HOLDEN

announcing the E·K

HOLDEN

with

HYDRA-MATIC

TRANSMISSION

GENERAL MOTORS – HOLDEN'S PTY. LIMITED

GMH

GENERAL MOTORS-HOLDEN'S

NEWS

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FIRST AUTOMATIC HOLDEN

Finer Fashion in Motoring

Australia's own thoroughbred, the Holden, has improved the marque with the addition of Hydra-Matic three speed automatic transmission.

The 1961 Holden—the "EK"—is *not* a new model. It is IMPROVED by new styling features and automatic transmission.

The "EK" features are:—

- NEW radiator grille and re-styled front bumper guards.
- NEW re-styled open grille-type ventilator in shroud top panel.
- NEW engine hood lock that unlocks from inside the car for added security.
- NEW windshield wipers are electric.
- NEW upholstery that harmonises with your choice of the new body colours.
- NEW hub cap and engine hood emblems.
- NEW embossing added to face of instrument carrier panel.
- NEW improved accessory Fresh Air Heater with greater heating capacity.
- AND . . . the low look is emphasised by a stainless steel full length moulding along the side of the Special models.

THE 'EK' RANGE OF 1961 IS . . .

Standard Sedan; Special Sedan; Standard Station Sedan; Special Station Sedan; Panel Van; Coupe Utility.

Hydra-Matic transmission—similar to the unit used in Cadillac, Oldsmobile, and Pontiac—the "big cars" of the General Motors range—is fitted to the Special models only, as an optional extra.

This transmission has been specially engineered for Holden and cars of its size.

The new Holden also retains the extra value of Magic Mirror Acrylic Lacquer finish—the car paint exclusive to GMH—because it stays bright and new looking for years with little or no polishing, if given reasonable washing to keep off the road dirt.

To set this finer fashion in motoring, the "EK" models were driven around the clock for thousands of miles at GMH's Proving Ground at Lang Lang. Each test car was durability tested for at least 25,000 miles under most severe conditions on the only motor vehicle testing ground in Australia.

Testing at the proving ground is thorough and rugged, and because of the types of road surfaces and steep gradients, it is considered that one mile of proving ground travel is equivalent to four miles of ordinary road travel by a private car owner.

HYDRA-MATIC TRANSMISSION

Means . . . two pedal simplicity with a hydraulic brain selecting the correct gear for each combination of car speed and accelerator position.

Means . . . a self-contained unit operating on time-proven hydraulic and mechanical principles.

Provides . . . complete control of the car. There are no free wheel periods. The engine is always available for use as a brake on the over-run.

The extremely dependable unit is entirely enclosed and requires only routine servicing every 24,000 miles—simply by changing the oil, the oil filter, and checking linkage adjustment. No other servicing is needed except for the normal inspection every 2000 miles to see if "topping up" with oil is required.

With Hydra-Matic transmission, the improved Holden offers:—

- Less wear on engine parts,
- Smoother getaway,
- Relaxed crawling in dense traffic,
- No crashing of gears,
- Improved isolation of rear axle from engine vibrations,
- No clutch pedal,
- No jerky starts,
- A saving of more than half the driving effort,
- Full braking of engine always available,
- AND, the assurance that it has already been proved by millions of driving miles in the U.S.A. and Europe.

HYDRA-MATIC TRANSMISSION FROM A STEERING WHEEL VIEW IS . . .

A conveniently placed illuminated selector indicator with six positions—these are (from right to left): "Pk" for park; "N" for neutral; "D" for drive; "S" for special intermediate gear; "L" for low gear; "R" for reverse.

- "Pk," or Park position, means the transmission is in neutral but with the propeller shaft, rear axle and rear wheels securely locked by a safety device. Of special importance, a safety switch prevents the engine from being started unless the selector pointer is in either the Neutral or Park position. This is an additional precaution to prevent jumping away in gear. The switch includes provision for connection to the back-up lamps which are available as accessory equipment. These lamps will light automatically with selection of "Reverse" position.
- "N" is the neutral position.
- "D" (drive) is the normal driving position, starting in first, shifting automatically into second then into the cruising top gear that automatically shifts back into second by treading hard on the accelerator.
- "S" special intermediate gear means extra speed on a steep climb, extra braking on a long descent to save brake wear and driver fatigue, and additional passing speed on the highway.
- "L" (low gear) is for maximum engine braking on very steep descents, for maximum pulling power on steep climbs, or for "rocking" out of bogs.
- Reverse position cannot be engaged until the car has slowed almost to a stop. To engage reverse, the selector lever is lifted over a stop. It is prevented from being accidentally moved into this position at speed by a safety device.

The selector dial is illuminated at night for the convenience of the driver, and the illumination can be dimmed together with the instrument illumination to suit personal taste.

HYDRA-MATIC TRANSMISSION IS BETTER

Because . . .

It eliminates most of the wasteful slippage and loss of power usually associated with fluid drive transmissions.

The secret is the unique patented Hydra-Matic principle of a fluid coupling which is rapidly filled and emptied to switch from fluid to geared drive and back again, to give the best of both systems.

Hydraulic power to change ratio and to fill and empty the fluid coupling comes from an engine driven, variable output pump—minimum power is used to maintain working pressure and output is increased to make changes in ratio. Slippage is minimised because of a highly efficient fluid coupling to cushion changes of ratio.

An oil cooling system ensures that the hydraulic fluid is always maintained at an optimum operating temperature.

Mechanically, the unit comprises the fluid coupling and two sets of epicyclic gears in series, providing three forward speeds, neutral and reverse.

THE HYDRA-MATIC TRANSMISSION AT WORK

Mechanical or geared transmission of power is efficient but difficult to change smoothly. Hydraulic transmission of power is smooth and can be changed smoothly, but losses tend to be high. Hydra - Matic transmission combines both principles in a way which gives the best of both.

Gear reduction in first and reverse is partly mechanical and partly hydraulic. Mechanical reduction is by epicyclic gearing and the hydraulic reduction, which is variable, and is obtained by a torque multiplier, similar to a torque converter in the fluid coupling, but operates only when it is actually required during starting or extremely heavy pulling.

The quick power build-up, smooth take off and high efficiency compared with torque converter transmissions are the result of this combination of a fluid and mechanical drive.

Second gear is entirely mechanical and no power is transmitted hydraulically once the change into second has been made. This means a highly efficient power transmission for hill climbing, acceleration and maximum retardation when the engine is being used as a brake.

The workhorse top (third) gear, used most of the time, is both hydraulic and mechanical, and exceptionally flexible. Engine power reaches it by two paths—two-thirds of the power is transmitted mechanically through epicyclic gearing and one-third hydraulically through the fluid coupling, thus cutting the hydraulic losses to one-third compared with torque converter transmissions.

Ratios of the Hydra-Matic gears are: First, between 3.6394 to 1 and 3.0303 to 1; Second, 1.5775 to 1; Third, direct; Reverse, between 3.5707 to 1 and 2.5159 to 1.

Manual Box ratios are: First, 2.99 to 1; Second, 1.59 to 1; Third (top), direct; Reverse, 2.99 to 1.

HYDRA-MATIC QUESTION TIME

Question: Is Hydra-Matic transmission smoother through the gears than other automatic transmission?

Answer: HYDRA-MATIC HAS TWO GEAR CHANGES. BECAUSE OF THE CONSEQUENT LESSER CHANGES IN ENGINE SPEEDS, HOLDEN'S TWO CHANGES ARE SMOOTHER AND LESS NOTICEABLE.

Question: Does "slippage" occur in gear changes?

Answer: COMPARED WITH TORQUE CONVERTER TRANSMISSIONS THERE IS NO SIGNIFICANT OR NOTICEABLE "SLIPPAGE" IN HYDRA-MATIC.

Question: How does the fuel economy of a standard transmission Holden compare with automatic transmission?

Answer: IT IS ANTICIPATED THAT SLIGHTLY MORE FUEL WILL BE USED WITH HYDRA-MATIC THAN WITH STANDARD TRANSMISSION.

Question: Exactly how effective is the braking on hills of the automatic Holden compared with using standard gears?

Answer: THIS IS EXCELLENT—JUST AS GOOD AS STANDARD TRANSMISSION AND BETTER IN THE LOW RATIO, AS FIRST GEAR ON THE STANDARD GEAR BOX IS DIFFICULT TO ENGAGE AT SPEED.

SPECIFICATIONS

ENGINE: Six cylinder, O.H.V. in line, of 138 cubic inches capacity, developing 75 brake horsepower (gross) at 4200 r.p.m. Bore and stroke, 3.062 x 3.125 in.

COMPRESSION RATIO: 7.25 to 1.

TAXABLE (S.A.E. OR R.A.C.) HORSEPOWER: 22.5.

IDLING SPEED: 500 r.p.m.

BRAKES: Four wheel hydraulic with total effective drum area of 198 sq. in.

SUSPENSION: Independent coil spring with short and long arms. Suspension assembled to front end frame as complete unit. Rubber insulators are fitted between suspension and front end frame mounting points. Front cross member is square section with two piece welded upper control arm mounting tower. Upper and lower control arms (short and long arms) are one piece steel pressings.

CARBURETTOR: One downdraft Bendix-Stromberg.

CLUTCH: Single dry plate.

STEERING: Recirculating ball type.

TURNING CIRCLE (kerb to kerb): 37 feet.

DIMENSIONS (Overall): Length (Sedans and Station Sedans): 181.79 inches;
Height at kerb weight (Sedan): 61.72 inches,
(Station Sedan): 62.24 inches;
Width (Sedans and Station Sedans): 67.03 inches.

HISTORY OF HYDRA-MATIC TRANSMISSION

The first General Motors automatic transmission as a production version was developed by GM's engineers in the early thirties.

It shifted automatically, but a conventional friction clutch was still required for stops and starts, and for full performance it required a certain amount of manipulation by the gear selector.

These, semi-automatics, were offered as an optional extra on the 1937 and 1938 Oldsmobiles.

Development continued after the semi-automatic went into production. Some of its functional units were retained, but by the addition of a fluid coupling and a comprehensive control system, the transmission was made completely automatic.

The friction clutch (and its pedal) were eliminated. The range selector was used for reverse and low gear—but in all normal forward driving it was used only once: to select the driving range before the initial start.

The long development had reached its goal. The resulting transmission was named General Motors Hydra-Matic Drive and the Detroit Transmission Division was organised in May, 1939, solely for its manufacture.

Ingenious engineering design features of Hydra-Matic transmission made it possible to use a high-efficiency fluid couupling but still permit the car to stand at engine idle speed without objectionable creep. Overall economy was still further increased by a split torque feature—only about 40 per cent. of the torque from the engine to rear wheels being passed through a fluid coupling; the balance of the torque was transmitted mechanically by shafts and gearing.

The final unit developed was the extremely versatile Hydra-Matic control system known to automatic transmission engineers as "The Brain."

This unit automatically chooses the proper gear ratio for each operating situation, making the same shifts that an expert driver would use to meet the same conditions.

And for less skilful drivers, it actually increases both safety and performance by making shifts that a driver would not realise were desirable or necessary under the existing circumstances.

Detroit Transmission Division has now produced more than 11,400,000 automobile transmissions and over 190,000 military transmissions.

Hydra-Matic for Holden is the brother of Torq-Matic automatic transmission which controlled Buick's Hellcat tank destroyers in the Battle of the Bulge, and the later stages of World War II—and in the giant General Pershing tanks.