APPENDIX A

FUEL SYSTEM SCHEMATICS

The following schematics are for numerous installations. There are variations of the descriptions also. The table below describes a typical application where the particular schematic may apply. If you have a unique application where the schematic does not quite apply, contact Airflow Performance for further information.

INDEX OF APPLICATIONS

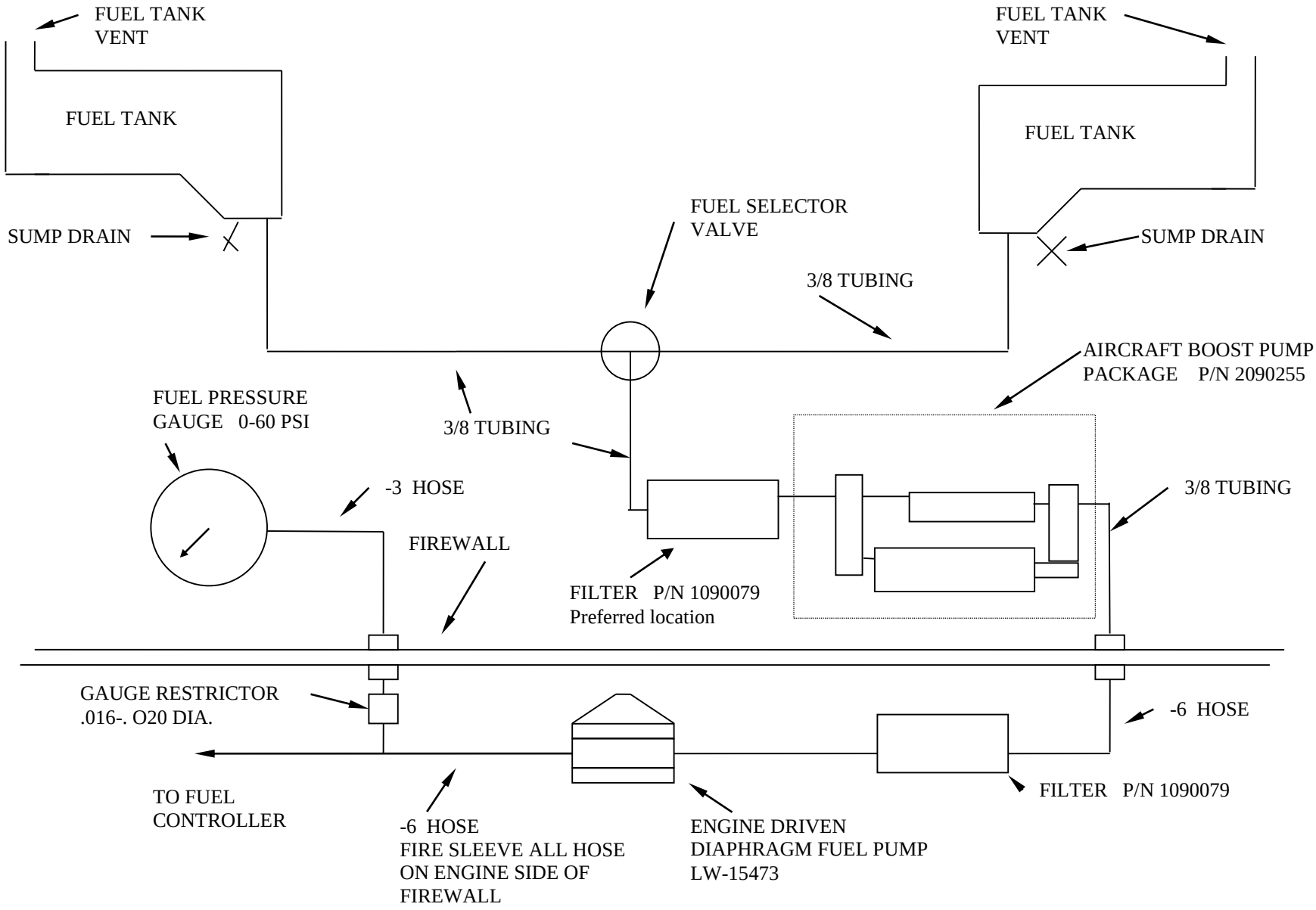
SCHEMATIC #	DESCRIPTION	TYPICAL APPLICATION
1	Diaphragm engine driven fuel pump with electric boost pump mounted in airframe.	RV series, Lancair, Glasair; preferred installation using Lycoming engines with down draft cooling. This is a typical tractor engine installation
2	Diaphragm engine driven fuel pump with electric boost pump mounted on firewall.	Long EZ, Cozy, typical Lycoming installation on rear engine aircraft using updraft cooling. The boost pump and filter are mounted low on the firewall in the stream of incoming cooling air.
3	Single fuel tank installation. Diaphragm engine driven fuel pump with electric boost pump in airframe.	Pitts, One Design. Lycoming engine installations with down draft cooling.
4	Mechanical vane or gear type engine driven fuel pump. Dual boost pump has no relief, uses relief on engine driven pump.	Automotive engine conversions, V-8 applications. S-51, FEW 51, Legend, are typical examples.
5	Dual electric fuel pump package. No mechanical pump is used.	Automotive engine conversions. Subaru, V-8, Mazda. This is an aerobatic installation. Fuel return from pump package goes to header tank.
6	Dual electric pump package. No mechanical fuel pump.	Automotive conversions. Fuel return is sent to main fuel tanks.
7	Mechanical vane pump with internal bypass and external relief. Dual boost pump with no relief.	Automotive V-8 conversions. S-51. Return fuel is sent back to each tank. Return check valves keep cross flow from happening if aircraft is in a bank.

APPENDIX A (Continued)

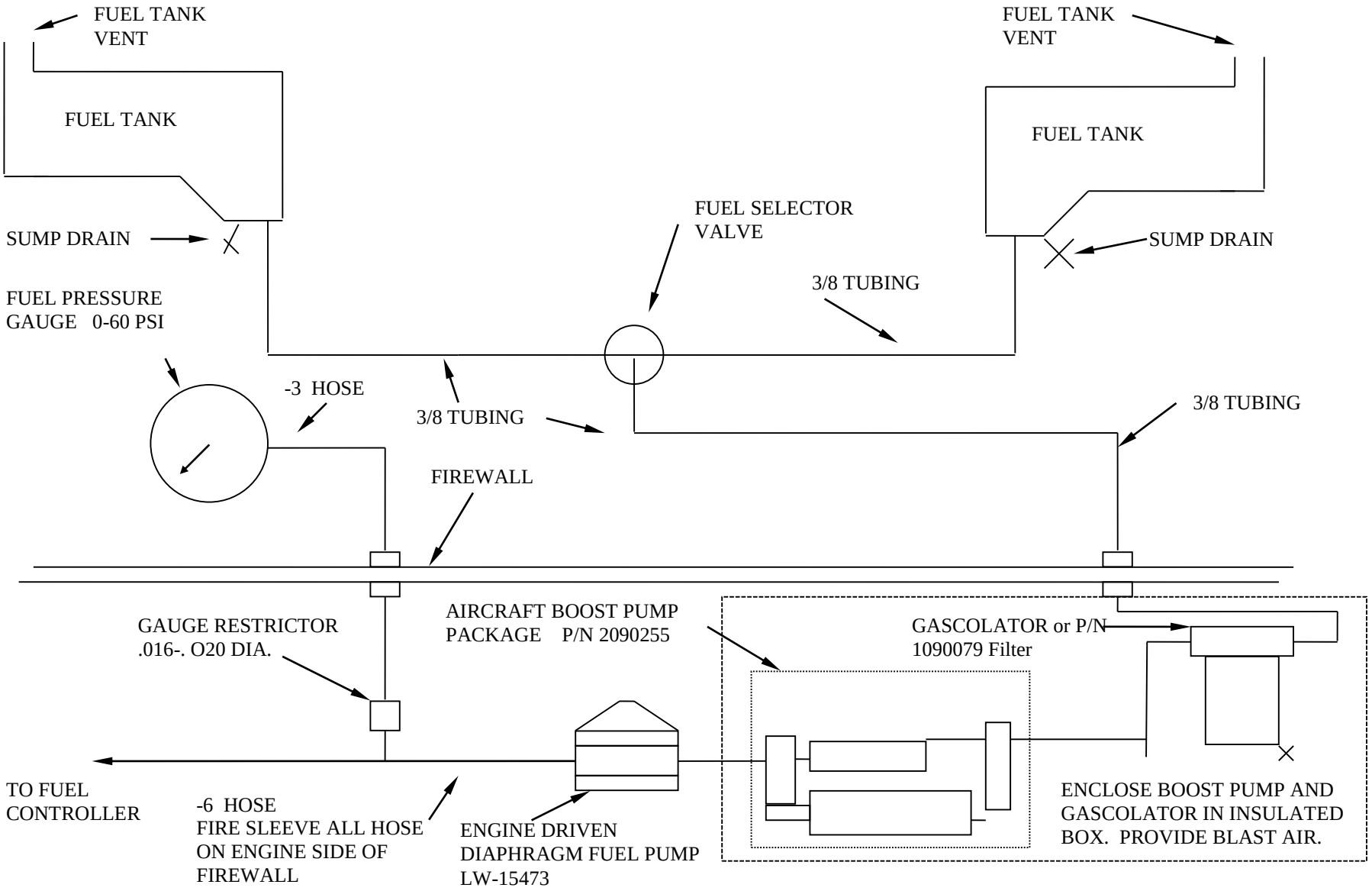
INDEX OF APPLICATIONS

SCHEMATIC #	DESCRIPTION	TYPICAL APPLICATION
8	Mechanical fuel pump with internal bypass and external relief. Single boost pump package with no relief.	AMW engine. Aerobatic installation. Return fuel is sent to header tank.
9	Mechanical fuel pump with internal bypass and external relief. Single boost pump package with no relief.	AMW engine. Return fuel is sent to each fuel tank through a ganged selector valve.
10	Mechanical fuel pump with internal bypass and external relief. Single boost pump package with no relief.	AMW engine. Return fuel is sent to one tank. The fuel tanks level them selves through a inter connected feed line.
11	Dual boost pump package feeding engine driven fuel pump.	Seawind. Used for starting and emergency back up. One pump is energized for high altitude and cruise flying.
12	Engine driven fuel pump with internal bypass and relief (Romec).	High output six cylinder Lycoming applications. Automotive conversions using Romec type engine driven fuel pump.
13	Dual electric fuel pump package.	Low horsepower Automotive conversions, Subaru, VW, Mazda. Relief valve for fuel pumps is in side fuel controller
14	Turbocharged Lycoming application. Romec engine driven fuel pump	Lancair IV or IV P application. This is a specialized installation using a modified Bendix fuel controller.
15	Turbocharger systems installation.	Lancair IV P. A typical installation for a turbocharged engine

FUEL SYSTEM SCHEMATIC 1



FUEL SYSTEM SCHEMATIC 2



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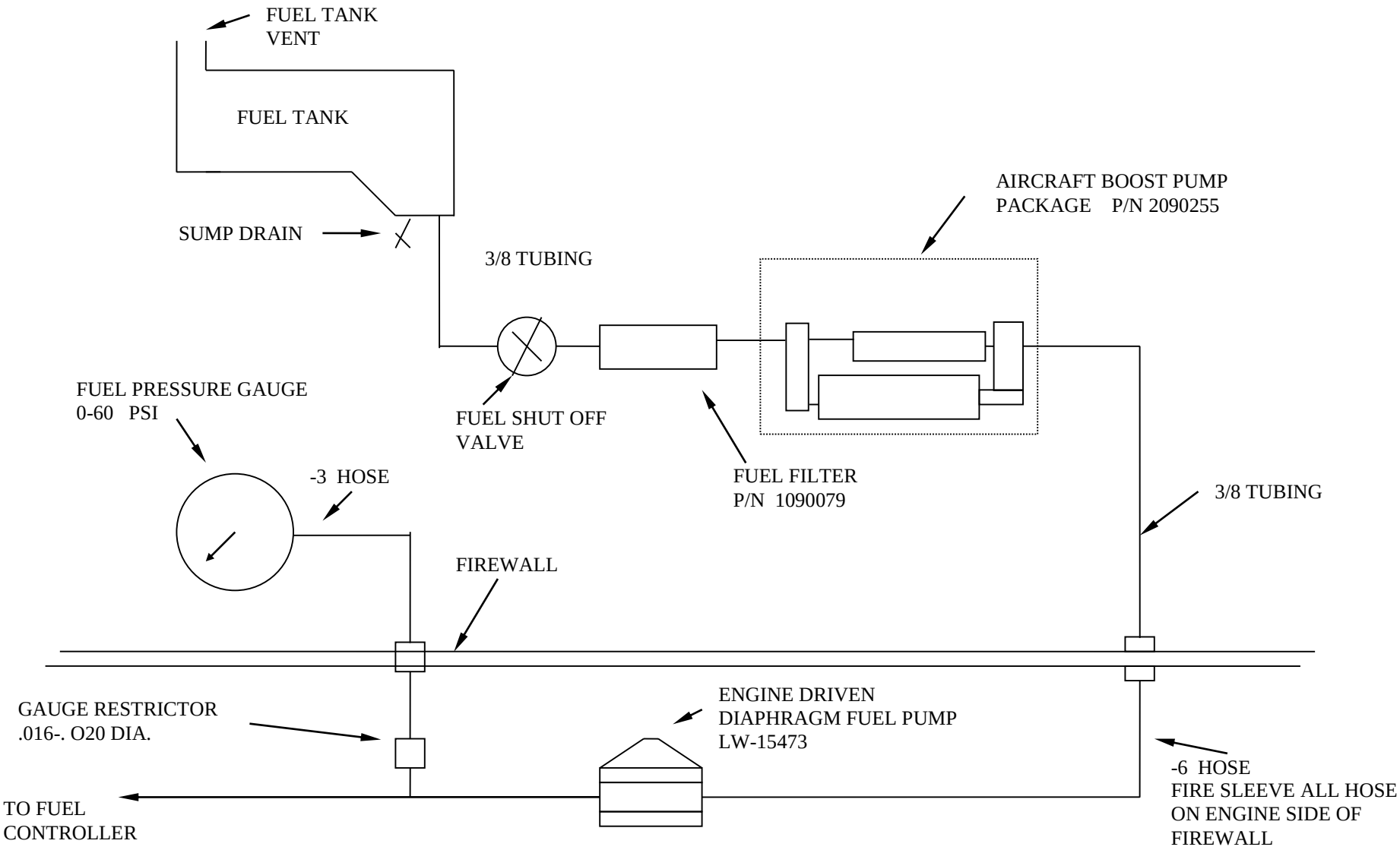
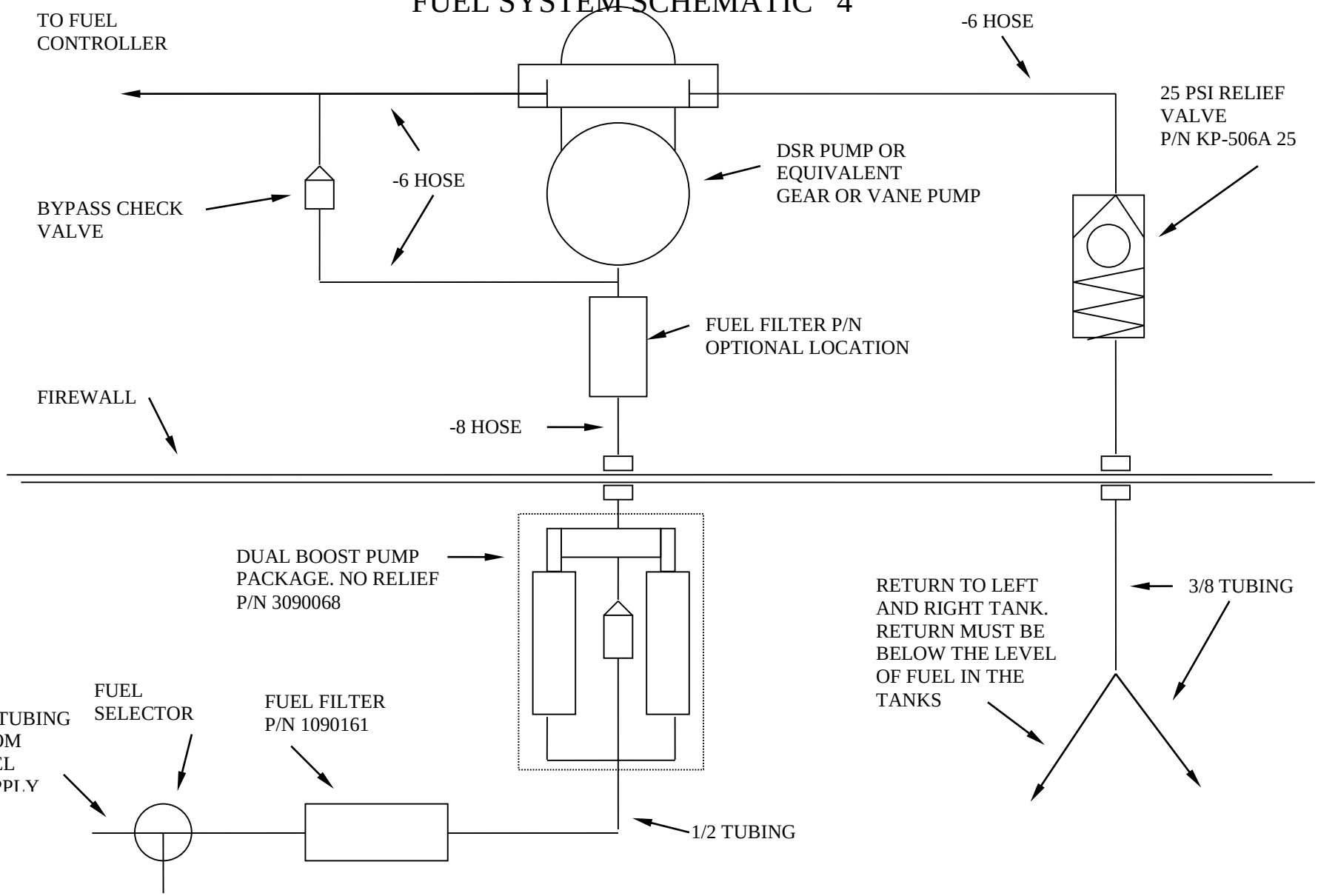
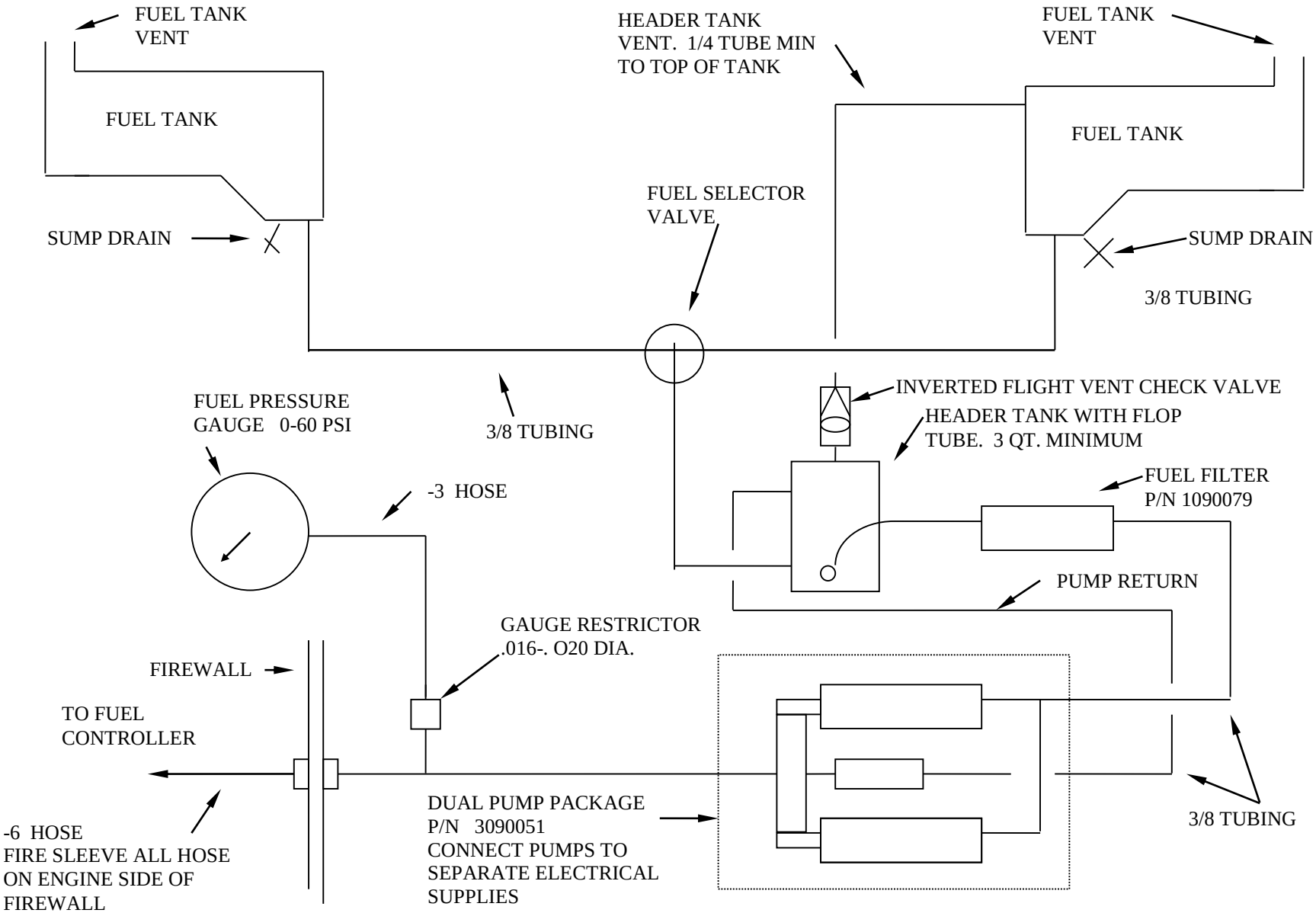


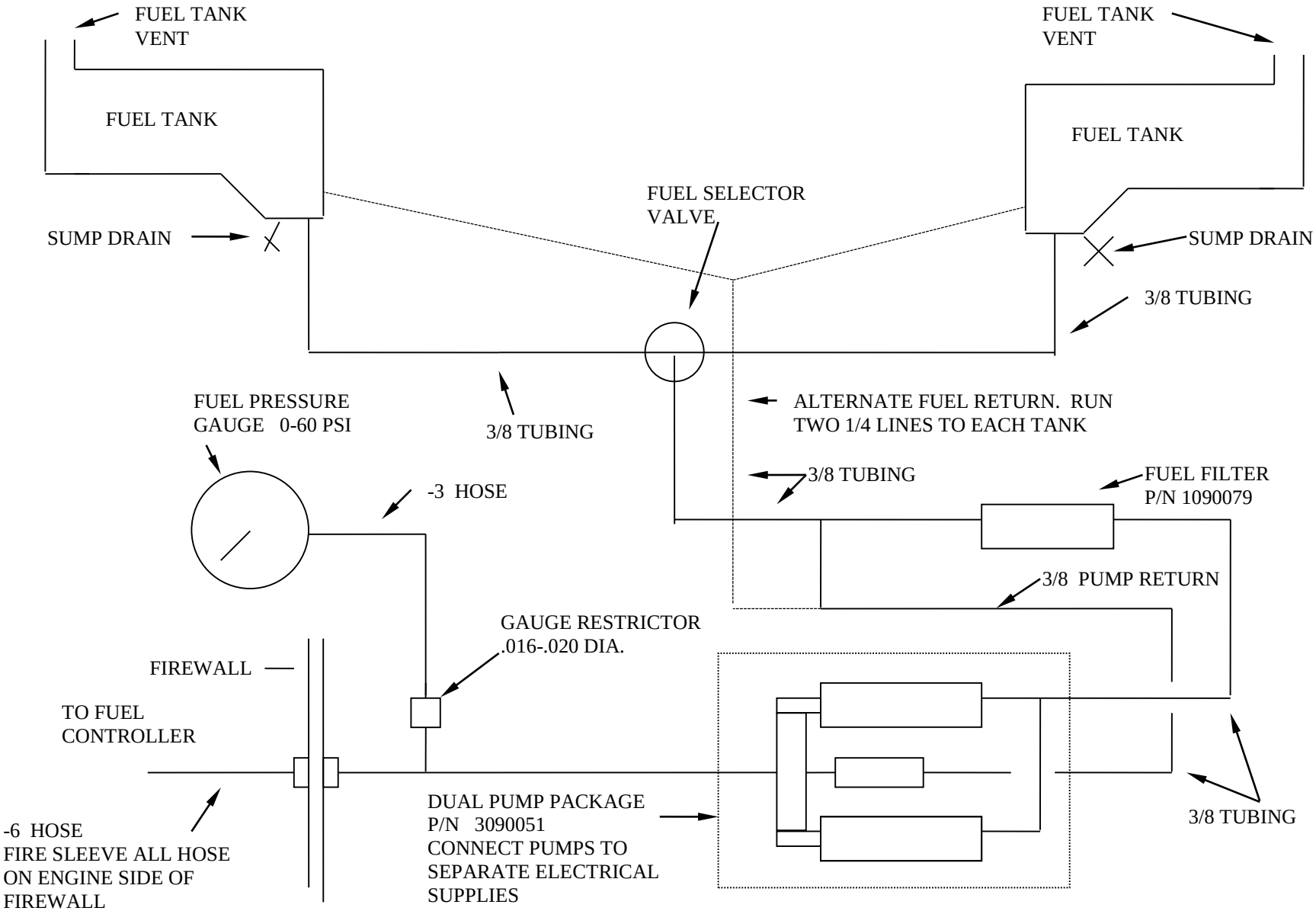
FUEL SYSTEM SCHEMATIC 4



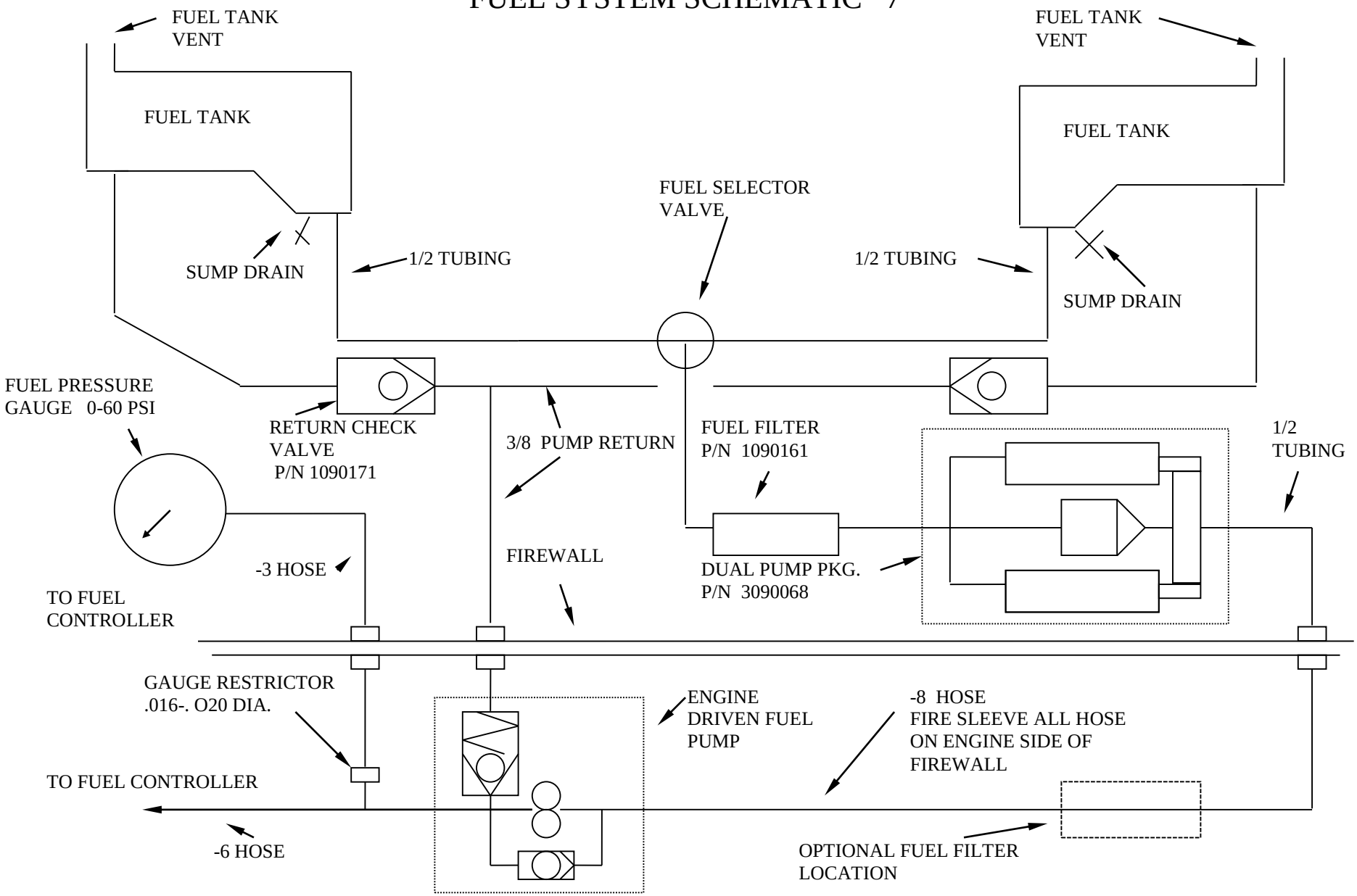
FUEL SYSTEM SCHEMATIC 5



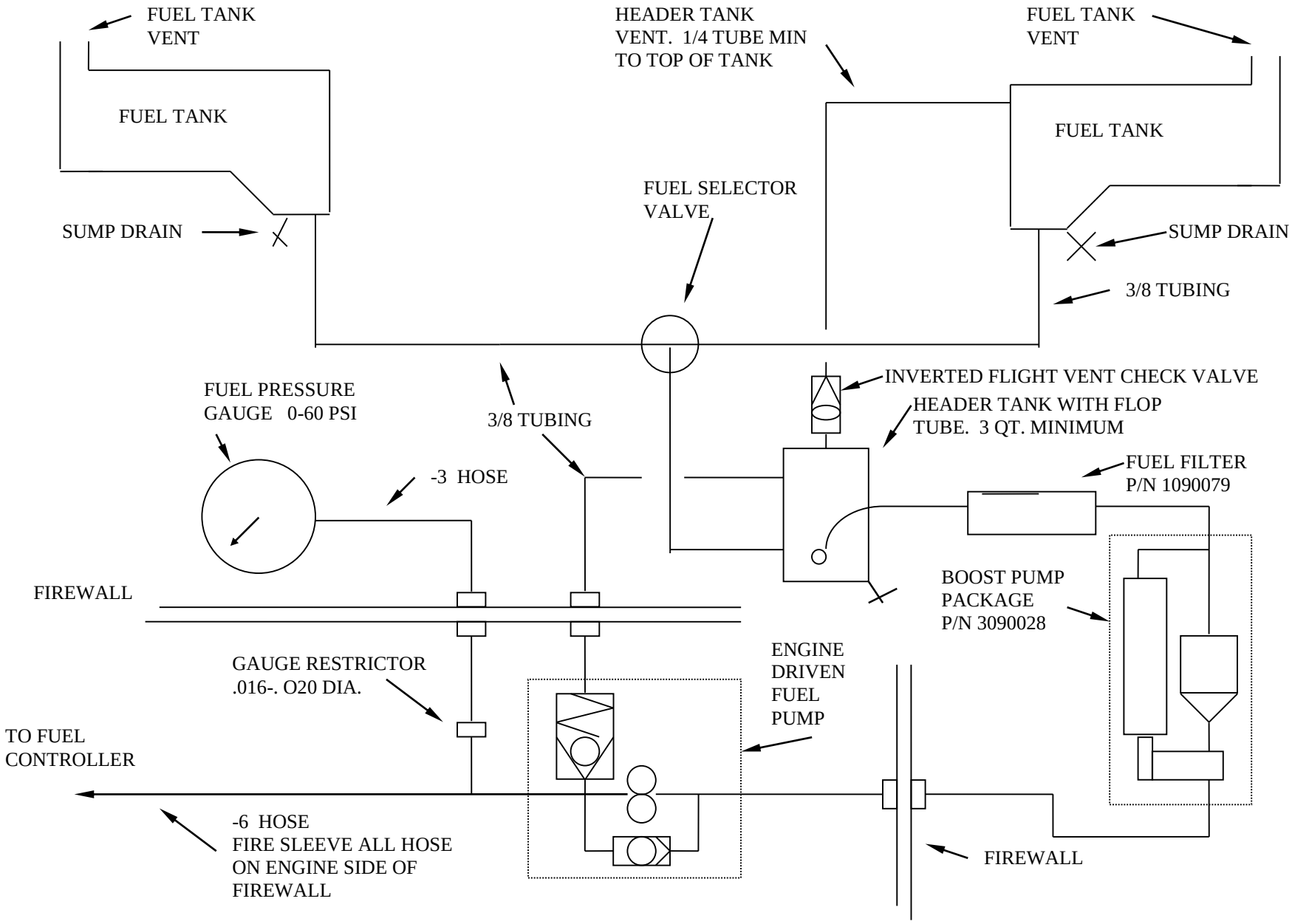
FUEL SYSTEM SCHEMATIC 6



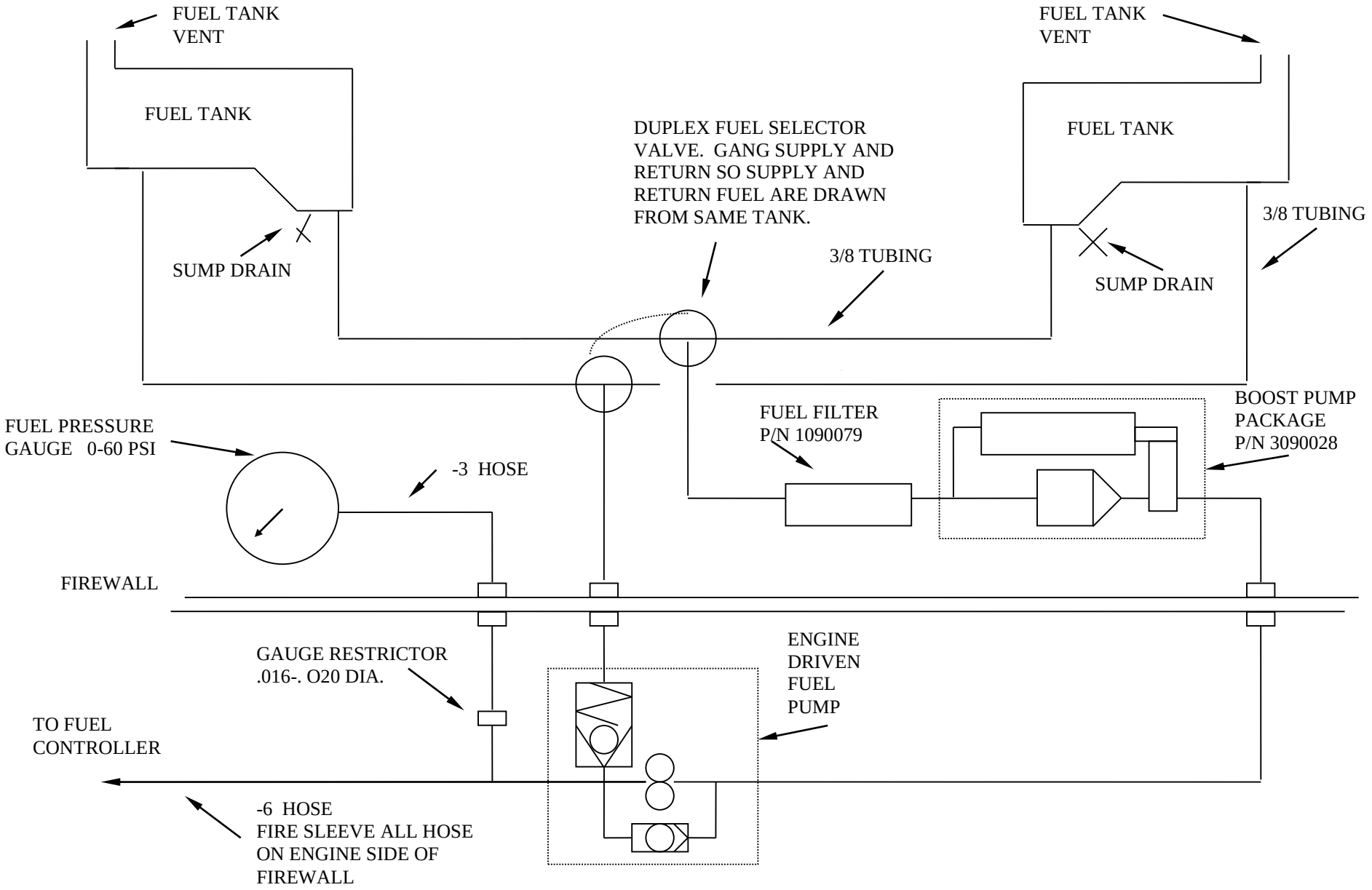
FUEL SYSTEM SCHEMATIC 7



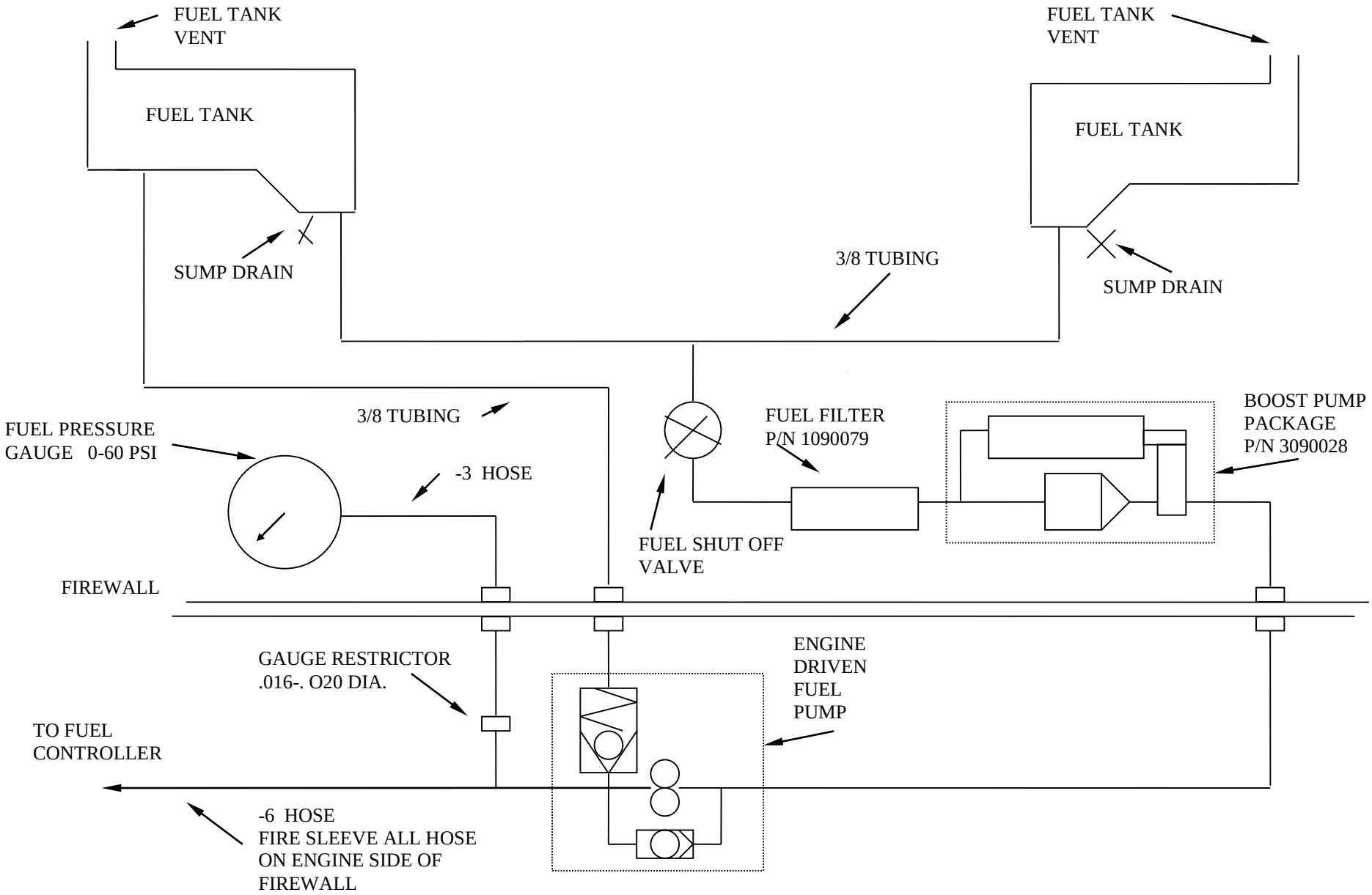
FUEL SYSTEM SCHEMATIC 8



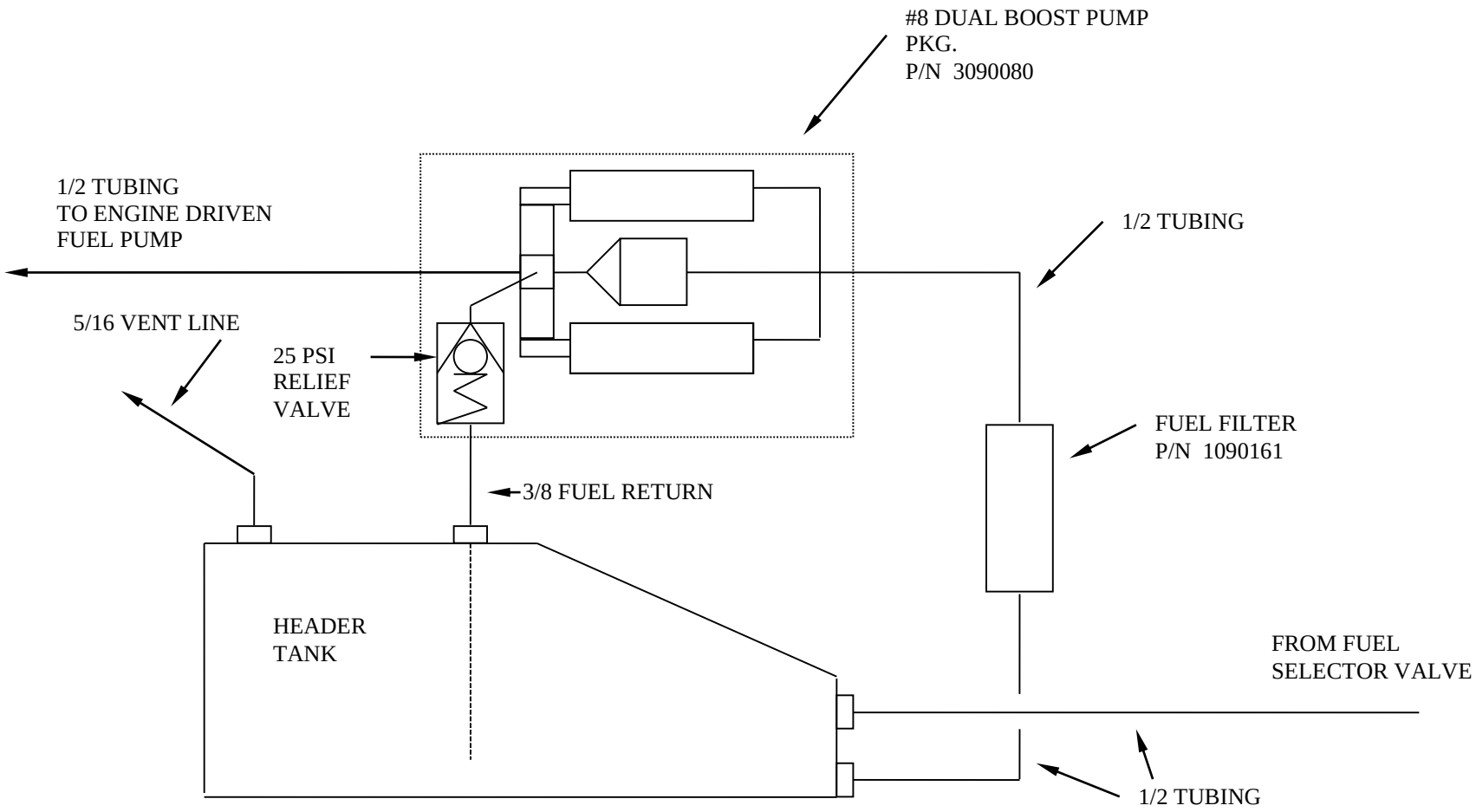
FUEL SYSTEM SCHEMATIC 9



FUEL SYSTEM SCHEMATIC 10

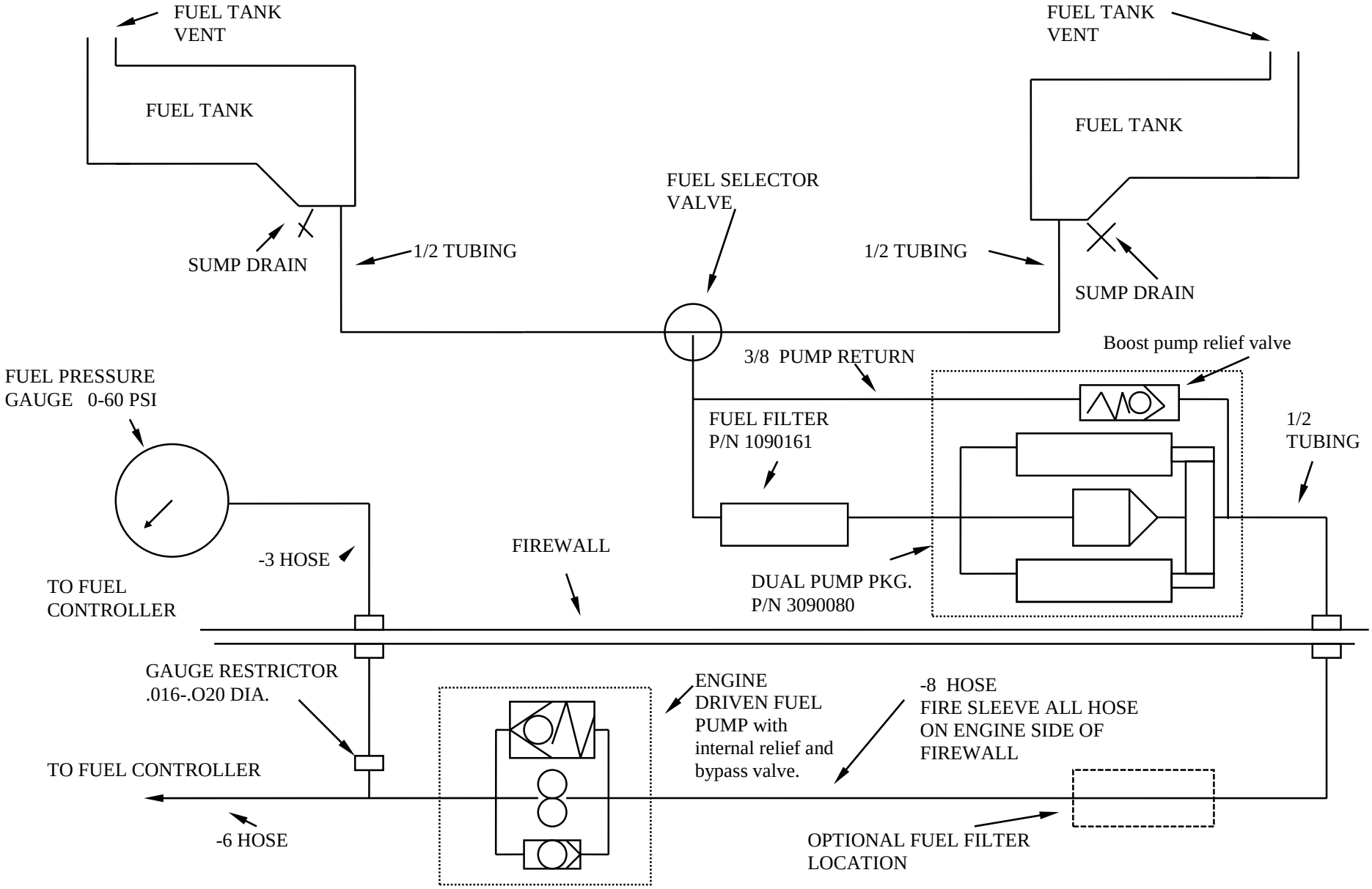


FUEL SYSTEM SCHEMATIC 11

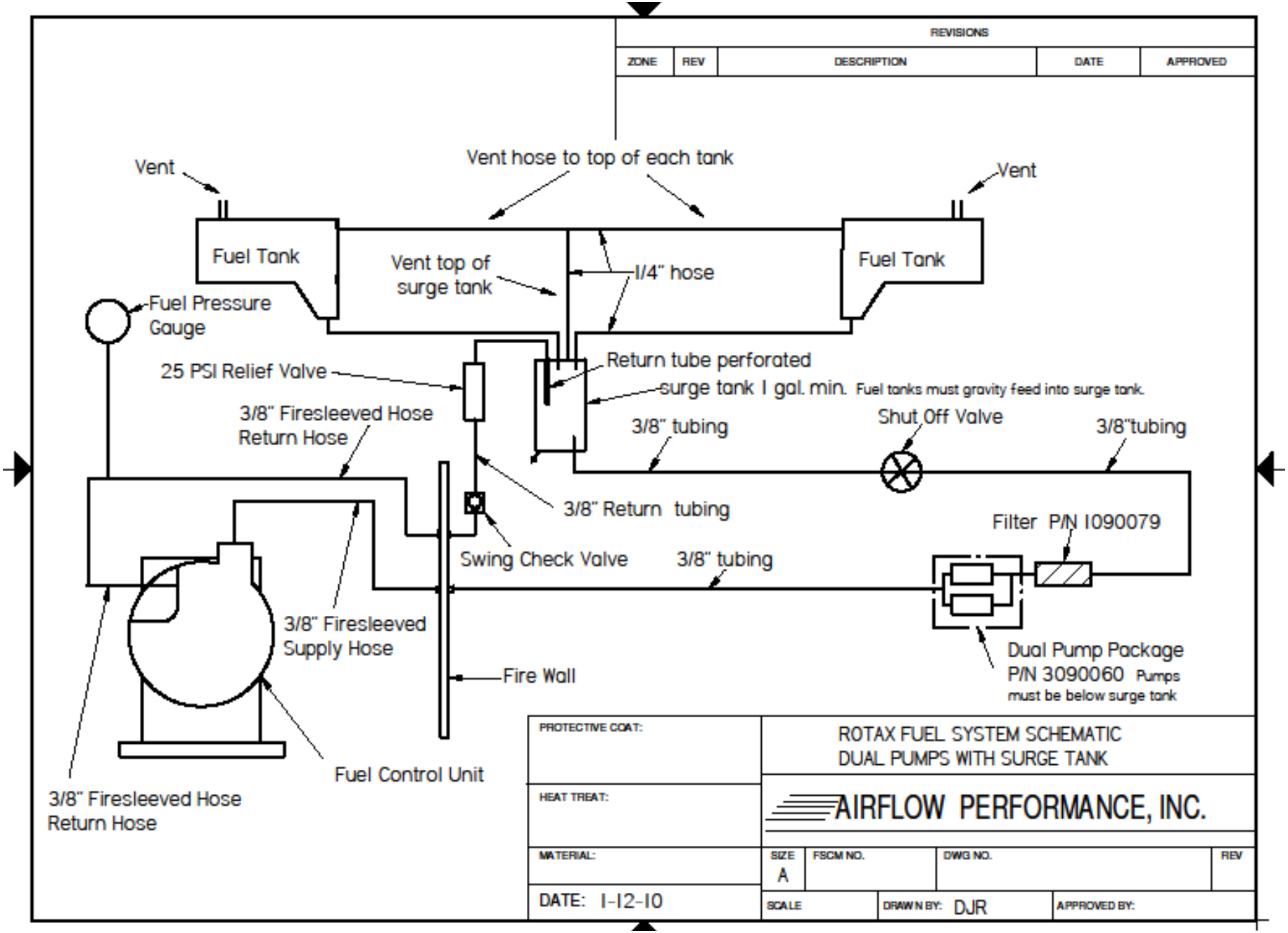


APPENDIX A (Continued)

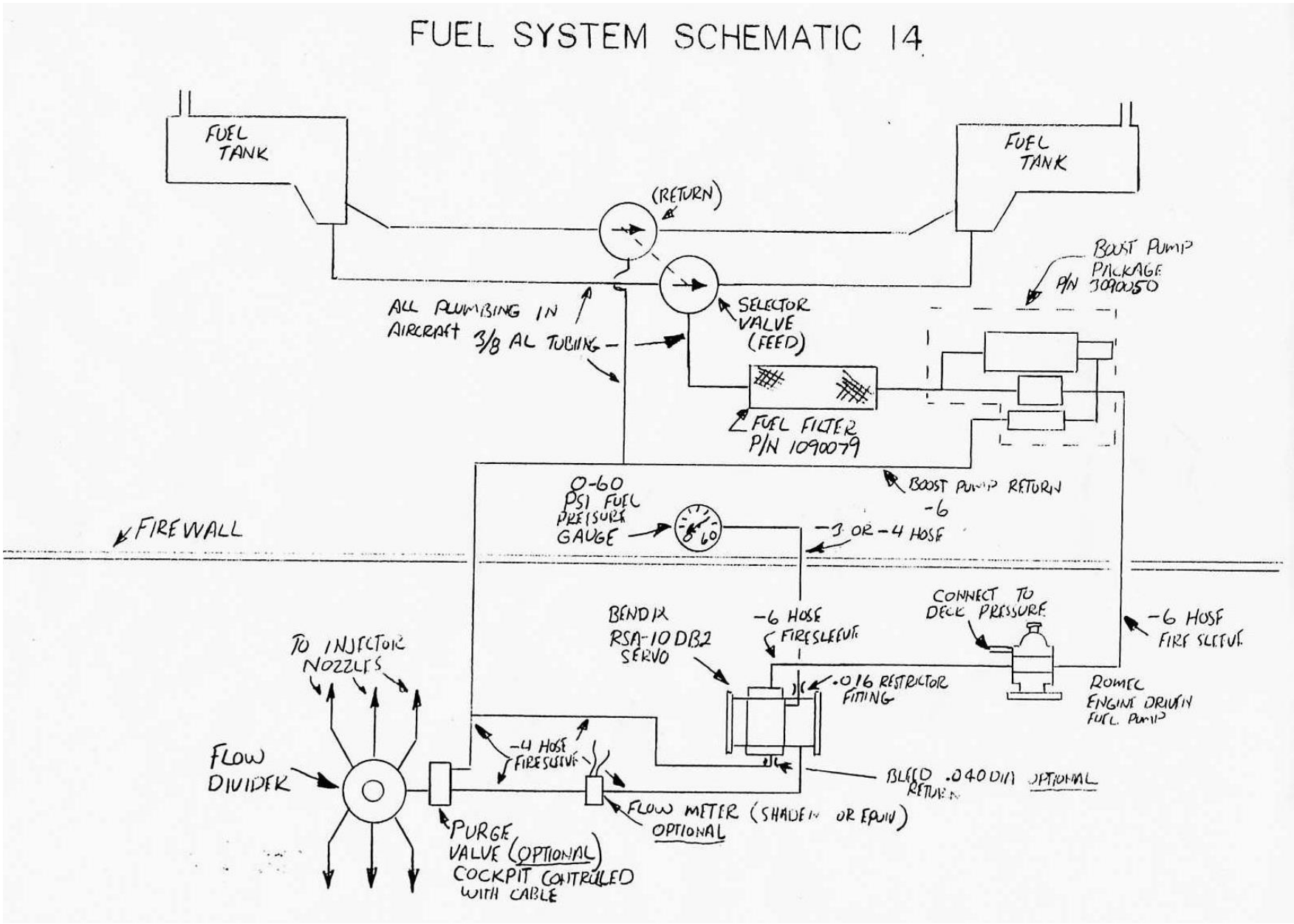
FUEL SYSTEM SCHEMATIC 12

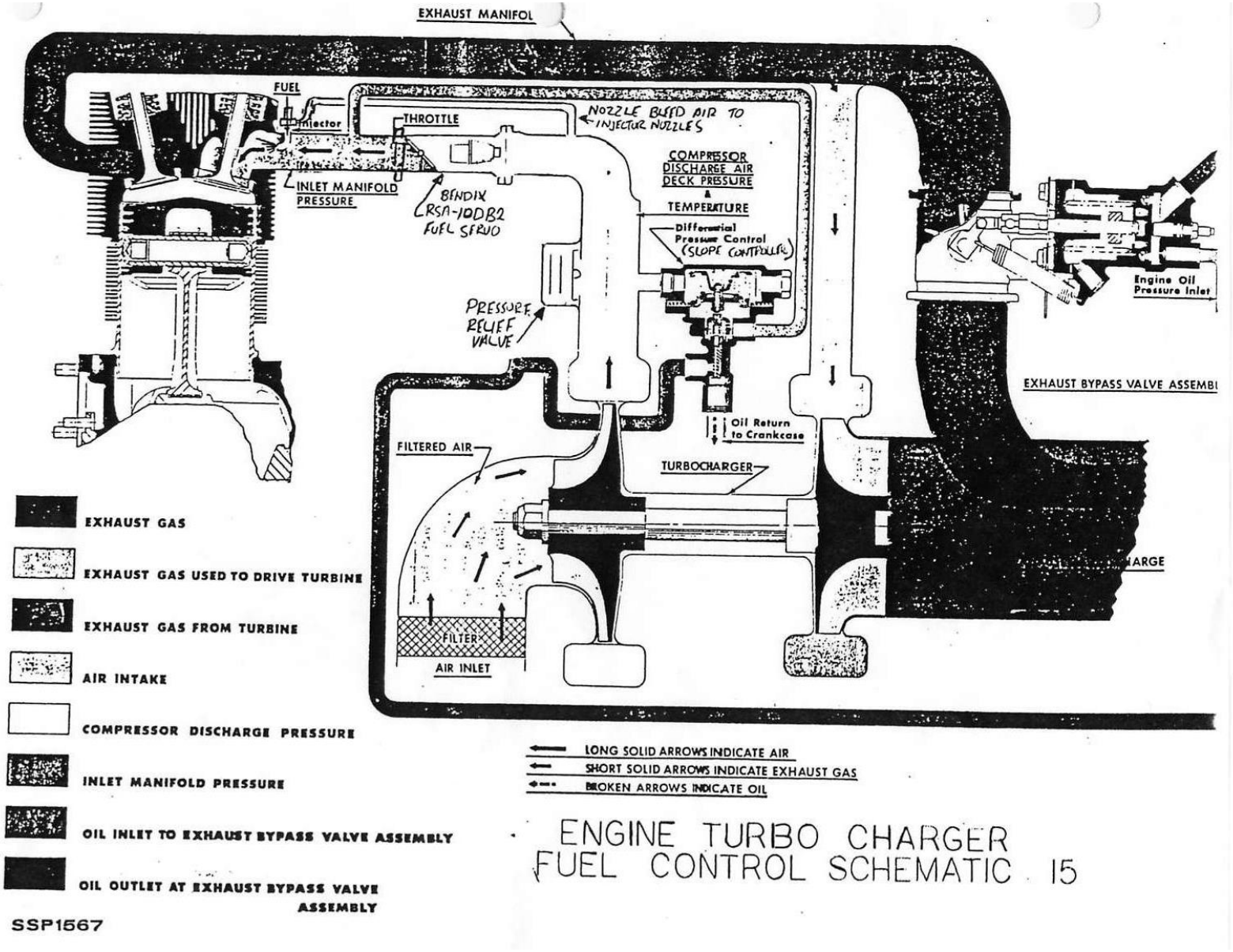


FUEL SCHEMATIC 13



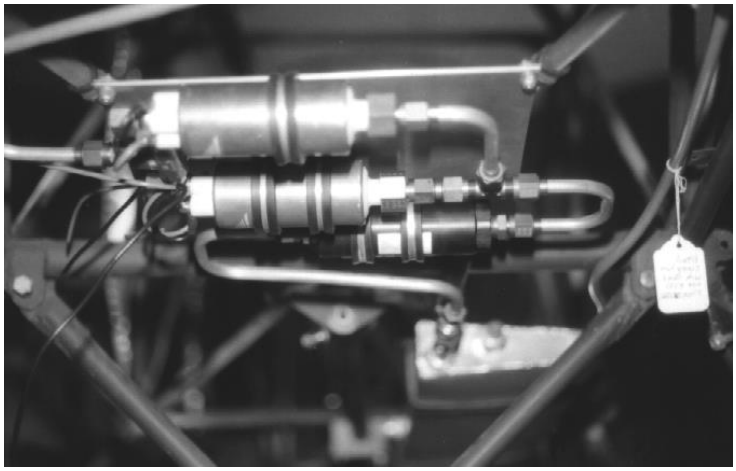
FUEL SYSTEM SCHEMATIC 14



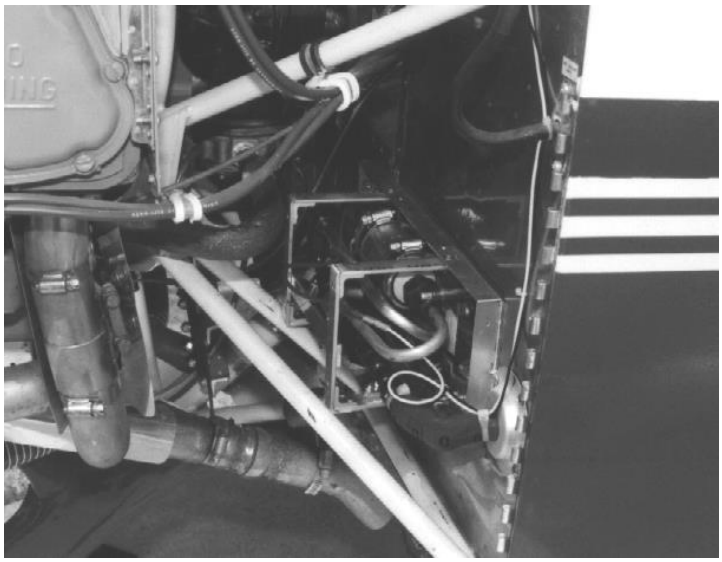


ENGINE TURBO CHARGER
FUEL CONTROL SCHEMATIC 15

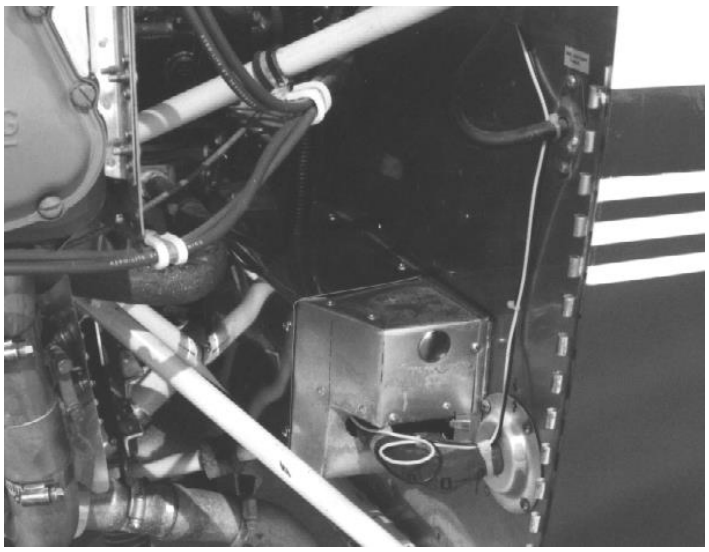
Dual electric pump package shown mounted to a .062 aluminum plate. The pump components and filter assy. are mounted to the plate with Adel clamps. The plate is mounted to the airframe with Adel clamps.



Boost pump and filter assy. mounted to the firewall. The complete assy. will be enclosed in an insulated box.

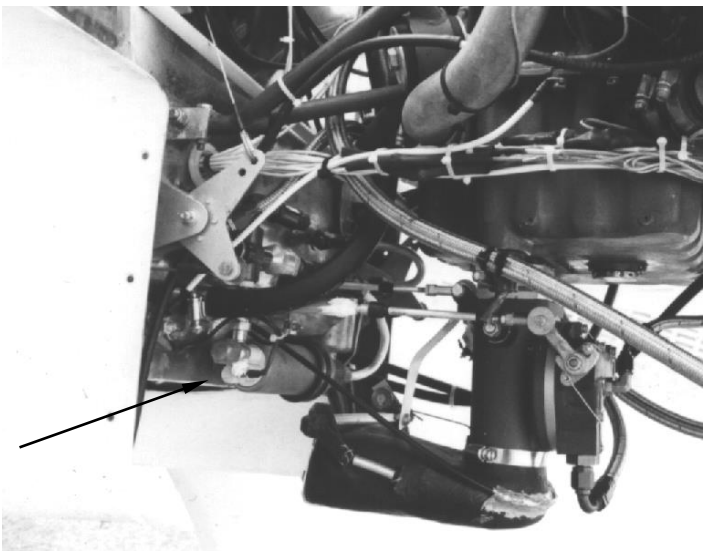


Boost pump filter assembly enclosed in insulated box. Blast air is run through the box for cooling.

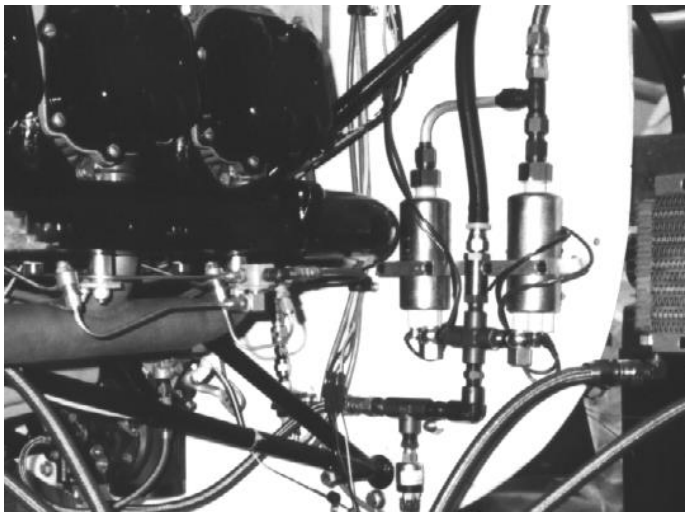


Long Ez installation. Boost pump package mounted on lower part of firewall. Incoming cooling air keeps pump cool. Engine is up draft cooled.

Boost pump package

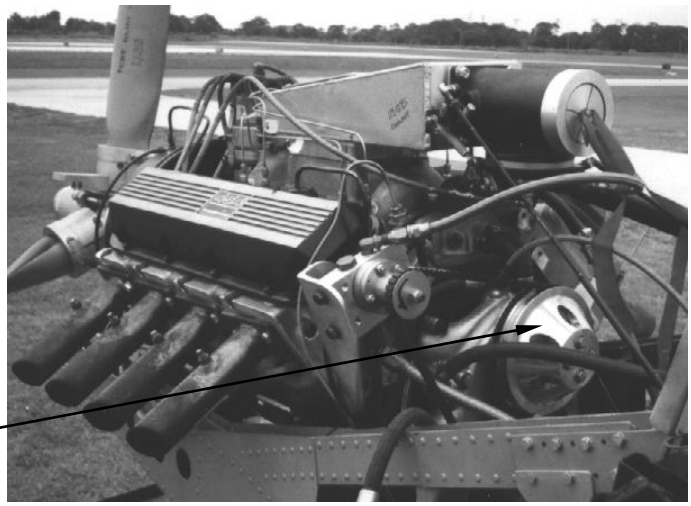


Installation using dual electric pumps.
Dual pump package mounted on firewall. Pumps need to be in an enclosed box if this engine is to be down draft cooled.

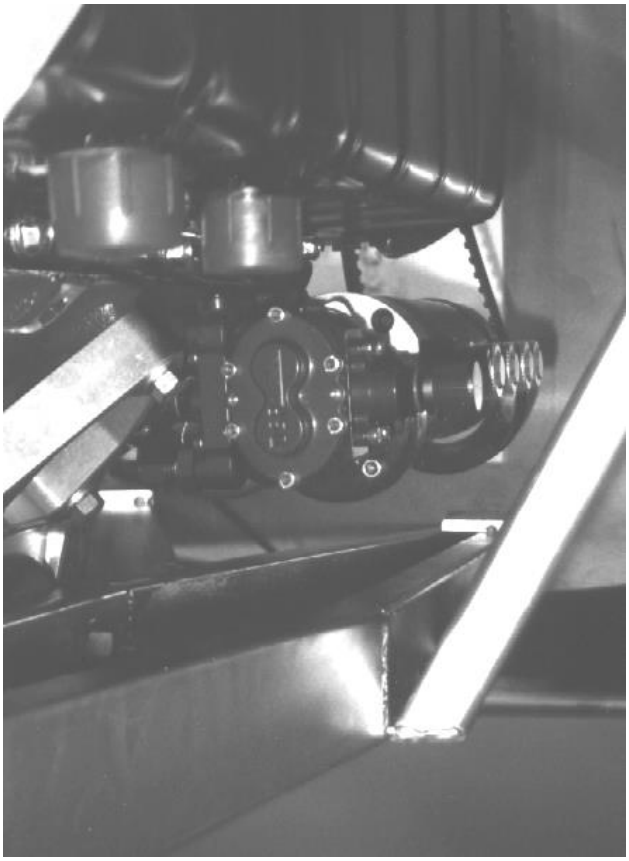


V-8 conversion. Belt drive mechanical fuel pump shown. Ideally the pump should be mounted as low as possible. This will help with hot operation at low engine speeds. Vapor lock may be a concern with this installation.

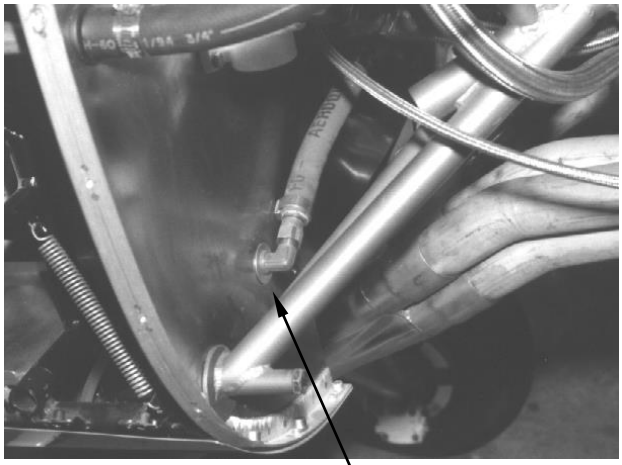
Belt driven engine driven fuel pump



V-8 conversion. Mechanical engine driven fuel pump driven off the back of the dry sump oil pumps. The dry sump pump stack is cog belt driven off the crankshaft nose. This installation offers low positioning of the fuel pump to minimize suction lift of the fuel.

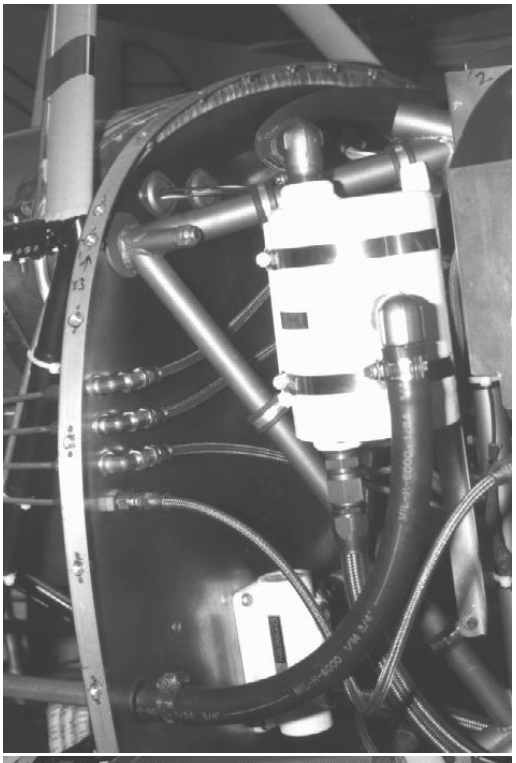


This shows the fuel supply line to the engine driven pump. The correct installation using bulkhead fittings to bring the fuel supply through the firewall and fire sleeved hose is seen in this photo. Care must be taken to avoid the use of 90 degree fittings on the suction side of the fuel pump on high horse power applications. The more correct way would be to use a straight bulkhead fitting and a full flow 90 degree hose end to eliminate flow pressure drop.

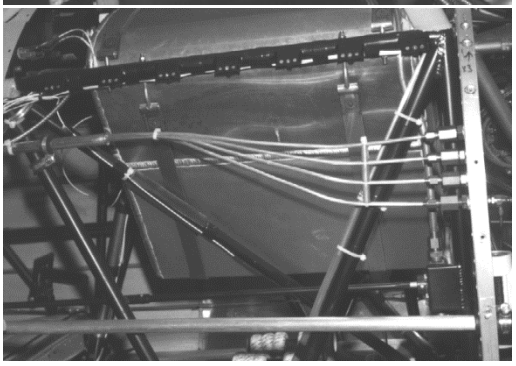


Fuel supply bulkhead fitting.

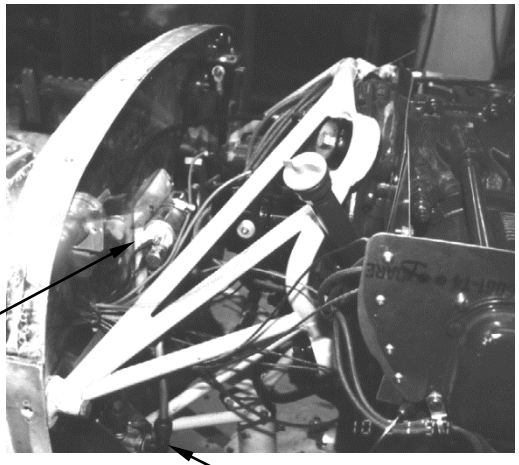
A nice tidy installation of the pressure gauge connections is shown here. Again the correct use of bulkhead fittings to route the hoses through the firewall. Note the use of braided stainless steel Teflon lined pressure hoses on the engine side of the firewall.



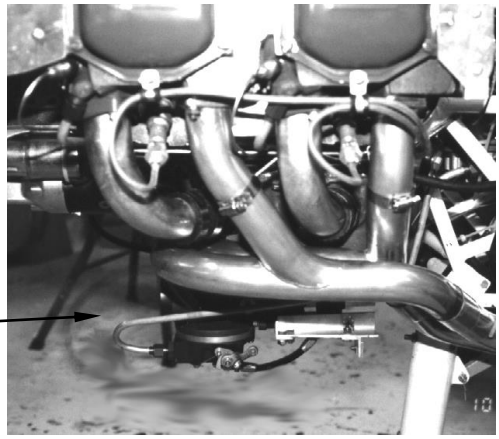
Hard plumbing is used on the cabin side of the firewall. Here the pressure lines come through the firewall. The 3/16" lines are neatly bundled into a conduit.



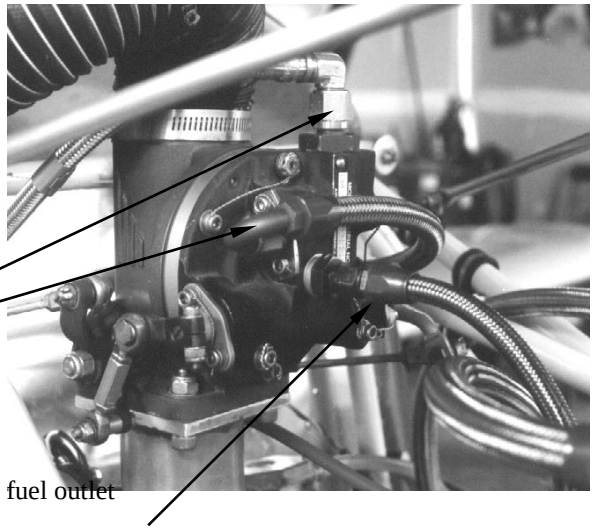
Boost pump mounted high on the firewall. Notice there is no box enclosing the pump or the gascolator (shown in the lower left hand corner of the photo). This will certainly cause fuel vapor problems and poor engine running under hot conditions. An installation like this may cause engine stoppage at low power settings.



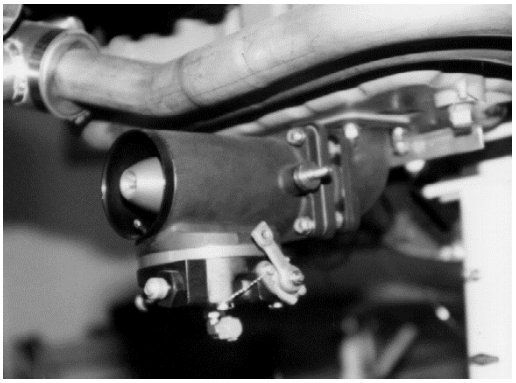
Here's an example of a builder wanting to make an unscheduled landing. The use of hard plumbing in the engine compartment will pick up heat and is subject to failure due to vibration.



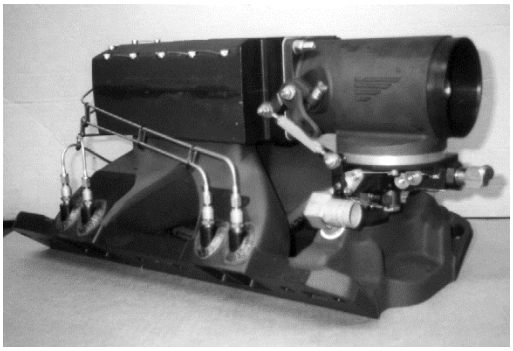
Fuel controller hook up for systems using electric fuel pumps. This fuel controller has the relief valve for the fuel pumps built into the regulator section. This keeps fuel circulating through the fuel control regulator keeping it cool.



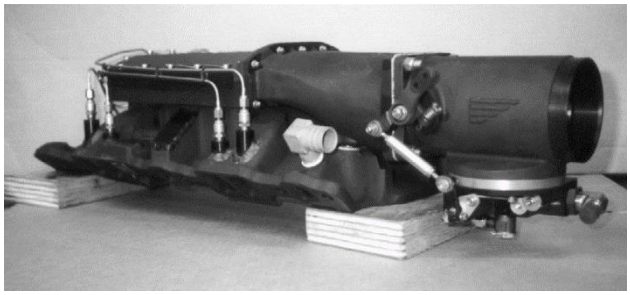
Since only air flows through the intake manifold, the fuel controller can be mounted on elbows and adapters to facilitate the installation. Airflow Performance has many different elbows in stock to fit various engines and installations. Phenolic spacers can also be used to space the fuel controller or elbow.



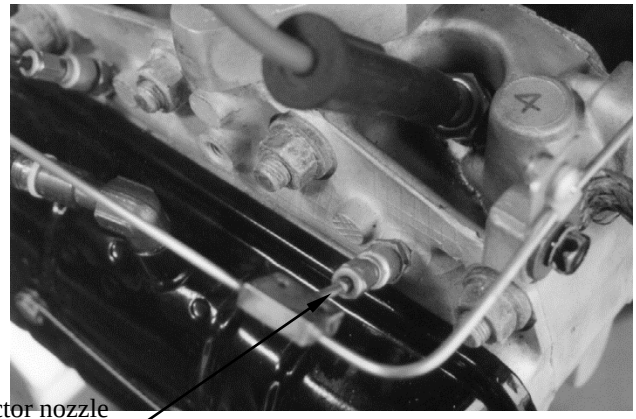
Airflow Performance manifold systems for automotive conversions. These fit most V-8 and V-6 engines. Injector nozzles are placed so that fuel is discharged near the intake valve.



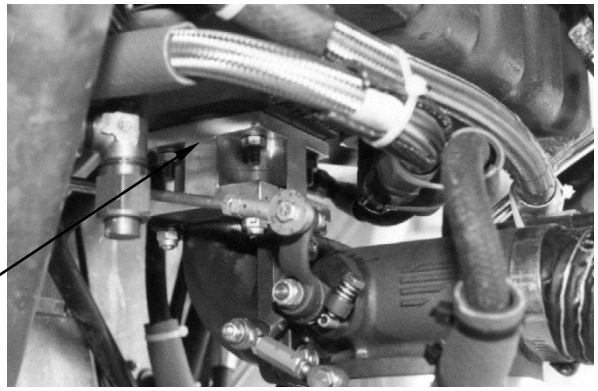
For installations where cowling clearance is a problem, a low profile plenum is available.



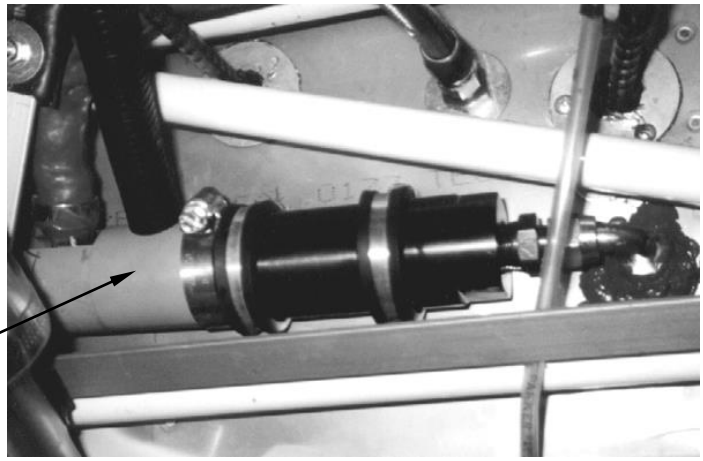
This Subaru engine has a siamesed intake port. The injector nozzles are installed in the head so that the fuel is discharged at the back of the intake valve.

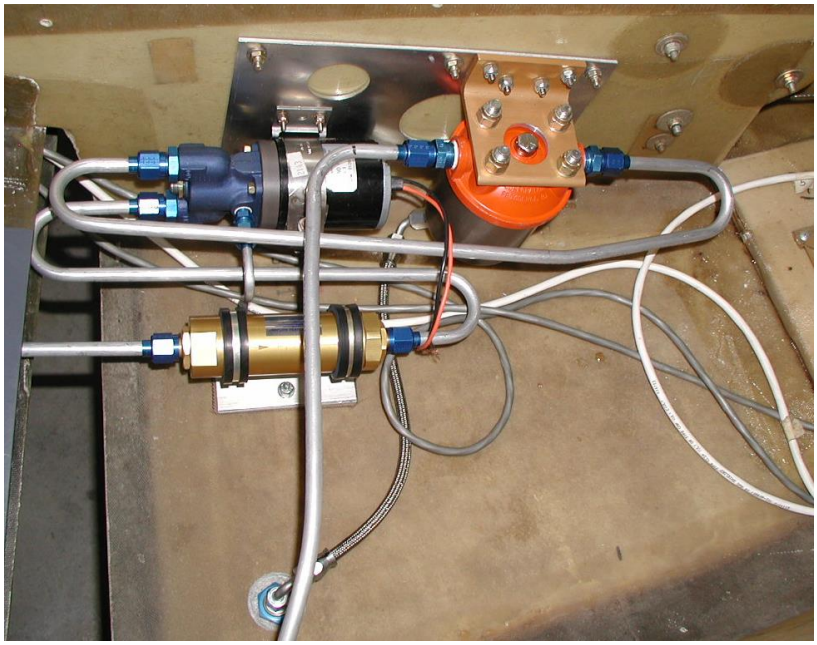


A machined aluminum spacer between the sump and the elbow provides clearance for the inverted oil system fittings and hoses and the fuel controller throttle body on this Lycoming 320.

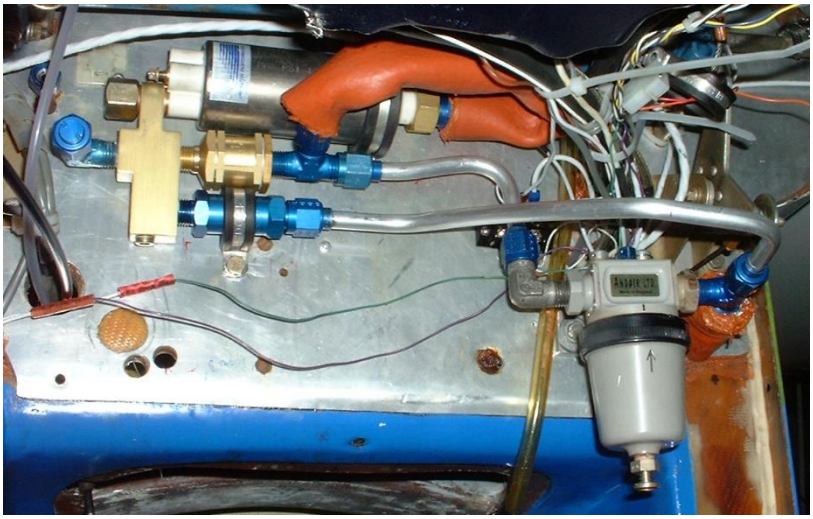


Maintainable fuel filter installation P/N 1090079. The filter is mounted to the firewall with two MS21919WDG26 clamps. Notice the blast air hose and shroud.





Glasair boost pump installation. Assembly is installed behind seat in aircraft. P/N 1090079 filter is installed before the boost pump. A high pressure Fram cartridge filter is installed after the boost pump. This filter is required to filter the small fiberglass particles from the fuel. It is installed on the pressure side of boost pump so that the boost pump can force the fuel through the filter



Boost pump and gascolator installed on the firewall of an up draft cooled Long EZ. The gascolator is installed on the boost pump inlet with the pump return teed into the gascolator inlet.

Boost Pump and Filter mounted in the tunnel of an RV-10

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