

GENERAL MOTORS

3 CYLINDER DIESEL

1967-70 "P" MODELS

1) Drain cooling system and disconnect battery. Remove engine cover, front bumper and sheet metal to provide clearance for removal. Remove fan, shroud and radiator core. Disconnect accelerator and stop controls from engine. Remove air cleaner, support and piping which connects air cleaner to blower manifold. Disconnect clutch control rod.

2) Disconnect exhaust pipe from manifold, heater hoses, fuel lines and all wiring. Disconnect drive shaft and speedometer cable at rear of transmission. Position crane-type hoist through front end opening and attach lifting sling to engine at lifting brackets of engine.

3) Remove bolts attaching engine front and rear mounts. Raise engine and transmission assembly and carefully remove through front opening.

4 & 6 CYLINDER ENGINES

1965-74 "C", "K" & "P" MODELS

1) Disconnect battery cables and drain cooling system, then remove air cleaner. Remove hood and engine compartment cover ("P" models only). Disconnect radiator hoses, transmission cooler lines (if equipped) and remove radiator and shroud from vehicle. Remove battery from vehicle on "P" models.

2) Disconnect electrical wiring at engine, accelerator linkage at manifold bellcrank, fuel line (from tank) at fuel pump, heater hoses at engine and vacuum lines at engine. Disconnect oil pressure gauge line (if equipped), emission system lines at carburetor, ground straps and power steering pump at engine bracket (position to one side).

3) Disconnect exhaust pipe at manifold and remove clutch cross-shaft (if equipped). Remove rocker arm cover, fan and pulley. Attach suitable lifting adapter to cylinder head, secure lifting device and raise slightly to remove engine weight from motor mounts. On all except "C" models, support transmission and disconnect transmission from engine, then remove motor mount attaching bolts.

4) On "C" models, remove drive shaft and plug opening in transmission. Disconnect switches, speedometer linkage, shift linkage, oil cooler lines (if equipped) and clutch linkage (if equipped) from transmission. Remove motor mount attaching bolts.

5) To remove engine on "K" models, raise engine and pull forward until disconnected from transmission. Raise engine and remove from vehicle. To remove engine on "P" models, raise engine and push forward to clear crossmember and disconnect from transmission. Remove engine from vehicle. On "C" models with automatic or four speed transmission, remove rear mount crossmember. Raise engine and transmission assembly and pull forward until removed from vehicle.

1965-70 "G" MODELS

1) Disconnect battery cables and drain cooling system. Remove air cleaner and engine splash shields. Disconnect radiator hoses at radiator and neutral safety switch wire at connector (if equipped). Disconnect all electrical wires to engine, accelerator linkage at bellcrank, choke cable at carburetor and fuel line from fuel pump.

2) Disconnect heater hoses, oil pressure gauge line (if equipped), vacuum lines at engine, ground straps to engine

and power steering lines at pump. Disconnect exhaust pipe at manifold. Remove fan and pulley, then remove clutch cross shaft or disconnect clutch slave cylinder (if equipped).

3) Remove drive shaft and plug opening in transmission. Disconnect speedometer cable, transmission shift linkage and clutch linkage (if equipped). Remove engine motor mount attaching bolts. Remove bolt retaining starter wire harness clip and engine ground strap to clutch housing. Remove oil cooler lines if equipped.

4) Position a suitable jack with a suitable engine cradle (J-21741) under engine and raise slightly to take engine weight off mounts. *NOTE* — *Position cradle so forward legs straddle fifth pan bolt from rear of engine and install safety chain over flywheel housing.* Remove engine mount bolts and front mount crossmember. Lower engine and transmission assembly slowly while pulling to the rear to clear front axle.

1971-73 "G" MODELS

1) Remove engine cover and disconnect battery cables. Drain cooling system and disconnect radiator and heater hoses. Disconnect transmission oil cooler lines and remove radiator. Disconnect engine wiring harness at dash panel junction block, oil pressure gauge (if equipped), transmission controlled spark electrical leads, alternator wiring and evaporation control system lines. Disconnect accelerator linkage at bellcrank and power brake vacuum line at manifold.

2) Raise vehicle on hoist and disconnect fuel line at fuel pump, engine ground strap, steering idler arm at frame and steering pitman arm at steering gear. Disconnect battery cable at starter, speedometer, cable and transmission controlled spark switch at transmission. Disconnect exhaust pipe at manifold and at pipe hangers, then remove exhaust system from vehicle.

3) Disconnect transmission at crossmember and stabilizer shaft at frame brackets. Disconnect clutch linkage and/or transmission linkage and remove cross shaft. Disconnect front shock absorbers at lower attachment and position shocks up and rearward. Remove drive shaft and plug opening in transmission. Disconnect front brake line at equalizer "T" fitting and rear brake line at connector at left frame rail.

4) Disconnect rear brake line at right frame rail connector. Remove transmission support frame-to-crossmember attaching nuts. *NOTE* — *Do not remove bolts.* Remove the six vertical bolts attaching crossmember to frame. Remove the four frame to upper control arm (inside) attaching bolts.

5) Lower vehicle on hoist so weight of vehicle is on hoist but with wheels touching floor and suspension at curb height. Install wood blocks between oil pan and crossmember to stabilize engine assembly. Position floor jack under transmission and support transmission. Remove transmission support crossmember, and four remaining suspension to frame (outside) retaining bolts. Raise vehicle slowly, leaving suspension and power train on floor until sufficient clearance is obtained for removing engine.

1974 "G" MODELS

1) Remove both headlamp bezels, grille attaching screws, body and radiator support, then remove grille from vehicle. Drain cooling system. Disconnect heater hoses, radiator hoses, transmission oil cooler lines and remove fan guard and radiator. Position headlamp wiring to one side, then remove radiator upper tie bar and center support.

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2) Disconnect battery cables at battery and radiator support baffle. Disconnect wiring harness at fuse panel and cowl attachments, and oil pressure gauge (if equipped). Raise vehicle on hoist. Disconnect fuel line (from tank) at fuel pump, ground straps, speedometer at transmission, and transmission at crossmember. Disconnect exhaust pipe at manifold and remove exhaust system from vehicle.

3) Disconnect clutch linkage and/or transmission linkage and remove cross shaft. Remove drive shaft and install plug in transmission extension. Remove engine mount through bolts. Remove crossmember to engine mount bracket (right side only) attaching bolts. Lower vehicle on hoist until approximately 12" from floor.

4) Remove engine compartment cover and air cleaner assembly. Disconnect carburetor linkage and fuel line, then remove carburetor from manifold. Disconnect power brake vacuum line at inlet manifold, spark plug wires from plugs, then remove ignition coil and engine rear lifting bracket. Position suitable tool (J-24680-2) to engine and attach lifting device. Raise engine slightly and remove right mount frame bracket and mount. Slowly raise engine while moving engine assembly forward and out of vehicle.

V6 ENGINES

1965-69 "C" & "K" MODELS

1) Drain cooling system and disconnect battery cables. Remove hood, radiator and shroud. Disconnect heater hose, fuel line, clutch and transmission control rods. Disconnect vacuum lines, electrical wiring, throttle and choke controls.

2) If equipped with power steering, remove pump or disconnect lines. Disconnect exhaust pipes from manifolds. Disconnect speedometer drive housing at transmission and remove air cleaner. Attach suitable hoist equipment to engine, then remove rear mounting bolts and detach front mountings from frame. Raise hoist equipment and remove engine and transmission from vehicle as an assembly.

V8 ENGINES

1965-74 "C", "K" & "P" MODELS

1) Disconnect battery cables, drain cooling system and remove air cleaner. Remove hood, disconnect radiator hoses and remove radiator and shroud. Disconnect electrical wiring, accelerator linkage at manifold bellcrank, fuel line (from tank) at fuel pump, heater hoses, oil pressure gauge line (if equipped), vacuum lines and ground straps from engine.

2) Disconnect power steering pump with hoses attached and position to one side. Disconnect exhaust pipe at manifold and TCS switch at transmission. Remove fan, pulley and clutch cross shaft. On 1965-70 models, remove rocker arm covers and attach lifting sling at proper cylinder head bolt location. Attach lifting device and raise slightly to remove weight from engine mounts. On 1971-74 models, attach suitable lifting device to engine lift brackets and raise slightly to remove weight from engine mounts.

1) On "C" models, remove drive shaft and install plug in transmission extension housing. Disconnect speedometer cable, shift linkage and clutch linkage (as required). Remove engine

mount bolts. On vehicles with automatic or four speed transmissions, remove rear mount crossmember. Raise engine and transmission assembly, then pull forward until removed from vehicle.

4) On "P" models remove engine from vehicle as follows: Using suitable crane-type hoist through body front end opening, attach lifting sling to engine. Disconnect transmission from engine assembly, transmission controls, carburetor controls and remove engine cover, front bumper and sheet metal to provide clearance for engine removal. Raise engine and move forward to clear crossmembers and disengage from transmission. Remove engine assembly through front of vehicle.

5) On "K" models, disconnect transmission from engine and transmission to engine controls. Raise engine and pull forward until disconnected from transmission. Raise engine and remove from vehicle.

1967-70 "G" MODELS

1) Disconnect battery cables and drain cooling system. Remove engine splash shields and air cleaner. Disconnect neutral safety switch and radiator hoses. Disconnect electrical wiring, accelerator linkage at manifold bellcrank, fuel line (from tank) at fuel pump, heater hoses, oil pressure gauge line (if equipped), vacuum lines and ground straps from engine.

2) Disconnect power steering pump with hoses attached and position to one side. Disconnect exhaust pipe at manifold and remove fan, pulley and clutch cross shaft. Remove drive shaft and install plug in transmission extension housing. Disconnect speedometer cable, shift linkage and clutch linkage (as required). Remove clutch housing bolt retaining starter wire harness clip and engine ground strap. Disconnect transmission oil cooler lines at both ends and remove from vehicle.

3) Position a suitable jack with a suitable engine cradle (J-21741) under engine and raise slightly to take engine weight off mounts. *NOTE* — Position cradle so forward legs straddle fifth pan bolt from rear of engine and install safety chain over clutch housing. Remove engine mount bolts and front mount crossmember. Lower engine and transmission assembly slowly while pulling to the rear to clear front axle.

1971-73 "G" MODELS

1) Remove engine cover and disconnect battery cables. Drain cooling system and disconnect radiator and heater hoses. Disconnect transmission oil cooler lines and remove radiator and radiator shroud. Remove air cleaner, oil filler tube and alternator with support bracket (position to one side). Disconnect oil pressure gauge (if equipped), engine wiring harness at dash panel junction block, accelerator linkage at bell crank and TCS electrical leads.

2) Disconnect Evaporation Control System lines at rocker arm cover and carburetor, then disconnect power brake vacuum hose at rocker arm cover. Raise vehicle on hoist and disconnect fuel line (from tank) at fuel pump, engine ground strap(s), steering idler arm at frame, steering pitman arm at steering gear and stabilizer shaft at frame brackets. Disconnect battery cable at starter, shock absorbers at lower control arm and speedometer cable at transmission.

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3) Disconnect TCS switch at transmission and remove bell housing mounted clip, then position wiring to one side. Disconnect exhaust crossover at manifolds and at muffler. Remove drive shaft and install plug in transmission extension housing. Disconnect clutch linkage and/or transmission linkage and transmission at crossmember. Remove clutch cross shaft (if equipped).

4) Disconnect front brake line at equalizer "T" fitting, rear brake line at connector on left frame rail and at connector on right frame rail. Remove transmission support frame-to-crossmember attaching nuts. **NOTE** — Do not remove bolts. Remove the six vertical bolts attaching crossmember to frame. Remove the four frame to upper control arm (inside) attaching bolts.

5) Lower vehicle on hoist so weight of vehicle is on hoist but with wheels touching floor and suspension at curb height. Install wood blocks between oil pan and crossmember to stabilize engine assembly. Position floor jack under transmission and support transmission. Remove transmission support crossmember, and four remaining suspension to frame (outside) retaining bolts. Raise vehicle slowly, leaving suspension and power train on floor until sufficient clearance is obtained for removing engine.

1974 "G" MODELS

1) Remove both headlamp bezels, grille attaching screws, body and radiator support, then remove grille from vehicle. Drain cooling system. Disconnect heater hoses, radiator hoses, transmission oil cooler lines and remove fan guard and radiator. Position headlamp wiring to one side, then remove radiator upper tie bar and center support.

2) Disconnect battery cables at battery and radiator support baffle. Disconnect wiring harness at fuse panel and cowl attachments, and oil pressure gauge (if equipped). Raise vehicle on hoist and disconnect fuel line (from tank) at fuel pump, ground straps, speedometer at transmission, and transmission at crossmember. Disconnect exhaust pipe at manifolds.

3) Disconnect clutch linkage and/or transmission linkage and remove cross shaft. Remove drive shaft and install plug in transmission extension. Remove engine mount to crossmember bracket attaching bolts. Remove engine mount through bolts, then raise engine and remove bracket and mount as an assembly. Position blocks between engine and crossmember, then lower engine onto blocks. Lower vehicle on hoist until approximately 12" from floor.

4) Remove engine compartment cover and air cleaner assembly. Disconnect carburetor linkage and fuel line, then remove carburetor from manifold. Disconnect power brake vacuum line at inlet manifold. Remove the two forward center inlet manifold bolts and position suitable tool (J-24680) to engine. Attach a lifting device, raise engine while moving the engine assembly forward and out of the vehicle.

1973-74 GMC MOTOR HOME

Engine assembly may be removed with or without transmission and final drive attached. Recommended procedure is to remove transmission and final drive from vehicle before removing engine. Proceed as follows:

1) Disconnect battery ground cables from both the automotive and living area batteries. Remove engine compartment cover and air cleaner. Disconnect coil bracket and position suitable engine removal tool (J-24603) to engine. Adjust tool so all slack is removed from cable, and drain radiator.

2) Raise motor home on a twin post hoist. **CAUTION** — Size and weight of vehicle necessitates use of a twin post hoist **ONLY**. Disconnect starter solenoid wires and remove starter. Loosen upper left hand bolt of flywheel cover and remove remaining three attaching bolts. Remove flywheel cover.

3) Disconnect transmission shift linkage, speedometer cable and transmission oil cooler lines. Disconnect detent solenoid wire and modulator tube from transmission. Remove right hand drive axle cotter pin, nut and washer. Remove inner constant velocity joint attaching bolts and push inner joint outward enough to disengage from final drive output shaft. Move drive axle rearward.

4) Remove lower right hand venturi ring (shroud to engine ring) bracket. Remove output shaft bracket from engine and right hand output shaft assembly from final drive. Disconnect left hand drive axle from flange at final drive and position axle forward and clear of flange. Remove three bolts attaching bracket on left hand side of engine to final drive.

5) Remove three bolts securing converter to flywheel and three transmission-to-support bracket bolts. Remove support bracket-to-crossmember bolts and position suitable transmission jack under transmission. Remove transmission housing-to-engine attaching bolts and slide transmission rearward. Carefully remove transmission and final drive.

6) Lower vehicle and remove engine oil dipstick. Disconnect vacuum line from front of carburetor to carbon canister and vacuum lines from intake manifold to brake booster and heater controls. Disconnect throttle linkage, coil bracket from engine (position on top of intake manifold), negative coil terminal wire, heater hoses and engine harness.

7) Disconnect brake combination valve wire, upper radiator hose from engine, air conditioning compressor from bracket (position to one side with refrigerant lines connected). Remove oil filler upper tube, oil dipstick tube, alternator and both upper venturi ring brackets. Raise vehicle on twin post hoist.

8) Disconnect exhaust pipes from manifolds, engine oil cooler tubes from tube to hose union and fuel line from fuel pump. Remove fan and clutch assembly. Remove lower left hand venturi ring bracket, venturi ring retainer strap, venturi ring and radiator shroud. Disconnect lower radiator hose, and power steering hoses from power steering pump. Remove engine front mounting bolts.

9) Remove left hand drive axle cotter pin, nut and washer. Tap lightly on outboard end of left hand axle until splines are free and remove drive assembly. Raise engine assembly using engine removal tool previously attached to engine. Remove engine by alternately raising, tilting, and lowering engine assembly. **CAUTION** — Take care not to damage oil pan.

Engine Removal

GENERAL MOTORS (Cont.)

TIGHTENING SPECIFICATIONS

"G" MODELS (1965-70)

| Application | Ft. Lbs. |
|---------------------------------|----------|
| Front Crossmember-to-Frame..... | 100-130 |
| Front Mount-to-Engine..... | 20-30 |
| Rear Mount-to-Bracket..... | 55-75 |

"G" MODELS (1971-73)

| Application | Ft. Lbs. |
|--|----------|
| Front Crossmember-to-Bottom Rail..... | 100 |
| Front Crossmember-to-Side Rail | |
| G-10..... | 65 |
| G-20 & 30..... | ① 100 |
| Front Mount-to-Engine..... | 45 |
| Idler Arm-to-Frame..... | 30 |
| Pitman Arm-to-Shaft Nut | |
| Power Steering..... | ② 180 |
| Manual Steering..... | ③ 140 |
| Rear Mount-to-Crossmember..... | 40 |
| Shock Absorber (Lower End)..... | 75 |
| Stabilizer Shaft-to-Frame..... | 25 |
| Transmission Crossmember-to-Frame..... | 25 |
| Upper Control Arm Shaft Nuts | |
| G-10..... | 70 |
| G-20 & 30..... | ③ 155 |

"G" MODELS (1974)

| Application | Ft. Lbs. |
|-----------------------------------|----------|
| Front Mount Bracket-to-Block..... | 45 |
| Rear Mount-to-Crossmember..... | 40 |

MOTOR HOMES (1972-74)

| Application | Ft. Lbs. |
|--------------------------------------|----------|
| Converter-to-Flywheel..... | 30 |
| Drive Axle Nut..... | 110 |
| Fan and Clutch Assembly..... | 15 |
| Final Drive-to-Support Bracket..... | 105 |
| Final Drive Bracket-to-Engine..... | 50 |
| Front Mount-to-Crossmember..... | 30 |
| Inner Constant Velocity Joint..... | 65 |
| Output Shaft Bracket-to-Engine..... | 55 |
| Support Bracket-to-Crossmember..... | 50 |
| Support Bracket-to-Transmission..... | 23 |
| Transmission Housing-to-Engine..... | 35 |
| Venturi Ring-to-Bracket..... | 20 |

CHEVROLET "C", "K" & "P" MODELS (1965-74)

| Application | Ft. Lbs. |
|--------------------------------------|----------|
| Flywheel Housing-to-Engine..... | 30 |
| Rear Mount Crossmember-to-Frame..... | 25 |
| Rear Mount-to-Crossmember..... | 40 |
| Transmission Housing-to-Engine | |
| Powerglide Trans. | |
| 1965-66..... | 25-30 |
| 1967-74..... | 35 |

TIGHTENING SPECIFICATIONS

(Cont.)

| Application | Ft. Lbs. |
|------------------------------|----------|
| Turbo Hydra Matic Trans. | |
| 1967-70..... | 28 |
| 1971-74..... | 30-35 |
| Converter-to-Flywheel | |
| Powerglide Trans. | |
| 1965-66..... | 15-20 |
| 1967-74..... | 35 |
| Turbo Hydra Matic Trans..... | 35 |

GMC "C", "K" & "P" MODELS (1965-74)

| Application | Ft. Lbs. |
|--------------------------------------|----------|
| Flywheel Housing-to-Engine..... | 30 |
| Rear Mount Crossmember-to-Frame..... | 25 |
| Rear Mount-to-Crossmember | |
| Manual Trans..... | ④ 55-75 |
| Pow-R-Flo Trans..... | 35-55 |
| Turbo Hydra Matic Trans..... | 35-45 |
| Transmission Housing-to-Engine | |
| Pow-R-Flo Trans..... | 30-40 |
| Turbo Hydra Matic Trans. | |
| 1967-68..... | 20-30 |
| 1969-74..... | 35 |
| Converter-to-Flywheel | |
| Pow-R-Flo Trans. | |
| 1967-69..... | 30-35 |
| 1970-74..... | 35 |
| Turbo Hydra Matic Trans. | |
| 1967-68..... | 20-30 |
| 1969-74..... | 35 |
| Front Mount-to-Engine Bracket | |
| V6 Engine (1969-72)..... | 20-30 |
| Mount Bracket-to-Engine | |
| V6 Engine (1969-72)..... | 30-55 |
| Crossmember-to-Front Mount | |
| V6 Engine (1969-72)..... | 45-50 |
| Front Mount-to-Engine | |
| "P" Models (Diesel Engine)..... | 35-45 |
| All Models (1967) | |
| Upper Bolts..... | 20-30 |
| Lower Bolt..... | 55-75 |
| All Models (1968) | |
| "C" Models (V8 Engine)..... | 20-30 |
| "P" & "K" Models (V8 Engine) | |
| Upper Bolts..... | 20-30 |
| Lower Bolt..... | 55-75 |
| All Models (6 Cyl. & V8 Engine) | |
| 1969-72 | |
| Upper Bolts..... | 20-30 |
| Lower Bolt..... | 55-75 |

① - 1973 Chevrolet is 65 ft. lbs.

② - 1971 Chevrolet is 125 ft. lbs.

③ - 1973 Chevrolet is 120 ft. lbs.

④ - Four Speed Transmission is 50 ft. lbs.