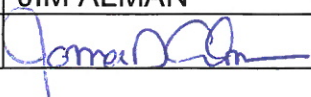


|                                                                                                                                                          |                                                                                   |                                                                                    |                |                                          |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------|------------------------------------------|--|
| P.O. Box 3149<br>Albany, GA 31706-3149<br>300 Old Pretoria Road<br>Albany, GA 31721<br>Phone: 229.883.1440<br>Fax: 229.439.970<br>www.thrushaircraft.com |                                                                                   |  |                | <b>ENGINEERING<br/>REPORT<br/>ER-511</b> |  |
| By:                                                                                                                                                      | ED RUSK, JR.                                                                      | FAA Project #                                                                      | Page: i        |                                          |  |
| Checked:                                                                                                                                                 | JIM ALMAN                                                                         | N/A                                                                                | Revision: IR   |                                          |  |
| Approved:                                                                                                                                                |  |                                                                                    | Date: 9/3/2013 |                                          |  |

# ENGINEERING REPORT

## ER-511

### S2R-T660 / T660DC

# TRAINING MANUAL

|           |               |           |                                         |       |                   |                |            |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |
| Page:     | <b>ii</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |

## LOG OF REVISIONS

| Rev.      | Page    | Description of Revision                                                       | By:                               |
|-----------|---------|-------------------------------------------------------------------------------|-----------------------------------|
| <b>IR</b> | ALL     | New Document Initial Release                                                  | Ed Rusk<br>9/3/2013               |
| <b>A</b>  | 28 – 29 | Added Chapter 8: Pilot Type Rating Requirements (Reference: FAR 61.31 [a][1]) | <i>Ed Rusk</i><br><i>11/25/13</i> |
|           | A1-A2   | Added Appendix A: S2R-T660 Aircraft Transition Course Syllabus                |                                   |
|           | B1-B7   | Added Appendix B: Model Turbo Thrush S2R-T660 Written Exam with answers       |                                   |
|           | C1      | Added Appendix C: Pilot Training Record Checklist                             |                                   |
|           | D1-D3   | Added Appendix D: Training Attendance Record.                                 |                                   |

|           |     |           |        |                                  |            |                |     |
|-----------|-----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |     | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | iii | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## TABLE OF CONTENTS

| Subject:                                                            | Page: |
|---------------------------------------------------------------------|-------|
| LOG OF REVISIONS .....                                              | ii    |
| TABLE OF CONTENTS.....                                              | iii   |
| PREFACE .....                                                       | iv    |
| CHAPTER 1: INTRODUCTION .....                                       | 1     |
| CHAPTER 2: AIRCRAFT SYSTEMS.....                                    | 2     |
| CHAPTER 3: OPERATIONAL PROCEDURES.....                              | 3     |
| CHAPTER 4: EMERGENCY PROCEDURES.....                                | 13    |
| CHAPTER 5: PERFORMANCE .....                                        | 16    |
| CHAPTER 6: HANDLING CHARACTERISTICS .....                           | 26    |
| CHAPTER 7: PILOT DOCUMENTATION .....                                | 27    |
| CHAPTER 8: PILOT TYPE RATING REQUIREMENT THRUSH AIRCRAFT, INC. .... | 28    |
| APPENDIX A: S2R-T660 AIRCRAFT TRANSITION COURSE SYLLABUS .....      | A1    |
| APPENDIX B: MODEL TURBO THRUSH S2R-T660 WRITTEN EXAM .....          | B1    |
| APPENDIX C: PILOT TRAINING RECORD CHECKLIST SHEET .....             | C1    |
| APPENDIX D: TRAINING ATTENDANCE RECORD.....                         | D1    |

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | iv | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **PREFACE**

This Manual was developed to establish a Training Program specific to the Thrush Aircraft S2R-T660 / S2R-T660DC aircraft. The Training Program meets the requirements of the United States of America Department of Transportation Federal Aviation Administration Exemption No. 9844 from the requirements of 14 CFR 61.31(a).

This manual is intended to serve as a supplement to the Approved Airplane Flight Manual (AFM) during training, and not as a stand-alone document. All information contained herein should be verified against the Approved AFM.

|           |        |           |                                  |       |            |                |     |
|-----------|--------|-----------|----------------------------------|-------|------------|----------------|-----|
| Report #: | ER-511 | Title:    | S2R-T660/-T660DC TRAINING MANUAL |       |            |                |     |
| Page:     | 1      | Revision: | A                                | Date: | 11/25/2013 | FAA Project #: | N/A |

## **CHAPTER 1: INTRODUCTION**

The systems of the Thrush Aircraft S2R-T660 / S2R-T660DC aircraft are similar to those systems found in other models of Thrush Aircraft. Differences may include:

1. Pratt & Whitney Canada PT6-60 series engine, rather than the -10, -20, -30 series engines found in other models.
2. 5-bladed reversible full-feathering Hartzell propeller, rather than the 3-bladed propeller found on other models.
3. Electric Rudder Trim

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 2 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## CHAPTER 2: AIRCRAFT SYSTEMS

The S2R-T660 / S2R-T660DC aircraft is typically equipped for Day and Night VFR flight. The following equipment comes standard from the factory:

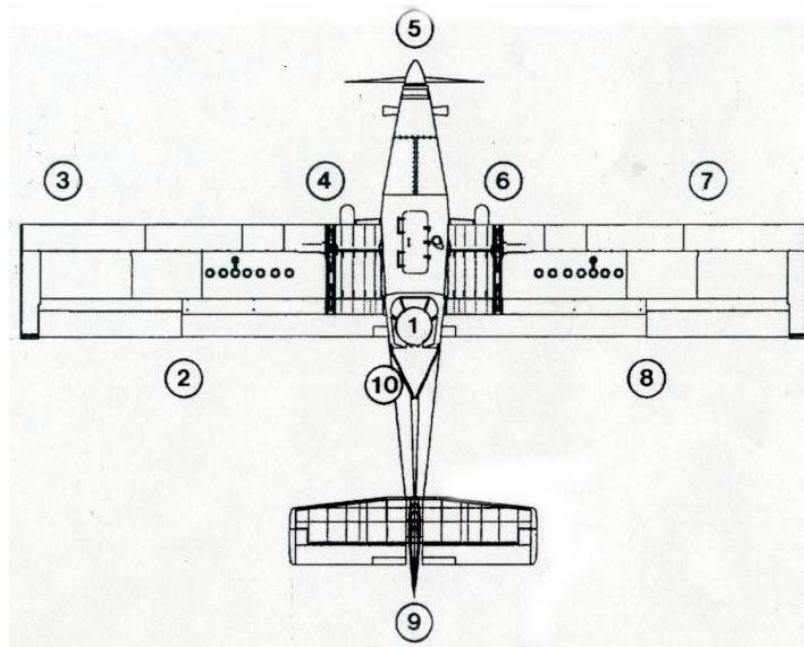
1. Basic flight instruments including, Airspeed Indicator, Altimeter, Fluid Compass, etc.
2. Electronics International MVP-50T Engine Monitoring System, which includes:
3. Stall warning system
4. Slip indicator
5. 24-volt electrical system
6. Handheld Fire Extinguisher
7. (Pilot comfort items, including cockpit air conditioning, bleed air cockpit heat, windshield washer and wiper systems.
8. Dispersal System includes: 3" plumbing, 710 gallon hopper, standard gate box for dry application or emergency dumping, booms and nozzles, either a standard chemical pump with Weathaero adjustable pitch fan or a standard chemical pump with electric fan brake.
9. Optional equipment includes: an electrically driven attitude indicator, various communication and navigation radios, GPS, transponder, audio panel, clock, night working lights, VSI, electric turn coordinator, light system for night VFR flight, and smoker.

Every aircraft is configured according to the customer's specification, so every aircraft is outfitted uniquely. Take time to familiarize yourself with your particular aircraft and its equipment.

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 3 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## CHAPTER 3: OPERATIONAL PROCEDURES

### EXTERIOR INSPECTION ROUTE



## VISUAL INSPECTION

### NOTE

Visually check the aircraft for general condition during the walk around inspection.

Verify that all camlocs on the skin panel are fastened. Remove all accumulations of frost, ice, or snow in cold weather from the wing, the tail, and the control surfaces.

If night flight is planned, check the operation of all lights and have a flashlight available.

### (POSITION) (1)

1. Ignition Switch – OFF
2. Power Lever – FORWARD IDLE STOP
3. Control Lock – REMOVE
4. Fuel Condition Lever – CUTOFF
5. Fuel Valve – ON
6. Parking Brake – TEST and SET
7. Battery Switch – ON
8. Fuel Quantity – CHECK each tank
- 8a. Battery Switch – ON

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 4 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

8b. Check Flap Operation – UP – DOWN - UP

9. Battery Switch – OFF

10. Elevator Trim Tab – SET for take-off (T.O. arc)

11. Oil Quantity – CHECK the dipstick and SECURE cap

11a. Fuel Quantity – CHECK visually and SECURE cap

#### **NOTE**

**Operate between 1 and 3 quarts below the maximum oil level mark on the oil dipstick.**

**(2)**

12. Wing Flap – CHECK for security

13. Spray Boom (if installed) – CHECK for leaks and security

14. Aileron – CHECK for free and correct Movement, aileron hinges – CHECK for looseness using a BRISK up and down motion.

*Use caution so as not to damage controls or stops.*

**(3)**

15. Wing Tip – CHECK for damage

16. Wing Leading Edge – CHECK for damage

17. Stall Vane – CHECK condition and freedom of movement

#### **NOTE**

**Keep the wing leading edge clean. An excessive build-up of dirt, bugs, and chemicals can have the same negative effect on lift as an accumulation ice and frost.**

18. Wing Tie Down – REMOVE

18a Spreader (if installed) CHECK for security of all attachments.

**(4)**

19. Left Wing Sump - DRAIN

20. Header Tank Sump – DRAIN

20a Left Fuel Vent Sump - DRAIN

21. Fuel Vent – CHECK for obstruction

22. Main Wheel Tire and Brake – CHECK for inflation, damage, and wear

23. Firewall Fuel Filter By-pass Indicator – CHECK

24. Firewall Fuel Filter – DRAIN

24a. Residual fuel reservoir (EPA tank) - DRAIN

25. Accessory Section – CHECK for debris, oil leaks, or any other irregularities

26. Oil Cooler – CHECK for leaks, stoppage, and flapper door for freedom of operation

27. Air Filter – CHECK for cleanliness and condition

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 5 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

**(5)**

- 28. Engine – CHECK for oil leaks, fuel leaks, loose fittings, cracked exhaust stacks, and excessive dirt or corrosion
- 29. Propeller – CHECK for spinner damage, oil, and grease leaks
- 30. Propeller – CHECK the propeller blades for nicks, cracks, or excessive erosion of the leading edge.
- 31. Dispersal Equipment (if installed) – CHECK the pump, the pump fan, hoses, the spreader, the mounting, etc., for security.
- 32. Wheel Chocks – REMOVE
- 32a Spreader (if installed) – CHECK for security of all attachments

**(6)**

- 33. Right Wing Sump – DRAIN
- 33a Right Fuel Vent Sump – DRAIN
- 34. Main Wheel Tire and Brake– CHECK for inflation, damage, and wear

**(7)**

- 35. Wing Leading Edge – CHECK for damage

#### **NOTE**

**Keeping the wing leading edge clean. An excessive build-up of dirt, bugs, and chemicals can have the same effect of lift as ice or frost build-up.**

- 36. Pitot Mast – CHECK for blockage of opening
- 37. Wing Tie Down –REMOVE
- 38. Wing Tip – CHECK for damage

**(8)**

- 39. Aileron – CHECK for free and correct movement
- 40. Aileron Hinges – CHECK for looseness by using a brisk up and down motion *(Use caution so as not to damage controls or stops.)*
- 41. Spray Boom (if installed) – CHECK for leaks and security
- 42. Wing Flap – CHECK for security
- 42a Fuel Quantity – CHECK visually and SECURE cap
- 42b Battery Vent – CHECK for obstruction
- 43. Static Port Opening – CHECK for blockage
- 44. Rudder Gust Lock (if installed) – REMOVE

**(9)**

- 45. Empennage – CHECK for condition
- 46. Struts – CHECK for tension and security
- 47. Tail Wheel Tire – CHECK for inflation, damage, and wear
- 48. Tail Wheel Spring – CHECK for condition

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 6 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

- 48a Tail Wheel Assembly – CHECK for condition
- 49. Rudder and Elevator – CHECK for freedom of movement and security
- 50. Elevator Trim Tabs – CHECK for near neutral position (Take-off) and excessive play
- 51. Tail Tie-Down – REMOVE
- 52. Static Port Opening – CHECK for blockage

**(10) FOR DUAL COCKPIT AIRCRAFT ONLY**

- 53. Rear Cockpit Area – CHECK and SECURE area

**BEFORE STARTING ENGINE**

- 1. Visual Inspection – COMPLETE
- 2. Seat – ADJUST
- 3. Rudder Pedals – ADJUST and LOCK
- 4. Seat Belt and Shoulder harness – ADJUST and LOCK
- 5. Altimeter – SET
- 6. Door Latches – CHECK
- 7. Parking Brake – SET
- 8. Propeller – CLEAR Area

**STARTING ENGINE**

- 1. Battery – ON
- 2. Power Lever – FORWARD IDLE STOP / BETA STOP
- 3. Propeller Lever – FEATHER
- 4. Fuel Condition Lever – CUT OFF
- 5. Fuel Valve – ON
- 6. Fuel Auxiliary Pump Switch – ON
- 7. Fuel Inlet pressure Indicator – CHECK 5 PSIG Minimum
- 8. Engine Starter Switch – ON  
(*The minimum engine speed to obtain satisfactory ignition is 13% Ng.*)
- 9. After approximately 5 seconds of motoring at a stabilized gas generator speed above 13%
  - a) MOVE Ignition Switch to ON Position
  - b) MOVE the Fuel Condition Lever to the Ground Idle Position
- 10. OBSERVE that the engine accelerates normally to idle RPM and that the maximum allowable inter-turbine starting limit is not exceed.

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 7 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |



**Whenever the gas generator fails to ignite within 10 Seconds after moving the Fuel Condition Lever to the Ground Idle Position;**

- 1. Move the Fuel Condition Lever to the cut off position, and**
- 2. Move the starter and ignition switches to the off positions.**

**Allow a 30 Second fuel draining period that is followed by a 15 SECOND DRY MOTORING RUN before attempting another star. If for any reason a starting attempt is discontinued, allow the engine to come to a complete stop and then accomplish a dry motoring run. See the following Section – DRY MOTORING RUN.**

11. Engine Starter Switch and Ignition Switch – OFF
12. Oil Pressure – CHECK 85 PSIG Minimum
13. Fuel Auxiliary Pump – OFF
14. Fuel Pressure from Engine Driven Pump – CHECK 5 PSI Minimum
15. Generator – ON and CHECK charging normally

## **DRY MOTORING RUN**

The following procedure is used to clear an engine at any time when it is deemed necessary to remove internally trapped fuel and vapor or when there is evidence of a fire within the engine.

Air that passes through the engine serves to purge fuel vapor, or fire from the combustion sections, the gas generator turbine, the power turbine, and the exhaust system.

1. Fuel Condition Lever – CUT OFF
2. Ignition Switch – OFF
3. Master Switch – ON
4. Fuel Valve – ON
5. Fuel Auxiliary Pump Switch – ON to provide lubrication for the engine driven fuel pumping element
6. Engine Starter Switch – ON

### **WARNING**

**If the fire should persist as indicated by the sustained interturbine temperature, close the fuel system shutoff valve immediately and continue motoring.**

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 8 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

7. Maintain the starter operation for the desired duration. The maximum starter duration is 3 minutes.
8. Engine Starter Switch – OFF
9. Fuel Auxiliary Pump Switch – OFF
10. Fuel Valve – OFF
11. Battery Switch – OFF
12. Allow a 5-minute cooling period for the starter before going any further with the starting operation.

## **TAXI**

1. Propeller lever – against feather latch (See Page I-7 for Propeller Ground Operation Limits)
2. Utilize Beta Region of the throttle quadrant for taxiing.
3. Push stick full forward to unlock the tail wheel.

## **BEFORE TAKE-OFF**

**Before proceeding with a ground run-up, be sure that the propeller system is purged, by feathering the propeller once or twice with the Power Lever in the Idle Position.**

The following procedures should be used to check the Propeller Overspeed Governor:

1. PLACE the propeller lever in full increase RPM position (*forward*)
2. INCREASE the RPM with the power lever to at least 1700 RPM.
3. MOMENTARILY EXERCISE the prop test switch and NOTE a small decrease in the RPM (1598 +/- 20). This checks the prop overspeed governor.

**CAUTION**

**HOLD the Elevator Control firmly FULL AFT during all high power ground operation to keep the airplane from nosing over.**

4. Flight Controls – CHECK free and full travel
5. Elevator Tab – SET for take-off
6. Flaps – SET as required
7. Fuel Condition Lever – SET flight idle and CHECK 69% Ng ( $\pm 1\%$ )
8. Fuel Auxiliary Pump – ON
9. Ignition Switch – ON
10. Rudder Trim – SET for take-off

|           |   |           |        |                                  |            |                |     |
|-----------|---|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |   | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 9 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

11. Prior to any flights, apply take-off power and read the filter condition indicator. If the needle enters the red arc, do not fly until the filter element has been cleaned.

## **TAKE-OFF**

1. Brakes – RELEASE
2. Power Lever – ADVANCE, but DO NOT EXCEED the engine operational limitations. *(See the Limitations Section)*
3. After take-off ACCELERATE to the best-rate-of-climb airspeed of 117 mph IAS, for flaps down.

## **CLIMB**

1. MAINTAIN maximum continuous power.
2. Flaps – RETRACT
3. Establish the Best Rate of Climb Airspeed of 122 MPH IAS with Flaps Up
4. Fuel Auxiliary Pump – OFF
5. Ignition Switch – OFF

## **GLIDE AND APPROACH**

1. Fuel Condition Lever – SET flight idle
2. Prop Control – SET full high RPM
3. Fuel Auxiliary Pump – ON
4. Ignition Switch – ON
5. Flaps – SET as required

## **GO AROUND**

1. Power Lever – INCREASE to the take-off setting
2. Flaps – RETRACT after positive rate of climb has been established
3. Airspeed – MAINTAIN the best-rate-of-climb speed of 122 MPH IAS with Flaps Up

## **LANDING**

1. Airspeed on Final – MAINTAIN 82 MPH with hopper empty
2. Wing Flaps – SET 15 degrees
3. Touchdown – Main Wheels

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 10 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

4. Landing Roll - LOWER tail smoothly and CLOSE the throttle
5. Propeller – REVERSE; reverse may be used after the tail is on the ground.  
*(To use Reverse Thrust; LIFT the Reverse Gate on the Power lever and MOVE the Power Lever smoothly into reverse. The tail wheel should be locked during all the reverse operation.)*

#### **NOTE**

**The tail wheel should not be unlocked prematurely. A crosswind or the initiation of a turn could cause loss of control.**

6. Brakes – USE as necessary

### **AFTER CLEARING THE RUNWAY**

1. Wing Flaps – RETRACT
2. Fuel Auxiliary Pump – OFF
3. Ignition Switch – OFF
4. Fuel Condition Lever – MOVE to ground idle position
5. Propeller lever – against feather latch (See Page I-7 for Propeller Ground Operation Limits)

### **ENGINE SHUTDOWN**

1. Parking Brake – SET
2. Power Lever – IDLE

#### **NOTE**

**Allow the engine to stabilize for a minimum of one minute below 650 degrees ITT maximum.**

3. Propeller Lever – FEATHERED
4. Fuel Condition Lever – CUT OFF
5. P-3 Heater Switch – OFF
6. Battery Switch – OFF
7. Generator Switch – OFF

#### **NOTE**

**During the shutdown be sure that the compressor decelerates freely.**

**WARNING**

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 11 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

**If there is any evidence of a fire within the engine after shutdown, proceed immediately as described in the Dry Motoring Run Section.**

## **SECURING THE AIRCRAFT**

1. Parking Brake – RELEASE and INSTALL the wheel chocks
2. Control Lock – ENGAGE
3. Wing Tie-Downs and Tail Tie Down – SECURE
4. While the aircraft is unattended, be sure that the propeller is tied down to prevent windmilling with zero oil pressure.

## **FOR AIRCRAFT WITH TRANSLAND HYDRAULIC FIREDOOR INSTALLED P/N: 25151**

### **FIRE DOOR OPERATING PROCEDURES**

#### **NOTE**

**To prevent failure codes from appearing on the computer, ensure the Hydraulic Arm switch is in the OFF position prior to turning on the computer.**

1. Battery - ON
2. Hydraulic Arm Switch - OFF
3. Fire Door Computer - ON
4. Check system indication – Should read “70”

#### **NOTE**

**If system indicates, “81,” the Hydraulic Arm Switch has been left on.**

5. If “70” is indicated, depress door opening switch on the pilots control stick. This will activate the system to normal operation.

#### **NOTE**

**If the number 82 appears when the door opening switch on the pilots control switch is depressed, this indicates a failure or short in the opening switch. The computer considers the “82” warning as a critical error, and will suspend all other operations until it is cleared.**

6. Select operating Mode
7. Set – Level

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 12 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

8. Depress Switch on Pilots Stick for operation.

## **MANUAL OPERATION**

1. The system is equipped with a manual switch that does not operate through the computer. This switch is intended for maintenance and ground operation only, such as calibration. To open door – place switch in open position momentarily. To close door – place switch in close position momentarily.

**CAUTION**

The manual switch should only be used momentarily to prevent system damage.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 13 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **CHAPTER 4: EMERGENCY PROCEDURES**

### **GROUND ENGINE FIRE**

See Dry Motoring Run in Section II.

### **ENGINE FIRE IN FLIGHT**

1. Power Lever – IDLE POSITION
2. Propeller Lever – FEATHERED
3. Fuel Condition Lever – CUT OFF POSITION
4. Fuel Auxiliary Pump Switch – OFF
5. Fuel Valve – OFF

### **ENGINE SHUTDOWN IN FLIGHT**

1. Propeller Lever – FEATHERED
2. Fuel Condition Lever – CUT OFF POSITION
3. Fuel Auxiliary Pump Switch – OFF
4. Fuel Valve – OFF
5. Power Lever – IDLE POSITION

### **ENGINE FLAMEOUT**

The indications of any engine flameout will be a drop in the inter-turbine temperature, a drop in the torque pressure, and a drop in RPM. The flameout may result from the engine running out of fuel or possibly caused by an unstable engine operation. Once the fuel supply has been restored to the engine or the cause of the unstable operation eliminated, the engine may be restarted in the manner described under Air Starts on the Page III-2.

### **NORMAL AIR STARTS**

#### **NOTE**

**Air Start Envelope – Normal Air Starts ranging from sea level to 12,000 feet altitude and above 148-MPH IAS have been approved.**

### **PRE-AIR START CHECK**

1. Propeller Lever – ANYWHERE IN THE OPERATING RANGE.

#### **NOTE**

**Propeller feathering is dependent on circumstances and is at the discretion of the pilot.**

**Fine pitch selection will pump air through the engine, and; therefore increase the gas generator motoring speed during the Air Start procedure.**

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 14 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

2. Power Lever – IDLE
3. Master Switch – ON
4. Fuel Valve – ON
5. Fuel Condition Lever – CUT OFF
6. Fuel Auxiliary Pump Switch – ON
7. Fuel Pressure Indicator – 5 PSIG minimum

## **AIR START PROCEDURE**

1. Starter Switch – ON, The minimum gas generator RPM to obtain satisfactory ignition is 13% Ng.
2. Engine Ignition Switch – ON
3. Fuel Condition Lever – GROUND IDLE POSITION after approximately five seconds of stabilized gas generator speed.

### **NOTE**

**A relight normally should be obtained within 10 Seconds and will be noted first by a rise in gas generator RPM. A rise in the inter-turbine temperature will also be noted.**

The following should be carried out when the engine reaches Idle RPM:

1. Engine Starter and Ignition Switches – OFF
2. Propeller Lever – INTO OPERATING RANGE
3. Power Lever – ADJUST to desire position
4. Fuel Condition Lever – FLIGHT IDLE
5. CHECK that the Engine Operating Limits are not exceeded. If a satisfactory Start is not obtained discontinued the air start. If another starting attempt is to be made, repeat the engine air start procedure.

### **NOTE**

**The best air start technique is to initiate the restart procedure immediately after a flameout occurs, if the pilot is certain that the flameout was not the result of some malfunction which might make the attempt to restart dangerous. There is always the chance that the engine may restart successfully just as soon as the ignition is turned on. In a flameout situation, move the igniter switch to the on position as quickly as possible, if the gas generator speed has not dropped below 58%. Under these circumstances it is not necessary to move the fuel lever or feather the propeller. However, the power lever should be returned to the idle position.**

## **ELECTRICAL FIRE IN FLIGHT**

1. Battery Switch and Generator Switch – OFF
2. All other Electrical Switches – OFF
3. Circuit Breakers – CHECK to identify faulty circuit, if possible.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 15 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

If electrical power is essential for the flight, try to identify and isolate the faulty circuit by doing the following:

1. Generator Switch – ON
2. If the Generator Switch is defective, MOVE the Generator Switch to the OFF position and then MOVE the Battery Switch to the ON position. Let a short period of time elapse before activating additional circuits one at a time until the defective circuit is identified.
3. Defective Circuit – OFF

## **EMERGENCY EGRESS**

If it is necessary to remove the cockpit door from its hinges, do the following:

1. KNOCK OUT the oval panel below the window.
2. REACH through the hole and PULL UP the flexible hinge pin.
3. PUSH the door clear of the aircraft and EXIT.

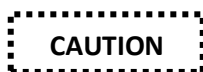
## **FOR DUAL COCKPIT AIRCRAFT:**

If it is not desired to release the door from its hinges while exiting the aircraft in the normal manner, proceed with the following:

1. The front cockpit door must be closed in order for the rear occupant to exit the aircraft.
2. The rear occupant can exit by using the step in the left side of the fuselage below the front door.

## **GENERATOR FAILURE**

1. RESET Generator
2. If Generator is not restored, accomplish the following:
  - a. Air Conditioner OFF
  - b. **All other nonessential electrical equipment OFF**



**If Generator Fails, Air Conditioner must be turned off to ensure  
30 minutes of Battery Power**

## **FOR AIRCRAFT WITH TRANSLAND HYDRAULIC FIRE DOOR INSTALLED P/N: 25151**

## **EMERGENCY DUMPS**

If Hydraulic Door fails to open:

1. PULL – Hydraulic Dump Valve Cable Handle
2. Activate Standard Dump Handle.

|           |               |           |                                         |       |                   |                |            |  |  |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|--|--|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |  |  |
| Page:     | <b>16</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |  |  |

## CHAPTER 5: PERFORMANCE

### POWER OFF STALL SPEEDS

The variation of power-off stall speeds with bank angle, flight configuration and airplane weight is shown below for the flaps up and flaps 15 degrees configurations.

### ASSOCIATED CONDITIONS

|                     |                                 |                                 |
|---------------------|---------------------------------|---------------------------------|
| Power               | Off                             |                                 |
| Configuration       | <u>Clean</u>                    | <u>T.O./Landing</u>             |
| Wing Flaps          | 0 Degrees                       | 15 Degrees                      |
| Dispersal Equipment | Std. Spray or<br>Large Spreader | Std. Spray or<br>Large Spreader |
| Stall Entry Rate    | Uniformly Decreasing            |                                 |
| Gross Weight        | 14,150 pounds                   |                                 |

### POWER OFF STALL SPEEDS – MPH (IAS)

|                   |                        |                         |
|-------------------|------------------------|-------------------------|
| <u>Bank Angle</u> | <u>Flaps-0 Degrees</u> | <u>Flaps-15 Degrees</u> |
| 0                 | 94                     | 90                      |
| 30                | 101                    | 97                      |
| 60                | 133                    | 127                     |

### SPEED FOR BEST RATE-OF-CLIMB

Flaps 0 Degrees - 122 MPH IAS

Flaps 15 Degrees - 117 MPH IAS

### AIRSPEED CALIBRATION MPH

|                  |     |    |     |     |     |     |     |     |     |
|------------------|-----|----|-----|-----|-----|-----|-----|-----|-----|
| FLAPS 0 DEGREES  | IAS | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 221 |
|                  | CAS | 82 | 102 | 122 | 142 | 161 | 181 | 201 | 222 |
| FLAPS 15 DEGREES | IAS | 80 | 100 | 120 | 140 | 156 |     |     |     |
|                  | CAS | 82 | 102 | 122 | 142 | 154 |     |     |     |

|           |               |           |                                         |       |                   |                |            |  |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|--|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |  |
| Page:     | <b>17</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |  |

## TAKEOFF DISTANCE ~ FEET

### INTERNATIONAL STANDARD ATMOSPHERE

| OAT<br>(°C) | TAKEOFF DISTANCE - FT |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |
|-------------|-----------------------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|
|             | SL                    |        | 1000     |        | 2000     |        | 3000     |        | 4000     |        | 5000     |        | 6000     |        | 7000     |        | 8000     |        | 9000     |        | 10000    |        |
|             | Gnd Roll              | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' | Gnd Roll | To 50' |
| -32         | -                     | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | 3335     | 6550   | 3564     | 7094   |
| -28         | -                     | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | 3003     | 5801   | 3211     | 6265   | 3430     | 6773   | 3667     | 7348   |
| -24         | -                     | -      | -        | -      | -        | -      | -        | -      | -        | -      | 2720     | 5192   | 2890     | 5554   | 3090     | 5994   | 3302     | 6474   | 3527     | 7003   | 3771     | 7607   |
| -20         | -                     | -      | -        | -      | -        | -      | 2467     | 4666   | 2628     | 4996   | 2791     | 5342   | 2973     | 5735   | 3177     | 6190   | 3394     | 6887   | 3626     | 7246   | 3925     | 8110   |
| -16         | 1571                  | 2780   | 2242     | 4217   | 2379     | 4487   | 2534     | 4803   | 2695     | 5139   | 2862     | 5494   | 3057     | 5919   | 3265     | 6389   | 3486     | 6906   | 3775     | 7727   | 4105     | 8788   |
| -12         | 2169                  | 4073   | 2298     | 4326   | 2443     | 4617   | 2602     | 4942   | 2763     | 5283   | 2940     | 5661   | 3140     | 6106   | 3353     | 6593   | 3618     | 7304   | 3936     | 8297   | -        | -      |
| -8          | 2222                  | 4177   | 2355     | 4439   | 2508     | 4749   | 2668     | 5080   | 2832     | 5429   | 3020     | 5837   | 3225     | 6297   | 3466     | 6905   | 3777     | 7852   | 4118     | 9035   | -        | -      |
| -4          | 2276                  | 4282   | 2416     | 4563   | 2573     | 4882   | 2733     | 5219   | 2903     | 5581   | 3100     | 6016   | 3328     | 6572   | 3627     | 7452   | 3953     | 8541   | -        | -      | -        | -      |
| 0           | 2329                  | 4388   | 2479     | 4690   | 2637     | 5016   | 2799     | 5358   | 2979     | 5749   | 3196     | 6262   | 3483     | 7084   | 3796     | 8092   | -        | -      | -        | -      | -        | -      |
| 4           | 2387                  | 4505   | 2541     | 4817   | 2700     | 5149   | 2865     | 5500   | 3086     | 6040   | 3345     | 6742   | 3648     | 7689   | -        | -      | -        | -      | -        | -      | -        | -      |
| 8           | 2447                  | 4626   | 2605     | 4947   | 2763     | 5283   | 2970     | 5783   | 3220     | 6457   | 3506     | 7322   | 3829     | 8452   | -        | -      | -        | -      | -        | -      | -        | -      |
| 12          | 2507                  | 4748   | 2665     | 5075   | 2862     | 5547   | 3106     | 6206   | 3377     | 7009   | 3679     | 8023   | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      |
| 16          | 2568                  | 4872   | 2764     | 5342   | 2999     | 5970   | 3260     | 6734   | 3549     | 7688   | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      |
| 20          | 2665                  | 5134   | 2893     | 5735   | 3145     | 6461   | 3425     | 7372   | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      |
| 24          | 2785                  | 5499   | 3030     | 6197   | 3303     | 7071   | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      |
| 28          | 2919                  | 5948   | 3182     | 6778   | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      | -        | -      |
|             |                       |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |
|             |                       |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |          |        |

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL / BLADES)  
ASSOCIATED CONDITIONS  
POWER ...  
CONFIGURATION  
WING FLAPS ...  
DISPERSAL EQUIPMENT ...  
GROSS WEIGHT ...  
RUNWAY ...  
WIND ...  
REVERSE THRUST ...  
CALIBRATED AIR SPEED AT 50 FEET ...

PT6A-60AG, PT6A-45 Series  
HC-B5MP-3C / M-10876  
  
TAKEOFF  
  
15°  
STANDARD SPRAY  
14150 LB  
LEVEL HARD SURFACE  
ZERO  
NONE  
1.2 Vs = 110 MPH

NOTE:  
FOR COLD ATMOSPHERE CONDITIONS BELOW – 16°C USE THE DATA FOR THE COLDEST TEMPERATURE SHOWN IN THE TABLE.

NOTE:  
THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:  
ENGINE (PRATT & WHITNEY) PT6A-67AG  
PROPELLER (HARTZELL HUB MODEL AND BLADES) HC-B5MA-3D / M11276NS  
PT6A-67AG

|           |               |           |                                         |       |                   |                |            |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |
| Page:     | <b>18</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |

## TAKEOFF DISTANCE ~ FEET

### INTERNATIONAL STANDARD ATMOSPHERE

#### TAKE OFF DISTANCE - FT

| OAT<br>(°C) | SL          |        | 1000        |        | 2000        |        | 3000        |        | 4000        |        | 5000        |        | 6000        |        | 7000        |        | 8000        |        | 9000        |        | 10000       |        |
|-------------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|
|             | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' | Gnd<br>Roll | To 50' |
| -32         | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | 2394        | 4612   | 2560        | 4974   | 2738        | 5376   |
| -28         | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | 2160        | 4118   | 2304        | 4421   | 2464        | 4764   | 2635        | 5138   | 2817        | 5567   |
| -24         | -           | -      | -           | -      | -           | -      | -           | -      | 1960        | 3705   | 2087        | 3963   | 2218        | 4239   | 2371        | 4563   | 2535        | 4918   | 2710        | 5308   | 2897        | 5761   |
| -20         | -           | -      | -           | -      | 1776        | 3342   | 1891        | 3567   | 2014        | 3813   | 2142        | 4078   | 2281        | 4372   | 2438        | 4708   | 2606        | 5075   | 2786        | 5490   | 3015        | 6118   |
| -16         | 1620        | 3044   | 1718        | 3230   | 1823        | 3434   | 1942        | 3669   | 2067        | 3923   | 2196        | 4193   | 2345        | 4508   | 2506        | 4855   | 2679        | 5236   | 2900        | 5831   | 3152        | 6586   |
| -12         | 1661        | 3122   | 1761        | 3313   | 1872        | 3530   | 1994        | 3772   | 2120        | 4033   | 2255        | 4318   | 2409        | 4646   | 2575        | 5005   | 2779        | 5520   | 3023        | 6228   | 3297        | 7130   |
| -8          | 1702        | 3201   | 1805        | 3398   | 1922        | 3628   | 2046        | 3878   | 2173        | 4144   | 2317        | 4447   | 2475        | 4787   | 2661        | 5231   | 2900        | 5905   | 3161        | 6729   | 3449        | 7772   |
| -4          | 1744        | 3280   | 1852        | 3490   | 1972        | 3728   | 2097        | 3984   | 2227        | 4258   | 2378        | 4579   | 2554        | 4986   | 2783        | 5616   | 3033        | 6378   | 3308        | 7324   | -           | -      |
| 0           | 1785        | 3360   | 1900        | 3584   | 2022        | 3828   | 2147        | 4090   | 2286        | 4382   | 2452        | 4759   | 2671        | 5348   | 2911        | 6059   | 3177        | 6947   | -           | -      | -           | -      |
| 4           | 1830        | 3447   | 1948        | 3679   | 2071        | 3930   | 2198        | 4198   | 2367        | 4593   | 2564        | 5100   | 2795        | 5770   | 3053        | 6609   | -           | -      | -           | -      | -           | -      |
| 8           | 1876        | 3537   | 1996        | 3776   | 2120        | 4033   | 2278        | 4403   | 2467        | 4890   | 2685        | 5504   | 2932        | 6289   | -           | -      | -           | -      | -           | -      | -           | -      |
| 12          | 1922        | 3628   | 2044        | 3874   | 2195        | 4226   | 2381        | 4704   | 2585        | 5277   | 2815        | 5985   | 3077        | 6916   | -           | -      | -           | -      | -           | -      | -           | -      |
| 16          | 1968        | 3720   | 2119        | 4067   | 2299        | 4527   | 2497        | 5075   | 2717        | 5746   | 2962        | 6596   | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      |
| 20          | 2042        | 3910   | 2217        | 4348   | 2410        | 4872   | 2623        | 5517   | 2861        | 6333   | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      |
| 24          | 2133        | 4172   | 2320        | 4675   | 2529        | 5295   | 2760        | 6071   | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      |
| 28          | 2234        | 4490   | 2435        | 5079   | 2658        | 5813   | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      |
| 32          | 2346        | 4876   | 2558        | 5564   | 2795        | 6453   | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      |
| 36          | 2473        | 5359   | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      | -           | -      |

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL / BLADES)  
ASSOCIATED CONDITIONS

POWER...  
CONFIGURATION  
WING FLAPS...  
DISPERSAL EQUIPMENT...  
GROSS WEIGHT...  
RUNWAY...  
WIND...  
REVERSE THRUST  
CALIBRATED AIR SPEED AT 50 FEET...

PT6A-60AG, PT6A-45 SERIES  
HC-B5MP-3C / M-10876

TAKEOFF  
15°  
LARGE SPREADER  
12500 LB  
LEVEL HARD SURFACE  
ZERO  
NONE  
1.2Vs = 110 MPH

#### NOTE:

THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL AND BLADES)  
PT6A-67AG

PT6A-67AG  
HC-B5MA-3D / M11276NS

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 19 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **RATE OF CLIMB**

### **INTERNATIONAL STANDARD ATMOSPHERE**

| OAT  | RATE OF CLIMB - FT |      |      |      |      |      |      |      |      |      |       |
|------|--------------------|------|------|------|------|------|------|------|------|------|-------|
| (°C) | SL                 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
| -24  | -                  | -    | -    | -    | 479  | 462  | 446  | 429  | 411  | 393  | 375   |
| -20  | -                  | -    | 503  | 488  | 472  | 455  | 439  | 421  | 404  | 386  | 345   |
| -16  | 527                | 512  | 497  | 481  | 465  | 448  | 432  | 414  | 396  | 355  | 307   |
| -12  | 520                | 505  | 490  | 474  | 458  | 442  | 425  | 407  | 370  | 321  | 269   |
| -8   | 514                | 499  | 484  | 468  | 451  | 435  | 418  | 388  | 334  | 282  | 231   |
| -4   | 508                | 493  | 477  | 461  | 445  | 428  | 400  | 347  | 294  | 243  | 192   |
| 0    | 502                | 486  | 471  | 455  | 438  | 412  | 359  | 306  | 254  | 200  | 147   |
| 4    | 496                | 480  | 464  | 448  | 413  | 369  | 316  | 262  | 209  | 156  | 103   |
| 8    | 490                | 474  | 458  | 422  | 376  | 325  | 271  | 217  | 164  | 111  | 58    |
| 12   | 484                | 468  | 432  | 382  | 331  | 279  | 226  | 172  | 119  | 66   | 14    |
| 16   | 478                | 439  | 389  | 337  | 286  | 233  | 179  | 126  | 73   | 21   | -32   |
| 20   | 447                | 396  | 345  | 293  | 239  | 186  | 133  | 80   | 27   | -    | -     |
| 24   | 405                | 352  | 299  | 245  | 192  | 139  | 86   | -    | -    | -    | -     |
| 28   | 359                | 305  | 251  | 198  | 145  | -    | -    | -    | -    | -    | -     |
| 32   | 311                | 258  | 204  | -    | -    | -    | -    | -    | -    | -    | -     |
| 36   | 264                | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     |

ENGINE (PRATT & WHITNEY)  
 PROPELLER (HARTZELL HUB MODEL / BLADES)  
 ASSOCIATED CONDITIONS  
   POWER ...  
   CONFIGURATION  
     WING FLAPS ...  
     DISPERSAL EQUIPMENT ...  
 GROSS WEIGHT ...  
 CALIBRATED AIR SPEED AT 50 FEET ...

PT6A-60AG, PT6A-45 SERIES  
 HC-B5MP-3C / M-10876  
  
 TAKEOFF  
  
 15°  
 STANDARD SPRAY  
 14150 LB  
 1.2 Vs = 110 MPH

NOTE:  
 FOR COLD ATMOSPHERE CONDITIONS BELOW – 16° C USE THE DATA FOR THE COLDEST TEMPERATURE SHOWN IN THE TABLE.

NOTE:  
 THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:  
 ENGINE (PRATT & WHITNEY) PT6A-67AG  
 PROPELLER (HARTZELL HUB MODEL AND BLADES) HC-B5MA-3D / M11276NS  
 PT6A-67AG

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 20 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **RATE OF CLIMB**

### **INTERNATIONAL STANDARD ATMOSPHERE**

| OAT<br>(°C) | PRESSURE ALTITUDE - FT |      |      |      |      |      |      |      |      |      |       |
|-------------|------------------------|------|------|------|------|------|------|------|------|------|-------|
|             | SL                     | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
| -24         |                        |      |      |      | 472  | 459  | 445  | 431  | 417  | 403  | 388   |
| -20         |                        |      | 492  | 479  | 466  | 453  | 439  | 426  | 411  | 397  | 363   |
| -16         | 511                    | 499  | 486  | 474  | 461  | 447  | 434  | 420  | 405  | 370  | 330   |
| -12         | 505                    | 493  | 481  | 468  | 455  | 442  | 428  | 414  | 383  | 341  | 297   |
| -8          | 500                    | 488  | 476  | 463  | 450  | 436  | 422  | 397  | 352  | 308  | 265   |
| -4          | 495                    | 483  | 471  | 458  | 444  | 431  | 408  | 362  | 318  | 275  |       |
| 0           | 490                    | 478  | 465  | 452  | 439  | 418  | 372  | 327  | 283  |      |       |
| 4           | 486                    | 473  | 460  | 447  | 418  | 381  | 335  | 290  |      |      |       |
| 8           | 481                    | 468  | 455  | 425  | 385  | 342  | 296  |      |      |      |       |
| 12          | 476                    | 463  | 433  | 390  | 347  | 303  | 257  |      |      |      |       |
| 16          | 471                    | 439  | 396  | 352  | 308  | 264  |      |      |      |      |       |
| 20          | 445                    | 402  | 358  | 313  | 268  |      |      |      |      |      |       |
| 24          | 409                    | 364  | 318  | 273  |      |      |      |      |      |      |       |
| 28          | 369                    | 323  | 277  |      |      |      |      |      |      |      |       |
| 32          | 328                    | 282  | 236  |      |      |      |      |      |      |      |       |
| 36          | 287                    |      |      |      |      |      |      |      |      |      |       |

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL / BLADES)  
ASSOCIATED CONDITIONS  
POWER ...  
CONFIGURATION  
WING FLAPS ...  
DISPERSAL EQUIPMENT ...  
GROSS WEIGHT ...  
CALIBRATED AIR SPEED AT 50 FEET ...

PT6A-60AG OR PT6A-45 SERIES  
HC-B5MP-3C / M-10876

TAKEOFF

15°  
LARGE SPREADER  
12500 LB  
1.2 Vs = 103 MPH

**NOTE:**

THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL AND BLADES)  
PT6A-67AG

PT6A-67AG  
HC-B5MA-3D / M11276NS

|           |               |           |                                         |       |                   |                |            |  |  |  |  |  |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|--|--|--|--|--|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |  |  |  |  |  |
| Page:     | <b>21</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |  |  |  |  |  |

## **LANDING DISTANCE FROM 50 FEET**

### **INTERNATIONAL STANDARD ATMOSPHERE**

| Airspeed<br>@ 50 Ft<br>(MPH) | Gross<br>Weight<br>(Lb) | PRESSURE ALTITUDE - FT |      |      |      |      |      |      |      |      |      |       |
|------------------------------|-------------------------|------------------------|------|------|------|------|------|------|------|------|------|-------|
|                              |                         | 0                      | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
| 112                          | 12500                   | 3317                   | 3400 | 3487 | 3576 | 3670 | 3766 | 3867 | 3971 | 4079 | 4191 | 4308  |
| 110                          | 12000                   | 3205                   | 3285 | 3368 | 3454 | 3543 | 3636 | 3733 | 3833 | 3937 | 4044 | 4157  |
| 107                          | 11500                   | 3093                   | 3169 | 3249 | 3332 | 3417 | 3506 | 3599 | 3695 | 3794 | 3897 | 4005  |
| 105                          | 11000                   | 2981                   | 3054 | 3130 | 3209 | 3291 | 3376 | 3465 | 3556 | 3652 | 3751 | 3853  |
| 103                          | 10500                   | 2869                   | 2939 | 3011 | 3087 | 3165 | 3246 | 3331 | 3418 | 3509 | 3604 | 3702  |
| 100                          | 10000                   | 2756                   | 2823 | 2893 | 2964 | 3039 | 3116 | 3197 | 3280 | 3367 | 3457 | 3550  |
| 98                           | 9500                    | 2644                   | 2708 | 2774 | 2842 | 2913 | 2986 | 3062 | 3142 | 3224 | 3309 | 3398  |
| 95                           | 9000                    | 2532                   | 2593 | 2655 | 2719 | 2787 | 2856 | 2928 | 3003 | 3081 | 3162 | 3247  |
| 92                           | 8500                    | 2420                   | 2477 | 2536 | 2597 | 2660 | 2726 | 2794 | 2865 | 2939 | 3016 | 3095  |
| 89                           | 8000                    | 2308                   | 2362 | 2417 | 2475 | 2534 | 2596 | 2660 | 2727 | 2796 | 2868 | 2943  |
| 87                           | 7500                    | 2196                   | 2246 | 2298 | 2352 | 2408 | 2466 | 2526 | 2589 | 2654 | 2721 | 2791  |
| 84                           | 7000                    | 2084                   | 2131 | 2179 | 2230 | 2282 | 2336 | 2392 | 2451 | 2511 | 2574 | 2640  |
|                              | Standard<br>OAT ~<br>°C | 15                     | 13   | 11   | 9    | 7    | 5    | 3    | 1    | -1   | -3   | -5    |

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL / BLADES)  
ASSOCIATED CONDITIONS

POWER ...  
CONFIGURATION  
WING FLAPS ...  
DISPERSAL EQUIPMENT ...  
RUNWAY ...  
WIND ...  
REVERSE THRUST ...  
CALIBRATED AIR SPEED AT 50 FEET ...

PT6A-60AG, PT6A-45 SERIES  
HC-B5MP-3C / M-10876

FLIGHT IDLE

15°  
STANDARD SPRAY  
LEVEL HARD SURFACE  
ZERO  
NONE  
NOTED

NOTE:  
THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:  
ENGINE (PRATT & WHITNEY) PT6A-67AG  
PROPELLER (HARTZELL HUB MODEL AND BLADES) HC-B5MA-3D / M11276NS

|           |               |           |                                         |       |                   |                |            |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |
| Page:     | <b>22</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |

## **LANDING DISTANCE FROM 50 FEET**

### **INTERNATIONAL STANDARD ATMOSPHERE**

| Airspeed<br>@50 Ft<br>(MPH) | Gross<br>Weight<br>(Lb) | PRESSURE ALTITUDE - FT |      |      |      |      |      |      |      |      |      |       |
|-----------------------------|-------------------------|------------------------|------|------|------|------|------|------|------|------|------|-------|
|                             |                         | 0                      | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 | 8000 | 9000 | 10000 |
| 112                         | 12500                   | 3069                   | 3147 | 3228 | 3312 | 3398 | 3489 | 3582 | 3680 | 3781 | 3886 | 3995  |
| 110                         | 12000                   | 2964                   | 3039 | 3117 | 3197 | 3281 | 3367 | 3457 | 3551 | 3648 | 3749 | 3853  |
| 107                         | 11500                   | 2860                   | 2932 | 3006 | 3083 | 3163 | 3246 | 3332 | 3422 | 3515 | 3611 | 3712  |
| 105                         | 11000                   | 2755                   | 2824 | 2895 | 2969 | 3045 | 3125 | 3207 | 3293 | 3382 | 3474 | 3570  |
| 103                         | 10500                   | 2651                   | 2716 | 2784 | 2854 | 2927 | 3003 | 3082 | 3164 | 3249 | 3337 | 3428  |
| 100                         | 10000                   | 2546                   | 2608 | 2673 | 2740 | 2810 | 2882 | 2957 | 3035 | 3116 | 3200 | 3287  |
| 98                          | 9500                    | 2442                   | 2501 | 2562 | 2626 | 2692 | 2761 | 2832 | 2906 | 2983 | 3062 | 3145  |
| 95                          | 9000                    | 2337                   | 2393 | 2451 | 2512 | 2574 | 2639 | 2707 | 2777 | 2849 | 2925 | 3004  |
| 92                          | 8500                    | 2232                   | 2285 | 2340 | 2397 | 2456 | 2518 | 2582 | 2648 | 2716 | 2788 | 2862  |
| 89                          | 8000                    | 2128                   | 2178 | 2229 | 2283 | 2339 | 2396 | 2456 | 2519 | 2583 | 2651 | 2720  |
| 87                          | 7500                    | 2023                   | 2070 | 2119 | 2169 | 2221 | 2275 | 2331 | 2390 | 2450 | 2513 | 2579  |
| 84                          | 7000                    | 1919                   | 1962 | 2008 | 2055 | 2103 | 2154 | 2206 | 2261 | 2317 | 2376 | 2437  |
|                             | Standard<br>OAT ~<br>°C | 15                     | 13   | 11   | 9    | 7    | 5    | 3    | 1    | -1   | -3   | -5    |

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL / BLADES)  
ASSOCIATED CONDITIONS  
POWER...  
CONFIGURATION  
WING FLAPS...  
DISPERSAL EQUIPMENT...  
RUNWAY ...  
WIND ...  
REVERSE THRUST ...  
CALIBRATED AIR SPEED AT 50 FEET ...

PT6A-60AG, PT6A-45 SERIES  
HC-B5MP-3C / M-10876

FLIGHT IDLE  
15°  
LARGE SPREADER  
LEVEL HARD SURFACE  
ZERO  
NONE  
NONE

#### **NOTE:**

THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:

ENGINE (PRATT & WHITNEY)  
PROPELLER (HARTZELL HUB MODEL AND BLADES)  
PT6A-67AG

PT6A-67AG  
HC-B5MA-3D / M11276NS

|           |               |           |                                         |       |                   |                |            |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |
| Page:     | <b>23</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |

## **POWER SETTING CHART**

### **PRATT AND WHITNEY PT6A-60AG AND PT6A-45 SERIES INSTALLED THRU SH AIRCRAFT INC MODEL S2R-T660**

RATING      TAKE OFF POWER

RPM 1700

The Chart Contains Torque Pressure ~ psi

AMBIENT TEMPERATURE ~ DEG. C

| Pressure<br>Altitude<br>(Ft.) | Field<br>Barometric<br>Pressure<br>(In-Hg) | AMBIENT TEMPERATURE ~ DEG. C |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|--------------------------------------------|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                               |                                            | -24                          | -20  | -16  | -12  | -8   | -4   | 0    | 4    | 8    | 12   | 16   | 20   | 24   | 28   | 32   | 36   |
| 0                             | 29.92                                      | -                            | -    | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.1 | 37.0 | 35.9 | 34.6 | 33.4 |
| 2000                          | 27.82                                      | -                            | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.2 | 37.1 | 36.0 | 34.9 | 33.7 | 32.5 | -    |
| 4000                          | 25.84                                      | 38.8                         | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.8 | 38.2 | 37.3 | 36.2 | 35.1 | 33.9 | 32.7 | 31.6 | -    | -    |
| 6000                          | 23.98                                      | 38.8                         | 38.8 | 38.8 | 38.8 | 38.8 | 38.4 | 37.4 | 36.4 | 35.3 | 34.2 | 33.0 | 31.9 | 30.7 | -    | -    | -    |
| 8000                          | 22.23                                      | 38.8                         | 38.8 | 38.8 | 38.2 | 37.4 | 36.4 | 35.4 | 34.4 | 33.2 | 32.1 | 31.1 | 29.9 | -    | -    | -    | -    |
| 10,000                        | 20.58                                      | 38.8                         | 38.1 | 37.2 | 36.3 | 35.5 | 34.6 | 33.5 | 32.4 | 31.3 | 30.2 | 29.2 | -    | -    | -    | -    | -    |
| 12,000                        | 19.03                                      | 36.4                         | 35.7 | 34.8 | 34.0 | 33.2 | 32.2 | 31.3 | 30.2 | 29.1 | 28.0 | -    | -    | -    | -    | -    | -    |

NOTE:  $\text{SHP} = \frac{\text{Torque Pressure (psi)} \times \text{RPM}}{62.79}$

NOTE:

THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:

ENGINE (PRATT & WHITNEY)

PT6A-67AG

PROPELLER (HARTZELL HUB MODEL AND BLADES)

PT6A-67AG

HC-B5MA-3D / M11276NS

|           |               |           |                                         |       |                   |                |            |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |
| Page:     | <b>24</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |

## **POWER SETTING CHART**

### **PRATT AND WHITNEY PT6A-60AG AND PT6A-45 SERIES INSTALLED IN THE THRUSH AIRCRAFT INC MODEL S2R-T660**

RATING      MAXIMUM CONTINUOUS POWER

RPM 1700

The Chart Contains Torque Pressure ~ psi

AMBIENT TEMPERATURE ~ DEG. C

| Pressure<br>Altitude<br>(Ft.) | Field<br>Barometric<br>Pressure<br>(In-Hg) | AMBIENT TEMPERATURE ~ DEG. C |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|--------------------------------------------|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                               |                                            | -24                          | -20  | -16  | -12  | -8   | -4   | 0    | 4    | 8    | 12   | 16   | 20   | 24   | 28   | 32   | 36   |
| 0                             | 29.92                                      | -                            | -    | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.0 | 35.8 | 34.5 | 33.1 | 31.8 | 30.5 | 29.2 | 27.9 |
| 2000                          | 27.82                                      | -                            | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.6 | 36.6 | 35.3 | 34.0 | 32.7 | 31.3 | 30.0 | 28.7 | 27.4 | -    |
| 4000                          | 25.84                                      | 37.7                         | 37.7 | 37.7 | 37.7 | 37.7 | 37.3 | 36.1 | 34.8 | 33.6 | 32.2 | 30.9 | 29.6 | 28.3 | 27.0 | -    | -    |
| 6000                          | 23.98                                      | 37.7                         | 37.7 | 37.7 | 37.7 | 36.7 | 35.5 | 34.2 | 33.0 | 31.6 | 30.3 | 29.0 | 27.7 | 26.4 | -    | -    | -    |
| 8000                          | 22.23                                      | 37.7                         | 37.7 | 36.8 | 35.8 | 34.6 | 33.4 | 32.2 | 30.9 | 29.7 | 28.4 | 27.0 | 25.7 | -    | -    | -    | -    |
| 10,000                        | 20.58                                      | 36.7                         | 35.8 | 34.9 | 33.8 | 32.6 | 31.4 | 30.2 | 29.0 | 27.8 | 26.4 | 25.1 | -    | -    | -    | -    | -    |
| 12,000                        | 19.03                                      | 34.3                         | 33.4 | 32.4 | 31.4 | 30.3 | 29.1 | 27.9 | 26.7 | 25.3 | 24.0 | -    | -    | -    | -    | -    | -    |

NOTE:    SHP =  $\frac{\text{Torque Pressure (psi)} \times \text{RPM}}{62.79}$

NOTE:

THIS CHART IS CONSERVATIVE WHEN USED WITH THE FOLLOWING ENGINES AND PROPELLERS:

ENGINE (PRATT & WHITNEY)

PT6A-67AG

PROPELLER (HARTZELL HUB MODEL AND BLADES)

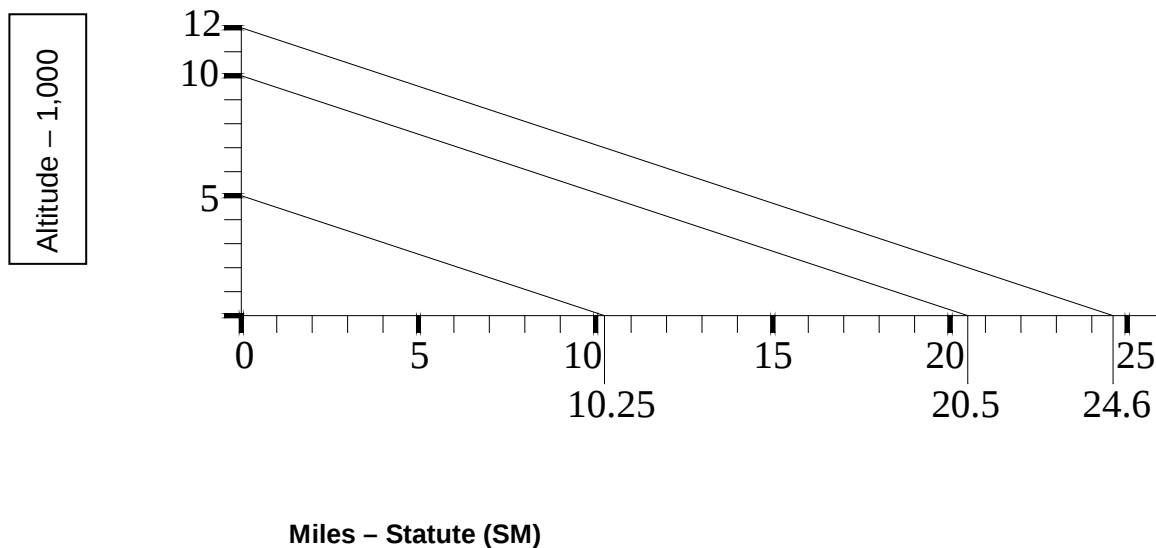
PT6A-67AG

HC-B5MA-3D / M11276NS

|           |               |           |                                         |       |                   |                |            |  |
|-----------|---------------|-----------|-----------------------------------------|-------|-------------------|----------------|------------|--|
| Report #: | <b>ER-511</b> | Title:    | <b>S2R-T660/-T660DC TRAINING MANUAL</b> |       |                   |                |            |  |
| Page:     | <b>25</b>     | Revision: | <b>A</b>                                | Date: | <b>11/25/2013</b> | FAA Project #: | <b>N/A</b> |  |

### FLAPS-UP GLIDE DISTANCE

**S2R-T660**



**Note:** Chart Glide Distance With PROP FEATHERED

Flaps-Up Ratio 10.8 : 1 ~ Multiply Altitude In Thousands Of Feet by 2.05 To Obtain No Wind Glide Distance

Flaps-Dn Ratio 9.6 : 1 ~ Multiply Altitude In Thousands Of Feet by 1.81 To Obtain No Wind Glide Distance

|          | Speed Schedule To Obtain L/D Max – Speeds Are IAS in MPH |        |        |        |        |       |       |       |
|----------|----------------------------------------------------------|--------|--------|--------|--------|-------|-------|-------|
| G.W.     | 14,000                                                   | 13,000 | 12,000 | 11,000 | 10,000 | 9,000 | 8,000 | 7,000 |
| Flaps-Up | 111                                                      | 107    | 103    | 99     | 94     | 89    | 84    | 78    |
| Flaps-Dn | 99                                                       | 94     | 92     | 90     | 84     | 80    | 75    | 70    |

**NOTE:** For Large Transland Spreader P/N 95370

Chart Glide Distance With **PROP FEATHERED**, Same Schedule

Flaps-Up Ratio 9.6 : 1 ~ Multiply Altitude In Thousands Of Feet By 1.81 To Obtain No Wind Glide Distance

Flaps-Dn Ratio 8.7 : 1 ~ Multiply Altitude In Thousands Of Feet By 1.64 To Obtain No Wind Glide Distance

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 26 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **CHAPTER 6: HANDLING CHARACTERISTICS**

The handling characteristics of the S2R-T660 are similar to the handling characteristics of other Thrush Aircraft models, and are typical of many other large, turbine-powered tailwheel aircraft. Obviously, variables such as hopper load, fuel load, loaded c.g., wind, runway conditions and construction, and atmospheric conditions will affect the handling characteristics of the aircraft. It is suggested that the first few flights be made at lower takeoff weights with mid-range loaded c.g., and in relatively calm wind conditions. As experience and proficiency allow, takeoff weights may be increased and the c.g. range may be expanded to gain well-rounded knowledge of the handling characteristics of the aircraft in all flight, loading, and atmospheric conditions.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 27 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **CHAPTER 7: PILOT DOCUMENTATION**

Before receiving Factory Authorized training, the following documentation must be on file with Thrush Aircraft, Inc.:

1. FAA Commercial Pilot Certificate (or higher)
2. Current 2nd Class Medical Certificate.
3. A logbook entry showing compliance with 14 CFR 61.31(i) (tailwheel endorsement).
4. A logbook entry showing compliance with 14 CFR 61.56 (BFR).
5. Written documentation of all previous ag, fire-bombing, and/or turbine tailwheel experience

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 28 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **CHAPTER 8: PILOT TYPE RATING REQUIREMENT FOR THRUSH AIRCRAFT, INC.**

### **Reference: FAR 61.31 (a) (1)**

Thrush Aircraft, Inc. is the manufacturer of the S2R Thrush series of turboprop agricultural aircraft. This letter and enclosed documentation represents our PETITION for an exemption of CFR 14, Section 61.31 (a) (1) for our model S2R-T660 aircraft.

### **Alternative to Type Rating Process:**

As an alternative to the type rating process, Thrush Aircraft, Inc. would like to propose the exemption include the following:

1. This exemption would be applicable to only Model S2R-T660 aircraft that are certified in restricted category and operated under procedures outlined in 14 CFR, FAR Part 137.
2. At the time of delivery, qualified pilots will receive complete transitional training in the aircraft by a Thrush Aircraft, Inc. (TIA) authorized pilot who meets the following minimum qualifications:
  - a. Hold at least a commercial pilot certificate; and
  - b. Meet the following experience requirements:
    - i. 500 hours of flight time in turbine-powered agricultural type airplanes:  
or
    - ii. 1,000 hours of flight time in agricultural type airplanes which includes at least 100 hours flight time in a S2R-T660.
3. Thrush Aircraft, Inc. (TIA) will make a copy of this exemption available to each pilot who serves as PIC in the S2R-T660.
4. Thrush Aircraft, Inc. (TIA) will authorize certain pilots in the field, who meet the qualification requirements of Item #3, to conduct transition training for S2R-T660 operators.

### **Transition Training:**

Prior to training, a complete review and inspection of the pilots flying credentials and qualifications, including licenses and logbook to assure the pilot meets the minimum requirements for the transitional training.

1. The training syllabus includes the following list of items:
  - a. A copy of the ER-511 S2R-T660/T660DC Training Manual.
  - b. A copy of the Aircraft Flight Manual.
  - c. A separate Checklist for all Normal and Emergency Procedures.
  - d. A training syllabus which includes classroom and cockpit training schedules.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | 29 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

- e. Projected images of the training manual and flight manual will be used as training aids during the classroom session of training.
  - f. A 50 question test will be administered after completion of classroom training and before the commencement of cockpit familiarization training.
  - g. Cockpit training will include familiarization of all controls, guidance systems, placards and practical training of all normal and emergency procedures.
2. Records – The following records of training for each pilot will be retained indefinitely by Thrush Aircraft:
- a. Copies of Pilots licenses and ratings.
  - b. Log of Training Attendance.
  - c. Copy of Written Test Results.
  - d. Copy of logbook record of training.
  - e. Copy of Certificate of Course Accomplishment.

## **Conclusion**

It is our goal to provide qualified pilots with transitional training which will assure a thorough understanding of the S2R-T660, including systems, flight characteristics and procedures.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | A1 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## **APPENDIX A:**

### **S2R-T660 AIRCRAFT TRANSITION COURSE SYLLABUS**

This course is for experienced agricultural pilots from other high performance agricultural aircraft into the S2R-T660 Turbo Thrush. The goal of this course is to provide a thorough understanding of the aircraft systems, normal and emergency procedures, and flight characteristics of the PT6A-60AG and PT6A-65AG powered S2R-T660. It satisfies the requirements for an the exemption from FAR 61.31(a)(1), Type Ratings for Large Aircraft.

#### **CLASSROOM TRAINING**

Classroom training will be approximately 5 hours consisting of the following:

1. A thorough review and familiarization of all limitations, normal procedures, emergency procedures, weight & balance and performance.
2. Discussion of aircraft and it's systems with emphasis on differences from other aircraft in flight characteristics, performance and procedures.

##### **Material Provided:**

1. S2R-T660 Training Manual
2. Individual Copy of Flight Manual
3. Normal and Emergency Procedures Checklist
4. 50 Question Written Test

##### **Schedule;**

Session 1: Introduction and Comparison of Procedures and Flight Characteristics to Other S2R Models and Systems.

Session 2: Aircraft Systems (training manual).

Session 3: Aircraft Limitations (aircraft flight manual).

Session 4: Normal Procedures (training manual and aircraft flight manual).

Session 5: Emergency Procedures (training manual and aircraft flight manual).

Session 6: Performance Including Weight & Balance (training manual and aircraft flight manual).

Session 7: Written Test (50 questions on aircraft flight manual) and review.

#### **COCKPIT TRAINING**

**Cockpit Training will consist of the following;**

1. A complete walk-inspection of the aircraft emphasizing the controls and systems.
2. A Thorough review of the cockpit including operation of controls, instrumentation, placards and limitations.
3. Familiarization with, and practice of, all normal and emergency procedures.

##### **Materials provided:**

1. Individual Copy of Flight Manual
2. Flight Manual
3. Normal and Emergency Procedures Checklist
4. One S2R-T660 Aircraft

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | A2 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

**Schedule:**

Session 1: Walk-Around Inspection and Familiarization with Aircraft Systems.

Session 2: Cockpit Familiarization including Placards Controls, Flight Instrumentation and Limitations.

Session 3: Normal Procedures.

Session 4: Emergency Procedures

Session 5: Review

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | B1 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## APPENDIX B:

### MODEL TURBO THRUSH S2R-T660 WRITTEN EXAM

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_ GRADE: \_\_\_\_\_

- What type of fuel may be used for the T660?
  - Jet A or Jet B
  - JP4
  - JP5
  - All of the above**
- If jet fuel or diesel fuel is not available, aviation gasoline MIL-G-5572 (all grades) may be used for a maximum of hrs between overhauls.
  - 100 hrs
  - 2,500 hrs
  - 150 hrs**
  - No Time Limit
- What is the maximum torque (PSI) allowable for take-off for the PT6A-65AG?
  - 38.7
  - 43.5
  - 45.07**
  - 61.0
- What is the maximum continuous ITT and NG% for the PT6A-65AG?
  - 810°C and 104%**
  - 715°C and 100%
  - 870°C and 106%
  - 1000°C and 104%
- Minimum ground idle RPM and maximum idle ITT for the PT6A-65AG are
  - 56% and 600°C
  - 58% and 750 °C**
  - 61% and 810 °C
  - 69% and 715 °C
- Minimum idle oil pressure is \_\_\_\_\_ psig.
  - 60**
  - 60 – 90
  - 90 – 135
  - 90

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | B2 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

7. At 56%-68% Ng. Maximum ITT is 870 degrees.
  - A. True
  - B. **False**
  
8. What is the maximum ITT transient engine limits for starting?
  - A. **1000°C - 5 seconds**
  - B. 1000 ~~°F~~ seconds
  - C. 800 ~~°F~~ seconds
  - D. 800 ~~°F~~ seconds
  
9. Maximum transient engine acceleration limits for Tq., ITT and Np are:
  - A. **60.98 psi, 850° C, and 1870 rpm.**
  - B. 45.4 psi, 870°C and 1800 rpm
  - C. 58 psi, 810°C and 1700 rpm
  - D. Same as Takeoff and Max Continuous limits
  
10. Transient engine limits are maximum of \_\_\_\_\_ for starting.
  - A. 1 minute
  - B. 30 seconds
  - C. **5 seconds**
  - D. No transient time limits so long as pilot pulls the power lever back after he is out of situation where transient range is required.
  
11. The minimum Idle engine oil pressure is \_\_\_\_\_ psig.
  - A. 90
  - B. **60**
  - C. 40
  - D. 56
  
12. The Minimum Oil Pressure for Takeoff, Max Continuous & Max Cruise/Climb is:
  - A. 60 psig.
  - B. **90 psig.**
  - C. 40 psig.
  - D. 56 psig.
  
13. What is the maximum starter duration and minimum cooling period between starting attempts?
  - A. 30 seconds and 3 minutes.
  - B. **3 minutes and 1 minute.**
  - C. 1 minute and 3 minutes.
  - D. None of the above.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | B3 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

14. Normal air starts on the PT6A-65AG can be accomplished at what airspeeds?
  - A. 75 to 150 MPH
  - B. Above 148 MPH**
  - C. There is no airspeed limitation for air starts
  - D. Air starting is impossible
  
15. Velocity Never Exceed ( $V_{NE}$ ) is:
  - A. 219 Knots
  - B. 169 mph
  - C. 219 mph**
  - D. 225 mph
  
16. Max Structural Cruising Speed ( $V_{NO}$ ) is:
  - A. 219 mph
  - B. 206 mph**
  - C. 160 mph
  - D. 143 mph
  
17. What is maneuvering speed ( $V_A$ )?
  - A. 219 mph
  - B. 206 mph
  - C. 160 mph**
  - D. 143 mph
  
18. Max Flap Extended Speed ( $V_{FE}$ ) is:
  - A. 219 mph
  - B. 206 mph
  - C. 160 knots
  - D. 143 mph**
  
19. Never exceed speed at 12,500 lbs. and above is:
  - A. 160 mph**
  - B. 219 mph
  - C. 160 mph
  - D. 143 mph
  
20. Maximum approved altitude is \_\_\_\_\_ feet.
  - A. 12,000**
  - B. 24,000
  - C. 36,000
  - D. No altitude limitations.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | B4 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

21. Design load factors of S2R-T65 at 12,500 lbs. and above are:
  - A. 3.17 positive, 1.27 negative – Flaps Up
  - B. 3.25 positive, 1.3 negative – Flaps Up
  - C. 2.0 positive, 0.8 negative – Flaps Down
  - D. 3.17 positive, 0.8 negative – Flaps Down
  - E. Both A & C above
  
22. What is (are) maximum take-off and landing weight?
  - A. 14,150 lbs. and 12,500 lbs.
  - B. 12,500 lbs. and 7300 lbs.
  - C. 12,500.
  - D. None of the above
  
23. Forward and Aft CG Limits at 14,150 lbs. are:
  - A. 25.9 and 30 inches.
  - B. 24 and 25.9 inches.
  - C. 27 and 30 inches inches
  - D. 27 and 29 inches
  
24. Forward CG Limit at 12,500 lbs. and Aft Limit at 8,000 lbs. are:
  - A. 24 and 30 inches.
  - B. 27.0 and 29.0 inches.
  - C. 25.9 and 29.0 inches
  - D. 24 and 27.0 inches
  
25. Flight operation of the S2R-T660 is day and night VFR and IFR.
  - A. True
  - B. False
  
26. Flight into known icing is approved only in very light conditions.
  - A. True
  - B. False
  
27. Stabilized Propeller RPM prohibited during ground operation is:
  - A. 1170 to 1400
  - B. Below 900 RPM – Except Feathered Operation from 0 to 400 RPM.
  - C. 0 to 400
  - D. A and B Above
  
28. Takeoff into visible moisture below 40 Degrees F. is allowed providing no ice is forming.
  - A. True
  - B. False

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | B5 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

29. Electronic Boost Pump and Manual Ignition should be turned on prior to:
  - A. entering heavy rains
  - B. encountering severe turbulence
  - C. takeoffs and landings
  - D. all of the above**
30. What is the usable fuel for each main tank?
  - A. 228 gallons
  - B. 114 gallons**
  - C. 70 gallons
  - D. 150 gallons
31. Pull control stick aft to unlock tailwheel:
  - A. True
  - B. False**
32. Hopper structural capacity is 5,500 lbs.
  - A. True**
  - B. False
33. The dual cockpit rear seat cargo limitation is \_\_\_\_\_.
  - A. 170 Lbs.
  - B. 200 Lbs.**
  - C. 250 Lbs.
  - D. No rear seat limitation so long as weight & balance within aft limits.
34. Which propeller operating range is prohibited on the ground?
  - A. 0 to 1700 RPM
  - B. 1400 to 1698 RPM
  - C. 1400 to 1700 RPM
  - D. 1170 to 1400 RPM**
35. Stabilized operation below \_\_\_\_\_ RPM is prohibited on the ground.
  - A. 400
  - B. 900**
  - C. 1170
  - D. 1400
36. Minimum Airspeed for Normal Air Starts is:
  - A. 160 mph
  - B. 118 mph
  - C. 148 mph**
  - D. 143 mph
37. Minimum fuel inlet pressure when fuel auxiliary pump switch is on before engine start is 5 PSIG.

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | B6 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

- A. **True**
  - B. False
38. Minimum Gas Generator (NG) speed to obtain a satisfactory engine start is:
- A. 10% for airstarts or 12% for ground starts
  - B. 14% to 18%
  - C. 13%**
  - D. Not stated in the AFM or Checklist.
39. According to Normal Procedures, whenever the gas generator fails to light up within 10 seconds after moving the starting control lever to the run low idle position; cut off the fuel, starter switch and ignition switch.
- A. True**
  - B. False
40. During start, if the gas generator fails to light within 10 seconds, cut off fuel, starter and ignition. Allow a 30 second fuel draining period followed by a 30 second dry motoring run before attempting another start.
- A. True
  - B. False**
41. Before ground run-up, feathering the propeller once or twice with the throttle in the idle position will purge the propeller system.
- A. True**
  - B. False
42. During taxi, the Propeller Control should be:
- A. Anywhere in operating range.
  - B. Against the feather latch with the fuel lever in high idle position.**
  - C. Full forward with the fuel lever in low idle position.
  - D. Against the feather latch with the fuel lever in low idle position.
43. The maximum observed propeller RPM during over-speed governor check is \_\_\_\_\_.
- A. 1598 RPM
  - B. 1598  $\pm$  20 RPM**
  - C. 1698  $\pm$  20 RPM
  - D. 1700  $\pm$  20 RPM
44. Before Take-Off set the Fuel Lever at High Idle and Check at \_\_\_\_\_ NG.
- A. 58%
  - B. 68%
  - C. 69%**
  - D. 104%
45. Ignition and auxiliary fuel pump are not required during takeoff at sea level.
- A. True
  - B. False**

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | B7 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

46. During climb, allow airspeed to build up to \_\_\_\_\_ with flaps up.
- A. 87 MPH
  - B. 94 MPH
  - C. 107 MPH
  - D. **110 MPH**
47. Allow the engine to stabilize below 650 I.T.T. before shutdown:
- A. **For 1 minute**
  - B. For 2 minutes
  - C. For 3 minutes
  - D. None of the above
48. When the aircraft is left unattended, be sure that the propeller is tied down to prevent the propeller:
- A. from striking an innocent bystander.
  - B. from turning the wrong direction and damaging the starter generator.
  - C. **from windmilling with zero oil pressure.**
  - D. All the above.
49. With 30° bank angle, 0 flaps, and power off, the stall speed is:
- A. 99 mph @ 12,500 lbs.
  - B. **99 mph @ 14,150 lbs.**
  - C. 124 mph @ 12,500 lbs.
  - D. 130 mph @ 14,150 lbs.
50. With 60° bank angle, 0 flaps, and power off, the stall speed is:
- A. 92mph @ 12,500 lbs.
  - B. 92 mph @ 14,150 lbs.
  - C. 95 mph @ 12,500 lbs.
  - D. **130 mph @ 15,150 lbs.**

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | C1 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## APPENDIX C:

### PILOT TRAINING RECORD CHECKLIST SHEET

Instructor \_\_\_\_\_

Pilot Name \_\_\_\_\_

Course Name \_\_\_\_\_

Attendance Date \_\_\_\_\_

#### Pilot Documentation:

1. Licenses ☐
2. Current Medical Certificate ☐
3. Most Recent Biannual Flight Review ☐
4. Record of Pilot Experience ☐

Log of Training Attendance. ☐

Copy of Written Test Results. ☐

Copy of logbook record of training. ☐

Copy of Certificate of Course Accomplishment. ☐

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | D1 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |

## APPENDIX D: TRAINING ATTENDANCE RECORD



P.O. Box 3149  
 Albany, GA 31706-3149  
 300 Old Pretoria Road  
 Albany, GA 31721  
 Phone: 229.883.1440  
 Fax: 229.439.9790  
[www.thrushaircraft.com](http://www.thrushaircraft.com)

# TRAINING ATTENDANCE RECORD

Vice President Marketing

Eric Rojek

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | D2 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |



## TRAINING ATTENDANCE RECORD

### LOG OF REVISIONS

**NOTE:** Re-formatting and correction of typographical errors is not considered revision. True revisions are indicated by a dark vertical line at the right margin of the line revised.

| Rev. | Page | Description of Revision                 | By:                    |
|------|------|-----------------------------------------|------------------------|
| IR   | ALL  | New Document Initial Release- TC-TAR-01 | TP 11-7-13 [Signature] |
|      |      |                                         |                        |

|           |    |           |        |                                  |            |                |     |
|-----------|----|-----------|--------|----------------------------------|------------|----------------|-----|
| Report #: |    | ER-511    | Title: | S2R-T660/-T660DC TRAINING MANUAL |            |                |     |
| Page:     | D3 | Revision: | A      | Date:                            | 11/25/2013 | FAA Project #: | N/A |



## TRAINING ATTENDANCE RECORD

Subject: \_\_\_\_\_

Instructor: \_\_\_\_\_

Start Date: \_\_\_\_\_

Hours: \_\_\_\_\_

End Date: \_\_\_\_\_

| No. | Name: | License Number: | Signature: |
|-----|-------|-----------------|------------|
| 1   |       |                 |            |
| 2   |       |                 |            |
| 3   |       |                 |            |
| 4   |       |                 |            |
| 5   |       |                 |            |
| 6   |       |                 |            |
| 7   |       |                 |            |
| 8   |       |                 |            |
| 9   |       |                 |            |
| 10  |       |                 |            |
| 11  |       |                 |            |
| 12  |       |                 |            |
| 13  |       |                 |            |
| 14  |       |                 |            |
| 15  |       |                 |            |
| 16  |       |                 |            |
| 17  |       |                 |            |
| 18  |       |                 |            |
| 19  |       |                 |            |
| 20  |       |                 |            |
| 21  |       |                 |            |
| 22  |       |                 |            |
| 23  |       |                 |            |
| 24  |       |                 |            |
| 25  |       |                 |            |