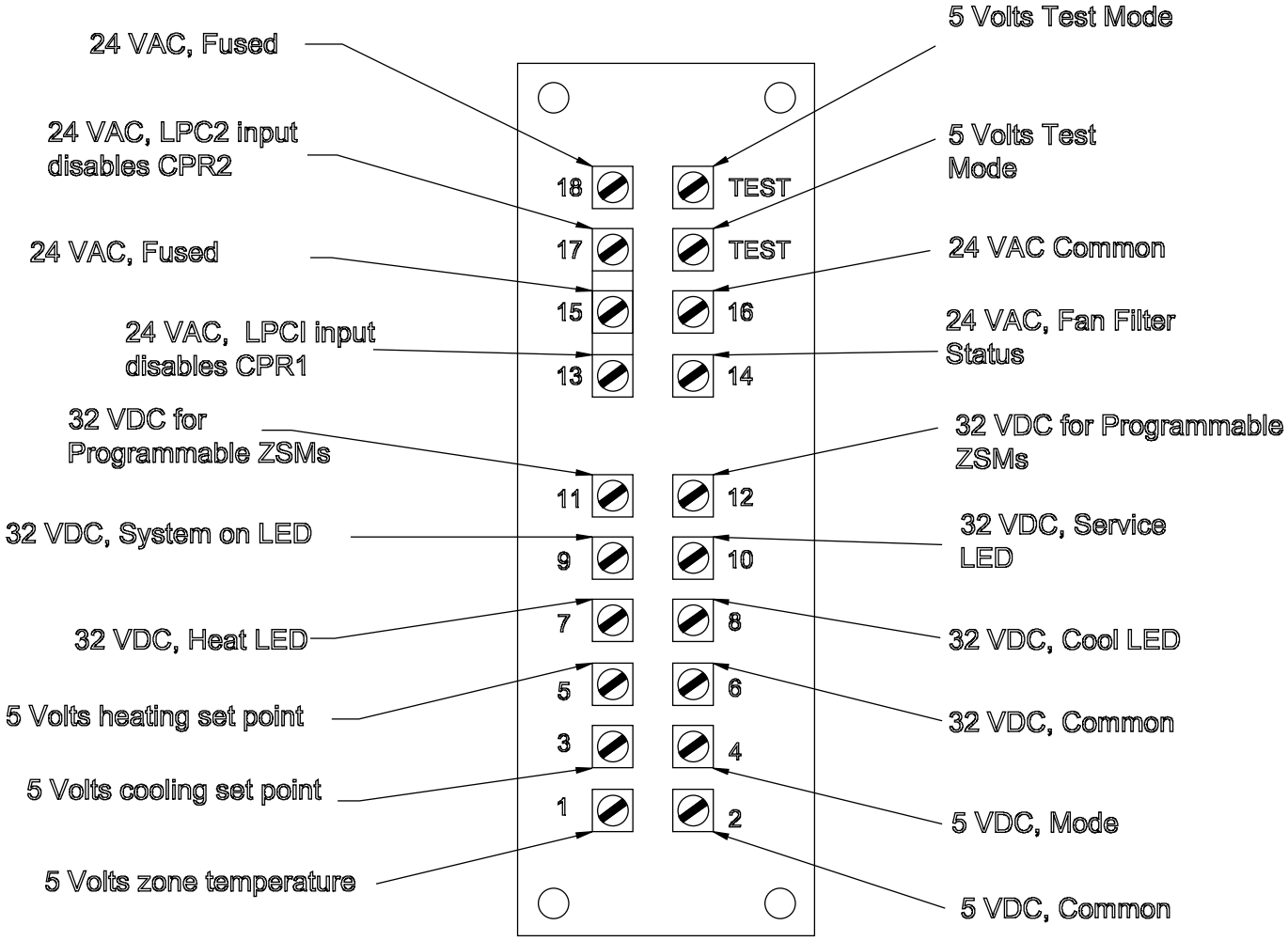
Section 6

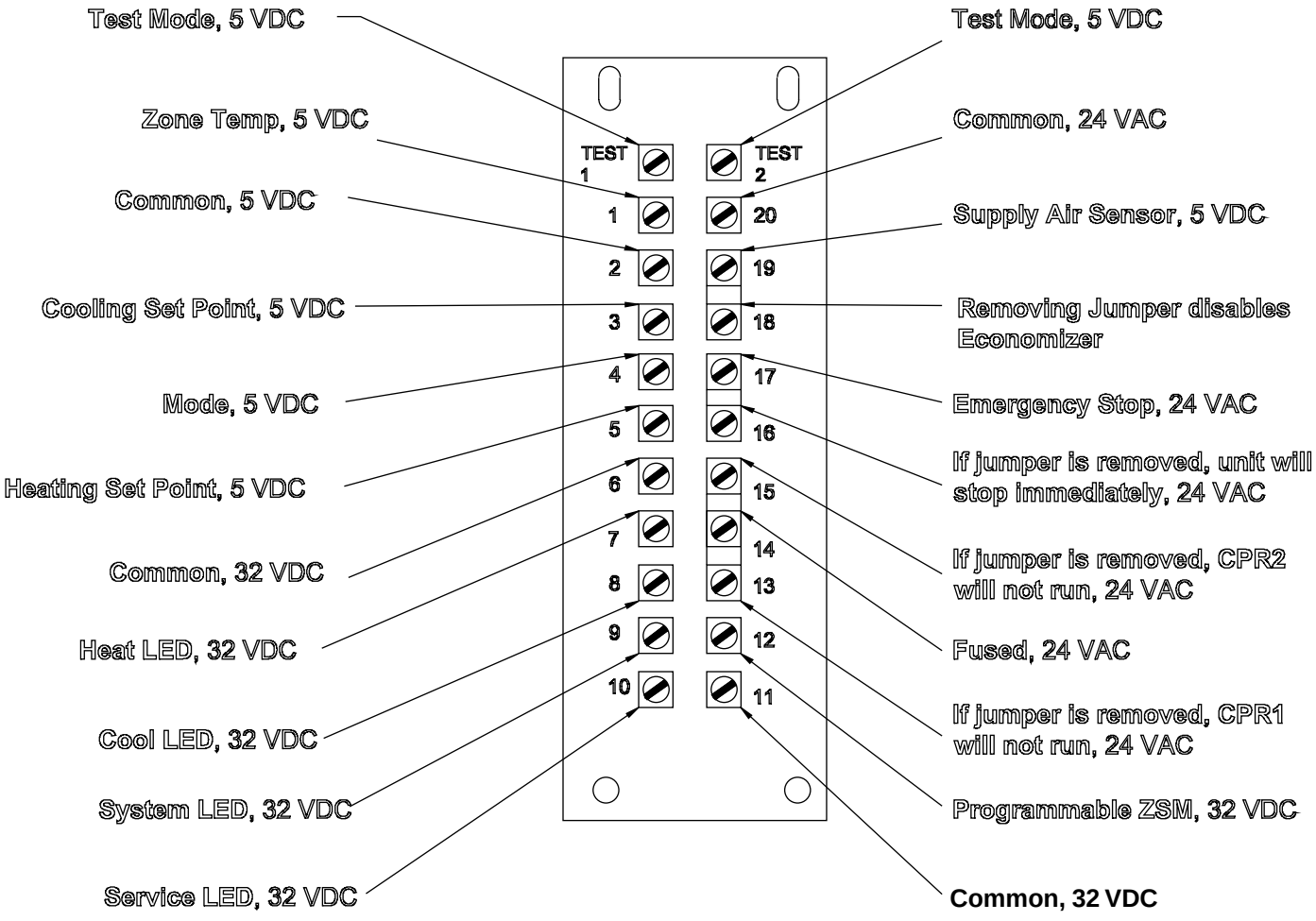
46. Pin Descriptions & Voltages

46.1. Voltages and Descriptions Available at the LTB, Prior to 06/93



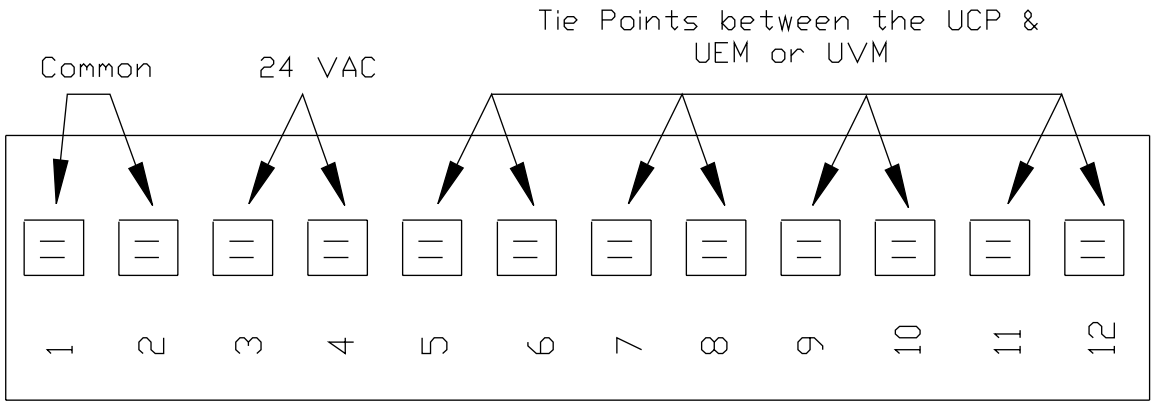
Note: Factory Jumpers Installed Across Terminals: LTB-13, 15, And 17. (Voltages are measured with wires disconnected).

46.2. Voltages and Descriptions Available At The LTB, After 06/93 (3-50 ton)

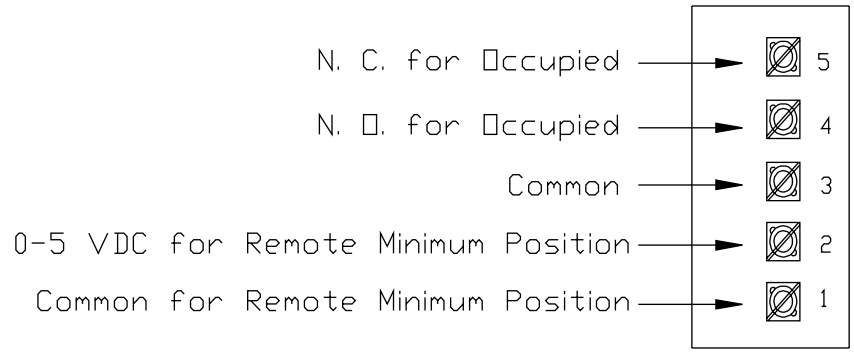


Note: Factory Jumpers Installed Across Terminals: LTB-13, 14, And 15 / LTB-16 And 17 / LTB-18 And 19. (Voltages Are Measured With Wires Disconnected).

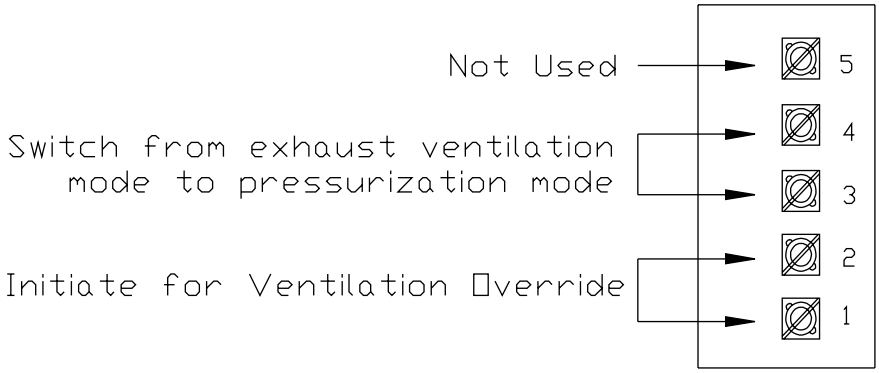
46.3. Voyager 27.5-50 Ton LTB-2 Pin Descriptions & Voltages



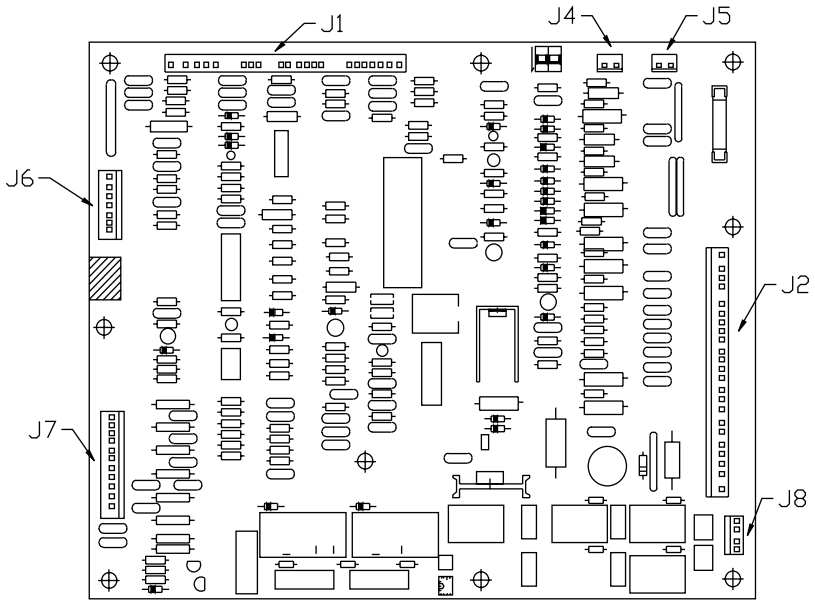
46.4. Voyager 27.5-50 Ton LTB-3 Pin Descriptions & Voltages



46.5. Voyager 27.5-50 Ton LTB-4 Pin Descriptions & Voltages



46.6. UCP Pin Descriptions & Voltages 3-25 Ton

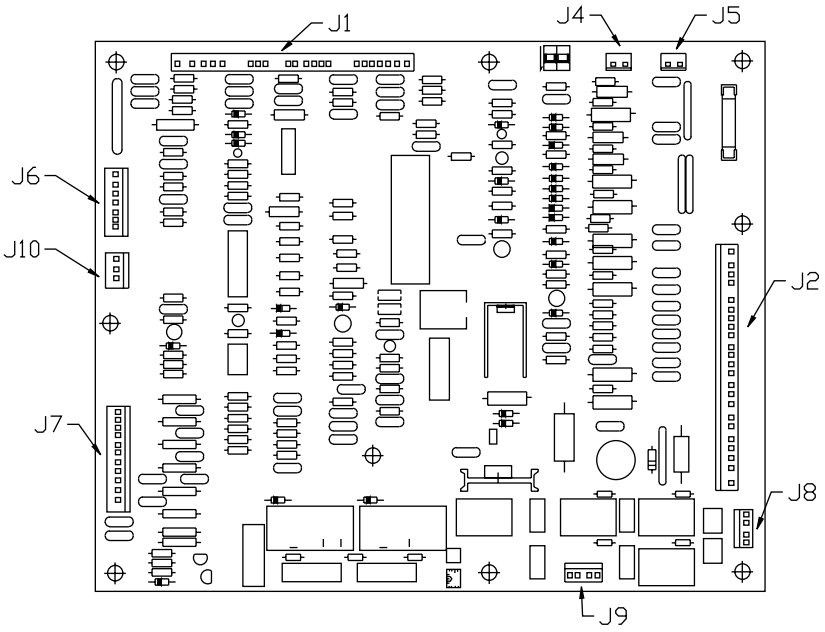


PIN	VOLTS	INFORMATION
J1-1	*Common	Digital Common Shorting Point for Configuring Inputs
J1-2 & J1-3	0 VDC Input	Inputs used to determine Unit Type TC,TW,YC
J1-4	0 VDC Input	Inputs used to determine 1 or 2 Compressor System
J1-5	24 VAC Input	Heat Fail Input for Gas/Electric
J1-6	No Pin	
J1-7	0 VDC Input	Input to disable Lead/Lag (cut to enable)
J1-8	32 VDC Output	Not used
J1-9	29 VDC Output	Not used
J1-10	No Pin	
J1-11	32 VDC Output	Output to ODF 2 Relay, 32 VDC present when "NOT" energized
J1-12	29 VDC Output	Output to ODF2 Relay
J1-13	32 VDC Output	Output to defrost relay (3-7.5) or defrost module (10-20)
J1-14	29 VDC Output	Output to defrost relay (3-7.5) or defrost module (10-20)
J1-15	5 VDC Input	Outdoor air sensor analog input
J1-16	*Common	Outdoor air sensor analog input
J1-17	No Pin	
J1-18	*Common	Digital Common Shorting Point for Configuring Inputs
J1-19 & J1-20	0 VDC Input	Inputs used to determine # of Heat Stages, for a particular unit type
J1-21	24 VAC Input	Heat 1 Input provides Power for Heat 1 Output
J1-22	24 VAC Output	Output to energize Stage 1 Heat
J1-23	Not Used	
J1-24	29 VDC Output	Not used
J2-1	24 VAC Input	UCP Power Supply Input from LTB16
J2-2	24 VAC Input	CPR 1 Disable Circuit from LPC1
J2-3	24 VAC Input	CPR 2 Disable Circuit from LPC2
J2-4	No Pin	
J2-5, 6 & 7	32 VDC Input	Inputs used with one another to determine Condenser Fan Cycling Temp.
J2-8	5 VDC Output	Binary Output to UEM to drive ECA open (1.7 V when driving)
J2-9	5 VDC Output	Binary Output to UEM to drive ECA closed (1.7 V when driving)

J2-10, 11 & 12	5 VDC Output	Analog/digital Output to UEM, tells UEM which data it wants to read on J2-15 Input
J2-13	29 VDC Output (Pulsing)	Output to UEM for XFC, 29 VDC present when XFC is "NOT" energized
J2-14	29 VDC Output	Output to UEM for XFC, continuous 29 VDC Output
J2-15	5 VDC Input (Pulsing)	Communication Input from UEM
J2-16	5 VDC Output	Analog Reference Voltage to UEM
J2-17	*Common	Analog Common to UEM
J2-18	*Common	Digital Common to UEM
J2-19	5 VDC Output	5 VDC Power Supply to UEM
J2-20	24 VAC Output	Power Supply for Humidity Sensor Circuits
J2-21	5 VDC Output	Output to Coil Temp. Sensor, or Defrost Module
J2-22	24 VAC Output	Output to energize Supply Fan Contactor
J2-23	No Pin	
J2-24	*Common	UCP Power Common – grounded
J4-1	5 VDC Input	Test Mode Initiation Analog Input
J4-2	*Common	Analog Common (LTB-TEST-2); Shorting point for configuring inputs
J5-1	24 VAC Input	Fan/Filter status input for indication
J5-2	No Pin	
J5-3	24 VAC Output	Output to TCO2 used for Heat Fail input, YCs Only
J6-1	24 VAC Output	TCI Power Supply for High Temp. Switch Input
J6-2	32 VDC Output	Output to TCI Power Supply
J6-3	5 VDC Input	TCI Installed, read unit address digital input
J6-4	5 VDC Output	Transmit Data, Binary Output to TCI
J6-5	5 VDC Output	Transmit Enable, Binary Output to TCI
J6-6	32 VDC O/I (Pulsing)	To LTB-12, Receive data line for programmable ZSM or TCI if installed
J6-7	*Common	To LTB-11 DC & AC common for programmable ZSM & TCI
J7-1	24 VAC Output	To LTB-14, 24VAC fused
J7-2	*Common	To LTB-6 Common for ZSM LED's
J7-3	*Common	To LTB-2 Analog Common to ZSM
J7-4	32 VDC Output	To LTB-10 for ZSM Service LED/LCD
J7-5	32 VDC Output	To LTB-8 for ZSM Cool LED/LCD
J7-6	32 VDC Output	To LTB-7 for ZSM Heat LED/LCD
J7-7	32 VDC Output	To LTB-9 for ZSM Sys On LED/LCD
J7-8	5 VDC Input	To LTB-3 ZSM Cooling Set Point Analog Input
J7-9	5 VDC Input	To LTB-5 ZSM Heating Set Point Analog Input
J7-10	5 VDC Input	To LTB-4 ZSM Mode Analog Input
J7-11	5 VDC Input	To LTB-1 ZSM Zone Temp. Analog Input
*See CTI	Pin descriptions to J7 if a	CTI is installed.
J8-1	24 VAC Output	Output to CC1 (compressor contactor circuit – HPC, WTL, CCB)
J8-2	0 VAC	Lockout input from CC1
J8-3	0 VAC	Lockout input from CC2
J8-4	24 VAC Output	Output to CC2 (compressor contactor circuit – HPC, WTL, CCB)

* Common to Chassis Ground

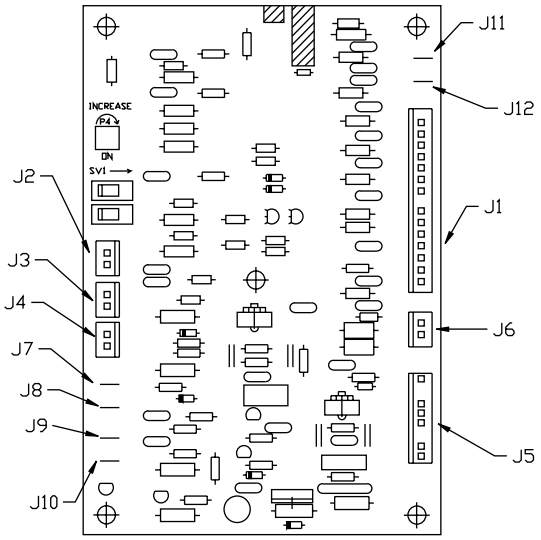
46.7. UCP Pin Descriptions & Voltages 27.5-50 Ton



PIN	VOLTS	INFORMATION
J1-1	*Common	Digital Common Shorting Point for Configuring Inputs
J1-2	0 VDC Input	Input to determine Heat Configuration
J1-3	0 VDC Input	Input to enable Daytime Warm-up Heat
J1-4	0 VDC Input	Input to determine Number of Compressors
J1-5	24 VAC Input	Heat Fail Input
J1-6	No Pin	
J1-7	0 VDC Input	Input to disable Lead/Lag (cut to enable)
J1-8	Pin	Not used
J1-9	29 VDC Output	Not used
J1-10	No Pin	
J1-11	32 VDC Output	Output to ODF 2 Relay, 32 VDC present when "NOT" energized
J1-12	29 VDC Output	Output to ODF2 Relay
J1-13	32 VDC Output	Output to VHR relay
J1-14	29 VDC Output	Output to VHR Relay continuous 29VDC
J1-15	5 VDC Input	Outdoor Air Sensor analog input (CV); data input from UVM (VAV)
J1-16	*Common	Common for: Supply air sensor (CV); Outside air sensor (VAV)
J1-17	No Pin	
J1-18	*Common	Digital common shorting point for configure inputs
J1-19	0 VDC Input	Input to determine VAV / CV unit
J1-20	0 VDC Input	Input used to determine unit type – TC, TE, YC
J1-21	24 VAC Input	Heat input provides power for heat 1 output
J1-22	24 VAC Output	Output to energize Stage 1 Heat
J1-23	24 VAC Output	Not used
J1-24	29 VDC Output	Not used
J2-1	24 VAC Input	UCP Power Supply Input from TNS1
J2-2	24 VAC Input	CPR 1 Disable Circuit.
J2-3	24 VAC Input	CPR 2 Disable Circuit.
J2-4	32 VDC Input	Not used
J2-5	0 VDC Input	Inputs used for Condenser Fan Cycling
J2-6	24 VAC Input	Supply Fan Proving input from FFS
J2-7	24 VAC Input	External Auto Stop input from LTB1-16

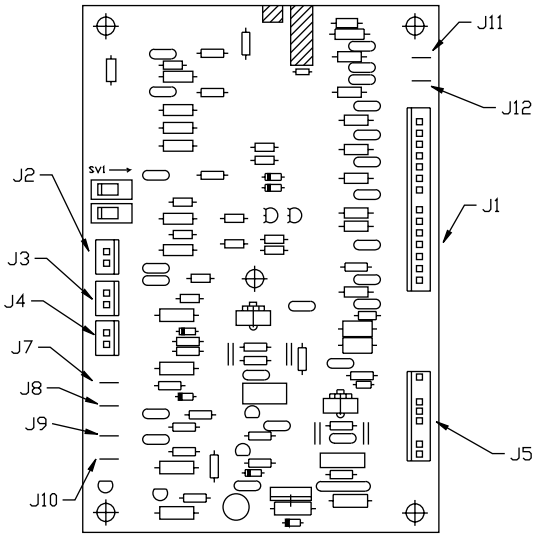
J2-8	5 VDC Output	Binary Output to UEM to drive ECA open (1.7 V when driving)
J2-9	5 VDC Output	Binary Output to UEM to drive ECA closed (1.7 V when driving)
J2-10, 11, 12	5 VDC Output	Analog/digital Output to UEM or UVM, tells UEM or UVM which data it wants to read
J2-13	29 VDC Output (Pulsing)	Output to UEM for XFC, 29 VDC present when XFC is "NOT" energized
J2-14	29 VDC Output	Output to UEM for XFC, continuous 29 VDC output
J2-15	5 VDC Input (Pulsing)	Communication Input from UEM
J2-16	5 VDC Output	Analog Reference Voltage to UEM, LTB2-8
J2-17	*Common	Analog Common to UEM, LTB2-9
J2-18	*Common	Digital Common to UEM, LTB2-10
J2-19	5 VDC Output	5 VDC Power Supply to UEM or UVM, LTB2-11
J2-20	24 VAC Output	Power Supply for Humidity Sensor, UVM, LTB2-12
J2-21	0-5 VDC Output	Biases OAS input (CV);Not used (VAV)
J2-22	24 VAC Output	Output to energize Supply Fan Contactor
J2-23	No Pin	
J2-24	*Common	UCP Power Common - grounded
J4-1	5 VDC Input	Test mode initiation (analog input) from LTB1-TEST 1
J4-2	*Common	Analog Common (LTB1-TEST 2);Shorting point for configuring inputs
J5-1	24 VAC Input	Clogged Filter status input for indication
J5-2	No Pin	
J5-3	24 VAC Output	Output to LTB-18 used for Heat Fail input, YCs Only
J6-1	24 VAC Output	TCI Power Supply for High Temp. Switch Input
J6-2	32 VDC Output	Output to TCI Power Supply
J6-3	5 VDC Input	TCI Installed, read unit address digital input
J6-4	5 VDC Output	Transmit Data, Binary Output to TCI
J6-5	5 VDC Output	Transmit Enable, Binary Output to TCI
J6-6	32 VDC O/I (Pulsing)	Output to LTB-12, Receive data line for programmable ZSM or TCI if installed
J6-7	*Common	Digital Common to LTB-11 for programmable ZSM & TCI
J7-1	24 VAC Output	To LTB1-14 24VAC fused
J7-2	*Common	To LTB1-6 Common to ZSM LED's
J7-3	*Common	To LTB1-2 Common to ZSM / VAV setpoint panel control inputs
J7-4	32 VDC Output	To LTB-10 for ZSM Service LED/LCD
J7-5	32 VDC Output	To LTB-8 for ZSM Cool LED/LCD
J7-6	32 VDC Output	To LTB-7 for ZSM Heat LED/LCD
J7-7	32 VDC Output	To LTB-9 for ZSM Sys On LED/LCD
J7-8	5 VDC Input	To LTB1-3 ZSM Cool Setpoint / Supply Air setpoint analog input
J7-9	5 VDC Input	To LTB1-5 ZSM Heat Setpoint / MWU setpoint analog input
J7-10	5 VDC Input	To LTB1-4 ZSM Mode analog input
J7-11	5 VDC Input	To LTB1-1 ZSM Zone Temp. / Supply Air temp. analog input
J8-1	24 VAC Output	Output to CC1 (compressor contactor circuit – HPC, WTL, CCB)
J8-2	24 VAC Ground	Lockout input from CC1- measures amp draw of coil
J8-3	24 VAC Ground	Lockout input from CC2- measures amp draw of coil
J8-4	24 VAC Output	Output to CC2 (compressor contactor circuit – HPC, WTL, CCB)
J9-1, 3	24 VAC Input	Power for Compressor Contactors
J9-2, 4	Pin	Not Used
J10-1	24 VAC Input	Froststat input
J10-2	24 VAC Input	Ventilation Override Initiate (from VOR relay)
J10-3	0-10 VDC Output	IGV/VFD Pulse Width Modulating (PWM) Output to UVM J1-11

46.8. UEM Pin Descriptions & Voltages 3-50 Ton



PIN	VOLTS	INFORMATION
J1-1	5 VDC Input	Analog Reference Voltage, Input from UCP
J1-2	Common	UEM Digital Common
J1-3	Common	UEM Analog Common
J1-4	5 VDC Output	Analog Output, Communication Link to UCP
J1-5, 6, & 8	5 VDC Input	Digital Input from UCP, tells UEM what data it wants to read on Output J1-4
J1-7	No Pin	
J1-9	5 VDC Input	5 VDC Power Supply Input from UCP
J1-10	5 VDC Input	Binary Input from UCP to Drive ECA Closed
J1-11	5 VDC Input	Binary Input from UCP to Drive ECA Open
J1-12	29 VDC Output	Input from UCP Directly Controls XFP, 29 VDC present when XFC is "NOT" energized
J1-13	24 VAC Input	Input from UCP which provides power for the Humidity Sensor
J1-14	29 VDC Output	Input from UCP Directly Controls XFP, 29 VDC continuously present
J2-1	5 VDC Input	Analog Input for Supply Air Sensor
J2-2	Common	Analog Common for Supply Air Sensor
J3-1	5 VDC Input	Analog Input for Return Air Sensor
J3-2	Common	Analog Common for Return Air Sensor
J4-1	5 VDC Output	Analog Reference Voltage, Output to DFM
J4-2	5 VDC Input	Analog Input from DFM for Time/Temp Defrost, or CTS for Demand Defrost
J4-3	Common	Analog Common to DFM, or CTS for Demand Defrost
J5-1	Pin	Not Used
J5-2	No Pin	
J5-3	5 VDC Input	Active Fan Failure Switch (AFF) input (3-25); XFSP input (27.5-50)
J5-4	Common	Active Fan Failure Switch (AFF) input (3-25); XFSP input (27.5-50)
J5-5	Common	Not used
J5-7	Common	Output to ECA, internally makes connection to Common to Drive ECA Closed
J5-8	Common	Output to ECA, Internally makes connection to Common to Drive ECA Open
J6-1	29 VDC Output	Direct Output from UCP to XFC, 29 VDC continuously present
J6-2	29 VDC Output	Direct Output from UCP to XFC, 29 VDC present when XFC is "NOT" Energized
J7+	4-20 mA Input	For Return Humidity Sensor
J8+	20 VDC Input	20 VDC Supply for Return Humidity Sensor
J9+	4-20 mA Input	Outdoor Humidity Sensor
J10+	20 VDC Input	20 VDC Supply for Outdoor Humidity Sensor
J11	5 VDC Input	Analog Input for Remote Minimum Position Pot.
J12	Common	Analog Common for Remote minimum Position Pot.

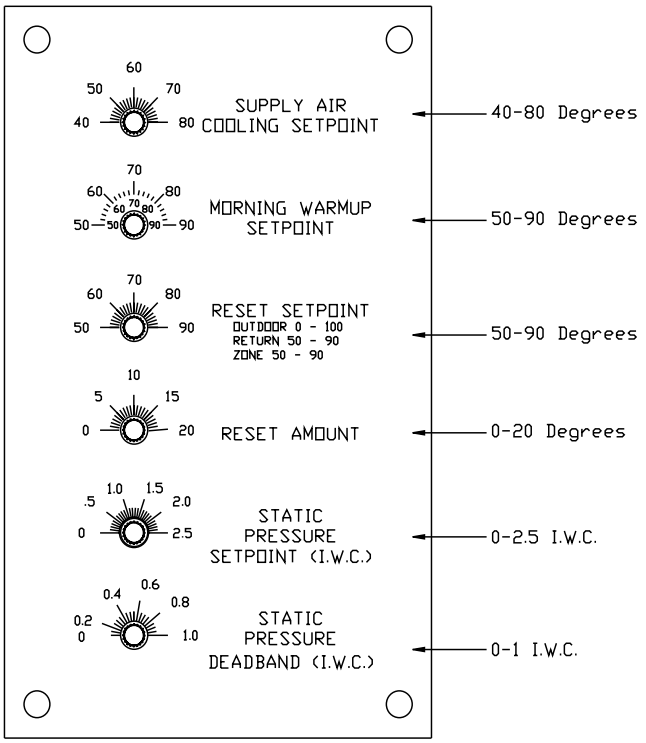
46.9. UVM Pin Descriptions & Voltages 27.5-50 Ton



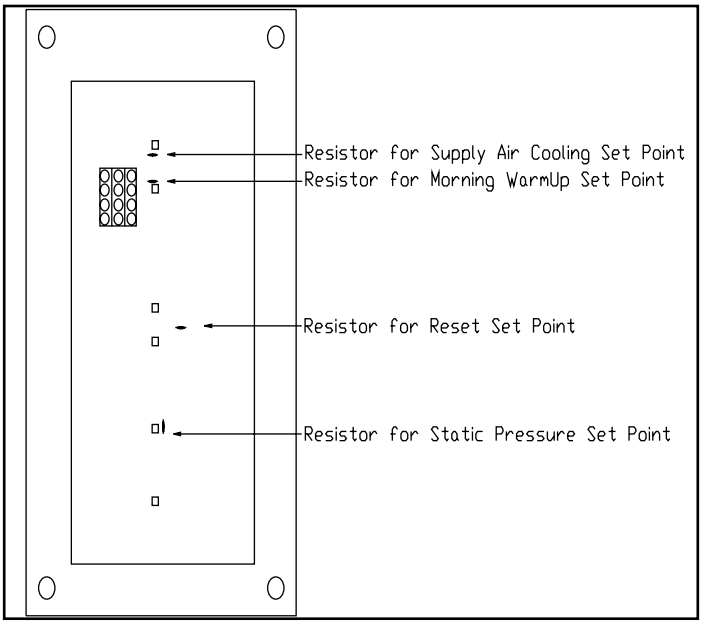
PIN	VOLTS	INFORMATION
J1-1	5 VDC Input	To LTB2-9 for analog reference voltage from UCP
J1-2	Common	To LTB2-10 Digital Common
J1-3	Common	To LTB2-9 Analog Common
J1-4	5 VDC Output	Analog Output, Communication Link to UCPJ1-15
J1-5, 6, 8	5 VDC Input	To LTB2-5, 6, 7 - Digital Input from UCP, tells UVM what data it wants to read on Output
J1-7	No Pin	
J1-9	5 VDC Input	To LTB2-11, 5 VDC Power Supply Input from UCP
J1-10	Pin	Not Used
J1-11	0-10 VDC Input	IGV/VFD PWM input from UCP J10-3
J1-12	Pin	Not Used
J1-13	24 VAC Input	To LTB2-12, Provides supply voltage for 0-10 VDC Output
J1-14	Pin	Not Used
J2-1	5 VDC Input	Analog Input for Outdoor Air Temperature
J2-2	Common	Analog Common for Outdoor Air Sensor
J3-1	5 VDC Input	Analog Input for Zone Temperature
J3-2	Common	Analog Common for Zone Temperature Sensor
J4-1	5 VDC Output	Not used
J4-2	5 VDC Input	To LTB1-5, Morning Warm Up Set Point
J4-3	Common	Not used
J5-1	Pin	Not Used
J5-2	No Pin	
J5-3	5 VDC Input	To VAV setpoint panel, Static Pressure Deadband input
J5-4	Common	To VAV setpoint panel, Static Pressure Deadband common
J5-5	Common	To IGV “B”; to VFD “Com”
J5-6	Pin	Not Used
J5-7	Pin	Not Used
J5-8	0-10 VDC Output	To IGV “W”; to VFD “AL1”
J7+	0-5 V Input	To VAV setpoint panel, Reset Amount input
J8+	Common	Analog Common for Reset Amount and Static Pressure Transducer
J9+	0-5 V Input	Static Pressure Transducer analog input
J10+	5 VDC Output	5 VDC Supply for Pressure Transducer
J11	0-5 V Input	To VAV setpoint panel, Static Pressure Set Point input
J12	Common	To VAV setpoint panel, Static Pressure Set Point common

46.10. VAV Set Point Panel 27.5-50 Ton

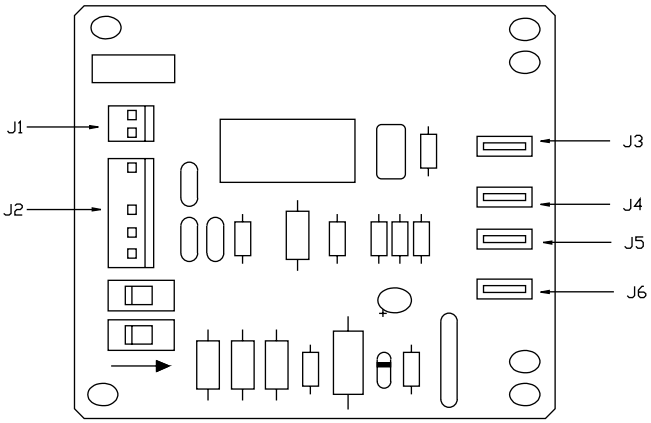
Front of Panel



Back of Panel

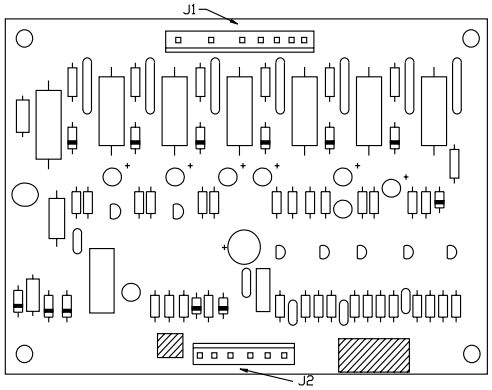


46.11. DFM Pin Descriptions & Voltages 3-20 Ton



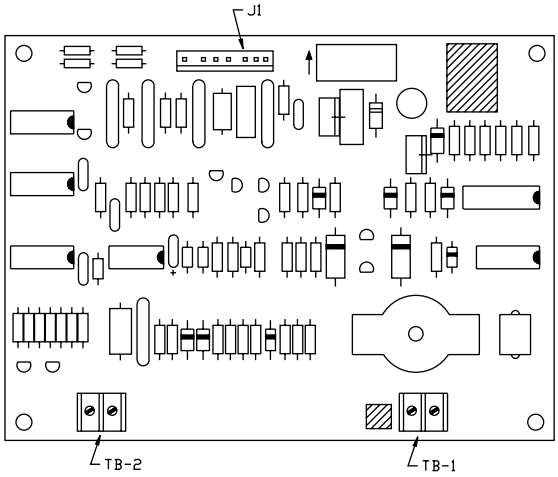
PIN	VOLTS	INFORMATION
J1-1	29 VDC Input	Input from UCP to DFM K1 Relay Coil, 29 VDC continuously present
J1-2	29 VDC Input	Input from UCP to DFM K1 Relay Coil, 32 VDC present if relay is NOT energized
J2-1	Common	Analog Common from UCP, or UEM if present
J2-2	Common	To LTB-20, DFM common
J2-3	5 VDC Output	Analog Output to UCP, or UEM if present
J2-4	No Pin	
J2-5	5 VDC Input	Analog Reference Voltage Input from UCP or UEM if present
J3	24 VAC Output	Output from DFM K1 Relay Normally Open, Energizes SOV(S)
J4	24 VAC Input	Input from TNS3 Secondary to KI Relay Contact Common, provides power to energize SOVs
J5	24 VAC Output	Not used
J6	24 VAC Input	Input from Defrost (Termination) Temperature Switch

46.12. CTI Pin Descriptions & Voltages 3-50 Ton



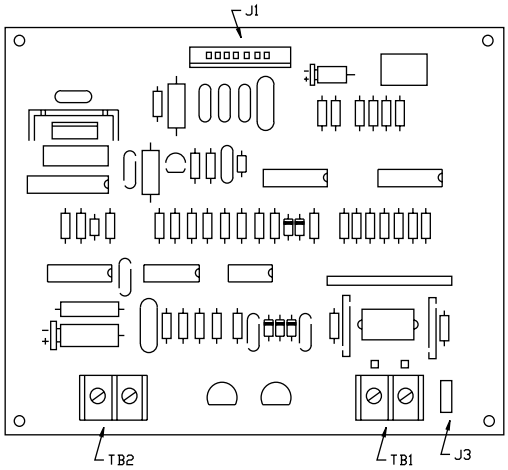
PIN	VOLTS	INFORMATION
J1-1	24 VAC Output	Output to LTB-14 (orLTB-15 prior to 06/93, provides 24VAC power to Tstat
J1-2	Not used	
J1-3	0 VAC output	Output to LTB-2, for “T” output (heat pump)
J1-2	Not Used	
J1-5	24 VAC Input	Input from LTB-8, for “O” input (heat pump)
J1-6	24 VAC Input	Input from LTB-7, for “G” input
J1-7	24 VAC Input	Input from LTB-9, for “W” input (heat pump)
J1-8	24 VAC Input	Input from LTB-3, for “X2” (heat pump) or “W2” (heat/cool) input
J1-9	24 VAC Input	Input from LTB-5, for “W1” (heat/cool) input
J1-10	24 VAC Input	Input from LTB-4, for “Y2” input
J1-11	24 VAC Input	Input from LTB-1, for “Y1” input
J2-1	Common	Output to UCP J7-2 - common
J2-2	5 VDC Output	Output to UCP J7-8 - Y1, Y2 input
J2-3	5 VDC Output	Output to UCP J7-9 - W1, W2 (heat/cool); X2, W (heat pump) input
J2-4	5 VDC Output	Output to UCP J7-11 - O (heat pump), G input
J2-5	5 VDC Output	Output to UCP J7-10 - flashing (0.8-2.5VDC)
J2-6	24 VAC Input	Provides 24VAC to CTI Output J1-1

46.13. TCI-1 Pin Descriptions & Voltages 3-50 Ton



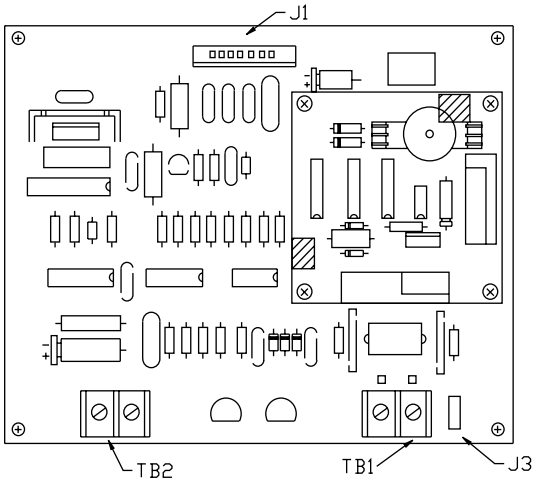
PIN	VOLTS	INFORMATION
J1-1	Common	Digital Common from UCP
J1-2	Pulsating 32VDC Output	Output to UCP, receive data line
J1-3	5 VDC Input	Transmit enable binary Input from UCP
J1-4	5 VDC Input	Transmit data, binary Input from UCP
J1-5	5 VDC Input	Digital Input from UCP. TCI Installed/Read Unit Address
J1-6	32 VDC Input	Input from UCP, TCI Power Supply
J1-7	24 VAC Input	Input from UCP provides power to TB2-2 for Output to High Temp Switches
TB-1 & 2	Pulsating 6VDC Input	Input from ICS device communication link, must be measured with an Oscilloscope
TB2-1	24 VAC Input	Input from High Temp Switches if present
TB2-2	24 VAC Output	Output to High Temp Switches if present

46.14. TCI-2 Pin Descriptions & Voltages 3-50 Ton



PIN	VOLTS	INFORMATION
J1-1	Common	Digital Common from UCP
J1-2	Pulsating 32VDC Output	Output to UCP, Receive data line
J1-3	5 VDC Input	Transmit enable, binary Input from UCP
J1-4	5 VDC Input	Transmit data, binary Input from UCP
J1-5	5 VDC Input	Digital Input from UCP, TCI Installed/Read unit address
J1-6	32 VDC Input	Input from UCP, TCI power supply
J1-7	24 VAC Input	Input from UCP provides power to TB2-2 for Output to High Temp Switches
J3	Unit Ground	Do not use
TB1-1 & 2	Pulsating 6 VDC Input	Input from ICS device communication link, must be measured with an Oscilloscope
TB2-1	24 VAC Input	Input from High Temp Switches if present
TB2-2	24 VAC Output	Output to High Temp Switches if present

46.15. TCI-3 Pin Descriptions & Voltages 3-50 Ton



PIN	VOLTS	INFORMATION
J1-1	Common	Digital Common from UCP
J1-2	Pulsating 32VDC Output	Output to UCP, receive data line
J1-3	5 VDC Input	Transmit enable, binary Input from UCP
J1-4	5 VDC Input	Transmit data, binary Input from UCP
J1-5	5 VDC Input	Digital Input from UCP, TCI Installed/Read unit address
J1-6	32 VDC Input	Input from UCP, TCI Power Supply
J1-7	24 VAC Input	Input from UCP provides power to TB2-2 for Output to High Temp Switches
J3	Unit Ground	Do not use
TB1-1 & 2	Pulsating 6 VDC Input	Input from ICS device communication link, must be measured with an Oscilloscope
TB2-1	24 VAC Input	Input from High Temp Switches if present
TB2-2	24 VAC Output	Output to High Temp Switches if present

47. Low Voltage Identification through Wire Color Coding (3-25 only)

BLACK	=	Output Or Input For Devices Not Used In Cooling Mode
BLUE	=	Common To Chassis Ground For All Low Voltage AC & DC
BROWN	=	Output Or Input For Heat Devices And Configuration
GREEN	=	Chassis Ground
PURPLE	=	Input To UCP And UEM, Binary Or Analog
RED	=	24 Volt AC Power
YELLOW	=	Cooling Function Output, Mechanical Or Economizer

Note: **Voyager 27.5-50 low voltage wires are all black.**

Wire Color	Voltage	Description And Identification
BLACK (BK) Output And Input	24 Volts AC	Output to Indoor Fan Contactor (F).
	32 Volts DC	Output to TCI, and ZSM LED's/LCD's.
	29 Volts DC	Output to UEM, DFM, and Defrost Relay (DFR).
	5 Volts DC	Output to UEM, TCI, And DFM. input to UEM from SAS.
BLUE (BL) Common	Ground	TNS1 Transformer Common, grounded All Low Voltage, Common to Ground.
BROWN (BR) Heat Output And Input	24 Volts AC	Output to 24 Volt AC Heat Controls.
	5 Volts DC	Input (Configuration) for available number of Heat Stages, TC* And WC*.
GREEN (GR)	Ground	Chassis Ground.
PURPLE (PR) Input	24 Volts AC	Input CPR1 Disable, CPR2 Disable, And Fan Filter Status (Binary).
	20 Volts DC	Input To UEM For OHS And RHS.
	5 Volts DC	Input, Binary And Analog For System Configuration And Operation. Input To UEM For RAS, And AFF.
RED (RD) 24VAC Power	24 Volts AC	Power For UCP, UEM, TCI, ECA, CTI, DFM, and Fan / Filter Status.
YELLOW (YL) Cool Output	5 Volts DC	Output To UEM To Drive ECA Open And Closed. UCP Analog Input For CTS On 3-7.5 Ton WCs Only.
	24 Volts AC	Output To CC1, CC2, LPC2, UEM, And ECA.
	29 Volts DC	Output To ODF, WCs Only.

48. General Specifications Of Control Components

Component	Voltage Range	Operating VA	Notes And Comments
(UCP) Unitary Control Processor	18-30 Volts AC, 24 VAC Nominal.	Inrush = 126 VA Sealed = 14 VA	Inrush Is Power Up With Multiple Components Energized. Sealed is Steady State VA During Normal Operation. Measure VA At Wire #32A (RED), If Manufactured Prior To 06/93 At Wire #34A (RED).
(UEM) Unitary Economizer Module	18-30 Volts AC, 24 VAC Nominal. 4.75-5.25 Volts DC, 5.0 VDC Nominal.	Inrush = 1.5 VA Sealed = 3.0 VA	Inrush is Steady State VA With Power "ON", And Dampers Not Moving (UEM LED is "OFF"). Sealed is Steady State VA With Dampers Driving Open Or Closed (UEM LED is "ON").
(UVM) Unitary VAV Module	18-30 Volts AC, 24 VAC Nominal. 4.75-5.25 Volts DC, 5.0 VDC Nominal.	Inrush = 1.5 VA Sealed = 3.0 VA	Inrush is Steady State VA.
(CTI) Conventional Thermostat Interface	18-30 Volts AC, 24 VAC Nominal.	Inrush = 12.5 VA Sealed = 12.5 VA	Power Consumption By The CTI is A Constant 12.5 VA, When Power is Applied To The Unit.
(DFM) Defrost Module (10-20 tons)	18-30 Volts AC, 24 VAC Nominal. 4.75-5.25 Volts DC, 5.0 VDC Nominal. 20.6-31.2 Volts DC, 29 VDC Nominal.	Inrush = Less Than 1.5 VA Sealed = Less Than 1.5 VA	Power Consumption By The DFM is A Constant 1.5 VA Or Less, When Power is Applied To The Unit.
(TCI) Trane Communication Interface	18-30 Volts AC, 24 VAC Nominal. 22.1-42.1 Volts DC, 32 VDC Nominal.	Inrush = 3.5 VA Sealed = 3.5 VA	Power Consumption By The TCI is A Constant 3.5 VA, When Power is Applied To The Unit.
(ECA) Economizer Actuator	18-30 Volts AC, 24 VAC Nominal.	Inrush = 8.0 VA Sealed = 4.0 VA	Inrush is Power Consumption While The ECA is Driving Open/Closed. Sealed is Power Consumption While The ECA is Stationary Or Holding A Position. Measure VA At Wire #32B (RED), If Manufactured Prior To 06/93 At Wire #34D (RED).
(IGN) Ignition Control Module	18-30 Volts AC, 24 VAC Nominal.	Inrush = 2.4 VA Sealed = 2.4 VA	Power Consumption By The IGN (Fenwal Model #05-24) is A Constant 2.4 VA, Anytime That The Heat Mode is Activated.
(IGN) Ignition Control Module	18-30 Volts AC, 24 VAC Nominal.	Inrush = 4.0 VA Sealed = 2.4 VA	Inrush is Power Consumption Of The IGN When The System is Actively Heating. Sealed is Power Consumption When The IGN is in Stand By, Or Not Actively Heating. The IGN is Always Powered (Texas Instruments Model #3HS-B4).

1. This chart is useful for locating over current problems which open UCP and transformer fuses / breakers.
2. To calculate VA, VA = Volts x Amps (Or Watts).
3. The VA consumption for individual components must be measured along with the UCP VA. Add and delete components by connecting and disconnecting plugs, adding and subtracting VA values to the base line UCP measurement.
4. All VA measurements listed in this table are worst case.

49. Microcontrol Printed Circuit Board Switch Settings

As a simplification all printed circuit boards are shipped with the on board switches set in the OFF position, this is the factory setting. The OFF position means that all switches are pushed toward the outside edge of the P.C. board.

49.1. Unitary Control Processor (UCP) Switch Setting Table

Switch 1	Switch 2	Heat Anticipation (3-50 Ton CV)	VAV Configuration (27.5-50 Ton VAV)
OFF	OFF	Normal (factory)	Inlet Guide Vanes
OFF	ON	Longer	N/A
ON	OFF	Shorter	Variable Frequency Drives
ON	ON	Special *	N/A

* The special setting is used when a very short heating cycle is required, typically used when the equipment heat capacity is over-sized for the application. This may help alleviate heating temperature swings due to over-sizing.

49.2. Unitary Economizer Module (UEM) Switch Setting Table

Switch 1	Switch 2	Dry Bulb (° F.) Temperature	Comparative Enthalpy	Reference Enthalpy
OFF	OFF	60 (factory)	19 Btu/LB dry air	D (factory)
OFF	ON	55	22 Btu/LB dry air	C
ON	OFF	65	25 Btu/LB dry air	B
ON	ON	70	28 Btu/LB dry air	A

49.3. Defrost Module (DFM) Switch Setting Table (10-20 ton)

Switch 1	Switch 2	Defrost Time Interval
OFF	OFF	70 Min. (factory)
ON	OFF	90 Min.
OFF	ON	60 Min.
ON	ON	45 Min.

49.4. Unitary Variable Air Volume Module (UVM) switch settings (27.5-50 ton)

Switch 1	Switch 2	Reset Setting
OFF	OFF	No Supply Air Temperature Reset (factory)
OFF	ON	Return Air Temperature Reset
ON	OFF	Zone Temperature Reset
ON	ON	Outdoor Air Temperature

50. UCP Configuration Input (3-25 ton)

Unit Type Configuration

Unit Type	Input J1-2	Input J1-3
TC	GND	GND
WC Time/Temp	GND	OPEN
YC	OPEN	GND
WC Demand Defrost	OPEN	OPEN

(Ground source is J1-1)

Heat Stage Configuration

Number Of Heat Stages	Input J1-19	Input J1-20
YC 1 Stage	OPEN	GND
YC 2 Stages	OPEN	OPEN
TC 0-1 Stage	GND	GND
TC 2 Stages	GND	OPEN
TC 3 Stages	OPEN	OPEN
WC 0-1 Stg Aux	OPEN	GND
WC 2 Stg Aux	OPEN	OPEN

(Ground source is J1-18)

Compressor LEAD/LAG Configuration

Enable / Disable Function	Input J1-7
Enable	OPEN
Disable	GND

(Ground source is J4-2)

Cooling Staging Configuration

Number Of Available Compressors	Input J1-4
One Compressor	GND
Two Compressors	OPEN

(Ground source is J1-1)

Condenser Fan Cycling Configuration (Outdoor temp. at which ODF2 will cycle off if present**)**

Outdoor Temp. (°F)	Input J2-5	Input J2-6	Input J2-7
80 Degrees	GND	GND	GND
70 Degrees	GND	GND	OPEN
60 Degrees	GND	OPEN	GND (factory default)
50 Degrees	GND	OPEN	OPEN
40 Degrees	OPEN	GND	GND
30 Degrees	OPEN	GND	OPEN
20 Degrees	OPEN	OPEN	GND
Continuous	OPEN	OPEN	OPEN

(Ground source is J4-2)

GND = This input must be connected as indicated. **OPEN =** This input must be open, no connection.
NOTE: Configuration is read by the UCP on power-up only.

51. UCP Configuration Input (27.5-50 ton)

Heat Configuration

Unit Type	Input J1-20	Input J1-2
Cool Only	GND	GND
Gas Heat	OPEN	OPEN
Electric Heat	OPEN	GND

(Ground source for J1-20 is J1-18)
(Ground source for J1-2 is J4-2)

Cool Configuration

Unit Type	Input J1-19
VAV	GND
CV	OPEN

(Ground source is J4-2)

Compressor LEAD/LAG Configuration

Enable / Disable Function	Input J1-7
Enable	OPEN
Disable	GND

(Ground source is J2-18)

Cooling Staging Configuration

Number Of Available Compressors	Input J1-4
2 Compressors (27.5-35 ton)	OPEN
3 Compressors (40-50 ton)	GND

(Ground source is J1-4)

Condenser Fan Cycling Configuration… See Section 10.1.2 (page 48)
NOTE: Configuration is read by the UCP on power-up only.

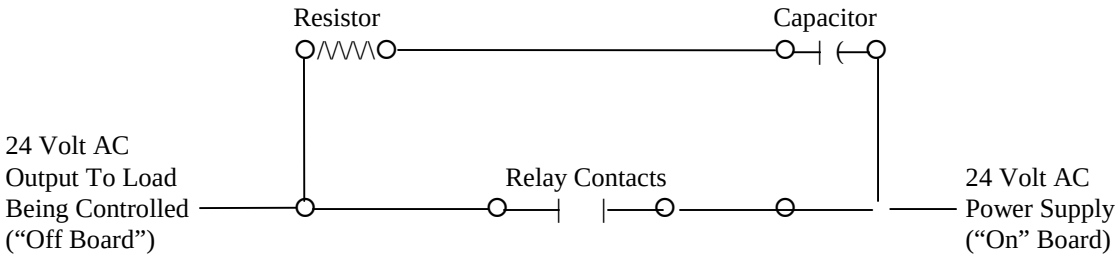
Condenser Fan Cycling Configuration

Unit Size (Tonnage)	J2-5
(27.5-35 ton)	GND
(35 ton)	OPEN
(40 ton)	GND
(50 ton)	OPEN

(Ground Source is J4-2)

52. UCP "Snubber Circuits"

The Unitary Control Processor (UCP) has up to six (6) relays located on the front of the printed circuit board. These relays are used to turn Alternating Current (AC) loads "ON" and "OFF". The purpose of the Snubber Circuit is to act as a filter; to help dampen the voltage peaks associated with the opening and closing of the relay contacts. The Snubber Circuit is a resistive / capacitor circuit, with a resistor and capacitor wired in series across the relay contacts.



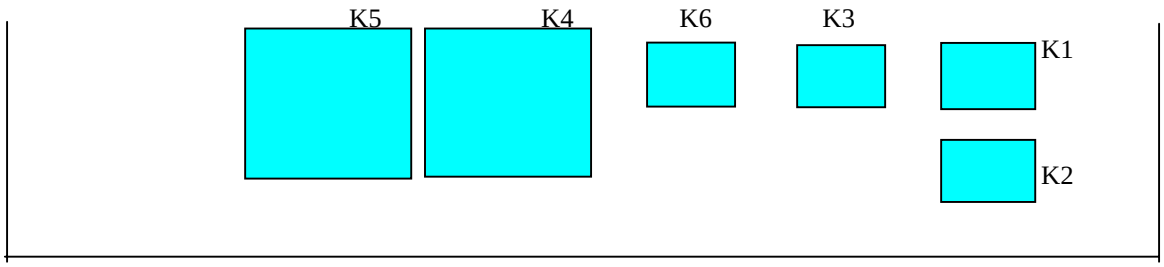
Snubber Circuits may cause confusion, because 24 VAC *will be present* if the output wire is disconnected from the load (relay or contactor coil) and the relay contacts are open. The voltage potential between the disconnected wire and ground will be 24 VAC, but no current is present. When the wire is placed back on the contactor coil, the 24 VAC potential will disappear.

The relays located on the UCP are numbered and identified as K1 through K6, the output relays are used to turn on "Off" board (24 VAC) loads such as relays and contactors. The relays are designated and dedicated as follows:

Relay #	**Relay Type**	**Contact Ratings**	**Contact Type**	**Output To Pin #**	**Relay Designation**
K1	Sealed	2A @ 24 VAC	SPDT / N.O.	J8-1	Circuit 1
K2	Sealed	2A @ 24 VAC	SPDT / N.O.	J8-4	Circuit 2
K3	Sealed	2A @ 24 VAC	SPDT / N.O.	J2-22	Supply Fan
K4	Sealed	30A @ 240 VAC	SPST / N.O.	1/4" Terminals	Condenser Fan
K5	Sealed	20A @ 240 VAC 10A @ 240 VAC	SPDT / N.O. N.C.	1/4" Terminals 1/4" Terminals	Heat 2
K6	Sealed	2A @ 24VAC	SPDT / N.O.	J1-22 J1-21	Heat 1 Common

Notes:
1. Relays K1, K2, K3 and K6 contacts are rated 5A @ 120 VAC by the manufacturer, they are de-rated to 2A @ 24 VAC.
2. Relays K1, K2, K3 and K6, there is no internal connection (on the UCP) to the N.C. contact.
3. Relay K6 common terminal is not internally powered by the UCP.

Physical Relay Location On The UCP



53. UCP Outputs To 29 - 32 Volt DC LOADS

There are two output driver chips on the Unitary Control Processor (UCP), **U5** and **U6**. They are located in the upper left-hand corner and the center of the printed circuit board respectively. These chips are used to energize and de-energize on-board and off-board DC loads.

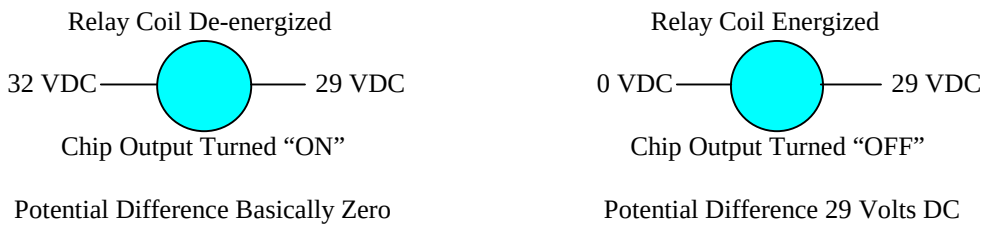
The U5 chip energizes and de-energizes the following DC loads, and the outputs have the following load limitations:

Load	Output Pin #	Maximum Output Load	Why Output Is Energized
SYSTEM LED/LCD	J7-7	27 mA (milliamps)	To turn LED or LCD "ON"
SERVICE LED/LCD	J7-4	27 mA (milliamps)	To turn LED or LCD "ON"
COOL LED/LCD	J7-5	27 mA (milliamps)	To turn LED or LCD "ON"
HEAT LED/LCD	J7-6	27 mA (milliamps)	To turn LED or LCD "ON"
Outdoor Fan #2 (ODF2)	J1-11	75 mA (milliamps)	To de-energize ODF2 (turn "OFF")
Power Slasher Relay	J1-8	75 mA (milliamps)	To de-energize relay if present
Defrost Relay (DFR)	J1-13	75 mA (milliamps)	To de-energize DFR (turn "OFF")

The U6 chip energizes and de-energizes the following DC loads, and the outputs have the following load limitations:

Load	Output Pin #	Maximum Output Load	Why Output Is Energized
K1 On Board Relay	NONE	75 mA (milliamps)	To de-energize K1 (turn "OFF")
K2 On Board Relay	NONE	75 mA (milliamps)	To de-energize K2 (turn "OFF")
K3 On Board Relay	NONE	75 mA (milliamps)	To de-energize K3 (turn "OFF")
K4 On Board Relay	NONE	75 mA (milliamps)	To de-energize K4 (turn "OFF")
K5 On Board Relay	NONE	75 mA (milliamps)	To de-energize K5 (turn "OFF")
K6 On Board Relay	NONE	75 mA (milliamps)	To de-energize K6 (turn "OFF")
Exhaust Fan Contactor (XFC)	J2-13	75 mA (milliamps)	To de-energize XFC (turn "OFF")

The U5 and U6 chip outputs for the relays are turned "ON" to de-energize the respective devices, this is done in a unique manner. This is accomplished by providing 29 Volts DC to the common side of the relay coil continuously, and when the U5 or U6 output is turned "ON", 32 Volts DC is applied to the other side of the coil, the resultant potential difference at the coil is basically zero. By turning the output "OFF", and removing the 32 Volts DC, the potential difference at the coil is 29 Volts DC. See the illustration below.



54. Software Change History

54.1. 3-25 ton UCP Identification and Software Change History

The Unitary Control Processor (UCP) software capabilities can be easily identified, by noting the "X-CODE" (purchased part number) located on the P.C. board. The X-CODE will be located in one of two places, depending upon when the board was manufactured. The first production UCP boards had the X-CODE silk screened directly on the board (X13650384). The X-CODE was located in the upper right hand corner, next to the F1 fuse. All subsequent UCPs, beginning with X13650407, will have the X-CODE printed on a sticker. The sticker will always be located in the same place, on top the K5 relay.

Version 1 X13650384 (BRD-0740)

Description: First production UCP. Used in Voyager 8.5 through 25 Ton production only.
Approximate production usage dates: 09/90 to 01/92

Version 2 X13650407 (BRD-0836) & (BRD-0838)

Description: Interim production UCP - same capabilities as Version 1, added Demand Defrost to support ASHRAE efficiency upgrade on Voyager 3 through 7.5 Ton products. **Approximate production usage dates: 11/91 to 01/92**

Version 3 X13650426 (BRD-0860)

Description: Major production UCP - with the following changes:
1. Added Demand Defrost.
2. Modified Smart Recovery - used in Heat Pumps, provides smart staging of two auxiliary heat stages.
3. Changed Supply Fan OFF Delay Time - changed from 90 to 60 seconds, in heat and cool, 3 through 7.5 Ton Heat Pumps.
4. Added Selectable Dry Bulb Change Over For Economizers - values of 55, 60 or 65° F. can be selected on UEM.
5. Added Stand Alone Unoccupied Mode - provides Set Up/Set Back and unoccupied functions, enabled by shorting LTB-11 and LTB-12 (BAYCLCK001A / ASYSTAT668A).
6. Added Sensor Only Economizer - using UEM (BAYDIAG001A), an ICS device can access supply air temperature on units without the economizer accessory.
7. Added Individual Fan Failure Detection - (AFF) Active Fan Failure Switch input (J5-3 & J5-4 on UEM), shuts down equipment, flashes SERVICE LED & alarms ICS device. **Approximate production usage dates: 01/92 to 06/93**

Version 4 X13650473 (BRD-0931)

Description: Replacement / Production UCP - issued to resolve software defrost incompatibility between X13650426 and Valera programmable ZSM when used in 3 through 7.5 Ton Heat Pumps.
The following changes were incorporated into this version:
1. Fixed defrost problem when X13650426 in 3 through 7.5 ton Heat Pumps was applied with a Valera programmable ZSM.
2. Added Comm 4 Capabilities - capable of communicating at 9600 baud, with Comfort Manager II and Tracer Summit.
3. Changed Control Loop - changed from 90 to 10 seconds.
4. Added improved anticipation - for better temperature control.
5. Changed Recovery From Set Back - eliminates over shoot.
6. Added Scroll Compressor Protection - a compressor will not run for more than two minutes on a LPC trip. On a trip during the three minute minimum ON time, the compressor will turn OFF two minutes after the trip or at the end of the three minute minimum ON time (whichever comes first).
7. Added Logic For Compressor Lockout - a compressor will be locked out if the LPC opens, during the three minute minimum on time, on four consecutive compressor starts.
8. Added Heat Pump LPC Trip Ignore Logic - an LPC trip is ignored if the outdoor temperature is below 0° F.
9. Added Gas Heat Minimum ON Time - a four minute minimum ON time was added to the heat cycle to prevent condensation, the ON time includes igniter preheat and ignition trials.
10. Added Economizer Preferred Cooling Logic - fully integrated economizer operation, compressors will not be turned on if recovering at a rate of 12° F. per hour.
11. Changed Economizer Enthalpy Change Over Dead Band - changed from +/- 4 Btu/LB dry air to +/- 1/2 Btu/LB dry air.
12. Fixed Jumping ZTEMP Analog Point - seen on ICS job sites.
13. Changed Single Compressor Unit Data - will not show compressor 2 cycling input open on ICS job sites.
14. Fixed Tracer Compressor Lock Outs - lock outs operate.
15. Emergency Heat Status Masked Out - masked out in ICS data for non-Heat Pump units.
Approximate production usage dates: 12/92 to 01/94 on Voyager 3 through 7.5 Ton Heat Pumps. Used in production for all other Voyager products 06/93 to 06/94.

Version 5 X13650508 (BRD-1007)

Description: Replacement / Production UCP - issued to resolve software defrost incompatibility between X13650473 and CTI when used in 3 through 7.5 Ton Heat Pumps. The following changes were incorporated into this version:

1. Fixed defrost problem when X13650473 in 3 through 7.5 ton Heat Pumps was applied with a CTI.

2. Added capability to defeat gas heat 4 minute minimum ON time. Systems with "NO" economizer - Pins J2-15 and J2-17 must be shorted together at the UCP, with economizer installed - Pins J4-2 and J4-3 must be shorted together at the UEM.

3. Fixed COMM4 Start Up Problem - changed address reading rate from 28 seconds to 3 seconds.

4. Fixed "Test Mode" - X13650473 enforced the gas heat 4 minute minimum ON time in Test Mode, this was removed.

5. Fixed Comfort Manager Problem - changed ECONOMIZE slave state to FAN ON when an economizer is not installed.

6. Added Condenser Fan Windmilling Fix - when changing from one condenser to two condenser fan operation, all compressor and condenser fans are turned OFF for 7 seconds, providing compressor 3 minute minimum ON time has been met. At which time condenser fan 1 & 2, and compressor 1 are turned on simultaneously, compressor 2 if required is turned on 1 second later.

7. Added 2 Minute ICS Start Up Delay - if TCI is installed, the unit will start with MODE = OFF and FAN MODE = AUTO, for 2 minutes. If the unit does not receive communications before this 2 minutes, it will start up stand alone, using local control.

8. Eliminated compressor lockout function below 50° F when using a CTI.

Approximate production usage dates: 01/94 to 12/94 on Voyager 3 through 7.5 Ton Heat Pumps. Used in production for all other Voyager products 06/94 to 06/95.

Version 6 X13650509 (MOD-0143)

Description: Replacement / Production UCP - Scheduled hardware release, coincides with Voyager 27.5-50 ton release. Minor hardware changes were, so that all equipment (3-50 Tons) could utilize the same base board. A resistor and diode were added to the U5 chip LED outputs, that protects the U5 if 24 VAC is applied to this 32 VDC circuit by chopping half of the sine wave.

Approximate production usage dates: 01/95 to 12/95 on 3-25 Ton equipment.

Version 7 X13650564 (MOD-0305)

Description: Scheduled release to support the implementation of the Texas Instruments Ignition Control (IGN) module in the Voyager product line. The following changes were incorporated into this version:

1. Fixed a bug which prevented cooling from occurring, if the zone temp. is greater than 87° F., and it is "OK" to economize.

2. Eliminated the gas heat 4 minute minimum ON time. Provides better control, eliminates overshoot due to over sizing.

3. Changed economizer supply air low limit from 45° F. to 50° F., prevents cold air from dumping out of supply air diffusers.

4. Changed filtering on supply air temperature channel, to make it faster, and to reduce the lag seen in the low limit function.

5. Added compressor "lead/lag" capability. The function ships disabled. Cutting the purple wire at UCP J1-7 enables Lead/Lag.

6. Eliminated Power Slasher (2 speed supply fan) function to free up resources needed to implement compressor lead/lag.

7. Added 1200 baud communication capabilities, allowing the programmable and digital ZSMs to enable the "Supply Air Tempering" function on a non-ICS installation.

8. Fixed a bug which prevents lockout of compressor #2 if LPC2 opens during the 3 minute minimum ON time, on 4 consecutive compressor starts.

9. Added a 3 minute delay between compressor stages (CPR2 will not be turned "ON" until CPR1 has been "ON" 3 minutes).

10. Changed supply fan start delay for gas heat operation from 45 seconds to 30 seconds (supports TIs new IGN).

11. Added incremental arbitration logic, incorporating a 5 minute delay when switching modes from heating to cooling (or vice versa). Prevents erratic temperature swings when equipment capacity is too great for application.

Approximate production usage dates: 12/95 to 8-11/96 on 3-25 Ton equipment.

Version 8 X13650591 (MOD-0380)

Description: Scheduled replacement part implementation expedited to address COMM4 communication problems.
The following changes were incorporated into this version:

1. Fixed a high temperature input nuisance problem on COMM4/Comfort Manager/wireless zone sensor applications.

2. Fixed a communication loss problem when a wireless zone sensor is used with Comfort Manager.

3. Verifies Tracer sends valid heating and cooling set points (greater than 50 ° F.).

4. Fixed a bug where the indoor fan turns off for 1 second when the outdoor fans are staging up. Now occurs only when fan mode is AUTO and it is not suitable to economize.

5. Fixed a bug where the UCP cycles Heat Pump Switch Over Valve(s) ON and OFF, when Tracer is in control, and not sending the UCP valid heating and cooling set points.

6. Fixed condenser fan wind milling bug, where cycling dead band was 64.9 - 65.0 ° F., instead of 60.0 - 65.0 ° F., causing excessive compressor cycling under these ambient conditions.

Approximate production usage dates: 08/96 to 10/96 on dual compressor models, 11/96 to 1/97 on single compressor models.

Version 9 X13650617 (MOD-0432)

Description: Replacement / Production UCP - implementation expedited to address condenser fan software glitch on 12.5, 15, and 20 ton heat pumps with dual condenser fans.

1. Fixed a bug where if the 12.5 - 20 ton heat pump "starts up" in the cooling mode, and the outdoor air temperature is between 60.0 - 65.0 ° F., no condenser fan motors are turned on. This results in the equipment locking out due to high discharge pressure.

Approximate production usage dates 10/96 to present on dual condenser fan heat pumps, 01/97 to present on all other models. Current replacement part 10/96 to present on 3-25 Ton equipment.

54.2. 27.5-50 ton UCP Identification And Software Change History

Version 1 X13650509-03 (MOD-0143)

Description: First production UCP. Used in Voyager 27.5-50 Ton production.

Approximate production usage dates: 10/94 to 12/95

Version 2 X13650564-03 (MOD-0305)

Description: Scheduled release to support the implementation of the Texas Instruments Ignition Control (IGN) module in the Voyager product line. The following changes were incorporated into this version:

1. Fixed a bug which prevented cooling from occurring, if the zone temp. is greater than 87° F., and it is "OK" to economize.

2. Eliminated the gas heat 4 minute minimum ON time. Provides better control, eliminates overshoot due to over sizing.

3. Changed economizer supply air low limit from 45° F. to 50° F., prevents cold air from dumping out of supply air diffusers.

4. Changed filtering on supply air temperature channel, to make it faster, and to reduce the lag seen in the low limit function.

5. Added compressor "lead/lag" capability. The function ships disabled. Cutting the purple wire at UCP J1-7 enables Lead/Lag.

6. Eliminated Power Slasher (2 speed supply fan) function, to free up resources needed to implement compressor lead/lag.

7. Added 1200 baud communication capabilities, allowing the programmable and digital ZSMs to enable the "Supply Air Tempering" function on a non-ICS installation.

8. Fixed a bug which prevents lockout of compressor #2 if LPC2 opens during the 3 minute minimum ON time, on 4 consecutive compressor starts.

9. Added a 3 minute delay between compressor stages (CPR2 will not be turned "ON" until CPR1 has been "ON" 3 minutes).

10. Changed supply fan start delay for gas heat operation from 45 seconds to 30 seconds (supports TIs new IGN).

11. Added incremental arbitration logic, incorporating a 5 minute delay when switching modes from heating to cooling (or vice versa). Prevents erratic temperature swings when equipment capacity is too great for application.

12. Revised so as to allow Tracer, when in control, to control the supply fan mode to either Auto or On, with the exception of when a VAV unit is in occupied mode.

13. Fixed a bug which would not allow the supply fan to come on when the economizer is called to open and Tracer is in control.

Approximate production usage dates: 12/95 to 10/96.

Version 3 X13650591-03 (MOD-0405)

Description: Replacement / Production UCP.

1. Fixed the Exhaust Fan set point problem when a NSB is installed on a CV unit. The exhaust fan would not come on until the economizer damper was at 100%.
2. Fixed the Supply Air Reset Set Point and Supply Air Reset Amount problem when ICS is installed and in control on a VAV unit. The problem is if either local SARSP or SARA fail on the VAV set point panel located in the control box, the unit will not do reset even if ICS supplies the set points.
3. Fixed a High Temp. Input nuisance problem on comm4/comfort manager/ wireless zone sensor application.
4. Implemented comm4 service mode support to be compatible with Voyager 1 & 2.
5. Added a diagnostic for failed supply air pressure sensor on VAV units. This diagnostic will flash cool and service simultaneously half a second on half a second off.
6. Verified that tracer sends a valid heat and cool set point greater than 50° F.
7. Fixed the problem with the supply fan turning off immediately on a VAV unit with gas heat when heat is on and the mode switch is turned off. The supply fan should run 90 seconds after the heat turns off even is the mode switch is turned off.
8. Added code to allow the ability to send an echelon zone temperature.
9. Fixed problem with MWU starting the fan to soon if the unit has only been in unoccupied for less than 7 minutes.
10. Removed 7FFF on VAV occupied sensor and set points in SCAN data when unit is unoccupied.
11. Fixed the supply fan 30 second delay on for gas heat units during an off mode to unoccupied transition and a call for heat.
12. Fixed counter for high duct pressure count out and clear the counter during CV operation.

13. Revised supply air pressure algorithm to reduce the IGV position by half when the pressure is greater than 1" w.c. above the supply air pressure set point.
14. Added a 5 minute waiting period when transitioning from any CV mode to a VAV occupied cooling mode.
15. VAV unit with economizer installed problem only. Fixed the economizer from being locked out during cooling periods. The problem existed when the machine had gone into an unoccupied or NSB time period and then returned to occupied VAV cooling. When unoccupied the CV economizer algorithm locked out the economizer (does not allow to open above minimum position) and then returned to the VAV occupied cooling period. The lock out is based on the zone temperature and the CV zone cooling set point, if the zone temp is not greater than the zone cooling set point – 1.5 degrees a flag is set to lockout the economizer. The VAV economizer algorithm did not clear this flag.

Approximate production usage dates 10/96 to present all 27.5-50 ton models.

54.3. 3-50 ton CTI Identification and Software Change History

On 6/93 the Voyager Low Voltage Terminal Board (LTB) was changed (the 24VAC hot terminal moved from LTB 15 to LTB 14.) The CTI itself remained the same, but the installation / wiring diagram changed. If components installed do not operate together, it will not damage the CTI or generic control, but a different wiring diagram may need to be used.

Accessory #	Usage Dates	Notes And Changes
BAYCTHI001A	06/90-03/92	Was not compatible with a Honeywell T7300 applied on a Heat Pump.
BAYCTHI001B	04/92-05/93	A resistor change was made, making the CTI compatible with T7300 / Heat Pump applications.
BAYCTHI001C	06/93-Present	Equipment LTB wiring changed, changing installers guide wiring.

Conventional Thermostat Interface (CTI) Application Matrix

The only significant change is which installer's guide to use.

Equipment Tonnage	7th Digit Unit Model	11th Digit Unit Model	Accessory Model Number	Installers Guide Required
3-7.5	C&D	A	BAYCTHI001A&B	ACCSY-IN-60/18-HE60D72
3-7.5	C&D	B	BAYCTHI001C	CTHI-IN-1 / 18-HE60D85
3-7.5	C&D	A	BAYCTHI001C	ACCSY-IN-60/18-HE60D72
3-7.5	C&D	B	BAYCTHI001A&B	CTHI-IN-1 / 18-HE60D85
8.5-25	B&C	A&B	BAYCTHI001A&B	ACCSY-IN-60/18-HE60D72
8.5-25	B	C	BAYCTHI001C	CTHI-IN-1 / 18-HE60D85
8.5-25	B&C	A&B	BAYCTHI001C	ACCSY-IN-60/18-HE60D72
8.5-25	B	C	BAYCTHI001A&B	CTHI-IN-1 / 18-HE60D85

Abbreviation Glossary - Microcontrol / ICS

Abbreviation	Name / Component	Use / Description
AFF	Active Fan Failure Switch	Accessory switch used if economizer is present.
AH	Auxiliary Heat contactor #A	Electric heat contactor.
AIP	Analog Input	A varying Microprocessor input (thermistor, potentiometer etc.).
AOP	Analog Output	A varying output from A Microprocessor or control.
BAS	Building Automation System	A controller such as Tracer or Tracker which controls multiple units and devices.
BH	Auxiliary Heat contactor #B	Electric heat contactor.
BIP	Binary Input	Provides status to a Microprocessor (typically dry contacts).
BMS	Building Management System	A controller such as Tracer or Tracker which controls multiple units and devices.
BOP	Binary Output	A Microprocessor control output, typically ON or OFF.
CC	Compressor Contactor coil	Used to energize a compressor. Often has controls in series (HPC, CCB)
CCB	Compressor Circuit Breaker	Circuit breaker used on some units to protect compressors.
CCH	Crankcase Heater	Keeps liquid refrigerant out of compressor during OFF cycle.
CCP	Central Control Panel	Controller for VariTrac bypass VAV system (ICS)
CF	Capacitor, Fan	Used on single phase fan motors.
CFM	Combustion Fan Motor	Used in all gas heat units to provide combustion air
CFS	Clogged Filter Switch	Pressure differential switch for dirty filter indication.
CPR	Compressor	Refrigerant compressor.
CPU	Central Processing Unit	The main chip On A UCP Or UCM. The computer and program resides in this chip.
CR	Compressor Run Capacitor	Used On Single Phase Compressors.
CRT	Cathode Ray Tube	Term Used To Refer To A BMS Edit Device Or Terminal.
CS	Compressor Start Capacitor	Used in optional quick-start kit for single phase compressors.
CSP	Cooling Set Point	Point at which the unit will attempt to cool (if mechanical cooling).
CSR	Compressor Start Relay	Used in optional quick-start kit for single phase compressors.
CTI	Conventional Thermostat	Accessory circuit board allows unit t be controlled from conventional thermostat or other auxiliary device.
CTL	Coil Temperature Limit	Thermostat for single phase crankcase heaters.

Abbreviation Glossary - Microcontrol / ICS

Abbreviation	Name / Component	Use / Description
CTS	Coil Temperature Sensor	Thermistor sensor used on 3-7.5 ton Demand Defrost heat pumps, Located on outdoor coil.
CV	Constant Volume	The indoor blower provides a constant volume of air, as opposed to a VAV unit which varies the quantity of air provided.
DDC	Direct Digital Control	A method by which programmable ZSM's and ICS systems digitally (as opposed to analog) transmit information.
DFM	Defrost Module	Circuit board provides time / temperature defrost on 10-20 ton heat pumps.
DFR	Defrost Relay	30VDC relay used on some heat pumps.
DTL	Discharge Temperature Limit	External limit, used to protect scroll compressors.
ECA	Economizer Actuator	The actuator which controls the economizer or motorized damper.
F	Indoor Fan Contactor	24VAC relay used to control the indoor fan motor.
F1	UCP Fuse	BUSS MDL4 or MDL3 fuse located on the upper right corner of the UCP. Provides protection for AC loads and the UCP.
FFS	Fan Failure Switch	Pressure differential switch for fan failure indication or Active Fan Failure, depending on where it is connected..
FU	Fuse	Typically used to fuse ignition and electric heater circuits.
FTB	Fan Terminal Board	Junction which connects indoor motor wiring to power wiring harness.
GV	Gas Valve	Used with natural and LP gas in all Gas/electric units.
H	Heat relay	Relay used with 2 speed combustion blower motors.
HPC	High Pressure Control	Safety control in series with compressor contactor on some units.
HSP	Heating Set Point	Point at which the unit will attempt to heat.
HTB	High Voltage Terminal Block	Terminal block for equipment primary voltage connections.
ICS	Integrated Comfort System	Building controls and devices which communicate with each other to provide an integrated HVAC system. Examples are Tracer, Tracker, and VariTrac.
IDM	Indoor Fan Motor	Supply air fan motor.
IGN	Ignition Control Module	Solid state ignition control for gas heat units.
IGV	Inlet Guide Vanes	Used on VAV units to vary air volume with a constant speed motor.
IGVA	Inlet Guide Vane Actuator	The actuator which controls the vanes

Abbreviation	Name / Component	Use / Description
IP	Ignition Probe	Hot surface ignitor, also acts as flame sensor.
IPR	Internal Pressure Relief	Pressure relief used in scroll and Climatuff compressors; eliminates requirement for HPC.
J…	Junction	Connection pins for wire harness connection on all circuit boards.
K4	UCP outdoor fan relay	UCP on-board relay for condenser fan on some units.
K5	UCP heat relay	UCP on-board relay energizes heat on some units.
LCD	Liquid Crystal Display	Display type used programmable ZSM's.
LED	Light Emitting Diode	Method of indication used on circuit boards and mechanical ZSM's.
LPC	Low Pressure Control	Compressor protection device.
LTB	Low Voltage Terminal Board	Customer connection point for Zone Sensor Module and accessories.
MWS	Morning Warmup Setpoint	Control point for heating and mode change on VAV units
MWU	Morning Warm Up	A heat mode which occurs at the beginning of an occupied mode when enabled.
OAS	Outdoor Air Sensor	Thermistor sensor on all Microcontrol units.
ODF	Outdoor Fan (relay)	Controls #2 outdoor fan motor.
ODM	Outdoor Motor	Condenser Fan Motor.
OHS	Outdoor Humidity Sensor	Optional economizer sensor.
P…	Wiring harness *Plug*	Connection harness for pin connections on all circuit boards.
PPF	Polarized Plug Female	Connects to Polarized Plug Male "PPM".
PPM	Polarized Plug Male	Connects to Polarized Plug Female "PPF".
RAS	Return Air Sensor	Used with optional differential enthalpy accessory.
RHS	Return Humidity Sensor	Used with optional differential enthalpy accessory
RMP	Remote Minimum Position	Optional potentiometer used to provide remote setting.
RTU	Roof Top Unit	Package AC units such as Voyager
SAS	Supply Air Sensor	Comes standard with economizer.
SOV	Switch Over Valve	24VAC reversing valve for heat pumps.
SPS	Supply Static Setpoint	Supply pressure at which VIII VAV drive controls to.
SPT	Supply Pressure Transducer	Provides input to UVM for VAV control.
TCI	Trane Communications Interface	Accessory circuit board required to interface unit to ICS device.

Abbreviation	Name / Component	Use / Description
TCM	Thermostat Control Module	Generic microprocessor-based ICS equipment controller.
TCO1	High Limit Cutout	Protection device in packaged gas / electric units.
TCO2	Fan Failure Limit	Protection device in packaged gas / electric units.
TNS	Transformer	Used for control power and ignition on packaged gas / electric units.
UCM	Unit Control Module	Generic term for a Micro-control such as the UCP.
UCP	Unitary Control Processor	Circuit board (Micro-control) in Voyager units.
UEM	Unitary Economizer Module	Circuit board located in Economizer section on 3-25 ton; located in control panel on 27.5-50 ton.
UVM	Unitary VAV Module	Circuit board for 27.5-50 ton VAV units.
VI	Voyager One	3-7.5 ton constant volume package units.
VII	Voyager Two	8.25-25 ton constant volume package units.
VIII	Voyager Three	27.5-50 ton constant volume & VAV package units.
VAV	Variable Air Volume	VIII VAV unit uses Inlet Guide Vanes or Variable Frequency Drive to vary the amount of supply air delivered.
VAV, Bypass		A VAV system using a Constant Volume unit with a bypass damper – such as VariTrac.
VFD	Variable Frequency Drive	A motor controller option for the VIII VAV units.
VOR	Ventilation Overide Relay	Relay which controls VAV boxes on VIII VAV units.
ZFSP	Exhaust Fan SetPoint	Setpoint at which exhaust fan(s) turn on (VIII units).
ZSM	Zone Sensor Module	Operator interface similar to a thermostat.
ZTEMP	Zone Temperature	Thermistor sensor In ZSM, provides zone temp. input to UCP.

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