

NETWORK THERMOSTAT CONTROL NTC1-1 KIT

INSTALLATION INSTRUCTIONS FOR NETWORK THERMOSTAT CONTROL KIT (LB-100354; 17M10) USED WITH NON-L SERIES UNITS

Shipping and Packing List

Package 1 of 1 contains:

- 1- NTC1-1 controller (A1)
- 1- Bag assembly containing:
 - 4-#6 - 32X1/2" TFS screws

IMPORTANT - Make sure any sensors used are compatible with the L Connection® network. Refer to L Connection engineering handbook for part numbers.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer, service agency or the gas supplier

⚠ CAUTION

Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.

⚠ WARNING



Electric shock hazard and danger of explosion. Can cause injury, death or product or property damage. Turn off gas and electrical power to unit before performing any maintenance or servicing operations on the unit. Follow lighting instructions attached to unit when putting unit back into operation and after service or maintenance.

Application

The NTC unit controller is used on non-L Series units to allow access to the L Connection network. The NTC may be used to control rooftop packaged equipment or split systems and is compatible with the Network Control Panel (NCP) versions 1.11 or later and Unit Controller (UC) software versions 2.02 or later. The NTC can control up to 3 stages of cooling, 2 stages of heating, the blower, and outdoor air dampers.

Installation

Install the NTC1-1 inside the unit if space is available. Install in a remote location no further than 100 feet from the unit. Installation site must be dry and free of harmful vapors and gases. Make sure there is space for the wiring and that controller is accessible for servicing.

If required, an optional rainproof NEMA hinged enclosure is available.

- 1- Disconnect all electrical power to unit.
- 2- Use NTC1 base as template to mark location of four mounting holes at desired installation site. See figure 1. The NTC1-1 may be installed in any direction.

IMPORTANT - Do not remove the NTC1-1 baseplate.

- 3- Drill holes and secure NTC1 in place with four screws provided in kit.

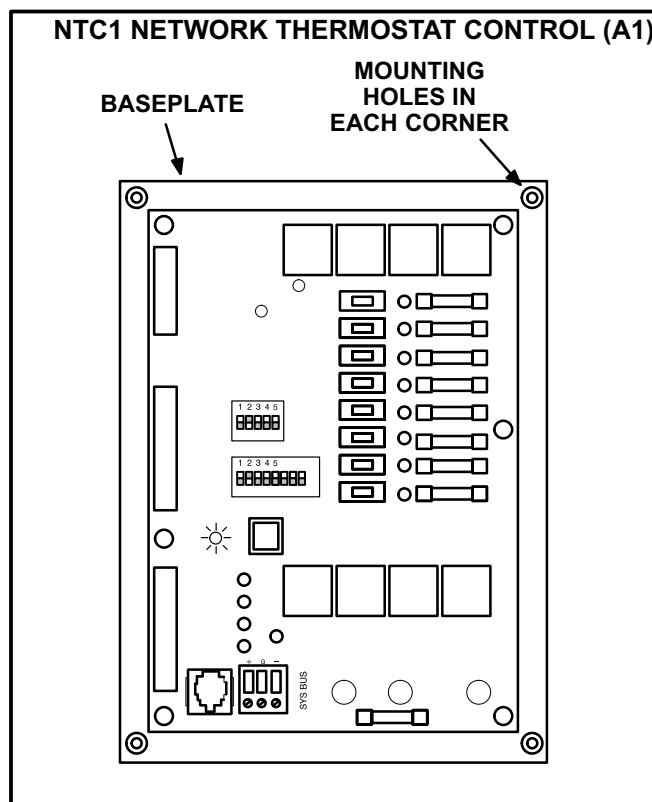


FIGURE 1



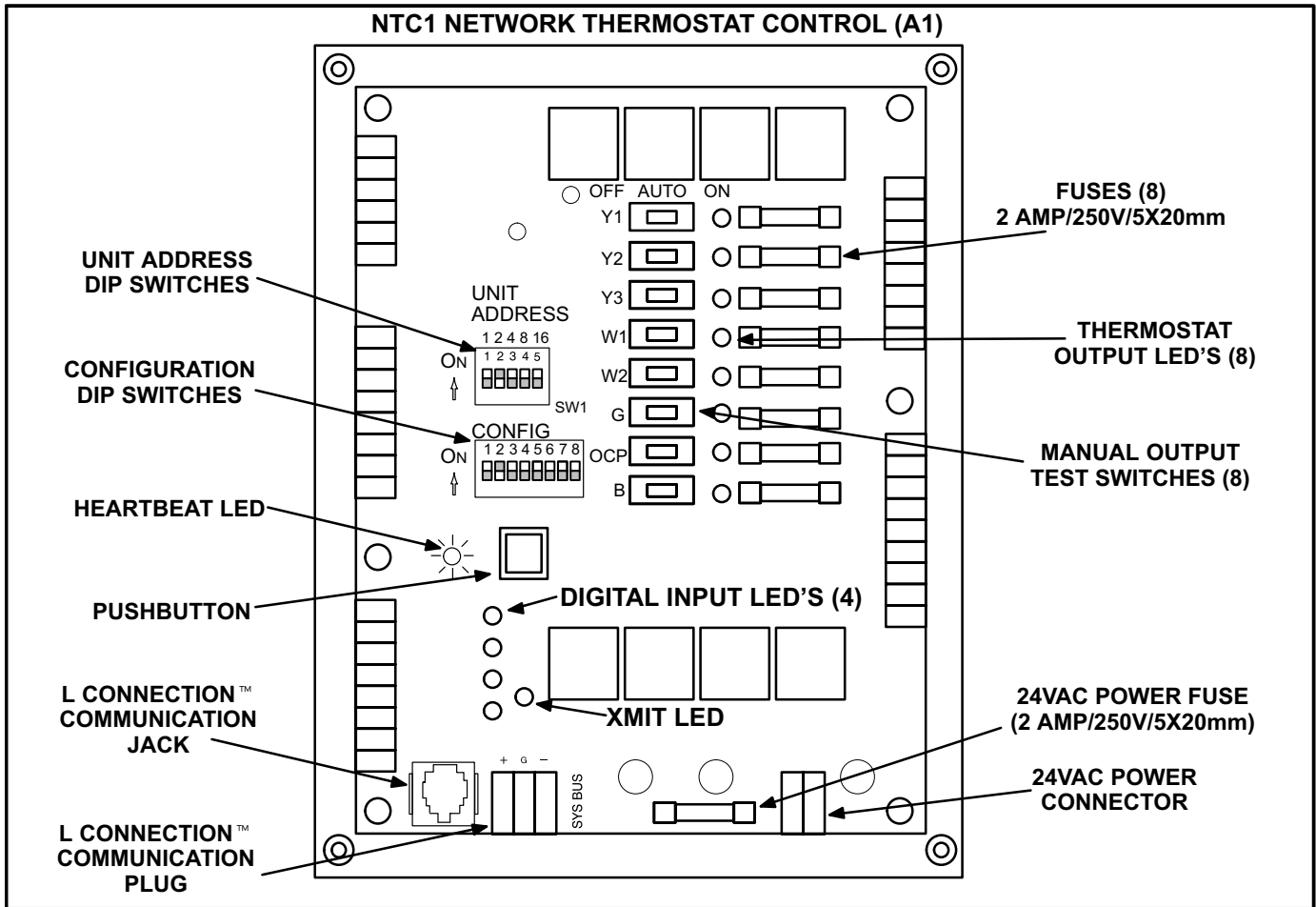


FIGURE 2

Heartbeat LED

See table 1 for LED function and figure 2 for location.

TABLE 1

LED	Indicates
Green on for 1 second, off for 1 second	Normal operation.
Green on for 3 seconds, off for 3 seconds	Delay initiated
Red on for 1 second, off for 1 second	No run lockout

Pushbutton

A short push of the pushbutton by-passes on/off delays. The heartbeat LED indicates when the delay is initiated. See table 1. To reset the control, press and hold the pushbutton.

Manual Output Test Switches

Manual switches simulate a thermostat demand to confirm proper unit operation. Switches have three positions: **on**, **off**, and **auto**. Place switches in the **auto** position for normal unit operation. Place switch in the **off** position to disable the output and in the **on** position to test unit function. See figure 3.

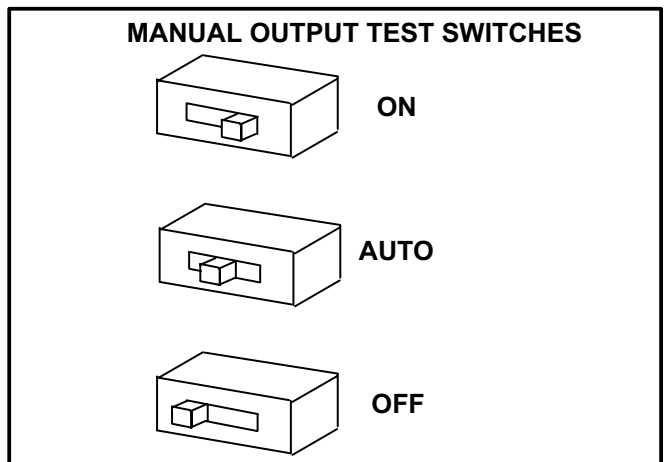


FIGURE 3

Unit Address DIP Switches

Assign a different address to each rooftop unit. Individual switches on the DIP unit address switch are labeled 1, 2, 4, 8, or 16. See figure 2. The unit address is the sum of the switches set to the ON position. See figure 4.

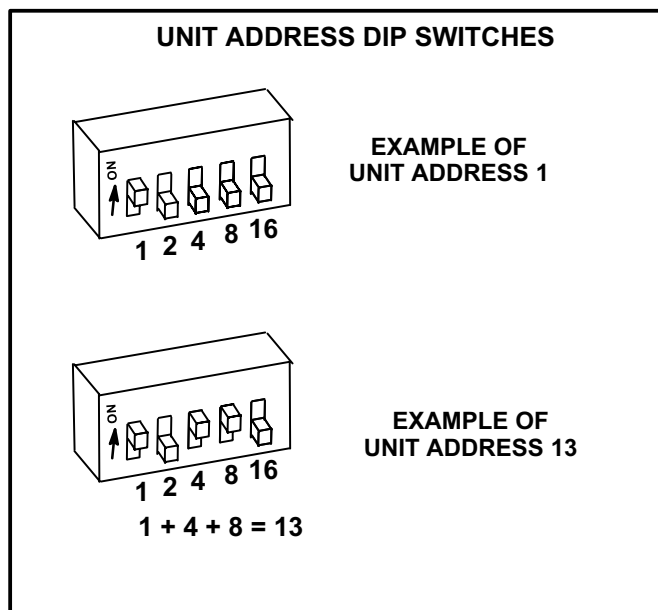


FIGURE 4

Configuration DIP Switches

Set configuration DIP switches 1 and 2 to identify the type of unit. See table 2 and figure 5.

Note - Switches 7 and 8 should be OFF.

TABLE 2

Switch 1	Switch 2	Type of Unit
Off	Off	Electric Cool/Electric Heat
On	Off	Heat Pump Type 1 Unit
Off	On	Heat Pump Type 2 Unit
On	On	Electric Cool/Gas Heat

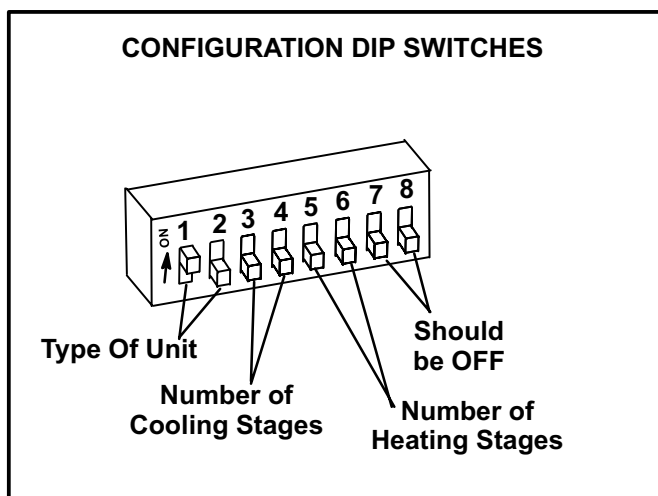


FIGURE 5

Type Of Unit - Switches 1 and 2

Electric Heat / Electric Cool Units -
Standard electric heat / electric cool unit.

Heat Pump Type 1 Units -
Heat pump units which internally energize the reversing valve. Lennox commercial heat pumps operate in this manner.

Heat Pump Type 2 Units -
Heat pumps units which require a thermostat signal to energize the reversing valve. Most residential heat pumps operate in this manner. Connect Lennox residential heat pumps to "O" output.

Electric Cool / Gas Heat Units -
Standard electric cool / gas heat unit.

Air Handling Only Units -
Switches 1 and 2 may be set in any position for air handling units, but switches 3 through 6 must be set to OFF.

Number Of Cooling Stages - Switches 3 and 4

Set switches 3 and 4 to identify the number of cooling stages. See table 3 and figure 5.

TABLE 3

Switch 3	Switch 4	Number of Cooling Stages
Off	Off	None
On	Off	1 Stage
Off	On	2 Stages
On	On	3 Stages

Number Of Heating Stages - Switches 5 and 6

Set switches 5 and 6 to identify the number of heating stages. See table 4 and figure 5.

TABLE 4

Switch 5	Switch 6	Number of Heating Stages
Off	Off	None
On	Off	1 Stage
Off	On	2 Stages

Digital Outputs - P181 and P182

Each output is a fused, dry contact and is rated for 24VAC, 2 amp maximum.

Refer to the appropriate unit in tables 5 through 8 to determine the digital output resulting at different thermostat inputs. The appropriate digital output LED will be energized at the same time. The output can also be read with a voltmeter at P181 and P182. Configuration DIP switches should be set as shown in tables 2 through 4 for each type of unit. When an air handling unit is installed, the "G" output is energized during the occupied time period. See system parameter A4.01.

All output tables show the G blower output during the unoccupied time period. During the occupied time period blower operation will be continuous. If A4.01 system parameter is changed to option 0, the blower will operate as shown in tables regardless of time period.

Output tables do not show blower on/off delays.

IMPORTANT - The NTC will energize only the stages of heating or cooling specified by the configuration switches. For example, the NTC will not energize a cooling output when DIP switches 3 and 4 are set to OFF, regardless of the number of cooling stages available on that unit.

**TABLE 5
ELECTRIC COOL / GAS HEAT UNITS**

T'Stat Demand	NTC Digital Output							
	P181				P182			
	Y1	Y2	Y3	W1	W2	O	B	G
1st Cool	On	Off	Off	Off	Off	NA	NA	On
2nd Cool	On	On	Off	Off	Off	NA	NA	On
3rd Cool	On	On	On	Off	Off	NA	NA	On
Low Heat	Off	Off	Off	On	Off	NA	NA	Off
High Heat	Off	Off	Off	On	On	NA	NA	Off

**TABLE 6
ELECTRIC COOL / ELECTRIC HEAT UNITS**

T'Stat Demand	NTC Digital Output							
	P181				P182			
	Y1	Y2	Y3	W1	W2	O	B	G
1st Cool	On	Off	Off	Off	Off	NA	NA	On
2nd Cool	On	On	Off	Off	Off	NA	NA	On
3rd Cool	On	On	On	Off	Off	NA	NA	On
Low Heat	Off	Off	Off	On	Off	NA	NA	On
High Heat	Off	Off	Off	On	On	NA	NA	On

**TABLE 7
HEAT PUMP UNITS TYPE 1**

T'Stat Demand	NTC Digital Output							
	P181				P182			
	Y1	Y2	Y3	W1	W2	O	B	G
1st Cool	On	Off	Off	Off	Off	NA	NA	On
2nd Cool	On	On	Off	Off	Off	NA	NA	On
3rd Cool	On	On	On	Off	Off	NA	NA	On
Low Heat	Off	Off	Off	On	Off	NA	NA	Off
High Heat	Off	Off	Off	On	On	NA	NA	Off

**TABLE 8
HEAT PUMP UNITS TYPE 2**

T'Stat Demand	NTC Digital Output							
	P181				P182			
	Y1	Y2	Y3	W1	W2	O	B	G
1st Cool	On	Off	Off	Off	Off	On	Off	On
2nd Cool	On	On	Off	Off	Off	On	Off	On
3rd Cool	On	On	On	Off	Off	On	Off	On
Low Heat	On	On	On	Off	Off	Off	On	On
High Heat	On	On	On	On	Off	Off	On	On

Temperature Sensors - P178

Sensors are wired to P178 using communication wiring. Connect the shield drain wire as shown in field wiring.

IMPORTANT - Make sure any sensors used are compatible with the L Connection network. Refer to L Connection engineering handbook for part numbers.

Zone Sensor A2

The zone sensor is required for system operation unless the NTC is installed in an air handling unit or other appliance which has no heating or cooling functions.

Return Air Sensor RT16

The return air sensor is optional and is used to monitor or to limit heating or cooling. See A1.09, A1.10, A2.10, A2.11 to set control for return air temperature limit option.

Discharge Air Sensor RT6

The discharge air sensor is optional and is used to monitor discharge air temperature.

Outdoor Air Sensor RT17

The outdoor air sensor is optional and is used to monitor outdoor air temperature and to control HP supplemental heat lock-out and low ambient control. See A1.13, A1.14., A1.15.

Analog Inputs - P179

Analog inputs are wired to P179 using communication wiring. Connect the shield drain wire as shown in field wiring.

IMPORTANT - Make sure any sensors used are compatible with the L Connection network. Refer to the L Connection engineering handbook for part numbers.

CO₂ And Relative Humidity Sensor

The CO₂ and RH sensors are optional and are used for reporting and displaying to the Network Control Panel only.

Damper Feedback

The Damper FB input is optional and used for reporting and displaying to the Network Control Panel only. The input is designed for a 2 to 10 VDC damper feedback signal; 2 volts = closed and 10 volts = 100% open.

Digital Inputs - P177

Wire digital inputs to P177 using standard 18AWG thermostat wire. Refer to figure 7. Each input is isolated and rated for 24VAC. Digital inputs are optional, but air flow switch and n.c. inputs must be jumpered to 24VAC if not used.

Air Flow Switch

The airflow switch is used to de-energize heating, cooling, and blower outputs if there is a loss of blower air. The input must be energized within 20 seconds (ECTO A4.05) of a blower (G) demand or the outputs will be shut off and the control will issue an alarm code 5 (airflow switch). The NTC will retry every five minutes. After three retries with no blower air, the control will lockout and alarm code 205 will be issued. A reset is required after lockout.

Note - Jumper this input to 24VAC if an air flow switch is not installed.

Service Input

This input is used to indicate the unit may require service. If the input is energized for longer than 1 minute (ECTO A3.01), the control will issue an alarm code 200 (service). This alarm is for information only and does not interrupt operation.

The input can be used to indicate a dirty filter. Set ECTO A3.01 to option 1. A dirty filter switch must be installed. If the dirty filter switch is on for 1 minute (ECTO A3.01), the control will issue an alarm code 6 (dirty filter). This alarm is for information only and does not interrupt operation.

Note - Leave this input open when not used.

N.C. Normally Closed Input

Used to shut off all outputs when this input is de-energized. If this input is de-energized, the control will de-energize all outputs and issue an alarm code 202 (N.C. input is OFF). The NTC will retry the input every five minutes.

This input can be used to indicate a blower overload. Set ECTO A3.04 to option 1. A blower overload must be installed. If the blower overload trips, the NTC will de-energize all outputs and issue an alarm code 203 (blower overload trip). The NTC will retry the input every 5 minutes.

This input can also be used to indicate a loss of phase. Set A3.04 to option 2. A loss of phase device must be installed. If the loss of phase device trips, the NTC will de-energize all outputs and issue an alarm 204 (loss of phase). The NTC will retry every 5 minutes.

Note - Jumper this input to 24VAC if not used.

N.O. Normally Open Input

Used to de-energize all outputs if the input is de-energized. If the input is de-energized, the NTC will de-energize all outputs and issue an alarm code 201 (N.O. input is off). The NTC will retry every 5 minutes.

This input can also be used by a smoke detector. Set A3.03 to option 1. A smoke detector must be installed. If the smoke detector trips, the NTC will de-energize all outputs and issue an alarm code 4 (smoke detector trip). The NTC will retry every 5 minutes.

Note - Leave this input open when not used.

Wiring

All wiring must comply with local electrical code or as specified on the unit wiring diagrams. Refer to figure 8 for field wiring connections. Example wiring diagrams are provided in the back of this manual.

24VAC

Connect 24VAC power to P176-1 and 2 from a class 2 transformer using standard 18AWG thermostat wiring. P176-2 (common) must be connected to earth ground.

Communication Wiring

Cable type: Lennox P/N 94L63 or 27M19, Belden type 88761 or equivalent. (22AWG stranded or twisted pair, 100% aluminum shield with drain wire, Teflon jacket).

Daisy chain the communications cable between each NTC and NCP as shown in figure 6. Do not connect the shield drain wire to the NTC "G".

Note - Make sure the total run of communications wiring does not exceed 4000 feet (1219 m).

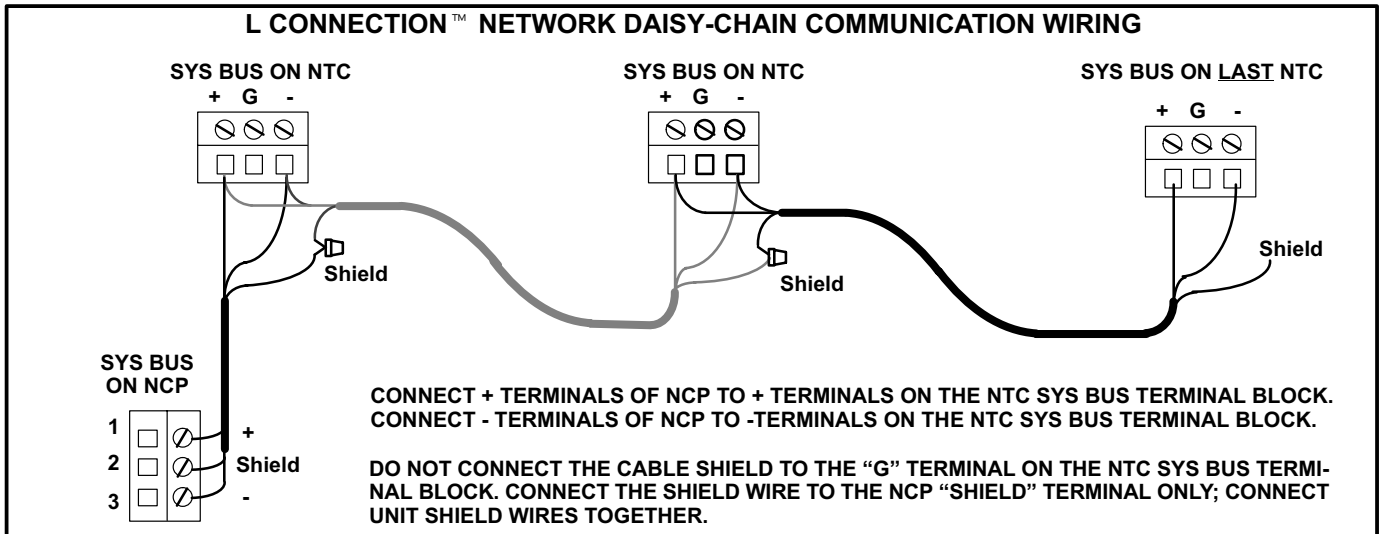


FIGURE 6

Check-Out Procedure

Unit Operation

Use the manual switches to simulate a thermostat demand and confirm proper unit operation.

Wiring Between NTC And Unit

- 1- Move all manual switches to the **OFF** position.
- 2- Apply power to unit.
- 3- Move the “G” switch to the **ON** position to energize the unit blower.
- 4- Move the “Y1” switch to the **ON** position and confirm the appropriate operation. Move the “Y1” switch to the **OFF** position and repeat for each heating and cooling stage. Proper operation of each function confirms that the wiring between the NTC and the unit is correct.

IMPORTANT - Do not energize cooling and heating output switches at the same time.

- 5- Move all switches back to the **AUTO** position. **All switches must be in the AUTO position to allow the NTC to control the unit.**

NTC Operation

- 1- Make sure the heartbeat LED is green, energized for one second and off for one second. This indicates normal NTC operation. If the LED is green, energized on for 3 seconds and off for 3 seconds, the NTC is in an off delay. Press the pushbutton to by-pass the delay.
- 2- Make sure the yellow “XMT” transmit light is blinking. This indicates that the NTC is transmitting to the NCP. If the transmit LED is not blinking, make sure communication wiring connections are correct and secure and that power is being supplied to the NCP.

NOTE - The transmit LED blinking rate depends on the number of units connected to the L Connection bus. The blink rate can be as slow as once every 30 seconds.

- 3- If an NCP is not connected, the NTC will control the unit to default settings: 70°F (21°C) heating setpoint, 75°F (24°C) cooling setpoint, and occupied time period (continuous blower).
- 4- If the heartbeat is flashing red, the control is locked out because of an alarm. Make sure all digital inputs (P177) are properly connected. The N.C. LED should be **ON**. If air flow switch is not used the input must be jumpered. The service input should normally be **OFF**.

Adjustable Parameters

The NTC default control parameters can be adjusted using a PC, Unit Controller PC software (version 2.02), and a PC to L Connection converter.

Connect the converter to either the NTC or the Network Control Panel (NCP). See figure 7. Refer to table 9 to adjust parameters.

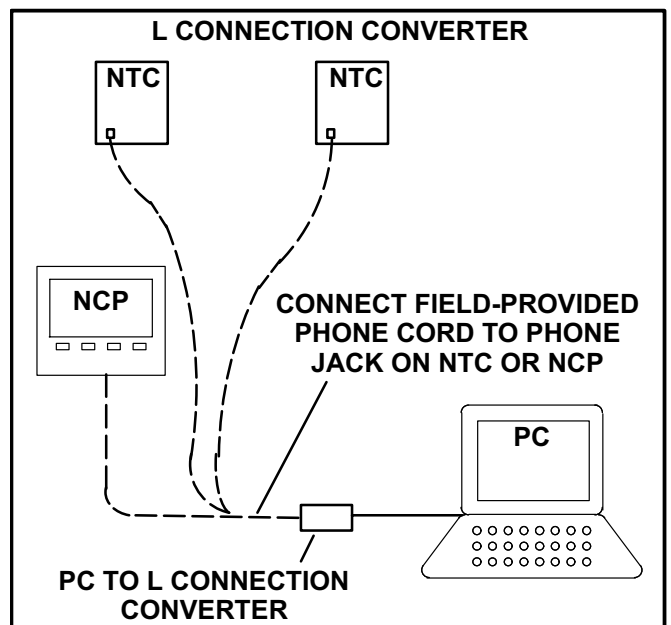


FIGURE 7

Reset NTC Parameters To Default

Restore the NTC control parameters to default settings as follows:

- 1- Disconnect power to NTC (P176).
- 2- Move all DIP switches on the Unit Address DIP switch to **OFF**.
- 3- Move all switches on the Configuration DIP switch, except for switch 7, to **OFF**.
- 4 Connect control power (P176). The heartbeat LED will cycle red, green, and off.
- 5- Press the pushbutton; the heartbeat LED will **display** red.
- 6- Wait until the LED cycles red, green, and off. Return Unit Address and Configuration DIP switches to the previous position.
- 7- Hold the pushbutton to reset control to normal operation.

**TABLE 9
NTC CONTROL PARAMETERS**

BLOCK 1 HEATING PARAMETERS						
Control Parameter		Control Value			Units	Description
No.	Name	Min	De- fault	Max.		
A1.01	Heating Backup Setpoint	55	70	85	Deg.F	Backup heating setpoint. Used if the communications link is lost (after 5 mins.) A1.10 <=A2.01-A4.03
A1.02	Stage 1 Heating Differential	0	0.5	3	Deg. F	Stage 1 heating differential. A1.02<=A1.03
A1.03	Stage 2 Heating Differential	0	1	3	Deg. F	Stage 2 heating differential. A1.03>=A1.02
A1.04	Heating Deadband	1	1	3.75	Deg. F	Heating stage deadband. A1.04 <=A4.03-A2.05
A1.05	Upper Stage Heating Latch Option	0	0	1	Option	Option used to hold upper stage on until temperature reaches setpoint.
A1.06	Heating Stage-Up Timer	0	0	60	Min.	Optional timer used to call the upper demand if the lower stage runs for this time. Disabled if set to "0".
A1.07	Heating Stage Down Timer	0	0	30	Min.	Optional time delay that occurs before a lower stage turns off following a higher stage termination.
A1.08	Occupied Warm-Up Delay	0	30	120	Min.	The delay on OCP output for first heating demand in occupied period.
A1.09	Heating Return Air Limit Option	0	0	1	Option	Heating return air limit option enable.
A1.10	Heating Return Air Limit	60	85	100	Deg. F	Return air temp. limit. Heating outputs off if return air temp. exceeds limit. ECTO A1.09 must be set to 1 to enable this limit.
A1.11	Heating Blower On Delay	0	0	60	Sec.	Length of time before the blower turns on after a heating demand.
A1.12	Heating Blower Off Delay	0	0	300	Sec.	The time the blower stays on after the heating demand is lost.
A1.13	HP Supp. Heat Lockout Temp.	20	40	60	Deg.F	Outdoor temperature setpoint for lockout of supplemental heat on heat pump units. Outdoor sensor required (RT17).
A1.14	Heat Pump Compr. Low Temp. Lockout	-30	-30	50	Deg. F	Heat pump low ambient compressor lockout temperature. A value of - 31°F will disable the low ambient lockout function. Outdoor sensor required (RT17).

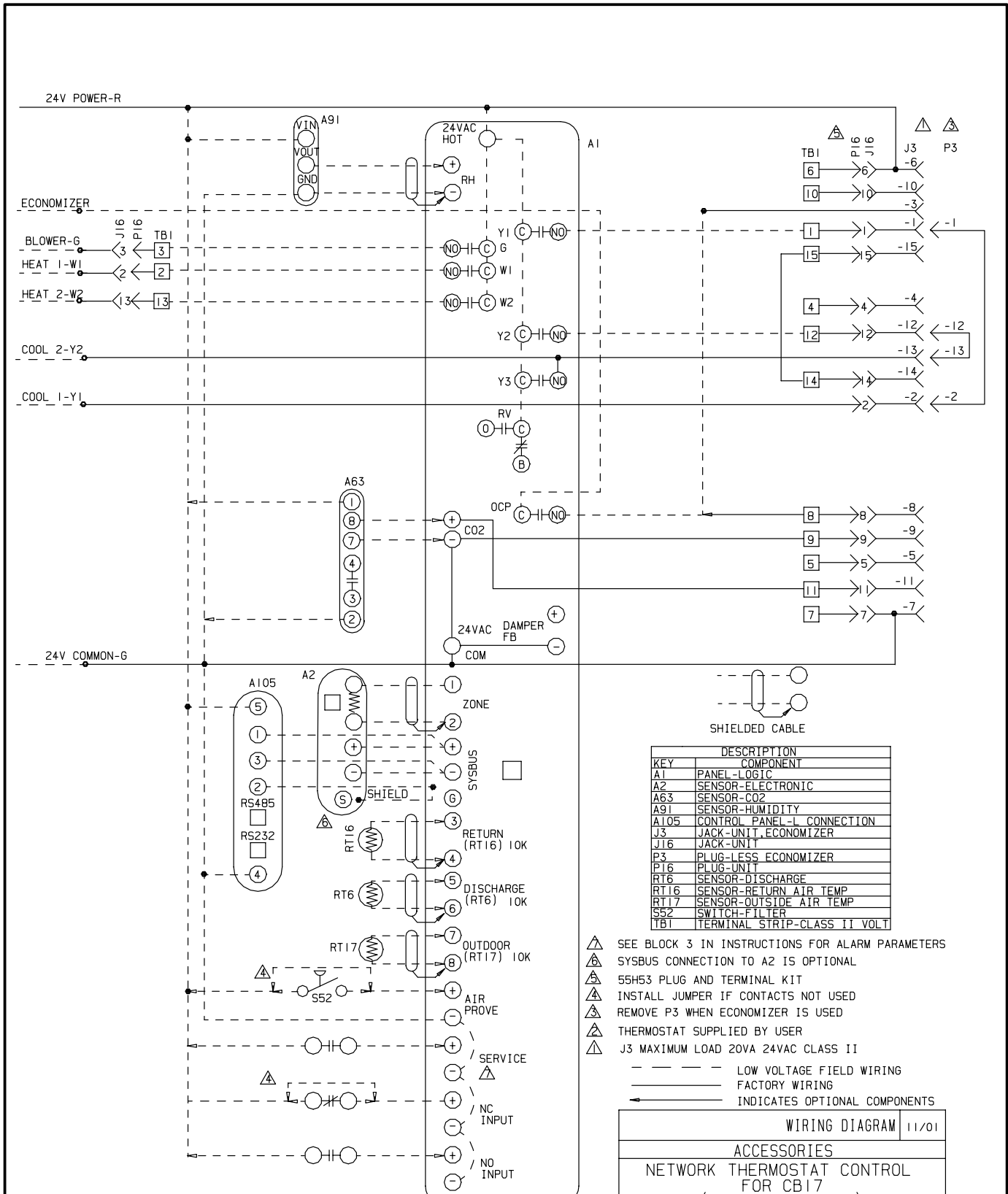
BLOCK 2 COOLING PARAMETERS						
A2.01	Cooling Backup Setpoint	55	75	85	Deg.F	Backup cooling setpoint. Used if the communications link is lost (after 5mins.) A2.01>= A1.01+A4.03
A2.02	Y1 Cooling Differential	0	0.5	4	Deg. F	Y1 cooling differential. A2.02<= A2.03
A2.03	Y2 Cooling Differential	0	1	4	Deg. F	Y2 cooling differential. A2.03>= A2.02 and <=A2.04
A2.04	Y3 Cooling Differential	0	1.5	4	Deg.F	Y3 cooling differential. A2.04>= A2.04
A2.05	Cooling Deadband	1	1	3.75	Deg. F	Cooling stage deadband. A2.05 <=A4.03-A1.04
A2.06	Upper Stage Cooling Latch Option	0	0	1	Option	Option used to hold upper stage on until lower stage demand is satisfied.
A2.07	Cooling Stage-Up Timer	0	15	60	Min.	Optional timer used to call the upper demand if the lower stage runs for this time. Disabled if set to "0".
A2.08	Cooling Stage Down Timer	0	15	30	Min.	Optional time delay that occurs before a lower stage turns off following a higher stage termination.
A2.09	Occupied Cool-Down Delay	0	30	120	Min.	The off delay on OCP output for first cooling demand in occupied period.
A2.10	Cooling Return Air Limit Option	0	0	1	Option	Cooling return air limit option enable.
A2.11	Cooling Return Air Limit	60	65	90	Deg. F	Return air temp. limit. Cooling outputs off if return air temp. exceeds limit. ECTO A2.10 must be set to 1 to enable this limit.
A2.12	Cooling Blower On Delay	0	0	60	Sec.	The time before the blower turns on after a cooling demand.
A2.13	Cooling Blower Off Delay	0	0	300	Sec.	The time the blower stays on after the cooling demand is terminated.
A2.14	Compr. Off Delay	60	300	510	Sec.	Compressor minimum off delay.
A2.15	Cooling Compr. Low Temp. Lockout	-30	0	80	Deg.F	Cooling low ambient compressor lockout temperature. A value of -31°F will disable the low ambient lockout function. Outdoor air sensor required (RT17).
BLOCK 3 MISCELLANEOUS PARAMETERS						
A3.01	Service Input Alarm Delay	0	1	10	Min.	The time delay used before alarm is generated.
A3.02	Service Input Alarm Description.	0	0	1	Option	The description option for the alarm associated with the Service Input. 0-Service Input energized 1-Dirty Filter
A3.03	Normally Open Input Alarm Description	0	0	1	Option	The description option for the alarm associated with the N.O. Input. 0-Normally Open Input energized 1-Smoke alarm
A3.04	Normally Closed Input Alarm Description	0	0	2	Option	The description option for the alarm associated with the N.C. Input. 0-Normally Closed Input energized 1-Blower overload trip 2-Loss of phase protector trip
BLOCK 4 SYSTEM PARAMETERS						
A4.01	Continuous Blower Control	0	1	0	Option	Option for setting the blower to continuous during occupied period. 0=Blower cycles with demands 1=Continuous blower
A4.02	Zone Sensor Calibration	5	0	-5	Deg. F	Used for calibrating the zone sensor.
A4.03	Autochangeover Deadband	2	3	10	Deg. F	The temperature deadband between heating and cooling demands. Do not change this parameter when an NCP is used.
A4.04	Autochangeover Delay	1	5	15	Min.	The off delay used when moving from heating to cooling or cooling to heating demand.
A4.05	Air Proof Switch Delay	10	20	120	Sec	After G is energized, if the Air Proof Switch is not on after this delay, the control will issue an alarm.
A4.06	Start-Up Demand Delay	2	2	30	Mins	The demand delay after power is applied to the NTC or after a control reset. This delay may be adjusted to stagger unit demands when units are powered on.

Error Codes

The NTC error codes can be viewed using a PC, Unit Controller PC software (version 2.02), and a PC to L Connection converter. Refer to “Adjust Parameters” section and table 10.

**TABLE 10
NTC ERROR CODES**

Error #	PROBLEM	ACTION
2	ECTO access error. This may indicate a problem with the ECTO memory chip and parameters may not be changeable.	Control will operate with factory ECTO defaults.
4	N.O. input indicates smoke alarm.	Unit is off for five minutes or until smoke alarm reset (N.O. input turns off)
5	Airflow switch. This indicates no blower air after 20 seconds (ECTO A4.05) after G output is energized.	Unit off. Will retry in 5 minutes.
6	Dirty filter. Service input indicates a dirty filter.	Alarm only. No other action taken.
40	Return air temperature exceeded heating limit set in ECTO A1.10.	Heating outputs off until RAT is back within limits.
41	Return air temperature cooling exceeded cooling limit set in ECTO A2.11.	Cooling outputs off until RAT is back within limits.
74	Zone sensor problem. Check wiring and sensor.	Control will switch over to the return air sensor, if present. Otherwise unit off until sensor is back in range.
75	Outdoor air temperature sensor problem. Check wiring and sensor.	Compressor low ambient and HP supplemental heat lock-out functions are disabled until sensor is back in range.
78	Return air temperature sensor problem. Check wiring and sensor.	Return air limit functions disabled until sensor is back in range.
82	Control reset or power outage.	Indication only. No action taken.
87	Equipment configuration DIP switch has changed while unit is energized. Check DIP switch settings and reset control. Make sure the DIP switch settings agree with the unit type.	Unit off until reset or DIP is changed back to original setting.
88	May indicate a problem with the ECTO chip.	Control will operate with factory ECTO defaults.
90	RAM memory error.	Control will reset.
94	Setpoint temperature is out of range.	Reverts to 65°F (18°C) heating and 80°F (27°C) cooling until setpoint is back in range.
127	Alarms buffer overflow.	Not all alarms stored.
200	Service input is on.	Alarm only.
201	Normally open (N.O.) input is on.	Unit off. Will retry every 5 minutes.
202	Normally closed (N.C.) input is off.	Unit off. Will retry every 5 minutes.
203	Blower overload (N.C. input) tripped.	Unit off. Will retry every 5 minutes.
204	Loss of phase. (N.C. input) tripped.	Unit off for 5 minutes or until loss of phase device is reset (N.C. input is on.)
205	Airflow switch tripped three times.	Unit is locked off until control is reset.
206	Control has lost communication from the master controller.	Control switches to the backup setpoints and occupied mode until communication link is re-established.

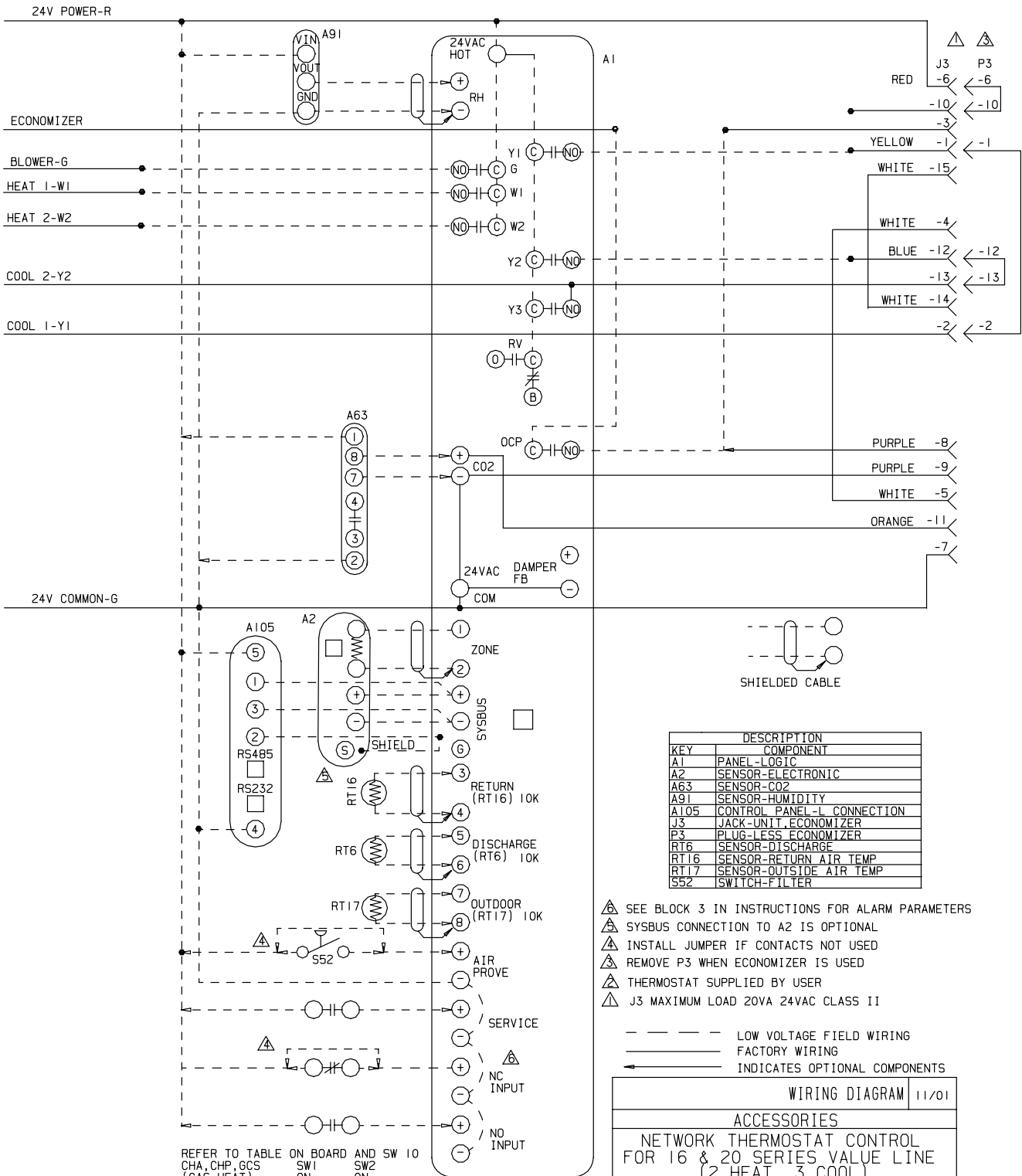


REFER TO TABLE ON BOARD AND SW 10
 CB17 SW1 SW2
 (GAS HEAT) ON ON

KEY	DESCRIPTION	COMPONENT
A1	PANEL-LOGIC	
A2	SENSOR-ELECTRONIC	
A63	SENSOR-CO2	
A91	SENSOR-HUMIDITY	
A105	CONTROL PANEL-L CONNECTION	
J3	JACK-UNIT, ECONOMIZER	
J16	JACK-UNIT	
P3	PLUG-LESS ECONOMIZER	
PT6	PLUG-UNIT	
RT6	SENSOR-DISCHARGE	
RT16	SENSOR-RETURN AIR TEMP	
RT17	SENSOR-OUTSIDE AIR TEMP	
S52	SWITCH-FILTER	
TB1	TERMINAL STRIP-CLASS II VOLT	

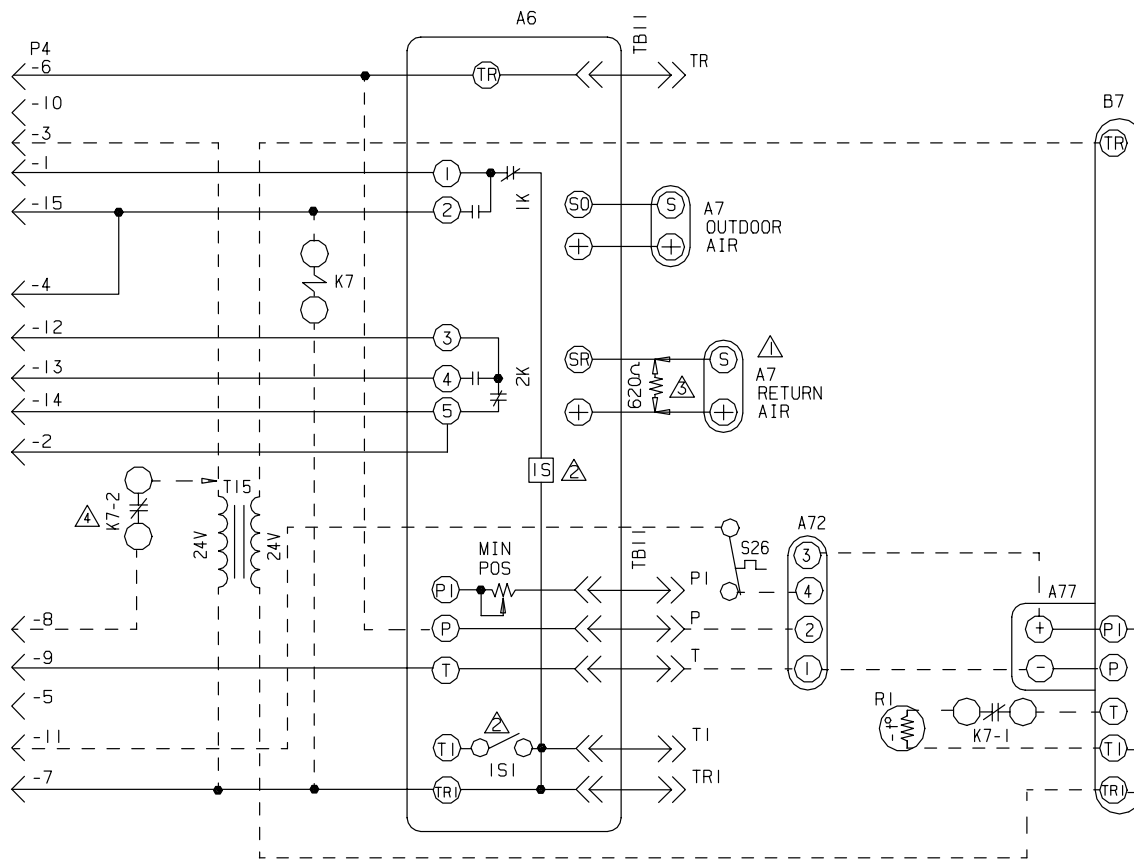
- ⚠ SEE BLOCK 3 IN INSTRUCTIONS FOR ALARM PARAMETERS
- ⚠ SYSBUS CONNECTION TO A2 IS OPTIONAL
- ⚠ 55H53 PLUG AND TERMINAL KIT
- ⚠ INSTALL JUMPER IF CONTACTS NOT USED
- ⚠ REMOVE P3 WHEN ECONOMIZER IS USED
- ⚠ THERMOSTAT SUPPLIED BY USER
- ⚠ J3 MAXIMUM LOAD 20VA 24VAC CLASS II
- LOW VOLTAGE FIELD WIRING
- FACTORY WIRING
- ⬅ INDICATES OPTIONAL COMPONENTS

WIRING DIAGRAM		11/01
ACCESSORIES		
NETWORK THERMOSTAT CONTROL FOR CB17 (2 HEAT, 3 COOL)		
THERMOSTAT-SECTION C1		
Supersedes Form No.		New Form No.
		533,802W



WIRING DIAGRAM		11/01
ACCESSORIES		
NETWORK THERMOSTAT CONTROL FOR 16 & 20 SERIES VALUE LINE (2 HEAT, 3 COOL)		
THERMOSTAT-SECTION C1		
Supersedes Form No.	New Form No.	
	533,803W	

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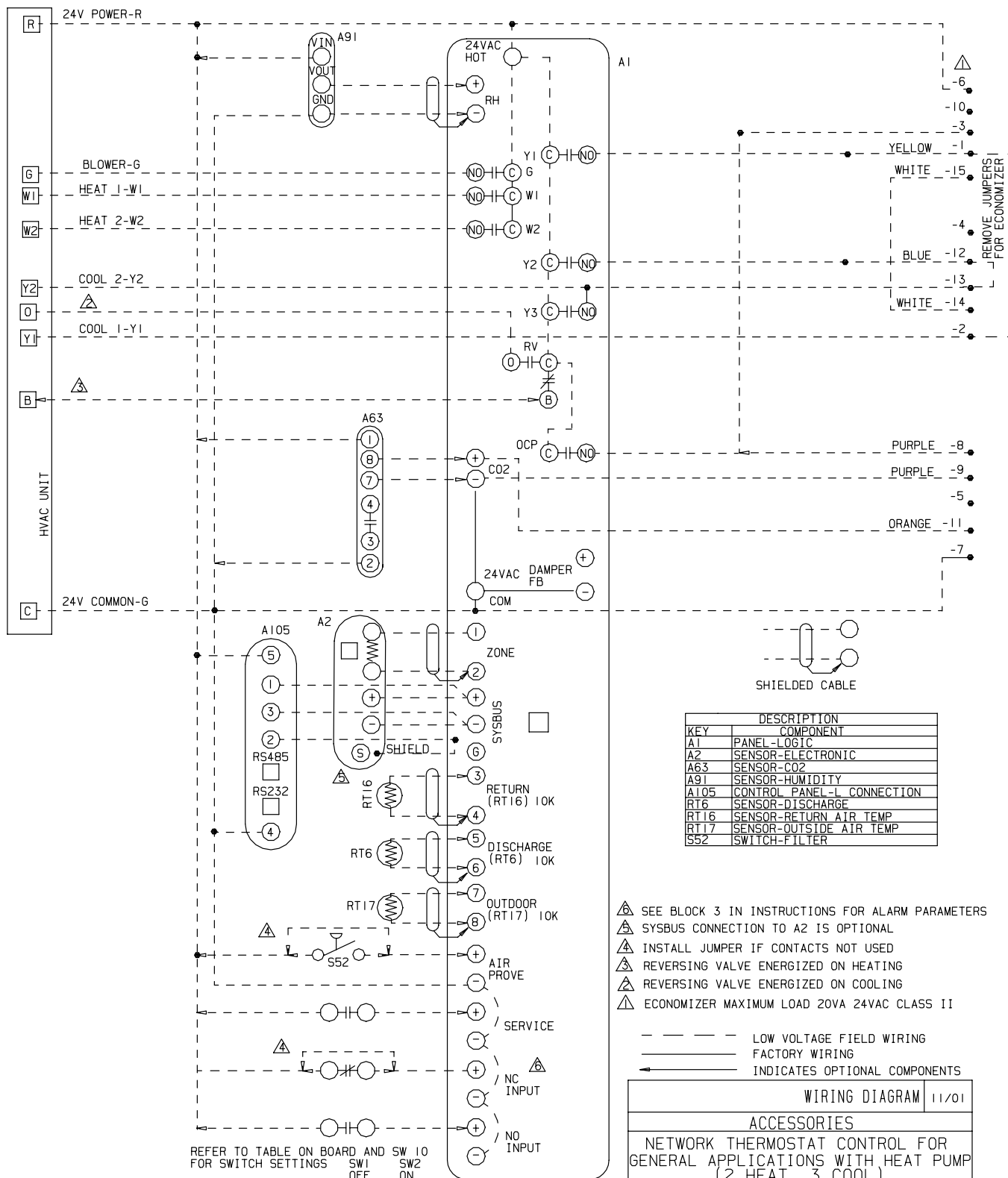


KEY	DESCRIPTION
A6	CONTROL-ENTHALPY W7459A
A7	SENSOR-ENTHALPY
A72	CONTROL-REMOTE MIN POS
A77	ADAPTOR-ECONO 0-10 VDC
B7	MOTOR-DAMPER M7415A
K7, -1, 2	RELAY-ECONOMIZER
P4	PLUG-ECONOMIZER
R1	SENSOR-SUPPLY AIR
S26	THERMOSTAT-AMBIENT
T15	TRANSFORMER-ECONO MOTOR
TB11	TERMINAL STRIP

- △ OPTIONAL-SECOND A7 INSTALLED IN RETURN AIR PROVIDES DIFFERENTIAL ENTHALPY CONTROL
- △ WHEN IS RECEIVES POWER, ISI CLOSES.
- △ FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR. REMOVE WHEN SECOND A7 SENSOR IS INSTALLED TO PROVIDE DIFFERENTIAL ENTHALPY CONTROL
- △ K7-2 OPTION FOR ECONOMIZER NITE COOL

--- LOW VOLTAGE FIELD WIRING

WIRING DIAGRAM		11/01
ACCESSORIES		
MODULATING ECONOMIZER FOR USE WITH NETWORK THERMOSTAT CONTROL		
ECONOMIZER-SECTION D5		
Supersedes Form No.	New Form No.	
	533,805W	

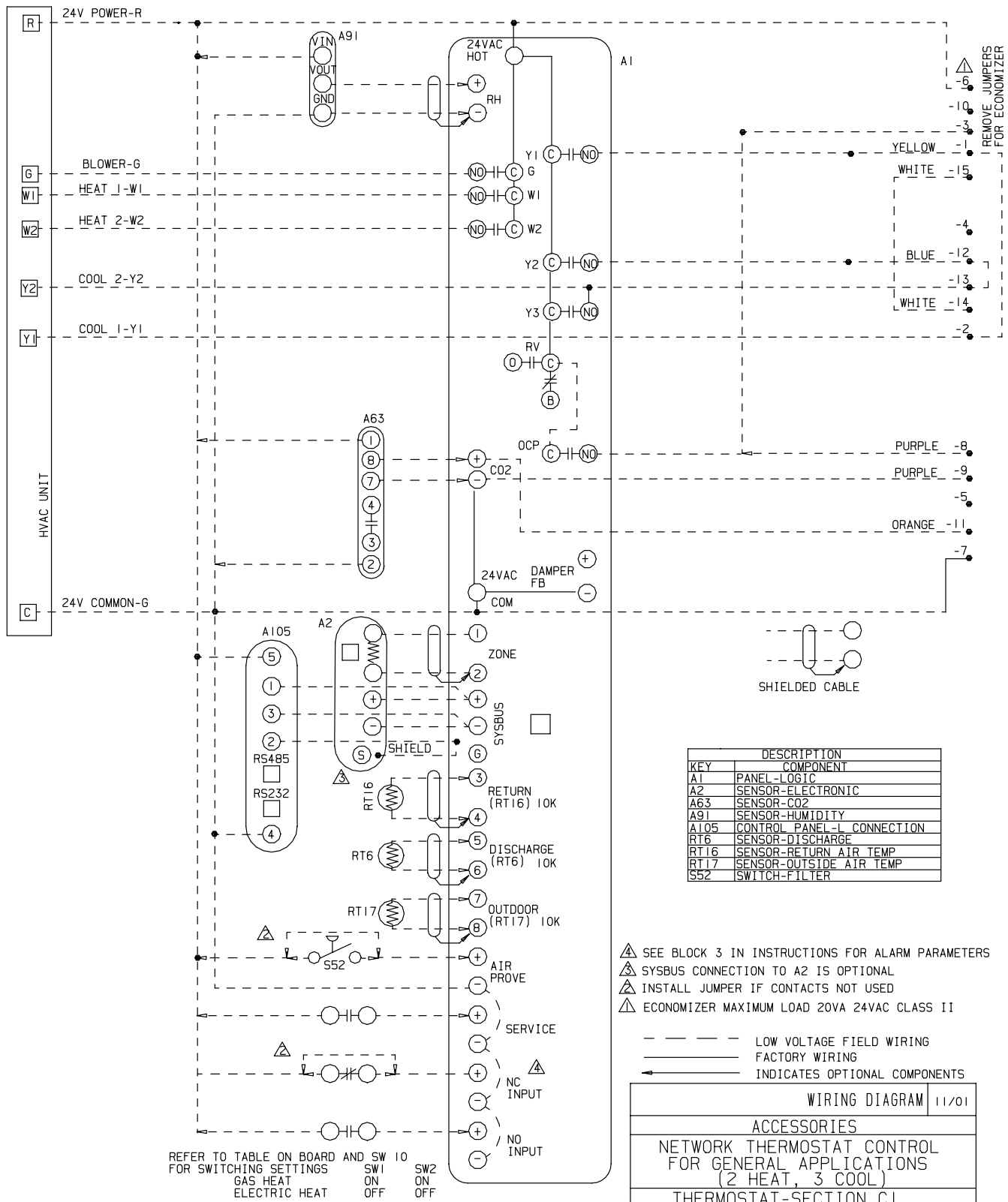


REFER TO TABLE ON BOARD AND SW 10 FOR SWITCH SETTINGS

SW1 OFF

SW2 ON

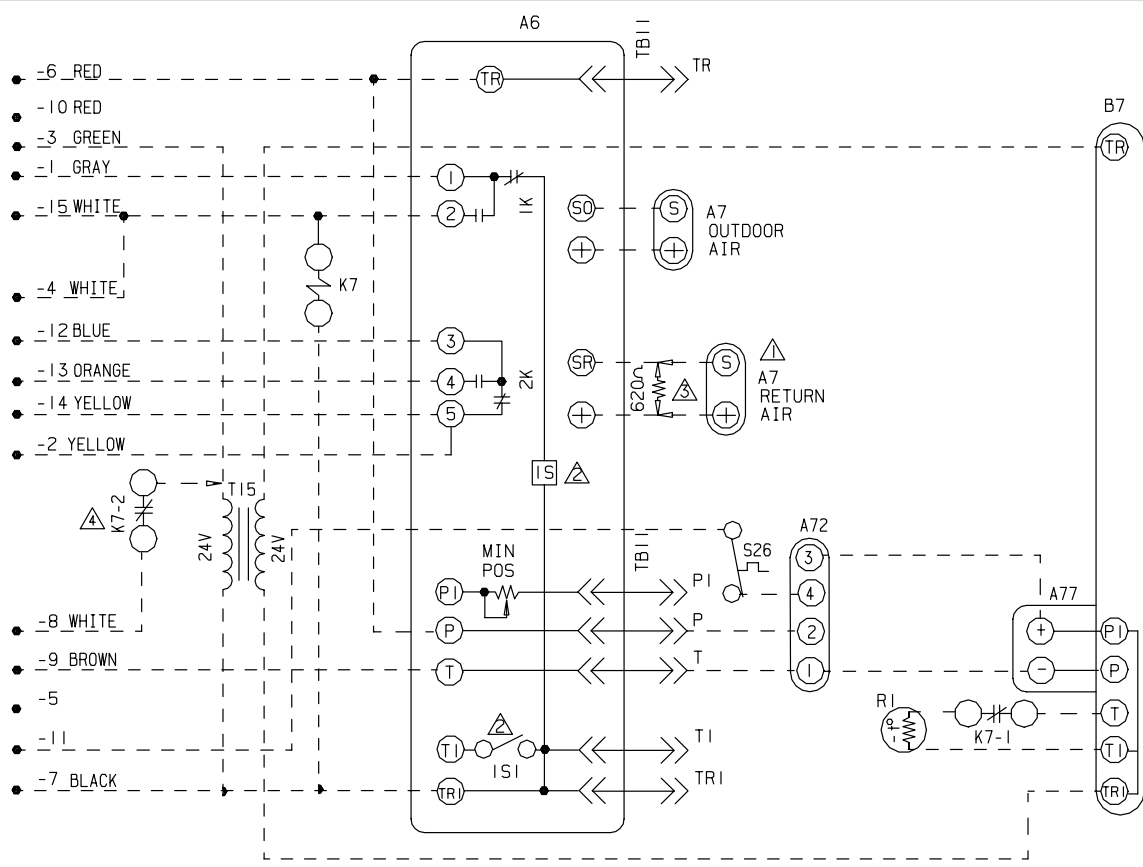
WIRING DIAGRAM		11/01
ACCESSORIES		
NETWORK THERMOSTAT CONTROL FOR GENERAL APPLICATIONS WITH HEAT PUMP (2 HEAT, 3 COOL)		
THERMOSTAT-SECTION C1		
Supersedes Form No.	New Form No.	
	533,807W	



KEY	DESCRIPTION
A1	PANEL-LOGIC
A2	SENSOR-ELECTRONIC
A63	SENSOR-CO2
A91	SENSOR-HUMIDITY
A105	CONTROL PANEL-L CONNECTION
RT6	SENSOR-DISCHARGE
RT16	SENSOR-RETURN AIR TEMP
RT17	SENSOR-OUTSIDE AIR TEMP
S52	SWITCH-FILTER

WIRING DIAGRAM		11/01
ACCESSORIES		
NETWORK THERMOSTAT CONTROL FOR GENERAL APPLICATIONS (2 HEAT, 3 COOL)		
THERMOSTAT-SECTION C1		
Supersedes Form No.	New Form No.	
	533,806W	

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DESCRIPTION	
KEY	COMPONENT
A6	CONTROL-ENTHALPY W7459A
A7	SENSOR-ENTHALPY
A72	CONTROL-REMOTE MIN POS
A77	ADAPTOR-ECONO 0-10 VDC
B7	MOTOR-DAMPER M7415A
K7, -1,2	RELAY-ECONOMIZER
R1	SENSOR-SUPPLY AIR
S26	THERMOSTAT-AMBIENT
T15	TRANSFORMER-ECONO MOTOR
TB11	TERMINAL STRIP

- ⚠ OPTIONAL-SECOND A7 INSTALLED IN RETURN AIR PROVIDES DIFFERENTIAL ENTHALPY CONTROL
- ⚠ WHEN IS RECEIVES POWER, ISI CLOSES.
- ⚠ FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR. REMOVE WHEN SECOND A7 SENSOR IS INSTALLED TO PROVIDE DIFFERENTIAL ENTHALPY CONTROL
- ⚠ K7-2 OPTION FOR ECONOMIZER NITE COOL

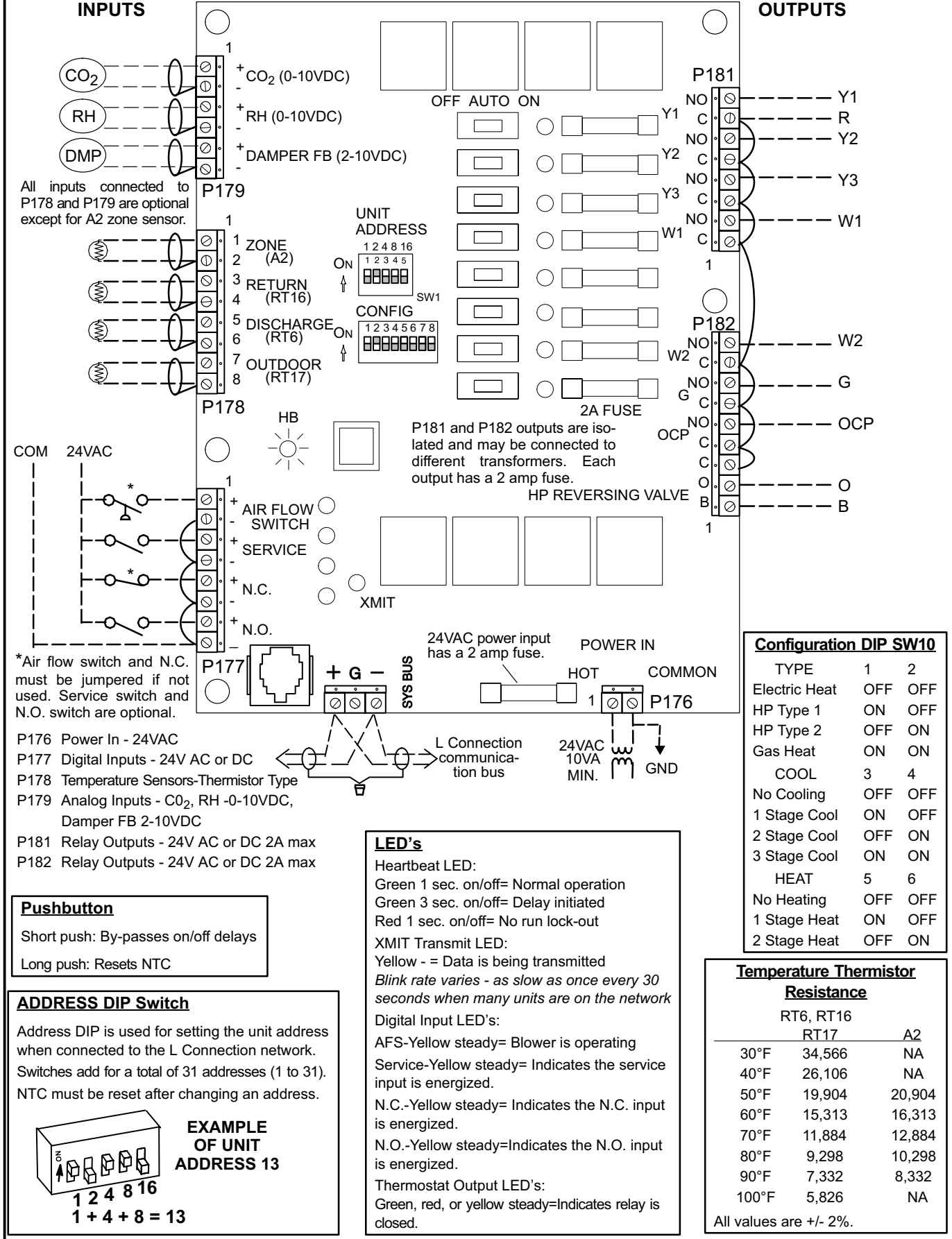
----- LOW VOLTAGE FIELD WIRING

WIRING DIAGRAM		11/01
ACCESSORIES		
EMD14		EMD17
MODULATING ECONOMIZER FOR USE WITH NETWORK THERMOSTAT CONTROL		
ECONOMIZER-SECTION D5		
Supersedes Form No.		New Form No.
		533,808W

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TYPICAL NTC1-1 (A113) FIELD WIRING



All inputs connected to P178 and P179 are optional except for A2 zone sensor.

*Air flow switch and N.C. must be jumpered if not used. Service switch and N.O. switch are optional.

- P176 Power In - 24VAC
- P177 Digital Inputs - 24V AC or DC
- P178 Temperature Sensors-Thermistor Type
- P179 Analog Inputs - CO₂, RH -0-10VDC, Damper FB 2-10VDC
- P181 Relay Outputs - 24V AC or DC 2A max
- P182 Relay Outputs - 24V AC or DC 2A max

Pushbutton
 Short push: By-passes on/off delays
 Long push: Resets NTC

ADDRESS DIP Switch
 Address DIP is used for setting the unit address when connected to the L Connection network. Switches add for a total of 31 addresses (1 to 31). NTC must be reset after changing an address.

EXAMPLE OF UNIT ADDRESS 13

1 2 4 8 16
 1 + 4 + 8 = 13

LED's
 Heartbeat LED:
 Green 1 sec. on/off= Normal operation
 Green 3 sec. on/off= Delay initiated
 Red 1 sec. on/off= No run lock-out
 XMIT Transmit LED:
 Yellow - = Data is being transmitted
 Blink rate varies - as slow as once every 30 seconds when many units are on the network
 Digital Input LED's:
 AFS-Yellow steady= Blower is operating
 Service-Yellow steady= Indicates the service input is energized.
 N.C.-Yellow steady= Indicates the N.C. input is energized.
 N.O.-Yellow steady=Indicates the N.O. input is energized.
 Thermostat Output LED's:
 Green, red, or yellow steady=Indicates relay is closed.

Configuration DIP SW10

TYPE	1	2
Electric Heat	OFF	OFF
HP Type 1	ON	OFF
HP Type 2	OFF	ON
Gas Heat	ON	ON
COOL	3	4
No Cooling	OFF	OFF
1 Stage Cool	ON	OFF
2 Stage Cool	OFF	ON
3 Stage Cool	ON	ON
HEAT	5	6
No Heating	OFF	OFF
1 Stage Heat	ON	OFF
2 Stage Heat	OFF	ON

Temperature Thermistor Resistance

	RT16	A2
30°F	34,566	NA
40°F	26,106	NA
50°F	19,904	20,904
60°F	15,313	16,313
70°F	11,884	12,884
80°F	9,298	10,298
90°F	7,332	8,332
100°F	5,826	NA

All values are +/- 2%.

FIGURE 8