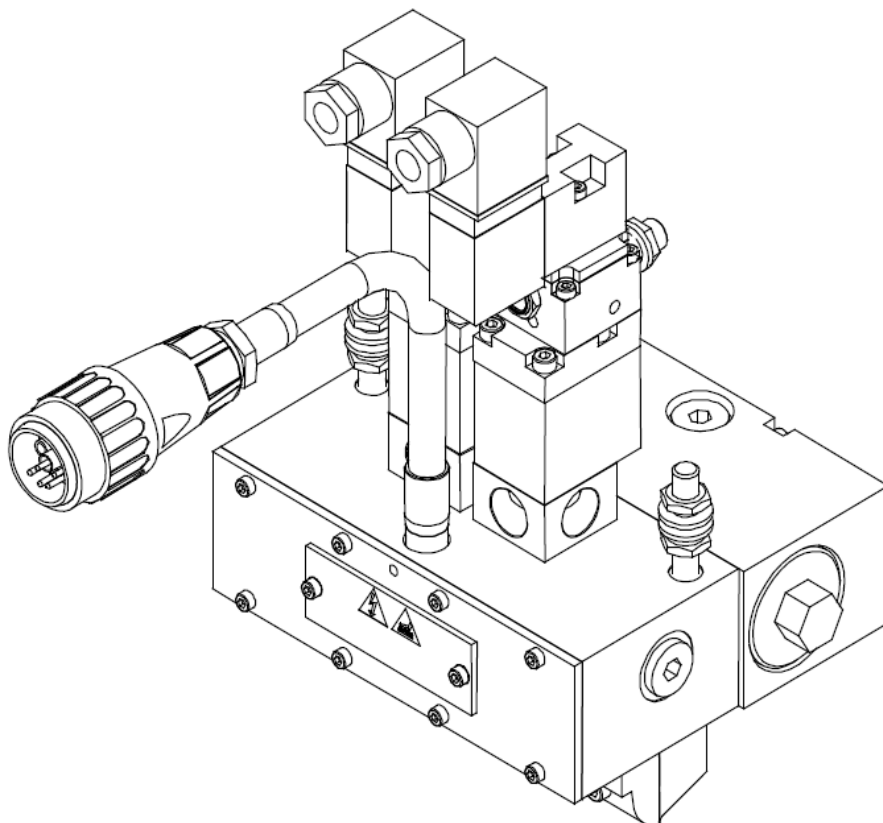


# APEX

## SLOT DIE APPLICATOR

Technical Documentation, No.40-47, Rev.5.24  
English - Original instructions

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## Information about this manual



### **Read all instructions before operating this equipment!**

It is the customer's responsibility to have all operators and service personnel read and understand this information. Contact your ITW Dynatec customer service representative for additional copies.



### **NOTICE:**

Please be sure to include the serial number of your application system each time you order replacement parts and/or supplies. This will enable us to send you the correct items that you need.

### **NOTICE:**

Most common screws, nuts and washers called out in the manual are not for sale and they can be obtained locally at your hardware Store. Specialty fasteners are available by contacting ITW Dynatec's Customer Service.

ITW Dynatec Service Parts Direct Dial: 1-800-538-9540

ITW Dynatec Technical Service Direct Dial: 1-800-654-6711

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# Chapter 1

## Declaration of Incorporation / Conformity

### Declaration of incorporation

according to the EU Machinery Directive 2006/42/EG, Annex II, 1.B  
for partly completed machinery

**Manufacturer:**

ITW Dynatec,  
31 Volunteer Drive  
37075 Hendersonville, TN

**Person residing within the Community authorised to compile the relevant technical documentation:**

Andreas Pahl  
ITW Dynatec GmbH,  
Industriestraße 28  
40822 Mettmann

**Description and identification of the partly completed machinery:**

Product / Article: APEX Crossfire Applicator Head  
Machine number: Large systems\_2  
Project number: APEX Crossfire  
Project name: APEX Crossfire  
Function: Delivery of hot melt adhesive to substrates

**It is declared that the following essential requirements of the Machinery Directive 2006/42/EG have been fulfilled:**

1.3.2.; 1.3.7.; 1.5.1.; 1.5.16.; 1.5.2.; 1.5.5.; 1.5.6.; 1.5.7.; 1.6.3.

**It is also declared that the relevant technical documentation has been compiled in accordance with part B of Annex VII.**

**It is expressly declared that the partly completed machinery fulfils all relevant provisions of the following EU Directives:**

2004/108/EG:2004-12-15 (Electromagnetic compatibility) Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC  
2006/95/EG:2006-12-12 (Voltage limits) Directive of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version)

**Reference to the harmonized standards used:**

EN ISO 14121-1:2007 Safety of machinery - Risk assessment - Part 1: Principles (ISO 14121-1:2007)  
EN 60204-1:2006-06 Safety of machinery - Electrical equipment of machines - Part 1: General requirements  
EN 349:1993 + A1 Safety of machinery - Minimum gaps to avoid crushing of parts of the human body  
EN ISO 12100-1/A1:2009 Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology  
EN ISO 12100-2:2003/A1 Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles  
EN ISO 13850:2008 Safety of machinery - Emergency stop - Principles for design (ISO 13850:2006)

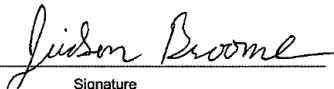
The manufacturer or his authorised representative undertake to transmit, in response to a reasoned request by the national authorities, relevant information on the partly completed machinery. This transmission takes place:

This does not affect the intellectual property rights!

**Important note! The partly completed machinery may be put into service only if it was determined, where appropriate, that the machinery into which the partly completed machinery is to be installed meets the provisions of this Directive.**

Hendersonville, TN, 2012.10.10

Place, date

  
Signature  
Judson Broome  
General Manager

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# Chapter 2

## Safety Instructions

### 2.1 General Considerations



- All operators and service personnel must read and understand this manual before operating or servicing equipment.
- All maintenance and service on this equipment must be performed by trained technicians.



#### Read and adhere to the manual!








1. Read and follow these instructions.  
Failure to do this could result in severe personal injury or death.
2. Keep the binding rules for accident prevention valid for your country and the place of installation. Also keep the approved qualified technical rules for safety-conscious and professional work.
3. Additional safety instructions and/ or symbols are located throughout this manual. They serve to warn maintenance personnel and operators about potentially hazardous situations.
4. Inspect the machine for unsafe conditions daily and replace all worn or defective parts.
5. Keep work area uncluttered and well lit. Remove all material or things not needed for the production from the workspace of the equipment!
6. All covers and guards must be in place before operating this equipment.
7. Subject to technical modifications without notice!
8. To ensure proper operation of the equipment, use specified electrical and/ or air supply sources.
9. Do not attempt to alter the design of the equipment unless written approval is received from ITW Dynatec.
10. Keep all manuals readily accessible at all times and refer to it often for the best performance from your equipment.

### 2.2 Warning Labels

1. Read and obey all of the warning labels, signs and caution statements on the equipment.
2. Do not remove or deface any of the warning labels, signs and caution statements on the equipment.
3. Replace any warning labels, signs and caution statements which have been removed or defaced. Replacements are available from ITW Dynatec.






## 2.3 Safety Symbols in this Manual

### Mandatory signs



	General mandatory sign		Wear foot guard!
	Read and adhere to the documentation!		Wear protective gloves!
	Switch the unit voltage-free before working! Main switch OFF!		Wear protective clothing!
	Wear headgear, protective goggles and ear protection!		

### Warning signs

**NOTE:** The dangers and risks exist if the corresponding instructions are not heeded and the precautionary measures are not taken!

	<b>Caution, danger spot!</b> This sign points to possible dangers for life and physical condition or to possible risks for machine and material or to possible risks for environment.  The word “ <b>DANGER</b> ” in addition with this points to possible dangers of life  The words “ <b>WARNING</b> ” and “ <b>CAUTION</b> ” in addition with this sign point to possible risks of injury.  The word “ <b>ADVICE</b> ” in addition with this sign points to possible risks for machine, material or environment.		<b>Danger, high voltage!</b> This sign points to possible dangers for life and physical condition caused by electricity. <b>Risk of injury, mortal danger!</b>
			<b>Caution, hot surface!</b> This sign points to possible risks of burns. <b>Risk of Burns!</b>
			<b>Caution, high pressure!</b> This sign points to possible risks of injury caused by high pressure. <b>Risk of injury!</b>
			<b>Caution, rotating rolls!</b> This sign points to possible risks of injury caused by inrunning nip (at rolls). <b>Risk of injury!</b>

### Prohibition signs

	<b>Fire danger!</b> <b>Smoking prohibited!</b>		<b>Fire danger!</b> <b>Fire and open flames prohibited!</b>
---	---	--	--

## 2.4 Safe Installation and Operation



### Read and adhere to the manual!

1. Read this manual before applying electrical power to the equipment. Equipment may be damaged by incorrect electrical connections.
2. To avoid possible failure of hoses, make sure all hoses are routed to avoid kinking, tight radius turns (8" or less) and abrasive contact. Hot-melt hoses should not have prolonged contact with heat-absorbing surfaces such as cold floors or metal troughs. These heat-absorbing surfaces can alter adhesive flow and cause incorrect calibration. Hoses should never be covered with materials that prevent heat dissipation, such as insulation or sheathing. Hoses should be spaced apart from each other, not making direct contact.
3. Do not use adhesive that is dirty or that may be chemically contaminated. Doing so can cause system clogging and pump damage.
4. When adhesive hand-held applicators or other movable applicators are used, never point them at yourself or at any other person. Never leave a hand-held applicator's trigger unlocked when not actually in use.
5. Do not operate the hopper or other system components without adhesive for more than 15 minutes if the temperature is 150° C (300° F) or more. To do so will cause charring of the residual adhesive.
6. Never activate the heads, hand-held applicators and/ or other application devices until the adhesive's temperature is within the operating range. Severe damage could result to internal parts and seals.
7. Never attempt to lift or move the unit when there is molten adhesive in the system.
8. In case of an emergency or exceptional incident, press the emergency stop button in order to stop the unit quickly.
9. Use the unit only as it is intended to.
10. Never let the unit run unattended.
11. Operate the unit only in a faultless and fully functional condition. Check and make sure that all safety devices work in proper form!



#### **Smoking, fire and open flames prohibited! Fire danger!**

Make absolutely sure that there is no smoking and no fire being lit in the work area!

## 2.5 Explosion/ Fire Hazard

1. Never operate this unit in an explosive environment.
2. Use cleaning compounds recommended by ITW Dynatec or your adhesive supplier only.
3. Flash points of cleaning compounds vary according to their composition, so consult with your supplier to determine the maximum heating temperatures and safety precautions.

## 2.6 Use of PUR (Polyurethane) Adhesives

1. PUR adhesives emit fumes (MDI and TDI) that can be dangerous to anyone exposed to them. These fumes cannot be detected by the sense of smell. ITW Dynatec strongly recommends that a power-vented exhaust hood or system be installed over any PUR system.
2. Consult with your adhesive manufacturer for specifics about required ventilation.



### CAUTION

Because of the nature of PUR adhesives to strongly bond in the presence of moisture, care must be taken to prevent them from curing inside ITW Dynatec equipment.

If PUR adhesive solidifies in a unit, the unit must be replaced. Always purge old PUR adhesive from the system per your adhesive manufacturer's instructions and time table.

ALLOWING PUR ADHESIVE TO CURE IN A UNIT OR ITS COMPONENTS VOIDS ITW DYNATEC'S WARRANTY.

## 2.7 Eye Protection & Protective Clothing



### WARNING

#### EYE PROTECTION & PROTECTIVE CLOTHING REQUIRED

1. It is very important that you PROTECT YOUR EYES when working around hot melt adhesive equipment!
2. Wear a face shield conforming to ANSI Z87.1 or safety glasses with side shields which conform to ANSI Z87.1 or EN166.
3. Failure to wear a face shield or safety glasses could result in severe eye injury.
4. It is important to protect yourself from potential burns when working around hot melt adhesive equipment.
5. Wear heat-resistant protective gloves and long-sleeved, protective clothing to prevent burns that could result from contact with hot material or hot components.
6. Always wear steel-reinforced safety shoes.

## 2.8 Electrical



### **DANGER HIGH VOLTAGE**

---

1. Dangerous voltages exist at several points in this equipment. To avoid personal injury, do not touch exposed connections and components while input power is on.
2. Disconnect, lockout and tag external electrical power before removing protective panels.
3. A secure connection to a reliable earth ground is essential for safe operation.
4. An electrical disconnect switch with lockout capability must be provided in the line ahead of the unit. Wiring used to supply electrical power should be installed by a qualified electrician.
5. Notify the maintenance personnel immediately, if cables are damaged. Provide for exchanging the defective components immediately.

## 2.9 Lockout/ Tagout



### **Switch the unit voltage-free before working! Main switch OFF!**

---

1. Follow OSHA 1910.147 (Lockout/ Tagout Regulation) for equipment's lockout procedures and other important lockout/tagout guidelines.
2. Be familiar with all lockout sources on the equipment.
3. Even after the equipment has been locked out, there may be stored energy in the application system, particularly in the capacitors within the panel box. To ensure that all stored energy is relieved, wait at least one minute after removing power before servicing electrical capacitors.

## 2.10 High Temperatures



### **WARNING HOT SURFACE**

---

1. Severe burns can occur if unprotected skin comes in contact with molten adhesive or hot application system parts.
2. Face shields (preferred) or safety glasses (for minimum protection), heat-resistant protective gloves and long-sleeved clothing must be worn whenever working with or around adhesive application systems.

## 2.11 High Pressure



### WARNING HIGH PRESSURE PRESENT

---

1. To avoid personal injury, do not operate the equipment without all covers, panels and safety guards properly installed.
2. To prevent serious injury from molten adhesive under pressure when servicing the equipment, disengage the pumps and relieve the adhesive system's hydraulic pressure (i.e. trigger the heads, hand-held applicators, and/or other application devices into a waste container) before opening any hydraulic fittings or connections.
3. IMPORTANT NOTE: Even when a system's pressure gauge reads "0" psi, residual pressure and trapped air can remain within it causing hot adhesive and pressure to escape without warning when a filter cap or a hose or hydraulic connection is loosened or removed. For this reason, always wear eye protection and protective clothing.
4. Either of the two High Pressure symbols shown may be used on ITW Dynatec equipment.
5. Keep the given operating pressure.
6. Notify the maintenance personnel immediately, if hoses or components are damaged. Provide for exchanging the defective components immediately.

## 2.12 Protective Covers



### WARNING DO NOT OPERATE WITHOUT GUARDS IN PLACE

---

1. Keep all guards in place!
2. To avoid personal injury, do not operate the application system without all covers, panels and safety guards properly installed.
3. Never get your extremities and/or objects into the danger area of the unit. Keep your hands away from running parts of the unit (pumps, motors, rolls or others).

## 2.13 Servicing, maintenance

1. Only trained and qualified personnel are to operate and service this equipment.
2. Before any service work disconnect the external power supply and the pressure air supply!
3. Never service or clean equipment while it is in motion. Shut off the equipment and lock out all input power at the source before attempting any maintenance.
4. Follow the maintenance and service instructions in the manual.
5. Keep the maintenance rates given in this documentation!
6. Any defects in the equipment that impact safe operation have to be repaired immediately.
7. Check screws that have been loosened during the repair or maintenance, if they are tight again.
8. Replace the air hoses in preventive maintenance regularly, even if they have got no viewable damages! Adhere to the manufacturers' instructions!
9. Never clean control cabinets or other houses of electrical equipment with a jet of water!
10. Adhere to the current safety data sheet of the manufacturer when using hazardous materials (cleaning agents, etc.)!

## 2.14 Secure transport

1. Examine the entire unit immediately after receipt, if it has been delivered in perfect condition.
2. Let damages in transit certify by the carrier and announce them immediately to the ITW Dynatec.
3. Use only lifting devices that are suitable for the weight and the dimensions of the equipment (see drawing of the equipment).
4. The unit has to be transported upright and horizontally!
5. The unit has to cool down to room temperature before packaged and transported.

## 2.15 Treatment for Burns from Hot Melt Adhesives

### **Measures after being burned:**

1. Burns caused by hot melt adhesive must be treated at a burn center. Provide the burn center's staff a copy of the adhesive's M.S.D.S. to expedite treatment.
2. Cool burnt parts immediately!
3. Do not remove adhesive forcibly from the skin!
4. Care should be used when working with hot melt adhesives in the molten state. Because they rapidly solidify, they present a unique hazard. Even when first solidified, they are still hot and can cause severe burns.
5. When working near a hot melt application system, always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothes that cover all vulnerable parts of the body.
6. Always have first-aid information and supplies available.
7. Call a physician and/or an emergency medical technician immediately. Let the burns medicate by a medic immediately.

## 2.16 Measures in case of fire

1. Please heed that not covered hot parts of the engine and molten hot melt may cause heavy burns. Risk of burns!
2. Work very carefully with molten hot melt. Keep in mind, that already jelled hot melt can be very hot, too.
3. When working near a hot melt application system, always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothes that cover all vulnerable parts of the body!

### **Measures in case of fire:**

Wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothes that cover all vulnerable parts of the body.

### **Firefighting - burning hot melt:**

Please keep attention to the safety data sheet given by the adhesive manufacturer.



## **EXTINGUISH FIRE**

### **Appropriate extinguishing agents:**

Foam extinguisher, Dry powder, Spray, Carbon dioxide (CO<sub>2</sub>), Dry sand.

*For safety reasons not appropriate extinguishing agents: None.*

### **Firefighting - burning electrical equipment:**

#### **Appropriate extinguishing agents:**

Carbon dioxide (CO<sub>2</sub>), Dry powder.



## 2.17 Keep attention to environmental protection standards



1. When working on or with the unit, the legal obligations for waste avoidance and the duly recycling / disposals have to be fulfilled.
2. Keep attention, that during installations, repairs or maintenance matters hazardous to water, like adhesive / adhesive scrap, lubricating grease or oil, hydraulic oil, coolant and cleaner containing solvent do not pollute the ground or get into the canalization!
3. These matters have to be caught, kept, transported and disposed in appropriate reservoirs!
4. Dispose these matters according to the international, national and regional regulations.



# Chapter 3

## Description and Technical Specs

### 3.1 Applicable Safety Regulations

#### 3.1.1 Intended Use

The APEX High-Speed Intermittent Slot Die Applicator may be used only to apply suitable materials, e.g. adhesives. When in doubt, seek permission from ITW Dynatec.



If the Applicator is not used in accordance with this regulation, a safe operation cannot be guaranteed.

The operator - and not ITW Dynatec - is liable for all personal injury or property damages resulting from unintended use!



Intended use includes, that you

- read this documentation,
- heed all given warnings and safety instructions, and
- do all maintenance within the given maintenance rates.

Any other use is considered to be unintended.

#### 3.1.2 Unintended Use, Examples

**The APEX Slot Die Applicator may not be used under the following conditions:**

- In defective condition.
- In a potentially explosive atmosphere.
- With unsuitable operating/processing materials.
- When the values stated under Specifications are not complied with.

**The APEX Slot Die Applicator may not be used to process the following materials:**

- Toxic, explosive and easily flammable materials.
- Erosive and corrosive materials.
- Food products.

#### 3.1.3 Residual Risks

In the design of the APEX Slot Die Applicator, every measure was taken to protect personnel from potential danger. However, some residual risks cannot be avoided.

**Personnel should be aware of the following:**



- Risk of burns from hot material.
- Risk of burns from hot Applicator's components.
- Risk of burns when conducting maintenance and repair work for which the system must be heated up.



- Risk of burns when attaching and removing heated hoses.
- Material fumes can be hazardous. Avoid inhalation. If necessary, exhaust material vapors and/or provide sufficient ventilation of the location of the system.
- Risk of pinching parts of the body at running parts of the Adhesive Supply Unit (pumps, motors, rolls or others).
- The safety valves may malfunction due to hardened or charred material.

### **3.1.4 Technical changes**

Any kind of technical changes having impact to the security or the operational liability of the system should only be done by written agreement of ITW Dynatec. Suchlike changes made without given a corresponding written agreement will lead to immediate exclusion of liability granted by ITW Dynatec for all direct and indirect subsequent damages.

### **3.1.5 Using foreign components**

ITW Dynatec takes no responsibility for consequential damages caused by using foreign components or controllers that have not been provided or installed by ITW Dynatec.

ITW Dynatec does not guarantee that foreign components or controllers used by the operating company are compatible to the ITW Dynatec-system.

### **3.1.6 Start-up operation**

We recommend asking for an ITW Dynatec-service technician for the start-up operation, to ensure a functioning system. Let yourself and the people working with or working on the system be introduced to the system on this occasion.

ITW Dynatec takes no responsibility for damages or faults caused by any untrained personal.

## 3.2 Description APEX Slot Die Applicator

### 3.2.1 Description

ITW Dynatec's APEX High Speed Intermittent Slot Die Applicator is an air-operated hot melt adhesive applicator assembly with an optional filter manifold. The applicator is used with intermittent pressure and constant pressure hot melt adhesive supply units (ASUs). APEX models are offered in several different module configurations.

Each APEX High Speed Slot Die applicator features various combinations of adhesive valve modules mounted to a single service block. Each module is opened and closed by air pressure. Springs are used to keep needles closed when no air pressure is supplied to the head. The rate of adhesive flow from the applicator is determined by the adhesive pressure applied by the ASU's pump, shim thickness and the amount of shim opening.

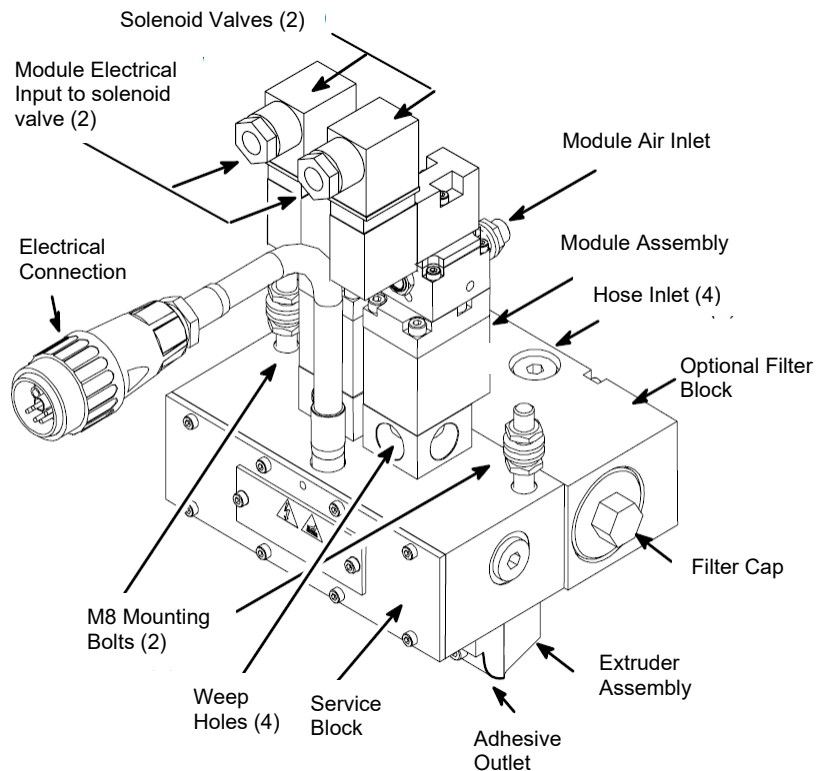
The applicator is heated by replaceable cartridge heating elements which are controlled by an integrated RTD sensor and electronic control. A single heat zone for the service block and die allows for only one temperature control point on models less than 390mm. Models longer than 390mm have two heat zones and control points.

The APEX module(s) is mounted onto either a steel or aluminum service block. A piston inside the module is pneumatically triggered by a solenoid valve, which allows adhesive to flow through a valve within the module.

The APEX offers a variety of heated adhesive supply hose connections into the service or filter manifolds. Adhesive flows from the hose into and through the channels within the manifold to the module. Air pressure opens the adhesive valve, allowing adhesive to flow through the module's die assembly when the valve is open.

In order to minimize response time, operating air and electrical connects from the solenoid valves are made to each individual module.

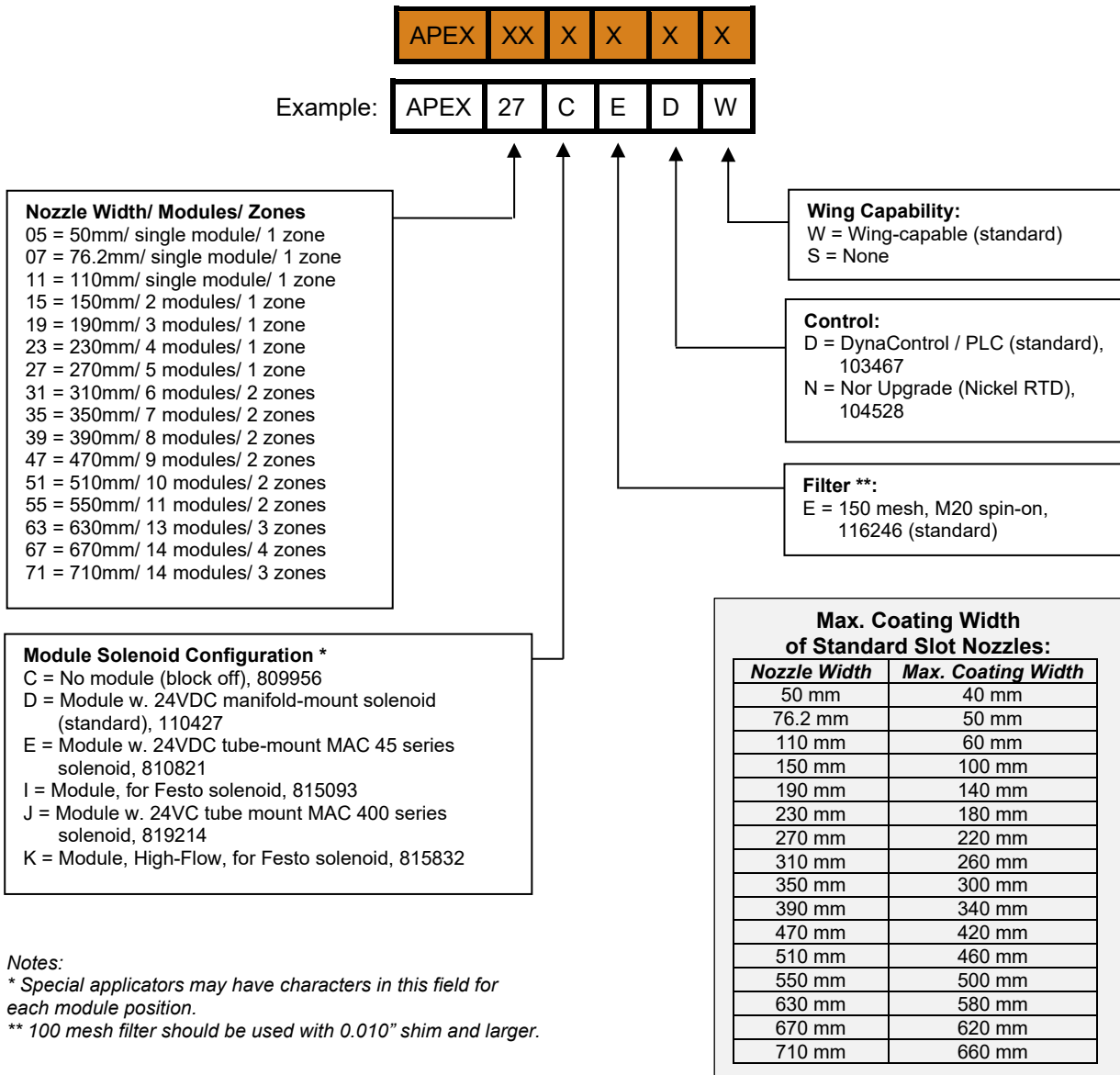
These slot nozzle applicators can be configured for either ITW Dynatec's DynaControl controller or it can be configured for a competitive upgrade.



*The APEX High-Speed Reverse Acting Slot Die Applicator*



### 3.2.3 Model Designation Guide



**Notes:**

\* Special applicators may have characters in this field for each module position.

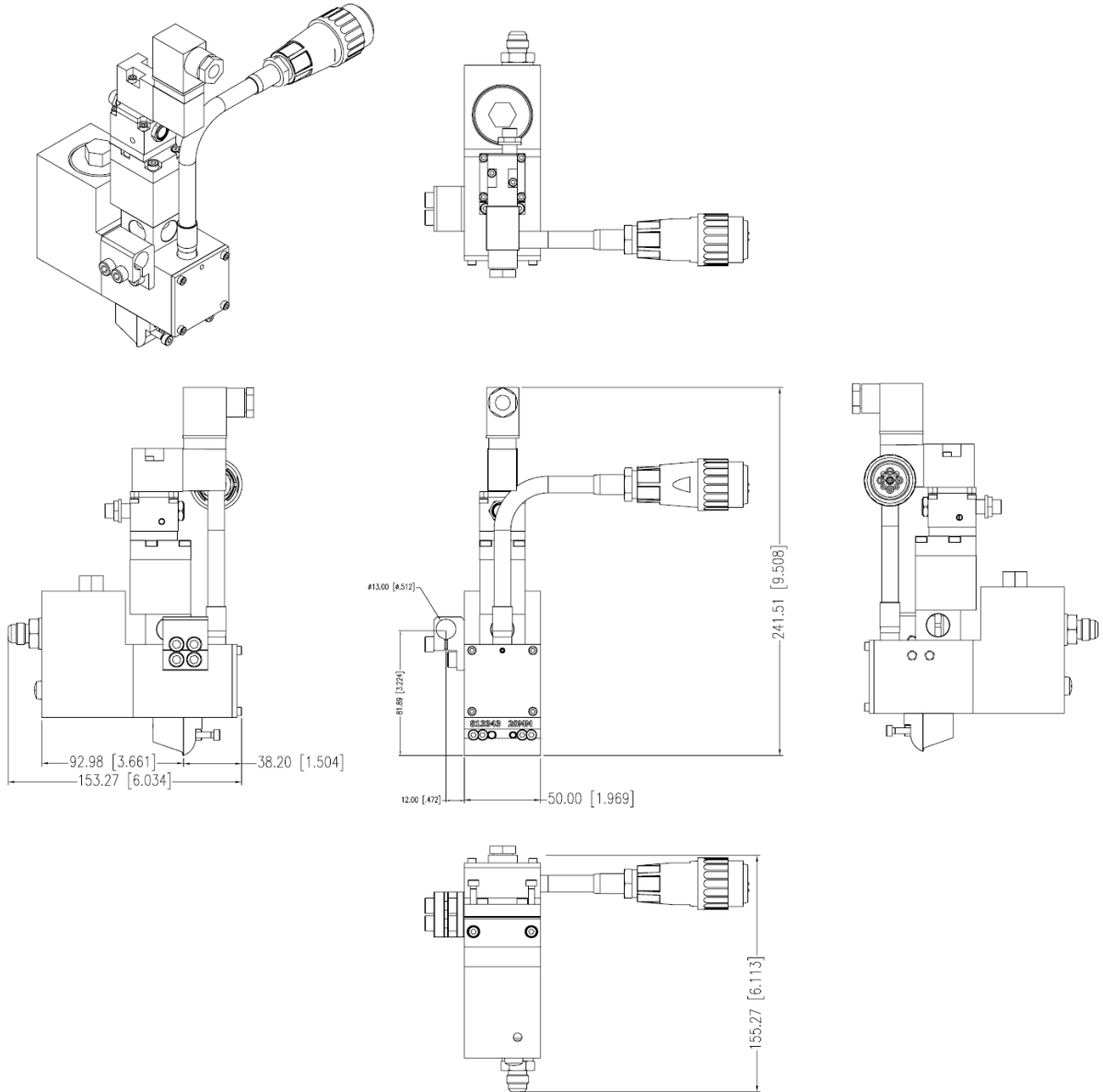
\*\* 100 mesh filter should be used with 0.010" shim and larger.

### 3.3 Dimensions APEX

#### 3.3.1 Dimensions: APEX 50 mm with MAC Valve

Applicator shown is a 50 mm slot die with Mac valve, 40 mm pattern and optional filter manifold.

Dimensions are expressed as “mm [inch]”.

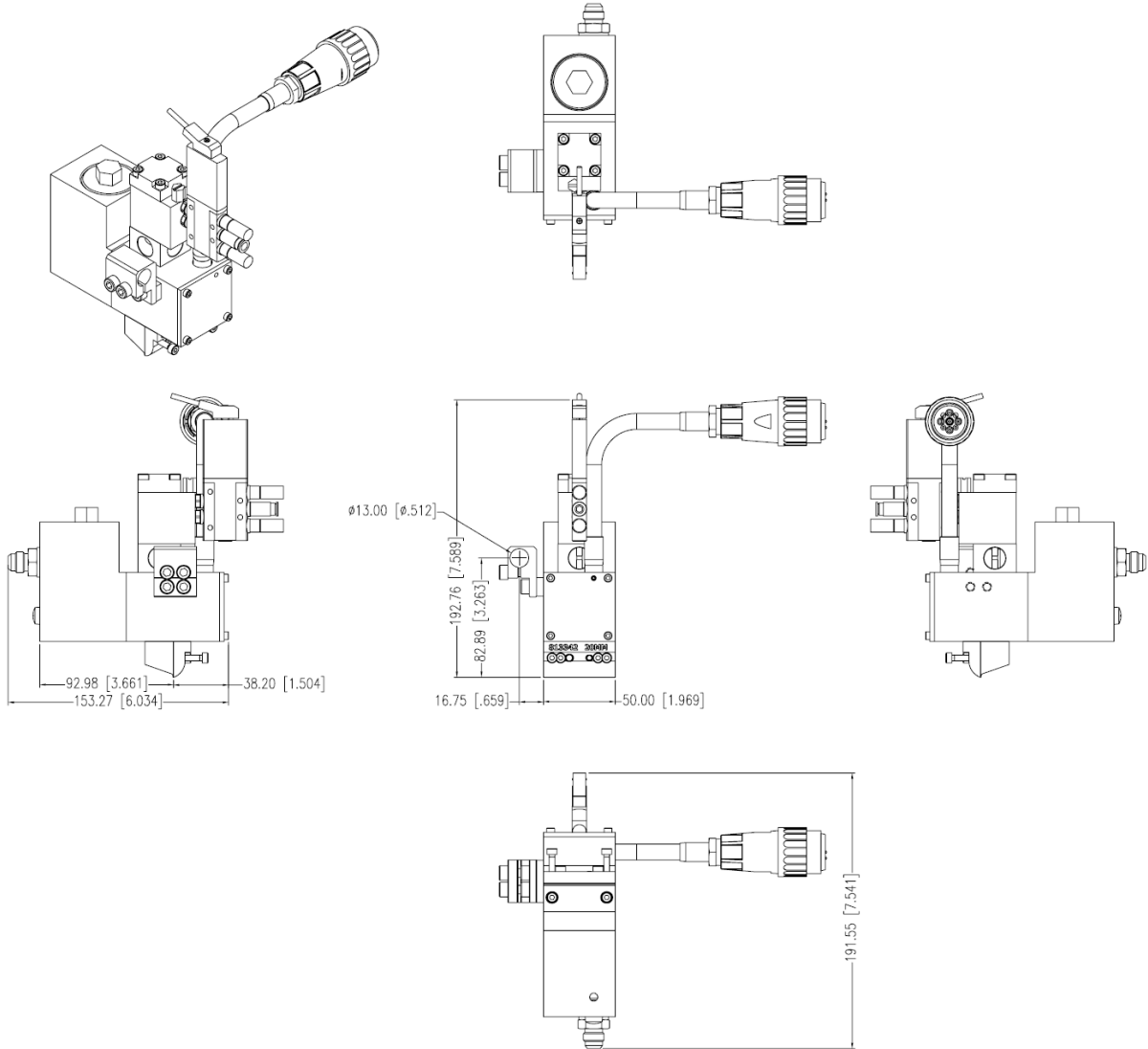




### 3.3.2 Dimensions: APEX 50 mm with Festo Valve

Applicator shown is a 50 mm slot die with Festo valve, 40 mm pattern and optional filter manifold.

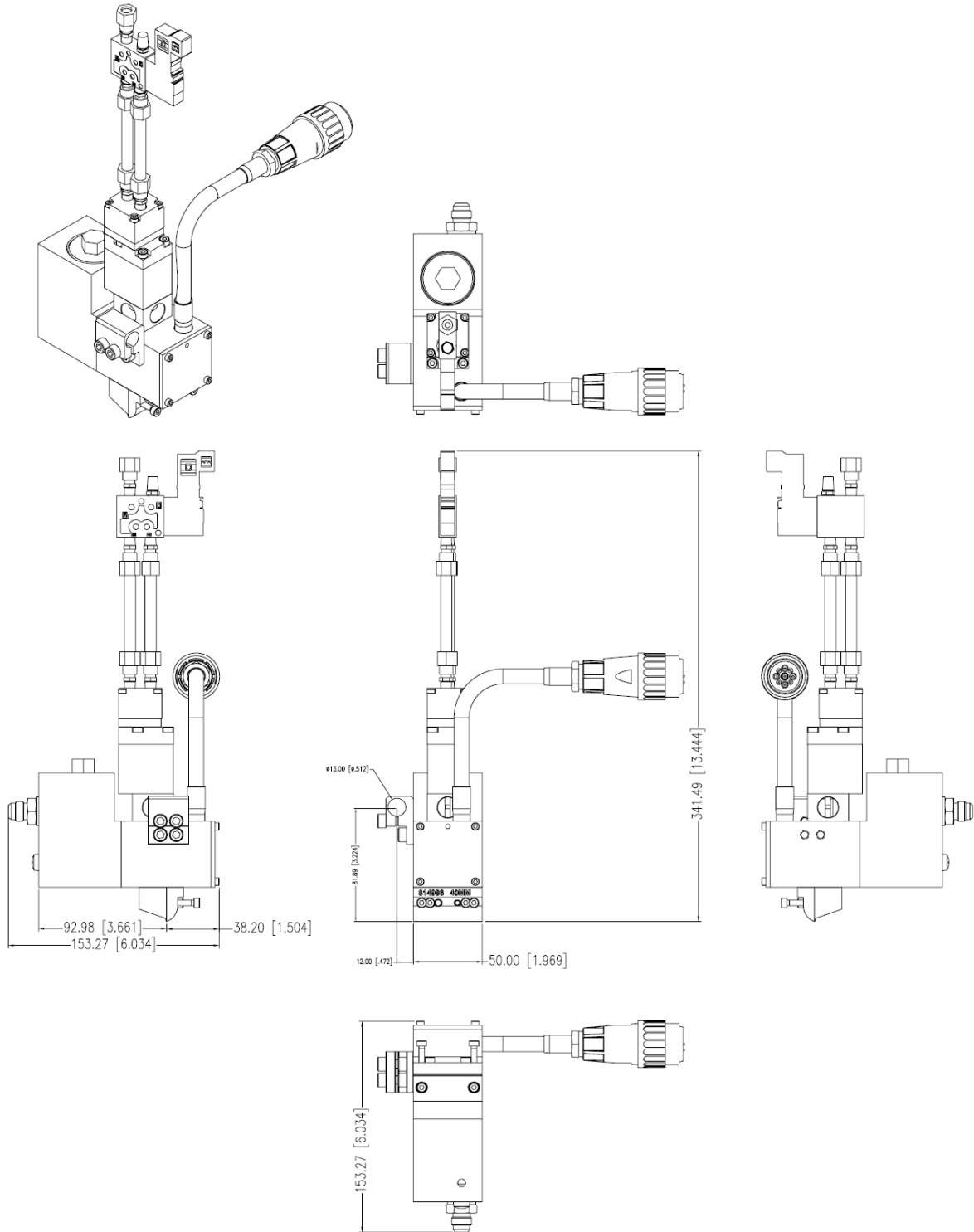
Dimensions are expressed as “mm [inch]”.



### 3.3.3 Dimensions: APEX 50 mm with MAC Valve, tube-mount

Applicator shown is a 50 mm slot die with MAC valve, tube-mount, 40 mm pattern and optional filter manifold.

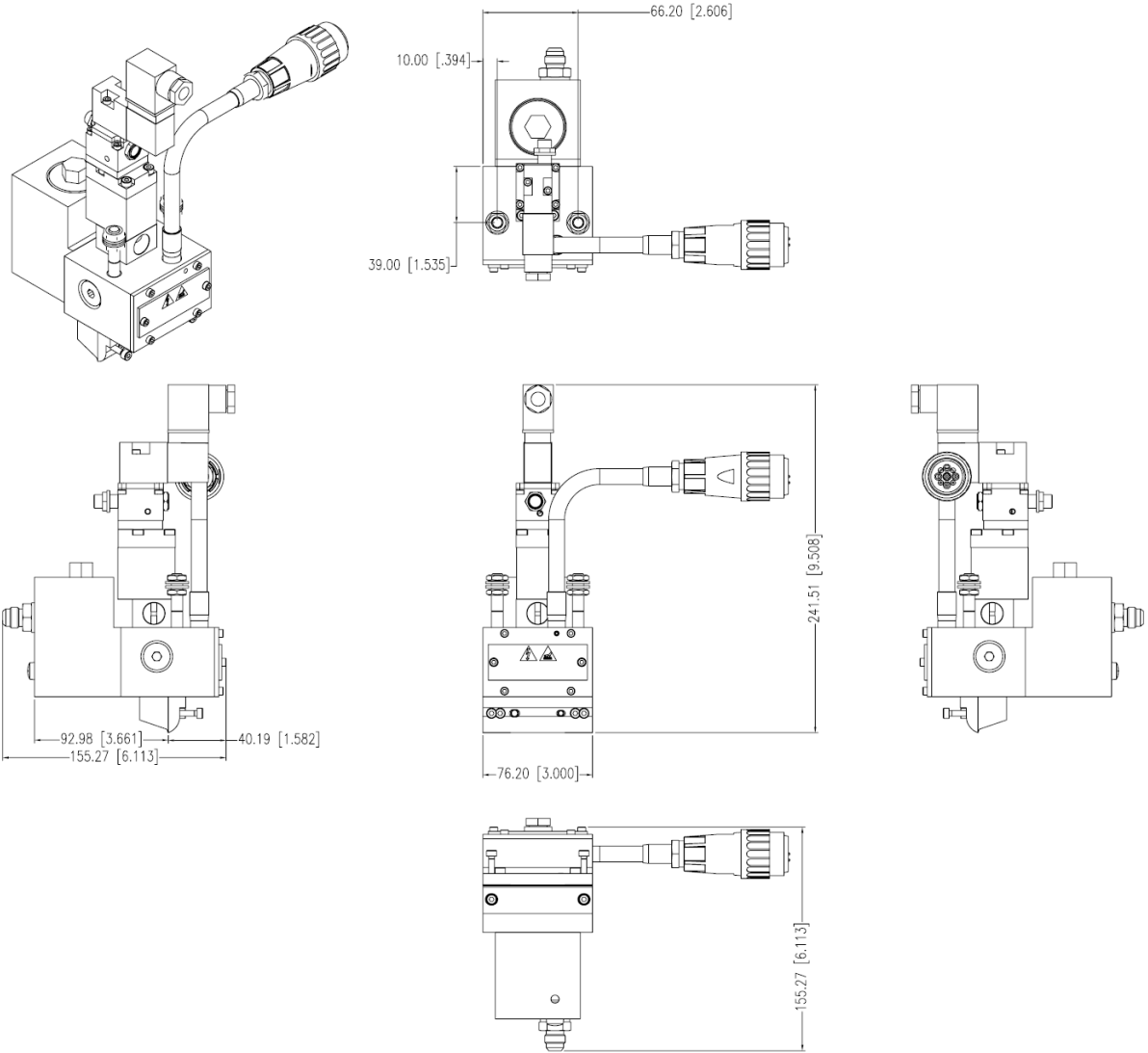
Dimensions are expressed as “mm [inch]”.



### 3.3.4 Dimensions: APEX 76.2 mm with MAC Valve

Applicator shown is a 76.2 mm slot die with Mac valve, 50 mm pattern and optional filter manifold.

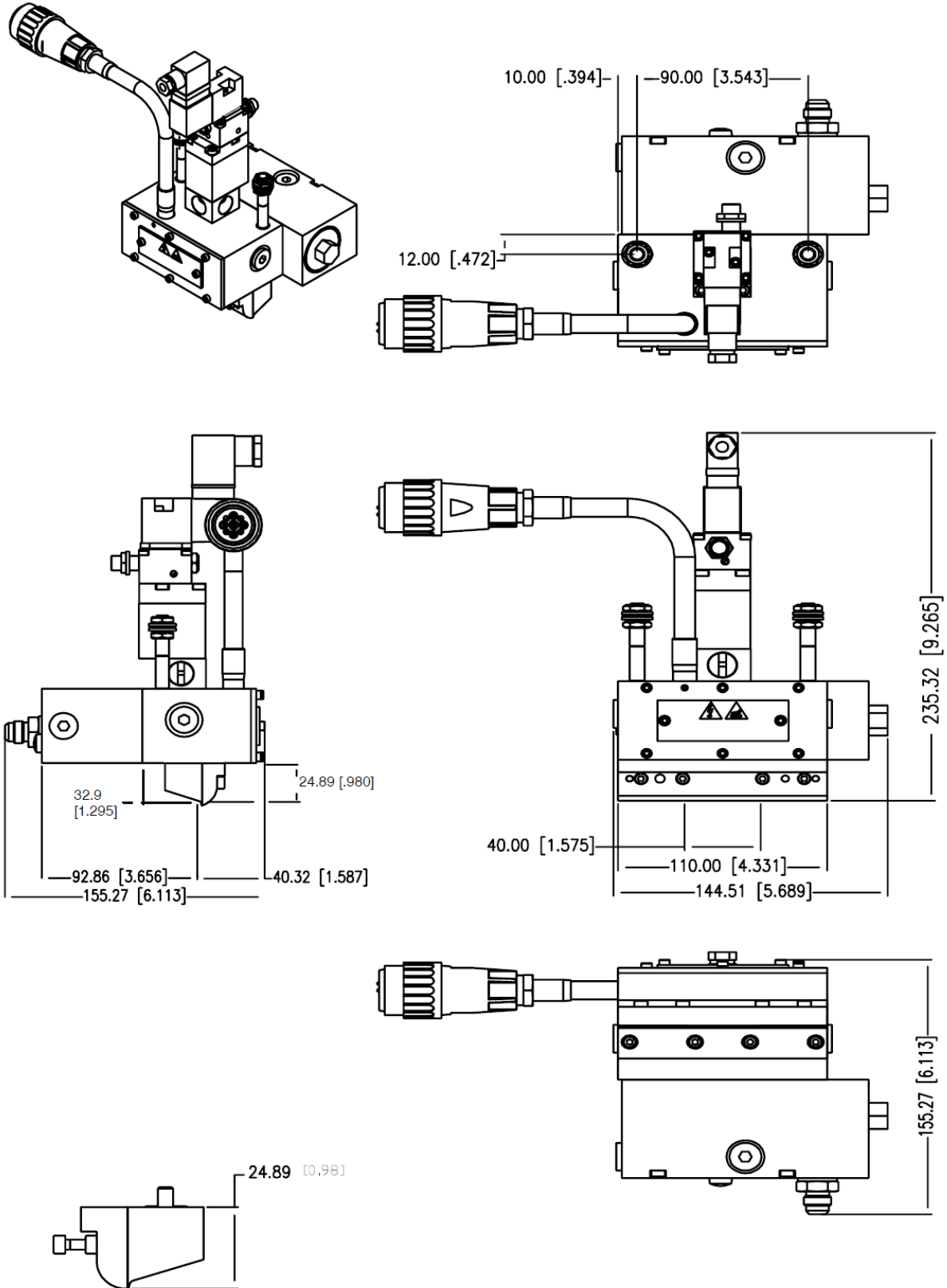
Dimensions are expressed as “mm [inch]”.



### 3.3.5 Dimensions: APEX 110 mm with MAC Valve

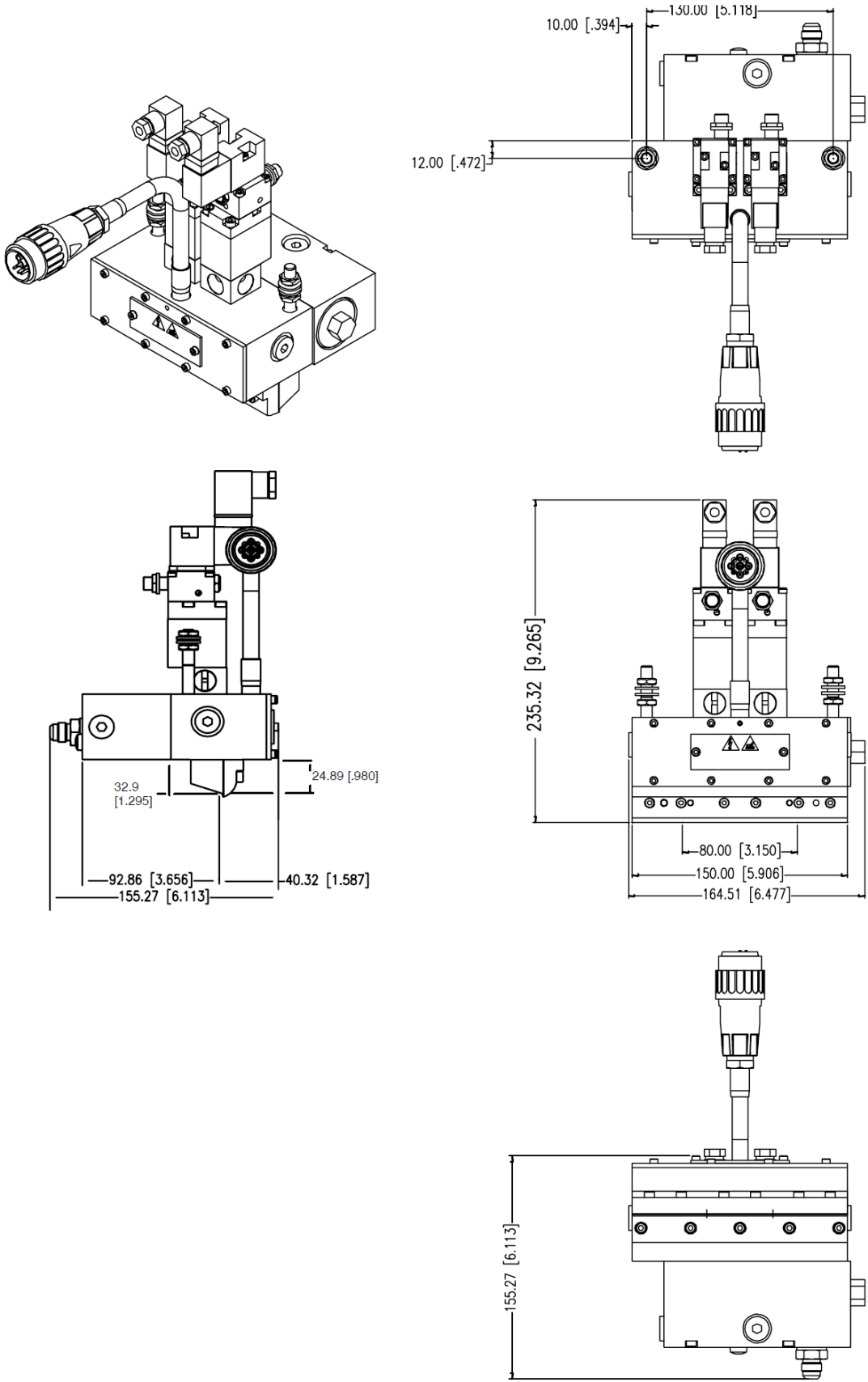
Applicator shown is a 110 mm slot die with Mac valve, 40 mm pattern and optional filter manifold.

Dimensions are expressed as “mm [inch]”.



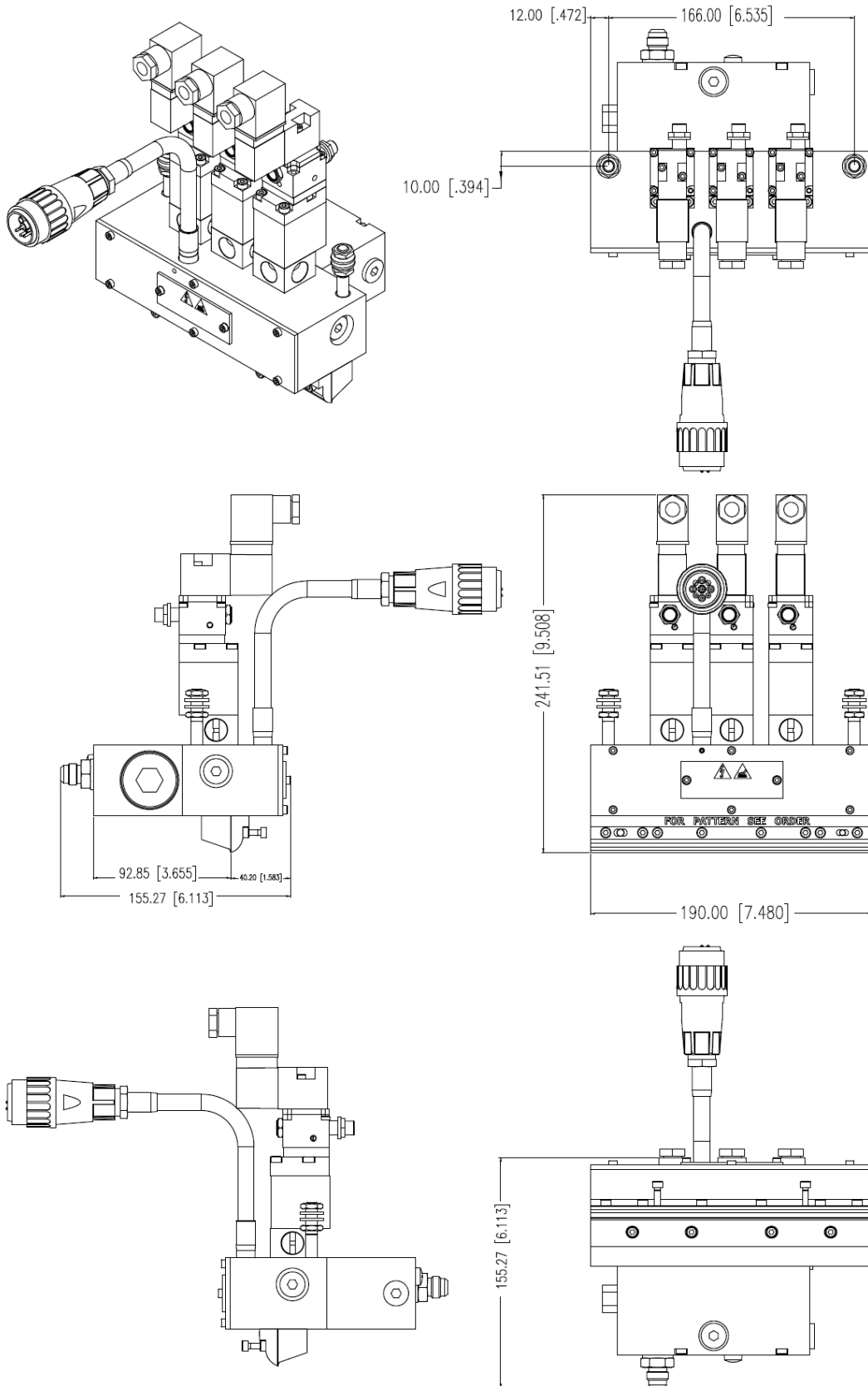
### 3.3.6 Dimensions: APEX 150 mm with MAC Valves

Applicator shown is a 150 mm slot die with Mac valves, 80 mm pattern and optional filter manifold. Dimensions are expressed as “mm [inch]”.



### 3.3.7 Dimensions: APEX 190 mm with MAC Valves

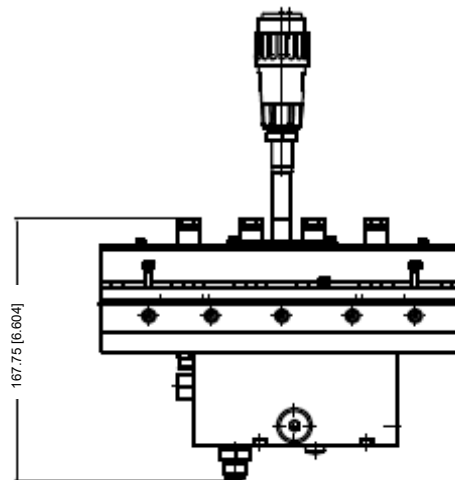
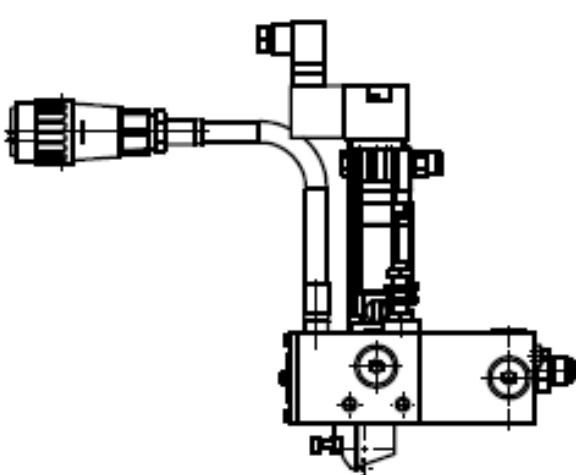
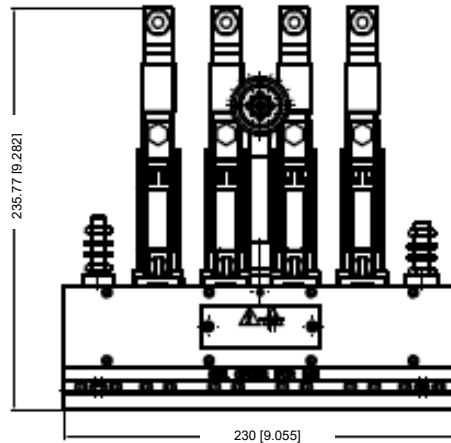
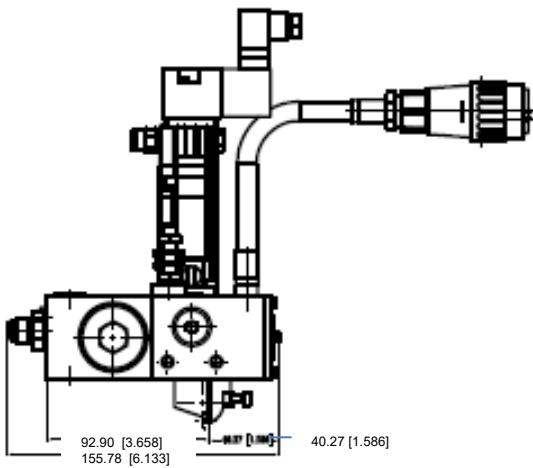
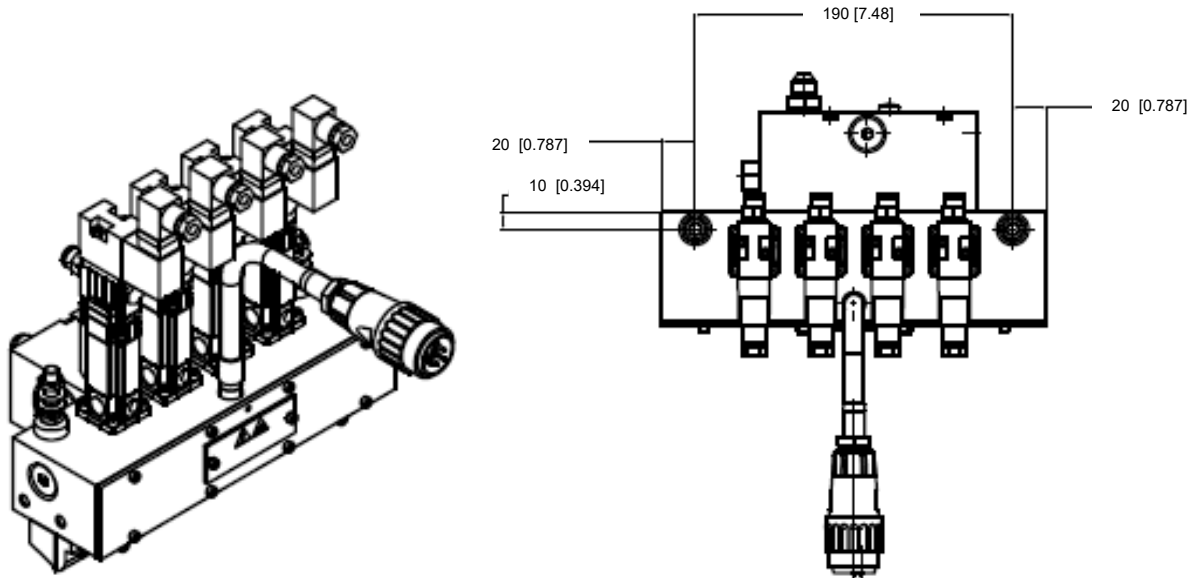
Applicator shown is a 190 mm slot die with Mac valves, 120 mm pattern and optional filter manifold. Dimensions are expressed as “mm [inch]”.



### 3.3.8 Dimensions: APEX 230 mm with MAC Valves

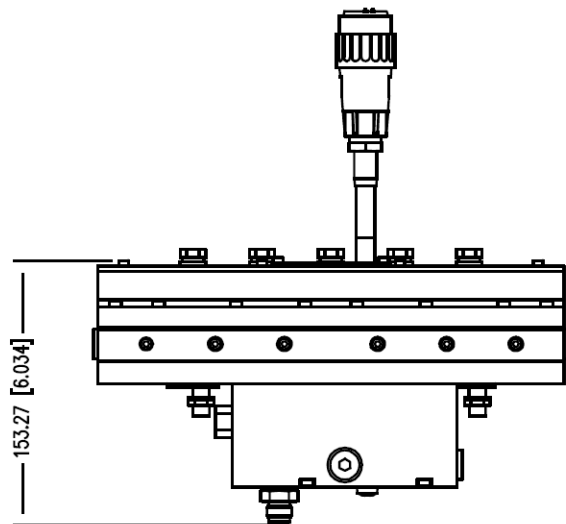
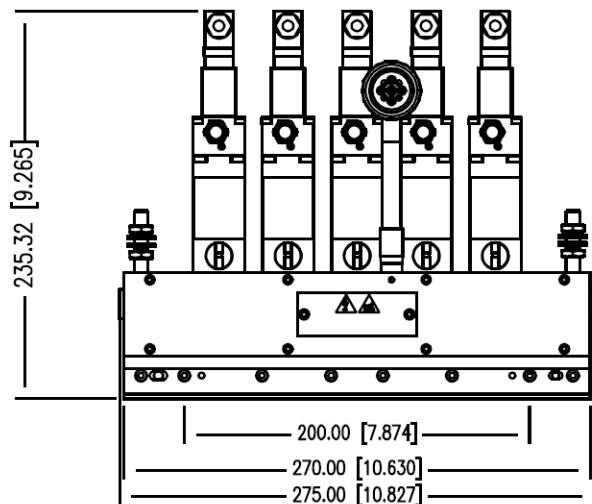
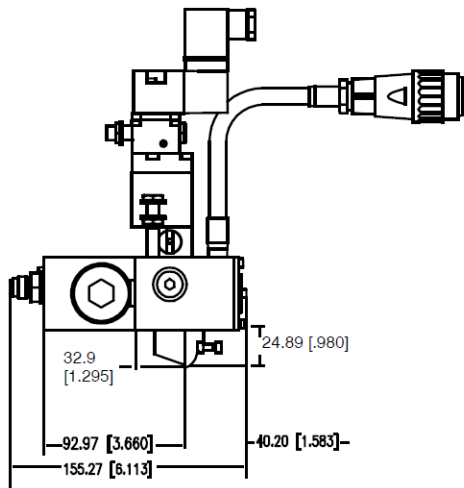
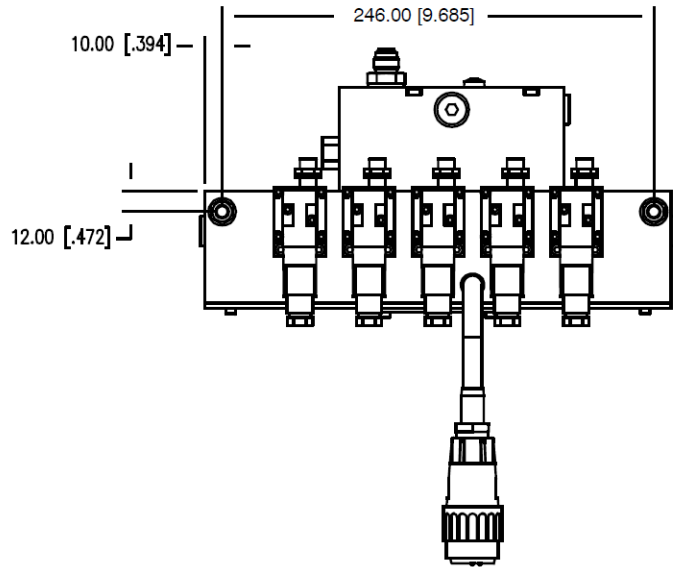
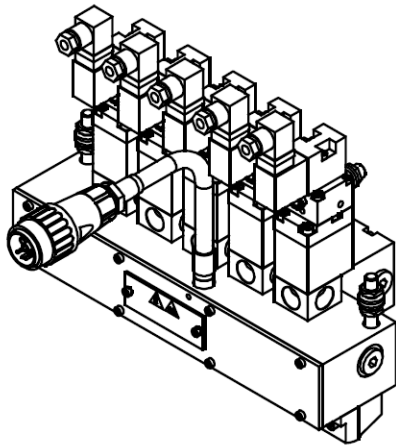
Applicator shown is a 230 mm slot die with Mac valves and optional filter manifold.

Dimensions are expressed as “mm [inch]”.



### 3.3.9 Dimensions: APEX 270 mm with MAC Valves

Applicator shown is a 270 mm slot die with Mac valves, 200 mm pattern and optional filter manifold. Dimensions are expressed as “mm [inch]”.

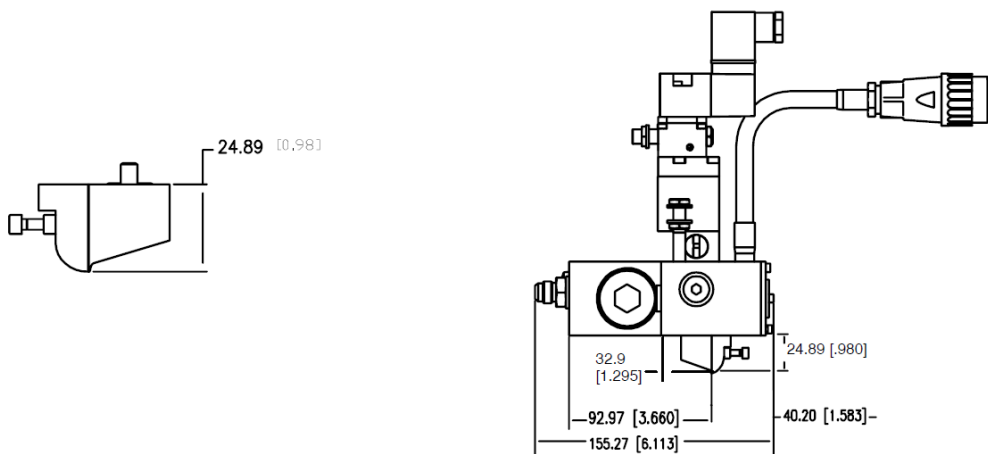
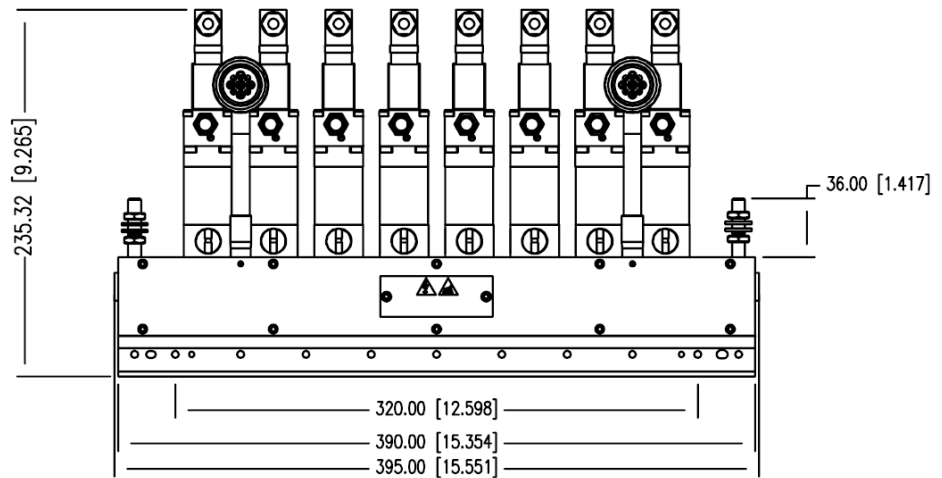
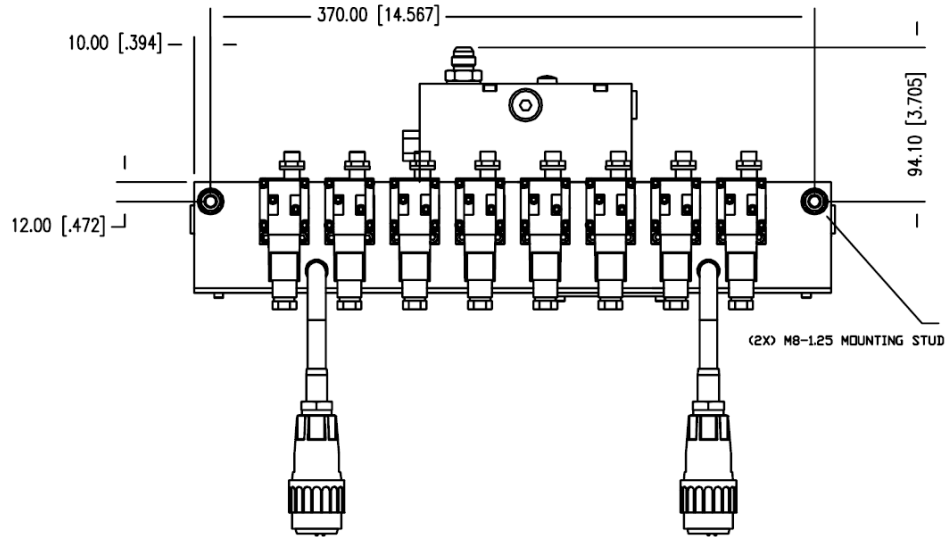




### 3.3.10 Dimensions: APEX 390 mm with MAC Valves

Applicator shown is a 390 mm slot die with Mac valves, 320 mm pattern and optional filter manifold.

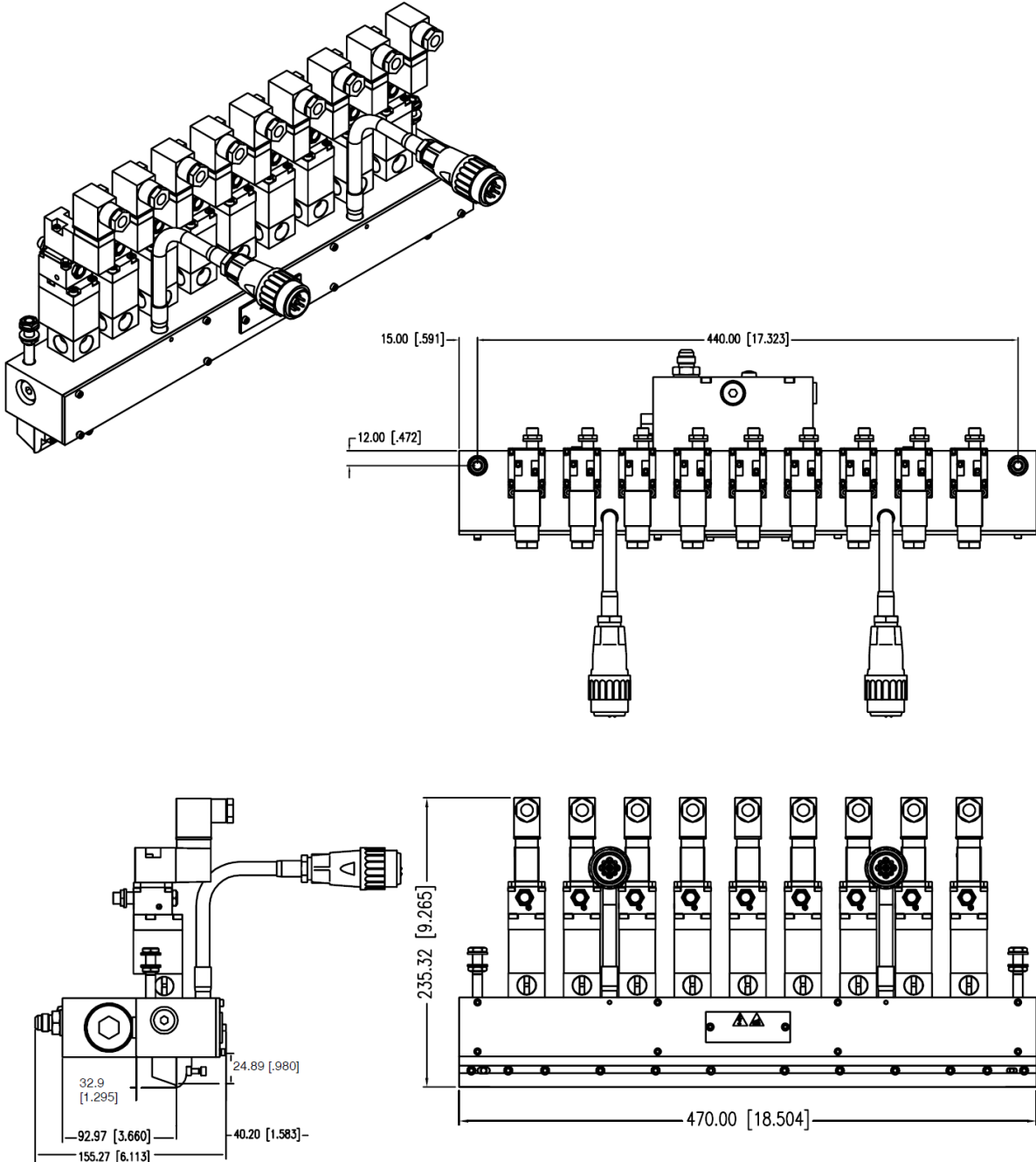
Dimensions are expressed as “mm [inch]”.



### 3.3.11 Dimensions: APEX 470 mm with MAC Valves

Applicator shown is a 470 mm slot die with Mac valves, 420 mm pattern and optional filter manifold.

Dimensions are expressed as “mm [inch]”.



## Chapter 4

# Installation & Start-up Operation



### CAUTION

- Before installation and start-up, please read this documentation carefully.
- Pay attention to all the installation and connecting advices.
- Heed all safety instructions mentioned in chapter 2.

## 4.1 Conditions for installation and mounting

### Place requirement

Install the APEX Applicator in the machine so that the operator is able to work on it from all sides, for e.g. for adjusting, preparing, maintaining, repairing, cleaning, etc. See drawing of the unit for admeasurements.

### Mounting and alignment

- The complete unit has to be installed on solid, stable and flat ground.
- The alignment in height of the complete system has to be considered.
- The alignment of the machine has to be considered.

### Electrical connection

- Necessary electrical connection has to be provided. See electrical schematics.
- Never connect or disconnect plug-and-socket connections under load!
- The service block's incoming electrical power and temperature control is supplied through the flexible cable exiting the adhesive supply hose cuff. The applicator has a circular, plastic connector which mates with the connector attached to this cable.

### Pneumatic connection



- In any case the air has to be clean and dry! See advice in chapter 4.3 "Quality of compressed air".
- Incoming (operating) air is supplied through a solenoid valve. It is controlled by a four-way solenoid valve and should be separately regulated and maintained at a pressure 4.1 to 6.9 bar (60 to 100 psi). Head air inlet ports are G1/8 (1/8 NPT) threads.
- Please heed that units with high air demand may not be used at the same time with the same air supply.



### Advices:

- Check all screw connections at the unit and retighten if necessary.
- Lay the cables and heated hoses so that no risk or least possible risk of stumbling occurs.

## 4.2 Installation

### 4.2.1 Typical Installation



#### CAUTION

- All work on or with this unit is only permitted for skilled personnel!
- Pay attention to the electrical schematics!
- Clean and dry air to the applicator solenoids is required.
- All motors have to be attached according to the data sheet of the manufacturer.
- All heating elements have to be mounted and operated secured and according to the valid regulations.



#### WARNING

- Risk of burns and risk of injury!
- While installing the Applicator, use an appropriate protection device to avoid unintended contact with heated parts and with spilling out Hotmelt. The protection device has to prevent also the operator against not reaching into the adhesive application and against injuring.



#### NOTE

- Air lines and fittings must be capable of withstanding temperatures up to 218°C (425°F).
- Applicator control solenoid valves may be controlled by timers or limit switches which sense the position of the package or object to which adhesive is being applied. Switches should be mounted on moveable brackets to provide adjustment for proper location of adhesive application.

1. The applicator should be supported from brackets that permit lateral and vertical adjustments. Mount the applicator on bracketry using the M8 screws and insulators provided.

Allow access to the (optional) filter, if installed.

Be sure that the “weep” holes are visible for periodic inspection.

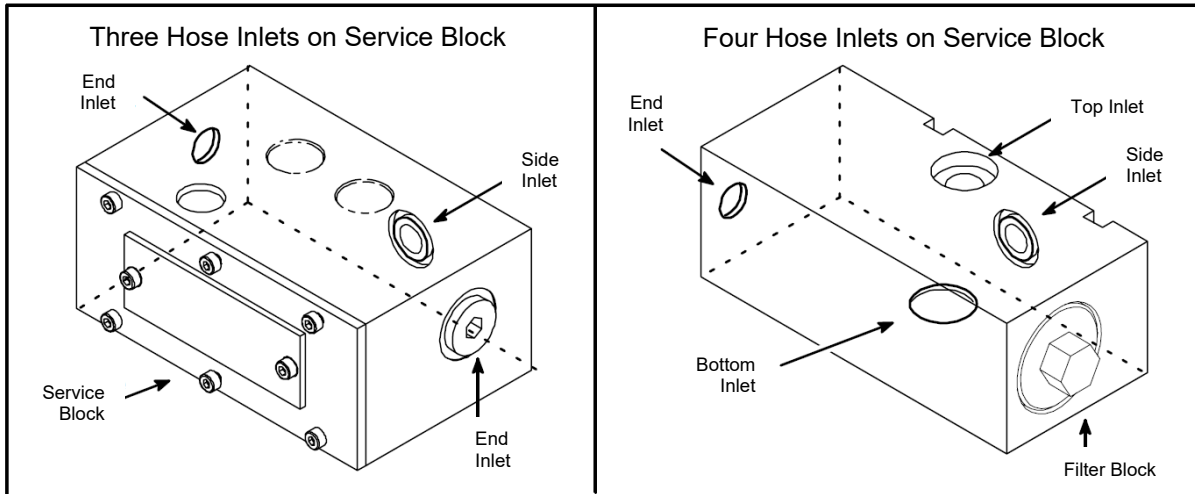
2. Before making the adhesive connection to the applicator, align the adhesive supply hose with its electrical connector oriented in relation to the electrical connector on the top of the applicator.

Connect the swivel fitting of the hot melt hose to the adapter on the service block (or the optional filter block) (see illustration on the next page), using any of the inlet ports located on the sides or back of the block. When tightening the hose fitting, hold the hose cuff to prevent the hose core from rotating.



#### Heed the following for the installation of the heated hoses:

- Heated hoses may be damaged by overheating, if they are laid faulty.
- Make your electrical hose connections at the numbered connects on the left side of the cover.
- Route hoses so that there is at least an 8-inch (20 cm) radius at any bend. Do not hang hoses without proper support.
- Do not crimp, clamp, squeeze or tie hoses.
- The hose adhesive ports are located at the bottom of the filter block, to the right of the electrical connections.
- There are 5 ports for the use of up to 4 hoses and for the (optional) adhesive pressure gauge. When making hose connections, use the numbered connections and ports accordingly; i.e. make your hookup for hose/head #1 to electrical connection #1 and adhesive port #1, hose/ head #2 to electrical connection #2 and adhesive port #2, etc.



3. Make the electrical connection as follows:  
Make the connection from the hose to the applicator by connecting the female connector of the hose to the male connector of the applicator.  
Connect all cables of the equipment components according to the electrical schematics (e.g. ASU, Hoses, Applicators, etc.).
4. Install the air line onto the air inlet port on the solenoid valve.



### CAUTION

- Do not use lubricating oil with the air supply as applicators are lubricated at the factory and do not require lubrication when used in production.
- The min. requirement for compressed air supply to solenoids to control automatic Applicators is ISO 8573-1:2010 class 2:4:3. See advice in chapter 4.3 "Quality of compressed air".
- We recommend installing the ITW Dynatec's Air Control Kit PN 100055 (see Appendix).

5. It is advisable to check the temperature of the applicator. This can be done through the temperature readout of the adhesive supply unit. Surface temperature may be checked with a separate pyrometer and surface probe or with a dial thermometer. Turn the system power switch ON. Permit the applicator to warm up at least 15 minutes (5 minutes for module change) before reading temperature.
6. Purge the applicator of air and oil. Turn the applicator ON electrically and pneumatically.



### WARNING HIGH PRESSURE

During the purging procedure, hot adhesive and oil can come out of the head under high pressure. Wear safety glasses, gloves and protective clothing.



### WARNING HIGH PRESSURE

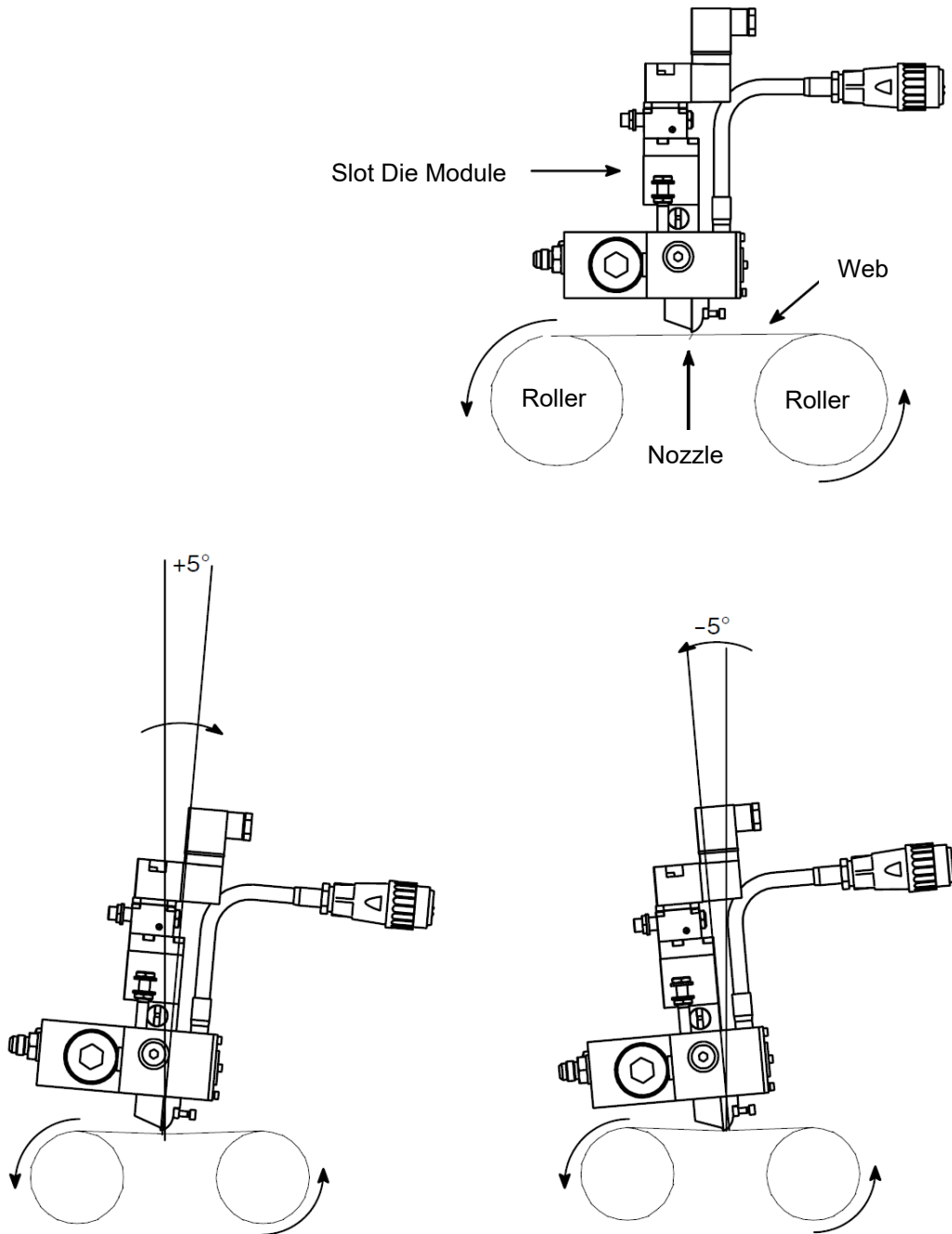
Use a stable, deep container to collect hot-melt adhesive and/ or oil.

7. Place a heat resistant container under the module to collect the material that drains from the applicator. Manually open the solenoid valve by pushing (with a small screwdriver or other tool) the purge button located on the solenoid coil. Continue to hold in the purge button until all air and oil have drained and only adhesive flows from the module.
8. Interconnect the components with the foreseen Profibus (or EtherNet, etc.) interface cables (if applicable).

## 4.2.2 Off-roll Installation

### Notes on Proper Off-roll Installation:

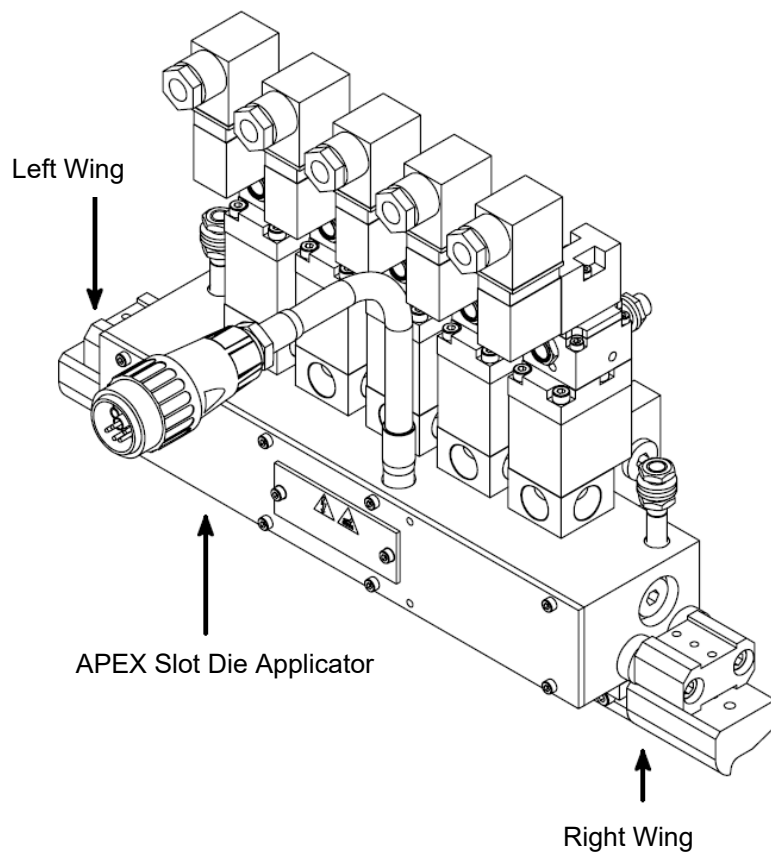
- Support the web (as the two rollers are supporting it in the illustration below) within a few inches of each side of the slot nozzle.
- Contact must be made no more than  $\pm 5^\circ$  from the vertical (see two lower illustrations).



### 4.2.3 Installation of Optional Wing Assemblies

Wing assemblies are attached to either side of an Apex applicator in order to give additional stability to a moving substrate. Two wing assemblies are required per application, either a right and left pair, or two universal wing assemblies.

1. Assemble each of the two wing assemblies for the applicator.
2. Align the wing assemblies with the die lips of the Apex slot die.
3. Attach wing assemblies by tightening the M6 bolts. Use a 0.010 feeler gauge to set clearance between the die lips and the end of the wing. The feeler gauge should slip between the two assemblies after tightening all bolts.
4. Tighten the M4 bolts.



## 4.3 Quality of compressed Air



### CAUTION

- In any case, the air has to be clean and dry!
- The min. requirement for compressed air supply to solenoids to control automatic Applicators is ISO 8573-1:2010 **class 2:4:3**.
- We recommend installing the ITW Dynatec's Air Control Kit PN 100055 (see Appendix).

### Compressed air quality classes according to ISO 8573-1:2010 **class 2:4:3**:

ISO 8573-1: 2010	Solid particles			Mass concentration mg/m <sup>3</sup>	Water		Oil
	0.1-0.5 µm	0.5-1 µm	1-5 µm		Vapor pressure dew point °C	Liquid g/m <sup>3</sup>	
Class	Maximum number of particles per m <sup>3</sup>						Total oil content (liquid, aerosol and mist) mg/m <sup>3</sup>
0	As stipulated by the equipment user, stricter requirements than class 1.						
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70	-	0.01
2	≤ <b>400,000</b>	≤ <b>6,000</b>	≤ <b>100</b>	-	≤ -40	-	0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20	-	<b>1</b>
4	-	-	≤ 10,000	-	≤ <b>+3</b>	-	5
5	-	-	≤ 100,000	-	≤ +7	-	-
6	-	-	-	≤ 5	≤ +10	-	-
7	-	-	-	5-10	-	≤ 0.5	-
8	-	-	-	-	-	0.5 - 5	-
9	-	-	-	-	-	5 - 10	-
X	-	-	-	> 10	-	> 10	> 10



## 4.4 Advices for the start-up operation



### WARNING

Start with start-up operation only if

- the functioning of the unit is known, and
- the unit installation for start-up operation has been done according to the details given in the previous chapter. That means all unit components are operable.

Read the documentation thoroughly to avoid breakdowns caused by faulty handling.

We recommend asking for an ITW Dynatec-service technician for the start-up operation, to ensure a functioning unit. Let yourself and the people working with or working on the unit be introduced to the unit on this occasion.

ITW Dynatec takes no responsibility for damages or faults caused by any untrained personal.



Allow only skilled expert staff to do the start-up operation!



Always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothing when working on or with the unit. Risk of burns and risk of injury!



Risk of electric shocks! Risk of injury, Mortal danger!

The unit components are getting very hot during operation! Risk of burns!



The adhesive is very hot and pressurized! Risk of burns and risk of injury! At working temperature, molten adhesive could cause heavy burns. Let spilled out adhesive cool down first, before removing it!



### CAUTION

**During operating the unit, heed the following:**

- Heed all safety instructions mentioned in chapter 2.
- Install an appropriate protection device to avoid unintended contact with heated parts and with spilling out hot adhesive. The protection device has to prevent also the operator against not reaching into the adhesive application and against injuring.
- Set the working temperatures strictly within the temperature range given by the adhesive manufacturer. Do not exceed this temperature range.
- Switch the unit off during longer production breaks.
- Switch the unit to standby during shorter production breaks.
- Avoid voltage fluctuation.
- The air supply has to be clean and dry.
- In case of an emergency or exceptional incident, press the emergency stop button in order to stop the unit quickly.



### CAUTION

The unit is ready for operation, when

- all temperatures are within the tolerances,
- all motors are switched on.



Risk of stumbling on cables and heated hoses!



Keep your hands away from running parts of the unit (pumps, motors, rolls or others).

## 4.5 Start-up operation, in general

This is a generic start-up and purging process:

1. Check the complete unit and the traverse paths for safety. Fix visible damages immediately.
2. Before switching the unit on, make sure that the starting unit could hurt no one!
3. Remove all material or other things not needed for the production from the workspace of the unit!
4. To turn the main power on, turn all main switches of the components to "ON"!
5. Set the temperatures in the controller.

### Heed following advices:

- The operating temperature range is 38°C to 200°C (100°F to 390°F)
- Use only adhesives recommended by the adhesive manufacturer! Before changing from one type of adhesive to another (even within the same product line of one manufacturer), the unit has to be cleaned respectively purged to avoid possible chemical reactions.
- Set the temperatures of the particular heating zones in the controller according to the adhesive that is in use. Always keep the temperature range given by the adhesive manufacturer. Wrong temperature settings could cause the burning of the adhesive within the system and unsatisfactory adhesion.
- Before starting the production, keep the required heat-up phase of the adhesive respectively of the Melter, so that sufficient adhesive can be molten and supplied to the applicator.



### CAUTION

#### The unit is ready for operation, when


- all temperatures are within the tolerances,
- the adhesive in the tank of Melter is molten completely.

#### Switch on the motors/pumps only if the adhesive is completely molten!

Untimely start of the motors could cause the following risks:

- The pumps are not sufficiently supplied with adhesive and they intake air. The air causes foam formation within the adhesive system and reactions with PUR adhesives.
- The pumps run dry and may block.
- Solid adhesive could block the intake port. The pumps and motors may overheat and even be destroyed.

- Adjust the adhesive pressure by the pressure regulator.
- Place a heat resistant container under the applicator to collect the material that drains from it.


	<p><b>WARNING HIGH PRESSURE RISK OF BURNS AND INJURY!</b></p> <ul style="list-style-type: none"><li>• During the purging procedure, hot adhesive and oil can come out of the head under high pressure.</li><li>• The unit operates with very high temperatures and high adhesive pressure.</li><li>• Always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothing when working on or with the unit. Risk of burns and risk of injury!</li><li>• Molten adhesives at operating temperature could cause heavy burns.</li><li>• Do not touch the hot surfaces or parts without wearing heat-resistant protective gloves!</li></ul>
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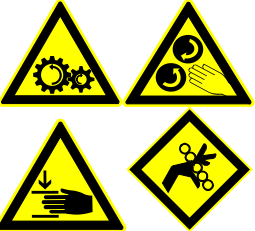
- Start the motors/pumps of the Melter.
- Purge the applicator of air and oil:  
Turn the applicator ON electrically and pneumatically.

Manually open the solenoids using the controller or by pushing (with a small screwdriver or other tool) the purge button located on the solenoid coil.

Continue to hold in the purge button until all air and oil have drained and only adhesive flows from the module.

- Switch off (deactivate) the module solenoids.
- Clean the slot die from adhesive residuals.
- Remove the heat resistant container.
- Switch the controller to automatic mode.
- Set the unit parameters respectively check if they are set correct.
- Thread the material webs.

	<p><b>WARNING</b></p> <p>Make sure, that the rolls are free from adhesive residuals or other contaminations before threading the material web!</p> <p><b>Avoid collision!</b> <b>In case of a collision with the rolls several parts of the coating station and of the applicator can be destroyed!</b></p> <p><b>Make sure unconditionally, that there is no mechanical contact possible between the applicator's nozzle and the rolls.</b></p>
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	<p>The basic requirement for proper coating is a tight guidance of the material web.</p> <p>Varying material tension may cause wrinkles within the material web.</p> <p>Keep your hands, head, etc. away from running rolls! Limbs may be drawn in. Risk of crushing!</p>
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16. Start the unit (web material). Make sure that the material web runs even.
17. Activate the module solenoids for the adhesive application. Adhesive will be applied; the adhesive film will be formed!
18. Production is running.

### Daily operation



Purge the Applicator before every start of production respectively of a shift by allowing the adhesive flows out until the adhesive film is clean and without tears.

Then switch off the adhesive and clean the extruder lip/ die from adhesive.

Bring the Applicator in work position and continue production.

## 4.6 Shut Down Procedure



### CAUTION! RISK OF BURNS AND INJURY!

- Parts of the unit can be hot long after switching off.
- Always wear heat-resistant protective gloves and safety goggles! Molten adhesives at operating temperature could cause heavy burns.
- Do not touch the hot surfaces or parts without wearing heat-resistant protective gloves!



**Do not switch off the controller and the main switch, if the unit has to be operated by weekly timer.**

### Effect following steps for switching the unit off:

1. Switch all pumps respectively motors off.
2. Switch the main switch off!

### Removing dirt:



Remove dirt from all unit components immediately.









Wooden scrapers or cleaner may only be used for cleaning.

Metallic scrapers or other tools made from steel, like knife or blades, may not be used under any circumstances.

## Chapter 5

# Maintenance and Repair Notes

### 5.1 Security advices for maintenance and repair

	<p>Heed all security advices given in chapter 2.</p>
 	<p>Use only original parts from ITW Dynatec, otherwise ITW Dynatec's warranty is void!</p>
	<p>Maintenance and repair work is only permitted for skilled personnel!</p>
 	<p>Always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothing that cover all vulnerable parts of the body while working on the heated unit! Risk of injury or heavy burns!</p>
	<p><b>High Voltage! Risk of injury and mortal danger!</b></p> <ul style="list-style-type: none"><li>• All electrical connections must be made by qualified electrical personnel.</li><li>• Care must be taken to assure proper grounding prior to any disassembly.</li><li>• Lockout and tag the electrical sources as required.</li><li>• Make sure there is no electrical power on the leads you will be connecting.</li><li>• When covers are removed, high voltage sources create an electrocution hazard.</li><li>• Wear appropriate safety equipment when working with high voltage sources.</li></ul>
	<p><b>Parts and surfaces of the unit get very hot. High temperatures! Risk of heavy burns!</b></p>
	<p><b>High adhesive temperature and adhesive pressure! Risk of injury or heavy burns!</b> Always assume that the system is under pressure, proceed with caution.</p>
	<p>Keep a cool-pack, or bucket of clean water near the work area.</p>
	<p>Place a heat-resistant catchment container/underlay under the components. Hot adhesive may come out.</p>
	<p><b>CAUTION:</b> At working temperature, molten adhesive could cause heavy burns. Let spilled out adhesive cool down first, before removing it!</p>
	<p><b>CAUTION:</b> Use only lint-free cleaning cloth and suitable cleaner for cleaning! Do not damage surfaces! Do not scratch above them with sharp-edged tools, otherwise the components will get leaky and inoperable!</p>
	<p><b>All maintenance and repair work has to be done at working temperature, except as noted otherwise. Else there is a risk of damaging the unit components!</b></p>
	<p><b>Before any service work disconnect the external power supply and switch the unit voltage-free:</b></p> <ol style="list-style-type: none"><li>1. Switch off the main switch and the controller.</li><li>2. Disconnect the power supply respectively remove the plug / cable.</li><li>3. Guard the unit against unauthorized restarting!</li></ol>

**Before any service work the adhesive pressure must be relieved throughout the system. Switch the unit pressureless:**

1. Disconnect the pressure air supply.
2. Turn the pressure regulator to zero bar, if necessary. Wait approximately 1 minute until the pressure is relieved.
3. Manually open the solenoid valve(s) on the applicator until all air and adhesive (pressure) have drained from the module.

### 5.1.1 Equipment Preparation for Maintenance & Repair

- Adhesive processing equipment must be worked on while hot enough to soften any material residue within the assembly. This depends on the type of adhesive used with the equipment. This may require the system to be up to operating temperature before disassembled, to prevent damage to fasteners and components.
- Once disassembled, the individual parts may be cleaned by immersion in approved solvent. Surface deposits may be removed by lightly scrapped with a brass device or scrapper. Care must be taken not to damage sealing surfaces with sharp objects or sand paper.
- Components such as O-rings, fasteners and relief valves should be discarded and replaced by certified ITW Dynatec replacement parts.

### 5.1.2 Re-Assembly Procedures and General Cautions

Unless noted, the re-assembly is simply the reverse sequence of the disassembly procedures. However, the following “cautions” should be followed (whenever they apply) for proper re-assembly:



#### CAUTION

In general, all O-RINGS AND SEALS must be replaced whenever hot-melt equipment is re-assembled. All new O-rings must be lubricated with O-ring lube (PN N07588).

TAPERED PIPE THREADS are found on air pipe fittings used with the pump air supply and on the outlet filter manifold. Apply thread sealant (PN N02892) whenever tapered pipe threaded parts are re-assembled.

SOME FITTINGS used for adhesive on hot melt equipment have straight threads and O-ring seals. Use of thread sealant is not necessary with these parts, but the O-ring seals should be clean and lubricated. Tighten straight-threaded parts and fittings until their shoulders are firmly seated. Excessive torque may damage straight-threaded parts and the use of power wrenches is not recommended.

HOT-MELT RESIDUE must be cleaned from parts before they are re-assembled, particularly from threaded parts. As a precaution against adhesive residue preventing proper re-assembly, threaded parts must always be re-tightened at operating temperature.

## 5.2 Maintenance plan



### CAUTION

Heed all security advices given in chapter 5.1.

Use only original parts from ITW Dynatec, otherwise ITW Dynatec's warranty is void!

Please use only the indicated lubricants and keep the prescribed maintenance intervals. Consider in addition the enclosed regulations of manufactures.

Punctual and conscientious maintenance of the unit secures not only a trouble-free function, but prevents also for expensive repair costs.

Remove all materials and tools used during the repair or maintenance from the workspace of the unit.

Place a heat-resistant catchment container/underlay under the components. Hot adhesive may come out.


Use only lint-free cleaning cloth and suitable cleaner for cleaning! Do not damage surfaces! Do not scratch above them with sharp-edged tools, otherwise the components will get leaky and inoperable!

**The applicator requires no regular maintenance. Wipe the applicator clean of adhesive with a clean cloth while still hot at the end of each shift, taking care not to damage the shim. Inspect the applicator periodically as outlined in the following table.**

#### Maintenance plan:

Operating time/ frequency	Inspection point / maintenance notes
Continuous	<ul style="list-style-type: none"> <li>Remove dropped out adhesive and scrap adhesive and search for the cause of that, eliminate the cause.</li> </ul>
Once a day	<ul style="list-style-type: none"> <li>Clean the Applicator and components from dirt.</li> </ul>
Once a week	<ul style="list-style-type: none"> <li>Check the Slot Die for proper operation and clean the Die assembly if necessary.</li> <li>Check filter for clogging and replace if necessary.</li> <li>Check modules on Applicator if leaky and replace if necessary. (Monitor for excess adhesive flow out of "Weep holes" – small amount is normal).</li> <li>Check air supply connections for leaks and tighten if loose or replace if necessary.</li> <li>Check all hose fittings for leaks and tighten if necessary.</li> <li>Check the solenoid valves for proper function and replace it if necessary.</li> </ul>
Every 3 months	<ul style="list-style-type: none"> <li>Due to temperature differences a loosening of threads (threaded connections) is possible. Check all parts with threads, all screw fittings and fasteners for tightness and tighten them if necessary.</li> </ul>
Once a year	<ul style="list-style-type: none"> <li>Clean the Applicator.</li> <li>Complete check-up for wearing.</li> </ul>
Every two years	<ul style="list-style-type: none"> <li>Complete maintenance.</li> </ul>

## 5.3 Replacement of Module

	<p><b>WARNING</b></p> <p>Heed all security advices given in chapter 5.1.</p> <p>Maintenance and repair work is only permitted for skilled personnel!</p> <p>Always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothing that cover all vulnerable parts of the body while working on the heated unit! Risk of injury or severe burns!</p> <p><b>During this procedure, hot adhesive can come out of the Applicator under high pressure.</b></p> <p>Components and adhesive are hot when this procedure is being done. Take every precaution to prevent the material and hot surfaces from contacting the skin.</p>
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**NOTE:** The stroke for standard modules is factory set to 0.3 mm ± 0.05 mm (0.012" ± 0.002") and for high-flow module to 0.6 mm ± 0.05 mm (0.012" ± 0.002").

**NOTE:** For the replacement, see module illustrations in Chapter 8.


1. The Applicator must be at operating temperature.
2. Turn the ASU's pump/ motor OFF.
3. Switch the unit pressureless.
4. Place a heat-resistant catchment container/underlay under the Applicator. Hot adhesive may come out!
5. Remove the air connections and the solenoid valve.
6. Loosen the 4 screws of the module and remove the module.
7. Lubricate the module O-rings with O-ring lube (PN N07588).
8. Clean the adhesive residuals from module hole in Applicator.
9. Insert the module and fasten it with its 4 screws.
10. Re-connect the solenoid valve and the air connections.

**After finishing the maintenance or repair works:**

- Remove all materials and tools used during the repair or maintenance from the workspace of the unit.
- Connect the compressed air supply.
- Continue production.



## 5.4 Replacement of the Filter in Optional Filter Block



**WARNING**

Heed all security advices given in chapter 5.1.

Maintenance and repair work is only permitted for skilled personnel!

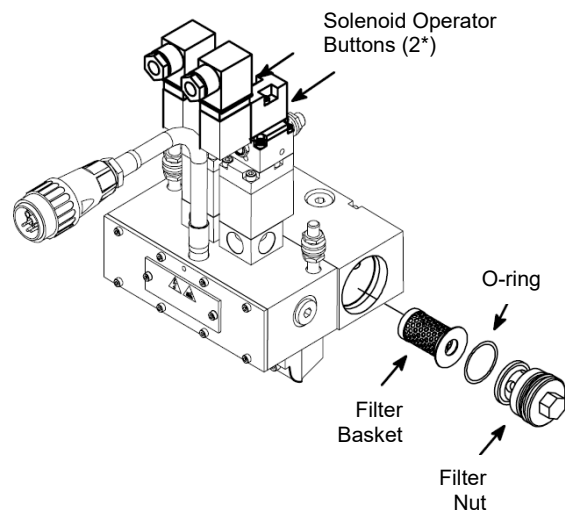
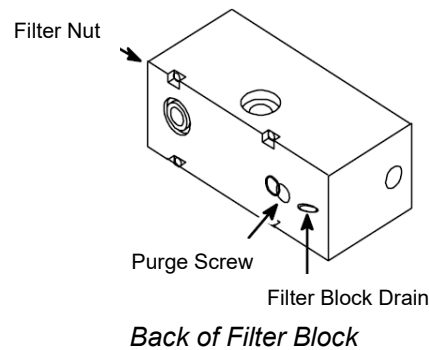
Always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothing that cover all vulnerable parts of the body while working on the heated unit! Risk of injury or severe burns!

**During this procedure, hot adhesive can come out of the Applicator under high pressure.**

Components and adhesive are hot when this procedure is being done. Take every precaution to prevent the material and hot surfaces from contacting the skin.

*NOTE: To make filter access easier, the filter block may be rotated 180°.*

1. The Applicator must be at operating temperature.
2. Turn the ASU's pump/ motor OFF.
3. Switch the unit voltage-free and pressureless.
4. Guard the unit against unauthorized restarting.
5. Place a heat-resistant catchment container/underlay under the Applicator. Hot adhesive may come out!
6. *Relieve the adhesive pressure by:*
  - a. Manually open the module(s). This is done by pushing the solenoid operator button(s) located on the back of the air solenoid coil(s).
  - b. Open the purge screw two turns. This screw is located on the back of the filter block next to the tamper-proof screw which prevents its removal.
  - c. If the ASU filter manifold is equipped with a drain, adhesive pressure may be relieved at the ASU.
7. Wearing insulated gloves, unscrew and remove the filter nut.
8. With needle nose pliers, pull the old filter basket out of the filter block.
9. Replace the O-ring on the filter nut. Apply O-ring lubricant (PN N07588) to the new O-ring.
10. Apply a coat of anti-seize to the threads of the filter nut.



(\* two module/solenoid model shown)

11. Re-install a new filter basket and the filter nut.


Tighten the filter nut until it is seated firmly, taking care not to cut the O-ring.

**After finishing the maintenance or repair works:**

- Remove all materials and tools used during the repair or maintenance from the workspace of the unit.
- Connect the voltage supply and the compressed air supply. Heat the unit up. Wait until all temperatures are within the tolerances and the adhesive in the hopper is molten completely.
- Continue production.

## 5.5 Shim Replacement

All slot die heads are equipped with shims, located between the die plate and the die adapter of the extruder. A standard (0.005") shim is factory-installed on your extruder. Two additional cut shims are included, along with three blank shims.



### WARNING

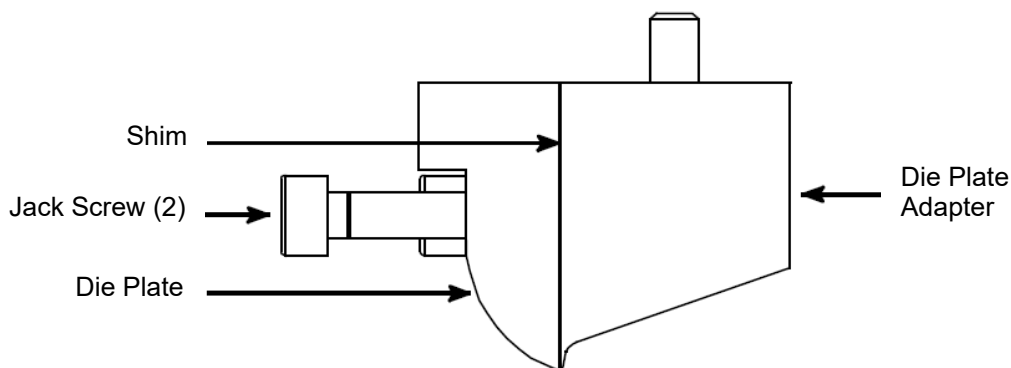
Heed all security advices given in chapter 5.1.

Maintenance and repair work is only permitted for skilled personnel!

Always wear safety shoes, heat-resistant protective gloves, safety goggles and protective clothing that cover all vulnerable parts of the body while working on the heated unit! Risk of injury or severe burns!

**During this procedure, hot adhesive can come out of the Applicator under high pressure.**

Components and adhesive are hot when this procedure is being done. Take every precaution to prevent the material and hot surfaces from contacting the skin.



### To replace a shim:

1. The Applicator must be at operating temperature.
2. Turn the ASU's pump/ motor OFF.
3. Switch the unit voltage-free and pressureless.
4. Guard the unit against unauthorized restarting.
5. Place a heat-resistant catchment container/underlay under the Applicator. Hot adhesive may come out!
6. Loosen the screws, which attach the die plate and shim to the extruder's die adapter.



### CAUTION

**Take care not to scratch or nick the mating surfaces of the parts of die lip set during this procedure.**

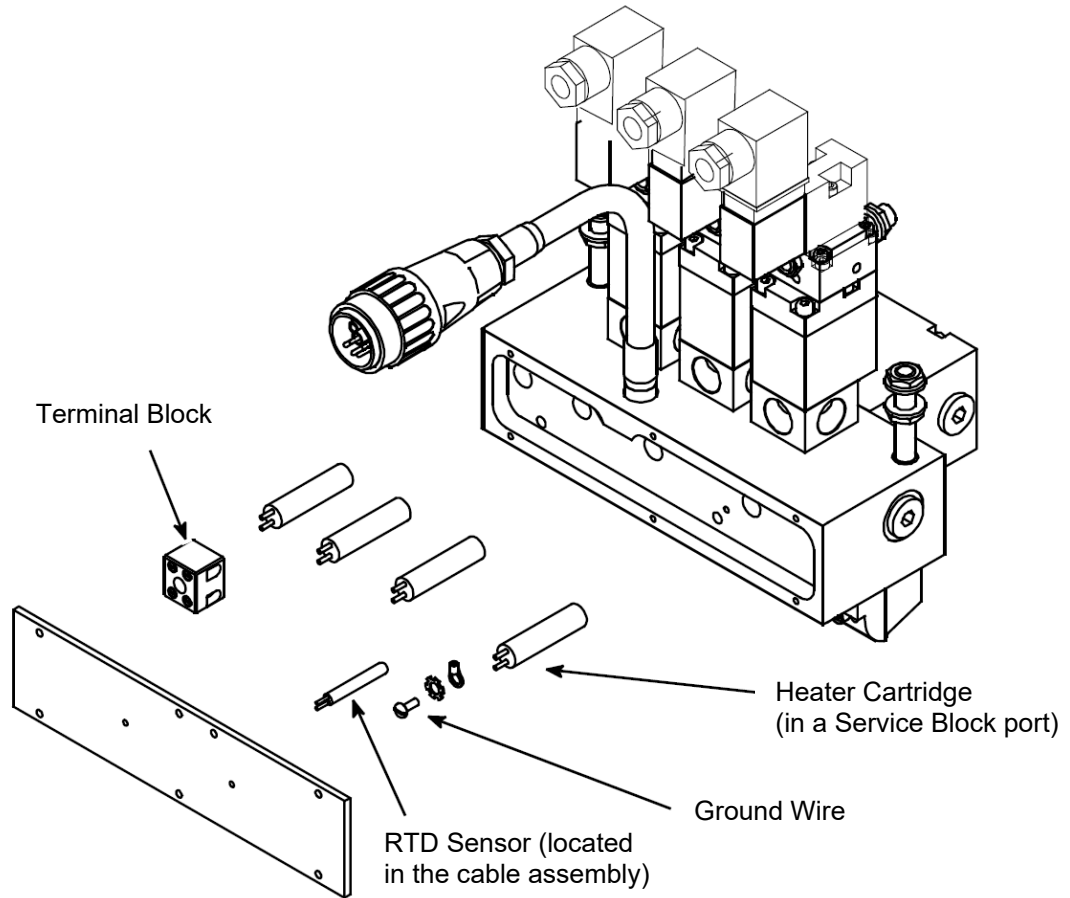
7. Tighten the two jack screws. This will allow you to remove the die plate from the die plate adapter without damage to the assembly.
8. Wipe the body and die plate clean of all adhesive and char using a liquid cleaning solvent. Pay special attention to the surfaces that clamp the shim.

9. Inspect the new shim for any burrs or rough edges. Using 400 grit paper on a flat surface, sand as required to insure flatness.
10. Re-attach shim and die plate to the body, keeping the screws loose.
11. Hold a flat bar (steel or aluminum) against the leading edge of the extruder. This will align the shim to the die plate and the die adapter. All components must be parallel for the entire length of the assembly. Tighten the screws to hold the components together. Remove the flat bar.
12. If required, wrap a piece of 400 grit sandpaper around a flat file and, going from end to end, sand the entire leading-edge surface to remove any shim edges that are not in parallel with the die plate and die adapter.

**After finishing the maintenance or repair works:**

- Remove all materials and tools used during the repair or maintenance from the workspace of the unit.
- Connect the voltage supply and the compressed air supply. Heat the unit up. Wait until all temperatures are within the tolerances and the adhesive in the hopper is molten completely.
- Test the applicator for proper performance. Adjust as required.

## 5.6 Replacement of Heater Cartridge or Sensor



ITW Dynatec has a High Temp Heater Splice Kit available (PN 102645). Each kit contains sufficient connectors and shrink tube to replace a heater cartridge (the heater is ordered separately).

1. Disconnect power to the ASU and make sure all adhesive air pressure and pumps are turned OFF.
2. Disconnect the electrical cable assembly from the hose.
3. Remove the wire access cover plate and the gasket via two holding screws.
4. *If replacing heater (only):* Cut the wires of the heater cartridge at the splice.
5. Pull the heater (or sensor) out of the service block.
6. Apply a thin coat of thermal paste (PN 001V061) to the new cartridge heater (or new sensor).
7. Put new cartridge heater (or new sensor) in service block.  
*If replacing heater:* connect its wires with splice and shrink tube.
8. Replace access cover plate and gasket.

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# Chapter 6

## Troubleshooting

### 6.1 Troubleshooting In General



**NOTE:** Please re-read all security advices given in chapter 2 before performing any troubleshooting or repair procedures.

All troubleshooting or repair procedures must be performed by qualified, trained technicians.



#### **DANGER HIGH VOLTAGE**

The Adhesive Supply Unit and Applicator use electrical power that can be life threatening and hot-melt adhesives that can cause serious burns. Only qualified persons should perform service on the ASU.



#### **WARNING HOT SURFACE**

Severe burns can occur if unprotected skin comes in contact with molten adhesive or hot application system parts.



Some of the procedures in the following Troubleshooting Guide require working near hot adhesive.



Face shields (preferred) or safety glasses (for minimum protection), heat-resistant protective gloves and long-sleeved clothing must be worn whenever working with or around adhesive application systems.

Use proper tools for handling hot melt components.

## 6.2 Troubleshooting Guide



**NOTE:** The temperatures measured on the outer surface may deviate significantly from the temperatures set and displayed. This can lead to a false conclusion (e.g. defective heating). Such a difference is normal and depends also largely on the materials used.

### Preliminary Checks: Verify the following before proceeding:

- All pneumatic and electrical connections are correct.
- The ASU is supplied with power and the main power switch is ON.
- Adhesive is in the hopper and the ASU's pump is ON.
- The ASU and Applicator have sufficient air pressure.
- The temperature controller is in operation. The setpoints are correct for the application, ASU, Heated Hoses and Applicators. All components are heating properly.

Problem	Possible Cause	Solution
Module does not open.	<ol style="list-style-type: none"> <li>1. Temperature adjustment of head is too low.</li> <li>2. Inoperative solenoid valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check temperature adjustment.</li> <li>2. Push the solenoid's manual button. If it opens, the problem is electrical.</li> </ol>
No adhesive flowing out of module.	<ol style="list-style-type: none"> <li>1. Die assembly is clogged.</li> <li>2. Filter element is dirty.</li> <li>3. Module seals (O-rings) are inoperative.</li> <li>4. ASU's hopper is empty.</li> <li>5. Adhesive is too cold.</li> <li>6. Solenoid valve is not opening.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean die assembly, see instructions in Ch. 5 Maintenance.</li> <li>2. Replace filter, see instructions in Ch. 5 Maintenance.</li> <li>3. Check module O-rings.</li> <li>4. Re-fill hopper.</li> <li>5. Adjust temperature, see ASU manual.</li> <li>6. Check solenoid valve.</li> </ol>
Hot melt is coming out of the module's "weep" holes.	<ol style="list-style-type: none"> <li>1. Module seals are damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace module.</li> </ol>
Applicator does not reach operating temperature.	<ol style="list-style-type: none"> <li>1. Hopper temperature setpoint is too low.</li> <li>2. Inoperative heater cartridge.</li> <li>3. Inoperative temperature sensor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Change setpoint, see ASU manual.</li> <li>2. Check/ replace heater cartridge.</li> <li>3. Check/ replace sensor.</li> </ol>



Problem	Possible Cause	Solution
Applicator is too hot.	1. Applicator temperature setpoint is too high. 2. Inoperative temperature sensor.	1. Change setpoint, see ASU manual. 2. Check/ replace sensor.
Air escapes from module.	1. Inoperative piston O-ring. 2. O-rings located between module and service block are inoperative.	1. Replace module. 2. Remove module from block and replace O-rings.
Application pattern is erratic.	1. Adhesive pressure is too low. 2. Pattern controller's adjustment is improper.	1. <i>a. For units without speed control:</i> increase adhesive pressure at ASU. <i>b. For units with speed control (tach follower):</i> adjust pump speed control. 2. See pattern controller manual for proper adjustment.

## 6.3 Testing of Heater Cartridge or Temperature Sensor

1. Turn the ASU OFF and make sure all adhesive air pressure and the pump are turned OFF.
2. Unplug the electrical cable from the adhesive supply hose to expose the pins in the cable.

*Note: Pin connectors and pinout numbers will vary depending on the control scheme of the applicator. See pages Chapter 8 for a diagram of each.*

### 6.3.1 Testing Resistance of the Heater Cartridge

- a. The resistance value (Ohms) of your heater cartridge may be calculated using the formula:

$$\frac{\text{Volts}^2}{\text{Watts}} = \text{Ohms}$$

To determine wattage, see heater cartridges chart in Chapter 7.

- b. Measurements:
  - *For DynaControl/ PLC:* With an ohmmeter, contact pins 7 and 8 and measure resistance.
  - *For Upgrade (NI RTD):* With an ohmmeter, contact pins 1 and 2 and measure resistance.
- c. A tolerance range of  $\pm 5\%$  is allowed. A heater cartridge that tests outside of this range must be replaced.

### 6.3.2 Testing Resistance of the RTD Temperature Sensor

- a. The resistance value (Ohms) of your temperature sensor depends on the temperature of the sensor at the time it is being tested.

**Resistance/ Voltage Tables for RTD Temperature Sensor:**

RTD Resistance - Temperature Tables						TC Voltage – Temperature Table		
PT 100 Ohms Control Option D, M, P or X			Ni 120 Ohms Control Option N			J-type TC Control Option L		
Temperature °F	Temperature °C	Resistance in Ohms	Temperature °F	Temperature °C	Resistance in Ohms	Temperature °F	Temperature °C	Voltage in mV
32	0	100	32	0	120	32	0	0
50	10	104	50	10	127	50	10	0.51
68	20	108	68	20	135	68	20	1.02
86	30	112	86	30	142	86	30	1.54
104	40	116	104	40	150	104	40	2.06
122	50	119	122	50	158	122	50	2.59
140	60	123	140	60	166	140	60	3.12
158	70	127	158	70	174	158	70	3.65
176	80	131	176	80	183	176	80	4.19
194	90	135	194	90	192	194	90	4.76
212	100	139	212	100	201	212	100	5.27
230	110	142	230	110	210	230	110	5.81
248	120	146	248	120	219	248	120	6.36
268	130	150	268	130	229	268	130	6.91
284	140	154	284	140	239	284	140	7.46
302	150	157	302	150	249	302	150	8.01
320	160	161	320	160	259	320	160	8.56
338	170	165	338	170	270	338	170	9.12
356	180	168	356	180	281	356	180	9.67
374	190	172	374	190	292	374	190	10.22
392	200	176	392	200	303	392	200	10.78
410	210	180	410	210	315	410	210	11.33
428	220	183	428	220	328	428	220	11.89

- b. Measurements:
- For DynaControl/ PLC: With an ohmmeter, contact pins 5 and 6 and measure resistance.
  - For Upgrade (NI RTD): With an ohmmeter, contact pins 3 and 5 and measure resistance.
- c. A tolerance range of ± 10% is allowed. A sensor that tests outside of this range must be replaced.



## Chapter 7

# Available Options & Accessories

### 7.1 Heater Cartridges

Head Length/ # of Modules	Heater PN/ Watts	Qty. Heaters
50 mm/ 1	803960/ 200W	2
76.2 mm/ 1	803960/ 200W	2
110 mm/ 1	803960/ 200W	2
150 mm/ 2	803960/ 200W	2
190 mm/ 3	803960/ 200W	4
270 mm/ 5	803960/ 200W	6
390 mm/ 8	803960/ 200W	8
470 mm/ 10	803960/ 200W	10

Add wattage of all segments on your applicator to determine total wattage of applicator.

### 7.2 RTD Sensors

Control	Part Number	Description	Quantity
DynaControl	N07958	PT100	1
Upgrade Nor	N07864	N120	1

### 7.3 Blank Shims

Length of Applicator	Blank Shim Part Number
50 mm	813341
76.2 mm	812330
110 mm	110961
150 mm	110974
190 mm	110983
270 mm	110968
390 mm	111323
470 mm	111092

NOTE: The standard shim thickness is 0.127mm [0.005"]. Thickness may vary depending on customer needs, application and viscosity of adhesive.

### 7.4 Cable Assemblies

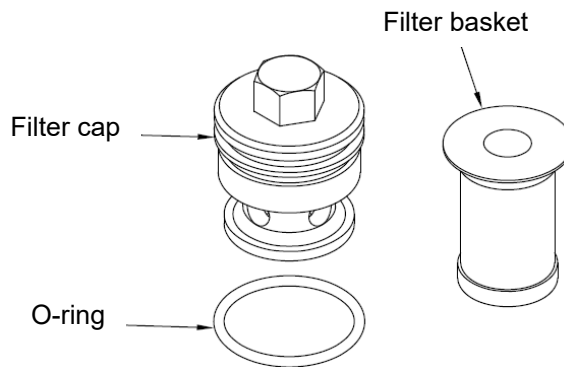
Part Number	Control Scheme	Voltage
103467	DCL/ PLC	240 V
104528	Nor	240 V

## 7.5 Filter Kits

To simplify ordering, Filter Kits are available.

### 1. Option = Filter Kits with filter basket:

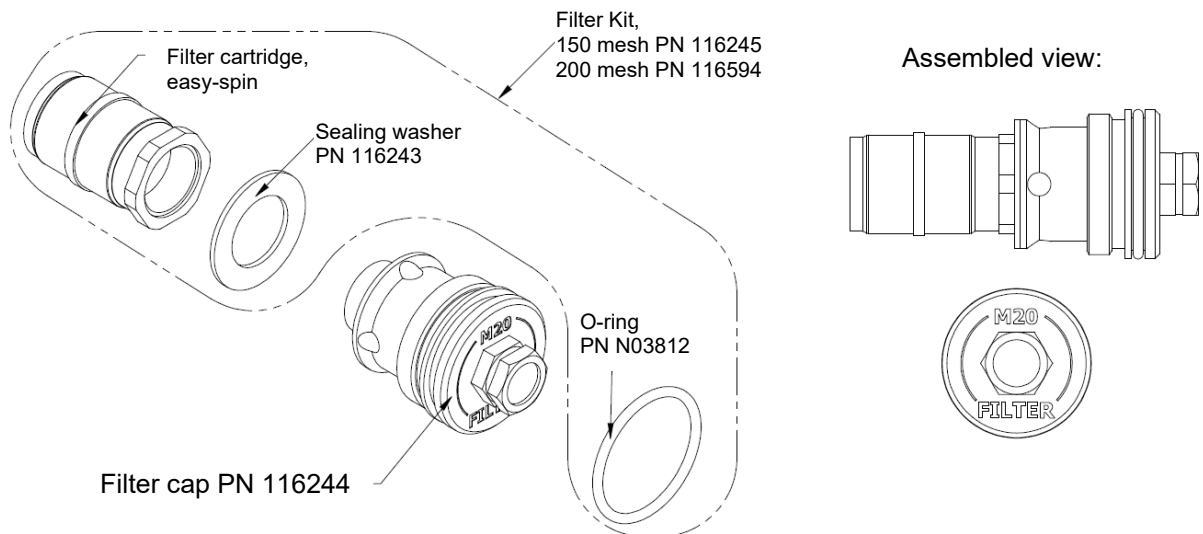
Filter Kit Part Number	O-ring Part Number	Filter Cap Part Number	Filter basket Part Number
-	N03812 O-ring #125	106303	102693 80 mesh,
114291	N03812 O-ring #125	106303	101247 100 mesh,
114292	N03812 O-ring #125	106303	106273 150 mesh,
-	N03812 O-ring #125	106303	109482 200 mesh,



### 2. Option = Filter Kits with easy-spin filter cartridge:

Filter Kit Part Number	O-ring Part Number	Filter Cap Part Number	Filter cartridge, easy-spin Part Number
116246*	N03812 O-ring #125	116244	116242 150 mesh, Spin-on M20
116245	N03812 O-ring #125	-	116242 150 mesh, Spin-on M20
116595	N03812 O-ring #125	116244	116593 200 mesh, Spin-on M20
116594	N03812 O-ring #125	-	116593 200 mesh, Spin-on M20

\* PN 116246 M-20 Spin-On Filter Assembly.



## 7.6 Recommended Spare Parts List

Part Number	Description	Quantity
See order	Filter Basket	2
803960	Heater, 240V/ 200W	m x 0.5*
N07958	RTD Sensor, Pt 100 (in cable)	1
110427	APEX Module (standard)	m x 0.5*
N00179	O-ring 012 (in cable)	1
N00178	O-ring 011 (on extruder)	m
N03812	O-ring 125	1
N00183	O-ring 016	1
(see list on previous page)	Shim (on extruder)	3
808913	Thickness Gauge	1
001U002	Lube, silicone, DOW112	A/R**
108669	Thread sealant, Loctite 266	A/R**
107324	Compound anti-seize	A/R**
001V061	Thermal Paste	1

\* Quantities for these items vary per the number of modules (ports) on the Applicator.  
m = number of modules.

\*\* A/R = As required.





## Chapter 8

# Component Illustrations and Bill of Materials

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### **WARNING**

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All parts must be periodically inspected and replaced if worn or broken. Failure to do this can affect equipment's operation and can result in personal injury.

This chapter contains the component illustrations (exploded-view drawings) for each assembly. These drawings are useful for finding part numbers as well as for use when maintaining or repairing the equipment.

**Note: Most common screws, nuts and washers called out in the manual are not for sale and they can be obtained locally at your hardware Store. Specialty fasteners are available by contacting ITW Dynatec's Customer Service.**

## 8.1 Standard APEX Applicators and Extruders

### 8.1.1 APEX 50mm Service Block Assembly PN 813187

Item No.	Part Number	Description	Quantity
02	813157	Mounting	1
03	104661	Screw M6x12mm	2
05	813184	Service Block 50mm	1
06	103470	Screw M3x5mm	1
07	803960	Heater 10x40mm, 240V, 200W	2
08	N07354	Screw M4x10mm	1
09	813185	Cover plate 50mm	1
10	106137	Screw M3x8mm	4
11	104228	Ferrule, wire, 16AWG (not shown)	4
12	107324	Compound anti-seize (not shown)	A/R*
13	107881	Terminal block, 2 pos., ceramic	1
17	N04302	Lock washer, EXT T, #10	1
18	N04268	Terminal ring, 22-16, #10	1
20	001U002	Lube, DOW Corning 112 (not shown)	A/R*
23	814423	Insulating, 29.5x13mm	1
24	104662	Screw M6x16mm	2

A/R\* = As required.

ASSEMBLY NOTES: Lubricate all seals and O-rings with item 20 during assembly. Apply item 12 to screws during assembly.

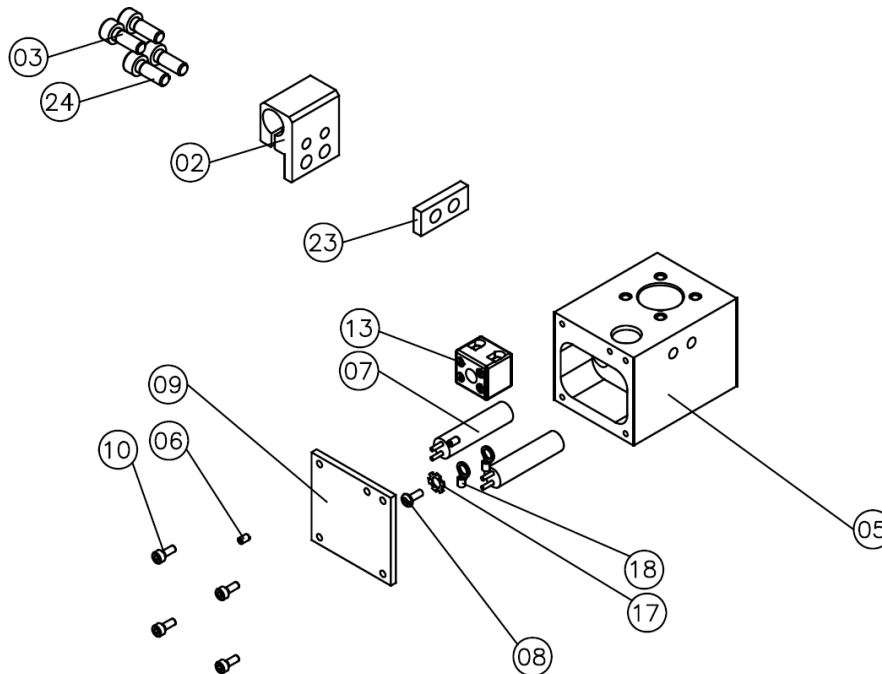


Illustration: APEX 50mm Service Block Assembly PN 813187

**8.1.2 APEX 50mm Extruder Assembly, PN 814408**

Item No.	Part Number	Description	Quantity
01	813188	Die Adapter 50mm	1
02	813341	Blank shim 50mm	3
03	814407	Die plate 50mm, 40mm pattern	1
04	808171	Dowel pin 4x20mm	1
05	N00178	O-ring -011, 70 Duro Viton	1
06	109745	Screw M4x20mm	4
07	808172	Dowel pin 5x20mm	1
08	001U002	Lube Dow Corning 112	A/R*
09	107324	Compound anti-seize (not shown)	A/R*
10	814406	Pattern shim 50mm, 40mm pattern	3

A/R\* = As required.

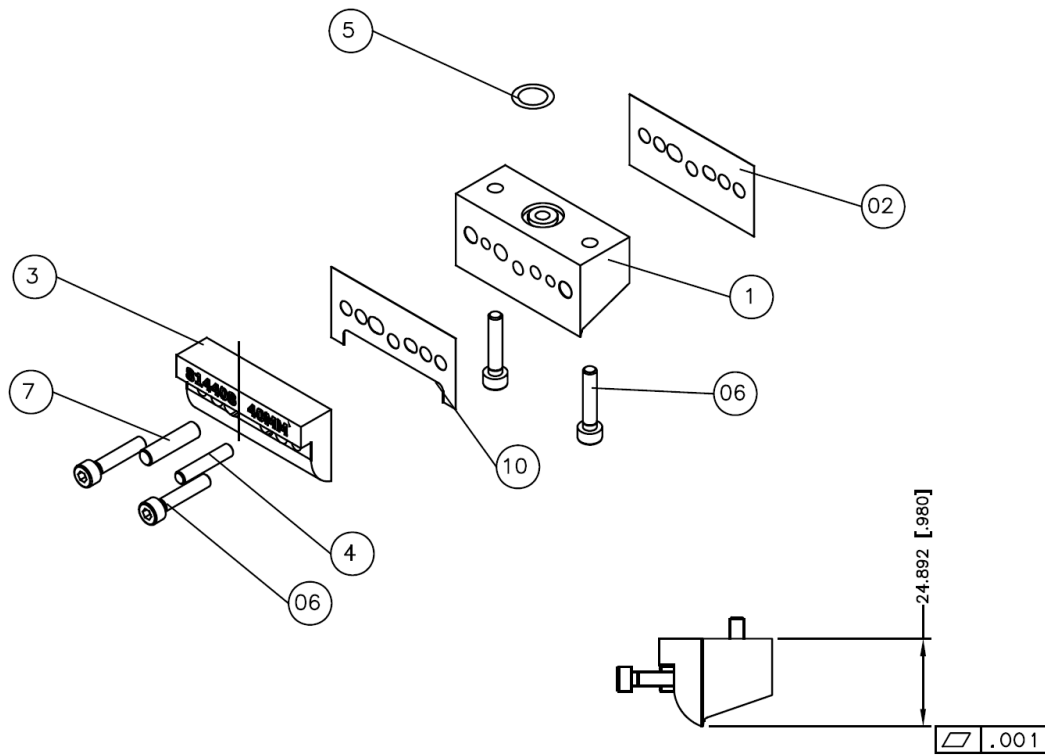


Illustration: APEX 50mm Extruder Assembly, PN 814408

**8.1.3 APEX 76.2mm Service Block Assembly, PN 812327**

Item No.	Part Number	Description	Quantity
01	103347	Plate	1
02	811170	Screw M3x4mm	2
03	101625	Fitting plug 1/4BSPP	2
04	001U002	Lube DOW Corning 112 (not shown)	A/R*
05	812325	Service block 76.2mm	1
06	103470	Screw M3x5mm	1
07	803960	Heater 10x40mm, 240V, 200W	2
08	N07354	Screw M4x10mm	1
09	812326	Cover plate 48x76.2mm	1
10	106137	Screw M3x8mm	4
11	104228	Ferrule, wire, 16AWG (not shown)	4
12	107324	Compound anti-seize, (not shown)	A/R*
13	107881	Terminal block, 2 pos. ceramic	1
14	105060	Nut M8	4
15	106321	Washer, flat, M8	4
16	107536	Screw M8x60mm	2
17	N04302	Lock washer, EXT T, #10	2
18	N04268	Terminal ring, 22-16,#10	1

A/R\* = As required.

ASSEMBLY NOTES: Lubricate all seals and O-rings with item 20 during assembly. Apply item 12 to screws during assembly.

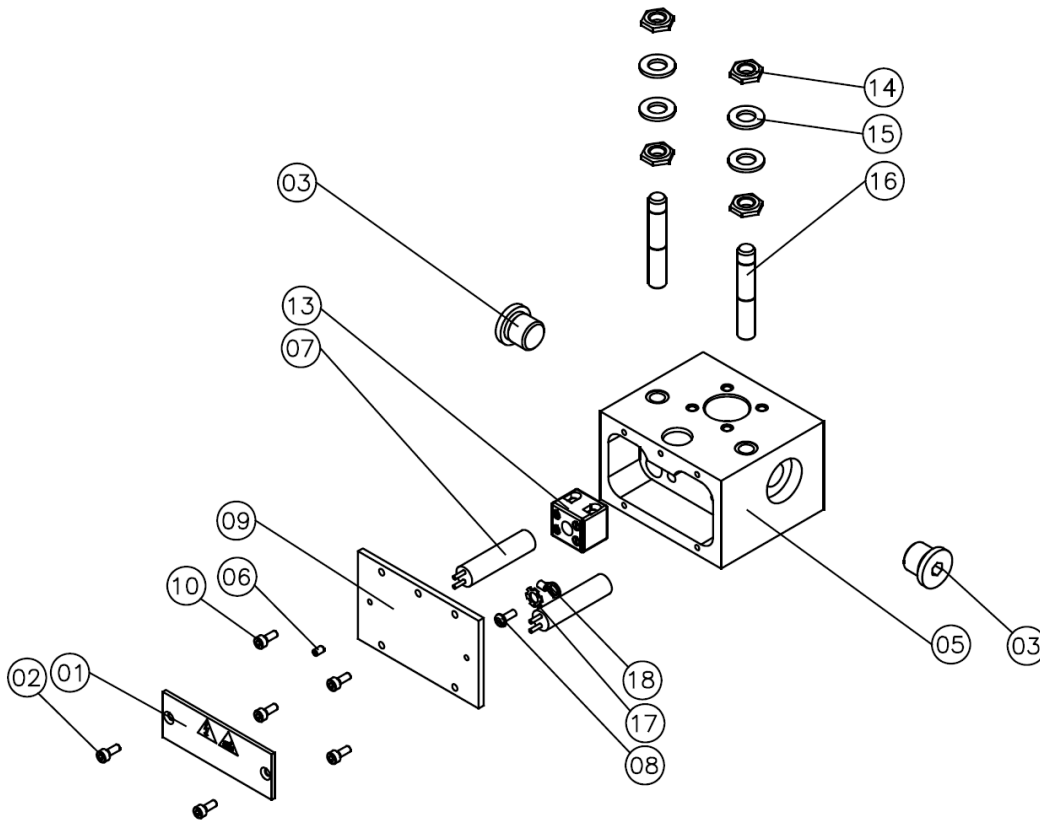


Illustration: APEX 76.2mm Service Block Assembly, PN 812327

### 8.1.4 APEX 76.2mm Extruder Assembly, PN 813009

Item No.	Part Number	Description	Quantity
01	812328	Die adapter 76.2mm	1
02	813008	Pattern shim 76.2mm, 50mm pattern	3
03	813007	Die plate 76.2mm, 50mm pattern	1
04	808171	Dowel pin 4x20mm	1
05	N00178	O-ring -011, 70 Duro Viton	1
06	107531	Screw M4x20mm	6
07	808172	Dowel pin 5x20mm	1
08	001U002	Lube Dow Corning 112	A/R*
09	107324	Compound anti-seize (not shown)	A/R*
10	812330	Blank shim 76.2mm	3

A/R\* = As required.

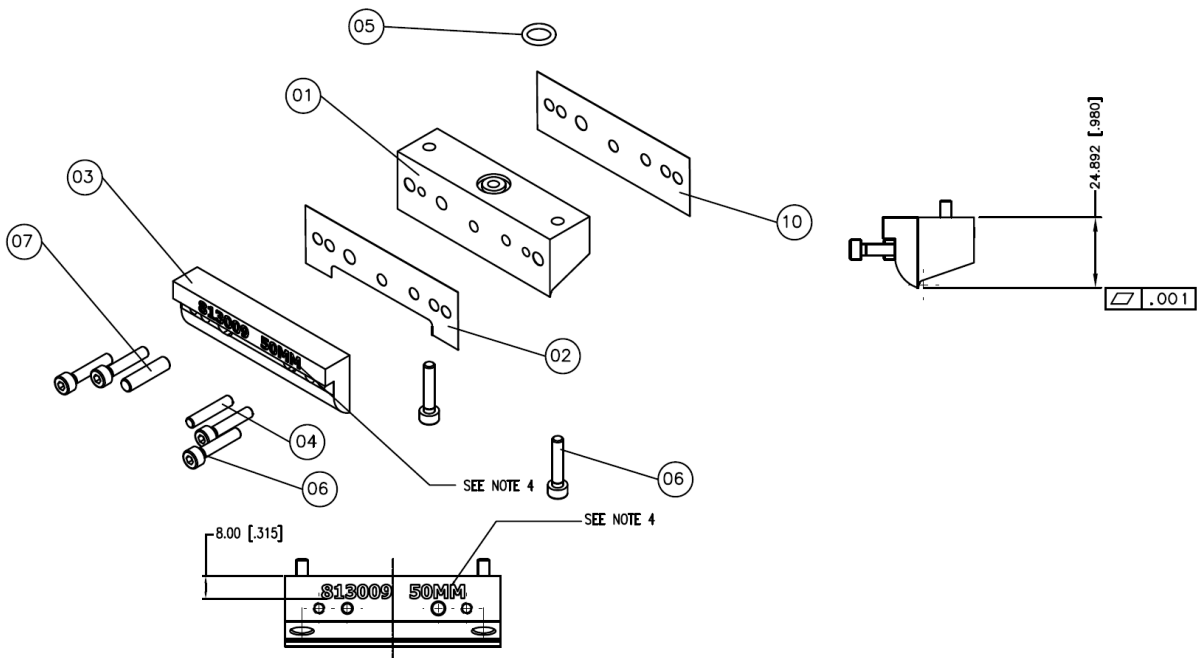


Illustration: APEX 76.2mm Extruder Assembly, PN 813009

**8.1.5 APEX 110mm Service Block Assembly, PN 111092**

Item No.	Part Number	Description	Quantity
1	103347	Heater and Sensor Plate	1
2	110427	Module Assembly (Interchangeable, shown for reference only) 1	1
3	101625	Fitting, Plug, 1/4 BSPP, Soc, Stl	5
4	101624	Fitting, Straight, 6 JIC x 1/4 BSPP	1
5	110960	Service Block, 110mm	1
6	103470	Set screw M3x5mm	1
7	803960	Heater 10 x 40mm, 240V, 200W	2
8	N07354	Screw M4x10mm	1
9	110978	Cover Plate 48 x 110mm	1
10	106137	Screw M3x4mm	8
11	104228	Ferrule, Wire, 16 Awg, 2.7 (not shown)	4
12	107324	Compound anti-seize (not shown)	A/R*
13	107881	Terminal Block, 2 Pos, Ceramic	1
14	105060	Nut M8	4
15	106321	Washer, Flat, M8	4
16	107536	Screw M8x60mm	2
17	N04302	Washer, Lock, Ext T #10	1
18	N04268	Terminal Ring, 22-16, #10,	1
19	110449	Block, Filter, Depres, B & A, D2	1
20	001U002	Lube, Dow Corning, 112 (not shown)	A/R*
21	808285	Screw M4x65mm	4
22	N00183	O-ring, -016	1
23	104852	Screw M10x12mm	1
24	101833	Screw 10-32 x 1/2	1
25	106303	Cap, Filter	1
26	N03812	O-ring, -125	1
		<b><i>The following shown for reference only; see your order for specific Part Numbers.</i></b>	
27	106273	Filter Basket, 150 mesh (see your order for size)	1
	101247	Filter Basket, 100 mesh (optional) (see your order for size)	
28	103467	Cable Assembly, 240V, DCL	1

\* see separate drawing and/or bill of material.

A/R\* = As required.

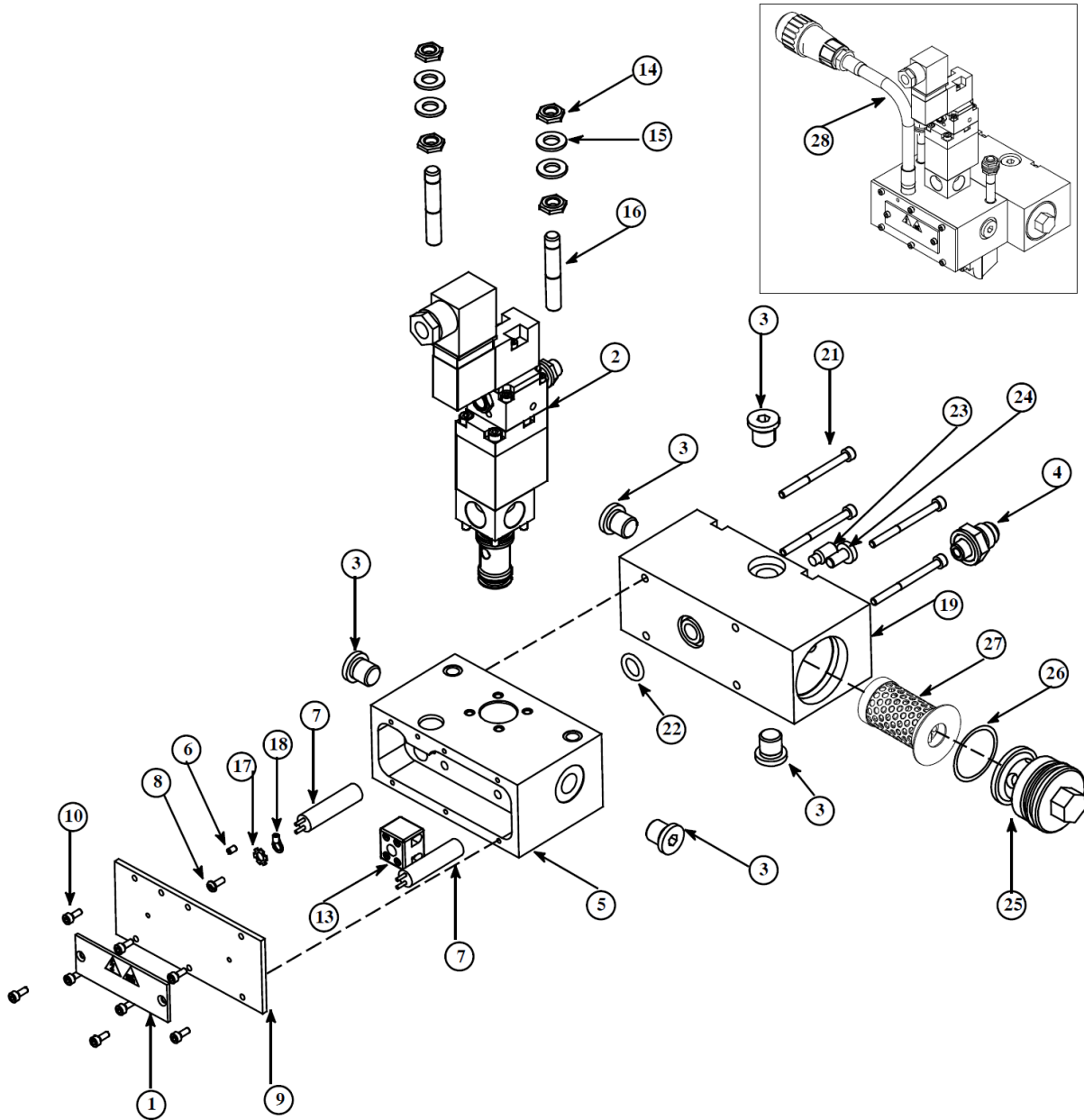


Illustration: APEX 100mm Service Block Assembly, PN 111092

**8.1.6 APEX 110mm Extruder Assembly PN 111095**

Item No.	Part Number	Description	Quantity
29	110964	Die, Adapter, 110, APEX	1
30	111093	Pattern Shim, 110, APEX, 40mm pattern	5
31	111094	Die Plate, 100, APEX, 40mm pattern	1
32	808171	Dowel Pin, 4 x 20mm	1
33	N00178	O- ring, -011	1
34	107531	Screw M4x20mm	10
35	808172	Dowel Pin, 5 x 20mm	1
36	001U002	Dow Corning Lube 112 (not shown)	A/R*
37	107324	Compound anti-seize (not shown)	A/R*
38	110961	Blank Shim (not shown)	3

\* see separate drawing and/or bill of material.  
A/R\* = As required.

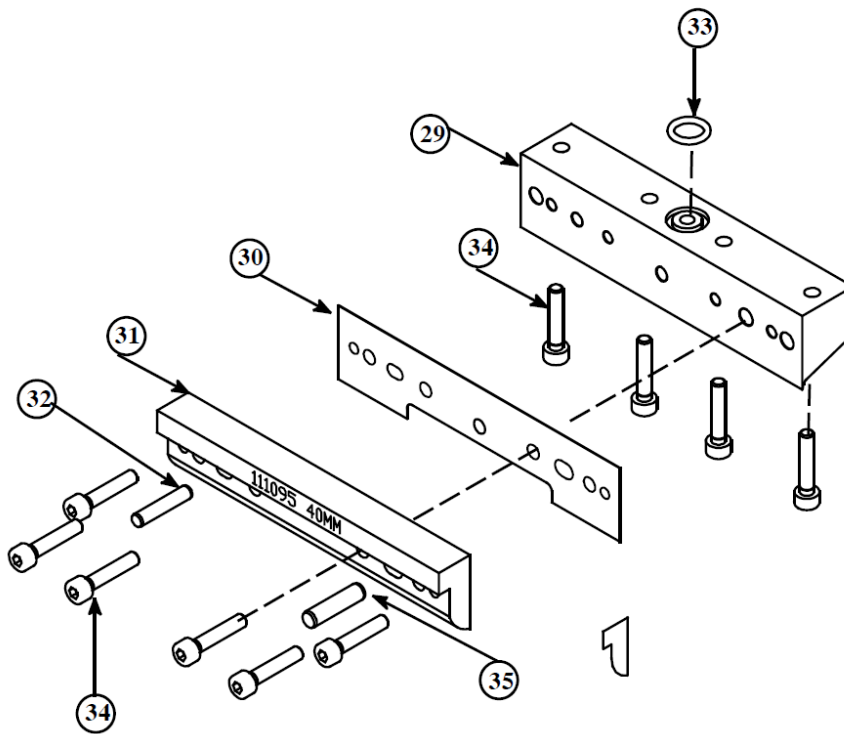
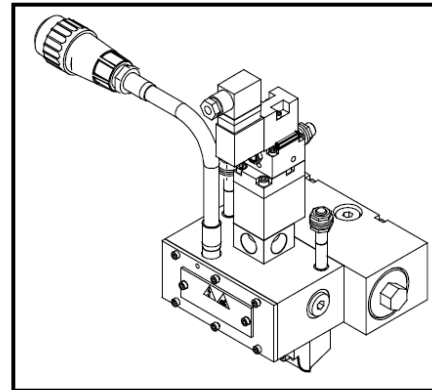


Illustration: APEX 110mm Extruder Assembly PN 111095



### 8.1.7 APEX 150mm Service Block Assembly, PN 111082

Item No.	Part Number	Description	Quantity
1	107324	Compound anti-seize (not shown)	A/R*
2	110427	Module Assembly (Interchangeable, shown for reference only)	1
3	101625	Fitting, Plug, 1/4 BSPP, Soc, Stl	2
4	101624	Fitting, Straight, 6 JIC x 1/4 BSPP	1
5	110436	Service Block, 150mm	1
6	103470	Set screw M3x5mm	1
7	803960	Heater 10 x 40mm, 240V, 200W	2
8	N07354	Screw M4x10mm	1
9	110437	Cover Plate 48 x 150mm	1
10	106137	Screw M3x8mm	10
11	104228	Ferrule, Wire, 16 Awg, 2.7 (not shown)	4
12	001U002	Lube, Dow Corning, 112 (not shown)	A/R*
13	107881	Terminal Block, 2 Pos, C	1
14	105060	Nut M8	4
15	106321	Washer, Flat, M8	4
16	107536	Set screw M8x60mm	2
17	N04302	Washer, Lock, Ext T #10	1
18	N04268	Terminal Ring, 22-16, #10,	1
19	110449	Block, Filter, Depres, B & A, D2	1
20	808285	Screw M4x65mm	4
21	N00183	O-ring -016	1
22	104852	Screw M10x12	1
23	101833	Screw 10-32 x 1/2	1
24	106303	Cap, Filter	1
25	N03812	O-ring -125	1
26	103347	Heater and Sensor Plate	1
		<b><i>The following shown for reference only; see your order for specific Part Numbers.</i></b>	
27	106273	Filter Basket, 150 mesh (see your order for size)	1
	101247	Filter Basket, 100 mesh (optional) (see your order for size)	
28	103467	Cable Assembly, 240V, DCL	1

\* see separate drawing and/or bill of material.

A/R\* = As required.

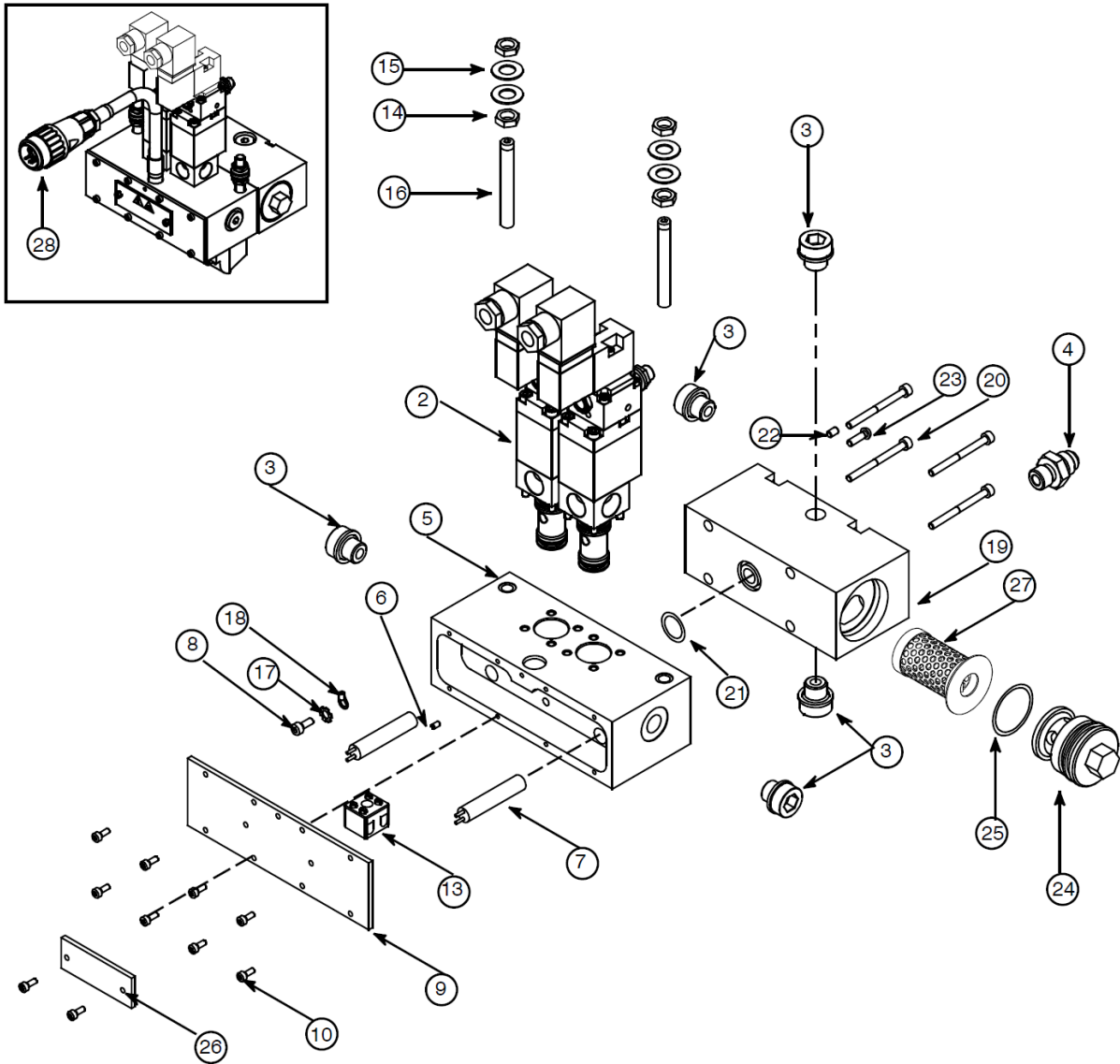


Illustration: APEX 150mm Service Block Assembly, PN 111082

### 8.1.8 APEX 150mm Extruder Assembly PN 111085

Item No.	Part Number	Description	Quantity
29	110440	Die Adapter, 150mm	1
30	111083	Pattern Shim, 150mm, 80mm pattern	5
31	111084	Die Plate, 150mm, 80mm pattern	1
32	808171	Dowel Pin, 4 x 20mm	1
33	N00178	O- ring, -011	2
34	107531	Screw M4x20mm	13
35	808172	Dowel Pin, 5 x 20mm	1
36	001U002	Dow Corning Lube 112 (not shown)	A/R*
37	107324	Compound anti-seize (not shown)	A/R*
38	110961	Blank Shim (not shown)	3

\* see separate drawing and/or bill of material.  
A/R\* = As required.

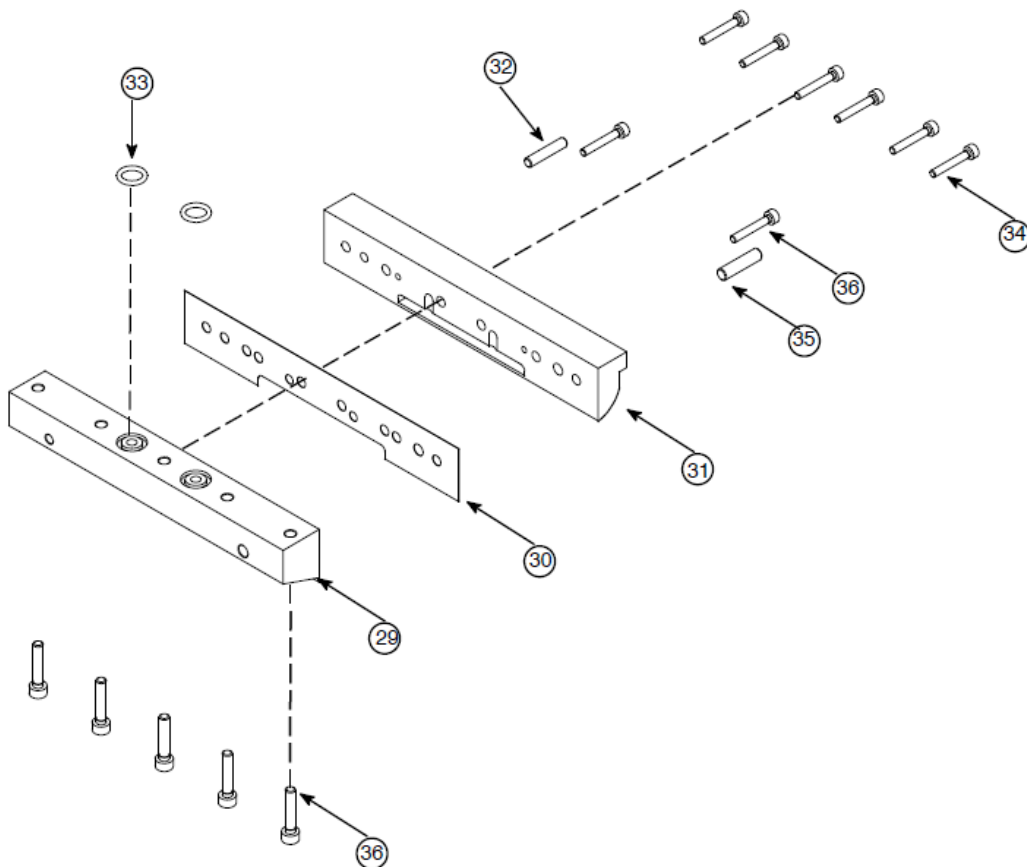
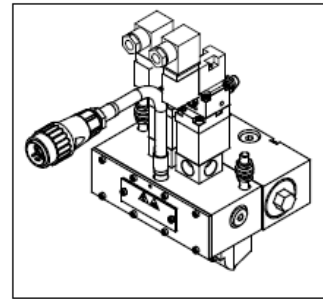


Illustration: APEX 150mm Extruder Assembly PN 111085

**8.1.9 APEX 190mm Service Block Assembly, PN 111289**

Item No.	Part Number	Description	Quantity
1	N07354	Screw M4x10mm	1
2	N04302	Washer, Lock, Ext T #10	1
3	N04268	Terminal Ring, 22-16, #10	1
4	N03812	O-ring, -125	1
5	N00183	O-ring, -016	1
6	001U002	Lube, Dow Corning, 112 (not shown)	A/R*
7	808285	Screw M4x65mm	4
8	803960	Heater 10 x 40mm, 240V, 200W	4
9	110449	Block, Filter, Depres, B & A, D2	1
10	110982	Cover Plate 48mm x 1900mm	1
11	110981	Service Block, 190mm	1
12	110427	Module Assembly (Interchangeable, shown for reference only)	1
13	107881	Terminal Block, 2 Pos, Ceramic	1
14	107536	Screw M8x60mm	2
15	107324	Compound anti-seize (not shown)	A/R*
16	106321	Washer, Flat, M8	4
17	106303	Cap, Filter	1
18	106137	Screw M3x4mm	8
19	105060	Nut M8	4
20	104852	Screw M10x12	1
21	104228	Ferrule, Wire, 16 Awg, 2.7 (not shown)	4
22	103470	Screw M3x5mm	1
23	103347	Heater and Sensor Plate	1
24	101833	Screw 10-32 x 1/2 PH	1
25	101625	Fitting, Plug, 1/4 BSPP, Soc, Stl	5
26	101624	Fitting, Straight, 6 JIC x 1/4 BSPP	1
		<b><i>The following shown for reference only; see your order for specific Part Numbers.</i></b>	
27	106273	Filter Basket, 150 mesh (see your order for size)	1
	101247	Filter Basket, 100 mesh (optional) (see your order for size)	
28	103467	Cable Assembly, 240V, DCL	1

\* see separate drawing and/or bill of material.

A/R\* = As required.

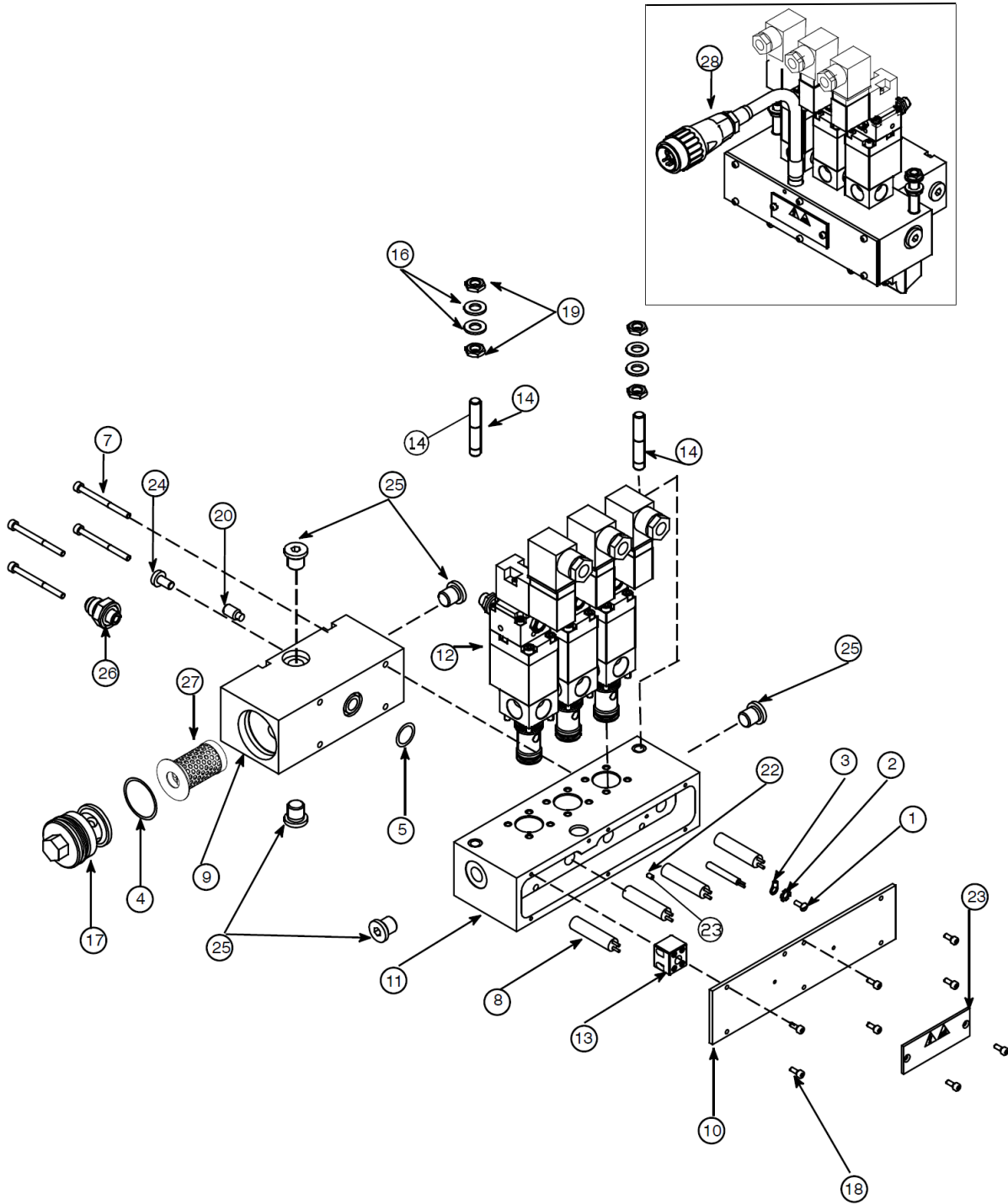


Illustration: APEX 190mm Service Block Assembly, PN 111289

**8.1.10 APEX 190mm Extruder Assembly PN 810007**

Item No.	Part Number	Description	Quantity
29	110988	Die Adapter, 190mm	1
30	810006	Pattern Shim, 190mm, 120mm pattern	5
31	810005	Die Plate, 190mm, 120mm pattern	1
32	808171	Dowel Pin, 4 x 20mm	1
33	N00178	O- ring, -011	3
34	107531	Screw M4x20mm	12
35	808172	Dowel Pin, 5 x 20mm	1
36	001U002	Dow Corning Lube 112 (not shown)	A/R*
37	107324	Compound anti-seize (not shown)	A/R*
38	110983	Blank Shim (not shown)	3

\* see separate drawing and/or bill of material.  
A/R\* = As required.

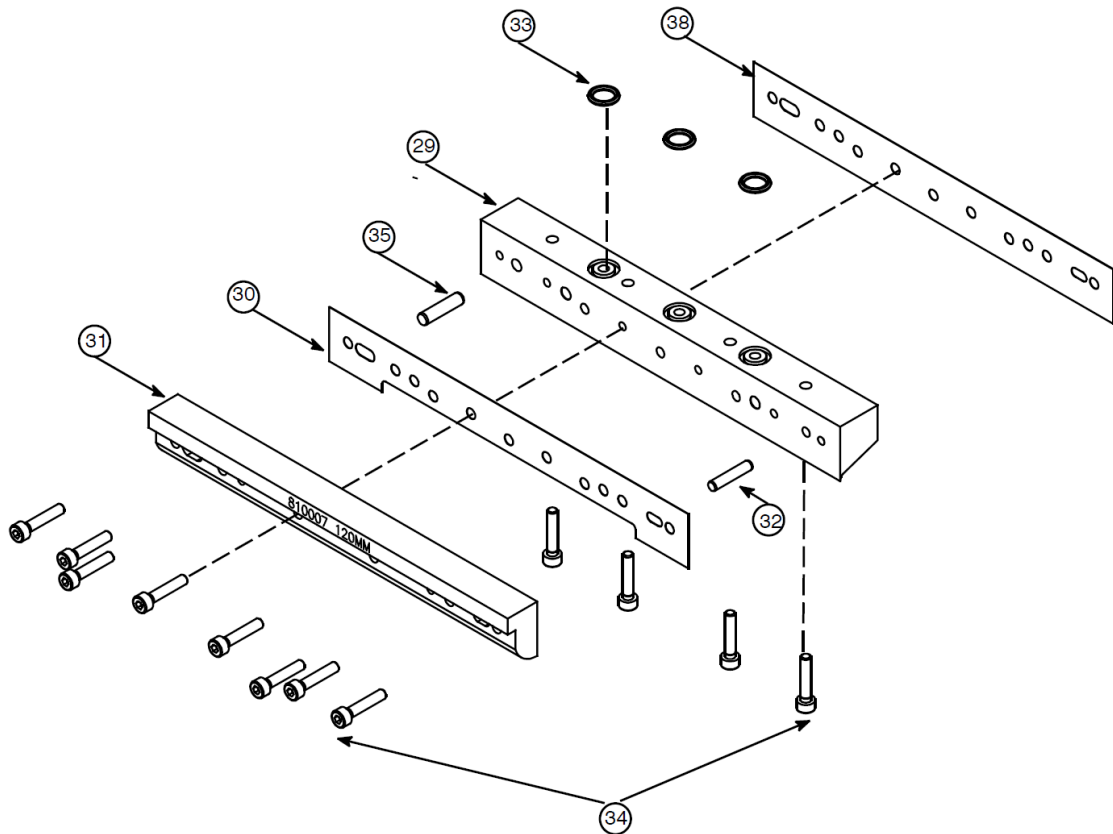
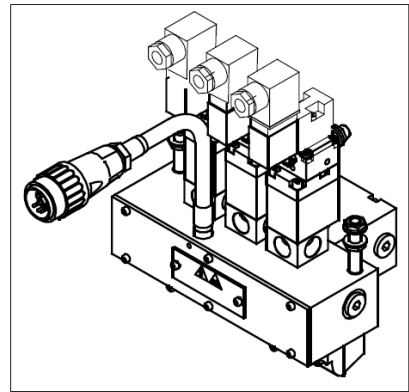


Illustration: APEX 190mm Extruder Assembly PN 810007

### 8.1.11 APEX 230mm Service Block Assembly, PN 821820

Item No.	Part Number	Description	Quantity
01	103347	Heater and Sensor Plate	1
02	001U002	Lube, Dow Corning, 112 (not shown)	A/R*
03	N04268	Terminal Ring, 22-16, #10	1
04	N04302	Washer, Lock, Ext T #10	1
05	821819	Service block 230mm	1
06	103470	Screw M3x5mm	1
07	803960	Heater 10 x 40mm, 240V, 200W	5
08	N07354	Screw M4x10mm	1
09	818558	E-cover plate 48x230mm	1
10	106173	Screw M3x4mm	8
11	104228	Ferrule, Wire, 16 Awg, 2.7 (not shown)	4
12	107324	Compound anti-seize (not shown)	A/R*
13	107881	Terminal Block, 2 Pos, Ceramic	1
14	105060	Nut M8	4
15	106321	Washer, Flat, M8	4
16	107536	Screw M8x60mm	2
17	811170	Screw M3x4mm	2
18	L00006	Insulating spacer .25 THK	2
19	810660	Filter block	1
		<b><i>The following parts are for reference only; see your order for specific Part Numbers.</i></b>	
	106303	Cap, Filter	1
	N03812	O-ring, -125	1
	106273	Filter Basket, 150 mesh (see your order for size)	1
	101247	Filter Basket, 100 mesh (optional) (see your order for size)	
	103467	Cable Assembly, 240V, DCL	1

\* see separate drawing and/or bill of material.

A/R\* = As required.

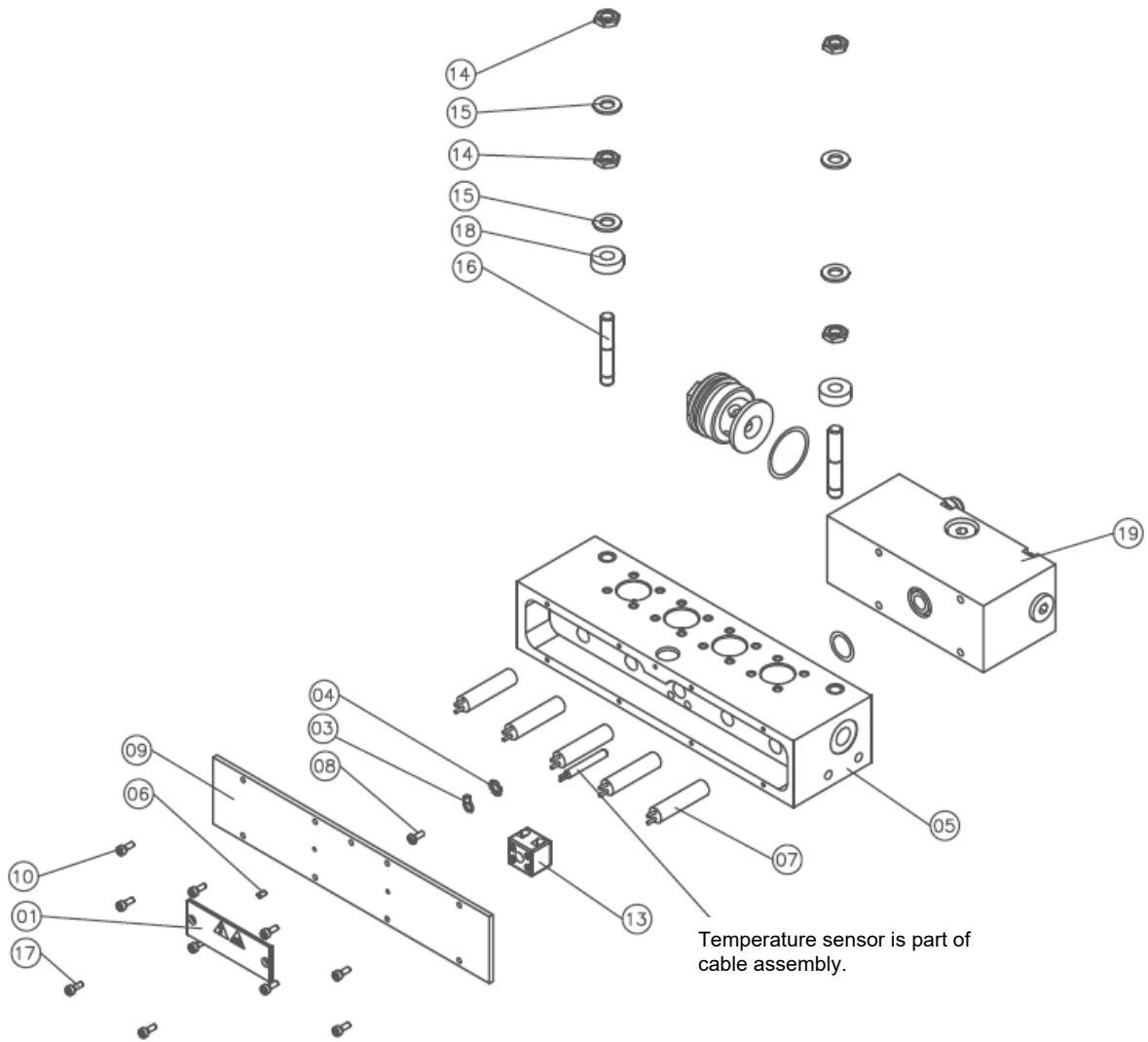


Illustration: APEX 230mm Service Block Assembly, PN 821820



**8.1.12 APEX 230mm Extruder Assembly PN 825708**

Item No.	Part Number	Description	Quantity
01	818560	Die Adapter, 230mm	1
02	825764	Pattern Shim, 230mm, 180mm pattern	3
03	825765	Die Plate, 230mm, 180mm pattern	1
04	815494	Dowel Pin, 4 x 20mm	1
05	N00178	O- ring, 011	5
06	107531	Screw M4x20mm	17
07	815495	Dowel Pin, 5 x 20mm	1
08	001U002	Dow Corning Lube 112 (not shown)	A/R*
09	107324	Compound anti-seize (not shown)	A/R*
10	821831	Blank Shim 230mm	3

\* see separate drawing and/or bill of material.  
A/R\* = As required.

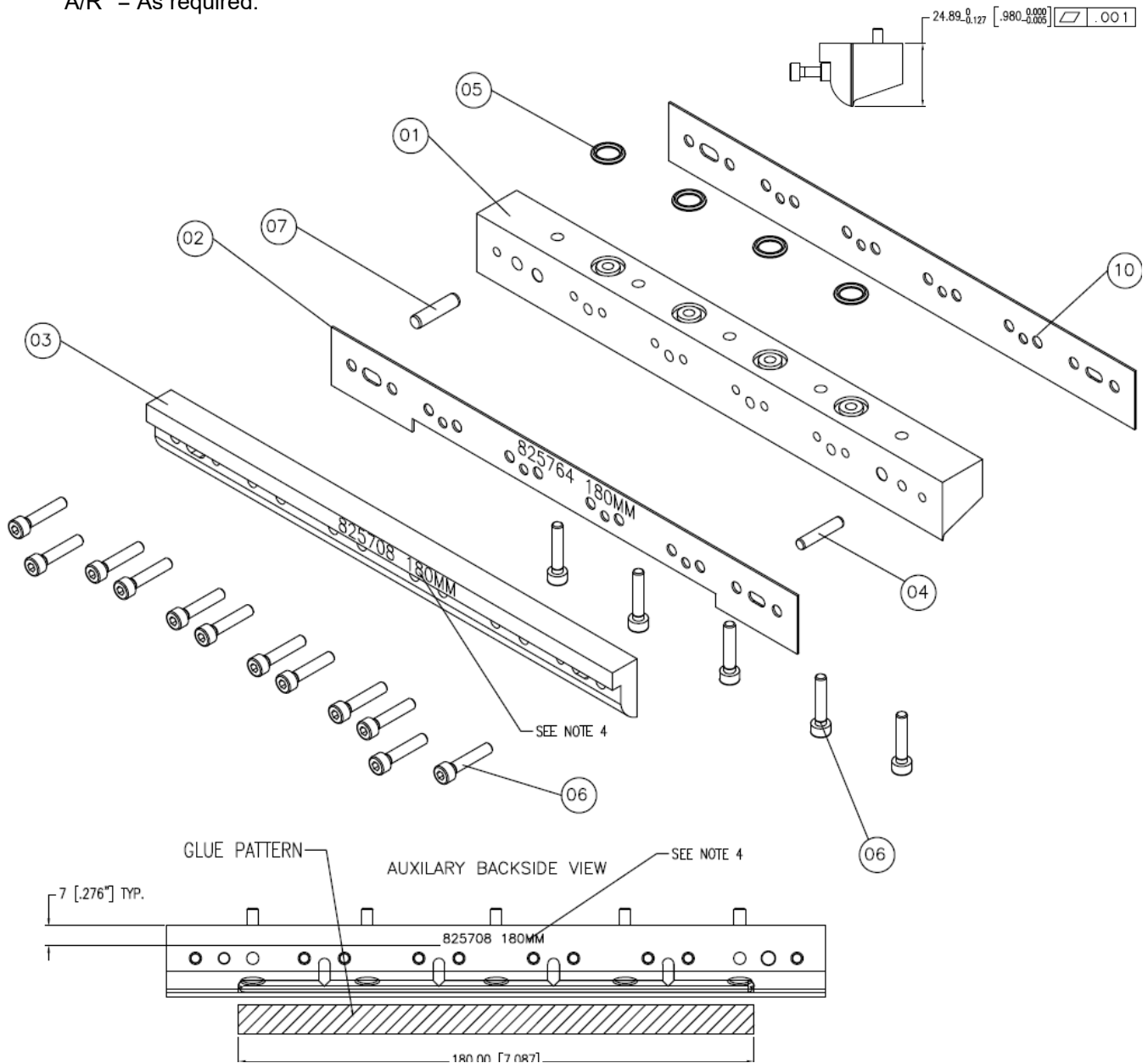


Illustration: APEX 230mm Extruder Assembly PN 825708

**8.1.13 APEX 270mm Service Block Assembly, PN 111087**

Item No.	Part Number	Description	Quantity
1	103347	Heater and Sensor Plate	1
2	110427	Module Assembly (Interchangeable, shown for reference only)	1
3	101625	Fitting, Plug, 1/4 BSPP, Soc, Stl	5
4	101624	Fitting, Straight, 6 JIC x 1/4 BSPP	3
5	110967	Service Block, 270mm	1
6	103470	Screw M3x5mm	1
7	803960	Heater 10 x 40mm, 240V, 200W	6
8	N07354	Screw M4x10mm	1
9	110979	Cover Plate 48 x 270mm	1
10	106137	Screw M3x4mm	10
11	104228	Ferrule, Wire, 16 Awg, 2.7 (not shown)	4
12	107324	Compound anti-seize (not shown)	A/R*
13	107881	Terminal Block, 2 Pos, Ceramic	1
14	105060	Nut M8	4
15	106321	Washer, Flat, M8	4
16	107536	Screw M8x60mm	2
17	N04302	Washer, Lock, Ext T #10	1
18	N04268	Terminal Ring, 22-16, #10	1
19	110449	Block, Filter, Depres, B & A, D2	1
20	001U002	Lube, Dow Corning, 112 (not shown)	A/R*
21	808285	Screw M4x65mm	4
22	N00183	O-ring, -016	1
23	104852	Screw M10x12	1
24	101833	Screw 10-32 x 1/2 PH	1
25	106303	Cap, Filter	1
26	N03812	O-ring, -125	1
		<b><i>The following shown for reference only; see your order for specific Part Numbers.</i></b>	
27	106273	Filter Basket, 150 mesh (see your order for size)	1
	101247	Filter Basket, 100 mesh (optional) (see your order for size)	
28	103467	Cable Assembly, 240V, DCL	1

\* see separate drawing and/or bill of material.

A/R\* = As required.

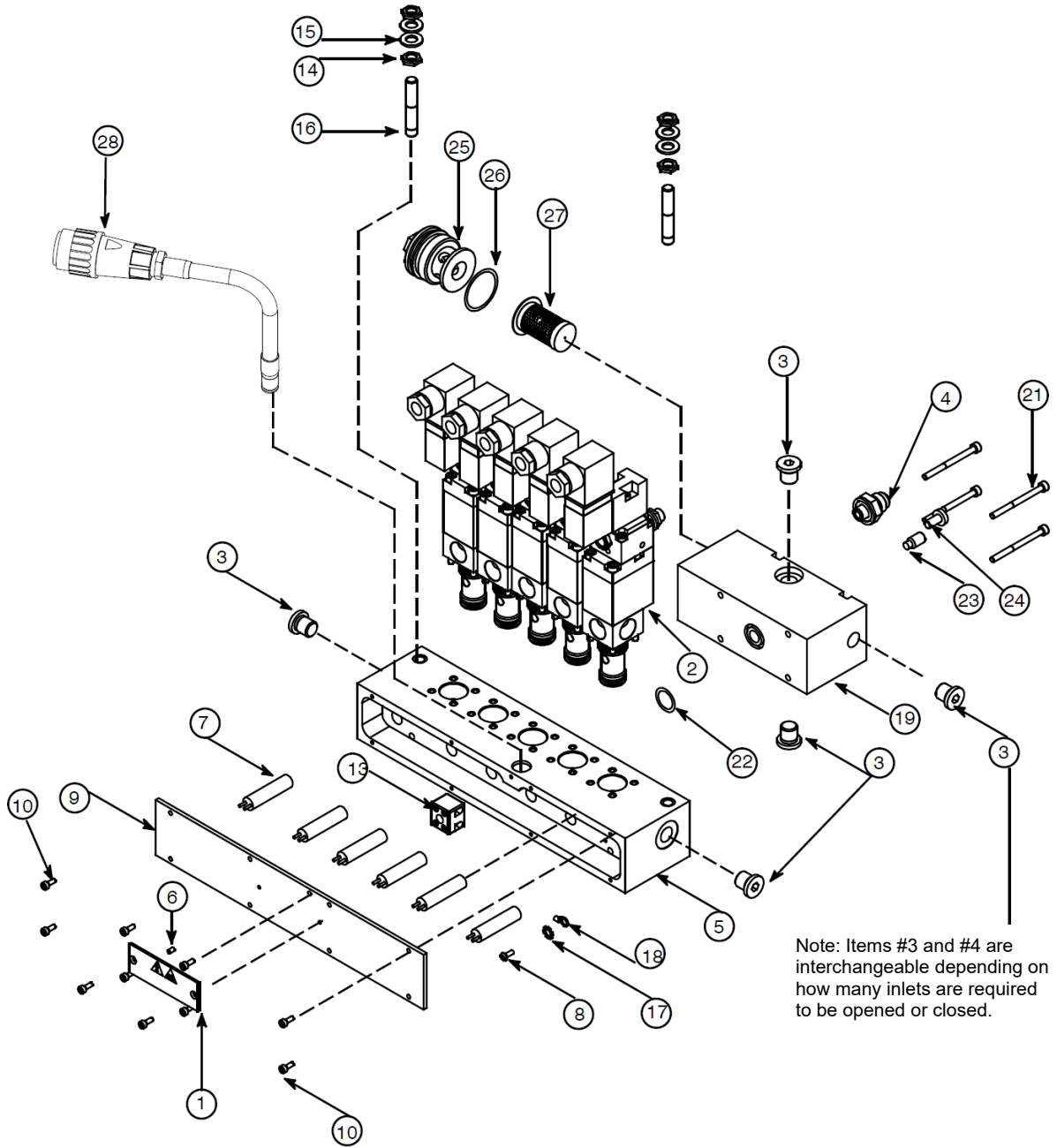


Illustration: APEX 270mm Service Block Assembly, PN 111087

**8.1.14 APEX 270mm Extruder Assembly PN 111090**

Item No.	Part Number	Description	Quantity
29	110971	Die Adapter, 270mm	1
30	111088	Pattern Shim, 270mm, 200mm pattern	5
31	111089	Die Plate, 270mm, 200mm pattern	1
32	808171	Dowel Pin, 4 x 20mm	1
33	N00178	O- ring, -011	5
34	107531	Screw M4x20mm	16
35	808172	Dowel Pin, 5 x 20mm	1
36	001U002	Dow Corning Lube 112 (not shown)	A/R*
37	107324	Compound anti-seize (not shown)	A/R*
38	110968	Blank Shim (not shown)	3

\* see separate drawing and/or bill of material.  
A/R\* = As required.

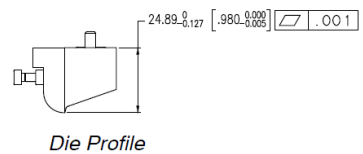
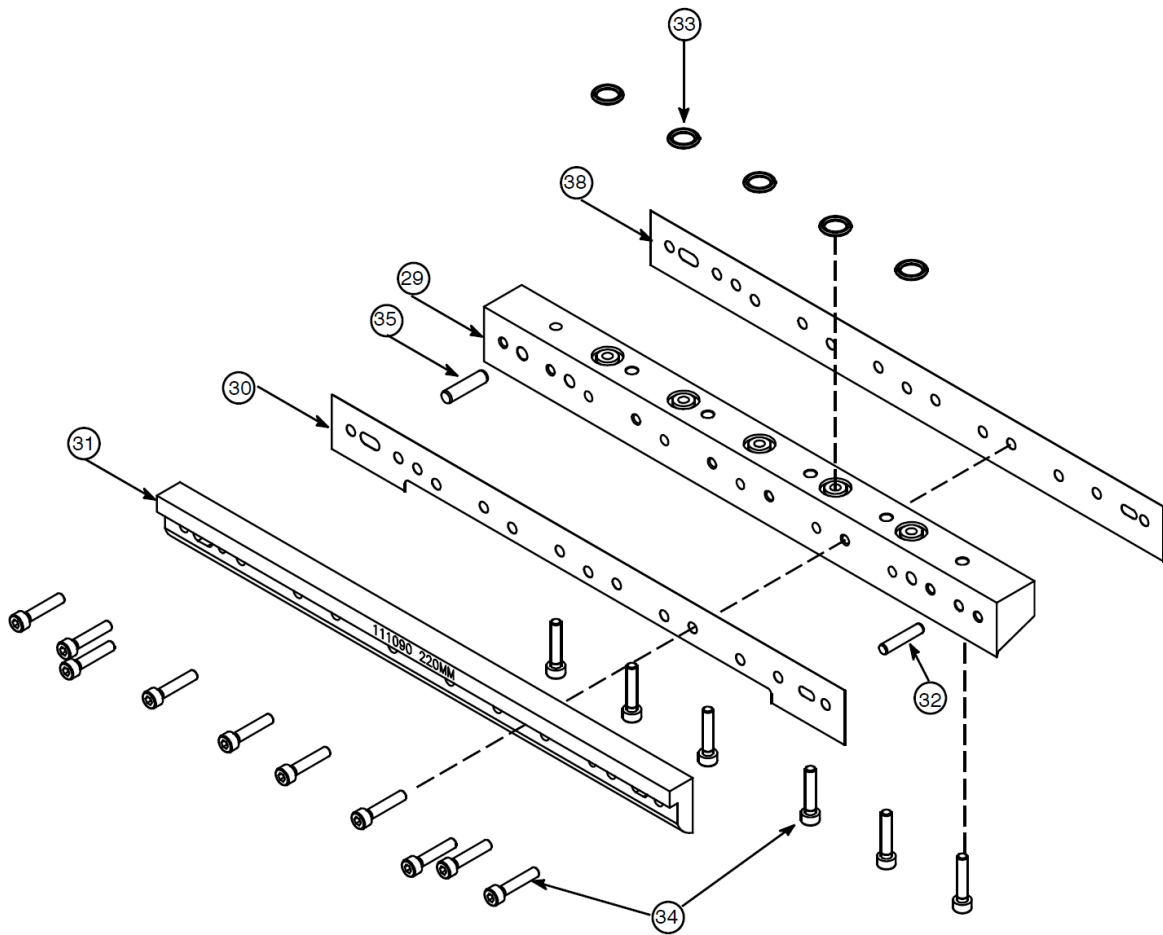


Illustration: APEX 270mm Extruder Assembly PN 111090

### 8.1.15 APEX 390mm Service Block Assembly, PN 111318

Item No.	Part Number	Description	Quantity
1	N07354	Screw M4x10mm	2
2	N04302	Washer, Lock, Ext T #10	2
3	N04268	Terminal Ring, 22-16, #10	2
4	N03812	O-ring, -125	1
5	N00183	O-ring. -016	1
6	001U002	Lube, Dow Corning, 112 (not shown)	A/R*
7	808285	Screw M4x65mm	4
8	803960	Heater 10 x 40mm, 240V, 200W	8
9	110449	Block, Filter, Depres, B & A, D2	1
10	111322	Cover Plate 48 x 390mm	1
11	111319	Service Block, 390mm	1
12	110427	Module Assembly (Interchangeable, shown for reference only)	8
13	107881	Terminal Block, 2 Pos, Ceramic	2
14	107536	Set screw M8x60mm	2
15	107324	Compound anti-seize (not shown)	A/R*
16	106321	Washer, Flat, M8	4
17	106303	Cap, Filter	1
18	106137	Screw M3x4mm	12
19	105060	Nut M8	4
20	104852	Set screw M10x12	1
21	104228	Ferrule, Wire, 16 Awg, 2.7 (not shown)	8
22	103470	Set screw M3x5mm	2
23	103347	Heater and Sensor Plate	1
24	101833	Screw 10-32 x 1/2	1
25	101625	Fitting, Plug, 1/4 BSPP, Soc, Stl	5
26	101624	Fitting, Straight, 6 JIC x 1/4 BSPP	1
		<b>The following shown for reference only; see your order for specific Part Numbers.</b>	
27	106273	Filter Basket, 150 mesh (see your order for size)	1
	101247	Filter Basket, 100 mesh (optional) (see your order for size)	
28	103467	Cable Assembly, 240V, DCL	1

\* see separate drawing and/or bill of material.

A/R\* = As required.

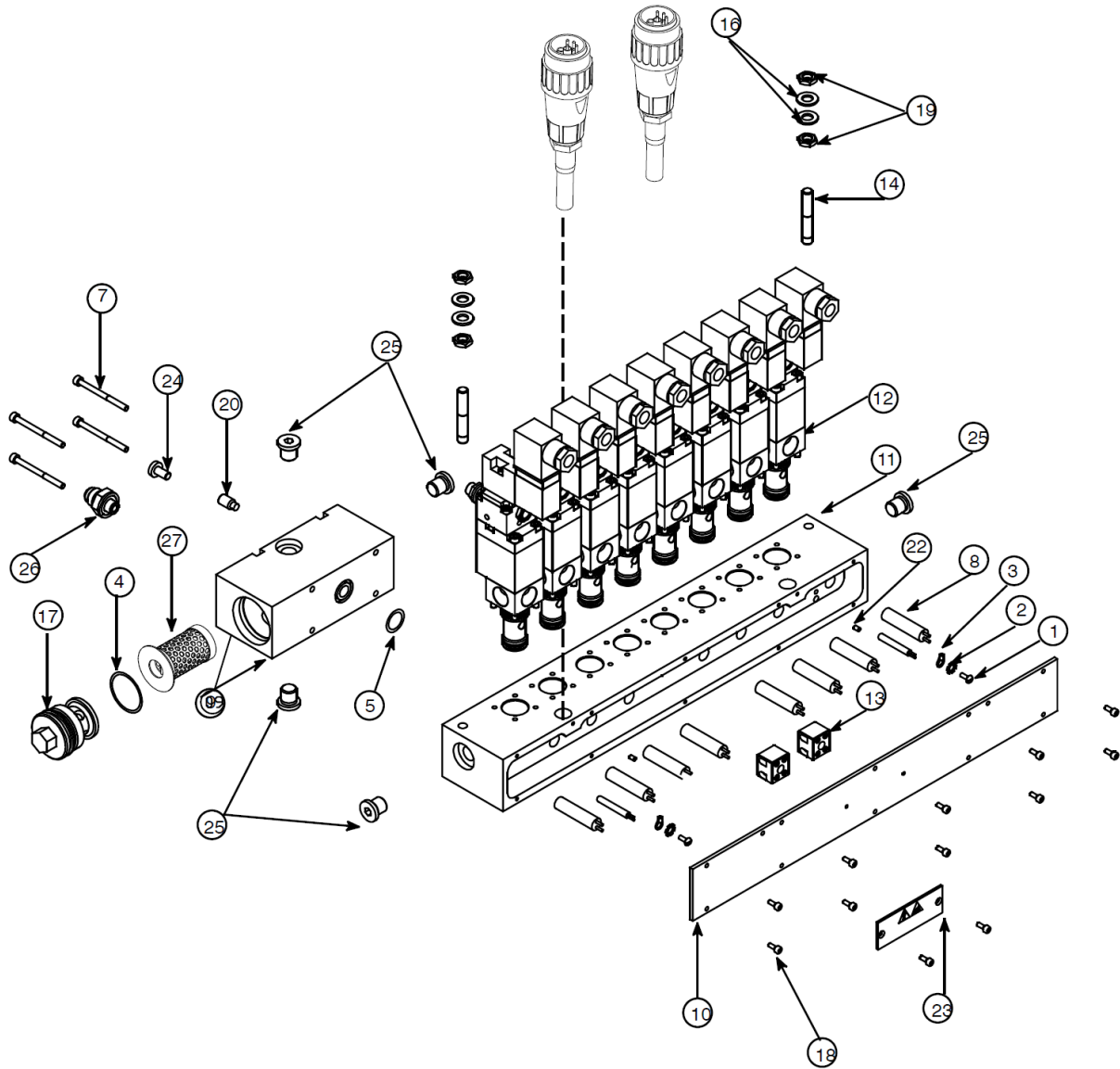


Illustration: APEX 390mm Service Block Assembly, PN 111318

**8.1.16 APEX 390mm Extruder Assembly PN 111324**

Item No.	Part Number	Description	Quantity
01	N00178	O-ring, -011	8
02	001U002	Lube, Dow Corning 112 (not shown)	A/R*
03	808172	Dowel Pin, 5 x 20mm	1
04	808171	Dowel Pin, 4 x 20mm	1
05	107531	Screw M4x20mm	23
06	111321	Die Plate, 390mm, 320mm pattern	1
07	107324	Compound anti-seize (not shown)	A/R*
08	111323	Blank Shim	3
09	111320	Die Adapter, 390mm	1
10	810557	Pattern shim 390mm, 320mm pattern	5

\* see separate drawing and/or bill of material.

A/R\* = As required.

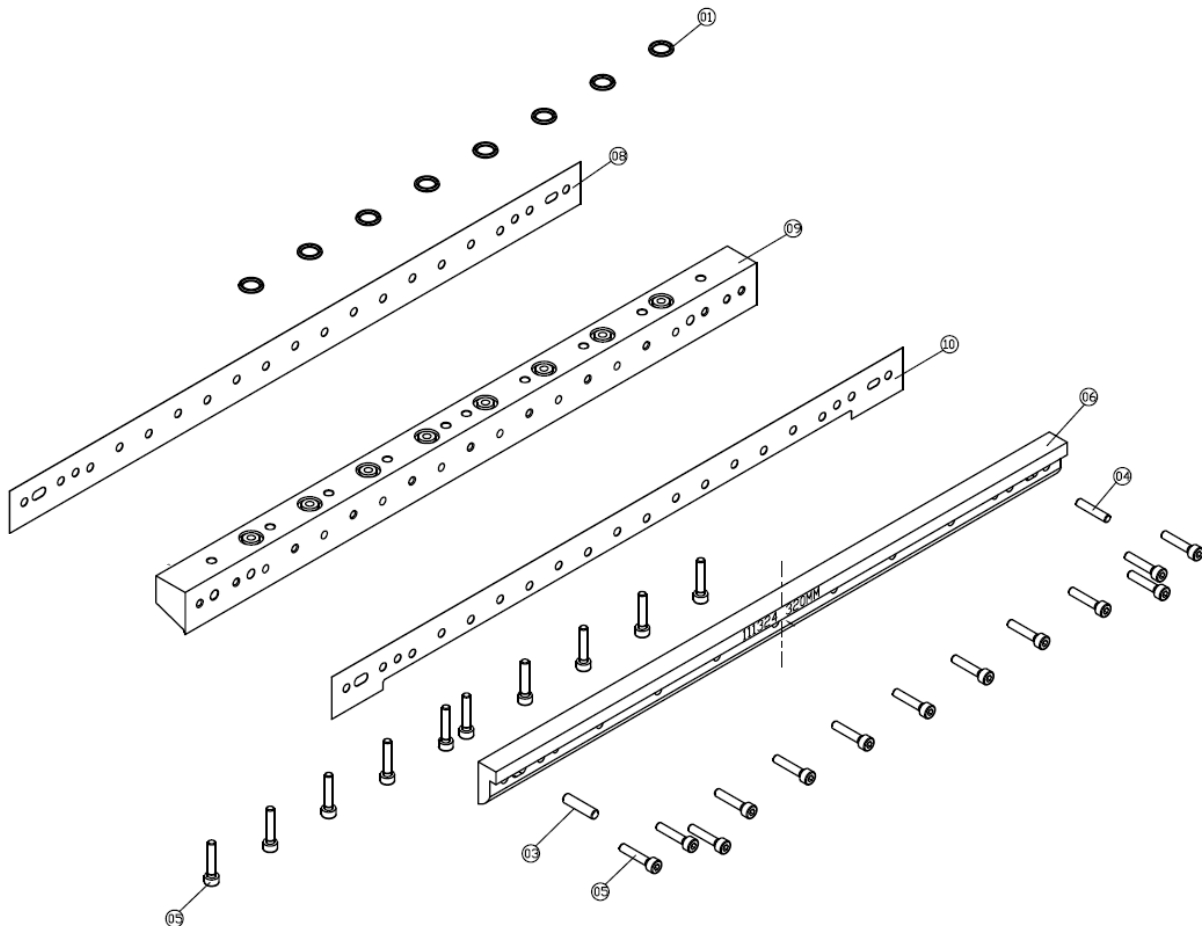


Illustration: APEX 390mm Extruder Assembly PN 111324

**8.1.17 APEX 470mm Service Block Assembly, PN 810489**

Item No.	Part Number	Description	Quantity
1	N07354	Screw M4x10mm	2
2	N04302	Washer, Lock, Ext T #10	2
3	N04268	Terminal Ring, 22-16, #10	2
4	N03812	O-ring, -125	1
5	N00183	O-ring. -016	1
6	001U002	Lube, Dow Corning, 112 (not shown)	A/R*
7	808285	Screw M4x65mm	4
8	803960	Heater 10 x 40mm, 240V, 200W	10
9	110449	Block, Filter, Depres, B & A, D2	1
10	810488	Cover Plate 48 x 470mm	1
11	810487	Service Block, 470mm	1
12	110427	Module Assembly (Interchangeable, shown for reference only)	9
13	107881	Terminal Block, 2 Pos, Ceramic	2
14	107536	Set screw M8x60mm	2
15	107324	Compound anti-seize (not shown)	A/R*
16	106321	Washer, Flat, M8	4
17	106303	Cap, Filter	1
18	106137	Screw M3x4mm	10
19	105060	Nut M8	4
20	104852	Set screw M10x12	1
21	104228	Ferrule, Wire, 16 Awg, 2.7 (not shown)	4
22	103470	Set screw M3x5mm	2
23	103347	Heater and Sensor Plate	1
24	101833	Screw 10-32 x 1/2	1
25	101625	Fitting, Plug, 1/4 BSPP, Soc, Stl	7
26	101624	Fitting, Straight, 6 JIC x 1/4 BSPP	1
		<b><i>The following shown for reference only; see your order for specific Part Numbers.</i></b>	
27	106273	Filter Basket, 150 mesh (see your order for size)	1
	101247	Filter Basket, 100 mesh (optional) (see your order for size)	
28	103467	Cable Assembly, 240V, DCL	1
29		Temperature sensor (included in the cable assembly)	1

\* see separate drawing and/or bill of material.

A/R\* = As required.





**8.1.18 APEX 470mm Extruder Assembly PN 810496**

Item No.	Part Number	Description	Quantity
01	N00178	O-ring, -011	9
02	001U002	Lube, Dow Corning 112 (not shown)	A/R*
03	808172	Dowel Pin, 5 x 20mm	1
04	808171	Dowel Pin, 4 x 20mm	1
05	107531	Screw M4x20mm	22
06	810495	Die Plate, 470mm, 420mm pattern	1
07	107324	Compound anti-seize (not shown)	A/R*
08	810490	Blank shim 470mm	5
09	810492	Die Adapter, 470mm	1
10	810494	Pattern shim 470mm, 420mm pattern	3

A/R\* = As required.

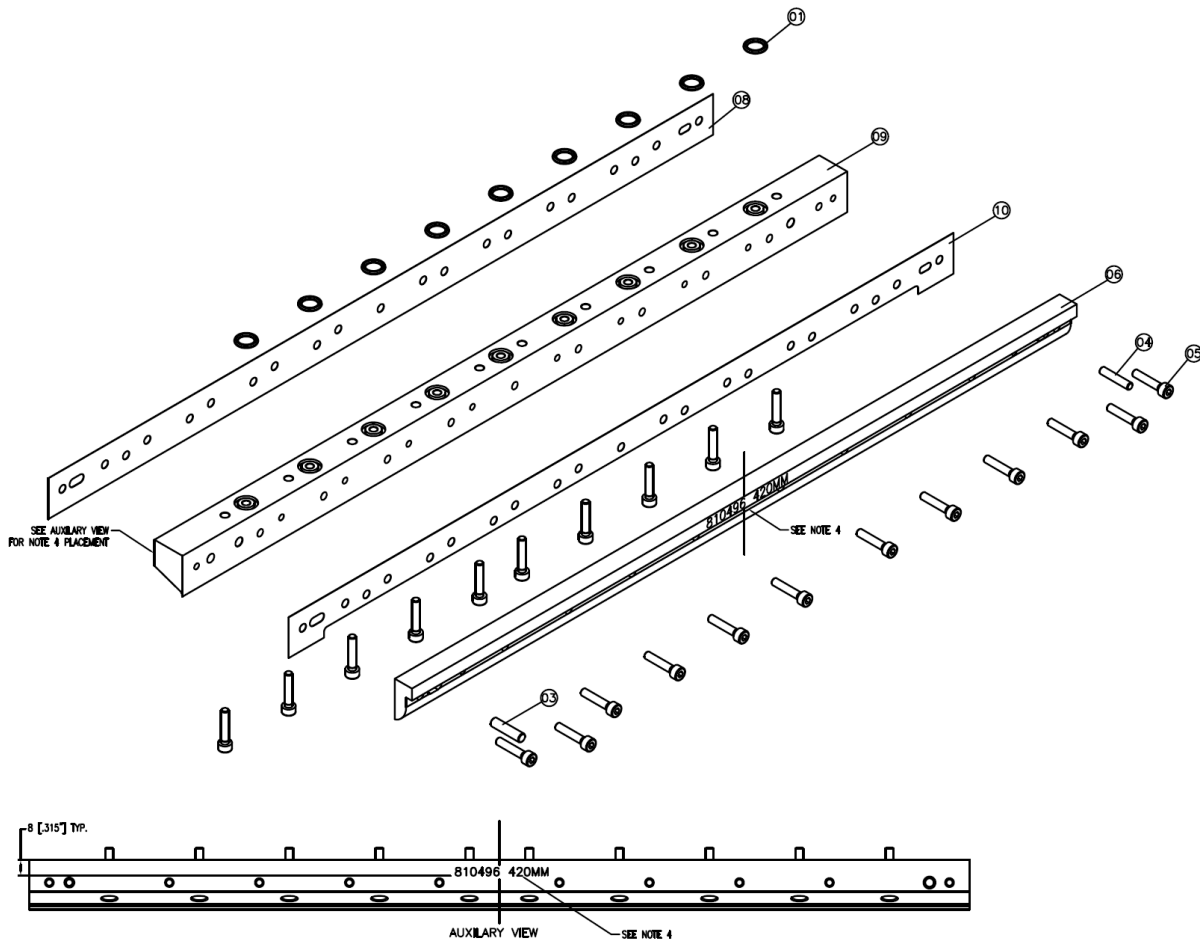


Illustration: APEX 470mm Extruder Assembly PN 810496

## 8.2 APEX Modules

### 8.2.1 APEX Module, with MAC solenoid valve

Item No.	Part Number	Description
1	110427	APEX Module, Stem stroke 0.3 mm, <b>with MAC Solenoid valve 24V 9.3W (PN 810028)</b>
1	814049	APEX Module, High-Flow, Stem stroke 0.6 mm, <b>with MAC Solenoid valve 24V 9.3W (PN 810028)</b> Fitting 1/8 UNI Straight Male (PN 072X529)

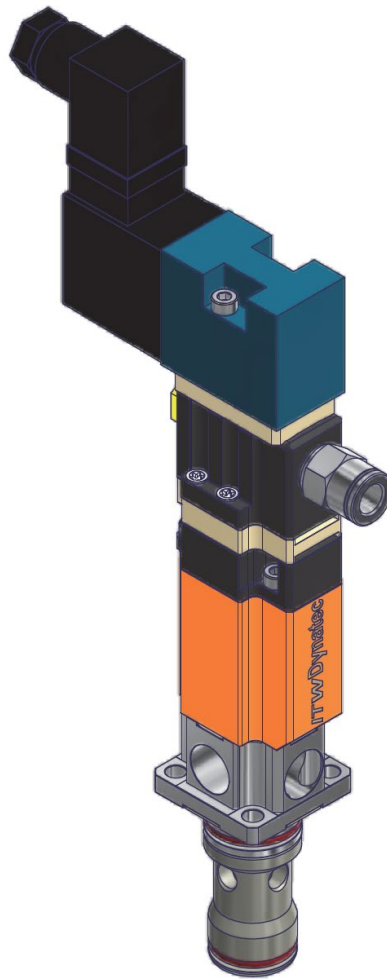
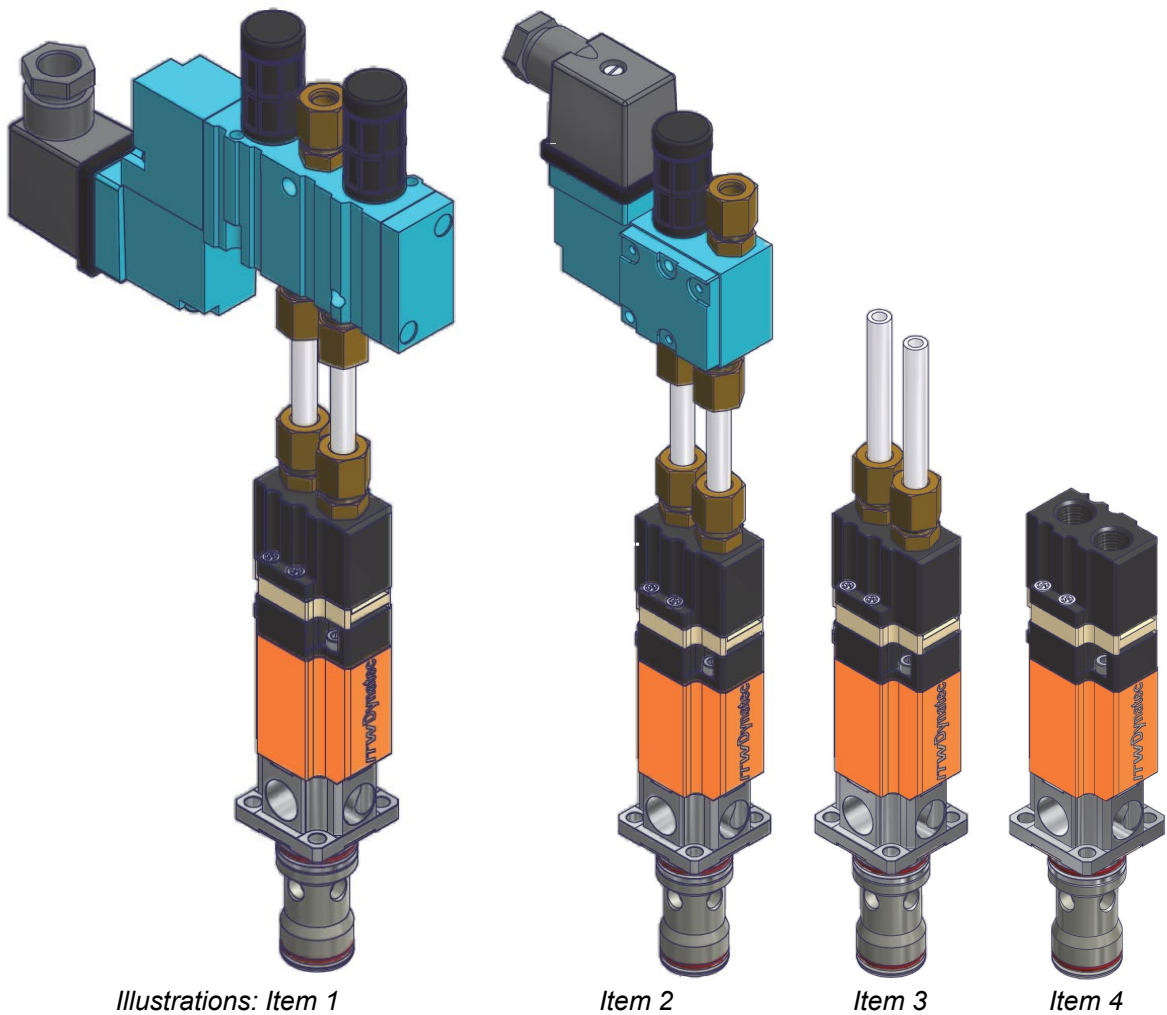


Illustration: Item 1

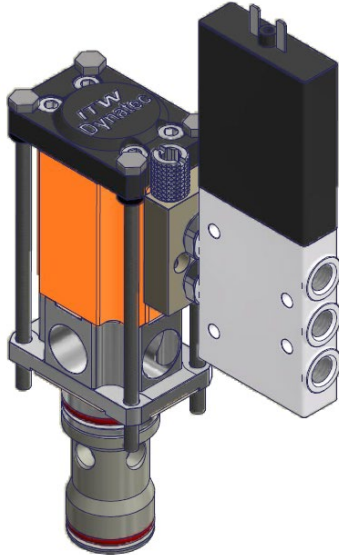
**8.2.2 APEX Module, with MAC solenoid valve and air tubes**

Item No.	Part Number	Description
1	819214	APEX Module, Stem stroke 0.3 mm, optional with either - 400 series MAC Solenoid valve 24V, 4,24,1/4,JB (PN 108968), or - 400 series MAC Solenoid valve 24V, 4,24, 8mm air fitting, with LED cap (PN 661107)
2	810821	APEX Module, Stem stroke 0.3 mm, with MAC Solenoid valve 24VDC, 4,02,1/8,HIR (PN 100054)
2	811137	APEX Module, Stem stroke 0.3 mm, with MAC Solenoid valve, 4,12,1/8,HIR, 120VAC/60HZ; 110VAC/50HZ (PN 106193)
2	815199	APEX Module, High-Flow, Stem stroke 0.6 mm, with MAC Solenoid valve, 4,12,1/8,HIR, 120VAC/60HZ; 110VAC/50HZ (PN 106193)
3	810659	APEX Module, Stem stroke 0.3 mm No solenoid valve
4	814050	APEX Module, High-Flow, Stem stroke 0.6 mm No solenoid valve

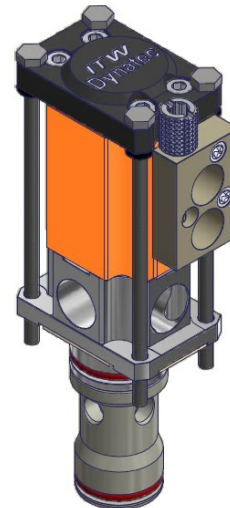


### 8.2.3 APEX Module, (rectangle stand-off), with Festo solenoid valve

Item No.	Part Number	Description
1	820802	APEX Module, Stem stroke 0.3 mm, <b>with 24 VDC Festo high-speed solenoid valve, 6mm tube fitting, (PN 115055)</b>
2	820868	APEX Module, Stem stroke 0.3 mm, No solenoid valve



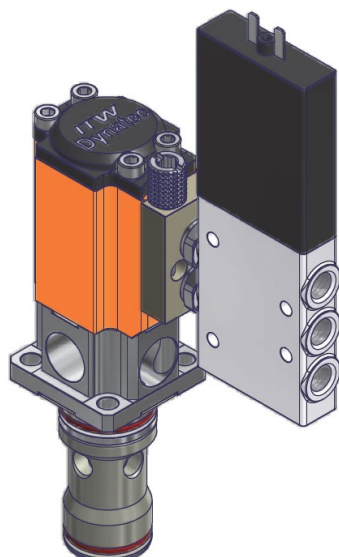
Illustrations: Item 1



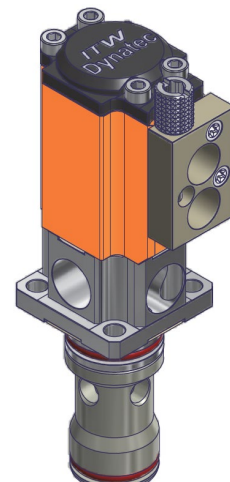
Item 2

### 8.2.4 APEX Module, (square stand-off), with Festo solenoid valve

Item No.	Part Number	Description
1	815833	APEX Module, High-Flow, Stem stroke 0.6 mm, <b>with 24 VDC Festo high-speed solenoid valve, 1/4 tube fitting, (PN 115056)</b>
2	815093	APEX Module, Stem stroke 0.3 mm, No solenoid valve
2	815832	APEX Module, High-Flow, Stem stroke 0.6 mm, No solenoid valve



Illustrations: Item 1



Item 2

### 8.3 Block-Off Modules

#### 8.3.1 Block-Off Module, square stand-off, PN 809956

Item No.	Part Number	Description	Quantity
1	808269	O-ring 14x2mm	1
2	808268	O-ring 16x2mm	1
3	809955	Module plug	1
4	102446	Screw M4x10mm	4

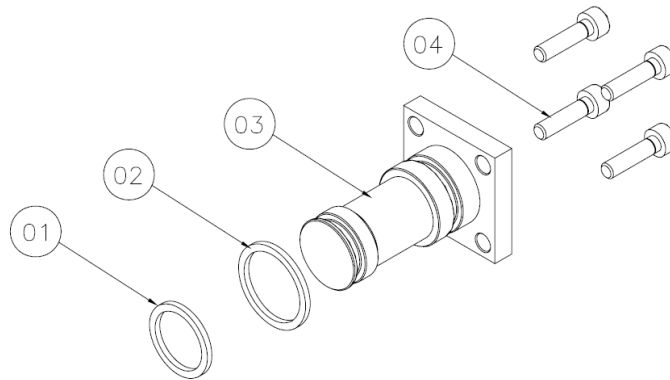


Illustration: Block-Off Module, square base, PN 809956

#### 8.3.2 Block-Off Module, rectangle stand-off, spacing 25mm, PN 823360

Item No.	Part Number	Description	Quantity
1	808269	O-ring 14x2mm	1
2	808268	O-ring 16x2mm	1
3	823359	Module plug	1
4	815723	Screw M3x12mm	4

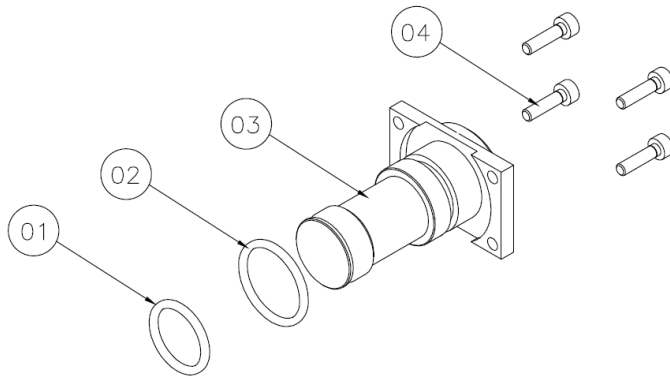


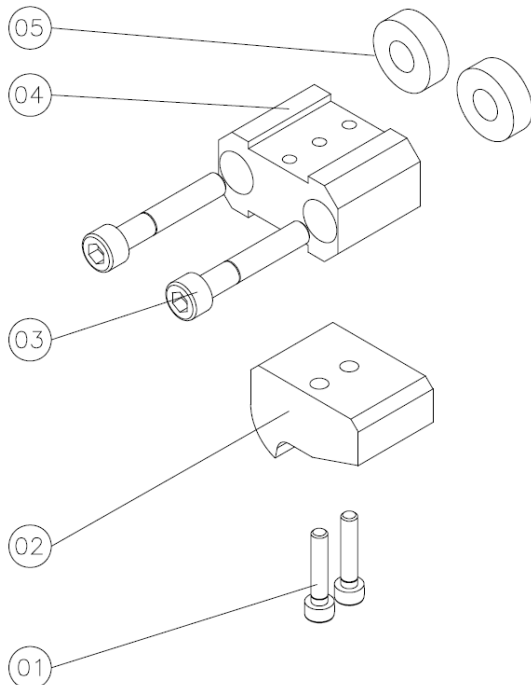
Illustration: Block-Off Module, rectangle base, spacing 25mm, PN 823360

## 8.4 Standard, Optional APEX Wing Assemblies

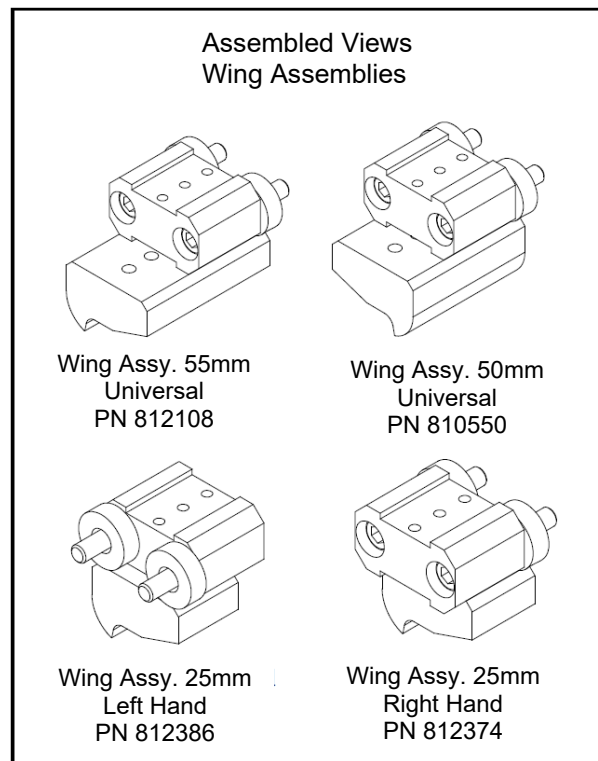
Item No.	Part Number	Description	Quantity
	<b>812386</b>	<b>Wing Assy. 25mm Left Hand</b>	1
	<b>812374 *</b>	<b>Wing Assy. 25mm Right Hand</b>	1
	<b>810550</b>	<b>Wing Assy., 50mm Universal</b>	1
	<b>812108</b>	<b>Wing Assy., 55mm Universal</b>	1
		<i>An assembly consists of:</i>	
1	107531	Screw M4x20mm	2
2	812385	Wing, 25mm, Left Hand	1
	812373	Wing, 25mm, Right Hand	1
	810549	Wing, 50mm, Universal	1
	812107	Wing, 55mm, Universal	1
3	106512	Screw, M6-1x35	2
4	810548	Wing, Mount block	1
5	L00006	Insul/ Spacer	2

\* exploded-view shown below.

Note: Universal wings can be oriented as either left- or right-handed. Typically, a pair of wing assemblies are mounted on an Apex applicator in order to stabilize the substrate.



*Exploded-view example  
PN 812374 Wing Assy. 25mm Right Hand*







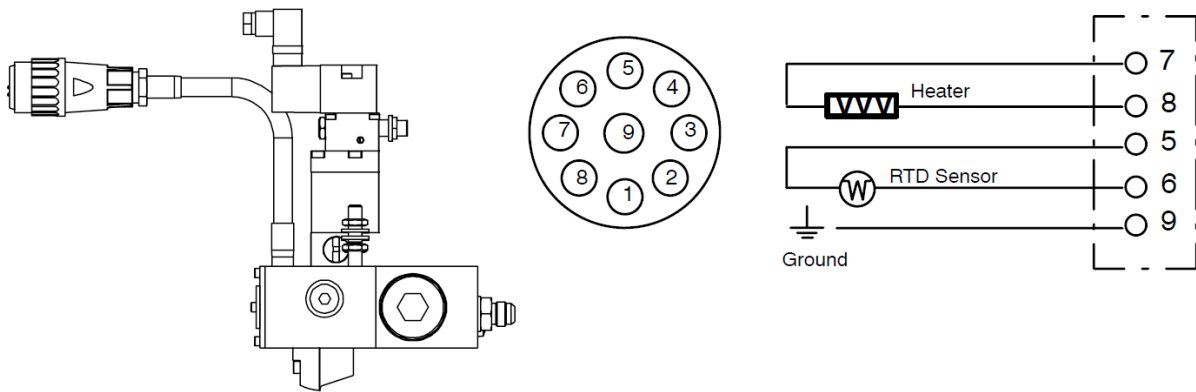
# Chapter 9

## Schematics

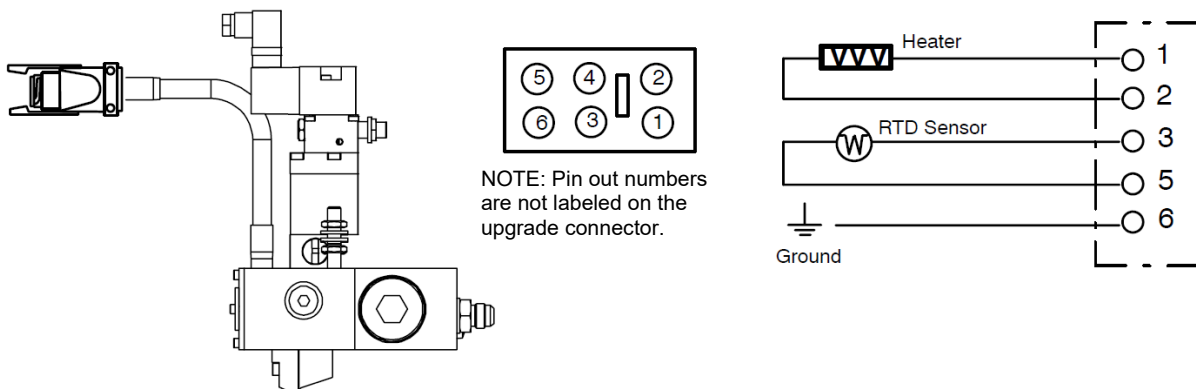
### 9.1 Pin Connectors & Electrical Schematics

Note: Pin connectors are viewed from the exposed end. Pins not shown on schematics are not used.

#### 9.1.1 DynaControl/Dynamini or PLC (Platinum RTD) Control Scheme, PN 103117



#### 9.1.2 Upgrade (Nickel RTD) Control Scheme PN 104551





# Chapter 10

## Appendix

### 10.1 Solenoid Valve Configurations, Schematics & Setup

This Appendix covers the pneumatic setup of the solenoid valves used to actuate the adhesive modules. A coalescing filter/ regulator kit (PN 100055) is available to provide regulated, oil-free air to the solenoid valves. The kit also contains the necessary fittings and tubing to configure the kit for each particular solenoid valve.

Some typical solenoid valve setups are shown on the following pages. While the most commonly used solenoid valves are shown, other valves not listed here may be used if required for the particular application. In general, however, the setups shown here can be applied to any solenoid valve. If there are questions about a valve that was supplied with the applicator, and it is not shown here, consult ITW Dynatec.

The Appendix is divided into sections for easy reference:

<b>Section 1</b>	PN 100054	24 VDC MAC solenoid valve, 4,02,1/8,HIR
<b>Section 2</b>	PN 810028	24 V MAC solenoid valve 9.3W
<b>Section 3</b>	PN 115055	24 VDC Festo high-speed solenoid valve, 6mm tube fitting
	PN 115056	24 VDC Festo high-speed solenoid valve, 1/4 tube fitting
		Choice of 2.5m, 5m, 10m cable or no cable
<b>Section 4</b>	PN 100055	Component Illustration: 100055 Air Control Kit
	PN 100380	Component Illustration: 100380 Air Control Kit

### 10.2 Air Filter/ Regulator Installation Notes

1. Compressed air for applicator head operation should be clean, dry and oil free.
2. In general, operation of more than one applicator head from a single air control kit is not recommended, because applicator response time may be increased and synchronization may be more difficult.
3. Install the filter/ regulator so that the bowl drains are easily accessible for servicing and the regulator knob is accessible for adjustments.
4. Use a minimum of 1/4" OD tubing to make connections.
5. If air tubing is routed close to the head due to space constraints, high temperature TFE tubing should be used to avoid tubing damage.

### 10.3 Section 1, 24 VDC MAC Solenoid valve, 4,02,1/8,HIR, PN 100054

**Description**

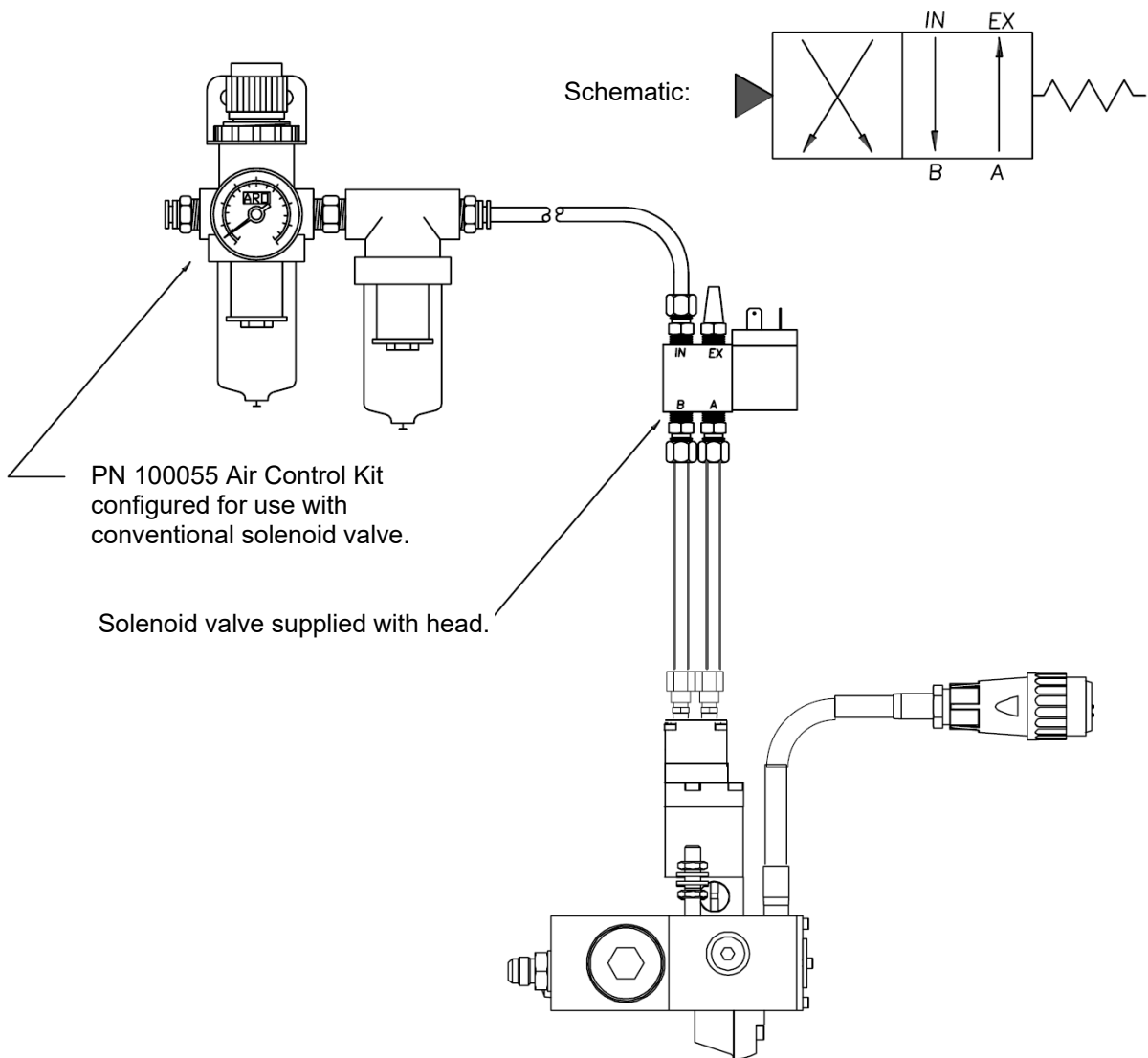
Direct acting poppet valve, 4-way, 1/8 NPT ports, with non-locking recessed manual operator.

**Connections**

IN	Inlet
EX	Exhaust
A	Open side of module
B	Close side of module

**Typical Setup**

Apply full air pressure (80-90 psi) to IN port of solenoid valve. Use air control kit PN 100055, configured as shown below.



## 10.4 Section 2, 24 V MAC Solenoid valve 9.3W, PN 810028

### Description

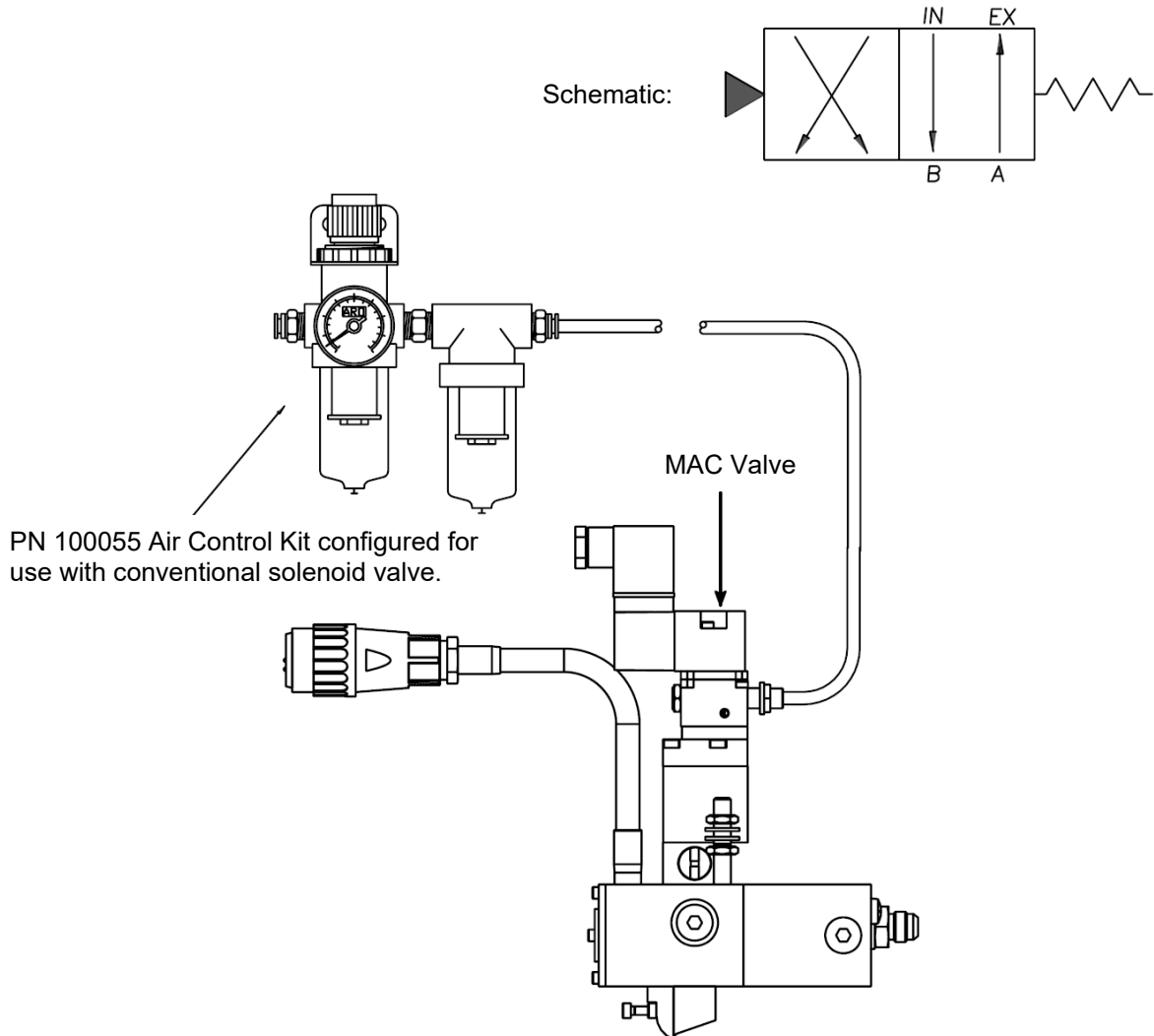
Direct acting poppet valve, 4-way, surface mount, with non-locking recessed manual operator.

### Connections

Within valve.

### Typical Setup

Apply full air pressure (80-90 psi) to IN port of solenoid valve. Use air control kit PN 100055, configured as shown below.



## 10.5 Section 3, 24 VDC Festo high-speed solenoid valve, PN 115055 & 115056

### Description

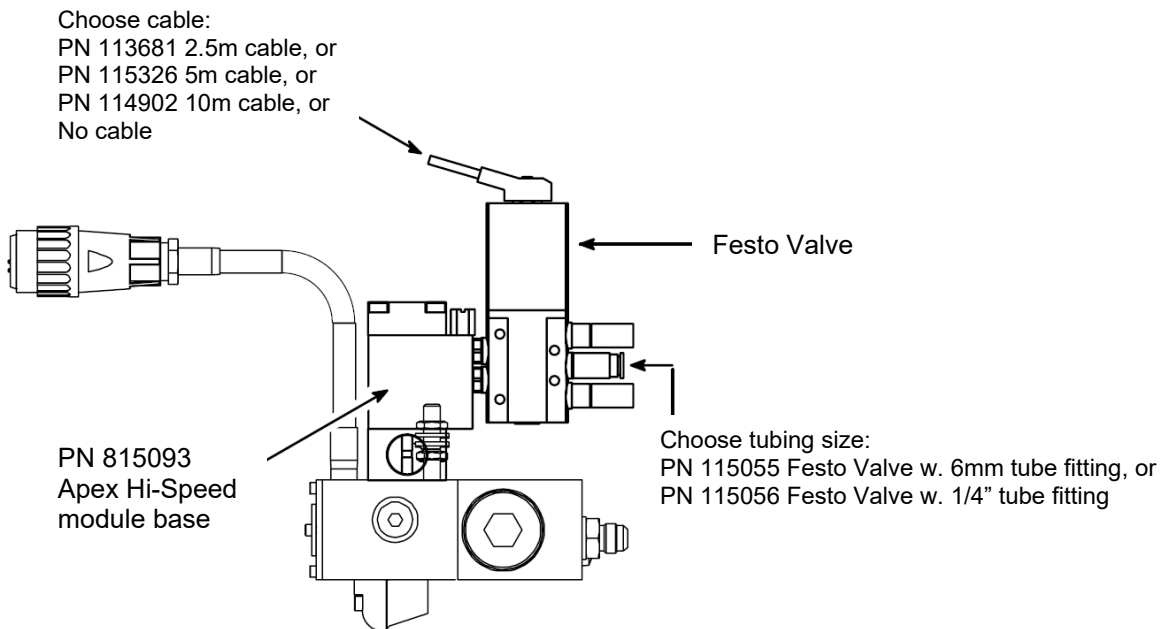
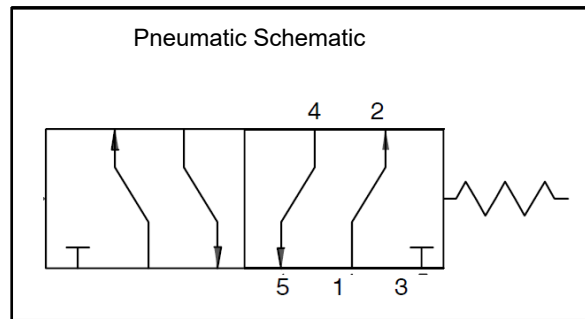
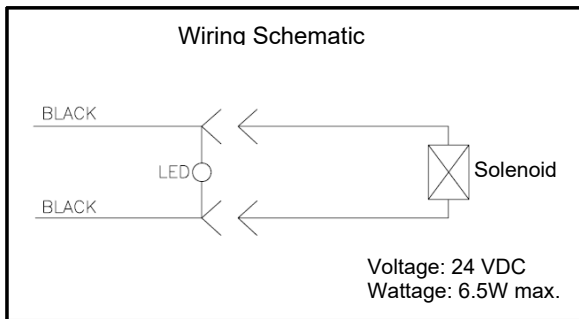
Direct-acting spool valve, 4-way, 24 VDC operation with M7 ports. Solenoid valve is configured to connect directly to the module. It is not setup for use as an in-line solenoid.

### Connections

Port 1	Inlet
Port 2	Close side of module
Port 3	Exhaust
Port 4	Open side of module
Port 5	Exhaust

### Typical Setup

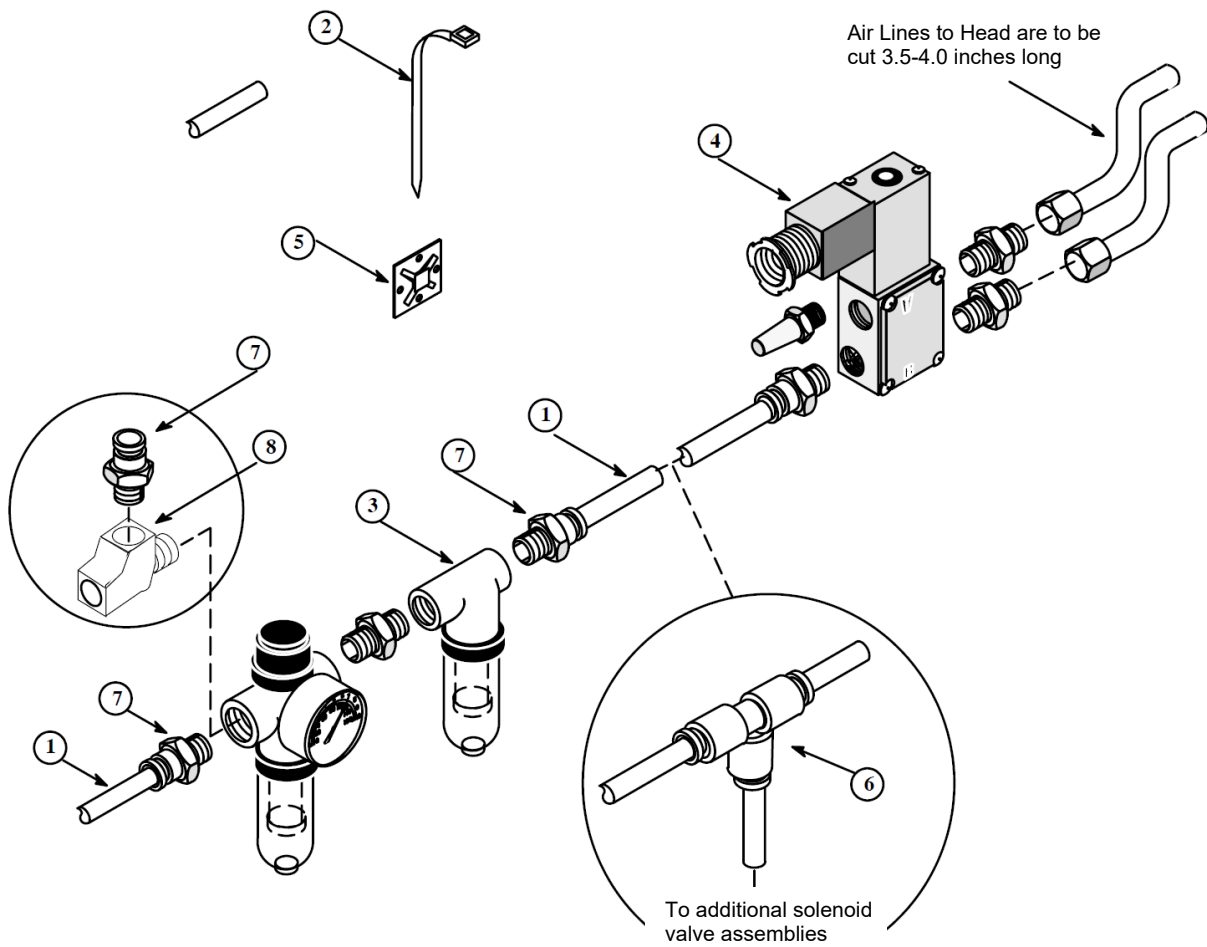
Apply full air pressure (80-90 psi) to Port 1 of solenoid valve.



### 10.6 Section 4, Air Control Kit PN 100055, Component Illustration

Item No.	Part Number	Description	Quantity
1	N06438	Nylon Tubing, .250 Dia.	10'
2	N00318	Cable Tie, .09 x 3.62 Lg	10
3	100380 *	Filter/Regulator Assembly	1
4		Solenoid Valve Assembly	1
5	N04264	Cable Tie Anchor	3
6	N06504	Push-in Union Tee Fitting	1
7	N06430	Male Connect Fitting	3
8	N04531	1/4 Treet T, Brass	1

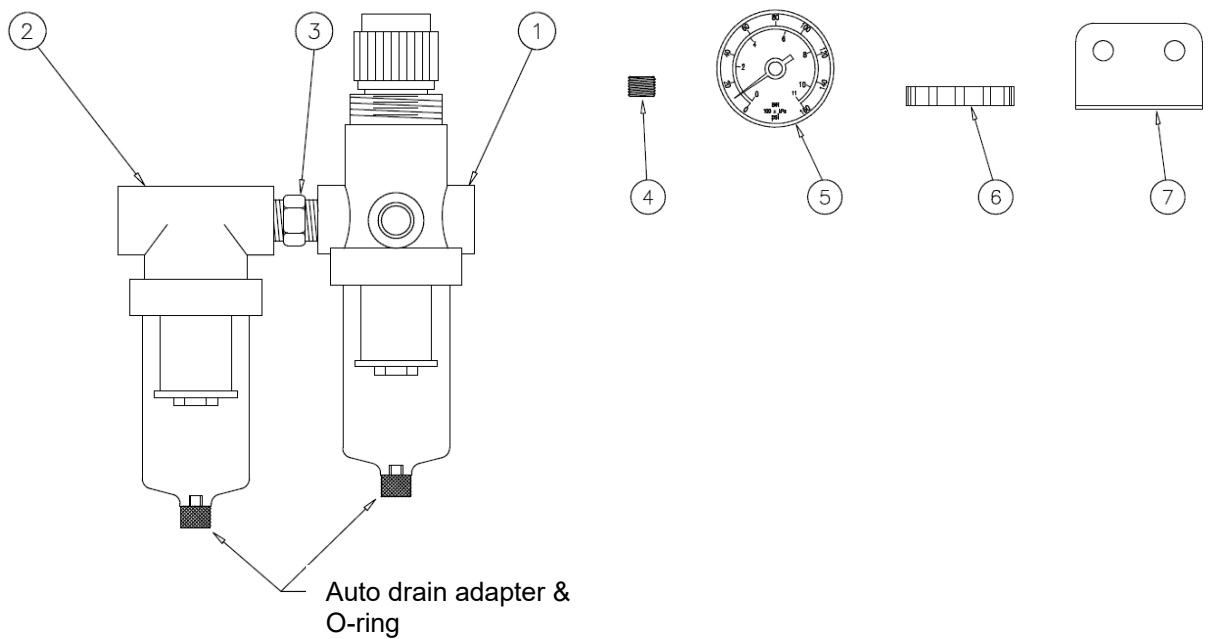
\* see next page.



### 10.7 Section 4, Filter/Regulator Assembly PN 100380, Component Illustration

Item No.	Part Number	Description	Quantity
1	N02774	Filter/ Regulator 1/4 NPT	1
2	100081	Filter coalescing 1/4 NPT	1
3	072X228	Fitting pipe nipple 1/4 NPT	1
4	-	Plug flush 1/8 NPT	1
5	-	Pressure gauge	1
6	-	Mounting nut	1
7	-	Mounting bracket	1

Notes: Items 4-7 are supplied unassembled and bagged with the filter/ regulator assembly.





## Revisions

Revision	Page/ Ch.	Description
Rev.10.18	59	Update module, filter and controller options.
Rev.1.19	60	Filter Kits updated.
	88	Mac solenoid valve with LED cap PN 661107 added.
	Ch.8	APEX 230mm added.
Rev.7.19	59	Filter kits updated.
Rev.5.20	Ch.8	New versions of APEX Modules 820802 and 820868 with long bolts.
Rev.6.23	1	Manual language added.
Rev.5.24	Ch.3.2.3	In the Model Designation Guide the option "K = Module, High-Flow, for Festo solenoid, 815832" added.

**ITW Dynatec Service Parts and Technical Service:**

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