

# **HelioJET<sup>®</sup> Fixed Flow System**

**Models: FB-30, FB-60, FB-100, FB-130**

## **Installation, Operation & Maintenance**



## **Instant High Pressure Hot Water for Industrial Cleaning**

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# Safety Precautions

## **SAFETY PRECAUTIONS:**

Please be sure the following instructions are understood thoroughly BEFORE operating the system. Consult our representative in your area or call the factory to resolve the items you do not understand.

This equipment can be used to generate:

1. A high pressure fluid that can penetrate the skin and cause severe internal injury!
2. A hot fluid which can severely burn the body.
3. A chemical solution ranging from mild to highly dangerous; protective measures must be taken.

## **Therefore:**

1. **DO NOT** exceed inlet pressure of 150 PSIG (10.5 Bar) for either steam or water supply, unless your HelioJET® system has been specifically designed to handle higher supply pressures.
2. **ALWAYS** use hardware (valves, fittings, etc.) which are rated for the maximum discharge pressure.
3. **INSTALL** in accordance with local codes.
4. **Start-Up Drain** shall be rigid metal pipe firmly anchored and routed directly to a drain and away from personnel.

## **REMEMBER:**

The HelioPAC™ is a powerful fluid pressure amplifier™ and condenser which can multiply the inlet pressure several times! For example, with 150 PSIG (10.5 Bar) of inlet water and 150 PSIG (10.5 Bar) inlet steam, the discharge pressure could reach 600 PSIG (41 Bar) at 212°F (100°C) and be laden with dangerous chemicals. This system deserves respect!

**CAUTION: Never use a flexible hose on the Start-Up Drain. Always use hard pipe and be sure the selected drain can handle hot water. Firmly anchor Start-Up Drain piping. Never plug, undersize, or restrict Start-Up Drain piping in any way. Never pipe Start-Up Drain anywhere near an occupied area. Be sure personnel are always safe from Start-Up Drain splash.**

**OBSERVE ALL ADDITIONAL SAFETY PRECAUTIONS FOUND IN THIS MANUAL.**

# Installation

Follow these instructions and refer to pages and illustrations as specified.

Your HelioJET® Fixed Flow System™ will require the following utilities and connections for proper operation:

- Cold water supply
- Steam supply
- Floor drain
- Electricity
- High pressure discharge piping and spray equipment such as showers headers
- Compressed air

***For details regarding utilities and connections, refer to the table on page 7.***

## **Location**

It is recommended that you place the Fixed Flow System™ away from production and other high traffic areas. A boiler or utility room, near good water and steam sources and reasonable piping distance to the point of cleaning is ideal. Placing the system in the proper location will avoid problems that can arise from tampering, water damage, etc.

## **Water Supply**

Use cold water supply less than 80°F (26°C). Water supply pressure must be stable. The supply line should be dedicated exclusively to the HelioJET and piped directly from a larger main.

Install a manual shut off valve (sold separately) and be sure it is accessible from the HelioJET location. Always use a full port or oversized valve in order to avoid a pressure drop.

If your plant has a water hardness problem, be sure that the HelioJET is supplied with treated water in order to prevent fouling in the system. Please discuss this issue with your chemical supplier.

Note:

To optimize performance, always avoid pressure drops in supply lines. Locate the HelioJET as close as possible to the water and steam source, and never undersize piping. If the HelioJET must be located a considerable distance from supply mains, increase pipe diameters feeding the unit. Avoid the use of restrictive devices in piping, such as regulators, etc.

Before actually connecting supply lines, to the HelioJET System, thoroughly flush them to remove any debris that may plug internal orifices and/ or discharge spray nozzles.

## **Steam Supply**

The Fixed Flow System™ requires a dedicated steam supply line. Insulate the Steam Line.

Install a full port or oversized manual shut-off valve, and be sure it is accessible from the FB-System™ location.

Standard HelioJET systems are designed to operate on steam supply pressures of 100-150 psi (7-10.5 Bar). If your steam supply pressure is outside this range, contact the HelioJET Technical Department for assistance. HelioJET systems can often be modified in the field to accommodate other supply conditions.

For steam consumption information, refer to table on page 7. Please be sure you have enough boiler capacity to operate the system.

### **Start-up Floor Drain**

Pipe the Start-Up Drain downward using rigid pipe. ID should be no less than that specified on pages 6-7.

**CAUTION: Overflow drain discharge is HOT. Never use a flexible hose on the Start-Up Drain. Always use hard pipe and be sure the selected drain can handle hot water. Firmly anchor overflow piping. Never plug, undersize, or restrict overflow piping in any way. Never pipe overflow anywhere near an occupied area. Be sure personnel are always safe from overflow splash.**

During usage, the HelioJET® will discharge some hot water to the drain each time it is turned on and off. Be sure the drain you choose can accommodate 212°F (100°C).

Never submerge the start-up drain pipe into a floor drain or sump. Always leave a little space between the end of the pipe and the waste water level in order to **prevent syphoning**.

Never route overflow piping overhead; doing so can impede start-up.

In some cases thrust may occur in the start-up drain line. To prevent movement, be sure all piping is firmly anchored.

### **Electrical Supply (see electrical drawings enclosed)**

The standard Fixed Flow System™ is wired to accept 3 phase power. Voltage may be modified to customer specification before shipment. All internal control wiring and components, such as PLC, Touch Screen, starter, overload, etc. are included in the package, unless otherwise specified.

### **High Pressure Discharge Piping**

To supply pressurized hot water to shower headers or other cleaning equipment in your facility, connect high pressure piping to the discharge line of the HelioJET FB-System (see pages 6-7). For pipe runs over 100 ft. (30m) enlarge discharge line.

### **Compressed Instrument Air**

Refer to pages 6-7, regarding the air supply connection.

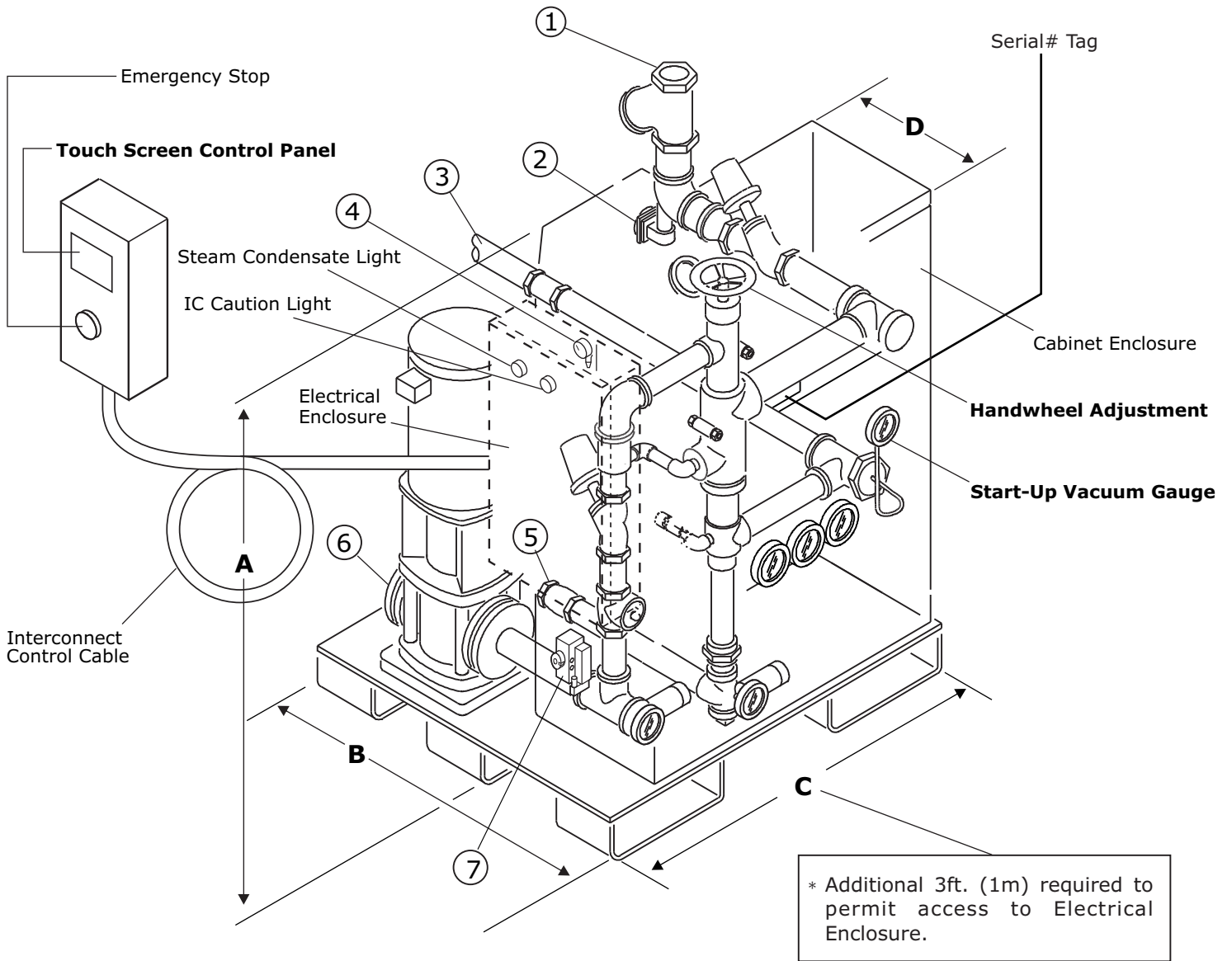
### **Chemical Supply**

With regard to chemical cleaning applications, each HelioJET FB-System is customized to some degree. The Chemical Supply may contain more than one supply valve in order to accommodate different chemical product applications. These chemical valves are controlled at the Touch Screen Panel. To interface Touch Screen selections to the proper chemical valve, please refer to electrical control logic drawings (provided).

**CAUTION: Be sure all pipe and fittings are rated for the pressure and temperature that the system may deliver.**

**NOTE: See pages 6 & 7 for installation diagram and charts.**

# Fixed Flow System Installation



① Steam Supply Connection

⑤ Discharge Line, Pressurized Hot Water Connection

② Steam Trap Drain Connection

⑥ Water Supply Connection

③ Start-Up Drain Connection

⑦ Chemical Supply Connection

④ Air Supply Connection

**Utilities Required for Operation (by Model)**

<b>MODEL ▶</b>	<b>FB-30</b>	<b>FB-60</b>	<b>FB-100</b>	<b>FB-130</b>
<b>STEAM SUPPLY ▶</b>	<b>Pipe Connection:</b> 2" 50.8mm  <b>Pressure:</b> 100 - 150 psi 7 - 10.5 Bar  <b>Usage:</b> 15 - 35 lbs/min 6.8 - 15.9 kg/min	<b>Pipe Connection:</b> 2" 50.8mm  <b>Pressure:</b> 100 - 150 psi 7 - 10.5 Bar  <b>Usage:</b> 20 - 60 lbs/min 9.1 - 27.2 kg/min	<b>Pipe Connection:</b> 2-1/2" 65mm  <b>Pressure:</b> 100 - 150 psi 7 - 10.5 Bar  <b>Usage:</b> 50 - 110 lbs/min 22.7 - 49.9 kg/min	<b>Pipe Connection:</b> 3" 76.2mm  <b>Pressure:</b> 100 - 150 psi 7 - 10.5 Bar  <b>Usage:</b> 90 - 130 lbs/min 40.8 - 59 kg/min
<b>STEAM Trap Drain ▶</b>	1/2"(12.7mm)	1/2"(12.7mm)	1/2"(12.7mm)	1/2"(12.7mm)
<b>WATER SUPPLY ▶</b>	<b>Pipe Connection:</b> 2" 50.8 mm  <b>Pressure:</b> Stable  <b>Temp:</b> Less than 80°F (26°C)	<b>Pipe Connection:</b> 2" 50.8mm  <b>Pressure:</b> Stable  <b>Temp:</b> Less than 80°F (26°C)	<b>Pipe Connection:</b> 2-1/2" 65mm  <b>Pressure:</b> Stable  <b>Temp:</b> Less than 80°F (26°C)	<b>Pipe Connection:</b> 3" 76.2mm  <b>Pressure:</b> Stable  <b>Temp:</b> Less than 80°F (26°C)
<b>DISCHARGE ▶</b>	<b>Connection:</b> 2" (58.5mm)  <b>Discharge Piping:</b> 2" (58.5mm)	<b>Connection:</b> 2" (58.5mm)  <b>Discharge Piping:</b> 2" (58.5mm)	<b>Connection:</b> 2" (58.5mm)  <b>*Discharge Piping:</b> 2.5" (65mm)	<b>Connection:</b> 2" (58.5mm)  <b>*Discharge Piping:</b> 3" (76.2mm)
* The HelioJET Connection is 2" (58.5 mm). The discharge piping must be increased in order to accommodate higher flow rates.				
<b>START-UP DRAIN ▶</b>	<b>Min. Pipe Connection:</b> 1-1/4" (31.75mm)  <b>Min. Floor Drain ID:</b> 3" (76.2 mm)	<b>Min. Pipe Connection:</b> 1-1/2" (38mm)  <b>Min. Floor Drain ID:</b> 4" (101.6 mm)	<b>Min. Pipe Connection:</b> 1-1/2" (38mm)  <b>Min. Floor Drain ID:</b> 6" (152.4 mm)	<b>Min. Pipe Connection:</b> 1-1/2" (38mm)  <b>Min. Floor Drain ID:</b> 6" (152.4 mm)
<b>Air Supply ▶</b>	<b>Pipe Size:</b> 1/4" (6mm) <b>Pressure:</b> 80-120 PSI (6-8 Bar) <b>Usage:</b> <1 cubic ft.(<30 cubic cm)/cycle			
<b>Electrical ▶</b>	Standard models are III phase 460 volts. Electrical can easily be modified per customer specs.			
<b>Dimensions ▶</b>	<b>A:</b> 54" (138cm) <b>B:</b> 42" (107cm) <b>C:</b> 42" (107cm) <b>D:</b> 16" (41cm)			
<b>WEIGHT ▶</b>	1100 lbs (499 kg)	1350 lbs (612 kg)	1350 lbs (612 kg)	1500 lbs (680 kg)

**Spray Nozzle Selection**

It is important that spray equipment is properly designed to operate with the HelioJET System. Spray equipment may include tank washers, shower headers for paper machines, etc.

HelioJET engineering should be consulted ahead of time regarding spray nozzle selection, etc. This approach will ensure proper operation.

# Initial Calibration & Start-Up

## Preparing for Initial Calibration and Start-up

After the HelioJET Fixed Flow System™ has been installed, complete the following steps:

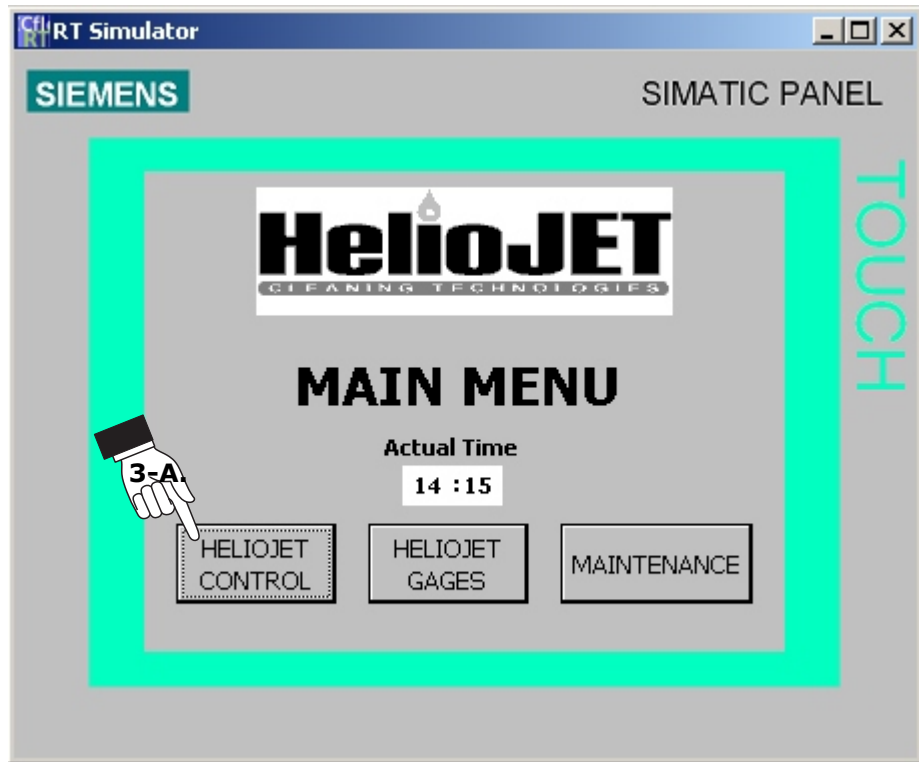
### Initial Calibration & Start-Up

Before attempting to start this system, be sure it has been installed in accordance with all previous instructions, that proper procedures have been followed, and all local codes satisfied.

**CAUTION: Before you begin this procedure, be sure you have read steps 1-4 and that you understand them and are familiar with all the components referenced. If the Touch Screen is in a remote location, this procedure will likely require at least two people. If you have any questions, contact the HelioJET Technical Service Department at 1-585-768-8710.**

- Step 1.** Be sure the handwheel adjustment (pg. 6) is turned clockwise to fully bottomed position.
- Step 2.** Open manually operated water and steam supply valves to system (be sure all condensate has been drained from the steam supply line).
- Step 3.** Refer to Touch Screen Control (see page 6).

### 3-A. Select "HelioJET Control"



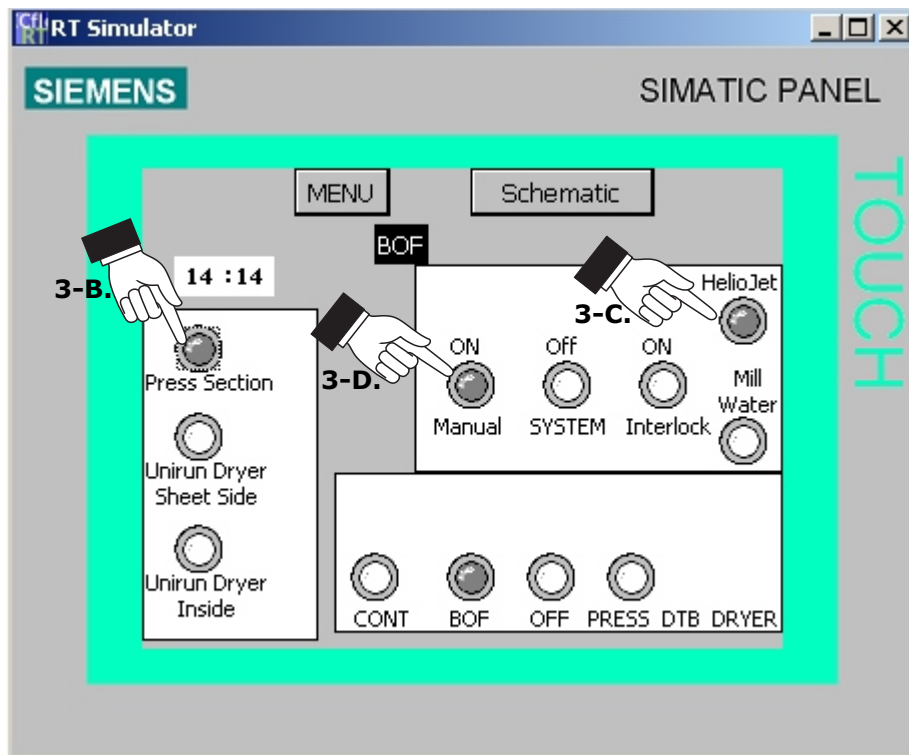


### 3-B. Select Press Section or Forming Fabric (as applicable)

### 3-C. Select HelioJET

### 3-D. Select "ON Manual"

- Operation Notes:
- Water will discharge from the Start-Up Drain and the selected Showers.
  - Check to see if the water supply pump rotation is correct, see page 26 & 27 for pump location. If rotation is incorrect select OFF POWER, lock out HelioJET power and make wire change to correct pump rotation, then start over.



**Step 4.** Observe the Start-up Vacuum gauge (pg. 6), and quickly begin turning the Handwheel counter-clockwise. At some point the gauge will suddenly read a vacuum. Continue to turn the Handwheel rapidly in the same direction until the vacuum reading is set at 5".

**Caution:** If you adjust the Handwheel too high, steam may discharge from the Start-Up Drain. If this occurs, lower the Handwheel until the vacuum gauge reads 5". To prevent a safety hazard be sure the overflow line is firmly anchored and piped directly to a drain and away from personnel.

**After Handwheel and Vacuum Gauge Reading is set, the following should occur:**

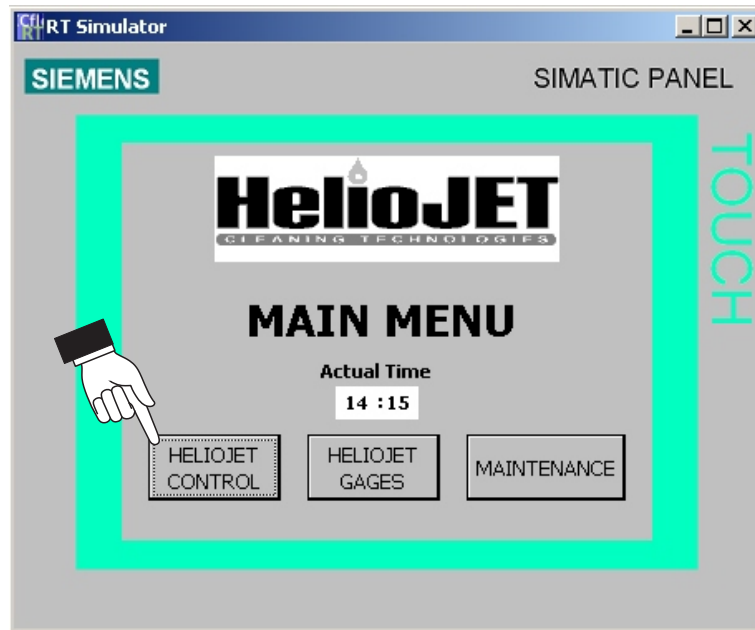
- If lit, the orange IC Caution Light on the electrical enclosure will turn off. This may happen as the Handwheel is being raised
- After 90 seconds the applicable shower drain valves will close.
- Pressure will build in the discharge lines that feed the applicable showers.
- The HelioJET System will continue to run smoothly until it is turned OFF (see "Shut Down" below).

Note: For subsequent (future) start-ups the Handwheel should not require any further adjustment. This initial calibration may have to be repeated if, the Handwheel is tampered with or the mill steam and water supply pressures change.

**Shut Down:** To turn the HelioJET System Off. Simply push the "OFF Power" button on the Touch Screen.

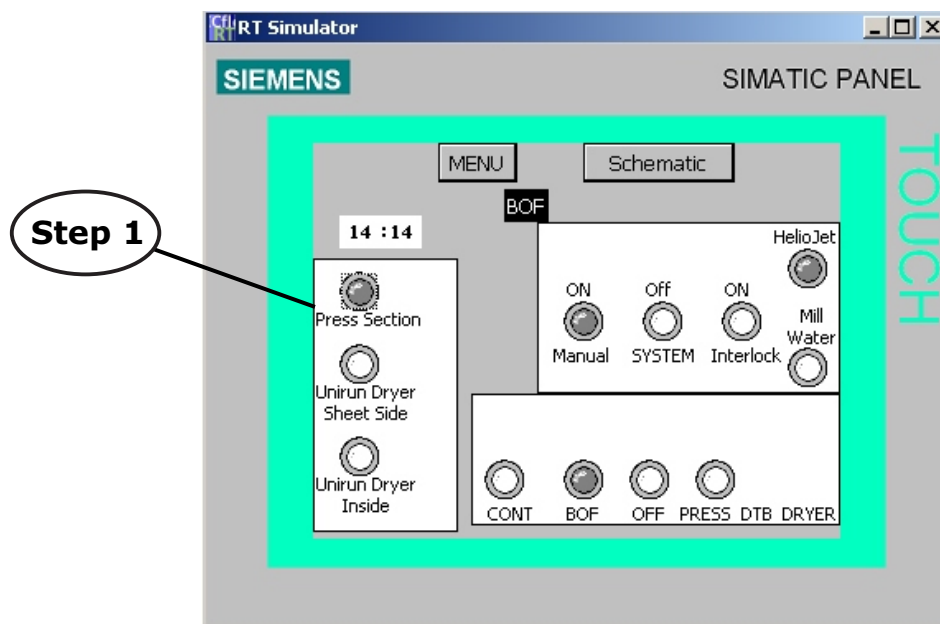
# Routine Start-up & Operation

After the initial calibration and start-up is complete and all adjustments are made in accordance with the initial calibration and start-up procedure, it is only necessary to follow the routine start-up and operation procedure below.

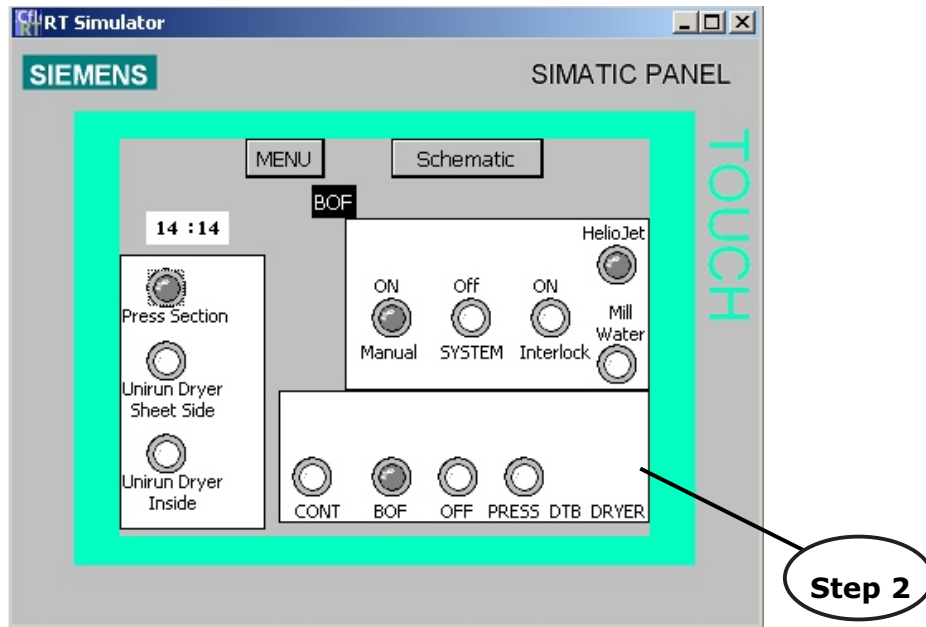


To operate the HelioJET, select "HelioJET Control"

## HelioJET Control Screen



**Step 1.** Select fabric section to be cleaned.



**Step 2.** Select chemical cleaning product (if desired).

**Key**  
 Cont = Continuous Press Felt Cleaning: This option cleans the press felt during paper production by applying hot water at full pressure with, typically, a low dose of chemical cleaning product on a continuous basis.

BOF = Batch On Fly Press Felt Cleaning: The BOF option allows the HeliJET to continuously apply high pressure hot water to the press felt during paper production. The chemical product is applied intermittently. The current program default allows for chemical product to be applied every 4 hours for a duration of 30 minutes. This of, course, can be modified in the field.

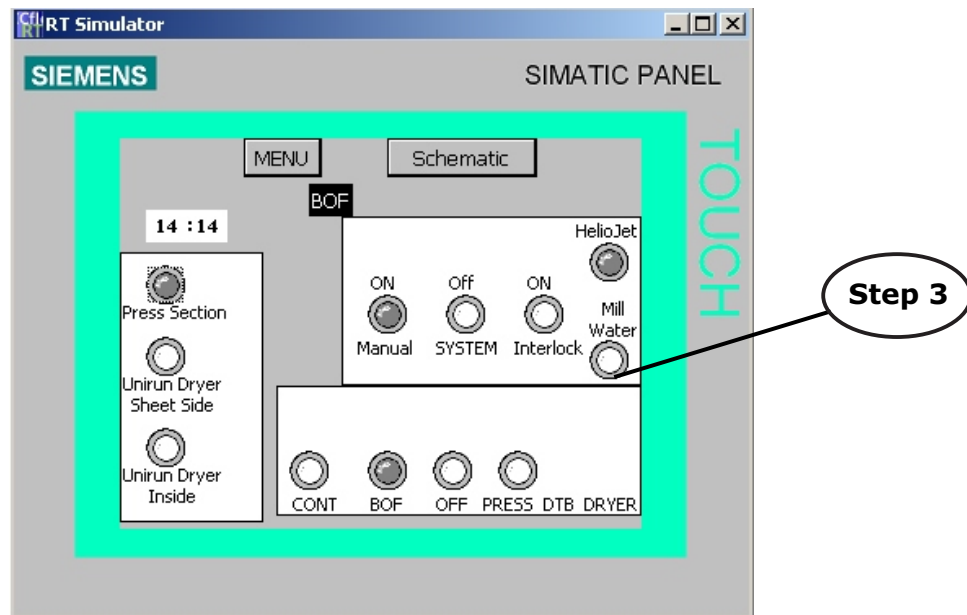
OFF = In case of a mistaken selection, the OFF button can be selected.

DTB / DB = Down Time Batch Cleaning / Batch Down (BD): The BD option is used for cleaning during a machine down or sheet break. The BD cleaning default settings are programmed to provide 5 minutes of hot water/chemical application followed by a 10 minute clean rinse period. An optional Chemical Dwell Time option is also available. This option allows chemicals to dwell on the fabric for a predetermined time before the rinse cycle begins. BD may be chosen for Press Fabric Cleaning or Dryer Fabric Cleaning.

1. Press- may be selected in order to Batch Clean(BD) the press felts.
2. Dryer- may be selected in order to Batch Clean(BD) the Dryer felts.

**Notes:**

- ✎ All chemical dosage settings are determined by your chemical supplier and are set at the chemical metering pump skid.
- ✎ The program provides for an adjustable pre-rinse before chemical products are applied. Regardless of the cleaning application.
- ✎ Program default settings are adjustable in the field and are accessible via a user name and password provided.



### Step 3.

#### First- Select Cleaning Option

##### Cleaning Option 1

HelioJET Option- Clean with HelioJET high pressure hot water with or without chemical.

##### Cleaning Option 2

Mill Water Option- Clean with mill water (typically ambient) with or without chemical. This option may be selected if the HelioJET is offline or in maintenance.

#### Second- Select ON Option

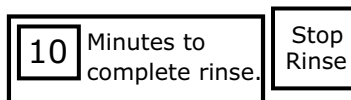
##### ON Options

Manual = The "ON Manual" option turns the HelioJET System on and activates the cleaning sequence as determined in steps 1 and 2.

Interlock = The "ON Interlock" option provides a secondary ON option which can be used to make HelioJET operation dependent on an outside power circuit. This is typically used for damage control and/or safety purposes. For example, if the paper machine power is turned off, power to the HelioJET may also be turned off automatically. See electrical schematic for interlock options.

OFF = Turns the HelioJET System off.

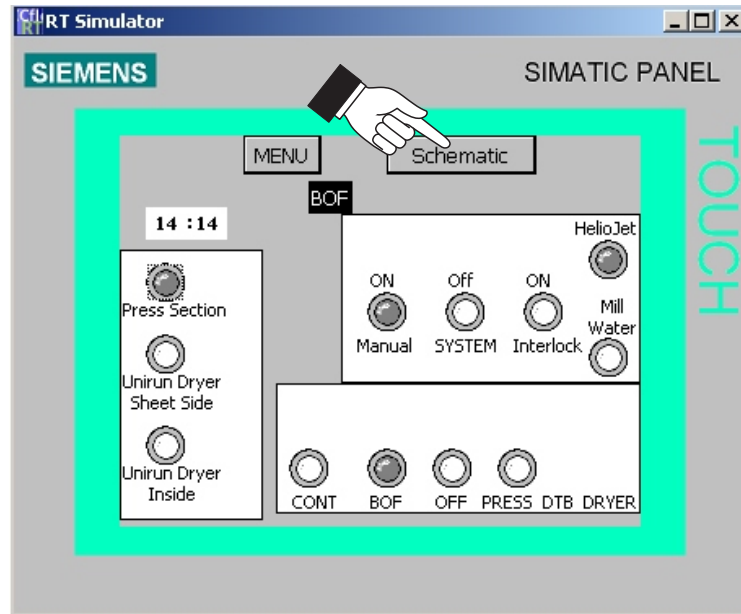
Note: If at any time the operator turns the HelioJET System OFF during a cleaning cycle, while chemical product is actually being applied to the paper machine fabric, the HelioJET is programmed to go into a safety rinse cycle before actually shutting down. This has been designed as a safety feature to avoid damage to paper machine fabrics. The safety rinse time is adjustable. The following pop-up will appear showing the set time:



**WARNING: TO AVOID DAMAGE TO MACHINE FABRICS  
RESTART HELIOJET AND THOROUGHLY RINSE.**

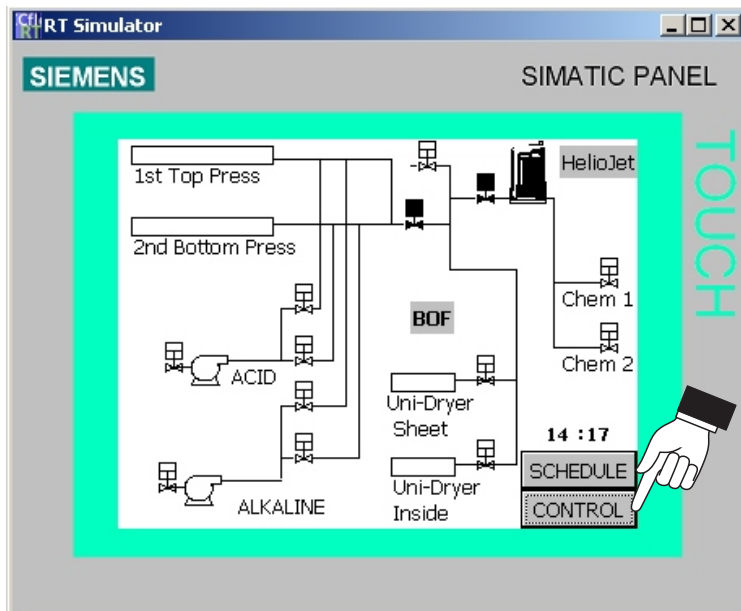
## View Schematic

The schematic button may be selected to view the path of water and chemical throughout the system.



## View Schematic

The schematic will appear and highlight the active components in black. In the example below, the HelioJET is activated along with two isolation valves which show that water is flowing from the HelioJET to the 2nd Bottom Press Shower.

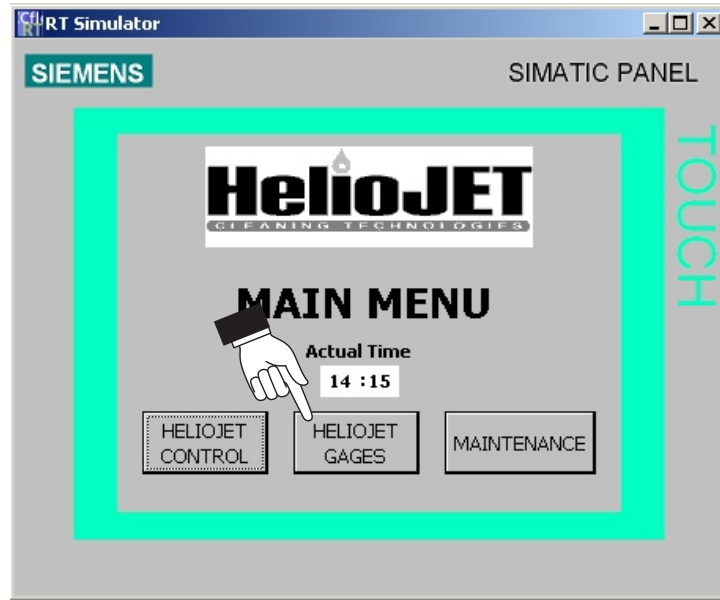


## View Schematic

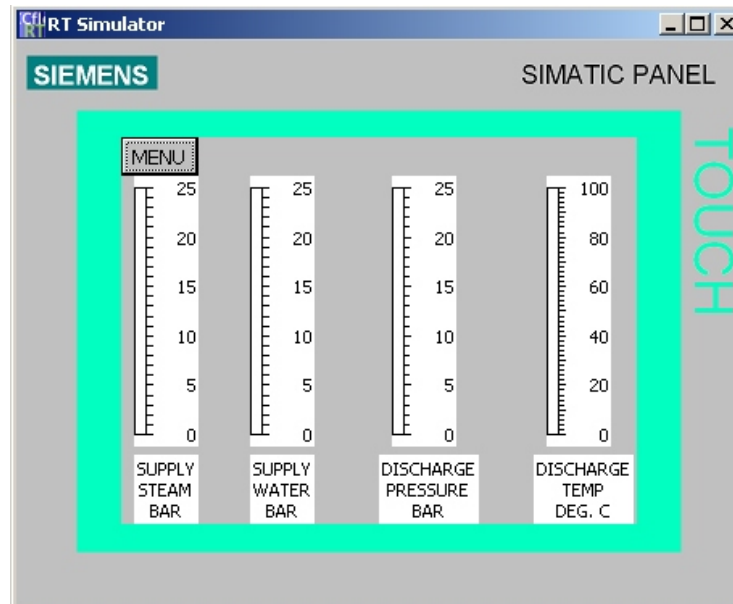
- By selecting the SCHEDULE button you may view the schedule for chemical applications. Chemical applications will be shown by time of day. Please note that the schedule may only be observed from this screen. To adjust the chemical application schedule you must use the maintenance option located on the main menu.

- By selecting CONTROL you will return to the control screen.

# Touch Screen Details



**HelioJET® Gauges:** Gauges read supply and discharge conditions as follows.

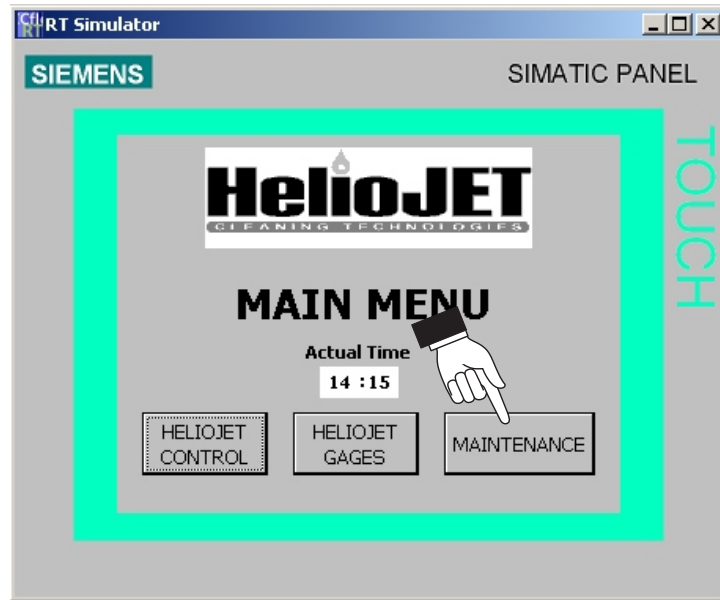


**Steam Supply:** This measures the incoming steam supply pressure as supplied by the paper mill boiler.

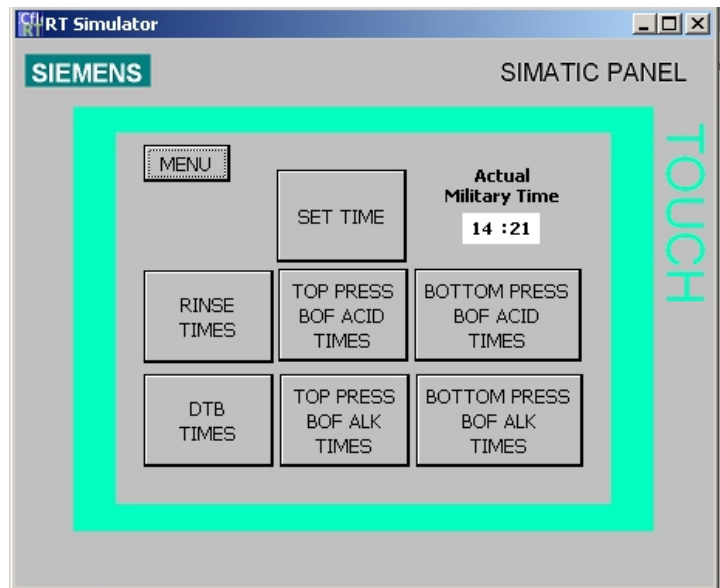
**Water Supply:** This gauge measures the cold water supply pressure from the paper mill water source after it is boosted through the HelioJET booster/stabilizer pump.

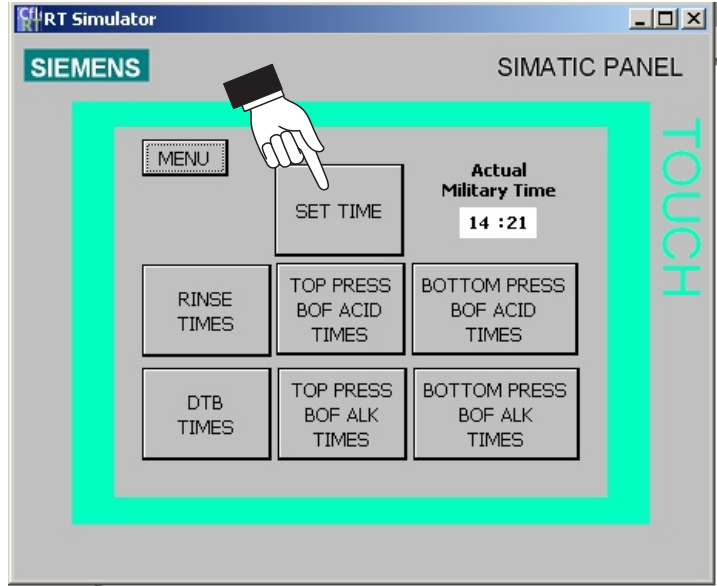
**Discharge Pressure:** This gauge measures the pressure in the discharge line which feeds the shower headers. It can also be referred to as "shower pressure".

**Discharge Temperature:** This gauge measures the temperature of the cleaning solution as it leaves the HelioJET System. Typical operating temperature is 150-170°F (65°- 77°C).

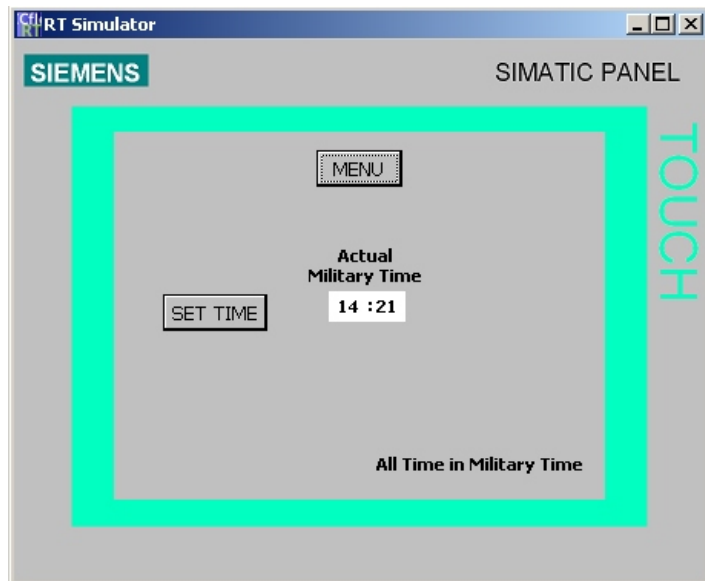


Maintenance allows for the adjustment of times and settings with regard to cleaning applications and their cycles. Maintenance access is granted via a user name and password. The first page of the maintenance screen looks like this:

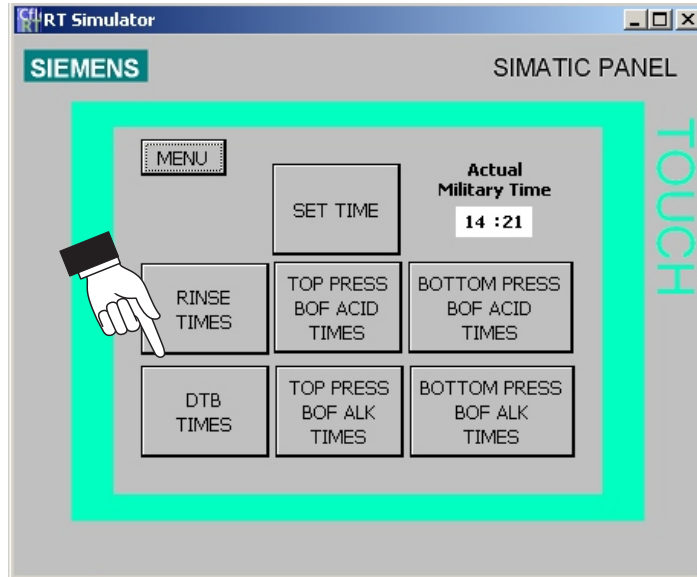




The set time button will cause the SET Time screen to appear. The time clock can then be adjusted to the proper time. The HelioJET system is based on military time.



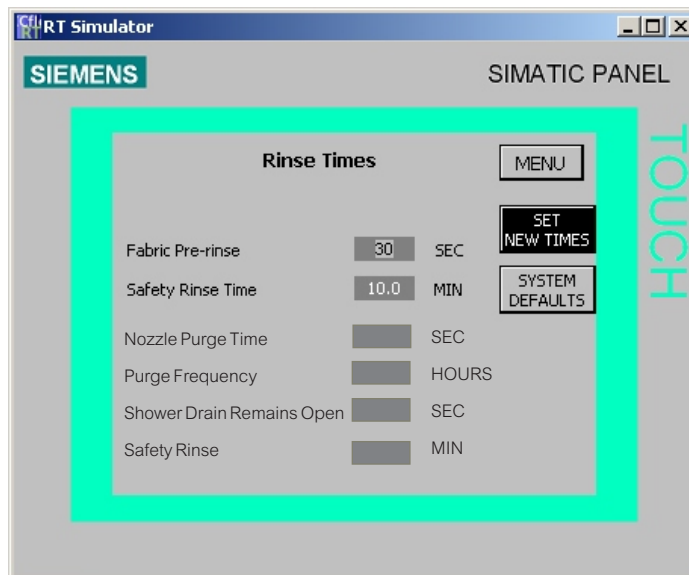




The RINSE TIMES button will cause the Rinse Times screen to appear.

**The Fabric Pre-rinse:** the number of seconds water is applied to the machine fabric before chemicals are applied. The Pre-rinse time can be set as low as 0 seconds.

**Safety Rinse Time:** is utilized if the HelioJET is applying chemical to the machine fabric and the operator suddenly turns the system OFF. In order to prevent the applied chemical from damaging the fabric, the HelioJET will begin a safety rinse cycle to remove it before the fabric dries. The operator may adjust the Safety Rinse Time based on the nature of the chemical product, etc.



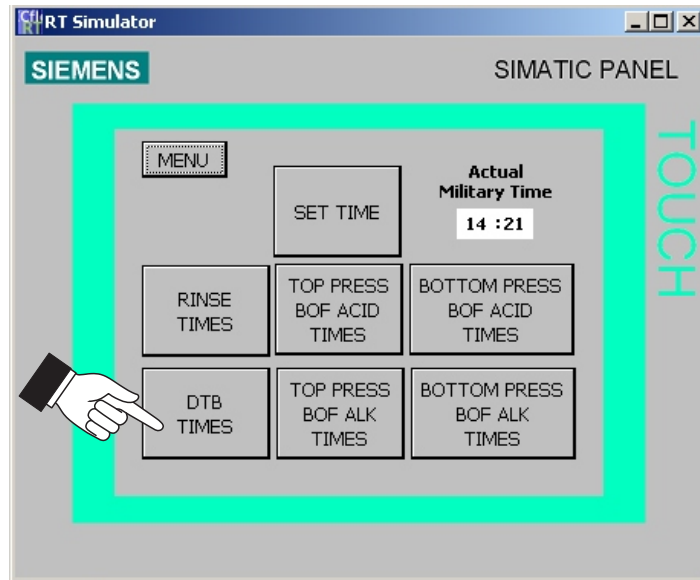
**Note: When motorized (automatic) self cleaning internal brush showers are used, the following setting options will also be present.**

**Shower Nozzle Purge Time:** Seconds shower drain is open and internal brushes rotate in order to clean (un-plug) nozzles. Default is 90 seconds

**Purge Frequency:** How often showers purge (self-clean, un-plug nozzles) during Continuous or Batch On Fly Press Felt cleaning. Default is every 4 hours.

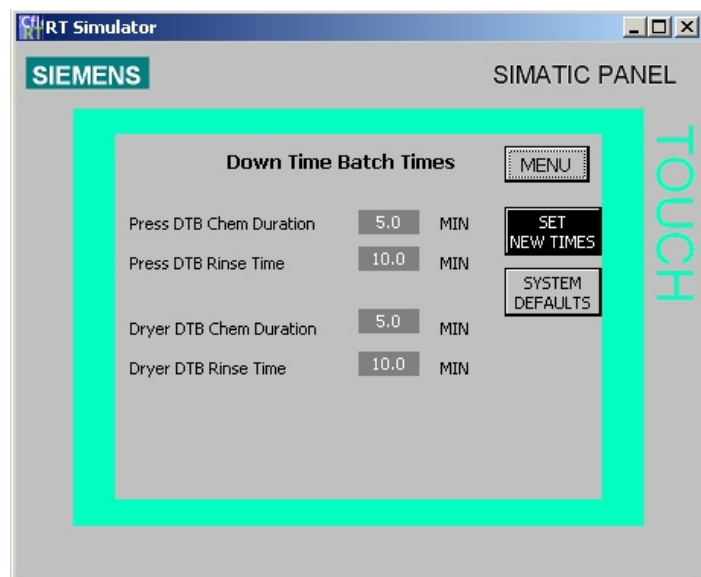
**Shower Drain Remains Open:** Seconds shower drain remains open (to allow water to drain) after HelioJET is shut down. Default is 20 seconds.

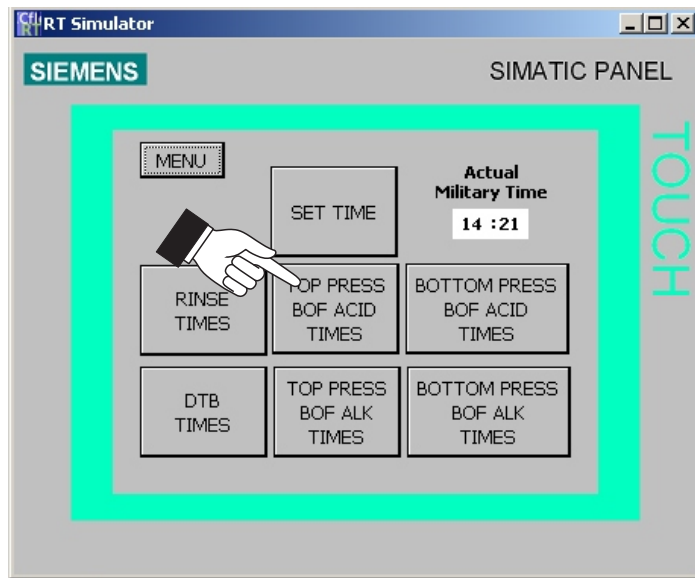
**Safety Rinse Time:** Minutes HelioJET rinses if, suddenly, shut down during the application of chemicals. Default is 10 minutes.



The DOWN TIME BATCH (DTB) sometimes referred to as Batch Down (BD) button will cause the Down Time Batch Times screen to appear.

During Batch Down Cleaning chemicals are applied to the fabric for a specified number of minutes and then rinsed out for a specified number of minutes. Typical times may be 5 minutes for the chemical application followed by a 10 minute rinse. As a rule, it is important to thoroughly remove chemicals from the fabric in order to provide effective cleaning and prevent damage to machine fabrics.

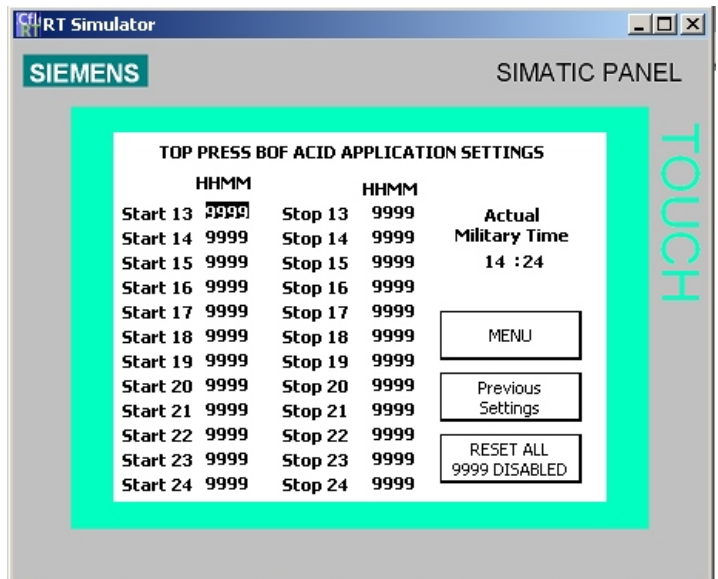
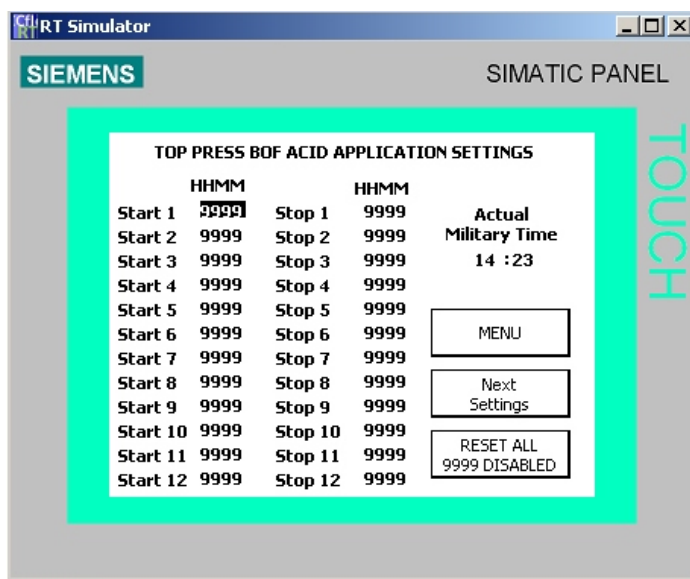




The ACID TIMES and ALKALINE TIMES buttons cause the appropriate chemical application screens to appear (see below). These times are applicable to Batch on the Fly Cleaning (BOF). For example; while the paper machine is in production, an acid chemical may be applied at a particular time of day and then stopped.

The screen allows the operator to set up to 24 chemical applications in a 24 our period. The heading HHMM stands for Hours Hours Minutes Minutes. For example, if the operator desires to apply a chemical from 3:00 PM until 3:15 PM, he or she would set the start time to: 1500 and the stop time to 1515. The default 9999 indicates the application is disabled and no time has been set, therefore no chemical will be applied.

All settings are in military time.



# Trouble Shooting

## Inadequate Cleaning/Improper Operation Caution Light (IC Caution Light)

### ABOUT THE IC CAUTION LIGHT

For the location of the IC Caution Light, see pages 26-27. When lit, the IC Caution Light serves as an indication to the operator that cleaning efficiency has been interrupted in some way. It also indicates that some aspect of the cleaning system requires attention. If after the Initial Calibration and Start-up procedure is complete and during routine operation the IC Caution light illuminates, and stays lit, attention should be given to the system. There are also cases when the light does not indicate a problem in operation. Please read on.

### IC CAUTION LIGHT AND FIRST TIME START-UP

The (IC) Caution Light indicates that water is passing through the start-up drain for an extended period of time. During initial calibration and start-up, the (IC) Caution Light may illuminate and stay lit while the initial Handwheel adjustment is being made (see start-up and calibration section for details on start-up). Illumination in this case does not indicate Inefficient Cleaning or Improper Operation.

### IC CAUTION LIGHT AND ROUTINE START-UP

Each time the HelioJET System is turned on, the IC Caution light may illuminate and stay lit for a few seconds (3-10 seconds). This is normal and does not indicate Inefficient Cleaning or Improper Operation.

### IC CAUTION LIGHT AS AN INDICATION OF INEFFICIENT CLEANING OR IMPROPER OPERATION

During routine operation, the IC Caution Light should not remain lit. If it does, your system should receive immediate attention.

Illumination of the IC Caution Light indicates that a problem exists that is preventing the HelioJET from cleaning efficiently and/or operating properly. It is important to address the cause. Following is a list of reasons that the IC Caution Light will illuminate as an indication of inefficient cleaning or improper operation. This list is given in order of probable cause, #1 being the most common problem. Thus, each possible reason for inadequate cleaning or improper operation should be addressed in the order given.

**1. DISCHARGE SPRAY NOZZLES ARE PLUGGED OR PARTIALLY PLUGGED.** This is the number one reason that the IC Caution Light will illuminate. It is important that spray nozzles are kept clean. In some cases shower brushes must be rotated so that nozzles can be "flushed and brushed" (cleaned) more often than standard program defaults allow. Do not assume that nozzles are clean even if they appear to be.

#### **2. BLOCKAGE OR FLOW RESTRICTION IN THE:**

- a. discharge line that feeds shower headers or other spray equipment. Examples of this are plugged nozzles, a closed or partially closed valve, undersized piping, dirty water filters, a faulty check valve, etc.
- b. Start-up Drain piping: Examples are under sized piping, mineral build up in the line, faulty Start-Up Check Valve (pages 26 & 27).
- c. water or steam supply line: Possible causes of restrictions are under sized piping, partially closed valves, back-flow preventors, regulators, mineral build up in the lines, etc.

#### **3. INADEQUATE STEAM TO HELIOJET SYSTEM**

- a. Drop in steam pressure. Partially closed valve, reduction in boiler pressure, increase in demand from other sources.
- b. Faulty Flow Switch. See pages 22, 26 & 27 for information regarding Flow Switch maintenance.

## MORE TROUBLE SHOOTING

### Problem:

Red Steam Condensate Light is lit and HelioJET will not start. For the location of the Condensate Light, see pages 26 & 27).

### Solution:

When lit, the Condensate Light is an indication that water is present in the steam supply line. This is a safety feature of the HelioJET. Be sure to flush lines before installing HelioJET. Be sure mill installed piping is well insulated and piping configuration is not prone to develop condensate. Allow enough time for condensate to drain. This is facilitated by the steam trap which is located on the steam supply line (see pages 26 & 27).

### Problem:

When Handwheel is raised, unit does not start, but begins to discharge hot vapor from the Start-Up Drain.  
OR

HelioJET® does not develop adequate or anticipated discharge pressure. IC Caution Light remains lit.

### Solution:

Spray nozzles are partially plugged. From the touch screen, select Nozzles Purge in order to unplug spray nozzles.

### Problem:

When system power switch is turned to the on position, the system discharges water to the drain. The steam valve does not open and the HelioJET will not start.

### Solution:

- A. Do you have adequate air pressure? Refer to chart on page 7.
- B. Refer to page 26 & 27, for the location of the flow switch. The flow switch is a safety and timing component that controls the operation of the air actuated steam valve. If the flow switch does not function properly it may prevent system start-up or the opening of the steam valve. Refer to page 22 (Flow Switch Maintenance).

### Problem

When the Handwheel is adjusted upward, (counter-clockwise) the Start-Up Vacuum Gauge never reads a vacuum. Water continuously discharges from the overflow no matter how high it is adjusted.

### Solution:

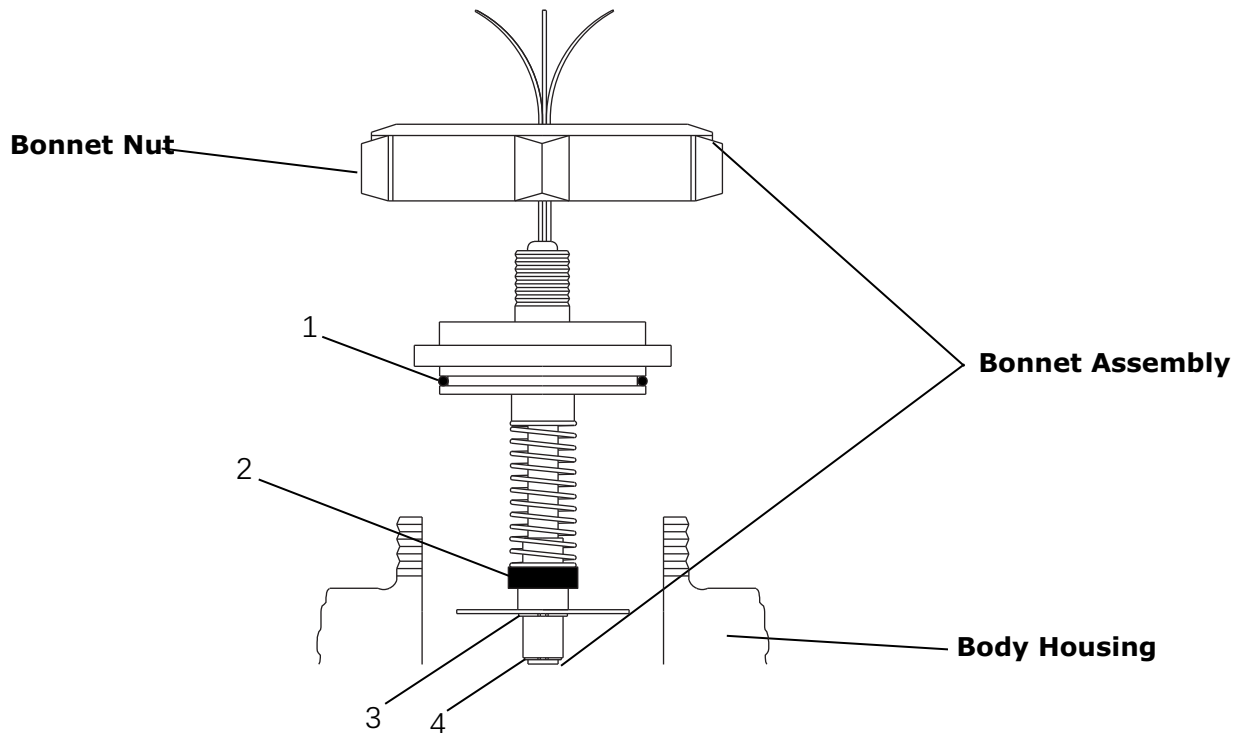
- A. Is steam pressure at least 100 PSI (7 Bar)? Perhaps it is at the boiler but there are line losses making it less at the HelioJET. In most cases, HelioJET systems can be field modified to operate on steam pressure less than 100 PSI (7 Bar). For further assistance, contact the HelioJET Technical Service Department at 1-585-768-8710.
- B. Is water supply under 80°F (26°C)? Standard equipment must not be supplied with water over 80°F (26°C).
- C. Is Start-Up Drain piping routed overhead? For proper start-up it should be at a declining level to the drain.
- D. Is Start-Up Drain line at least 1½"(38mm) in diameter and completely free of obstruction? Never plug, restrict, or valve off the Start-Up Drain.
- E. Inspect the internal condition of the Start-Up Check Valve and the Discharge Check Valve (pages 26 & 27). If check valve seat is lodged or damaged it can obstruct the Start-Up Drain line. This may prevent start-up, disturb the vacuum reading, or cause the Drain to continuously overflow water and/or steam vapor.
- F. If the HelioJET has been in service for more than 1 year, the HelioPAC may need attention. See maintenance note at the bottom of page 25.
- G. Is the Start-Up Vacuum Gauge (pages 26 & 27) working consistently when the HelioJET is running? If not, inspect the condition of the Start-Up Check Valve (pages 26 and 27). If the check valve does not seat properly it will allow an excess amount of air to enter the system. This can disrupt the reading on the Vacuum Gauge. If the check valve proves to be in good working order, replace the gauge.

# Preventative Maintenance

## Flow Switch Maintenance

For location of the flow switch see pages 26-27. The flow switch acts as a safety mechanism for the air actuated steam valve. When water supply to the HelioJET is adequate, the flowing water lifts a metering disc which raises the magnet. The magnet completes the circuit allowing power to the steam valve. If the flow switch does not function properly it will affect steam valve operation. Inspect the magnet and other components to be sure they are intact and operating properly.

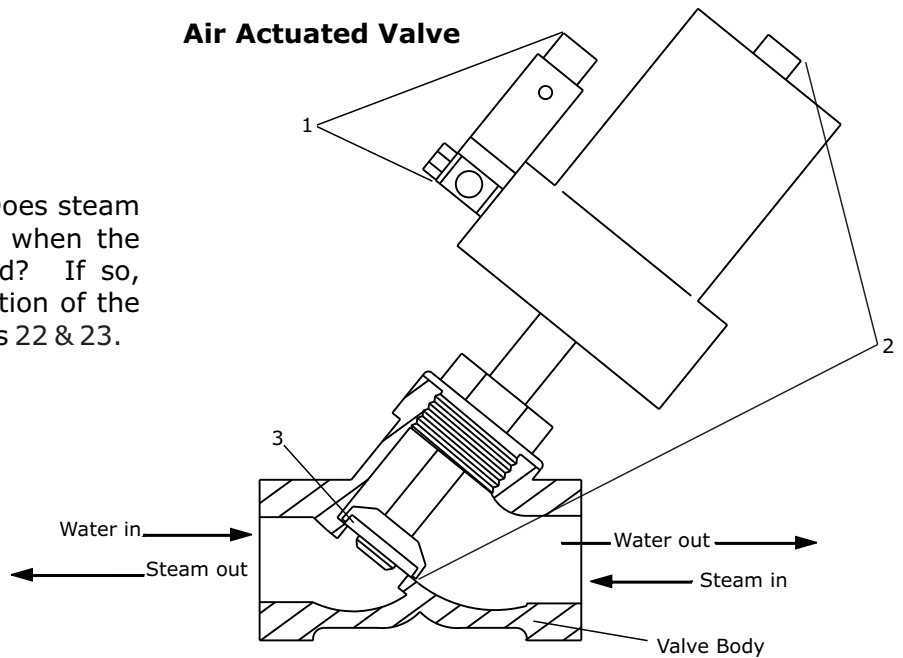
## Flow Switch



<u>Component Description</u>	<u>Part#/FB-30</u>	<u>Part#/FB-60</u>	<u>Part#/FB-100</u>	<u>Part#/FB-130</u>
Flow Switch Complete	FS-1-1/2-7.5-02	FS-2-15-02	FS-2-25-01	FS-2-50-02
Bonnet Assembly Complete	FSB-1-1/2-7.5-2	FSB-2-15-02	FSB-2-25-01	FSB-2-50-02
1. O-Ring	611057	611035	611057	611035
2. Magnet	MAG-01	MAG-01	MAG-01	MAG-01
3. Snap Ring	SR-03	SR-01	SR-03	SR-01
4. Snap Ring	SR-04	SR-02	SR-04	SR-02

## Steam Valve

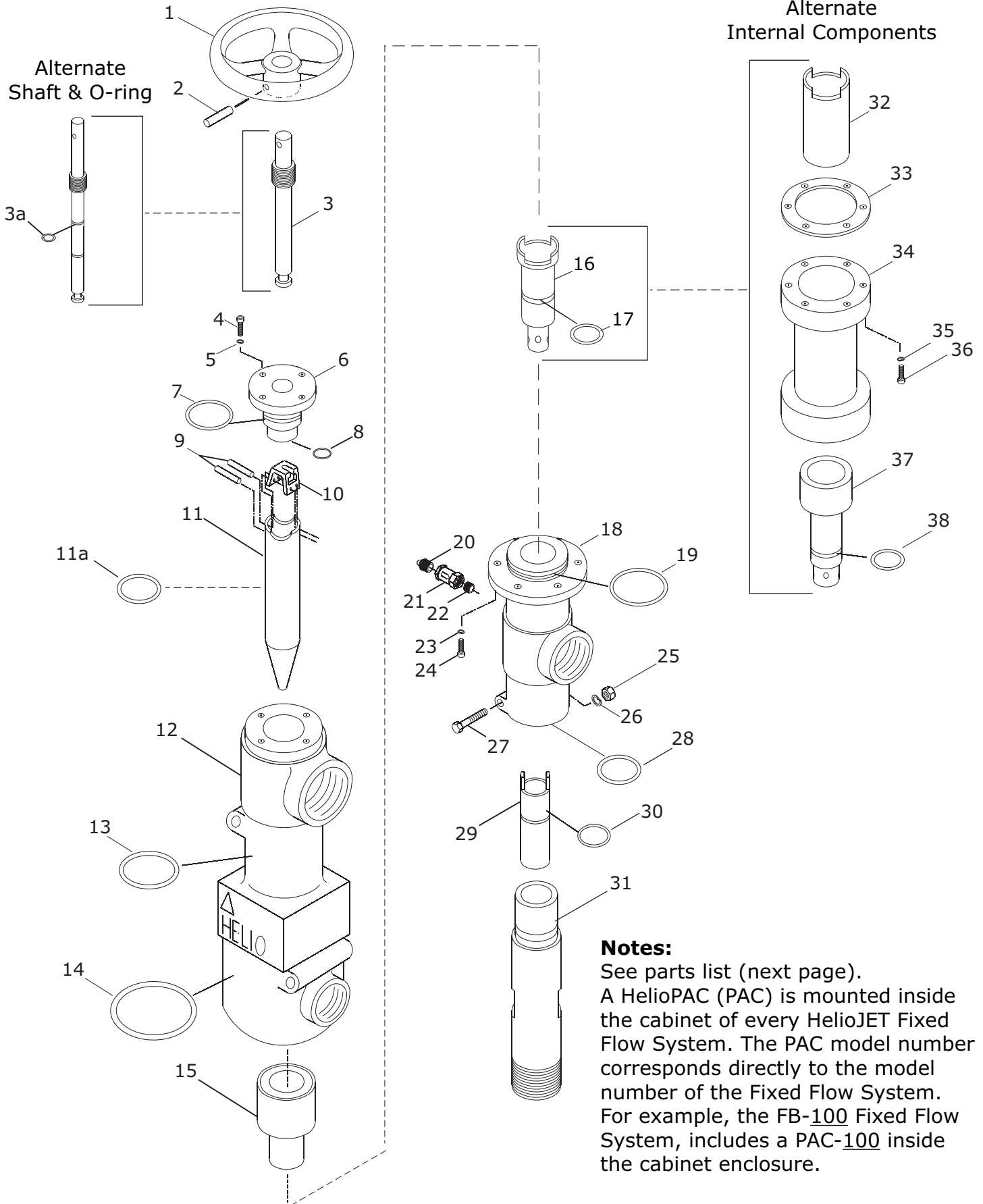
Check condition of steam valve seat. Does steam leak through the Start-Up Drain, even when the Fixed Flow System™ is not being used? If so, replace the steam valve seat. For location of the steam and water supply valves, see pages 22 & 23.



<b><u>Steam Valve Components</u></b>	<b><u>Part#/FB-30</u></b>	<b><u>Part#/FB-60</u></b>	<b><u>Part#/FB-100</u></b>	<b><u>Part#/FB-130</u></b>
Complete Valve Assembly	S-AVP-1-1/2-05	S-AVP-2-11	S-AVP-2-11	S-AVP-2-1/2-02
1- Solenoid Sub Assembly Includes: - Conduit Connector - Solenoid (24VDC) - Block - Adaptor Connection	SOL-19	SOL-19	SOL-19	SOL-19
2- Actuator Head Sub-Assembly	ACT-12	ACT-13	ACT-13	ACT-19
3- Valve Seat	RK-AVP-1-1/2-01	RK-AVP-2-02	RK-AVP-2-02	RK-AVP-2-1/2-01

<b><u>Water Valve Components</u></b>	<b><u>Part#/FB-30</u></b>	<b><u>Part#/FB-60</u></b>	<b><u>Part#/FB-100</u></b>	<b><u>Part#/FB-130</u></b>
Complete Valve Assembly	S-AVP-1-1/2-04	S-AVP-2-12	S-AVP-2-12	S-AVP-2-12
1- Solenoid Sub Assembly Includes: - Conduit Connector - Solenoid (24VDC) - Block - Adaptor Connection	SOL-20	SOL-20	SOL-20	SOL-20
2- Actuator Head Sub-Assembly	ACT-18	ACT-10	ACT-10	ACT-10
3- Valve Seat	RK-AVP-1-1/2-01	RK-AVP-2-02	RK-AVP-2-02	RK-AVP-2-02

# HelioPAC® Components & Maintenance





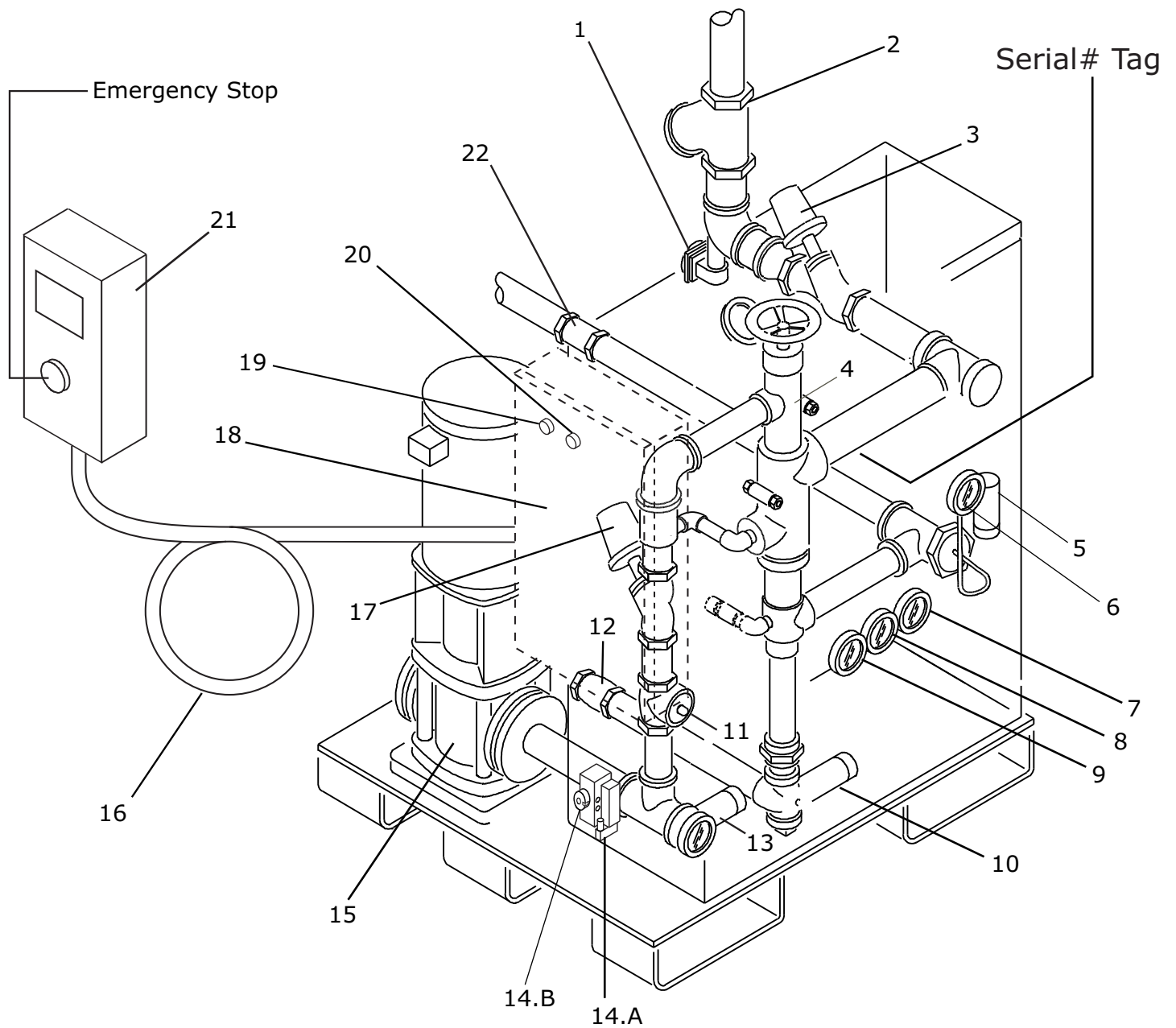
## HelioPAC® Models with Corresponding Part Numbers

	<u>Internal Component</u>	<u>PAC-30</u>	<u>PAC-60</u>	<u>PAC-100</u>	<u>PAC-130</u>
1	Handwheel	2000189-375	2000189-625	2000189-625	2000189-625
2	Dowel Pin (Handwheel)	615008	615008	615008	615008
3	Waterjet Shaft	100135	100172	100172	100172
3a	O-ring (PAC-30 Shaft)	611002	not applicable	not applicable	not applicable
4	Socket Head Screw (4)	not applicable	612023	612023	612023
5	Lock Washer (4)	not applicable	613001	613001	613001
6	Plug	200469	200373	200373	200373
7	O-Ring	611024	611033	611033	611033
8	O-Ring	n/a	611037	611037	611037
9	Dowel Pins (Bracket)	615004	615021	615021	615021
10	Bracket (waterjet)	100122-121	100171	100171	100171
11	Waterjet	200434-XXX	200348-XXX	200429-XXX	200427-XXX
11a	O-Ring	611019	not applicable	not applicable	not applicable
12	Body Casting	400051	400032	400032	400032
13	O-Ring	not applicable	611032	611032	611032
14	O-Ring	611041	611010	611010	611010
15	Mixing Chamber	100134	200349-XXX	200358	200381
16	*Amplifier	100137	200350	200357	not applicable
17	O-Ring	611042	611019	611019	611019
18	Manifold	300101	300057	300057	300057
19	O-Ring	611043	611011	611011	611011
20	*Air Nozzle	100054-0012	100054-0020	100054-0025	100054-0030
21	*Check Valve	CV-1/4-03	CV-1/4-03	CV-1/4-03	CV-1/4-03
22	Nipple	616054	616054	616054	616054
23	Lock Washer (6)	613001	613001	613001	613001
24	Socket Head Screw (6)	612023-01	612023-01	612023-01	612023-01
25	Hex Nut	614011	614011	614011	614011
26	Lock Washer	613008	613008	613008	613008
27	Bolt	612029	612029	612029	612029
28	O-Ring	611027	611025	611025	611025
29	*Insert	100136-XXX	200351-XXX	200428-XXX	200380-XXX
30	O-Ring	611044	611006	611006	611006
31	Diffuser Body	200435	200352	200359	200379
32	Amplifier Extension	not applicable	not applicable	not applicable	200377
33	Gasket	not applicable	not applicable	not applicable	200204
34	Manifold Extension	not applicable	not applicable	not applicable	300066
35	Lock Washer (6)	not applicable	not applicable	not applicable	613001
36	Socket Head Screw (6)	not applicable	not applicable	not applicable	612023-01
37	*Amplifier	not applicable	not applicable	not applicable	200378
38	O-Ring	not applicable	not applicable	not applicable	611019
	* O-Ring Replacement Kit	S-100128	S-100054	S-100054	S-100058

**Maintenance Note:** After a long period of intense operation, wear may begin to occur at the smallest orifice diameters located in the Amplifier (Item 16 or 37) and Insert (Item 29). These two components may require replacement. Indications of wear are decreased pressure output and constant overflow to drain. Visual signs of wear can be: orifice enlargement, pitting and/or cracks. For assistance, call HelioJET at 1-585-768-8710.

# HelioJET<sup>®</sup> Fixed Flow System<sup>™</sup>

# Major Components & Spare Parts



# HelioJET® FB-Systems

# Major Components & Spare Parts

<b>HelioJET FB-Systems</b>	<b>FB-30</b>	<b>FB-60</b>	<b>FB-100</b>	<b>FB-130</b>
<b><u>Component Description</u></b>	<b><u>Part Numbers</u></b>	<b><u>Part Numbers</u></b>	<b><u>Part Numbers</u></b>	<b><u>Part Numbers</u></b>
1. Steam Trap	637016	637016	637016	637016
2. Steam Strainer	621012-1-1/2	621012-2	621012-2-1/2	621012-2-1/2
3. Steam Valve, Air Actuated	S-AVP-1-1/2-05	S-AVP-2-11	S-AVP-2-11	S-AVP-2-1/2-02
4. HelioPAC® 100	PAC-30	PAC-60	PAC-100	PAC-130
*5. Pressure Transducer	PT-002	PT-002	PT-002	PT-002
*6. Gauge, Start-Up Vacuum	620030-01	620030-01	620030-01	620030-01
7. Gauge, Steam Pressure	620041	620041	620041	620041
8. Gauge, Water Pressure	620041	620041	620041	620041
9. Gauge, Discharge Pressure	620026-01	620026-01	620026-01	620026-01
10. Pressure Transducer	PT-002	PT-002	PT-002	PT-002
11. Flow Switch	FS-1-1/2-7.5-02	FS-2-15-01	FS-2-25-01	FS-2-35-02
*12. Discharge Check Valve	CV-1-1/2-05	CV-2-01	CV-2-01	CV-2-01
13. Pressure Transducer	PT-002	PT-002	PT-002	PT-002
*14.A Chemical Valve Solenoid	SOL-18	SOL-18	SOL-18	SOL-18
14.B Chemical Valve	AVB-1/2-05	AVB-1/2-05	AVB-1/2-05	AVB-1/2-05
15. Booster Pump	643XXX	643XXX	643XXX	643XXX
16. Interconnect Cable	CAB-01-XXXX	CAB-01-XXXX	CAB-01-XXXX	CAB-01-XXXX
17. Water Valve, Air Actuated	S-AVP-1-1/2-04	S-AVP-2-12	S-AVP-2-12	S-AVP-2-12
18. Electrical Enclosure (PLC, etc.)	EE-01-XXXX	EE-01-XXXX	EE-01-XXXX	EE-01-XXXX
19. IC Caution Light	629285	629285	629285	629285
20. Steam Condensate Light	629284	629284	629284	629284
21. Touch Screen Panel	TS-01-XXXX	TS-01-XXXX	TS-01-XXXX	TS-01-XXXX
*22. Start-Up Check Valve	CV-1-1/4-08	CV-1-1/2-05	CV-1-1/2-05	CV-1-1/2-05
* Water Valve Actuator Head Assembly	ACT-18	ACT-10	ACT-10	ACT-10
* Water Valve Solenoid Sub-Assembly	SOL-20	SOL-20	SOL-20	SOL-20
* Steam Valve Actuator Head Assembly	ACT-12	ACT-13	ACT-13	ACT-13
* Steam/Water Valve Seat	RK-AVP-1-1/2-02	RK-AVP-2-02	RK-AVP-2-02	RK-AVP-2-02
* Steam Valve Solenoid Sub-Assembly	SOL-19	SOL-19	SOL-19	SOL-19
* Flow Switch Bonnet Assembly	FSB-1-1/2-7.5-02	FSB-2-15-02	FSB-2-25-01	FSB-2-35-02
* Flow Switch Magnet	MAG-01	MAG-01	MAG-01	MAG-01
<b>* Recommended Spare Part</b>				



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