THERMOSTATS

USER GUIDE

Programmable Thermostat - 2ET0470224 / 324 / 424

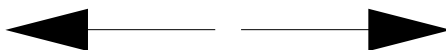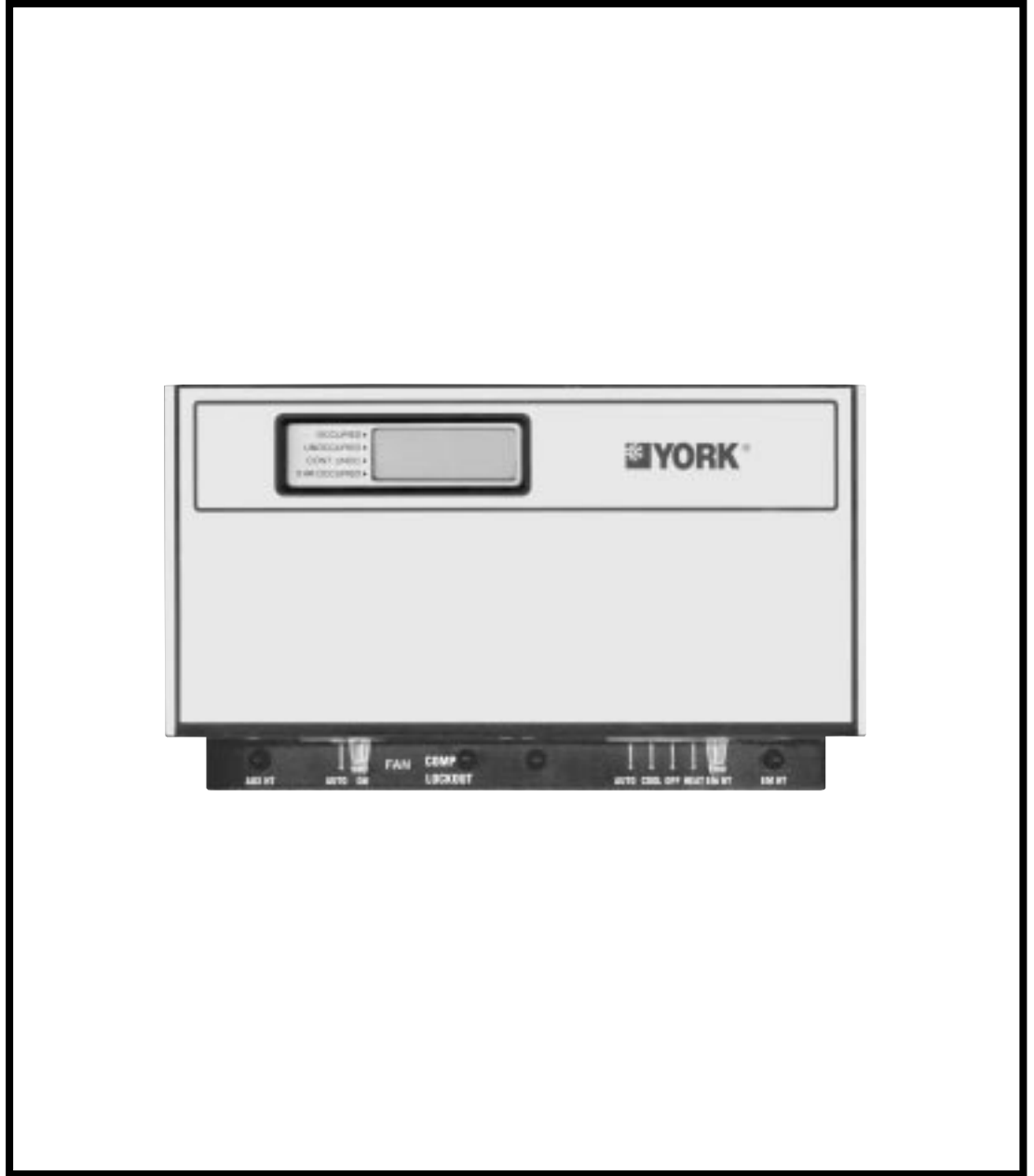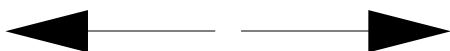**Roof - Top units**

❄️ **York**®

Table of Contents

1 - Specifications

1.1 - Product range

2ET04700224

This thermostat may be used with the following units:
- All DCE (with or without electrical heaters) and DIG roof top units.

2ET04700324

This thermostat may be used with the following units :
- BCH 036 / 060 (with or without electrical heaters).

2ET04700424

This thermostat may be used with the following units :
- BCH 090 / 120 and BIH 180 / 240 (with or without electrical heaters).

Technical data

Description	Values
Rated Voltage	24-30 Vac, 50/60 Hz
Rated A.C Current	1,6 Amps continuous per output with surges to 3,5 Amp Max.
Control Range	7 to 35°C; 1°C Steps
Thermostat Measurement range	4 to 43°C
Control Accuracy	± 0,5° C at 20°C
Minimum deadband	Between heating and cooling : 1°C
Clock accuracy	+/- 1 minute per month
Default setpoint heating	20°C during occupied period 13°C during unoccupied period
Default setpoint cooling	26°C during occupied period 32°C during unoccupied period
Anti recycle time	2 min ON / 4 min OFF
Battery backup	Up to 60 hours with fresh 9 Volts alkaline battery

1.2 - General features

- One model can be used for single-stage and multistage applications.
- Day programming : two occupied/unoccupied periods per day.
- Individual temperature setpoints for:
    - Occupied heat and cool.
    - Unoccupied heat and cool.
- Proportional plus integral control eliminates temperature fluctuations and thermostat tampering.
- Intelligent Recovery : automatically optimises start time depending on building load.
- Intelligent Fan energizes fan on call for heating or cooling only. Fan can be configured to run continuously in occupied mode.
- Automatic heat/cool changeover.
- Locking setpoints and schedules eliminate tampering (user keyboard security).
- One thermostat can be used for heat pump or conventional control.
- Optional remote sensors.
- Convenient overrides allow temporary changes.

1.3 - Dimensions
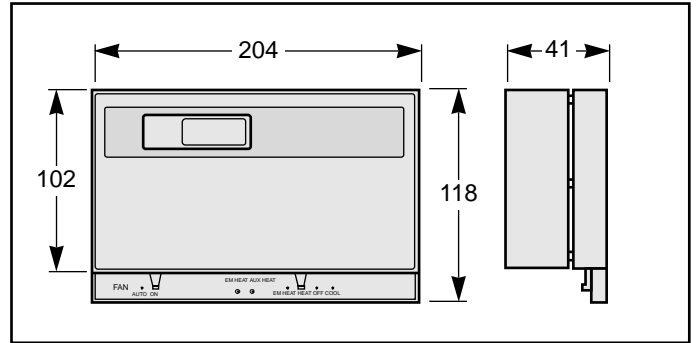
1.4 - Recovery from unoccupied

Intelligent Recovery™ is a Honeywell trademark for the way the thermostat controls the heating and cooling equipment during recovery from unoccupied to occupied setting. During recovery, the control point ramps up at the rate of 3°C per hour rather than jumping from the energy savings setting to the comfort setting all at once. This provides additional energy savings.

When the Intelligent Recovery™ is used in the heating mode the control point raises 3°C per hour (2°C for the heat pump), maximizing the use of the more economical first stage heat to bring the sensed temperature to the desired comfort setpoint. This minimizes using the typically more expensive second stage heat.

The advantages are:

- Comfort setting is achieved at the programmed time and maintained regardless of weather conditions; occupants are comfortable.
- Drafts from low temperature discharge air are minimized during occupied periods.
- The thermostat automatically uses the more economical first stage of heat as the primary heat source during heat mode recovery, avoiding the use of the expensive second stage heating.
- Comfort and energy savings can be achieved in both heating and cooling.
- The thermostat reduces heat cycling, extending equipment life.
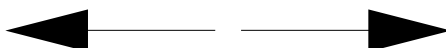
2 - Installation

2.1 - New Installation

Run cable to a hole at the selected wall location for the thermostat and pull about 75 mm of wire through the opening. Color-coded thermostat cable with at least one conductor for each wiring terminal is recommended. Good service practice recommends selecting a cable with one or two extra conductors than the immediate application requires.

If using remote temperature sensor(s), refer to the mounting instructions included with the device for wiring cable requirements. Route cable away from sources of electrical interference.

2.2 - Mount subbase or wallplate

The subbase or wallplate can be mounted on a horizontal outlet box or directly on the wall.

For a wall installation, hold subbase or wallplate in position and mark holes for the screws. See figure 1. Screws and wall plugs must be obtained locally. Be careful that the wires do not fall back into the wall opening. Set aside subbase or wallplate.
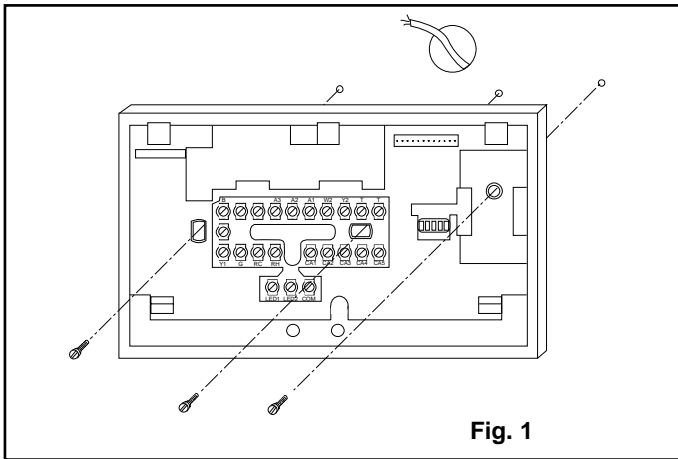

Fig. 1

2.3 - Set subbase DIP switches

The Subbase provides the Thermostat with an interface to the single zone HVAC system. See Table 1 for DIP switch settings. The subbase DIP switches are located on the front and to the right of the wiring terminals. See Fig.2. Set the DIP switches for the system being controlled.

Table 1 - Subbase DIP switch settings

Switch	Setting	Function
1a	ONb	2 stages heat
	OFF	1 stage heat
2a	ONb	2 stages cool
	OFF	1 stage cool
3	ONb	Proportional plus integral (P+I) control (droopless)
	OFF	Proportional control (allows droop)
4c	ONb	Energizes fan on cool only
	OFF	Energizes fan on heat and cool
5	ONb	Use internal sensor
	OFF	Use remote sensor

a. No effect on 2 heat/1 cool Thermostats/ 2ET04700324.
b. Factory setting.
c. No effect on heat pump subbases : 2ET04700324/424.
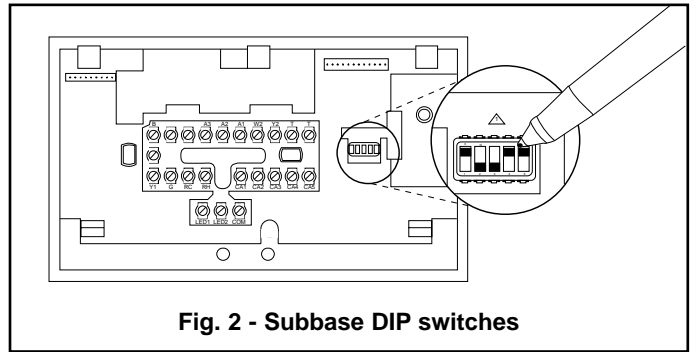
Fig. 2 - Subbase DIP switches

2.4 - Set thermostat mini-jumper

Note : This operation must be done prior to installing the batteries. If batteries are installed prior to this operation, remove battery for 15 minutes and begin.

The thermostat is factory-set for conventional system control. If using with a heat pump 2ET04700324 or 424, locate the mini-jumper on the back of the display. See Fig. 3. Pull the mini-jumper off the two CONV pins and move to the two HEAT PUMP pins. This changes the thermostat to the heat pump algorithm.

If you wish to change the control of the thermostat because a new subbase has been purchased, remove battery for 15 minutes, change mini-jumper position, and re-install battery.
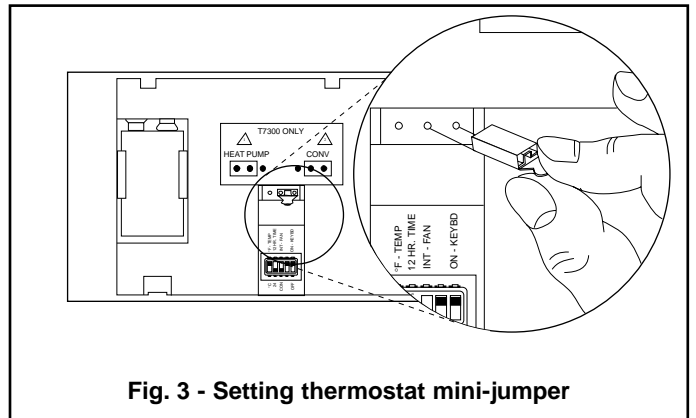
Fig. 3 - Setting thermostat mini-jumper

2.5 - Set display DIP switches

The thermostat DIP switches provide the thermostat with an interface to the single zone HVAC system. See Table 2 for DIP switch settings. The display DIP switches are located on the back of the thermostat. See Fig. 4. Set the DIP switches for the desired thermostat features and the system being controlled.

Fig. 4 - Display DIP switches

Table 2 - Display DIP switch settings

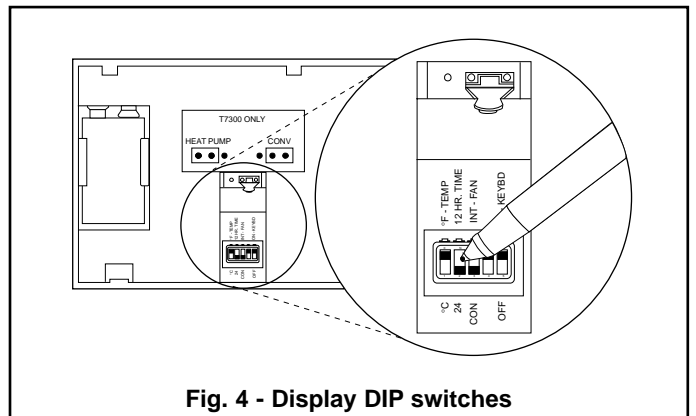| Switch	Setting	Function
1	ONa	°F display
1	OFF	°C display
2	ONa	12 hour clock display
2	OFF	24 hour clock display
3	ONa	Continuous fan operation in occupied period
3	OFF	Intermittent fan operation in occupied period
4		Non functional switch
5	ONa	Keyboard is used for programming
5	OFF	Keyboard disabled, but can be used to review program, perform overrides and make clock changes.

a : Factory settings.

2.6 - Mount thermostat

Caution

Always disconnect power supply and remove battery from the thermostat before connecting the ribbon cables to prevent electrical shock and equipment damage.

Use the Following procedure to connect the display ribbon cables to the subbase.

1. Check that the 24 Vac power supply is disconnected.
2. Check that the 9 Vdc battery is not installed in the display.

Important : First be sure to connect the 12 pin ribbon cable to the base.

3. Connect the 12 pin (larger) ribbon cable to the display. See Fig. 4.
4. Connect the 9 pin (smaller) ribbon cable to the display.
5. If using a 9 Vdc battery, go to the Install Battery backup section for installation instructions.

2.7 - Install battery

The 9 volts battery is not necessary for the operation of the thermostat, but holds the program during power outages. When the power is restored, the system will resume normal operation. Without the battery, the system will adopt the default setpoints. Refer to the "technical data". Use the following steps to install a battery :

1. Locate the battery holder on the back of the display.
2. Slide the battery up to the connector until it is firmly seated.

Notes : Observe the polarity when snapping a 9 volt alkaline battery into the holder.
The plugs must be firmly seated on the connectors for the thermostat to work properly

3. Hang the top edge of the display on the subbase hooks. See Fig. 5.
4. Swing down and press on the lower edge until the thermostat snaps in place.
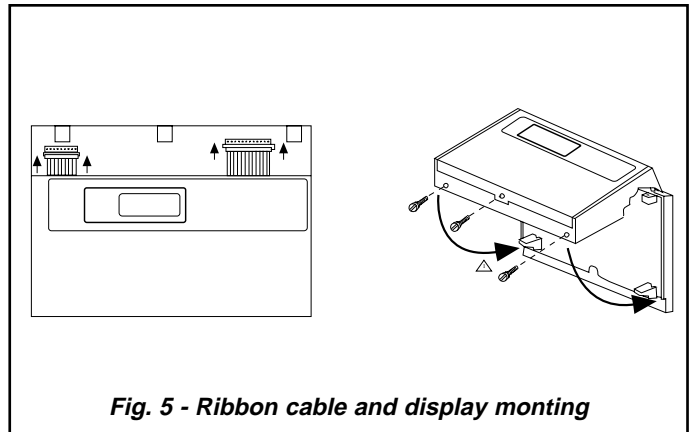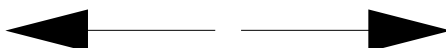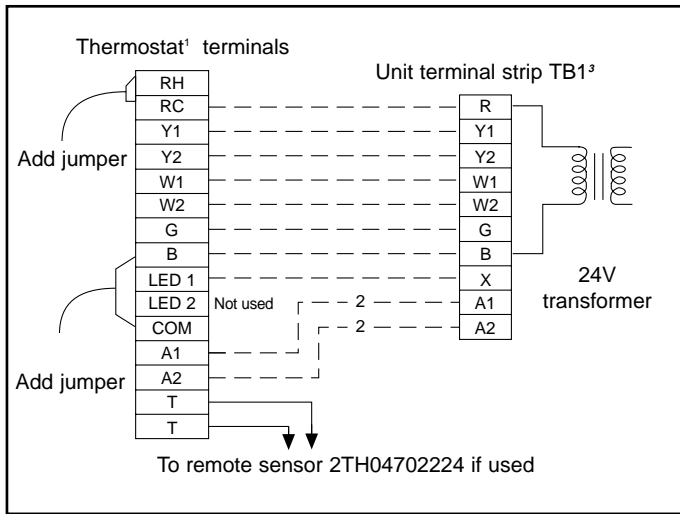5. Insert and tighten three Allen head screws on the bottom of the thermostat. See Fig. 5.
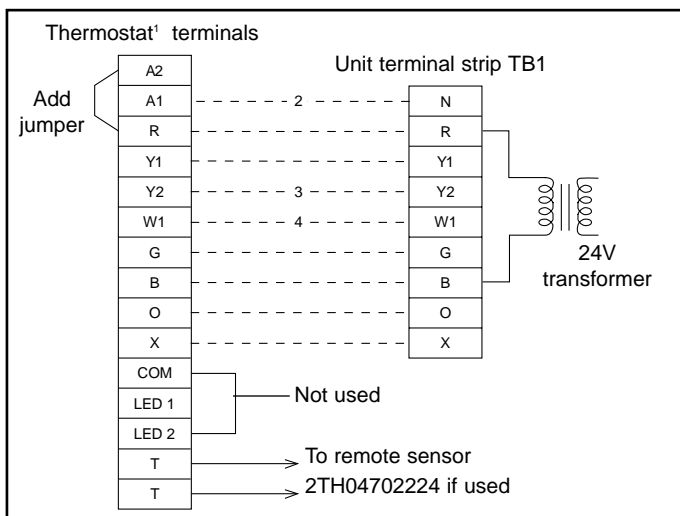

Fig. 5 - Ribbon cable and display monting

3 - Wiring

3.1 - Connections between thermostat and equipment terminals - 2ET04700224

```
Thermostat¹ terminals

             RH                        Unit terminal strip TB1³
             RC                              R
             Y1                              Y1
Add jumper   Y2                              Y2
             W1                              W1
             W2                              W2
             G                               G
             B                               B
             LED 1                           X
             LED 2    Not used    2          A1        24V
             COM                  2          A2        transformer
             A1
Add jumper   A2
             T
             T

        To remote sensor 2TH04702224 if used
```
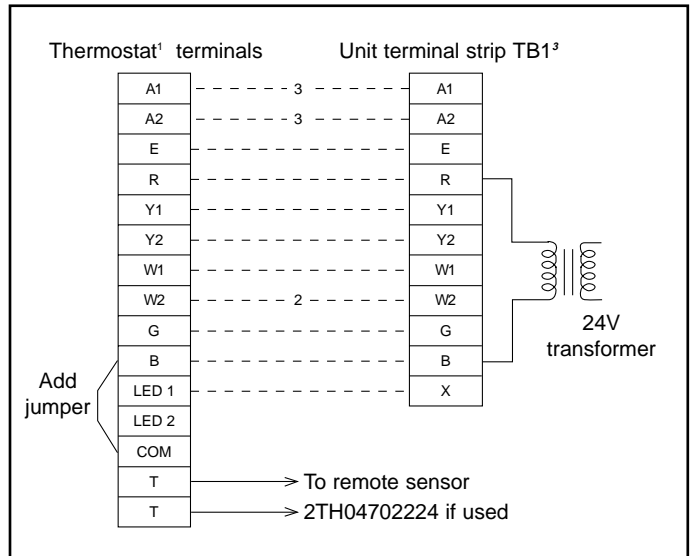
Note : Use copper conductors only. Section > 1mm².

1. Electronic programmable thermostat 2ET04700224 (includes subbase).
2. Terminals Al and A2 provide a relay output when the thermostat switches to the set-back position.
3. Terminal strip TB1 - locate on relay board in 24-volt section of the unit control box.

3.2 - Connections between thermostat and equipment terminals - 2ET04700324

```
Thermostat¹ terminals

             A2                     Unit terminal strip TB1
Add          A1          2          N
jumper       R                      R
             Y1                      Y1
             Y2          3           Y2
             W1          4           W1
             G                       G        24V
             B                       B        transformer
             O                       O
             X                       X
             COM
             LED 1       Not used
             LED 2
             T           To remote sensor
             T           2TH04702224 if used
```

1. Electronic programmable thermostat 2ET04700324 with subbase for both manual and automatic changeover.
2. Only required on units with economizer. Remove jumper J2 from terminals 4 and 9 on jumper plug P7. The outdoor air intake dampers will return to their fully closed position when the thermostat switches to the "unoccupied" mode.
3. Second stage cooling is only required on units with economizer. Remove jumper J1 from terminals 8 and 10 on jumper plug connector P7.
4. Only required on units with supplemental electric heat.

3.3 - Connections between thermostat and equipment terminals - 2ET04700424

```
Thermostat¹ terminals          Unit terminal strip TB1³

             A1        3         A1
             A2        3         A2
             E                   E
             R                   R
             Y1                  Y1
             Y2                  Y2
             W1                  W1
             W2        2         W2
             G                   G        24V
             B                   B        transformer
Add          LED 1               X
jumper       LED 2
             COM
             T        To remote sensor
             T        2TH04702224 if used
```

Note : Use copper conductors only. Section > 1mm².

1. Electronic programmable thermostat 2ET04700424 (includes subbase).
2. Second stage heating only required on units with supplemental resistance heat.
3. Terminals A1 and A2 provide a relay output when the thermostat switches to the setback position.

4 - Program the thermostat

4.1 - Overview

The keyboard is located behind the thermostat flip-up cover. See Fig. 6. There are 16 keys to set, review and modify programmed times and temperatures. The liquid crystal display (LCD) shows day, time or temperature and which programming period is operating.

The thermostat can be set for two occupied and two unoccupied time and temperatures for each day of the week (28 independent settings). The two override keys provide quick temporary programming changes for increased occupant comfort.

Important : To program the thermostat, 24 Vac is required (turn on System power) and the keyboard lockout switch (see Fig. 4) must be in the ON-KEYBD position.
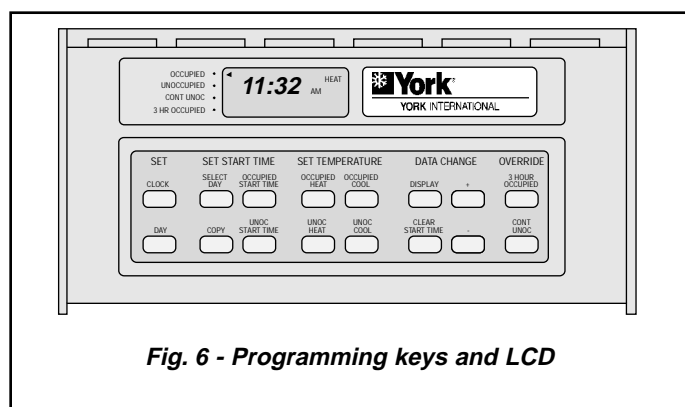

Fig. 6 - Programming keys and LCD

4.2 - Set current time/day

1. Set the current time by pressing and releasing the CLOCK key once.

2. Press the + or - key until the current time appears on the LCD.

3. Set the current day by pressing and releasing the DAY key once.

4. Press the + or - key until the current day appears on the LCD.

Note : Su = Sunday; Mo = Monday; Tu = Tuesday; We = Wednesday; Th = Thursday; Fr = Friday; Sa = Saturday.

4.3 - Set program times

Important : The thermostat will remain in occupied mode from the point of initial programming until it encounters the first unoccupied start time. To avoid the unnecessary occupied period following initial programming, set a 12:00 AM unoccupied start time on the thermostat when programmed.

Note : The programming times are in intervals of ten minutes; i.e., 8:00, 8:10, 8:20...

1. Press the SELECT DAY key. The display shows the abbreviation for a day.

2. Press and hold the + or - key until the desired day appears.

3. Press the OCCUPIED START TIME key. The program indicator will point to OCCUPIED.

4. Press and hold the + or - key until the desired start time appears.

Note : If a start time is not required, press the CLEAR START TIME key.

5. Press the UNOC START TIME key. The program indicator will point to UNOCCUPIED.

6. Press and hold the + or - key until the desired start time appears.

7. To program a second occupied start time for the selected day, repeat Step 3 until four dashes (----) are displayed or the second start time (if previously programmed) is displayed. Then repeat Step 4.

8. To program a second unoccupied start time for the selected day, repeat Step 5 until four dashes (----) are displayed or the second start time (if previously programmed) is displayed. Then repeat Step 6.

9. Repeat Steps l through 8 for each remaining day of the week or refer to the following section, COPY A DAY.

4.4 - Copy a day

1. Press the SELECT DAY key. The display shows the abbreviation for a day.

2. Press and hold the + or - key until the day to be copied from appears.

3. Press the COPY key.

4. Press and hold the + or - key until the day to be copied to appears.

Note : The day to be copied from will remain on the display.

5. Press the COPY key a second time to perform the copy.

6. Repeat Steps 3 to 5 to copy to another day.

4.5 - Set program temperature setpoints

Note : The setpoint temperature range is 7°C (unoccupied heat) to 35°C (unoccupied cool). The occupied heat setpoint must be at least 1°C less than the occupied cool setpoint

1. Press the SET TEMPERATURE key (OCCUPIED HEAT, OCCUPIED COOL, UNOC HEAT, or UNOC COOL). The program indicator will point to OCCUPIED or UNOCCUPIED and the LCD will indicate HEAT or COOL.

2. Press and hold the + or - key until the desired temperaure appears.

3. Repeat Steps 1 and 2 until all four temperatures are set.

4.6 - Set operating display

The LCD can show time or temperature. To change the current display, press the DISPLAY key until the desired operating display appears.

4.7 - Clear start time

1. Press the SELECT DAY key.

2. Press and hold the + or - key until the desired day appears.

3. Press and hold the OCCUPIED START TIME or the UNOC START TIME key until the time to clear appears.

4. Press and hold the CLEAR START TIME key until the display shows four dashes (----).

Note : If there is a second OCCUPIED setting, the start for time this setting will appear instead of four dashes.

4.8 - Temporarily override program

There are three overrides available. The 3 hour occupied overrides can be initiated from the thermostat.

3 hour occupied

The 3 HOUR OCCUPIED key is used to override the unoccupied program when people need to use the area temporarily (working late, weekends or holidays).

1. Press the 3 HOUR OCCUPIED key to change the unoccupied temperature setting to the occupied setpoint for three hours.

Note : The program indicator will point to 3 HR OCCUPIED while the override is in effect.

3 hour occupied with + or - Key

When using the + or - key with the 3 HOUR OCCUPIED key, the + or - key has a preassigned value of 0 to 3°C (default is 0). Use the following steps to check or change the value:

1. Press the 3 HOUR OCCUPIED key. The program indicator will point to 3 HR OCCUPIED.

2. Press the DISPLAY key. The LCD will show a number from 0 to 3.

3. Press the + or - key to change the value.

4. Press the DISPLAY key to return to the program.

Set 3 hour occupied Override With + or - Key

The 3 HOUR OCCUPIED key with the + or - key will override the unoccupied program for three hours with the occupied temperature setpoint +/- the preassigned key value (see Set + or - Key Value section).

1. Press the 3 HOUR OCCUPIED key to change the unoccupied temperature setting to the occupied setpoint for three hours.

2. Press the + key to increase or press the - key to decrease the occupied setpoint by the key value.

Example : Unoccupied setpoint is 17°C, occupied setpoint is 21°C and key value is 1,7°C. Pressing the 3 HOUR OCCUPIED key and the + key will change the setpoint from 17°C to 21°C plus 1,7°C or ~23°C. Pressing the - key would change the setpoint to 21°C minus 1,7°C or ~19°C.

Note : The program indicator will point to 3 HR OCCUPIED while the override is in effect. The LCD will not reflect the key value.

4.9 - Cont Unoc

The continuous unoccupied override feature holds the setpoint at the unoccupied temperature setpoint until the DISPLAY or CONT UNOC key is pressed. This override is used when the area will be closed for a temporary period such as a long holiday.

1. Press the CONT UNOC key to hold the temperature at the unoccupied setpoint.

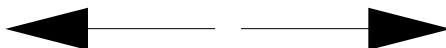*2.* Press the CONT UNOC key again to return to the program.
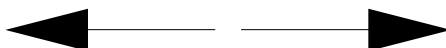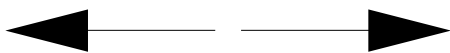
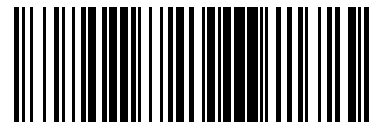# CUSTOMER INSTALLATION
UNITARY equipment

Simplified Diagram

Notes

York ® Europe

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York Europe

YORK INTERNATIONAL

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