User's Manual

IDS/PI-400 Five Gallon Pigmented Ink System

Revision E
5802-495

Diagraph®

An ITW Company

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INTRODUCTION The (9600-000) Diagraph Five-Gallon Pigmented Ink System, or IDS/PI-400, supplies pigmented ink to large character ink jet printheads while continuously circulating ink through the printheads and back into the ink container. Circulation keeps pigments in suspension and ink flowing smoothly. Flushing the ink lines with cleaning solvent is easily performed by switch selection.

METHOD OF OPERATION The IDS/PI-400 uses a pneumatic operated, diaphragm pump to lift pigmented ink or solvent from a reservoir, pressurize the fluid through a surge tank, then split it into two output flows. One pressurized flow feeds up to four ink jet printheads while the other mixes ink in the supply reservoir. As long as the pneumatic pump is running and continuous flow is maintained throughout the system, the ink pigment remains suspended.

CAUTION: Whenever this flow stops, a complete solvent flush must follow immediately. That flush must continue until clear, clean solvent flows into the effluent container (see "System Purging", page 16). Both the TSO-SC conditioner and inks are flammable liquids. Handle with due caution. See the Material Safety Data Sheet for more information.

The IDS/PI-400 may be left on continuously to minimize the need to flush the system as long as air pressure is supplied to operate the pump.

PREPARATION Place the IDS/PI-400 on a stand or table near the ink supply at operator working-height. Collect the following items:

- Diagraph IV ink jet printing system with pigmented ink printheads and regulators *(Figure 14, also see Table 1)*
- Clean, absorbent rags
- 1301-562 Wash bottle filled with Solvent (TSO-SC conditioner)
- Five-gallon container of Diagraph pigmented ink (White 2600-238 or Yellow 2600-239).
- 1301-017 five-gallon effluent container
- 2600-199 five-gallon container of Diagraph solvent (TSO-SC Conditioner)
- 9600-073 ink cap assembly *(Fig. 3)*
- 9600-074 ink pump supply tubing assembly *(Fig. 7)*
- 9600-784 ink tank return tubing assembly *(Fig. 8)*
- 9600-783 ink ph return tubing assembly *(Fig. 9)*
- 1902-842 low ink strobe light assembly *(Fig. 10)*
- 5700-736 solvent cap assembly *(Fig. 11)*
- 9600-780 solvent pump supply tubing assembly *(Fig. 12)*
- 9600-779 ink from ph tubing assembly for each IV printhead *(consists of Part "A" and Part "B", see Figures 13 and 18)*
- 5700-743 pressure gauge *(Fig. 16)*
- 9600-075 ink to ph tubing assembly for each IV printhead *(Fig. 13)*
- 1301-875 six-feet (of the 12-ft) solvent ph return tubing assembly
- 1301-875 six-feet (of the 12-ft) solvent tank return tubing assembly

ALWAYS WEAR THE APPROPRIATE SAFETY EQUIPMENT AS PRESCRIBED BY YOUR SUPERVISOR WHEN WORKING WITH OR AROUND PRESSURIZED FLAMMABLE LIQUIDS.

NOTE: Lubricated air is recommended. Supply the air lubricator with a good grade of SAE 90 wt. non-detergent oil and set the lubricator to a rate not to exceed one drop per minute.

INSTALLATION

Shop Air Connection

1. Turn the blue AIR VALVE **(D)** *(Fig. 2*) to OFF.
2. Connect shop air to the AIR-IN PORT **(Q)** (*Fig. 1)* located on the back of the IDS/PI-400. The supply minimum requirements are 2.5 CMF and 80 PSI.

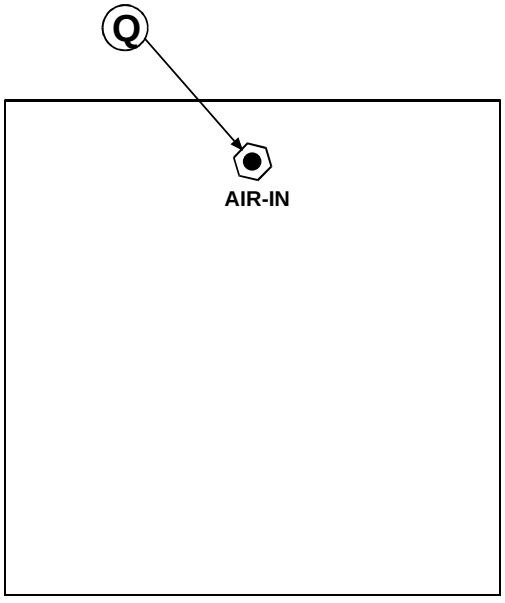

Figure 1 IDS/PI-400 Back Panel AIR IN Port

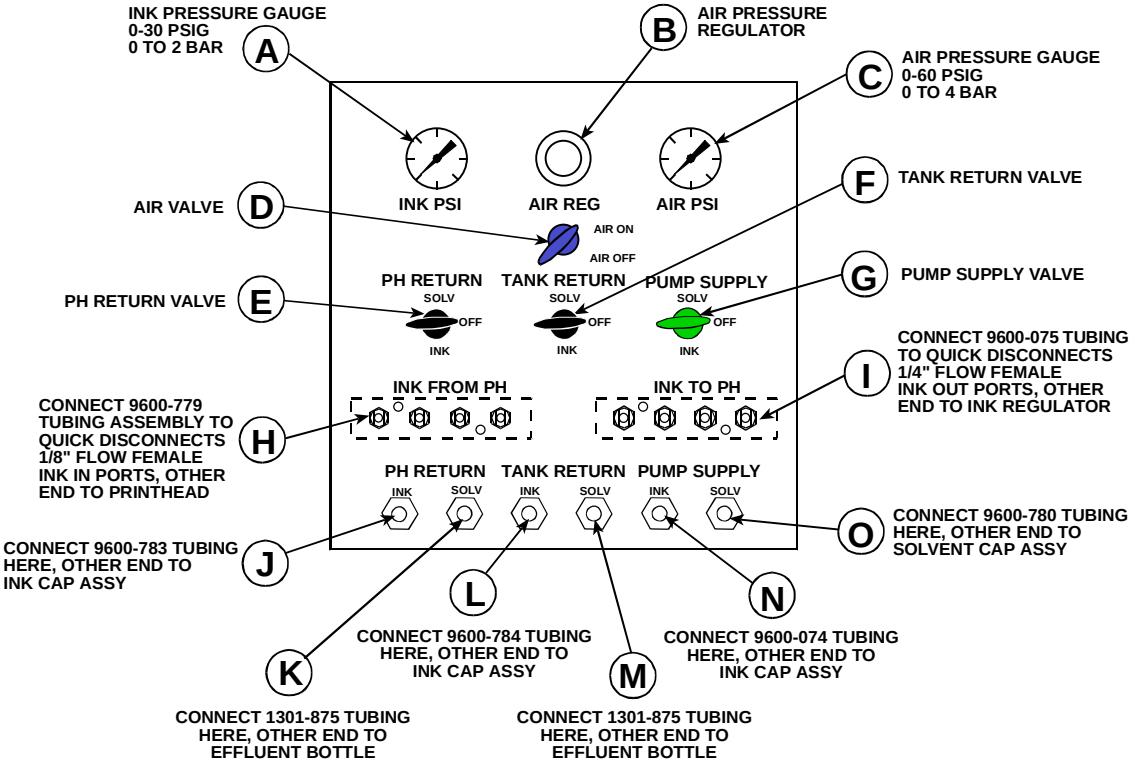

Figure 2 IDS/PI-400 Front Panel

Prepare the Ink Container (2600-238, White or 2600-239, Yellow) and Install the INK CAP Assembly (9600-073)

1. Shake the ink by first turning the pail upside-down and striking the bottom of the pail approximately 10 times to break up the pigment "cake" settled at the bottom. Rock the pail back and forth 10 times and rotate it 90°. Repeat this step three more times. Turn the pail upright and remove the shipping cap from the container.

2. Install the INK CAP assembly *(Fig. 3)* in the ink container by inserting one side of the bundled "T" ends into the opening followed by the other side of the "T". Make sure that the bundled "T" ends curve towards the bottom center of the ink supply pail. As the ink level drops, both ends of the "T" must rest on the bottom or the system will take in air and corrupt the printing.

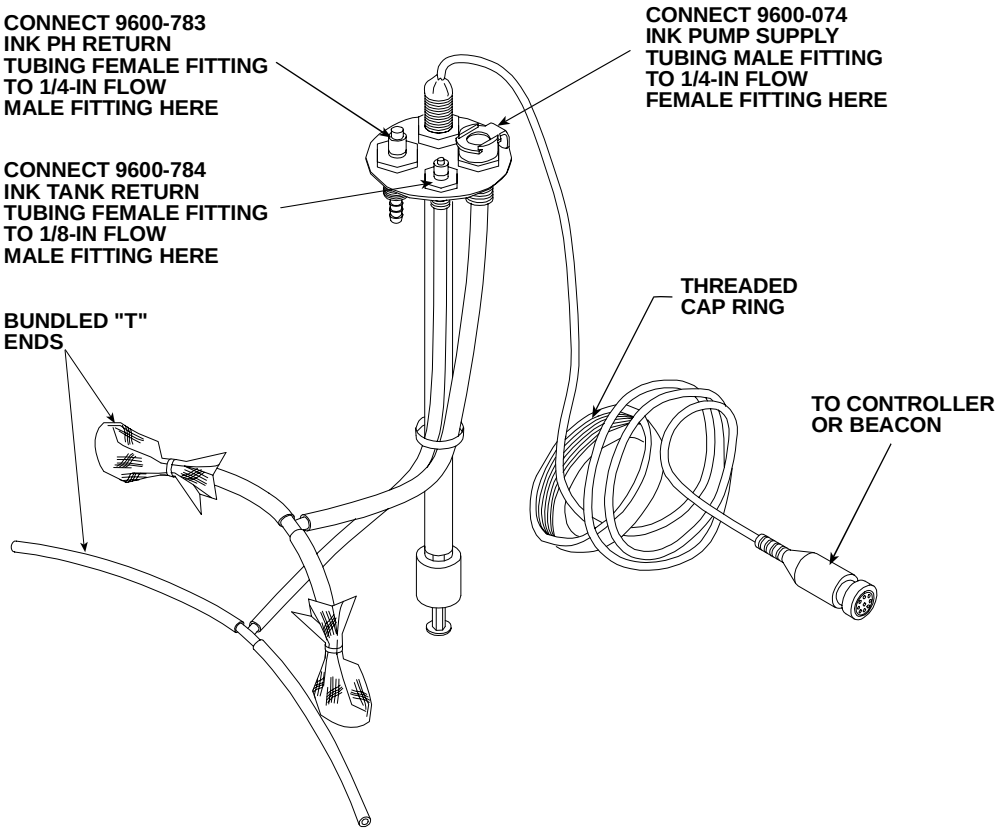

Figure 3 Ink Cap Assembly (9600-073)

3. Tighten the threaded cap ring of the INK CAP assembly.

NOTE: Ink can leak from the ink cap vent hole if the container is tipped over.

CAUTION: Keep all ink lines and cables free of entanglement by securing them against structures.

Prepare Tubing Assemblies to Fittings (J) through (O) on the IDS/PI-400 Front Panel

1. Tubing 1301-875 for the effluent container comes in 12-ft length, cut in half for use on **(K)** SOLV PH RETURN and **(M)** SOLV TANK RETURN.

2. Before connecting any of the tubing assemblies **(J)** through **(O)**, make sure the open end of the tubes are cut squarely and remove any burrs.

3. Draw a length of insertion mark 9/16-in from the open end of the tubes *(Fig. 4)*.

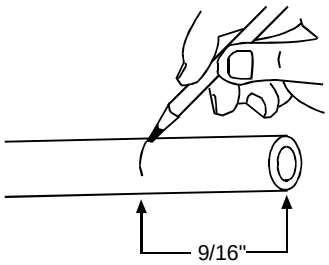

Figure 4 Mark the Length of Insertion

4. On the fittings **(J)** through **(O)**, loosen the nut until three threads are visible *(Fig. 5)*.

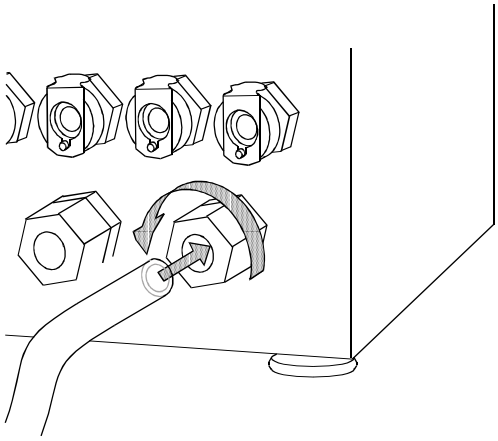

Figure 5 Loosen the Nut and Insert the Tube into Nut and Tighten

5. Moisten the open end of the tube with water and push the tube STRAIGHT into the fitting until it bottoms on the fitting's shoulder. Tighten the nut by hand. Additional tightening should not be necessary, but 1/4-inch turn may be added if desired. DO NOT OVER-TIGHTEN. Nut or threads will strip and the fitting will not function properly if over-tightened. A proper assembly will not show the

insertion mark you made on the tube end *(Fig. 6)*. If the insertion mark is visible, re-adjust until it is hidden.

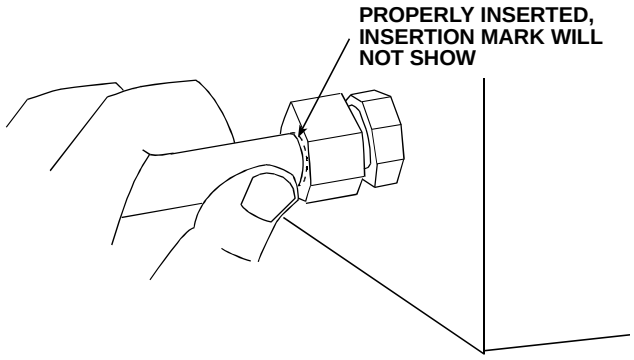

Figure 6 Insertion mark should not show

Connect Tubing (9600-074) INK PUMP SUPPLY from (N) to INK CAP Assembly (9600-073)

1. Identify the INK PUMP SUPPLY tubing assembly — a 5-ft, 3/8-in OD section of tubing terminated at one end with a male fitting and open at the other.

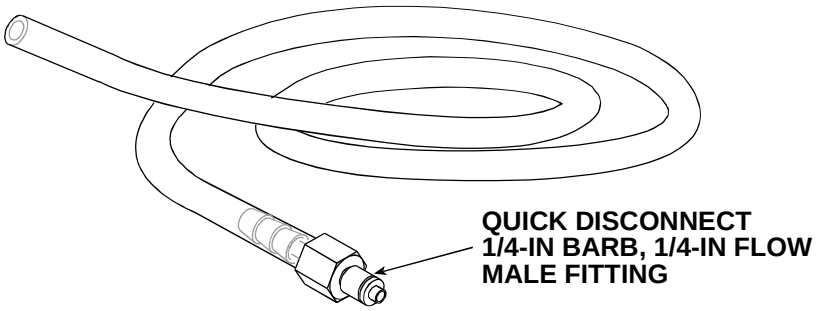

Figure 7 Ink Pump Supply Tubing Assembly (9600-074)

2. Connect the open end of the INK PUMP SUPPLY tubing assembly to the front panel INK PUMP SUPPLY fitting **(N)**.

3. Connect the male fitting end of the tubing into the 1/4-in flow female fitting of the INK CAP assembly *(Fig. 3)*.

Connect the Tubing (9600-784) INK TANK RETURN from (L) to INK CAP Assembly (9600-073)

1. Identify the INK TANK RETURN tubing assembly—a 5-ft, 1/4-in section of tubing terminated at one end with a quick disconnect female fitting and open at the other.

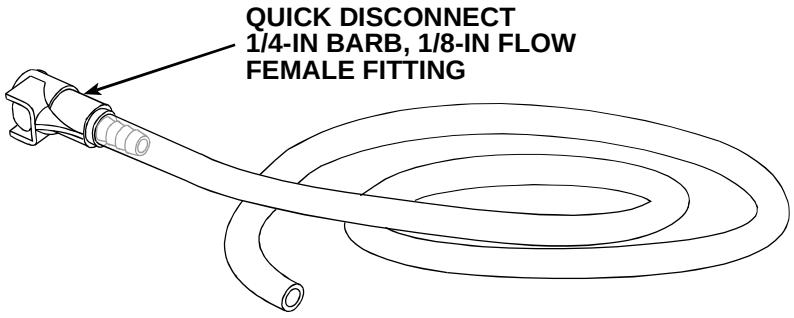

Figure 8 Ink Tank Return Tubing Assembly (9600-784)

2. Connect the open end of the tubing assembly to the INK TANK RETURN **(L)** fitting on the front panel.
3. Connect the female fitting end of the tubing to the 1/8-in flow, male fitting of the INK CAP assembly *(Fig. 3)*.

Connect the tubing (9600-783) INK PH RETURN from (J) to the INK CAP Assembly (9600-073)

1. Identify the INK PH RETURN tubing assembly—a 5-ft, 1/4-in section of tubing terminated at one end with a female fitting and open at the other.

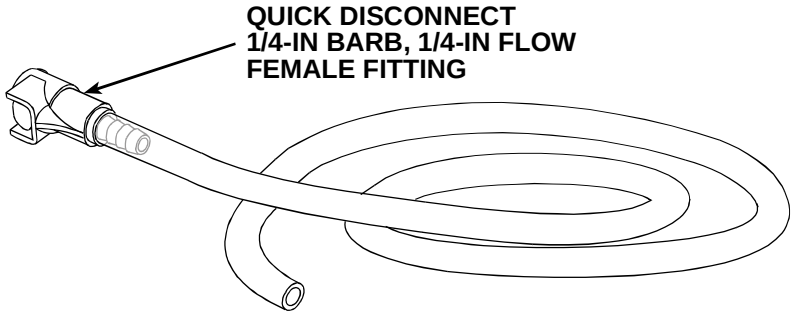

Figure 9 Ink PH Return Tubing Assembly (9600-783)

2. Connect the open end of the INK PH RETURN tubing assembly to the INK PH RETURN fitting **(J)** on the front panel.
3. Connect the female fitting end of the tubing to the 1/4-in flow male fitting on the INK CAP Assembly *(Fig. 3)*.

Install the Ink Low Strobe Light Assembly (1902-842)

Connect the INK LOW STROBE LIGHT to the INK CAP assembly connector *(Fig. 3)* and plug the power supply into a standard 110VAC outlet.

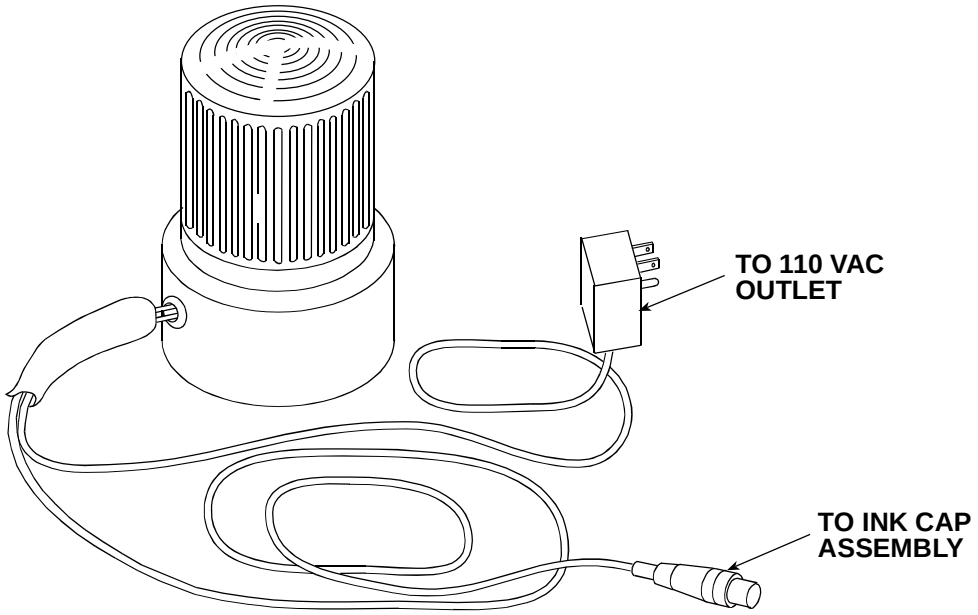

Figure 10 Strobe Light Assembly (1902-842)

Installing the Solvent Cap Assembly (5700-736)

1. Remove the shipping cap from the solvent container.
2. Install the SOLVENT CAP assembly into the solvent container and tighten.

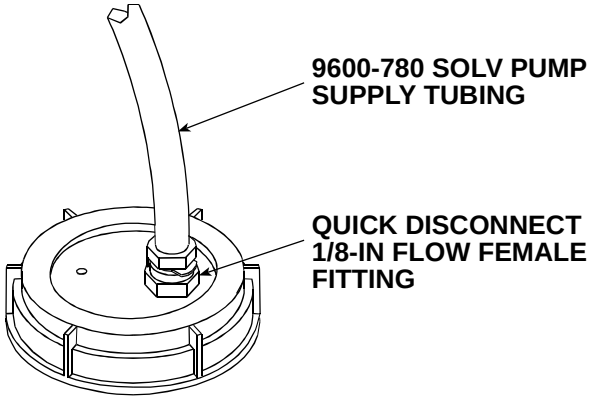

Figure 11 Solvent Cap Assembly (5700-736)

NOTE: Solvent can leak from the solvent cap if the container tips over.

Installing the SOLV PUMP SUPPLY Tubing Assembly (9600-780)

1. Identify the SOLV PUMP SUPPLY tubing assembly—a 5-ft section of tubing terminated at one end with a male fitting and open at the other.

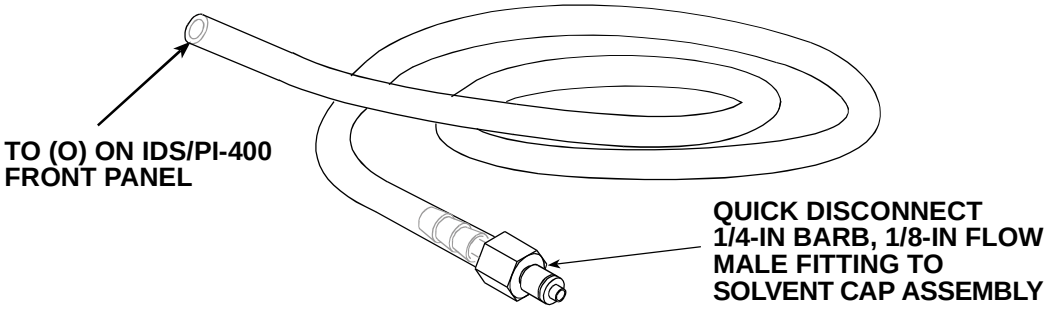

Figure 12 Solv Pump Supply Tubing Assembly (9600-780)

2. Connect the open end of the tubing assembly to the SOLV PUMP SUPPLY fitting **(O)** on the front panel.
3. Connect the male fitting of the tubing assembly to the female fitting in the SOLVENT CAP assembly *(Fig. 11)*.

Installing the 1301-875 tubing to the Effluent Container (1301-017)

1. This is the 12-ft length tubing that you cut in half earlier. Both these 6-ft length of tubing are open at both ends.
2. Connect an end of one of the 6-ft length tubing to the SOLV TANK RETURN fitting **(M)** on the front panel. Place the other end into the effluent container opening.
3. Connect an end of the other 6-ft length tubing to the SOLV PH RETURN fitting **(K)** on the front panel. Place the other end into the same effluent container opening.

Installing the INK TO PH Tubing Assembly (9600-075 and Part "A" of 9600-779)

1. Start with the 20-ft length of 1/4-in INK TO PH tubing (9600-075) with a quick disconnect male elbow fitting at one end and a quick disconnect male fitting at the other end *(Fig. 13)*. The end with the male elbow fitting connects to the INK TO PH port **[I]** on the IDS/PI-400 front panel. The other male fitting connects to the female fitting on the ink regulator. Note: Do not trim or cut the 20-ft tubing length. Excess printhead pressure variation will result.

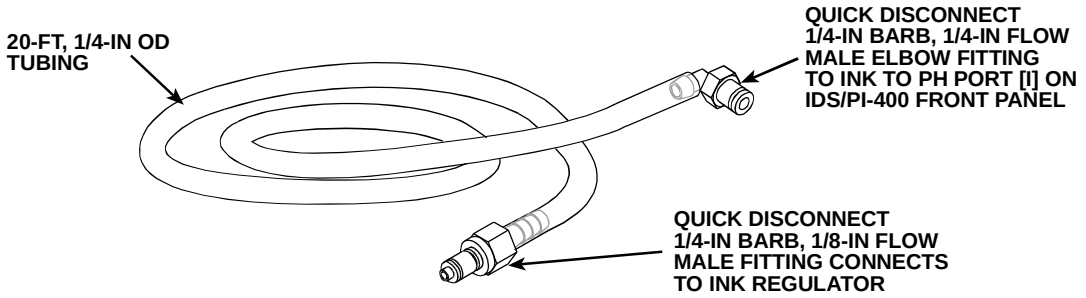

Figure 13 INK TO PH Tubing Assembly (9600-075)

2. The 1902-700 INK REGULATOR assembly comes with the pigmented ink printhead. The tubing on one side of the regulator is a 3-ft long, 1/8-in tube terminated with a quick disconnect male fitting. The tubing on the other side is a 2-in long, 1/8-in tube terminated with a quick disconnect female fitting side *(Fig. 14)*.

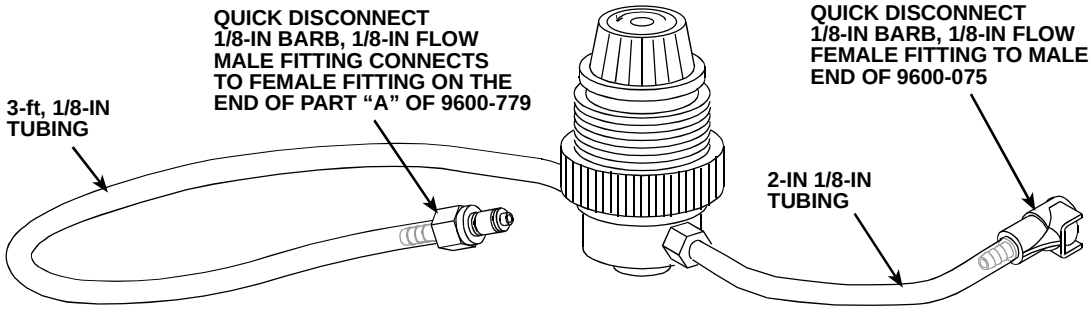

Figure 14 Ink Regulator Assembly (1902-700)

3. Part "A" (Fig. 15) of the 9600-779 tubing assembly consists of a 33-in long, 1/4-in tube and a 3-in long, 1/4-in tube connected together by a "T" fitting. The end of the 33-in tube has a quick disconnect female fitting that connects to the male end of the ink regulator. The end of the 3-in long, 1/4-in tube has a quick disconnect male fitting that connects to the female fitting on the printhead (DO NOT CONNECT TO PRINT HEAD YET). The "T" fitting is for the supplied 5700-743 pressure gauge *(Fig. 16)*.

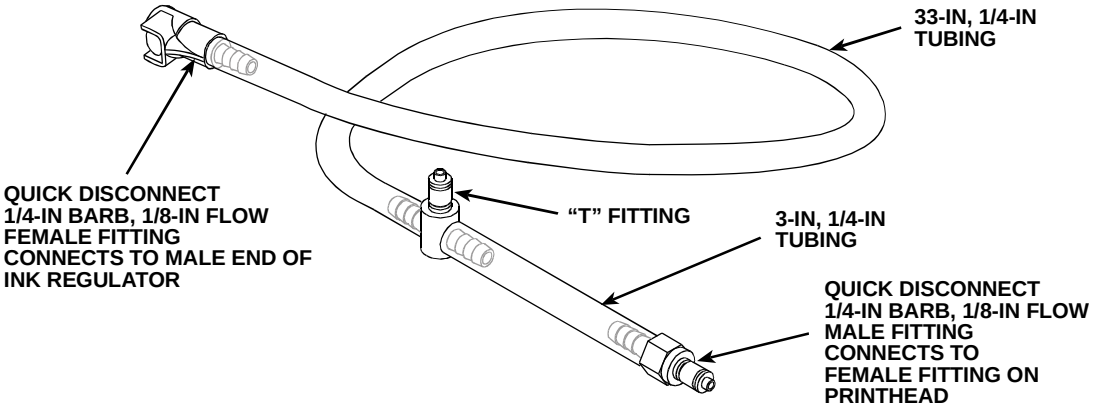

Figure 15 Part "A" tubing (9600-779)

4. Connect the 5700-743 pressure gauge to the "T" fitting on Part "A" tubing assembly 9600-779.

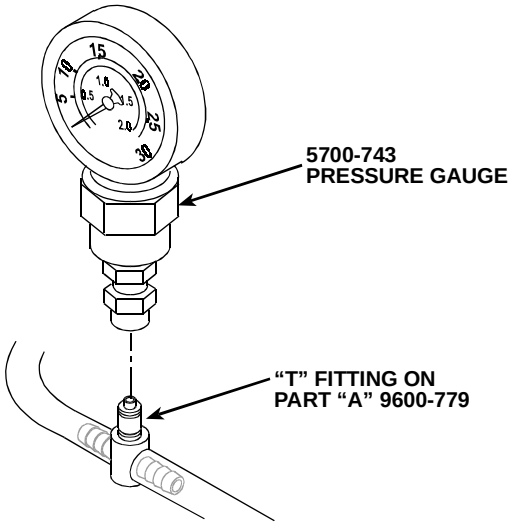

Figure 16 Pressure Gauge (5700-743)

NOTE: You may connect as many as four INK TO PH tubing assemblies, one for each printhead, to the INK TO PH ports **(I)** located on the front panel. Connect tubing for printhead number one to the far right quick disconnect *(Fig. 19)* on the front panel. Connect successive printheads from right to left.

6. Close all ink regulators fully by turning counterclockwise *(Fig. 17)*.

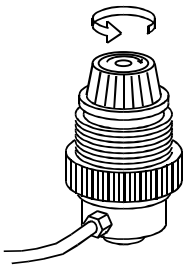

Figure 17 Close Ink Regulator

Installing the INK FROM PH Tubing Assembly (Part "B" 9600-779)

The INK FROM PH tubing assembly is Part "B" of 9600-779. It is a 20-foot length of 1/8-in tubing with a female quick disconnect fitting at one end and a male quick disconnect fitting at the other end *(Fig. 18)*. The female fitting connects to the male fitting on the pigmented ink printhead, DO NOT CONNECT PRINTHEADS YET. Connect the end with the male fitting to the INK FROM PH port **(H)** on the IDS/PI-400 front panel. Note: Do not trim or cut the 20-ft tubing length. Excess printhead pressure variation will result.

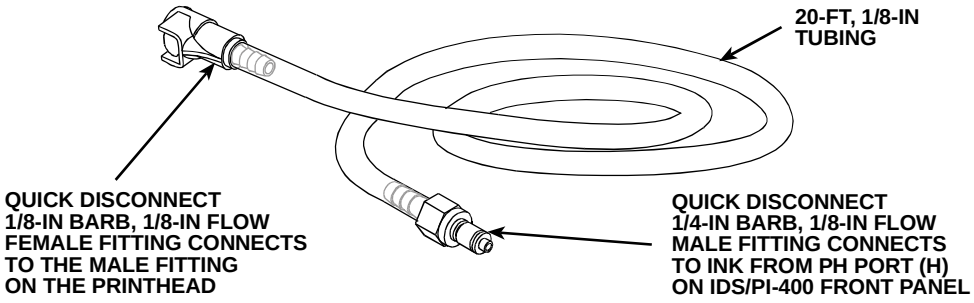

Figure 18 Part "B" INK FROM PH tubing (9600-779)

NOTE: You may connect as many as four INK FROM PH tubing assemblies. Connect tubing for printhead number one to the far left quick disconnect on the INK FROM PH ports **(H)**. Connect successive printheads from left to right.

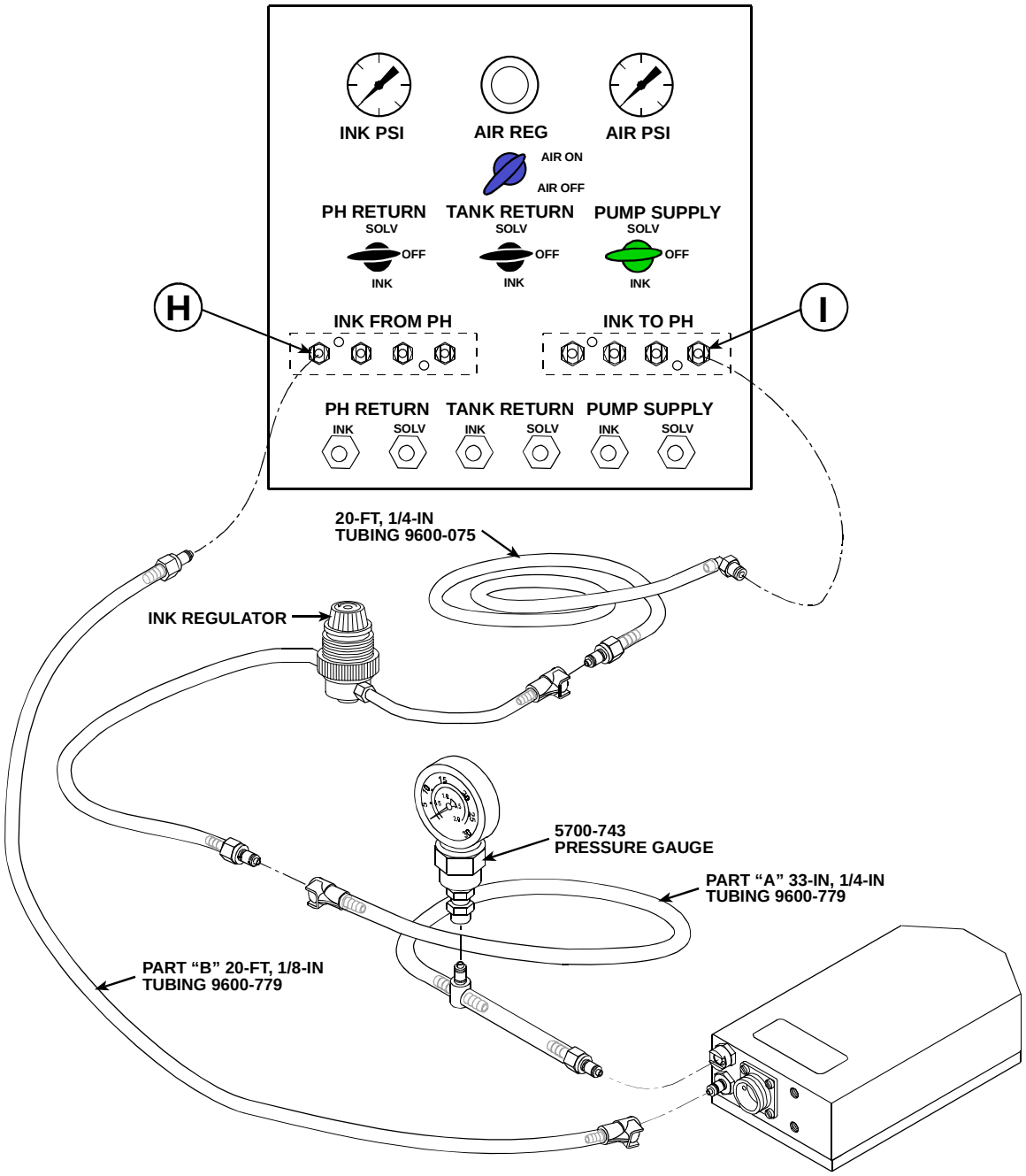

Figure 19 Final Ink Tubing Assembly

PRINTHEAD CONNECTION AND OPERATION

Your system is now plumbed except for printheads. Proper ink pressure must be attained before printheads can be connected or printhead damage will result. Correct ink pressure requires the printhead ink supply lines to connect and loop back into the IDS / PI-400 by way of the INK FROM PH lines and INK TO PH lines. Refer to Figure 20 during these steps.

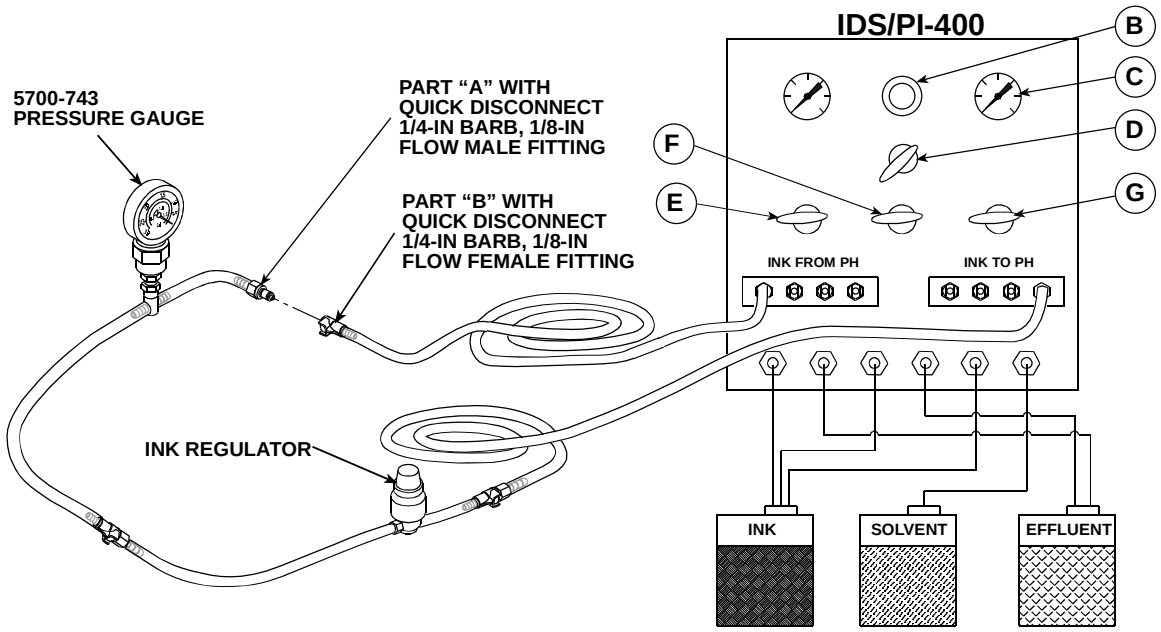

Figure 20 Attaining Correct Ink Pressure before Connecting Printheads

1. Connect the male end of Part "A" 600-779), ink line to the female end of the Part "B" (9600-779) ink line. This loops the ink back into the IDS / PI-400.
2. Position the pressure gauge so it remains upright during ink pressure adjustment.
3. To attain proper ink pressure, turn the PH RETURN **(E, black)**, TANK RETURN **(F, black)**, and the PUMP SUPPLY **(G, green**) three-way valves to the INK position.

CAUTION: Once ink is in the system, the system should not be shut off unless it is first flushed with conditioner (see "System Purging", page 17). Shutting off the system with ink in it allows the solids in the ink to settle and damage the pump. Shutting off the system with ink in it will void the warranty.

4. Turn the AIR VALVE **(D, blue)** to ON. Air pressure is now present at the AIR REGULATOR **(B)** located on the front panel.
5. Regulate the air pressure with the AIR REGULATOR **(B)** to 35 to 55 PSI. The AIR PRESSURE GAUGE **(C)** needle will oscillate as the pump cycles. The desired air pressure should be mid-range of this oscillation.

6. Adjust the printhead ink pressure with the INK REGULATOR *(Fig 14)* until the required setting for the printhead (refer to Table 1) appears on the pressure gauge *(Fig. 16)*. If the recommended printhead pressure required could not be reached, try partially closing the TANK RETURN valve **(F)** to restart the flow of ink back into the container. This should generate adequate ink back pressure to enable the printhead to reach the required ink PSIG pressure.

Series 1 Part Number	Telemark Part Number	Pigmented Ink Printhead Size	Ink Pressure PSIG
5700-355	1902-704	1/2-inch	6 ± 1
5700-460	1902-705	7/8-inch	7 ± 1
Custom	1902-706	1 1/2-inch	8 ± 1
5701-034	1902-707	2-inch	8 ± 1

Table 1

NOTE: If possible, allow system to operate approximately one hour before proceeding. This will allow for thorough mixing of the ink.

7. Wrap an absorbent cloth around the tee connection and disconnect the pressure gauge. Repeat Steps 6, 7, 8 and 9 for each printhead. Be sure to thoroughly clean the pressure gauge fitting with a squirt bottle and conditioner before storing.
8. Break the connection you made in step 1 that looped the ink supply lines and connect them to the printhead.
9. Connect the female fitting of Part "B" of 9600-779 tubing assembly to the male fitting on the back panel of the printhead.
10. Connect the male fitting of Part "A" of 9600-779 tubing assembly to the female fitting on the back panel of the first printhead.

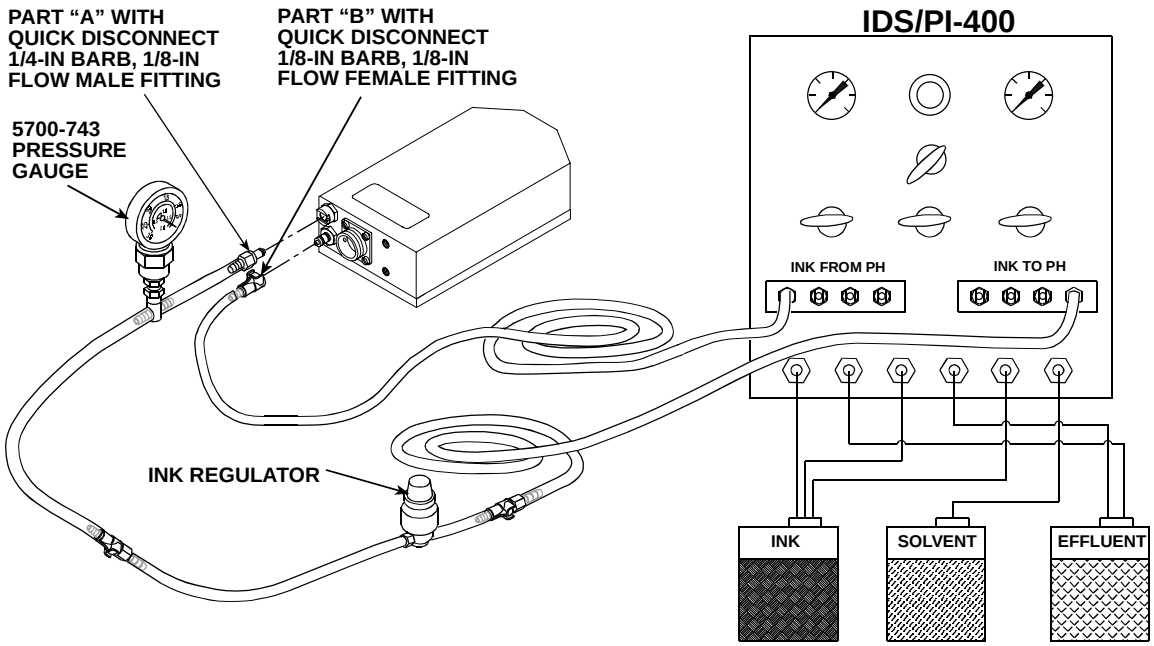

Figure 21 Connection of One Printhead

11. Repeat Steps 8, 9 and 10 for each printhead.
12. Readjust the ink pressure to the correct readings if needed. If the correct pressure cannot be reached, partially close the tank return valve to increase the pressure.

NOTE: If excessive air bubbles are present in the ink supply line, adjust the cap on the ink supply so that all "T" tubing sections are beneath the surface of the ink.

SYSTEM PURGING

Keep the system running continuously (24 hours a day, 7 days a week) to keep the pigment in suspension in the container and ink lines. If you must shut it off, flush with conditioner first. Once purged, the system can be turned off. Refer to Figures 2 and 19 for these steps. To purge the system:

1. Turn the AIR VALVE **(D)** to AIR OFF.
2. Switch the PH RETURN **(E)**, TANK RETURN **(F)** and PUMP SUPPLY **(G)** three-way valves to the SOLV position.
3. Turn the AIR VALVE **(D)** to AIR ON and allow the pump to work until you see clear solvent exiting the SOLV TANK RETURN line.
4. Turn the TANK RETURN three-way valve **(F)** to OFF and allow the pump to continue working until clear solvent is observed exiting the SOLV PH RETURN line.
5. Purge the printheads until you see clear streams from every orifice.

NOTE: Small conditioner leakage from orifices is normal. Make no adjustments.

6. Clean front printhead plates by spraying with the appropriate conditioner, and then give a final purge.
7. Turn the AIR VALVE **(D)** to AIR OFF.

Should a surge be present on the ink pressure gauge that affects the print quality (as indicated by fluctuations in dot diameter), shut the system down by turning the AIR VALVE **(D)** to the AIR OFF position. Remove outer cover held in place with four screws on each side of the IDS/PI-400, and then add air by depressing the internal fitting for about 10 sec. This will eliminate the surge.

IMPORTANT
Handle and dispose of liquid waste in accordance with local, state and federal regulations.

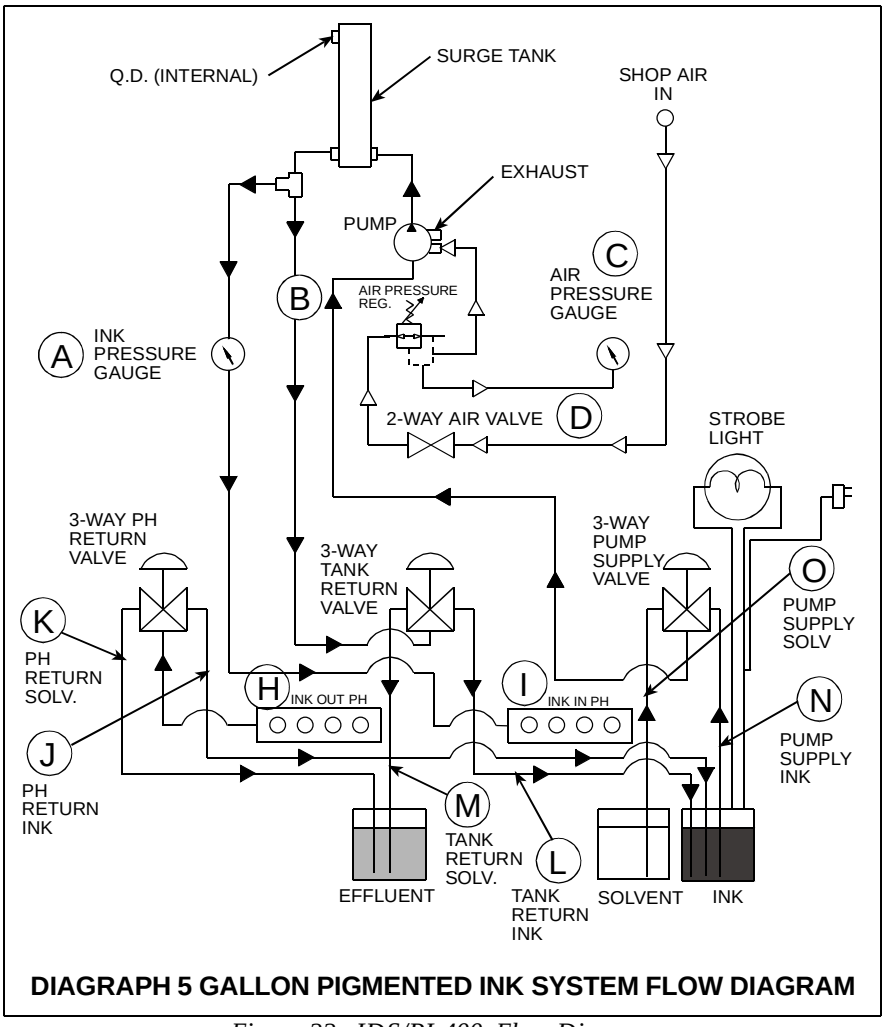

Figure 22 IDS/PI-400 Flow Diagram

MAINTENANCE PROCEDURES FOR THE PIGMENTED INK PRINTHEADS

Daily: Once per shift.

Start Up:

1. Clean front plate by spraying with the appropriate ink conditioner.
2. Purge into an absorbent tissue until all orifices are firing.
3. Ensure proper distance to the surface for printing.

Shutdown:

1. Purge twice into an absorbent tissue.
2. Clean front plate by spraying with the appropriate ink conditioner.
3. Turn off electrical power to system.

CAUTION: To prevent ink line fittings from freezing open, clean them with ink conditioner whenever fittings are disconnected for maintenance.

Intermittent:

This procedure is the same as System Purge and should be followed when preparing the IDS / PI-400 for system shutdown. Refer to Figure 2 for these steps.

1. Turn the AIR VALVE **(D)** to AIR OFF.
2. Turn the PH RETURN **(E)**, TANK RETURN **(F***)* and PUMP SUPPLY **(G)** to the SOLV position.
3. Turn the AIR VALVE **(D***)* to AIR ON and allow the pump to work until you see clear solvent exiting the SOLV TANK RETURN line.
4. Turn the TANK RETURN **(F)** three-way valve, to OFF and allow the pump to continue working until you see clear solvent exiting the SOLV PH RETURN line.
5. Purge the printhead until you see clear streams from every orifice.
6. Clean front plates by spraying with the appropriate conditioner, and then give a final purge.
7. Turn the AIR VALVE **(D)** to AIR OFF.

Monthly:

Flush pigmented ink system as indicated below:

1. Turn the AIR VALVE **(D)** to AIR OFF.
2. Turn the PH RETURN **(E),** TANK RETURN **(F)** and PUMP SUPPLY **(G)** three-way valves, to the SOLV position.

3. Turn the AIR VALVE **(D)** to AIR ON and allow the pump to work until you see clear solvent exiting the SOLV TANK RETURN line.
4. Turn the TANK RETURN three-way valve **(F***)* to OFF and allow the pump to continue working until you see clear solvent exiting the SOLV PH RETURN line.
5. Purge the printheads until you see clear streams from every orifice.
6. Disconnect the INK TO PH and INK FROM PH lines to the first printhead.
7. Connect the INK TO PH line and the INK FROM PH line to form a closed loop.
8. Repeat steps 6 and 7 for each printhead in the system.
9. Clean the ink regulator by fully opening and closing the regulator. Repeat opening and closing until all traces of ink are gone (usually about two minutes). Leave the ink regulator closed.
10. Turn the PUMP SUPPLY **(G)** three-way valve from SOLV to INK position.
11. Leave the PH RETURN **(E)** three-way valve, in the SOLV position until you see ink exiting from the SOLV PH RETURN line, then turn the valve to the INK position.
12. Turn the TANK RETURN **(F)** three-way valve, from OFF to SOLV until you see ink exiting the SOLV TANK RETURN line, then switch the TANK RETURN **(F)** three-way valve to INK.
13. Connect the pressure gauge to the tee fitting on the INK TO PH tubing assembly.
14. Position the pressure gauge so it remains upright during ink pressure adjustment.
15. Adjust the pressure with the INK REGULATOR to the setting shown in *Table 1* for the printhead in use at this connection by turning the regulator clockwise.
16. Wrap an absorbent cloth around the tee connection and disconnect the pressure gauge.
17. Repeat Steps 14, 15 and 16 for each printhead. Be sure to clean the pressure gauge fitting thoroughly with a squirt bottle and conditioner before storing.
18. Break the closed loop at the connection you made in step 7.
19. Connect the male fitting of Part "A" 9600-779 tubing assembly to the female fitting on the back panel of the printhead (Fig. 19 or 21).
20. Connect the female fitting from Part "B" 9600-779 tubing assembly to the male fitting of the printhead (Fig. 19 or 21).
21. Repeat Steps 18 through 20 for each printhead.
22. Readjust the ink pressure to the correct readings if needed.

Yearly:

Replace the pressure gauge, ink supply lines, ink regulator, and ink cap assembly yearly.

Replacement Parts

Part Number	Description
9600-205	Pump Kit Assembly
9600-137	Pump
9600-176	Ink Pressure Gauge inside the IDS/PI-400 pump
9600-175	Air Pressure Gauge inside the IDS/PI-400 pump
Series 1 5700-335 or Telemark 1902-704	1/2-inch Pigmented Ink Printhead
Series 1 5700-460 or Telemark 1902-705	7/8-inch Pigmented Ink Printhead
Series 1 Custom or Telemark 1902-706	1 1/2-inch Pigmented Ink Printhead
Series 1 5700-034 or Telemark 1902-707	2-inch Pigmented Ink Printhead
1902-700	Ink Regulator
1301-562	Wash bottle for TSO-SC Conditioner
2600-238	5-gallon White Pigmented Ink
2600-239	5-gallon Yellow Pigmented Ink
1301-017	5-gallon Effluent Container
2600-199	5-gallon Solvent (TSO-SC Conditioner)
5700-736	Solvent Cap Assembly
5700-743	Ink Line Pressure Gauge
9600-073	Ink Cap Assembly
9600-075	Ink to PH Tubing Assembly, 20-ft long 1/4-in
9600-779	Ink to/from PH Tubing Assembly, Part “A” and “B”
9600-074	Ink Pump Supply Tubing Assembly, 5-ft long, 1/4-in
9600-780	Solvent Pump Supply Tubing Assembly, 5-ft long 1/4-in
9600-783	Ink PH Return Tubing Assembly, 5-ft long, 1/4-in
1301-017	12-ft long, 1/4-in OD Cut in half for: Solvent PH Return Tubing Assembly, 6-ft long, 1/4-in Solvent Tank Return Tubing Assembly, 6-ft long, 1/4-in
9600-784	Ink Tank Return Tubing Assembly, 5-ft long, 1/4-in
1902-842	Low Ink Strobe Light Assembly