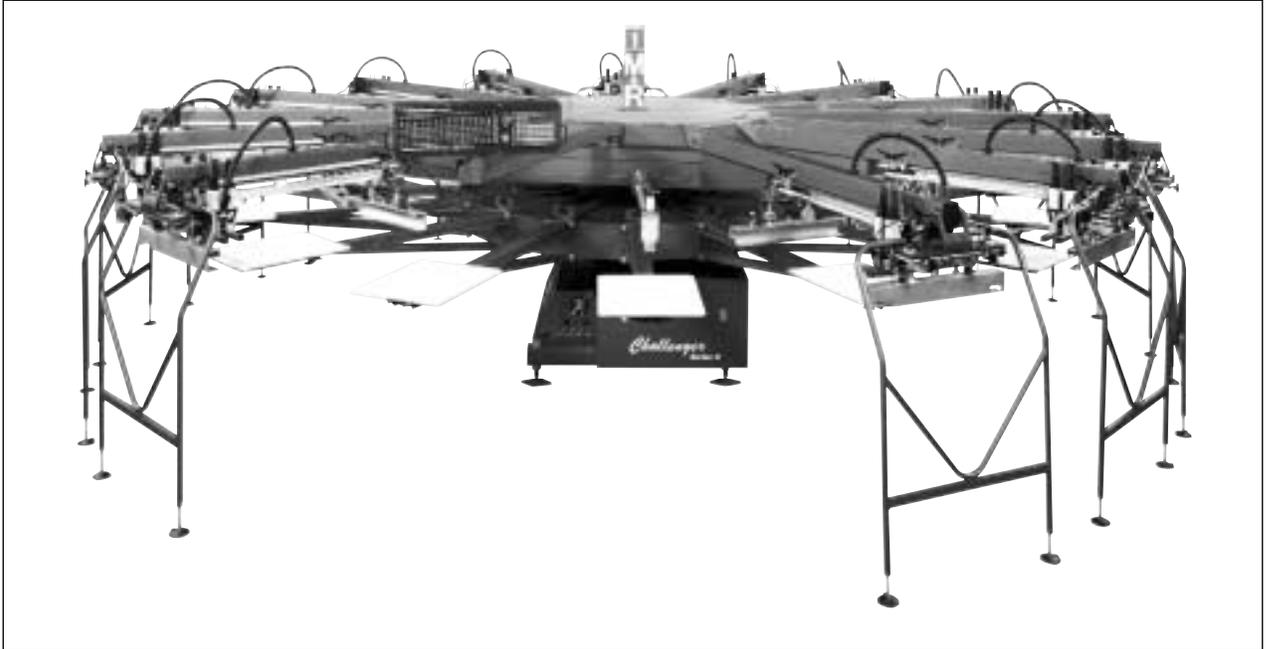


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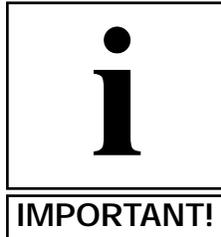


# The M&R

***Challenger II***  
*mrprint.com* **18 Color**



**M&R Printing Equipment, Inc.**  
[www.mrprint.com](http://www.mrprint.com)  
Toll Free 1-800-736-6431



# IMPORTANT!

The product described in this publication may employ hazardous voltages or might create other conditions that could, through misuse, inattention, or lack of understanding, result in personal injury, or damage to the product or to other equipment. It is imperative, therefore, that personnel involved in the installation, maintenance, or use of this product understand the operation of the product and the contents of this publication.

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware, software, features or specifications, nor to provide for every possible contingency in connection with installation, operation and maintenance. Features may be described herein which are not present in all variations of this product. M&R Printing Equipment, Inc. assumes no obligation of notice to holders of this document with respect to changes subsequently made.

M&R Printing Equipment, Inc. makes no representation or warranty, expressed, implied or statutory with respect to, and assumes no responsibility for the accuracy, completeness, sufficiency or usefulness of the information contained herein. No warranties of merchantability or fitness for purpose shall apply.



The information listed below will prove helpful when ordering replacement parts, requesting service or repairs. Please fill in the following information. The Model No., Serial No., Schematic No. and Machine No. are all located on the Manufacturers Rating Plate mounted to the equipment. Should you have any questions regarding this information, please do not hesitate to contact our Equipment Service Department at 1 (800) 736-6431 during normal business hours.

			
Made in the U.S.A.			
VOLTS	AMPS	CYCLES	PHASE
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
AMPS LARGEST MOTOR	F.L.A.	SCHEMATIC No.	
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MODEL No.		SERIAL No.	MACHINE No.
<input type="text"/>		<input type="text"/>	<input type="text"/>
M&R PRINTING EQUIPMENT, INC. 1 N. 372 Main Street Glen Ellyn, Illinois 60137 U.S.A. www.mrprint.com			
PH: (630) 858-6101		FAX: (630) 858-6134	

Product Name: \_\_\_\_\_

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

Schematic No. \_\_\_\_\_

Machine No. \_\_\_\_\_

Date of Installation: \_\_\_\_\_

Installed By: \_\_\_\_\_



---

# Introduction



Valued Customer,

Thank you and congratulations on your purchase of your new M&R Challenger Series II semi-automatic Textile Screen Printing System.

The M&R Challenger Series II has set the industry standard for affordable, high performance automatic textile screen printing. Designed for quick set-ups and high volume production, the M&R Challenger Series II is loaded with time saving, cost cutting features.

Incorporating a sophisticated servo-driven index system to insure accurate, consistently smooth index cycles, even at the highest possible production speeds, the M&R Challenger Series II delivers a full 20" x28" print area.

A thorough understanding of the operation and maintenance of your new M&R Challenger Series II will insure maximum production rates and a long service life for your investment. This Operator's Manual is provided to help guide you, and your employees, in the proper procedures for set-up, operation and preventive maintenance of your new M&R Challenger Series II.

Should you have any questions regarding the operation or maintenance of your new M&R Challenger Series II, M&R's world wide Technical Service and Support Network is available to you during regular business hours (8:30am - 5:00pm C.S.T.) at 1 (800) 736-6431, or, on week ends or holidays, call our 24 hour Emergency Service Hotline at 1 (630) 462-4715 for technical support 24 hours a day, seven days a week.

On behalf of all of us here at M&R, thank you for selecting M&R as your equipment supplier.

A handwritten signature in black ink, appearing to read "M. J. Sweers".

Michael J. Sweers  
Director of Technical Services  
M&R Printing Equipment, Inc.







## Challenger Series II

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# Safety Precautions

## SAFETY PRECAUTIONS

### FUNDAMENTAL SAFETY INSTRUCTIONS:

**Please read all information regarding safety precautions as presented in the Operator's Manual.**

The fundamental requirement to assure safe and trouble-free operation of this equipment, is a thorough understanding of the safety information contained in this Operator's Manual.

This Operator's Manual includes important instructions to assure safe operation of this equipment. This Operator's Manual, and especially the safety instructions as described there-in, must be observed by everyone who will operate this equipment. In addition to the safety instructions and regulations described in this Operator's Manual, rules and regulations of the equipment owners place of business must also be observed.

### Obligation of the Equipment Operator:

The equipment Operator is obliged to guarantee that only staff who are acquainted with the fundamental regulations according to workers protection and accident prevention, and, are completely knowledgeable in the operation of this equipment have fully read the Safety Chapter and the Warning Instructions of this manual, and understand the instructions as they relate to operation of this equipment. Equipment Operators must be continually evaluated to assure that they fully understand the operation of this equipment.

### Obligation of Personnel:

Every person that will be engaged in the operation of this equipment must comply with the following before operation of the equipment is to begin.

1. Observe the fundamental regulations of worker's protection and accident prevention.
2. Read the Safety Chapter and Warning Instructions of this Operator's Manual and confirm by signature that they understand the instructions as described in the manual.

### Dangerous Situations during Operation of the Equipment:

The M&R Challenger Series II has been designed and constructed in accordance with safety standards as described by Nationally Recognized Testing Laboratories, such as Underwriters Laboratories in the United States, and the European Economic Community (CE) Standards and Directives. However, it is possible that dangerous conditions which can cause serious injury or loss of life for the user or third persons, or damage to the equipment or property could occur.

This equipment must be used only for the defined purpose as described in the Operator's Manual, and must be maintained in perfect running condition in accordance with described Safety Regulations.

Conditions which may compromise operator safety must be identified and corrected immediately.

### Defined Purpose:

The M&R Challenger Series II is specifically designed to apply (print) screen printed textile inks on textile substrates. Any other use of the equipment which does not meet the Defined Purpose as described above is not permitted.

In accordance with the Defined Purpose of this equipment, it is necessary to observe all instructions as outlined in the Operator's Manual and to perform the preventive maintenance procedures as described in the manual.

### Guarantee and Liability:

In principle, our general terms of sale and delivery are valid and these are at the Operator's disposal. Guarantee and liability claims for persons or property damage are excluded if they originate for one or more of the following reasons.

1. A non-defined use of the equipment
2. Improper installation or use of the equipment
3. Operation of the equipment with defective safety devices
4. Non-Observance of instructions as described in the Operator's Manual for transportation, storage, installation, operation, maintenance, set-up and take-down of the equipment.
5. Modification of the equipment.
6. Failure to replace worn or defective parts of the equipment.
7. Defective repairs made to the equipment.
8. Dangerous conditions which are a result of the improper use of the equipment.

### Description of Safety Symbols and Instructions:



This symbol signifies or alerts the equipment operator of conditions or areas of the equipment which present imminent danger to the health of the equipment Operator.

**Non-observance of these instructions has serious health consequences, and can lead to highly dangerous injuries.**

# Safety Precautions



This symbol signifies a possible imminent danger for life and health of persons and equipment Operators.

**Non-observance of these instructions can have serious health consequences and can lead to highly dangerous injuries.**



This symbol signifies a possible danger.

**Non-observance of these instructions can lead to light injuries or damage to the equipment or property.**



This symbol gives important instructions for the proper use of the equipment. **Non-observance of these instructions can lead to equipment failure.**



This symbol is used to describe operating tips or especially useful information.

**This information will enable the Operator to use all equipment functions for optimal performance.**

## Organizational Measures:

Equipment operators are responsible to provide personal protection when operating this equipment. All safety devices must be checked each day before operation of the equipment can begin.

## Safety Devices:

Before beginning operation of the equipment, all safety appliances must be checked for proper operation. Safety devices may only be removed after.....

1. The equipment is shut down.
2. The electrical power has been dis-connected from the equipment.
3. In case of delivery of partial components, the Operator must install safety devices in accordance with regulations.

## Exploratory Safety Measures:

The Operator's Manual must be kept on or near the equipment at all times. All safety and danger notices must be kept in readable condition at all times.

## Training of Equipment Operator's

Only properly trained Operators may run the equipment. The competence of personnel who are to operate, maintain, set-up and shut down the equipment must be confirmed. Unskilled staff may work with the equipment only when supervised by experienced equipment Operators.

## Equipment Control System:

Never make any modifications to software. Only experienced Operators may actuate the control system.

## Safety Measures during Normal Operation:

Operate the equipment only if all safety devices are fully operational.

Before starting the equipment, check to be sure no-one will be endangered by the operation of the equipment.

Check the equipment and safety devices at least once per shift for external or visible damage.

## Danger by Electrical Energy:



Work on the electrical system must be carried out by qualified personnel only.

Check the electrical equipment regularly for any sign of defect or loose connections.

Electrical enclosures must be kept securely locked at all times.

Only authorized personnel with a key are allowed access to electrical enclosures.

## Danger by Pneumatic Energy:

Only personnel with experience with pneumatic power systems may work with pneumatic components or assemblies. Before starting any work on pneumatic components or assemblies, **the compressed air supply must be completely drained from the equipment to prevent any operation of pneumatic controls or assemblies.**

# Safety Precautions

All pneumatic piping and/or hoses must be checked at regular intervals for signs of wear or failure.

## Maintenance & Trouble Shooting:

Preventive maintenance must be performed at regular intervals as described in the Operator's Manual.

Equipment operator's must be informed before any preventive maintenance can be performed.

**All power systems such as electrical, pneumatic, hydraulic or mechanical must be dis-connected and locked out before preventive maintenance may begin.**

## Structural Modification of the Equipment:

Modifications of equipment are specifically not allowed without written authorization from M&R Printing Equipment, Inc.

## Cleaning of the equipment:

Clean away all ink or other contaminant's at the end of each day.

## Equipment Noise:

Under normal operating conditions as described under Defined Purpose, this equipment will not produce sound above the level of 65 db. Depending on local conditions, a higher continuous sound level may result that could lead to hardness of hearing. In this case, the operational staff must wear appropriate safety clothing or protection.



**CAUTION:** The information contained in this Operator's Manual has been provided to eliminate problems from occurring. Be sure to read through this Operator's Manual fully before operating your press.

There are numerous safety features utilized in the operation of this equipment. **Please be sure you know the location of these safety devices and how they operate before attempting to operate this equipment.**

## SAFETY FEATURES -

1. All equipment is provided with either a safety bar, foot switch, yellow safety cords, infrared safety beam, yellow floor mats or hand switch to stop the equipment. Please know the type on your equipment and its location and function before operating. **NEVER ATTEMPT TO BY-PASS OR DEFEAT ANY SAFETY DEVICE OR APPLIANCE. IN THE EVENT THAT ANY OR ALL SAFETY DEVICES ARE NOT OPERATING OR FUNCTIONING PROPERLY, DO NOT ATTEMPT TO OPERATE THIS EQUIPMENT!**

2. Safety guards have been provided to protect the operator from all moving parts. Please do not remove these Safety Guards any time the equipment is in operation.

3. This Operator's Manual includes information regarding the proper preventative maintenance procedures. When ever personnel are performing preventative maintenance procedures, **be sure that all electrical and pneumatic power is disconnected from the equipment, and that disconnects are locked in the "OFF" position.**

4. Never work on the table surface under the print stations unless the power "ON/OFF" switch is placed in the "OFF" position.

## OPERATOR SAFETY INSTRUCTIONS -

All industrial equipment, including screen printing equipment, requires a combination of high electrical, pneumatic, hydraulic or mechanical power for operation. In addition, automatic screen printing equipment, by its nature, exposes operators to parts and assemblies which operate at high speeds and contain numerous moving parts. As with all complex industrial equipment, care should be exercised to carefully observe proper operating procedures and safety precautions.

Although every effort has been made to design and construct safe, dependable equipment, it is impossible to foresee all circumstances under which this equipment may be utilized, or to anticipate all possible combinations of factors which may cause a hazardous condition or situation. It is therefore imperative that the equipment Operator, as well as all other personnel engaged in any phase of the set-up, operation or preventative maintenance of this equipment consider safety first an important part of their job.

The following general safety considerations are offered as an aid to users of M&R Printing Equipment to assist them in becoming safety conscience.

**1. READ THE OPERATOR'S MANUAL** before attempting to lift, move, operate or perform maintenance on any piece of machinery. Become intimately familiar with all equipment controls, their locations, their operation and their effect on equipment function. Keep this Operator's Manual in a clean location immediately adjacent to the equipment for a quick and handy reference.

**2. BEFORE ATTEMPTING TO START THE EQUIPMENT** inspect all areas around and adjacent to moving parts for possible obstructions: tools, rags, crating remnants etc. Be certain that all Safety Guards, covers, access doors etc., are properly installed prior to starting operation.



# Specifications



## SPECIFICATIONS CHALLENGER Series II (Pneumatic Models)

MODEL No.	12 COLOR	14 COLOR	16 COLOR	18 COLOR
Maximum Image Size	20" x 28" (50 x 70 cm)			
Maximum Frame O.D.	26" x 43" (66 x 109 cm)			
Total Set-Up Diameter	18' (5.49 m)	19' 6" (5.94 m)	21' (6.40 m)	22.5' (6.9 m)
Compressed Air Req.	100 P.S.I. @ 60scfm	100 P.S.I. @ 72 scfm	100 P.S.I. @ 72 scfm	100 P.S.I. @ 72 scfm
Electrical Requirements	208/240 v, 3 ph, 17 Amps			
Shipping Weight	7500 lbs. (3402 kg)	8000 lbs. (3629 kg)	8500 lbs. (3856 kg)	9000 lbs. (4083 kg)
Standard Pallet Size	16" x 22" (40.6 x 55.8 cm)			



### IMPORTANT!

The electrical specifications indicated are based on mathematical calculations which assume ideal conditions exist for electrical supply line values, material used in the installation of electrical service and site preparation. Although every effort has been made to provide accurate electrical specifications, M&R Printing Equipment, Inc., does not assume any liability for damages, whether consequential or incidental, that may result from the use of the indicated electrical specifications. M&R Printing Equipment, Inc., encourages the use of a licensed Electrician for the installation of electrical service to this equipment. The equipment when installed must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code ANSI/NFPA 70- Latest Edition.

M&R Printing Equipment, Inc. reserves the right to alter specifications in the manufacture of its products.

# Specifications



## SPECIFICATIONS CHALLENGER Series II (AC Models)

MODEL No.	12 COLOR	14 COLOR	16 COLOR	18 COLOR
Maximum Image Size	20" x 28" (50 x 70 cm)			
Maximum Frame O.D.	26" x 43" (66 x 109 cm)			
Total Set-Up Diameter	18' (5.49 m)	19' 6" (5.94 m)	21' (6.40 m)	21' (6.40 m)
Compressed Air Req.	100 P.S.I. @ 21scfm	100 P.S.I. @ 21 scfm	100 P.S.I. @ 21 scfm	100 P.S.I. @ 21 scfm
Electrical Requirements	208/230 v, 3 ph, 37 Amps	208/230 v, 3 ph, 40 Amps	208/230 v, 3 ph, 40 Amps	208/230 v, 3 ph, 40 Amps
Shipping Weight	7500 lbs. (3402 kg)	8000 lbs. (3629 kg)	8500 lbs. (3856 kg)	9000 lbs. (4083 kg)
Standard Pallet Size	16" x 22" (40.6 x 55.8 cm)			



**IMPORTANT!**

*The electrical specifications indicated are based on mathematical calculations which assume ideal conditions exist for electrical supply line values, material used in the installation of electrical service and site preparation. Although every effort has been made to provide accurate electrical specifications, M&R Printing Equipment, Inc., does not assume any liability for damages, whether consequential or incidental, that may result from the use of the indicated electrical specifications. M&R Printing Equipment, Inc., encourages the use of a licensed Electrician for the installation of electrical service to this equipment. The equipment when installed must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code ANSI/NFPA 70- Latest Edition.*

*M&R Printing Equipment, Inc. reserves the right to alter specifications in the manufacture of its products.*

# Specifications

## Standard Features

### Carousel Rotation

- Bi-directional rotation
- Free-wheel capability
- Pre-registration performed at the factory

### Certification

- Panel listed by Underwriter's Laboratories (UL)

### Color Capacity

- 12, 14, 16 and 18 color models

### Control Center

- Control panel offers easy navigation, with programming and prompts in plain language
- Digital microprocessor with self-diagnostics
- Independent print start/print finish setting automatically activates and stops print heads in proper sequence.
- Multiple print stroke capability
- Production speed monitor for more accurate job costing
- Test print setting turns individual print heads on/off during test print cycle

### Design and Construction

- Improved print heads and pallet arms provide stability for excellent print quality
- Made of rigid steel and aluminum and premium electronic components

### Index System

- Adjustable index speed
- Servo driven index system for increased speed, smoothness and consistency
- Single or double indexing

### Pallet Locator

- Synchronizes distance of all pallets from center of press

### Pallets

- All aluminum
- Low profile
- Pallet leveling system
- Quick release and tool-free for rapid installation and removal
- Rubber coated

### Print Area

- 20" x 28" (50 x 70 cm)
- Double index print area: Call for dimensions

### Print Carriage Bearings

- True close tolerance linear bearing carriage system for uniform ink deposit

### Print Heads

- 4-point off-contact adjustment on all print heads
- Independent print/flood speed controls on each head
- Independent print button on each head
- Independent reset button on each head

### Registration

- Enhanced front micro-registration adjustments
- Tri-Loc compatible
- Visual guides

### Screen Clamps

- Clamping system holds roller frames without clamp adapters

### Screen Holders

- Adjustable rear screen holders accommodate a wide variety of screen sizes
- Compatible with numerous registration systems including M&R's Tri-Loc and Newman Pin-Lock
- Flip-up front screen holders make setup fast and mid-run screen changes easy

### Squeegees/Floodbars

- Calibrated independent and adjustable pressure settings
- Front and rear stop position allows operator to leave screen clear or flooded (great for water-based inks)
- Pressure and angle adjustments independently set for superior print quality

### Stations

- 14, 16 and 18

### Stroke Length

- Calibrated stroke length adjustment allows faster setup
- Rear stroke length is adjustable to maximize print speed and efficiency and to reduce the "working" of ink

### Training

- Access to M&R's Training Center

### Warranty

- Two Year Limited

### Service

- 24 hour hotline

## Options & Accessories

### Central Off-Contact

- Permits fast, incremental single lever adjustment of all stations simultaneously

### Certification

- CE compliant (Built to specifications established by the European Committee for Standardization)

### Control Center

- Management Production Software
- Modem with cable and module
- Revolver print program automatically operates individual print stations in programmed sequence and provides multiple flashing with just one flash unit (Patent No. 5,595,113)

### Electrical

- Single phase available

### Flash Curing

- A full range of M&R flash cure units is available

### Optic Shirt Detector

- Patent No. 5,883,400

### Pallets

- Wide range of pallet sizes and styles

### Print Heads

- Variable frequency AC electric drive heads for the ultimate in print control

### Registration

- Pneumatic screen clamps facilitate rapid screen loading and deliver unmatched stability on a wide variety of screens

### Squeegee/Floodbar

- Pneumatic squeegee/floodbar locks (includes tool-free squeegee/floodbar angle adjustment)
- Pressure gauge for squeegee on each print head

### Stroke Length

- Front stroke length adjustment (standard on AC heads)

### Tri-Loc Rapid Registration System

- Dramatically speeds setup

# Specifications

TYPICAL MULTIPLE UNIT (LOOP) COMPRESSOR - CHILLER LAYOUT  
(Use Black Iron Pipe)

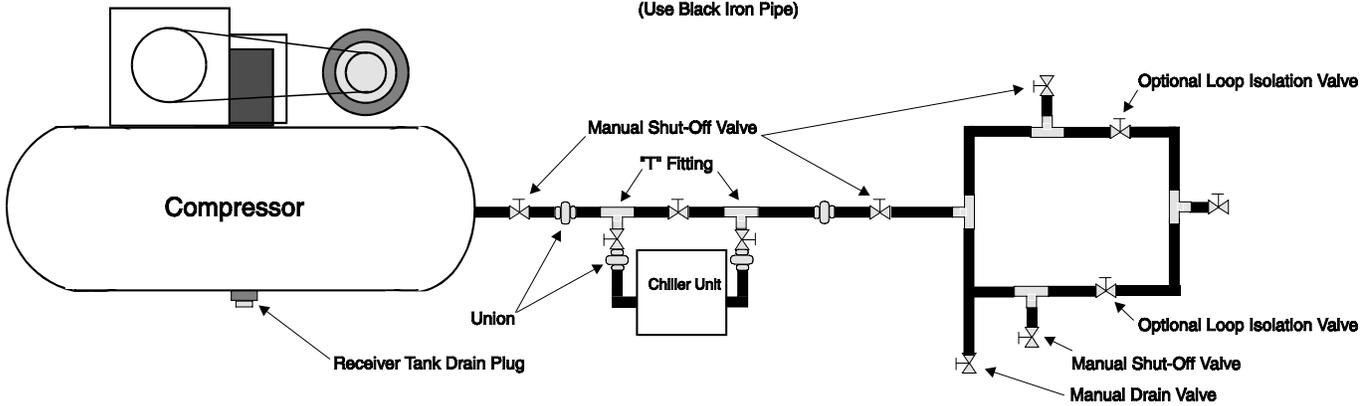


Figure 2 Typical Multiple Unit (Loop) Compressor-Chiller Layout



A clean, moisture free compressed air supply is essential for the continued operation of the M&R Challenger Series II press. We strongly recommend that a refrigerated air chiller be installed in the compressed air supply line to the Challenger Series II press to prevent moisture damage to pneumatic seals, valves and air cylinders used in the operation of the print carriage (See diagram above). Failure to use a refrigerated compressed air chiller with this equipment may void the warranty for pneumatic components such as air cylinders, valves and seals.

# Specifications

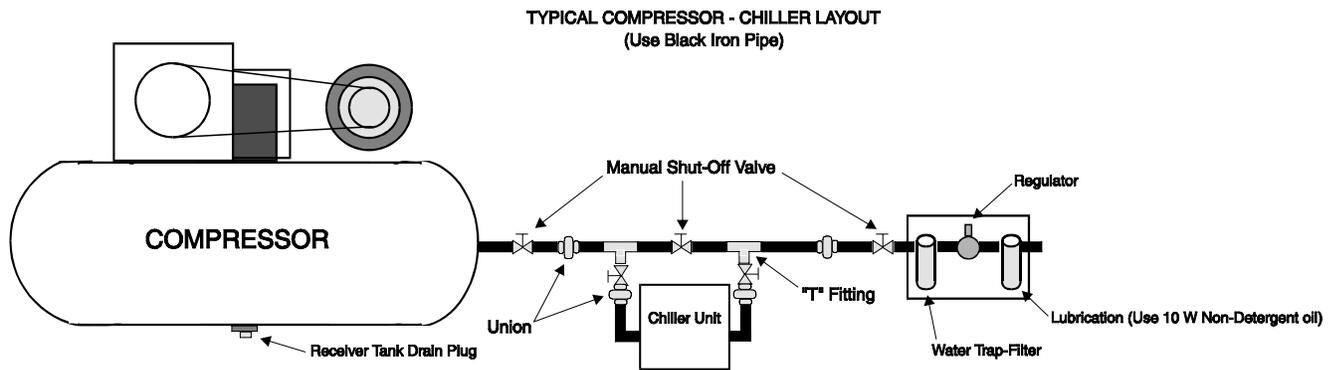
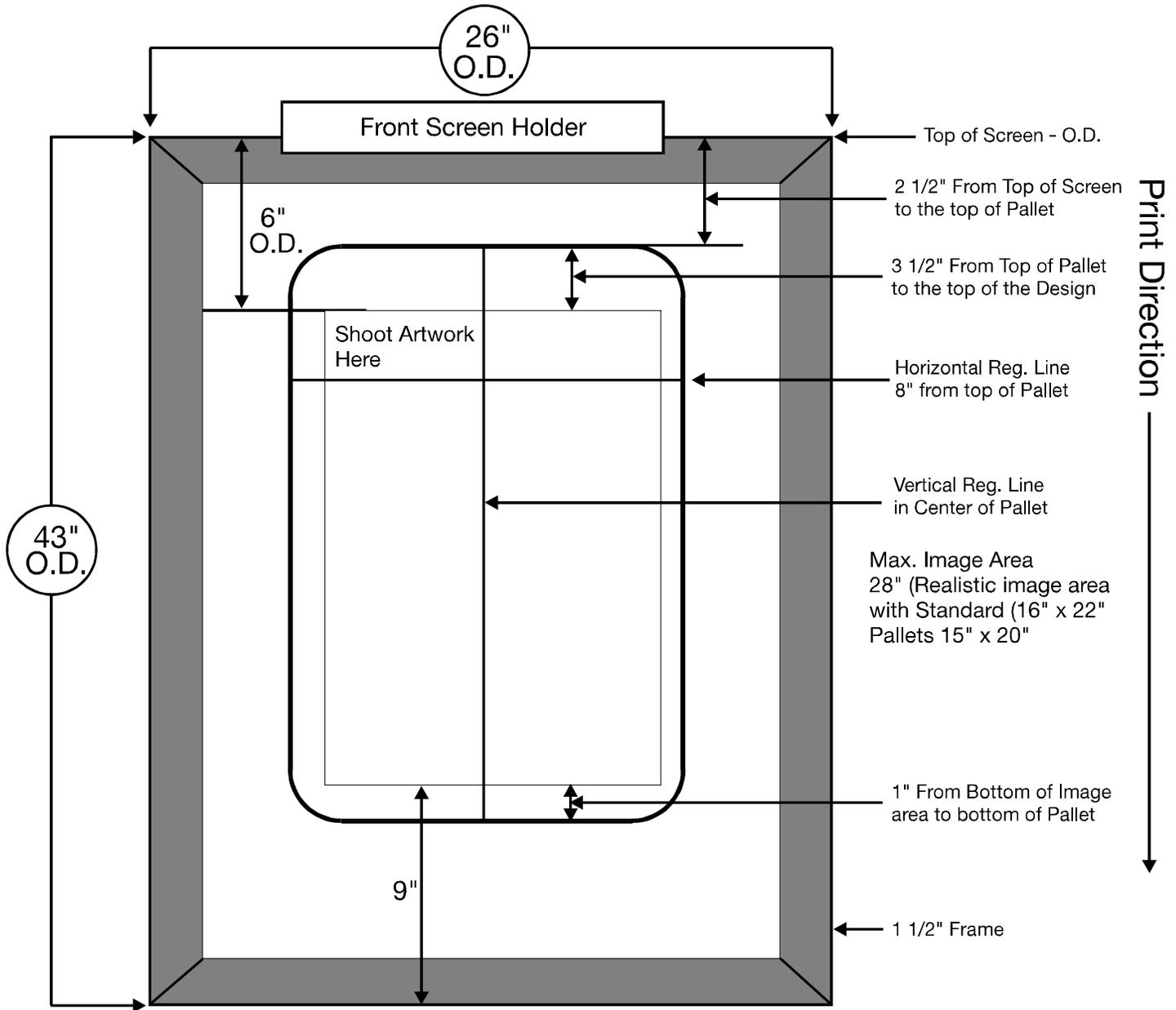


Figure 1 Typical Compressor-Chiller Layout

 <b>CAUTION!</b>	<p>A clean, moisture free compressed air supply is essential for the continued operation of the M&amp;R Challenger Series II press. We strongly recommend that a refrigerated air chiller be installed in the compressed air supply line to the Challenger Series II press to prevent moisture damage to pneumatic seals, valves and air cylinders used in the operation of the print carriage (See diagram above). Failure to use a refrigerated compressed air chiller with this equipment may void the warranty for pneumatic components such as air cylinders, valves and seals.</p>
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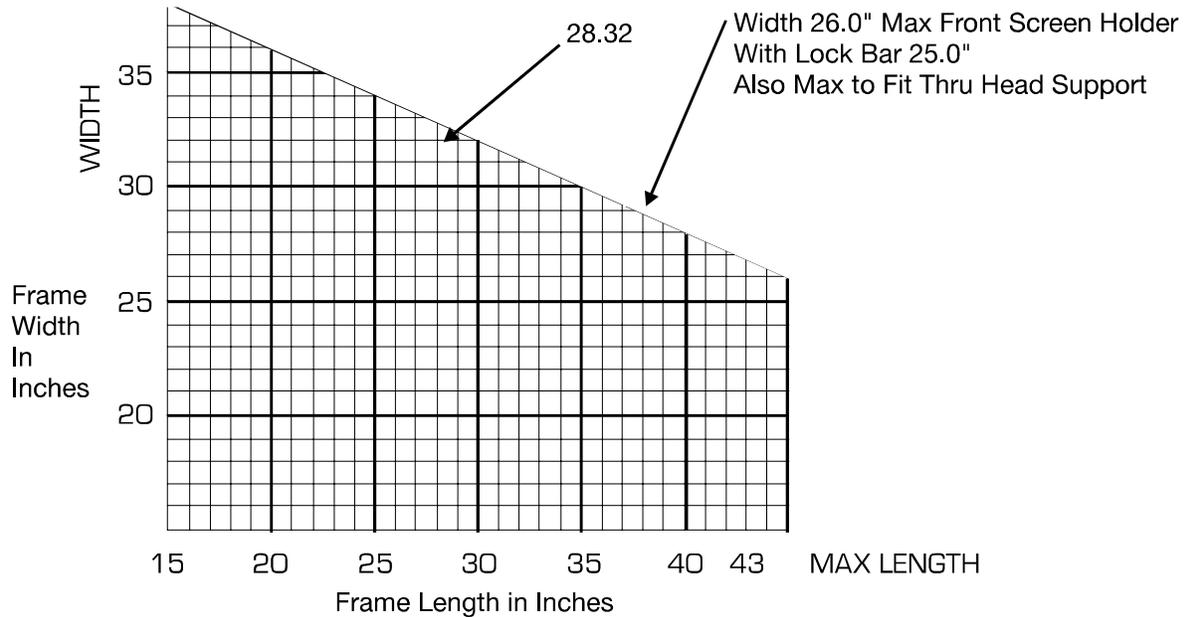
# Screen Frame & Image Size



**NOTE:** Although every effort has been made to provide accurate screen frame specifications, M&R Printing Equipment, Inc. does not assume any liability for damages, whether consequential or incidental that may result from the use or misuse of the indicated specifications. M&R Printing Equipment, Inc. reserves the right to alter specifications in the manufacture of its products.



# Screen Frame & Image Size



Use this chart to determine whether your existing screen frame can be used on the M&R Challenger Series II.

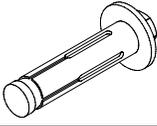
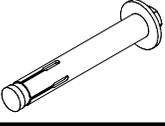
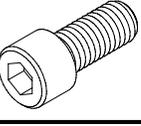
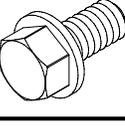
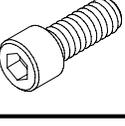
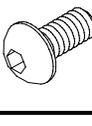
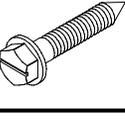
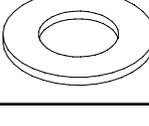
1. Locate where your frames width falls along the left side of the chart.
  2. Now find where the frame length falls along the bottom of the chart.
- As long as these two dimensions come together within the chart, the frame will fit on the press.

**NOTE! 26" wide by 43" long is the maximum screen size when every print station is in use.**



# Installation Hardware

The hardware list shown below illustrates and describes all hardware required to assemble your Challenger Series II screen printing system. The quantity is indicated for each available model size. Although a Factory Trained M&R Service Representative will perform the original installation of this equipment, this hardware list can prove valuable should the equipment be relocated or dis-assembled for any reason. If any of the hardware listed below is not included with the equipment upon delivery, please contact our Customer Service Dept. at 1 (800) 736-6431 for assistance.

Illustration	Part No.	Description	12 Color	14 Color	16 Color	18 Color
	3047001	Sleeve Anchor 1/2" x 2-1/4"	4	4	4	4
	3047000	Sleeve Anchor 5/16" x 2-1/2"	26	30	34	38
	3009013	Socket Cap Screw 1/2" - 13 x 1-1/4"	36	42	48	54
	3003003	Bolt FL Whiz Lok 1/2"-13 x 1" Long	56	64	72	80
	3009047	Socket Cap Screw 1/4" - 20 x 1/2" Long	48	56	64	72
	3001013	Button Socket Cap 10-24 x 1/2" Long	42	51	60	69
	3055003	Self Drill (Sheet Metal Screw) 8 x 3/4"	12	14	16	18
	3022001	Lock Washer 1/4"	48	56	64	72
	3021000	SAE Washer 1/2" Zinc Plated	36	42	48	54

# Tri-Loc Pre-Registration System

The M&R Tri-Loc Registration System is designed to aid in the set up and registration of screens on the M&R Gauntlet, Terminator, Challenger and Formula series presses. The system as a whole is simple to use. It starts by pre-registering screens on the exposure unit, then transferring those screens to the press, which is outfitted with a location fixture that duplicates the exposure system exactly. This stop location is accurately repeatable from print head to print head, giving the press operator a quick and exact locating point to set screens. The process is divided into three areas as follows:

1. **ART DEPT: "Film and Pin Register"**
2. **SCREEN DEPT: "Exposure Registration"**
3. **PRESS SET-UP: "On Press Registration"**

As with any system of this type, it is important that everyone involved has a through understanding of how their participation affects the overall accuracy of the system. It is recommended that everyone involved read these instructions in their entirety.

**SYSTEM COMPONENTS:** (See Fig. 1)

- EXPOSURE UNIT MASTER FRAME (Adjustable)**
- EXPOSURE UNIT MASTER FRAME (Non-Adjustable)**
- ON-PRESS PALLET**
- PIN BAR**
- CARRIER SHEET (8.5" x 20")**
- CARRIER SHEET (11.5" x 26")**

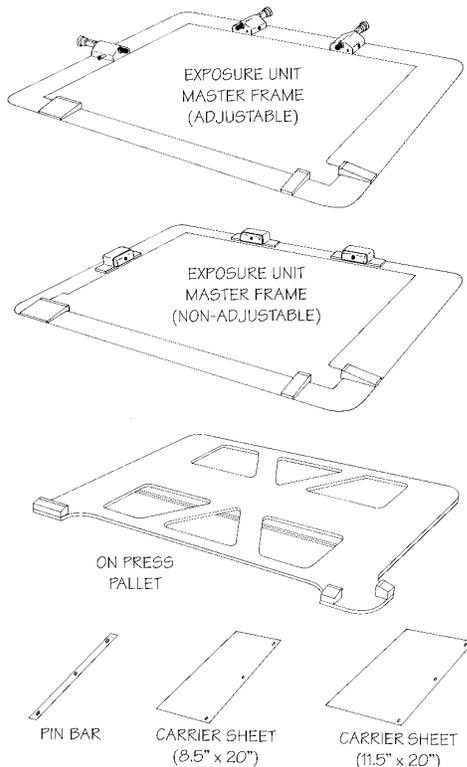


Figure 1

To better facilitate shops that have existing film/pin systems, the M&R Tri-Loc is offered without a film register Pin Bar attached. Pin Bars and carrier sheets are available separately or in a start up kit available through M&R Sales and Service. It is important to note that the greatest factor affecting quick set ups and on press registration, is properly separated films that have been accurately registered to one another using some type of "Pin Bar" system.

This method of pre-registration in the Art Dept. will have a direct effect on the overall accuracy of the system once the screens reach the press.

Because the system begins in the Art Dept., you will need to set up a film/layout table in which to register your films to the Pin Bar. This layout table must duplicate the image and Pin Bar location of that on the exposure unit Master Frame. The following pages will detail the steps needed to set up a Film/Pin system that will carry through from the Art Dept. to screen exposure, and ultimately to the press mounted unit.

### Art Dept. Set-up:

In order to set up a layout table for registering films, you must first attach 1 Pin Bar to the exposure Unit Master Frame as a reference for your film positioning. The dimensions shown are for M&R supplied Pin Bars, but can be used as a guide if you are currently using pin registered films. (See Fig. 2)

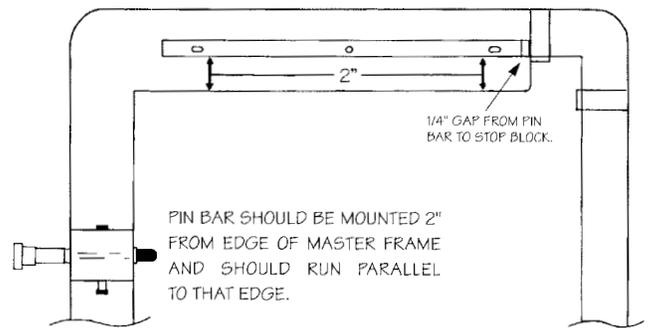


Figure 2



**NOTE:** When mounting pin bars, clean the mounting surface thoroughly to insure proper tape adhesion.

# Tri-Loc Pre-Registration System

Once the Pin Bar has been attached to the Master Frame, place a punched film on the Pin Strip and measure over from the side stop block to find the image center. (See Fig. 3 "A") and measure down from the top stop block to find image start location. (See Fig. 3 "B")

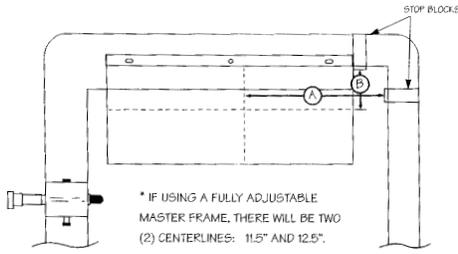


Figure 3



**NOTE: DIMENSION "A" = Half of frame width O.D. Example: 23" wide = 11.5" - 25" wide = 12.5" - 26" wide = 13.0" DIMENSION "B" = 6" for Gauntlet, Formula 5090 and Challenger reverse print. 9" for Challenger standard print and Formula 5070.**

Scribe these lines on the film and this will become your Master Sheet for transferring dimensions to the layout table. Ideally, the layout table should be a backlit unit to better check actual film tolerances during the registration and paste up process. Although the type of table used may vary, it is important that the art table pin bar is positioned to match the vertical centerline and image start position of that on the Exposure Master Frame. (See Fig. 4)

MASTER CARRIER SHEET

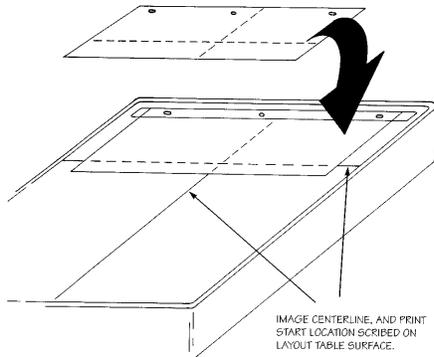


Figure 4

If you are using a fully adjustable exposure frame, your layout table should have 2 center lines, one for the 23" wide frames, and one for the 25" wide frames. When pasting up films to carrier sheets it is important to use the centerline that corresponds with the frame size that will be used for that job.

(ie: 23" frame = 11.5" centerline) When pasting up films, the main or "trap color" should be positioned first and taped securely to the pin mounted carrier sheet. (See Fig. 5)

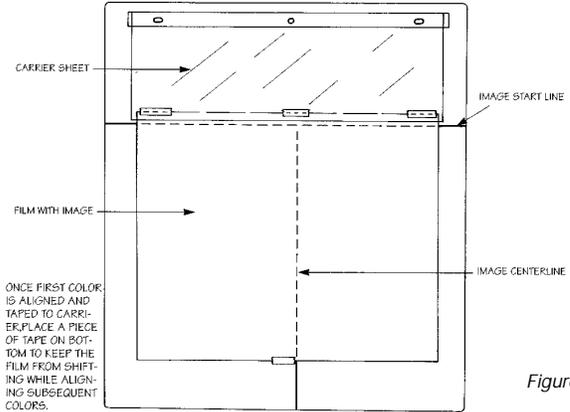


Figure 5

It is recommended to tape up one color at a time to cut down on the optical distortion that occurs when layering too many films together.

The extra time and care taken at this point is critical to the overall accuracy on the press.

### Exposure Unit Set-Up:

The exposure unit master frame is designed to be mounted directly to the exposure unit. This mounting method can be permanent or removable. It is recommended however, that which ever exposure unit you elect to use with the Tri-Loc system, that this exposure unit be dedicated to the Tri-Loc system for all future set-ups. The master frame may be attached to the glass using a heavy grade tape such as duct tape. Typical one up semi-permanent installation showing stop blocks towards the operator for ease of loading and confirming stop block contact. (See Fig. 6)

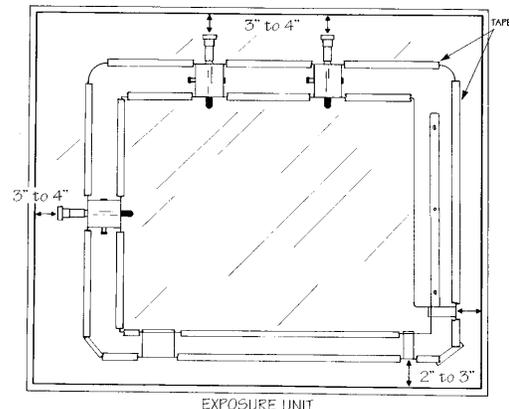


Figure 6

# Tri-Loc Pre-Registration System

The master frame may also be mounted permanently to the exposure glass (See Fig. 7) using a heavy bond double sided tape (M&R Part No. 701600 / 2 Pcs. 3.75" x 14") cut tape as shown.

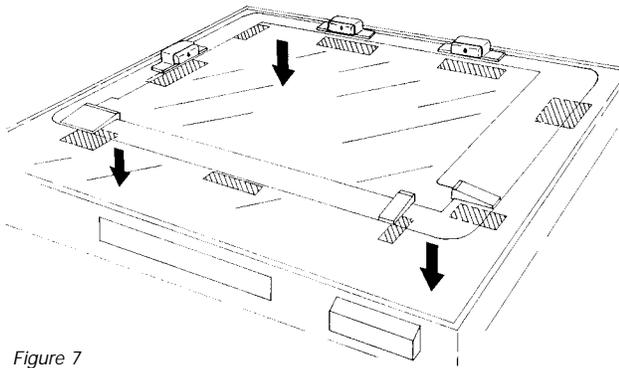


Figure 7

The majority should be used under the working fixtures. (ie: Stop blocks and push pins). Thoroughly clean the master frame and glass for proper tape adhesion. Position master frame on the exposure unit leaving proper clearances and mark the outer edges with masking tape for a reference. (See Fig. 6)

Once the tape backing is removed it is recommended to use two people to position it on the glass, as once the tape is down, it is not easily removed.

To expose a screen, position film and carrier sheet on pin-bar. Next, load screen into master frame by pushing against push pins and lowering front edge to rest against stop blocks. (Do not use excessive force to load a frame. If it does not fit, check frame tolerances. (See Fig. 8)

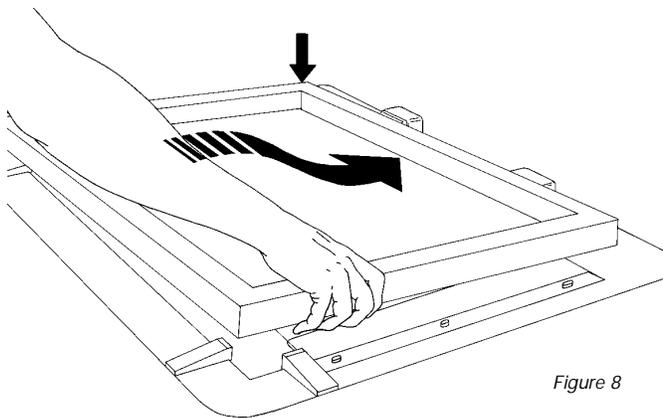


Figure 8

If using a roller type adjustable frame, be sure to check that the push pin is properly engaged and that the frame is flat on the glass before turning on the vacuum. (See Fig. 9)

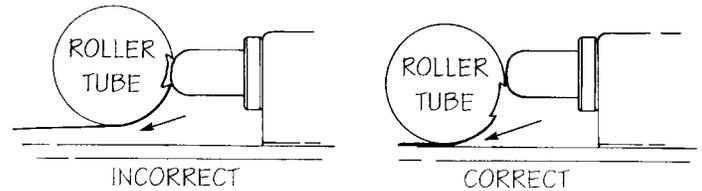


Figure 9

Once the frame is positioned, give it a slight push towards the stop blocks to confirm that you have contact against all three blocks. Activate the vacuum and expose the screen in the normal manner. (See Fig. 10)

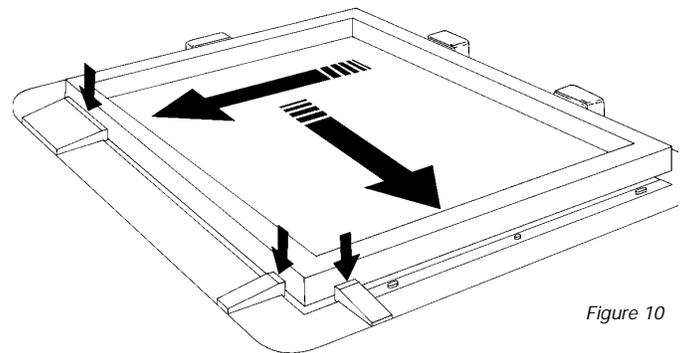


Figure 10

Adjustable master frames are equipped with push pins that adjust in half inch (1/2") increments to fit a variety of frames. Remember, frame width dictates image centerline. To adjust push pin, push locking cam to unlock position Adjust push pin barrel to the desired position and push locking cam back to the locked position. (See Fig. 11)

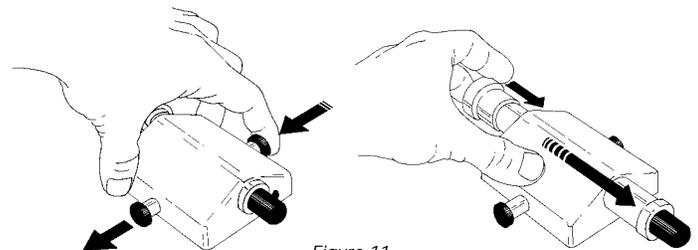
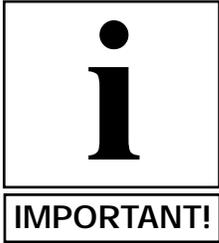


Figure 11

# Tri-Loc Pre-Registration System



**IMPORTANT:** While prepping screens for the press, it is important **NOT** to tape over the corners that were in contact with the stop blocks. This will change the frames outside dimension (O.D.) and effect its registration when it contacts the stop blocks on the press.

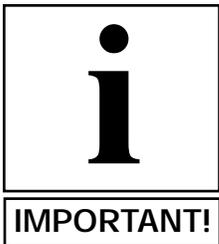
Since registration relies heavily on screen tension, it is important to use screens that are not only tensioned properly, but also consistently. A large variance of mesh tension from one screen to another within the same job will have an effect on front to back (North/South) registration

If using two or more master frames on one exposure unit, it is recommended that each job be burned on the same master frame to reduce the number of variables that may affect registration.

## M&R Press Set-Up:

Press registration is achieved by simply locating the screens to the same three points that were used in the exposure unit. This is done via a Tri-Loc registration pallet which is positioned in place of a normal print pallet during set-up. The positioning of the Tri-Loc pallet will be referred to as the "Prime Position". This position will be different on every press due to the number of presses in the field. The procedure for finding the "Prime Position" is a one time operation. The benefits derived from spending the time to properly set this position will become evident the first time the Tri-Loc system is put into use.

## Press Set-Up Formulas 5070/5090 Series



**NOTE:** Before starting, it is important that pallet level and off-contact are set to specifications. If there is any question of calibration of your press, it should be corrected before you begin. You will realize more of the advantages the system has to offer if all printing parameters are correctly calibrated.

Once it is determined that the press is calibrated properly (i.e; Pallet Level and Off Contact), adjust the micros on each print head to their center position. Micros are zeroed when pointers are centered on the grid blocks. (See Fig. 12)

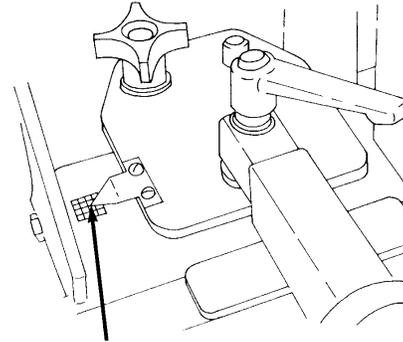


Figure 12

Now you are ready to install the Tri-Loc pallet and mark the press for "Prime Position". Remove one print pallet and replace it with the Tri-Loc pallet. When installed, the M&R logo should be facing the operator and the registration stop blocks will be on the left side.

With the pallet still loose on the arm, manually index the Tri-Loc pallet under the first print head. Re-arm safety circuits and reset machine so that the lower carousel is locked in position with the pallet centered under the print head (formulas = home position). Check clearance between right and left sides of front stop block and frame holder. This measurement will vary with size of Tri-Loc pallets but should be no less than 3/16". Use right to left micro to adjust if necessary. (See Fig 13)

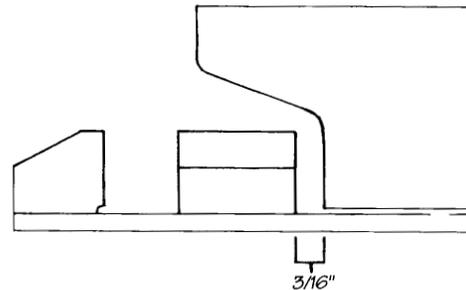


Figure 13

Having confirmed clearances, lower the master frame assembly. Next, slide the pallet so the front stop block is positioned (3/16") beyond the inside front edge of the front frame holder. Once the pallet is positioned properly, securely lock in place using cam locks. (See Fig. 14)

# Tri-Loc Pre-Registration System

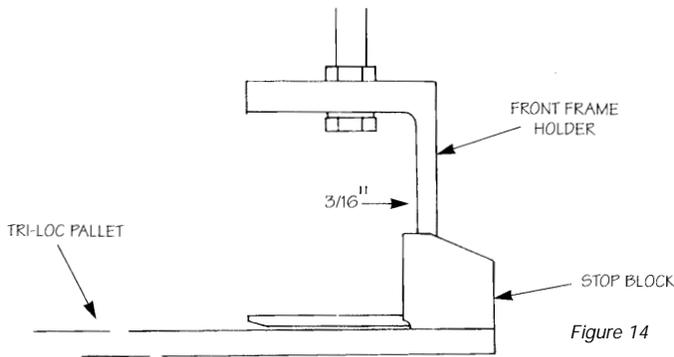


Figure 14

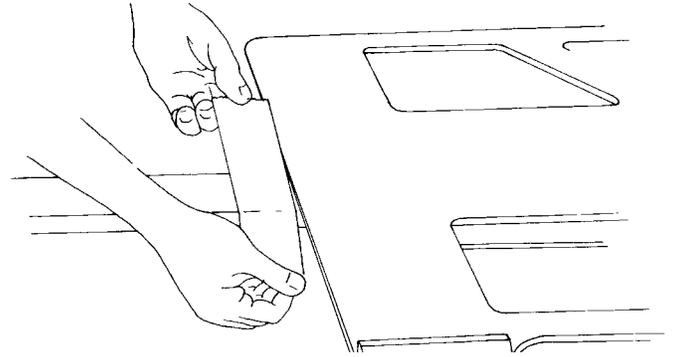


Figure 17

With the Tri-Loc pallet locked in position, repeat procedure on all remaining print heads and confirm measurements. (See Fig. 13 & 14) The goal of positioning frame holders is to ensure they are not restricting the frame while in contact with the stop blocks. (See Fig. 15)

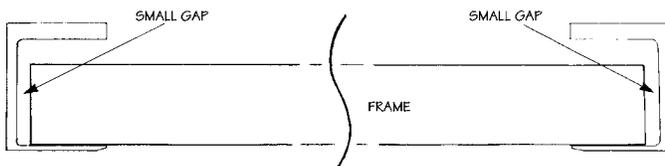


Figure 15

Having confirmed clearances you are now ready to mark the press for "Prime Position." (See Fig. 16)

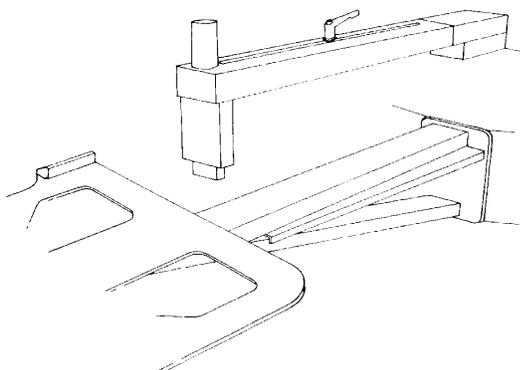


Figure 16

On formulas, simply mark pallet position with tape or a permanent marker. (See Fig. 17 top right)

## Using the Tri-Loc

After having marked the press with the "Prime Position" setting, and adjusted the frame holders to their optimum position, you are now ready to set up a print run using the Tri-Loc pallet. Locate the print arm marked with "Prime Position" and replace the standard print pallet with the Tri-Loc registration pallet, setting the back edge of the pallet to the mark on the support arm and securely fastening it in place.

Now, load the press with screens exposed using the Tri-Loc exposure master frame. Rotate the Tri-Loc pallet under the first screen, visually confirm stop block to frame clearances and bring print head into set up position.

With the master frame in the down position, pull the screen towards the stop blocks. While applying light pressure, hold the screen against all three stop blocks, and lock the frame in place. Visually confirm that frame holders are not interfering with the screens placement. (See Fig. 15)

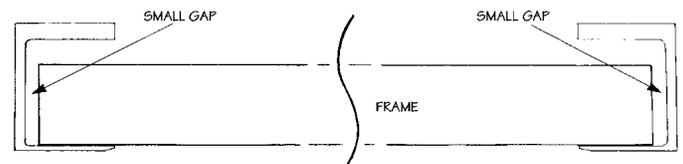


Figure 15

After confirming clearances, raise print head and repeat procedure on remaining screens.

In house and field testing conducted with the Tri-Loc system, and other registration systems has shown presses equipped with rear micro's can benefit from the addition of a rear micro lock.



# General Setup & Registration

1. Before installing screens into the print stations, check the recommended print order, consider the mesh count, type of ink, and area (image size) of ink deposit. This is the best time to eliminate problems, such as ink build-up and butt-to-butt registration blurring due to mesh count or ink type, or improper screen tension. Experience is always the best teacher for pre-press trouble shooting. It is always better to eliminate problems before you start to print.

2. Once you determine print order, install all your screens in their print stations and zero out the micros. Locate and align the "trap" screen or screen that has the main image to which all other colors register. When setting this screen, be sure to leave 3/8" (9mm) to 1/2" (12mm) between the inside of the front screen holder and the frame. Leaving this gap will help you later as you align the rest of your screens because not all the screens are going to be in the exact location as the first one. This gap should give you enough room to align "mis-exposed" screens without running out of room in the frame holders.

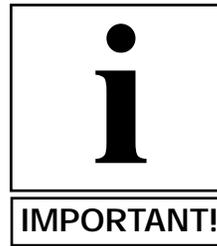
3. Install the flood bar, squeegee and add ink in your "trap" screen, making sure that all adjustments are secure, then print it on a Pelon. Be sure you have the proper ink deposit and squeegee pressure before you register the rest of your screens to this image.

4. Rotate the index table and pallet with the image around, printed in step No. 3, to the remaining screens and register them visually. You may find that registering your screen slightly above the trap print will help, due to mesh elongation during the print stroke. When locking down a registered screen, do not tighten down the rear hand knob because you are going to need to release the rear clamps later when doing any micro-registration unless you have the optional rear micro.

5. Install all squeegees and flood bars. Place a small amount of ink in the screen to start with. This way, if the color is incorrect, clean-up won't be much of a problem.

6. Walk around the press and print one screen at a time. Check the print for proper ink deposit, adjust print speed, squeegee angle and pressure accordingly.

7. Once you have your desired ink deposit on all screens, start to fine tune your registration. Remember to use the same pallet and plenty of spray tack (adhesive) when making test prints for registration.



**NOTE:** When using the micro-registration, you must have the rear screen frame clamps released to allow the screen frame to move freely and to avoid side loading of the screen frame.

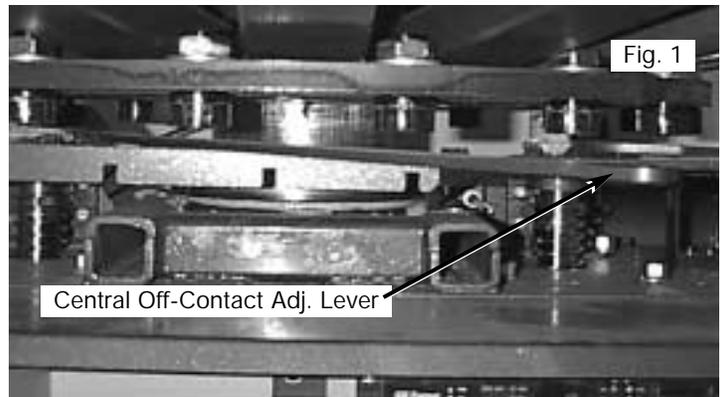
8. When using the micro register adjustments, be sure to back the adjustment knob off after you lock down the Kipp Elisa handles. This will take any side load or torque off of the adjuster so the next time you release the Kipp Elisa handle, the screen won't shift.

9. Once you have a good print and it's been approved, go back and add ink to your screens.

10. When finished with the job, and during tear down, always clean the press and make sure to keep the carriage shafts clear of ink or pallet adhesive and well lubricated.

### CENTRAL OFF-CONTACT LEVER:

The Central Off-Contact Lever provides a single point adjustment that allows the press Operator to change the off-contact dimension of all the screens with a simple adjustment of a lever. This eliminates the need to individually adjust off-contact for screens when printing different thickness garments. i.e. (T-shirts to sweat-shirts). (See Fig. 1)

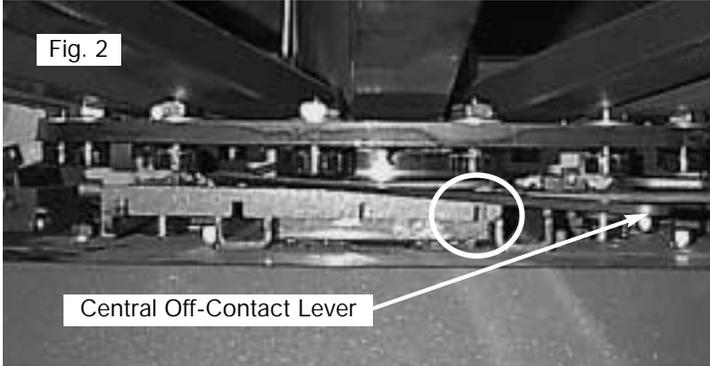


This convenient control lever allows the press Operator to adjust the off-contact setting for the press from a maximum of 3/16" (5mm) to the minimum setting. The adjustment is calibrated in three settings at 1/16" (1.5mm) increments.

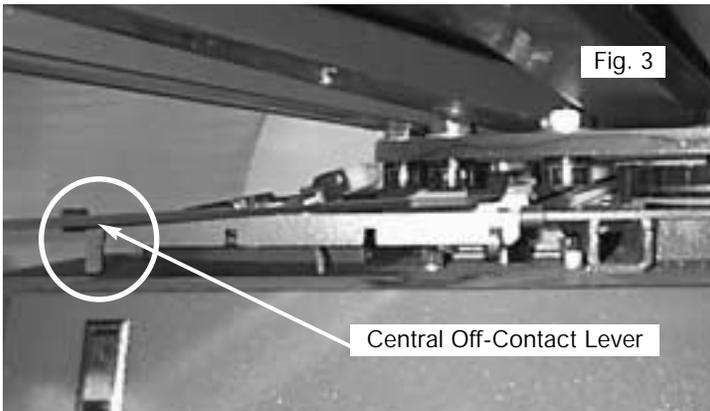
# General Setup & Registration

The following is a step by step instruction of how to change the off -contact setting using the central-off-contact lever:

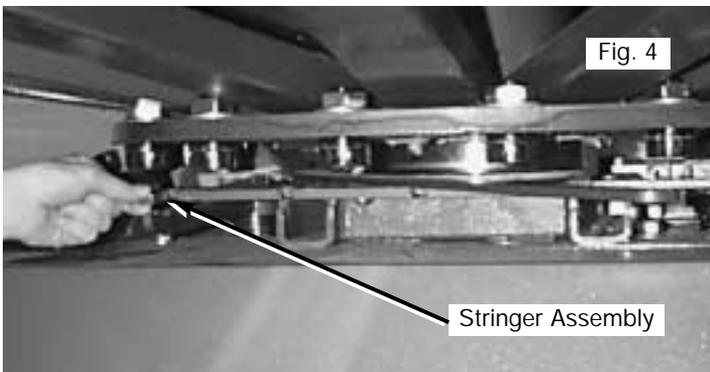
The central off-contact adjustment lever has four possible positions. When the lever is fully to the right hand side, the index table will be set for its highest position. This setting then allows for the minimum off-contact setting. (See Fig. 2)



When the lever is all the way towards the left hand side, which is the lowest position of the table, this gives you the most off-contact setting, which is 3/16" (5mm) added to your initial off-contact. (See Fig. 3)

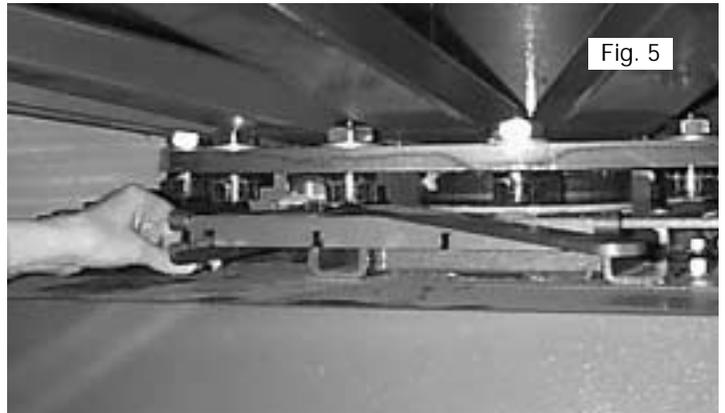


In order to adjust the lever, the index table should be in the lowered position. Taking your left hand and lifting up on the stringer, you can now manually move the lever to the desired position for the off-contact setting. (See Fig. 4)



Each setting is designed to change the off-contact setting by 1/16" (1.5mm).

After determining the proper off-contact setting, lower the stringer to lock the setting in place. Now raise the table to check the off-contact between your screens and your garment. (See Fig. 5)



i

IMPORTANT!

**NOTE:** You will have to adjust your squeegee pressure setting on each print head that you are using. However, the flood bar setting remains the same.

# Omni/Uni Flash Operation

## AUTO FLASH MODE - (See page 43 for control instructions)

When using any print station for Auto Flash Operation, the control panel switches for that particular print station must be set for the "Front" stop position, and the print station stroke switch set in the "Single" position. More than one print station can be activated for flash mode simply by positioning the switches as described above. Once placed in the auto flash mode, the print stations will cycle in the auto flash mode and remain in the auto flash mode as long as the indexer is running, either manually or in the automatic mode. When the indexer stops and the dwell time expires, the flash will return to a standby position (which will be away from the pallet). To return the print stations to normal print mode, simply flip the carriage stop toggle switch to the "Rear" stop position.

**NOTE:** All Challenger Series II systems can be retrofitted to accept the Omni Flash or Quartz Flash Unit.

\* *DISCLOSURE STATEMENT:* The following parts list may not all apply to your Omni Flash Unit, check with the factory for further information.

### List of parts:

No. of Items:	Description of Item:
2	Cross knob 1/2" - 20
4	Flat Washer 1/2"
2	Hex nut 1/2" - 20
4	Flat Soc. Cap-Screw 10-24
2	Bolt 3/8" - 16 x 1" lg.
2	Hex nut 3/8" - 16
1	Clamp Bracket
1	Flat Mounting Bracket
1	Flash Adapter Series I to II
1	Flash Hanger
2	Squeegee Clamp (Manual)

## MANUAL FLASH MODE -

To flash a sample manually or test print, proceed as follows:

1. Position front-rear switch to "Rear" position on the print station with the Omni Flash.
2. Position single-double switch to either "Single" or "Double" position.
3. Press the green "Reset" button and the Omni Flash will move into position over the pallet.

4. Return the single-double switch to the middle position and the front-rear switch to the front position.
5. Press any print button to raise the carousel to print position.
6. After flash time is completed, return the single-double switch to single position and press the reset button to remove the Omni Flash from over the pallet.

## INSTRUCTIONS FOR OMNI/UNI FLASH INSTALLATION:

The following information describes the proper procedure for the installation of the M&R Omni/Uni Flash cure unit on M&R Challenger Series II textile screen printing systems.

**NOTE:** The M&R Omni/Uni Flash requires the installation of electrical power for operation. Please refer to the Manufacturer's Rating Plate located on the side of the control panel enclosure for the proper electrical specifications to operate this equipment. M&R Printing Equipment, Inc. encourages the use of a professionally licensed electrical contractor for the installation/connection of electrical power/service to this equipment.

1. After determining the location of the M&R Omni/Uni Flash Unit, generally print station number "2" in the print sequence, disengage the latch clamp located on the flip-up front screen frame holder assembly (See Fig. 1).



Fig. 1

2. After loosening the latch clamp as described in number 1 above, lift the entire front screen frame holder assembly up into the fully raised, vertical position. The flip-up front screen frame holder assembly should lock into the fully raised position. (See Fig. 2 top left next page) In the event the flip-up front screen frame holder assembly does not lock securely into position, examine the lock assembly for proper operation or contact our Equipment Service Department at 1 (800) 483-8765 for further assistance.

# Omni/Uni Flash Operation

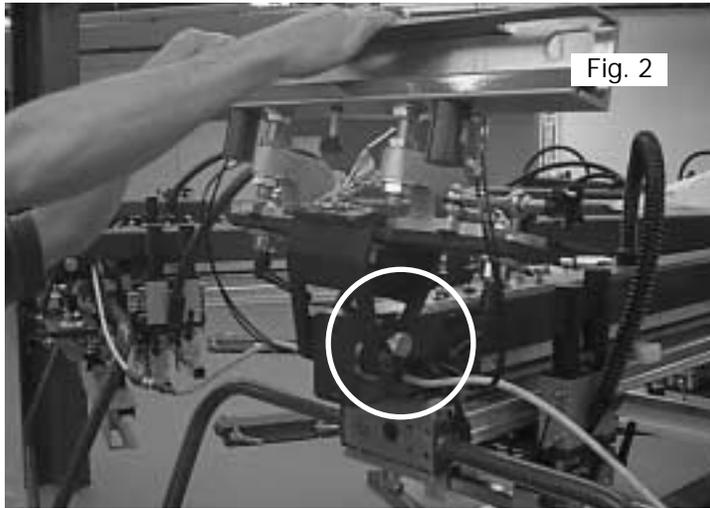


Fig. 2

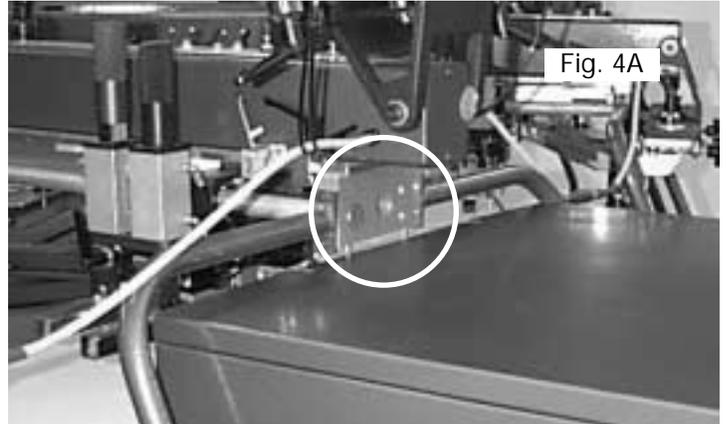


Fig. 4A

Be sure to loosen the ratchet knob, (Kipp Elisa Knob) that secures the two telescope tubes together, before making this adjustment. (See Fig. 5)



**WARNING!** Do not operate the Omni/Uni Flash cure unit if the flip-up front screen holder assembly does not lock securely into position. Serious injury to personnel or damage to the equipment can result if the front screen frame holder does not lock securely in the raised position.

3. Roll the M&R Omni/Uni Flash cure unit into position, in line with the selected print station. (See Fig. 3)

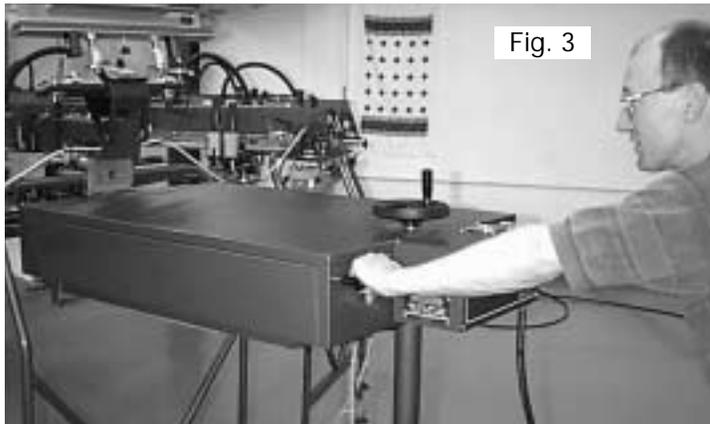


Fig. 3

4. Using the round height adjustment handle located at the top rear of the M&R Omni/Uni Flash unit. Adjust the height of the infrared heating omni panel enclosure so that it is slightly above the front end plate. (Latch clamp assembly locking bracket. (See Fig. 4 & 4A)



Fig. 4

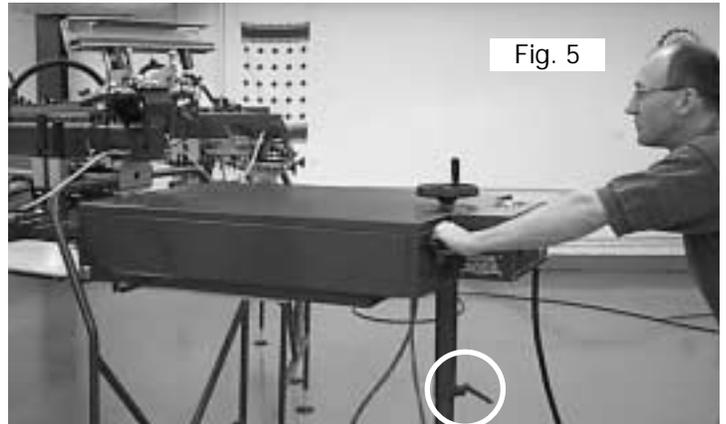


Fig. 5

5. Check to be sure the front mounting bar is straight (no angle) by loosening the two ratchet knobs (Kipp Elisa Knobs) and turning the mounting bar. (See Fig. 6)

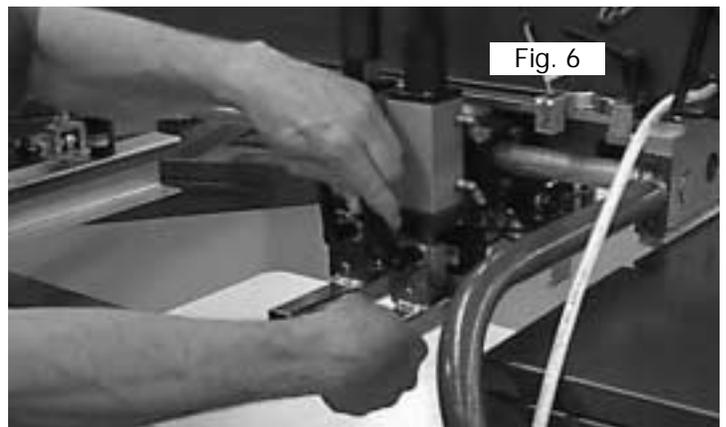


Fig. 6

6. Next, adjust the squeegee/flood bar pressure adjustment knobs (turn clockwise) until the squeegee/flood bar is fully raised. In this position the squeegee/flood bar will not perform the "chopper" motion in the event the print station is inadvertently turned on. In this way damage to the radiant panel is eliminated. (See Fig. 7 top left next page)

# Omni/Uni Flash Operation

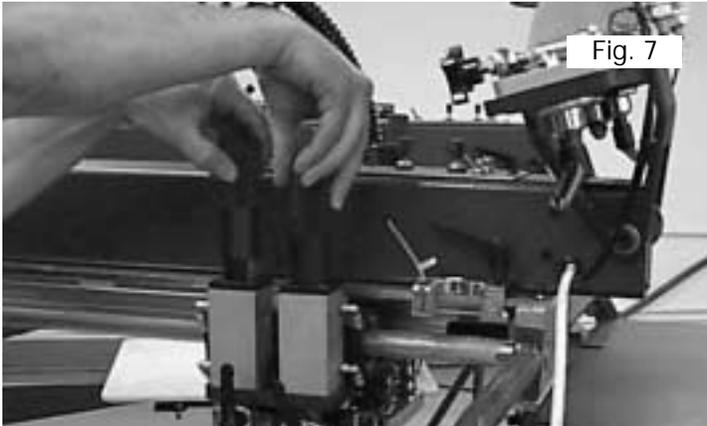


Fig. 7

7. Install the flash panel mounting bracket on the mounting bar and secure with two squeegee clamps (manual) (See Fig. 8)



Fig. 9A

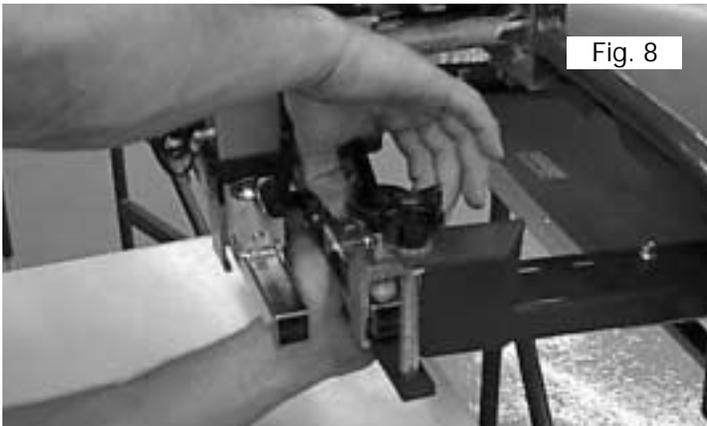


Fig. 8

The height of the heat panel may be adjusted by using the black plastic cross knobs, which are threaded onto the threaded support rod on top of the flash panel mounting bracket. (See Fig. 9)



**NOTE:** Check to be sure all bolts and nuts are securely tightened.

9. Adjust both the front and rear threaded support rods so that the dimensions from the top of the printing pallet to the bottom of the infrared heat panel is 3/4" (1.9 cm) to 1-1/2" (3.8 cm) at all four corners. Make this adjustment while the index table is in the fully raised position. (See Fig. 10)

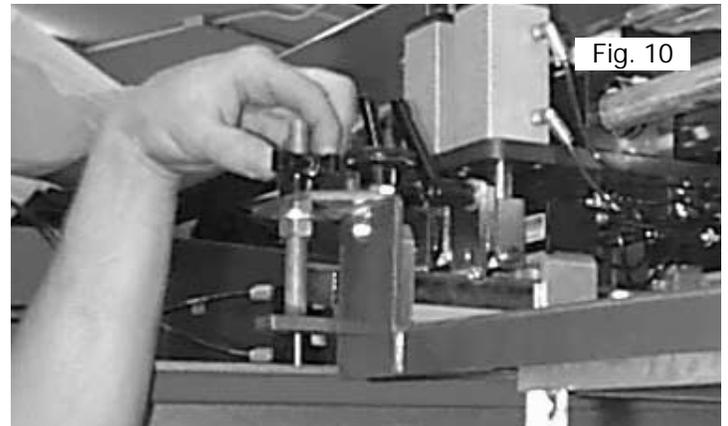


Fig. 10

10. Set the inboard speed and the outboard speed of the infrared panel by adjusting the squeegee and flood bar speed controls located on the top of the print station. (See Fig. 11)



Fig. 9

8. To adjust the infrared panel at the rear for proper level, adjust the black plastic cross knob located at the rearuni-strut support channel under the infrared panels insulated cover guard. (See Fig. 9A top right)



Fig. 11

# Omni/Uni Flash Operation



**WARNING!** Be careful not to adjust the inboard or outboard speed too fast. Higher speeds can lead to premature failure of the infrared heat panel due to mechanical shock generated by the higher inboard/outboard speed. Always adjust the inboard or outboard speed so the heat panel moves in and out of position smoothly without jerking motion or vibration.

11. Adjust the digital temperature control for optimum flash curing of garments. We suggest that you run a few tests to determine the proper heat setting before beginning production. Proper cure temperature will be determined in large part by the type and weight of the garment. In addition, the type of ink used will also have an effect on the proper cure temperature. 100% cotton t-shirt, start at 800 degrees F. For 100% cotton sweat shirts, start at 850 degrees F. (See Fig. 12)



Fig. 11

Operation of the Temperature Controller:

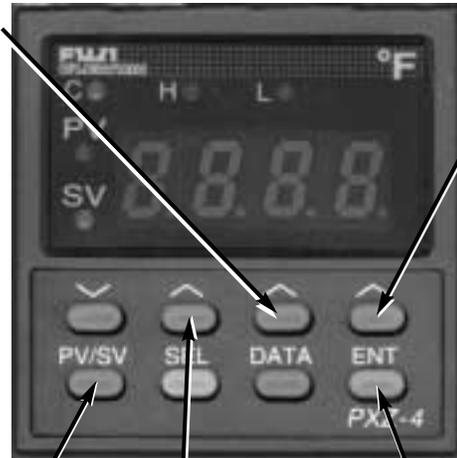
1. Turn "On" the electrical power to the Omni/Uni Flash cure unit.
2. Press the "PV/SV" key so that the green L.E.D. beside the "PV" (Present Value) or "SV" (Set Value) on the display illuminates.
3. To set the desired process temperature, press the key under each individual numeric number. For example- to set for 250 degrees, push the 10 digit key one time. The 10 indication will flash. Push the 10 digit key 5 times to indicate 5. The display will read 0050. Now press the 100 digit key. The 100 digit indication will flash. Push the 100 digit key 2 times so the number 2 appears in the indicator. The display will now read 0250. Press the ENTER key. The display will stop flashing, and the set value of 250 degrees will now be indicated on the display.

4. To check the current process temperature, press the "PV/SV" key so the red L.E.D. lights beside the PV (Measured Value) indication. The number displayed will be the current process temperature as measured by the thermocouple in the flash panel.

5. To lower the process temperature, press the PV/SV key so the green L.E.D. light beside the SV indicator comes on. Press the  $\wedge$  key. Under each digit that you want to change, you will use the  $\vee$  key to decrease the number value on each digit to get the numbers to flash. Once the programmed temperature has been selected, press the enter key. The display will stop flashing. Now press the PV/SV key so the red L.E.D. light beside the PV is showing the temperature as measured by the thermocouple, in the flash panel (See Fig. 13).

Press this key to set 10 digit value.

Fig. 13



Press this key to set 1 digit value.

Press this key to indicate the set value.

Press this key to set the 100 digit value.

Press ENT to Enter set value into the control.



**WARNING!** The electrical power switch for the Challenger Series II must NOT be turned "OFF" before the flash cure panel has cooled down to at least 99 degrees or lower.

# Quartz Flash Installation

## QUARTZ FLASH INSTALLATION -

After determining the location of the M&R Quartz Flash unit (usually print station number two in the print sequence) move the front screen frame holder into the fully raised and locked position. Roll the M&R Quartz Flash unit into position at the front of the print station with the index table in the fully lowered position. (See figure 1 below)

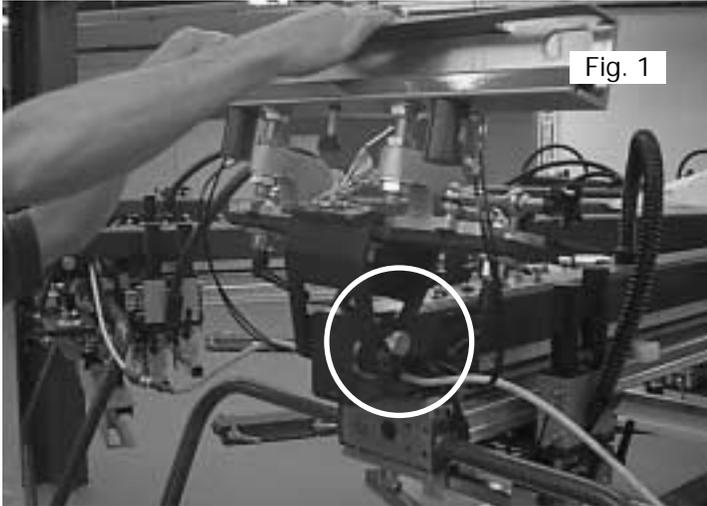


Fig. 1

Adjust both the squeegee and flood bar height adjustments to the full up position to maximize the clearance between the Quartz Flash unit and the print carriage assembly. Additionally, adjust both the flood and squeegee speed controls to their minimum settings. (See figure 2 below)

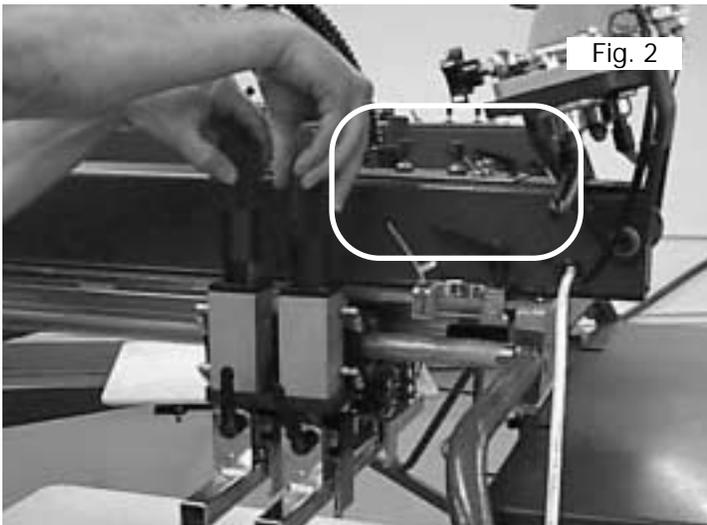


Fig. 2

The M&R Quartz Flash unit will produce excellent cure results when properly leveled. It is imperative that the heating element assembly be parallel to the pallet surface. The preferred dimension between the surface of the heating elements and the pallet surface is 2-1/4" as measured at all four corners when the index carousel is fully raised. (See figure 3 above right)



Fig. 3

Leveling of the heating element assembly is easily accomplished by use of the two rear leveling legs and the two front to rear pivoting adjustments for the heating element assembly. Once the Quartz Flash unit is parallel to the pallet surface, the height or distance from the pallet surface may be easily adjusted by use of the large hand wheel located on the top of the heating element assembly. (See figure 4 below)



Fig. 4

To level the M&R Quartz Flash unit, proceed as follows.  
1. Place a small Carpenters level on the top of the Quartz heating element assembly to check level front to rear and left to right. (See figure 5 below)



Fig. 5

# Quartz Flash Installation

2. To adjust the front to rear angle of the heating element assembly, loosen the 3/4" hex head bolts located on either side of the chassis near the floor. (See figure 6 below)



Fig. 6

3. Now, adjust the front to rear angle by using a 3/4" socket wrench to adjust the hex head bolt located at the bottom center of the M&R Quartz Flash cure chassis. (See figure 7 below)



Fig. 7

4. Additional leveling adjustments are made by alternately adjusting the two rear leveling legs located at the rear bottom of the chassis. (See figure 8 below)



Fig. 8

5. When leveling adjustments are completed, tighten the 3/4" pivot hex head bolts and the rear leveling leg adjustments.

## SIGNAL CABLE INSTALLATION -

The M&R Quartz Flash unit is designed to receive operational signals from the on-board PLC (Programmable Logic Controller) internal to your M&R Challenger Series II control system. Simply install the signal cable (supplied) from the plug marked "PLC SIGNAL" on the Quartz Flash unit to the plug socket located on the presses lower electrical enclosure provided for this purpose. Set the toggle switch to "PLC SIGNAL". You will note that there are four plug sockets located on the lower electrical enclosure. Plug the control cable into the socket on the left. The remaining sockets are provided for future installation of additional Quartz Flash units. (See figure 9 and 10 below)



Fig. 9



Fig. 10

## Quartz Flash Unit Operation -

If your press is equipped with optional M&R Quartz Flash cure units, you will access and adjust the Quartz flash dwell time in the "TIMERS" menu. The controls available are "Quartz" dwell time, and "Preheat" dwell time. These sub-menu items are accessed by pressing the "ARROW DOWN" key while in the "TIMERS" menu. (See figure 11 top left next page)





# Operator Controls

The Challenger Series II is a blend of exciting technology that incorporates microprocessor controls and a unique servo driven index system that offer the ultimate in maximum production efficiency. The following is a description of a single cycle operation of your new press, followed by a description of all control functions.

## Cycle Sequence -

Position the table so that the Index "On" Proximity Switch, located on the base of the machine, is "On". Release the Emergency Stop Button and press the green "Reset" button. The index fork (clevis) will cycle in and engage one of the index cam followers located on the bottom of the index table. Turn one print station switch "On" by placing the toggle switch to the "Single" print position. Depress the mode switch to "Manual" and release.

The press will perform the following functions:

- The index servo drive assembly will rotate the carousel until the next cam follower again activates the index "On" proximity switch.
- Simultaneously, the flood stroke of the print station is started and completed.
- Next, the carousel is lifted into the print position and activates the Table Proximity Switch; this starts the print stroke. At the same time, the index servo drive is returning to the start or standby position for the next cycle.
- At the completion of the print stroke, the carousel lowers with the cam follower settling into the index fork (clevis) ready for the next cycle.

The combination of full microprocessor controls—and the use of proximity switches to indicate the position of all components at any time—permits our Engineers to provide you with a "plain language" self-diagnostic system unavailable on any competitive semi-automatic textile press.

## Control Panel Functions:

The Main Control console for the M&R Challenger Series II contains all controls for operation of the entire system. The individual controls and their functions are described as follows.

Main "ON/OFF" switch location. (See figure 1)

Fig. 1



## Print Station Control Switches:

To the extreme left of the Main Control panel, the individual Print Head control switches and push buttons are located. These include "Independent Print", "Single/Double" print stroke and "Front/Rear" print carriage stop. (See illustration on page 33)

## Independent Print Start Push Button:

This push button permits manual cycling of a selected print station. Please note that the "Single/Double" toggle switch for the selected print station must be set to either "Single" or "Double" position in order for the print station to operate. When the "Single/Double" toggle switch is selected to "Single" the print head will make one complete flood/print cycle. When the "Single/Double" toggle switch is selected for "Double" the selected print head will make two (2) complete flood/print cycles. The "Independent Print" push button is also used during screen frame setup to check registration etc. as follows:

During screen frame installation and setup, place the selected "Single/Double" toggle switches to the middle or "OFF" position. Then press the "Print" push button. The index carousel will raise so that screen registration or placement may be checked. To lower the index carousel, press the green "Reset" push button located at the right of the control panel under the "Emergency Stop" push button. (See illustration on page 33)

## Single/Double Selector Switch:

The "Single/Double" toggle switch commands the selected print head to print either one complete flood/print cycle or two (2) flood/print cycles. Generally, this switch is used when it is desired to deposit a thicker coating of ink, such as in flash cure applications, or whenever increased ink opacity is desired. Each individual print head in the system may be set independently for either "Single" or "Double" print mode using these toggle switches.

**NOTE: When this toggle switch is selected for the middle, or "OFF" position, the particular print station will not operate.** (See illustration on page 33)

# Operator Controls

A small L.E.D. located in the tip of the toggle handle will illuminate confirming activation. When in the **"Single"** position the L.E.D. will be GREEN. When in the **"Double"** position the L.E.D. will be ORANGE.

## Front/Rear Toggle Switch:

This toggle switch permits the system operator to command the selected print station to stop in either the **"Front"** or **"Rear"** position. Generally, this switch is used whenever the Operator desires to complete the print cycle with the screen frame flooded with ink, to reduce the chance of ink drying in the image. When this toggle switch is placed in the **"Front"** position, the print carriage will stop at the front (outside) of the screen frame, with the image area flooded with ink. When placed in the **"Rear"** position, the print carriage will stop at the rear (inside) of the print head, and the image area will be clear of ink. A small, red L.E.D. located in the tip of the toggle handle will illuminate confirming that the switch is set for **"Front"** stop. (See illustration on page 35)

## Print Start/Print Finish Toggle Switch:

This toggle switch is provided as a convenience when initially starting or finishing a print run. It is designed to eliminate the need to individually turn **"ON"** or **"OFF"** print stations. Placing this toggle switch in the **"Print Start"** position will automatically command each print station that is selected to **"ON"**, to print sequentially at the start of a print run. (See illustration on page 34)

## Test Print Toggle Switch:

This toggle switch is designed to aid the system operator when it is desired to print only one garment to check for registration or image quality. When this toggle switch is placed in the **"ON"** position, the control system will automatically and sequentially command each print station which is selected to **"ON"**, to print one complete flood/print cycle. The result will be one printed garment at the end of the print sequence, ready for inspection. In this way, the press Operator is not required to manually turn **"ON"** and **"OFF"** individual print stations to print one sample garment. (See illustration on page 34)

## Operation Mode Toggle Switch:

This toggle switch has three positions: **"Automatic"** at the top position; **"Stop"** at the middle position; and **"Manual"** at the lower position. This switch commands the system to operate in either **"Automatic"** or **"Manual"** mode of operation. To operate the index system one complete cycle, press the toggle switch down to **"Manual"**.

You will note that the toggle switch does not "latch" in the **"Manual"** position, but returns via a spring-loaded action to the middle or **"OFF"** position when released.

The index system will cycle one time, along with any print stations that are selected to **"ON"**. Placing this toggle switch in the **"Automatic"** position while the index table is in motion, will command the index system to operate in the automatic mode. The dwell time for automatic operation is adjusted via the L.C.D. operator interface control panel to the extreme right of the Main Control panel. Instructions on how to adjust the index dwell time are available on page 34 of this manual.

**NOTE: When the Operation Mode toggle switch is selected to the middle or "OFF" position, the index system will NOT operate.**

## Emergency Stop Push Button:

This large, red mushroom-shaped push button is designed to stop the system operation only in an emergency situation. Do NOT USE THIS PUSH BUTTON TO STOP SYSTEM OPERATION UNDER NORMAL OPERATING CONDITIONS.

To stop the system in an Emergency situation, press the red mushroom-shaped button "In." This will result in all print stations shutting down, the retraction of the index fork and shut down of all system operation. Once pushed "In," the Emergency Stop push button will remain locked in this position to prevent any further operation of the system. To start the system operation once again, turn the red mushroom shaped Emergency Stop Push Button clockwise one quarter turn, until it pops out then press the green "Reset" push button.



**WARNING! DO NOT ATTEMPT TO RESUME SYSTEM OPERATION UNTIL YOU HAVE IDENTIFIED AND CORRECTED THE CAUSE OF THE EMERGENCY STOP COMMAND. TEST ALL SAFETY DEVICES BEFORE RESUMING OPERATION.**

## Reset Push Button:

The green colored **"Reset"** push button is provided to "reset" the control system logic in the event of a Emergency Stop command or activation of one of the safety devices. This push button also is used to lower the index table during set-up procedures.

**WARNING! IN THE EVENT OF AN EMERGENCY STOP OR SAFETY SYSTEM SHUT DOWN OF THE EQUIPMENT, DO NOT PRESS THE RESET PUSH BUTTON UNTIL YOU HAVE IDENTIFIED AND CORRECTED THE CAUSE OF THE EMERGENCY STOP OR SAFETY SHUT DOWN.**

# Operator Controls

## Independent Print Start Push Button:

This push button permits manual cycling of a selected print station. Please note that the "Single/Double" toggle switch for the selected print station must be set to either "Single" or "Double" position in order for the print station to operate. When the "Single/Double" toggle switch is selected to "Single" the print head will make one complete flood/print cycle. When the "Single/Double" toggle switch is selected for "Double" the selected print head will make two (2) complete flood/print cycles. The "Independent Print" push button is also used during screen frame setup to check registration etc. as follows:

During screen frame installation and setup, place the selected "Single/Double" toggle switches to the middle or "OFF" position. Then press the "Print" push button. The index carousel will raise so that screen registration or placement may be checked. To lower the index carousel, press the green "Reset" push button located at the right of the control panel under the "Emergency Stop" push button.

## Emergency Stop Push Button:

This large, red mushroom-shaped push button is designed to stop the system operation **only in an emergency situation. Do not use this push button to stop system operation under normal operating conditions.**

To stop the system in an Emergency situation, press the red mushroom-shaped button "In". This will result in all print stations shutting down, the retraction of the index fork and shut down of all system operation. Once pushed "In" the Emergency Stop push button will remain locked in this position to prevent any further operation of the system. To resume system operation once again, turn the red mushroom shaped Emergency Stop Push Button clockwise one quarter turn, until it pops out then press the green "Reset" push button.



## Single/Double Selector Switch:

The "Single/Double" toggle switch commands the selected print head to print either one complete flood/print cycle or two (2) flood/print cycles. Generally, this switch is used when it is desired to deposit a thicker coating of ink, such as in flash cure applications, or whenever increased ink opacity is desired. Each individual print head in the system may be set independently for either "Single" or "Double" print mode using these toggle switches.

**NOTE:** When this toggle switch is selected for the middle, or "OFF" position, the particular print station will not operate.

## Reset Push Button:

The green colored "Reset" push button is provided to "reset" the control system logic in the event of a Emergency Stop command or activation of one of the safety devices. This push button also is used to lower the index table during set-up procedures.

# Operator Controls

## Test Print Toggle Switch:

This toggle switch is designed to aid the system operator when it is desired to print only one garment to check for registration or image quality. When this toggle switch is placed in the "ON" position, the control system will automatically and sequentially command each print station which is selected to "ON", to print one complete flood/print cycle. The result will be one printed garment at the end of the print sequence, ready for inspection. In this way, the press Operator is not required to manually turn "ON" and "OFF" individual print stations to print one sample garment.

## Print Start/Print Finish Toggle Switch:

This toggle switch is provided as a convenience when initially starting or finishing a print run. It is designed to eliminate the need to individually turn "ON" or "OFF" print stations. Placing this toggle switch in the "Print Start" position will automatically command each print station that is selected to "ON", to print sequentially at the start of a print run.



## Operation Mode Toggle Switch:

This toggle switch has three positions: "Automatic" at the top position; "Stop" at the middle position; and "Manual" at the lower position. This switch commands the system to operate in either "Automatic" or "Manual" mode of operation. To operate the index system one complete cycle, press the toggle switch down to "Manual".

You will note that the toggle switch does not "latch" in the "Manual" position, but returns via a spring-loaded action to the middle or "OFF" position when released. The index system will cycle one time, along with any print stations that are selected to "ON". Placing this toggle switch in the "Automatic" position while the index table is in motion, will command the index system to operate in the automatic mode. The dwell time for automatic operation is adjusted via the L.C.D. operator interface control panel to the extreme right of the Main Control panel. Instructions on how to adjust the index dwell time are available on page 43 of this manual.

**NOTE:** When the Operation Mode toggle switch is selected to the middle or "OFF" position, the index system will NOT operate.

# Operator Controls

## Front/Rear Toggle Switch:

This toggle switch permits the system operator to command the selected print station to stop in either the "Front" or "Rear" position. Generally, this switch is used whenever the Operator desires to complete the print cycle with the screen frame flooded with ink, to reduce the chance of ink drying in the image. When this toggle switch is placed in the "Front" position, the print carriage will stop at the front (outside) of the screen frame, with the image area flooded with ink. When placed in the "Rear" position, the print carriage will stop at the rear (inside) of the print head, and the image area will be clear of ink. A small, red L.E.D. located in the tip of the toggle handle will illuminate confirming that the switch is set for "Front" stop.



## E300 Operator Interface Instructions:

The Operator Interface control panel incorporates an L.C.D. (Liquid Crystal Diode) type alpha/numeric display for providing information regarding operational, programming and system status messages in real time. Refer to page 41 of this Manual for a detailed description of the operation and function of this control.

# Operator Controls

## Individual Print Station Controls:

Each of the print stations used on the M&R Challenger Series II includes individual controls for adjustment of flood stroke speed, print stroke speed, independent print start, On/Off switches for pneumatic screen frame clamps and, if ordered as an option, squeegee/flood bar pneumatic clamps, and "Reset" push button.

### 1. Squeegee/Flood Bar Pneumatic Locking Clamps (Optional):

Located at the top of the print station control panel, these toggle switches are used to lock the squeegee and flood bar to their respective mounting bars. To lock the squeegee or flood bar to the print station carriage mounting bars, simply position the squeegee or flood bar on the mounting bar and place the toggle switch in the "On" lock position (up).

### 2. Pneumatic Screen Frame Locks:

Situated just below the pneumatic squeegee/flood bar locking clamps controls are the pneumatic screen frame locking clamp control switches. The toggle switch on the left activates the front screen frame clamps, while the right toggle switch activates the rear screen frame locking clamps. To lock the screen frame into the screen frame holder assembly, simply locate the screen frame in position and place the toggle switches in the "On" (up) position. The pneumatic cylinders (front & rear) will securely lock the screen frame into the screen holder assembly. To release the screen frame, simply move the toggle switches to the "Off" position and remove the screen frame from the holder assembly.

### 3. Squeegee Speed Adjustment: (Pneumatic Heads Only)

The squeegee speed may be independently adjusted by use of this convenient control knob. To increase the squeegee speed, turn the control knob counterclockwise. To decrease the squeegee speed, turn the control knob clockwise.

### 4. Flood Bar Speed Adjustment: (Pneumatic Heads Only)

The flood bar speed may be independently adjusted by use of this convenient control knob. To increase the flood bar speed, turn the control knob counterclockwise. To decrease the flood bar speed, turn the control knob clockwise.

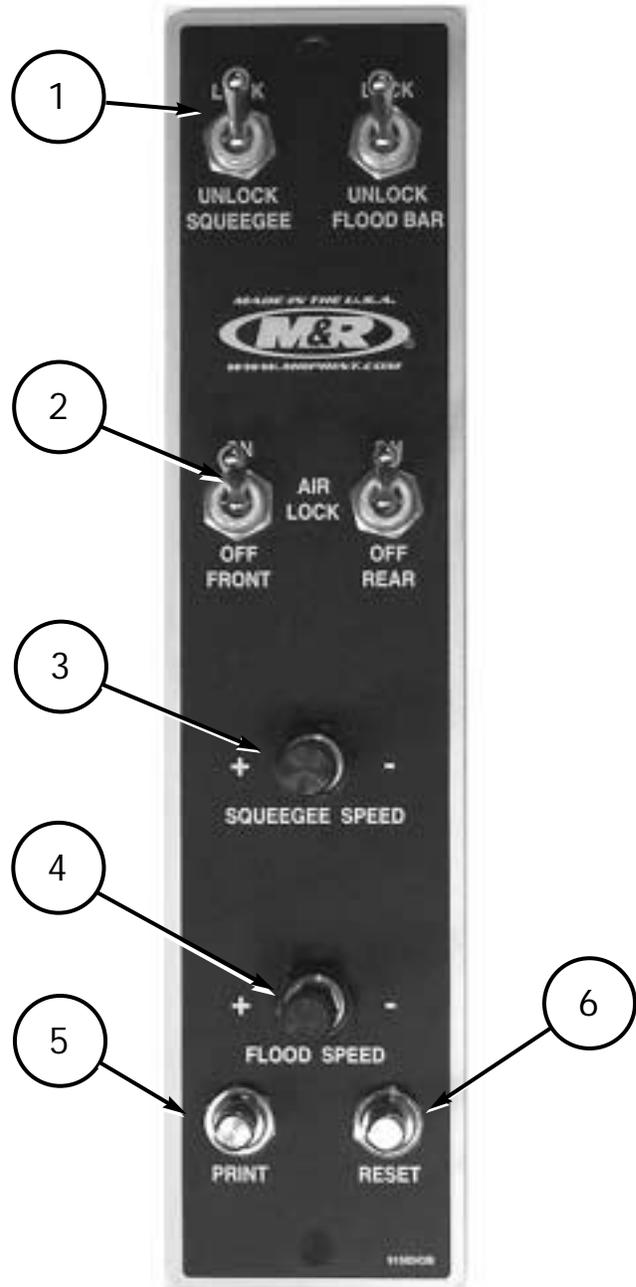
### 5. Independent Print Push Button:

As described in the Main Control Panel section, this push button is used to cycle the individual print station manually. The "Print" push button is also used during screen frame set-up to check for proper screen placement during registration adjustments. To operate, place the "Single/Double" toggle switch for the particular print station on the Main Control Panel in the middle, or "Off" position. Now press the "Print" push button on the print station control panel. The index table will raise so that screen placement and registration may be checked.

To lower the index table, press the green "Reset" push button located just to the right of the "Print" push button on the Print Station control panel.



**NOTE:** The "Single/Double" toggle switch on the Main Control Panel must be selected for either "Single" or "Double" operation in order for the print station to operate.



# Operator Controls

## YELLOW CYCLE INTERRUPTION CORDS/BARRIER GATES:

To prevent injury to operating personnel, yellow cycle interruption cords, or on some models, yellow barrier gates are provided to restrict access into the index table operating area while the equipment is in operation. The yellow cycle interruption cords are provided with magnetic connection jacks at the middle to facilitate entry into the index table operating area during screen set-up or preventive maintenance procedures. If you press has yellow cycle interruption cords, grasp each of the cords at the magnetic jack connections and pull firmly and gently apart. The magnetic connection jacks are separated easier by breaking apart in a downward motion, much like breaking a pencil or dowel rod. (See illustration below)

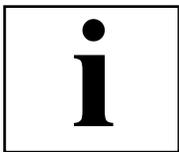


**WARNING!**

**WARNING!** NEVER ATTEMPT TO BY-PASS OR DEFEAT ANY CONTROL DEVICE OR APPLIANCE. CHECK TO BE SURE THAT ALL CONTROL DEVICES AND APPLIANCES ARE WORKING AND FUNCTIONING PROPERLY BEFORE BEGINNING ANY OPERATION OF THIS EQUIPMENT. SHOULD YOU DETERMINE THAT ANY CONTROL DEVICE OR APPLIANCE IS NOT OPERATING OR FUNCTIONING PROPERLY, DO NOT ATTEMPT TO OPERATE THIS EQUIPMENT. REPORT ANY FAILURE OF CONTROL DEVICES OR APPLIANCES TO YOUR SUPERVISOR SO THAT REPAIRS OR REPLACEMENT MAY BE MADE AS SOON AS POSSIBLE.

## YELLOW BARRIER GATES: (Export Models)

Some models of the M&R Challenger Series II may be equipped with yellow barrier gates. These gates provide the same protection to the press Operator as the yellow cycle interruption cords by restricting access to the inner operating area of the index table.



**IMPORTANT!**

**IMPORTANT!** DO NOT PULL ON THE YELLOW CYCLE INTERRUPTION CORD ITSELF. THIS PRACTICE WILL RESULT IN A LOOSE OR "OPEN" ELECTRICAL CONNECTION INTERNAL TO THE JACK AND EQUIPMENT OPERATION WILL NOT BE POSSIBLE.



**WARNING!**

**WARNING!** ALWAYS DISCONNECT THE YELLOW CYCLE INTERRUPTION CORDS AND PUSH "IN" THE RED EMERGENCY STOP PUSH BUTTON DURING SCREEN INSTALLATION, SCREEN SET-UP AND WHILE WORKING WITHIN THE INDEX TABLE OPERATING AREA. CLEARANCE BETWEEN PRINT STATIONS IS EXTREMELY LIMITED AND SERIOUS BODILY INJURY MAY RESULT! DO NOT STAND BETWEEN INDEX PALLET SUPPORT ARMS TO INSTALL SCREEN FRAMES, ADJUST SCREEN REGISTER OR PERFORM ANY OTHER OPERATIONAL ADJUSTMENTS WITH THE YELLOW CYCLE INTERRUPTION CORDS CONNECTED!



**WARNING!**

**WARNING!** ALWAYS DISCONNECT THE YELLOW BARRIER GATE AND PUSH "IN" THE RED EMERGENCY STOP PUSH BUTTON DURING SCREEN INSTALLATION, SCREEN SET-UP AND WHILE WORKING WITHIN THE INDEX TABLE OPERATING AREA. CLEARANCE BETWEEN PRINT STATIONS IS EXTREMELY LIMITED AND SERIOUS BODILY INJURY MAY RESULT!

# Operator Controls



DO NOT STAND BETWEEN INDEX PALLET SUPPORT ARMS TO INSTALL SCREEN FRAMES, ADJUST SCREEN REGISTER OR PERFORM ANY OTHER OPERATIONAL ADJUSTMENTS WITH THE YELLOW BARRIER GATES CONNECTED!

## AC PRINT STATIONS: (Optional)

The M&R Challenger Series II is offered with optional AC drive print stations. The optional AC drive print stations feature precise and repeatable control of both flood and print stroke speeds, produces "glass smooth" flood and squeegee strokes and virtually eliminates print carriage "chatter" and vibration through the use of a dependable timing belt drive system. The M&R Challenger Series II AC drive print stations are simple to operate and maintain. The following information will describe the operation, set-up and preventive maintenance procedures.

## Operation -

The M&R Challenger Series II AC drive print heads include controls for the adjustment of both flood and squeegee stroke speeds, independent print start push button, reset push button, ON/OFF toggle switches for activation of the front and rear pneumatic screen frame holder clamps and ON/OFF toggle switches for activation of the pneumatic flood bar and squeegee mounting clamps. All of these controls operate in the same manner as described on page 34 of this Operator's Manual. The exception being the flood and squeegee speed adjustments which are adjusted by means of two potentiometers in place of the flow control adjustment knobs used on the conventional print station control panel. (See illustration above)

Adjusting the flood bar or squeegee speed control in a clockwise direction will result in a faster stroke speed. Adjusting the control in a counterclockwise direction will decrease the flood or squeegee speed. While adjusting either the flood bar or squeegee stroke speed, observe the L.E.D. digital readout on the power drive inverter located at the rear right hand side of the print head. This L.E.D. indicator provides a visual reference of flood/squeegee speed and is invaluable when you need to set precise flood or squeegee speeds. (See illustration top right)



The L.E.D. display automatically changes to display either flood stroke or squeegee speed as the print station operates through the flood/print cycle.

## Set-Up -

To facilitate the installation of screen frames, and/or flash cure units, the M&R AC drive print stations feature "Flip Up Front Frame Holder" assemblies which conveniently pivot up and out of the way. To move the front frame holder assembly to the "load" position, simply unlatch the front frame holder lock handle at the front middle of the print head. The locking handle is identified by the red plastic grip on the locking handle. To unlatch, push the handle lever "DOWN". Be sure that the "U" shaped locking bracket is clear of the latch, then move the front frame holder assembly up 180 degrees to the lock position. A spring loaded locking pin will automatically secure the front frame holder assembly in place during screen frame or flash unit installation. You may now load the screen frame into the rear screen frame holder assembly. (See illustration below)



Now pull "OUT" the small knurled knob located at the upper right side of the "Flip Up Front Screen Frame Holder" assembly. This will release the locking pin mechanism, allowing the front screen frame holder assembly to swing down into normal print position. Locate the "U" shaped locking bracket into the lock mechanism and pull up on the red locking lever to secure the front frame holder assembly back in place. (See top left next page)

# Operator Controls



Before securing the screen frame in the frame holders, be sure to set the micro registration adjustments for "Zero" or middle range. (See illustration below)



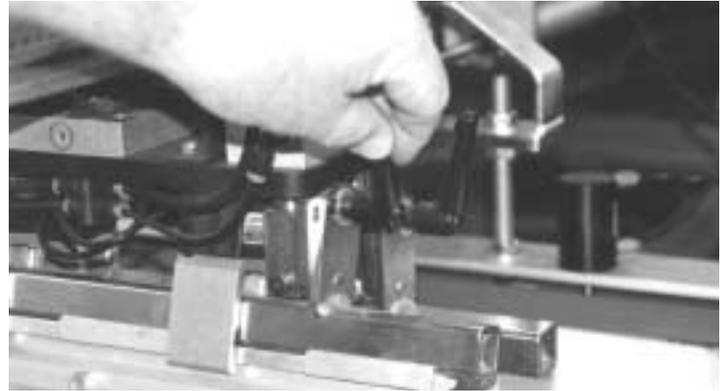
In addition, be sure to allow 3/8" (9mm) to 1/2" (12mm) gap between the inside of the front screen frame holder and the screen frame. This clearance will prove helpful later in the set-up process as you align screen frames which may have a slightly mis-aligned image. When the screen frames are properly loaded into the front and rear screen frame holders, lock the screen frame into position using the pneumatic screen frame clamp toggle switches (Air Locks) located on the small control panel on top of the print station assembly. Install all remaining screen frames as outlined above.

You are now ready to install the flood bar and the squeegee. The flood bar is installed on the rear (towards the center of the press) print carriage mounting bar. The squeegee is installed on the front (towards the outside diameter of the press). **NOTE:** On presses ordered with outside to inside diameter print stroke, the flood bar and squeegee mount in an opposite manner, squeegee at the rear (towards the center of the indexer) and flood bar in the front (towards the outside diameter of the press).

Align the notches on the flood bar and squeegee with the pneumatic squeegee/flood bar clamps, or with the manual mounting clamps provided. Raise the squeegee/flood bar into the clamp assembly and up against the chrome plated mounting bar and slide it either to the right or the left to center it on the mounting bar.

Once centered, lock the squeegee/flood bar in place using the pneumatic clamps or manual clamps as provided.

Both the flood bar and the squeegee are provided with an angle adjustment. If the angle is set to a greater degree, the squeegee will deposit more ink during the print stroke. Decreasing the angle will result in less ink deposit. The same holds true for the angle of the flood bar as well. Set the angle for the squeegee and flood bar to middle range (an approx. 30-40 degree angle). (See illustration below)



Adjust the flood bar pressure by use of the large black knurled knobs at the top of the print carriage assembly. The flood bar pressure should be adjusted so that there is only a slight pressure felt on the bottom of the screen mesh. To increase the flood bar pressure, turn the black knurled knobs counterclockwise. To decrease the pressure, turn the black knurled knobs clockwise. With the flood bar installed, you are now ready to install the squeegees.

Squeegee installation is performed in the same manner as described previously for the flood bar, raise, align and lock. Adjustment of the squeegee pressure is as follows:

A properly adjusted squeegee should exhibit a slight bend, producing a light resistance as you manually push the print carriage towards the rear of the screen. You can note the pressure reading on the small reference scale on the air cylinder. To increase the squeegee pressure, turn the black knurled knobs counterclockwise. To decrease the pressure, turn the black knurled knobs clockwise. (See illustration below)

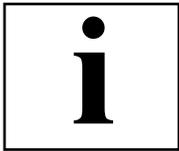


# Operator Controls

The M&R AC print stations feature solid state proximity sensors to facilitate the setting of print stroke length from the front and the rear of the screen. To adjust the print stroke length, simply grasp the sensor mounting bracket, and gently slide the proximity sensor to the desired position. Adjust the sensor so that the flood bar and squeegee just clear the image area of the screen. (See illustration below)



The AC drive print stations include an adjustment for setting of the off-contact distance. Off-contact is defined as the dimension between the bottom of the screen fabric and the top surface of the substrate. Generally when printing textiles, the off-contact distance is set for 1/16". The adjustment may be set by use of the threaded shafts with lock nuts located on the front and rear screen frame holder assembly. Using a 1-1/8" open end wrench, loosen the lower locking nut on the threaded shaft. Turning the top locking nut counterclockwise will decrease the off-contact distance, while turning the top locking nut clockwise will increase the off-contact distance. Remember to tighten the bottom and top locking nuts when you are satisfied with the off-contact distance. Adjustment of the rear screen holder off-contact will require the use of a 3/4" open end wrench (See illustration below)



**NOTE: DO NOT ADJUST THE SENSOR WHILE THE PRINT STATION IS IN OPERATION!**

**IMPORTANT!**

The squeegee and flood bar speeds may be independently adjusted to suit a wide range of print applications or requirements. The speed adjustment knobs are located on the top print station control panel. Simply adjust the control knob for either the flood bar speed, or the squeegee speed, clockwise to increase the speed, or counterclockwise to decrease the speed. A convenient L.E.D. digital speed indicator is located on the power inverter assembly at the right rear of the print station chassis. Use this indicator as a handy visual reference whenever the need for reproducing precise flood/print stroke speeds is required. (See illustration below)



# E 300 Operator Interface

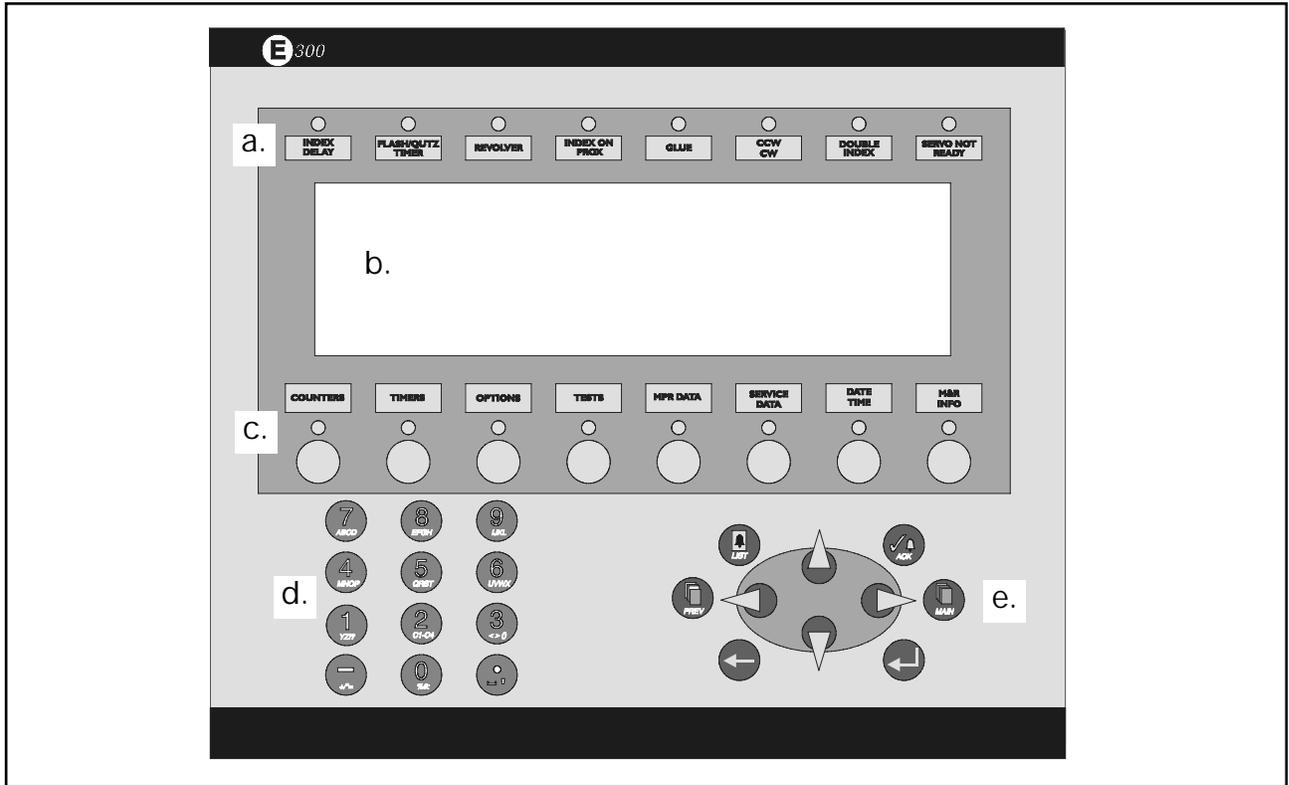


Figure 1

## E 300 OPERATOR INTERFACE -

The Operator Interface control panel used in the manufacture of the M&R Challenger Series II Textile Screen Printing System incorporates an L.C.D. (Liquid Crystal Diode) type alpha/numeric display for providing information regarding operational, programming and system status messages in real time. The Operator Interface control panel is divided into 5 different control areas as follows. (See Figure 1 above)

a. Along the top width of the control are status L.E.D. indicators each of which can display either a green or red indication based on the various operational parameters listed below each individual indicator. The operational parameters, listed from left to right are - **INDEX DELAY, FLASH/QUARTZ TIMER, REVOLVER, INDEX ON PROX, GLUE, CCW/CW** (Counterclockwise & Clockwise), **DOUBLE INDEX** and **SERVO NOT READY**.



**NOTE:** If your press has been ordered with the "Revolver" print sequencing program, then the "QUARTZ PRE-HEAT" L.E.D. indicator will be replaced with "REVOLVER".

b. Directly below the L.E.D. indicators is the L.C.D. display window. Information regarding operation, programming and system status are displayed here.

c. Directly below the L.C.D. display window are the individual Status and Program control buttons with L.E.D. indicators. These control buttons are used to program the on-board PLC for various requirements, and to access system status, useful for trouble shooting procedures. Listed from left to right they are - **COUNTERS, TIMERS, OPTIONS, TESTS, MPR DATA, SERVICE DATA, DATE/TIME** and **M&R INFO**.

# E 300 Operator Interface

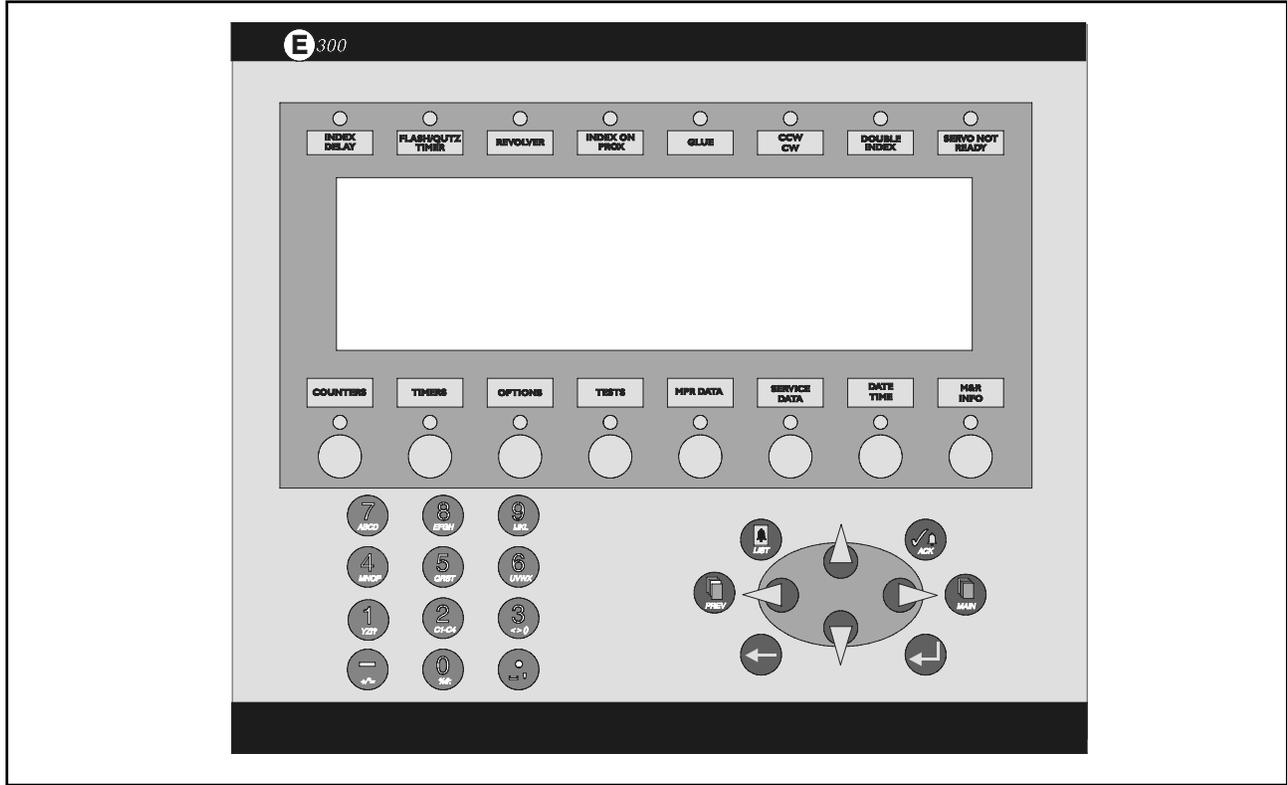


Figure 2

d. Located at the bottom left of the control is the alpha numeric keypad used to input information for various programming parameters.

e. To the lower right of the control panel is the programming function buttons. Starting at the 12 O'clock position and moving clockwise they are - **ARROW UP, ACKNOWLEDGE, ARROW RIGHT, MAIN, ENTER, ARROW DOWN, BACK SPACE, ARROW LEFT, PREVIEW** and **LIST**.

The following information provides a detailed description of all controls and indicators on the Operator Interface. (Refer to Figure 2 above)

**L.E.D. STATUS INDICATOR LIGHTS - INDEX DELAY -**

This indicator light displays a green L.E.D. when the system is operating with the "Index Delay" command. A red L.E.D. will be displayed when the system is operating in the "Revolver" print sequencing program.

**FLASH/QUARTZ TIMER -**

When the "Flash Timer" command is selected, this L.E.D. will display a green indication.

**REVOLVER/QUARTZ PREHEAT -**

This L.E.D. will display a green indication when the "Quartz Preheat" time interval is activated, or when the system is operating in the Revolver sequencing mode.

**INDEX ON PROX -**

This L.E.D. will display a green indication when the "Index ON" proximity switch which reads the carousel index cam followers is activated.

**GLUE -**

This indicator will display a green L.E.D. when ever the optional M&R Annamister spray guns are activated.

**CCW/CW -**

This L.E.D. will display a green indication when the indexer rotation is selected for counterclockwise

# E 300 Operator Interface

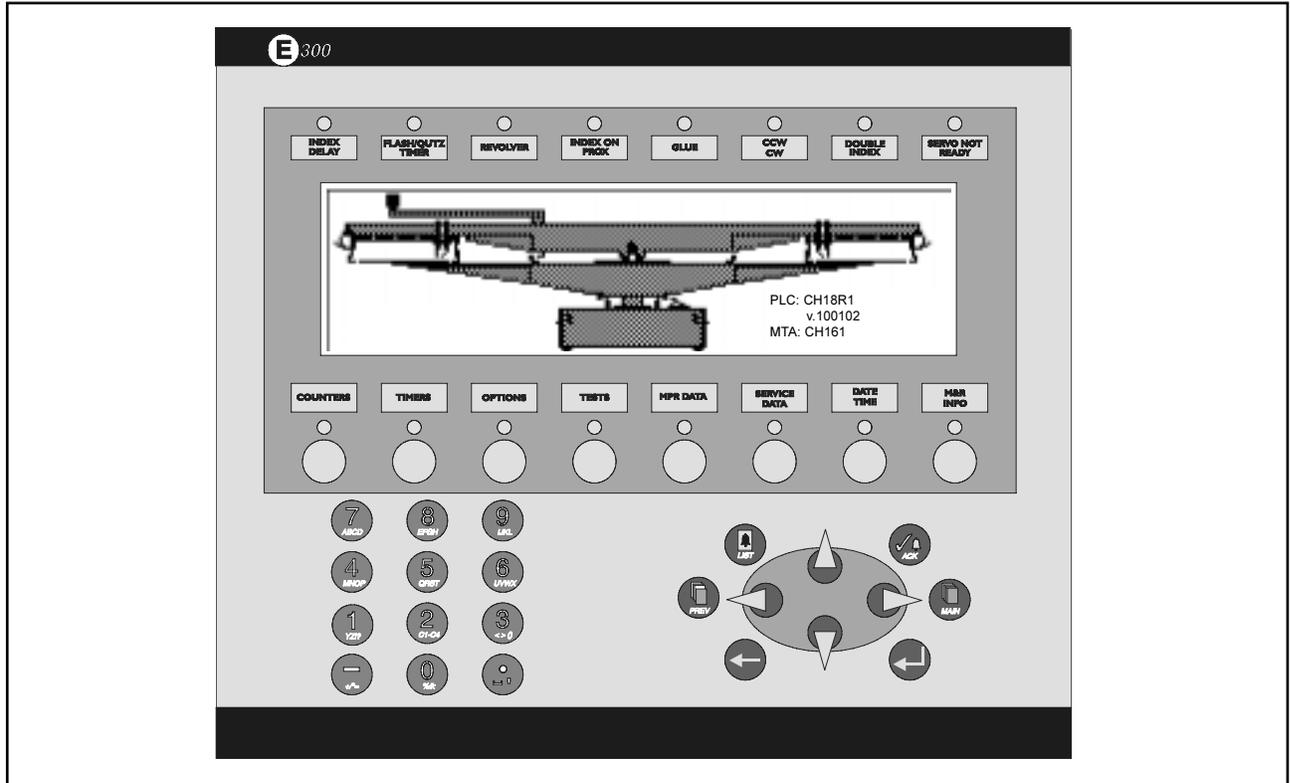


Figure 3

### (CCW) operation.

When selected for clockwise (**CW**) operation, the L.E.D. will display a red indication.

### DOUBLE INDEX -

When ever the system Operator selects the index system to operate in the “**DOUBLE INDEX**” mode of operation in the “**OPTIONS**” menu, this L.E.D. will display a green indication.

### SERVO NOT READY -

When ever this indicator displays a red L.E.D. indication, it means that the indexer servo drive system is not operating. This L.E.D. will also illuminate for a few seconds after the “**EMERGENCY STOP**” push button has been activated, or when ever the “**POWER ON**” switch is turned “**ON**”. (Refer to the illustration below)

### OPERATIONAL CONTROL & STATUS KEYS - MAIN SCREEN

The first screen which is displayed is the **MAIN SCREEN**. The L.C.D window will display a graphic

representation of the M&R Challenger Series II press. In the lower right corner of the L.C.D. window, the screen will display the program reference information for the program currently installed in the press. (See Figure 3 above)

### COUNTERS -

The first command key on the left is “**COUNTERS**”. To access “**COUNTERS**”, press the button under “**COUNTERS**” one time.

The “**COUNTERS**” information menu is displayed in the L.C.D. window, and the green L.E.D. indicator above the “**COUNTERS**” button illuminates. The L.C.D. window displays “**Shift Counter**”, “**Job Counter**” and “**Total Counter**”. Immediately below is a graduated scale starting at “**0**” on the left and increasing to “**120**” on the right. This scale indicates the current production rate and is expressed in “**Dozens per hour**”. As the press operates, you will note that the scale will gradually fill in from the left to the right to indicate the current production speed.

# E 300 Operator Interface

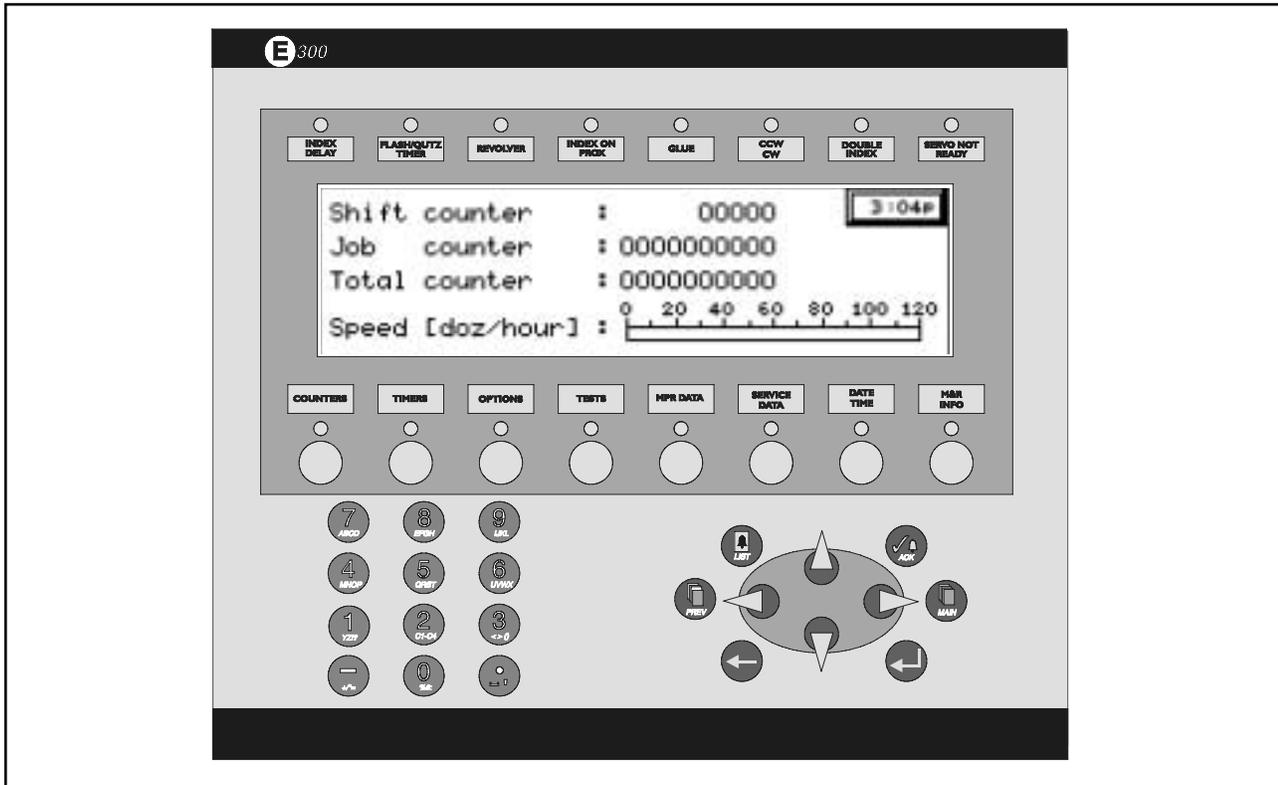


Figure 4

Lastly, in the upper right corner of the screen, the current time of day is displayed. (See Figure 4 above)

The **"Shift Counter"** displays the production shift. The **"Shift Counter"** may be reset using the arrow keys, the numerical keys and the **"ENTER"** key as follows. First, press the **"RIGHT ARROW"** key. The numerical display for **"Shift Counter"** will start to flash, confirming its selection. To reset the **"Shift Counter"**, press the **"0"** key on the numerical keypad, then press the **"ENTER"** key. The display for **"Shift Counter"** is now reset to **"0"**.

The **"Job Counter"** displays the current number of index cycles for a given print job. The **"Job Counter"** may be reset in the same manner as described above for **"Shift Counter"**.

The **"Total Counter"** displays the total number of press cycles beginning from the initial date of installation of the equipment in your production facility. The numerical value for the **"Total Counter"** cannot be changed or adjusted in any way. It merely serves

as a reference for the systems operational history.

## TIMERS -

The **"TIMERS"** menu contains four sub-menu items which are, **"Index"**, **"Flash"**, **"Quartz"** and **"Preheat"**. You may access each of these sub-menu areas by using the **"ARROW DOWN"** key to scroll down through the L.C.D. display. (See Figure 5 on the next page)

Index Dwell Time is used to control the dwell time when operating the system in the automatic mode. Dwell time is defined as the time interval during automatic operation in which the system operator may load and/or unload garments. The dwell time starts at the completion of the index cycle. The dwell time is adjustable from a minimum of **"0"** seconds, to a maximum of **"20"** seconds and may be adjusted to suit the system operators requirements as follows. Press the **"ARROW RIGHT"** key. The numerical value for dwell time to the right of **"Index"** will start to flash, confirming its selection. Now, simply press the numerical keys to select the desired amount of

# E 300 Operator Interface

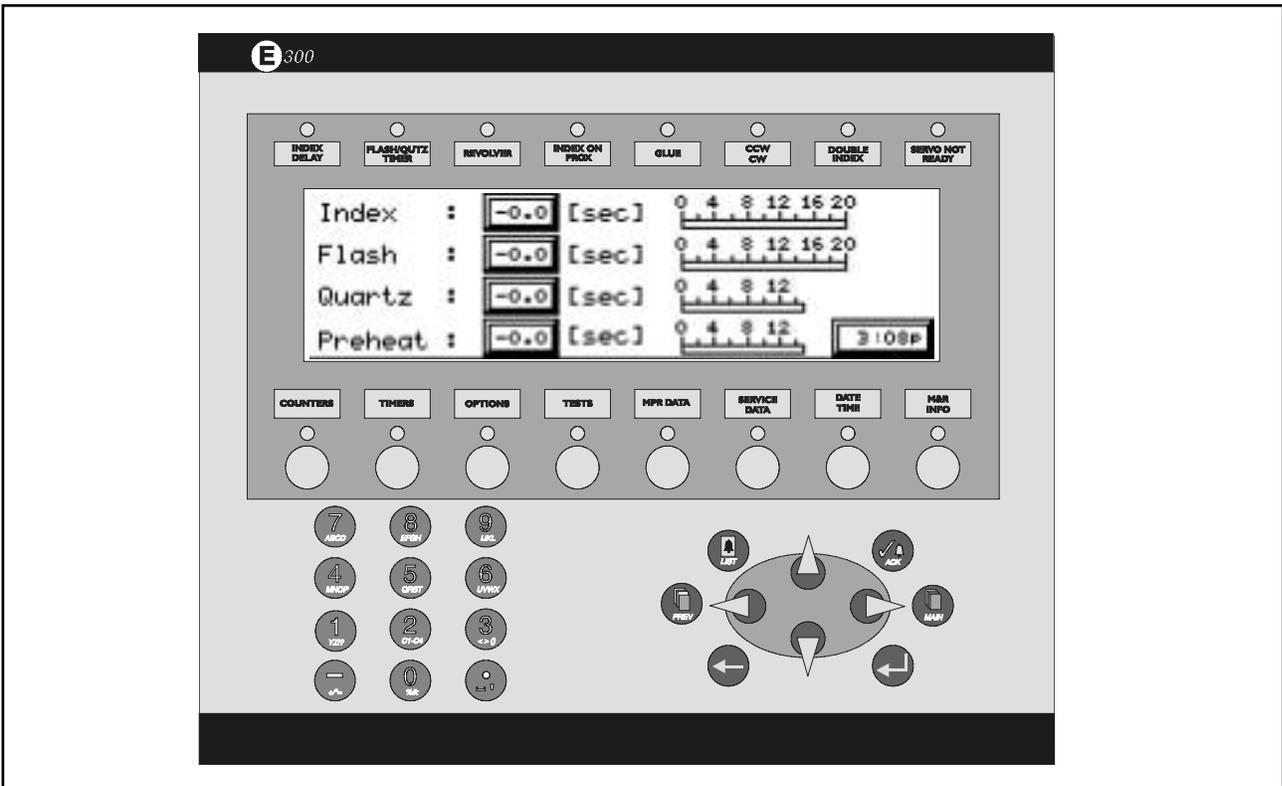


Figure 5

Index Dwell Time. Now, press the “ENTER” key. Your selection is now programmed into the PLC memory. (See Figure 5 above)

To reset the “Flash” dwell time, press the “ARROW DOWN” key. The numerical value for “Flash” will start to flash confirming its selection. Now, as with “Index” time described above, enter the desired amount of flash dwell time using the numerical keys. As with “Index” dwell time above, the maximum dwell time allowed is “20” seconds and the minimum is “0”. Now press the “ENTER” key and your selection will be saved in the PLC memory. Please be aware that whenever a dwell time value of “0” has been selected for the “INDEX” or “FLASH DWELL TIMER”, the flash cure units heating panel will not cycle in or out of position over the printing pallets.

To adjust the “Quartz” dwell time, you proceed in the same manner as previously described for “Index Dwell Time” and “Flash Dwell Time”. Press the “ARROW DOWN” key until the numerical value for “Quartz” time starts to flash, confirming its selec-

tion. Now enter the numerical value using the number keys, maximum “15.0” seconds, minimum is “0” seconds and press the “ENTER” key. Your selection is now programmed into the PLC memory.

When first starting production with the optional Quartz Flash unit or whenever the Quartz Flash unit has been inoperative for 10 minutes or longer, a dwell time is required to allow the quartz heating elements to achieve proper operating temperature. The “Preheat” menu item provides the system Operator with a convenient means to adjust the required preheat dwell time. To adjust the “Preheat” dwell time, press the “ARROW DOWN” key so that the numeric indication for “Preheat” flashes. Now using the numerical keys, enter the desired preheat dwell time from a minimum of “1” to a maximum of “15” seconds. Then press the “ENTER” key. The “Preheat” dwell time is now saved in the PLC memory. To command the Quartz Flash unit to begin its preheat cycle, press the “ARROW LEFT” key so the word “Preheat” flashes, then press the “ENTER” key.

# E 300 Operator Interface

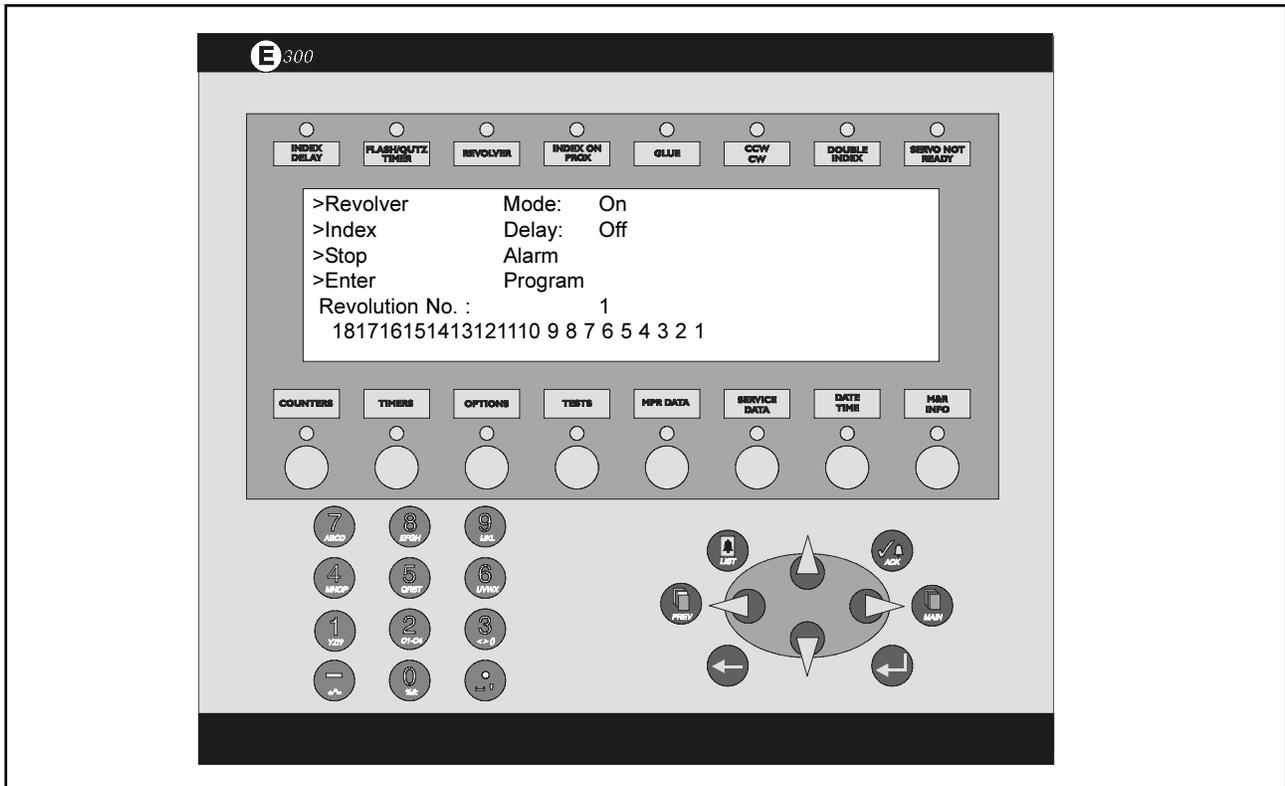


Figure 6

“Preheat” will change to “ON” for the selected time of the preheat cycle, and the “Preheat” L.E.D. will flash.

### OPTIONS -

The next menu item is “OPTIONS”. To access the “OPTIONS” menu item, press the “OPTIONS” key located to the right of the “TIMERS” key. The “OPTIONS” menu contains nine sub-menu items, “Revolver Mode”, “Rotation”, “Index”, “Skip”, “Pallets Size”, “Flash”, “Servo Off-Set”, “Glue Applicator”, “Oiler” and “Ink Dip”.



**NOTE:** The sub-menu item for “REVOLVER” appears only on presses equipped with the “REVOLVER” program option.

### M&R REVOLVER SEQUENCING PROGRAM (Optional)

The first sub-menu item is “Revolver mode”.



**NOTE:** The “REVOLVER” option only appears on presses equipped with the “REVOLVER” program option.

To access the Revolver mode of operation, press the “ARROW DOWN” key one time, then press the “ARROW RIGHT” key so that the flashing cursor is located under the “>” to the left of the letter “R” in “Revolver Mode”, then press the “ENTER” key one time. The “Revolver Mode” display screen contains “Revolver Mode ON/OFF”, “Index Delay”, “Stop Alarm”, “Enter Program”, “Revolution Number”, “Pallet No.:", “Job No.”, “Job Clear” and “Alarm Enabled ON/OFF”. When you first enter into this message screen, you will note that the flashing cursor automatically locates beneath the letter “R” on

# E 300 Operator Interface

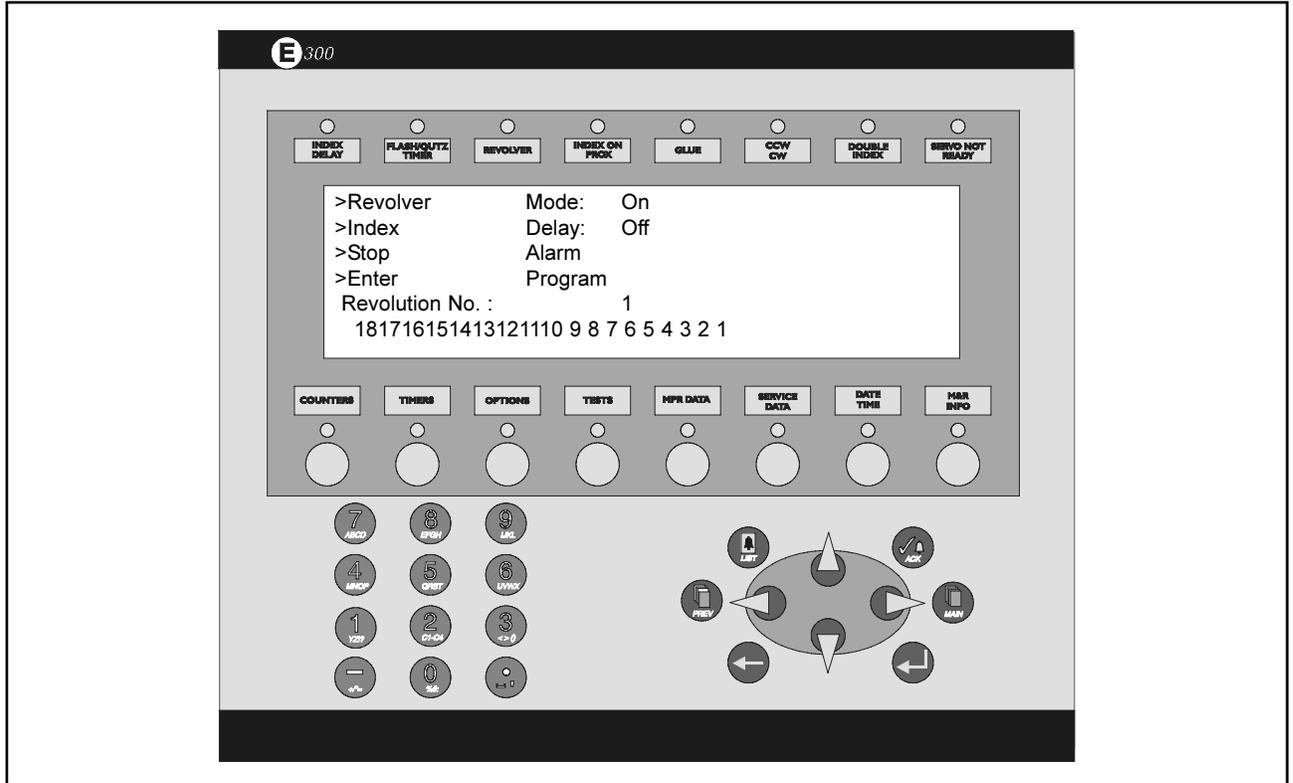


Figure 7

the word **“Revolver”** in **“Revolver Mode”**.

To activate the revolver mode simply press the **“ENTER”** key one time. The **“ON/OFF”** indication will now change to **“ON”**. (See Figure 7 above)

Pressing the **“ENTER”** key once again will change the indication to **“OFF”**. Press the **“ARROW DOWN”** key one time, then press the **“ARROW RIGHT”** key. The flashing cursor is now located under the letter **“I”** in the word **“INDEX”**. Press the **“ENTER”** key one time. You will be presented with a **“WAIT”** indication, after which the current index dwell time as programmed under the **“TIMERS”** menu will be activated. The **“INDEX DELAY”** L.E.D. will display a red indication when the timer is inactive and a green indication when the **“INDEX DELAY”** is activated.

Press the **“ARROW DOWN”** key one time, then press the **“ARROW RIGHT”** key one time to access the **“Stop Alarm”** menu item. When the flashing cursor is located under the letter **“S”** in the word **“STOP”**, press the **“ENTER”** key one time.

You will see the **“WAIT”** message appear in the message window. This control feature allows the system Operator to over-ride the audible alarm signal which indicates the approaching end of a programmed print sequence in the Revolver mode of operation. (See Figure 7 above)

Press the **“ARROW DOWN”** key one time, then press the **“ARROW RIGHT”** key one time to access the **“Enter Program”** menu item. This control function is used to enter print sequences for the Revolver program mode of operation. When the flashing cursor is located under the letter **“E”** in the word **“ENTER”**, press the **“ENTER”** key one time. You will see the **“WAIT”** message appear in the message window, after which your pre-selected program information will be saved in the PLC memory.

The next menu item is **“Revolution No.”** Press the **“ARROW DOWN”** key one time, then press the **“ARROW RIGHT”** key one time.

# E 300 Operator Interface

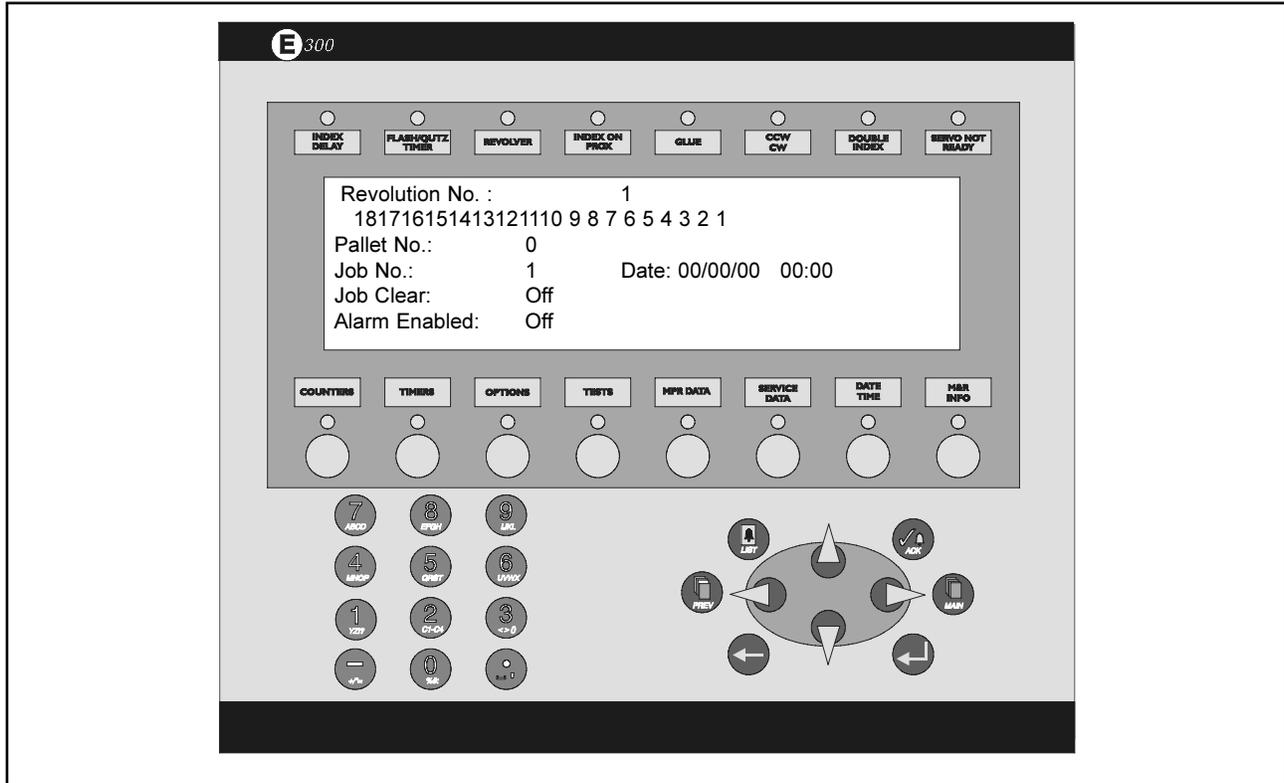


Figure 8

This control function allows the selection of up to 10 different revolutions to be programmed for print, flash operation in the Revolver program. Enter a number from 1 to 10, then set the active heads to either "Single" or "Double" (remember, flashes units must be programmed before you enter the "Revolver" screen), then press the "ENTER" key one time. Your "Revolver" program will be displayed on the screen. "S" indicates a print station is printing in "Single" mode. "D" indicates the print station is printing in "Double" mode. "F" indicates that the print station is operating in the "Flash" mode.

The "Pallet No." indication provides a visual indication of how many pallets are entered in the program sequence for each revolution of the indexer. The numerical indication will change (count down) as the press continues through its operation.

The next menu item is "Job No.". "Job No." is used to enter a job number from 1 to 3 which is saved in the PLC memory. Simply press the numeric key from 1 to 3, then press the "ENTER" key. (See illustration

Figure 8 above)

The next menu item is "Job Clear". This menu item is used to clear all currently active Revolver program data from the PLC. To use it, press the "ARROW DOWN" key once, then press the "ARROW RIGHT" key one time. Now press the "ENTER" key. The indication will toggle from "ON" to "OFF". When the indication reads "ON", then all Revolver program data as entered by the Operator will be cleared from the PLC memory.

The next menu item is "Alarm Enabled". This menu item provides the system Operator with a way to either enable or disable the audible alarm signal which sounds just before the completion of a programmed print sequence. To turn the alarm signal "OFF", press the "ENTER" key when the flashing cursor is located under the letter "O" in the "ON" indication. To turn the alarm back "ON", press the "ENTER" key once again, and the alarm will turn back on. Press the "PREV" button to return to the previous screen.

# E 300 Operator Interface

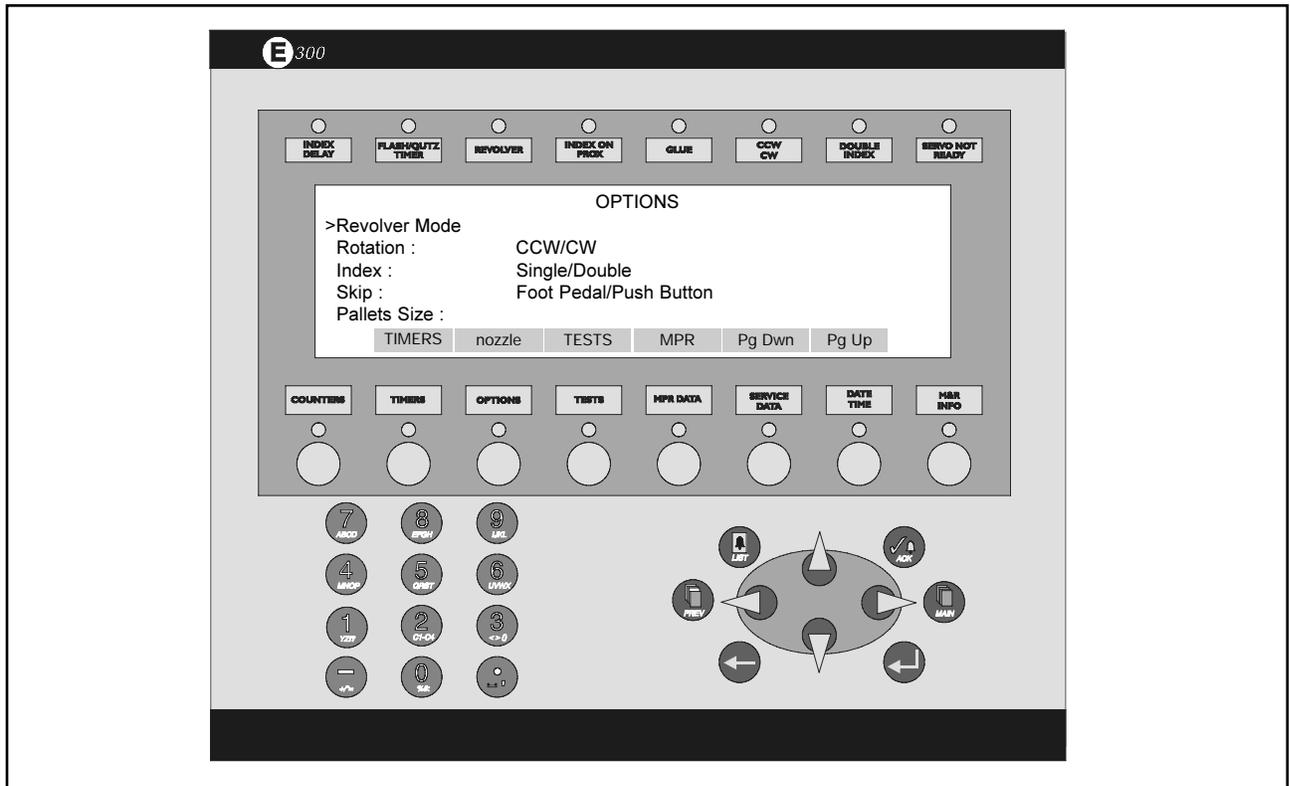


Figure 9

The next sub-menu item after **“Revolver Mode”** is **“Rotation” CCW/CW**. This sub-menu item permits the system Operator to select either counterclockwise rotation of the index carousel, or clockwise rotation of the index carousel.

To change the indication, use the **“ARROW”** keys to place the flashing cursor under the **“CCW”** or **“CW”** indication, press the **“ENTER”** key, then press the **“Reset”** push button. When the indication is selected for CCW, counterclockwise rotation, the green L.E.D. at the top of the control panel will illuminate. When CW clockwise rotation is selected, the L.E.D. displays a red indication.

The next sub-menu item is **“INDEX SINGLE/DOUBLE”**. This menu item provides the system Operator with a means to select either **“SINGLE”** index operation, or **“DOUBLE”** index rotation. To select **“SINGLE”** index rotation, use the arrow keys to place the flashing cursor under the letter **“D”** in the word **“DOUBLE”**, then press the **“ENTER”** key one time.

The next menu item is **“SKIP”**. This menu item permits selection of either **“No T-Shirt Sensor”** or **“FOOT PEDAL/PUSH BUTTON”** operation. To select either function, use the arrow keys to place the flashing cursor on either the letter **“N”** in **“NO”**, or the letter **“F”** in the word **“FOOT”** and press the **“ENTER”** key. (See Figure 9 above)

**Pallets Size:**

The next sub-menu in the listing under **“OPTIONS”** is **“Pallets Size”**. Use the arrow keys to select either **“Small”**, **“Normal”** or **“Large”**, then press the **“ENTER”** key.

**Flash:**

The next menu item in the **“OPTIONS”** menu is **“FLASH”**. This menu item provides a visual indication which alerts the system Operator as to which print heads are currently selected for **“Flash Cure”** operation. Print heads are displayed from the left to the right of the display screen starting with the highest number print head. Displayed below each print head you will note either a **“-”** indicating that print

# E 300 Operator Interface

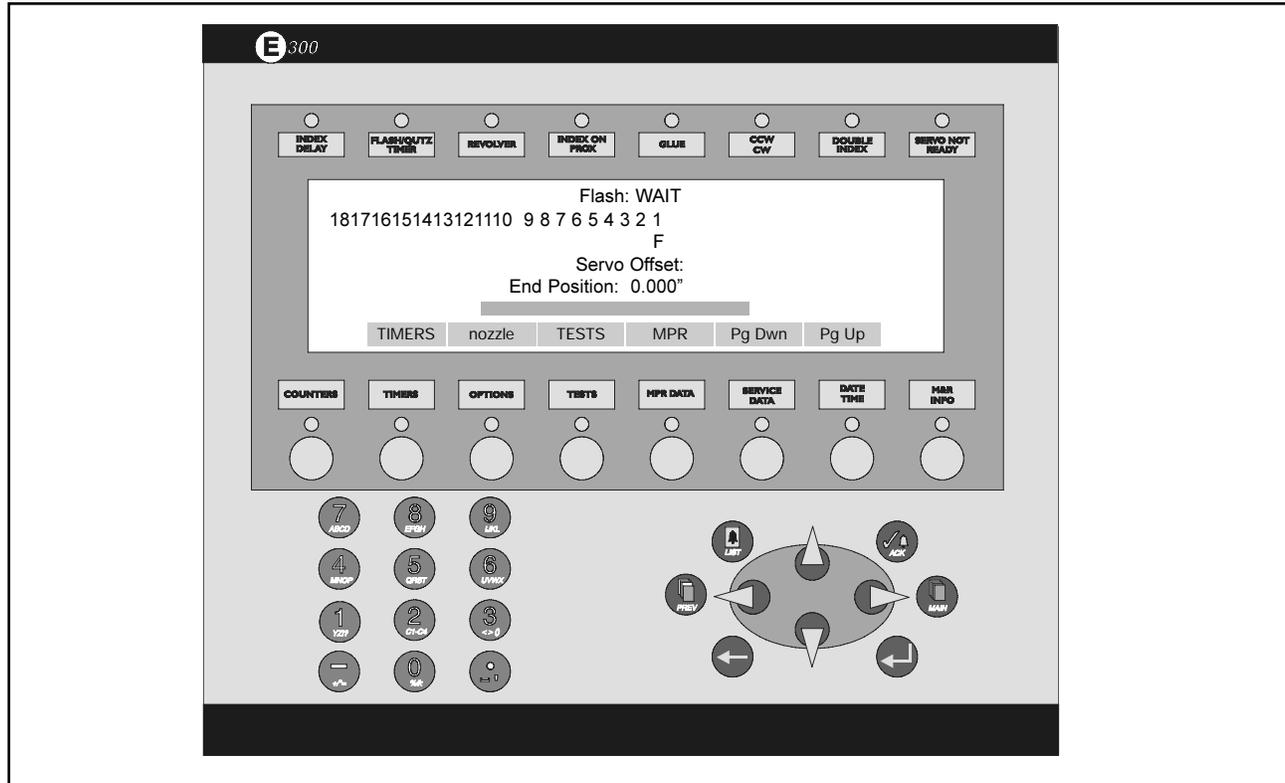


Figure 10

head is currently selected for print operation, or the letter “F” indicating that the print head is selected for flash cure operation. To change the indication from flash to print operation and back again, use the “FRONT/REAR” stop toggle switches located on the Main control console to select the desired operation of that particular print head. To select the print head for flash cure operation, place the toggle switch in the “FRONT” stop position, then, using the “ARROW” keys, place the flashing cursor under the letter “E” in the word “ENTER” to the right of the word “FLASH”, and press the “ENTER” key. In addition, the “SINGLE/DOUBLE” toggle switch must also be selected, or the print head will not operate in either print or flash operation. (See illustration below)

#### Servo Offset:

Scrolling down further in this menu will reveal the word “Servo Offset” and below this “End Position” and “Start position”. These controls are used to program the stopping position of the indexer servo drive system for the most optimum locking of the carousel. This control is provided to adjust index

stop after changing pallets to a smaller or larger size. Larger pallets increase the mechanical load as seen by the indexer, while smaller lighter pallets decrease the index load. As a result, changing of printing pallets can have an impact on the stopping position, and ultimately, the smooth operation of the index servo drive system.

The range of setting is from **-0.25”** to **+ 0.25”**. To change the setting for either “Strt” or “End”, use the arrow keys to place the flashing cursor on either the “-” sign, or the “+” sign. Now press the “ENTER” key and hold it down until the desired numerical value, either plus or minus is displayed. Then release the “ENTER” key. Your selection is now programmed into the Servo Drive Offset. (See Figure 11 next page)

#### Glue Applicator:

The “GLUE APPLICATOR” sub-menu provides control adjustments for the optional M&R Annamister Automatic Adhesive Application system. The available parameters are “Spray 1 Revltn Only:”, “Spray Every: Revolution” “Front Delay”, “Front

# E 300 Operator Interface

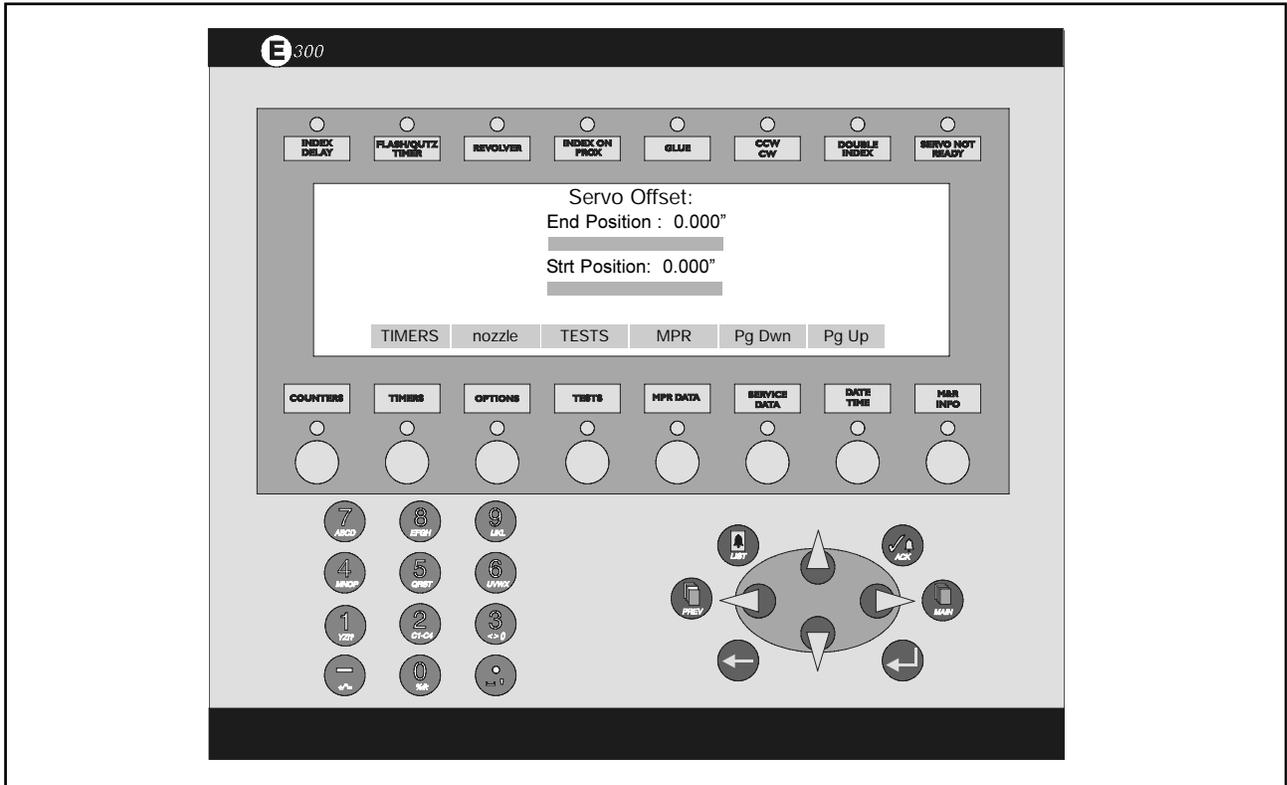


Figure 11

**Duration”, “Rear Delay”, “Rear Duration”, “Revolution #:” and “Pallet #:”.**

To access the first menu item, **“Spray 1 Revltn Only”** press the **“ARROW DOWN”** key one time. Now press the **“ARROW RIGHT”** key one time.

The flashing cursor will now be positioned at the **“ON/OFF”** indication. To activate **“Spray 1 Revltn Only”** press the **“ENTER”** key one time. The indication will now display **“ON”**. When **“Spray 1 Revltn Only”** is **“ON”**, the M&R Annamister will dispense adhesive on all pallets for one revolution only. A revolution is defined as one complete cycle of all printing pallets. This control provides a convenient manner in which to automatically apply adhesive to all printing pallets at the beginning of a print run.

Press the **“ARROW DOWN”** key one time, then press the **“ARROW RIGHT”** key one time to access the **“Spray Every Revolution”** sub-menu item. The **“Spray Every Revolution”** menu item permits the system Operator to program the M&R Annamister to

apply adhesive to the printing pallets based on the number of revolutions of the press. Remember that a revolution is defined as one complete cycle of all printing pallets. The value may be set for a minimum of **“0”**, or a maximum of **“99”**. As an example, if the indication is set for **“5”**, then the M&R Annamister system will automatically apply adhesive to all printing pallets every fifth revolution of the index system. To change the indication, use the numerical keys to enter the desired number of revolutions, then press the **“ENTER”** key one time. Your selection is now saved in the PLC memory.

Press the **“ARROW DOWN”** key one time, then press the **“ARROW RIGHT”** key one time to access the next sub-menu item, **“Front Delay”**. This sub-menu item permits the system Operator to program a start delay time for the front air valve which operates the two front spray guns.

This adjustment is provided to precisely set the spray gun trigger cycle to the speed of the indexer when operating the press in the automatic mode.

# E 300 Operator Interface

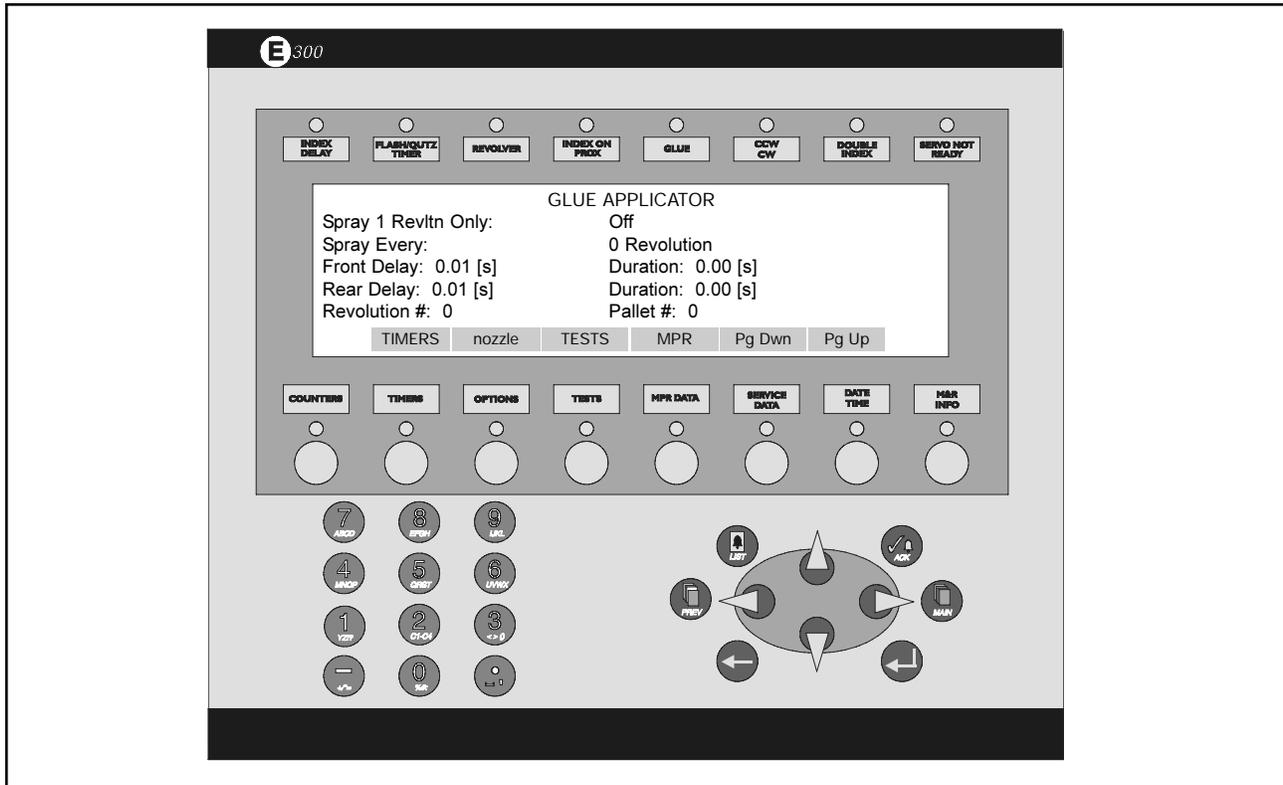


Figure 12

The adjustment has a range of between “0.01” second and “2” seconds delay time. To adjust the “Front Delay” time, enter the desired time interval using the numerical keys, then press the “ENTER” key one time. Your selection is now saved in the

Press the “RIGHT ARROW” key one time to access the “Front Duration” dwell time. This sub-menu item permits the adjustment of the time duration in which the front air valve which operates the front spray gun is activated. This adjustment, like the “Front Delay” adjustment described above, permits the system Operator to precisely set the two front spray guns to synchronize with the current index speed. The adjustment has a range of “0.00” seconds to “2” seconds. Use the numerical keys to enter the desired time value, then press the “ENTER” key one time. Your selection is now saved in the PLC memory. (See Figure 12 above)

The next sub-menu item is “Rear Delay”. This sub-menu item permits the system Operator to program

a start delay time for the one rear air valve which operates the rear spray gun. As with “Front Delay” described previously, this adjustment is provided to precisely set the spray gun trigger cycle to the speed of the indexer when operating the press in the automatic mode. The adjustment has a range of “0.01” second to “2” seconds delay time.

To adjust the “Rear Delay” time, press the “RIGHT ARROW” key so that the flashing cursor is located under the current indication. Now using the numerical keys, enter the desired delay time, then press the “ENTER” key. Your selection is now saved in the PLC memory. (See Figure 12 above)

The next sub-menu item is “Rear Duration”. This sub-menu item permits the adjustment of the time duration in which the rear air valve which operates the rear spray gun is activated. This adjustment, like the “Rear Delay” adjustment described previously, permits the system Operator to precisely set the one rear spray gun to synchronize with the current index speed.

# E 300 Operator Interface

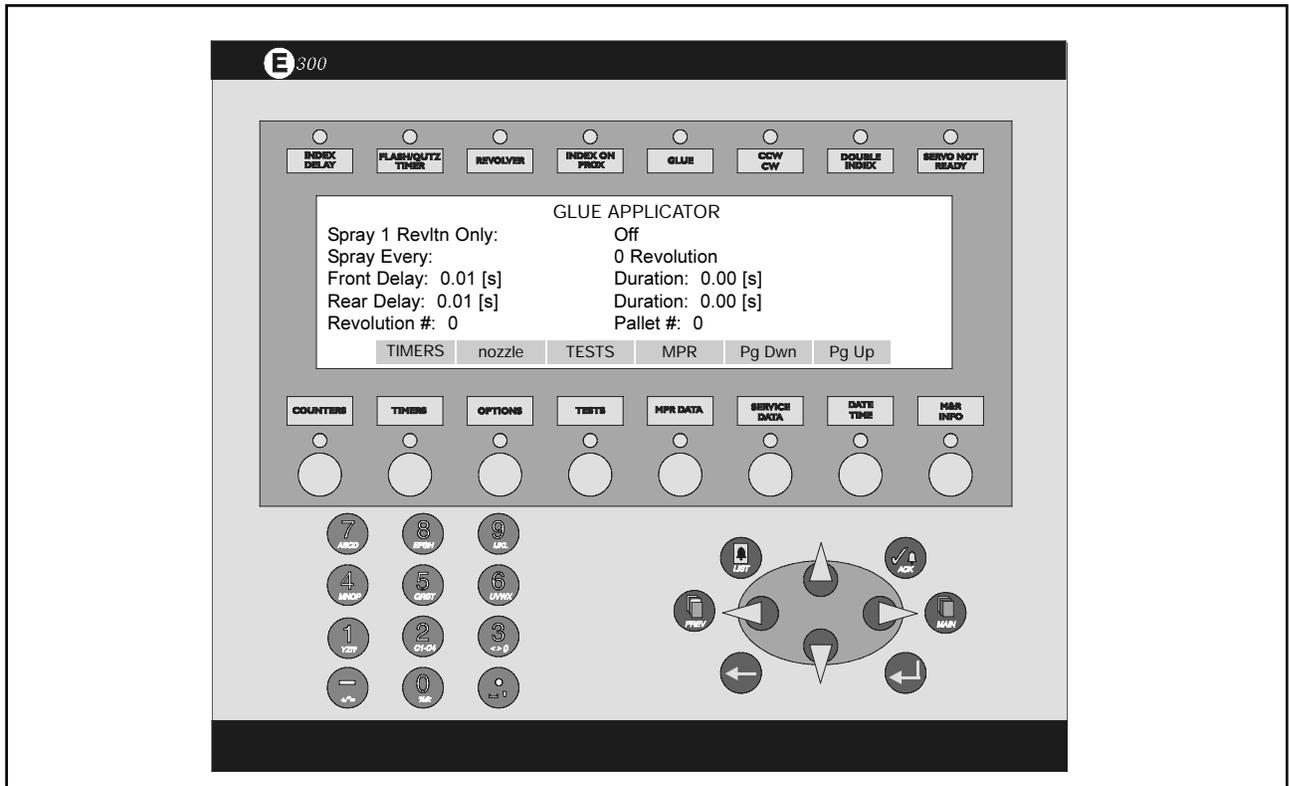


Figure 13

The adjustment has a range of "0.00" second to "2" seconds. To adjust the "Rear Duration" time, press the "RIGHT ARROW" key so that the flashing cursor is located under the current indication. Now using the numerical keys, enter the desired delay time, then press the "ENTER" key. Your selection is now saved in the PLC memory.

The next sub-menu item is "Revolution #". This menu item is used to provide the system Operator with a visual indication of the current number of revolutions remaining before the M&R Annamister automatically applies adhesive to the printing pallets as determined by the Operator's selection in the "Spray Every..." sub-menu item as described previously. The indication displayed shows a countdown of remaining revolutions. For example, if the selection for "Spray Every..." was "20". Then the indication will begin at "20" and countdown to "0" at which time the M&R Annamister system will begin applying adhesive to the printing pallets. (See Figure 13 above)

The next sub-menu item is "Pallet #". This menu item is provided as an indication of how many pallets remain until the end of the current revolution. (See Figure 13 above above)

You will note that across the bottom of the display screen is a dark bar with "TIMERS", "NOZZLE", "TESTS", "MPR", "Pg Dwn" and "Pg Up". Except for "NOZZLE" and "Pg Dwn" and "Pg Up" these functions work as explained previously. "NOZZLE" is used to manually activate the M&R Annamister spray guns. Simply press the button below "NOZZLE" which normally would be "OPTIONS", and the spray guns will dispense adhesive for as long as you hold the button "IN". Additionally, the green L.E.D. above the "GLUE" indicator at the top of the control panel will also illuminate. Press the buttons below "Pg Dwn" or "Pg Up" to scroll down through the menu item.

# E 300 Operator Interface

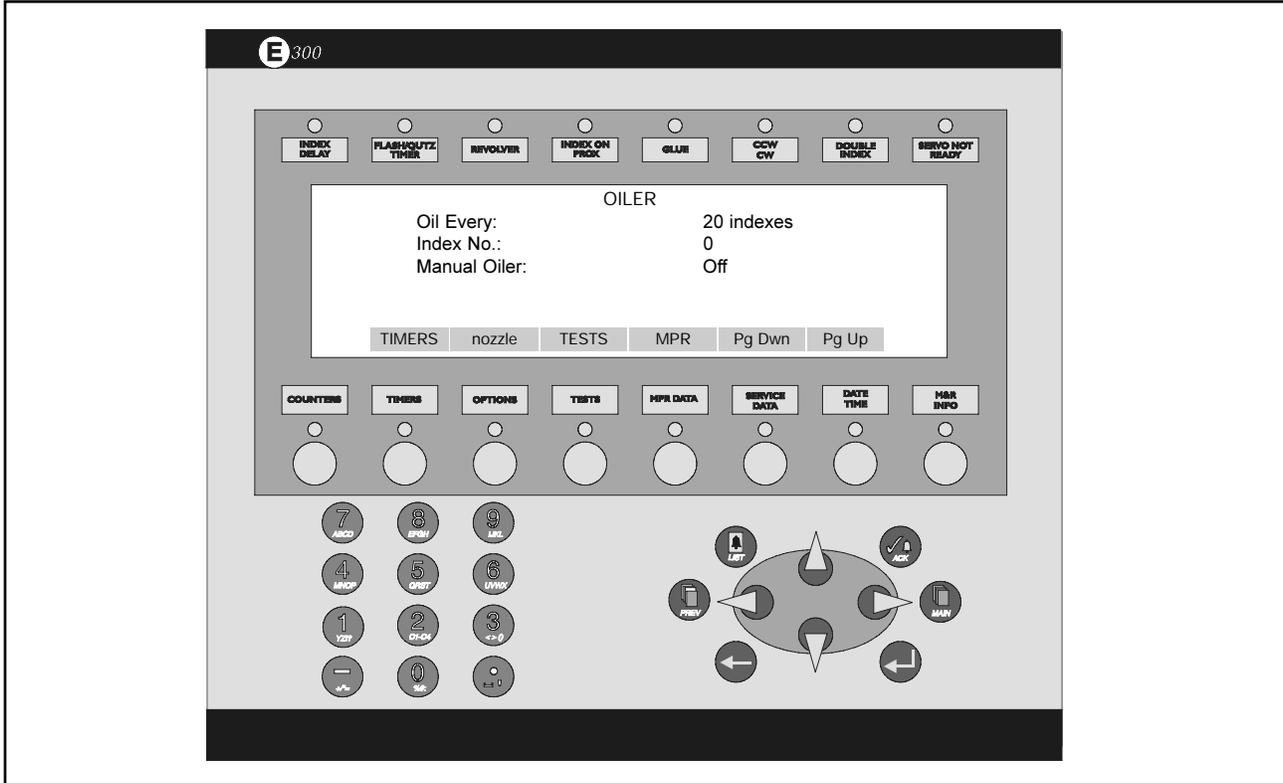


Figure 14

## OILER -

The next sub-menu item is "OILER". This sub menu item makes the periodic lubrication of the index drive assembly convenient and effortless. The first parameter "OIL EVERY \_\_ INDEXES" allows the system Operator to enter a number from "0" up to "999". The index lubrication system will now dispense oil to the indexer drive assembly every so many cycles based on the value entered. For example, if you enter the number 80, which is the value selected at the factory, the lubrication system will automatically dispense oil to lubricate the indexer every 80 cycles. To change the value, use the "ARROW" keys to place the flashing cursor on the value, then use the numerical keys to select the value, then press the "ENTER" key.

"INDEX No." is used as a visual indicator to advise the system Operator how many index cycles remain before automatic lubrication will take place.

"MANUAL OILER" permits the lubrication of the index system manually. To activate the "MANUAL

OILER", use the "ARROW" keys to place the flashing cursor on the "ON/OFF" indication, and press the "ENTER" key. This action will activate the lubricant pump resulting in the manual lubrication of the index system. (See Figure 14 above)

## Ink Dip:

The last sub-menu selection under the "OPTION" menu is "Ink Dip". This control feature eliminates the need for the press Operator to manually scoop ink from the rear ink well area of the screen, into the active image area of the screen. The "Ink Dip" feature does this for you automatically. Use the "ARROW" keys to locate the flashing cursor at the left of the first menu selection under "Ink Dip"... "Ink Dip Every". Now press the "ARROW RIGHT" key to locate the flashing cursor on the value at the right. Using the numerical keys, enter the desired number of print cycles before the ink dip control feature activates. Now press "ENTER". For instance, if you enter the number "10" into the value, then the "Ink Dip" feature will automatically retrieve ink from the ink well area of the screen after 10 print cycles have

# E 300 Operator Interface

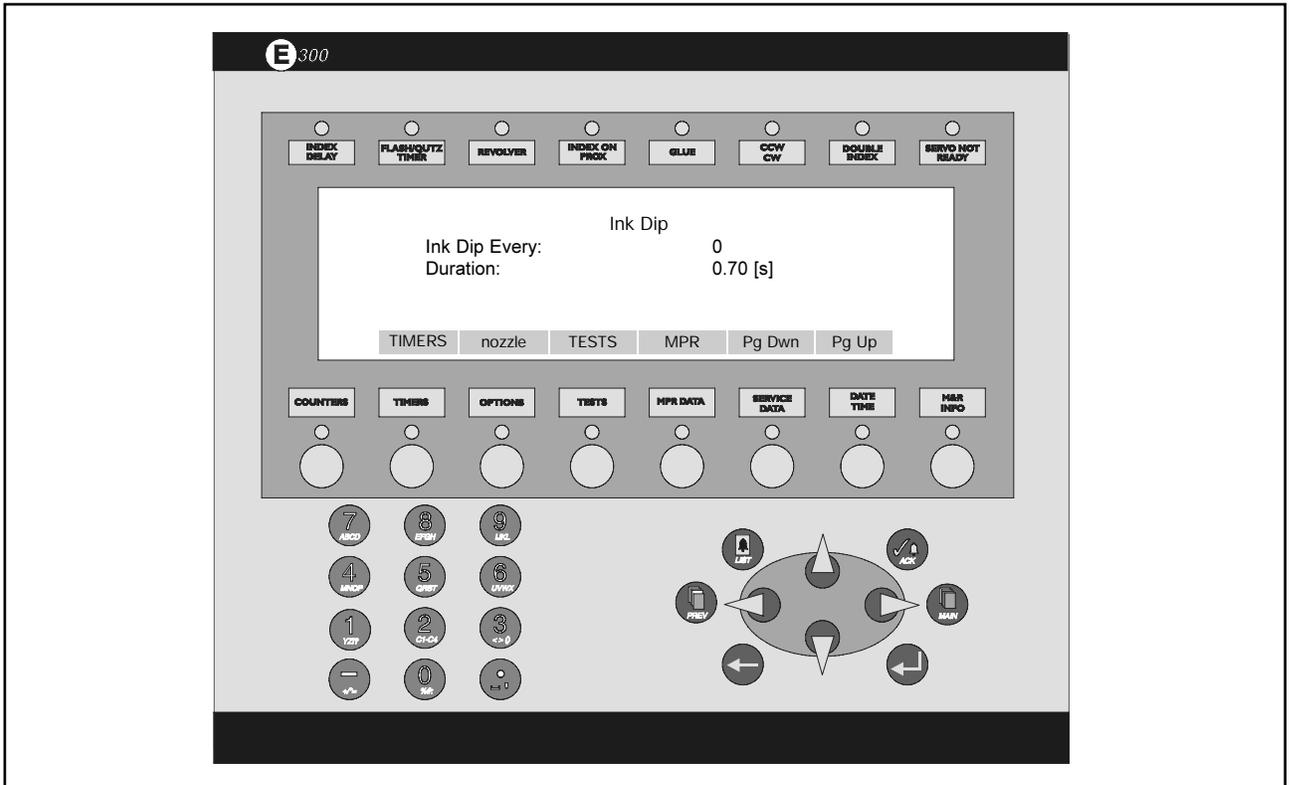


Figure 15

been completed. You may enter a value up to a maximum of "999". If you enter the value "0", the "Ink Dip" control feature will not operate. (See Figure 15 above)

**Duration:**

Duration is used to control the time interval for the application of the adhesive. The maximum time allowed is 0.70 seconds. The minimum is 0 seconds. Larger (wider) pallets may required a longer time duration that narrower pallets in order to apply adhesive in a larger pattern.

To adjust the duration, press the "ARROW DOWN" key one time so that the flashing cursor rests to the left of the "Duration" menu selection. Now Press the "ARROW RIGHT" key to move the flashing cursor over to the value for "Duration". Use the numerical keys to enter your selection for the time duration, then press the "ENTER" key. You selection is displayed for "Duration" in the L.C.D. window.

**TESTS -**

The next menu item is the "TEST" menu item. In the "TESTS" menu item there are six sub-menu selections which are "Panel Test", "Proximity's Test", "Motion Card Test", "Servo Drive Test", "Servo Motion Card History" and "Others" tests. The "TESTS" menu provides an on-board self diagnostic program which gives the system Operator a visual indication of the operational integrity of all the proximity switches, toggle switches and push button switches used in the operation of the M&R Challenger Series II system. To access the "Panel Test" sub-menu, press the arrow keys to place the flashing cursor on the small arrow to the left of the words "Panel Test", then press the "Enter" key. The L.C.D. display window will now display a graphic representation of the Main Control console.

As you select either "ON" or "OFF" the various switches and push buttons used to control the system, the particular switch or push button will become highlighted on the graphic representation of the control panel, indicating that it is working properly.

# E 300 Operator Interface

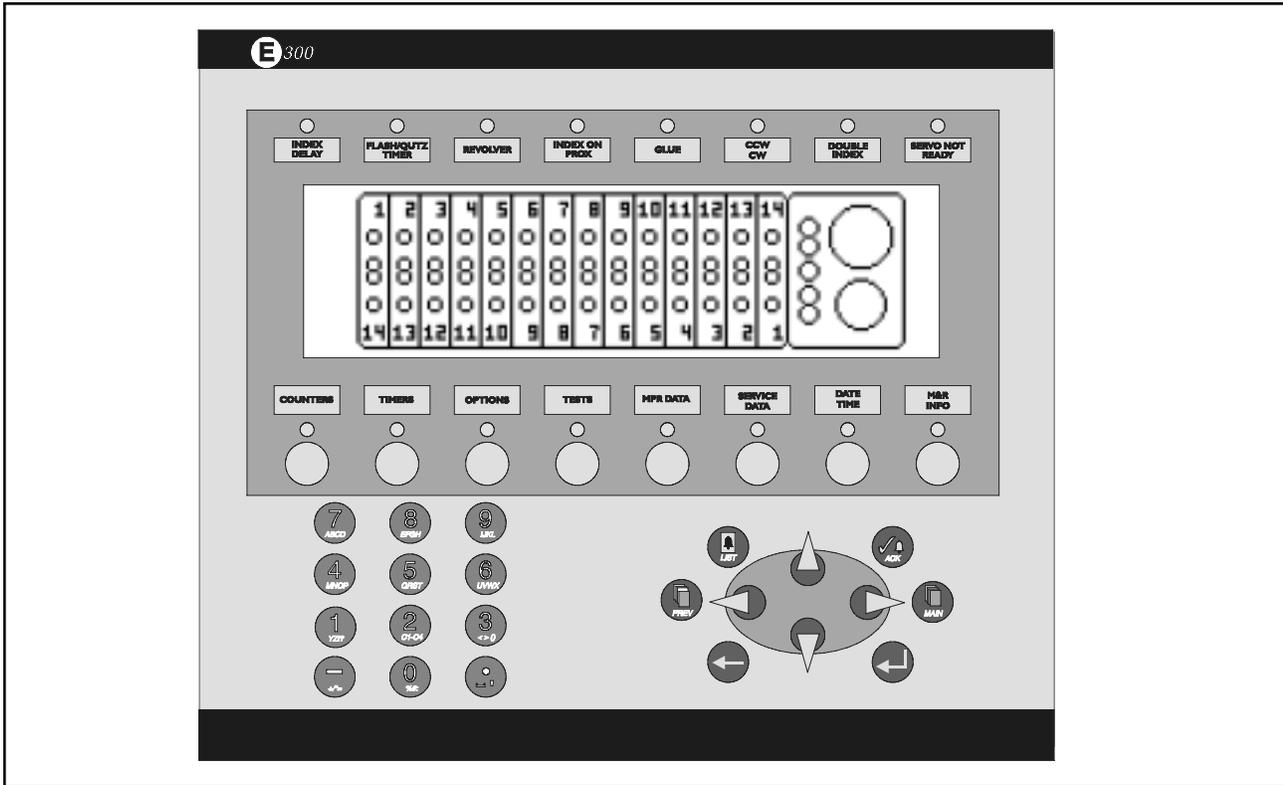


Figure 16

Should the indication on the graphic representation of the control panel fail to respond, then the particular switch in question must be examined for a possible defect in operation, or possible replacement. (See Figure 16 above)



We strongly recommend that when performing tests on the Main Control Panel, that the **“EMERGENCY STOP”** push button be activated (Pushed IN).

**“PROXIMITIES TEST”** may be accessed in the same manner as described above for **“Panel Test”**. The **“Proximities Test”** menu performs the same diagnostic function as described for **“Panel Test”** above. The display screen will list every proximity switch used in the operation of the system.

As each individual switch is activated, the corresponding indication on the display screen will confirm its operational integrity. Should a indication fail to respond, then investigation of the operation of that particular proximity switch is indicated. (See Figure 17 on next page)

**“MOTION CARD ERROR”** again performs in the same diagnostic manner as described above for **“Panel Test”** and **“Proximities Test”**, the exception being that as the servo drive system utilizes a number of various components for operation, the listing of operational components is further expanded to include these items. Use the **“ARROW DOWN”** key to scroll through the component list to examine each parameter.

**“SERVO DRIVE TEST”** also performs in the same diagnostic manner as described above for **“Panel Test”** and **“Proximities Test”**, with the exception being that as the servo drive system utilizes a number of various components for operation, the listing of operational components is further expanded to

# E 300 Operator Interface

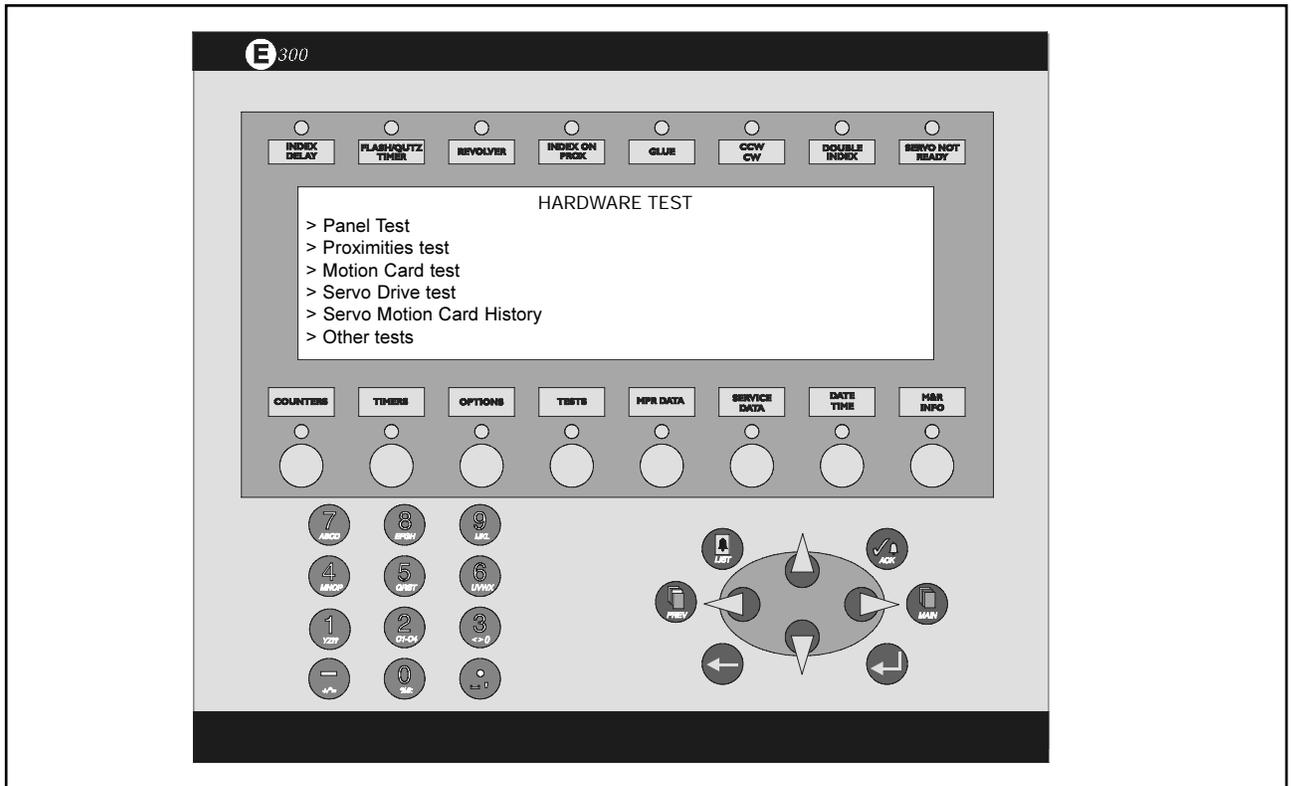


Figure 17

include these items. Use the **“ARROW DOWN”** key to scroll through the component list to examine each parameter.

### SERVO MOTION CARD HISTORY

This menu selection is used to display historical data for the motion card. This information is for the use of M&R Technical Representatives only and should not be accessed or used by Operators unless instructed by M&R Technical Service personnel.

### OTHER TESTS

This menu selection is used to display the current operational status of other control features which may be utilized on the equipment. These control features include Print head pushbuttons, Yellow cycle interruption cords, no t-shirt sensor, Foot Pedal, Air Pressure Switch and PLC Errors.

### MPR DATA -

The optional MPR Data menu item is designed for use with M&R’s exclusive Management Production Report software package.

A detailed logging builds a data base, which may be used for cost analysis, job tracking, production volume reporting, press utilization and down time analysis. The MPR Data report filters, compiles and formats this data for output to any compatible computer. MPR Data contains three sub-menu items which are **“Job No.”**, **“Message”**, and **“Production Speed Trend”**. The **“Message Code”** is a code number which describes a reason for which down time occurred during a shift. You may for instance, select code 1 for set-up time, or code 20 for lunch or dinner breaks. To use the **“MPR Data”** menu, press the **“MPR Data”** key.

The display will read **“Job number”** and **“Message Code”**. (See Figure 18 on the next page) As you access the **“MPR DATA”** menu, the numerical value for **“Job number”** will automatically start to flash. Now, using the numerical keys, enter the desired Job No., then press the **“ENTER”** key. Press the **“ARROW RIGHT”** key to access the **“Message code”** indication.

# E 300 Operator Interface

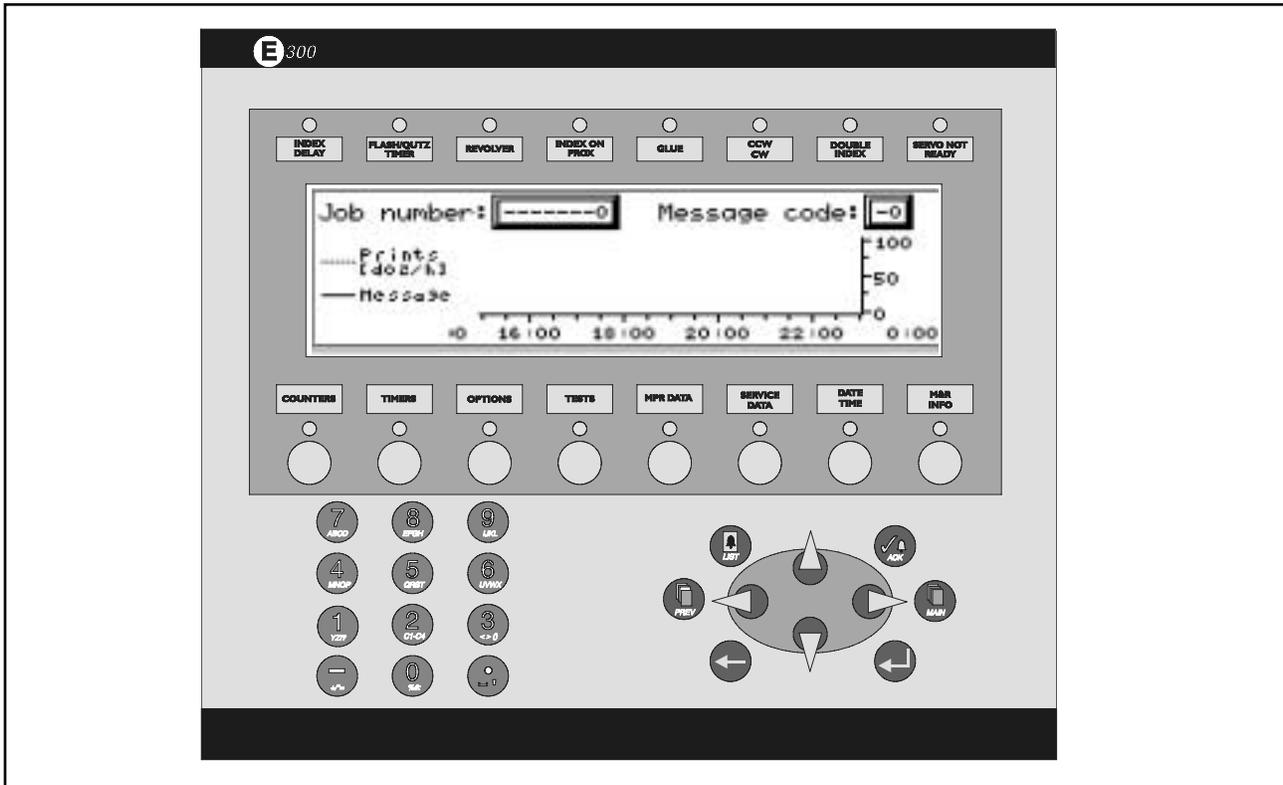


Figure 18

Based on your pre-determined Message and Error code listing, enter the corresponding code number, then press the “ENTER” key. Your selections are now saved in the PLC memory.

The next menu item is “SERVICE DATA”. This menu item is used by **M&R Technical Support Personnel ONLY** and cannot be accessed by the system Operator. This menu item creates and stores in the PLC memory a complete operational history of the system.

## DATE/TIME

The next menu item is “DATE/TIME”. In this menu item you may adjust the on-board clock and calendar for the proper display. The date is displayed as day of the week, month of the year, date and year. To adjust the date, press the numerical keys for the month. For example, for January 12, 1998, first press the “0” key, then press the “1” key. The display will change to “01” for the month indication. For the date press first the “1” key, then press the “2” key. The display will read “12” for the date indication.

To enter the current year, press the “9” key, then press the “8” key. Now press the “ENTER” key. The day of the week will automatically be displayed based on the information entered for month, date and year.

To change the time of day, press the “ARROW DOWN” key. The frame around the time of day display will start to flash confirming its selection. Use the numerical keys to enter the current hour and minutes of the day, then press the “ENTER” key. Upon pressing the “ENTER” key, you will be prompted to select either “AM” or “PM”.

Use the “ARROW UP” or “ARROW DOWN” keys to select either “AM” or “PM”, then press the “ENTER” key once again. Your selection for the date and time of day are now saved in the PLC memory. (See Figure 19 on next page)

# E 300 Operator Interface

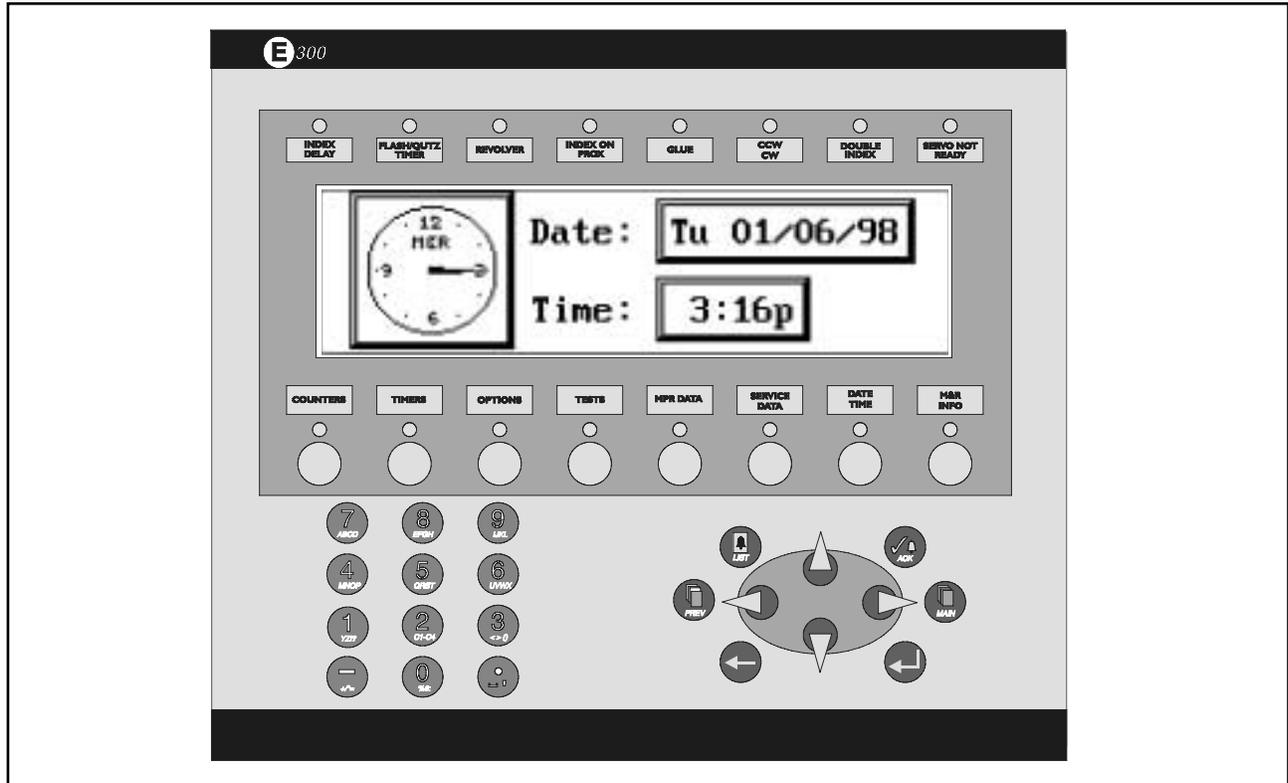
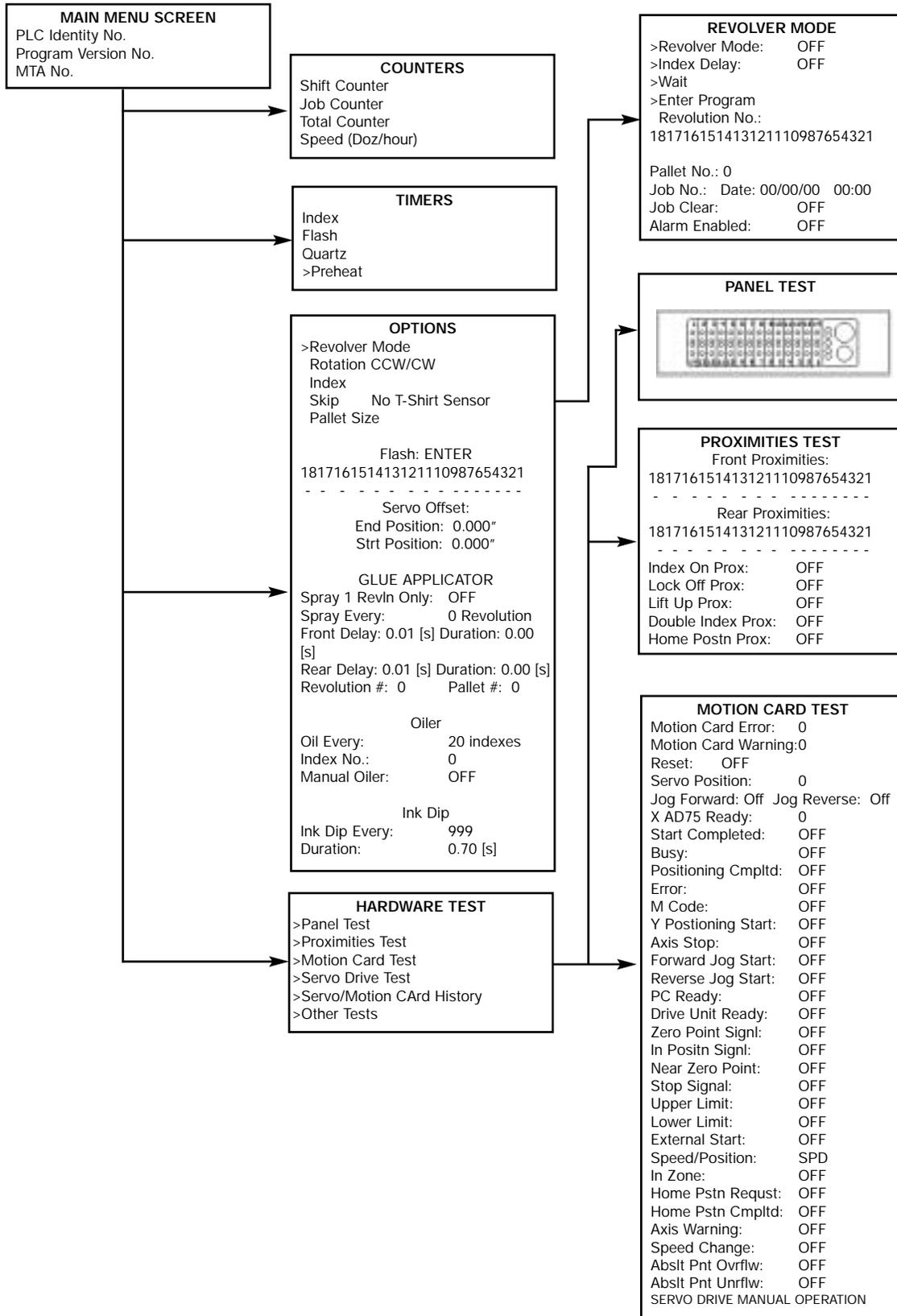


Figure 19

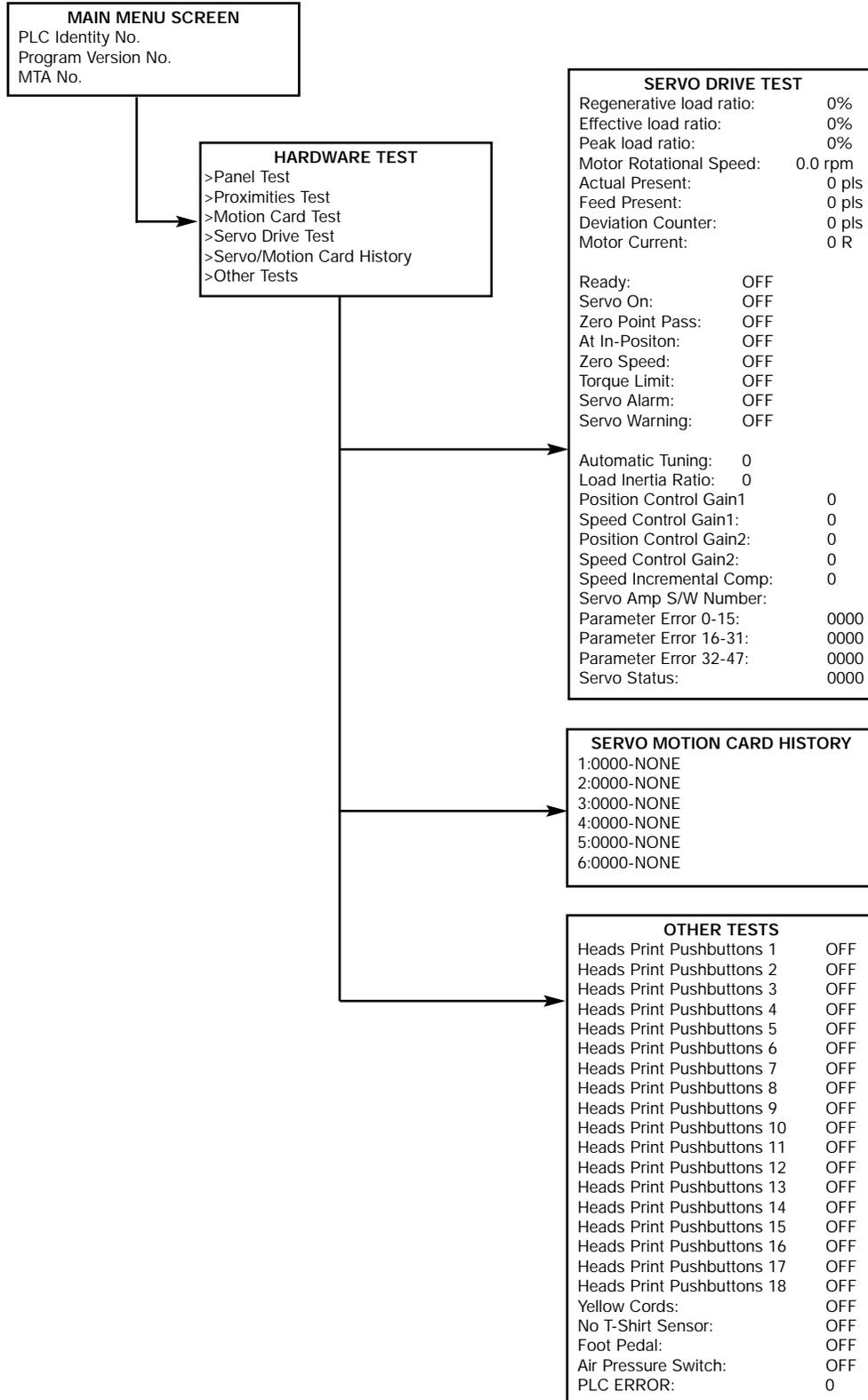
### M&R INFO -

The last menu item is “M&R INFO” located under the L.C.D. window at the extreme left of the control panel. This menu item provides information on how to contact M&R Printing Equipment, Inc. It lists our phone number, Fax number and address.

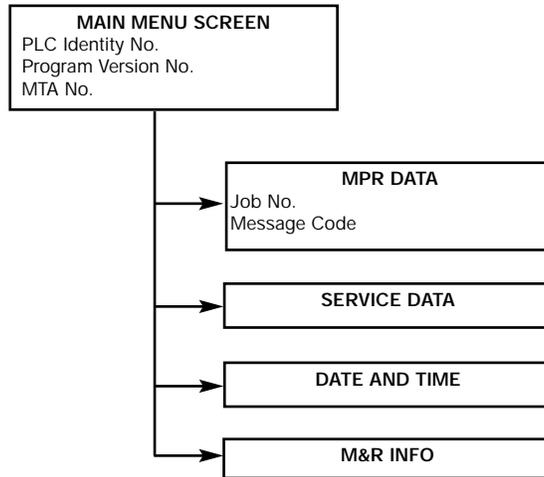
# E 300 Operator Interface Logic Diagram



# E 300 Operator Interface Logic Diagram



# E 300 Operator Interface Logic Diagram





# Recommended Lubricants

Quantity	Description	M&R Part No.
1 Quart	10 Wt. Non-Detergent Oil	7017000
1 Tube	White Lithium Grease	7018017
1 Tube	Permatex Super Lube with Teflon	7018031
1 Quart	Vactra No. 4 Oil	7017018

# Recommended Tools

Description
Combination Wrench Set (U.S. Standard) 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8
Allen Wrench Set (U.S. Standard) 1/16, 5/64, 3/32, 7/64, 1/8, 9/64, 5/32, 3/16, 7/32, 1/4,
Allen Wrench Set (Metric) 1.5mm, 2mm, 2.5mm, 3mm, 4mm, 5mm
12" Adjustable Wrench
6" "C" Clamp
Locking Pliers (Vise Grip)
12" Pipe Wrench (Aluminum)
Electrical Pliers
Hammer 13" or Longer (Optional)
Rubber Mallet
Hack Saw (Optional)
1/2" Drive Ratchet Handle
1/2" Drive Socket Set (U.S.Standard) 3/8, 7/16, 1/2, 9/16, 5/8, 1/16, 3/4, 15/16, 1-5/16
Needle Nose Pliers
Measuring Tape Rule
Rat Tail File (Round)
5/16" Nut Driver
Screw Starter (Magnetic Type)
Utility Knife
Phillips Screw Driver 7" Long
Blade Screw Driver 7" Long
Flash Light
Wire Stripper/Solderless Terminal Crimper
9" Torpedo Level with Magnetic Strip
Small Phillips Screw Driver
Small Blade Screw Driver
Flat File (Coarse & Fine)
Snap Ring Pliers Int/Ext Rings
Volt/Ohm Meter (Multi-Tester)
Standard Pump Action Grease Gun





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. PH1

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

#### Maintenance Point

Check and clean away as needed any lint, ink or spray adhesive which may have accumulated on the print carriage assembly.

#### Frequency Interval

Every Day

#### Procedure Information

**Tools required:** None

Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



**NOTE: The manual shut-off valve is not supplied with the equipment. The manual shut-off valve must be installed by the end user.**

Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve. Close the pet-cock valve once the needle on the air gauge reads zero.





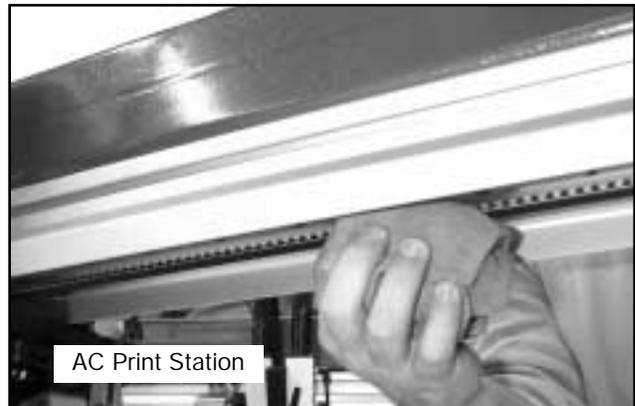
## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

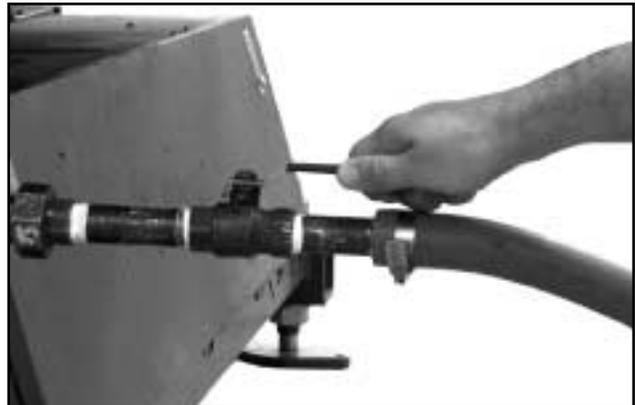
Bulletin No. PH1

### Procedure Information (Cont.)

Using a clean cloth moistened with 10 wt. non-detergent oil, clean away any accumulation of ink, lint, dirt or spray adhesive from the print carriage guide shafts, chopper linkage assembly, adjustment knobs, squeegee/flood bar angle brackets and miscellaneous hardware. (Refer to the illustrations of pneumatic and AC print stations at right)  
After cleaning, lubricate all assemblies as required.



Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. EL1

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

Check and clean as required the lower electrical component enclosure air vents and circulation fan of any accumulation of lint or dirt.

### Frequency Interval

Daily

### Procedure Information

#### Tools Required:

- Shop Style Vacuum Cleaner
- Soft brush vacuum attachment

1. Disconnect, lock out and tag the electrical and pneumatic power supplies to the equipment.



2. If the equipment is to be operated in an environment which is exposed to excessive accumulations of lint or air borne garment fibers, we suggest the use of a shop style vacuum cleaner. Use a soft brush attachment and carefully vacuum the area around the fresh air intake vents and the circulation fan and finger guard assembly. (See illustrations at right)



Circulation Fan and Finger Guard



Fresh air intake vents



## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

Bulletin No. EL1

### Procedure Information (Cont.)

4. Remove lock-out tag from electrical disconnect switch and turn disconnect switch back "ON" to supply electrical power to the equipment.





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX1

#### Maintenance Point

Check moisture trap and drain as needed. In normal operation, you should never notice any accumulation of water in the moisture trap. If water is discovered, you should inspect the air compressor receiver tank and air refrigeration unit for proper operation. Clean, filtered regulated air only must be supplied to the equipment.

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

#### Frequency Interval

Daily

#### Procedure Information

##### Tools Required:

None required

1. Disconnect, lock-out and tag the electrical and pneumatic power supplies to the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



**NOTE: The manual shut-off valve is not supplied with the equipment. The manual shut-off valve must be installed by the end user.**

3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system, needle on air gauge will read zero, before closing (turn handle clockwise to close) the pet-cock valve.





## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

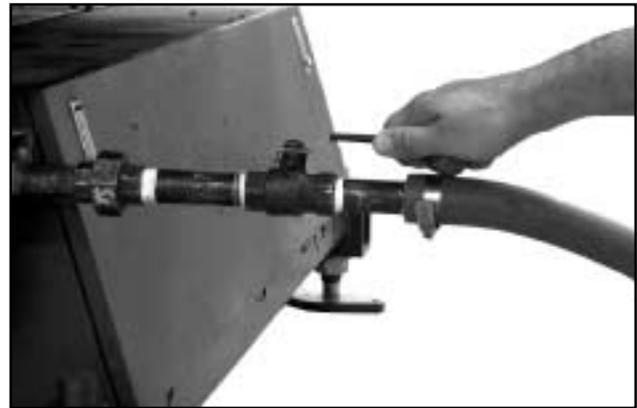
Bulletin No. IX1

### Procedure Information (Cont.)

4. Remove moisture trap reservoir by pushing up while turning the reservoir bowl 1/4 turn to the left, then pull straight down. Inspect the inside of the reservoir for indications of standing water or excessive moisture. If water or excessive moisture is discovered in the reservoir, clean water/moisture from reservoir and inspect the compressed air supply lines to the equipment. Also inspect the refrigerated air line chiller and air compressor for proper operation. If water and moisture are not detected in the reservoir, replace the moisture trap reservoir by reversing removal procedure described above. Reservoir should lock and "seat" when properly installed. (Refer to the illustration at the right)



5. Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





# PREVENTIVE MAINTENANCE PROCEDURE

## CHALLENGER Series II

### Bulletin No. IX2

### Maintenance Point

Lubricate indexer assembly bearing using Permatex Super Lube with Teflon. (M&R Part No. 7018031)

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Frequency Interval

Every Day

### Procedure Information

**Tools required:** 1 - Permatex Super Lube M&R Part No. 7018031  
1 - Standard pump action grease gun.

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system, the needle on the air gauge should read zero, before closing (turn handle clockwise to close) the pet-cock valve.





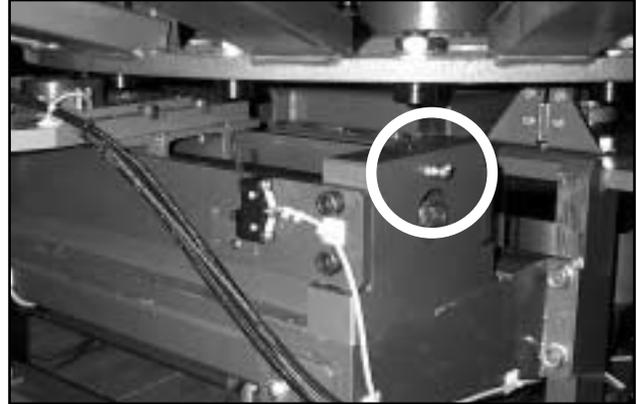
## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

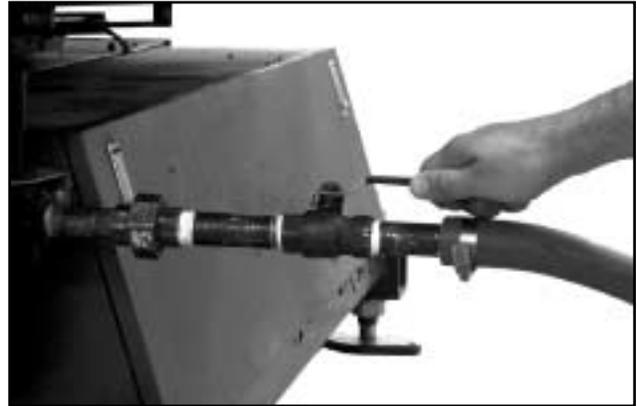
Bulletin No. IX2

### Procedure Information (Cont.)

4. Using the grease gun, apply Super Lube with Teflon grease to the index drive assembly bearing. Two to three pumps of the grease gun should be all that is required. (See illustration at right)



5. Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

**Maintenance Point**

Check (Vactra) oil level and inspect index drive screw lubrication system for proper operation.

**Frequency Interval**

Every Day

**Procedure Information**

**Tools required:** 1 - M&R Part No. 7017018 Vactra Oil

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

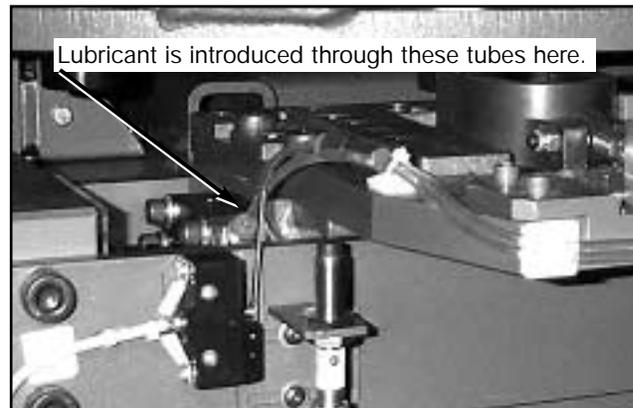
### Bulletin No. IX3

#### Procedure Information (Cont.)

4. The reservoir for the Vactra oil is located on the upper portion of the indexer assembly between the unload and load stations. The lubricant is supplied to the index drive screw assembly by pneumatic pressurized feed through a small tube from the reservoir to the index screw drive assembly. The oil level in the reservoir must be maintained at the level indicated by the oil level label on the side of the reservoir. To add oil, simply remove the black plastic cover at the top of the reservoir, after bleeding off residual air in the press manifold as described in step No.3, and add oil directly into the reservoir. Fill to the indicated level on the label mounted to the side of the reservoir. (See illustration at right)



5. Inspect the screw drive assembly to be sure lubricating oil is reaching the screw drive assembly. The screw drive assembly is directly lubricated by a metered application of Vactra oil onto screw drive component surfaces at pre-determined intervals. Run-off lubricant is collected in a reservoir mounted to the bottom of the indexer chassis. **This run-off lubricant should never be re-cycled back into the system**, but should be disposed of according to local codes and regulations. Check the level in the collection reservoir and dispose of used lubricant as necessary.



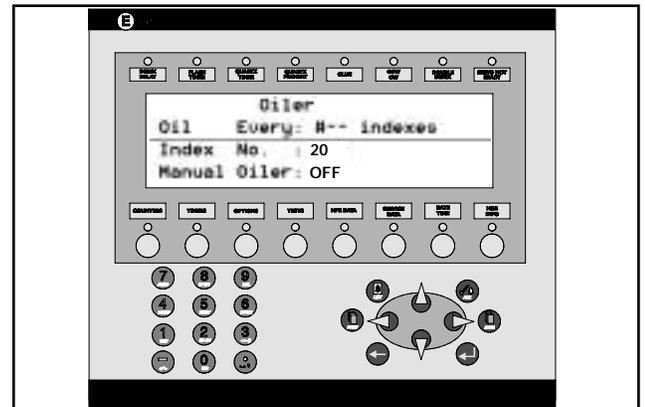
6. The amount of oil which is introduced to both the linear bearing assembly and the ball screw assembly is pre-set at the factory. In the event that this adjustment should be changed or mis-adjusted for any reason, it may be reset as follows. Using a small screw driver, turn the small metering screw located in the center of the adjustment all the way "in" (clockwise). Now turn the metering screw 4 full turns counterclockwise. When adjusted properly the metering screw will be flush with the outer hex nut on the adjustment. Both adjustments are set in the same manner.



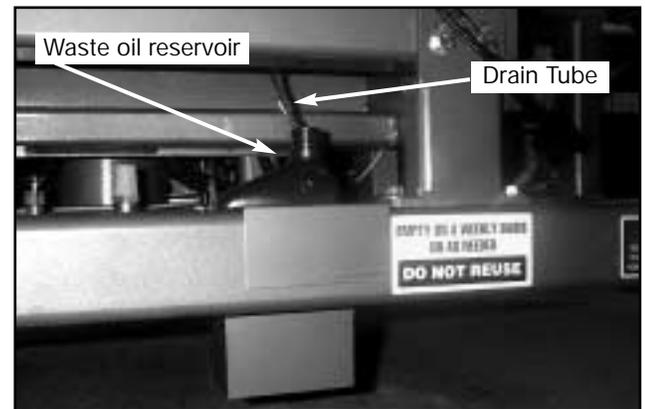


**Procedure Information (Cont)**

7. The frequency of lubrication may be adjusted through the use of the E 300 Operator Interface on the main control panel. Press the **"OPTIONS"** key. Now use the **"ARROW DOWN"** key to scroll down through the sub-menus to select **"OILER"**. Now press the **"ENTER"** key. The first sub-menu, **"OIL EVERY \_ INDEXES"** is used to enter a value from **"0"** to **"999"**. For example, if you enter the number **"20"**, which is the value pre-set at the factory, the lubrication system will automatically dispense oil to lubricate the screw drive assembly every 20 index cycles. To change the value, use the **"ARROW"** keys to place the flashing cursor on the value, then use the numerical keys to select the value, then press **"ENTER"**.

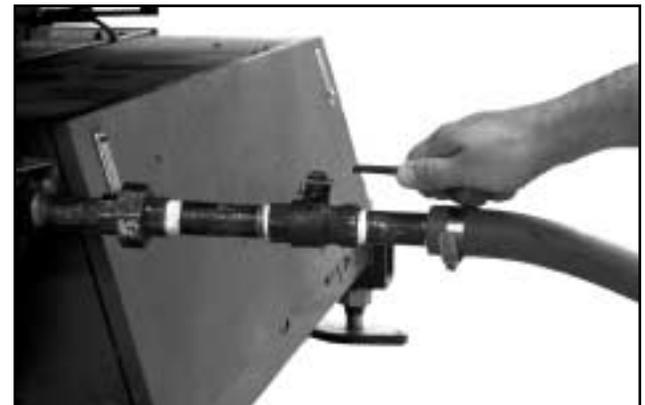


The next sub-menu **"INDEX No."** is provided as a visual indicator to advise the Operator of how many index cycles remain before automatic lubrication of the screw drive takes place.



**"MANUAL OILER"** permits the lubrication of the screw drive assembly manually. To use the **"MANUAL OILER"** use the **"ARROW"** keys to place the flashing cursor on the **"ON/OFF"** indication, then press the **"ENTER"** key. This will activate the lubricant pump resulting one application of lubricant to the index screw drive assembly.

8. Check the level of the waste oil in the waste oil collection reservoir. Dispose of the waste oil as required by local code or regulations. Replace waste oil collection reservoir in holder on lower index chassis. Be sure the drain tube is inserted in the waste oil collection reservoir.



9. Be sure pet-cock valve on air line moisture trap is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)

10. Remove lock-out tag from electrical disconnect and turn disconnect switch back **"ON"** to supply electrical power to the equipment. (See illustration at right)







## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX4

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

Check air line lubricator/moisture trap assembly oil level. Add 10 wt. non-detergent oil as needed. Oil should be added whenever the graduated sight glass indicator displays a half full indication.

### Frequency Interval

Two Times a Week

### Procedure Information

**Tools required:** 1 - Standard blade screw driver  
1 - Non-detergent oil (M&R Part No. 7017000)

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





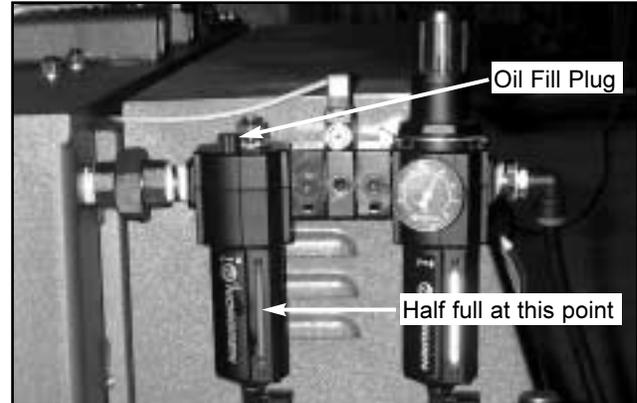
## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

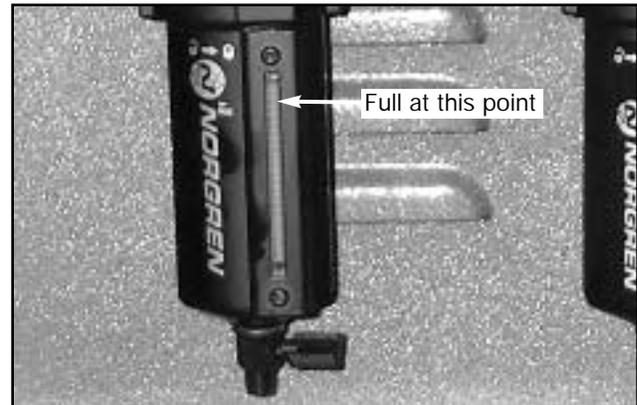
Bulletin No. IX4

### Procedure Information (Cont.)

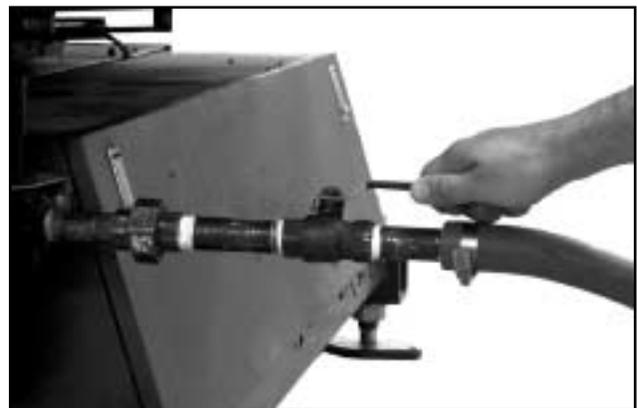
4. Check the current oil level on the glass indicator. If the oil level indicated is less than half full, you will need to add oil.



5. To add oil, use the standard blade screw driver to remove the fill plug at the top of the lubricator assembly. Add 10 wt. non-detergent oil (M&R Part No. 7017000) as needed to bring oil to proper level. The glass indicator will indicate full when the oil level is approximately 1/8" from the top of the glass indicator. Replace the oil fill plug and tighten securely. **NEVER OVERFILL THE LUBRICATOR RESERVOIR!**



6. Be sure the pet-cock valve on moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



7. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment.

**NOTE:** If after placing the equipment back on-line it is determined that the rate of oil flow will need adjustment, see Maintenance Bulletin No. IX5 for instructions on how to adjust oil rate.



## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX5

#### Maintenance Point

The air line lubricator automatically dispenses 10 wt. non-detergent oil into the compressed air used to operate the system. This oil is carried via the air lines to all air cylinders, valves and seals for the purpose of lubrication. The system will operate at peak performance when the oil rate is set to one drop dispensed for every 2 complete press cycles with all print stations and indexer operational.

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

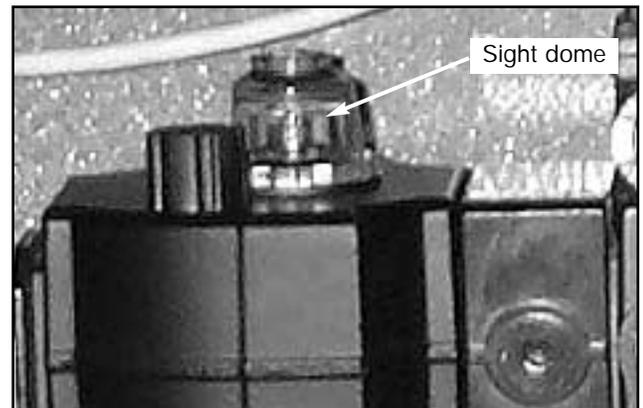
#### Frequency Interval

As Required

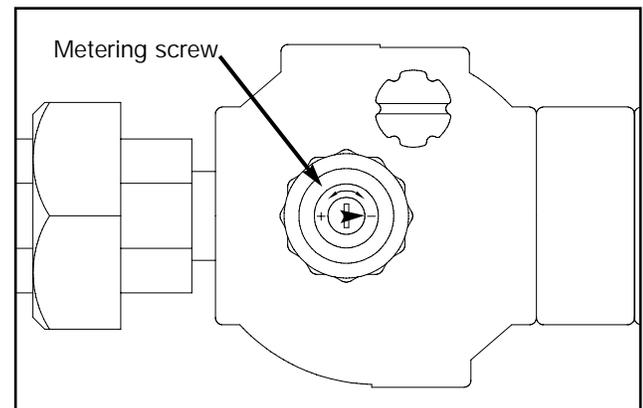
#### Procedure Information

**Tools required:** 1 - Standard blade screw driver (small)

1. Turn "ON" all print stations. Start the press and allow the press to run with all print stations and index system operational for 5-10 minutes. After the press has run for 5-10 minutes, observe the oil flow rate at the sight dome on top of the air line lubricator assembly. A proper rate of flow will be 1 drop of oil for every 2 complete press cycles.



2. Should the oil flow rate require adjustment, use the small standard blade screw driver and adjust the small red colored metering screw on top of the sight dome for the proper rate of 1 drop for every 2 complete press cycles. Turn the metering screw clockwise to decrease the oil flow rate. Turn the metering screw counterclockwise to increase the oil flow rate. (See top view illustration at right)



**WARNING!**

**WARNING! THE INDEX SYSTEM WILL BE OPERATIONAL DURING THIS ADJUSTMENT. DO NOT PERFORM THIS ADJUSTMENT BY YOURSELF! ALWAYS WORK WITH AN ASSISTANT WHO CAN SHUT THE EQUIPMENT DOWN IN THE EVENT OF AN EMERGENCY SITUATION. ADJUST THE DWELL TIME CONTROL IN THE E 300 OPERATOR INTERFACE SO THAT YOU HAVE PLENTY OF TIME TO MAKE ADJUSTMENTS TO THE METERING SCREW BEFORE THE INDEX TABLE BEGINS ANOTHER CYCLE.**





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX6

#### Maintenance Point

Lubricate the center index shaft bearings using white lithium grease M&R Part No. 7018017.

#### Frequency Interval

Every 16 hours of operation

#### Procedure Information

**Tools required:** 1 - M&R Part No. 7018017 White Lithium Grease  
1 - Standard pump action grease gun

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





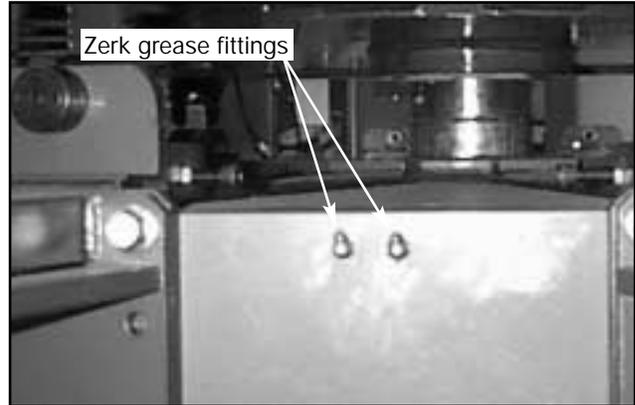
## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

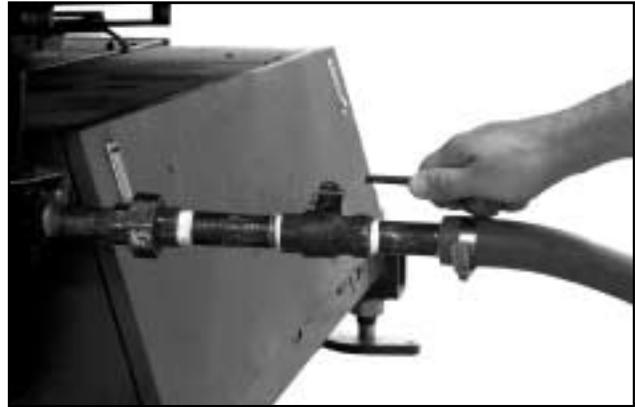
Bulletin No. IX4

### Procedure Information (Cont.)

4. Apply white lithium grease until you notice the grease breaking between the bearing race and the center shaft. Two or three pumps of the grease gun should be all that is required for proper lubrication of the index bearings.



5. Be sure pet-cock valve on moisture trap reservoir assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. PH2

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

#### Maintenance Point (Pneumatic)

Clean away old lubricant and apply a fresh coat of 1/3 white lithium grease (M&R Part No. 7018017) and 2/3 non-detergent oil (M&R Part No. 7017000) to the print carriage guide shafts on each print station.

#### Frequency Interval

Weekly

#### Procedure Information

**Tools required:** 1 - M&R Part No. 7018017 White Lithium Grease  
1 - M&R Part No. 7017000 10 wt. non-detergent oil

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





## PREVENTIVE MAINTENANCE PROCEDURE

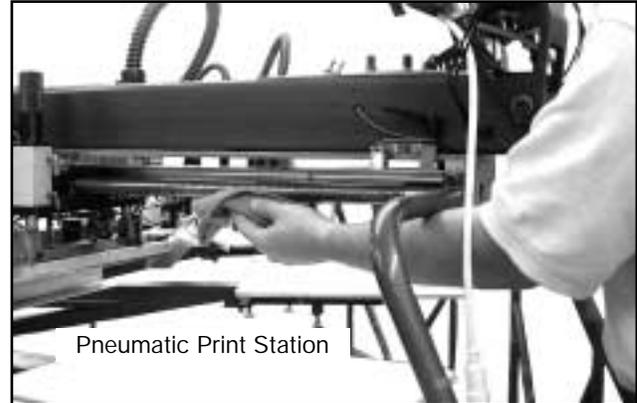
CHALLENGER Series II

Bulletin No. PH2

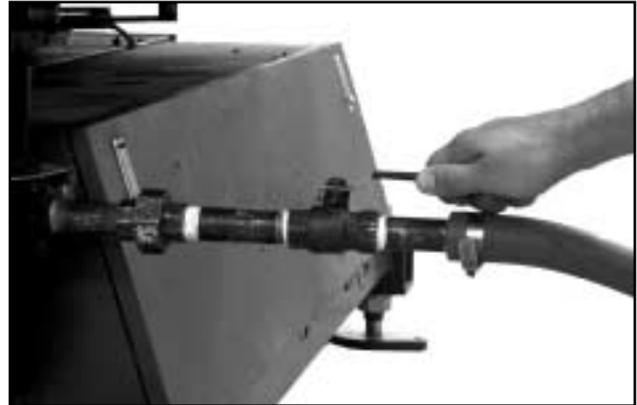
### Procedure Information (Cont.)

#### Pneumatic Print Stations Only

4. Using a suitable wiper or cloth shop towel, remove old grease from the print carriage guide shafts on each print station. Using a small painters brush, apply a blend of 1/3 white lithium grease with 2/3 10 wt. non-detergent oil along the length of each guide shaft. Only a small amount of lubricant is required. Excessive lubricant will only serve to attract lint and other air borne contaminant's to the guide shaft surfaces.



5. Be sure pet-cock valve on moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. PH3

#### Maintenance Point (AC Drive Print Stations Only)

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

Lubricate the print carriage assembly linear bearing using Permatex Super lube with Teflon (M&R Part No. 7018031)

#### Frequency Interval

Weekly

#### Procedure Information

**Tools required:** 1 - M&R Part No. 7018031 Permatex Super Lube  
1 - Standard pump action grese gun

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.



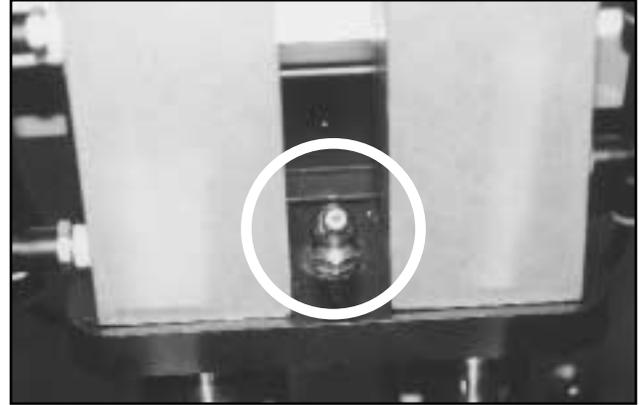


# PREVENTIVE MAINTENANCE PROCEDURE

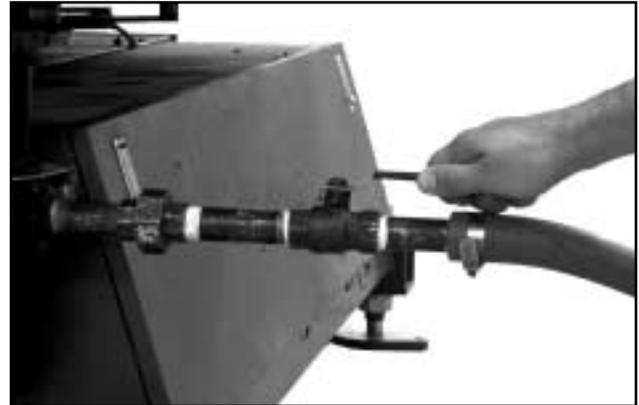
## CHALLENGER Series II Bulletin No. PH3

### Procedure Information (Cont.)

4. Using a standard pump action grease gun, apply 3 or 4 applications of Permatex Super Lube to the zerk grease fitting located between the print carriage squeegee and flood pressure air cylinders.



5. Be sure pet-cock valve on moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX7

### Maintenance Point

Lubricate the lower carousel plate with white lithium grease (M&R Part No. 7018017) at the point where the index table lift cylinder pistons make contact with the plate. You may use a small painters brush to apply the grease.

### Frequency Interval

Weekly

### Procedure Information

**Tools required:** 1 - M&R Part No. 7018017 White Lithium Grease  
1 - Small Painter's Brush

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

Bulletin No. IX7

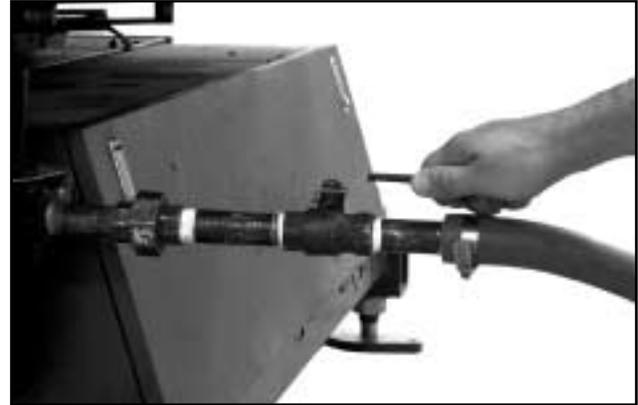
### Procedure Information (Cont.)

4. Using a suitable wiper or cloth shop towel, clean away the old grease from the bottom surface of the lower carousel plate. Use a small painters brush to apply white lithium grease around the bottom of the lower carousel plate where the index lift pistons make contact with the plate. Only a small amount of grease is required. Excessive application of grease will only serve to attract lint and other air borne contaminant's to the index plate surface.

**IMPORTANT! IF THIS MAINTENANCE PROCEDURE IS NOT PERFORMED ON A REGULAR BASIS AS LISTED, THE TABLE LIFT CYLINDER PISTONS WILL SCORE A GROVE INTO THE SURFACE OF THE CAROUSEL PLATE CAUSING SEVERE AND PERMANENT DAMAGE!**



5. Be sure pet-cock valve on moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. PH4

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

Clean away old grease, dirt or lint and apply a fresh coat of 10 wt. non-detergent oil (M&R Part No. 7017000) to the print carriage stroke cylinder (Tol-O-Matic band cylinder) on each print station.

### Frequency Interval

Weekly

### Procedure Information

**Tools required:** 1 - M&R Part No. 7017000 10 Wt. non-detergent oil  
1 - Cloth wiper (shop towel)

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





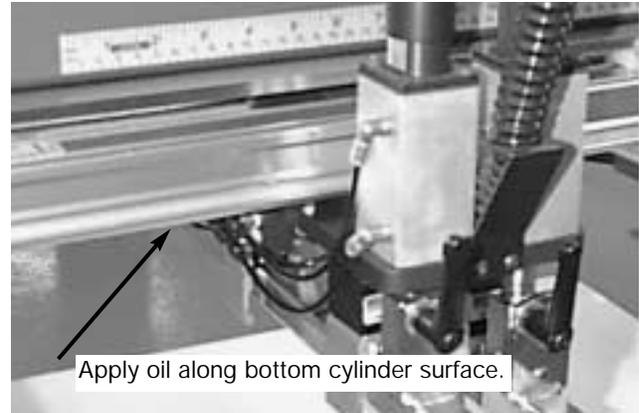
## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

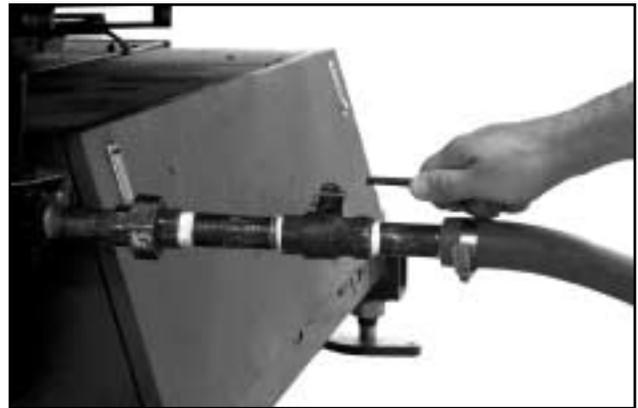
Bulletin No. PH4

### Procedure Information (Cont.)

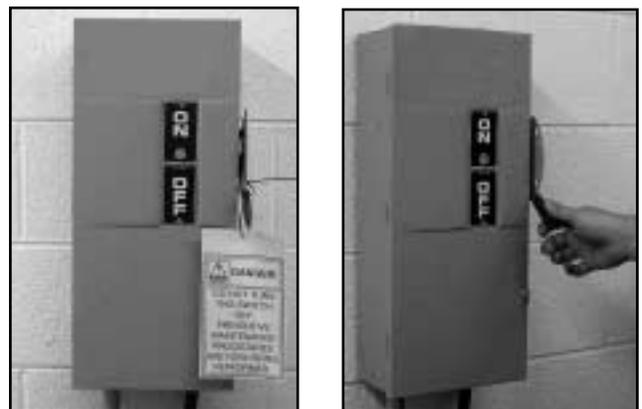
4. Using a suitable wiper of cloth shop towel remove the old oil from the outside surface of the print carriage stroke cylinder on each print station. Using a cloth wiper, apply 10 wt. non-detergent oil along the length of each stroke cylinder. Only a small amount of oil is required. Excessive application of oil will only serve to attract lint and other air borne contaminant's to the stroke cylinder surface.



5. Be sure pet-cock valve on moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. PH5

#### Maintenance Point

Clean away old grease dirt or lint and apply a fresh coat of white lithium grease (M&R Part No. 7018017) to the inside "U" shaped index drive capture fork.

#### Frequency Interval

Monthly

#### Procedure Information

**Tools required:** 1 - M&R Part No. 7018017 White Lithium Grease  
1 - Small Painter's Brush

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





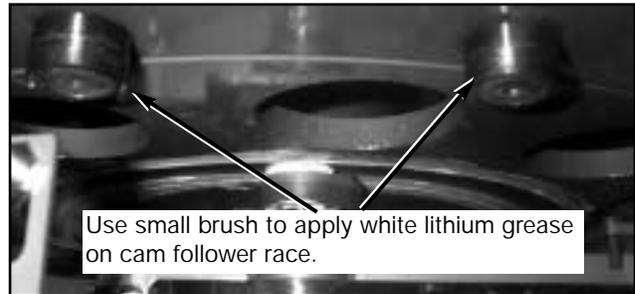
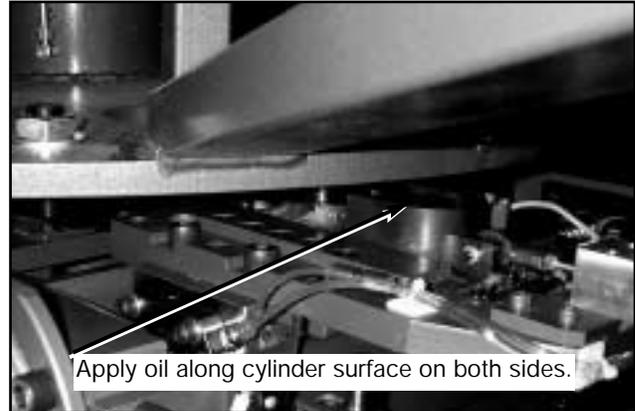
## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

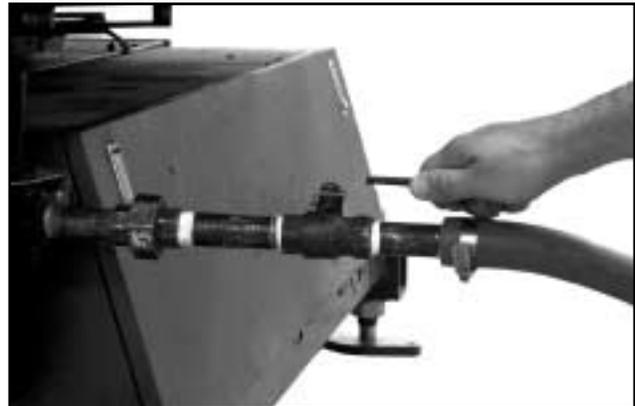
Bulletin No. PH5

### Procedure Information (Cont.)

4. Using a suitable wiper or cloth shop towel remove the old grease from the inside surface of the "U" shaped index capture fork clevis and outside race of the index cam follower bearings. Using a small painter brush, apply white lithium grease to the inside "U" of the capture fork clevis and the outside race of the index cam follower bearings. Only a small amount of grease is required. Excessive application of grease will only serve to attract lint and other air borne contaminants to the capture fork clevis and cam follower bearing race surface.



5. Be sure pet-cock valve on moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX8

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

Clean away old grease from the inside of the "U" shaped registration forks and each of the registration cam follower bearings on the index table. Use a small painters brush to apply a fresh coat of white lithium grease (M&R Part No. 7018017) to the inside of the "U" shaped registration forks and around the outer race of each registration cam follower bearing.

### Frequency Interval

Monthly

### Procedure Information

**Tools required:** 1 - M&R Part No. 7018017 White Lithium Grease  
1 - Small Painter's Brush

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





## PREVENTIVE MAINTENANCE PROCEDURE

CHALLENGER Series II

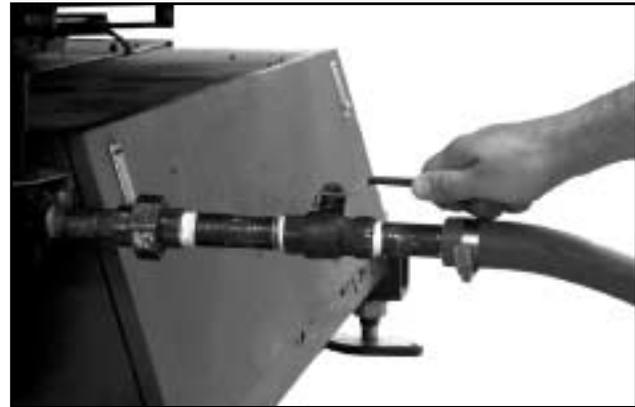
Bulletin No. IX8

### Procedure Information (Cont.)

4. Using a suitable wiper or cloth rag, remove old grease from the inside "U" surface of the registration forks and outside race of the registration cam follower bearings. Using a small painters brush, apply white lithium grease to the inside "U" of the registration forks and outside race of the registration cam follower bearings. Do not apply too much grease. Only a small amount will be required. Excessive application of grease will only serve to attract lint and other air borne contaminant's to the surfaces.



5. Be sure pet-cock valve on moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment.





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. PH6

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

Lubricate the micro-registration threaded adjustment shafts on each print stations front and rear screen frame holder assembly.

### Frequency Interval

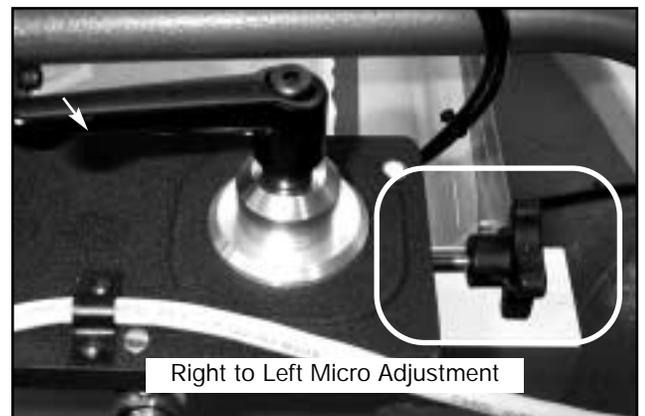
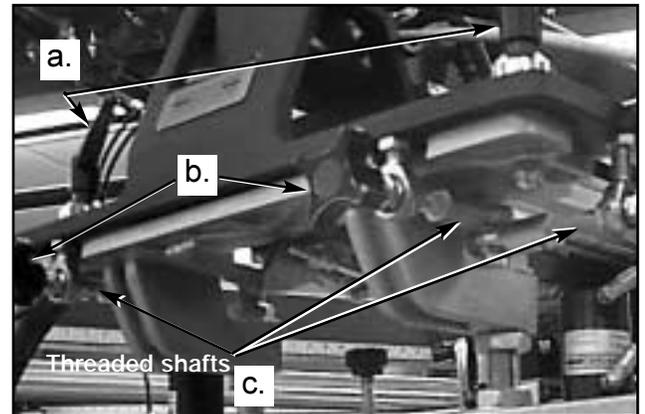
Every Three Months

### Procedure Information

**Tools required:** 1 - M&R Part No. 7018017 White Lithium Grease  
1 - 1 small painters brush

1. Use a suitable wiper or cloth shop towel to remove any old grease or dirt which may have accumulated on the threaded shaft surfaces.

2. First, release the micro-registration locking knobs (a) by turning counterclockwise. Back out the micro-registration adjustments (b) fully by turning the adjustment knob counterclockwise. Now, apply a coat of grease to the threads of the micro register knobs. Turn the micro-registration adjustment knobs (b) clockwise until the micro adjustment reference pointer registers in the center of the micro-registration reference grid. Lock the micro-registration lock knobs by turning clockwise. Using a small painters brush, apply white lithium grease along the entire threaded shaft (c) for each micro-registration adjustment on each print station. Do not apply excessive amounts of grease to the threaded shaft. Only a small amount is required.(See illustration at right)







## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX9

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

Drain accumulated water and moisture from your compressor receiver tank and the press air manifold located on the bottom of the indexer chassis.

### Frequency Interval

Monthly

### Procedure Information

**Tools required:** 1 - 7/16" Box end 12 point wrench  
1 - 3/8" open end wrench

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





# PREVENTIVE MAINTENANCE PROCEDURE

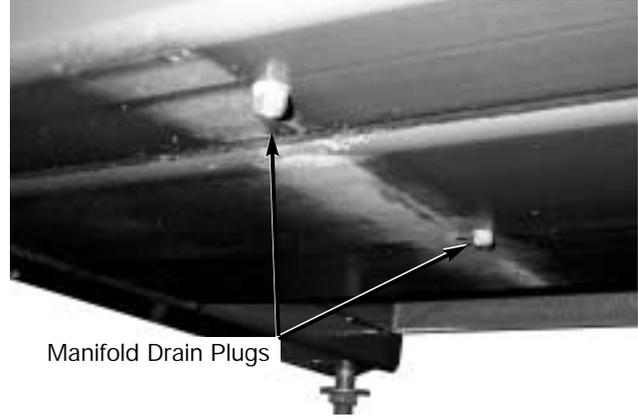
## CHALLENGER Series II

### Bulletin No. IX9

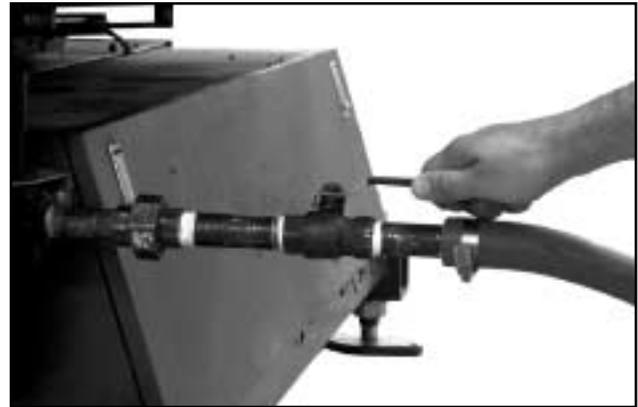
#### Procedure Information (Cont.)

4. Using the wrench, remove the press manifold drain plug on the bottom of the indexer chassis and alternate manifold by turning counterclockwise. Allow any accumulated water and moisture to discharge from the manifold. If moisture is discovered in the press manifold, check your compressor and/or refrigerated air chiller unit.

5. Replace the manifold drain plug and tighten securely. **DO NOT OVER TIGHTEN!**



5. Be sure the pet-cock valve on the moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



6. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment.





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. IX10

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

Replace air filter element in air line moisture trap assembly.

### Frequency Interval

Every Six Months

### Procedure Information

**Tools required:** 1 - Filter element (M&R Part No. 2019047)  
Shop towels

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.



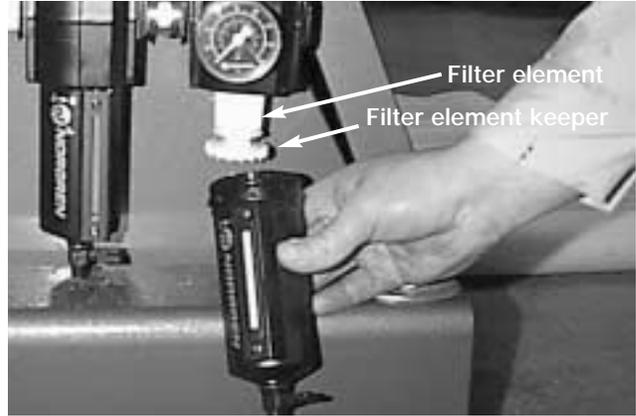


# PREVENTIVE MAINTENANCE PROCEDURE

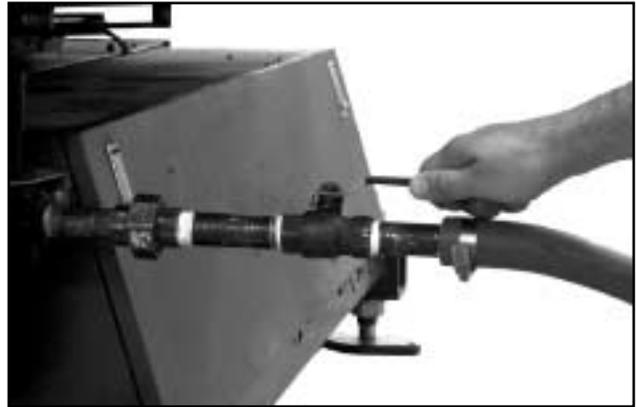
## CHALLENGER Series II Bulletin No. IX10

### Procedure Information (Cont.)

4. Remove moisture trap reservoir assembly by pushing up while turning the reservoir 1/4 turn to the right (clockwise).
5. Remove the filter element keeper by turning to the left (counterclockwise).
6. Install new filter element and element keeper. Replace reservoir assembly. (Refer to the illustration at right)



7. Be sure the pet-cock valve on the moisture trap assembly is closed. (See Step No. 3) Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



8. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment.





## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. PH7

#### Maintenance Point (AC Print Stations Only)

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

Check and adjust as required, the print carriage timing belt tension on each of the print stations.

#### Frequency Interval

Every Six Months

#### Procedure Information

**Tools required:** 1 - 1/8" Allen wrench  
1 - 3/16" Allen wrench

1. Disconnect, lock out and tag the electrical and pneumatic power from the equipment.



2. Disconnect the compressed air supply from the equipment by closing the manual shut-off valve. The manual shut-off valve is closed when the handle is positioned across the air supply pipe/hose. (See illustration at right)



3. Bleed off any compressed air which may remain in the system by opening the small pet-cock valve (turn handle counterclockwise to open valve) at the bottom of the moisture trap assembly. Allow any compressed air to completely evacuate the system before closing (turn handle clockwise to close) the pet-cock valve.





## PREVENTIVE MAINTENANCE PROCEDURE

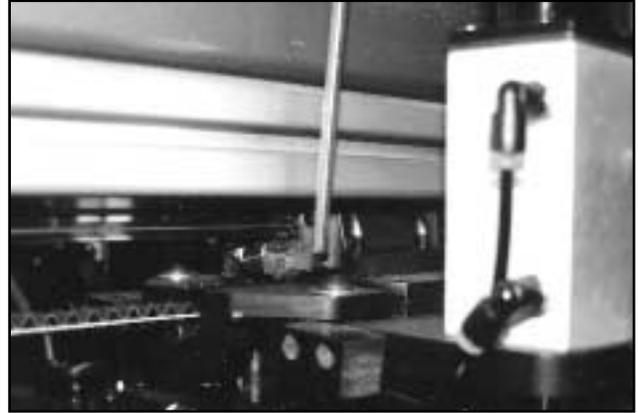
CHALLENGER Series II

Bulletin No. PH7

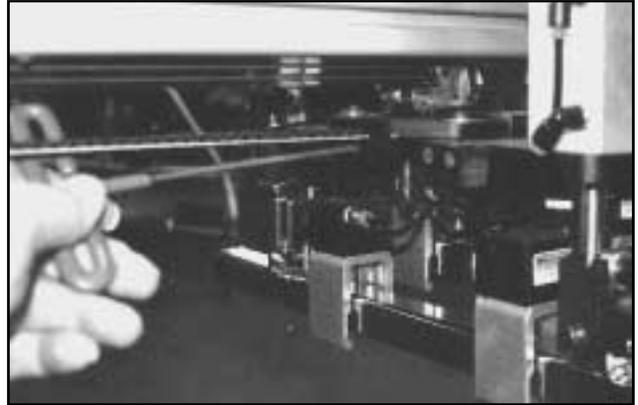
### Procedure Information (Cont.)

4. Using a 1/8" allen wrench, remove both the left and right dust covers by loosening the three 10-24 X 3/8" button head allen screws.

5. Using a 3/16" allen wrench, loosen the two 5/16"-18 X 3/4" button head allen screws on the tension bracket assembly. (See illustration at right)

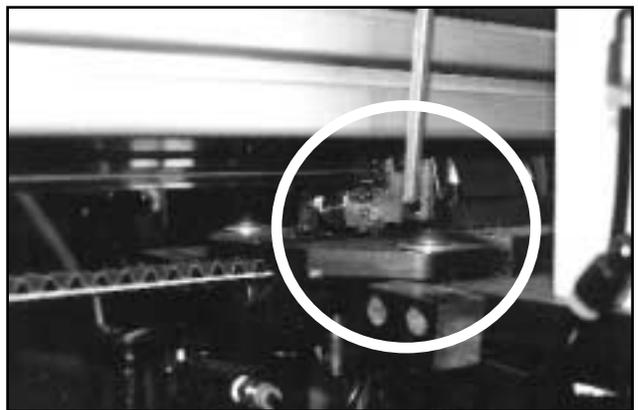


6. Adjust the 1/4"-20 X 1-1/4" allen head cap screw in a clockwise direction to increase the tension on the timing belt. Generally, this will only be a slight adjustment, perhaps 1/4 to 1/2 turn of the screw. (See illustration at right)



7. Re-tighten the 5/16"-18 X 3/4" button head allen screws.

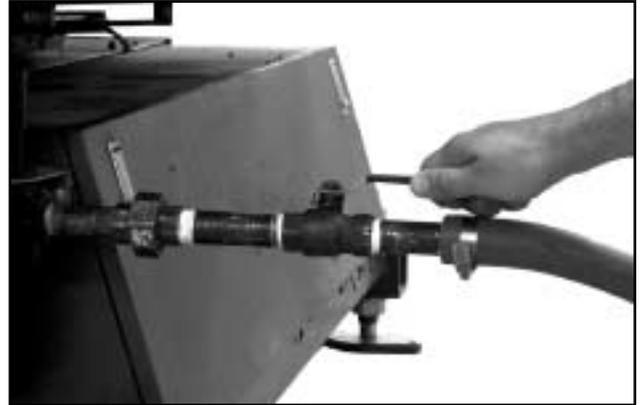
8. Re-install both the right and left dust covers using the 10-24 X 3/8" button head allen screws.





**Procedure Information (Cont.)**

9. Open manual shut-off valve for compressed air supply to the equipment. The manual shut-off valve is open when the handle is aligned with the incoming compressed air supply line pipe or hose. (See illustration at right)



10. Remove lock-out tag from electrical disconnect and turn disconnect switch back "ON" to supply electrical power to the equipment. (See illustration at right)







## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. EL3

The frequency of the following preventive maintenance procedure is based on a 8 hour daily production shift or 40 hour work week.

### Maintenance Point

The service life of the battery in the Mitsubishi PLC unit is three years. When the battery is nearly discharged the "ALARM" indicator on the PLC will begin to flash. When this happens, replace the battery (M&R Part No. 1017147) within a week.

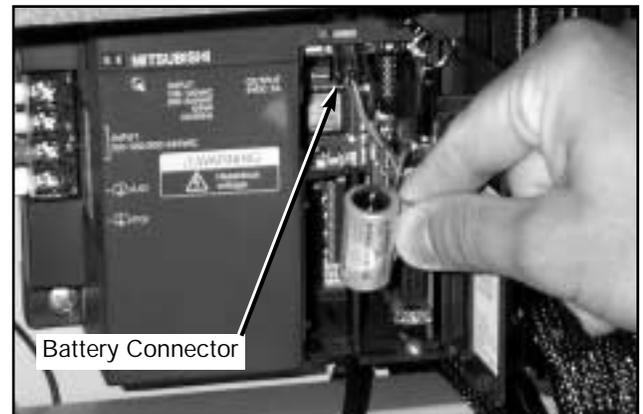
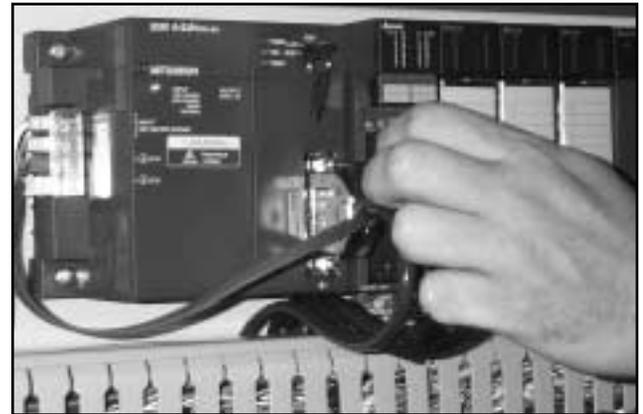
### Frequency Interval

Every Three Years

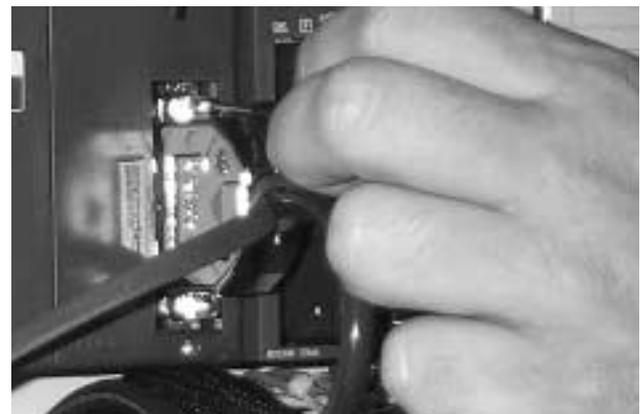
### Procedure Information

**Tools required:** 1 - Replacement battery M&R Part No. 1017147  
1 - Small phillips screw driver

1. DO NOT turn "OFF" the electrical power to the equipment. If the electrical power is not "ON", turn it "ON".
2. Open the access door on the lower electrical component cabinet mounted to the indexer chassis.
3. Remove the communication cable from the CPU unit using the small phillips screw driver. Open the access door on the CPU unit to expose the battery and battery connector.
4. Remove the old battery from the holder on the access door, then disconnect the battery by gently squeezing while pulling down on the connector.
5. Install the new battery together with the connector. Replace the battery in the holder on the access door and close the access door.
6. Install the communication cable using the small phillips screw driver.



**WARNING! THE NEW BATTERY MUST BE INSTALLED WITH IN FIVE (5) MINUTES OF REMOVAL OF THE OLD BATTERY. THIS WILL ENSURE THE PRESERVATION OF DATA IN THE PLC MEMORY.**







## PREVENTIVE MAINTENANCE PROCEDURE

### CHALLENGER Series II

Bulletin No. EL4

### Maintenance Point

The service life of the battery in the Mitsubishi Servo Amplifier Unit is three years. Replace the battery (M&R Part No. 1017147).

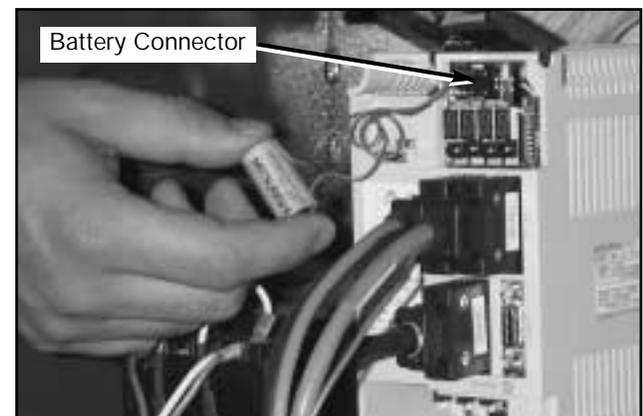
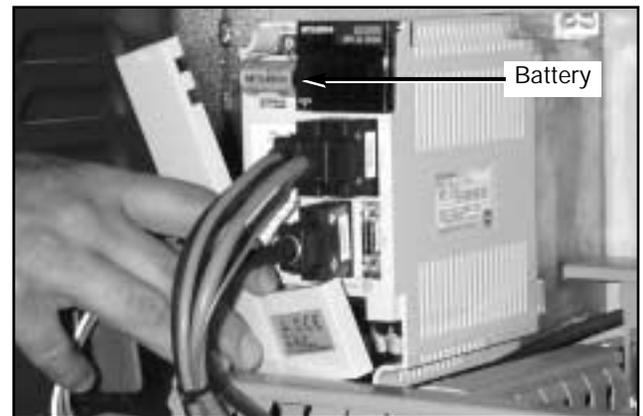
### Frequency Interval

Every Three Years

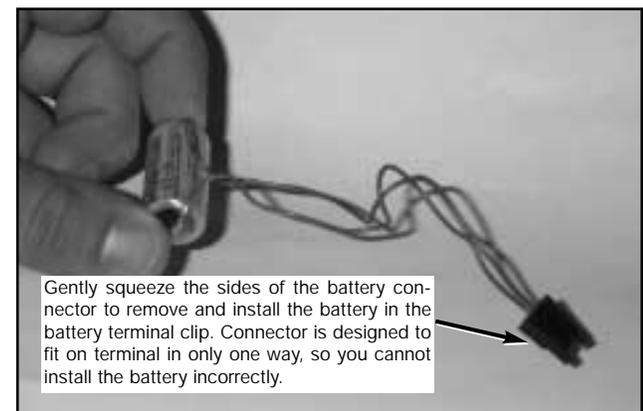
### Procedure Information

**Tools Required:** None

1. DO NOT turn "OFF" the electrical power to the equipment. If the electrical power is not "ON", turn it "ON".
2. Open the access door on the lower electrical component cabinet mounted to the indexer chassis.
3. Open the access panel to the battery compartment on the left side of the Servo Amplifier Unit to expose the battery.
4. Flip up the plastic L.E.D. cover assembly on the right of the battery to expose the battery connector. Remove the old battery from the holder, then disconnect the battery by gently squeezing while pulling down on the connector.
5. Install the new battery together with the connector. Replace the battery in the holder and close the plastic L.E.D. cover.



**WARNING! THE NEW BATTERY MUST BE INSTALLED WITH IN FIVE (5) MINUTES OF REMOVAL OF THE OLD BATTERY. THIS WILL ENSURE THE PRESERVATION OF DATA IN THE SERVO AMPLIFIER MEMORY.**





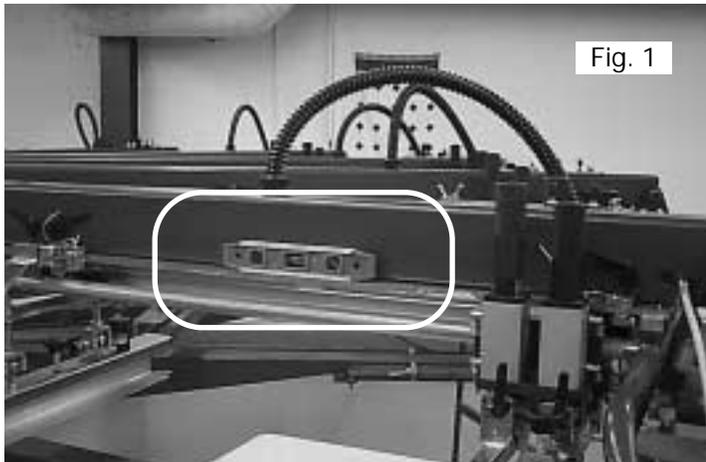


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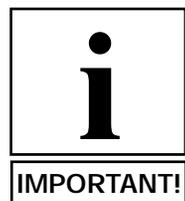
# Leveling the Pallets

## LEVELING THE PALLETS:

1. Make sure the print station being used to level the pallets is level by placing a small magnetic level (Torpedo Level) on the chrome plated plate (See Fig. 1).



Adjust the leveling pads on the head support to level the head if necessary. (See Fig. 2)



**NOTE:** After the press has been installed by a factory trained technician, there is no further need to adjust the print head supports.

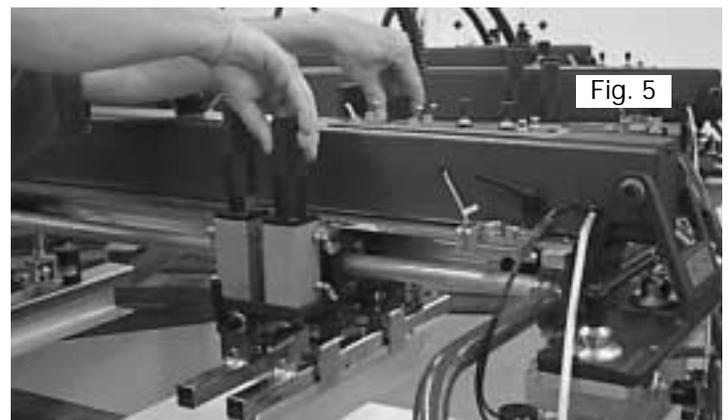
2. Mount the flood bar on the mounting bar flood position. (Mounting Bar with the extended chopper cylinders) (See Fig. 3 top right)



3. Adjust the flood bar for zero angle. Loosen the two ratchet type knobs on both sides of the mounting bar. After adjusting, tighten the knobs. (See Fig. 4)



4. Turn the flood pressure knobs clock-wise, to adjust flood bar all the way up. (See Fig. 5)



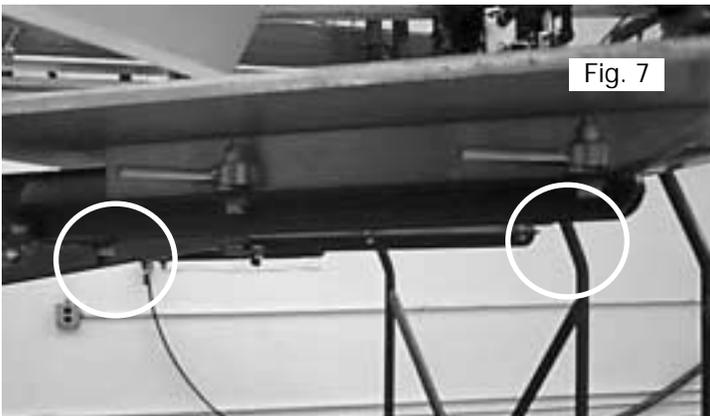
5. Pull the print carriage all the way towards the front of the print head and disconnect the 3/8" air line located on the front of the head (Tol-O-Matic Cylinder Fitting). Use a brass fitting union with plug, to plug the 3/8" air line (M&R Part #2003060-fitting union and Part # 2003042-plug).

# Leveling the Pallets

After doing this, unplug the air line located on the back of the head (Tol-O-Matic Brass Cylinder Fitting). Use a brass fitting union with plug, to plug the air line. This will allow you to move the head carriage back and forth by hand without resistance. (See Fig 6)



6. Before raising the table into the registration forks, make sure that the nuts on the three adjustment points on the base pallet frame are slightly tightened towards the middle of the adjustment range. (See Fig 7)



7. Now go ahead and raise the first pallet into the head used for leveling the pallets. (See Fig. 8)



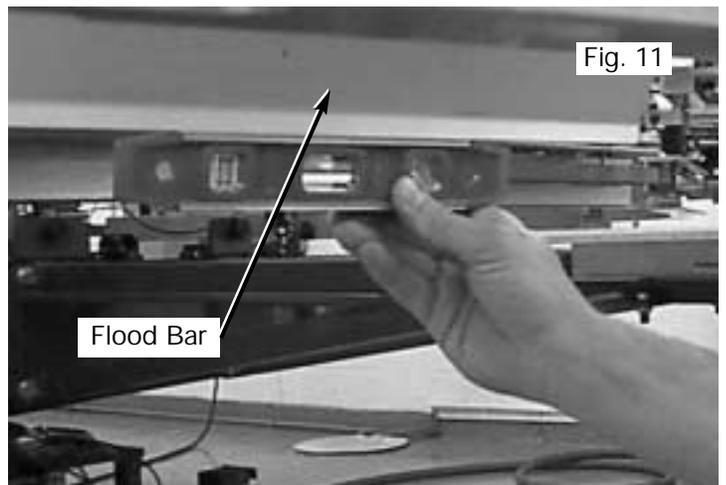
**NOTE:** If your machine has the "Central - Off Contact Lever", make sure it is set for the highest position, least amount of off-contact. (See Fig. 9)



8. Now go ahead and move the head carriage towards the center so that it is located above the center of the pallet. Now adjust the flood pressure knobs counter-clockwise until the edge of the flood bar comes in contact with the surface of the Pallet. (See Fig. 10)



9. Bring pallet down by pressing the green reset button, now use your small magnetic level (Torpedo Level) and place it on the edge of the flood bar to make sure it is level. If it is not level, make the necessary adjustments to make it level. (See Fig 11)



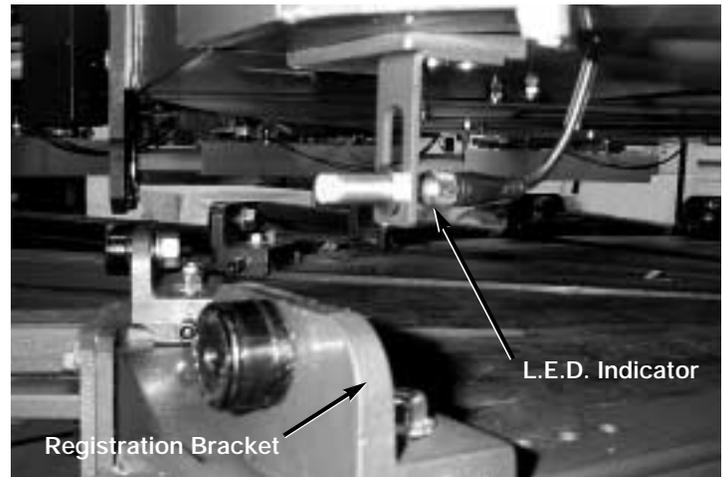




# Proximity Switch Location & Function

## INDEX TABLE UP PROXIMITY SWITCH - (Lift "ON" Prox)

This proximity switch is mounted to a bracket located in the middle area of the indexer assembly. The function of this proximity switch is to signal the PLC that the index table has reached its fully raised, or print position. A small L.E.D. on the side of the proximity switch illuminates whenever the proximity switch senses the proximity of the registration mounting bracket as the index table raises. (See illustration at left)



## FORK OFF PROXIMITY SWITCH -

This square shaped proximity switch, referred to as the "Fork Proximity Switch" is used to signal the PLC when the index capture fork clevis is dis-engaged from the index table. A small L.E.D. on the switch illuminates confirming the switch operation and the fork clevis position. The switch is mounted to the index clevis assembly. (See illustration at right)



## INDEX "ON" PROXIMITY SWITCH -

This proximity switch is referred to as the "Index ON" proximity switch. The function of this proximity switch is to signal the PLC that the index table is aligned with the print stations by sensing the index cam follower bearing mounted to the bottom of the index carousel plate. In addition, this proximity switch also provides a signal which tells the PLC that the index table has reached its fully lowered position. A small L.E.D. on the side of the proximity switch will illuminate when the switch senses the index cam follower bearing. (See illustrations at right)



# Proximity Switch Location & Function

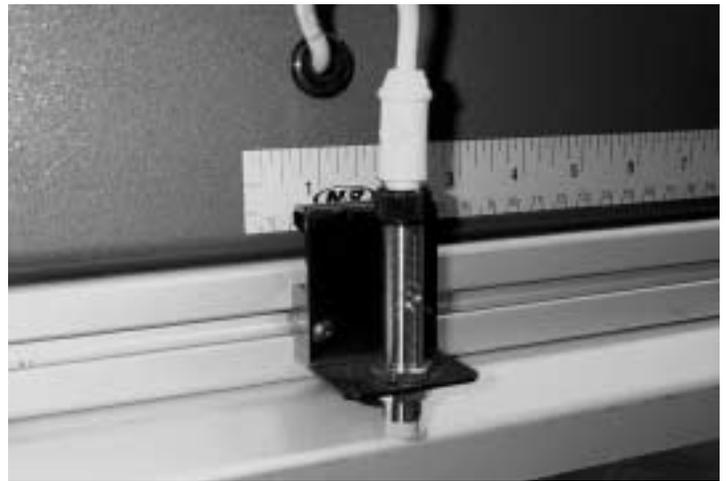
## DOUBLE INDEX PROXIMITY SWITCH -

The function of this proximity switch is to signal the PLC that the double index fork is "dis-engaged" from the index table. A small L.E.D. on the switch illuminates confirming switch operation and the position of the double index fork. This switch is mounted on the double index fork assembly located near the load and unload stations. (See illustrations at right)



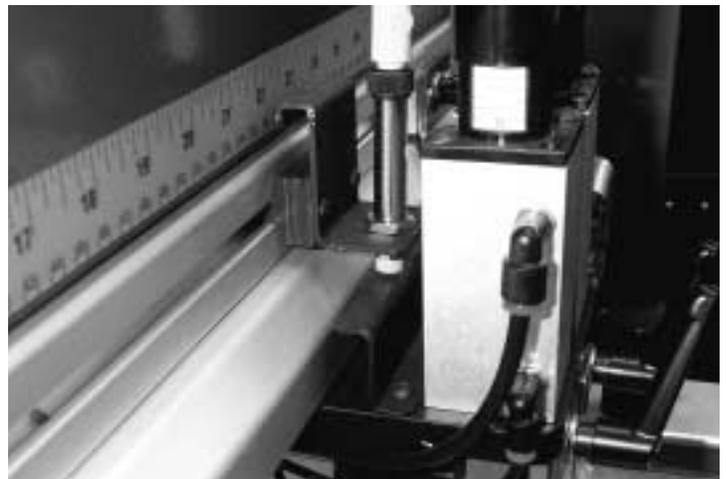
## FRONT PROX - (On AC Print Station)

The function of this proximity switch is to signal the PLC that the print station carriage is at the front of the print head. In this position, the print carriage assembly is closer to the outside diameter of the press.



## REAR PROX - (On AC Print Station)

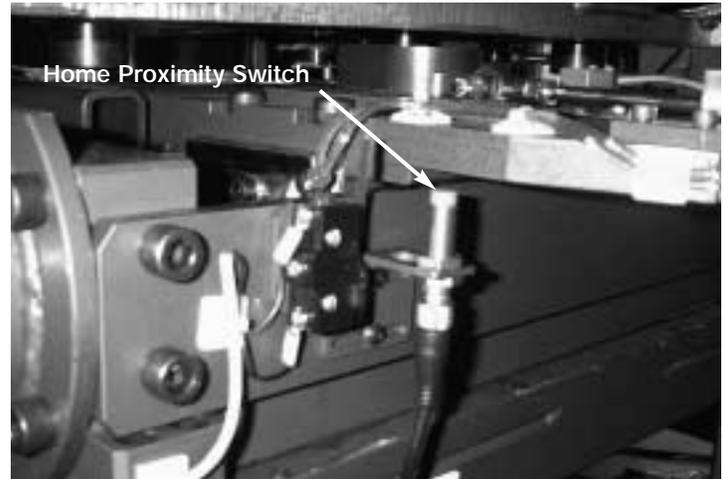
The function of this proximity switch is to signal the PLC that the print station carriage is at the rear of the print head. In this position, the print carriage assembly is closer to the center diameter of the press.



# Proximity Switch Location & Function

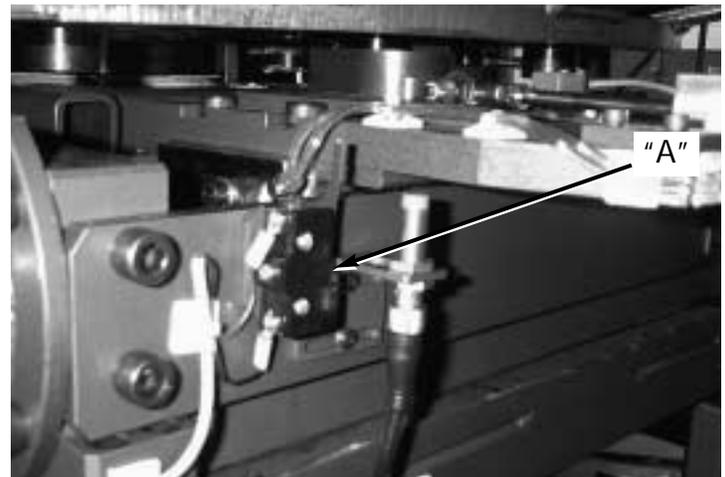
## HOME PROXIMITY SWITCH -

This proximity switch is used during the initial installation and set-up of your M&R Challenger Series II press. The Home proximity switch is used in conjunction with the Index Servo Drive to “teach” the servo drive where the optimum starting reference point for the index drive assembly is located. The Home proximity switch is used only for the initial installation of the system, or when ever the servo drive assembly or its components have been replaced. This proximity switch is not actively used during normal operation. The switch is located on the left side of the index drive assembly. (See illustration at left)



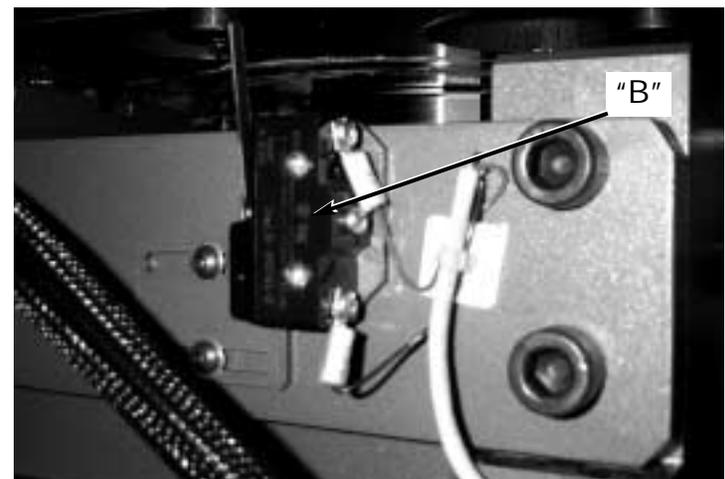
## LOWER LIMIT/REVERSE SNAP ACTION SWITCH -

This snap action style switch, (“A” in illustration at right) sends a signal to the PLC should the index drive assembly over run its travel range during the return (towards servo motor) cycle. (See illustration at left)



## UPPER LIMIT/FORWARD SNAP ACTION SWITCH -

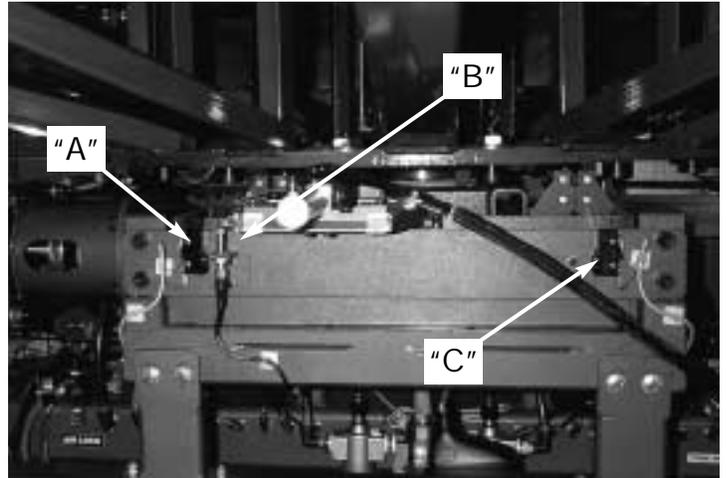
This snap action style switch (“B” in illustration at left) sends a signal to the PLC should the index drive assembly over run its travel range during the forward/index (away from the servo motor) cycle. (See illustration at left)



# Proximity Switch Location & Function

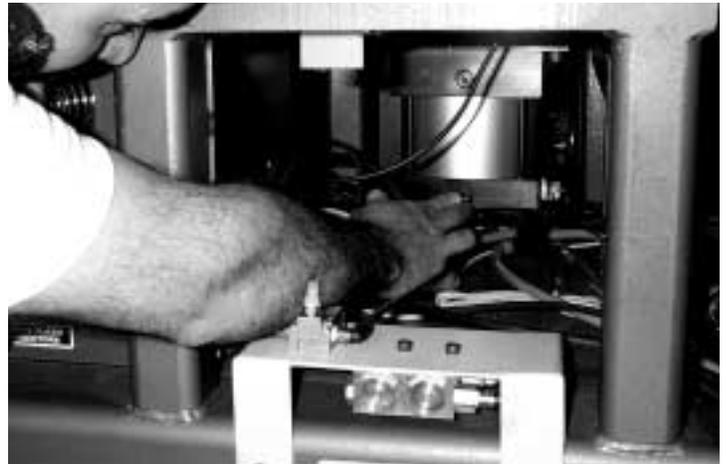
## INDEX DRIVE PROXIMITY SWITCHES -

- Lower Limit/Reverse Snap Action Switch ("A")
- Home Position Proximity Switch ("B")
- Upper Limit/Forward Snap Action Switch ("C")



# Index Lift Cylinder Cushion Adjustments

Adjustments for the deceleration or cushioning of the index table lift/lower cycle are provided on both of the index lift air cylinders. There are two cushion adjustment screws on each lift cylinder. The adjustment screw located on the bottom is used for the retraction (lowering) of the cylinder piston, while the adjustment on the top is used for the extension (raising) of the cylinder piston. On some models the adjustment is made using a small blade screw driver, on other models the adjustment is made using a 5/32" allen wrench. Be aware, these adjustments are very slight, perhaps only 1/8 turn to achieve the desired result. Turning the adjustment screw in a clockwise direction will increase the cushion effect while turning the adjustment screw in a counterclockwise direction will decrease the cushion. (See illustrations at the right)



# Idec Relay Identification

## Idec Relay Location & Function



**K1 (Quartz Lamps Relay 4 Pole 120 volts AC)** - This relay is used to signal the optional Quartz Lamp Flash Cure Units to cycle up to the pre-selected output power setting for flashing of garments.

**K2 (Emergency Relay 4 Pole 120 volts AC)** - This relay is used to confirm the closure of the red emergency stop push button located on the Operator's control panel. If this relay does not energize, it is an indication that the red emergency stop push button has been activated (pushed "IN").

**K3 (Servo Alarm Relay 2 Pole Relay 24 volts DC)** - This relay is used to monitor the Mitsubishi Servo Amplifier Unit. Should a Servo Alarm condition occur, this relay will drop out resulting in a shut down of the index Servo Drive unit.

**K4 (Safety Relay 2 Pole Relay 24 volts DC)** - This relay is used to confirm the closure of the yellow safety cord circuit. If this relay does not energize, it is an indication that one or more yellow safety cords have not been connected.



# E 300 Alarm Message Listing

## ALARM LIST FOR THE CHALLENGER SERIES II WITH THE MITSUBISHI PLC AND SERVO DRIVE, AND THEIR DEFINITIONS.

**EMERGENCY-PANEL.** – This alarm will appear if the Emergency stop push button on the control panel is pushed "IN". In order to clear the alarm, first the push button must be pulled "OUT" and then the Green reset push button must be pressed momentarily to clear the alarm.

**SAFETY CIRCUIT.** – This alarm will appear if one or more of the yellow safety cords, which are located on the print heads is not properly connected. In order to clear the alarm, first you must make sure that all the yellow safety cords are properly connected and then press on the Green reset push button momentarily to clear the alarm.

**TIMERS NOT SET.** - This alarm will appear after the registers in the plc program have been cleared or set to zero, in order to clear this alarm the values to the registers in the plc must be entered into the program (please contact the Technical Service Department for the proper values)

**RESET ERROR.** – This alarm will appear if the Reset input signal is being sent to the plc, and the signal has not discontinued after 10 sec of receiving it. This error will appear after 10 sec of receiving a constant signal from any reset push button (shorted switch) on the machine

**AIR PRESSURE.** – This alarm will appear if the incoming air pressure to the machine has dropped below 75 psig. In order for the alarm to clear, air pressure must reach a minimum of 100 psig. Check at the incoming regulator to confirm that the air pressure to the machine is proper.

**LIFT PROX ERROR.** – This alarm will appear if the signal from the lift prox (table prox) is either staying on all the time or the signal is not being sent to the plc, after the table has raised into the registration forks.

**INDEX ON PROX ERROR.** – This alarm will appear if the signal from the index on prox is either staying on at all the time or the signal is not being sent to the plc, after the table has been aligned with the print heads or after the table has rotated (index).

**SERVO FWD TIME OUT.** - This alarm will appear after the servo drive not being able to send or not sending feed back information to the plc about its movement. After the plc gives a output to the servo drive to move, it will wait 6 seconds for this feed back information. If it is not received, the alarm will appear.

**LOCK OFF PROX ERR.** – This alarm will appear if the signal from the lock off prox (fork prox) is either staying on all the time or the signal is not being sent to the plc. After the index clevis is pulled away from the index cam follower bearings (table is in the free wheel mode)

**DBL INDX PROX ERR.** – This alarm will appear if the signal from the double index prox, is either staying on all the time or the signal is not sent to the plc, after the double index nylon fork has pulled away from the index cam follower bearing.

**SERVO RVR TIME OUT.** -This alarm will appear should the servo drive fail to send, or not send feed back information to the plc about its movement in the reverse motion. After the plc gives a output to the servo drive to move, it will wait 4 seconds for this feed back information, if it is not received. the alarm will appear.

**SERVO NOT HOME.** - This alarm will appear if the servo index drive system is not at the starting position after pressing on the green reset button, the alarm will appear after 5 seconds of the index drive not reaching the starting position.

**MOTION CARD ALARM.** - This alarm will appear if there is an error with the motion card of the plc, either communication between the absolute encoder or servo amplifier has been lost, or the motion card has a internal circuit failure.

# E 300 Alarm Message Listing

**SRVO AMPLIFIER ALARM.** - This alarm will appear if there is an error on the servo amplifier, you must check the read-out on the face of the servo amplifier to see which code is given, this way the source of the problem can be determined.

**MOTION CARD NOT READY.** - This alarm will appear if the motion card detects a failure within the servo drive system, be it a positioning problem or a hardware problem etc.

**HOME POSITION LOST.** - This alarm will appear if the reference position (home position) of the servo drive has been lost. In order to clear the alarm, the green reset button must be pressed and the servo drive will search for the home prox. Switch, this way determining the reference position (home position).

**HOME RETURN ON.** - This alarm will appear if the servo drive is going through its homing mode, the servo index drive (servo motor) will move at a very low speed while searching for the home prox, after the servo finishes the homing mode the alarm will disappear.

**H 1 FRONT PROX ERR. THRU H 14 FRONT PROX ERR-** This alarm will appear if the signal from the front prox is either on at all times or the signal is not being sent to the plc, after the print head carriage has reached the front position (outside ) of the print head.

**H 1 REAR PROX ERR THRU H 14 REAR PROX ERR.-** This alarm will appear if the signal from the rear prox is either on at all times or the signal is not being sent to the plc, after the print head carriage has reached the rear position ( in side ) of the print head.

**FLASH 1 TO FAST THRU FLASH 14 .-** This alarm will appear if either the inboard or outboard speed of the head used as a flash head (infra-red only) is set too fast. The maximum speed of travel should not be faster than 1 sec from the outside position of the head to the inside position of the head and vise-versa.

**BATTERY LOW PLC.** - This alarm will appear if the lithium battery in the CPU for the plc, runs low on voltage or if it is disconnected. If the alarm (battery low plc) appears, do not turn the power off to the machine or the plc will lose its program. The battery in the plc must be connected or replaced if the voltage is low, after doing so the alarm will disappear.

**SERVO NOT READY.** - This alarm will appear if power is turned off to the machine and then turned on again, the alarm will clear it self within the next 4 seconds. Additionally, this alarm will appear if the emergency stop is pushed in or if either one of the two limit switches is triggered.

**ABS COMMUNICATION.** - This alarm will appear after 4 attempts by the servo amplifier and the plc to establish communication, if no communication is established the alarm will appear.

**FORWARD LIMIT.** - This alarm will appear if the limit switch which is placed away from the servo motor is tripped by the servo index drive assembly, in order to clear the alarm the limit switch must be reset by moving the Servo index drive assembly away from the limit switch.

**REVERSE LIMIT.** - This alarm will appear if the limit switch which is placed next to the Servo drive motor is tripped by the servo index drive assembly, in order to clear the alarm the limit switch must be reset by moving the Servo index drive assembly away from the limit switch.

**FLASHES NOT SET** - This alarm will appear if the flashes programmed in the MTA E-300 do not match the flashes programmed in the Revolver mode set-up screen. This alarm will only appear if the machine is placed in the Revolver mode.

**SYSTEM ERROR - COMM ERROR.-** This alarm will appear if the communication between the CPU and the E-300 interface panel is lost or interrupted. The 25 pin connector behind the E-300 interface panel or the 25 pin connector which is connected to the CPU has come loose. If both 25 pin connectors are properly connected there might be an "Open circuit" in one of the communication wires inside the cable connecting the CPU with the E-300 interface panel.

# Troubleshooting Procedure

The following information is provided as a guide for troubleshooting in the event a problem may occur during the operation of your M&R Challenger Series II press. Should you have any questions regarding the installation, operation or preventive maintenance procedures for this equipment, we strongly encourage you to contact our Equipment Service Department at 1 (630) 858-6101 during normal business hours, or our 24 hour Emergency Service hotline at 1 (630) 462-4715 in the evening, week ends or holidays.

It is further recommended that persons using this troubleshooting guide have a working knowledge of electrical power and control systems, and in addition are thoroughly familiar with the operation and adjustment of the components and control devices used on this equipment before attempting to replace or adjust components of this equipment.

**IMPORTANT!** Experience has shown that many problems can be Operator induced. It is important to check that the main electrical power lines to the equipment are **"ON"**, and that the manual power **"ON/OFF"** switch is **"ON"**.

PROBLEM	PROBABLE CAUSE/SOLUTION
<p>No power to main control panel. Neither print stations or index system operate.</p>	<ol style="list-style-type: none"> <li>1. "ON/OFF" toggle switch located on the side of the control panel box is in the "OFF" position. Check the "ON/OFF" toggle switch and be sure it is selected for the "ON" position.</li> <li>2. The circuit breaker or fuse for the incoming electrical power to the equipment has tripped or opened. Check for the proper incoming electrical power at the incoming power terminal block on the equipment. Reset the circuit breaker or replace the fuse as necessary.</li> <li>3. The control power fuse 2-1/4 amp fuse has opened or control power 1 amp fuse has opened. Remove the 2-14 amp fuse from the control box and check with a continuity tester. Replace if open. The fuse holder will have wires #1 and #15 attached to it. After replacing fuse, and turning power back on to the machine, check for 110 vac across wire # 1 and wire #2 with a volt meter. Remove 1 amp fuse from control box and check with continuity tester. Replace fuse if open. Fuse will have wires #1 and #17 attached to it.</li> <li>4. A short circuit exists in the 24 volt DC power circuit of the press. Check for 24 VDC across wires #3 and #4 with a volt meter. If no voltage is present check 2 amp fuse, fuse holder will have wires #4 and #18. Remove fuse from fuse holder and check with continuity tester.</li> <li>5. A print station proximity switch may be damaged or inoperative. Check for any damage (Ex: pinch points on proximity switch wires and/or cables) to print station proximity switches and replace as necessary.</li> </ol>
<p>Electrical power is indicated to controls, but nothing operates.</p>	<ol style="list-style-type: none"> <li>1. There may be insufficient air pressure to the equipment (100 lbs. minimum per square inch). Check to be sure that your compressor is turned "ON" and the shut-off valve is open. Adjust the main air regulator to at least 100 lbs. minimum per square inch.</li> <li>2. Carousel arms are not located in the correct position. Manually move the index table into the lock position, the index clevis will lock into place.</li> <li>3. One of the yellow safety cords between print stations is disconnected. Check to be sure all yellow safety cords are properly connected. Clean away ant ink that may have accumulated on the safety cord surface.</li> </ol>

# Troubleshooting Procedure

PROBLEM	PROBABLE CAUSE/SOLUTION
<p>(Cont.) Electrical power is indicated to controls, but nothing operates.</p> <p>During the set-up procedure a print station start push button is activated, however the carousel does not lift to the print position.</p>	<ol style="list-style-type: none"> <li>4. Index "ON" proximity switch has failed or is mis-adjusted. Check to see if the small L.E.D. on the side of the proximity switch illuminates when the index cam follower locates in front of the switch. If the L.E.D. does not illuminate, adjust the switch using two 11/16" open-end wrenches until the L.E.D. illuminates.</li> <li>5. A short circuit exists in the 24 VDC power supply on the press. Check the 1 amp fuse with a continuity tester. The fuse holder will have wires #4 and #18 on it. Check for 24 volts DC with a volt meter across wires #3 and #4 in control box.</li> <li>6. A print station proximity switch may have failed or may be shorted. Check for any physical damage done to any of the proximity switches and their cable on the print stations and replace as needed. Also look for any indication that the switch wire or control cables may have been pinched in any way.</li> </ol> <ol style="list-style-type: none"> <li>1. One or more print stations are selected for either "SINGLE" or "DOUBLE" print operation. Check to be sure all print station stroke switches are selected to the "OFF" position.</li> <li>2. The Emergency Stop push button has been activated. Pull "out" the red Emergency Stop push button, and press the green "Reset" push button to resume operation.</li> <li>3. There may be insufficient air pressure to the equipment (100 lbs. minimum per square inch). Check to be sure that your compressor is turned "ON" and the shut-off valve is open. Adjust the main air regulator to at least 100 lbs. minimum per square inch.</li> <li>4. The lift valve solenoid coil on the Mac valve may have failed. Remove the base access cover on the indexer and manually activate the valve by pushing the white over-ride/test button. If the indexer goes up and down the valve is fine. Locate wires #2 and #Y42 and inspect the wires from the control box. Using a volt meter, they should read 110 volts AC. If voltage is present, trace for broken or open/loose connections. The test should be taken after pressing the print station start button.</li> </ol>
<p>The indexer does not raise fully into the print position.</p>	<ol style="list-style-type: none"> <li>1. The air cushion adjustments on the lift cylinders are mis-adjusted. To adjust the cylinder cushions, remove the index base access covers and locate the allen screws on the top of both lift cylinders. Insert Allen Wrench and turn both screws counterclockwise 1/4 turn or less to adjust the cushion.</li> <li>2. The off-contact is set too low, or one or more screen frame holders may be striking the pallets when the index table rises. Re-adjust the off-contact setting. The screen frame should be adjusted so that there is at least 1/16" off-contact between the frame and the material being printed. (On models equipped with the central off-contact lever, set the lever for the required off-contact distance.)</li> </ol>
<p>The index table lifts and lowers too fast or too slow.</p>	<ol style="list-style-type: none"> <li>1. The lift cylinder flow-controls may be mis-adjusted. Remove the index base access cover and locate the lift cylinder Mac valve. The left flow control valve controls the lifting of the indexer, the right controls the lowering. To increase the speed, turn the knob counterclockwise. To slow the movement, turn the control knob clockwise.</li> <li>2. The air pressure to the equipment is insufficient. Check to be sure you are getting 110 PSI to the equipment by checking the air regulator. As you operate the equipment you should not see a pressure drop any greater than 5 PSI. If you do, check your compressed air supply for restrictions or blockages.</li> </ol>

# Troubleshooting Procedure

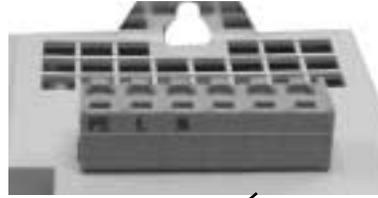
PROBLEM	PROBABLE CAUSE/SOLUTION
<p>Indexer shudders or is excessively noisy when cycling up or down.</p>	<p>1. The main index shaft bearings require lubrication. Lubricate the index shaft bearing with white lithium grease. There are two zerk grease fittings provided on the center index shaft for this purpose.</p>
<p>The print station complete the print cycle, however the index table does not lower.</p>	<p>1. One or more of the proximity switches on print stations is defective or mis-adjusted. Once it has been determined which proximity switch or switches are at fault, check the switch to see if it will operate using a piece of metal to trigger the switch. If the L.E.D. illuminates on the side of the proximity switch, adjust the distance between the proximity switch tip and the actuator flag on the print carriage assembly for consistent operation.</p>
<p>The electrical and pneumatic power supplies to the equipment are connected, but the index table does not operate.</p>	<p>1. The Emergency Stop push button has been activated. Pull "out" the red Emergency Stop push button, and press the green "Reset" push button to resume operation.</p> <p>2. One of the yellow safety cords between print stations is disconnected. Check to be sure all yellow safety cords are properly connected. Clean away any ink that may have accumulated on the safety cord surface.</p> <p>3. The indexer drive assembly is out of position. Push the "Reset" button for the servo motor to return to the "Start" position. Press the "Reset" button for one second.</p> <p>4. The carousel is located in the wrong position. Carousel arms are not located in the correct position. Manually move the index table into the lock position, the index clevis will lock into place.</p> <p>5. Index "ON" proximity switch is damaged or mis-adjusted. Check to see if the L.E.D. indicator light on the side of the proximity switch illuminates when the index cam follower locates in front of the switch. If it does not adjust the proximity switch with two 11/16" open-end wrenches until the L.E.D. illuminates.</p>
<p>The index table rotates, however the table assembly does not lift into print position.</p>	<p>1. Index "ON" proximity switch is damaged or mis-adjusted. Check to see if the L.E.D. indicator light on the side of the proximity switch illuminates when the index cam follower locates in front of the switch. When the index cam follower is not in front of the proximity switch, you should not see the L.E.D. indicator illuminate. If the L.E.D. stays on constantly, replace the index ON proximity switch.</p> <p>2. Lift valve solenoid coil on Mac valve is defective. The lift valve solenoid coil on the Mac valve may have failed. Remove the base access cover on the indexer and manually activate the valve by pushing the white over-ride/test button. If the indexer goes up and down the valve is fine. Locate wires #2 and #Y42 and inspect the wires from the control box. Using a volt meter, they should read 110 volts AC. If voltage is present, replace the solenoid. If voltage is not present check for broken or open/loose connections. The test should be taken after the press has finished rotating (indexing).</p>

# Troubleshooting Procedure

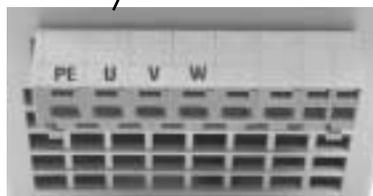
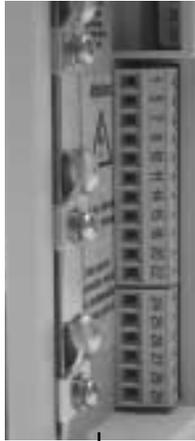
PROBLEM	PROBABLE CAUSE/SOLUTION
<p>In the automatic mode the press cycles a few times and then stops.</p>	<ol style="list-style-type: none"> <li>1. The center proximity switch is loose or not making contact. Push the Emergency stop push button. Check to see if the proximity switch mounted to the underside of the print station support arm is loose. Before tightening adjust so that the proximity switch tip is approximately 1/8" away from the indexer registration bracket when the carousel is in the upper position. The L.E.D. light on the proximity switch will be on when the switch is properly adjusted.</li> <li>2. Safety cord has broken or has a loose wire connection. Check all safety cords at plugs with a continuity tester for "Open" or broken conductors. Replace the safety cord as necessary.</li> </ol>
<p>The indexer raises and the print stations start to print but do not complete the print stroke.</p>	<ol style="list-style-type: none"> <li>1. A print station flow control valve is mis-adjusted. Turn the knob on the flow control that is farthest away from you counterclockwise to increase air flow to the stroke cylinder.</li> <li>2. Center table proximity switch not giving signal. The proximity switch may be loose requiring adjustment. Push the Emergency stop push button. Check to see if the proximity switch mounted to the underside of the print station support arm is loose. Before tightening adjust so that the proximity switch tip is approximately 1/8" away from the indexer registration bracket when the carousel is in the upper position. The L.E.D. light on the proximity switch will be on when the switch is properly adjusted.</li> <li>3. Solenoid valve is sticking or there is an air leak in the system. Remove the access covers from the top of the carousel and check for any air leaks. Press on the white test button on the end of the print station valves to be sure that they are free and that nothing mechanical has stopped the print station from moving. This action will also serve to clear any dirt or lint that might be blocking the spool slide, to be forced through the valve.</li> </ol>
<p>The indexer over-travels and is so rough that it clanks or the machine moves.</p>	<ol style="list-style-type: none"> <li>1. If the pallet sizes have been changed, the difference in the mechanical load on the indexer can result in excessive vibration during indexer operation. Adjust the "Pallet Sizes" control in the "OPTIONS" menu of the Operator Interface control panel.</li> </ol>
<p>The print station goes through the flood cycle and print cycle, however the flood bar and squeegee do not go through the change over.</p>	<ol style="list-style-type: none"> <li>1. Solenoid Mac valve for the chopper cylinders has failed. With the power turned "OFF" to the equipment, manual activate the Mac valve for the chopper cylinders. If the action takes place, the valve is operating fine.</li> </ol> <p>You must now check the solenoid for the condition of the coil with an Ohm meter or continuity tester. If the coil is "open" replace with a new coil.</p>

# Kebco Frequency Drive

Power Supply Terminal



Control Card Terminal

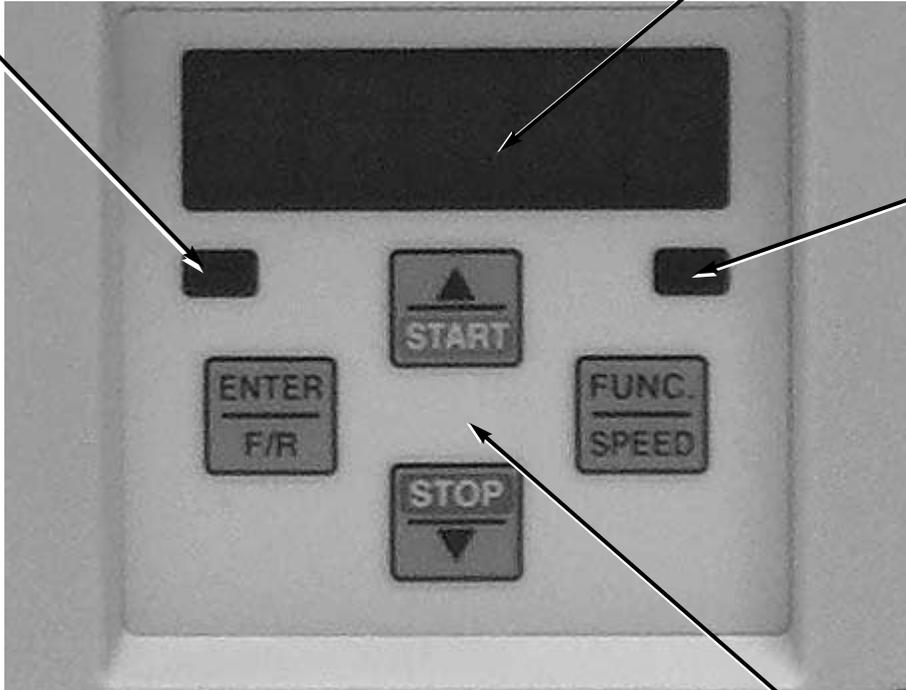


Motor, brake resistor Terminal

# Kebco Frequency Drive

Interface control  
BUS-Operation "LED on"

5 Digit LED display



Operating/Error display  
Normal "LED on"  
Error "LED blinks"

Double function keyboard

# Kebco Frequency Drive Error List

KEB Combivert **error** messages are always represented with an “E” and the appropriate error in the display. Error messages cause the immediate deactivation of the modulation. Restart is possible only after reset. **Malfunctions** are represented with an “A” and the appropriate message. Reactions to malfunction can vary. **Status Messages** have no addition. The status message shows the current operating status of the inverter (e.g. forward constant run, standstill etc.). In the following the display and their causes are described.

Display	Plaintext Combivis	Value	Meaning
nop	no operation	0	no control release
E. OP	ERROR overpotential	1	Error: Overvoltage (DC -link circuit) Occurs, if DC-link voltage rises above the permissible value. Causes: - poor control adjustment (overshooting) - input voltage too high - interference voltages at the input - deceleration ramps too short - braking resistor damaged or undersized
E. UP	ERROR underpotential	2	Error: Undervoltage (DC-link circuit). At F5-G E.UP is also displayed if no communication takes place between the power circuit and control card. Occurs if DC-link voltage falls below the permissible value. Causes: - input voltage too low or unstable - inverter rating too small - voltage losses due to wrong cabling - the supply voltage through generator/transformer breaks down at very short ramps.
E. UPh	ERROR phase failure	3	Error: One phase of the input voltage is missing (Ripple detection)
E. OC	ERROR overcurrent	4	Error: Overcurrent Occurs, if the specified peak current is exceeded. Causes: - acceleration ramps too short - the load is too large at turned off acceleration stop and turned off constant current limit - short circuit at the output - ground fault - deceleration ramp too short - motor cable too long - EMC
E.OHI	ERROR overheat internal	6	Error: Overheating in the interior: error can only be reset at E.nOHI, if the interior temperature has fallen by at least 3 degrees C.
E.nOHI	no ERROR overheat internal	7	No longer overheating in the interiorE.OHI, interior temperature has fallen by at least 3 degrees C.
E.OH	ERROR overheat pow. mod.	8	Error: Overtemperature of power module. Error can only be reset at E.nOH. Causes: - insufficient airflow at the heat sink (soiled) - ambient temperature too high - line breakage to the temperature sensor
E.dOH	ERROR drive overheat	9	ERROR: Overtemperature of motor PTC. Error can only be reset at E.ndOH, if PTC is again low-resistance. Causes: - resistor at the terminals T1/T2>1650 Ohm - motor overloaded -line breakage to the temperature sensor

# Keasco Frequency Drive Error List

Display	Plaintext Combivis	Value	Meaning
E.nEd	no ERROR detected	10	no defined error recognized (should not occur)
E.ndOH	no ERROR drive overheat	11	no longer overtemperature of motor PTC, PTC is again low resistance.
E.PU	ERROR power unit	12	Error: General power circuit fault.
NO.PU	power unit not ready	13	Power circuit not ready.
E.PUIN	ERROR power unit invalid	14	Error: Software version for power circuit and control card are different. Error cannot be reset.
E.LSF	ERROR load shunt faultl	15	Error: Load shunt relay has not picked up, occurs for a short time during the switch-on phase, but must be automatically reset immediately. If the error message remains the following causes may be applicable. <ul style="list-style-type: none"> <li>- load shunt defective</li> <li>- input voltage wrong or too low</li> <li>- high losses in supply cable</li> <li>- braking resistor wrongly connected or damaged</li> <li>-braking module defective</li> </ul>
E.OL	ERROR overload	16	Error: Overload error can only be reset at E.nOL, if OL-counter has again reached 0%. Occurs if an excessive load is applied longer than for the permissible time. Causes: <ul style="list-style-type: none"> <li>-poor control adjustment (overshooting)</li> <li>- mechanical fault or overload in the application</li> <li>- inverter not correctly dimensioned</li> <li>- motor wrongly wired</li> <li>- encoder damaged</li> </ul>
E.nOL	no ERROR overload	17	No more overload, OL-counter has reached 0%; after the error E.OL a cooling phase must elapse. This message appears upon completion of the cooling phase. The error can be reset. The inverter must remain switched on during the cooling phase.
E.buS	ERROR bus	18	Error: Adjusted monitoring time (Watchdog) of communication between operator and PC has been exceeded.
E.OL2	ERROR overload 2	19	Error: Overload can only be reset at E.nOL2, if cool-down time has elapsed.
E.nOL2	no ERROR overload 2	20	No more overload, the cool-down time is terminated.
E.EEP	ERROR EEPROM defective	21	Error: EEPROM defective. After reset the operation is again possible (without storage in the EEPROM)
E.PUCO	ERROR power unit common	22	Error: Parameter value could not be written to the power circuit. Acknowledgment from PC <> OK
E.Sbus	ERROR bus synchron	23	Error: Sercos - Synchronization not possible
E.OH2	ERROR motor protection	30	Error: Electronic motor protective relay has tripped
E.EF	ERROR external fault	31	Error: External error. Is triggered, if a digital input is being programmed as external error input and trips.
E.ENC	ERROR encoder	32	Error: Cable breakage resolver or incremental encoder.
E.PFC	ERROR power factor control	33	Error: In the power factor control.
E.nOH	no E. over heat power module	36	No more overtemperature of power module.

# Kebco Frequency Drive Error List

Display	Plaintext Combivis	Value	Meaning
E.SET	ERROR set	39	Error: Set selection: It has been attempted to select a locked parameter set.
E.PRF	ERROR prot. rot. for.	46	Error: Locked direction of rotation clockwise.
E.PRR	ERROR prot. rot. rev.	47	Error: Locked direction of rotation counter-clockwise
E. PUCI	E. power unit code invalid	49	Error: during the initialization the power circuit could not be recognized or was identified as invalid.
E.PUCH	ERROR power unit changed	50	Error: Power circuit identification was changed; with a valid power circuit this error can be reset by writing to SY.3. If the value displayed in SY.2 is written, only the power-circuit dependent parameters are reinitialized. If any other value is written, then the default set is loaded.
E.DRI	ERROR driver relay	51	Error: Driver relay. Relay for driver voltage on power circuit has not picked up although control release was given.
E.HYB	ERROR hybrid	52	Error: Invalid encoder interface identifier
E.iED	ERROR input error detection	53	Error: Hardware error during the start/stop measurement.
E.CO1	ERROR counter overrun 1	54	Error: Counter overflow encoder channel 1
E.CO2	ERROR counter overrun 2	55	Error: Counter overflow encoder channel 2
E.BR	ERROR brake	56	Error: This error can occur in the case of switched on brake control, if the load is below the minimum load level at start up or the absence of an engine phase was detected.
E.INI	ERROR initialization MFC	57	Error: MFC not booted
E.OS	ERROR over speed	58	Error: Real speed is larger than the max. Output speed.
E.HYBc	ERROR hybrid changed	59	Error: Encoder interface identifier has changed, it must be confirmed over ec.0 or ec.10.
E.ccd	ERROR calculation drive	60	Error: During the automatic motor stator resistance measurement.
FAcc	forward acceleration	64	Forward acceleration
FdEc	forward deceleration	65	Forward deceleration
Fcon	forward constant	66	Forward constant run
rAcc	reverse acceleration	67	Reverse acceleration
rdEc	reverse deceleration	68	Reverse deceleration
rcon	reverse constant	69	Reverse constant run
LS	low speed	70	No direction of rotation preset
SLL	stall	71	Constant current limit active
LAS	LA stop	72	Acceleration stop active
LdS	Ld stop	73	Deceleration stop active
SSF	speed search	74	Speed search function active
dcb	DC brake	75	DC-brake active
bbL	base block	76	Power modules for motor de-excitation locked
dLS	low speed/DC brake	77	No direction of rotation preset after DC-brake
POFF	power off	78	Power-Off-function active
STOP	quick stop	79	Quick stop active

# Kebco Frequency Drive Error List

Display	Plaintext Combivis	Value	Meaning
HCL	hardware current limit	80	Hardware current limit active
SrA	search for ref. active	81	Search for reference point approach active
ccd	calculate drive	82	Measurement of the motor stator resistance
POSI	positioning	83	Positioning function active
PLS	low speed/power off	84	No direction of rotation after Power-Off
bon	brake on	85	Brake control, brake engaged
boff	brake off	86	Brake control, brake released
A.OHI	ABN.STOP overheat int.	87	Warning: over temperature in the interior
A.nOH	no A. overheat pow. mod.	88	Warning: no more over temperature of power module
A.OH	A.STOP overheat pow. mod	89	Warning: Over temperature of power module
A.EF	ABN. STOP external fault	90	Warning: external error
A.ndOH	no A. drive overheat	91	Warning: no more over temperature of motor PTC. Motor PTC is low resistance again.
A.nOHI	no A. STOP overheat int.	92	Warning: no more over temperature in the interior
A.bus	ABN.STOP bus	93	Warning: Watchdog for communication between operator/control card has responded.
A.PRF	ABN.STOP prot.rot.for	94	Warning: locked direction of rotation clockwise
A.PRR	ABN.STOP prot.rot.rev.	95	Warning: locked direction of rotation counter-clockwise
A.dOH	ABN.STOP drive overheat	96	Warning: over temperature of motor PTC
A.OH2	ABN.STOP motor protect	97	Warning: electronic motor protective relay has tripped
A.nOL	no ABN.STOP overload	98	Warning: no more overload. OL counter has reached 0%
A.OL	ABN.STOP overload	99	Warning: Overload can only be reset at A.nOL, if OL counter has again reached 0%
A.OL2	ABN.STOP overload 2	100	Warning: Overload can only be reset at A.nOL2 if cool down time has elapsed
A.nOL2	no ABN.STOP overload 2	101	Warning: no more overload, the cool down time has elapsed
A.SET	ABN.STOP set	102	Warning: set selection: It has been attempted to select a locked parameter set.

# Servo Amplifier Alarm List

## Alarms and Warning Listing:

When a fault occurs during operation, the corresponding alarm or warning is displayed. The alarms marked "O" in the alarm deactivation column can be deactivated by the corresponding operations.

	Display	Name	Alarm deactivation		
			Power OFF → ON	Error reset	CPU reset
Alarms	10	Undervoltage	O	O	O
	12	Memory error 1	O		
	13	Clock error	O		
	15	Memory error 2	O		
	16	Encoder error 1	O		
	17	Board error	O		
	19	Memory error 3	O		
	1A	Motor combination error	O		
	20	Encoder error 2	O		
	24	Main circuit error	O	O	O
	25	Absolute position erase	O		
	30	Regenerative error	O	O	O
	31	Overspeed	O	O	O
	32	Overcurrent	O	O	O
	33	Overvoltage	O	O	O
	34	CRC error	O	O	O
	35	Command pulse frequency error	O	O	O
	36	Transfer error	O	O	O
	37	Parameter error	O		O
	45	Main circuit device overheat	O	O	O
46	Servo motor overheat	O	O	O	
50	Overload 1	O (Note 1)	O (Note 1)	O (Note 1)	
51	Overload 2	O (Note 1)	O (Note 1)	O (Note 1)	
52	Error excessive	O	O	O	
8E	Serial communication error	O	O	O	
88	Watchdog	O			
Warnings	92	Open battery cable warning	Removing the cause of the occurrence deactivates the alarm automatically.		
	96	Home position setting warning			
	9F	Battery warning			
	E0	Excessive regenerative warning			
	E1	Overload warning			
	E3	Absolute position counter warning			
	E4	Parameter warning			
	E6	Servo forced stop warning			
	E7	Controller emergency stop warning			
	E9	Main circuit off warning			
EE	SSCNET error warning				

**Note:** Deactivate the alarm after allowing about 30 minutes of cooling time after removing the cause of occurrence.

# Servo Amplifier Alarm List

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# Recommended Spare Replacement Parts

QUANTITY	M&R PART No.	DESCRIPTION
2	2010034	Stroke Valve (Pneumatic Heads Only)
2	2011000	Chopper Valve
2	2009023	Air Cylinder (Air Locks)
2	2009118	Air Clamps
2	9150003	Chopper Cylinders
1	2009303	Stroke Cylinder (Pneumatic Heads Only)
1	8080252A	Clevis
4	3023064	Cam Follower
1	1004026	Fuse 30 Amp (FLNR 30)
1	1004024	Fuse 3 Amp (FLNR 3)
1	1004020	Fuse 1/4 Amp (FLNR 1/4)
1	1004028	Fuse 7 Amp (FLNR 7)
1	1004036	Fuse 25 Amp (FLNR 25)
2	8080160	Safety Cords (Complete)
300 Ft.	2001002	3/8" Air Tubing
300 Ft.	2001000	1/4" Air Tubing
300 Ft.	2001001	5/32" Air Tubing
2	1010006	Push Button Switch
2	1017157	Toggle Switch ON/OFF
2	1017158	Toggle Switch ON/OFF
2	1010011	2 Pole Switch
2	1010007	2 Pole Switch with Lever Seal
2	1010005	Square Proximity Switch
2	1010012	Round Proximity Switch (3 Wire)
2	1010082	Round Proximity Switch (4 Wire) AC Heads
2	2018001	Flow Control (Pneumatic Heads Only)
2	3032001	Female Handle
2	3032000	Male Knob 10/32"
2	3032002	Male Knob 5/16"



# Ordering Replacement Parts



As your equipment supplier, M&R Printing Equipment, Inc. and our subsidiaries, NuArc Company and Amscomatic, Inc. are committed to your satisfaction. We will do whatever it takes to provide you with the exact replacement part you need, when you need it. In the event an exact replacement part is no longer available due to discontinuance, manufacturer component modification or other factors beyond our control, we will provide you with an alternate part which meets, or exceeds, the original part specifications for application and performance.

To insure you receive the exact replacement part you need, we will require the following information. In some instances our Parts Dept. personnel may need Model No. or Style No. information which is marked on the original part. This is especially true for some older electrical components.

When ordering replacement parts it is very important to include the following information which can be found on the Manufacturers Rating Plate riveted to the side of the master control panel. (See illustration above)

1. The Model No. of the equipment \_\_\_\_\_

2. The Serial No. of the equipment \_\_\_\_\_

3. The Machine No. of the equipment \_\_\_\_\_

If you are ordering electrical parts please include the

4. Volts, Amp, Cycles and Phase of the equipment \_\_\_\_\_

5. The Schematic No. for the equipment. \_\_\_\_\_



## **M&R Sales & Service, Inc.**



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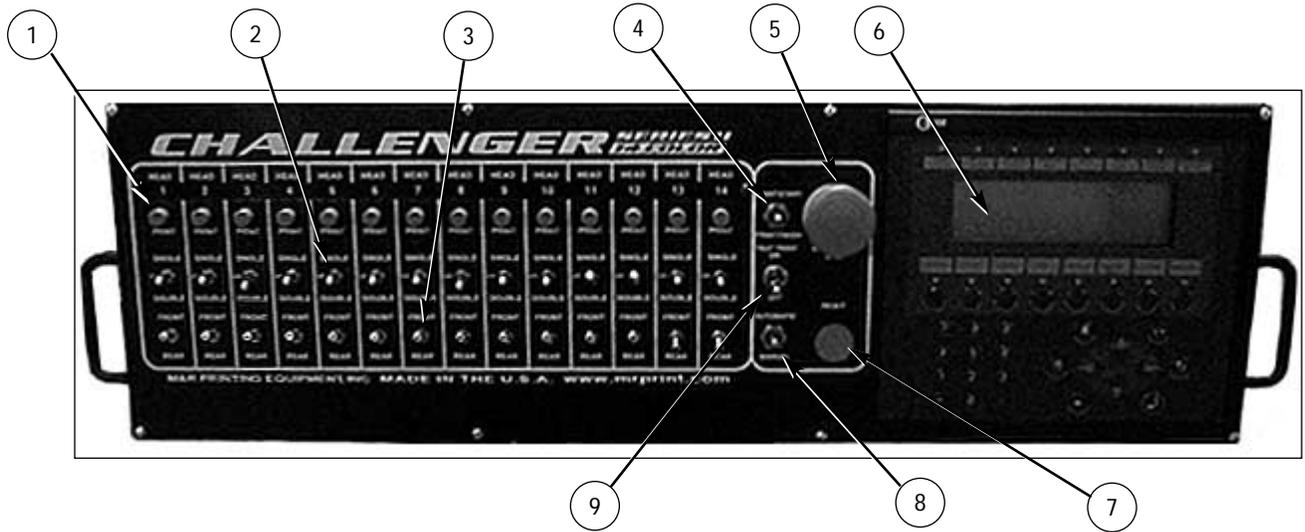
M&R Printing Equipment, Inc.  
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# Replacement Parts

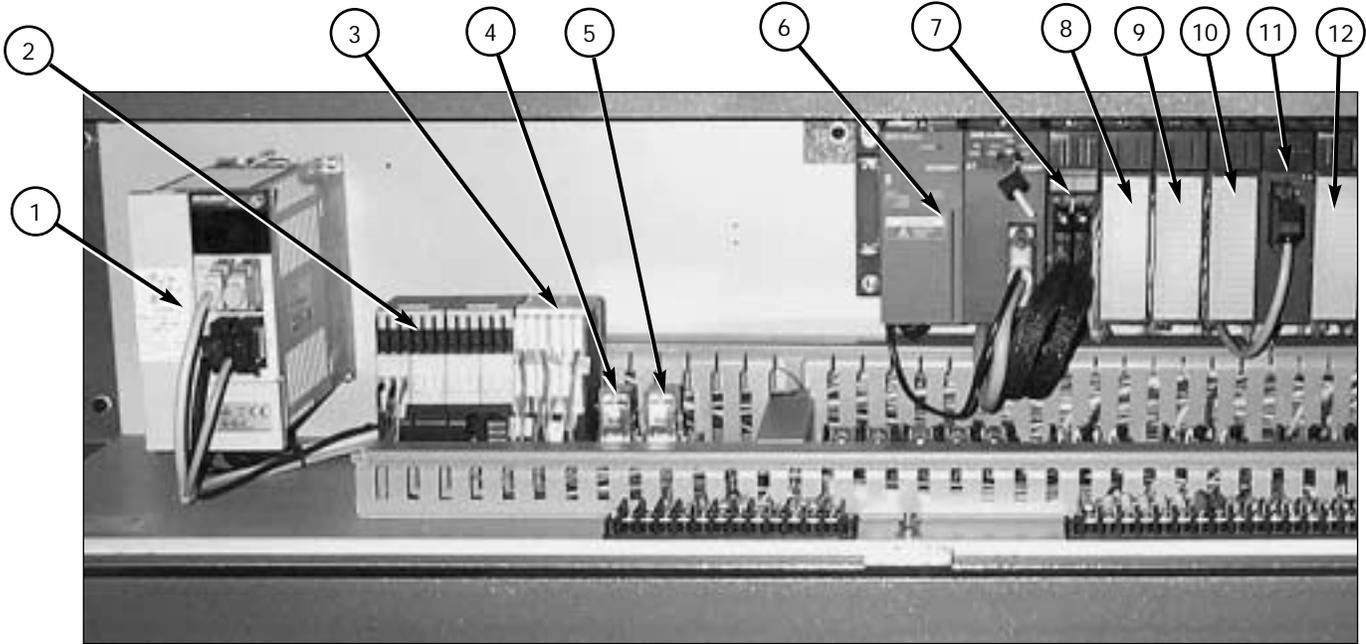
Operator Control Console



Part Description		Part Number
1	Push Button Switch	1017159
2	Toggle Switch.	1017157
3	Toggle Switch	1017158
4	Toggle Switch	1010007
5	Emergency Stop Push Button	1010040
6	E-300 Operator Interface	1017295
7	Reset Push Button	1010001
8	Toggle Switch	1010007
9	Toggle Switch	1010011

# Replacement Parts

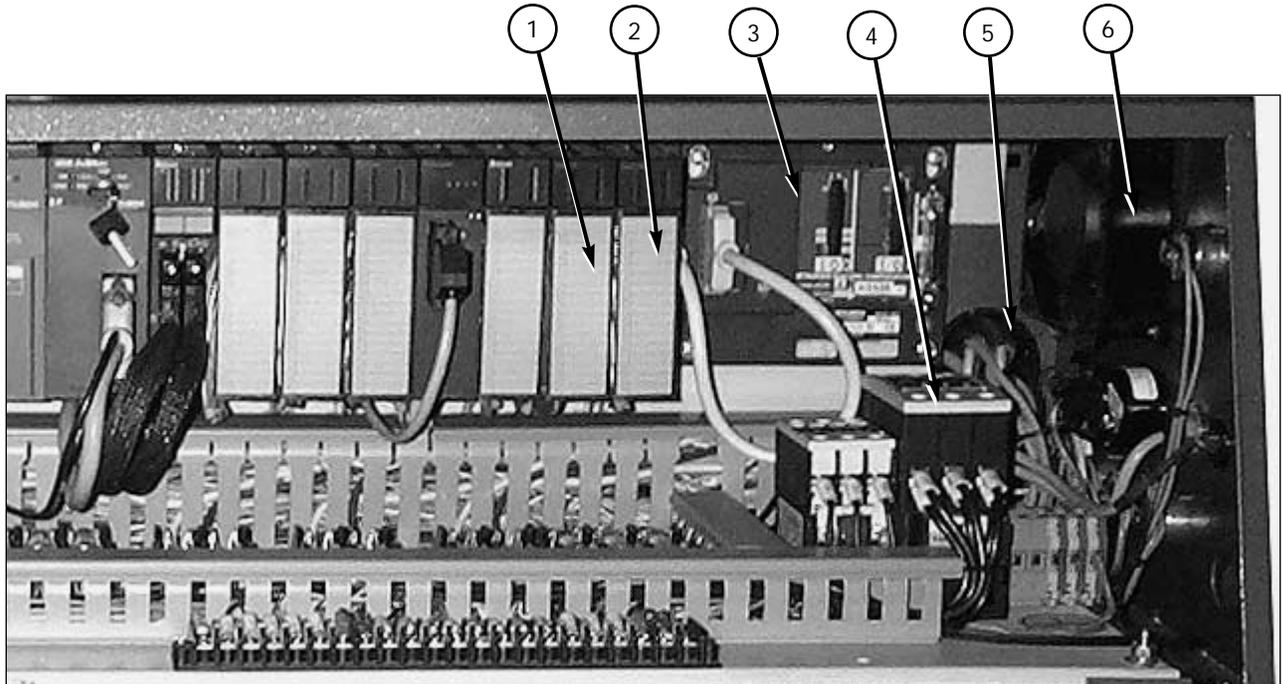
Indexer Electrical Enclosure



	Part Name	Part Number
1	Servo Amplifier MR-J2S-350-B	1017483
2	Power Supply 24 vdc	1024059
3	Siemens Safety Relay	1017422
4	Idec Relay	1011079
5	Idec Relay	1011079
6	Mitshubishi Power Supply Module	1017043
7	DC Module A1SX42-UL	1017044
8	Output Module A1SY10	1017073
9	Output Module A1SY10	1017073
10	Output Module A1SY10	1017073
11	Motion Card Module A1SD7SP1	1017161A
12	Output Module A1SY10	1017073

# Replacement Parts

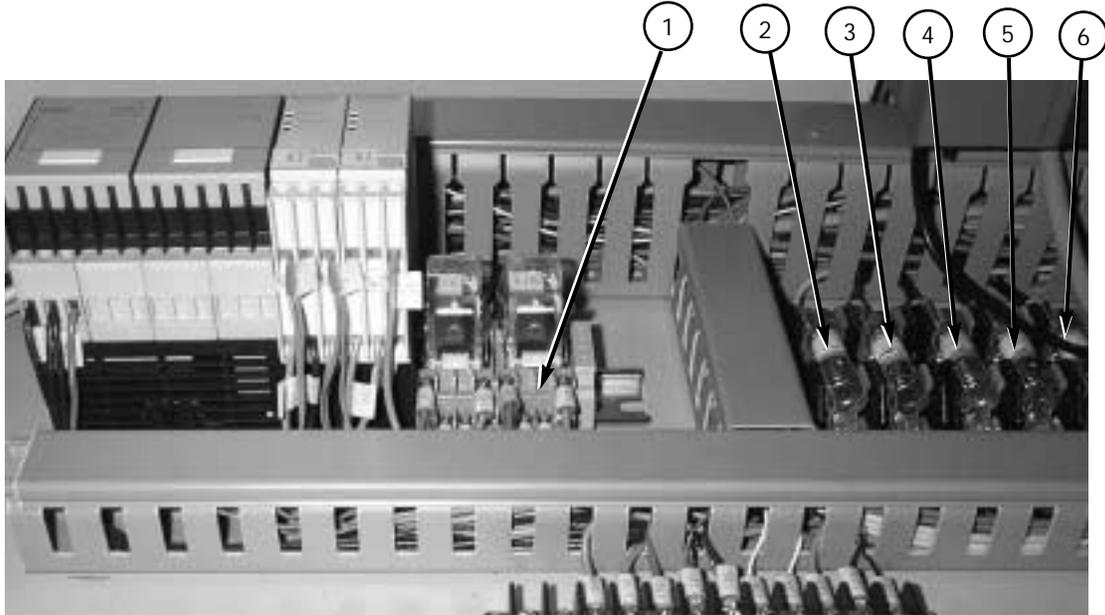
Indexer Electrical Enclosure



	Part Name	Part Number
1	Output Module A1SY10	1017073
2	Output Module A1SY10	1017073
3	Mitshubishi Ext. Base	1017233
4	Contactor	1011516
5	Axial Fan	1009004

# Replacement Parts

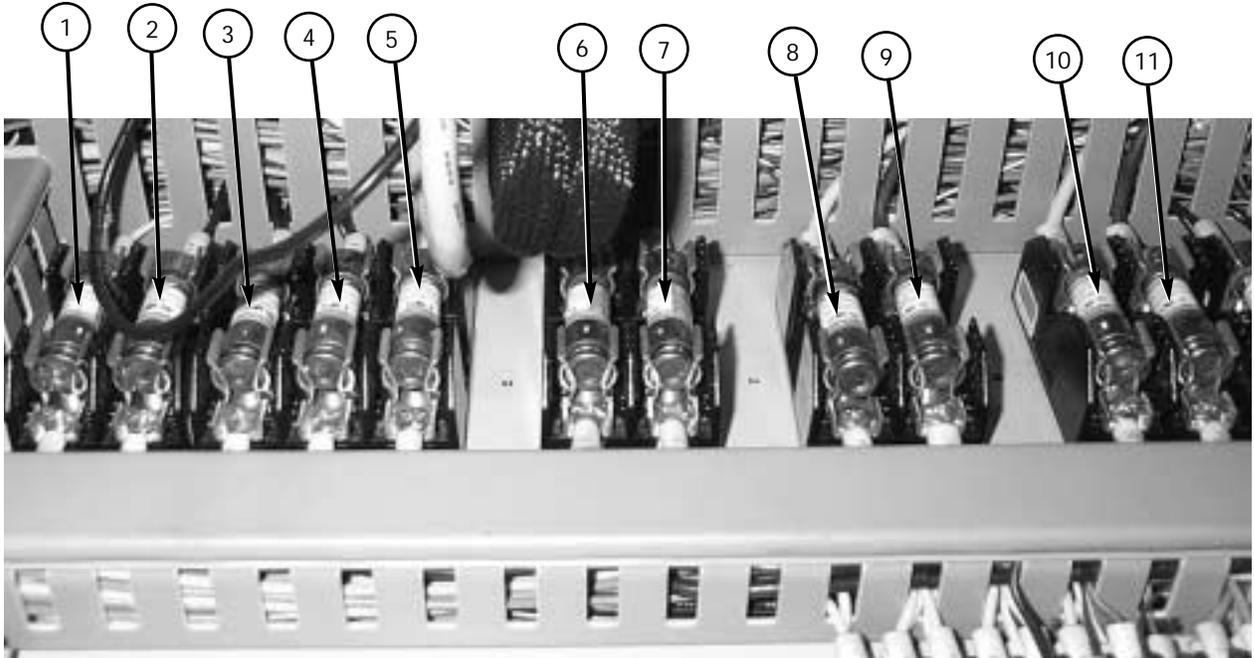
Indexer Electrical Enclosure Fuses



	Part Name	Part Number
1	Idec Relay Plug Base	1010208
2	Fuse 7 Amp FLNR 7 (F8)	1004028
3	Fuse 1/4 Amp FLNR 1/4 (F6)	1004020
4	Fuse 1/4 Amp FLNR 1/4 (F7)	1004020
5	Fuse 3 Amp FLNR 3 (F4)	1004024
6	Fuse 3 Amp FLNR 3 (F5)	1004024

# Replacement Parts

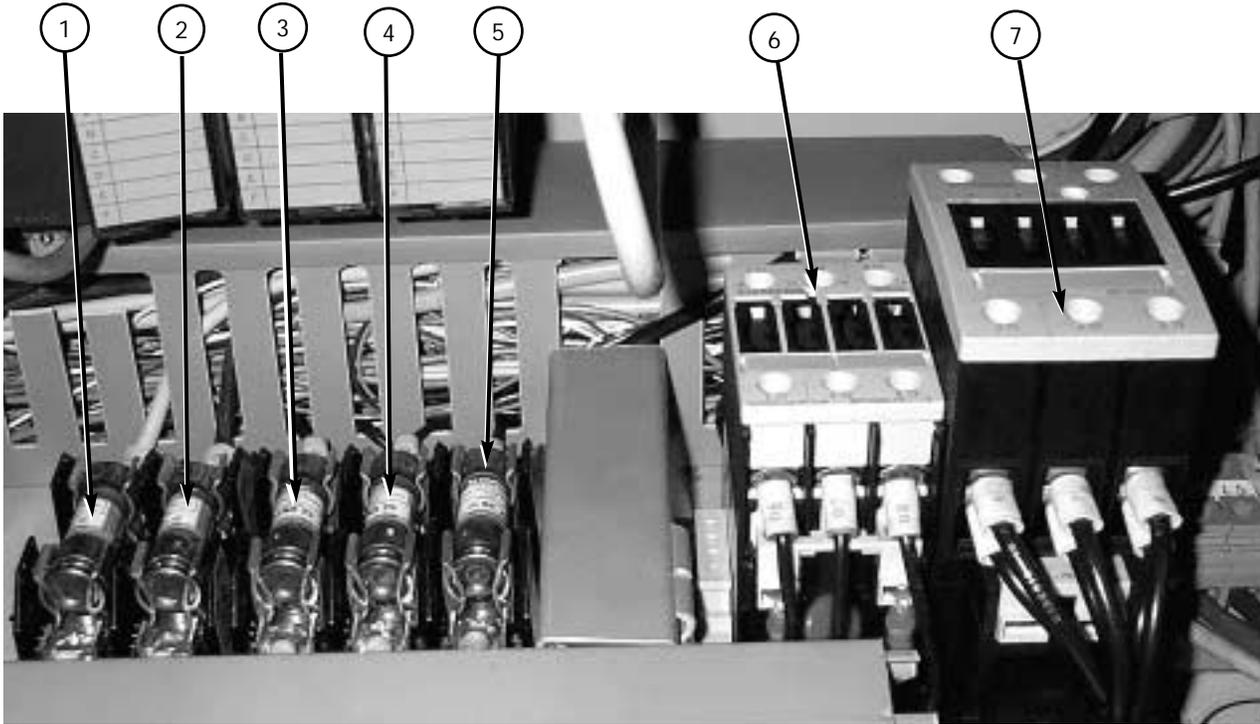
Indexer Electrical Enclosure Fuses



	Part Name	Part Number
1	Fuse 7 Amp FLNR 7 (F8)	1004028
2	Fuse 1/4 Amp FLNR 1/4 (F6)	1004020
3	Fuse 1/4 Amp FLNR 1/4 (F7)	1004020
4	Fuse 3 Amp FLNR 3 (F4)	1004024
5	Fuse 3 Amp FLNR 3 (F5)	1004024
6	Fuse 30 Amp FLNR 30 (F9)	1004026
7	Fuse 30 Amp FLNR 30 (F10)	1004026
8	Fuse 30 Amp FLNR 30 (F11)	1004026
9	Fuse 30 Amp FLNR 30 (F12)	1004026
10	Fuse 30 Amp FLNR 30 (F13)	1004026
11	Fuse 30 Amp FLNR 30 (F14)	1004026

# Replacement Parts

## AC PRINT STATION DRIVE CONTROL



	Part Name	Part Number
1	Fuse 30 Amp FLNR 30 (F13)	1004026
2	Fuse 30 Amp FLNR 30 (F14)	1004026
3	Fuse 25 Amp FLNR 25 (F1)	1004036
4	Fuse 25 Amp FLNR 25 (F2)	1004036
5	Fuse 25 Amp FLNR 25 (F3)	1004036
6	Contactora	1011518
7	Contactora	1011516

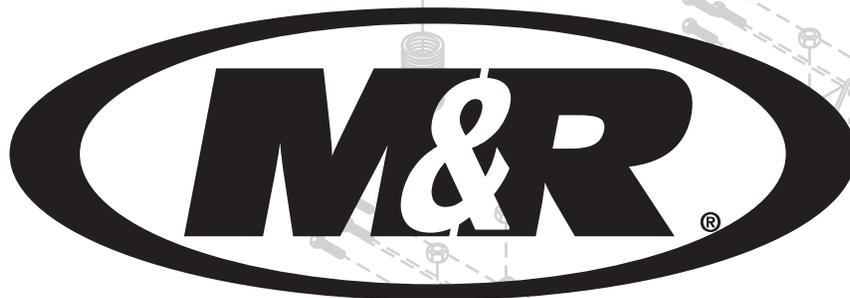
# ***Technical Documentation***



# ***Challenger II***

**18 color**

EAD\_CH2\_18  
Pages (1-40)



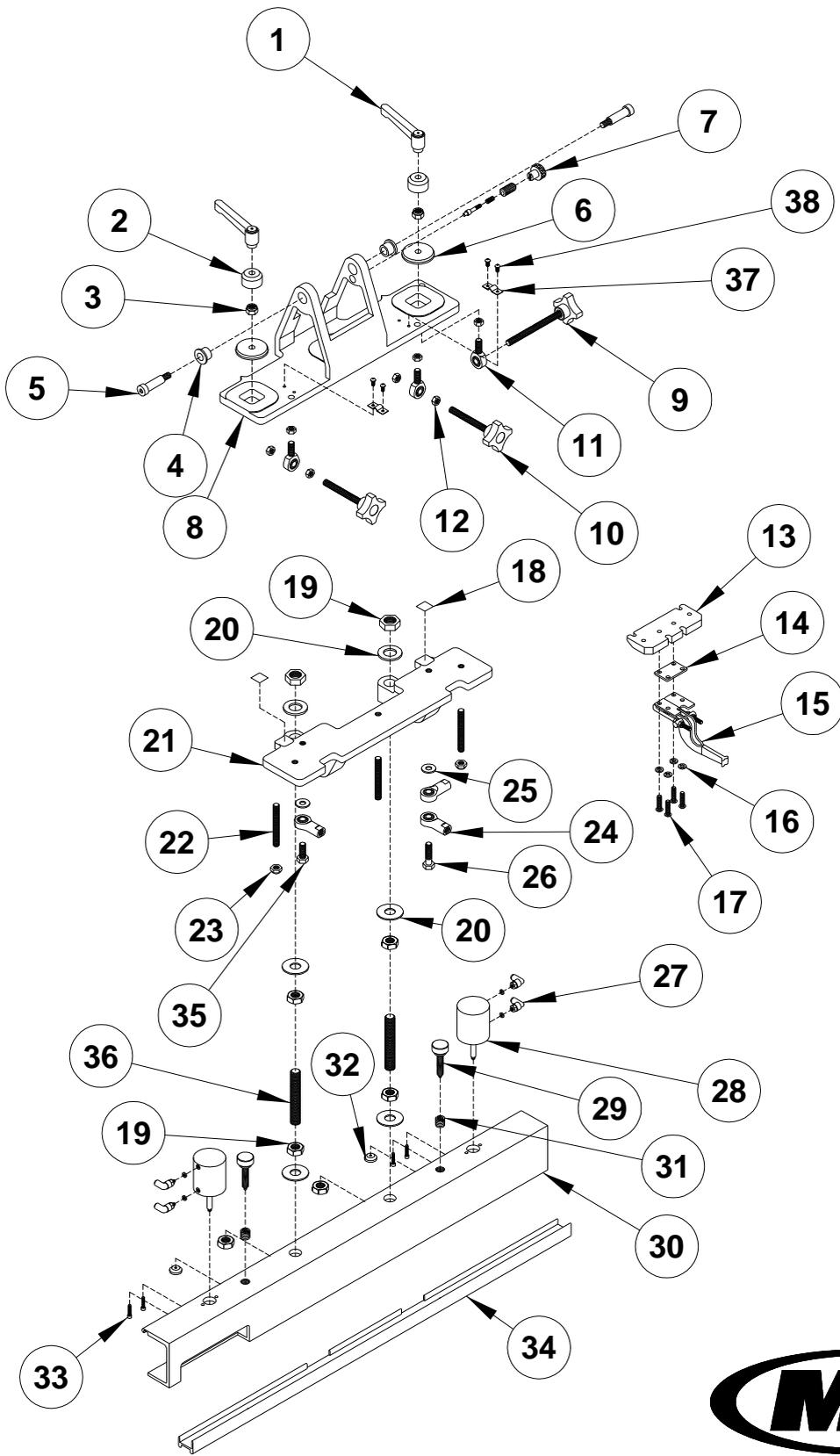
**M&R Printing Equipment, Inc**  
**Technical Services Dept.**  
**[www.mrprint.com](http://www.mrprint.com)**



# Challenger II

18 color

(A.C. HEAD) FRONT FRAME HOLDER/MICRO ASSEMBLY



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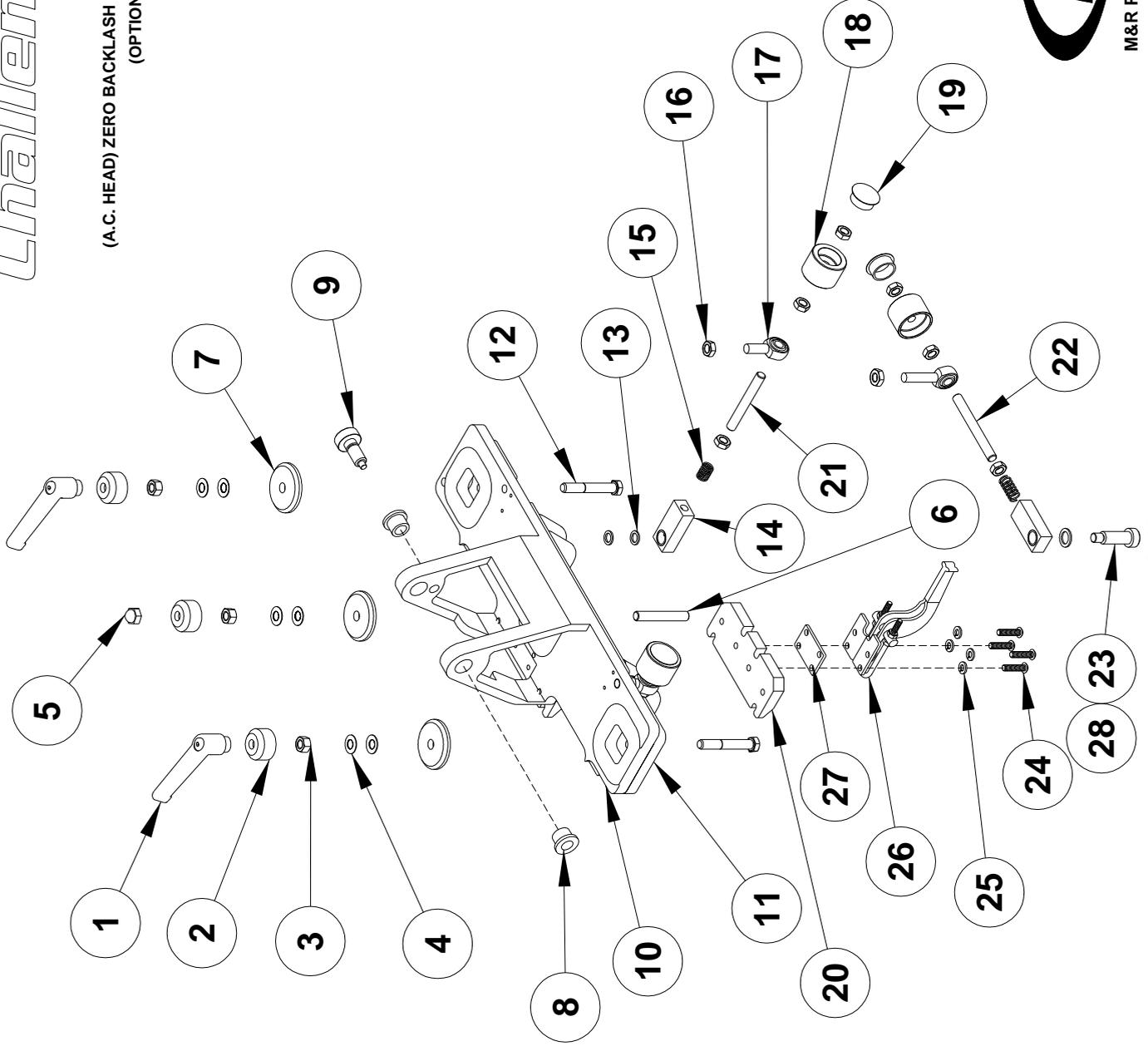
36	THREADED ROD 3/4"-16 X 4.75"	9150005-15
35	HEX CAP SCREW 3/8"-24 X 1 1/4"	3054031
34	SCREEN FRAME LOCKING BAR	9153315
33	SOCKET CAP SCREW 8-32 X 3/4"	3009032
32	CUP WASHER	8010005
31	KEY LOCKING INSERT	3013106
30	FRONT AIR LOCK SCREEN HOLDER	9153314
29	FRONT SCREEN HOLDER KNOB	9362098
28	CYLINDER, AIR LOCK	2009023
27	FITTING, MALE ELBOW 1/8 NPT	2003005
26	HEX CAP SCREW 3/8"-24 X 1 3/4"	3054032
25	SAE WASHER 3/8"	3021013
24	FEMALE ROD END 3/8"-24	3034002
23	ACORN HEX NUT 3/8"-16	3013139
22	THREADED ROD PLAIN 3/8"-16 X 3"	9150005-25
21	BOTTOM MICRO CASTING	9150064
20	SAE WASHER 3/4" Z	3021005
19	FIN HEX JAM NUT 3/4"-16	3013031
18	REGISTRATION GRID LABEL	5020154
17	BUTTON SOCKET CAP SCREW 1/4"-20 X 1"	3001004
16	SPLIT LOCK WASHER ZP 1/4"	3022001
15	DE-STA-CO CLAMP	3033087
14	LOCK CLAMP SPACER PLATE	9150017
13	MICRO POSITIONING PLATE	9150014
12	FIN HEX JAM NUT 3/8"-24	3013015
11	MALE ROD END 3/8"-24	3034003
10	MICRO X-Y ADJUSTING SCREW	8090057
9	MICRO SIDE ADJUSTING SCREW	8090056
8	TOP MICRO CASTING	9150062
7	RETRACTABLE SPRING PLUNGER	3033090
6	MICRO LOCK WASHER	8080132
5	SHOULDER BOLT 1/2" X 1 1/2"	3006048
4	FL BR BEAR 1/2" X 3/4" X 5/8"	3023025
3	ELASTIC STOP NUT ZP 3/8"-16	3012003
2	TOP LOCK WASHER	9150016
1	KIPP ELISA FEMALE HANDLE	3032001
<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>PART NO.</b>
CHALLENGER II 18 COLOR (A.C. HEAD) FRONT FRAME HOLDER/MICRO ASSEMBLY		



# Challenger III

18 color

## (A.C. HEAD) ZERO BACKLASH FRONT MICRO ASSEMBLY (OPTIONAL)



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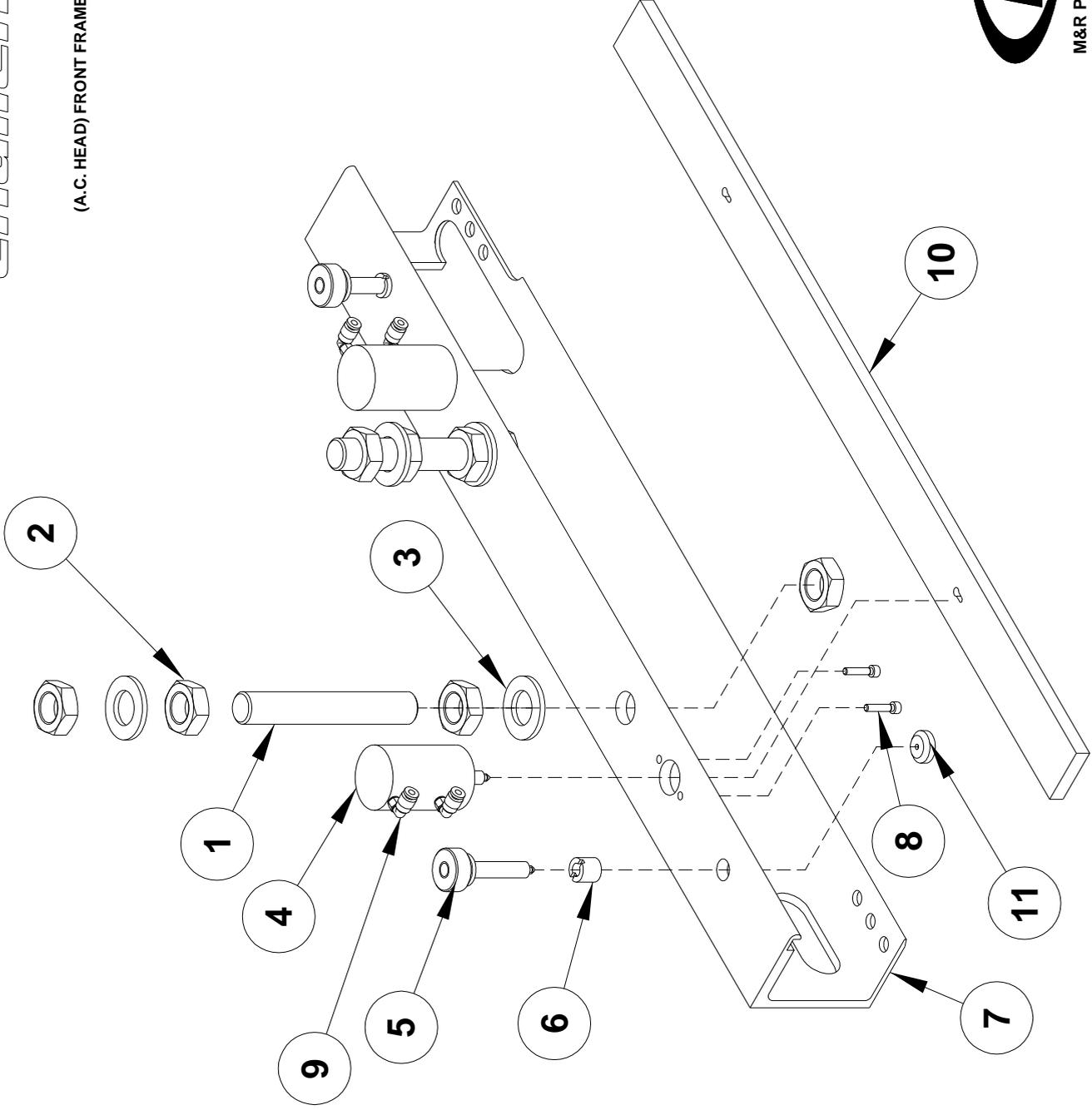


28	SHOULDER BOLT 1/2" X 5/8" (LEFT SIDE)	3006064
27	LOCK CLAMP SPACER PLATE	9150017
26	DE-STA-CO CLAMP	3033087
25	SPLIT LOCK WASHER ZP 1/4"	3022001
24	BUTTON SOCKET CAP SCREW 1/4"-20 X 1"	3001004
23	SHOULDER BOLT 1/2" X 1-1/4" (RIGHT SIDE)	3006065
22	THREADED ROD 3/8"-24 X 3-1/2"	9151846
21	THREADED ROD 3/8"-24 X 3"	9151843
20	MICRO POSITIONING PLATE	9150014
19	PLUG	7025004
18	Z-AXIS KNOB	9151844
17	MALE ROD END 3/8"-24	3034049
16	HEX JAM NUT 3/8"-24	3013015
15	SPRING	3043059
14	ROD END	9151842
13	SHORTENING SHIM	3006062
12	HEX HEAD BOLT 3/8"-16 X 2-1/2"	3008006
11	BOTTOM MICRO	9151847
10	TOP MICRO	9150062
9	RETRACTABLE SPRING PLUNGER	3033090
8	FL BR BEAR 1/2" X 3/4" X 5/8"	3023025
7	MICRO LOCK WASHER	8080132
6	THREADED ROD 3/8"-16 X 2-1/2"	9150005-34
5	ACORN HEX NUT 3/8"-16	3013139
4	DISC SPRING	3021043
3	ELASTIC STOP NUT ZP 3/8"-16	3012003
2	TOP LOCK WASHER	9150016
1	KIPP ELISA FEMALE HANDLE	3032001
ITEM NO.	DESCRIPTION	PART NO.
CHALLENGER II 18 COLOR (A.C. HEAD) ZERO BACKLASH FRONT MICRO ASSEMBLY (OPTIONAL)		



# Challenger III 18 color

(A.C. HEAD) FRONT FRAME HOLDER ASSEMBLY



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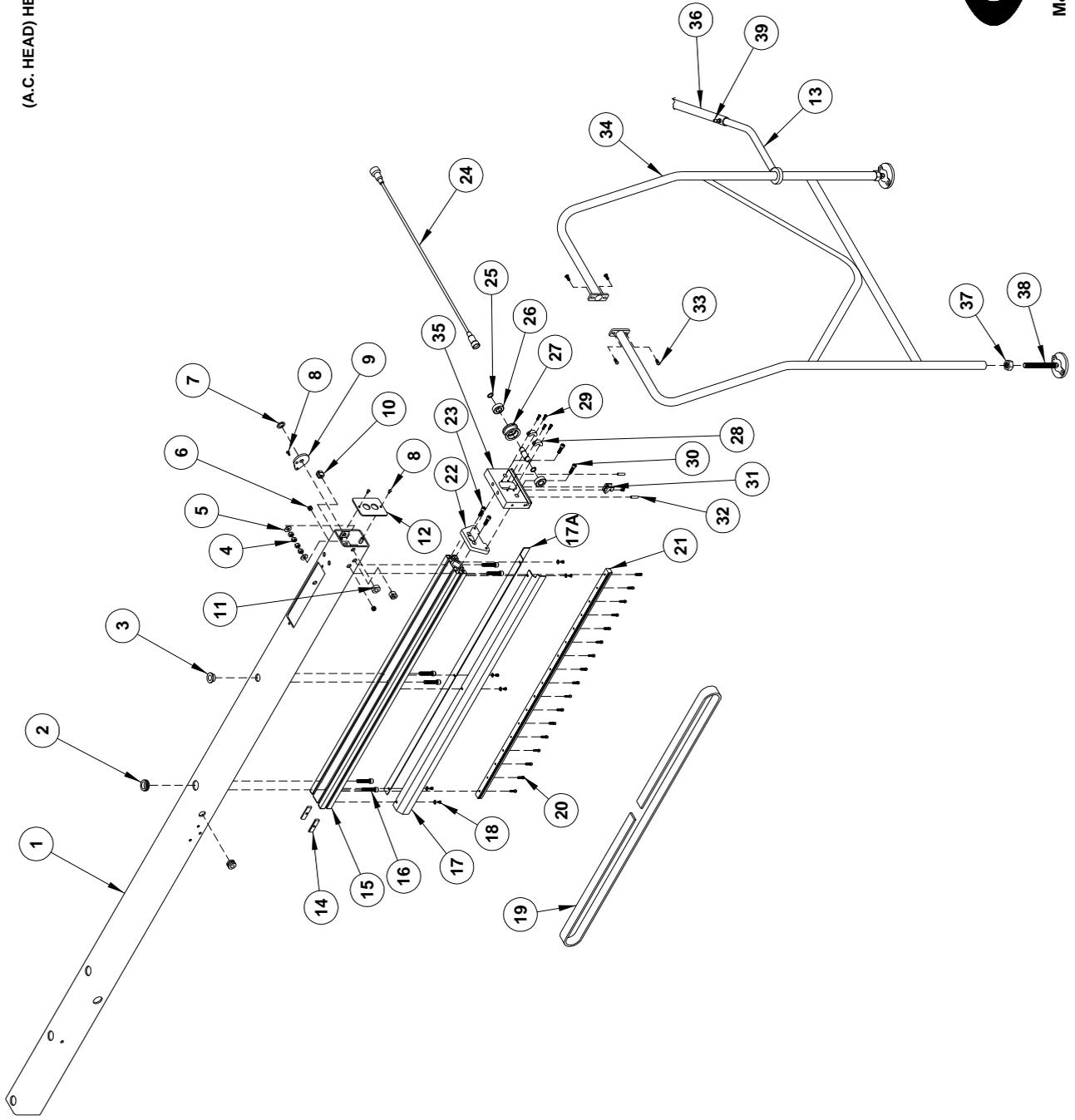




# Challenger II

18 color

(A.C. HEAD) HEAD TUBE ASSEMBLY



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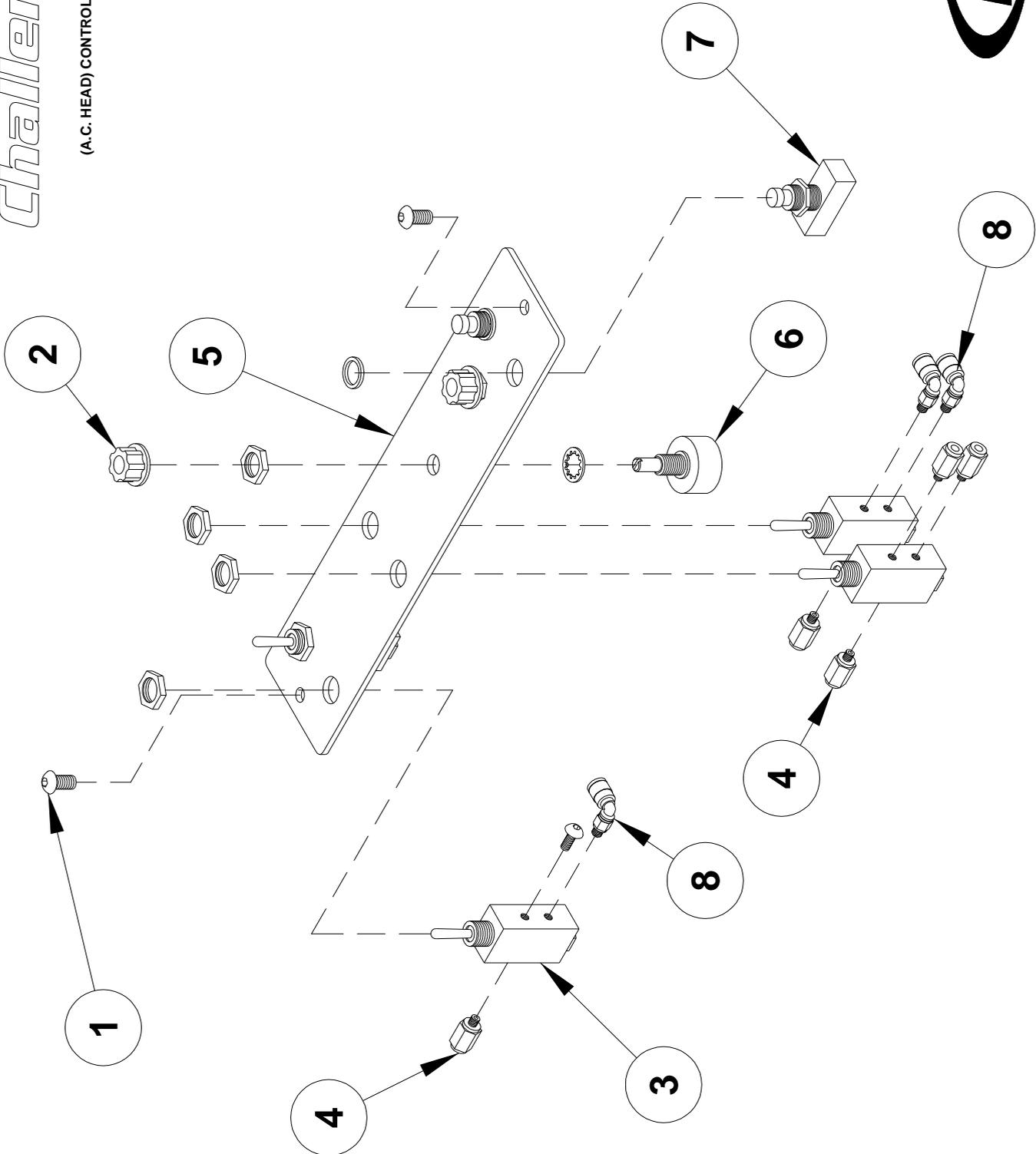


34	HEAD SUPPORT FRAME (JUMBO)	9150085
33	SOCKET CAP SCREW 1/4"-20 X 5/8"	3009047
32	DOWEL PIN 1/4" X 1"	3014001
31	DE-STA-CO CLAMP	3033087
30	SOCKET CAP SCREW 5/16"-18 X 1"	3009003
29	SOCKET CAP SCREW 10-24 X 1/2"	3009024
28	IDLER SHAFT CLAMP	9150939
27	IDLER ROLLER	9150907
26	BALL BEARING, BOSTON	3023097
25	EXTERNAL RETAINING RING 5/8"	3024041
24	CYCLE INTERRUPTION CORD 76"	1018035
23	SOCKET CAP SCREW 5/16"-18 X 3/4"	3009005
22	FRONT SPACER	9150906
21	LINEAR MOTION RAIL 1660mm	3030114
20	SOCKET CAP SCREW M5 X 16mm	3009166
19	8mm POLY CHAIN BELT 12mm WIDE 98.25" LG.	3041184
18	BUTTON SOCKET CAP SCREW 10-24 X 1/4"	3001021
17A	HEAD COVER R.H.	9150956
17	HEAD COVER L.H.	9150957
16	SOCKET CAP SCREW 3/8"-16 X 1 3/4"	3009023
15	SUPPORT BEAM	9150904
14	REAR SCREEN HOLDER NUT	9150944
13	PERIMETER RAIL SUPPORT	9150132
12	PRINT HEAD FRONT COVER	9155013
11	MICRO SHOULDER BOLT SPACER	9150045
10	STRAIN RELIEF BUSHING	7006000
9	MICRO FLIP LOCK PLATE	9150086
8	BUTTON SOCKET CAP SCREW 10-24 X 1/2"	3001013
7	FLAT NYLON WASHER 1/2"	3020001
6	GROMMET, RUBBER 5/16" I.D.	7001101
5	WROUGHT FLAT WASHER 3/8" ZP	3020010
4	FIN HEX JAM NUT ZP 3/8"-16	3013014
3	CARRIAGE AIR CABLE BUSHING	9151113
2	GROMMET, RUBBER	7001028
1	HEAD TUBE	9130002
ITEM NO.	DESCRIPTION	PART NO.
CHALLENGER II 18 COLOR (A.C. HEAD) HEAD TUBE ASSEMBLY		



# Challenger II

18 color  
(A.C. HEAD) CONTROL PANEL ASSEMBLY



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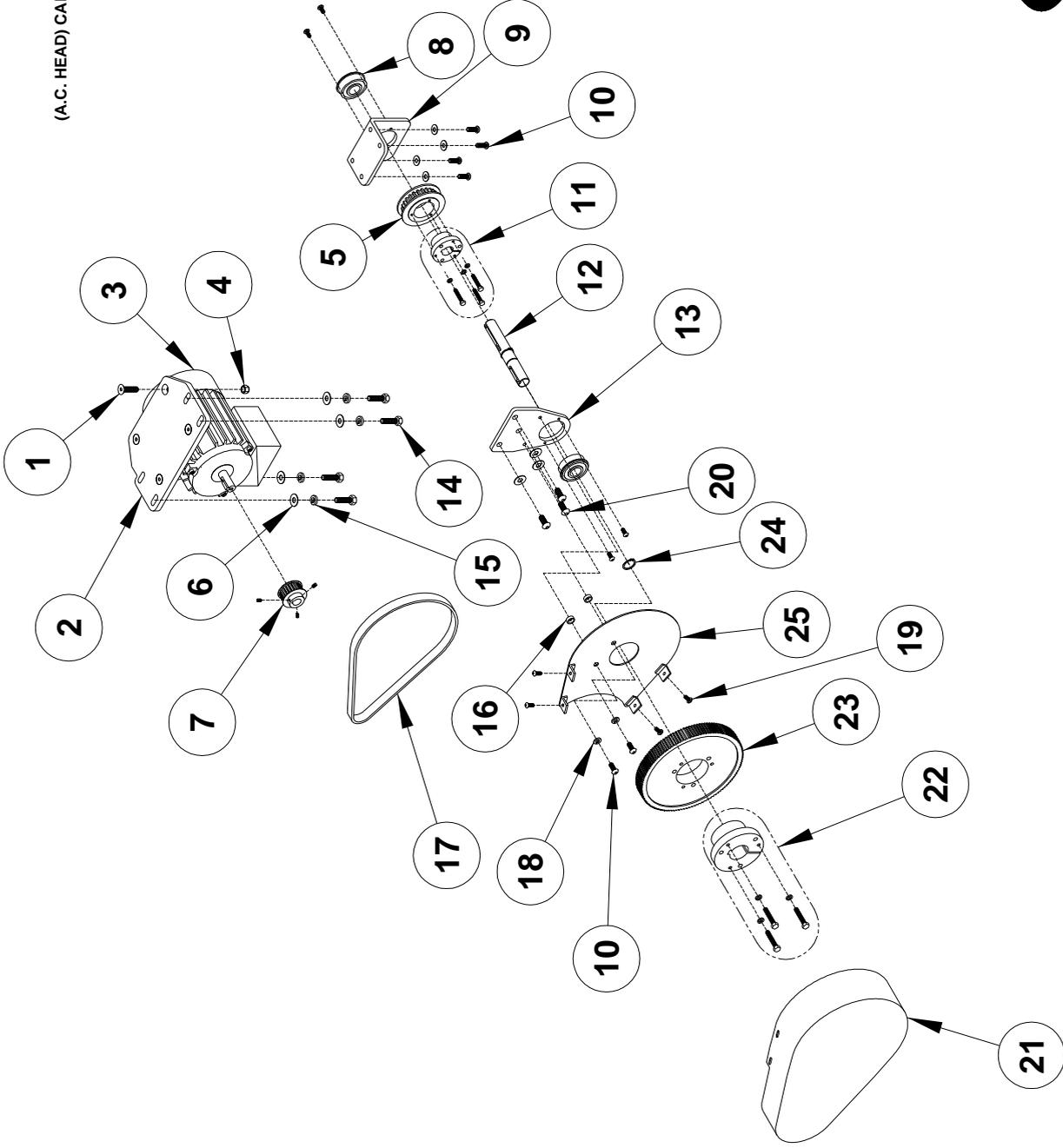




# Challenger III

18 color

(A.C. HEAD) CARRIAGE DRIVE ASSEMBLY



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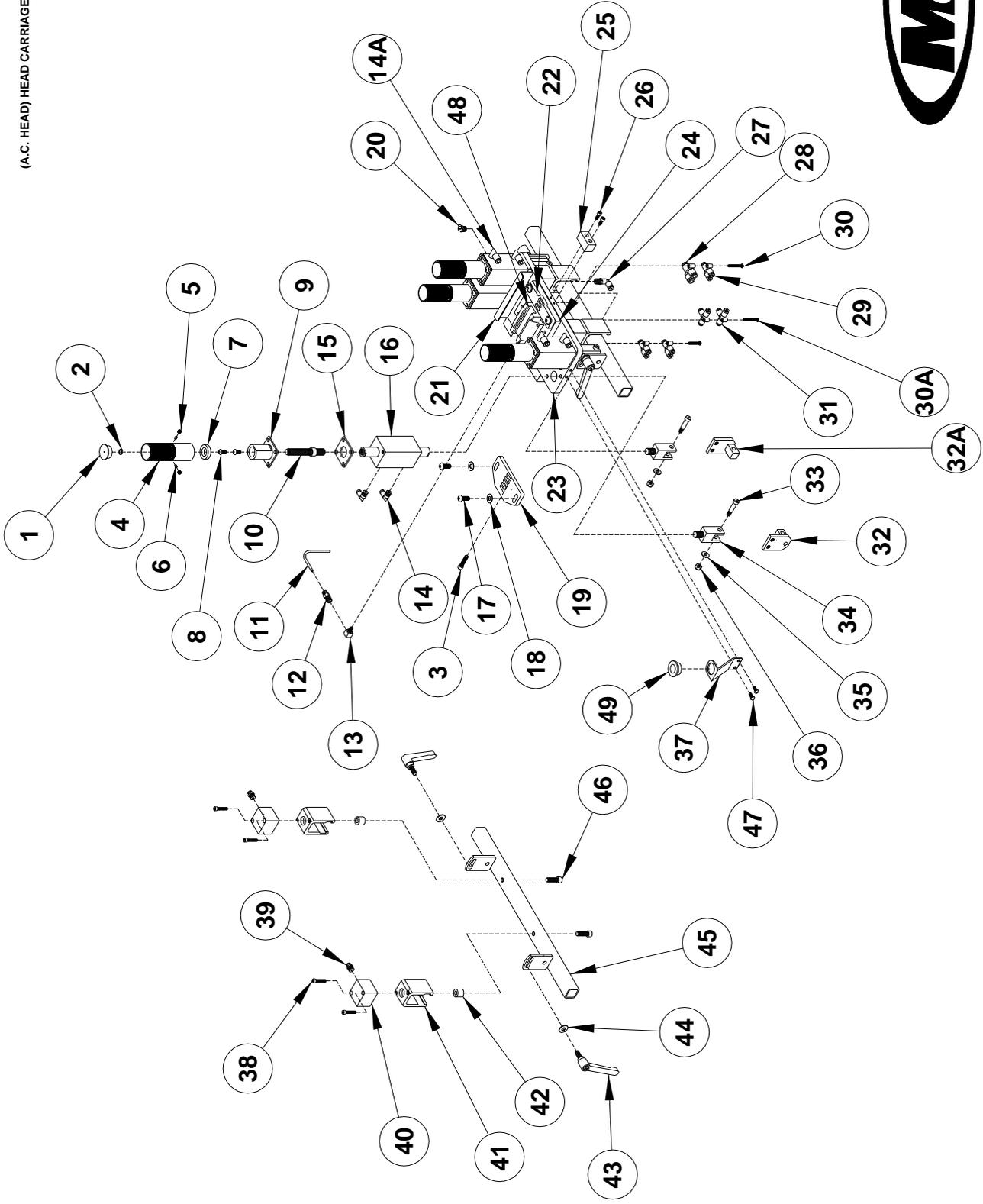




# Challenger II

18 color

(A.C. HEAD) HEAD CARRIAGE ASSEMBLY



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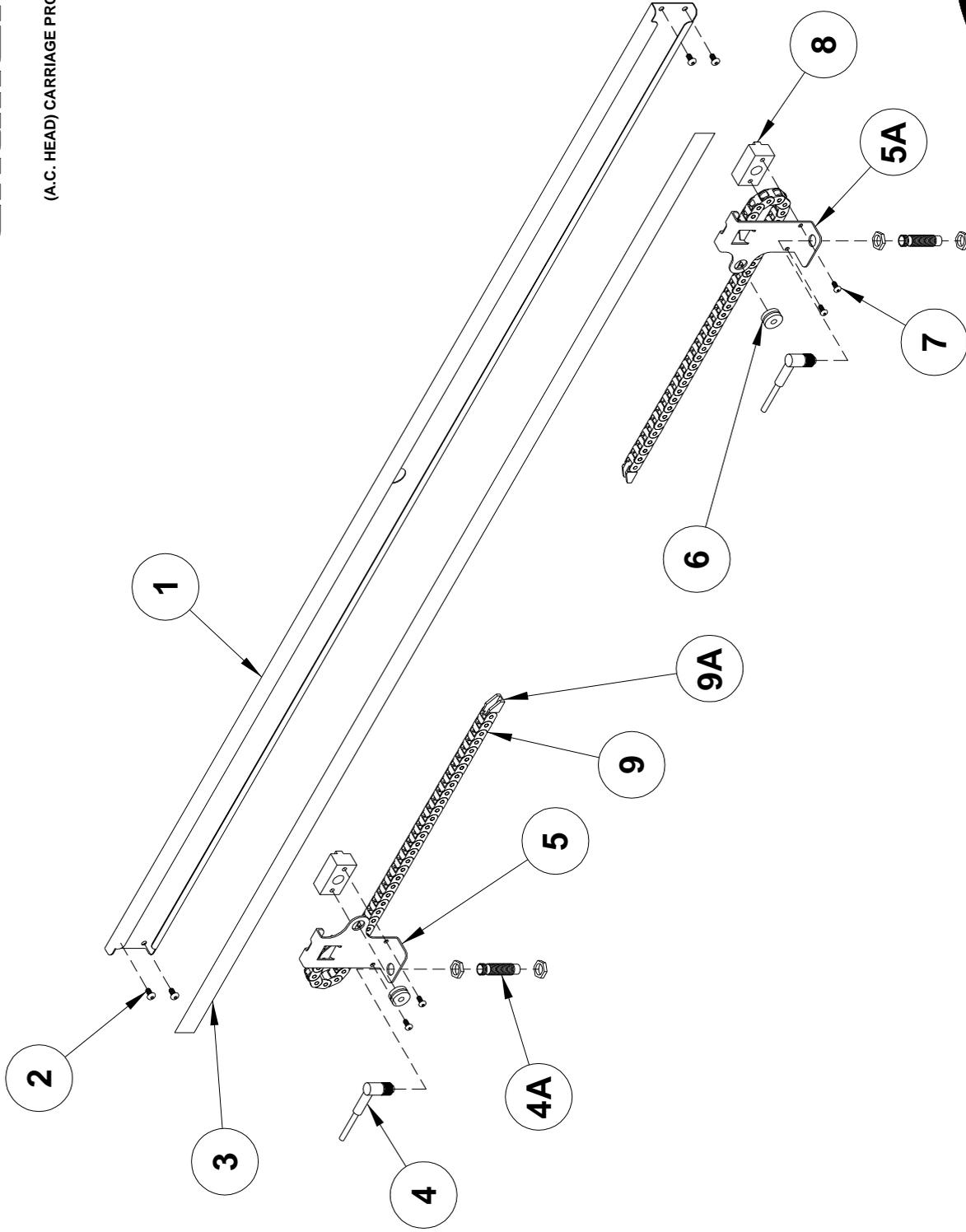
49	CARRIAGE AIR CABLE BUSHING	9151113
48	LINEAR CARRIAGE BEARING	3030113
47	BUTTON SOCKET CAP SCREW 10-24 X 1/2"	3001013
46	SOCKET CAP SCREW 5/16"-24 X 1"	3009085
45	SQUEEGEE MOUNTING BAR	9362169
44	WROUGHT FLAT WASHER ZP 5/16"	3020007
43	KIPP ELISA MALE HANDLE 5/16"-18	3032009
42	AIR LOCK SPACER	9151047
41	SQUEEGEE/FLOOD BAR AIR CLAMP	9151048
40	CUSTOM SQUARE CYLINDER	2009118
39	FITTING, MALE CONNECTOR 5/32" TUBE	2003142
38	SOCKET CAP SCREW 10-32 X 1"	3009082
37	FLEXIBLE CABLE BRACKET	9151111
36	ELASTIC STOP NUT ZP 1/4"-20	3012000
35	SAE WASHER ZP 1/4"	3021015
34	CYLINDER PIVOT BRACKET	9260108
33	SHOULDER BOLT 5/16" X 1"	3006014
32A	RIGHT HAND PIVOT SHAFT	9362114
32	LEFT HAND PIVOT SHAFT	9362113
31	FITTING, UNION TEE 5/32" TUBE	2003021
30A	BUTTON SOCKET CAP SCREW 8-32 X 1"	3001024
30	BUTTON SOCKET CAP SCREW 8-32 X 1 1/4"	3001071
29	FITTING, Y CONNECTOR, 5/32" TUBE	2003024
28	FITTING, Y CONNECTOR, 1/4" TUBE	2003086
27	FITTING MALE SWIVEL ELBOW 1/8 NPT 5/32" TUBE	2003004
26	SOCKET CAP SCREW 10-24 X 5/8"	3009045
25	CARRIAGE STOP	9150940
24	BEARING SPACER	9150903
23	CARRIAGE PLATE	9150902
22	BELT, FRONT LOCK	9150914
21	PROXIMITY ACTIVATOR	9150934
20	FITTING, GREASE 1/8 NPT 45°	2003032
19	BELT TENSION LOCK	9150911
18	WROUGHT FLAT WASHER 5/16" ZP	3020007
17	BUTTON SOCKET CAP SCREW 5/16"-18 X 3/4"	3001046
16	CYLINDER, 1 1/4" BORE 1 1/2" STROKE	2009299
15	CARRIAGE AIR CABLE BUSHING	9151113
14A	FITTING, MALE ELBOW 1/8 NPT 1/4" TUBE	2003005
14	FITTING, MALE ELBOW 1/8 NPT 5/32" TUBE	2003017
13	FITTING, ELBOW 1/8 NPT M6 X .75	2005104
12	FITTING, MALE CONNECTOR 1/8 NPT 5/32" TUBE	2003000
11	TUBING, POLYURETHANE 5/32"	2001077
10	STROKE ADJUSTMENT SCREW	9150037
9	STROKE ADJUSTMENT GUIDE	9150036
8	BUTTON SOCKET CAP SCREW 1/4"-20 X 1/2"	3001005
7	STROKE ADJUSTMENT SPACER	9150039
6	TEFLON TFE ROD 3/16"	7013052
5	SOCKET SET SCREW 1/4"-20 X 3/16"	3007012
4	STROKE ADJUSTMENT KNOB	9150035
3	SOCKET CAP SCREW 1/4"-20 X 1 1/4"	3009018
2	EXTERNAL RETAINING RING	3024019
1	SNAP IN PLUG	7025004
ITEM NO.	DESCRIPTION	PART NO.
CHALLENGER II 18 COLOR (A.C. HEAD) HEAD CARRIAGE ASSEMBLY		



# Challenger III

18 color

(A.C. HEAD) CARRIAGE PROX BRACKET ASSEMBLY



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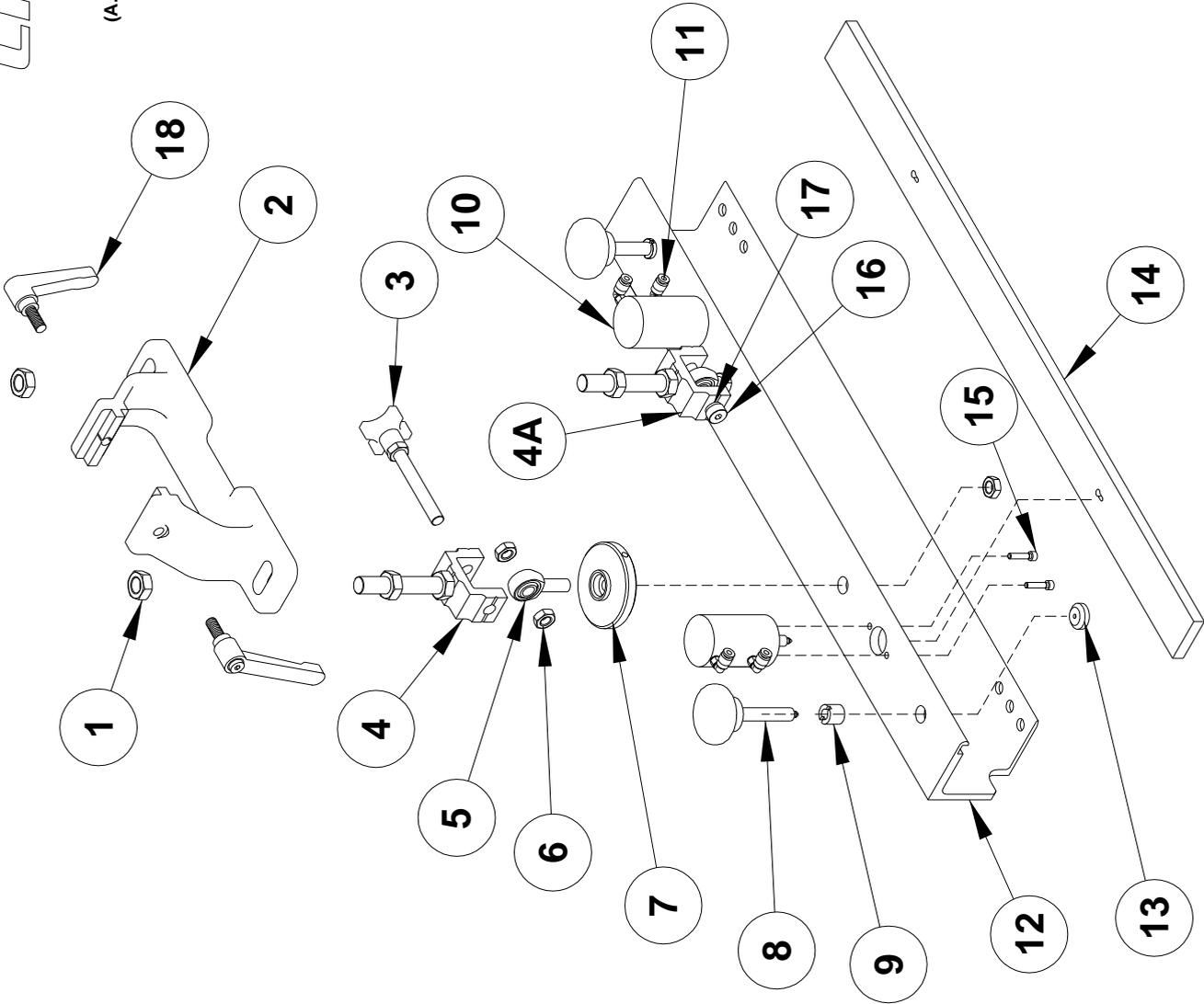






# Challenger III 18 color

(A.C. HEAD) REAR FRAME HOLDER/MICRO ASSEMBLY



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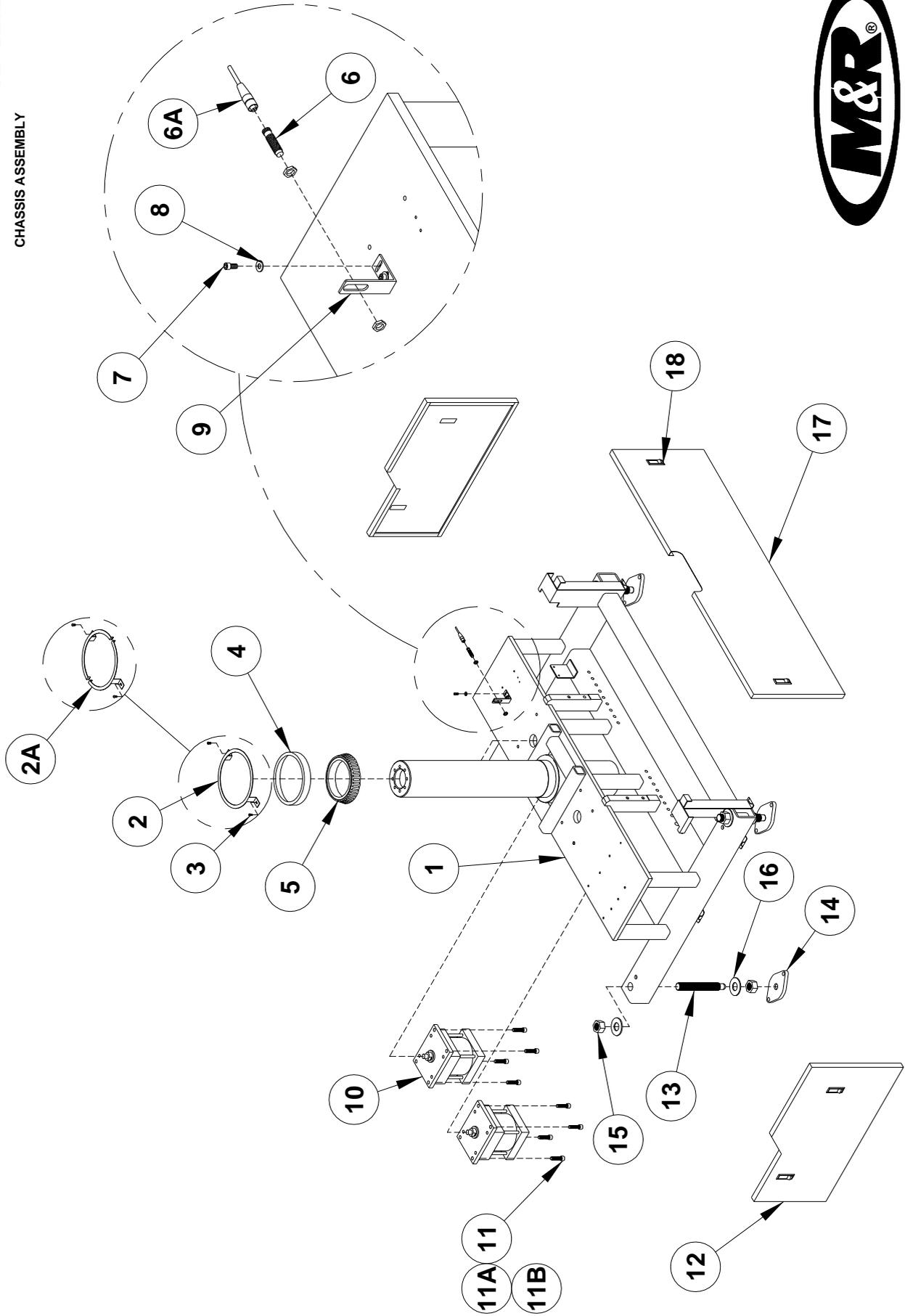




# Challenger III

18 color

## CHASSIS ASSEMBLY



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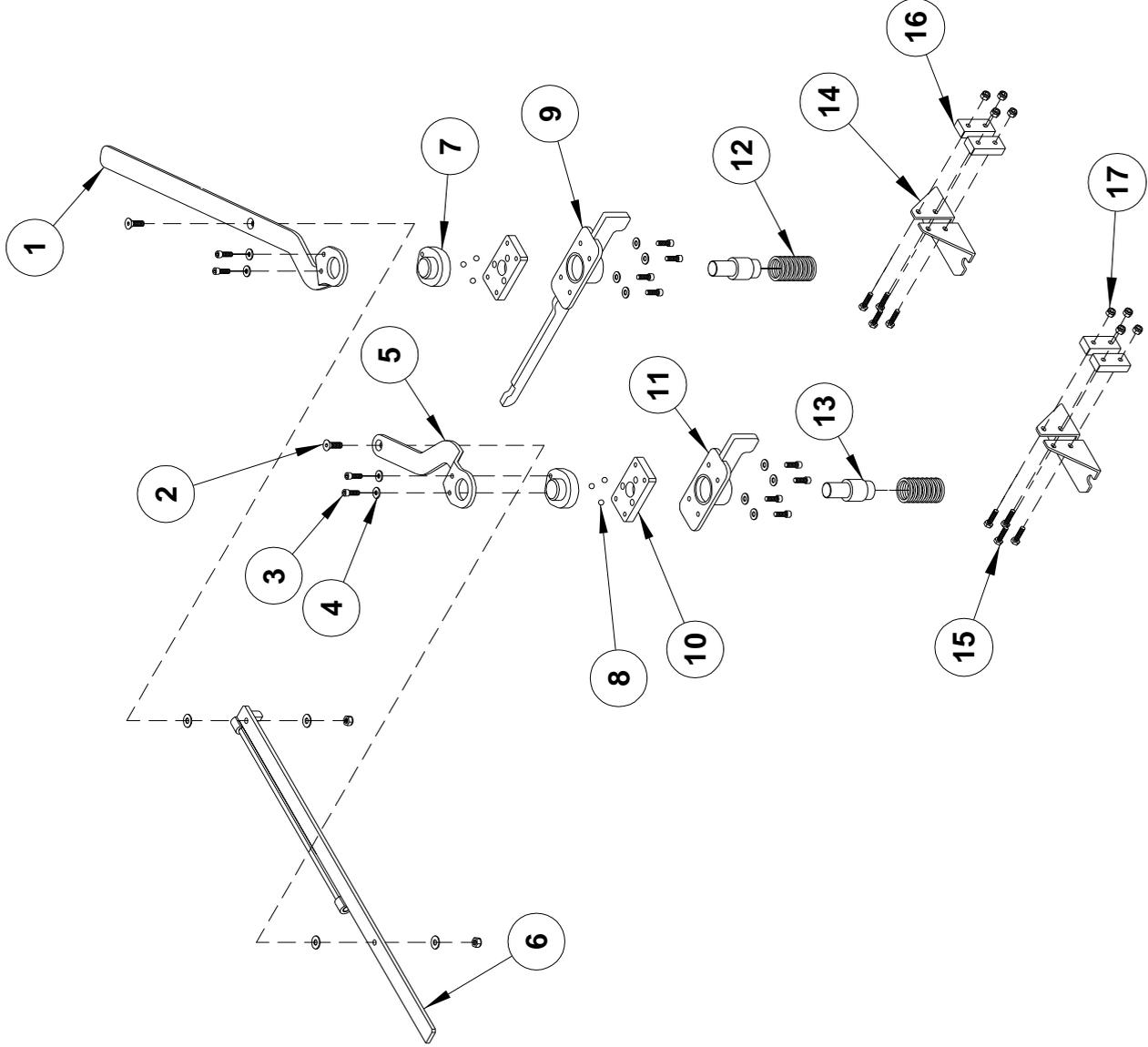




# Challenger III

13 color

## OFF-CONTACT ASSEMBLY



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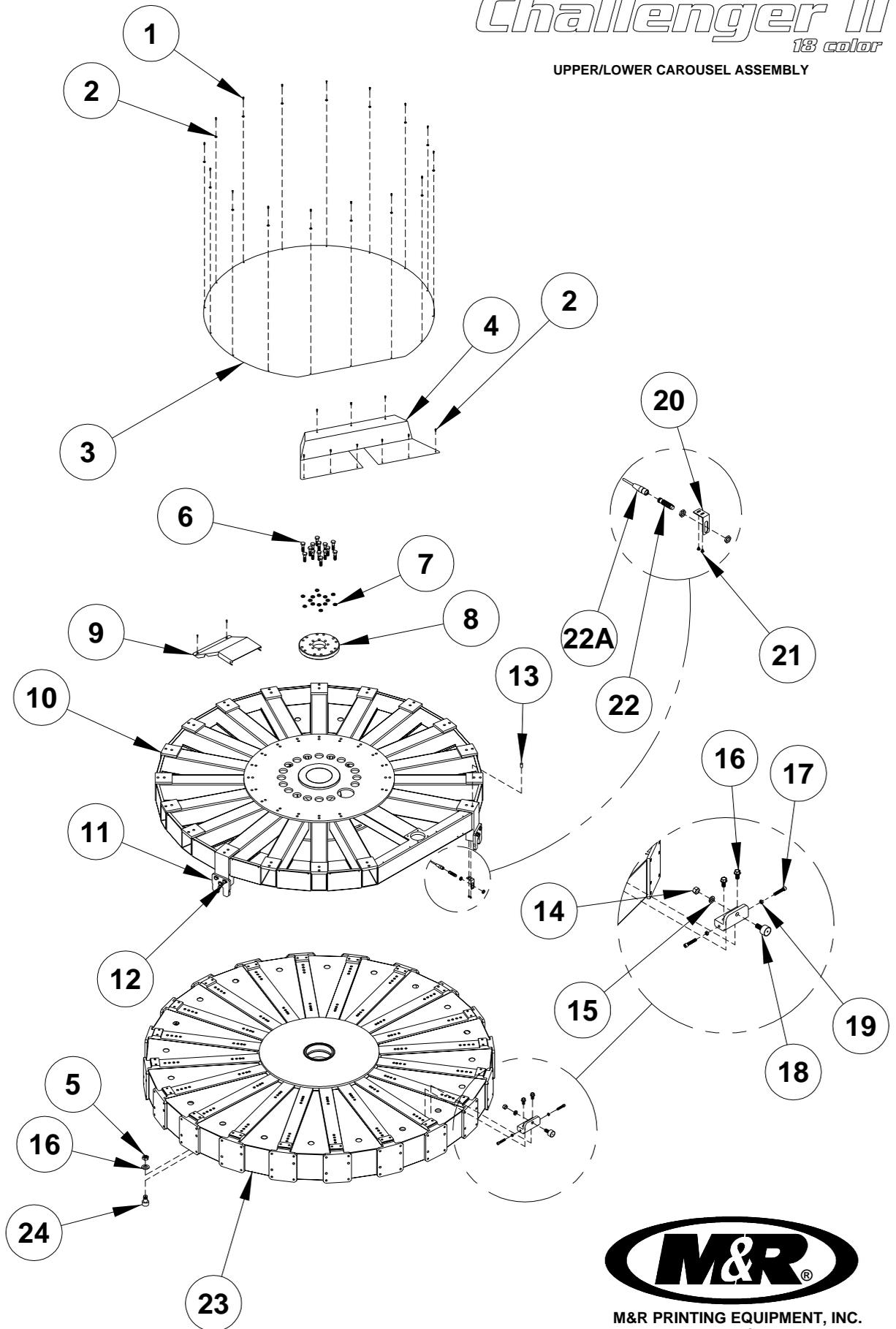




# Challenger II

18 color

## UPPER/LOWER CAROUSEL ASSEMBLY



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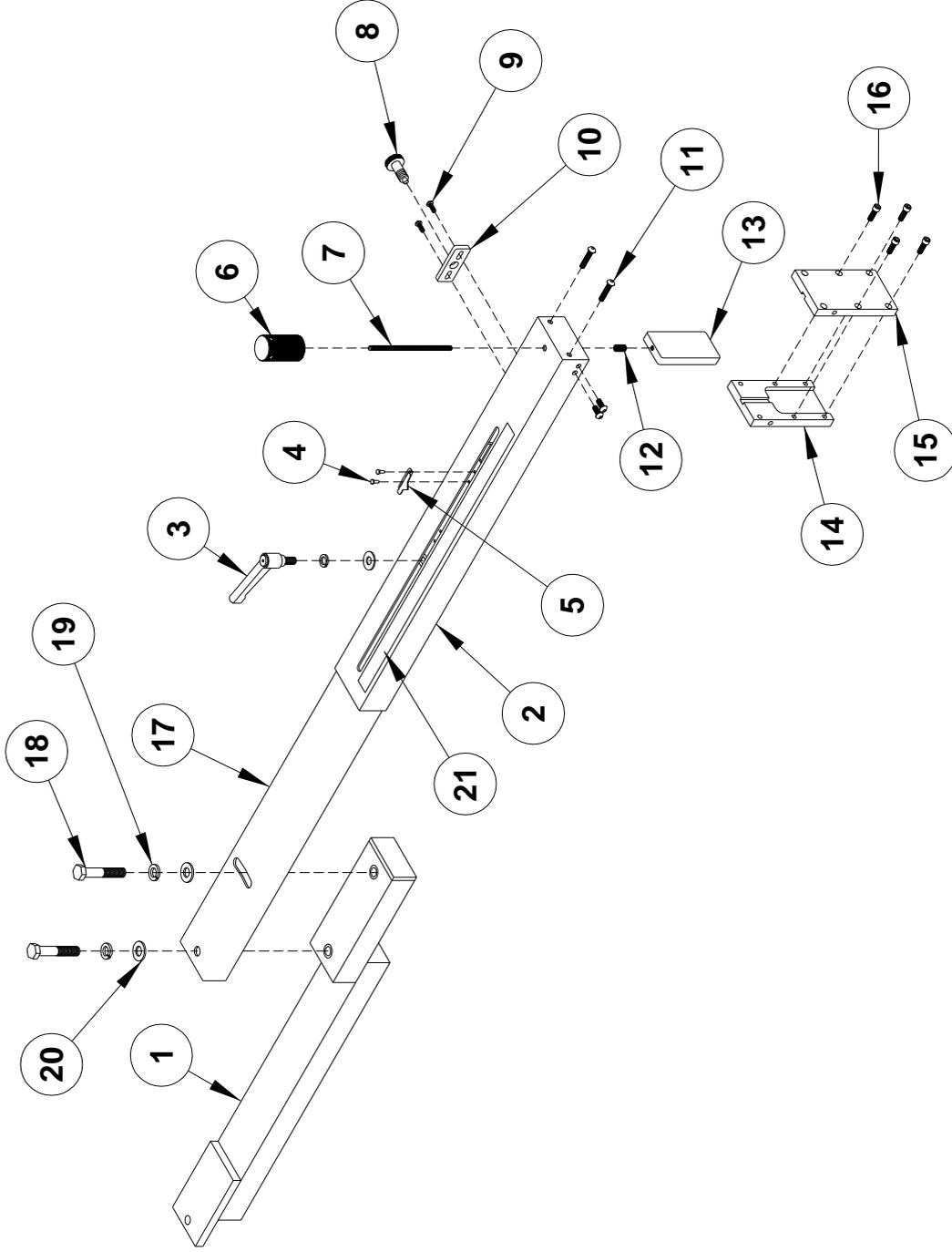




# Challenger III

1/8 color

## PALLET STOP ASSEMBLY



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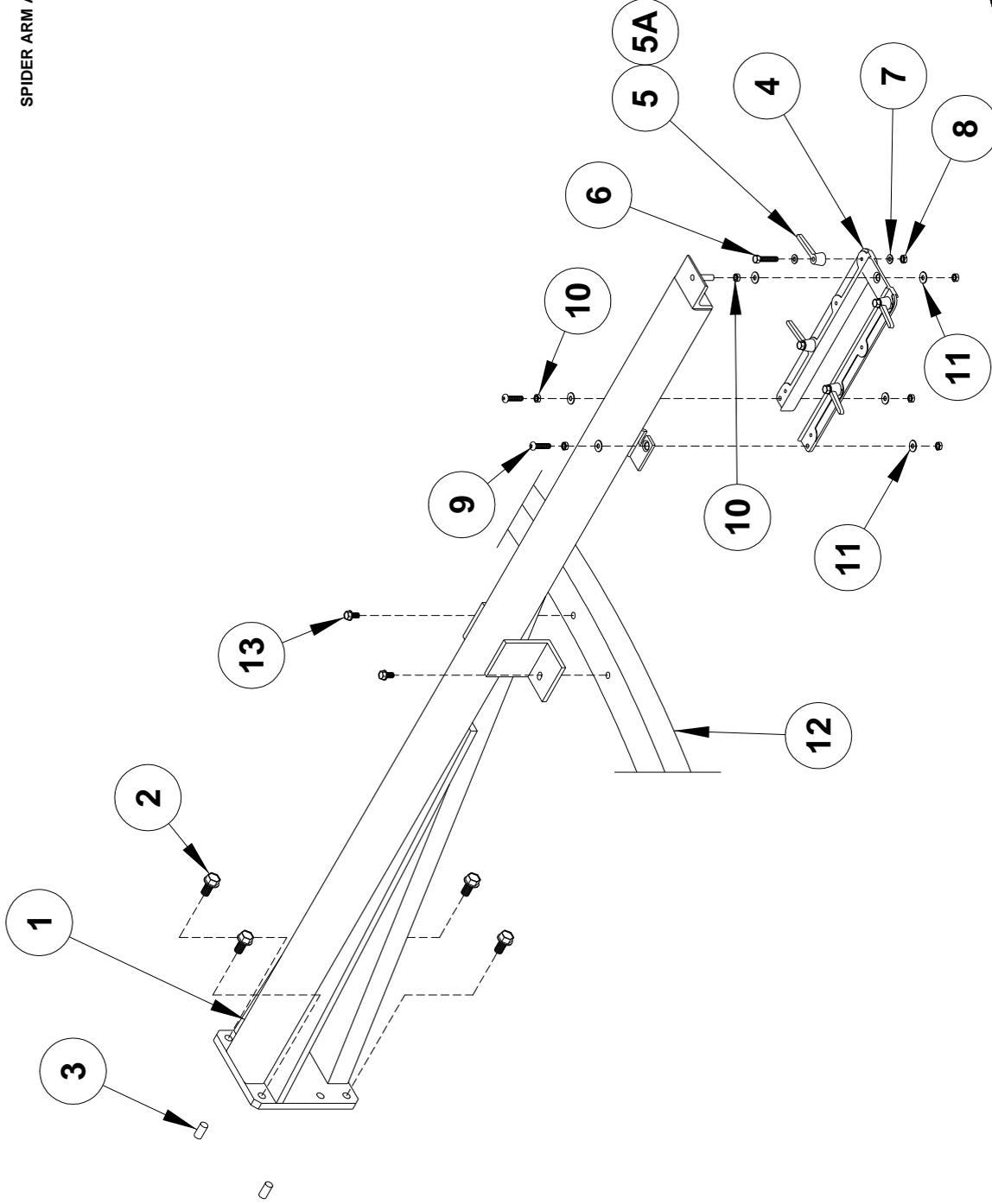




# Challenger II

18 color

## SPIDER ARM ASSEMBLY



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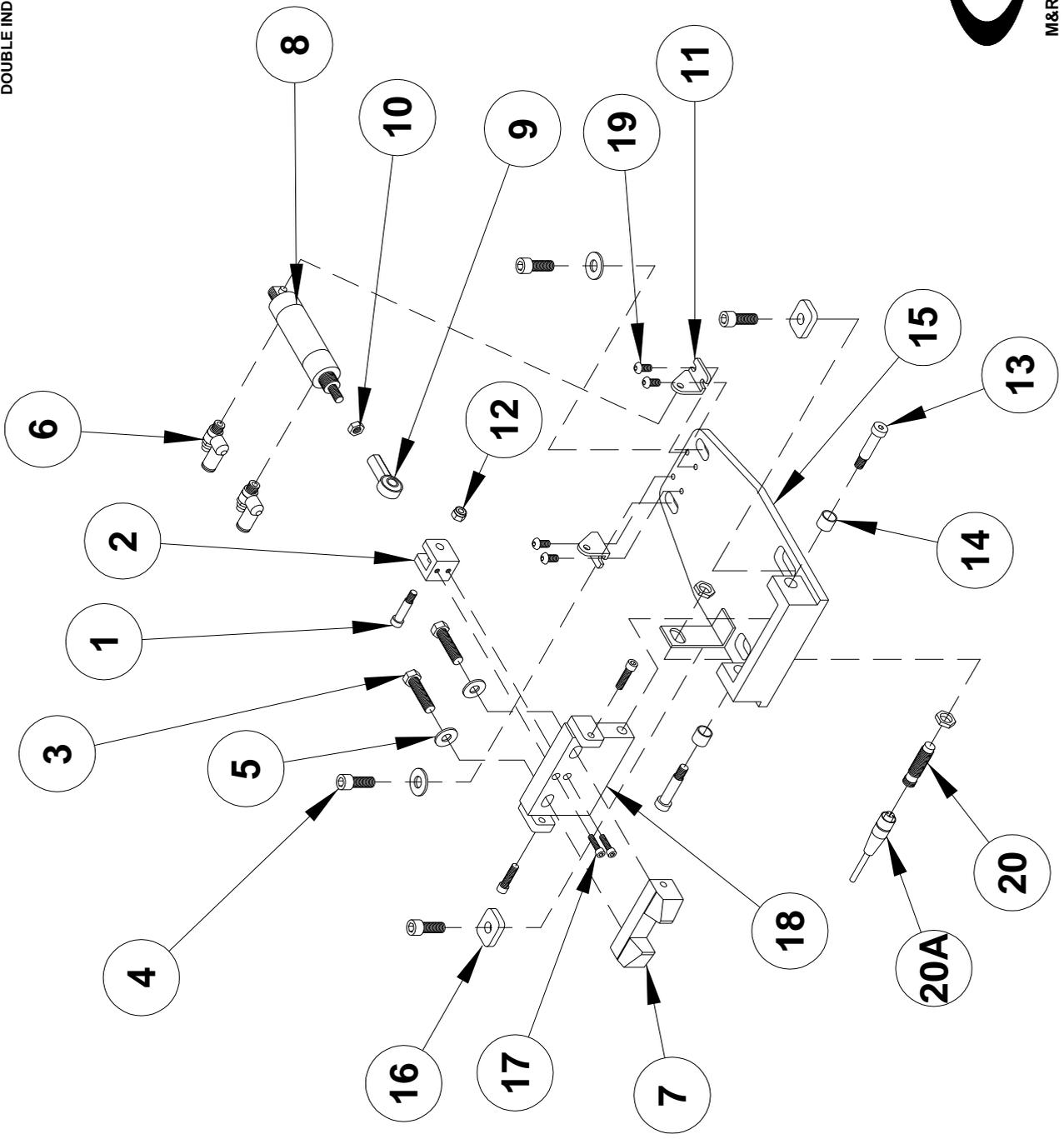




# Challenger III

18 color

## DOUBLE INDEX ASSEMBLY



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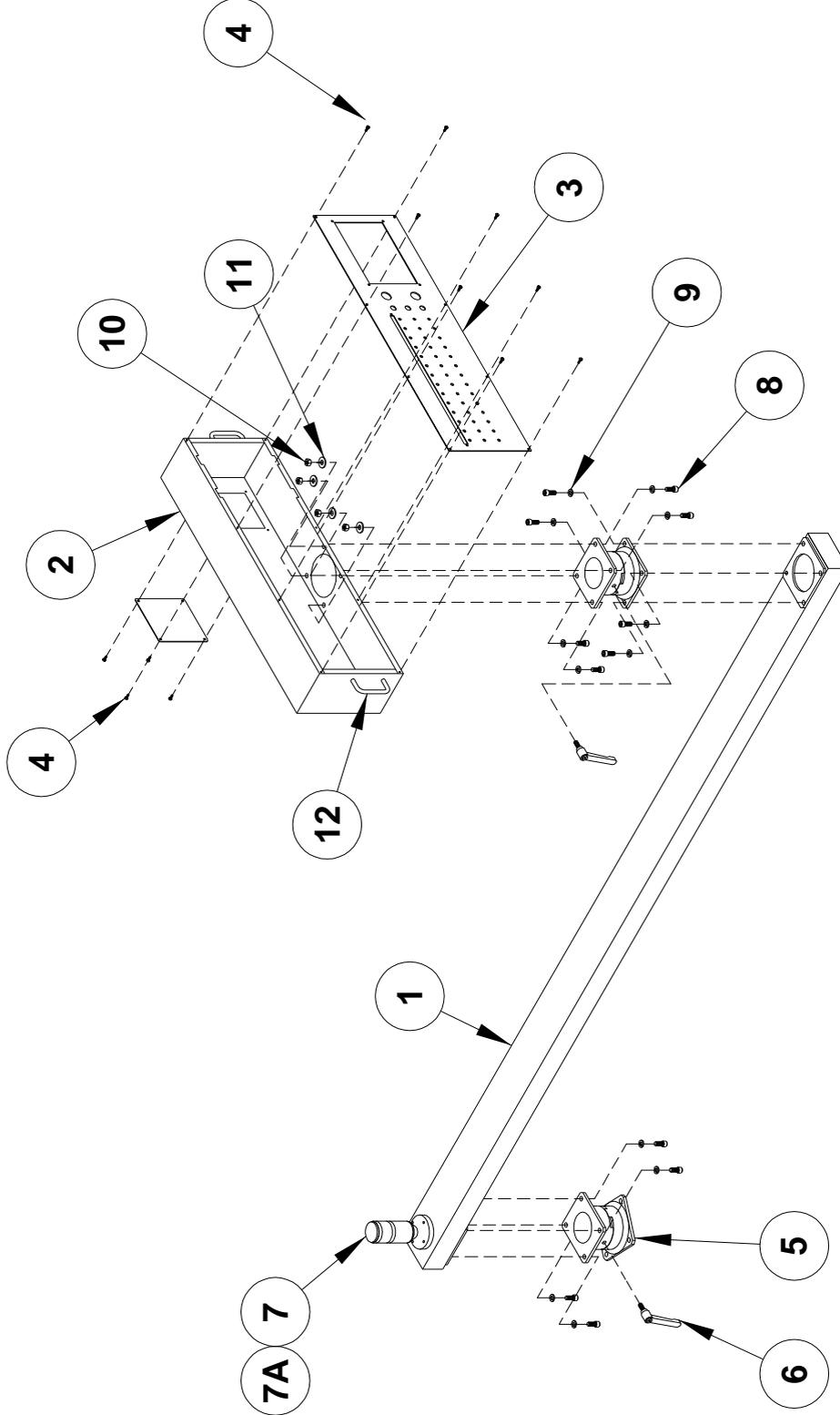




# Challenger III

18 color

MAIN CONTROL PANEL ASSEMBLY



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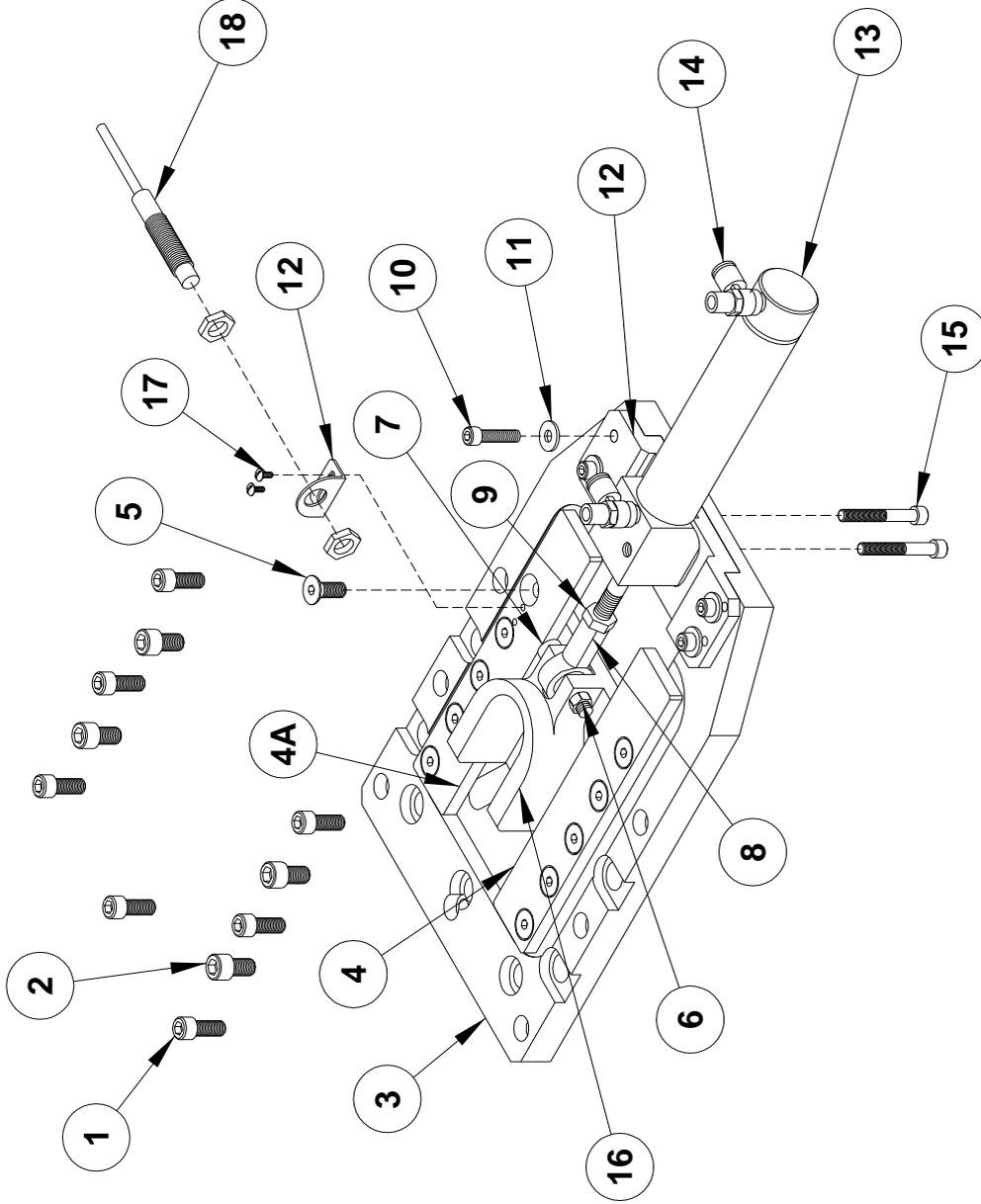




# Challenger II

18 color

## CLEVIS PLATE ASSEMBLY



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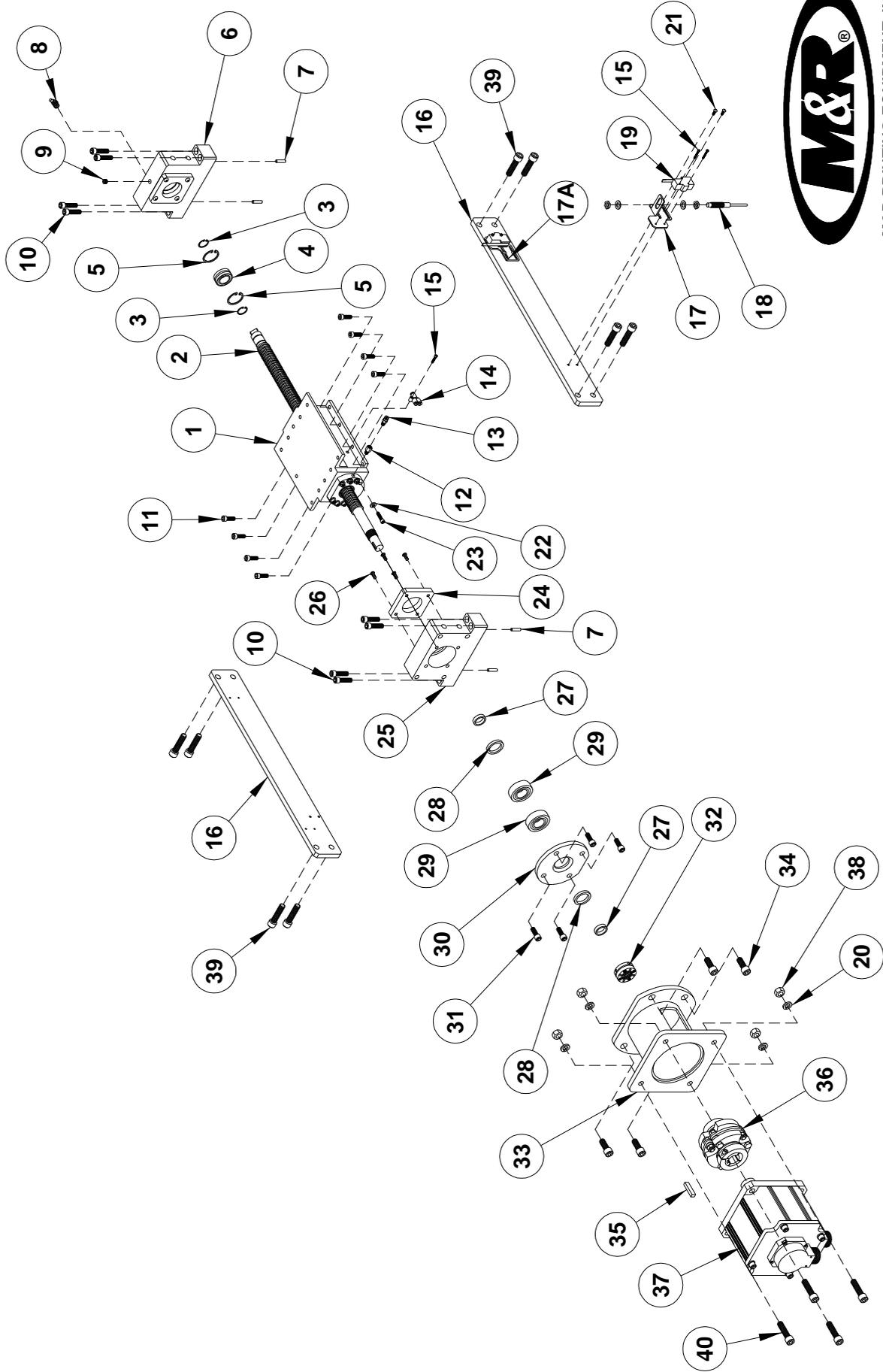




# Challenger III

18 color

## DRIVE MOTOR/BALL SCREW ASSEMBLY



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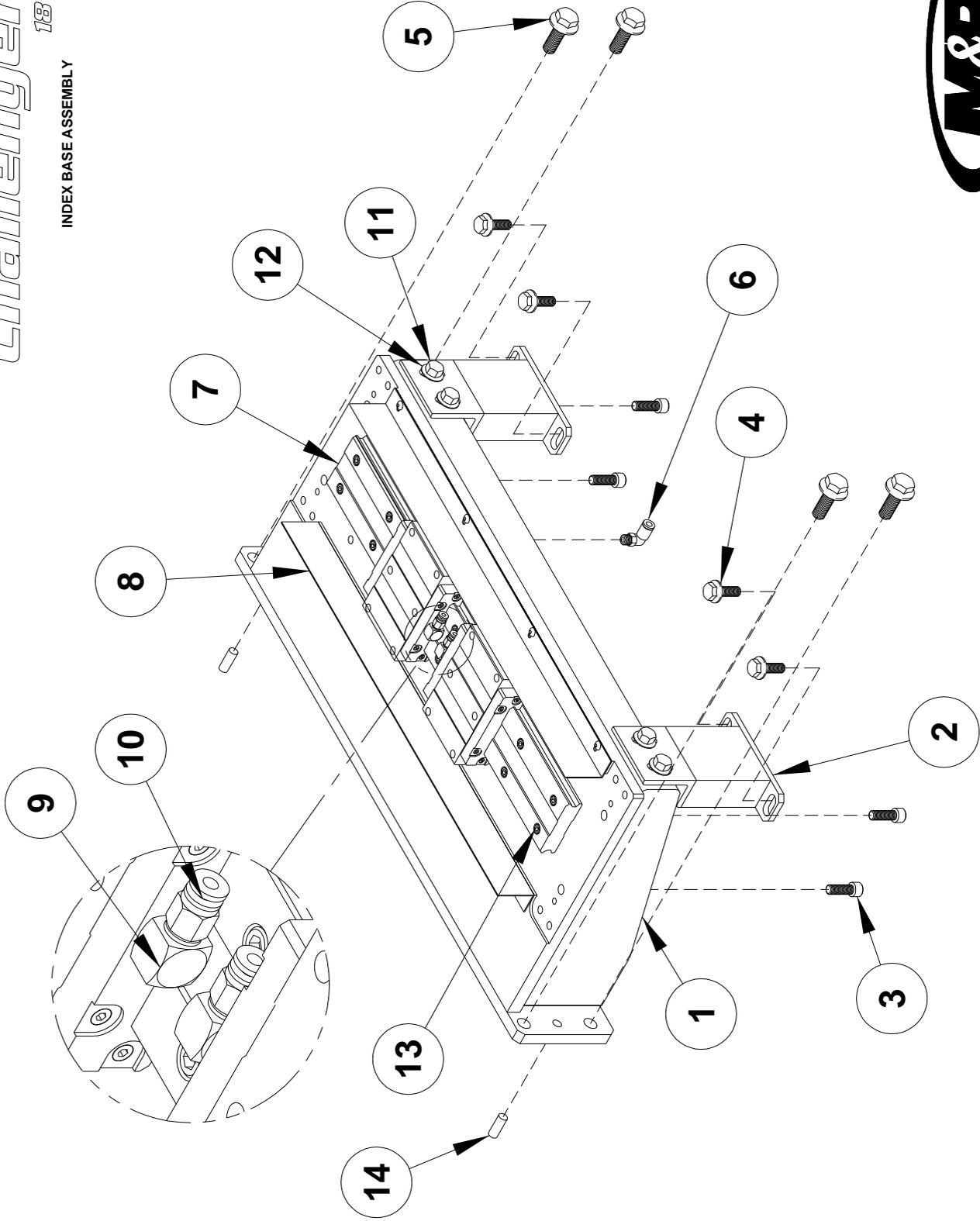
34	SOCKET CAP SCREW 1/2"-13 X 1"	3009058
33	MOTOR MOUNTING BRACKET	9150076
32	LOCKING NUT	3013143
31	SOCKET CAP SCREW 3/8"-16 X 1"	3009000
30	BEARING FLANGE	9105252
29	SINGLE ROW ANG. CONTACT BALL BEARING	3023089
28	OIL SEAL	3023088
27	DISTANCE BUSHING	9105258
26	BUTTON SOCKET CAP SCREW 1/4"-20 X 1/2"	3001005
25	BEARING BLOCK, LEFT	9150433
24	BALL SCREW BUMPER	9150424
23	SOCKET CAP SCREW 5/16"-18 X 1"	3009003
22	SPLIT LOCK WASHER 5/16"	3022003
21	BUTTON SOCKET CAP SCREW 10-24 X 1/2"	3001013
20	SPLIT LOCK WASHER 1/2"	3022000
19	SNAP ACTION SWITCH	1020242
18	PROX. SWITCH, ROUND	1010012
17A	HOME PROX. MOUNTING BRACKET, RIGHT	9150429
17	HOME PROX. MOUNTING BRACKET	9150439
16	REINFORCEMENT PLATE	9150437
15	ROUND HEAD MACHINE SCREW 6-32 X 7/8"	3005008
14	FITTING "Y" Ø5/32" TUBE	2003024
13	FITTING, MALE CONNECTOR 1/8 NPT	2003000
12	LUBE ADAPTER	2007088
11	SOCKET CAP SCREW M8 X 25mm	3009162
10	SOCKET CAP SCREW 3/8"-16 X 1 1/2"	3009001
9	PLUG 1/8 NPT	2006002
8	FITTING, GREASE 1/8 NPT 45°	2003032
7	DOWEL PIN	3014001
6	BEARING BLOCK, RIGHT	9150434
5	INTERNAL RETAINING RING	3024047
4	NEEDLE ROLLER BEARING	3023460
3	EXTERNAL RETAINING RING	3024046
2	BALL SCREW (SHAFT)	9150441
1	BALL SCREW NUT HOUSING	9150442
ITEM NO.	DESCRIPTION	PART NO.
CHALLENGER II 18 COLOR DRIVE MOTOR/BALL SCREW ASSEMBLY		



# Challenger II

18 color

## INDEX BASE ASSEMBLY



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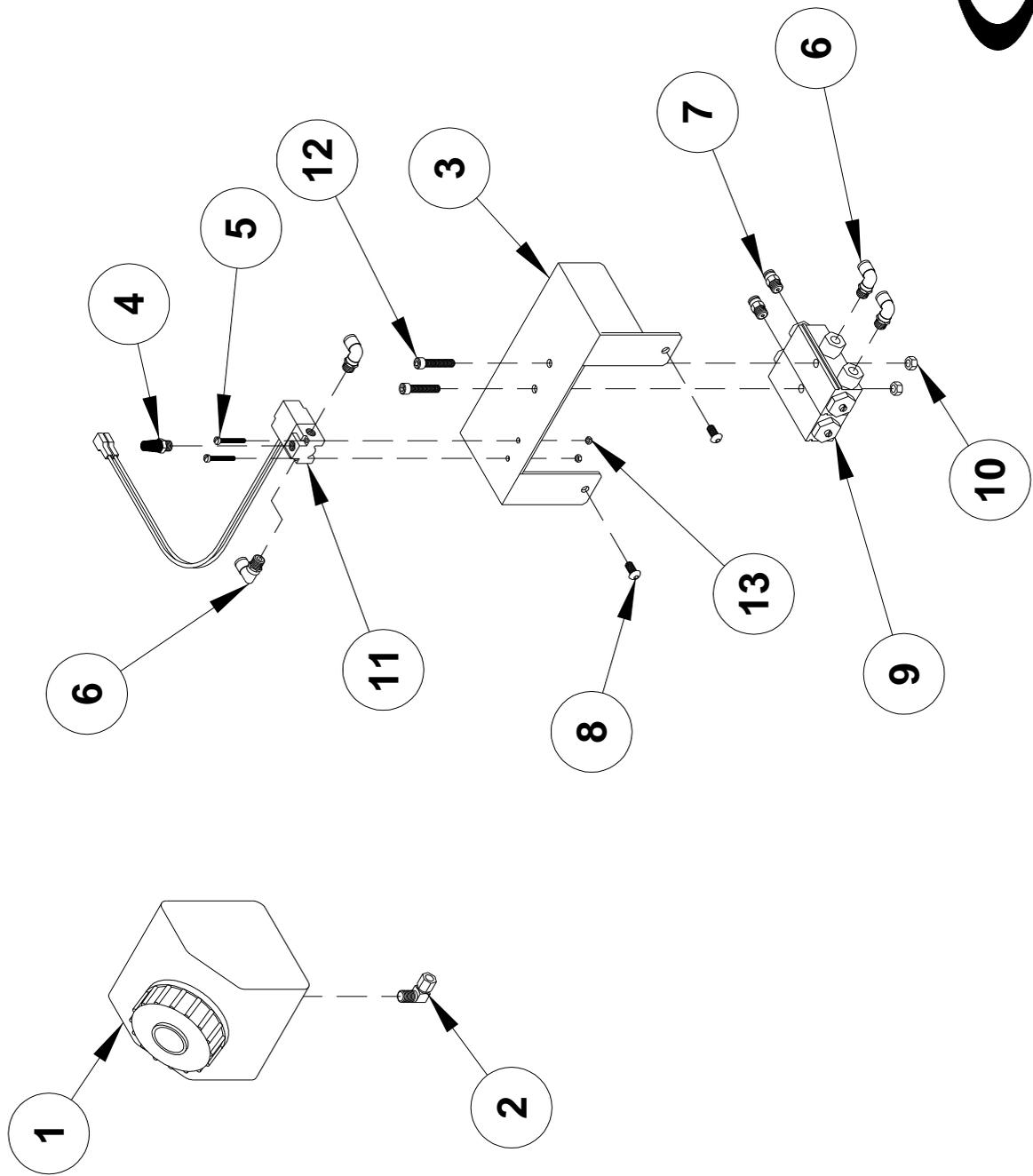




# Challenger II

18 color

INDEX LUBRICATOR ASSEMBLY



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# Glossary:

**active size** - The speed at which the servo index drive will make the machine carousel turn, determined by the pallet size selected.

**adjuster** - The mechanism used to change, so as to adjust speed, height, distance and etc.

**adjustment knob** - A knob/handle provided with threads which is used to make changes to speed, height, distance etc.

**air dryer** - A device utilized to eliminate the moisture and condensate which is a by product of the act of compressing free air, also referred to as "Refrigerated Chiller".

**Allen Head Screw** - A machine screw with a head which requires an Allen Wrench for turning of the screw body. Allen head screws are used with or without a nut to mount or fasten two or more component assemblies together.

**APM status** - The current condition of the amplifier circuit used to provide electrical power to the index drive servo motor.

**art table pin bar** A flat metal strip with 3 machined dowel pins, which is located at the top of the art table, used to secure pre-punched plastic carrier sheets for the placement of film positives or art-work.

**base pallet frame** The assembly to which the pallet is attached on the pallet support arm.

**butt-to-butt registration** The alignment of two or more colors in the printed image in such a manner which results in no overlapping of one color to another.

**cam follower** A roller type bearing with a threaded shaft, which will be used to secure the bearing to a mechanical assembly. Cam followers are used on the carousel table for locking of the carousel table during the printing cycle. Cam followers are also used on the index plate for rotation of the index table.

**carousel** The rotating part on the machine, to which the pallets are attached. (Also referred to as the "Index Table")

**carousel plate** The lower machined plate that makes up the carousel, which rides on the center bearing, known as the "Timken bearing".

**carriage shafts** The cylindrical rods used to guide and support a mechanical assembly, such as print head carriage or index drive carriage assemblies.

**carrier sheet** A Piece of film or acetate that has been pre-punched with holes that correspond to the pins on the pin bar.

**chopper cylinder** The pneumatic double acting cylinders used to make the flood bar and squeegee raise or lower.

**compressor** The apparatus used to compress free air into a holding tank.

**control element** The device in an electrical circuit or system that maintains a given valve.

**control box** The enclosure in which you will find most of the electrical and electronic elements of the machine.

**cooling fan** The blower used to move air across a control box to keep electrical and electronic elements within specific operating temperatures.

**cross knobs** A knob/handle which has four points of leverage in the form of a cross.

**cure temperature** The temperature at which a liquid compound (ink) will change its chemical composition making it solid. (Plastisol Fusion)

**cycle sequences** A series of events or operations which must take place in a specific order to complete a work operation.

**digital temperature control** A device which uses electronic circuits to maintain a given temperature within a specific area.

**drain valve** A valve used to drain/release a substance out of a container.

**dwel timer** A device used to delay the time in which the different steps of a sequence take place.



**exposure unit master frame** The assembly used to secure the screen during the exposure time.

**flash mode** The condition in which a print station (or print stations) will operate as a flash cure station.

**flash panel** The infra-red panel, powered by electricity, used to create heat to cure inks on a garment.

**film register pin bar** A flat metal strip with three (3) machined dowel pins used to secure pre-punched plastic carrier sheets for the placing of film positives or art work.

**flip-up front screen holder** The “C” shaped channel attached to a mechanism with a pivot point that will allow the operator to swing the holder upward.

**flood bar** A metal blade with a specific contour used to spread the ink across the image area in a screen.

**flow control valve** The valve used to control the flow rate of a fluid (compressed air), which will increase or decrease the displacement speed of a pneumatic cylinder.

**frame** A structure composed of parts fitted and joined together which will serve as the perimeter of a screen and support structure of the screen fabric or mesh.

**frame holder assembly** The mechanism used to secure a screen onto the print head of the machine.

**front/rear toggle switch** An electrical switch device used to determine if the print carriage will stop in the front or rear position of the print station at the completion of the print stroke operation.

**front screen holder** The “C” shaped channel used to clamp the screen once placed in the print head.

**front stop** The position at which the print carriage will stop towards the outside of the machine.

**fuse holder** The device for securing a fuse in place in an electrical circuit, which will have provision for electrical connection to a circuit.

**head/print carriage** The assembly to which the flood bar and squeegee are mounted.

**imprint area** The surface on which it is desired to print.

**improper screen tension** The absence of sufficient force used to produce elongation or extension of the screen fabric or mesh secured to a screen.

**inboard speed** The speed at which the print carriage moves from the outside of the machine towards the center.

**indexer** The mechanism used to make the carousel rotate one station over.

**indexer base** The bottom structure of the machine consisting of printing pallets with support arms to which garments are placed.

**index cam follower** A roller type bearing employed in the index drive mechanism.

**index delay** The interval of time that the machine will wait before initiation of the next operating or index cycle.

**index fork (clevis)** A machined metal “U” shaped fixture designed to engage the index cam-follower bearings.

**independent print** The activation of a single print head so that it performs a print cycle.

**index on proximity switch** The sensor which detects the location of the carousel by sensing the proximity of the index cam-follower bearings.

**index table** The rotating part on the machine, to which the pallets are attached to. (Also referred to as the “carousel”).

**indicator** A device which draws the attention of the Operator to a specific control area, alerting the Operator to the current condition of a control element.

**infra-red heat panel** A flat rectangular piece forming a part of a surface powered by electricity, used to create heat to cure inks on a garment.

**ink build-up** The accumulation of several layers of ink on the bottom surface of a screen or the printing surface.

**ink deposit** The amount of ink left on the printing surface after the print cycle.



**latch clamp** The mechanical device used to join the front screen holder assembly against the head front end plate.

**L.C.D.** The liquid crystal display.

**locking cam** A machined cam milled in such a fashion as to lock two mechanical surfaces against one another when turned in a specific direction. Locking cams are used to secure printing pallets to the index support arm assemblies.

**main image** The defining color of a design. (In some cases one or more colors/films may be needed to create a defining complete image.)

**main regulator** The first air pressure regulator which the incoming compressed air encounters, located on the bottom of the machine.

**manufacturer's rating plate** The plate on which a manufacture will state the power requirements and serial and model numbers of a machine.

**mesh count** The number of openings per linear unit of measurement, either per inch or per centimeter, of a screen printing fabric.

**mesh tension** The force tending to produce elongation or extension at which the screen printing fabric (mesh) is exposed to, expressed in nanometers.

**message code** The systematically arranged and comprehensive collection of statements to convey a message.

**micro registration** The incremental adjustment or placement of a screen.

**no shirt detector** The photo eye sensor that will allow the machine to determine if there was no T-shirt place at the load station after the machine has gone through an index cycle.

**O.D.** The outside dimension.

**off-contact** The preset distance between the bottom of the screen fabric and the top surface of the substrate that is to be printed.

**off-contact lever** A mechanism designed to allow the adjustment of the off-contact of all screens at a single point.

**Ohm Meter** The testing device used to check the resistance across an electrical conductor.

**oiler** The device used to supply a mist of oil to the compressed air utilized by the machine.

**operator interface** The circuit that permits communication between a central processing unit and the Operator of the machine. The LCD control panel provides this interface.

**operation mode toggle switch** The electrical device used to command the machine to start an index cycle.

**optical distortion** The effect of viewing layered films at differing perspectives.

**outboard speed** The speed at which the print carriage moves from the center of the machine towards the outside.

**pallet** The flat surface on which the substrate is placed to be imprinted.

**Pelon** A material used to sample prints during set-up and registration of the press.

**pin bars** A flat piece of stainless steel containing small dowel "Pins", manufactured under high tolerances so that there is zero play between the pins and the corresponding pre-punched acetate carrier sheet.

**PLC memory** The program within the programmable logic controller.

**press head** The mechanism used on the machine to push the ink through the screen.

**press registration** The capability of the equipment to repeat print location and alignment from color to color and pallet to pallet. Press registration is an extremely fine adjustment which sets the distance between the center of pallet arms to a tolerance of plus or minus .001".



**press manifold** The holding tank under the machine, which will store compressed air, available for the machine to use.

**prime position** The ideal location of placement of different components so that maximum adjustment can be achieved.

**print finish** The function of the machine that will allow the press operator to sequentially shut off the print heads as the last garment gets printed.

**print speed** The speed at which the squeegee travels across the screen.

**print start** The function of the machine that will allow the press operator to sequentially turn on the print heads, as the first garment gets printed.

**print station master frame** The mechanical structure which forms the perimeter of the printing head of a machine.

**proximity switch** The solid-state switch that will complete an electrical circuit by the presence of metal within a specific distance (proximity) from the sensor portion of the switch.

**push pin** A spring loaded pin.

**PV/SV key** The control element on the temperature controller that changes the temperature display indication, either PV (pre-set value) or SV (set value).

**ram** The random access memory.

**ratchet knob** The knob which has a ratchet mechanism that will allow you to change the position of the lever for better leverage.

**rear frame holder** The "C" shaped channel used to clamp the rear of the screen once placed in the print head.

**rear micro lock** The locking mechanism that will not allow the rear micro adjustment to shift once an adjustment is made.

**rear stop** The position at which the print head will stop towards the inside of the machine.

**registration** The proper alignment of all the screens so that the printed image is reproduced on the substrate exactly as it appears on the original artwork.

**reset button** The electrical switch used to re-initiate the PLC after a halt has occurred.

**revolver mode** The section of the program of the machine that allows the PLC to accept up to 10 different print sequences.

**screen exposure** The action of allowing the screen with emulsion to get exposed to light.

**scribe** The action of drawing a very thin line.

**servo amplifier unit** The electro-electronic device which will provide the servo motor with electrical power.

**servo index drive** The mechanism used to make the carousel turn, which will be driven by a servo motor.

**shut off valve** The device that regulates or blocks the flow of gases, liquids or loose materials through structures, such as piping or passage ways.

**sight dome** The transparent hemispherical structure that will allow you to see the oil rate of an oiler.

**side load** The pressure of tension left on the micro-assembly after an adjustment took place.

**solenoid** An electro-magnet consisting of a coil with a movable core, which is used to activate the valves used in the machine.

**spray tack** The aerosol substance used to create stickiness on the surface of a pallet.

**spool** A cylindrical shaped control element internal to an air valve which incorporates fixed rubber "O" rings along its length designed to either block off, or open drilled air ports in the air valve body, depending on its position within the valve body.

**squeegee angle** The position at which the squeegee blade comes in contact with the screen.



**squeegee blade** The flat thin structural member made of a rubber-like material, used to push the ink through the screen.

**squeegee pressure** The amount of force placed on the squeegee blade to push ink through the screen.

**stop blocks** A solid piece of metal having one or more flat sides, which will be used to determine the placement of the screen.

**stop block contact** The coming together or touching of the screen frame corner with the stop block.

**stroke cylinder** The pneumatic cylinder used to carry the print carriage through the flood and print motion.

**SV (set value)** The value at which you desire the unit should reach.

**tear down** The action of taking squeegee, flood bar and screen off a print head or print heads.

**terminal block** The connecting device at which the end of a electrical wire gets attached to.

**threaded rod** The cylindrical rod that has been threaded throughout its length.

**tight registration** The scenario at which two colors printed on a garment come so close that they almost touch, but without leaving a gap between them. Sometimes referred to as "Butt Registration".

**Timken bearing** The tapered roller bearing on which the carousel rotates.

**torpedo level** An instrument consisting of an encased liquid-filled tube containing an air bubble used for leveling a surface horizontally or vertically.

**trap color** The color which is used to fill up the gaps left by the previous colors printed on a garment.

**trap screen** The screen used to print the trap color on a garment.

**trip points** Any object placed, secured, or bolted to the floor that may cause someone to trip.

**uni-strut support channel** The "U" shaped channel on which the rear of the radiant panel frame gets its support.

**water trap** The device on the machine that will collect a very small amount of the moisture traveling with the compressed air. This is just a warning device.

**Zerk fitting** The device that will provide a place to connect the grease gun.

**zero out the micros** The action of placing the micro registration assembly in the middle position so that there is equal adjustment in either direction.





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Damage which occurs in transit is not covered under this warranty. Any damage which occurs in transit is the responsibility of the freight carrier.

Neither are parts subject to normal wear and tear nor expendable parts such as motor brushes, filters, lamps and fuses covered by this warranty, nor do we warrant failure of parts or components resulting from misuse or lack of normal maintenance. Conveyor transport belts are subject to normal wear and tear. These belts may be replaced subject to M&R Printing Equipment, Inc. inspection. If replacement is deemed necessary by M&R, the belt will be replaced at no prorate during the first year and a graduated prorate during the second year of the warranty. M&R is not responsible for the removal or installation of a defective part or its replacement part, nor for any related or unrelated costs incurred with respect thereto. All labor, travel and sustenance charges for service technicians are the customers responsibility. Any part determined to be defective in material or workmanship within the warranty period will be repaired or replaced if deemed necessary and at our discretion without charge when returned **FREIGHT PREPAID** to:

**M&R Printing Equipment, Inc.**  
**1 N. 372 Main Street**  
**Glen Ellyn, Illinois 60137-3576**

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A clean, moisture-free air supply must be installed onto pneumatically operated equipment. Failure to install a clean moisture-free air supply to this equipment may result in premature failure of pneumatic components such as air cylinders, seals and valves. Any pneumatic component or assembly which is determined to have failed due to the customers failure to provide a clean moisture-free air supply to the equipment will not be covered under this warranty.

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