

Ransburg Voltage Controller (RVC)



Model: 81000, 81020

IMPORTANT: Before using this equipment, carefully read SAFETY PRECAUTIONS and all instructions in this manual. Keep this Service Manual for future reference.

CONTENTS

SAFETY:	4-8
Safety Precautions	4
Hazards / Safeguards	5
ATEX/FM:	9-10
European ATEX Directive	9
European ATEX Labels	10
INTRODUCTION:	11
System Overview	11
General Description	11
Safety Features	11
Specifications	11
INSTALLATION:	12-17
Location of RVC	12
Grounding	12
Main Supply Line Power	12
RVC Connections	13
Connector Signals	14
System Outputs (8 Pin)	14
System Digital Inputs (6 Pin)	15
Gun I/O (14 Pin)	16
Low Voltage I/O (5 Pin)	17
INTRODUCTION TO COMMON SCREEN FEATURES:	18-21
Interactive Screen Features	18
Common Screen Layout Regions	18
Status Bar	18
Navigation and Command Bar	20
Navigation Bar Examples	21
OPERATION – SCREENS FOR STANDARD USERS:	22-34
Home Screen	22
Preset Selection Screen	25
Help Screen	26
Events	26
Information	27
Settings Screens	27
Set Preset Screen	28
Keypad Screen	29
Analytics Screen	30
Lifetime Operating Statistics - System Statistics	30
Lifetime Operating Statistics - Gun Statistics	31
User Statistics - Gun Statistics	32
Maintenance Screen	34
OPERATION – CHANGING USER ACCESS LEVEL:	35-37
Logging in as System Administrator (Admin Access Level)	35
Passcode Keypad Screen	36
Logging Out of Admin Access	37
Changing the Admin Access Passcode	37

(Continued On Next Page)

CONTENTS (Cont.)

OPERATION – SCREENS FOR ADMINS:	38-50
Home Screen - With Admin Access	38
Additional Admin Capabilities	38
Settings Screen	39
Gun Parameters Screen.....	39
Set Date/Time Screen	41
Signal Interface Screen	42
Configuration of Signal Interfaces - System Signals	42
Configuration of Signal Interfaces - Gun Signals	43
Set Language Screen	44
File Management Screens	45
Snapshot Transfer Screen	47
Software Update Screen	48
RVC Updater Software	49
Language Transfer Screen	50
INTRODUCTION TO TWO-GUN FEATURES:	51
Introduction	51
STANDARD USER – TWO-GUN EXCLUSIVE FEATURES:	52-55
Home Screen	52
Gun 2 - Independent	52
Gun 2 - Linked	53
Gun Disabled	54
Administrator - Two-Gun Exclusive Features	54
Settings Screen	55
Administrator Configuration	55
STATUS MESSAGES:	56
System Status Messages	56
Gun Status Messages	56
TROUBLESHOOTING:	57-64
Resetting Faults	57
General Troubleshooting	58
Failure Troubleshooting.....	61
System Fault Troubleshooting.....	62
Gun Fault Troubleshooting.....	62
Low Voltage Cable Continuity Check	64
PARTS IDENTIFICATION:	65
Spare Parts	65
Accessories.....	66
APPENDIX A – RAC CARD JUMPER SETTING:	67-69
RAC Card Jumpers	67
RAC Card Connectors.....	69
APPENDIX B – RVC HAT (80569) CARD:	70-71
Hat Card Jumper Settings	71
Hat Card Connector	71
APPENDIX C – SERVICE INSTRUCTION:	72-92
Ransburg Voltage Controller (RVC) Installing a New Language	72
Ransburg Voltage Controller (RVC) Resetting Admin Passcode	80
Ransburg Voltage Controller (RVC) Updating the RVC Software	85

SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any electrostatic coating system, read and understand all of the technical and safety literature for your products. This manual contains information that is important for you to know and understand. This information relates to **USER SAFETY** and **PREVENTING EQUIPMENT PROBLEMS**. To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

WARNING

A **WARNING!** states information to alert you to a situation that might cause serious injury if instructions are not followed.

CAUTION

A **CAUTION!** states information that tells how to prevent damage to equipment or how to avoid a situation that might cause minor injury.

NOTE

A **NOTE** is information relevant to the procedure in progress.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and associated equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your equipment, contact your local Carlisle Fluid Technologies representative or Carlisle Fluid Technologies technical support.


WARNING



- The user **MUST** read and be familiar with the Safety Section in this manual and the safety literature therein identified.
- This equipment is intended to be used by trained personnel **ONLY**.
- This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA-33 AND EN 50177 SAFETY STANDARDS, LATEST EDITION**, or applicable country safety standards, prior to installing, operating, and/or servicing this equipment.


WARNING




- The hazards shown on the following pages may occur during the normal use of this equipment.

Repairs may only be performed by authorized personnel.

<p>AREA Tells where hazards may occur.</p>	<p>HAZARD Tells what the hazard is.</p>	<p>SAFEGUARDS Tells how to avoid the hazard.</p>
<p>Spray Area</p> 	<p>Fire Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.</p>	<p>Fire extinguishing equipment must be present in the spray area and tested periodically.</p> <p>Spray areas must be kept clean to prevent the accumulation of combustible residues.</p> <p>Smoking must never be allowed in the spray area.</p> <p>The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance.</p> <p>Spray booth ventilation must be kept at the rates required by NFPA-33, OSHA, country, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents.</p> <p>Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times.</p> <p>Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed.</p> <p>Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled.</p> <p>The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, OSHA, local, country, and European Health and Safety Norms.</p>

<p>AREA Tells where hazards may occur.</p>	<p>HAZARD Tells what the hazard is.</p>	<p>SAFEGUARDS Tells how to avoid the hazard.</p>
<p>Spray Area</p> 	<p>Explosion Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation.</p> <p>Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.</p>	<p>Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times.</p> <p>Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33.</p> <p>Test only in areas free of flammable or combustible materials.</p> <p>The current overload sensitivity (if equipped) MUST be set as described in the corresponding section of the equipment manual. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if the current overload sensitivity is not properly set. Frequent power supply shutdown indicates a problem in the system which requires correction.</p> <p>Always turn the control panel power off prior to flushing, cleaning, or working on spray system equipment.</p> <p>Before turning high voltage on, make sure no objects are within the safe sparking distance.</p> <p>Ensure that the control panel is interlocked with the ventilation system and conveyor in accordance with NFPA-33, EN 50176.</p> <p>Have fire extinguishing equipment readily available and tested periodically.</p>
<p>General Use and Maintenance</p> 	<p>Improper operation or maintenance may create a hazard.</p> <p>Personnel must be properly trained in the use of this equipment.</p>	<p>Personnel must be given training in accordance with the requirements of NFPA-33, EN 60079-0.</p> <p>Instructions and safety precautions must be read and understood prior to using this equipment.</p> <p>Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, EN Norms and your insurance company requirements.</p>

<p>AREA Tells where hazards may occur.</p>	<p>HAZARD Tells what the hazard is.</p>	<p>SAFEGUARDS Tells how to avoid the hazard.</p>
<p>Spray Area / High Voltage Equipment</p> 	<p>Electrical Discharge</p> <p>There is a high voltage device that can induce an electrical charge on ungrounded objects which is capable of igniting coating materials.</p> <p>Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.</p>	<p>Parts being sprayed and operators in the spray area must be properly grounded.</p> <p>Parts being sprayed must be supported on conveyors or hangers that are properly grounded. The resistance between the part and earth ground must not exceed 1 megohm. (Refer to NFPA-33.)</p> <p>Operators must be grounded. Rubber soled insulating shoes should not be worn. Grounding straps on wrists or legs may be used to assure adequate ground contact.</p> <p>Operators must not be wearing or carrying any ungrounded metal objects.</p> <p>When using an electrostatic handgun, operators must assure contact with the handle of the applicator via conductive gloves or gloves with the palm section cut out.</p> <p>NOTE: REFER TO NFPA-33 OR SPECIFIC COUNTRY SAFETY CODES REGARDING PROPER OPERATOR GROUNDING.</p> <p>All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Grounded conductive flooring must be provided in the spray area.</p> <p>Always turn off the power supply prior to flushing, cleaning, or working on spray system equipment.</p> <p>Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33.</p> <p>Avoid installing an applicator into a fluid system where the solvent supply is ungrounded.</p> <p>Do not touch the applicator electrode while it is energized.</p>

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p>Electrical Equipment</p> 	<p>Electrical Discharge</p> <p>High voltage equipment is utilized in the process. Arcing in the vicinity of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance.</p> <p>Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation.</p> <p>Frequent power supply shut-down indicates a problem in the system which requires correction.</p> <p>An electrical arc can ignite coating materials and cause a fire or explosion.</p>	<p>Unless specifically approved for use in hazardous locations, the power supply, control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2 hazardous areas in accordance with NFPA-33 and EN 50176.</p> <p>Turn the power supply OFF before working on the equipment.</p> <p>Test only in areas free of flammable or combustible material.</p> <p>Testing may require high voltage to be on, but only as instructed.</p> <p>Production should never be done with the safety circuits disabled.</p> <p>Before turning the high voltage on, make sure no objects are within the sparking distance.</p>
<p>Toxic Substances</p> 	<p>Chemical Hazard</p> <p>Certain materials may be harmful if inhaled, or if there is contact with the skin.</p>	<p>Follow the requirements of the Safety Data Sheet supplied by coating material manufacturer.</p> <p>Adequate exhaust must be provided to keep the air free of accumulations of toxic materials.</p> <p>Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.</p>
<p>Spray Area</p> 	<p>Explosion Hazard — Incompatible Materials</p> <p>Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1, - Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.</p>	<p>Spray applicators require that aluminum inlet fittings be replaced with stainless steel.</p> <p>Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your coating supplier. Any other type of solvent may be used with aluminum equipment.</p>

ATEX/FM

EUROPEAN ATEX DIRECTIVE

The following instructions apply to equipment covered by certificate number FM 18ATEX0025:

1. The equipment may be used with flammable gases and vapors with apparatus groups II and with temperature class T6.
2. The equipment is only certified for use in ambient temperatures in the range 5°C to 40°C and should not be used outside this range.
3. Installation shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-14:1997.
4. Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-17.
5. Repair of this equipment shall be carried out by suitable trained personnel in accordance with the applicable code of practice e.g. EN 60079-19.
6. Putting into service, use, assembling, and adjustment of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation. Refer to the "Table of Contents" of this service manual:
 - a. Installation
 - b. Operation
 - c. Maintenance
 - d. Parts Identification
7. Components to be incorporated into or used as replacement parts of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.
8. The certification of this equipment relies upon the following materials used in its construction:

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.

Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheets that it is resistant to specific chemicals.

Refer to "Specifications" in the "Introduction" section:

 - a. All fluid passages contain stainless steel or nylon fittings.
 - b. High voltage cascade is encapsulated with a solvent resistant epoxy.
9. A recapitulation of the certification marking is detailed in the "ATEX" section, on the next page, drawing numbers: 80584-01 and 80694.
10. The characteristics of the equipment shall be detailed e.g. electrical, pressure, and voltage parameters.

The manufacturer should note that, on being put into service, the equipment must be accompanied by a translation of the instructions in the language or languages of the country in which the equipment is to be used and by the instructions in the original language.

EUROPEAN ATEX LABELS

Ex Certificate Number: FM 18ATEX0025

- FM = Notified Body performing EC-type examination
- 18 = Year of certification
- ATEX = Reference to ATEX Directive
- 0025 = Document serial number

The Ransflex 80665 applicator shall only be used with associated RVC power supply. It is the end users responsibility to insure the RVC power supply be connected to true earth ground. Resistance of the low voltage cable from the applicator to the power supply must be .5MΩ or less regardless of cable length.

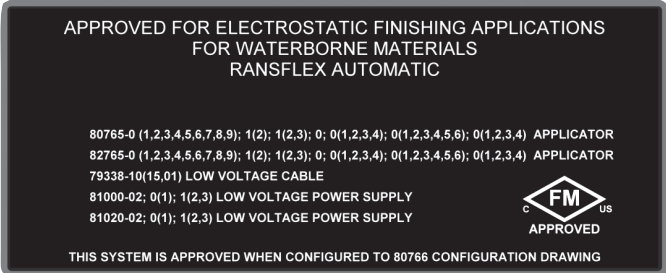
Product Marking

- Ex = Specific marking of explosive protection
- II = Equipment Group hazardous area characteristics
- 2 = Equipment Category
- G = Type of explosive atmosphere (gases, vapors, or mists)

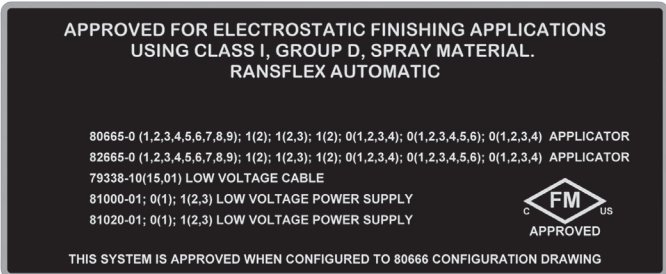
EEx 0.24mJ = The Ransflex 80665 Applicator is suitable for use in automatic spraying installations complying with EN 50 050 as they are a Type A class with a discharge energy limit of 0.24mJ.



Label 80694-0518



Label 80726-02



Label 80726-01



Label LSLA0003-01



Label 80081-00

Ransburg BRAND OF CARLISLE FLUID TECHNOLOGIES INC
16430 N. SCOTTDALE ROAD SUITE 450
SCOTTSDALE, AZ, 85254

CONTROL UNIT/POWER SUPPLY
FOR ELECTROSTATIC PAINT FINISHING APPLICATIONS
(SERIAL NUMBER INCLUDES DATE OF MANUFACTURE)

WARNING
FAILURE TO OBSERVE THE FOLLOWING PRECAUTIONS MAY RESULT IN AN ELECTRICAL DISCHARGE CAPABLE OF STARTING A FIRE.

1. THE ARTICLE BEING COATED MUST BE GROUNDED.
2. ALL OTHER ELECTRICALLY CONDUCTING OBJECTS WITH SPRAY BOOTH WITH THE SPRAY APPLICATOR MUST BE GROUNDED.
3. THIS CONTROL UNIT/POWER SUPPLY MUST BE INTERLOCKED WITH THE SPRAY BOOTH VENTILATORS SO AS TO PREVENT OPERATION OF THE POWER SUPPLY UNLESS VENTILATING FANS ARE IN OPERATION.
4. SERVICE WARNING- ENCLOSURE PROTECTS AGAINST SHOCK AND INJURY. SERVICE TRAINING REQUIRED.
5. KEEP POWER SUPPLY OUTSIDE THE HAZARDOUS AREA.
6. DO NOT ATTEMPT OPERATION OR REPAIR BEFORE READING SERVICE MANUAL.
7. FOR ELECTROSTATIC PAINT FINISHING APPLICATIONS.

PART No.			
SERIAL No.			
INPUT VOLTAGE	100-240 VAC	1 A MAX.	INPUT RMS CURRENT PHASES
FREQUENCY	50 / 60 Hz	1	MAX OUTPUT VOLTAGE
VOLTAMPS	120 VA MAX.	20 VDC	MAX OUTPUT CURRENT
HUMIDITY	95% NON-CONDENSING	1 ADC	TEMPERATURE
INPUT PRESSURE	100 PSI MAX.	ka	SCCR
WEIGHT	kg		

Label 80108-14



Label A13205

INTRODUCTION

SYSTEM OVERVIEW

GENERAL DESCRIPTION

The Ransburg Voltage Controller provides high voltage for electrostatic application equipment using a combination of proven high voltage generation technology and microprocessor-based control. Utilizing a variable voltage output, the Ransburg Voltage Controller drives a cascade that amplifies the voltage to a high kV level. It also detects current feedback information to maintain the desired setpoint. The processor circuitry provides maximum applicator transfer efficiency while maintaining the maximum safety.

SAFETY FEATURES

When used with the appropriate applicators and cascades, the Ransburg Voltage Controller provides protections for operational safety. These protections include detection of Ground Faults, Cable Faults, Overvoltage, and Overcurrent. Maximum operational safety is obtained when the correct applicator settings are used and when safe distances between the applicator and target are observed and followed. The maximum efficiency of the high voltage controller is based on load.

SPECIFICATIONS

Environmental/Physical

Operating Temperature:	5°C to +40°C (41°F to +104°F)
Storage and Shipping Temperature:	-40°C to +85°C (-40°F to +185°F) (Allow power supply to reach room temperature before use)
Humidity:	95% Non-Condensing

Physical

Height:	18.4 cm (7.3 inches)
Width:	27.3 cm (10.8 inches)
Depth:	39.4 cm (15.5 inches)
Weight:	10.2 kg (22.5 lbs.)

Electrical

Input Voltage:	100-240 VAC
Frequency:	50-60 Hz
Current:	1 A max. RMS
Wattage:	75 watts (max.)
Output Voltage:	Dependent upon applicator
Ransflex Automatic:	1-65kV MAX DC, adjustable in 1kV increments
Ground:	Use known good earth ground

INSTALLATION

This section discusses how to install the RVC.

⚠ WARNING

- This manual **MUST** be read and thoroughly understood by ALL personnel who operate, clean, or maintain this equipment! Special care should be taken to ensure that the warnings and requirements of operating and servicing safely are followed. The user should be aware of and adhere to ALL local building and fire codes and ordinances, and all related country safety codes prior to installing, operating, and/or servicing this equipment.
- Only approved applicators should be used with the RVC controller.

LOCATION OF RVC

⚠ WARNING

- RVC must be located outside the hazardous area (class 1 division 1 and 2 or zone 0, 1, and 2).
- **DO NOT** locate the controller near or adjacent to heat producing equipment such as ovens, high wattage lamps, etc.

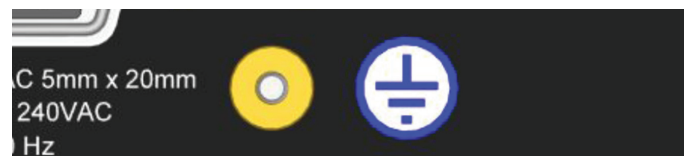
The area should have ambient temperatures that do not exceed 40°C (104°F), and be as close to the applicator as possible to minimize the applicator cable length.

The controller may be free standing on any flat surface. It is recommended to place it in a horizontal orientation on its rubber feet.

GROUNDING

⚠ CAUTION

- The supplied grounding cable (green/yellow) must be connected to the grounding screw of the electrostatic manual painting equipment. The grounding cable also must have a good metallic connection to true earth ground.



In order to achieve a good coating and for safety reasons (see safety regulations), the system must be properly grounded to true earth ground (copper rod driven into the ground). A ground cable is included with the controller. The following picture shows the connecting point on the back of the RVC.

Grounding of the work piece is a prerequisite for optimum painting. A poorly grounded work piece causes:

1. Very bad wrap-around, poor efficiency
2. Uneven coating thickness
3. Back spray onto spray applicator and user
4. Dangerous electric charging of the work piece

MAIN SUPPLY LINE POWER

A power cable is included with the controller. The following picture indicates the location on the back of the RVC box to attach this cable.



RVC CONNECTIONS

The connectors for the RVC are located on the rear panel as outlined in the picture below.



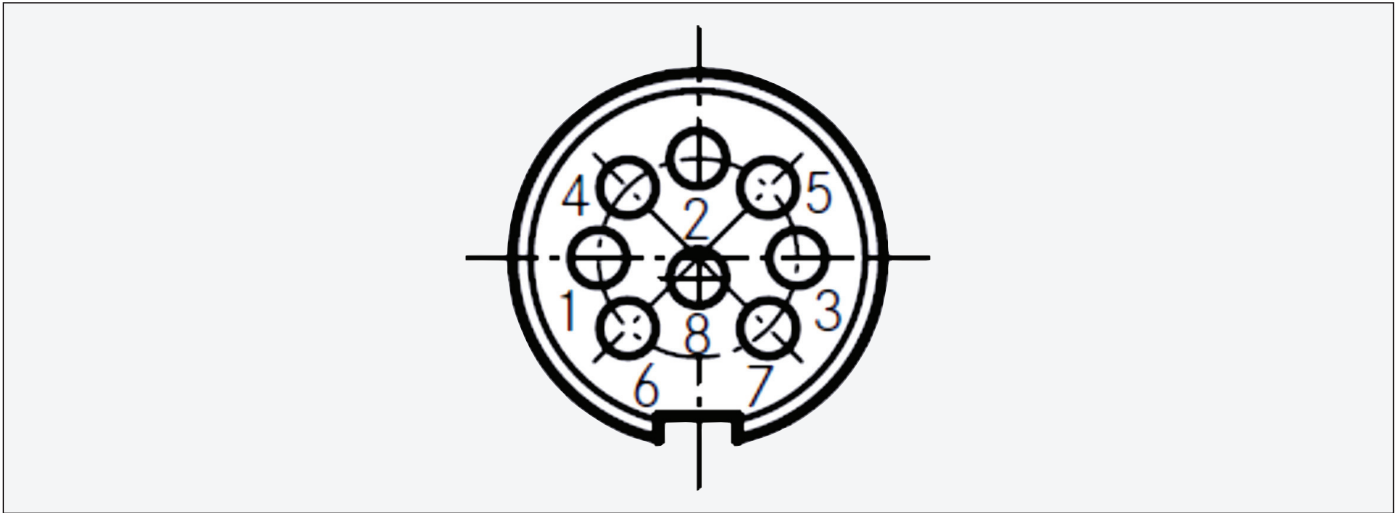
RVC CONNECTIONS	
Connector	Description
Power switch	Switch to turn RVC on and off.
Ethernet Port	Reserved for future capabilities.
AC Inlet and Fuses	The AC inlet receptacle is a standard IEC C14 Appliance Inlet connector with a maximum rating of 250 VAC. It can handle both 110 VAC and 220 VAC inputs at 50 or 60 Hz.
Earth Ground Lug	Point to connect a lead to earth ground.
Gun 1 – Pressure Switch In/Out (Optional)	Air ports for triggering the gun 1’s high voltage.
Gun 2 – Pressure Switch In/Out (Optional)	Air ports for triggering the gun 2’s high voltage.
System Outputs	Connector for system output signals. See detailed description in the following section.
System Inputs	Connector for system input signals. See detailed description in following section.
Gun 1 - Low Voltage	Connector for power cable going to gun 1. See detailed description in following section.
Gun 1 - Gun I/O	Connector for control and status signals for gun 1. See detailed description in following section.
Gun 2 - Low Voltage	Connector for power cable going to gun 2. See detailed description in following section.
Gun 2 - Gun I/O	Connector for control and status signals for gun 2. See detailed description in following section.

CONNECTOR SIGNALS

This section explains the signals attached to the individual pins located on the various connectors on the RVC back plate. All pictures are as viewed from the outside of the connector.

SYSTEM OUTPUTS (8 PIN)

The System Outputs connector contains eight pins, which control signals relating to the output of the system. The pin arrangement of the System Outputs connector is located below.



SYSTEM OUTPUTS (8 PIN)

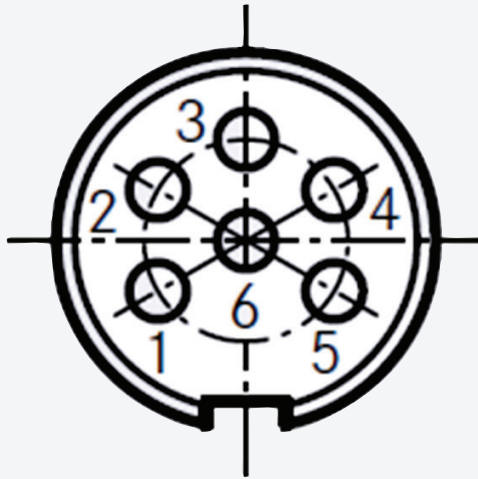
Pin	Signal	Type	Usage
1	Trigger 1 Ready (-)	Output contact closure	Current flowing (60VDC/40VAC, 150mA max) indicates system will accept Trigger 1.
2	Fault Output (-)	Output contact closure	Current flowing (60VDC/40VAC, 150mA max) indicates system is faulted.
3	Trigger 2 Ready (-)	Output contact closure	Current flowing (60VDC/40VAC, 150mA max) indicates system will accept Trigger 2.
4	Fault Output (+)	Output contact closure	
5	Trigger 2 Ready (+)	Output contact closure	
6	Trigger 1 Ready (+)	Output contact closure	
7	Power (VCC +24V)	+24VDC	24VDC from RVC power supply.
8	Ground (GND)	Ground	Ground from RVC.

SYSTEM DIGITAL INPUTS (6 PIN)

The System Digital Inputs connector contains six pins related to inputs for the system. The pin arrangement of the System Inputs connector is located below. Pre-made cables will have leads labeled with these names. By default, these signals are 24VDC sinking inputs (provide a 24VDC signal to make input active). These signals can be changed to source 24V by changing RAC-Jumper 9 (see Appendix A).

NOTE

- All signals are changed at same time by RAC-Jumper 9.

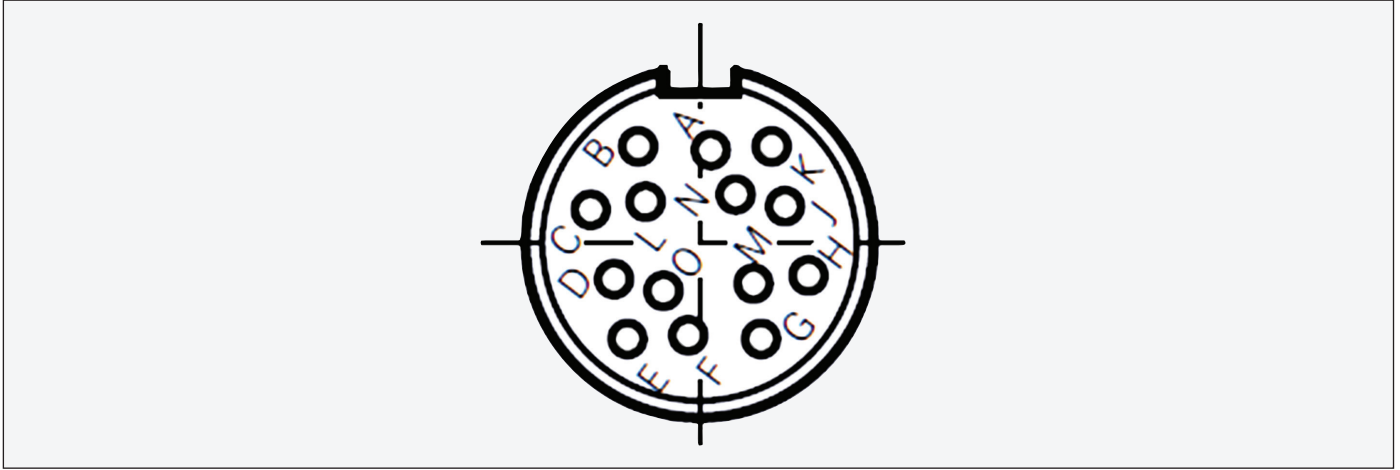


SYSTEM DIGITAL INPUTS (6 PIN)

Pin	Signal	Usage
1	Interlock – Door	Pull up to +24VDC to indicate Interlock is okay
2	Interlock – Air	Pull up to +24VDC to indicate Interlock is okay
3	Interlock – Misc.	Pull up to +24VDC to indicate Interlock is okay
4	Interlock – Solvent	Pull up to +24VDC to indicate Interlock is okay
5	Spare Signal Input	
6	Reset	Pull up to +24VDC to indicate Reset signal is active

GUN I/O (14 PIN)

The Gun I/O connector for each gun contains 14 pins, controlling various gun-related signals. The pin arrangement of the Gun I/O connector is located below.

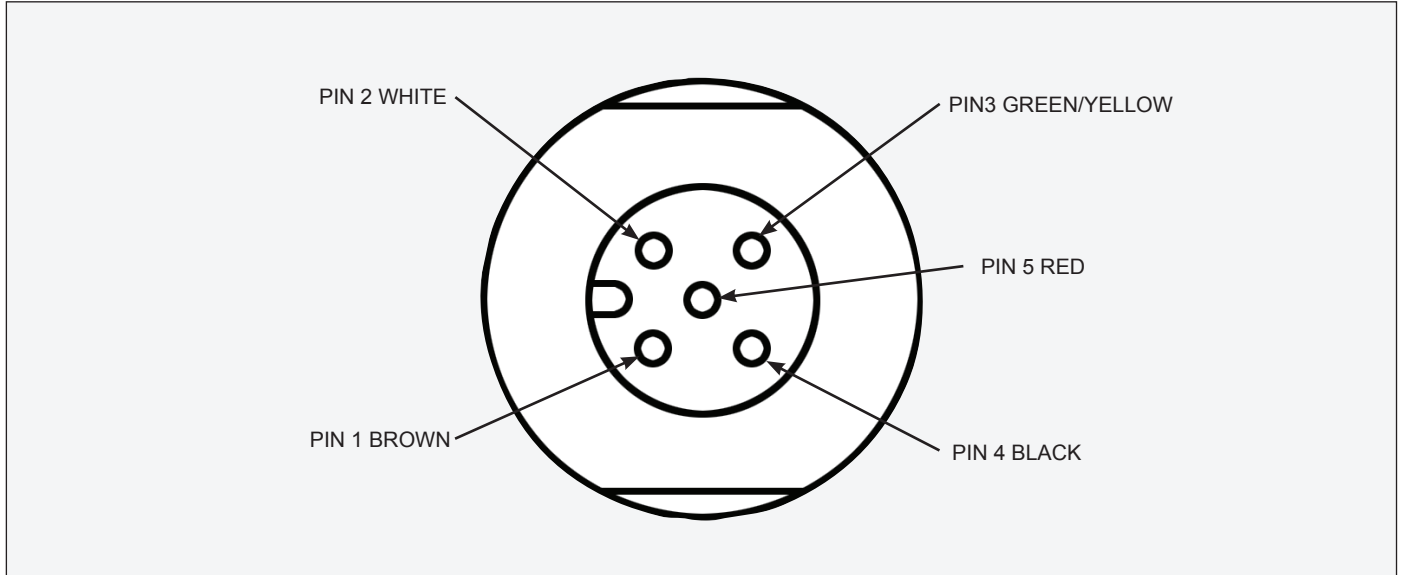


GUN I/O (14 PIN)

Pin	Signal	Type	Usage
A	HV On Output (+)	Output contact closure	Current flowing (60VDC/40VAC, 150mA max) indicates high voltage is active.
B	Triple Setpoint 1	Digital 24VDC Input (See appendix for RAC Card Jumper 9)	Used with Triple Setpoint 2 to select predefined KV setpoint 1, 2 or 3. (if "Signal Interface" for KV Setpoint configured to use "Wired Preset Selection").
C	Triple Setpoint 2	Digital 24VDC Input (See appendix for RAC Card Jumper 9)	Used with Triple Setpoint 1 to select predefined KV setpoint 1, 2 or 3. (if "Signal Interface" for KV Setpoint configured to use "Wired Preset Selection").
D	Not Connected	Not Connected	Unused.
E	Gun Trigger (External)	Digital 24VDC Input (See appendix for HAT Jumper 3)	Used to turn on gun's high voltage. Closing a switch to Ground (e.g. Pin O) indicates Trigger should be active.
F	Power (VCC +24V)	+24VDC	24VDC from RVC power supply.
G	Analog Extra Input (+)	Analog Input (see appendix for RAC Card Jumpers 4/6)	Unused.
H	KV Setpoint (+)	Analog Input (see appendix for RAC Card Jumpers 3/5)	Used to set KV setpoint value. (if "Signal Interface" for KV Setpoint configured to use "Wired Analog Input").
J	µA Feedback Common	Analog Output Common	
K	µA Feedback (+)	Analog Output (See appendix for RAC Card Jumpers 10/11)	Output indicating current feedback current level.
L	Process Cycle Indicator Input	Digital 24VDC Input (See appendix for RAC Card Jumper 9)	This input signal is optional for informing the RVC of when the Process is running a "Cycle" (e.g. painting a door). If used, the RVC can capture additional performance information about the "Cycle". (see Analytics screen).
M	Analog Input Common	Analog Input Common	Analog input common for KV Setpoint and Analog Extra Input.
N	HV On Output (-)	Output contact closure	
O	Ground	Ground	Ground from RVC.

LOW VOLTAGE I/O (5 PIN)

The Low Voltage I/O connector for each gun contains 5 pins, controlling various gun-related signals. The pin arrangement of the Low Voltage I/O connector is located below.



LOW VOLTAGE I/O (5 PIN)		
Pin	Signal	Color
1	Current Feedback	Brown
2	LED SW	White
3	Ground	Green/Yellow
4	Power (VCC +15)	Black
5	VCT	Red

INTRODUCTION TO COMMON SCREEN FEATURES

A 'common screen feature' refers to an icon, button, panel, or label that can be found on many screens throughout the program. These features are commonly used, and therefore a solid understanding of these features is beneficial.

INTERACTIVE SCREEN FEATURES

Action Buttons

These buttons will appear with a faded grey background and darker outline. Pressing the button will cause the system to perform an action. This action could be changing to a different screen, changing a selection or causing the system to do something such as turn an output signal on or off.

Example:



Tab Selections

Many screens will display a group of tabs with names on them. Selecting a different tab will change what is displayed on the screen.

Example:



Selection Lists

On many screens, there will be a box containing a list of items. Pressing an item in the list will cause that item to be selected as the item of interest for acting on as directed by near-by action buttons. Language Selection:

Example:

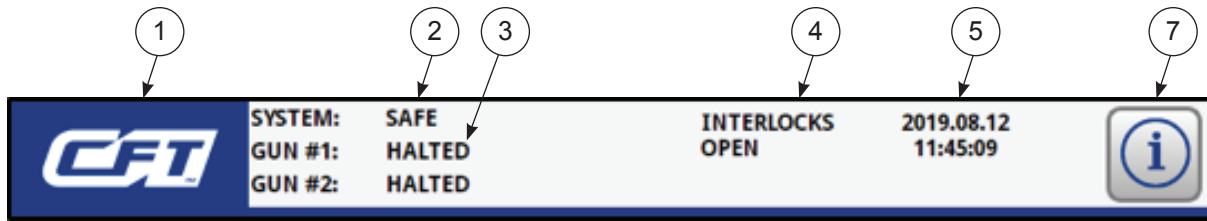
Deutsche [v0.0.5]
English [v1.0.1]
Français [v0.0.5]
繁體中文 [v0.0.5]

COMMON SCREEN LAYOUT REGIONS

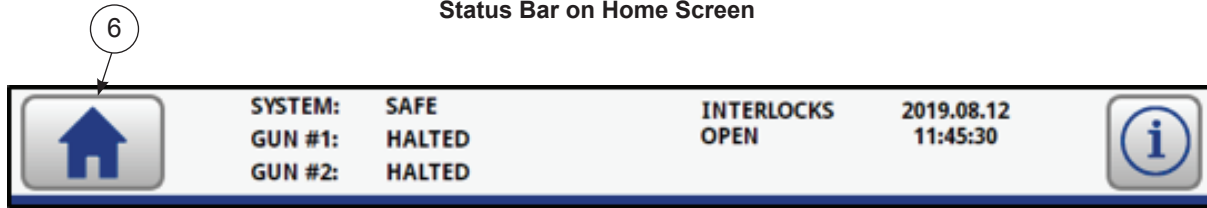
For easier use, the screens are laid out in a consistent manner. At the top of each screen, there is Status Bar. On the right side of most screens is a Navigation and Command Bar.

STATUS BAR

The Status Bar is located at the top of each screen. The Status Bar displays important runtime information for the system. This information refreshes on a regular basis. The Status Bar is designed to give a general, brief overview of the most essential status information. The Status Bar provides a button to navigate to the Help Screen, where more detailed status information and troubleshooting for issues is located.



Status Bar on Home Screen



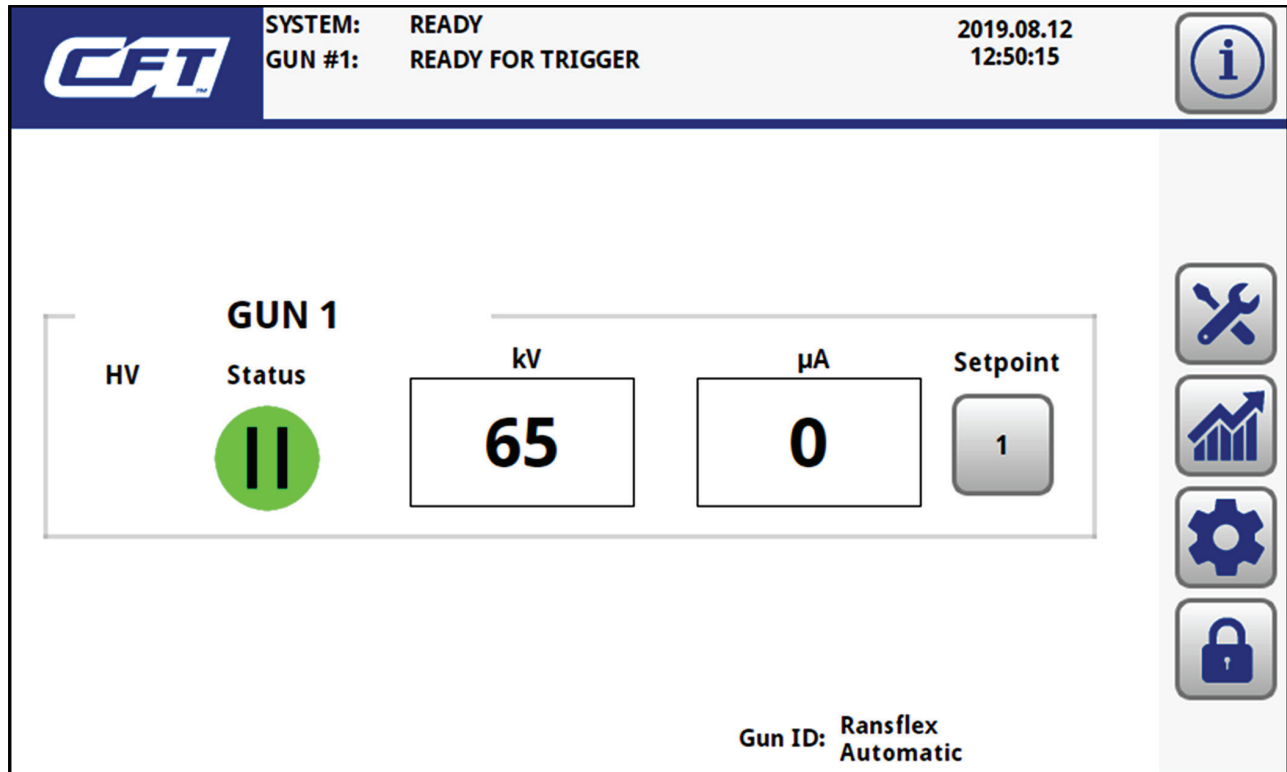
Status Bar on other screens

STATUS BAR

Number	Status	
1		On the top-level Home Screen only, the brand logo is displayed.
2		System Status – This displays a simple message about whether the system is ready to use, or if a fault or warning has been detected. Please see the System Status Messages section for information on specific statuses.
3		Gun Status – This displays a simple message about the gun. The messages displayed are statuses for faulted, triggered, high voltage on and ready. Please see the Gun Status Messages section for information on specific statuses.
4		Interlock Status – If it is visible, this indicates at least one interlock is open and needs to be closed to transition the system into a ready state.
5		Date and Time of the system are displayed here.

STATUS BAR

Number	Navigation Buttons	
6		Home Button – Available on all screens other than the Home Screen. Pressing this button immediately will go to the Home Screen.
7		Help Button – Indicates there are no active faults or warnings. Pressing this button will go to the Help Screen where additional information can be viewed.
7		Warning Button – Indicates there are warnings active. Pressing this button will go to the Help Screen where information about the warning conditions is available.
7		Fault Button – Indicates there is an active fault condition. Pressing this button will go to the Help Screen where additional information about the fault conditions is available.



NAVIGATION AND COMMAND BAR

This panel is present on most screens on the right-hand side. The Navigation and Command Bar contains buttons used to navigate from screen to screen. Some screens will also have command buttons.

The navigation options that are available will change depending on the user's access level and if the system is running.

The Navigation and Command Bar will also contain different buttons depending on which screen the user is currently on. These buttons are commonly used across various screens, and should be understood by the user. Following are some examples of possible navigation bars in the RVC program.

NOTE

- For the safety of the operator, many navigation options will be unavailable while the gun is triggered and the high voltage is enabled.

NAVIGATION BAR EXAMPLES



Maintenance Button – This button opens the Maintenance Screen, which displays live values for input and output signals.



Analytics Button – This button opens the Analytics Screen, which displays multiple types of statistics for the system and the guns.



Settings Button – This button opens the Settings Screen, which allows the user to modify various properties based on their access level.

Note: This button will not be displayed or accessible when the system is running.



Login Button – This button opens the Login Screen, which allows the user to change their access level by entering a password. The symbol on this button will appear unlocked if the user is logged in.



Note: This button will not be displayed or accessible when the system is running.



OPERATION - SCREENS FOR STANDARD USERS

This section discusses the various screens that a user of the Ransburg Voltage Controller will be seeing on a day-to-day basis. The following is an outline of the screens that will be discussed in this section.

SCREENS FOR STANDARD USERS	
Screen Name	Brief Screen Description
Home Screen	The runtime screen for the system and guns. Provides live status for the system and the guns along with selection of the kV preset.
Help Screen	View log of events, reset faults and view system information.
Settings Screen	Configure various system settings and parameters, such as language, signal configuration and kV setpoints. Note: The system will be in configuration mode while on this screen. The system is unable to run while in this mode.
Analytics Screen	Displays lifetime and user statistics for the system and all guns. These include statistics tracked automatically by the RVC and statistics that are controllable by the user.
Maintenance Screen	Access maintenance and diagnostic features such as live viewing of input values.

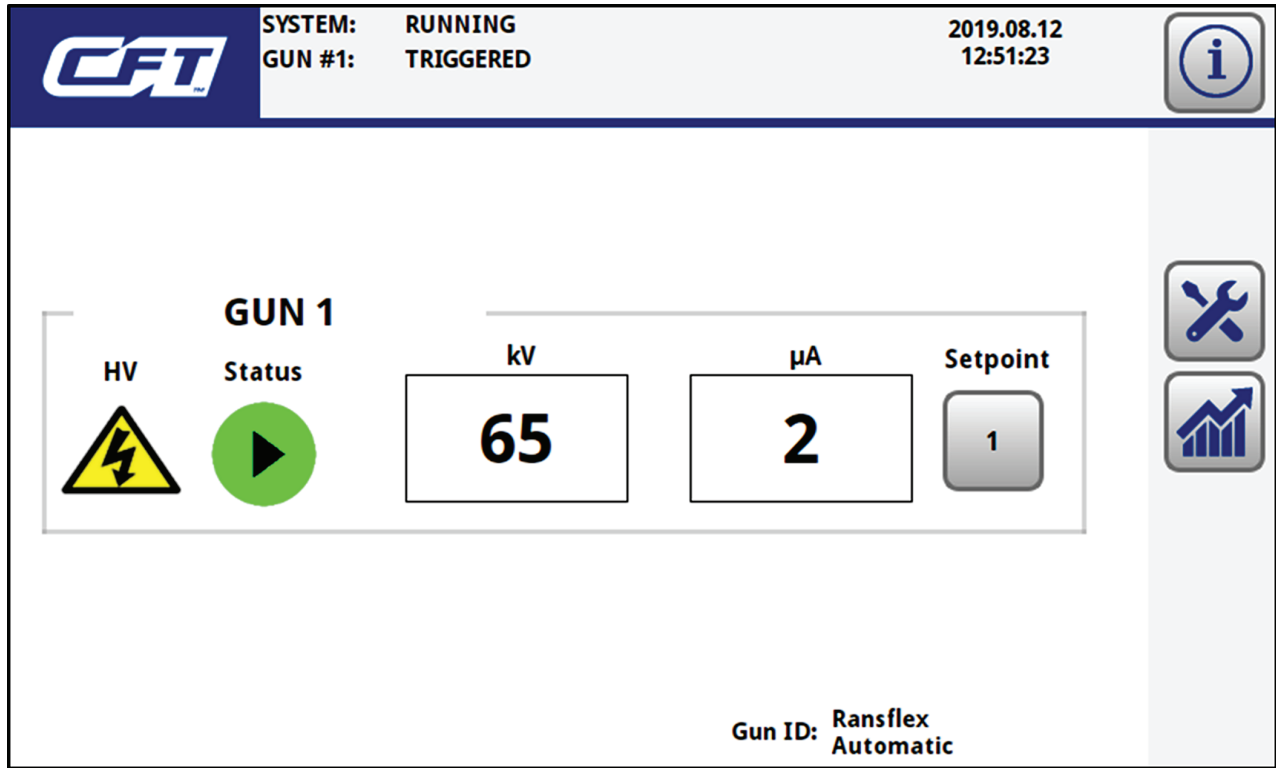
NOTE

➤ The screens discussed in this chapter are the standard user level screens. Additional screens that require a privileged access level are discussed in later sections.







HOME SCREEN

The Home Screen displays essential runtime information for the system and the guns. The screen displays the high voltage status, trigger state, selected voltage and real-time current. KV preset selection may also be available on this window, when configured for Display Presets.

All other screens are accessible from the Home Screen. This is the only base-level screen.



Status Indicators	
	HV (High Voltage) – The system displays this symbol if it detects high voltage present. <u>Use caution if this symbol is present.</u>
Status: refers to the current runtime status of the Gun and its ability to be triggered. The possible status are as follows:	
	Running Status – The system displays this symbol if it detects the gun is currently triggered and the system is not faulted.
	Ready for Trigger Status – The system displays this symbol if it detects the gun has no faults, all the interlocks are closed and the system is ready to be triggered. When the trigger input is detected as being active, the gun will transition to Running.
	Stopped Status – The system displays this symbol if it detects that the gun cannot be triggered. Something in the system must be resolved to change the state to Ready for Trigger.
	Faulted Status – The system displays this symbol if it detects the gun and/or system is faulted. The gun and/or system must be reset after the fault is resolved. Troubleshooting and reset information can be found in the 'Troubleshooting' section.
	Voltage – This is the selected voltage setpoint, presented in kilovolts.
	Current – This is the current detected by the system, presented in micro-amps.

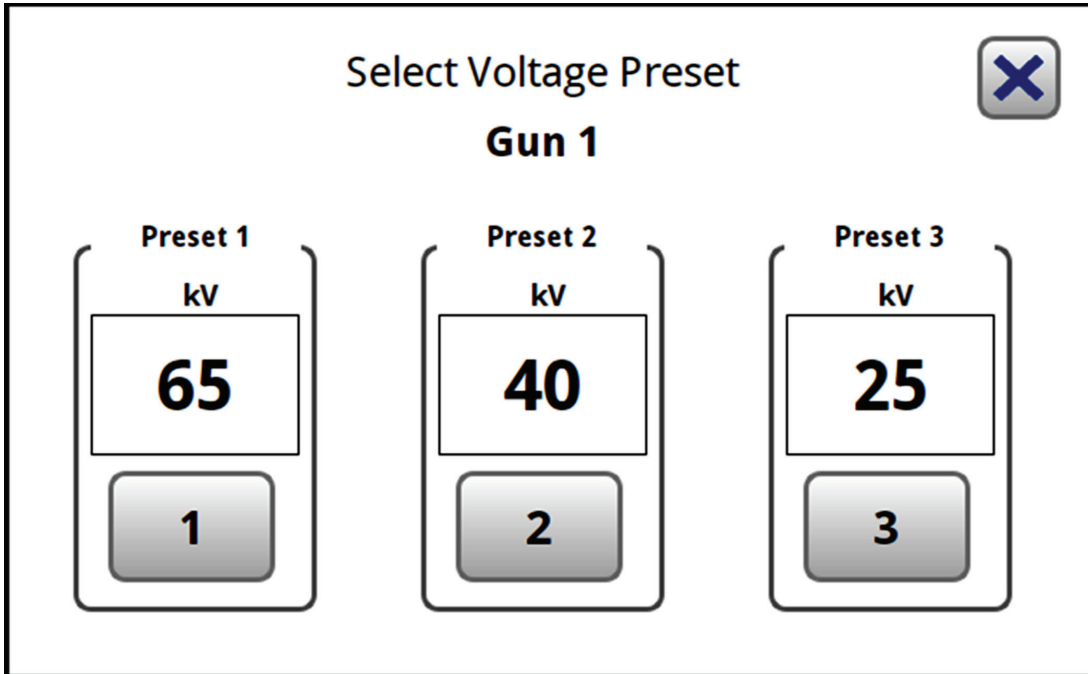
Navigation Buttons	
	<p>Select Preset – Pressing this button displays a screen that will prompt the user to select one of three presets. Presets are voltage setpoints for the gun. More information on the preset selection screen is available in the next section.</p> <p>Note: This button will only be displayed if the 'kV Setpoint Source Type' option is selected on the Signal Interface Screen.</p>
	<p>Maintenance Button – This button opens the Maintenance Screen, which displays live values for input and output signals.</p>
	<p>Analytics Button – This button opens the Analytics Screen, which displays numerous lifetime statistics for the system and the guns.</p>
	<p>Settings Button – This button opens the Settings Screen, which allows the user to modify various properties based on their access level.</p> <p>Note: This button will not be displayed or accessible when the system is in a running state.</p>
 	<p>Login Button – This button opens the Login Screen, which allows the user to change their access level by entering a password. This button will display unlocked if the user is logged in.</p> <p>Note: This button will not be displayed or accessible when the system is in a running state.</p>

PRESET SELECTION SCREEN

This screen is used to change the desired voltage setpoint to the preset selected. The values for each preset are configured by the user in the Settings Screen.

NOTE

- This screen is only accessible when the 'kV Set-point Source' is selected on the Signal Interface Screen.



Status


	<p>Preset Value – This value represents the currently configured kV value for the respective preset.</p>
--	---

Command Buttons

	<p>Select Button – Clicking this button will select the respective preset as the new kV setpoint and return to the Home Screen.</p>
	<p>Exit Button – Clicking this button will return the user to the Home Screen without making any changes.</p>

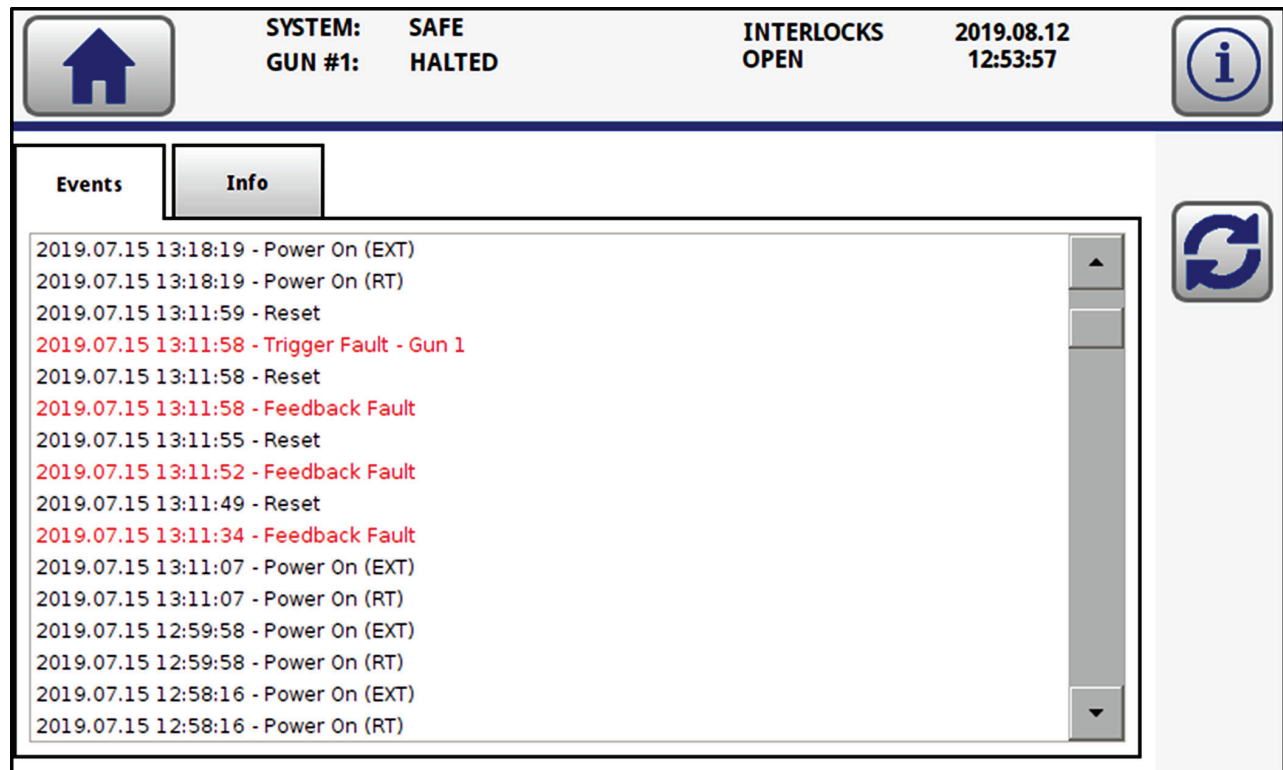
HELP SCREEN

The Help Screen has Events and Info Tabs with information helpful to diagnosing issues with the system.

Command Buttons	
	<p>Reset Faults Button – This button is used to reset faults.</p> <p>Note: This button will only be visible and available when the 'Source of Reset Command' is selected on the Signal Interface Screen</p>

EVENTS

The Events Tab provides up to 200 log messages. These contain important events that occurred on the RVC. Faults are highlighted in red. They are chronologically ordered, with the most recent appearing at the top.

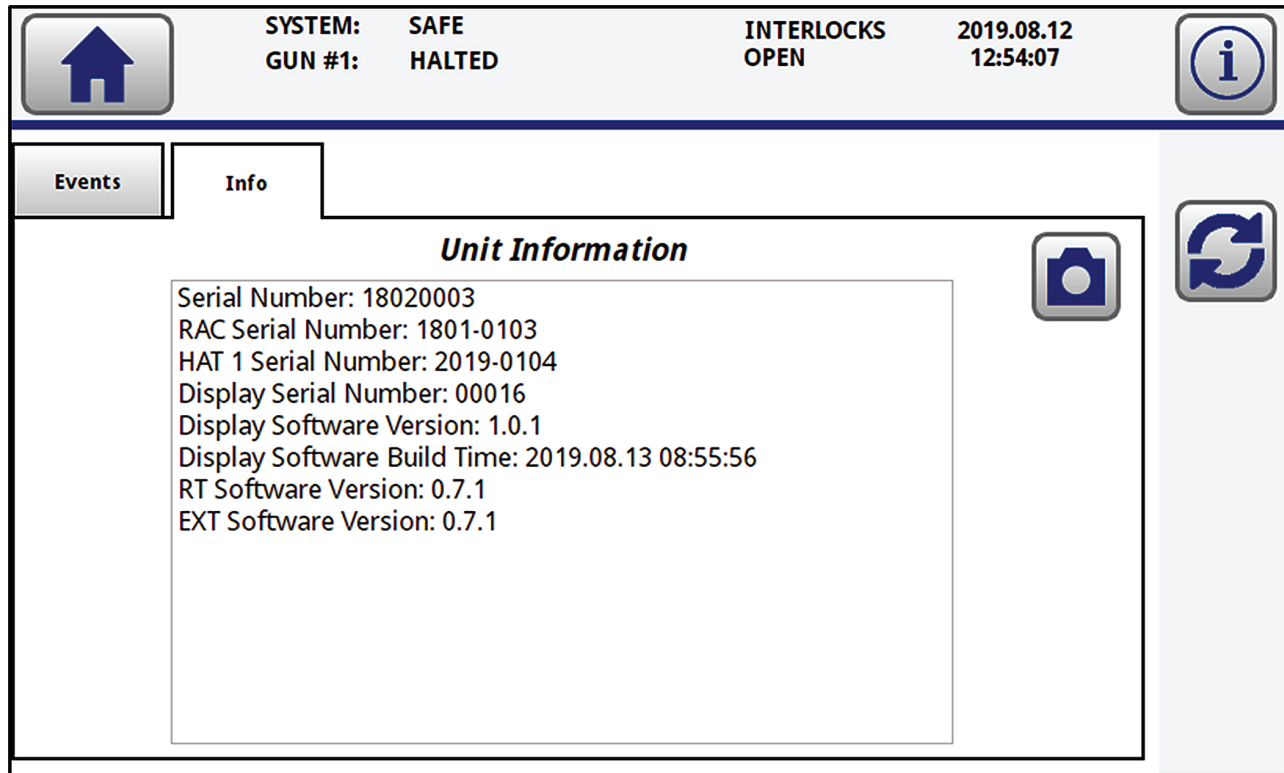


System Status	Gun Status	Interlocks	Date/Time
SYSTEM: SAFE	GUN #1: HALTED	INTERLOCKS: OPEN	2019.08.12 12:53:57

Event Log
2019.07.15 13:18:19 - Power On (EXT)
2019.07.15 13:18:19 - Power On (RT)
2019.07.15 13:11:59 - Reset
2019.07.15 13:11:58 - Trigger Fault - Gun 1
2019.07.15 13:11:58 - Reset
2019.07.15 13:11:58 - Feedback Fault
2019.07.15 13:11:55 - Reset
2019.07.15 13:11:52 - Feedback Fault
2019.07.15 13:11:49 - Reset
2019.07.15 13:11:34 - Feedback Fault
2019.07.15 13:11:07 - Power On (EXT)
2019.07.15 13:11:07 - Power On (RT)
2019.07.15 12:59:58 - Power On (EXT)
2019.07.15 12:59:58 - Power On (RT)
2019.07.15 12:58:16 - Power On (EXT)
2019.07.15 12:58:16 - Power On (RT)

INFORMATION

The Info Tab provides general information regarding the RVC. It lists RVC software versions and serial numbers for various hardware components within the RVC.



Command Buttons



Snapshot Button – Clicking this button will save the displayed data to a file. Later, an Admin user can retrieve this file for review and analysis.

SETTINGS SCREENS

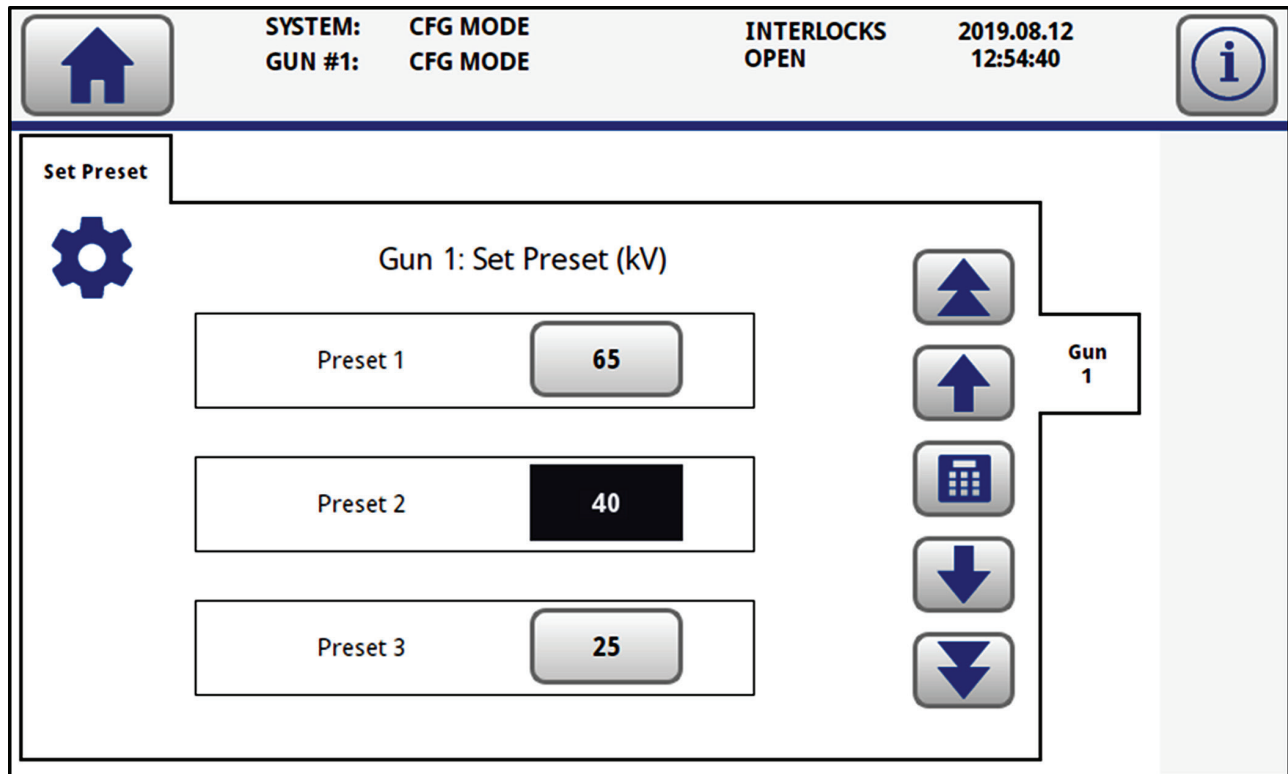
The Settings Screens allows the user to modify various system settings. Admin users will see more settings options than Standard users. The additional Admin options will be discussed in another chapter.

NOTE

- Settings cannot be modified while the unit is running. If the system is triggered while this screen is displayed, the system will go back to the Home Screen

SET PRESET SCREEN

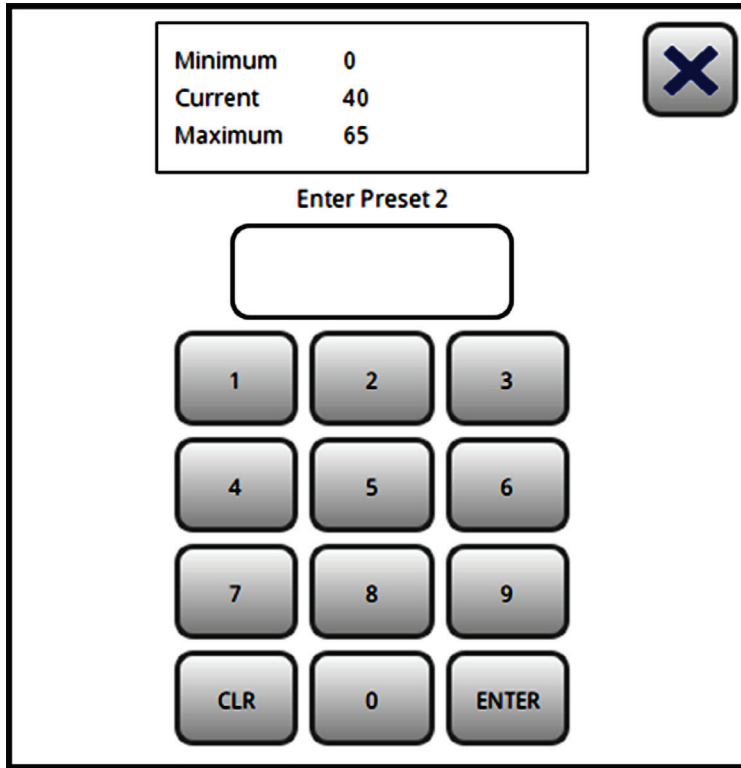
The Set Preset Screen is used to modify the three voltage presets, which can be selected at runtime.






Command Buttons	
	<p>Preset Selection Buttons – Pressing these buttons allow that preset value to be modified.</p>
	<p>Increase / Decrease Buttons – These buttons increment the current preset value up or down. The single arrow button represents an increment of one, while the two-arrow button represents an increment of five. These buttons will only be available when a preset is selected</p>
	<p>Keypad Button – Pressing this button will allow the user to enter a new preset value using an on-screen keypad.</p>

KEYPAD SCREEN

The Keypad Screen is used throughout the program to modify various numeric values such as preset setpoints.

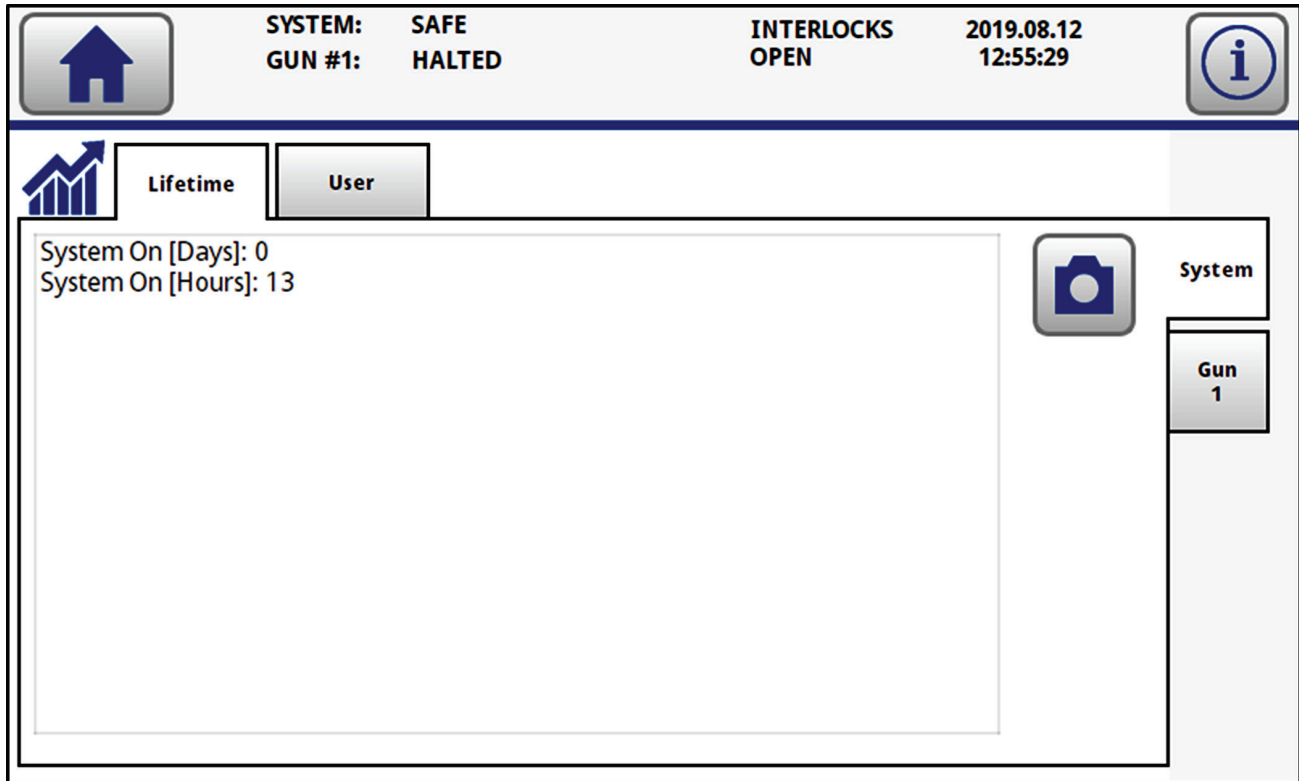


Command Buttons	
	<p>Values – This section displays the minimum and maximum acceptable setpoints, as well as the current value.</p>
<p>Preset 1</p>	<p>Parameter Name – This label indicates the parameter that the user is modifying.</p>
<p>Enter Value</p> 	<p>Value – This box displays the present entered value.</p>
	<p>Enter – Pressing this button will update the selected parameter with the new value and close the screen.</p>


ANALYTICS SCREEN

The Analytics Screens contains statistics for the system and guns. Currently, lifetime statistics are tracked and displayed. The statistics are updated every time the screen refreshes.

LIFETIME OPERATING STATISTICS - SYSTEM STATISTICS




System Lifetime Statistic Name	Description
System On	This is the number of days and hours the system has been powered on.

Command Buttons	
	Snapshot Button – Clicking this button will save the displayed data to a file. Later, an Admin user can retrieve this file for review and analysis.

LIFETIME OPERATING STATISTICS - GUN STATISTICS

The screenshot shows a software interface for gun statistics. At the top, there is a status bar with a home icon, system status (SAFE), gun status (GUN #1: HALTED), interlocks (INTERLOCKS OPEN), and date/time (2019.08.12 12:55:41). Below this is a navigation bar with a bar chart icon and two tabs: 'Lifetime' (selected) and 'User'. The main content area displays the following statistics for Gun 1: High Voltage On [Days]: 0, High Voltage On [Hours]: 2, Triggers: 15105, and Cycles: 4. To the right of the statistics is a camera icon labeled 'System' and a label 'Gun 1'.

Gun 1 Lifetime Statistic Name	Description
High Voltage On	This is the number of days and hours the high voltage has been turned on.
Triggers	This is the total number of times this gun has been triggered.
Cycles	This is the total number of complete cycles recorded for this gun.

Command Buttons	
	Snapshot Button – Clicking this button will save the displayed data to a file. Later, an Admin user can retrieve this file for review and analysis.

USER STATISTICS – GUN STATISTICS

The User Statistics are resettable statistics managed by the user. There are two different groups of user statistics. Each of these statistics groups are dependent on the user resetting statistics at the intended times. It is up to the user to define how they want to use each statistic group.




The screenshot displays the 'Gun Statistics' interface. At the top, system status is shown as 'SAFE' and 'GUN #1: HALTED', with 'INTERLOCKS OPEN' and the date/time '2019.08.12 12:56:02'. Below this, there are navigation icons and tabs for 'Lifetime' and 'User'. The main area lists statistics for 'Gun 1':

- High Voltage On [Minutes]: 101
- High Voltage On [Seconds]: 42
- Triggers: 3597
- Faults: 31
- Cycles: 4
- Cycle Time (High) [Minutes]: 2** (highlighted)
- Cycle Time (High) [Seconds]: 28
- Cycle Time (Low) [Minutes]: 0
- Cycle Time (Low) [Seconds]: 1
- Cycle Triggers (High): 2
- Cycle Triggers (Low): 0
- Cycle kV Changes (High): 8
- Cycle kV Changes (Low): 0

On the right side, there are buttons for 'Group 1', 'Group 2', and a refresh icon.

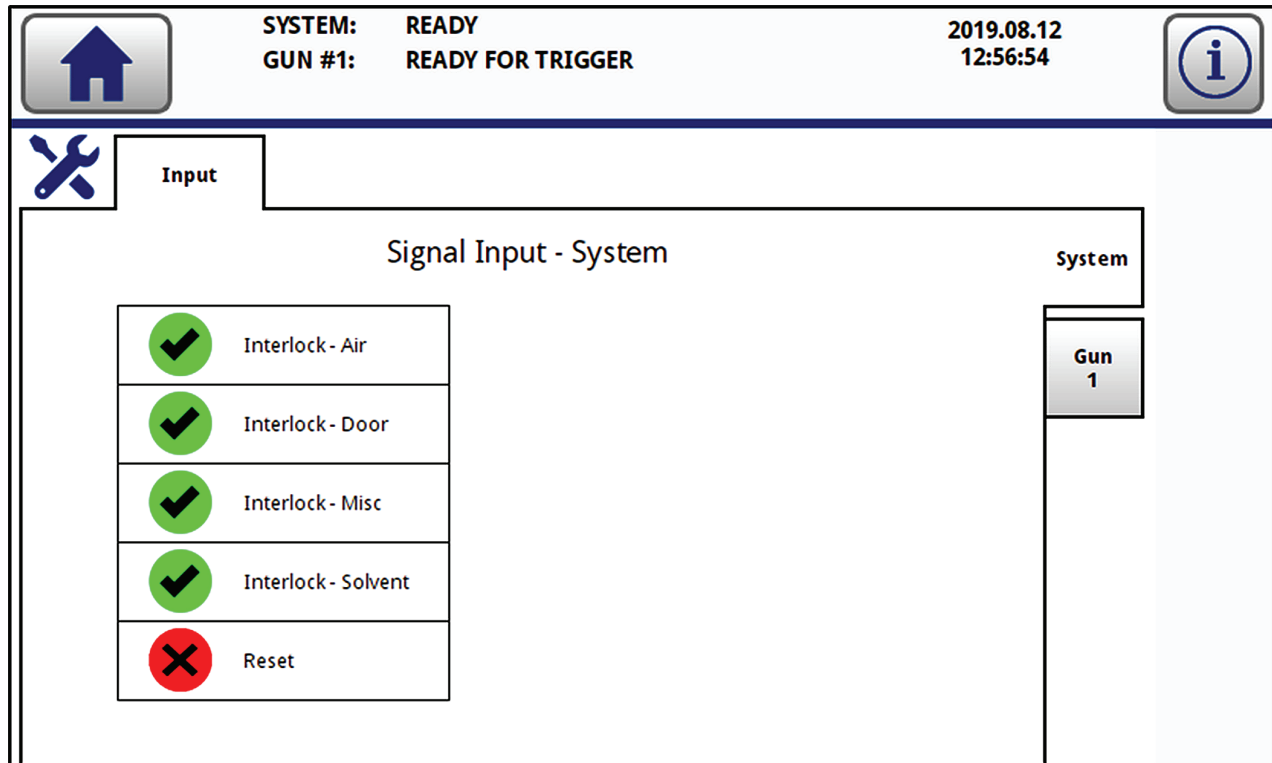
General User Statistic Name	Description
High Voltage On	Total time the high voltage was on in minutes and seconds.
Triggers	This is the number of times the trigger input signal has been activated.
Faults	The number of faults that have been reported.
Cycles	The number of times the Cycle input signal has been turned on and off.

Cycle User Statistic Name	Description
<p>All of the following statistics are measured based on all Cycles monitored since the last time the User Statistics were reset.</p> <p>For a consistent process, the high and low values would be expected to be similar. If there is a large difference in the high and low values, this indicates that at least two of the cycles may not have been consistent.</p>	
Cycle Time Minutes/Seconds (High/Low)	Indicates the longest and shortest time the cycle signal was active.
Cycle Triggers (High/Low)	Indicates the most and least number of Triggers observed during a cycle.
Cycle kV Changes (High/Low)	Indicates the most and least number of changes to kV setpoint observed during a cycle.



Command Buttons	
	Reset Button – Clicking this button will reset the currently displayed user statistics.
	Snapshot Button – Clicking this button will save the displayed data to a file. Later, an Admin user can retrieve this file for review and analysis.
	Group 1 and Group 2 Buttons – Clicking on one of these buttons will toggle over to the other Statistics User Group.

MAINTENANCE SCREEN

The Maintenance Screen displays the live status or value for individual signals. All the signals on the Maintenance Screen are covered in the Connector Signals section.



Status Indicators


	<p>Off Status – This symbol is displayed if the I/O is off, inactive or cannot be detected.</p> <p>Note: If the signal should be detected, please confirm that the signal source is properly set. If the source is a wired connection, the cable may be faulty.</p>
	<p>On Status – This symbol is displayed if the signal is currently on or active.</p>

OPERATION - CHANGING USER ACCESS LEVEL

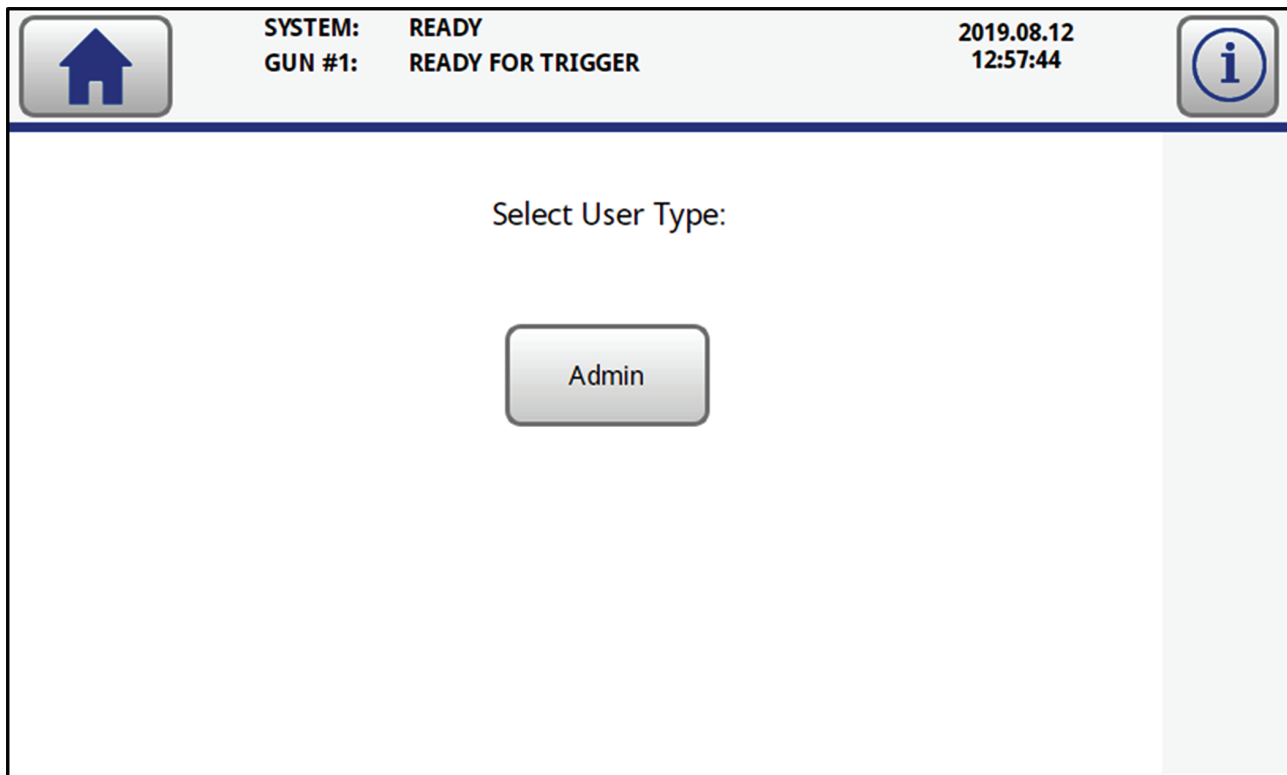
This section will discuss how to log into and out of Admin access level.

LOGGING IN AS SYSTEM ADMINISTRATOR (ADMIN ACCESS LEVEL)

From the Home screen, in the lower right of the Navigation Bar, is a button with a lock on it.

Command Buttons	
	Lock Button: Brings up the screen for changing the user's access level.

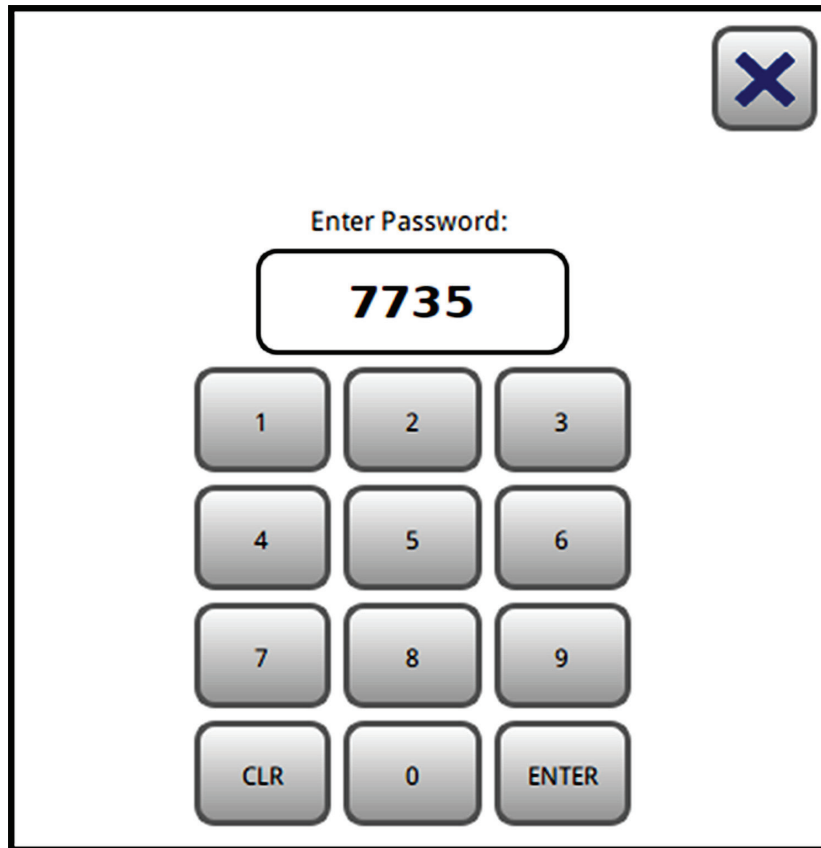
Press the Lock Button and the system will go to the Login Screen.



Press the Admin Button and the keypad dialog will pop-up, requesting the user to enter the passcode for an Admin.

PASSCODE KEYPAD SCREEN

This screen is used for entering the passcode for Admin access.



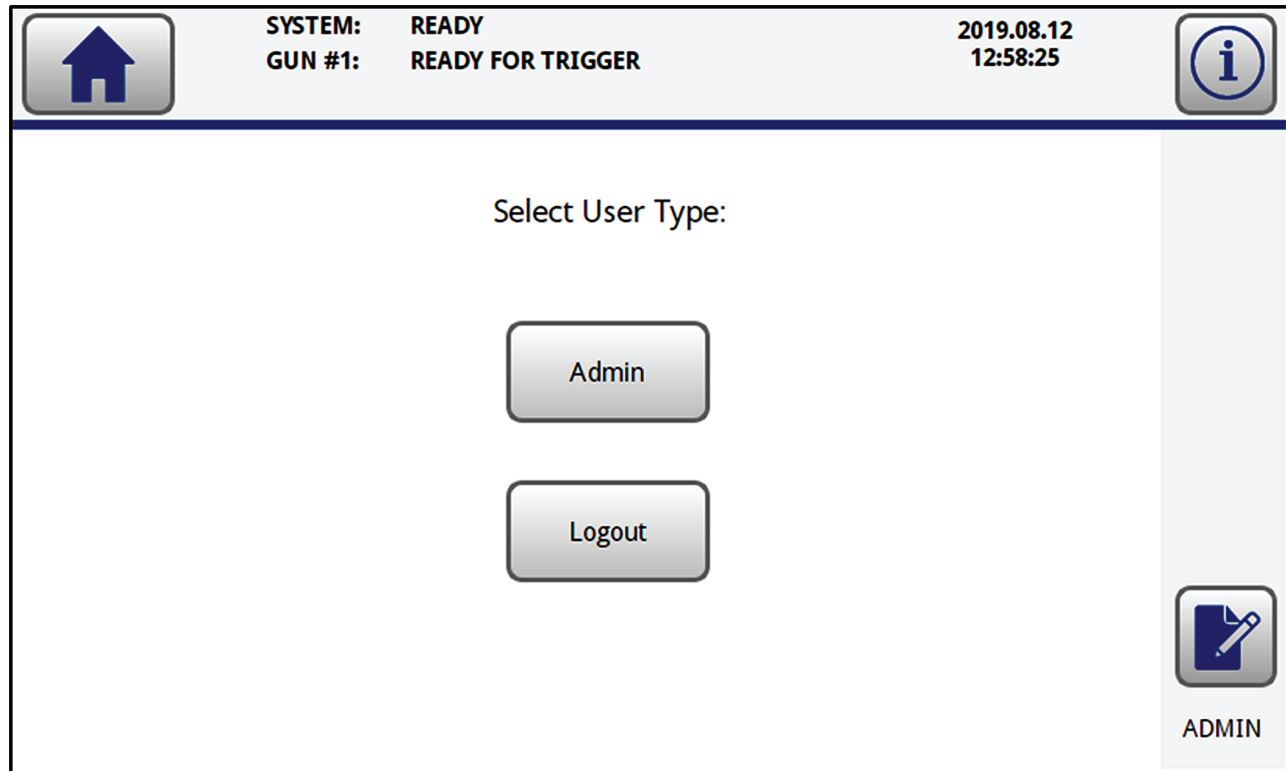
To log into the Admin access level, enter the passcode and press ENTER. If the passcode matches, the user will be elevated to the Admin access level. If the passcode does not match, the user will be notified that the passcode is incorrect.

When shipped from the factory, the Admin passcode is "7735"

LOGGING OUT OF ADMIN ACCESS

When logged into Admin access level, there are advanced configuration options and features that can significantly affect how the system operates.

Additionally, when logged into Admin access level, the options on the Login Screen will look different.



Pressing the logout button will immediately return the system to Standard access level and return to the Home Screen.

NOTE

- As a security precaution, the system will automatically log out of an elevated access level after 3 minutes of no screen activity by the user.

CHANGING THE ADMIN ACCESS PASSCODE

Command Buttons



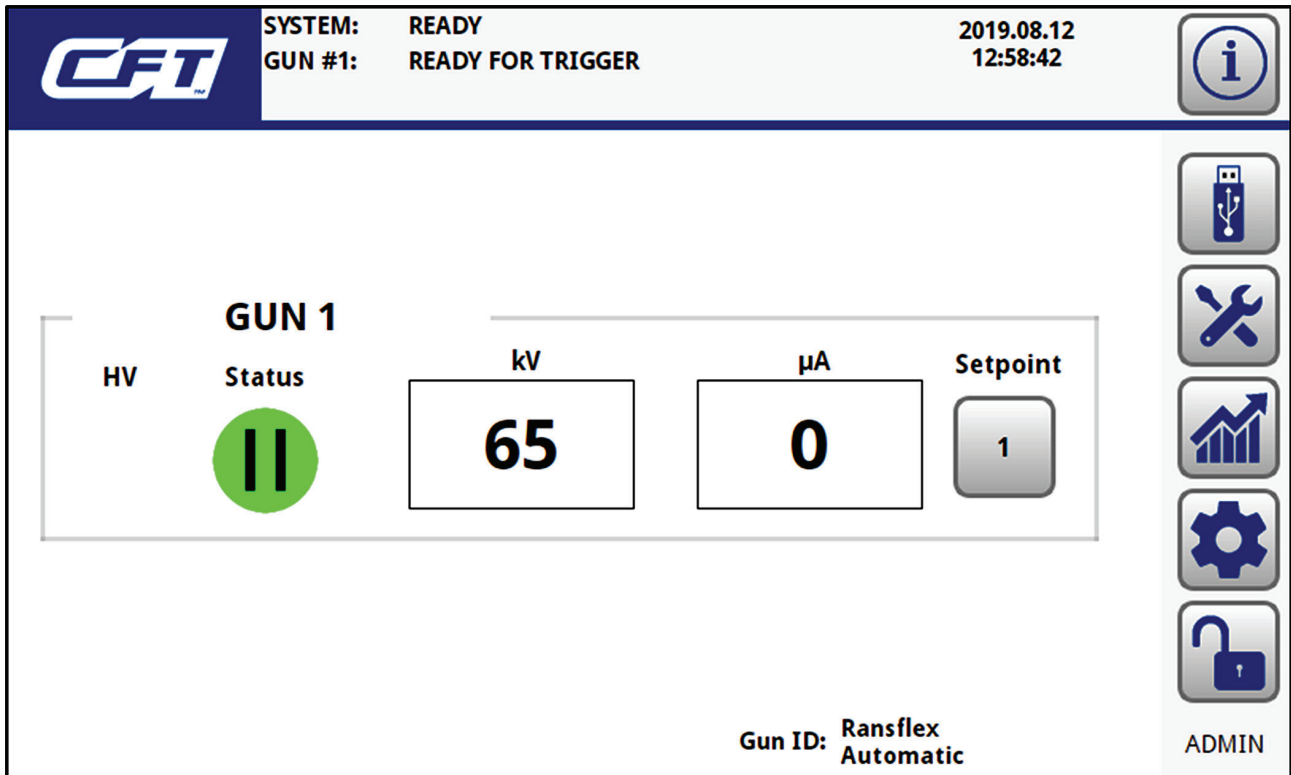
Change Passcode – This button will change the Admin passcode. Press this button and follow the screen instructions to change the passcode.

OPERATION - SCREENS FOR ADMINS

In addition to the screens and options previously discussed for Standard users, users logged in with Admin access have access to more advanced configuration screens and operations. These screens are not available to users who do not possess Administrator level access.

HOME SCREEN - WITH ADMIN ACCESS

This is the Home Screen of the application. Additional features become available when the user is logged in with Admin access.



ADDITIONAL ADMIN CAPABILITIES

Command Buttons	
	<p>Login Button – Navigates the user to the Login Screen. This allows the user to type in a passcode to change user security level. Some of the menu buttons will be disabled or enabled depending on your current user security level which is displayed in the bottom right corner of each screen</p>
	<p>File Transfer Button – Navigates the user to the File Transfer Screen. It only appears for users with Admin access level or above. File transfer requires a USB to be inserted.</p>

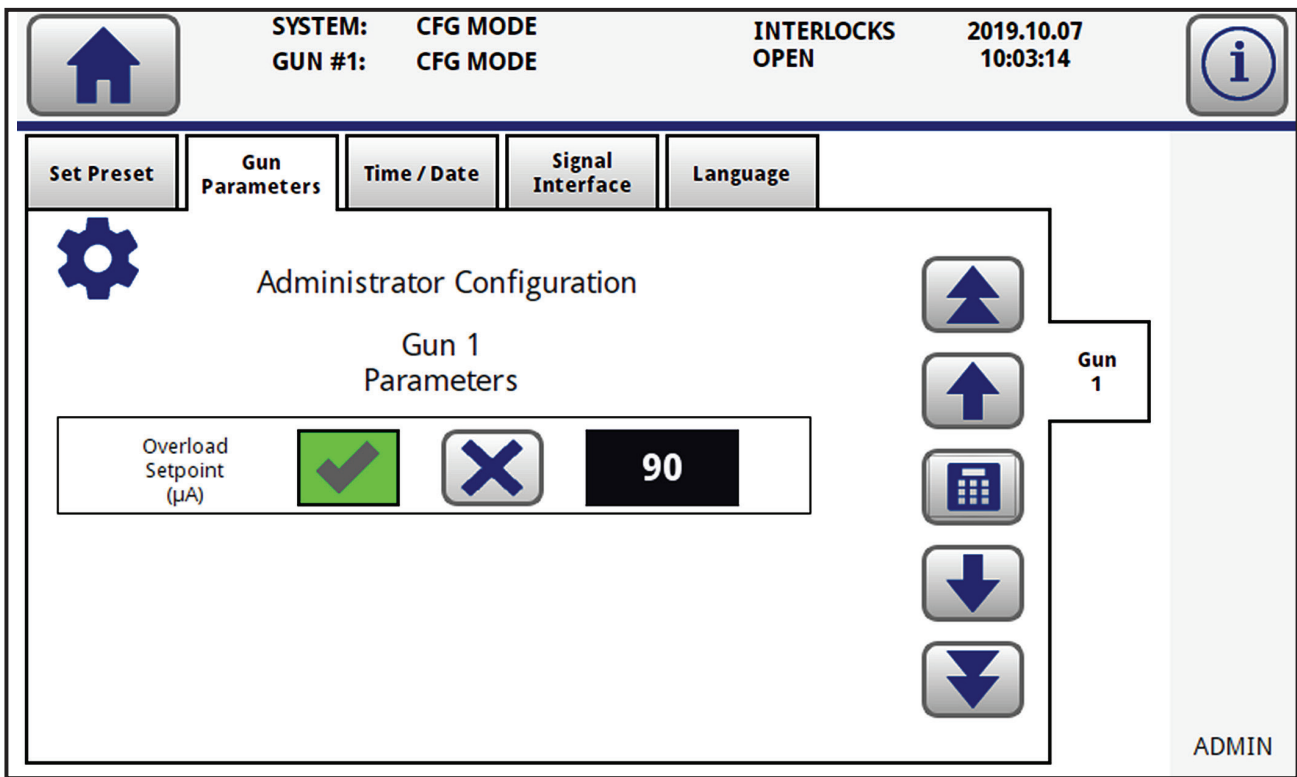
SETTINGS SCREEN

GUN PARAMETERS SCREEN









When logged in as Admin, the Settings screen now shows several more tabs of configuration settings. The first of these is the Gun Parameters screen used to configure advanced gun parameters.

NOTE

➤ Available Parameters and default values vary with the type of gun that the system is configured for.

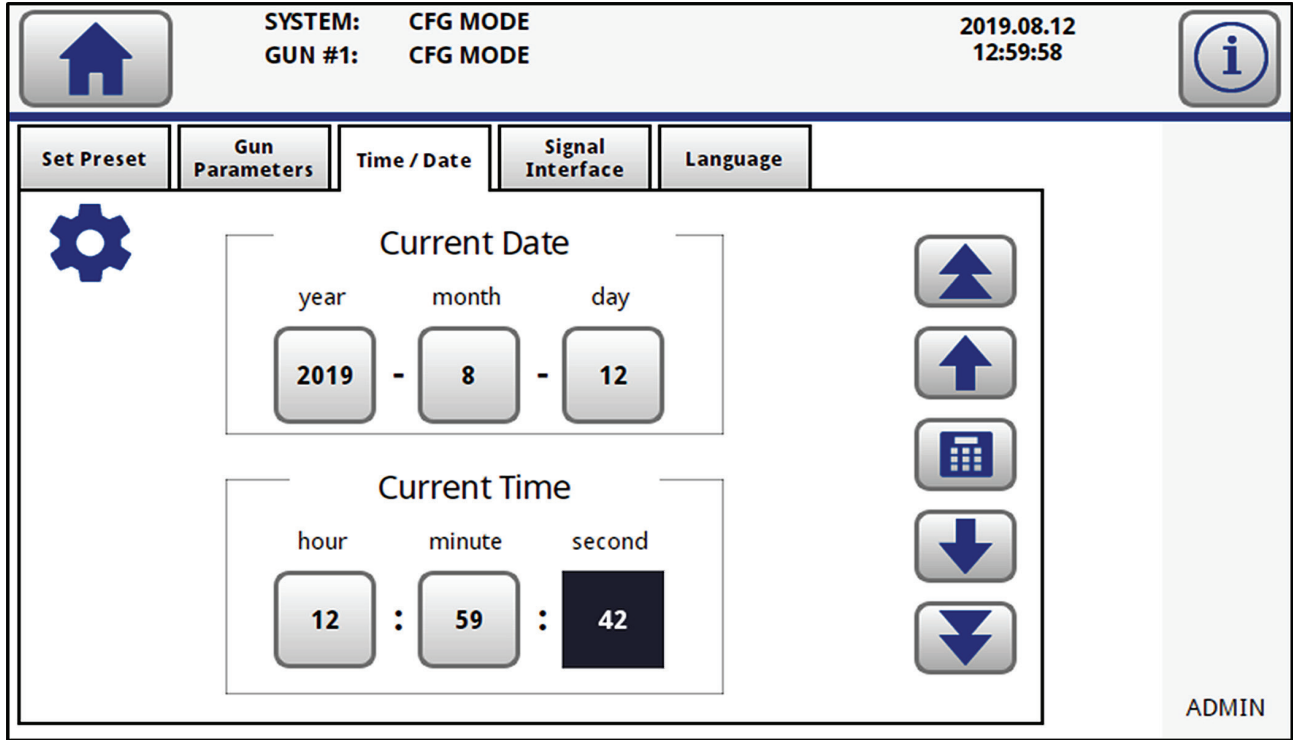


Parameters	
Overload Setpoint	<p>The Overload Setpoint defines a current level where the system will declare an Overload Fault and shut off. This must be set correctly to prevent discharges.</p> <p>Note: This feature may be disabled by an Admin user depending on the presently connected gun.</p>

Command Buttons	
	Enable – Enables the parameter and uses the parameter value provided.
	Disable – Disables the parameter and the system does not utilize it.
	Parameter Value – Value of the parameter. Can be adjusted by the user.
   	Parameter Increase/Decrease – These buttons increment or decrement the parameter value. The single arrow button represents an increment of one, while the double arrow button represents an increment of five.
	Parameter Keypad – Pressing this button will allow the user to enter a new parameter value using an on-screen keypad

SET DATE / TIME SCREEN

The Set Date / Time Screen is used to change the date and time of the system. In certain cases, such as for daylight saving's time, the date and time may need to be adjusted. The date and time are used by the system to provide timestamps for things like events or faults.

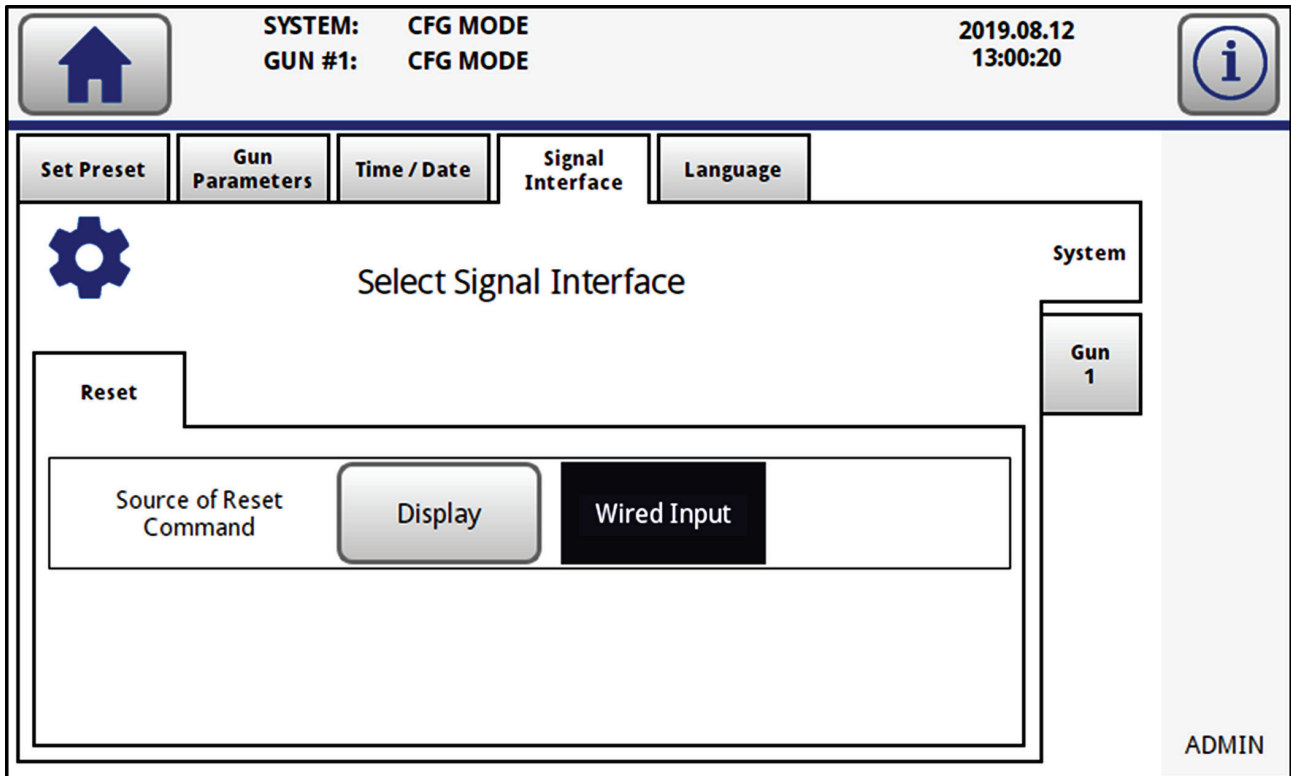


Command Buttons	
	<p>Date / Time Value Buttons - These buttons will select what value the user wants to modify. Tapping these buttons pulls up a number pad for adjusting the selected value.</p>
	<p>Increase / Decrease Buttons - These buttons increment or decrement the selected value. The single arrow button represents an increment of one, while the two-arrow button represents an increment of five. A box must be selected to see these buttons.</p>
	<p>Keypad Button - Pressing this button will allow the user to enter a new value using an on-screen keypad.</p>

SIGNAL INTERFACE SCREEN

The Signal Interface Screen is used to modify the source for various command and control signals detected by the system and the connected gun(s). Each signal originates from exactly one source. This screen is separated into two sections, System Signals and Gun Signals. Please see the RVC Connections for a detailed description of all of the connections.

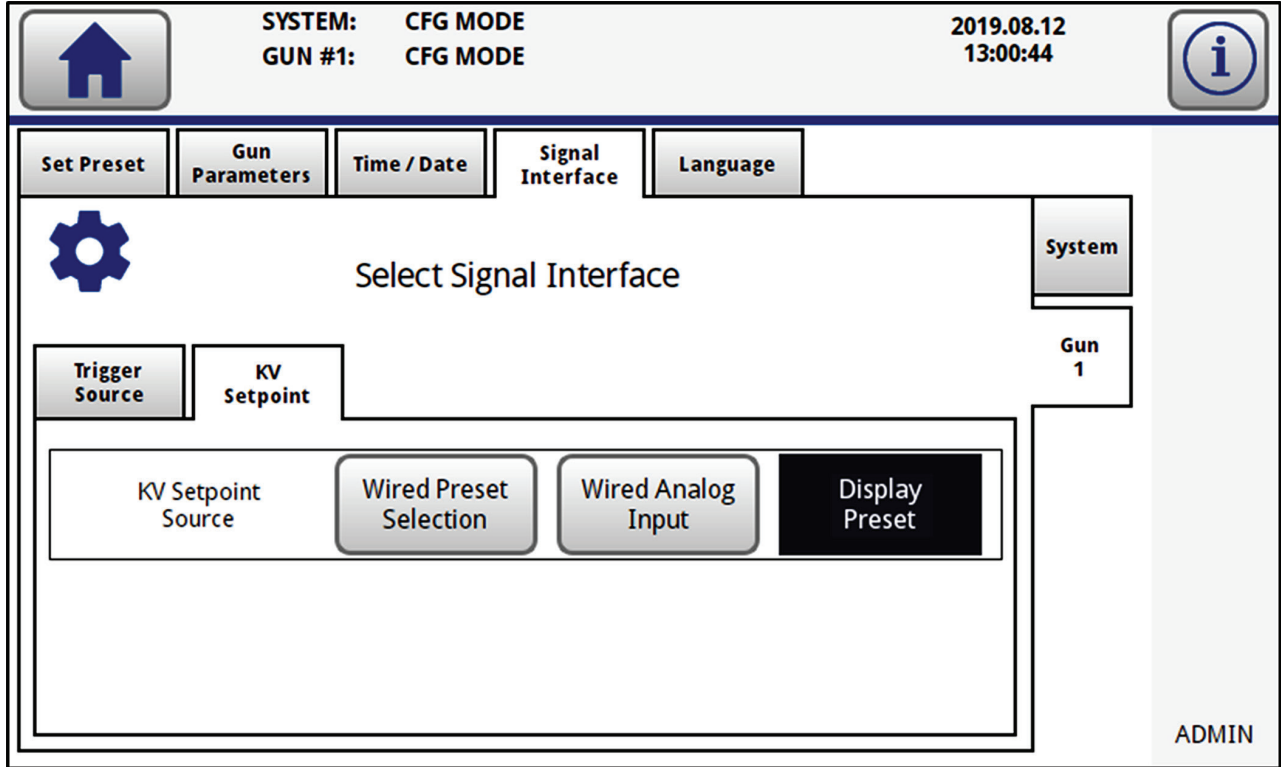
CONFIGURATION OF SIGNAL INTERFACES - SYSTEM SIGNALS



Parameters	
Reset Source	This setting determines if faults can be reset from the screen display (on the Information screen), or only through wired input signal on the System Inputs connector.

CONFIGURATION OF SIGNAL INTERFACES - GUN SIGNALS

There are several important command signals related to controlling the gun(s). These signals can potentially come from multiple places. These screens permit the user to configure which signals will be monitored and how.

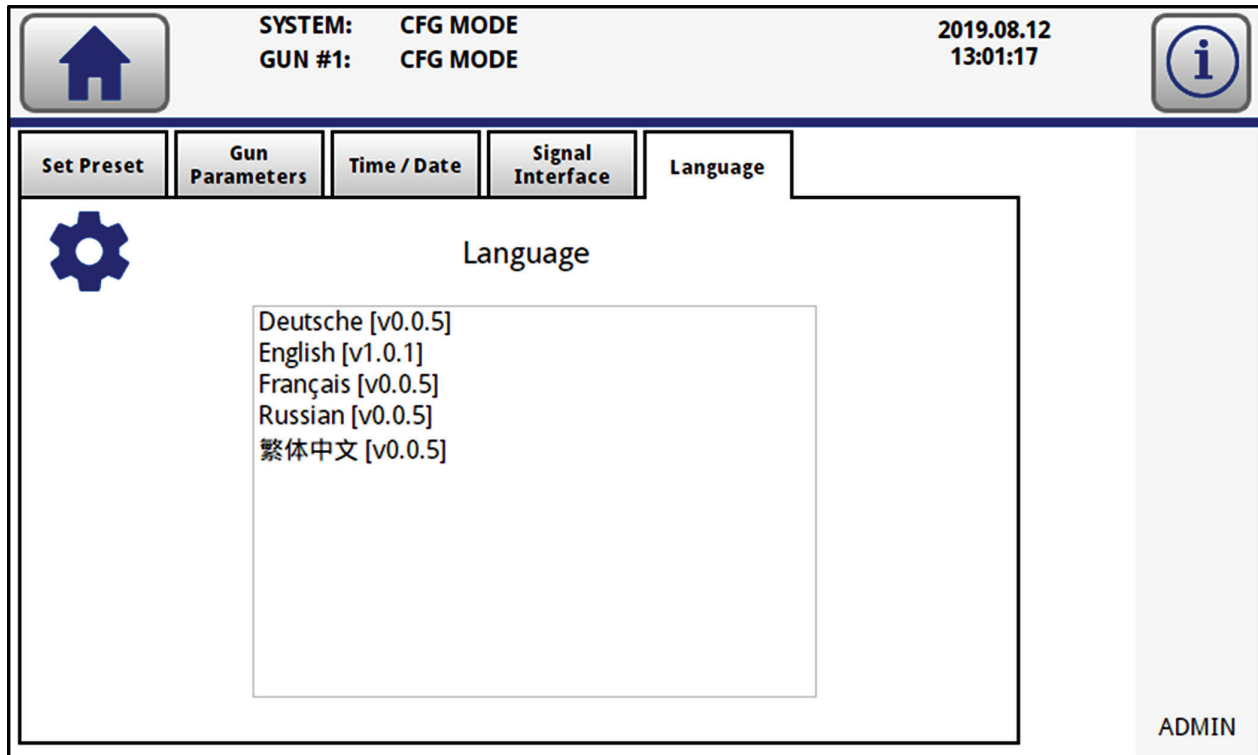


Parameters	
<p>Trigger Source</p>	<p>The trigger signal is what tells the system to turn on the High Voltage output. This setting permits an Admin user to select which input source will be used by the system to activate the High Voltage. The available options include:</p> <p>Airflow Switch: The airflow switch will be used as the trigger input.</p> <p>I/O: The trigger input signal on the Gun I/O connector will be used as the trigger input.</p>
<p>KV Setpoint Source</p>	<p>This setting tells the system where to look for the KV Setpoint value. The options available are:</p> <p>Display Preset Selection – The system will use the value associated with the preset currently selected by the user from the display.</p> <p>Wired Preset Selection – The system will look at the wired inputs for present selection and use the corresponding preset value.</p> <p>Wired Analog Input – The system will read the wired analog input, convert this value to a KV level, and use that value as the target KV setpoint.</p>

SET LANGUAGE SCREEN

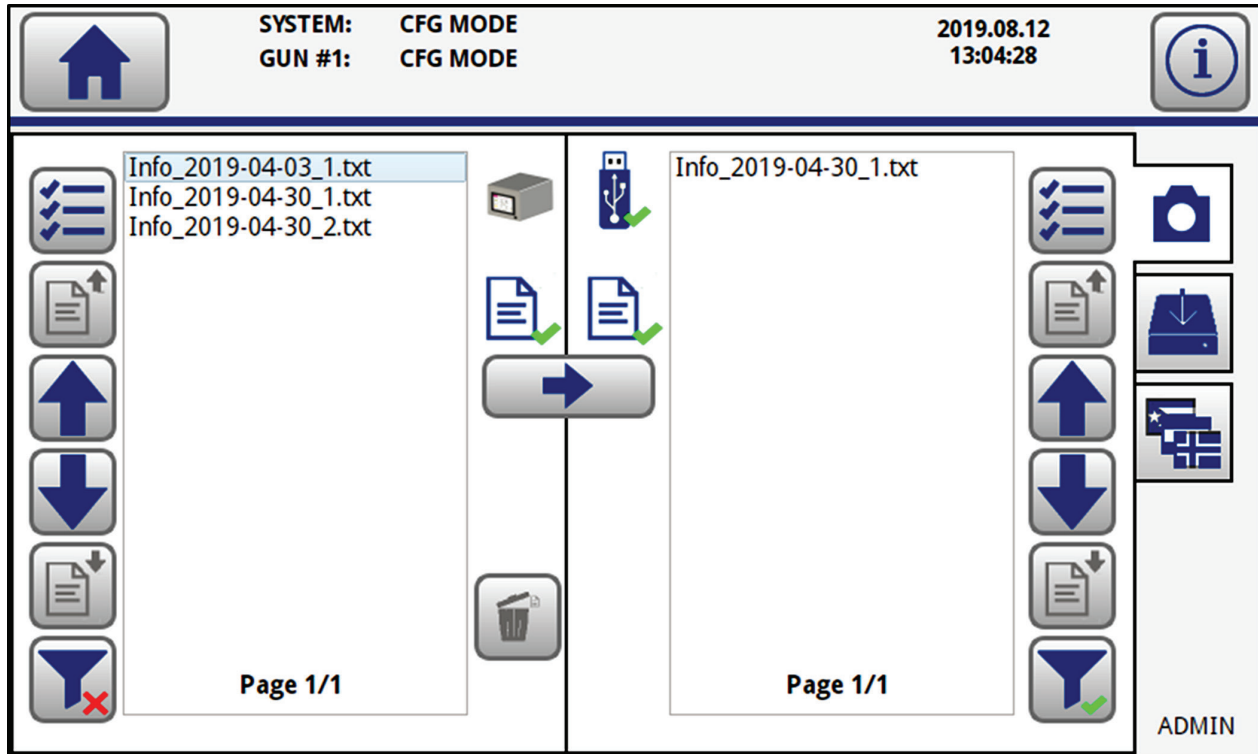
The Set Language Screen allows an Admin to select which language is used to display the text shown on the screen. A language selection is immediately applied. The selected language remains in effect until a different one is chosen.




If one of the languages are outdated or missing, new language files can be transferred to the RVC (see "RVC Installing New Language" in Appendix C section).











FILE MANAGEMENT SCREENS

- The **File Management Screens** have useful tools to:
- Copy files from the system to a USB memory stick
 - Copy files from a USB memory stick to the system



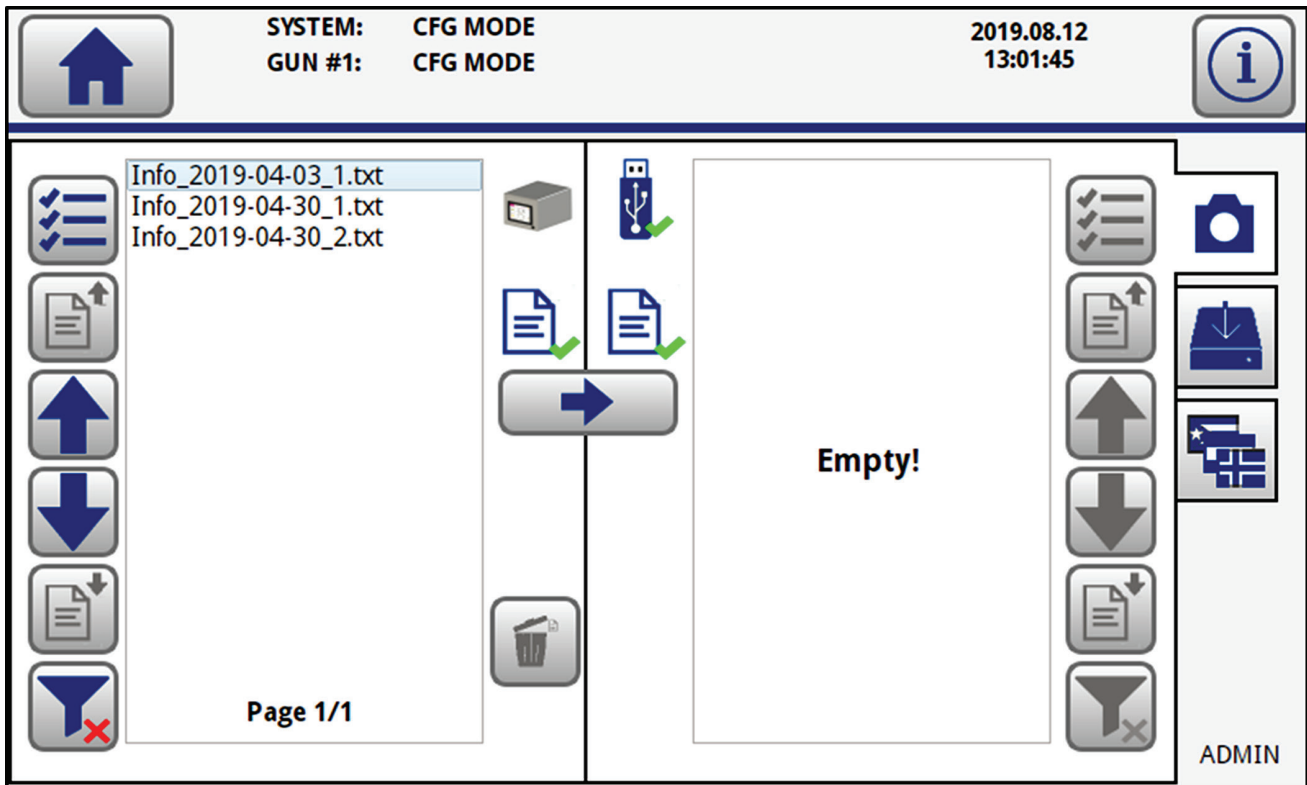
Tab Selections For Data Files Types	
	Snapshot Transfer Screen – Allows transfer for snapshots taken from various screens.
	Software Update Screen – Update the software on the display or control processors via USB.
	Language Transfer Screen – Allows transfer of language files from a USB onto the RVC and manage currently installed files.

Screen Features	
List of system files (on left) 	System Side – Displays a list of files on the system available for selection for copying to the USB or deleting. Touching a filename will select it.
List of USB memory files (on right) 	USB Side – Displays a list of files on the USB memory stick available for selection for copying to the system. Touching a filename will select it.
	USB Status Icon – A green icon with a checkmark indicates a USB memory stick is detected. A red icon with an “X” indicates no USB is detected.

Command Buttons	
	Select All button – Selects all files in corresponding list.
	List Navigation buttons – Pressing these buttons will move the file selection highlight up and down the list. The single arrows will move the file selection highlight by one. The double arrow will move the selection highlight by a large amount.
	Remove File Filter and Add File Filter buttons – Filters can be applied to reduce the number of files displayed for selection. The green checkmark indicates that file selection filters are currently applied. The red X indicates that no file selection filters are currently applied and all of the available files are displayed in the list. Pressing either button will go to a sub-menu to select how the files should be filtered. Two methods currently exist: filter by type of file and filter by date of file.
	Copy buttons – Press one of these buttons to copy selected files in the direction indicated by the arrow. If the button is gray rather than black, it indicates that the button is currently disabled. Example - if the USB is not present or no file has been selected, the copy arrow will be disabled.
	Delete Selected button - Deletes selected data files. This option will only be available for the system files (not USB files). The user will be prompted a confirmation for deletion.

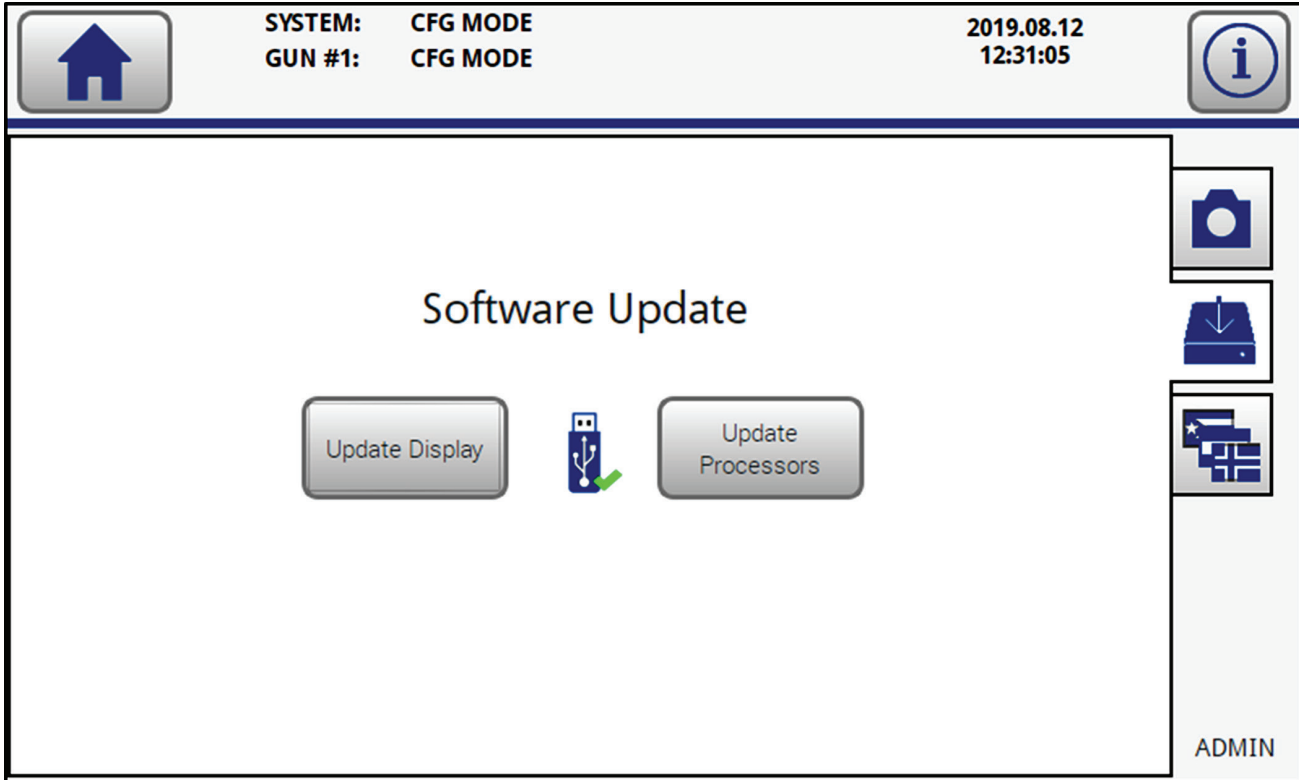
SNAPSHOT TRANSFER SCREEN

On the **Snapshot Screen**, snapshots taken on the RVC can be transferred to a USB. Snapshots are a list of statistics from the moment when the snapshot was taken. The name of the snapshot indicates what type of snapshot it is and when the snapshot was taken. The left side of the screen displays the snapshots detected on the RVC, while the right side displays the snapshots detected on the USB. The snapshots are stored in the folder \\RVC\[RVC_SERIAL_NUMBER]\Snapshots on the USB and can be opened with any simple text editor.



SOFTWARE UPDATE SCREEN

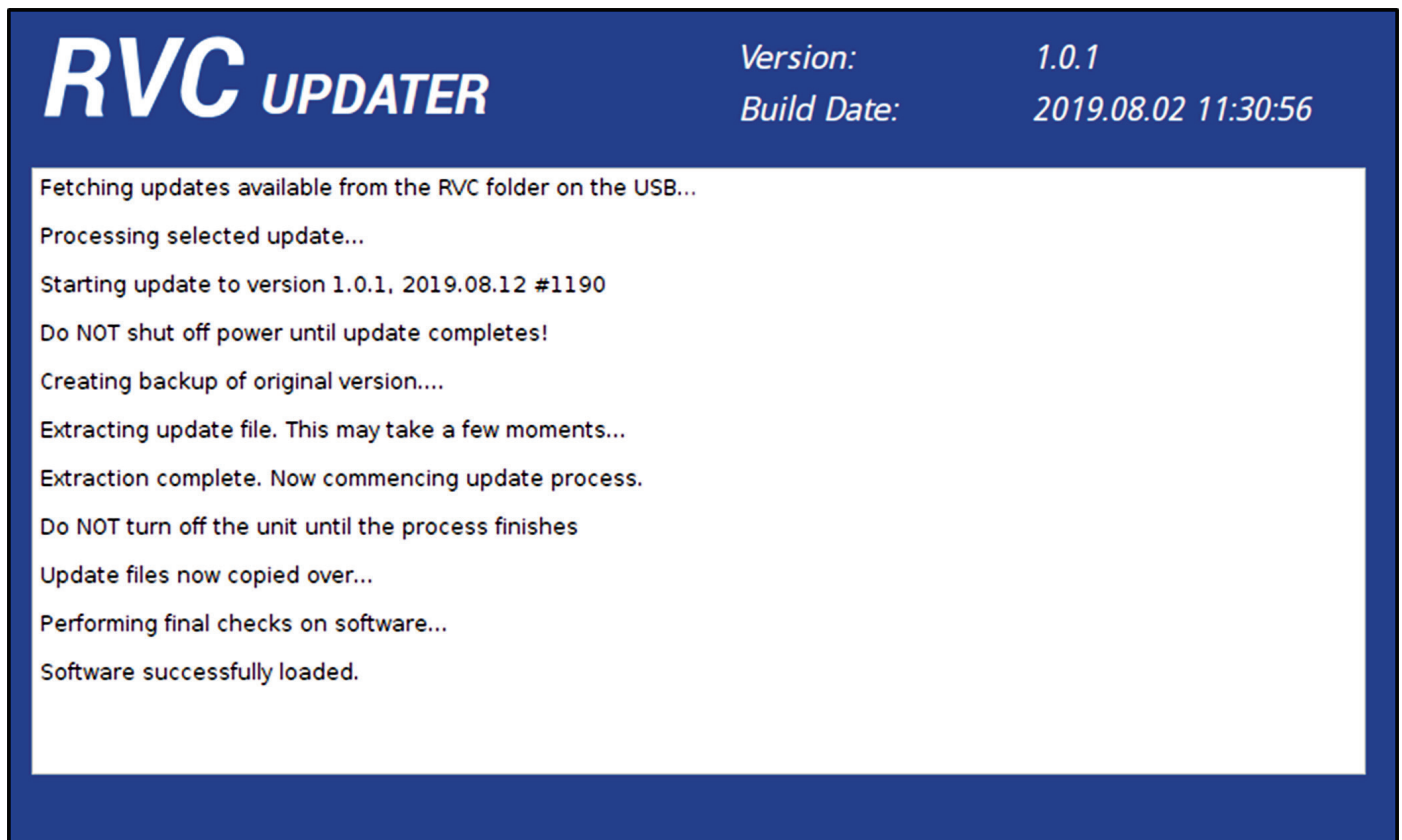
The software of the display and the controller processors may be updated on the Software Update Screen, also simply referred to as the Update Screen. Both buttons will launch a separate program titled the RVC Updater. Multiple types of software can be updated using this software.



RVC UPDATER SOFTWARE

The RVC Updater software can update three main pieces of software: the touchscreen software, the RVC Updater itself and the RAC processors. The first two pieces of software have rollback safety in case the update did not complete successfully. For example, if a corrupted update file is provided, the updater would rollback to the previous update file.

The target update file must be placed on a USB in a top-level directory titled “RVC” prior to starting the updater. The updater will display a list of update files the system found on the USB. The user can select one of these files or cancel the process. The rest of the update process is automated. The user should pay attention to the messages that pop-up. The user will be prompted to reboot or shutdown the machine after the update process has completed (see “Updating the RVC Software” in Appendix C section).



RVC UPDATER *Version: 1.0.1*
Build Date: 2019.08.02 11:30:56

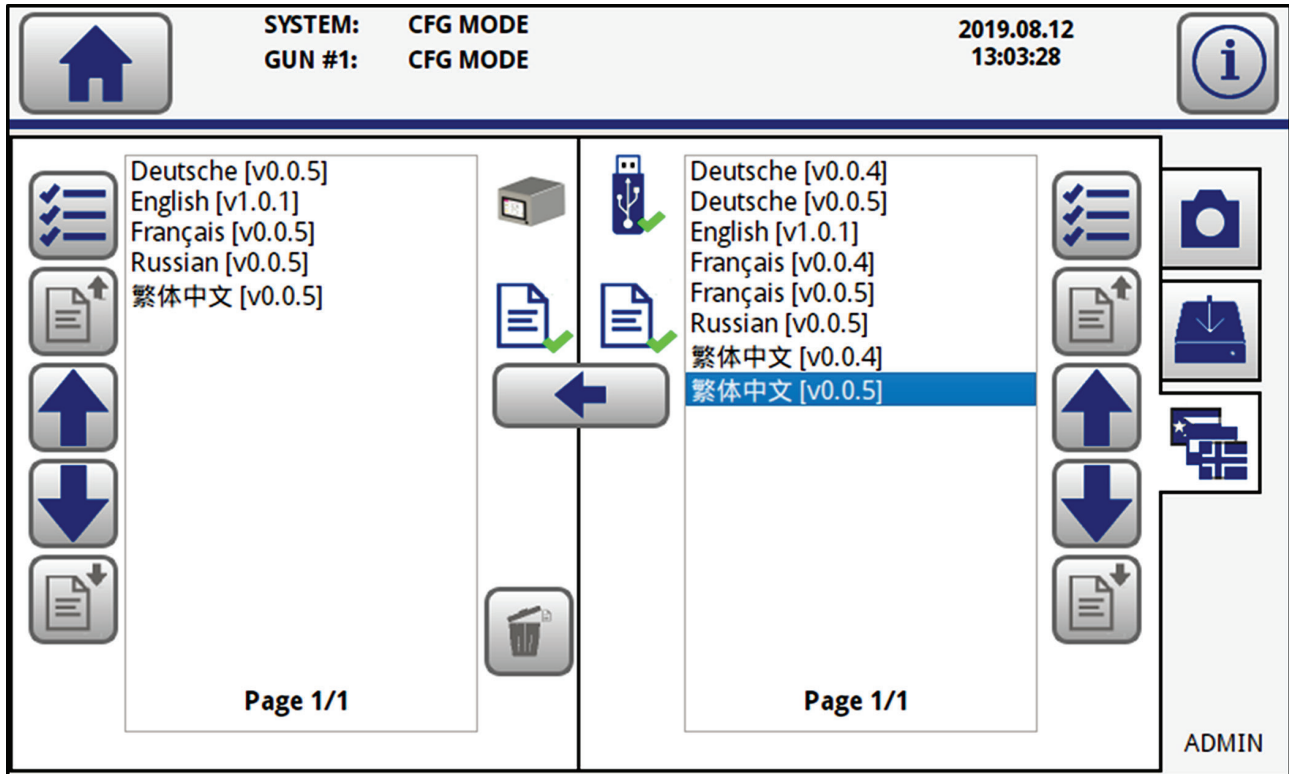
Fetching updates available from the RVC folder on the USB...
Processing selected update...
Starting update to version 1.0.1, 2019.08.12 #1190
Do NOT shut off power until update completes!
Creating backup of original version....
Extracting update file. This may take a few moments...
Extraction complete. Now commencing update process.
Do NOT turn off the unit until the process finishes
Update files now copied over...
Performing final checks on software...
Software successfully loaded.

WARNING

- Once the user decides to start the update process, the update should NOT be interrupted. The USB should not be removed and the power should not be shut off during the update process. If the process is interrupted, it may corrupt the software files.

LANGUAGE TRANSFER SCREEN

The RVC supports the ability to add new or updated language files. This screen follows the same conventions as the snapshot transfer screen. Once the language file is installed, it can be selected on the Set Language Screen in Settings (see “RVC Installing New Language” in Appendix C section).

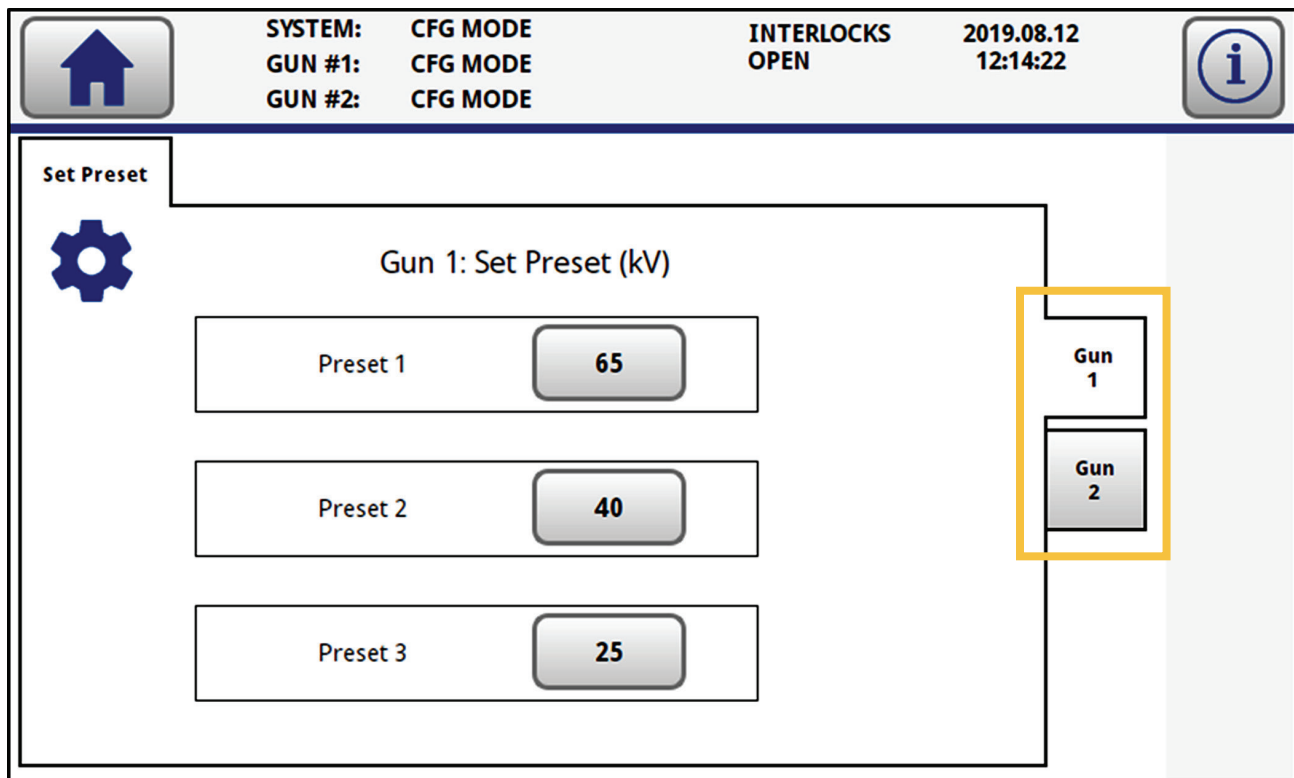


INTRODUCTION TO TWO-GUN FEATURES

This section focuses on features and functionality available exclusively to a two-gun system.

For the user's convenience, gun 2 will mirror gun 1 in terms of functionality. Each gun can have its own distinct configuration, but they all share the same conventions for configuring and utilizing a gun.

An example below of the Preset Adjustment Screen demonstrates this mirrored functionality. The functionality for modifying preset values is identical for each gun. The only difference is the addition of a Gun 2 tab, allowing the user to select which gun to adjust the preset value for.



STANDARD USER – TWO-GUN EXCLUSIVE FEATURES

This section discusses features exclusive for Standard Users utilizing a two-gun system. Please read the section Operations – Screens for Standard User in its entirety before proceeding.

HOME SCREEN

The Home Screen displays essential runtime information for each gun. This screen acts similarly to the one-gun version, along with a few additional options and features for gun 2 that are detailed in this section.

An Administrator has the ability to toggle between these new features. This is detailed more in the next section.

GUN 2 – INDEPENDENT

While independent, gun 2 has its own configuration that is distinct from the gun 1 configuration. As shown in the image below, each gun can have a different KV setpoint and preset selected.

System-wide signals still affect both guns, such as the reset signal.

The screenshot displays the CFT control interface. At the top left is the CFT logo. The top status bar shows: SYSTEM: RUNNING, GUN #1: TRIGGERED, GUN #2: READY FOR TRIGGER, and the date/time 2019.08.12 11:42:56. An information icon (i) is in the top right. The main area is divided into two sections for GUN 1 and GUN 2. Each section has an HV icon, a Status icon, and three data fields: kV, μA , and Setpoint. GUN 1 shows a lightning bolt HV icon, a play button Status icon, 65 kV, 3 μA , and Setpoint 1. GUN 2 shows a lightning bolt HV icon, a stop button Status icon, 15 kV, 0 μA , and Setpoint 2. On the right side, there are icons for a wrench and a bar chart. At the bottom right, it says Gun ID: Ransflex Automatic.

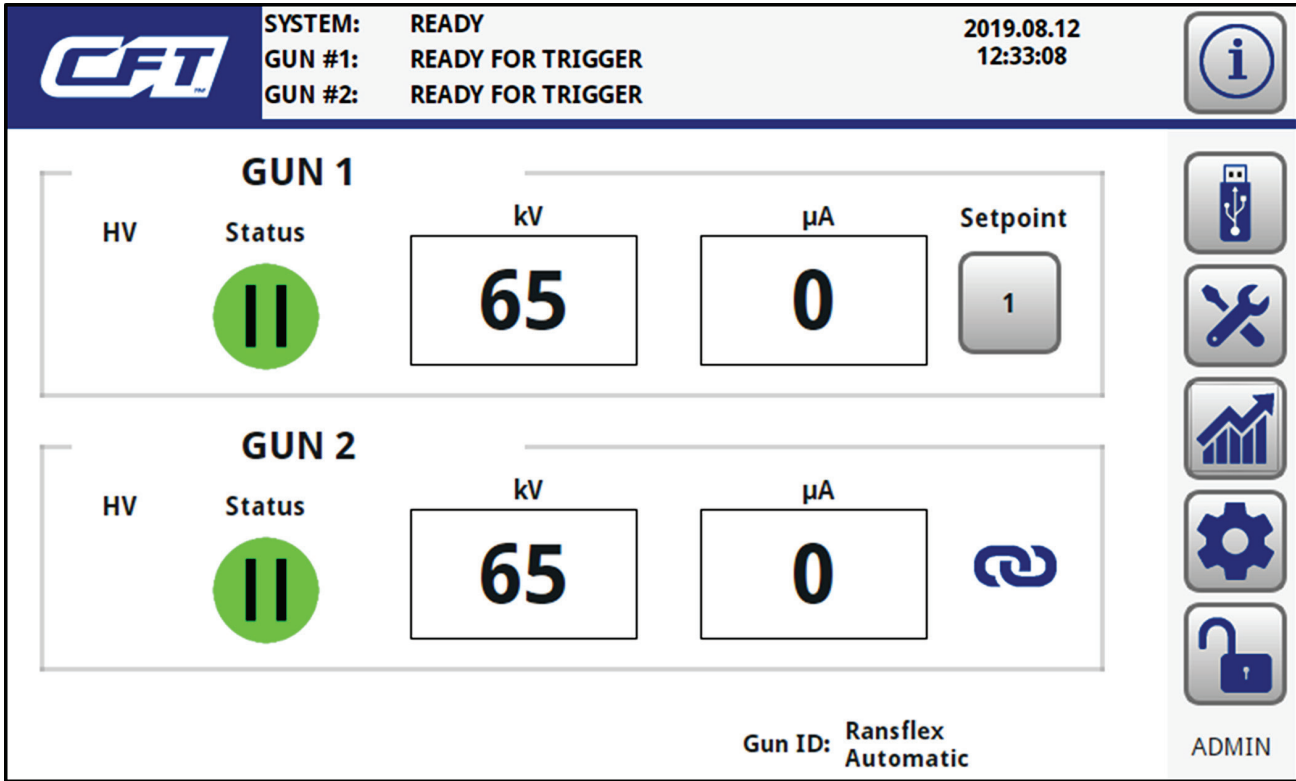
Gun	System	Gun #1	Gun #2	Date/Time
Standard User	RUNNING	TRIGGERED	READY FOR TRIGGER	2019.08.12 11:42:56

Gun	Gun ID	HV	Status	kV	μA	Setpoint
1	Ransflex Automatic	⚡	▶	65	3	1
2	Ransflex Automatic	⚡	⏸	15	0	2

GUN 2 – LINKED

While linked, gun 2 is solely controlled by gun 1. Gun 2 will attempt to replicate all of gun 1’s actions. Gun 2 will also copy gun 1’s entire configuration.

Since gun 2 mimics gun 1 while linked, it is not possible to modify any of the gun 2 configuration values. Gun 2 tabs will generally not be visible on other screens.



Status Indicator



Linked – The system displays this symbol if gun 2 is presently linked to gun 1. Gun 2 is configured identically to gun 1 while this symbol is active.

GUN DISABLED

In certain cases, it may be useful to utilize only one of the guns. In this case, it is possible to disable one of the guns. The unit will now function similarly to a one-gun unit.

The screenshot displays the CFT control interface for a two-gun system. At the top left is the CFT logo. The top status bar shows: SYSTEM: READY, GUN #1: READY FOR TRIGGER, GUN #2: DISABLED, and the date/time: 2019.08.12 12:33:26. An information icon (i) is in the top right. The main area is divided into two sections: GUN 1 and GUN 2 DISABLED. GUN 1 shows HV Status as a green circle with two vertical bars, kV as 65, μ A as 0, and a Setpoint of 1. GUN 2 DISABLED shows HV Status as a red circle with a black square, and both kV and μ A as dashes. A vertical toolbar on the right contains icons for USB, tools, graph, settings, and a lock. At the bottom right, it says 'Gun ID: Ransflex Automatic' and 'ADMIN'.

System Status	Gun #1 Status	Gun #2 Status	Date/Time
READY	READY FOR TRIGGER	DISABLED	2019.08.12 12:33:26

Gun	HV Status	kV	μ A	Setpoint
GUN 1	II (Green)	65	0	1
GUN 2	■ (Red)	---	---	-

Gun ID: Ransflex Automatic
ADMIN

ADMINISTRATOR – TWO-GUN EXCLUSIVE FEATURES

This section discusses features exclusive for an Admin utilizing a two-gun system. For non-exclusive Admin features, please see the section Operations – Screens for Admins.

SETTINGS SCREEN

ADMINISTRATOR CONFIGURATION

The Administrator Configuration screen is only visible for the Admin of two-gun systems. On this tab, the Admin has the ability to alter Admin-only configuration options for the system. Admins have the ability to disable either one of the guns or link gun 2 to gun 1.

The screenshot shows the Administrator Configuration screen. At the top, there is a header bar with a home icon, system status (SYSTEM: CFG MODE, GUN #1: CFG MODE, GUN #2: CFG MODE), date and time (2019.08.12 12:33:46), and an information icon. Below the header is a navigation menu with tabs: Set Preset, Gun Parameters, Time / Date, Signal Interface, Language, and Admin Config. The Admin Config tab is selected. The main content area is titled "Administrator Configuration" and contains three rows of configuration options:

Option	Current Status	Action
Gun 1 Enabled	Green checkmark	Blue X
Gun 2 Enabled	Green checkmark	Blue X
Gun 2 Linked	Blue checkmark	Red X

At the bottom right of the screen, the user role "ADMIN" is displayed.

STATUS MESSAGES

This section contains descriptions of the different status messages that a user may encounter at runtime. These messages are divided into two groups, System Status Messages and Gun Status Messages.

SYSTEM STATUS MESSAGES

System Status Messages reflect the present status of the overall RVC system. These messages can be located on the Status Bar.

	SYSTEM: READY	2019.08.12 12:37:25	
	GUN #1: READY FOR TRIGGER		

Status	Description
Ready	Everything is functioning as normal and the system is ready to operate. The system may run at any moment.
Safe	The system is in a safe state. This may be caused by an open interlock or an active reset signal. The system cannot operate or run while in this state. Please see the Troubleshooting section for more information.
Faulted	A fault has been detected and operation has been halted. More information can be found in the 'Faults' section of the Help Screen. Troubleshooting and reset information can be found in the Troubleshooting section.
Running	System is presently running and the guns are active. High voltage is on and caution should be used.
Failure	System is in a state of failure due to a no-reset fault. The fault must be resolved and the RVC must be rebooted in order to remove the failure state.
Config	The system is now allowing modifications to its configuration. Gun inputs will be ignored and the gun cannot be successfully triggered while in this state.

GUN STATUS MESSAGES

Gun Status Messages reflect the present status of the gun. These messages can be located on the Status Bar.

	SYSTEM: READY	2019.08.12 12:37:25	
	GUN #1: READY FOR TRIGGER		

Status	Description
Ready For Trigger	Everything is functioning normal and the gun is ready to be used.
Triggered	The gun is presently being triggered.
Halted	The gun is presently halted. This may be due to a fault, an interlock being open or an active reset signal. The gun cannot be triggered successfully until this is resolved.
Disabled	The gun is presently disabled. It cannot be triggered until it is enabled.

TROUBLESHOOTING

This section contains descriptions of the various faults a user may encounter at runtime. Also in this section is a guide to resetting faults.

WARNING

- Before troubleshooting gun and control unit problems, flush the gun with solvent and purge with air. Some of the tests will require high voltage to be applied to the gun, so the gun must be empty of paint and solvent.

RESETTING FAULTS

The Reset command for the system can be configured to originate either from a Wired Input or from the Display.

When configured for Wired Input, the Reset command will directly follow the state of the Reset signal on the System Inputs connector.

When configured for Display, follow these steps to reset the system:

Step 1 Navigate to the Help Screen via the button on the upper right-hand corner.

Step 2 Press the 'Reset Faults Button'.


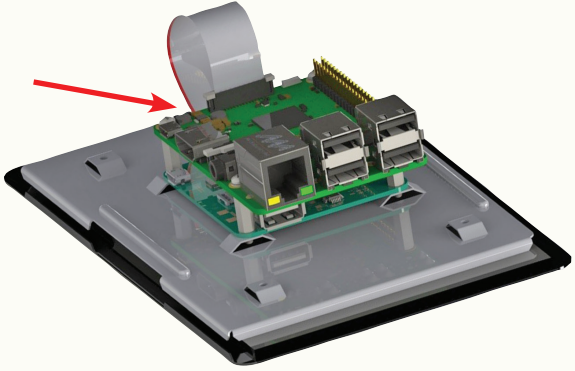


This will reset a fault or overload condition that has occurred. It will **NOT** prevent any other existing fault conditions from re-faulting the system immediately after resetting. Please refer to the list of fault conditions in this section for troubleshooting information.

The screenshot displays a control panel interface. At the top, there is a status bar with the following information: SYSTEM: SAFE, GUN #1: HALTED, INTERLOCKS OPEN, and the date/time 2019.08.12 12:53:57. On the left, there is a home button (house icon). On the right, there is an information button (i icon). Below the status bar, there are two tabs: 'Events' and 'Info'. The 'Events' tab is active, showing a list of system events. A 'Reset Faults' button (circular arrow icon) is located on the right side of the event log area.

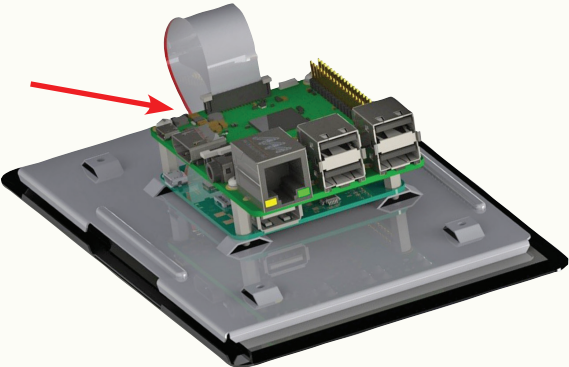
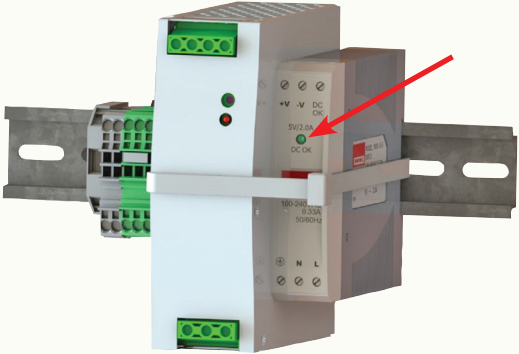
Event
2019.07.15 13:18:19 - Power On (EXT)
2019.07.15 13:18:19 - Power On (RT)
2019.07.15 13:11:59 - Reset
2019.07.15 13:11:58 - Trigger Fault - Gun 1
2019.07.15 13:11:58 - Reset
2019.07.15 13:11:58 - Feedback Fault
2019.07.15 13:11:55 - Reset
2019.07.15 13:11:52 - Feedback Fault
2019.07.15 13:11:49 - Reset
2019.07.15 13:11:34 - Feedback Fault
2019.07.15 13:11:07 - Power On (EXT)
2019.07.15 13:11:07 - Power On (RT)
2019.07.15 12:59:58 - Power On (EXT)
2019.07.15 12:59:58 - Power On (RT)
2019.07.15 12:58:16 - Power On (EXT)
2019.07.15 12:58:16 - Power On (RT)

GENERAL TROUBLESHOOTING

General Problem	Possible Cause	Solution
<p>Blank Display</p>	<p>No Power</p>	<p>Check the power connections and verify they are fully connected and power is available.</p> <p>Power cycle the unit off and back on.</p>
	<p>Blown Fuse</p>	<p>Power off unit.</p> <p>Disconnect the power cord.</p> <p>While unit is powered off, remove fuses from the power supply on the back of the unit. If they are blown, replace the 2-amp fuses.</p> 
	<p>Power connection to display (inside the RVC box)</p>	<p>Power off unit.</p> <p>Disconnect the power cord.</p> <p>Remove bottom access plate.</p> <p>Visually inspect the display power connection and confirm the connection. There should be a red LED on once the unit is powered on.</p> 

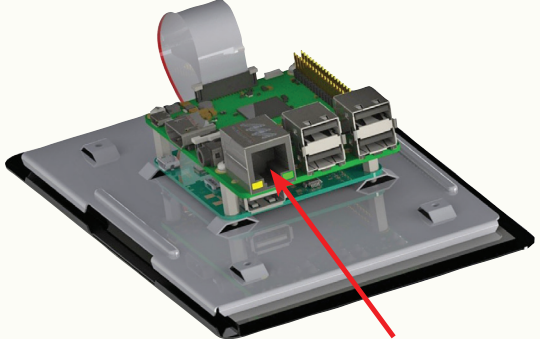
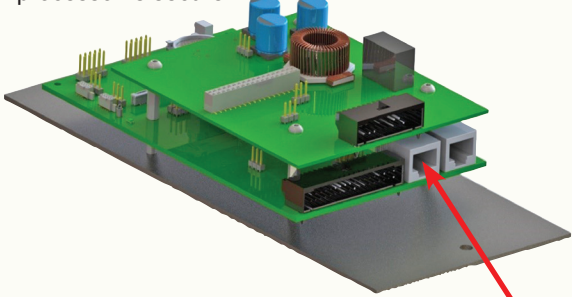
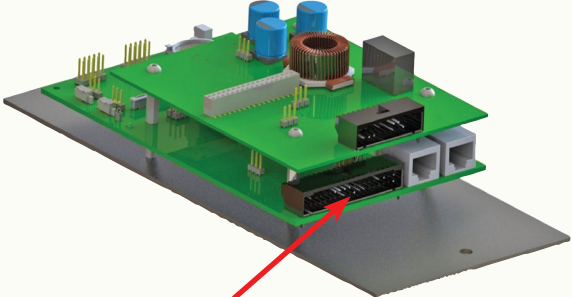
(Continued On Next Page)

 **GENERAL TROUBLESHOOTING (Cont.)**

General Problem	Possible Cause	Solution
<p>Blank Display (Cont.)</p>	<p>Corrupted SD card in display</p>	<p>Power off unit.</p> <p>Disconnect the power cord</p> <p>Remove bottom access plate</p> <p>Visually inspect the display power connection LED's. In normal operating conditions, the red LED should be on and the green LED should blink at least once every minute or so. If not, power cycle the unit and repeat this step up to three times.</p> <p>The SD card may be corrupted. Note how frequently the green LED blinks at boot up and contact customer support.</p> 
	<p>Faulty +5 Volt Power Supply (inside the RVC box)</p>	<p>Power off unit.</p> <p>Disconnect the power cord.</p> <p>Remove bottom access plate.</p> <p>Re-connect power cord and turn unit on.</p> <p>Confirm green LED on 5-volt power supply is on. If not, replace the power supply.</p> 

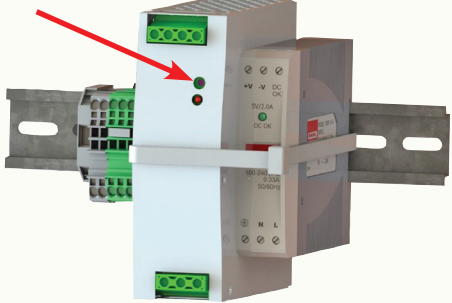
(Continued On Next Page)

 **GENERAL TROUBLESHOOTING (Cont.)**

General Problem	Possible Cause	Solution
<p>Connection Unsuccessful</p>	<p>Loose Ethernet Cable on display processor (inside the RVC)</p>	<p>Power off unit. Disconnect the power cord Remove bottom access plate Check Ethernet connection to the display processor is secure on both ends</p> 
	<p>Loose Ethernet Cable on RAC processor board (inside the RVC)</p>	<p>Power off unit. Disconnect the power cord Remove bottom access plate Check Ethernet connection to the control processor is secure.</p> 
	<p>RAC Processor cable disconnected (inside the RVC)</p>	<p>Power off unit. Disconnect the power cord Remove bottom access plate Check RAC board connector is secure</p> 

(Continued On Next Page)

GENERAL TROUBLESHOOTING (Cont.)

General Problem	Possible Cause	Solution
Connection Unsuccessful (Cont.)	Faulty +24 Volt Power Supply (inside the RVC box)	<p>Power off unit.</p> <p>Disconnect the power cord</p> <p>Remove bottom access plate</p> <p>Re-connect power cord and turn unit on.</p> <p>Confirm green LED on 24-volt power supply is on. If not, replace the power supply.</p> 
	Ethernet issue with the display or processor.	Restart RVC. If issue continues to persist over multiple reboots, either send the RVC in for repair or contact technical support.

FAILURE TROUBLESHOOTING

General Problem	Possible Cause	Solution
Software Mismatch Fault	The Software Mismatch Fault indicates that the software version on the processors does not match. It is highly unlikely this fault will ever be observed.	<p>Ensure that the software on all processors matches (Software information is located in the Info tab in the Help Screen).</p> <p>If problem persists, send in the controller for repair.</p>
System Mode Fault	The System Mode Fault indicates that the system software has encountered an invalid internal operating state. It is highly unlikely this fault will ever be observed.	<p>Power cycle the unit.</p> <p>If problem persists, send high voltage controller in for repair.</p>
RAC-HAT Interface Error	RAC-HAT Interface Error indicates that the RAC board was unable to detect a HAT board.	<p>Turn off the unit.</p> <p>Ensure the HAT is properly mounted on top of the RAC board.</p> <p>If problem persists, send in the controller for repair.</p>
24V Sense Power Fault	24V Sense Power Supply indicates that it has been detected that the power supply is providing an inadequate amount of power.	Send in the controller for repair
Configuration Fault	Configuration Fault indicates there are files that are either missing or not loading correctly.	<p>Power cycle the unit.</p> <p>If problem persists, send high voltage controller in for repair</p>



SYSTEM FAULT TROUBLESHOOTING

The following fault effects the entire system.

General Problem	Possible Cause	Solution
Interlock Fault (Door)	The "Door" Interlock was opened while the system was running.	Close interlock. Ensure trigger is not active Reset the fault.
Interlock Fault (Air)	The "Air" Interlock was opened while the system was running.	Close interlock. Ensure trigger is not active. Reset the fault.
Interlock Fault (Misc.)	The "Misc" Interlock was opened while the system was running.	Close interlock. Ensure trigger is not active Reset the fault.
Interlock Fault (Solvent)	The "Solvent" Interlock was opened while the system was running.	Close interlock. Ensure trigger is not active Reset the fault.



GUN FAULT TROUBLESHOOTING

The following faults relate to specifically a particular gun. The fault message will indicate which gun was the source of the fault.

General Problem	Possible Cause	Solution
Feedback Fault	<p>This fault indicates there is no current feedback or it is incorrect.</p> <p>The system must be running for this fault to be detected.</p> <p>Under normal running conditions, the system will see more than 4 μA feedback. If the system sees less than 4 μA of feedback, it will cause this fault.</p> <p>This fault detection CANNOT be disabled.</p>	<ul style="list-style-type: none"> • Confirm the system is set to run above 10KV with normal loading conditions resulting in μA readings above 4 μA. • Confirm the voltage cable is properly connected at both ends. • Make sure gun is clean and clear of any grounded object • Perform Power Cable Continuity check. If continuity test fails, replace cable. • If problem persists, send gun and high voltage controller in for repair.
Trigger Fault	<p>This fault indicates that an active trigger signal was detected when the system was resetting faults, starting up or in a not ready state.</p> <p>This fault detection CANNOT be disabled.</p>	<ul style="list-style-type: none"> • Ensure trigger is not active. • Reset the fault.

(Continued On Next Page)



GUN FAULT TROUBLESHOOTING (Cont.)

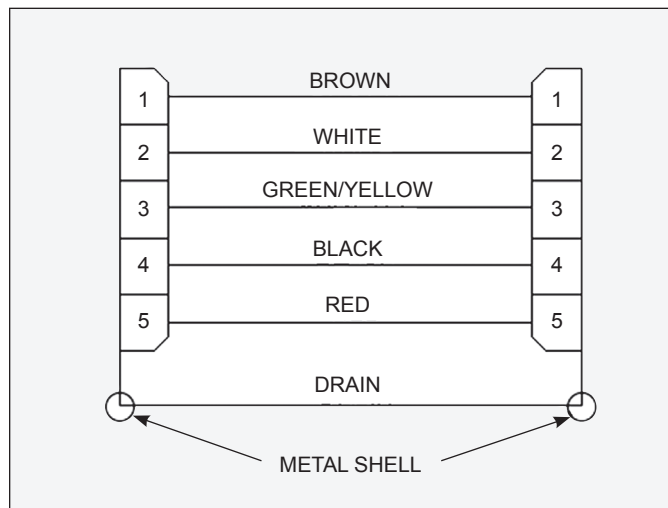
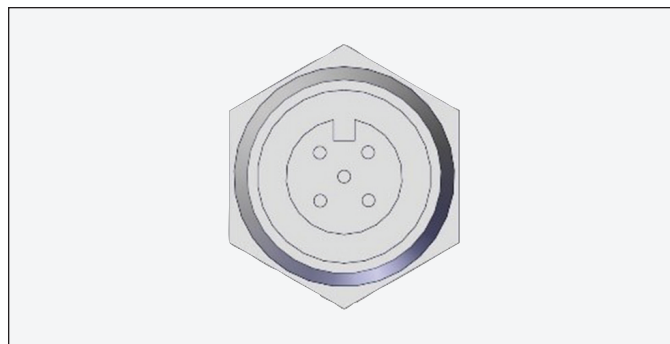
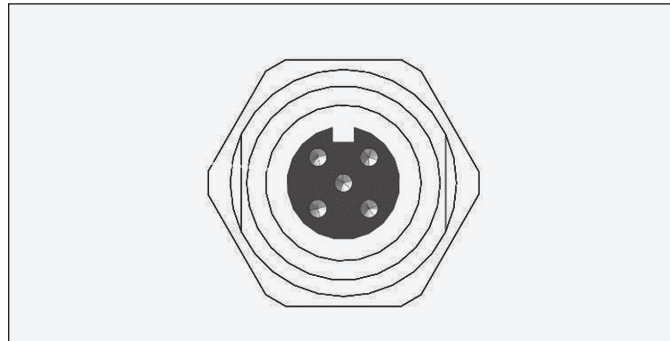
The following faults relate to specifically a particular gun. The fault message will indicate which gun was the source of the fault.

General Problem	Possible Cause	Solution
<i>μA Fault - Factory</i>	<p>This fault indicates the current output of the gun has exceeded the factory maximum allowable output current. It can only occur with the high voltage on.</p> <p>This fault detection CANNOT be disabled.</p> <p>Due to the safety limiting control algorithm, it is highly unlikely this fault will ever be observed.</p>	<ul style="list-style-type: none"> • Check cable connections. • Make sure gun is clean and clear of any grounded object. • Perform Power Cable Continuity check. If continuity test fails, replace cable. • If problem persists, send gun and high voltage controller in for repair.
<i>μA Fault - User</i>	<p>This fault indicates the current output has exceeded the user μA limit.</p> <p>An Admin user can disable detecting this fault. An Admin user can modify the limit value.</p> <p>If the limit has been set properly for the process (not too low), this fault indicates that something in the process has changed.</p>	<ul style="list-style-type: none"> • Try increasing limit value or increasing distance from part being painted. • Check cable connections. • Make sure gun is clean and clear of any grounded object. • Perform Power Cable Continuity check. If continuity test fails, replace cable. • If problem persists, send gun and high voltage controller in for repair.
<i>Voltage Cable Fault</i>	<p>This fault indicates the cascade drive signal is not present. It typically occurs when high voltage is triggered.</p> <p>This fault detection CANNOT be disabled.</p>	<ul style="list-style-type: none"> • Check cable connections. • Make sure gun is clean and clear of any grounded object. • Perform Power Cable Continuity check. If continuity test fails, replace cable. • If problem persists, send gun and high voltage controller in for repair.

LOW VOLTAGE CABLE CONTINUITY CHECK

If the applicator low voltage cable has been damaged, it will not work correctly. The following steps can be used to ensure the cable is still functional.

1. Power down the system
2. Disconnect the cable from the RVC and the gun.
3. Use an ohmmeter to confirm each pin connects to the corresponding pin at the other end and NOT any other pin.



PARTS IDENTIFICATION

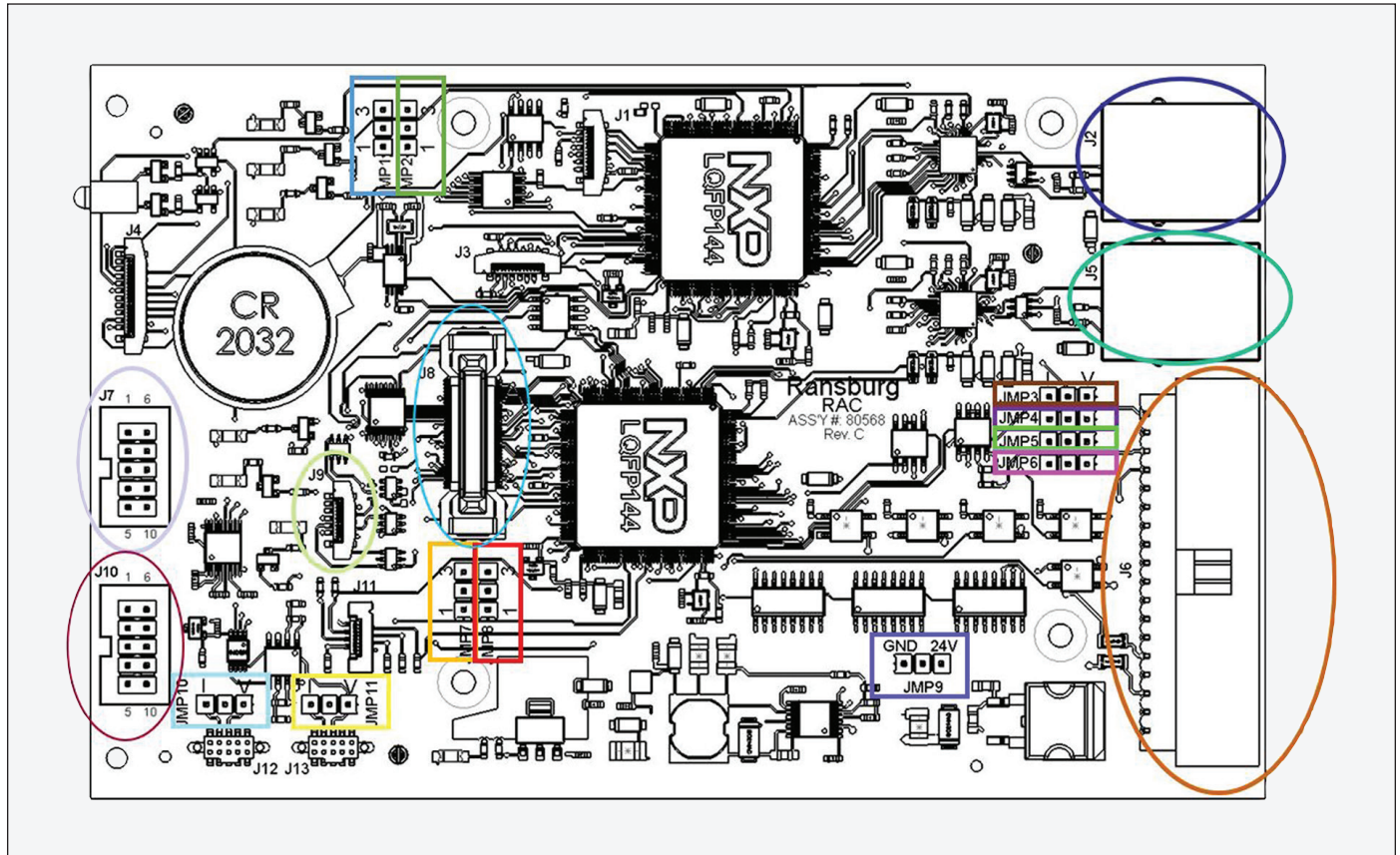
SPARE PARTS		
Part #	Description	Image
80970-XXXX	Mainboard, Ransburg Advanced Controller (RAC) NOTE: When requesting parts, please provide relevant specifications about your system; Applicator, Software Revision	
80971-XX	Controller Board, Cascade Driver – HAT NOTE: When requesting parts, please provide relevant specifications about your system; Applicator	
80829-00	Raspberry Pi Board	
80972-XXXX	Micro SD Card NOTE: When requesting parts, please provide relevant specifications about your system; Software Revision	
72771-09	Fuses (250V, 2A, 5mm x 20mm)	
80792-00	Power Supply, 5V	
80835-00	Power Supply, 24V	

ACCESSORIES

ACCESSORIES	
Part #	Description
A13248-00	4-20mA CONVERTER
80948-03	GUN I/O CABLE, 3M
80948-15	GUN I/O CABLE, 15M
80946-03	SYSTEM INPUT CABLE, 3M
80946-15	SYSTEM INPUT CABLE, 15M
80947-03	SYSTEM OUTPUT CABLE, 3M
80947-15	SYSTEM OUTPUT CABLE, 15M
80951-03	SINGLE GUN JUNCTION BOX, RVC, 3M CABLE
80951-15	SINGLE GUN JUNCTION BOX, RVC, 15M CABLE
80951-03	DUAL GUN JUNCTION BOX, RVC, 3M CABLE
80951-15	DUAL GUN JUNCTION BOX, RVC, 15M CABLE

APPENDIX A – RAC CARD JUMPER SETTINGS

This section discusses the jumpers on the RAC board. Following is a picture of the RAC card and the location of the jumpers and connectors.







RAC CARD JUMPERS

Under normal operating conditions, there will be one or more boards mounted on top of the RAC card, which will make many of these jumpers inaccessible. To change these jumpers, perform these steps:


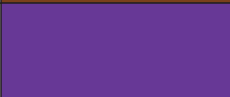


1. Power down the system and disconnect the power cord
2. Remove the bottom access cover
3. One by one, disconnect and remove all boards mounted on top of the RAC card
4. Change the jumper(s) as needed
5. Remount, reconnect and mechanically refasten the removed boards back on top of the RAC card
6. Replace bottom access cover
7. Reconnect power cord and turn on the system

In the following tables, the function of each jumper, in each position, is discussed. Each jumper can be identified in the image by a colored rectangular outline.

Note: in all following tables, '(*)' Indicates the factory default setting.

PROCESSOR WATCHDOG ENABLES				
Jumper	Color Identifier		1:2 Position	2:3 Position
JMP1		RT-Watchdog & Factory Config Mode in pair with JMP8	1:2 = Disable Watchdog & Enter Factory Config Mode.	2:3 = Watchdog Enable (*)
JMP8		RT-Watchdog & Factory Config Mode in pair with JMP1	Watchdog & Factory Config Mode in pair with JMP1	2:3 = Watchdog Enable (*)
JMP2		EXT-Watchdog & Factory Config Mode in pair with JMP7	1:2 = Disable Watchdog & Enter Factory Config Mode.	2:3 = Watchdog Enable (*)
JMP7		EXT-Watchdog & Factory Config Mode in pair with JMP2	Watchdog & Factory Config Mode in pair with JMP2	2:3 = Watchdog Enable (*)

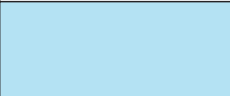
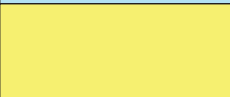
These jumpers select the analog input types.

ANALOG INPUTS - INPUT TYPE			
Jumper	Color Identifier	'V' Position	'I' Position
JMP3 – Gun 1 – KV Setpoint		0-10V LOW (*)	4-20mA HIGH
JMP4 – Gun 1 – AIN Spare		0-10V LOW (*)	4-20mA HIGH
JMP5 – Gun 2 – KV Setpoint		0-10V LOW (*)	4-20mA HIGH
JMP6 – Gun 2 – AIN Spare		0-10V LOW (*)	4-20mA HIGH

These jumpers select Analog output types for the outputs indicating Current Feedback levels for Gun1 and Gun2.

NOTE

- Must use 4-20mA Converter Board A13248-00 when using analog inputs in 'I' position.

ANALOG OUTPUTS - OUTPUT TYPE			
Jumper	Color Identifier	'V' Position	'I' Position
JMP10 – Gun 2		0-10V (*)	4-20mA
JMP11 – Gun 1		0-10V (*)	4-20mA

DISCRETE INPUTS - POLARITY OF INPUT SIGNALS

Jumper	Color Identifier	'GND' Postion	'24V' Postion
JMP9		Inputs are Sinking. Provide 24VDC signal to make input active HIGH TO TRIGGER (*)	Inputs are Sourcing. Provide Ground signal to make input active. LOW TO TRIGGER

This jumper applies to ALL of the following signals:

System Digital Input Signals:

- Interlock – Door
- Interlock – Air
- Interlock – Misc.
- Interlock – Solvent
- Spare Signal Input
- Reset

Gun 1 and Gun 2 signals:

- Triple Setpoint 1
- Triple Setpoint 2
- Cycle Indicator

RAC CARD CONNECTORS

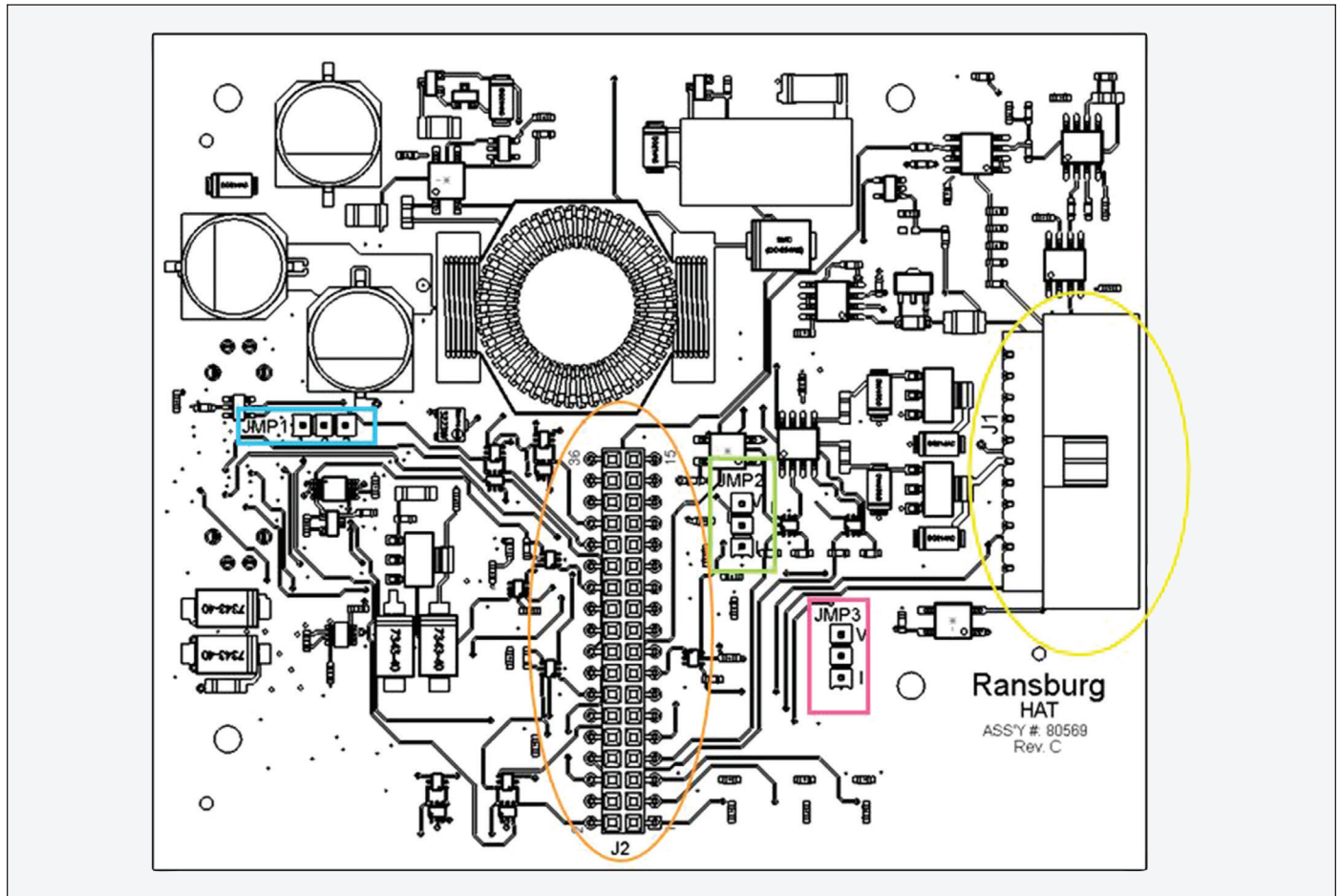
The following table provides a description for each connector located on the RAC board. Each jumper can identified in the image by a colored oval outline.

RAC CARD CONNECTORS

Connector	Color Identifier	Description
J2		Ethernet port for the EXT processor
J5		Ethernet port for the RT processor
J6		I/O Connector
J7		Serial port for the RT processor
J8		Connector for HAT
J10		Serial port for the EXT processor

APPENDIX B – RVC HAT (80569) CARD

This section discusses the jumpers on the HAT board. Following is a picture of the HAT card and the location of the jumpers and connectors.



Under normal operating conditions, there may be one or more boards mounted on top of the HAT card, which may make these jumpers or connectors inaccessible. To change these jumpers, perform these steps:

1. Power down the system and disconnect the power cord.
2. Remove the bottom access cover.
3. One by one, disconnect and remove any boards mounted on top of the HAT card.
4. Change the jumper(s) as needed.
5. Remount, reconnect and mechanically refasten any removed boards back on top of the HAT card.
6. Replace bottom access cover.
7. Reconnect power cord and turn on the system.

HAT CARD JUMPER SETTINGS

In the following tables, the function of each jumper, in each position, is discussed. Note: in all following tables, '(*)' Indicates the factory default setting. Each jumper can identified in the image by a colored rectangular outline

MODE JUMPER			
Jumper	Color Identifier	1:2 Postion	2:3 Postion
JMP1		Normal Operation (*)	Setup Mode

TRIGGER INPUTS POLARITY			
Jumper	Color Identifier	1:2 Postion	2:3 Postion
JMP2 – Internal Trigger Input Polarity		Input is Sinking. Provide 24VDC signal to make input active HIGH TO TRIGGER (*)	Input is Sourcing. Provide Ground signal to make input active. LOW TO TRIGGER
JMP3 – External Trigger Input Polarity		Input is Sinking. Provide 24VDC signal to make input active HIGH TO TRIGGER (*)	Input is Sourcing. Provide Ground signal to make input active. LOW TO TRIGGER

HAT CARD CONNECTOR

The following table provides a description for each connector located on the RAC board. Each jumper can identified in the image by a colored oval outline

HAT CARD CONNECTOR		
Connector	Color Identifier	Description
J1		I/O Connector
J2		Connector for another HAT

APPENDIX C – SERVICE INSTRUCTION

Ransburg

SERVICE INSTRUCTION

Ransburg Voltage Controller (RVC) Installing a New Language

The Ransburg Voltage Controller (RVC) has the ability to install and dynamically load multiple languages. In order to install a new language, a USB with the necessary files must be inserted. This Service Instruction will cover the process for installing and loading a new language.

Preparation

Requirements:

- USB Flash Drive
- Language File(s)

The language file(s) will likely be supplied via an E-mail attachment from a CFT employee.

Step 1. Load the USB with the Language File

The language file(s) must be placed on a USB memory stick in a particular folder location. The folder location is: “\RVC\languages”. Create this directory on your USB if it does not currently exist. Copy and paste the update files into the “\RVC\languages” folder. In Figure 1, the update file is placed on the USB (titled Samsung USB) into the RVC.

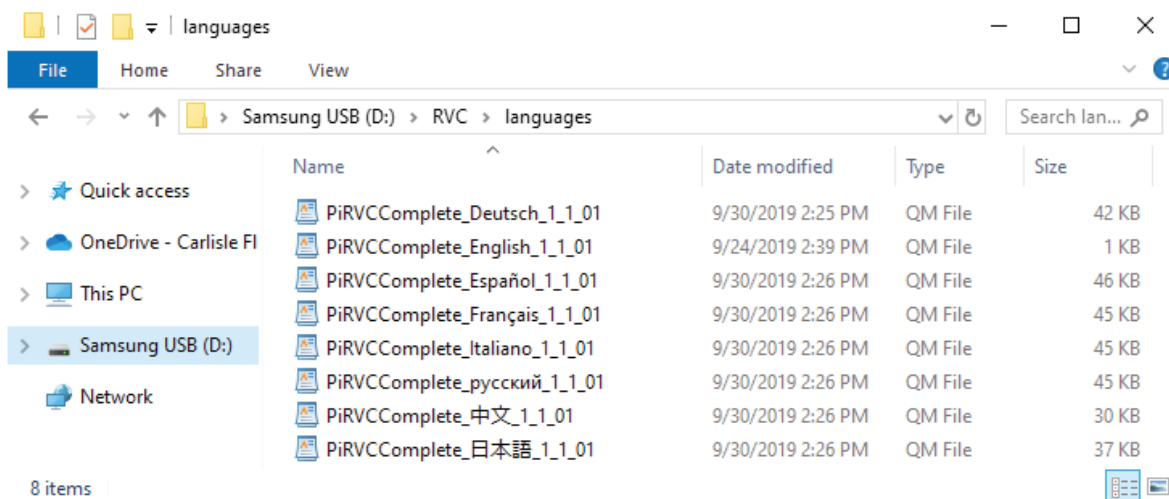


Figure 1: Language File on USB

Step 2. Insert USB into RVC

Ensure that the RVC is powered off, and unscrew the cap located on the bottom left-hand corner of the RVC box.

Insert the USB drive containing the necessary files, and power on the unit.



Step 3. From Home Screen, Press Lock Button

To access the Update Screen, the RVC must be logged in as an “Admin”. To login, press the Lock Button to navigate to the Login Screen.

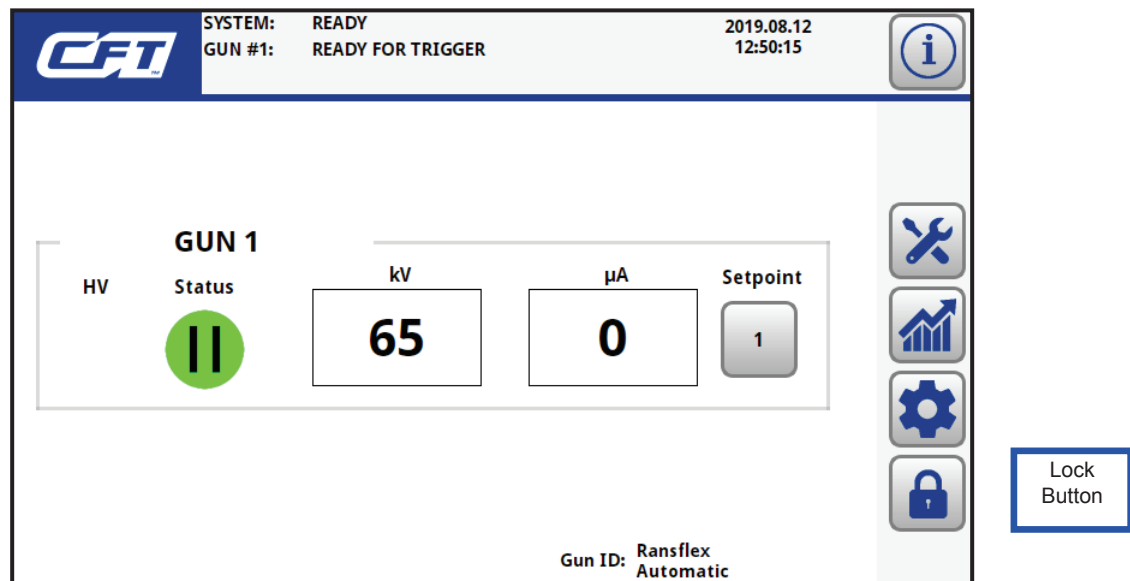


Figure 3: Main Screen

Step 4. Press the “Admin” Button and Enter Passcode

Press on “Admin” button on the Login Screen. A dialog will appear and request the user to enter the “Admin” passcode. The default passcode is “7735”. After logged in, return to the Home Screen by clicking on the Home Button in the top left corner.

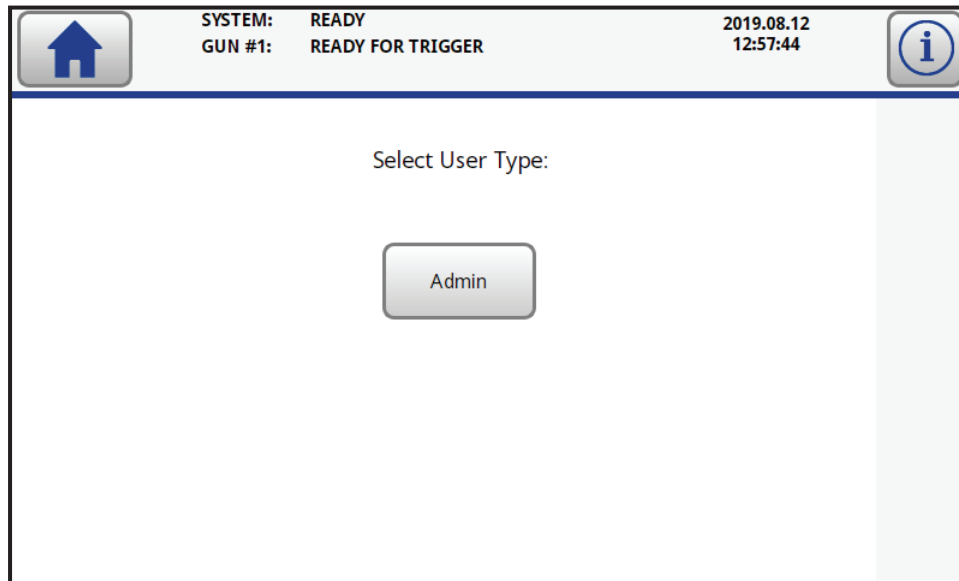


Figure 4.A: Login Screen

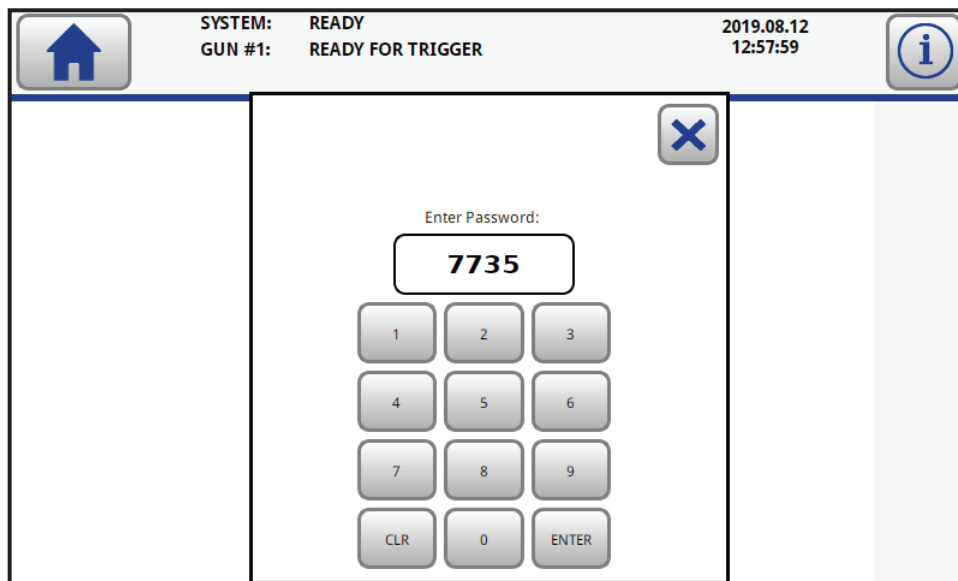


Figure 4.B: Enter Passcode Dialog on Login Screen

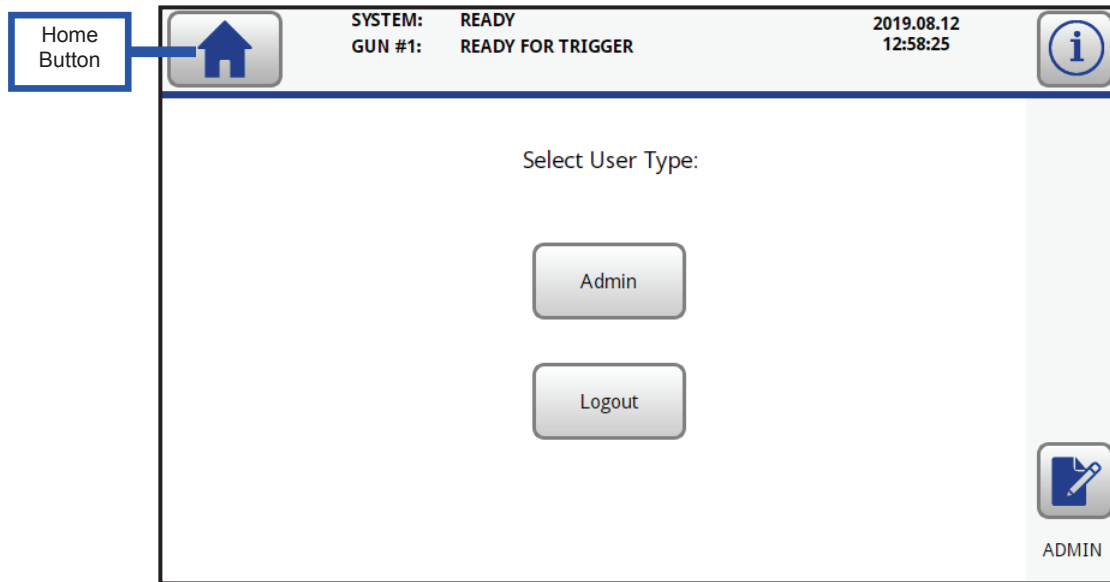


Figure 4.C: Successfully Logged in as “Admin” on Login Screen

Step 5. Navigate to the File Transfer Screen

The File Transfer Screen, which contains the Language Transfer Screen, becomes available while logged in as an “Admin”. On the Home Screen, click on the File Transfer Button. While on the File Transfer Screen, press the Language Transfer Button.

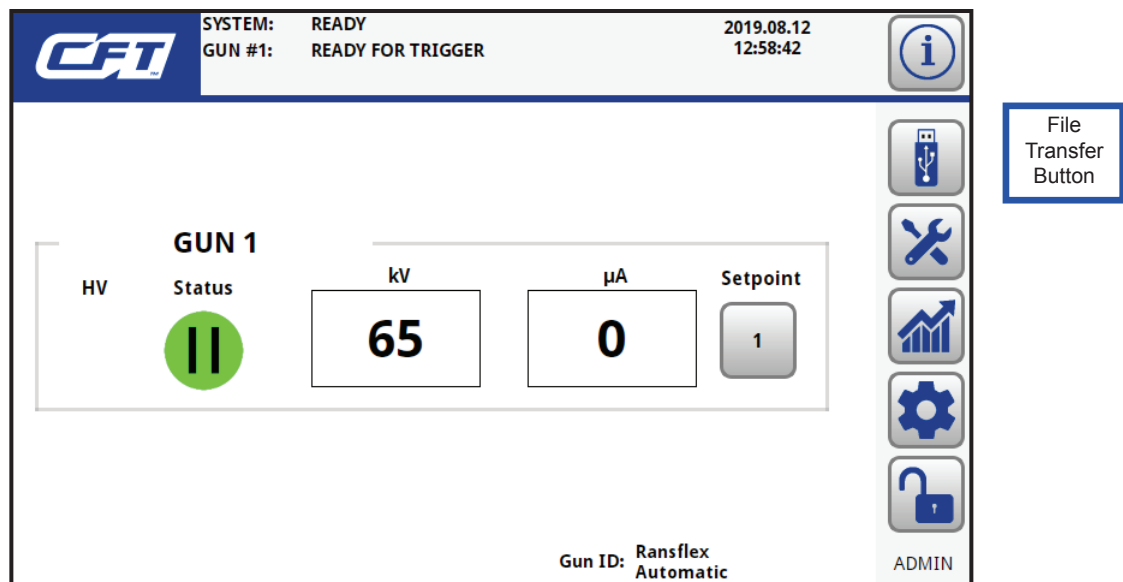


Figure 5.A: Main Screen when logged in as “Admin”

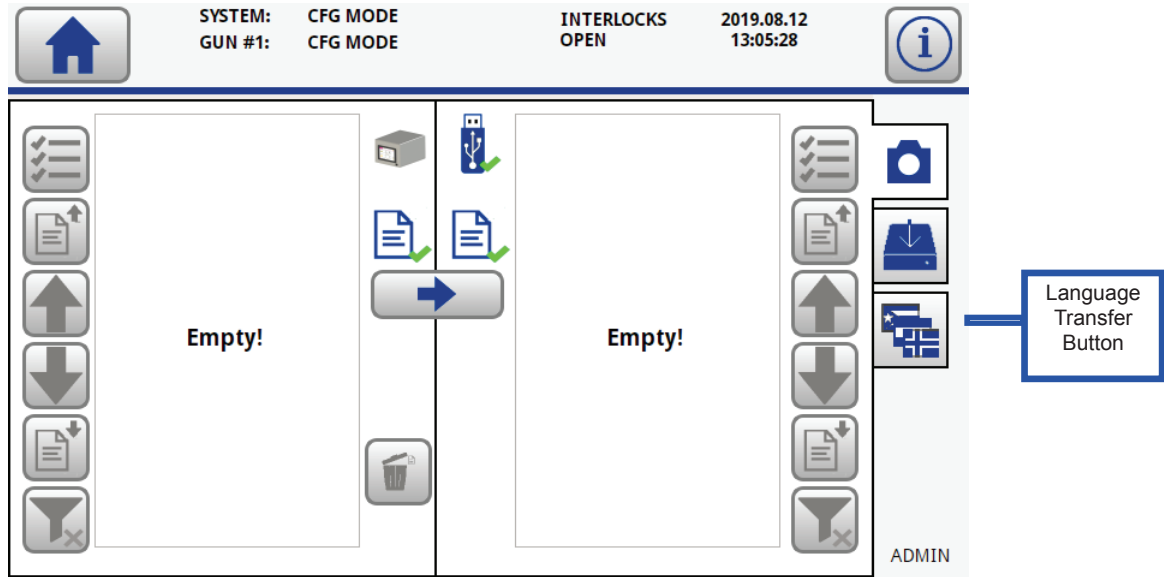


Figure 5.B: File Transfer Screen

Step 6. Select Language to Transfer

On the USB side, select the language(s) to be transferred onto the RVC. The RVC can hold multiple languages and versions. Once the language(s) are selected, click on the “transfer” tab to copy the file from the USB onto the RVC. Next, to apply the newly added translation file, it must be selected in the settings screen. Return to the Home Screen after transferring the selected language file.

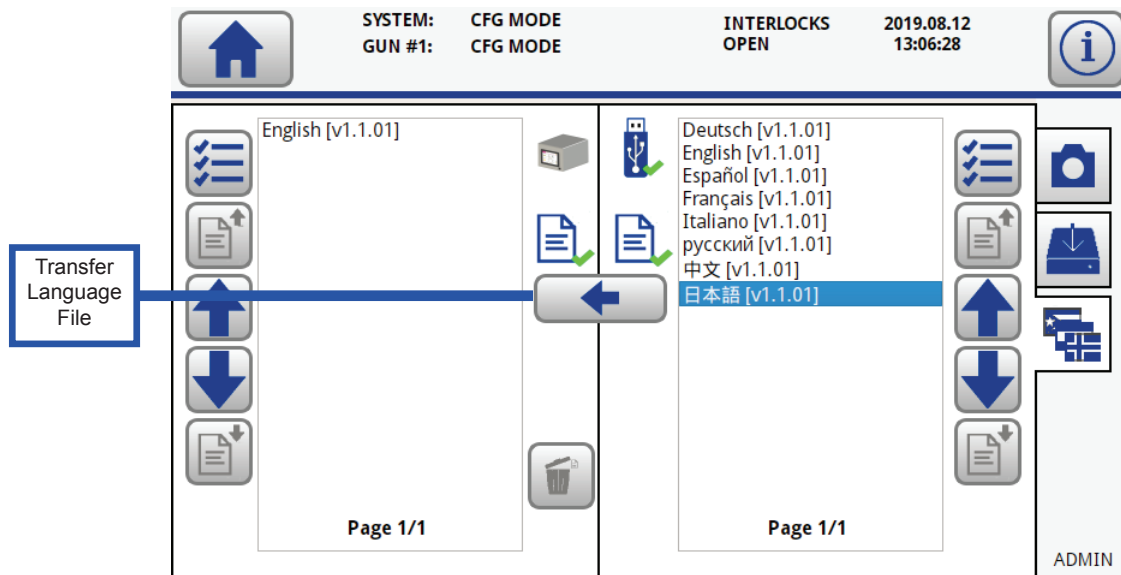


Figure 6: Language Screen

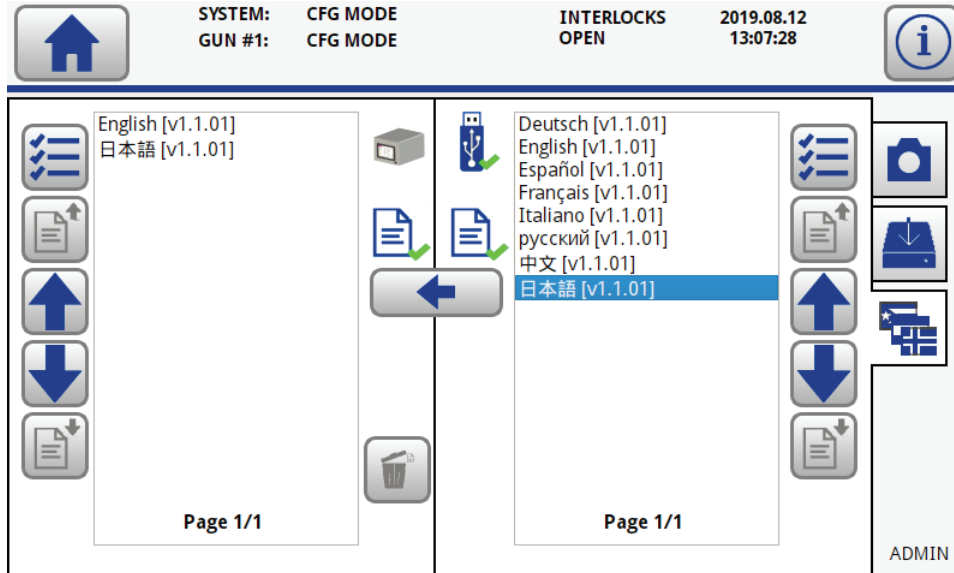


Figure 6.B: French Language File Transferred

Step 7. Go to the Settings Screen

Click on the Settings button while still logged on as Admin.

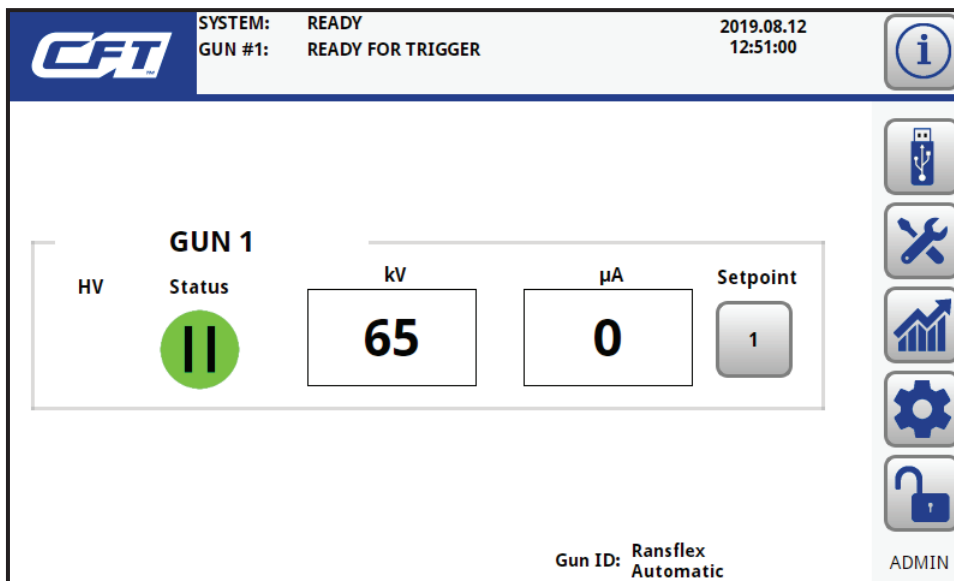


Figure 7: Main Window

Step 8. Language Tab

When logged in as an Admin, the Language tab is available in Settings. Click on the Language Tab. In this tab, there are a list of all the language files that are saved on the RVC currently.

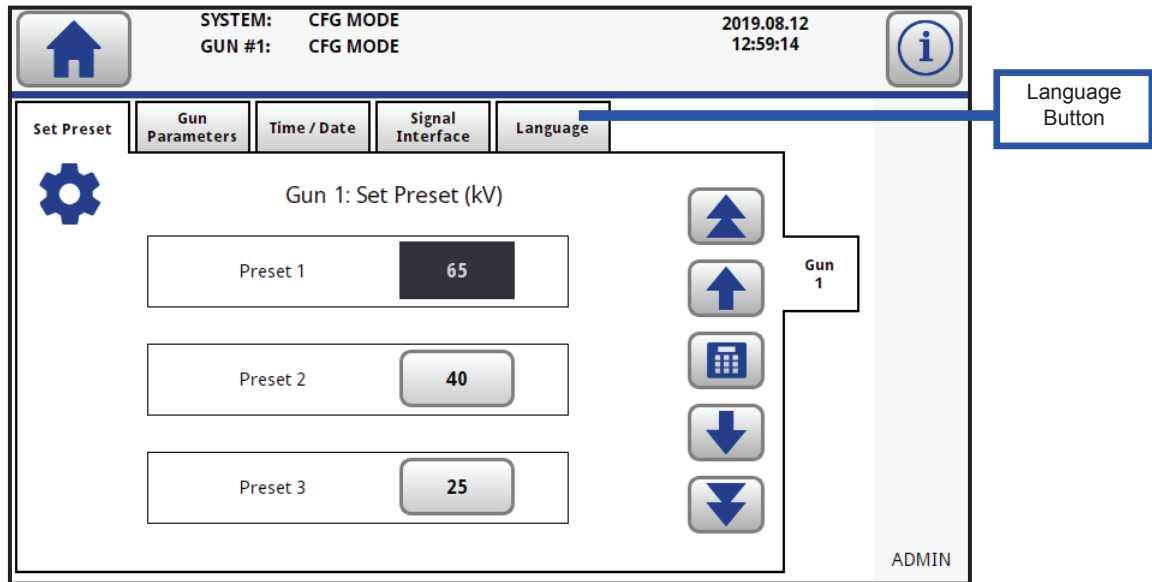


Figure 8.A: Settings

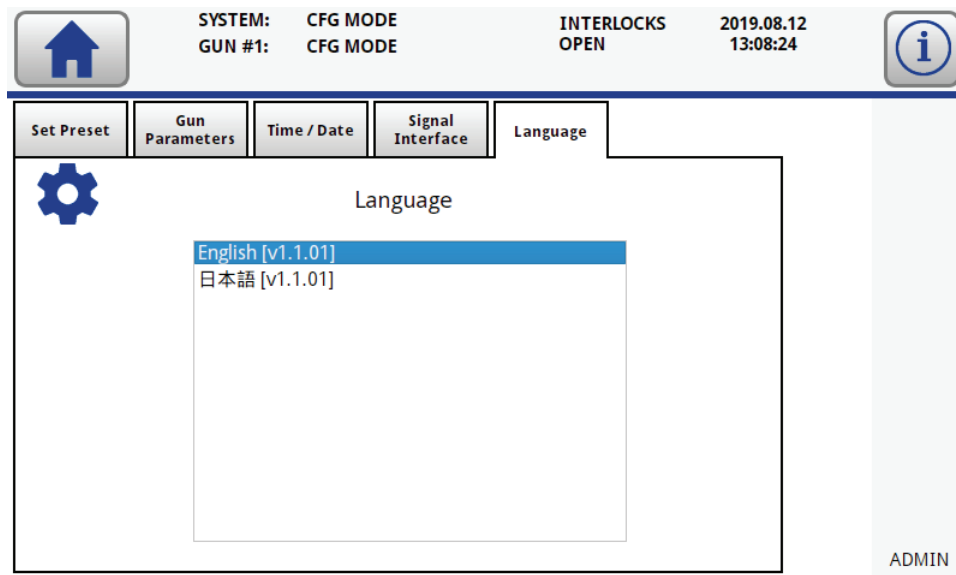


Figure 8.B: Settings, Language Tab

Step 9. Selecting a Language to Load

Click on the language you would like to load onto the RVC. Once it is selected, it is immediately applied and remains in effect until a different language is chosen.

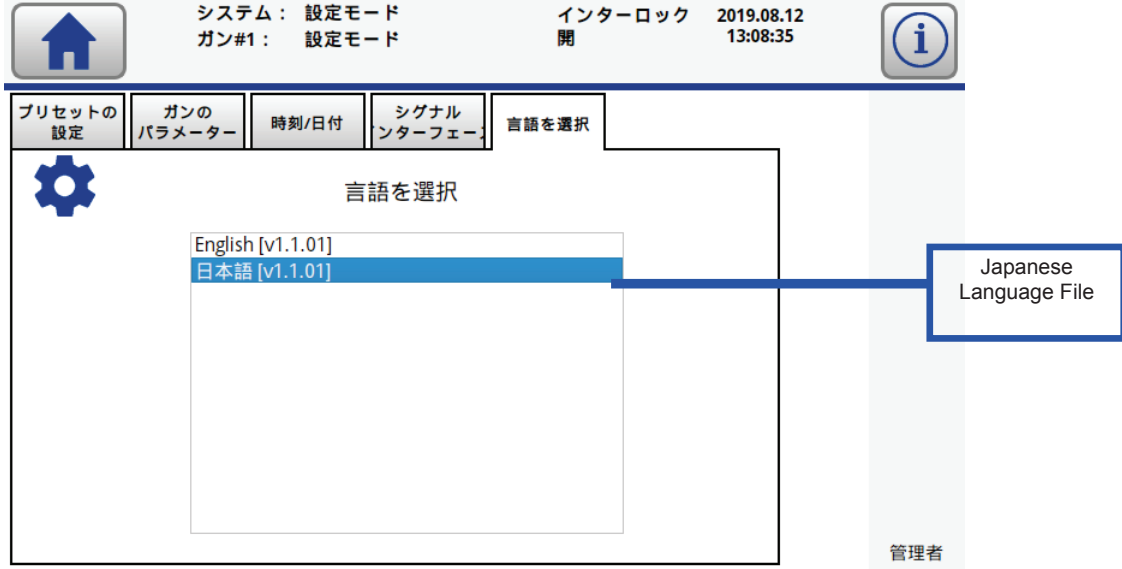


Figure 9. Japanese Language Loaded onto RVC

Ransburg

SERVICE INSTRUCTION

Ransburg Voltage Controller (RVC) Resetting Admin Passcode

The Ransburg Voltage Controller (RVC) has an “Admin” (Administrator) access level that requires a passcode for logging in. In the case that the passcode is forgotten, this service instruction provides the steps to reset the Admin passcode back to the factory defaulted passcode.

Preparation

The user must obtain an EUK (Encrypted User Key) for resetting the Admin passcode and a USB to load the file onto. The EUK file will likely be supplied via an E-mail attachment from a CFT employee. It will be named “RVC_adminPassReset_key.EUK” or something similar.

Step 1. Load the USB with the EUK file

The EUK file must be placed on a USB memory stick in a particular folder location. The folder location is: \RVC\

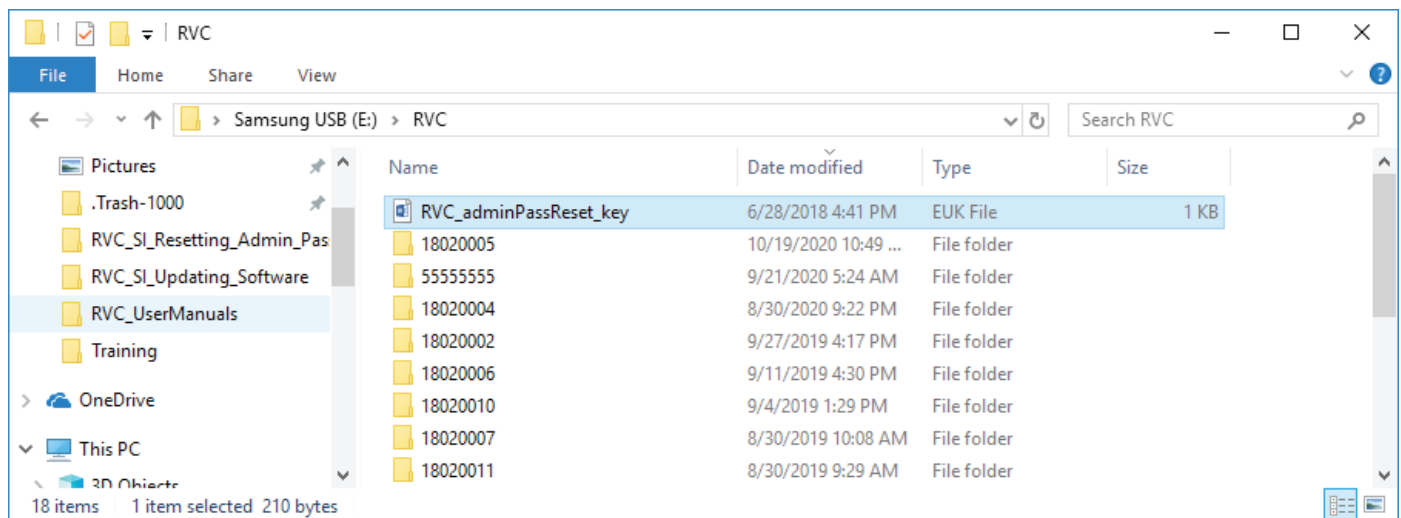


Figure 1: Folder for EUK File

Step 2. Insert USB into RVC

Ensure that the RVC is powered off, and unscrew the cap located on the bottom left-hand corner of the RVC box.

Insert the USB drive containing the necessary files, and power on the unit.



Step 3. From Home Screen, Press Lock Button

To access the Update Screen, the RVC must be logged in as an “Admin”. To login, press the Lock Button to navigate to the Login Screen.

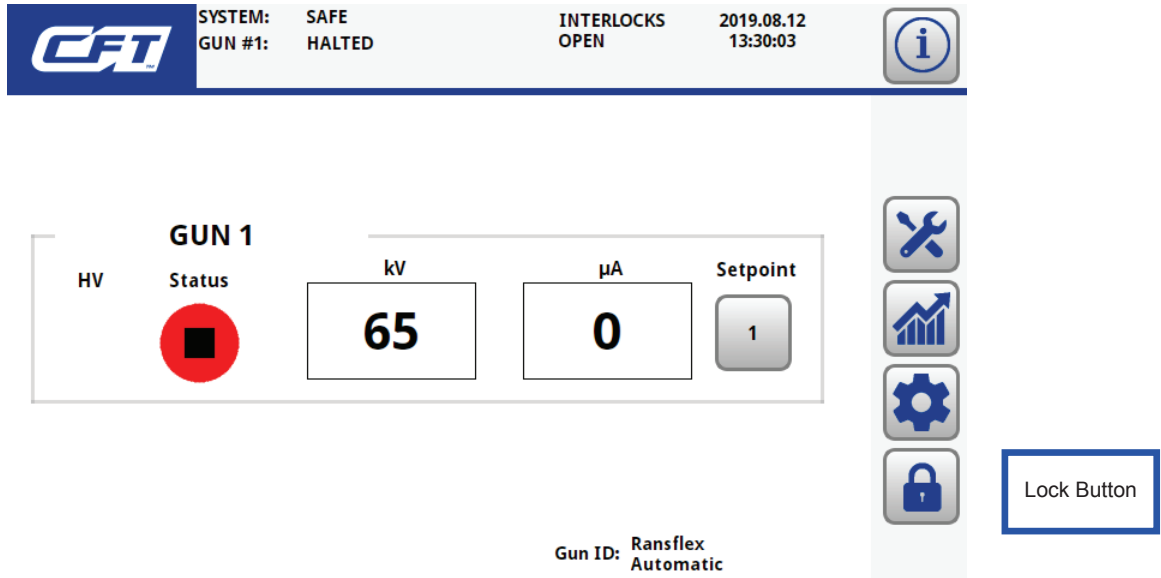


Figure 3: Main Screen

Step 4. Press the “Password Reset” button and Follow Prompts

On the Login Screen, a special button should appear if the “Admin” Passcode Reset EUK is detected by the RVC. If it does not appear, go back to the beginning of the document, as the EUK cannot be located by the RVC. Press the special “Passcode Reset” button. A confirmation dialog will then appear. Agree to resetting the passcode for “Admin” to the factory defaults.

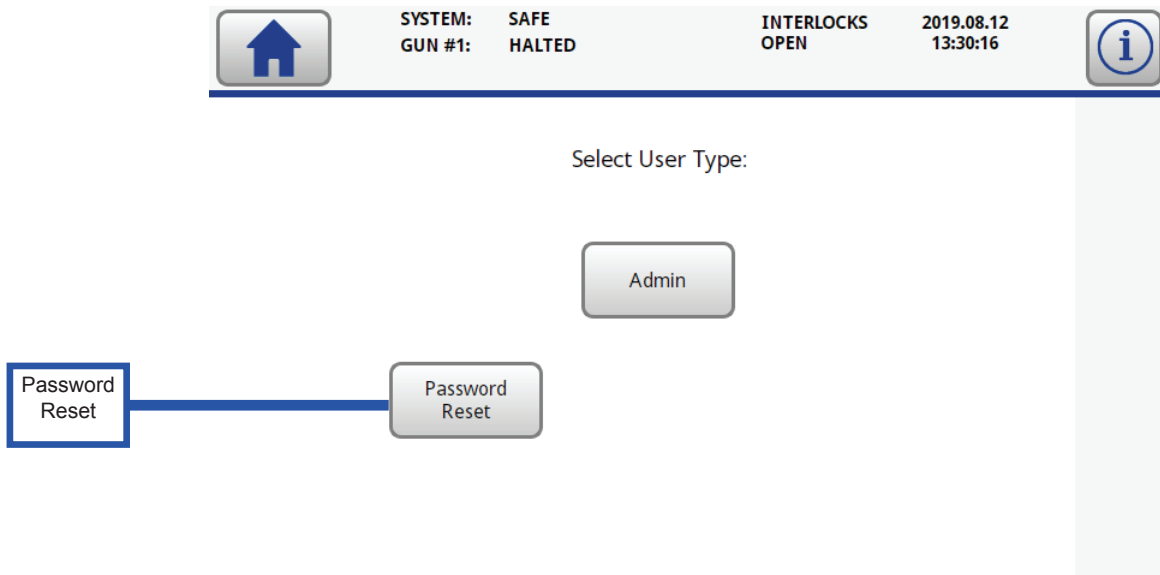


Figure 4.A: Login Screen

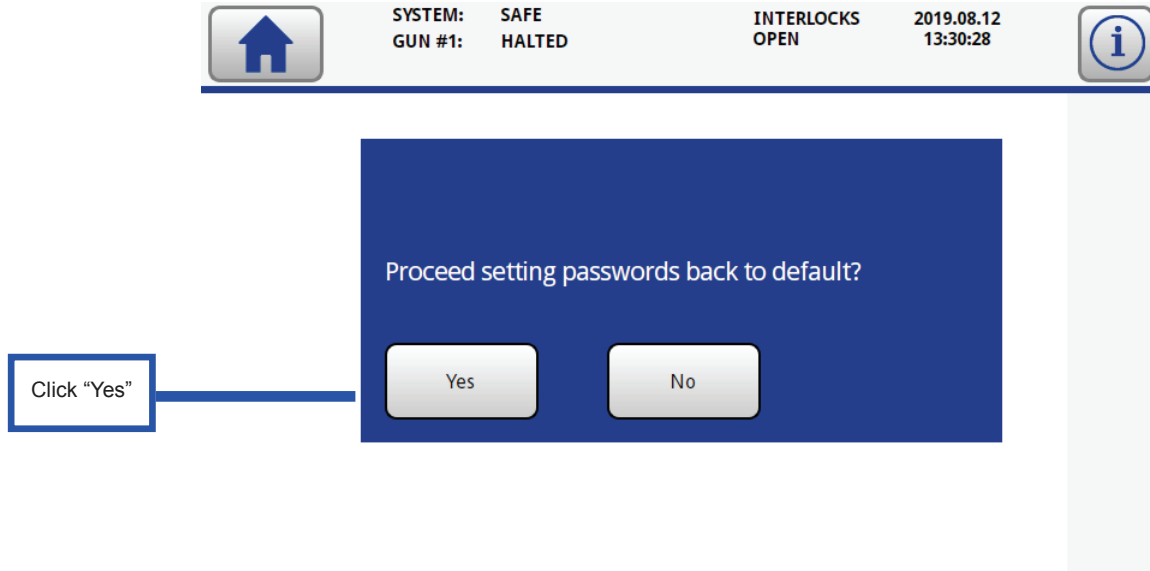


Figure 4.B: Confirmation Dialog for Resetting Passcode to Default

(Recommended) Step 5. Log in as Admin

The "Admin" passcode has successfully been reset to its factory default value. Currently, the default passcode is "7735". We can confirm this by logging in to "Admin" with that passcode.

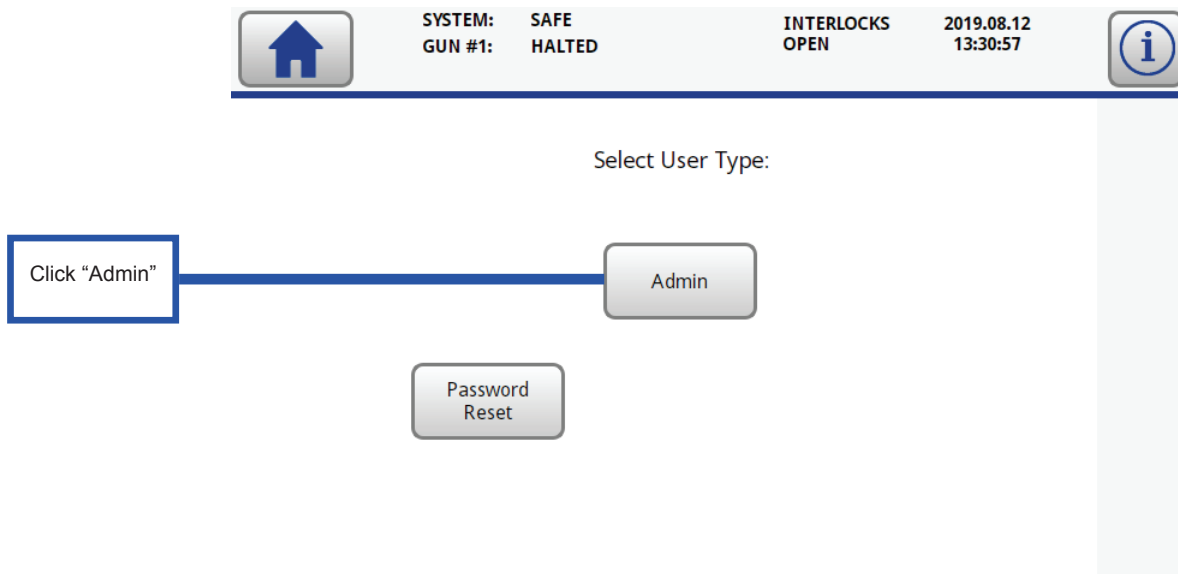


Figure 5.A: Login Screen

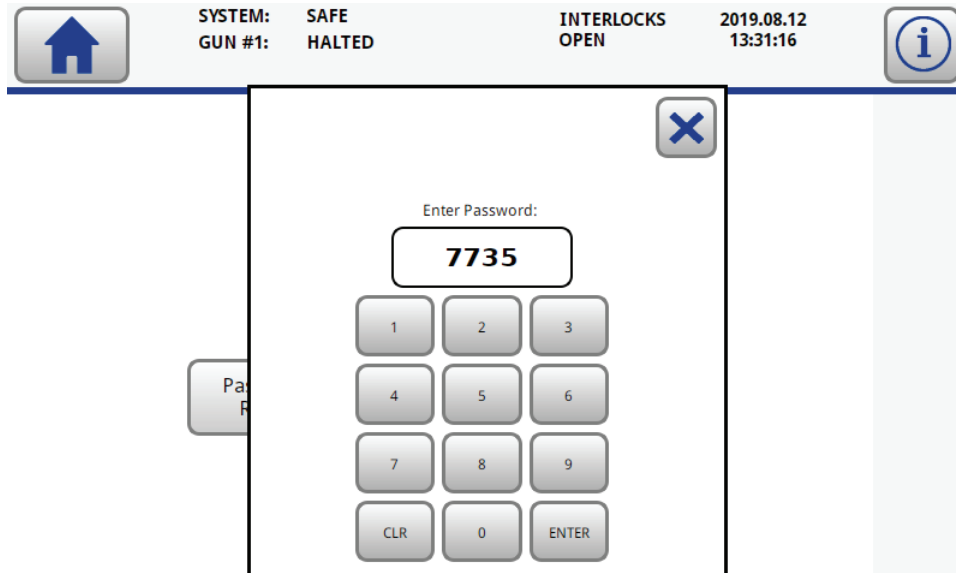


Figure 5.B: Enter Default Passcode

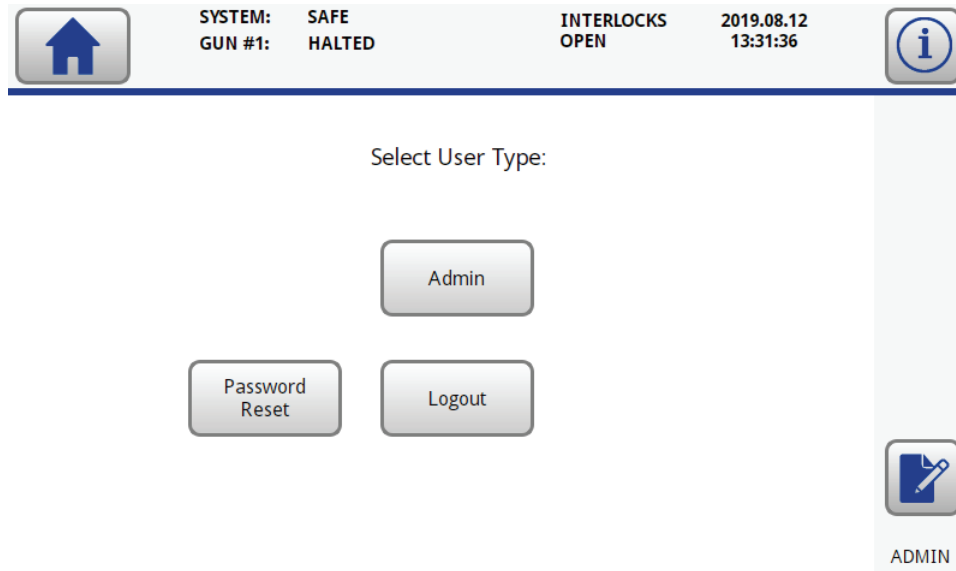


Figure 5.C: Logged in as "Admin"

Ransburg

SERVICE INSTRUCTION

Ransburg Voltage Controller (RVC) Updating the RVC Software

The Ransburg Voltage Controller (RVC) can be updated or downgraded by an “Admin” user. In order to update the unit, a USB with the necessary files must be inserted. This Service Instruction will cover preparation for updating and downgrading the RVC.

Preparation

Requirements:

- USB Flash Drive
- Update File(s)

The update file(s) will likely be supplied via an E-mail attachment from a CFT employee.

Step 1. Load the USB with the update file

The update file(s) must be placed on a USB memory stick in a particular folder location. The folder location is: “\RVC\updates\”. Create this directory on your USB if it does not currently exist. Copy and paste the update files into the “\RVC\updates\” folder. In Figure 1, the update file is placed on the USB (titled Samsung USB in this example) into the RVC.

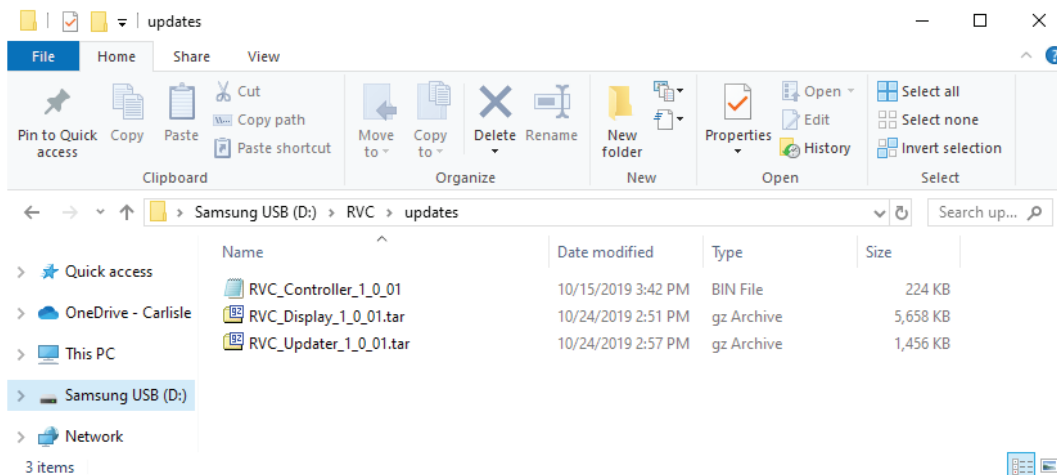


Figure 1: Update File on USB

Step 2. Insert USB into RVC

Ensure that the RVC is powered off, and unscrew the cap over the USB port located on the bottom left-hand corner of the RVC box.

Insert the USB drive that contains the necessary files, and power on the unit.



Step 3. From Home Screen, Press Lock Button

To access the Update Screen, the RVC must be logged in as an “Admin”. To login, press the Lock Button to navigate to the Login Screen.

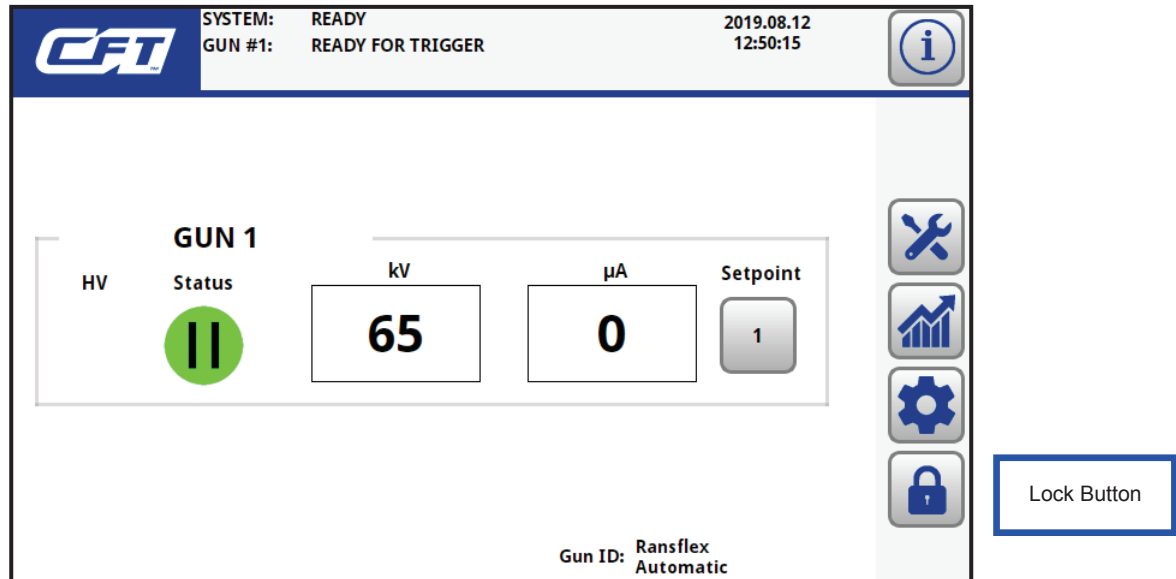


Figure 3: Main Screen

Step 4. Press the “Admin” Button and Enter Passcode

Press on “Admin” button on the Login Screen. A dialog will appear and request the user to enter the “Admin” passcode. The default passcode is “7735”. After logged in, return to the Home Screen by clicking on the Home Button in the top left corner.

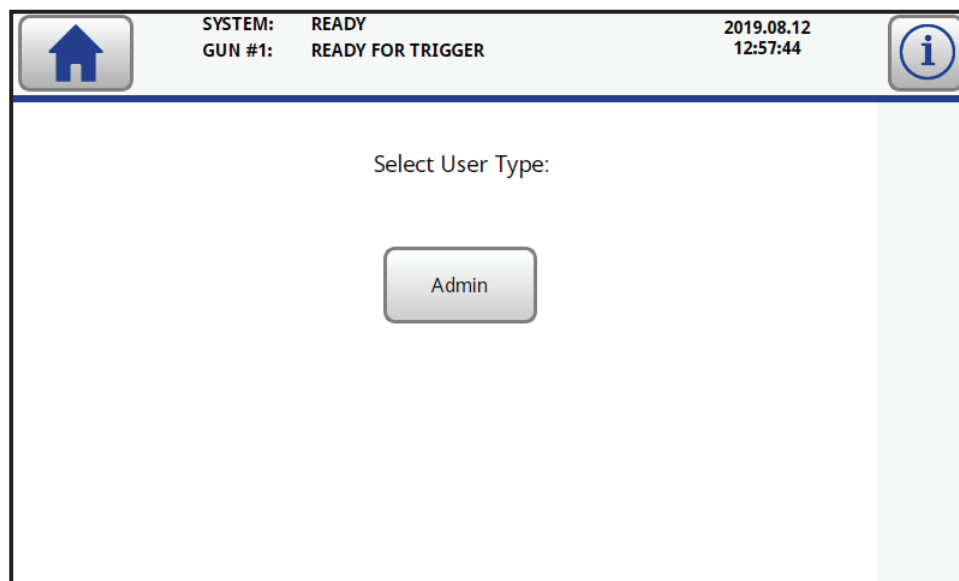


Figure 4.A: Login Screen

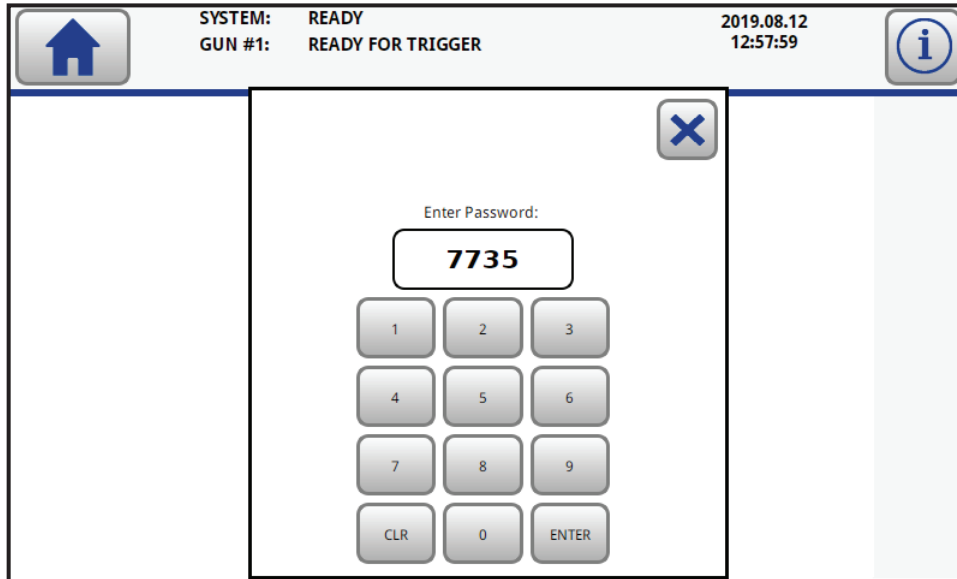


Figure 4.B: Enter Passcode Dialog on Login Screen

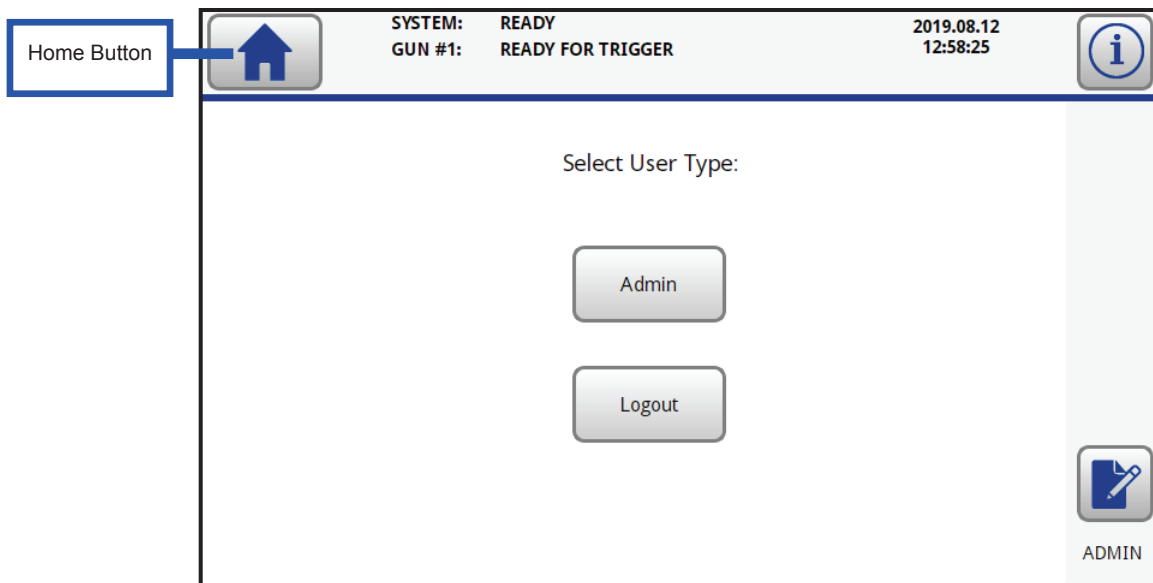


Figure 4.C: Successfully Logged in as “Admin” on Login Screen

Step 5. Navigate to the File Transfer Screen

The File Transfer Screen, which contains the Update Screen, becomes available while logged in as an “Admin”. On the Home Screen, click on the File Transfer Button. While on the File Transfer Screen, press the Update Screen Button.

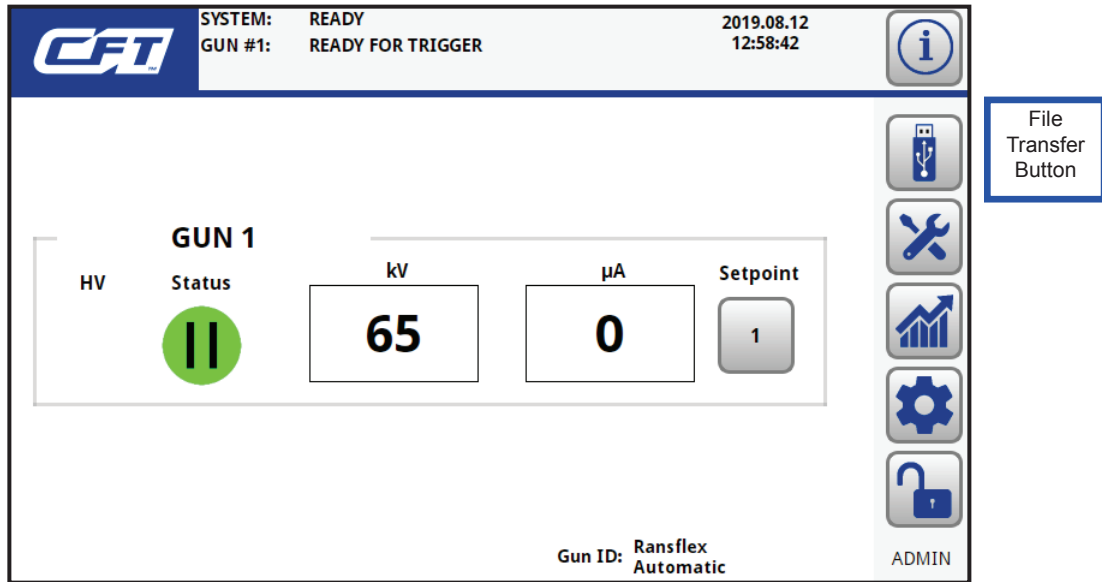


Figure 5.A: Main Screen when logged in as “Admin”

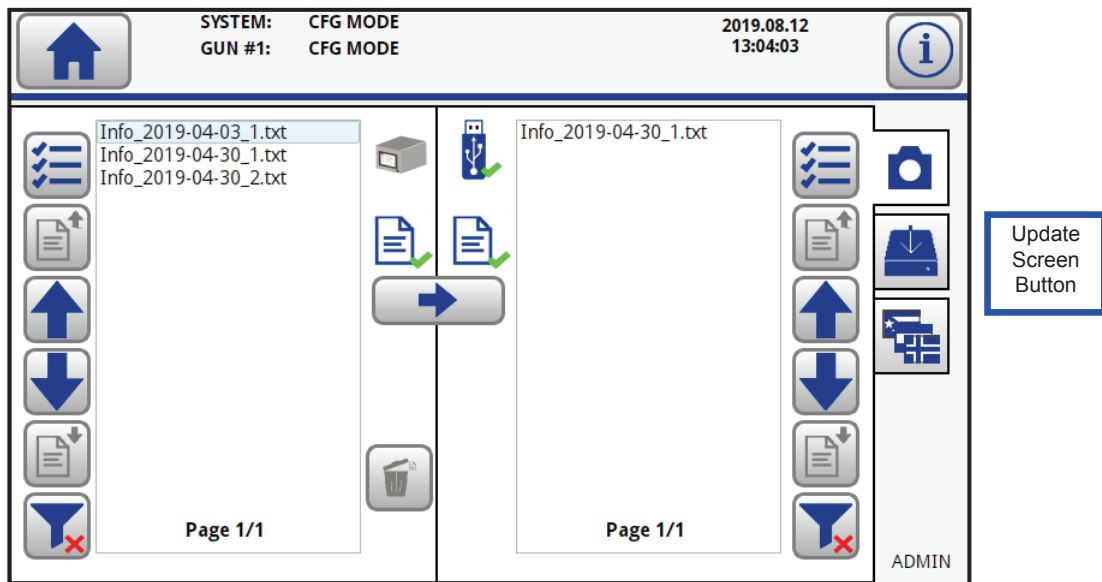


Figure 5.B: File Transfer Screen

Step 6. Press Update Button

On the Update Screen, the user has the option to update the display (touchscreen) software or the processors. Select the software you would like to update and click “Yes” when a confirmation for your selection pops up.

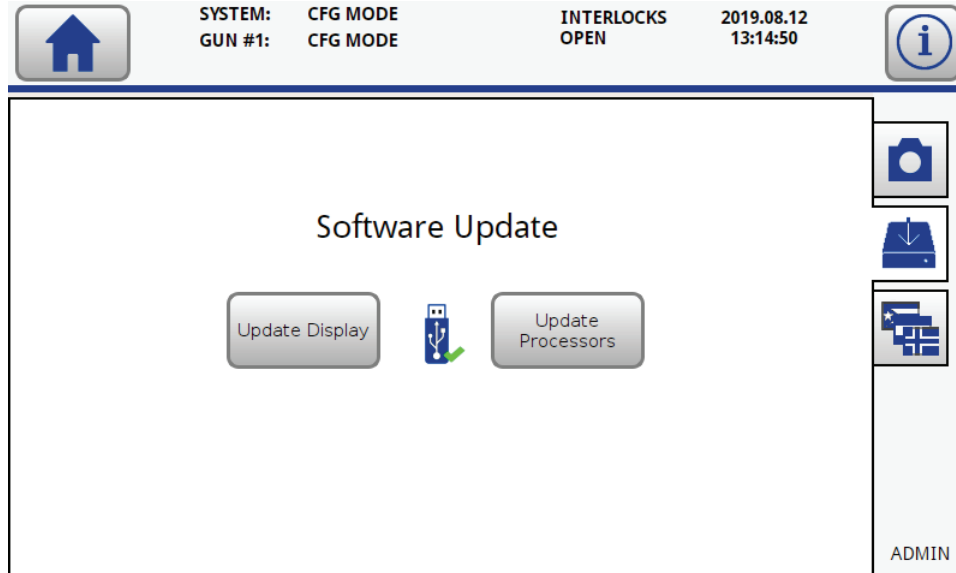


Figure 6.A: Update Screen

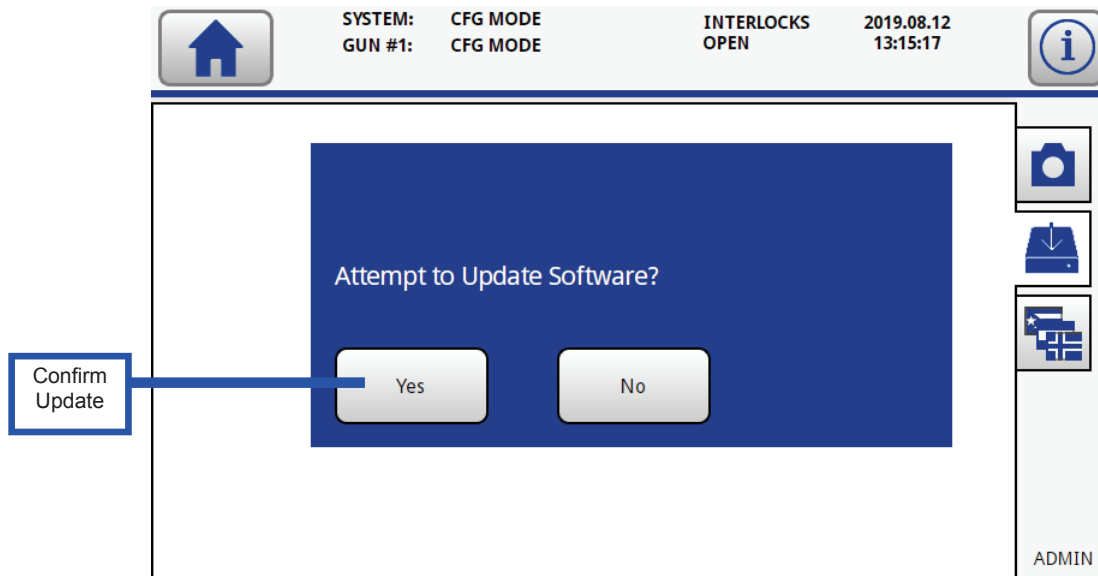


Figure 6.B: Update Confirmation Dialog on Update Screen

Step 7. Select Update File

The RVC Updater will launch after confirming to update software. The next dialog that will appear is to select the desired update file from the update list. After touching the desired update, verify the contents of the update at the bottom of the screen, and then press the “Start Update” button. Pay attention to the details as the update processes.

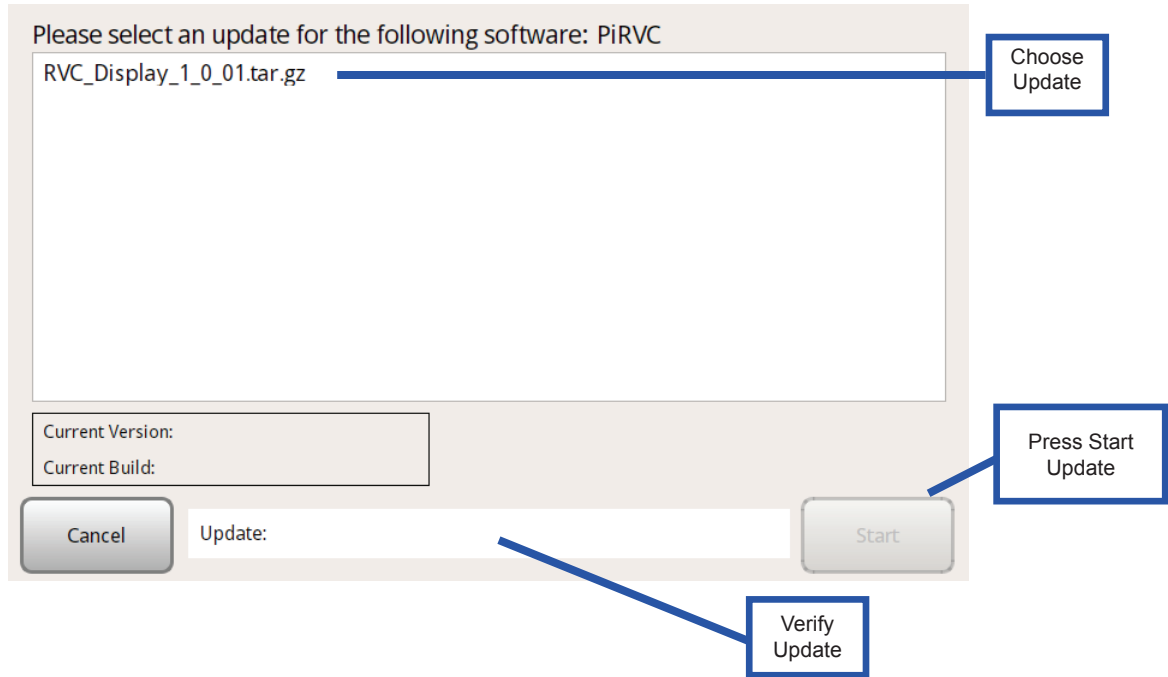


Figure 7.A: Select Update File

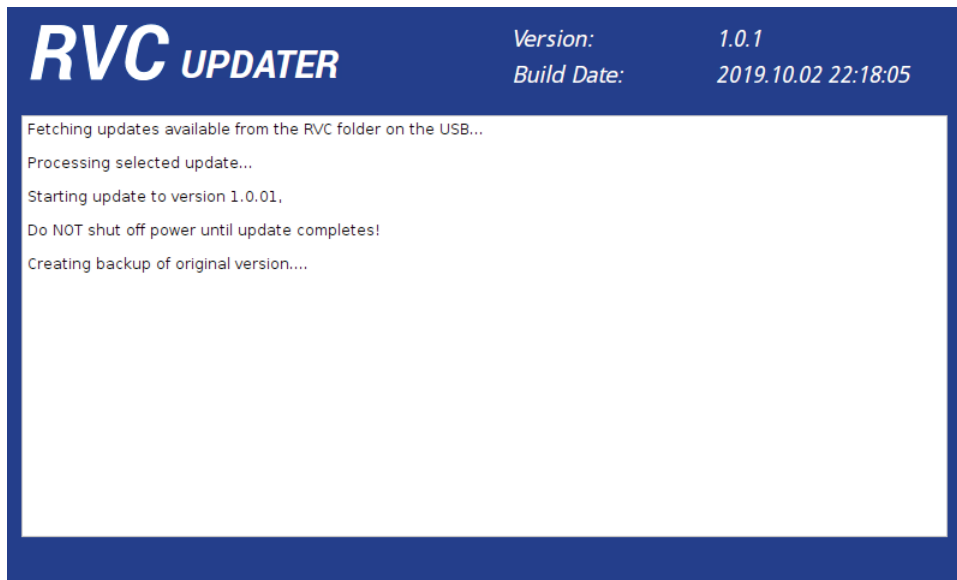


Figure 7.B: Update Processing

Step 8. Watch Update Process

Wait while the updater installs the new software and finishes the process via reboot. Pay attention to the output and confirm everything is processing as expected. **Figure 8.A** shows what the output would usually generate in normal circumstances. **Figure 8.B** shows the reboot action the user must click on.

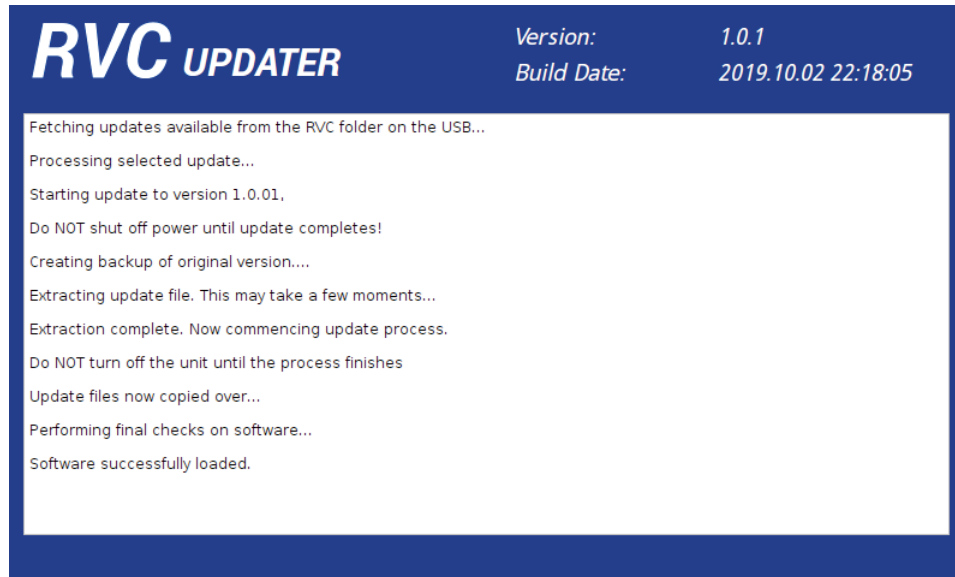


Figure 8.A: Normal Update Output

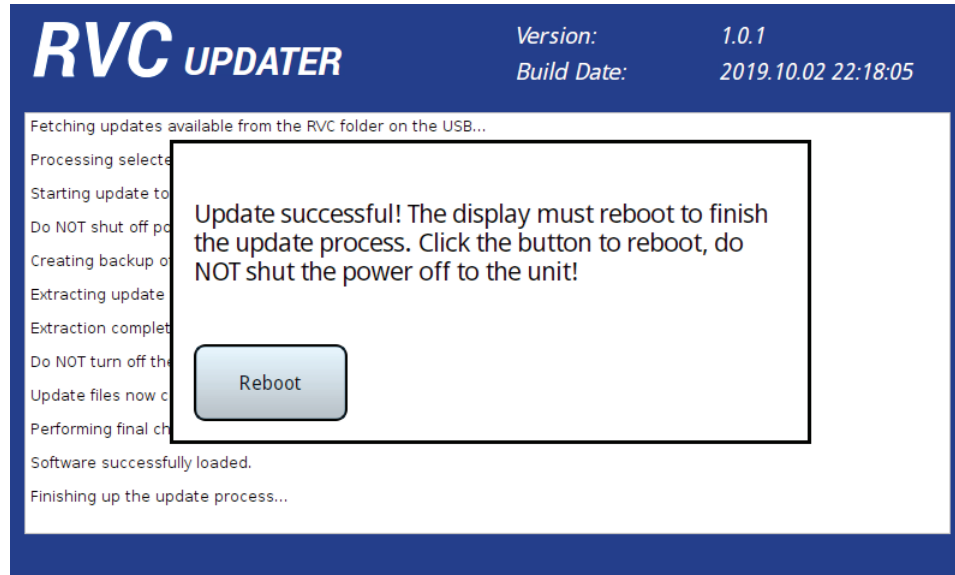


Figure 8.B: Successful Update — Must Click Button to Process All Changes

Step 9. Reboot

After a successful update, the display must be rebooted. Click the “reboot” button to reboot the display. No further action should be required. If the display remains black for over a minute, the unit may also be power cycled.

WARRANTY POLICY

This product is covered by Carlisle Fluid Technologies materials and workmanship limited warranty. The use of any parts or accessories, from a source other than Carlisle Fluid Technologies, will void all warranties. For specific warranty information please contact Carlisle Fluid Technologies.

Carlisle Fluid Technologies is a global leader in innovative finishing technologies. Carlisle Fluid Technologies reserves the right to modify equipment specifications without prior notice.

DeVilbiss®, Ransburg®, MS®, BGK®, and Binks®,
are registered trademarks of Carlisle Fluid Technologies, Inc.

©2019 Carlisle Fluid Technologies, Inc.
All rights reserved.

For technical assistance or to locate an authorized distributor, contact one of our international sales and customer support locations.

Region	Industrial / Automotive	Automotive Refinishing
Americas	Tel: 1-800-992-4657 Fax: 1-888-246-5732	Tel: 1-800-445-3988 Fax: 1-800-445-6643
Europe, Africa Middle East, India	Tel: +44 (0)1202 571 111 Fax: +44 (0)1202 573 488	
China	Tel: +8621-3373 0108 Fax: +8621-3373 0308	
Japan	Tel: +81 45 785 6421 Fax: +81 45 785 6517	
Australia	Tel: +61 (0) 2 8525 7555 Fax: +61 (0) 2 8525 7575	

For the latest information about our products, visit www.carlisleft.com.