



TRUTRAK
— LIVE TO FLY TRUE —

Operating Handbook

For

Vizion 380/385 Series Autopilots



TRUTRAK FLIGHT SYSTEMS

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1. Revisions

Rev Number	Notes	Date
Initial	Manual Created (VZ.12)	20-Nov-13

2. General Introduction

2.1. About Trutrak and your Vizion autopilot

Thank you for purchasing this Trutrak product. At Trutrak, we strive to provide the highest quality avionics and autopilots available in the Experimental & Light Sport Aviation markets. The team at TruTrak are not only committed to quality, but to industry leading customer service and support.

We believe that the Vizion is the best stand-alone autopilot that we have ever created. This is no small accomplishment considering the huge success of the Digiflight II product line. The Vizion capitalizes on the simple user interface and supreme flight dynamics that were established by the Digiflight II.

Your new Vizion autopilot was created with both the VFR and IFR pilot in mind. The new Emergency Level Mode was designed primarily for the VFR pilot that inadvertently finds himself in IMC. The operation of the Altitude Select and Altitude Preselect Modes were designed to be extremely useable and useful in IFR flight, even to the extent that an Altitude Select can be entered and the vertical speed is easily adjusted to any desired value. This feature is extremely useful when initiating approaches or during step down approaches.

Please read this manual carefully and get to know your new autopilot. The operation of the Vizion is similar to Digiflight II, but there are many new modes with changes in user interface.

2.2. Controls

The face of the autopilot has a display for showing mode and other information to the pilot. Also on the face of the autopilot there is a **MODE** button, **ALT** button, and a **KNOB**.

Not on the face of the unit, but also integral pieces of the autopilot system are the control wheel steering button or **CWS** button, and the **AP LEVEL** button.

Most modes and features of the autopilot are accessed using **MODE**, **ALT**, and **KNOB**.

There are a few different ways to utilize the **MODE** and **ALT** buttons, one is a momentary press and release, this will be called “press”. The other way to utilize the **MODE** or **ALT** button, is to press and hold the button until the display changes, this will be called “press and hold”. The press and hold function requires approximately 2 seconds for the hold.

Similarly to the **MODE** and **ALT** buttons, the **KNOB** has press and hold functions. The knob is also rotated for selecting new values for data entry. The rotation will be called “select”.

Like the **MODE**, **ALT**, and **KNOB**, the **CWS** button has both press and press and hold functions.

The **AP LEVEL** button has only the press function.



3. Autopilot Power Up

It is essential that the aircraft be stationary during the power up sequence!

The autopilot master switch should be in the off position when the engine is started. After starting the aircraft engine, turn on the autopilot master switch and keep the aircraft stationary as the internal gyros are initialized. This takes approximately 20 seconds during which time the display will first show the autopilot type and software version in lower portion of the screen. This is displayed for the first 10 seconds. Autopilot type and software version is shown in figure 3a.



Figure 3a

Following the autopilot type and software version screens, the display show the words **PWR UP** in the lower right, as shown in figure 3b.



Figure 3b

When the power up sequence is complete **PWR UP** will change to **AP OFF**, as shown in figure 3c. Once **AP OFF** is displayed, the aircraft can be moved without introducing centering errors into the internal gyros.



Figure 3c

Note: Before using the autopilot, an altimeter sync should be completed. See section 6.1 for altimeter sync instructions

4. Autopilot Display

The autopilot display shows operating modes and associated data. It is also used to display setup mode screens and their values. When displaying operating modes, the left side shows lateral data and the right side shows vertical data.

4.1. GPS Signal Status

4.1.1. Autopilot Not Engaged

The current GPS signal status is indicated in the top left corner of the display. **NO GPS** is displayed when no valid signal is being received. This is shown in Figure 4.1.1a

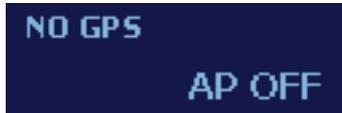


Figure 4.1.1a

A flashing period is displayed in the upper left when a GPS signal is detected but no position information is available and the words **NO FIX** are displayed. This is shown in Figure 4.1.1b



Figure 4.1.1b

A flashing asterisk (*) and **GPS OK** is displayed when the GPS position information is valid. This is shown in Figure 4.1.1c.



Figure 4.1.1c

A flashing plus (+) is displayed when GPS flight plan information is received via RS232 or GPS Steering information is received via ARINC 429. This is shown in Figure 4.1.1d.



Figure 4.1.1d

If the aircraft is travelling at a speed greater than 10 knots, and has a valid GPS fix (a flashing asterisk (*) or plus (+) is displayed), the display will show the current ground track or **TRK**. This is shown in Figure 4.1.1e.



Figure 4.1.1e

4.1.2. Autopilot Engaged

Similar to when the autopilot is not engaged, the current GPS signal status is indicated in the top left corner of the display. **BANK** is displayed when no valid signal is being received. This is shown in Figure 4.1.2a.



Figure 4.1.2a

A flashing period is displayed under **BANK** when a GPS signal is detected but no position information is available. This is shown in Figure 4.1.2b.



Figure 4.1.2b

A flashing asterisk (*) is displayed when the GPS position information is valid. TRK replaces GPS OK once the aircraft has 10 knots of ground speed. This is shown in Figure 4.1.2c.

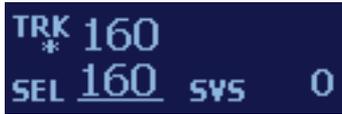


Figure 4.1.2c

A flashing plus (+) shows when GPS flight plan information is received via RS232 or GPS Steering information is received via ARINC 429. This is shown in Figure 4.1.2d.

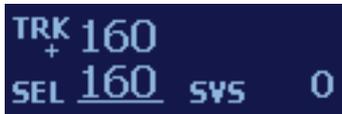


Figure 4.1.2d

4.2. DG Display

The upper left display shows **TRK** and the current GPS ground track only when there is at least 10 kts of ground speed and a valid GPS signal. The DG display is a gyroscopically enhanced GPS ground track. This enhancement creates a very easy to fly track based DG, which is free of the usual GPS based lag in many displays. The DG is shown in the upper left of figure 4.3a

4.3. Trim Annunciation

The scrolling bars in the middle of the display indicate a need for pitch trim adjustment. Bars scrolling up means trim up, bars scrolling down mean trim down. Figure 4.3a shows a sample screen with the trim annunciation shown in the center of the display.

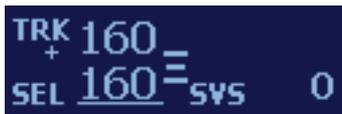


Figure 4.3a

5. Vizion Setup Procedure

In the Vizion setup screens, pressing **ALT** will advance the page to the next setup screen. Pressing **MODE** will return to the previous screen. Rotating the **KNOB** changes the values. Pressing the **KNOB** exits the setup mode. NOTE: See Section 8 for suggested settings of many common aircraft.

5.1. Lateral Setup

Press and hold **MODE** to access the lateral setup menu.

5.1.1. LAT ACTIVITY

Selectable from **0** to **24**. This setting controls the “sensitivity” of the roll servo. A higher setting will increase the reaction speed, too high will cause jitteriness. A lower setting will decrease reaction speed, too low will cause sluggishness. The LAT ACTIVITY setup screen is shown in Figure 5.1.1a.



Figure 5.1.1a

5.1.2. BAUD

Selectable from **600** to **9600**. Most GPS settings will be either 4800 or 9600. This setting must be matched to the Baud Rate output of the GPS connected to the RS232 input of the autopilot. Consult the setup procedure for the GPS to obtain the proper baud rate setting. The BAUD setup screen is shown in Figure 5.1.2a



Figure 5.1.2a

5.1.3. BANK ANGLE

Selectable between **LO**, **MED**, and **HI**. This setting controls the bank angle in GPS Nav mode or the Track Selector Mode. It does not affect GPSS mode. LO provides approximately 12° of bank, MED provides 18°, and HI 24°, regardless of airspeed. The BANK ANGLE setup screen is shown in figure 5.1.3a.



Figure 5.1.3a

5.1.4. MICROACTIVITY

Selectable from **0** to **31**. This setting is used to reduce the effects of lost motion in the system. Cable operated systems will need to use a higher value. Most pushrod control systems can use a value of 0. Obtain factory assistance before making large adjustments to this setting. The lateral axis MICROACTIVITY setup screen is shown in Figure 5.1.4a.

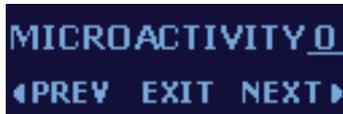


Figure 5.1.4a

5.1.5. GPSS GAIN

Selectable from **16** to **32**. This setting is used to adjust the gain of the GPS Steering signal from a source device. Increasing the setting will result in a higher bank angle at a given point, up to the maximum of the internal limiter. The GPSS GAIN setup screen is shown in Figure 5.1.5a.



Figure 5.1.5a

5.1.6. YAW DAMPER?

Selectable between **N** and **Y**. Setting this to **Y** will engage an installed yaw damper with the autopilot. Leave this set at **N** if no yaw damper is installed. The YAW DAMPER? setup screen is shown in Figure 5.1.6a.



Figure 5.1.6a

5.2. Vertical Setup

Press and hold **ALT** to access the vertical setup menu.

5.2.1. VRT ACTIVITY

Selectable from **0** and **24**. This setting controls the “sensitivity” of the pitch servo. A higher setting will increase the reaction speed, too high will cause jitteriness. A lower setting will decrease reaction speed, too low will cause sluggishness. The VRT ACTIVITY setup screen is shown in Figure 5.2.1a



Figure 5.2.1a.

5.2.2. MIN AIRSPD

Selectable from **0** to **399**. This setting adjusts the minimum airspeed, in knots indicated, that the autopilot will fly. When this airspeed is reached in flight, the autopilot will flash a warning on the screen and drop the nose of the aircraft to maintain this airspeed. The MIN AIRSPD setup screen is shown in Figure 5.2.2a



Figure 5.2.2a.

5.2.3. MAX AIRSPD

Selectable from **0** to **399**. This setting adjusts the maximum airspeed, in knots indicated, that the autopilot will fly. When this airspeed is reached in flight, the autopilot will flash a warning on the screen and raise the nose of the aircraft to maintain this airspeed. The MAX AIRSPD setup screen is shown in Figure 5.2.3a



Figure 5.2.3a.

5.2.4. PITCH REV

Selectable between **N** and **Y**. This setting allows reversal of the direction of travel and trim annunciation of the pitch servo without a wiring change. The PITCH REV setup screen is shown in Figure 5.2.4a.



Figure 5.2.4a

5.2.5. STATIC LAG

Selectable from **0** to **4**. This setting is used to tune out gentle oscillations in the pitch axis. Increasing the setting will dampen an oscillation, but will also make the autopilot less reactive to altitude deviations. The STATIC LAG setup screen is shown in Figure 5.2.5a.



Figure 5.2.5a

5.2.6. MICROACTIVITY

Selectable from **0** to **31**. This setting is used to reduce the effects of lost motion in the system. Cable operated systems will need to use a higher value. Most pushrod control systems can use a value of 0. Obtain factory assistance before making large adjustments to this setting. The vertical axis MICROACTIVITY setup screen is shown in Figure 5.2.6a.

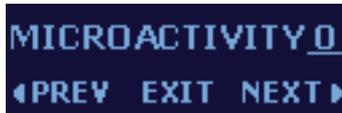


Figure 5.2.6a

5.2.7. HALF-STEP?

Selectable between **N** and **Y**. This setting is used to tune out an almost imperceptible pitch oscillation where one step of the servo is too much adjustment. Set to Y to enable. The HALF STEP? setup screen is shown in Figure 5.2.7a.



Figure 5.2.7a

5.3. Contrast and Minimum Backlight Adjustment

5.3.1. Contrast Adjustment

The contrast adjustment allows the user to set a desired contrast level for the autopilot display. This mode is accessed by a press and hold of the **KNOB** while turning on the autopilot master switch. Once power is applied, release the **KNOB** to show the contrast setup screen. Rotate the **KNOB** to the desired value. Press the **KNOB** to advance to the Minimum Backlight adjustment. Figure 5.3.1a shows the Contrast Adjustment screen.



Figure 5.3.1a

5.3.2. Minimum Backlight Adjustment

The Minimum Backlight Adjustment allows the user to set a minimum value for the autopilot backlight automatic dimming feature. It is accessed after the Contrast Adjustment (section 5.3.1). Rotate the **KNOB** to select a desired value. Press the **KNOB** to exit the screen and return to the normal power up sequence. Figure 5.3.2a shows the Minimum Backlight Adjustment.



Figure 5.3.1a

6. Autopilot Operation

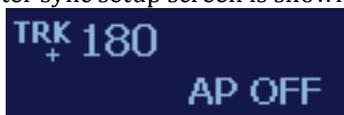
6.1. Syncing the altimeter

Sync the altimeter as part of pre-takeoff checklist!

The autopilot has a built in altimeter that must be synced to the aircraft altimeter for proper operation of the altitude select and pre-select modes.

This is accessed by pressing the **ALT** button twice from the normal operating home screen (not in a setup mode, or in the altitude select setup screen). The first press of the **ALT** button is the altitude select setup screen, the second press is the altimeter sync setup screen.

Rotate the **KNOB** to set the altimeter to the aircraft altimeter reading, in feet, and then press the **KNOB**. Each time the power is cycled on the autopilot, the altimeter will return to an equivalent baro setting of 29.92. When the autopilot is disengaged, the transition to altimeter sync setup screen is shown in Figure 6.1a.



Press **ALT**



Press **ALT**

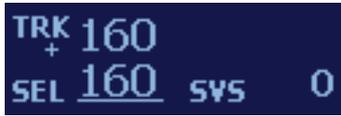


Rotate **KNOB** then Press **KNOB**

Figure 6.1a

NOTE: If the sync page is entered by accident, pressing the **MODE** button will exit back to the normal operation screen.

Figure 6.1b shows the transition from a normal autopilot engaged operating home screen (TRK mode and SVS mode in this case) to the altimeter sync setup screen.



TRK + 160
SEL 160 SVS 0

Press **ALT**



SEL ALT 1400
SEL VS 100↑

Press **ALT**



ALTITUDE 1352

Rotate **KNOB** then Press **KNOB**
Figure 6.1b

6.2. Engaging/Disengaging the autopilot

6.2.1. Engaging the autopilot

The autopilot can be engaged in one of four ways:

- 1) Press the **KNOB** on the autopilot face;
- 2) Press and hold the **CWS** button for 1.5 seconds (if equipped) (See section 6.5.3 for **Control Wheel Steering Mode**).
- 3) Remotely from an EFIS or other system, which has a connection to the autopilot (if equipped).
- 4) Using the **AP LEVEL** button. (if equipped) (See section 6.5.1 for **Emergency Level Mode**).

When engaged using the **KNOB** or **CWS** button, the autopilot will synchronize to the current ground track and the current vertical speed, as shown in Figure 6.2.1a. The aircraft is flying a track of 200 degrees and a positive vertical speed of 1000 fpm.



Figure 6.2.1a

6.2.2. Disengaging the autopilot

The autopilot can be disengaged in one of three ways:

- 1) Press and hold the **KNOB** on the face of the autopilot for 1.5 seconds;
- 2) Press the **CWS** button (if equipped).
- 3) Remotely from an EFIS or other systems, which has a connection to the autopilot (if equipped).

When disengaged, the autopilot will release control of both servos. An example of a disengaged autopilot is shown in Figure 6.2.2a.



Figure 6.2.2a

6.3. Normal Lateral Autopilot Modes

6.3.1. Track Select Mode

The track select mode, or **TRK** mode is the default lateral mode that is activated when the autopilot is engaged. When the autopilot is engaged it will synchronize to the track being flown at that time. This mode allows the user to select a desired track for the autopilot to fly. The selected track can be adjusted by turning the knob.

- 1) 5° increments when turning the **KNOB**.
- 2) 1° increments when pressing and holding the **KNOB** in while turning it.

To access the **TRK** mode from **GPS NAV** mode (see section 6.3.2) or **GPSS** mode (see section 6.3.3), press the **MODE** button on the autopilot. Figure 6.3.1a shows the transition from **GPS NAV** mode to **TRK** mode.

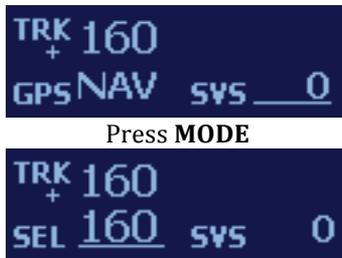


Figure 6.3.1a

Figure 6.3.1b shows the autopilot in **TRK** mode and **SVS** mode (see section 6.4.1 for **SVS** mode).

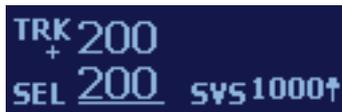


Figure 6.3.1b

Figure 6.3.1c shows the autopilot in **TRK** mode and **ALT HOLD** mode (see section 6.4.2 for **ALT HOLD** mode).



Figure 6.3.1c

Figure 6.3.1d shows the autopilot in **TRK** mode and **SEL** mode (see section 6.4.3 for **SEL** mode).

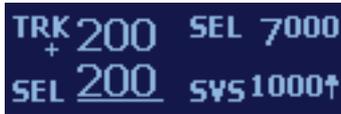


Figure 6.3.1d

6.3.2. GPS NAV Mode (RS232 Only)

The **GPS NAV** mode allows the autopilot to follow a direct-to or multi-leg flight plan from the connected handheld or non-IFR GPS. This mode uses only RS232 data and will not anticipate any turns or fly any procedure turns/approaches. This mode is accessed from the **TRK** mode by pressing the **MODE** button on the autopilot.

To access the **GPS NAV** mode from **TRK** mode, press the **MODE** button. Figure 6.3.2a shows the transition from **TRK** mode to **GPS NAV** mode.

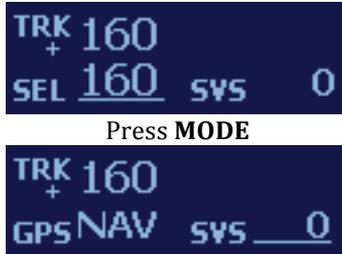


Figure 6.3.2a

Figure 6.3.2b shows the autopilot in **GPS NAV** mode and **SVS** mode (see section 6.4.1 for **SVS** mode).

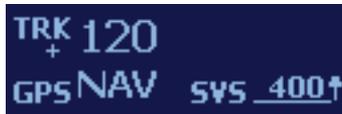


Figure 6.3.2b

Figure 6.3.2c shows the autopilot in **GPS NAV** mode and **ALT HOLD** mode (see section 6.4.2 for **ALT HOLD** mode).

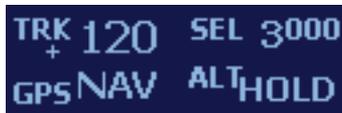


Figure 6.3.2c

Figure 6.3.2c shows the autopilot in **GPS NAV** mode and **SEL** mode (see section 6.4.3 for **SEL** mode).

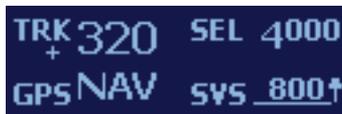


Figure 6.3.2c

6.3.3. GPSS Mode (Vizion 385 Only)

The **GPSS** mode allows the autopilot to follow a direct-to or multi-leg flight plan from an IFR GPS, or an external steering source such as an EFIS. This mode uses ARINC 429 data. This mode will anticipate upcoming turns, rounding the corners instead of overshooting the next course. It will also fly procedure turns and approaches. This mode is accessed from the track selector mode by pressing the **MODE** button on the autopilot. When in **GPSS** Mode, the autopilot display will show **GPSS** on the display. *If ARINC 429 steering inputs are present, GPS Nav mode will be skipped.*

To access the **GPSS** mode from **TRK** mode, press the **MODE** button. Figure 6.3.3a shows the transition from **TRK** mode to **GPSS** mode.

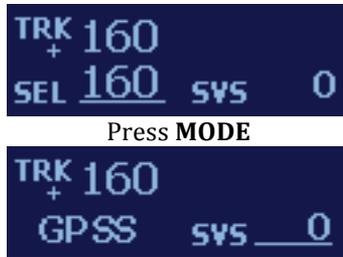


Figure 6.3.3a

Figure 6.3.3b shows the autopilot in **GPSS** mode and **SVS** mode (see section 6.4.1 for **SVS** mode).



Figure 6.3.3b

Figure 6.3.3c shows the autopilot in **GPSS** mode and **ALT HOLD** mode (see section 6.4.2 for **ALT HOLD** mode).

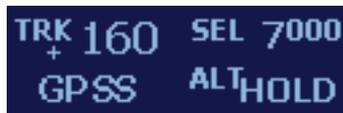


Figure 6.3.3c

Figure 6.3.3c shows the autopilot in **GPSS** mode and **SEL** mode (see section 6.4.3 for **SEL** mode).

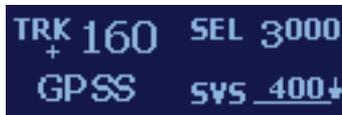


Figure 6.3.3c

Figure 6.3.3d shows the autopilot in **GPSS** mode and **GPSV** mode (see section 6.4.5 for **GPSV** mode).

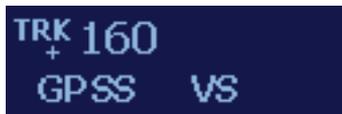


Figure 6.3.3d

Figure 6.3.3e shows the autopilot in **GPSS** mode and **GS ARM** mode (see section 6.4.6 for **GS ARM** mode).



Figure 6.3.3e

Figure 6.3.3f shows the autopilot in **GPSS** mode and **GS CPLD** mode (see section 6.4.6 for **GS CPLD** mode).



Figure 6.3.3f

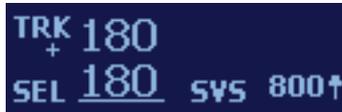
6.4. Normal Vertical Autopilot Modes

6.4.1. Vertical Speed Mode

The vertical speed mode or **SVS** mode is the default vertical mode that is activated when the autopilot is engaged (as long as an altitude pre-select has not been entered).

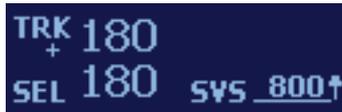
When the autopilot is engaged it will synchronize to the vertical speed being flown at that time. The **SVS** mode allows the user to select a desired vertical speed for the autopilot to fly. The selected vertical speed can be adjusted by pressing the **KNOB** to move the cursor under the number next to **SVS**, and then rotating the **KNOB**.

Once the **SVS** is selected the autopilot will continue climbing or descending at the selected vertical speed until the user stops the climb or descent. Figure 6.4.1a shows the movement of the cursor from **TRK** to **SVS**.



TRK + 180
SEL 180 SVS 800↑

Press **KNOB**

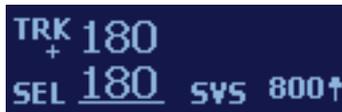


TRK + 180
SEL 180 SVS 800↑

Rotate **KNOB**

Figure 6.4.1a

Figure 6.4.1b shows the autopilot in **TRK** mode (see section 6.3.1 for **TRK** mode) and **SVS** mode. Note: in this figure, the cursor will have to be moved to change the **SVS**.



TRK + 180
SEL 180 SVS 800↑

Figure 6.4.1b

Figure 6.4.1c shows the autopilot in **GPS NAV** mode (see section 6.3.2 for **GPS NAV** mode) and **SVS** mode.



TRK + 120
GPS NAV SVS 400↑

Figure 6.4.1c

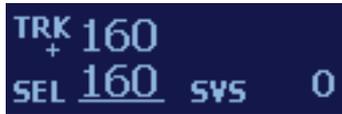
Figure 6.4.1d shows the autopilot in **GPSS** mode (see section 6.3.3 for **GPSS** mode) and **SVS** mode.



TRK +160
GPSS SVS 1000↑

Figure 6.4.1d

NOTE: There is a special case of vertical speed when zero (0) is selected. This is NOT altitude hold, but will maintain zero vertical speed. This mode allows the aircraft to vary in altitude, and in heavy turbulence will give a smoother ride to the occupants. The **SVS** zero mode is shown in figure 6.4.1e.



TRK +160
SEL 160 SVS 0

Figure 6.4.1e

6.4.2. Altitude Hold Mode

The altitude hold mode or **ALT HOLD** holds the selected altitude. The autopilot can hold at any 100-foot increment. When directly entering the **ALT HOLD** mode, the autopilot will go to the nearest 100-foot increment. It is recommended that the altimeter be synced prior to using altitude hold.

This mode is accessed from **SVS**, **SEL**, or **GS ARM** mode by pressing the **ALT** button and then pressing the **KNOB**. The transition from **SVS** to **ALT HOLD** mode is shown in figure 6.4.2a.

NOTE: pressing **ALT** when in **GS CPLD** mode will initiate the **Missed Approach!** (see section 6.4.7 for Missed Approach mode)

NOTE: Pressing **ALT** while in **GPSV** mode will not change any vertical modes! (see section 6.4.5 for GPSV mode)

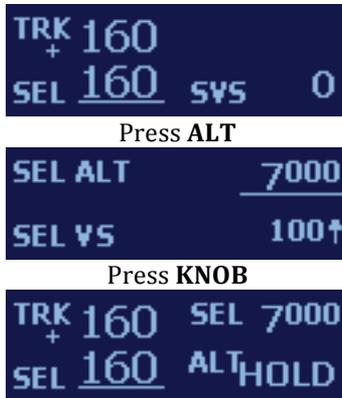


Figure 6.4.2a

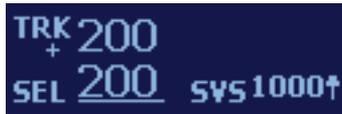
6.4.3. Altitude Select Mode

Sync the altimeter before performing altitude select (see section 6.1)

The altitude select mode allows the user to select a target altitude above or below the current altitude, as well as a vertical speed to transition to that altitude. This mode is accessed by pressing the **ALT** button.

With autopilot engaged, press **ALT**, rotate the **KNOB** to select target altitude, press the **KNOB**, select vertical speed, press the **KNOB**. The sequence for entering altitude select is shown in Figure 6.4.3a

- 1) 500 foot increments when turning the **KNOB**.
- 2) 100 foot increments when pressing and holding the **KNOB** in while turning it.



TRK 200
+
SEL 200 VS 1000↑

Press **ALT**



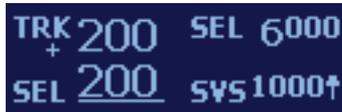
SEL ALT 1400
SEL VS 1000↑

Rotate **KNOB** then Press **KNOB**



SEL ALT 6000
SEL VS 1000↑

Rotate **KNOB** then Press **KNOB**



TRK 200 SEL 6000
+
SEL 200 VS 1000↑

Figure 6.4.3a.

NOTE: The selected vertical speed will default to the last selected.

The vertical speed and altitude can be adjusted at any time during a transition to a selected altitude. This requires simply moving the cursor, which normally resides beneath the **SEL** track, to the value to be edited. To move the cursor Press the **KNOB** and the cursor will move to **SVS**, Press the **KNOB** again to move the cursor to **SEL** altitude. Figure 6.4.3b shows moving the cursor around the display.

If the **SEL** altitude is moved to the current altitude the autopilot will enter **ALT HOLD**.

The **SVS** can be adjusted to ANY value during a transition, even the opposite direction. This may be useful when flying instrument approaches, as the desired altitude can be entered and the vertical speed set to zero until time to begin the transition to the selected altitude. Note that zero vertical speed will NOT keep the aircraft locked at a specific altitude, but will certainly hold fairly close for several minutes.

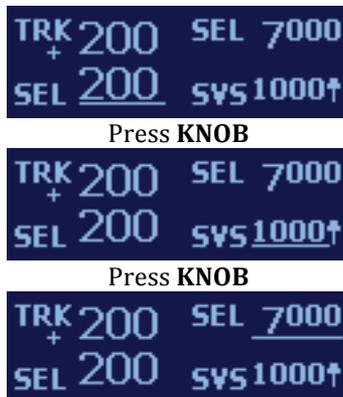


Figure 6.4.3b

6.4.4. Altitude Pre-Select Mode

Sync the altimeter before performing altitude pre-select (see section 6.1)

The altitude pre-select mode allows the user to pre-select a target altitude before takeoff. Once engaged, the autopilot will proceed in a climb to the selected target altitude and synchronize to the current vertical speed. This mode is accessed by pressing the **ALT** button once while the autopilot is disengaged.

From autopilot disengaged, press **ALT** button, rotate the **KNOB** to select target altitude, press the **KNOB**. The sequence for entering an altitude pre-select is shown in figure 6.4.4a.

- 1) 500 foot increments when turning the **KNOB**.
- 2) 100 foot increments when pressing and holding the **KNOB** in while turning it.

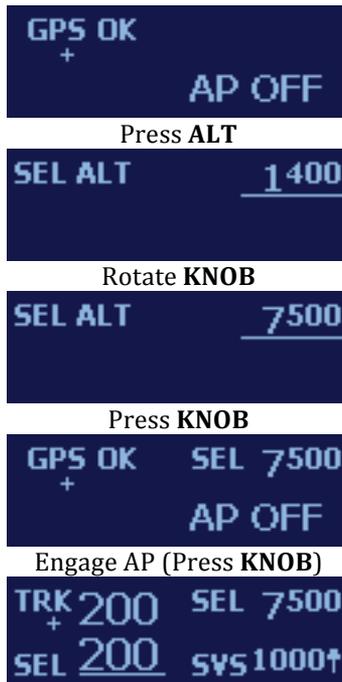


Figure 6.4.4a

Once a target altitude is selected, it will be displayed in the top right of the autopilot display. This is shown in the fourth picture of Figure 6.4.4a.

When the autopilot is engaged, it will synchronize to the current vertical speed, as long as the current vertical speed is above 500 fpm, otherwise it will synchronize to 500 fpm.

The vertical speed and altitude can be adjusted at any time during a transition to a selected altitude. This requires simply moving the cursor, which normally resides beneath the **SEL** track, to the value to be edited. To move the cursor Press the **KNOB** and the cursor will move to **SVS**, Press the **KNOB** again to move the cursor to **SEL** altitude. Figure 6.4.3b shows moving the cursor around the display.

If the **SEL** altitude is moved to the current altitude the autopilot will enter **ALT HOLD**.

The **SVS** can be adjusted to ANY value during a transition, even the opposite direction.

6.4.5. GPSV Mode (Vizion 385 ONLY)

The vertical GPS Steering mode or **GPSV** mode is engaged automatically with **GPSS** if the vertical steering signal is present. This mode is displayed with the addition of **VS** to the **GPSS** that appears in the lower left. If the autopilot is engaged during a climb or descent, the vertical speed must be zeroed (see section 6.4.1) or **ALT HOLD** (see section 6.4.2) engaged to engage **GPSV**. The only exception is if the autopilot is engaged remotely from an EFIS. Figure 6.4.5a shows the autopilot in **GPSS** and **GPSV**

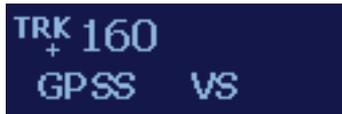


Figure 6.4.5a

6.4.6. Vertical Approach Mode (Vizion 385 ONLY)

The vertical approach mode allows the autopilot to couple to and track the glide slope of a GPS LPV approach. This mode is only available in **GPSS** mode. To access this mode, the autopilot must be in GPSS mode and have zero vertical speed selected (section 6.4.1) or **ALT HOLD** (section 6.4.2) selected. Once **ALT HOLD** or zero vertical speed is selected the approach mode will automatically engage. It is displayed by sequencing **GS ARM** initially to **GS CPLD**, once the glide slope is intercepted, on the lower right of the display. Figure 6.4.6a shows the sequencing on the display.

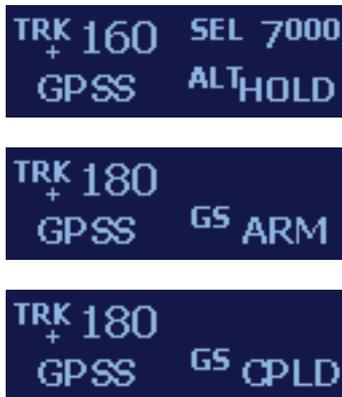


Figure 6.4.6a

In the event that the GPS sends out a flagged vertical steering signal, the autopilot will display **GS FLG** and maintains the current altitude. Figure 6.4.6b shows the **GS FLG** display.



Figure 6.4.6b

6.4.7. Missed Approach Mode (Vizion 385 ONLY)

This mode allows the autopilot to break off from a coupled glide slope and initiate a 500 fpm climb while maintaining the current track, but staying in **GPSS** mode. This mode can only be initiated while coupled to an LPV glide slope with the display showing **GS CPLD**. To use Missed Approach Mode, press **ALT**. Figure 6.4.7a shows the autopilot in the Missed Approach Mode.



Figure 6.4.7a

6.5. Other Autopilot Modes

6.5.1. Emergency Level Mode

This mode allows the autopilot to be engaged into track hold mode and zero vertical speed mode from ANY attitude, with the press of a single button. Figure 6.5.1a shows the display when the Emergency Level Mode is engaged. To engage the Emergency Level mode, press the **AP LEVEL** button (if equipped).

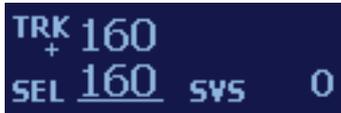


Figure 6.5.1a

6.5.2. Gyro Backup Mode

This mode is the lateral mode available when the RS232 signal from the GPS is lost. It allows selection of a bank angle in either the left or right direction up to 30° of bank. This mode is essentially a wing leveler. Use the **KNOB** to select the desired bank angle. Figure 6.5.2a shows the gyro backup mode screen.



Figure 6.5.2a

Altitude select, altitude hold, and vertical speed select modes are still accessible when no GPS signal or fix is available. Figure 6.5.2b shows a 10 degree left bank and altitude hold at 7000 feet. (see section 6.4.2 for **ALT HOLD**)

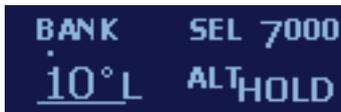


Figure 6.5.2b

If the autopilot is drifting left or right with 0° selected, the gyro trim needs to be adjusted. **Press and hold KNOB** to access the gyro trim screen. Adjust the gyro trim in the appropriate direction in 0.2°/min increments. Figure 6.5.2c shows the gyro backup mode screen and the gyro trim screen.

Note: the autopilot may momentarily switch to the AP OFF screen while performing the **Press and hold**, Rotating the knob left of right will bring the normal display back into view and the autopilot will not disengage.



Figure 6.5.2c

6.5.3. Control Wheel Steering Mode

This mode allows the autopilot to be temporarily disengaged to make a quick course change and/or vertical speed change. This mode is accessed by a **press and hold** of the control wheel steering switch (if equipped). While the switch is held, the display will show the autopilot is in CWS Mode. Figure 6.5.3a shows the CWS mode screen.



Figure 6.5.3a

When the button is released, the autopilot will hold the new track and the new vertical speed, if greater than 400 fpm in either direction. If the vertical speed at time of release is less than 400 fpm, then the autopilot will hold zero vertical speed. Figure 6.5.3b shows the screen after release at a vertical speed of 800 fpm up.

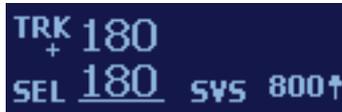


Figure 6.5.3b

6.6. Gyro Set Mode

This mode allows the autopilot to re-center the internal gyros. This can often help to correct a drift in one or more axes. This procedure does not need to be performed on every flight. It can be done once after the initial installation of the autopilot, but should not need to be repeated.

6.6.1. Performing a Gyro Set

HOLD THE AIRCRAFT STATIONARY THROUGHOUT THIS PROCEDURE!

To perform a gyro set, make sure the autopilot is fully powered up and showing AP OFF on the display. Press and hold the **KNOB** for about 45 seconds. During this time the display will show GYRO SET. Once 45 seconds has elapsed, release the **KNOB**. The procedure is complete. Figure 6.6.1a shows the GYRO SET screen.



Figure 6.6.1b

7. Quick Reference Cards

The following Quick Reference Cards will give a quick overview of the Vizion 380 and 385 controls.

7.1. Vizion 380 Quick Reference

Power Up – Aircraft Stationary!!!

GPS Status

GPS OK and flashing * or + means GPS communication is working properly and GPS has a fix.

Engage Autopilot

Press knob

or

Press and hold CWS switch for 2 seconds and release

or

Press AP LVL button

Disengage Autopilot

Press and hold knob for 2 seconds

or

Press CWS switch

Lateral Modes

Track Mode

Rotate knob to select desired track

GPS Nav Mode

Press MODE button to follow flight plan on GPS.

Gyro Back-Up Mode (Bank) – Only with GPS failure

Rotate knob to select desired bank angle (up to 30 degrees)

Press and hold knob in and rotate to trim gyro drift when commanding zero bank angle

Vertical Modes

Altimeter Sync (AP disengaged or engaged)

Press ALT button ->
Sync altimeter, press knob

Altitude Pre-Select Mode (AP disengaged)

Press ALT button ->
Select altitude, press knob
AP will sync to current vertical speed when engaged, or default to 500 fpm if current vertical speed is less than 500 fpm

Altitude Select Mode

Press ALT button ->
Select altitude, press knob ->
Select vertical speed, press knob

Altitude Hold Mode

Automatically entered when target altitude is reached
or
Press ALT button ->
Press knob (without adjusting target altitude)

Additional Information

Gyro Set - Aircraft must be stationary!

With AP NOT engaged
Press and hold knob for 45 seconds

7.2. Vizion 385 Quick Reference

Power Up – Aircraft Stationary!!!

GPS Status

GPS OK and flashing * or + means GPS communication is working properly and GPS has a fix.

Engage Autopilot

Press knob

or

Push and hold CWS switch for 2 seconds and release

or

Press AP LVL button

Disengage Autopilot

Press and hold knob for 2 seconds

or

Press CWS switch

Lateral Modes

Track Mode

Rotate knob to select desired track

GPS Steering Mode (GPSS)

Press MODE button to follow flight plan on GPS.

Gyro Back-Up Mode (Bank) – Only with GPS failure

Rotate knob to select desired bank angle (up to 30 degrees)

Push and hold knob in and rotate to trim gyro drift when commanding zero bank angle

Vertical Modes

Altimeter Sync (AP disengaged or engaged)

Press ALT button twice ->

Sync altimeter, press knob

Altitude Pre-Select Mode (AP disengaged)

Press ALT button ->

Select altitude, press knob

AP will sync to current vertical speed when engaged, or default to 500 fpm if current vertical speed is less than 500 fpm

Altitude Select Mode

Press ALT button ->

Select altitude, press knob ->

Select vertical speed, press knob

Altitude Hold Mode

Automatically entered when target altitude is reached

or

Press ALT button ->

Press knob (without adjusting target altitude)

Vertical GPS Steering Mode (unless remote engage)

Press MODE button ->

Select zero vertical speed or altitude hold

Additional Information

Gyro Set - Aircraft must be stationary!

With AP NOT engaged

Press and hold knob for 45 seconds

8. Suggested Autopilot Settings

The following section will give suggested starting points for the settings of the Vizion based on several popular Experimental-Amateur Built aircraft.

Note: Baud is not listed, as it is a GPS specific selection.

8.1. Van's Aircraft RV's

RV-4

Lat Activity - 2
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 1
Min Airspeed - 60
Max Airspeed - 180
Static Lag - 0
Microactivity - 0
Half-Step - 0

RV-6

Lat Activity - 3
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 2
Min Airspeed - 65
Max Airspeed - 180
Static Lag - 0
Microactivity - 0
Half-Step - 0

RV-7

Lat Activity - 3
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 2
Min Airspeed - 65
Max Airspeed - 180
Static Lag - 0
Microactivity - 0
Half-Step - 0

RV-9

Lat Activity - 3
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 2
Min Airspeed - 60
Max Airspeed - 170
Static Lag - 0
Microactivity - 0
Half-Step - 0

RV-10

Lat Activity - 3
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 9
Min Airspeed - 70
Max Airspeed - 180
Static Lag - 0
Microactivity - 0
Half-Step - 0

8.2. Lancair

Lancair 235/320/360

Lat Activity - 4
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 2
Min Airspeed - 70
Max Airspeed - 190
Static Lag - 0
Microactivity - 0
Half-Step - 0

Lancair Legacy

Lat Activity - 5
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 4
Min Airspeed - 75
Max Airspeed - 195
Static Lag - 0
Microactivity - 0
Half-Step - 0

Lancair IV-P Piston

Lat Activity - 6
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 5
Min Airspeed - 80
Max Airspeed - 200
Static Lag - 0
Microactivity - 0
Half-Step - 0

Lancair IV-P Turbine

Lat Activity - 15
Bank Angle - MED
Microactivity - 4
GPSS Gain - 16
Vrt Activity - 6
Min Airspeed - 80
Max Airspeed - 200
Static Lag - 0
Microactivity - 0
Half-Step - 0

Lancair ES

Lat Activity - 5
Bank Angle - MED
Microactivity - 0
GPSS Gain - 16
Vrt Activity - 4
Min Airspeed - 80
Max Airspeed - 190
Static Lag - 0
Microactivity - 0
Half-Step - 0

8.3. Glasair Aviation

Sportsman 2+2

Lat Activity - 7
Bank Angle - MED
Microactivity - 4
GPSS Gain - 16
Vrt Activity - 7
Min Airspeed - 55
Max Airspeed - 150
Static Lag - 0
Microactivity - 4
Half-Step - 0



TruTrak Flight Systems, Inc.