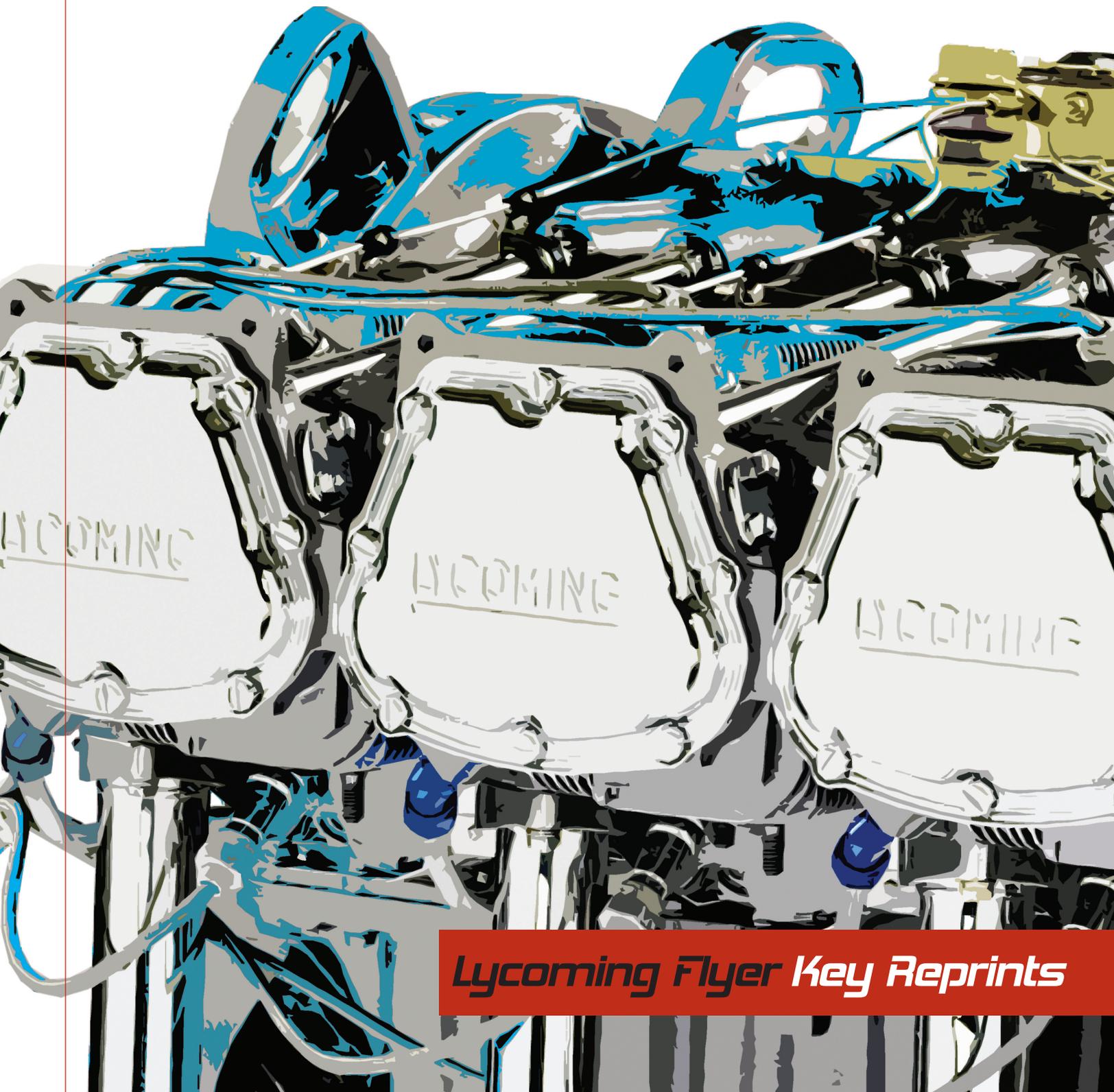


LYCOMING

A Textron Company

*A compilation of key maintenance and performance articles
taken from the former Lycoming "Flyer" Newsletter*



Lycoming Flyer Key Reprints



Flight Plans from Ian

Dear *Lycoming Flyer* Customer,

Our Key Reprints is one of Lycoming's many unique aspects that make our company special. For those who have been in aviation a long time and for those who are just discovering general aviation's wonders, fun, and excitement, you will quickly realize that our engines are truly living organisms. As with any living organism, better understanding and care of the product will ensure maximum performance for every flight and for the life of the engine.

For over 75 years Lycoming has been designing, testing, and assembling engines. As a company we have a body of knowledge about our products unparalleled in the industry. We thus have a responsibility to share this knowledge with you and hope you learn as much as possible about how our products work and the necessary care and feeding of each model. Lycoming's Key Reprints is our effort to continually share our best practices, key lessons, and engines systems knowledge to empower our customers.

Please enjoy Lycoming's Key Reprints. Read, learn, and build on your body of knowledge about how our engines live and breathe. To know more about our engines and how to care for them, will no doubt make better pilots and maintenance professionals around the world.

A fellow pilot,
Ian Walsh
Vice President & General Manager
Lycoming Engines

I N D E X

The articles contained herein are not intended to supersede manufacturers' service publications, instructions or manuals or any other official publications, but are provided in order to augment or explain in pilot's or mechanic's language these publications, as well as provide other supplemental helpful information for our customers and operators.

G E N E R A L

Facts About the Flyer and Key Reprints	6
Some Definitions of Terms	8
How to Get Lycoming Engine and Accessory Maintenance Publications	8
Determining Engine Condition of High-time Piston Power Plants	9
Questions Asked by Pilots and Mechanics	10
Definitions Applicable to TBO, Engine Replacement and Engine Rebuild	11
Oil Analysis	13
What is an Aerobatic Engine?	14
Low-compression Engine — Grade 100 Aviation Fuel	15
Fuel Contamination	17
Do Not Use Automotive Gasoline in Lycoming Aircraft Engines	17
Let's Talk Turbocharging	18
Information About Lycoming-approved, Full-flow Oil Filters	19
Detonation and Preignition	19
Nitriding — What is it?	20
Compression Ratio — An Explanation as it Relates to Lycoming Engines	21
“Watts” Horsepower	21
Cutaway of a Four-cylinder Power Plant	22
Your Engine and the Fixed-pitch Propeller	22
Induced Engine Damage	23
The Whistle Slot	25
Welding is not Recommended	26
Engine Balance	26
Fuel Injector or Carburetor	27
The “Same Engine” Myth	28
The Unfortunate Choice	29
Low-time Engine May Not Mean Quality and Value	30
In Search of Badly Behaving Baffles and Seals	31

OPERATIONS

Hard Facts About Engine Break-in	36
Leaning Lycoming Engines	36
Proper Leaning at Cruise Aids Safe Flight and Saves Dollars	39
Operating the Direct-drive Fixed-pitch Lycoming Engine	39
Operating Your Lycoming Engine at Takeoff and Climb	40
The Exhaust Gas Temperature (EGT) and Fuel Management	40
Landings and Takeoff from High-elevation Airports	42
Basic Power Sequence	43
An Explanation of Power Settings	43
Considerations for Low-power Low-RPM Cruise	44
Induction Icing	47
Cold-weather Operations	48
National Transportation Safety Board Warning on Simulated Engine-out Maneuvers	51
Importance of the Cylinder Head Temperature	51
More on Cylinder Head Temperature	52
Interpreting Your Engine Instruments	52
Engine Starting Suggestions	52
Use of Fuel Boost Pumps with Lycoming Engines	53
Avoid Sudden Cooling of Your Engine	53
Sticking Valves — Do Not Neglect the Warning Signs	54
Operational and Maintenance Procedures to Avoid Sticking Valves	55
Tips from the Hangar	56
The Pilot and Turbocharging	57
TBO Tradeoffs or Tips from Fred	61
Thieves of Aircraft Engine Power	62
Wet Air Effect on Engine Power	64
Frequency of Flight and Its Effect on the Engine	65
A Review of Old Wives' Tales	65
Spark Plug Fouling	66
Engine Instruments: To Believe or Not to Believe	66
Oil Flow — Screens, Filter, Cooler and Pressure Relief	67
Test Your Knowledge on Engines	69

MAINTENANCE

Mechanic's Creed	74
The Basics Of Maintenance in General Aviation	74
Ask About Reference Publications Before Your Engine is Taken Apart	75
Air Filter Maintenance	76
Oil and Your Engine	76
Oil and Filter Change Recommendations	77
More About Oil and Your Aircraft Engine	77
Maintaining Oil Levels of Wet Sump Engines	79
Tips for Changing Your Spin-on Oil Filter	79
Suggestions if Metal is Found in the Screens or Filter	80
Safety Tip — Sealant Use	81
Understanding Engine Color Codes	81
Reciprocating Engine Break-in and Oil Consumption Limits	81
Compression Check as a Maintenance Aid	84
Spark Plugs — Key To Smooth Engine Operation, I	85
Spark Plugs — Key To Smooth Engine Operation, II	86
Is Your Spark Plug Connector Overtorqued?	88
Why Rotate Spark Plugs?	88
Maintenance Suggestions From the Lycoming Service Hangar	89
Engine Hoses	90
Checking and Adjusting Dry Tappet Clearance on Lycoming Engines	90
Some Tips on the Lycoming O-235 Engine	91
Importance of the Correct Base Nut Tightening Procedure	91
Fuel Injector Nozzles Have Been Improved	92
Unauthorized Additions to Your Engine Can Cause Trouble	92
A Simple Check of Internal Engine Timing	93
Installation of Counterweight Rollers	93
Safety Notes	94
Engine Suggestions for Operators	94
Recommendations for Aircraft or Engine Struck by Lightning	94
Recommendation Regarding Use of Incorrect Fuel	95
Propeller Ground Strike or Sudden Stoppage Can Be Dangerous	95
Keep Your Direct-drive Engine Starter Clean to Avoid Trouble	95

Notes on Replacing Connecting Rods or Pistons	96
Does Your Nose Seal Leak?	96
Cam and Tappet Wear	97
Exhaust System Maintenance — Pay Now or Pay Later	98
High Time Cylinders	99
Top Overhaul?	99
Lycoming Model Codes for Reciprocating Engines	100

FREQUENTLY ASKED QUESTIONS

Lycoming Overhaul Engine FAQ	104
Lycoming Cylinder Kit FAQs	105
Lycoming Roller Tappet Technology FAQs	106
Lycoming-IO-390 FAQs	107
Lycoming-IO-580 FAQs	108

FACTS ABOUT THE FLYER AND KEY REPRINTS

Lycoming has been pleased and impressed by the number of requests for copies of the "Key Reprints" — pleased by your many favorable comments concerning it, and impressed by the thirst for knowledge by operators of General Aviation aircraft engines.

In the event a reader perceives a conflict between the content of these articles and the content of the current manuals, service bulletins or service instructions, the latter items govern, but the reader should contact Lycoming Service and bring such a conflict to our attention. The service bulletins and parts of the manuals are FAA approved; these articles are not.

Some of the articles published are based on information contained in Service Bulletins, Service Instruction, and Service Letters. In addition, other articles are taken from actual field test data carried on by Lycoming personnel. Furthermore, the Lycoming factory is a central collecting agency on its aircraft engines in the field. Experiences and information from all over the world provide feedback that is recorded and analyzed. We share this information with our readers in the Flyer and Key Reprints.

During the preparation process of each article and as each subsequent re-issue updating of information is part of the procedure. After articles are written, each one is carefully screened and checked by management, engineering and service personnel to ensure accuracy before being released for publication.

The Flyer does not have an established publishing date for each issue. The latest issue is Number 53.

The original concept of the Flyer has not changed since the first issue was published in 1964. Approximately 85% of the prepared text deals with technical information related to Lycoming engines, and the remaining 15% covers general newsworthy items. Distribution of the Flyer is made to owners and operators of Lycoming powered aircraft, authorized distributors and others who write us and request that we place them on our mailing list, with all costs of printing and mailing absorbed by Lycoming. It is the intention of Lycoming to continue to make available service, maintenance and operational data in the Flyer and Key Reprints to assist the owner and operator in improving their engine's performance and reliability.

STATEMENT OF COPYRIGHT

This material is copyrighted under the laws of various countries including the United States and Canada. No reproduction is authorized. Violation of copyright laws may render unauthorized copiers subject to penalties of up to \$50,000.00 per unauthorized copy.