

H.T.I.

MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

PREPARATION OF VISUAL AIDS FOR
AUTOMATIC TRANSMISSIONS

M-835

GEORGIOS VANNAS

JULY 1998

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HIGHER TECHNICAL INSTITUTE	PROJECT NO. <i>2921</i>
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PREPARATION OF VISUAL AIDS FOR AUTOMATIC TRANSMISSIONS

**By
GEORGIOS VANNAS**

**Project Report
Submitted to**

**the department of Mechanical Engineering
of the HIGHER TECHNICAL INSTITUTE
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in partial fulfillment of the requirements
for the diploma of
TECHNICIAN ENGINEER**

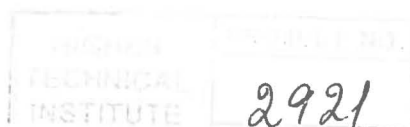
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Lecturer in Mechanical Engineering**

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To my family for its support and love

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SUMMARY

The objective of this book is to describe how the automatic transmissions function. How automatic clutches, planetary gearsets and numerous valves existing in an automatic transmission work together to make true the automatic transmission? What is - electronic control of automatic transmission? These questions, are going to be answered through this book.

Note that for better understanding of the topic a survey of popular types of automatic transmissions exist in this book. Note also that a certain model of automatic transmission [Mercedes Benz 722.3 (W4A040), 722.4 (W4A020)] has been prepared in such a manner in order to see how the different parts of automatic transmission function together. This model exists in the H.T.I. laboratory.

CONTENTS

	PAGE
Introduction	1
Chapter 1: Automatic clutches	3
1.1 Fluid Coupling	3
1.1.1 Assembly of fluid coupling	3
1.1.2 Function of fluid coupling	5
1.1.3 Split guide ring	7
1.1.4 Fluid coupling characteristics	8
1.2 Torque Converter	8
1.2.1 Stator and torque multiplication	9
1.2.2 The free wheel clutch	12
1.2.2.1 The sprag freewheel	12
1.2.2.2 The roller freewheel	12
1.2.3 Blades	13
1.2.4 Torque converter characteristics	15
Chapter 2: Planetary gearsets	16
2.1 How it works	17
2.1.1 Torque increase - large	17
2.1.2 Torque increase - small	18
2.1.3 Torque transmission - reverse	18
2.1.4 Torque transmission - constant	19
2.2 Compound planetary gearsets	19
2.2.1 How a compound planetary gearset provide the ratios	19

	PAGE
Chapter 3: Survey of popular types of automatic transmissions	21
3.1 Hydramatic drive	21
3.1.1 Operation	21
3.1.2 Gear system	22
3.1.3 First gear	23
3.1.4 Second gear	24
3.1.5 Third gear	24
3.1.6 Fourth gear	25
3.1.7 Reverse gear	25
3.1.8 Neutral	26
3.1.9 Clutch system	27
3.1.10 Oil delivery sleeve	28
3.1.11 Assemblies	29
3.1.12 Servos	30
3.1.13 Accumulator check valve and plunger	34
3.1.14 Blocker piston	35
3.1.15 Oil pressure system	36
3.1.16 Governor	36
3.1.17 Valve controls	38
3.1.18 Control valve body	39
3.1.18.1 Schematic treatment	40
3.1.18.1.1 Neutral	40
3.1.18.1.2 First speed	41
3.1.18.1.3 Second speed	41
3.1.18.1.4 Third speed	42
3.1.18.1.5 Fourth speed	43
3.1.18.1.6 Reverse	43
3.1.18.1.7 "LO" range	44

	PAGE
3.1.18.1.8 4-3 downshift	45
3.1.18.1.9 Full-throttle 3-2 downshift	45
3.1.18.1.10 Full-throttle 2-1 downshift	46
3.1.18.1.11 Closed throttle downshifts	46
3.1.18.2 Actual treatment	46
3.1.18.2.1 First speed	47
3.1.18.2.2 Second speed	48
3.1.18.2.3 Third speed	48
3.1.18.2.4 Fourth speed	49
3.1.18.2.5 Reverse	50
3.1.19 Lubrication	50
3.2 Powerflite transmission	51
3.2.1 Low gear	51
3.2.2 Direct drive	52
3.2.3 Reverse gear	52
3.2.4 Neutral	53
3.3 Buick 4000-4001 transmission	53
3.3.1 Drive range	54
3.3.2 Low range	54
3.3.3 Reverse	55
3.3.4 Neutral and park	55
3.4 Hydraulic controls in two-speed converters	56
3.5 Torqueflite transmission	60
3.5.1 Drive range	60
3.5.2 Reverse	62
3.5.3 Second (2) range	62
3.5.4 Low (1) range	62
3.5.5 Summary	63

	PAGE
3.6 Torqueflite six transmission	63
3.6.1 Drive range	63
3.6.2 Reverse	65
3.6.3 Second (2) range	66
3.6.4 Low (1) range	66
3.6.5 Summary	66
3.7 Hydraulic controls in three-speed converters	67
Chapter 4: Electronic control of automatic transmission	72
Chapter 5: Visual aids of automatic transmission, 722.3 (W4A040), [Mercedes Benz]	74
Conclusion	80
References	82
Appendix [Automatic transmission, [Mercedes Benz], 722.3 (W4A040), 722.4 (W4A020)]	84

INTRODUCTION

Automatic transmission, like the standard transmission is designed to adapt car engine power to meet varying road and load conditions. The point is that the transmission does this automatically. No clutch pedals are provided in cars equipped with this drive, control being accomplished entirely by accelerator and brake. After the driver has selected the necessary range (speed, or ratio selection) by shifting a lever or pushing a button, the transmission shifts itself up or down depending on road speed, throttle position and engine loading.

Automatic transmissions are installed in most new cars, coming off the assembly lines, and become famous enough during recent years because of their significant advantages, like:

- reduction of driver fatigue
- enables driver to concentrate on driving
- avoidance of clutch and gear mis-use
- exact matching of torque supplied to torque required. The automatic transmission can do this far better than the average driver and better than most experienced drivers.
- great reduction of wheel spin under bad conditions, e.g. ice, snow, wind and sand.

But how the automatic transmission work?

Basically in addition to the metal housing, the automatic transmission assembly consist of:

1. A fluid coupling (known as fluid flywheel) or torque converter to transmit power from the engine to the transmission proper.
2. One or more planetary gearsets and shafts to secure the necessary forward and reverse speeds.

3. A series of brake bands and multiple disc clutches designed to control the planetary gearsets.
4. Hydraulic servos and pistons to actuate the bands and clutches.
5. One or more oil pumps to provide the necessary hydraulic pressure.
6. Numerous valves, all designed to control, direct and administer hydraulic pressures throughout the transmission to provide automatically all of the forward and reverse gear ratios needed for efficient operation under normal operating conditions.
7. Some means of cooling the oil.