

# EconoMelt™

## Models 10-2 & 10-4

### Operations & Service Manual



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# Chapter 1 - Safety Summary

## 1.1 Introduction

This chapter is intended as an introduction to the installation, operation and maintenance of the hot melt applicator and sets out the safety rules to be observed for preventing risk both to personnel and to the equipment.

## 1.2 Safety During Installation

1. Establish correct and effective ground connection for entire apparatus. Without such connection, every element of the apparatus even those apparently insulated become a potential conductor and pose a risk of electrical shock.
2. Check that the power cords and their insulation are correctly dimensioned for the load constituted by the apparatus complete with all its accessories.
3. Always operate the apparatus in accordance with the recommended current and voltage. If the apparatus is operated at voltages and currents other than recommended this may create potential fire risk.

## 1.3 Safety During Operation

1. Do not operate the equipment near volatile or otherwise explosive gases or materials.
2. Do not operate the equipment without the covers, panels and safety guards properly installed.
3. Do not operate the equipment at a temperature above 50°C or below 0°C (122°F/32°F).
4. Do not use the equipment as a ladder or stepping stool.
5. Only the base of the hot melt applicator can be used while moving or lifting the machine. Do not use outstretched parts or components on control panel as supporting parts for lifting.

## 1.4 Safety During Maintenance

The main precautions to be adopted when carrying out maintenance are:

1. Disconnect the electrical power supply before performing maintenance on the equipment.
2. Do not wear rings, watches, bracelets, etc. when carrying out the maintenance.
3. Do not in any way inspect or adjust any component unless another person is present and able to ensure immediate assistance in event of an accident.
4. Employ only qualified personnel for maintenance work on the equipment.
5. Never touch bared connection or components while power is on without disconnecting the electrical power supply. Dangerous voltage exists at several points in the equipment.
6. Disconnect the electrical supply before removing any protection case or changing any electrical component.
7. If possible, stand on a rubber-insulating mat when carrying out maintenance on the hot melt applicator. Do not work on wet floors or in very damp surroundings.
8. Always use protective gloves and clothing which gives the maximum protection to parts of the

body liable to be splashed by hot melt or that may come in contact with the hot surface of components.

9. To avoid injury in the internal surface of the equipment, do not use any tools with open flames or sharp tips to clean a hot melt applicator.
10. Never operate the equipment with air or adhesive leaks (air or hot melt) in the system.

### **1.5 Safety When Using Adhesive and Solvent**

#### **A. Adhesive**

1. Use extreme care when working with molten materials as they solidify rapidly and present a hazard. Severe burns can occur if the molten materials first solidify; they are still hot.
2. Always wear protective clothing and eye protection when handling molten materials or working near equipment containing hot melt adhesive under pressure.

#### **B. Cleaning Solvents**

#### ***WARNING***

#### **DO NOT USE ANY HALOGENATED HYDROCARBON CLEANING SOLVENTS.**

The chemical reaction between aluminum or galvanized parts and halogenated hydrocarbon cleaning solvents is unpredictable and may result in anything from corrosion to a dangerous explosion. Contact your supplier to make sure you are not using this type of solvent for cleaning and flushing. The common halogenated hydrocarbon solvents are listed below.

Carbon tetrachloride  
Chloroform  
Dichlorofluoromethane  
Dichloromethane  
Ethylene dibromide  
Ethylene dichloride  
Ethyl iodine  
Methyl bromide  
Methylene chloride  
Methylene chloridebromide  
Methyl iodide  
Monochlorobenzine  
Monochlorotoluene  
N-butly iodide  
Orthodichloronenzine  
Perchloroethylene  
Propyl iodide  
Trichloroethylene  
Trichlorfluoromethane  
1,1,1-trichloroethane

#### ***WARNING***

An extreme fire hazard exists when heating solvents in a heating device that is not thermostatically controlled. When heating a solvent always use a controlled heat source.

### **WARNING**

Hot-melt adhesives are a burn hazard both in the molten state and when they are solidified and still hot. Be sure that first-aid information and supplies are always available where hot-melt adhesives systems are operating.

#### **C. Purging of system**

Pump all adhesive from system

Turn off system power and disconnect air from the system

Remove the filter in the tank and reinstall filter cover

Fill system with recommended purge material (Caution- purge material may be much thinner than hot melt and may spray from system with high velocity and splash)

Turn system on and re-pressurize

Heat then purge material and pressurize pump at very low pressure

Extrude purge material from gun into proper receptacle or re-circulate back into tank

Purge all material from tank and hose

Turn off system and depressurize

Install a new tank filter

Fill tank with hot melt to the 80% full level

Melt adhesive and purge one full tank of adhesive through hose and gun

#### **IF MOLTEN MATERIAL COMES IN CONTACT WITH THE SKIN:**

- **Do not try to remove molten material from the skin.**
- **Immediately immerse the affected area in cold, clean water. Keep the affected area immersed until the material has cooled.**
- **Do not try to remove the cooled material from the skin.**
- **Cover the affected area with a clean, wet compress.**
- **In case of severe burns, look for signs of shock. If shock is suspected, have the patient lie down, use blankets to preserve body heat and elevate the feet several inches.**

**Call a physician immediately.**

# Chapter 2 - Equipment

## 2.1 Introduction

This chapter contains general information on the EconoMelt™ 10-2 / 10-4



## 2.2 Specifications:

<b><u>Item:</u></b>	<b><u>EconoMelt™ 10-2 / 10-4</u></b>
Tank Capacity:	10 lbs.
Melting Rate:	15 lbs/hr
Power Supply:	220V/60HZ, Single Phase
Power (W):	2700 (Tank)
Size (L, W, H):	29", 16", 29"
Weight:	90 Lbs
Air Pressure:	7-57 PSI
Max. Viscosity:	20,000 CPS
Max. Working Temp:	220°C (428°F)
Max. Pump Air Consumption	at 60 psi, 1.4 SCFM (30 pump cycles per minute)

Note: Specifications subject to change without notice.

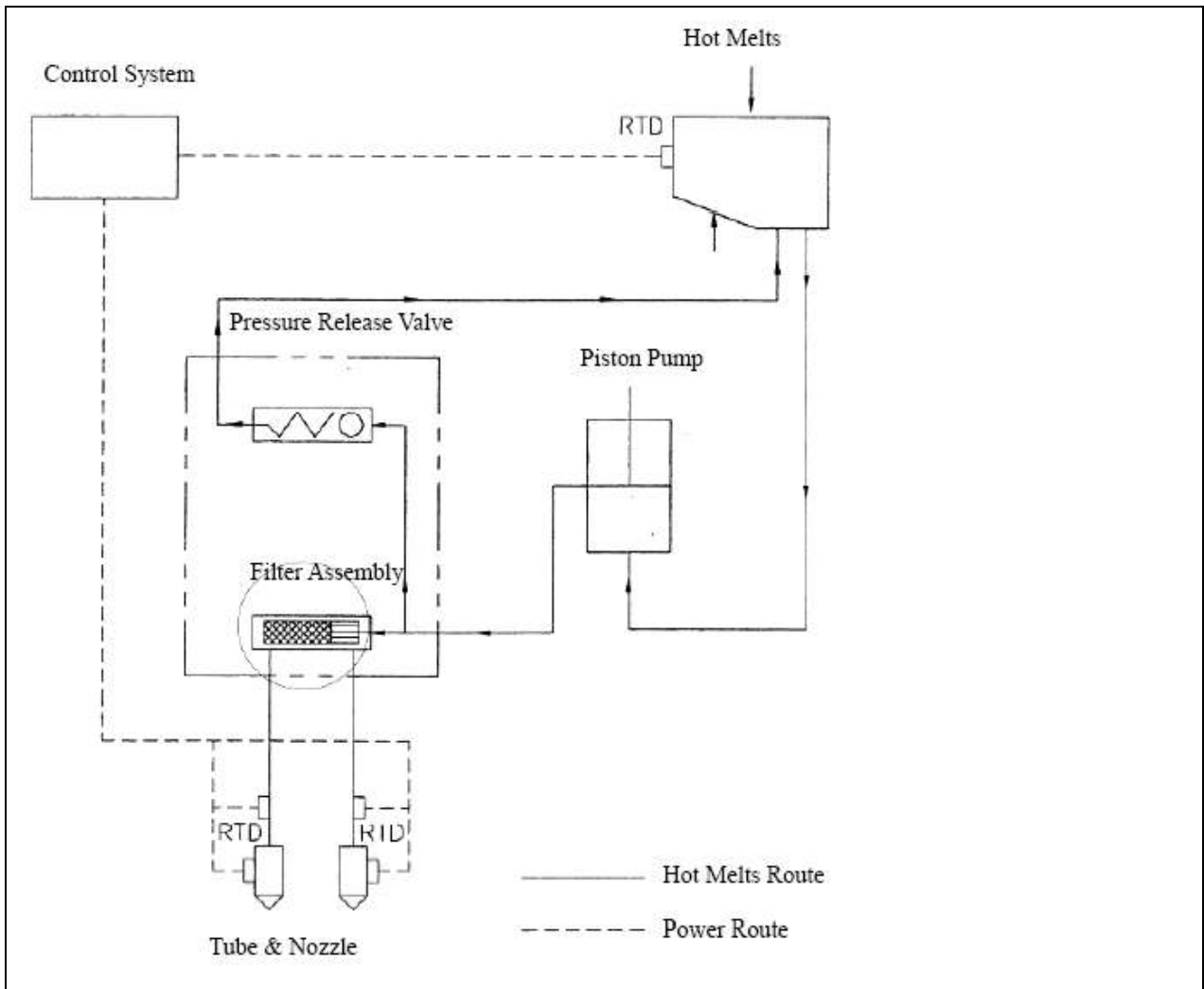


Fig. 2.2 Flow & Electric Control System

## 2.2 Mechanical characteristics

The EconoMelt™ 10-2/10-4 is designed to melt hot melts in most bulk forms such as chips, flyers and 2.5 lb. bricks. The system processes hot melts with viscosities from 500cps to 12,000 cps. A pneumatic cylinder pump is used in this machine.

The EconoMelt™ 10-2/10-4 consists of an electrical system, pneumatic system and hydraulic system. The melt tank is insulated to reduce heat transferred through the surface of the machine but some surfaces are hot and operators must exercise caution.

Solid adhesive in the tank melts into liquid which flows to the bottom of the tank and into the dual-action piston pump. When the piston pump cycles, hot melt flows into the pump and is pressurized into the manifold through the filter assembly, through the flexible heated hose and into the handgun.

## **2.3 Function of the Equipment.**

### **2.3.1 Drive System**

Adhesive pressure is achieved with a pneumatic piston driving a hydraulic pump. As shown in fig2.2 the cylinder is connected to the pneumatic pump. The cylinder's piston moves upward and downward, which drives the pump, pulling hot melt from the tank and pressurizing it into the hose manifold. The cylinder's action is controlled by a solenoid valve and limit switch.

### **2.3.2 Hydraulic System**

#### **1. Melt Tank**

Hot melt is placed in the melting tank, the heaters in the bottom of the tank heat the tank and the adhesive becomes molten. Molten adhesive flows to the pumping system. On the internal wall of the tank there is a coated layer of Teflon material which reduces hot melt adherence to the wall of the tank. Fins inside the tank increase the heat conductivity and melt rate. An RTD sensor is built in the tank to detect the tank temperature and sends relevant signals to the temperature controller. This effectively controls the tank temperature.

#### **2. Cylinder Pump**

In the EconoMelt™ 10-2/10-4 piston pump can be divided into two sections, i.e. pneumatic drive system (Drive System) and the hydraulic system (the Dual-Action Piston Pump) which is installed inside the tank). As the Fig 7.4 shows, adhesive is pumped when cycling both up and down. The combination of the Lower Check Valve (at top of the cylinder) and the Upper Check Valve (inside the piston) makes continuous glue pumping possible. When the piston strokes upward- section A draws adhesive in and adhesive in Section B is driven out to the manifold. These actions are controlled by the limit switch located on two sides of the cylinder base. Back pressure is created on each stroke with a series of check valves.

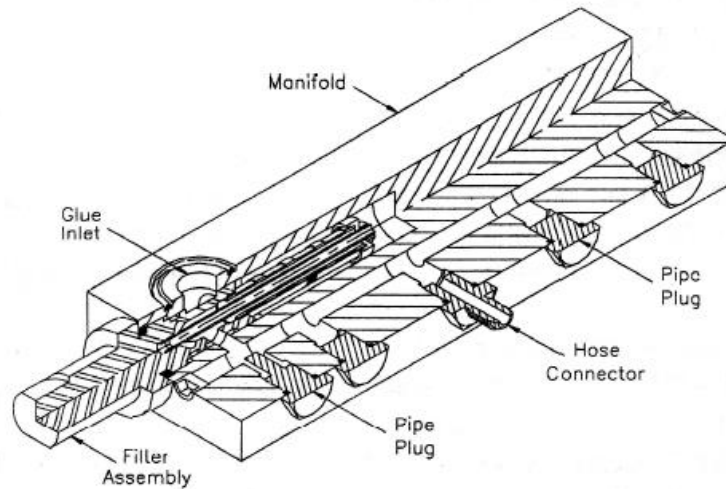
#### **3. Filter Assembly**

The filter is installed inside the manifold. Hot melt that is pressurized out of the piston pump is filtered here and then dispatched to different channels inside the manifold. This device filters impurities and char prior to the flexible hose. It is fixed in the back of the tank and is convenient for easy removal.

#### **4. Manifold**

The manifold is made of aluminum alloy and is attached to the heated tank. Adhesive from the pump arrives here after being filtered and is dispatched in 2 channels. Two hard pipe tubes are connected with the manifold, where adhesive will flow before reaching the heated hose.





### 2.3.3 Electrical System

#### 1. Heating System

The heating system consists of the melting tank, flexible hose and nozzle assembly. The heater for the tank is at the tank bottom. The heater for handguns is the cartridge style. RTD temperature controllers are used to detect the temperature of heating system and send relevant signals to the temperature controller to insure accurateness of  $\pm 3^{\circ}\text{F}$ . A mechanical temperature controller is installed in the hot melt applicator.

#### 2. Temperature Controller

Temperature Controlling system can be divided into 2 individually controlled sections.

Two different temperature controllers are utilized:

- (A). Electronic proportional temperature controller.
- (B). Mechanical temperature controller.

#### 2. Electronic temperature controller

At first the temperature induced by the thermocouple is transmitted into an electronic signal and then transferred to the comparison devices of the temperature controller. The device compares the voltage detected by the thermal couple with the preset voltage. The controller sends an ON/OFF signal to SSR to control the power switch of the heater.

Some of the electronic proportional temperature controllers control the temperature of the melting tank and some control the temperature of the nozzle. Normally there is little structure difference between them.

To adjust the temperature press the (<) Button to highlight the number to change and use the ( $\wedge$ ) Button to set the desired temperature. Press the "Set" Button when done.

#### 3. Mechanical temperature controller

Inside the mechanical temperature controller, an RTD is applied to detect the temperature of the heating system. When the bar is warmed the solvent will expand because of heat when the temperature reaches preset value, the solvent will be transferred to the temperature controller through the pressure conduit, the spring inside is *kicked off* and cuts off the power and the heater stops continuous heating. When the temperatures begin to drop, the spring automatically withdraws to where it was kicked off and once again the heater is ON and continues to give off heat.

# Chapter 3 - Installation

## 3.1 Environment for using applicator

1. Make sure the control panel is easily accessible and there is enough room to open the tank lid to add adhesive material to the tank. Please also leave sufficient space around the applicator when installing for easy access and serviceability.
2. Secure the EconoMelt™ 10-2 / 10-4 base with four bolts to a sturdy flat surface.
3. Try to avoid locating the machine where the ambient temperature is below 32°F or above 122°F.
4. Try to install the system in a low dust environment. Prevent the machine from vibrating.
5. Install the system where external air flow is minimized.
6. System must be installed in a dry environment.
7. Compressed air to system must be above 20 PSI  
Air source after filtered can be kept at 4kg/cm<sup>2</sup> for general pressure.

## 3.2 The Installation of Power Supply

The rated voltage is 220VAC single phase. When installing electric please note the following items:

1. Disconnect the foreign power source when removing the shield of the electric cabinet. OR the internal terminal will be electrified even though the applicator is shut off.
2. Do not try to amend the power supply to make it work in 3-phase power as this will damage the machine.
3. Cut off the power supply to the system.
4. Ensure the breaker has been switched to OFF.
5. If the electric system has no ground line, ensure there is a ground line to be linked to the terminal base.

Note: Please carefully read the following unit before operation.

# Chapter 4 - Operation Instruction

## 4.0 Introduction.

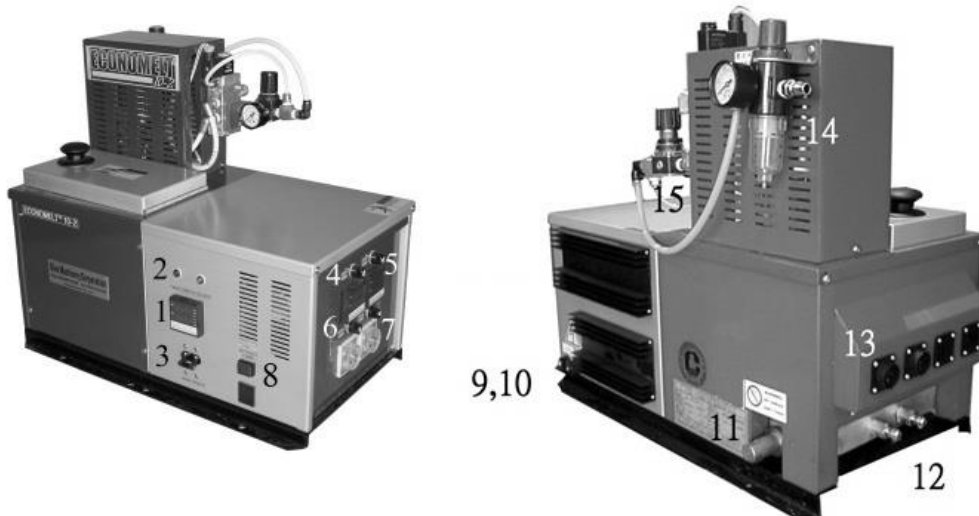
The purpose of this section is to introduce EconoMelt 10-2 / 10-4 owners to electrical function, preparation before operation and system set up

## 4.1 Safety Precaution.

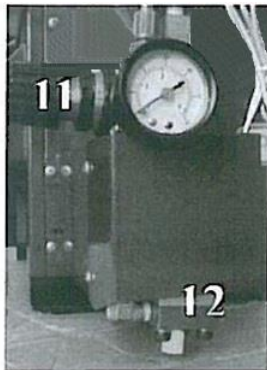
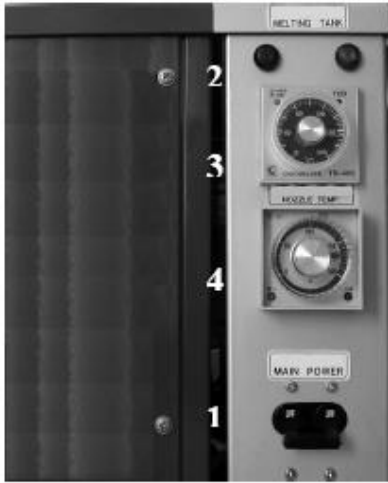
Always wear safety gloves, safety glasses and long-sleeved overalls to prevent the operator from being burned by hot melt or by the heated components of the system.

- a) Try to avoid damp air in the compressed air source.
- b) The adhesive level in the tank should be kept at approximately 80% of tank capacity
- c) General operational air pressure is approximately 20+ psi and should not exceed 80 psi
- d) Do not operate the system until it reached temperature
- e) Pay attention to all the safety items.

## 4.2 Introduction to the function of the control panel and relative parts:



No.	Part Name & Function	No.	Part Name & Function
1	Main Power Switch for system machine	9	Main fuse for the machine
2	LED indicates tank being heated or not	10	220 VAC Input
3	Main power switch	11	Bolt to fasten the Filter Assembly
4	Nozzle assembly fuse	12	Glue outlet btw applicator and hose
5	Temp. controller for Nozzle	13	Electric outlet btw applicator and hose
6	Fuse for hoses	14	Pressure Regulator for the Whole Machine
7	Temp. controller for Hose	15	Pressure Regulator for the Pump
8	220/VAC output		



No.	Part Name & Function	No.	Part Name & Function
1	Main Power Switch for system machine	7	Footswitch Adapter
2	LED indicates tank being heated or not	8	Filter Core to Fix the Filter Assembly
3	Temp. Controller for Tank Temp.	9	Pressure Regulator for machine
4	Temp. Controller for Nozzle Temp.	10	Pressure Regulator for the Pump
5	Main fuse for the machine	11	Pressure regulator for Nozzle assy.
6	220VAC Power Cord IN	12	Nozzle assembly

## **Additional Introduction:**

### **1. Electronic Proportional Temperature Controller**

There are two types of electronic proportional temperature controller on the control panel of the EconoMelt™ 10-2/10-4. One for melting tank (ON/OFF LED: Orange ON means heating, Green ON means heating stopped), the other for the nozzle assembly. Rotate the dial to the desired temperature. The red hand on the dial must point at the desired temperature. (each scale stands for 5°C). If the indicator in the left hand corner of the controller is on the system is heating.

### **2. Pressure Regulator**

There is one pressure regulator to the hot melt unit.

### **4.3 Preparation before operation.**

1. Before operation of the system please insure all fittings are tight.
2. Insure the power is consistent at 220 VAC
3. Make certain the tank has molten adhesive over the grids.
4. Insure the desired tank temperature has been reached (approximately 170°C). And the nozzle assembly, approximately 180°C. Please note that all hot melts have different melt rates.
5. Check all connections again
6. Check if the air supply system is dry and the air pressure is stable.
7. Make sure all the parts are normal.

### **4.4 Starting the Machine.**

1. Attach the power supply and switch on the machine. See if the red indicator is ON.
2. Check if all the temperature controllers are set at the above-mentioned value.
3. When the temperatures are reached the red and green lights on the temperature controller will alternate cycling.
4. Attach the compressed air source, set the value of pressure starting at 10 psi; begin to apply adhesive with the manual gun.

### **4.5 General Adjustment of Nozzle Assembly**

Flow is adjusted to the handgun or automatic gun with the pressure on the pump. Increase air pressure and the flow increases. Maximum output is approximately 2 lbs per minute. Flow can also be limited with different sized nozzles on the handgun. Also, lower temperatures will create lower viscosity and has the effect of slowing flow.

### **4.6 Shutting Down Steps.**

1. Switch off the main power.
2. Reduce air pressure to the pump to 0 or disconnect air source

# Chapter 5 - Precaution and Maintenance

## 5.0 Introduction

This chapter will introduce programs for the safety precautions and maintenance for the EconoMelt™ 10-2/10-4 hot melt applicator. These programs are based directly on the quality and cleanliness of the adhesive and amount of use the system experiences. Maintenance schedules depend on the adhesive and application and need to be determined by the customer. Proper system maintenance can ensure the high efficiency and long life of the machine.

## 5.1 Safety Precautions.

1. Always wear safety gloves, safety glasses and long-sleeved overalls to keep your body from hot melt or by the hot component surface.
2. External power supply must be cut off before dismantling control panel or removing the covers of any machine or replacing electronic components. This can avoid hazard, injury of personnel or the damage of the machine.
3. When dismantling and maintaining hydraulic system or air supply. It is best to discharge the tank to avoid hazard.
4. Dismantling all protective covers. Note- try to avoid burn or electric shock.
5. Do not heat the glued components with open flame or a blowtorch. If it is necessary to heat or clean the components, use electrical oven or hot air gun.

## 5.2 Daily maintenance items:

1. Always keep surface of the machine and the working environment clean.
2. When loading hot melt it is best to check the material and remove any impurities After material is loaded into the melt tank to the 80% fill level cover the lid of tank soon to prevent impurities entering hot melt material.
3. Always keep the surface of nozzle assembly clean.

## 5.3 Monthly maintenance Items;

To dismantle and clean the filter assembly.  
Please refer to *Chapter 6* on how to disassemble and assemble the filter assembly.

## 5.4 Regular Maintenance

Note 1:

Always wear safety gloves, safety glasses and long sleeved overalls to insure there is no contact with hot melt adhesive or hot components of the system

Note 2:

Before working on the system - including pump maintenance, filter maintenance, hose or gun maintenance - all compressed air sources must be detached from the machine. Please note that when reheating a system the expansion of the adhesive inside the system can create pressure and caution must be exercised

### **5.4.1 General Maintenance**

1. Clear the air filter regulator of any water.
2. Very light compressed air should be used to clear internal electrical components of dust and dirt.
3. Check the contacts of wires and reattach all loose wires
4. Note: Short circuit will occur due to loose wiring.
5. Tighten all hose fittings to the tank and gun  
Please note that fittings for the tank to hoses and guns should be tightened when the system is at temperature. Over-tightening of cold components with adhesive in them can damage the components
6. If adhesive leakage occurs, loosen the connection and check the O-ring. Clean it or even replace it.

### **5.4.2 Cleaning the Pumping System.**

Over time adhesive can degrade and build up on the pump. Basic flushing of the system can remove some of this degraded adhesive

Note: Some cleaning solutions are not compatible with hot melt. Warm the machine to working temperature. Cycle the nozzle assembly and completely discharge the pressure in the tank and the nozzle assembly.

1. Put a container below the fitting joining the heated hose and gun.  
Remove the gun and steer the hose into the catch container.  
Start the pneumatic pump and purge the hot melt from the tank and hose.

Note: When Dismantle glue-using trigger. Start pressure of pump and hot melt squeezed out from nozzle assembly.

Note: Make sure the power supply have been cut off when detaching components.

2. When the clean tank is purged adhesive flow will stop and the pump will cavitate. Stop the pump.
3. Add hot melt into to the tank and melt the adhesive
4. Start the pump when the system reaches the working temperature. Drain the melting hot melt out of system again.
5. Refer to chapter 5.3 to disassemble the filter assembly and clear it until clean.
6. Disconnect the external power supply. Reassemble the connector and the power plug of hose and the nozzle assembly.
7. Connect the external power supply to recover the system to the working state.

### **5.4.3 Clear the Nozzle Assembly**

When the nozzle assembly is blocked by impurities the following steps should be taken.  
Heat the nozzle assembly to preset working temperature.

1. Adjust the air pressure to the pump to zero or disconnect
2. Pull the trigger to relieve pressure in the gun.
3. Remove the nozzle assembly from the gun
4. Dismantle the nozzle assembly from the gun. Us a nozzle cleaning tool to clear blockage

Never clear the hole of the nozzle with sharp drills, or the nozzle will be damaged, and the hot melt flow rate will become uneven.

# Chapter 6 - Disassembly and Maintenance

## 6.0 Introduction

This chapter covers how to disassemble the pump and the filter assembly. It is suggested only qualified technicians should be performing rebuild work on the EconoMelt 10-2/10-4.

## 6.1 Safety Precaution

Disconnect power supply before removing the control panel or shields or any other electric components. This can avoid unnecessary injury to staff or damage to machines.

Do not try to disassemble any parts of the manifold, tube or nozzle assembly before you insure that the air pressure on the machine is completely discharged. Severe injury can occur if the system is pressurized.

Always wear safety gloves, safety glasses and long sleeved uniforms to avoid being burned by hot melt adhesive or hot surfaces of the system.

Do not heat the glued components with open flame or a blowtorch. If it is necessary to heat or clean the components, use electrical oven.

## 6.2 The Disassembly of the Hydraulic System

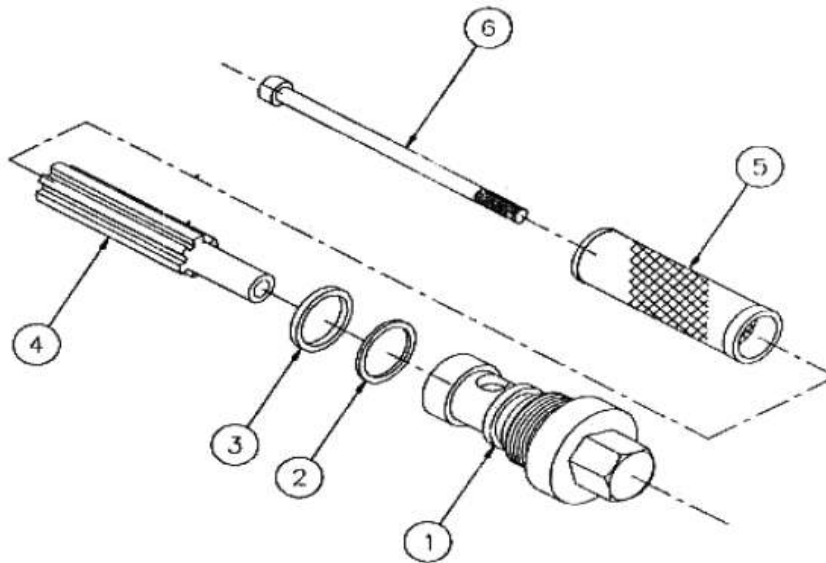
### 6.2.1 How to Disassemble the Filter Assembly

The following is about the maintenance of the filter assembly.

1. Before dismantling the filter assembly, the machine must be warmed up to normal working temperature.
2. When the working temperature is reached, cycle the trigger switch on the handgun until the hydraulic system is completely discharged.
3. Place a container below where the tube and the manifold meet. Remove the tube with adjustable spanner.
4. Start the motor by switching it on. Completely squeeze the HMA from the tank into the container below.
1. Set the system pressure at normal working value and start the motor, purge the hot melt pump into a container. Switch off the motor when the HMA becomes clean and of no impurities.
2. Remove the filter assembly with adjustable spanner and vertically remove the filter assembly.
3. When dismantling the filter assembly, first remove the screw (6), now you can dismantle the filter (5) and the core (4), and then slide and spacer (3) and O-ring (2) out by regulating the bolt (1).
4. Check all dismantled parts for damages. If components esp. filter or O-ring are damaged change them with new ones referring to the diagram in Chapter 8.
5. If no components are damaged dip all old ones in the cleaning solvent. If necessary use hot air gun or flameless dryer to clean. Clean the filter with brush. Never use steel brush, or the filter will be torn open. Washed components needs to be cleaned with clean cloth.

\*The following content shortens “hot melts” as “HMA”.





**Figure 6.1 – Filter Assembly - G07E53-006\*\***

No	Description	Part Number	Quantity
1	Bolt	G07E47-002	1
2	Back Ring	G07E99-001	1
3	O-Ring	G07E99-020	1
4	Supporter	G07E46-001	1
5	Screen Mesh Filter	G07E53-001	1
6	Socket Head Screw	G07E39-001	1
**	Complete Filter Assembly	G07E53-006	

6. Referring to the above picture, reassemble cleaned components, and install the filter assembly into the manifold again. Properly tighten the filter assembly with adjustable spanner. Never use too strong of force to avoid damaging the O-ring and the washer or flattening the screw threads.
7. Adjust the system to the normal working pressure. Start the pneumatic pump letting the hot melt adhesive pump steadily into a container. Switch off the motor when the HMA becomes clean. The following is about the maintenance of the filter assembly. Clear the nozzle assembly each month until this can be done less frequently.

### 6.2.2 How to Disassemble the Pneumatic Pump

If hot melt adhesive does not flow when the system is at temperature and pressurized there are many possible factors. One of them is that the O-ring inside the pump has failed, resulting in the pump inability to draw in and pressurize the hot melt. Another possibility is that the surface of the inside of the pneumatic pump is scratched, which leads to air leakage or unstable driving pressure (the latter indirectly affects the flow rate of hot melt adhesive.)

The following is about how to remove and disassemble and check the pneumatic pump. We suggest only qualified technicians perform this job.

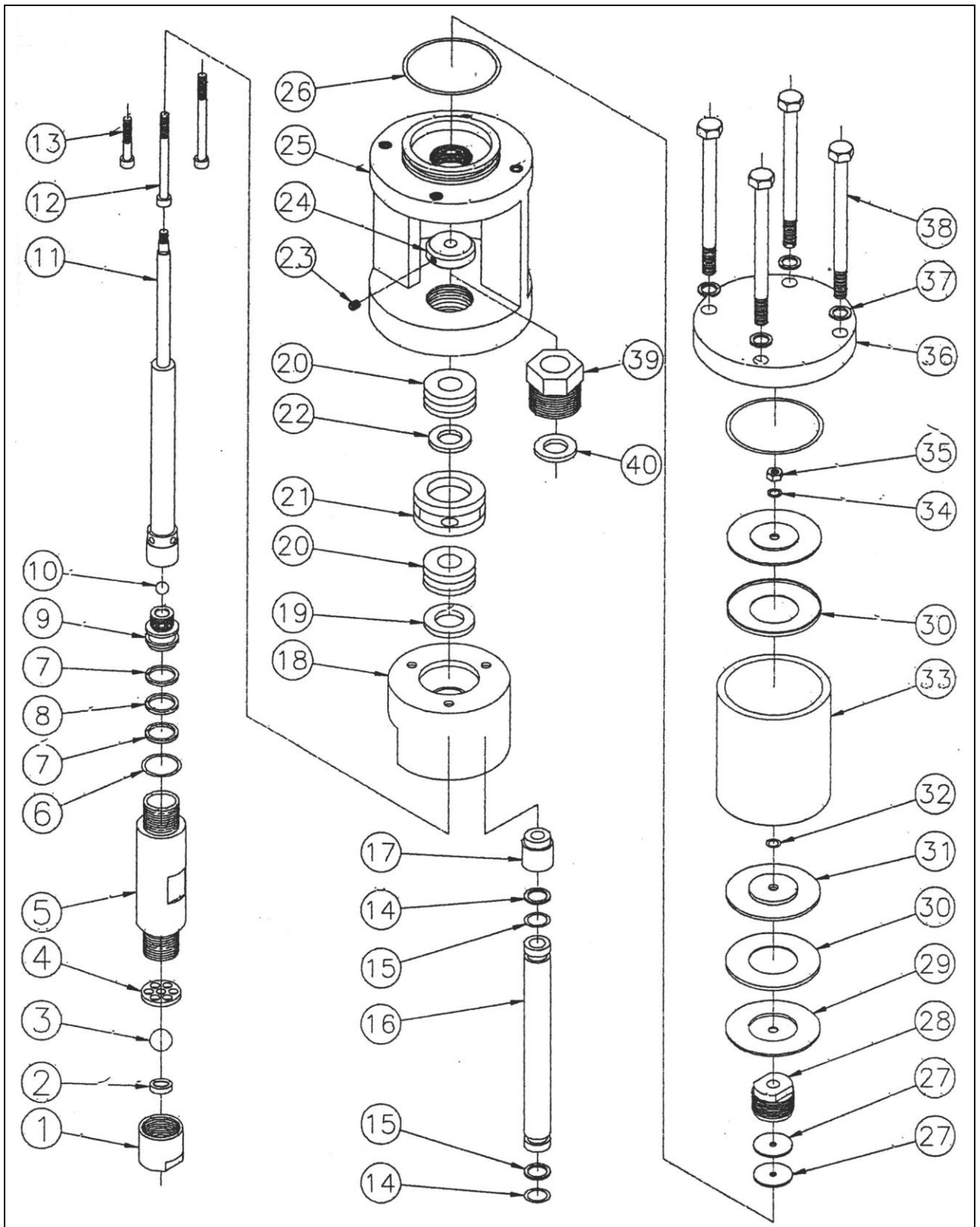


Figure 6.2 – Pneumatic Pump

1. Remove the shield of the pump, and then remove the two micro switches from the cylinder base.

Note: Please disconnect the power supply before removing the micro switch.

2. Warm up the Applicator to normal working temp. When the hot melt adhesive in the melting tank is completely melted, loosen the three hexagon bolts which fix the pneumatic pump on the melting tank.
3. Wear gloves and carefully take the melting tank out of the pump.
4. Clean the pump with cloth. Disassemble the pump as the picture shows.
5. Vertically take the glue pipe (16) out of the washer (17).
6. Remove the tightening nut with adjustable spanner (13).
7. Take the steel ball (3) out of the tightening nut (1).
8. Open the cylinder with an adjustable spanner. Carefully take it out along its shaft.
9. Remove the fixing ring with the adjustable spanner and take the steel ball out of the cylinder.
10. Loosen the bolts that secure the cylinder with open-ended spanner, and then take out the four bolts.
11. Remove the cylinder cover (36), and carefully take out the cylinder (33).do not damage the leakage-proof washer and the O-ring.
12. Loosen the nut (35) with open-ended spanner; gently remove the washer (30) and the piston plate (24).
13. Loosen the anti-slip nut (35), take the cylinder shaft (11) out of the cylinder (25) vertically.
14. With the Hexagon spanner remove the hexagon screw on the cylinder base, which is fastened by the connection base.
15. Remove the leakage proof washer (20),(22),(19) and the tightening ring (21).
16. Remove the tightening nut (28) from the cylinder base with the open-ended spanner. Meanwhile the two leakage proof washer (27) can be taken out of the cylinder base.
17. Remove all the O-rings from the components and this is the end if the disassembly.
18. Check all components for damages, esp. O-rings for ageing. And check the cylinder surface for scratches. Change it with a new one if necessary.
19. As to those components needless to change, dip them into solvent for cleaning, If necessary, heat them with hot air gun or flameless heater. After clearing, clear them with clean cloth one by one.
20. Reassemble the pump with good components (old or new) and fix it on the applicator.
21. Always replace O-rings whenever possible.

## Chapter 7 - Trouble Shooting

### 7.0 Introduction

This chapter introduces how to prevent machinery trouble, how to solve the problems, and how to prevent them from reoccurring. These steps will insure longer operational life with higher efficiency. Please refer to “*Chapter 6. Disassembly and Maintenance*” when troubleshooting and replacing parts

This chapter does not include such obvious problems as wire disconnections within the system. Attention should be paid to these problems when regular maintenance is carried out on this problem and overcome them.

### 7.1 Safety Precautions

Disconnect power supply when disassembling control panel. This will help to avoid risks of staff injury or machine damage.

Do not try to disassemble the manifold, tube or nozzle assembly. Discharge the pressure completely before disassembly. Always wear safety gloves, safety glasses and long sleeved uniform. Try to prevent contact with hot melt adhesive or hot component surface.

Do not heat the components with open flame or a blowtorch. If it is necessary to heat or clean the components, use electrical oven.

### 7.2 Troubleshoot on Mechanic & Electric Section

Trouble	Steps Or Causes	Trouble Shoot
The Melting Tank Cannot be heated or Temp. does not reach the preset value	1. Main power is not completely ON or switch trouble.	Put power switch at ON or replace it with new switch.
	2. Temp. controller for tank is not set at right temperature.	Readjust the temp. controller.
	3. Mechanic Temp. Controller is set too low.	Re-set.
	4. Heating bar or temp. controller is out of function.	Check wiring for loose. If no loose occurs, replace heater or temp. controller with new ones.
The hose cannot be heated or does not reach the preset temperature when power is on	1. Fuse holder becomes loose or burned.	Replace the fuse with a new one, tighten fuse holder
	2. Temp. controller not working	Replace with a new temperature controller.
	3. RTD is out of order	Change with a new RTD
	4. The hose heater does not work.	Replace

The nozzle assembly gives off no heat or cannot reach the pre-set temperature. when Power is ON.	1.Fuse holder is loose or the fuse has blown	Replace the fuse with new one and tighten the fuse holder.
	2. The temperature controller has failed.	Change with new temp controller.
	3.RTD is out of function	Change with new RTD.
	4. Heater is not functioning.	Change with new heater.
No adhesive comes out of nozzle or flow is not consistent.	1.Working pressure is too low.	Put power switch to ON or replace it with new switch.
	2.The pre-set temperature is not reached.	machine must reach adjustable pre-set temperature.
	3. Nozzle is blocked by foreign matters.	Reassemble the nozzle and clear it with nozzle cleaning tool and cleaner.
	4. Solenoid trouble. (Automatic Gun)	Change it with new one.
	5.Filter inside the nozzle assembly is blocked. (Automatic Gun)	Disassemble the device, clear it and change the internal filter.
	6. Filter inside the manifold is blocked.	Disassemble the filter assembly, clear the interior filter.
Melt Tank overheats	1.RTD is completely detached or only a small part is inside the heating plate.	Put the RTD into the heating plate completely
	2.SSR contact becomes loose or damaged.	Replace with a new one.
	3.RTD is faulty.	Replace with a new one.
Nozzle Tip Dripping	1. Temperature for nozzle assembly is set too high.	Re-set the temperature for nozzle assembly.
	2. Nozzle tip is not tightened enough.	Tighten the nozzle tip once again.
	3. Nozzle is partially clogged	Clean nozzle
Nozzle assembly keeps overheating	4. Nozzle main frame is damaged.	Replace with a new one.
	1.RTD is completely detached or only a small part is inside the heating plate.	Reattach RTD correctly
	2.SSR is damaged.	Replace it with a new one.
	3. Proportional temp. controller is damaged.	Replace it with a new one.
Adhesive pressure and flow is inconsistent	4.RTD is faulty	Check the wiring or replace with new parts.
	1. Adhesive level in tank is too low	Add adhesive
	2. Adhesive in the tank is not completely melted	Do not start the pump until the tank content is completely melted.
	3. Adhesive viscosity is too high.	Replace hot melt with lower viscosity adhesive

	4. Impurities cause check valve to work improperly 5. O-ring or washer for piston is broken	Ask qualified technicians for service or replacement
No adhesive flows out	1. Adhesive in the tank is not completely melted.	Add adhesive. Do not start the pump until the contents of the tank are completely melted. Correct the pre-set temp. if it is too low.
	2. The pneumatic pump is not started.	Set the pressure regulation valve at working value
	3. Pump not pumping	Check steps 4-12. If everything is OK. Takes other measures.
	4. Any part in the circuit does not work when heating or the system cannot reach pre-set temp.	Check these parts if they can work for pre-set temp. Or replace possibly damaged fuse, RTD, or heater. Check electric contacts for loose, break or improper contacting.
	5. Check the nozzle tip for blockage.	Clear blocked nozzle tip with nozzle cleaning kit
	6. Pressure for nozzle assembly action is not reached.	Set air pressures at working value. Or change bad pressure-related parts.
	7. Troubles with the controlling circuit of nozzle assembly, such as timer, footswitch, photoelectric switch and solenoid valve.	Check that the controlling circuit is not loose or improperly connected. Otherwise, change
	8. Nozzle assembly does not work	Change to nozzle
	9. Nozzle filter is blocked	Disassemble, clean and change the filter
	10. Manifold filter is blocked	Disassemble and clean
	11. Hose is blocked	Replace the hose
	12. Pump micro-switch fails to turn on.	Reinstall the micro-switch or change to a new one

Trouble	Steps Or Causes	Troubleshoot
	13. The solenoid valve that controls the pressure circuit is broken. The pressure tube or the pressure connector is damaged	Replace damaged components
	14. The circuit controller relay is broken	Check if loose or disconnected. If not replace
	15. The setup temp. of the piston pump is too high to actuate the solenoid valve	Adjust the setup temp. according to the ambient air temperature.
	16. The cylinder pump is blocked. If the cylinder pump works properly, check the following:	Change cylinder pump
	17. CPS of the HMA is too high (over 10,000 CPS), or too low causing the pump to work improperly.	Change the HMA
	18. O-ring, back-packing or feed-back valve is blocked	

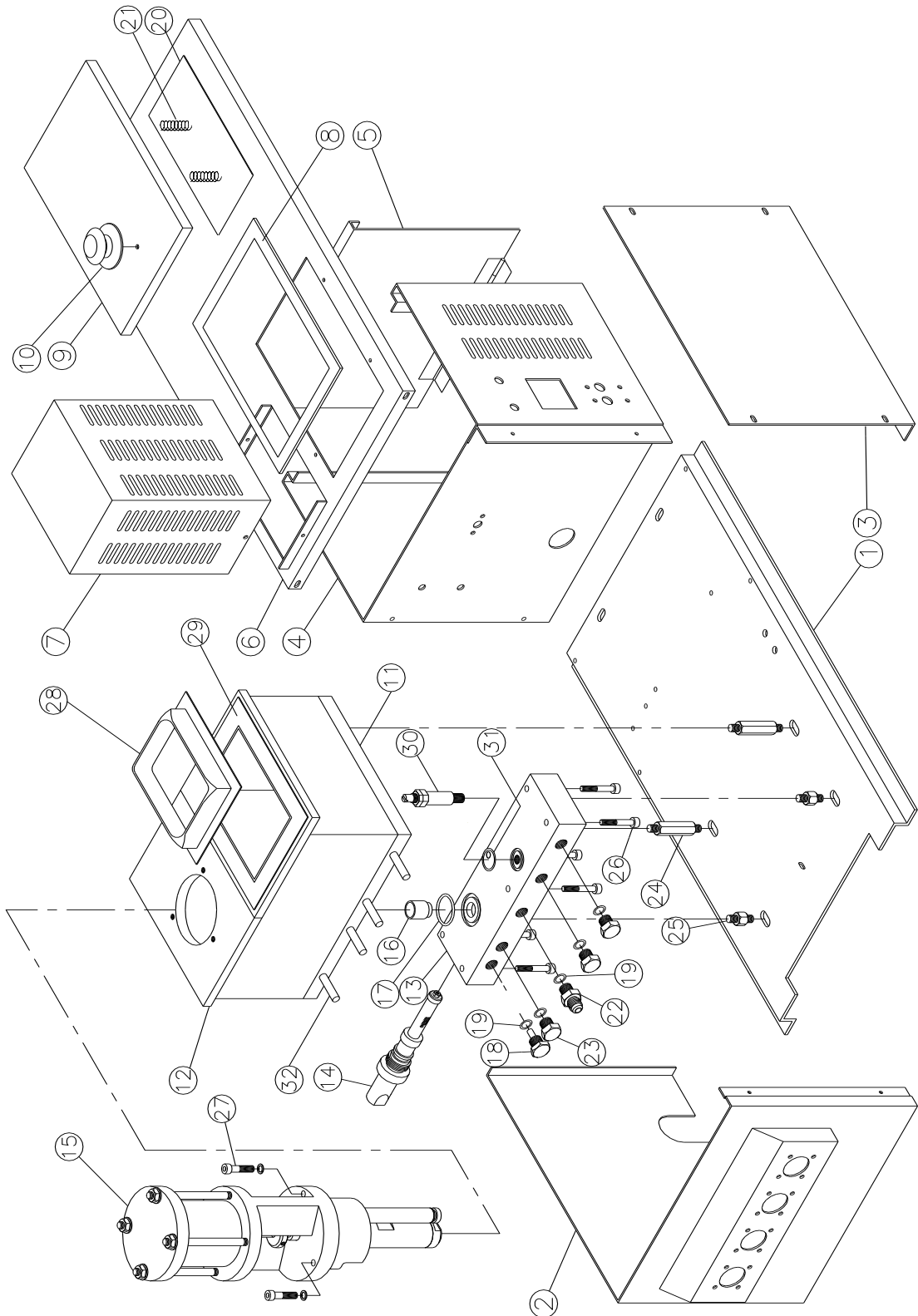
## 7.3 The trouble shooting of Hot Melt Adhesive Coating

Trouble	Steps or Cause	Troubleshoot
<b>Too much HMA at the start of the coating process</b>	<ol style="list-style-type: none"> <li>1. Too much pressure in the cylinder pump.</li> <li>2. The tip of the nozzle assembly is too far from the coating material.</li> <li>3. The tip is slightly blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the pressure of the adjustment valve.</li> <li>2. Adjust the distance between the nozzle and the coating material to approximately 0.5 inch (12.7mm).</li> <li>3. Disassemble and clean the tip.</li> </ol>
<b>Too much HMA at the end of the coating.</b>	<ol style="list-style-type: none"> <li>1. Pressure is not enough in the pump.</li> <li>2. The temperature of the hot melt adhesive is too low.</li> <li>3. The tip is too long or not hot enough.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the pressure of the adjustment valve.</li> <li>2. Adjust the temperature of each heating part.</li> <li>3. Adjust the working temperature of the nozzle assembly or the dimension of the tip is suggested to change.</li> </ol>
<b>The coating becomes hollow when coating in dots.</b>	<ol style="list-style-type: none"> <li>1. The hot melt adhesive is too hot.</li> <li>2. The viscosity of the hot melt adhesive is too low.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the temperature of each heating zone.</li> <li>2. Change to the proper hot melt adhesive.</li> </ol>
<b>Hot melt bouncing or splashing from coating material</b>	<ol style="list-style-type: none"> <li>1. The hot melt adhesive is too hot.</li> <li>1. Pressure of the cylinder pump is too high.</li> <li>2. The hot melt adhesive is too low in viscosity.</li> <li>3. The nozzle holes are too big.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the temperature of each heat zone.</li> <li>2. Adjust the pressure of the adjustment valve.</li> <li>3. Change to the proper hot melt adhesive.</li> <li>4. Replace the nozzle with smaller diameter one.</li> </ol>
<b>The coating surface becomes wavy.</b>	<ol style="list-style-type: none"> <li>1. Ambient temperature is below 0°C.</li> <li>2. The nozzle assembly and the tip exposed to the flowing cold air.</li> <li>3. Temperature of the nozzle assembly too low.</li> <li>4. The tip of the nozzle assembly is too far from the coating material.</li> </ol>	<ol style="list-style-type: none"> <li>1. Recommended temperature is 0°C to 50°C.</li> <li>2. Proper heating material is recommended to cover the nozzle assembly and the tip.</li> <li>3. Adjust the working temperature of the nozzle assembly.</li> <li>4. Adjust the distance between the nozzle and the coating material to approximately 0.5 inch (12.7mm).</li> </ol>
<b>Hot melt cannot penetrate coating material.</b>	<ol style="list-style-type: none"> <li>1. Hot melt adhesive is not hot enough.</li> <li>2. There is a film covering on the coating surface.</li> <li>3. Coating amount is not enough.</li> <li>4. Hot melt adhesive is too high in viscosity.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the temperature value of each heating zone.</li> <li>2. Adjust the hot melt adhesive to higher temperature. If there is no improvement, replace it with other adhesive.</li> <li>3. One is to raise the operating temperature or pressure on the cylinder pump. The other is to replace the nozzle with bigger diameter one in order to increase</li> </ol>



		the hot melt flow rate.
		4. Change to proper HMA.
<b>Bubbles or vapor are produced when the hot melt is coating.</b>	<ol style="list-style-type: none"> <li>1. The lack of hot melt adhesive in the tank leads to the air suction in the cylinder pump.</li> <li>2. The hot melt adhesive is too high in viscosity.</li> <li>3. The coating surface is humid.</li> </ol>	<ol style="list-style-type: none"> <li>1. Add proper hot melt adhesive.</li> <li>2. Change to proper hot melt adhesive.</li> <li>3. We recommend you to preheat the coating surface to be coated.</li> </ol>
<b>Adhesive in the tank cannot be melted completely</b>	<ol style="list-style-type: none"> <li>1. Two kinds of incompatible hot melt adhesives are mixed.</li> <li>2. The heating time of the hot melt adhesive is too long time.</li> <li>3. The heating temperature of hot melt adhesive is too high.</li> </ol>	<ol style="list-style-type: none"> <li>1. We recommend you to pump out the hot melt adhesive with piston pump. If the problem cannot be solved, you may have to change among the tank, the manifold, hose and the nozzle assembly.</li> <li>2. Please consult your hot melt adhesive supplier for proper heating time.</li> <li>3. Please consult your hot melt adhesive supplier for proper heating temperature.</li> </ol>
<b>Hot melt adhesive in the tank fumes or bubbles</b>	<ol style="list-style-type: none"> <li>1. The operating temperature of the hot melt adhesive is too high.</li> <li>2. The stability of the hot melt adhesive is not good.</li> </ol>	<ol style="list-style-type: none"> <li>1. Properly adjust the operating temperature.</li> <li>2. Close the cover of the melting tank tightly, or change the adhesive with good stable one.</li> </ol>
<b>Hot melt in the melting tank is charred.</b>	<ol style="list-style-type: none"> <li>1. The operating temperature of the hot melt adhesive is too high</li> <li>2. Adhesive in the melting tank is overheated.</li> <li>3. Adhesive in the melting tank is not enough.</li> <li>4. Hot melt adhesive in the melting tank is oxidized.</li> </ol>	<ol style="list-style-type: none"> <li>1. Properly adjust the operating temperature.</li> <li>2. Check whether the heating system and the overheat protection switch work properly.</li> <li>3. Add proper amount of adhesive to the tank.</li> <li>4. Secure the covers of the hot melt applicator tightly during working period.</li> </ol>

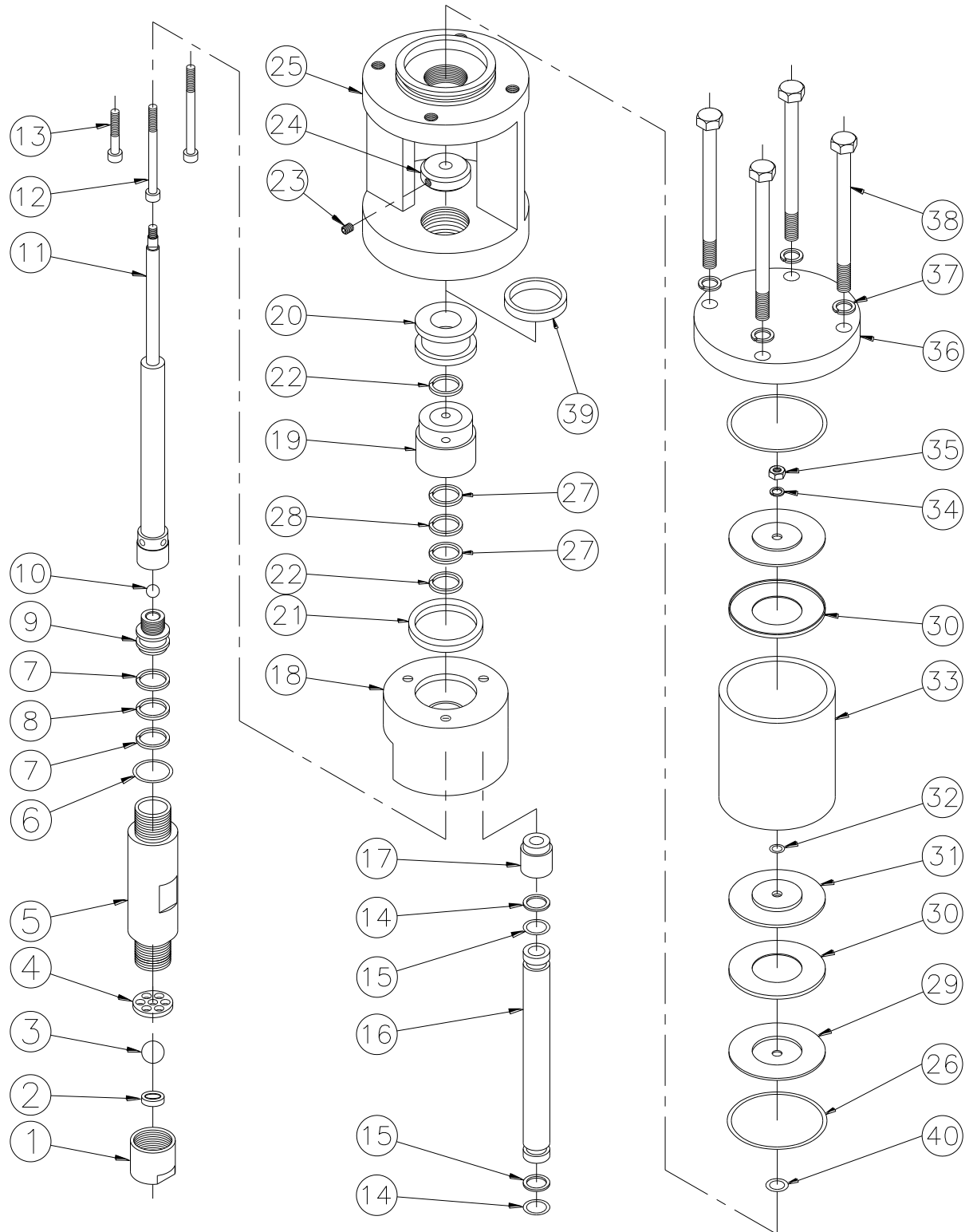
## 8.1 CASE ASSEMBLY



<b>NO.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QTY.</b>
1	G07E22-001	CYLINDER COVER	1
2	G07E22-018	COVER FOR TANK	1
3	G07E90-001	FASTEN BOARD	1
4	G07E22-014	COVER FOR CONTROL	1
5	G07E22-015	SIDE COVER FOR CONTROL	1
6	G07E22-003	UPPER COVER	1
7	G07E22-002	TANK COVER	1
8	G07E16-001	BI PLATE	1
9	G07E22-016	TANK LID	1
10	G07E35-001	HANDLE	1
11	G07E07-001	TANK	1
12	HC110	FASTEN PLATE	1
13	G07E57-002	MANIFOLD	1
14	G07E53-006	FILTER ASSEMBLY	1
15	G07E51-001	COMPLETE PUMP	1
16	G07E47-035	BUSHING	1
17	G07E99-018	O-RING	1
18	G07E40-006	NUT	1
19	G07E41-001	WASHER	5
20	G07E90-001	FASTEN BOARD	1
21	G07E42-001	SPRING	2
22	G07E47-004	HYDRAULIC JOINT	4
23	G07E39-002	PLUG SCREW	4
24	G07E46-011	SUPPORTING PILLAR (LONG)	2
25	G07E46-012	SUPPORTING PILLAR (SHORT)	2
26	G07E39-012	SCREW	6

27	G07E39-013	SCREW	3
28	G07E07-004	TANK HOPPER	3
29	G07E22-014	TANK UPPER COVER	1
30	G07E15-023	PRESSURE RELEASE VALVE	1
31	G07E99-019	O-RING	1
32	G07E50-008	HEATER CARTRIDGE	4

## 8.2 PISTON PUMP ASSEMBLY

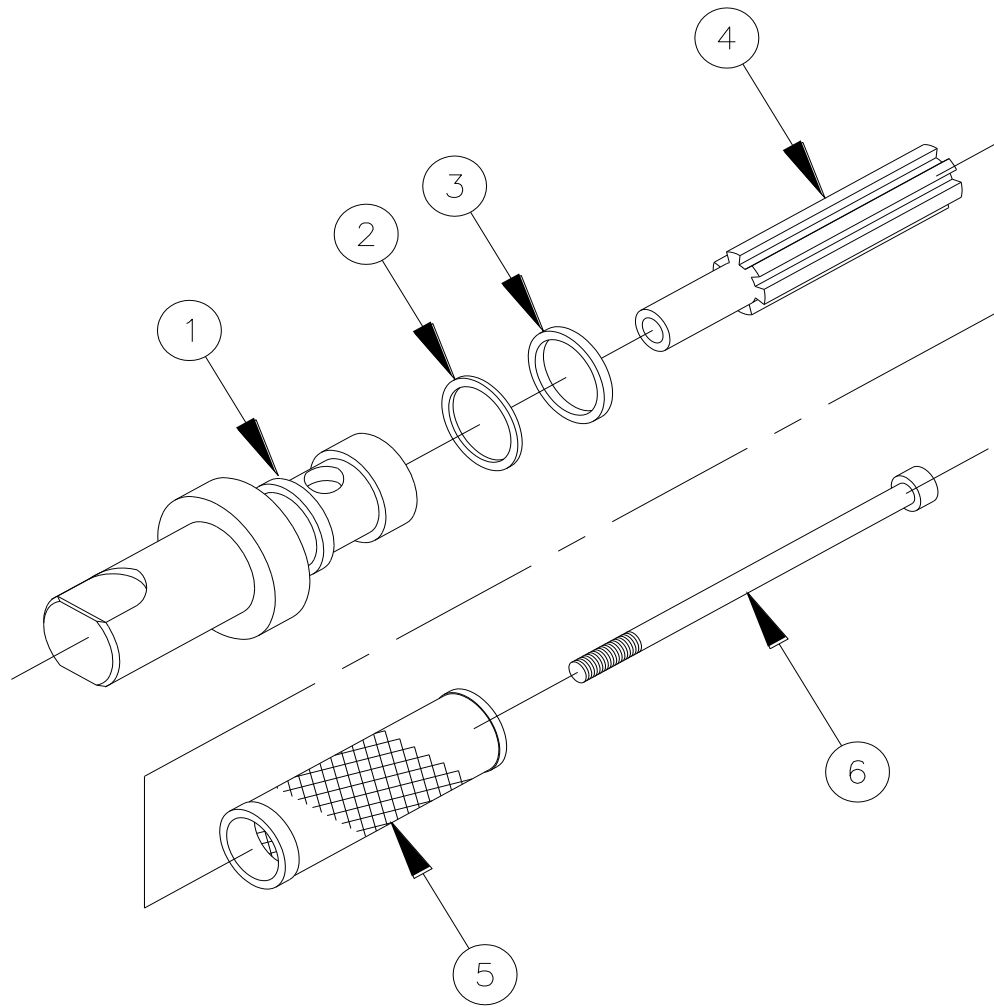


8 · 2 PISTON PUMP ASSEMBLY

<b>NO.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QTY.</b>
1	G07E40-002	TIGHTEN BOLT	1
2	HC123	BALL BASE	1
3	HC126	STEEL BALL	1
4	HC116	FILTER PLATE	1
5	HC124	GLUE PIPE	1
6	G07E41-002	WASHER	1
7	HC122	PACKING	2
8	HC130	O-RING	1
9	HC115	FIXED RING	1
10	HC125	IRON BALL	1
11	HC146	PISTON SHAFT	1
12	G07E39-004	SOCKET HEAD SCREW	2
13	G07E39-005	SOCKET HEAD SCREW	1
14	HC127	O-RING	2
15	HC145	O-RING	2
16	HC160	GLUE GUIDING PIPE	1
17	HC109	GUIDE FUNNEL	1
18	HC144	CONNECTING BASE	1
19	G07E48-001	SEAL	1
20	G07E48-002	SEAL	1
21	G07E99-006	O-RING	1
22	G07E48-003	HI-PER SEAL	2
23	G07E39-006	SET SCREW	1
24	HC117	STOPPER	1
25	G07E47-012	CYLINDER BASE	1
26	HC119	O-RING	2
27	G07E99-007	PACKING	2
28	G07E99-008	O-RING	1
29	HC128	PISTON PLATE	2
30	HC120	SEAL	2
31	HC161	PISTON RING	1
32	CSP035	O-RING	1
33	HC121	CYLINDER	1
34	CSP118	SPRING WASHER	1
35	CSP100	NUT	1

36	HC129	HIND CYLINDER OF COVER	1
37	G07E41-005	WASHER	4
38	G07E39-007	HEXAGON HEAD SCREW	4
39	G07E41-003	O-RING	1
40	G07E99-009	O-RING	1

### 8.3 FILTER ASSEMBLY

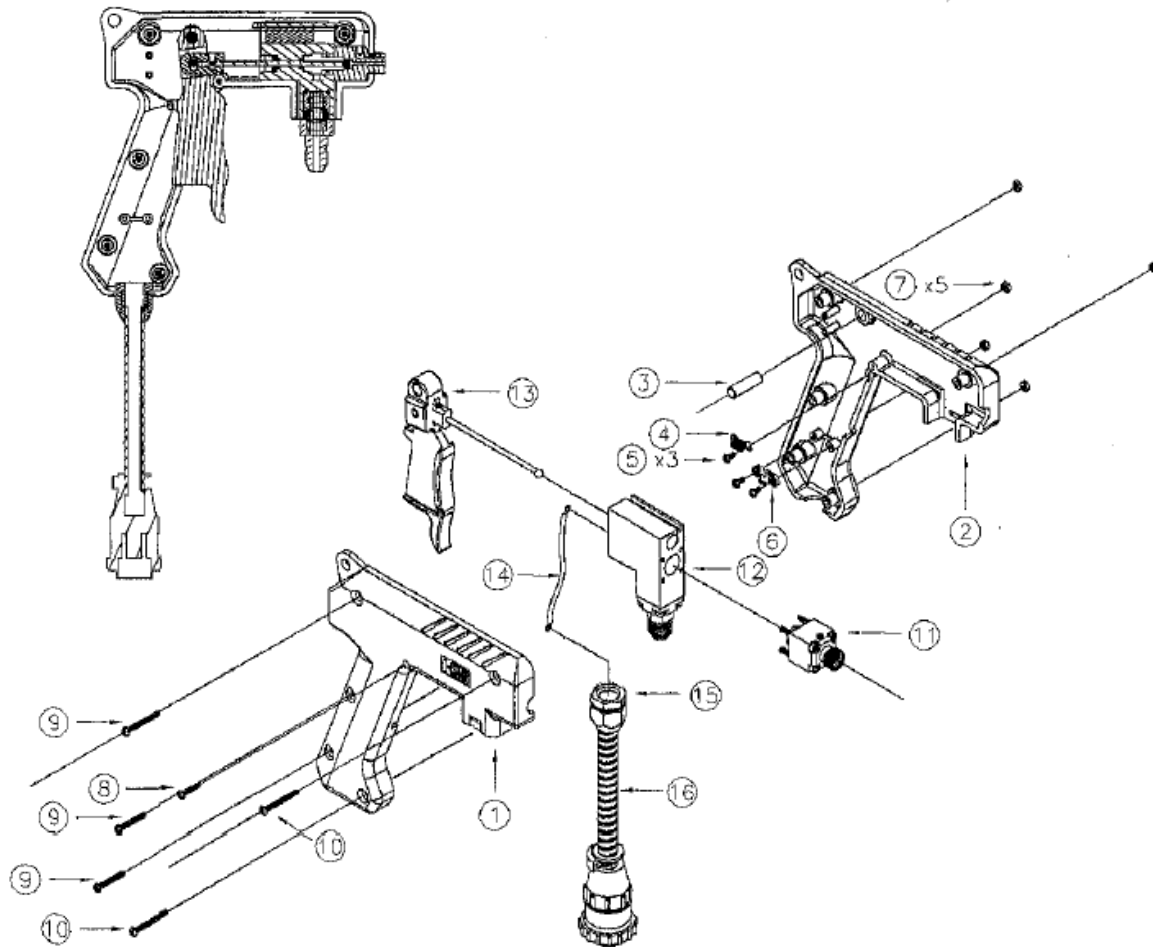


### 8 · 3 FILTER ASSEMBLY / G07E53-006\*\*

NO.	PART NO.	DESCRIPTION	QTY.
1	G07E47-002	BOLT	1
2	G07E99-001	BACK UP RING	1
3	G07E99-020	O-RING	1
4	G07E46-001	SUPPORTER	1
5	G07E53-001	FILTER	1
6	G07E39-001	SOCKET HEAD SCREW	1
**	G07E53-006	COMPLETE FILTER ASSEMBLY	

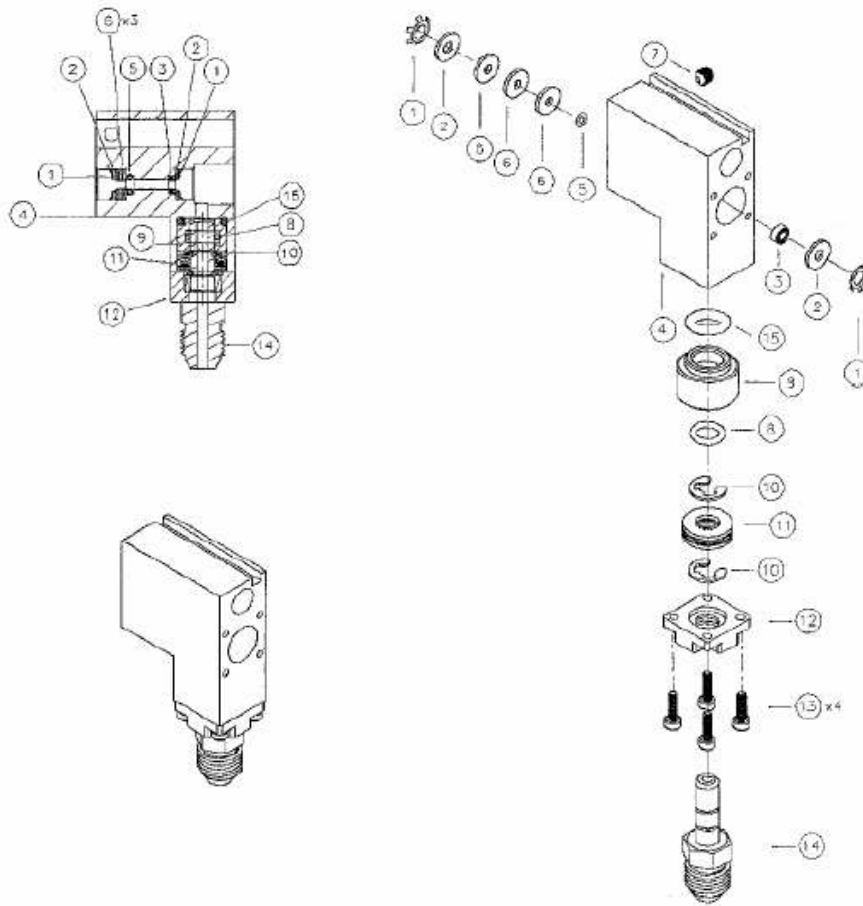


## 8.4 EconoChamp 2 Gun Drawing



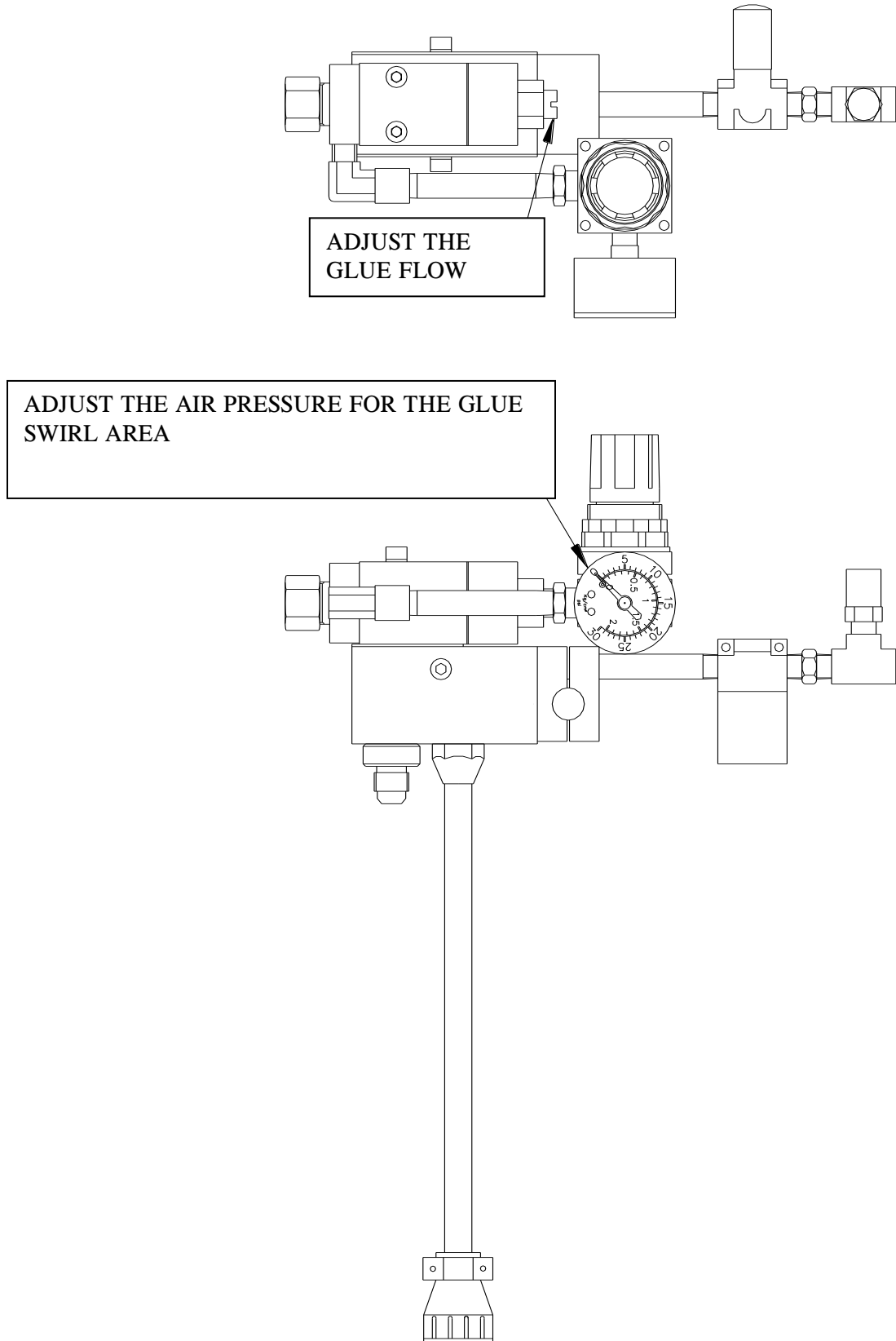
NO.	PART NO.	DESCRIPTION	QTY.
16	G07E47-024	Cover Assembly	1
15	G07E47-029	Electrical connector	1
14	G07E42-006	Wire	1
13	G07E76-001	Trigger Assembly	1
12	G07E03-008	Gun Body Assembly	1
11	G07E01-015	Gun Nozzle Assembly	1
10	G07E39-014	Screw	2
9	G07E39-015	Screw	3
8	G07E39-016	Screw	1
7	G07E40-009	Nut	5
6	G07E47-023	Fixed Support for Electrical Wire	1
5	G07E40-010	Nut	3
4	G07E42-007	Spring	1
3	G07E47-015	Fixed Bolt	1
2	G07E19-002	Gun Case (R)	1
1	G07E19-003	Gun Case (L)	1
	G07E03-009	Hand Gun Assembly	

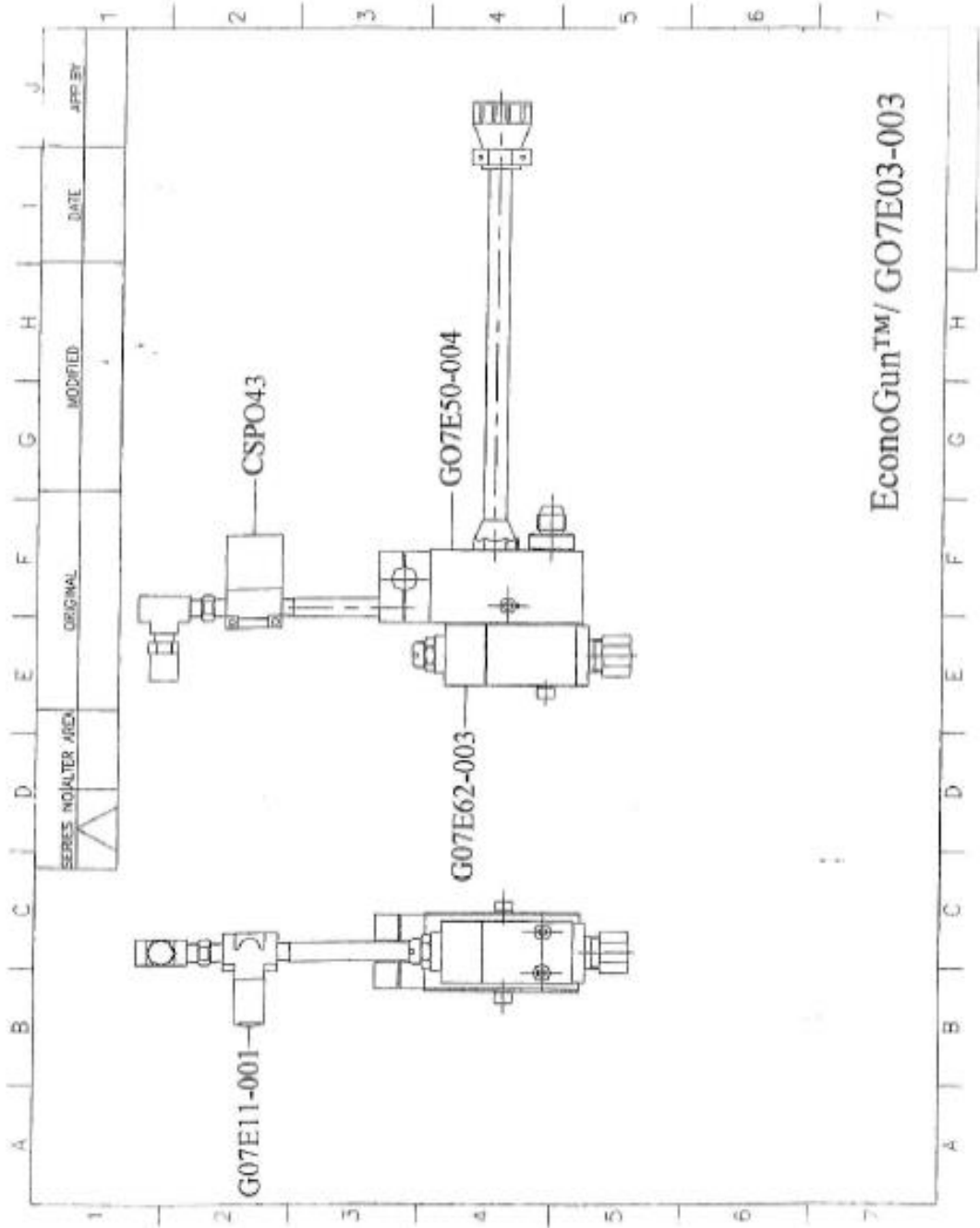
## 8.5 EconoChamp 2 Gun Drawing



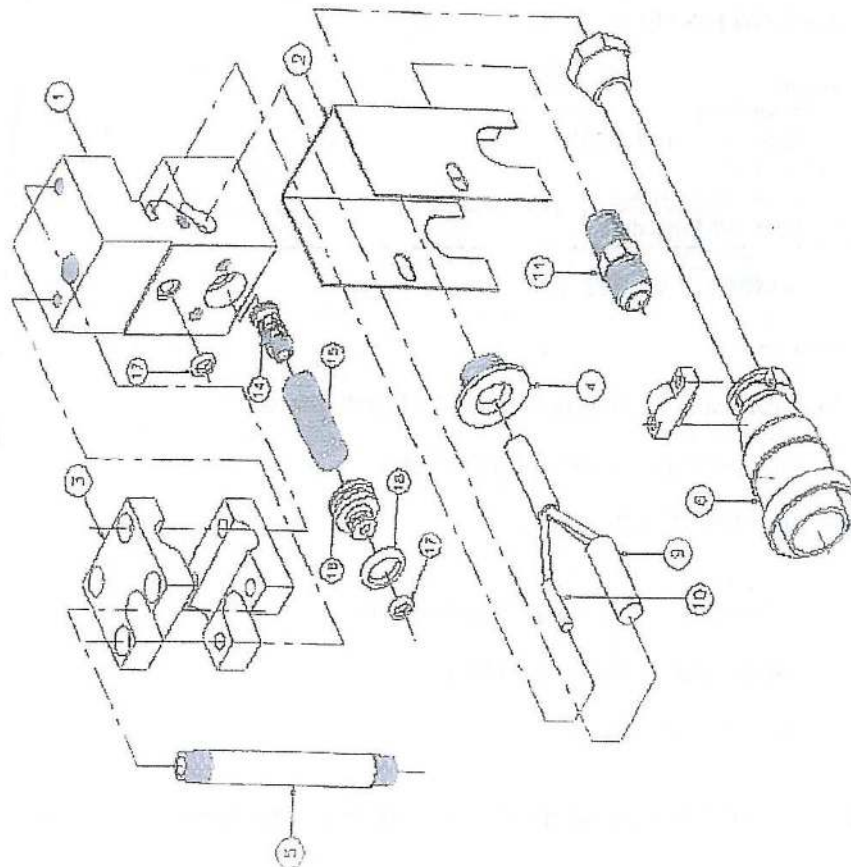
NO.	PART NO.	DESCRIPTION	QTY.
15	CSP033	O-Ring	1
14	G07E78-007	Rotatable Connector	1
13	G07E39-017	Socket Set Screw	4
12	G07EA7-037	Fixed Base for Spring	1
11	G07E25-002	Bearing	1
10	G07E42-008	E-Snap Ring	2
9	G07E28-001	Bushing	1
8	G07E99-009	O-Ring	1
7	G07E39-008	Socket Set Screw	1
6	CSP098	Seal	3
5	CSP036	O-Ring	1
4	G07E03-010	Gun Body	1
3	G07E99-026	U-Ring	1
2	CSP037	Washer	1
1	G07E47-028	C-Snap Ring	1
	G07E03-008	Gun Body Assembly	

## 8.6 THE OUTFIT OF THE SWIRL NOZZLE SET





8.7

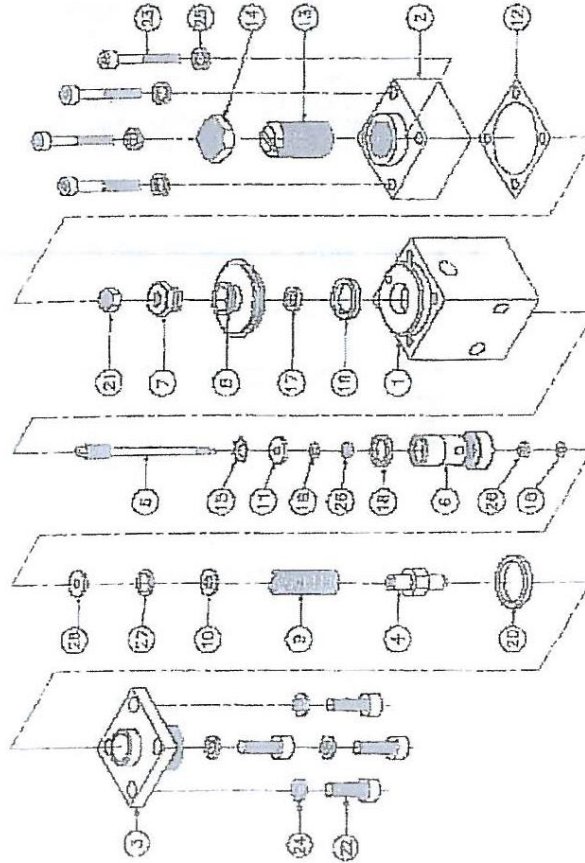


1	G07E50-004	Heating block	1
2	G07E50-003	Heater base	1
3	G07E22-009	Protecting cover	1
4	G07E47-032	Fixing block	2
5	G07E39-011	Screw	1
6	G07E47-031	Air pipe	1
7	G07E47-024	Cover	1
8	G07E54-003	Plug	1
9	G07E54-002	1/4 pins plug	1
10	CSP084	Heater	1
11	G07E80-001	Sensor	1
12	G07E78-001	Connector	1
13	G07E47-026	Gold pin	2
14	G07E47-027	Silver pin	2
15	CSP080	Filter body	1
16	CSP081	Filter net	1
17	CSP082	Seal	1
18	CSP035	O-ring	2
	CSP033	O-ring	1

G07E50-004 / HEATING BLOCK  
 GLUE MACHINERY CORPORATION

8.8

	G07E62-003	Needle valve	1
1	G07E15-002	Valve base	1
2	G07E22-008	Upper cover	1
3	G07E22-007	Cover	1
4	G07E58-001	Nozzle head	1
5	CSP092	Glue adjust rod	1
6	CSP093	Valve body	1
7	G07E40-005	Nut	1
8	CSP095	Fixing ring assembly	1
9	G07E42-003	Spring	1
10	CSP037	Washer	1
11	CSP096	Washer	1
12	CSP097	Washer	1
13	CSP104	Adjusting rod	1
14	CSP105	Nut	1
15	G07E47-028	Clasp	1
16	CSP036	O`ring	2
17	HC118	O`ring	1
18	CSP009	O`ring	1
19	HC127	O`ring	1
20	HC130	O`ring	1
21	CSP100	Nut	1
22	G07E39-010	Screw	4
23	G07E39-009	Screw	4
24	CSP118	Washer	4
25	CSP103	Washer	4
26	G07E99-002	Backing o`ring	2
27	CSP031	Seal	1
28	CSP098	Seal	1



G07E62-003 / NEEDLE VALVE  
GLUE MACHINERY CORPORATION

## 8.9

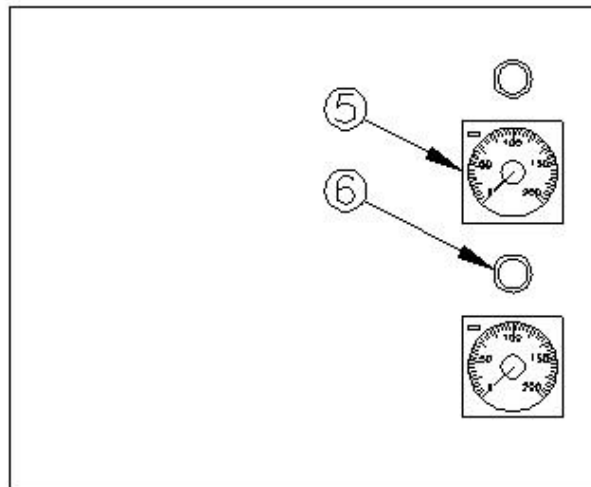
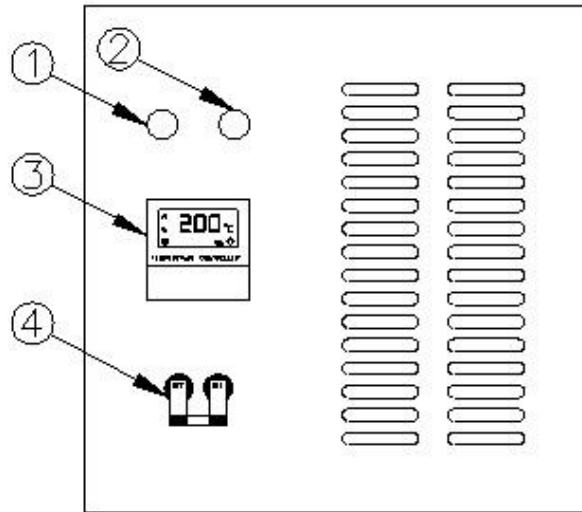
6-∅0.5 mm

ANGLE

	Angle
A	5°
B	10°
C	15°
D	20°

8.10

## 8.11 CONTROL PANEL



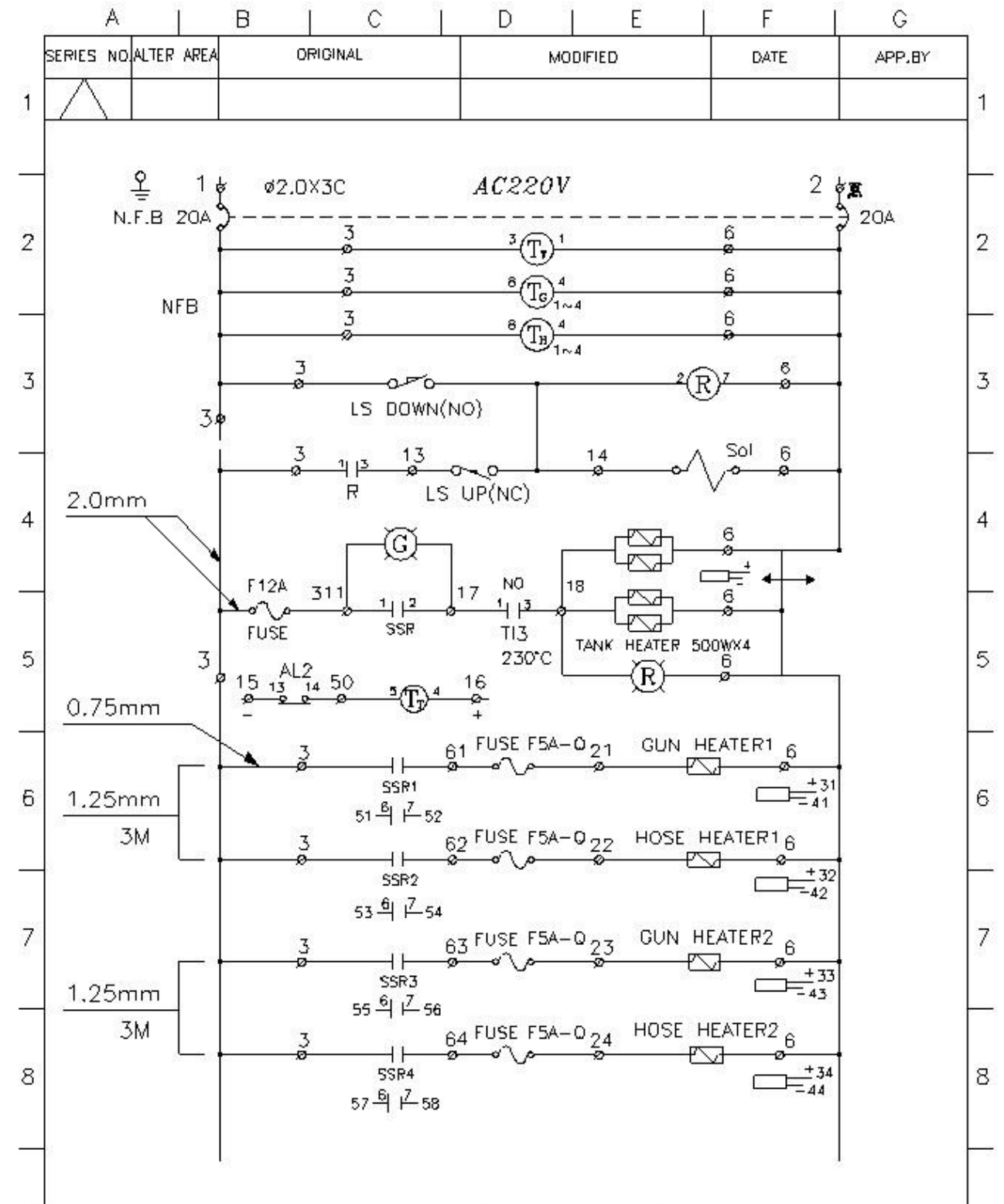
RIGHT SIDE OF THE  
PANEL

## 8.11 CONTROL PANEL

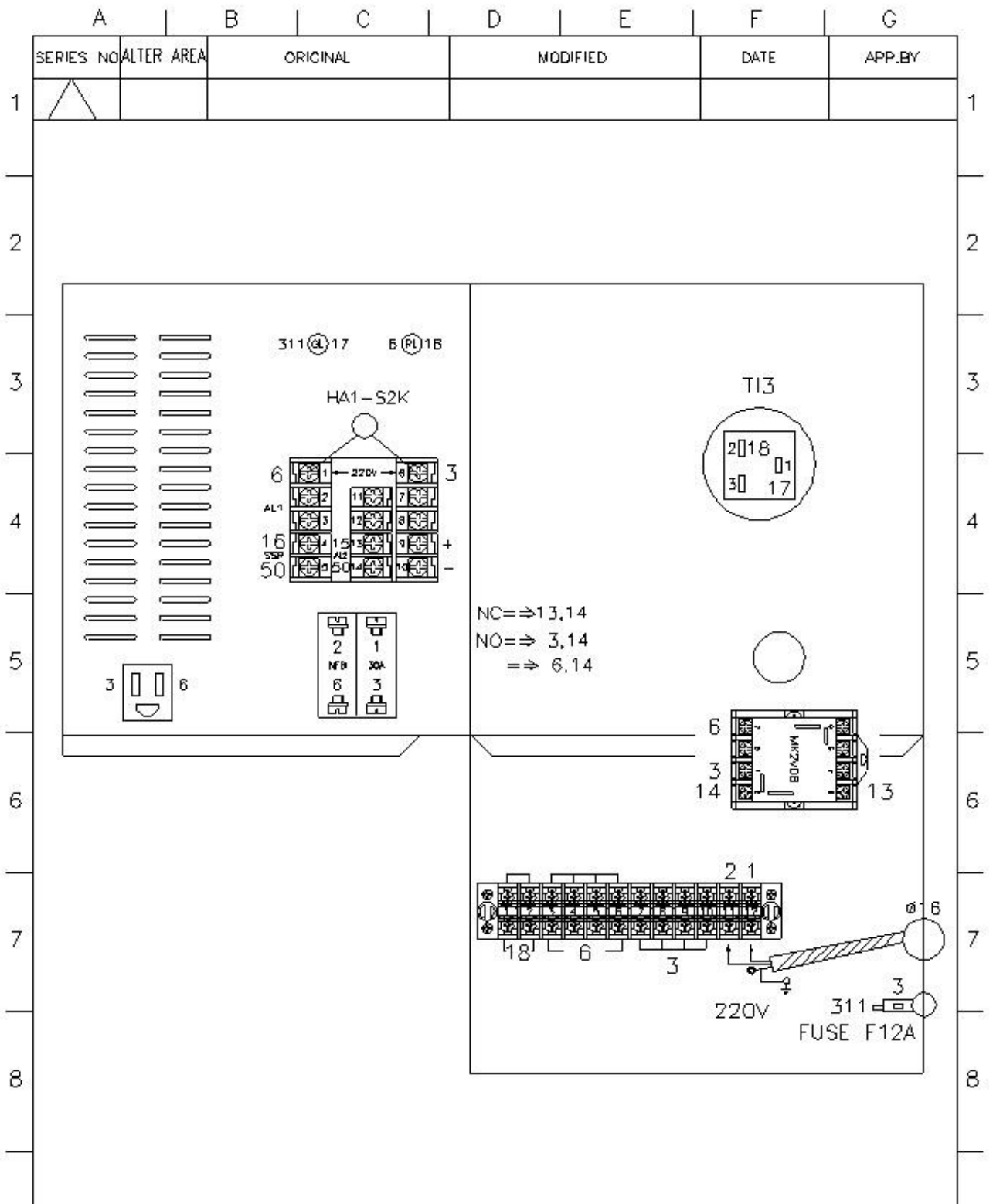
NO.	PART NO.	DESCRIPTION
1	G07E47-034	INDICATOR
2	G07E47-033	INDICATOR
3	G07E56-002	PID TEMP. CONTROLLER
4	G07E68-003	POWER SWITCH
5	G07E56-003	ELECTRONIC TEMP. CONTROLLER
6	CSP041	FUSE BASE



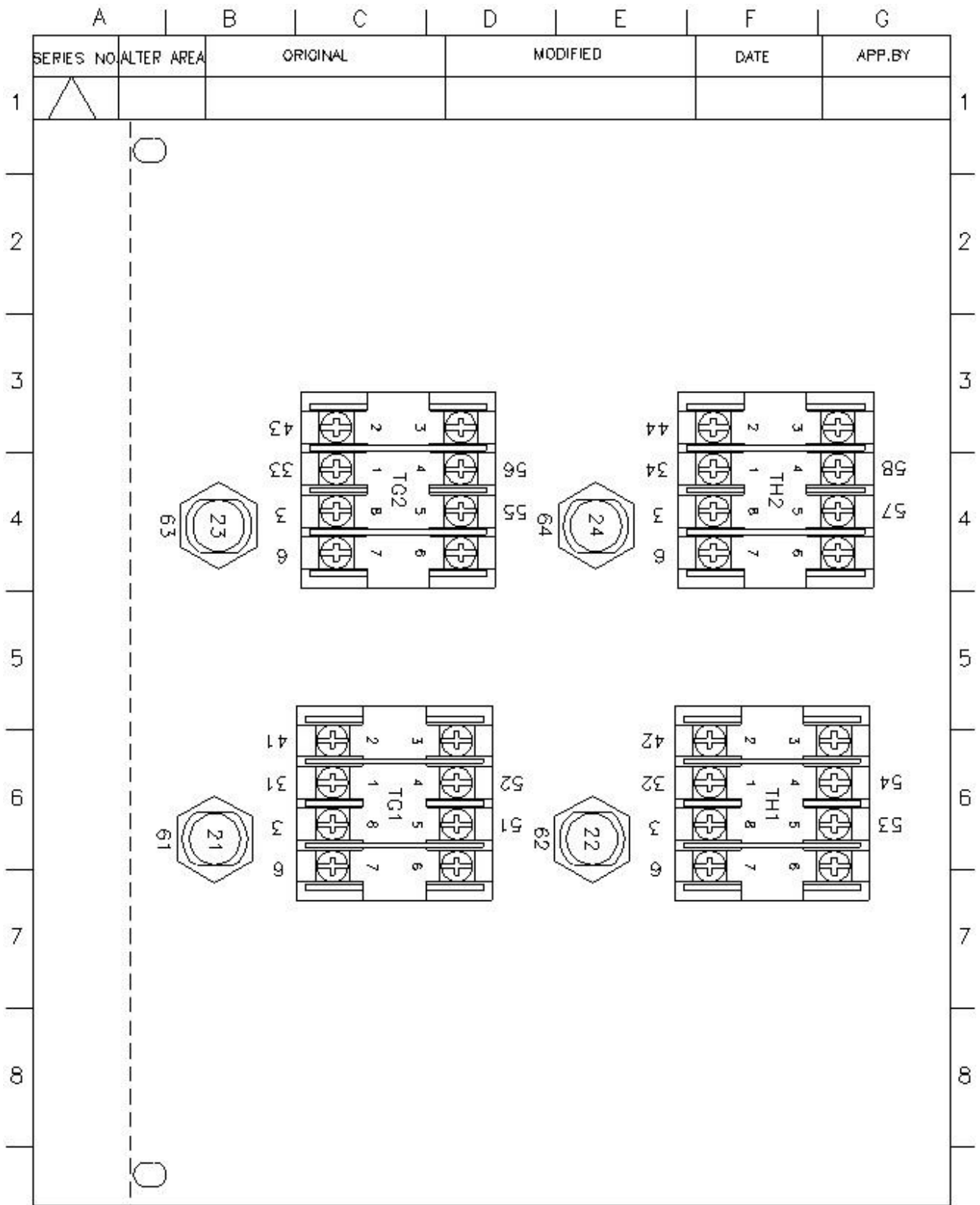
## 8.12 WIRE DIAGRAM (FOR TWO OUTLET)

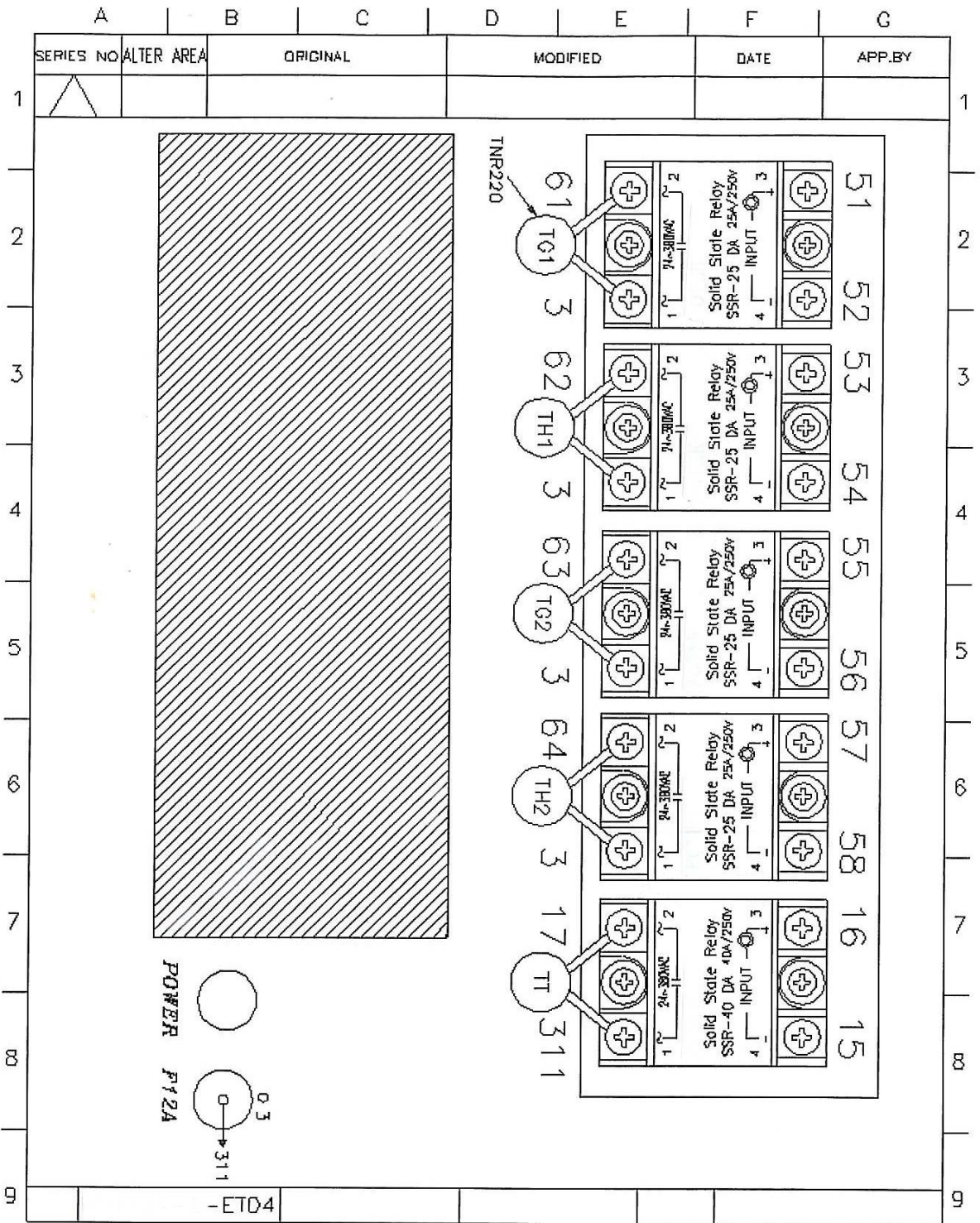


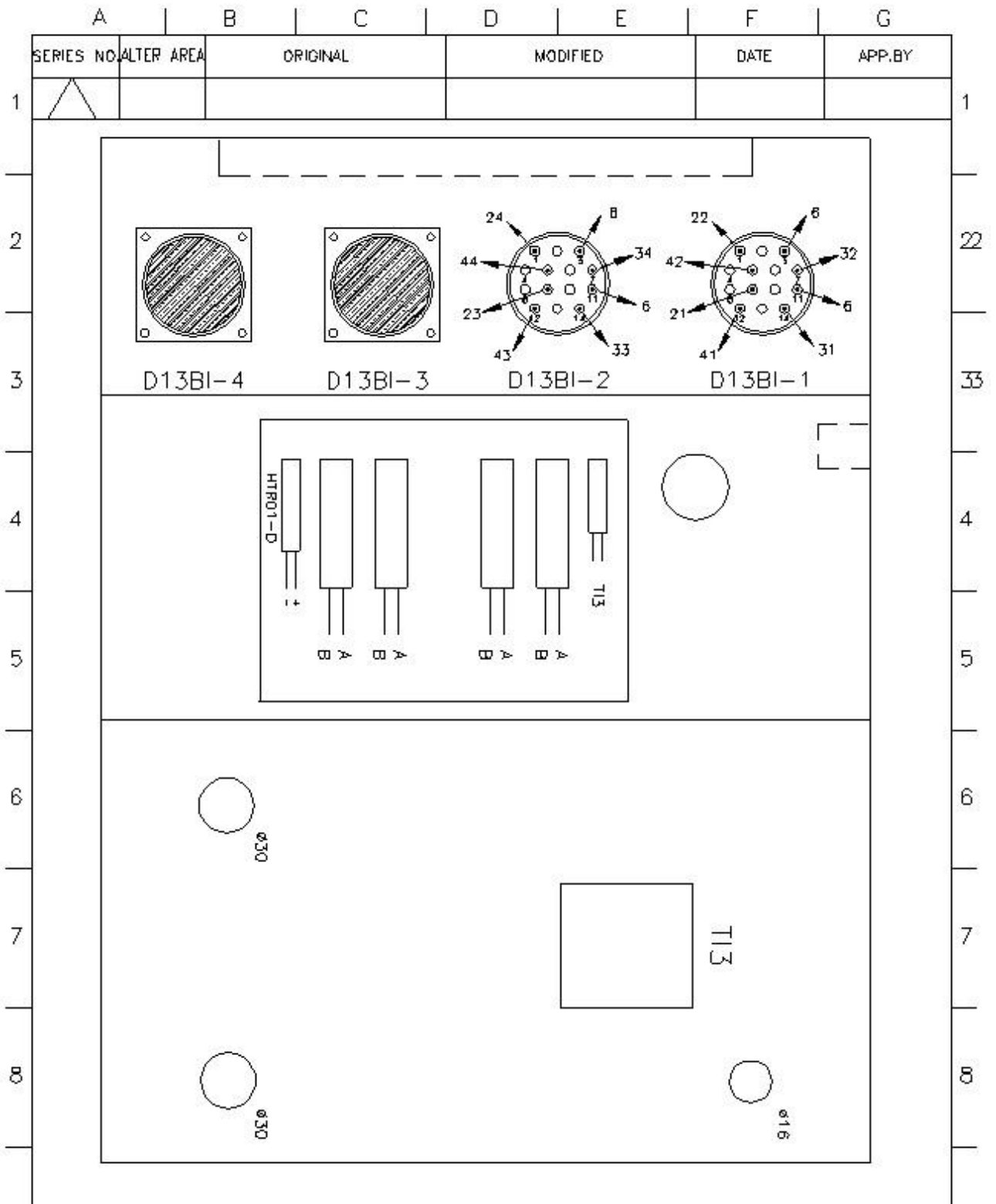
\*If EconoMelt D or N ( operating with Dynamelt or Norsdon hoses/guns) the wiring pin out is different for hose connectors. Please see contact Glue Machinery Corporation for schematics.



### 8.1 3

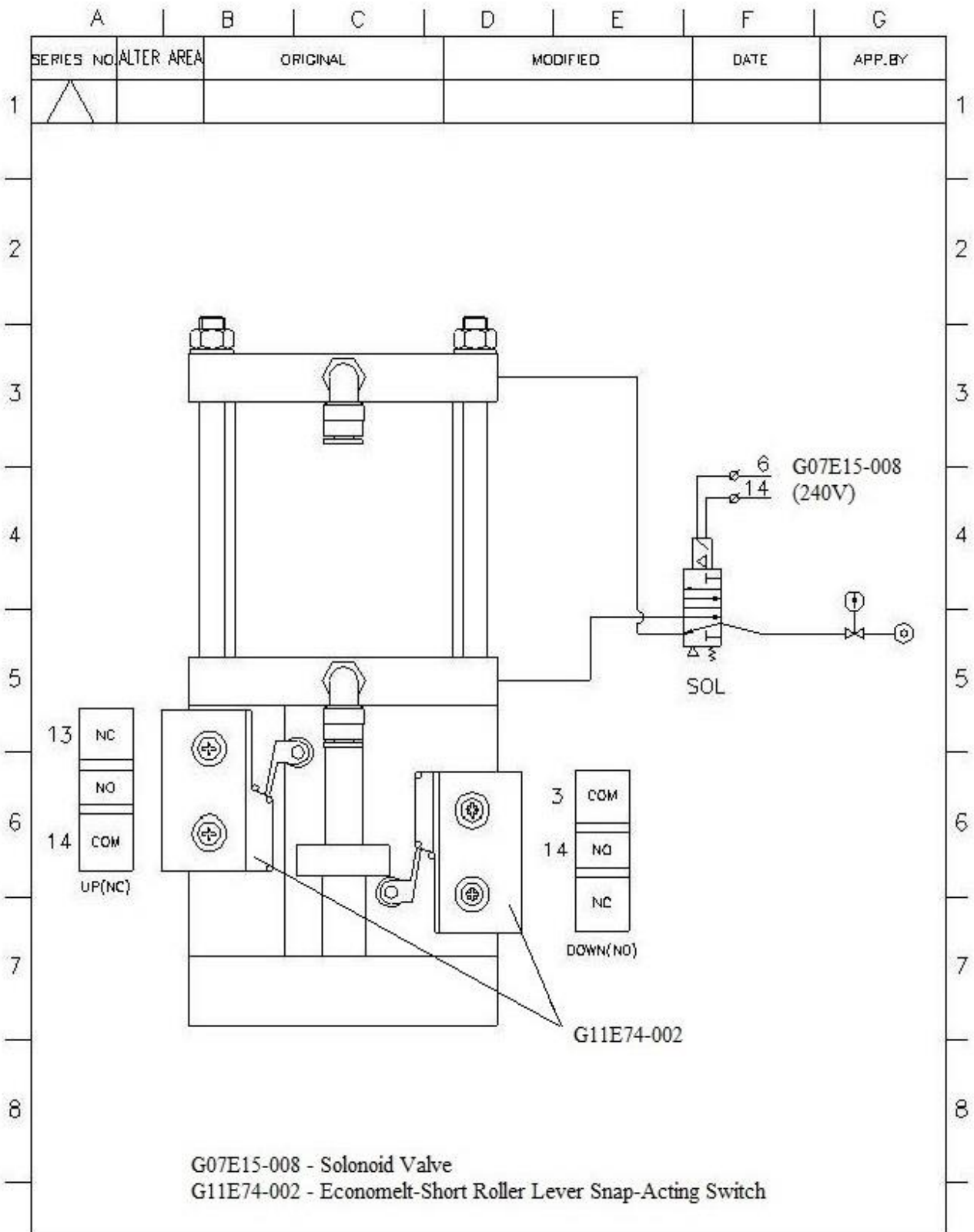




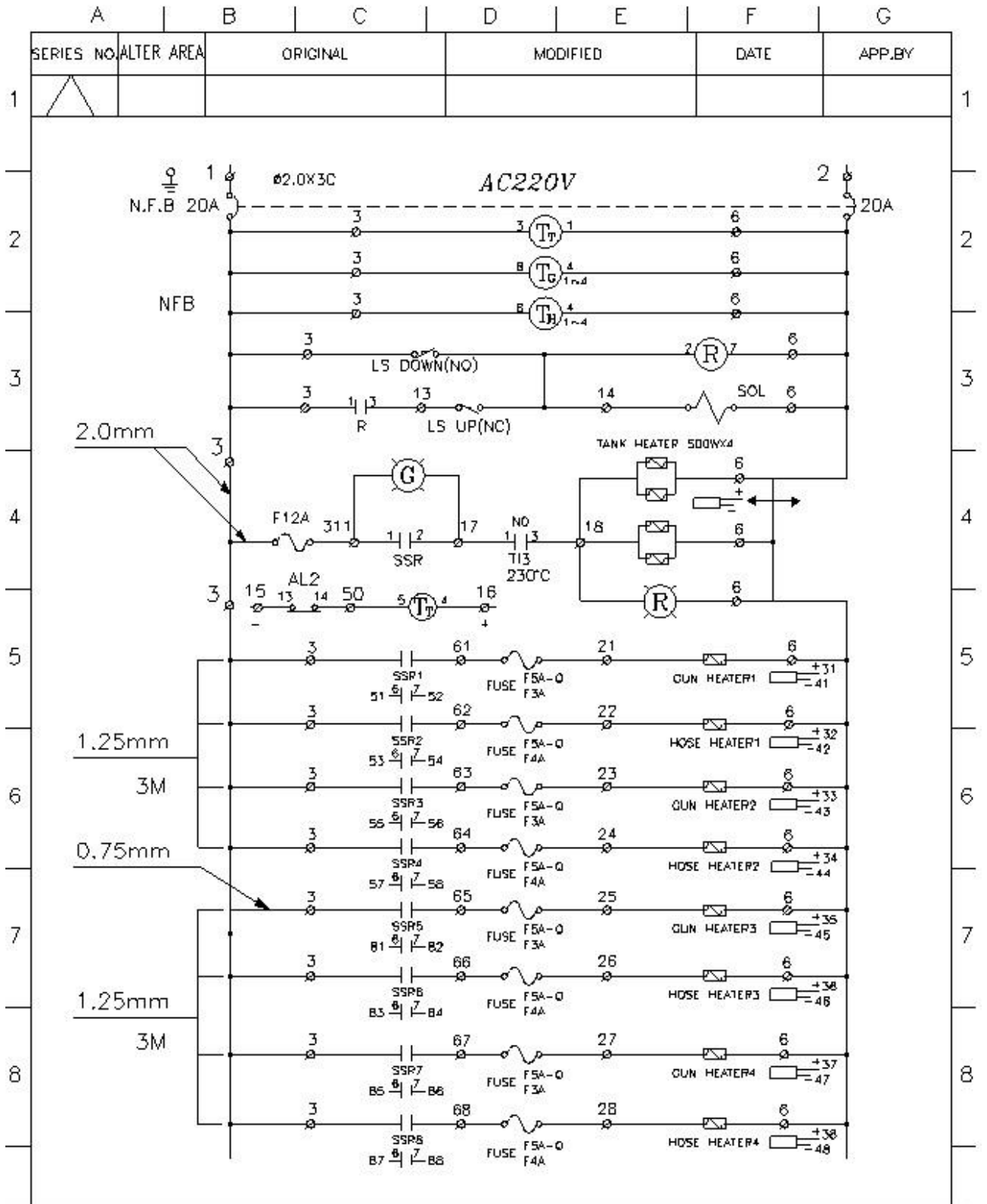


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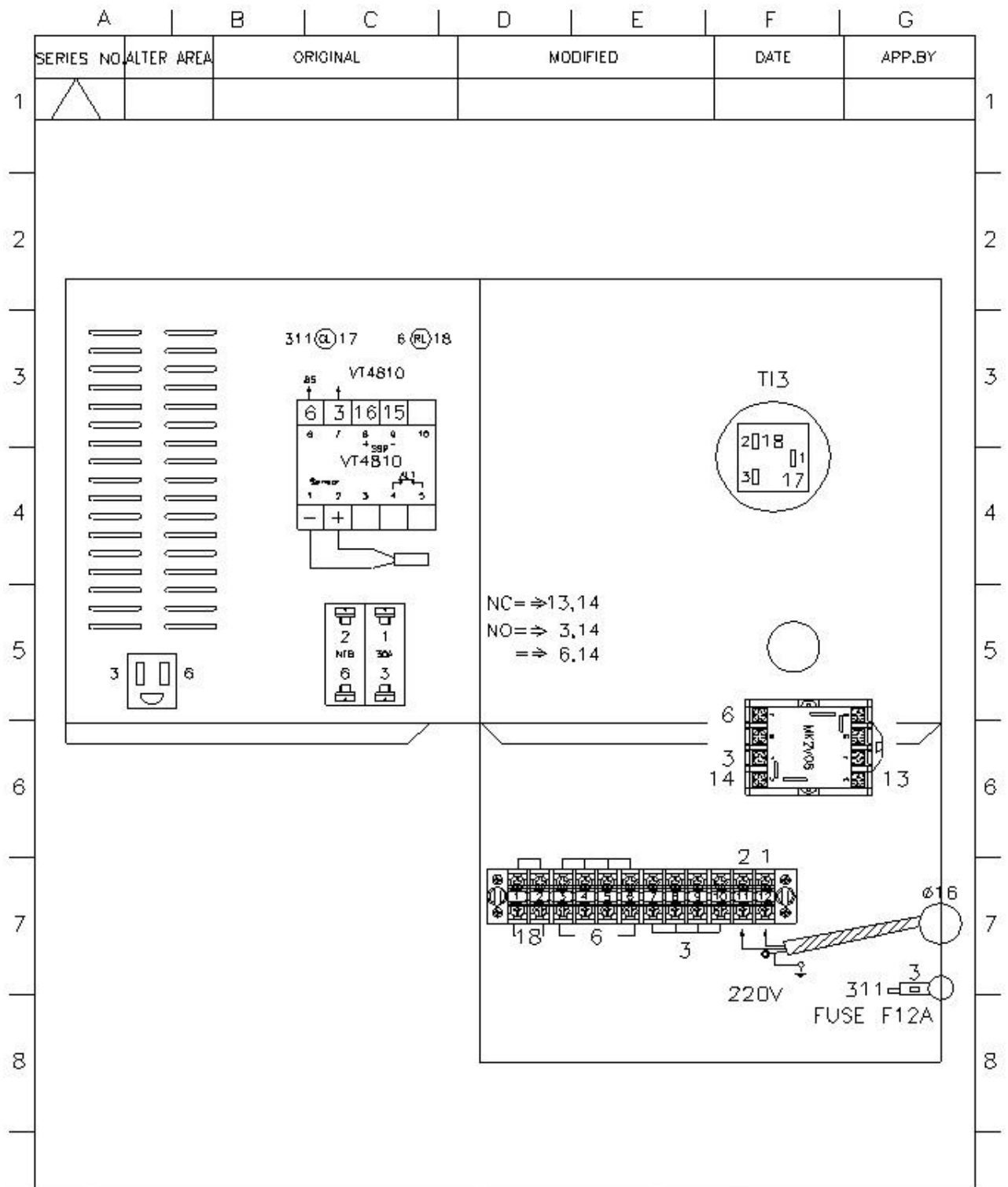
**\*If EconoMelt D or N ( operating with Dynamelt or Norsdon hoses/guns) the wiring pin out is different for hose connectors. Please see contact Glue Machinery Corporation for schematics.**



# WIRE DIAGRAM FOR 4 OUTLET

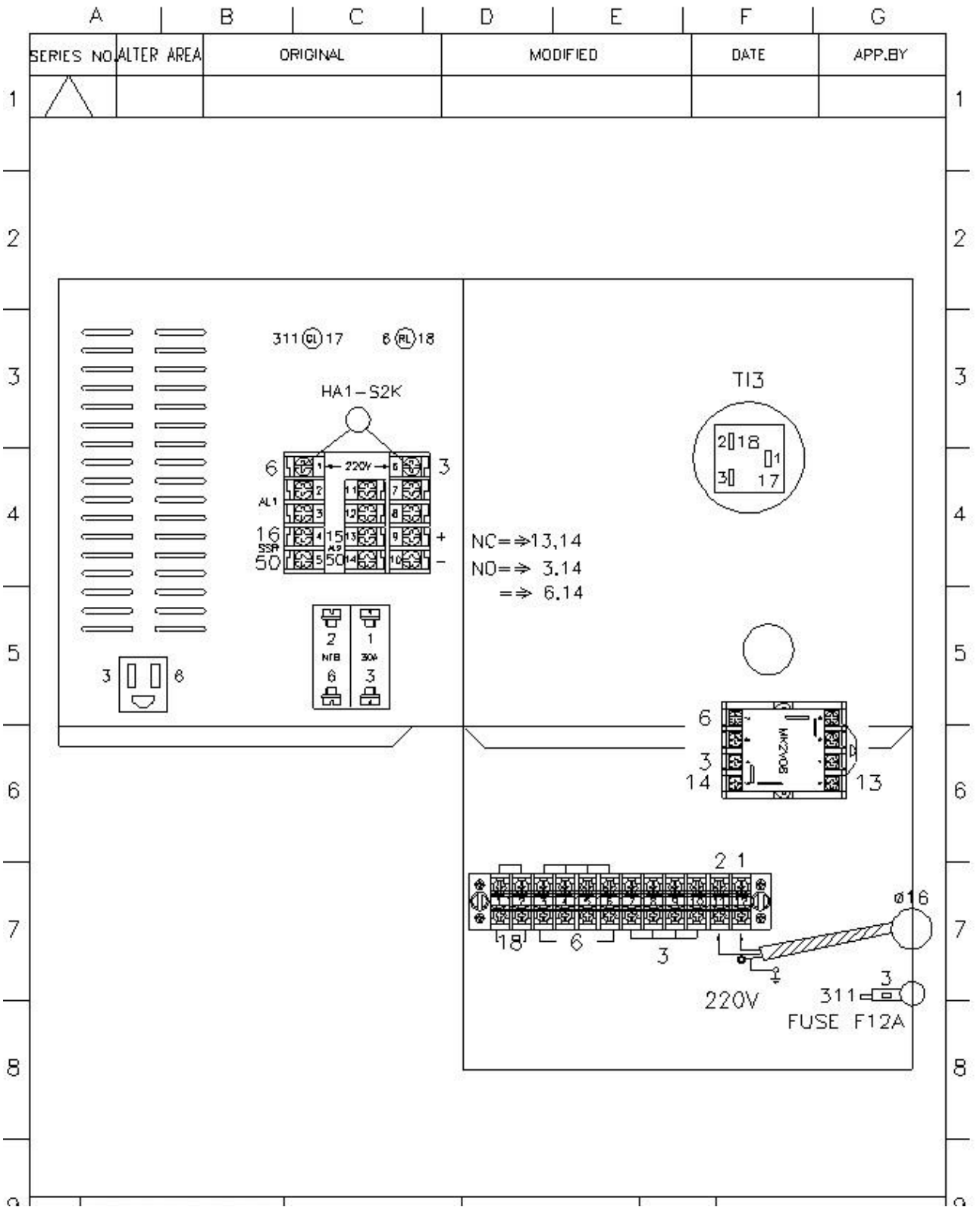


**\*If EconoMelt D or N ( operating with Dynamelt or Norsdon hoses/guns) the wiring pin out is different for hose connectors. Please see contact Glue Machinery Corporation for schematics.**

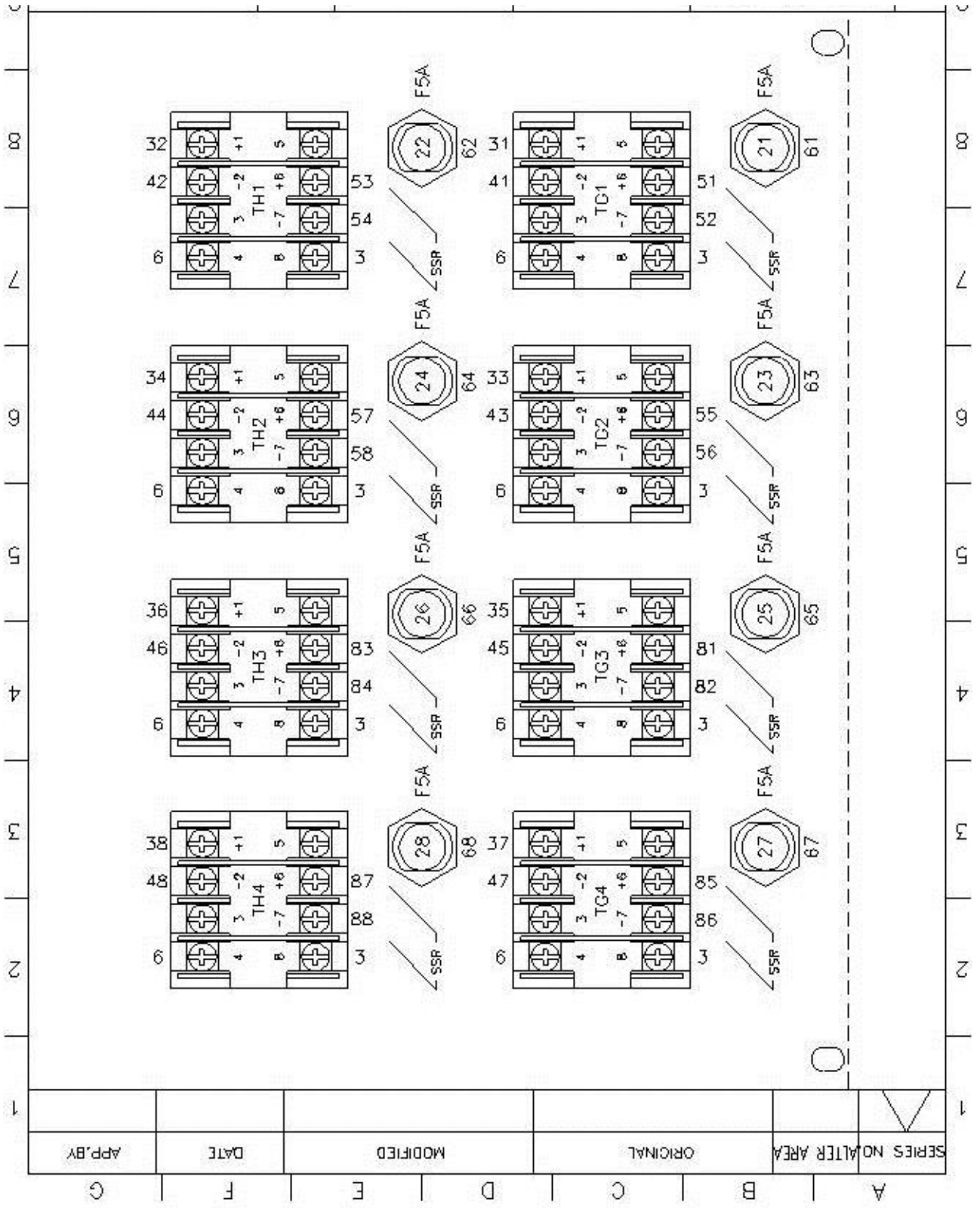


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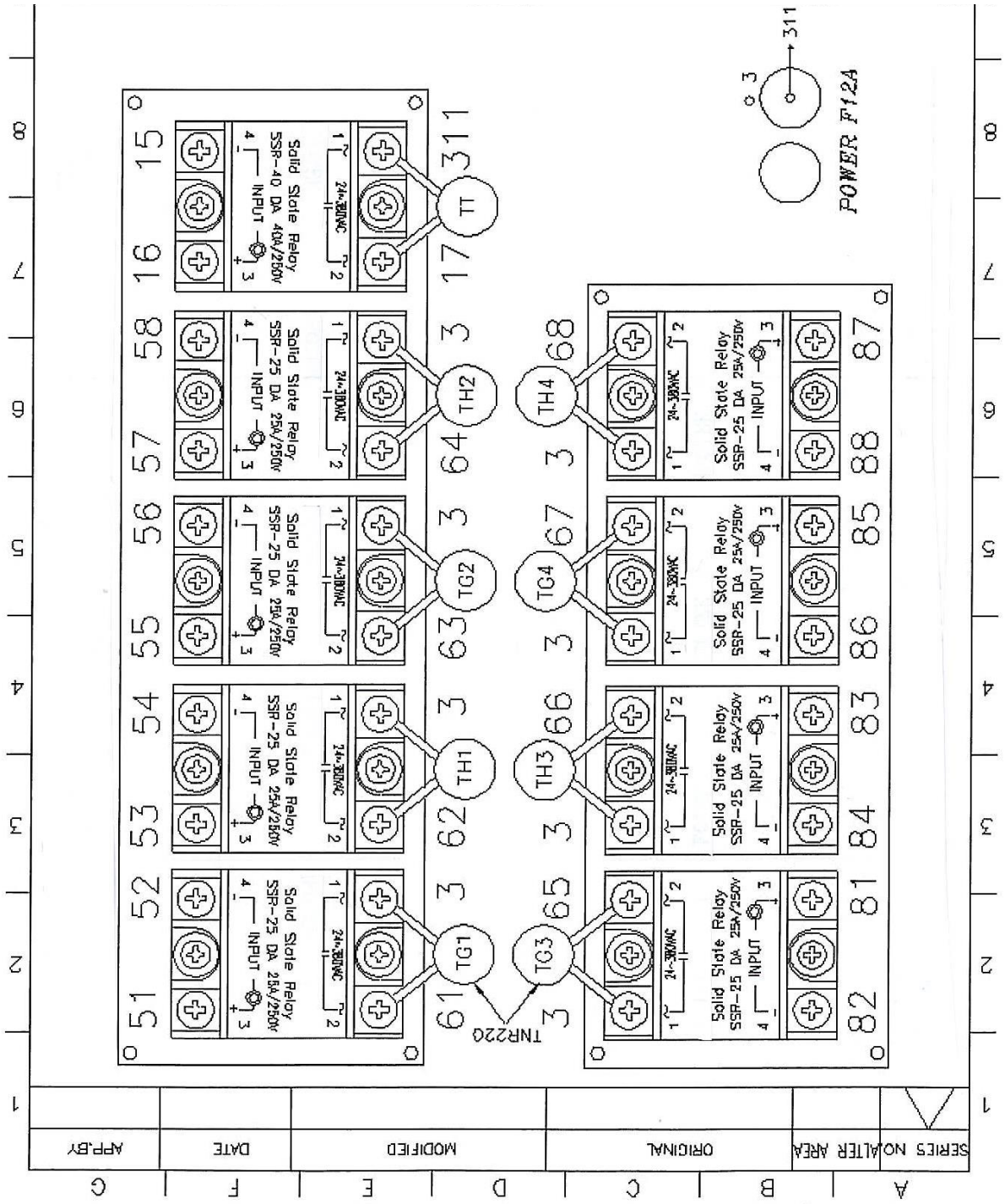




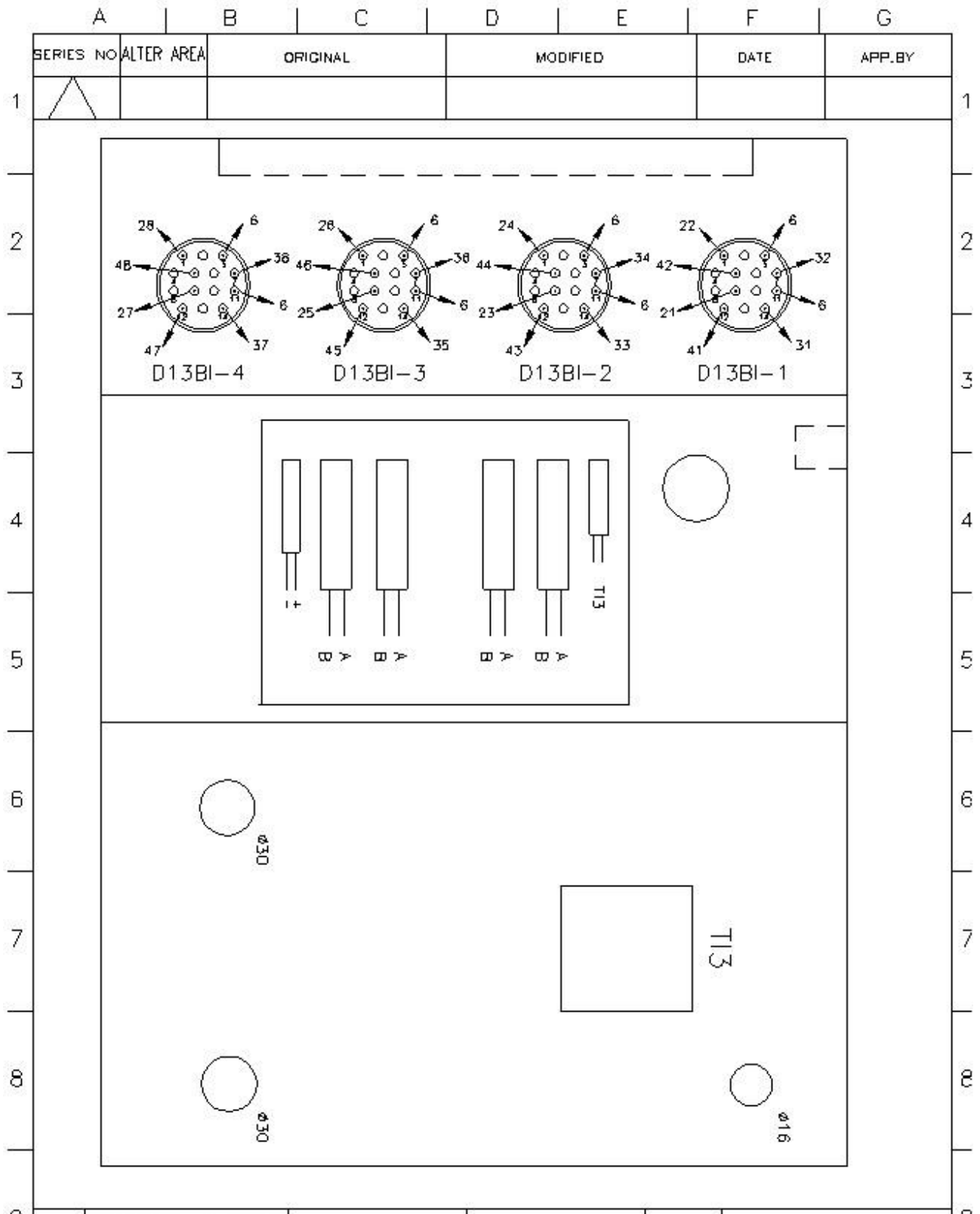
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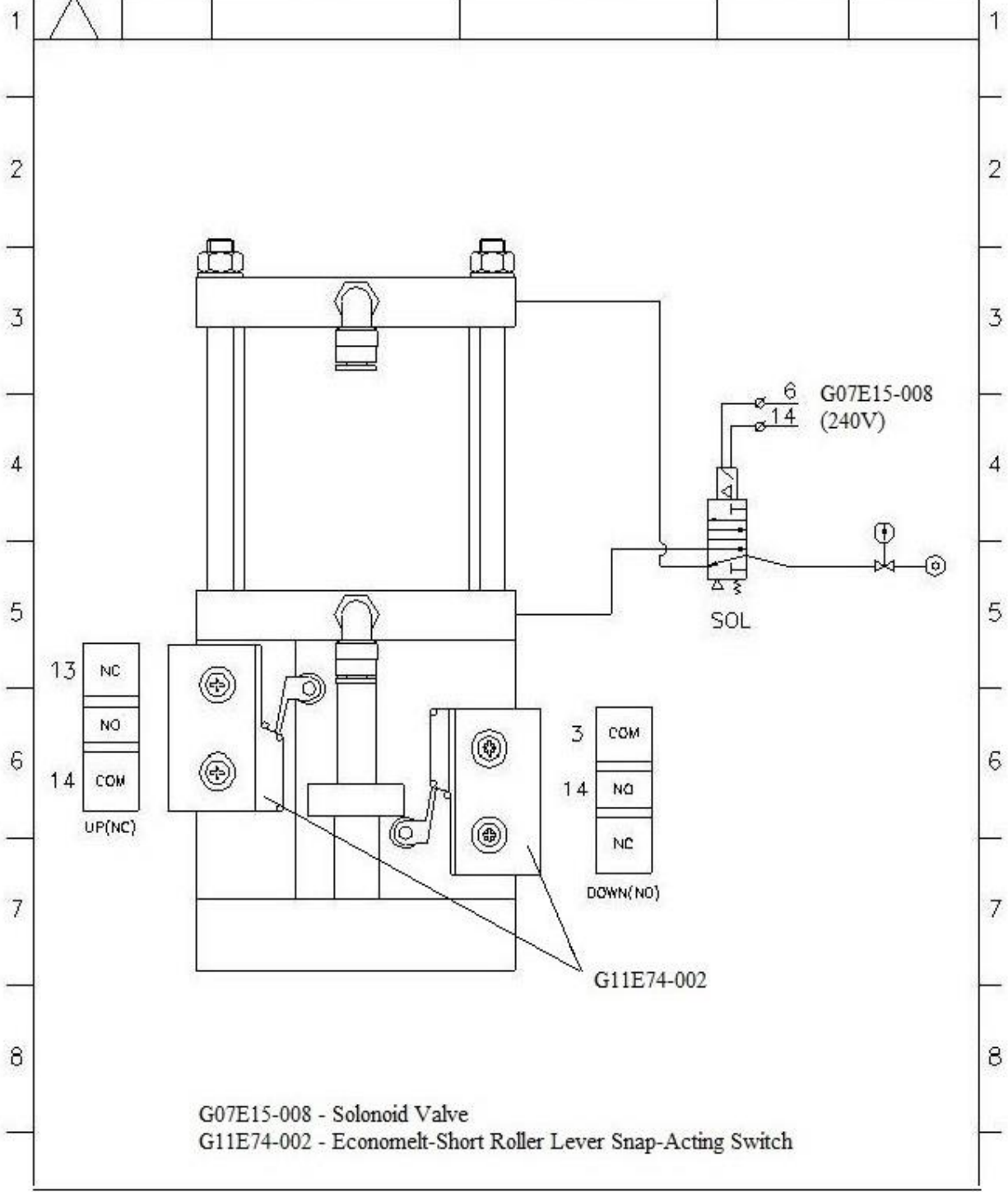
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**\*If EconoMelt D or N ( operating with Dynamelt or Norsdon hoses/guns) the wiring pin out is different for hose connectors. Please see contact Glue Machinery Corporation for schematics.**

	A	B	C	D	E	F	G
SERIES NO.			ORIGINAL		MODIFIED		DATE
ALTER AREA							APP. BY



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## **CUSTOMER SERVICE POLICIES**

### **Standard Parts:**

- Customer Service will strive to ship stock parts within 24 hours of receipt of purchase order.
- Most non-stock parts will be available for shipment within 5-10 business days of receipt of purchase order.
- A 30% re-stock fee will apply to all returned parts received in new and operable condition within 30 days of shipment.

### **Special Parts:**

- Special non-stock items may have considerable lead times. Customers who use special (non-stock) items are encouraged to keep these items in stock.
- Returns are acceptable at the sole discretion of Glue Machinery Corporation. No equipment or goods are to be returned without a Glue Machinery return authorization number. If an item is deemed returnable, a re-stocking fee of up to 50% will apply to special or non-stock items.

### **Shipments:**

- Most shipments are routed UPS. Shipments over 150 pounds are forwarded via trucking service.

### **Same day (24 hour) special handling:**

- Rush orders are accepted.

NOTE: CUSTOMER SERVICE DIRECT DIAL PARTS - 1-888-202-2468

**Prices and Terms subject to change without notice.**

## **TECHNICAL SERVICE POLICIES**

### **Repairs (at Glue Machinery Corporation facility):**

- Items determined repairable are invoiced at cost of materials plus \$75.00/hour labor. Estimates will be made prior to any repair service.
- Most guns are repairable and should not be discarded. Please call Glue Machinery personnel to determine the feasibility of repairing questionable equipment.
- Customer is responsible for all freight charges.

### **Installation Supervision:**

- Glue Machinery Corporation provides in plant technical supervision at a rate of \$850.00 per day, plus expenses.
- Two weeks notice is necessary to schedule Glue Machinery Corporation technical personnel.
- Customers are responsible for pre-installation preparation. Information is provided for machine and head mounting, electrical information, timing information, etc.
- Missed appointments, or those cancelled with less than 24 hours notice, will be charged at the full rate of \$850.00, plus expenses.
- If Customer is not prepared for a scheduled service visit, the day will be charged at \$850.00 plus expenses.

### **Technical Service (in-field repair):**

- Technical service personnel are available to all Glue Machinery Corporation customers. Glue Machinery Corporation should be contacted at 888-202-2468 if a technician is needed.
- Service charges are: \$100.00/hour - Monday through Friday, plus expenses; and \$150.00/hour on weekends and holidays, plus expenses. Mileage is charged at \$0.52/mile. Minimum service charge is \$425.00 plus expenses. Under certain circumstances, time is charged from the time a Glue Machinery Corporation technician leaves his location until he returns to that location. The customer will be notified in advance of this situation and the customer must authorize these charges.

## TERMS AND CONDITIONS OF SALE

1. **ENTIRE AGREEMENT:** These Terms and Conditions, together with terms on the face of Seller's invoice, shall constitute the entire and exclusive contract ("Agreement") between Seller and Buyer. This Agreement is intended to be a final expression of the parties' understanding and agreement with respect to its terms and shall supersede all prior negotiations, promises, agreements and representations not set forth herein. Seller's acceptance of Buyer's order is expressly conditioned on Buyer's assent to these Terms and Conditions of Sale. Any order, whether quoted, shipped or received by Seller, shall be construed as a written acceptance by Buyer of Seller's offer to sell in accordance with this Agreement, and any such order shall be filled in accordance with the terms as provided in this Agreement. No other terms and conditions shall apply unless specifically accepted by Seller in writing. No modifications of this Agreement shall be of any force and effect unless such modifications are made in writing and signed by the party claimed to be bound thereby. Additionally, no modification shall be effected by an acknowledgment or acceptance by Seller of any oral or written purchase order from Buyer containing any different terms and conditions, and any such inconsistent terms and conditions shall be deemed to be superseded by this Agreement and the other documents delivered by Seller to Buyer.

If for any reason Buyer fails to accept this Agreement in writing, any conduct that demonstrates the existence of a contract, including, without limitations, the delivery of items in accordance with this Agreement prior to written acceptance hereof and acceptance of such items by Buyer, shall constitute an agreement to all of the terms and conditions stated herein.

The provisions herein set forth, plus all drawings, constitute the entire contract between the Seller and the Buyer and supersede all prior Proposals, purchase orders, correspondence and other communications, whether written or oral, between the Seller and the Buyer. No provision of these conditions of Sale shall be subject to change except by the written authorization of a properly authorized representative of the Seller.

2. **PRICE:** The prices set forth on the face of Seller's quotation or invoice is only for the quantities of items listed and the specifications indicated. Except as otherwise indicated on the face of Seller's invoice, Buyer is responsible for all freight and transportation charges, and all items will be billed at the prices (including applicable freight and transportation charges) in effect as of the date of shipment. All prices and extras, including all freight and transportation charges, are subject to change by Seller at any time without prior notice. In addition, all prices are subject to the addition of an applicable use, sales, excise or other taxes levied by any federal, state or local authority, and Buyer shall be responsible for any such taxes. Any excises, levies or taxes which Seller is required to pay or collect, under any existing or future law or regulation (domestic or foreign), upon or with respect to the sale, purchase, delivery, storage, processing, use, consumption or transportation of any of the items covered hereby, shall be for the account of Buyer and Buyer agrees to promptly pay the amount thereof to Seller upon request.
3. **DELIVERY AND RISK OF LOSS:** Unless otherwise stated in Seller's quotation or invoice, delivery shall occur, and risk of loss shall pass to Buyer upon delivery of the items to Buyer's designated shipping carrier. All items shall be delivered and shipped in accordance with the delivery schedule and instructions indicated on the face of Seller's invoice; provided, however, that delivery dates are approximate and are subject to reasonable variation. The amount of all applicable taxes, federal, state or local, will be charged in Maryland unless the purchase order clearly states that the equipment of goods are tax exempt and an exemption certificate is on file at the Seller's location. Any personal property or other tax assessable on the equipment or applicable taxes outside of Maryland shall be the sole responsibility of the buyer.
4. **PAYMENT:** Unless otherwise specified, the terms of payment for each order under this Agreement shall be net cash in 30 days from the date of invoice. C.O.D. or prepayment may apply to new customers. Transactions are FOB Seller's factory exclusive of sales or use



taxes. All payments shall be in the legal currency of the United States. All prices are subject to exception or change without notice. Pricing errors may be corrected at any time. The Seller may, at any time and without obligation, suspend performance or require payment in cash, security, or other adequate assurances satisfactory to the Seller when, in the opinion of the Seller in its sole discretion, the financial circumstances of Purchaser warrant such action. Seller shall retain title to all items as security until payment for same has been received. If Buyer at any time fails to make payment as required under this Agreement, Seller may, in addition to any other remedies that it may have as provided by law or in equity, suspend its own performance hereunder and demand collateral sufficient to ensure the payment of all outstanding amounts that are then due and/or that may become due in the future under this or any other agreement between the parties.

5. **FREIGHT:** Buyer is responsible for all freight and forwarding charges, import fees, customs fees, duties, taxes, etc.
6. **LIMITED WARRANTY AND DISCLAIMERS:** All equipment and goods are warranted by the Seller to be free from defects in material and workmanship as follows:

All items except electrical components and hot melt hoses for a period of six (6) months from date of shipment or one thousand (1,000) hours of use, whichever occurs first.

All electrical components for a period of ninety (90) days from the date the equipment or goods were shipped, and

For hot melt hoses for a period of six (6) months from date of shipment.

This warranty does not apply to equipment or goods which are, by the sole discretion of the seller, misused, abused, damaged from installation, or not used in accordance with seller's instructions. Normal wear of equipment or goods is not included in this warranty.

Equipment or goods not manufactured by the Seller but supplied through the Seller shall carry the warranty of the original manufacturer.

Seller assumes no responsibility for the quality or performance of coatings, adhesives or other materials used with Seller's equipment or goods.

Subject to the limitations set forth in these terms and conditions, Seller warrants that the item(s) sold to Buyer will, under normal use and service, conform to any specifications that are listed in this Agreement. Seller reserves the right to change any of its specifications, if applicable, at any time. The limited warranty set forth in this paragraph expires at the earlier of (i) six months after date of shipment or (ii) the period or shelf life specified in the applicable Technical Data Sheet (the "Warranty Period"). This limited warranty is the sole and exclusive warranty provided under this Agreement and extends only to the original Buyer from Seller and does not extend to any subsequent purchases or any other uses of any item sold hereunder. No claim against Seller, including but not limited to personal injury claims relating to any products, shall be allowed by any party other than the Buyer. **NO OTHER WARRANTY, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY, INFRINGEMENT, FITNESS FOR PARTICULAR PURPOSE OR OTHERWISE, SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF ANY ITEM HEREUNDER. ADDITIONALLY, NO REPRESENTATION OR WARRANTY MADE BY ANY SALES REPRESENTATIVE OR SELLER WHICH IS NOT SPECIFICALLY SET FORTH HEREIN SHALL BE BINDING UPON SELLER.** All claims under this warranty must be made in writing and delivered to Seller at the address listed in Seller's invoice prior to the expiration of the Warranty Period or such claims shall be barred.

Glue Machinery Corporation and/or its respective suppliers make no representations about the suitability of the information contained in the documents and related graphics published on GlueMachinery.com for any purpose. Corresponding images and/or example photos depict professionals and should not be relied upon when operating any of the depicted machinery. Glue Machinery Corporation hereby disclaims all warranties and conditions with regard to this information, including implied warranties. The documents and related images published on GlueMachinery.com or other advertising materials could include technical inaccuracies or typographical errors. Glue Machinery Corporation reserves the right to make improvements and/or changes to GlueMachinery.com at any time.

The limited warranty provided for herein does not cover, and specifically excludes, material failure resulting from normal wear and tear, abuse, neglect, improper installation, faulty maintenance, accidental or intentional damage, damage from fire, floods, earthquakes or other acts of God, and/or defects resulting from seller's compliance with Buyer's specifications. Additionally, it is solely Buyer's responsibility to test and determine the suitability of any item for any intended use, and although Seller may have recommended an item or developed an item at Buyer's request, Buyer assumes all risk and liability whatsoever regarding the item's suitability for Buyer's or any other intended use.

7. **LIMITATIONS OF LIABILITY.** Upon receipt of a timely warranty claim from Buyer in accordance with these terms and conditions, Seller shall have the option either to inspect the item while in Buyer's possession or to request Buyer to deliver the item to Seller at its factory or other designated site, at Buyer's expense, for inspection by Seller. Seller shall, at its option, either (i) replace any item that has been properly selected, stored and used and is reasonably determined by Seller to be in breach of the warranty set forth in the foregoing paragraph of these terms and conditions, in which case seller shall then ship the replacement item to Buyer F.O.B. point of shipment; or (ii) if in Seller's sole judgment circumstances are such as to preclude the remedying of a breach of any warranty by replacement, Seller shall refund to Buyer, by issuance of a credit or otherwise, the applicable part of the purchase price theretofore paid to Seller. **IN NO EVENT SHALL SELLER'S LIABILITY FOR ANY DEFECTIVE ITEMS UNDER THIS AGREEMENT EXCEED THE PURCHASE PRICE THEREOF. IT IS EXPRESSLY AGREED THAT REPLACEMENT OR REFUND OF THE PURCHASE PRICE SHALL BE THE SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY OR ANY OTHER CLAIM IN RESPECT OF SUCH ITEMS, INCLUDING, WITHOUT LIMITATIONS, THOSE CLAIMS BASED ON CONTRACT, WARRANTY, TORT, OR STRICT LIABILITY. SELLER SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE FOR REMOVAL OR INSTALLATION COSTS, DISPOSAL COSTS, LABOR COSTS, DOWNTIME, DAMAGE TO OTHER PROPERTY, LOSS OF BUSINESS OR PROFITS, OR ANY SIMILAR OR DISSIMILAR INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES.** The sole purpose of the stipulated exclusive remedy set forth in this paragraph shall be to provide Buyer with free replacement or refund for defective items in the manner provided herein. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as Seller is willing and able to replace defective items in the manner prescribed herein or to provide a refund if, in Seller's judgment, replacement is not feasible or appropriate under the circumstances.
8. **ITEM RETURNS:** Seller, in its sole and exclusive discretion, shall have the right to accept returns of item(s) from Buyer during the applicable Warranty Period. No item shall be returned, however, unless (i) Seller has issued to Buyer a written return authorization number, (ii) Buyer has a valid receipt for the item, and (iii) the Warranty Period has not expired. Buyer shall be responsible for any costs and expenses associated with the return of any item, including, but not limited to, any applicable shipping costs, restocking fees and any costs associated with the proper disposal of the returned items.
9. **FORCE MAJEURE:** Seller shall be excused from, and shall have no liability for, any prohibitions, failures, interruptions or delays in the manufacture or delivery of any items which may be occasioned by matters beyond the control of Seller, including, but not limited to, any act of

sabotage, fire, flood, storms, explosion, labor dispute, strike, work stoppage, riot, insurrection, war, act of, or priorities granted by request of or for the benefit, directly or indirectly, of any government body, authority or agency, shortage of raw materials or supplies, act of God, or any other causes beyond Seller's control. In the event of any such prohibition, failure, interruption or delay in manufacture or delivery, Seller may, at its option, extend the delivery time or cancel the order in whole or in part. **IN NO EVENT SHALL SELLER BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR CLAIMS OF ANY NATURE RESULTING FROM FAILURE OR DELAY IN DELIVERY.**

10. **TERMINATION/CANCELLATION:** In addition to any other remedies that Seller may have as provided by law or in equity, if Buyer (i) fails to make any payment when due hereunder, or (ii) fails on request to give proper shipping instruction, or (iii) fails to accept delivery at times stated, or (iv) becomes insolvent or otherwise voluntarily or involuntarily becomes subject to any bankruptcy or receivership proceedings, or (v) otherwise fails to comply with any terms and conditions of any contract between Buyer and Seller, Seller shall have the right at its option to terminate this Agreement, recover damages and deduct any undelivered quantities of items from the total quantities of items to be furnished to Buyer, whether under this or any other contract between Buyer and Seller. Additionally, Seller may, at any time or times, suspend performance of any order or require payment in cash, security or other adequate assurance satisfactory to Seller when, in Seller's sole opinion, the financial condition of Buyer or other grounds for insecurity warrant such action.

Buyer shall not be permitted to modify or cancel orders without the prior written consent of Seller. In no event shall any order be modified or cancelled for any portion thereof already manufactured, blended or in the process of manufacture or blending at the time the request for modification or cancellation is received by Seller. Seller, in its sole and exclusive discretion, shall have the right to make exceptions to this cancellation/modification requirement upon such terms as are satisfactory to Seller and that will protect and indemnify Seller against all loss.

Seller intends to comply with all federal, state and local laws and regulations applicable to the performance by Seller of each order, but any failure of Seller to so comply shall not be a defense to, or excuse Buyer from, performance by Buyer of any order.

11. **INDEMNIFICATION:** Seller shall not be liable for any inaccurate, incomplete, or faulty specifications supplied by Buyer, nor will seller be liable for any infringement or alleged infringement of any patent, trademark, design, or other intellectual property rights arising out of Seller's compliance with Buyer's specifications. To the fullest extent permitted by law, Buyer shall protect, defend, indemnify and hold harmless Seller, its directors, officers, shareholders and employees (collectively "Seller") from and against any and all manner of actions, claims, demands, damages, losses, liabilities, penalties, judgments, costs and expenses of any kind whatsoever (including without limitation, attorneys' and consultants' fees and expenses), whether in law or in equity or otherwise, arising out of or relating to (i) any inaccurate or faulty specifications supplied by Buyer, or (ii) any infringement or alleged infringement of any patent, trademark, design or other intellectual property rights resulting from Seller's compliance with Buyer's specifications, or (iii) any personal injuries or property damage sustained or allegedly sustained by any person (including, but not limited to, Seller's agents and employees) as a result of Buyer's active or passive negligence or misconduct; or (iv) Buyer's or any third party's failure to test and determine the suitability of any item for Buyer's or any other intended user; (v) Buyer's or any third party's misuse or failure to use any item in a manner that does not conform to the applicable item specifications or to the requirements of any applicable federal, state or local law or requirement; or (vi) any third party claims asserted against Seller as a result of Buyer's or any other third-party's use of any item purchased hereunder. The provisions of this paragraph shall survive the delivery of and payment for all items under this Agreement and shall apply irrespective of whether Seller is also actively or passively negligent or otherwise at fault. In addition, this indemnity specifically covers any claims that may be asserted by Buyer's employees, and Buyer hereby expressly waives, for purposes of this indemnity only, any immunity it may have under any worker's compensation or other law from liability for claims brought by Seller pursuant to this paragraph.

Buyer's indemnity obligations to Seller hereinabove shall not be limited by any limitation on the amount or type of damages, benefits or compensation payable by or for Buyer under worker's compensation acts, disability benefit acts or other employee benefit acts on account of claims against Seller by an employee of Buyer or anyone employed directly or indirectly by Buyer or anyone for whose acts Buyer may be liable. In no event shall Buyer's liability hereunder be limited to the extent of any insurance available to or provided by Buyer.

12. **GOVERNING LAW:** This Agreement shall be governed by, and construed in accordance with, the laws of the State of Maryland without regard to its conflicts of laws. Any and all disputes arising under this Agreement shall be resolved in a state or federal court of competent jurisdiction within the State of Maryland and Buyer hereby irrevocably submits to the jurisdiction of any such court for the resolution of any and all disputes arising hereunder.
13. **WAIVER OF BREACH AND SEVERABILITY:** Any failure by Seller at any time, or from time to time, to enforce or require the strict keeping and performance by Buyer of any of the terms or conditions of this Agreement shall not constitute a waiver by Seller of a breach of any such terms or conditions, nor shall it affect or impair such terms or conditions in any way, or the right of Seller at any time to avail itself of such remedies as it may have for any such breach or breaches of such terms or conditions. A waiver of any of the terms or conditions hereof must be in writing and signed by the Seller. Any such waiver shall not be deemed a continuing waiver, but shall apply solely to the instance to which the waiver is directed. If any term or condition of this Agreement, or portion thereof, is rendered unenforceable under the law, all remaining terms and conditions not affected by such determination shall remain in full force and effect and shall be binding upon the parties hereto.
14. **NO THIRD PARTY BENEFICIARIES:** Except as otherwise provided in writing, nothing contained in this Agreement shall be construed to give any rights or benefits in this Agreement to anyone other than Buyer and Seller, and all duties and responsibilities undertaken pursuant to this Agreement will be for the sole and exclusive benefit of Buyer and Seller and not for the benefit of any other party.
15. **SUCCESSORS AND ASSIGNS:** This Agreement shall be binding upon and shall inure to the benefit of the respective successors and assigns of both Seller and Buyer. Buyer shall not, however, assign this Agreement or any part thereof or the items hereunder without the prior written consent of Seller, which consent Seller may grant or withhold in its sole and absolute discretion.