

**SUPPLEMENT A34  
TO THE AIRPLANE FLIGHT MANUAL  
DA 42 NG**

**ELECTRONIC STABILITY AND PROTECTION (ESP)**

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## 1. GENERAL

### 1.5 DEFINITIONS AND ABBREVIATIONS

#### (a) Airspeeds

$V_{sw}$  Stall Warning Speed

#### (g) Equipment

AFCS Automatic Flight Control System

CWS Control Wheel Steering Switch

ESP Electronic Stability and Protection System

USP Underspeed Protection System

### 1.8 G1000 AVIONICS SYSTEM

#### 6. ELECTRONIC STABILITY AND PROTECTION (ESP)

The Electronic Stability and Protection System (ESP) is an optional part of the Garmin G1000 Integrated Avionics System. This information supplements the information presented in the Airplane Flight Manual.

The ESP system provides automatic stability augmentation and envelope protection for the airplane through the use of a control force feedback system. This will aid pilot recognition and recovery from inadvertent excessive pitch, roll and airspeed excursions when the autopilot is switched off.

The ESP system can be enabled and disabled on the AUX - SYSTEM SETUP 2 page on the MFD. Once the flight has ended and power is removed from the Garmin G1000 system, ESP will default to 'Enabled' on the next power-up.

For further details refer to the Garmin G1000 Pilot's Guide.

## 7. AUTOPILOT UNDERSPEED PROTECTION (USP)

For airplanes that have ESP installed, the AFCS is able to detect and protect against underspeed situations while the autopilot is engaged.

When the AFCS is engaged and a non-altitude critical mode (LVL, PIT, FLC, VS, VNV) and airspeed falls below the minimum threshold of 90 KIAS, the AFCS automatically enters the minimum airspeed mode. A MINSPD annunciation appears above the airspeed tape, and the AFCS causes the airplane to pitch down to maintain 90 KIAS. An aural "AIRSPEED" alert will sound once.

If the AFCS is engaged in an altitude critical mode (ALT, GS, GP and GA) and the aural stall warning is played for more than 1 second, the AFCS will maintain a wings-level roll attitude and pitch the airplane down to maintain an airspeed that will cause the aural stall warning to stop playing, plus 2 KIAS. Also, an aural "AIRSPEED" alert will sound every 5 seconds.

All underspeed protection modes are exited automatically when there is enough airplane performance to follow the originally selected flight director mode and reference.

## 8. COUPLED GO-AROUND

ESP-equipped airplanes are capable of flying fully coupled go-around maneuvers. Pressing the GA button on the left power lever will not disengage the autopilot. Instead, the autopilot will attempt to capture and track the flight director command bars. If insufficient airplane performance is available to follow the commands, the AFCS will enter altitude- critical underspeed protection mode when the stall warning sounds.

## 2. OPERATING LIMITATIONS

No change.



### 3. EMERGENCY PROCEDURES

#### 3.4 G1000 SYSTEM WARNINGS

##### 3.4.7 USP ACTIVE

<b>USP ACTIVE</b>	Underspeed Protection is active
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The USP ACTIVE caution may also be accompanied by an amber MINSPD annunciator above the airspeed tape display and the aural 'AIRSPEED' alert.

1. Power levers ..... increase power as required to correct underspeed
2. Airplane attitude and altitude ..... monitor

#### **NOTE**

If a large power addition is made expect distinctive transmission to a nose-up pitch attitude since the AP/FD aggressively returns to the original altitude or glidepath / slope. In case the airplane diverts significantly from the desired altitude or attitude disconnect A/P or reselect vertical / lateral A/P mode.

*After underspeed condition is corrected:*

3. AUTOPILOT ..... reselect vertical and lateral modes (if necessary)
4. Power levers ..... adjust as required

### NOTE

Autopilot Minimum Airspeed Mode provides a pitch down command to maintain 2 KIAS above stall warning airspeed. Underspeed protection is not available below 200 feet AGL, except in go-around mode.

## 4A. NORMAL OPERATING PROCEDURES

### 4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

#### 4A.6.2 BEFORE STARTING ENGINE

*The following item is amended to read:*

16. G1000 ..... wait until power-up completed.  
Verify splash screen shows ESP.  
Press ENT on MFD to  
acknowledge.

#### 4A.6.4 BEFORE TAXIING

*The following item is added:*

16. MFD ..... select AUX page System SETUP  
2, verify Stability & Protection  
STATUS; DISABLE if desired.

#### 4A.6.8 CLIMB

*If necessary, ESP may be manually disconnected using any of the following methods:*

- AP DISC switch ..... press and hold
- CWS button ..... press and hold
- AUX-SYSTEM SETUP 2 page on MFD . . . . disable stability and protection

#### **4A.6.9 CRUISE**

*If necessary, ESP may be manually disconnected using any of the following methods:*

- AP DISC switch ..... press and hold
- CWS button ..... press and hold
- AUX-SYSTEM SETUP 2 page on MFD .... disable stability and protection

#### **4A.6.10 DESCENT**

*If necessary, ESP may be manually disconnected using any of the following methods:*

- AP DISC switch ..... press and hold
- CWS button ..... press and hold
- AUX-SYSTEM SETUP 2 page on MFD .... disable stability and protection

#### **4A.6.11 APPROACH AND LANDING**

*If necessary, ESP may be manually disconnected using any of the following methods:*

- AP DISC switch . . . . . press and hold
- CWS button . . . . . press and hold
- AUX-SYSTEM SETUP 2 page on MFD . . . . . disable stability and protection

#### **4A.6.12 GO AROUND**

##### Autopilot coupled Go Around

1. Control Stick . . . . . GRASP FIRMLY
2. GO AROUND button (Left power lever) . . . . . PUSH – Verify GA // GA on PFD  
in lateral and vertical mode fields,  
autopilot will not disengage.
3. Autopilot . . . . . VERIFY airplane pitches up  
following flight director command  
bars
4. Balked Landing . . . . . EXECUTE
5. Mode Control Panel . . . . . PRESS NAV to Fly Published  
Missed Approach Procedure  
PRESS HDG to Fly ATC  
Assigned Missed Approach  
Heading

**NOTE**

The pilot is responsible for initial missed approach guidance in accordance with published procedure. The G1000 may not provide correct guidance until the airplane is established on a defined leg of the procedure.

6. Altitude Preselect . . . . . VERIFY Set to appropriate altitude

**NOTE**

When the GA button is pressed the Flight Director command bars will command 6° nose up and wings level, the HSI nav source automatically switches to GPS, the flight plan sequences to the first published missed approach leg, and automatic leg sequencing resumes. The autopilot will remain engaged, and fly the published missed approach procedure once the airplane is established on a segment of the missed approach procedure and NAV mode is selected.

The flight plan can only contain one approach procedure at a time. If the pilot attempts to load another instrument approach at this time, the airplane will depart from the missed approach procedure and turn directly towards the first waypoint in the new approach.

Do not attempt to load or activate a new approach while flying the missed approach procedure until ready to fly the new approach.

*Recommended Procedures Following a Missed Approach:*

1. To repeat the instrument approach procedure currently loaded into the flight plan:
  - a. Activate Vectors-To-Final if being radar vectored by ATC,

**OR**

  - b. If flying the entire instrument approach procedure, activate a DIRECT TO the desired initial waypoint. Follow the appropriate procedure for the instrument approach being flown.
2. To proceed to an alternate airport (This procedure will allow the pilot to enter the route to the alternate before leaving the missed approach holding fix):
  - a. Highlight the first enroute waypoint in the flight plan
  - b. Begin entering waypoints in the desired route order. Do not attempt to load a new approach at this time.
  - c. CLR all waypoints after the last waypoint in the route to the alternate and the currently loaded instrument approach header.
  - d. When ready to proceed to the alternate, highlight the first enroute waypoint in the route to the alternate airport. ACTIVATE a DIRECT TO that waypoint.
  - e. When enroute to the alternate, a new instrument approach may be loaded into the flight plan.

## 4B. ABNORMAL OPERATING PROCEDURES

### 4B.4 CAUTION-ALERTS ON THE G1000

#### 4B.4.15 MINSPD

<b>MINSPD</b>	AFCS entered Minimum Airspeed Mode
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1. Power levers ..... increase power as required to  
correct underspeed
2. Airplane attitude, speed and altitude .... monitor

*After Minimum Airspeed Mode condition is corrected:*

3. AUTOPILOT ..... reselect vertical and lateral  
modes (if necessary)
4. Power levers ..... adjust as required

### **NOTE**

Autopilot Underspeed Protection Mode provides a pitch down command to maintain  $90 \pm 2$  KIAS or  $v_{sw} + 2$  KIAS, depending on the vertical mode selected. Underspeed protection is not available below 200 feet AGL, except in go-around mode.



#### **4B.14 WINDSHEAR ENCOUNTER**

1. AP DISC SWITCH ..... press and hold
2. Perform established windshear escape procedures

*After Exiting Windshear:*

3. AP DISC SWITCH ..... release
4. Autopilot/Yaw Damper ..... if required

## 4B.15 ESP DISENGAGEMENT

*If ESP is erroneously activated use one of the following methods to disconnect:*

- AP DISC switch . . . . . press and hold
- CWS button . . . . . press and hold
- AUX-SYSTEM SETUP 2 page on MFD . . . . disable stability and protection

*If all three methods are NOT successful:*

- AUTO PILOT circuit breaker . . . . . pull

## **5. PERFORMANCE**

No change.

## **6. MASS AND BALANCE**

No change.

## **7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS**

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For more information refer to the Garmin G1000 Pilot's Guide.

## **8. AIRPLANE HANDLING, CARE AND MAINTENANCE**

No change.

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