



ClimateMaster TRANQUILITY DIGITAL PRODUCTS

Mike Hammond

January 2013

CLIMATEMASTER PRODUCTS

2011



<u>Product Group</u>	<u>Current</u>
Package 30	<i>TT Rev A</i>
Package 20	<i>TS Rev A</i>
Split Outdoor	<i>TTP Rev A</i>
Split Indoor	<i>TTS Rev A</i>
Air Handler	<i>TAH Rev A</i>
Cased coil	<i>TAC</i>
Med temp WW	<i>TMW Rev A</i>
High temp WW	<i>THW</i>

CLIMATEMASTER PRODUCTS

2013 January



	DXM2
	CXM

Product Group	Family	2011	Next Gen	Change
Water-Air Packaged	Package 30 <i>Digital</i>		TE	iGate, vFlow on TT; No ClimaDry; New layout inside; Microchannel on 038
	Package 30	TT Rev A	TT Rev B/C	Higher efficiency; Microchannel on 038

CLIMATEMASTER PRODUCTS

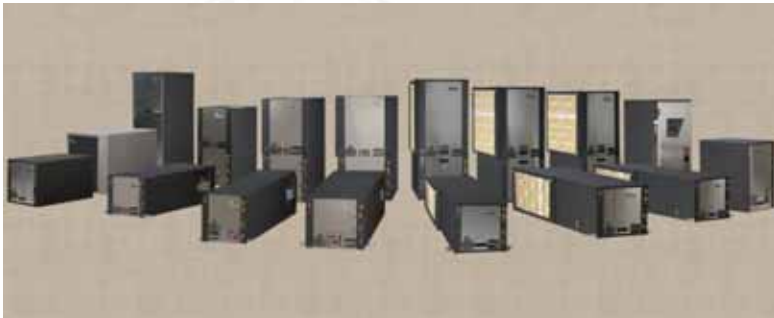
2013 January



	DXM2
	CXM

Product Group	Family	2011	Next Gen	Change
Water-Air Packaged	Package 30 <i>Digital</i>		TE	iGate, vFlow on TT; No ClimaDry; New layout inside; Microchannel on 038
	Package 30	TT Rev A	TT Rev B/C	Higher efficiency; Microchannel on 038
	Package 22 <i>Digital</i>		TZ REV B	New Product (REV B = new coax on 024, 036 and 060)
	Package 20	TS Rev A	TS Rev A	
Water-Air Splits	Split Outdoor Digital		TEP	iGate, vFlow on TTS; New layout inside
	Split Indoor Digital		TES	iGate, vFlow on TTP; New layout inside
	Split Outdoor	TTP Rev A	TTP Rev A	
	Split Indoor	TTS Rev A	TTS Rev A	
	Air Handler	TAH Rev A	TAH Rev B	iGate (AXM board) on TAH REV A
	Cased coil	TAC	TAC	
Water-Water	Med temp WW	TMW Rev A	TMW Rev A	
	High temp WW	THW	THW	

TRANQUILITY DIGITAL TOP 2 Selling points



Highest Efficiency = Lowest operating cost

Up to 29.6 EER/4.8 COP + 60-80% reduction in pumping watts



Quickest installation

Easiest Troubleshooting

TRANQUILITY® 30 DIGITAL BIG Changes – sales / competitive



- Up to 30 EER / 4.8 COP (Most Efficient of ENERGY STAR)
- Lowest operating cost in industry including pumping op cost
- Capacities: 2, 3, 4, 5, 6 ton
- Same size as TT27, Stainless panels, 2" MERV 11 filter
- Comfort comes standard with Copeland 2-stage compressor / Emerson ECM motor
- vFlow™ Variable Water Flow Standard – save 2-3 hours in installation and 60-80% on pumping operating cost (w/VS pump models)
- iGate™ Information gateway Standard – Monitor, Control and Diagnose from the thermostat with 4-wire connection.
- No ClimaDry® (will be available at a later date)

TRANQUILITY[®] 22 DIGITAL BIG Changes – sales / competitive



- Up to 22 EER / 4.1 COP (qualifies for *Federal Tax Credit*)
- Capacities: 2, 2.5, 3, 3.5, 4, 5 ton
- Compact size, Bond silver finish, 1" filter MERV 8
- Copeland 2-stage compressor / Emerson ECM motor standard @ / near Single Stage price
- vFlow – internal variable speed water control
- iGate - Industry's first true 4-wire, two-way communicating system
- No Downflow configuration
- No ClimaDry[®]
- External Auxiliary heat (vertical)

TRANQUILITY DIGITAL SPLITS

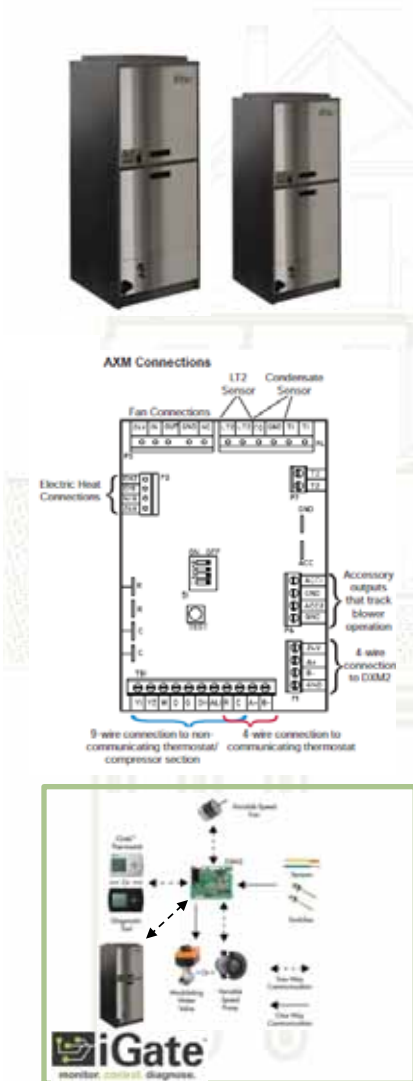
BIG Changes – sales / competitive



- Up to 26.3 EER / 4.6 COP
- Lowest operating cost in industry including pumping op cost
- Capacities: 2, 3, 4, 5 ton
- vFlow™ Variable Water Flow Standard – save 2-3 hours in installation and 60-80% on pumping operating cost (w/VS pump models)
- iGate™ Information gateway Standard – Monitor, Control and Diagnose from the thermostat with 4-wire connection.
- TES has same design as compressor section of TE
- Still ship with LT2 sensor to connect to non-communicating air handler/ furnaces
- Improved water connections in TEP (vs TTP)

CLIMATEMASTER®
Geothermal Heat Pump Systems

An LSB Industries, Inc. Company (NYSE: LXU)



- *New* AXM communicating board
 - 4-wire connection to communicating compressor section and thermostat (and fan motor)
 - Optional 9-wire connection to non-communicating compressor section and thermostat
 - No dip switches to set airflow – connect communicating thermostat (ATC) or Diagnostic tool (ACD) to AXM or DXM2 board to configure airflow
- Capacities: 2, 3, 4, 5 ton
- More airflow options – increments of 25 CFM in 9-modes
- Configure, monitor and Diagnose from connection to DXM2 or AXM
- Comes standard with LT2 sensor installed and connected to AXM board

TRANQUILITY® DIGITAL PACKAGED

BIG Changes – install / service



1. vFlow: Built-in VARIABLE Water Flow

2. iGate Information Gateway: Configure, Monitor and Diagnose at Thermostat



3. Swing-out control box – access to components

4. 4-wires between thermostat and unit

5. External auxiliary heater (TZ only)

6. External condensate trap

7. High/Low refriger. Pressure ports – easy access

CONTROL STATUS		
PUMP OPERATION		
PUMP	SPEED	60 %
PUMP	WATTS	140
FLOW	RATE GPM	7.4
◀ PREVIOUS		

AIRFLOW SELECTION		
CFM		
HEAT	STAGE 1	600
HEAT	STAGE 2	750
AUXILIARY	HEAT	850
EMERGENCY	HEAT	850
COOL	STAGE 1	525
COOL	STAGE 2	700
COOL	DEHUM 1	425
COOL	DEHUM 2	550
CONTINUOUS	FAN	350
HEAT	OFF DELAY	60
COOL	OFF DELAY	30
◀ PREVIOUS NEXT ▶		



TRANQUILITY DIGITAL SPLITS

BIG Changes – install / service



1. vFlow: Built-in VARIABLE Water Flow



2. iGate Information Gateway: Configure, Monitor and Diagnose at Thermostat

Swing-out control box – access to components (TES)

CONTROL STATUS		
PUMP OPERATION		
PUMP	SPEED	60 %
PUMP	WATTS	140
FLOW	RATE GPM	7.4
◀ PREVIOUS		

4. 4-wires between thermostat, Compressor section and air handler

AIRFLOW SELECTION		
HEAT	STAGE	1
HEAT	STAGE	2
AUXILIARY	HEAT	85.0
EMERGENCY	HEAT	85.0
COOL	STAGE	1
COOL	STAGE	2
COOL	DEHUM	1
COOL	DEHUM	2
CONTINUOUS	FAN	35.0
HEAT	OFF	DELAY
COOL	OFF	DELAY
◀ PREVIOUS NEXT ▶		

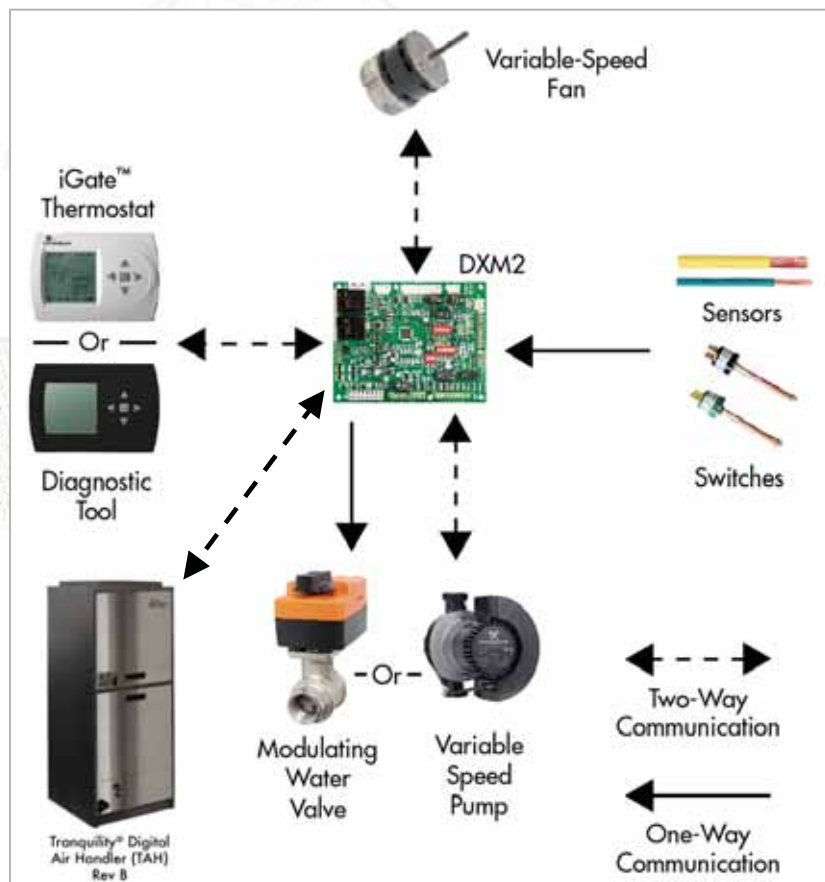
5. High/Low refig. Pressure ports – easy access

6. 4-wire connection to External HWG (TEP)



TRANQUILITY DIGITAL SPLITS

iGate™ System



Next generation in Intelligent Controls

Uses 2-way communication to provide GATEWAY into the system

Monitor, Configure (without touching the unit) and Diagnose issues, all from the thermostat

DXM2 intelligent controller is the communications hub - analyzes status of sensors and smart components to optimize operation for comfort, efficiency and long-term reliability

Information is passed to the iGate thermostat (or diagnostic tool) to be displayed in PLAIN English

Future accessories for communication over the Internet

TRANQUILITY DIGITAL SPLITS

iGate Information Gateway



Configure

AIRFLOW SELECTION			
HEAT STAGE 1			CFM
HEAT STAGE 2			6000
AUXILIARY HEAT			7500
EMERGENCY HEAT			8500
COOL STAGE 1			5250
COOL STAGE 2			7000
COOL DEHUM 1			4250
COOL DEHUM 2			5500
CONTINUOUS FAN			3500
HEAT OFF DELAY			60
COOL OFF DELAY			30
◀ PREVIOUS		SELECT ▶	

CONFIGURE:

CFM, Water ΔT

Unit info. + Accessory configuration

Water circuit option

MONITOR:

Entering / Leaving Water Temperature

GPM (w/ IFC)

Leaving Air Temperature

Compressor discharge temperature

Blower RPM

Monitor

SYSTEM STATUS			
LT1 TEMP			38.1
LT2 TEMP			79.9
COMP DISCHARGE			157.7
HOT WATER EWT			121.5
LEAVING AIR			75.1
LEAVING WATER			73.3
ENTERING WATER			78.5
ECM BLOWER RPM			5500
ECM TARGET CFM			8000
ECM BLWR STATIC			0.5
PUMP WATTS			140
FLOW RATE GPM			7.4
PUMP SPEED			60%
◀ PREVIOUS		SELECT ▶	

DIAGNOSE:

Fault code

Fault History

Conditions AT TIME OF FAULT!

Diagnose

FAULT STATUS	
ACTIVE FAULT	
NO FAULT	
LAST 5 FAULTS	
LT1 LOW WATER TEMP	
NO FAULT	
NO FAULT	
NO FAULT	
NO FAULT	
◀ PREVIOUS	SELECT ▶

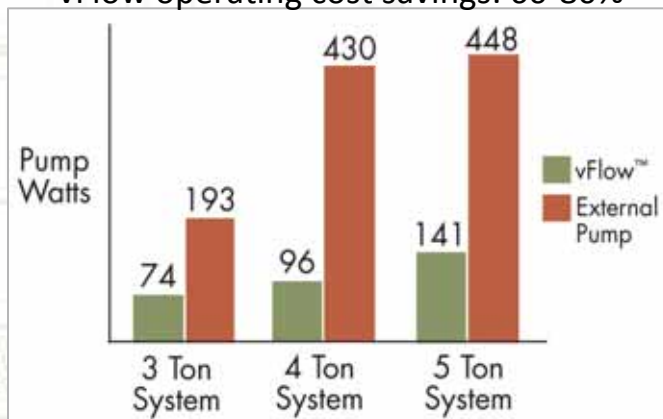
FAULT CODE #2	
HIGH REFRIG PRESSURE	
DIRTY FILTER-HEATING	
LOW AIR FLOW-HEATING	
LOW WATER FLOW-CLO	
OVERCHARGED	
BAD PRESSURE SWITCH	
◀ PREVIOUS	SELECT ▶

TRANQUILITY DIGITAL SPLITS

vFlow Variable Water Flow



vFlow operating cost savings: 60-80%



Major advance in geothermal system performance made possible by iGate™ system

Builds the major water circulation components right into the unit and Varies water flow to

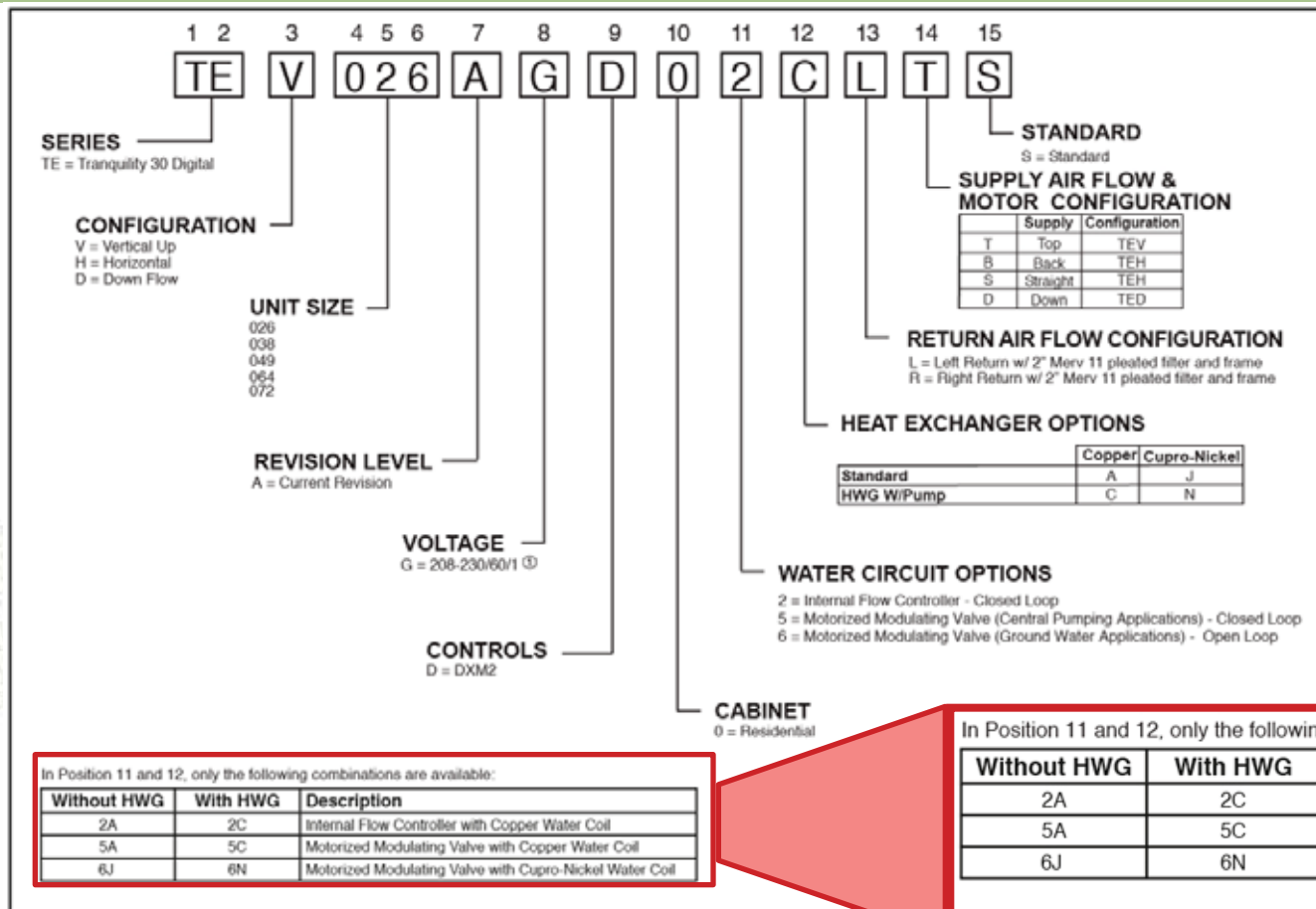
- Minimize pump energy consumption
- Improve system reliability
- Save on installation time
- Make for a very clean and compact installation.

Water flow is automatically varied to maintain optimum system performance based on:

- Changes in unit capacity level (stage)
- Source water temperature

Protects the unit against extreme operating conditions, extending the life of the compressor and air coil

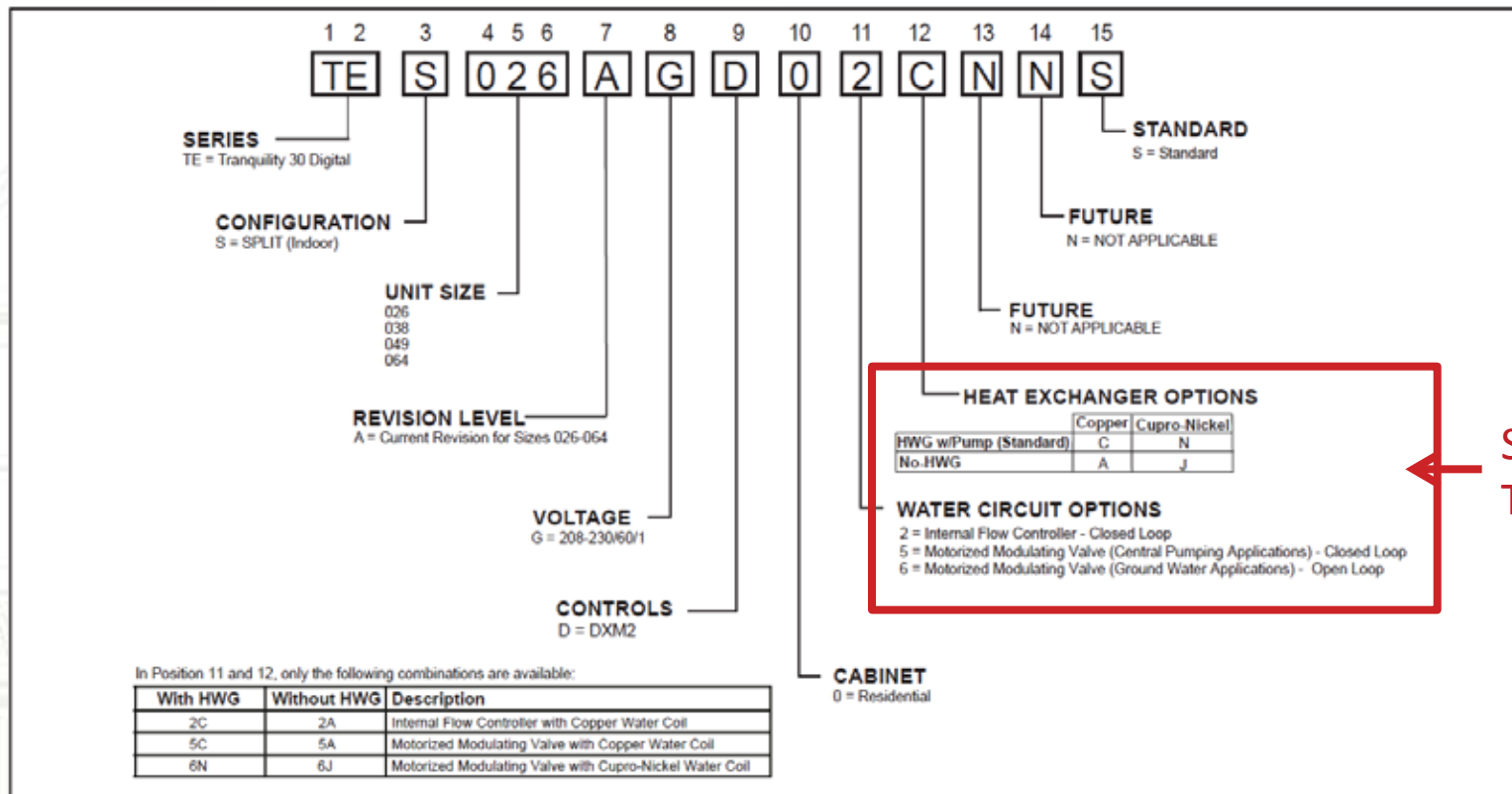
TRANQUILITY® 30 DIGITAL Models



Only these water circuit and heat exchanger combinations are available

TRANQUILITY DIGITAL SPLITS

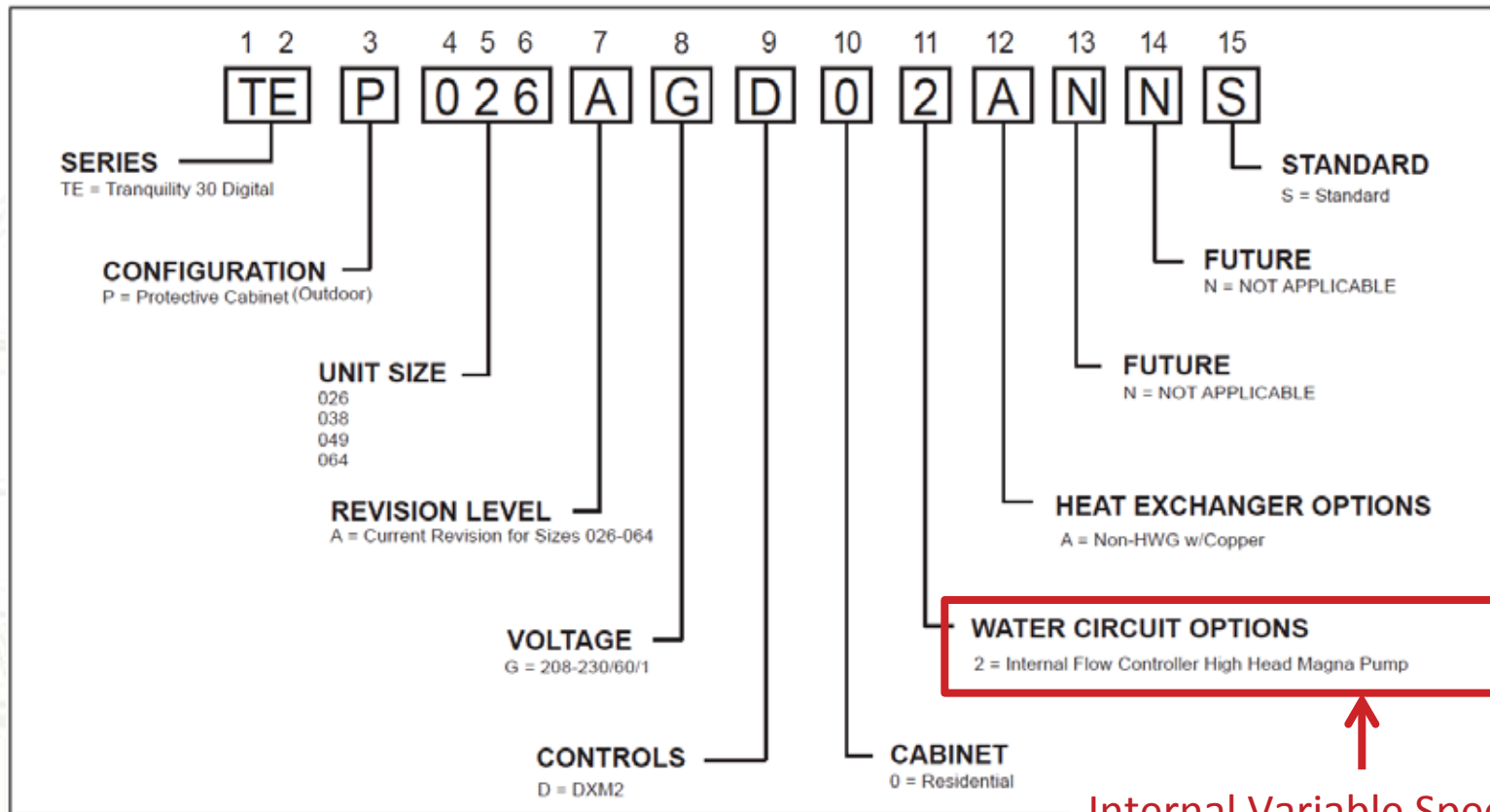
Nomenclature



Same as
TE

TRANQUILITY DIGITAL SPLITS

Nomenclature - TTP



Internal Variable Speed flow controller (with copper coil) option only

TRANQUILITY® PACKAGED

System comparisons



System Comparison

- Standard
- Optional

		Indoor Split		Outdoor Split	
		Tranquility® 27 Digital (TES)	Tranquility® 27 (TTS)	Tranquility® 27 Digital (TEP)	Tranquility® 27 (TTP)
Efficiency*	Cooling	26.3	26.2	26.3	26.2
	Heating	4.6	4.7	4.6	4.7
ENERGY STAR Designation		Most Efficient	Tier 3	Most Efficient	Tier 3
30% Federal Tax Credit Eligible		Yes	Yes	Yes	Yes
Compressor		Two Stage	Two Stage	Two Stage	Two Stage
Front panel		Stainless Steel	Stainless Steel	Painted	Painted
vFlow™ Internal Variable Water Flow		●		●	
External Fixed Speed Flow Controller			○		●
iGate™ Communicating System		●		●	
Non-Communicating Electronic Controls			●		●
Hot Water Generator	Built-In	○	○		
	Accessory			○	○
Warranty - 10-Year Parts; 5-Year Labor Allowance		●	●	●	●
Warranty - 10-Year Parts; 10-Year Labor Allowance		○	○	○	○

*When matched with Tranquility® Air Handler

TRANQUILITY SPLITS

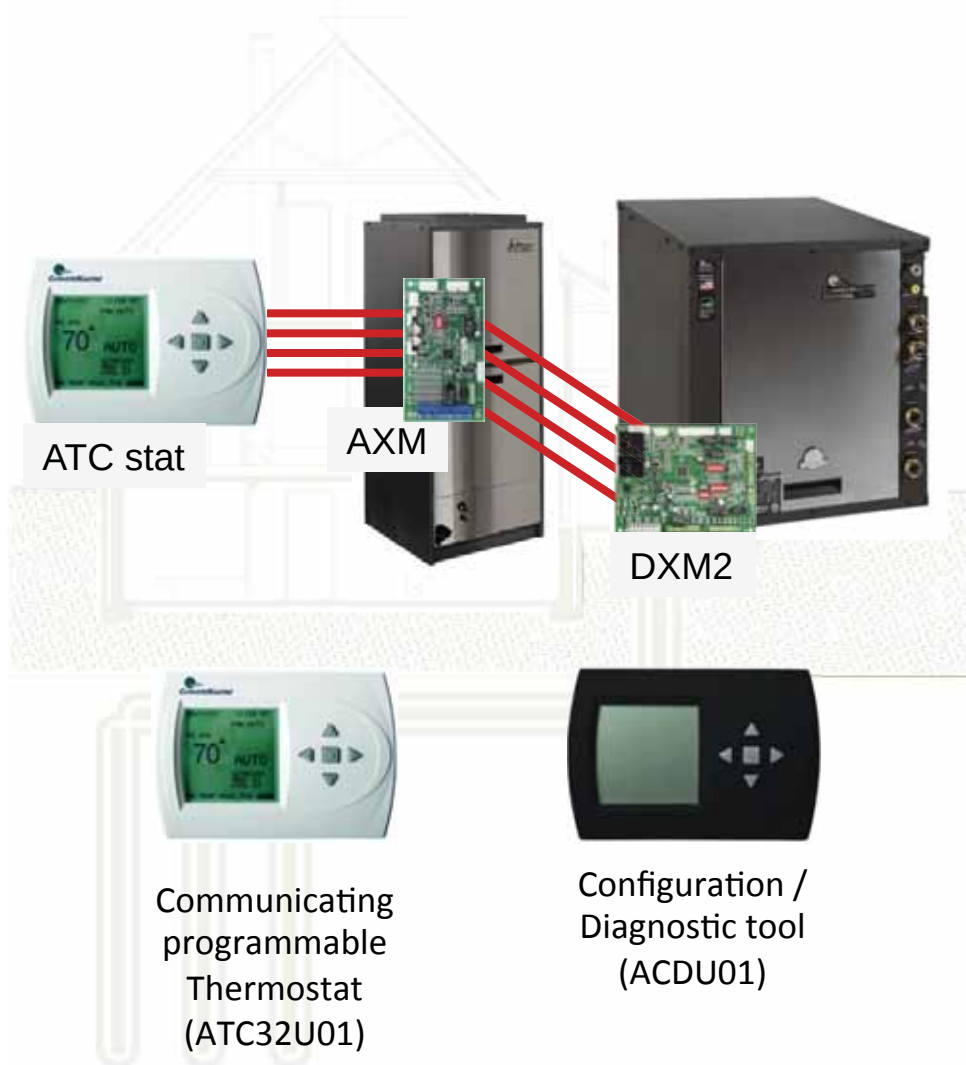


Tranquility® Split Series ● Standard ○ Optional		Tranquility® 27 Digital (TES)	Tranquility® 27 (TTS)	Tranquility® 27 Digital (TEP)	Tranquility® 27 (TTP)
Tranquility® Compressor Section		Indoor Split		Outdoor Split	
Efficiency*	Cooling	26.3	26.2	26.3	26.2
	Heating	4.6	4.7	4.6	4.7
ENERGY STAR Designation		Most Efficient	Tier 3	Most Efficient	Tier 3
30% Federal Tax Credit Eligible		Yes	Yes	Yes	Yes
Compressor		Two Stage	Two Stage	Two Stage	Two Stage
Front panel		Stainless Steel	Stainless Steel	Painted	Painted
vFlow™ Internal Variable Water Flow		●		●	
External Fixed Speed Flow Controller			○		●
iGate™ Communicating System		●		●	
Non-Communicating Electronic Controls			○		●
Hot Water Generator	Built-in	○	○		
	Accessory			○	○
Warranty - 10-Year Parts; 5-Year Labor Allowance		●	●	●	●
Warranty - 10-Year Parts; 10-Year Labor Allowance		○	○	○	○

* When matched With Tranquility® Air Handler

TRANQUILITY DIGITAL SPLITS

iGate Information Gateway

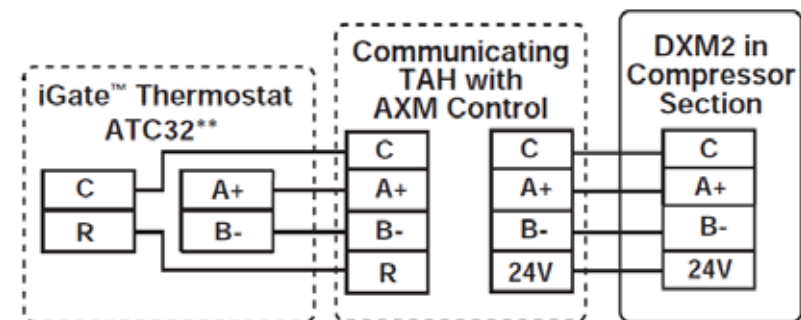


4-wires to thermostat

Need either CONFIGURATION / DIAGNOSTIC tool (ACDU01) or Communicating stat (ATC32U01) to configure / troubleshoot

Integrates ECM and HWG boards

Fewer Dip Switches to configure (not needed for most initial configuration)

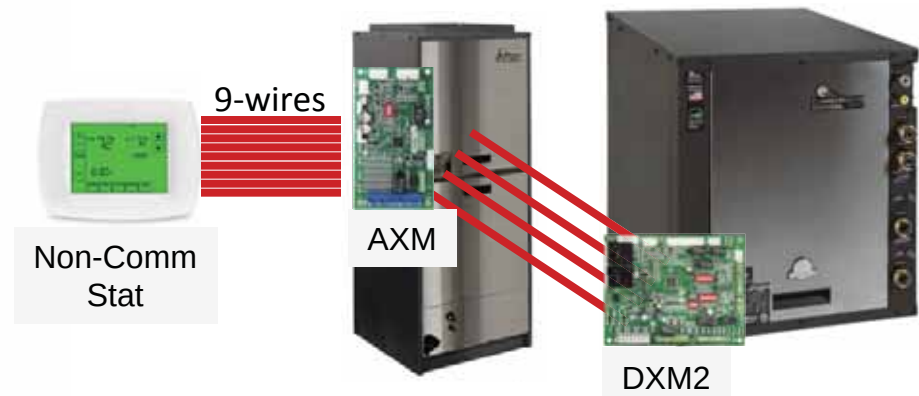


TRANQUILITY DIGITAL SPLITS

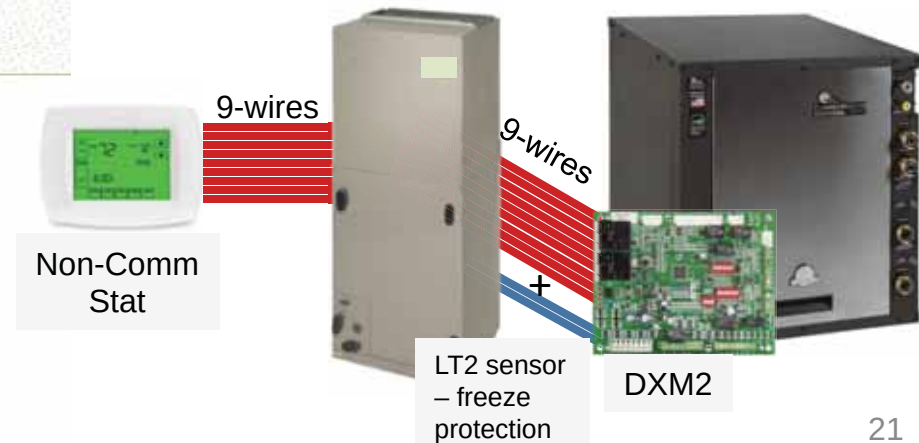
Non-communicating connections



Option 1: non-communicating thermostat,
communicating split, air-handler



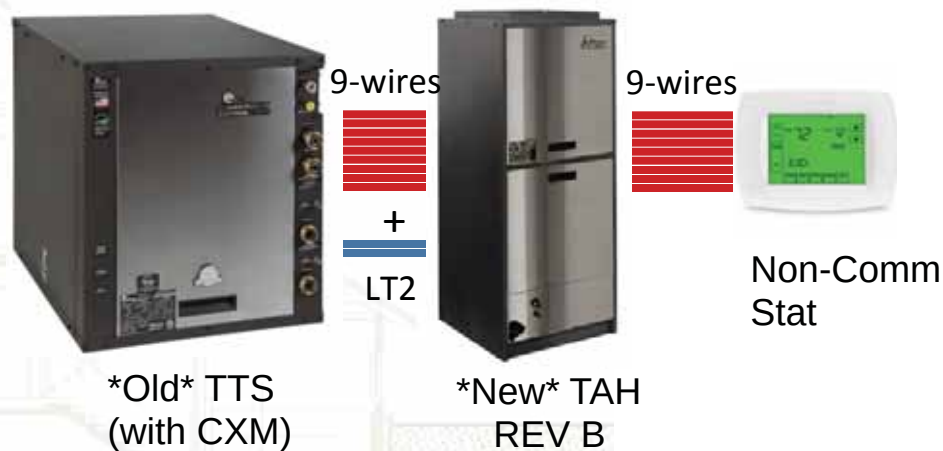
Option 2: non-communicating thermostat,
non-communicating air-handler



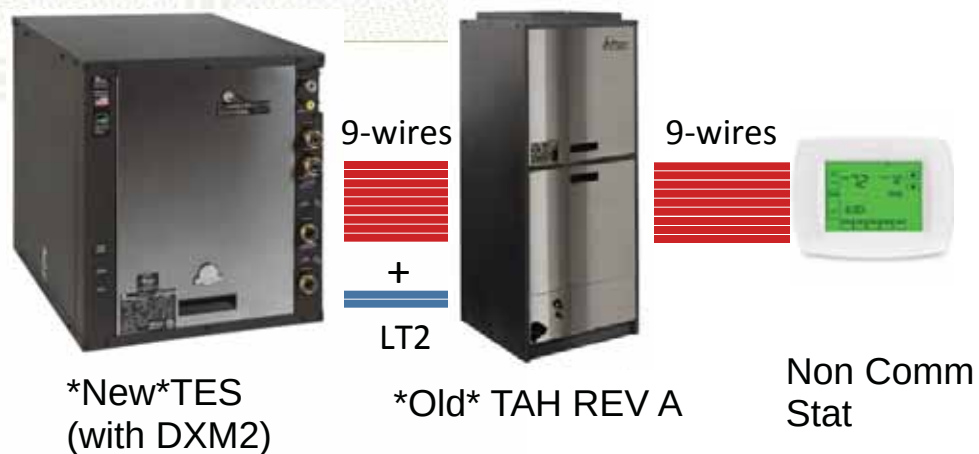
LT2 sensor is shipped on both TES and TEP

FIELD REPLACEMENT

Scenario 1:



Scenario 2:



TRAINING - Videos

TRAINING

VIDEOS

- SALES
- INSTALLATION
- TROUBLESHOOTING / SERVICE
- NEW COMMUNICATING CONTROL
- PLUG & PLAY (INTERNAL WATER FLOW CONTROL)

Troubleshooting / Service Videos

- Name
- [DXM2 Unit Fault Code 1](#)
 - [DXM2 Unit Fault Code 2](#)
 - [DXM2 Unit Fault Code 3](#)
 - [DXM2 Unit Fault Code 4](#)
 - [DXM2 Unit Fault Code 5](#)
 - [DXM2 Unit Fault Code 6](#)
 - [DXM2 Unit Fault Code 8](#)
 - [DXM2 Unit Fault Code 9](#)
 - [DXM2 Unit Fault Code 10](#)
 - [DXM2 Unit Fault Code 11](#)
 - [DXM2 Unit Fault Code 12](#)
 - [Water Side Analysis Procedures](#)
 - [Coax Replacement Procedures - Part 1](#)
 - [Coax Replacement Procedures - Part 2](#)
 - [Butt Fusion Procedures](#)

- Significantly enhanced videos at:
http://residential.climatemaster.com/dealers_area/training.html
- Sales, Installation, Troubleshooting sections
- Walk through fault codes
- Can reach YouTube videos only through link on website
- More to come..*

DXM2 controller



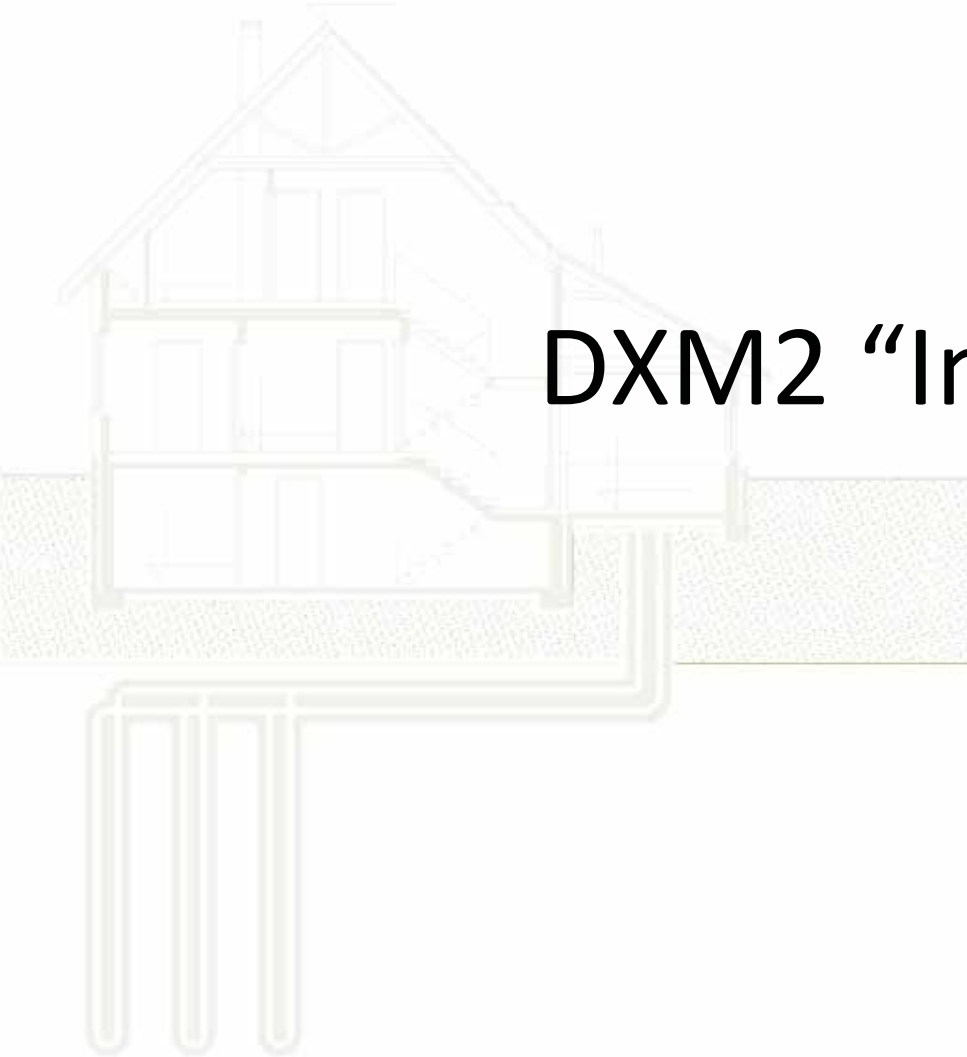
N02

Original version
Still in production on TZ, TE
3 silver and 2 yellow dots
Version 1.2



N05

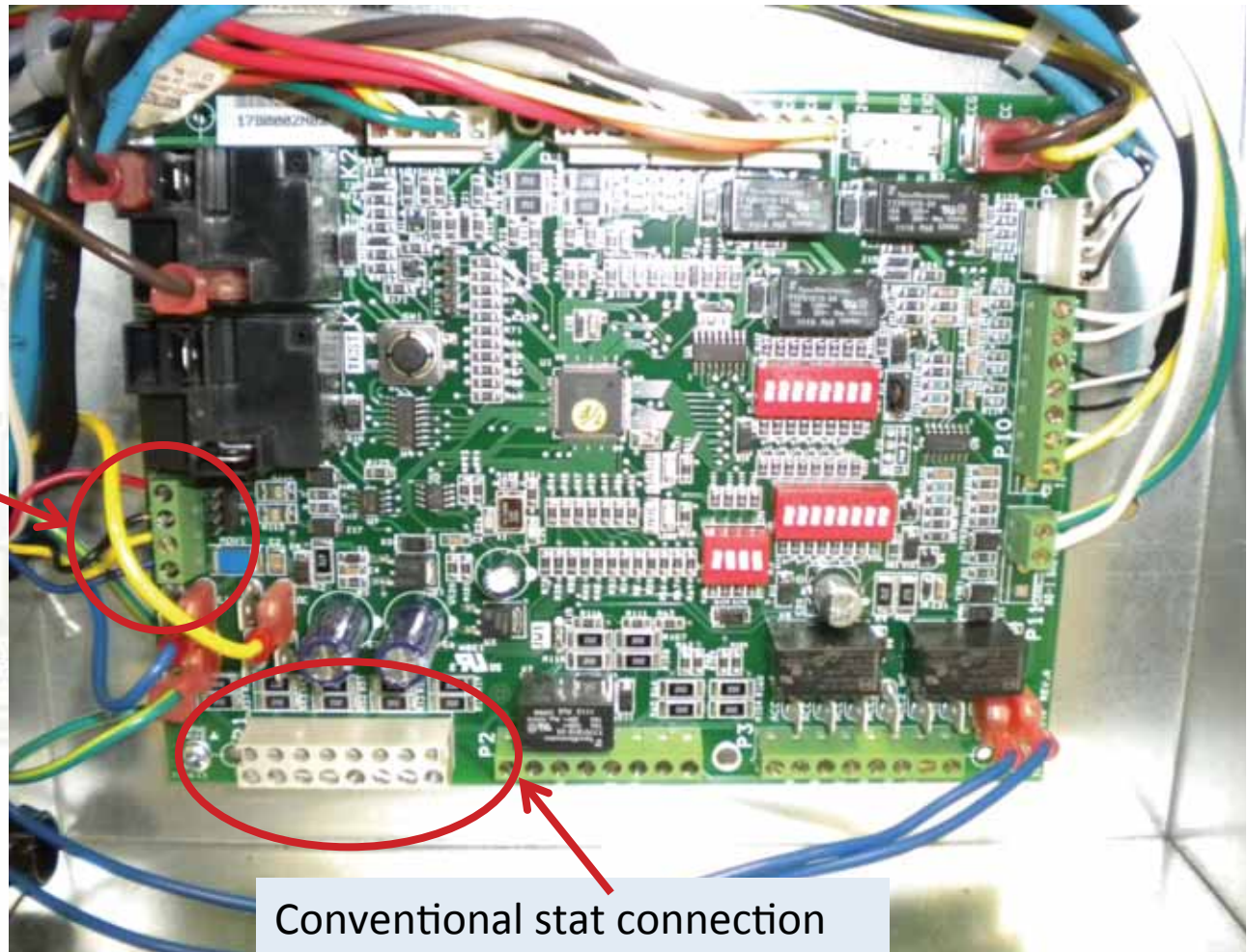
New version
Used on Splits (TES/TEP)
2 yellow dots
Version 1.2 or 1.3



DXM2 “In-Depth”

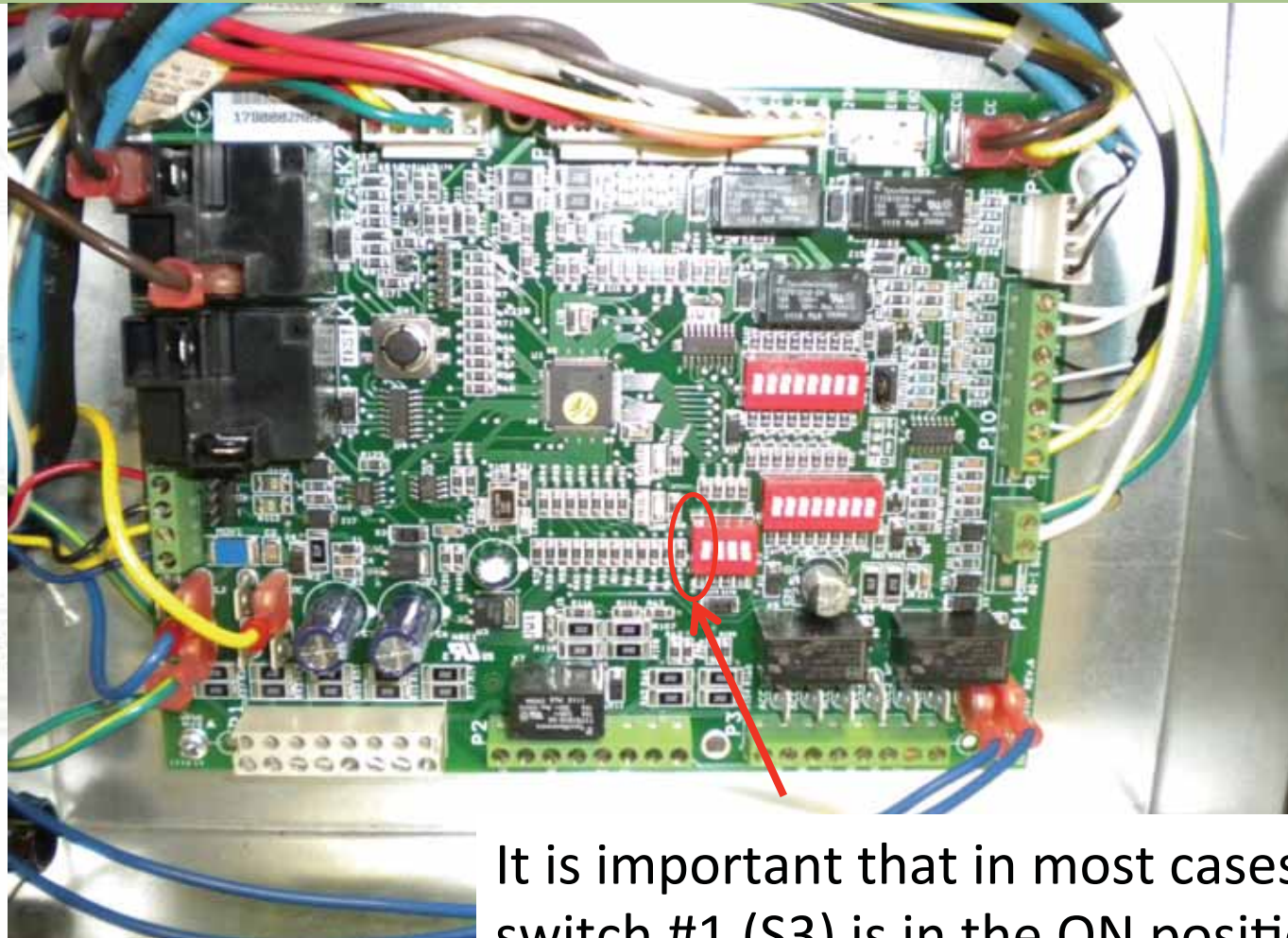
Thermostat Wiring Options

Communicating stat
connection 4 wire

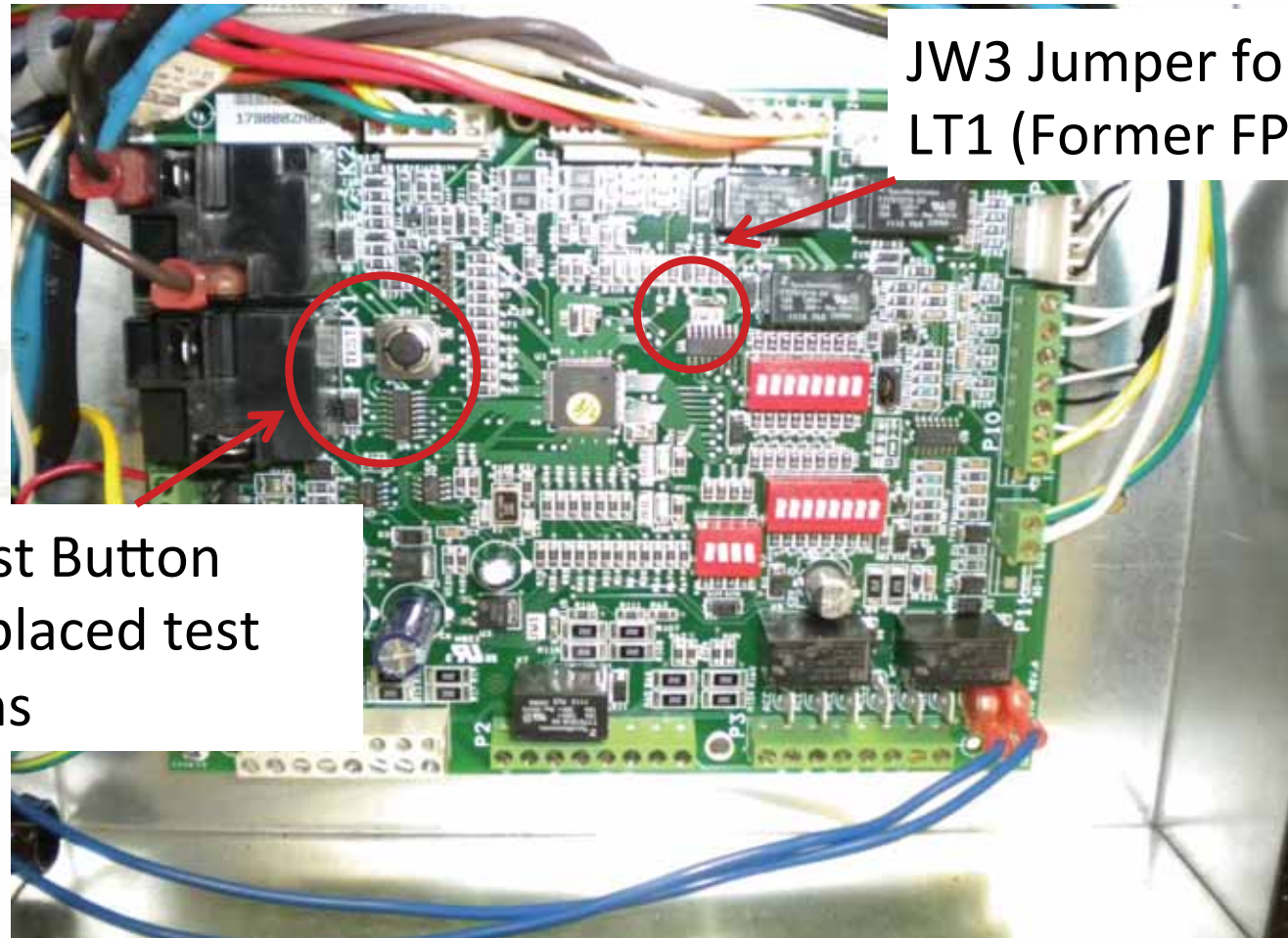


Conventional stat connection

Communications Dipswitch



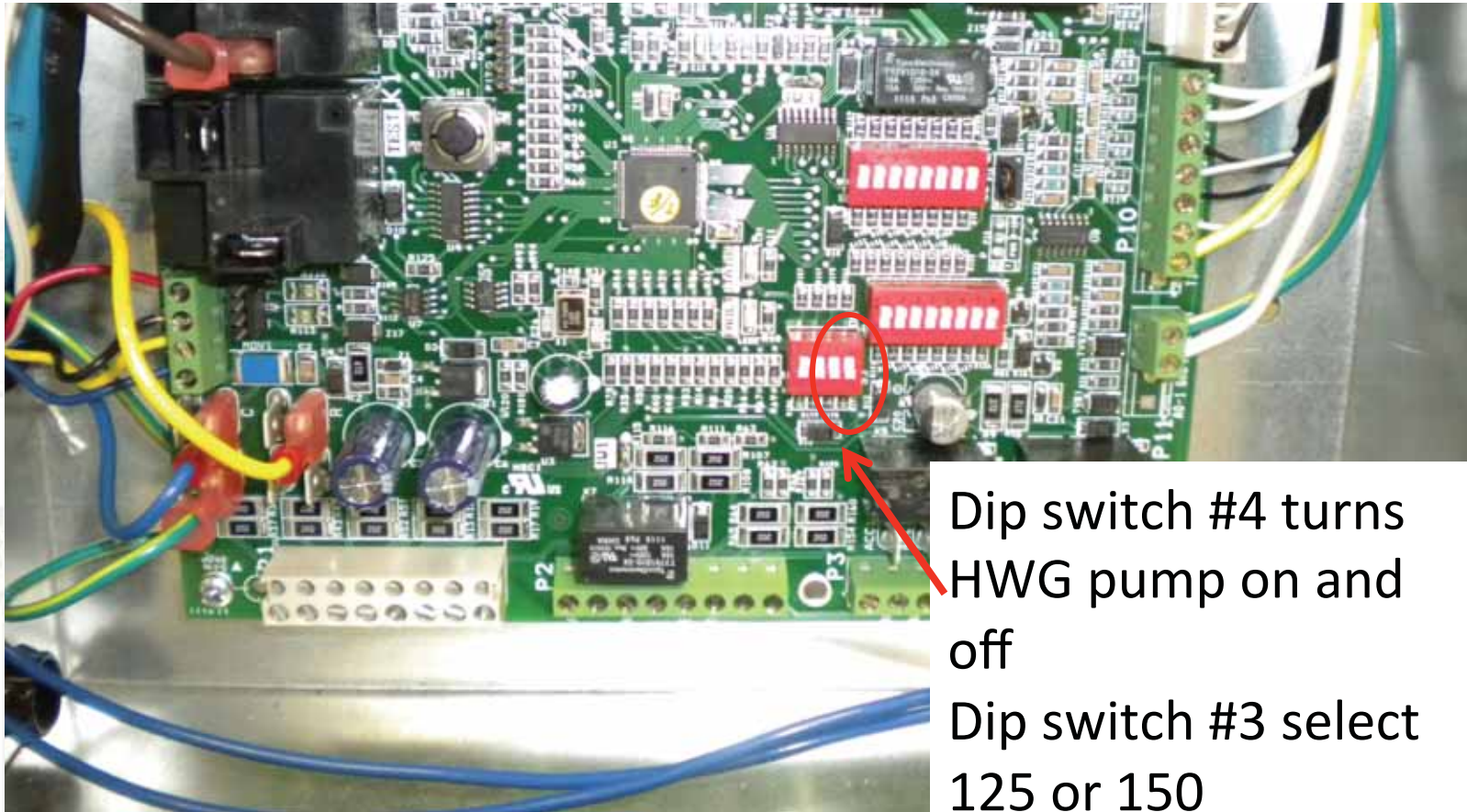
It is important that in most cases dip switch #1 (S3) is in the ON position



JW3 Jumper for
LT1 (Former FP1)

Test Button
replaced test
pins

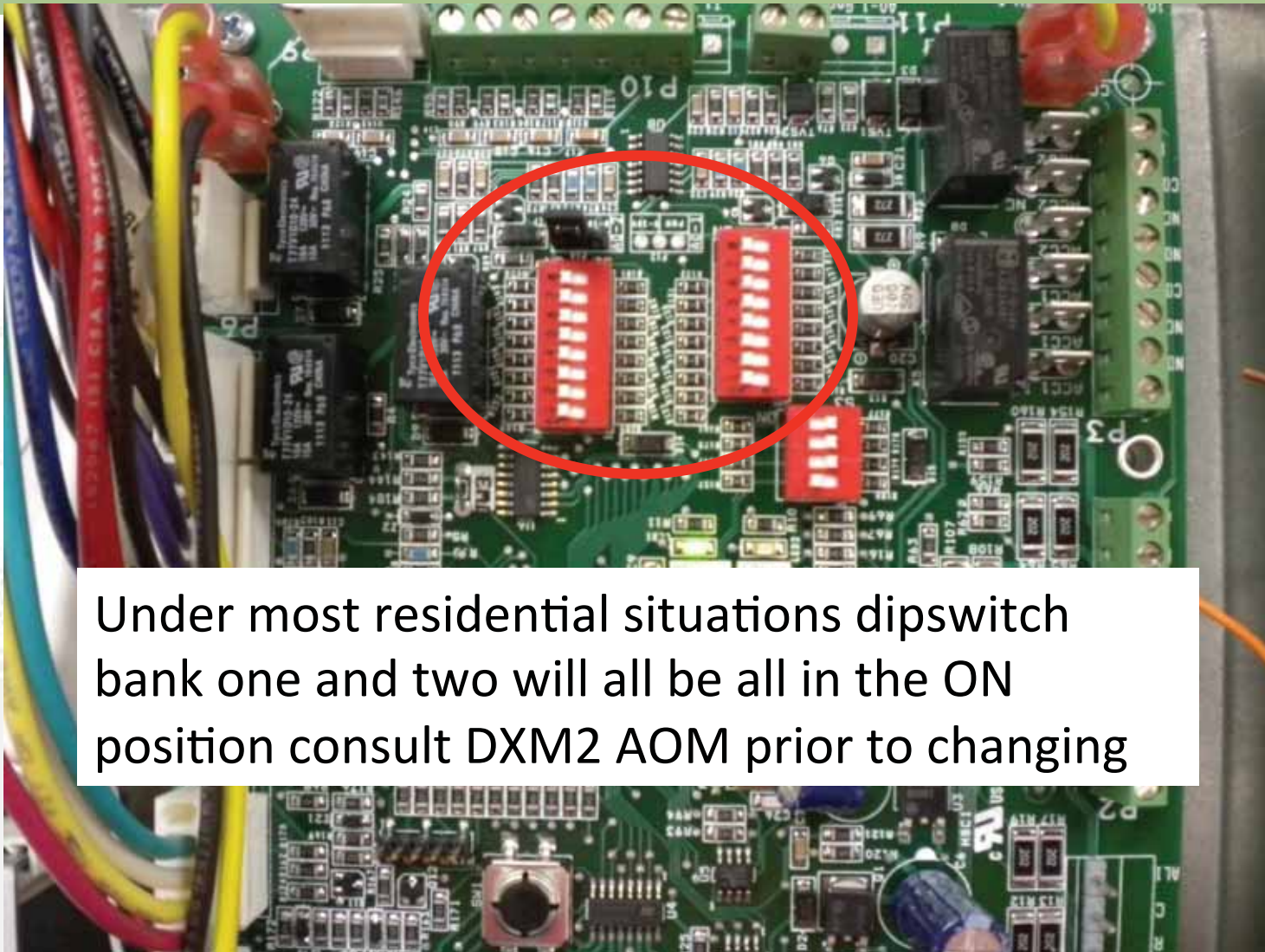
HWG Dipswitchs



Dip switch #4 turns
HWG pump on and
off

Dip switch #3 select
125 or 150

Dip Switch #2 is test
mode for pump.

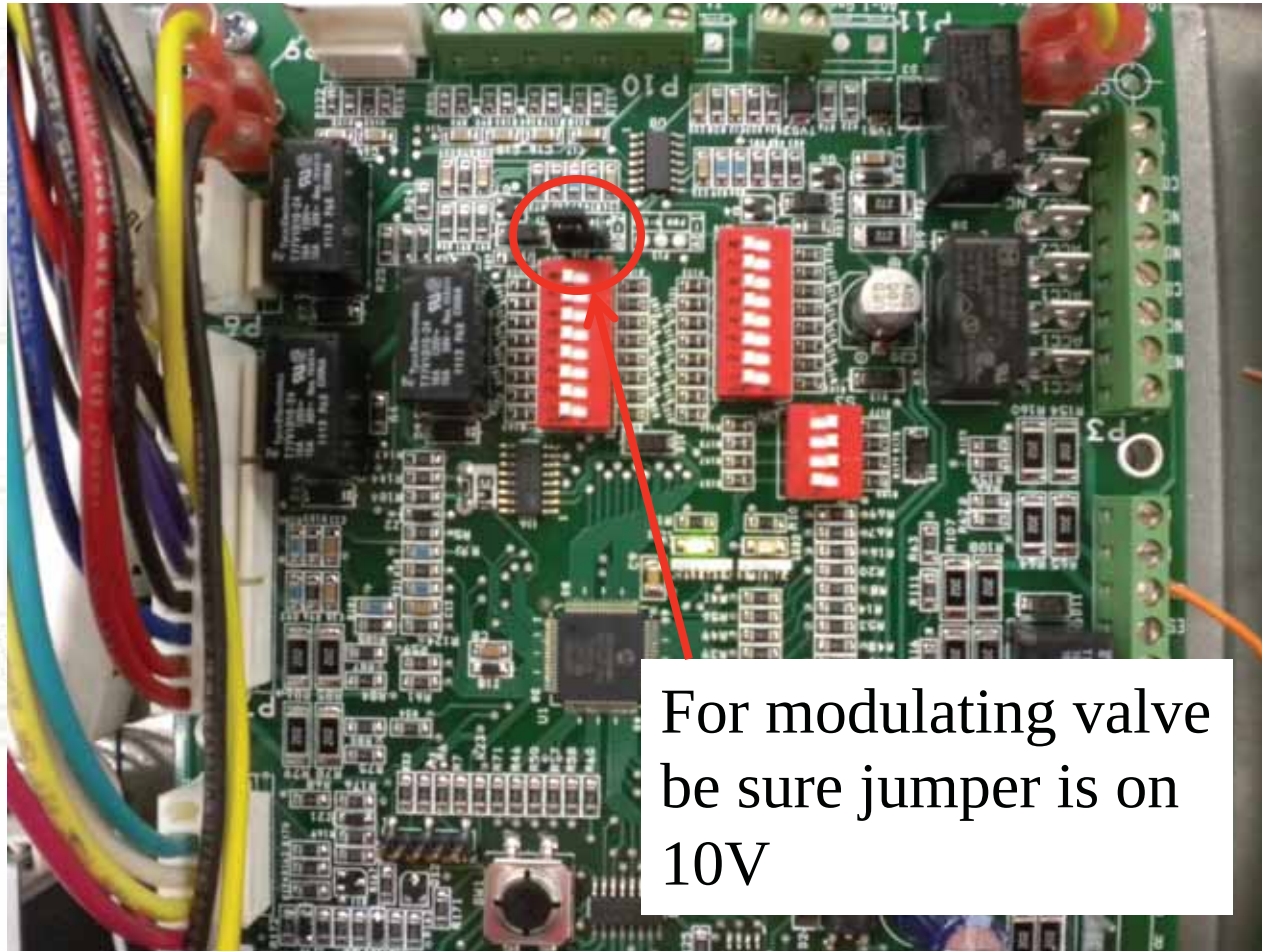


Under most residential situations dipswitch bank one and two will all be all in the ON position consult DXM2 AOM prior to changing

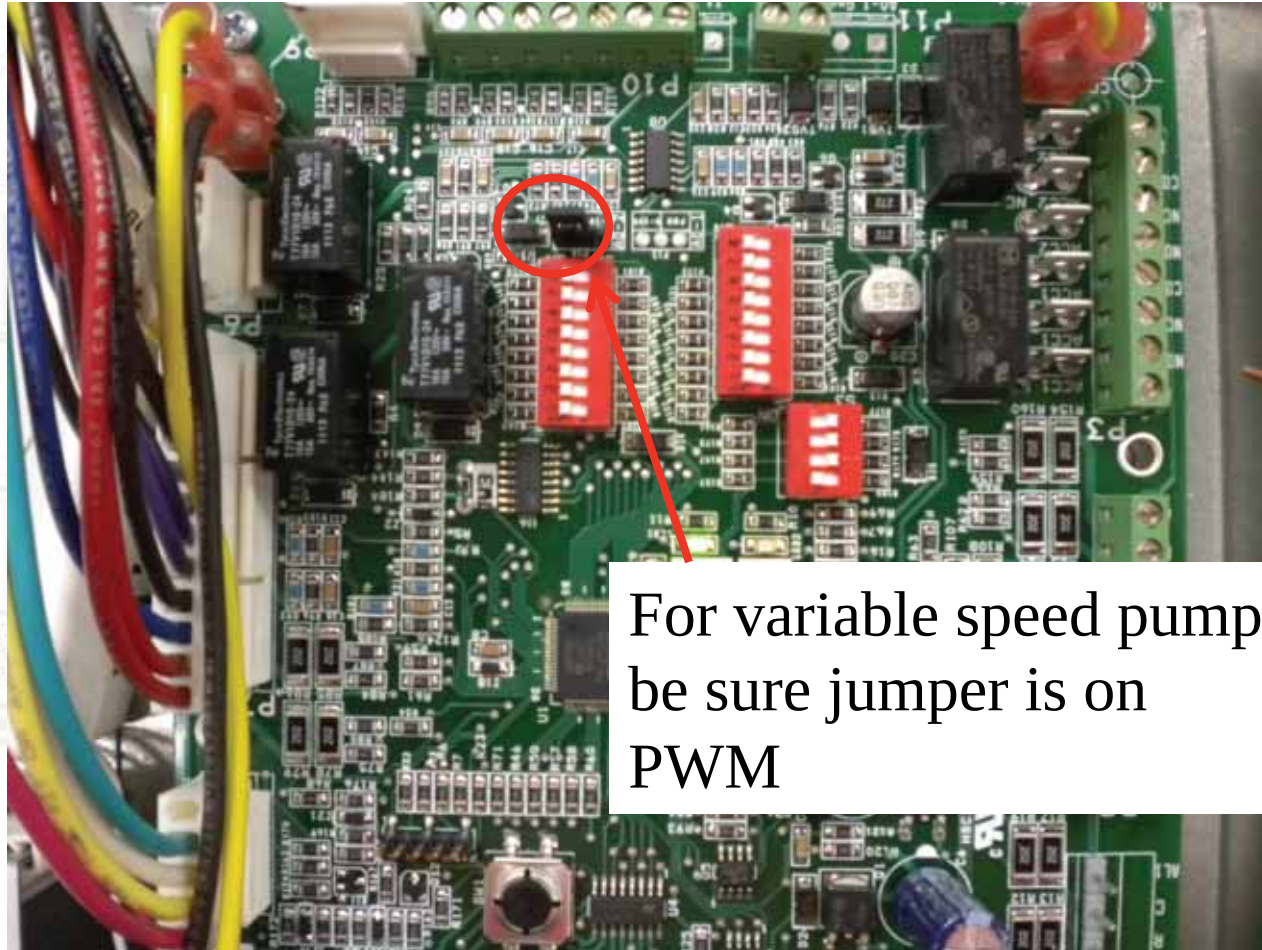
If you want a humidifier controlled by ATC Thermostat



AO-2 Jumper

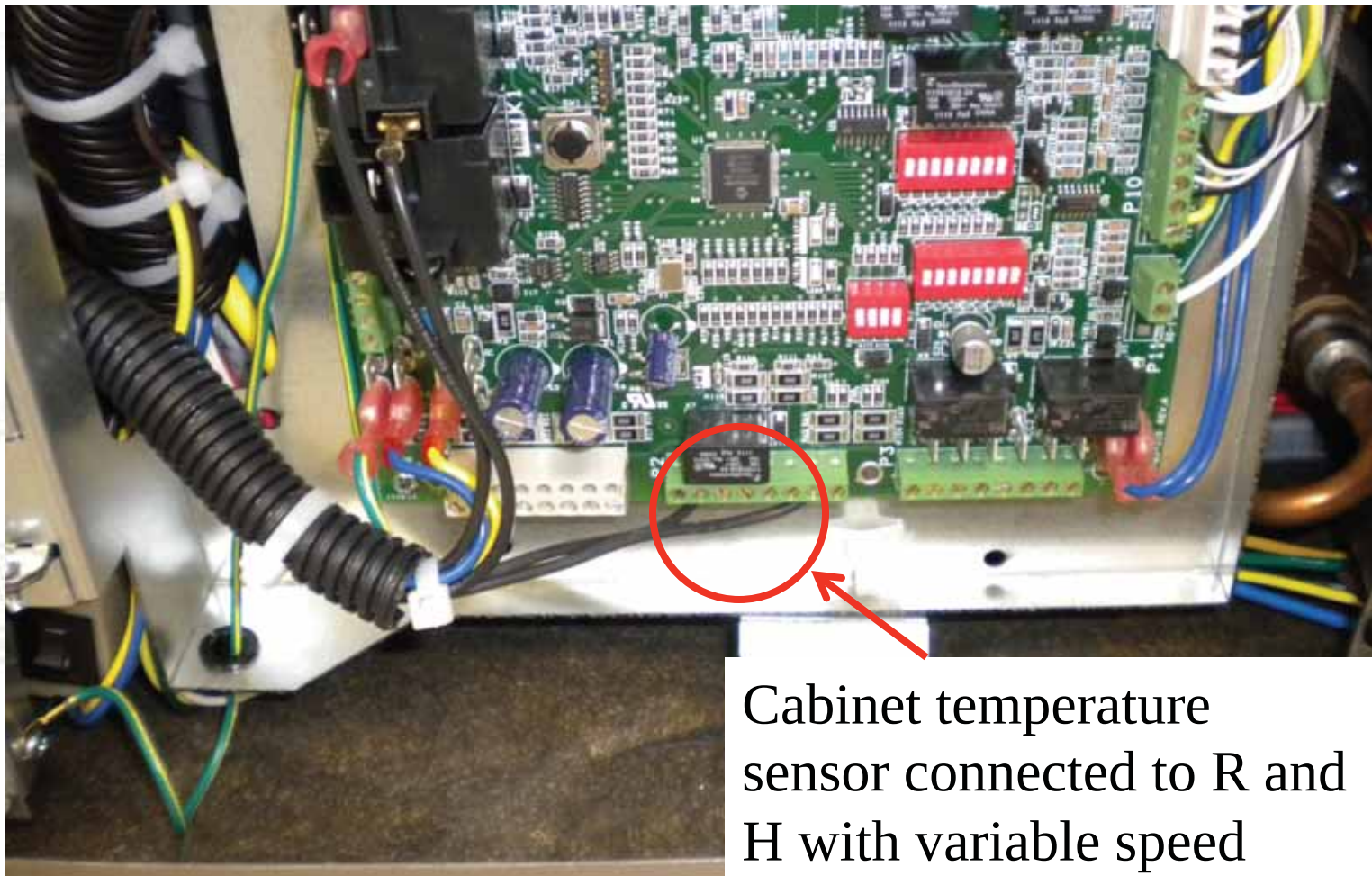


AO-2 Jumper



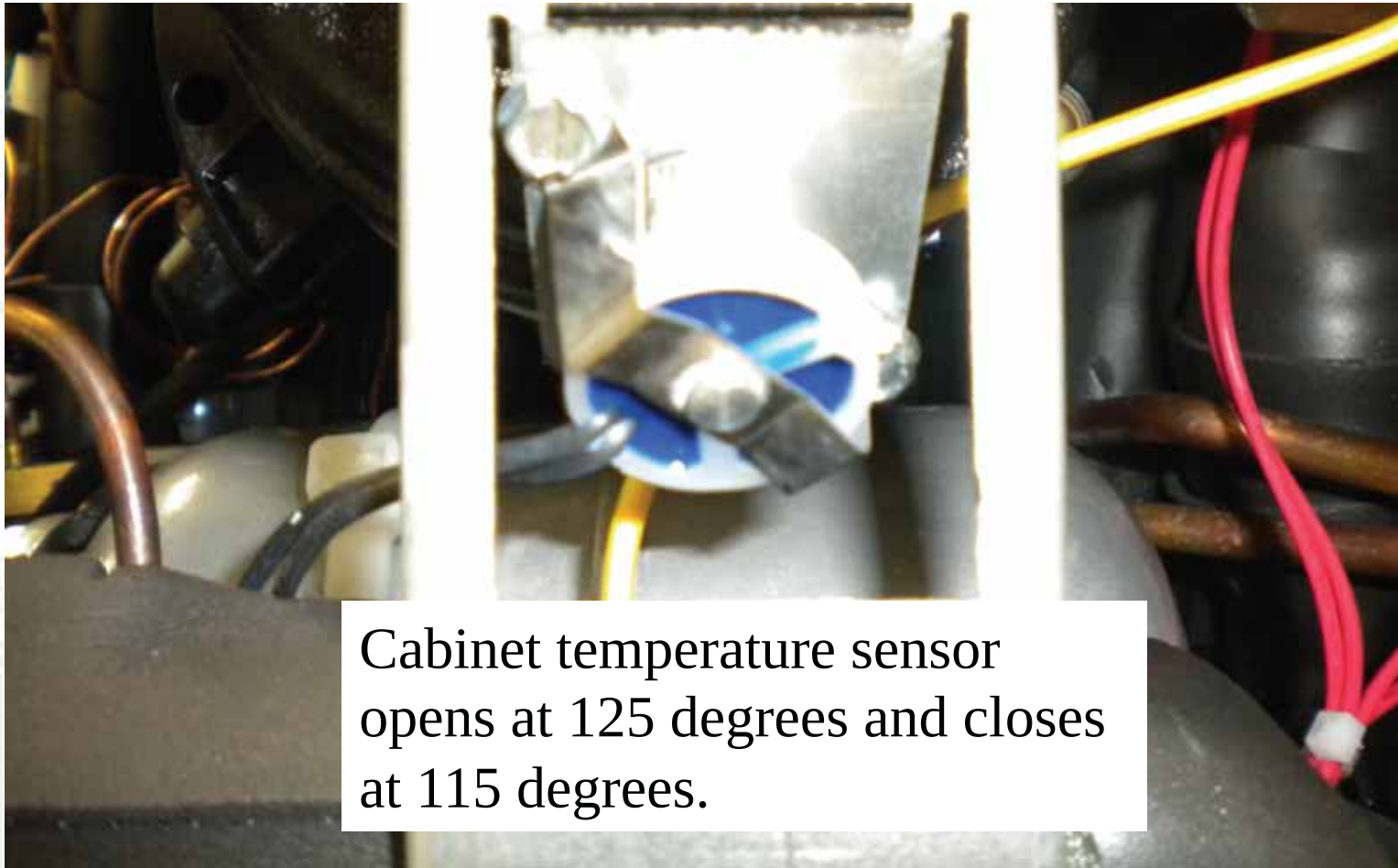
For variable speed pump
be sure jumper is on
PWM

PACKAGED UNITS



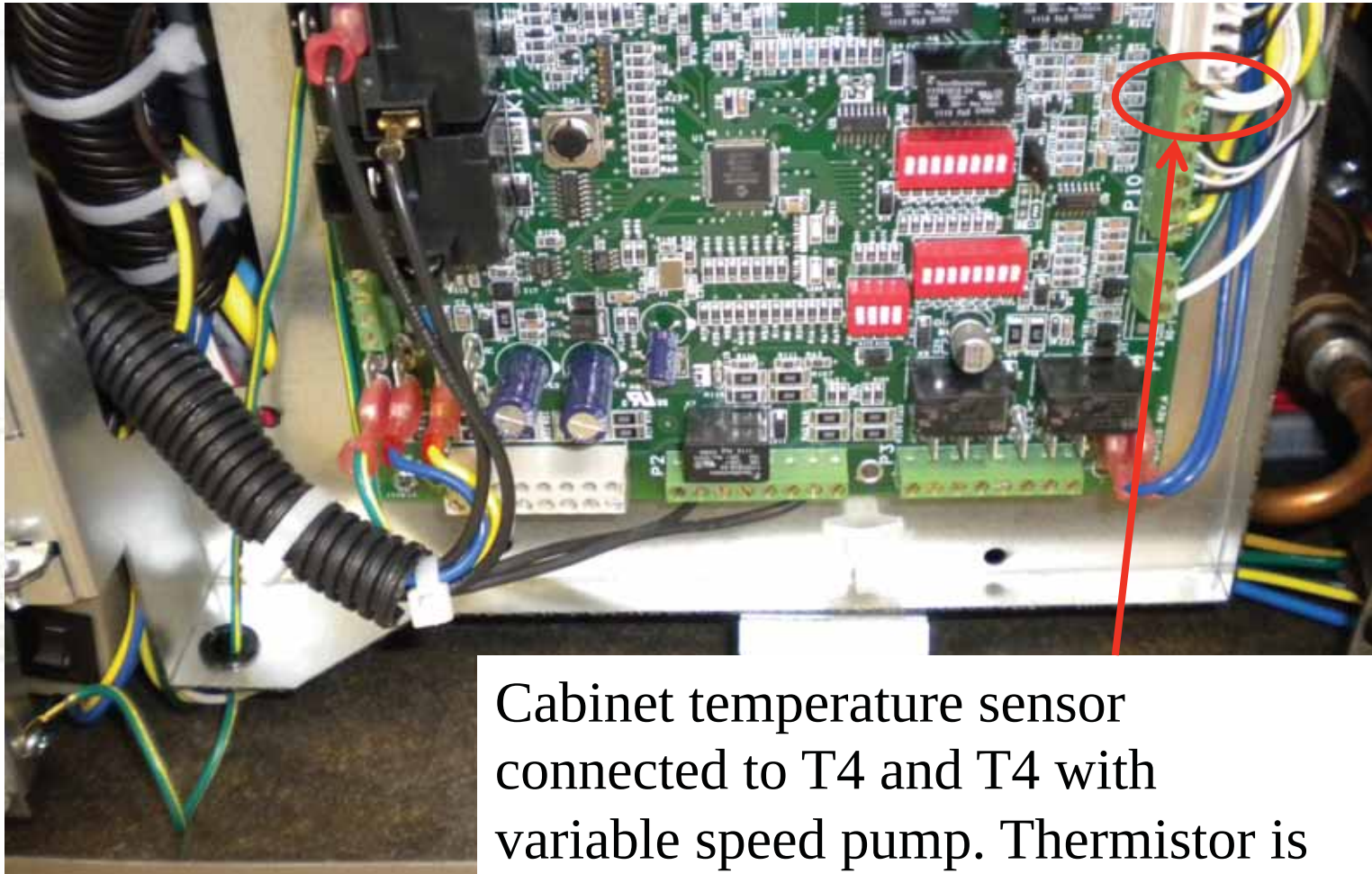
Cabinet temperature sensor connected to R and H with variable speed pump.

PACKAGED UNITS



Cabinet temperature sensor
opens at 125 degrees and closes
at 115 degrees.

SPLIT UNITS



Cabinet temperature sensor connected to T4 and T4 with variable speed pump. Thermistor is used on splits.

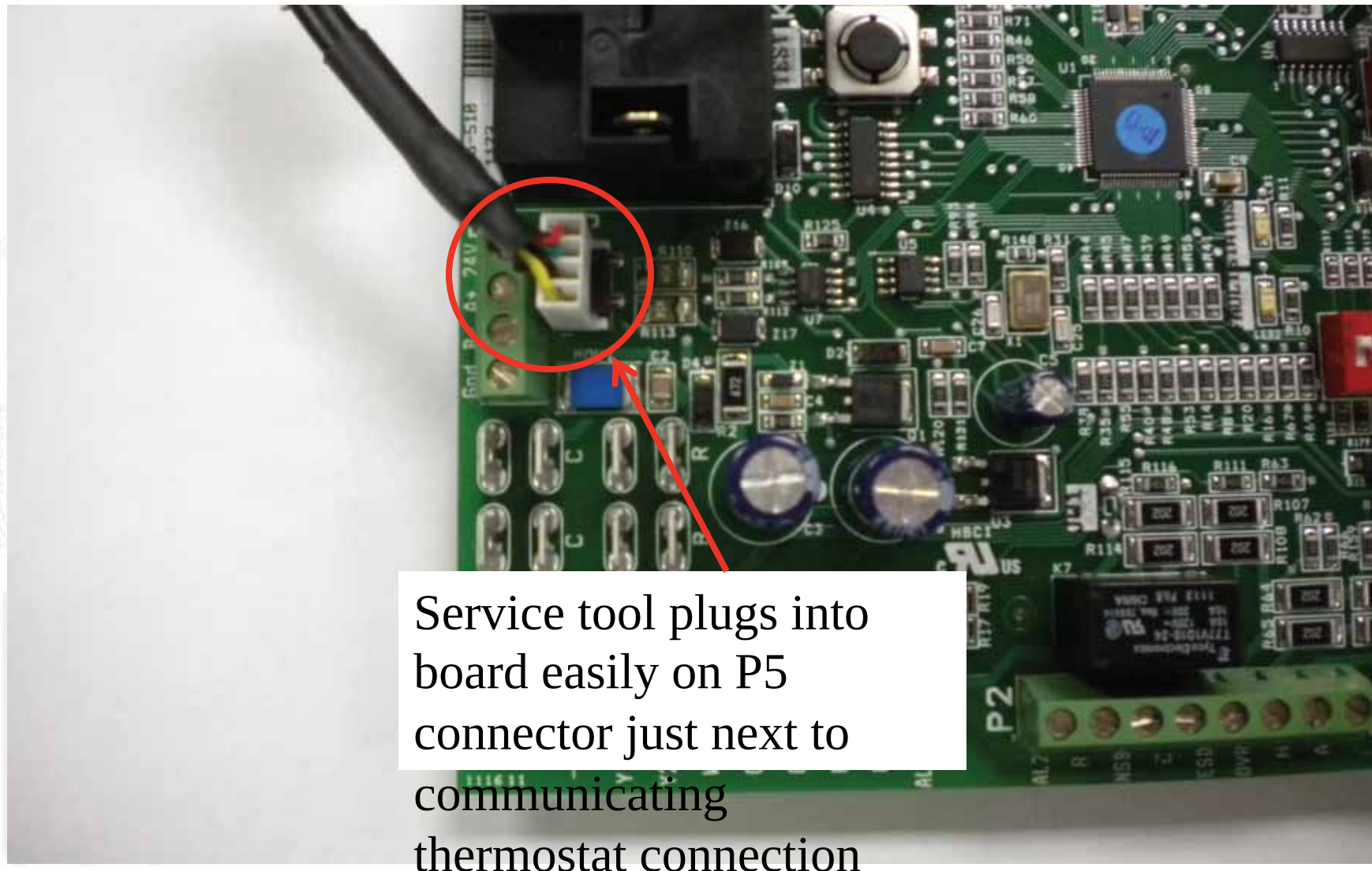
Service Tool ACDU01


CLIMATEMASTER[®]
Geothermal Heat Pump Systems
An LSB Industries, Inc. Company (NYSE: LXU)



Wire connector for service tool

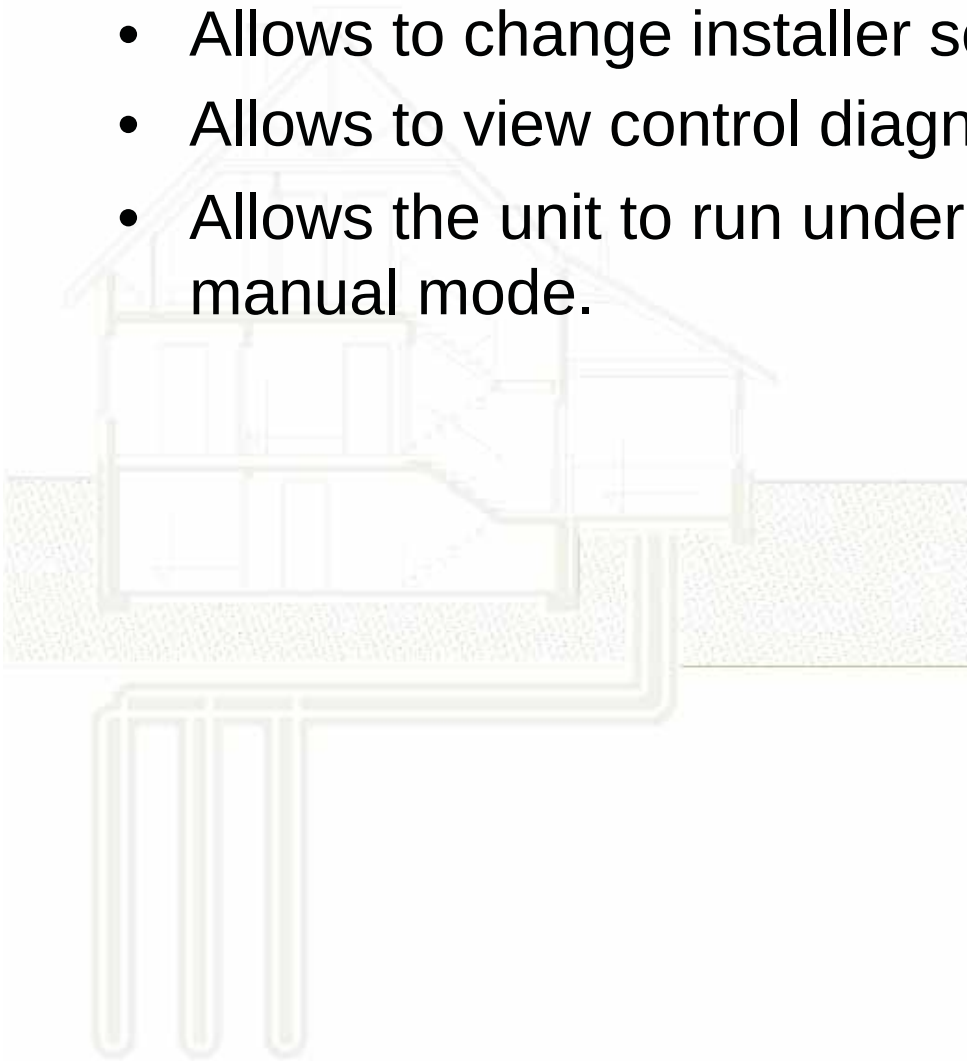




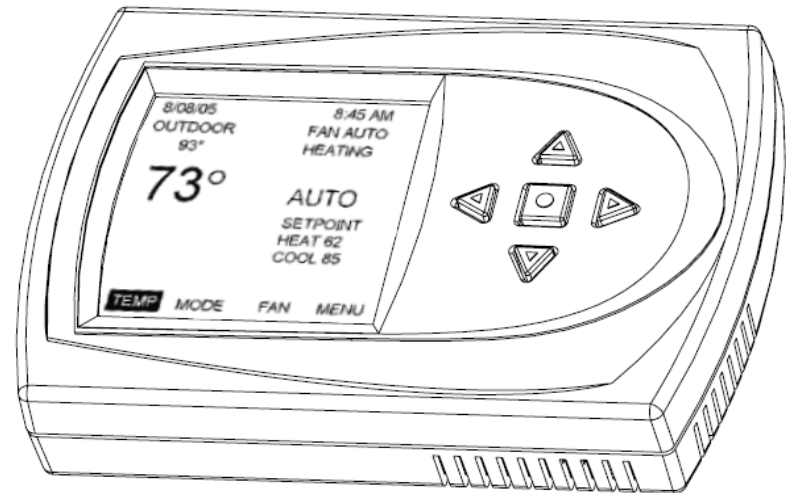
Service Tool



- Allows to change installer setup.
- Allows to view control diagnostics.
- Allows the unit to run under control diagnostics in the manual mode.



ATC32U01 Communicating Thermostat



4 Wire communicating Stat

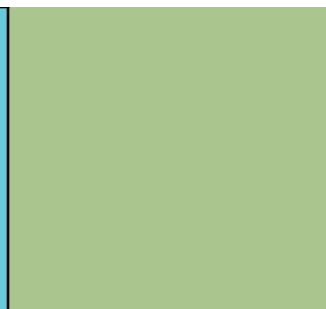


THERMOSTAT
CONFIGURATION

SINGLE STAGE

MULTI STAGE

SELECT OPTION ▲▼
◀ PREVIOUS SAVE □



THERMOSTAT
CONFIGURATION

PROGRAMMABLE

NON PROGRAMMABLE

NIGHT SETBACK

SELECT OPTION ▲▼
◀ PREVIOUS SAVE □

Initial Power-Up

THERMOSTAT
CONFIGURATION

ELECTRIC

MULTI FUEL

NO AUXILIARY HEAT

SELECT OPTION ▲▼
◀ PREVIOUS SAVE □

Auxiliary Settings



THERMOSTAT
CONFIGURATION

**AUXILIARY HEAT TO
SUPPLEMENT HEAT PUMP**

AUXILIARY HEAT FOR
EMERGENCY HEAT ONLY

SELECT OPTION ▲ ▼
◀ PREVIOUS

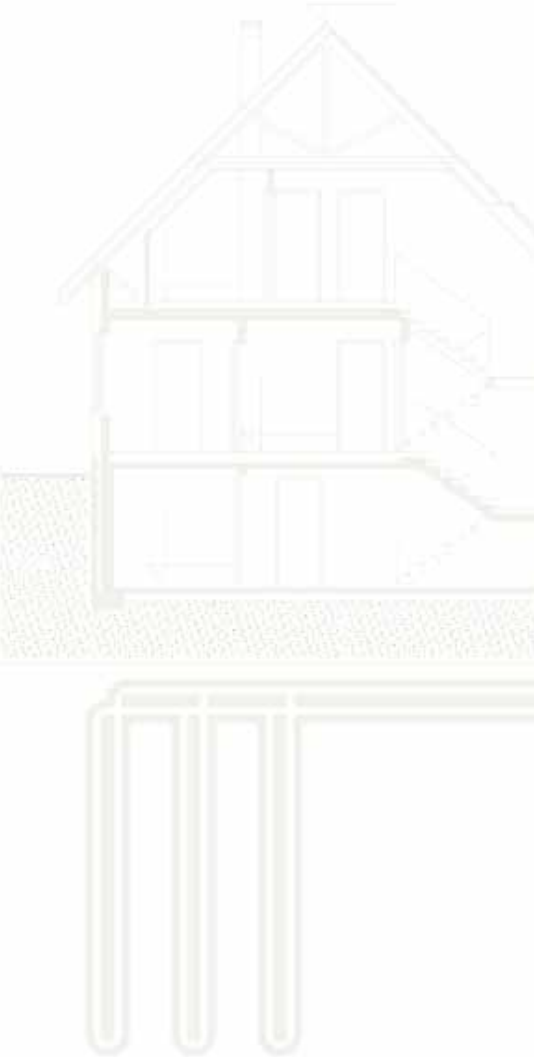
SAVE ■

Board Version and Thermostat version can be verified.



I N S T A L L E R										S E T T I N G S									
T H E R M O S T A T										C O N F I G									
S Y S T E M										C O N F I G									
A C C E S S O R Y										C O N F I G									
I N P U T										D E A L E R I N F O									
H U M I D I T Y										C O N F I G									
T E M P E R A T U R E										C O N T R O L									
D E M A N D										R E D U C T I O N C N F G									
S E R V I C E										M O D E									
R E S T O R E										D E F A U L T S									
D X M 2										C 1 . 0									
A T C 3 2 U 0 1										C 2 . 1									
S E L E C T										O P T I O N ▲ ▼									
◀										P R E V I O U S									

System Configuration Menu



SYSTEM CONFIGURATION

AIRFLOW SELECTION

OPTION SELECTION

UNIT CONFIG TT026

PUMP CONFIGURATION

SELECT OPTION ▲▼

◀ PREVIOUS SELECT ◻

System Configuration



Airflow Selection

- Configure each stage of airflow

AIRFLOW SELECTION				CFM
HEAT	STAGE	1		600
HEAT	STAGE	2		750
AUXILIARY	HEAT			850
EMERGENCY	HEAT			850
COOL	STAGE	1		525
COOL	STAGE	2		700
COOL	DEHUM	1		425
COOL	DEHUM	2		550
CONTINUOUS	FAN			350
HEAT	OFF	DELAY		60
COOL	OFF	DELAY		30
◀ PREVIOUS				NEXT ▶

Option Selection

- Configure heat pump options

OPTION SELECTION			
MOTORIZED VALVE		OFF	
COMPRESSOR ASCD		5	
LT2	SETPOINT	WATER	
◀ PREVIOUS		SELECT ▶	

Motorized Valve in the Options menu is not the Modulating valve built into the unit. DO NOT turn on if using a modulating valve

O P T I O N S E L E C T I O N		
M O T O R I Z E D V A L V E		O F F
C O M P R E S S O R A S C D		5
L T 2	S E T P O I N T	W A T E R
◀ P R E V I O U S		S E L E C T ▶

System Configuration



Unit Configuration

- Configure the heat pump (replacement part)

UNIT CONFIGURATION			
CURRENT	CONFIG	TT026	
HEAT PUMP	FAMILY	TT	
HEAT PUMP	SIZE	026	
BLOWER	TYPE	ECM	
LOOP	CONFIG	VS	PUMP
SELECT	OPTION	▲▼	
◀	PREVIOUS	SELECT	Ⓢ

Pump/Valve Configuration

- Configure temperature settings for loop

VARIABLE SPD INTERNAL PUMP CONFIGURATION				DEG
HEATING		DELTA T		8
COOLING		DELTA T		15
MINIMUM		HEAT LWT		10
MAXIMUM		HEAT LWT		80
MINIMUM		COOL LWT		40
MAXIMUM		COOL LWT		110
◀	PREVIOUS		SELECT ▶	

⚠ NOTICE! ⚠

NOTICE: If installing MULTIPLE vFlow™ Internal VS Flow Controller units (in parallel) on one loop, ALWAYS select 'VS PUMP PARALLEL' under Installer Settings
➡ System Config ➡ Unit Config ➡ Loop Config.
Also, follow proper pump selection procedures for parallel pumping applications.

If using multiple units with internal pump on a common loop.



UNIT CONFIGURATION									
CURRENT CONFIG					TZ 0 3 0				
HEAT PUMP FAMILY					TZ				
HEAT PUMP SIZE					0 3 0				
BLOWER TYPE					ECM				
LOOP CONFIG					VS PUMP PARALLEL				
SELECT OPTION					▲ ▼				
◀ PREVIOUS					SELECT ▶				

Can control pump by delta T or fixed pump speed.



VARIABLE SPD INTERNAL PUMP CONFIGURATION			
PUMP CONTROL		DELTA T	
HEATING	DELTA T		7
COOLING	DELTA T		10
MAXIMUM	HEAT	LWT	80
MINIMUM	COOL	LWT	40
◀ PREVIOUS		SELECT ▶	

VARIABLE SPD INTERNAL PUMP CONFIGURATION			
PUMP CONTROL		FIXED	
HEATING	STAGE	1	60%
HEATING	STAGE	2	75%
COOLING	STAGE	1	50%
COOLING	STAGE	2	70%
◀ PREVIOUS		SELECT ▶	



To control vs pump by fixed speed, select 'Pump Control', press ■, use down arrow to select 'Fixed', and press ■ to save.

Default stored in control. Valid range: 15% - 90% (in 1% increments)

Heating Stage 1

Cooling Stage 1

Heating Stage 2

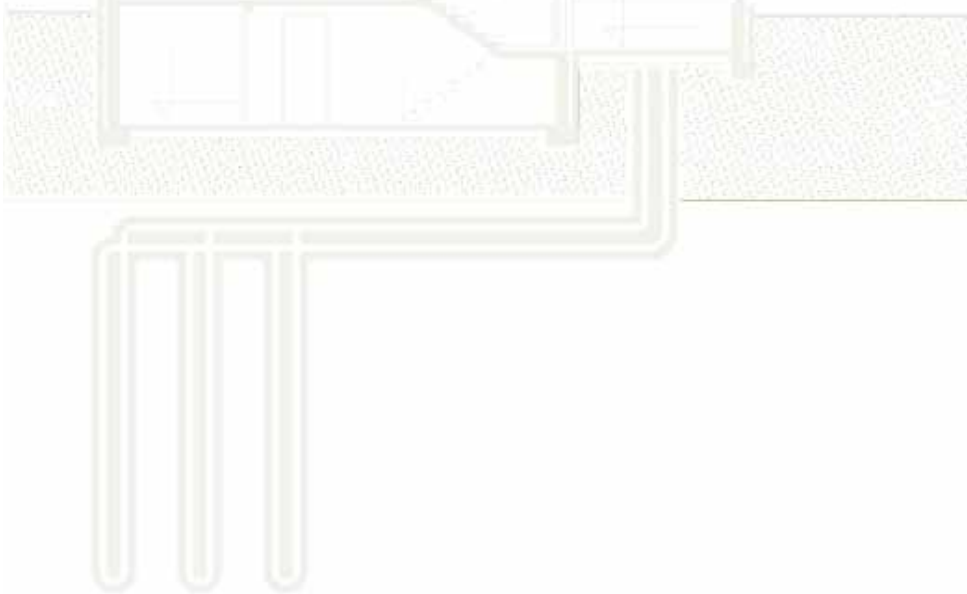
Cooling Stage 2

If Pump Configuration is set to 'VS PUMP PARALLEL', valid range changes to 50-90% (in 1% increments).

Setting Up Delta T



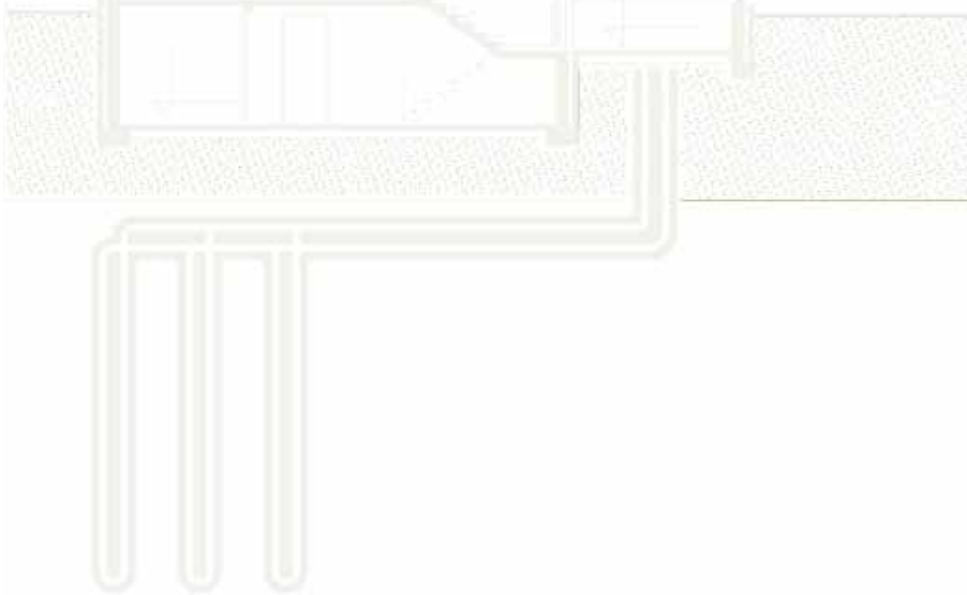
- For the Pump or the valve
- Heating delta T will be 4-12 degrees default will be 7 degrees.
- Cooling delta T will be 9-20degrees default will be 10 degrees.



Things To Think About



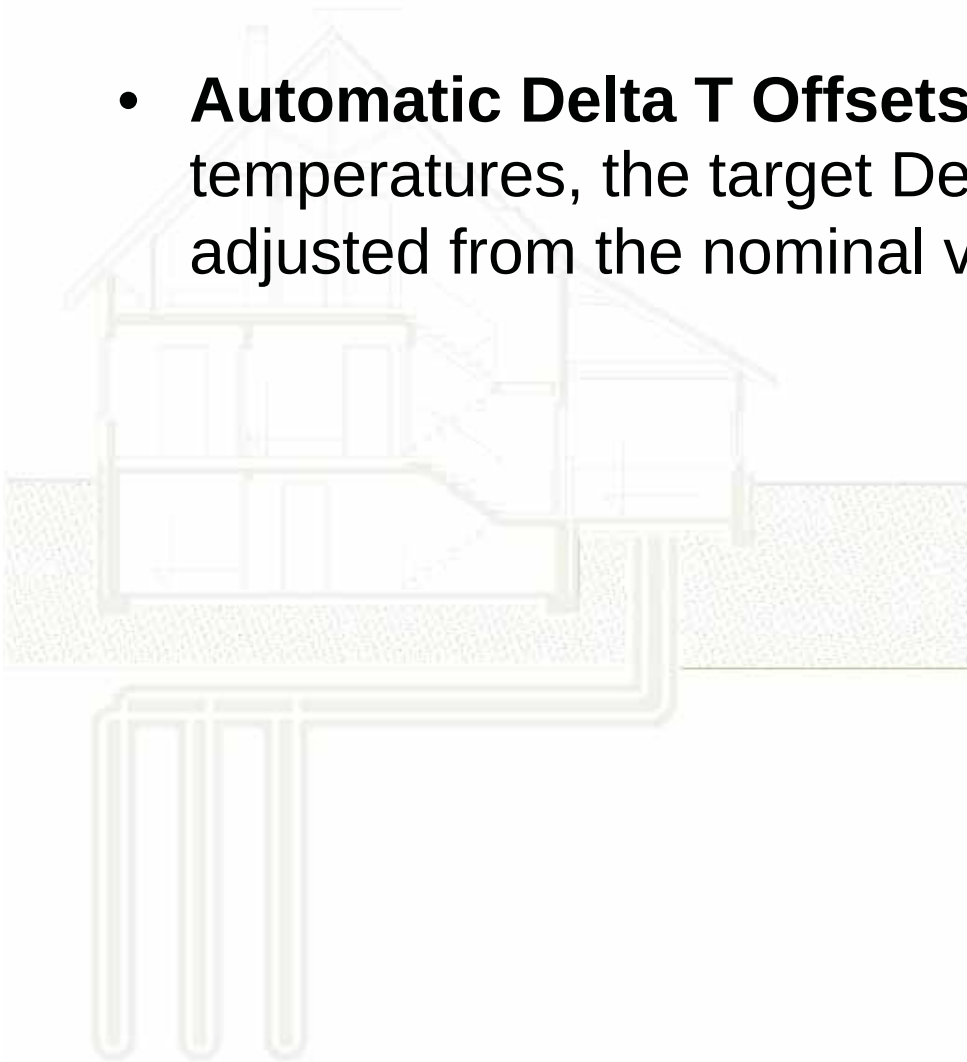
- With some loops to maintain turbulent flow it will be necessary to lower the heating delta T to increase GPM flow through the loop. Some things that will drive this more than one circuit per ton or the use of propylene glycol.



More on the operation of the pump



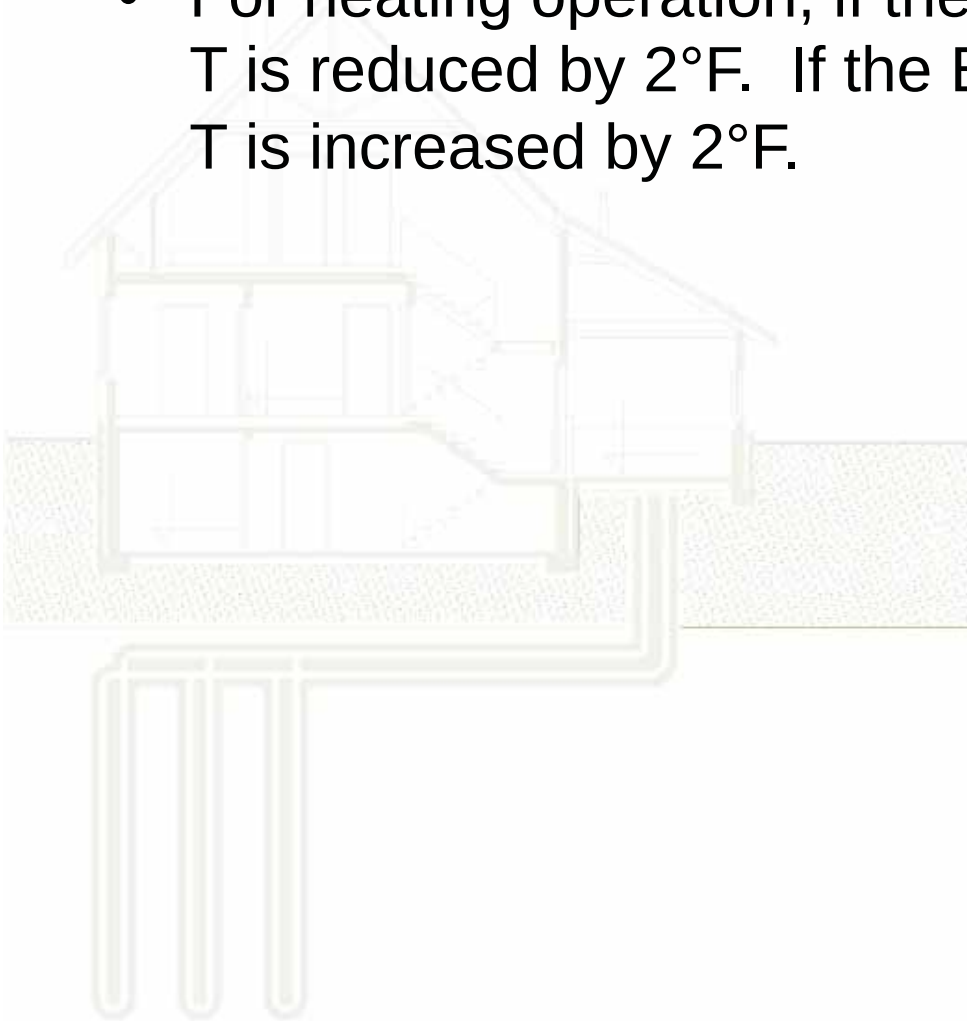
- **Automatic Delta T Offsets** –For high and low loop temperatures, the target Delta T is automatically adjusted from the nominal value.



For Heating



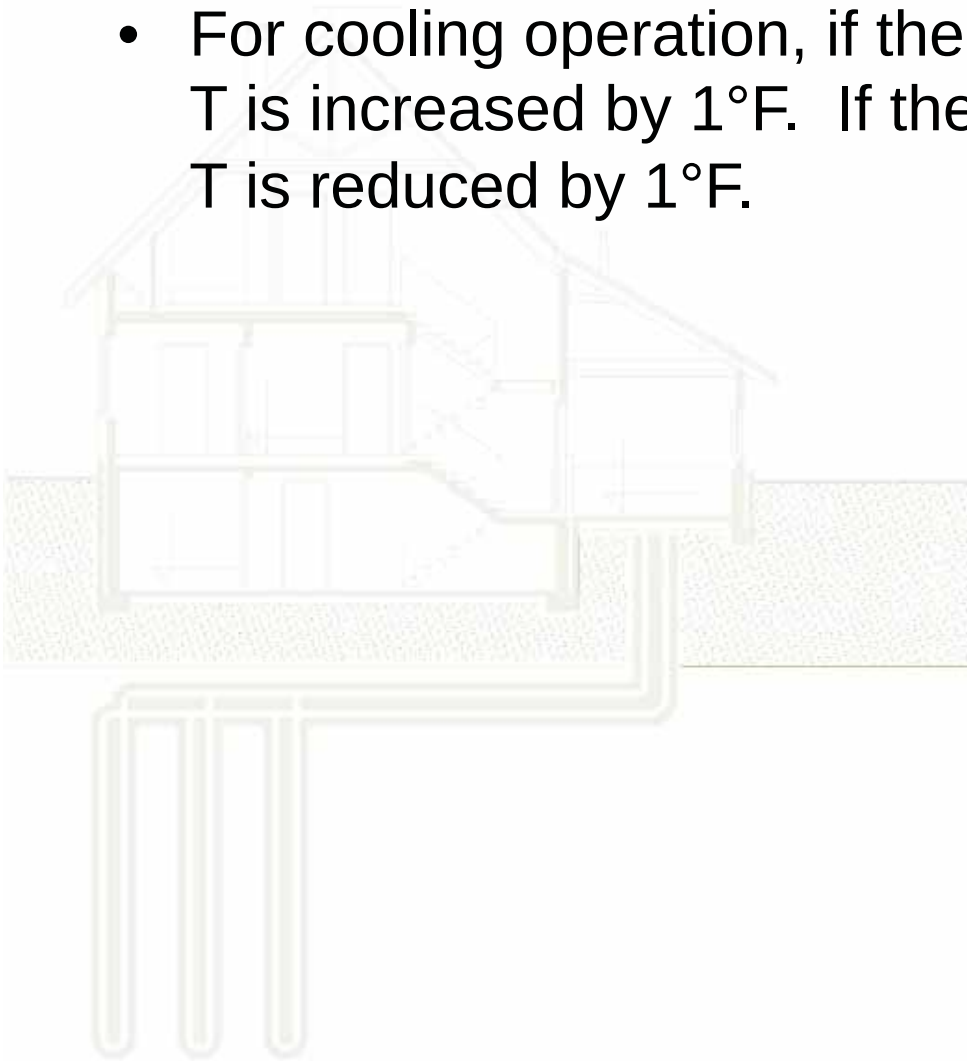
- For heating operation, if the EWT < 40°F, the target Delta T is reduced by 2°F. If the EWT > 60°F, the target Delta T is increased by 2°F.



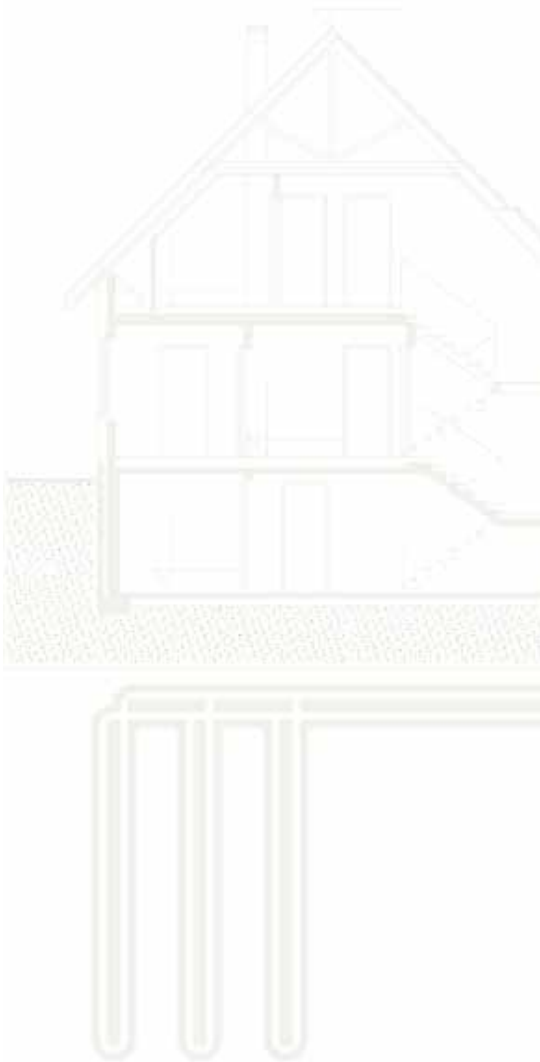
For Cooling



- For cooling operation, if the EWT $< 70^{\circ}\text{F}$, the target Delta T is increased by 1°F . If the EWT $> 90^{\circ}\text{F}$, the target Delta T is reduced by 1°F .



Service Mode Menu

A faint, light-colored illustration of a house with a chimney and a geothermal system with three vertical pipes is visible in the background on the left side of the page.

S E R V I C E M O D E

M A N U A L O P E R A T I O N

C O N T R O L D I A G N O S T I C S

D I P S W I T C H C O N F I G

F A U L T H I S T O R Y

C L E A R F A U L T H I S T O R Y

S E L E C T O P T I O N ▲ ▼

◀ P R E V I O U S S E L E C T ◻

Service Mode

Manual Operation

- Direct manual control of all system outputs

MANUAL OPERATING MODE			
Y 1	COMM	OUTPUT	OFF
Y 2	COMM	OUTPUT	OFF
W	COMM	OUTPUT	OFF
O	COMM	OUTPUT	OFF
G	COMM	OUTPUT	OFF
H	COMM	OUTPUT	OFF
DH	COMM	OUTPUT	OFF
ECM	AIRFLOW		0
PUMP	SPEED		0 %
TEST	MODE		OFF
SELECT OPTION ▲ ▼			
◀	PREVIOUS		SELECT ▶

Control Diagnostics

CONTROL DIAGNOSTICS

HP	SWITCH	CL
LOC	SWITCH	CL
Y1	PHYSICAL INPUT	ON
Y2	PHYSICAL INPUT	OFF
W	PHYSICAL INPUT	OFF
O	PHYSICAL INPUT	ON
G	PHYSICAL INPUT	ON
H	PHYSICAL INPUT	OFF
EMERG SHUTDOWN		OFF
NIGHT SETBACK		OFF
OVR INPUT		OFF

◀ PREVIOUS NEXT ▶

CONTROL STATUS TEMPERATURES

LT1	TEMP	38.1
LT2	TEMP	79.9
COMP	DISCHARGE	157.7
HOT	WATER EWT	121.5
LEAVING	AIR	75.1
LEAVING	WATER	73.3
ENTERING	WATER	78.5
CONTROL	VOLTAGE	26.4
ECM	BLOWER RPM	550
ECM	TARGET CFM	800
ECM	BLWR STATIC	0.5

◀ PREVIOUS NEXT ▶

CONTROL STATUS PUMP OPERATION

PUMP	SPEED	60%
PUMP	WATTS	140
FLOW	RATE GPM	7.4

◀ PREVIOUS

Service Mode



Dipswitch Configuration

- Displays the control dipswitch settings

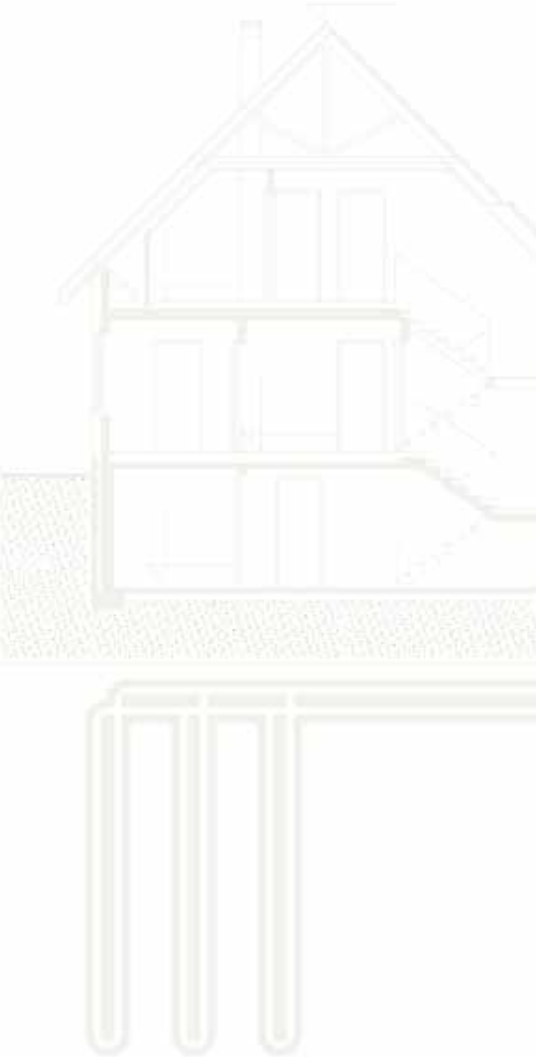
```
CONTROL CONFIGURATION
DIPSWITCH S3
1  ON  FACTORY SETTING
2  OFF HWG TEST OFF
3  OFF HWG SP 125
4  OFF HWG DISABLED
JW3 LT1 SETTING WELL
◀ PREVIOUS
```

Fault History

- Displays a detailed fault history for the control

```
TT038 SN - - - - 0123
LAST 5 FAULTS
LT1 LOW WATER TEMP
NO FAULT
NO FAULT
NO FAULT
NO FAULT
NEXT ▶
◀ PREVIOUS SELECT
```

Fault Condition Menu



```
FAULT CONDITION MENU
LT1 LOW WATER TEMP
COOL 1 11:11AM 12/25
FAULT TEMP CONDITIONS
FAULT FLOW CONDITIONS
FAULT I/O CONDITIONS
FAULT CONFIG COND
FAULT POSSIBLE CAUSES
◀ PREVIOUS SELECT ▶
```

Fault Conditions



Temperature Conditions

- Control temperature conditions when the fault occurred

FAULT TEMP CONDITIONS				
LT1	LOW	WATER	TEMP	
COOL	1	11:11 AM	12 / 25	
LT1	TEMP		28.1	
LT2	TEMP		79.9	
HOT	WATER	EWT	121.5	
COMP	DISCHARGE		157.7	
LEAVING	AIR		75.1	
LEAVING	WATER		73.3	
ENTERING	WATER		78.5	
CONTROL	VOLTAGE		26.4	
◀ PREVIOUS				

Flow Conditions

- Control flow conditions when fault occurred

FAULT FLOW CONDITIONS				
LT1	LOW	WATER	TEMP	
COOL	1	11:11 AM	12 / 25	
ECM	TARGET	CFM	800	
ECM	BLOWER	RPM	550	
FLOW	RATE	GPM	6.5	
PUMP	SPEED		60%	
VALVE	POSITION		0%	
◀ PREVIOUS				

CLIMATEMASTER®
Geothermal Heat Pump Systems

An LSB Industries, Inc. Company (NYSE: LXU)

- Control configuration when the fault occurred

```

F A U L T      C O N F G C O N D I T I O N S

L T 1      L O W      W A T E R      T E M P
C O O L      1      1 1 : 1 1 A M      1 2 / 2 5

      S 1              S 2              S 3
1      O N              1      O N              1      O N
2      O N              2      O N              2      O F F
3      O N              3      O N              3      O F F
4      O N              4      O N              4      O F F
5      O N              5      O N
6      O N              6      O N      L T 1      W E L L
7      O N              7      O N      L T 2      W E L L
8      O N              8      O N

```

Fault Conditions

Possible Causes

- Possible causes as to why the fault occurred

P O S S I B L E F A U L T C A U S E S

L O W W A T E R C O I L T E M P

L O W W A T E R T E M P - H T G

L O W W A T E R F L O W - H T G

L O W R E F R I G C H A R G E - H T G

I N C O R R E C T L T 1 S E T T I N G

B A D L T 1 T H E R M I S T O R

◀ P R E V I O U S



Time For Questions?

Use Service Tool Or Communicating Thermostat
to run the unit in Manual Mode.

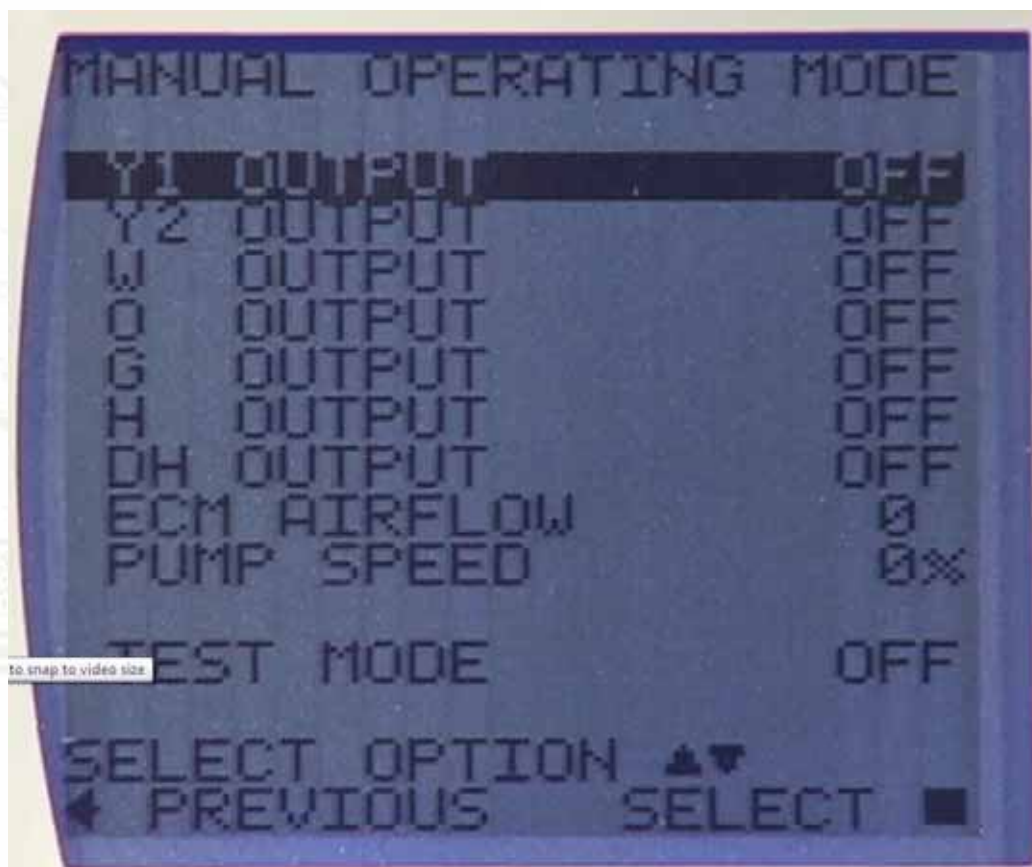


Put Control In Manual Mode



- Select Y1 & Y2
- Select O if you want to run in cooling.
- Select CFM and raise the CFM to the catalog specified CFM.
- Raise Pump speed % until you get catalog GPM or if a Modulating valve increase valve % until Pressure drop is where you need it for the correct GPM.

Manual Mode



This Is Where I Get CFM and GPM

Table 14c: Performance Data — Tranquility® 22 Model 036 - Full Load

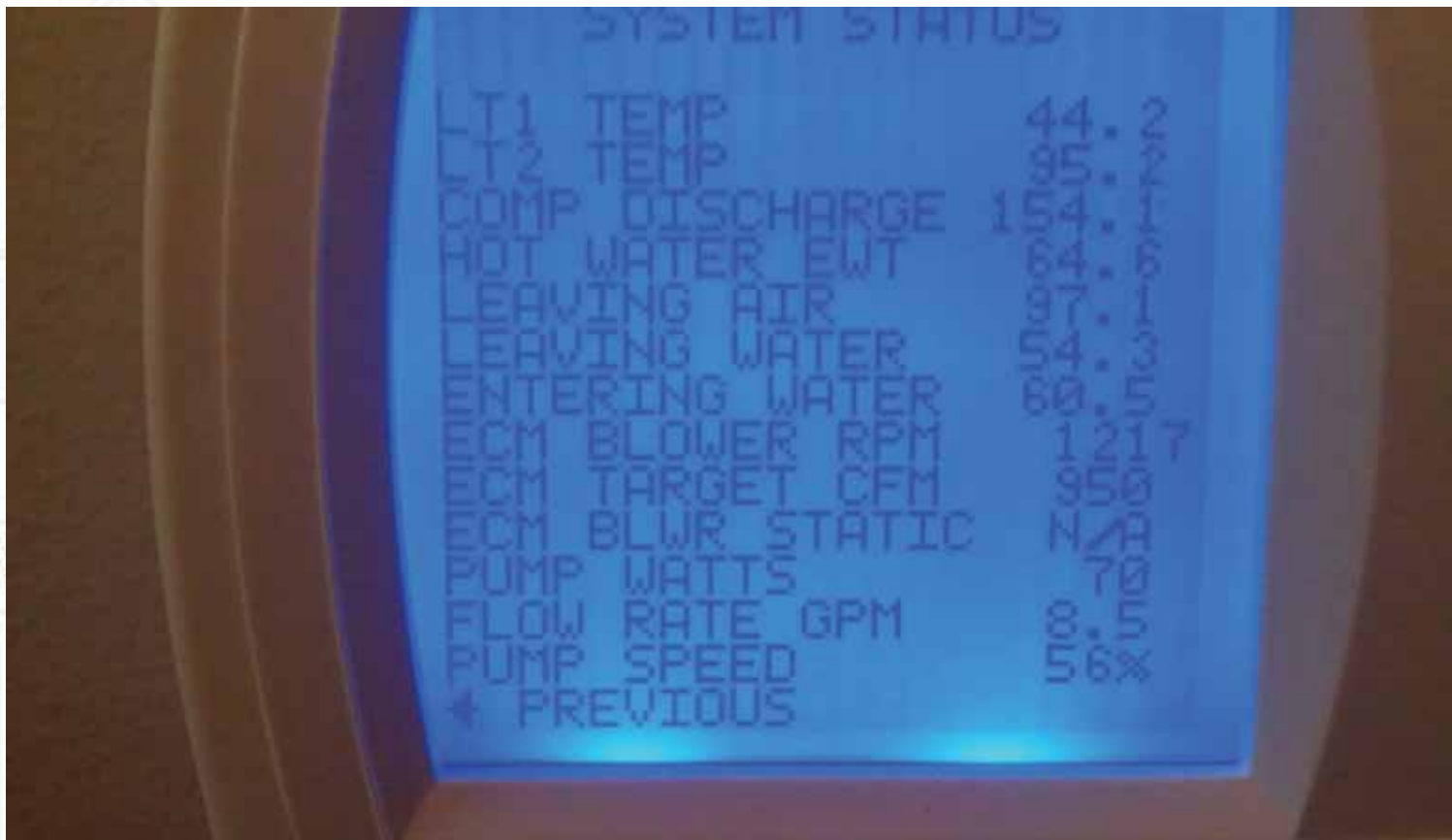
1150 CFM Nominal (ISO Rated) Airflow Heating, 1150 CFM Nominal (ISO Rated) Airflow Cooling

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD		Cooling - EAT 80/67°F								GPM	WPD		Heating - EAT 70°F							
		PSI	FT HD	CFM	TC	SC	KW	EER	HR	LOOP ΔT	HWG CAP		PSI	FT HD	CFM	HC	KW	COP	LOOP ΔT	HE	AIR ΔT	HWG CAP
20	Operation Not Recommended											9.0	9.2	21.3	920	24.8	2.42	3.0	3.8	16.8	25.0	3.3
												9.0	9.2	21.3	1150	25.3	2.32	3.2	4.0	17.3	20.3	3.4
30												4.5	2.4	5.6	920	27.0	2.48	3.2	8.6	18.7	27.2	3.3
												4.5	2.4	5.6	1150	27.5	2.39	3.4	8.9	19.3	22.1	3.5
												6.8	4.1	9.5	920	28.1	2.51	3.3	6.0	19.7	28.3	3.4
												6.8	4.1	9.5	1150	28.6	2.42	3.5	6.2	20.3	23.0	3.5
												9.0	7.6	17.5	920	28.7	2.53	3.3	4.6	20.2	28.9	3.5
												9.0	7.6	17.5	1150	29.2	2.43	3.5	4.8	20.9	23.5	3.6
40												4.5	2.0	4.7	920	30.7	2.59	3.5	9.8	21.9	30.9	3.6
												4.5	2.0	4.7	1150	31.2	2.49	3.7	10.1	22.7	25.1	3.8
												6.8	3.1	7.2	920	32.0	2.63	3.6	6.8	23.1	32.2	3.7
												6.8	3.1	7.2	1150	32.5	2.53	3.8	7.0	23.9	26.2	3.9
												9.0	6.4	14.8	920	32.7	2.65	3.6	5.3	23.8	32.9	3.8
												9.0	6.4	14.8	1150	33.3	2.55	3.8	5.5	24.6	26.8	4.0
50												4.5	1.8	4.2	920	34.4	2.70	3.7	11.2	25.3	34.6	4.1
												4.5	1.8	4.2	1150	35.0	2.59	4.0	11.6	26.2	28.2	4.2
												6.8	2.5	5.7	920	36.0	2.74	3.8	7.8	26.7	36.2	4.2
												6.8	2.5	5.7	1150	36.6	2.64	4.1	8.1	27.6	29.5	4.3
												9.0	5.7	13.1	920	36.8	2.77	3.9	6.1	27.4	37.0	4.3
												9.0	5.7	13.1	1150	37.4	2.66	4.1	6.3	28.4	30.1	4.4
60												4.5	1.6	3.8	920	38.2	2.81	4.0	12.7	28.7	38.5	4.6
												4.5	1.6	3.8	1150	38.9	2.70	4.2	13.2	29.7	31.3	4.7
												6.8	2.1	4.9	920	40.0	2.86	4.1	8.9	30.3	40.2	4.7
												6.8	2.1	4.9	1150	40.7	2.75	4.3	9.2	31.3	32.7	4.8
												9.0	5.2	11.9	920	40.9	2.89	4.2	6.9	31.1	41.2	4.8
												9.0	5.2	11.9	1150	41.6	2.78	4.4	7.1	32.2	33.5	5.0

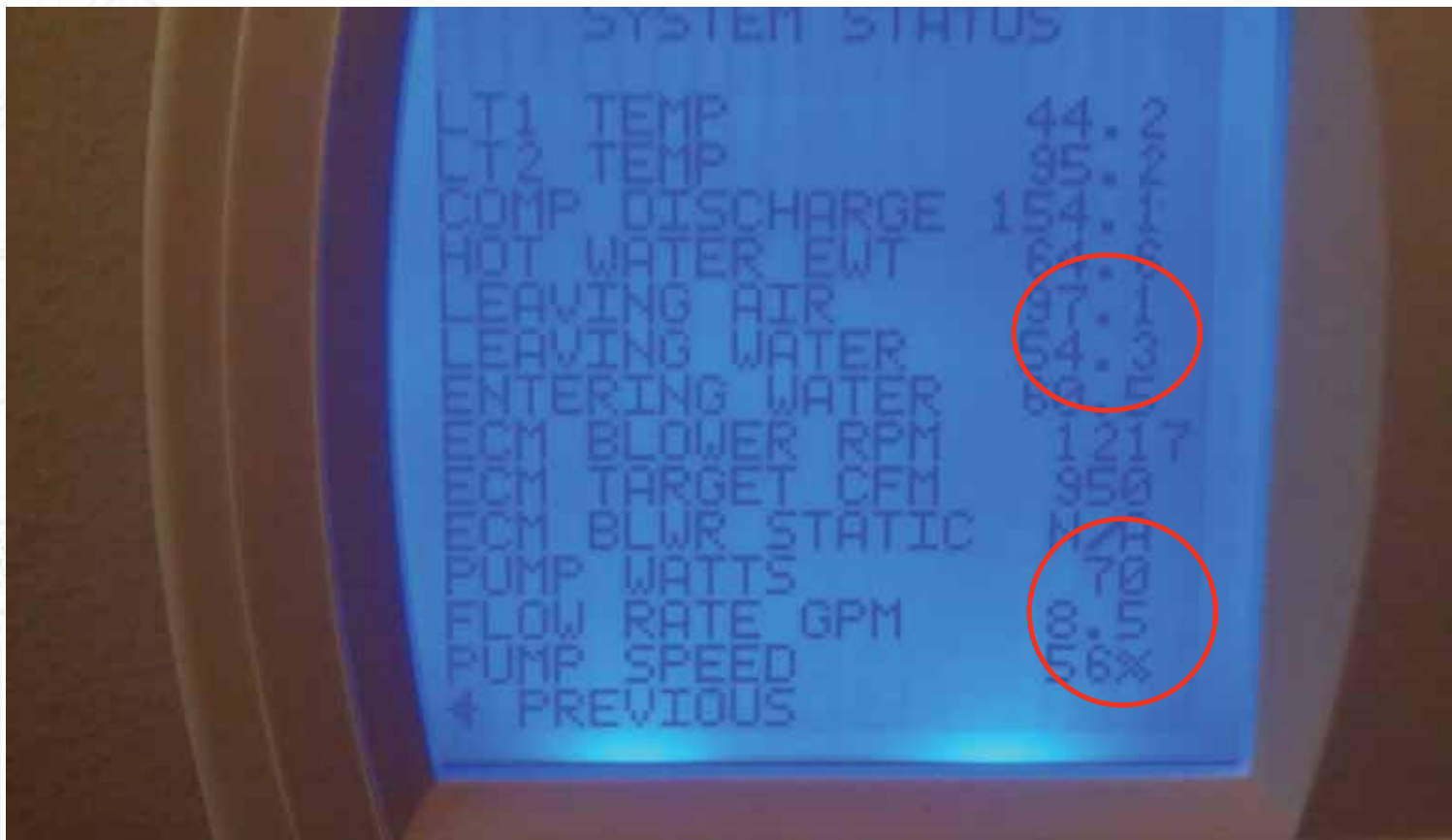
When water is used in lieu of anti-freeze, maintain flow to keep LWT > 40°F.

Under Control Diagnostics



SYSTEM STATUS	
LT1 TEMP	44.2
LT2 TEMP	95.2
COMP DISCHARGE	154.1
HOT WATER EWT	64.6
LEAVING AIR	97.1
LEAVING WATER	54.3
ENTERING WATER	60.5
BLMCH BLOWER RPM	1217
BLMCH TARGET CFM	950
BLMCH BLWR STATIC	N/A
PUMP WATTS	70
FLOW RATE GPM	8.5
PUMP SPEED	56%
← PREVIOUS	

Have EWT,LWT, and Flow(GPM)



What Else Do I Need?



- Fluid Factor 500 for water or 485 for antifreeze.
- Formula $HE/HR = \Delta T \times GPM \times \text{Fluid Factor}$.
- Then compare to Specified HE or HR
- If within 10% you are in good shape.

If I could Not Get GPM From Thermostat Or
Service Tool.



If You Can Not Read GPM on Service Tool Or Thermostat.



- You will need a digital tire pressure gauge.
- After getting pump to desired speed or valve to desired opening measure pressure drop using pressure ports at front of the unit.
- If you do not have correct flow go back into manual mode and and adjust speed.
- The Variable speed pump will only show GPM on screen if pump is between 50-90% pump speed.

Pressure Ports And Gauge



Table 10a: TZ Coax Water Pressure Drop

Model	GPM	Pressure Drop (psi)			
		30°F*	50°F	70°F	90°F
024	2.3	2.2	1.5	1.2	1.1
	3.4	4.5	3.1	2.5	2.4
	3.0	3.7	2.4	1.9	1.8
	4.5	6.1	4.3	3.4	3.2
	6.0	12.8	10.0	8.6	8.0
030	3.0	1.1	0.9	0.8	0.8
	3.8	1.5	1.1	1.0	0.9
	4.5	2.1	1.6	1.3	1.3
	6.0	3.4	2.6	2.2	2.1
	7.5	4.7	3.5	3.0	2.8
036	3.0	1.0	0.7	0.6	0.6
	4.0	2.1	1.2	1.0	0.9
	6.0	3.6	2.0	1.6	1.5
	6.8	4.1	2.5	2.0	1.9
	9.0	7.6	5.7	4.8	4.3
042	3.8	1.3	1.1	0.9	0.8
	5.6	2.8	2.0	1.7	1.6
	7.5	4.5	3.4	2.9	2.7
	7.9	4.9	3.7	3.1	2.9
	10.5	7.3	5.8	5.1	4.8
048	4.5	1.6	1.1	0.9	0.8
	6.0	2.4	1.7	1.3	1.2
	6.8	2.9	2.0	1.7	1.5
	9.0	4.7	3.5	3.0	2.8
	12.0	7.4	5.6	4.9	4.7
060	6.0	4.0	2.6	2.4	2.4
	7.5	5.4	3.8	3.3	3.3
	9.0	6.8	4.9	4.4	4.3
	12.0	10.6	7.9	7.0	6.7
	15.0	16.2	12.8	11.1	10.1

* Based on 15% methanol antifreeze solution

