

HARTECH AUTOMOTIVE

THE HARTECH PORSCHE 944 ENGINE-REPLACEMENT SERVICE



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1.0 FOREWORD

The Hartech 944 engine replacement service covers all variants of the 944 engine ;

944 8-valve 2.5 (including turbo models)

944 8-valve 2.7

944 16-valve 2.5

944 16-valve 3.0

2.0 INTRODUCTION TO 944 ENGINE

The basic 944 Engine is very well designed with high quality materials used throughout, as a result of which it is capable of very high mileage's indeed.

Older cars may cover 150K to 200K on mostly original parts while newer versions may well exceed these figures by another 100K.

We have rebuilt engines after covering 100K to 150K that upon inspection were almost perfect inside and needed very little replacing. We have also rebuilt damaged engines from Turbo's and standard 944's that have covered between 50K and over 200K and thus, have a vast experience of the typical parts required and likely costs.

Cylinder heads can be repaired and replaced without engine removal - and with the head off, new big end bearings and piston rings can also be fitted without engine removal providing that the crankshaft is undamaged and to size. If engine removal is necessary, it is often a good idea to consider doing other jobs, which are less expensive to do at the same time, like replacing seals that have started to leak or fitting a new clutch. This would however dramatically influence the final cost if taken too far as the same reconditioned basic block fitted with new engine mounts, water pump, belts & rollers, clutch, etc will cost roughly twice as much as the same reconditioned block fitted with many of the original used parts or the customers parts. This makes it very complicated trying to make sense of a pricing system for a reconditioned engine that is easy for a customer to follow - but we have tried.

If an engine has not suffered any other damage it is often possible to use the same crankshaft without re-grinding and the same pistons - as the crankshaft & cylinder bores have a very hard surface that hardly ever wears. However if a crankshaft is badly damaged, it might need replacing altogether - with huge cost differences to the final outcome.

3.0 WHY REPLACE / REBUILD AN ENGINE ?

There are two basic reasons for needing an engine rebuild.

The **first** is to freshen up a tired engine that is still running perfectly well. It is usually preferable to carry this kind of work out on a customer's own engine as it not only maintains the integrity of the original engine numbers, but also enables much of the original auxiliaries to be used as well.

These auxiliaries cause the greatest problem when considering complete replacement. You see, more often than not, an engine fails due to damage resulting from wear and tear of an external auxiliary part. Typical of this would be failure of the water pump, cam belt, and rollers. In each case the failure could wreck the pistons, bores, crankshaft or crankcases and a new or different engine block would be needed.

A customer who had recently had his cylinder head reconditioned, new belts and rollers and perhaps a new water pump but then had an engine failure, some time later requiring a replacement block, would certainly want his recently replaced auxiliary parts fitted to the new block, whereas a customer who's engine failed because all the aforementioned parts were worn out anyway would not want them used again (or simply could not use them anyway). Still that second customer may prefer new auxiliary parts fitted or good used parts and this would make a huge difference to the eventual cost.

If a used block is needed, it originally came from a car as a complete engine so although the block only may be used, the original cost was still that for a complete engine and everyone in the business

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has too many of some parts in stock and not enough of the others - so costing out this part is also difficult.

The **second** option is to have a completely different engine (usually c/w ancillaries) fitted, where the original engine has had an internal failure and, as such, is beyond economical repair. Note that with this option, the engine numbers will change, resulting in a requirement to notify DVLA.

Many 'used' engines sold by breakers are also worn out or damaged internally and no one could be expected to guarantee a used engine - so it becomes a very risky business.

The options therefore vary between having some work done on a customers engine, to scrapping the customers engine and fitting a good used one, a used but reconditioned one, or a used block - and in either case fitted with new, used or the customers original auxiliaries (or a mixture). The final price would not only result from these options, but also would still depend on the value of any refund that might apply to the customers parts removed in exchange and their condition. There is a charge to strip and inspect the customers engine - if only to assess the value of the parts - and some customers who know that their engine is in a very bad way, may consider it better to scrap it at the outset in which case they save the cost of inspection and receive the minimum refund.

To try and make some sense of this pricing difficulty we have prepared a list of options, which allow you to roughly calculate the expected full price. This is not always perfect and may still throw up a small anomaly, but generally it will result in a fair assessment of the costs involved.

Competitors often mislead customers by not being as thorough in their attempt to work out true costing and we have tried to be as clear as possible, however if you are unsure please contact us directly for an accurate quotation.

Please note that we do not sell engines for others to fit, as we have found that during the fitting several important technical requirements are often overlooked or have been carried out incorrectly, with consequential damage resulting and arguments about who is to blame.

We will only fit our own engines (or a rebuilt customers engine) and get them running correctly, after which we guarantee the work we have done and that the parts we claim to have repaired, replaced or fitted - have indeed been used. New parts carry a 12-month warranty.

N.B. To remove the engine we also remove the gearbox and so any gearbox work included in the order will include for free removal and replacement. Please refer to the gearbox section (to follow in the future - not completed yet) for clarification.

4.0 ENGINE REPLACEMENT OPTIONS

THE RE-BUILT ENGINE

A **rebuilt engine** (using the customers - or another block) may have been rebuilt with new or good used parts (or a mixture of both), which will be guaranteed by providing a blueprint describing condition and contents. We guarantee this description and accept that in selecting parts to be used (whether new or "good used") we imply their suitability for a reasonable service life thereafter.

This blueprint will include a statement about the condition of any good but used auxiliary parts fitted - like say a water pump, rollers, etc. Although these may be perfectly OK at the time of fitting - they will not be guaranteed for more than is necessary to prove that they were working satisfactorily at the time of the rebuild - in most cases this will cover three months. This is because no one can predict when a perfectly good but used water pump may fail, it may be months or years, and this applies to several other auxiliaries.

The only alternative is to fit all new auxiliaries, but this is expensive and not strictly necessary as you may also be discarding auxiliaries that have several years life left in them. The best advice is to follow the opinion of the technician, but make some reasonable allowance for the long term.

Unless otherwise requested by the customer, when a replacement block is used, then the customers

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auxiliaries are also inspected and fitted (providing that they are not obviously faulty). However replacement engines or rebuilt blocks which are re-fitted with customers auxiliaries will not be covered for failure of those auxiliaries or any other subsequent damage caused by their failure - for obvious reasons.

We currently stock complete "good used" engines, "short blocks" (rebuilt with both good used and new parts) and all the auxiliaries necessary for a rebuild with good used or alternatively, new parts throughout.

THE REPLACEMENT ENGINE

A **replacement good 'used' engine** will have been heard running by ourselves and appears to be working correctly. Our price is for fitting this engine and getting it running correctly with the customers own original air flow metering unit, ignition system, alternator, power steering pump (if applicable) etc. We will have checked the belts and rollers, changed the plugs, oil and antifreeze, set the CO and tickover etc. Although we guarantee our work, we do not guarantee the condition of the internals of the engine as we will not have inspected them, nor do we make any claims about how long that engine will last. This is however the cheapest option if another engine is needed.

5.0 PRICE STRUCTURE

All cars will need "a customers engine removed". If it is known to be damaged then it will not need further stripping and can be condemned.

As an alternative it is possible to re-condition a customer engine without removal - providing only specific jobs are required and there is no basic damage or wear to the crankshaft or bores.

This solution will lower the front suspension, remove the head and sump and gain access to the internals from underneath enabling the replacement of big end shells and piston rings, and to re-condition the cylinder head and replace some seals etc.

This will not be as good as removing the engine as some seals will not be accessible, however it can offer a re-freshening for slightly tired engines at a lower cost - £800.00 is typical for the work described above.

(N.B. The total cost will be lower than the total calculated in the following list by the amount of refund for any old parts retained that can be refurbished. Please refer to "part exchange" table in Section 6).

Typical prices are as follows (VAT is not included in any of these prices) ;

REMOVAL, INSPECTION & RE-FITTING COSTS

	LABOUR
(A) To remove a customers engine (If it is condemned then stripping and inspecting is free of charge) (2.5 & 2.7 as stated, S & S2 + £25.00, Turbo + £50.00)	£150.00
(B) To strip, measure and inspect customers engine. (for instances where it is likely to be rebuilt) (2.5 & 2.7 as stated, S & S2 + £25.00, Turbo + £50.00)	£50.00
(C) To replace a good used engine (incl settings and road test etc) (which will not have been fully stripped or rebuilt but service items are checked and the engine will have been heard running and found OK) (2.5, 2.7, S & S2 as stated, Turbo + £50.00)	£200.00
(D) To replace a customers rebuilt engine (incl settings and road test etc) (which may include some selected auxiliaries) (2.5, 2.7, S & S2 as stated, Turbo + £50.00)	£200.00

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(E) To replace a different engine (incl settings and road test etc) £200.00
(which may include some customers auxiliaries)
(2.5, 2.7, S & S2 as stated, Turbo + £50.00)

STRIPPING & RE-BUILDING COSTS

If an alternative engine block, crankshaft or any other parts supplied by Hartech, are being used, then the cost of stripping, checking and cleaning those parts is included in the Parts price stated and there is no extra labour charge - except fitting (where appropriate). Some work is sub-contracted where one price includes labour & parts.

If customers parts are used then the price of labour for cleaning the parts is a labour charge that is added to the cost of the rebuild. This has to be done as new parts are already clean and old parts often have bits of gasket material stuck on etc and must be cleaned before re-use.

N.B. S & S2 have 16 valves, valve guides & tappets, all other models have 8.
All models have 4 fuel injectors, pistons etc.

	LABOUR
To clean parts for re-fitting (customer parts)	
(1) Main Engine Block	£20.00
(2) Crankshaft	£10.00
(3) Pistons (including ring gaps)	£35.00
(4) Cylinder head re-skimming	£35.00
(5) To re-grind & re-cut valves & seats - per valve	£5.00
(6) To decoke the cylinder head	£25.00
(7) To clean the face of the water pump	£5.00
(8) To clean out the oil cooler & mating faces	£25.00
(9) To clean faces of balance shaft housings	£8.00
(10) To clean out oil pump and reassemble	£15.00
(11) To check hydraulic tappets/tappet	£10.00
(12) To ultrasonic-clean injectors	£5.00
& flow test - per injector	

To Build up a basic engine using sub assemblies that have already been assembled or have not been disassembled, i.e. using a new oil pump or an old one that has been cleaned but not been stripped and rebuilt or has already been stripped and rebuilt - or using pistons that already have rings assembled etc.

	LABOUR
(F) To Assemble a customers engine block or a replacement engine block (includes pistons, rods, main brgs & crankcase), to assemble cylinder head and camshaft housing, to assemble front end with casings, belts and rollers , to assemble oil pump, oil cooler & housing, complete clutch assembly and ignition pick ups to fit the sump etc (i.e. assembling a complete engine again)	£120.00

Parts used (essential not optional), head & base gasket sets, oil cooler gaskets, seals, anaerobic sealant, oil, oil filter, anti freeze, spark plugs etc £250.00

Good used or reconditioned parts used (optional)

Good Used Engine	£1500.00
Used oil pump.	£175.00
Used oil pressure relief valve.	£50.00
To refurbish a customers cylinder head including valves seats, skim & decoke.	£100.00
Used Cylinder head Skimmed, de-coked, re-cut valves & seats	£275.00
Used Crankshaft (within tolerance but used)	£200.00
Used Re-ground crankshaft	£275.00

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To regrind customers crankshaft	£75.00
Replacement Block	£750.00
Used Mahle matching piston sized to bore (new £165.00 each)	£60.00
Used oil pump.	£175.00
Used oil pressure relief valve.	£50.00

New parts used (optional)

new pistons (each)	£284.49
complete set of rings (chromed)	£88.35
Turbo gaskets incl sump banjo bolts & washers	£8.66
Turbo exhaust gasket set	£55.95
Turbo Oil cooler pipe block to oil cooler (from Porsche)	£45.12
Std clutch c/w. pressure plate and release brg	£300.00
crankshaft/clutch pilot brg	£15.00
Turbo complete new clutch assembly	£420.00
Fan temp switch	£12.00
6 litres mobil 15/40 racing (extra for synthetic)	£45.00
main bearing set	£62.00
big end set	£25.36
piston rings.	£78.40
water pump.	£110.00
distributor dust cap seal	£1.00
Supply & Fit new exhaust valve guides	£60.00
4 x inlet & 4 x exhaust valves	£209.60
Cam Belt	£15.00
Cam belt tensioner	£35.00
Cam belt idler	£27.00
Balance Belt	£40.00
Balance belt tensioner gear	£35.00
Balance belt idler gear	£42.00

6.0 PART-EXCHANGE ALLOWANCES

Refunds only apply when a complete engine is being replaced (in which case it is reasonable to assume that the original engine block is damaged) or when for speed and convenience, a customer requires a rebuilt engine when their own is not damaged but just worn out.

We do not make an allowance for small items which have been replaced as the cost is too small, but main items are inspected and valued as follows.

	Refund Value
Good Cylinder Block	£500.00
Good crankshaft not needing a re-grind	£120.00
Crankshaft capable of being re-ground to -.25m/m	£30.00
Good cylinder head needing refurbishment	£100.00
Rods and pistons	£25.00 each

7.0 UNLEADED FUEL CONVERSIONS

PLEASE CALL FOR A QUOTATION

8.0 EXAMPLE COSTINGS

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Using the lists on the previous pages we have selected typical examples and added up all the costs to reach the totals that follow hear as an example of the likely cost ranges involved.

Example 1 - rebuilding a customers engine

Remove engine	£150.00
Strip & Inspect	£50.00
Replace	£200.00
Clean & Measure block	£20.00
Clean and measure crankshaft	£10.00
Clean and measure pistons	£35.00
Fully recondition and skim cylinder head	£100.00
Clean water pump	£5.00
Clean out oil cooler	£25.00
Clean oil pump	£15.00
Clean balance shaft housings	£8.00
Clean injectors	£20.00
Re-assemble	£120.00
Parts needed (not optional)	£250.00
Piston rings	£88.35
Big end bearings	£25.36
TOTAL	£1121.71

Example 2 -

	COST	REFUND	TOTAL
(1) Replace big end shells and rings & re-condition head without removing engine	£800.00	NIL	£800.00
(2) To remove customers engine, re-condition & re-fit using all gaskets & seals, re-conditioned head, new rings, big-ends etc - to get running again.	£1120.00	NIL	£1120.00
(3) As in (2) above but including new main bearings re-ground crankshaft, new water pump, all belts & rollers new clutch etc	£1900.00	NIL	£1900.00

Therefore typical costs for reconditioning a customers engine vary from £800.00 (if the engine is not removed) to between £1120 and £1900 (if the engine is removed)

Example 3 -

	COST	REFUND	TOTAL
(5) To scrap a customers engine and replace with a checked good used engine with the service items, belts & rollers changed.	£1850.00	NIL	£1850.00
(6) As in (5) but assuming full refund for customers old engine.	£1850.00	£850.00	£1000.00

Therefore typical prices for replacing a customers engine with a good used one will vary between about £1000.00 and £1850.00 - depending upon the condition of the Old Engine.

Example 4 -

	COST	REFUND	TOTAL
(7) To replace customers block with a good one, replace one piston, fit rings, big ends, refurbish head fit two cam belt rollers otherwise all customers good	£2120.00	NIL	£2120.00

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old parts re-used.

(8) To replace complete engine with rebuilt one re-conditioned head, crankshaft, pistons, oil pump, clutch, rollers, belts, big ends, mains, water pump etc	£3500.00	NIL	£3500.00
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(9) As in (8) but with maximum refund	£3500.00	£850.00	£2650.00
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Therefore if a customer block needs replacing it can cost between about £2120.00 and £3500.00 depending upon the refund possible from the original engine parts.

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9.0 CONTACTING HARTECH

Please call for a QUOTATION if the enclosed is insufficient for you to work out a cost for your own circumstances. We usually have 8 or more engines in stock at any one time.

Telephone: 07000 100944 between 9am and 5pm Mon - Fri.

For personal attention, ask for Barry Hart.

E-mail address: auto@hartech.u-net.com

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