
REPAIR OPTIONS

REPAIR OPTIONS PREVENT COMPONENT FAILURE AND REDUCE YOUR COSTS

Component failure can cause damage to other components and increase repair costs by 2.5x.

Key indicators of component failure:

- Number of service meter hours
- High fuel & oil consumption
- Concerning fluid analysis results
- Sudden increase in fuel burn
- Unusual noises
- Overheating
- Burning smell
- Smoke
- Filter debris
- Engine hesitation
- Loss of power
- Hard starts

Mantrac recently repaired a genset that had failed due to poor maintenance:

Total cost **\$46,275**

Cost of advance engine overhaul **\$17,350**

Potential overhaul savings **\$28,935**

MANTRAC OPTIONS TO MEET YOUR NEEDS

	Basic	Basic Plus	Rebuild/Exchange	Reman	New
What is it?	Rebearing/Reseal: A baseline to extend your engine life before failure	Rebearing/Reseal and components: Added parts and systems for more systemic support	Complete end-to-end rebuild service to give engines a second life	Cat Remanufactured components: same-as-new performance, a fraction of the cost of new	Cat original new component: built to last and to be rebuilt again and again
Ownership	< 2 years		> 2 years		
Utilisation	< 1,000 hours per year		> 1,000 hours per year		
Affordability	< 50% of the cost of new		> 50% of the cost of new		
Turnaround	Flexible		Urgent		
Component life	Extend	Extend	Extend/ Restore	Restore	Restore
Indicators	Planned	Planned	Planned/Problem	Problem	Problem



IDENTIFYING YOUR REPAIR OPTIONS

INDICATORS

RO LEVELS		Basic Plus	Fixed Price	Reman	New
AFFORDABILITY		25 - 50% of new	55 - 65% of new	60 - 80% of new	100%
Oil level above full	• Coolant or/and fuel leak into crankcase		●	●	
White smoke	• Cracked head and/or liners • Leaking head gasket • Incorrect fuel injector timing • Faulty injector	●	●		
Hard starting	• Malfunctioning fuel nozzles/injectors • Worn fuel injector pump	●	●		
Overheating	• Malfunctioning temperature regulator • Malfunction in the water pump • Dirty air cleaner	●	●	●	
Excessive black smoke at full load	• Dirty primary/secondary air cleaner • Over fuelling • Worn piston rings or/and liners	●	●		
Increased fuel consumption	• Malfunctioning fuel nozzles/injectors • Malfunctioning turbocharger • Improper set point	●	●		
Blue smoke	• Worn turbocharger seals • Worn rings/liners • Worn valve guides	●	●	●	
Debris in oil filter	• Damaged bearings		●		
Increased oil consumption or excessive blow-by	• Worn or broken rings/liners • Worn turbocharger seals • Worn valve guides		●		
Lack of power	• Power loss		●		

REPAIR OPTIONS: BASIC & BASIC PLUS

Basic:

How it works:

- Reseal fluid leaks
- Free rotation of metal components
- Seal components from contaminants
- Refill with new fluids
- Test to Cat reusability guidelines
- 12 months or 3,000 hours warranty

Advantages:

- Fixed upfront cost for basic repair
- Recover fuel economy
- Reduces oil consumption/smoke
- Restores power and friction
- Improves starting ability

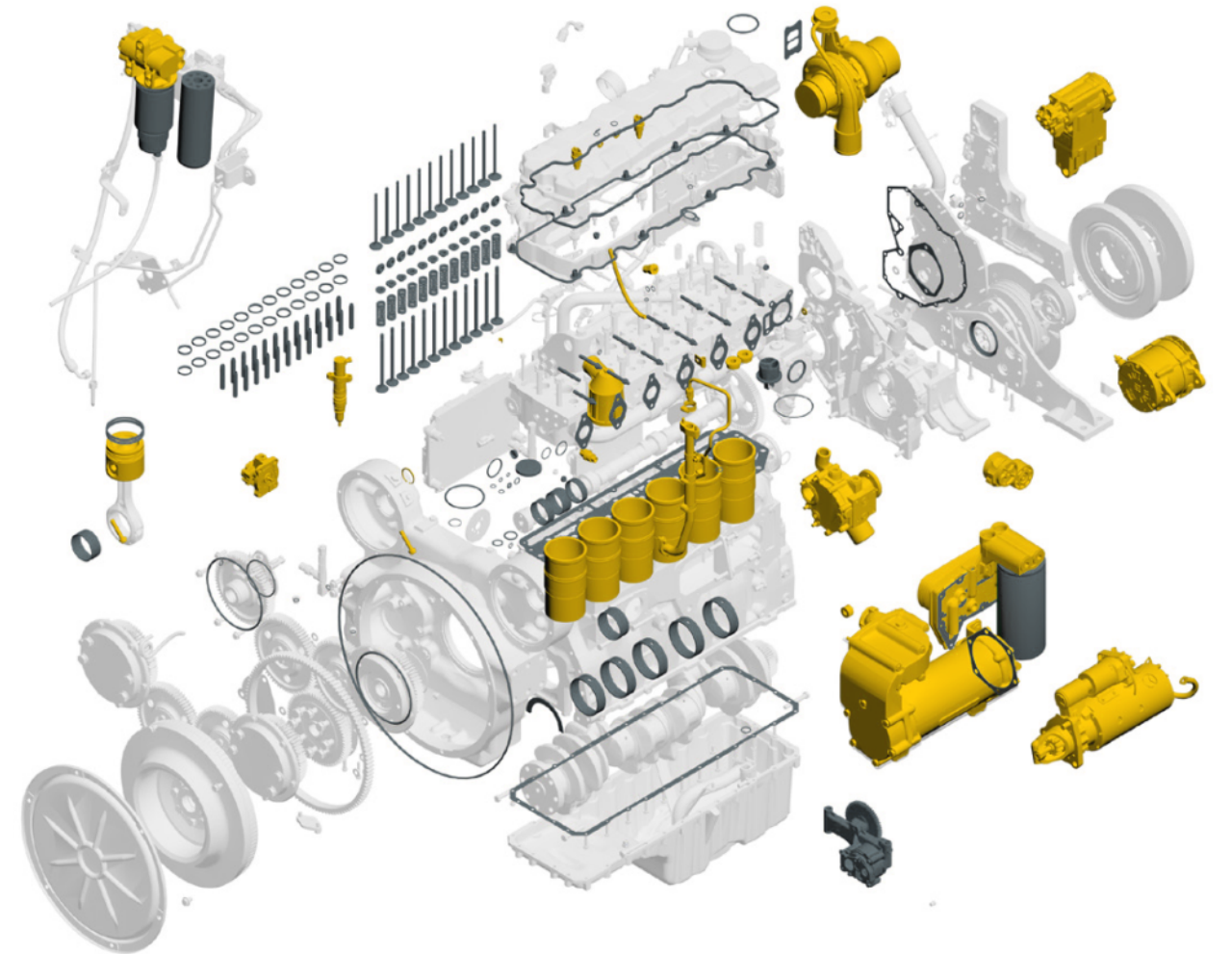
Basic plus:

How it works:

- Readjust timing and replace timing belt
- All items covered in Basic option including a selection of additional components (based on inspection)

Advantages:

- Extend up to 50% component life
- Recover fuel economy
- Improve fuel combustion for power
- Restore turbo performance



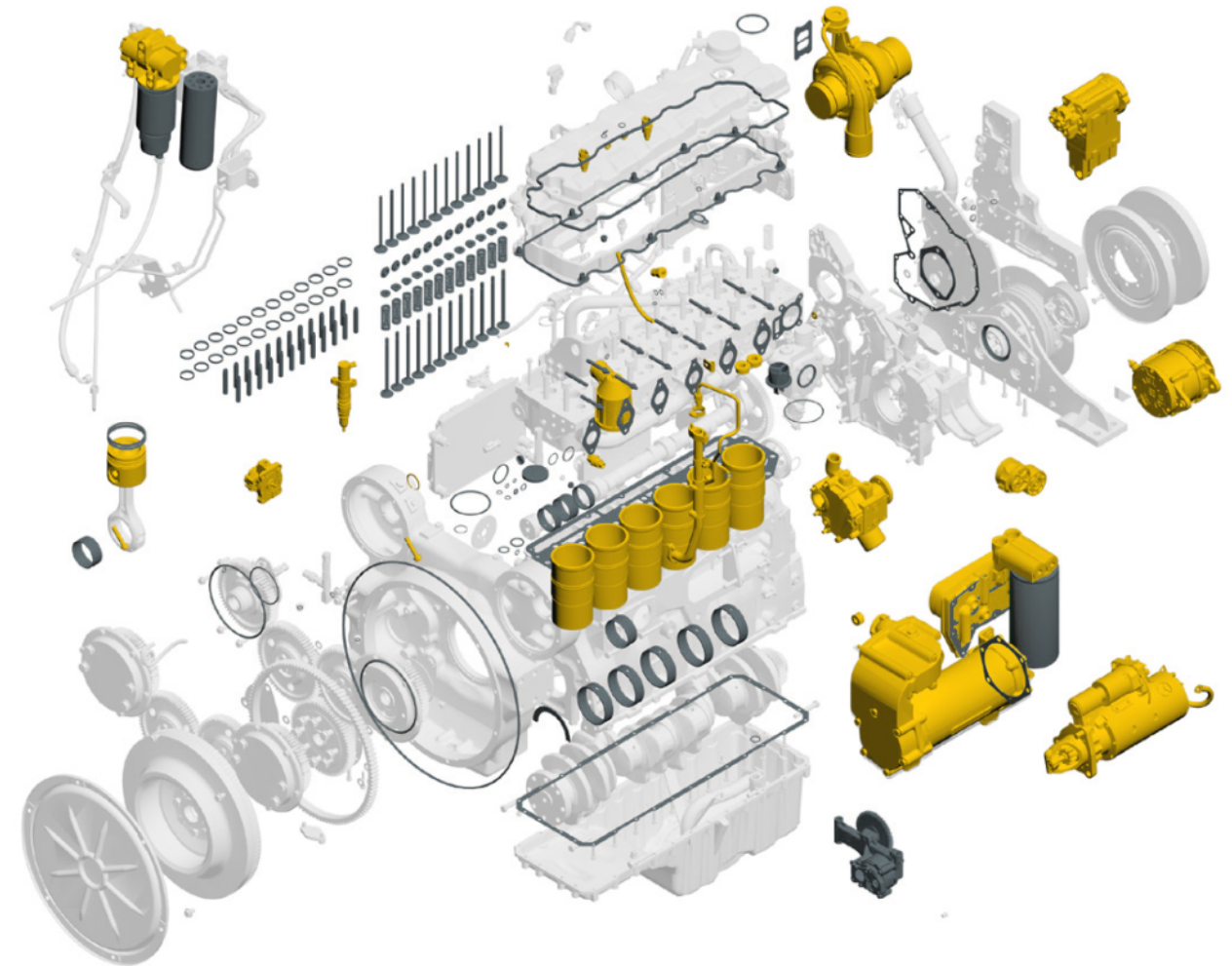
REPAIR OPTIONS: BASIC & BASIC PLUS

What's included in Basic:

- Camshaft bearings
- Coolant temperature regulator
- Crankshaft thrust plates
- Exhaust manifold studs/locknuts
- Freeze plugs
- Gaskets & seals
- Main bearings & rod bearings
- Piston rings
- PM Service: oil, fuel and air filters
- Turbocharger (mounting) studs/locknuts
- Valve spring lock retainers, valve rotocoils, inlet & exhaust valves

Plus options:

- Replace pistons
- Reman fuel injectors
- Reman turbo cartridge
- Rebuild oil pump
- Rebuild water pump
- Replace coolant hoses and belts
- Reman fuel pump
- Reman oil cooler
- Reman starter
- Reman alternator
- Replace engine mounts
- Engine remove & install



REPAIR OPTIONS: FIXED PRICE REBUILD

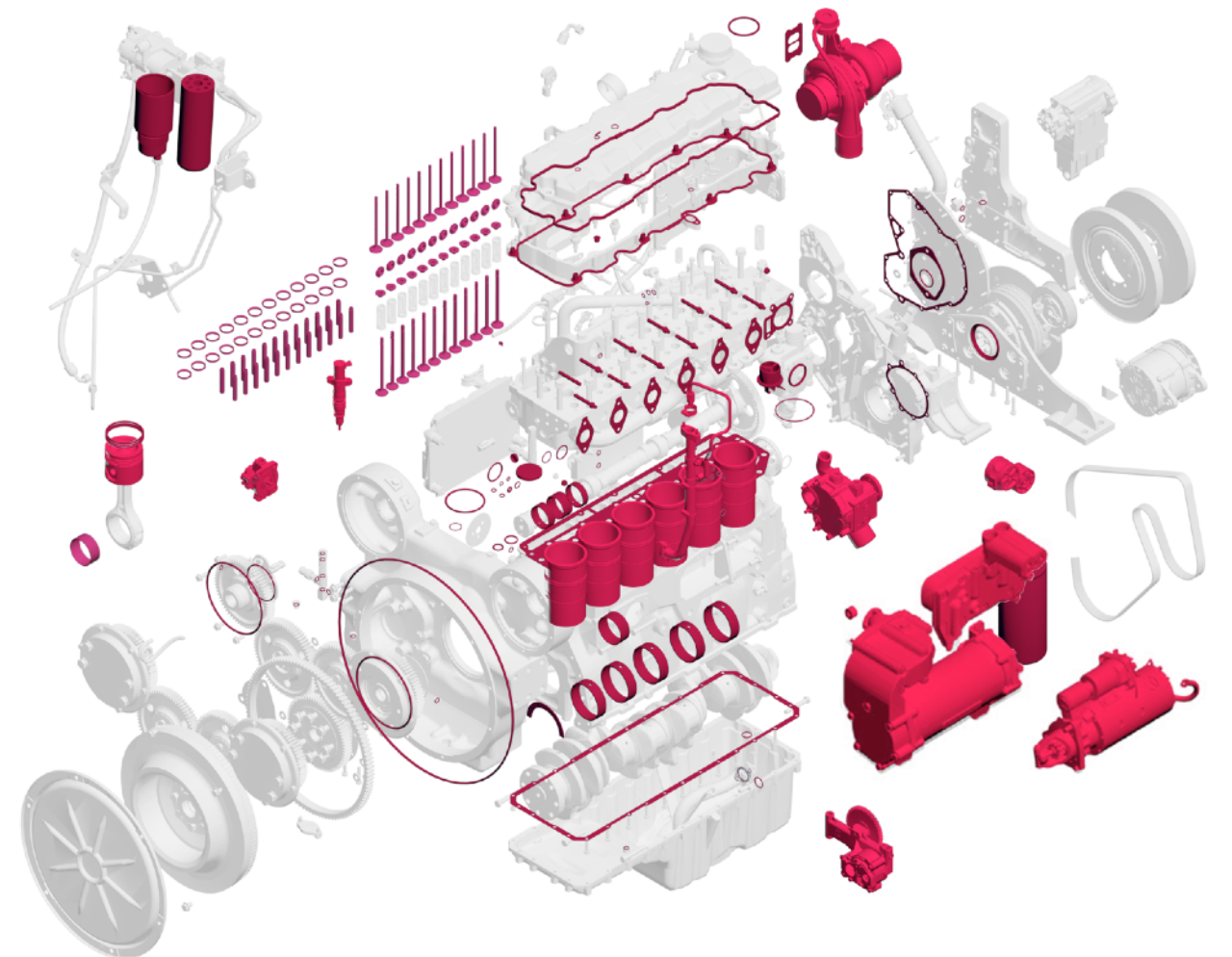
A second life for your engine:

How it works:

- Inspect/test according to Cat reusability guidelines
- Option to rebuild your core component or off-the-shelf exchange with store credit
- Inspect/reuse for full life of reusable parts
- 12 months or 3,000 hours warranty

Advantages:

- Restores 100% component life and performance
- Value for your core
- Latest engineering updates
- Quick turnaround



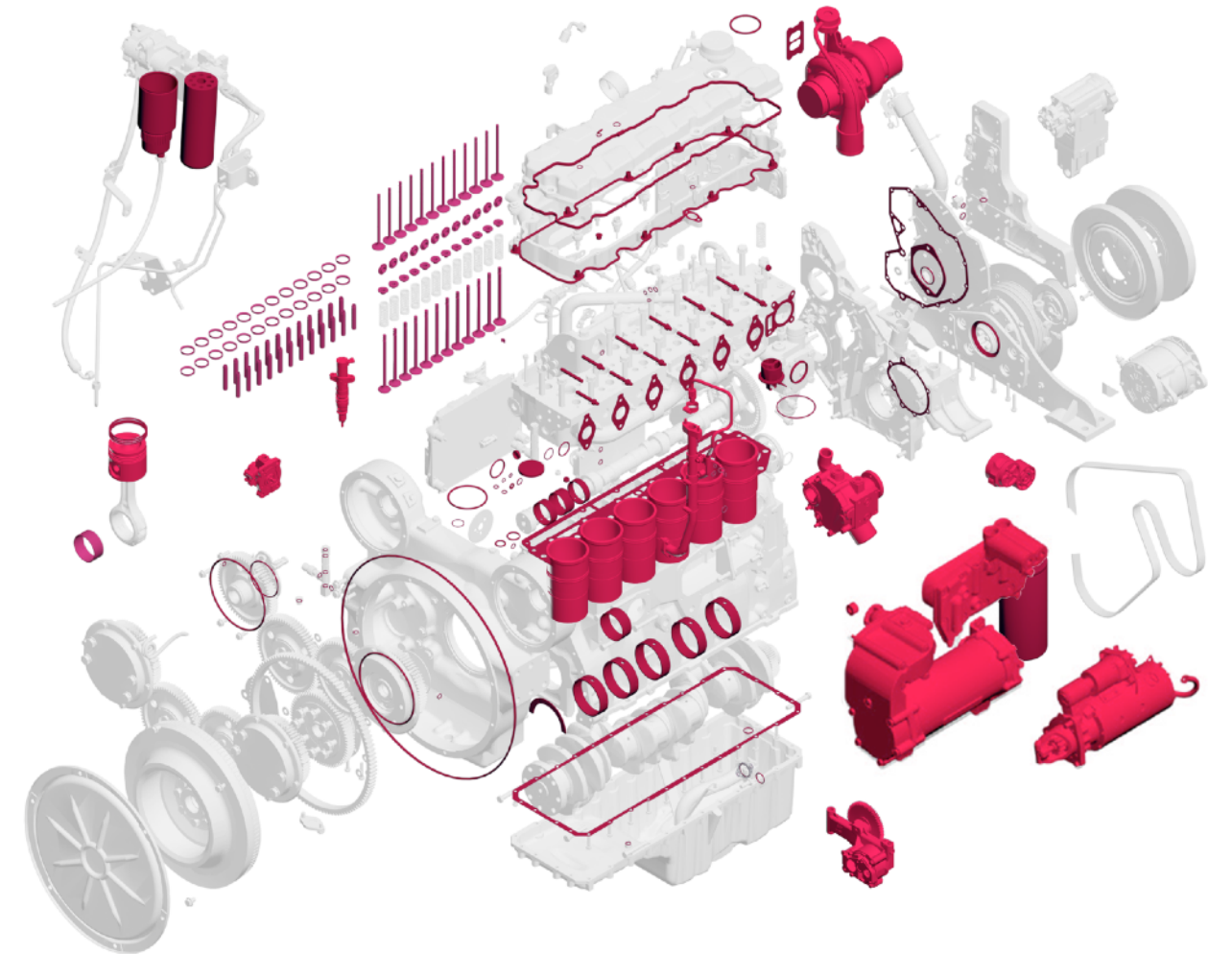
REPAIR OPTIONS: FIXED PRICE REBUILD

What's included:

- Fixed price for rebuild
- Inspect/test according to Cat reusability guidelines
- Engine must be running
- Improves starting ability
- Restores power
- Restores fuel consumption level
- Fully tested on dynamometer
- 12 months (standard labour hours and set turnaround time)

Excluded:

- Crank shaft
- Cam shaft
- Cylinder head casting
- Cylinder block
- Turbo housing
- Extended warranty



MANTRAC REPAIR OPTIONS EXTEND THE LIFE OF YOUR ENGINE

We also have lower cost options and a selection of kits to do your own repair.

- Up to 15% savings on parts compared to individual purchases
- Faster repairs with pre-assembled components
- Single part number kitting options for your technician
- Access to the exact parts saves precious time
- Service instruction including guidelines
- 12-month warranty with genuine Cat parts

Transmission Repair Cost Comparison:

	<u>After failure</u>	<u>Before failure</u>
Overhaul:	14,175 hours	9,200 hours
Costs of repair:	\$22,205	\$8,130
Cost/hour:	\$1.56	\$0.88
4975 extra hours cost:	\$2.82/hour	