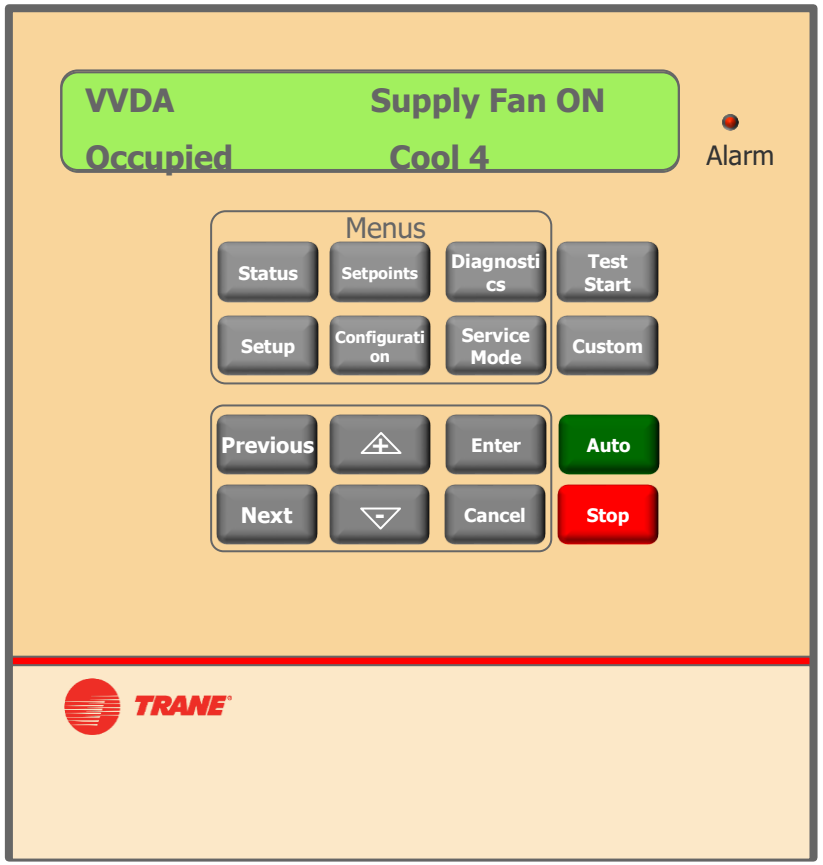
Legacy vs Symbio 800

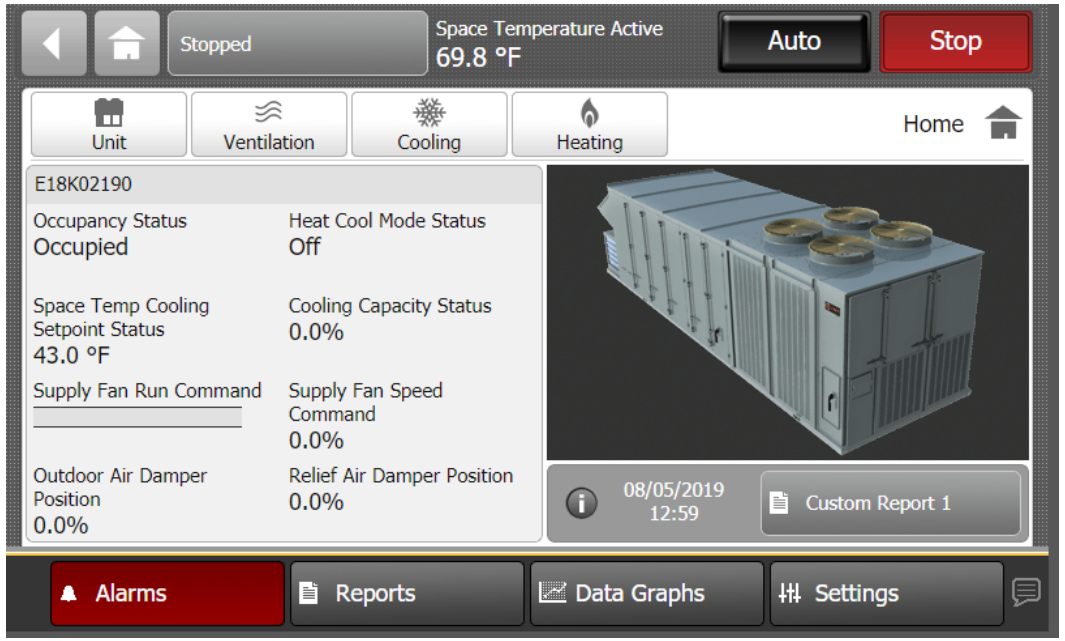
IPAK I &II

IPAK III

Legacy IPAK I&II with Symbio 800

Human Interface

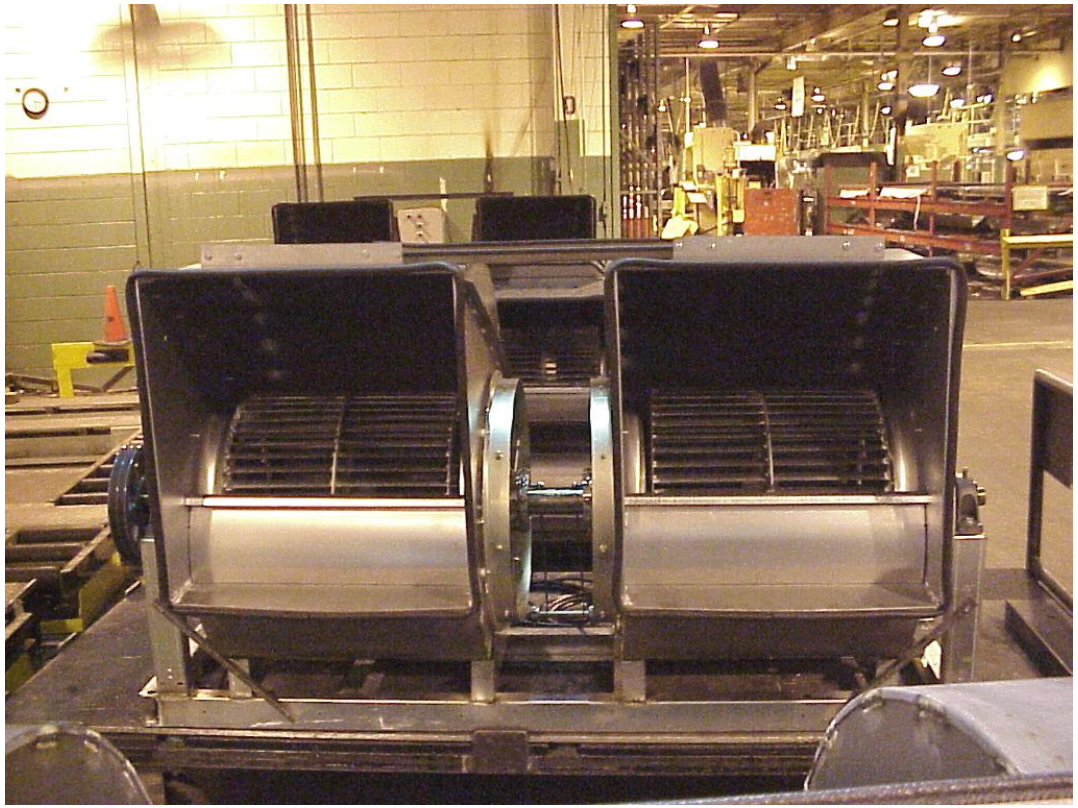




Legacy IPAK
– discontinued

Fans

IPAK I &II



IPAK III

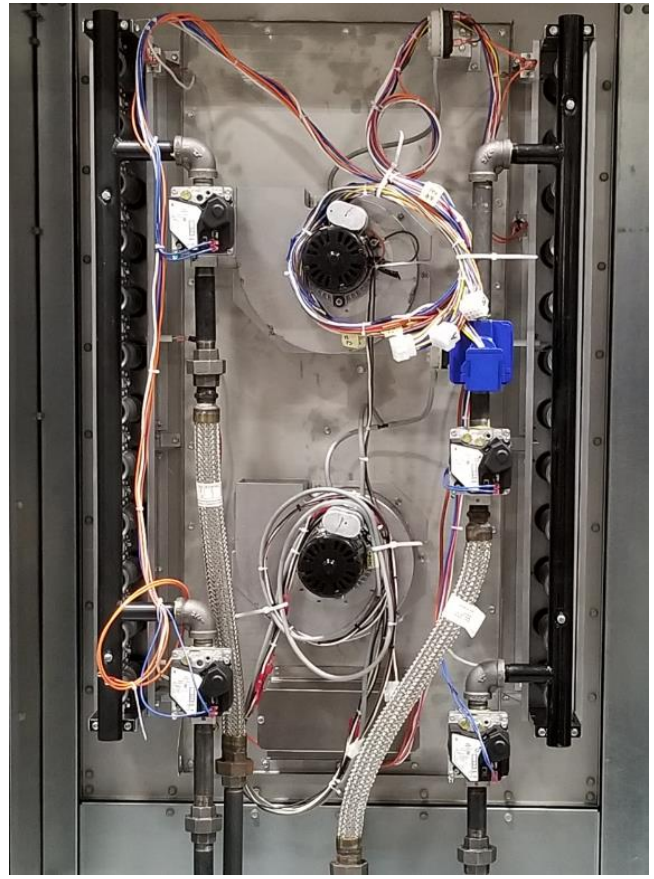
Heat Section

Legacy IPAK
– discontinued

Legacy IPAK w/Symbio 800

Siemens Controller

IPAK III



Supply Fan VFD

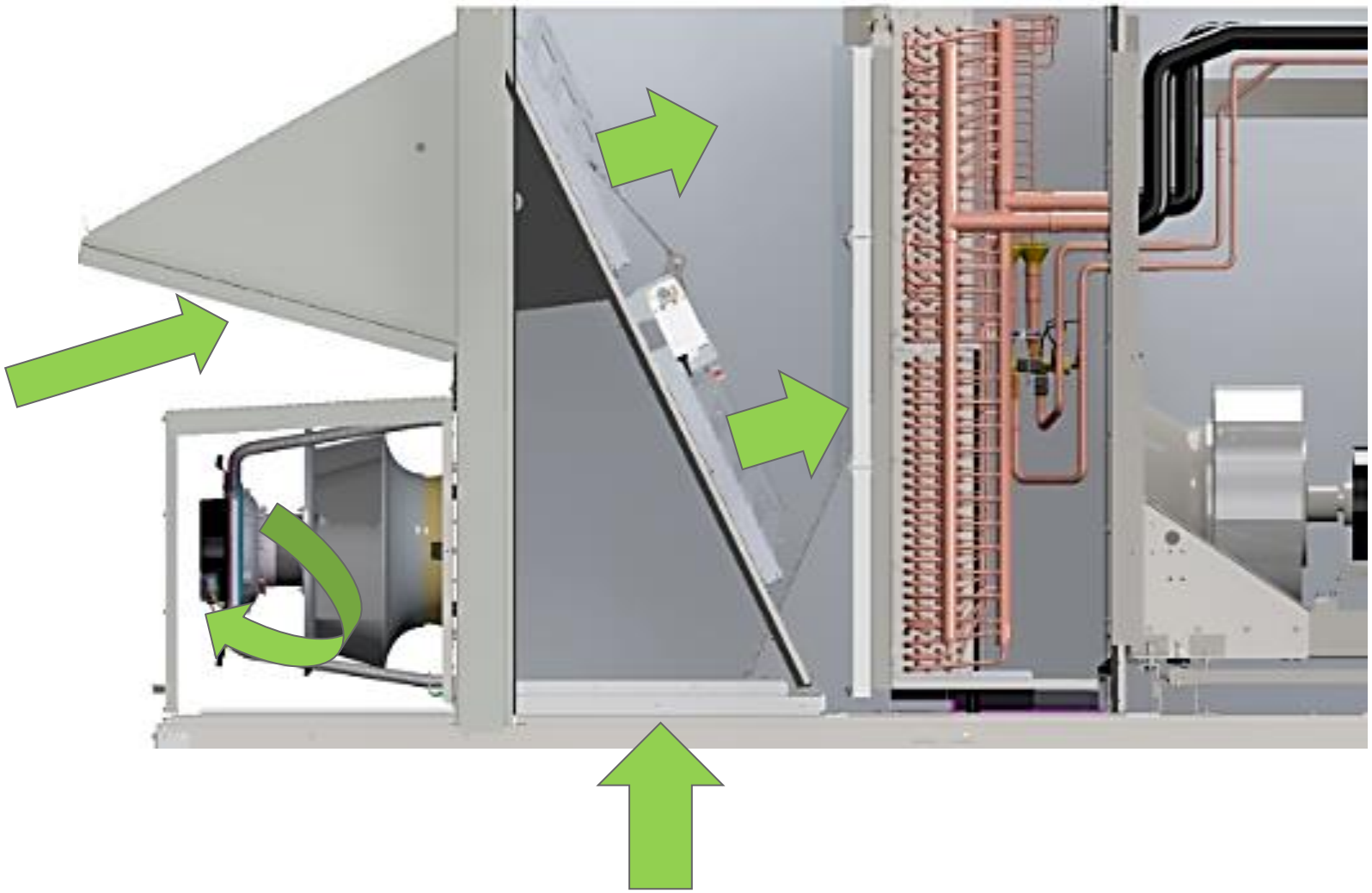
OA Damper

IPAK I &II

IPAK III

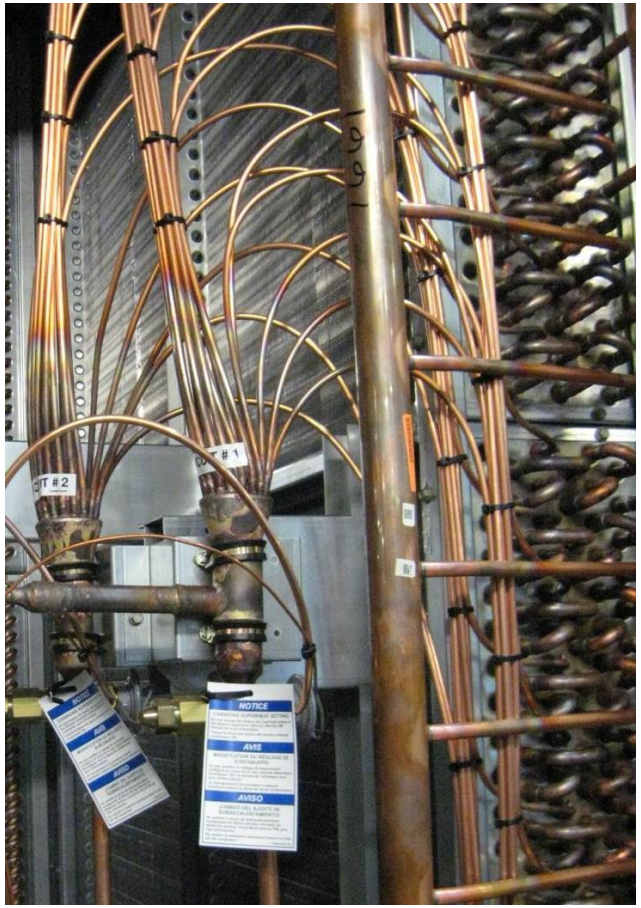
OA Damper

IPAK III

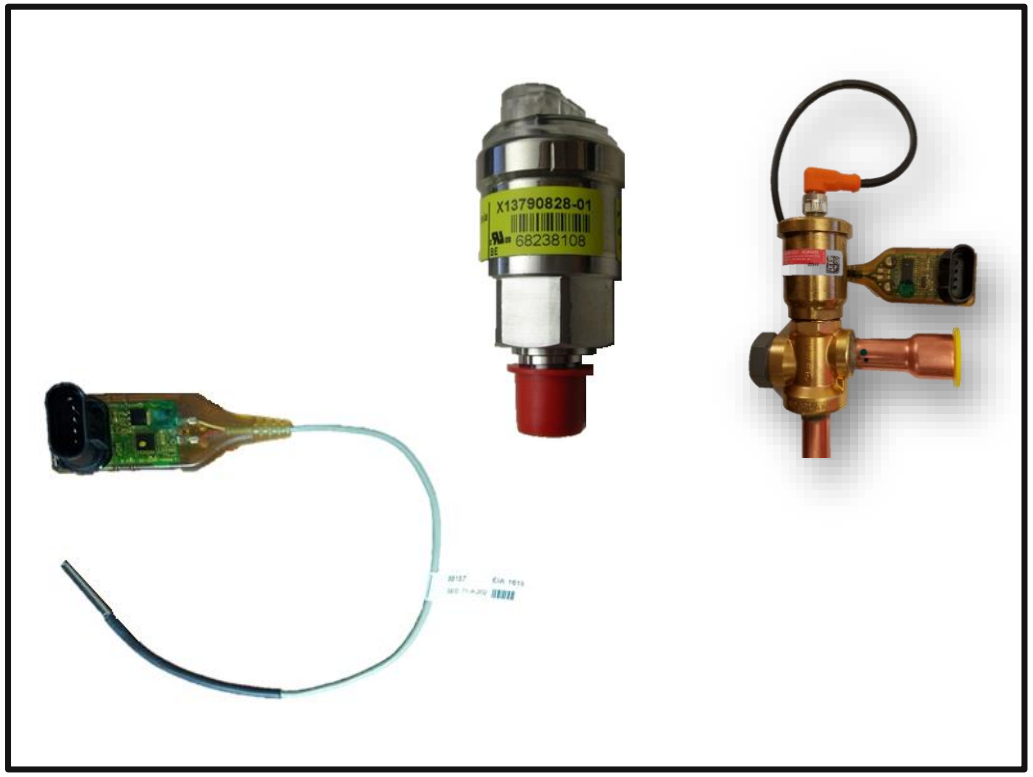


Refrigerations Controls

Legacy IPAK - discontinued



IPAK III & Legacy w/Symbio 800



A2L & R454b Refrigerant

- Mildly Flammable Classification
- Lower Global Warming Potential (GWP)
- A2L
  - A = LOWEST TOXICITY
  - 2L = MILDLY FLAMMABLE
- R-454
  - Trane's choice for A2L
  - R-454B = 68.9% R-32 and 31.1% R-1234yf

P/T Differences

- R454 pressure is slightly lower than R410
- Pay attention to glide

50°F saturated temp:
135 PSIG (R454B)
145 PSIG (R410A)

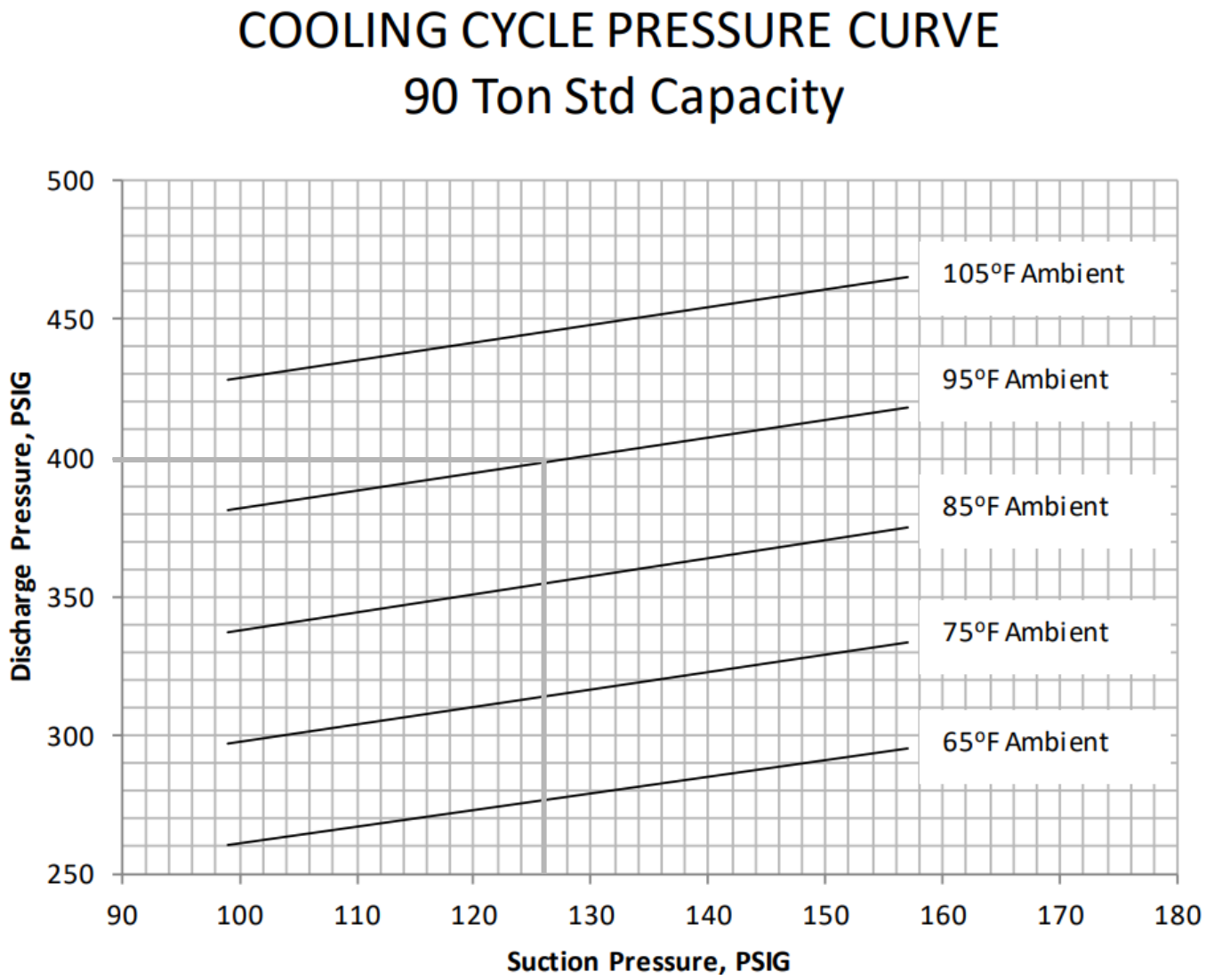
R-454B			
Pressure (psig)	Temperature (°F)		
	Average	Bubble	Dew
0	-58.1	-59.0	-57.3
20	-24.3	-25.2	-23.3
40	-3.6	-4.6	-2.6
60	11.9	10.9	13.0
70	18.5	17.4	19.6
80	24.5	23.4	25.6
90	30.0	29.0	31.1
95	32.7	31.6	33.8
100	35.2	34.1	36.3
105	37.7	36.6	38.8
110	40.0	38.9	41.1
115	42.3	41.2	43.4
120	44.6	43.5	45.7
125	46.7	45.6	47.9
130	48.9	47.7	50.0
135	50.9	49.8	52.1
140	52.9	51.8	54.1
145	54.9	53.8	56.0
150	56.8	55.7	58.0
155	58.7	57.6	59.8
160	60.5	59.4	61.7

GENETRON AZ-20 (R-410A) PRESSURE BASED PT CHART	
PSIG	°F
105	33.8
110	36.1
115	38.4
120	40.6
125	42.8
130	44.9
135	46.9
140	48.9
145	50.8
150	52.7
155	54.5
160	56.4

Refrigerant Pressure Curve Comparison

- R-454b
- 95° ambient
- 126 psig low pressure
- 400 psig high pressure

Discharge pressure: R-454b < R410a by 25 psig



Leak Detection Sensor

- Operational Voltage
  - Range 18-32VAC, 24VDC ±10%
- Modbus Communications
  - Default Modbus address is 50
- Dry Contact
- Alarm Threshold Trigger Value 15% LFL
- Alarm Threshold Reset Value 10% LFL

Leak Detection Sensor- Mitigation Sequence

- Supply fans activated to deliver circulation airflow
- VAV Boxes fully opened
- Compressors disabled
- Additional mechanical ventilation activated
- Mitigation will continue until refrigerant has not been detected for five minutes.

Refrigerant Evacuation/Charge

- Access Points
  - Reclaim/Charge/Evacuation sequence button accessible via TD7 or Tracer TU.
- Reclaim/Charge Sequence
  - Expedites process, reducing manual execution by technicians.
  - Separate button for each refrigeration circuit.

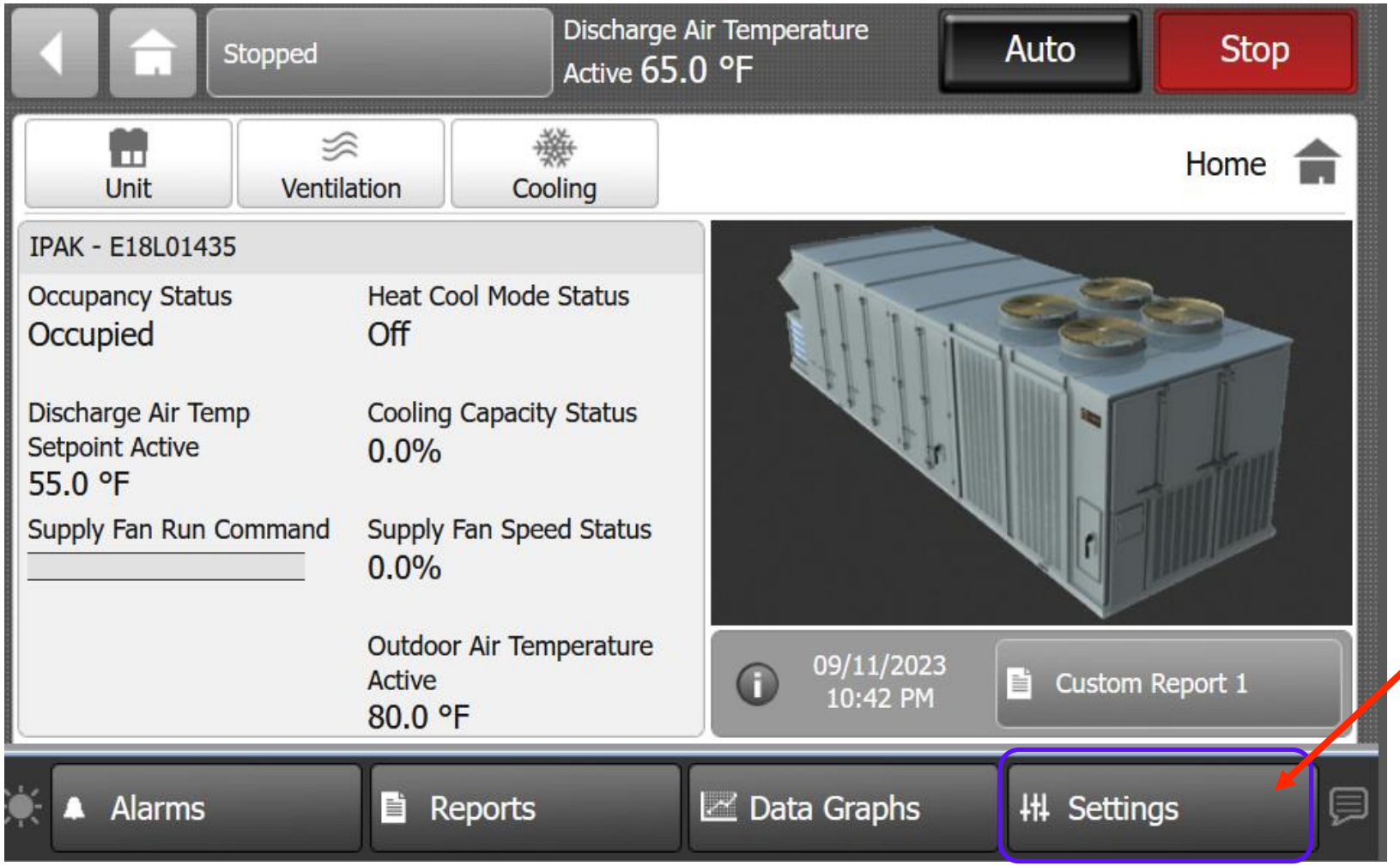
Refrigerant Evacuation/Charge

- Evacuation Sequence
  - Allows circuit to stay open longer for complete evacuation
  - Single button per circuit on TD7 & TU to open all valves
    - EXV, Reheat, Cooling

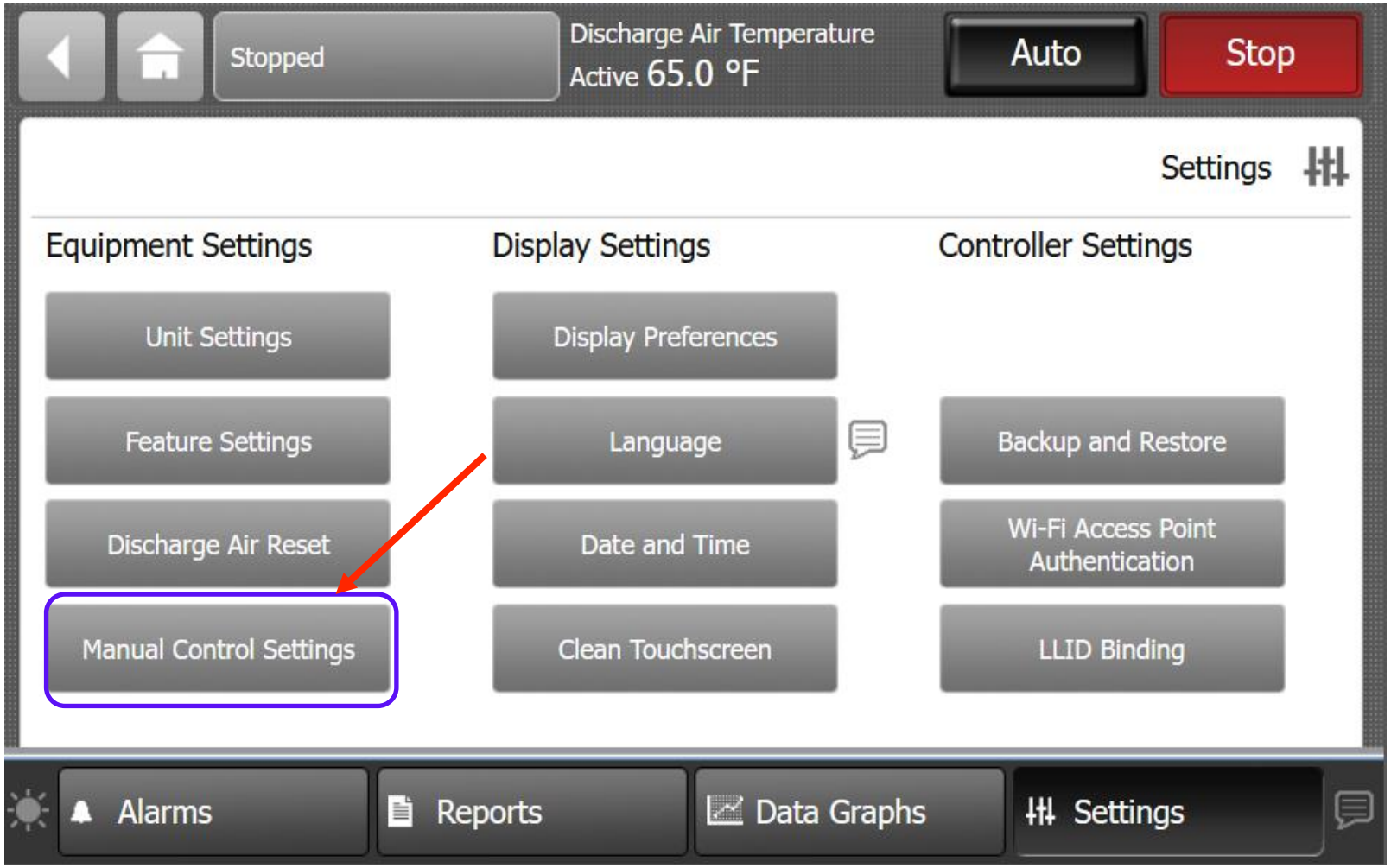
Refrigerant Evacuation/Charge

- Access Points
  - Reclaim/Charge/Evacuation sequence button accessible via TD7 or Tracer TU.
- Reclaim/Charge Sequence
  - Expedites process, reducing manual execution by technicians.
  - Separate button for each refrigeration circuit.

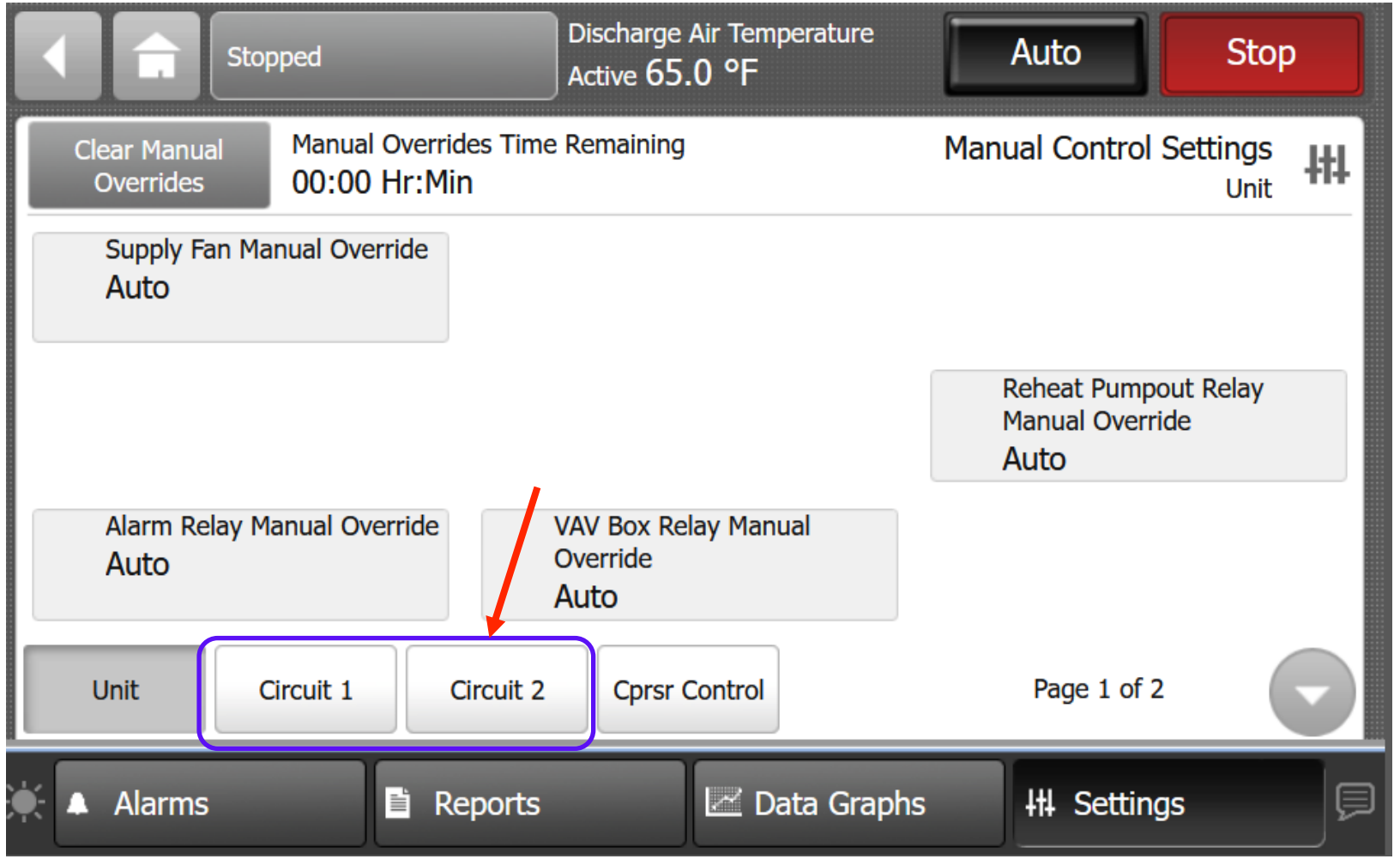
Refrigerant Evacuation/Charge



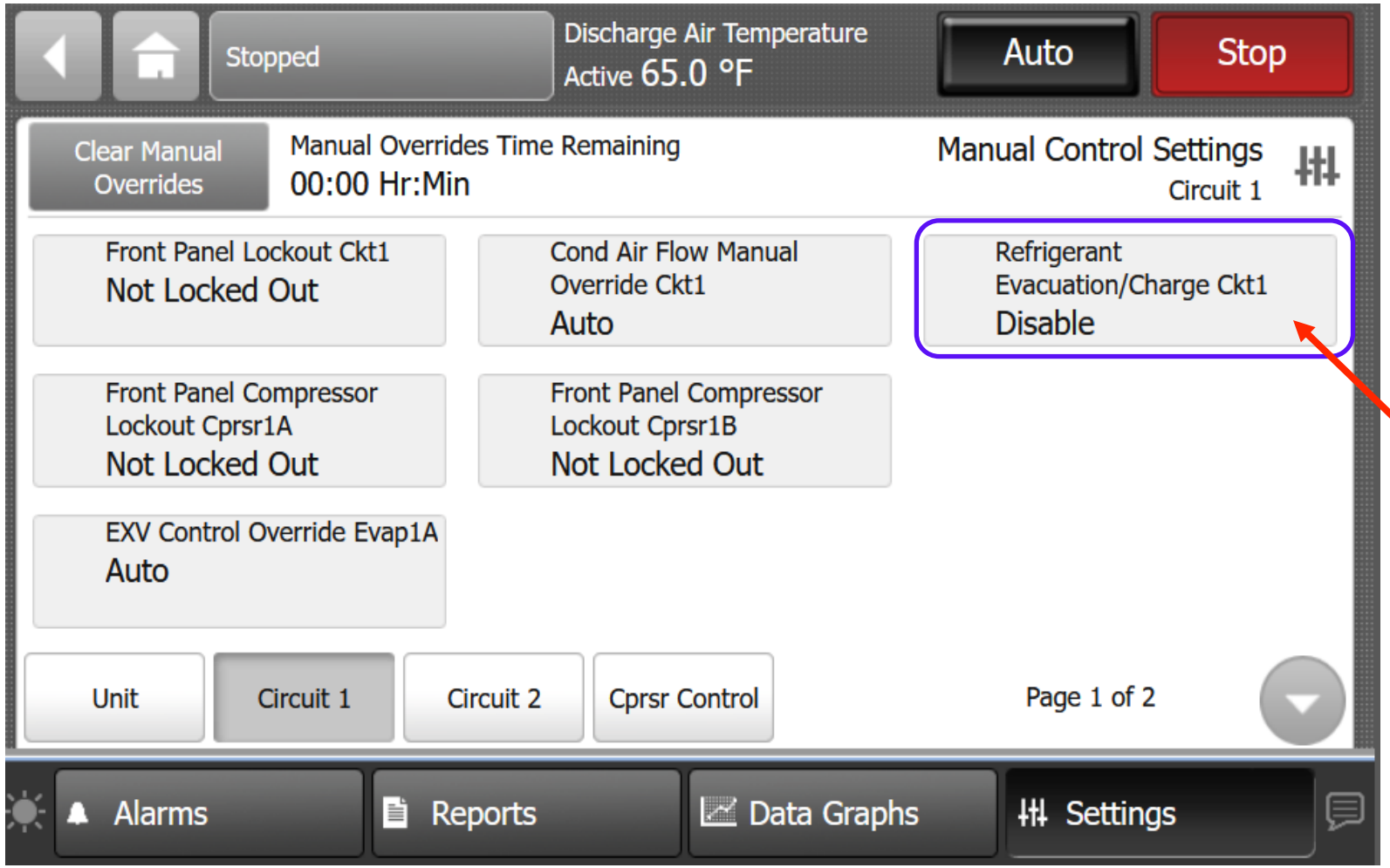
Refrigerant Evacuation/Charge



Refrigerant Evacuation/Charge

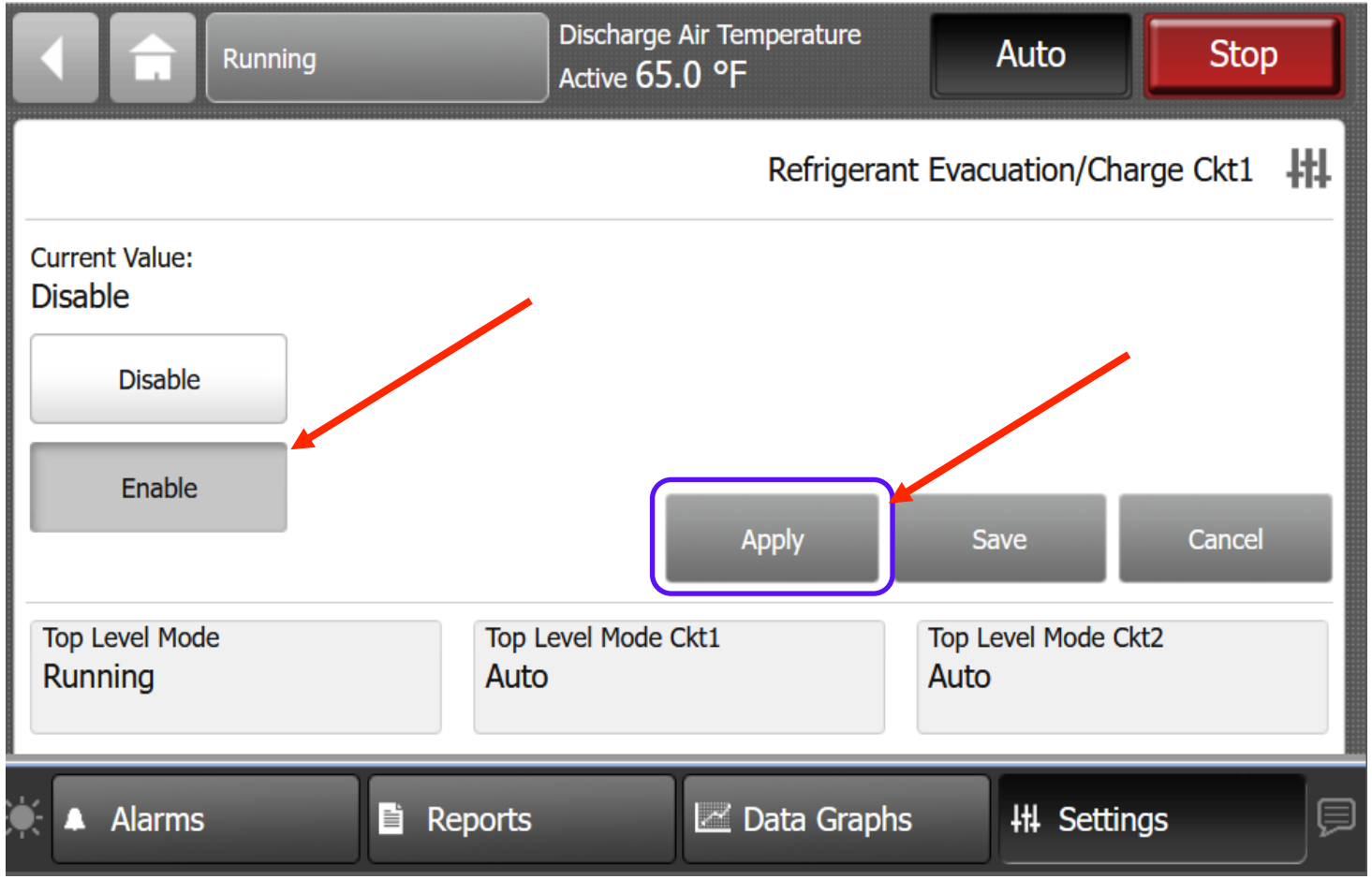


Refrigerant Evacuation/Charge

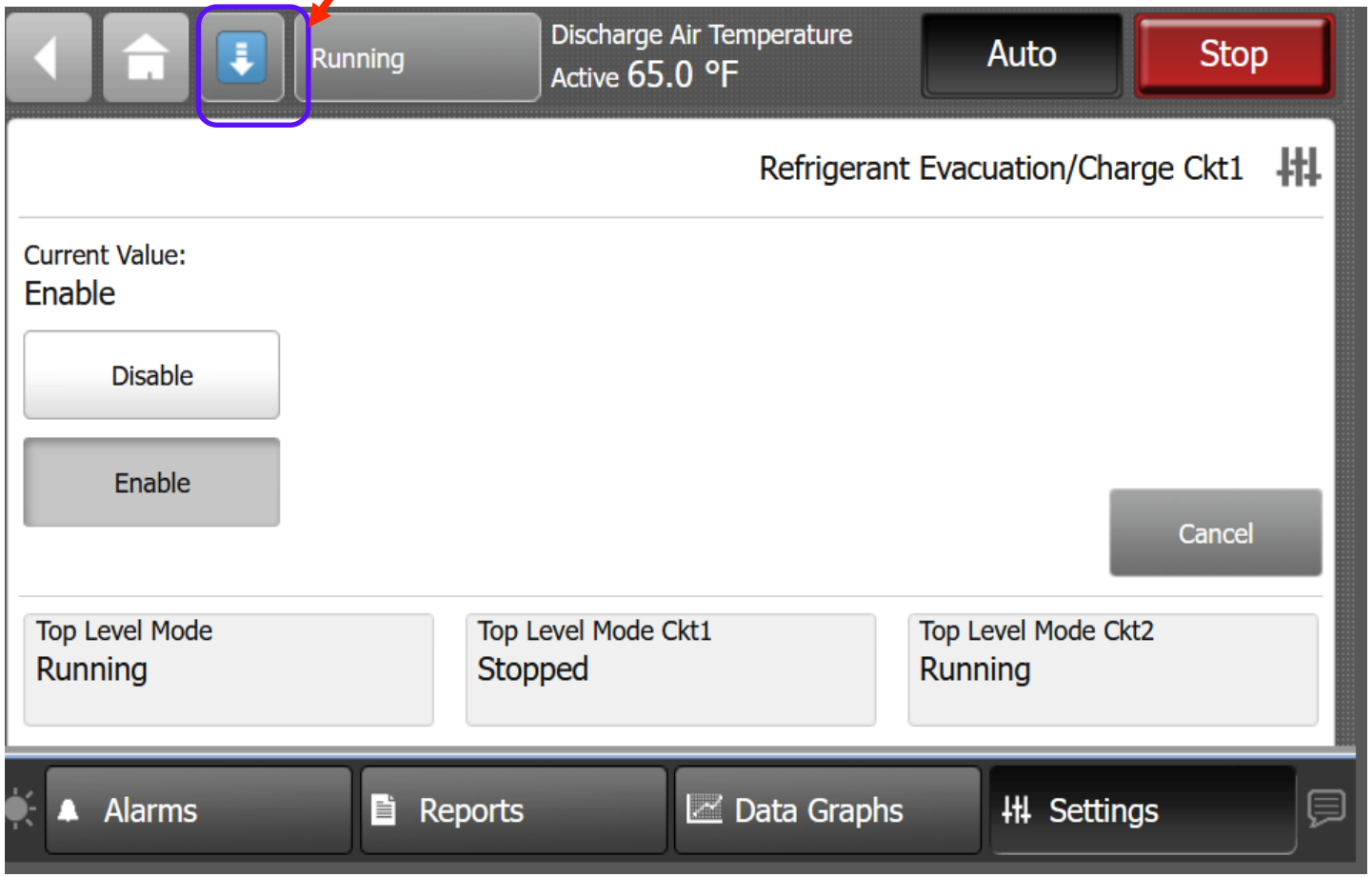


- Circuit Level
- Disable / Enable (Disable)

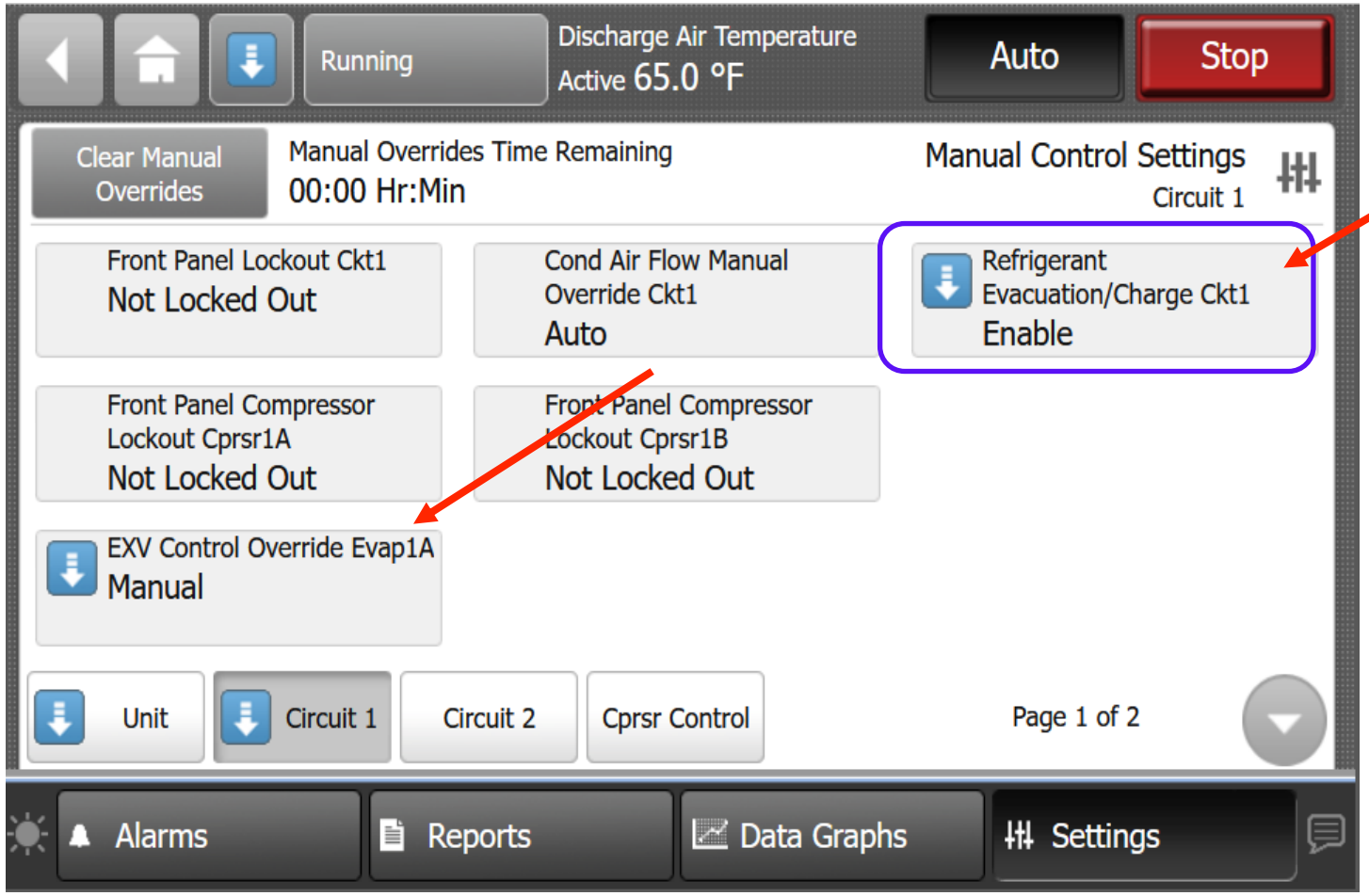
Refrigerant Evacuation/Charge



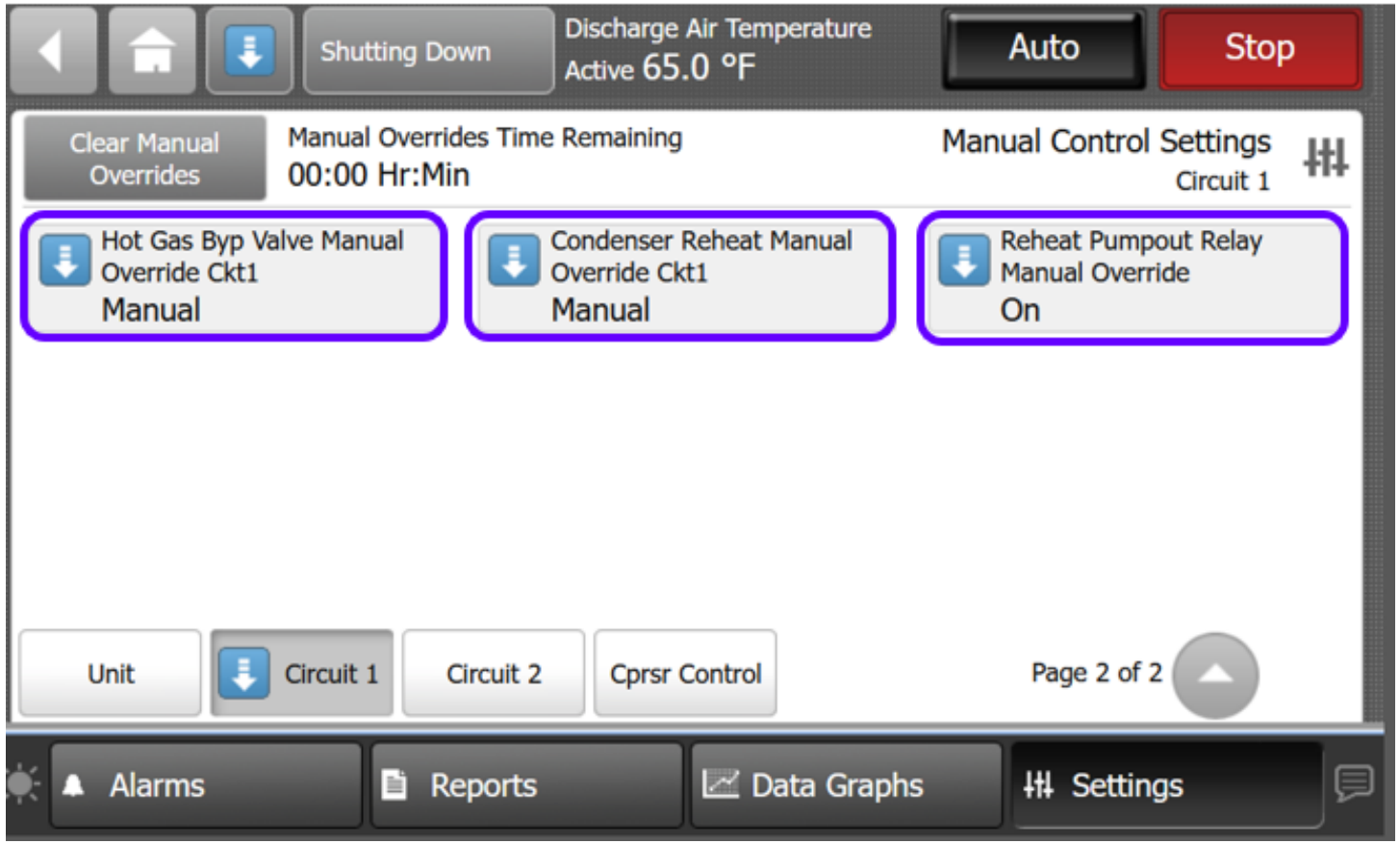
Refrigerant Evacuation/Charge



Refrigerant Evacuation/Charge

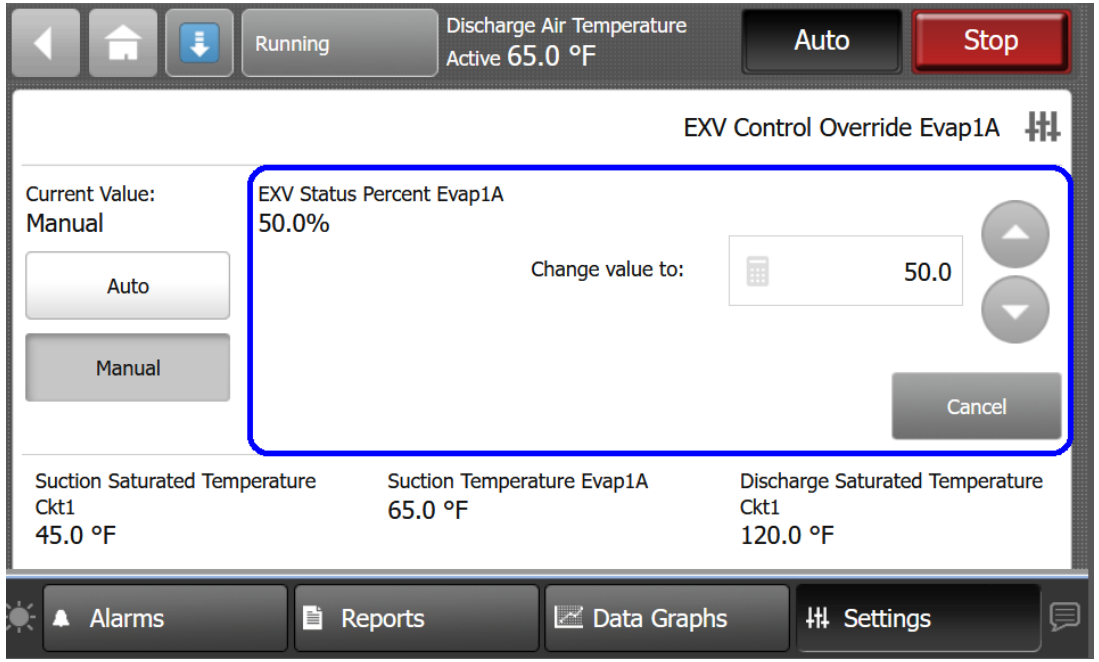


Refrigerant Evacuation/Charge



Component List

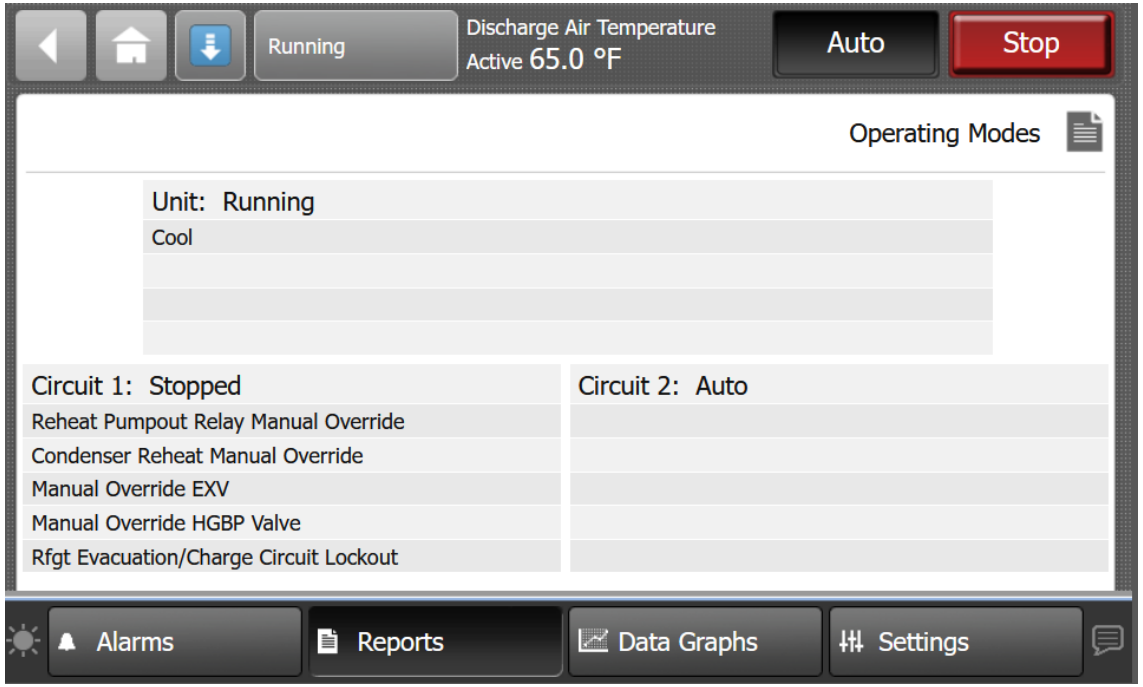
Component	Command
EXV Control Override Evap 1A	50%
EXV Control Override Evap 1B	50%
EXV Control Override Evap 2A	50%
EXV Control Override Evap 2B	50%
Hot Gas Byp Valve Manual Override Ckt1	50%
Condenser Reheat Manual Override Ckt1	50%
Reheat Pumpout Relay Manual Override	Open



*** Reheat Pumpout Relay cannot be commanded Off during Evacuation/Charge Operation.**

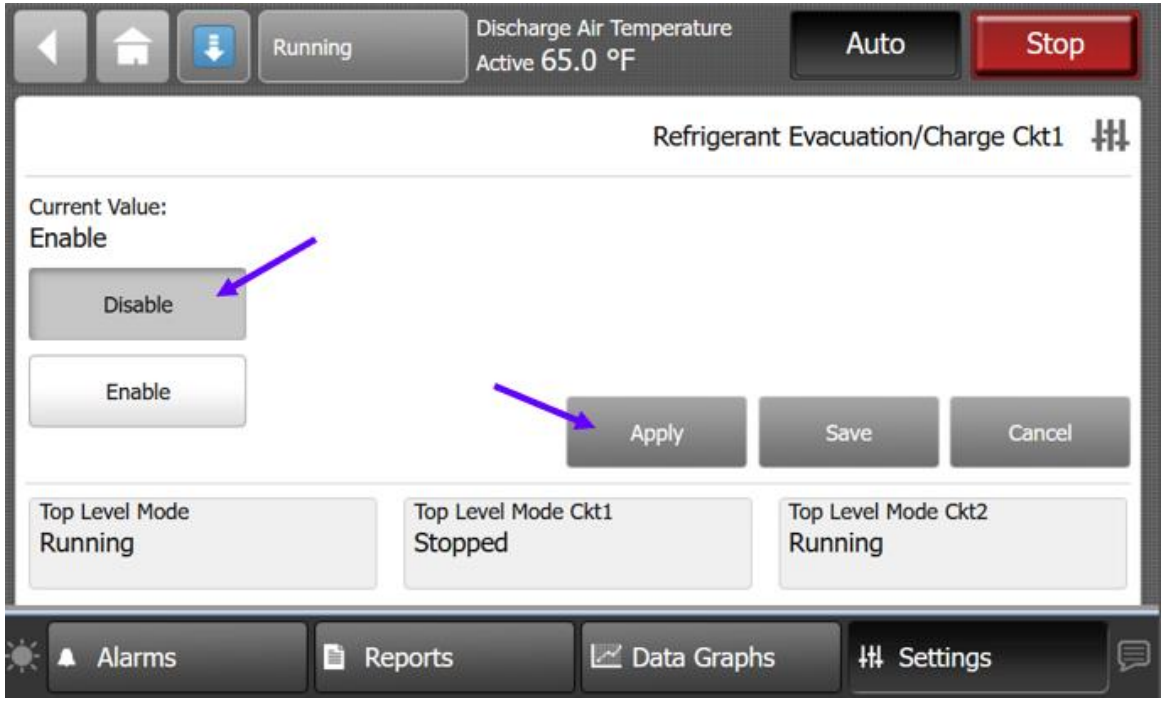
Refrigerant Evacuation/Charge

- Evacuation/Charge Operation
  - Compressor Minimum On Time will be honored if compressor is running
  - Compressor operation locked out



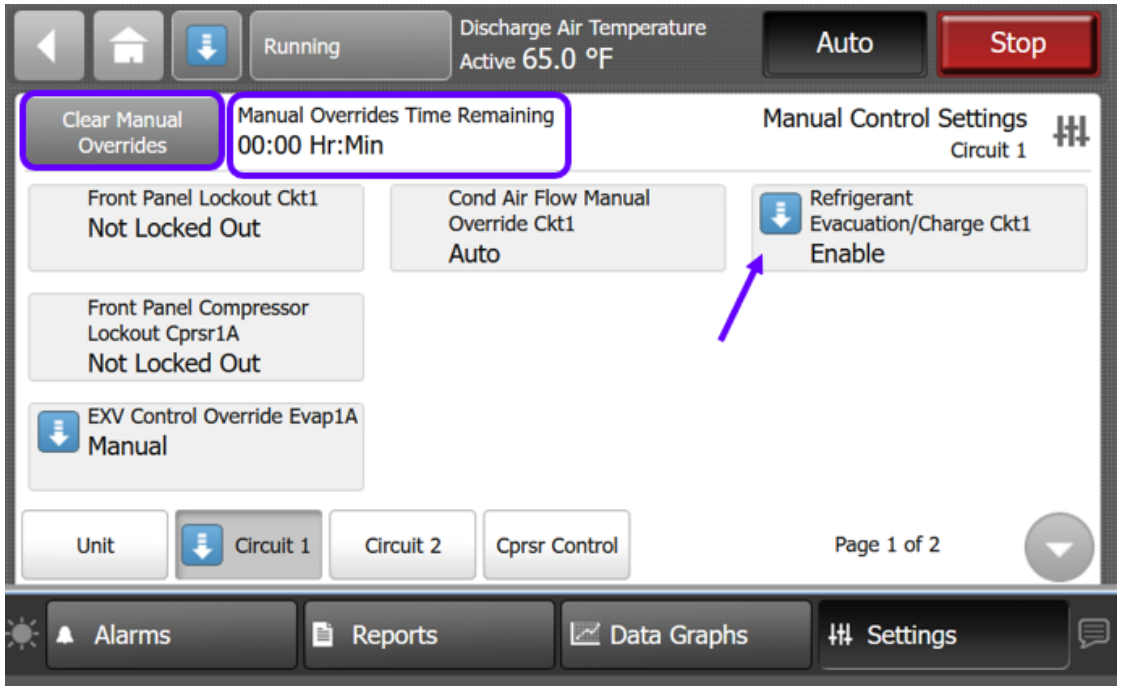
Refrigerant Evacuation/Charge

- Once active
  - The function will persist through power off-on cycles
  - Valves placed into manual override with this function can only be removed through this function.



Refrigerant Evacuation/Charge

- Manual Override Timer
  - No timer countdown
  - Doesn’t clear evacuation function
- Evacuation/Charge can only be cleared by disabling the function.



Supply Fan VFD programming

- VFD is factory programmed
  - Unit nameplate shows Max/Min Hz

MODEL NUMBER	RF0603442AAAA3M1F231000D004B20A00A3B21C0000100
SERIAL NUMBER	C18123456
EVAP FAN VFD MAX HZ	55
EVAP FAN VFD MIN HZ	20

VFD Parameters

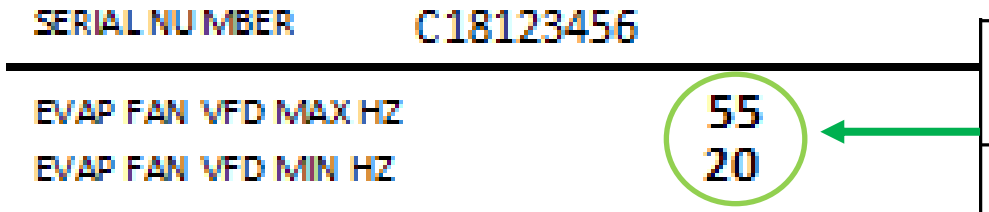
3-02	Minimum Reference (HZ)	Per Unit Nameplate - Evap Fan VFD Min Hz
3-03	Maximun Reference (HZ)	Per Unit Nameplate - Evap Fan VFD Max Hz

- Fan curve shows RPM

4 Pole motor = 1750 RPM @ 60 Hz
55 Hz / 60 Hz = 0.92
0.92 X 1750 = 1604 RPM

IPAK 1 DDP Fan VFD programming

- VFD is factory programmed
  - Unit nameplate shows Max/Min Hz



VFD Parameters		
3-02	Minimum Reference (HZ)	Per Unit Nameplate - Evap Fan VFD Min Hz
3-03	Maximun Reference (HZ)	Per Unit Nameplate - Evap Fan VFD Max Hz

- IPAK 1 Model Number shows selected RPM

Digit 15 — Supply Air Fan RPM

G = 1600 RPM

H = 1700 RPM

J = 1800 RPM

4 Pole motor = 1750 RPM @ 60 Hz
55 Hz / 60 Hz = 0.92
0.92 X 1750 = 1604 RPM

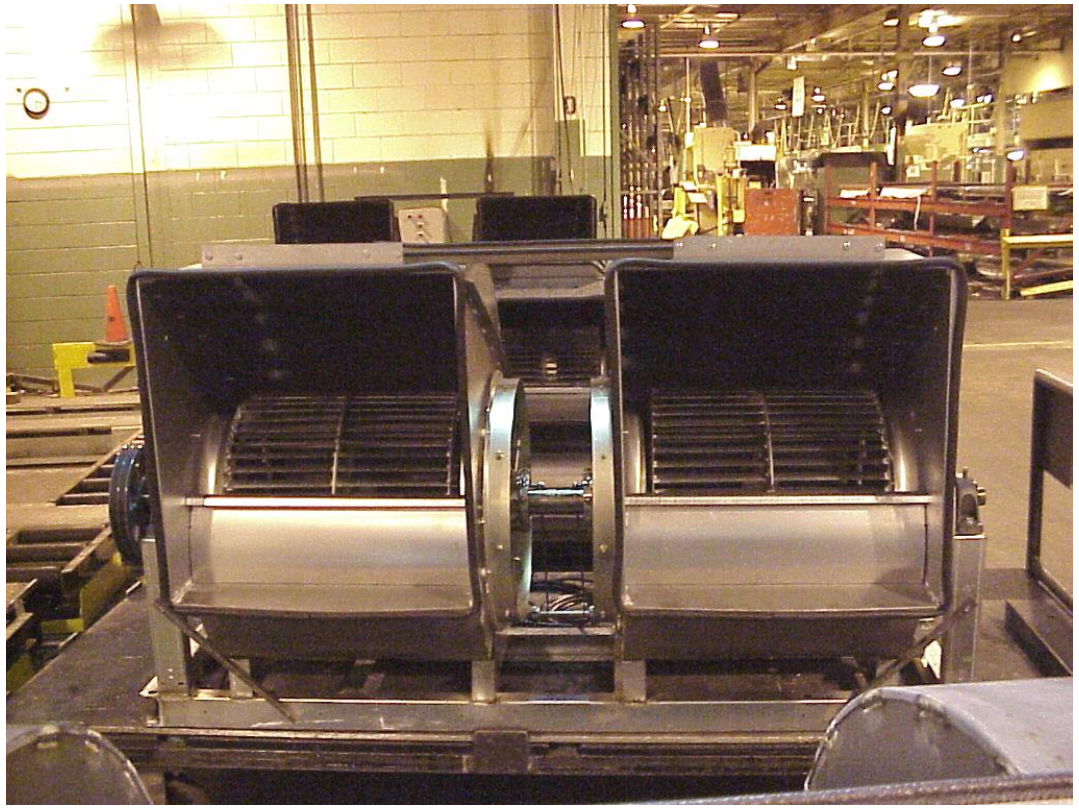
TRANE

LET'S GO BEYOND™

Forward Curved Fan

TRANE UNIVERSITY™

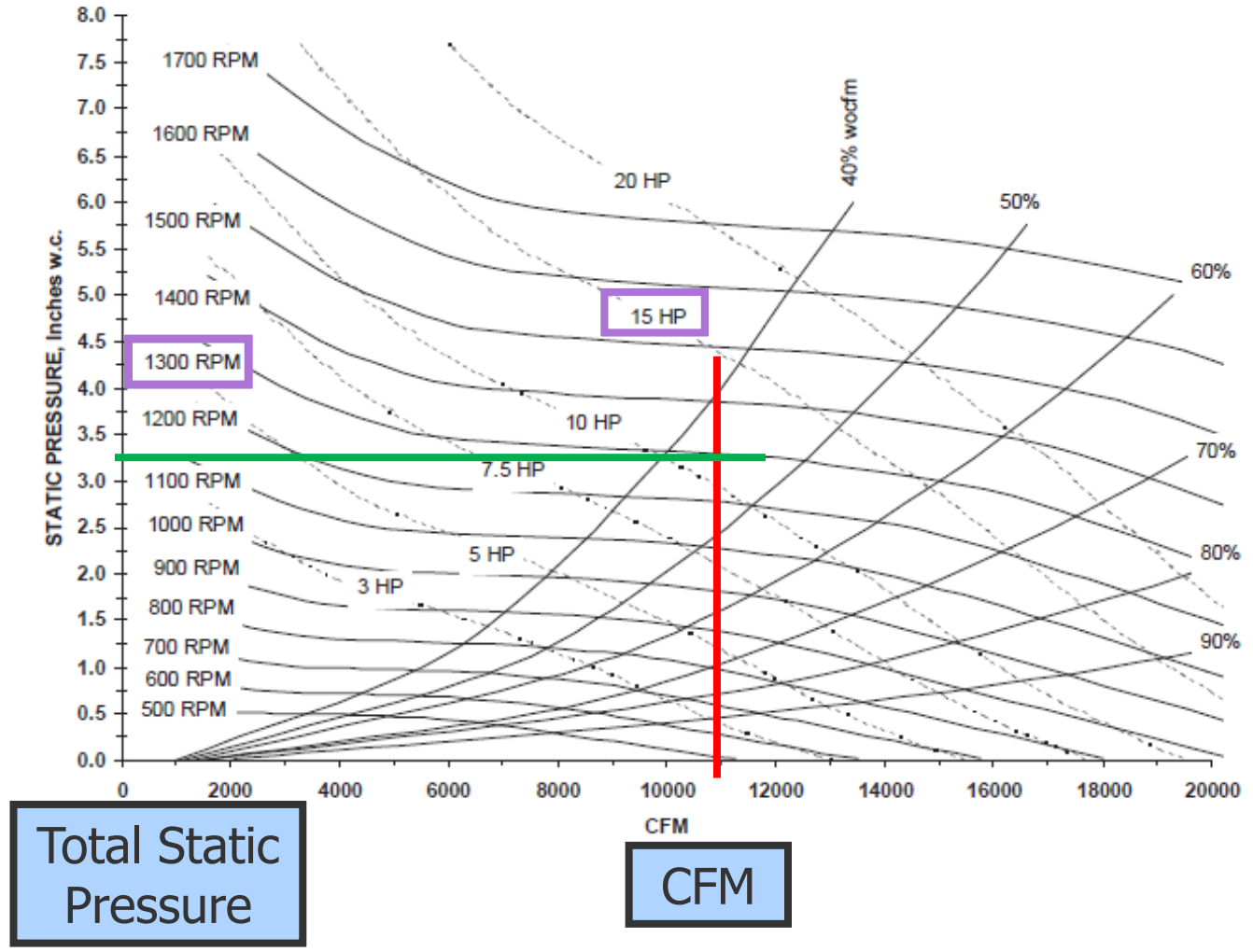
Forward Curved Fan



- Used on IPAK1 20 to 75 ton units
- Single fan drive assembly

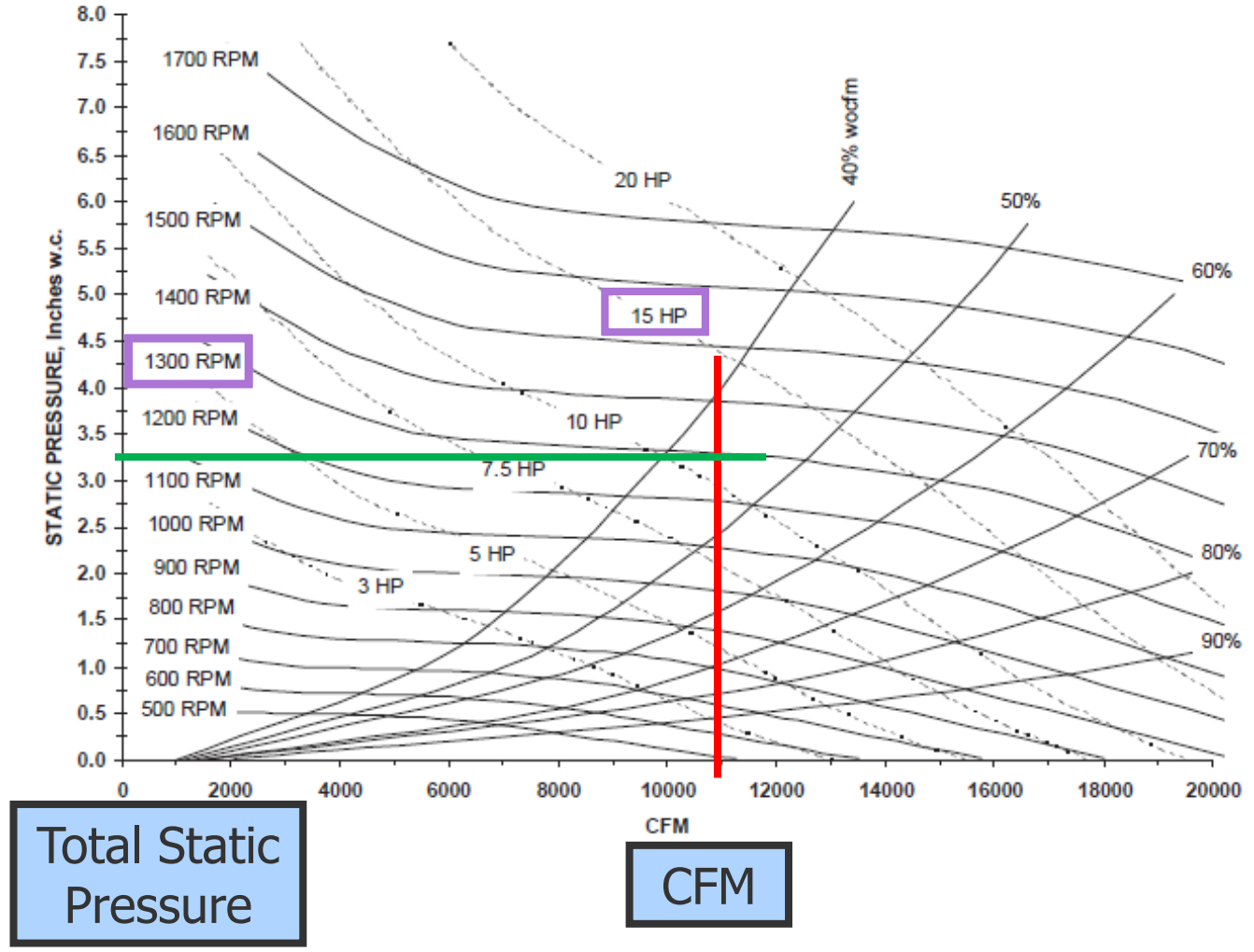
Forward Curve Fan Selection

- Fan Selection
  - CFM needed versus Total Static Pressure
    - Return ducting
    - Curb
    - Filters
    - Evaporator coil
    - Heater
    - Supply ducting



Forward Curve Fan Selection

- Example
  - 11,000 CFM needed
  - Pressure drops add up to 3.25”
  - Select 1300 RPM fan
  - Select 15 HP motor



Brake Horsepower

- To Determine BHP without a VFD
  - Measure fan motor amp draw
  - Record nameplate amps
  - Record nameplate HP
  - Calculate BHP by using the following formula

  - BHP = (Actual Amps ÷ FLA) x HP

BHP Example

Actual measured amps = 13

Nameplate Full Load Amps (FLA) = 18

Nominal Horsepower = 10HP

BHP = (Actual Amps ÷ FLA) x Nominal HP

BHP = (13 ÷18) x 10

BHP = .7222 x 10

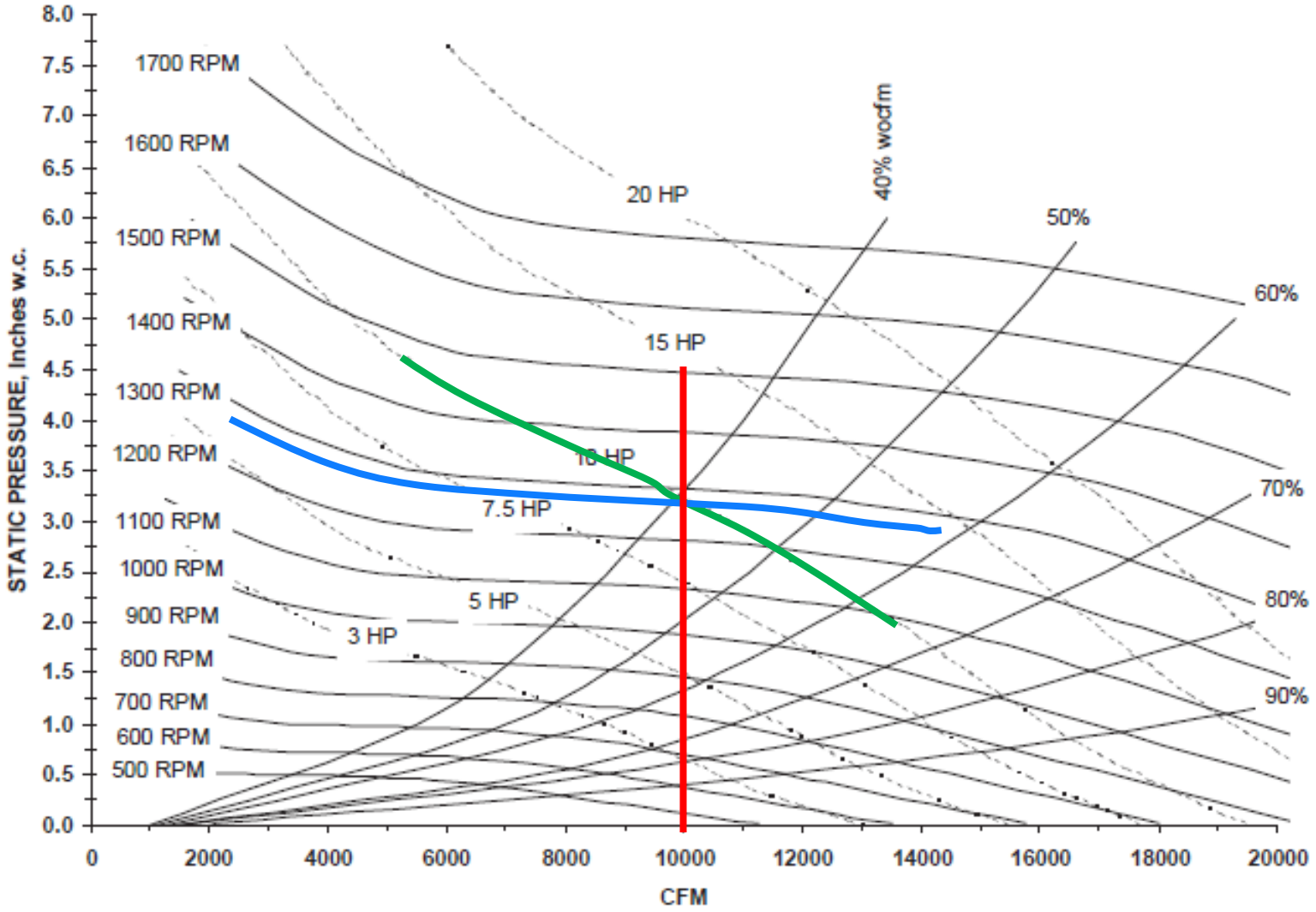
BHP = 7.2

TR200 Status Screen

- To Determine BHP with a VFD
  - With fan running at 60 Hz
  - Read Brake HP on VFD display

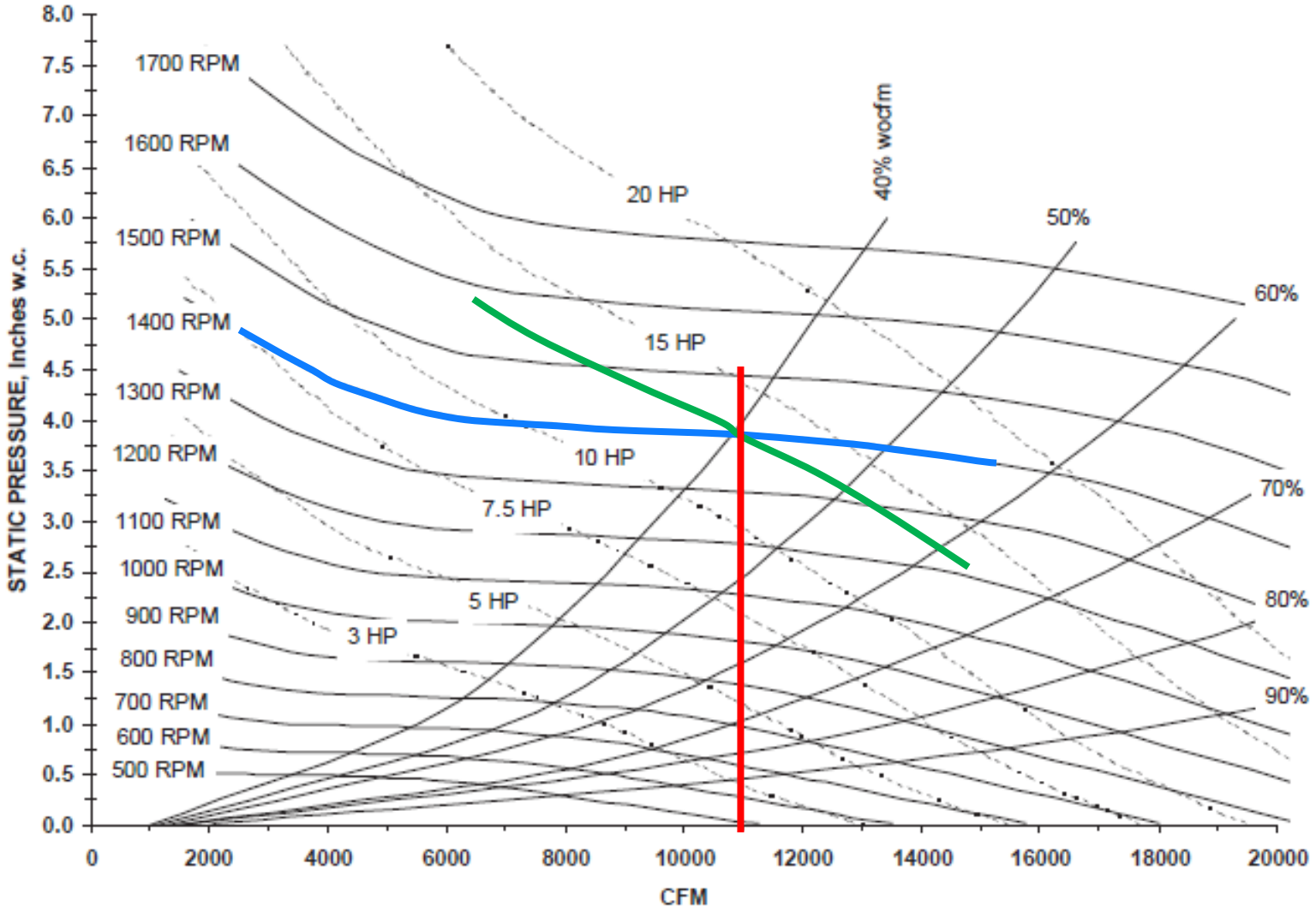
hp = Brake Horsepower

Forward Curve Fan - Field Measurement



- Airflow measurement Forward Curve Fan
  - Determine BHP
    - 10.0 BHP
  - Determine Blower RPM
    - 1290
  - Plot Points on Fan Curve
  - At Intersection Read Down to CFM (Accurate to +/- 5%)

Forward Curve Fan - Field Adjustment



- Airflow measurement Forward Curve Fan
  - Change sheaves to new RPM
    - 1400 RPM
  - Measure new BHP
  - Plot Points on Fan Curve
  - At Intersection Read Down to CFM (Accurate to +/- 5%)

TRANE

LET'S GO BEYOND™

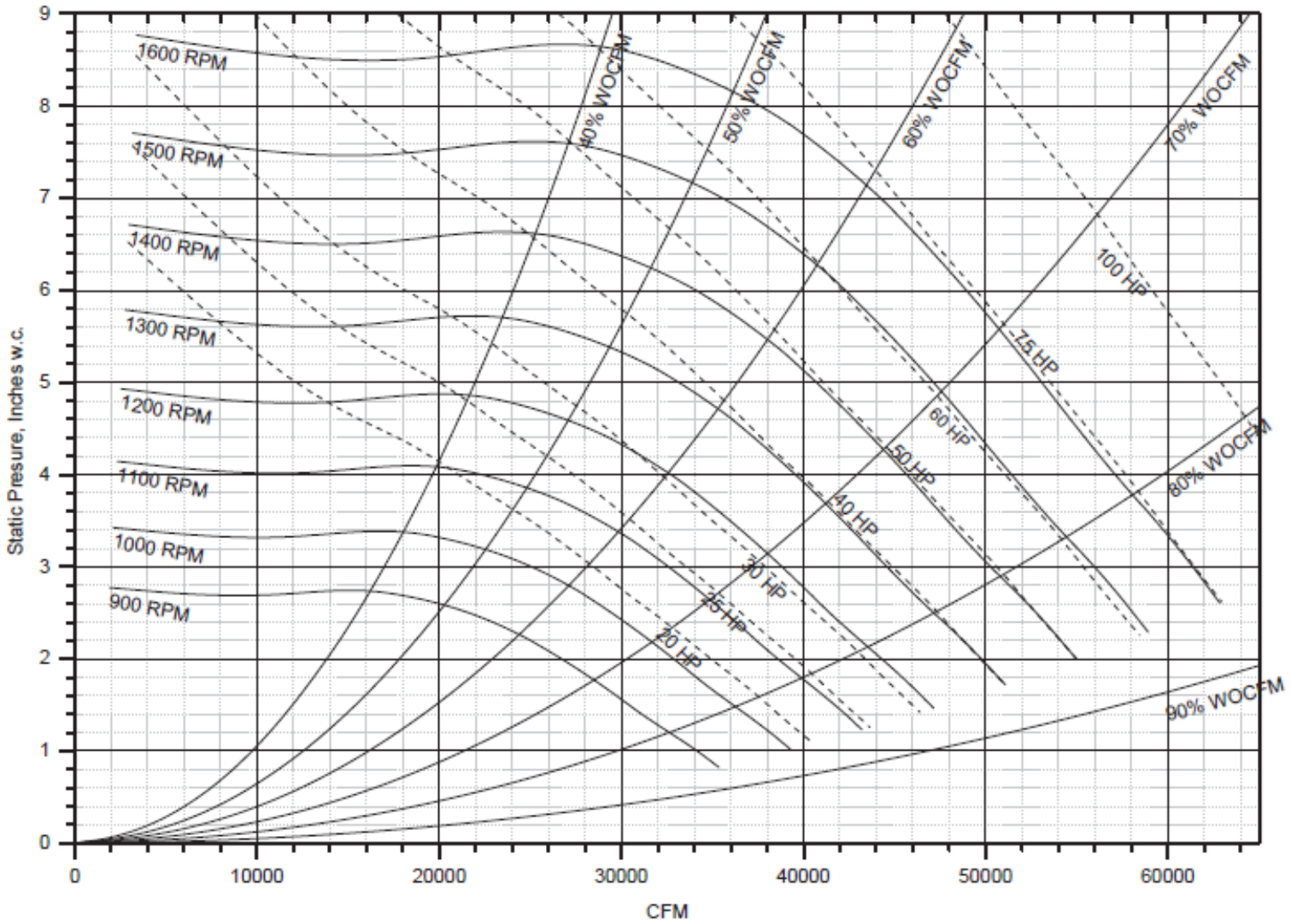
Airfoil Fan

TRANE UNIVERSITY™

Airfoil Fan

- Used On 90 To 162 Ton Units
  - Intellipak I
    - Two Independent fan drive assemblies
  - Intellipak II
    - One single fan drive
    - Better efficiency at higher static pressures

Airfoil Fan

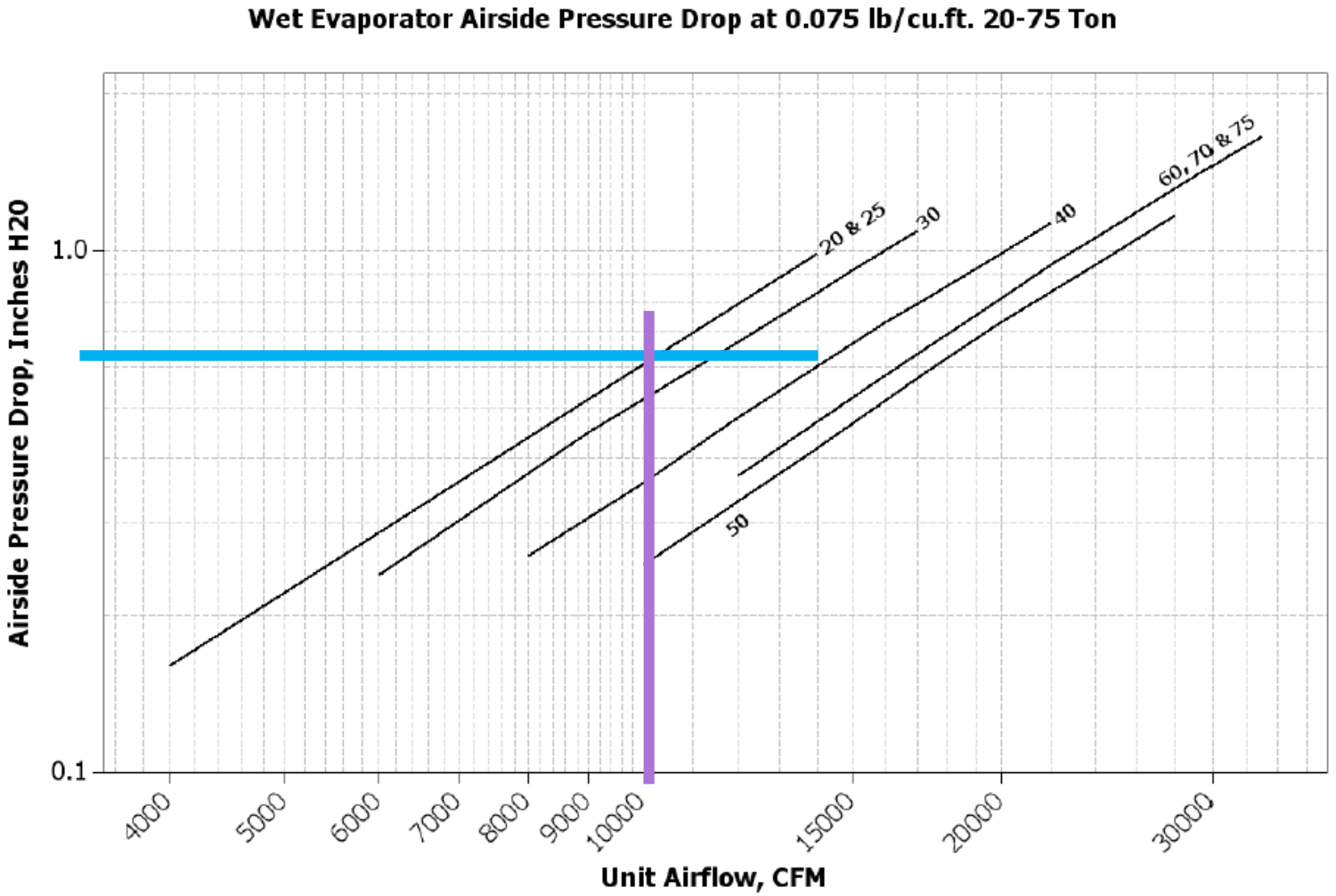


- Air flow measurement Airfoil Fan
  - BHP lines are in parallel with RPM lines, so airflow cannot be determined by plotting
  - Must use another method to measure airflow.
  - However, if airflow is known, changes to airflow can be plotted

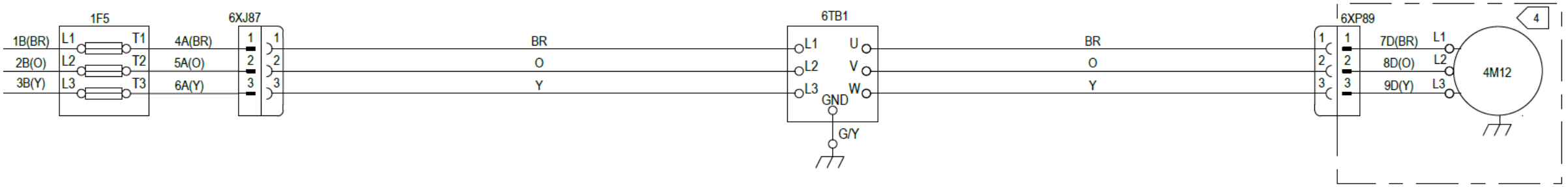
Airfoil Fan Airflow Measurement

- Can use evaporator pressure drop tables located in the IOM
  - Tables are based on unit tonnage
- Two tables
  - Wet coil
  - Dry coil
- Using a manometer, measure the evaporator pressure drop
  - Plot on the appropriate chart for coil conditions
  - Where pressure drop line intersects unit tonnage
    - Read straight down to obtain airflow in CFM

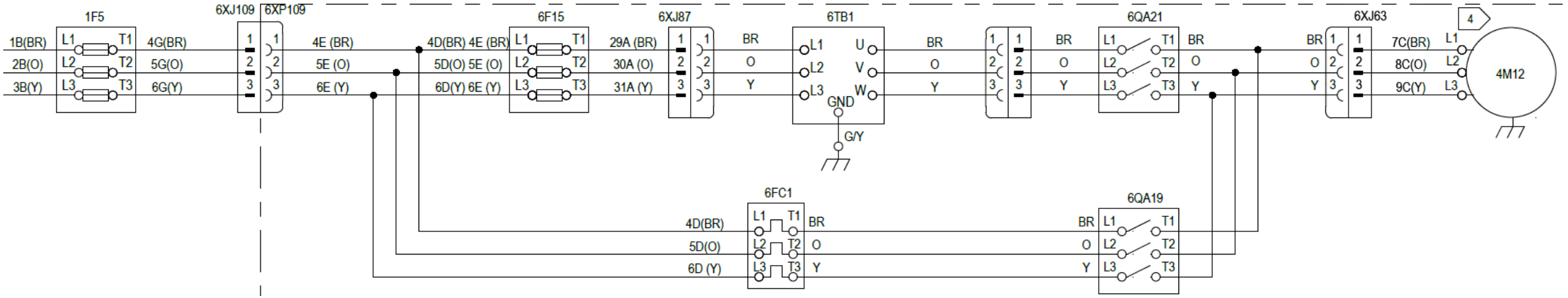
Airfoil Fan Airflow Measurement



VFD Wiring Without Bypass



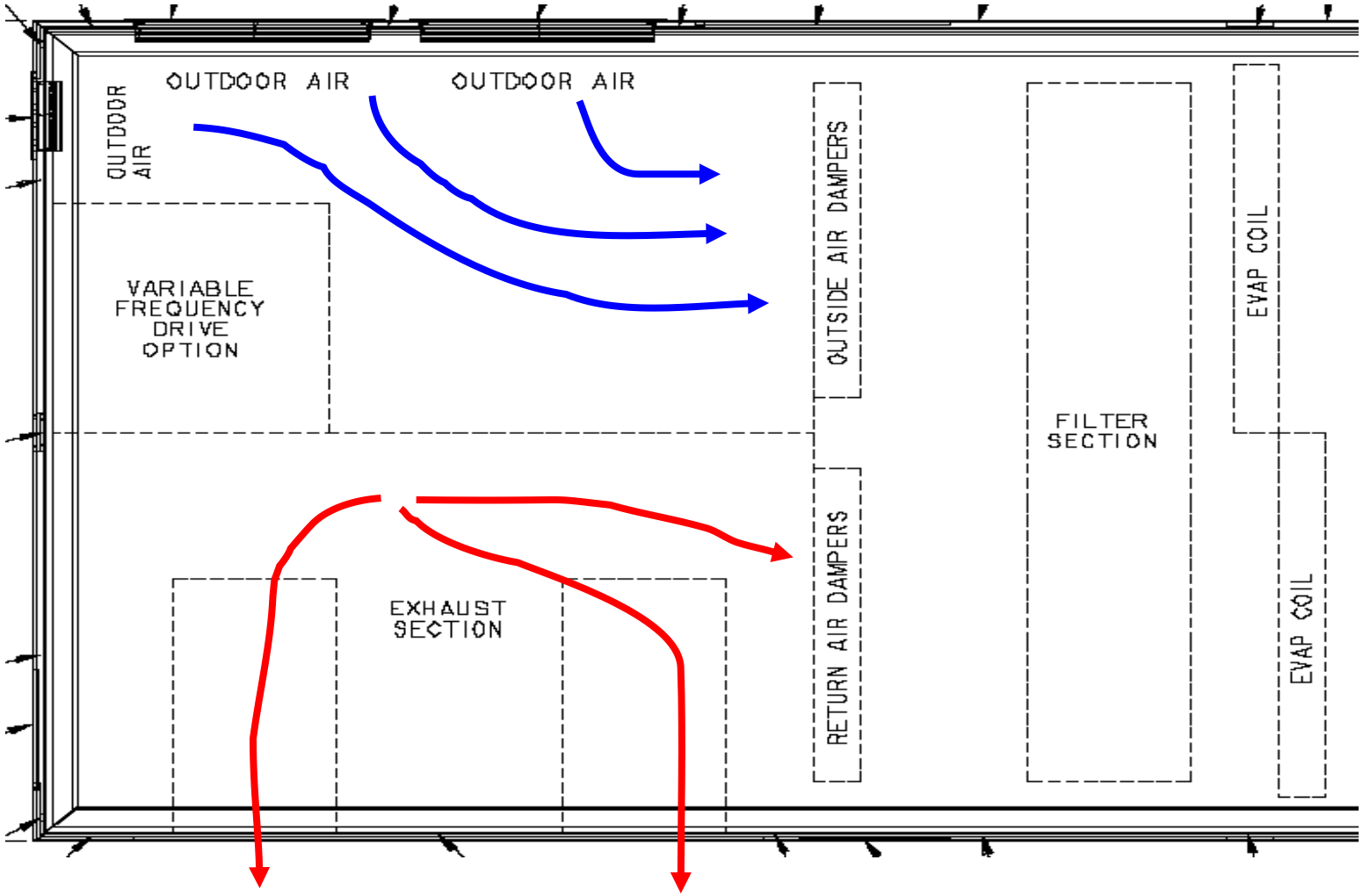
VFD Wiring With Bypass



Exhaust Fan IPAK I and II

- Exhaust Fan
  - With or without StatiTrac
  - Relieve excess building pressure
- IntelliPak I with StatiTrac
  - VFD with barometric damper
  - 1 Speed fan with motorized damper
- IntelliPak II with StatiTrac
  - VFD and motorized damper

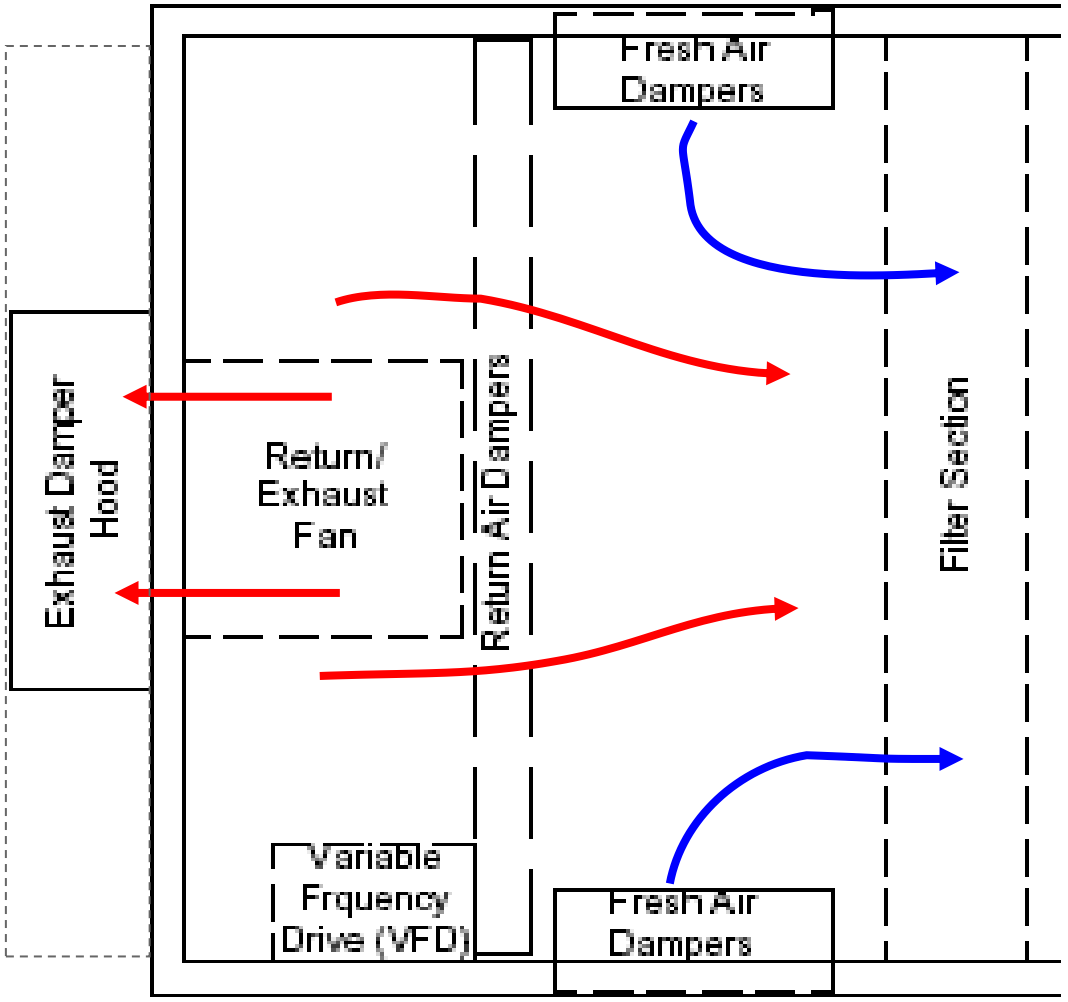
IntelliPak I Fresh Air Intake and Exhaust



IntelliPak II Fresh Air Section

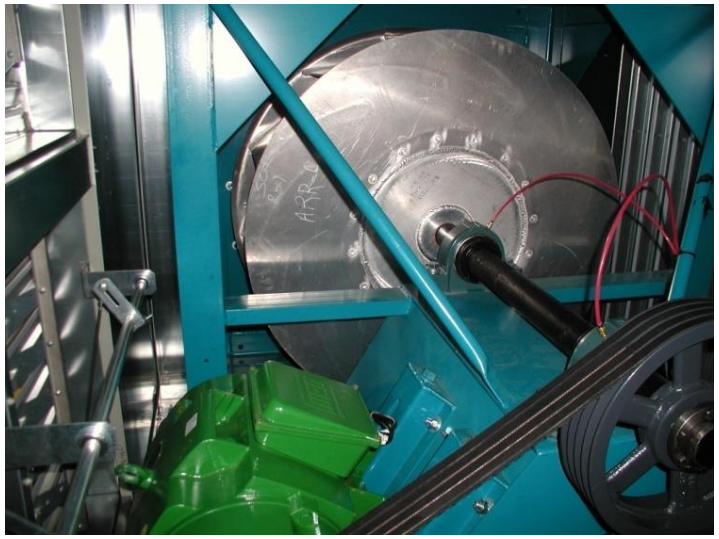
- Two fresh air inlets
- Two actuators
  - Each linked to one set of return dampers and one set of fresh air dampers
  - Left and right when looking at the Human Interface
  - Traq inlets report left airflow, right airflow, and combined airflow
  - Each side has a measuring station and pressure transducer
    - Two inlets on each side

IntelliPak II Fresh Air Intake and Exhaust

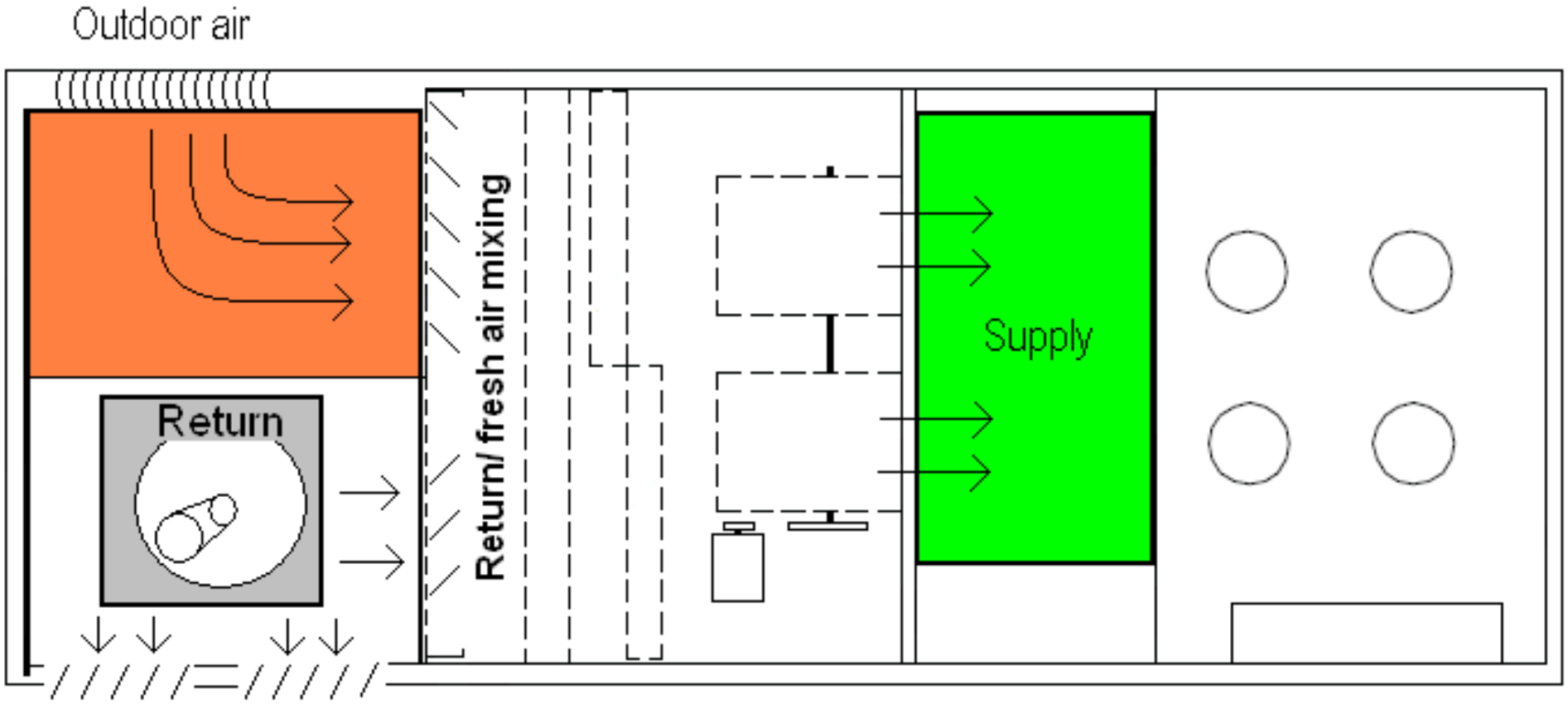


IPAK 1 and II Return Fan

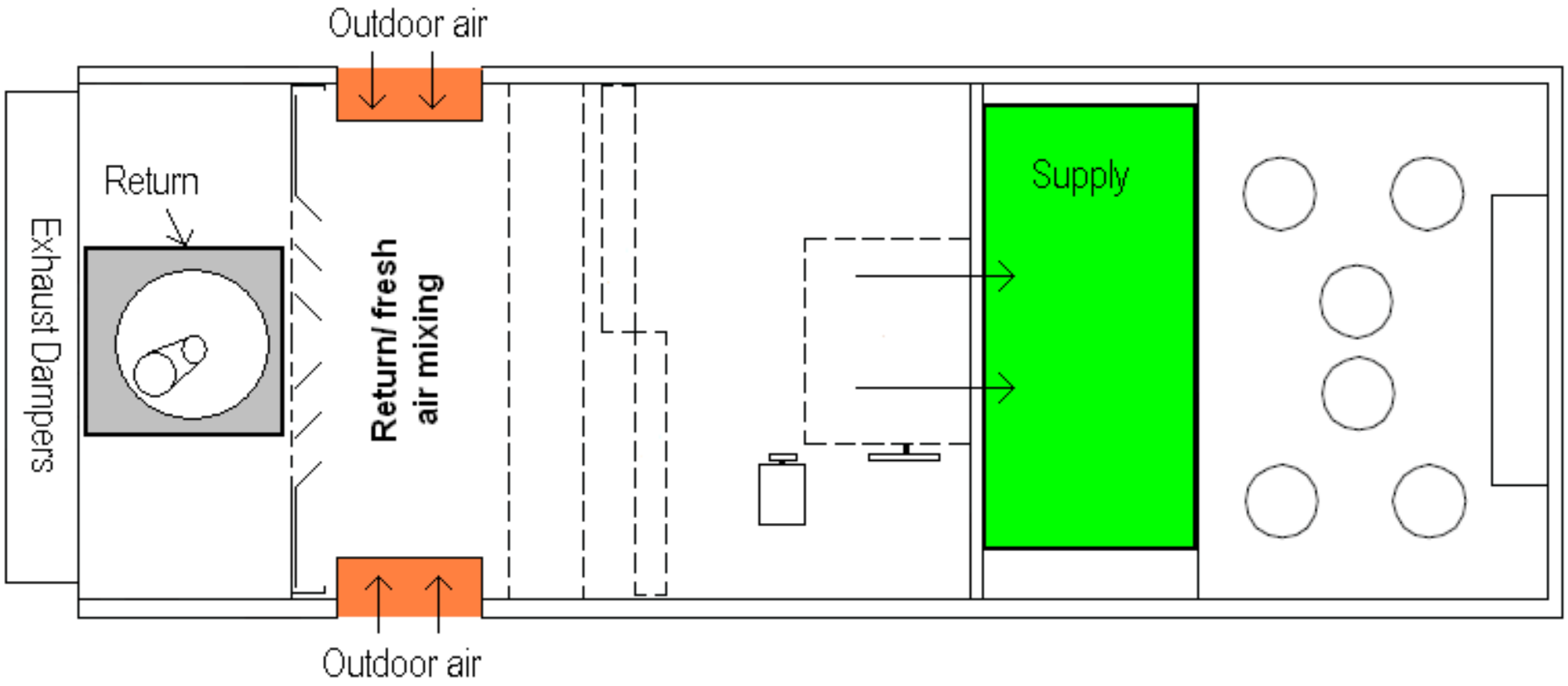
- Basic operation
  - On when supply is running
  - Purpose of the return fan is to overcome the pressure drop of the return duct
  - The return fan doubles as the exhaust fan with StatiTrac



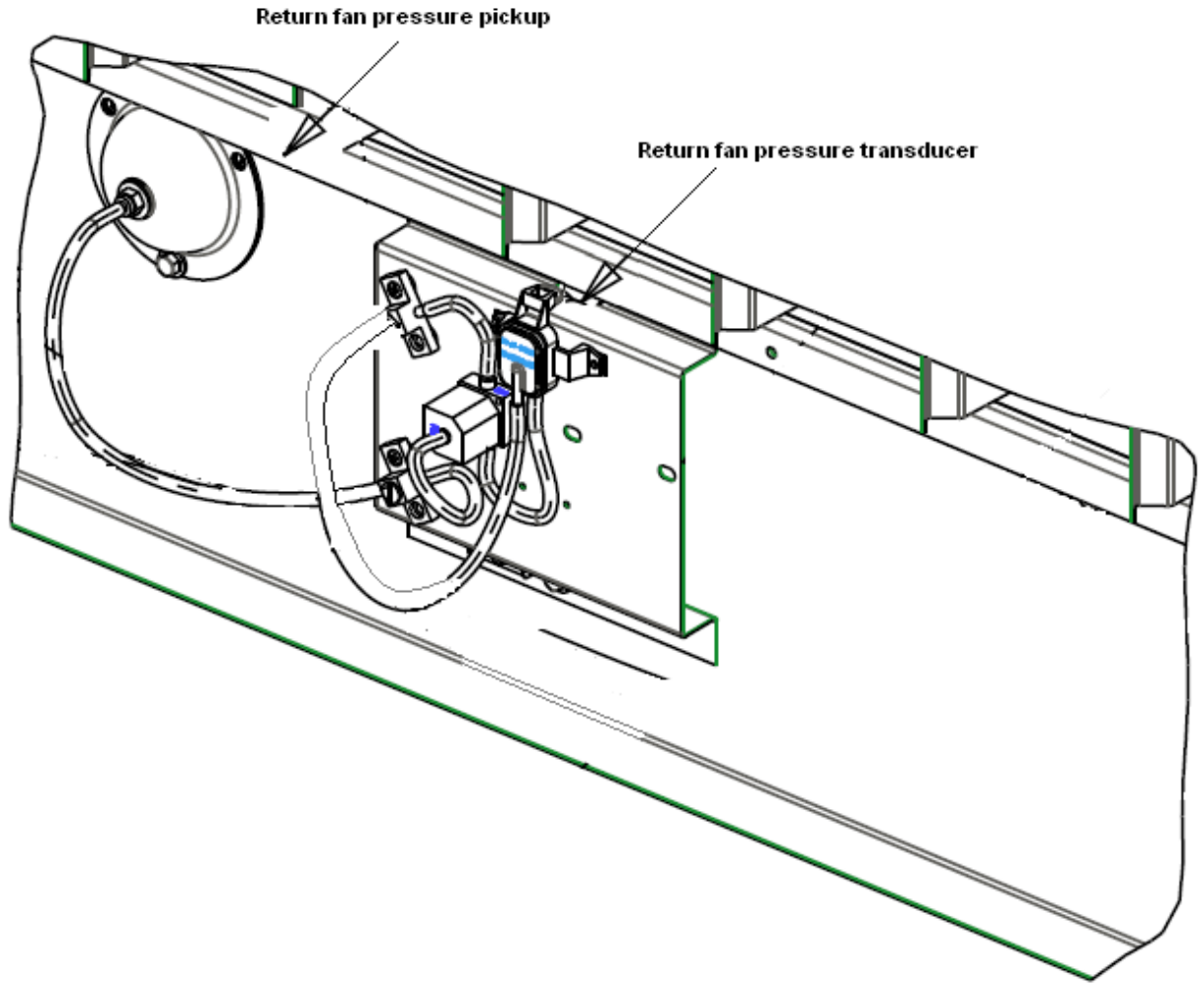
Unit Layout With Return Fan Intellipak I



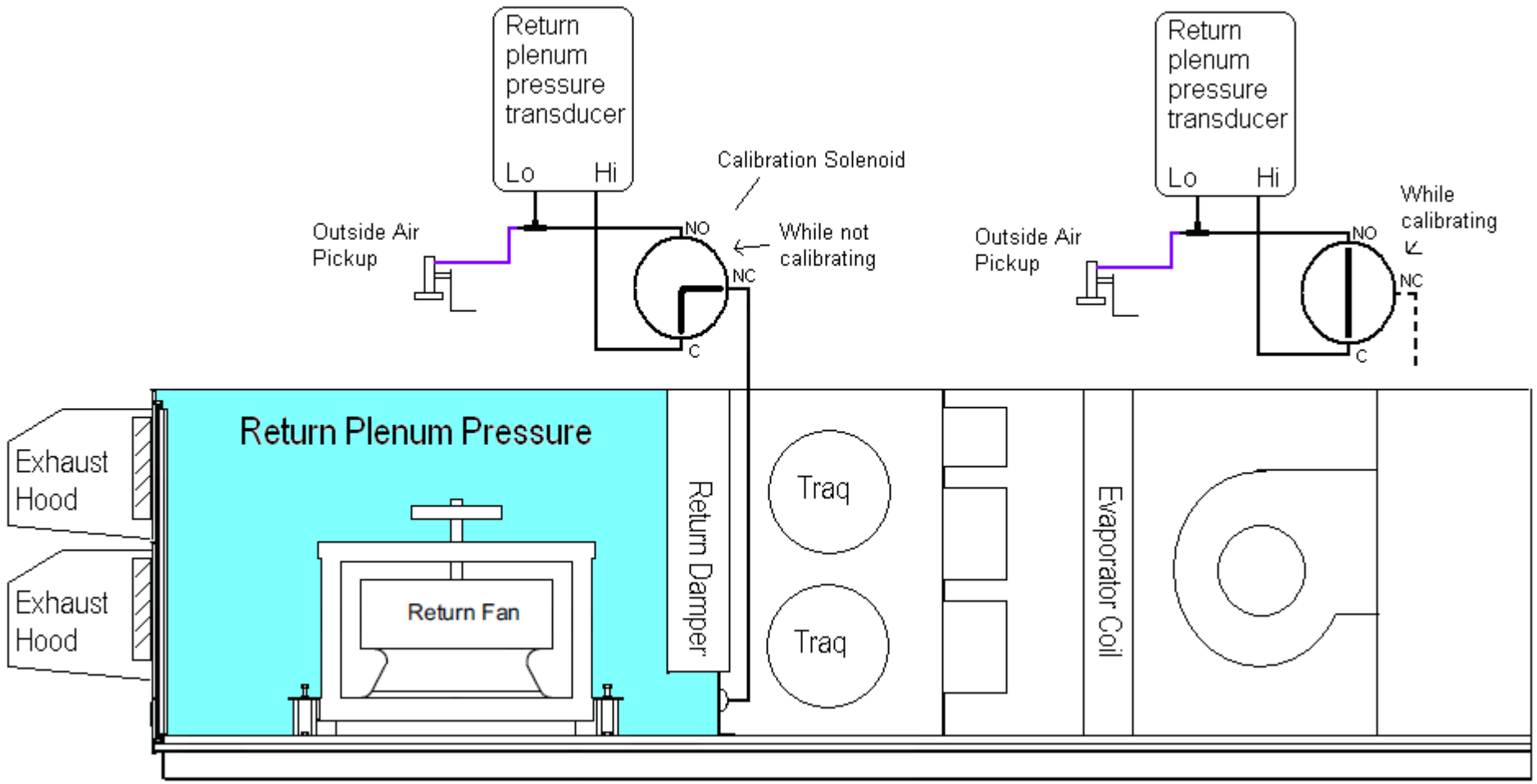
Unit Layout With Return Fan Intellipak II



Return Plenum Pressure Tubing



Return Plenum Pressure Tubing

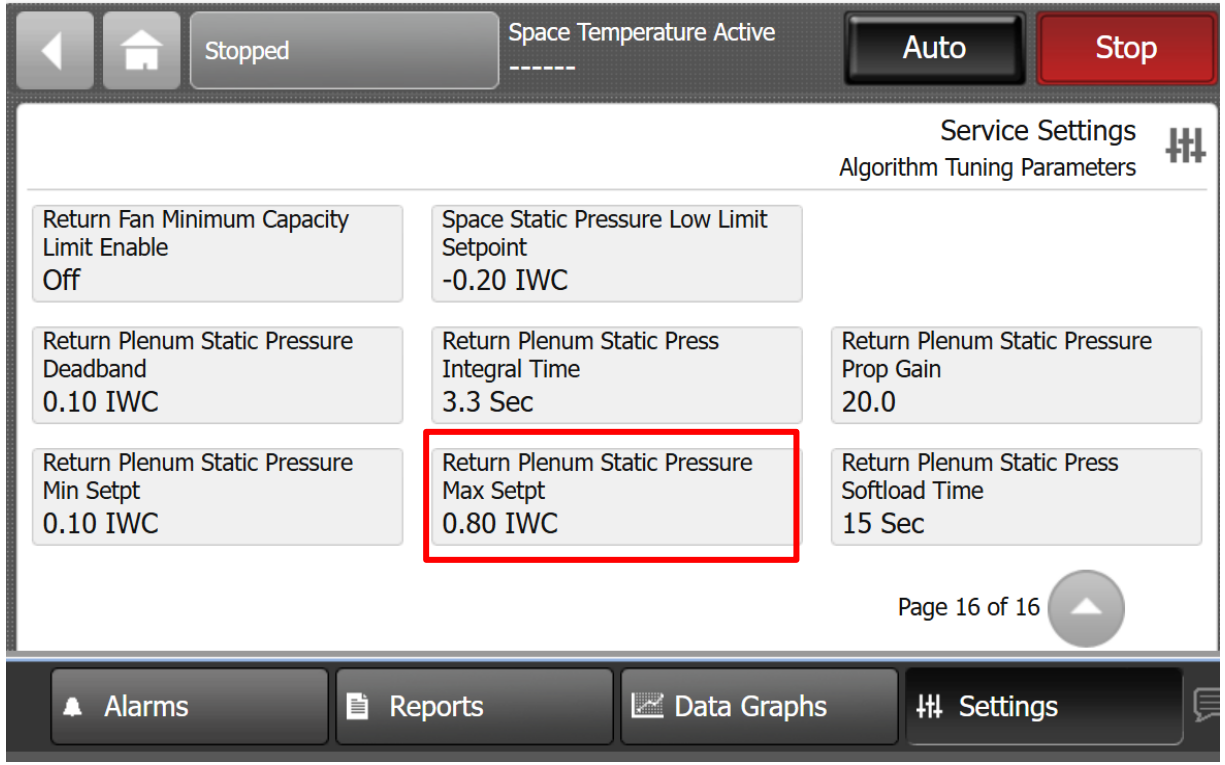


Basic IntelliPak Return Fan Sequence

- Supply fan speeds up
  - Return plenum pressure drops
  - Supply fan holds
  - Return fan speeds up
- Supply fan slows down
  - Return plenum pressure increases
  - Supply fan holds
  - Return fan slows down
- Return fan seeks to maintain a target setpoint

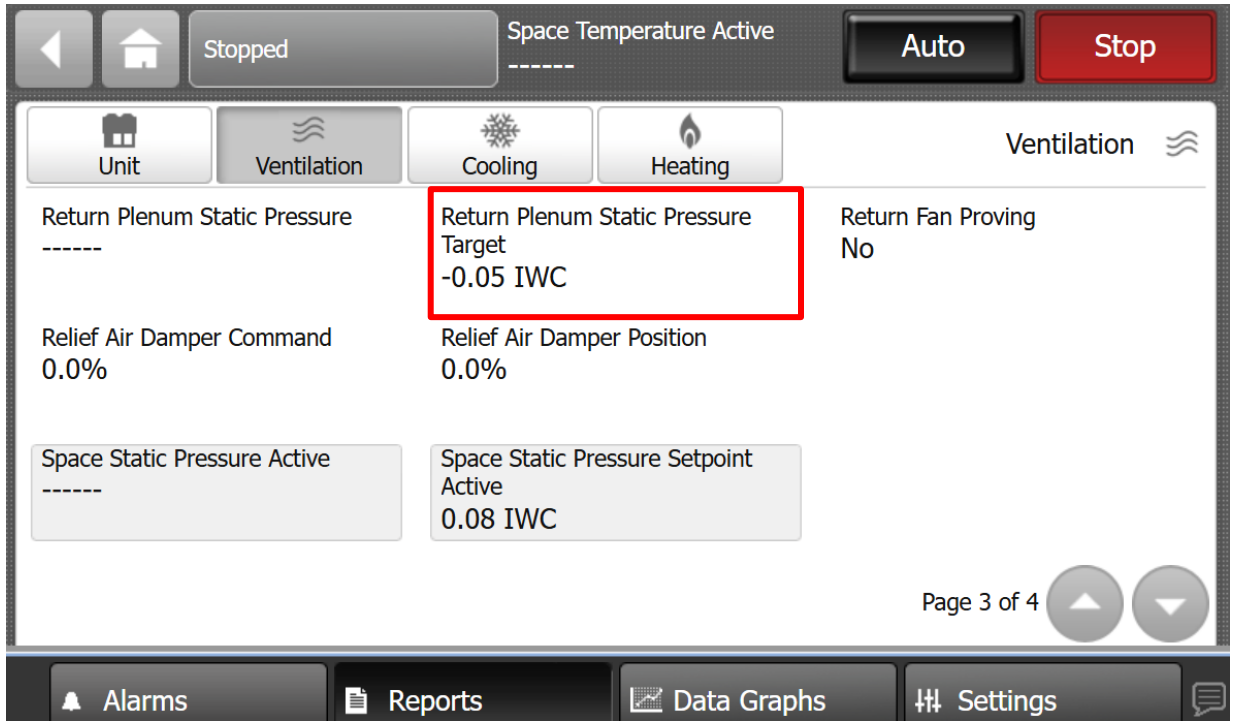
Return Plenum Setpoint

- The target setpoint is internally calculated
  - The Return plenum max setpoint is field set, initially at 0.8”wc
  - The Max setpoint is the return plenum pressure at which the Exhaust damper pressure drop is overcome at 100% exhaust mode
- The target setpoint varies from -0.05”wc to the Max Setpoint depending on Space Pressure

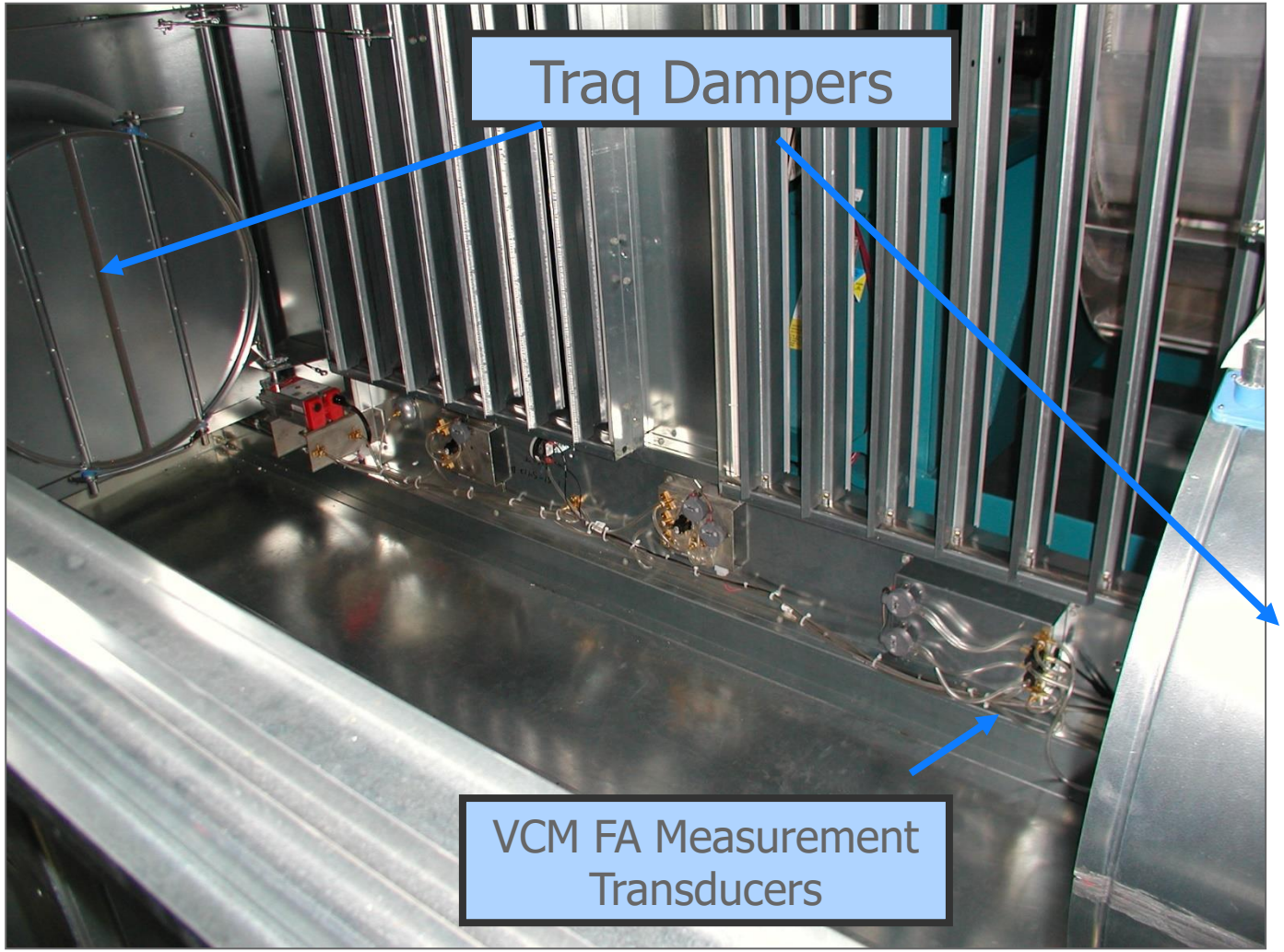


Return Plenum Pressure Target setpoint

- Initially, the target setpoint is -0.05”
- With high Supply VFD and Fresh Air % and/or high building pressure, the target setpoint will vary from -0.05” to + 0.8”
- With low building pressure, the target setpoint will drop to -0.05”
  - This is done to ensure that the mixing box (fresh air) is always at a negative pressure

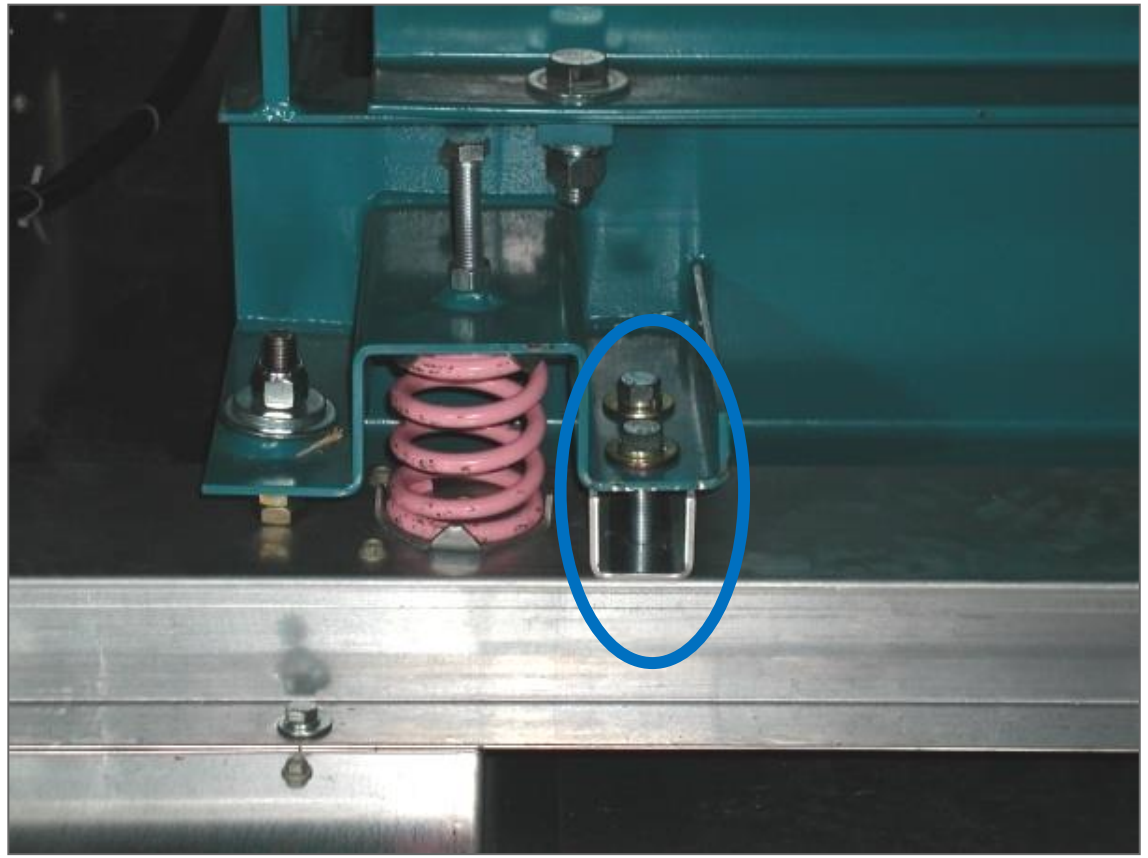


TRAQ Fresh Air Measurement



Intellipak I Fan Shipping Brackets

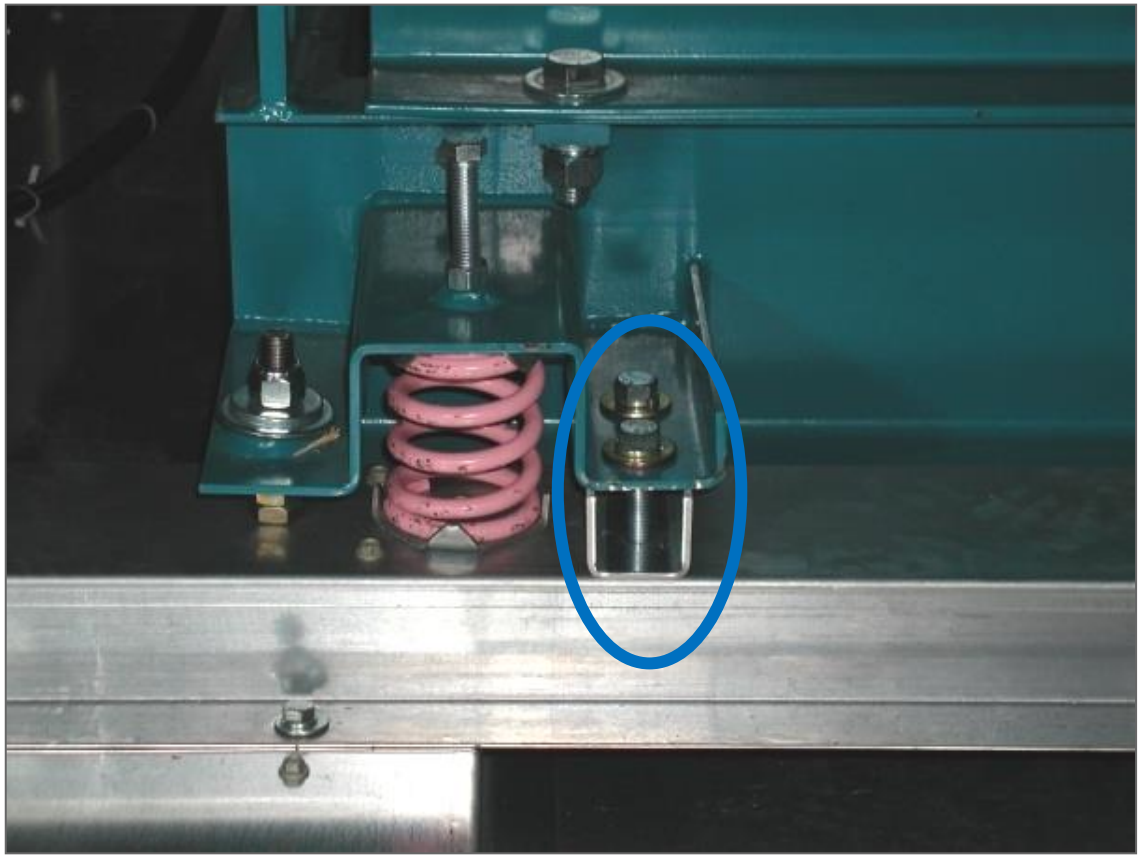
- Remove shipping tie down bolt and washer
  - 4 - 20 to 30 ton
  - 6 - 40 to 55 ton
  - 8 - 60 to 75 ton
- Leave shipping channels in place
  - Verify spring height is 0.1" to 0.2" above shipping channel



Do NOT remove electrical ground wire strap between isolation base and unit base.

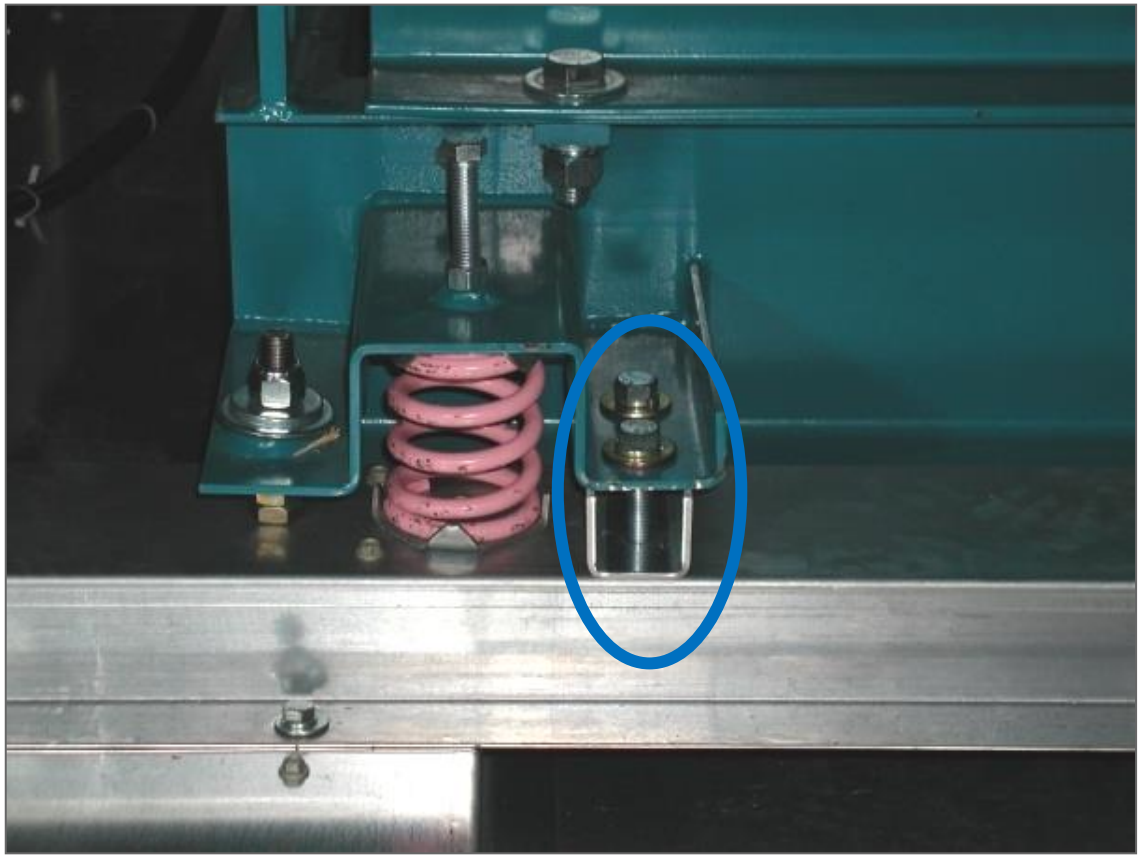
IntelliPak I Fan Adjustment

- Back off all spring isolator jam nuts on top of the assembly
  - Adjusting one spring effects all others
- Turn adjustment bolt
  - Each change effects all other springs.
  - Clockwise raises
  - Counter-clockwise lowers
  - When correctly adjusted re-tighten jam nuts and remove shipping channels



Intellipak II Fan Shipping Brackets

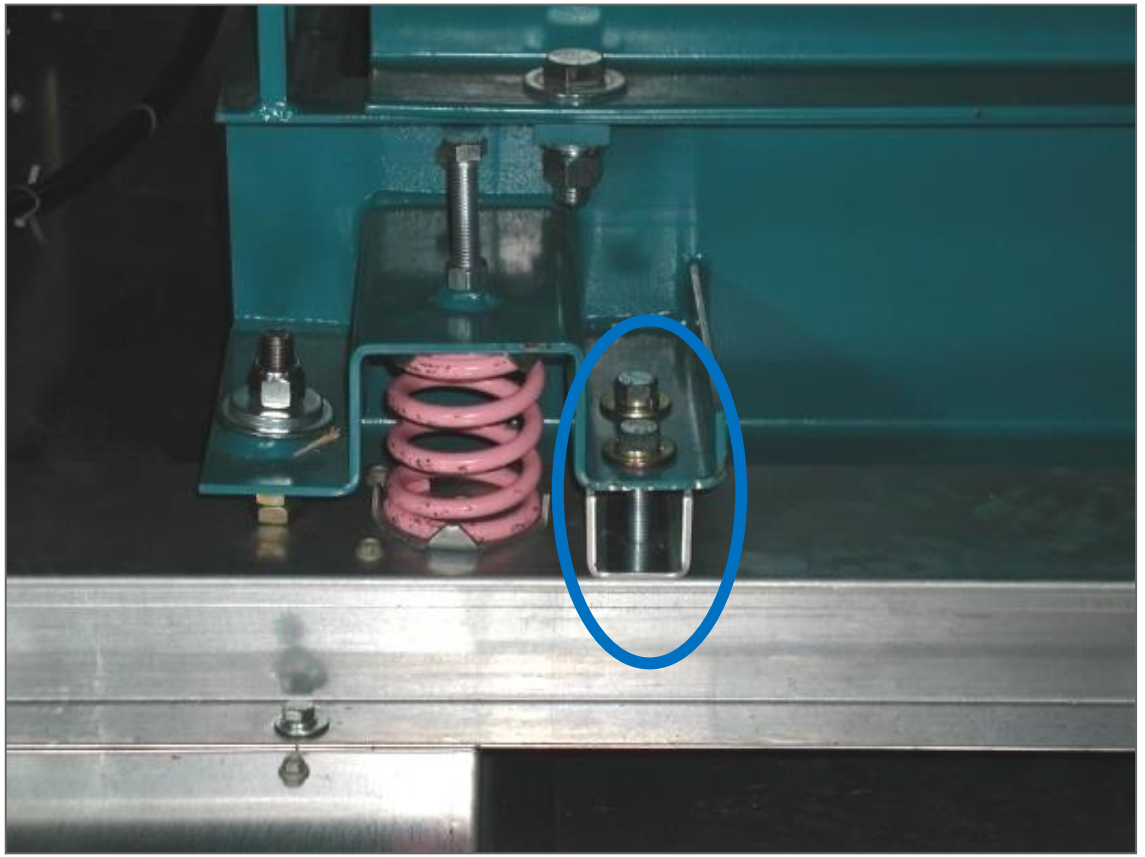
- Spring isolators for the supply and/or exhaust fan are shipped with the isolator adjusting bolt backed out. Field adjustment is required for proper operation



Do NOT remove electrical ground wire strap between isolation base and unit base.

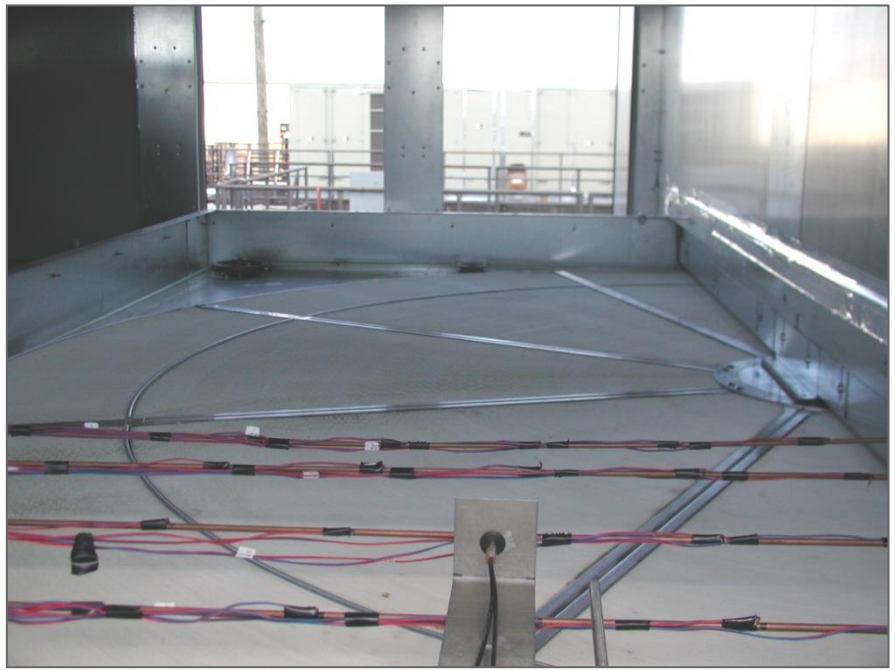
Intellipak II Fan Shipping Brackets

- To adjust the spring isolators
  - Remove and discard the shipping tie down bolts
  - Leave the shipping channels in place
  - Tighten the leveling bolts to adjust fan assembly to 1/4" above each shipping channel
- Secure the lock nut on each isolator
- Remove shipping channels

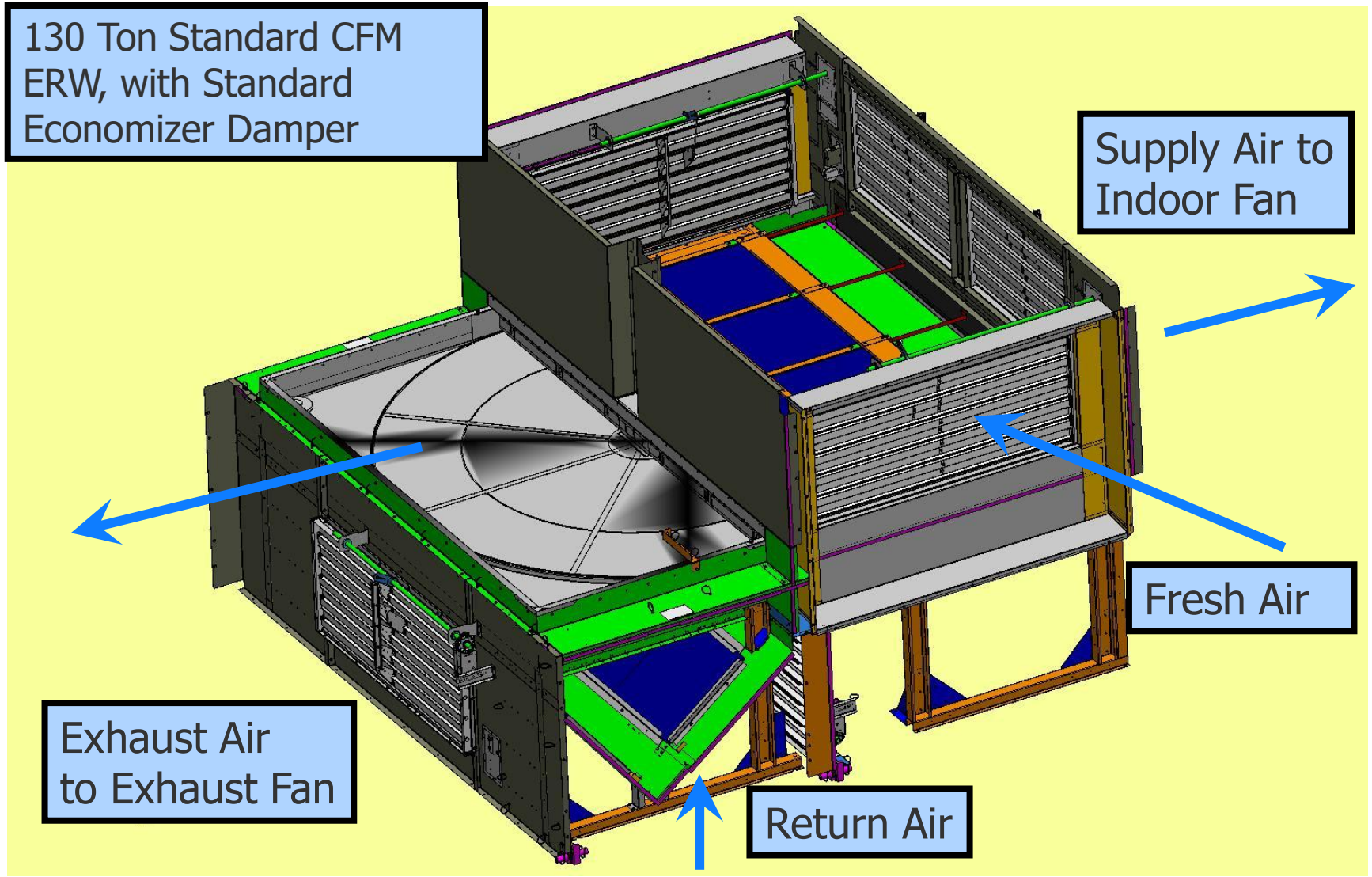


Energy Recovery Wheel

- Requirements
  - Economizer w/ Comparative Enthalpy
  - Exhaust Fan
  - Operational Supply Air Temperature Sensor
  - Up-flow Return
  - Return Duct Burglar Bars Automatically Included
- Wheel is segmented to facilitate service



ERW Design and Operation



ERW

- Energy Recovery is active when:
  - The supply and exhaust fans are on and there is an active demand for heating or cooling
  - Sensors are valid to determine activation conditions
  - Indoor and Outdoor Temperature/Enthalpy conditions are favorable for energy recovery
    - Cooling - If OA enthalpy is 3btu/lb greater than RA enthalpy enable wheel to remove energy from incoming OA
    - Heating - If OA is 5°F less than RA enable wheel to recover energy from exhaust air

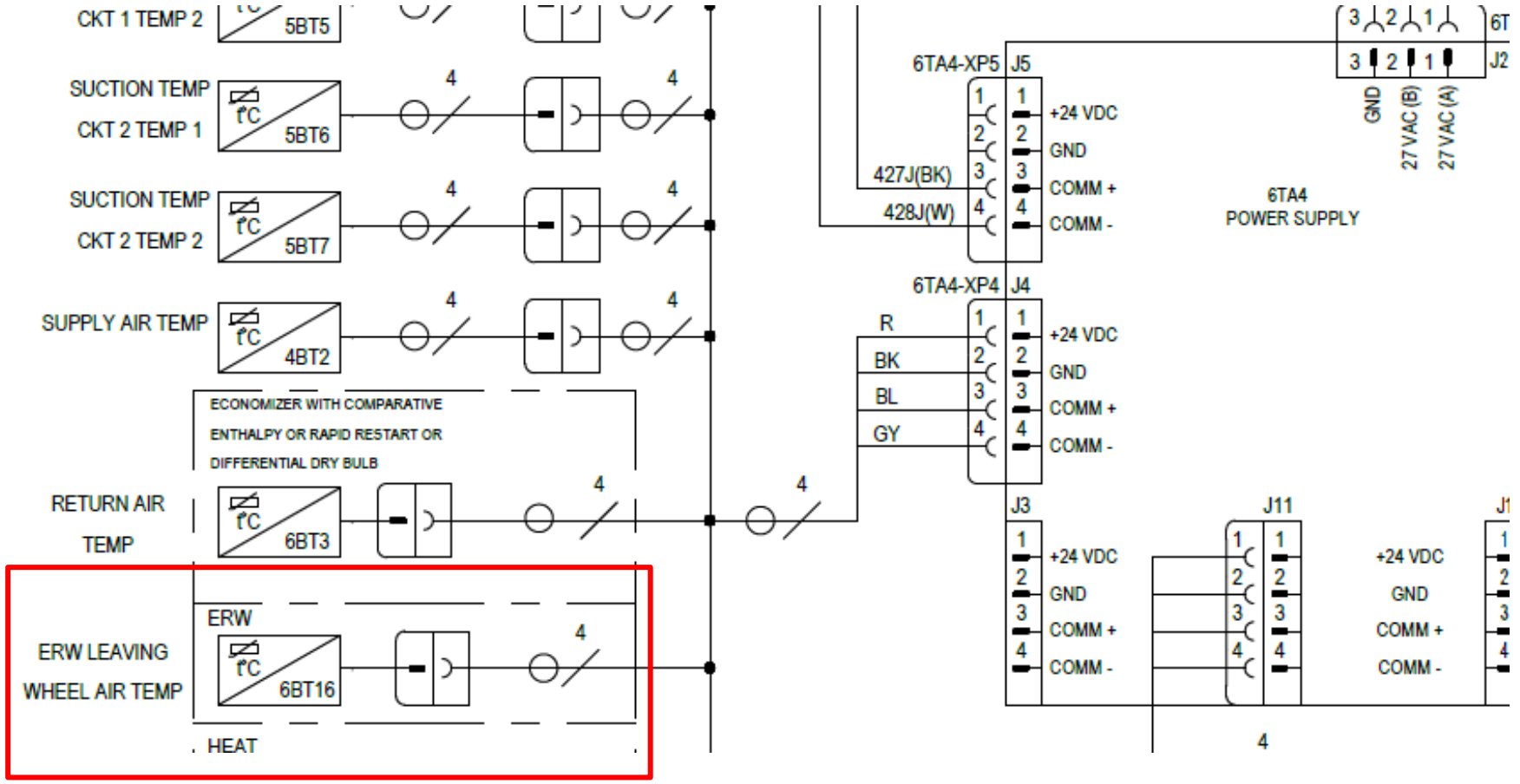
ERW

- Energy Recovery is disabled when
  - Indoor vs. Outdoor Temperature/Enthalpy conditions are not favorable
  - Economizer-only cooling mode is active
  - Outside Air Temperature sensor failure
  - Supply Air Temperature sensor failure
- When Energy Recover is disabled
    - Stop the wheel
    - Bypass dampers are requested full open

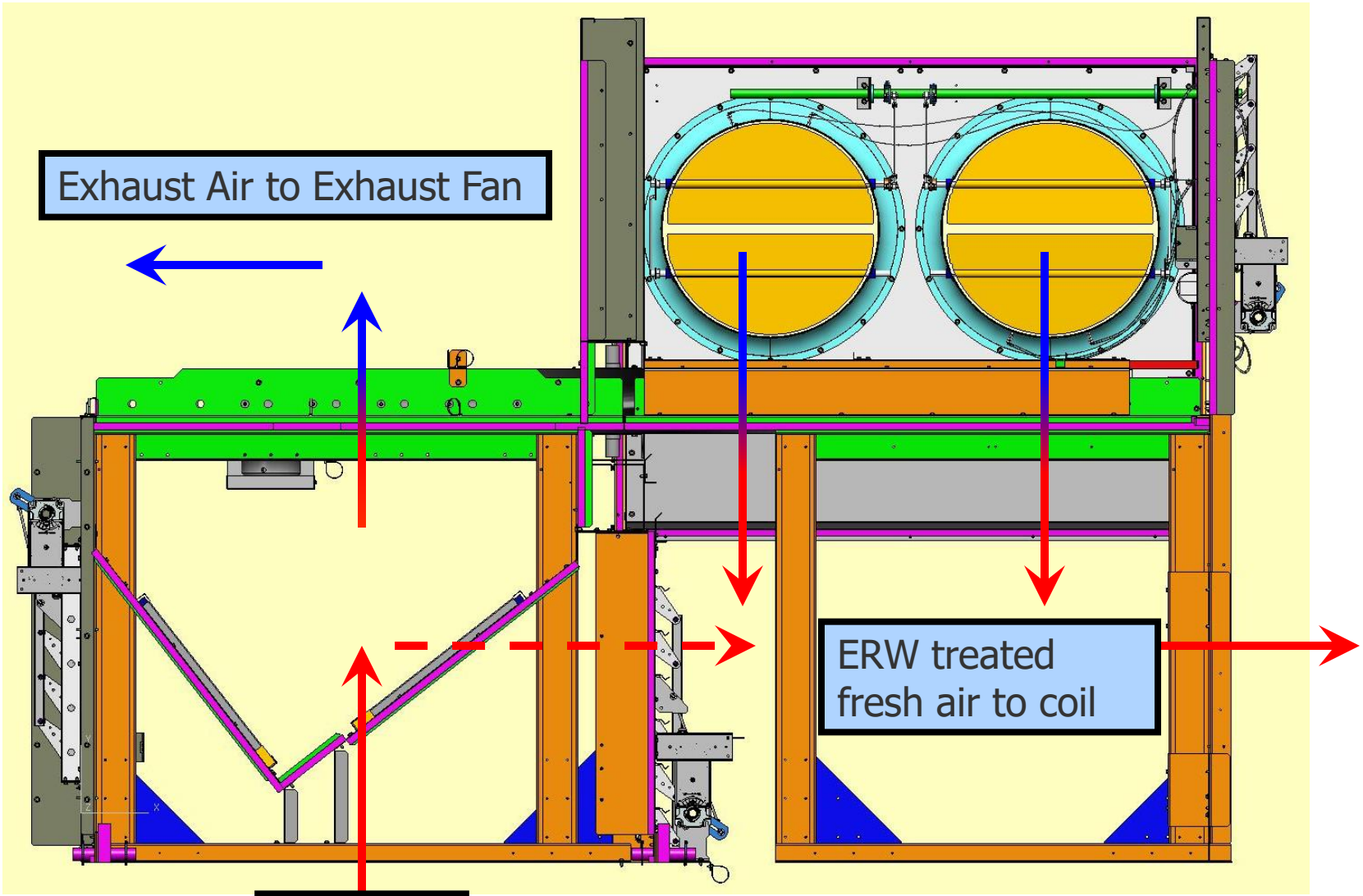
ERW

- Wheel Proving
  - After 5 minutes of wheel operation verify energy transfer by comparing leaving recovery air temp to return air temp
  - There should be a greater than 3°F difference between the two temperatures being monitored
  - If the temperature difference is not greater than 3°F
    - Set wheel off and dampers to closed
    - Set manual diagnostic reset
  - The above proving function will be suspended if there is less than a 13°F difference between return air and outside air

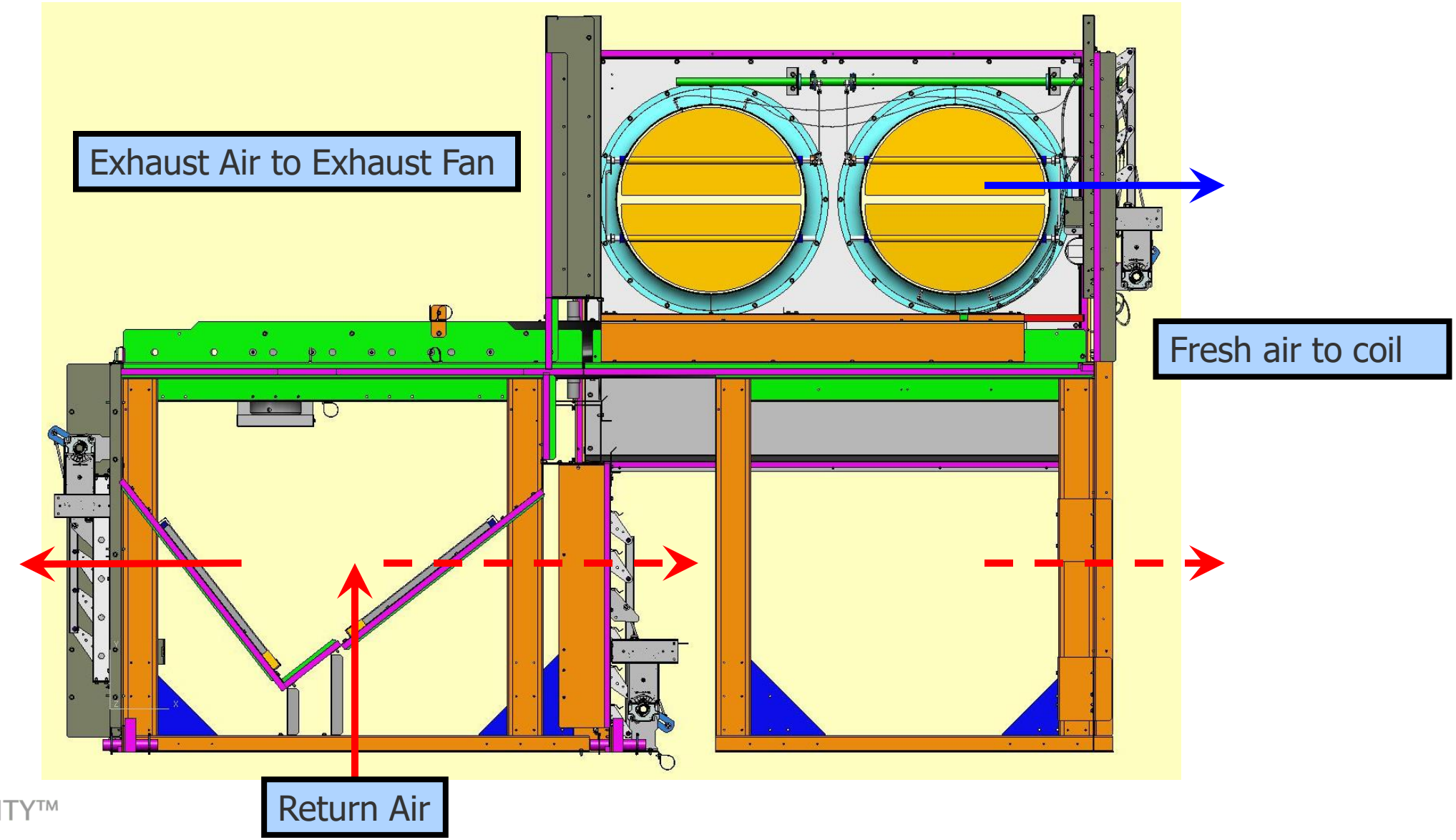
Energy Recovery Control Options



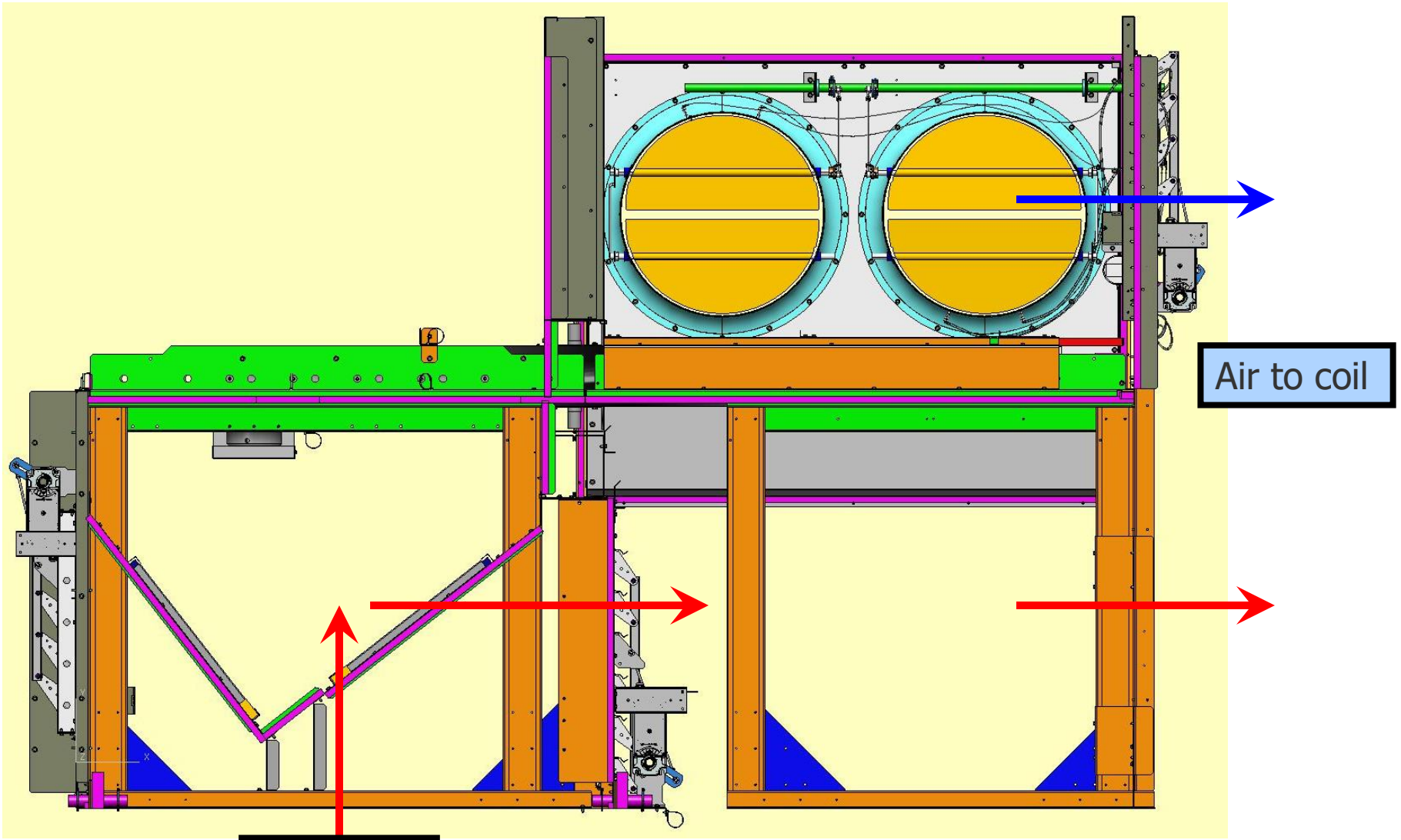
Energy Recovery Wheel On



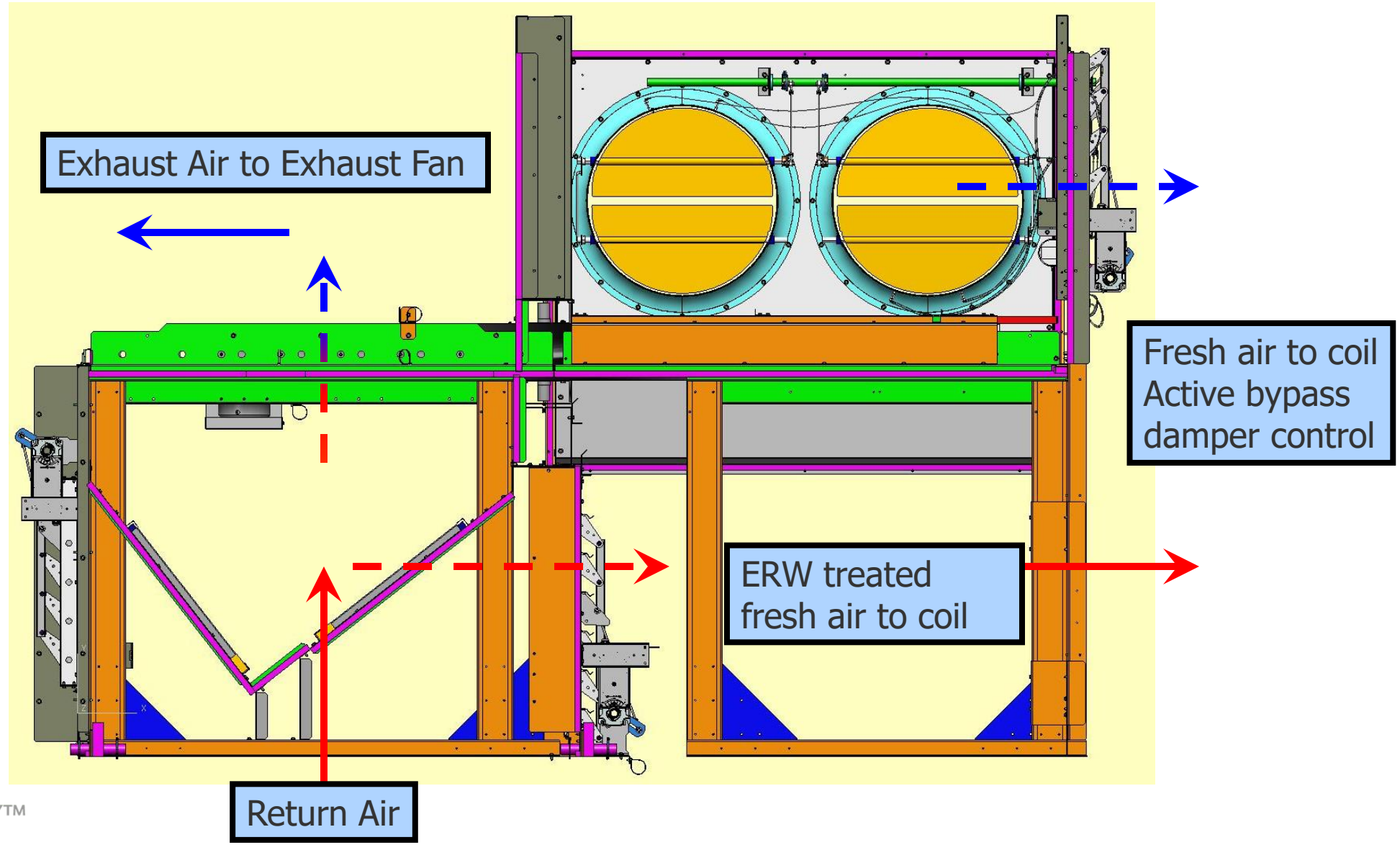
Energy Recovery Wheel Off Economizing



Energy Recovery Wheel Off Not Economizing



Energy Recovery Wheel On Frost Prevention



Intellipak I Staged Heating

IntelliPak 1 Midco Burner

- 2-Stage
- Modulating burner

Digit 9 — Heating Capacity

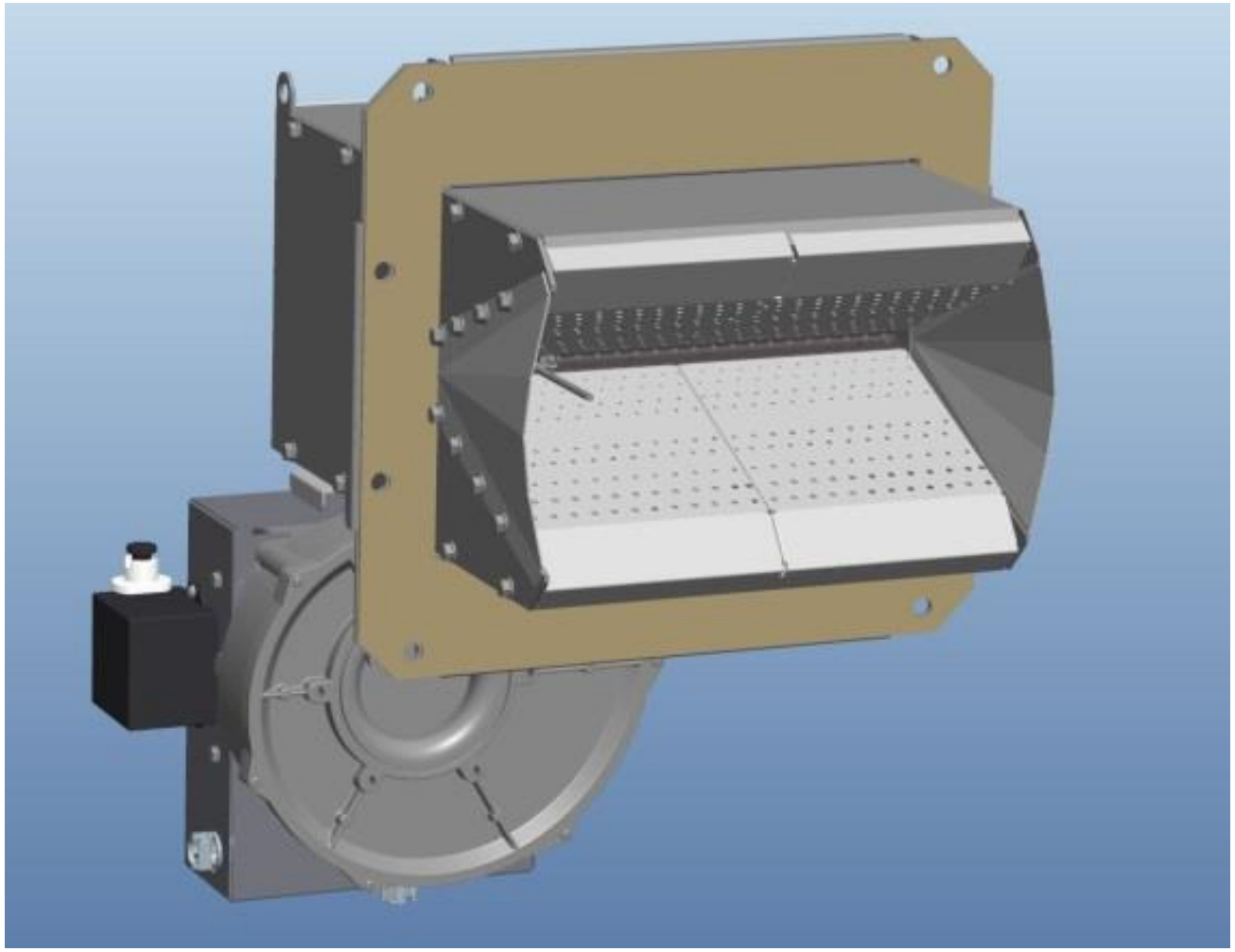
H = High Heat — 2-Stage
K = Low Heat — Ultra Modulating
L = Low Heat — 2-Stage
M = Low Heat — Modulating
0 = No Heat
P = High Heat — Modulating
T = High Heat — Ultra Modulating

Nominal Burner Size	Two Stage Burner	Modulating Burner	
	Stage 1/Stage 2	Modulating Input Range	Ultra Mod Input Range
235 MBH	117/ 235	n/a	n/a
350 MBH	175/ 350	n/a	n/a
500 MBH	250/ 500	125 - 500	36 - 500
800 MBH	400/ 800	125 - 800	45 - 800
850 MBH	425/ 850	125 - 850	48 - 850
1000 MBH	500/ 1000	125 - 1000	48 - 1000

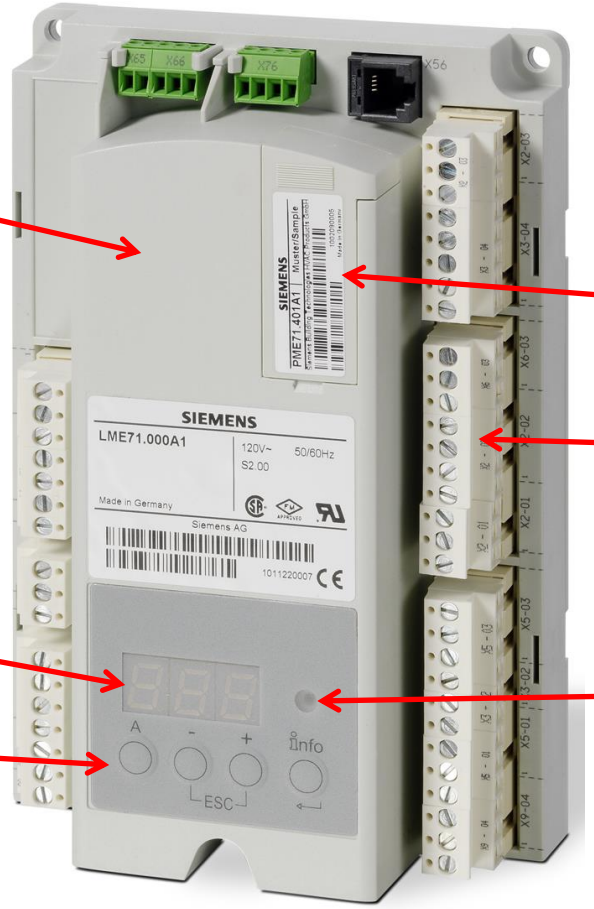
Condensate Drain Gas Furnace

- ¾”CPVC
- Stubbed through vertical support
- Important to pipe to proper drain
- Connect compartment drain line
- Do installations comply with local codes?

Profile Burner



Siemens Ignition Control



Base unit

Program module

Plug-in terminals

Integral Display

Keypad

Signal lamp

Siemens Ignition Control

Modbus Communicated

Staged & Modulating Systems Start-Up Procedures

Tools Needed For Startup

- Pressure gauges
  - Incoming gas pressure
  - Manifold gas pressure
- Flue analyzer
  - CO_2
  - O_2
  - CO
  - Flue temperature
- Hand tools
- Voltmeter

Manifold Pressures

Recommended manifold pressures during furnace operation			
Furnace Stage	**MBH**	**Firing Rate**	**Manifold Pressures**
High Fire	235	100%	1.4-1.6
Low Fire	117	50%	0.39
High Fire	350	100%	1.2-1.3
Low Fire	175	50%	0.37
High Fire	500	100%	2.3-2.6
Low Fire	250	50%	0.72 (staged), 0.22 (mod)

Manifold pressures are given in inches w.c.
High fire manifold pressure is adjustable on all heaters
Low fire manifold pressure is non-adjustable on 235 MBH and 350 MBH heaters.

Manifold Pressures

Recommended manifold pressures during furnace operation			
Furnace Stage	**MBH**	**Firing Rate**	**Manifold Pressures**
High Fire	800	100%	1.83-1.87
Low Fire	500	50%	0.49 (staged) 0.04 (mod)
High Fire	850	100%	1.8-2.1
Low Fire	500	59%	0.45 (staged) 0.05 (mod)
High Fire	1000	100%	2.5-2.7
Low Fire	500	50%	0.68 (staged) 0.05 (mod)
Manifold pressures are given in inches w.c. High fire manifold pressure is adjustable on all heaters Low fire manifold pressure is non-adjustable on 235 MBH and 350 MBH heaters.			

Factory Settings 2 Stage

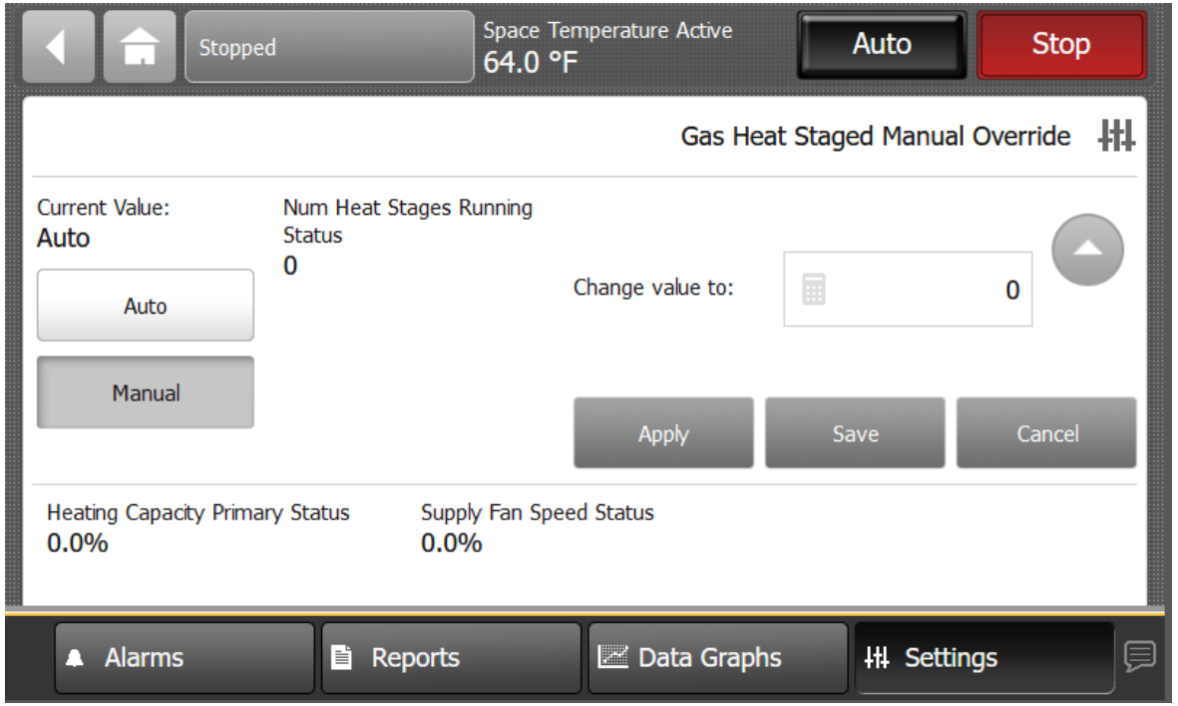
Natural Gas							
Burner Size	Low Fire			High Fire		Shutter Setting	Ratio Regulator Turns
	VDC input	P0	P1	VDC input	P2		
235 MBH 2-stg	n/a	203	203	10	330	0.5	2.5 – 3 CW
350 MBH 2-stg	n/a	213	213	10	350	2-2.5	3.5 – 4 CW
500 MBH 2-stg	n/a	270	270	10	480	1.5-2	3.5 – 4 CW
800 MBH 2-stg	n/a	250	250	10	475	4	
850 MBH 2-stg	n/a	251	251	10	460	4	3.5 – 4 CW
1000 MBH 2-stg	n/a	280	280	10	535	3.5	3.5 CW

Factory Settings Modulating

Natural Gas							
Burner Size	Low Fire			High Fire		Shutter Setting	Ratio Regulator Turns
	VDC input	P0	P1	VDC input	P2		
500 MBH Mod	0	200	185	10	480	1.5-2	3.5 – 4 CW
800 MBH Mod	0	200	120	10	475	4	3.5 – 4 CW
850 MBH Mod	0	200	113	10	460	4	3.5 CW
1000 MBH Mod	0	200	113	10	535	3.5	1.75 – 2 CW

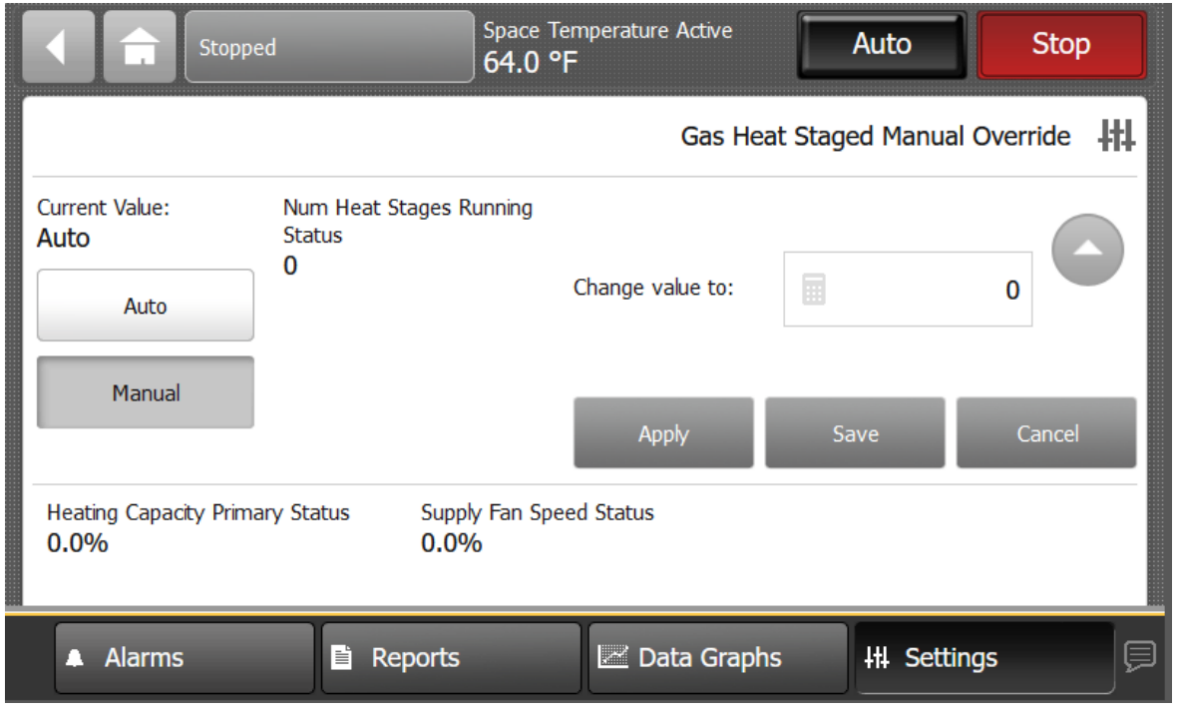
Manual Override Settings Startup

- Navigate to Manual Override Screen
- Set fan speed to 100%
- Set Modulating Percentage to 100% and/or enable 2nd stage
- Press the Auto button
- Ensure Gas Regulator outlet pressure is 7”w.c



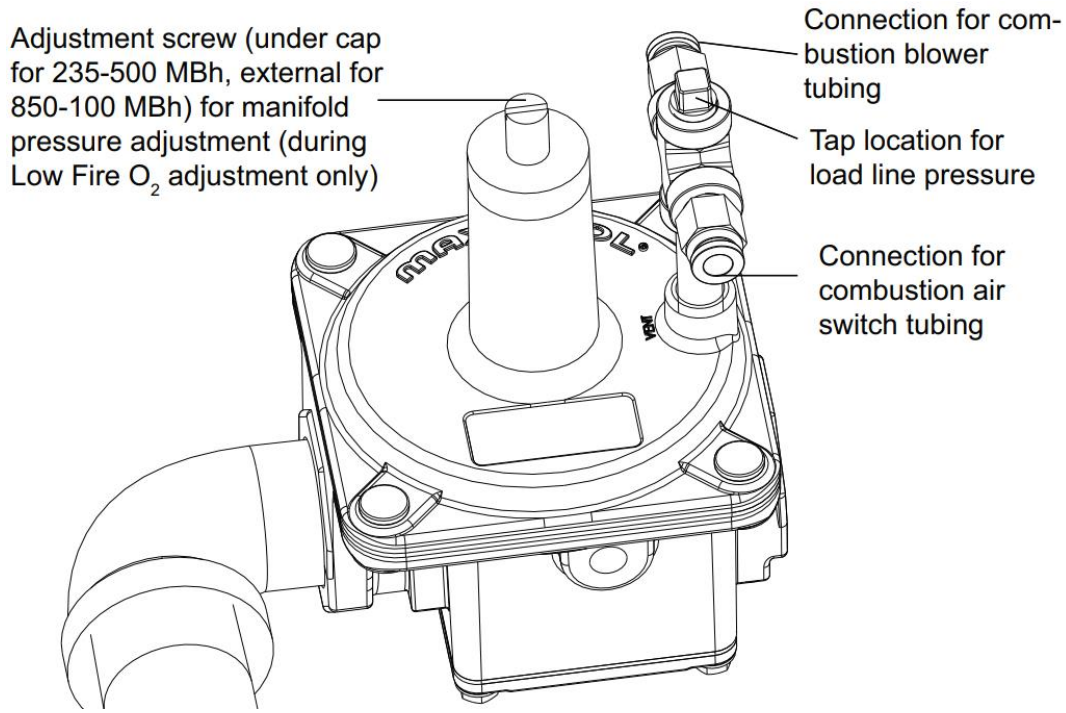
Manual Override Settings

- Navigate to Gas Heat Manual Override Screen
- Enable 1st stage or set Mod Gas to 1%



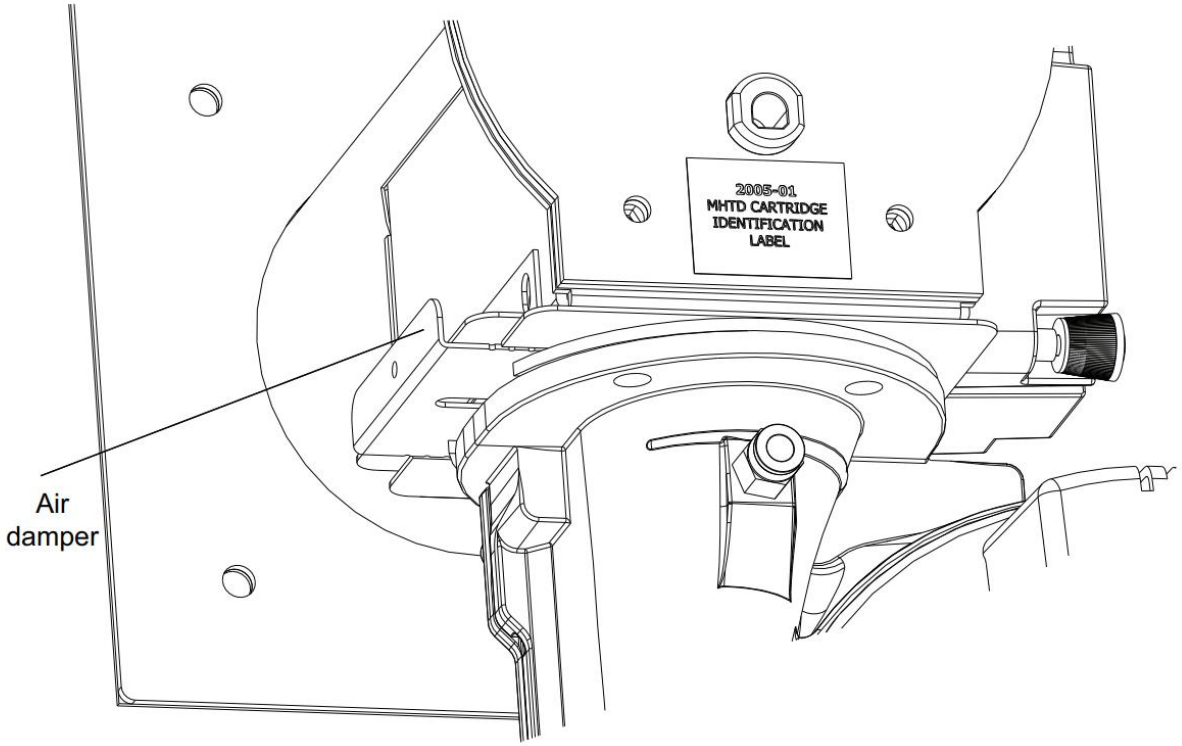
Burner Setup O_2 Low Fire

- If adjustment is needed
  - Adjust the ratio regulator
  - CW is more gas
    - Higher CO_2
    - Less O_2
  - CCW is less gas
    - Lower CO_2
    - More O_2



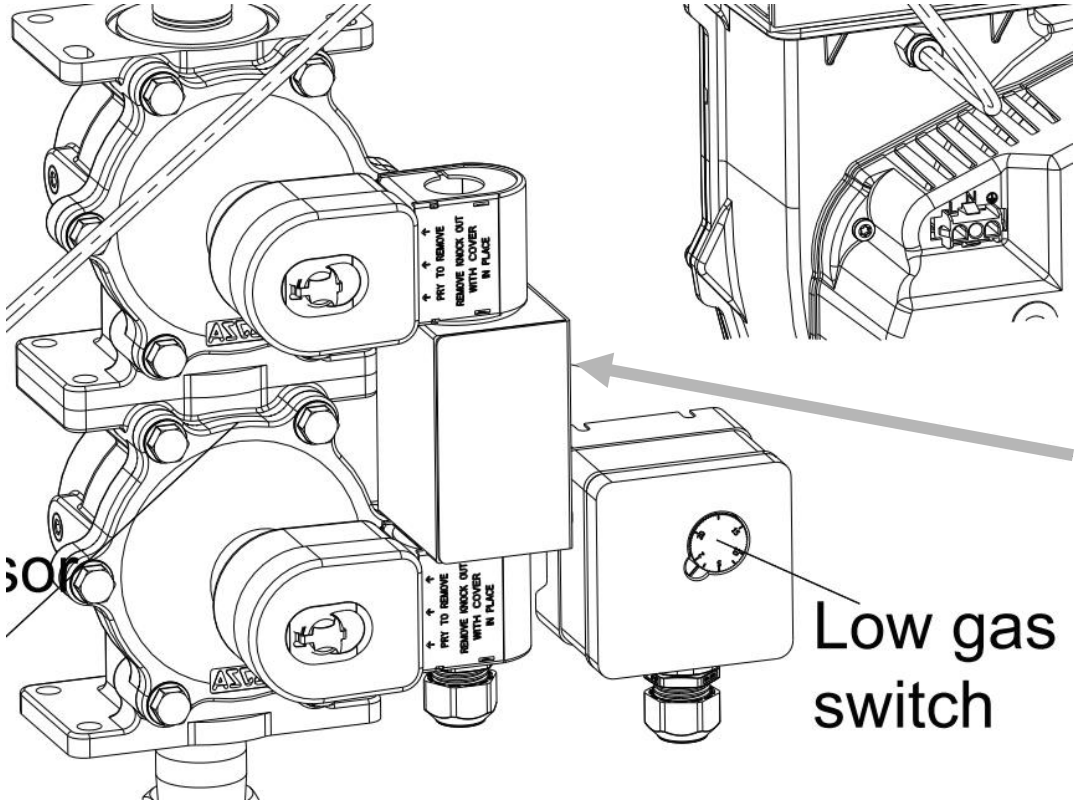
Burner Setup CO_2 High Fire

- Set User Interface to 100%
- Allow to run for 10 minutes
- If adjustment is needed
  - Check air damper
    - Close to increase CO_2



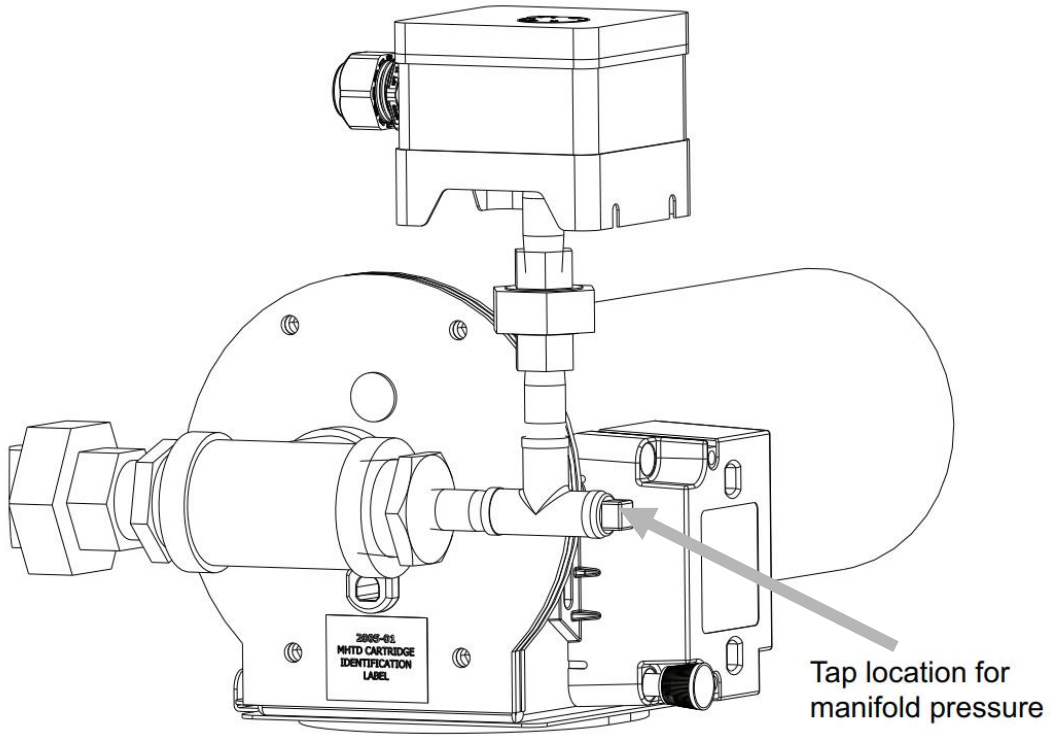
Gas Pressures

- Incoming pressure
  - 7.0” to 14.0”



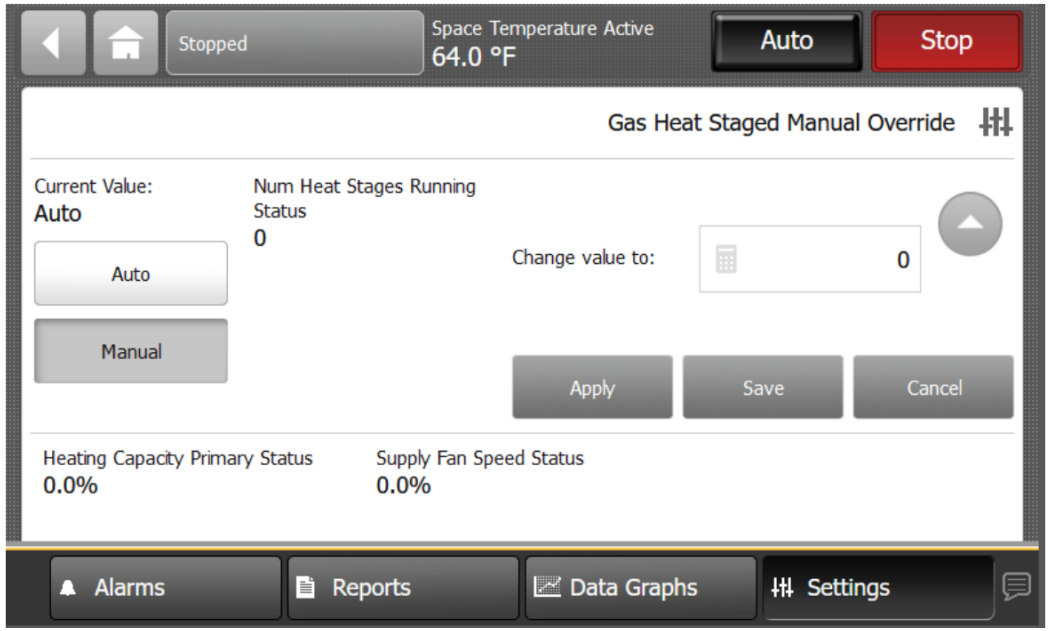
Gas Pressures

- Manifold pressures
  - Low fire
    - .39″ to .72″
  - High fire
    - 1.4″ to 2.7″



Low Fire Manifold Pressure

- Navigate to the Gas Heat Manual Override Screen
- Set the percentage to 1%
  - Staged to 1st stage

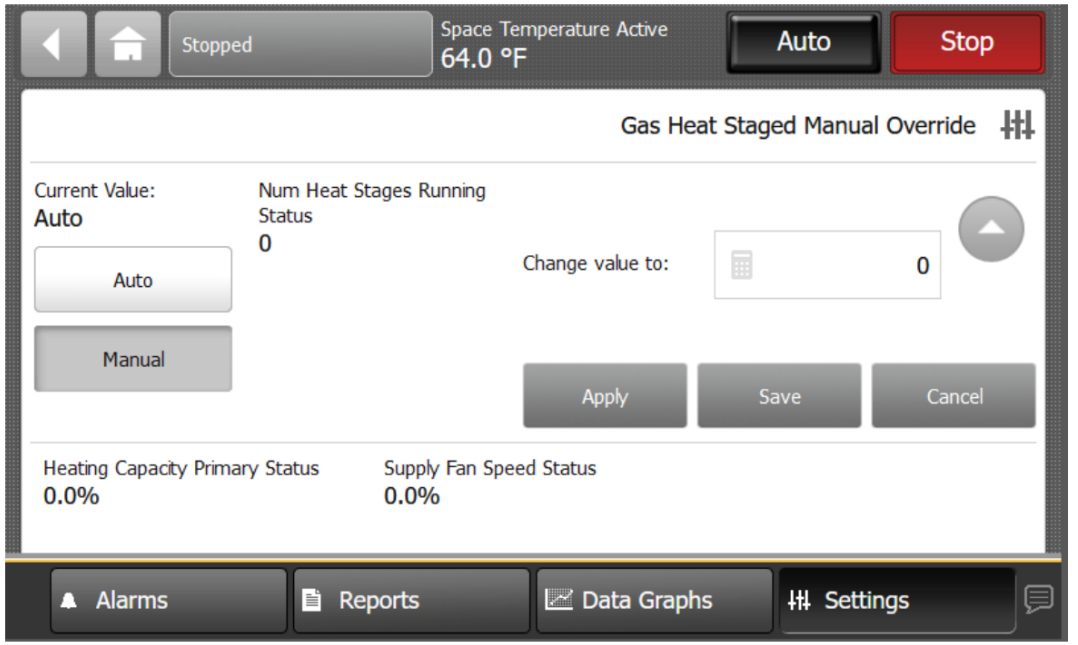


Low Fire Manifold Pressure

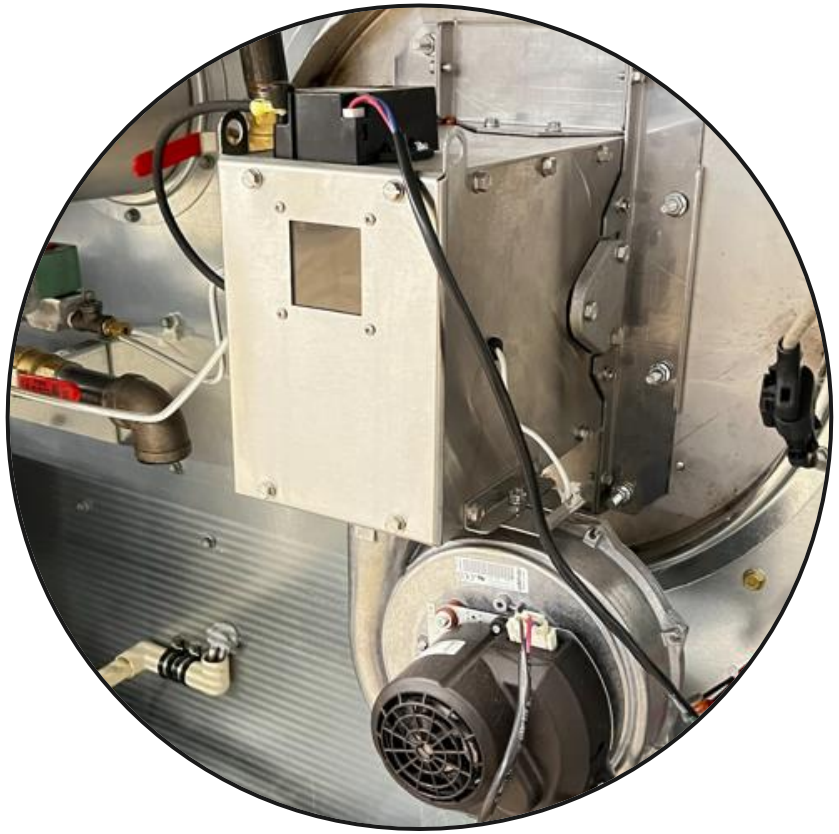
- Adjust motor speed if needed
  - Siemens Ignition Controller
    - P0 ignition speed
    - P1 low fire speed
- Multiply P0/P1 value by 10 for RPM

High Fire Manifold Pressure

- Set the modulating percentage to 100% or 2nd stage
- Adjust motor speed if needed
- Siemens Ignition Control
  - P2 high fire speed
- Multiply P2 value by 10 for RPM



IntelliPak I
Ultra Modulating



IntelliPak I VA Burner

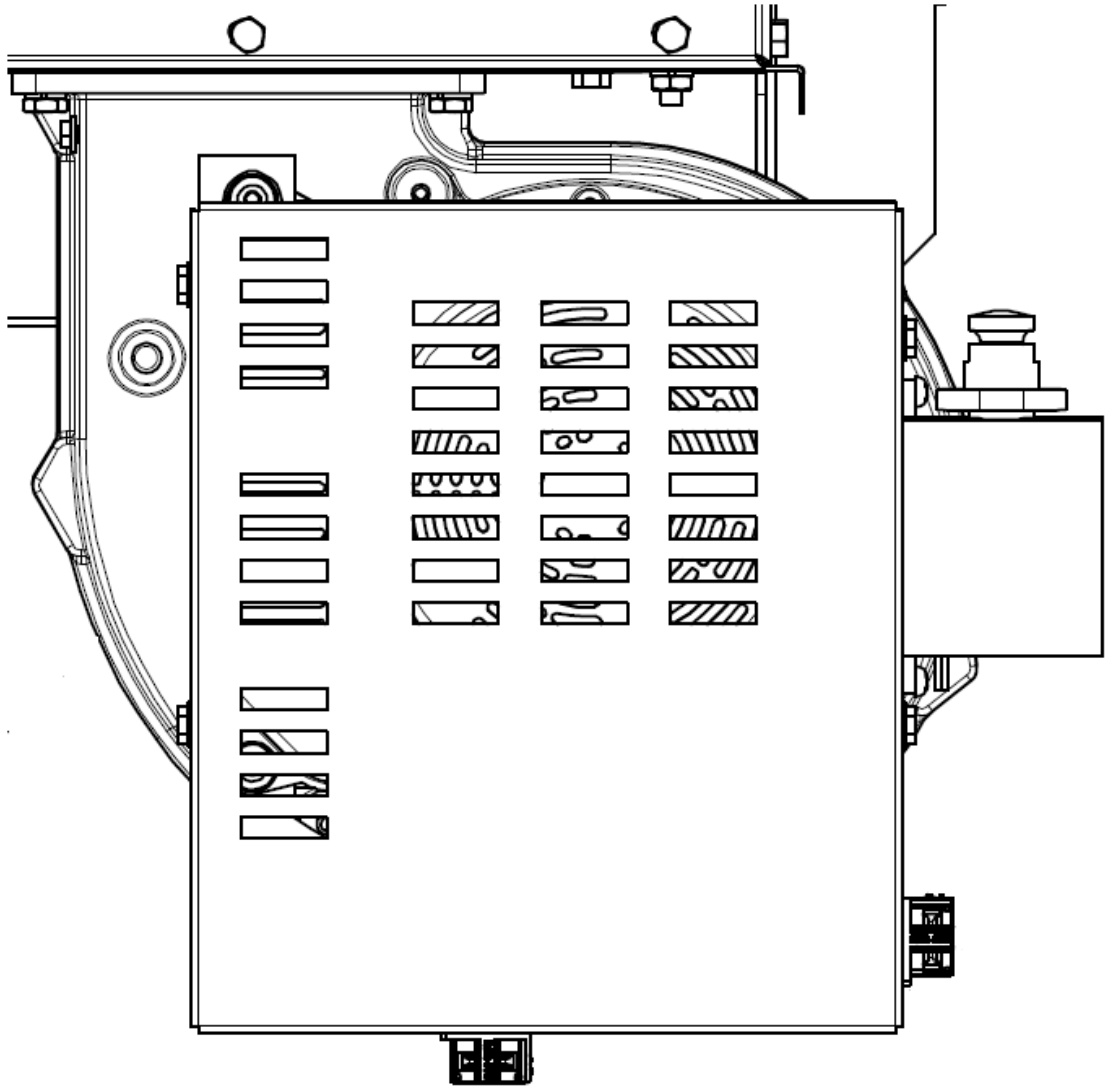
- IPAK I Ultra Modulating Burner
- IPAK II 2 Stage and Modulating Burner
  - No Ultra Mod for IPAK II

Nominal Burner Size	Two Stage Burner	Modulating Burner	
	Stage 1/Stage 2	Modulating Input Range	Ultra Mod Input Range
235 MBH	117/ 235	n/a	n/a
350 MBH	175/ 350	n/a	n/a
500 MBH	250/ 500	125 - 500	36 - 500
800 MBH	400/ 800	125 - 800	45 - 800
850 MBH	425/ 850	125 - 850	48 - 850
1000 MBH	500/ 1000	125 - 1000	48 - 1000

IntelliPak I VA Burner

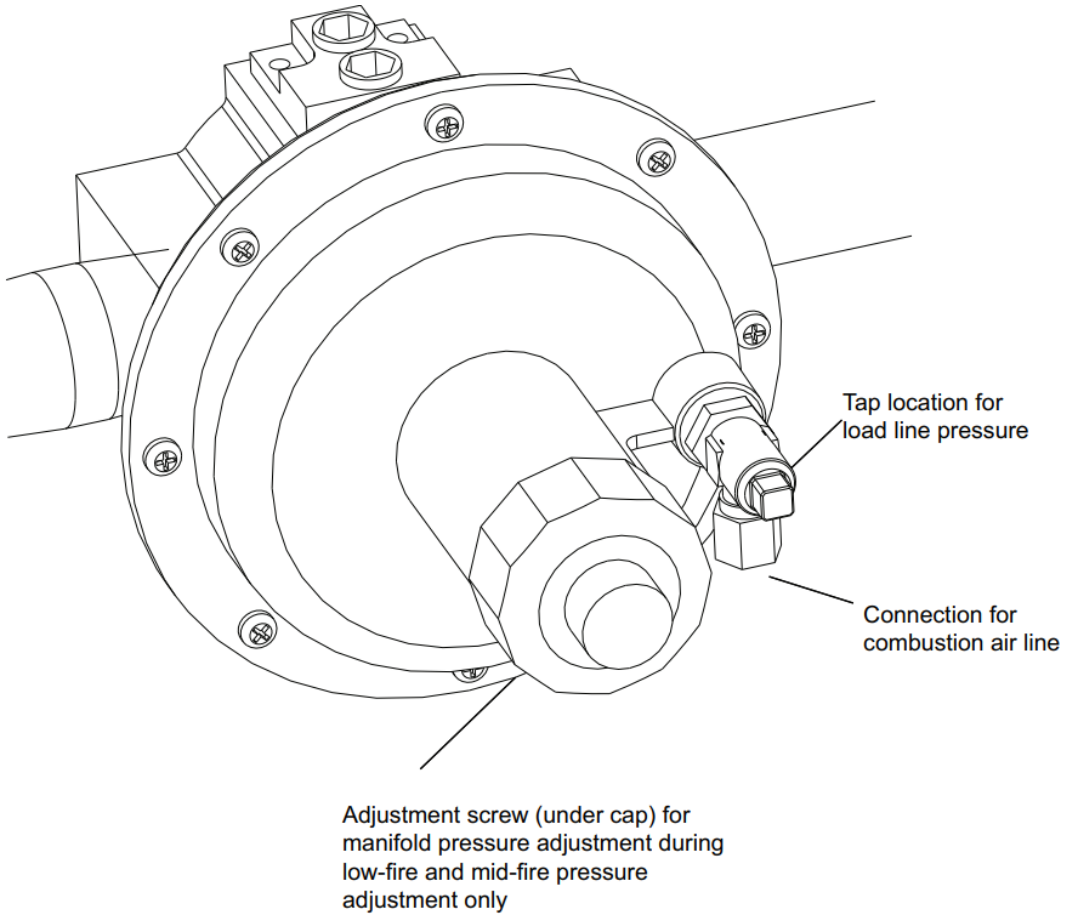
Combustion Blower

- ECM
- Low fire
  - 10% EBM, 15% Fasco
- High fire
  - 500 MBH 41% EBM & Fasco
  - 800 MBH 48% EBM, 47% Fasco
  - 850 MBH 50% EBM, 49% Fasco
  - 1000 MBH 72% EBM, 55% Fasco



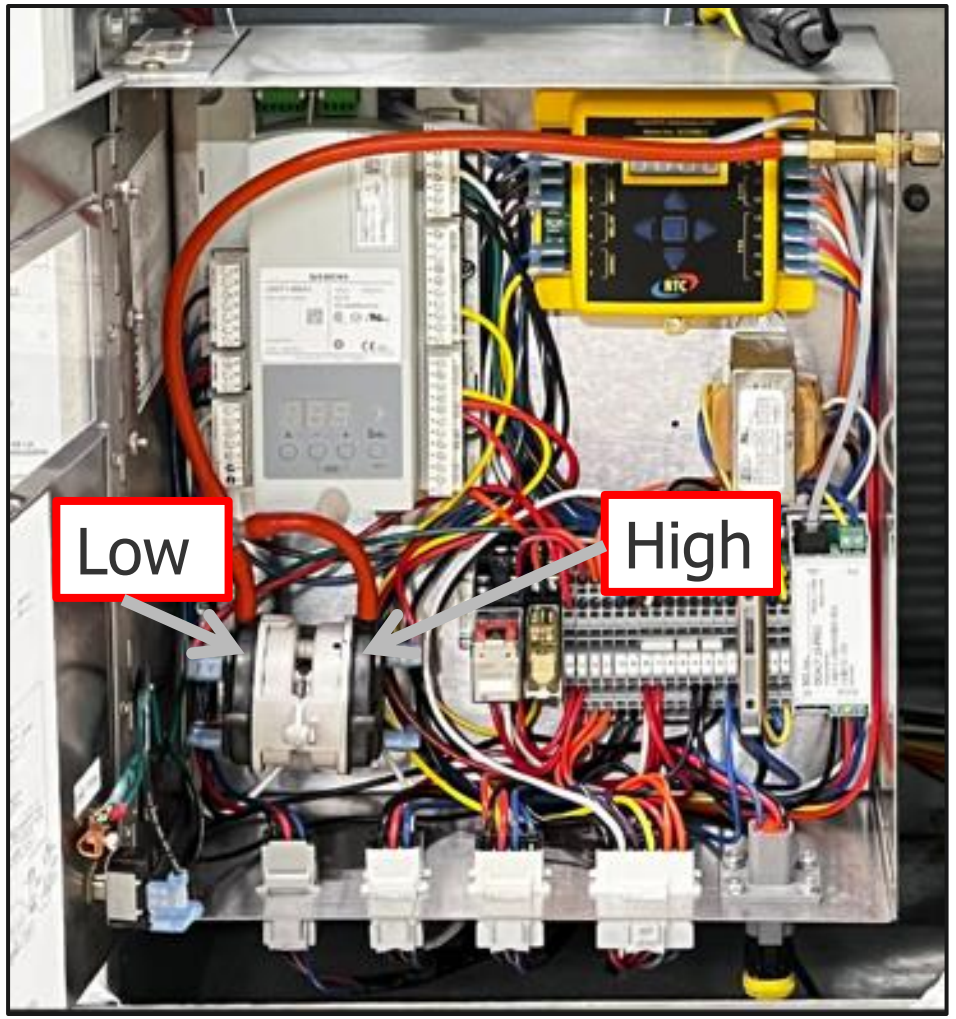
Ratio Regulator

- Combustion pressure to manifold pressure ratio
- Spring pressure adjustment made during low-fire setup



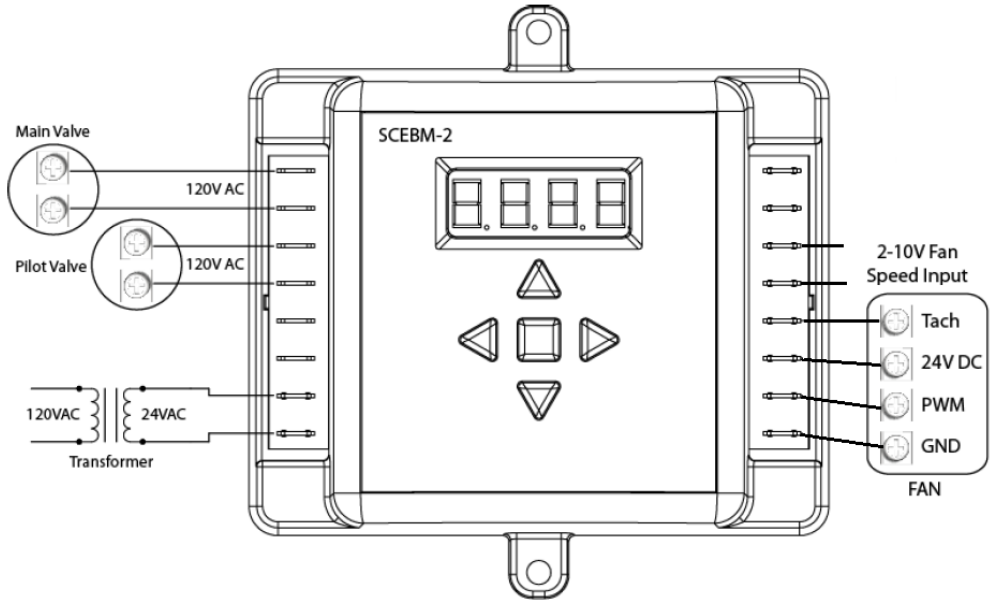
Combustion Proving Switches

- High Pressure
  - Closes at 3.0”
  - Closed during Purge cycle then bypassed
- Low Pressure
  - Closes at 0.05”
  - Closed whenever combustion blower is running
- Piped in parallel
- Wired in series

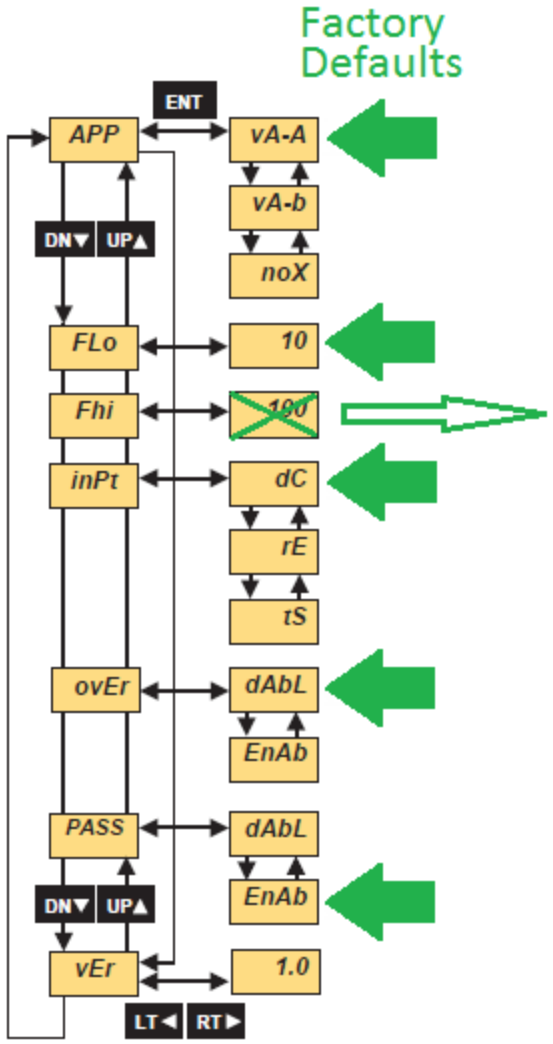


Motor Control

- RTC Solutions
  - Model SCEBM-2



Motor Control – ECM Programming



Programming is done at the factory but should be verified

MBH	Fhi setpoint
500	41%
800	48%
850	50%
1000	72%

Note: There are other parameters for use with a temperature sensor These settings do not matter

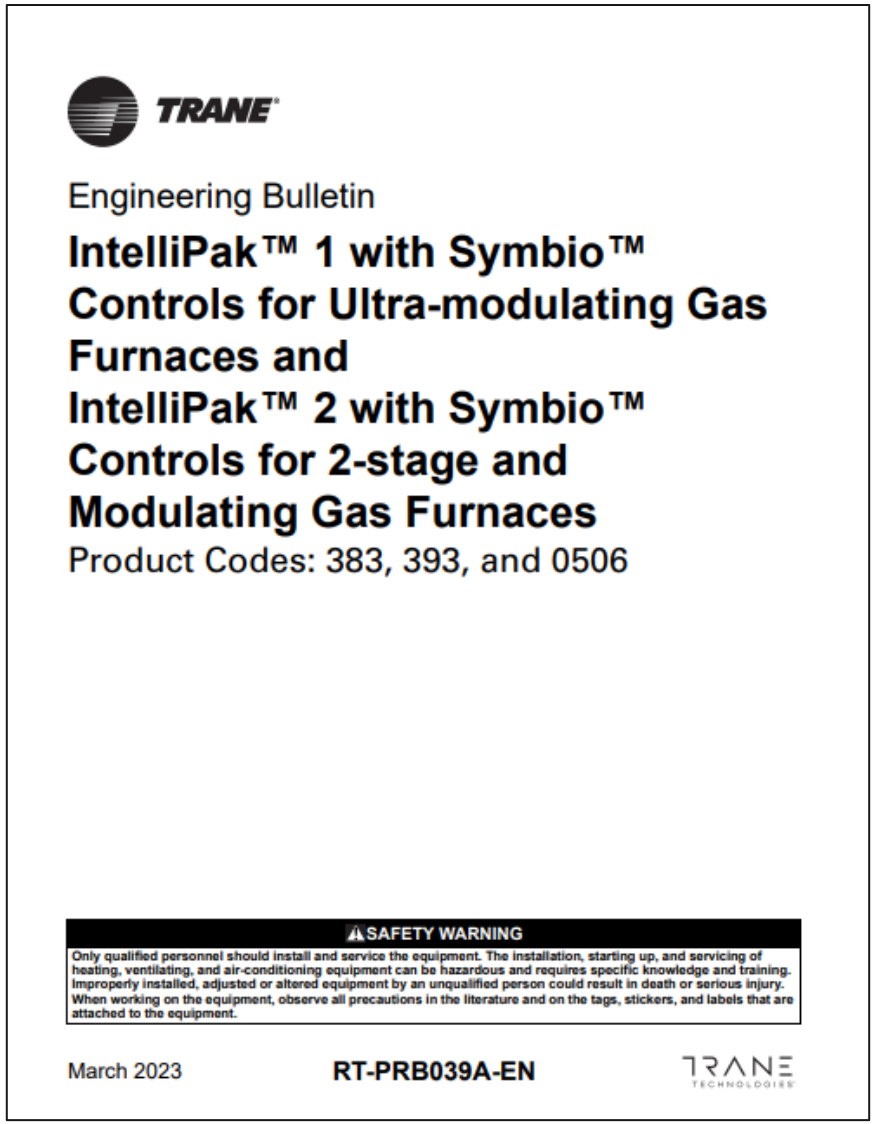
Motor Control - Combustion Blower

- High Fire (100%) manifold pressure is based on the Fhi setting
- Talk to Tech Support before adjusting

MBH	Fhi setpoint	Manifold " W.C.
500	41%	2.6" to 2.9"
800	48%	1.3" to 1.6"
850	50%	1.6" to 1.9"
1000	72%	2.1" to 2.4"

Burner setup

VA Burner Engineering Bulletin



TRANE

Engineering Bulletin

IntelliPak™ 1 with Symbio™ Controls for Ultra-modulating Gas Furnaces and IntelliPak™ 2 with Symbio™ Controls for 2-stage and Modulating Gas Furnaces

Product Codes: 383, 393, and 0506

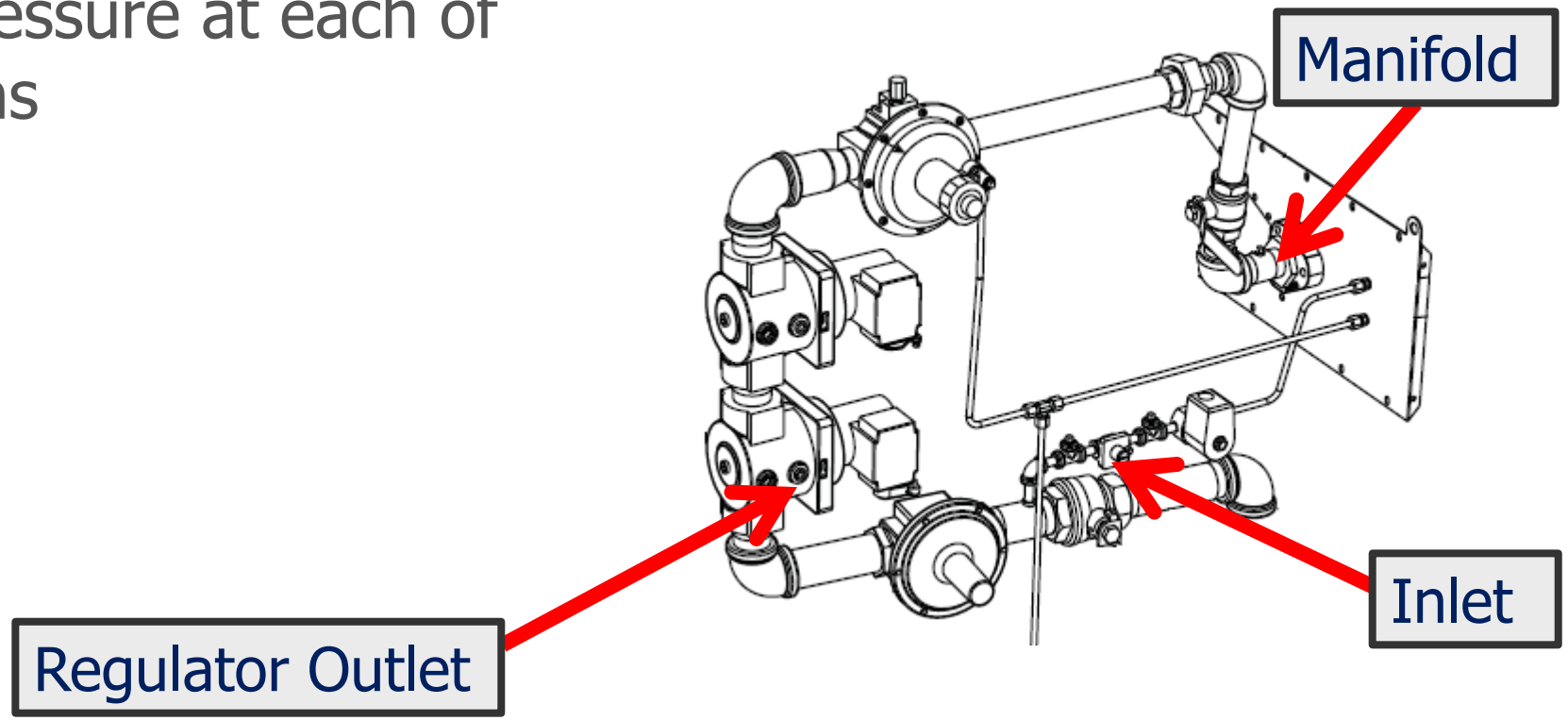
⚠SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

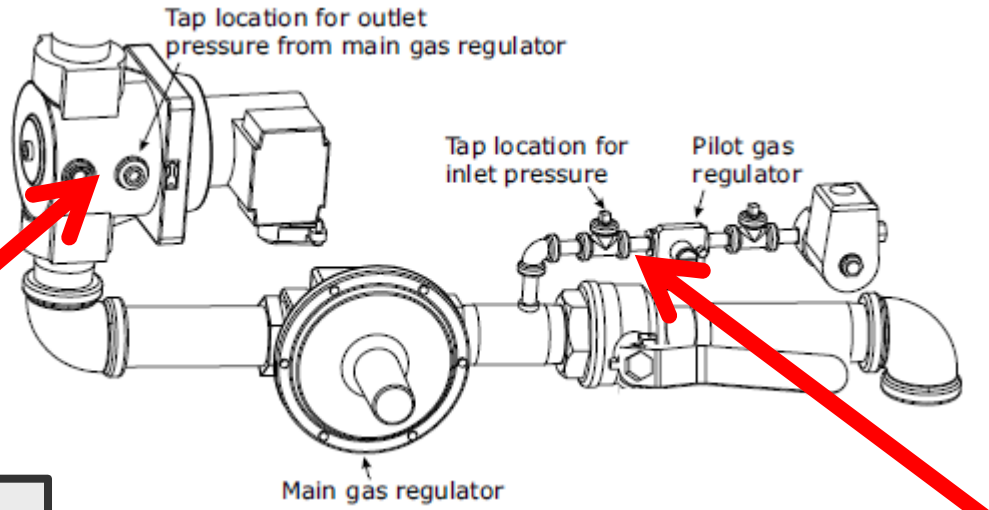
March 2023 **RT-PRB039A-EN** TRANE TECHNOLOGIES

Measuring Gas Pressure

- During setup you will be measuring pressure at each of these locations



Inlet and Regulator Gas Pressure



Main Gas Regulator Pressure **5.8-6.2”**

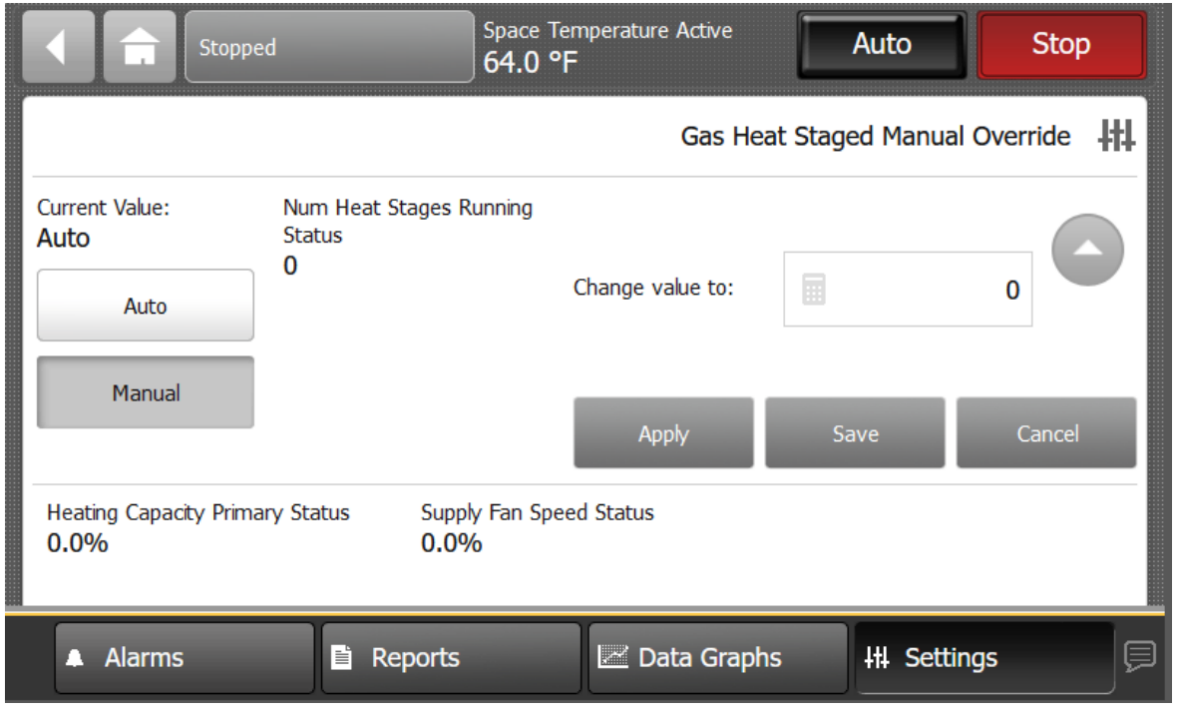
Inlet Pressure 7.0” – 14.0”
Prefer 12.0”

Prepare Unit for Startup

- Feed the pilot flame
  - Open manual shutoff valve near gas regulator
  - Ensure manifold gas manual shutoff valve is closed

Manual Override Settings

- Turn supply fan on
- Set fan speed to 100%
- Set Gas Heat Stage to 1
- Set Gas Heat to 1%
- Press Auto

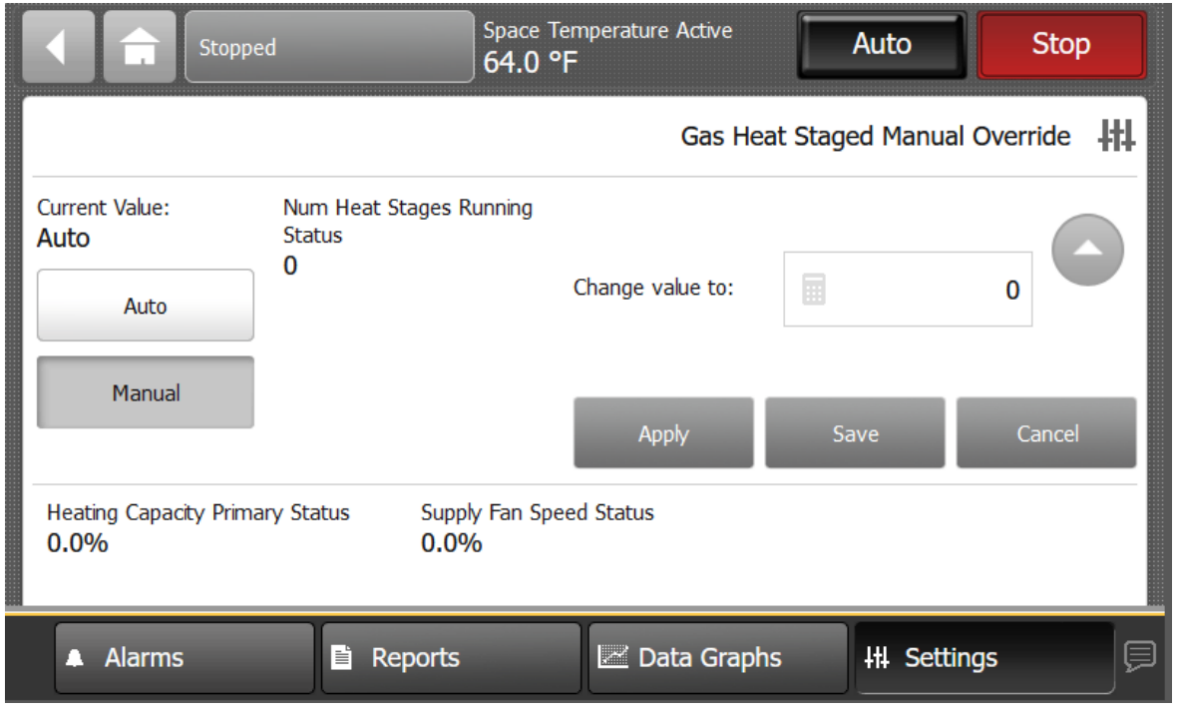


Pilot Flame

- After initial purge and pilot has been lit, Measure pilot gas pressure at pilot gas pressure tap
- Adjust pilot gas regulator to 3.0-3.5” w.c.
- Once pilot flame is established, slowly open manifold gas manual shutoff valve unit.
  - Burner lights at low fire
  - Allow system to operate for 10 minutes

Manual Override Settings Startup

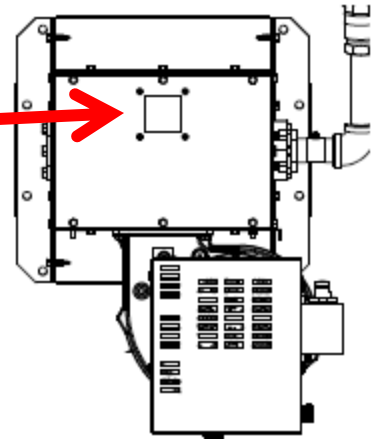
- Navigate to Gas Heat Manual Override Screen
- Set Modulating Percentage to 100% and/or enable 2nd stage
- Ensure Gas Regulator outlet pressure is 5.8-6.2” w.c.

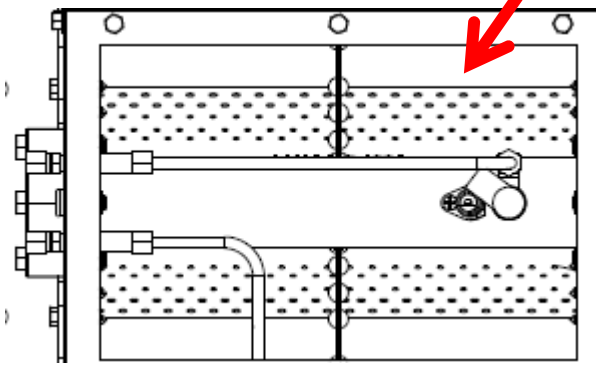


Low Fire Setup

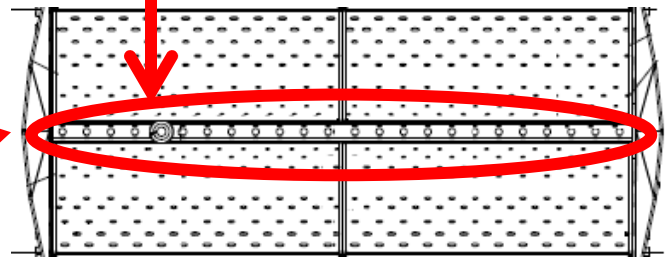
- Navigate to Gas Heat Manual Override Screen
- Set percentage to 1%

Once burner fires, look in this sight glass





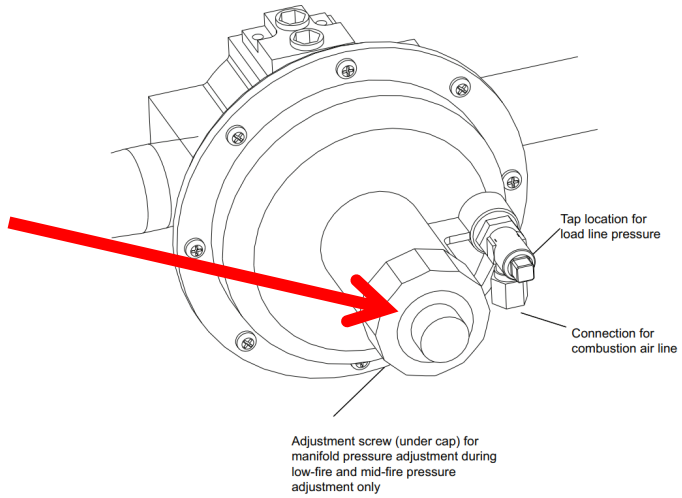
Verify that flame is seen at all holes



Burner orifices from inside

Low Fire Setup

If flame is not seen in all holes, adjust Low Fire Bypass on the ratio regulator



Flue Analyzer:
O_2 17.0% - 19.0%
CO <400ppm

CCW to **incr**ease O_2
CW to **decrease** O_2

High Fire Setup

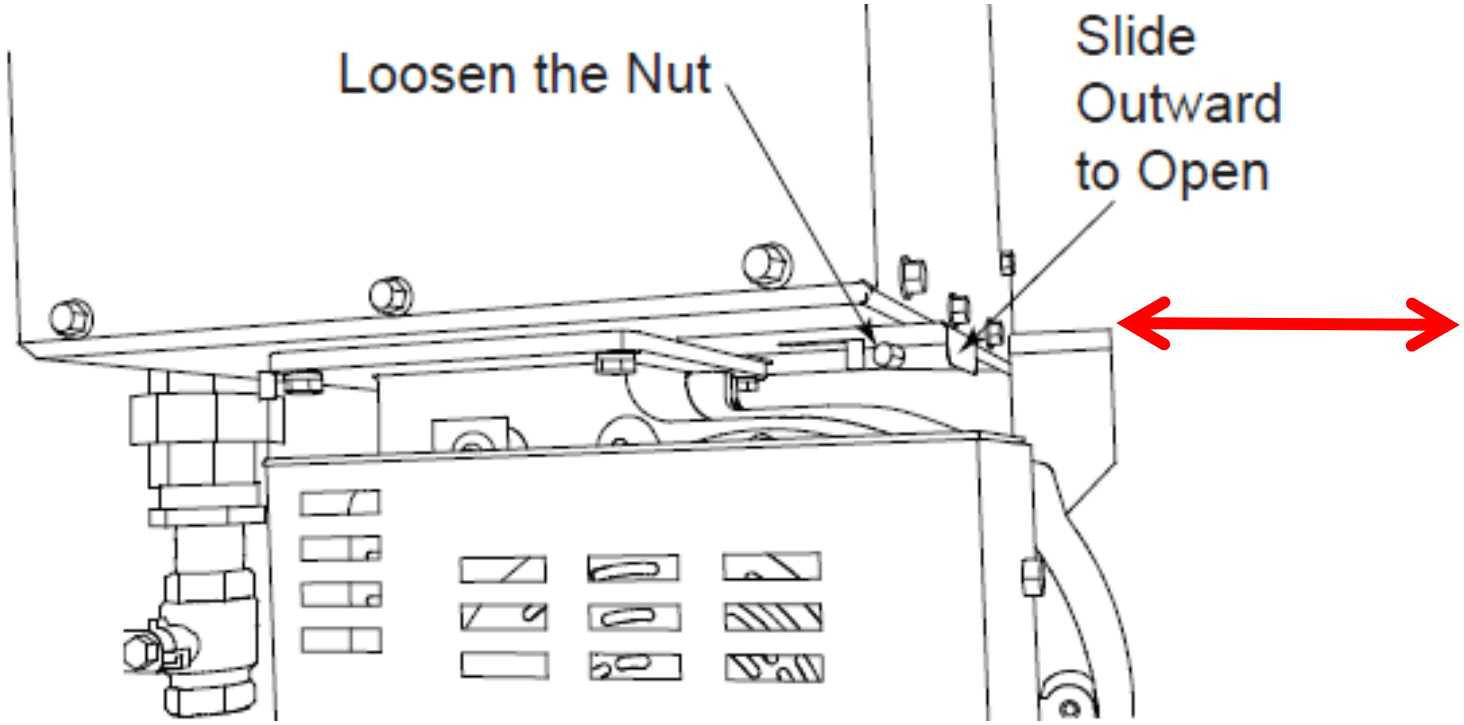
- Gas Heat Manual Override
  - Set Mod Gas 100%
  - Manifold Pressure
    - Adjust by Fhi Setpoint
  - Combustion gases
    - Adjust by air damper
    - O_2 3.0% - 5.0%
    - CO_2 8.5% - 10.0%
    - CO <100ppm

Verify:
Inlet pressure: 7.0″ to 14.0″
Main Regulator Pressure: 6.0″
Manifold Pressure:

MBH	Fhi setpoint
500	2.6″ to 2.9″
800	1.3″ to 1.6″
850	1.6″ to 1.9″
1000	2.1″ to 2.4″

High Fire Setup

If O_2 is too high or too low adjust the combustion damper



Recheck Low Fire Values

- Set Mod Gas to 1%
- Allow system to operate for 10 minutes
- Recheck O_2 and CO_2 values