UNIVERSAL

STENCILING & MARKING — SYSTEMS

OWNER'S MANUAL

PROGRAMMABLE
INK DELIVERY SYSTEM
ALL U.S. MODELS

INSTALLATION - OPERATION - MAINTENANCE

IMPORTANT NOTE

UNIVERSAL products are manufactured to exacting standards and every available step has been taken to assure your complete satisfaction. It is most important, however, that the instructions contained in this manual are read and carefully followed for best results. Failure to do so may result in unsatisfactory performance, damage to the equipment and personal injury.

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PREFACE

In any printing operation, the task of monitoring the inking system is the most demanding and costly from a maintenance standpoint. UNIVERSAL Programmable Ink Delivery Systems not only reduce daily printing system maintenance requirements but they also improve print quality by delivering a continuous supply of ink to the printing system on an "as needed" basis.

UNIVERSAL Programmable Ink Delivery Systems (PIDS) are designed to accurately meter ink to a printing system at programmed intervals and volumes during the printing operation. These systems can be interfaced with parent equipment to further simplify controlling the ink delivery process and minimize the possibility of operator error. If interfaced, the PIDS Systems will automatically stop ink delivery to the Coder if the parent equipment is turned off.

This manual covers the installation, operation and maintenance procedures for the PIDS Systems and these instructions must be followed carefully. If you should have any questions concerning the operation of this system, please contact our Customer Service Department for assistance <u>before</u> attempting to operate this equipment.

<u>WARNING</u>

UNIVERSAL PROGRAMMABLE INK DELIVERY SYSTEMS ARE NOT DESIGNED TO OPERATE IN EXPLOSIVE ATMOSPHERES! DO NOT OPERATE THESE SYSTEMS IN THE PRESENCE OF EXPLOSIVE OR FLAMMABLE GASES, VAPORS OR DUST.

SYSTEM SPECIFICATIONS

The following specification diagrams include basic dimensions and approximate net weights of the various PIDS Systems. The minimum and maximum flow rates and power requirements are also listed for your reference. Ink compatibility information is discussed on the page 11.

SPECIFICATIONS

PROGRAMMABLE INK DELIVERY SYSTEM SPECIFICATIONS
PIDS-100 SERIES

4 - MOUNTING HOLES
0.30" DIAMETER

MODEL NUMBER

PIDS-100

PROGRAMMABLE
INK DELIVERY SYSTEM

P.O. BOX 871 - ST. PETERSBURG, FL 33731 USA
PH: (727) 894-3027 - FAX: (727) 821-7944

OFF
MAN   AUTO

STOP
RESET

START

10.75
(237 MM)

11.62
(295 MM)

6.00
(152 MM)

9.37
(238 MM)

4.31
(109 MM)

5.49
(139 MM)

5.11
(130 MM)

2.25
(57 MM)

6.35
(89 MM)

5.38
(137 MM)

12.12
(308 MM)

14.07
(357 MM)
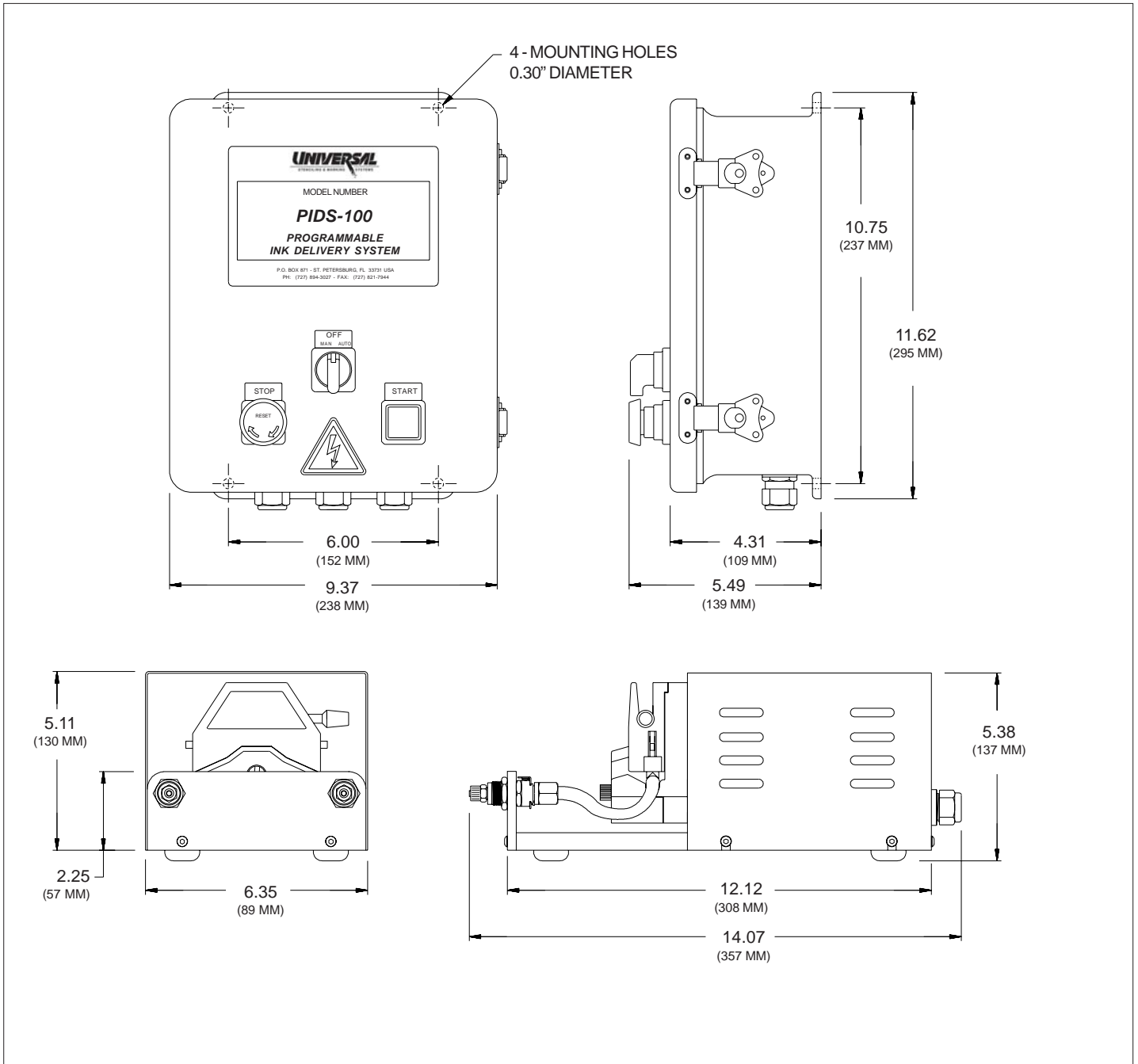
NET WEIGHT: *19 LBS 6 OZ. (8.78 kg)*

MINIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-100: *0.033 OZ/HOUR (1.0 ml/h)*
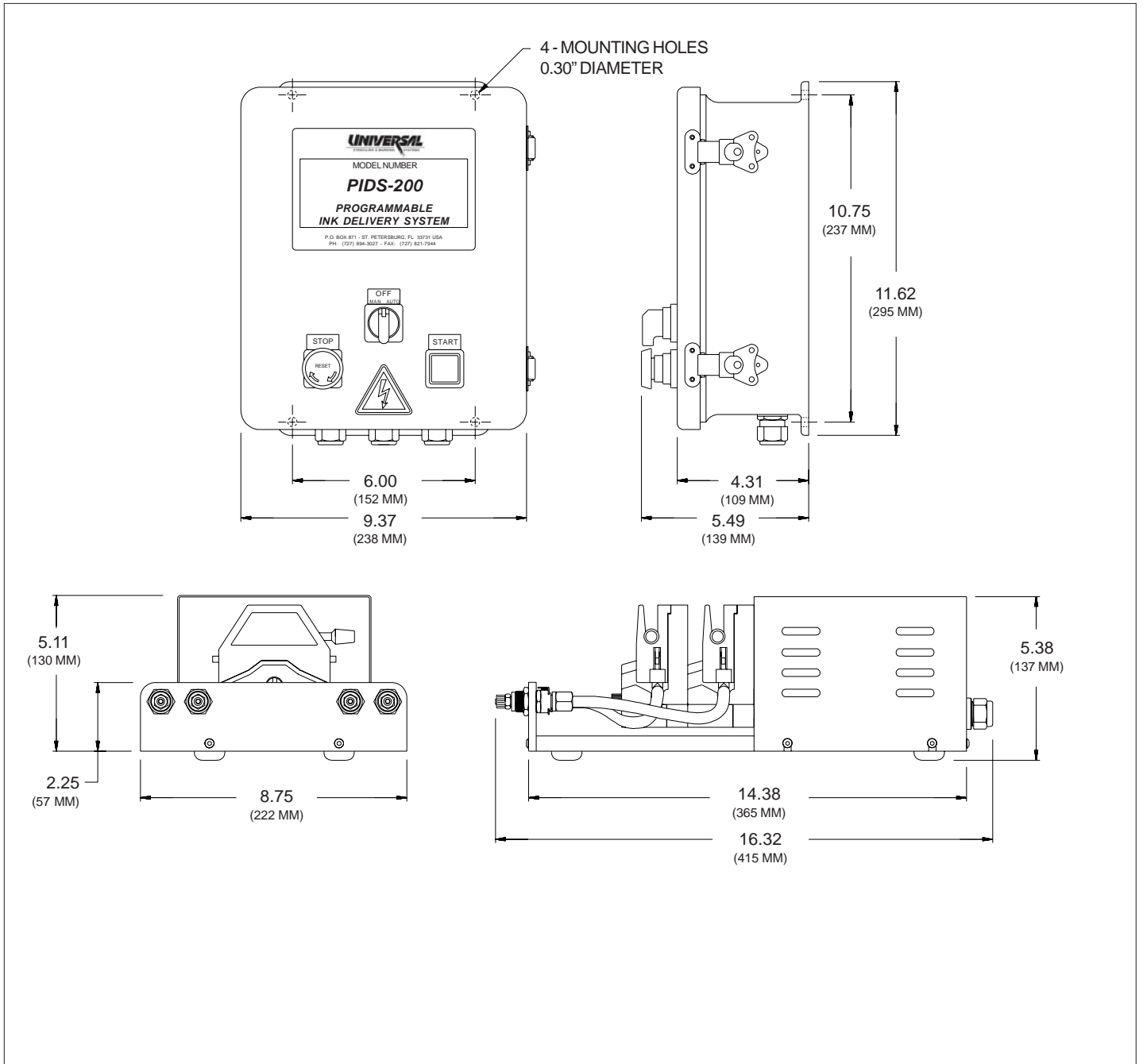
MAXIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-100: *20.25 OZ/HOUR (600 ml/h)*

POWER REQUIREMENTS - PIDS-100: *115 VAC/60 Hz /0.5 A*

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SPECIFICATIONS

PROGRAMMABLE INK DELIVERY SYSTEM SPECIFICATIONS
PIDS-200 SERIES

4 - MOUNTING HOLES
0.30" DIAMETER

UNIVERSAL
STENCILING & MARKING SYSTEMS

MODEL NUMBER

PIDS-200

**PROGRAMMABLE
INK DELIVERY SYSTEM**

P.O. BOX 871 - ST. PETERSBURG, FL 33731 USA
PH: (727) 894-3027 - FAX: (727) 821-7944

OFF
MAN   AUTO

STOP
RESET

START

10.75
(237 MM)

11.62
(295 MM)

6.00
(152 MM)

9.37
(238 MM)

4.31
(109 MM)

5.49
(139 MM)

5.11
(130 MM)

2.25
(57 MM)

8.75
(222 MM)

5.38
(137 MM)

14.38
(365 MM)

16.32
(415 MM)

NET WEIGHT: 20 LBS 10 OZ. (9.35 kg)

MINIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-200 (PER HEAD): 0.033 OZ/HOUR (1.0 ml/h)

MAXIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-200 (PER HEAD): 20.25 OZ/HOUR (600 ml/h)

POWER REQUIREMENTS - PIDS-200: 115 VAC /60 Hz /0.5 A

SPECIFICATIONS

PROGRAMMABLE INK DELIVERY SYSTEM SPECIFICATIONS
PIDS-300 SERIES

NET WEIGHT: *33 LBS 3 OZ. (15.05 kg)*

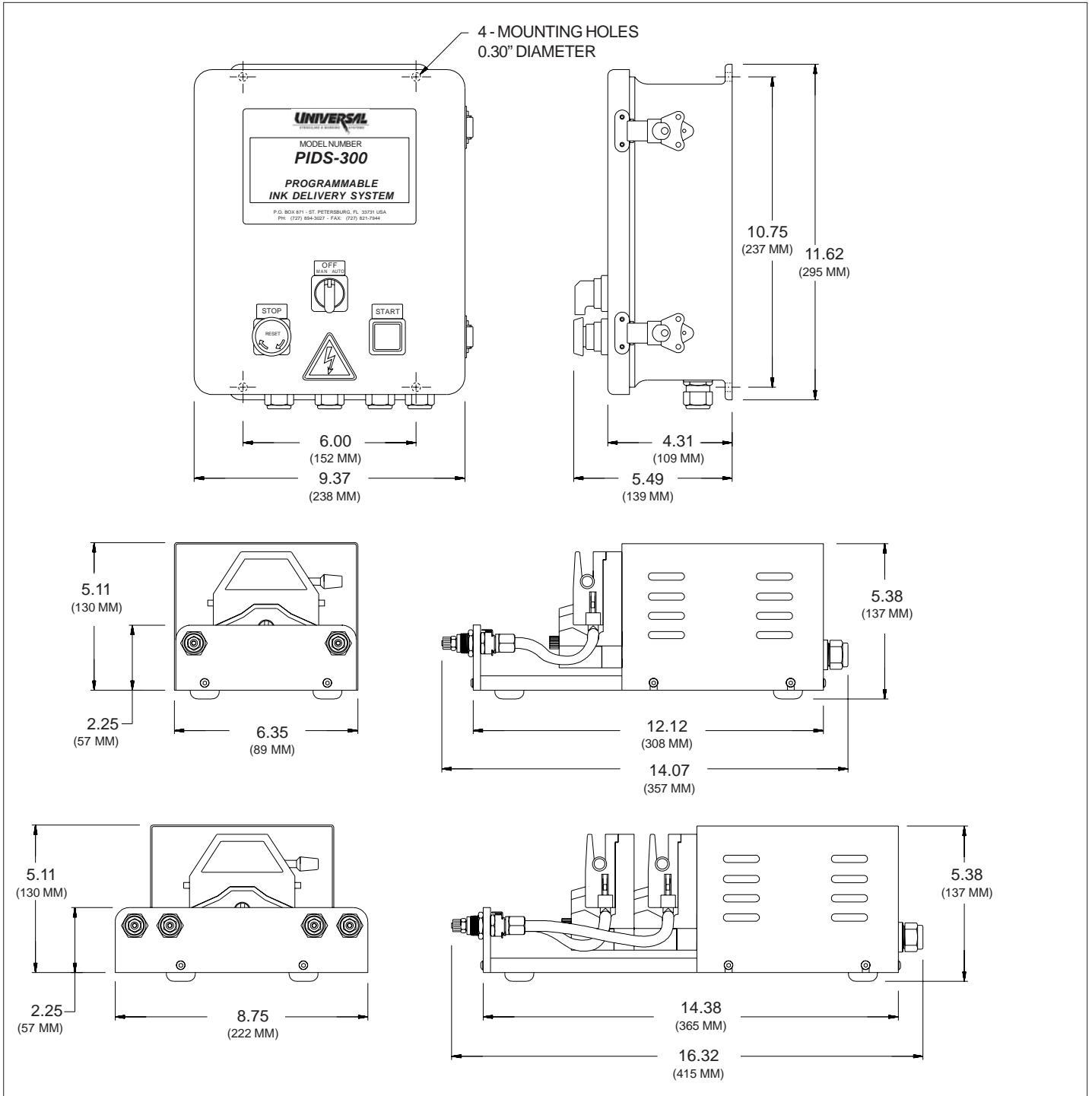**MINIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-300 (PER HEAD):** *0.033 OZ/HOUR (1.0 ml/h)*

MAXIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-300 (PER HEAD): *20.25 OZ/HOUR (600 ml/h)*

POWER REQUIREMENTS - PIDS-300: *115 VAC /60 Hz /1 A*

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SPECIFICATIONS

PROGRAMMABLE INK DELIVERY SYSTEM SPECIFICATIONS
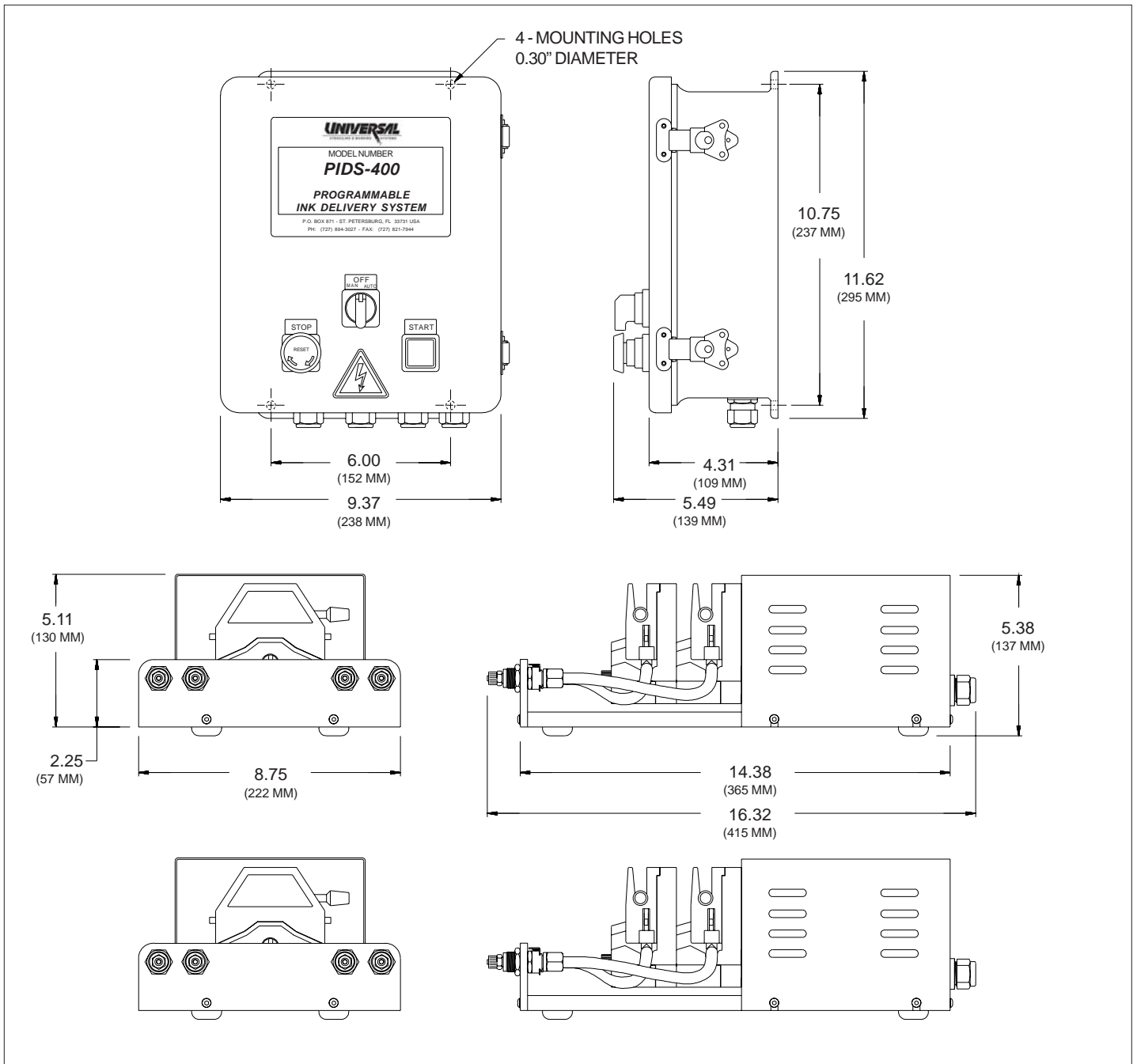### PIDS-400 SERIES

NET WEIGHT: *34 LBS 3 OZ. (15.45 kg)*

MINIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-400 (PER HEAD): *0.033 OZ/HOUR (1.0 ml/h)*

MAXIMUM PROGRAMMABLE FLOW CAPACITY - PIDS-400 (PER HEAD): *20.25 OZ/HOUR (600 ml/h)*

POWER REQUIREMENTS - PIDS-400: *115 VAC /60 Hz /1 A*

INTRODUCTION

INSPECTING YOUR NEW PIDS SYSTEM

The PIDS Systems are shipped from the factory in two or three cartons, depending on the model number you have ordered.

Each PIDS Sysytem contain the following component parts:

PIDS - 100

1 Each - PIDS -100 Control Box Assembly.
1 Each - Single Pump Module Assembly Ink Reservoir.
31 Feet - 0.25" Poly Ink Tube
1 Each - Replacement Pump Tube - 12"

PIDS - 200

1 Each - PIDS -200 Control Box Assembly.
1 Each - Dual Pump Module Assembly Ink Reservoir.
62 Feet - 0.25" Poly Ink Tube
1 Each - Replacement Pump Tube - 12"
1 Each - Replacement Pump Tube - 18"

PIDS - 300

1 Each - PIDS -300 Control Box Assembly.
1 Each - Single Pump Module Assembly Ink Reservoir.
1 Each - Dual Pump Module Assembly Ink Reservoir.
100 Feet - 0.25" Poly Ink Tube
2 Each - Replacement Pump Tube - 12"
1 Each - Replacement Pump Tube - 18"

PIDS - 400

1 Each - PIDS - 400 Control Box Assembly.
2 Each - Dual Pump Module Assembly Ink Reservoir.
100 Feet - 0.25" Poly Ink Tube
2 Each - Replacement Pump Tube - 12"
2 Each - Replacement Pump Tube - 18"

Inspect the contents of all the cartons. If there is any sign of damage to the cartons or products contact the *freight carrier* immediately.

BASIC PRINCIPLES OF OPERATION

During any production printing operation, the volume of ink consumed per hour by each Coder depends on the following factors:

  1 - The speed of the printing, measured in print cycles per hour
  2 - The size of the text or logo dies being used

When the printing system is operating at normal production speed, the ink consumption rates can be accurately measured. Providing neither of the above variables change during production, the ink consumption rates will remain constant.
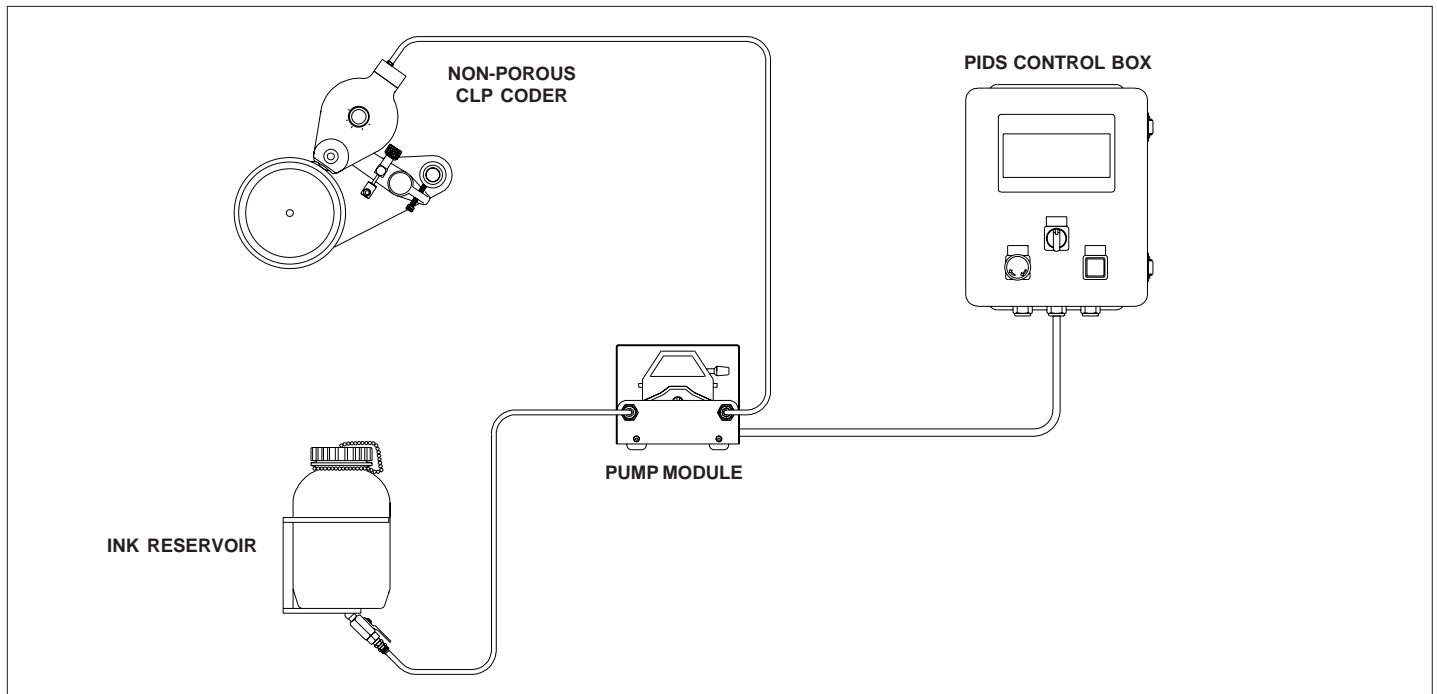

FIGURE 1

Universal Programmable Ink Delivery Systems are designed to automatically deliver a pre-determined volume of ink to a printing system at regular intervals during production. A programmable electronic Interval Timer in the system's Control Box controls the cycle of a Peristaltic Metering Pump. When the Pump is cycled on, a small volume of ink is pumped from an Ink Reservoir (See Figure 1) to the printing system. The Pump is then cycled off for a specified interval to allow the Coder time to consume the ink just delivered. Delivering ink to the Coder in this manner produces much more consistent print quality and, with proper programming, completely eliminates the possibility of over saturating the inking system.

After an initial test of the actual printing application to determine the average ink consumption rates, the Interval Timer in the system's Control Box is programmed and then the PIDS System is set to run in the automatic mode during production.

Peristaltic Pumps are used in this system to provide accurate metering of dye or pigmented inks while isolating the ink from direct contact with any of the Pump's moving parts. Since the ink in this system is completely contained in a closed series of tubes, the ink is never exposed to atmosphere where solvent loss through evaporation could occur. This design ensures that ink viscosities will not be affected by solvent loss and therefore, print quality and ink drying times will remain consistent throughout the printing operation.

INTRODUCTION

ADAPTING THE PIDS SYSTEM TO A CODER

Although the PIDS Systems can be adapted to supply ink to a variety of different coding systems, this manual specifically covers applications involving Universal's line of Non-Porous Coders. Connecting the PIDS System to a Universal Non-Porous Coder requires the use of a special adapter for the Coder's inking system. Two types of adapters are available, a Wiper Adapter assembly for use with Top Mounted Coders in continuous web printing applications and a Ball & Socket Adapter for use with Side Mounted Coders in intermittent printing applications.

The Wiper Adapter System is particularly effective when printing with large characters, codes or logo dies. Since the entire face of the Ink Roll is evenly inked with this system, the resulting code prints are very uniform in color density.
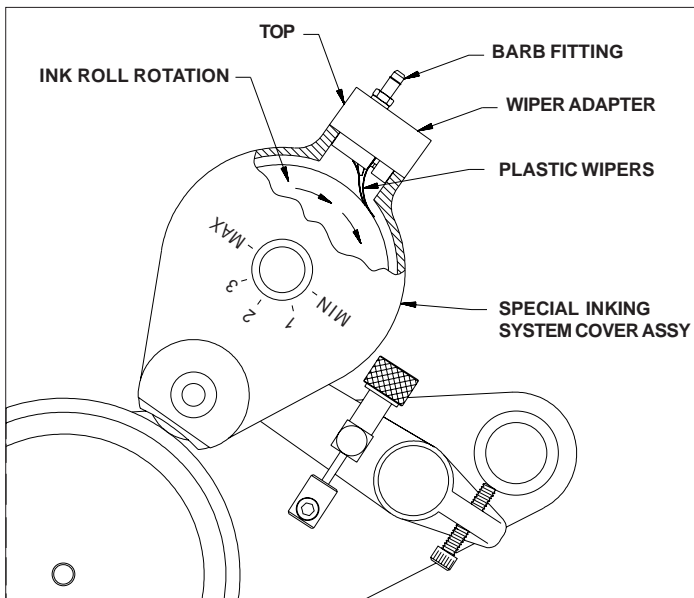

FIGURE 2

WIPER ADAPTERS

Wiper Adapters are designed for use only with Top Mounted Coders. The Wiper Adapter shown in Figure 2 consists of two thin and extremely flexible plastic Wipers mounted in an aluminum holder. The assembly is installed in a special Non-Porous Inking System Cover Assembly and secured in place with a thumb screw. The ink supplied from the PIDS Pump Module is injected through a rubber check valve between the two plastic Wipers. The tandem Wipers transform the ink from a small diameter stream into a wide film of ink which is then "wiped" completely across the face of the XF Neoprene Ink Roll as the Ink Roll rotates. Since the ink is applied directly to the face of the Ink Roll, the affect on print quality is nearly instantaneous.
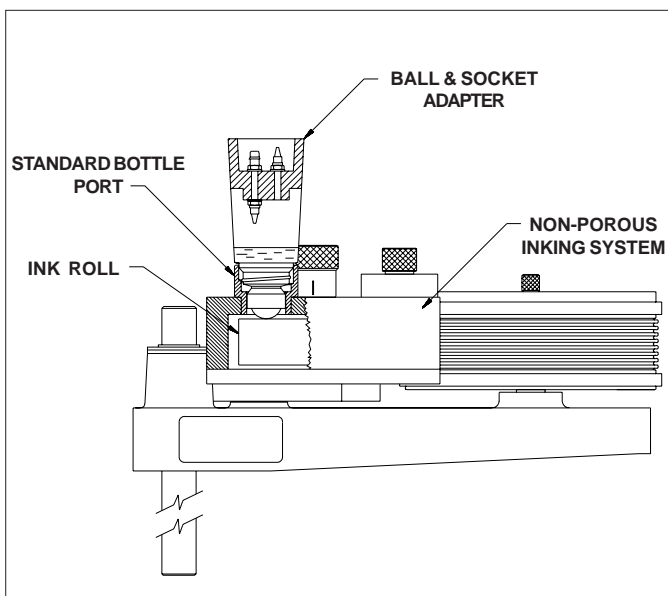

FIGURE 3

BALL & SOCKET ADAPTERS:

Ball & Socket Adapters are primarily designed for use with Universal's Side Mounted Non-Porous Coders. The Ball & Socket Adapter shown in Figure 3 consists of a small plastic Reservoir with a free turning plastic ball seated in a mating socket. An aluminum plug in the end of this Reservoir contains a Barb Fitting which connects to the PIDS System's Pump Module. These Adapters can be installed in the standard Reservoir Bottle Port on Universal's Non-Porous Coders without modification.

Since most Side Mounted Coders are used to print on the sides of individual parts such as varnished or waxed cartons, metal bars, etc., the Coders operate intermittently, not continuously like a web printing application.

INTRODUCTION

To prevent ink from being applied to only one spot on the Ink Roll when the Coder is not in operation, the Ball & Socket Adapter acts as an intermediate reservoir to store very small volumes of ink *temporarily* until the Coder is activated by the product to begin printing again. As soon as the Coder begins to print, the plastic ball in the Adapter rotates in contact with the Ink Roll, and begins to apply a thin film of ink to the outer edge of the Ink Roll. The ink then migrates through the Ink Roll by capillary action until it reaches the roll face, where it is picked up by the Transfer Roll and applied to the face of the printing die. Although the capillary action begins immediately when ink is applied to the edge of the Ink Roll, it will take a short period of time for the ink to reach the die face.

It is very important to understand that the small reservoir capacity of the Ball & Socket Adapter is only designed as a *temporary* holding vessel for the very small volumes of ink delivered from the Ink Pump. During the majority of the printing operation, this Reservoir should be completely empty. Programming the PIDS System to fill this Reservoir with ink greatly reduces the accuracy of the PIDS System and should be avoided.

SIDE MOUNT CODERS: When using the PIDS System with Universal Non-Porous Side Mount Coders, a Ball & Socket Adapter should be installed on the Coder as shown in Figure 3. This Adapter simply replaces the disposable 4 oz. Reservoir Ink Cartridges and requires no modification to the Coder.

TOP MOUNT CODERS: When using the PIDS System with Universal Non-Porous Top Mount Coders, a Wiper Adapter is used to connect the Pump System to the Coder. If your Non-Porous Coder was ordered from the factory specifically for use with a PIDS System, the Inking System Cover on the Coder will have a rectangular hole in the end as shown in Figure 4. If not, you will need to order the appropriate cover assembly for your specific Coder model.

The Wiper Adapters for the Top Mount Coders are very easy to install, but they are, by design necessity, very fragile and must be handled and installed carefully to prevent damage.

To install the Wiper Adapter, hold it with the side marked "**TOP**" up as shown in Figure 5. While rotating the Print Drum in the normal direction, so the Ink Roll will turn, slowly insert the plastic Wipers into the rectangular hole in the cover. Rotating the Print Drum during this procedure ensures that the plastic Wipers orient themselves in the proper direction relative to the Ink Roll. When the Adapter is fully seated in the Inking System Cover, tighten the thumb screw to secure it in place. Figure 2 shows a properly installed Wiper Adapter.
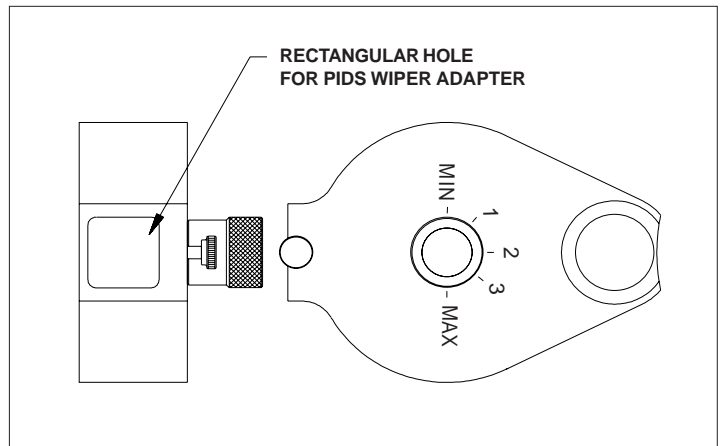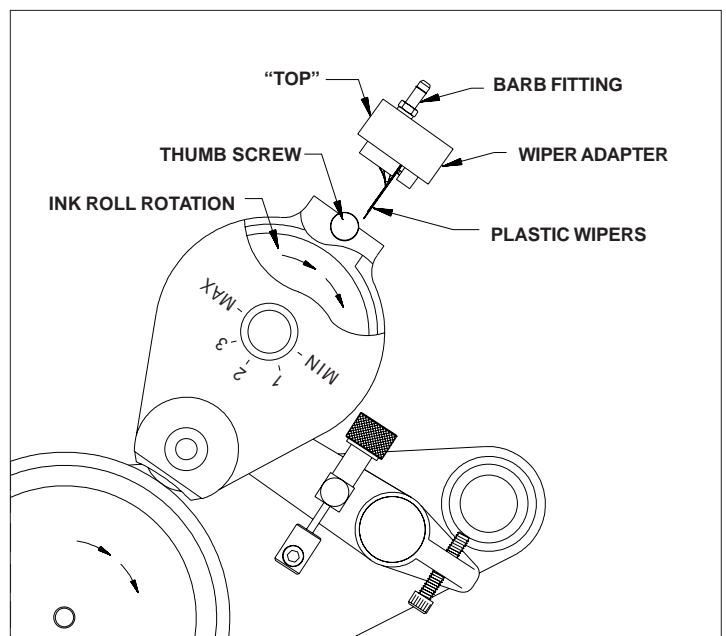

FIGURE 4

FIGURE 5

SELECTING THE APPROPRIATE LOCATION

The Installation process should begin by inspecting the area where the printing operation is performed and selecting an appropriate location to mount the PIDS components. The entire PIDS System should be mounted as close to the printing station as possible. In order to program the Interval Timer, you will need to be close enough to the Coder to visually observe the printed marks. It is advisable to keep the length of your 0.25" O.D. Poly Ink Feed Tubes as short as possible and route them from the Reservoir to the Pump Module and from the Pump Module to the Coders in a way that protects them from damage. You will also want to mount the Ink Reservoir in a location which is easily accessible for filling. Once you have found a suitable location for the PIDS System, the following steps will guide you through the installation process.

MOUNT CONTROL BOX
ABOVE HEIGHT OF PUMP MODULE

MOUNT TOP OF INK RESERVOIR
BELOW PUMP MODULE

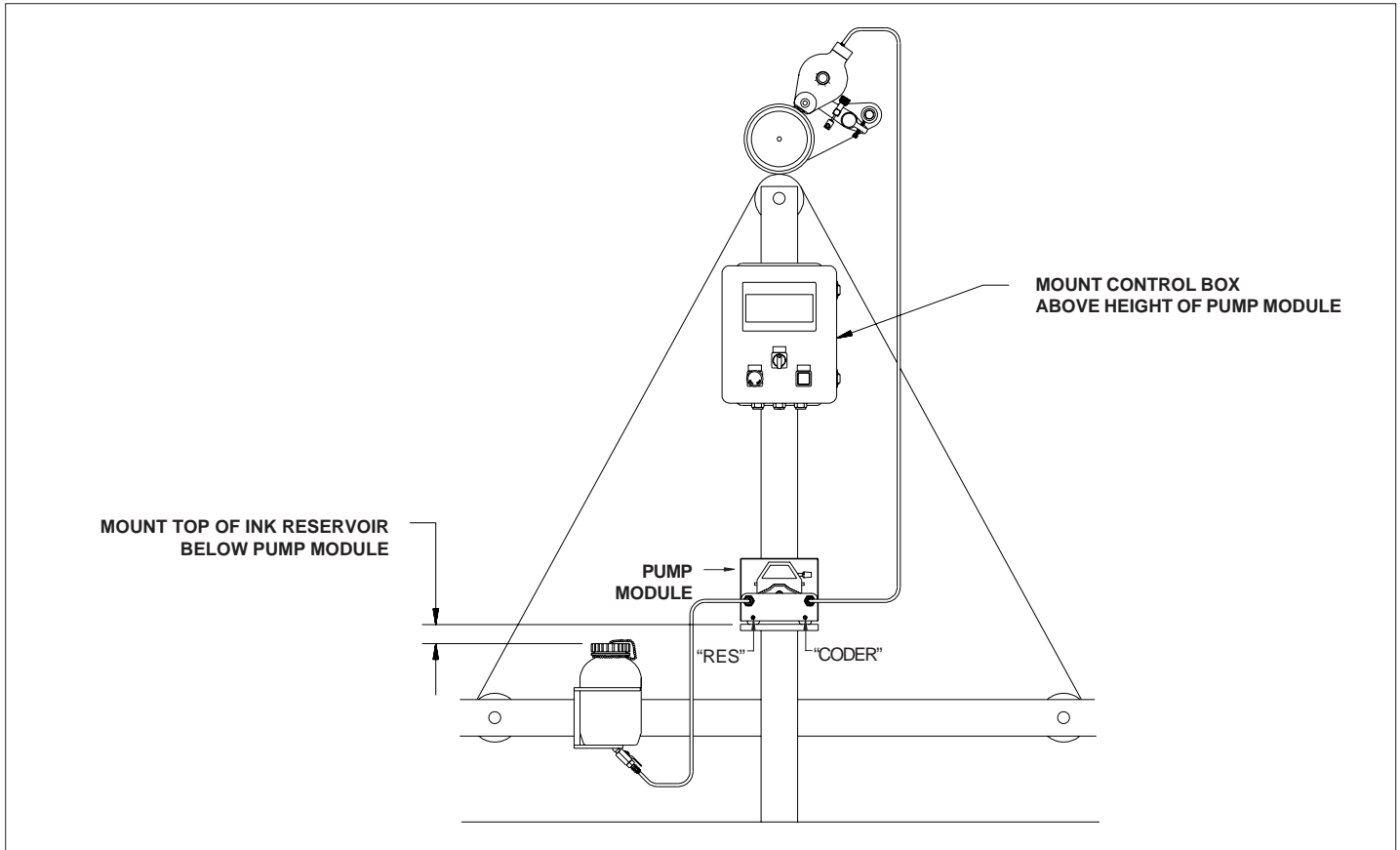PUMP MODULE

"RES"   "CODER"

FIGURE 6

1 - Mount the Ink Reservoir on a vertical surface with the top of the Ink Reservoir slightly below the bottom of the Pump Module and within close proximity of the same as shown in Figure 6 . ***Mounting the Ink Reservoir below the vertical height of the Pump Module is a safety consideration and will prevent the ink in the Reservoir from draining out should an Ink Pump Tube failure occur.***

2 - Connect a length of the Polyethylene Ink Tube from the Ink Reservoir to the fitting on the Pump Module marked **"RES."** Repeat this process for each Pump Module.

Do not fill the Ink Reservoir with ink at this time.

3 - Connect a length of the Polyethylene Ink Tube from the fitting on the Pump Module marked **"CODER"** and route this tube to the Coder. Repeat this process for each Pump Module.

4 - Mount the Control Box vertically above the Pump Module and Ink Reservoir in a convenient location for programming and near a suitable electrical receptacle. ***<u>Do not connect the system to electrical power at this time.</u>***
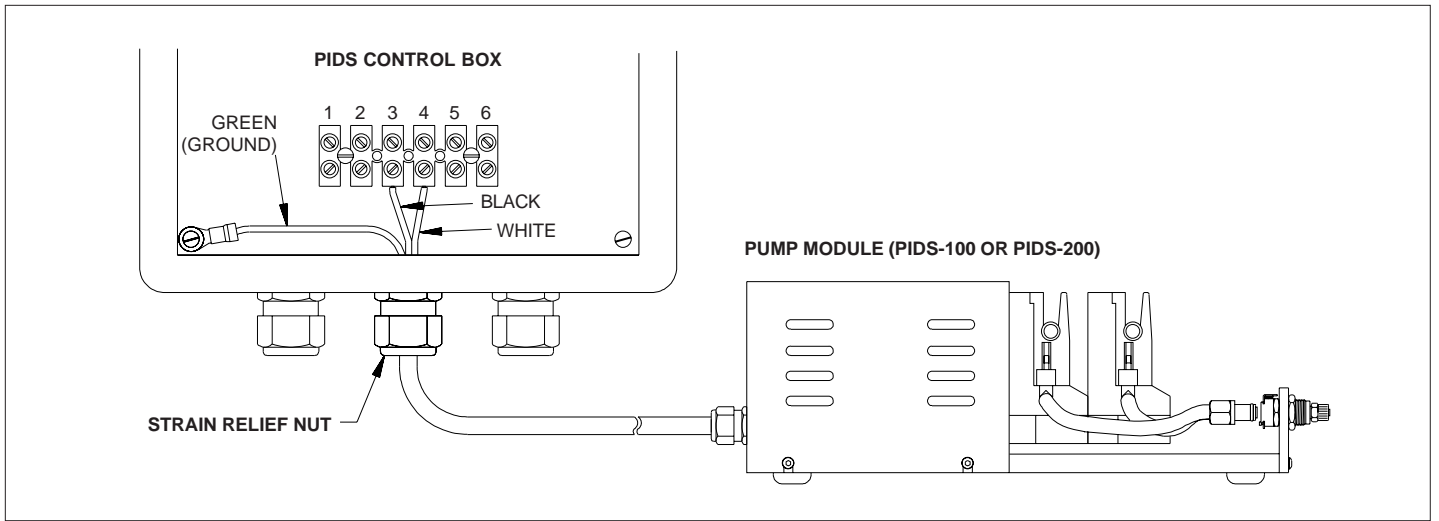
FIGURE 7

5 - Since the Control Box and the Pump Module or Modules are shipped from the factory in separate cartons, the electrical cable on these Modules will have to be connected to the Terminal Block in the Control Box as shown in Figures 7 and 8. The connections for the PIDS-100 and the PIDS-200 Systems are identical. The connections for the PIDS-400 Systems are different since there are two Pump Modules on the 400 Series Systems. ***WARNING: The control box must <u>not</u> be connected to electrical power during this procedure. If you are not confident about performing this procedure, have a qualified electrician make these connections.***

PIDS-100 & PIDS-200 Electrical Cable Connection: To connect the Pump Module electrical cable to the PIDS Control Box, loosen the nut on the center strain relief fitting on the bottom of the Control Box (See Figure 7). Insert the cable end from the Pump Module through this fitting and connect the individual wires as indicated in the diagram. A ring terminal is pre-assembled on the cable assembly ground wire for ease of installation. Be sure all wire connections are tight and then tighten the nut on the strain relief fitting to grip the cable securely.
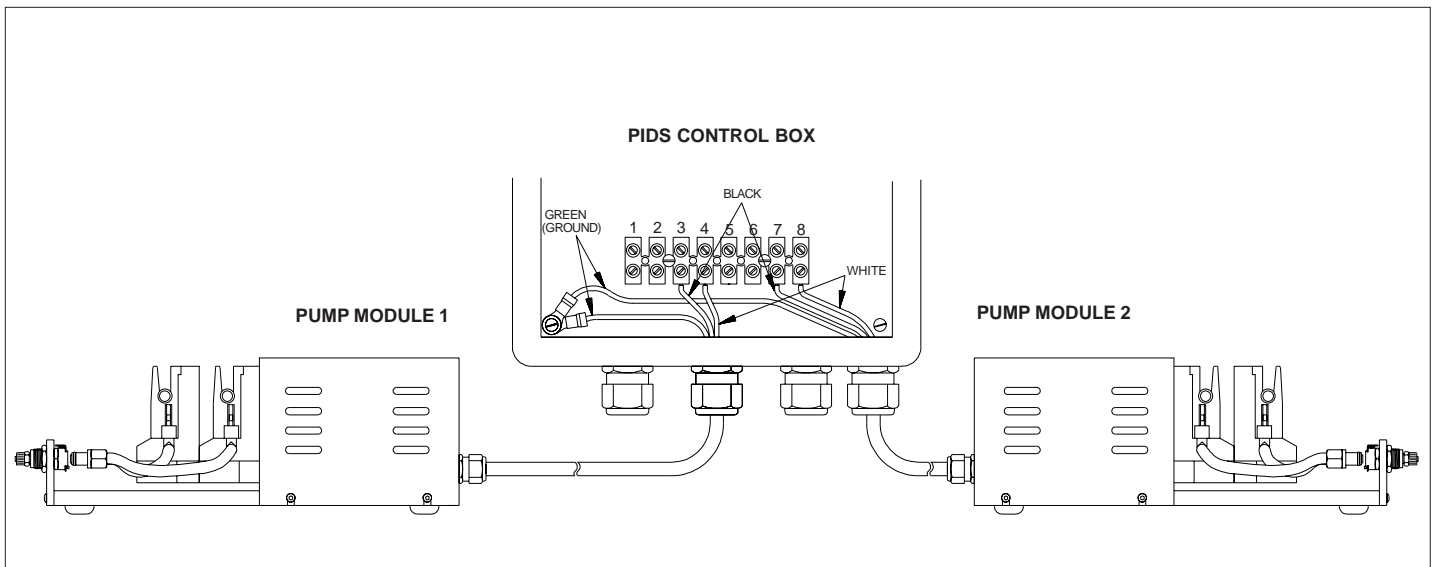

FIGURE 8

SELECTING AN APPROPRIATE INK

Universal offers a variety of inks for use in the PIDS Systems including the #1150 ink for porous surfaces and #100 inks for non-porous surfaces. The PIDS Systems are compatible with a wide variety of free flowing marking inks containing water, glycol, and/or alcohol solvents however, these systems are **not** compatible with petroleum or ketone base inks. The suitability of a particular ink for use in these systems can be determined by their compatibility with the rubber Pump Tubes, the polyethylene Ink Reservoir and the polyethylene Ink Tubes.

The Material Safety Data Sheet on your ink should disclose the solvent contents. If you are unsure of the solvents contained in the ink you have selected, a physical test can be performed to determine compatibility. If for any reason you need to use an ink which is not offered by Universal, you will need to test the ink for compatibility with both the PIDS System and the Coder.

To check compatibility of your ink with the Pump Tubes, cut two 1 inch sections of Pump Tubing and submerge one of the pieces in a small sealed container of your ink. Soak the tube in the ink for 24 hours and then remove it and compare it to the second piece. If the tube shows any signs of swelling in either diameter or length, the ink solvents are not compatible and the ink should not be used in this system. Using an ink which is not compatible with the Pump Tubing could result in a Pump Tube rupture.

To test the ink in a Universal Non-Porous Coder, a similar soaking test of the XF Neoprene Ink Roll will quickly determine compatibility. Fully saturate a dry NP-XC1 or NP-XC2 XF Neoprene Ink Roll with ink and let it soak for 24 hours. After soaking, accurately measure the outside diameter of the Ink Roll. The ideal diameter for this roll is 3.5 inches. If the diameter is larger than 3.57 inches, then the ink is not compatible and should not be used. Using an Ink Roll which has swelled to a diameter larger than 3.57 inches will result in excess ink being transferred to the die face, and possible contact of the Ink Roll surface with the inside of the Inking System Cover which will result in leakage.

PRIMING THE SYSTEM WITH INK

Before operation, the Ink Reservoir must be filled with ink and all of the Ink Tubes must be primed. **The system should be disconnected from electrical power during the initial phase of this process.**

Several factors should be considered before filling the Reservoir with ink. The type of ink being used will determine how much ink should be placed in the Reservoir. If you are using a dye base ink, the Reservoir can be filled to within 2" of the top.

If you are using a pigmented ink, you should be aware of the fact that the pigments in all pigmented inks tend to settle out of solution when stored without agitation for prolonged periods of time. To minimize this problem, the Reservoir should be filled with only enough ink to last one or two days of operation. When refilling the Reservoir with pigmented inks, the supply container should be shaken vigorously to re-disperse the pigments prior to filling the PIDS System Ink Reservoir.

WARNING: The electrical controls in this system are not designed to be operated in explosive atmospheres. Contamination of the Control Box or Pump Module with flammable inks may cause a fire hazard and must be avoided. If contamination should occur - immediately disconnect the system from the electrical supply and do not operate the system until all traces of solvent vapor are removed.

1 - With the valve on the Ink Reservoir in the closed position (See Figure 9), fill the Ink Reservoir approximately 1/4 full with ink.

2 - Open the valve on the Ink Reservoir and check to ensure that all the tube fittings are tight and free from leaks.

3 - Rotate the lever on the Pump Head to the right (clockwise) to clamp the Pump Tube in position for operation. Be sure the V-Shaped Tube Retainers seat directly over the Pump Tube (See Figure 10). If your system has two Pump Heads, duplicate this procedure for each Head.

Note: Peristaltic pumps have a tendency to pull the Pump Tube into the Head during operation.
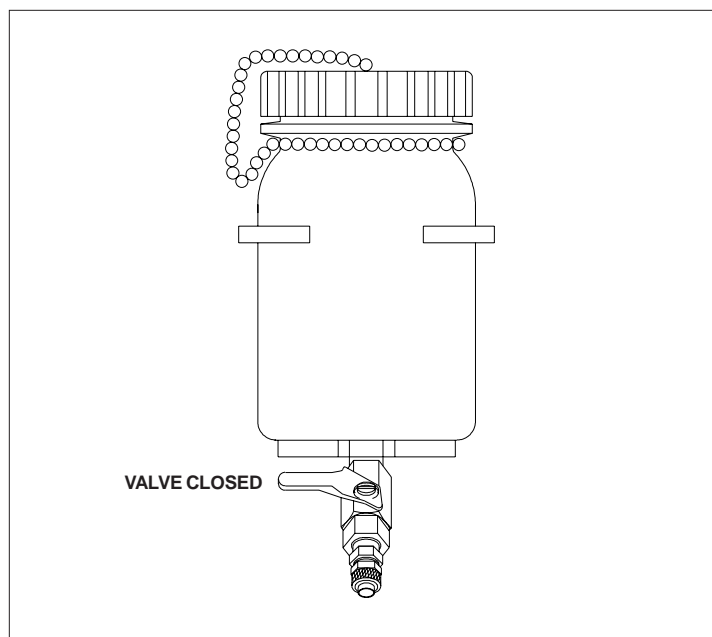

VALVE CLOSED

FIGURE 9

OPERATION

The V-Shaped Retainers on either side of the Pump Head are designed to prevent this action when adjusted properly. These Retainers have been adjusted at the factory but if during operation you notice that the Pump Tube is being pulled into the Pump Head, the Retainers should be re-adjusted. To adjust the Pump Tube Retainers, rotate the lever on the Pump Head to the "**UN-CLAMPED**" position. Press in on the Tube Retainer Levers (one on each side of the Pump Head) and move it down one notch. Center the Pump Tube in the Pump Head and move theClampingLevertothe"**CLAMPED**" position (See Figure 10) Repeat this procedure as necessary until the Pump Tube remains in place during operation.
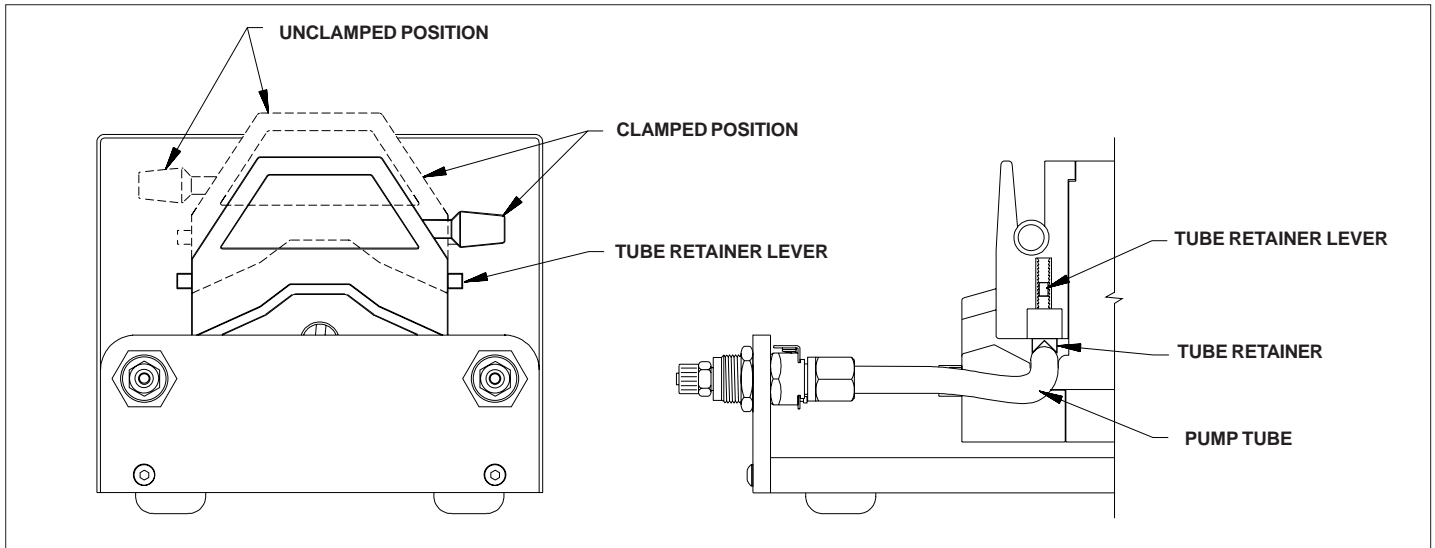
FIGURE 10

4 - Plug the Power Cord on the Control Box into an appropriate electrical receptacle.

5 - Press the "**ON**" Button on the Control Box (See Figure 11) and the green Indicator Lamp should light. (If the Indicator Lamp does not light, rotate the red **"STOP"** Button clockwise to re-set and repeat the procedure.)

6 - Turn the "**MANUAL-OFF-AUTO**" Selector Switch on the Control Box to the "**MANUAL**" position and the Pump will start running. As long as this switch is in the "**MANUAL**" position, the Pump will run continuously and ink will begin to be pumped to the Coders. Watch the progress of the ink through the Ink Tubes. When the ink reaches the Adapters on the Coders, immediately turn the switch to the "**OFF**" position. **Do not feed ink into the Adapters at this time.** The system should now be primed and ready for operation.

FIGURE 11

16

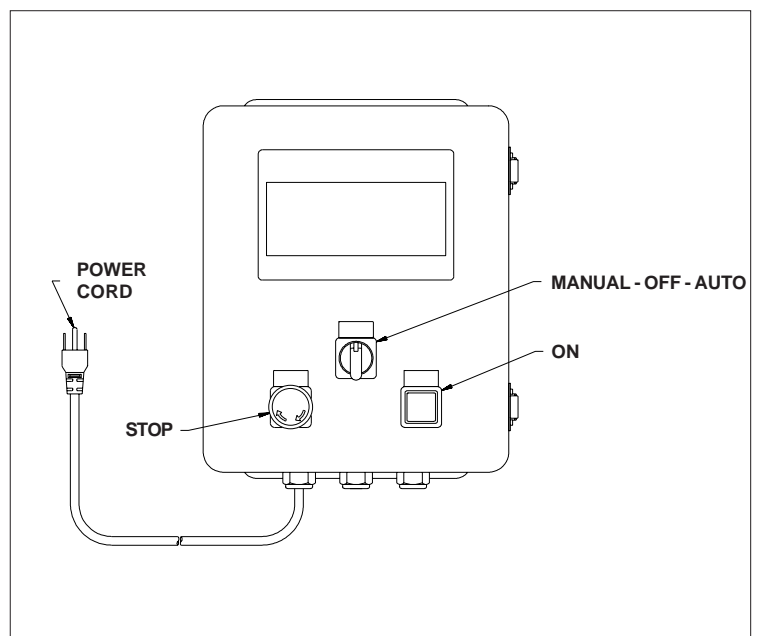*NOTE: For users of the PIDS-200 Series Systems with Dual Pump Heads. It is very unlikely that the ink feed lines to your Coders are the same exact length and therefore ink may reach one of the Adapters before the other. If this happens, as soon as the ink reaches the first Adapter, turn the selector switch to the "OFF" position. Rotate the Pump Head Lever of the fully primed line to the "UN-CLAMPED" position. This will prevent any additional ink from being pumped to that Adapter when the Pump is turned back on. Turn the selector switch back to the "MANUAL" position and continue priming the remaining Ink Feed Tube. As soon as the ink reaches the last Coder Adapter, turn the selector switch to the "OFF" position. Rotate the Pump Head Lever on the disabled Pump Head, back to the "CLAMPED" position.*

PROGRAMMING THE SYSTEM

If allowed to run continuously, each Pump Head of the PIDS System would feed ink to the Coder at a rate of approximately 10 milliliters per minute. Since this volume of ink would normally far exceed the rate the ink is being consumed by the printing operation, the system must be programmed to feed ink at an appropriate rate for each specific application. Programming the system is very simple and can usually be accomplished with one test and a few minutes of observation.

PREPARING THE CODER FOR TESTING: A primary advantage of using the PIDS System is that ink can be delivered to the Coder in very small volumes at regular intervals. This capability eliminates the need for the Ink Roll in the Coder to store large volumes of ink to support the printing operation. When the Ink Roll contains less ink, the force required to rotate the Roll is reduced and it also minimizes the undesirable effect of centrifugal force on the Roll at high rotational speeds.

When preparing the Coder for use with a PIDS System, it is important to understand the performance characteristics of the Ink Rolls used in Universal Non-Porous Coders. These Ink Rolls are manufactured from an open cell XF Neoprene material which absorbs ink through capillary action like a sponge. The absorption rate of the material is greatly increased after all of the microscopic cells in the material have been dampened with ink. Because the absorption rate of dry XF Neoprene material is rather slow, the PIDS System should never be used with a dry Ink Roll.

To prepare the Ink Roll for use, it should first be thoroughly saturated with ink in order to dampen all of the cells. After the initial inking, at least half of the ink content should be removed by squeezing the roll over a clean container. Preparing the Ink Roll in this manner will ensure that the ink delivered by the PIDS System will be absorbed immediately by the surface of the Roll. When the Ink Roll is re-installed on the Coder in this condition and the printing operation is started, the printed codes should begin to show signs of needing more ink very rapidly.

PROGRAMMING THE PIDS SYSTEM: Programming the PIDS System involves testing the coding operation to determine ink consumption rates and setting the DIP Switches on the Interval Timer (See Figure 12) in the system's Control Box according to the results of this test. Making an accurate measurement of ink consumption rates is a very critical part of the set-up procedure and must be performed carefully. It is very important that the Ink Tubes are fully primed, so that whenthe Pump is started in the following procedure, ink will immediately be injected into the Coder Adapters.

Caution: During these procedures, any time it is required to open the Control Box to access the Interval Timer, the PIDS System should be disconnected from its electrical power source to prevent possible electrical shock.

The Interval Timer in the Control Box (Figure 12) controls the "**ON**" and "**OFF**" cycling of the Ink Pump Module. The Timer has two groups of DIP Switches. **"T1 ON-DELAY"** group controls the running duration during each cycle and **"T2 OFF-DELAY"** group controls the time duration that the Pump Module does not pump ink.

Moving any switch to the "**ON**" position adds the time value indicated by that switch to the cumulative total time for that group of switches. These values are in minutes or tenths of a minute. The Interval Timer has been programmed at the factory for initial testing and the switch settings should not be changed at this time. The factory set program is as follows:
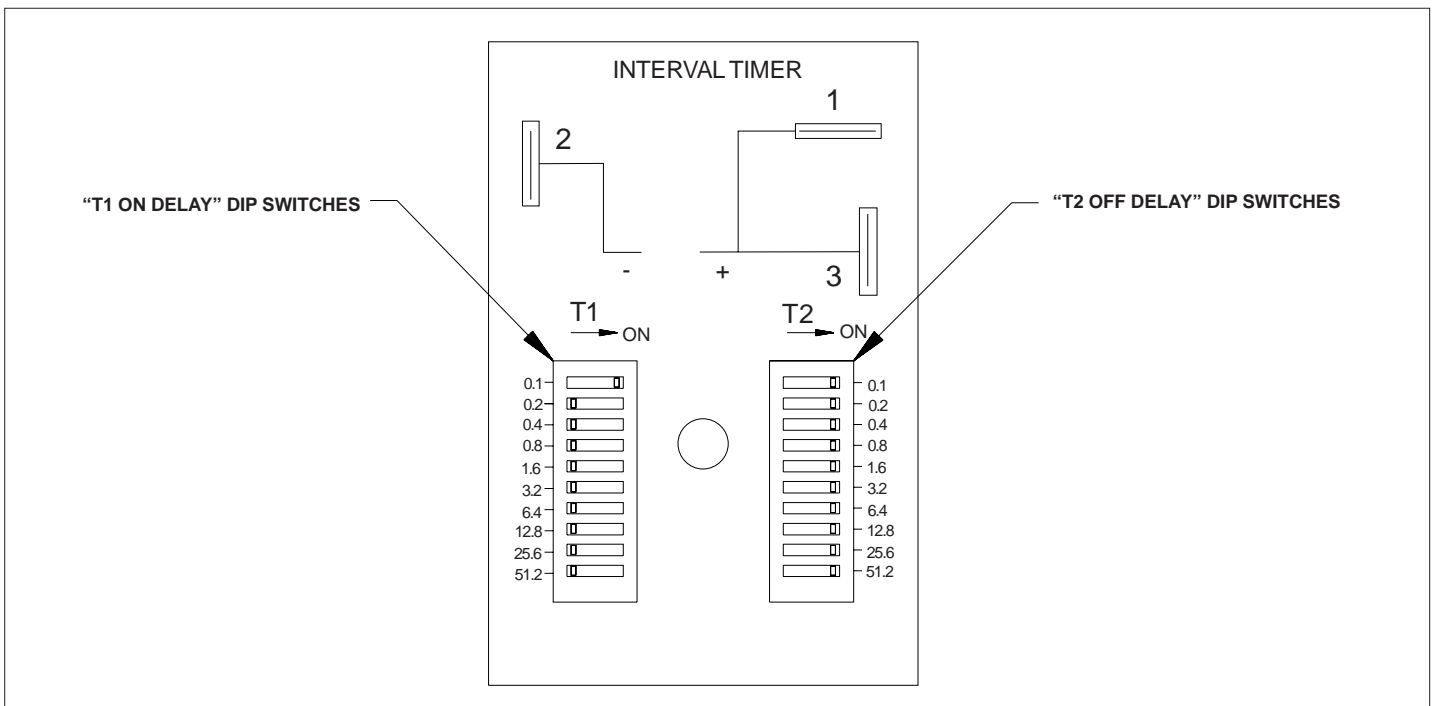

FIGURE 12

"T1 ON-DELAY" DIP SWITCH SETTINGS: On this group of switches, only the switch marked "**.1**" is in the "**ON**" position. All other switches in this group are in the "**OFF**" position. This setting means that when the system is operating, the Pump will cycle "**ON**" for .1 minute (6 seconds). This setting should be adequate for most printing applications and should not be changed.

"T2 OFF-DELAY" DIP SWITCH SETTINGS: On this group of switches, all of the switches were set at the factory to the "**ON**" position. This means that when the system is operating, the Pump will cycle "**ON**" for the .1 minute, set on **"T1 ON-DELAY"** group and then cycle off for a total of 102.3 minutes. This figure is determined by adding the time values of all switches on the **"T2 OFF-DELAY"** group (.1 + .2 + .4 ... + 51.2 = 102.3 minutes).

The basic programming principle of this system is to pump only a very small volume of ink to the printing system per cycle and set the cycle to repeat as often as necessary to provide a quality print. With the **"T1 ON-DELAY"** switches set to cycle the Pump on for only .1 minutes (6 seconds), the Pump will deliver approximately 1 ml. of ink to the Coder. The programming requirements are now limited to changing the settings of the **"T2 OFF-DELAY"** group of switches to the required time for your specific printing application.

OPERATION

1 - With the power supply re-connected to the PIDS System, set the **MANUAL-OFF-AUTO** Selector Switch to the "**OFF**" position. Press the "**ON**" Button and the green Indicator Lamp should light.

2 - With the Ink Roll on the Coder, prepared as previous instructed, and the Ink Tubes fully primed, start the production line and observe the coding operation.

3 - As soon as the printed marks being applied by the Coder appear to need more ink, turn the "**MANUAL-OFF-AUTO**" Selector Switch on the PIDS Control Box to the "**AUTO**" position and immediately start timing the cycle with the stopwatch and observe the printed marks being applied by the Coder. Within a few seconds, the printed marks should improve in print quality as the ink is pumped to the Coder.

The factory set program will start the Ink Pump and keep it running for 6 seconds. The Interval Timer will then turn the Pump off for 102.3 minutes. Sometime during this 102.3 minute off cycle, the Coder should require more ink. Continue to observe the printed marks being applied by the Coder and as soon as the marks appear to need more ink, record the time on the stopwatch. With this information, you are now ready to program the Interval Timer.

4 - Press the red "**STOP**" Button on the Control Box and once again disconnect the system from the electrical supply. (Note: The red "**STOP**" Button must be rotated CW to reset each time after pressing.) Open the Control Box and re-set the **"T2 OFF-DELAY"** group of Dip Switches to the time recorded on the stopwatch. For instance, if the printed marks appeared to need more ink after 10 minutes and 15 seconds, set only the following switches on the **"T2 OFF-DELAY"** Timer to the "**ON**" position: .2 + .4 + 3.2 and 6.4. Adding these values together gives you 10.2 minutes (10 minutes and 12 seconds) which is the closest setting to the 10 minutes and 15 seconds you have recorded. Make sure that all other Dip Switches on the **"T2 OFF-DELAY"** group are set to the "**OFF"** position.

5 - Once the above program has been set, close the cover on the Control Box and re-connect the PIDS System to the electrical supply. Press the "**ON**" Button and then turn the "**MANUAL-OFF-AUTO**" Selector Switch to the "**AUTO**" position. The Pump will immediately start running and will run for 6 seconds. After running for 6 seconds the timer will turn the Pump off and it will remain off for only 10 minutes and 12 seconds before it cycles on again. By running this new program, the Pump should deliver fresh ink to the Coder only as needed. This programmed cycle will continue to run as long as the PIDS System is turned on.

For the next few days, you should monitor the print quality to ensure that the program you have set is keeping up with the consumption rate of the printing system. If the printed marks appear to be starved for ink, slightly shorten the **"T2 OFF-DELAY"** cumulative time setting. If the printed marks appear to be excessively wet, slightly increase the **"T2 OFF-DELAY"** cumulative time setting.

INTERFACING WITH PARENT EQUIPMENT

The PIDS System is designed to enable interfacing with parent equipment such as web feed machines, extruders or conveyor lines. By interfacing the PIDS with the parent equipment, the PIDS System can be automatically activated or disabled when the parent equipment is turned on and off. This eliminates the possibility of pumping ink to a Coder which is not in operation.

CONNECTING THE PIDS SYSTEM TO PARENT EQUIPMENT: Inside the PIDS System Control Box you will find an empty 14-pin Socket where an Auxiliary Control Relay (R2) can be installed (See Figure 13). A jumper wire (#11) is installed to enable system operation without the R2 Relay. To interface the PIDS System with parent equipment, you need to determine where an electrical signal can be taken from the parent equipment's controls which will be on when the parent equipment is running and off when the parent equipment is stopped. This electrical signal will be used to energize the coil of the R2 Relay. When you determine the voltage of the signal (AC or DC), an appropriate R2 Relay can be supplied.

Before installing Relay R2, the #11 jumper wire must be removed from the R2 Socket. The R2 Relay is then installed in the R2 Socket and the electrical signal from the parent equipment is connected to terminals 5 and 6 on the Terminal Block in the bottom of the Control Box. A ground from the parent equipment also has to be connected to the Ground Screw in the Control Box. After making the above connections, the green Indicator Lamp on the PIDS front panel will remain illuminated, however, the Pump will not run unless the parent equipment is operating.
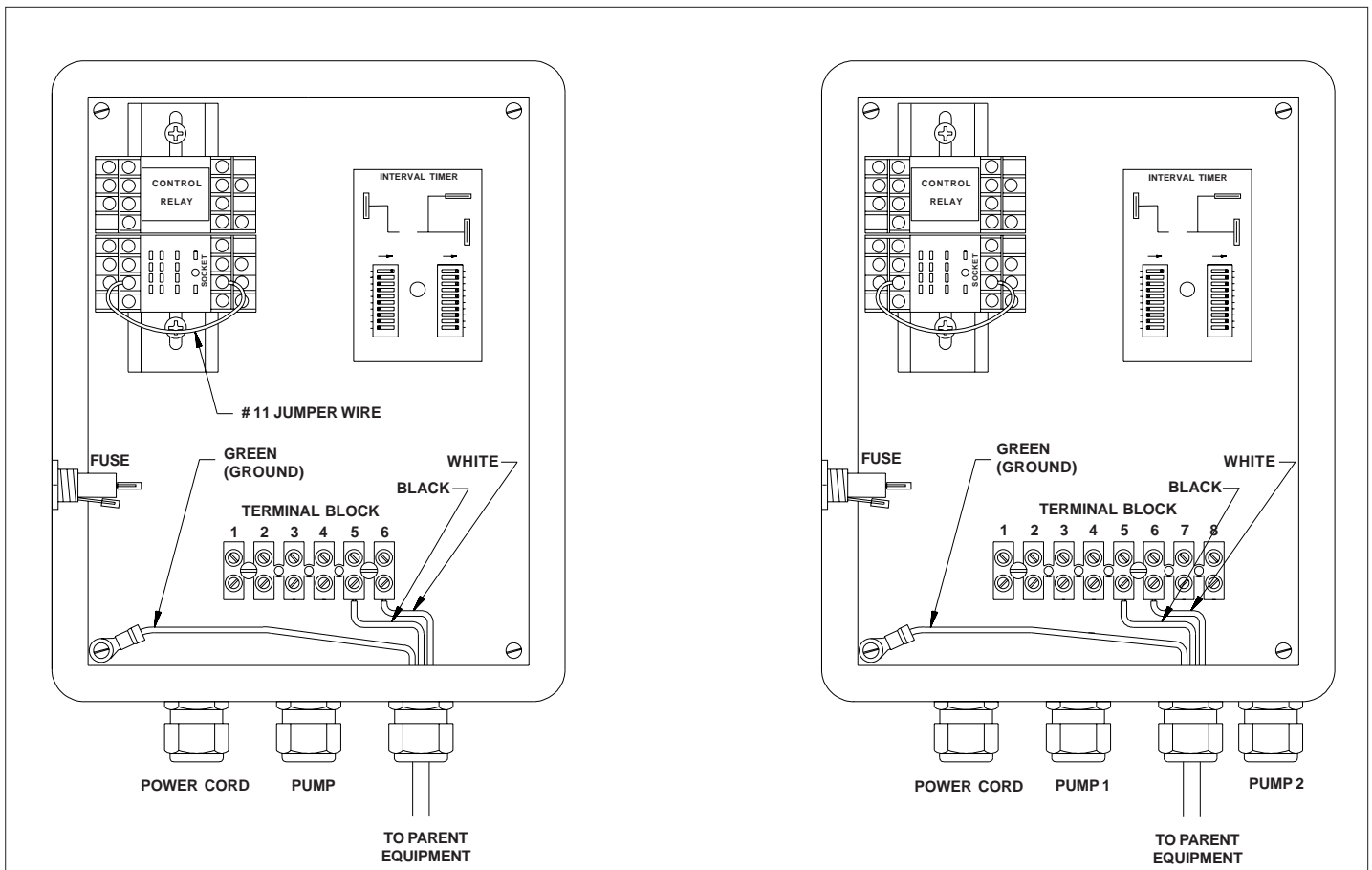

FIGURE 13

Universal Programmable Ink Delivery Systems are designed to provide years of trouble free service with very minimal maintenance requirements. The only routine maintenance required on this system, aside from periodic filling of the Ink Reservoir, is to replace the Pump Tubes at regular intervals.

The Pump Tubes on these systems are made from Norton Norprene which is a very durable synthetic rubber material. During operation, these tubes undergo constant compression and flexing in the Pump Head. Although these tubes are rated for up to 3,000 hours of continuous operation, a Pump Tube failure would cause ink leakage and therefore a more conservative life expectancy is used when pumping inks. It is recommended that the tubes in the Pump Heads be replaced after every 1,000 hours of operation or every 8 weeks, whichever comes first. With a little practice, a Pump Tube can be changed in as little as 10 seconds.

CHANGING THE PUMP TUBE

1 - Press the "**STOP**" Button on the PIDS Control Box.

2 - Rotate the lever on the Pump Head to the left (CCW) to un-clamp the tube (See Figure 14).

3 - Place a paper towel under the Quick Release Tube Fittings and press the "**RELEASE**" Buttons to disconnect the Pump Tube.

NOTE: There are check valves in each of the fittings to prevent ink flow from either side when the fittings are separated, but a drop or two of ink may be released during separation. It is advisable to cover the ends of the Pump Tube Fittings with a towel, while handling, since most inks will permanently stain clothing.

4 - Load a new Pump Tube Assembly into the Pump Head and re-connect the fittings.

5 - Slowly rotate the Pump Head Lever to the right (CW) and ensure that the Pump Tube is centered under the V- Shaped Pump Tube Retainers on either side of the Pump Head. When the Pump Head Lever is in the fully "**CLAMPED**" position, the operation is complete.
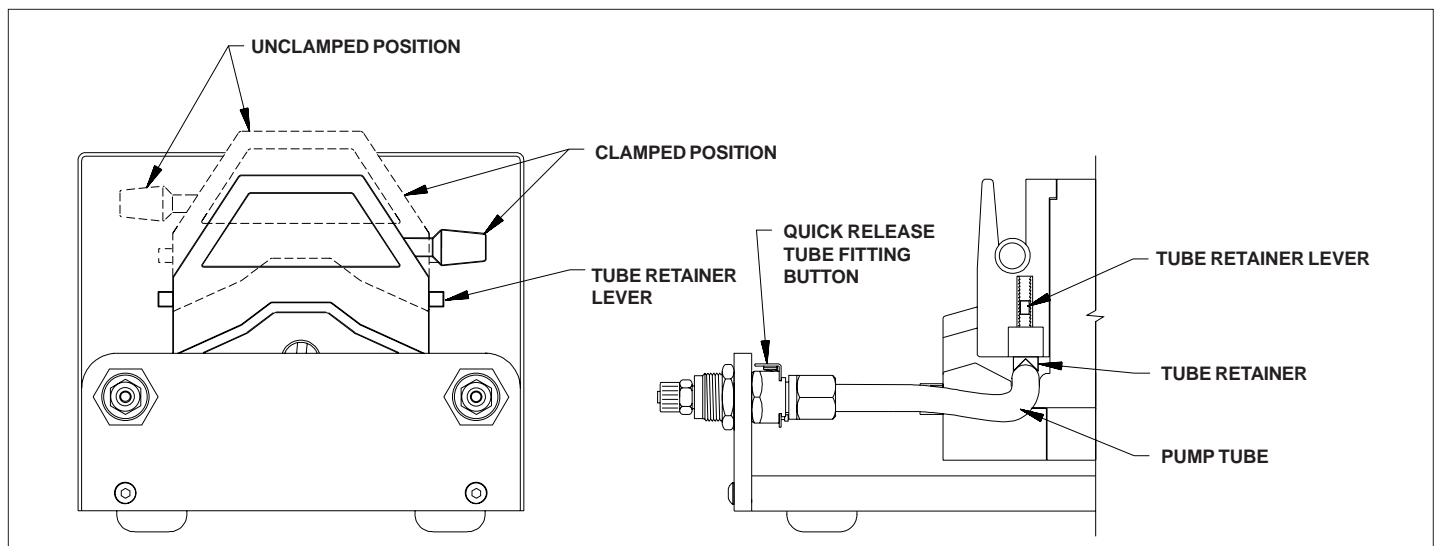

FIGURE 14

ADJUSTING THE PUMP TUBE RETAINERS

Peristaltic pumps have a tendency to pull the Pump Tube into the Pump Head during operation. The V-Shaped Pump Tube Retainers on either side of the Pump Head are designed to prevent this action when adjusted properly. These Retainers have been adjusted at the factory but if during operation you notice that the Pump Tube is being pulled into the Pump Head, the Pump Tube Retainers should be re-adjusted.

It is important to note that with proper adjustment, the Pump Tube Retainers slightly compress the Pump Tube when the Pump Head Lever is in the "**CLAMPED**" position. Care must be taken to ensure that the Retainers are not set too tight or restriction of the Pump Tube may occur.

To adjust the Pump Tube Retainers, rotate the lever on the Pump Head to the "**UN-CLAMPED**" position. Press in on the Tube Retainer Levers (one on each side of the Pump Head) and move it down one notch. Center the Pump Tube in the Pump Head and move the Pump Head Lever to the "**CLAMPED**" position being sure that the Pump Tube is centered under the V-Shaped Pump Tube Retainers on either side of the Pump Head. Repeat this procedure as necessary until the Pump Tube remains in place during operation.
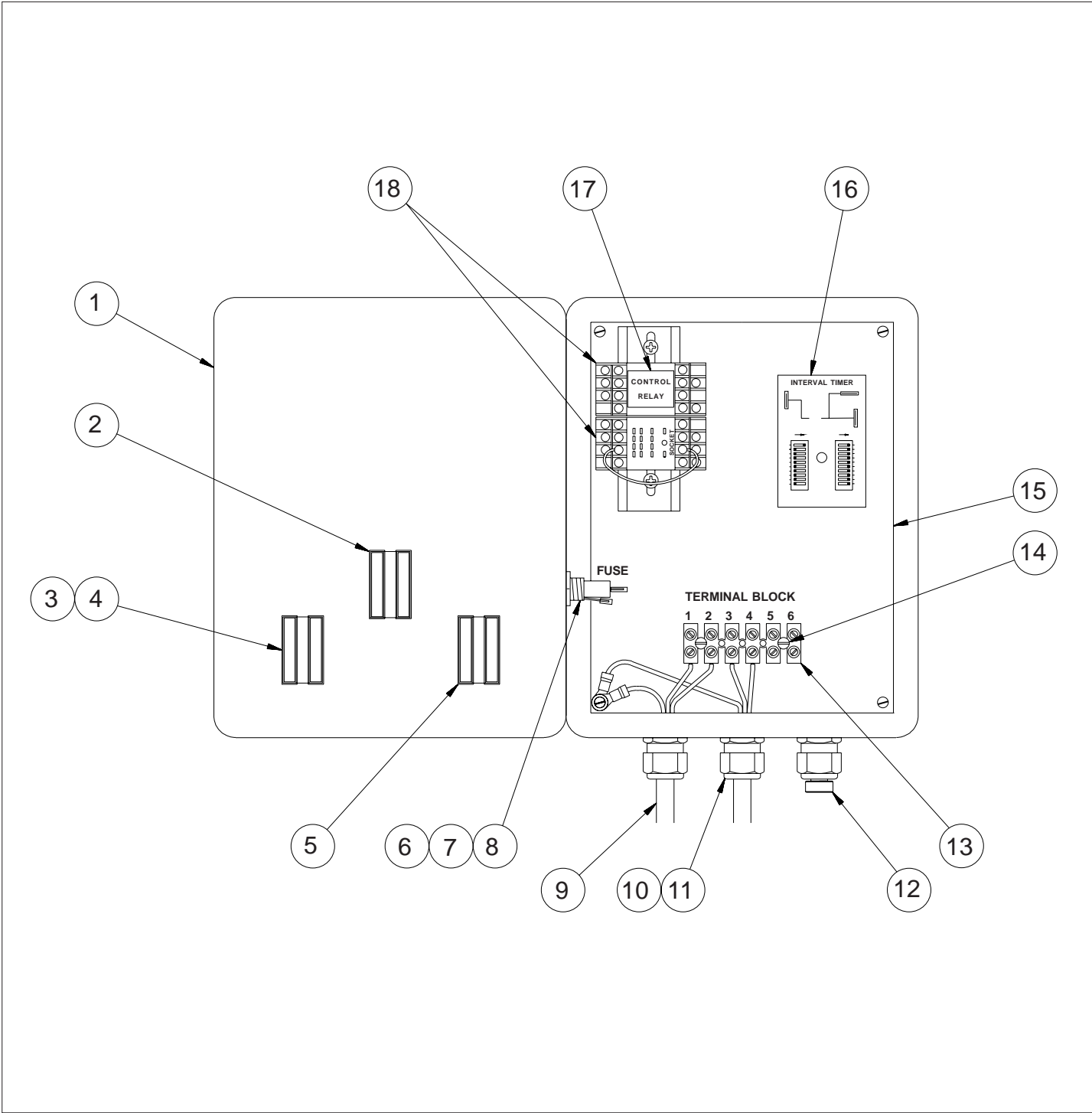
WIPER ADAPTER ASSEMBLY
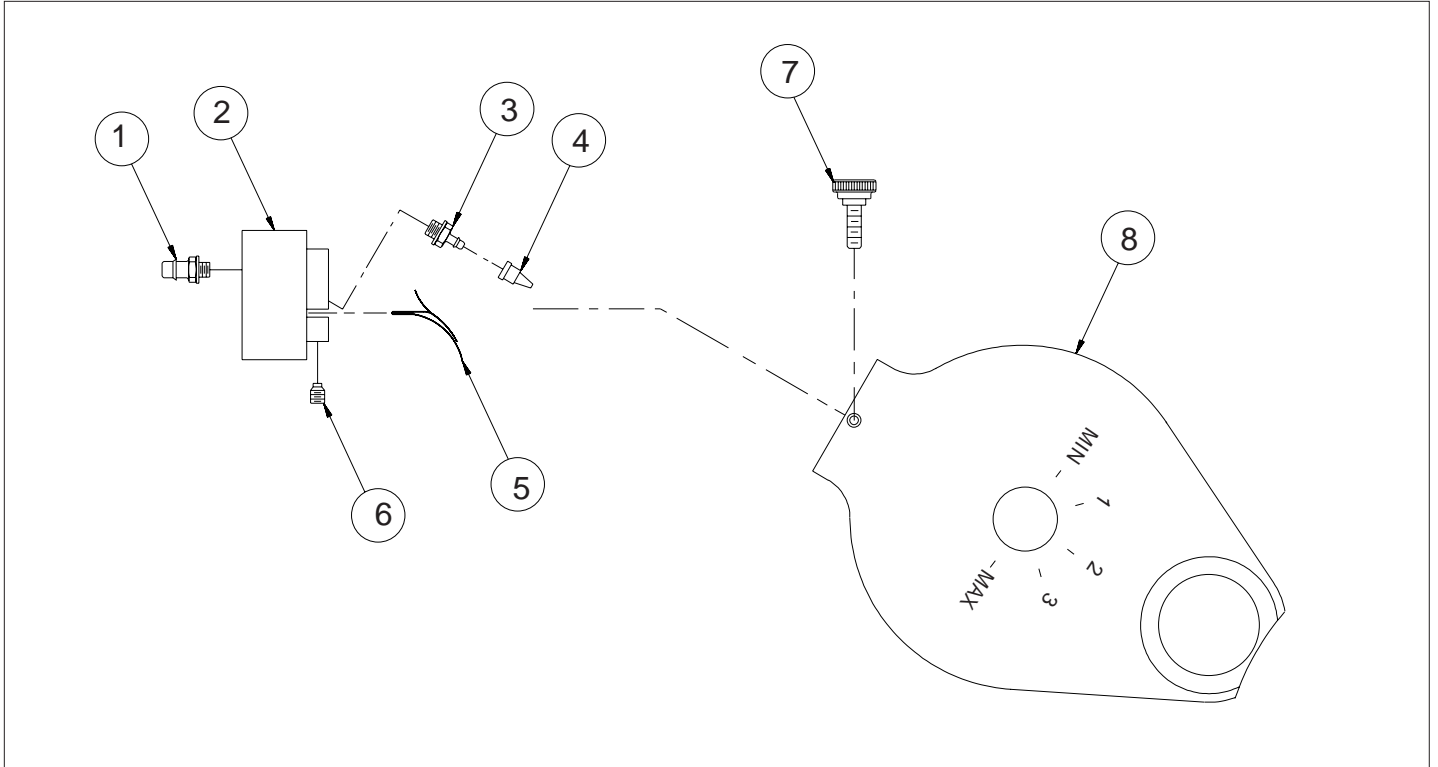
WIPER ADAPTER PARTS LIST

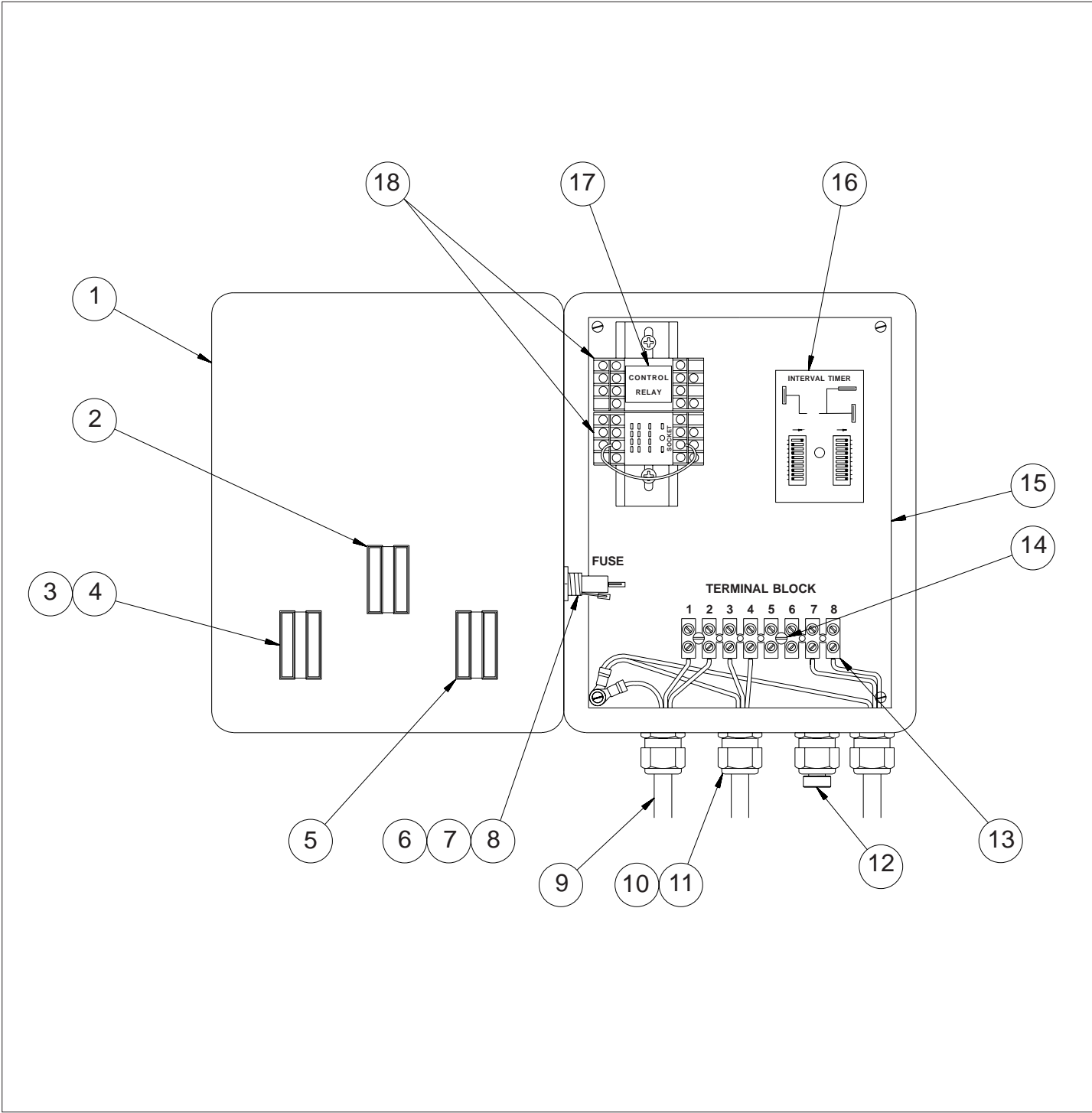| KEY NO.	PART NUMBER	QTY. REQD.	DESCRIPTION
1	MRM-PC-70	1	10-32 BARB FITTING X 1/8" I.D. TUBE
2	PIDS-37	1	WIPER BLOCK FOR 1-1/8" NON-PPOROUS COVER
	PIDS-38		WIPER BLOCK FOR 2" NON-PPOROUS COVER
3	MRM-PC-69	1	10-32 BARB FITTING X 1/16" I.D. TUBE
4	PIDS-16	1	CHECK VALVE, DUCK BILL
5	PIDS-35	1	PLASTIC WIPER, 1-1/8" REPLACEMENT
	PIDS-36		PLASTIC WIPER, 2" REPLACEMENT
6	CF-05	2	NYLON TIP SET SCREW, 8-32 THREAD
7	PIDS-48	1	THUMB SCREW ASSEMBLY, 8-32 THREAD
8	PIDS-39	1	NON-POROUS INKING SYSTEM COVER, 1-1/8" CLP, FOR WIPER ADAPTER
	PIDS-42		NON-POROUS INKING SYSTEM COVER, 2" CLP, FOR WIPER ADAPTER
	PIDS-45		NON-POROUS INKING SYSTEM COVER, 1-1/8" L. H. TOP MOUNT MINI-CODER, FOR WIPER ADAPTER
	PIDS-46		NON-POROUS INKING SYSTEM COVER, 1-1/8" R. H. TOP MOUNT MINI-CODER, FOR WIPER ADAPTER

PIDS-100 & PIDS-200 CONTROL BOX ASSEMBLY
PROGRAMMABLE INK DELIVERY SYSTEM

CONTROL
RELAY

SOCKET

INTERVAL TIMER

FUSE

TERMINAL BLOCK

1 2 3 4 5 6

PIDS-100 & PIDS-200 CONTROL BOX ASSEMBLY PARTS LIST
PROGRAMMABLE INK DELIVERY SYSTEM

KEY NO.	PART NUMBER	QTY. REQD.	DESCRIPTION
1	MRM-EC-52	1	FIBERGLASS ENCLOSURE
2	MRM-EC-34	1	SELECTOR SWITCH, 3 POSTION, BLACK
3	MRM-EC-30	1	ILLUMINATED PUSHBUTTON SWITCH - GREEN
4	MRM-EC-31	1	INCANDESCENT LAMP 120 VAC
5	MRM-EC-33	1	MUSHROOM PUSHBUTTON SWITCH - RED
6	MRM-EC-60	1	FUSE, 0.5 A, US
7	MRM-EC-63	1	FUSE CARRIER, US
8	MRM-EC-62	1	FUSE HOLDER, UNIVERSAL PANEL MOUNT
9	MRM-EC-22	1	POWER CORD ASSEMBLY, 14-3, 8 FEET, WITH MOLDED PLUG
10	MRM-EC-10	3	STRAIN RELIEF - STRAIGHT - THRU FITTING
11	MRM-EC-11	3	NYLON LOCKNUT
12	PIDS-09	1	DELRIN PLUG FOR STRAIN RELIEF
13	MRM-EC-04	1	TERMINAL BLOCK FOR 6 WIRE CORDAGE - INTERNATIONAL
14	PIDS-15	2	SCREW, 6-32 X 3/4" BH SLOT
15	MRM-EC-53	1	ALUMINUM COMPONENT MOUNTING PANEL
16	MRM-EC-70	1	RECYCLE TIMER .1 - 102.3 MIN. - 110 VAC / 60 Hz
17	MRM-EC-82	1	CONTROL RELAY 4PDT 120 VAC COIL - 14 PIN
18	MRM-EC-85	1	SOCKET BASE FOR CONTROL RELAY - 14 PIN

PIDS-300 & PIDS-400 CONTROL BOX ASSEMBLY
PROGRAMMABLE INK DELIVERY SYSTEM

CONTROL RELAY

SOCKET

INTERVAL TIMER

FUSE

TERMINAL BLOCK

1 2 3 4 5 6 7 8

PIDS-300 & PIDS-400 CONTROL BOX ASSEMBLY PARTS LIST
PROGRAMMABLE INK DELIVERY SYSTEM

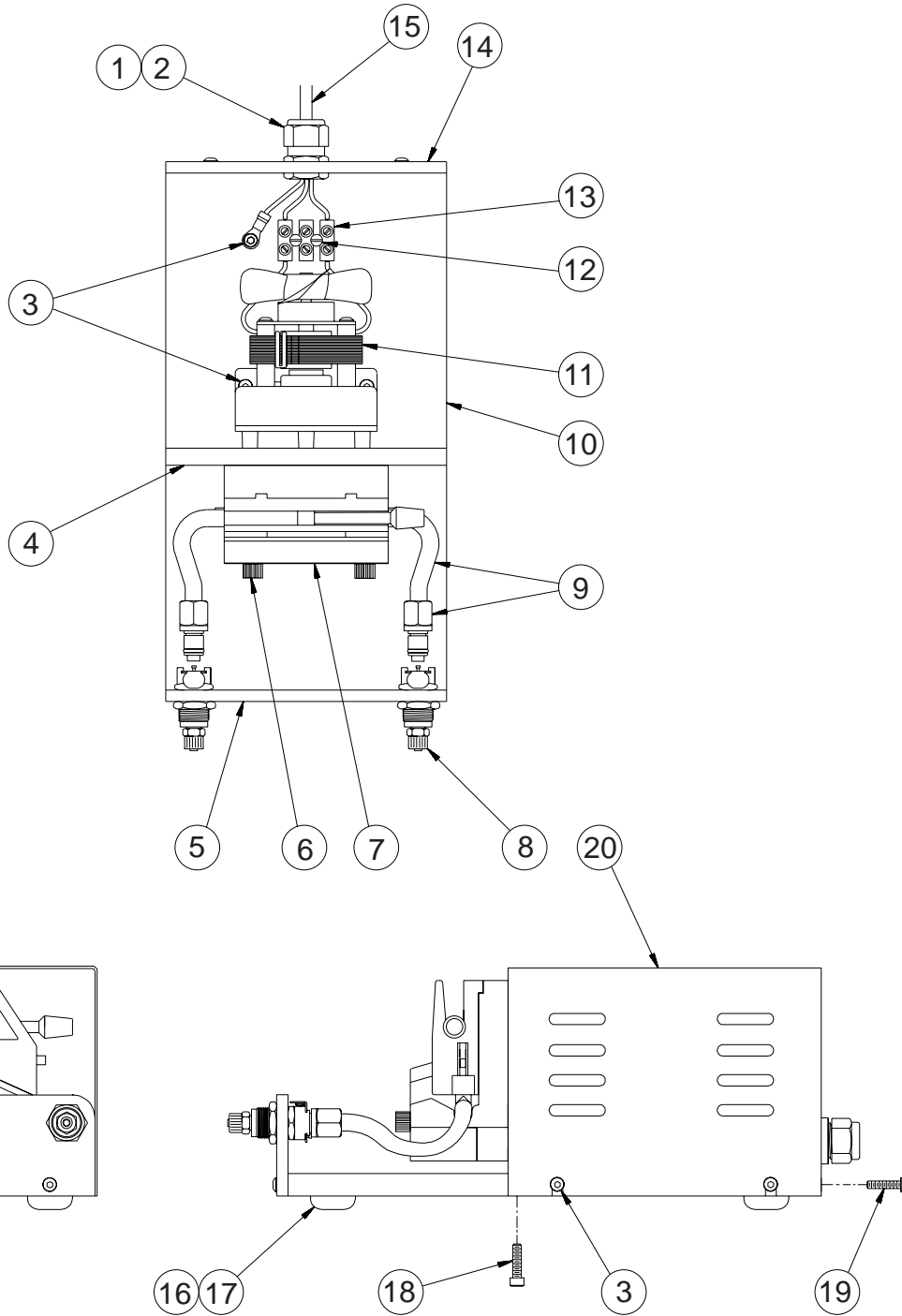| KEY NO.	PART NUMBER	QTY. REQD.	DESCRIPTION
1	MRM-EC-52	1	FIBERGLASS ENCLOSURE
2	MRM-EC-34	1	SELECTOR SWITCH, 3 POSTION, BLACK
3	MRM-EC-30	1	ILLUMINATED PUSHBUTTON SWITCH - GREEN
4	MRM-EC-31	1	INCANDESCENT LAMP 120 VAC
5	MRM-EC-33	1	MUSHROOM PUSHBUTTON SWITCH - RED
6	MRM-EC-60	1	FUSE, .1 A, US
7	MRM-EC-63	1	FUSE CARRIER, US
8	MRM-EC-62	1	FUSE HOLDER, UNIVERSAL PANEL MOUNT
9	MRM-EC-22	1	POWER CORD ASSEMBLY, 14-3, 8 FEET, WITH MOLDED PLUG
10	MRM-EC-10	3	STRAIN RELIEF - STRAIGHT - THRU FITTING
11	MRM-EC-11	3	NYLON LOCKNUT
12	PIDS-09	1	DELRIN PLUG FOR STRAIN RELIEF
13	MRM-EC-04	1	TERMINAL BLOCK FOR 8 POLE - INTERNATIONAL
14	PIDS-15	2	SCREW, 6-32 X 3/4" BH SLOT
15	MRM-EC-53	1	ALUMINUM COMPONENT MOUNTING PANEL
16	MRM-EC-70	1	RECYCLE TIMER .1 - 102.3 MIN. - 110 VAC / 60 Hz
17	MRM-EC-82	1	CONTROL RELAY 4PDT 120 VAC COIL - 14 PIN
18	MRM-EC-85	1	SOCKET BASE FOR CONTROL RELAY - 14 PIN

PIDS-100 & PIDS-300 SINGLE PUMP HEAD MODULE ASSEMBLY
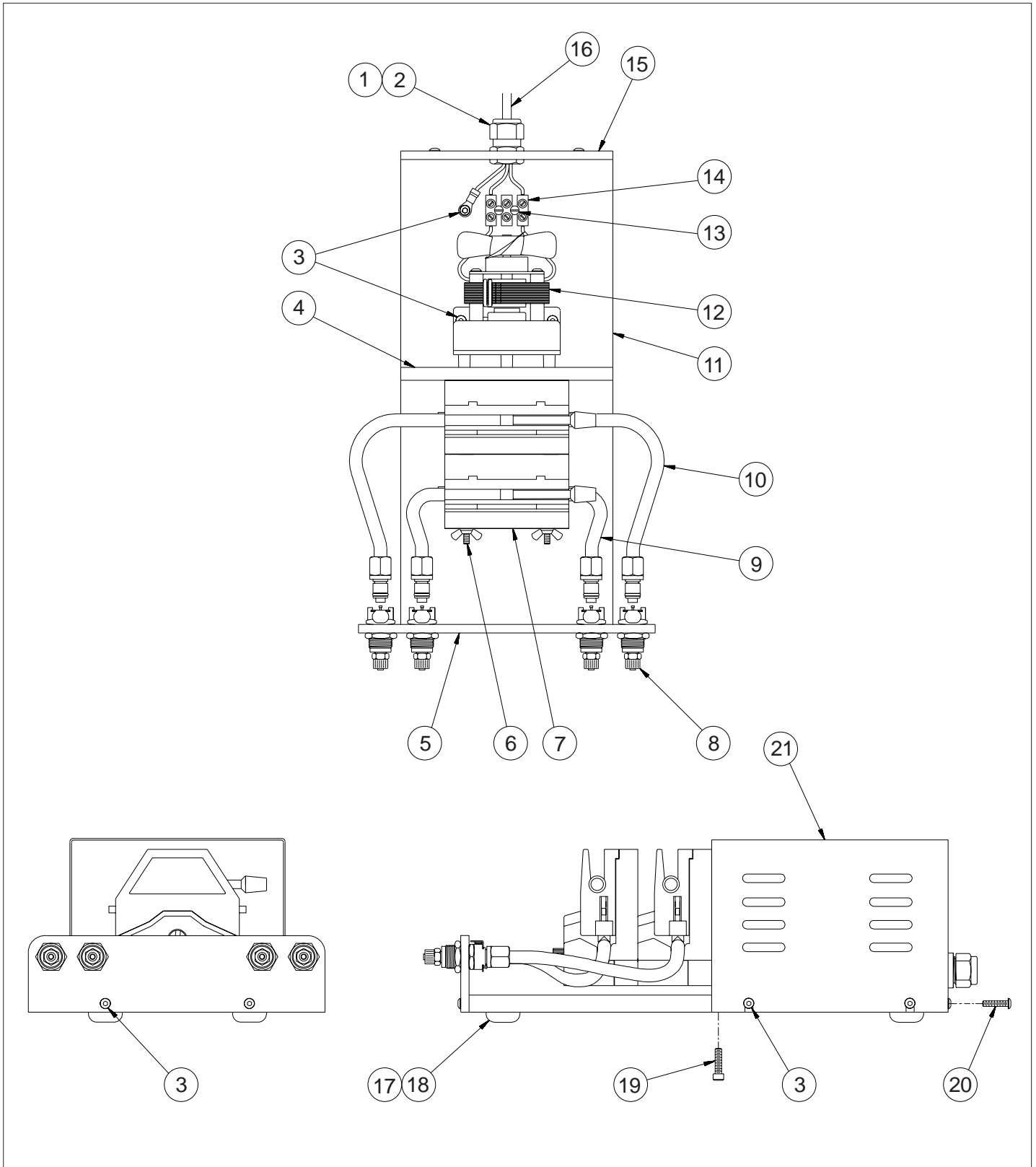## PROGRAMMABLE INK DELIVERY SYSTEM

PIDS-100 & PIDS-300 SINGLE PUMP HEAD MODULE ASSEMBLY PARTS LIST
PROGRAMMABLE INK DELIVERY SYSTEM

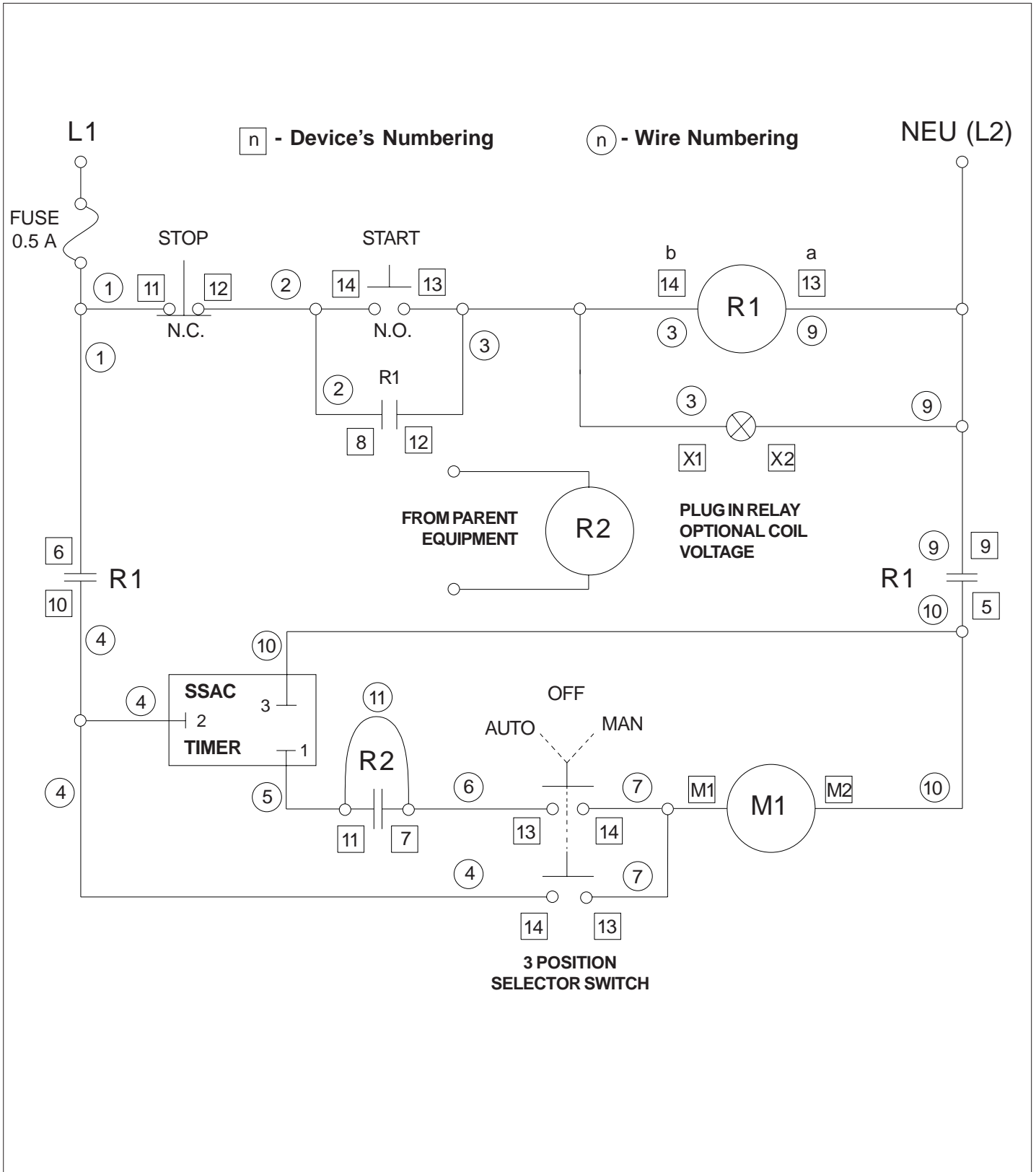| KEY NO.	PART NUMBER	QTY. REQD.	DESCRIPTION
1	MRM-EC-10	1	STRAIN RELIEF - STRAIGHT-THRU FITTING
2	MRM-EC-11	1	NYLON LOCKNUT
3	HP-10	9	SCREW, 8-32 X 1/2" BHC
4	PIDS-04	1	PUMP HEAD MOUNTING PLATE
5	PIDS-05	1	PUMP MODULE FRONT PLATE
6	PIDS-47	2	MOUNTING HARDWARE - SINGLE PUMP HEAD
7	PIDS-01	1	EASY LOAD PUMP HEAD
8	PIDS-40	2	QUICK RELEASE COUPLING - PANEL MT BODY
9	PIDS-PTA1	1	PUMP TUBE ASSEMBLY - 12"
10	PIDS-03	1	PUMP MODULE BASE PLATE
11	PIDS-02-115	1	PUMP MOTOR, 6 RPM - 115 VAC / 60Hz
12	PIDS-15	2	SCREW, 6-32 X 3/4" BH SLOT
13	MRM-EC-03	1	TERMINAL BLOCK - 3 POS. INTL.
14	PIDS-06	1	PUMP MODULE BACK PLATE
15	MRM-EC-10	8'	CABLE, 16/3 AWG
16	5121-709	4	SCREW, 10-32 X 1/2" RH SLOT
17	1199-138	4	RUBBER FOOT
18	PIDS-10	2	SCREW, 10-32 X 3/4" SHC
19	PIDS-17	2	SCREW, 8-32 X 3/4" BHC
20	PIDS-08	1	ALUMINUM COVER FOR PUMP MODULE
	* CT-02	31 FT.	NATURAL POLY 1/4" O.D. TUBE

* ITEM NOT SHOWN

PIDS-200 & PIDS-400 DUAL PUMP HEAD MODULE ASSEMBLY PARTS LIST
PROGRAMMABLE INK DELIVERY SYSTEM

KEY NO.	PART NUMBER	QTY. REQD.	DESCRIPTION
1	MRM-EC-10	1	STRAIN RELIEF - STRAIGHT-THRU FITTING
2	MRM-EC-11	1	NYLON LOCKNUT
3	HP-10	9	SCREW, 8-32 X 1/2" BHC
4	PIDS-04	1	PUMP HEAD MOUNTING PLATE
5	PIDS-13	1	PUMP MODULE FRONT PLATE
6	PIDS-14	1	MOUNTING HARDWARE - DUAL PUMP HEAD
7	PIDS-01	2	PUMP HEAD, EASY LOAD
8	PIDS-40	2	QUICK RELEASE COUPLING - PANEL MT BODY
9	PIDS-PTA1	1	PUMP TUBE ASSEMBLY - 12"
10	PIDS-PTA2	1	PUMP TUBE ASSEMBLY - 18"
11	PIDS-12	1	PUMP MODULE BASE PLATE
12	PIDS-02-115	1	PUMP MOTOR, 6 RPM - 115 VAC / 60Hz
13	PIDS-15	2	SCREW, 6-32 X 3/4" BH SLOT
14	MRM-EC-03	1	TERMINAL BLOCK - 3 POS. INTL.
15	PIDS-06	1	PUMP MODULE BACK PLATE
16	MRM-EC-10	8'	CABLE, 16/3 AWG
17	5121-709	4	SCREW, 10-32 X 1/2" RH SLOT
18	1199-138	4	RUBBER FOOT
19	PIDS-10	2	SCREW, 10-32 X 3/4" SHC
20	PIDS-17	2	SCREW, 8-32 X 3/4" BHC
21	PIDS-08	1	ALUMINUM COVER FOR PUMP MODULE
	* CT-02	62 FT.	NATURAL POLY 1/4" O.D. TUBE

* ITEM NOT SHOWN

PIDS-100 & PIDS-200 SCHEMATIC WIRING DIAGRAM
PROGRAMMABLE INK DELIVERY SYSTEM

L1

NEU (L2)

n - Device's Numbering

n - Wire Numbering

FUSE
0.5 A

STOP

START

b

a

1   11   12   2   14   13   14   R1   13

N.C.   N.O.   3   3   9

1

2   R1   3   9

8   12   X1   X2

FROM PARENT
EQUIPMENT

R2

PLUG IN RELAY
OPTIONAL COIL
VOLTAGE

6   9   9

R1   R1

10   10   5

4   10

SSAC   3   11

4   2   OFF

TIMER   AUTO   MAN

R2   1

5   6   7   M1   M1   M2   10

4   11   7   13   14

4   7

14   13

3 POSITION
SELECTOR SWITCH

PIDS-300 & PIDS-400 SCHEMATIC WIRING DIAGRAM
PROGRAMMABLE INK DELIVERY SYSTEM
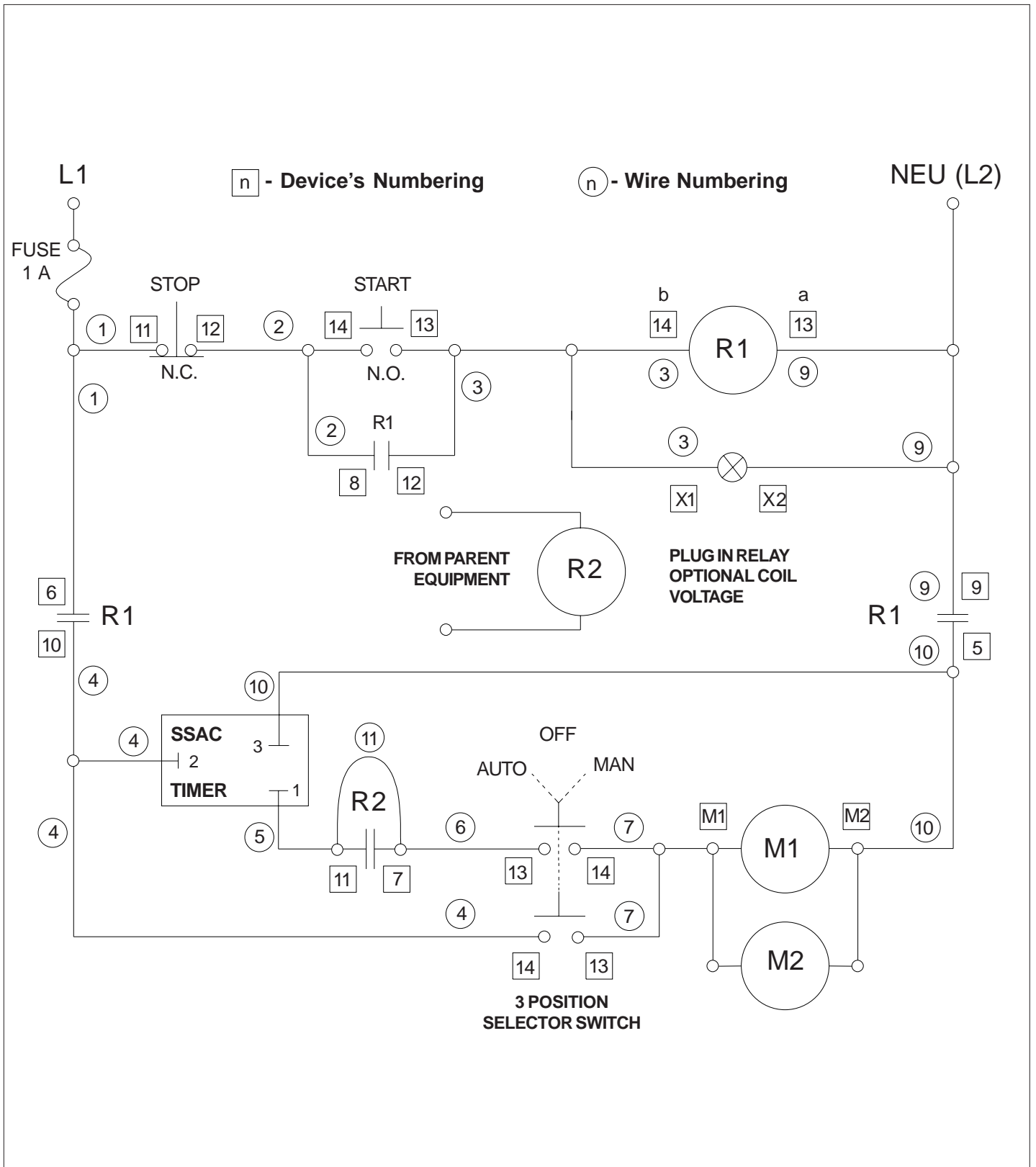
PUMP MODULE CORD CONNECTION

GREEN

WHITE

BLACK