

IOLINE PLOTTER

USER GUIDE

MODEL 600
MODEL 28

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Introduction

This manual contains instructions and guidelines for setting up, operating and maintaining the Ioline plotter models 600 and 28. The model 600 uses a frame sensor to allow ultra long plotting up to 600 yards. The model 28 does not use a sensor for frame correction which limits plotting to 28 yards. The following components are needed to create plots:

- A computer system that is properly installed and has a functioning serial port.
- Design software that can output plot files in HPGL 7475/7596 or DM/PL format.
- An Ioline plotter model 600 or model 28 that has been installed according to the directions in the *Setup* chapter of this manual.
- Plotting media and a pen that are within the guidelines stated in the *Operation* chapter.
- The Ioline Control Center software (this software is not required but allows adjustment of plotter settings and can help optimize performance).

How The Ioline Plotter Works

Media and pen motion is combined to create vector plots. Files are sent to the plotter via a serial connection with a computer or file server. When a file is sent to the plotter the electronic logic system translates the vectors into instructions for the X axis (paper motion) and Y axis (pen motion) motors and uses feedback to ensure plot accuracy. Long plots are accomplished by breaking the plot file into frame segments and rolling the completed frames onto a take-up shaft. Long plot accuracy is maintained by checking an alignment mark on each frame with multiple passes of a sensor fixed to the carriage (model 600 only).

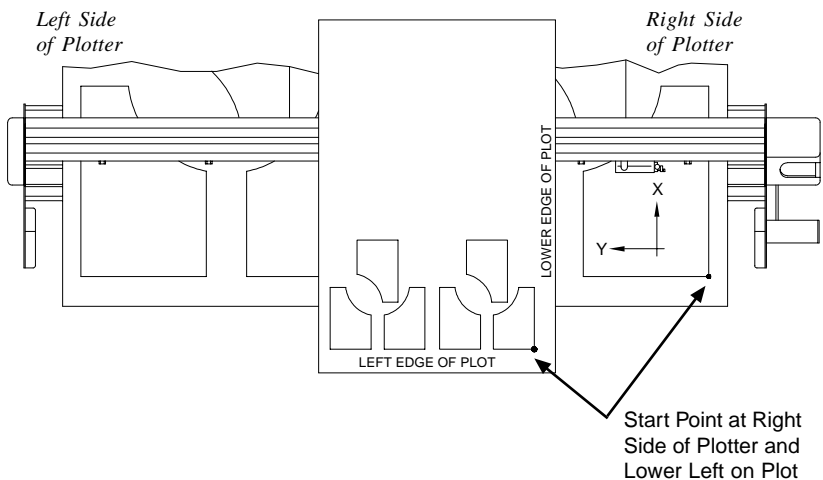


Figure 1. The X and Y axes and Start Point (top view).

Note: In this manual the right and left side refers to the right and left side of the front view of the plotter. Design software usually refers to the **Start Point** as “lower left” because it is the lower left corner of a completed plot. The plot is usually oriented in the plotter as shown in *Figure 1* so the lower left corner of the plot is physically on the right side of the plotter.

Safety Precautions

The plotter has many moving components. Always observe the following safety precautions while operating the plotter:

- Do not try to repair the machine without factory authorization. Only qualified service personnel should attempt any disassembly or access to internal components. If there is a need to make external mechanical adjustments turn off the plotter and disconnect it from all power sources (both the computer and the wall outlet).
- Be careful with hair, jewelry, or loose clothing near the plotter so they do not become caught in the mechanical parts.
- Never move the carriage by hand. Use the keypad arrows and let the machine do it.
- Keep hands away from the carriage when the plotter is in operation. The carriage will automatically move to its right end position when the power is turned on.
- Never run the plotter with either the dust cover or the end covers removed.
- Always hold the bottom surfaces or top bars when lifting or moving the plotter. Never lift the machine by the plastic end covers.
- Keep fingers away from the grit shaft when the plotter is in operation.

Setup

Assembling the Ioline plotter model 600 or 28 requires two people. One person should hold the parts while the other person uses the supplied hex wrench and screws to fasten them together. The plotter must be assembled on a flat level surface. The plotter and stand must be aligned and level to ensure proper operation.

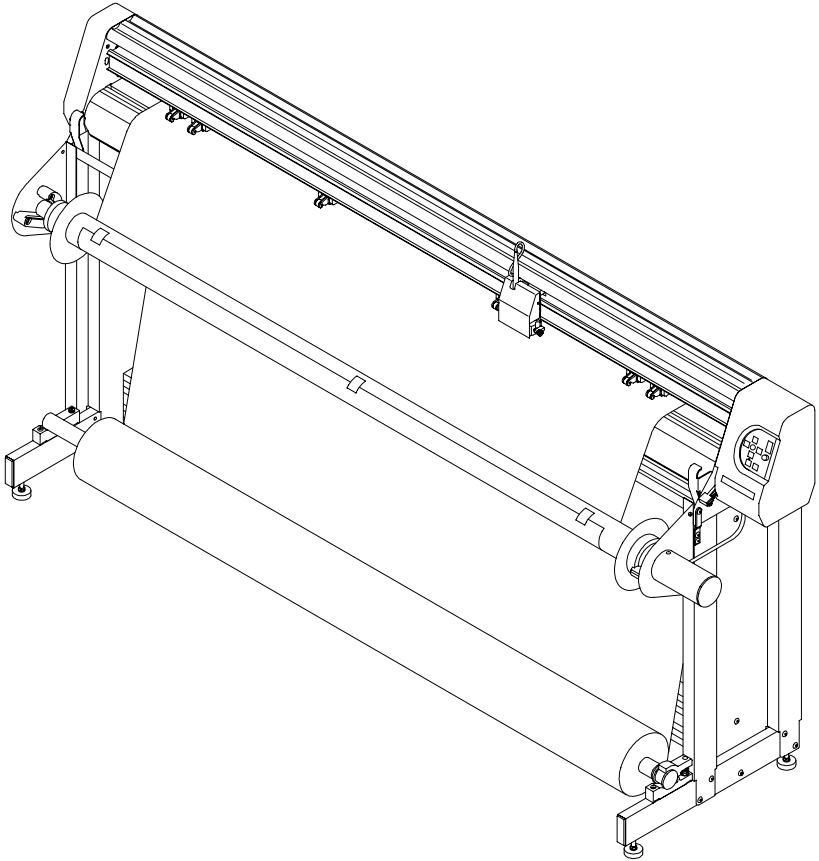


Figure 2. Ioline plotter (model 600 shown).

Assembling the Stand

1. Attach one crossmember to the lower position on the right leg assembly. Use a 2" button-head screw for the lower hole and a 1" button-head screw for the upper hole. Make sure that the crossmember and support block are on the same side and that the crossmember is flush with the leg. See *Figure 3*.

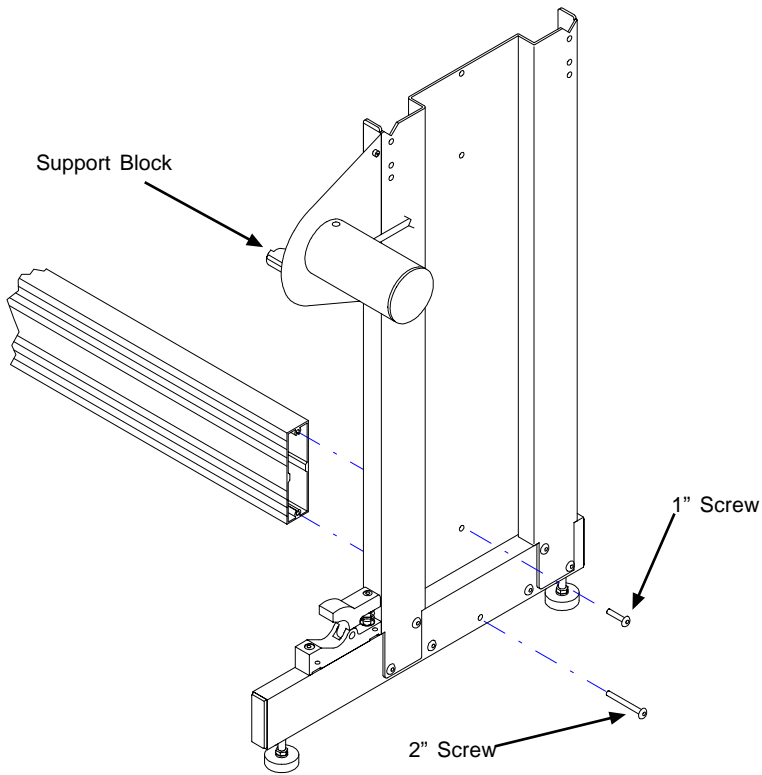


Figure 3. Attaching the lower crossmember to the right leg.

2. Connect the left leg assembly to the free end of the lower crossmember using the hardware as noted above. Leave the screws slightly loose. The support block on the left leg should be on the same side as the crossmember as shown in *Figure 4*.

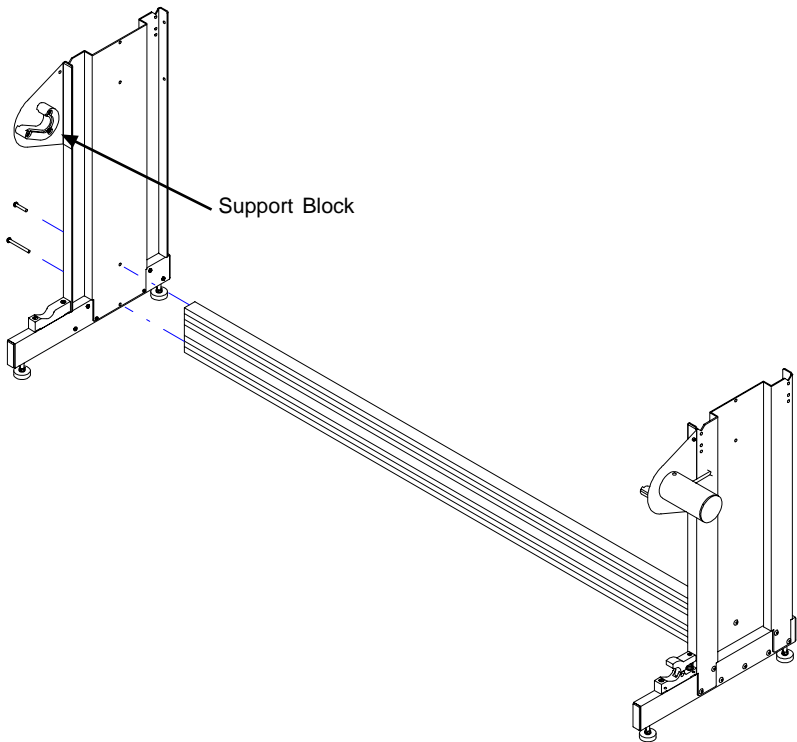


Figure 4. Attaching the left leg assembly to the lower crossmember.

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1. Fasten the remaining crossmember in the upper position on both legs using four 1" button-head screws. See *Figure 5*.

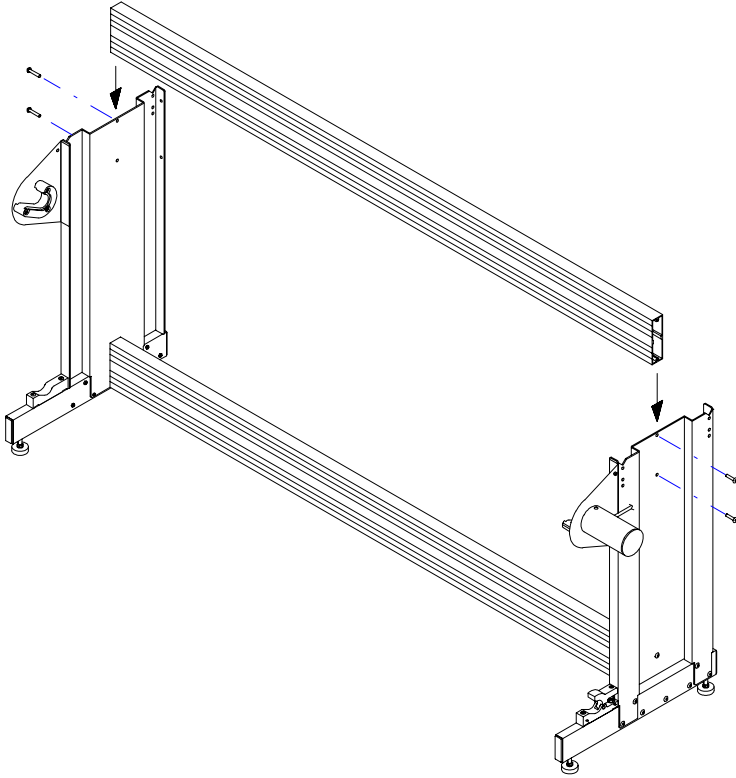


Figure 5. Attaching the upper crossmember.

2. Tighten all eight crossmember screws with the supplied hex wrench.

Leveling the Stand

1. Use an adjustable wrench to loosen the lock nut on both of the leg levelers. Place a level across the top of the right stand leg, perpendicular to the crossmembers. Adjust the threaded feet until the stand is level along the long axis of the leg. Repeat this procedure for the left leg. See *Figure 6*.

2. Place a level on the upper crossmember. Repeat the adjustment procedure as above except rotate both levelers on each leg the same amount so that the legs stay level. Adjust the threaded feet until the stand is level on the long axis of the crossmember. See *Figure 6*.

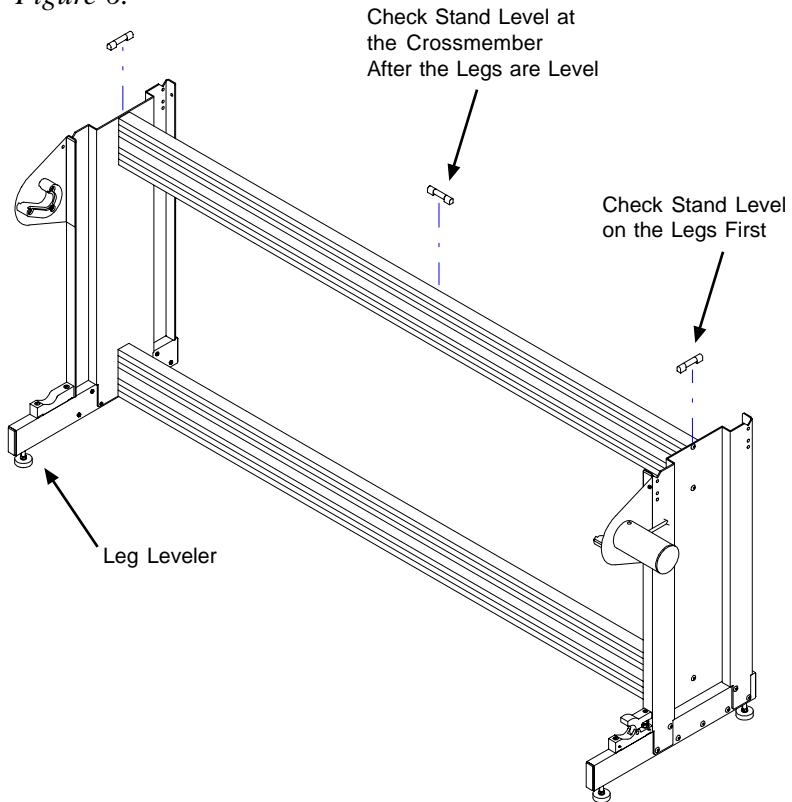


Figure 6. Leveling the stand.

3. Check the level of the legs again and make small adjustments as necessary until the stand is level in both directions.
4. Tighten all of the lock nuts on the levelers.

Attaching the Plotter to the Stand

Warning: Do not hold the plotting head by the bottom edge of the end plates when attaching it to the stand. Fingers and hands may be pinched between the end plates and stand legs. Hold the shiny metal top bars a few inches from the end plates when handling the head.

1. Using two people, lift the plotting head onto the stand. The front (carriage side) of the plotter should be facing the same direction as the support blocks as shown in *Figure 7*. The front top bar should rest in the notch in the front of both legs. See *Figure 8*.

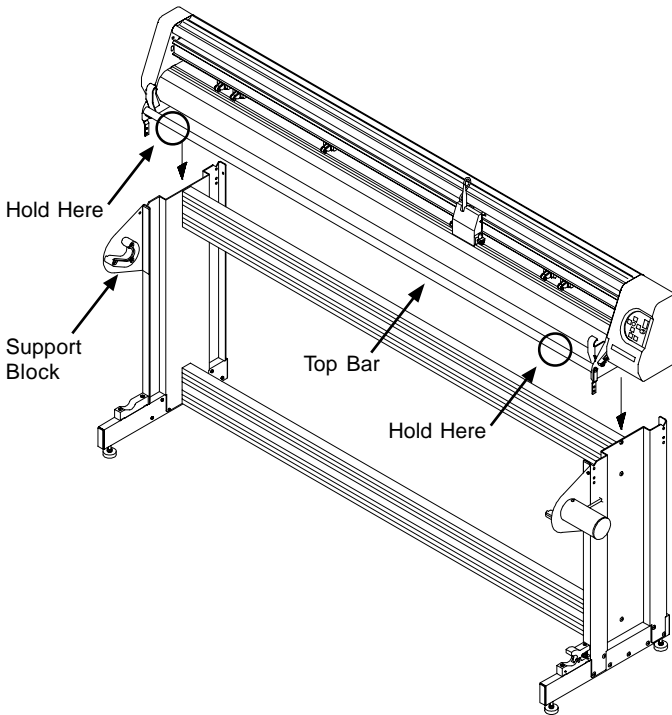


Figure 7. Attaching the plotting head to the stand.

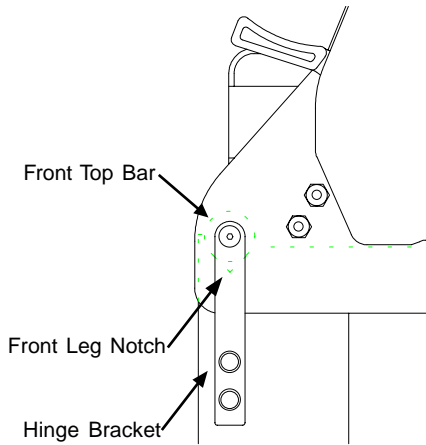


Figure 8. Locating the front top bar in the front leg notch.

2. Insert a 5/8" button-head screw through the hole in the back of both end plates to connect the head to the stand. Tighten the screws with the supplied hex wrench. See *Figure 9*.

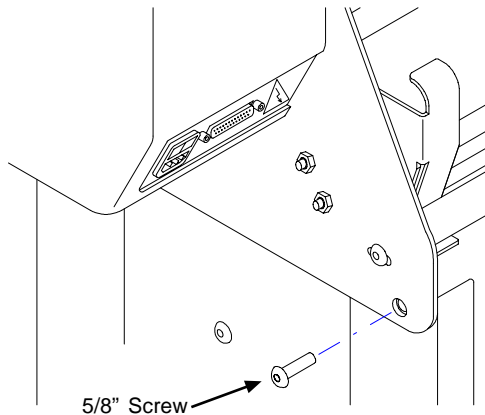


Figure 9. Fastening the end plate to the stand.

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3. Rotate both front hinge brackets so that the holes in the bracket line up with the holes in the leg. If the bracket cannot be aligned with the two threaded holes then check to make sure that the front top bar is in the front notch on both legs. See *Figure 8*. Fasten both brackets to the legs with two 5/8" button-head screws and tighten with the hex wrench. See *Figure 10*.

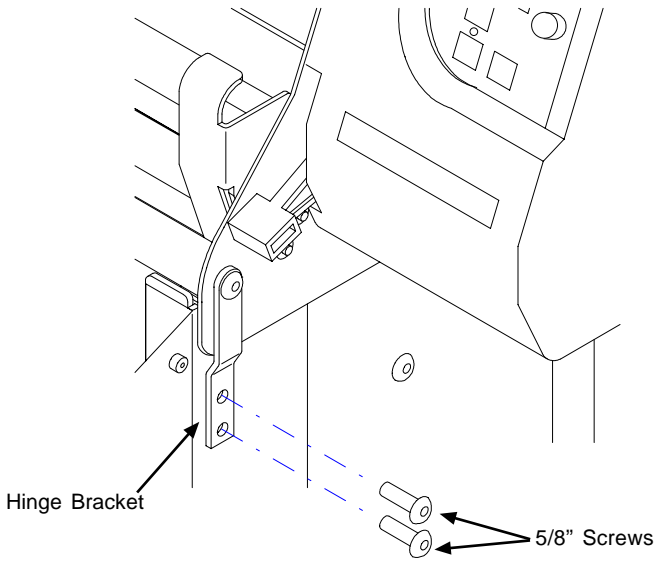


Figure 10. Fastening the hinge brackets to the stand.

4. Make sure that the screws in both ends of the front top bar are tight.

5. Plug the take-up motor cable into the socket on the bottom of the right cover and rotate the locking collar until it stops. Gently pull on the cable to ensure that the plug is securely fastened. See *Figure 11*.

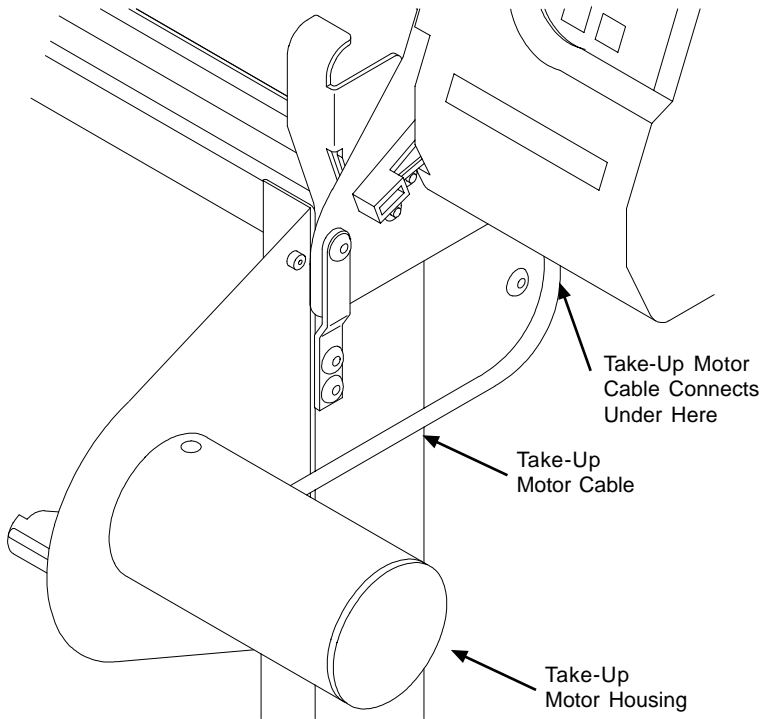


Figure 11. Connecting the take-up motor cable.

6. Cut the plastic straps holding the carriage in place and remove any packing foam.

Adjusting the Plotter

1. Place a level on the platen so that it is parallel to and in front of the grit shaft. Make small adjustments to the threaded feet if the machine is not level. If the machine is difficult to level check the plotter for shipping damage and contact your distributor or Ioline Customer Service. See *Figure 12*.
2. The rear top bar is adjusted at the factory and should not need to be moved.

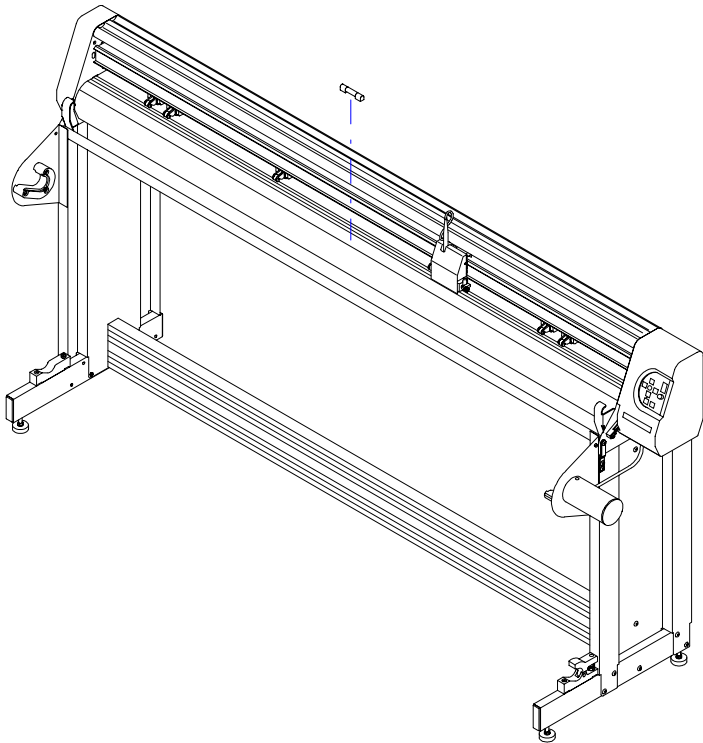


Figure 12. Checking that the plotter is level on the stand.

Connecting the Serial Cable and Power Cord

Note: Make sure power to the computer and plotter is off!

1. Use the power cord in the accessory kit to connect the plotter to an outlet or surge protector. See *Figure 13*.
2. Use the included serial cable to connect the serial port on the rear panel of the plotter to the serial port on the back of the computer. A 25 pin to 9 pin serial adapter may be necessary. See *Figure 13*.

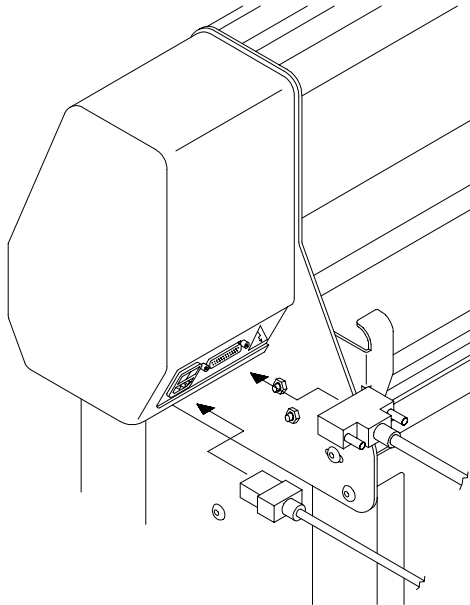


Figure 13. Connecting the power and serial cables to the rear panel.

Installing The Ioline Control Center

The plotter comes with a single 3.5" diskette which contains the Microsoft Windows (3.x and '95) version of the Ioline Control Center program. The Macintosh version of the program is available from an Ioline distributor. Installation procedures for both versions are included below.

Windows Installation

1. Turn on the power to the computer.
2. Start Windows.
3. Insert the Ioline Control Center disk into drive A: (or B:)
4. Choose File, Run from the Program Manager bar menu (Win 3.x) or Run from the Start menu (Win '95).
5. Type A:\SETUP (or B:\SETUP) and Click OK.
6. Follow the instructions that appear on the screen.
7. Installation is complete. See the *Operation* chapter of this manual for details on using the Ioline Control Center software.

Macintosh Installation

Note: The Macintosh version of the Control Center cannot be run from a floppy disk. The software must be installed on a hard drive before it will run.

1. Turn on the power to the computer.
2. Insert the Macintosh version of the Control Center diskette into the floppy disk drive of the computer.
3. Double click on the Ioline Control Center Installer icon.
4. Follow the instructions that appear on the screen. An Ioline folder will be created on the hard disk.
5. Installation is complete. See the *Operation* chapter of this manual for details on using the Ioline Control Center software.

Operation

Power On

The power switch is on the panel behind the plotter, near the power cable connection. Turn on the power to the plotter and the computer and make sure they both work. The pen carriage will move to the right end plate when the power comes on. Keep hands and loose clothing away from all moving parts during start-up and operation. The plotter will be in **Stop** mode (red LED) after the carriage has found the endplate.

Loading a Pen

Any pen that has a diameter of .30" to .45" (7.6 mm to 11.4 mm) or any Hewlett Packard compatible pen can be used. The included Fisher pen has a large ink capacity (which is required for overnight plotting) but requires more pen force which could tear some light paper. A pen like the included Pilot V-Ball makes high quality lines and is gentle on the media but does not have the ink capacity for overnight plotting. Ioline does not recommend using ink pens with tubular metal tips.

Gently insert the flange of the pen (if a plotting pen) between the grooves of the pen holder and rotate the spring loaded locking block into place. If the pen has no flange locate the pen with the tip approximately 1/8" (3 mm) off of the paper. Tighten the thumb screw firmly but do not damage the pen body.

Paper

Ioline recommends 27 - 35 pound recycled or bond paper, 36" to 74" (91 to 188 cm) wide.

Front Panel Controls

The front panel controls on the models 600 and 28 provide control of the motion systems as well as access to pen force and frame sensor testing. Communication can also be interrupted and restored and the initial plotting point can be set from the control panel.

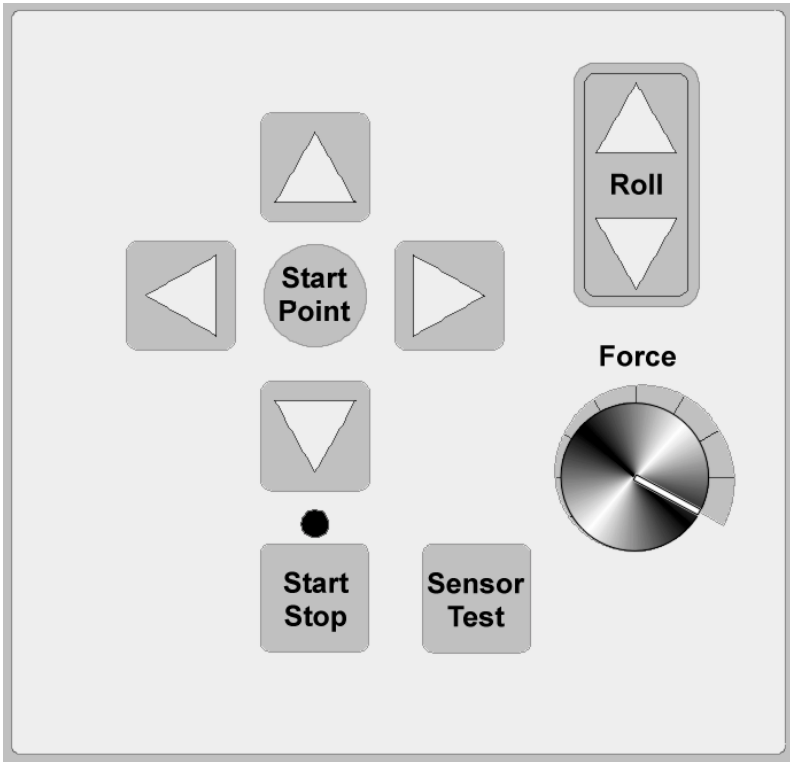


Figure 14. The plotter models 600 and 28 control panel.

Start Point

A **Start Point** must be set before sending a plot file to the plotter. Pressing the **Start Point** key will set the current Y axis position of the pen carriage and X axis position of the paper as the starting point of the next plot. A feed loop that is equal to the panel length setting in the Control Center is created (the default panel length is 46" or 116.8 cm). When the **Start Point** process is finished the LED on the keypad will turn green (**Start** mode) and the plotter will accept plot files and settings from the Control Center or design software.

Arrow Keys

The **Arrow** keys control paper (vertical arrows) and pen carriage (horizontal arrows) movement within the parameters of the plotter frame setting. The plotter must be in **Stop** mode (red LED) to use the keypad **Arrow** keys. The pen and media speeds become greater the longer the key is depressed. The carriage has a safety feature that will not allow it to collide with the end plates (except during the start up end plate seek). The grit shaft will not allow paper motion outside of the plotting frame during plotting operations. Diagonal pen/paper motion is possible by simultaneously pressing a vertical and horizontal **Arrow** key.

Roll Keys

The **Roll** buttons control the rotation of the take-up shaft. The plotter has to be in **Stop** mode for the **Roll** keys to function. The **Roll** switch up arrow will unroll a completed marker plot when the media is cut free of the take-up loop. An automatic unroll feature can be invoked by pressing and holding the up **Roll** arrow key then pressing the down **Roll** arrow key. Automatic unroll will stop after one minute and is cancelled by pressing any key on the keypad *other than the **Roll** arrows*. For more details on removing plotted markers from the take-up shaft see *Removing Completed Markers from the Take-Up Roll* later in this chapter.

Pen Force

Pen force can be set by using the knob on the keypad. The minimum and maximum values of the available force can be set from the Control Center (the default range is 1 to 250 grams). Pen type determines the correct force setting and range. To set pen force, begin with the minimum and slowly increase the force by turning the control panel knob clockwise. If the knob stops before line quality is acceptable increase the upper limit in the Control Center. Excessive force could damage the pen or cause the paper to tear.

Start/Stop

The **Start/Stop** key controls communication between the plotter and the computer. When the communication line is open the LED will be green (**Start** mode). The LED turns red when communication is stopped (**Stop** mode). Plot files and Control Center settings can only be sent to the plotter when the communication line is open (green LED).

Sensor Test

The **Sensor Test** switch has two functions. It provides a means to test the frame-sensor wand on the model 600 (the button is not functional on the model 28). The **Sensor Test** button can also be used to repeat an unsuccessful frame mark search. See the *Testing the Frame Sensor* and *LED Codes* section of the **Testing and Troubleshooting** chapter for more details.

Loading the Feed Roll

1. Before loading a new paper roll always clean the grit shaft. See the *Preventative Maintenance* chapter for more details.
2. Place a paper hub in each end of the paper roll. Use a rubber mallet to drive the hubs in as far as they will go.
3. Slide the feed shaft through the paper hubs and the paper roll. If a paper hub falls out, press it firmly back into the end of the paper roll and set it with a rubber mallet.
4. Lift the feed shaft (with the paper roll mounted) into the brake (right) and feed shaft support block (left). Make sure the paper unrolls from behind and towards the plotter. The flanged coupling must be on the same side as the brake.

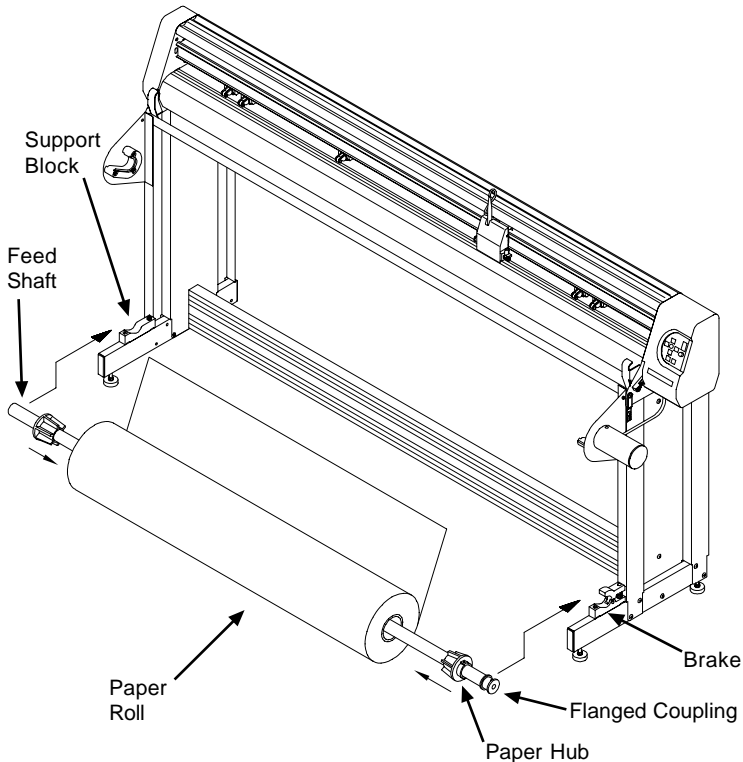


Figure 15. Installing the feed shaft.

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1. *This step is very important.* Center the paper roll between the two stand feet by sliding it to the left or right along the feed shaft. Make sure the hubs remain securely in place.
 2. Use the supplied hex wrench to tighten both screws on each paper hub.

Loading the Take-Up Roll

Warning: *Never touch the take-up key or flange coupling while they are rotating (see Figure 16). Serious personal injury could result.*

1. Remove all plotted markers from the take-up shaft. See *Unloading Completed Markers* for details.
2. Rotate the take-up key with the **Roll** arrow keys until it is oriented perpendicular to the support block opening.
3. If rolling up more than 28 yards on the take-up shaft (model 600 only), install the paper guide flanges. See *Figure 16*.
4. Put the take-up shaft into the front support blocks with the flanged coupling at the right end. Rotate the shaft until the slot in the flanged coupling is aligned with the take-up key. When the shaft slot and the key are aligned, push the take-up shaft into place until it is seated in the support block.

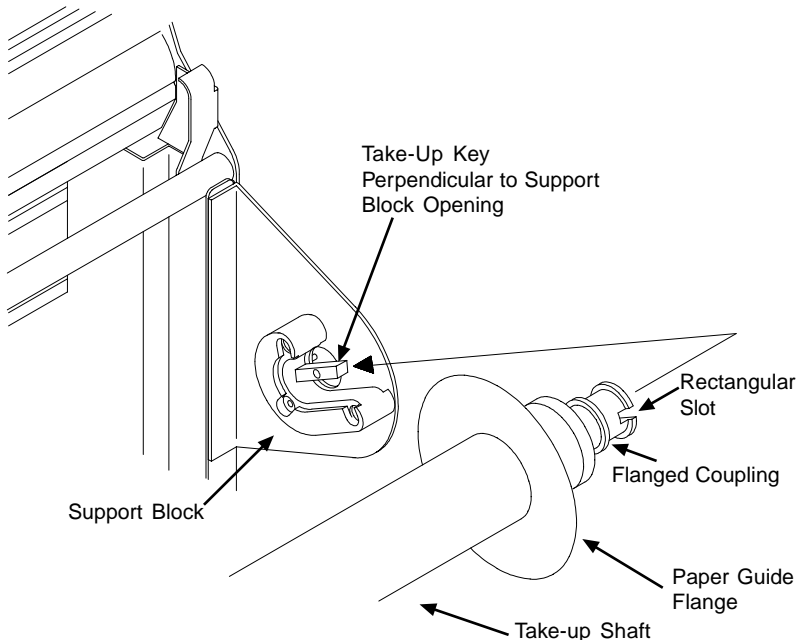


Figure 16. *Aligning the shaft slot and the take-up key.*

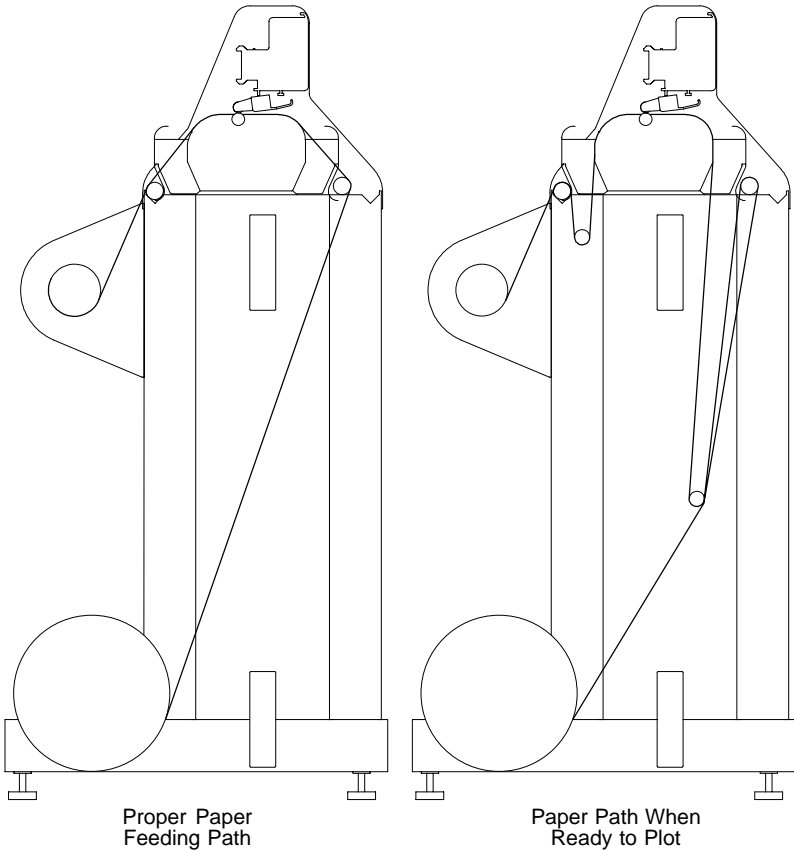


Figure 17. The correct paper feeding path on the model 600 and 28.

Feeding Paper

Figure 17 represents the proper paper feeding paths. The diagram on the left shows the paper after it is fed properly and taped to the take-up shaft. The figure on the right shows the result after the dancer bars are inserted and a **Start Point** is set.

1. On the model 600, slide each of the take-up shaft paper guide flanges toward the outside ends of the take-up shaft to create enough room for the width of the paper.
2. If the chart wheels are lowered, raise them by lifting the chart wheel lever on the right side of the plotter.
3. Turn on the power to the plotter if it is not already on.
4. Pull a long leader of paper off of the paper roll and feed it through the stand, behind the plotting head, over the rear top bar, and between the platen and chart wheels.
5. Temporarily lock the paper in place by lowering the chart wheel lever. Refer to *Figure 17* for help with the proper paper path.

Taping Paper to the Take-Up Shaft

1. Stand in front of the machine.
2. Attach a piece of masking tape to the center of the front edge of the paper from beneath.
3. While holding the front edge with both hands about 2' apart, raise the chart wheel lever, and pull about 18" - 20" (46-51 cm) of paper over the platen and shiny top bar and under the take-up shaft (see *Figure 17*).
4. Align the paper by gently moving it back and forth until the tension feels even. Attach the tape to the take-up shaft.

Note: *If the paper is not evenly aligned, the first few frames may not line up properly. Misalignment will be automatically corrected after plotting two or three frames. If this problem causes difficulties the **optional method** described below can improve frame alignment.*

5. Tape the right and left ends (about 2" or 5 cm in from the edge) to the take-up shaft. See *Figure 18*.

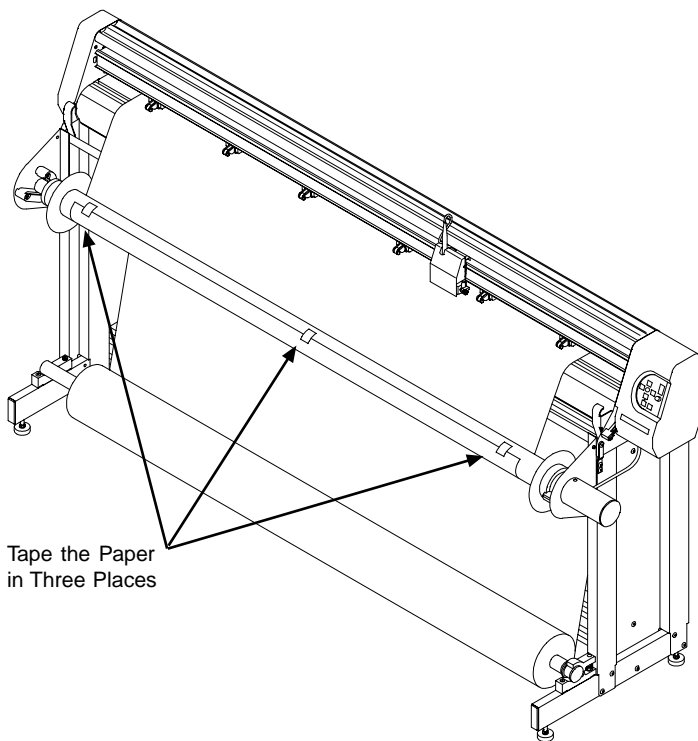


Figure 18. Taping the paper to the take-up shaft.

Taping Paper to the Take-Up Shaft - Optional Method

Note: *This method is useful for accurate alignment of the first few frames but is not always necessary.*

1. Stand in front of the machine.
2. Attach a piece of masking tape to the front of edge of the paper from beneath.
3. While holding the front edge with both hands about 2' apart, raise the chart wheel lever, and pull about 18" - 20" (46-51 cm) of paper over the platen and shiny top bar and under the take-up shaft (see *Figure 17*).

4. Lower the chart wheel lever.
5. Insert the rear dancer bar. See *Figure 22*.
6. Press the **Start Point** key on the keypad. Gently pull the middle of the front edge of the paper to start the machine pulling paper from the feed roll. As the paper feeds forward guide it over the shiny front top bar. The paper will reverse direction and form a feed loop in the rear. When the sequence is finished the plotter will be in **Start** mode (green LED).
7. If the paper is not long enough to be wrapped under the take-up shaft and taped to the front (see *Figure 18*) more paper must be pulled forward. Press the **Start/Stop** key until the LED turns red (**Stop** mode). Use the down **Arrow** key to pull enough paper to attach the middle of the paper to the center of the take-up shaft. Use masking tape to attach the right and left ends (about 2" or 5 cm in from the edge) to the take-up shaft.

Positioning the Chart Wheels

Note: *It is important for these procedures that the paper roll is centered on the feed shaft.*

Chart wheel position depends on the width of the paper. Diagrams are included below for common paper widths. Other paper sizes may require some experimentation to determine the proper chart wheel position.

1. Lift the chart wheel lever if it is not already up.
2. Make sure that the paper roll is centered on the feed shaft.
3. Avoid placing a chart wheel over bearings or smooth portions of the grit shaft. The bearings can be felt through the paper.

For 72" (183 cm) paper:

1. The outer wheels should be about 2" (5.1 cm) in from the edge of the paper.
2. The next wheels should be about 3" (7.6 cm or about four fingers width) from the outer wheels.
3. The inner chart wheels should be placed 1" (2.5 cm) from the bearings as shown in *Figure 19*.

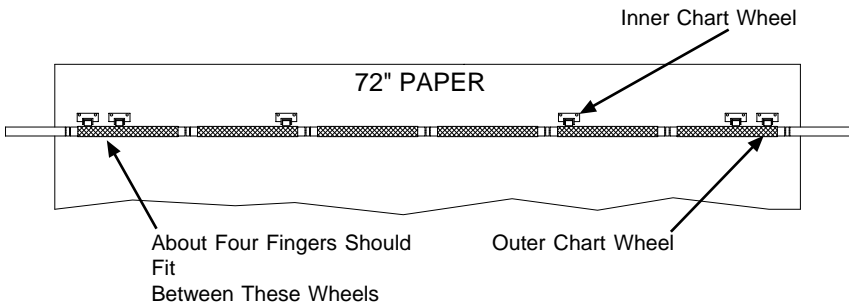


Figure 19. *Positioning the chart wheels for 72" (183 cm) paper.*

For 63" (160 cm) paper:

1. The outer wheels should be about 2" (5.1 cm) in from the edge of the paper.
2. The next wheels should be about 3" (7.6 cm or about four fingers width) from the outer wheels.
3. The inner chart wheels should be placed 1" (2.5 cm) from the bearings as shown in *Figure 20*.

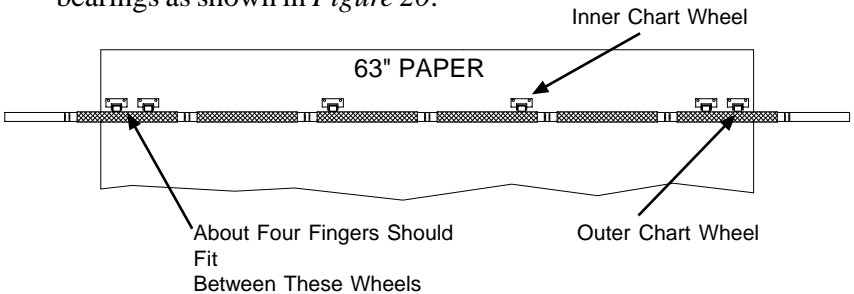


Figure 20. Positioning the chart wheels for 63" (160 cm) paper.

For 36" (91 cm) paper:

1. The outer wheels should be about 2" (5.1 cm) in from the edge of the paper.
2. The next wheels should be about 3" (7.6 cm or about four fingers width) from the outer wheels.
3. The inner chart wheels should be equally spaced as shown in *Figure 21*.

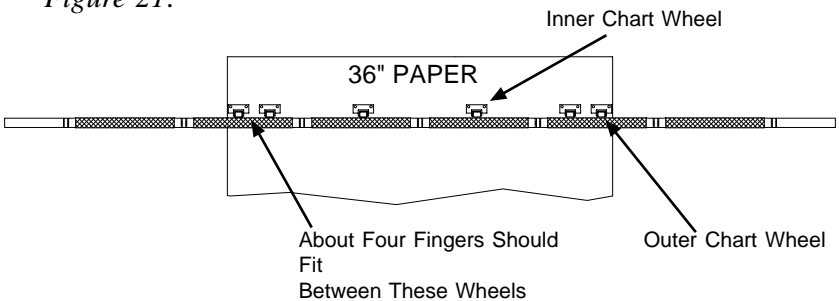


Figure 21. Positioning the chart wheels for 36" (91 cm) paper.

Preparing to Plot

Important: *Do not turn the feed or take-up roll by hand during plotting.*

1. Lower the chart wheel lever if it is not already down.
2. Insert the short rear dancer bar (if it is not already inserted) into the rear channels. See *Figure 22*.
3. Insert the long front dancer bar into the front channels. See *Figure 22*.

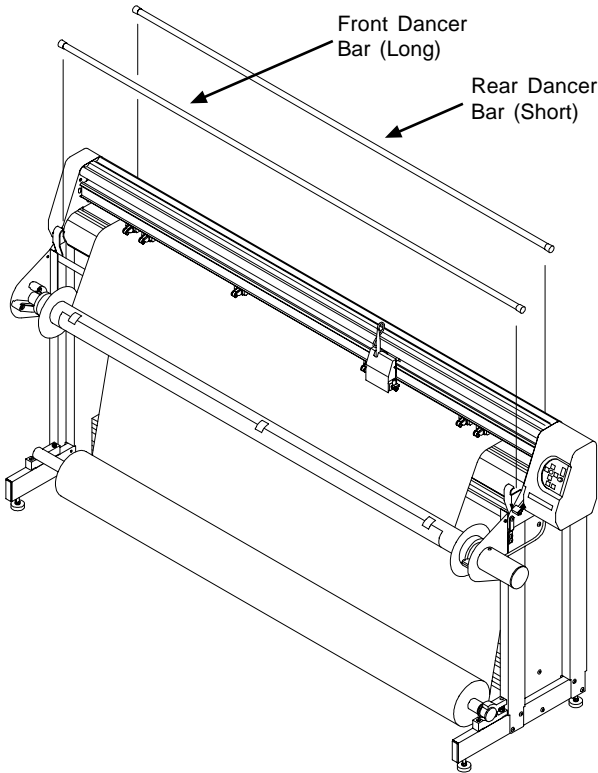


Figure 22. Inserting the dancer bars.

4. Press the down **Arrow** key until the front dancer bar falls into a take-up loop formed by the paper. Pull enough media to form a loop that is about 12" (30 cm) deep. **Do not** attempt to pull paper with take-up shaft.
5. If installed, move the paper flanges to about 1/16" (1.5 mm) from the edges of the paper (model 600 only). Tighten the flange thumb screws.
6. Make sure a pen is installed in the pen holder. Use the left and right **Arrow** keys to move the carriage to the desired starting location (usually near the right most chart wheel). Press the **Start Point** key. Paper will be pulled from the feed roll and a feed loop will form in the rear. The control panel LED will change to green when the plotter is ready to receive a plot file.

Control Center Software

The Control Center Software provides an interface that allows detailed changes to plotting parameters (speed, pen force, testing, etc.) and a means to send plot files. The model 600 and 28 require Control Center version 4.5 or newer.

1. Make sure that the plotter is on and that a **Start Point** has been set (keypad LED is green).
2. Start the software by double clicking on the Control Center icon in the Ioline folder or program group.
3. The software will attempt to identify the plotter. If the Control Center cannot find a plotter connected to the computer the Control Center Setup screen will appear. See *Figure 23*.

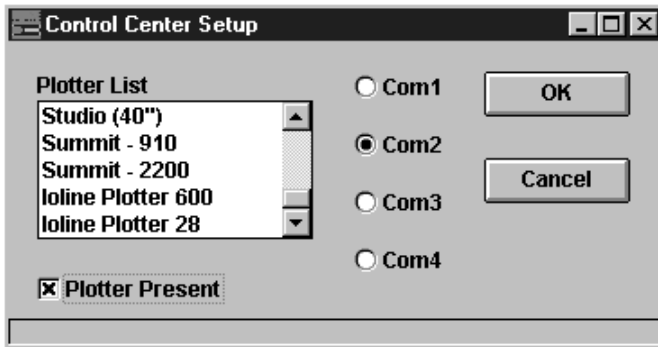


Figure 23. Control Center Setup screen.

4. If prompted, select *Ioline Plotter 600* (or *Ioline Plotter 28*) and the communication port that will be used to send marker plot files to the plotter. COM2 is the default selection.
5. Select *Plotter Present*. Click on OK. If the software cannot find the plotter see the **Testing and Troubleshooting** chapter of this manual for suggestions to solve the problem.

6. If the Control Center finds the plotter the Control Center main screen will appear. See *Figure 24*.

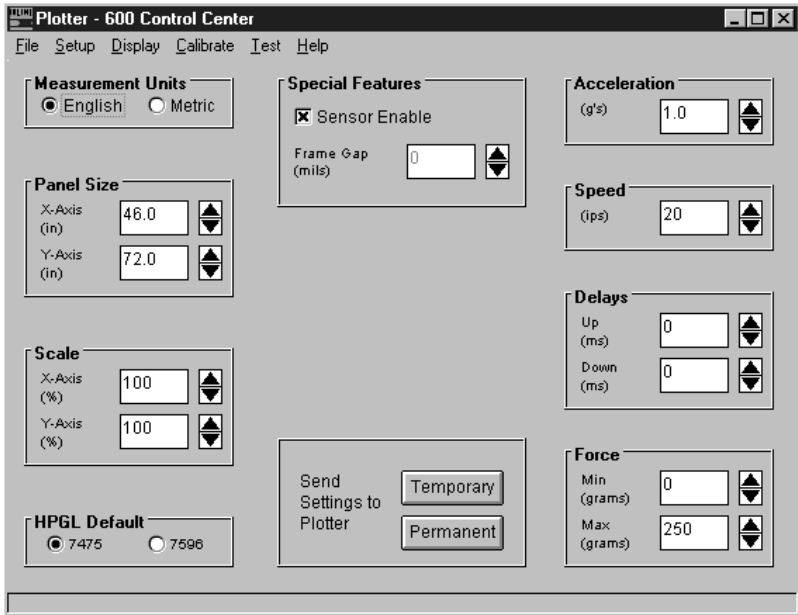


Figure 24. Control Center main screen (Ioline model 600 screen shown).

Screen Options

The main Control Center screen provides control over the primary plotting parameters. The plotter must be in **Start** mode (green LED) before attempting to send any changes to the plotter. Press the **Start/Stop** or **Start Point** key to put the plotter in **Start** mode. All changes must be sent as **Temporary** or **Permanent** settings before they take affect.

In the MS-Windows version of the Control Center the cursor can be moved with the mouse or the keyboard. When using the keyboard, note the following:

-
- Use the **Tab** key to cycle through the settings fields.
 - Use either the **up/down** cursor movement keys or the numeric keys to change a numeric value within a highlighted settings field.
 - Use the **Alt** key to toggle between the pull down menu items.
 - Use the **space bar** to toggle check boxes on and off.
 - Use the **Enter** key to select a highlighted field.

Measurement Units

English or Metric unit systems may be used for length and speed settings.

Acceleration

The acceleration setting determines how quickly the pen will reach full speed when starting a marker line. The factory default acceleration setting is 1.0 g (1 g = 32.2 ft/s²). The setting range is 0.1 to 2.0 g on the model 600 and 0.1 to 1.0 g on the model 28.

Speed

Speed refers to pen and media speeds during plotting. Lower speed settings will improve the line quality but will reduce throughput. The factory default speed is 20 ips (inches per second) or 51 cm/sec. The setting range is 1 to 30 ips (2.5-76 cm/sec) on the model 600 and 1 to 20 ips (2.5-51 cm/sec) on the model 28.

Delays

Up/down delay controls how long the pen hesitates when actuated. Under normal circumstances no changes to the pen delay should be required. Pen down delay is a pause to let the pen settle. Pen up delay makes the pen pause before rising off the paper. For example, zero up delay makes the pen rise instantly when line drawing is finished. The setting range is 0 to 250 ms (milliseconds).

Sensor Enable (Model 600 Only)

The Sensor Enable check box allows the frame sensor to be disabled. This is useful to increase the throughput on the model 600 by skipping the panel alignment mark searching between each frame. Ioline recommends that the frame sensor be used for long markers to increase inter-frame accuracy. Frame Gap settings (see below) can be used to correct X axis misalignment when the frame sensor is disabled.

Frame Gap

Note: *On the model 600 **Frame Gap** will affect plotting **only** when the frame sensor is disabled.*

Frame Gap affects the size of the gap between each plotted frame in the direction of paper movement (*X axis*). The frame gap value must be set to achieve optimal performance on the model 28 or on the model 600 when the sensor is disabled. The gap is affected by paper size and weight, plot frame size and slightly by the size of the paper roll. Overlapping or separation that result from not using the frame sensor can be accounted for with frame gap adjustment. When determining the frame gap value always use the same paper and settings that will be used when plotting normally. To determine the necessary frame gap use the following procedure:

1. Turn off the frame sensor (model 600 only, refer to the *Sensor Enable* description above).
2. Send a marker plot with two consecutive frames to the plotter with the same frame size .
3. Measure the frame separation or overlap in the X axis.
4. If the frames are separated enter the measurement as a negative number in the frame gap field. For overlapping enter the measurement as a positive number in the frame gap field.

Example: If the plot shows an overlap of .200 inches, set the

frame gap in the Control Center to 200 (positive). If the plot shows a gap of .200, set the frame gap in the Control Center to -200 (negative).

5. With the plotter in **Start** mode (green LED) send settings with the **Temporary** or **Permanent** screen options.

HPGL Default

The plotter models 600 and 28 support three industry standard plotter languages; HPGL 7475, HPGL 7596 (rarely used), and DM/PL. The plotter will automatically switch between DM/PL and HPGL. The plotter cannot distinguish between HPGL 7475 and HPGL 7596 so the version number must be set in the Control Center before a plot file is sent.

HPGL stands for Hewlett Packard Graphics Language and DM/PL stands for Digital Microprocessor/Plotter Language. HPGL 7475 is the default plotting language and is the most common in industry. It has a lower left (of the plot) origin which, when the plot is oriented in the plotter, is on the right side of the machine (see *Figure 1*). Every part of the plot is measured from this location. HPGL 7596 uses a center origin and is much less common. A center origin means the plotter measures all points from the center of the panel. DM/PL uses a lower left origin like HPGL 7475.

Send Settings to the Plotter

When changes are made in the screen dialog boxes the plotter logic has to be updated via the serial link. Two options exist to make the changes take effect. Sending the settings with the **Temporary** button will change the current plotter parameters until the power is turned off (or new settings are sent from the Control Center). If the **Permanent** button is used to send the settings, the changes remain in the plotter (even after the power is turned off) until they are changed from the Control Center.

Force

The force values set the range for the **Force** knob on the control panel. The force can be set within a range of 1 to 325 grams. The factory defaults (which work well for most pens) are 0 grams minimum and 250 grams maximum. A narrow range of values allows fine adjustments to the pen force setting. A wide range of values allows coarse adjustments to the pen force.

Panel Size

The panel size in the plotter is the area that can be plotted before advancing the paper. It should generally be set to the same value as the design software frame size (sometimes called panel, frame, tile, page, etc.). *The plotter panel size should never be set smaller than the software frame size; the plot will clip and the plotter may jam or tear paper.* If the plotter panel size is set larger than the design software frame size the plot will be correct but the feed and take-up loops will be unnecessarily long. The maximum frame size is 46" (116.8 cm) long by 72" (182.9 cm) wide. These are also the default settings.

Scale

By default the plotter will produce a marker at 100% the size specified in the plot file (no scaling). If the X and Y scale is set to 50% the plotter will produce a marker that is half the specified size. The X and Y scaling of the plot can be independently set from 1% to 999%.

Menu Bar Items

The menu items along the top of the screen allow adjustment of a variety of settings for computer control of the plotter. File management, plotter setup and serial port testing can all be accessed from the menu bar.

File

Send Plot File

Use this option to send plot files (.plt format) to the plotter.

Open Settings File

Replaces the Control Center screen values with settings saved with the *Save Settings As* option described below. The new screen values must be sent with the **Temporary** or **Permanent** send settings buttons.

Save Settings As...

Allows custom settings to be saved to a file so that they can be sent to the plotter at a later time. To retrieve these files use *Open Settings File* explained above.

Exit

Exits the Ioline Control Center.

Setup

Plotter Setup

Allows selection of the plotter model and COM port.

Com Port Setup

Provides a list of COM ports to select from.

Display

Plotter Settings

Replaces all of the screen setting values with the current settings stored in the plotter.

Factory Defaults

Replaces all of the screen values with the factory defaults. A dialog box will appear that allows these values to be sent as **Temporary** settings (lost at power off) to the plotter. Use the *Send Settings* **Permanent** button to make the factory defaults permanent.

ROM Version

Displays the current ROM version installed in the plotter.

Memory Buffer Size

Displays the amount of buffer memory on the logic board. This value should be 12 K (kilobytes)

Calibration

Calibrate Plotter

Provides methods to calibrate the plotter for maximum accuracy.

The plotter was accurately calibrated at the factory and should not require adjustment. Before performing any recalibration verify that slipping during plotting is not causing the problem. See the ***Testing and Troubleshooting*** chapter for more details.

The factory set calibration values can always be reset with the *Reset Calibration* button in the *Set Calibration* dialog box.

To calibrate the plotter model 600 or 28:

1. Select *Calibrate, Calibrate Plotter* from the menu bar. A window like *Figure 25* will appear.

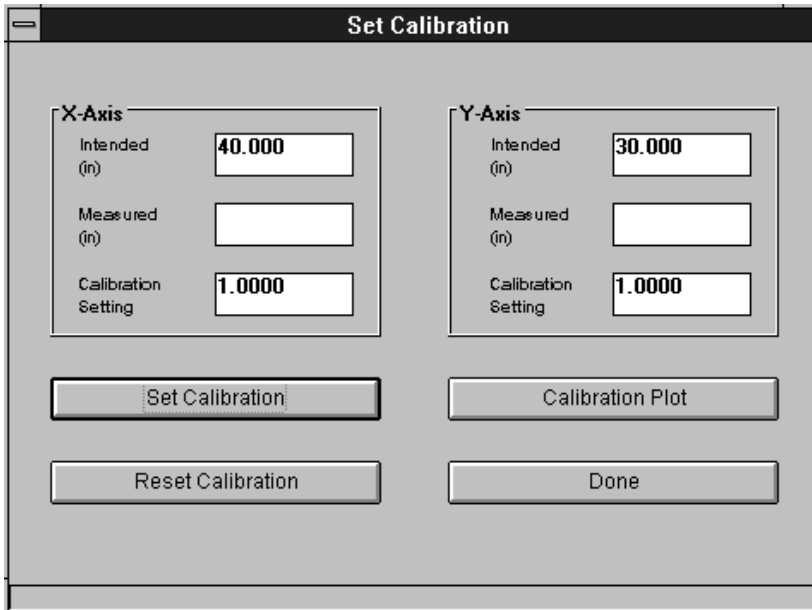


Figure 25. Calibration screen.

1. Load the plotter with paper. Make sure the paper is at least 50” (127 cm) long by 36” (91 cm) wide and that it is the type of paper used by the plotter most often.
2. Select *Calibration Plot*. The plotter will draw four ruled lines that are 40” (102 cm) on the X axis and 30” (76 cm) on the Y axis.
3. Precisely measure one length (X axis) and one width line (Y axis) in either inches or centimeters (dependent on the *Measurement Units* setting) and record the results.
4. Select *Set Calibration*. Enter the measured X value. Enter the measured Y value.
5. Select *Set Calibration* again.
6. Select *Done*

7. Only use *Reset Calibration* to restore original factory calibration settings.

Test

Serial Test

Tests the serial connection between the plotter and the computer. See the ***Testing and Troubleshooting*** chapter for further information.

Computer Port Test.

Tests the serial port on the computer with a special tool available from Ioline. See the ***Testing and Troubleshooting*** chapter for further information.

Plotter Port Test.

Tests the serial port on the plotter with a special tool available from Ioline. See the ***Testing and Troubleshooting*** chapter for further information.

Sending Plot Files

When apparel design is complete send the pattern (as a marker plot file) to the plotter. Make sure the power is on and that the paper is loaded. Also, be sure that a **Start Point** has been set and that the plotter is in **Start** mode (green LED).

From the Design Software

In most cases the apparel design software will be used to create a marker plot file and send the data directly to the plotter. Some software packages also allow changes to plotting parameters. Be sure to follow the software instructions.

From the Ioline Control Center

The Ioline Control Center software can be used to send a completed marker plot file to the plotter. Open the Ioline Control Center as described earlier in this chapter.

1. From the menu bar select *File*.
2. Select *Send Plot File*.
3. Enter the correct path and file name of the plot that will be sent to the plotter. For example, the path might be:

C:\IOLINE*<filename>*.plt

4. Select OK.

Pausing Plotting

Important: *Do not pull paper tight between the grit shaft and the take-up shaft while plotting is paused. Do not turn the feed roll or take-up roll by hand while plotting is paused.*

Plotting can be paused by pressing the **Start/Stop** key. The control panel LED will change from green to red. When plotting is paused the carriage, paper, and take-up roll can be moved with the keypad **Arrow** keys. The current plotting position is saved in memory and will be reset when the **Start/Stop** key is pressed again (red LED changes to green).

Canceling a Marker Plot

From the Apparel Design Software

1. Press the **Start/Stop** key to place the plotter in **Stop** mode (red LED).
2. Cancel the plot from the apparel design software (refer to the apparel design software manual or consult the software dealer). If this step is skipped the plot will continue when a new **Start Point** is set.
3. Press the **Start Point** key to make the plotter delete the plot data it has already received but has not yet drawn. New feed and take-up loops will form.

From the Ioline Control Center

1. Press the **Start/Stop** key to place the plotter in **Stop** mode (red LED).
2. Cancel the plot in the Control Center software by clicking on the **ABORT** button.
3. Press the **Start Point** key to make the plotter delete the plot data it has already received but has not yet drawn. New feed and take-up loops will form.

Removing Completed Markers from the Take-Up Roll

Note: *Except when the feed roll has been changed, it is best to leave the chart wheels down when removing completed markers from the take-up roll. Leaving the chart wheels down will help keep the paper aligned with the feed roll and reduce the time between plotting operations.*

1. Remove the front dancer bar. Press the **Start/Stop** key until the keypad LED changes to red (**Stop** mode).
2. Cut the paper with the included cutting tool. Use the groove in the front of the platen as a guide.

Use one of the following methods to remove completed markers:

Method 1: Unroll with the Shaft in Place

1. Rotate the take-up shaft by hand until the rectangular opening in the flanged coupling is perpendicular to the opening in the support block (see *Figure 16*). Remove the shaft.
2. The paper is wound so that when unrolled the plotted image is facing up. The markers can be unrolled directly onto the cutting table with the take-up shaft in place in the roll.

Method 2: Manual Unroll with the Roll Arrow Keys

1. Press and hold the up **Roll** arrow key on the control panel.
2. Hold the key until the all of the markers are unwound. The unroll speed will increase after a few seconds of rotation.
3. Remove the tape holding the paper on the take-up shaft.

Method 3: Automatic Unroll with the Roll Arrow Keys

1. Press and hold the up **Roll** arrow key then press the down **Roll** arrow key.
2. The automatic unroll feature will continue for 1 minute and then stop.
3. Repeat this procedure until all of the markers are unwound.

4. The auto-unroll feature can be canceled at any time by pressing any keypad key *except* the **Roll** arrow keys.

Method 4: Removing The Shaft

The shaft can be removed from the roll of completed markers without unwinding. The take-up shaft must be freed from the plot roll before it can be removed. This is accomplished manually or with the take-up motor.

Manually Freeing The Take-Up Shaft:

Note: *The take-up shaft is very heavy when many plots have been rolled up. Get help removing the plotted paper roll from the machine.*

1. Tape the loose end of the roll down so that it cannot flap freely.
2. Rotate the take-up shaft by hand until the rectangular opening in the flanged coupling is perpendicular to the opening in the support block (see *Figure 16*). Remove the shaft.
3. Stand the roll on end with the flanged coupling pointing up. Rotate the take-up shaft counter clockwise (opposite to the direction that the paper was rolled on the machine). See *Figure 26*.

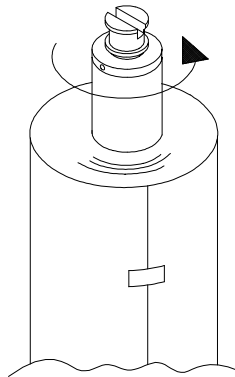


Figure 26. *Manually freeing the take-up shaft.*

-
1. The larger the roll, the more rotations are required to free the shaft. When the shaft freely rotates, lay the roll on the ground.
 2. Continue to twist the shaft counter clockwise while pulling it out of the paper roll until it is free.

Automatically Freeing The Take-Up Shaft with the Motor:

Note: *The take-up shaft is very heavy when many plots have been rolled up. Two or more people may be required to remove the plotted paper roll from the machine.*

1. Tape the loose end of the roll down so that it cannot flap free.
2. While one person lifts from the bottom and holds the paper roll still, use the up **Roll** arrow key on the control panel to rotate the take-up shaft opposite to the direction that the paper was rolled on the machine. The *automatic unroll* feature mentioned above can be used.
3. The larger the roll, the more rotations are required to free the shaft. When the shaft freely rotates in the roll, stop turning the take-up shaft. If the plotter jams (single blinking green LED) then the paper cannot be unwound with the roll motor. See *Manually Freeing the Take-Up Shaft* above.
4. Rotate the take-up shaft by hand until the rectangular opening in the flanged coupling is perpendicular to the opening in the support block (see *Figure 16*). Remove the shaft and lay it on the ground.
5. Continue to twist the shaft counter clockwise while pulling it out of the paper roll until it is free.

Reattaching Paper to the Take-Up Shaft After Unrolling:

Note: *Except when the feed roll has been changed, it is best to leave the chart wheels down when removing completed markers from the take-up roll. Leaving the chart wheels down will help keep the paper aligned with the feed roll and reduce the time between plotting operations.*

1. Use the vertical keypad **Arrow** keys to drive enough paper forward to drape over the shiny top bar and wrap under and around the take-up shaft. If the paper will not move far enough forward, press the **Start Point** key on the keypad. Gently pull the middle of the front edge of the paper to start the machine pulling paper from the feed roll. Guide the paper over the shiny top bar as it is pulled forward. The paper will reverse direction and a feed loop will form in the rear. Use the keypad **Arrow** keys as described above until enough paper is available.
2. Follow the guidelines described in the *Taping Paper to the Take-Up Shaft* section above.

Preventative Maintenance

The following preventive maintenance procedures should be performed when debris has visibly accumulated or when plotting quality is affected.

Cleaning the Grit Shaft

Dust and paper residue accumulating on the grit shaft can cause slippage of the paper during plotting and poor plot accuracy. This procedure should be performed before loading every new paper roll.

1. Turn off the power to the plotter.
2. Remove the paper from the platen.
3. Using the supplied cleaning brush, remove any accumulated dust and paper residue from the grit shaft. Be sure to rotate the grit shaft and clean all of the surfaces. See *Figure 27*.

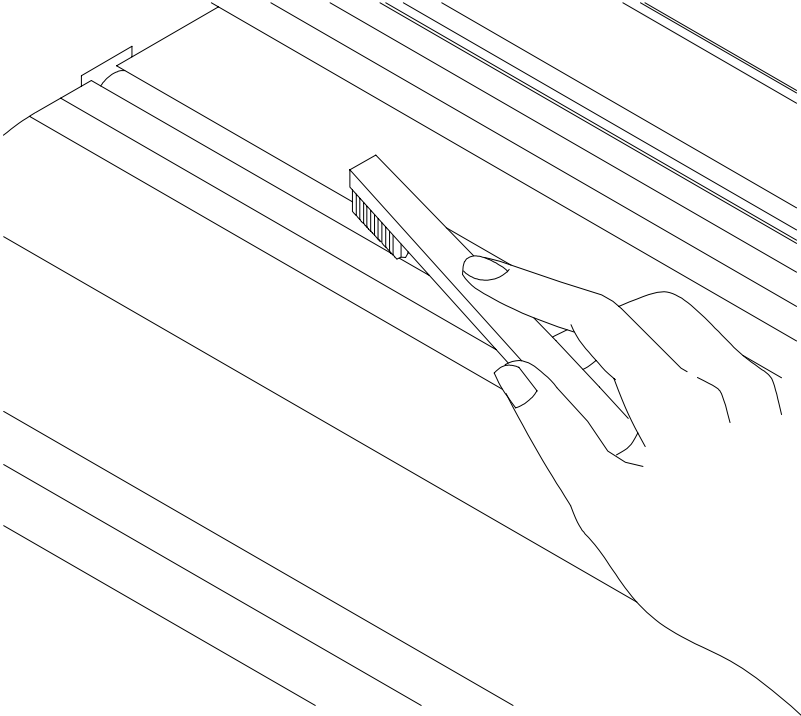


Figure 27. Cleaning the grit shaft.

Cleaning the Platen

As the plotter is used, dust and paper residue will accumulate on the platen. This debris may have to be removed as often as every two weeks.

1. Turn off the power to the plotter.
2. Dampen a lint-free cloth with isopropyl (pharmacy) alcohol and gently wipe the platen until any accumulated residue has been removed. Antistatic spray may be used instead of isopropyl alcohol to clean the platen.

Cleaning the Support Blocks

Dust and paper residue will accumulate on the take-up and feed shaft support blocks. Perform this procedure when debris inhibits easy rotation of the shafts.

Warning: *Never touch the take-up key or flange coupling while they are rotating (see Figure 16). Serious personal injury could result.*

1. Turn off the power to the plotter.
2. Remove the feed shaft and the take-up shaft.
3. Dampen a lint-free cloth with isopropyl (pharmacy) alcohol and gently wipe the support blocks until any accumulated residue has been removed.
4. Wipe down both ends of the feed shaft and the take-up shaft before reinstalling them.

Cleaning the Traverse Extrusion and Carriage V-Wheels

The dust and debris that accumulates on the traverse extrusion must be wiped off with an isopropyl (pharmacy) alcohol dampened, lint-free cloth.

1. Turn off the power to the plotter.
2. Dampen a lint-free cloth with isopropyl (pharmacy) alcohol and gently wipe the top and bottom rails of the traverse extrusion until any accumulated dust and debris has been removed.
3. Clean the lower carriage v-wheels by holding an isopropyl alcohol dampened lint-free cloth against a v-wheel while gently sliding the carriage back and forth. See *Figure 28*.

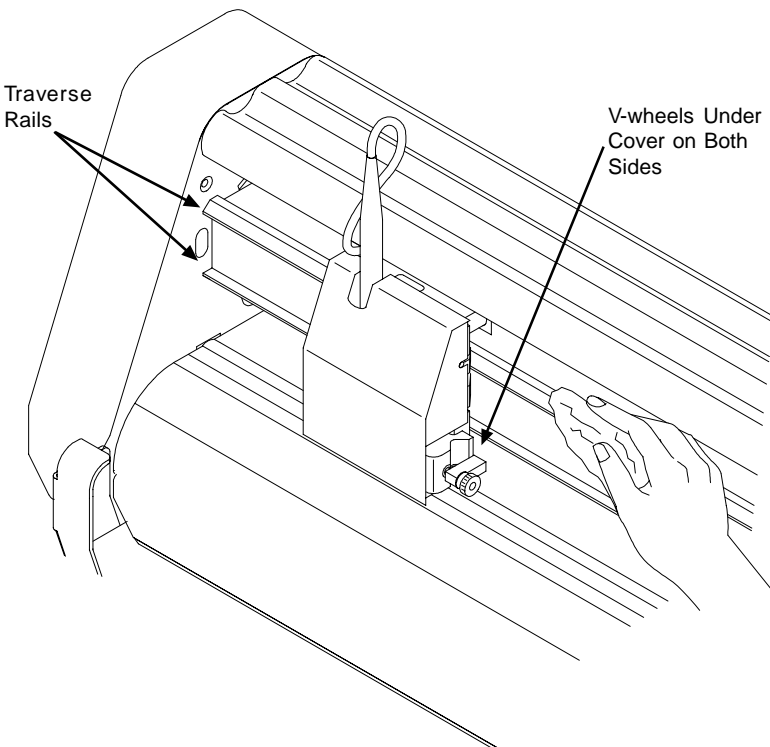


Figure 28. Cleaning the traverse extrusion and carriage V-wheels.

Testing and Troubleshooting

If the system isn't working correctly it is very important to determine which component is causing the problem. Likely difficulties may involve the computer, the power cord or serial cable, the apparel/plot design software, or the plotter. If the problem appears to be with the computer or design software consult the appropriate documentation or an Ioline distributor first. Contact Ioline Customer Service if these suggestions do not correct the problem.

General Problems

A marker plot doesn't start at the correct point on the paper.

Cause:

The starting point is not set.

Solution:

Press the **Start Point** key with the pen positioned where the plot should start.

The plotter does not complete the marker plot and leaves a large gap between frames.

Cause:

The apparel design software frame size is set larger than the plotter panel size setting (the factory set and maximum frame size is 46" or 116.8 cm).

Solution:

Increase the panel size setting (with the Control Center software) to match the setting of the apparel design software or lower the apparel design software frame size setting to match the panel size setting.

If a marker plot file has been sent but nothing happens.

Cause:

A communication problem has occurred or the plotter is in **Stop** (red LED) mode.

Solution:

Make sure the serial ports on the computer and the plotter are configured properly. Press the **Start/Stop** key to put the plotter in **Start** mode (green LED). Feed loops will form.

No power when the plotter is turned on.

Cause:

1. The power cord is damaged or disconnected.
2. The plotter is damaged and needs professional service.

Solution:

1. Check the power cord connection.
2. Call an Ioline distributor or Ioline Customer Service.

Plotting Quality Problems

Good plotting quality is dependent upon a number of different factors. The type of paper, environmental conditions, and operator habits are only a few of the variables that can affect the quality of a plot. It is important that the plotter is loaded and maintained according to the guidelines in the *Operation* chapter. Below is a summary of the most common difficulties:

A marker plot file has been sent and the output is erratic..

Cause:

The marker plot file was sent with the wrong plotter language setting

Solution:

Make sure the apparel design software and the plotter are set to the same plotter language (either HPGL 7475 or HPGL 7596).

The frame sensor does not detect a frame axis mark (the plotter stops functioning, emits audible beeps and the keypad LED is green).

Cause:

The frame sensor was unable to find the frame alignment mark.

Solution:

See the LED Codes section below.

The corners of the lines on the plots are not completely meeting.

Cause:

1. The paper is slipping.
2. The up/down delay values are set incorrectly.
3. The pen force setting is too low.

Solution:

1. Clean the grit shaft and adjust the chart wheels.
2. Adjust the up/down delay.
3. Increase the pen force.

A gap or overlap is evident between panels or the panels are not aligned.

Cause:

1. The paper is slipping.
2. Sensor disabled or frame gap not set.

Solution:

1. Clean the grit shaft then change the chart wheel position.
2. Set the frame gap or enable the sensor in the Control Center.

Pen tears the paper during plotting.

Cause:

1. The pen is dry.
2. The pen tip is broken, possibly due to pen force set too high.
3. The pen force is set too high.
4. Dirt or debris is stuck on the pen.
5. The paper is bubbling because the fans are not working.
6. Paper is bubbling because the paper is slipping.
7. The up/down delay values are set incorrectly.

Solution:

1. Replace the pen.
2. Decrease the pen force and replace the pen.
3. Reduce the pen force.
4. Clean or replace the pen.
5. Contact an Ioline distributor or Ioline Customer Service.
6. Clean the grit shaft then change the chart wheel position.
7. Reset to defaults. Adjust as necessary.

Loss of Registration Between Frames

Loss of accuracy between the frames of a completed marker plot may indicate a loss of registration during frame advance. Check the following items to ensure that the plotter is setup properly:

- Make sure the frame sensor is enabled in the Control Center (model 600 only) or check the *Frame Gap* (see the *Operation* section for more details). If the frame sensor is OFF mark the check box and send settings to the plotter so that it functions properly.
- The frame/panel size may be mismatched between the plotter and the design software. Check that the frame size in the software is equal to or lower than the default panel size of 46" (116.8 cm).

Registration problems can also arise from the paper slipping under the chart wheels or from other tracking problems. If everything appears to be setup properly see *Tracking* below.

Tracking

Tracking is the process that controls the media motion over the platen and assures accurate lines and frame matching. If the paper is slipping under the chart wheels or is not aligned, plotting quality and frame registration are degraded. To resolve tracking difficulties try the following suggestions:

- The paper must be installed correctly. See the *Operation* chapter for more details.
- Inspect the paper for wrinkles or folds. Never use any paper that is folded, wrinkled, or torn in any way.
- Check the take-up shaft to see if the roll of completed marker plots exceeds the height of the paper guide flanges (greater than 600 yards). If the take-up roll diameter is greater than the paper guide flanges the paper will have to be removed before sending the

next plot file. See *Removing Completed Markers from the Take-Up Roll* in the **Operation** chapter.

- Reducing the speed and acceleration settings in the Control Center can resolve some tracking problems.
- Make sure the chart wheels are spaced across the paper as outlined in the **Operation** chapter.
- The inner chart wheels must not be positioned over the bearings in the grit shaft because paper tearing and bunching will occur.
- Check to make sure that the plotter is level. See the **Setup** chapter.
- The chart wheel pressure on the grit shaft creates an impression on the marker. The underside of the completed marker plot will always have visible grit tracks which should be identical. If one grit track is more pronounced or markedly different than the others there may be a chart wheel or grit shaft problem.
- The paper may be slipping because debris has accumulated on the grit shaft preventing proper paper traction. Inspect and clean the grit shaft. Refer to the **Preventative Maintenance** chapter.
- Contact an Ioline distributor or Ioline Customer Service if damaged equipment is causing tracking difficulty or if the plotting quality problem cannot be resolved.

Poor Line Quality

If the marker plot line quality is uneven try the following suggestions in order:

1. Use the keypad force knob to select a pen force that produces adequate line quality.
2. Increase the **Pen Down Delay**.
3. Replace the pen with a new one.
4. Adjust the plotting speed values in the Control Center software.
5. Plot on a higher quality paper.
6. Refer to the **Operation** chapter to check that the pen is recommended by Ioline.

-
7. Check the white plotting strip under the pen. Have it replaced if it is damaged.
 8. Contact an Ioline distributor or Ioline Customer Service for further help.

Error Messages

Error messages that are specific to the plotter are divided into two categories; software errors and LED codes. Software errors present themselves on the computer screen and usually indicate a communication problem. LED codes are visible below the keypad on the front panel of the plotter and can be green, red or a combination of both. The *LED Codes* table in this section explains the the type and meaning of each error. Other errors can occur with the operating system or the plotting software and should be resolved with the software vendor.

Software Errors:

Could not open COMx.

Cause:

The Control Center couldn't open the COM port for use. A serial port that is not available was selected.

Solution:

Select a serial port that is available.

Setup COM port and check plotter present.

Cause:

The last operation requires that the plotter be connected to the serial port but the Control Center could not find it.

Solution:

Be sure the plotter is connected to the selected serial port, that the green LED is on, and that the serial cable is functioning.

Green LED not on or plotter not connected to COMx.

Cause:

The Control Center opened the COM port but could not get a response from the plotter.

Solution:

Be sure the plotter is connected to the selected serial port, that the green keypad LED is on, and that the serial cable is functioning. This message may appear if communication is attempted during plotting. If this is the case wait for the plot to finish and send the setting or file again.

The selected plotter is not the same as that connected to the computer.

Cause:

The Control Center cannot match the plotter that was chosen at start up with the one found during initialization.

Solution:

Select the correct plotter from the plotter list.

This version of Control Center needs a ROM version of X.X or later.

Cause:

The ROM is not compatible with the Control Center currently in use.

Solution:

The plotter is shipped with a Control Center that is designed to function with specific ROM versions. If this error occurs contact Ioline to determine the correct ROM and software combination.

LED Codes

Double blinking red LED, pause, repeat ...

Cause:

Buffer overflow or communications problem.

Solution:

Perform communication tests as outlined below. Send the marker.plt file from the Control Center to verify communication.

Alternating blinking green and red LED

Cause:

Plotter language syntax error.

Solution:

Make sure that the plotter and the computer software are set to the same plot language. Send the marker.plt file from the Control Center to verify communication.

Single blinking green LED, pause, repeat ...

Cause:

Carriage (Y axis) or take-up roll jam due to crumpled media or other objects blocking motion.

Solution:

Clear media or objects causing jam.

Single blinking red LED, pause, repeat ...

Cause:

Grit Shaft (X axis) jam due to crumpled media or other objects blocking motion.

Solution:

Clear media or objects causing jam.

Solid green LED, continuous beeping.*

Cause:

The frame sensor was unable to find the registration mark. The plotter has entered frame sensor error mode.

1. The pen is dry or the ink is not black.
2. Paper is bubbling or badly misaligned.
3. The sensor is loose in the bracket or damaged.

Solution:

1. Replace the pen with a new black ink pen. Press the keypad Sensor Test key to perform the frame axis mark procedure again. If the mark cannot be read, press the **Start/Stop** key to skip frame registration and proceed to the next frame.
2. Check paper alignment.
3. Call Ioline Customer Service for adjustment details or to identify an equipment problem.

* Normally the model 600 will make multiple attempts to find each frame mark. The plotter will continue to plot if one frame mark cannot be found. If another frame mark is missed during the next eight frame advances the plotter will enter *frame sensor error* mode. The keypad LED will remain solid green but plotting will stop and the machine will beep continuously.

Pressing the **Sensor Test** button will force the machine to attempt to find the sensor mark again. If the mark is found plotting will continue. This solution is especially effective when the pen has run out of ink and is replaced. Pressing the **Start/Stop** button will allow plotting to continue normally without frame correction for the current frame advance. If the plotter enters *frame sensor error* mode frequently, contact an Ioline distributor or Ioline Customer Service.

Testing the Frame Sensor

If the frames are not meeting or the frame sensor is not performing properly the following procedure will help determine if a problem has developed. This test can be performed during plotting.

1. The plotter must be in **Stop** mode to perform the test. Press the **Start/Stop** button until the keypad LED turns red.
2. Position the carriage so that the pen is over a clean section of paper. Press the **Sensor Test** switch. A frame alignment mark will be drawn and the machine will attempt to detect the edges.
3. The sensor will pass back and forth over the frame mark, beeping after each pass that the mark is recognized, until any keypad key is pressed.
4. If no beep is heard the sensor may need to be adjusted or replaced. Contact an Ioline distributor or Ioline Customer Service for details.

Communications Problems

Many problems can be resolved by testing and adjusting the communications between the plotter and the computer. There are three diagnostic tests that can be run from the Control Center. These tests are designed to help determine if there are communications problems and isolate where the difficulty is occurring.

The last two tests require that a diagnostic module (available from an Ioline distributor) be connected to the serial port on the computer or the plotter. If the following tests do not resolve the problem and the computer and software are working properly contact Ioline Customer Service.

Serial Communication Test:

Run this test from the Ioline Control Center. The diagnostic module will NOT be needed to run this test.

1. Connect the serial ports on the plotter and the computer with a serial cable.
2. From the Control Center screen, select *Test* in the menu.
3. Select *Serial Test*.
4. Turn on the plotter while holding down the **Sensor Test** key on the keypad until the machine beeps and the LED flashes three times.
5. Press the **Start/Stop** key on the keypad to verify that the handshake line (CTS), displayed on the computer, toggles ON and OFF. Leave the handshake lines ON. Press the **Roll** down arrow key to switch the plotter into ECHO mode. The green LED will come on.
6. Press any key on the computer keyboard and verify that the character transmitted equals the character received. If the plotter and the computer transmit characters properly, there should not be any problems sending marker files to the plotter.
7. Select **Exit** after completing the serial test.

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8. Turn off the plotter at the end of the test. Normal communications will be restored when the power is turned back on.
 9. If this test is successful the next two tests are not necessary.

Testing the Plotter Port:

Run this test from the Ioline Control Center. The diagnostic module will be needed to run this test.

1. Connect the diagnostic module directly to the plotter serial port.
2. Turn on the plotter while holding down the *Sensor Test* key on the keypad. Hold down the Sensor Test key until the machine beeps and LED flashes three times.
3. Press any **Arrow** key to transmit and receive characters. Verify that the plotter beeps and the green LED flashes.
4. Turn off the plotter at the end of the test. Normal communications will be restored when the power is turned back on.

Testing the Computer Port:

Run this test from the Ioline Control Center. The diagnostic module will be needed to run this test.

1. Connect the diagnostic module directly to the serial port on the computer.
2. From the Control Center, select *Test*.
3. Select *Computer Port Test*.
4. Verify that the COM port displayed is the correct one. If it is not, press the ESC key twice and select the correct COM port from the *Setup, Com Port Setup* menu. If any key other than ESC is pressed the computer serial test screen will be displayed.
5. Press any key on the computer keyboard and verify that the character transmitted is the same as the character received.

Glossary

A

Acceleration - The rate that a plotter changes the speed of the *carriage* or the paper. This value affects speeding up and slowing down. Acceleration is measured in units of g (1 g = 32.2 ft/s²). Higher acceleration can increase *throughput* but may degrade plot quality.

Arc - A line segment that is deflected an angle to form a curve.

Axis - The geometric guidelines used to place a *coordinate* that determines pen paths for plotters.

B

Bottom Pan - Metal housing that protects the underside of the plotter.

C

Carriage - The component that holds the pen and *frame sensor* (model 600 only). It travels along the *Y axis* on the *traverse*.

Chart Tape - Slick white tape located under the pen to cushion and protect the *platen* and pen.

Chart Wheel - Roller wheels that push the paper against the *grit shaft* when lowered into position by the *square shaft*.

Chart Wheel Lever - Lever connected to the *square shaft* that, when actuated, raises and lowers the *chart wheels*.

Control Panel - Where the user controls simple plotter functions. *Carriage* and media motion is accessible from here during **Stop** mode. Also called the *keypad*.

Coordinate - A point that can be referenced by its position on the *X* or *Y axes* of a plotter. The use of line or *arc* segments to connect coordinates creates paths for pens to follow when plotting.

D

Dancer Bar - Rod that holds the *feed loop* and *take-up loop* taut during plotting.

DM/PL - Digital Microprocessor/Plotting Language. An instruction set used to send *vector* information to a machine that can represent data as a plot. DM/PL is used in software drivers for some design programs.

F

Feed Loop - Slack material between the feed roll and the plotter. The rear *dancer bar* holds the *feed loop* taut during plotting.

Feed Shaft - Metal rod that holds the paper roll parallel to the plotter and allows it to turn during feeding.

Filename Extensions - In DOS and Windows based programs, the three letters after the period in a file name. With graphics files the three letters denote a file type such as the *vector* and bitmap based Encapsulated Postscript (EPS) and the *vector* based *Hewlett Packard Graphics Language* (PLT).

Font - Refers to the style and width of letters, numbers, and symbols, such as Helvetica Bold or Times Roman.

Force - The downward pressure exerted on a pen tip. The force range available with the force knob on the *keypad* can be changed with the Control Center. Increasing the pressure can produce a darker line. Too much force can damage some pens and tear media.

Frame - Segment of a plot established by the design software. Frames can be any size up to 46" (X axis) by 72" (Y axis). Markers are generally plotted as a series of frames.

Frame Size - The *X axis* length of each part of the plot as established by the design software. *Frame* size is also called tile size, page size, etc.

Frame Sensor - The electronic eye that reads *frame* position and adjusts plotting parameters so that the *frames* are aligned properly (on the model 600 only).

Friction Feed - Process where material is fed through a plotter by placing it between a motor-driven grit wheel and a tensioned *pinch wheel*.

G

Grit Shaft - The motor driven shaft that moves material through a friction feed plotter. The grit shaft has a rough surface to provide a better grip on the media.

H

HPGL - Hewlett Packard Graphics Language. Instruction set used to send *vector* information to a machine that can represent data as a plot. HPGL 7475 is the most common plot language used for communication between a plotter and design software.

K

Keypad - Where the user controls simple plotter functions. *Carriage* and media motion is accessible from here during **Stop** mode. Also called the *control panel*.

O

Origin - Point marking the zero (0) *coordinate* on the *X* and *Y* axes. Used as a starting reference by plotters for pen paths. On the Ioline plotter models 600 and 28 the origin is set with the *start point* key on the control panel.

P

Panel - A panel is the plot area that can be drawn without advancing the paper. Service loops (*take-up* and *feed*) are established based on the *X axis* length of the panel. Maximum panel size is 46" (116.8 cm) long by 72" (182.9 cm) wide. On the model 600 or 28 multiple panels are rolled up on the *take-up shaft*. In general the panel size should be set the same size as the frame size in the design software.

Paper Hub - Device that holds the feed paper roll in position on the *feed shaft*.

Pen Delay - The amount of time, in milliseconds, that the pen hesitates when actuated (up or down).

Pinch Wheel - See *chart wheel*.

Platen - Curved surface that houses the *grit shaft* and supports the material during plotting.

R

Resolution - Degree of accuracy that a plotter will place a pen tip in relation to the intended location of a *coordinate*.

S

Serial Communication - Method of sending information one signal at a time, usually through a cable.

Square Shaft - Shaft that raises and lowers the *chart wheels* when rotated. Located below the *traverse* assembly.

Start Point - The *origin* of a plot file. The model 600 and 28 require a *Start Point* be set before receiving a plot file.

Support Blocks - Plastic parts that hold the *feed shaft* and *take-up shaft*.

T

Take-Up Loop - Slack material between the plotter and the *take-up shaft*. The front *dancer bar* holds the *take-up loop* taut during plotting.

Take-Up Motor - The motor that rotates the *take-up shaft* on the model 600 and 28.

Take-Up Shaft - Metal rod that the plotted markers are rolled onto. The *take-up shaft* is driven by the take-up motor.

Throughput - Speed of a plotter in completing a job. Represents the ability to process information and plot an image.

Top Bar - Metal bars in the front and rear of the plotter that hold the *feed loop* and *take-up loop* vertical.

Traverse - Structure that supports and guides the *carriage* and holds the *square shaft* support brackets.

V

Vector - In computerized apparel plotting, a line segment between two *coordinates* on which a pen path can be created for plotting.

X

X Axis - Direction of paper moving over the *platen*. Usually associated with the *grit shaft*.

Y

Y Axis - Direction of pen motion. Usually associated with the *carriage*.

FCC Notice

This equipment generates and uses radio frequency energy and, if not installed and used properly (in strict accordance with the manufacturer instructions), it may cause interference to radio and television reception. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. If this equipment does cause interference to radio or television reception - which can be determined by turning the equipment off and on - you are encouraged to try to correct the problem by one or more of the following measures:

- Use only shielded interface cables.
- Reorient the receiving antenna.
- Relocate the host computer with respect to the receiver.
- Move the host computer away from the receiver.
- Plug the host computer into a different outlet so that the host computer and receiver are on different branch circuits.

If necessary, consult your distributor or an experienced radio/television technician for additional suggestions. The following booklet, prepared by the Federal Communications Commission, is a helpful reference:

How To Identify and Resolve Radio-TV Interference Problems.

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. The stock number is 004-000-00345-4.

Your Comments Are Requested

Ioline Corporation is interested in any comments about this documentation. Please send your corrections or suggestions to Ioline Corporation, 14140 NE 200th Street, Woodinville, WA 98072, USA.

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Customer Service

Ioline Corporation is committed to providing quality service and support to our customers. If you need assistance with an Ioline product, contact your local distributor or Ioline authorized service center. You may also contact the Ioline Customer Service Department at: 425-398-8282 [7:00 a.m.-5:00 p.m. PST], FAX: 425-398-8383, Email: techsupport@ioline.com, WWW: <http://www.ioline.com/>.

Limit of Liability Statement

It is the responsibility of the operator of the plotter model 600 or model 28 to monitor the performance of the plotter model 600 or model 28 and maintain it in proper working condition by following the instructions in this Guide to Operations. It is the responsibility of the operator of the plotter model 600 or model 28 to follow all safety precautions and warnings that are described in this Guide to Operations. Ioline is not responsible for injuries that may occur as a result of unsafe operating procedures. Ioline is not responsible for substandard operational performance as a result of failure to maintain the plotter model 600 or model 28 as described in this Guide to Operations.