

Midwest M20 Sales & Service  
R.R Box 193A  
Flora, IL 62839

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M1029-12  
Rev. A

## M20R & M20S – AFMS

### STC No. SA02193CH

## FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR MOONEY AIRCRAFT MODEL M20R&S  
MANUAL NUMBER – 003700 M20S  
MANUAL NUMBER – 003600 M20R

Aircraft Serial Number: 29-0455

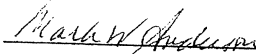
Registration Number: N667DL

1. General Section

This supplement must be attached to the FAA approved Flight Manual when the airplane is modified by the installation of a Hartzell PHC-J3YF-1RF/F7693DF (B)-2 propeller and A-2295-10(P) spinner in accordance with STC **SA02193CH**.

The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the FAA approved Airplane Flight Manual.

FAA APPROVED



~~/s/~~ Charles L. Smalley, Manager  
System & Flight Test Branch  
Chicago Certification Office  
ACE-115C, Federal Aviation Administration  
Des Plaines, IL 60018

Date: DEC 11 2006

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### LOG OF REVISIONS

Revision Number	Review	Affected Pages	Description of Revision	FAA Approved
IR	BWM	All	Initial Issue.	
A	BWM	All	Updated to latest flight test data	<i>Per [Signature]</i> <i>Acc-1172</i>

**NOTE: All changes are indicated by black vertical line along the left margin.**

Date: 8/21/14

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**DESCRIPTIVE DATA**

**Engine**

Number ..... 1  
Manufacture ..... Teledyne Continental Motors  
Model Number ..... IO-550-G modified per STCSE02930AT  
Optional Engine ..... IO-550-N  
Number of Cylinder ..... 6  
Displacement ..... 550 Cu. In (9014 cc)  
Maximum Continuous Power ..... 310 BHP  
Maximum Continuous RPM ..... 2700  
Maximum Recommended Cruise Power / RPM ..... 262 BHP / 2550 RPM

**Fuel System**

Type ..... Fuel Injection  
Make ..... TCM  
Fuel – Aviation Grade Gasoline ..... 100 Octane / 100LL  
Total Capacity ..... 95 U.S Gal. (359.6 Liters)  
Usable ..... 89 U.S Gal. (336.9 Liters)

**Engine Oil**

Oil Specification ..... MHS-24( )  
and as approved by TCM. Reference Engine Maintenance & Operators Manual  
All Temperatures ..... 15W50 or 20W50  
Above 30 ° F (-1° C) ..... SAE 50  
Below 50 °F (10 ° C) ..... SAE 30 or 10W30  
Total oil Capacity ..... 8 Qts. (7.57 liters)  
Oil Filter ..... Full Flow

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**Propeller**

Number ..... 1  
Manufacture ..... Hartzell  
Model Number ..... PHC-J3YF/F7693DF(B)-2  
Number of Blades ..... 3  
Diameter (Max.) ..... 76 in.  
(Min.) ..... 75 in.  
Type ..... Constant Speed  
Governor Model (McCauley) ... Hydraulically Controlled by Engine Oil  
Blade Angles @ 30.0 inch radius  
Low ..... 16.5 ±0.2 degrees  
High ..... 38.0 ±1.0 degrees

**Maximum Certificated Weight M20R&S**

Gross Weight ..... 3368 Lbs. (1528 Kg)  
Maximum Landing Weight ..... 3200 Lbs. (1452 Kg)  
Baggage Area ..... 120 Lbs. (54.4 Kg)  
Rear Storage ..... 10 Lbs. (4.5 Kg)  
Cargo (Rear Seat Folded Down) ..... 340 Lbs. (154.2 Kg)

2. **LIMITATIONS SECTION**

**NOISE LIMITS**

The certification noise level for the M20R and M20S modified in accordance with STC SA02193CH is 83.5 db(A). No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

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**POWER PLANT LIMITATIONS**

Propeller Manufacturer ..... Hartzell  
Propeller Hub/Blade Model Number .. PHC-J3YF-1RF/F7693DF (B)-2  
Number of Blades ..... 3  
Propeller Diameter: Hartzell  
    Min ..... 75 in.  
    Max ..... 76 in.

Engine Operating Limits for takeoff and Continuous Operations:

- Green Arc - Normal Operating Range ..... 2200 –2699 RPM
- Red Line – Maximum Limit ..... 2700 RPM
- Maximum Continuous Power ..... 310 BHP

Oil Flow @ max power ..... 150 / 160 Lbs/Hr

Propeller Operating Limits (Hartzell) ..... 2700 RPM's

**Note:** Engine modification in accordance with STC SE02930AT

**No other changes**

**3. EMERGENCY PROCEDURES SECTION**

**GLIDE**

The Hartzell propeller increases descent rate and decreases glide distance approximately 7%. When computing glide distances with the Hartzell propeller installed, "**SUBTRACT**" 7% to ground distance taken from the "MAXIMUM GLIDE DISTANCE MODEL M20R &M20S" charts.

**Propeller Overspeed**

Throttle.... AS REQUIRED to maintain RPM below 2700 RPM

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**4. NORMAL PROCEDURES SECTION**

- Takeoff  
Power ..... Full Throttle - 2700 RPM
- Climb (Cruise)  
Power ..... 2550 RPM  
Manifold Pressure ..... 24 Inches Hg.
- Climb (Best Rate) Vy  
Power ..... Full Throttle / 2700 RPM  
Airspeed ..... 105 KIAS
- Climb (Best Angle) Vx  
Power ..... Full Throttle / 2700 RPM  
Airspeed , Takeoff Speed at 50 Ft ..... 75 KIAS

**Note:** Engine modification in accordance with STC SE02930AT

**5. PERFORMANCE SECTION**

Performance with the Hartzell three-blade PHC-J3YF-1RF/F7693DF(B)-2 propeller installed is as follows:

- Takeoff Distance  
- Equal to or no less than AFM data
- Time – Fuel – Distance to Climb:  
- Equal to or no less than AFM data
- 100% Climb Performance  
- use M20R & M20S Chart for STC SA02193CH, page 10

**Caution:** Power settings, fuel consumption and endurance range should be computed using the M20R performance charts. Higher power settings of the M20R will result in an increase fuel consumption causing a reduction in endurance time.

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**6. WEIGHT AND BALANCE SECTION**

The three-blade Hartzell propeller is approximately 11 pounds heavier than the two-blade McCauley. The STC installation instructions contain information for revising the aircraft weight and balance data.

**7. SYSTEM DESCRIPTION**

PROPELLER

The propeller is a three-blade 76 inch constant-speed unit that features aluminum blades in an aluminum hub. The spinner is fabricated from aluminum alloy. A more detail description is found in Hartzell Manual 115N (Propeller Owner Manual).

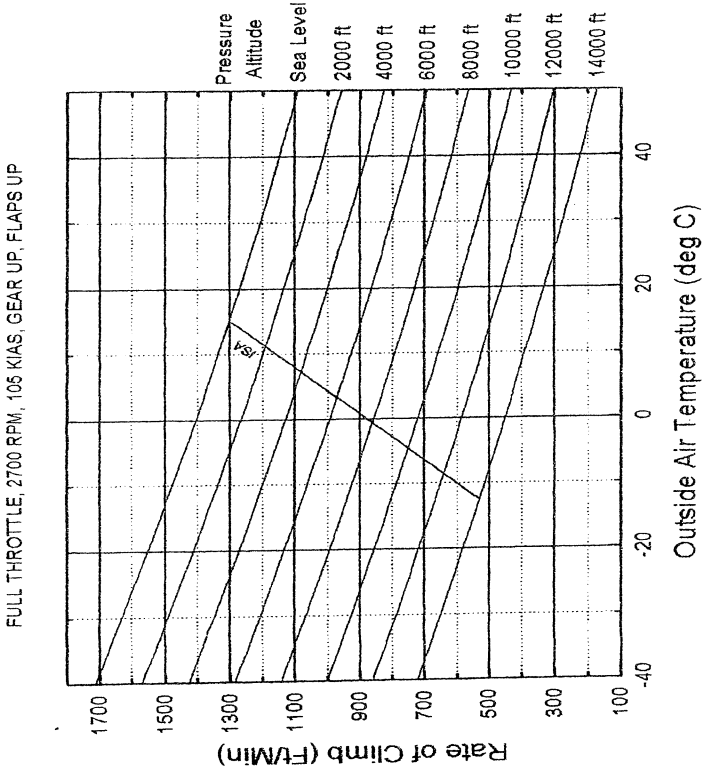
**7. HANDLING AND SERVICE**

Routine propeller servicing is described in the latest revision of Hartzell Manual 115N (propeller Owner Manual) provided with the propeller.

**Aircraft modified by STC SA02193CH is meets and or exceeds data presented.**

Date: 10/17/20

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**Caution: Higher power settings than those shown will result in an increase in fuel flows.**

**END**

Date: DEC 17 1980



**Midwest M20 Sales & Service**  
**STCSA02193CH**

**Mooney M20R & S 310 BHP**  
**Cruise Power Settings and Fuel Flow**

			260 BHP Max. Recommended Cruise			242 BHP 78% Power				217 BHP 70% Power				186 BHP 60% Power			
<b>RPM</b>			2550	2600	2700	2400	2550	2600	2700	2400	2550	2600	2700	2400	2550	2600	2700
Pressur e Altitude	Fuel Flow	Best Power	19.9	19.9	20.2	18.6	18.6	18.8	19.0	16.6	16.6	16.8	17.0	14.3	14.3	14.4	14.6
	Std. Temp		<b>MANIFOLD PRESSURE – INCHES OF MERCURY</b>														
Std. Day																	
SL	15C	59F	25.5	25.0	24.4	24.8	24.5	24.0	23.2	24.1	22.6	21.8	21.4	21.5	20.5	19.8	19.0
2000	11C	52F	24.8	24.5	23.8	24.4	23.8	23.4	22.7	23.2	21.8	21.2	21.0	21.0	20.1	19.4	18.6
4000	7C	45F	24.4	24.1	23.2	24.0	23.3	23.0	22.2	22.6	21.2	20.8	20.6	20.6	19.6	19.0	18.2
6000	3C	38F		24.0	23.0	23.6	23.1	22.6	22.0	22.2	20.6	20.5	20.4	20.1	19.2	18.6	17.9
7000	1.1C	34F			22.8		23.1	22.4	21.8	22.2	20.4	20.3	20.3	19.9	19.0	18.2	17.7
8000	-1C	31F						22.2	21.6	22.2	20.2	20.2	20.2	19.6	18.8	18.1	17.4
9000	-3	27F						21.2			20.2	20.1	20.2	19.3	18.5	17.9	17.2
10000	-5C	23F										20.0	20.2	19.1	18.3	17.7	17.0
12000	-9C	6F											19.7		17.9	17.3	16.6
14000	-13C	9F														16.9	16.2
16000	-17C	2F															15.8
18000	-21C	-5F															
20000	-25C	-12F															

**Best Power is 50° F Rich of Peak**  
**Fuel Flow is in Gal/HR**

WARNING ..... Use of this STC is subject to federal law 104-254 110stat.3256, section 403. Federal law prohibits use of the contents of this STC without permission or license from the owner Midwest M20 Sales & Service

# PREDICTED TAKEOFF DISTANCE - 10° FLAPS

## ASSOCIATED CONDITIONS:

Wing Flaps: 10°  
 Weight: 3368 (2700) LBS  
 Liftoff Speed: 66 (59) KIAS  
 Barrier Speed: 80 (74) KIAS

Runway: PAVED, LEVEL & DRY  
 Power: 2700 RPM  
 FULL THROTTLE  
 BEFORE BRAKE RELEASE

## EXAMPLE:

O.A.T.: 17° C Headwind: 5 Kt.  
 Pressure Altitude: 5000 Ft. Takeoff Gr Roll Dist: 1170 Ft.  
 Gross Weight: 3250 Lb. Takeoff Dist: 2530 Ft.

