

THEPRA - Automatic Transmission

Mechanically and electronically controlled automatic transmission with sport and winter program

Inputs **Processing** **Output**
Sensors Control Unit Actuators



This function demonstration stand is equipped with original state-of-the-art components of an automatic transmission (Opel Vectra). The mechanical part of this educational appliance is arranged clearly and visible to the student. Mechanical and electronic functional components and actuating elements have been mounted in an educational and logical arrangement with serigraphy diagrams. The functional components required for the control system and their interlinking can be investigated and tested at the control panel independent from the mechanical part. Individual shifting actions (triggered by the control unit) on brake bands and multidisc clutches are actuated by electro pneumatic systems.

Inputs	Processing	Outputs
<ul style="list-style-type: none"> • Transmission drive speed • Pilot lamps/drive switch • Brake light switch • Selector position switch • Push-button switch for winter program • Sports program • Throttle valve potentiometer • Kick down switch • Drive speed/output speed • Pulse generator • Transmission oil temperature sensor • Coolant temperature 	<ul style="list-style-type: none"> • Speed • LED - green - • Selector • Control unit • Diagnostic link 	<ul style="list-style-type: none"> • Transmission output speed • Brake light • Sports program malfunction • Winter program • Solenoid valve • Torque converter clutch • Electro hydraulic pressure regulator • Solenoid valve 1-2/3-4 shift • Solenoid valve 2-3 shift • LED - yellow - • Compressed air connections for gear shifting



Measuring instruments for transmission input speed, transmission output speed, and vehicle speed are arranged clearly visible on the front panel.

LEDs:

- in green: located above the selector switch, indicate the current transmission gear
- in yellow: indicate the switching functions, e.g. of brake bands and multi-disk clutches
- in red: indicate the sports program and malfunctions

The winter program can be switched on/off with the push-button switch in the original selector switch case.

Measuring points:

Student's workplaces:

The student measures the electrical values and their variation originating from the function demonstration stand at his/her workplace by means of multimeter on the circuit diagram mask.

Error switchgear:

The teacher can enter any errors, line interruptions and transition resistances which can be measured at the student's workplace.

PC interface:

Data acquisition and logical evaluation by means of a computer, for example in order to demonstrate cause and effect or errors.

Error diagnosis:

Interface for the original diagnostic unit **Tech 2** allows trouble shooting procedures as carried out on a real vehicle

Planetary gear trains



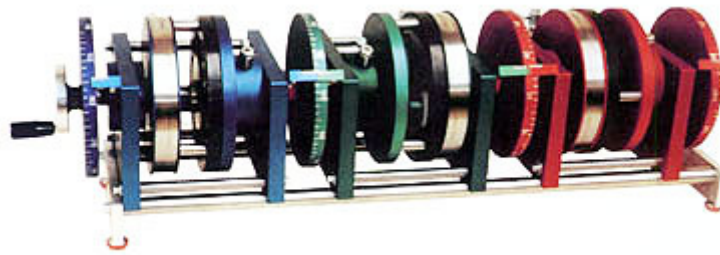
Extracted from the confusing installations in a vehicle, yet fully operable and identical to the real equipment, this system is both functional and attractive for EXPERIMENTAL and RESEARCH work.

In experiments (as specified in the student's worksheet) the student learns about causes and effects. By turning the input shaft, operating the shifting mechanism, the brake band and the multi-disk clutch (pneumatic actuation) shifting positions, driving - fixed - output, are clearly visible; the transmission ratio can be measured by means of 2 graduated scale discs.

1st Wheel set - blue -
1st gear

2nd Wheel set - green -
2nd gear

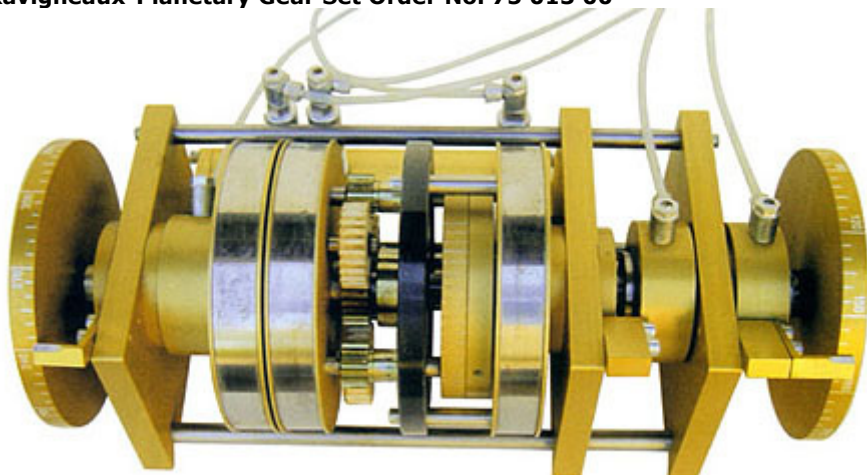
3rd Wheel set - red -
3rd gear
with reverse gear



With all three gear trains mounted together, manual drive, and shifting element actuation the operation with regard to POWER TRANSMISSION, TRANSMISSION RATIO and SENSE OF ROTATION is demonstrated clearly and will be easy to understand for the student.

Extent of supply:	
- 1st drive wheel set sun wheel, output planet carrier - colour blue -	Order No. 75 010 000
- 2nd drive wheel set internal gear wheel, output planet carrier - colour green -	Order No. 75 011 000
- 3rd drive wheel set sun wheel, output internal gear wheel - colour red -	Order No. 75 012 000
- Mounting frame for wheel sets	Order No. 75 016 000
- Electric drive	Order No. 75 017 000
- Park position unit	Order No. 75 018 000
- Cart with original electronic control system, pneumatic connections, instruments	Order No. 75 020 000
Optional accessories:	
PC interface	Order No. 75 020 020
Software	Order No. 75 020 030
Interface I/O card PCI (to be mounted in PC) -universal-	Order No. 38 079 131
Interface I/O card USB (to be mounted in PC) -universal-	Order No. 38 079 132
Measuring point decoupler, 32 measurements	Order No. 38 099 050
Error switchgear, up to 60 errors, any combination possible	Order No. 38 099 080
Error circuit diagram mask	Order No. 38 099 090
Circuit diagram base plate (1 per student)	Order No. 38 099 100
circuit diagram mask (1 per student)	Order No. 38 099 150
Connection cable, 1 m, strain relieved (1 per student)	Order No. 38 099 500
Bridging cable 3 m, strain relieved	Order No. 38 099 550
Expansion:	
- Ravigneaux gear train	Order No. 75 013 000
- Simpson gear train	Order No. 75 014 000

Ravigneaux-Planetary Gear Set Order No. 75 013 00



Simpson-Planetary Gear Set Order No. 75 014 000



Dimensions:

width 1340mm, height 1920mm, depth 730mm

weight: 180 kg

El. Supply: 230V, 10A

Changes reserved!