

**New Horizons Regional Education Center
Automotive Technology II Course Syllabus**

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Office Hours

7:00 a.m.-7:15 a.m.
2:35 p.m.-3:00 p.m.

Course Description

Auto Technology II prepares students for employment in the automotive industry as entry-level technicians. The program stresses theory, diagnostic procedures and repair.

The program provides the students with an understanding of automotive theory in air conditioning/heating systems, engine performance, manual transmissions /axles, automatic transmission operation and four-wheel drive systems. This course of instruction provides hands-on training in each of the aforementioned subjects. The program stresses safe and accurate repair procedures based on published automotive standards. The program also emphasizes the importance of developing desirable employability skills in the following areas: personal appearance, communication, attendance and the ability to work as a team member. The program will offer each student the opportunity to attain NA3SA credentialing credits, automotive certifications and college credit through dual enrollment with Thomas Nelson Community College.

Required Textbook

Modern Automotive Technology (provided by NHREC)
Copyright 2009
Automotive Fundamental (Same as last year)
Auto Fundamental Workbook
Copyright 2005
Publisher: Goodheart-Wilcox

Course Fees

Skill USA dues \$16.00
ASE refrigerant handling test fee \$15.00 (Optional)
AYES/ASE Credentialing Test \$15.00 (If requirement hasn't been achieved)
Other ASE tests are optional and fees are based on the number taken.
Total fees \$16.00-\$46.00

Materials for Class

Dickies dark blue button down shirt
Dickies dark blue pants (coveralls are **not** acceptable)
2-3"-ring binder
Oil resistant shoes (steel toe recommended)
Safety glasses and hand tools will be provided.

Evaluation of Student Performance/Grading

Nine week grading periods are based on the following:

Employability Skills – 1/3
Related Instruction (Tests, quizzes, notebook, class work) – 1/3
Competencies (hands-on, and workplace skill demonstration) – 1/3
Two nine-week grading periods: 80% of semester grade
Mid term and final exams: 20% of semester grade

Working safely in the Repair Facility (1Day-3 Hours)

Outline safety procedures for personal protection

Outline guidelines for proper care of tools and equipment

Air Conditioning and Heating Systems (30 Days-90 Hours)

- A. Heating Ventilation and Air Conditioning System Theory.
- B. Operating Systems and related controls, Diagnosis and Service
- C. A/C Systems, Diagnosis and Service.
- D. Heating, Ventilation and Engine Cooling Systems, Diagnosis and Service.
- E. Refrigerant Recovery, Recycling and Handling

Engine Performance (74 Days-205 Hours New Horizons-15 Hours during summer mentorship)

- A. General Engine Performance Theory.
- B. Computerized Engine Controls Diagnosis
- C. Ignition Systems Diagnosis and Service
- D. Fuel, Air Induction and Exhaust Systems Diagnosis and Service.
- E. Emission Control Systems Diagnosis and Service.
- F. Engine Related Service.

Manual Drive and Drive Axles (34 Days-100 Hours)

- A. General Drive Train Theory
- B. Clutch Diagnosis and Service
- C. Transmission/Transaxle Diagnosis and Service
- D. Drive Shaft, Half Shaft Universal and Constant Velocity (CV) Joint Diagnosis and Service.
- E. Drive Axle Diagnosis and Service.
- F. 4-- Wheel and All Wheel Drive Systems Diagnosis and Service.

Automatic Transmission and Transaxle (40 Days-120 Hours)

- A. General Automatic Transmission and Transaxle Theory.
- B. Automatic Transmission and Transaxle Diagnosis.
- C. Automatic Transmission and Transaxle Service.

- 95% of all Priority 1 (P-1) items must be accomplished
- 80% of all Priority 2 (P-2) items must be accomplished
- 50% of all Priority 3 (P-3) items must be accomplished

For every task in Heating and Air conditioning, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

VII. HEATING AND AIR CONDITIONING

A. A/C System Diagnosis and Repair

	P1	P2	P3
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.			
2. Identify and interpret heating and air conditioning concern; determine necessary action.			
3. Research applicable vehicle and service information, such as heating and air conditioning system operation, vehicle service history, service precautions, and technical service bulletins.			
4. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).			
5. Performance test A/C system; diagnose A/C system malfunctions using principles of refrigeration.			
6. Diagnose abnormal operating noises in the A/C system; determine necessary action.			
7. Identify refrigerant type; select and connect proper gauge set; record pressure readings.			
8. Leak test A/C system; determine necessary action.			
9. Inspect the condition of discharged oil; determine necessary action.			
10. Determine recommended oil for system application.			
11. Using scan tool, observe and record related HVAC data and trouble codes.			

B. Refrigeration System Component Diagnosis and Repair

1. Compressor and Clutch

1. Diagnose A/C system conditions that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.			
2. Inspect and replace A/C compressor drive belts; determine necessary action.			
3. Inspect, test, and/or replace A/C compressor clutch components and/or assembly.			
4. Remove, inspect, and reinstall A/C compressor and mountings; determine required oil quantity			
5. Identify hybrid vehicle AC system electrical circuits, service and safety precautions.			

2. Evaporator, Condenser, and Related Components

1. Determine need for an additional A/C system filter; perform necessary action.			
2. Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action.			
3. Inspect A/C condenser for airflow restrictions; perform necessary action.			
4. Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine required oil quantity			
5. Remove and install expansion valve or orifice (expansion) tube.			
6. Inspect evaporator housing water drain; perform necessary action.			
7. Remove, inspect, and reinstall evaporator; determine required oil quantity			
8. Remove, inspect, and reinstall condenser; determine required oil quantity			

C. Heating, Ventilation, and Engine Cooling Systems Diagnosis and Repair

1. Diagnose temperature control problems in the heater/ventilation system; determine necessary action.			
2. Perform cooling system pressure tests; check coolant condition, inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.			

	P1	P2	P3
3. Inspect engine cooling and heater system hoses and belts; perform necessary action.			
4. Inspect, test, and replace thermostat and gasket.			
5. Determine coolant condition and coolant type for vehicle application; drain and recover coolant.			
6. Flush system; refill system with recommended coolant; bleed system.			
7. Inspect and test cooling fan, fan clutch, fan shroud, and air dams; perform necessary action.			
8. Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.			
9. Inspect and test heater control valve(s); perform necessary action.			
10. Remove, inspect, and reinstall heater core.			

D. Operating Systems and Related Controls Diagnosis and Repair

1. Diagnose malfunctions in the electrical controls of heating, ventilation, and A/C (HVAC) systems; determine necessary action.			
2. Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; perform necessary action.			
3. Test and diagnose A/C compressor clutch control systems; determine necessary action.			
4. Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action.			
5. Inspect and test A/C-heater control panel assembly; determine necessary action.			
6. Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action.			
7. Inspect A/C-heater ducts, doors, hoses, cabin filters and outlets; perform necessary action.			
8. Check operation of automatic and semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.			

E. Refrigerant Recovery, Recycling, and Handling

1. Perform correct use and maintenance of refrigerant handling equipment.			
2. Identify (by label application or use of a refrigerant identifier) and recover A/C system refrigerant.			
3. Recycle refrigerant.			
4. Label and store refrigerant.			
5. Test recycled refrigerant for non-condensable gases.			
6. Evacuate and charge A/C system.			

For every task in Engine Performance, the following safety requirement must be strictly enforced: Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

VIII. ENGINE PERFORMANCE

A. General Engine Diagnosis

	P1	P2	P3
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.			
2. Identify and interpret engine performance concern; determine necessary action.			
3. Research applicable vehicle and service information, such as heating and air conditioning system operation, vehicle service history, service precautions, and technical service bulletins.			
4. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).			
5. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.			
6. Diagnose abnormal engine noise or vibration concerns; determine necessary action.			
7. Diagnose abnormal exhaust color, odor, and sound; determine necessary action.			
8. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.			
9. Perform cylinder power balance test; determine necessary action.			
10. Perform cylinder cranking compression tests; determine necessary action.			
11. Perform engine running compression test; determine necessary action.			
12. Perform cylinder leakage test; determine necessary action.			
13. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and/or engine diagnostic equipment; determine necessary action.			
14. Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.			
15. Verify engine operating temperature; determine necessary action.			
16. Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.			
17. Verify correct camshaft timing.			

B. Computerized Engine Controls Diagnosis and Repair

1. Retrieve and record stored OBD I diagnostic trouble codes; clear codes.			
2. Retrieve and record stored OBD II diagnostic trouble codes; clear codes when applicable.			
3. Diagnose the causes of emissions or driveability concerns resulting from malfunctions in the computerized engine control system with stored diagnostic trouble codes.			
4. Diagnose emissions or driveability concerns resulting from malfunctions in the computerized engine control system with no stored diagnostic trouble codes; determine necessary action.			
5. Check for module communication (including CAN/BUS systems) errors using a scan tool.			
6. Inspect and test computerized engine control system sensors, powertrain control module (PCM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.			
7. Obtain and interpret scan tool data.			
8. Access and use service information to perform step-by-step diagnosis.			
9. Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.			
10. Perform active tests of actuators using scan tool; determine necessary action.			

C. Ignition System Diagnosis and Repair

	P1	P2	P3
1. Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns on vehicles with electronic ignition (distributorless) systems; determine necessary action.			
2. Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns on vehicles with distributor ignition (DI) systems; determine necessary action.			
3. Inspect and test ignition primary circuit wiring and solid state components; perform necessary action.			
4. Inspect, test and service distributor.			
5. Inspect and test ignition system secondary circuit wiring and components; perform necessary action.			
6. Inspect and test ignition coil(s); perform necessary action.			
7. Check and adjust ignition system timing and timing advance/retard (where applicable).			
8. Inspect and test ignition system pick-up sensor or triggering devices; perform necessary action			

D. Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair

1. Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems on vehicles with injection-type fuel systems; determine necessary action.			
2. Check fuel for contaminants and quality; determine necessary action.			
3. Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.			
4. Replace fuel filters.			
5. Inspect and test cold enrichment system and components; perform necessary action.			
6. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.			
7. Inspect and test fuel injectors.			
8. Check idle speed			
9. Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.			
10. Perform exhaust system back-pressure test; determine necessary action.			
11. Test the operation of turbocharger/supercharger systems; determine necessary action.			

E. Emissions Control Systems Diagnosis and Repair

1. Positive Crankcase Ventilation

1. Diagnose oil leaks, emissions, and drivability problems resulting from malfunctions in the positive crankcase ventilation (PCV) system; determine necessary action.			
2. Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.			

2. Exhaust Gas Recirculation

1. Diagnose emissions and drivability problems caused by malfunctions in the exhaust gas recirculation (EGR) system; determine necessary action.			
2. Inspect, test, service and replace components of the EGR system, including EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.			
3. Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action			

For every task in Manual Drive Train and Axles, the following safety requirement must be strictly enforced:

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III. MANUAL DRIVE TRAIN AND AXLES

A. General Drive Train Diagnosis

	P1	P2	P3
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction			
2. Identify and interpret drive train concern; determine necessary action.			
3. Research applicable vehicle and service information, such as drive train system operation, fluid type, vehicle service history, service precautions, and technical service bulletins.			
4. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals).			
5. Diagnose fluid loss, level, and condition concerns; determine necessary action.			
6. Drain and fill manual transmission/transaxle and final drive unit.			

B. Clutch Diagnosis and Repair

1. Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action.			
2. Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action.			
3. Inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action.			
4. Inspect release (throw-out) bearing, lever, and pivot; determine necessary action.			
5. Inspect and replace clutch pressure plate assembly and clutch disc.			
6. Bleed clutch hydraulic system.			
7. Inspect, remove or replace pilot bearing or bushing (as applicable).			
8. Inspect flywheel and ring gear for wear and cracks, determine necessary action.			
9. Inspect engine block, clutch (bell) housing, transmission/transaxle case mating surfaces, and alignment dowels; determine necessary action.			
10. Measure flywheel runout and crankshaft endplay; determine necessary action.			

C. Transmission/Transaxle Diagnosis and Repair

1. Remove and reinstall transmission/transaxle.			
2. Disassemble, clean, and reassemble transmission/transaxle components.			
3. Inspect transmission/transaxle case, extension housing, case mating surfaces, bores, bushings, and vents; perform necessary action.			
4. Diagnose noise, hard shifting, jumping out of gear, and fluid leakage concerns; determine necessary action.			
5. Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers.			
6. Inspect and reinstall powertrain mounts.			
7. Inspect and replace gaskets, seals, and sealants; inspect sealing surfaces.			
8. Remove and replace transaxle final drive.			
9. Inspect, adjust, and reinstall shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.			
10. Measure endplay or preload (shim or spacer selection procedure) on transmission/transaxle shafts; perform necessary action.			
11. Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.			
12. Inspect and reinstall speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.			

	P1	P2	P3
13. Diagnose transaxle final drive assembly noise and vibration concerns; determine necessary action.			
14. Remove, inspect, measure, adjust, and reinstall transaxle final drive pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.			
15. Inspect lubrication devices (oil pump or slingers); perform necessary action.			
16. Inspect, test, and replace transmission/transaxle sensors and switches.			

D. Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair

1. Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action.			
2. Diagnose universal joint noise and vibration concerns; perform necessary action.			
3. Remove and replace front wheel drive (FWD) front wheel bearing.			
4. Inspect, service, and replace shafts, yokes, boots, and CV joints.			
5. Inspect, service, and replace shaft center support bearings.			
6. Check shaft balance and phasing; measure shaft runout; measure and adjust driveline angles.			

E. Drive Axle Diagnosis and Repair

1. Ring and Pinion Gears and Differential Case Assembly

1. Diagnose noise and vibration concerns; determine necessary action.			
2. Diagnose fluid leakage concerns; determine necessary action.			
3. Inspect and replace companion flange and pinion seal; measure companion flange runout.			
4. Inspect ring gear and measure runout; determine necessary action.			
5. Remove, inspect, and reinstall drive pinion and ring gear, spacers, sleeves, and bearings.			
6. Measure and adjust drive pinion depth.			
7. Measure and adjust drive pinion bearing preload.			
8. Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup or shim types).			
9. Check ring and pinion tooth contact patterns; perform necessary action.			
10. Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.			
11. Reassemble and reinstall differential case assembly; measure runout; determine necessary action.			

2. Limited Slip Differential

1. Diagnose noise, slippage, and chatter concerns; determine necessary action.			
2. Clean and inspect differential housing; refill with correct lubricant.			
3. Inspect and reinstall clutch (cone or plate) components.			
4. Measure rotating torque; determine necessary action.			

3. Drive Axle Shaft

1. Diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leakage concerns; determine necessary action.			
2. Inspect and replace drive axle shaft wheel studs.			
3. Remove and replace drive axle shafts.			
4. Inspect and replace drive axle shaft seals, bearings, and retainers.			
5. Measure drive axle flange runout and shaft endplay; determine necessary action.			

F. Four-wheel Drive/All-wheel Drive Component Diagnosis and Repair

1. Diagnose noise, vibration, and unusual steering concerns; determine necessary action.			
2. Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.			
3. Remove and reinstall transfer case.			
4. Disassemble, service, and reassemble transfer case and components.			
5. Inspect front-wheel bearings and locking hubs; perform necessary action.			
6. Check drive assembly seals and vents; check lube level.			
7. Diagnose, test, adjust, and replace electrical/electronic components of four-wheel drive systems.			

For every task in Automatic Transmission and Transaxle, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

II. AUTOMATIC TRANSMISSION AND TRANSAXLE

A. General Transmission and Transaxle Diagnosis

	P1	P2	P3
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction			
2. Identify and interpret transmission/transaxle concern; assure proper engine operation; determine necessary action.			
3. Research applicable vehicle and service information, such as transmission/transaxle system operation, fluid type, vehicle service history, service precautions, and technical service bulletins.			
4. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals).			
5. Diagnose fluid loss and condition concerns; check fluid τ level on transmissions with and without dip-stick, determine necessary action.			
6. Perform pressure tests; determine necessary action.			
7. Perform stall test; determine necessary action.			
8. Perform lock-up converter system tests; determine necessary action.			
9. Diagnose, mechanical and, vacuum control system concerns; determine necessary action.			
10. Diagnose noise and vibration concerns; determine necessary action.			
11. Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.			
12. Diagnose pressure concerns in the transmission using hydraulic principles (Pascal's Law).			
13. Diagnose electrical/electronic concerns using principals of electricity (Ohm's Law).			

B. Transmission and Transaxle Maintenance and Adjustment

1. Inspect, adjust or replace throttle valve (TV) linkages or cables; manual shift linkages or cables; transmission range sensor; check gear select indicator (as applicable).			
2. Service transmission; perform visual inspection; replace fluids and filters.			

C. In-Vehicle Transmission and Transaxle Repair

1. Inspect, adjust or replace (as applicable) vacuum modulator; inspect and repair or replace lines and hoses.			
2. Inspect, repair, and replace governor assembly.			
3. Inspect and replace external seals and gaskets.			
4. Inspect extension housing, bushings and seals; perform necessary action.			
5. Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.			
6. Diagnose electronic transmission control systems using a scan tool; determine necessary action.			
7. Inspect, replace, and align powertrain mounts.			

D. Off-Vehicle Transmission and Transaxle Repair

1. Removal, Disassembly, and Reinstallation

1. Remove and reinstall transmission and torque converter (rear-wheel drive).			
2. Remove and reinstall transaxle and torque converter assembly.			
3. Disassemble, clean, and inspect transmission/transaxle.			

1. Removal, Disassembly, and Reinstallation(cont)

	P1	P2	P3
4. Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, sleeves, retainers, brackets, check-balls, screens, spacers, and gaskets).			
5. Inspect servo bore, piston, seals, pin, spring, and retainers; determine necessary action.			
6. Inspect accumulator bore, piston, seals, spring, and retainer; determine necessary action.			
7. Assemble transmission/transaxle.			
8. Inspect, leak test, and flush cooler, lines, and fittings.			

2. Oil Pump and Converter

1. Inspect converter flex plate, attaching parts, pilot, pump drive, and seal areas.			
2. Measure torque converter endplay and check for interference; check stator clutch.			
3. Inspect, measure, and reseal oil pump assembly and components.			

3. Gear Train, Shafts, Bushings and Case

1. Measure endplay or preload; determine necessary action.			
2. Inspect, measure, and replace thrust washers and bearings.			
3. Inspect oil delivery seal rings, ring grooves, and sealing surface areas.			
4. Inspect bushings; determine necessary action.			
5. Inspect and measure planetary gear assembly (includes sun, ring gear, thrust washers, planetary gears, and carrier assembly); determine necessary action.			
6. Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action.			
7. Inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action.			
8. Inspect, measure, repair, adjust or replace transaxle final drive components.			
9. Inspect and reinstall parking pawl, shaft, spring, and retainer; determine necessary action.			

4. Friction and Reaction Units

1. Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; determine necessary action.			
2. Measure clutch pack clearance; determine necessary action.			
3. Air test the operation of clutch and servo assemblies.			
4. Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; determine necessary action.			
5. Inspect bands and drums; determine necessary action.			