WALCHEM

IWAKI America Inc.

EHE Series Metering Pumps

# EHE Series Electronic Metering Pump Instruction Manual

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## Notice

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**P/N E00022.M**
**Oct 2012**

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Thank you for choosing a Walchem E Series metering pump. This instruction manual deals with the correct installation, operation, programming maintenance, and troubleshooting procedures for the EHE Series metering pumps. Please read through it carefully to ensure the optimum performance, safety and service of your pump.


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# 1.0 INTRODUCTION

## 1.1 Safety and Caution Notes



Always wear protective clothing, eye protection and gloves before working on or near a metering pump. Follow all recommendations of the supplier of the solution being pumped. Refer to the MSDS from the solution supplier for additional precautions.

Walchem EH Series metering pumps should NOT be installed where ambient temperatures exceed 122°F (50°C) or fall below 32°F (0°C), or where the pump or tubing are directly exposed to sunlight.



**WARNING Risk of electrical shock!** This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electrical shock, be certain that it is connected only to a properly grounded, grounding type receptacle with ratings conforming to the data on the pump data plate. Prior to performing any maintenance on a pump, disconnect the pump from the electrical power source.



### Plumbing Precautions

All tubing must be securely attached to the fittings prior to starting the pump (see Section 2.3). Only use Walchem tubing with your pump. Tubing should be shielded to prevent possible injury in case of rupture or damage. UV resistant tubing should be used if the tubing is exposed to UV light. Always adhere to local plumbing codes and requirements. Be sure that the installation does not constitute a cross connection. Walchem is not responsible for improper installations. Prior to performing any maintenance on a pump, depressurize the discharge tubing.

If you are pumping downhill or into little or no system pressure, a back pressure/anti-siphon device must be installed to prevent over-pumping. Contact your Walchem distributor for additional information.



### Solution Compatibility

**CAUTION!** This pump has been tested by Underwriters Laboratories Inc. using water only. The suitability of this pump for use with liquids other than water is the responsibility of the user. For liquids other than water, select the best-suited liquid end material combination using a chemical compatibility chart or guidance from the solution supplier.

## 1.2 Principle of Operation

The E Series electronic metering pump consists of a pump unit, a drive unit, and a control unit. The drive unit is an electromagnetic solenoid. When the solenoid coil is energized by the control unit, the armature shaft moves forward due to the magnetic force of the solenoid. The shaft is attached to a PTFE faced diaphragm, which is part of the pump unit. The diaphragm is forced into the pump head cavity decreasing volume and increasing pressure which forces liquid in the pump head out through the discharge check valves. When the solenoid coil is de-energized, a spring returns the armature to its starting position. This action pulls the diaphragm out of the head cavity increasing volume and decreasing pressure. Atmospheric pressure then pushes liquid from the supply tank through the suction check valves to refill the pump head.

## 1.3 Specifications

| EH | E36 | E | 1 | - | PC | V |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | | 5 | 6 |

### 1 Pump Series

**EHE** Electronic metering pump with external Analog and pulse control or manual speed control (adjustable to 360 strokes per minute). Manually adjustable stroke length. (Turndown ratio 1800:1)

### 2 Capacity/Pressure Rating

| Size | Output Capacity (GPH) min | Output Capacity (GPH) max | Output Capacity (mL/min) min | Output Capacity (mL/min) max | Output per stroke (mL) min | Output per stroke (mL) max | Maximum Pressure (PSI) | Maximum Pressure (MPa) | Conn. Size (in) Tubing O.D. |
|---|---|---|---|---|---|---|---|---|---|
| **E31** | 0.0031 | 5.5 | 0.189 | 340 | 0.189 | 0.94 | 150 | 1.0 | ½ |
| **E36** | 0.0047 | 8.5 | 0.289 | 520 | 0.289 | 1.44 | 105 | 0.7 | ½ |
| **E46** | 0.0067 | 12.0 | 0.417 | 750 | 0.417 | 2.08 | 60 | 0.4 | ½ |
| **E56** | 0.0111 | 20.0 | 0.694 | 1250 | 0.694 | 3.47 | 30 | 0.2 | ½ |
| **E35-HV** | 0.0033 | 4.0 | 0.21 | 252 | 0.21 | 1.05 | 50 | 0.35 | ¾" NPTM |

### 3 Control Module

**E** For use on all EHE models, features analog and external pulse control with pulse divide and multiply capability.

### 4 Voltage

**1** 115VAC, 50/60 Hz
**2** 230VAC, 50/60 Hz

### 5 Liquid End

| Liquid End Code | Pump Head & Fittings | Diaphragm* | Valve Balls | Valve Seat | Valve Seals | Gasket | Tubing |
|---|---|---|---|---|---|---|---|
| **HV** | PVC | PTFE | CE/HC | PCTFE | FKM | PTFE | N/A |
| **VC** | PVC | PTFE | CE | FKM | FKM | PTFE | PE |
| **VE** | PVC | PTFE | CE | EPDM | EPDM | PTFE | PE |
| **VF** | PVC | PTFE | PTFE | EPDM | EPDM | PTFE | PE |
| **PC** | GFRPP | PTFE | CE | FKM | FKM | PTFE | PE |
| **PE** | GFRPP | PTFE | CE | EPDM | EPDM | PTFE | PE |
| **FC** | PVDF | PTFE | CE | PCTFE | PTFE | PTFE | PE |
| **VM**✞ | M-PVC | PTFE | CE | FKM | PTFE | PTFE | PE |

✞ E56 Model only * Bonded to EPDM

#### Materials of Construction

| | |
|---|---|
| CE | Alumina ceramic |
| EPDM | Ethylene propylene diene monomer |
| FKM | Fluoroelastomer |
| GFRPP | Glass fiber reinforced polypropylene |
| M-PVC | Machined polyvinylchloride |
| HC | Hastelloy C276 (spring in HV) |
| PCTFE | Polychlorotrifluoroethylene |
| PE | Polyethylene |
| PTFE | Polytetrafluoroethylene |
| PVC | Polyvinylchloride (translucent) |
| PVDF | Polyvinylidenefluoride |

### 6 Special Head Options

**Blank** Standard ½" tube connection with tube style injection & foot valves, except HV (No accessories)
**V** Standard ½" tube connection with back pressure/anti-siphon valve, tube style injection & foot valves.
**T** ¾" NPT (male) pipe thread connection. No accessory valves.
**P** ¾" NPT (male) pipe thread connection with back pressure/anti-siphon valve.

*Adjustment Range*

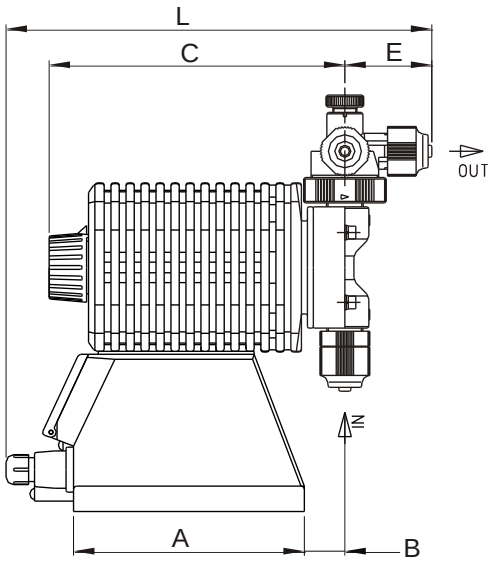
| | |
|---|---|
| Stroke length adjustment range | 20% to 100% Stroke Length |
| Frequency adjustment range | 1 to 360 strokes per minute (1 to 240 strokes per minutes for –HV) |

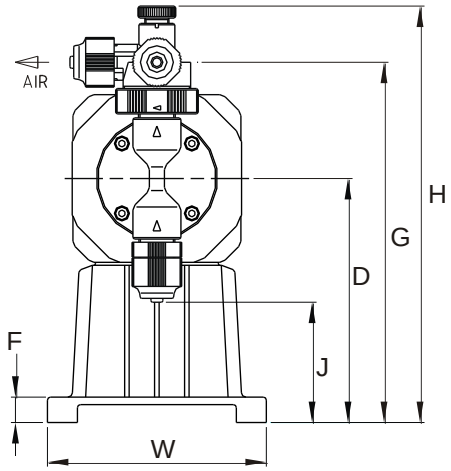
*Operating Conditions*

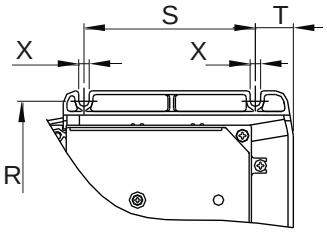
| | |
|---|---|
| Ambient temperature | 32 to 122°F (0 to 50°C) |
| Relative humidity | 30 to 90% non-condensing |
| Liquid temperature | 32 to 104°F (0 to 40°C) for PVC based Liquid Ends<br>32 to 140°F (0 to 60°C) for PP or PVDF based Liquid Ends |

## 1.4 Dimensions

PVC & GFRPP Models



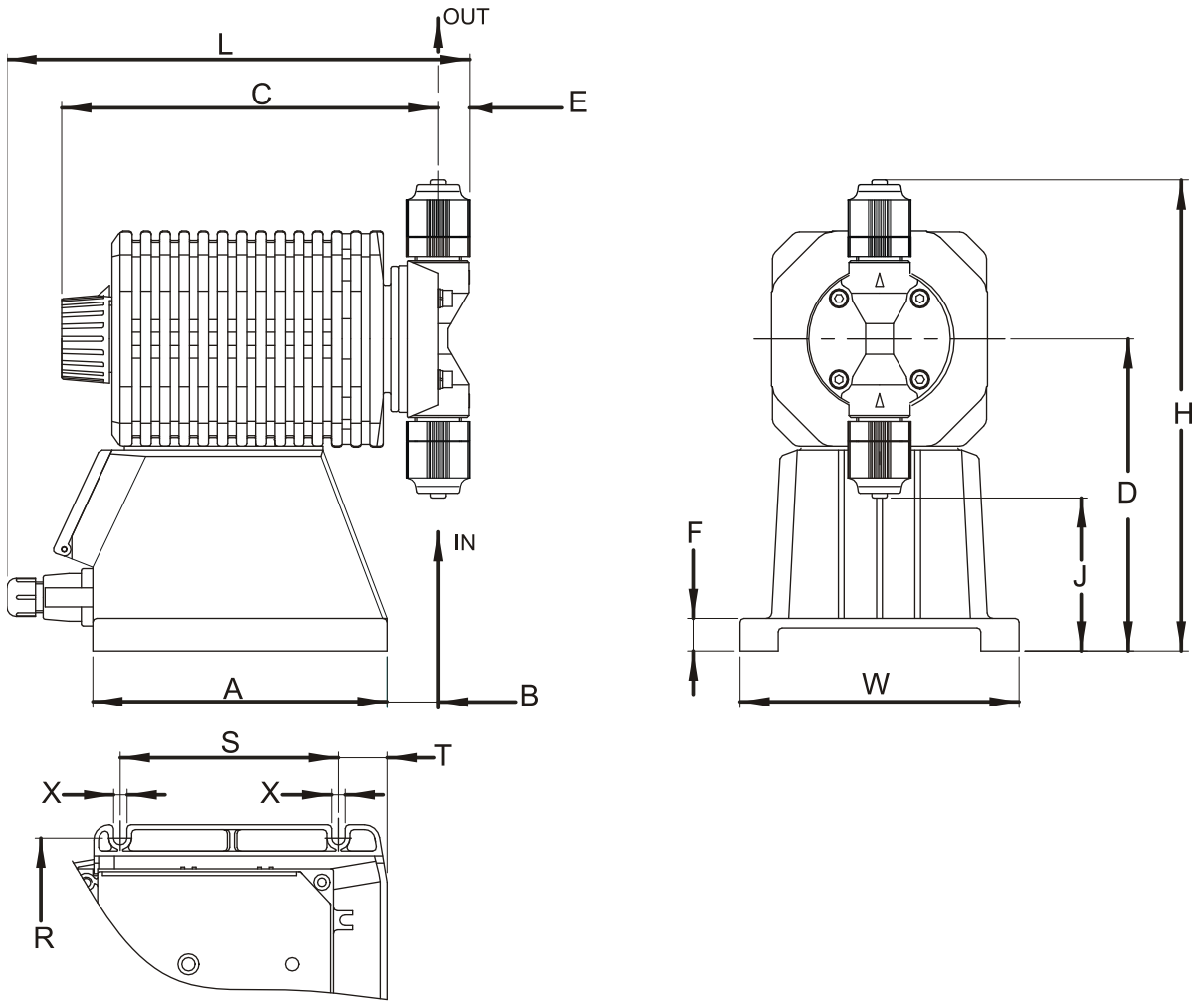




| Model | | | | | A | B | C | D | E | F | G | H | J | L | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EHE | 31<br>36 | E1<br>E2 | -VC<br>-PC<br>-VE | -PE<br>-VF | 6.06 | 1.05 | 7.76 | 6.42 | 2.28 | 0.67 | 9.49 | 10.95 | 3.15 | 11.18 | 5.75 |
| EHE | 46 | E1<br>E2 | -VC<br>-PC<br>-VE | -PE<br>-VF | 6.06 | 1.14 | 7.83 | 6.42 | 2.28 | 0.67 | 9.86 | 11.34 | 2.80 | 11.25 | 5.75 |
| EHE | 56 | E1<br>E2 | -VC<br>-PC<br>-VE | -PE<br>-VF | 6.06 | 1.42 | 8.13 | 6.42 | 2.28 | 0.67 | 10.10 | 11.57 | 2.38 | 11.55 | 5.75 |
| EHE | 56 | E1<br>E2 | -VM | | 6.06 | 1.42 | 8.13 | 6.42 | 2.28 | 0.67 | 10.10 | 11.57 | 2.38 | 11.55 | 5.75 |

| Mounting Dimensions | R | S | T | X |
|---|---|---|---|---|
| EHE all variations | 5.20 | 4.50 | 1.00 | 0.28 |

FC and HV Models




| Model | | | | A | B | C | D | E | F | H | J | L | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EHE | 31<br>36 | E1<br>E2 | -FC | 6.06 | 1.05 | 7.76 | 6.42 | 0.65 | 0.67 | 9.69 | 3.15 | 9.53 | 5.75 |
| EHE | 46 | E1<br>E2 | -FC | 6.06 | 1.14 | 7.83 | 6.42 | 0.75 | 0.67 | 10.00 | 2.80 | 9.72 | 5.75 |
| EHE | 56 | E1<br>E2 | -FC | 6.06 | 1.42 | 8.13 | 6.42 | 0.85 | 0.67 | 10.45 | 2.38 | 10.12 | 5.75 |
| EHE | 35 | E1<br>E2 | -HV | 6.06 | 1.05 | 7.76 | 6.42 | 1.00 | 0.67 | 9.80 | 3.03 | 9.90 | 5.75 |

| Mounting Dimensions | R | S | T | X |
|---|---|---|---|---|
| EHE all variations | 5.20 | 4.50 | 1.00 | 0.28 |

All dimensions in inches

# 2.0 INSTALLATION

## 2.1 Unpacking

Open the shipping carton and inspect contents for damage. If any items are missing or damaged contact your local distributor to arrange for replacement.

**CAUTION**

Pumps are pre-primed with water at the factory. If the application is not compatible with water, drain and dry before use. Be sure to remove caps from fittings before attaching tubing.

Head bolts may have loosened during storage or shipment. Be sure to check and tighten to 19 lb-in of torque, as necessary.

The electronics within the pump can be damaged by excessive surges in voltage. Do not install the pump near high-power electrical equipment that generates high surge voltages. Avoid branch circuits that also supply power to heavy or other equipment that could generate electrical interference. If necessary, install a surge suppression device (such as a varistor with a resistance greater than 2000A) or a noise-reducing transformer at the pump's power connection.

**WARNING: Risk of electrical shock!** *This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electrical shock, be certain that it is connected only to a properly grounded, grounding type receptacle.*

## 2.2 Location

Choose a location for the pump that is clean, dry, vibration –free, close to an electrical outlet, and allows convenient access to stroke length control, frequency control, and tubing connections. Avoid areas where ambient temperature exceeds 122°F (50°C) or falls below 32°F (0°C), or where the pump or tubing would be exposed to direct sunlight.

This pump is cord connected and not intended for permanent mounting to a building structure. However, temporary mounting to stabilize the pump during operation may be necessary as long as tools are not required for the installation or removal of the pump.

Flooded suction (mounting the pump below the level of liquid in the supply tank) is strongly recommended, especially when pumping liquids that readily generate gas bubbles. Sodium hypochlorite and hydrogen peroxide are common examples of such liquids. (See Figure 1.)

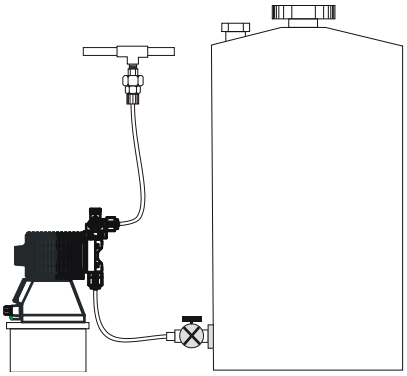


Figure 1
Flooded Suction

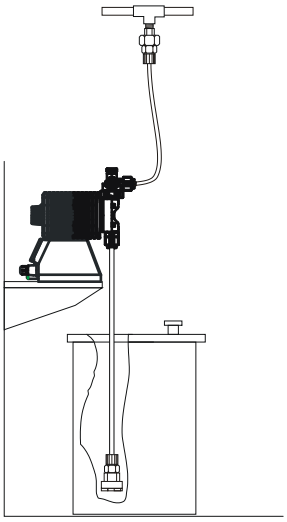


Figure 2
Shelf Mount
Suction Lift

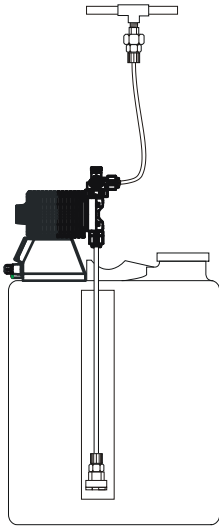


Figure 3
Tank Mount
Suction Lift

If flooded suction mounting is not possible, a shelf adjacent to (but not directly above) the supply tank often works well (see Figure 2). The supply tank or cover can also be used if it has provisions for mounting a pump (see Figure 3). In any case, the total suction lift should not exceed 5 ft (1.5m). For extremely gaseous liquids such as Sodium Hypochlorite or Hydrogen Peroxide, pulling from an external manifold will significantly reduce gas bubbles to the suction side of the pump. This installation will typically solve most priming issues associated with these gaseous liquids. See Figure 4 for reference.

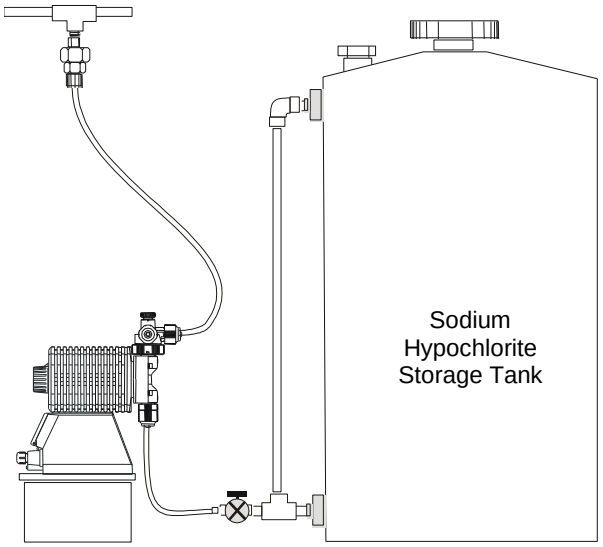



Figure 4
Flooded Suction for Gaseous Liquids

The EH-HV Series pumps require a flooded suction or pre-primed condition before operation. Flooded suction (mounting the pump below the level of liquid in the supply tank) is recommended for proper operation of high viscosity pumps. (See Figure 1) These pumps are not designed to be self-priming.

The pump is supplied with ½" or ¾" (depending on model) NPT male suction and discharge connections. Mount the pump close to the supply tank and arrange the suction piping to be as short and straight as possible. Avoid piping installations where air may become trapped in the suction piping.

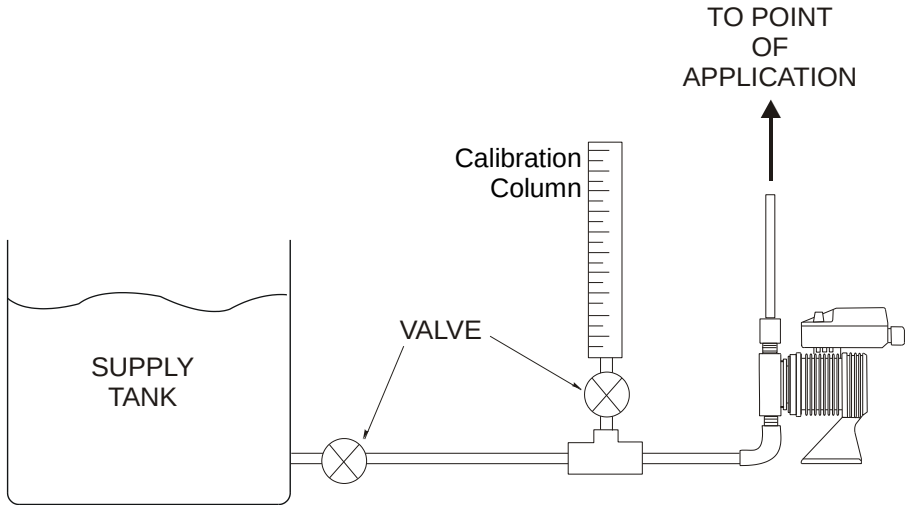



Figure 5

## 2.3 Supply Tubing

The supply tubing run should be as short as possible. For flooded suction mounting, install a shut-off valve with an appropriate tubing connector at the tank outlet. Cut a length of tubing from the coil supplied and install between the shut-off valve and the pump inlet fitting. For suction lift applications, install a foot valve on one end of suction tubing and cut the tubing to a length such that the foot valve hangs vertically about 1 in (25mm) above the bottom of the tank. Avoid any loops in the tubing run that could form a vapor trap. Running the tubing through a length of rigid pipe will help to keep tubing straight (see Figure 3). Total vertical suction lift should be no more than 5ft. (1.5m).

Attach tubing as shown in Figure 5. First slide the coupling nut, small end first, onto the tubing. Then slide on the clamp ring so that the rounded edges face the end of the tubing. Next push the tubing onto the tubing adapter fitting. (Tips: Place tubing adapter fitting on a flat surface such as a table top and press tubing down on top of it *all the way to the lip* of the tubing adapter fitting. If the tubing is stiff from cold, dip the tubing end in hot tap water for a few minutes so it will slide on and flare out more easily. Slide clamp ring down until it tightens over the adapter fitting. Then slide coupling nut down as far as it will go. Insert this arrangement into the suction valve housing. With one hand holding tubing and applying slight downward pressure, tighten the coupling nut until secure.

**WARNING:** All fittings and coupling nuts should be tightened by hand. If necessary, small pliers may be used to make it snug. DO NOT use excessive force or large wrenches.

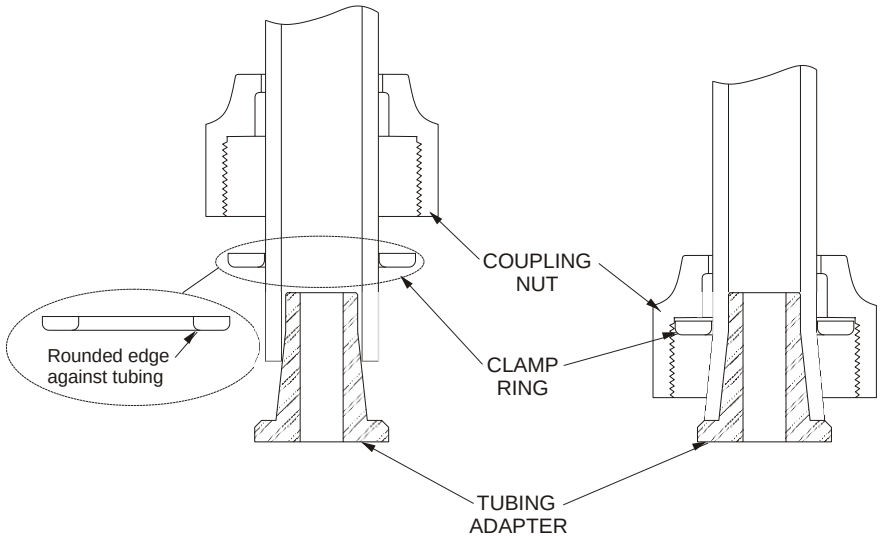



Figure 6 Tubing Connections

## 2.4 Discharge Tubing

Cut a length of tubing long enough to go from the pump to the application (injection) point. Additional tubing can be ordered from your distributor. Avoid sharp bends or kinks in the tubing and protect the tubing from sharp edges that could chafe or cut it. If applicable, install the injection valve in 1/2" NPT thread at the injection point and connect the discharge tubing to the injection valve. Attach the tubing as described above in Section 2.3, Figure 5.

**Note:** Most pump models have an air vent valve with two connections on the discharge side of the pump head. The connection marked 'OUT' is the discharge connection plumbed to the injection point. The connection marked 'AIR' is the vent connection and tubing should be routed from this point back to the chemical solution (supply) tank or drum. Refer to Section 1.4 drawing.

## 2.5 Installing Injection Check Valve

A fitting or tee with 1/2" NPTF threads and sufficient depth should be used to install the injection valve assembly. If required, trim off an amount of the extension tip until it fits your fitting or tee (see Figure 7). Attach the supplied tubing to the compression end: cut the tubing square, slide on the coupling nut, push the tubing to the bottom of the cone (use warm water to soften tubing as necessary), and hand tighten coupling nut.

The position of the injection check valve can be at any orientation as long as the spring is retained in the valve. DO NOT REMOVE THE SPRING. Be sure to check/replace the spring as needed.

**CAUTION:** Some chemicals may have reactions as they are injected into the main flow (ie. sulfuric acid may react with water causing excess heat). If that chemical is heavier than water, mount the injection valve as close as possible to vertical, injecting into the bottom of the pipe. This will keep the injection nozzle facing up and keep the heavier chemistry from draining into the pipe causing adverse reactions within the injection valve and pipe.

In addition to preventing backflow from pressurized lines, the injection valve will provide a limited amount of backpressure when pumping into open atmosphere type applications. However, the backpressure by the injection check valve is very low and can vary. Metering pump output is rated at maximum backpressure and, depending upon the application, may be higher if the back-pressure is lower than rated. Additionally, the valve does NOT act as an anti-siphon valve. If siphoning is a possibility, or if pumping downhill into open atmosphere (open tank), a separate backpressure/anti-siphon valve must be installed.

**NOTE:** Siphoning can also occur at the tip of the injection valve because of the high flow rate in the main pipe flowing past the small injection nozzle (venturi effect). In this case, an anti-siphon device must be installed to avoid over feeding or siphoning of chemistry into the line. Cutting the injector tip at an angle or to a different length will sometimes alleviate this problem.

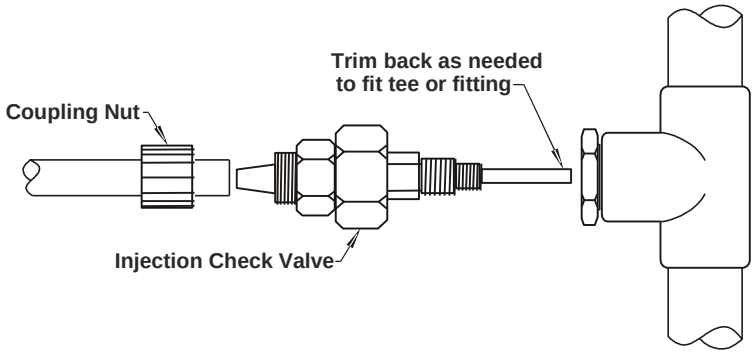



Figure 7
Injection Check Valve Installation

# 3.0 OPERATION

## 3.1 Priming

Install the pump as described in Section 2.0. With the pump plugged in but not pumping, set stroke length at 100% and frequency at 360 (use the ▲ or ▼ buttons as necessary to adjust the frequency). If the pump is equipped with a manual air vent valve, open the knob ½-1 turn; otherwise disconnect the discharge tubing from the injection valve. Push the **START/STOP** button to start the pump. *As soon as* liquid enters the discharge tubing at the pump head, push the **START/STOP** button again to stop the pump. Close the air vent valve and/or reconnect the discharge tubing to the injection valve.

If the pump does not self-prime, remove the check valve housing on the discharge and suction sides to make sure the valve cartridges and gaskets are in correct positions (see Section 4.2). Remove and shake cartridges to make sure ball is loose inside. Wetting cartridges before re-installing will help in priming.

## 3.2 Adjustment

The pump will operate best with the stroke length at 100%. If less than full output is required, set the frequency to the desired percentage of maximum.

Example: Model EHE31E1-VC has maximum output of 5.5 GPH at 360spm and 100%SL.
Desired output is 4.0 GPH.
4.0 ÷ 5.5 = 0.73 or 73%. 73% of 360spm is 263spm.
Press the ▲ or ▼ buttons as necessary to set the frequency to 263spm.

If very low outputs are required, it will be necessary to also reduce the stroke length. (Minimum recommended stroke length is 20%.)

## 3.3 Calibration

If the application requires the pump to be calibrated, prime and adjust the pump per directions above. Then connect a calibration column to the suction side of the pump and re-prime the pump to eliminate any air.

Turn the pump on for one minute and read the amount of liquid pumped from the column. Adjust the frequency up or down as necessary and check the output again. When the desired output is reached, disconnect the calibration column and reconnect the suction tubing. (See Figure 8.)

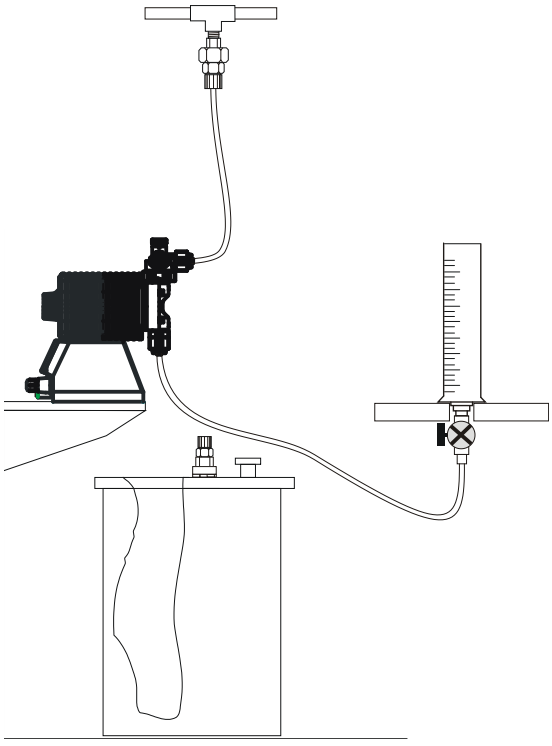
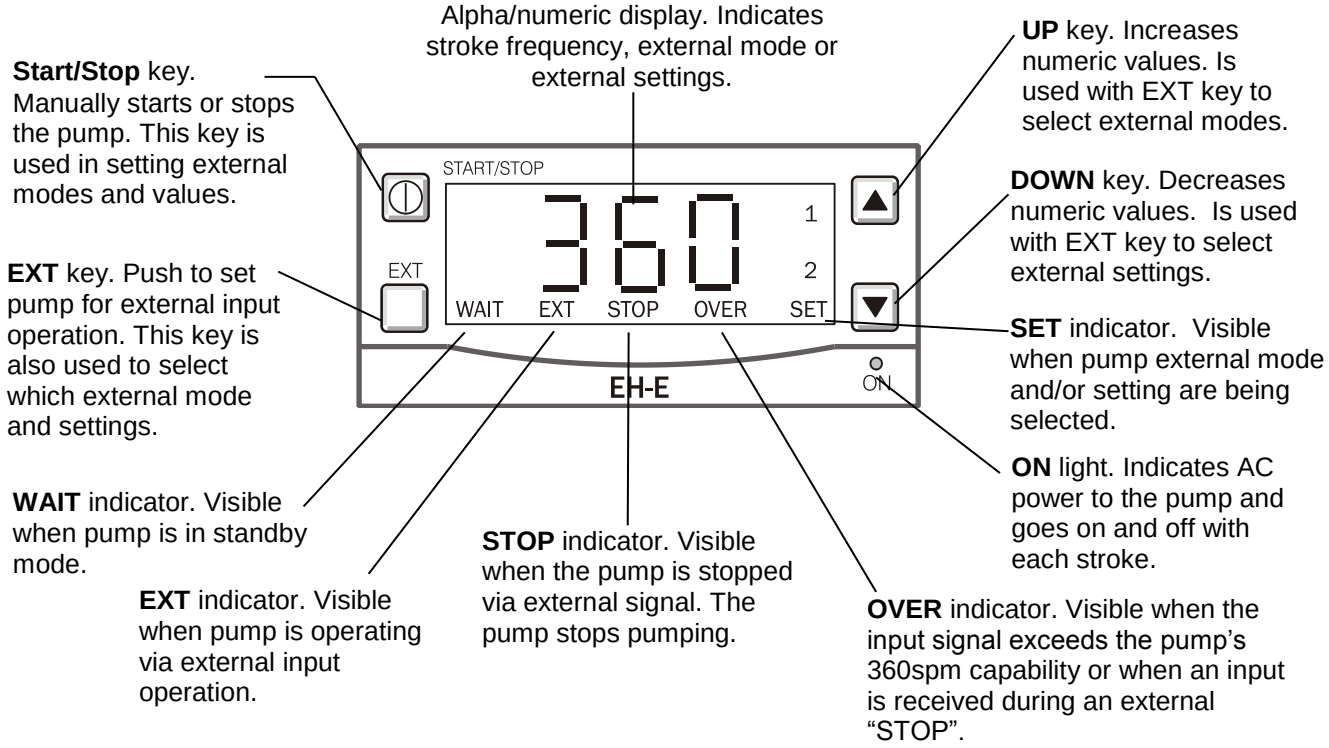


Figure 8
Pump Calibration

### 3.4 Control Unit Operation and Programming

The EHE Series metering pumps can be operated in either manual or external modes. The external mode can be controlled from a digital or analog external signal. An external stop function is available for remotely suspending operation of the pump and functions independent of the control mode.

***Display/Keypad Overview***



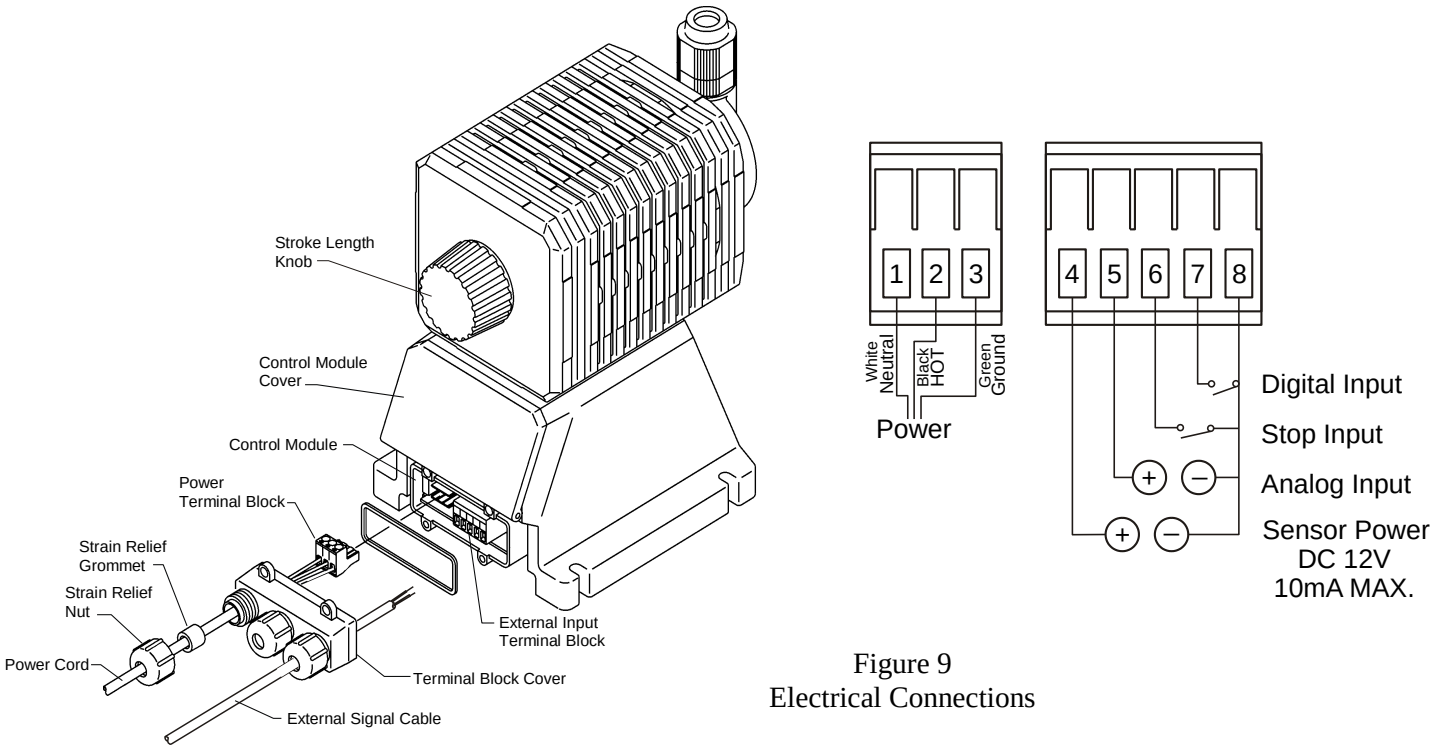
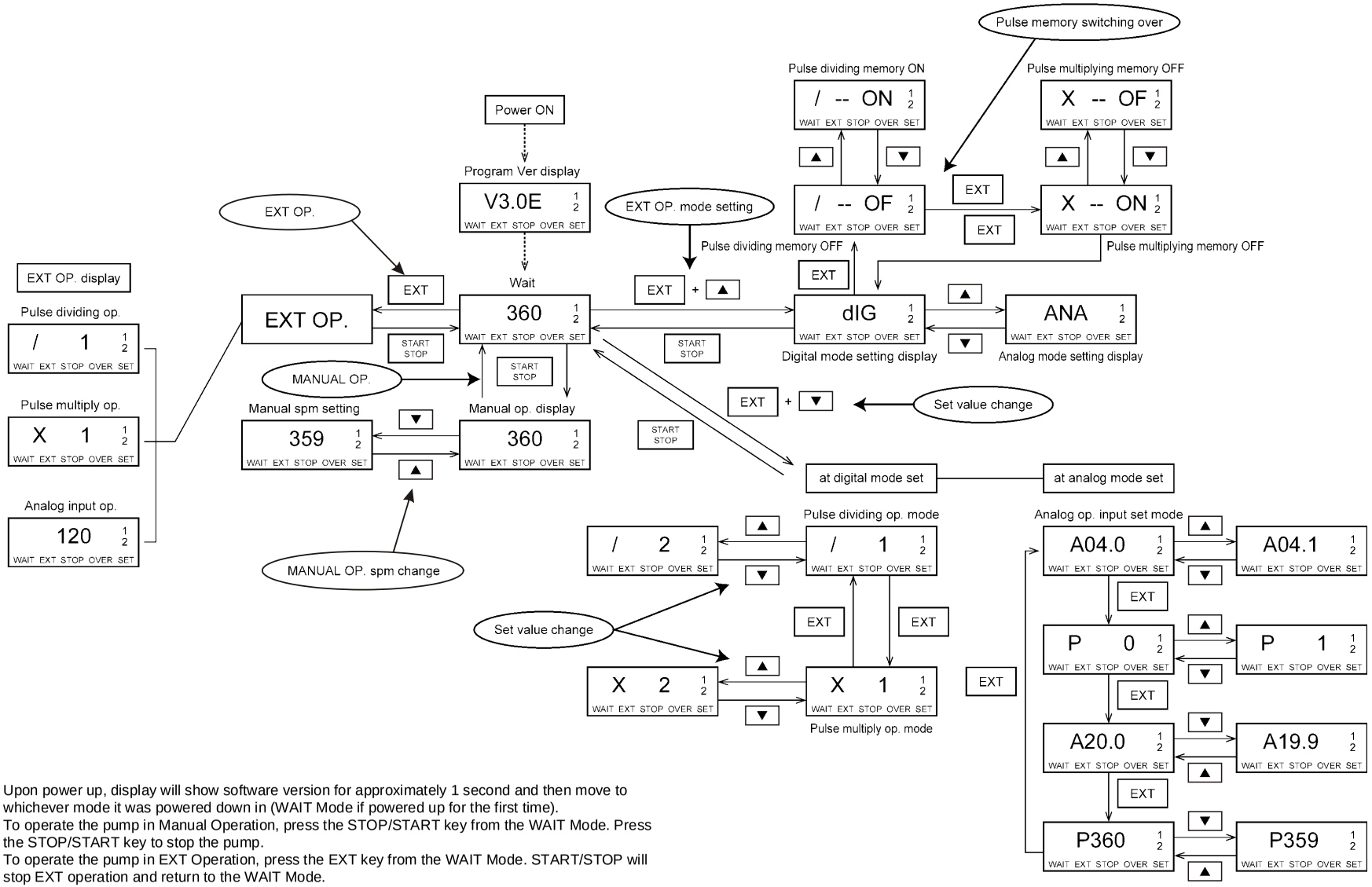




Figure 9
Electrical Connections

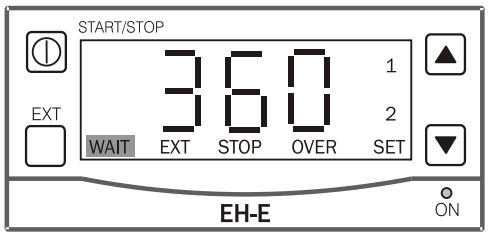



Notes:

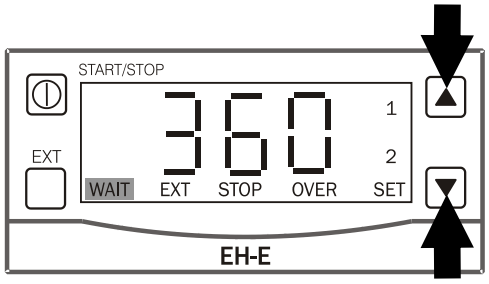
1. Upon power up, display will show software version for approximately 1 second and then move to whichever mode it was powered down in (WAIT Mode if powered up for the first time).
2. To operate the pump in Manual Operation, press the STOP/START key from the WAIT Mode. Press the STOP/START key to stop the pump.
3. To operate the pump in EXT Operation, press the EXT key from the WAIT Mode. START/STOP will stop EXT operation and return to the WAIT Mode.
4. To change input operation between Digital or Analog, press the EXT and ▲ keys simultaneously. Toggle between DIG or ANA with the ▲ or ▼ keys and select the desired control method by pressing with the STOP/START key. This will also exit this menu.
5. Input Pulse Memory can be turned on/off in the DIG mode. While selecting DIG in step 4, pressing the EXT key will move to this selection. On/Off is toggled with the ▲ or ▼ keys and the EXT key will switch between multiply and divide. Press the STOP/START key to return to the WAIT Mode.
6. To set the input operation values, press the EXT and ▼ keys simultaneously from the WAIT Mode. The values are changed with the ▲ or ▼ keys. The EXT key is used to toggle between MULT or DIV if set in DIG mode and will scroll through the (4) setpoints in ANA mode.

### *Manual Operation*

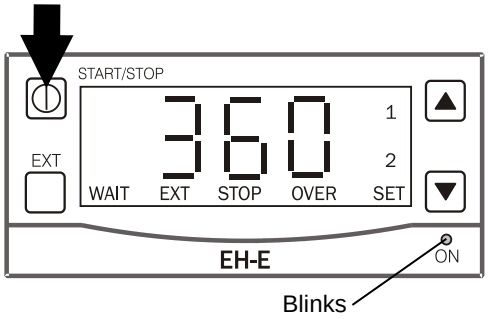
(1) Power ON
When power is applied to the pump, the green indicator above ON lights up, the display momentarily shows the software version ("Vx.xE"), and the controller goes to whatever mode the pump was in when power was disconnected. If being powered for the first time, the stroke rate is then displayed, the "WAIT" is lit, and pump is then in the Wait Mode.




(2) The stroke rate (spm) can be changed by pressing the ▲ or ▼ keys in either the Wait Mode or during operation. Press the ▲to increase the stroke rate and the ▼ key to decrease the rate. Holding the keys down briefly will change the rate slowly, but holding them down for 3 seconds will change the rate rapidly. The default setting shipped from the factory is 360 spm.




(3) Pressing the STOP/START key will start pump operation. The WAIT backlight disappears and the green ON indicator blinks off with every stroke.




(4) Pressing the STOP/START key again will stop pump operation and the WAIT will be backlit as the pump enters the WAIT Mode.

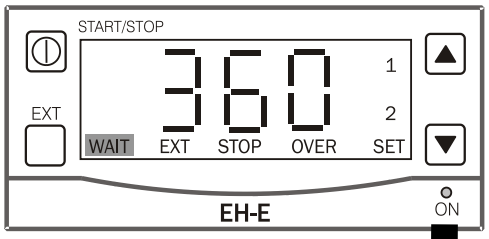


## *External Operation*

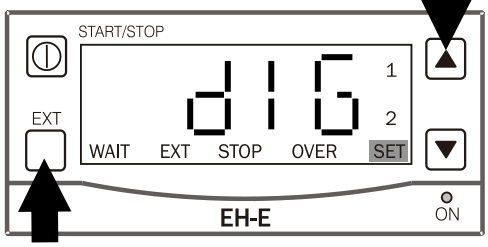
### ANALOG INPUT OPERATION

In analog mode the pump will accept a milliamp signal and produce a pump speed proportional to the signal level received. The input resistance of the analog signal is 250Ω. The pump's response can be fine-tuned by variable set points to meet system requirements.

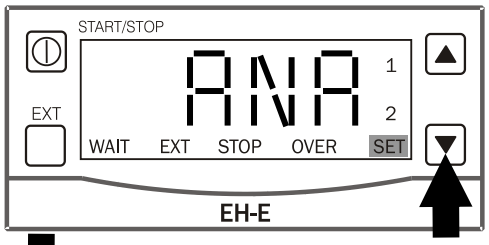
(1) Power ON
When power is applied to the pump, the green indicator above ON lights up, the display momentarily shows the software version ("Vx.xE"), and the controller goes to whatever mode the pump was in when power was disconnected. If being powered for the first time, the stroke rate is then displayed, the "WAIT" is lit, and pump is then in the Wait Mode.



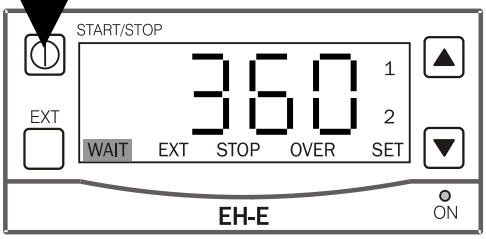

(2) Selecting the mode of EXT operation:
Press the EXT and the ▲ keys simultaneously. The WAIT backlight disappears, the SET backlight is lit, and the display shows "dIG" (if "ANA" is displayed, skip to step 3).



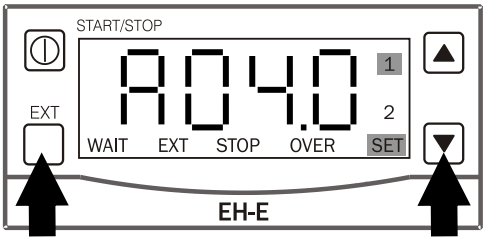

Change the mode by pressing the ▼ key. Every time the ▼ key is pressed, it toggles between the ANA and dIG modes. (Pump is shipped from the factory preset in the dIG mode)



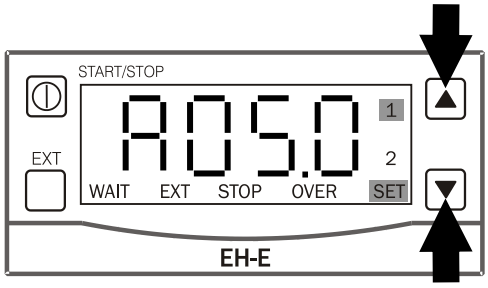

(3) Press the START/STOP key to confirm the Analog selection and return to the WAIT mode.



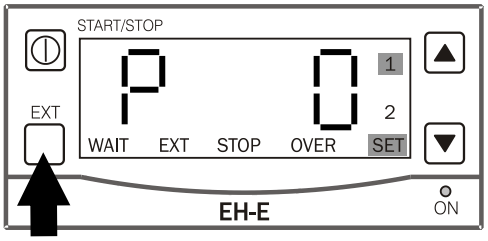

(4) Setting the Analog Input Set points:
*(NOTE: Pump is pre-set at factory with the Analog set points set at 4.0mA = 0 SPM and 20.0mA = 360 SPM. If these are the desired set points, skip steps 4-12 and move to step 13.)*
Press the EXT and ▼ keys simultaneously. The display will show the initial set point (default is A04.0) and the SET and 1 backlight will appear.



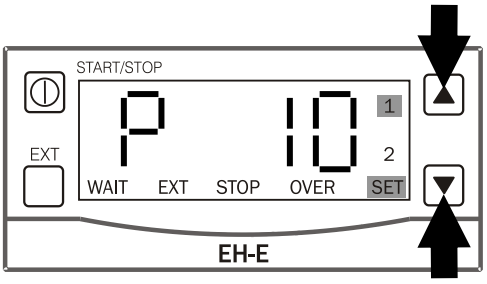
(5) Setting the Input Current (mA) of SET point 1:
Use the ▲ and ▼ keys to set the input current (mA) of SET point 1. The value will increase with the ▲ key and decrease with ▼ the key. The numerical value will change slowly by 0.1mA if the keys are pressed briefly, but will increment rapidly if they are held for more than 3 seconds.
The allowable range is 0.0-20.0mA and the default setting from the factory is 4.0mA.



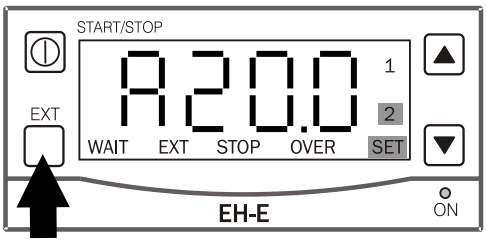

(6) Press the EXT key to confirm the current value of SET point 1 and move to the pump speed (SPM) setting of SET point 1. "P 0" will be the default setting (Pump speed=0spm) and the SET and 1 will remain backlit.



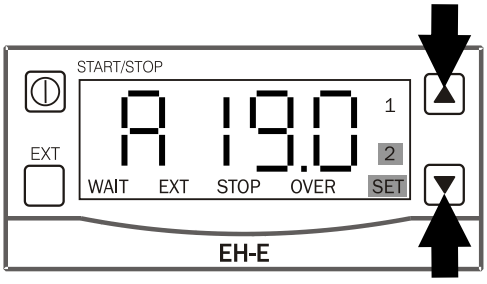

(7) Setting the Stroke Rate of SET point 1:
Set the stroke rate corresponding to the current setting of SET point 1 using the ▲ and ▼ keys.
The allowable range is 0-360 spm and the default setting from the factory is 0 spm.



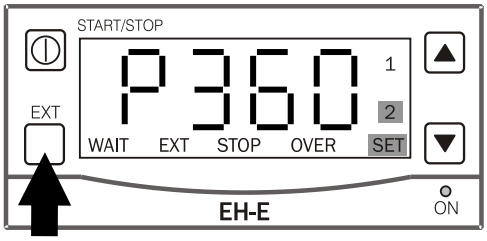

(8) Press the EXT key to confirm the pump speed value of SET point 1 and move to the Current Input setting of Set point 2. The backlight behind SET will remain, but the light behind 1 will go off and 2 will become backlit. The default display will show A20.0.



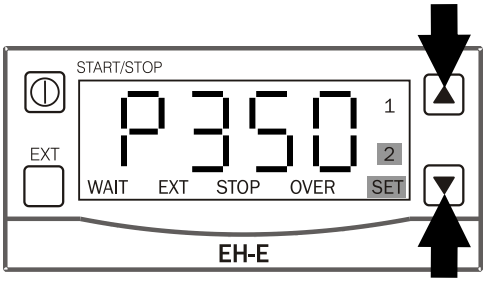

(9) Setting the Input Current (mA) of SET point 2:
Use the ▲ and ▼ keys to set the input current (mA) of SET point 2. Do NOT set the value equal to SET point 1 or an error (ERR1) will occur.
The allowable range is 0.0-20.0mA and the default setting from the factory is 20.0mA.



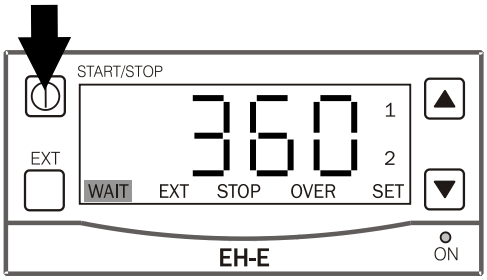

(10) Press the EXT key to confirm the current value of SET point 2 and move to the pump speed (SPM) setting of SET point 2. "P360" will be the default setting (Pump speed=360spm) and the SET and 2 will remain backlit.



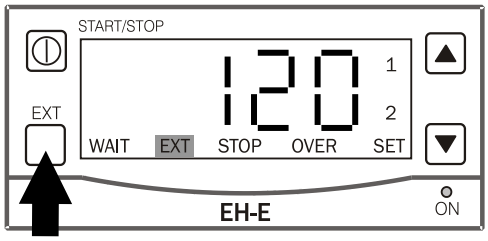
(11) Setting the Stroke Rate of SET point 2:
Set the stroke rate corresponding to the current setting of SET point 2 using the ▲ and ▼ keys.
The allowable range is 0-360 spm and the default setting from the factory is 360 spm.



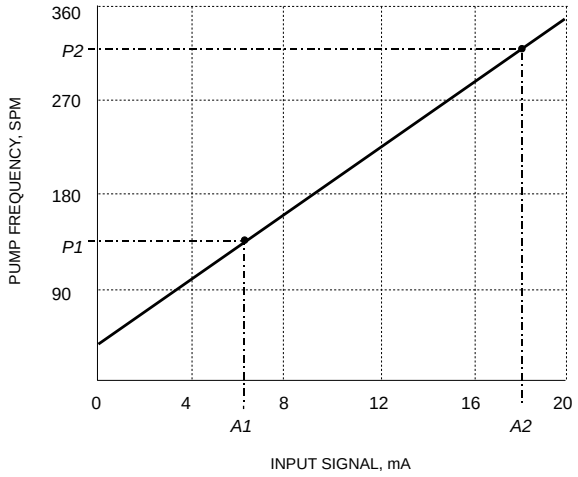

(12) Press the STOP/START key to confirm the pump speed value of SET point 2 and move back to the WAIT mode. (Pressing the EXT key will move back to setting the current value of SET point 1 – step #4. Press the STOP/START key anytime to exit and go to the WAIT mode)




(13) Press the EXT button to start EXT pump operation. The WAIT backlight will go out, EXT will become backlit, and the ON lamp will begin to blink with every stroke. The pump will operate at the speed corresponding to the incoming current (mA) signal.
To stop the pump, press the STOP/START key once and the pump will enter the WAIT mode.
Pressing the EXT again will restart the pump in EXT mode. (see wiring section to ensure the analog wiring is correct)



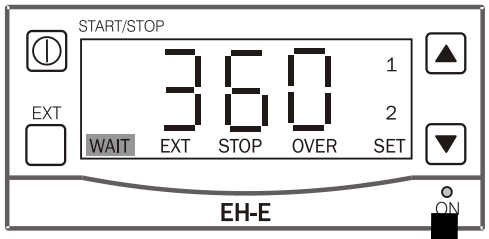

The pump speed will now be determined by the level of the milliamp signal as shown in the graph. The stroke length can be adjusted manually to set the volume pumped per stroke.



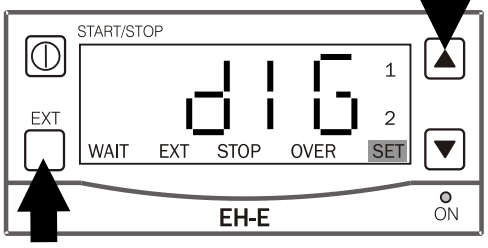
## DIGITAL INPUT OPERATION

In digital mode, the pump can accept a non-powered (dry contact) pulse signal from a flowmeter or other similar instrument. The pump can be set to <u>divide</u> pulses by a factor of 1 to 999; or in <u>multiply</u> mode, 1 input pulse can produce 1 to 999 pump strokes. The minimum pulse width for input pulses is 10 mSec.

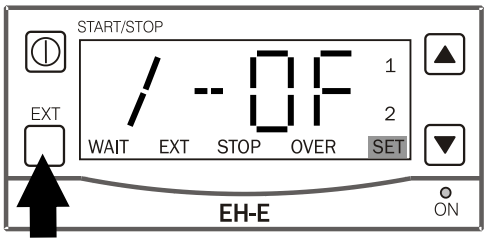
(1) Power ON
When power is applied to the pump, the green indicator above ON lights up, the display momentarily shows the software version ("Vx.xE"), and the controller goes to whatever mode the pump was in when power was disconnected. If being powered for the first time, the stroke rate is then displayed, the "WAIT" is lit, and pump is then in the Wait Mode.




(2) Selecting the mode of EXT operation:
Press the EXT and the ▲ keys simultaneously. The WAIT backlight disappears, the SET backlight is lit, and the display shows "dIG" or "ANA" (if "dIG" is displayed, skip to step 3). Change the mode by pressing the ▼ key. Every time the ▼ key is pressed, it toggles between the ANA and dIG modes. (Pump is shipped from the factory preset in the dIG mode)

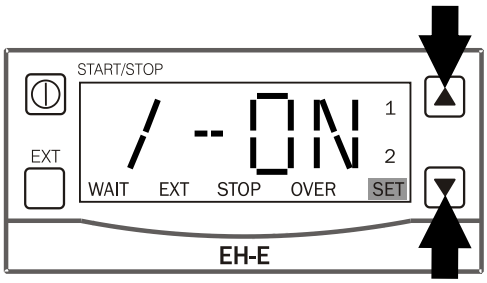



(3) Move to the Pulse Input Memory menu:
Press EXT while dIG is displayed and "/--OF" or "/--ON" will be displayed. "/--OF" is the default set at the factory as it is rarely needed or used.

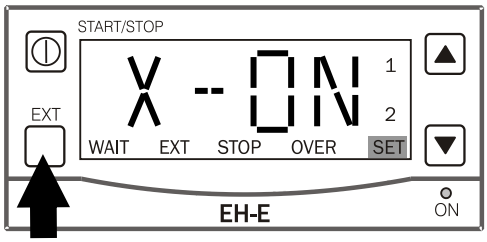



Pulse Input Memory: As digital pulses come into the pump – whether the pump will operate faster than the pulses (MULT) or at a fraction of the speed (DIV) – internal memory can be set to store these pulses if they come in too fast for the pump to keep up. Once the incoming pulses slow or stop, the pump will work off the excess pulses. The factory default settings are that the memory is OFF for the divide mode and ON for the multiply mode. A max. of 255 pulses can be stored.
**NOTE!** In the Multiply mode, stored pulses can cause the pump to run excessively after incoming pulses (usually indicating flow) have stopped. This could cause injection into a stagnant pipe.

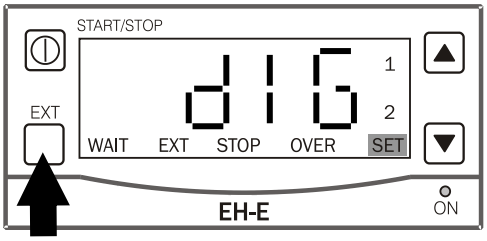
(4) Use the ▲ and ▼ keys to toggle the divide memory ON and OFF. These will change the display between "/--OF" and "/--ON".



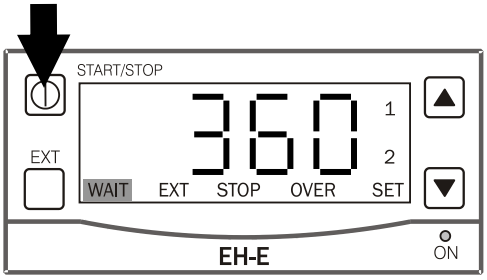

(5) Pressing the EXT key moves to the memory setting for the MULT mode. "X--ON" is the default setting. Pressing the ▲ and ▼ keys will toggle the display between "X--ON" and "X--OF".



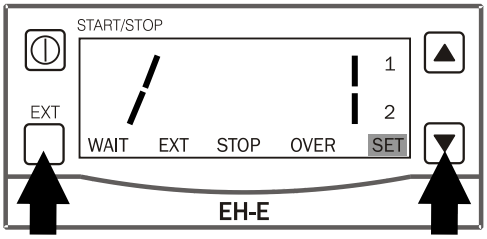
(6) Press the EXT key to enter the memory selections and return to the "dIG" set menu.




(7) Press the START/STOP key to confirm the Digital Operation selection and return to the WAIT mode. The SET backlight will go out and the WAIT light will illuminate.

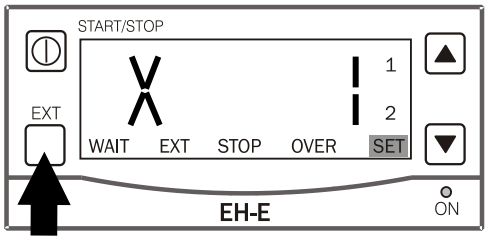



(8) Digital Input Selection:
*(NOTE: Pump is pre-set at factory with both MULT or DIV set to 1. The default Digital mode is preset to DIV.)*
Press the EXT and ▼ keys simultaneously. The display will show "/ 1" (Dividing mode) and the SET backlight will appear.

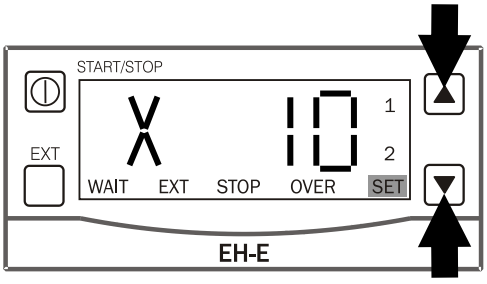


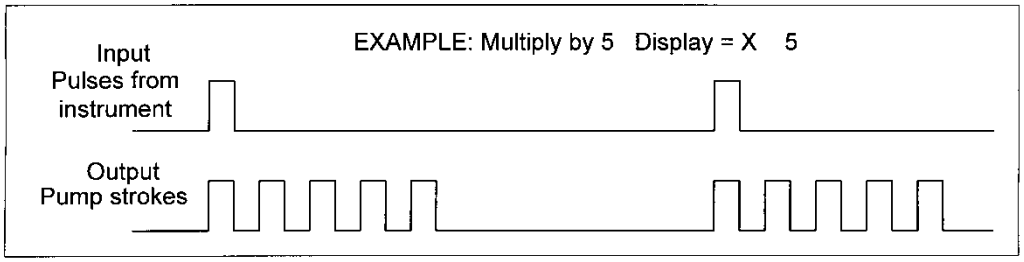

(9) Pressing the EXT key toggles the mode of operation between "/" (DIV) and "X" (MULT).

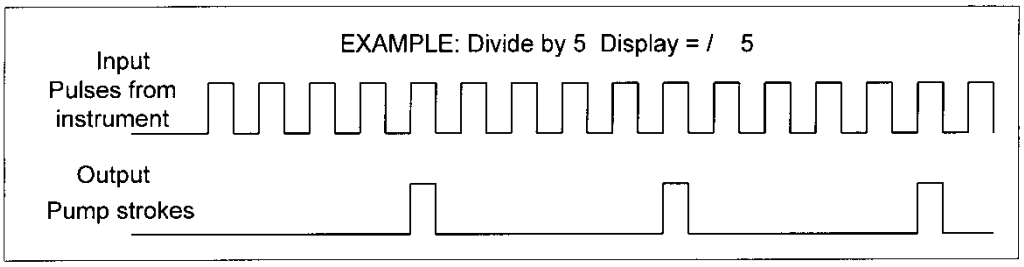
Once the desired mode of operation is displayed ("X 1" for MULT or "/ 1" for DIV), set the value needed to be multiplied or divided.



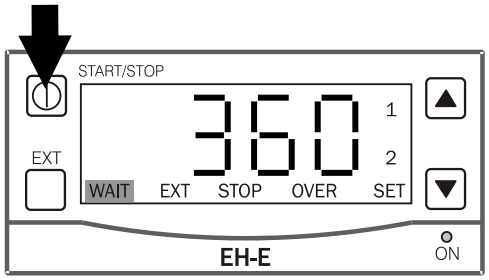

(10) Setting the Stroke Rate:
Set the desired multiplier or divider value using the ▲ and ▼ keys.
The allowable range is 1-999 and the default setting from the factory is 1.



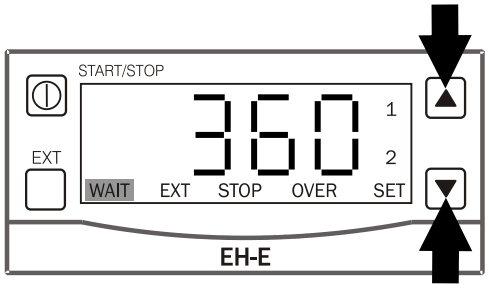





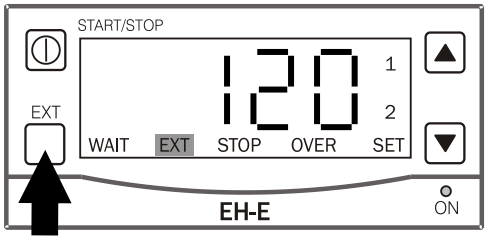

(11) Press the START/STOP key to confirm the operation mode and value settings. This will also return to the WAIT mode. The WAIT light will illuminate and the backlight behind SET will go out.




(12) IMPORTANT: Changing the pump speed in the WAIT (or MAN) mode using the ▲ and ▼ keys sets the MAX operating speed the pump will operate in the Digital mode (MULT). This can be used to help moderate the pump output and reduce slug feeding. For example, if the pump is set to multiply by 10 and a max of 3 input pulses/min are expected from a flowmeter, instead of having the pump stroke 10 times in 2 seconds for each input pulse (pump set at 360SPM), the speed can be reduced to 40 SPM and the pump will take 15 seconds to evenly pump in the 10 strokes – the pump will be operating 45 seconds out of 60 instead of 6 out of 60.

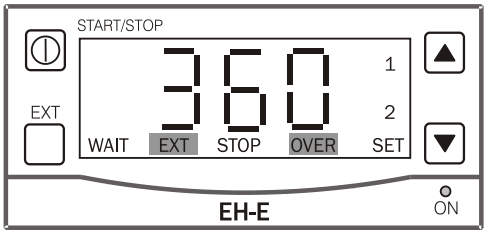



(13) Press the EXT button to start EXT pump operation. The WAIT backlight will go out, EXT will become backlit, and the ON lamp will blink with every stroke. The pump will operate at the speed corresponding to the MULT or DIV setting of the incoming pulses. To stop the pump, press the STOP/START key once and the pump will enter the WAIT mode.
Pressing the EXT again will restart the pump in EXT mode.
(see wiring section to ensure the digital input wiring is correct)

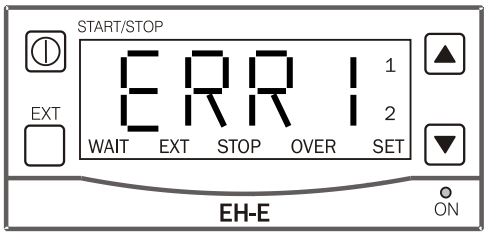


**ALARM Indications**

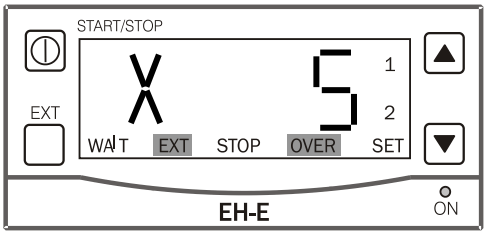
(1) In ANALOG Input Operation, if the incoming current matching 360SPM (typically, 20mA=360SPM) is exceeded, the OVER will become backlit. The pump will continue to operate at 360SPM during this condition.




(2) While programming the Analog Input Setpoints, if the same value (current or SPM) is set for both Setpoint 1 and 2, "ERR 1" will be displayed for 3 seconds. It will return to the programming menu so the setpoints can be corrected.




(3) In DIGITAL Input Operation (Multiply or Divide modes), if the incoming pulses come in either during operation or exceed the pump doing 360SPM, the OVER will be come backlit. If the Pulse Input Memory is on, the pump will store the extra pulses (max. of 255 incoming pulses) and work them off as it can to catch up.

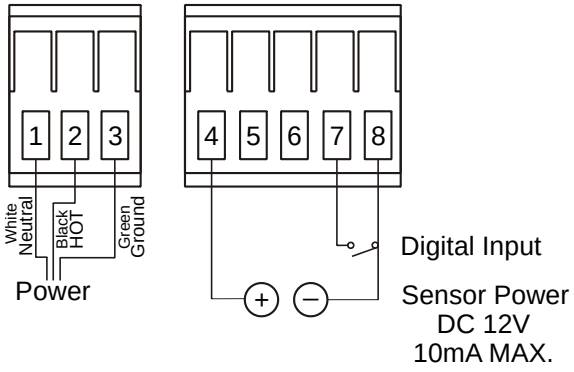


## 3.5 Input Wiring and Connections

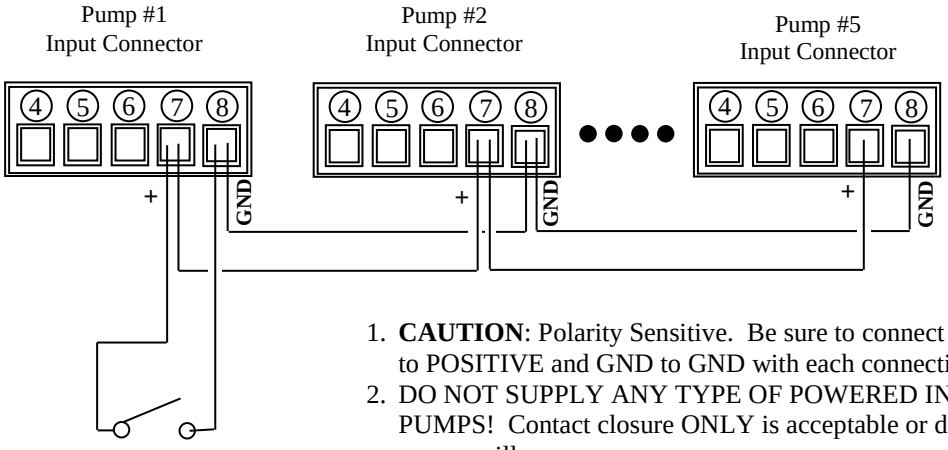
### *Digital Mode*

**Connecting a digital input device**

Disconnect AC power to the pump. Remove the four screws from the terminal block cover and remove the cover. Remove the cord nut and bushing from the terminal block cover. Remove the terminal block from the connector. Slide the nut and bushing over the external control cable and insert the cable through the terminal block cover. Strip 1/4" insulation from conductors and connect the positive side to terminal 7 and the negative side to terminal 8. (See Figure 8 and the schematic, below.)




**Connecting a digital input to multiple pumps in parallel**




1. **CAUTION**: Polarity Sensitive. Be sure to connect the POSITIVE to POSITIVE and GND to GND with each connection.
2. DO NOT SUPPLY ANY TYPE OF POWERED INPUT TO THE PUMPS! Contact closure ONLY is acceptable or damage to the pumps will occur.
3. Maximum current rating of the pump input is 10mA. Each pump draws approximately 2mA. There is a 5 PUMP LIMIT of pumps in parallel.
4. Make sure the switching device can handle the maximum current in the system.

   Current = 2mA x # of Pumps

**Sensor Power**

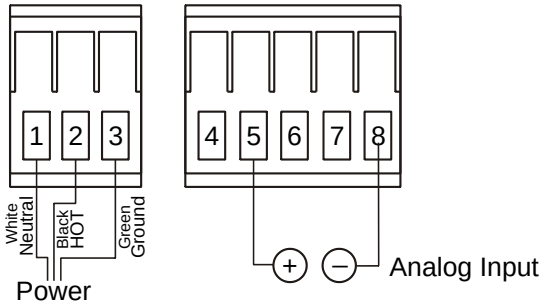
The control circuit of the EHE series has the ability to provide 12 VDC at up to 10 mA to power a Hall effect sensor or similar device. Connect the sensor power leads to terminal 4 (positive) and terminal 8 (negative) of the terminal block.

### *Analog Mode*

**CAUTION:** Open loop signal voltage must not exceed 25 VDC. If the signal voltage is greater than 25 VDC, power down the signal source prior to connection.

**Connecting an analog signal device**

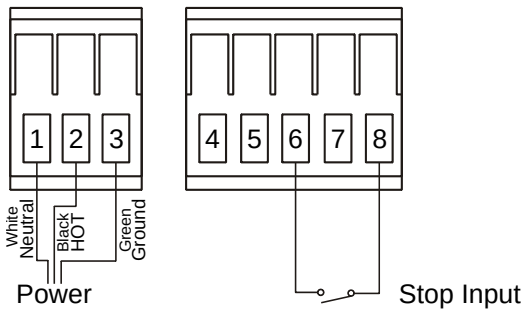
Disconnect AC power to the pump. Remove the four screws from the terminal block cover and remove the cover. Remove the cord nut and bushing from the terminal block cover. Remove the terminal block from the connector. Slide the nut and bushing over the external control cable and insert the cable through the terminal block cover. Strip 1/4" insulation from conductors and connect the positive side to terminal 5 and the negative side to terminal 8. (See Figure 8 and the schematic to the right.)




### *STOP Function*

The EHE series pump also includes a **STOP** function that allows an external signal to stop the operation of the pump.

A switch or solid-state device capable of switching 5 VDC at 2 mA can be connected to terminals 6 (positive) and 8 (negative) of the terminal block. Closing this circuit temporarily interrupts pump operation. Opening this circuit resumes pump operation. If the pump is operating in external digital mode, any pulses received while the pump is stopped will be saved (up to a maximum of 255). When pump operation resumes, saved pulses will allow the pump to "catch up" by producing the correct number of pump strokes that should have occurred while it was stopped. The 'Over' indicator will light up if the pump receives pulses while in the 'Stopped' condition (see Figure 8 and the schematic below).




## 3.6 AC Power Interruption

If AC power is interrupted, the pump will power up as shown below:

| State preceding power OFF | State following power ON |
|---|---|
| WAIT | WAIT |
| Run Manual | Run manual |
| Run external | Run external |
| Set EXTernal mode | WAIT |
| Set EXTernal values | WAIT |

# 4.0 MAINTENANCE

**CAUTION:** Before working on the pump, disconnect the power cord, depressurize the discharge tubing and drain or flush any residual liquid from the pump head and valves. Always wear protective gear when working around chemicals.

## 4.1 Diaphragm Replacement

Disconnect AC power to the pump and disconnect the suction tubing and discharge tubing. Remove the four head bolts with a 4mm hex wrench. Turn the stroke length knob fully counter-clockwise. Unscrew the diaphragm and remove its retainer (small disk behind the diaphragm). **CAUTION:** *There may be small brass spacers between the retainer and the armature shaft. These spacers need to be re-used when replacing the diaphragm.* Install the new retainer and diaphragm on the shaft. Turn the diaphragm clockwise until it bottoms on the shaft. Use Caution when handling the diaphragm – the PTFE surface can be damaged by tools, nails, or any sharp objects. Replace the pump head and tighten the head bolts to a torque of 19 lb-in (2.16 N-m).

## 4.2 Valve Replacement

Making sure the discharge side has been depressurized, remove the suction and discharge tubing. Remove the suction fitting, two valve cartridges*, o-ring and gasket(s). Install the new o-ring, gasket(s) and valve cartridges. Be sure both valve seats are in the same orientation. Refer to Figure 9 below. Tighten the suction fitting. Similarly remove and replace the discharge valve cartridges, o-ring and gasket(s).

*EHE35-HV, EHE46 and EHE56 series have one valve cartridge on the suction and discharge sides. Refer to Section 5.0 for exploded view drawing and parts list.

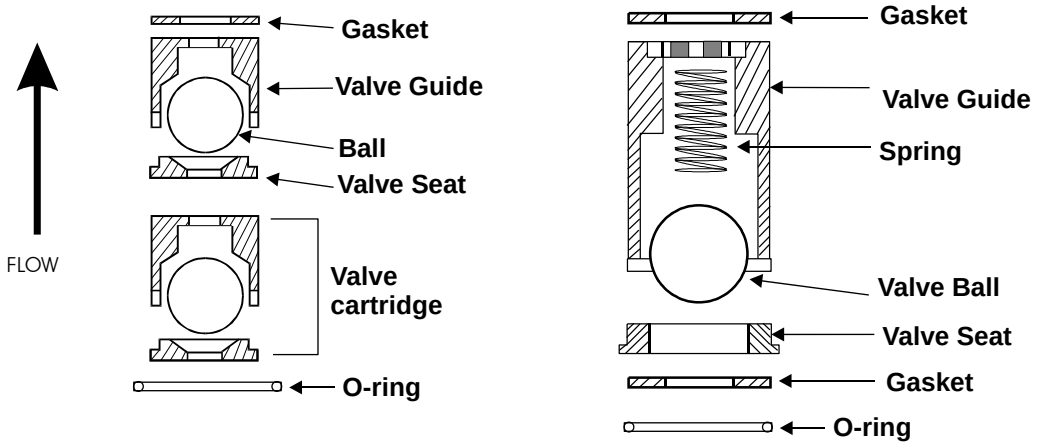



Figure 10 Valve Cartridge Orientation

## 4.3 Tubing

Check ends of tubing for splits, cracks or thin spots. Examine the full length of tubing for damage due to chafing, abrasion, stress cracks, excessive temperature or exposure to ultraviolet light (direct sunlight or mercury vapor lamps). If any signs of deterioration exist, replace the entire length of tubing. It is a good idea to replace discharge tubing on a regular preventative maintenance schedule every 12 months.

# 5.0 EXPLODED VIEW AND PARTS GUIDE

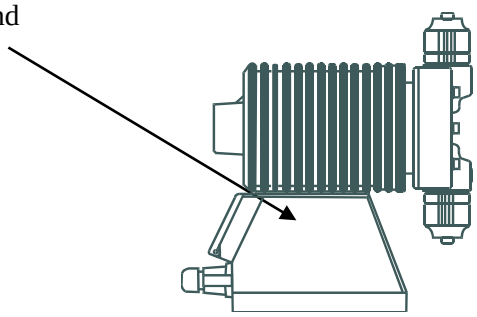
## 5.1 How to order parts for your metering pump.

Have your catalog or model number ready. This is found on the silver label on the side of the pump.

From the exploded view drawing, identify the item number of the part(s) to be ordered.

The item numbers are listed and include part number, description and size/material information.

Contact your Walchem distributor for further assistance.

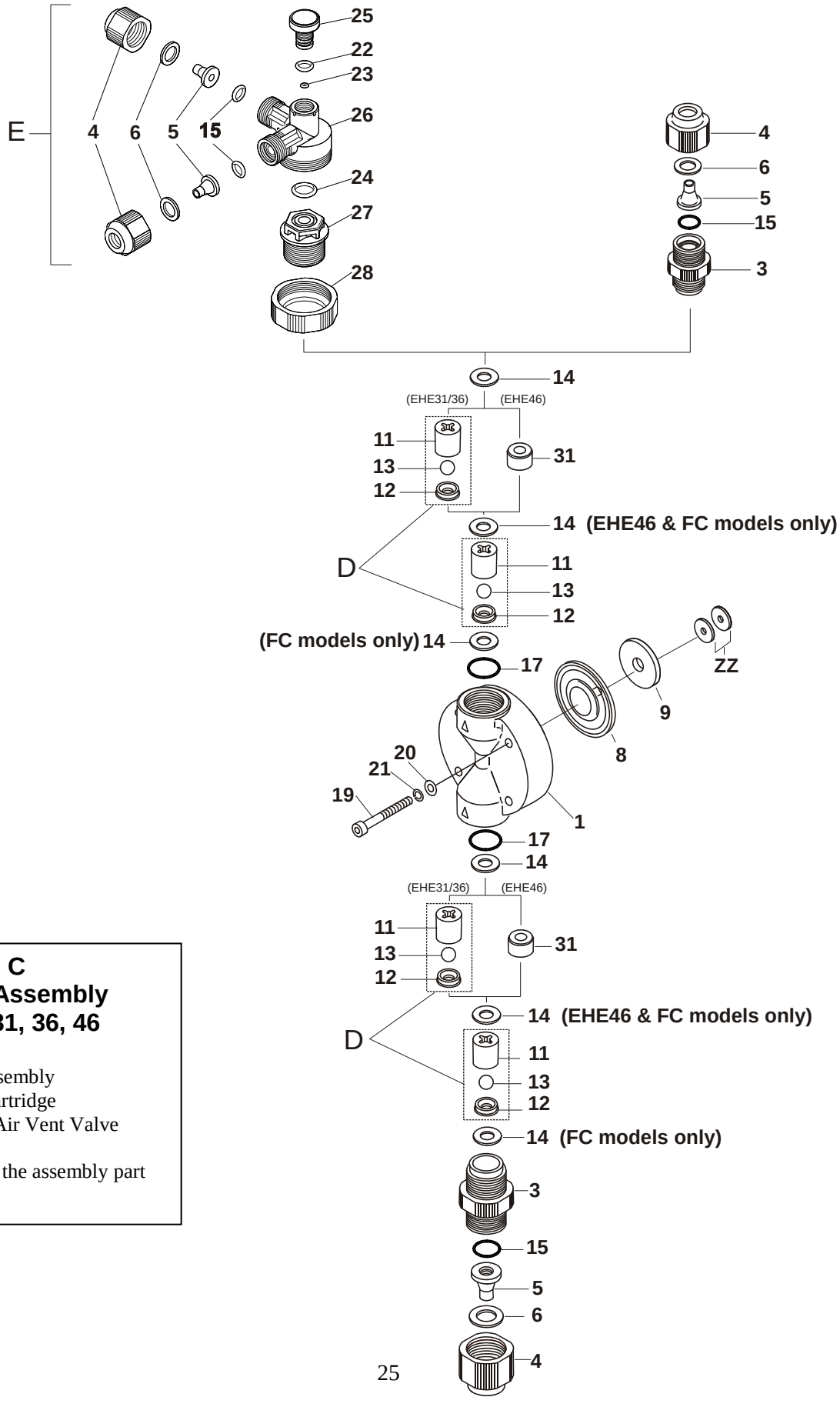


## 5.2 Accessories (Not shown)

| Part No. | Description | Size | Liquid End Mtl |
|---|---|---|---|
| E90005 | Valve, Injection 1/2 | 31, 36, 46 | VC |
| E90006 | Valve, Injection 1/2 | 31, 36, 46 | VE, VF |
| E90007 | Valve, Injection, 1/2 | 56 | VC, VM |
| E90008 | Valve, Injection, 1/2 | 56 | VE, VF |
| E90009 | Valve, Injection, 1/2 | 31, 36, 46 | PC |
| E90010 | Valve, Injection, 1/2 | 31, 36, 46 | PE |
| E90011 | Valve, Injection, 1/2 | 56 | PC |
| E90012 | Valve, Injection, 1/2 | 56 | PE |
| E90022 | Valve, Injection/Back Pressure, 1/2 | 31, 36, 46, 56 | FC |
| E90068 | Valve, Back Pressure/Anti-Siphon, 1/2 | 31, 36, 46, 56 | VC, VE, VM, VF |
| E90069 | Valve, Back Pressure/Anti-Siphon, 1/2 | 31, 36, 46, 56 | PC, PE |
| E90018 | Valve, Foot, 1/2 | 31, 36, 46, 56 | PC |
| E90036 | Valve, Foot, 1/2 | 31, 36, 46, 56 | PE |
| E90016 | Valve, Foot, 1/2 | 31, 36, 45, 56 | VC |
| E90037 | Valve, Foot, 1/2 | 31, 36, 46, 56 | VE |
| E90193 | Valve, Foot, 1/2 | 31, 36, 46, 56 | VF |
| E90275 | Valve, Foot, 1/2 | 31, 36, 46, 56 | FC |
| E00001-00 | Tubing, 1/2 OD LLDPE per foot | 31, 36, 46, 56 | All |
| E00001 | Tubing, 1/2 OD LLDPE, 20 FT | 31, 36, 46, 56 | All |
| E00001-50 | Tubing, 1/2 OD LLDPE, 50 FT | 31, 36, 46, 56 | All |
| E00001-100 | Tubing, 1/2 OD LLDPE, 100 FT | 31, 36, 46, 56 | All |
| E00001-250 | Tubing, 1/2 OD LLDPE, 250 FT | 31, 36, 46, 56 | All |
| E00001-500 | Tubing, 1/2 OD LLDPE, 500 FT | 31, 36, 46, 56 | All |
| E00071 | Weight, Ceramic | 31, 36, 46, 56 | All |
| *E00030 | Fitting (NPT Valve Housing) 1/2" NPT, PVC | 31, 36 | VC, VE, VF |
| *E00031 | Fitting (NPT Valve Housing) 1/2" NPT, PP | 31, 36 | PC, PE |
| *E00032 | Fitting (NPT Valve Housing) 1/2" NPT, PVDF | 31, 36 | FC |
| *E00033 | Fitting (NPT Valve Housing) 3/4" NPT, PVC | 31, 36 | VC, VE, VF |
| *E00034 | Fitting (NPT Valve Housing) 3/4" NPT, PP | 31, 36 | PC, PE |
| *E00035 | Fitting (NPT Valve Housing) 3/4" NPT, PVDF | 31, 36 | FC |
| *E00036 | Fitting (NPT Valve Housing) 3/4" NPT, PVC | 46 | VC, VE, VF |
| *E00037 | Fitting (NPT Valve Housing) 3/4" NPT, PP | 46 | PC, PE |
| *E00038 | Fitting (NPT Valve Housing) 3/4" NPT, PVDF | 46 | FC |
| *E00039 | Fitting (NPT Valve Housing) 3/4" NPT, PVC | 56 | VC, VE, VM, VF |
| *E00040 | Fitting (NPT Valve Housing) 3/4" NPT, PP | 56 | PC, PE |
| *E00041 | Fitting (NPT Valve Housing) 3/4" NPT, PVDF | 56 | FC |

* Fittings replace the Valve Housing (Item 3) and the complete Manual Air Vent Valve assembly (Item E) shown in exploded view.

## 5.3 EHE31, 36, 46 Liquid End Exploded View




**C**
**Head Assembly**
**EHE 31, 36, 46**

C Head Assembly
D Valve Cartridge
E Manual Air Vent Valve

See Page 31 for the assembly part numbers

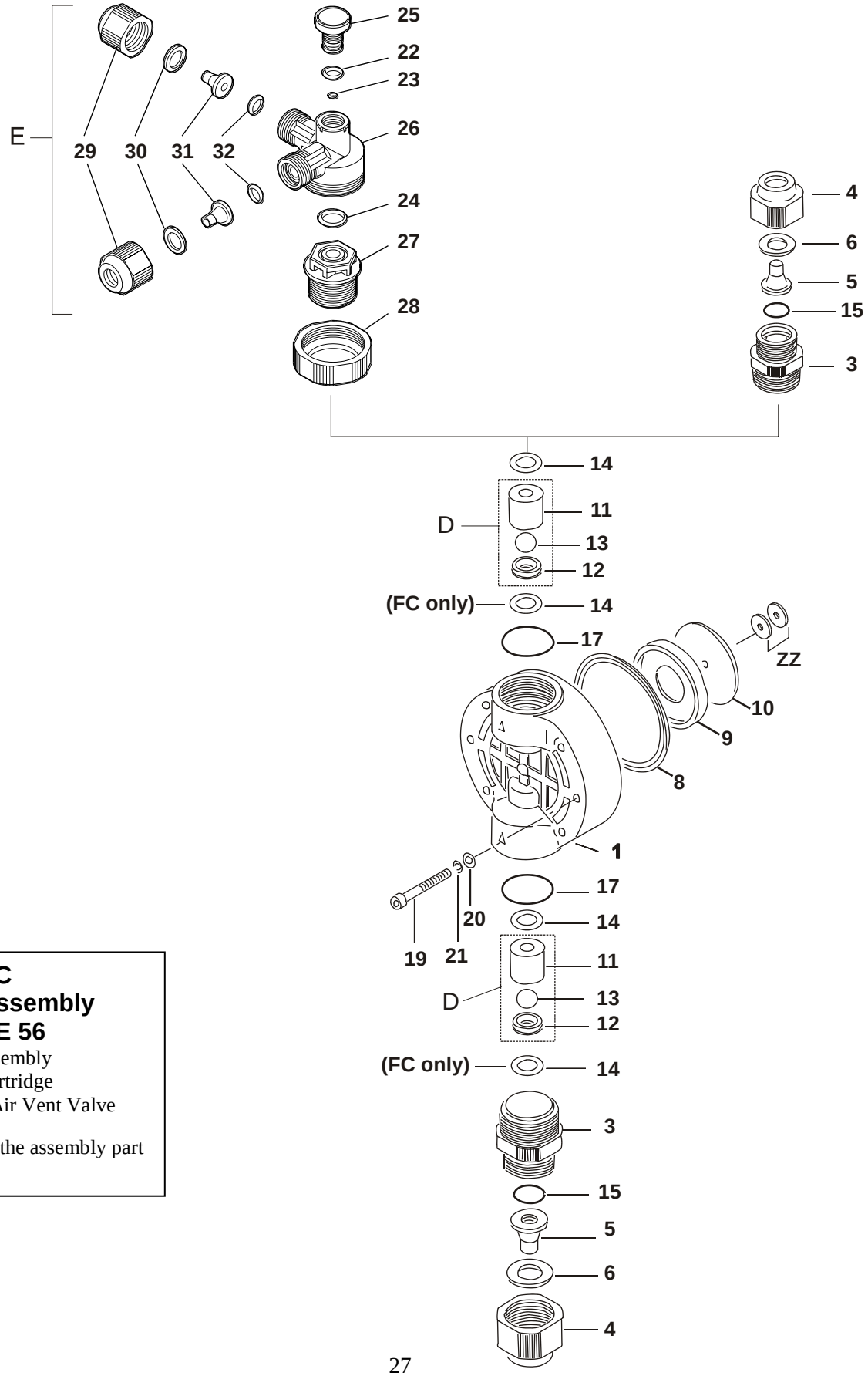
# EHE31, 36, 46 Liquid End Parts List

| Item | Part No | Description | Qty | Size | Liquid End Mtl |
|---|---|---|---|---|---|
| **1** | EH2101 | Head, E31 PVC | 1 | 31 | VC, VE, VF |
| | EH2102 | Head, E31 GFRPP | 1 | 31 | PC, PE |
| | EH2103 | Head, E31 PVDF | 1 | 31 | FC |
| | EH1953 | Head, E36 PVC | 1 | 36 | VC, VE, VF |
| | EH1962 | Head, E36 GFRPP | 1 | 36 | PC, PE |
| | EH1967 | Head, E36 PVDF | 1 | 36 | FC |
| | EH2109 | Head, E46 PVC | 1 | 46 | VC, VE, VF |
| | EH2110 | Head, E46 GFRPP | 1 | 46 | PC, PE |
| | EH2111 | Head, E46 PVDF | 1 | 46 | FC |
| **3** | EH0619 | Housing, Valve, ½ PVC | 1 | 31,36 | VC, VE, VF |
| | EH0675 | Housing, Valve, ½ GFRPP | 1 | 31,36 | PC, PE |
| | EH0947 | Housing, Valve, ½ PVDF | 2 | 31,36 | FC |
| | EH0640 | Housing, Valve, ½ PVC | 1 | 46 | VC, VE, VF |
| | EH0679 | Housing, Valve, ½ GFRPP | 1 | 46 | PC, PE |
| | EH0932 | Housing, Valve, ½ PVDF | 2 | 46 | FC |
| **4** | EH0620 | Nut, Coupling, ½ PVC | 3 | 31,36,46 | VC, VE, VF |
| | EH0676 | Nut, Coupling, ½ GFRPP | 3 | 31,36,46 | PC, PE |
| | EH0933 | Nut, Coupling, ½ PVDF | 2 | 31,36,46 | FC |
| **5** | EH0719 | Adapter, ½, PVC | 3 | 31,36,46 | VC, VE, VF |
| | EH0734 | Adapter, ½ GFRPP | 3 | 31,36,46 | PC, PE |
| | EH0938 | Adapter, ½ PVDF | 2 | 31,36,46 | FC |
| **6** | EH0720 | Clamp Ring, 1/2 SS | 3(2) | 31,36,46 | All (FC) |
| ***8** | EH2105 | Diaphragm, PTFE/EPDM | 1 | 31 | All |
| | EH2108 | Diaphragm, PTFE/EPDM | 1 | 36 | All |
| | EH2113 | Diaphragm, PTFE/EPDM | 1 | 46 | All |
| ***9** | EH0622 | Retainer, Diaphragm | 1 | 31 | All |
| | EH0637 | Retainer, Diaphragm | 1 | 36 | All |
| | EH0642 | Retainer, Diaphragm | 1 | 46 | All |
| ***11** | EH0118 | Guide, Valve 0.375 PVC | 4 | 31,36 | VC, VE,VF |
| | EH0332 | Guide, Valve 0.375 GFRPP | 4 | 31,36 | PC, PE |
| | EH0352 | Guide, Valve 0.375 PVDF | 4 | 31,36 | FC |
| | EH0643 | Guide, Valve 0.500 PVC | 2 | 46 | VC, VE,VF |
| | EH0680 | Guide, Valve 0.500 GFRPP | 2 | 46 | PC, PE |
| | EH0934 | Guide, Valve 0.500 PVDF | 2 | 46 | FC |
| ***12** | EH0119 | Seat, Valve 0.375 FKM | 4 | 31, 36 | VC, PC |
| | EH0623 | Seat, Valve, 0.375 EPDM | 4 | 31, 36 | VE, PE, VF |
| | EH0593 | Seat, Valve, 0.375 PCTFE | 4 | 31, 36 | FC |
| | EH0644 | Seat, Valve, 0.500 FKM | 2 | 46 | VC, PC |
| | EH0645 | Seat, Valve, 0.500 EPDM | 2 | 46 | VE, PE, VF |
| | EH0935 | Seat, Valve, 0.500 PCTFE | 2 | 46 | FC |
| ***13** | EH0120 | Ball, Valve, 0.375 CE | 4 | 31, 36 | VC, VE, PC, PE, FC |
| | E00062 | Ball, Valve, 0.375, PTFE | 4 | 31, 36 | VF |

| Item | Part No | Description | Qty | Size | Liquid End Mtl |
|---|---|---|---|---|---|
| ***13** | EH0646 | Ball, Valve, 0.500, CE | 2 | 46 | VC, VE, PC, PE, FC |
| | E00072 | Ball, Valve, 0.500, PTFE | 2 | 46 | VF |
| ***14** | EH0121 | Gasket, Valve, 0.375 PTFE | 2 | 31, 36 | VC, VE, PC, PE, VF |
| | EH0354 | Gasket, Valve, 0.375 PTFE | 6 | 31, 36 | FC |
| | EH0648 | Gasket, Valve, 0.500, PTFE | 4 | 46 | VC, VE, PC, PE, VF |
| | EH0936 | Gasket, Valve, 0.500, PTFE | 6 | 46 | FC |
| ***15** | EH0028 | O-Ring, P12 FKM | 3 | 31,36,46 | VC, PC |
| | EH0051 | O-Ring, P12 EPDM | 3 | 31,36,46 | VE, PE, VF |
| | EH0939 | Gasket, Adapter, PTFE | 2 | 31,36,46 | FC |
| ***17** | EH0122 | O-Ring, P16 FKM | 2 | 31, 36 | VC, PC |
| | EH0127 | O-Ring, P16 EPDM | 2 | 31, 36 | VE, PE, VF |
| | EH0650 | O-Ring, 24 x 2.62, FKM | 2 | 46 | VC, PC |
| | EH0649 | O-Ring, 24 x 2.62 EPDM | 2 | 46 | VE, PE, VF |
| | EH0355 | Gasket, Housing, PTFE | 2 | 31, 36 | FC |
| | EH0941 | Gasket, Housing, PTFE | 2 | 46 | FC |
| **19** | EH2106 | Bolt, M5 x 40 316 SS | 4/6 | 31,36,46 | All |
| **20** | EH2011 | Washer, M5 Flat, 316 SS | 4/6 | 31,36,46 | All |
| **21** | EH2012 | Washer, M5 Lock, 316 SS | 4/6 | 31,36,46 | All |
| ***22** | EH0302 | O-Ring, Knob, Seal | 1 | 31,36,46 | VC, PC |
| | EH0303 | O-Ring, Knob, Seal | 1 | 31,36,46 | VE, PE, VF |
| ***23** | EH0300 | O-Ring, Knob, Stop | 1 | 31,36,46 | VC, PC |
| | EH0301 | O-Ring, Knob, Stop | 1 | 30.35.45 | VE, PE, VF |
| ***24** | EH1082 | O-Ring, Fitting Seal | 1 | 31, 36 | VC, PC |
| | EH1084 | O-Ring, Fitting Seal | 1 | 31, 36 | VE, PE, VF |
| | EH0122 | O-Ring, Fitting Seal | 1 | 46 | VC, PC |
| | EH0127 | O-Ring, Fitting Seal | 1 | 46 | VE, PE, VF |
| **25** | EH0299 | Adjustment Knob | 1 | 31,36,46 | VC, VE, VF |
| | EH0321 | Adjustment Knob | 1 | 31,36,46 | PC, PE |
| **26** | EH1662 | Manual Air Vent Valve Body | 1 | 31,36,46 | VC, VE, VF |
| | EH1665 | Manual Air Vent Valve Body | 1 | 31,36,46 | PC, PE |
| **27** | EH1078 | Valve Housing MAVV | 1 | 31, 36 | VC, VE, VF |
| | EH1088 | Valve Housing MAVV | 1 | 31, 36 | PC, PE |
| | EH1660 | Valve Housing MAVV | 1 | 46 | VC, VE, VF |
| | EH1663 | Valve Housing MAVV | 1 | 46 | PC, PE |
| **28** | EH1674 | Lock Nut, MAVV | 1 | 31, 36 | VC, VE, VF |
| | EH1675 | Lock Nut, MAVV | 1 | 31, 36 | PC, PE |
| | EH1661 | Lock Nut, MAVV | 1 | 46 | VC, VE, VF |
| | EH1664 | Lock Nut, MAVV | 1 | 46 | PC, PE |
| **31** | EH0653 | Spacer, V.Housing, PVC | 2 | 46 | VC, VE, VF |
| | EH0683 | Spacer, V.Housing, PP | 2 | 46 | PC, PE |
| | EH0940 | Spacer, V.Housing, PVDF | 2 | 46 | FC |
| **ZZ** | --------- | Brass Spacers | Drive specific/Re-use when replacing the diaphragm | | |

* Included in spare parts kit

## 5.4 EHE 56 Liquid End Exploded View




**C**
**Head Assembly**
**EHE 56**

C Head Assembly
D Valve Cartridge
E Manual Air Vent Valve

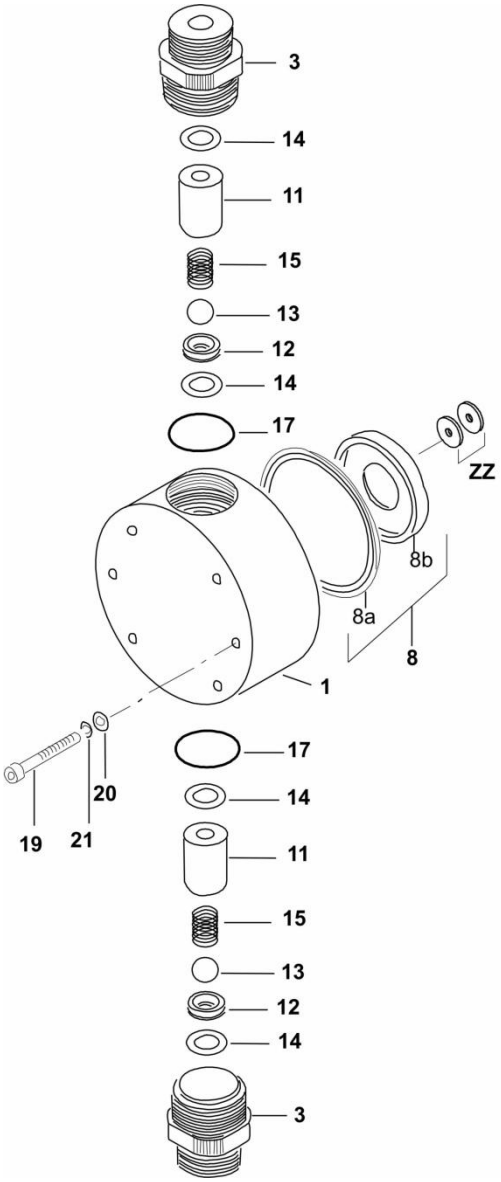
See page 31 for the assembly part numbers

# EHE 56 Liquid End Parts List

| Item | Part No | Description | Qty | Size | Liquid End Mtl |
|---|---|---|---|---|---|
| **1** | EH2114 | Head, E56 PVC | 1 | 56 | VC, VE, VF |
| | EH2115 | Head, E56 GFRPP | 1 | 56 | PC, PE |
| | EH2118 | Head, E56 PVC Machined | 1 | 56 | VM |
| | EH2116 | Head, E56 PVDF | 1 | 56 | FC |
| **3** | EH0656 | Housing, Valve, E56, PVC | 2 | 56 | VC, VE, VM, VF |
| | EH0685 | Housing, Valve, E56, GFRPP | 2 | 56 | PC, PE |
| | EH0916 | Housing, Valve, ½ PVDF | 2 | 56 | FC |
| **4** | EH0657 | Nut, Coupling, E56, PVC | 2 | 56 | VC, VE, VM, VF |
| | EH0686 | Nut, Coupling, E56, GFRPP | 2 | 56 | PC, PE |
| | EH0917 | Nut, Coupling, E56, PVDF | 2 | 56 | FC |
| **5** | EH0730 | Adapter, E56, 1/2, PVC | 2 | 56 | VC, VE, VM, VF |
| | EH0735 | Adapter, E56, 1/2, GFRPP | 2 | 56 | PC, PE |
| | EH0923 | Adapter, E56, PVDF | 2 | 56 | FC |
| **6** | EH0731 | Clamp Ring, E56, 1/2, SS | 2 | 56 | All |
| ***8** | EH2119 | Diaphragm, PTFE/EPDM | 1 | 56 | All |
| ***9** | EH0660 | Retainer, Secondary, PPS | 1 | 56 | All |
| ***10** | EH0659 | Retainer | 1 | 56 | All |
| ***11** | EH0661 | Guide, Valve, .625, PVC | 2 | 56 | VC, VE, VM, VF |
| | EH0718 | Guide, Valve, .625, GFRPP | 2 | 56 | PC, PE |
| | EH0918 | Guide, Valve, 0.625, PVDF | 2 | 56 | FC |
| ***12** | EH0662 | Seat, Valve, .625, FKM | 2 | 56 | VC, VM, PC |
| | EH0663 | Seat, Valve, .625, EPDM | 2 | 56 | VE, PE, VF |
| | EH0920 | Seat, Valve, 0.625, PCTFE | 2 | 56 | FC |
| ***13** | EH0664 | Ball, Valve, .625, CE | 2 | 56 | VC, VE, VM, PC, PE, FC |
| | E00073 | Ball, Valve, .625, PTFE | 2 | 56 | VF |
| ***14** | EH0666 | Gasket, Valve, .625, PTFE | 2 | 56 | VC, VE, VM, PC, PE, VF |
| | EH0921 | Gasket, Valve, 0.625 PTFE | 4 | 56 | FC |
| ***15** | EH0122 | O-Ring, P16 FKM | 2 | 56 | VC, VM, PC |
| | EH0127 | O-Ring, P16 EPDM | 2 | 56 | VE, PE, VF |
| | EH0924 | Gasket, Adapter, PTFE | 2 | 56 | FC |
| ***17** | EH0667 | O-Ring, 29.8 X 2.62, FKM | 2 | 56 | VC, VM, PC |
| | EH0668 | O-Ring, 29.8 X 2.62, EPDM | 2 | 56 | VE, PE, VF |
| | EH0925 | Gasket, Housing, PTFE | 2 | 56 | FC |
| **19** | EH2054 | Bolt, M5 x 55 SHC, 316 SS | 6 | 56 | VC, VE, PC, PE, VF |
| | EH2121 | Bolt, M5 x 75 SHC, 316 SS | 6 | 56 | VM |
| **20** | EH2011 | Washer, M5 Flat, 316 SS | 6 | 56 | All |
| **21** | EH2012 | Washer, M5 Lock, 316 SS | 6 | 56 | All |
| ***22** | EH0302 | O-Ring, Knob, Seal | 1 | 56 | VC, PC |
| | EH0303 | O-Ring, Knob, Seal | 1 | 56 | VE, PE |
| ***23** | EH0300 | O-Ring, Knob, Stop | 1 | 56 | VC, PC |
| | EH0301 | O-Ring, Knob, Stop | 1 | 56 | VE, PE |
| ***24** | EH0122 | O-Ring, Fitting Seal | 1 | 56 | VC, PC |
| | EH0127 | O-Ring, Fitting Seal | 1 | 56 | VE, PE |
| **25** | EH0299 | Adjustment Knob | 1 | 56 | VC, VE |
| | EH0321 | Adjustment Knob | 1 | 56 | PC, PE |
| **26** | EH1662 | Manual Air Vent Valve Body | 1 | 56 | VC, VE |
| | EH1665 | Manual Air Vent Valve Body | 1 | 56 | PC, PE |
| **27** | EH1666 | Valve Housing MAVV | 1 | 56 | VC, VE |
| | EH1667 | Valve Housing MAVV | 1 | 56 | PC, PE |
| **28** | EH1661 | Lock Nut, MAVV | 1 | 56 | VC, VE |
| | EH1664 | Lock Nut, MAVV | 1 | 56 | PC, PE |
| **29** | EH0620 | Coupling Nut | 2 | 56 | VC, VE |
| | EH0676 | Coupling Nut | 2 | 56 | PC, PE |
| **30** | EH0720 | Clamp Ring | 2 | 56 | VC, VE, PC, PE |
| **31** | EH0719 | Adapter | 2 | 56 | VC, VE |
| | EH0734 | Adapter | 2 | 56 | PC, PE |
| **32** | EH0028 | O-Ring, Coupling Nut | 2 | 56 | VC, PC |
| | EH0051 | O-Ring, Coupling Nut | 2 | 56 | VE, PE |
| **ZZ** | ---------- | Brass Spacers | Drive specific/ re-use when replacing diaphragm | | |

***** Included in spare parts kit

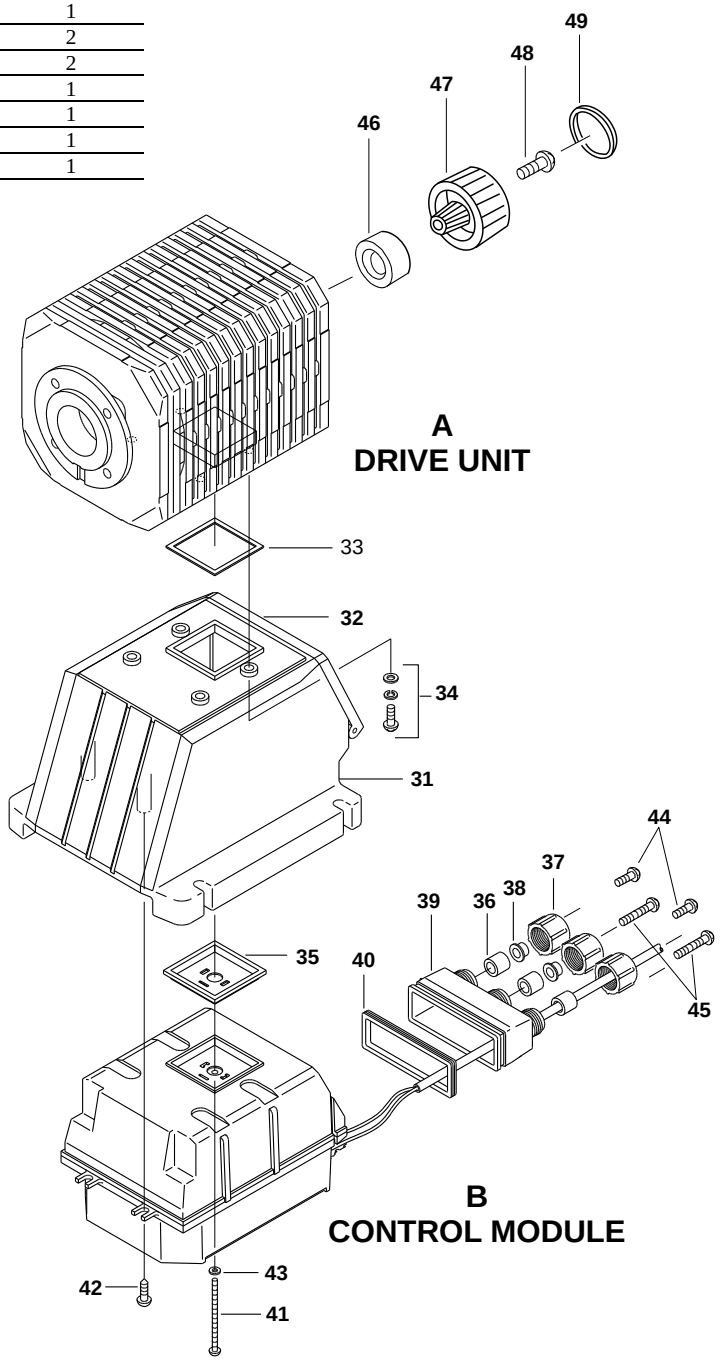
## 5.5 EHE 35-HV Liquid End Parts List




| | Item | Part No | Description | Qty | Size |
|---|---|---|---|---|---|
| | 1 | EH1243 | Head, HV, PVC | 1 | 35 |
| | 3 | E00036 | Housing, Valve, ¾" NPT, PVC | 2 | 35 |
| * | 8 | E90085 | Diaphragm and Retainer | 1 | 35 |
| | 8a | EH0636 | Diaphragm, PTFE/EPDM | 1 | 35 |
| | 8b | EH0637 | Retainer, Diaphragm | 1 | 35 |
| | 11 | EH1246 | Guide, Valve, .500, PVC | 2 | 35 |
| * | 12 | EH1247 | Seat, Valve, 0.500, PCTFE | 2 | 35 |
| * | 13 | EH0646 | Ball, Valve, 0.500, CE | 2 | 35 |
| * | 14 | EH0936 | Gasket, Valve, 0.500, PTFE | 4 | 35 |
| * | 15 | EH1291 | Spring, Valve, HC | 2 | 35 |
| * | 17 | EH0650 | O-Ring, 24 X 2.62, FKM | 2 | 35 |
| | 19 | EH2054 | Bolt, M5 X 55 SHC, 316SS | 4 | 35 |
| | 20 | EH2011 | Washer, M5 Flat, 316SS | 4 | 35 |
| | 21 | EH2012 | Washer, M5 Lock, 316SS | 4 | 35 |
| | ZZ | --------- | Spacers, Brass | Re-use | |
| * | Included in spare parts kit | | | | |

## 5.6 Drive Control Components

| Item | Part No. | Description | Qty |
|---|---|---|---|
| 31 | EH0700 | Base, Pump, EHE | 1 |
| 32 | EH0697 | Cover, Control Panel | 1 |
| 33 | EH1658 | Gasket, EHE Pump Base | 1 |
| 34 | EH1071 | Screw, M5 x 12, SS, PH | 4 |
| 35 | EH0696 | Gasket, Terminal Block | 1 |
| 36 | EH0202 | Grommet, Cord | 3 |
| 37 | EH0205 | Nut, Strain Relief | 3 |
| 38 | EH0204 | Cap, Strain Relief | 2 |
| 39 | EH0706 | Box, Terminal, EHE | 1 |
| 40 | EH1036 | Gasket, Terminal Box | 1 |
| 41 | EH0710 | Screw, M3 x 50, SS, PH | 1 |
| 42 | EH0711 | Screw, 5-10 SS PH Self Tap | 2 |
| 43 | EH0261 | Gasket, M3 x 5 Bolt | 1 |
| 44 | EH1037 | Screw, M3.5 x 10, SS, PH | 2 |
| 45 | EH1038 | Screw, M3.5 x 25, SS, PH | 2 |
| 46 | EH0872 | Gasket, Stroke Adjustment | 1 |
| 47 | EH0871 | Knob, Stroke length Adj. | 1 |
| 48 | EH0873 | Screw, M4 x 30 SS PH | 1 |
| 49 | EH0141 | Cap, Stroke Length Adj Knob | 1 |




| | |
|---|---|
| A | Drive Unit |
| B | Control Unit |

See page 31 for the spare part assembly part numbers.

## 5.7 Assembly Part Numbers

Key letter from exploded view drawing, previous pages

- A Drive Unit
- B Control Module
- C Head Assembly
- D Valve Cartridge
- E Manual Air Vent Valve Assembly

| E H E | 36 | E | 1 | – | V C |
|---|---|---|---|---|---|
| Series | Size | Control | Voltage | | Liquid End |

| Pump Model | A<br>Drive Unit<br>Use P/N: | B<br>Control Module<br>Use P/N: | C<br>Head Assembly<br>Liquid End Code | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | VC | VE | VF | PC | PE | VM | FC | HV |
| EHE31E1- | HE31-1 | EHC-E11UPE (115V) | E31VC | E31VE | E31VF | E31PC | E31PE | -- | E31FC | -- |
| EHE31E2- | HE31-2 | EHC-E23UPE (230V) | | | | | | | | |
| EHE36E1- | HE36-1 | EHC-E11UPE (115V) | E36VC | E36VE | E36VF | E36PC | E36PE | -- | E36FC | -- |
| EHE36E2- | HE36-2 | EHC-E23UPE (230V) | | | | | | | | |
| EHE46E1- | HE46-1 | EHC-E11UPE (115V) | E46VC | E46VE | E46VF | E46PC | E46PE | -- | E46FC | -- |
| EHE46E2- | HE46-2 | EHC-E23UPE (230V) | | | | | | | | |
| EHE56E1- | HE56-1 | EHC-E11UPE (115V) | E56VC | E56VE | E56VF | E56PC | E56PE | E56VM | E56FC | -- |
| EHE56E2- | HE56-2 | EHC-E23UPE (230V) | | | | | | | | |
| EHE35E1- | HE35-1 | EHC-E11UPE-HV (115V) | -- | -- | -- | -- | -- | -- | -- | E35HV |
| EHE35E2- | HE35-2 | EHC-E23UPE-HV (230V) | | | | | | | | |
| D<br>Valve Cartridge | | 31, 36 | E90052 | E90071 | E90313 | E90056 | E90073 | -- | E90316 | -- |
| | | 46 | E90074 | E90075 | E90314 | E90077 | E90078 | -- | E90317 | -- |
| | | 56 | E90079 | E90080 | E90315 | E90082 | E90083 | E90079 | E90318 | -- |
| E<br>Manual Air Vent Valve Assembly | | 31, 36 | E90589 | E90590 | E90590 | E90591 | E90592 | -- | -- | -- |
| | | 46 | E90366 | E90367 | E90367 | E90368 | E90369 | -- | -- | -- |
| | | 56 | E90370 | E90371 | E90371 | E90372 | E90373 | E90370 | -- | -- |

## 5.8 Spare Parts Kit

The spare parts kit number is the Head Assembly part number with '–PK' at the end. (E31VC-PK, E31VE-PK, E31PC-PK, etc.)

Spare parts kit includes: diaphragm, retainer(s), valve guides, valve seats, valve balls, valve gaskets, o-rings and a hex wrench (head bolts are not included) (see the exploded view drawings for detail of parts in the spare parts kits)

## 6.0 TROUBLESHOOTING



**Caution:** Before working on the pump disconnect the power cord, depressurize the discharge tubing and drain or flush any residual liquid from the pump head and valves.

| Problem | Possible Cause | Corrective Action |
|---|---|---|
| ***Pump does not start*** | Faulty wiring | Correct wiring |
| | Improper voltage | Connect to proper voltage source |
| | Electronic control unit is damaged | Replace control unit (Contact distributor or factory) |
| ***Pump does not prime*** | Pump stroke length is too short | Operate pump with stroke length set at 100% until primed. Then set the stroke length as needed to obtain desired output. |
| | Air in suction tubing | Reroute suction tubing to eliminate air trap |
| | Valve gasket is missing | Install valve gasket |
| | Valve set assembly direction is wrong. | Reassemble valve set |
| | Pump is air locked | Prime pump per instructions |
| ***Output fluctuates*** | Suction or discharge valve is clogged with foreign matter | Disassemble, inspect, clean |
| | Air is trapped in pump | Prime pump per instructions |
| | Overfeeding | Install injection valve or back pressure valve. Check stroke length knob(@ 0%, pump should not pump) |
| | Diaphragm is damaged | Replace diaphragm |
| | Worn check valves | Replace valve cartridges |
| ***Liquid leaks*** | Fitting or coupling nut is loose | Tighten |
| | Pump head is loose | Tighten pump head bolts. Torque: 19 lb-in (2.16 N-m) |
| | Diaphragm is damaged | Replace diaphragm |
| | O-ring or valve gasket missing. | Install o-ring or valve gasket |

## 7.0 SERVICE POLICY

The EHE Series electronic metering pumps have a 2-year warranty. Contact your Walchem distributor for service.

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