

INSTALLATION

The 175 SERIES electric actuator is designed to mount directly to inline fuel injection pumps, with a right hand rack in place of the mechanical governor. An optional external fuel shut off lever is provided to manually override the actuator's control. Also provided, as standard equipment, is an adjustable internal maximum fuel limit.

The 175 Series Electric Actuator can control fuel pumps up to 8 cylinders. The actuator was designed with two isolated chambers. The upper chamber is wet with oil and contains the connection to the fuel rack and an optional manual shut off mechanism. The sealed lower chamber contains the electromagnetic components.

Preparing the fuel injection pump

If the fuel injection pump is equipped with a mechanical governor, it must be removed. GAC recommends that this modification be performed by a qualified fuel injection service facility. The following procedure lists the general steps required to remove the mechanical governor.

NOTE: Be prepared to collect the oil that will be released from the mechanical governor.

1. Remove the rear housing from the mechanical governor and disconnect the governor linkage from the pump fuel rack. Remove the flyweight assembly. A special tool is required.
2. Remove the intermediate governor housing. This leaves only the rack and camshaft protruding from the pump.
3. Install the adapter plate to provide the transition required from the actuator to the mounting holes formerly held by the governor housing. This plate must have countersunk holes for the mounting screws.

Installing the actuator

All hardware needed to attach the actuator to the pump is located in kit KT289 supplied with the actuator.

1. Place the spring seat (1) over the fuel rack and slide it to the body of the fuel pump (see Figure 1-1). Slide the fuel rack return spring (2) over the fuel rack and against the spring seat. Attach the rack connection link assembly (4, 5, 6, 7) to the fuel rack with two M5 X 10 mm long retaining screws (3) that include patches of Loctite adhesive. Torque the screws to 3-4 NM.
2. Remove the upper actuator cover (8) and o'ring seal (25). Clean the actuator to pump adapter mounting surface

so that it is free of any debris. Insert two M6 X 16 mm long screws (15) and spring washers (16) through the lower mounting holes inside the upper actuator cavity (see Figure 1-3). Align the gasket (29) as shown in (Figure 1-4) and install it over the two screws and carefully slip the actuator over the fuel rack assembly until the two lower screws just start to meet the fuel pump mounting holes. Insert a ball end hex wrench through the access point located on the operating lever (17), to tighten the left lower mounting screw (15) a few turns. Pull the operating lever outward and slide the ball end hex wrench into the space between the operating lever and the access point in the housing of the actuator to tighten the right lower mounting screw. Alternate the turning of each screw so that the actuator is aligned properly with the pump adapter plate. Once these two screws are fully engaged (do not tighten at this time) into the pump housing, insert two additional M6 X 16 mm long screws (15) and spring washers (16) into the top two mounting holes of the actuator and thread into the pump housing. Torque all four mounting screws to 5-6 NM. Verify that the fuel rack assembly moves in and out freely inside the upper cavity of the actuator.

3. Carefully loosen screw (11) and (20) over the slotted portion of the adjustment plate so that the operating lever bearing assembly (21) can be moved away from the fuel rack connection link. Ensure that the fuel rack is as far out of the pump as possible. Rotate the operating lever (17) out from the actuator until it stops (the armature of the actuator will be in contact with the lower cover (9)) and hold in this position. Rotate the adjustment plate and lever bearing assembly (21) in towards the fuel rack so that contact between the bearing and rack connection link is made. Continue to push in an additional 1 to 2 mm. While holding this position torque the operating lever assembly shaft screw (11) and screw (20) to 4-6 NM.
4. Inspect the assembly to ensure all screws are tight and the fuel rack moves smoothly without any binding. Push in the fuel rack manually to the full fuel position and rotate the fuel shut off lever (22) to minimum fuel to confirm that the shut off lever contacts the metal plate (6) on the fuel rack connector assembly and forces the fuel rack to minimum position.
5. The operating lever has a maximum fuel adjustment set screw (23) which can be used to restrict the fuel rack travel.

NOTE: When installed, the cover must not hit the internal operating lever or the maximum fuel adjustment screw.

Torque the cover screws to 2-3 NM. Check for any oil leaks. Lock-wire the lower screws for tamper resistance.

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WARNING

Setting high fuel levels may cause the maximum fuel adjustment screw to hit the inside of the top cover, which can change the minimum fuel position. This could lead to a dangerous condition. When setting fuel levels above 17mm of rack travel, ensure that the adjustment screw does not contact the cover at minimum fuel position.

With the fuel pump operating on the engine, the maximum fuel setting screw can be adjusted to provide specific horsepower. Once this setting is made torque the locknut (24) on the fuel adjustment screw to 5-6 NM.

Rotate the manual shut off lever (22) to the stop position and ensure that the fuel is completely shutoff and the engine stops. With the engine shut down, install the upper chamber cover (8) and o'ring seal (25) by first applying Loctite 222 to the six screws (26, 27) provided.

CAUTION

The engine should be equipped with an independent shut down device to prevent overspeed which can cause equipment damage or personal injury.

SELECTION CHART

TABLE A

	12V	24V	w/ Shutoff	w/o Shutoff	w/ Mating Conn	w/o Mating Conn
ADD175-12	*			*		*
ADD175-24		*		*		*
ADD175A-12	*		*			*
ADD175A-24		*	*			*
ADE175-12	*			*	*	
ADE175-24		*		*	*	
ADE175A-12	*		*		*	
ADE175A-24		*	*		*	

SPECIFICATIONS

Performance

Force.....6.2 lbs (27.5N)
 Operating Stroke.....0.80 in (21mm)
 Response Time (10-90% 2-19mm).....35 MSEC
 Internal Sealing Pressure.....2 bar (29 psi)

Electrical Power Input

Operating Voltage.....12 VDC or 24 VDC
 Coil Resistance.....12 VDC Version- 1.7 +/-0.2 OHMS
24 VDC Version- 7.2 +/-0.5 OHMS
 Nominal Operating Current.....12 VDC Version- 4.0 A
24 VDC Version- 2.0 A
 Maximum Current.....12 VDC Version- 5.8 A
24 VDC Version- 3.1 A

Environmental

Operating Temperature.....-40° to +200°F (-40° to +95°C)
 Relative Humidity.....Up to 100%
 Shock.....20g @11msec
 Vibration.....20g, 20-500 Hz
 Agency.....RoHS Compliant

Physical

Dimensions.....See Figure 2-1
 Weight.....4.75 lbs. (2.2 kg)
 Mounting.....requires BYC adapter plate
 Finish Specification.....ES1031
 Mating Connector.....EC1300
 Mating Cable Harness.....CH1215

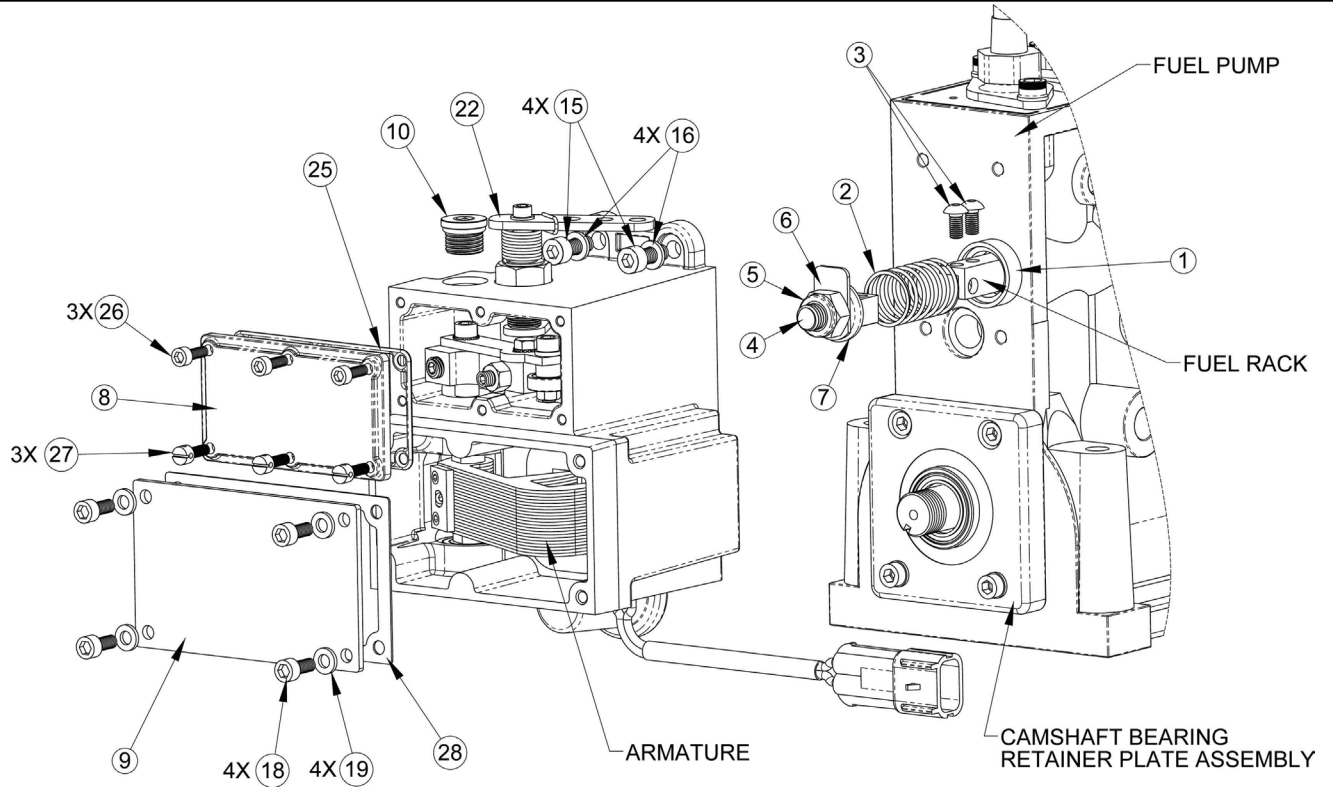


FIGURE 1-1

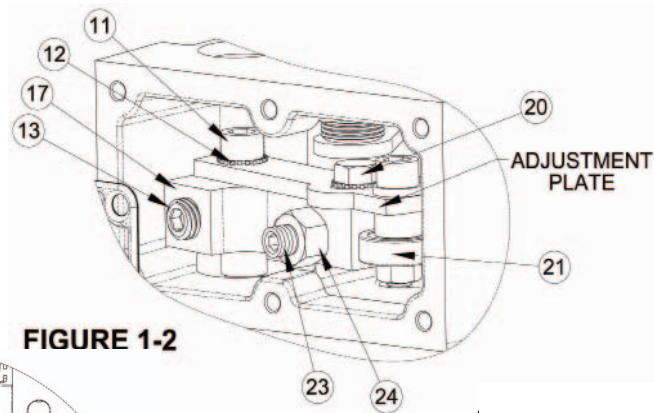


FIGURE 1-2

ORIENTATION OF MOUNTING GASKET

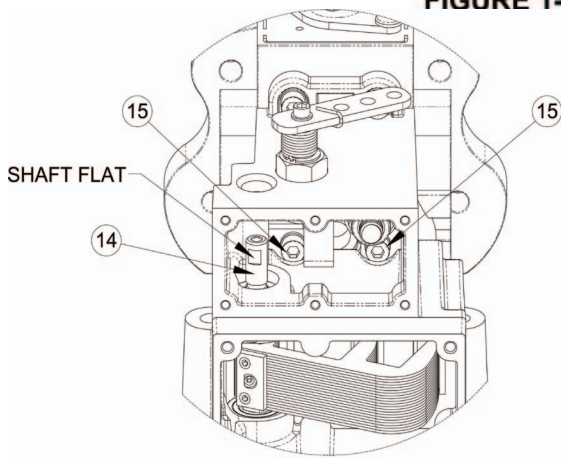


FIGURE 1-3 LOWER COVER AND LEVER ASSEMBLY NOT SHOWN FOR CLARITY

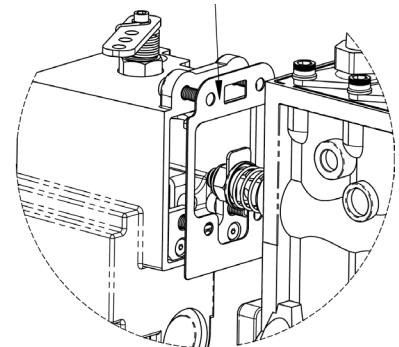


FIGURE 1-4

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 Caution: None of GAC products are flight certified controls including this item.

DIMENSIONS

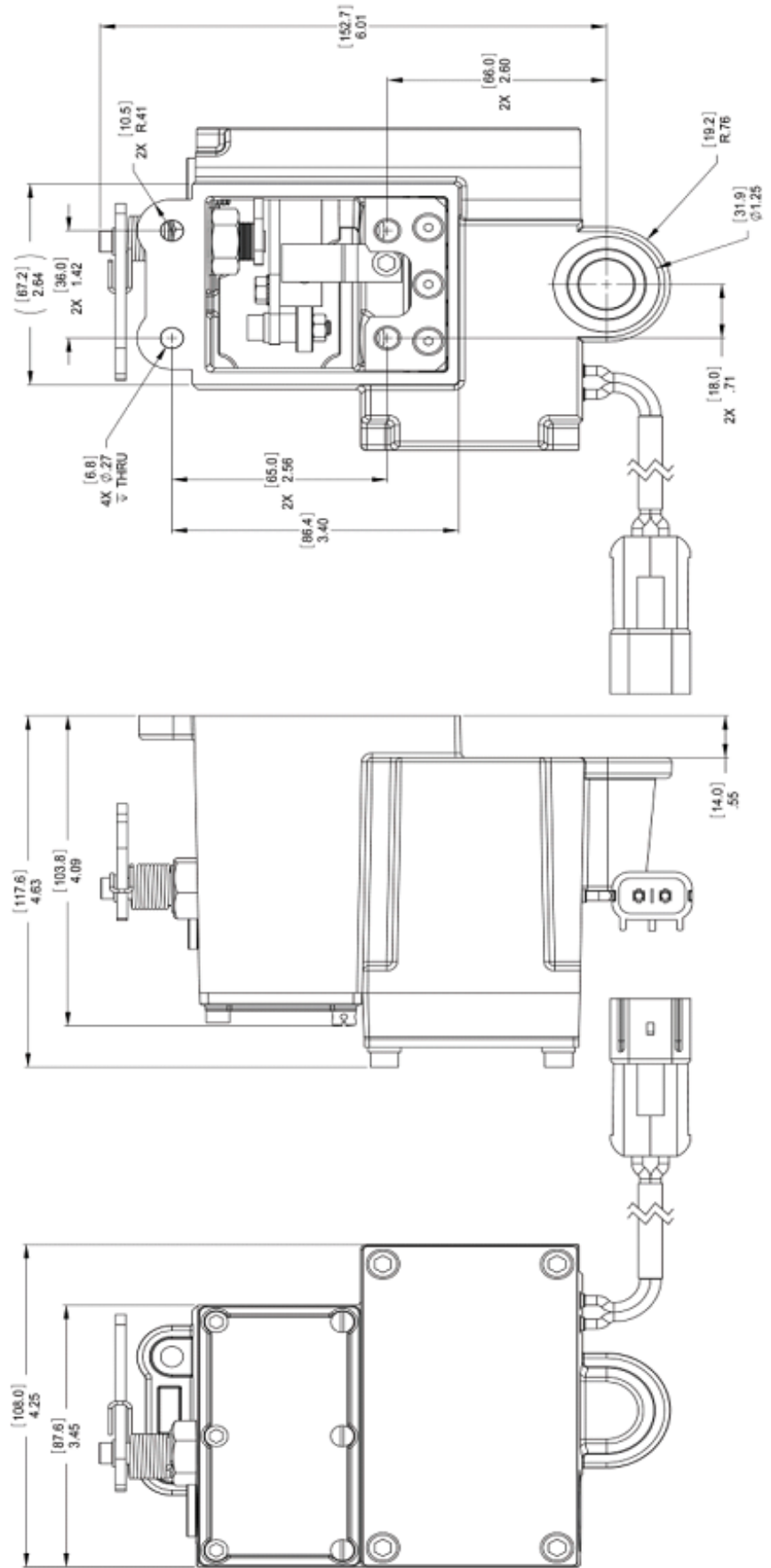


Figure 2-1

This document is subject to change without notice.
 Caution: None of GAC products are flight certified controls including this item.

安装说明

ACD175系列电动执行器是特别设计的，因此可直接安装在直列式燃油喷射泵右手式推拉架油喷射泵旁。取代已往使用的机械调速器。安装175执行器后的油喷射泵，显示了优越的性能，从而行成一长期稳定的燃料控制系统。此种电动执行器还可提供一个外置的燃料切断操纵杆使用户可绕过执行器的电力控制，直接切断燃料。此电动执行器又可通过内部提供的调控点来调节最大燃料供应的限度从而控制系统输出。

ACD175系列电动执行器可控制上至8个汽缸的燃油喷射泵。此电动执行器的独创性设计是具有两个隔绝的内腔。上层腔内含有加充润滑剂，油泵推拉架连接点及可选择的手控燃料切断机构。下层密封腔内有电磁控制零件。

燃料油喷射泵的准备

如果油喷射泵已配备一机械调速器，此机械调速器则须拆除。GAC建议由具有充分资格的，了解油喷射泵设备的人员执行此项工作。下列陈述详列拆除机械调速器的步骤。

提示：须预备收集从机械调速器中流泻出的润滑油。

1. 拆开机械调速器的后方外壳，拆除与喷射泵推拉架的连接。拆除调速器离心重块，这些操作需要特别工具。
2. 拆除机械调速器的中部外壳，喷射泵推拉支架凸轮轴突部会显露出来。
3. 安装对接承托板，用此板代替机械调速器外壳来支撑轴承。承托板需有埋头式开孔以供螺钉加固。

安装电动执行器

贴附电动执行器于油喷射泵侧面上所需的一切五金硬件均在KT289装备袋中。此袋与执行器一起供给。

1. 穿置弹簧顶座（1）于燃料推拉架上，并推其滑入拉架入油泵内（见图1-1）；再穿置拉架反回弹簧。（2）于拉架杆上，推其顶住弹簧顶座。将推拉架连接装配（4，5，6，7）用两颗M5x10毫米的螺钉固定。（3）抹上锁定胶，用3-4牛顿-米（NM）扭力矩上紧。
2. 移掉执行器盖子（8）和密封圈（25）。清洁执行

器与油泵对接口的表面，清除任何污物。插入两个M6x16mm长螺丝（15）和弹簧垫圈（16）穿过位于部执行器上腔内的下部的安装孔（参见图1-3）。依（图1-4）所示将垫圈对齐并安置于两螺丝之上，然后小心地把执行器在燃料推拉架组件上滑入，使两个下部的螺丝刚好碰到燃料泵的安装孔（参见）。通过操作杆（17）上留出的插入口，将球形内六角扳手伸入上腔内，拧上左右下部的安装螺丝（15），拧几圈即可。把操作杆拉出，让球形扳手通过操作杆与外壳之间的空间，以便拧上右下部的螺丝。然后将两个螺丝交替拧，直到执行器与油泵对接面充分对齐。一旦这两个螺丝充分入扣（此时先不要上紧）进入泵的外壳，插入另外两个M6x-16mm长螺丝（15）和弹簧垫圈（16），插入到执行器上部的安装孔中并拧入泵的外壳。四个安装螺丝的扭矩均为5-6牛顿米。核实推拉架组件可在执行器上腔体中自由里外移动。

3. 小心松开在调整板虚线部分的螺丝（11和20），以便使操作杆轴承组件（21）可以被移出燃料架的链接。确保使燃料架离油浦尽量远。往执行器以外转动操作杆（17），直至转不动。（执行器的电枢会与低端盖子（9）接触）。并保持这个位置。转动调整板和杠杆轴承组件（21）往燃料架里侧，使轴承和机架连接。继续推进1到2mm。在这个位置下，上紧操作杆组件轴螺丝（11）和螺丝（20）到扭矩为4-6牛顿-米。
4. 检查整个组件的安装，确保所有螺钉已上紧、燃料推拉架可平滑移动无约束；用手推推拉架至最大供油点，然后扳用燃料切断操纵杆使其移至最小供油点，以此证明燃料切断操纵杆（22）与推拉架顶端的连接头金属片（6）相触。并强制燃料推拉架移至最小供油位。
5. 燃料切断操纵杆端有一螺钉（23）用来设定最大供油量。此螺钉可限制燃料推拉架的移动位置。

注意：安装后，盖子不能碰击内部操作杆或最大燃料调节螺丝。

警告

设定太大的供油量会造成油量设定螺钉端触及上部盖片，从而影响最低油量点的位置。这须警惕。建议油量设定杆不要超出17mm。

燃油泵在发动机上操作时，调最大燃料设置螺丝可调整提供发动机的马力。调好这个燃料调节螺旋后，用扭矩5-6牛顿-米（NM）拧紧这个锁螺帽（24）。

转动手动燃料切断操纵杆（22）至停止位置，确保燃料全部切断，且发动机停止运转。发动机停止后，装回上部盖片（8）和O形圈（25），Loctite222抹在6个螺钉（26，27）上，上紧。

注意

发动机应该具备独立关闭装置设备，以防其过速时，至使设备受损，或人身受伤。

型号选择表

表 A

型号	12V	24V	有燃料 切断	无燃料 切断	有相配 接头	无相配 接头
ADD175-12	*			*		*
ADD175-24		*		*		*
ADD175A-12	*		*			*
ADD175A-24		*	*			*
ADE175-12	*			*	*	
ADE175-24		*		*	*	
ADE175A-12	*		*		*	
ADE175A-24		*	*		*	

规格标准

性能

力度.....6.2 磅（27.5牛顿）
运行跨距.....0.80 英寸（21毫米）
响应时间（10-90% 2-19mm）.....35 毫秒
内部密封压力.....2 巴（29 psi）

输入电源

工作电压.....直流12V或24V
线圈电阻.....12V型：1.7+/-0.2 欧姆
.....24V型：7.2+/-0.5 欧姆
标称工作电流.....12V型：4.0安
.....24V型：2.0 A
最大工作电流.....12V型：5.8 A
.....24V型：3.1 A

环境

工作温度.....-40° C至+200° F（-40至+95° C）
相对湿度.....上至100%
冲击.....20g，11毫秒
振荡.....20g，20-500赫兹
有害物质限制.....符合欧盟RoSH标准

物理指标

尺寸.....见图2-1
重量.....4.75 磅（2.2 千克）
安装.....需要BYC对接承托板
表面加工规范.....ES1031
连接插头.....EC1300
连接电缆.....CH1215
可用型号.....见表A

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注意：此GAC产品尚未取得可用于飞行器控制系统的验证证明。

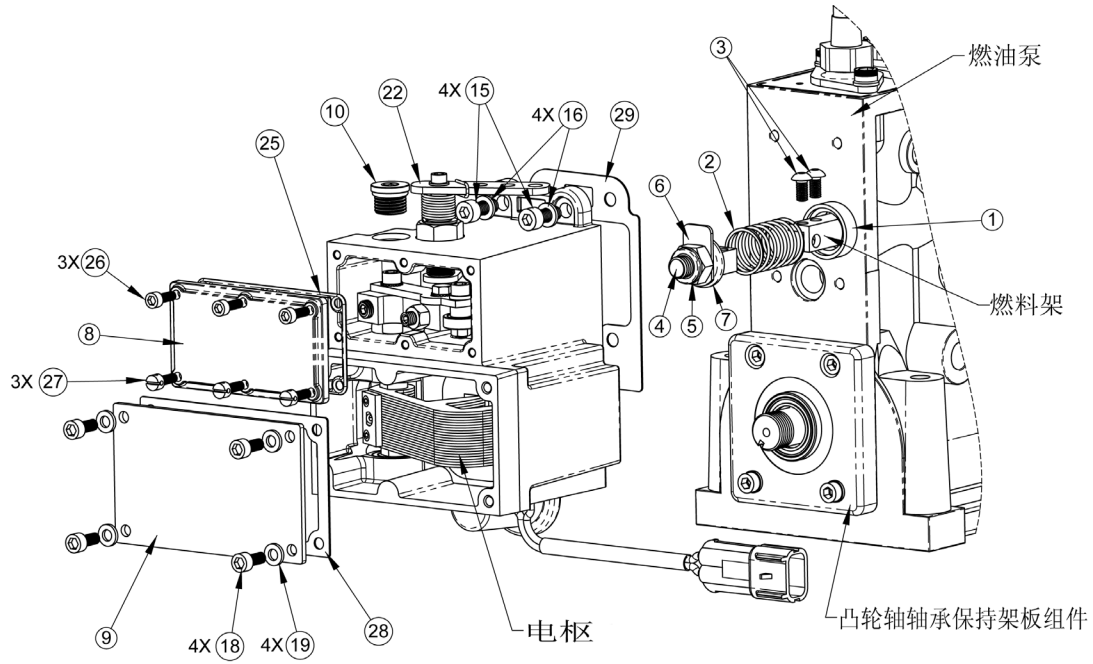


图 1-1

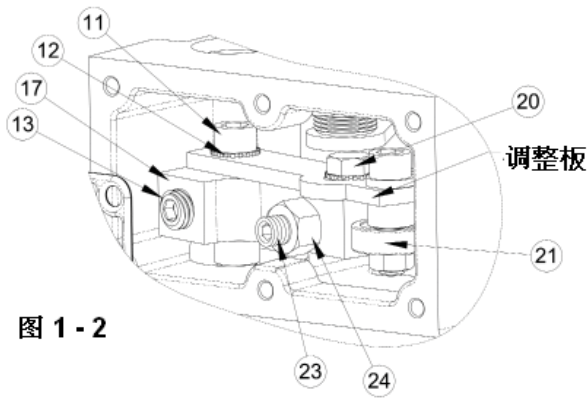


图 1-2

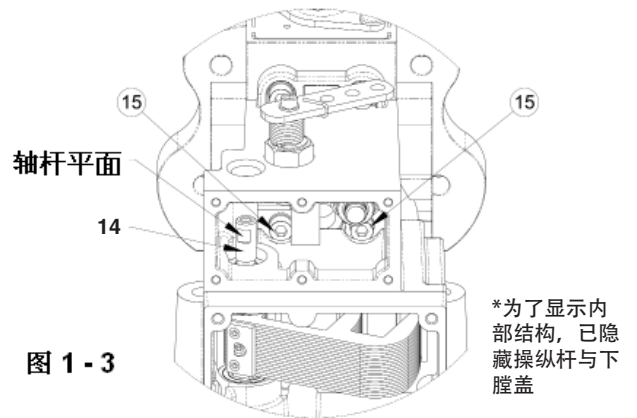


图 1-3

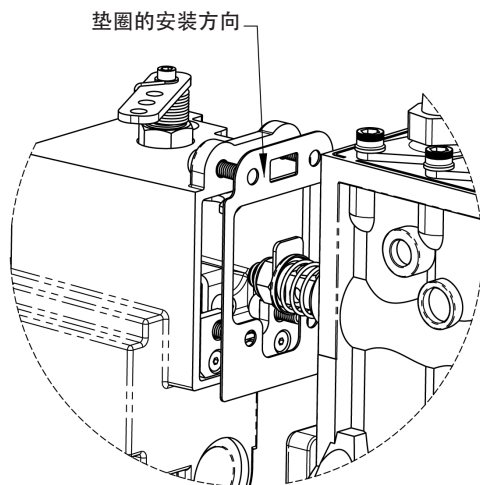


图 1-4

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尺寸

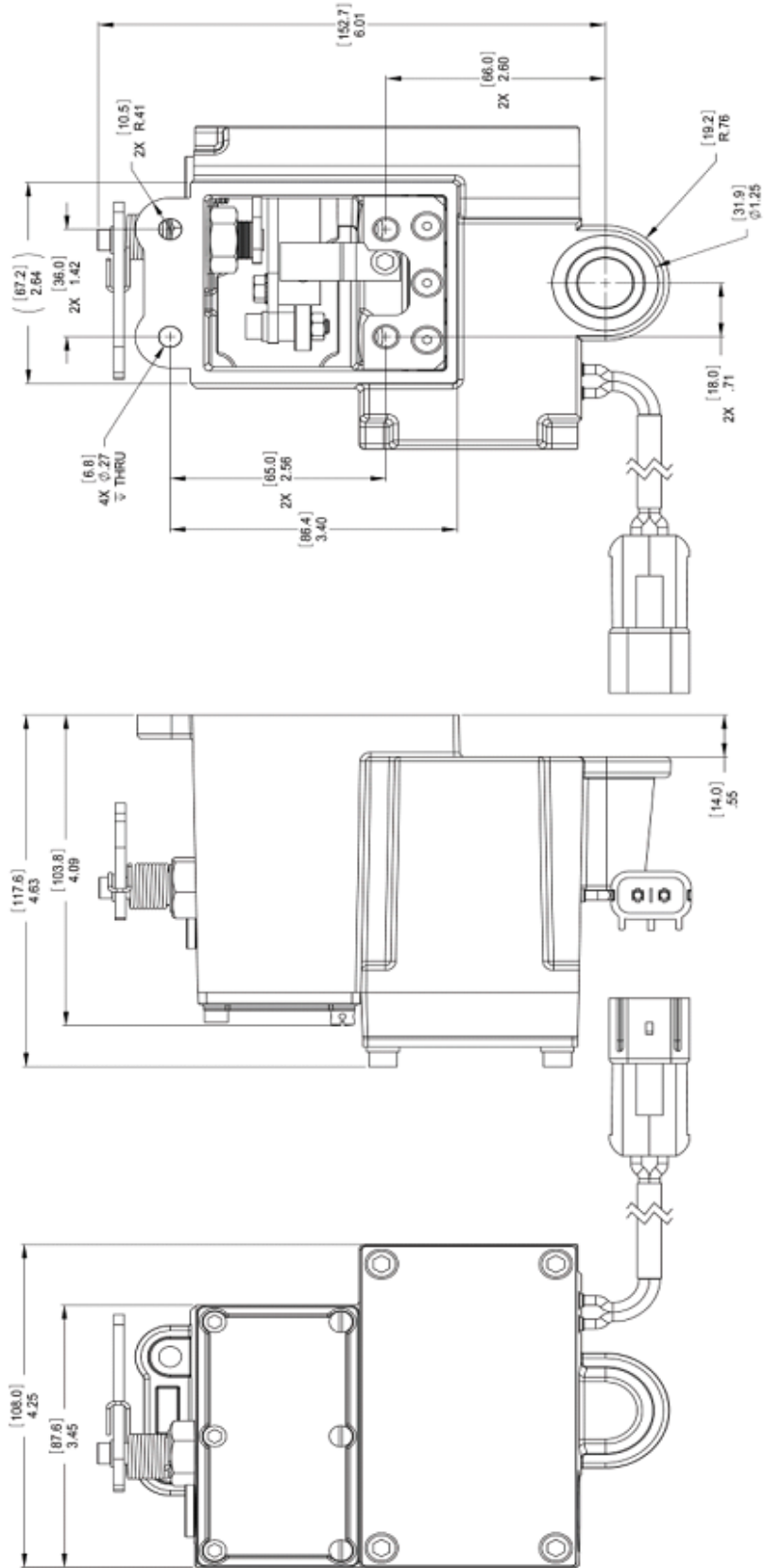


图 2-1

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