

australasian DIRT BIKE

NOVEMBER/DECEMBER 1979 \$1.65

Southerners \$1.65
**MIKE
LANDMAN
MARK HILL**

The Power and the Glory

SUZUKI RM400N

Cruising down
mainstreet

YAMAHA XT500F

Caterisms Part 2

Shortening the odds,
increasing the choice

YAMAHA IT175F SUZUKI PE175N



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VOL. 4, NO. 2

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**DIRT
BIKE**

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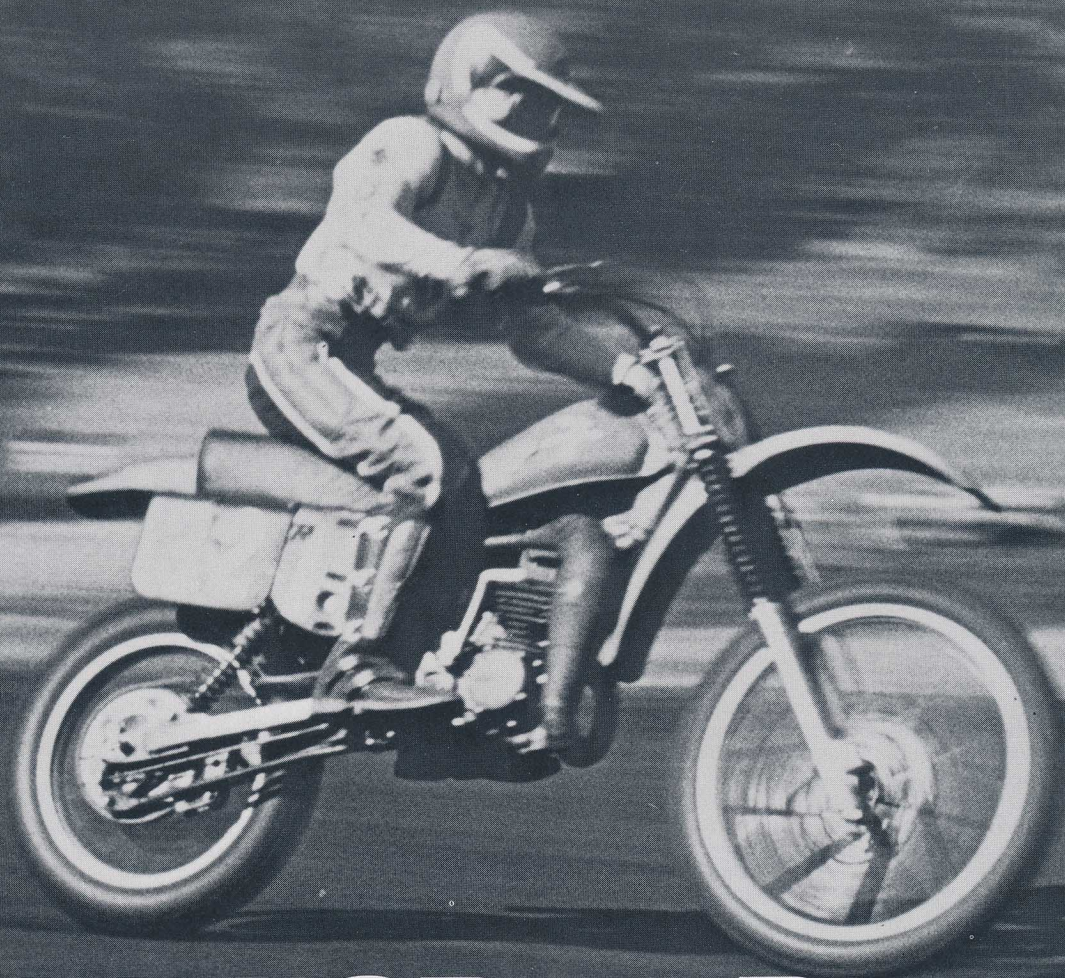


COVER: Some like them powerful. Some like them to handle well. Others just like to have whatever is up with the forefront of design. This machine embodies the lot in one beautiful package. The RM400N.

Photograph by Michael Andrews, after ADB's trusty Pentax gave up the ghost on a critical day of shooting. RIP.

**Recommended and maximum price only*





HONDA CR125R POWERHOUSE

The potential of the CR125R Honda is mindblowing when it comes to extracting more and better power out of it. Here's how.

The new CR125R engine is completely different from the early CR series engines, and has all the design features necessary to produce competitive power.

Honda has put a lot of effort into the crankshaft assembly, which is very rigid and will allow sustained high rpm operation without breakage. The flywheel design is different to what is normally used: instead of using

holes machined in the flywheels, crankshaft balance has been achieved by removing metal from the outside of the flywheels adjacent to the crankpin. The result is more rigid flywheels and a significant reduction in crankshaft flex compared to a conventional layout.

Any reduction in crankshaft flex is beneficial, since it means less power is lost due to bearing friction, particularly at high rpm, when the losses can become quite high. The fact that the new CR revs as high as it does is partly due to its excellent crankshaft design.

The ignition system is similar

to the system used on earlier CRs except for one peculiarity: the timing marks align at TDC. The reason for this could only be ease of timing, since in operation the ignition does not retard to TDC. With the CR125R, Honda retards the timing electronically as the engine rpm increases, a feature common to most Japanese racing two-stroke ignitions. A high performance two-stroke engine is not very efficient at low revs and needs to have fairly advanced ignition timing to produce good power. Combustion efficiency increases as engine rpm increases and the ignition timing must be retarded to suit.

The Honda ignition provides near optimum spark timing throughout its rpm range, resulting in a wider powerband than would be possible if the ignition timing was fixed. Some Japanese ignitions have a built-in rev-limiter to prevent engine damage at high rpm (eg RM125N) but the Honda has none.

The CR125R cylinder is a scaled down version of Honda's successful CR250RZ cylinder. The chrome bore cylinder has a bridged exhaust port, four side transfers fed from the crankcase by huge passages and a YZ-style boost port cut into the top of the inlet port.

This inlet port is flanked by two passages which connect the reed cavity directly to the main transfer ports. The passages function in the following way.

As the piston approaches BDC the reeds are closed and the charge is transferred from the crankcase via these passages to the rear boost port. After the piston has passed BDC the reeds are open and intake charge can flow direct to the main transfer ports.

The reed valve has six petals and is very large (about the same size as a YZ400E block). The reeds are made of stainless steel and have been photo-etched in a grid-pattern to lighten them whilst retaining their stiffness.

The piston is a lightweight single ring design with a small semi-circular cutout in the inlet skirt.

Despite all of the above design features, the new Honda doesn't quite make it in terms of engine performance. The standard engine has good bottom-end and midrange power, but falls on its head above 10,000 rpm. As can be seen from the charts, the Honda develops more power than the RM125N up to 9,000 rpm and more than the YZ125F up to 9,500 rpm, but the CR's power dies at 10,000 rpm, 1,000 revs too soon.

The Honda's problem is two-fold. Firstly, the exhaust port timing is insufficient to allow the engine to produce good top-end power. The solution is simple — raise and widen the exhaust port.

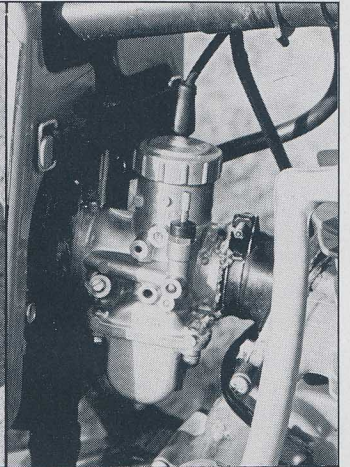
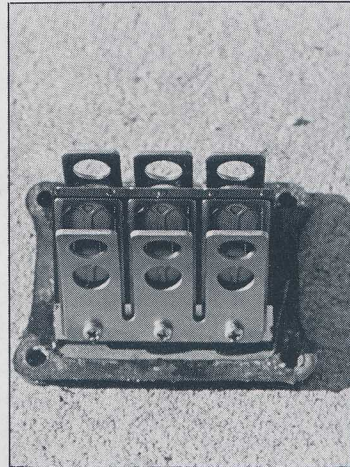
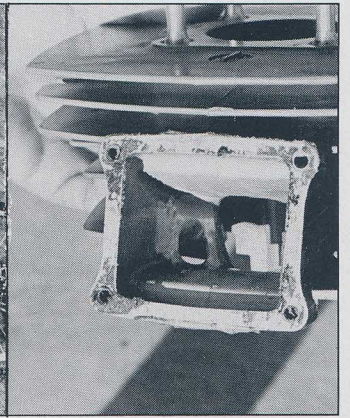
This is where the second problem arises. The standard exhaust system has been designed in such a way that any increase in exhaust port timing results in a spectacular increase in top-end power and corresponding loss in mid-range power. Initial testing with the standard pipe resulted in an increase of 8 HP at 11,500 rpm and a loss of 7 HP at 9,000 rpm. In other words, the standard pipe cannot be used with the modified cylinder, so a new pipe was designed to retain the increase in top end power obtained with the modified cylinder and still provide good mid-range power.

The results were well worth the effort involved in building the new pipe. Power was greatly increased above 9,000 rpm, even with the standard carb. Additional testing was done using a 34mm Power Jet Mikuni, which gave slightly more peak power and extended the effective powerband.

Honda's CR125R can be transformed into a red rocket with a few slight porting changes and the addition of a pipe and carburettor.

All that remains is to match the shocks and swingarm to all this power. But engine-wise, we got everything we were after.

All work performed by Garry Treadwell, 800504. Bike supplied by Don Millard Snr and Don Millard Jnr.



TOP: The most visible difference to stock is the new pipe, which was a necessary addition to create a power spread which started lower and improved the CR125R's already strong midrange. This is perhaps the fastest Honda of its type in Australia.

ABOVE: A power jet Mikuni was added to extend the peak power range, while inside is a new, more effective reed block and critical porting modifications.



ABOVE: You can see the complexity of the new pipe. It uses the old tail piece and silencer off the original pipe.

