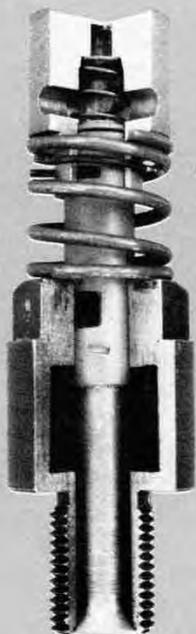


# VICTOR COMPRESSION RELEASE



● Compression releases of all types are very popular with off-road riders, especially those in areas where water abounds. No manufacturer has yet perfected a truly *water proof* brake. Some dirt bike's brakes become absolutely useless after crossing just one small stream. Others may fade gradually after repeated drownings; but all brakes fail after sufficient moisture has eliminated the friction between the linings and drums.

Compression releases have been around for decades. Diesel trucks use compression release devices, commonly called Jacobs brakes, as an auxiliary stopping method. However, because of the terribly loud motorized gargle a "Jake-Brake" makes as a diesel decelerates their use is illegal in most metropolitan areas.

The use of conventional two-way compression releases in two-stroke motorcycles is of unknown origin. Compression releases were used in the early days of motorcycling in four-stroke motorcycles as de-compression devices. When fitted in the cylinder head or an upper location in the cylinder these manually operated mini-valves were used to let out a portion of the trapped gases. In the big single cylinder four-strokes this reduced the compression and kicking effort required to crank the engine.

In two-strokes, a cylinder head located compression release performs a task opposite that in four-strokes. Excluding some cylinder located devices in big-bore engines, two-stroke compression releases are used to slow or brake the bike (ala diesels) or stop the engine. In effect

a cylinder head compression release transforms a two-stroke engine into an air compressor motor when actuated. When the small valve of the release is opened it performs as a restricted intake and exhaust passage. On the up-stroke of the piston the compressed gases in the cylinder are forced out the release orifice. The absence of sufficient compression and a fuel/air charge (it escapes out the release) prevents ignition and combustion when the spark plug fires. On the down-stroke, an intake (work) cycle replaces the power stroke. The engine is now developing a work load rather than producing power.

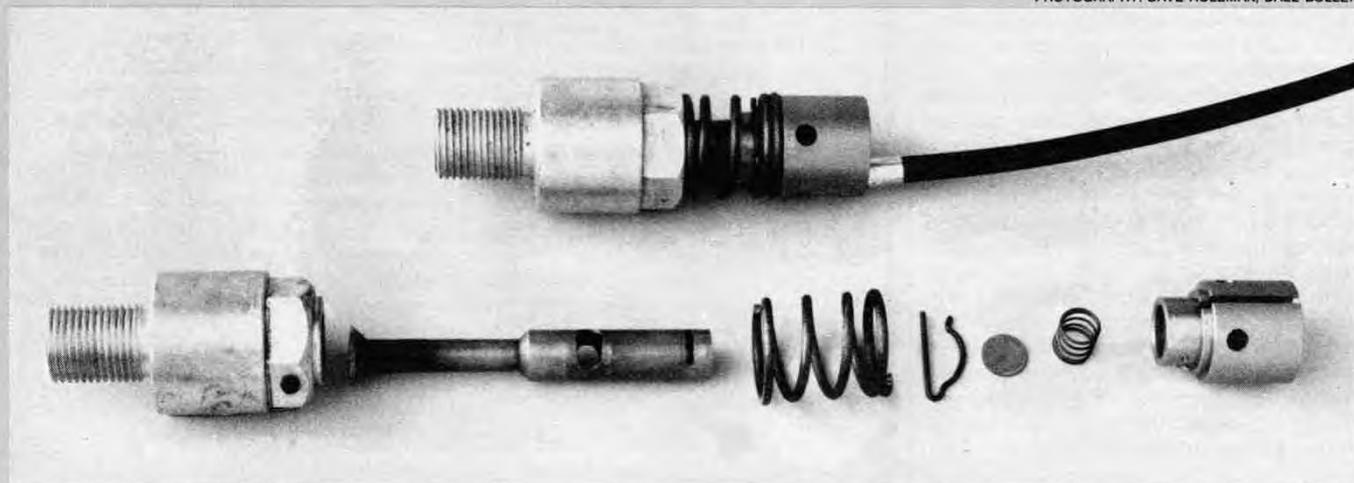
Two-way compression releases remain open to atmosphere on both up (exhaust) and down (intake) strokes. The work load created as the piston lowers, pulling in air through the small compression release orifice, acts as a braking force. However there are problems with two-way releases created by its inhaling of outside air. In dusty regions various quantities and types of dust enter the engine through the release. The unwanted dust can accelerate top end wear. The most irritating side-effect of the dust intake is continual spark plug bridging from conductive silica particles that lodge between the electrodes.

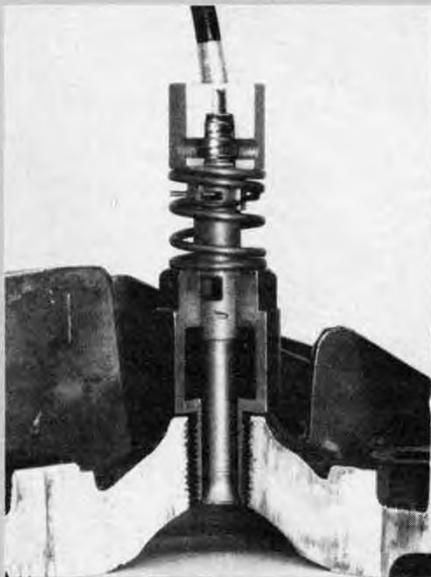
In wet regions the intake of outside elements can be serious if not fatal to the engine internals. Water entering the combustion chamber can cause a hydraulic lock in the engine. Bent connecting rods are often the result. Some machines will pull the head studs out or even break a piston if just a teaspoon of water gets trapped in the combustion chamber.

**A clever innovation, the Victor compression release works as a starting and stopping device.**

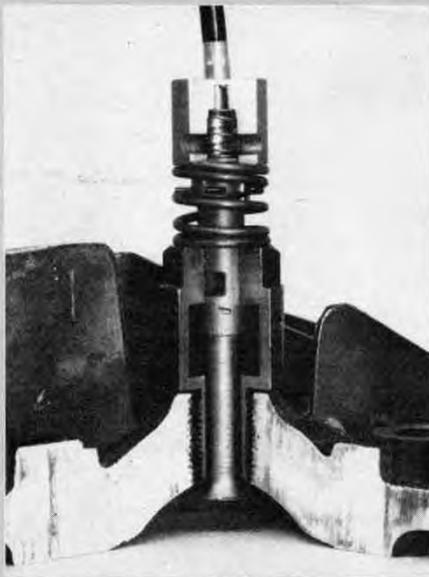
**by Dave Holeman**

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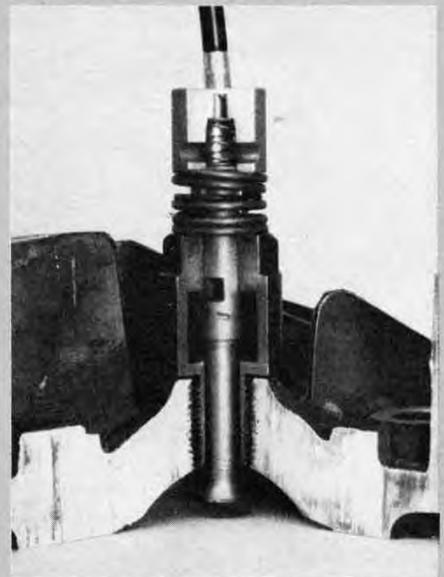




The complex construction of the release accounts for its start or stop application.



When opened partially the release chamber increases combustion volume.



Fully opened, the ported valve vents combustion one-way to the atmosphere.

Attempts to wrap water and dust-proof filters around compression releases have been failures. The simple solution of valving the top of the compression release with a spring loaded cap has solved the intake problems. A spring loaded cap allows the release to exhaust normally and closes the instant there is no pressure. This eliminates the intake of outside air. On the down stroke the work load is actually increased by having the combustion area sealed. As the piston lowers an increasing vacuum pressure is created. This vacuum develops a *work load cycle* that lasts until the exhaust and transfer ports are opened.

The Victor compression/starting release incorporates the one-way valving along with a unique feature. In addition to functioning as a braking or stopping device the Victor release also can be used as a starting aid for larger displacement two strokes. By making the body of the release large Victor has been able to include a special internal compartment.

This small compartment acts as a combination passageway and, when properly valved, an addition to the combustion area volume. The simple function of the compartment is to increase the combustion chamber volume and therefore decrease compression.

To accomplish the two separate tasks of starting and stopping, Victor Products has invented a special *hollow* valve stem with port windows. The port windows are placed high on the stem so the valve must be fully opened before the release vents to atmosphere.

When the valve is opened partially the compartment remains sealed to atmosphere. The four-cc volume, when added to the existing combustion area, produces a substantial decrease in cranking pressure required to kick through an engine. An average 400cc single has a combustion chamber volume of about 35cc. The additional four-ccs is just enough to aid starting without affecting the engine's ability to ignite the fuel charge and start.

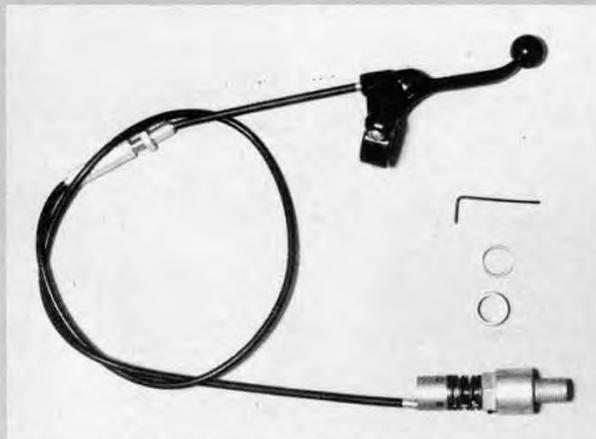
There are numerous big-bore two-stroke singles that would be much easier to start with the Victor release—360/400/450cc Huskies, 400cc CZs, 350cc Kawasaki Bighorns, 360cc Bultacos and others. There are some of the big singles

that come with compression releases but are still unpleasant to start. These bikes—360 Yamahas, 360, 400, 450, 501 Maicos and Suzuki 400s—will often start easier with the Victor release than with the factory de-compressor. When installed in 250cc engines the starting chore becomes that of a 125cc machine.

Installing the release can be done with the spark plug socket in your tool kit. The hex size on the release is standard 13/16" (rather than 3/4" hex bar stock used by most other compression releases). A 1/4" spacer is included with the Victor release to permit its use in 1/2" or 7/16" spark plug holes. When screwing in the release be sure the cable is securely locked in its locating hole with the allen set screw before installation. It's almost impossible to get the allen wrench in the screw after the release is sandwiched between the fins.

Operation of the Victor release is simple. To start an engine, just pull the lever in about one-fourth its total travel. This opens the special compartment to the combustion chamber without venting to atmosphere. To use the engine as a brake or to kill it involves pulling the lever full-open. Now the release vents one-way to atmosphere.

It's essential that you cinch down the compression release regularly. It has a tendency to work itself loose because of variations in expansion and contraction rates between the aluminum head and steel release. At intervals depending on the amount of use, the release should be disassembled and cleaned. Each time you decarbonize the top end or re-ringing the piston it would be proper to clean the compression release. While you have it apart you can also lap the valve to the body's seat to insure against air leaks. By placing the body in a vise, the valve stem in a drill motor's chuck (while in the release body) and lapping compound on the valve and body seat faces, the sealing



The complete assembly includes the Victor compression release, cable, lever, 1/4" spacer, washer and allen wrench.

(Continued on page 91)

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VICTOR *Continued from page 65*

can be done in just minutes.

The clever design of the Victor release is an attraction strengthened by good materials and quality fabrication. The majority of compression releases we have seen and used, including factory items, have been made of low grade materials and marked by shoddy workmanship. The body of the Victor release is a two-piece unit. Copper brazing bonds the two pieces as one and provides a strong air seal. The steel bodies are drilled, threaded and the valve seat faces machined and centered before being cadmium plated. Both springs and the retaining pin are 17-7 hardened stainless steel. The most critical part, the valves, are 1215 steel and they are induction hardened prior to centerless grinding and lapping. Each compression release assembly is pneumatically pressure checked after assembly. Rejects are rebuilt or destroyed. The Victor releases come with a cable and plastic lever. Most new dirt bikes come with two tapped spark plug holes in the cylinder head and usually there is enough clearance for the release, which is taller and broader than a spark plug. Some machines may have only one spark plug hole or head finning may prevent an easy fit of the big compression release body. In these cases a machinist will have to fly cut the fins for clearance and drill and tap if necessary.

If you have your head drilled and tapped with an additional spark plug hole be sure to keep the new recess as far from the original as possible. This is particularly critical with small displacement engines where cracking between spark plug holes is not uncommon.

We used the Victor release in a 400 Maico motocrosser. The 400 Maico, with its ferocious kick back, started easily (as good as with the factory release) and slowed with definite authority using the Victor release. By using the Victor release we were able to remove the stock cylinder de-compressor used for starting. As a stopping or slowing device the release worked ideally, especially on twisty Edison roads and long down-hills, where the rear Maico brake fades as the heat of constant use builds. When the brakes got wet the compression release became invaluable, being the only way to slow the bike.

While still a messy device from the standpoint of spraying unburned fuel, the Victor one-way starting/stopping compression release is as important to an enduro rider as a good speedometer. For trail riders the compression release can take the horror out of that surprise moment when freshly soaked brakes fail. Considering the physical and mechanical damage the Victor compression release could prevent, the price is cheap. The releases are distributed by Webco, Wheelsport and Yamaha. The suggested list prices vary from \$11.95 to \$14.95 depending on which vendor sells to your dealer. At twice the price it still would be cheap insurance. ©

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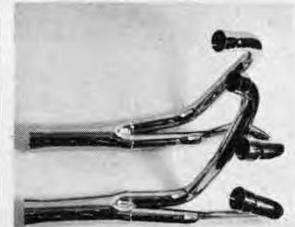
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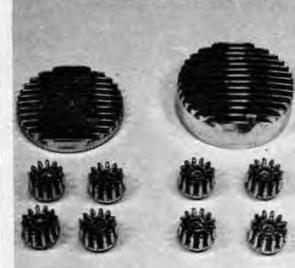
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