes. If not, the warranty will be null and void.

4. The purchaser shall have maintained the product in accordance with the manual that accompanies the unit. Annually, a qualified and licensed contractor must inspect the product to assure it is in proper working condition.

5. All related heating components must be maintained in good operating condition.

6. All lines must be checked to confirm that all condensation drains properly from the unit.

7. Replacement of a product or product part under this limited warranty does not extend the warranty term or period.

8. Replacement product parts are warranted to be free from defects in material and workmanship for ninety (90) days from the date of installation. All exclusions, conditions, and limitations expressed in this warranty apply.

9. Before warranty claims will be honored, Electro Industries shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Remedies under this warranty are limited to repairing or replacing alleged defective product or product parts. The decision whether to repair or, in the alternative replace, products or product parts shall be made by Electro Industries or its authorized representative.