

Section 11 - Electric Actuators

Introduction

We would like to take this opportunity to thank you for purchasing a *Mold-Masters E-VG* unit. The purpose of this manual is to assist users in the integration, operation and maintenance of *Mold-Masters* systems. This manual is designed to cover most system configurations. For additional information, please contact your representative or a *Mold-Masters* office.

Electric Valve Actuator Selection Chart

Part Name	Part Description
ES5510003A	Solenoid size 55mm stroke 3mm
LS0001A	ES5510003A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER14 & 3.0mm PIN (10" LG.) 3mm STROKE (48VDC)
LS0001B	ES5510003A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER14 & 3.0mm PIN (14" LG.) 3mm STROKE (48VDC)
LS0001x	ES5510003A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER14 w/o 3.0mm PIN 3mm STROKE (48VDC)
ES7510003A	Solenoid size 75mm stroke 3mm
LS0002A	ES7510003A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER13 & 3.0mm PIN (10" LG.) 3mm STROKE (48VDC)
LS0002B	ES7510003A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER13 & 3.0mm PIN (14" LG.) 3mm STROKE (48VDC)
LS0002x	ES7510003A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER13 w/o 3.0mm PIN 3mm STROKE (48VDC)
ES7510008A	Solenoid size 75mm stroke 8mm
LS0003A	ES7510008A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER13 & 3.0mm PIN (10" LG.) 8mm STROKE (48VDC)
LS0003B	ES7510008A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER13 & 3.0mm PIN (14" LG.) 8mm STROKE (48VDC)
LS0003x	ES7510008A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER13 w/o 3.0mm PIN 8mm STROKE (48VDC)
ES11010010A	Solenoid Size 110mm with Stroke 10mm
LS0004A	ES11010010A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER & 5.0mm PIN (10" LG.) (48VDC)
LS0004B	ES11010010A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER & 5.0mm PIN (14" LG.) (48VDC)
LS0004X	ES11010010A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/ 5mm VPHOLDER & w/o PIN
LS0005A	ES11010010A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER & 8.0mm PIN (10" LG.) (48VDC)
LS0005B	ES11010010A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/VP-HOLDER & 8.0mm PIN (14" LG.) (48VDC)
LS0005X	ES11010010A DOUBLE ACTING LINEAR SOLENOID PACKAGE w/8mm VPHOLDER & w/o PIN

ES Solenoids

ES Solenoids are precision engineered actuators with integrated permanent magnets. Inside the actuator, a moving armature is guided by linear bearings. The armature can take two end positions and is solidly held at these positions by permanent magnets. Switching between both end positions is accomplished by energising the coils.



CAUTION

Switching between both end positions of the armature must only take place by means of applying an electric current to the coils. Any switching with external mechanical means may lead to the destruction of the ES solenoid.

Safety Warnings



This product contains permanent magnets which generate a magnetic field even if the coil is not energised. This magnetic field is also effective outside of the product.

The following warnings indicate a potentially hazardous situation, which if not avoided, could result in serious injury or death.

- Magnetic fields can erase data stored on magnetic media. They can also influence or even destroy electronic and mechanic components, such as pacemakers. For this reason, the required safety distances need to be observed.
- Certain magnetic materials are toxic and/or easily soluble and therefore represent a safety hazard. Destruction and disintegration can be caused by corrosion, chemical influences, other magnetic fields, high temperatures etc. Direct contact with magnetic materials may result in allergic reactions.
- For shipping via airfreight, a dangerous goods declaration is required. Permanent magnets may not be exposed to radioactive emissions.
- During its operation, the ES solenoid may develop considerable heat. Physical contact with the solenoid during operation may result in burns.
- Loud noises can be caused during operation. Wearing hearing protection is strongly recommended.
- Activating the ES solenoid manually with external mechanical tools may lead to serious physical harm.
- When applying mechanical forces, please take into consideration that the material may break or splinter.
- Turn off a defective solenoid immediately and disconnect it from its power supply.

- The ES solenoid must be mechanically fixed before operating.
- The latest standards and regulations, such as the Low Voltage Directive need to be observed when installing the ES solenoid. In addition, any technical information printed on the label and the packaging must be observed.

Cautions



Damage to the solenoid is possible if the following cautions are not followed.

- **Any switching with external mechanical means may lead to the destruction of the ES solenoid.**
- **Oiling or greasing the moving parts of the solenoid may lead to a total failure of the ES solenoid.**
- Applying an improper voltage to the coils or exceeding the nominal switch on period may damage or thermally destroy the solenoid by overheating.
- Any mechanical damage of the surfaces may lead to corrosion.
- Exposing the unit to hard shocks during installation may interfere with the function of the ES solenoid.
- All wire leads and electrical contacts need to be protected against mechanical damages.
- Exposure to high temperatures will irreparably damage the permanent magnets.
- Prevent magnetisable particles, such as iron cuttings from getting close to the product.

- Exposing the ES solenoid to dust particles will reduce the life cycle of the bearings guiding the armature.
- Modifications of the ES solenoid may limit its function or lead to its total failure.
- The ES solenoid should be installed at a clean location.
- Only use the mounting holes provided to attach the unit.
- Use screws to mechanically attach the ES solenoid and tighten them with an appropriate torque before connecting the unit electrically.
- To apply the supply voltage, only use leads with a sufficient cross section and insulation.
- Solvents, such as Acetone or Benzine can influence the function of the ES solenoid. You may safely remove metal cuttings stuck to the solenoid by means of an adhesive tape.
- Store in a dry location at the required storage temperature.

Additional Tools Required

The following tools are required in addition to those listed in Section 4:

- Valve pin pulling tool.
- Long M5 hex key with T-handle and snap ring in tip (*Mold-Masters* item number: KEY-BPHEXTKEY5.0).
- Grease: Castrol Longtime PD2 (*Mold-Masters* item number: 104L11051).
- Proper Valve Pin extraction tools.

Specifications

Input power: 230 V

Actuator stack height: 100mm + 35mm mounting plate

Stroke length:

- for 55mm solenoid: 3mm
- for 75mm solenoid: 3mm and 8mm
- for 110mm solenoid: 10mm

Minimum pitch:

- for 55mm solenoid: >58mm
- for 75mm solenoid: >78mm
- for 110mm solenoid: >112mm

Available gating styles: any cylindrical valve gate

Number of cavities: 2-8

Resins: commodity resins, ABS, PA

Maximum valve pin diameter:

- for 55mm solenoid: 3.2mm
- for 75mm solenoid:
 - with 3mm stroke: 5.2mm
 - with 8mm stroke: 3.2mm
- for 110mm solenoid: 8.2mm

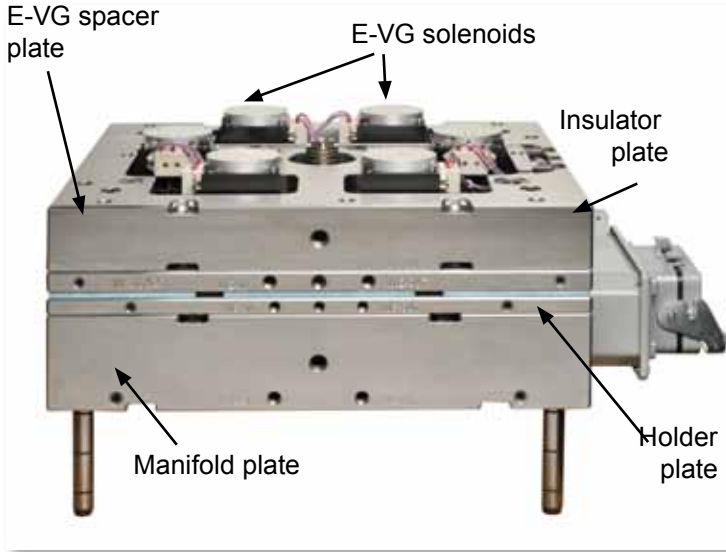


Figure 11-1 Example: 6 Cavity hot half with E-VG units. Stack for high mold temperature >122°F (50°C)



Figure 11-2 Example: 2 Cavity Accu-Valve CX hot half and 75 mm and 55 mm EVG. Stack for low mold temperature <122°F (50°C)



Figure 11-3 75 mm E-VG with VP Holder14



Figure 11-4 55 mm E-VG with VP Holder13



Figure 11-5 E-VG with Valve Pin Assembled

Pin Height Adjustment

The following procedure is for adjusting the pin height. The pin height can be adjusted +/- 1 mm in each direction (forward or back).



IMPORTANT

Pin height adjustments need to be done when the system is hot in order for the pin to be a true length in operating conditions. Failure to do so could result in damage to the gate.



CAUTION

Water circulating in the holder space plate should be 25°C or below.

1. Open the lock nut using the supplied lock nut tool.
2. Use the M5 hex key (KEY-BPHEXTKEY5) to turn the adjusting screw clockwise (to move the pin forward) or counter-clockwise (to move the pin back).
3. When the pin is in the correct position hold the screw with the hex key and tighten the lock nut.

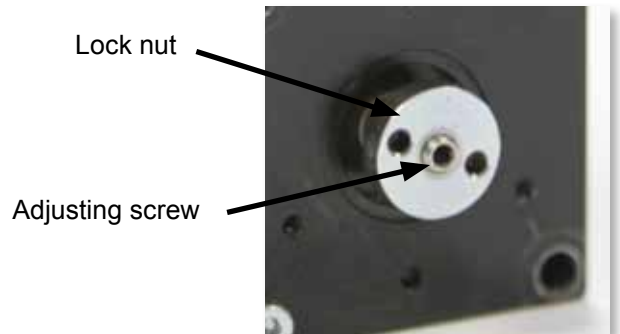


Figure 11-6 E-VG Lock Nut and Adjusting Screw

Pin Removal from 110 mm E-VG (VPHolder15/16)

1. Remove the E-VG unit.
2. Slide the pin from the T-slot.

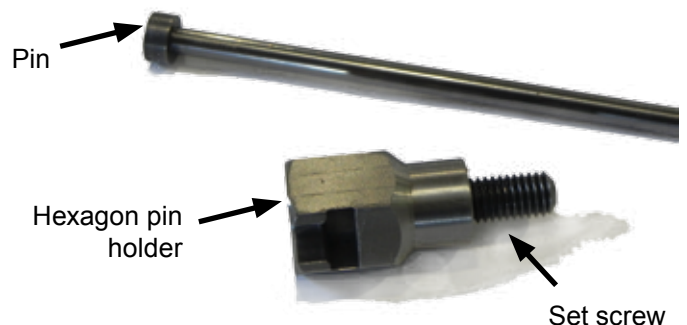


Figure 11-7 Pin Removal

Pin Installation into 110 mm E-VG (VPHolder15/16)

1. Apply high strength thread locking compound to the pin holder set screw and install it into the pin holder.
2. Apply high strength thread locking compound to the other end of the set screw and install the valve pin holder into the E-VG unit.
3. Slide the pin into the pin holder T-slot.

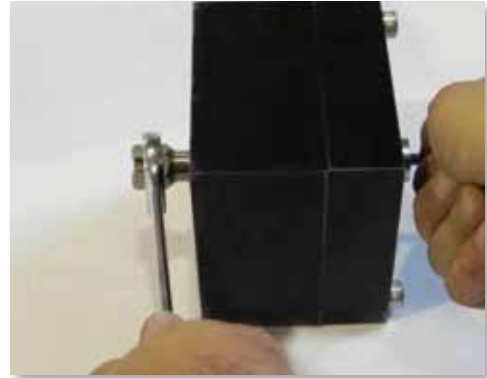


Figure 11-8a Valve Pin Holder Assembled into E-VG



Figure 11-8b Pin in Pin Holder T-Slot

Pin Removal from 75 mm E-VG (VPHolder13)

1. Remove the E-VG unit.
2. Loosen the hexagon pin holder.
3. Anchor the unit in a vice and use the M5 hex key (KEY-BPHEXTKEY5) to remove the set screw.
4. Pull the set screw out.
5. Remove the dowel pin.
6. Pull the pin out.

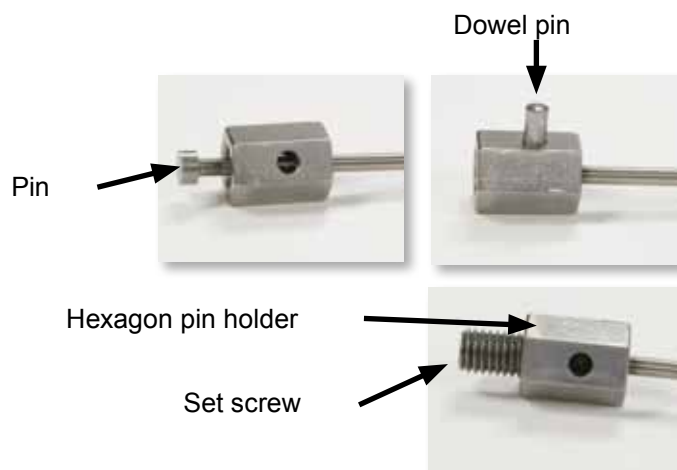


Figure 11-9 Pin Removal

Pin Installation into 75 mm E-VG (VPHolder13)

1. Place the pin in the pin holder.
2. Apply high strength thread locking compound to the dowel pin and insert it into the pin holder.
3. Apply high strength thread locking compound to the set screw and tighten set screw into the pin holder.
4. Screw the set screw back into the E-VG unit.



Figure 11-10 Valve Pin Holder 13
Assembled into E-VG

Pin Removal 55 mm E-VG (VPHolder14)

1. Remove the E-VG unit.
 1. Unthread the hexagon valve pin holder from the EVG.
 2. Use pliers to remove the holder clip.
 3. Remove the pin.

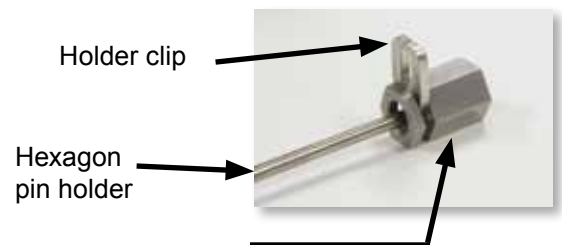


Figure 11-11 Pin Removal /
Installation

Pin Installation 55 mm E-VG (VPHolder14)

1. Place the pin in the pin holder.
2. Install the clip to hold the pin in place.
3. Apply high strength thread locking compound to the pin holder and insert it into the E-VG unit.
4. Screw the valve pin holder onto the E-VG unit.



Figure 11-12 Valve Pin Holder 14
Assembled into E-VG

Removing E-VG Unit from Hot Half

1. Unscrew and remove the wire harness cover plate.



Figure 11-13 Removal of wire harness cover plate

2. Remove the wires from the wiring harness.



Figure 11-14 Removal of wires from wire harness

3. Loosen and remove the BLACK mounting screws.

NOTE

DO NOT remove the SILVER screws.

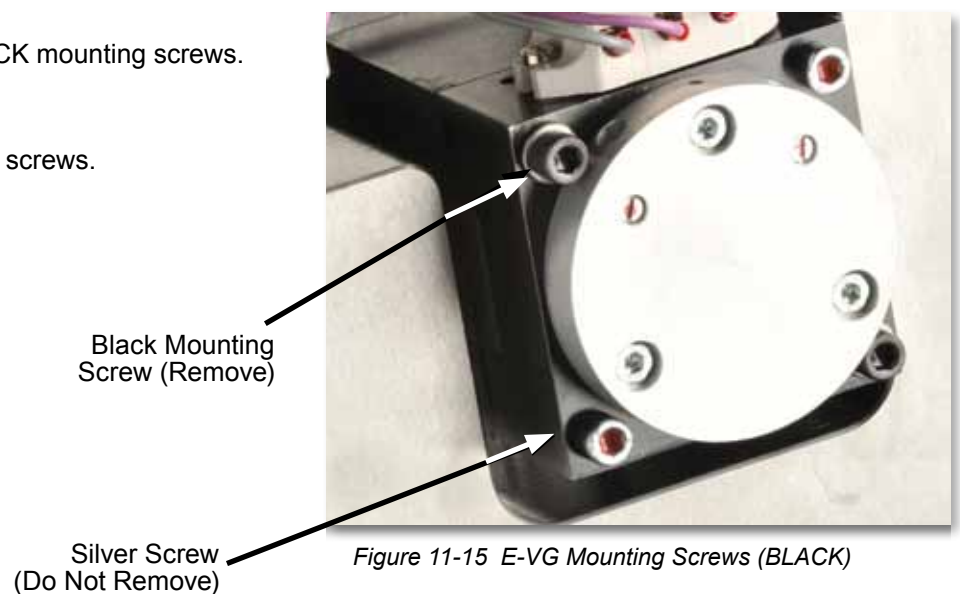


Figure 11-15 E-VG Mounting Screws (BLACK)

4. Carefully slide the E-VG unit valve pin out of the valve bushing.



Figure 11-16 Removal of unit from hot half

Installing E-VG Unit into Hot Half

1. Insert the valve pin into the valve bushing.



Figure 11-17 Insert valve pin into valve bushing

2. Insert the BLACK mounting screws.



Figure 11-18 Insert E-VG mounting screws

Installing E-VG Unit into Hot Half - con't

3. Tighten the BLACK mounting screws to the torque setting indicated on the assembly drawing.



Figure 11-19 Tighten mounting screws

4. Complete wiring per assembly drawing.



Figure 11-20 Complete wiring

5. Install wiring harness cover plate.



Figure 11-21 Install wiring cover plate