

Operations Manual

Integrated Valve Print System



5770-018
Revision B

Integrated Valve Print System Operations Manual

5770-018

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Integrated Valve

Warranty:

The Valve Jet System, including all components unless otherwise specified, carries a limited warranty.

The inks and conditioners used with the Valve Jet System carry a limited warranty.

For all warranty terms and conditions, contact the manufacturer for a complete copy of the Limited Warranty Statement.

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Section 1: Safety and Ink Usage

Following is a list of safety symbols and their meanings, which are found throughout this manual. Pay attention to these symbols where they appear in the manual.



Wear safety goggles when performing the procedure described!



Caution or Warning! Denotes possible personal injury and/or damage to the equipment.



Caution or Warning! Denotes possible personal injury and/or equipment damage due to electrical hazard.

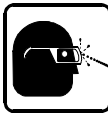


NOTE: (Will be followed by a brief comment or explanation.)



ESD protection should be worn when servicing internal printed circuit boards.

After service to the equipment is completed, replace all protective devices such as grounding cables and covers before operating the equipment.



It is extremely important to:

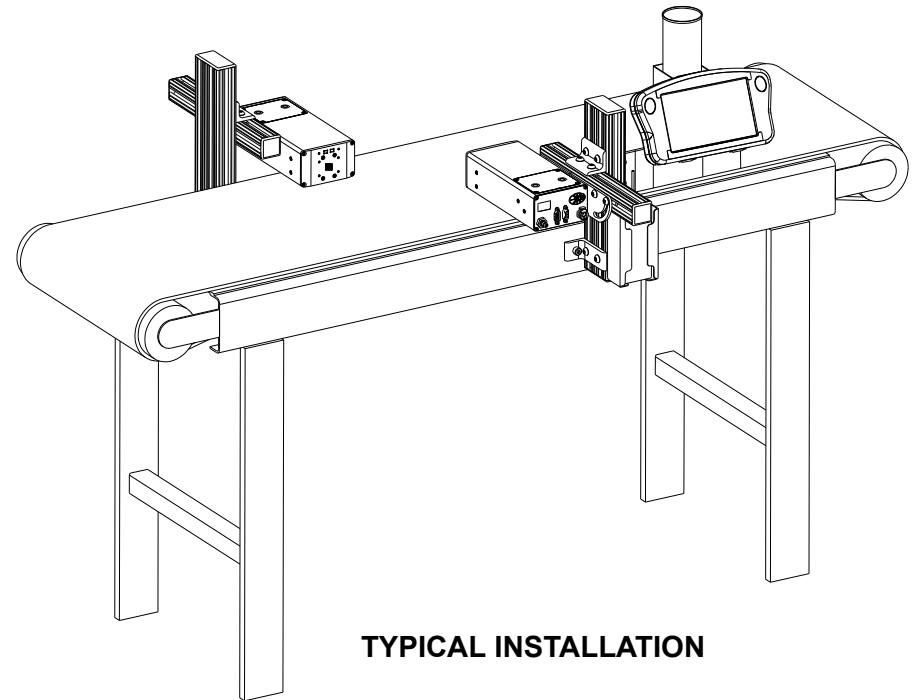
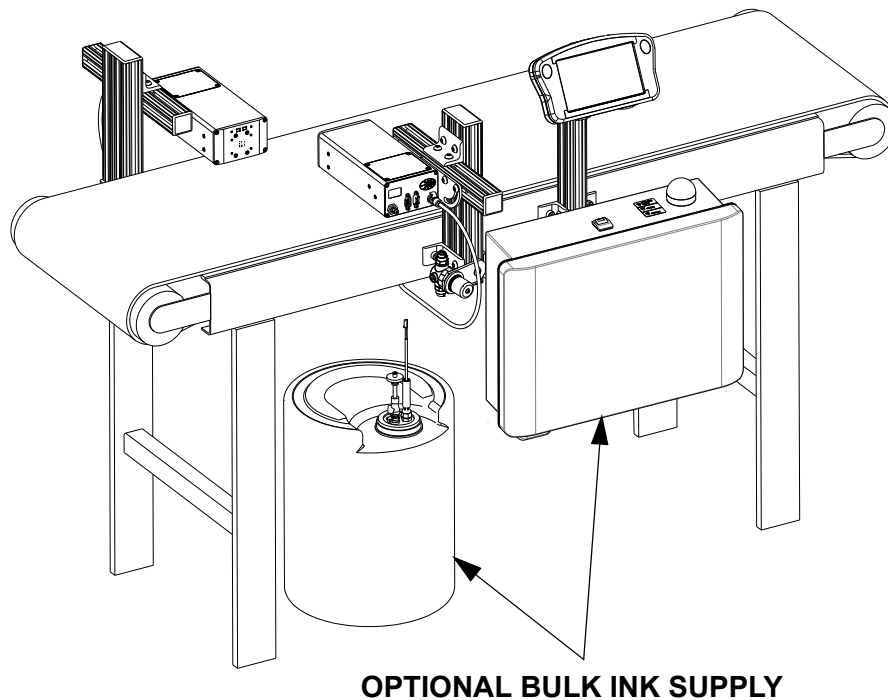
- Clean up all spills with the appropriate solvents immediately and dispose of all waste according to local and state regulations.
- Wear safety glasses and protective clothing, including gloves, when handling all inks and conditioners.
- Store inks and solvents under the recommended conditions found on the SDS (Safety Data Sheet).

Section 2: Quick Start

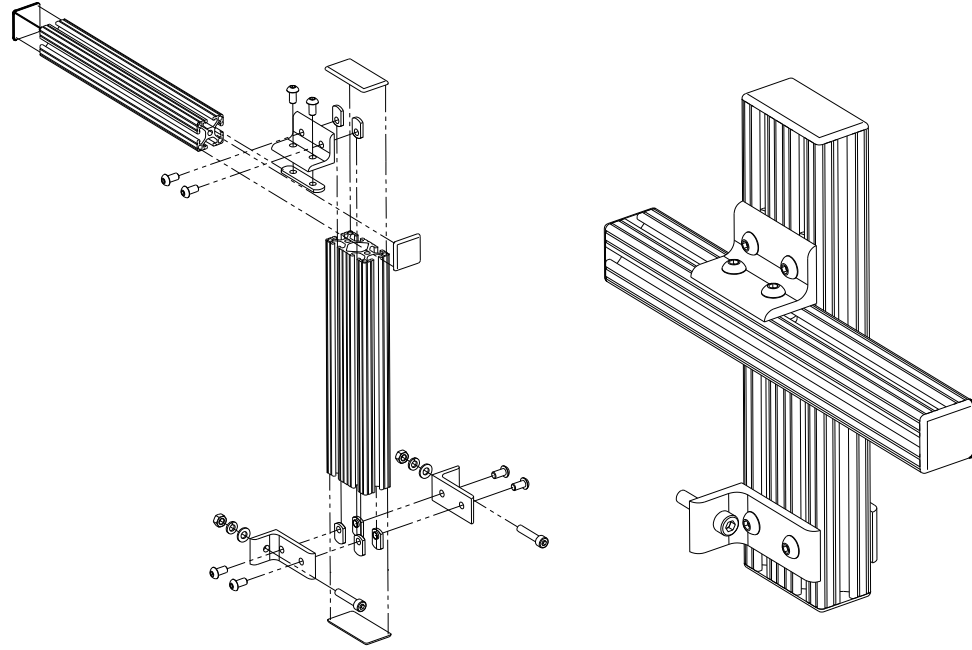
Contents:

- Print Head, 12 Dot Integrated Valve
- Handheld Controller
- Pressurized Ink Can Delivery System
- Bracketry Kit
- Power Supply, 15 V
- Power Supply Bracket
- Power Cord
- Serial Cable
- Tubing
- Software

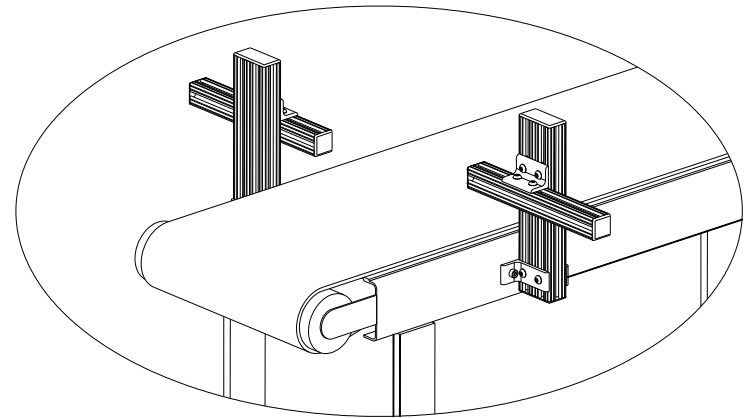
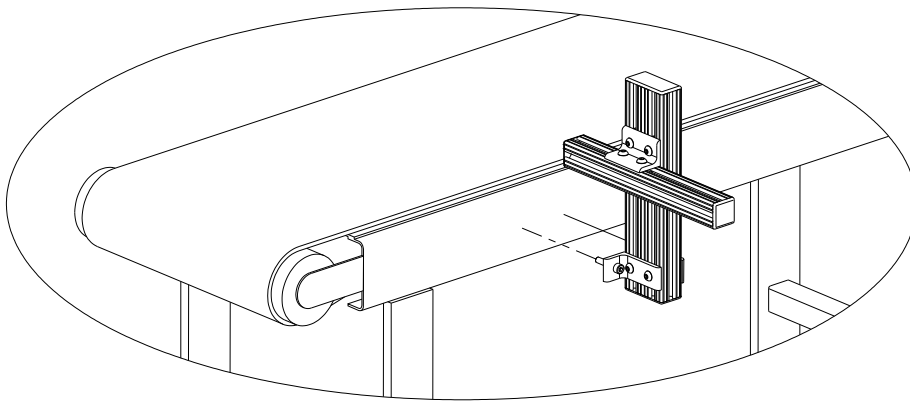
(Ink sold separately.)



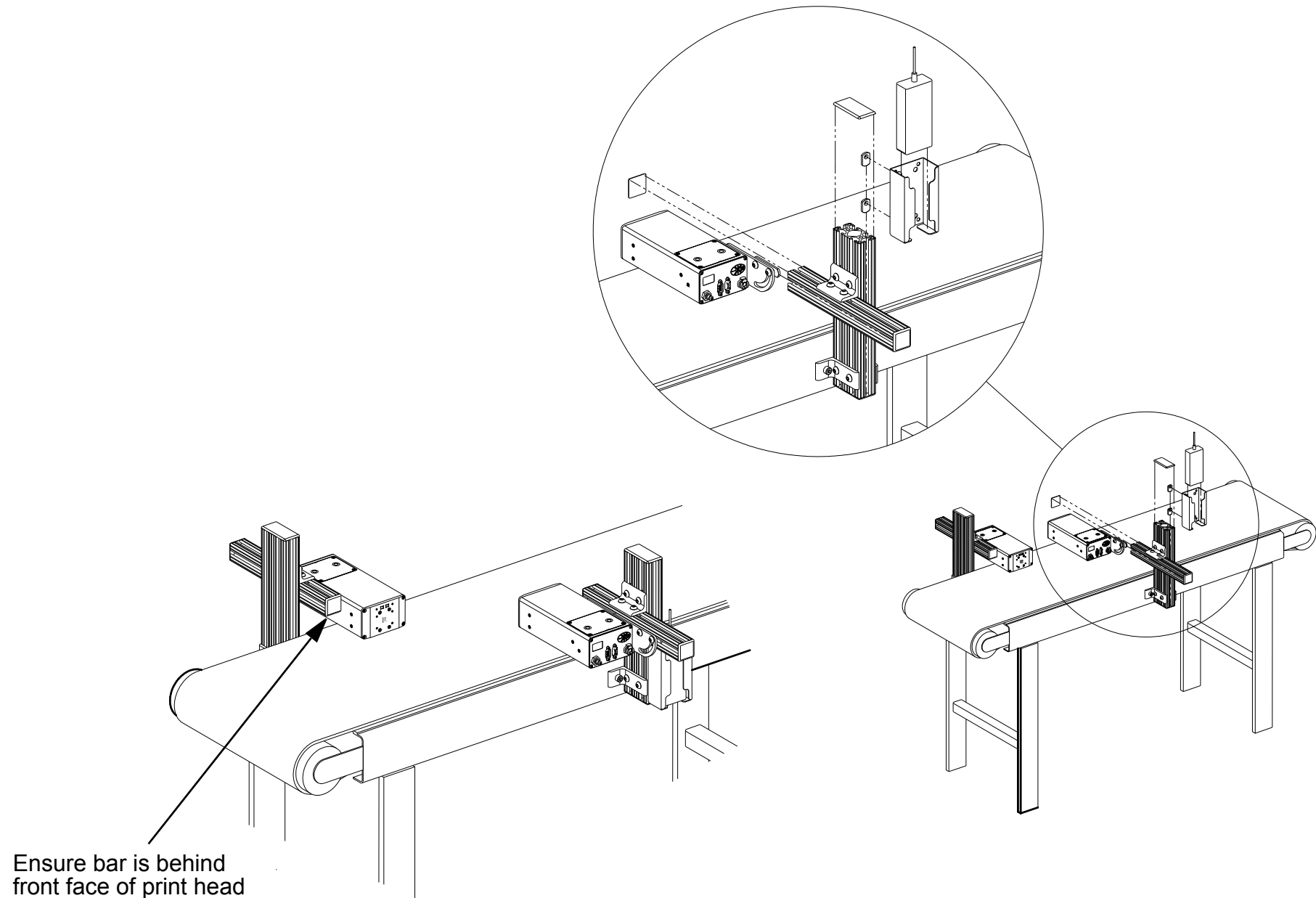
Step 1: Assemble Bracketry



Step 2: Assemble Brackets to Conveyor



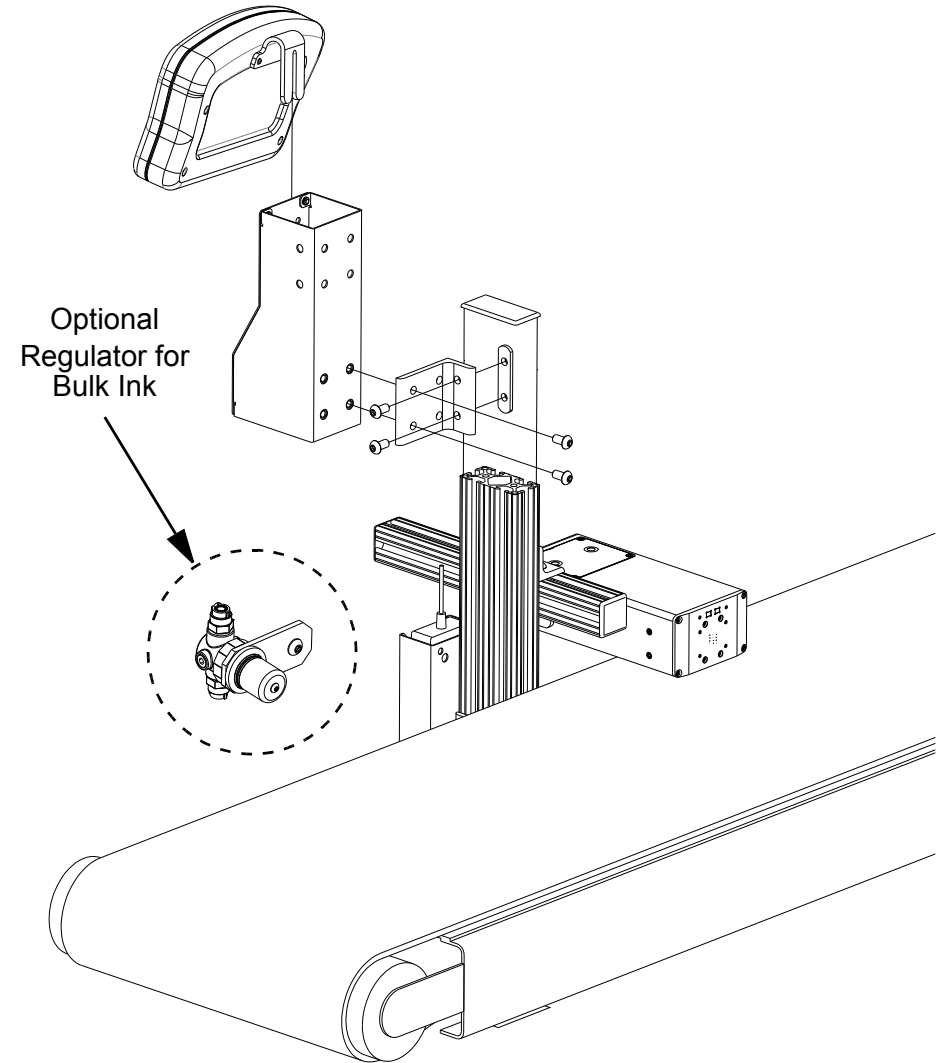
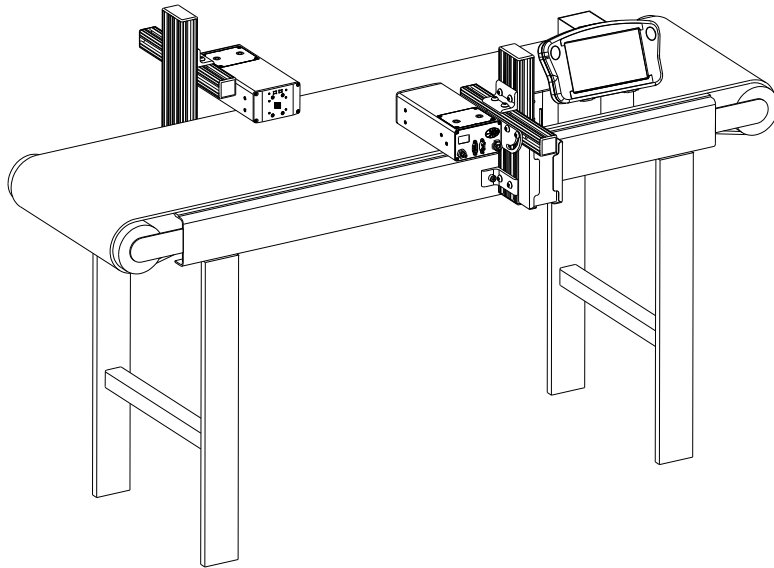
Step 3: Assemble Print Head and Power Supply to Bracketry



Step 4: Install Pressurized Ink Can Supply and Controller

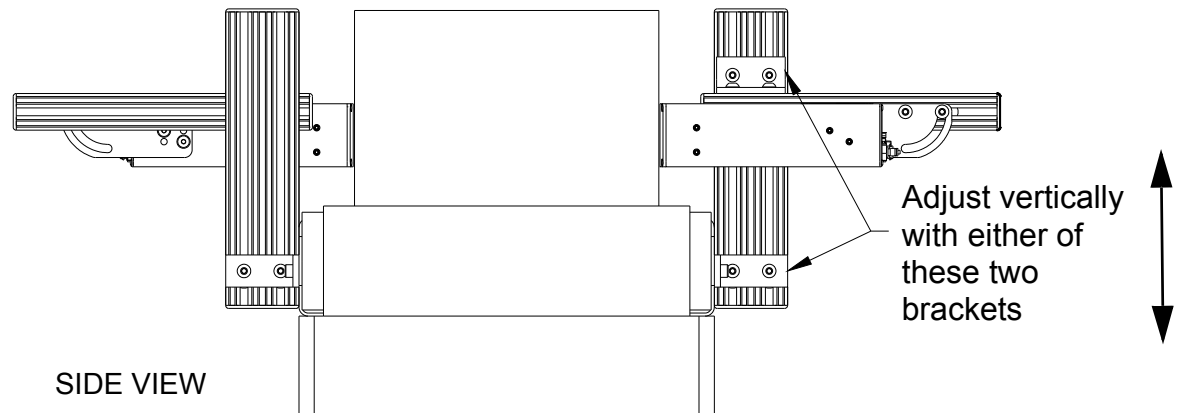


CAUTION: DO NOT INSTALL PRESSURIZED INK CAN YET. All tubing connections must be made first.

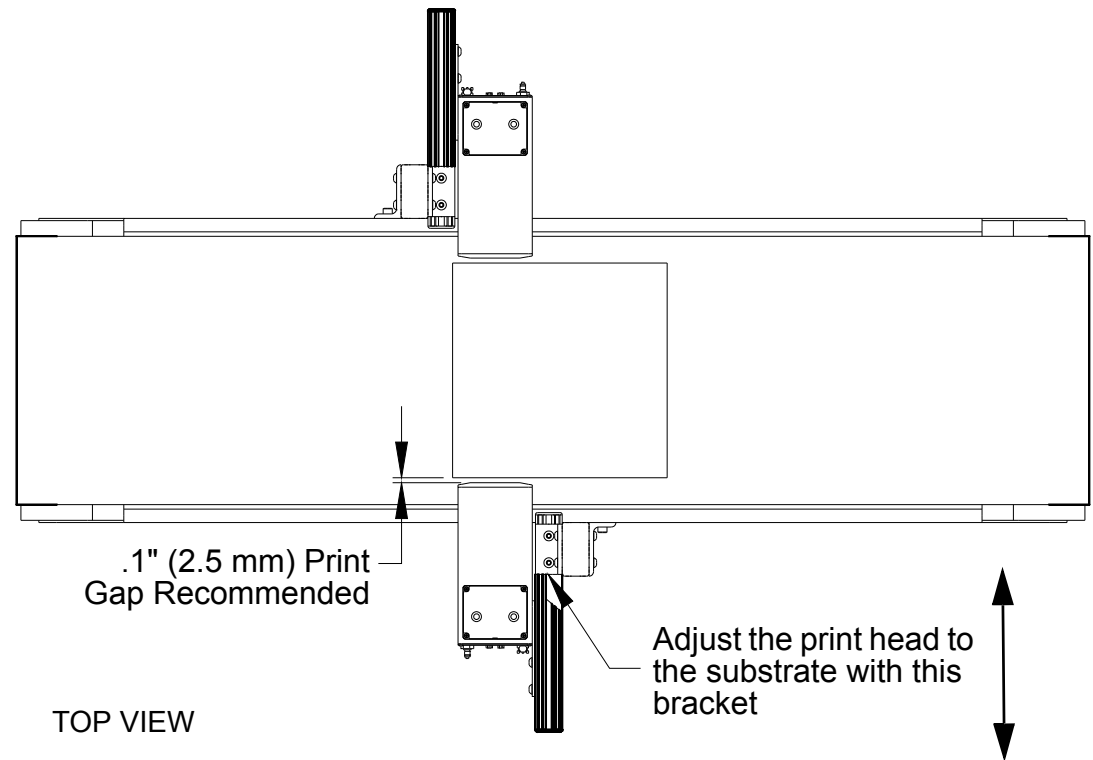


Step 5: Adjust Print Head to Substrate

Adjust print head vertically to meet requirement.



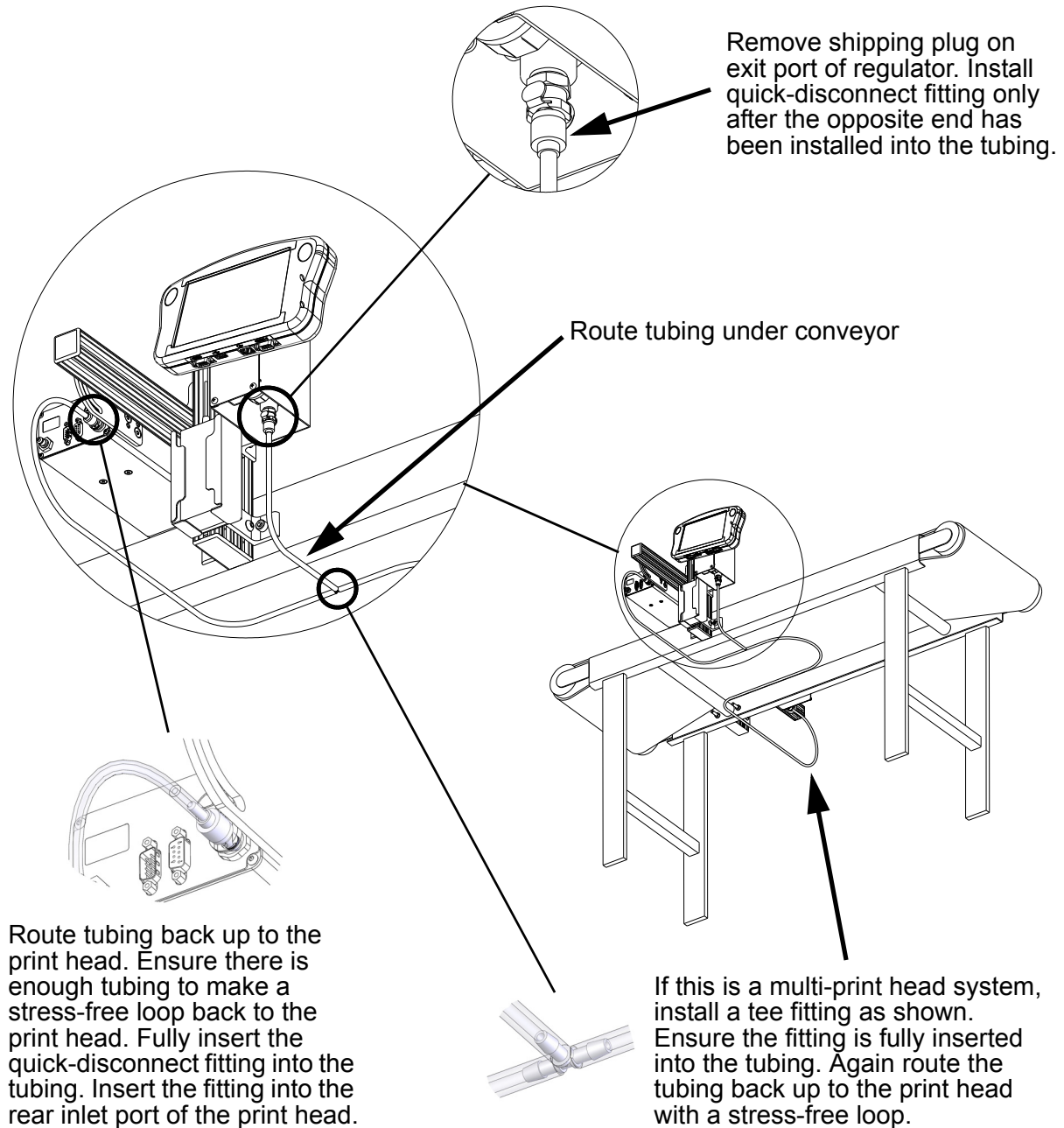
Adjust print head horizontally to set print gap.



Step 6: Install Tubing

CAUTION: DO NOT INSTALL PRESSURIZED INK CAN YET. All tubing connections must be made first.

1. Install / route tubing per diagram.
2. Insert quick-disconnect fittings at each open end of the tubing. One quick-disconnect fitting is supplied with the pressurized ink can system, and an additional fitting is supplied with each print head.
3. Remove plug from the exit port of the regulator.
4. Insert the tube / quick-disconnect fitting into the appropriate open ports on the ink supply and print head(s).

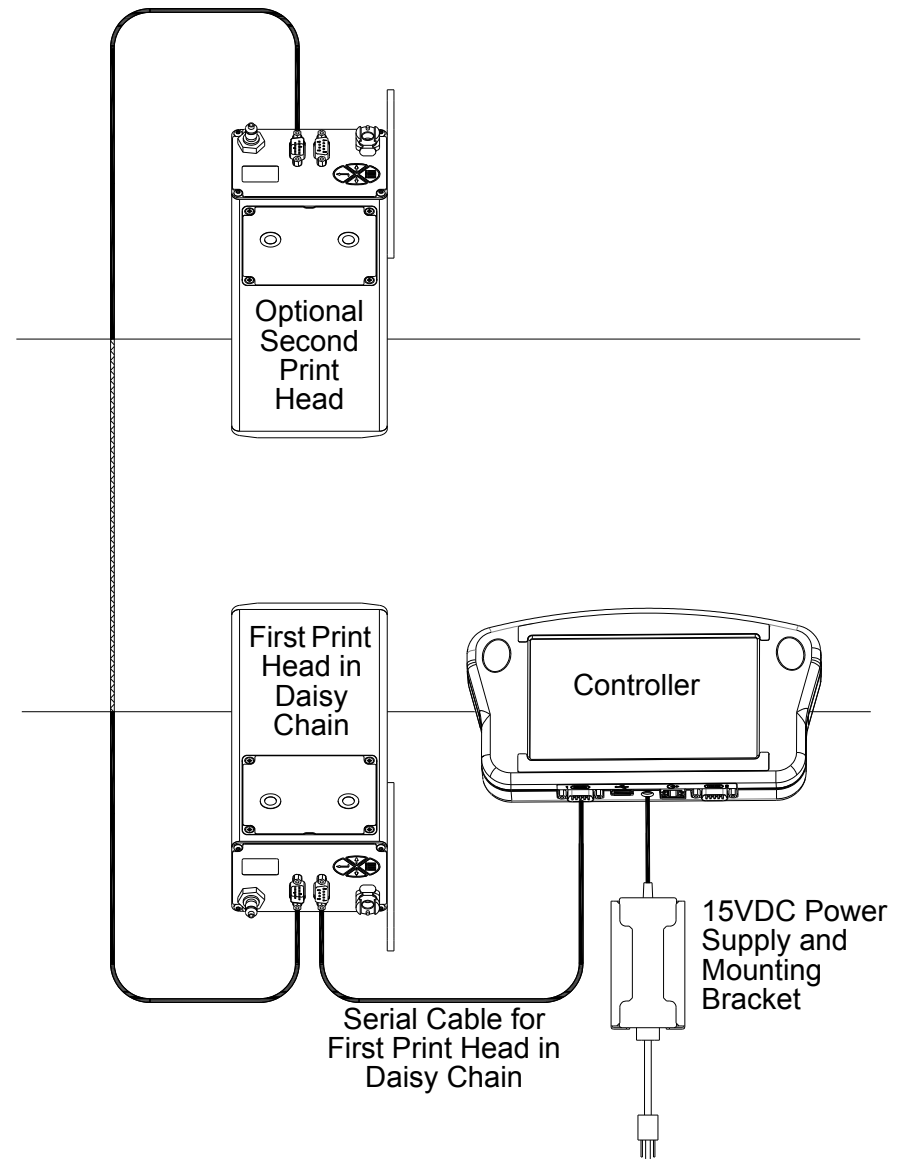


Step 7: Electrical Connections

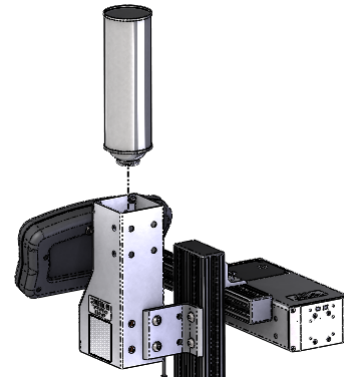


CAUTION: Power should be disconnected from the controller prior to connecting or disconnecting any external device, including print head daisy chain cables or ancillary cables for a photocell, encoder, etc. Electrical arcing may occur if external cabling is connected or disconnected while power is supplied to the unit.

After making all other electrical connections, connect the included Power Supply to the AC mains (100V - 240 VAC). The controller will turn on and an LED light will show up on all print heads. After power and boot up, the controller will start on the Home screen.

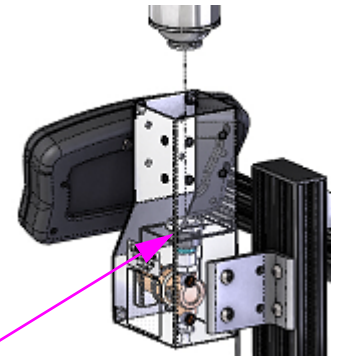


Step 8: Bleed Ink Lines and Print Heads



Remove shipping tube / cap from the ink canister inlet side.

Insert can of ink into opening of Pressurized Ink Can supply down to the receiver. Rotate can clockwise until resistance is felt. System is now pressurized with ink.



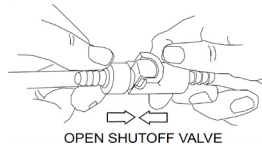
Ink Can Receiver



CAUTION: Ensure that the shutoff valve on the effluent bottle system is closed prior to connecting to the last print head in the daisy chain.

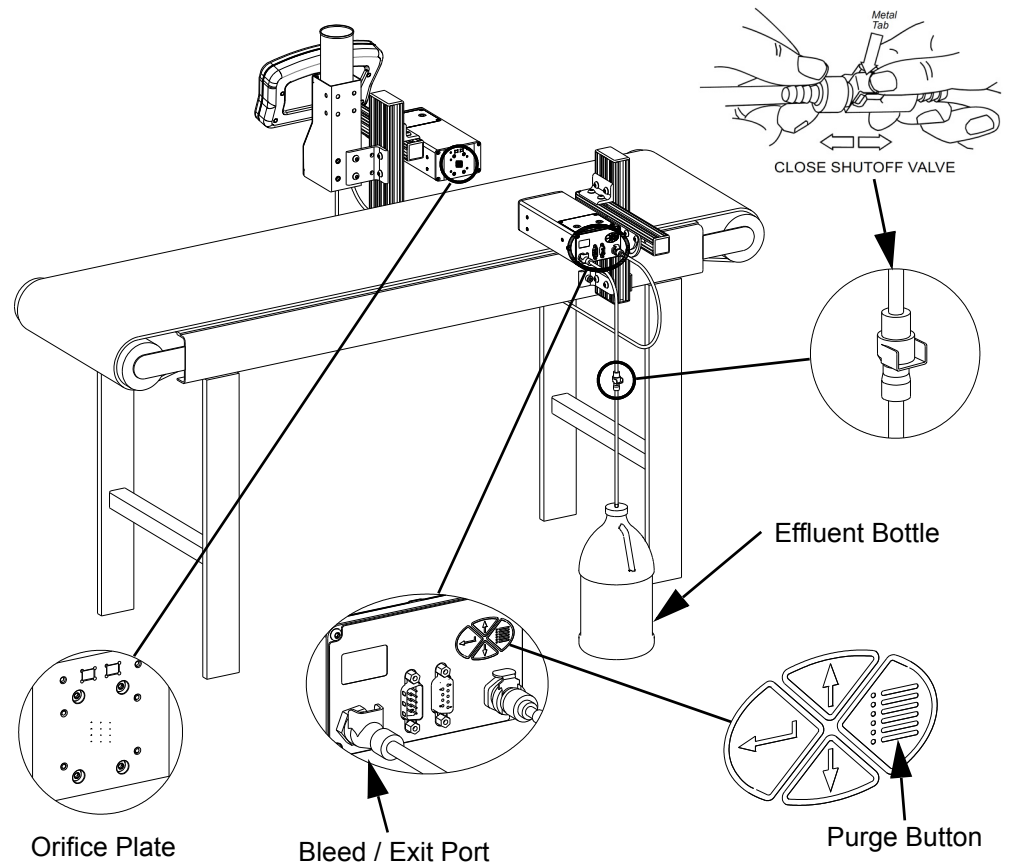
Bleed Steps:

1. Insert effluent bottle system quick-disconnect fitting into the exit (bleed) port of the last print head in the daisy chain.
2. Crack open the shutoff valve and observe ink flow through the ink lines from the pressurized ink supply. Ink will fill the lines.



OPEN SHUTOFF VALVE

3. When ink passes through this print head and out of the bleed port and into the effluent bottle, close the shutoff valve. Note that upstream print heads will not be bled.
4. Disconnect the effluent bottle system and connect to the next print head upstream in the daisy chain.
5. Again, crack open the shutoff valve until ink flows into the effluent bottle.
6. Repeat the print head bleed steps to all remaining print heads.
7. Hold an absorbent towel over the orifice plate at the front of any print head and press the **Purge** button on the rear of the print head until ink is observed on the towel.
8. Repeat step 7 on all other print heads.



Orifice Plate

Bleed / Exit Port

Effluent Bottle

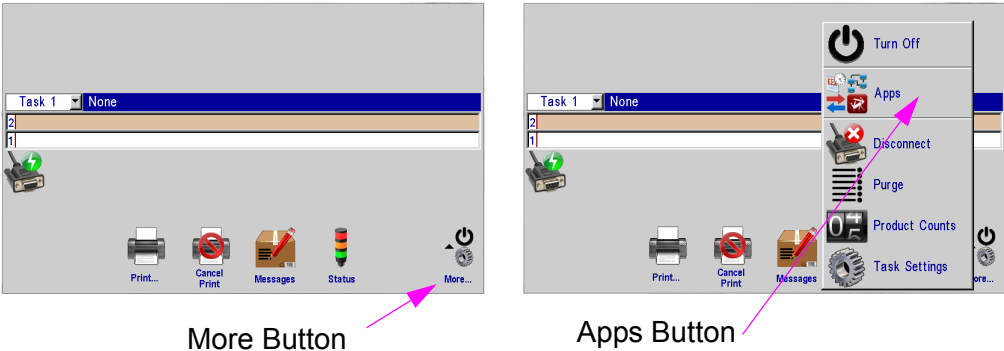
Purge Button

Step 9: Serial Port Setup

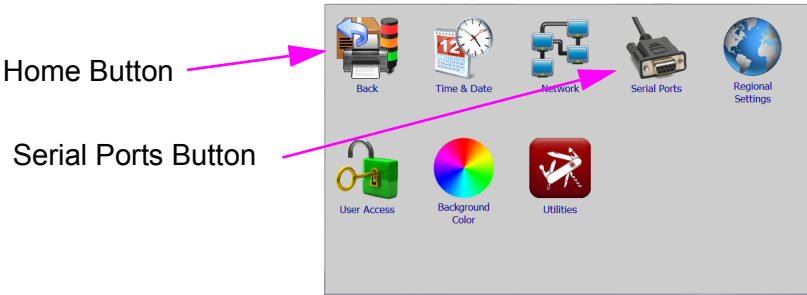


NOTE: Depending on the controller configuration, this step may already be complete.

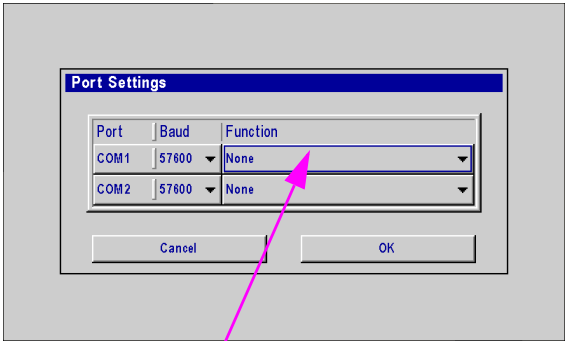
On the **Home** screen, press the **More** button, then the **Apps** button.



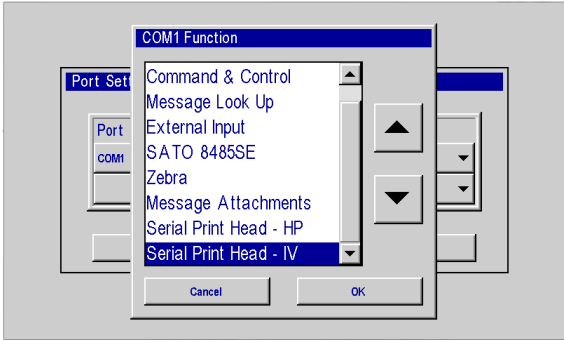
On the **Apps** screen, press the **Serial Ports** button.



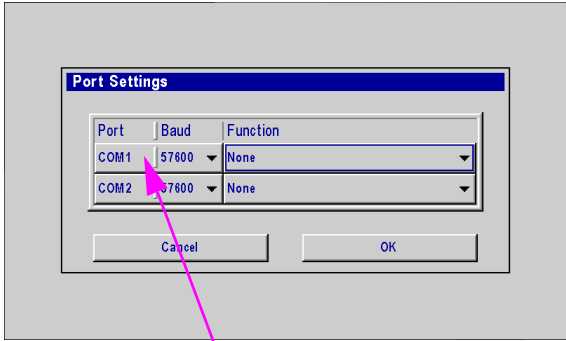
On the **Ports Setting** screen, press the **COM1 Function** button, select **Serial Print Head- IV**, and press **OK**. Press **OK** again to exit the Port Settings screen.



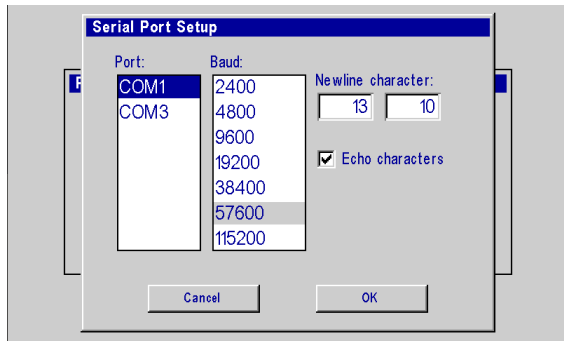
COM1 Function Button



If using a PC, press the **COM1 Settings** button to open the Serial Port Setup dialog box. Select the desired COM port (only those ports available are listed) and press **OK**. Press **OK** again to exit the Port Settings screen.



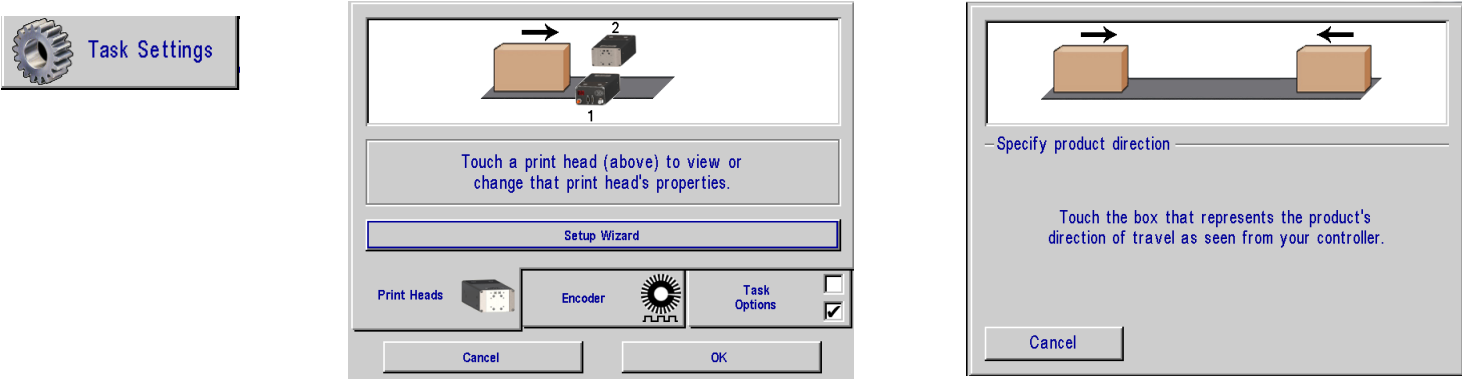
COM1 Settings Button



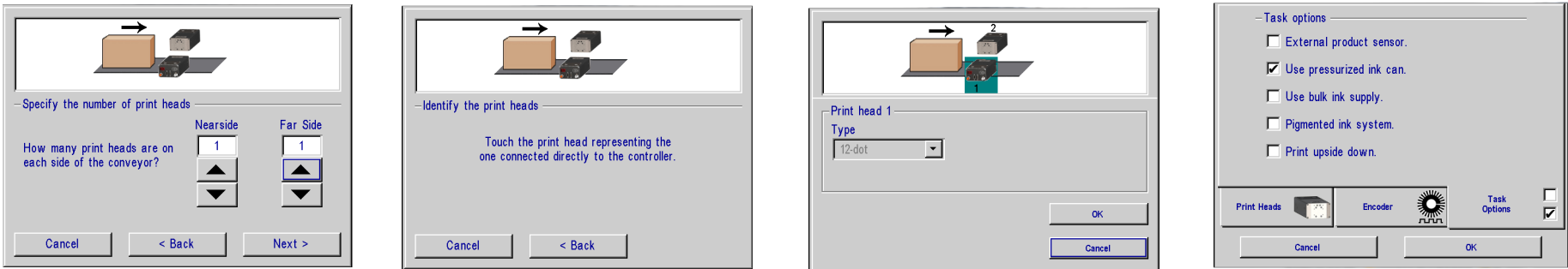
Press the **Home** button to return to the **Home** screen.

Step 10: Configure the Print Head

On the **Home** screen, press the **More** button, and then press **Task Settings**. On the **Print Heads** page, press the **Setup Wizard** button. Select the product direction.

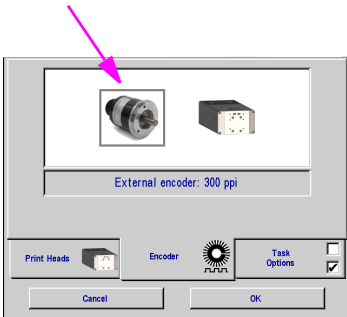


Set the number of print heads, identify their positions relative to the controller, and select the appropriate task options.

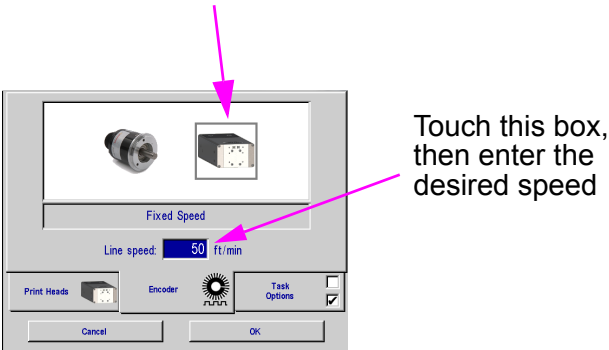


Select the **Encoder** tab and choose the desired encoder type.

External Encoder:
Line speed measured
by an externally
mounted encoder con-
nected to the last print
head in the daisy chain



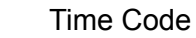
Fixed Speed:
User enters the
desired line speed



From the **Home** screen, select the **Messages** button and then the **New** button to enter the **Message Editor**.



New Message Button



Message Display Area

Carton Ruler

- Next Field Button

- Field Properties

Font Selection

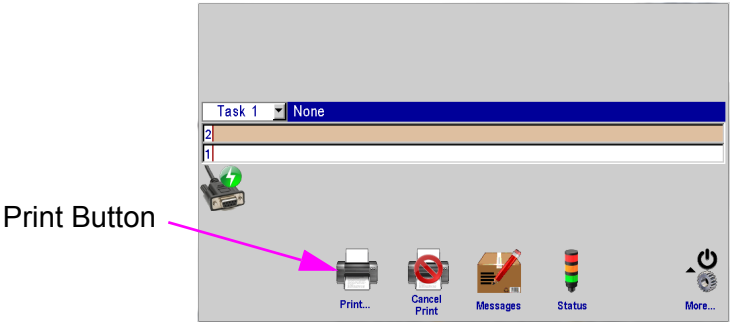
Delete Button

Product Side

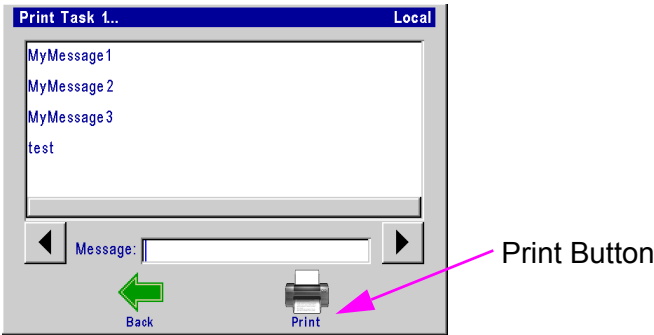
Line Field

Step 12: Print a Message

From the **Home** screen, press the **Print** button.



Select the desired message to print, and press the **Print** button.



The message will print on the next photocell trigger.



Section 3: User Interface

On-Screen Keyboards & Numeric Keypads

Keyboard Button:

- Edit screen only: Press once to show the keyboard; press again to hide it.
- All other screens and dialogs: Keypad or keyboard appears when text or numeric input box is touched.

Layer Select:

- Pressing the **Layer Select** button cycles through letters, numbers & symbols, and extended characters.

Language Select Button:

- Changes keyboard layout to that of the language selected. Changes keyboard layout only; user interface language does not change.

ESC (Escape):

- Undoes any changes made to any input entry box. If no changes made, hides the keypad or keyboard.
- Edit screen full keyboard: always hides the keyboard.

Arrow Keys:

- Moves highlighted fields or the cursor around in the Message Editor.

Tab:

- Shifts focus between fields in the Message Editor.

Backspace:

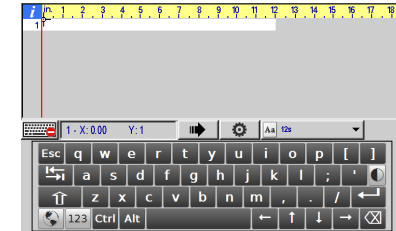
- Deletes the character to the left of the cursor.
- On the edit screen, deletes a highlighted (red) field.

Ctrl (Control) in Message Editor:

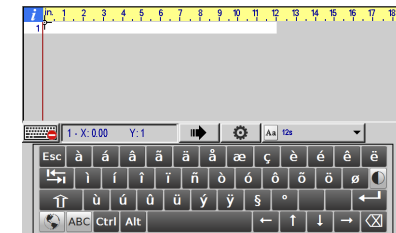
- Amplifies the movement of the arrow keys.
- Press **Ctrl-Enter** to insert a new line in a text field.

Shift:

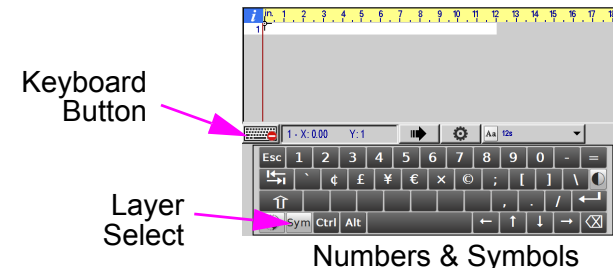
- Press **Shift** once to make the next character upper case.
- Press **Shift** twice for shift lock. Press **Shift** again to exit shift lock.



Letters



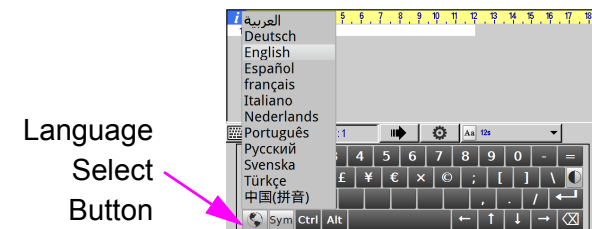
Extended Characters



Keyboard Button

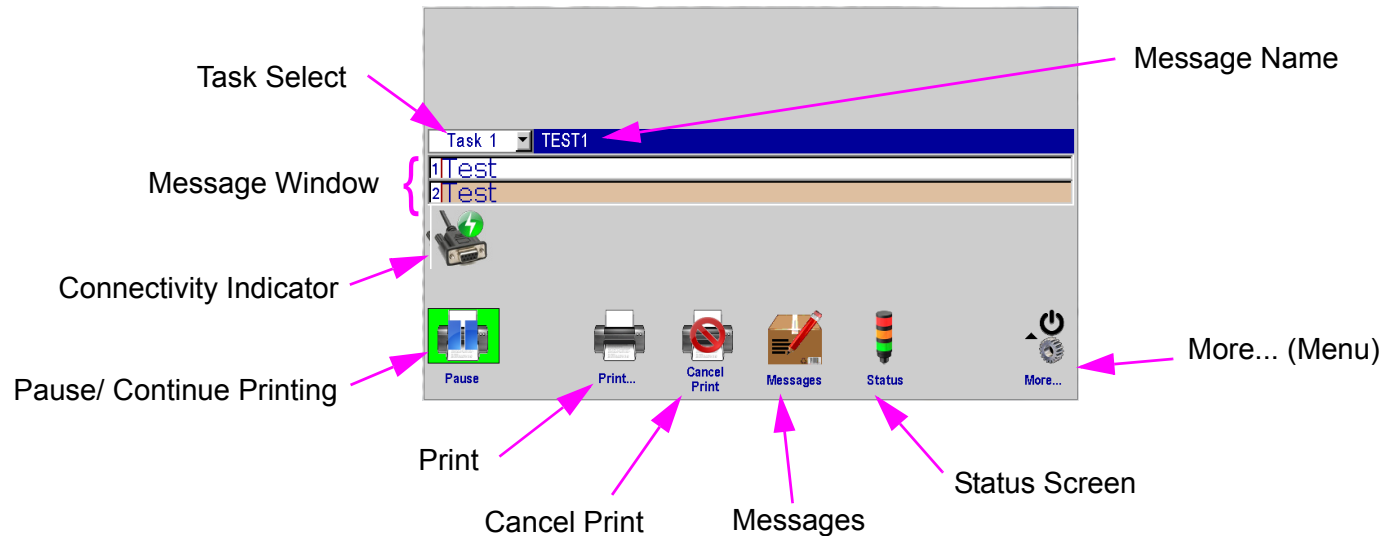
Layer Select

Numbers & Symbols



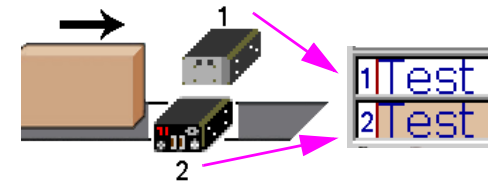
Language Select Button

Home Screen:



Message Window:

- Displays the current print message
- Updated approximately every seven seconds, so every print may not be displayed.
- Touch and swipe the **Message Window** to scroll the message.
- White or Beige bars represent the print heads. The numbers in the left margin correspond to the numbers assigned to the print heads during system setup.
- The window header displays the task number and the file name of the message being printed. **"None"** is displayed when no message is being printed.



Task Select Drop Down List:

- On dual task systems, switches controller operation from one task to another.



Pause/Continue Button:

- The **Pause/Continue** button appears only when a print message is displayed in the Message Window.
- Press **Pause** to halt printing. Any message being printed will finish before printing is halted.
- Press **Continue** to resume printing. Print will resume on the next photocell trigger.



Pause



Continue



Print Button:

- Press **Print** to select a message to print.
- Select the desired message and press the **Print** button. The message will print at the next photocell trigger.



Cancel Print Button:

- Press the **Cancel Print** button to remove the current message from the print head(s) and stop print.



Connectivity Indicator:

- Indicates the controller is electronically connected to and communicating with the print heads.

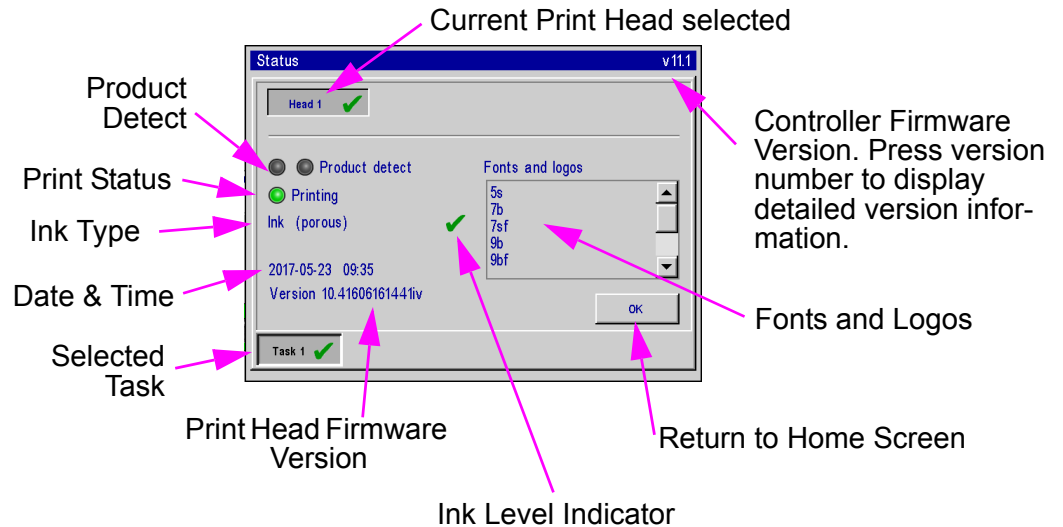
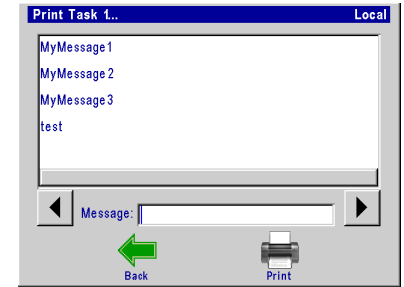


- Indicates the controller is electronically disconnected and is not communicating with the print heads.



Status Button:

- Press the **Status** button to display the Status screen. The Status screen displays:
 - Controller firmware version number.
 - Fonts and Logos present on the selected print head.
 - Product Detect status.
 - Printing status. Indicates the presence of a print message on the selected print head.
 - Ink Type, if applicable.
 - Current Date and Time, as reported by the selected print head's clock.
 - Print head firmware version number.
 - Ink Level Indicator (Green = Good, Yellow = Low, Red X = Out).



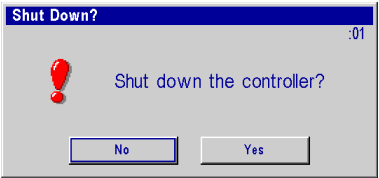
More... Menu Button:



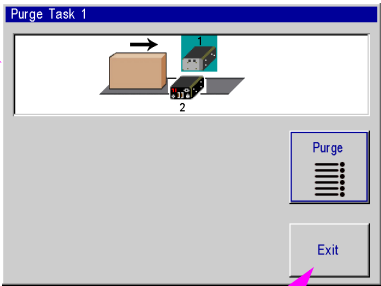
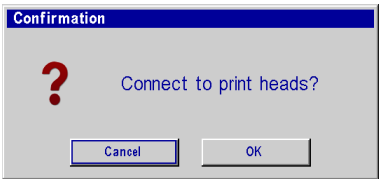
(See “The Apps Screen” on page 32.)

Fires all jets for a short period of time on the selected print head.

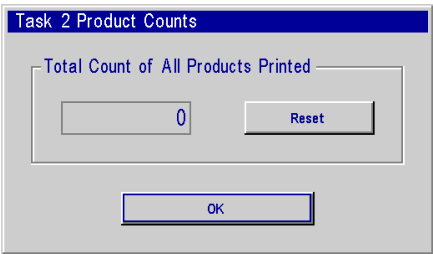
(See “Step 10: Configure the Print Head” on page 17.)



To turn the controller on, touch anywhere on the touchscreen.



Returns to Home Screen



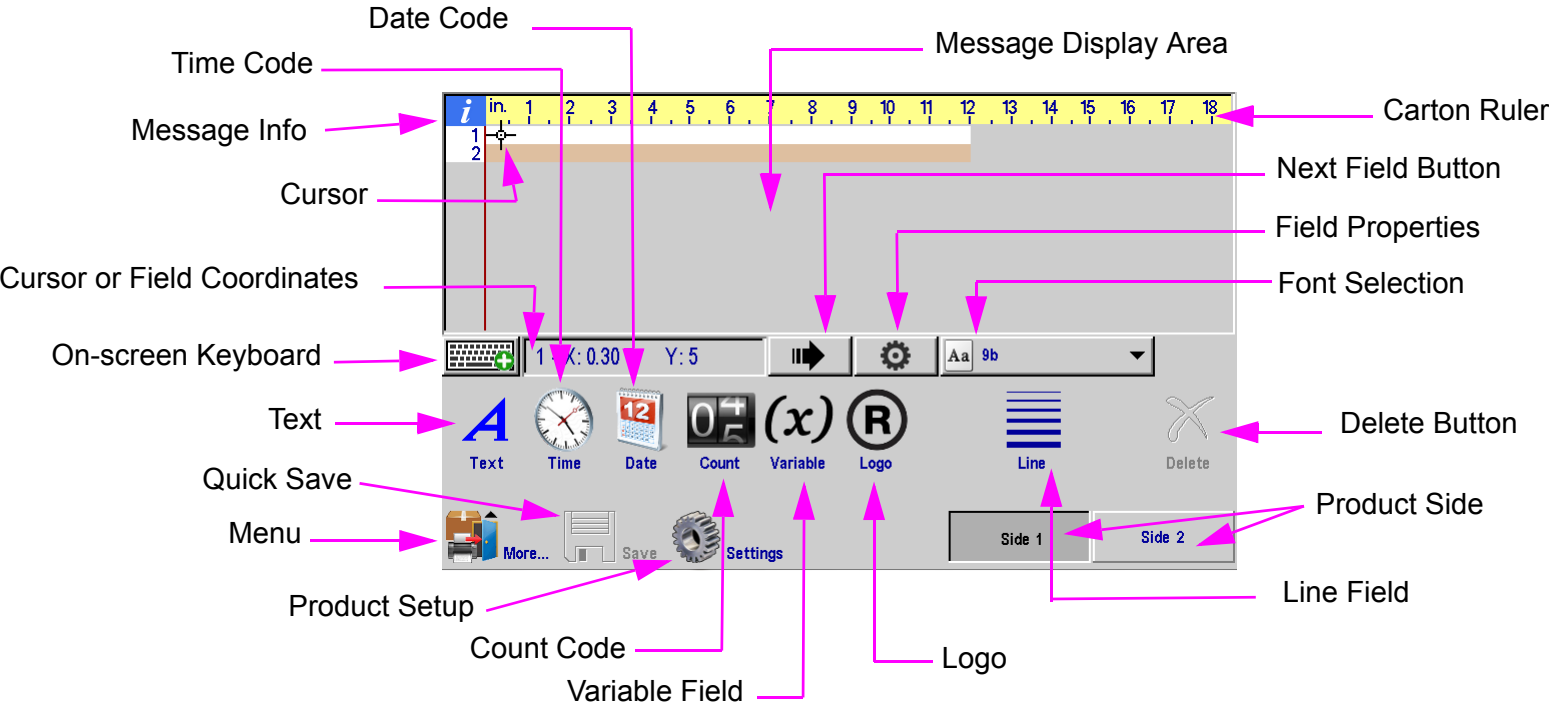
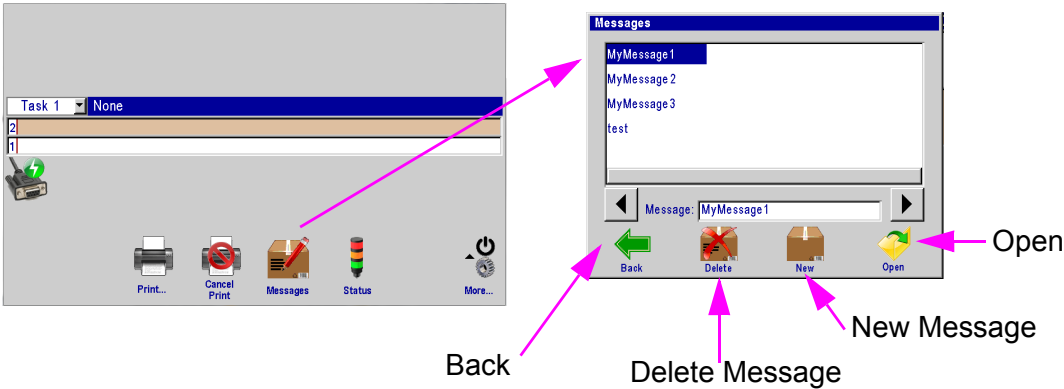
Displays count of all products printed.

Message Editor

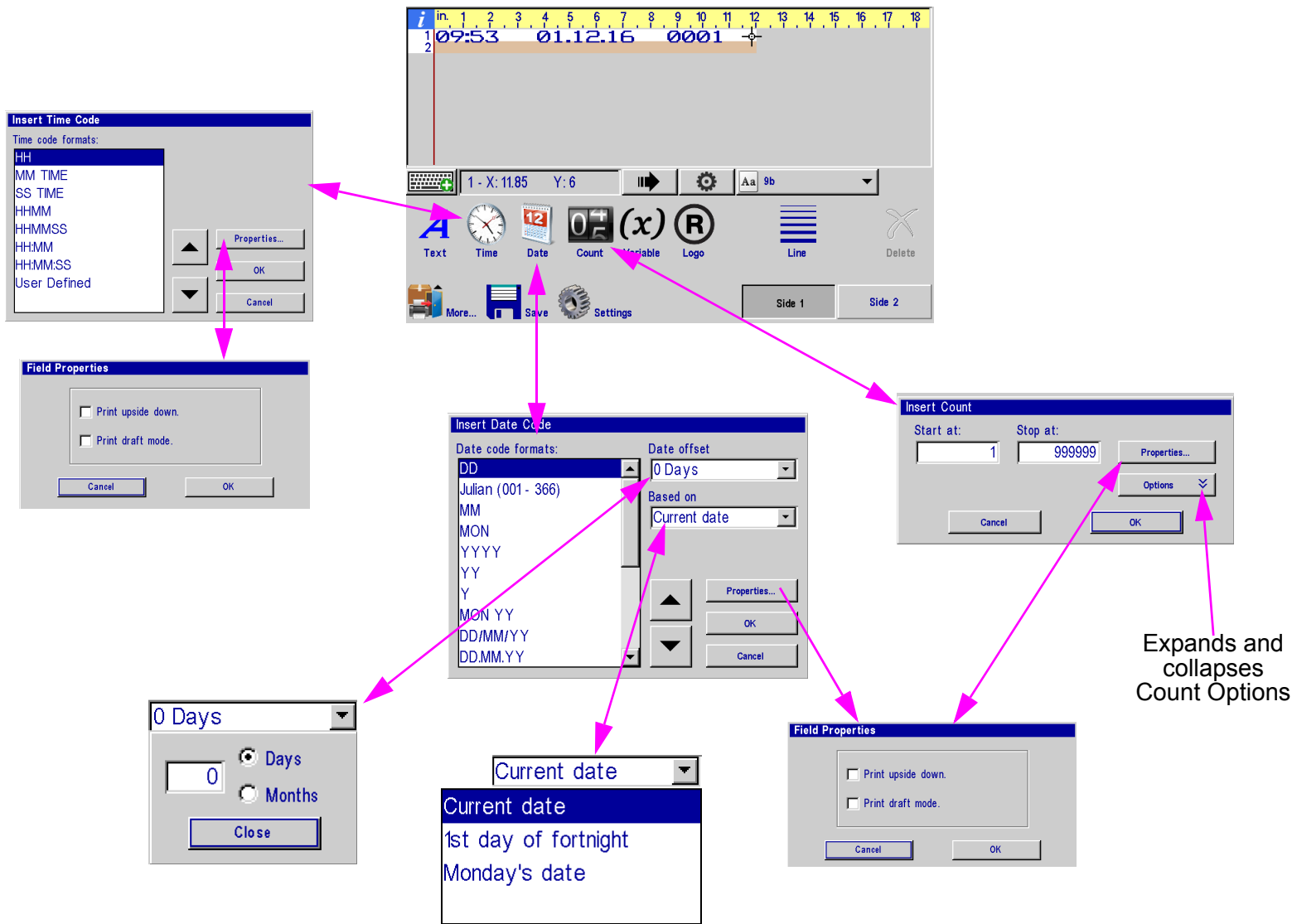


Message Button:

- Press the **Message** button on the **Home** screen to bring up the message screen.
- To create a new message press the **New** button.
- To edit an existing message, select the message and then press the **Open** button.
- Both editing a message and creating a new message will bring up the message editor.



Time, Date, and Count Codes



User Defined Time Codes

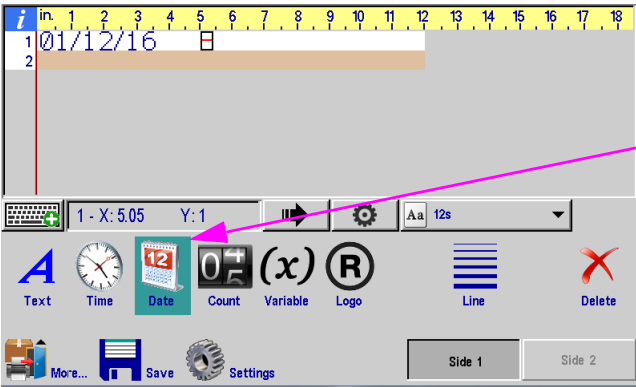
When **User Defined** is selected, **Define Time Code** button appears.

Sequential format: minute code shown. Minute 00 = AA, 01 = AB, 02 = AC, etc.

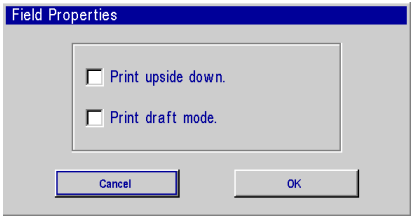
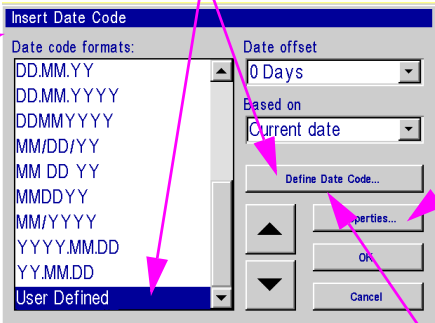
Tabular format: codes printed taken from table. Use default codes (default Hour codes shown) or edit table to suit your requirements.

Periodic format: example illustrates a shift code implemented by using a periodic quarter hour code. 'A' prints from 23:30 - 06:59, 'B' from 07:00 - 15:29, and 'C' from 15:30 - 23:29.

User Defined Date Codes

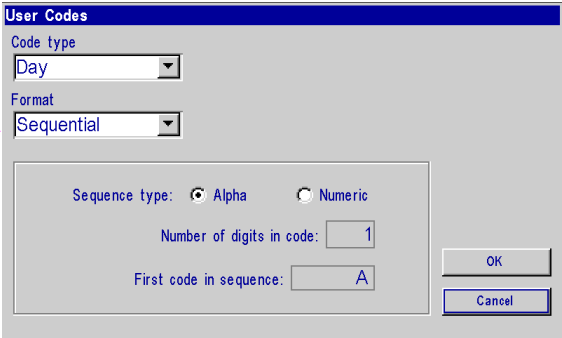
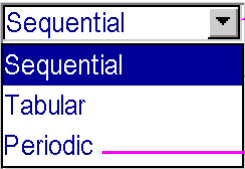
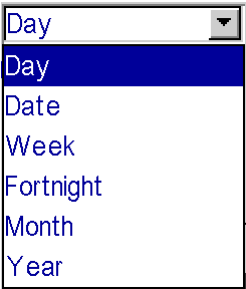


When **User Defined** is selected, **Define Date Code** button appears.

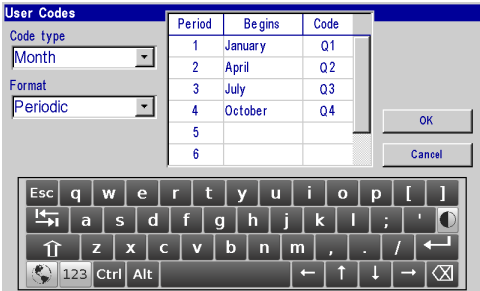
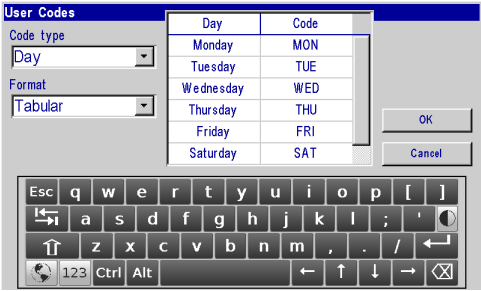


Sequential format: minute code shown. Day 1 = A, Day 2 = B, Day 3 = C, etc.

The Fortnight code type is available for the Tabular format only.

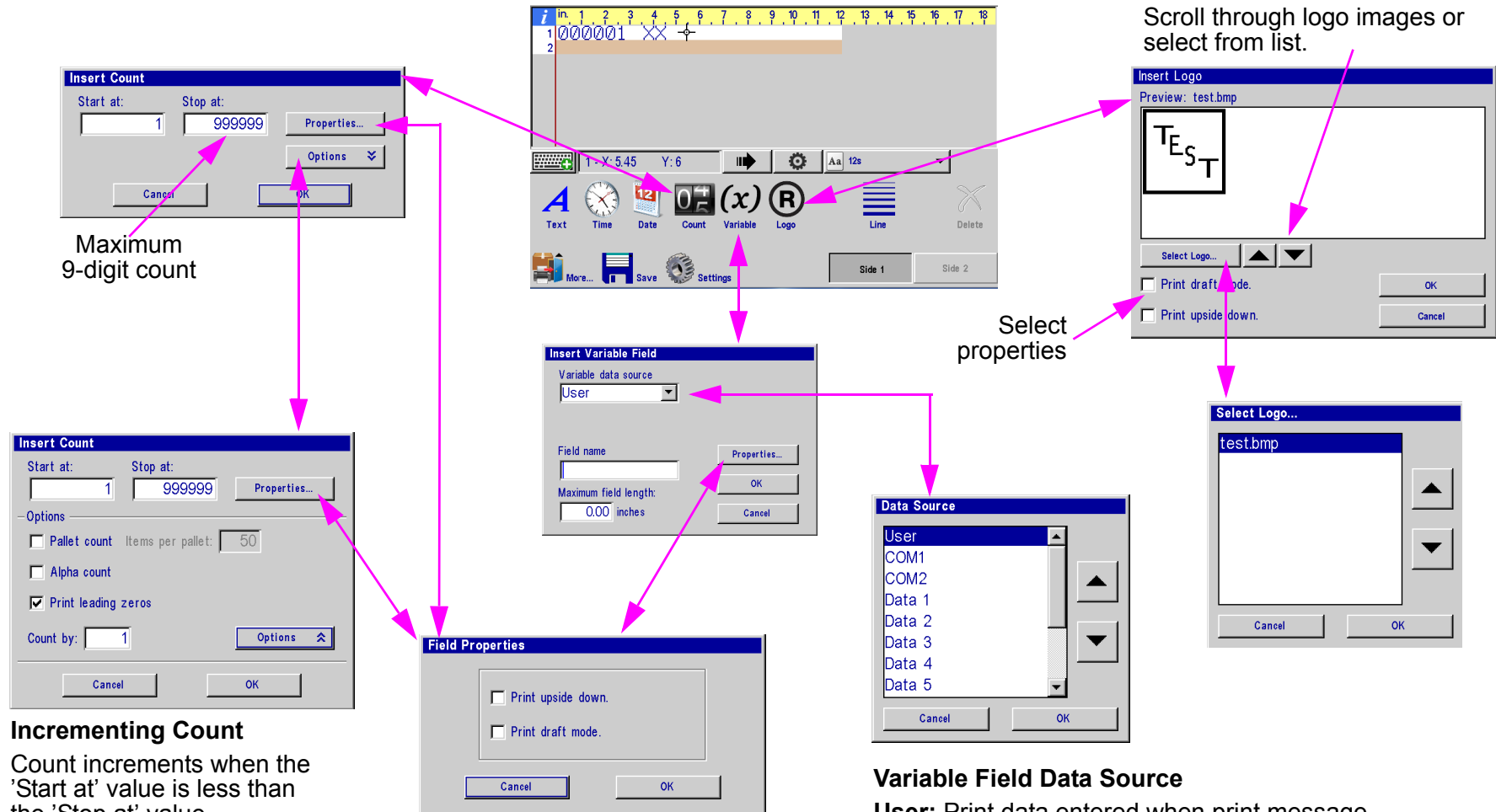


Tabular format: codes printed taken from table. Use default codes (default Day codes shown) or edit table to suit your requirements.



Periodic format: example above illustrates a quarter year code implemented by using a periodic month code. 'Q1' prints from Jan 1 - Mar 31, 'Q2' from Apr 1 - Jun 30, etc.

Product Counts, Variable Fields, Logos



Maximum
9-digit count

Insert Count

Start at: Stop at:

Options

☐ Pallet count Items per pallet:

☐ Alpha count

☒ Print leading zeros

Count by:

Incrementing Count

Count increments when the 'Start at' value is less than the 'Stop at' value.

Decrementing Count

Count decrements when the 'Start at' value is greater than the 'Stop at' value.

Data Source

User
COM1
COM2
Data 1
Data 2
Data 3
Data 4
Data 5

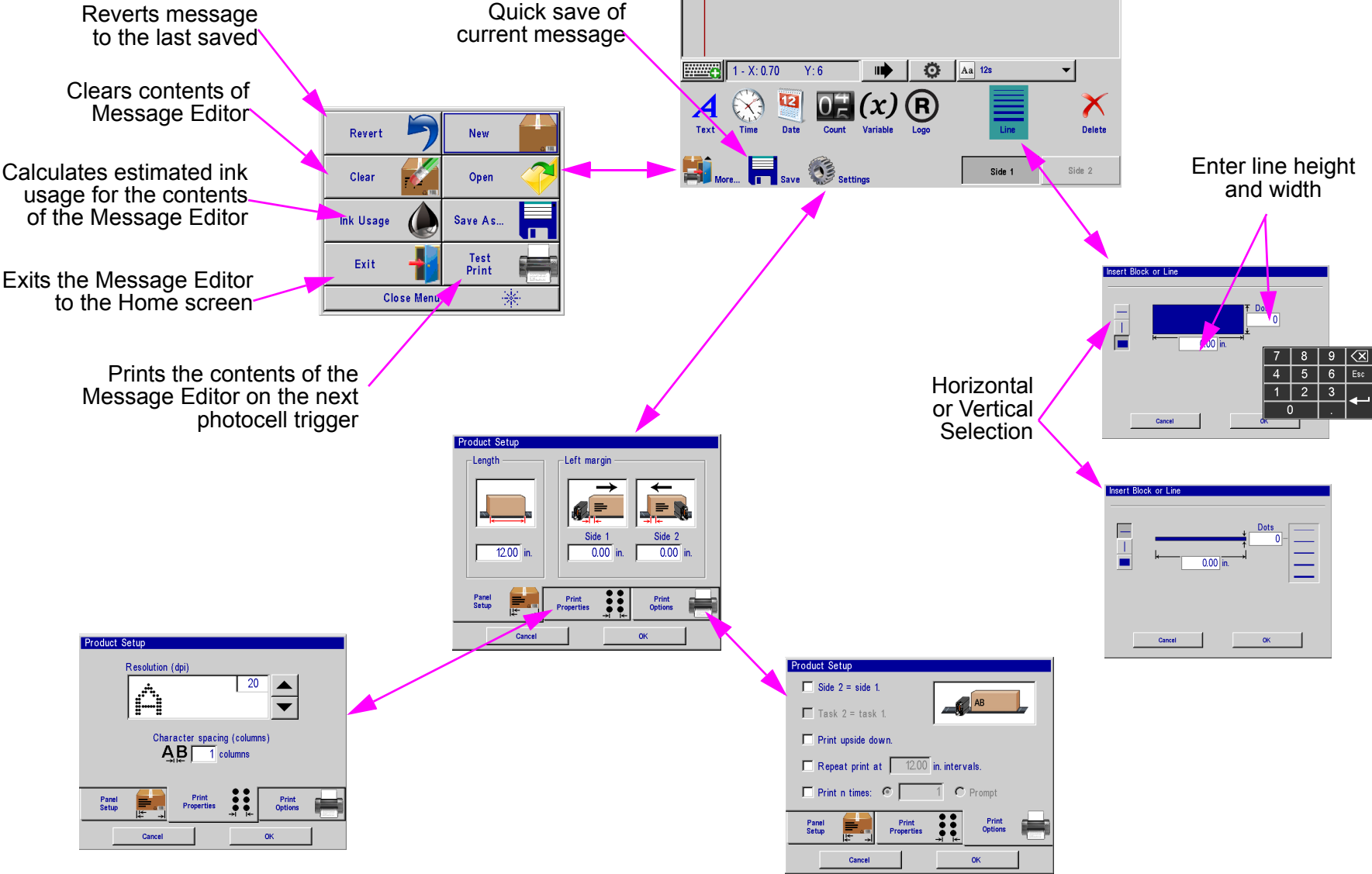
Variable Field Data Source

User: Print data entered when print message containing the variable field is selected to print.

COM1, COM2: Data is received through COM1 or COM2 serial port. Data must be received before the message is selected to print.

Data 1-10: Data is retrieved from corresponding system variable. User has the option to change the data when the message is selected to print.

Lines, Product setup, & Menu





Message Info Box

Delete Button

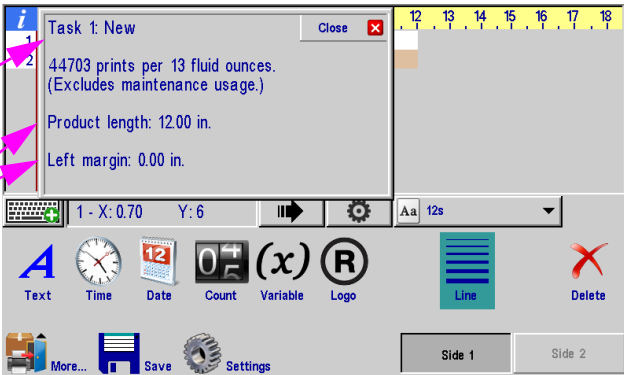


- Deletes the selected field.

Message Info Box

Task number & message name

Product length & left margin settings



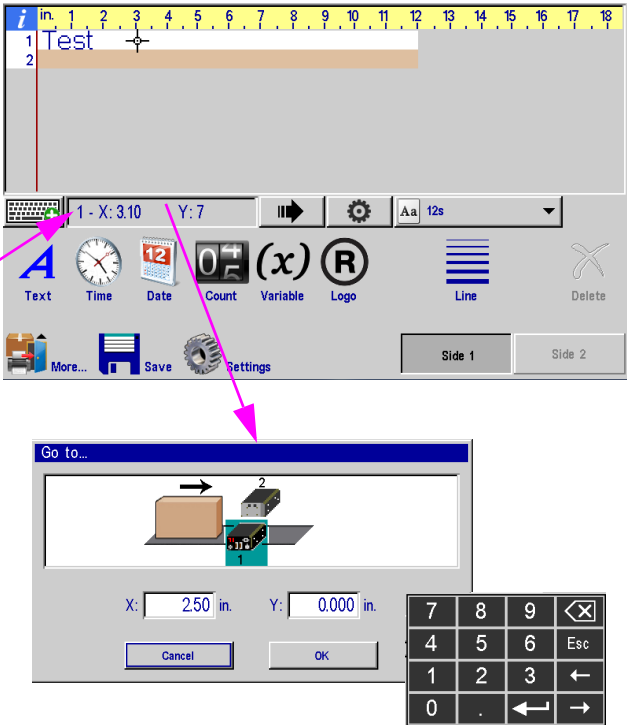
Direct Entry of Cursor or Field Position

Direct Entry Box

Field: Selecting the **Direct Entry Box** while having a field selected will allow the user to manually input the X & Y location of the selected field.

Cursor: When no fields are selected, the **Direct Entry Box** will allow the user to manually input the X & Y location of the cursor.

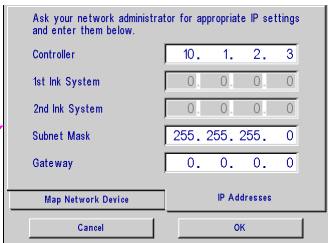
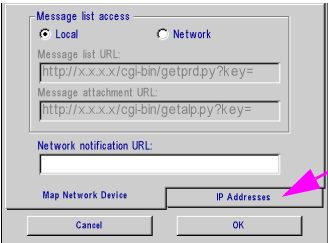
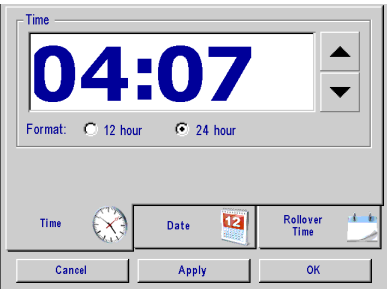
Print Head Number (Touch box)



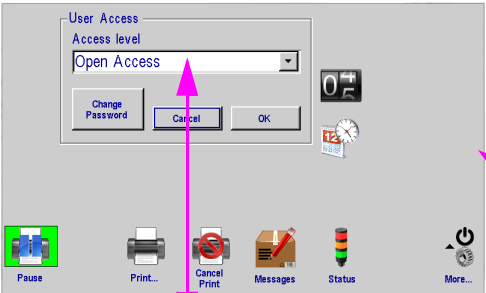
The Apps Screen



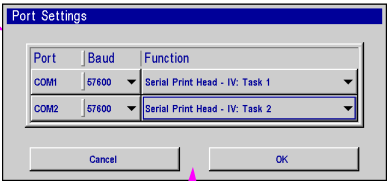
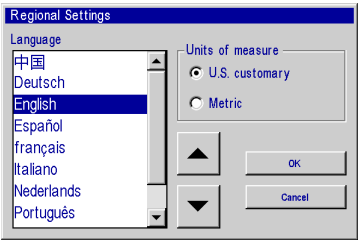
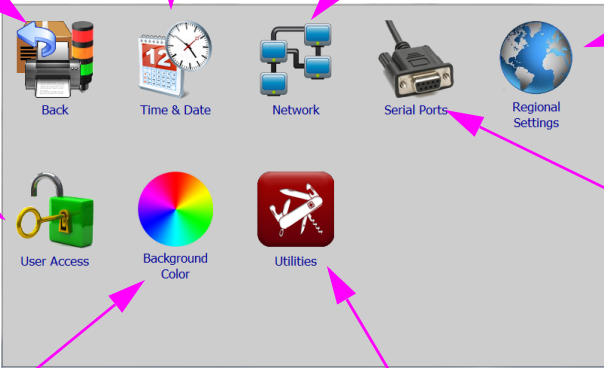
See “Time, Date, and Rollover Time Screen” on page 33



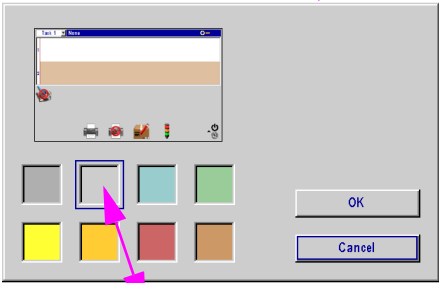
Return to the Home screen



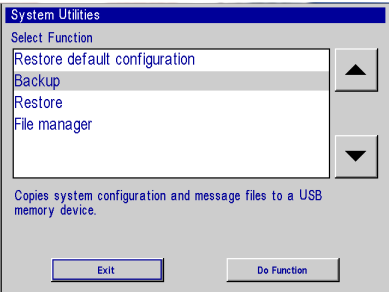
See “User Access” on page 33



See “Step 9: Serial Port Setup” on page 15



Select Background color



Time, Date, and Rollover Time Screen

Set the controller's time and time format

NOTE: The 12 hour/24 hour format option applies to controller functions; it does not apply to time codes in print messages.

The screen displays the current time as 04:07. Below the time, there are radio buttons for '12 hour' and '24 hour' format. At the bottom, there are buttons for 'Cancel', 'Apply', and 'OK'. The 'Date' button is highlighted with a red box.

The screen shows a calendar for May 2017. The days of the week are listed at the top: Sun, Mon, Tue, Wed, Thu, Fri, Sat. The dates 1 through 31 are arranged in a grid. At the bottom, there are buttons for 'Cancel', 'Apply', and 'OK'. The 'Date' button is highlighted with a red box.

The screen displays the Rollover Time as 00:00. At the bottom, there are buttons for 'Cancel', 'Apply', and 'OK'. The 'Rollover Time' button is highlighted with a red box.

Press **OK** to return to the Apps screen

User Access

The screen has three input fields: 'Old password:', 'New password:', and 'Confirm new password:'. Below the fields are 'Cancel' and 'OK' buttons.

The factory set password is **Manager**. Passwords are case sensitive.

Controls within this box set the user access level. Buttons outside the box mirror the Home screen and indicate which functions are password protected and which are open.

The screen shows the 'User Access' section with a dropdown menu set to 'Open Access'. Below it are 'Change Password', 'Cancel', and 'OK' buttons. At the bottom, there are icons for 'Pause', 'Print...', 'Cancel Print', 'Messages', 'Status', and 'More...'. The 'More...' icon is highlighted with a red box.

The screen shows a list of access levels: 'Open Access', 'Restricted Access', 'Closed Access', and 'User Defined'. The 'Restricted Access' level is selected. At the bottom are 'Cancel' and 'OK' buttons.

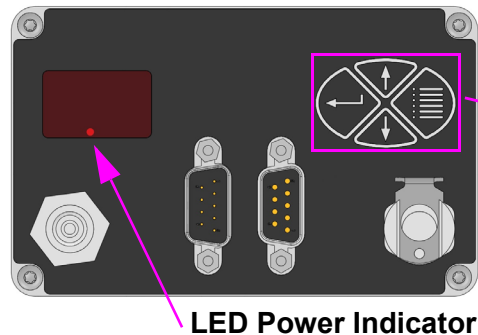
Padlock symbol indicates function is password protected.



Note: Users can either select a pre-defined access level from the list, or they can select **User Defined** and customize their permissions by touching icons on the **User Access** screen.

Section 4: Print Head Functionality

Home Screen:



Enter Button:
Executes a command

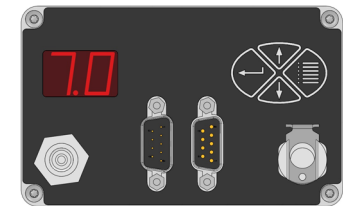
Up Arrow:
Scrolls up a list or increases pulse width

Purge Button:
Ejects ink from all or individually selected channels

Down Arrow:
Scrolls down a list or decreases pulse width

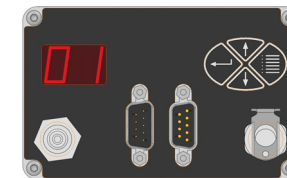
Pressure Screen:

- Pressing the **Enter** button from the **Home** screen displays the ink pressure in psi on the inside of the print head (e.g. 7.0 psi)
- After 30 seconds, the display returns to the Home screen.



Print Head Purge:

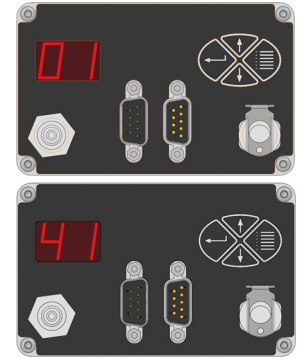
- Press and hold the **Purge** button to fire all print channels.
- If the **Enter** button is pushed from the **Pressure** screen, then an individual channel is displayed (e.g. channel 1).
- Individual channels can be selected using the up and down arrows. Pressing the **Purge** button will only eject ink for the individual channel selected.
- To return to the **Home** screen, press the down arrow until the **Pr** (Pressure) screen is reached, and then press the **Enter** button.



Pulse Width (Printed Dot Size) Adjustment:

- From the **Home** or **Pressure** screen, simultaneously press the Up and Down arrows. The last active channel will display (e.g. channel 1).
- Select the desired channel to change the pulse width using the Up and Down arrows.
- Press the **Enter** button.
- The current pulse width value is displayed (e.g. 41).
- Use the Up and Down arrows to increase or decrease the pulse width.

Press the **Enter** button to save the change. If the **Enter** button is not pressed within 30 seconds, then the pulse width is not changed.



Section 5: Maintenance & Shutdowns

The following are the recommended maintenance procedures to keep the system printing cleanly and efficiently.

System Maintenance

Intermittent (as required):

1. Be sure the photosensor is clean and free of debris.
2. Be sure the O-rings on the encoder wheel are present and not worn (cracked and/or chipped).
3. Be sure the nuts and bolts holding the bracketry in place remain tight.
4. Equipment may be cleaned utilizing the appropriate conditioner for the ink. See “Consumables” on page 56.

CAUTION: Do not spray conditioner on, or wipe off, exposed electrical connections.

Annually:

1. Replace encoder O-rings (refer to “Optional Equipment” on page 58).
2. Recalibrate Touch Screen.

Print Head Maintenance

Daily Startup

Wear safety goggles when working with industrial inks or solutions!

1. Clean print head faceplates with the appropriate conditioner for your ink system. Spray conditioner on a lint-free wipe and wipe the faceplate in a circular motion to remove ink from the orifices. Maintenance sprays are conveniently packaged in pressurized cans. See “Consumables” on page 56.
2. Inspect lines and connections for leaks. Make repairs if needed.
3. Inspect all electrical connections and cabling for damage, and replace as necessary.

Preventative Maintenance at 2000 Hours

- Thorough cleaning of print head.
- Solenoid and pulse-width adjustment for optimal dot size.

Shutdowns of Seven Days or Longer

For extended shut down periods, it is recommended that the print head(s), regulator(s) and the optional ink delivery system be thoroughly flushed with appropriate conditioner. In order to perform this procedure, an adequate supply of conditioner and an additional cap assembly for the optional ink delivery system are required. Refer to “Consumables” on page 56.

1. Remove the ink.
2. Install the can of conditioner / solvent.
3. Connect an effluent bottle system as discussed in “Step 8: Bleed Ink Lines and Print Heads” on page 14.
4. Perform the “Bleed Steps:” in “Step 8: Bleed Ink Lines and Print Heads” on page 14.

Section 6: Troubleshooting

NO PRINT

Symptom	Possible Cause	Actions
No print head power / red LED on rear of print head	<ul style="list-style-type: none"> Power Supply AC Source 	<ul style="list-style-type: none"> Check power supply light indicator. Check for AC power source between power supply input limits.
Pressure is low indicated by an "Ink Low" or "Ink Out" on the controller	<ul style="list-style-type: none"> Ink can is empty Regulator is set low or malfunctioning 	<ul style="list-style-type: none"> Replace with new can of ink. Refer to "Ink Regulator Adjustment" on page 39.
Print head purges but won't print desired message	<ul style="list-style-type: none"> No print message on print head Controller or PC software not configured for Serial Print Head Encoder Malfunction Product not triggering photocell. 	<ul style="list-style-type: none"> Ensure the desired print message appears on the controller home screen. If not, reselect message to print. Configure task to serial print head. Refer to "Step 9: Serial Port Setup" on page 15. Ensure encoder is installed and plugged into the last print head in the daisy chain. Ensure the product is within 1/4" of the front face of the print head. If an external photocell is installed, validate the setting from the Control Panels, System Setup, Task Options tab. Ensure print head photocells are clean.

POOR PRINT QUALITY

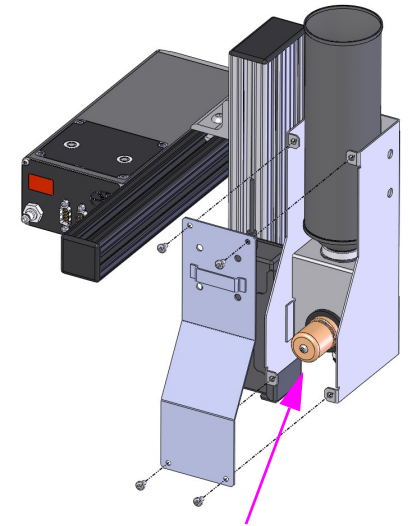
Symptom	Possible Cause	Actions
Print is splattered or excessive satellites	<ul style="list-style-type: none"> Print head is mounted too far away from the substrate Pulse width(s) set too high Print head pressure set too high 	<ul style="list-style-type: none"> Adjust the print head to within specifications. See "Step 5: Adjust Print Head to Substrate" on page 11. See "Print Head Purge:" on page 34. Refer to "Ink Regulator Adjustment" on page 39.
Dot columns are out of alignment	<ul style="list-style-type: none"> Product speed and print speed are not matched External encoder malfunction 	<ul style="list-style-type: none"> From the controller Home screen, press the Control Panels button, System Setup button, Encoder tab, and then make sure the Fixed Speed matches the actual line speed. Ensure the encoder wheel is properly tracking the belt and not bouncing. Ensure encoder o-rings are not worn, cracked, or broken.
Dot size variation or missing dots	<ul style="list-style-type: none"> Regulator is set low or malfunctioning Pulse width set too high or low Clogged or covered orifices 	<ul style="list-style-type: none"> Refer to "Ink Regulator Adjustment" on page 39. Refer to "Pulse Width (Printed Dot Size) Adjustment:" on page 35. Clean the orifice plate (See "Daily Startup" on page 37), and broach any orifice as necessary. See "Tools & Maintenance" on page 58 for broach kit.
Static seepage (ink seeping out of orifices when not printing)	<ul style="list-style-type: none"> High ink pressure Incorrect pre-load 	<ul style="list-style-type: none"> Refer to "Ink Regulator Adjustment" on page 39. See "Adjusting Solenoid Pre-load" on page 40.
Dynamic seepage (ink seeping out of orifices during print)	<ul style="list-style-type: none"> Pulse width set too low Low ink pressure Incorrect pre-load Expired ink 	<ul style="list-style-type: none"> Refer to "Pulse Width (Printed Dot Size) Adjustment:" on page 35. Refer to "Ink Regulator Adjustment" on page 39. See "Adjusting Solenoid Pre-load" on page 40. Replace ink and bleed new ink through system (see "Step 8: Bleed Ink Lines and Print Heads" on page 14).

Ink Regulator Adjustment



NOTE: The regulator installed inside the pressurized ink can system comes from the factory adjusted to the correct pressure. However, occasionally it may need to be adjusted for a change in pressure or has drift issues. **DO NOT** adjust the regulator for the purpose of increasing any or all dot sizes. The regulator should always be set to 7.0 +/- .3 PSI while not printing.

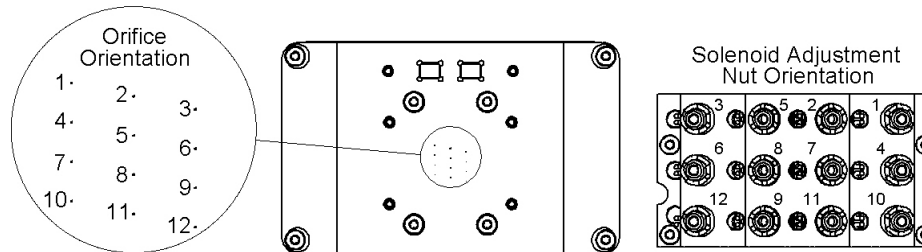
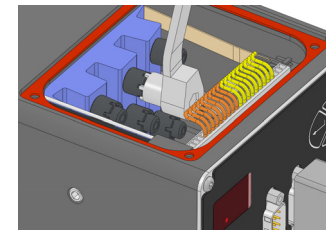
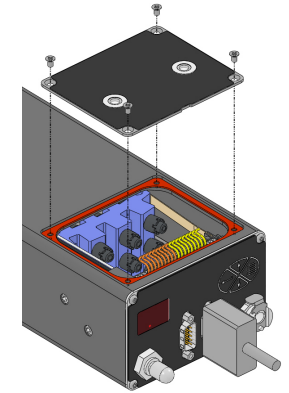
1. Remove the controller from the Pressurized Ink Can enclosure and place on a nearby stable object so it won't be damaged.
2. Remove the four screws holding the enclosure cover in place. The regulator is now exposed. Loosen the screw locking the regulator cap in place.
3. Connect an effluent system bottle to a nearby print head bleed port (see "Step 8: Bleed Ink Lines and Print Heads" on page 14) and ensure the shutoff valve is closed.
4. Open the shutoff valve and immediately turn the regulator knob clockwise fully (regulator full pressure).
5. Immediately turn the regulator knob counterclockwise fully until flow is shutoff.
6. Repeat steps 4 through 5 two more times.
7. Close the shutoff valve and remove the effluent bottle.
8. Adjust the operating pressure to 7.0 +/- .3 psi. Press the **Purge** button on the rear of the print head. Observe the pressure on the rear of the print head after it has stabilized.
9. Make small adjustments until the correct operating pressure is achieved. The **Purge** button must be pushed after each regulator adjustment.
10. If the regulator pressure never stabilizes, then it must be replaced. Refer to "Appendix I: Part Numbers" on page 56.



Ink regulator adjustment knob. Turn clockwise for more pressure and counterclockwise for less.

Adjusting Solenoid Pre-load

1. If any of the orifices are seeping statically (not printing) or dynamically (while printing), then the appropriate channel pre-load may need to be adjusted.
2. Ensure the print head is powered and ink line connected.
3. Remove the enclosure cover, exposing the solenoid mounting block and adjustment nuts.
4. The regulator pressure should be set to 7.0 +/- .3 psi while not printing. Refer to the previous section, "Ink Regulator Adjustment" if it is not.
5. Thoroughly clean the orifice plate with a clean non-abrasive cloth and maintenance spray, and then dry.
6. Hold a clean and absorbent cloth up to the front face of the print head and press the **Purge** button until all channels fire.
7. Wipe the orifice plate with a clean cloth and maintenance spray. Dry the orifice plate.
8. Observe the orifice plate for ink seepage over 30 seconds. Per the below diagrams, identify which orifice is leaking and its associated solenoid adjustment nut.
9. Turn the solenoid nut a very small amount counterclockwise (more pre-load) with a solenoid adjustment tool (see "Appendix I: Part Numbers").
10. Repeat steps 6 through 9 until the seepage stops.
11. If there are any nuisance valves that do not stop seeping, then the print head will have to be returned to the factory for refurbishment.



Appendix A: System Specifications

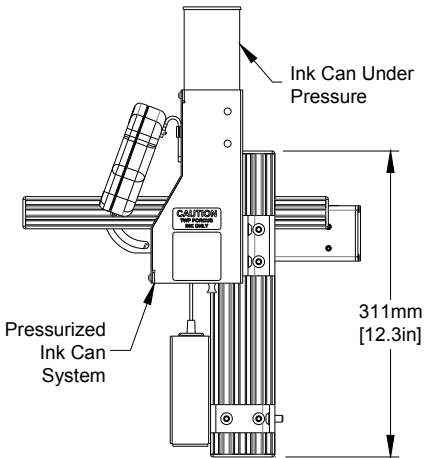
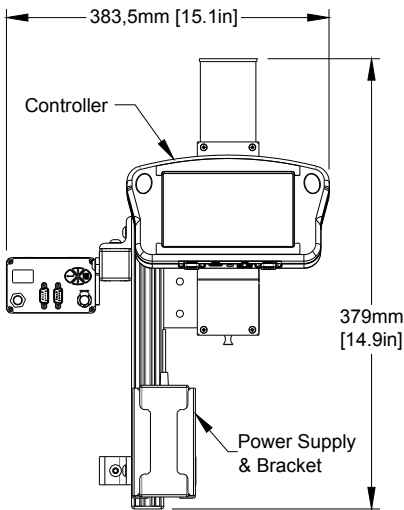
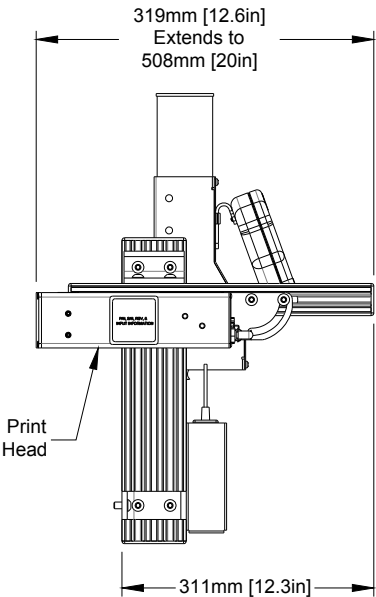
System

- A typical system consists of:
- Controller
 - Print Head
 - Pressurized Ink Can System
 - Power Supply and Mounting Bracketry
 - System Mounting Bracketry

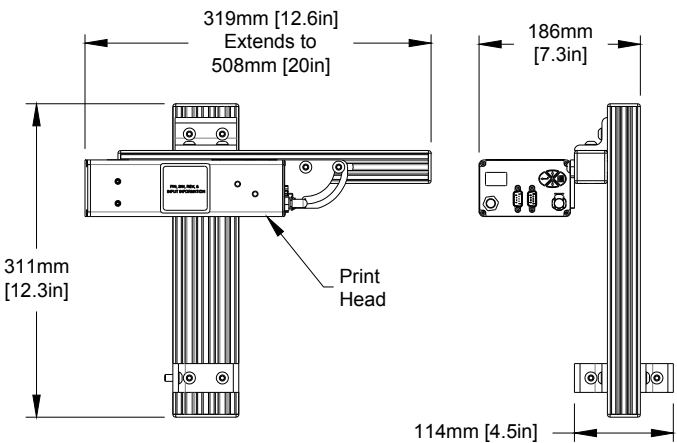
(Ink purchased separately)



NOTE: The system mounting bracketry is shown in a typical configuration. Bracketry and print head orientation is left to the user to fit the application.



Typical Print Head and Bracketry



Print Head

Weight

2.3 kg [5.1 lb]

Enclosure

Anodized Aluminum and Stainless Steel

Operating Pressure

7.0 psi (48.3 kPa)

Electrical

15 VDC input from controller

Print Speed (Print Resolution Dependent)

Up to 650 ft/min (200 m/min)

Vertical Print Resolution

24 dpi

Horizontal Print Resolution

Varies up to 33 dpi

Throw Distance

Recommended Gap: .1 in (2.5 mm) or less

Maximum Gap: .5 in (12 mm)

Print Head Orientation

Any

Environment

Ambient operating temperature: 50°F to 104°F (10°C to 40°C)

Operating humidity: 10% - 90% non-condensing

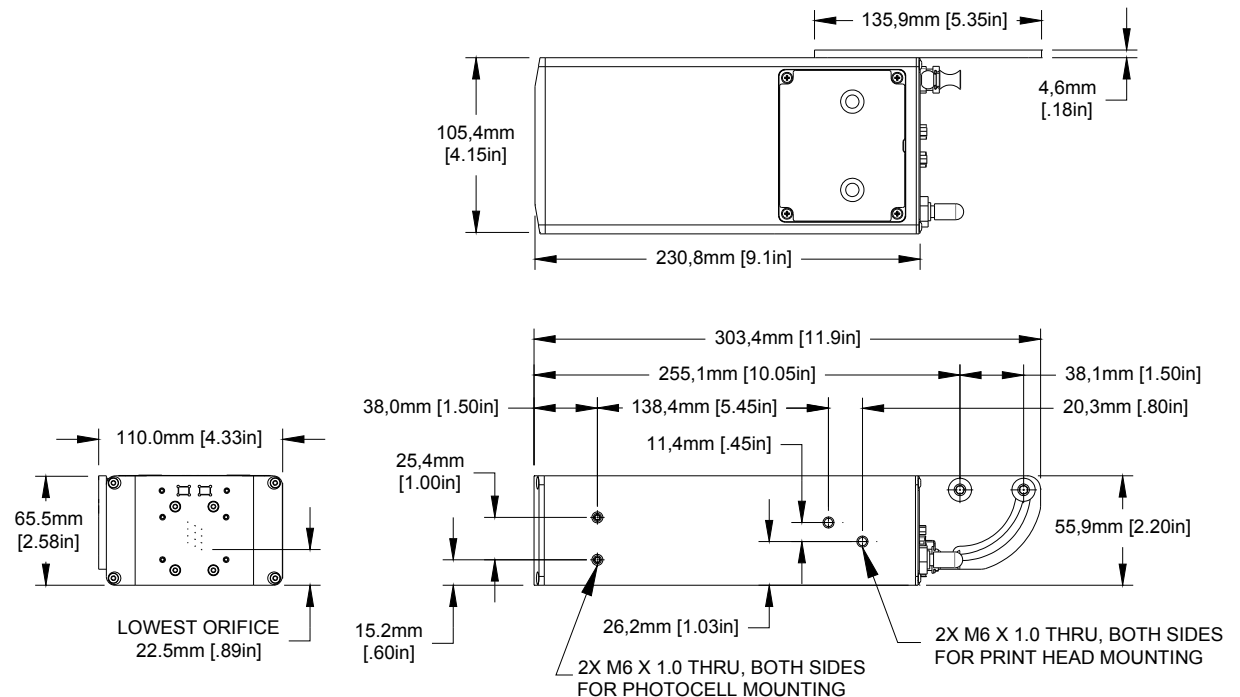
Ink Type

Porous (Water Based)

Non-Porous (Solvent Based)

Number of Print Fields

Maximum 2 lines of print per print head at any given point. Each print line may have at least three 52-character print fields; number of fields per line increases as the number of characters per field decreases.



File Storage

Sectors: Twenty-seven 256 kB sectors per print head are available for font and logo file storage. Files larger than 256 kB use multiple sectors. Factory installed fonts occupy 9 of the 27 sectors.

Fonts: Nine factory installed; 5s (5 dot tall single), 7sf (7dot tall single, fixed character spacing), 7b (7 dot tall bold), 9s (9 dot tall single), 9b (9 dot tall bold), 9bf (9 dot tall bold, fixed character spacing), 12s (12 dot tall single), 12b (12 dot tall bold), and 18b (18 dot tall bold).

Bitmap (logo) files: 12 dots tall max (.5 in / 12.7 mm); 5000 columns (dots) wide max (200 in / 5.1 m at 25 dpi).

Handheld Serial Controller

Size

Weight: .50kg [1.1lb]

Height: 133.4mm [5.25in]

Width: 240.0mm [9.45in]

Depth: 39.4mm [1.55in]

Enclosure

Black ABS Plastic

User Interface

Type: Graphical User Interface
keyboard: on screen QWERTY

Display

7in [178mm] LCD with touch
screen, 800 X 480 pixels

Fonts

Unicode

Ports

(2) RS-232 Ports, (1) USB Port

(1) 100 base-T Ethernet Port

Electrical

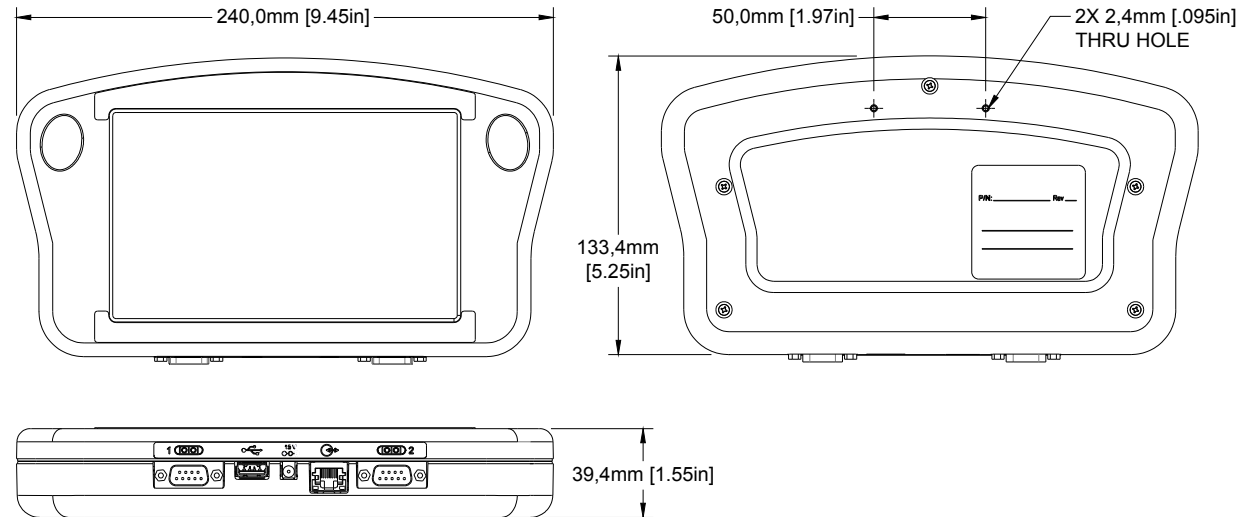
15 VDC Supplied from print head power supply:

90-260 VAC, 50/60 Hz, 1.5A max.

Environment

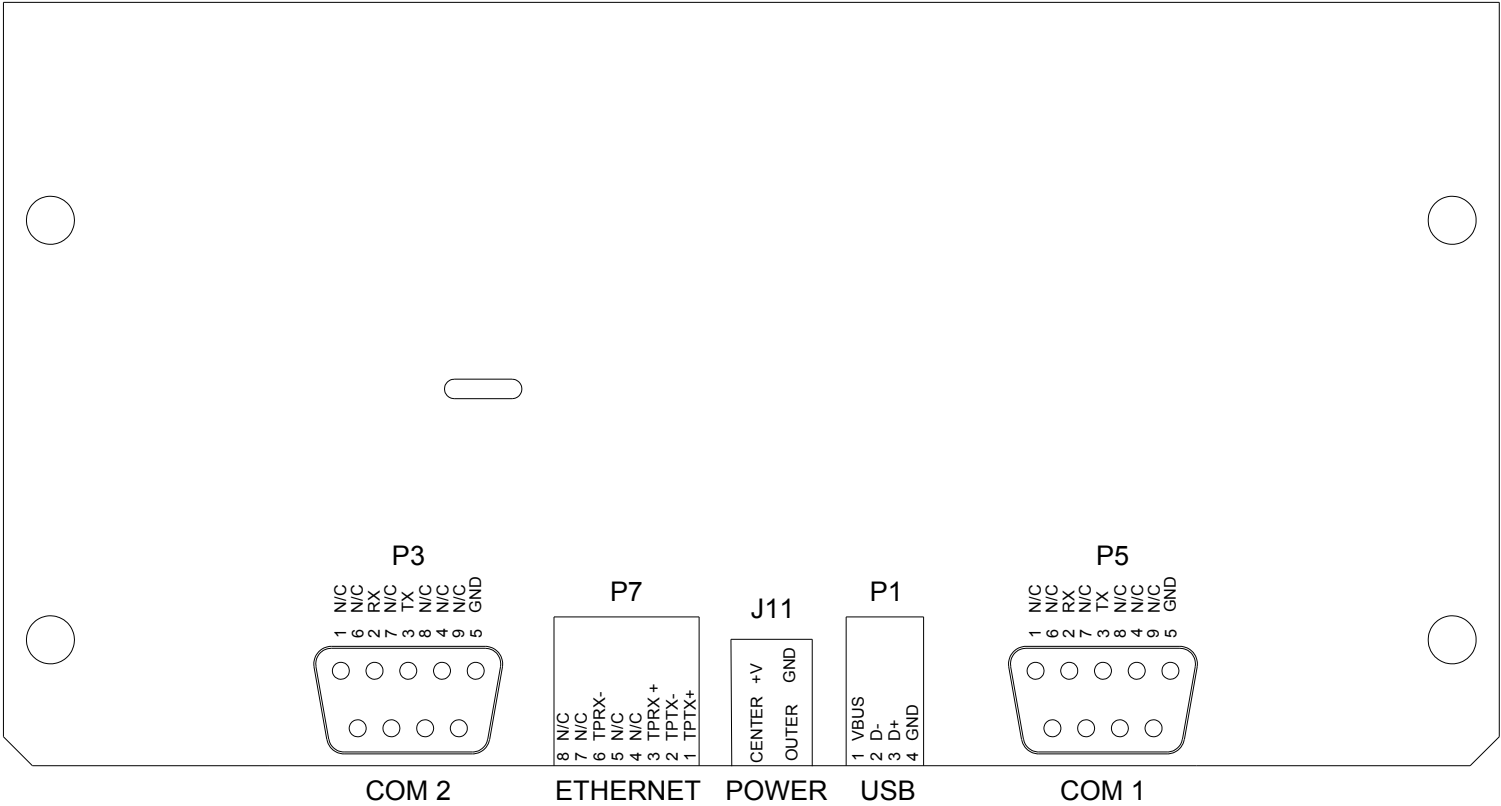
Ambient operating temperature: 40°F to 104°F (5°C to 40°C)

Operating humidity: 10% - 90%, non condensing



System Interconnect Diagram

Handheld Controller CPU Board



Pressurized Ink Can System

Weight

1.2 kg [2.7 lb]

Enclosure

Stainless Steel

Mounting Orientation

3 sides

Ink Capacity

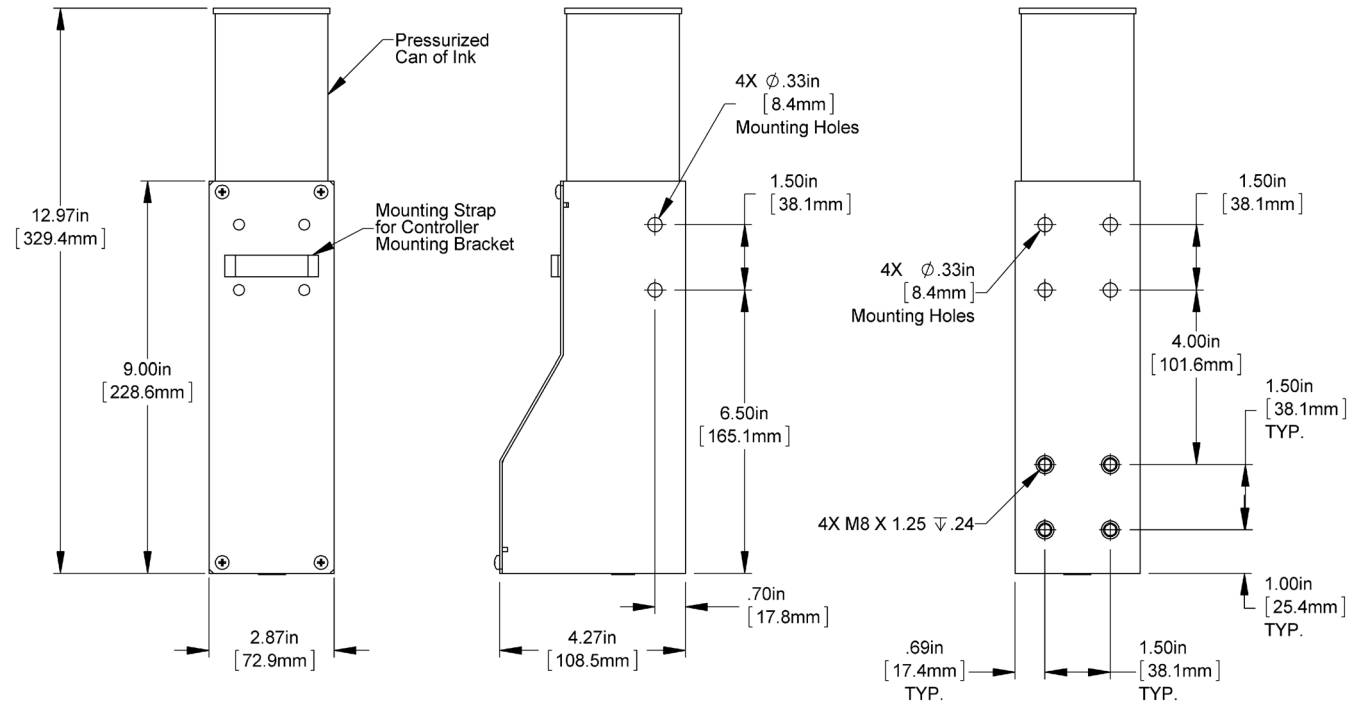
13 fl oz (385 mL) screw top cans

Regulator

Factory set to 7.0 psi (48.3 kPa)

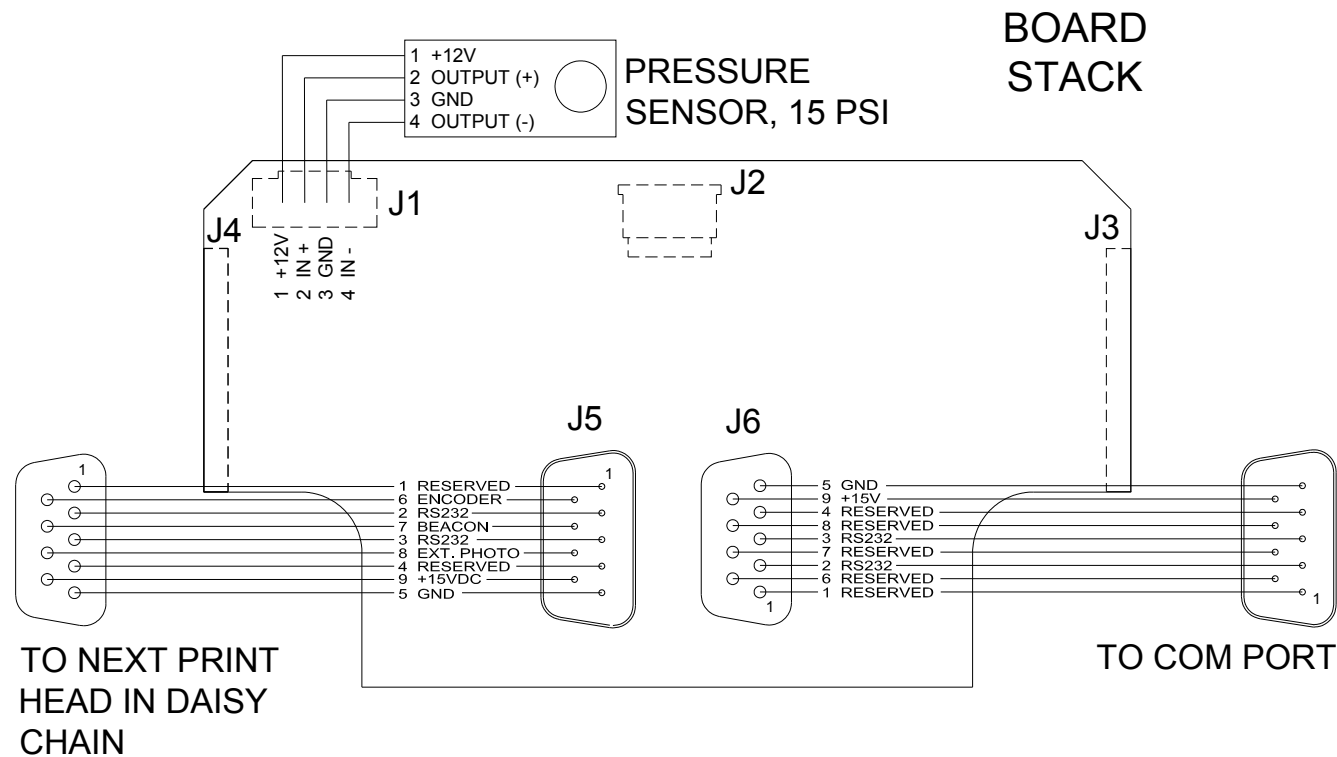
Maximum Number of Print Heads

4



NOTE: For more print heads, an optional pumping ink delivery system is available. See “Appendix I: Part Numbers” on page 56.

Print Head PCB Diagram



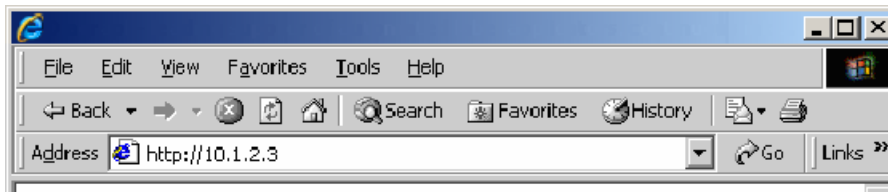
Appendix B: File System Backup and Restore

From a PC

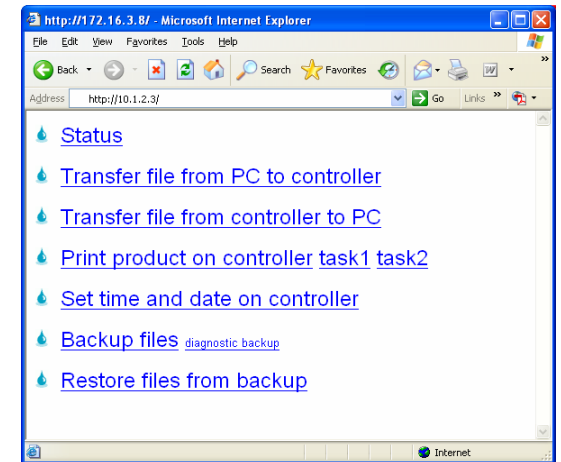
Use these procedures for making archival copies of the system configuration and print message files, and for preserving the system's configuration and print messages during firmware upgrades. File types saved during a backup are .cfg, .prd, .bmp and .alp. These are the system configuration files, message files, logo files and label files, respectively.

These instructions assume the Handheld Controller is already connected, via Ethernet, to a PC. If not, please refer to "Appendix C: Configuring a PC to Communicate with the Handheld Controller" on page 51.

1. Obtain the Controller's IP address. Most controllers have an IP address of **10.1.2.3**. It may be different if the controller is networked with other Handhelds or other devices. If the IP address is unknown, go to the controller, and from the **Home** screen:
 - Open the menu and touch the **Apps** button to go to the Apps screen.
 - Touch the **Network** button on the Apps screen to open the **Network Setup** screen.
 - Touch the **IP Addresses** tab to display the system's IP addresses.
 - Record the Controller's IP address (the top one).
2. On the PC, start Microsoft Internet Explorer (must be version 3.2 or higher) or another web browser.
3. In the browser's address box type in "http://", followed by the controller's IP address. See the illustration below:

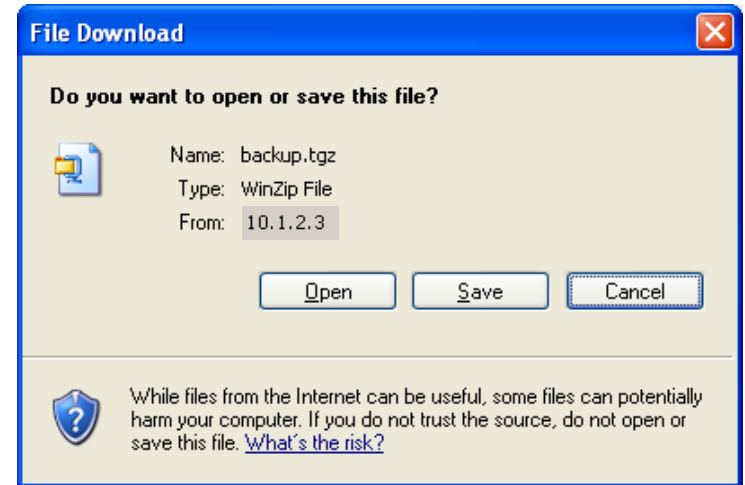


4. Press **Enter**. The web page shown at right should appear.



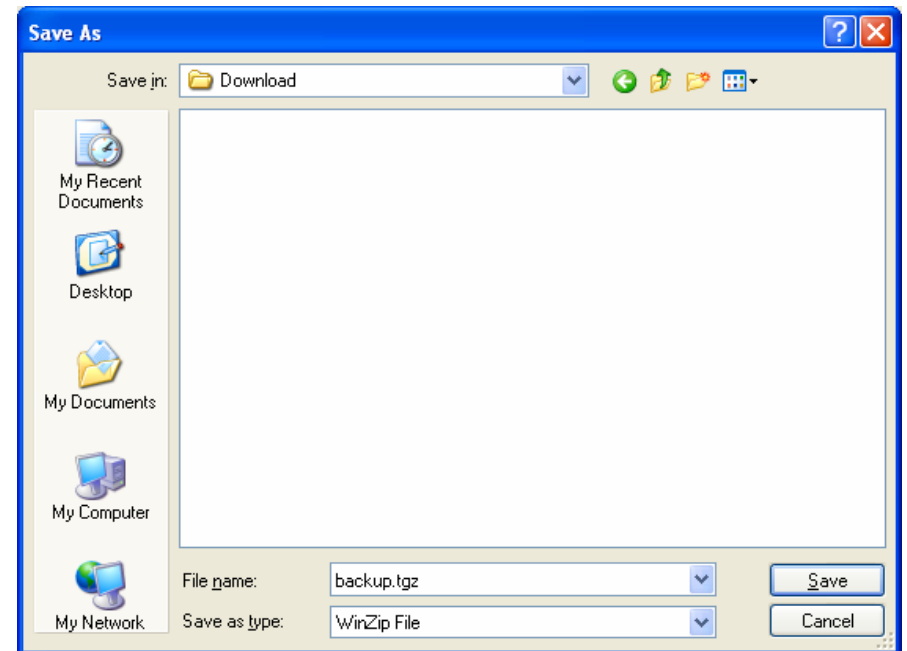
File Backup

To backup the system files, click the **Backup files** link. The dialog box shown at right (or a similar dialog box) will appear.



Click the **Save** button. A **Save As** dialog appears.

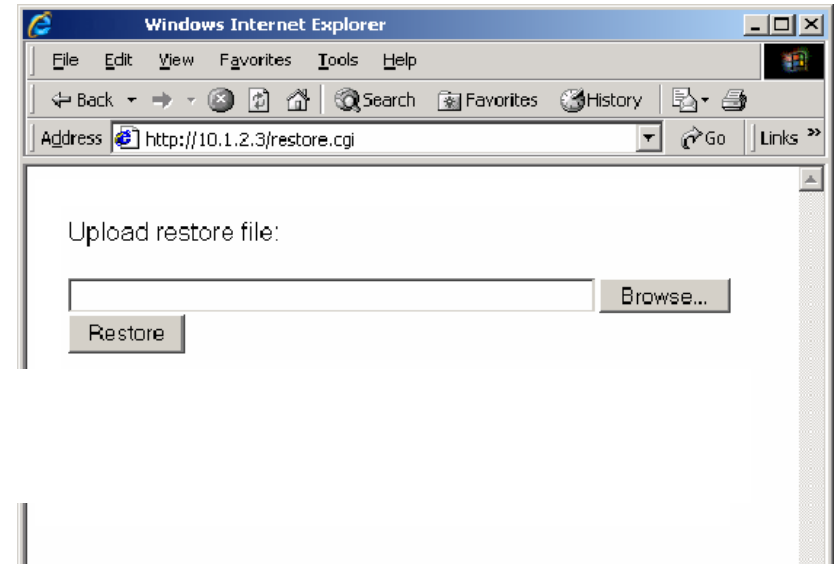
The files backed up are compressed and put into a single file, and are given the default name and file extension **backup.tgz**. Following normal Windows® conventions, the backup file may be renamed and given any extension, and saved in any folder desired. To save the backup file with an extension other than .tgz, open the **Save as type** combo box and select **All Files**.



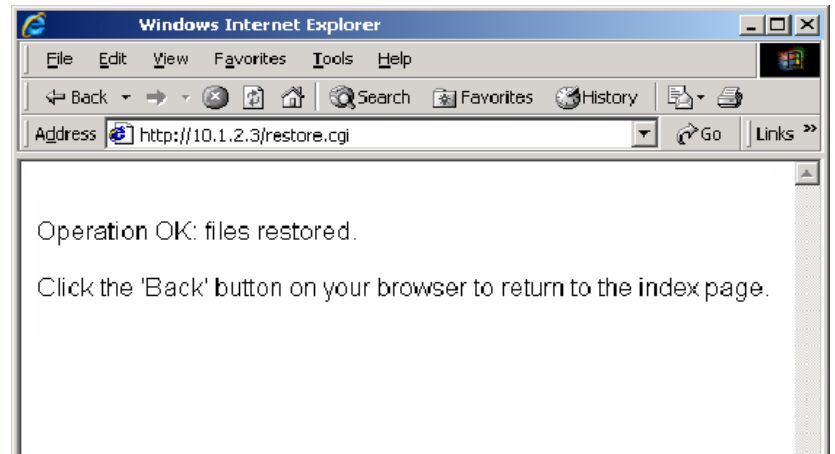
Restoring Backed-Up Files

To restore the controller's backed up system files, click the **Restore files from backup** link. The web page shown appears.

Click the **Browse...** button to locate and select the backup file to be sent to the controller.



Click the **Restore** button to send the file to the controller. If the file transfer is successful, the web page shown will be displayed.



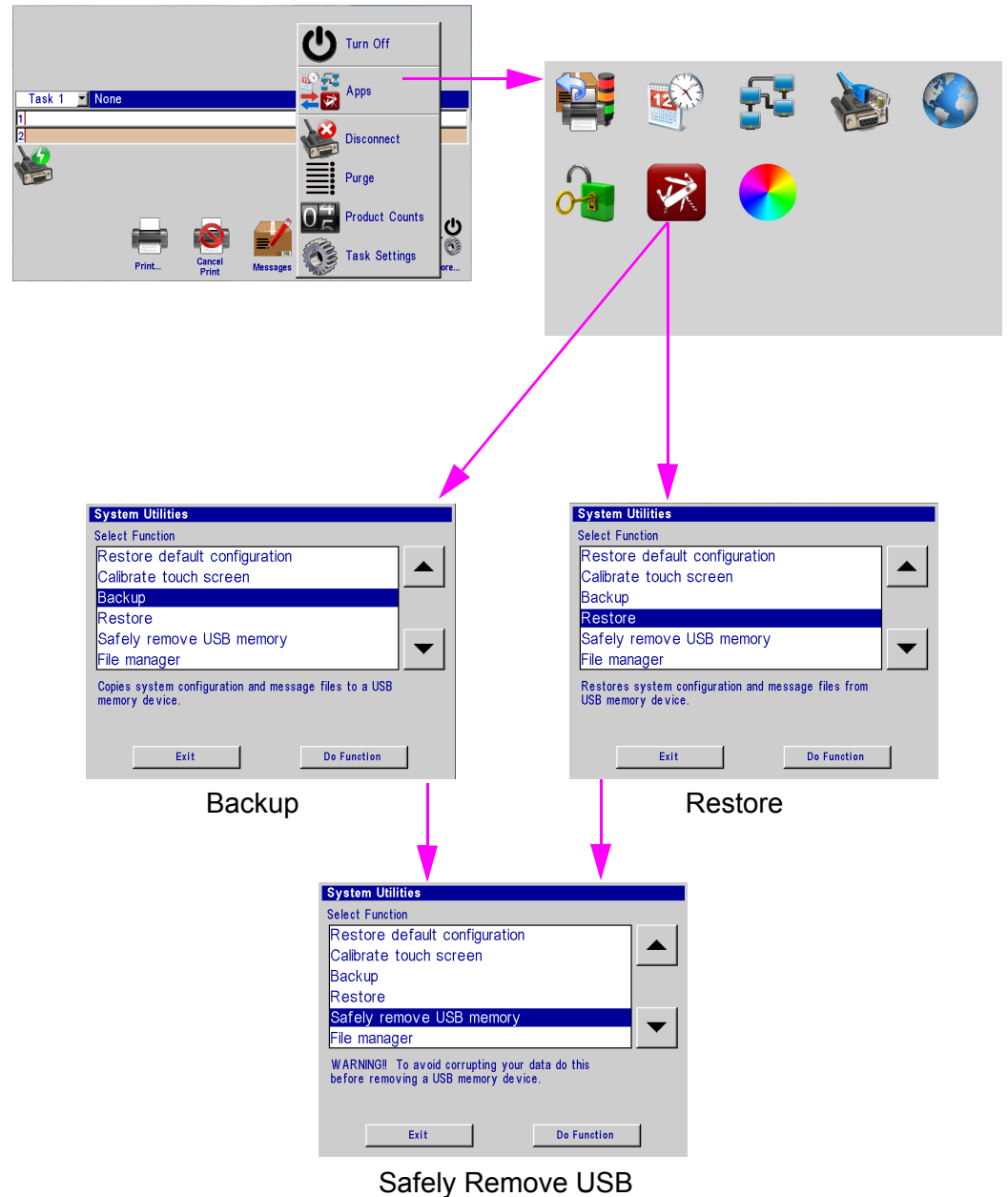
From a Controller

Backup

1. Insert a USB jump drive into the USB port on the controller.
2. From the home screen, touch the **Apps** button, then **Utilities**.
3. From the **Utilities** screen, select **Backup**.
4. Enter a file name at the **Backup** dialog popup ("Backup" is the default name) and press **Save**.
5. From the **System Utilities** screen, select **Safely remove USB memory**.

Restore

6. Insert a USB jump drive into the USB port on the controller.
7. From the home screen, touch **Apps** button then **Utilities**.
8. From the **Utilities** screen, select **Restore**.
9. Select the appropriate backup file from the **Restore** dialog popup and press **Open**.
10. From the **System Utilities** screen, select **Safely remove USB memory**.
11. Restart controller for new settings/backup to take effect.



Appendix C: Configuring a PC to Communicate with the Handheld Controller

Configuring a PC to communicate to the Handheld controller requires configuring the PC's network adapter settings. The network adapter should be configured with a **static** IP address of **10.1.2.4** and a subnet mask of **255.255.255.0**. The network adapter configuration procedure is dependent upon the operating system. Contact your network administrator to configure your network adapter.

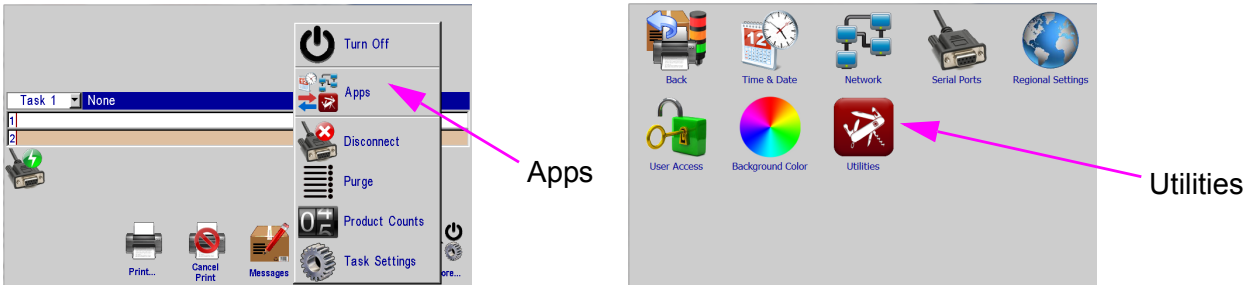
Appendix D: Controller and Print Head File Management

File Manager



NOTE: A .bmp (logo) or .fnt (font) file must reside on both the controller and print head(s) to be correctly selected, displayed, and printed. Ensure the file names are less than 15 characters long.

- 1. If logo or font files are to be transferred, place them on a portable USB storage device and insert it into the controller USB port.
- 2. Touch the **Apps** button on the **Home** screen, then select the **Utilities** button.

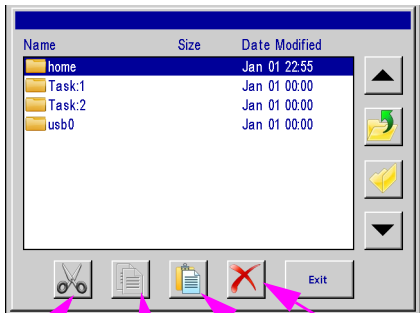
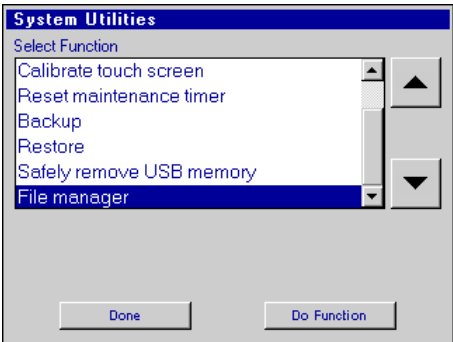


- 3. Scroll to the bottom of the **Select Function** list and select **File manager**. Press the **Do Function** button; the **File manager** screen is displayed.

The **home** folder contains all folders and files related to the controller operation.

The **Task:1** and / or **Task:2** folders contain all font and logo files resident on the print head(s) in that daisy chain.

The **usb0** folder contains all folders and files resident on the USB storage device.



Cut Copy Paste Delete

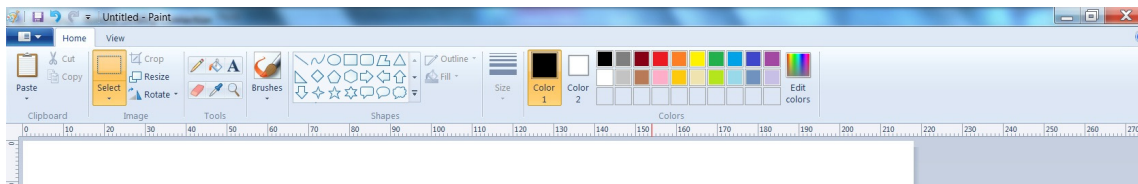


NOTE: Cut, Copy, Paste, and Delete function the same way as any software. Navigate to any file in any of the folders and perform the desired function; however, files are not allowed to be copied from any task (print heads).

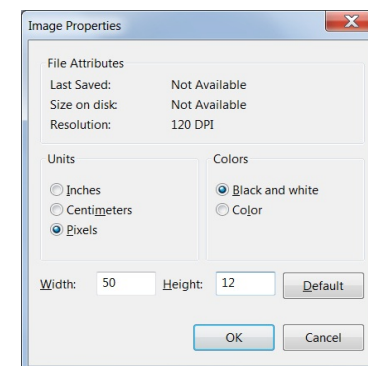
Appendix E: Creating & Transferring Logo Files

Creating Logo Files

Open Paint from a PC by selecting Start, All Programs, Accessories, and then Paint.



Navigate to the **Image Properties** dialog box via the drop down menu.



Enter the **Width** and **Height** of the logo in **Pixels**. For practical purposes, the maximum height of a logo is 12 pixels if the logo is printed with a single print head. Maximum logo width is 5000 pixels, or print columns (200 in / 5.1 m when printed at 25 dpi.)

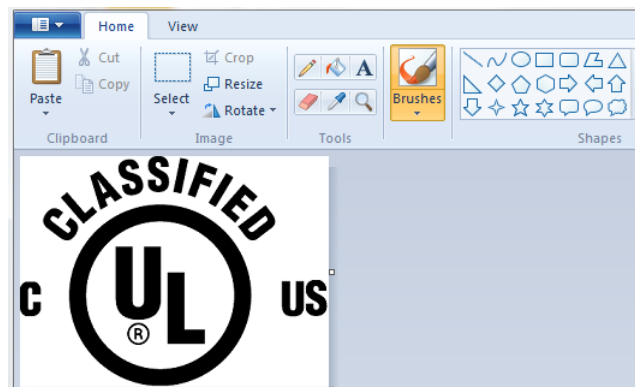
Select **Black and white** for the Colors.

Draw the pixels of the logo using the drawing tools. See the example at right.

From the **File Menu**, select **Save As** and save the logo with a convenient name and directory location.



NOTE: If this logo was imported from another document or software, make sure that the first step taken is to **Save As a Monochrome Bitmap (bmp)** and then **Resize** to the appropriate height.



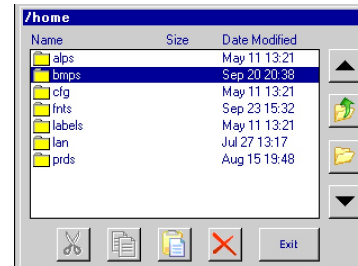
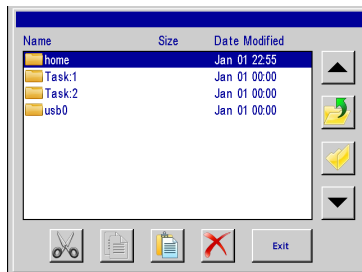
Next, click the **Rotate** button; **Rotate Left 90°** (CCW 90°).



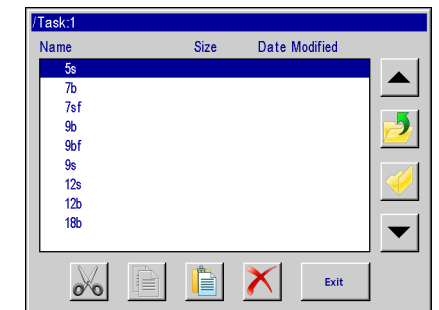
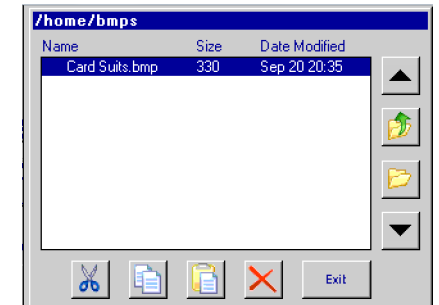
Transferring Logo and Font Files

NOTE: Files cannot be transferred to the print head while printing. Pause print first.

1. As shown in the “File Manager” section, make sure a USB storage device is installed and the **File manager** selection screen is present on the controller.
2. Select the **usb0** folder and press the **Open Folder** button.
3. Navigate to a previously saved file, highlight the file and press the **Copy** button. The file is now stored in temporary memory. In this example, a logo file will be transferred.
4. Press the **Close Folder, Go Up One Level** button until the **File manager** selection screen is present.
5. Select the **home** folder, press the **Open Folder** button, select the **bmeps** folder and press the **Open Folder** button.



6. Press the **Paste** button. The logo (bmp file) will appear in the **bmeps** folder.
7. Because the file is still resident in memory, it can be easily transferred to the print head(s). Navigate back to the **File Manager** selection screen. Select the **Task:1** or **Task:2** folder and press the **Open Folder** button.
8. Finally, press the **Paste** button, and the file appears on **Task:1** or **Task:2**. If the file is desired on the opposite task, navigate back and repeat the process. Note that the available fonts are listed in the Task folder, too.
9. When all desired file transfers are complete, press the **Exit** button.
10. From the **System Utilities** menu, press the **Safely remove USB memory** button, and then **Done**.
11. The file is now available for message creation in the Message Editor.



Appendix F: Communicating Directly to the Print Head

The print heads can be controlled by direct serial communication. Refer to the serial protocol document **5780-316N** when communicating directly to the print head without the use of a controller or InkJet Demo software running on a PC.

Appendix G: Updating the Controller and Ink Delivery System via USB or Ethernet

For instructions on updating the controller and ink delivery system via USB or Ethernet, please refer to document **5765-390N**.

Appendix H: InkJet Demo Software for Windows

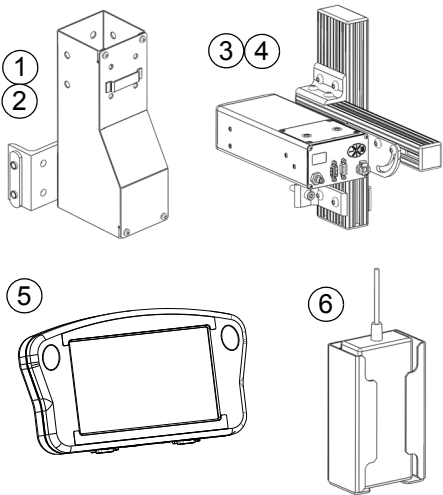
For information on the InkJet Demo Software for Windows, please refer to document **5765-388N**.

Appendix I: Part Numbers

System

Major Components

Item	Kit No.	Description
1	5770-010P	Pressurized Ink Can System for Porous Inks
2	5770-010NP	Pressurized Ink Can System for Non-Porous Inks
3	5770-012P500	Integrated Valve Print Head with Bracketry, Plumbing, and Serial Cable for Porous Inks
4	5770-012N500	Integrated Valve Print Head with Bracketry, Plumbing, and Serial Cable for Non-Porous Inks
5	5780-017SV	Handheld Controller
6	5780-236D	Power Supply and Bracketry



Consumables

Inks, Conditioners, and Maintenance Sprays

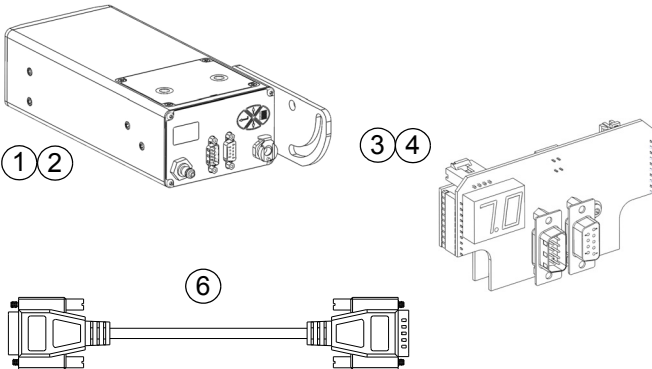
Part No.	Description	Package	Shelf Life
5750-242	Conditioner Flush, Porous, Cans	2 / case	1 year
5750-243	Ink, Porous, Black, Cans	6 / case	
5750-249	Maintenance Spray, Porous, Cans	2 / case	
5750-650	Conditioner Flush, Non-Porous, Cans	2 / case	
5750-651	Ink, Non-Porous, Black, Cans	6 / case	
5750-657	Maintenance Spray, Non-Porous, Cans	2 / case	

* Optional inks available with optional bulk ink supply.

Service Parts

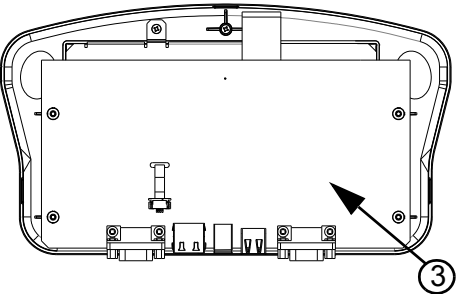
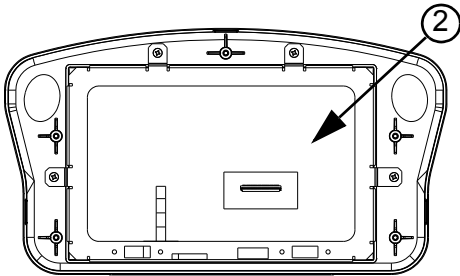
12 Dot Integrated Valve Print Head

Item	Kit No.	Description
1	5770-239P500	Print Head Replacement, Porous Ink
2	5770-239N500	Print Head Replacement, Non-Porous Ink
3	5770-242P	PCB Replacement for Porous Print Heads (all boards included)
4	5770-242N	PCB Replacement for Non-porous Print Heads (all boards included)
5	5770-243	Internal Tubing and Fitting Replacement (not shown)
6	5770-451-010	Cable, Print Head, 10'



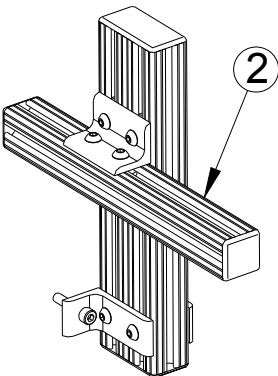
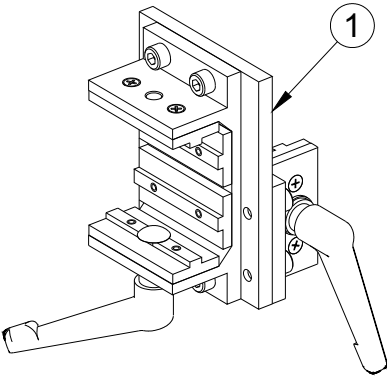
IJ4000-HH

Item	Kit No.	Description
1	5780017SV	IJ4000-HH Controller
2	5765-227	Kit, Replacement Display, IJ4000-HH, 7"
3	5765-228	Kit, Replacement CPU, IJ4000-HH
4	5780-626	Battery (CR1220)



Bracketry

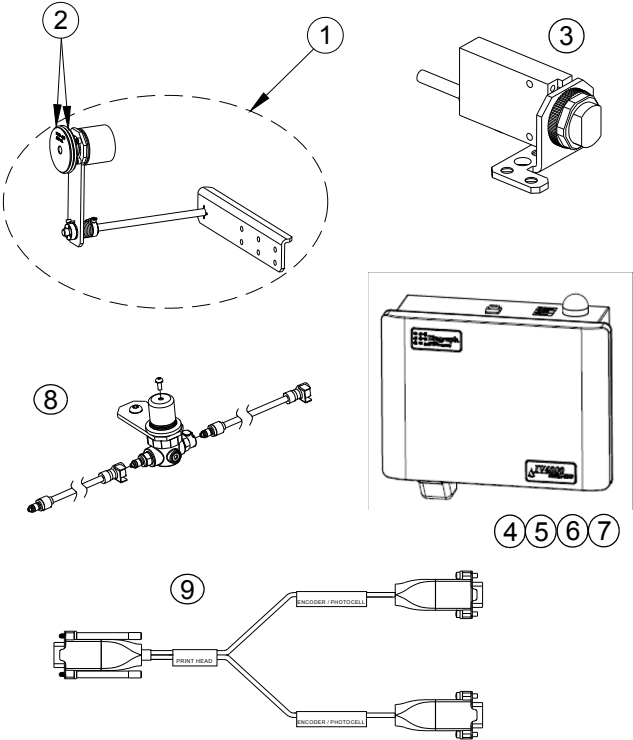
Item	Kit No.	Description
1	2464-561	X-Y Linear Print Head Adjustment, Tool-less
2	5760-821	Print Head, Pressurized Ink Can, and Power Supply Mounting



Optional Equipment

Encoder, Photocell, Accessory Hub and Beacon

Item	Kit No.	Description
1	5760-820-IJ	Encoder Assembly with Mounting Bracket & 25' Cable
2	5765-206	Encoder O-ring Replacement
3	5760-383	Photocell
4	5770-019DP	Ink Delivery System, Domestic (115 VAC), Porous Inks
5	5770-019DN	Ink Delivery System, Domestic (115 VAC), Non-Porous
6	5770-019EP	Ink Delivery System, International (230 VAC), Porous Inks
7	5770-019EN	Ink Delivery System, International (230 VAC), Non-Porous
8	5701-502	Regulator Assembly, Porous
	5701-501	Regulator Assembly, Non-Porous
9	5780-339	Adapter Cable, Encoder & Photocell



Tools & Maintenance

Item	Kit No.	Description
1	1901-398	Hand Cleaner, Ink (not shown)
2	5770-244	Broach, Orifice
3	5750-503	Effluent Bottle Kit
4	5770-201	Solenoid Pre-load Adjustment

