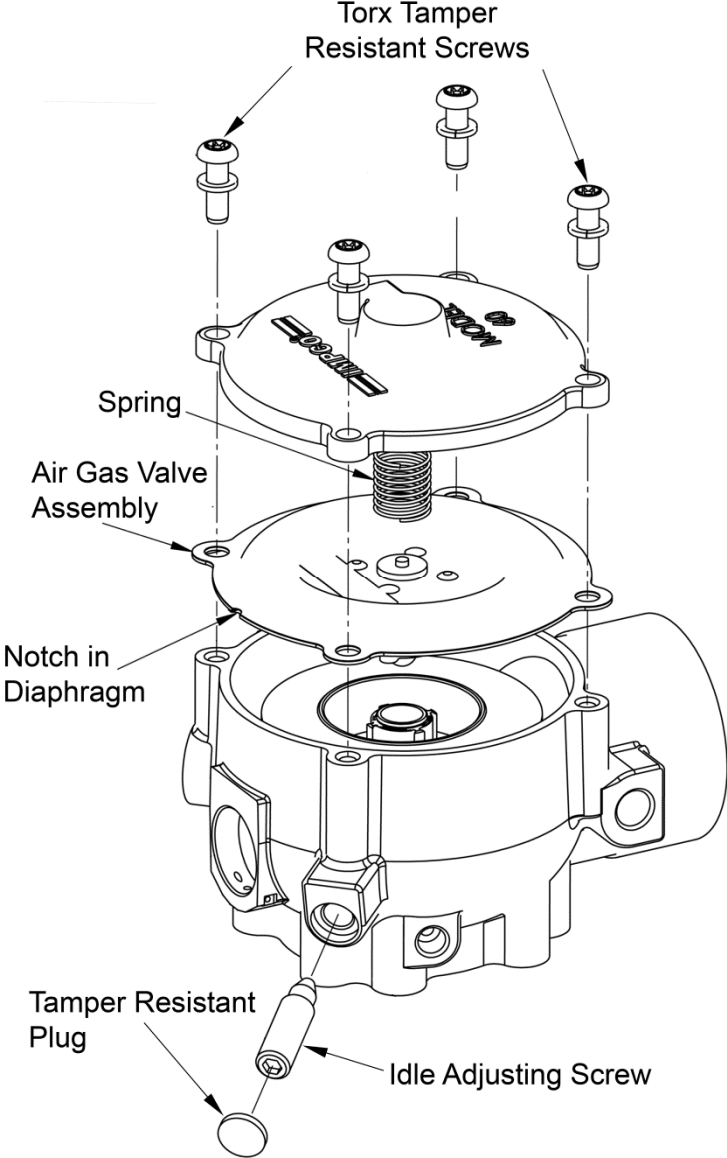


# RK-30796-002 REPAIR KIT INSTRUCTIONS

This PPI covers the repair of the FT60M Mixer that use air gas valve part number AV1-30796-002. This service repair kit is designed to service the fuel mixer in a fuel system in use in countries that have not adopted emission regulations preventing adjustment of fuel systems. It is not legal for sale or use in the USA or other regions or countries that have adopted such emission regulations.

**IMPORTANT:** Any maintenance, service or repair should be performed by trained and experienced service technicians. Proper tools and equipment should be used to prevent injury to the servicing technician, property or system components. Service repairs should always be performed in a safe environment and the technician should always wear protective clothing and eyewear to prevent injury.

The IMPCO PPI-100 repair kit instructions will provide the technician information to successfully repair FT60 Mixers. Always inspect the major casting pieces for damage, corrosion or cracks before attempting a service repair.



**Figure 1: A view of the FT60M components covered in this repair kit instruction.**

**WARNING**

**Do not use Teflon tape to seal any fuel fittings. Fragments of the tape may enter into the fuel system, causing damage or malfunction of critical fuel system components that may result in serious injury and/or property damage.**

**Repair Kit RK-30796-002 Component Parts List**

Item	Description	P/N	Qty
1	Airgas Valve Assembly	AV1-30796-002	1
2	Tamper Resistant Cap	P3-17956-1	1
3	Product Installation Instructions*	PPI-100	1

\*Repair kit instructions may be included with the repair kit or available at: [www.impcotechnologies.com/repair-kits.asp](http://www.impcotechnologies.com/repair-kits.asp)



## REQUIRED TOOL LIST

- Spectrum DST (Diagnostic Scan Tool)
- Torx Tamper Resistant Driver Tool ¼"
- Drift Punch
- Drill And Bit Set
- Hardened Steel Pick Tool
- 1/6" To 1/8" Sheet Metal Screw
- Pliers
- Medium Size Metal Hammer
- Hex Key Wrench 5/32" or 4mm

## INSTRUCTIONS

1. Start the engine.
2. Close the LPG manual shut off valve on the propane tank.
3. Let the engine idle until the engine stops from fuel starvation.
4. Turn the ignition key OFF.
5. Disconnect the negative battery cable.
6. Remove the four cover Screws using the Torx tamper resistant tool.
7. Remove the original Spring and Air Gas Valve assembly.
8. Use a soft lint free cloth to wipe clean any fuel residue, dust and debris from the fuel mixer body with. Also wipe clean the inside of the top cover.
9. Install the Air Gas Valve assembly with the notch in line with the mixer fuel inlet port, as shown in Figure 1. Re-install the Spring.
10. Replace the four cover Screws and tighten to 30 inch lbs  $\pm 3$  (3.4Nm  $\pm 3$ ).
11. Remove the Expansion Plug by drilling a 1/8" (3.2mm) to 1/16" (1.6mm) hole in the center of the Plug (use care not to damage the adjusting screw behind the plug). Thread in the appropriate sheet metal screw and pull the plug away using a set of pliers.



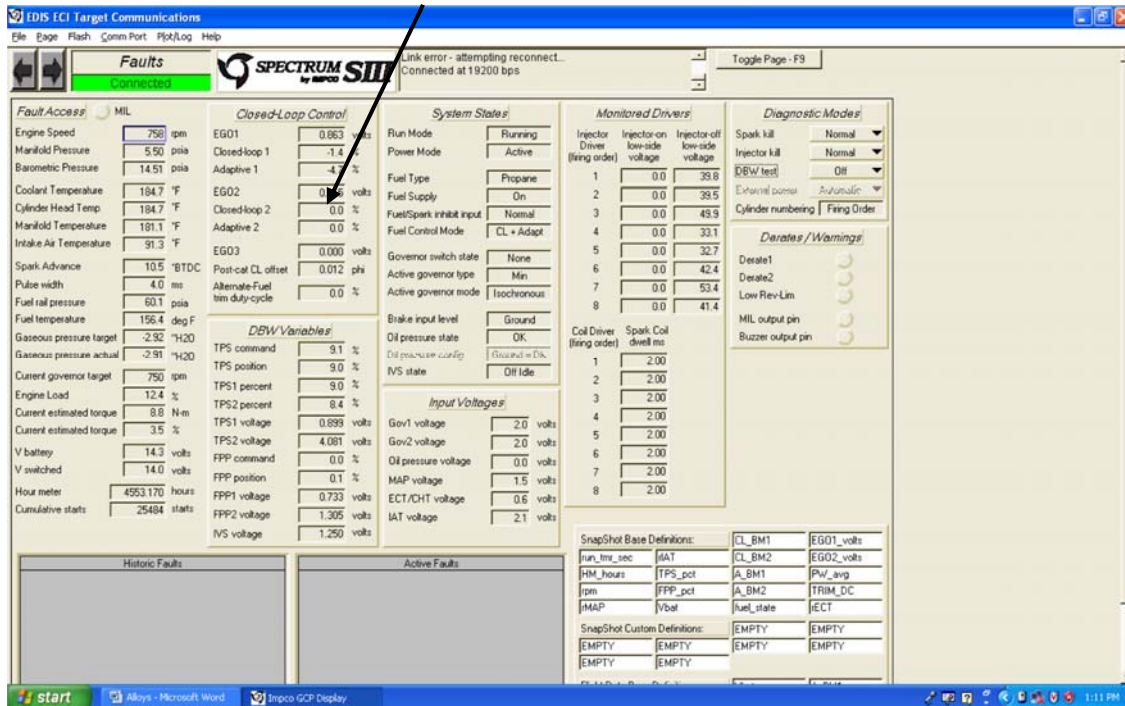
## Adjusting the Mixer Idle Screw

1. Connect the DST (Diagnostic Scan Tool) to the truck (refer to DST section of the IMPCO Parts & Service Manual).
2. Reconnect the negative battery cable.
3. Open the fuel supply valve (manual shut-off valve) on the tank.
4. Start engine and let run at idle until it reaches normal operating temperature.
5. Once the DST is connected, go to the Faults screen and wait until the Fuel Control Mode reads "CL + Adapt" (closed loop plus adaptive) as shown below.

The screenshot shows the EDIS ECI Target Communications software interface. The 'Fuel Control Mode' is set to 'CL + Adapt', which is highlighted by a black arrow. The interface displays various engine parameters and diagnostic information.

Fault Access		Closed-Loop Control		System Status		Monitored Drivers			Diagnostic Modes			
Engine Speed	748 rpm	EG01	0.874 volts	Run Mode	Running	Injector Driver	Injector-on low-side voltage	Injector-off low-side voltage	Spark kill	Normal		
Manifold Pressure	5.34 psia	Closed-loop 1	-35.0 %	Power Mode	Active	1	0.0	39.3	Injector kill	Normal		
Barometric Pressure	14.47 psia	Adaptive 1	0.0 %	Fuel Type	Propane	2	0.0	42.6	DBW test	Off		
Coolant Temperature	182.4 °F	EG02	0.738 volts	Fuel Supply	On	3	0.0	55.0	Exhaust brake	Automatic		
Cylinder Head Temp	182.4 °F	Closed-loop 2	0.0 %	Fuel/Spark inhibit input	Normal	4	0.0	42.2	Cylinder numbering	Firing Order		
Manifold Temperature	180.1 °F	Adaptive 2	0.0 %	Fuel Control Mode	CL + Adapt	5	0.0	36.6	Derates / Warnings			
Intake Air Temperature	92.1 °F	EG03	0.000 volts	Governor switch state	None	6	0.0	42.4	Derate1	<input type="checkbox"/>		
Spark Advance	13.0 °BTDC	Post-cat CL offset	0.000 phi	Active governor type	Min	7	0.0	48.8	Derate2	<input type="checkbox"/>		
Pulse width	3.0 ms	Alternate-Fuel trim duty-cycle	0.0 %	Active governor mode	Isochronous	8	0.0	41.4	Low Rev-Lim	<input type="checkbox"/>		
Fuel rail pressure	60.1 psia	DBW Variables		Brake input level	Ground	Coil Driver (firing order)		Spark Coil dwell ms	MIL output pin	<input checked="" type="checkbox"/>		
Fuel temperature	151.7 deg F	TPS command	9.2 %	Oil pressure state	OK	1	2.00		Buzzer output pin	<input type="checkbox"/>		
Gaseous pressure target	-3.61 "H2O	TPS position	9.1 %	Oil pressure config	Ground as DA	2	2.00		Snapshot Base Definitions:			
Gaseous pressure actual	-3.60 "H2O	TPS1 percent	9.1 %	IVS state	Off Idle	3	2.00		run_tmr_sec	IAT	CL_BM1	EG01_volts
Current governor target	750 rpm	TPS2 percent	8.5 %	Input Voltages		4	2.00		HM_hours	TFS_pct	CL_BM2	EG02_volts
Engine Load	13.1 %	TPS1 voltage	0.904 volts	Gov1 voltage	2.0 volts	5	2.00		rpm	FPP_pct	A_BM1	PW_avg
Current estimated torque	10.5 N-m	TPS2 voltage	4.076 volts	Gov2 voltage	2.0 volts	6	2.00		MAP	Vbat	A_BM2	TRIM_DC
Current estimated torque	4.1 %	FPP command	0.0 %	Oil pressure voltage	0.0 volts	7	2.00				fuel_state	JECT
V battery	14.4 volts	FPP position	0.0 %	MAP voltage	1.5 volts	8	2.00		Snapshot Custom Definitions:			
V switched	14.0 volts	FPP1 voltage	0.733 volts	ECT/EHT voltage	0.6 volts				EMPTY	EMPTY	EMPTY	EMPTY
Hour meter	4552.884 hours	FPP2 voltage	1.305 volts	IAT voltage	2.0 volts				EMPTY	EMPTY	EMPTY	EMPTY
Cumulative starts	25483 starts	IVS voltage	1.250 volts									

9. Clear any faults and note the Adaptive Value as shown below.



## Changing the Adaptive Value

The ideal Adaptive value is between +ve 5 and -ve 5%. A negative (-) number indicates a mechanically rich condition and a positive (+) number indicates a mechanically lean condition.

- Using the hex key wrench, turn the idle screw counter clockwise to lean the mixture and clockwise to richen. **Note that Adaptive value may take 60 seconds or more once the idle screw is changed. Make small 1/8 turn changes to the idle screw and wait at least one minute prior to making another change.**
- Once the value is between -5% and +5% allow to run at least ten minutes, pushing on the foot pedal once or twice to increase the engine rpms, then allow to idle. Recheck the Adaptive value and adjust again if necessary.
- Place the tamper resistant cap (P/N P3-17956-1) over the idle screw and using a hammer and small flat punch, tap into place.
- The vehicle may be returned to service.

## Future Adjustments

If the idle screw adjustment does not correct the DTC(s), refer to the Parts and Service Manual for further diagnostic information.

## Diagnostic Scan Tool (DST)

For additional information regarding the DST software including its installation and use, refer to the Parts and Service Manual and <http://www.impcotechnologies.com/spectrum-test-tools.asp>



# WARNING:

**IMPROPER INSTALLATION OR USE OF THIS PRODUCT MAY CAUSE  
SERIOUS INJURY AND/OR PROPERTY DAMAGE.**

## **SERVICE TECHNICIANS AND USERS**

SHOULD CAREFULLY READ AND ABIDE BY THE PROVISIONS SET FORTH IN NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #37 FOR STATIONARY ENGINES, #52 FOR CNG VEHICULAR FUEL SYSTEMS OR #58 FOR LPG SYSTEMS.

## **INSTALLERS**

LPG INSTALLATIONS IN THE UNITED STATES MUST BE DONE IN ACCORDANCE WITH FEDERAL STATE OR LOCAL LAW, WHICHEVER IS APPLICABLE AND NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #58, STANDARD FOR STORAGE AND HANDLING OF LIQUEFIED PETROLEUM GASES TO THE EXTENT THESE STANDARDS ARE NOT IN VIOLATION WITH FEDERAL, STATE OR LOCAL LAW.

## **COUNTRIES OUTSIDE OF USA**

REFER TO THE GOVERNING AGENCIES OVERSEEING CNG AND PROPANE APPLICATIONS.

## **CNG INSTALLATIONS IN THE UNITED STATES**

MUST BE DONE IN ACCORDANCE WITH FEDERAL STATE OR LOCAL LAW AND NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #52, COMPRESSED NATURAL GAS (CNG) VEHICULAR FUEL SYSTEMS TO THE EXTENT THESE STANDARDS ARE NOT IN VIOLATION WITH FEDERAL, STATE OR LOCAL LAW.

## **LPG AND/OR NATURAL GAS INSTALLATIONS ON STATIONARY ENGINES**

MUST BE DONE IN ACCORDANCE WITH FEDERAL, STATE OR LOCAL LAW AND NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #37, STATIONARY COMBUSTION ENGINES AND GAS TURBINE ENGINES, TO THE EXTENT THESE STANDARDS ARE NOT IN VIOLATION WITH FEDERAL, STATE OR LOCAL LAW. FAILURE TO ABIDE BY THE ABOVE WILL VOID ANY IMPCO WARRANTY ON THE PRODUCTS AND MAY CAUSE SERIES INJURY OR PROPERTY DAMAGE.

DUE TO THE INHERENT DANGER OF GASEOUS FUELS THE IMPCO PRODUCTS SHOULD NOT BE INSTALLED OR USED BY PERSONS NOT KNOWLEDGEABLE OF THE HAZARDS ASSOCIATED WITH THE USE OF GASEOUS FUELS.