

BK1700 Controller User's Guide

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1.1 Introduction

The Buskro BK1700 Portable Controller is a stand-alone ink-jet controller primarily designed to integrate Buskro's inkjet technologies to transport bases, finishing lines, and web presses. The BK1700 controller is fully compatible with all Buskro transport bases, which when combined, offers a complete turnkey inkjet solution. By selecting the appropriate inkwell and print heads, the BK1700 can be tailored to support the various Buskro inkjet technologies including Apollo, Atlas, and Atlas-UVC.

Note: Although the BK1700 was designed with all Buskro ink technologies in mind, it was initially released for Atlas only. The current availability of other technologies for the BK1700 should be discussed with a Buskro representative.

The BK1700 consists of six main sub-systems:

1. The **controller 19" rack-type cabinet** includes a wheel-equipped cabinet enclosure housing a 4.5 KVA transformer capable of accommodating various input power sources of 50/60Hz for voltages ranging from 200/208/230/250 VAC. The power input line is an IEC type connector and includes a main disconnect switch, fusing, and EMI filtration. The resulting output power is a standard 120 VAC distributed by two cables to the power supply module(s). *Please refer to Chapter 2.0 for detailed information.*
2. The **controller power supply module** accepts the 120 VAC input from the transformer and provides the necessary power source(s) for up to four print heads, or in the case of Apollo, 4" of print. This basic power support can be expanded to two power supply modules to support up to eight print heads or 8" of Apollo print in total.
3. The **computer module**, responsible for all control aspects of the system, consists of a computer, 3.5" floppy, CD ROM, a Datapath card producing data flow for up to 4 print heads (*4" of print for Apollo*), and a field connection plate assembly for sensor I/O. The controller also includes an LCD monitor, mouse, and keyboard. Options include a tracking board providing the possibility of tracking products over 8 transport zones, and an expansion board for data flow to an additional 4 print heads (or *4" of Apollo*). Printer control is achieved with Compose IQ™, the inkjet control software running on a Windows™ XP platform.

4. A **sub-rack** for the housing of all “life” support and ink management elements of a given inkjet technology including the Ink Delivery module, Pressure/Vacuum module, and its supporting electronics in the form of a Reservoir Control card (RCC) and Head Control card (HCC). In the case of Apollo, these elements are not needed other than the Apollo Ink delivery Module.
5. The **ink delivery module**, a four-channel unit whose task is to deliver ink to the print head(s) from the central console, is a sub-rack type unit specific for each technology chosen. The Apollo ink delivery module is a self-sufficient unit whereas the other technologies depend on the backplane-mounted reservoir control card (RCC) card to provide ink module control.
6. The **pressure regulator module** is a unit that provides meniscus, lung, and purge functions to the print head(s) from the central console. It is a sub-rack type unit which supports Atlas, Atlas UVC, and Elite⁺ based technologies. This module depends on the backplane-mounted reservoir control card (RCC) card to provide vacuum/pressure control.

The BK1700 controller is ordered as a package that includes the following elements

(Figure 1-1):

1. The standard BK1700 controller for desired technology.
2. A Photocue sensor and an encoder (*5 choices*) to enable printing.
3. A print head bridge(s).
4. A printhead(s) of choice (Apollo, Atlas, Atlas-UVC, and Sapphire).
5. An optional communication package for RS232C.
6. An optional tracking package capable of product tracking over up to 8 zones.

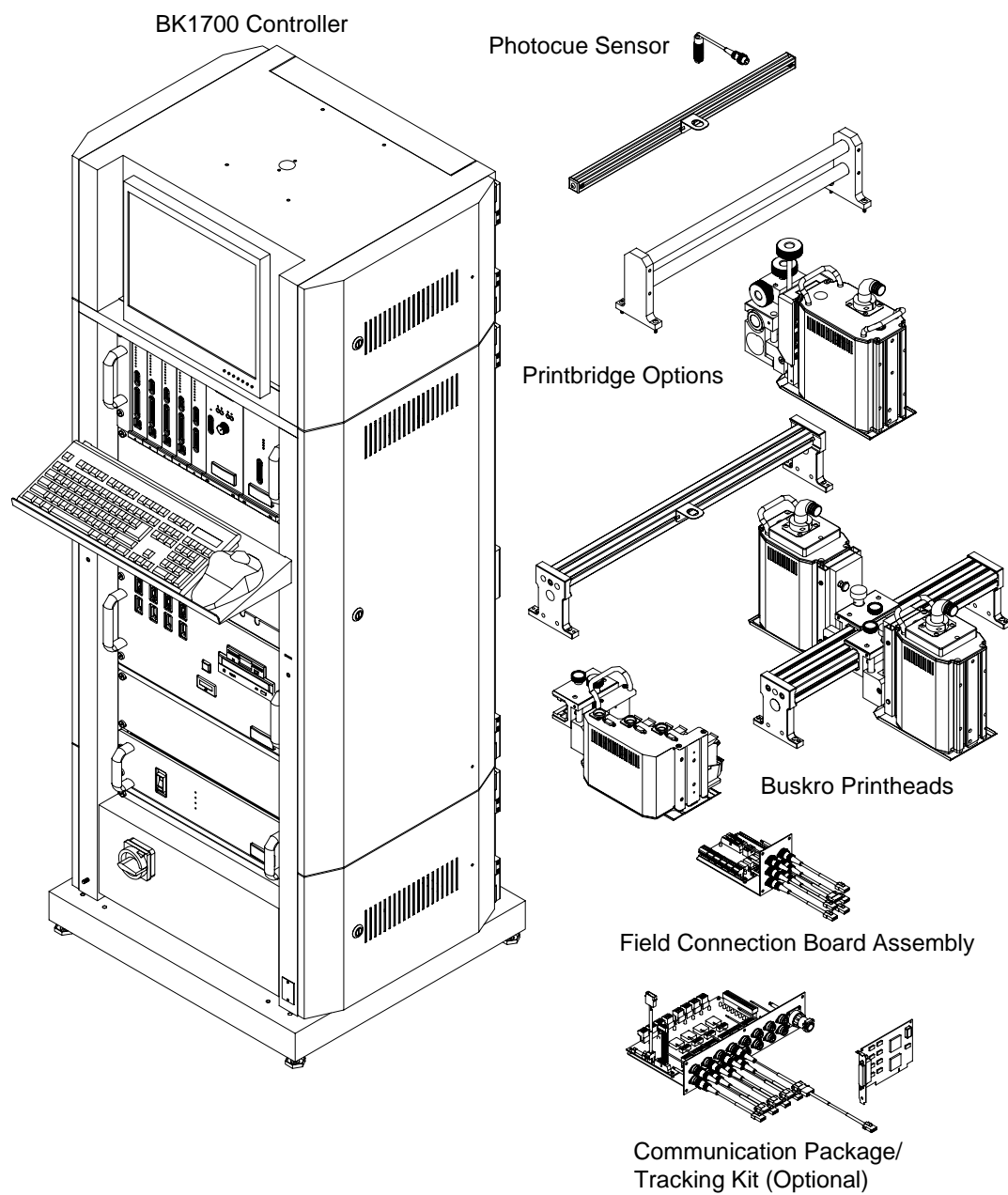


Figure 1-1: BK1700 Controller package elements.

1.2 Features

1.2.1 Compose IQ

Compose IQ™ is the Windows™ based inkjet control software included with all standard BK1700 controllers. It is designed to control and monitor all aspects of the printing process including production reporting. With Compose IQ™, the user can control the graphic layout and job setup, and monitor the job run progress in real time. The BK1700 controller with Compose IQ features include:

- Easy layout tools providing many image types in a WYSIWYG environment.
- Operator screen permits real-time viewing of records, their status, and provides tools to search, reposition, and reprint them.
- Provides for a vertical print coverage of up to twenty inches of print.
- Setup and diagnostic windows to identify and monitor the various print heads installed on the system.
- 1:1 product/data monitoring for robust system-wide integrity.
- Complete job audit reporting of current and archived production.
- Network and communication capability with external input devices or other controllers.
- Track products over up to eight independent transport zones.

A number of optional items can either be included with the original purchase of a BK1700 controller, or can be field-upgraded at a later date. These options include:

- An enhanced communication package for communication with an external device(s) or other Buskro controller(s) through serial means (RS232C).
- An OCR package for applications where a number is received from an external device or controller, looked up in a database, and at an appropriate time, transferred to the printing process.

- A selective control package for situations where it is necessary to control external system elements selectively based on data. In order to implement selective controls, it is necessary to provide localized system controls with a PLC.

Note, programming and implementation of the PLC functions is not included in the price of the upgrade package.

When one of these optional upgrade packages is installed, the user can run in any desired mode supported by the package. This includes standard, client, host, OCR (*OCR package*), and selective (*Selective package*).

1.2.2 Field Connection Board (FCB)

The Field Connection Board assembly (FCB) is included in every BK1700 Controller. This allows for a standard connection point to the controller for input sensors and output devices. The main input sensors used by the controller include the Photocue, encoder, jam, and cycle. The FCB also has a 17-pin output connector that can be used to integrate the output signals from the controller to the transport base. These output signals include the stacker signal, stop signal, and divert signal.

1.2.3 Serial Card

The Computer box of the BK1700 Controller will accommodate a high-speed serial card that is required for all Compose IQ applications. This serial card is installed in the PCI slot on the motherboard, with connectors oriented in the same way as the connectors on the FCB.

1.2.4 Universal power input

The BK1700 controller is designed to satisfy standard voltage and frequency requirements through the use of a universal IEC type input connector and multi-tap transformer.

1.2.5 Modularity

The BK1700 controller uses a modular 4-channel design concept incorporating the computer module, power supply module, ink delivery module and/or pressure regulator

module in a standard 19" rack-mount enclosure. Although each module has limitations associated with print head(s) capacity, enhanced capacity is achieved by adding similar modules while combination systems utilizing differing technologies can be assembled using dissimilar modules. As with all system elements, modules can be interchanged and/or added in the field should the customer decide to upgrade or exchange technologies.

1.2.6 Portability and flexibility

The BK1700 controller is a carriage assembly with casters allowing for the unit to be easily moved from one system to another. Both the keyboard/mouse and LCD display can be mounted on either side depending on operator preference. In addition, the keyboard tray can be mounted at two different heights to accommodate the operator.

1.2.7 Controller Upgradeability

The modular design of the BK1700 simplifies the task of upgrading systems quickly and cost effectively. The ink delivery module, pressure regulator module, reservoir control card (RCC), and head control card (HCC) share the same physical height (6U) and have optimal widths to allow for a number of combinations to fit within the 19" sub-rack. The design of the modules follows the 6U and 3U physical dimensions. The Apollo technology can readily be added to an Atlas, or Atlas-UVC configuration.

1.2.8 Combo Systems

Any BK1700 Atlas, or Atlas-UVC controller is capable of operating as a combination unit with the addition of the Apollo print heads. In this type of configuration all engaged print head technologies can be operated simultaneously for the desired application or can be employed separately in a valuable backup capacity should one of the technologies exhibit difficulties.

1.3 Specifications

Table 1-1: *BK1700 Controller Specifications*

1.3.1 Physical			
	Overall Length	27.80"	706 mm
	Overall Height	72.68"	1846 mm
	Overall Width	31.28"	795 mm
	Including keyboard tray		
	Weight (4 channels)	497 lbs	226 kg
	(8 channels)	559 lbs	254 kg
1.3.2 Electrical Requirements			
	Line Voltage	200/208/230/250 VAC input	
	Line Power	3750 VA	
1.3.3 Operator Controls			
	Main On/OFF	Rotary padlock switch - enclosure	
	Power ON/OFF	Circuit breaker switch - power supply	
	Computer ON/OFF	Computer reset button	
	Meniscus Level	4 - channel Meniscus LCD monitor	
	Compose IQ	All printer controls via mouse/keyboard	
	3 ½" floppy & CD ROM	Data and software loading	
1.3.4 Computer Specifications (Minimum)			
	CPU	Pentium 4	
	Memory	256 MB DDR RAM	
	Hard Drive	10.0 GB, IDE Controller	
	Floppy Drive	1.44 MB, 3 ½"	
	CD-ROM	8X, IDE Controller	
	Video Display	800 x 600, 16-Bit Color	
	Keyboard	101 US	
	Mouse	Trackball	
	Operating System	Windows™ XP Professional	
	Imaging Software	Compose IQ	

1.4 System Drawings

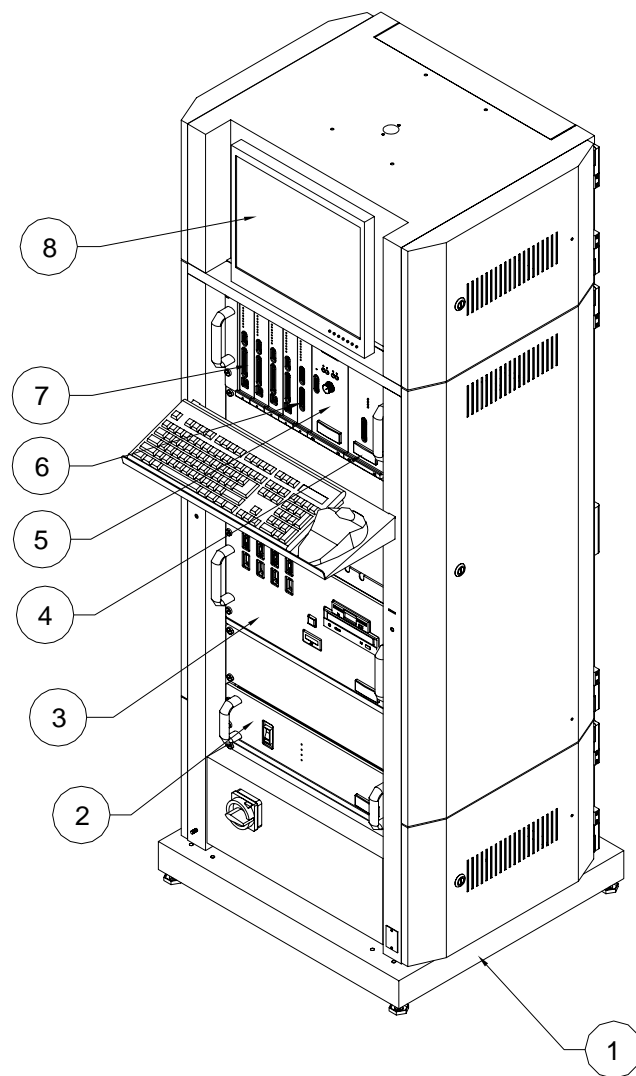


Table 1-2: *Illustration of the various BK1700 Controller Elements*

Item	Description	Reference
1	Controller Cabinet	
2	Controller Power Supply Module – Apollo, Atlas	
3	Computer Module	
4	Ink Delivery Module – Apollo, Atlas	
5	Pressure Regulator Module – Atlas	
6	Reservoir Control Card (RCC) – Atlas	
7	Head Control Card (HCC) – Atlas	
8	Computer Monitor	

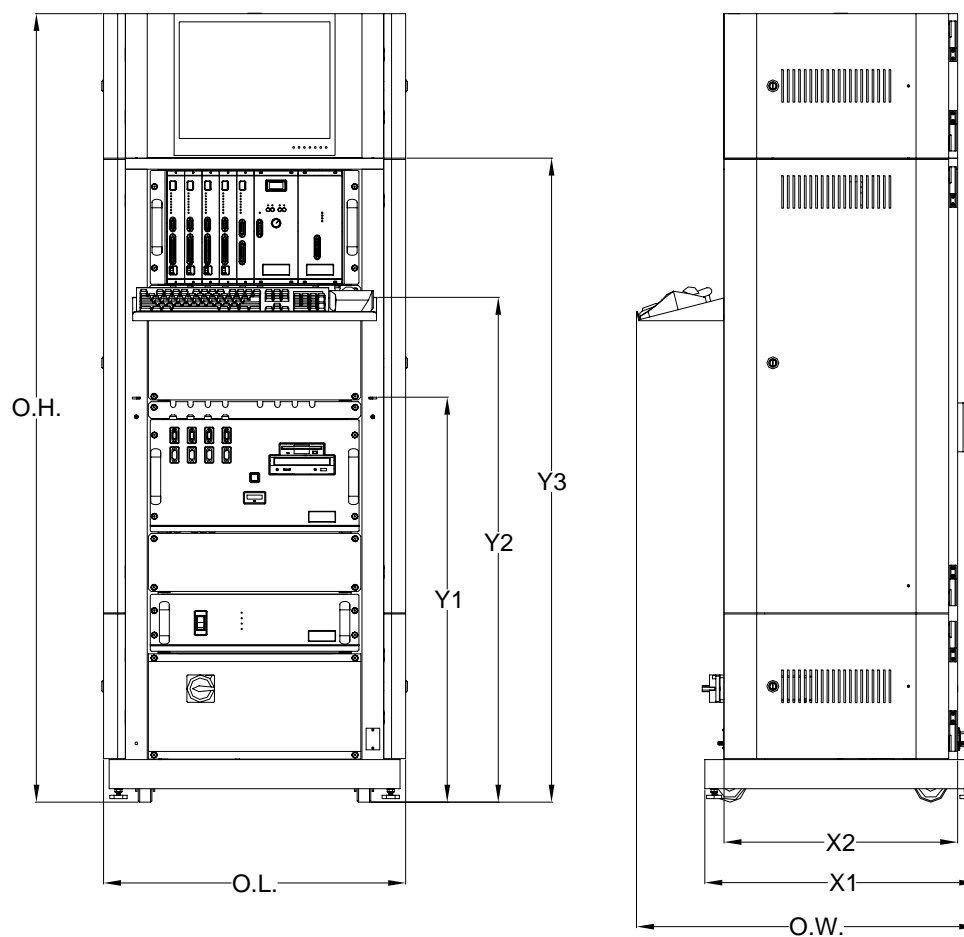


Table 1-3: BK1700 Controller dimensions

Symbol	Description	Dimensions	
O.H.	Overall Height	72.68"	1846 mm
O.L.	Overall Length	27.80"	706 mm
O.W.	Overall Width	31.28"	795 mm
X1	Base Width	25.00"	635 mm
X2	Frame Width	21.50"	546 mm
Y1	Keyboard Height (Low)	37.30"	947 mm
Y2	Keyboard Height (High)	46.50"	1181 mm
Y3	Controller Height (Without Top Section)	59.36"	1508 mm

2.1 Introduction

The BK1700 is a rack type controller cabinet that houses all of the modules necessary in the specification of a particular inkjet system. It employs a standard 19" wide rack arrangement, mounted on casters for portability and has the following built-in elements:

- A **Power Distribution Grid** capable of adapting to all international power requirements through the use of a universal transformer and IEC input line connector. Most of the components are located at the bottom of the cabinet and can be accessed by the 2 lower side doors. *See Figure 2-1 for more details.*
- A **Rack System** permitting the attachment of the various modules with sufficient capacity to produce a system capable of eight print head supports.
- A detachable **Keyboard/mouse Tray** with the possibility of attachment on either side of the controller at 2 differing heights.
- A **Monitor Housing**, situated on the upper portion of the cabinet, allowing for attachment of a 17" LCD display on either side of the controller, with 2 side doors for access to the ink containers.

The standard output voltage distributed in the system is 120VAC, supplied by a universal transformer with 200/208/230/250 VAC input at 50/60 Hz. This output voltage is distributed via 2 power cables, compatible with the Power Supply modules. In addition, the input power utilizes a universal IEC type connector that is filtered, fused, and switched through a main padlock switch at the bottom of the cabinet.

2.2 Power Distribution Grid

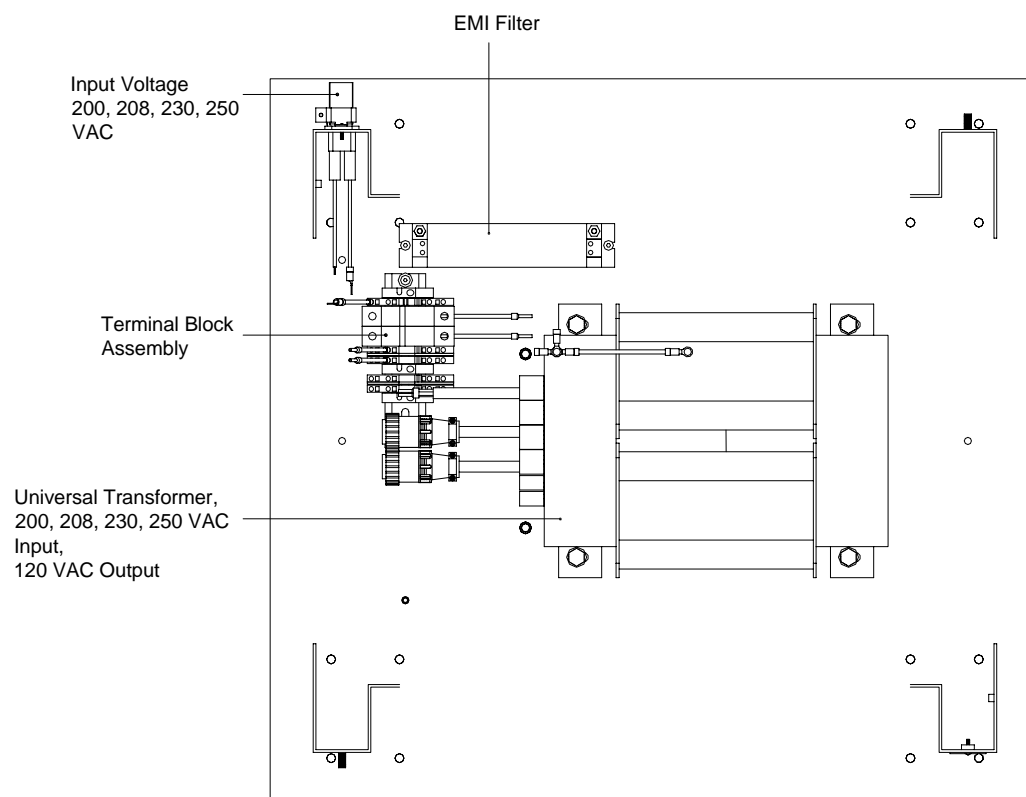
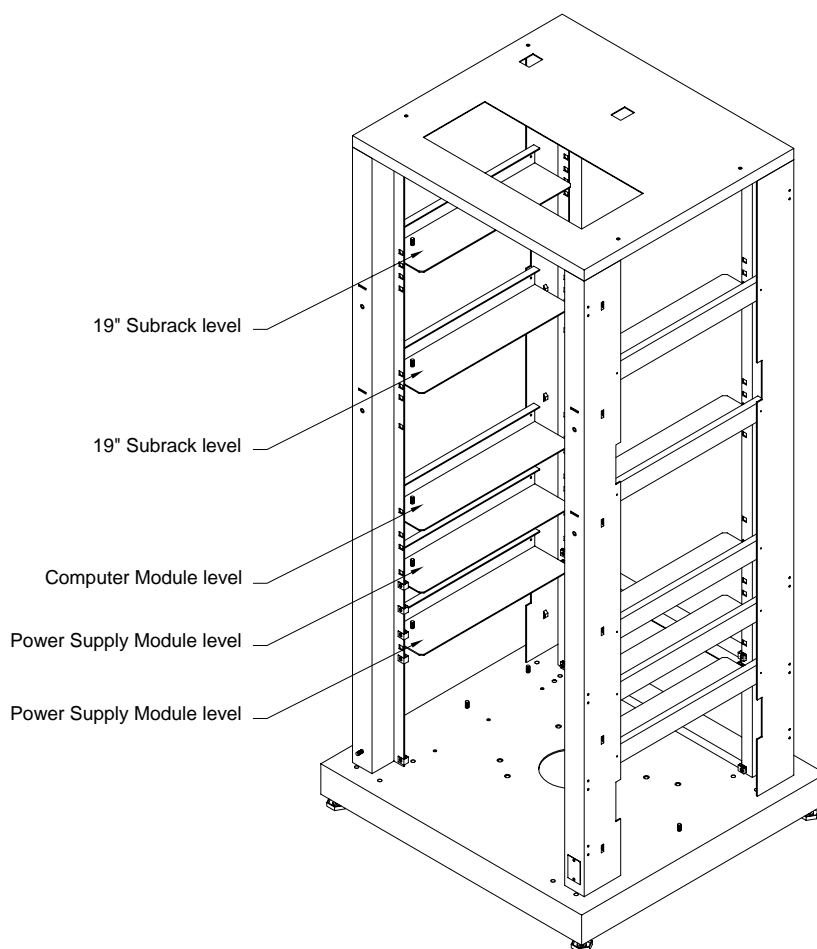


Figure 2-1: Top cutaway view of the bottom of the cabinet showing the location of the Universal Transformer and the various input power elements.

2.3 Rack System

The Rack system provides five different levels for the modules where two levels are to accommodate the 3U modules i.e. Power supplies and three levels are to accommodate the 6U modules i.e. computer module and the two additional combinations of “life” support components for various printing technologies.

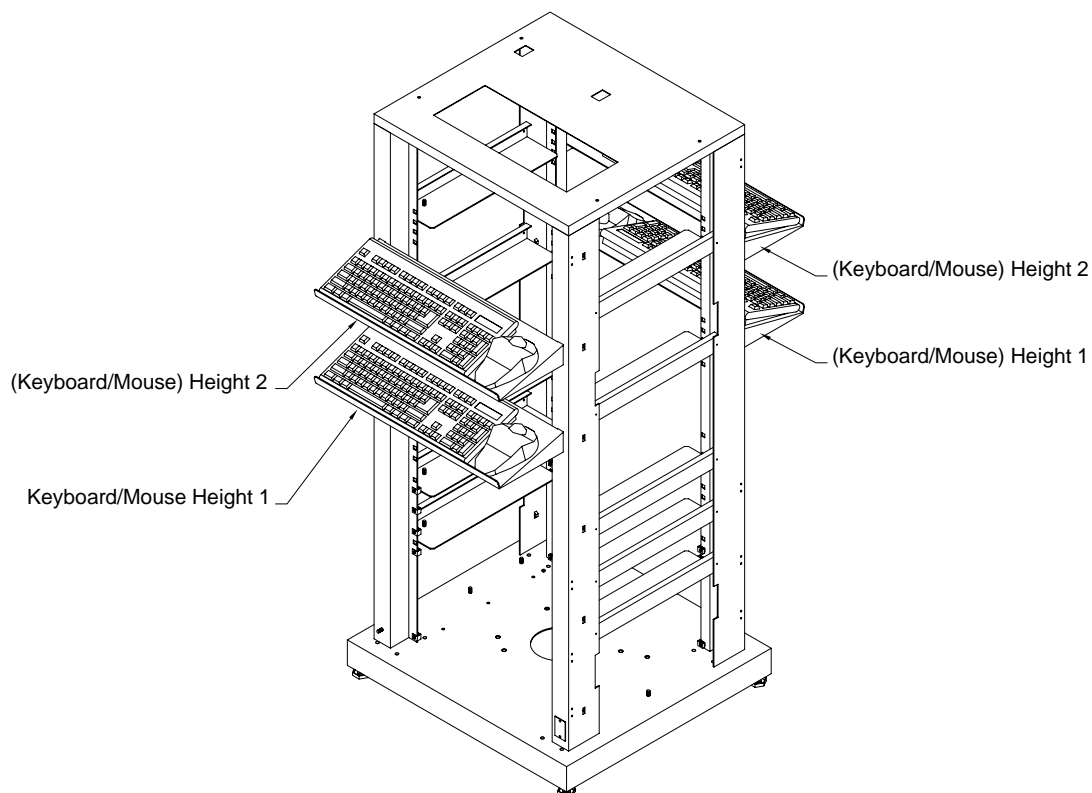
Figure 2-2: Rack System levels



2.4 Keyboard/Mouse Tray

The Keyboard/Mouse Tray can be attached at two different heights on both sides of the cabinet.

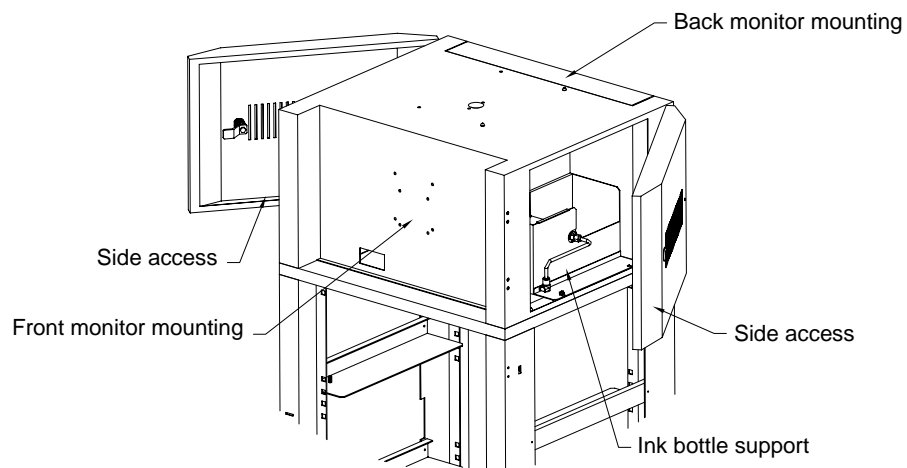
Figure 2-3: Keyboard/Mouse Tray heights



2.5 Monitor Housing

The Monitor housing provides the choice of having the ink bottle arrangement on either side of the top portion as well as the optional dual monitor arrangement.

Figure 2-4: Monitor housing arrangement



3.1 Introduction

The Power Supply Module receives the 120 VAC power input from the universal transformer, converts it, and supplies all the necessary power requirements for a given inkjet technology including Apollo, Atlas, Atlas-UVC, and Elite⁺. The power output for the various technologies are as follows:

- **Atlas/Atlas-UVC.** 12 VDC, 170 VDC, 120 VAC
- **Apollo.** 5 VDC, 28 VDC, 120 VAC
- **Elite+.** 12 VDC, 36 VDC, 170 VDC, 120 VAC

The front panel includes a circuit-breaker equipped power switch and a number of indicator LED's displaying the status of the various power output by the power supply module. The rear panel houses all the output connectors and includes a connector compatible with the power cable originating from the universal transformer.

Each of the output power lines is protected with the fuses located in the module on the terminal block assembly. *See Figure 3-1 and Figure 3-2 for an illustration of the power supply module.*

3.1.1 Atlas/Atlas-UVC Power Supply Module

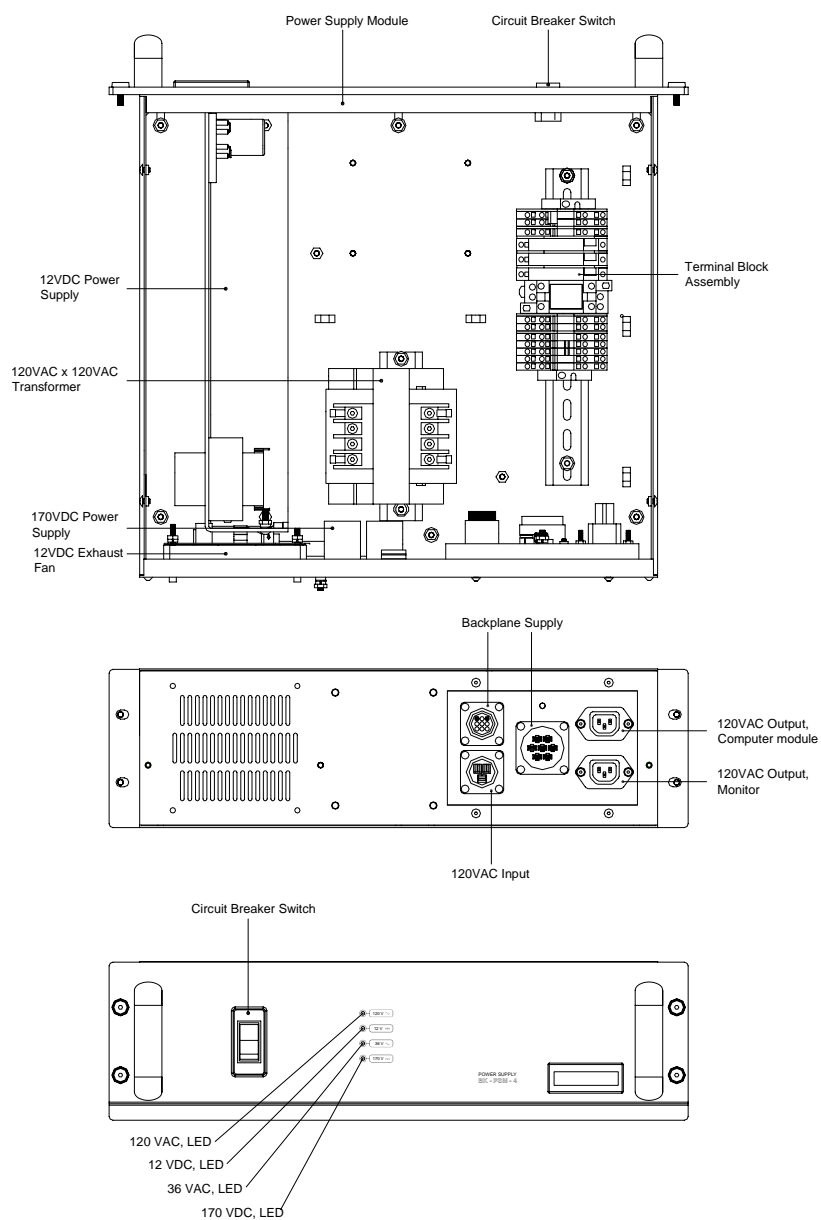


Figure 3-1: Top, Back and Front View of Atlas based Power Supply Module.

3.1.2 Apollo Power Supply Module

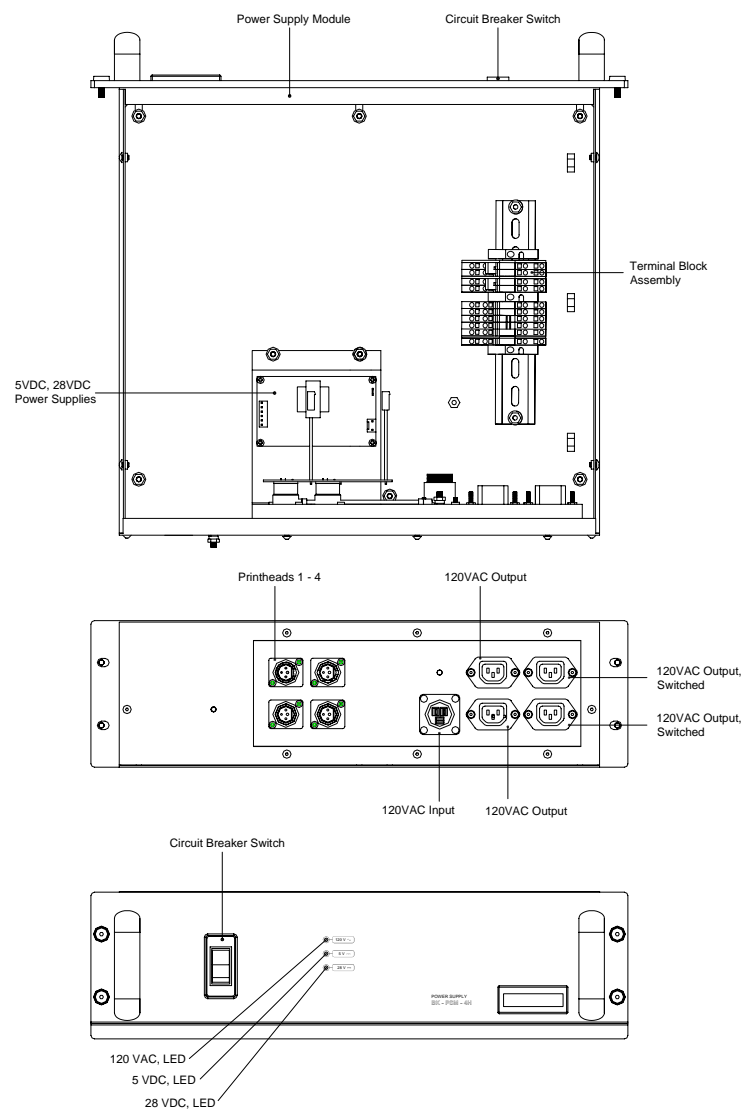


Figure 3-2: Top, Back and Front View of Apollo Power Supply Module

4.1 Introduction

The computer module, whose function is to control all aspects of the printing process, consists of a standard ATX computer configuration with power supply, motherboard, RAM, hard drive, AGP video card, equipped with Windows™ XP software. In addition, seated on the PCI bus, is a Data Path card that enables data flow for up to 4 individual print heads, accepts various critical I/O, and communicates with some specific “life” support elements of a print head. Completing the arrangement is Compose IQ, the inkjet control software specifically tasked with the printing operation.

The front panel consists of the 8 print head data ports, the computer reset switch, a life counter, and access to the 3 ½” floppy and CD ROM drives. The rear panel has a number of connection possibilities including the main power inlet, printing critical inputs such as the encoder and Photocue and other inputs/outputs via the FCB, a communication port for “life” support elements, computer peripheral connections for mouse/keyboard/LCD display, and an optional series of inlets for the tracking board. In the event a serial card is attached, its ports will also be accessed from the back.

A number of optional hardware items exist for specific applications including the following:

1. Serial card for RS232C intensive applications where communication between the controller and an external device or other controller is required.
2. An expansion board that provides 4 additional print head data ports for applications where more than 4 print heads are needed.
3. A tracking board that permits tracking of a product over a series of independent transport zones to a maximum of 8.

In addition to the hardware options listed above, a number of Compose IQ software options exist.

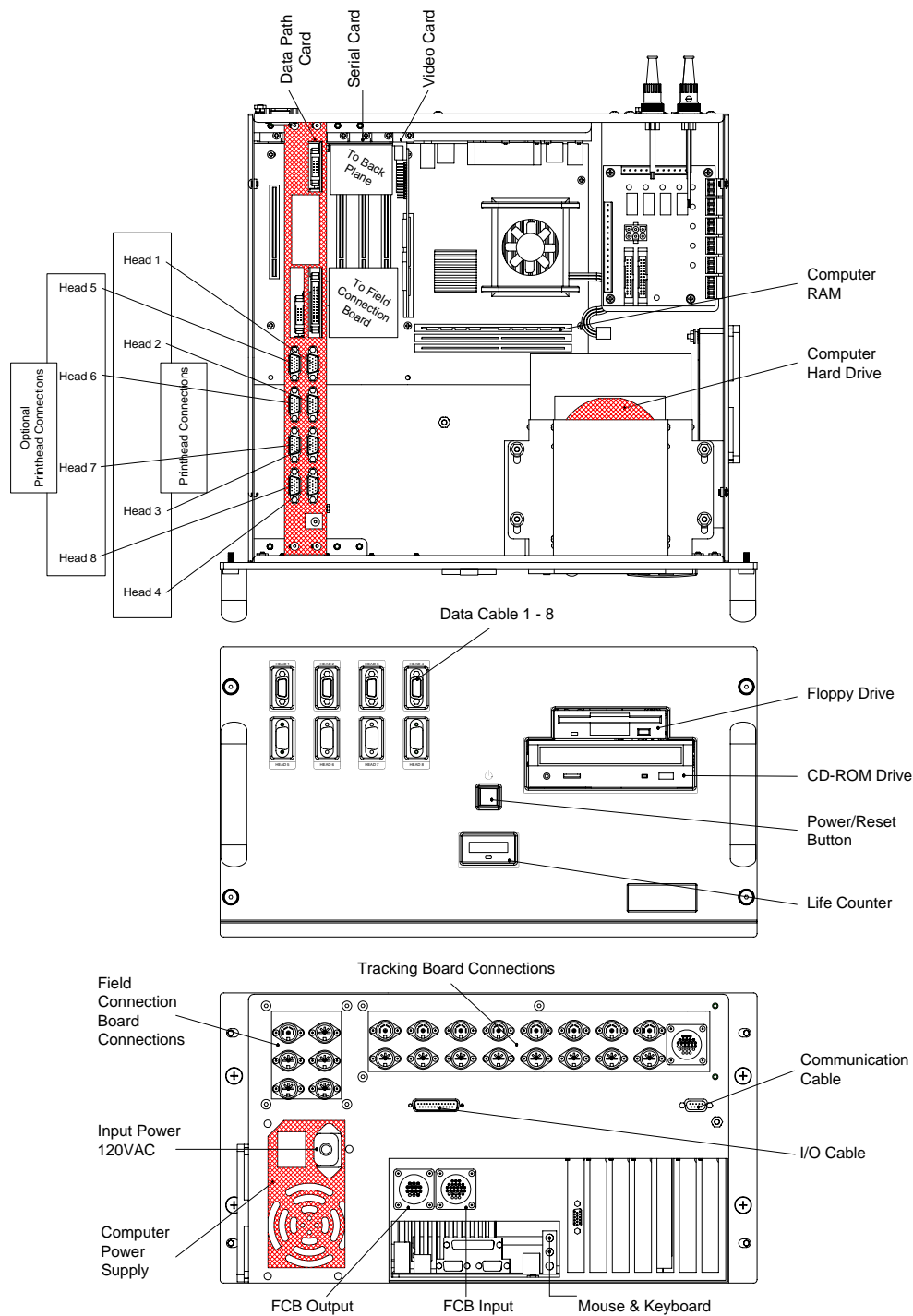


Figure 4-1: Top, Front and Back View of Computer Module.

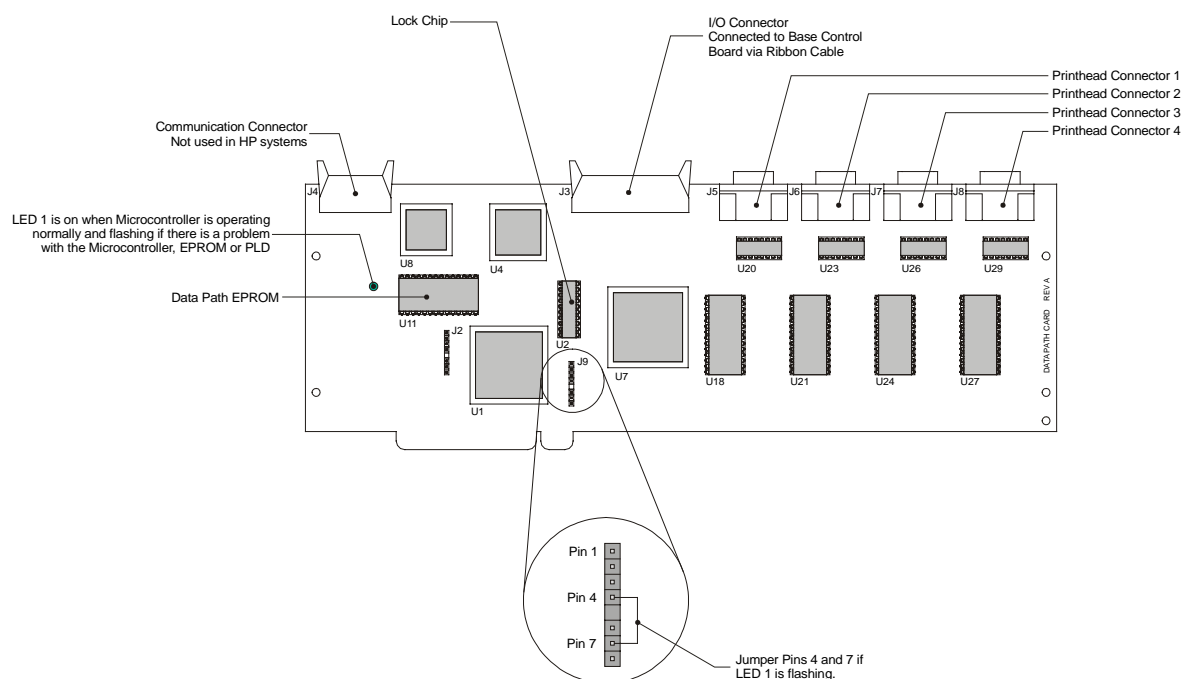
4.1.1 Datapath Card

The Datapath card connects to the motherboard through the PCI Bus and performs the following functions: See Figure 4-2. *for Datapath illustration.*

- Where a Buskro transport base is present, interfaces with the Base Interface board or Base control board to receive sensor inputs from the base.
- Where a Buskro transport base is present, interfaces with the Base Interface board or Base control board to control the base and conveyor.
- Provides a communication port for control and monitoring of the “life” support elements.
- Receives configuration information from Compose IQ.
- Transmits status information to Compose IQ, the inkjet control software.
- Controls print head firing sequence.
- Transfers image data for up to four head print heads via the data ports.
- Permits connection to an Expansion board, provides data transfer to 4 additional print heads.

Situated on the Datapath at the U2 location, is a lock chip whose presence is required to enable the printing operation. In the case of the BK1700, a USB dongle replaces the lock chip to permit printing operation.

Figure 4-2: Illustration of Datapath card



4.1.2 Keyboard & Mouse

In order for the operator to interface with the software, the BK1700 provides a keyboard located in the keyboard tray and a stationary trackball. Other options, such as a regular mouse, a wireless mouse, pen mouse, touch pad or other pointing device may also be used, as long as they are compatible with Windows™.

Note: Country-specific keyboards may be required for foreign character sets.

4.1.3 Serial Card (optional)

The Serial Card is a “smart” high-speed serial communications card equipped with its own processor. It is designed to plug into a PCI slot on the computer motherboard and has 4 connectors for serial communications cables. These connectors are standard RS-232 connectors in a DB-25 configuration and use a null modem.

4.1.4 Expansion board (optional)

The expansion board is used for 3 specific applications; notably, the added capacity of 4 print heads, the inclusion of a differing technology for combo applications, and as a conduit to Compose IQ for the tracking board. This board, which comprises 4 print head data ports and a tracking input connector, attaches directly to the Datapath card via a connector. It is available as a kit that includes all necessary cabling, and hardware attachment items, needed to seat and secure it into the computer module.

4.1.5 Tracking Board (optional)

The tracking board, requiring the presence of an expansion board, is available as a kit that consists of a Tracking Board Assembly mounting directly into the computer module. The Tracking Board supports up to 8 independent transport zones with a pair of input connectors for each zone for a registration signal and an encoder pulse stream. The tracking board in turn communicates with Compose IQ via a connector located on the expansion board, hence its requirement for tracking applications.

5.1 Introduction

In order to satisfy a wide variety of industry needs, Buskro offers four main printing technologies: Apollo, Atlas, Atlas-UVC, and Elite⁺. A brief description of the specifications of each print technology is found in Table 5-1 while a list of applications can be found in Table 5-2.

Table 5-1: Print technology description

	Apollo	Atlas/Atlas-DV/Sapphire	Atlas-UVC	Elite ⁺ /Elite ⁺ DV
Ink used	Water-based, HP cartridges or bulk ink	Monet, solvent-based	Renoir, UV Curable	Wax-based
Available Resolution	150, 200, 300, 400, 600 dpi horizontal x 600 dpi vertical.	110, 220, 330, 440 and 660 dpi horizontal x 256 dpi vertical (200 dpi Atlas-DV, 300 dpi Sapphire)	110, 220, 330, 440 and 660 dpi horizontal x 256 dpi vertical	220, 330, 440 and 660 dpi horizontal x 256 dpi vertical (200 dpi Elite ⁺ DV)
Production Speed* (see footnote)	20,000 pph 100 dpi 18,000 pph 200 dpi 14,000 pph 300 dpi	40,000 pph at 110 and 220 dpi, 1.7 m/s surface speed at 330 dpi (depends on complexity of print - Sapphire)	29,000 pph at 330 dpi (depends on cure rate)	25,000 pph 330 dpi
Vertical print swath	1" or 2" or 3"	1" or 2.55"	1"	1" or 2.55"
Characteristics	Safe, nontoxic and nonflammable water-based inks. Bulk ink available for mid to high volume applications. Spot color printing available.	Very low ink cost. Fast drying Monet inks for outstanding results on most glossy or coated stocks. High-resolution graphics on the fly. Reliable performance and reduced maintenance.	Prints on a wide variety of substrates with no solvent emissions. Fast curing UV ink that hardens instantly. Outstanding print quality.	Substrate independent. Instant dry with no external dryer needed. Near laser print quality. Colorful inks available. Clean, safe technology-nontoxic, nonflammable wax-based inks.

Note: The pieces-per-hour figure depends on the size of the product. To give a more meaningful comparison, please be advised that the figures for a 1" printhead, #10 envelope with 5 lines of text and 1 line of barcode are as follows: Apollo (300 dpi) = 14,000 pph; Atlas (330 dpi) = 39,200 pph.

Table 5-2: *Print technology applications*

	Apollo	Atlas/Atlas-DV/Sapphire	Atlas-UVC	Elite⁺/Elite⁺ DV
Applications	<p>Interfaced with vision recognition systems.</p> <p>Creative, high-quality, multi-color promotional mailings.</p> <p>Outside envelope addressing and bar-coding.</p> <p>High-quality indicia and graphics.</p> <p>Cross check, auto reject and selective printing applications.</p>	<p>Print is permanent even on glossy stock.</p> <p>Will not smudge.</p> <p>Randomly selected, high-quality bitmap graphics</p> <p>Inline applications, magazines, flats, books, etc.</p> <p>Interface with vision recognition systems for read and print, and selective control applications.</p> <p>Interface to high-speed graphic equipment.</p> <p>Printing on inserts and inside of folded pieces.</p> <p>Demographic selective custom printing inline and offline pieces.</p> <p>Cross check, auto reject and selective printing applications.</p>	<p>Print is permanent even on glossy stock. Can print on coated stocks, plastic, and metal.</p> <p>Will not smudge once cured.</p> <p>Randomly selected, high-quality bitmap graphics</p> <p>Inline applications, magazines, flats, books, etc.</p> <p>Interface with vision recognition systems for read and print, and selective control applications.</p> <p>Interface to high-speed graphic equipment.</p> <p>Printing on inserts and inside of folded pieces.</p> <p>Demographic selective custom printing inline and offline pieces.</p> <p>Cross check, auto reject and selective printing applications.</p>	<p>Randomly selected, high-quality bitmap graphics.</p> <p>Inline applications, magazines, flats, books, etc.</p> <p>Interface with vision recognition systems for read and print, and selective control applications.</p> <p>Interface to high-speed graphic equipment.</p> <p>Printing on inserts and inside of folded pieces.</p> <p>Demographic selective custom printing inline and offline pieces.</p> <p>Cross check, auto reject and selective printing applications.</p>

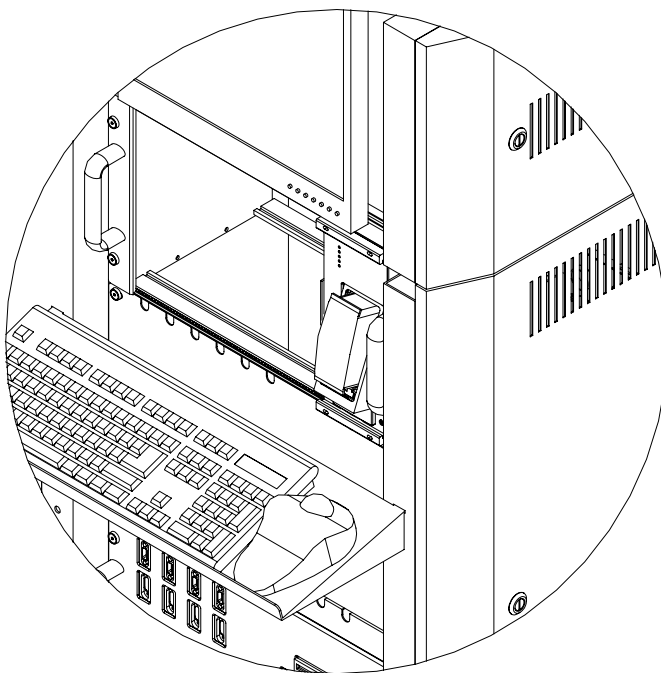
5.2 Ink Delivery Module Integration

The Ink delivery module for every available printing technology is physically integrated to the 19" subrack. This is because they share the same physical dimensions and mounting configuration. However, they differ internally and require different connections from the printheads to the inkwell.

5.2.1 Apollo Ink Delivery Module Integration

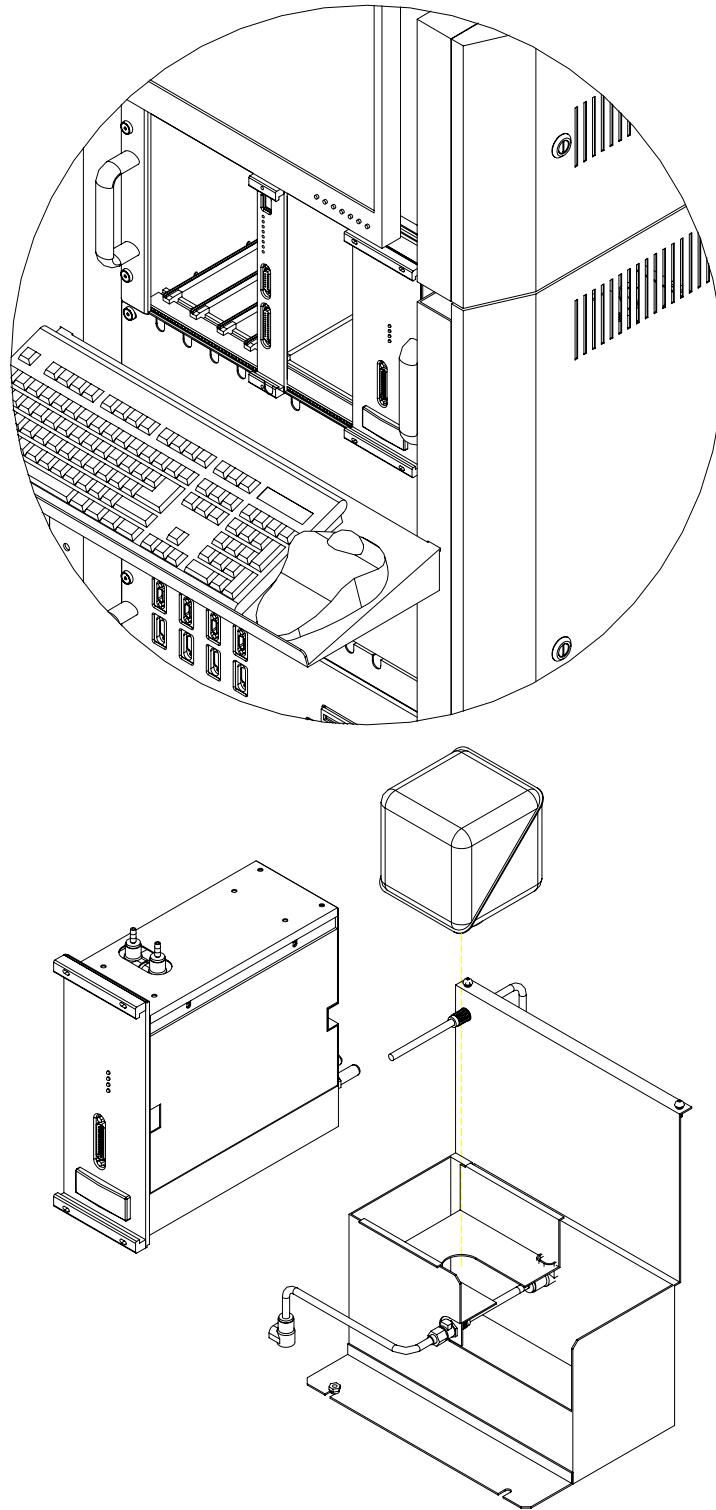
The Apollo and Atlas ink delivery module share the same physical dimensions. The end user is only required to connect the power cable, the communication cable, and the ink quick disconnect couplings upon install. The quick disconnect couplings are linked to the ink flow regulator tubes. The power on the Apollo module can be switched on and off directly from the back plane switch and the bulk ink cartridge has to be properly inserted to provide larger volume of ink. The subrack space that is not populated has to be masked with the blind covers. For more information on the Apollo print technology, please consult the Apollo manuals.

Figure 5-1: Ink Delivery Module Integration



5.2.2 Atlas/Atlas-UVC/Sapphire Ink Delivery Module Integration

The Apollo and Atlas ink delivery module share the same physical dimensions. The end user is only required to connect the RCC cable, ink supply quick disconnect coupling, exhaust coupling, and the ink umbilical quick disconnect couplings upon install. The power on the Atlas module can be switched on the Power supply module only. Since the Atlas technology requires pressure and vacuum supplies, every ink delivery module is always accompanied with the pressure regulator module. For more information on the pressure regulation, please see Pressure/Vacuum module chapter.

Figure 5-2: Ink Delivery Module Integration

5.2.3 Combo systems

For added flexibility, Buskro offers the ability to combine print technologies on a single controller. By using an expansion board kit (BK-EXP-1), the Apollo print technology can be added to an existing Atlas, Atlas-UVC or Sapphire module arrangement. This allows for the simultaneous use of two separate technologies with very different qualities and characteristics in one unit. It must be noted that the resolutions for the Apollo printhead changes when used in combination with Atlas, Atlas-UVC, or Sapphire technologies. A standalone Apollo system has a horizontal resolution of 150, 200, 300, 400 and 600 DPI. When used in a combo system, the horizontal resolutions will be 110, 220, 330, 440, and 660 DPI. Since all the ink delivery modules have identical overall dimensions, they can be arranged in the subrack according to user's requirements.

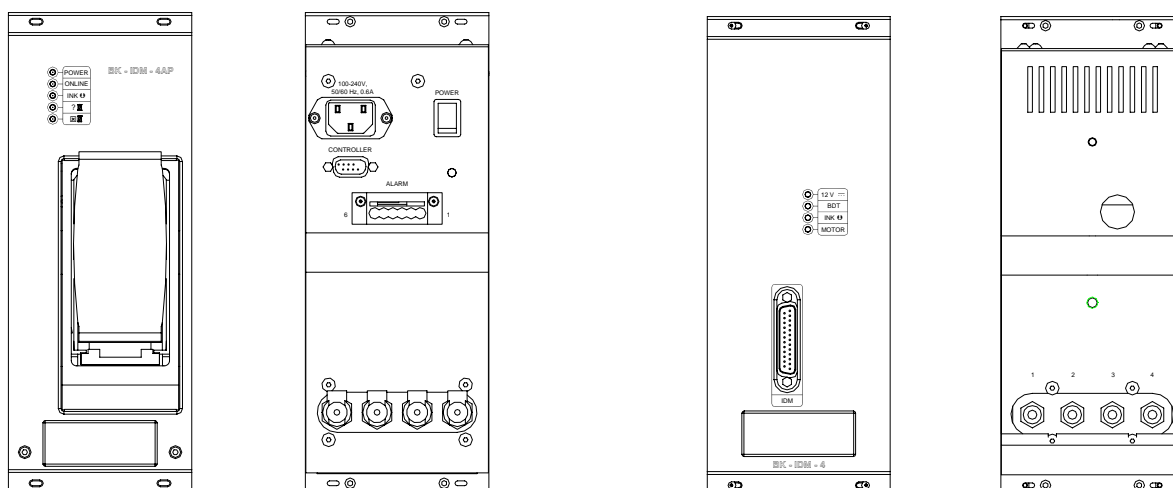


Figure 5-3: Front and Back views of Apollo and Atlas Ink Delivery Modules

6.1 Introduction

The Pressure/Vacuum Module is Buskro's newest pressure regulation solution designed to satisfy those customers who need a unit to provide the vacuum and pressure requirements for up to 4 printheads. The vacuum and pressure produced by this subsystem are fully adjustable by the user and that makes this unit universal and applicable to any available printing technology. This 4-channel module is semi-electronically controlled and manually adjustable. One of the new features is the LCD screen showing vacuum at any time and can be easily monitored from distance. The four-position switch allows the operator to change the channel to monitor if the meniscus vacuum is within given range. Please refer to the Sapphire printhead Manual.

6.2 Pressure/Vacuum Module Integration

Since the Pressure/Vacuum Module has the same physical dimensions, it can be easily interchanged with the Ink Delivery Module or placed into different location inside the 19" subrack.

Figure 6-1: Pressure/Vacuum Module Integration

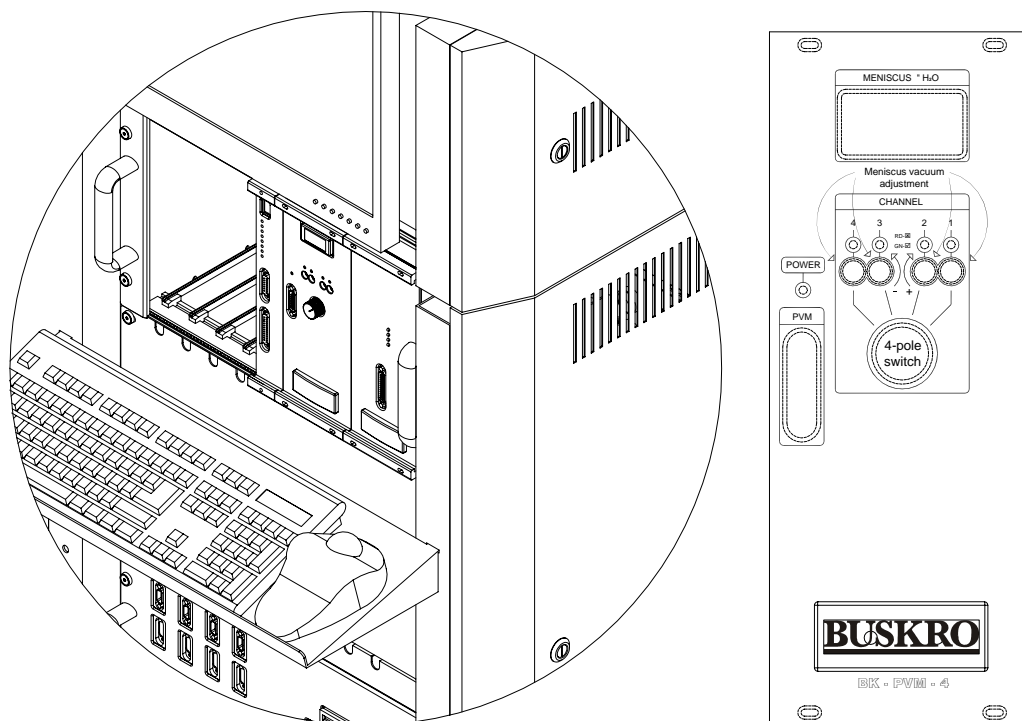
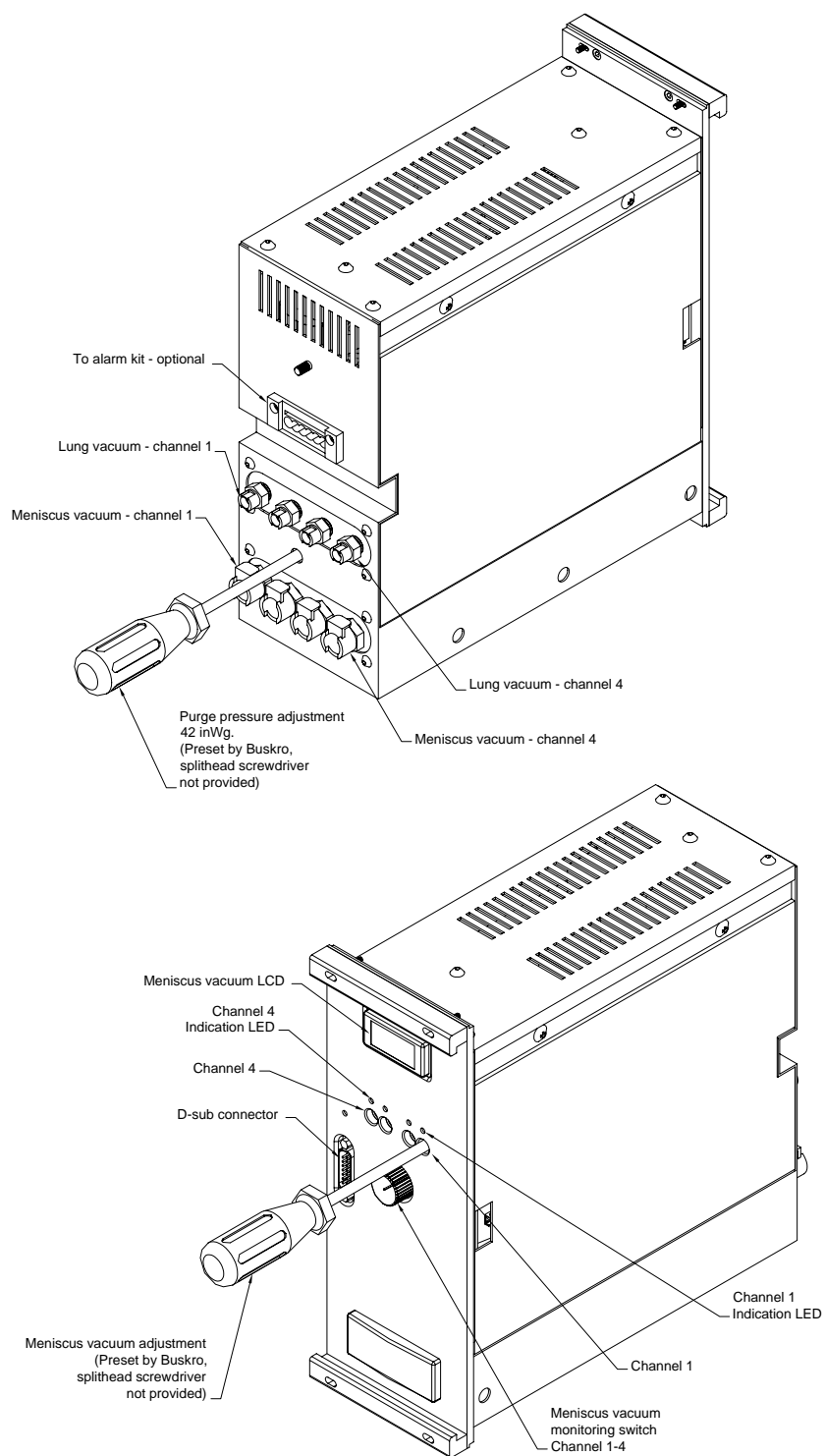


Figure 6-2: Meniscus vacuum adjustment, Purge pressure adjustment



6.3 Pressure/Vacuum Adjustment

The meniscus vacuum and the purge pressure of the unit are fully adjustable as shown. While the meniscus vacuum range can vary depending on printing technology, the purge pressure is around 42 inWg. The Sapphire technology requires 4.7 inWg with the tolerance of ± 0.3 inWg, and the reading on the LCD will reflect given range. Subsequently, the Atlas technology requires 3.3 inWg in the same tolerance range as above. Since there is no physical difference between Atlas and Atlas-UVC print heads, the Atlas-UVC meniscus vacuum will be set as the Atlas meniscus vacuum.

6.3.1 Meniscus vacuum monitoring switch

This monitoring switch allows switching between the four channels monitoring if the meniscus vacuum reading is within required range. See Figure 6-1.

6.3.2 Status/Warning light

If the meniscus vacuum range is within limits, the LED located above the adjustment opening will be a solid green. Once the meniscus vacuum for the particular channel exceeds the limits, the LED will flash red independent from the position of the monitoring switch. If this switch is set to a channel that exceeds required range, the LED will flash green and orange indicating incorrect meniscus vacuum level. See Figure 6-2.

6.3.3 Lung vacuum

The lung vacuum level is not adjustable and the pump provides maximum vacuum of 14 inHg to the output.

6.3.4 Troubleshooting

The excessive amount of paper dust can cause sintered filter in the adjustment needle valve to clog over extended period of time, creating increase of meniscus vacuum. If the replacement filter is not available at a time, it is required to remove the existing and readjust the meniscus vacuum. It is required to install proper filter as soon as possible to avoid any damage of the adjustment needle valve.

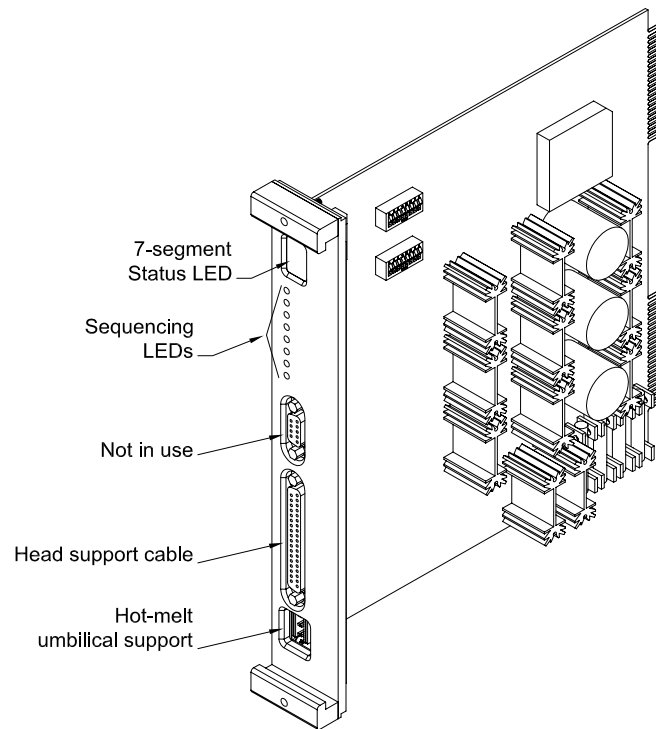
7.1 Introduction

The Head Control Card is a newly designed card to reflect the standard 19" subrack physical requirements and to support the chosen print head technology. This support is required for the new Sapphire technology because this new technology cannot be properly supported by the existing System Support electronics. Backward compatibility is required with existing heads. The head drive electronics are necessarily either positive or negative. It is assumed that the new system support electronics will only be compatible with positive drive heads.

The heads to be supported include the following:

Atlas,
Atlas-UVC,
Atlas-DV,
Sapphire300,
Sapphire200,
Sapphire100,
(Elite⁺)

The design of the new electronics should attempt to simplify the troubleshooting process. This reduces the number of boards required, so that board swapping can be done in a straightforward manner. Additionally, it is proposed that the new electronics incorporate built in diagnostics, and an error display on a 7-segment LED.

Figure 7-1: Head Control Card (HCC)

7.2 Status and Error Codes, Indication LEDs

This feature is introduced to eliminate downtime while troubleshooting and to monitor status of the system at any time. It is important to understand the status codes so that a possible problem can be understood immediately by understanding the sequence of the problem after it occurs.

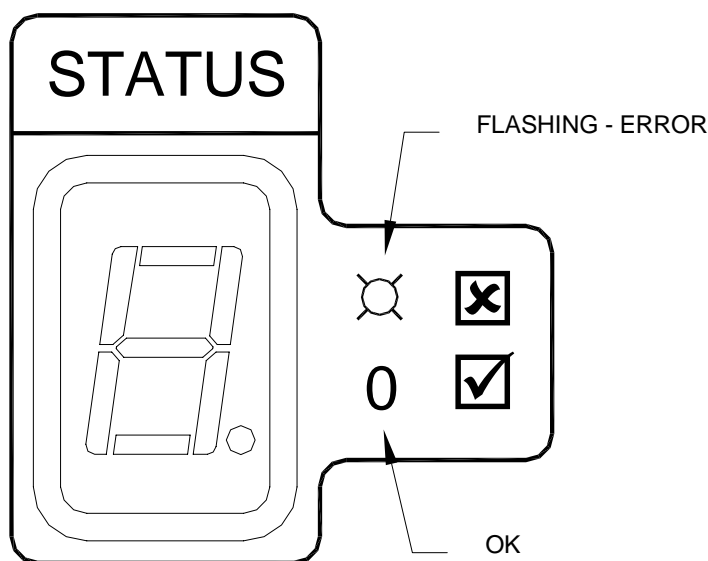


Figure 7-2: 7-segment LED

STATUS/ERROR CODES AND THEIR MEANINGS:

- 0 - READY**
- 1 - INK LOW**
- 2 - TEMPERATURE LOW**
- 3 - INK EMPTY – RCC ONLY**
- 4 - THERMISTOR SHORT**
- 5 - THERMISTOR OPEN**
- 6 - HEATER FAILURE**
- 7 - LOIS SHORT**
- 8 - LOIS OPEN**
- 9 - PUMP/REFILL FAILURE**

The order of priority is 9 – 0.

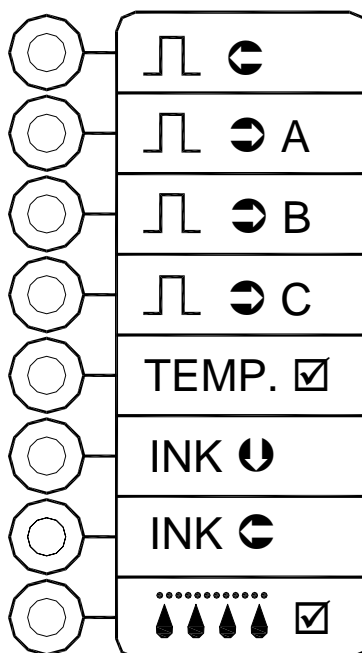


Figure 7-3: LED indicators

LED INDICATORS AND THEIR MEANINGS (from top):

- LED 1 ON - FIRE PULSE IN**
- LED 2 ON - FIRE PULSE OUT A**
- LED 3 ON - FIRE PULSE OUT B**
- LED 4 ON - FIRE PULSE OUT C**
- LED 5 ON - AT TEMPERATURE**
- LED 6 ON - HEAD INK LOW**
- LED 7 ON - REFILL IN PROGRESS**
- LED 8 ON - PURGE ALLOWED**

The “FIRE PULSE OUT A, B, and C” are strictly related to the number of jetting assemblies with 256 jets each or simply one, two and three jetting assemblies per printhead referring to the chosen technology.

7.3 DIP-Switch settings

The HCC DIP switch settings will determine the printhead address, the head reservoir address, the necessary IAP voltage, and the printhead type. There are two DIP-switch blocks on each HCC:

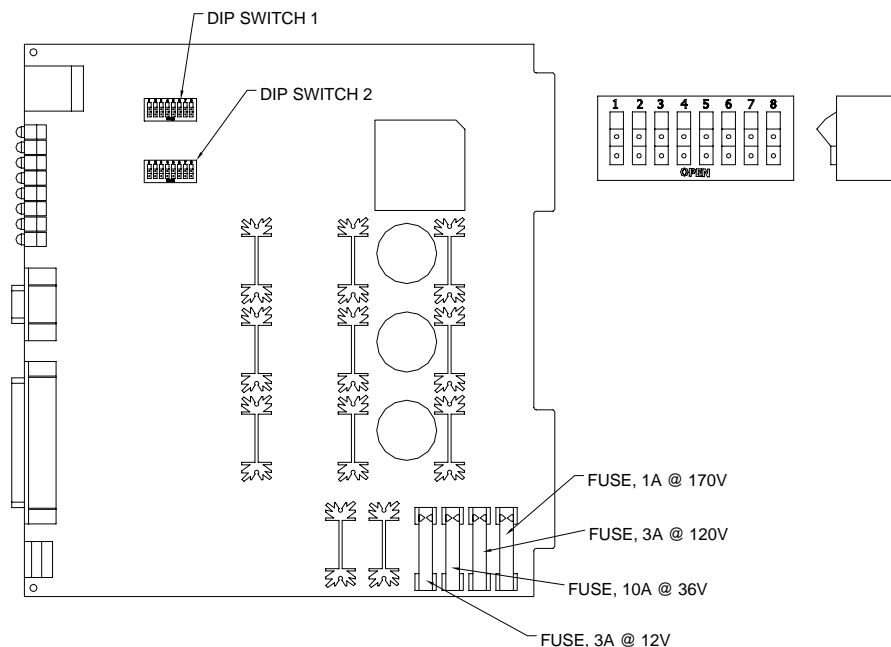


Figure 7-4: HCC DIP-switch location

HCC DIP-SWITCH 1 SETTINGS:

- POSITION 1 - HEAD ADDRESS BIT 0**
- POSITION 2 - HEAD ADDRESS BIT 1**
- POSITION 3 - HEAD ADDRESS BIT 2**
- POSITION 4 - HEAD ADDRESS BIT 3**
- POSITION 5 - RESERVOIR ADDRESS FOR HEAD BIT 0**
- POSITION 6 - RESERVOIR ADDRESS FOR HEAD BIT 1**
- POSITION 7 - IAP VOLTAGE BIT 0 (Note 1)**
- POSITION 8 - IAP VOLTAGE BIT 1 (Note 1)**

Note 1:

- Switch 8:7 = 00 ⇒ IAP Voltage = 0% Jetting Voltage**
- Switch 8:7 = 01 ⇒ IAP Voltage = 25% Jetting Voltage**
- Switch 8:7 = 10 ⇒ IAP Voltage = 33% Jetting Voltage**
- Switch 8:7 = 11 ⇒ IAP Voltage = 50% Jetting Voltage**

HCC DIP-SWITCH 2 SETTINGS:

POSITION 1 - HEAD TYPE BIT 0 (Note 2)
POSITION 2 - HEAD TYPE BIT 1 (Note 2)
POSITION 3 - HEAD TYPE BIT 2 (Note 2)
POSITION 4 - HEAD TYPE BIT 3 (Note 2)
POSITION 5 - HEAD TYPE BIT 4 (Note 2)
POSITION 6 - RESERVED
POSITION 7 - RESERVED
POSITION 8 - RESERVED

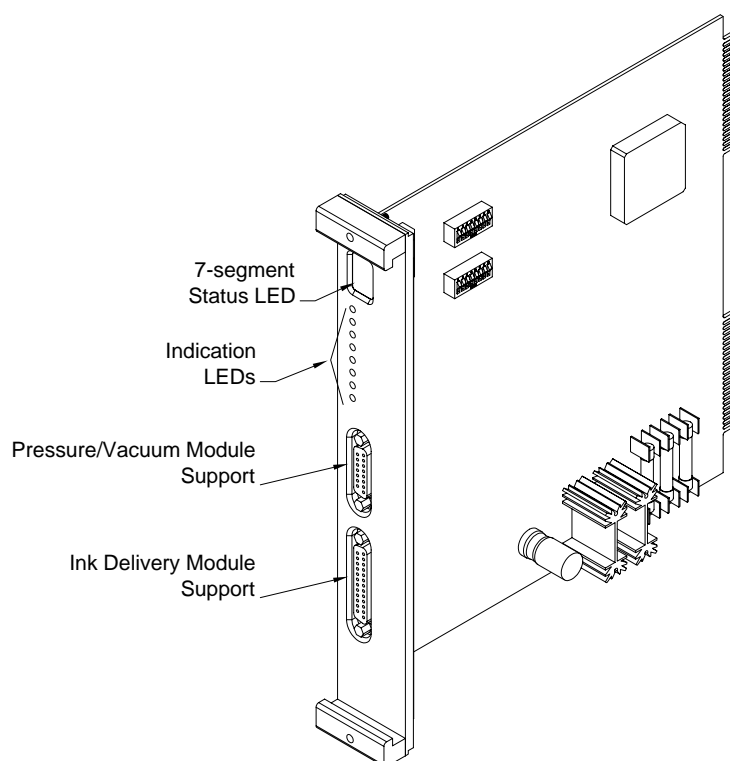
Note 2:

- Switch 5-1 = 00000 ⇒ Atlas Head Type**
- Switch 5-1 = 00001 ⇒ Atlas-DV Head Type**
- Switch 5-1 = 00010 ⇒ Atlas-UVC Head Type**
- Switch 5-1 = 00011 ⇒ Sapphire 1 Head Type**
- Switch 5-1 = 00100 ⇒ Sapphire 2 Head Type**
- Switch 5-1 = 00101 ⇒ Sapphire 3 Head Type**

8.1 Introduction

Reservoir Control Card is a newly designed card to reflect the standard 19" subrack physical requirements and to support the chosen printhead technology. It is used to support the Pressure/Vacuum Module and the Ink Delivery Module. Backward compatibility is required with existing heads.

Figure 8-1: Reservoir Control Card (RCC)



8.2 Indication LEDs

Please refer to the Head Control Card (HCC) chapter for the Status (error) Codes as the meaning is shared for both cards.

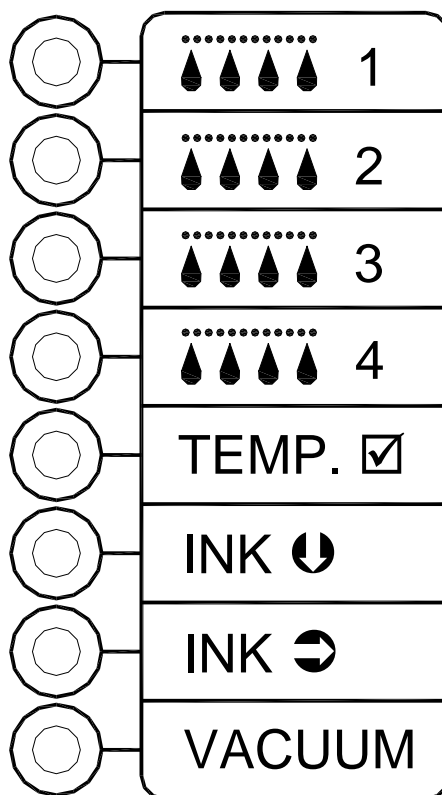


Figure 8-2: LED indicators

LED INDICATORS AND THEIR MEANINGS (from top):

LED 1 ON - PURGE 1 (CHANNEL #1)

LED 2 ON - PURGE 2 (CHANNEL #2)

LED 3 ON - PURGE 3 (CHANNEL #3)

LED 4 ON - PURGE 4 (CHANNEL #4)

LED 5 ON - AT TEMPERATURE (IF APPLICABLE)

LED 6 ON - RESERVOIR INK LOW (INK DELIVERY SYSTEM)

LED 7 ON - PUMP INK

LED 8 ON - PUMP VACUUM (IF APPLICABLE)

8.3 DIP-Switch settings

The RCC DIP-switch settings will determine the pressure regulator address (Pressure/Vacuum Module), the pressure regulator type, the pressure regulator purge type, the ink delivery module address, and the type of the ink delivery module. There are two DIP-switch blocks on the RCC as per picture:

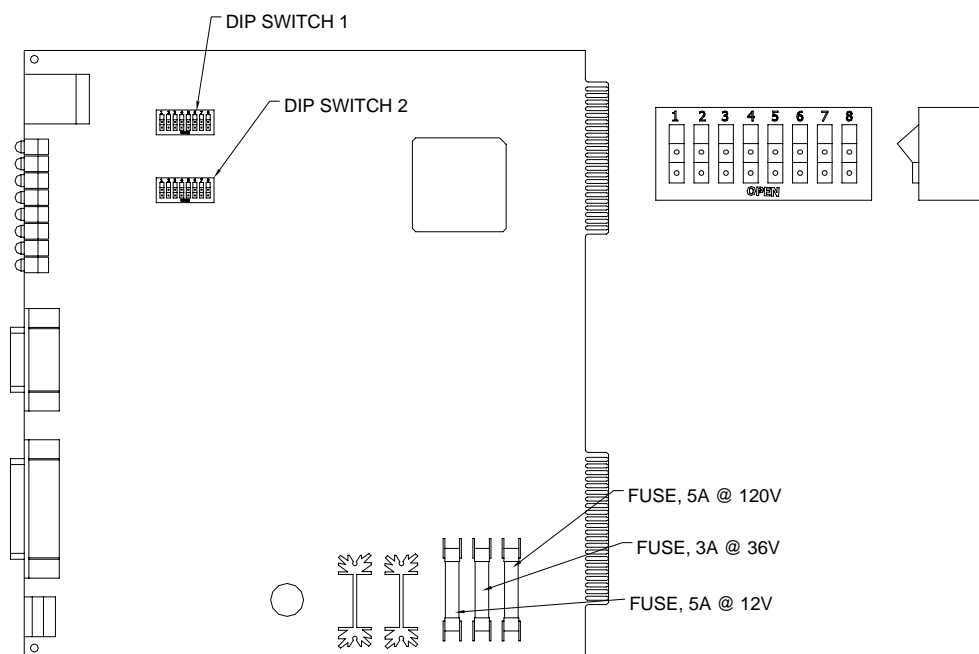


Figure 8-3: RCC DIP-switch location

RCC DIP-SWITCH 1 SETTINGS:

- POSITION 1 - PRESSURE REGULATOR ADDRESS BIT 0**
- POSITION 2 - PRESSURE REGULATOR ADDRESS BIT 1**
- POSITION 3 - PRESSURE REGULATOR TYPE BIT 0 (Note 1)**
- POSITION 4 - PRESSURE REGULATOR TYPE BIT 1 (Note 1)**
- POSITION 5 - PRESSURE REGULATOR TYPE BIT 2 (Note 1)**
- POSITION 6 - PRESSURE REGULATOR PURGE TYPE BIT 0 (Note 2)**
- POSITION 7 - PRESSURE REGULATOR PURGE TYPE BIT 1 (Note 2)**
- POSITION 8 - RESERVED**

Note 1:

- Switch 5:3 = 000 \Rightarrow Spectra 2Ch (Addr+0, Addr+1)
- Switch 5:3 = 001 \Rightarrow Buskro 4Ch (Addr+0, Addr+1, Addr+2, Addr+3)
- Switch 5:3 = 010 \Rightarrow Buskro 4Ch (Addr+0, Addr+1, Addr+2, Addr+4)
- Switch 5:3 = 011 \Rightarrow Buskro 4Ch (Addr+0, Addr+1, Addr+4, Addr+5)

Note 2: **Switch 7:6 = 00 \Rightarrow Constant Purge Type**
 Switch 7:6 = 01 \Rightarrow Three x 1 Second Pulses
 Switch 7:6 = 10 \Rightarrow Reserved
 Switch 7:6 = 11 \Rightarrow Reserved

RCC DIP SWITCH 2 SETTINGS:

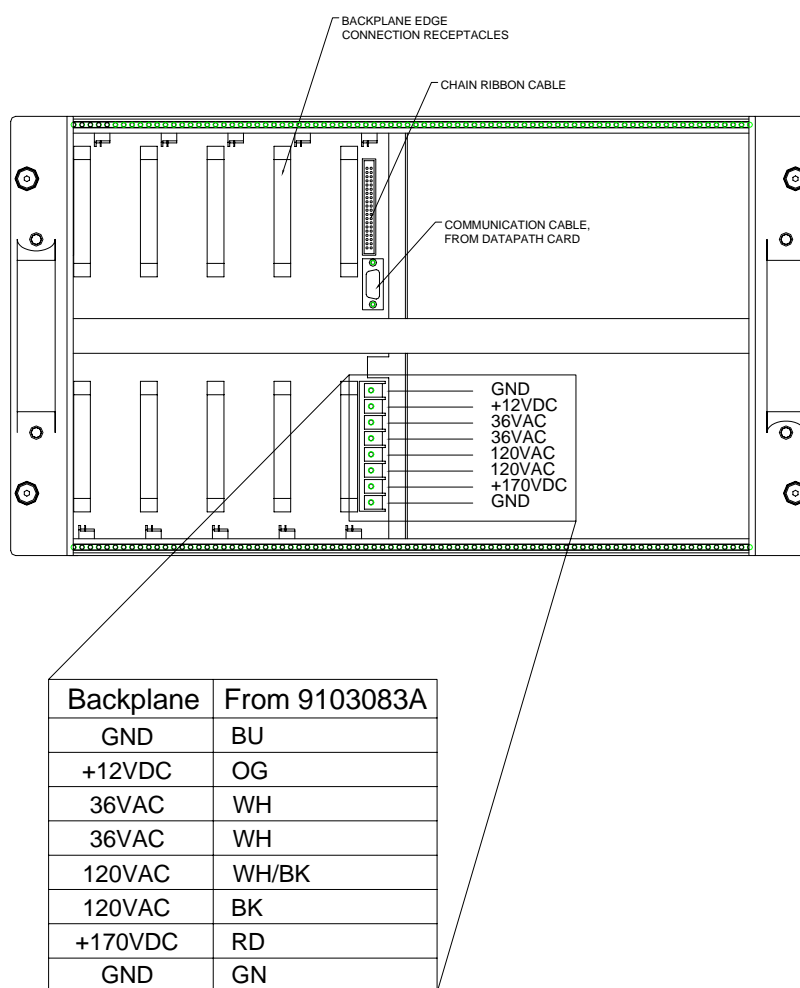
POSITION 1 - RESERVOIR ADDRESS BIT 0
POSITION 2 - RESERVOIR ADDRESS BIT 1
POSITION 3 - RESERVOIR TYPE BIT 0 (Note 3)
POSITION 4 - RESERVOIR TYPE BIT 1 (Note 3)
POSITION 5 - RESERVOIR TYPE BIT 2 (Note 3)
POSITION 6 - RESERVOIR TYPE BIT 3 (Note 3)
POSITION 7 - RESERVED
POSITION 8 - RESERVED

Note 3: **Switch 6-3 = 0000 \Rightarrow Buskro Monet Reservoir**

9.1 Introduction

The 5 Slot Backplane supports any combination of 5 HCC/RCC cards. It connects to the Datapath through a DE9 connector, which allows Compose IQ to monitor and configure the system. The power connection provides +12 VDC, +170 VDC, 120 VAC and 36 VAC, as shown. Backplanes can be chained to increase the number of cards. Each backplane has a dedicated power harness, but does not require a Datapath communication cable.

Figure 9-1: Backplane power connections



10.1 Introduction

In addition to being designed as a stand-alone controller, the BK1700 controller was also designed to work together with standard Buskro transport bases as a complete turnkey unit. In addition, electrical cables must be connected between the BK1700 and the base for the encoder, photocue, stack signal, jam switch, cycle, and stop relay signals.

10.2 Cable Connections

To electrically integrate the BK1700 controller to a Buskro base or web, it is recommended to install an I/O ribbon cable from the I/O connector on the base to the I/O connector on the BK1700 controller computer module. Installing this cable will transmit the encoder, photocue, jam, cycle, stack, and stop signals from the base to the BK1700 controller. The second option is to use the FCB inputs and outputs to integrate the controller to the base. This method involves connecting individual cables from the encoder, photocue, jam, and cycle connectors on the FCB interface to the corresponding connectors on the base.

11.1 Introduction

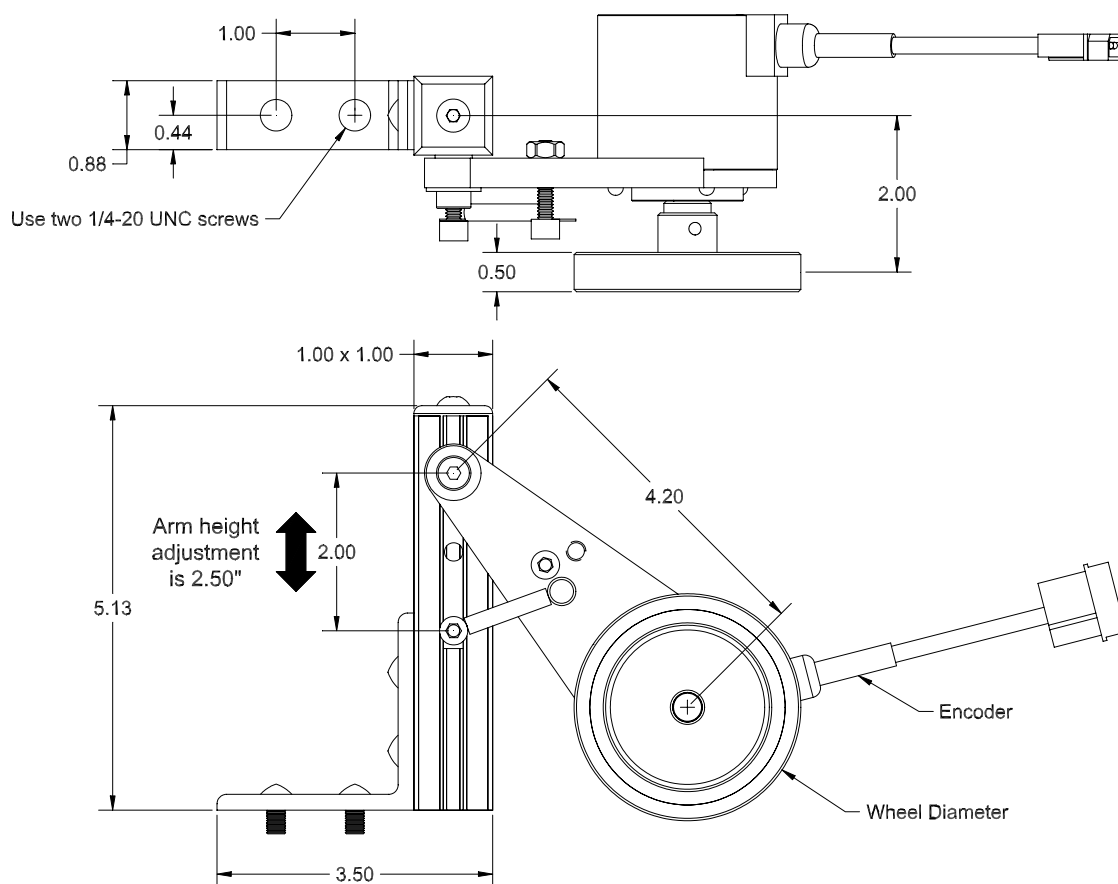
To make the BK1700 Controller functional, an encoder must be ordered and integrated with the transport base. Each one of the options available has their advantages depending on the installation. A summary of each option can be found in *Table 11-1*.

Table 11-1: Encoder options

Option	Encoder	DPI	Technology	Wheel Dia.	Part Number
A	6000 ppr	600	Apollo	3.19"	BK-ENC-600W
B	6000 ppr	660	Apollo, Atlas, Elite ⁺ and Sapphire	2.88"	BK-ENC-660W
C	Programmable	Depends on technology	All types	Not used	BK-ENC-PROG
D	Programmable	Depends on technology	All types	3.19"	BK-ENC-PROGW
E	6000 ppr	Depends on technology	All types	Not used	BK-ENC-STAN

Figure 11-1 below provides a top and front view of the encoder assembly (for all models) that can be used for reference to integrate the encoder wheel assembly onto another transport base. The assembly includes a friction wheel, arm, spring and an adjustable post that can be modified for different installations. If more information is required, please contact the factory for assistance.

Figure 11-1: Encoder Wheel



11.2 Dealer/Customer Responsibility

When ordering a BK1700 controller, one of the encoder options *must* be chosen. In addition, it must be noted that the installing dealer/customer is responsible for mounting the encoder to the transport base on which the BK1700 Controller is being installed. If an encoder wheel assembly is ordered, the wheel must be mounted where it contacts the surface of the transport belts. This is required in order to obtain proper readings of belt speeds. If an encoder is ordered separately, then a mounting location must be determined for the encoder.

11.3 Encoder Options

11.3.1 Option A - Encoder Wheel Assembly, 600 DPI

The encoder wheel assembly uses a friction wheel that contacts the surface of the transport belts. This option includes the standard 6000 ppr encoder, the encoder wheel, and the mounting hardware. This option can be ordered under part number BK-ENC-600W (previously 9101543A) and can be used with Apollo print technology. When this option is used, the base DPI setting in the setup tab within Compose must be set to 600 DPI.

11.3.2 Option B - Encoder Wheel Assembly, 660 DPI

This option is the same as Option A except it is designed for use with Atlas, Atlas-UVC, Sapphire, and Apollo print technology. This option can be ordered under part number BK-ENC-660W (previously 9101685A). When this option is used, the base DPI setting in Compose must be set to 660 DPI.

11.3.3 Option C – Programmable Encoder

Unlike Options A and B, this option (BK-ENC-PROG – previously 9101705A) supplies the customer with the programmable encoder alone. As a result, the dealer/customer must mount the encoder to the transport base. The advantage with this option is that it can be used with any print technology. As a result, the base DPI setting in Compose depends on the technology used. The proper values are shown below:

Table 11-2: Base DPI settings for Compose

Print Technology	Base DPI Setting
Apollo	600 DPI or 660 DPI
Atlas, Elite ⁺	660 DPI
Atlas-UVC	660 DPI
Sapphire	660 DPI

Note: The encoder will have to be programmed for the correct number of pulses to match the drive roller size. To program the encoder, a special programming unit is required. For more information on this programming unit, please contact the Buskro service department.

11.3.4 Option D – Encoder Wheel Assembly w/ Programmable Encoder

This option (BK-ENC-PROGW - previously 9101668A) is identical to Option A except the standard encoder is replaced with the programmable encoder. As a result, this option can be used with any print technology. In addition, it is also possible to use a reference point other than the transport belts such as the output roller or shaft. However, the encoder would have to be programmed for a specific number of pulses to compensate for the speed differences. As with Option C, the base DPI settings in Compose depend on the technology used and are shown in Table 11-2.

11.3.5 Option E – Standard Encoder (6000 ppr)

This option (BK-ENC-STAN – previously 9100188A) supplies the dealer/customer with the standard 6000 ppr encoder alone and can be used with any print technology. However, the drive rollers must be sized correctly and the encoder must be mounted directly to the driveshaft. This option can be chosen when mounting the BK1700 controller to an existing Buskro transport base provided that the transport rollers and belts are matched correctly. Contact the service department for further details. In terms of the base DPI settings, this can be found in Table 11-2.

11.4 Introduction

The print head bridge (BK80B series) is designed to accommodate the mounting and horizontal positioning of multiple print heads. The length of the bridge is dependent on the base to which it will be mounted. Standard rail length available is 22 inches. In addition, if custom lengths are required, the rail could be cut to size. In order to mount a photocue, the BK80BP bridge should be ordered (BK80B without photocue).

11.5 Specifications

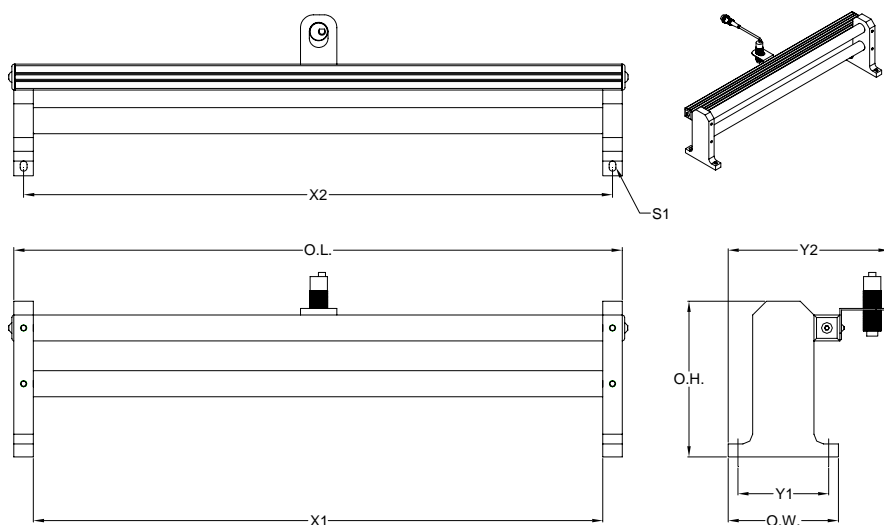


Table 11-3: Bridge Dimensions (Single bridge shown – BK80BP-22)

Symbol	Description	Dimensions	
O.W.	Overall Width	4.25"	108 mm
O.H.	Overall Height	6.00"	152 mm
O.L.	Overall Length, 22" Rail	23.45"	595 mm
X1	Exposed rail length, 22" Rail	21.95"	557 mm
X2	Mounting distance between feet, 22"	22.70"	576 mm
Y1	Mounting slot distance	3.50"	89 mm
Y2	Photocue bracket distance	6.21"	157 mm
S1	Mounting slot	0.39" x 0.26" (4)	9.90 x 6.60 mm

12.1 Introduction

The Compose IQ software is a built-in package capable of supporting systems applications in which machine control, data acquisition, print sequencing, and product tracking or a combination thereof may be required. Essentially, the software provides the following rudimentary tools:

- Product tracking and print sequencing
- Communication with reading devices or other controllers via the COM2 serial port
- Data output communication with other devices via COM3
- Machine control utilizing a PLC with communication via COM1
- Data acquisition and record retrieval in OCR mode

The software offers three distinct building blocks for the implementation of a system. This includes client (*slave*) mode, OCR mode, and selective device control supporting host mode (*master*) for data echo requirements. Figure 12-1 below illustrates the different configurations:

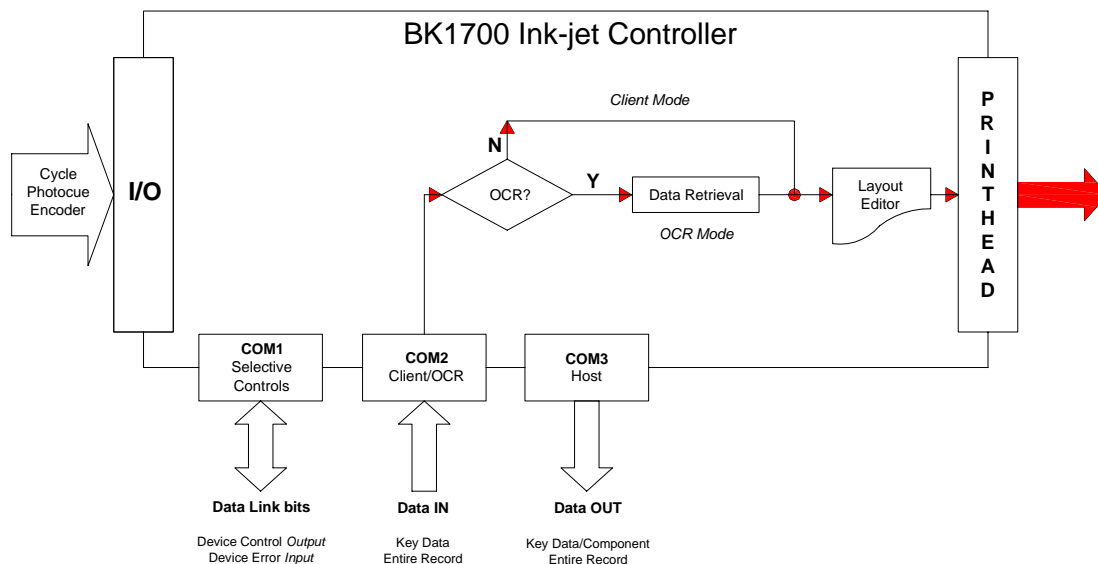


Figure 12-1: Block diagram of various models and the I/O devices required

12.2 Host/Client Mode

12.2.1 Client Mode

Client mode permits the controller to accept data *directly* from another controller (device) via the serial COM2 port, and at the appropriate time, print out some or all of the data based on the image layout. A number of baud rates and physical definition tools are offered to tailor the controller to the physical delays of the system and provide a data communication link with a host controller (device).

12.2.2 Host Mode

Host mode provides a means whereby a portion or all of the printed record data is output on COM3 such that it can be acquired and used by a downstream controller/device. This capability allows for the creation of distributed systems in which a number of printers can be networked together and controlled by a host controller.

12.3 OCR Mode

The OCR mode functions in much the same way as the client mode with the addition of a lookup and data retrieval process occurring prior to image creation. This capability supports reading devices that send limited data via the serial COM2 port, representing a key that maps onto a defined component of the data file such that a search will find and retrieve the entire record corresponding to the key. As with the client mode, the resulting record's components are then printed out as defined by the image layout.

12.4 Selective Inserting Mode

Completing the suite of controller products is a selective device control operation. With this, individual records are sourced from the aforementioned applications or the resident database and subsequently queried prior to the printing operation. As a result, various upstream and downstream devices can be actuated via a PLC based on the contents of these records. Included with this is a data echo feature that outputs all or part of the printed record on the COM3 serial port for communication with other downstream client controllers. This creates a distributed network of printers.

PLC control and communication is enabled through the COM1 port where a number of virtual input/output points are transmitted and stored directly in the PLC for further processing. Using this type of system architecture, logical functions are performed by the generic printer controller with the PLC providing localized system customization to implement the instructions supplied by the controller.

12.5 Software Requirements

- The Datapath EPROM must be V6.2 or later
- The PCI Controller must be V1.7 or later
- Compose IQ must be V6.04 or later
- **New System Support** must be checked in **Advanced Options**
- **Streaming Print Engine** should be checked in **Advanced Options**
- **Diagnostics** screen can be used to confirm meniscus pressure

Figure 12-2: Advanced Options screen

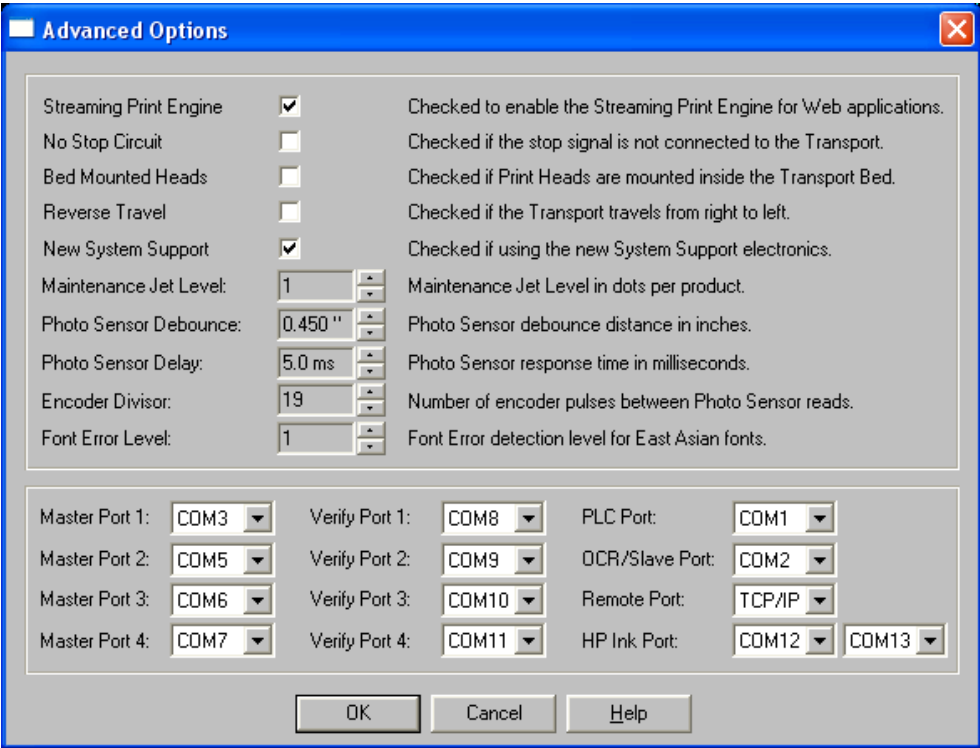
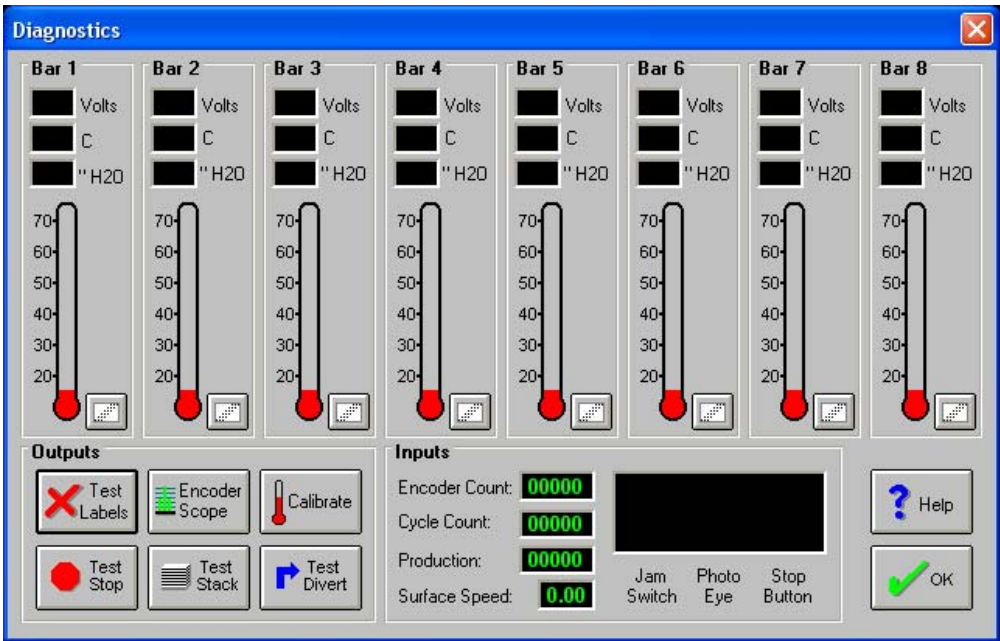


Figure 12-3: Diagnostics screen



Common Assembly Drawings

Appendix A

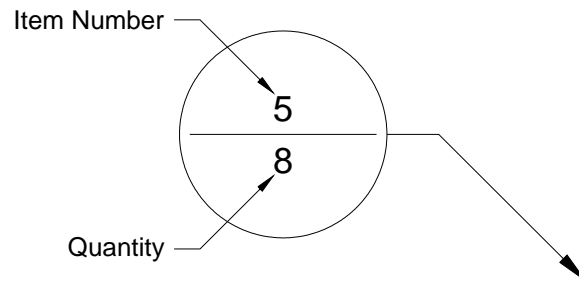
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Balloon Annotation and Parts Listing



Item	Part Number	Quantity	Description	Reference
1				
2				

The following is a description of how to interpret the information in this section:

Item:

This column indicates the item number used for each unique part in an assembly drawing.

It is matched with the top number in the balloon pointing at the associated part.

Part Number:

This column represents the Buskro part number.

Quantity:

This represents the total number of a given part in an assembly. It is matched with the bottom number in the balloon pointing at the associated part.

Description:

This column contains a brief description of the part.

Reference:

This column indicates the page location for sub-assemblies.

Table A-1: *Frame, Rack Type, BK1700 (BK-1700-FRM)*

Item	Part Number	Quantity	Description	Reference
1	401330	4	Screw, PHMS, 4-40 UNC x 1/2"	
2	404520	2	Screw, BHCS, 10-32 UNF x 3/8"	
3	405530	2	Screw, BHCS, 1/4-20 UNC x 1/2"	
4	420010	2	Nut, 1/4-20 UNC	
5	439010	2	Lockwasher, 1/4" I.D.	
6	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
7	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
8	9102358A	1	Cable, IEC Receptacle	
9	9102360	1	Lock, IEC Connector Plug	
10	9102681	1	Wire, #14, Green/Yellow, 6"	
11	9103103	1	Cover, IEC Receptacle	
12	9103211A	1	Front Guard Assembly, BK1700	Page A-26
13	9103212A	1	Umbilical bracket assembly	Page A-27
14	9103216	1	Bracket, Cabinet keyboard	
15	9103219A	4	Caster wheel assembly	Page A-30
16	9103225	4	Leveling foot, 3/8-16	
17	9103314	36	Nut, clip, 10-32 UNF, Black finish	
18	9103315A	1	Rear guard assembly	Page A-33
19	9103359	1	Cabinet, 19" subrack	
20	9103360A	1	Side Door Assembly, Left, BK1700	Page A-34
21	9103362A	2	Side Door Assembly, Bottom, BK1700	Page A-35
22	9103407A	1	Controller Top Assembly, BK1700	Page A-36
23	9103408A	1	Side Door Assembly, Right, BK1700	Page A-37
24	9103423A	1	Back cover support assembly	Page A-39
25	9103425A	1	Cable bracket assembly	Page A-40
26	9103426	1	Cover, Computer/power supplies	
27	9103428	1	Bracket, Rear upper cabinet cover	
28	9103447A	1	Terminal Block Assembly, Main, BK1700	Page A-41
29	9103464A	1	Crossbar Assembly, Generic	Page A-43
30	9103494	1	Filter, RFI, HLE110	
31	BK-1700-TRAN	1	Transformer Assembly, BK1700	Page A-6

Figure A-1: *Frame, Rack Type, BK1700 (BK-1700-FRM)*

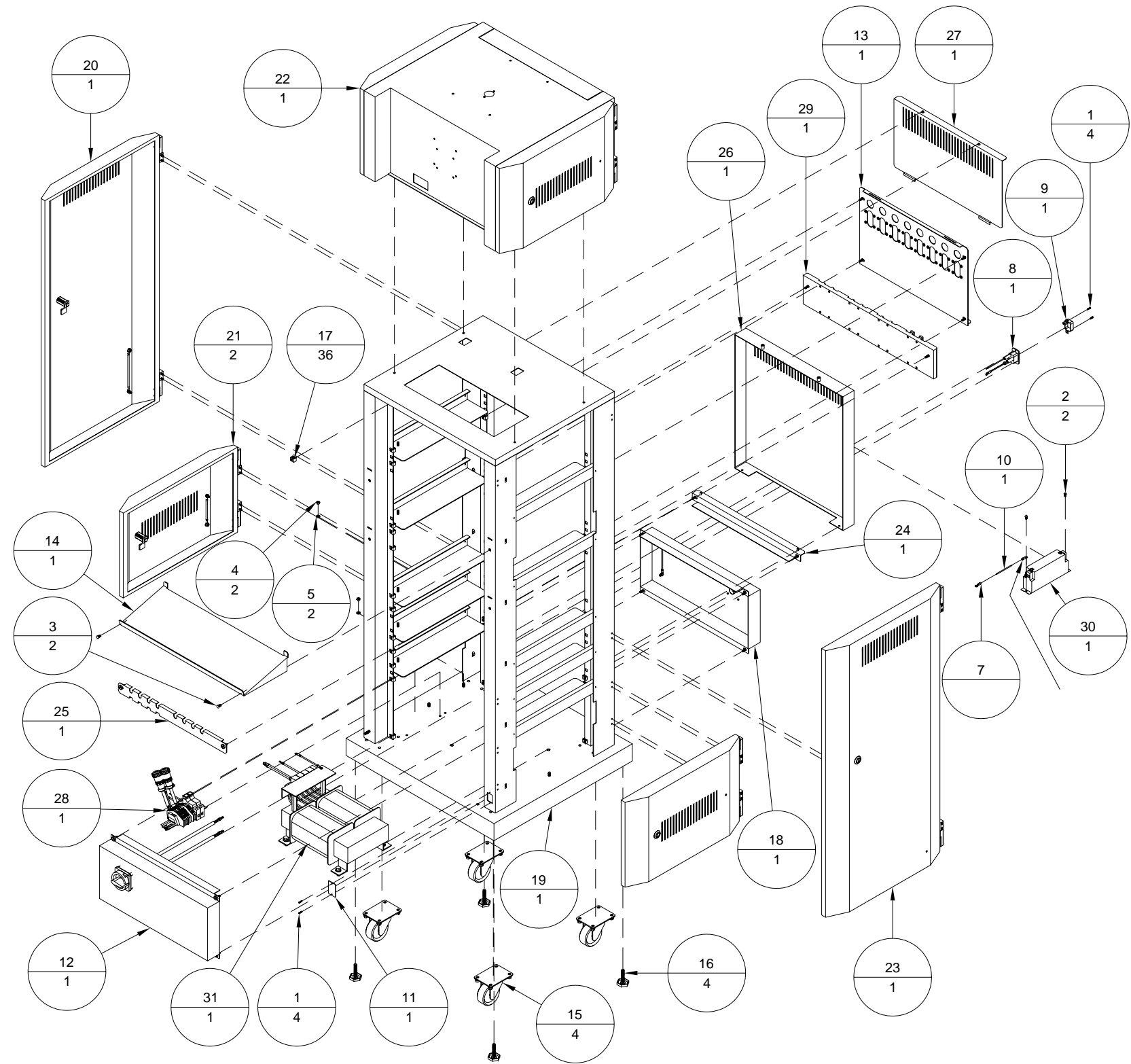


Table A-2: *Transformer Assembly, BK1700 (BK-1700-TRAN)*

Item	Part Number	Quantity	Description	Reference
1	406670	4	Screw, HHMS, 5/16-18 UNC x 1"	
2	439015	4	Lockwasher, 5/16 I.D.	
3	440015	4	Washer, 5/16" ID	
4	606033	2	Cable, #14-3, SJOW-A, 14"	
5	606040	1	Cable, #14-2, SJOW, BK/WH, 15"	
6	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
7	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
8	9102681	1	Wire, #14, Green/Yellow, 17"	
9	9103398	1	Transformer, 4.5 kVA, 200/208/230-120V	
10	9103433	10	Ferrule, #14 AWG, Blue	
11	9103434	3	Ferrule, #14, Dual Wire, Blue	

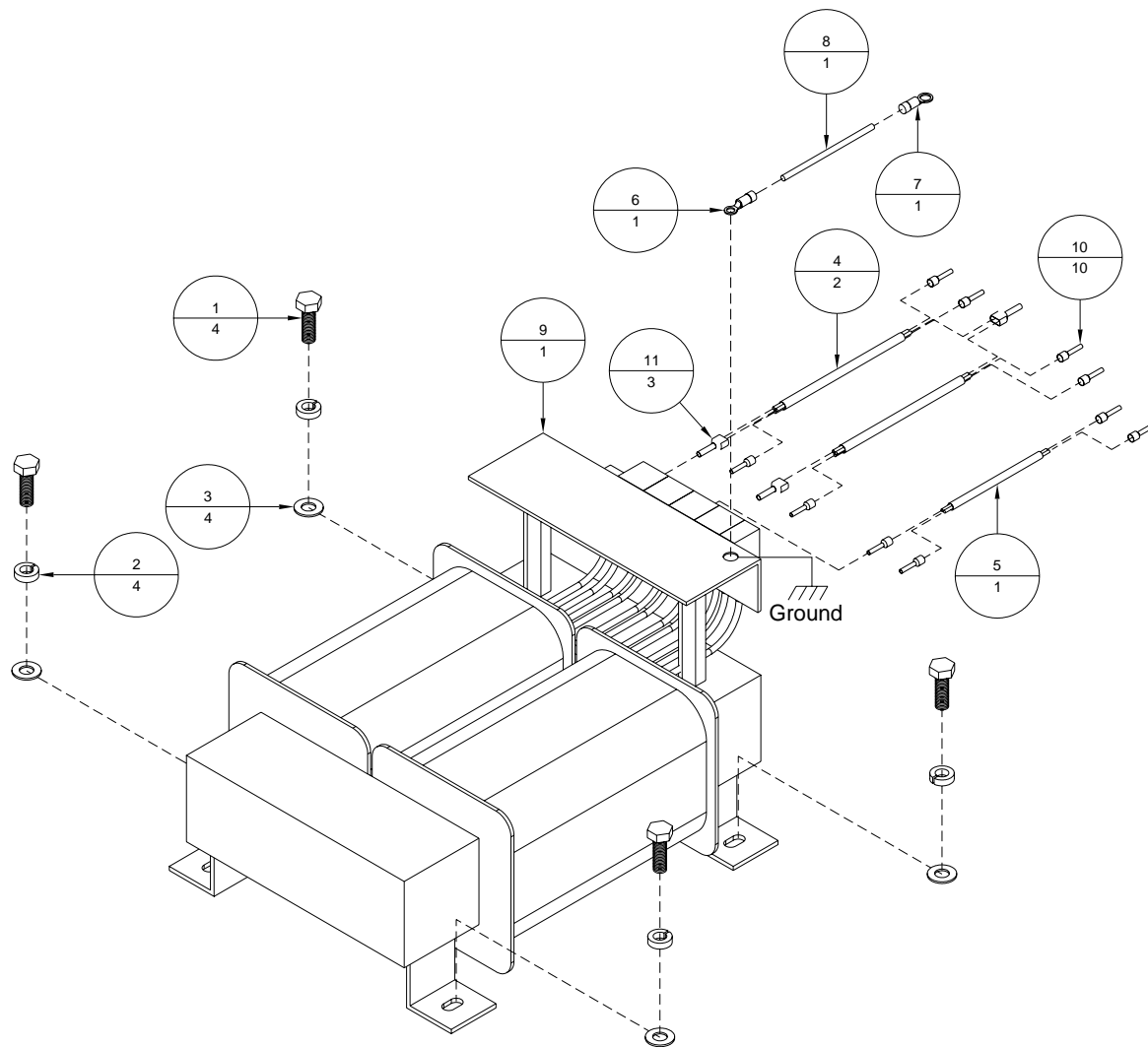
Figure A-2: *Transformer Assembly, BK1700 (BK-1700-TRAN)*

Table A-3: *Head Control Card Assembly (BK-HCC-1A)*

Item	Part Number	Quantity	Description	Reference
1	401310	2	Screw, PHMS, 4-40 UNC x 1/4"	
2	402210	4	Screw, SHCS, 6-32 UNC x 1/4"	
3	420006	3	Nut, 6-32 UNC	
4	439004	2	Lockwasher, No. 4	
5	439006	3	Lockwasher, No. 6	
6	615322	4	Female Screwlock, 4-40 UNC	
7	9102823	1	Head Control Card (HCC)	
8	9102909	2	Screw, M 2.5 x 6, cross recessed panhead	
9	9102947	1	Head Control Card (HCC) Bracket	
10	9102949	1	Head Control Card (HCC) Front Plate	
11	9102986	2	Handle, HCC and RCC	
12	9103431	1	Bezel Screen	

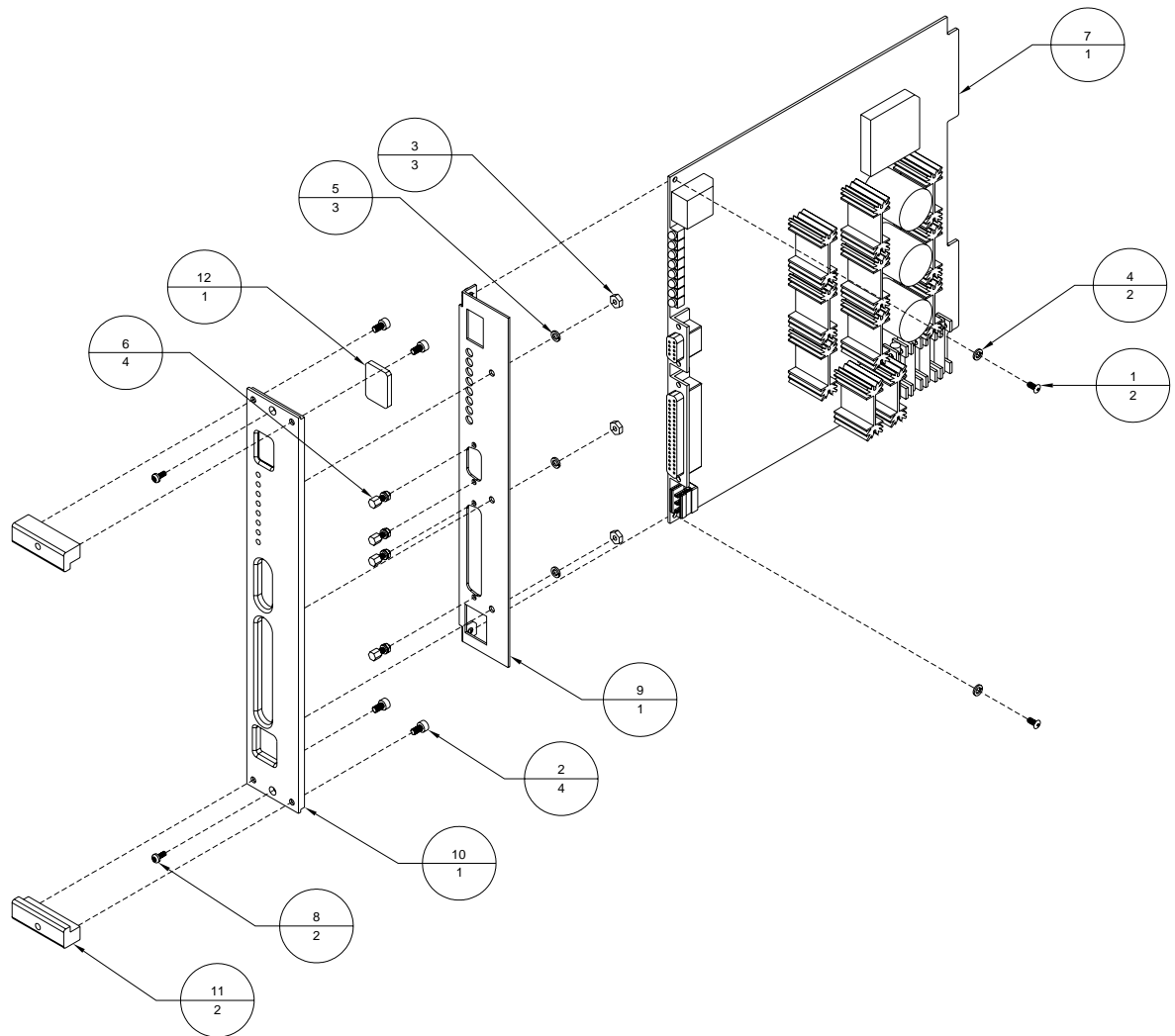
Figure A-3: *Head Control Card Assembly (BK-HCC-1A)*

Table A-4: *Monitor, 17" LCD Display (BK-MON-LCD17)*

Item	Part Number	Quantity	Description	Reference
1	414310	4	Screw, PHMS, M4 x 10	
2	9103404	1	Monitor, LCD, 17"	

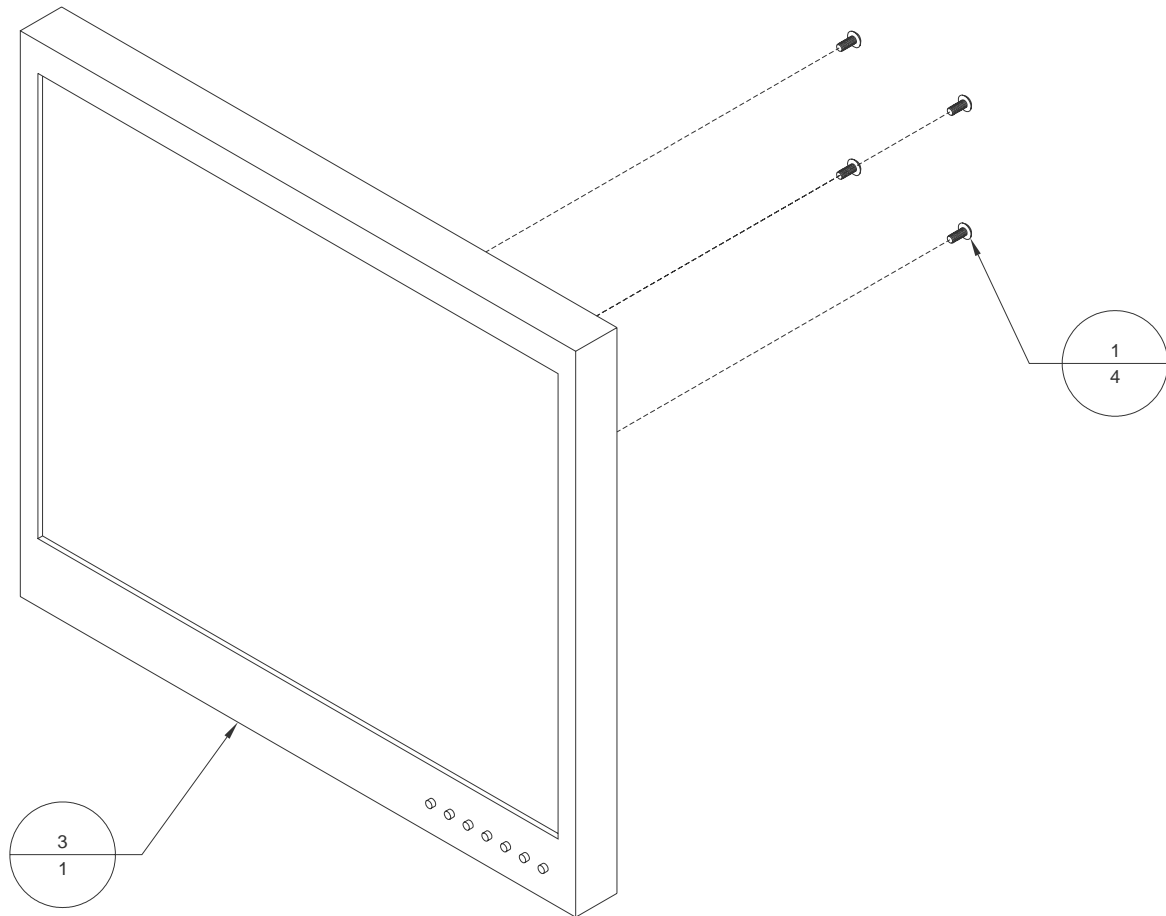
Figure A-4: *Monitor, 17" LCD Display (BK-MON-LCD17)*

Table A-5: *Module, BK1700 PC, 8 Channel (BK-PCM-8A)*

Item	Part Number	Quantity	Description	Reference
1	401310	8	Screw, PHMS, 4-40 UNC x 1/4"	
2	402310	12	Screw, PHMS, 6-32 UNC x 1/4"	
3	402320	4	Screw, PHMS, 6-32 UNC x 3/8"	
4	403510	8	Screw, BHCS, 8-32 UNC x 1/4"	
5	404510	10	Screw, BHCS, 10-32 UNF x 1/4"	
6	420007	4	Nut, 8-32 UNC	
7	420008	9	Nut, 10-32 UNF	
8	420010	1	Nut, 1/4-20 UNC	
9	426301	4	Hard Drive Rubber Mount	
10	439008	1	Lockwasher, No.10, External Tooth	
11	439009	13	Lockwasher, No. 10	
12	439010	1	Lockwasher, 1/4" I.D.	
13	440008	12	Washer, #10 ID	
14	600101A	1	Counter Assembly, BK1700	Page A-16
15	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
16	609115	1	Terminal, Ring, 1/4", 10-12 AWG, Non-Insulated	
17	614307A	1	Cable, I/O Assembly	
18	615322	16	Female Screwlock, 4-40 UNC	
19	9101863	1	Power Supply, 12V, ATX	
20	9101864	1	Card, Video, AGP	
21	9101866	1	CPU, Pentium 4, Socket 478	
22	9101932	1	Memory, 256 MB DDR	
23	9102308	1	Motherboard, P4B533, Socket 478 S/N	
24	9102681	1	Wire, #14, Green/Yellow Hookup, 24"	
25	9102733A	1	Cable, Controller I/O Receptacle, 30"	
26	9102780A	1	Datapath Card Assembly, BK1700	Page A-18
27	9102781A	1	Fan Assembly, 12 VDC	Page A-19
28	9102782	1	Filter, 12VDC Fan, Flight II 120	
29	9102783	1	Fan, Finger Guard Metal, Flight II 120	
30	9102881	1	Computer Cabinet, BK1700	
31	9102882A	1	Computer Drive Mount Assembly	Page A-20
32	9103116	1	Cover, Power supply enclosure	
33	9103128A	1	Computer Faceplate Assembly, BK1700	Page A-23
34	9103177	1	Cover, Computer Cabinet, BK1700	
35	9103178A	1	Field Connection Board Assembly, BK1700	Page A-24
36	9103185	4	Screw, FPHMS 8-32 UNC x 1 3/4"	
37	9103188	5	Cover, Computer Slot	
38	9103196A	1	Cable, Data Ribbon, DB9 Male	
39	9103226A	4	Cable, Printhead Data, 12'	
40	9103258	1	Cover, DB9 Slots	
41	9103297	1	Label, Switch Off Computer	
42	9103317A	1	Cable, Switch Pushbutton Assembly	
43	9103471A	1	Cable, FCB Output	
44	9103472A	1	Cable, FCB Input	

Figure A-5: *Module, BK1700 PC, 8 Channel (BK-PCM-8A)*

NOTE:
ASSEMBLY COMES STANDARD AS A 4 CHANNEL SYSTEM. FOR A FULL 8 CHANNEL SYSTEM AN EXPANSION CARD AND FOUR ADDITIONAL DATA CABLES ARE REQUIRED.

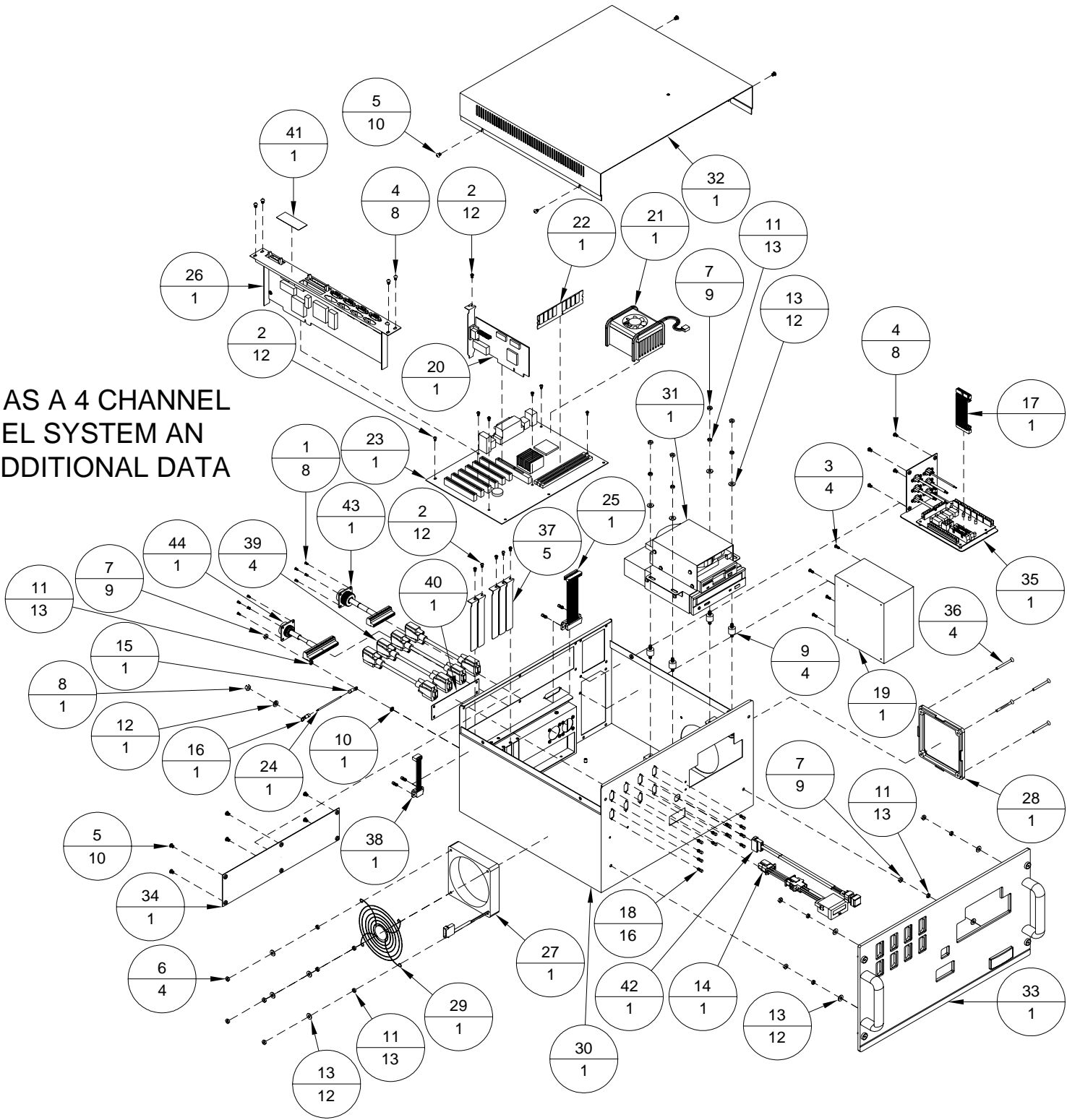


Table A-6: *Rack, Frame, Unpopulated (BK-RACK-0)*

Item	Part Number	Quantity	Description	Reference
1	9102801	1	Subrack, 6U for 220 mm card	
2	9102803	2	Insert, Rack, Threaded, M2.5 mm	
3	9103004A	2	Side Bracket Assembly, Rack, BK1700	Page A-21

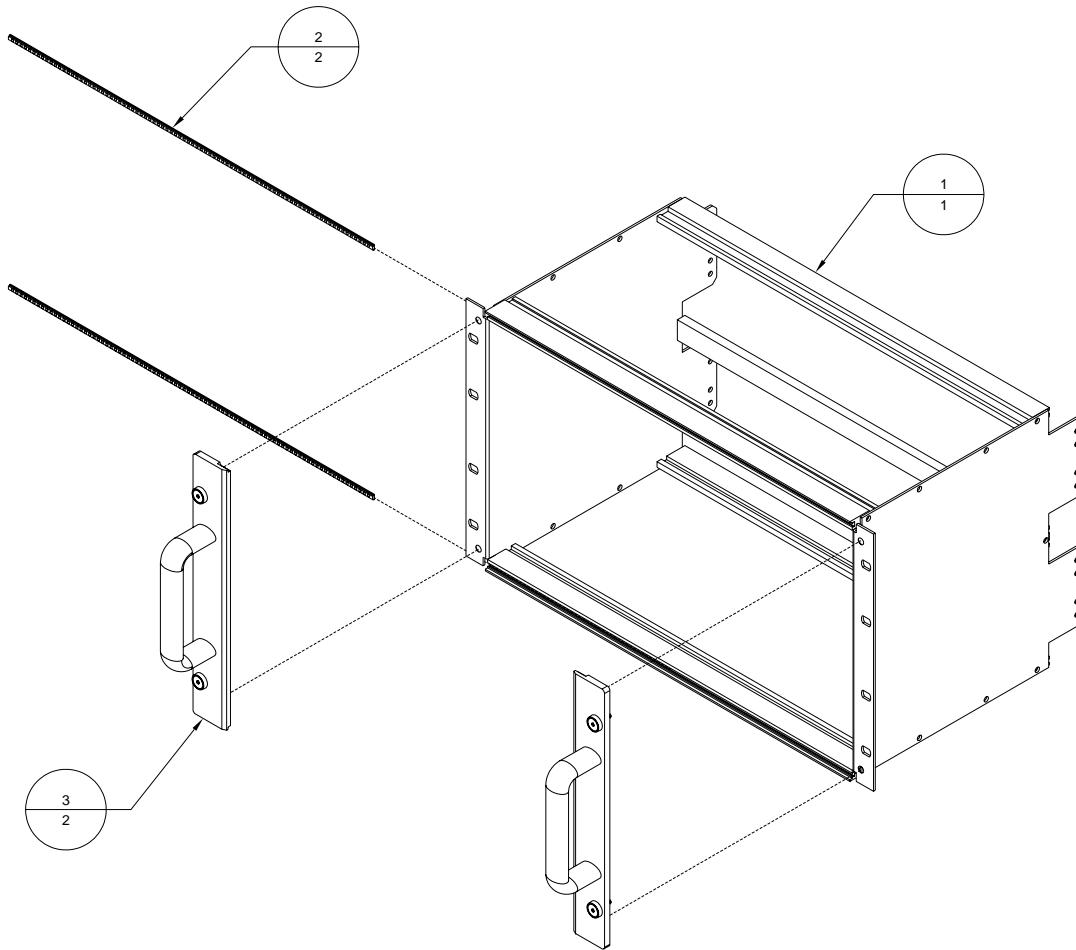
Figure A-6: *Rack, Frame, Unpopulated (BK-RACK-0)*

Table A-7: *Rack, Frame, Backplane, 4 Channel (BK-RACK-4)*

Item	Part Number	Quantity	Description	Reference
1	401309	18	Screw, PHMS, M2.5 x 6mm	
2	9102802	10	Cardguide, 220 mm	
3	9102803	3	Insert, Rack, Threaded, M2.5 mm	
4	9102821	1	Back Plane, Card Cage	
5	9103206A	1	Connector Bracket Assembly, BK1700	Page A-25
6	BK-RACK-0	1	Subrack Assembly, 4 head Atlas/Elite Generic	Page A-11

Figure A-7: *Rack, Frame, Backplane, 4 Channel (BK-RACK-4)***NOTE:**

FOR 1-4 CHANNELS, ONE RACK HOLDS THE ELECTRONIC RELATED COMPONENTS, AN INK DELIVERY MODULE, AND A PRESSURE REGULATOR.

FOR 5-8 CHANNELS, ONE RACK HOLDS ALL ELECTRONIC RELATED COMPONENTS WHILE THE SECOND RACK HOLDS THE INK DELIVERY MODULES AND THE PRESSURE REGULATORS.

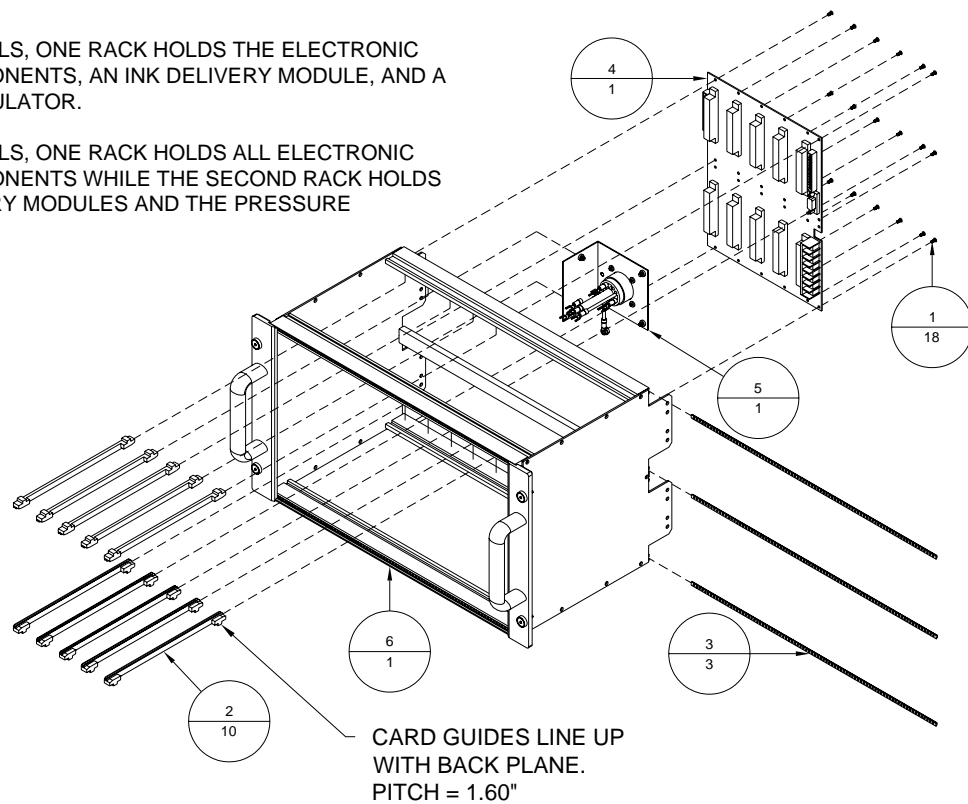


Table A-8: *Reservoir Control Card Assembly (BK-RCC-4A)*

Item	Part Number	Quantity	Description	Reference
1	401310	2	Screw, PHMS, 4-40 UNC x 1/4"	
2	402210	4	Screw, SHCS, 6-32 UNC x 1/4"	
3	420006	3	Nut, 6-32 UNC	
4	439004	2	Lockwasher, No. 4	
5	439006	3	Lockwasher, No. 6	
6	615322	4	Female Screwlock, 4-40 UNC	
7	9102822	1	Card, Reservoir Control (RCC)	
8	9102909	2	Screw, M2.5 x 6, cross recessed panhead	
9	9102948	1	Bracket, Reservoir Control Card (RCC)	
10	9102950	1	Plate, Front, Reservoir Control Card (RCC)	
11	9102984A	1	Cable, Pressure Regulator, RCC	
12	9102985A	1	Cable, Pumping Station, RCC	
13	9102986	2	Handle, HCC and RCC	
14	9103431	1	Bezel Screen	

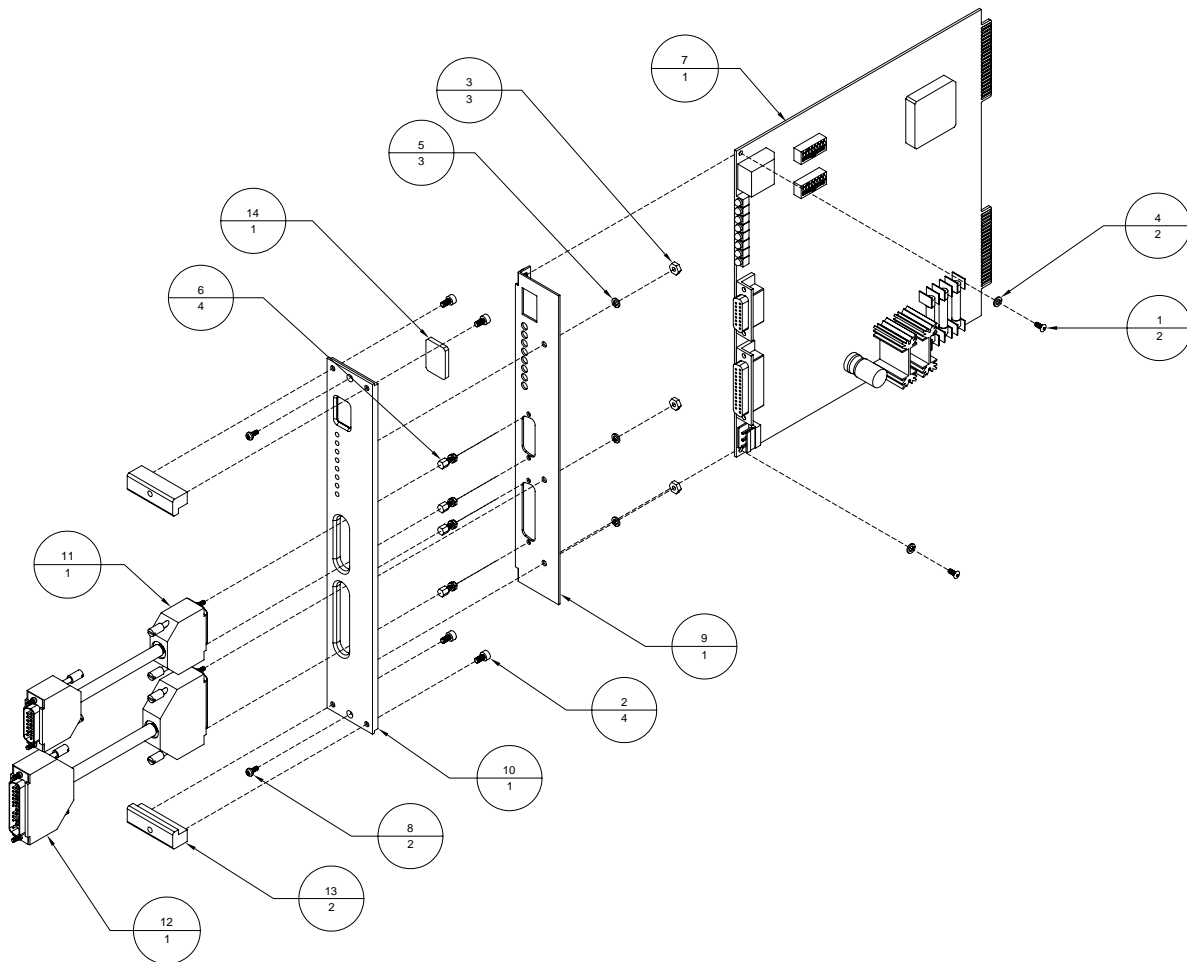
Figure A-8: *Reservoir Control Card Assembly (BK-RCC-4A)*

Table A-9: *Tracking Board Assembly, BK1700 (BK-TRACK-1700)*

Item	Part Number	Quantity	Description	Reference
1	401310	36	Screw, PHMS, 4-40 UNC x 1/4"	
2	402310	6	Screw, PHMS, 6-32 UNC x 1/4"	
3	614140	1	Cable Clamp, Shell 17	
4	615063	8	Connector, Female, 3-Pin, BLA3	
5	615066	8	Connector, Female, 4-Pin, BLA4	
6	615079	1	Connector, Female, 16-Pin, BLA16	
7	9100711A	8	Field Sensor Cable Assembly	
8	9100723A	8	Field Encoder Cable Assembly	
9	9100724A	4	Jam/Proxi/Photocue Extension Cable	
10	9100725A	4	Shaft Encoder Extension Cable	
11	9100739A	1	Input Cable	
12	9100740	1	Plug, 17-28, Reverse, CPC	
13	9100784	16	Contact, Male, 24-20 AWG, Size 20 DF	
14	9101976	1	Board, Tracking	
15	9101977A	1	Cable, Tracking Board I/O	
16	9102011A	1	Cable, Tracking Board 12 VDC Power	
17	9102120A	1	Cable, Tracking Board Cycle Adapter	
18	9103179	1	Tracking Plate, BK1700	

Figure A-9: *Tracking Board Assembly, BK1700 (BK-TRACK-1700)*

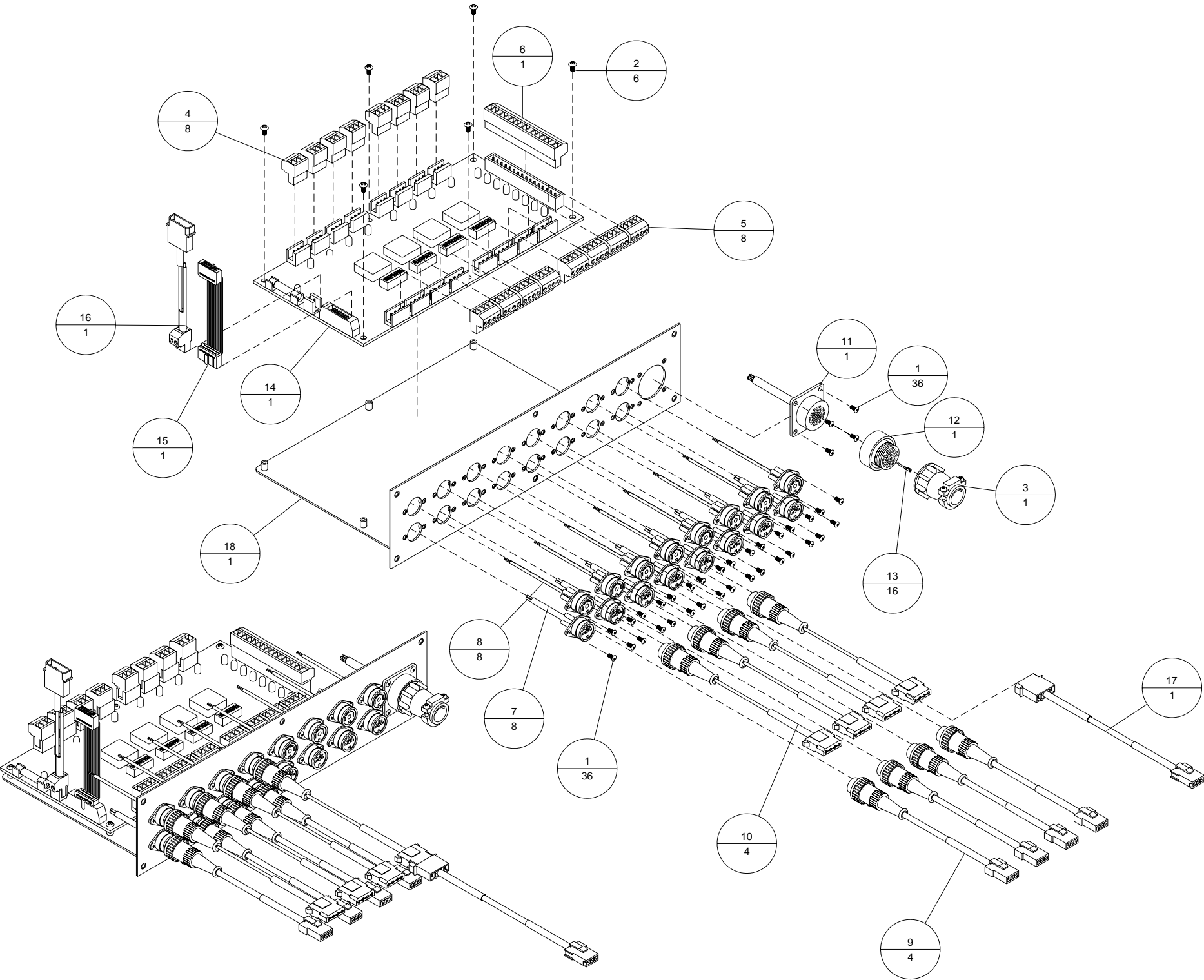


Table A-10: Counter Assembly, BK1700 (600101A)

Item	Part Number	Quantity	Description	Reference
1	600101	1	Counter, SPR #8705	
2	606020	1	Wire, #18, Black, 7.5"	
3	606020	1	Wire, #18, Black, 3"	
4	606024	1	Wire, #18, Yellow, 10"	
5	609000	3	Shrink Wrap, 3/16" I.D., 1" long	
6	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
7	614008	2	Contact, Male, 24-18 AWG, Mate-n-lok	
8	614009	1	Connector, 4-Pin, Male, Mate-n-lok	
9	614107	3	Contact, Male, 24-20 AWG, Yellow	
10	9100717A	1	Field Connection Cable	
11	9100718A	1	Cable, Power Box Counter	
12	9100738	1	Contact, Female, 24-18 AWG, Mate-n-lok	

Figure A-10: Counter Assembly, BK1700 (600101A)

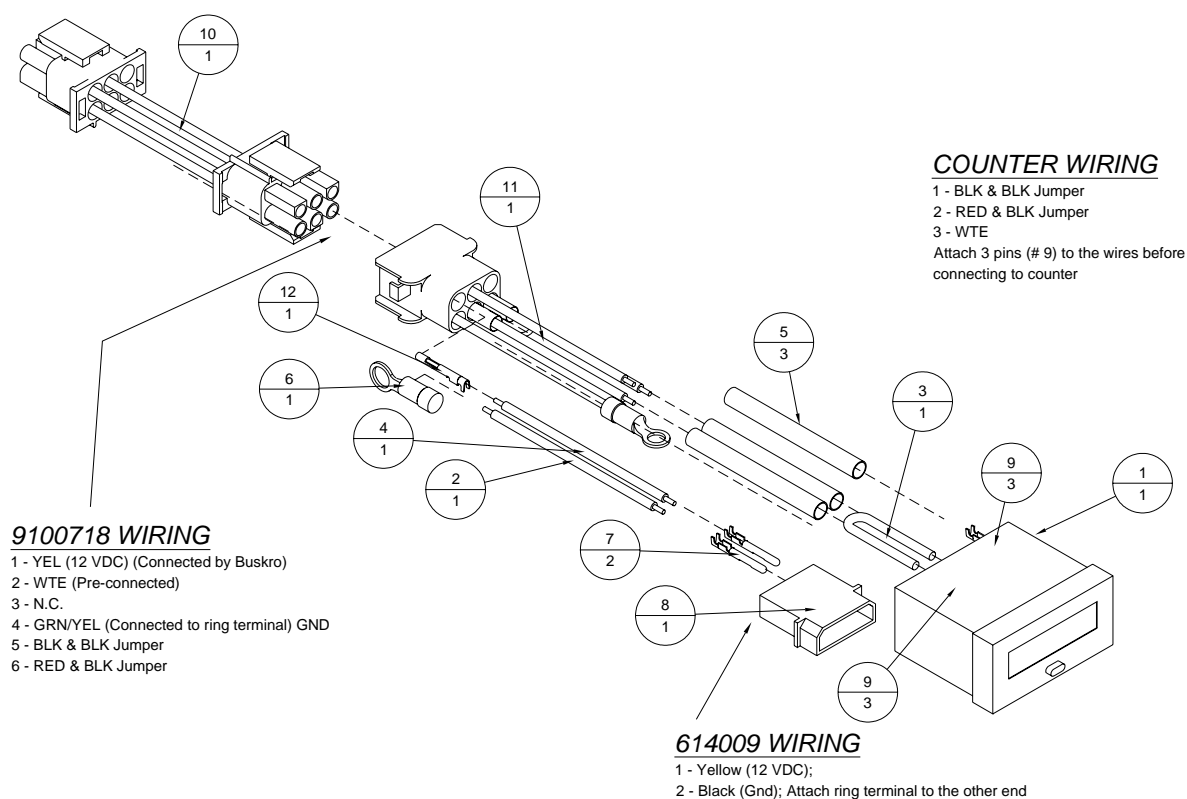


Table A-11: *Profile Bar Assembly (9102094A)*

Item	Part Number	Quantity	Description	Reference
1	402250	2	Screw, SHCS, 6-32 UNC x ¾"	
2	9102094	1	Profile Bar	

Figure A-11: *Profile Bar Assembly (9102094A)*

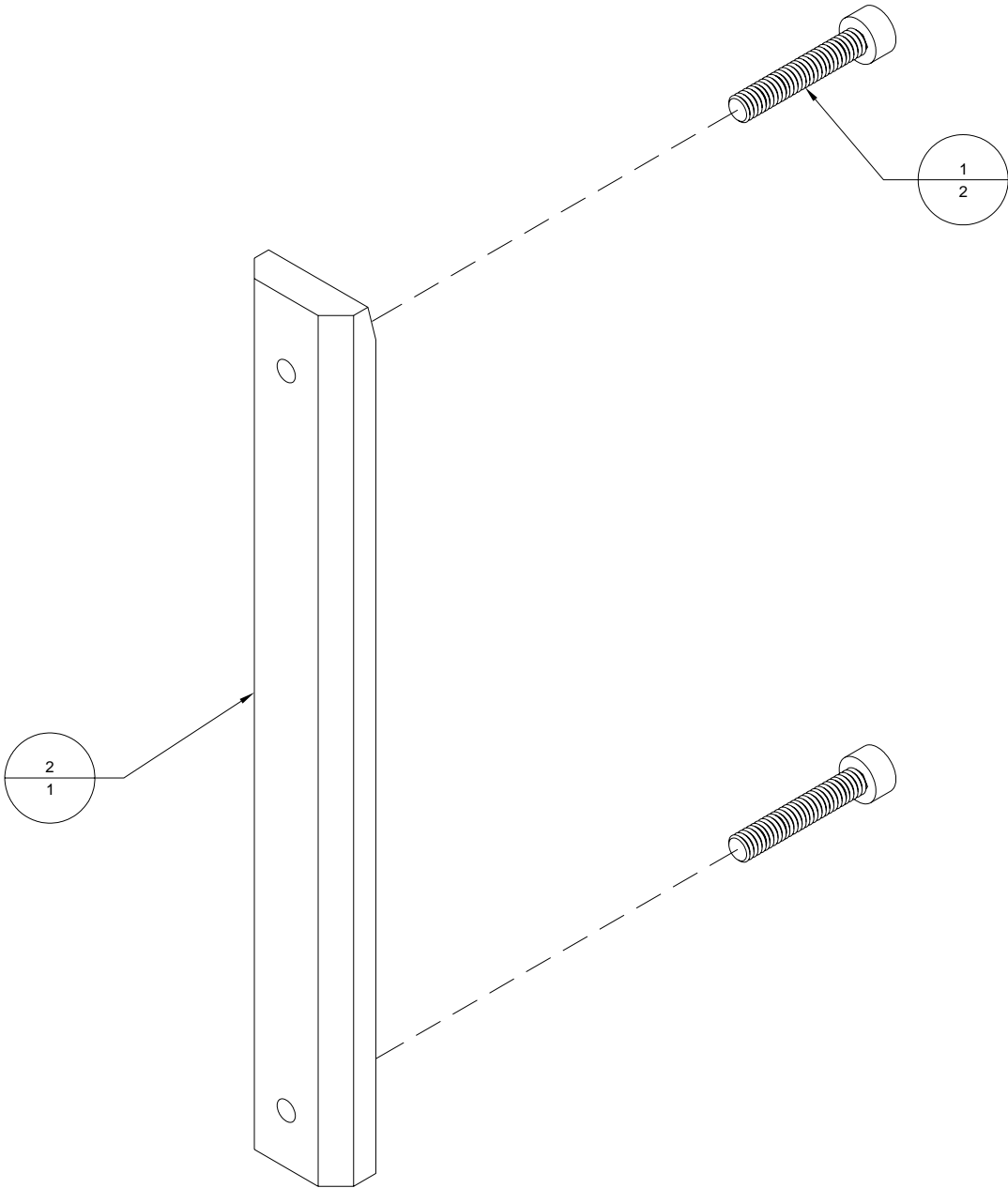


Table A-12: *Datapath Card Assembly, BK1700 (9102780A)*

Item	Part Number	Quantity	Description	Reference
1	401310	4	Screw, PHMS, 4-40 UNC x 1/4"	
2	403510	1	Screw, BHCS, 8-32 UNC x 1/4"	
3	420004	4	Nut, 4-40 UNC	
4	440530	4	Washer, #6, Nylon	
5	615322	8	Female Screwlock, 4-40 UNC	
6	9100194	1	Card, Datapath	
7	9100335	1	Bracket, Secondary Card Support	
8	9102780	1	Datapath Card Bracket, ATX	

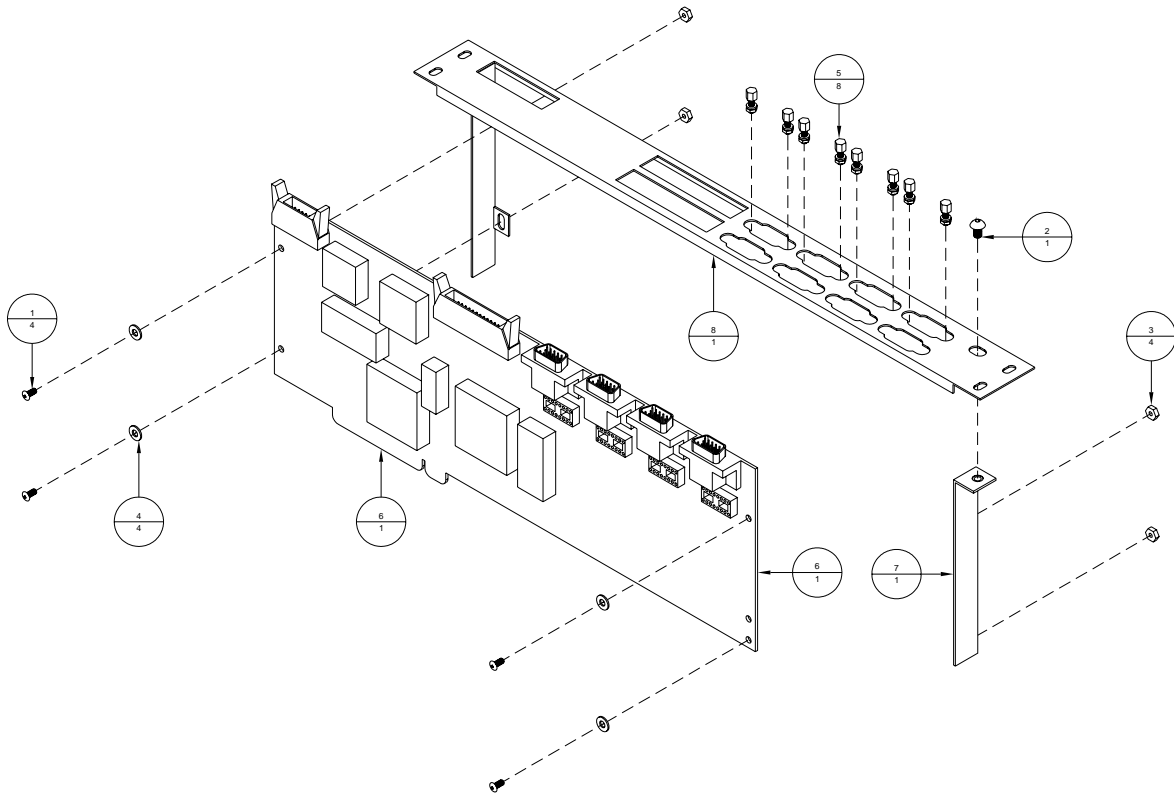
Figure A-12: *Datapath Card Assembly, BK1700 (9102780A)*

Table A-13: *Fan Assembly, 12VDC (9102781A)*

Item	Part Number	Quantity	Description	Reference
1	609000	1	Shrink Wrap, 3/16" I.D., 1"	
2	614008	2	Contact, Male, 24-18 AWG, Mate-n-lok	
3	614009	1	Connector, 4-Pin, Male, Mate-n-lok	
4	9102781	1	Fan, 12VDC, Flight II 120	

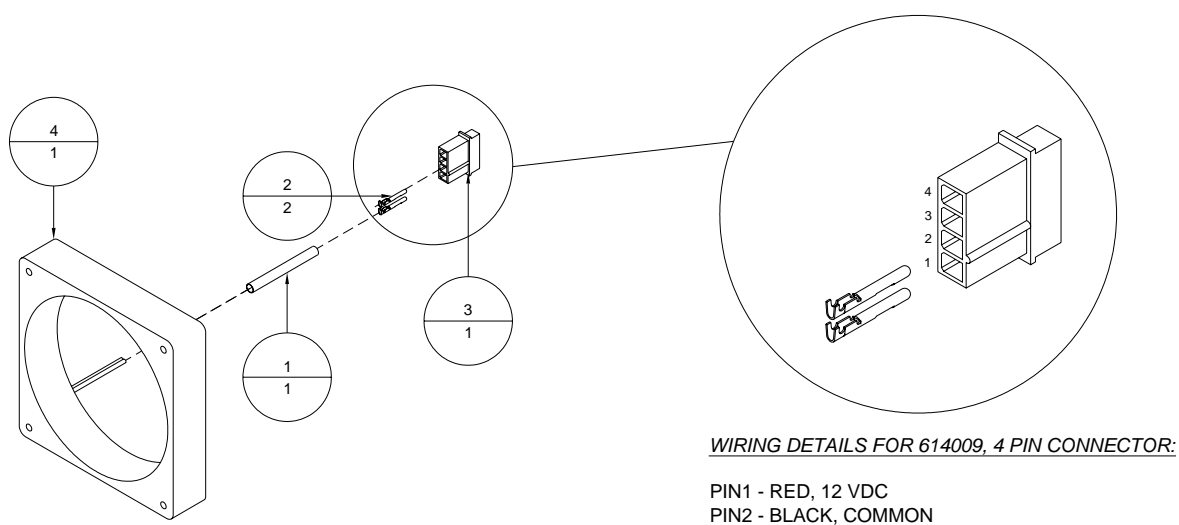
Figure A-13: *Fan Assembly, 12VDC (9102781A)*

Table A-14: *Computer Drive Mount Assembly (9102882A)*

Item	Part Number	Quantity	Description	Reference
1	402320	4	Screw, PHMS, 6-32 UNC x 3/8"	
2	413506	8	Screw, BHCS, M3 x 6mm	
3	439006	12	Lockwasher, No. 6	
4	440005	12	Washer, #6 ID	
5	60333	1	Hard Drive, IDE	
6	803600	1	Floppy Drive, 3 1/2, Black	
7	803601	1	CD-ROM Drive, Black	
8	9102882	1	Hard Drive Mount	

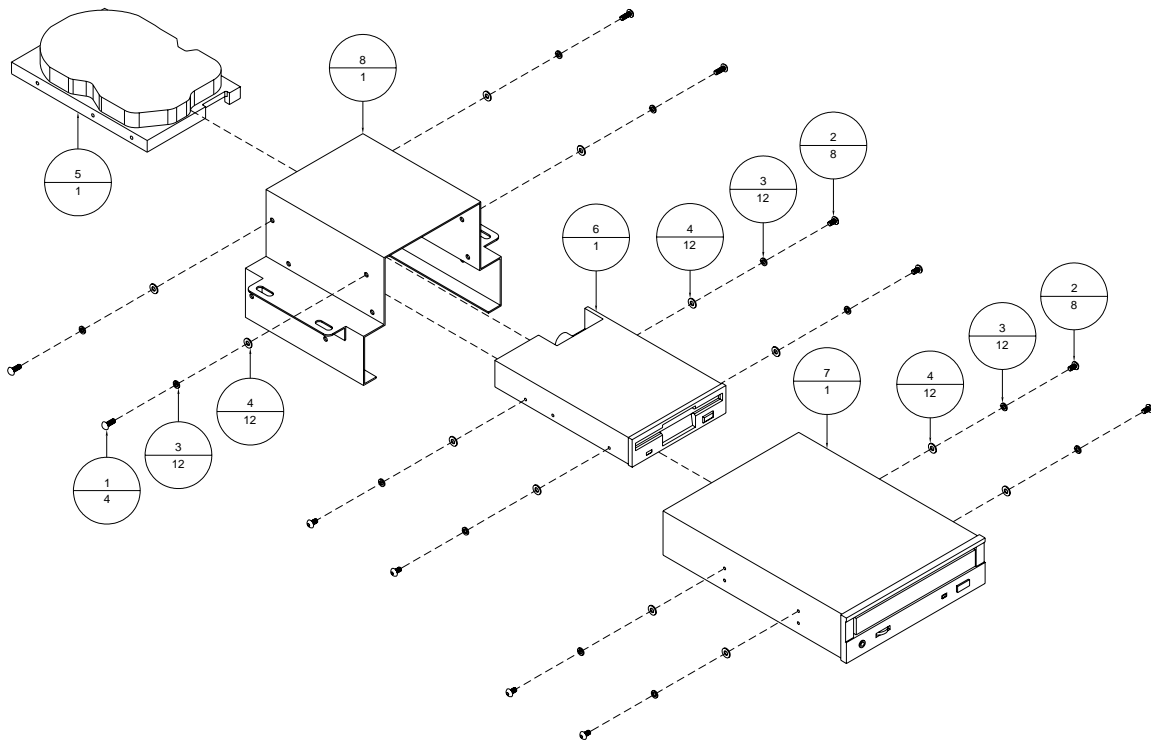
Figure A-14: *Computer Drive Mount Assembly (9102882A)*

Table A-15: *Side Bracket Assembly, Rack, BK1700 (9103004A)*

Item	Part Number	Quantity	Description	Reference
1	404010	2	Screw, FHCS, 10-32 UNF x 1/4"	
2	404050	2	Screw, FHCS, 10-32 UNF x 3/4"	
3	9102847	1	Handle, Pull, 5/16-18	
4	9103004	1	Plate, Side, Rack	
5	9103111	2	Screw, FHMS, 5/16-18 UNC x 5/8"	
6	9103315	2	Washer, Cup, 10-32 UNF flat head screw	

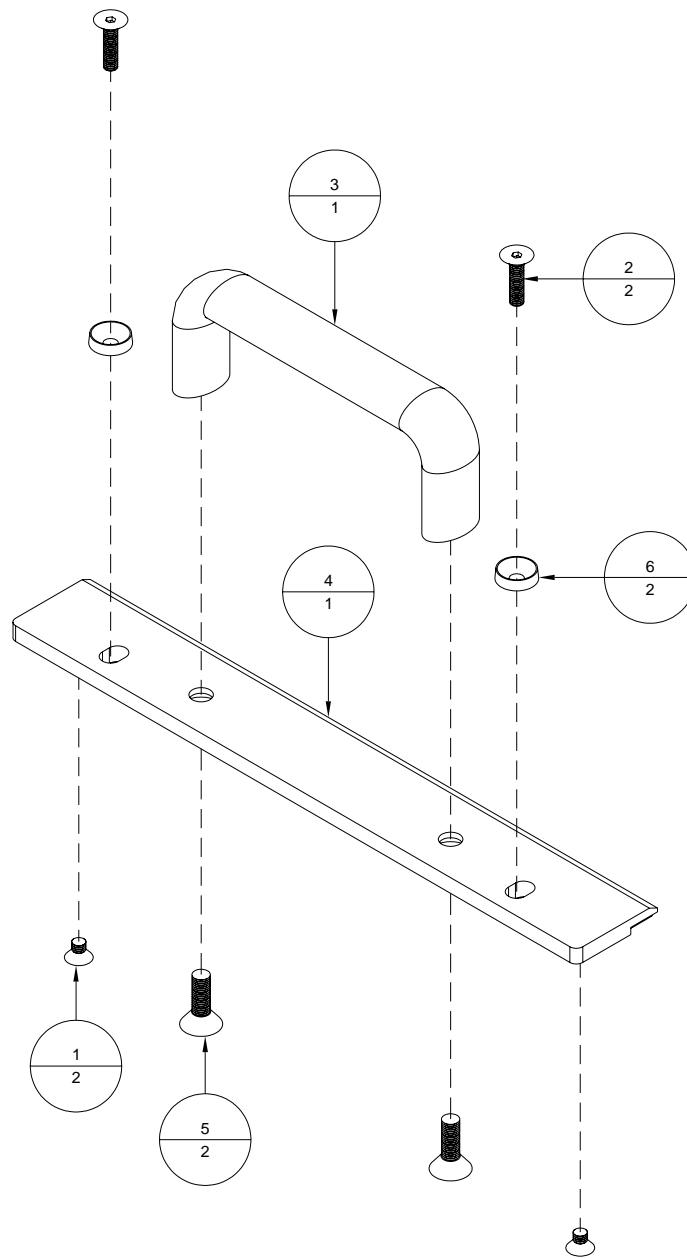
Figure A-15: *Side Bracket Assembly, Rack, BK1700 (9103004A)*

Table A-16: *Cover Assembly, Backplane Guard, Single (9103114A)*

Item	Part Number	Quantity	Description	Reference
1	401309	3	Screw, PHMS, M2.5 x 6 mm	
2	403520	2	Screw, BHCS, 8-32 UNC x 3/8"	
3	420008	1	Nut, 10-32 UNF	
4	420010	1	Nut, 1/4-20 UNC	
5	439009	1	Lockwasher, No. 10	
6	439010	1	Lockwasher, 1/4" I.D.	
7	609114	1	Terminal Ring, #10, 12-10AWG, Non-Insulated	
8	609115	1	Terminal, Ring, 1/4", 10-12 AWG, Non-Insulated	
9	9102681	1	Wire, #14, Green/Yellow, 20"	
10	9103114	1	Cover, Backplane Guard, Single	

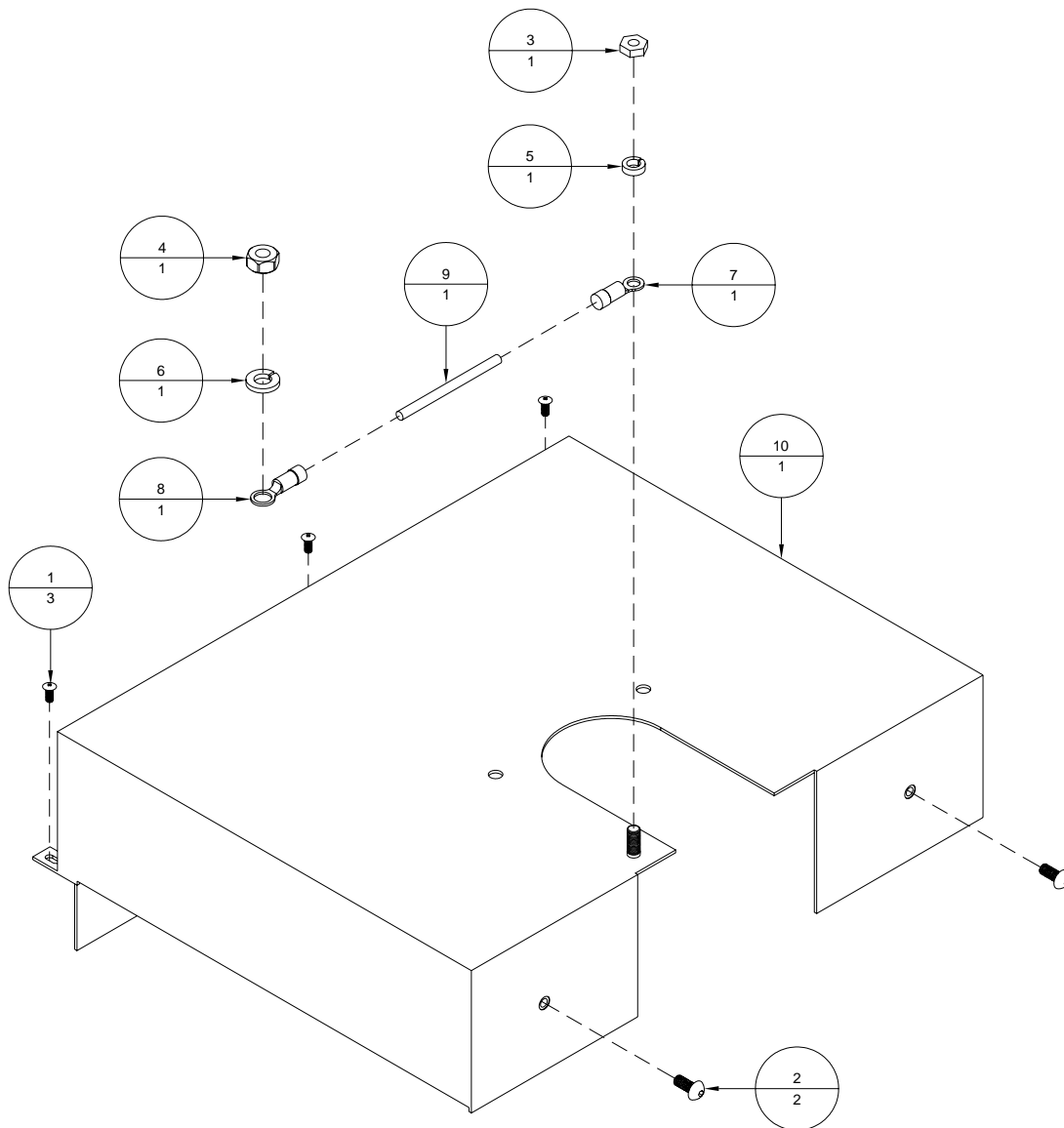
Figure A-16: *Cover Assembly, Backplane Guard, Single (9103114A)*

Table A-17: *Computer Faceplate Assembly, BK1700 (9103128A)*

Item	Part Number	Quantity	Description	Reference
1	404020	2	Screw, FHCS, 10-32 UNF x 3/8"	
2	404050	4	Screw, FHCS, 10-32 UNF x 3/4"	
3	9102847	2	Handle, Pull, 5/16-18	
4	9103111	4	Screw, FHMS, 5/16-18 UNC x 5/8"	
5	9103128	1	Faceplate, Computer Cabinet	
6	9103183	1	Nameplate, Buskro Logo	
7	9103315	4	Washer, Cup, 10-32 UNF Flat Head Screw	

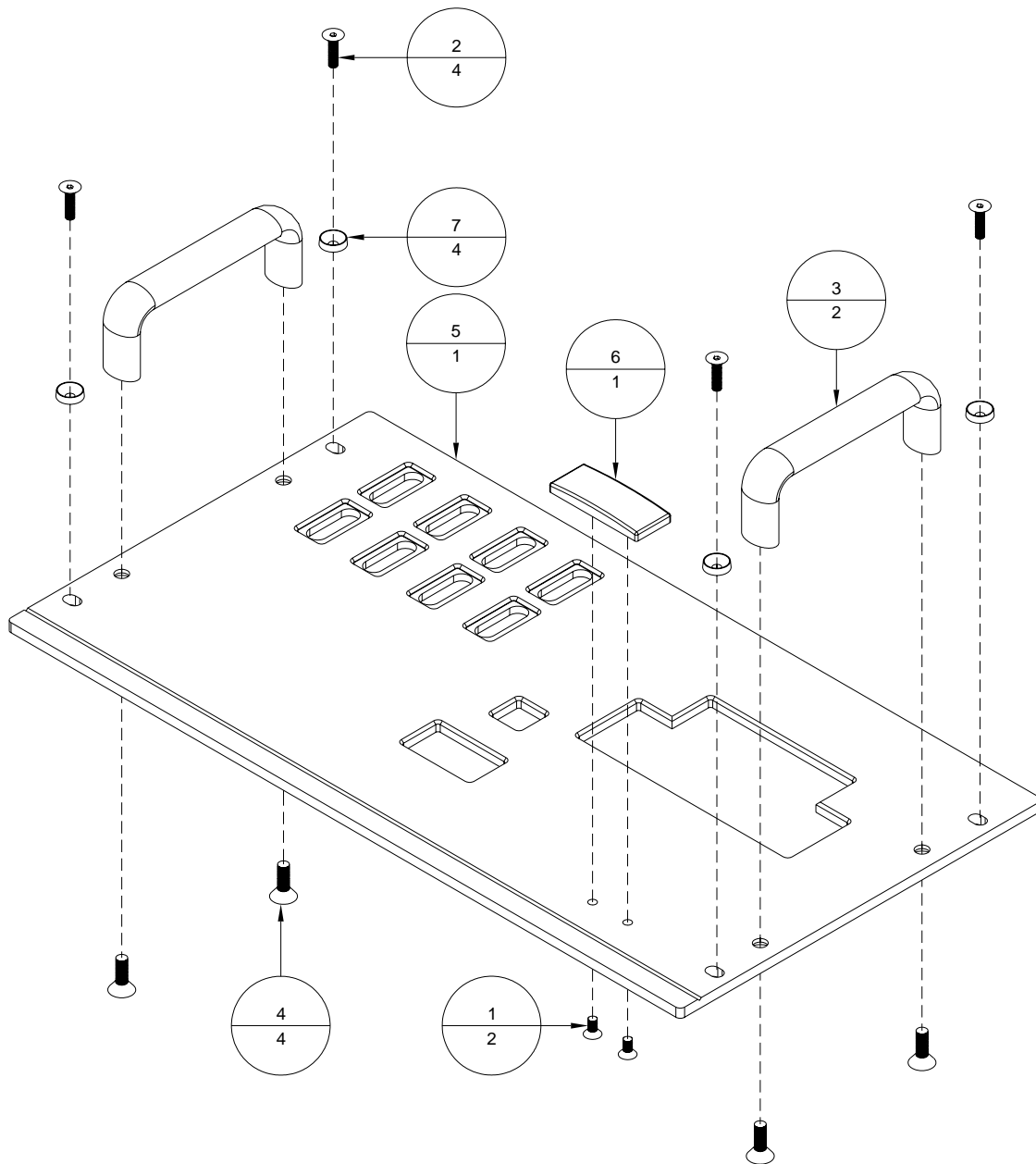
Figure A-17: *Computer Faceplate Assembly, BK1700 (9103128A)*

Table A-18: *Field Connection Board Assembly, BK1700 (9103178A)*

Item	Part Number	Quantity	Description	Reference
1	401310	12	Screw, PHMS, 4-40 UNC x 1/4"	
2	402310	4	Screw, PHMS, 6-32 UNC x 1/4"	
3	440530	4	Washer, #6, Nylon	
4	615063	5	Connector, Female, 3-Pin, BLA3	
5	615066	1	Connector, Female, 4-Pin, BLA4	
6	9100711A	5	Field Sensor Cable Assembly	
7	9100723A	1	Field Encoder Cable Assembly	
8	9100724A	5	Jam/Proxi/Photocue Extension Cable	
9	9100725A	1	Shaft Encoder Extension Cable	
10	9100731	1	Board, Field Connection	
11	9103178	1	Connector Plate, BK1700	

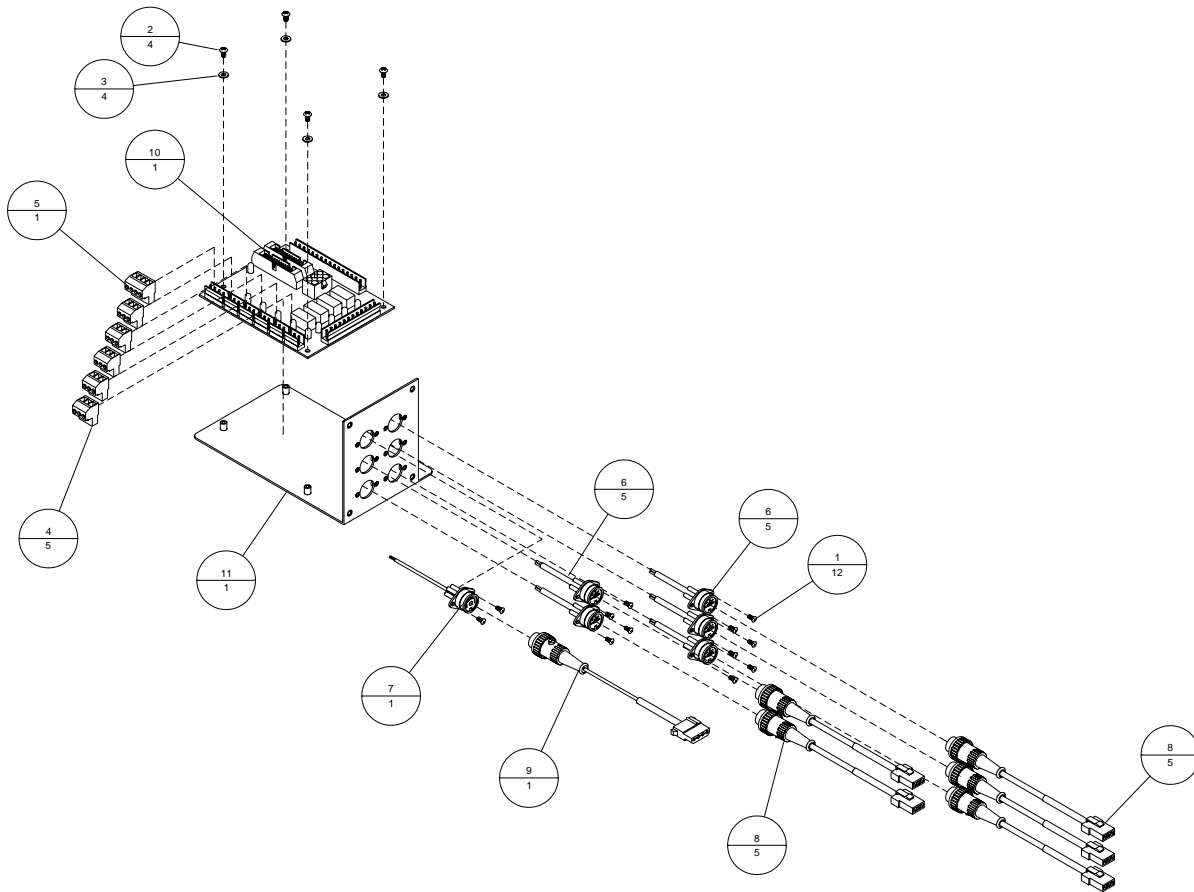
Figure A-18: *Field Connection Board Assembly, BK1700 (9103178A)*

Table A-19: *Connector Bracket Assembly (9103206A)*

Item	Part Number	Quantity	Description	Reference
1	402320	4	Screw, PHMS, 6-32 UNC x 3/8"	
2	403520	4	Screw, BHCS, 8-32 UNC x 3/8"	
3	420008	2	Nut, 10-32 UNF	
4	439009	2	Lockwasher, No. 10	
5	609111	2	Terminal, Ring, #10, 16-14 AWG, Blue	
6	9102681	1	Wire, #14, Green/Yellow Hookup, 4"	
7	9103083A	1	Cable, Backplane, 5 x 8	
8	9103206	1	Bracket, Subrack Power Supply Connector	

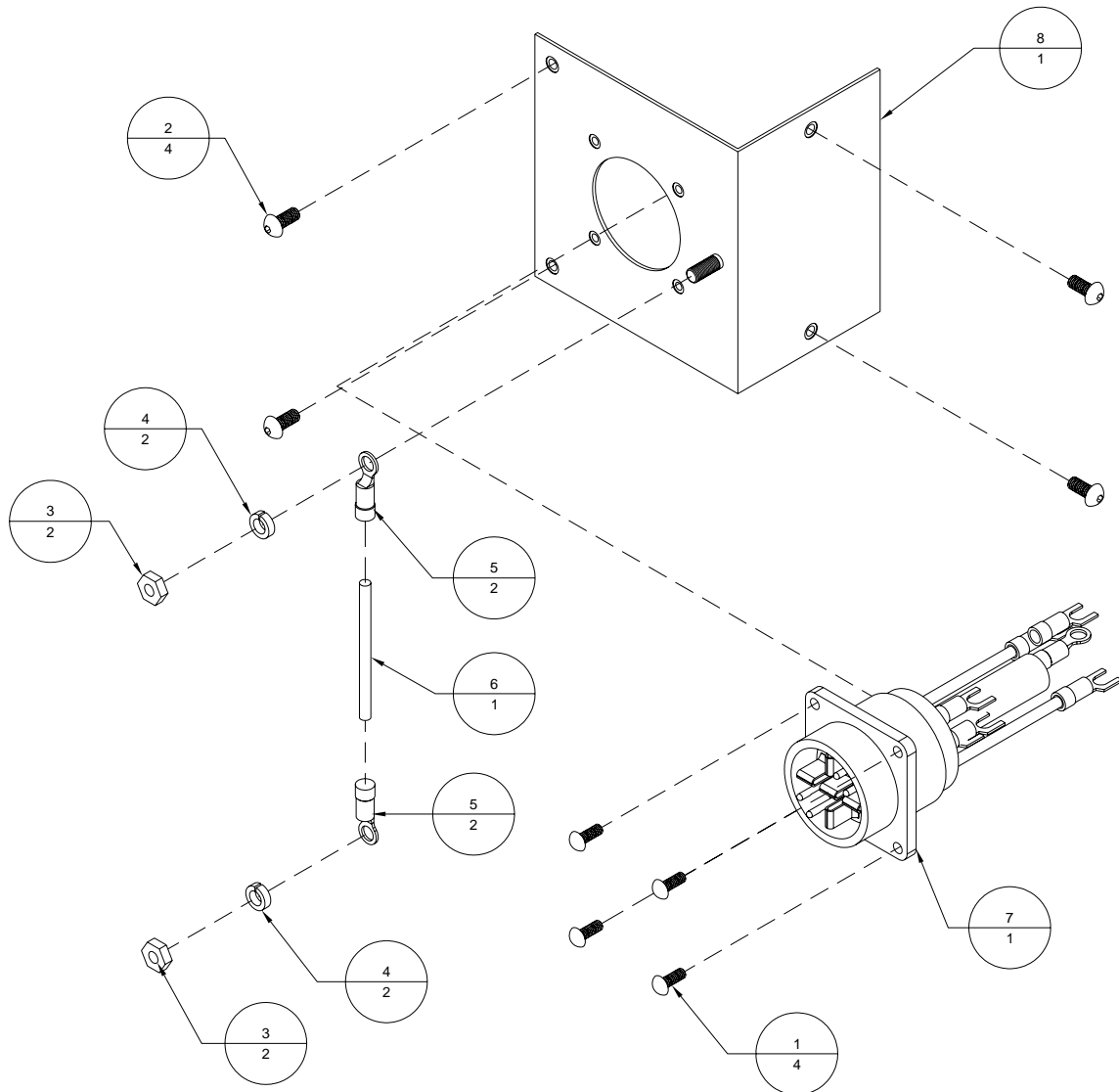
Figure A-19: *Connector Bracket Assembly (9103206A)*

Table A-20: *Front Guard Assembly, BK1700 (9103211A)*

Item	Part Number	Quantity	Description	Reference
1	404050	4	Screw, FHCS, 10-32 UNF x 3/4"	
2	420008	1	Nut, 10-32 UNF	
3	420010	1	Nut, 1/4-20 UNC	
4	439009	1	Lockwasher, No. 10	
5	439010	1	Lockwasher, 1/4" I.D.	
6	606033	2	Cable, #14-3, SJOW-A, 24"	
7	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
8	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
9	9102681	1	Wire, #14, Green/Yellow Hookup, 12"	
10	9103187	1	Switch, Padlock, 25A	
11	9103211	1	Guard, Bottom	
12	9103315	4	Washer, Cup, 10-32 UNF flat head screw	
13	9103433	8	Ferrule, #14 AWG, Blue	

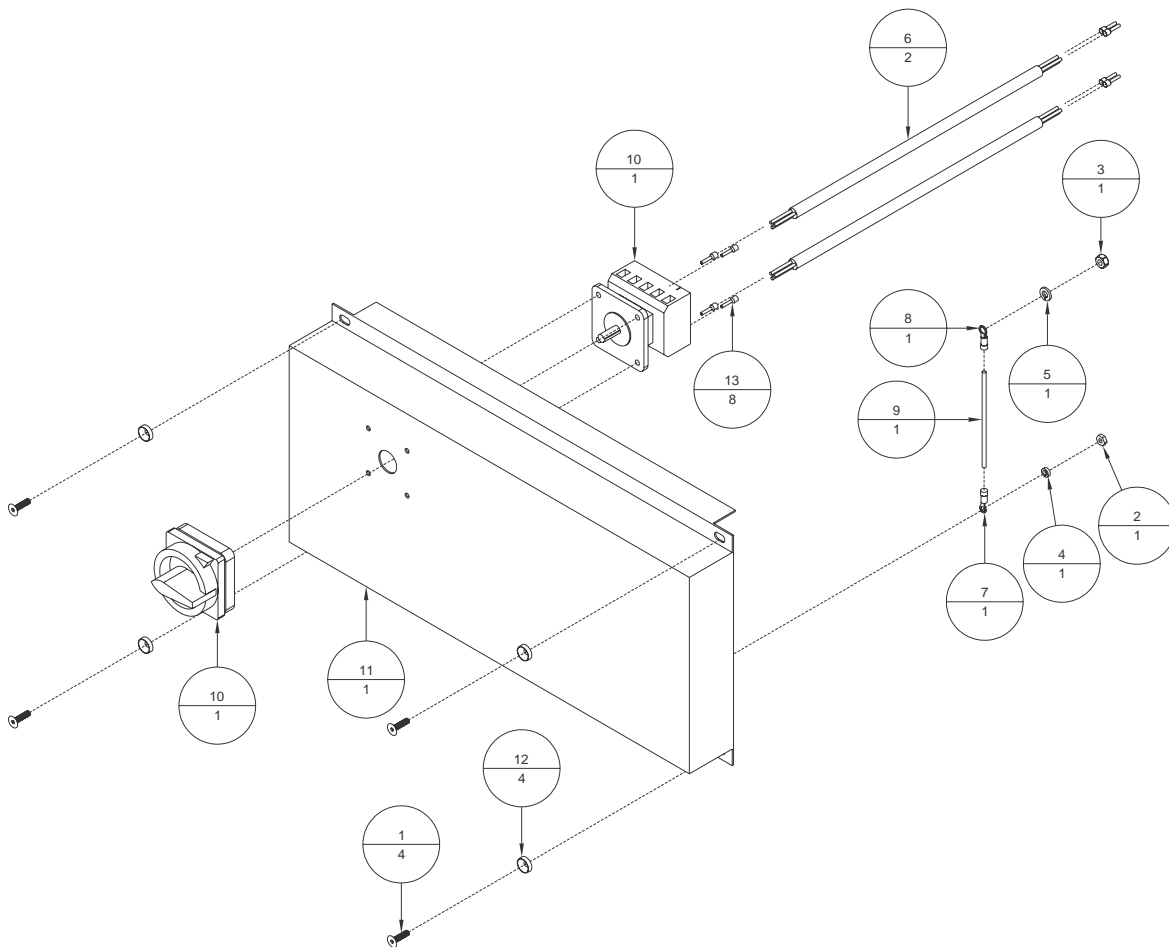
Figure A-20: *Front Guard Assembly, BK1700 (9103211A)*

Table A-21: *Umbilical Bracket Assembly (9103212A)*

Item	Part Number	Quantity	Description	Reference
1	404050	4	Screw, FHCS, 10-32 UNF x 3/4"	
2	9103212	1	Bracket, Cabinet Umbilicals	
3	9103315	4	Washer, Cup, 10-32 UNF Flat Head Screw	

Figure A-21: *Umbilical Bracket Assembly (9103212A)*

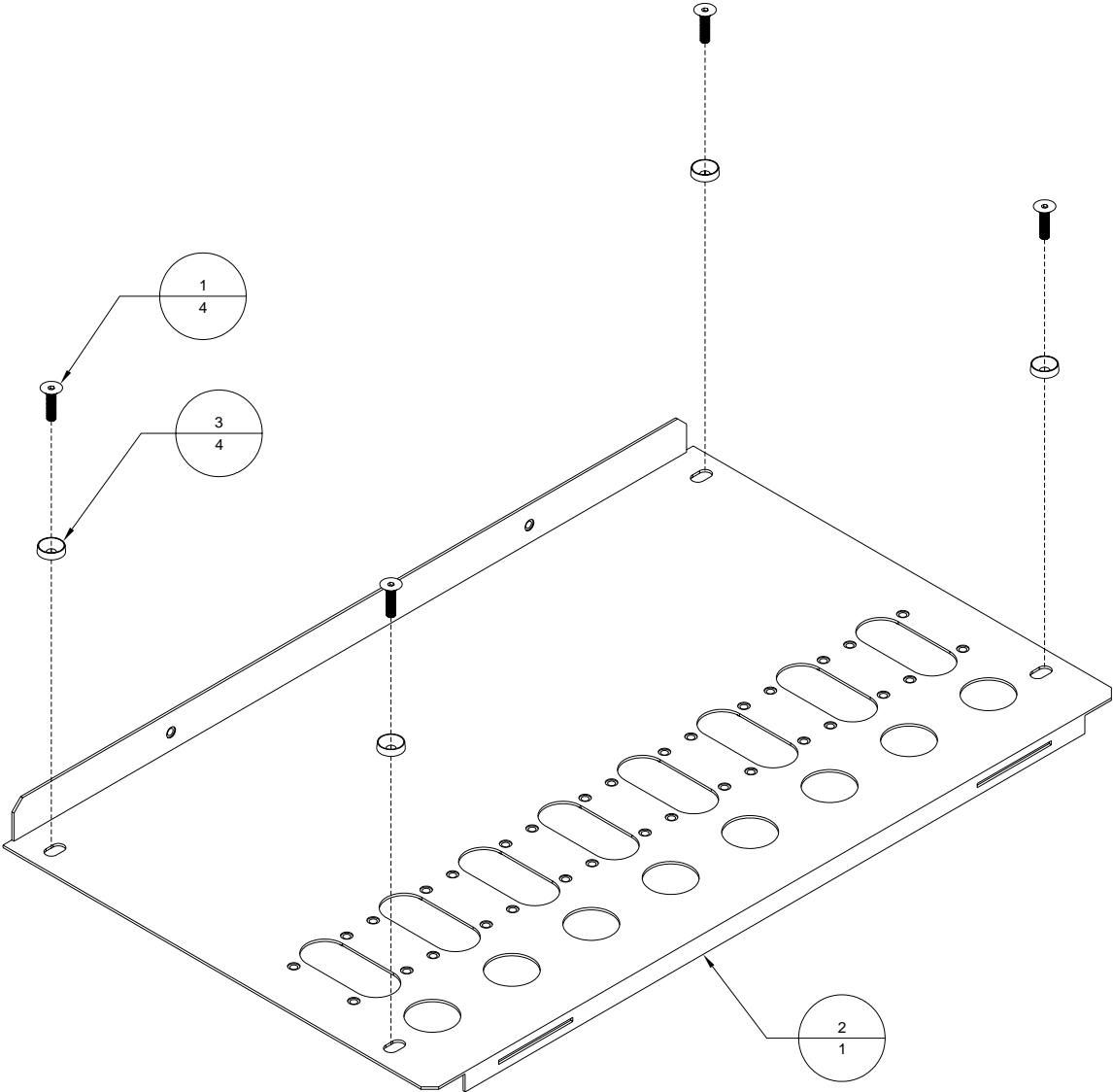


Table A-22: *Cover Assembly, 6U, BK1700 (9103213A)*

Item	Part Number	Quantity	Description	Reference
1	404050	4	Screw, FHCS, 10-32 UNF x 3/4"	
2	9103213	1	Cover, Blind, 6U	
3	9103315	4	Washer, Cup, 10-32 UNF Flat Head Screw	

Figure A-22: *Cover Assembly, 6U, BK1700 (9103213A)*

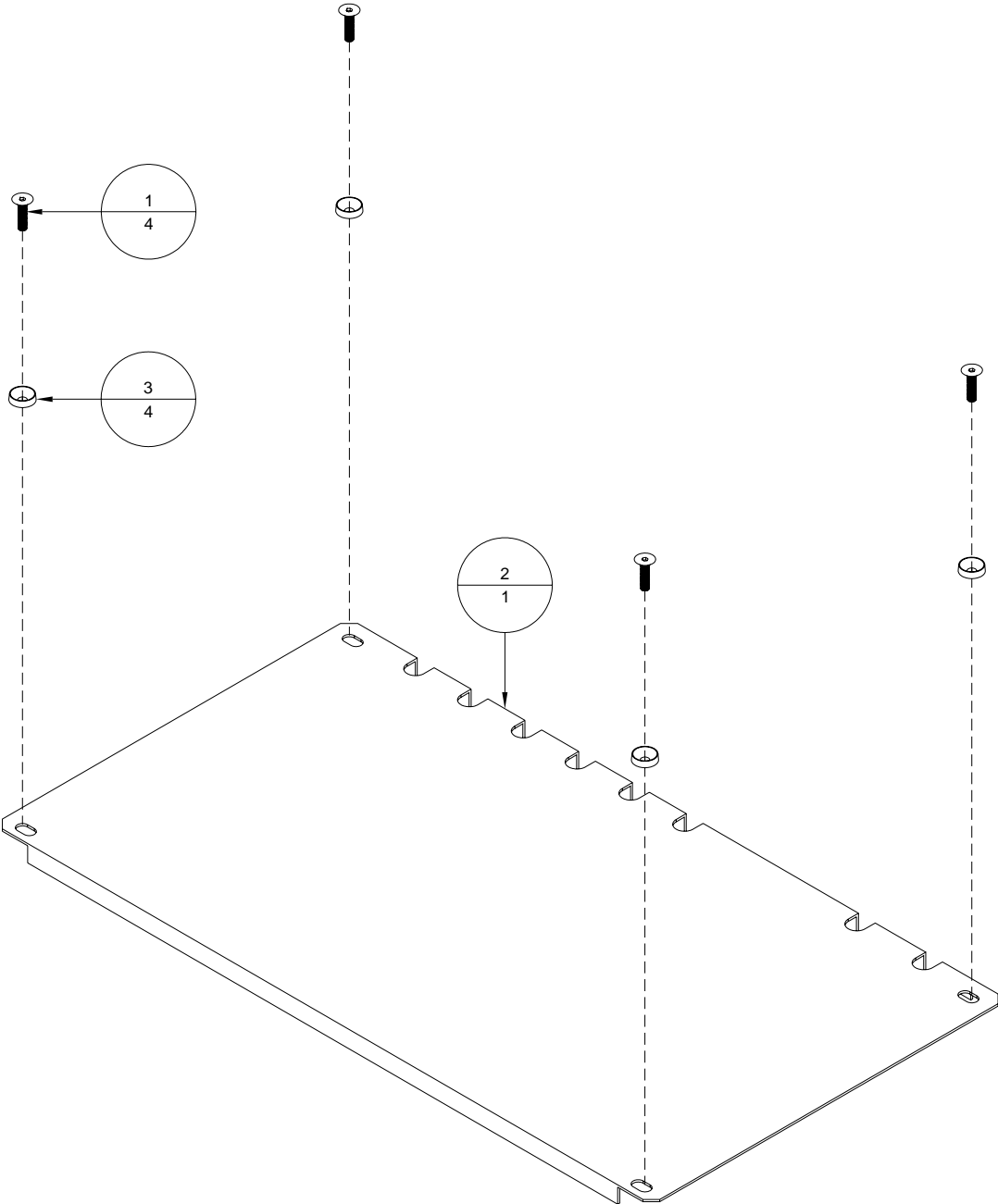


Table A-23: *Cover Assembly, 3U, BK1700 (9103217A)*

Item	Part Number	Quantity	Description	Reference
1	404050	4	Screw, FHCS, 10-32 UNF x $\frac{3}{4}$ "	
2	9103217	1	Cover, Blind, 3U	
3	9103315	4	Washer, Cup, 10-32 UNF Flat Head Screw	

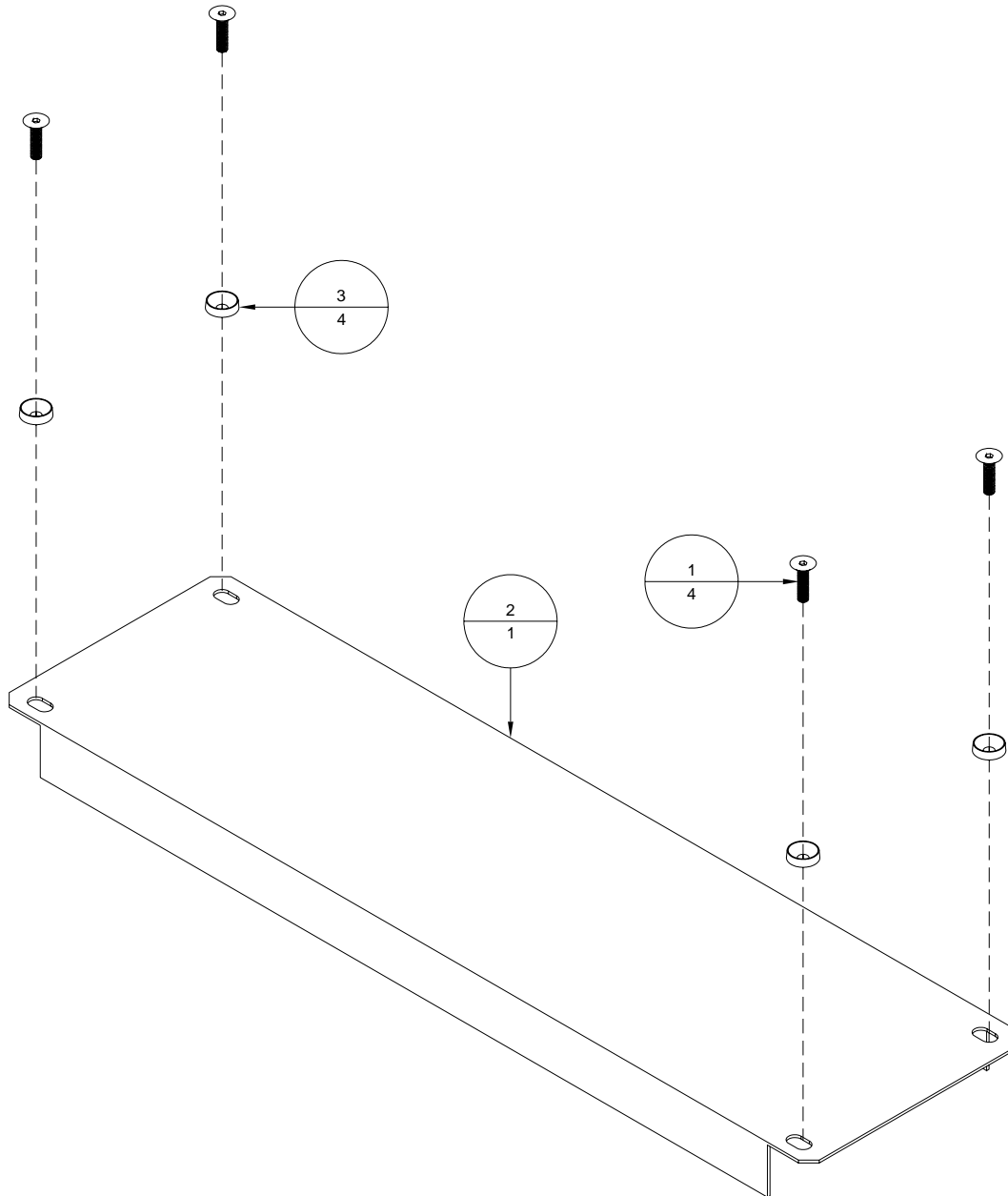
Figure A-23: *Cover Assembly, 3U, BK1700 (9103217A)*

Table A-24: *Castor Wheel Assembly (9103219A)*

Item	Part Number	Quantity	Description	Reference
1	420015	4	Nut, 5/16-18 UNC	
2	439015	4	Lockwasher, 5/16 I.D.	
3	440015	4	Washer, 5/16" ID	
4	9103219	1	Castor Wheel, 3" Dia	

Figure A-24: *Castor Wheel Assembly (9103219A)*

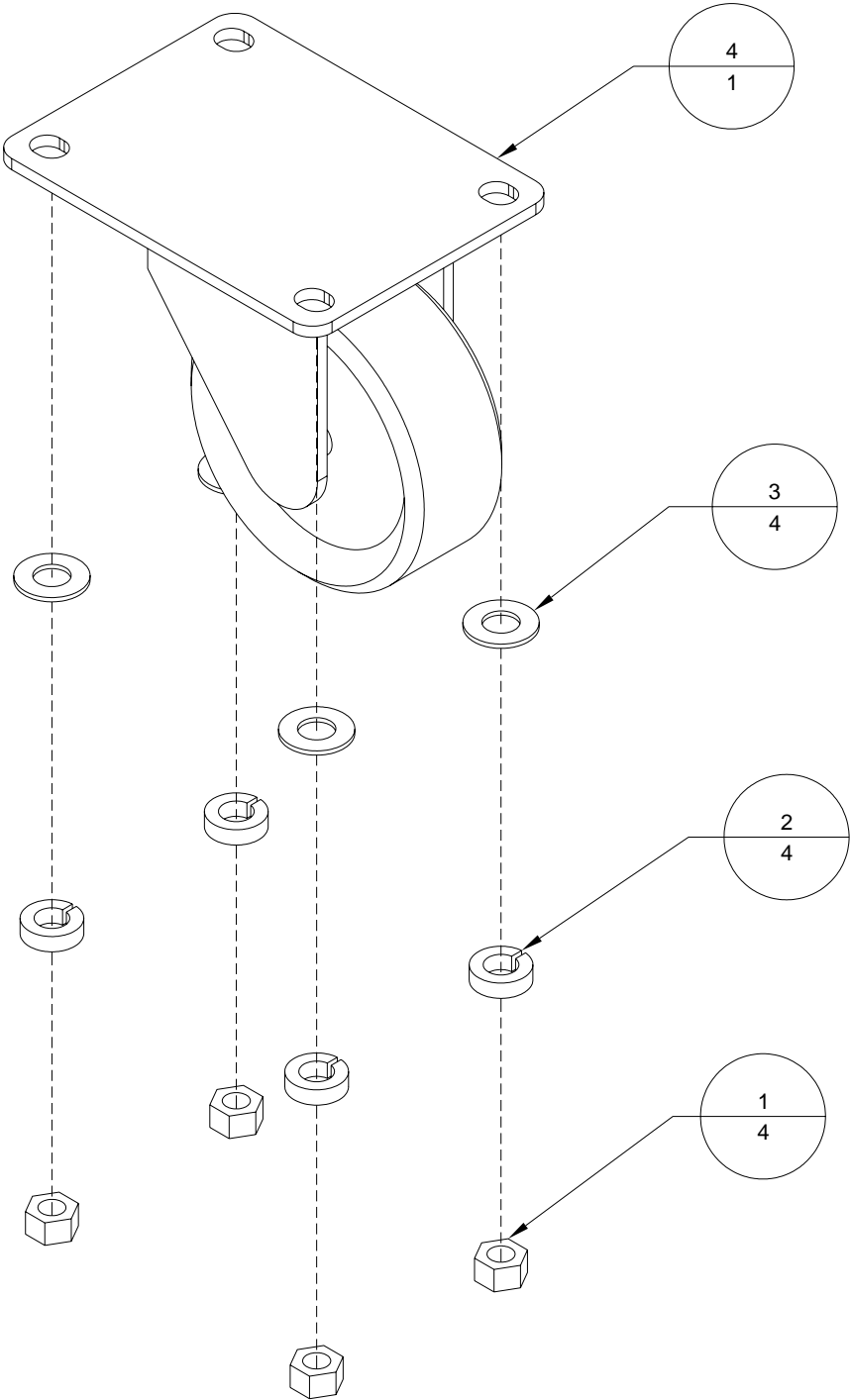


Table A-25: *Dongle Assembly (9103285A)*

Item	Part Number	Quantity	Description	Reference
1	9103278	1	Dongle, USB	
2	9103285	1	Ball Chain, No. 10, 4.5"	
3	9103286	2	Ball Chain Coupling Type "D"	
4	9103287	1	Split Ring, 0.52" I.D.	

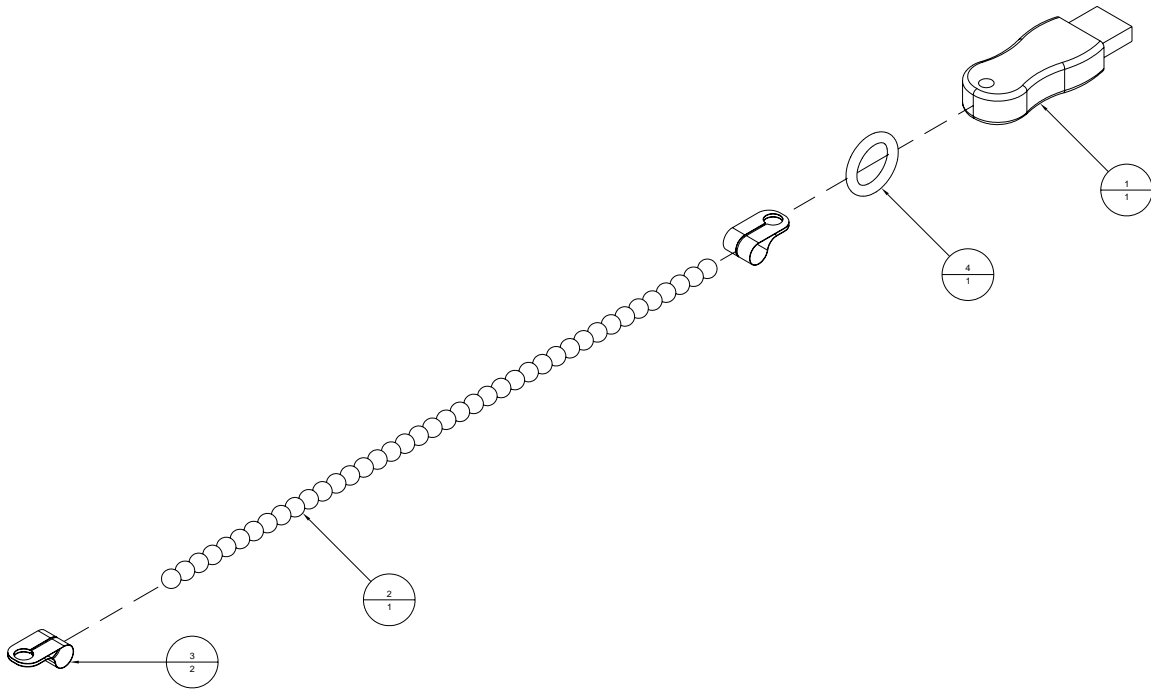
Figure A-25: *Dongle Assembly (9103285A)*

Table A-26: *Cover Assembly, Blind Umbilical, BK1700 (9103288A)*

Item	Part Number	Quantity	Description	Reference
1	404510	2	Screw, BHCS, 10-32 UNF x ¼"	
2	9103288	1	Cover, Cabinet Umbilical, Blind	

Figure A-26: *Cover Assembly, Blind Umbilical, BK1700 (9103288A)*

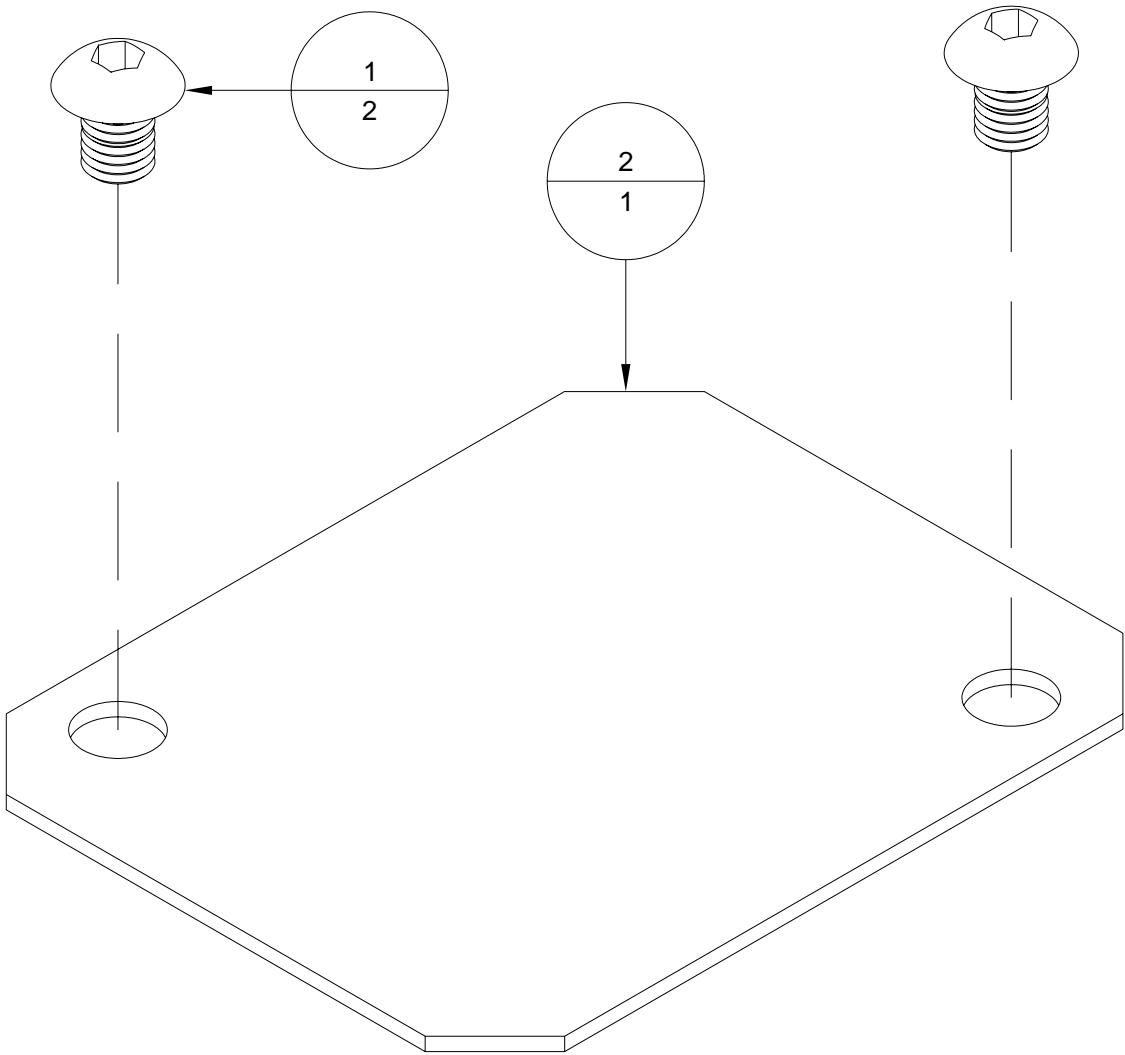


Table A-27: *Rear Guard Assembly (9103315A)*

Item	Part Number	Quantity	Description	Reference
1	404050	4	Screw, FHCS, 10-32 UNF x ¾"	
2	420008	1	Nut, 10-32 UNF	
3	420010	1	Nut, ¼-20 UNC	
4	439009	1	Lockwasher, No. 10	
5	439010	1	Lockwasher, ¼" I.D.	
6	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
7	609120	1	Terminal, Ring, ¼", 16-14 AWG, Non-Insulated	
8	615425	1	Hole Plug, 7/8"	
9	9102681	1	Wire, #14, Green/Yellow Hookup, 12"	
10	9103211	1	Guard, Bottom	
11	9103315	4	Washer, Cup, 10-32 UNF Flat Head Screw	
12	9103403	4	Hole Plug, Dome, 0.187"	

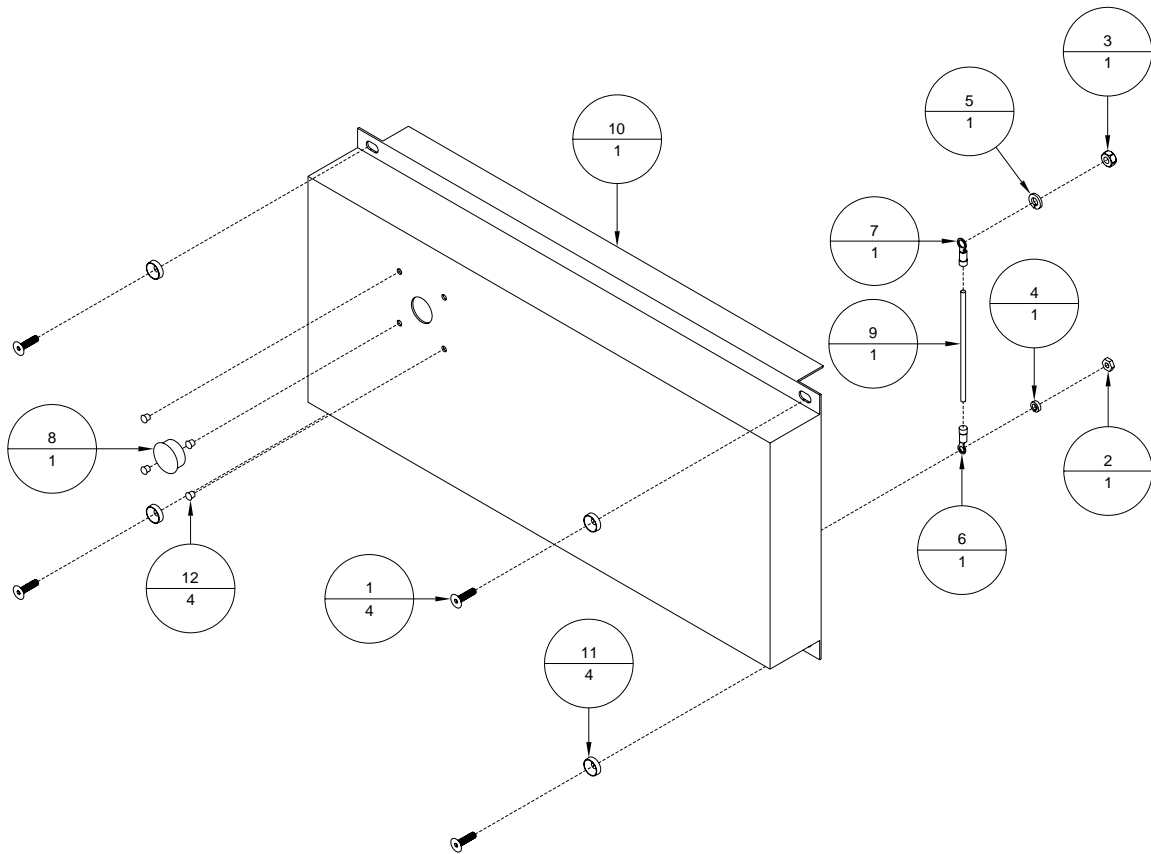
Figure A-27: *Rear Guard Assembly (9103315A)*

Table A-28: *Side Door Assembly, Left, BK1700 (9103360A)*

Item	Part Number	Quantity	Description	Reference
1	404240	4	Screw, SHCS, 10-32 UNF x 5/8"	
2	404250	4	Screw, SHCS, 10-32 UNF x 3/4"	
3	420008	1	Nut, 10-32 UNF	
4	420010	1	Nut, 1/4-20 UNC	
5	439009	1	Lockwasher, No. 10	
6	439010	1	Lockwasher, 1/4" I.D.	
7	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
8	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
9	9102681	1	Wire, #14, Green/Yellow Hookup, 15"	
10	9103360	1	Door, Side, Cabinet, Right	
11	9103372	2	Hinge, Front Mount, Adjustable	
12	9103373	1	Latch, Quarter Turn	

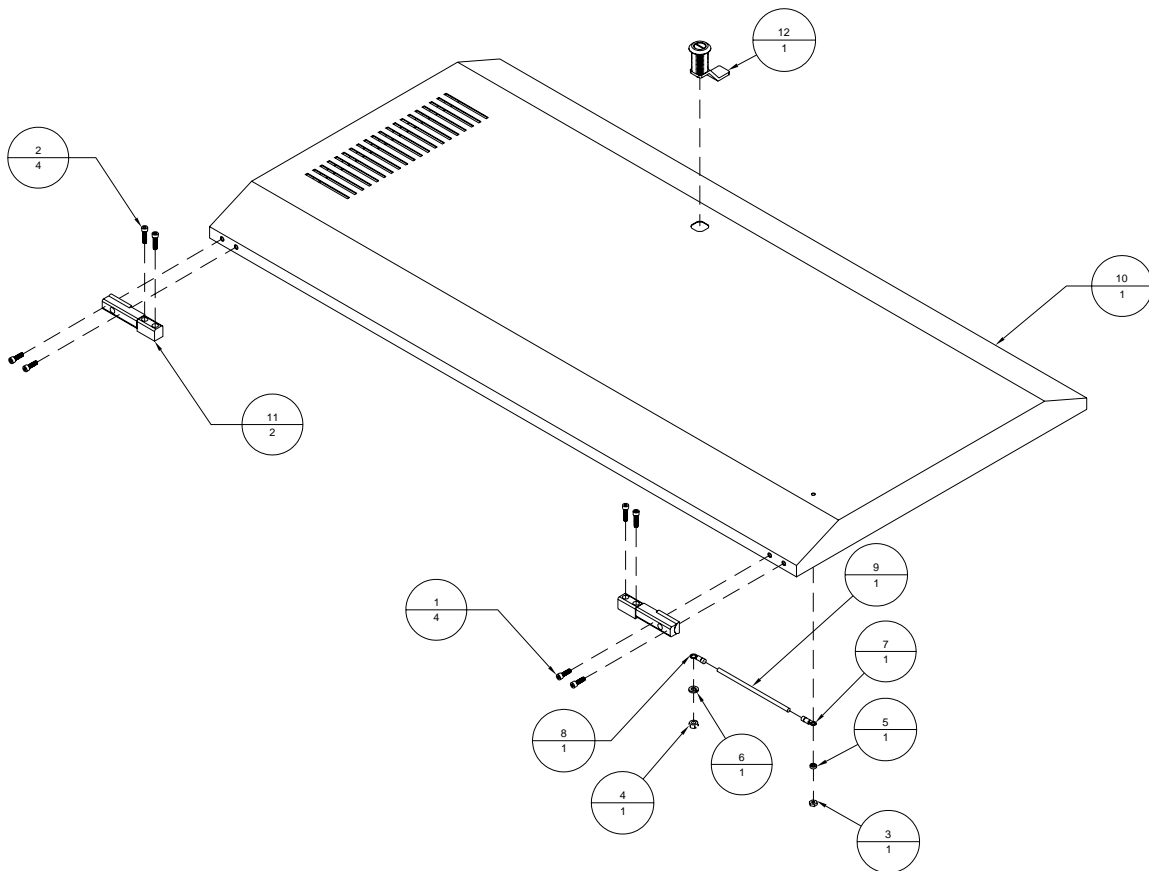
Figure A-28: *Side Door Assembly, Left, BK1700 (9103360A)*

Table A-29: *Side Door Assembly, Bottom (9103362A)*

Item	Part Number	Quantity	Description	Reference
1	404240	4	Screw, SHCS, 10-32 UNF x 5/8"	
2	404250	4	Screw, SHCS, 10-32 UNF x 3/4"	
3	420008	1	Nut, 10-32 UNF	
4	420010	1	Nut, 1/4-20 UNC	
5	439009	1	Lockwasher, No. 10	
6	439010	1	Lockwasher, 1/4" I.D.	
7	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
8	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
9	9102681	1	Wire, #14, Green/Yellow Hookup, 20"	
10	9103362	1	Door, Side, Cabinet, Short	
11	9103372	2	Hinge, Front Mount, Adjustable	
12	9103373	1	Latch, Quarter Turn	

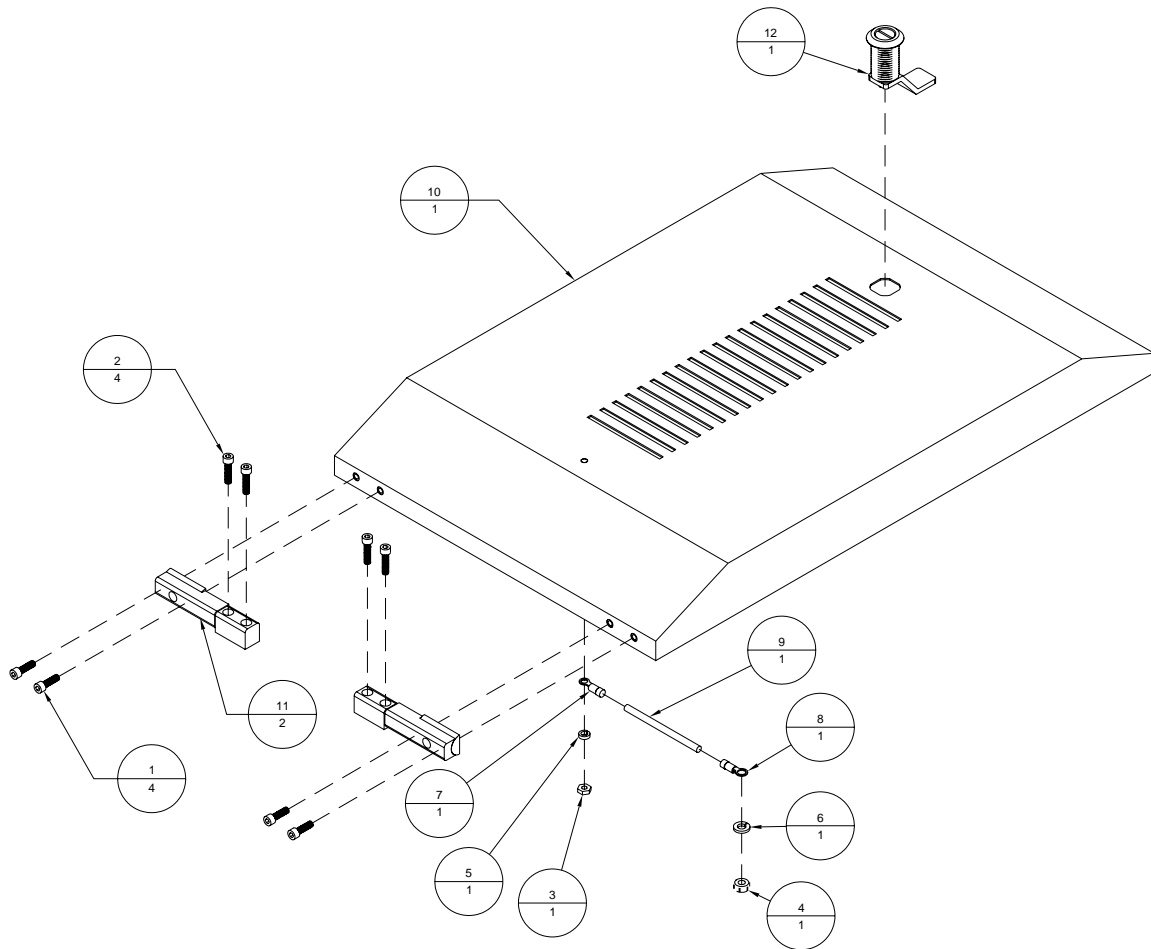
Figure A-29: *Side Door Assembly, Bottom (9103362A)*

Table A-30: *Controller Top Assembly, BK1700 (9103407A)*

Item	Part Number	Quantity	Description	Reference
1	404530	8	Screw, BHCS, 10-32 UNF x 1/2"	
2	420008	2	Nut, 10-32 UNF	
3	439008	4	Lockwasher, No.10, External Tooth	
4	440008	2	Washer, #10 ID	
5	615426	1	Hole Plug, 1 1/8"	
6	9103406	1	Mount, Monitor, LCD, BK1700	
7	9103407	1	Bracket, Blind, Dual monitor	
8	9103409A	2	Side door assembly, Top	Page A-38

Figure A-30: *Controller Top Assembly, BK1700 (9103407A)*

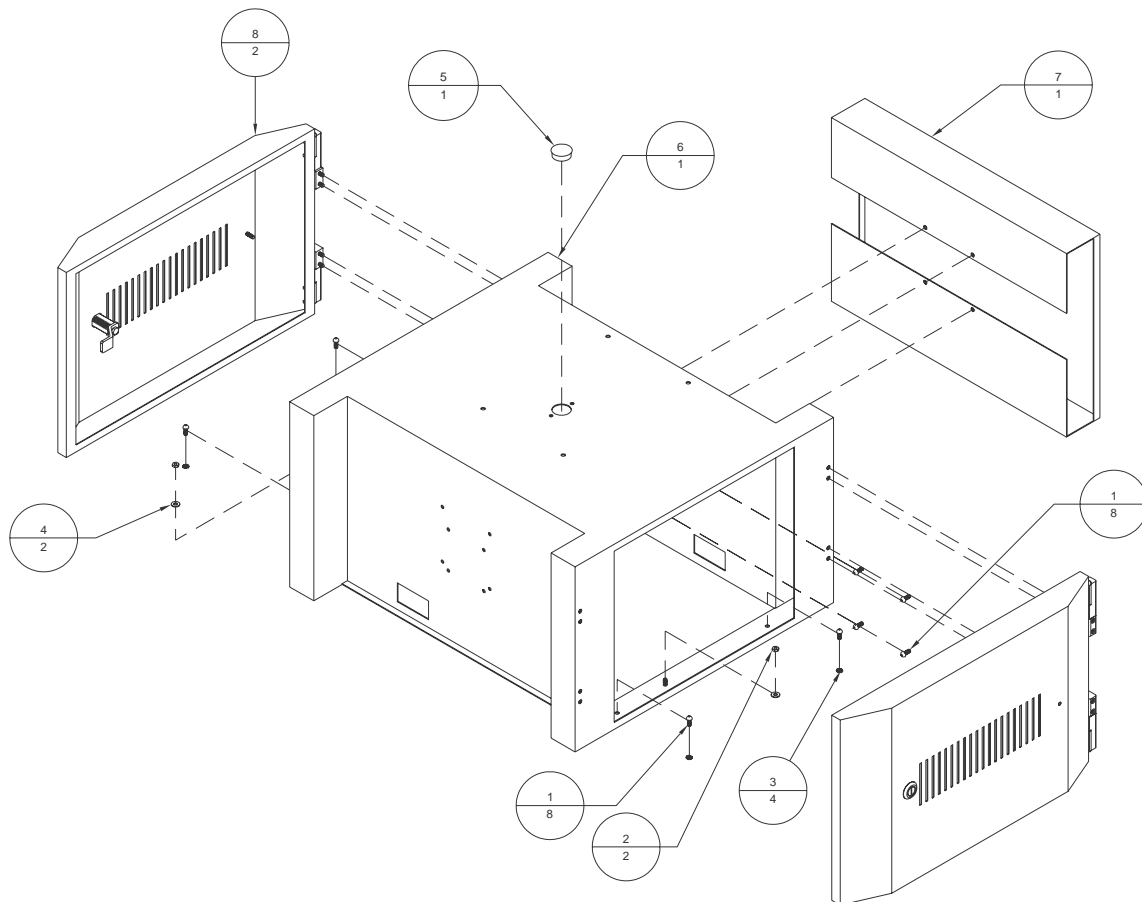


Table A-31: *Side Door Assembly, Right, BK1700 (9103408A)*

Item	Part Number	Quantity	Description	Reference
1	404240	4	Screw, SHCS, 10-32 UNF x 5/8"	
2	404250	4	Screw, SHCS, 10-32 UNF x 3/4"	
3	420008	1	Nut, 10-32 UNF	
4	420010	1	Nut, 1/4-20 UNC	
5	439009	1	Lockwasher, No. 10	
6	439010	1	Lockwasher, 1/4" I.D.	
7	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
8	609120	1	Terminal, ring, 1/4", 16-14 AWG, Non-Insulated	
9	9102681	1	Wire, #14, Green/Yellow Hookup, 15"	
10	9103372	2	Hinge, Front Mount, Adjustable	
11	9103373	1	Latch, Quarter Turn	
12	9103408	1	Door, Side, Cabinet, Left	

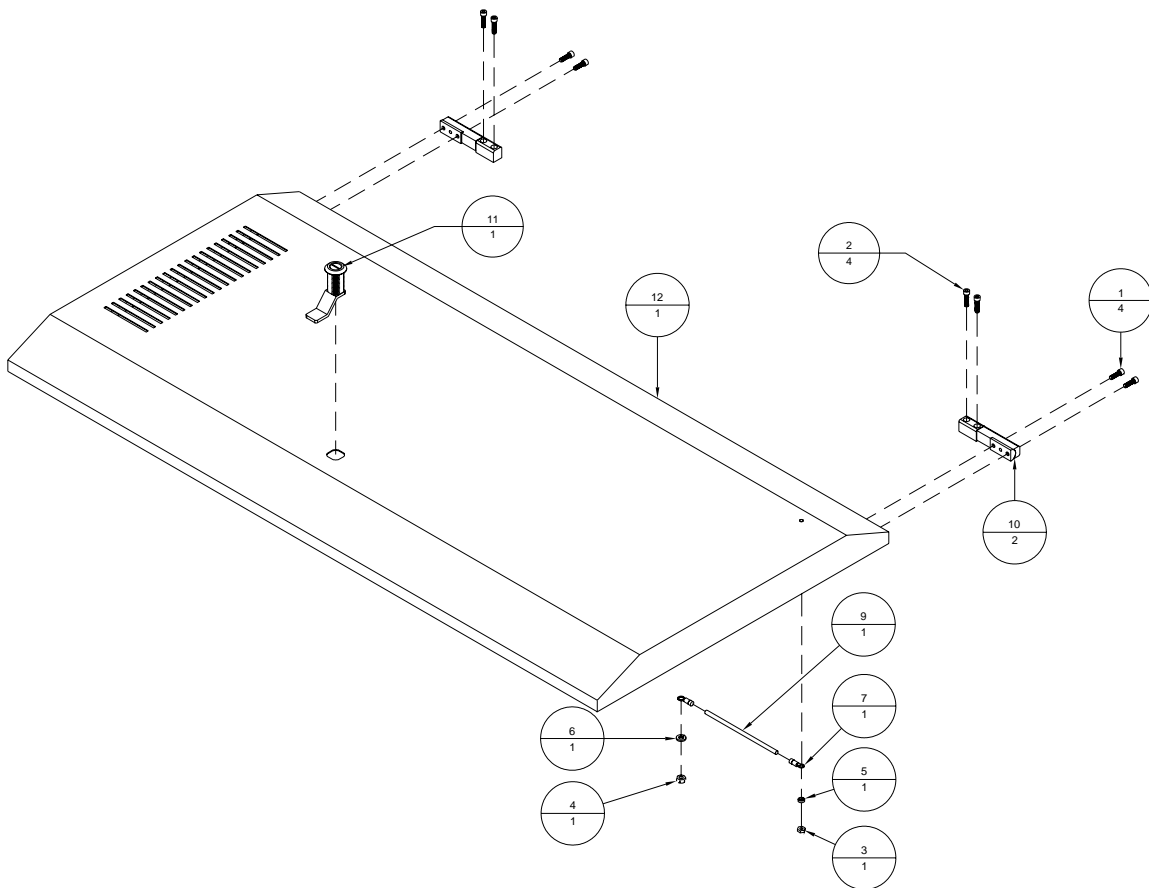
Figure A-31: *Side Door Assembly, Right, BK1700 (9103408A)*

Table A-32: *Side Door Assembly, Top (9103409A)*

Item	Part Number	Quantity	Description	Reference
1	404240	4	Screw, SHCS, 10-32 UNF x 5/8"	
2	404250	4	Screw, SHCS, 10-32 UNF x 3/4"	
3	9103362	1	Door, Side, Cabinet, Short	
4	9103372	2	Hinge, Front Mount, Adjustable	
5	9103373	1	Latch, Quarter Turn	

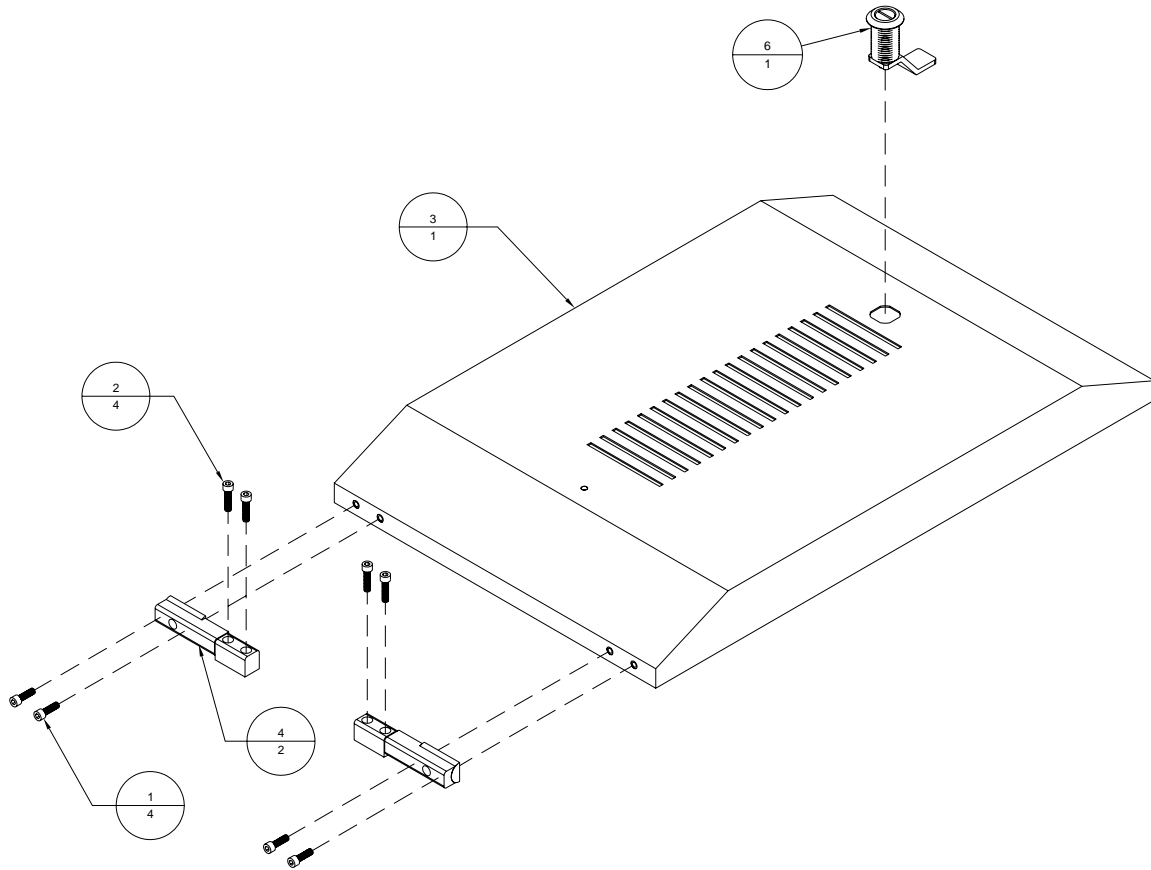
Figure A-32: *Side Door Assembly, Top (9103409A)*

Table A-33: *Back Cover Support Assembly (9103423A)*

Item	Part Number	Quantity	Description	Reference
1	404050	2	Screw, FHCS, 10-32 UNF x ¾"	
2	9103315	2	Washer, Cup, 10-32 UNF Flat Head Screw	
3	9103423	1	Bracket, Back Cover Support	

Figure A-33: *Back Cover Support Assembly (9103423A)*

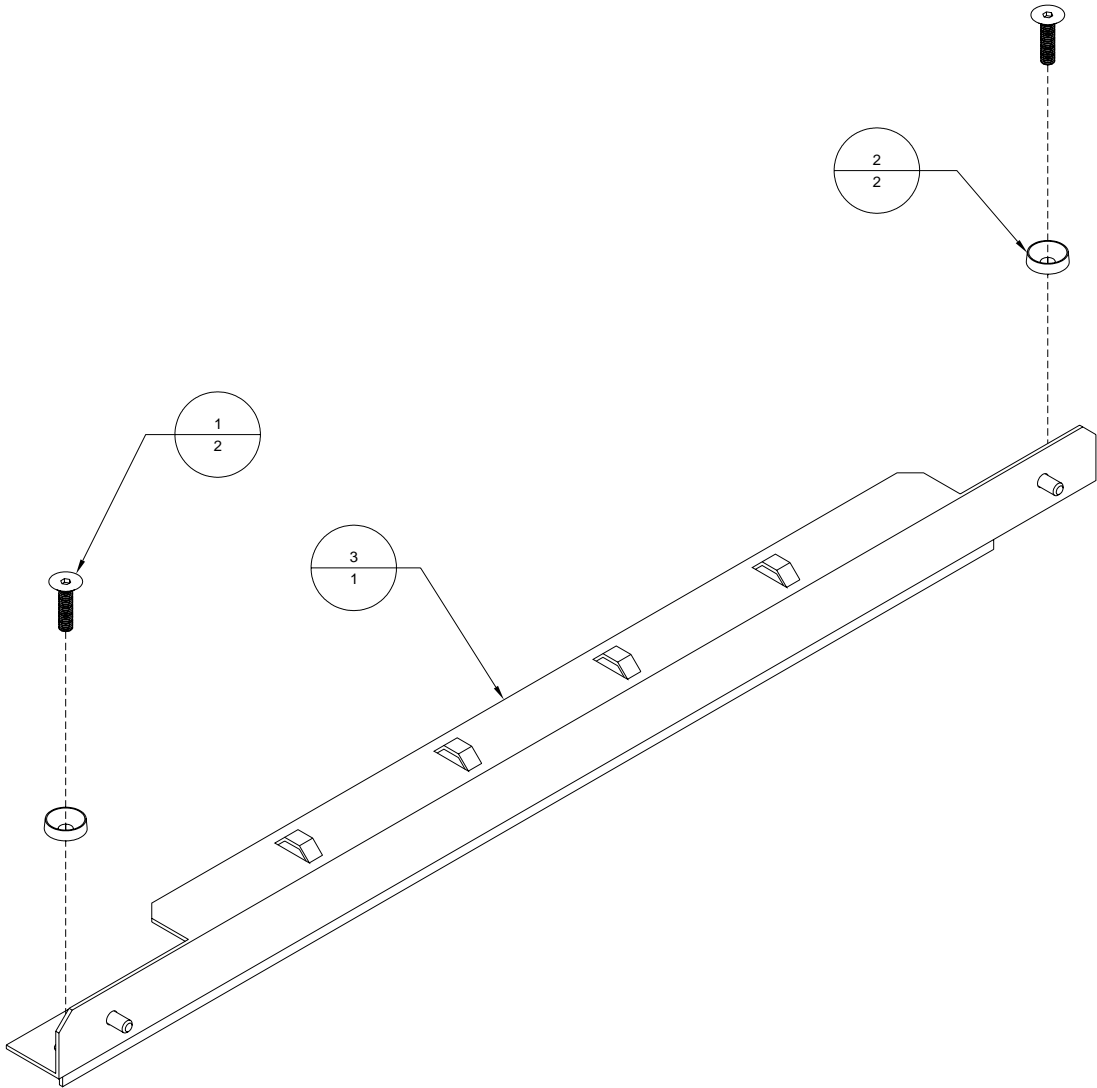


Table A-34: *Cable Bracket Assembly (9103425A)*

Item	Part Number	Quantity	Description	Reference
1	404050	2	Screw, FHCS, 10-32 UNF x $\frac{3}{4}$ "	
2	9103315	2	Washer, Cup, 10-32 UNF Flat Head Screw	
3	9103425	1	Bracket, Gap Cover, Front	

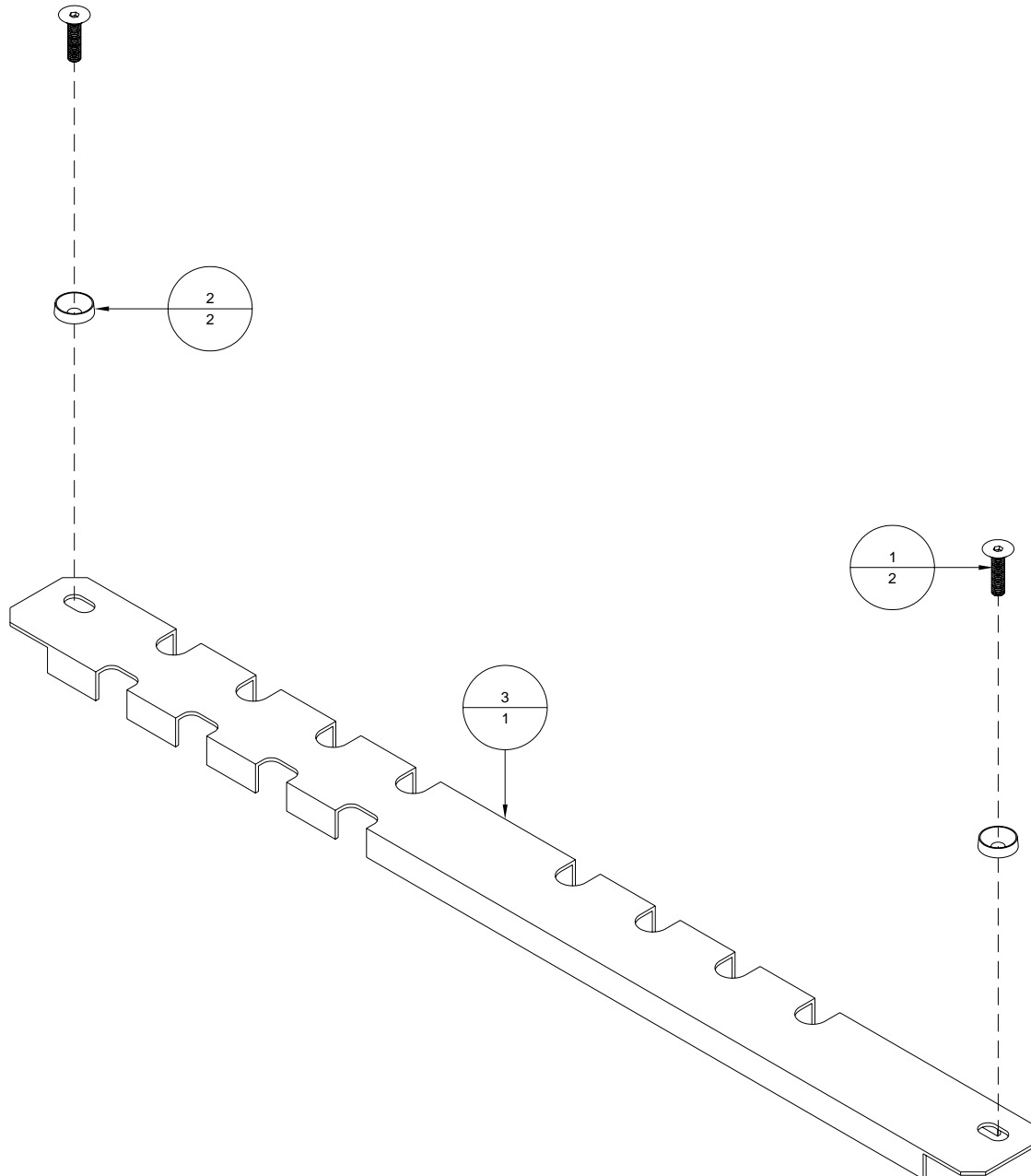
Figure A-34: *Cable Bracket Assembly (9103425A)*

Table A-35: *Terminal Block Assembly, Main, BK1700 (9103447A)*

Item	Part Number	Quantity	Description	Reference
1	404530	2	Screw, BHCS, 10-32 UNF x 1/2"	
2	439009	2	Lockwasher, No. 10	
3	440008	2	Washer, #10 ID	
4	606008	1	Wire, #14, White, Hookup, 12"	
5	606010	1	Wire, #14, Black, Hookup, 12"	
6	606033	2	Cable, #14-3, SJOW-A, 55"	
7	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
8	614104	2	Plug Connector, 17-3, Standard	
9	614110	6	Socket, Power Contact	
10	614140	2	Cable Clamp, Shell 17	
11	615021	1	T Rail, DIN, 7"	
12	9100218	2	Label, Fuse, T15A L 250V	
13	9102046	1	Terminal Marker, WS 12/6, L1	
14	9102047	1	Terminal Marker, WS 12/6, L2	
15	9102050	2	Terminal Marker, WS 12/6, L	
16	9102051	2	Terminal Marker, WS 12/6, N	
17	9102681	1	Wire, #14, Green/Yellow Hookup, 7"	
18	9103433	11	Ferrule, #14 AWG, Blue	
19	9103436	6	Terminal block, Z-roofstyle, ZDU 4-2/4AN	
20	9103437	1	Terminal block, Z-roofstyle, ground, ZPE 4-2/4AN	
21	9103438	3	End plate, ZAP ZDU 4-2/4AN	
22	9103442	3	End bracket, EW 35	
23	9103447	2	Fuse holder, 13/32" dia.	
24	9103448	2	Fuse, 15A, 250V, 13/32 x 1-1/2", Slo-blo	

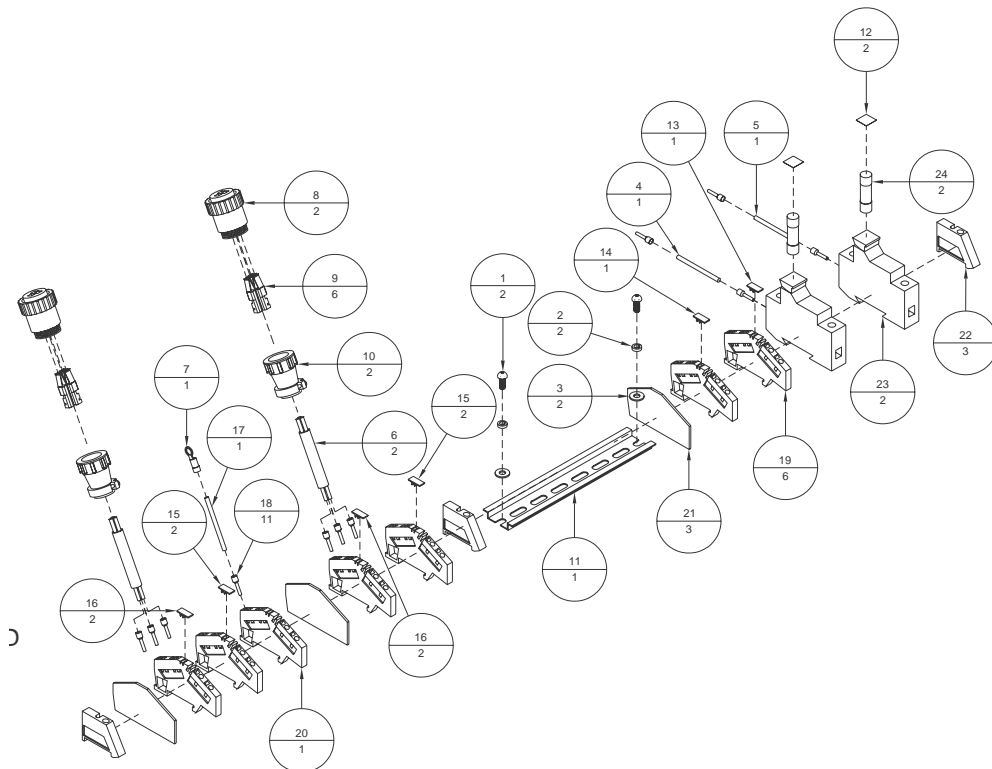
Figure A-35: *Terminal Block Assembly, Main, BK1700 (9103447A)*

Table A-36: *Cover Assembly, Blind Card, BK1700 (9103455A)*

Item	Part Number	Quantity	Description	Reference
1	402210	4	Screw, SHCS, 6-32 UNC x 1/4"	
2	9102909	2	Screw, M2.5 x 6, cross recessed panhead	
3	9102986	2	Handle, HCC and RCC	
4	9103455	1	Bracket, Blind, Card	

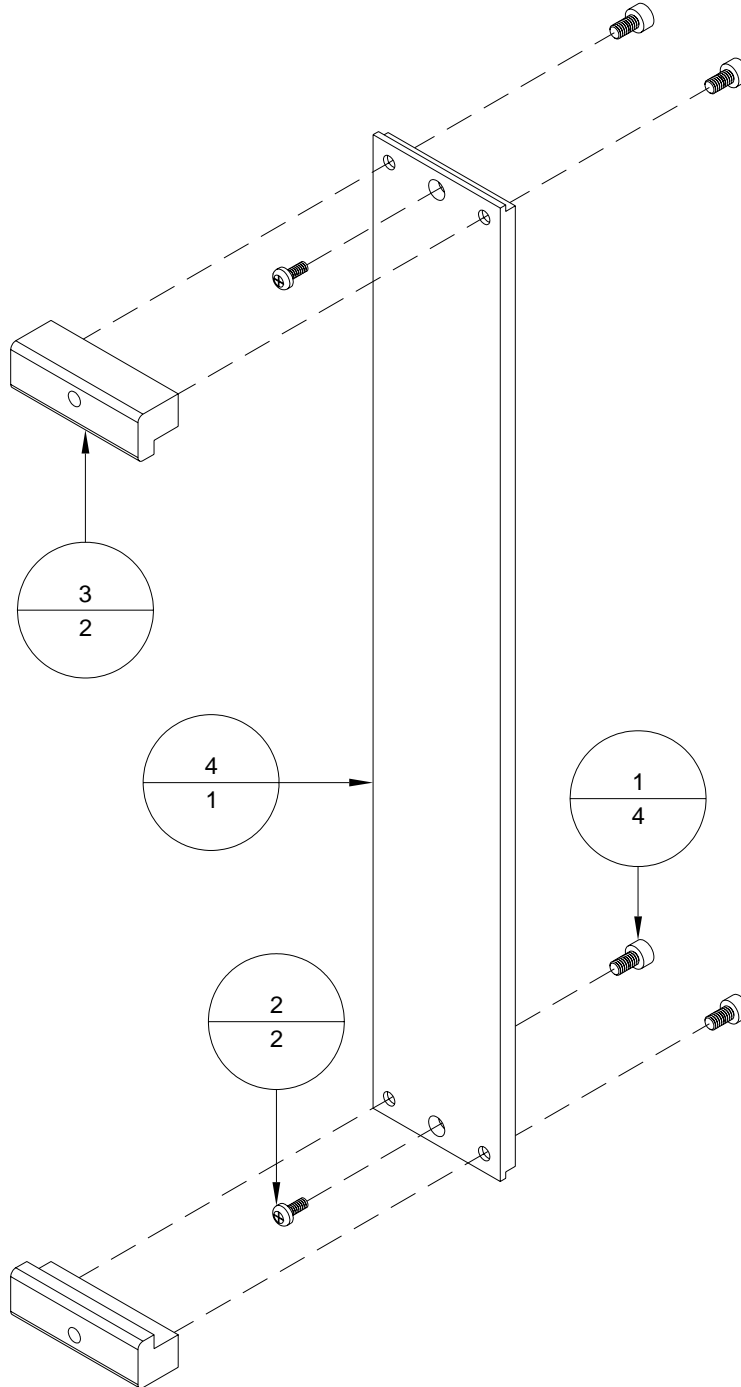
Figure A-36: *Cover Assembly, Blind Card, BK1700 (9103455A)*

Table A-37: *Crossbar Assembly, Generic (9103464A)*

Item	Part Number	Quantity	Description	Reference
1	405270	2	Screw, SHCS, ¼-20 UNC x 1"	
2	9102094A	2	Profile Bar Assembly	Page A-17
3	9103464	1	Crossbar, Printhead Parking Bracket	

Figure A-37: *Crossbar Assembly, Generic (9103464A)*

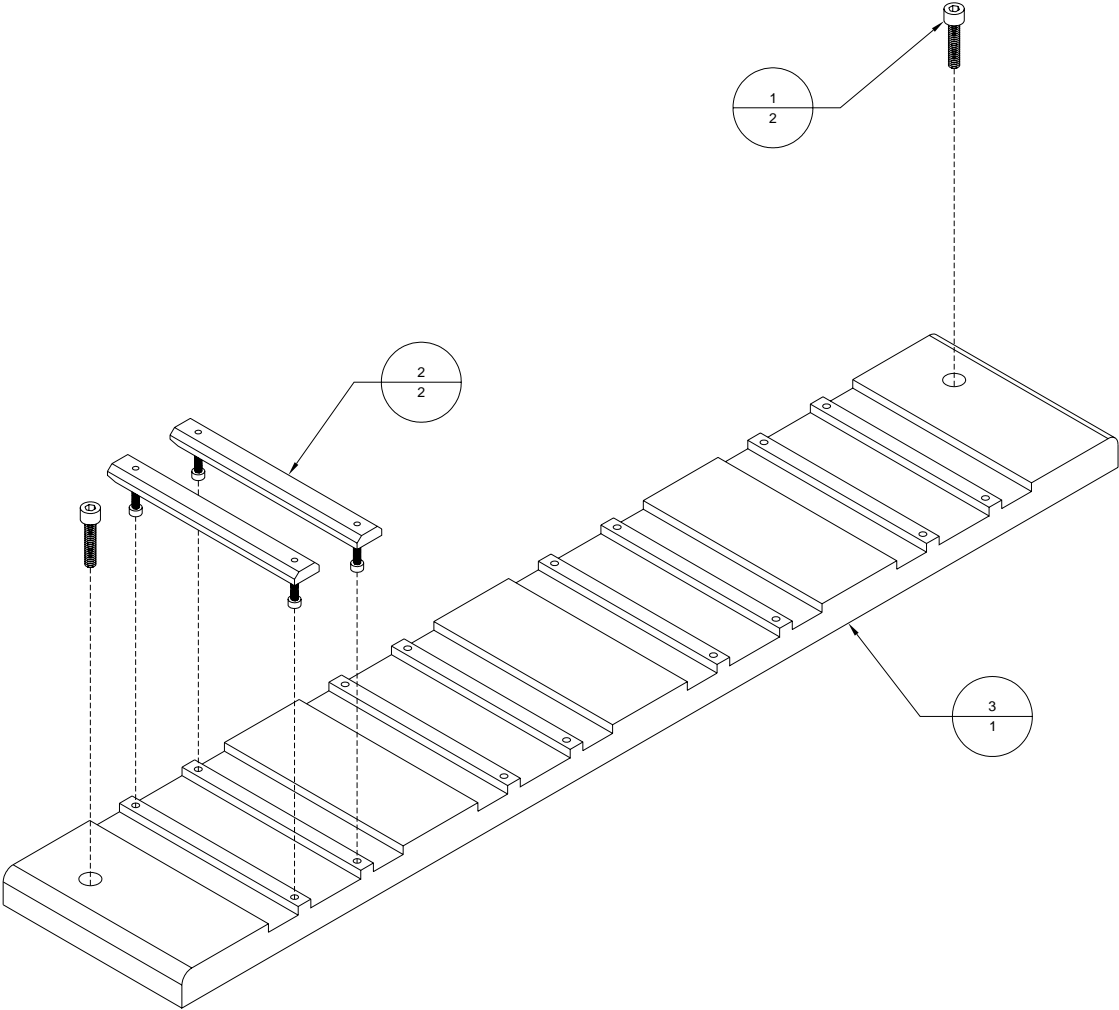


Table A-38: *Cover Assembly, Backplane, Dual (9103493A)*

Item	Part Number	Quantity	Description	Reference
1	403520	4	Screw, BHCS, 8-32 UNC x 3/8"	
2	420008	1	Nut, 10-32 UNF	
3	420010	1	Nut, 1/4-20 UNC	
4	439009	1	Lockwasher, No. 10	
5	439010	1	Lockwasher, 1/4" I.D.	
6	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
7	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
8	9102681	1	Wire, #14, Green/Yellow Hookup, 20"	
9	9103493	1	Cover, Backplane, Guard Double	

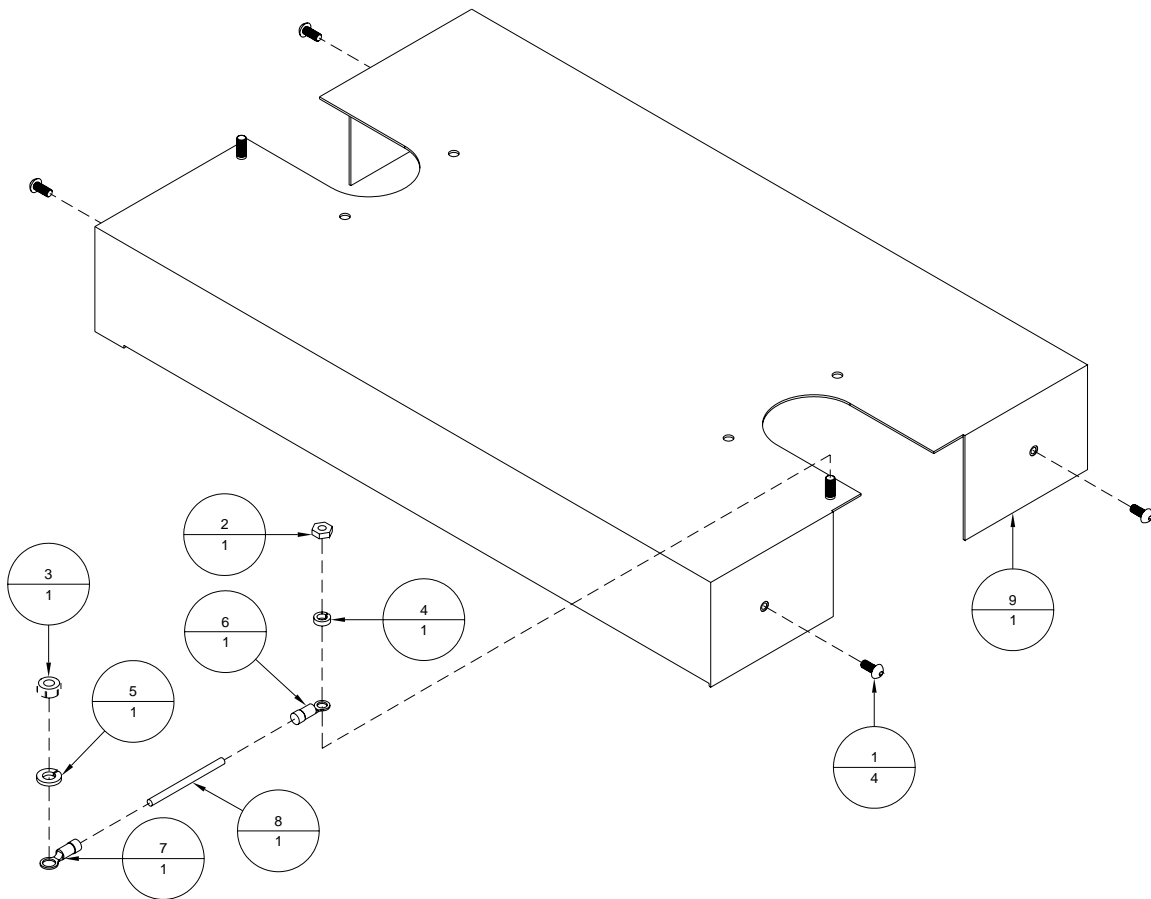
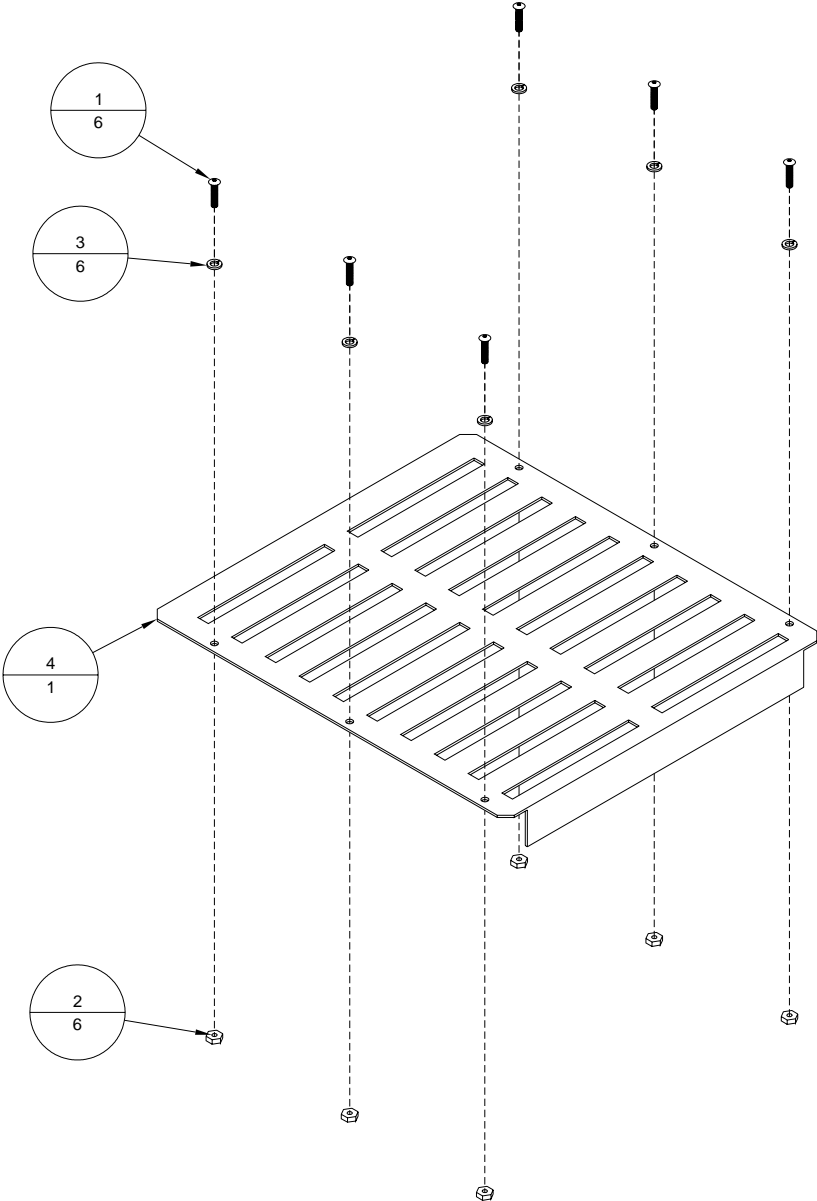
Figure A-38: *Cover Assembly, Backplane, Dual (9103493A)*

Table A-39: *Electronics Rack Cover Assembly (9103564A)*

Item	Part Number	Quantity	Description	Reference
1	609000	1	Shrink Wrap, 3/16" I.D. x 1"	
2	9102426	2	Terminal, Male Crimp	
3	9103312	1	Connector, Male, 2-Pin, SL	
4	9103473	1	Pump, 12 VDC, diaphragm, brushless	

Figure A-39: *Electronics Rack Cover Assembly (9103564A)*



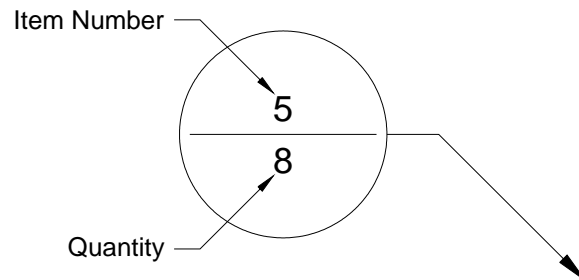
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Balloon Annotation and Parts Listing



Item	Part Number	Quantity	Description	Reference
1				
2				

The following is a description of how to interpret the information in this section:

Item:

This column indicates the item number used for each unique part in an assembly drawing.

It is matched with the top number in the balloon pointing at the associated part.

Part Number:

This column represents the Buskro part number.

Quantity:

This represents the total number of a given part in an assembly. It is matched with the bottom number in the balloon pointing at the associated part.

Description:

This column contains a brief description of the part.

Reference:

This column indicates the page location for sub-assemblies.

Table B-1: *Controller, BK1700, Atlas (BK1700AU)*

Item	Part Number	Quantity	Description	Reference
1	402310	1	Screw, PHMS, 6-32 UNC x 1/4"	
2	615426	8	Hole Plug, 1 1/8"	
3	9101627	1	Buskro Serial Number Label	
4	9103237A	1	Cable, System Communication, 50"	
5	9103285A	1	Dongle Assembly	Page A-31
6	BK-1700-FRM	1	Frame, Rack Type, BK1700 Controller	Page A-4
7	BK-IDM-4A	1	Module, Atlas Ink Delivery, 4 Channel	Page B-4
8	BK-MON-LCD17	1	Monitor, 17" LCD Display	Page A-8
9	BK-PCM-8A	1	Module, BK1700 PC, 8 Channel	Page A-9
10	BK-PSM-4A	1	Module, Atlas Power Supply, 4 Channel	Page B-5
11	BK-PVM-4A	1	Module, Pressure/Vacuum, 4 Channel	Page C-3
12	BK-RACK-4	1	Rack, Frame, Backplane, 4 Channel	Page A-12
13	BK-RCC-4A	1	Reservoir Control Card Assembly	Page A-13

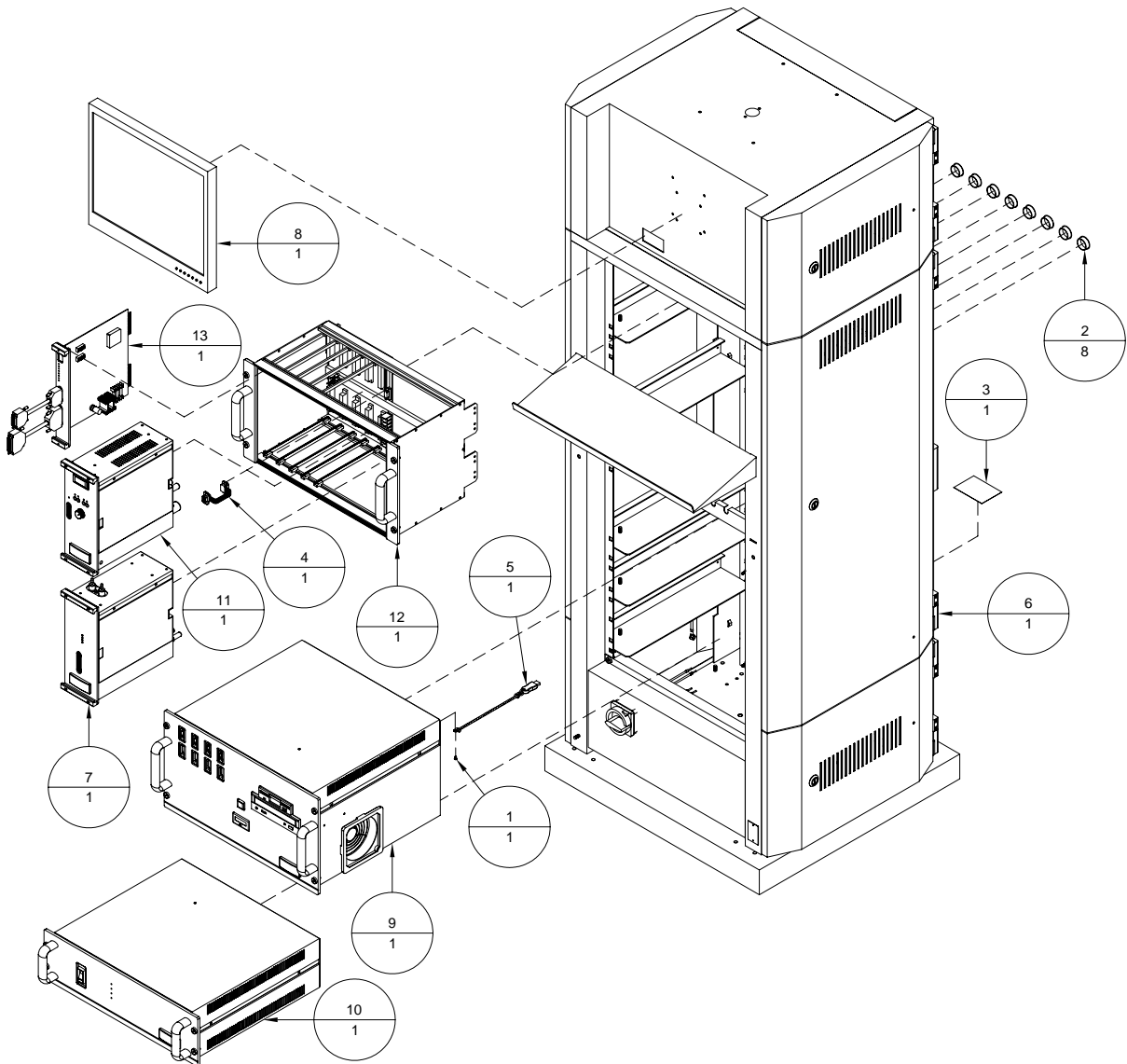
Figure B-1: *Controller, BK1700, Atlas (BK1700AU)*

Table B-2: *Module, Atlas Ink Delivery, 4 Channel (BK-IDM-4A)*

Item	Part Number	Quantity	Description	Reference
1	9100895	1	Ink, Monet Black, 1L	
2	9102942A	1	Pumping Station Assembly, Atlas	Page B-9
3	9103430A	1	Ink Bottle Bracket Assembly	Page B-21

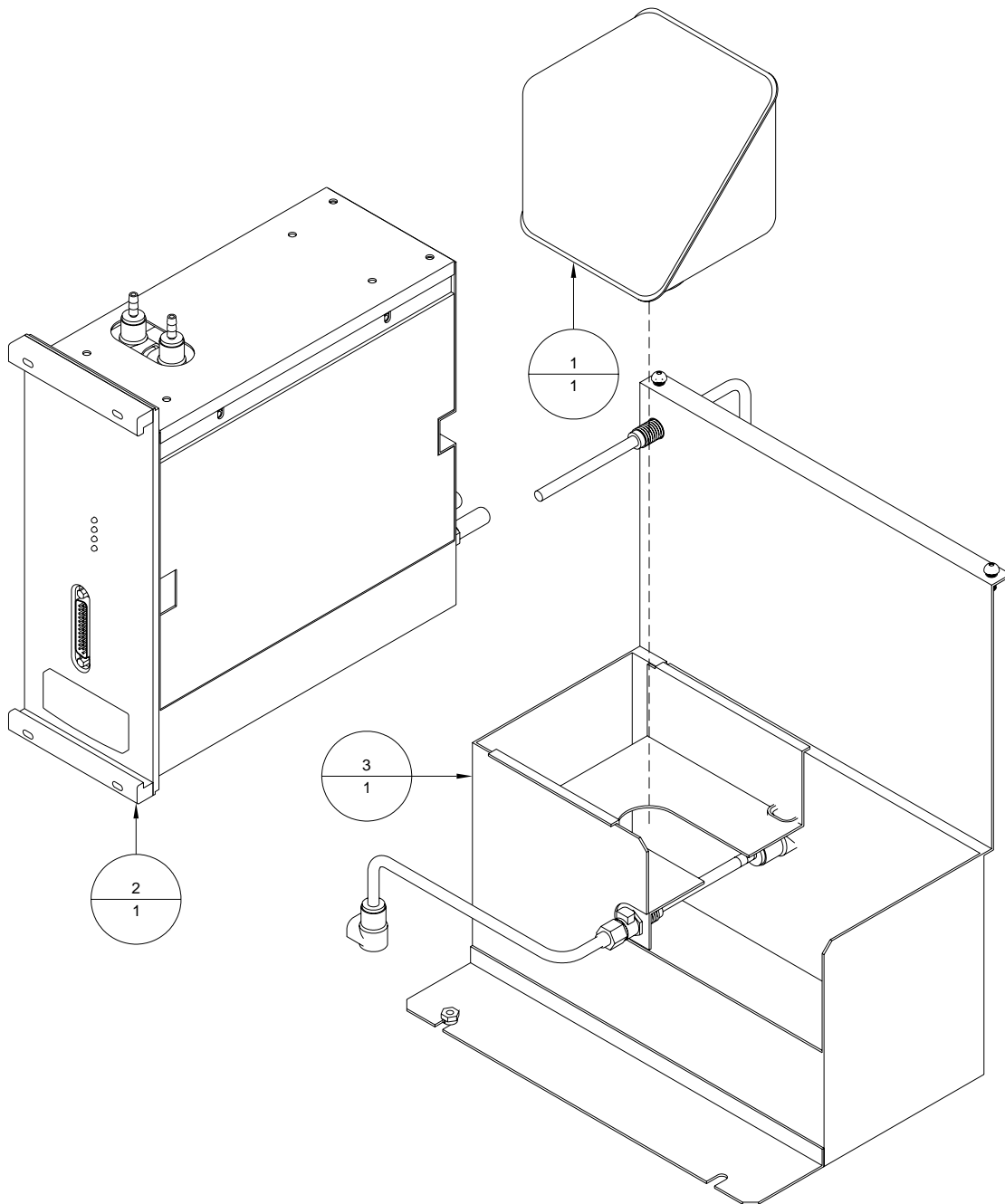
Figure B-2: *Module, Atlas Ink Delivery, 4 Channel (BK-IDM-4A)*

Table B-3: *Module, Atlas Power Supply, 4 Channel (BK-PSM-4A)*

Item	Part Number	Quantity	Description	Reference
1	403520	2	Screw, BHCS, 8-32 UNC x 3/8"	
2	420008	13	Nut, 10-32 UNF	
3	439009	13	Lockwasher, No. 10	
4	440008	6	Washer, #10 ID	
5	606008	1	Wire, #14, White, Hookup, 12"	
6	606010	1	Wire, #14, Black, Hookup, 12"	
7	606010	1	Wire, #14, Black, Hookup, 6"	
8	609111	2	Terminal, Ring, #10, 16-14 AWG, Blue	
9	609113	3	Connector, Push-on, Yellow	
10	9102205	1	Switch, Breaker, 15A, 2 Pole, Illuminated Green	
11	9102681	1	Wire, #14, Green/Yellow Hookup, 10"	
12	9103082A	1	Cable, Atlas/Elite power supply	
13	9103109	4	Screw, Truss, 8-32 UNC x 1/4"	
14	9103116	1	Cover, Power supply enclosure	
15	9103176	1	Board, Power Supply Display, Atlas/Elite	
16	9103176A	1	Cable, Power Supply Display board	
17	9103411	1	Chamber, Power supply, Universal	
18	9103412A	1	Faceplate Assembly, Power Supply, BK1700	Page B-16
19	9103417A	1	Power supply subbracket assembly	Page B-19
20	9103433	3	Ferrule, #14 AWG, Blue	

Figure B-3: *Module, Atlas Power Supply, 4 Channel (BK-PSM-4A)*

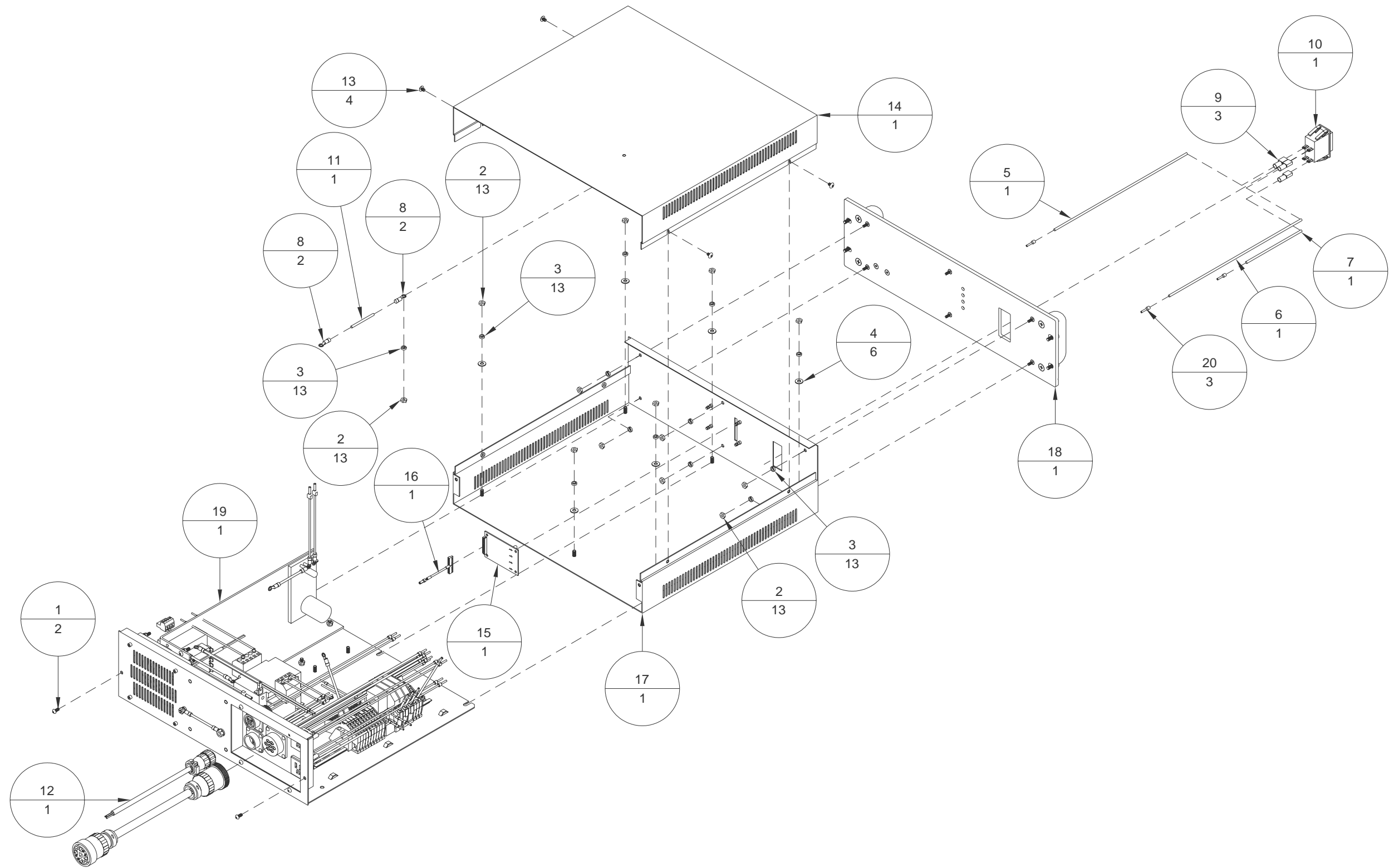


Table B-4: *Filter Holder Assembly – IDS (9100149A)*

Item	Part Number	Quantity	Description	Reference
1	9100149	2	Connector, 1/8" NPT, 1/8" ID	
2	9102675A	1	Filter Body Assembly	

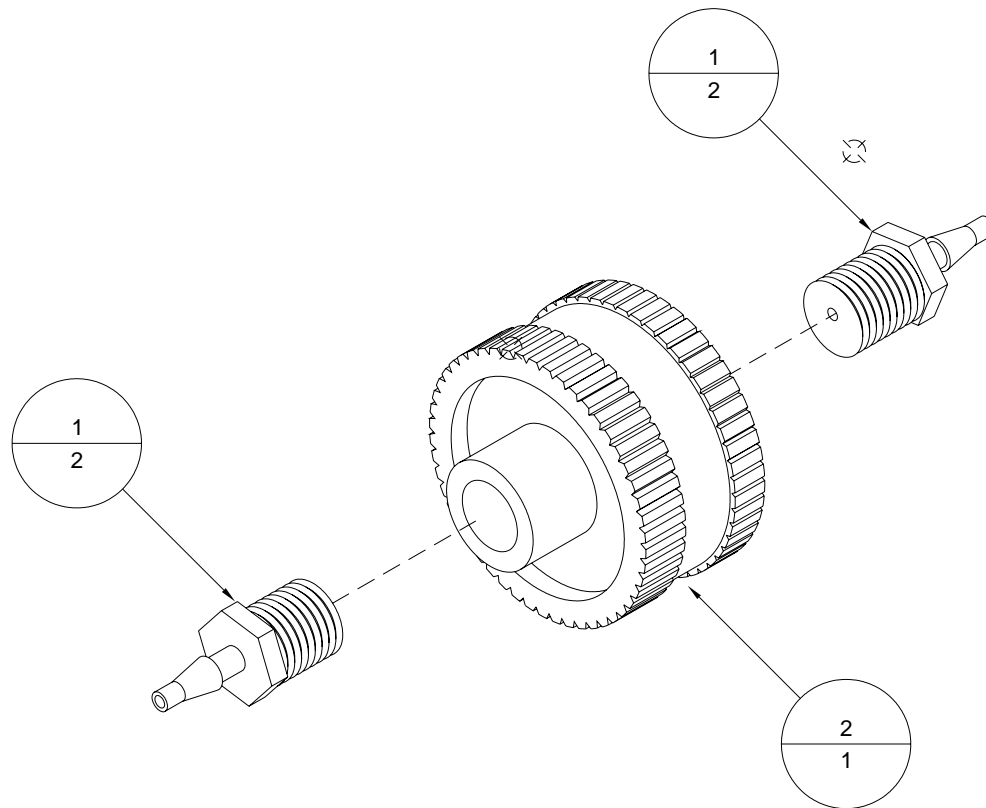
Figure B-4: *Filter Holder Assembly – IDS (9100149A)*

Table B-5: *Gearmotor Assembly (9100936A)*

Item	Part Number	Quantity	Description	Reference
1	606023	1	Wire, #18, Green, Hookup, 4"	
2	606025	1	Wire, #18, Orange, Hookup, 4"	
3	609001	1	Shrink Wrap, 1/4" I.D., 2"	
4	609004	2	Shrink Wrap, 1/8" I.D., 1"	
5	614002	2	Female Contact, Socket	
6	614003	1	Cap Receptacle	
7	9100936	1	Motor, Gear, R 187:1, 12 VDC	

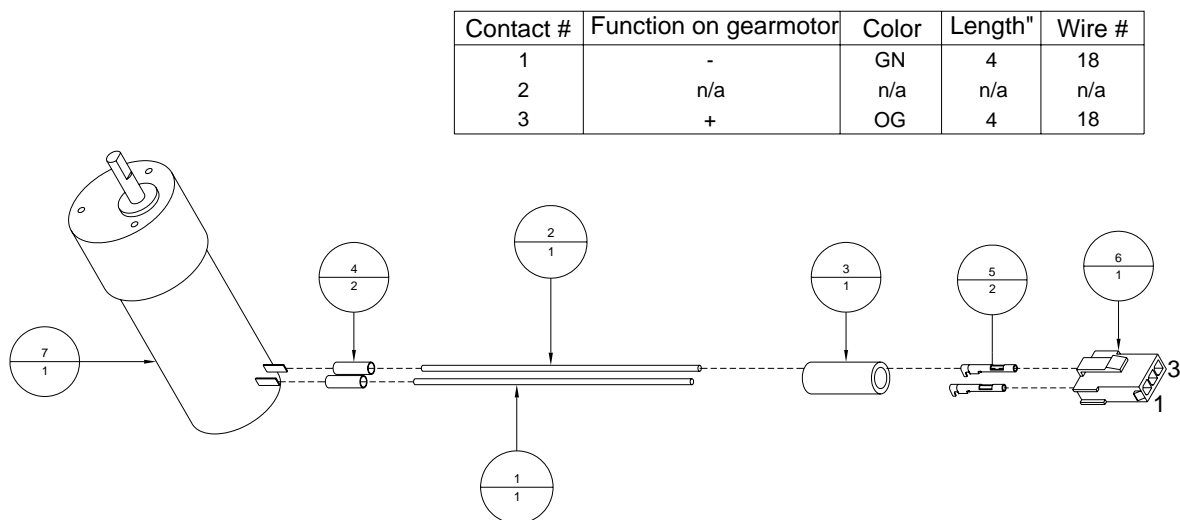
Figure B-5: *Gearmotor Assembly (9100936A)*

Table B-6: *Pumping Station Assembly, Atlas (9102942A)*

Item	Part Number	Quantity	Description	Reference
1	401309	4	Screw, PHMS, M2.5 x 6 mm	
2	402210	4	Screw, SHCS, 6-32 UNC x 1/4"	
3	403510	9	Screw, BHCS, 8-32 UNC x 1/4"	
4	420006	6	Nut, 6-32 UNC	
5	420008	1	Nut, 10-32 UNF	
6	420010	1	Nut, 1/4-20 UNC	
7	439006	6	Lockwasher, No.6	
8	439009	1	Lockwasher, No. 10	
9	439010	1	Lockwasher, 1/4" I.D.	
10	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
11	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
12	615322	2	Female Screwlock, 4-40 UNC	
13	9102681	1	Wire, #14, Green/Yellow Hookup, 12"	
14	9102940	1	Plate, Front, Pumping station module	
15	9102941	2	Handle, Module	
16	9102942	1	Bracket, Main, Pumping station	
17	9103015	1	Board, Reservoir Connector	
18	9103016A	1	Atlas pumping subbracket assembly	Page B-11
19	9103019A	1	Manifold block assembly - Atlas	Page B-12
20	9103054	2	Cover, Controller Module, Side	
21	9103109	4	Screw, Truss, 8-32 UNC x 1/4"	
22	9103429	1	Tray, Spill	
23	9103429A	1	Cable, Drive, Atlas pumping module	

Figure B-6: *Pumping Station Assembly, Atlas (9102942A)*

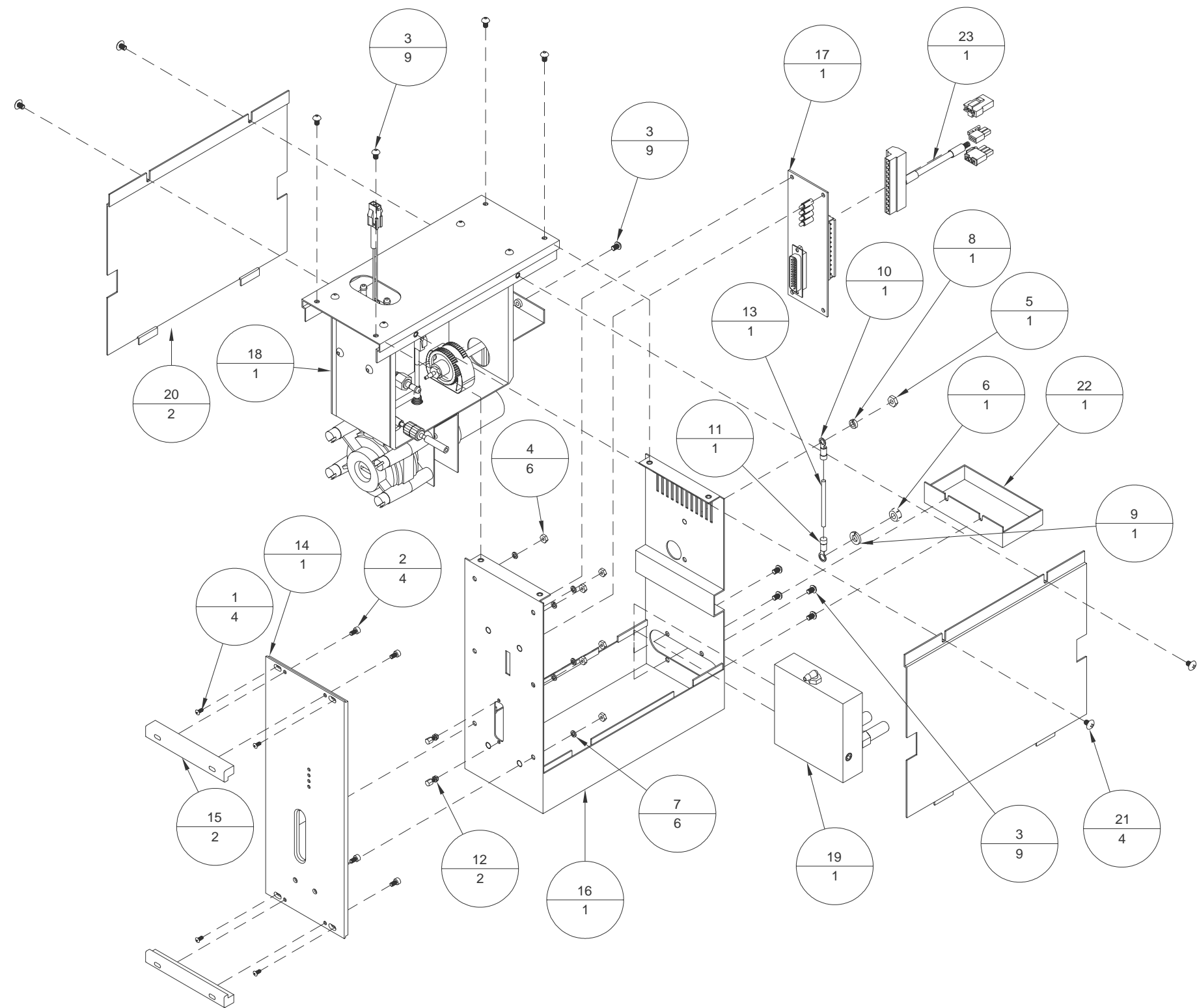


Table B-7: *Atlas Pumping Subbracket Assembly (9103016A)*

Item	Part Number	Quantity	Description	Reference
1	401310	3	Screw, PHMS, 4-40 UNC, 1/4"	
2	403510	4	Screw, BHCS, 8-32 UNC x 1/4"	
3	404510	3	Screw, BHCS, 10-32 UNF x 1/4"	
4	404550	1	Screw, BHCS, 10-32 UNF x 3/4"	
5	630004A	1	Cycle Proximity Switch Assembly	
6	9100149A	1	Filter Holder Assembly – IDS	Page B-7
7	9100876	1	Coupling, 0.5" DIA	
8	9100931	1	Peristaltic Pump Head	
9	9100936A	1	Gearmotor Assembly	Page B-8
10	9100971	1	Gripper Clip	
11	9101290	2	Fitting, Tee, 1/8" I.D.	
12	9101700	1	Check Valve, 1/8" I.D.	
13	9102116	3	Tubing, Pharmed 1/4" x 1/8", 1"	
14	9102116	1	Tubing, Pharmed 1/4" x 1/8", 8"	
15	9102116	2	Tubing, Pharmed 1/4" x 1/8", 3"	
16	9103016	1	Bracket, Atlas ID Module, Top	
17	9103017	1	Bracket, Atlas Pumping Components	
18	9103034A	1	Subcontainer Assembly	Page B-13

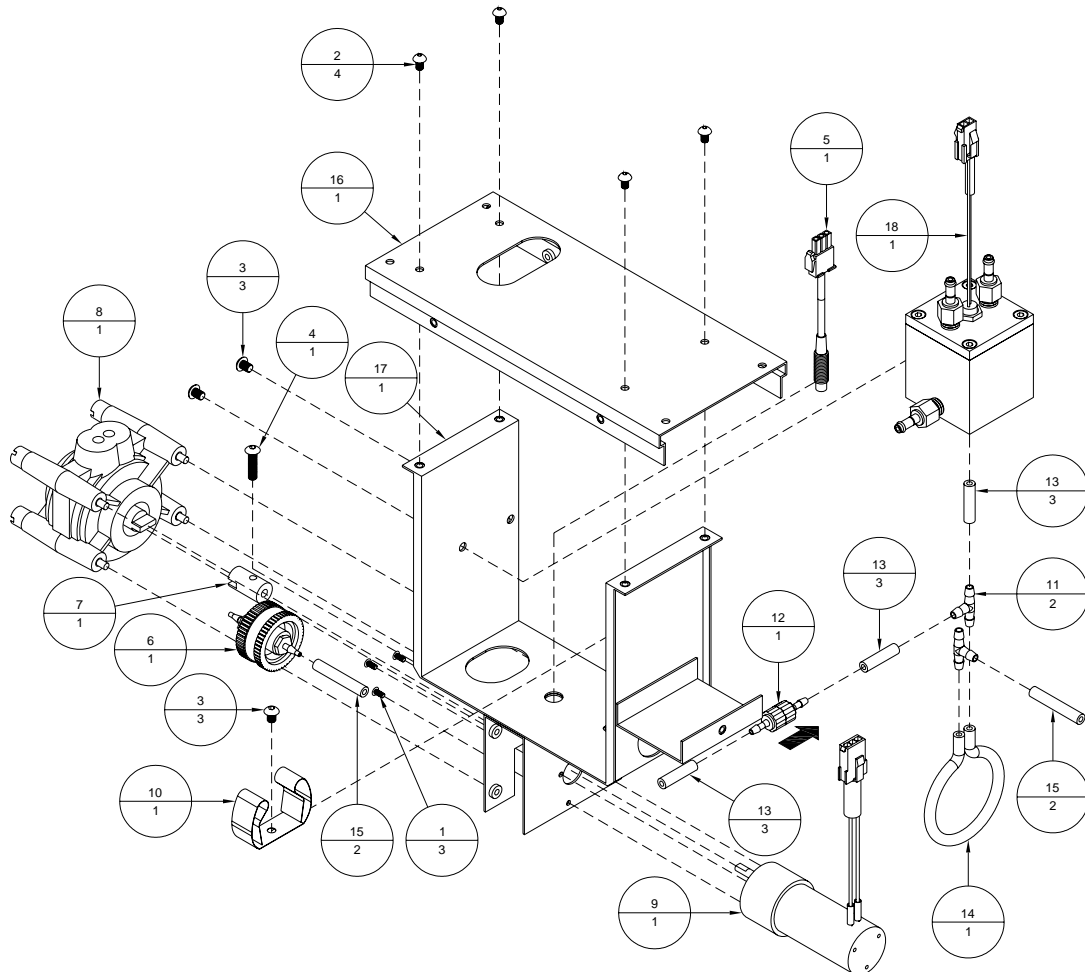
Figure B-7: *Atlas Pumping Subbracket Assembly (9103016A)*

Table B-8: *Manifold Block Assembly (9103019A)*

Item	Part Number	Quantity	Description	Reference
1	9101167	4	Coupling Insert, Chrome Plated, 1/8" NPT	
2	9102085	1	Connector "L", 1/8-27 NPT, 1/8" I.D.	
3	9103019	1	Manifold block, Atlas	
4	9103033	1	Screw, SHSC, 5/16-18 UNC x 1/4", SS	
5	9103289	4	Caplug, VC series, 0.281" dia, Black	

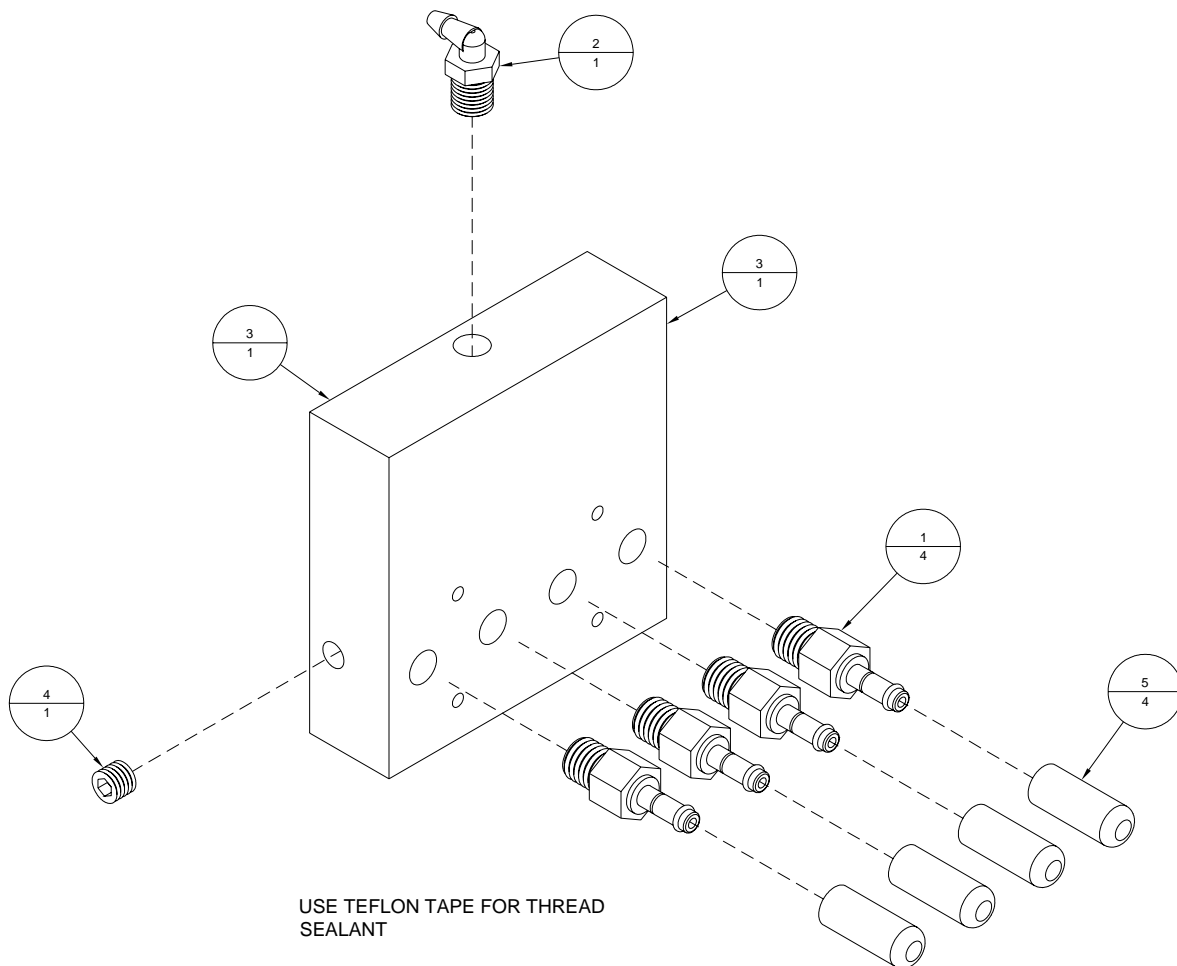
Figure B-8: *Manifold Block Assembly (9103019A)*

Table B-9: *Subcontainer Assembly (9103034A)*

Item	Part Number	Quantity	Description	Reference
1	404220	4	Screw, SHCS, 10-32 UNF x 3/8"	
2	609000	1	Shrink Wrap, 3/16" I.D., 5" LG.	
3	9100206	1	Receptacle, 2-Pin, Mini-Fit Jr	
4	9100207	2	Contact, Male, 18-22 AWG, Series 5558	
5	9100877	1	O-Ring, 1/16" Dia	
6	9100966	1	Float Switch, Micro-Miniature w/ Nut	
7	9101166	1	Drainable Subcontainer	
8	9101297	1	O Ring, 7/16" x 5/8" x 3/32"	
9	9101582	1	Fitting, 10-23 Thread to Tube 1/8" I.D.	
10	9101693	3	Coupling Insert, 1/8" NPT, Pipe Thread	
11	9103034	1	Cover, Subcontainer, Atlas	

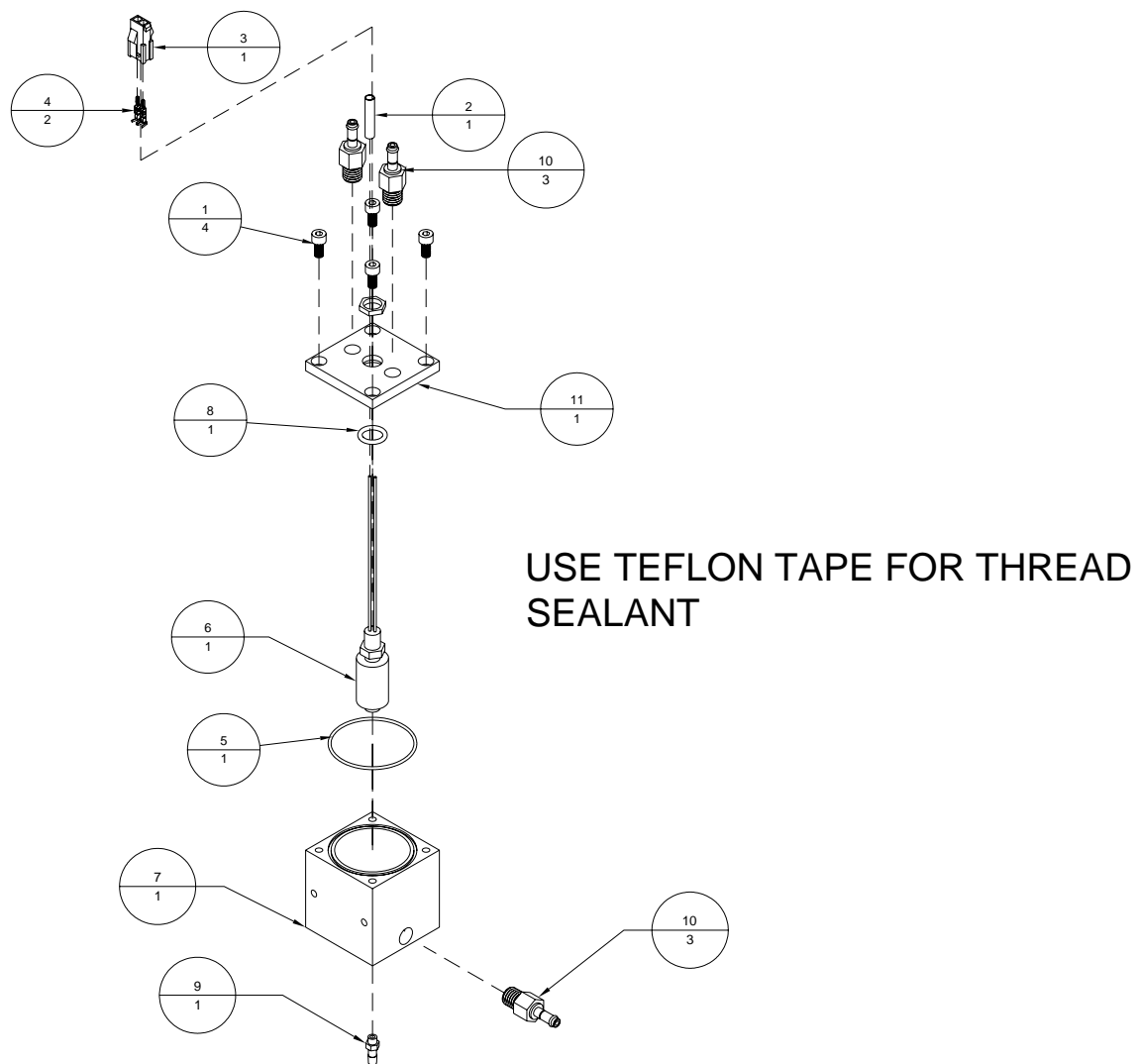
Figure B-9: *Subcontainer Assembly (9103034A)*

Table B-10: *Terminal Block Assembly, Atlas (9103171A)*

Item	Part Number	Quantity	Description	Reference
1	420008	2	Nut, 10-32 UNF	
2	439009	2	Lockwasher, No. 10	
3	440008	2	Washer, #10 ID	
4	606000	1	Wire, #16, Black, Hookup, 5"	
5	606002	1	Wire, #16, Blue, Hookup, 4"	
6	606008	1	Wire, #14, White, Hookup, 6"	
7	606009	1	Wire, #16, White, Hookup, 4"	
8	606010	3	Wire, #14, Black, Hookup, 4"	
9	606021	1	Wire, #16, Brown, Hookup, 5"	
10	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
11	610100	1	Relay, 120 VAC	
12	615004	1	Relay Base	
13	615021	1	T Rail, DIN, 12"	
14	9100096	1	Fuse, 10A, 250 V, ¼ x 1-1/4", Slo-Blo	
15	9100286	1	Fuse, 2A, 250 V, ¼ x 1-1/4", MDL	
16	9102050	2	Terminal Marker, WS 12/6, L	
17	9102051	3	Terminal Marker, WS 12/6, N	
18	9102052	1	Terminal Marker, WS 12/6, 12VDC	
19	9102053	1	Terminal Marker, WS 12/6, 170VDC	
20	9102297	2	Terminal Marker, WS 12/6, L'	
21	9102299	1	Terminal Marker, WS 12/6, GND	
22	9102681	1	Wire, #14, Green/Yellow Hookup, 6"	
23	9102767	3	Terminal Marker, WS 12/6, 250V	
24	9102769	1	Terminal Marker, WS 12/6, T3A L	
25	9102769	1	Terminal Marker, WS 12/6, T2A L	
26	9102770	1	Terminal Marker, WS 12/6, T10A L	
27	9103433	9	Ferrule, #14 AWG, Blue	
28	9103435	7	Ferrule, #16 AWG, Red	
29	9103436	11	Terminal Block, Z-roofstyle, ZDU 4-2/4AN	
30	9103437	2	Terminal Block, Z-roofstyle, ground, ZPE	
31	9103438	2	End Plate, ZAP ZDU 4-2/4 AN	
32	9103439	3	Cross-connection, ZQV 4/2	
33	9103440	3	Fuse Terminal, ZSI 2.5/2, ¼ x 1 ¼, 10A	
34	9103441	1	End plate, Fuse Terminal	
35	9103442	2	End bracket, EW 35	
36	9103445	1	Fuse, 3A, 250V, ¼ x 1-1/4", Slo-Blo	

Figure B-10: *Terminal Block Assembly, Atlas (9103171A)*

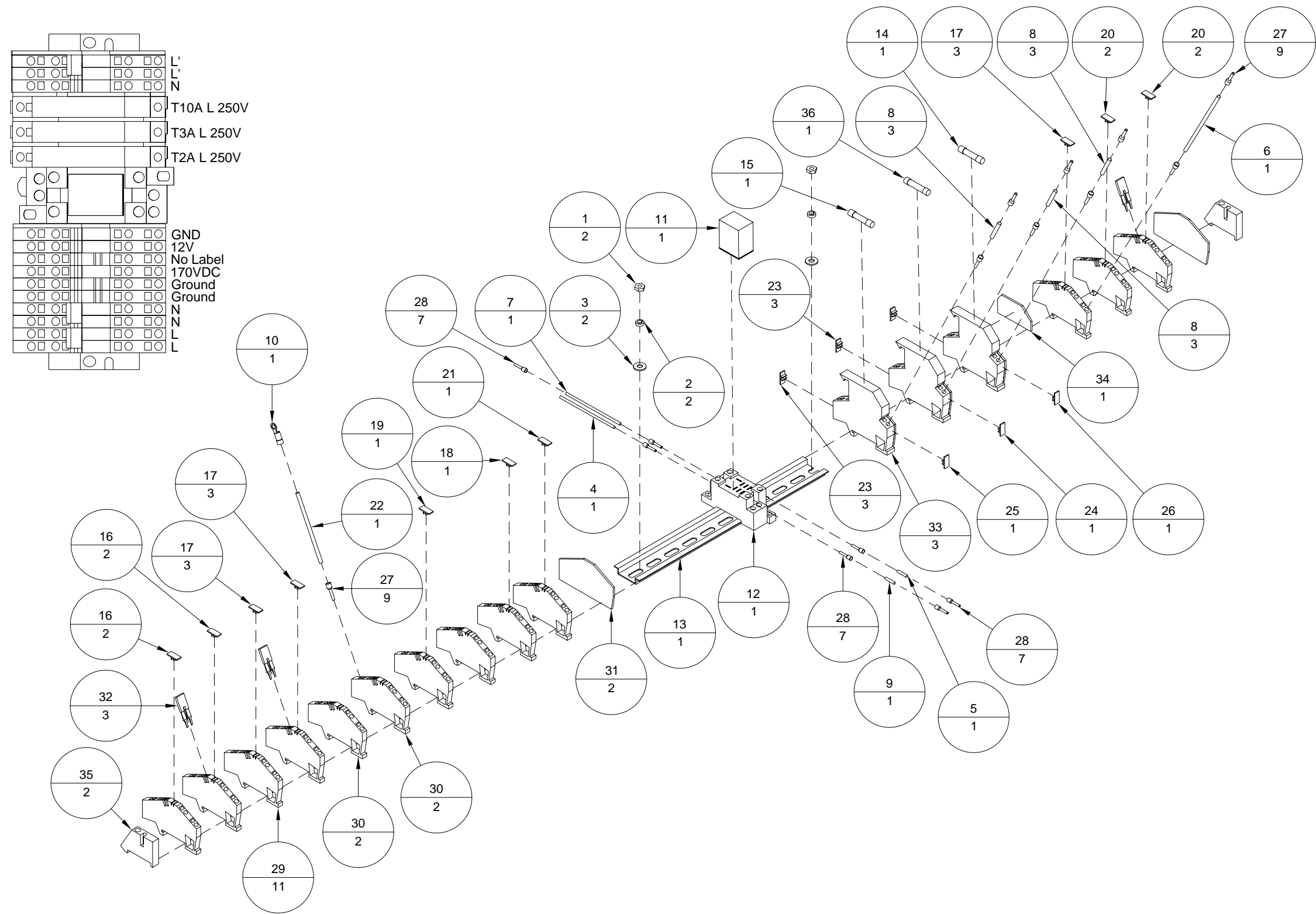


Table B-11: *Faceplate Assembly, Power Supply, BK1700 (9103412A)*

Item	Part Number	Quantity	Description	Reference
1	404020	2	Screw, FHCS, 10-32 UNF x 3/8"	
2	404050	4	Screw, FHCS, 10-32 UNF x 3/4"	
3	9102846	2	Handle, Pull, 1/4-20	
4	9103112	4	Screw, FHMS, 1/4-20 UNC x 1/2"	
5	9103183	1	Nameplate, Buskro Logo	
6	9103315	4	Washer, Cup, 10-32 UNF Flat Head Screw	
7	9103412	1	Faceplate, Power Supply	

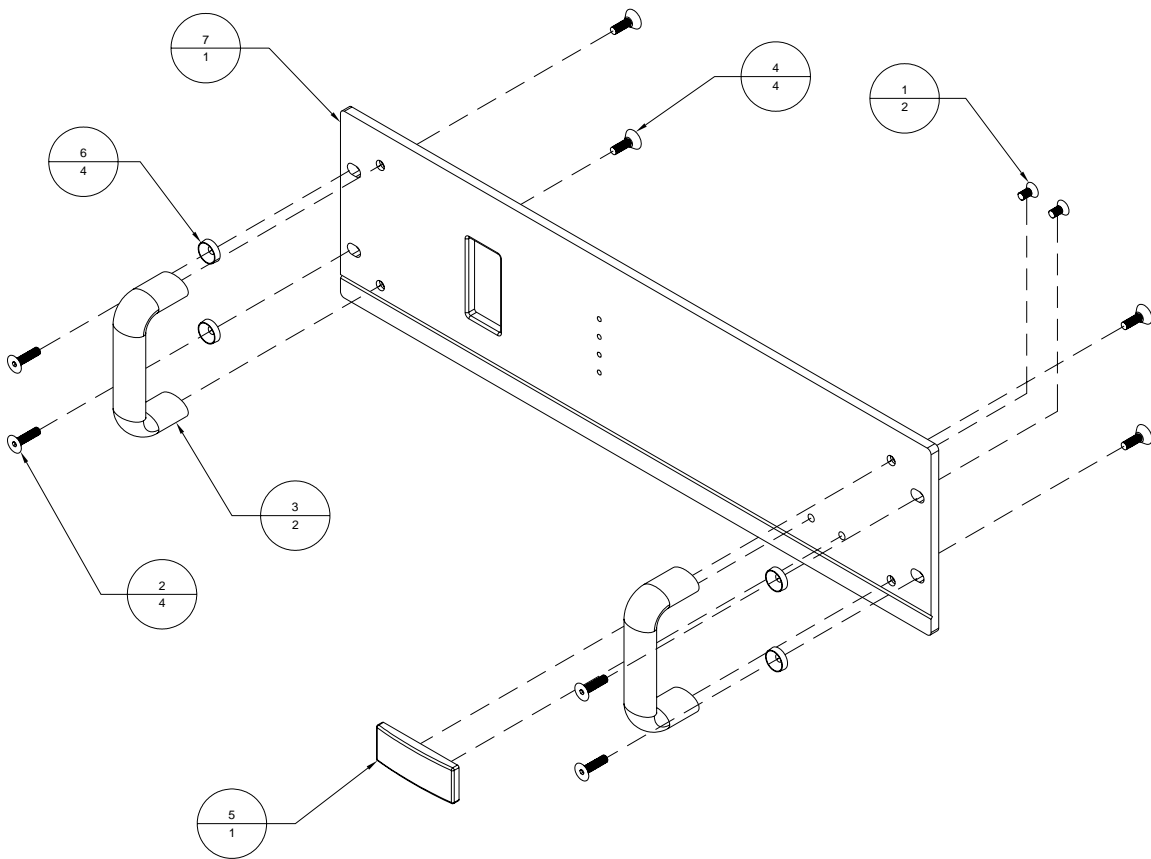
Figure B-11: *Faceplate Assembly, Power Supply, BK1700 (9103412A)*

Table B-12: *Subbracket Assembly, Atlas/Elite (9103416A)*

Item	Part Number	Quantity	Description	Reference
1	402320	12	Screw, PHMS, 6-32 UNC x 3/8"	
2	403530	4	Screw, BHCS, 8-32 UNC X 1/2"	
3	420008	1	Nut, 10-32 UNF	
4	439009	1	Lockwasher, No. 10	
5	606000	2	Wire, #16, Black, Hookup, 12"	
6	606001	1	Wire, #16, Red, Hookup, 12"	
7	606002	1	Wire, #16, Blue, Hookup, 12"	
8	606005	1	Wire, #16, Green, Hookup, 12"	
9	606008	1	Wire, #14, White, Hookup, 6"	
10	606008	1	Wire, #14, White, Hookup, 12"	
11	606009	2	Wire, #16, White, Hookup, 12"	
12	606010	1	Wire, #14, Black, Hookup, 6"	
13	606010	3	Wire, #14, Black, Hookup, 12"	
14	606021	1	Wire, #16, Brown, Hookup, 12"	
15	609000	4	Shrink Wrap, 3/16" I.D., 1"	
16	609111	5	Terminal, Ring, #10, 16-14 AWG, Blue	
17	614102	1	Receptacle, 17-3, Male	
18	614106	1	Receptacle, Female, 23-7	
19	614109	3	Pin, Power Contact	
20	614110	7	Socket, Power Contact	
21	614123	2	Contact, Female, 18-16 AWG, Blue	
22	9102681	4	Wire, #14, Green/Yellow Hookup, 6"	
23	9102681	1	Wire, #14, Green/Yellow Hookup, 6"	
24	9103160	1	Receptacle, 17-9, Reverse Sex	
25	9103416	1	Subbracket, Atlas/Elite power supply	
26	9103433	17	Ferrule, #14 AWG, Blue	
27	9103567	2	Socket, Straight blade, 15A/125VAC, Snap-in	

Figure B-12: Subbracket Assembly, Atlas/Elite (9103416A)

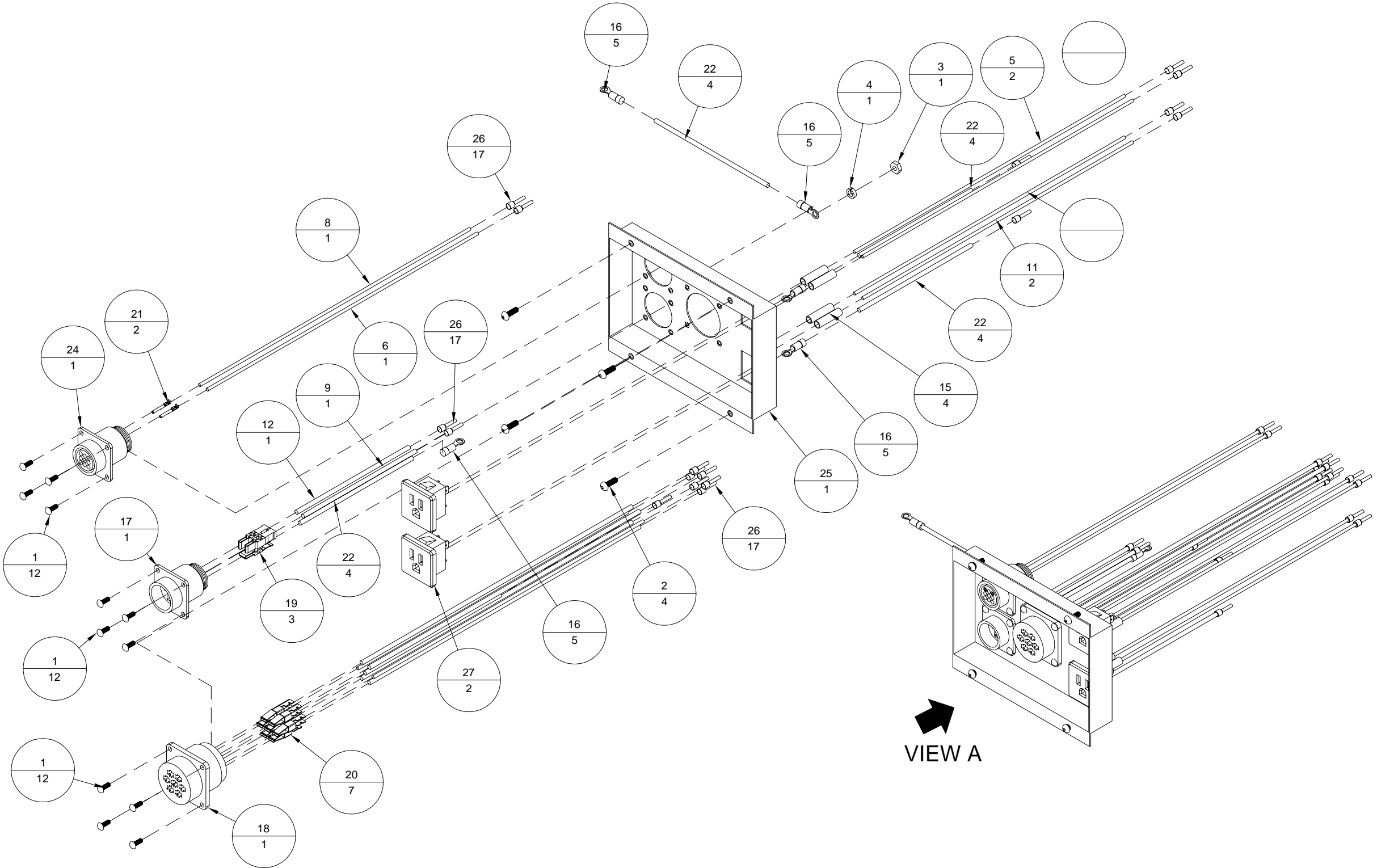


Table B-13: *Power Supply Subbracket Assembly (9103417A)*

Item	Part Number	Quantity	Description	Reference
1	420007	4	Nut, 8-32 UNC	
2	420008	7	Nut, 10-32 UNF	
3	420010	1	Nut, 1/4-20 UNC	
4	439009	12	Lockwasher, No. 10	
5	439010	1	Lockwasher, 1/4" I.D.	
6	606037	1	Wire, #22, Black Hook-up, 6"	
7	606044	1	Wire, #22, Red Hook-Up, 6"	
8	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
9	609120	1	Terminal, Ring, 1/4", 16-14 AWG, Non-Insulated	
10	9101669	2	Shrink Wrap, 1/16" I.D., 1"	
11	9102681	1	Wire, #14, Green/Yellow Hookup, 24"	
12	9102781	1	Fan, 12VDC, Flight II 120	
13	9102783	1	Fan, Finger Guard Metal, Flight II 120	
14	9103117	1	Board, 170V Power Supply	
15	9103171A	1	Terminal block assembly, Atlas/Elite	Page B-14
16	9103198	4	Screw, SHCS, 8-32 UNC x 1-3/4"	
17	9103416A	1	Subbracket Assembly, Atlas/Elite	Page B-18
18	9103417	1	Bracket, Atlas/Elite power supply	
19	9103433A	1	Power Supply Assembly, 12VDC, BK1700	Page B-22
20	9103434	3	Ferrule, #14, Dual Wire, Blue	
21	9103514A	1	Transformer Assy, Jetting Voltage	Page B-8

Figure B-13: *Power Supply Subbracket Assembly (9103417A)*

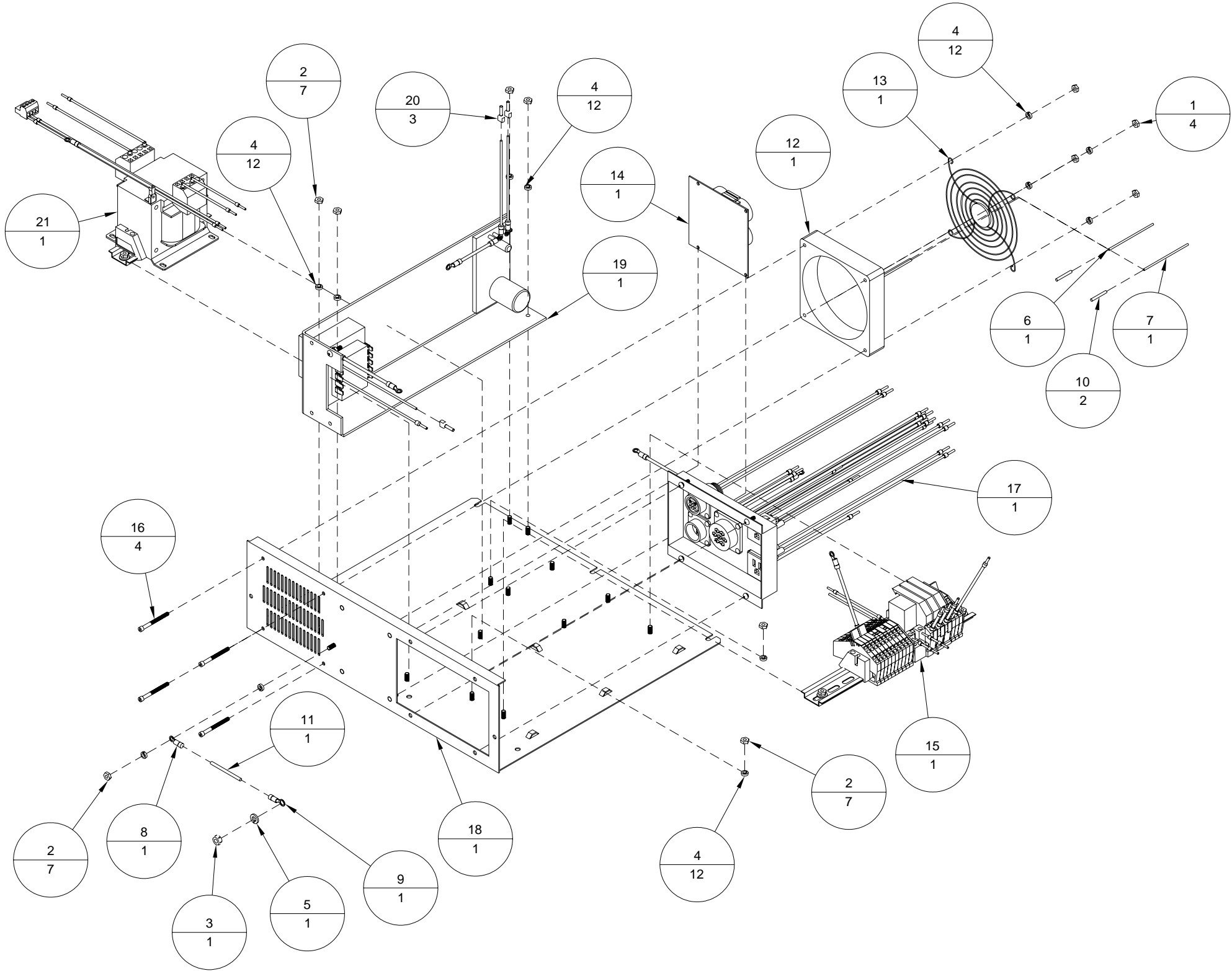


Table B-14: *Ink Bottle Bracket Assembly (9103430A)*

Item	Part Number	Quantity	Description	Reference
1	404530	2	Screw, BHCS, 10-32 UNF x 1/2"	
2	420008	1	Nut, 10-32 UNF	
3	439009	1	Lockwasher, No. 10	
4	9100967	1	Coupling Body, Puncture Seal, 3/8" O.D.	
5	9101691	2	Coupling Insert, 1/8" ID, Inline, Hose Barb	
6	9101692	2	Coupling Body, 1/8" ID, Panel Mount	
7	9101770	1	Bracket, Ink Bottle	
8	9102116	2	Tubing, Pharmed, 1/4" x 1/8", 10"	
9	9102116	1	Tubing, Pharmed, 1/4" x 1/8", 20"	
10	9102116	1	Tubing, Pharmed, 1/4" x 1/8", 20"	
11	9102149	2	Coupling Body, Inline, 1/8" I.D.	
12	9103430	1	Bracket, Ink Bottle	

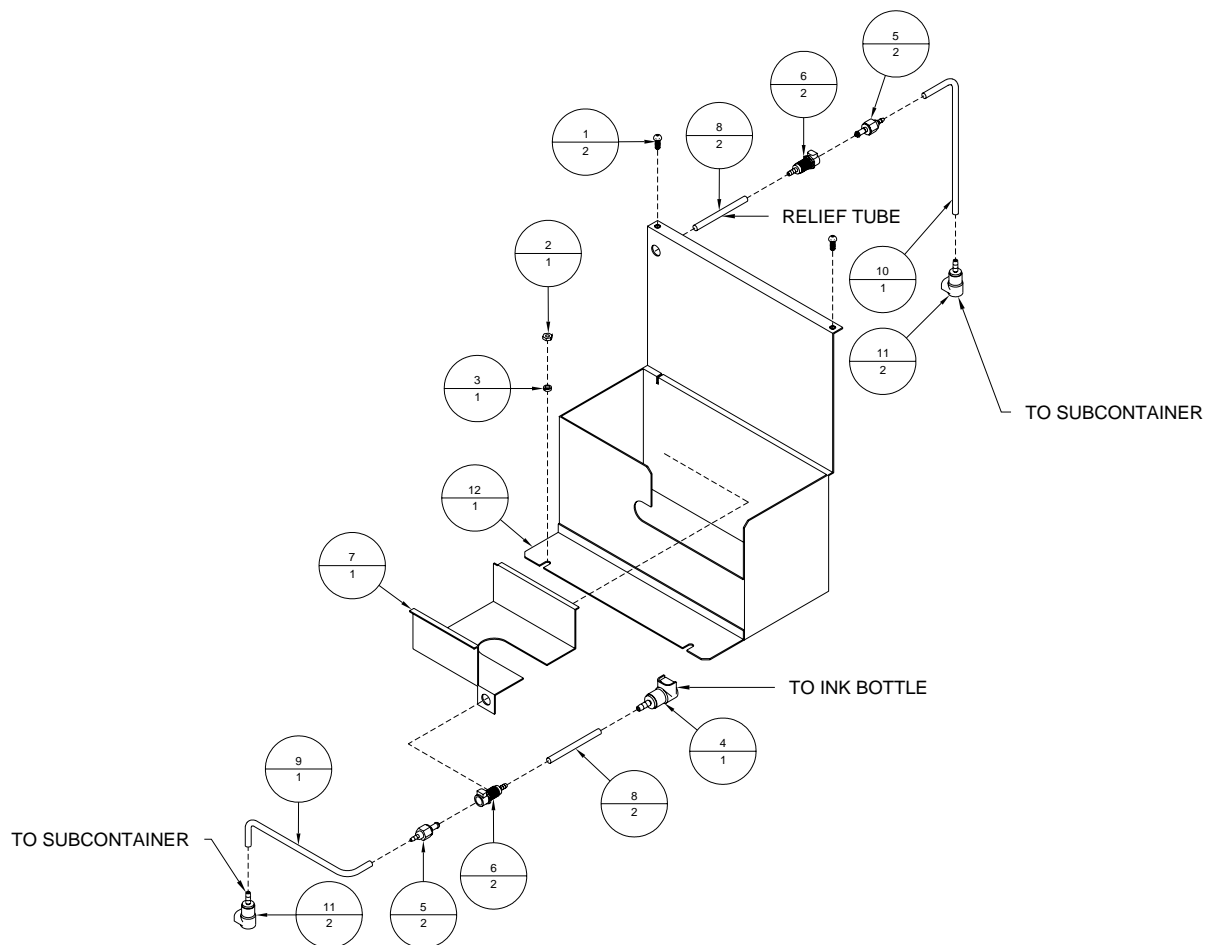
Figure B-14: *Ink Bottle Bracket Assembly (9103430A)*

Table B-15: *Power Supply Assembly, 12VDC, BK1700 (9103433A)*

Item	Part Number	Quantity	Description	Reference
1	404550	1	Screw, BHCS, 10-32 UNF x ¾"	
2	420008	1	Nut, 10-32 UNF	
3	439009	1	Lockwasher, No. 10	
4	606000	1	Wire, #16, Black, Hookup, 14"	
5	606002	1	Wire, #16, Blue, Hookup, 14"	
6	606009	1	Wire, #16, White, Hookup, 14"	
7	606021	1	Wire, #16, Brown, Hookup, 14"	
8	609114	6	Terminal Ring, #10, 10-12AWG, Non-Insulated	
9	9101209	1	Power Supply, 12 VDC, 10.2 Amps	
10	9102681	1	Wire, #14, Green/Yellow Hookup, 12"	
11	9102681	1	Wire, #14, Green/Yellow Hookup, 6"	
12	9103433	1	Ferrule, #14, AWG, Blue	

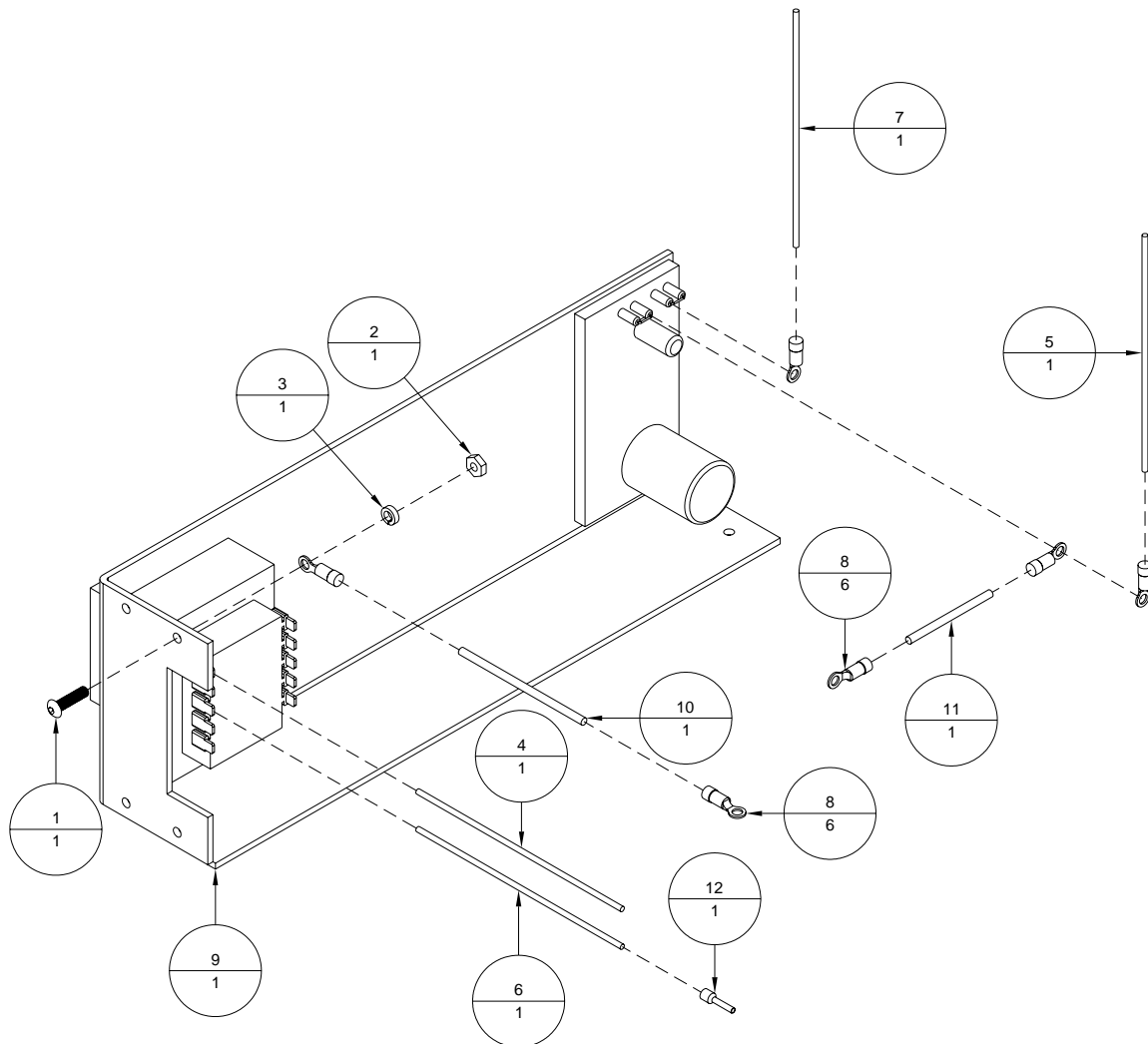
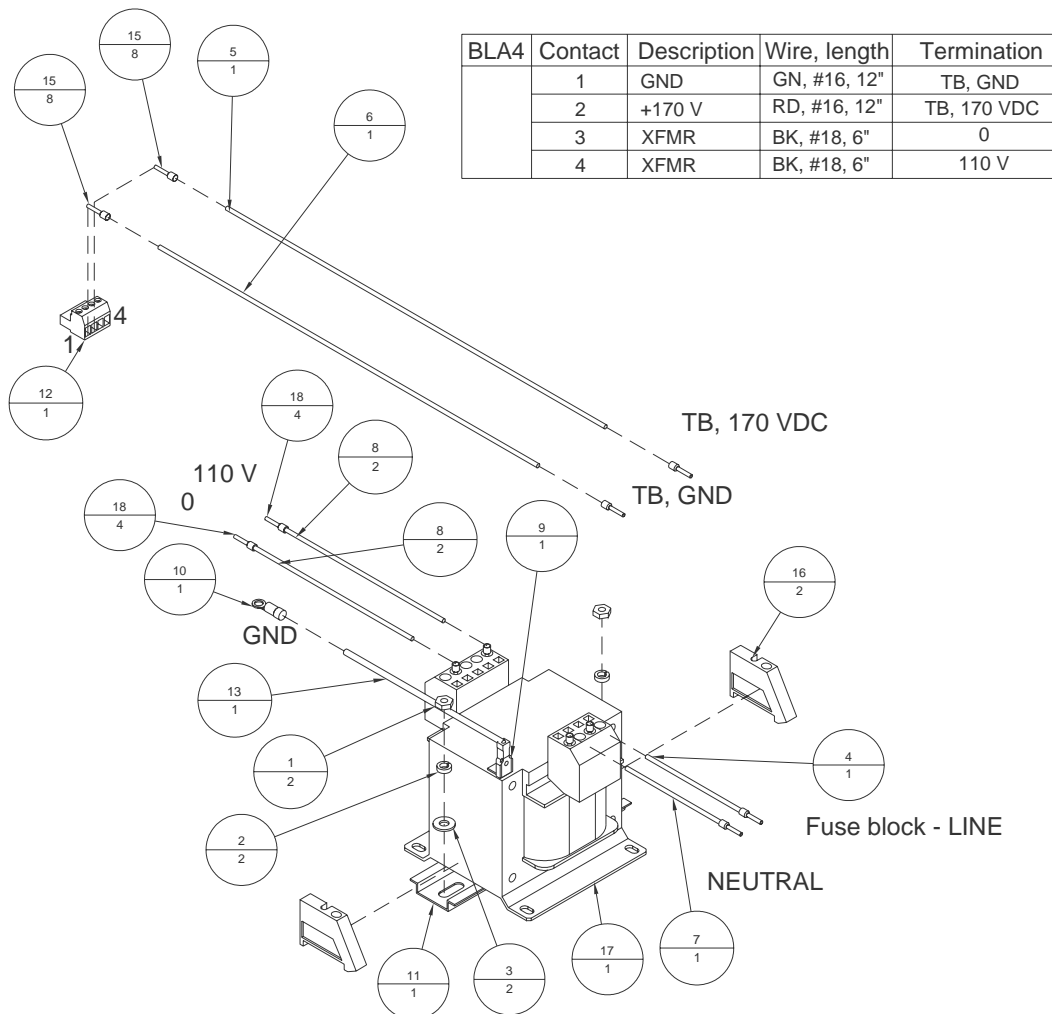
Figure B-15: *Power Supply Assembly, 12VDC, BK1700 (9103433A)*

Table B-16: *Transformer Assembly, Jetting Voltage (9103514A)*

Item	Part Number	Quantity	Description	Reference
1	420008	2	Nut, 10-32 UNF	
2	439009	2	Lockwasher, No. 10	
3	440008	2	Washer, #10 ID	
4	606000	1	Wire, #16, Black, Hookup, 12"	
5	606001	1	Wire, #16, Red, Hookup, 12"	
6	606005	1	Wire, #16, Green, Hookup, 12"	
7	606009	1	Wire, #16, White, Hookup, 12"	
8	606020	2	Wire, #18, Black, Hookup, 6"	
9	609110	1	Connector, Push-on, Blue	
10	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
11	615021	1	T Rail, DIN, 5.6"	
12	615066	1	Connector, Female, 4-Pin, BLA4	
13	9102681	1	Wire, #14, Green/Yellow Hookup, 6"	
15	9103435	8	Ferrule, #16 AWG, Red	
16	9103442	2	End bracket, EW 35	
17	9103514	1	Transformer, 250VA, 120-90/100/110/120VAC	
18	9103539	4	Ferrule, #18 AWG, White	

Figure B-16: *Transformer Assembly, Jetting Voltage (9103514A)*

Pressure Regulator Drawings

Appendix C

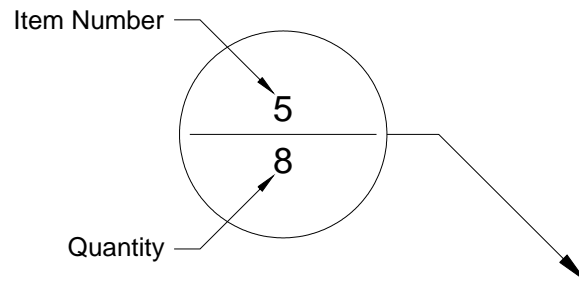
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Balloon Annotation and Parts Listing



Item	Part Number	Quantity	Description	Reference
1				
2				

The following is a description of how to interpret the information in this section:

Item:

This column indicates the item number used for each unique part in an assembly drawing.

It is matched with the top number in the balloon pointing at the associated part.

Part Number:

This column represents the Buskro part number.

Quantity:

This represents the total number of a given part in an assembly. It is matched with the bottom number in the balloon pointing at the associated part.

Description:

This column contains a brief description of the part.

Reference:

This column indicates the page location for sub-assemblies.

Table C-1: *Module, Pressure/Vacuum, 4 Channel (BK-PVM-4A)*

Item	Part Number	Quantity	Description	Reference
1	9102575	4	Filter, Bronze/Steel	
2	9101866A	1	Pressure Regulator Assembly, 4-Head	Page C-8

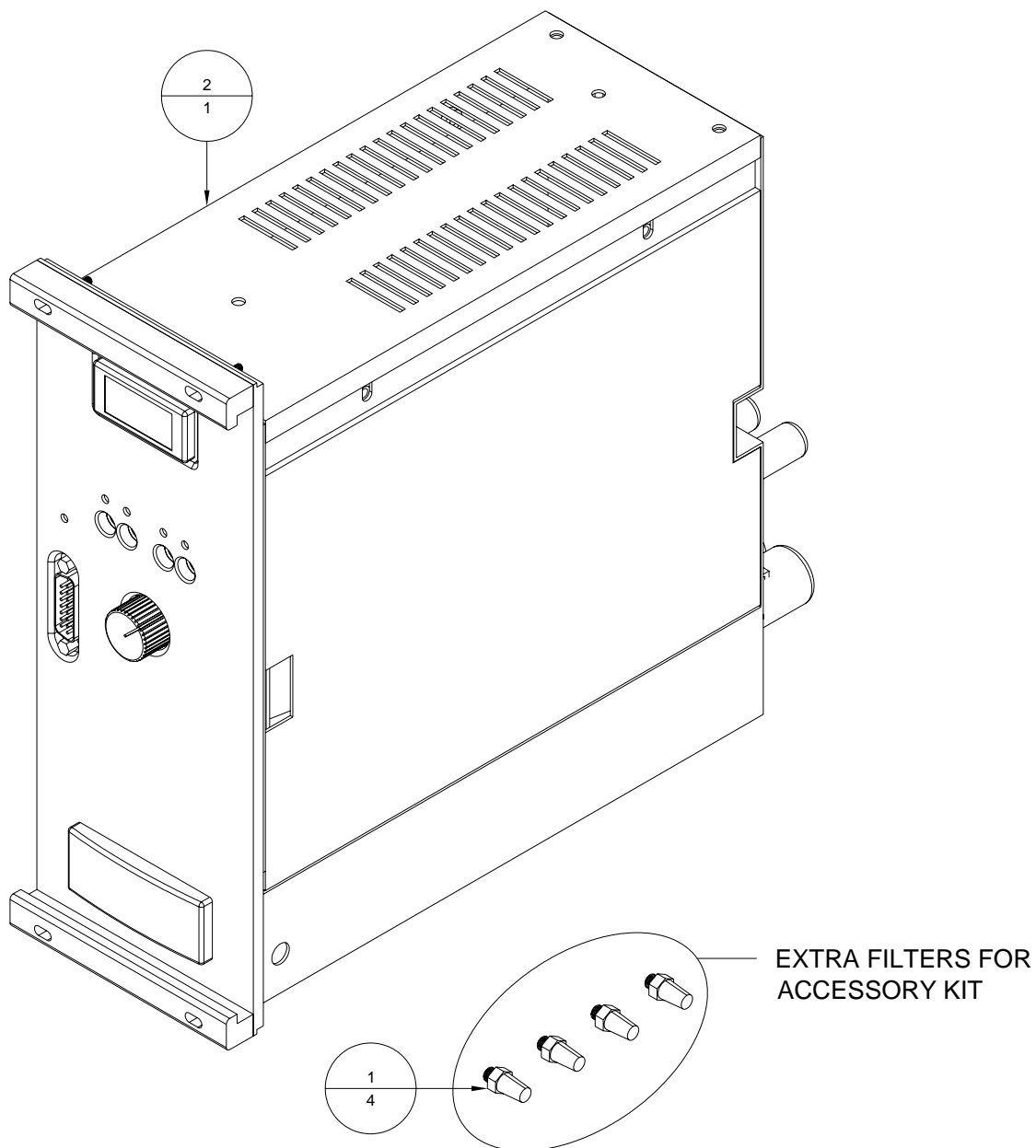
Figure C-1: *Module, Pressure/Vacuum, 4 Channel (BK-PVM-4A)*

Table C-2: *Flow Control, Purge Pressure (9101582A)*

Item	Part Number	Quantity	Description	Reference
1	9101582	1	Fitting, 10-32 Thread to Tube 1/8" I.D.	
2	9102960	1	Valve, Flow Control, 10-32 UNF	

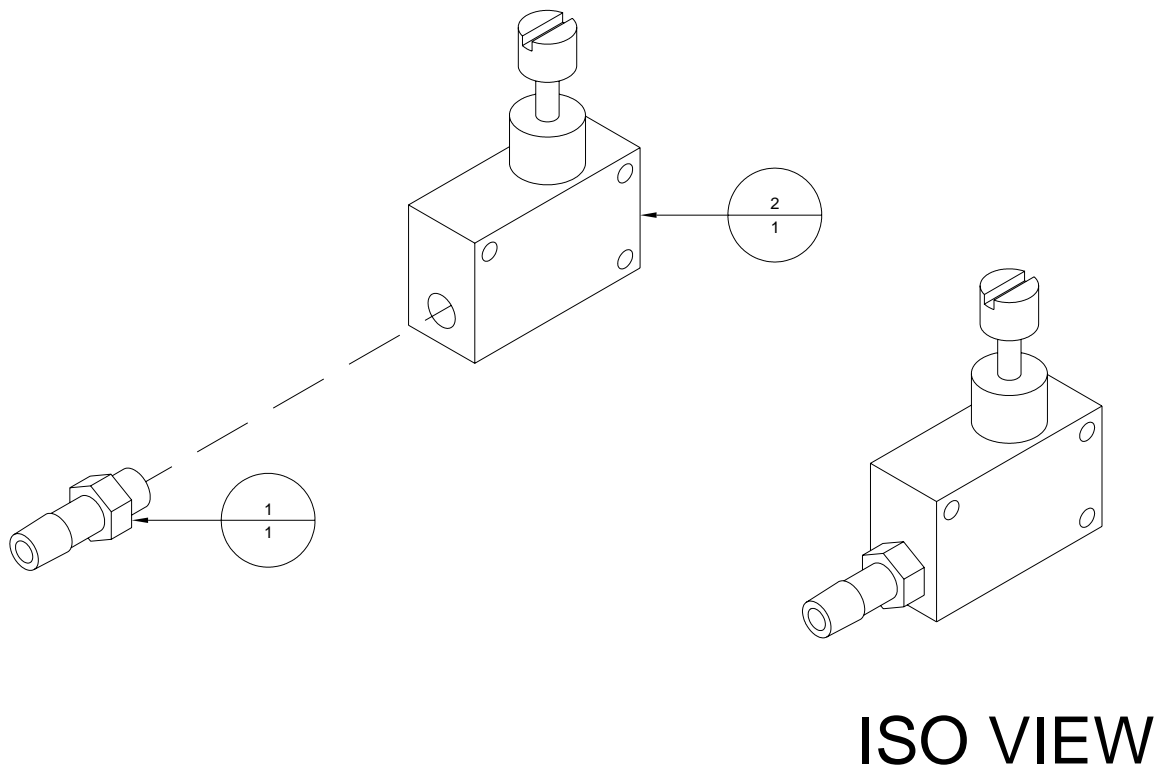
Figure C-2: *Flow Control, Purge Pressure (9101582A)*

Table C-3: *Pressure Regulator Main Chamber Assembly (9101862A)*

Item	Part Number	Quantity	Description	Reference
1	401330	2	Screw, PHMS, 4-40 UNC x ½"	
2	402510	8	Screw, BHCS, 6-32 UNC x ¼"	
3	420004	2	Nut, 4-40 UNC	
4	439004	2	Lockwasher, No. 4	
5	9103046	1	Bracket, Main, Pressure Regulator	
6	9103047A	1	Manifold Block Assembly, Meniscus Vacuum	Page C-12
7	9103048A	1	Manifold Block Assembly, Lung Vacuum	Page C-13
8	9103456A	1	Cable, Through-Panel, Alarm	

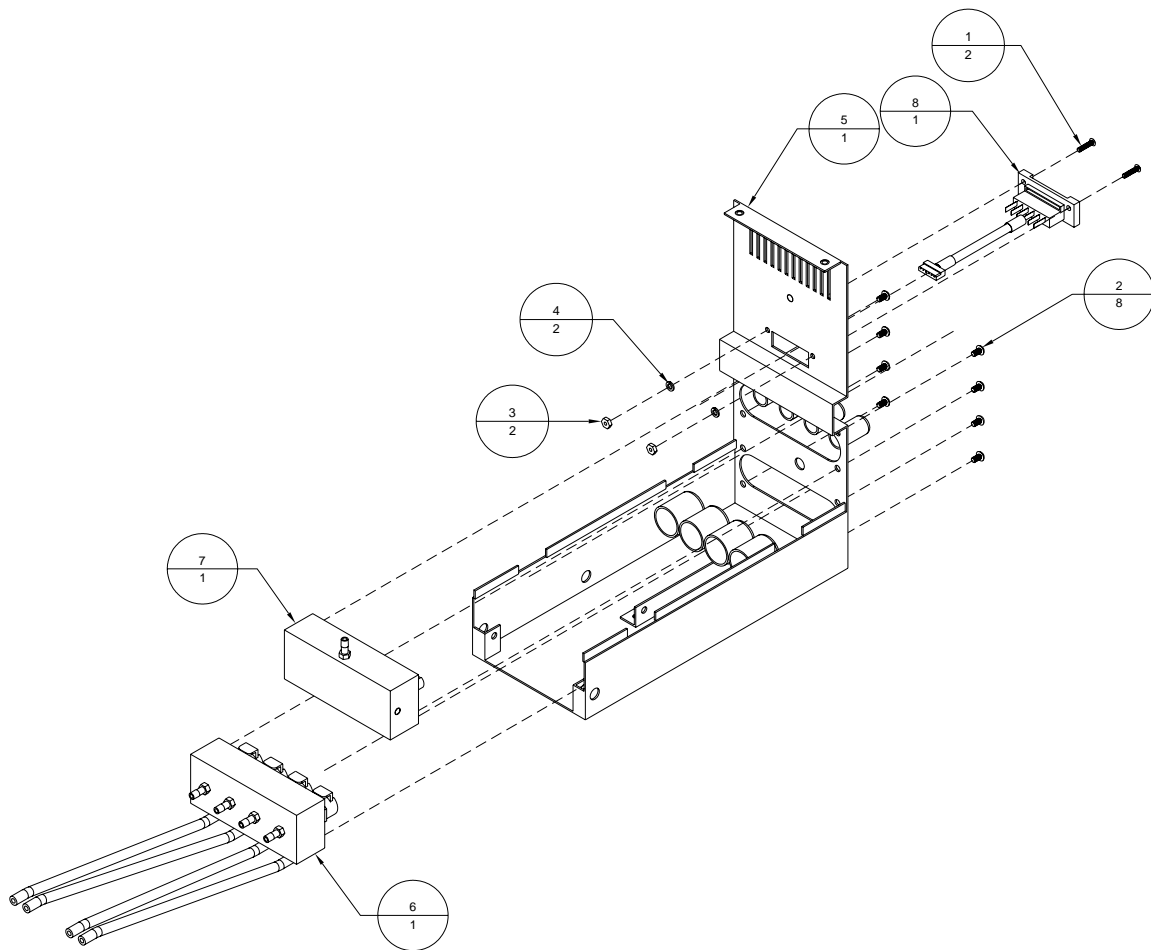
Figure C-3: *Pressure Regulator Main Chamber Assembly (9101862A)*

Table C-4: *Pressure Regulator Bottom Assembly (9101863A)*

Item	Part Number	Quantity	Description	Reference
1	403310	2	Screw, PHMS, 8-32 UNC x 1/4"	
2	439009	2	Lockwasher, No. 10	
3	9101862A	1	Pressure Regulator Main Chamber Assembly	Page C-5
4	9103069A	1	Front Plate Assembly, Pressure Regulator	Page C-19
5	9103081A	1	Cable, Pressure Regulator, Solenoids	
6	9103192A	1	Cable, Pressure Regulator, Pumps	

Figure C-4: *Pressure Regulator Bottom Assembly (9101863A)*

NOTE: THE SILICONE TUBING CONNECTS TO THE LOWER FITTINGS ON THE FRONT PLATE ASSEMBLY SENSORS

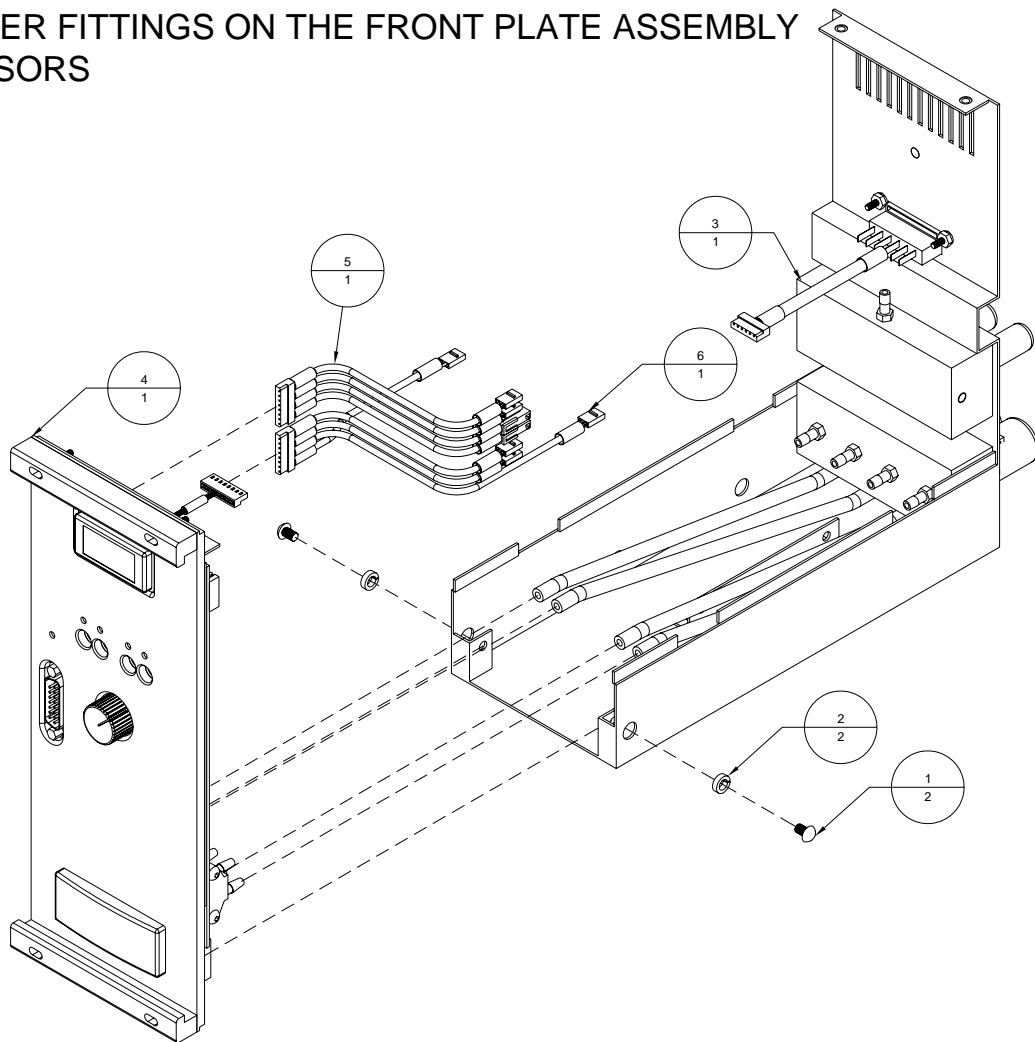


Table C-5: *Pressure Regulator Top Assembly (9101865A)*

Item	Part Number	Quantity	Description	Reference
1	403510	2	Screw, BHCS, 8-32 UNC x ¼"	
2	439009	2	Lockwasher, No. 10	
3	9103049	1	Bracket, Controller Module, Top	
4	9103050A	1	Pressure Regulator Pump Support Assembly	Page C-14
5	9103053A	1	Pressure Regulator Add-On Bracket Assembly	Page C-17
6	9103109	2	Screw, Truss, 8-32 UNC x ¼"	

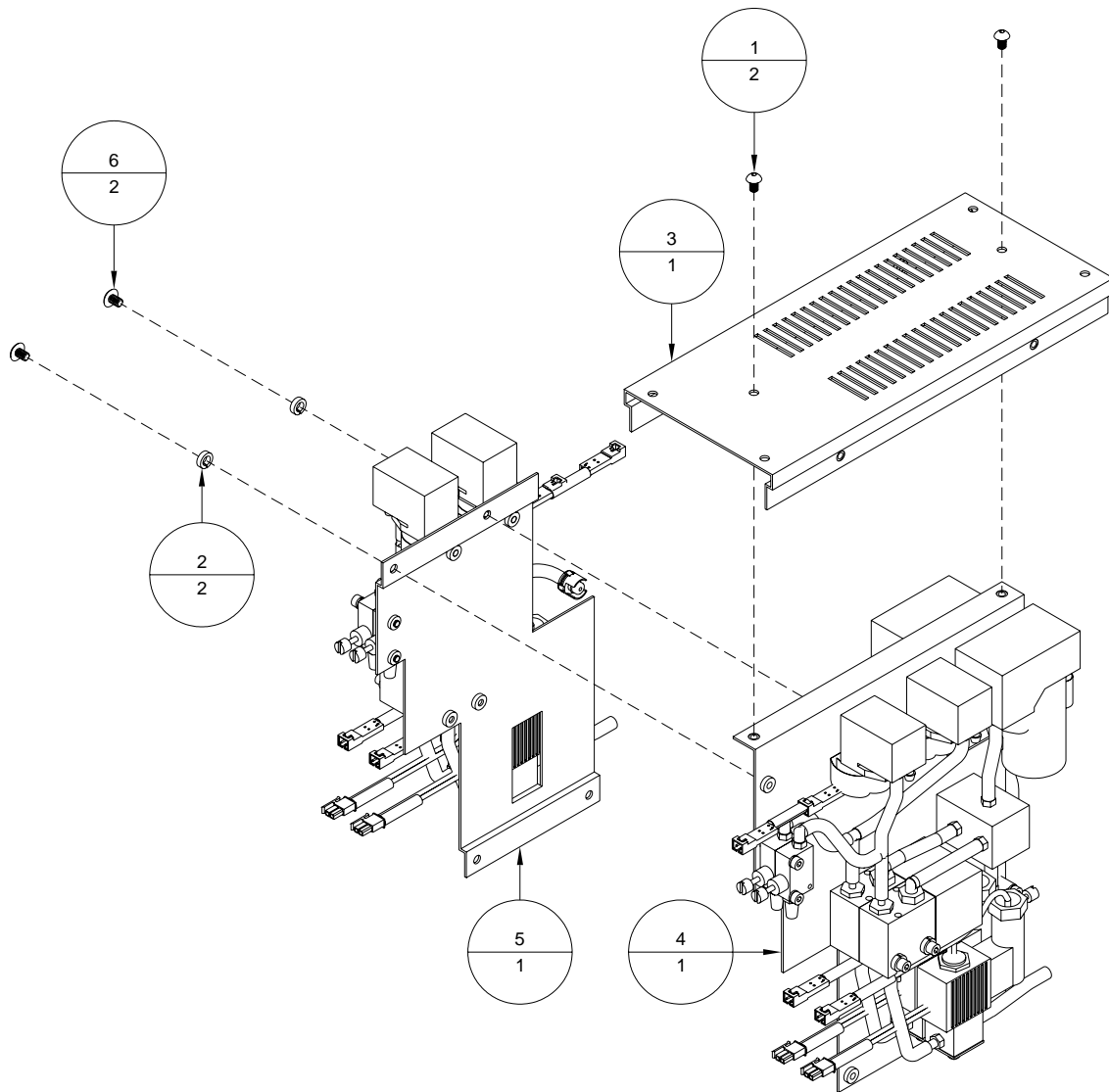
Figure C-5: *Pressure Regulator Top Assembly (9101865A)*

Table C-6: *Pressure Regulator Assembly, 4-Head (9101866A)*

Item	Part Number	Quantity	Description	Reference
1	403510	4	Screw, BHCS, 8-32 UNC x ¼":	
2	439009	2	Lockwasher, No. 10	
3	9101863A	1	Pressure Regulator Bottom Assembly	Page C-6
4	9101865A	1	Pressure Regulator Top Assembly	Page C-7
5	9103054	2	Cover, Controller Module, Side	
6	9103081A	1	Cable, Pressure Regulator, Solenoids	
7	9103109	6	Screw, Truss, 8-32 UNC x ¼"	
8	9103190A	1	Cable, Pressure Regulator Pumps, 4-Head	

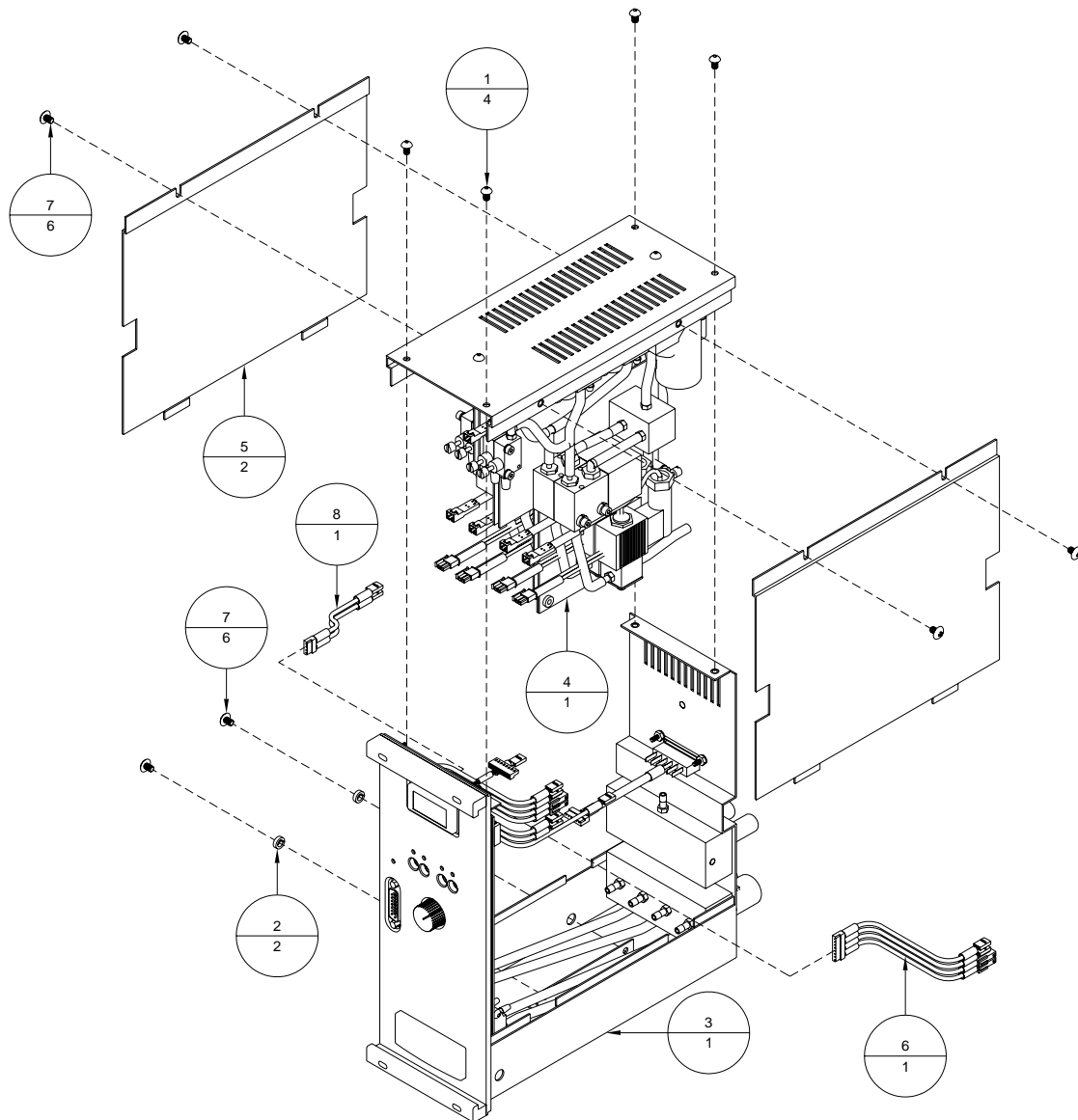
Figure C-6: *Pressure Regulator Assembly, 4-Head (9101866A)*

Table C-7: *Solenoid Valve Assembly, Meniscus/Purge (9102715A)*

Item	Part Number	Quantity	Description	Reference
1	609000	1	Shrink Wrap, 3/16" I.D. x 1"	
2	9100149	2	Connector, 1/8" NPT, 1/8" I.D.	
3	9100247	2	Contact, Female, 24-20 AWG, Micro-Fit 3.0	
4	9102085	1	Connector "L", 1/8-27 NPT, 1/8" I.D.	
5	9102714	1	Solenoid Valve, 12VDC	
6	9102718	1	Connector, male, 2-Pin, Micro-Fit 3.0	

Figure C-7: *Solenoid Valve Assembly, Meniscus/Purge (9102715A)*

USE TEFLON TAPE AS THREAD
SEALANT

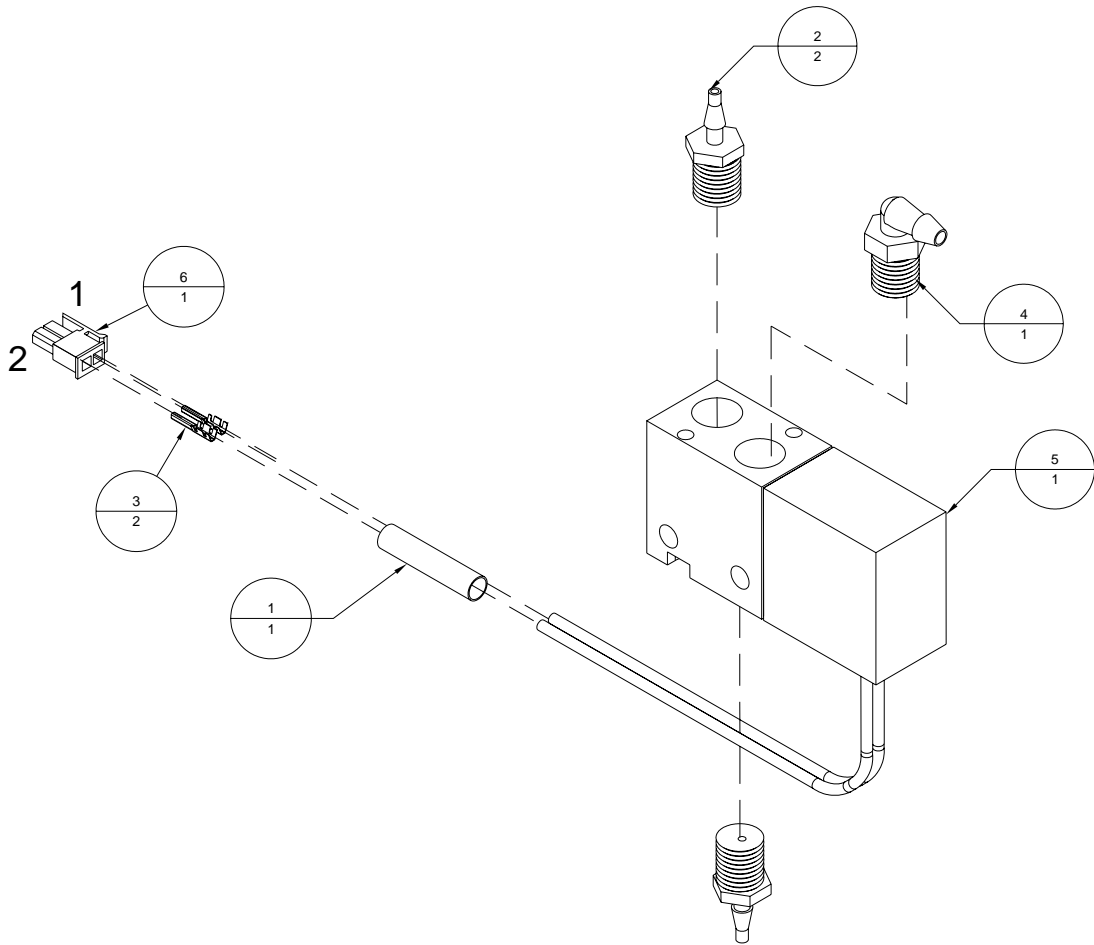


Table C-8: *Pressure Regulator 2-Way Valve Assembly (9102941A)*

Item	Part Number	Quantity	Description	Reference
1	606531	1	Cable, #22-2, Shielded, 5"	
2	609000	1	Shrink Wrap, 3/16" I.D. x 1"	
3	9101208	1	Solenoid Wrap, Air, 12 VDC, N.C.	
4	9101582	2	Fitting, 10-32 Thread to Tube, 1/8" I.D.	
5	9102426	2	Terminal, Male Crimp	
6	9103312	1	Connector, Male, 2-Pin, SL	

Figure C-8: *Pressure Regulator 2-Way Valve Assembly (9102941A)*

USE TEFLON TAPE FOR THREAD SEALANT

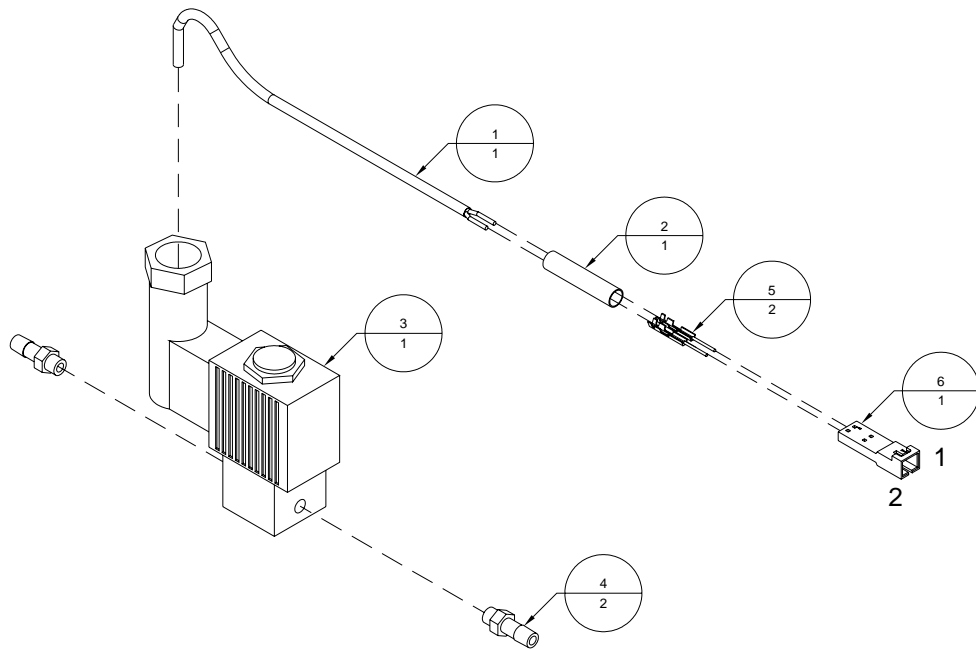


Table C-9: *Flow Control, Meniscus Vacuum (9102960A)*

Item	Part Number	Quantity	Description	Reference
1	9102575	1	Filter, Bronze/Steel	
2	9102960	1	Valve, Flow Control, 10-32 UNF	
3	9103020	1	Fitting, 10-32 UNF, Elbow, 1/8" I.D.	

Figure C-9: *Flow Control, Meniscus Vacuum (9102960A)*

USE TEFLON TAPE AS THREAD SEALANT

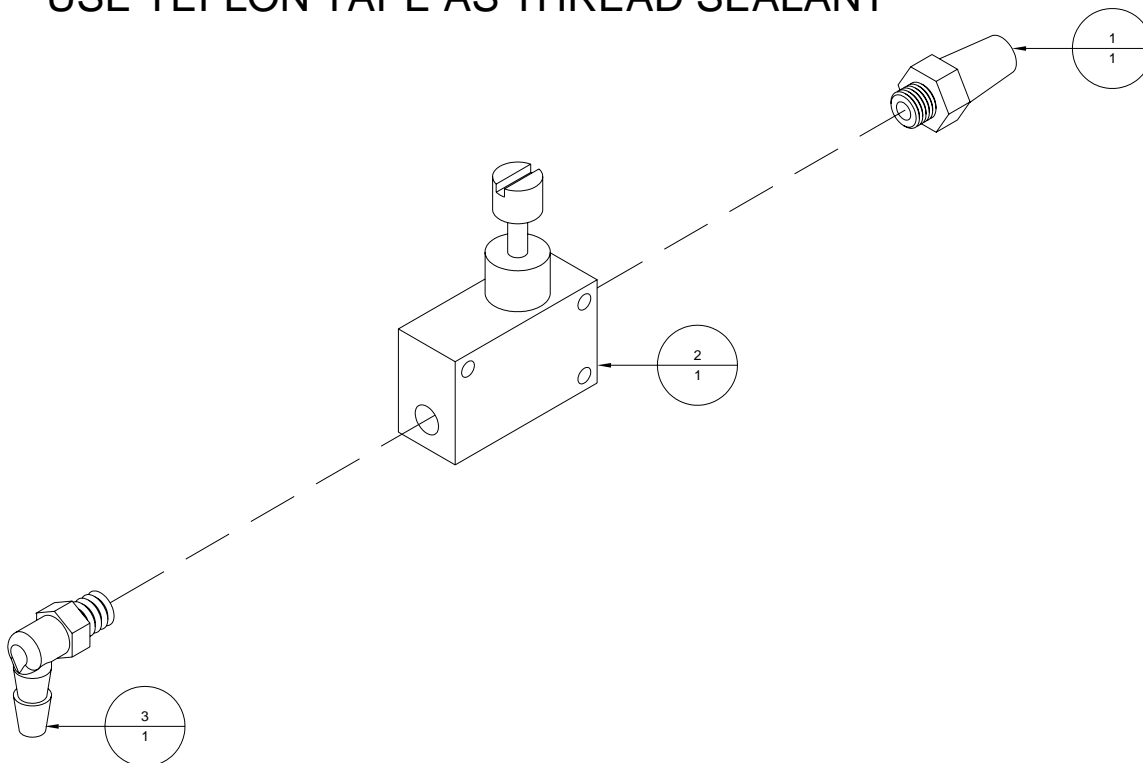


Table C-10: *Manifold Block Assembly, Meniscus Vacuum (9103047A)*

Item	Part Number	Quantity	Description	Reference
1	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D., 8"	
2	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D., 8"	
3	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D., 8"	
4	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D., 8"	
5	9101582	4	Fitting, 10-32 Thread to Tube 1/8" I.D.	
6	9102989	4	Coupling, 1/8" NPT, PMC, Shutoff	
7	9103020	4	Fitting, 10-32 UNF, Elbow, 1/8" I.D.	
8	9103047	1	Manifold Block, Meniscus Vacuum	
9	9103290	4	Caplug, VC Series, 0.750" dia, Black	

Figure C-10: *Manifold Block Assembly, Meniscus Vacuum (9103047A)*

USE TEFLON TAPE FOR TREAD SEALANT
 USE SILICONE FOR EACH TUBE/FITTING SEALANT
 USE TIE WRAPS AROUND EACH TUBE/FITTING

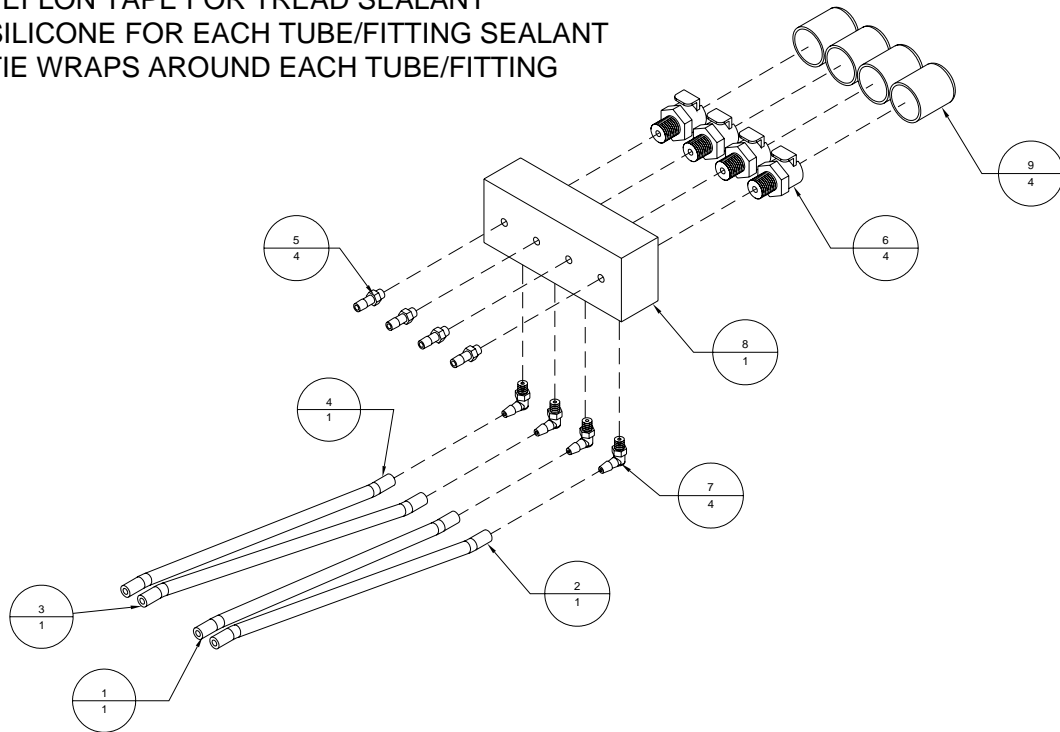


Table C-11: *Manifold Block Assembly, Lung Vacuum (9103048A)*

Item	Part Number	Quantity	Description	Reference
1	404810	1	Screw, SHSS, 10-32 UNF x 1/4"	
2	9101582	1	Fitting, 10-32 Thread to Tube 1/8"	
3	9102990	4	Coupling, 1/8" NPT, SMC, Shutoff	
4	9103048	1	Manifold Block, Lung Vacuum	
5	9103291	4	Caplug, VC Series, 0.406" dia, Black	

Figure C-11: *Manifold Block Assembly, Lung Vacuum (9103048A)*

USE TEFLON TAPE AS THREAD SEALANT
USE SILICONE FOR TUBE/FITTING SEALANT

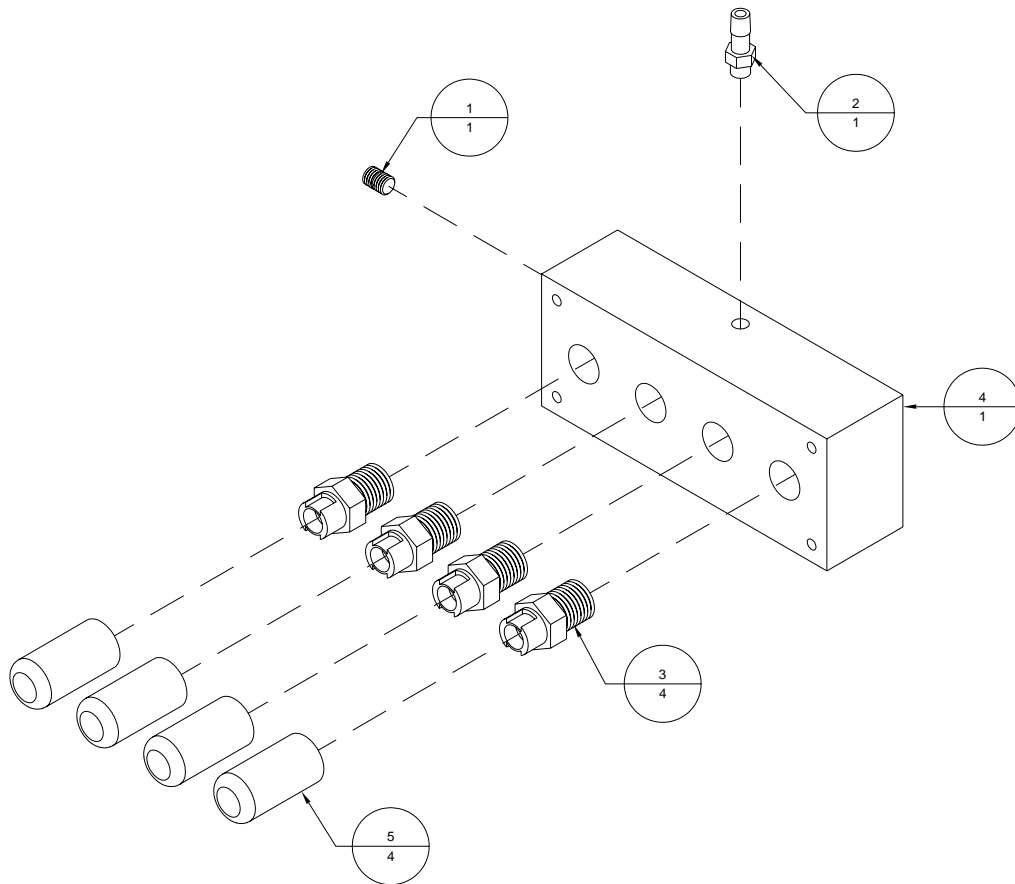


Table C-12: *Pressure Regulator Pump Support Assembly (9103050A)*

Item	Part Number	Quantity	Description	Reference
1	402230	2	Screw, SHCS 6-32 UNC x 1/2"	
2	402270	2	Screw, SHCS 6-32 UNC x 1"	
3	403310	4	Screw, PHMS, 8-32 UNC x 1/4"	
4	404210	2	Screw, SHCS, 10-32 UNF x 1/4"	
5	413506	4	Screw, BHCS, M3 x 6mm	
6	439006	4	Lockwasher, No.6	
7	439009	8	Lockwasher, No. 10	
8	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2.5"	
9	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2.5"	
10	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 3"	
11	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2.5"	
12	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 4"	
13	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2.5"	
14	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2.5"	
15	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 1.5"	
16	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 1.5"	
17	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2"	
18	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2"	
19	9100472	2	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 1"	
20	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2.5"	
21	9100472	1	Tubing, Silicone, 1/4" I.D. x 1/8" O.D. x 2"	
22	9100921	2	Lung Vacuum Pump	
23	9100971	2	Gripper Clip	
24	9101290	2	Fitting, Tee, 1/8" I.D.	
25	9101582A	1	Flow Control, Purge Pressure	Page C-4
26	9102715	2	Gripper Clip, 3/8" - 5/8"	
27	9102715A	2	Solenoid Valve Assembly, Meniscus/Purge	Page C-9
28	9102941A	2	Pressure Regulator 2-Way Valve Assembly	Page C-10
29	9102960A	2	Flow Control, Meniscus Vacuum	Page C-11
30	9103050	1	Mount, Pump Support	
31	9103052A	1	Manifold Block Assembly, Purging Pressure	Page C-16
32	9103198	2	Screw, SHCS, 8-32 UNC x 1-3/4"	
33	9103473A	2	Meniscus Pump Assembly, Heavy duty	Page C-22

Figure C-12: *Pressure Regulator Pump Support Assembly (9103050A)*

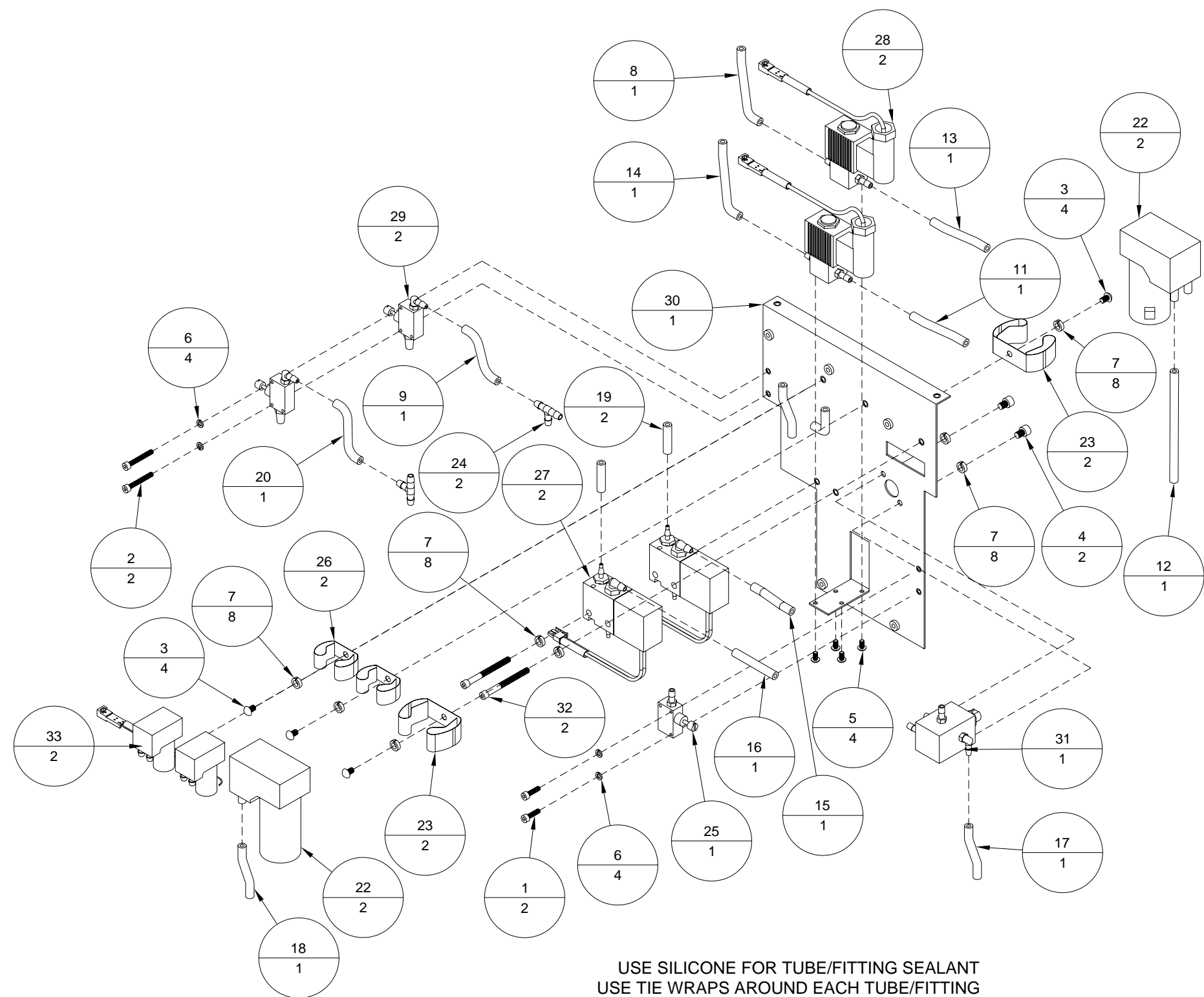


Table C-13: *Manifold Block Assembly, Purging Pressure (9103052A)*

Item	Part Number	Quantity	Description	Reference
1	9101582	3	Fitting, 10-32 Thread to Tube 1/8" I.D.	
2	9102990	1	Coupling, 1/8" NPT, SMC, Shutoff	
3	9103020	1	Fitting, 10-32 UNF, Elbow, 1/8"	
4	9103052	1	Manifold Block, Purging Pressure	

Figure C-13: *Manifold Block Assembly, Purging Pressure (9103052A)*

USE TEFLON TAPE AS THREAD SEALANT

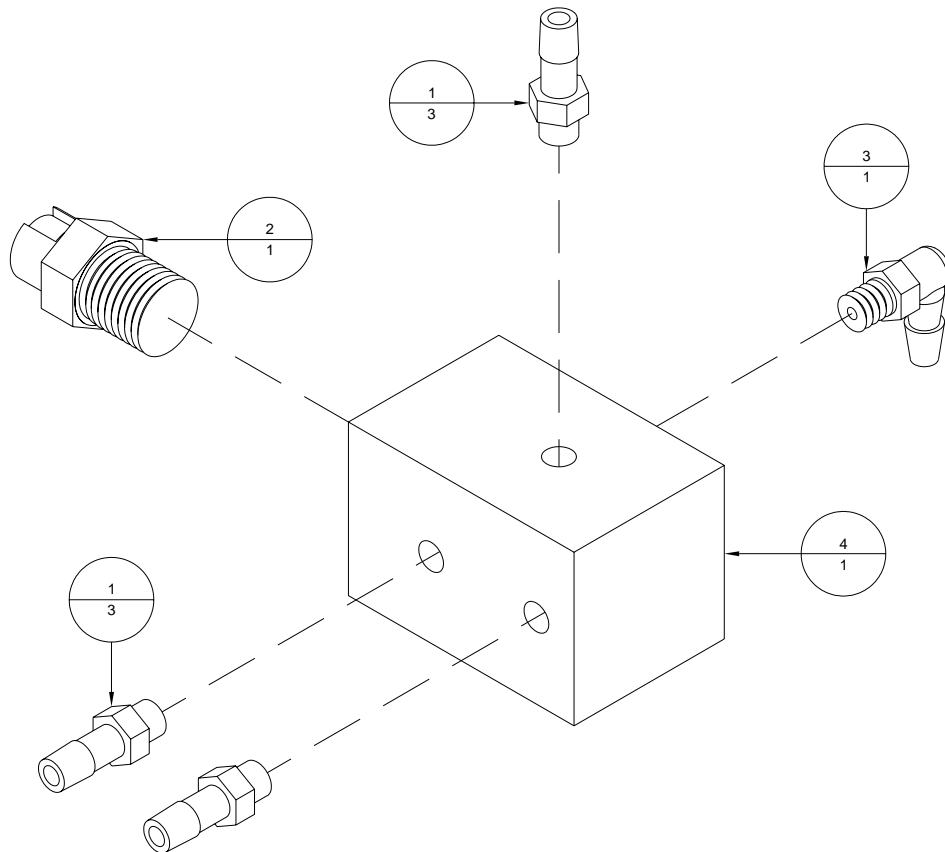


Table C-14: *Pressure Regulator Add-On Bracket Assembly (9103053A)*

Item	Part Number	Quantity	Description	Reference
1	402270	2	Screw, SHCS, 6-32 UNC x 1"	
2	413506	4	Screw, BHCS, M3 x 6mm	
3	439006	2	Lockwasher, No.6	
4	439009	4	Lockwasher, No. 10	
5	9100472	2	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 1"	
6	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 1.5"	
7	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 2"	
8	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 3.5"	
9	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 3"	
10	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 1.5"	
11	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 1.5"	
12	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 2.5"	
13	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 2.5"	
14	9101290	2	Fitting, Tee, 1/8" I.D.	
15	9102715	2	Gripper Clip, 3/8" - 5/8"	
16	9102715A	2	Solenoid Valve Assembly, Meniscus/Purge	Page C-9
17	9102941A	2	Pressure Regulator 2-Way Valve Assembly	Page C-10
18	9102960A	2	Flow Control, Meniscus Vacuum	Page C-11
19	9103053	1	Bracket, Add-on, Pressure Regulator	
20	9103109	2	Screw, Truss, 8-32 UNC x 1/4"	
21	9103198	2	Screw, SHCS, 8-32 UNC x 1-3/4"	
22	9103284A	1	Purge Pressure Connector, Add-on Unit	Page C-21
23	9103473A	2	Meniscus Pump Assembly, Heavy duty	Page C-22

Figure C-14: *Pressure Regulator Add-On Bracket Assembly (9103053A)*

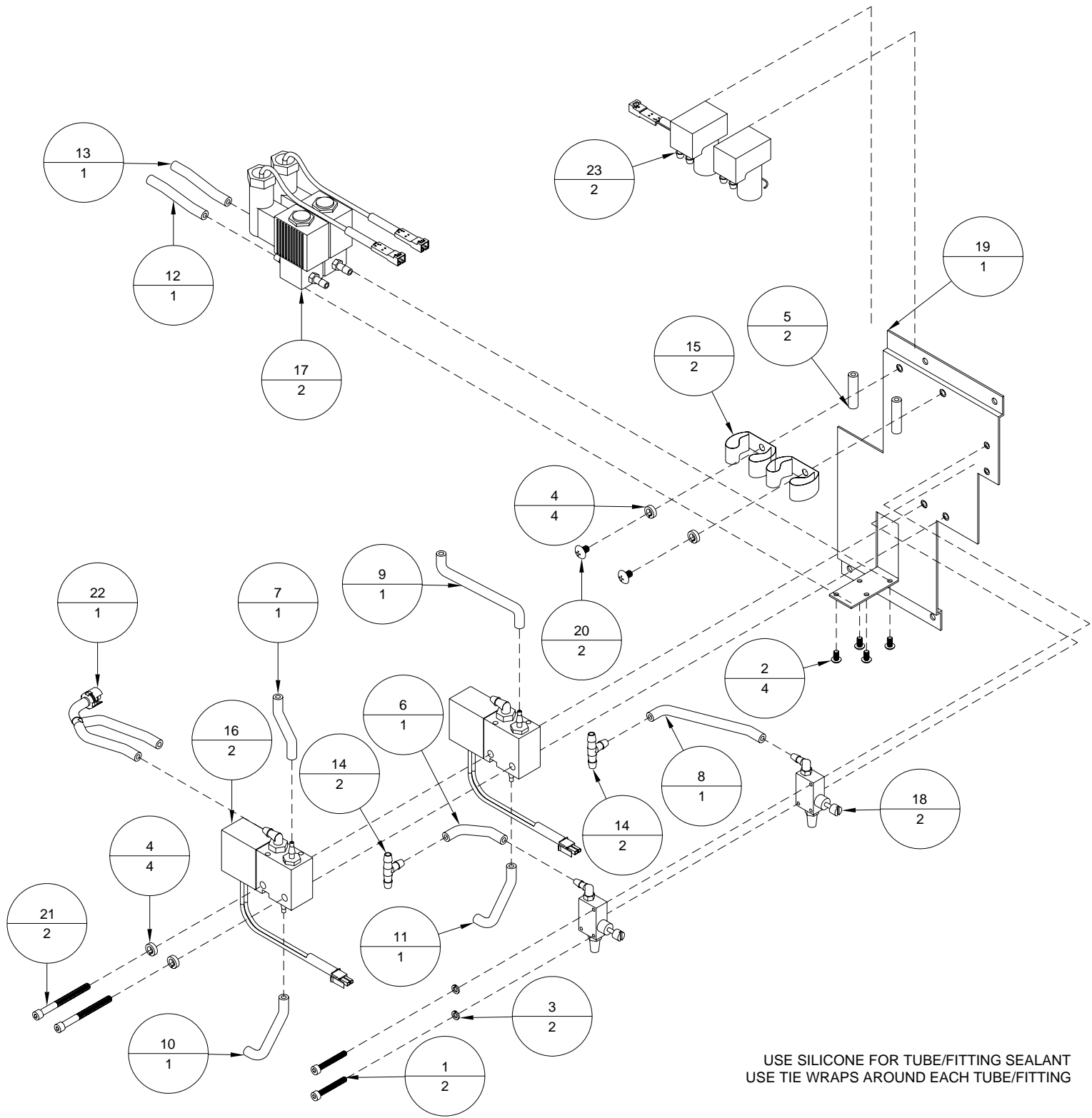


Table C-15: *Front Plate Assembly, Pressure Regulator (9103069A)*

Item	Part Number	Quantity	Description	Reference
1	401309	4	Screw, PHMS, M2.5 x 6 mm	
2	401510	4	Screw, BHCS, 4-40 UNC x 1/4"	
3	402210	4	Screw, SHCS, 6-32 UNC x 1/4"	
4	420006	6	Nut, 6-32 UNC	
5	439006	6	Lockwasher, No.6	
6	615322	2	Female Screwlock, 4-40 UNC	
7	9102941	2	Handle, Module	
8	9103069	1	Plate, Front, Pressure Regulator	
9	9103071	1	Board, Pressure Regulator	
10	9103072	1	Bracket, Electrical Board	
11	9103080A	1	Voltmeter LCD Assembly	Page C-20
12	9103081	1	Knob, Knurled, Black, 1/4" Shaft	
13	9103339	6	Nut, 6-32 UNC, Nylon	
14	9103477	1	Spacer, Pressure Regulator Block	

Figure C-15: *Front Plate Assembly, Pressure Regulator (9103069A)*

NOTE 1: M2.5 SCREWS (1) ARE ASSEMBLED IN BETWEEN THE HANDLE MODULE (6) AND THE FRONT PLATE (7)

MVP1-4 - MENISCUS VACUUM PUMP 1 - 4,
 PPP - PURGE PRESSURE PUMP,
 LVP - LUNG VACUUM PUMP,
 2WV1-4 - TWO WAY VALVE 1 - 4,
 3WV1-4 - THREE WAY VALVE 1 - 4.

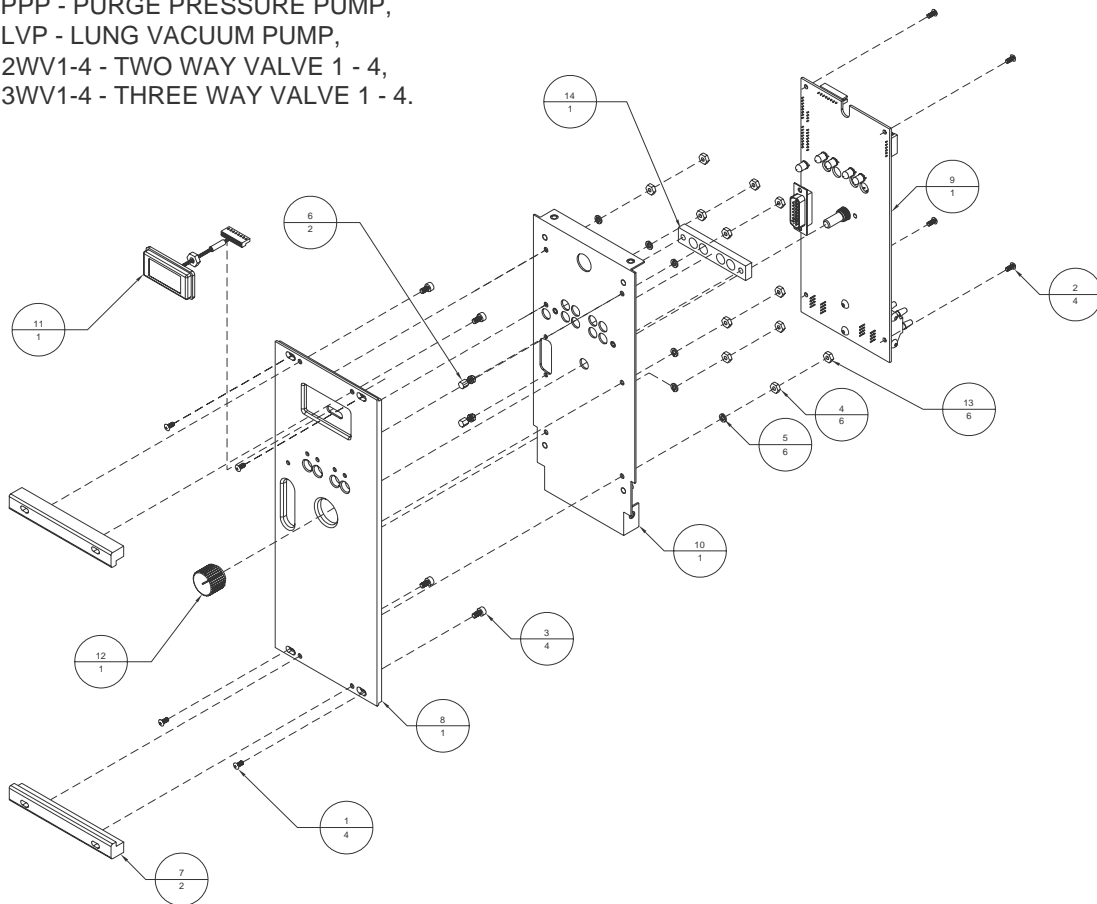


Table C-16: *Voltmeter, LCD Assembly (9103080A)*

Item	Part Number	Quantity	Description	Reference
1	609004	1	Shrink Wrap, 1/8", 1"	
2	9102565	8	Contact, Female, #22-28, SPOX	
3	9103080	1	Voltmeter, LCD, 3 ½ Digit	
4	9103192	1	Connector, Female, 8-Pin, Series 5264	

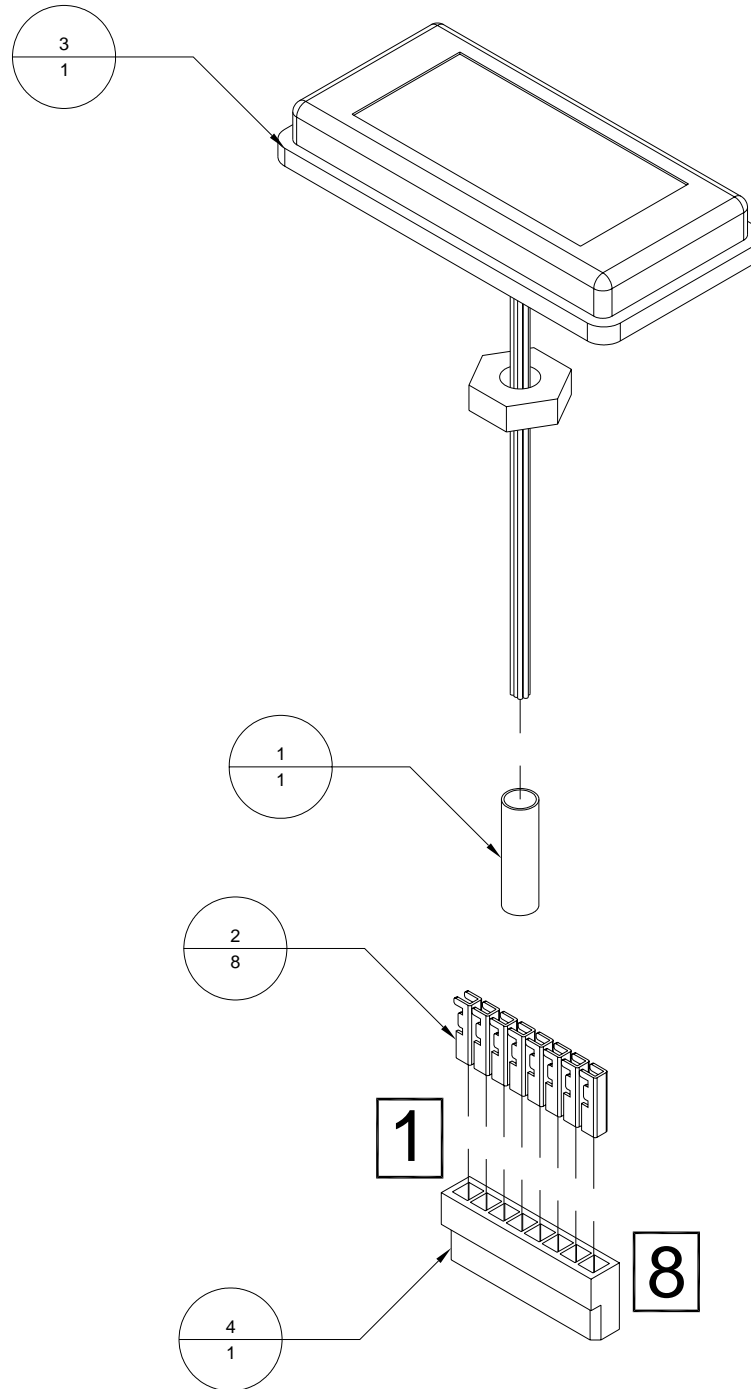
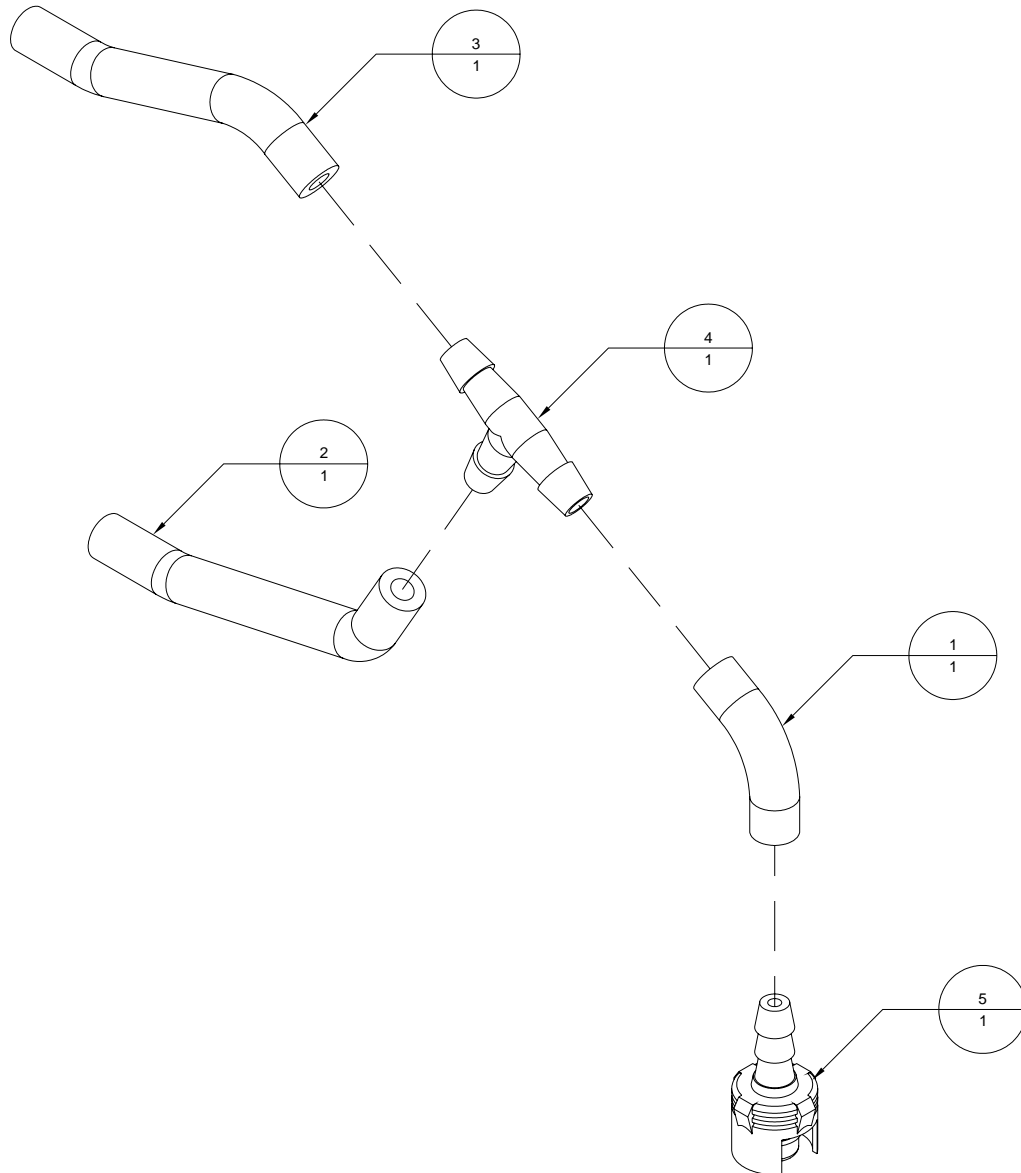
Figure C-16: *Voltmeter, LCD Assembly (9103080A)*

Table C-17: *Purge Pressure Connector, Add-On Unit (9103284A)*

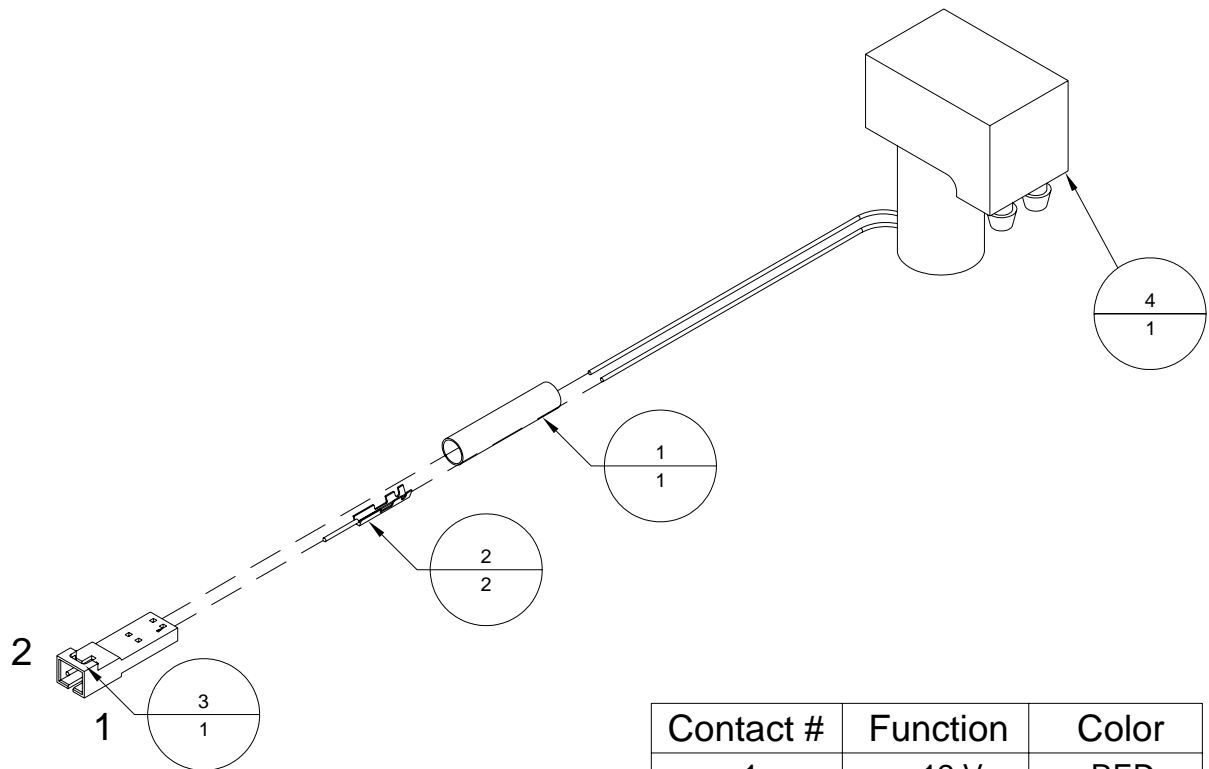
Item	Part Number	Quantity	Description	Reference
1	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 1"	
2	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 2.5"	
3	9100472	1	Tubing, Silicone, 1/4" O.D. x 1/8" I.D. x 2.5"	
4	9101290	1	Fitting, Tee, 1/8" I.D.	
5	9103284	1	Coupling, Insert-In-Line, 1/8" I.D.	

Figure C-17: *Purge Pressure Connector, Add-On Unit (9103284A)*

USE SILICONE FOR EACH FITTING/TUBE SEALANT
USE TIE WRAPS AROUND EACH TUBE/FITTING

Table C-18: *Meniscus Pump Assembly, Heavy Duty (9103473A)*

Item	Part Number	Quantity	Description	Reference
1	609000	1	Shrink Wrap, 3/16" I.D. x 1"	
2	9102426	2	Terminal, Male Crimp	
3	9103312	1	Connector, Male, 2-Pin, SL	
4	9103473	1	Pump, 12 VDC, diaphragm, brushless	

Figure C-18: *Meniscus Pump Assembly, Heavy Duty (9103473A)*

Contact #	Function	Color
1	+12 V	RED
2	GND	BLK

NOTE: Cut pump wire to 6"

List of Schematics

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Figure D-5: Electrical Schematic, BK1700 Atlas Power Supply (BK-PSM-4A-E)..... D-6

Figure D-6: Wiring Diagram, Pressure Regulator (BK-PVM-4A-C)..... D-7

Figure D-1: Wiring, BK-1700 Frame (BK-1700-FRM-C)

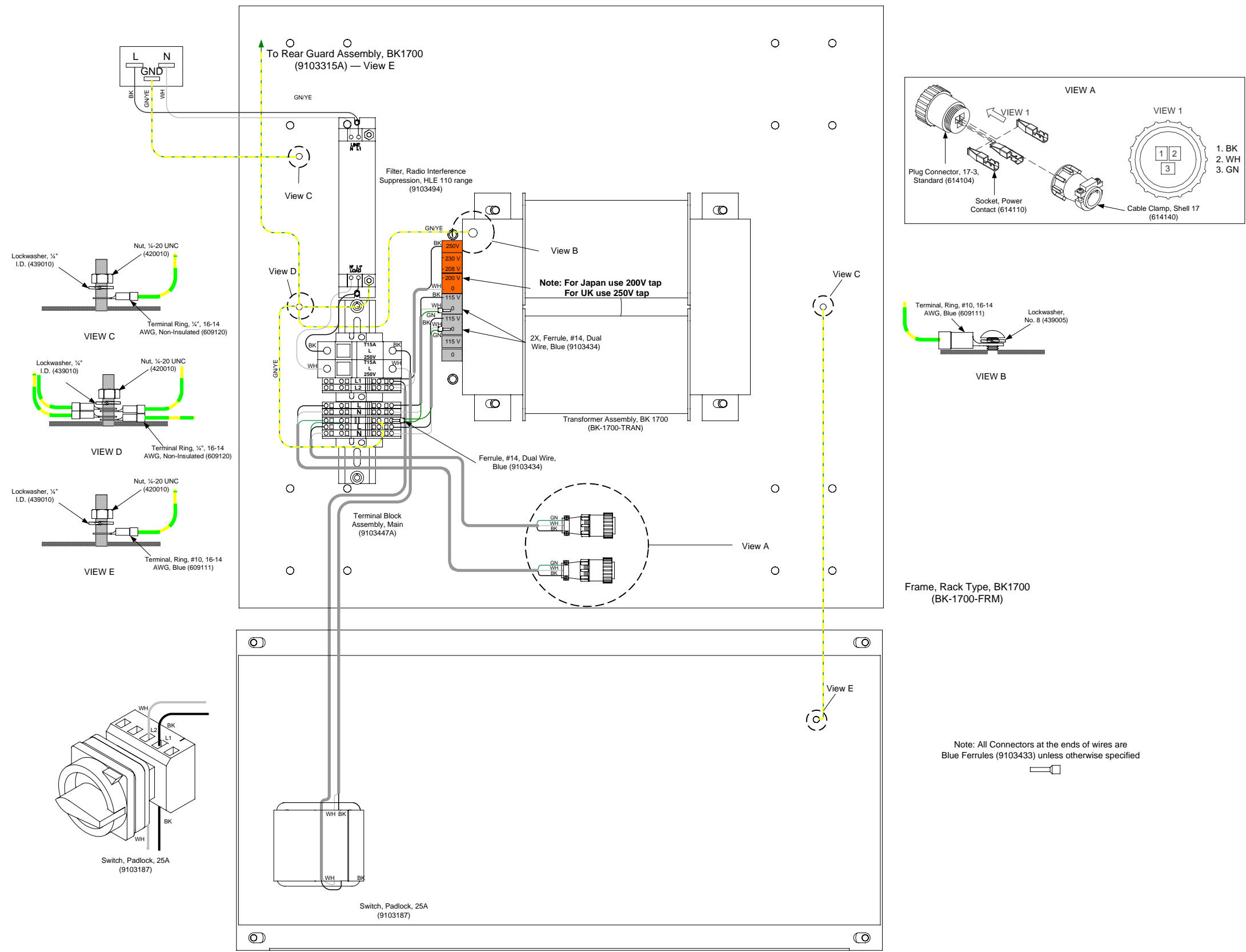


Figure D-2: Wiring Diagram, BK1700 Computer, Part 1/2 (BK-PCM-8A-C)

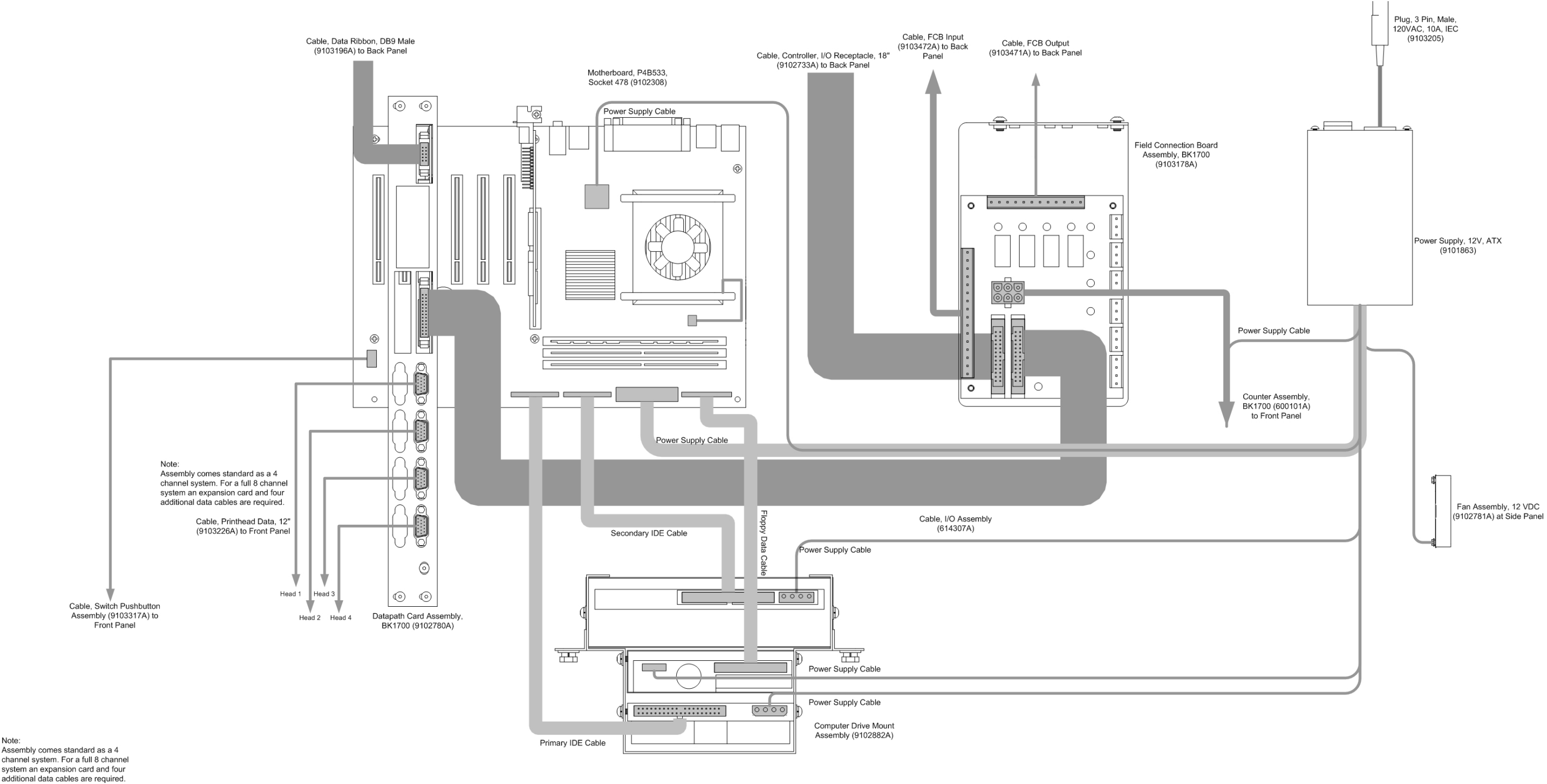


Figure D-3: Wiring Diagram, BK1700 Computer, Part 2/2 (BK-PCM-8A-C)

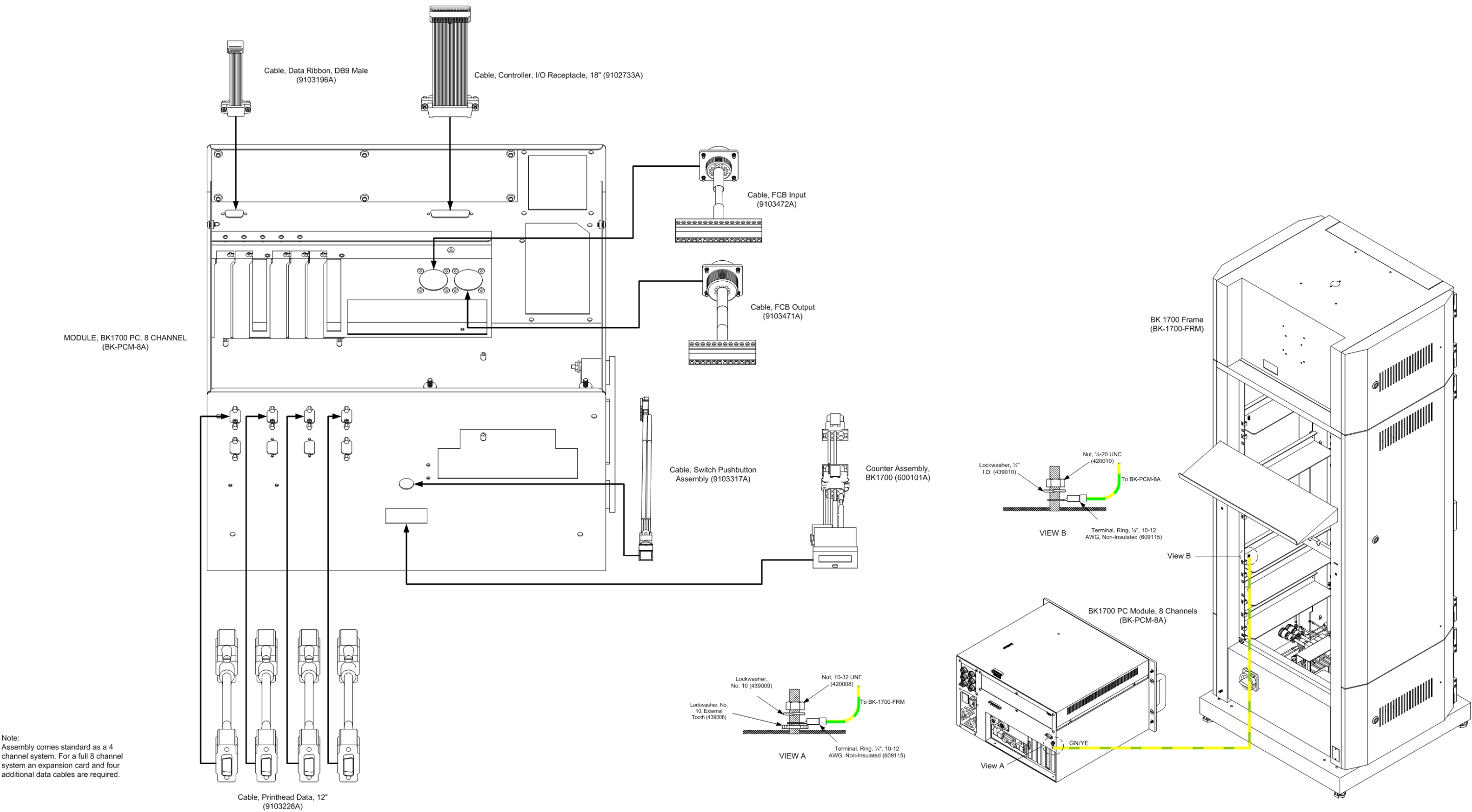


Figure D-4: Wiring Diagram, Atlas Power Supply (BK-PSM-4A-C)

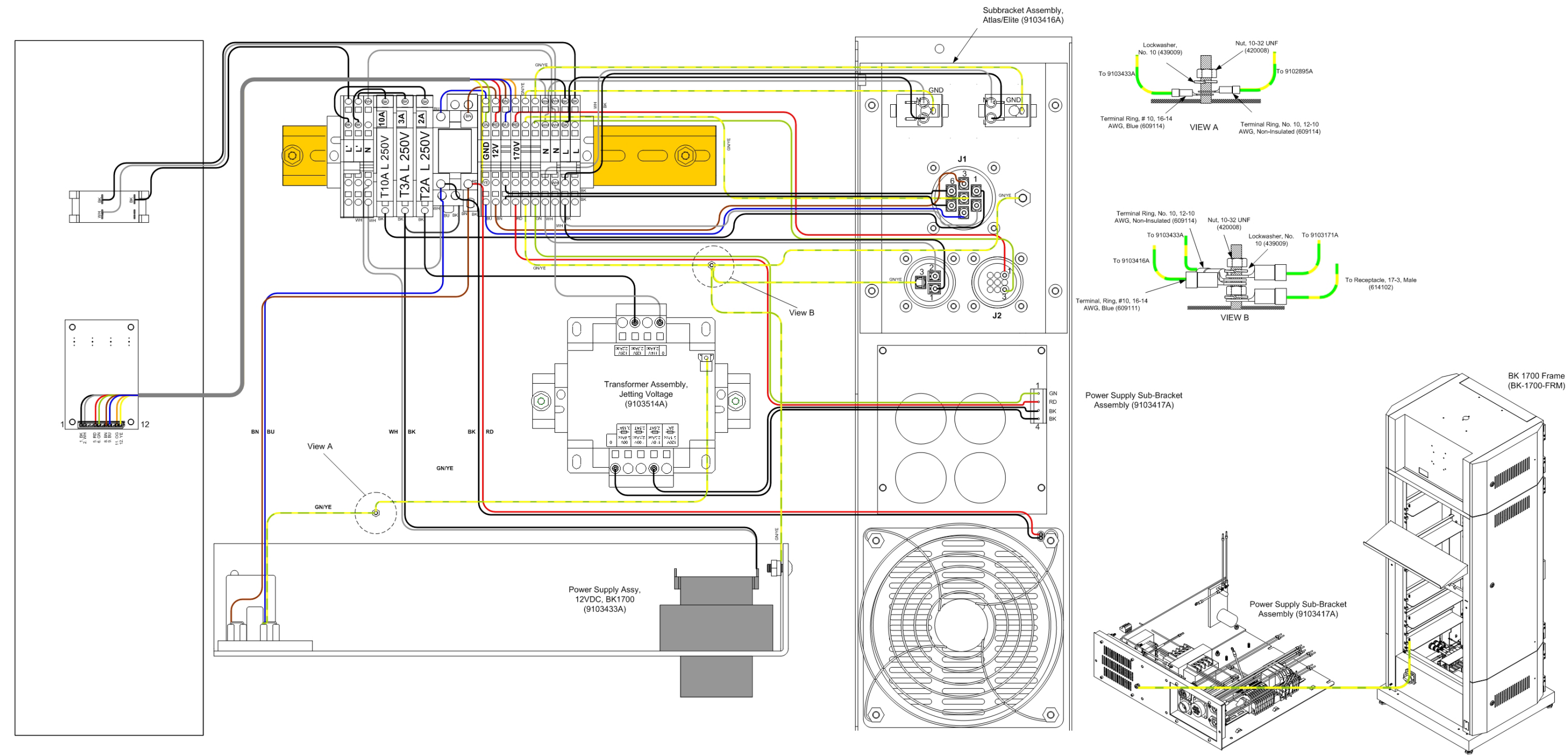


Figure D-5: Electrical Schematic, BK1700 Atlas Power Supply (BK-PSM-4A-E)

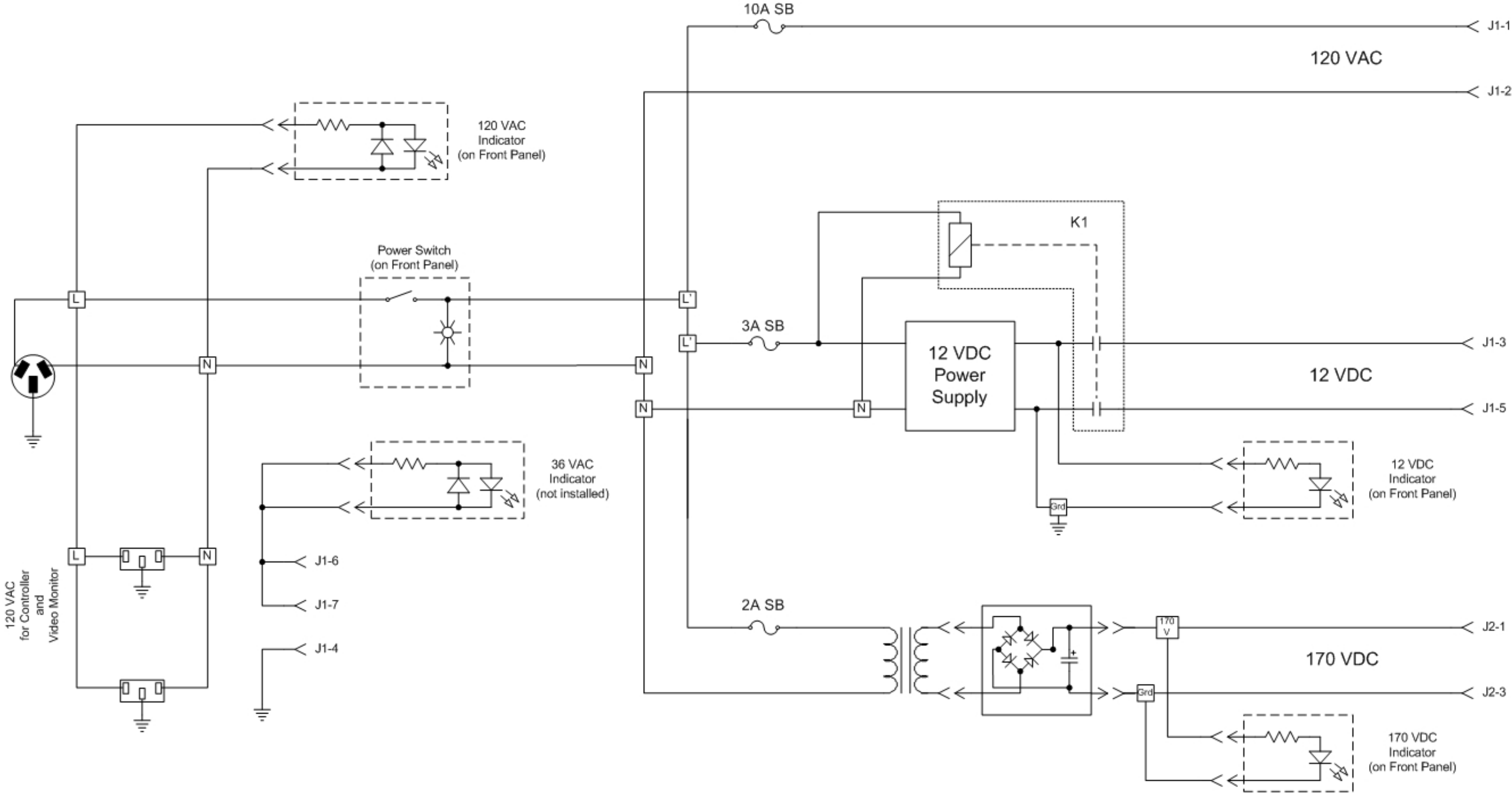


Figure D-6: Wiring Diagram, Pressure Regulator (BK-PVM-4A-C)

