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	SUBTITLE: Cessna 180G-H on Model 3400 Floats		REVISION: 1

**FAA APPROVED**

**SUPPLEMENTAL AIRPLANE FLIGHT MANUAL  
FOR  
CESSNA 180G-180H SERIES FLOATPLANES**

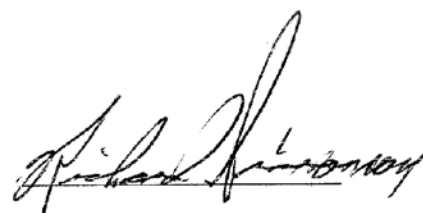
Equipped With AEROCET 3400 Amphibious Seaplane Floats

Registration No. \_\_\_\_\_

Serial No. \_\_\_\_\_

The information contained in this document is FAA approved material which must be applied together with the basic FAA approved airplane placards and markings and/or FAA approved Airplane Flight Manual. This supplemental manual must be carried in the airplane when it is modified by the installation of the Aerocet Model 3400 amphibious seaplane floats in accordance with Supplemental Type Certificate (STC) No. SA01257SE. The information contained in this document supersedes the basic airplane markings and placards and/or Flight Manual covered in the items contained herein. For Limitations, Procedures, and Performance information not contained in this supplement, consult the basic airplane markings and placards, and/or Flight Manual.

FAA Approved:



Manager, Special Certification Branch  
Seattle Aircraft Certification Office

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## **SECTION 1. GENERAL**

This supplemental manual, applicable to those Cessna Model 180G-180H Series airplanes equipped with Aerocet Model 3400 Amphibious Seaplane Floats, provides information and limitations not included in the basic FAA approved markings and placards, and/or Airplane Flight Manual. Whenever the words "Not Applicable" (NA) appear in this supplemental manual, they are used to indicate that the related information may not be the same as that shown in the Cessna markings and placards, and/or Flight Manual and are not required by the airplane certification basis and, therefore, should not be referenced. The aircraft is to be operated under the "NORMAL CATEGORY" only.

### **PERFORMANCE - SPECIFICATIONS**

SPEED: NA

CRUISE: NA

RATE OF CLIMB AT SEA LEVEL: EXCEEDS 590 FPM (CAR 3.85a)

SERVICE CEILING: NA

TAKEOFF PERFORMANCE ON WATER: NA

LANDING PERFORMANCE ON WATER: NA

TAKEOFF PERFORMANCE ON LAND: NA

LANDING PERFORMANCE ON LAND: NA

STALL SPEED (POWER OFF, FORWARD CG):

FLAPS UP:	56 KCAS	64 MPH CAS
FLAPS DOWN:	48 KCAS	55 MPH CAS

MAXIMUM WEIGHT:

RAMP or DOCK:	2975 LBS.
TAKE-OFF & LANDING:	2950 LBS.

EMPTY WEIGHT: SEE ACTUAL WT. & BALANCE FORM FOR AIRCRAFT

MAXIMUM USEFUL LOAD: REF. ACTUAL WT. & BALANCE FORM FOR A/C

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**PERFORMANCE – SPECIFICATIONS (cont'd)**

**BAGGAGE ALLOWANCE:**

IN AIRPLANE: NO CHANGE  
 IN EACH FLOAT 100 LBS.

(CAUTION: ASSURE CG RANGE IS PROPER WHEN LOADING)

WING LOADING: NA

POWER LOADING: NA

RANGE: NA

FUEL CAPACITY: NO CHANGE

OIL CAPACITY: NO CHANGE

ENGINE: NO CHANGE

PROPELLER: NO CHANGE

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## **SECTION 2. LIMITATIONS**

### **CENTER OF GRAVITY LIMITS:**

Center of Gravity Range: (inches aft of reference datum –front face of firewall)

(+40.0) to (+43.9) at 2950 lbs. Max. G.W.

(+35.0) to (+43.9) at 2125 lbs. or less with a straight line variation between points given.

### **WEIGHT LIMITS**

Maximum Ramp (Dock) Weight:	2975 lbs.
Maximum Takeoff Weight:	2950 lbs.
Maximum Landing Weight:	2950 lbs.
Maximum Weight in Baggage Compartment:	NO CHANGE
Maximum Weight in Float Baggage Compartment	100 lbs. each.

### **AIRSPPEED LIMITS**

	<b>KCAS</b>	<b>KIAS</b>	<b>MPH CAS</b>	<b>MPH IAS</b>
Never Exceed Speed (Vne)	No Change	No Change	No Change	No Change
Max Structural Cruising (Vno)	No Change	No Change	No Change	No Change
Max Maneuvering Speed (Va)	No Change	No Change	No Change	No Change
Max. Speed with Flaps (Vfe)	No Change	No Change	No Change	No Change
Max Ldg. Gear Operating Speed (Vlo)	118	120	136	138
Max Ldg. Gear Extended Speed (Vle)	148	150	170	172

**TAKEOFF WITH KNOWN HULL LEAK OR STRUCTURAL DAMAGE IS PROHIBITED.**

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## MANEUVER LIMITS

The maneuver limits defined in the basic handbook are applicable to the amphibian.

“Avoid slips with wing flaps extended”

## FLAP LIMITATIONS

Approved Takeoff Range:	0° to 20°.
Approved Runway Landing Range:	0° to 40°.
Approved Water Landing Range:	40°

NOTE: Wing flaps must be retracted to 20° immediately following power application for a balked landing go-around.

## AIR SPEED INDICATOR MARKINGS

The airspeed indicator markings are the same as shown in the basic markings/Flight manual. Due to differences in airspeed calibration and speeds with floats installed, the indicated stall speeds and maximum structural cruising speed vary slightly from airspeed indicator markings.

## PLACARDS

1. Aerocet P/N 35A-59330 Placard is located in plain view of the pilot:

### “EMERGENCY LANDING GEAR OPERATION

If electric driven hydraulic pump fails, use hand operated pump to retract and extend landing gear.

Land on sod if gear position is unknown.

**DO NOT LAND ON WATER UNLESS  
GEAR IS FULLY RETRACTED”**

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## PLACARDS (Cont'd)

2. Aerocet P/N 35A-59331 Placard is located near the emergency gear hand pump:

**“EMERGENCY HAND PUMP  
OPERATING INSTRUCTIONS**

1. Pull landing gear motor circuit breaker.
2. Move landing gear position switch to desired position.
3. Rotate emergency gear selector valve to desired position.
4. Pump emergency gear hydraulic pump until gear lights show for desired position and there is significant force on the pump handle.

Always keep gear selector valve in OFF position (detent engaged –handle pointed toward copilot seat) except for emergency operation.”

3. Aerocet P/N 35A-59332 Placard is located on the instrument panel:

**“IN FLOATPLANE, AMPHIBIAN AND SKIPLANE RETRACT  
FLAPS TO 20° IMMEDIATELY AFTER APPLYING POWER FOR  
BALKED LANDING GO-AROUND.”**

4. Aerocet P/N 35A-59333 Placard on inside of oil filler access door:

**“FLOATPLANE ONLY  
SEE BACK OF DIPSTICK  
FOR OIL LEVEL  
UPPER ‘X’ 12 QTS  
LOWER ‘X’ 9 QTS”**

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**PLACARDS (Cont'd)**

5. Aerocet P/N 35A-59334 Placard on instrument panel:

“IN FLOATPLANE, AMPHIBIAN AND SKIPLANE AVOID SLIPS WITH FLAPS EXTENDED.”

6. Aerocet P/N 35-70006 Placard is located on after part of console near water rudder handle in the "RETRACT" position:

"WATER RUDDER  
 ALWAYS UP  
 EXCEPT  
 WATER TAXIING"

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## **SECTION 3. EMERGENCY PROCEDURES**

Emergency procedures in the FAA approved airplane placards and/or Flight Manual generally apply except for airspeeds which may be different. Emergency landings on water should be done with water rudders up, aircraft slightly tail low on touchdown, and control wheel held full aft as the floatplane decelerates on the water. Emergency landings on land should be done with water rudders up, aircraft in a level attitude on touchdown, and the control wheel full aft after contact. If damage occurs to the floats causing compartments to flood, aggressively shift the weight (people & baggage) in the opposite direction of damage in order to balance the aircraft over the buoyant compartments.

## **EMERGENCY OPERATIONAL CHECKLISTS**

### **ENGINE FAILURE**

#### **ENGINE FAILURE DURING TAKEOFF RUN (ON WATER)**

1. Throttle -- IDLE.
2. Control Wheel -- FULL AFT.
3. Mixture -- IDLE CUT-OFF.
4. Ignition Switch -- OFF.
5. Master Switch -- OFF.

#### **ENGINE FAILURE DURING TAKEOFF RUN (ON LAND)**

1. Throttle -- IDLE.
2. Brakes - - APPLY.
3. Wing Flaps -- RETRACT.
4. Mixture - - IDLE CUT-OFF.
5. Ignition Switch - - OFF.
6. Master Switch -- OFF.

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## FORCED LANDINGS

### EMERGENCY LANDING ON WATER WITHOUT ENGINE POWER

1. Landing Gear -- UP.
2. Airspeed -- 73 KIAS (flaps UP).68 KIAS (flaps DOWN).
3. Mixture -- IDLE CUT-OFF.
4. Fuel Shutoff Valve -- OFF.
5. Ignition Switch - - OFF.
6. Master Switch - - OFF.
7. Water Rudders -- UP.
8. Wing Flaps -- AS REQUIRED.
9. Doors - - UNLATCH PRIOR TO APPROACH.
10. Touchdown -- SLIGHTLY TAIL LOW.
11. Control Wheel -- HOLD FULL AFT as amphibian decelerates.

### EMERGENCY LANDING ON LAND WITHOUT ENGINE POWER

1. Landing Gear - - UP on soft or rough ground. DOWN on firm and smooth ground.
2. Airspeed -- 73 KIAS (flaps UP).68 KIAS (flaps DOWN).
3. Mixture -- IDLE CUT-OFF.
4. Fuel Shutoff Valve -- OFF.
5. Ignition Switch -- OFF.
6. Master Switch -- OFF.
7. Water Rudders - - UP.
8. Wing Flaps - - AS REQUIRED (40° recommended).
9. Doors -- UNLATCH PRIOR TO APPROACH.
10. Touchdown -- LEVEL ATTITUDE (if gear is up). SLIGHTLY TAIL LOW (if gear is down).
11. Control Wheel -- FULL AFT (after contact if gear is up).
12. Brakes -- APPLY HEAVILY (if gear is down).



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## LANDING GEAR MALFUNCTION PROCEDURES

### LANDING GEAR FAILS TO RETRACT

1. Master Switch -- ON.
2. Landing Gear Handle - - CHECK (handle full up).
3. Landing Gear Motor Circuit Breaker - - IN.
4. Emergency Hand Pump Selector Valve -- CHECK (in off position – toward copilot seat)
5. Gear Relay Circuit Breaker - - IN.
6. Gear Advisory Circuit Breaker - - IN.
7. Gear Up Lights -- CHECK bulb operation (press-to-test).
8. Main Gear Visual Indicators - - VISUALLY CHECK (at float inspection openings).
9. Landing Gear Handle -- RECYCLE.
10. Landing Gear Motor -- CHECK operation (motor indicator light, ammeter, and noise).
11. Rotate the Emergency Hand Pump Selector Valve briefly into the UP position (this reduces pressure in the system allowing the pressure switches to sense low pressure allowing the pump to cycle)

If the landing gear still does not retract and a water landing is desired:

12. Landing Gear Motor Circuit Breaker - - PULL.
13. Landing Gear Handle -- UP.
14. Emergency Hand Pump Selector Valve -- ROTATE (to UP position – clockwise 90 deg).
15. Emergency Hand Pump -- PUMP (up and down until gear is in UP position - approximately 165 strokes -- there should be significant force on the pump handle with the final stroke).
16. Gear Up Lights - - CHECK ILLUMINATED.
17. Main Gear Visual Indicators - - VISUALLY CHECK (at float inspection openings). Nose gear - - VISUALLY CHECK (gear is nested in the bow of the float)

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## LANDING GEAR MALFUNCTION PROCEDURES

### LANDING GEAR FAILS TO EXTEND

1. Master Switch -- ON.
2. Landing Gear Handle - - CHECK (handle full down).
3. Emergency Hand Pump Selector Valve -- CHECK (in off position – toward copilot seat)
4. Landing Gear Motor Circuit Breaker - - IN.
5. Gear Relay Circuit Breaker - - IN.
6. Gear Advisory Circuit Breaker - - IN.
7. Gear Down Lights -- CHECK bulb operation (press-to-test).
8. Main Gear Visual Indicators - - VISUALLY CHECK (at float inspection openings).
9. Landing Gear Handle -- RECYCLE.
10. Landing Gear Motor -- CHECK operation (motor indicator light, ammeter, and noise).
11. Rotate the Emergency Hand Pump Selector Valve briefly into the DOWN position (this reduces pressure in the system allowing the pressure switches to sense low pressure allowing the pump to cycle)

If the landing gear still does not extend and a wheels down landing is desired:

12. Landing Gear Motor Circuit Breaker - - PULL.
13. Landing Gear Handle -- DOWN.
14. Emergency Hand Pump Selector Valve -- ROTATE (to DOWN position – counterclockwise 90 deg).
15. Emergency Hand Pump -- PUMP (up and down until gear is in DOWN position - approximately 230 strokes -- there should be significant force on the pump handle with the final stroke).
16. Gear Down Lights - - CHECK ILLUMINATED.
17. Main & Nose Gear Visuals - - VISUALLY CHECK (with mirrors & note that the up indicators on the mains are not visible at the float inspection openings).

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## GEAR UP LANDING (ON LAND)

1. Landing Gear - - CHECK UP (indicator lights and main gear latch fittings).
2. Runway -- SELECT longest smooth ground or grass surface available.
3. Wing Flaps -- 40° (on final approach).
4. Airspeed -- 63 KIAS.
5. Master Switch -- OFF.
6. Doors - - UNLATCH PRIOR TO TOUCHDOWN.
7. Touchdown - - LEVEL ATTITUDE.
8. Control Wheel - - FULL AFT (after contact).
9. Mixture -- IDLE CUT-OFF.
10. Fuel Shutoff Valve -- OFF.
11. Ignition Switch -- OFF.

## AMPLIFIED PROCEDURES

### MECHANICAL FAILURE

If it is ascertained that a mechanical failure has occurred and the gear will not achieve either a gear up or a gear down position with visual confirmation, the best course of action will be dependent upon the nature of the failure and the choices of landing surfaces available. In the unlikely event that a landing gear has failed in an intermediate position and cannot be moved to either a Gear Up or Gear Down position, the amphibian should **be landed on land only.**

### WARNING

**DO NOT** land in the water with the wheels either partially or fully extended. If the landing **MUST** be accomplished on water and the gear is partially or fully extended, it is suggested that a power-on full stall landing with full flaps (40°) would be the best procedure. Unlatch both cabin doors prior to touchdown. **During deceleration after touchdown, with the gear extended, the float bows will submerge and there is a high probability of flipping the amphibian onto its back causing either fatal or serious injury.**

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## **SECTION 4. NORMAL PROCEDURES**

(NOTE: THESE ITEMS SUPPLEMENT THE CESSNA NORMAL PROCEDURES- BE SURE TO FOLLOW THE CESSNA PROCEDURES EXCEPT AS NOTED BELOW)

### **BEFORE ENTERING FLOATPLANE**

1. Inspect the floats and attachment for dents, cracks, punctures, etc.
2. Remove rubber plugs (which serve as stoppers on the standpipe in each float compartment) and pump out any accumulation of water. Reinstall rubber stoppers with enough pressure for a snug fit. (If there is an excess of water, investigate the leakage - if there is red hydraulic fluid in any water, investigate fittings and lines in that bay before proceeding)
3. Landing Gear -- INSPECT. Check the main wheel oleo struts for proper inflation; check the tires for cuts, bruises and proper inflation.

#### **NOTE:**

Refer to placards on the main wheel oleo struts for strut inflation procedures. Proper tire inflation for 6.00-6 main wheel tires is 55 psi; tire inflation for the 10-3.50 nose wheel tires is 70 psi.

4. When checking engine oil level, use the side of the dipstick having two "X" marks. The lower mark indicates nine quarts and the upper mark indicates twelve quarts.
5. Inspect locker door latches – DETENTS ENGAGED, LATCHES TURNED CLOCKWISE TO STOPS.

#### **NOTE:**

An un-latched locker bay door will cause a howl and may bang against the float struts during flight. Aircraft should be returned to field in normal fashion to avoid potential damage, and to assess any possible problems. However, as with any situation, "FLY THE AIRCRAFT!" rather than make a rash decision. It is likely that little or no damage will occur to locker door.

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## BEFORE STARTING ENGINE

1. Landing Gear Handle – DOWN (amphibian on land), or UP (amphibian on water)
2. Water Rudder Operation – CHECK VISUALLY
3. Water Rudders – DOWN FOR TAXIING ON WATER – UP FOR TAXIING ON LAND
4. Water Rudders – CHECK FREEDOM OF MOVEMENT & SECURITY

## TAKEOFF

### TAKEOFF ON WATER

1. Landing Gear – UP
2. Landing Gear Blue Indicator Lights – CHECK ILLUMINATED
3. Water Rudders – UP (retraction handle aft)
4. Wing Flaps – 20 DEGREES" (second notch)
5. Control Wheel – HOLD FAR AFT INITIALLY
6. Power – FULL THROTTLE & MAX RPM (advance slowly)
7. Mixture – LEAN FOR HIGH DENSITY ALTITUDE
8. Control Wheel – MOVE FORWARD TO ATTAIN PLANING ATTITUDE
9. Control Wheel – APPLY LIGHT BACK PRESSURE TO LIFT OFF
10. Wing Flaps – UP AFTER OBSTACLES ARE CLEARED

### WARNING:

**Never attempt a takeoff without all four blue indicator lamps illuminated – any gear hanging down will drag the aircraft dangerously into an arc, compromising takeoff distances, and endangering the occupants.**

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## TAKEOFF ON LAND

1. Landing Gear – DOWN
2. Landing Gear Amber Indicator Lights – CHECK ILLUMINATED
3. Water Rudders – UP (retraction handle aft)
4. Wing Flaps – 20 DEGREES (second notch)
5. Power – FULL THROTTLE & MAX RPM (advance slowly)
6. Mixture – LEAN FOR HIGH DENSITY ALTITUDE
7. Control Wheel – APPLY LIGHT BACK PRESSURE TO LIFT OFF
8. Wing Flaps – UP AFTER OBSTACLES ARE CLEARED
9. Landing Gear – UP

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## BEFORE LANDING

### BEFORE LANDING ON WATER

1. Landing Gear -- UP.
2. Landing Gear Blue Indicator Lights -- CHECK ILLUMINATED.
3. **Visually check that nose gear are UP**
4. Water Rudders -- UP.
5. Wing Flaps -- 40°.

### BEFORE LANDING ON LAND

1. Landing Gear -- DOWN.
2. Landing Gear Amber Indicator Lights - - CHECK ILLUMINATED.
3. Water Rudders - - UP.
4. Wing Flaps -- 40°.

## LANDING

### LANDING ON WATER

1. Touchdown -- SLIGHTLY TAIL LOW.
2. Control Wheel -- HOLD FULL AFT as amphibian decelerates to taxi speed.

### AFTERLANDING – WATER RUDDERS DOWN

### LANDING ON LAND

1. Touchdown -- SLIGHTLY TAIL LOW.
2. Control Wheel - - EASE FORWARD to lower wheels gently to runway.
3. Braking -- MINIMUM REQUIRED



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## **BALKED LANDING**

RETRACT FLAPS TO 20 DEG. IMMEDIATELY AFTER APPLYING FULL POWER FOR GO-AROUND"

## **SECURING AIRPLANE**

"FUEL SELECTOR TO RIGHT OR LEFT TANK POSITION TO PREVENT CROSSFEEDING"

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## **SECTION 5. PERFORMANCE**

Airspeed Calibration – Essentially unchanged

### **STALL SPEEDS**

POWER OFF, FORWARD CG, 2950 LBS

FLAPS UP:	56 KCAS	64 MPH CAS
FLAPS DOWN (40 Deg).:	48 KCAS	55 MPH CAS

#### **NOTE**

ALTITUDE LOSS DURING STALL RECOVERY MAY BE AS MUCH AS 200 FEET.

### **CLIMB RATE**

EXCEEDS 590 FPM (CAR 3.85a)

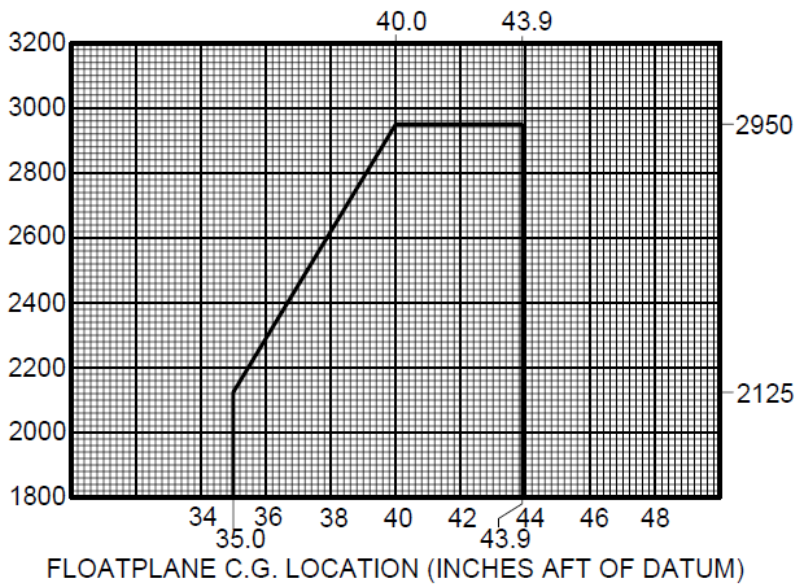
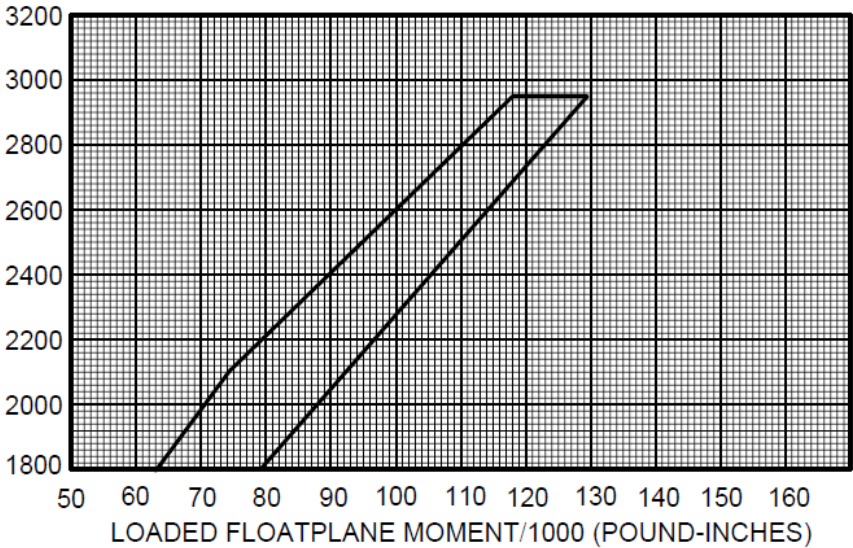
## **SECTION 6. WEIGHT AND BALANCE**

The airplane equipped with Aerocet 3400 amphibious seaplane floats must be loaded in accordance with the limitations in Section 2. These are shown as an aircraft weight/moment envelope or an aircraft weight versus c.g. location chart.

#### **Note:**

It is the responsibility of the airplane owner and pilot to insure that the airplane is loaded properly.

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## **SECTION 7. AIRPLANE AND SYSTEMS DESCRIPTIONS**

In addition to the Aerocet 3400 amphibious seaplane float installation the aircraft must incorporate the Cessna approved seaplane kit. As a result of these installations, the floatplane is identical to the landplane with the following exceptions:

### **AEROCET MODIFICATIONS**

Floats, incorporating a water rudder steering system, replace the landing gear. A water rudder retraction lever, connected to the water rudders by cables, is located on the cabin floor tunnel. A landing gear position indicating system including lights and audio advisory is installed.

### **CESSNA MODIFICATIONS**

1. An additional structural "V" brace is installed between the top of the front door posts and the cowl deck.
2. Additional fuselage structure is added to support the float installation.
3. A ventral fin is added for additional stability. This item must be removed before conversion back to a landplane.
4. The floatplane has additional corrosion proofing and stainless steel cables.
5. Hoisting provisions are added to the top of the fuselage.
6. The left-hand cabin door is equipped with removable hinge pins for ease of door removal when loading large cargo.
7. Fueling steps and assist handles are mounted on the forward fuselage, and steps are mounted on the wing struts to aid in refueling the floatplane. Inboard fuel fillers are added when long range fuel tanks are installed.

#### **NOTE**

A reduction of approximately five gallons of usable fuel in each tank will result if inboard fillers are used to fill the long-range fuel tanks.

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**CESSNA MODIFICATIONS (Cont'd)**

8. A drain line is added to the front of the induction air manifold.
9. Floatplane placards are added.

**NOTE:**

Refer to the appropriate Cessna Pilots Operating Handbook for other seaplane changes which apply to individual 180 models.

**NOTE:**

If the floatplane is returned to the landplane configuration, these items need not be removed apart from the ventral fin.

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## AMPHIBIOUS LANDING GEAR SYSTEM

The landing gear incorporated within the amphibious floats on this airplane is a retractable, quadricycle type with two full swiveling nose (or bow) wheels and two main wheels. Shock absorption is provided by air oil shock struts for the main gear and composite leaf springs for the bow gear. Each main wheel is equipped with a hydraulically-actuated disc-type brake.

Normal landing gear extension and retraction accomplished by hydraulic actuators for each gear. The hydraulic system is powered by a reversible, electrically-driven hydraulic pump located just forward of fuselage station 172. Hydraulic system fluid level should be checked every 25 hours of flight time by viewing the reservoir or its sight glass on the side of the pump. Fill to fill-line of reservoir or to within 1/2" of the top of the sight glass by removing the plug and using MIL-H-5606 hydraulic fluid. Hydraulic pump operation is initiated by moving the landing gear switch on the gear control unit to either the up or down position. The landing gear will travel to the position selected, cycling the electrically-driven hydraulic pump. The pump is shut off by pressure switches. When the pressure switch senses a certain amount of pressure in the hydraulic line, which the electric pump is forcing fluid through, it will send a signal to the motor relay shutting down the pump. The pressure increases at the end of operation when all the actuators have traveled to the end of their stroke. Eight position-indicator lights (four gear up and four gear down) are provided to show landing gear position. An additional indicator light shows that the landing gear pump motor is in operation. The landing gear system is also equipped with an emergency hand pump with a selector valve.

## LANDING GEAR HANDLE

The landing gear handle is an electrical switch mounted within a control unit on the instrument panel and has two positions (UP for gear up and DOWN for gear down) which give a mechanical indication of the gear position selected. From either position, the handle must be pulled out to clear a detent before it can be repositioned. Moving the handle to UP or DOWN will start the reversible, electrically-driven hydraulic pump in the selected direction of gear travel. Operation of the landing gear system will not begin until repositioning of the handle is complete.

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## INDICATOR LIGHTS

Eight indicator lights are mounted on the Landing Gear Advisory Unit adjacent to the landing gear handle. The four blue indicator lights, labeled WATER, (positioned respective to their location on the float, i.e. top left – front left gear) show by their illumination that the landing gear is up. The four amber indicator lights, labeled LAND, illuminate when the landing gear is down. Neither set of lights is illuminated when the landing gear is in transit. The single red indicator light, labeled PUMP, comes on when current is being supplied to the landing gear pump motor. If the motor continues running during flight or goes on and off repeatedly, the motor should be shut off by pulling the LANDING GEAR MOTOR circuit breaker, since continual running of the motor can result in premature motor failure. Prior to landing, the circuit breaker should be pushed in to reactivate the circuit. All the indicator lights can be dimmed for night operation using the dimmer knob on the Landing Gear Advisory Unit. An optional dash mounted remote light system is available to assure gear position. It incorporates two lights, one blue one for water landing (gear up) and an amber light for land landing (gear down). These lights flash when the landing gear is in transit to the desired position (ex. the blue light flashes when the gear is in transit to a gear up water landing position and then becomes a solid blue light when all the gear have reached their gear up positions). If an indicator light should fail to come on when pressed for testing, remove bulb for a new bulb or double check the circuit by interchanging a bulb from a lit indicator light. The WATER, LAND, and PUMP light circuits are protected by the Landing Gear Advisory circuit breaker and are therefore independent of the landing gear motor circuit and will function when using the emergency hand pump.

### NOTE:

**The pilot should always visually check the nose gear before attempting a water landing to assure himself that it is up regardless of lights. If the pull ram mechanically fails, it could travel and show a light but not be connected to the nose gear itself leaving the nose gear in the down position.**



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## AUDIO ADVISORY OPERATION

The Landing Gear Advisory Unit includes an audio output that is connected to an audio output source (i.e. radio or audio panel) for verbal pilot information regarding gear position. A static and pitot pressure source is connected to the Unit which determines airspeed. The Landing Gear Advisory Unit has a trigger point set at approximately 90 knots. This adjustment is set using a small, slotted screwdriver in the hole above the gear handle on the face of the Advisory. Clockwise is for increasing the trigger speed. As the airplane passes through this speed the system is armed. When the airplane slows back through this speed an audio voice will announce the position of the gear and what kind of landing it is suited for. With the gear up the message will say, "Gear up for water landing". With the gear down the message will say, "Gear down for runway landing". This message will continue and repeat itself until acknowledged by the pilot by canceling out the message either by the button on the optional dash mount or on the Landing Gear Advisory Unit itself. What does this look like? If the gear goes to a landing position and remains there **without** all four gear in place for a period of time beyond normal cycle time, the audio system will advise the pilot that the gear is unsafe with the following message: "Landing gear unsafe, check gear". The message will repeat until canceled. Upon operational start-up, the Landing Gear Advisory Unit will announce all three messages at once to indicate their availability and this should be canceled using the buttons provided.

### NOTE:

**It should be clearly noted that the audio advisory side of the Landing Gear Advisory Unit by Aerocet, Inc. does not alleviate the pilot's responsibility to visually check the location of the landing gear prior to landing, especially to assure the gear is up when making a water landing. Audio systems may be turned down or fail.**

### NOTE:

**The pilot should always visually check the nose gear before attempting a water landing to assure himself that it is up regardless of audio indication. If the pull ram mechanically fails, it could travel and show a light or give an audio indication but not be connected to the nose gear itself leaving the nose gear in the down position.**

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## LANDING GEAR OPERATION

To retract or extend the landing gear, pull out on the landing gear handle, and move it to the desired position. When the handle is positioned, electrical power is directed to one of two solenoid relays, which energize the reversible electric motor. The Emergency Hand Pump lever must be in the OFF position (handle pointed toward the copilot seat) in order for the electric pump to pump fluid. The electric motor powers the hydraulic pump and actuates two hydraulic gear actuators in each float in the appropriate direction. During operation of the landing gear motor, the “PUMP” indicator light is illuminated. When the hydraulic rams have enough resistance on them, typically by achieving full travel of the ram, pressure will build triggering the electric pressure switches that in turn activate the relays to turn the pump off. Proximity sensors are located on all four gear, feeding appropriate gear position to the Landing Gear Advisory Unit illuminating the appropriate (WATER or LAND) lights. Again, the pressure in the system turns the pump on and off, not the proximity sensors.

## EMERGENCY HAND PUMP SELECTOR VALVE & HAND PUMP

A three-position emergency hand pump selector valve combined with a single action hand pump is located between the crew seats to the left of the flap handle pivot point and is for use in the event the normal hydraulic system fails. The selector valve has three positions, labeled UP, DOWN, and OFF which points the handle toward the copilot seat. To select gear position with the emergency hand pump selector, rotate the handle to UP (clockwise 90 degrees) or DOWN (counterclockwise 90 degrees).

### NOTE:

**The emergency hand pump selector valve must be rotated to the OFF position (in a detent pointing toward the copilot seat) during normal system operation. If the selector valve is in any other position, it provides a by-pass for hydraulic pressure and the landing gear may not function properly.**

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## EMERGENCY HAND PUMP SELECTOR VALVE AND HAND PUMP (cont'd)

Prior to utilizing the emergency hand pump, pull the LANDING GEAR MOTOR circuit breaker to ensure deactivation of the electric hydraulic pump, then rotate the hand pump selector valve to the desired position (UP or DOWN). Actuate the hand pump up and down (Oildyne hand pump: approximately 230 strokes for extension and 165 strokes for retraction; Aerocet hand pump: approximately 103 strokes for extension and 96 strokes for retraction) until the landing gear reaches the selected position. When the gear reaches the selected position, the appropriate gear position indicator lights will illuminate and the hand pump should be pumped until there is significant force on the pump handle with the final stroke. For complete emergency procedures, refer to Section 3 of this supplement.

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## **SECTION 8. AIRPLANE HANDLING, SERVICE, AND MAINTENANCE**

### **INTRODUCTION**

Airplane handling, service, and maintenance in the basic handbook applies, in general, to the amphibian. The following recommended procedures apply specifically to amphibian operation. (Cleaning, servicing and maintenance of the amphibious floats should be accomplished as suggested in the Aerocet, Inc. 3400 amphibian Service and Maintenance Manual.)

### **MOORING**

Proper securing of the amphibian can vary considerably, depending on the type of operation involved and the facilities available. Each operator should use the method most appropriate for his operation. Some of the most common mooring alternatives are as follows:

1. The amphibian can be moored to a buoy, using a yoke tied to the forward float cleats, so that it will freely weathervane into the wind.
2. The amphibian can be secured to a dock using the fore and aft cleats of one float, although this method is generally not recommended unless the water is calm and the amphibian is attended.
3. The amphibian may be removed from the water (by use of a special lift under the spreader bars) and secured by using the wing tie-down rings and float cleats. If conditions permit the amphibian to be beached (with the landing gear retracted), ensure that the shoreline is free of rocks or abrasive material that may damage the floats.
4. The amphibian may be taxied from the water onto land if a hard surface ramp is available by extending the landing gear just prior to reaching the ramp area. The amphibian should then be tied down using procedures similar to the landplane.

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## BEACHING – HEELING IN

### (stern of the floats on the beach) or NOSING INTO SHALLOW GRADIENT WATER

The amphibian may be heeled into a beach, but with caution. Also use caution when beaching, nose in, at shallow shore gradients. The wheel well area can scoop sand, mud, rocks, or clay. A rock (deflector) shield is provided to help prevent the debris from collecting underneath the gear truck. If the plane is secured with the step area embedded in the sand, wave action can wash sand into the wheel well area. Clay or mud can also stick in this area posing a problem. This can reduce clearances, because of debris buildup, preventing the main gear truck from extending to the full gear down position. The main landing gear has tremendous leverage as it travels into its over-center position and can damage the float and gear truck if there is a restriction.

A method (no guarantees) of cleansing this area is proposed. With the gear still retracted, after leaving the beach, aggressively plow the floats to flush this area. This puts the plane at a high angle of attack and introduces water for flushing. Do this a couple of times and even go up on the step for a moment.

After washing the area and the airplane is at idle power lower the gear. Assure that all the amber lights illuminate, indicating gear down position is achieved. If a main gear light does not illuminate, proceed to inspect the problem. Ideally, finding a float dolly which will lift the floats out of the water with the gear retracted, will give opportunity to investigate the problem.

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## SERVICING

Service the airplane in accordance with the basic handbook. Special attention should be given to engine oil and landing gear servicing of the amphibian. Some of the following service information is contained in the basic handbook and is repeated here for your convenience.

### OIL

The oil dipstick is calibrated for both landplane and floatplane/ amphibian use. The floatplane/ amphibian side of the dipstick has two x marks. The lower mark indicates nine quarts and the upper mark indicates twelve quarts. When checking the oil level, take precautions to assure that you are using the correct calibrations for your airplane.

### AMPHIBIOUS LANDING GEAR

#### NOSE WHEEL TIRE PRESSURE:

70 PSI on 10-3.50, 4-Ply Rated Tires.

#### MAIN WHEEL TIRE PRESSURE:

55 PSI on 6.00-6, 8-Ply Rated Tires.

#### MAIN GEAR SHOCK STRUTS:

Keep filled with MIL-H-5606 hydraulic fluid and inflated with nitrogen to 350 PSI for main gear shock struts with no load.

#### HYDRAULIC FLUID RESERVOIR:

Check and service with MIL-H-5606 hydraulic fluid every 25 hours of flight time. Fill to fill-line of reservoir or to within ½" of the top of the sight glass by removing the plug and using MIL-H-5606 hydraulic fluid.

#### CAUTION:

**When servicing the landing gear system, the procedures and precautions contained in the Service and Maintenance Manual for Aerocet 3400 Amphibious Floats must be followed.**

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