Model HMA009 – Instruction Manual

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1. Introduction

This manual provides instructions for storing, installing, safe operation, and minor maintenance of the HMA009 series of actuators. For optimal performance and longevity, proper installation and minor maintenance are required. Read and save these instructions prior to installing, operating or servicing the actuator. Failure to operate and service an actuator in accordance with these instructions could impair the protection provided by the actuator and could void the warranty.

2. Safety

1. Refer to the installation and maintenance instructions in this manual for proper installation and use. Failure to install and maintain the actuator properly could result in personal injury.
2. Installation and commissioning requires working with potentially lethal electricity and should be carried out by qualified tradesmen that are familiar with the installation of industrial equipment.
3. The actuator produces significant force and can cause serious injury or death if not used properly.
4. The actuator can be operated remotely and startup without notice. Always keep clear of the actuator unless it has been disabled.
5. Do not operate or service the actuator unless specific lock-out/tag-out procedures are in place and enforced.
6. End users must ensure all operators are trained in the safe operation of the actuator and have read and understood this manual.
7. Do not open or remove any covers, plugs or other entries into the internal components of the actuator when it is operating in an environment with explosive dust.
8. During operation, the actuator can create surface temperatures greater than 140˚F (60˚C). Check the surface temperature prior to contact to avoid burns.
9. A switch or circuit breaker must be included in the installation, it must be suitably located, suitable rated, and marked as the disconnection device for the equipment.
10. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
11. Following are symbols and their associated meaning which may be used in sections related to your equipment:

 Caution: possibility of electric shock or burn

 Warning: indicates activities that could cause injury if not conducted properly.

 Alternating Current

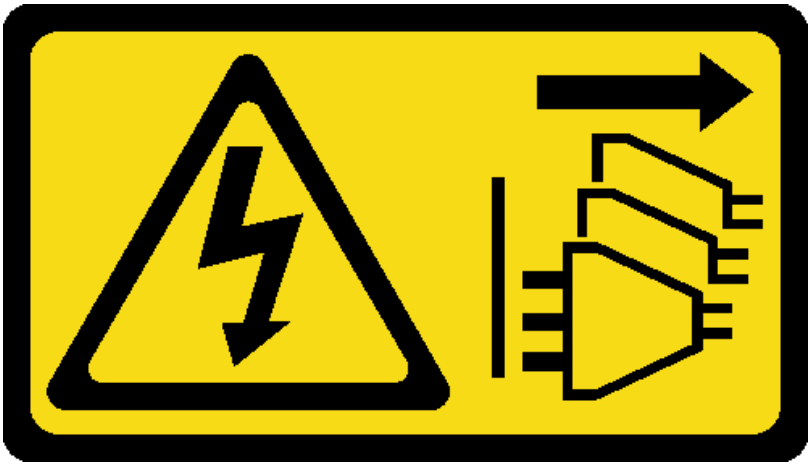
 Three-phase Alternating Current

 Ground

The below symbols are present on your equipment as shipped from the manufacturer. Review the below information prior to installation, and ensure all end users are familiar with the information.
Electrical shock risk, isolate / de-energize prior to maintenance or accessing enclosed areas of the unit
Location: Limit switch housing cover

Prior to accessing the unit for maintenance, field wiring, setting end of travel switches, etc., ensure that the unit is fully de-energized to mitigate risk of electrical shock.

Risque d'électrocution, isoler/mettre hors tension avant toute opération de maintenance ou avant d'accéder aux zones fermées de l'appareil
Emplacement : Couvercle du boîtier du commutateur de fin de course
Avant d'accéder à l'appareil pour effectuer des opérations de maintenance, de câblage sur site, de réglage des interrupteurs de fin de course, etc., assurez-vous que l'appareil est complètement hors tension afin de réduire le risque d'électrocution.



Authorized personnel entry only
Location: Limit switch housing cover
Do not access the enclosed areas of the unit unless you have received appropriate training and authorization.

Accès strictement réservé au personnel autorisé
Emplacement : Couvercle du boîtier du commutateur de fin de course
N'accédez pas aux zones fermées de l'appareil à moins d'avoir reçu une formation appropriée et une autorisation.



Hot surface
Location: Motor housing
Use caution when working in proximity of the motor housing. Housing surface has the potential to reach harmful temperatures under certain environmental and operating conditions.

Surface chaude
Emplacement : Carter du moteur
Faites preuve de prudence lors des travaux à proximité du carter du moteur. La surface du carter peut atteindre des températures nocives sous certaines conditions d'environnement et d'utilisation.



Moving parts
Location: Drive screw tube housing
Use caution when working in proximity of the drive components. Failure to do so could result in serious injury.

Pièces mobiles
Emplacement : Boîtier du tube à vis d'entraînement
Faites preuve de prudence lors des travaux à proximité des composants de l'entraînement. Vous risqueriez autrement de graves blessures.



Grounding location
Location: External ground on the outside of the limit switch housing, internal ground inside the limit switch housing
Ensure that the unit and field wiring are properly grounded via the marked grounding lugs on the unit.

Emplacement de mise à la terre
Emplacement : Mise à la terre externe à l'extérieur du boîtier du commutateur de fin de course, mise à la terre interne à l'intérieur du boîtier du commutateur de fin de course
Assurez-vous que l'appareil et le câblage sur site sont correctement mis à la terre via les cosses de mise à la terre marquées sur l'appareil.



3. Description

The HMA009 series actuators are self-contained electro-mechanical linear devices with integral, adjustable end-of-travel limit switches. They are driven by high starting torque AC induction motors with thermal overload protection. Mounting options include:

- Clevis mounted
- Flange mounted
- Trunion mounted

4. Storage

Failure to follow these storage instructions could void the warranty.

Actuators placed into storage for any reason must be located in a well-ventilated, dry environment free from excessive vibration and rapid temperature changes. All covers and conduit entry plugs must remain in place.

5. Intended Use

The Hamar HMA009 is suitable for use on industrial valves, doors, louver dampers, or most applications involving the application of linear force. Contact Hamar Automation for application questions or concerns.

6. Lifting and Transportation

1. Do not lift the actuator by the limit switch compartment.
2. If the actuator is attached to other equipment, lift the equipment according to the manufactures recommendations. Do not lift the assembly by the actuator.
3. Use original packaging or equivalent packaging for transportation to the installation site.

7. Product Identification

The actuator nameplate is located on the limit switch housing cover. It contains the manufacturer location, model number, serial number, specified velocity, motor power, additional power requirements, temperature rating, and limit switch contact ratings.

8. Product Specifications

Speed and Force:

Velocity in/sec (mm/sec)	Force (lbs / N)	
	Peak	Running
0.25 (6)	2200 / 9785	1500 / 6670
0.4 (10)	1600 / 7120	1000 / 4450
0.8 (20)	850 / 3780	500 / 2225
2.0 (51)	400 / 1780	225 / 1000

*applies to single-phase, 60 Hz actuators. Velocity is slightly reduced for 50 Hz actuators.

Temperature: -40˚ to 149˚F (-40˚ to 65˚C), 90% relative humidity

Electrical:

Voltage	Frequency (Hz)	Current (FL)
115 – 1 Phase	60	3.05 A
230 – 1 Phase	60	1.32 A

Duty: 15 minutes on, 45 minutes off for single-phase units
*Supply voltage fluctuations not to exceed ± 10 % of nominal supply voltage

Motor: Class F Insulation, Internal Thermal Switch

Certifications and Compliances:

- NEC/CEC Class II, Division 1, Groups E, F, G, T145 ˚C
- The equipment has been separately tested against the requirements of IEC 60529 and meets IP65

Actuator is constructed for industrial processes or discrete control applications, not safety functions.
Pollution degree 4
Installation category II
Altitude 2000m
Humidity 80% to temperatures up to 31 ºC decreasing linearly to 50% rH at 40 ºC; max 80% rh, non condensing

Mounting Types:

- Clevis at drive rod
- Clevis at motor end
- Adjustable trunnion
- Adjustable flange

Weight: 35 – 50 lbs (16 – 23 kg) depending on stroke length and mounting options.

Suitable for indoor or outdoor installations.

Stroke - in (mm)	"A" Dimension - in (mm)
6 (150)	2.38 (60.5) - 2.88 (73)
12 (300)	2.38 (60.5) - 8.00 (203)
18 (450)	2.38 (60.5) - 14 (355.6)
24 (600)	5.38 (136.6) - 20 (508)
30 (750)	11.38 (289) - 26 (660)
36 (900)	17.38 (441.5) - 32 (812.8)

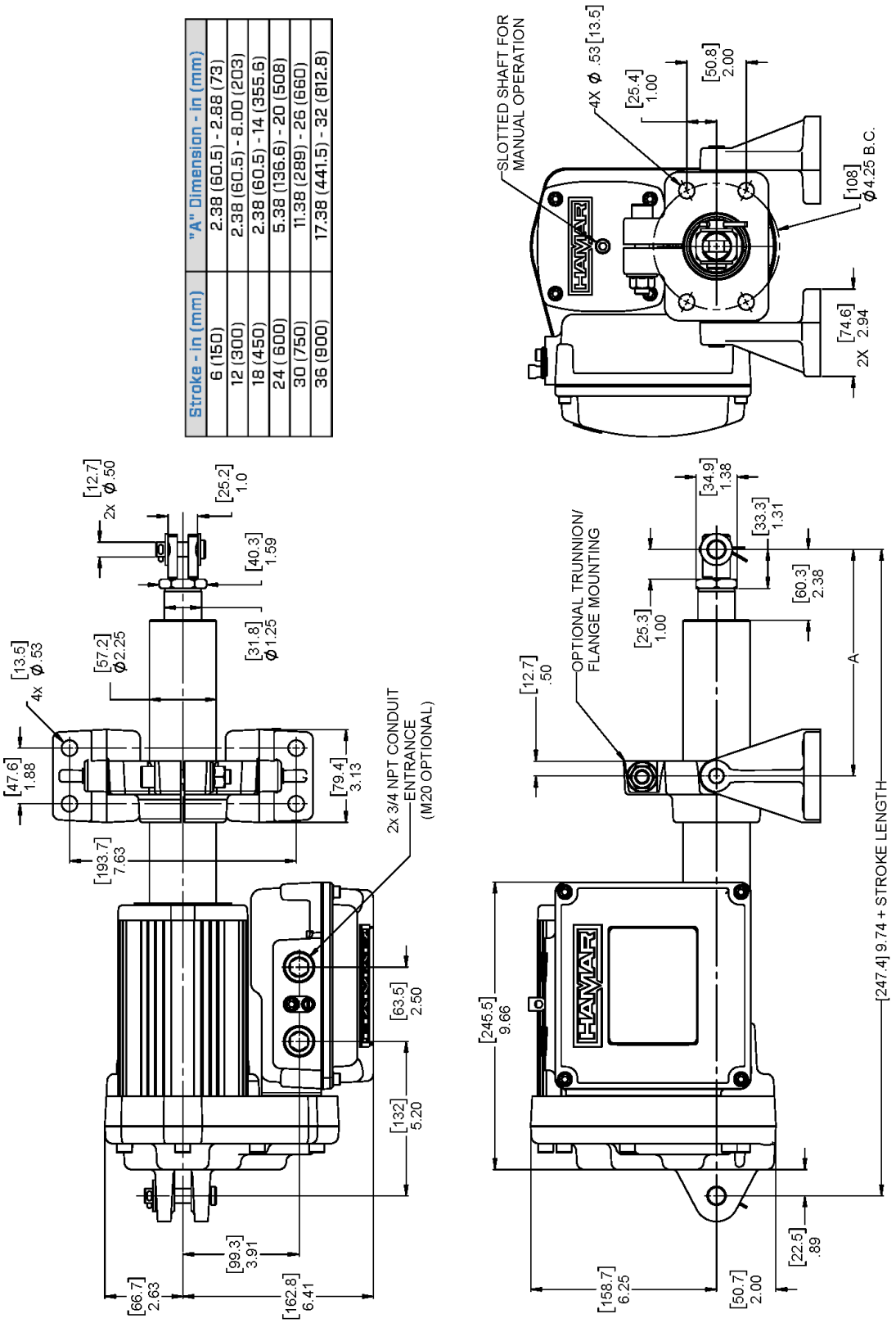


Figure 1 – Outline Dimension Drawing

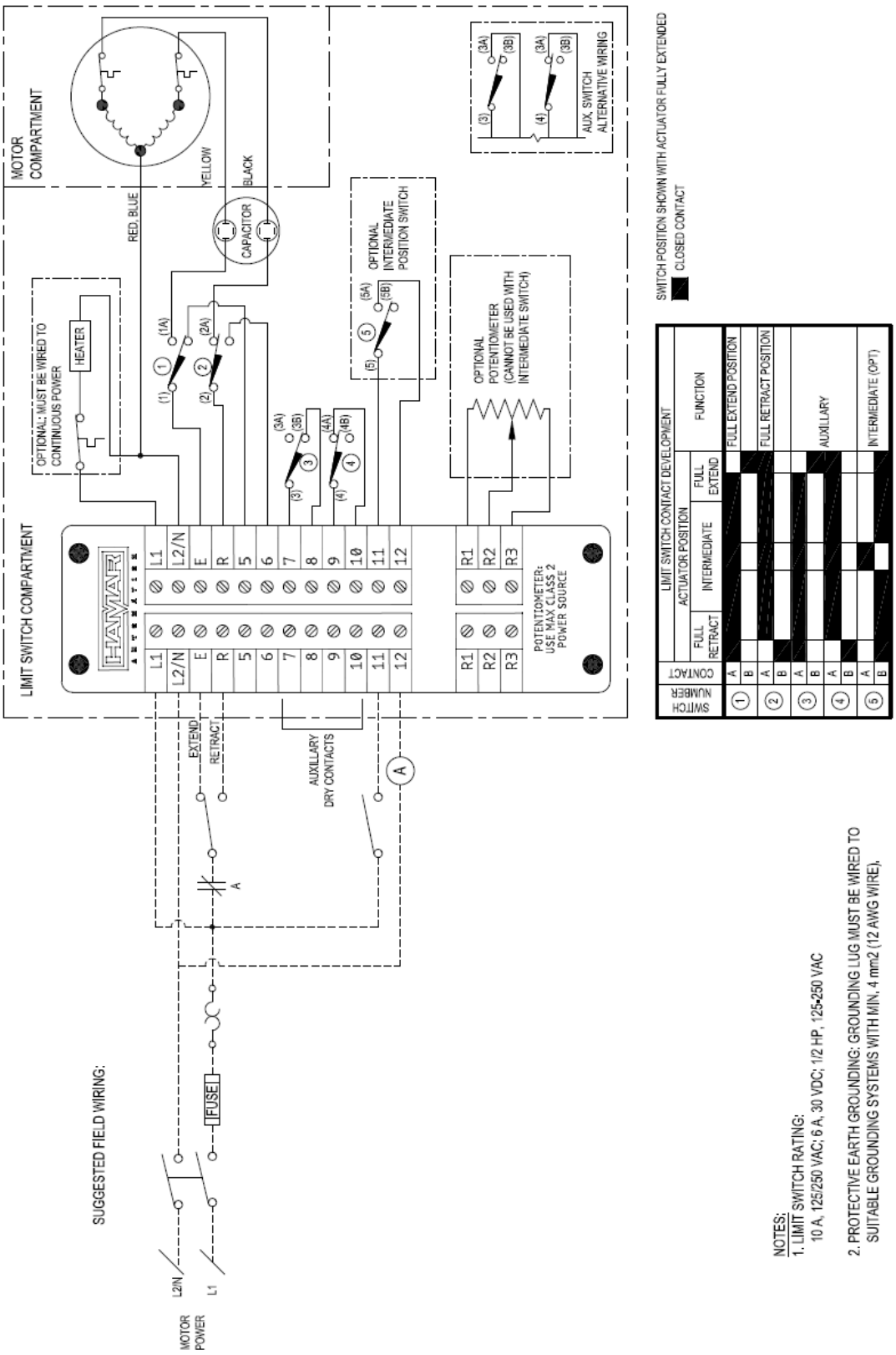


Figure 2 – Wiring Diagram for Single-Phase Actuators

9. Installation

1. Refer to Figure 1 for installation dimensions.
2. Protect the extension rod from damage during installation as burrs/gouges could cause damage to the tube bushing and seals.
3. Check the alignment between the actuator mounting and the driven equipment to ensure the actuator will not experience any side loading. Failure to do so will result in premature wear of the actuator drive components.
4. Check that the planned installation allows room for removal of the limit switch housing cover.
5. A small amount of length adjustment is possible by loosening the extension rod jam nut and turning the clevis in the extension rod. Turning it clockwise will decrease the length and counterclockwise will increase the length. Retighten the jam nut.
6. For trunnion mounting applications, install the actuator with the pin in the clevis parallel to the trunnion pins.
7. For face flange or trunnion mounting applications, position the flange/tube adapter to the desired location and tighten the flange/tube adapter to 55 ft-lbs (75 Nm).
8. Lubricate all pinned connections.
9. Ensure cotter pins are installed and secured.
10. Refer to Figure 2 for single-phase actuator wiring. Field wiring terminals are only for use with copper conductors. Note: minimum insulation temperature for field wiring is 90°C.
11. Install conduit to the actuator in such a way as to prevent any condensation that occurs inside the conduit does not enter the actuator limit switch enclosure. It is recommended that moisture/gas tight conduit seals are installed at the conduit connections. All hazardous location cable entry holes must be fitted with appropriately rated / certified cable glands or stopping plugs that is suitable for the application. The of cable, glands and stopping plugs shall have temperature ratings of at least 100°C.



Limit switch housing and cover flange surfaces/gaskets must be clean and well maintained to ensure a proper seal and prevent dust from entering the actuator. Unused conduit entrances must be tightly sealed with the supplied blanking plug as well as the motor end bell plug.



Protective earthing connections must be wired to suitable grounding systems with 14-4 AWG wire. For North American applications, the exterior grounding lug is supplemental to the internal grounding lug.

10. Position Limit Switch Adjustment

HMA009 Series Actuators are equipped with micro switches that interrupt power to the electric motor when activated by gear driven cams. The limit switch gear train is unique to both the actuator stroke and speed specified. The limit switches are factory set for the full stroke of the actuator that was ordered. If a shorter stroke is desired, the limit switches must be adjusted during installation, according to the following procedure.

1. Disconnect power supply.
2. Remove the pipe plug in the center of the motor end bell. Once removed, the end of the electric motor rotor shaft is exposed. It is slotted to allow it to be turned by manual or power driven screwdriver.
3. Position the actuator at either the fully extended position or fully retracted position if it is not already in one of those positions. This will make it easier to reset the limit switches. Warning: be sure to

measure the extended or retracted distance as over traveling the actuator may result in the drive nut being disengaged or cause damage to the actuator.

4. Remove the limit switch housing cover.
5. Inside the limit switch housing, locate the limit switch cams, which are red and green in color, and using a 2mm allen key, loosen the set screws that secure them to the shaft. Each cam activates two switches. One switch is part of the motor control circuit and the other is available for general purpose use.
6. Beginning with the position set in step 1, rotate the motor shaft until the extension tube has reached the desired position. Clockwise rotation of the shaft extends the tube, while counterclockwise rotation retracts it.
7. Once the desired position is reached, make sure that the indent in the cam is engaged with the roller on the limit switch. If it is not, rotate the cam by hand until it is engaged and tighten the cam set screw.
8. Repeat this process for the opposite end of stroke.
9. Replace the pipe plug in the motor end bell and reinstall the housing cover. Tighten the cover fasteners to 13.3 lbf ft (18 Nm).
10. Reconnect electrical power to the actuator.

11. Maintenance

If access to enclosed areas of the unit are required beyond the limit switch housing and motor housing via the bell plug port, consult with manufacturer to avoid damaging the unit. Failure to do so may void warranty. Under normal service conditions, the HMA009 actuator does not require periodic maintenance. Figure 4 depicts the actuator broken down into its major subassemblies.

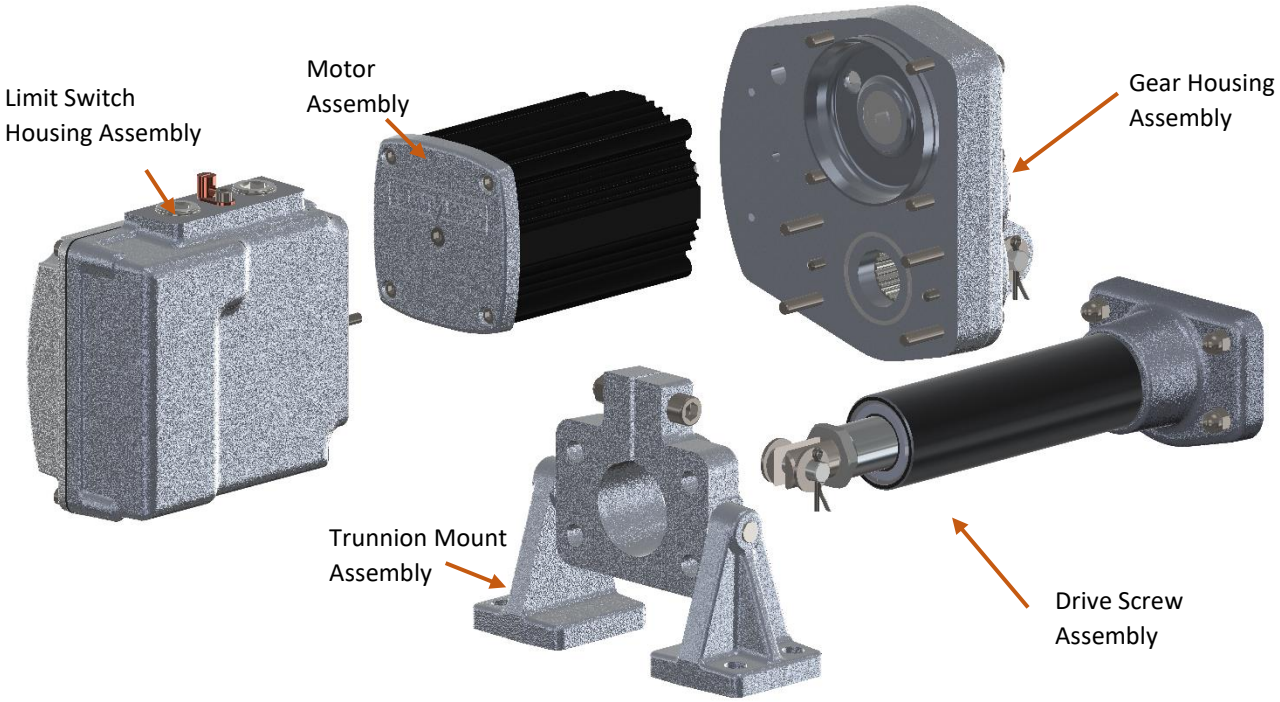


Figure 4 - Actuator Subassemblies.

11.1 Limit Switch Housing Assembly: In addition to containing the limit switches, the limit switch housing assembly contains the terminals to connect power and control circuits to the actuator.

To avoid the risk of contact with hazardous voltages and to prevent the ignition of hazardous atmospheres, be sure to disconnect all electrical power to the actuator prior to removing the limit switch housing cover.

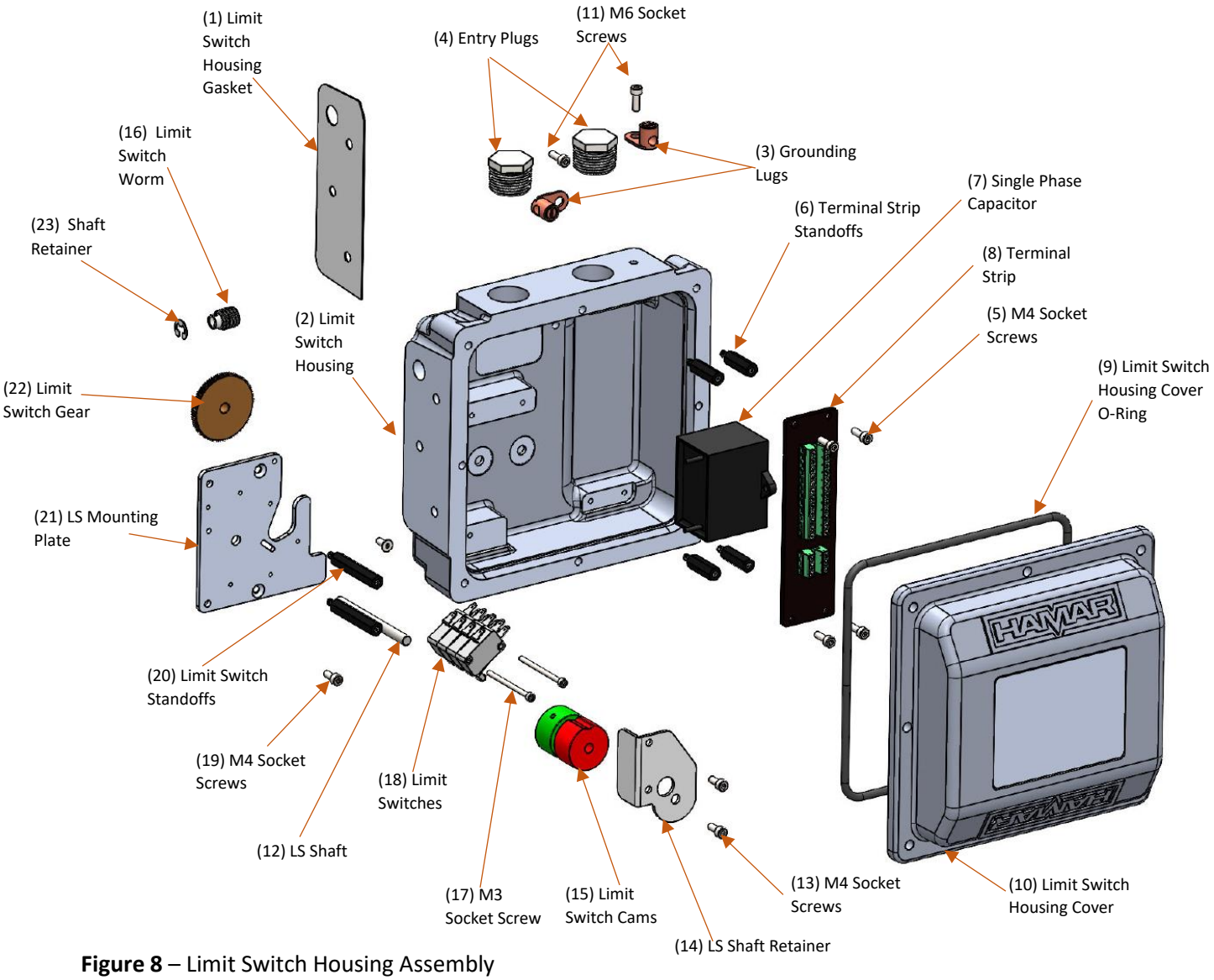


Figure 8 – Limit Switch Housing Assembly

To access the components of the limit switch housing, remove the 8 screws that secure the cover to the housing. Should any of the limit switches need to be replaced, begin by removing the screws to the limit switch mounting plate (21). Next, remove the M3 screws (17) that secure the switches to the plate (21). Disconnect the switch to be replaced and attach the leads to the new switch. Once the internal components are reinstalled, install the housing cover via the 8 M6 bolts and torque to 13.3 lbf ft (18 Nm).

11.2 Lubrication: The HMA009 series actuator is lubricated for life at the factory and periodic lubrication of internal contacts is not required. All pivot points used for actuator field mounting should be lubricated routinely.

12. Troubleshooting:

Caution: Disconnect power before working on the unit.

Condition	Possible Cause	Corrective Action
Extension rod does not extend or retract but motor operates	Worn gearing	Coordinate with manufacturer
	Worn drive screw or drive nut	Coordinate with manufacturer
Motor hums but does not run	Power is applied to terminals E and R at the same time	Correct power input
	Defective capacitor	Replace capacitor (single phase units only)
	Drive screw or gear train is in a bind	Coordinate with manufacturer
Motor does not run	No power to the actuator	Check power source, fuse, disconnect switch, wiring
	Motor overheated and activated the thermal switches	Disconnect power to the actuator and allow to cool. Determine what caused the motor to overheat, correct the problem and reconnect power. Power must be cycled to reset thermal protector after cool down.
	Motor defective	Coordinate with manufacturer
	Both limit switches are open or one is open and one is defective	Inspect limit switch cams and limit switch. Replace any defective components
	Load exceeds actuator linear force rating	Reduce load or replace the actuator with one that has a higher force rating
The actuator operates in one direction only	Motor has an open winding	Coordinate with manufacturer
	Improper wiring	Inspect and correct wiring
	Incorrect cam positioning	Ensure limit switch cam positioning is correct

A translated copy of this manual can be generated and provided at customer expense.

For technical assistance or questions, contact:

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