

Information Sheet # 51
Lubrication Oil Make-up Systems

*Your Reliable Guide for
Generator Maintenance*

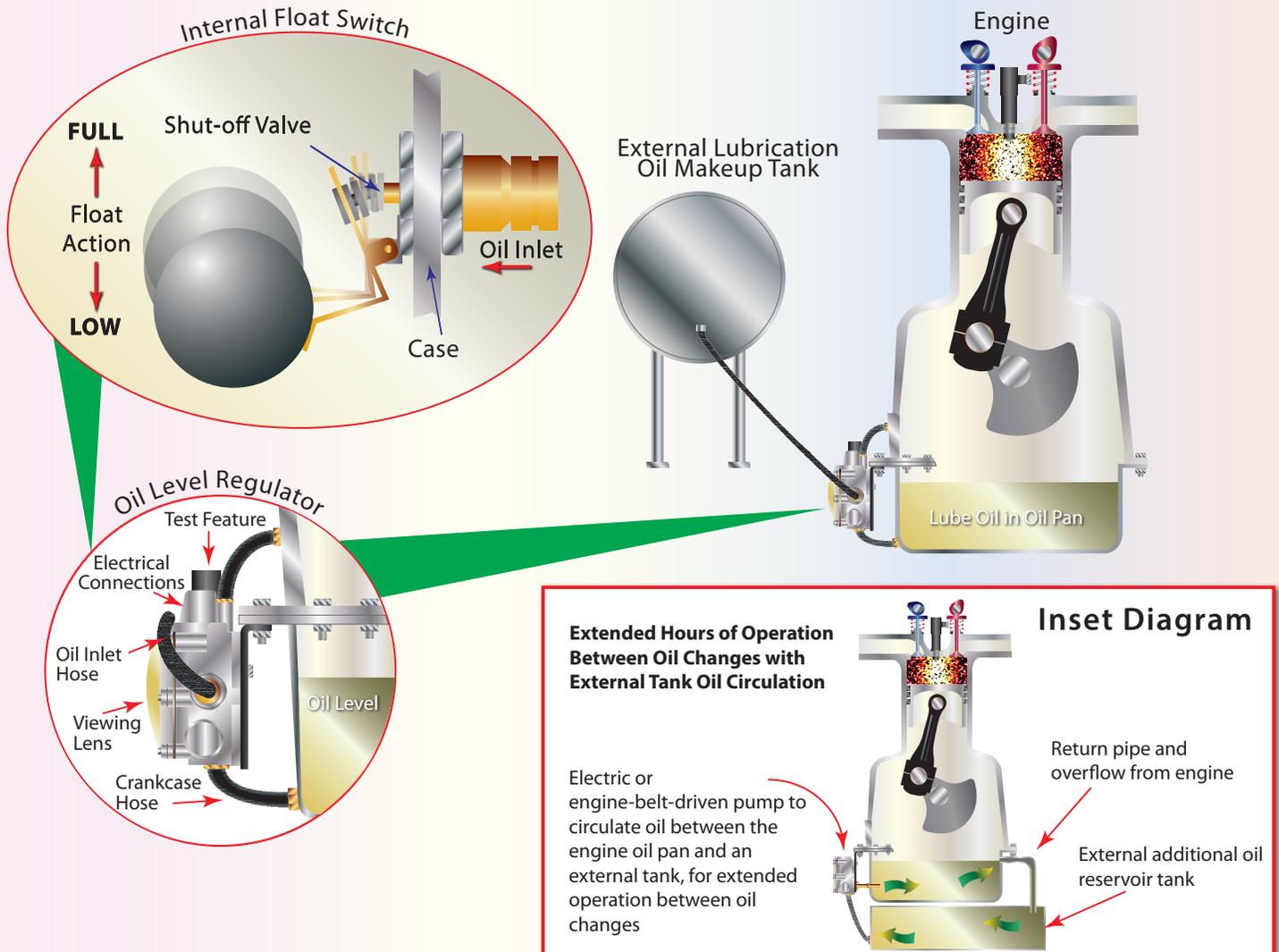
1.0 Introduction:

Many generator systems are used to power equipment and facilities located in remote locations or in areas that are hard to reach in inclement weather. These generator systems may be acting as standby to the utility supply or as the prime power source.

Sometimes, engine manufacturers recommend standard oil-change intervals that are shorter than is practical for service technicians to visit the location. When this happens, a generator system designer will consider additional lubrication-system accessories that permit longer run times between oil changes and allow technicians to check oil level without shutting down the engine to make a visual dipstick inspection.

This Information Sheet discusses various solutions available to a system designer for running generator set engines for longer periods between lubricating oil changes and checking oil levels while the unit is running. *(Continued over)*

Lubrication Oil Makeup System



To fulfill our commitment to be the leading supplier in the power generation industry, the Loftin Equipment and Bay City Electric Works teams ensures they are always up-to-date with the current power industry standards as well as industry trends. As a service, our **Information Sheets** are circulated on a regular basis to existing and potential power customers to maintain their awareness of changes and developments in standards, codes and technology within the power industry.

The installation information provided in this information sheet is informational in nature only and should not be considered the advice of a properly licensed and qualified electrician or used in place of a detailed review of the applicable National Electric Codes, NFPA 99/110 and local codes. Specific questions about how this information may affect any particular situation should be addressed to a licensed and qualified engineer and/or electrician.

2.0 Benefits of an Extended Run Lubricating Oil System: The generator system can be run for extended periods before the oil has been topped up or changed. A standard oil pan does not hold sufficient lubricating oil to permit extended nonstop operation until a service technician returns to top off or change the oil. A system designer will choose an extended oil system based on the projected run period, and longest frequency between site visits.

3.0 Typical Applications Requiring Extended Run Lubricating Oil System: Applications include, but are not limited to, remote telecommunication sites, monitoring systems, secure installations, offshore buoys, and weather stations.

- 4.0 Types of Oil Make-up Systems:** Principally there are three methods to extend engine lubrication inspection and oil change intervals:
- **Larger Oil Pan** - Engine manufacturers do not always offer this choice. Also, most generator manufacturers build around standard platforms that would not accommodate a deeper oil pan.
 - **Oil Top-off Float Switch System** - This system uses a float to monitor the engine oil level and pumps oil from a separate reservoir when the float drops to a predetermined level. While this system, also known as an Oil Level Regulator system, permits engines to run longer and with no daily dipstick visual inspection, it does not increase the total volume of oil available for circulation to lubricated components. Therefore, while it reduces top-off frequency, it cannot extend overall engine oil life as much as a large sump or extended oil system.
 - **External Extended Oil Tank** - In this system, an external oil tank is connected to an engine's oil pan to increase overall oil capacity. The engine's internal pump feeds lubricated areas from the oil in the oil pan, while another, external pump pumps oil from the external tank into the engine oil pan and an overflow pipe from the engine returns the oil to the external tank.

5.0 Oil Top-off Float System: This is also called an oil level regulator system. An oil level regulator is mounted to a bracket most engine manufacturers allow for on the side of the crankcase and a separate oil tank is located near the engine. (See Main Diagram)

As the regulator senses the oil in the engine has dropped to a predetermined level, the float valve will open, to allow additional oil to flow from the external tank. The regulators are designed to be unaffected by any engine or system vibration.

The regulator can be also mounted to the base frame of the generator. Whether mounted on the engine or base frame, the center line of the window in the regulator should be adjusted to the same height as the level of oil in the crankcase.

The correct regulator model should be determined by which features are needed for diesel and spark-ignition engines. These include an adequate flow rate, switches to shut engines down if oil levels become too high or too low and alarms to signal when that happens.

6.0 External Extended Oil Tank: An extended oil capacity system greatly increases the quantity of available for continually circulating around the engines lubrication system. As such, with more oil available for lubrication the overall lubrication properties of the oil breaks down slower than the volume contained in the standard oil pan.

Engine oil is also contaminated by combustion gases, condensation and other impurities. With the increased volume an extended tank system provides, any contamination is dispersed in any greater volume and extends the useful life of the engine oil. External tank size will depend on the period required between oil changes.

When an application is requiring generator systems to run for extended periods unattended, such as 3000 hours, then a extended lubrication system supplemented with an external tank is the most viable solution. However, most extended run intervals can be managed by a Oil Level Regulator system. (See Inset Diagram)

7.0 Gaseous Site Conditions: Explosion-proof models are available if such a system is to be used in hazardous area.

8.0 Alarms and Shutdown Switches: These should be set so that any drop or rise in the engine's oil level sets off an alarm and shuts down the power unit if oil falls or rises to predetermined levels.

9.0 Site Inspection Tip: Most manufacturers will provide fittings such as pipes and connections that have been preapproved for extended operations as an option. The manufacturer's authorized generator distributor will be very familiar with these extended run oil systems and can provide the necessary components and labor for them. Any unauthorized adaptation could void the generator system warranty.

10.0 Extended Run Filtration Systems: It is important that additional filtration (oil, air and fuel) be considered when operating engines continuously for longer periods to make certain that any filters utilized do not become blocked. All filter systems should be sized to meet the proposed operational periods.

11.0 Extended Run Systems Fittings: Most manufacturers will provide fittings such as pipes and connections that have been preapproved for extended operations as an option. The manufacturer's authorized generator distributor will be very familiar with these extended run oil systems and can provide the necessary components and labor for them. Any unauthorized adaptation could void the generator system warranty.

12.0 Conclusion: The addition of an oil makeup system will lower operational costs by removing the need for daily inspection site visits and allowing for continuous operation over extended periods between oil changes. However, care must be taken not to exceed the limit of the oil to provide adequate lubrication to the engine. A timely oil analysis program should be implemented to ensure that oil changes are made in time to avoid premature wear or damage.

13.0 Further information: For further details, consult your generator manufacturer's authorized distributor. They will be very familiar with oil makeup and extended run systems.



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