Repair of the GPU

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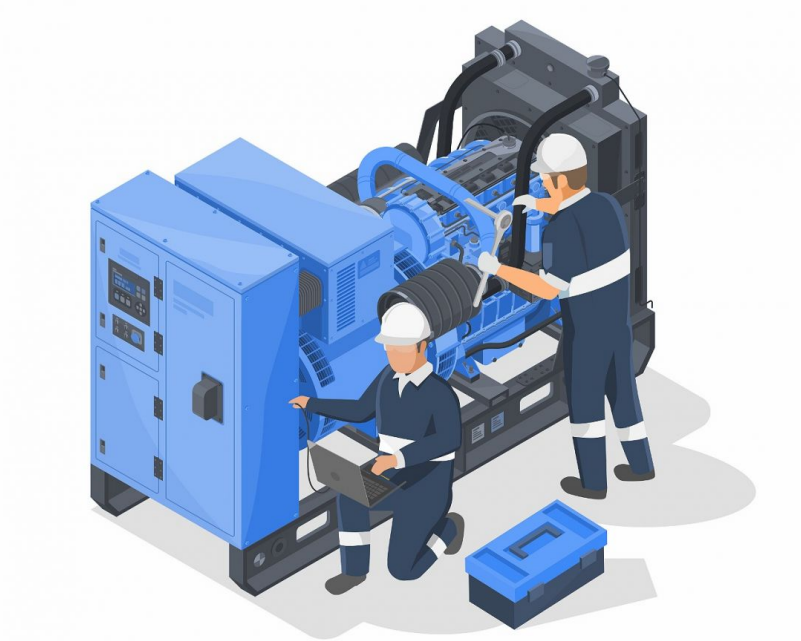
Gas piston units (GPU) are a key element of power systems, providing generation of electric and thermal energy. Reliable operation of gas piston units directly affects the efficiency of the power system of the enterprise. However, like any technical equipment, gas piston units can encounter various faults that require prompt repair of the GPU engine. In this material we will consider in detail planned service actions and possible malfunctions of MWM GPU.



gas piston plant repair

Classification of repairs of MWM gas piston units

Maintenance and repair activities are categorized into several types depending on the operating condition of the unit and the mileage (operating hours):

- **E-10 to E-40:** diagnostic inspections and checks. During these stages, the condition of the main components of the GPU is checked to identify potential defects or wear. During maintenance
- **E40:** according to MWM regulations oil and air filters are supposed to be replaced, spark plugs are replaced if necessary. At 8000 mth the crankcase gas filters are replaced.

- **E-50 - E-60:** medium repair. Within the framework of this repair, worn assemblies and parts are replaced, ignition and fuel supply systems are adjusted.
- **E-70:** major repair. This is the deepest and most complex type of repair, involving a complete disassembly of the unit, replacement of the main parts and assemblies, as well as restoring the performance characteristics of the engine. These categories determine the nature of the work and help plan maintenance to ensure smooth operation of the units.

GPU repair stages

The repair process of a gas piston unit includes several stages:

1. **Fault diagnosis.** The initial stage consists in identifying problematic components of the unit, using specialized diagnostic equipment, and checking the engine performance indicators.
2. **Determination of the causes of the malfunction.** After the detection of defects, the causes of their occurrence are analyzed. This can be due to both wear and tear of parts and operational errors.
3. **Restoration of performance.** At this stage, damaged assemblies and parts are replaced or repaired, fuel supply, ignition, cooling and other critical systems of the GPU are adjusted.
4. **Testing after repair.** After repair, all operating parameters of the unit are checked to make sure that the equipment is reliable and working correctly.

Causes of gas piston unit (GPU) malfunctions

Gas piston units are subject to various types of malfunctions, which can be caused by both component wear and tear and external factors such as operating conditions, fuel quality and others. The following are the most common malfunctions of gas turbine units and possible causes of their occurrence:

Component	Gas supply interrupted	Possible causes
Engine stop		
The engine won't start	Gas supply interrupted	Gas shut-off elements closed, leakage, gas pressure regulator jammed

		Leakage
		Gas pressure regulator is stuck
	Gas supply disrupted	Gas pressure too high or too low
	Speed control is not possible	Malfunction of the actuator
	Power supply interrupted	Power supply to switch cabinet interrupted
		Cable breakage
	The camshaft speed sensor does not give a signal	Distance too far away
		Sensor or sensor cable defective
	Engine shut down by TEM system (cooling system not running)	Lack of coolant
		Leakage
		Coolant pump defective
		Coolant pump leaks
		The cooling system is contaminated
The engine won't start	Gas supply interrupted	Gas shut-off elements closed
	Power supply interrupted	The power supply to the machine switch cabinet has been interrupted.
		Power supply to the starter has been interrupted
	Ignition does not work	Spark plug defective
		Ignition wire defective

		Ignition coil defective
		Ignition control unit defective
	Engine does not turn	The starter system is defective
	The camshaft frequency sensor does not give a signal	Distance too far away
	Flywheel frequency sensor does not signal	Too much distance
Ignition skipping and irregular engine running	Gas supply interrupted	Gas shut-off elements closed
	Power supply interrupted	The power supply to the machine switch cabinet has been interrupted.
		Power supply to the starter has been interrupted
	Ignition does not work	Spark plug defective
		Ignition wire defective
		Ignition coil defective
		Ignition control unit defective
	The motor does not turn	The starter system is defective
	The camshaft speed sensor does not give a signal	Too much distance
	The flywheel frequency sensor does not give a signal	Distance is too great
The engine is overheating	Gas supply interrupted	Gas shut-off elements closed
	Power supply interrupted	Power supply to the machine switch cabinet has been interrupted

		The starter power supply has been interrupted
	Ignition does not work	Spark plug defective
		Ignition wire defective
		Ignition coil defective
		Ignition control unit defective
	Engine does not turn	
		The starter system is defective
	The camshaft speed sensor does not give a signal	Too far away
	Flywheel speed sensor does not signal too far away	Too much distance
Engine ignition is irregular	The ignition doesn't work	Spark plug defective
		Ignition wire defective
		Ignition coil defective
		Ignition control unit defective
	Camshaft speed sensor signal too weak	Too much distance
		Frequency sensor defective
	Flywheel frequency sensor signal too weak	Too much distance
		Frequency sensor defective

The engine is overheating	Insufficient heat transfer (between primary and secondary heating circuit)	The heat exchanger is dirty
	Insufficient heat transfer (secondary heating circuit)	3 way valve defective
	Insufficient cooling capacity (cooling circuit)	Coolant pressure too low
		Leakage
		Coolant pump defective
		The coolant pump is not sealing properly
Table of exhaust system and supercharger faults	Leaky flange connection on the exhaust gas heat exchanger	Defective gasket
		Loose threaded connection
	Insufficient capacity of the exhaust gas heat exchanger (pressure drop)	Water side contamination of the exhaust gas heat exchanger
		Contamination of the OH heat exchanger on the side of the OH unit
	Water leakage at the condensate connection of the exhaust gas heat exchanger when the unit is switched off	Pressure vessel leaks
		Threaded connection loosened
	Leaky flange connections of the suction air pipe	Defective gasket
		Threaded connection loosened

Cooling system fault table	Coolant pump does not work	Faulty fuse
		Cable clamp is loose
		Coolant pump defective
	Coolant pump performance is too low	Air in the cooling system
		Coolant pump connected in wrong direction of rotation
		Rotation speed is too low
		Coolant pump defective
	Coolant pump makes noises	Initial pressure too low
		Bearing malfunction
	Engine shut down by TEM system (lack of coolant)	Lack of coolant
		Leakage
	Engine shut down by TEM (coolant temperature too high)	Lack of coolant
		Coolant temperature sensor malfunction
Table of pneumatic system faults	Pneumatic starter does not respond	Empty compressed air tank
		Valves closed
		Insufficient compressed air
		Compressed air lines clogged
		Compressed air lines are leaking Compressed air lines are leaking
		Pneumatic starter malfunction
	Pneumatic starter does not reach the required speed	Insufficient amount of compressed air

		Compressed air lines are clogged
	Pneumatic starter rotates without thrust	Compressed air lines clogged
		Pneumatic starter malfunction
Table of coupling faults	Cracks in elastomer	Overloading of the coupling
		Coupling aging
		Coupling is incorrectly positioned
	Elastomer is detaching	The coupling is not correctly positioned
Generator fault table	Alternator voltage too high	Incorrect nominal value set
		Incorrect measurement lines connected
		Voltage regulator defective
	Alternator voltage fluctuations	Inconsistent engine speed
		Incorrect nominal value set
		Voltage regulator defective
	Generator voltage cannot be increased	Setpoint adjuster or connection cable broken
	Generator does not produce voltage	Excitation fuse blown
		Exciter diodes defective
	Generator voltage drops significantly under load	Drive speed decreases under load
		Protective fuse defective
		Exciter diodes defective

Benefits of regular maintenance

Regular maintenance of gas piston units not only helps reduce malfunctions, but also extends equipment life, reduces operating costs and improves overall plant efficiency. Maintenance recommendations include routine replacement of filters, oil and other consumables, as well as periodic inspection of systems for leaks, defects and wear.

Advantages of repair from “MKS”

- **Original spare parts.** Repair of gas piston units is carried out using only original spare parts. “MKS” has an operative stock of original spare parts and components supplied from manufacturing plants.
- **Qualified specialists.** Repair of gas piston plants of various brands and other equipment is performed by experienced engineers who have passed certified training at the manufacturing plants. The whole staff of the MKS service department is constantly improving its qualification and undergoing technical training.
- **Minimal repair time.** The extensive network of MKS branches in Russia ensures the presence of experienced specialists in different regions of the country. Together with the availability of spare parts and components that do not require additional delivery and customs clearance, this minimizes the time of GPU repair.
- **Original service tools.** MKS has at its disposal special service and repair kits designed for each type of engine. Repair of plants using other tools is inadmissible, as it leads to equipment breakdown.

Emergency repairs of gas turbine units

We also carry out emergency repairs of gas piston units, which may be required if the equipment is operated incorrectly. The main causes of accidents include unqualified maintenance, use of non-original spare parts and ignoring warnings about incorrect operation of the unit. The MKS team offers prompt specialist visit, diagnostics, estimation of the scope and cost of work, as well as supply of spare parts for necessary repairs.

Conclusion

Repair and maintenance of gas piston units play a key role in ensuring their reliable and long-term operation. It is important to follow a schedule of diagnostic inspections and scheduled repairs, such as E-10 through E-70, to keep your equipment in good working order and avoid costly downtime.