

FENCODER Operations, Programming & Installation Manual

About This Manual

This manual is divided into three sections 1) operations; 2) programming; 3) installation.

All three sections are combined as the programming information is necessary for both after-installation setup and occasional changes of options or limits for optimum customization. We suggest that the entire operations section be read first before attempting to change any options or warning limits.

Those tasks that would normally be performed in flight are in the operations section and those performed on the ground are in the programming section.

This manual describes FENCODER software version:

11.30 through 12.xx

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NOTE TO THE USER

The FENCODER manuals are open to revision based on your needs. If you have suggestions for improvement or clarification, please write or call.

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Description

The FENCODER (micro-encoder) is a mode C altitude encoder with a host of additional features. Using solid-state sensors and processing technology with a powerful microprocessor, the unit combines an altitude encoder with a graphical/digital vertical speed indicator, digital airspeed indicator, sensitive digital altimeter and digital outside air temperature indicator.

With this information available to the micro-processor, additional flight information such as true airspeed, altitude alert, density altitude, pressure altitude and true air temperature are available at the touch of a switch. Front panel controls allow you to select options and enter warning limits to tailor the FENCODER to your aircraft and personal preferences. A nonvolatile memory maintains all programmed information even with power off or disconnected.

Visual blink warnings and optional audio alarms are provided to warn you when programmed limits have been exceeded. An altitude alert feature provides warnings and alarms for converging on a target altitude, holding an altitude and approach decision height.

All warning limits, calibration, backlighting intensity and other programming is performed using front panel controls and can be done without removing the unit from the instrument panel.

A built-in RS232 serial port can be programmed for various baud rates and output formats to offload internal data. This can be used by external equipment such as GPS units or serial-capable transponders that need an altitude reference or other air data provided by the FENCODER.

Compass heading can be displayed and sent in the air data stream when the optional model 303 compass module is installed.

If you're not familiar with the world of computers, welcome. The FENCODER is a dedicated computer in that its function cannot be changed, but it presents the user with a lot of information and there is quite a bit of flexibility in its operation. It's more on the order of a GPS rather than a standard altimeter that is "just there", so some effort is required in understanding its use and adjusting the alarm limits and options to best suit your aircraft and your flying skills.

NOTICE: The FENCODER MUST NOT be used to replace more than the vertical speed indicator in aircraft certified for or intended for IFR flight. It is not prudent to chance a potential loss of three important flight parameters during instrument conditions due to the failure of one unit.

Warnings and Alarms

A flight safety role of the FENCODER is to provide warnings or alarms to the pilot when a function exceeds a programmed limit. An example would be the airspeed exceeding V_{NO} , the normal operating speed of the aircraft.

Warnings are given by blinking the errant function on the display to attract attention and are always given whenever any programmed limit is exceeded.

Audio alarms activate with warnings if the instrument has been programmed to enable an audio alarm for that particular limit.

In the above example where airspeed has exceeded V_{NO} , a V_{NO} indicator will blink as a warning and an audio alarm will optionally sound depending if it has been enabled or not during user programming. The most common blink warning is all five altitude digits for the altitude alert modes.

Two forms of audio alarms are provided: 1) the built-in cockpit audio transducer; 2) a 600 ohm output (with volume control) to headsets. When the term "alarm" is used in this manual, it applies to both built-in and headset audio alarms.

Limits & Options Available

Vertical Speed Indicator

- Limits: None
- Options: Selection of bar graph maximum range from 1000 to 6000 FPM
- Selection of bar graph sensitivity
- Selection of damping rates for display action
- Replacement of the digital digits with compass heading if an external sensor is installed

Outside Air Temperature

- Limits: None
- Options: Choice of indicated or true air temperature for normal display
- Choice of centigrade or Fahrenheit degrees for display

Airspeed

- Limits: V_{NE} Indicator - never exceed or redline speed
- V_{NO} Indicator - maximum normal operation speed and bottom of yellow arc
- Gear Indicator - maximum speed for safe gear extension
- Flap Indicator - maximum speed for safe flap extension or top of white arc
- High Stall - upper stall warning speed or bottom of green arc
- Low Stall - lower stall warning speed or bottom of white arc
- Mach Limit – never exceed Mach number for high performance aircraft
- External Gear Warning - trigger point for external gear warning circuit
- (See the programming and installation sections for additional information.)
- Options: Choice of knots or MPH for airspeed units
- Choice of indicated or true airspeed or Mach number for normal display
- Adjust sensitivity of increasing or decreasing Airspeed Trend Indicators
- Choice of alarm or no alarm to accompany V_{NE} warning
- Choice of alarm or no alarm to accompany V_{NO} warning
- Choice of alarm or no alarm to accompany stall range warning

Altimeter

- Limits: None
- Options: Choice of nearest 10 foot or 1 foot increments shown on readout
Choice of nearest 10 foot or 1 foot increments shown on readout when in approach mode
Choice of InHg or millibar for altimeter setting
Choice of alarm or no alarm at flight level change (18,000ft in USA) warning

Altitude Alert

- Limits: Selection of number of feet for warning when approaching target altitude in converge mode
Selection of number of feet for warning when deviating from target altitude in hold mode
Selection of number of feet for warning when approaching decision height altitude in approach mode
- Options: Choice of alarm or no alarm to accompany some converge/hold warnings
Choice of alarm or no alarm to accompany decision height warning
Selection of alarm duration in seconds for decision height alarm

Miscellaneous Options

- Selection of number of seconds for control panel delay
- Selection of baud rate for serial port
- Selection of output format for serial port (or disable)
- Selection of input format for serial port (or disable)

Built-in Warnings (no audio available)

- Altitude over or under range of instrument
- Airspeed over range of instrument
- VSI over range of instrument
- VSI bar graph over maximum range that has been selected
- Outside air temperature over or under range of instrument

Operating Controls

There are only three controls of two different types on the FENCODER, but because of the powerful micro-processor in the unit there are scores of functions that can be controlled.

The **TOGGLE SWITCHES** are three position switches that return to the normal center position when released after being pressed up or down.

In this manual pressing the toggle switch up toward the DALT label on the panel will be shown as **[DALT]** and pressing the toggle switch down toward the PALT label will be shown as **[PALT]**.

The **SETTING SWITCH** rotates clockwise or counter-clockwise in "clicks" and also has an additional momentary switch that is activated by pushing the knob. In this manual turning the knob will be shown as **[SET]** and pushing the knob will be shown as **[ACK]** (for acknowledge).

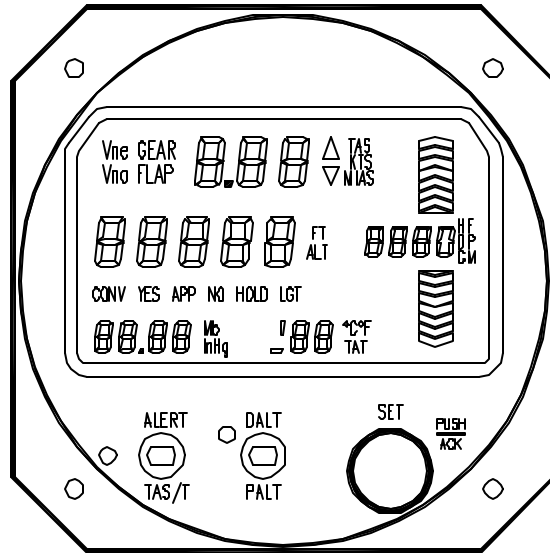


Figure 1 μEncoder controls & display.

The basic operation of the FENCODER should be intuitive turning the knob changes the altimeter setting and pressing **[DALT]**, **[PALT]** or **[TAS/T]** will show density altitude, pressure altitude and true airspeed/altitude/air temperature¹. More advanced operations are a little more complex but pains have been taken to keep all operations as simple, consistent and intuitive as possible. Please read this manual thoroughly to realize the most from the FENCODER.

Vertical Speed Indicator

The vertical speed indicator (also referred to as rate of climb indicator) provides both a digital readout of feet per minute of climb or descent and a bar graph/analog type indication. The bar graph indicates the direction of change and the approximate amount of change while the digital readout gives an accurate rate of change.

The upper bar graph represents climb and the lower bar graph represents descent.

¹ Other options are available for airspeed and outside air temperature depending on which function has been programmed for normal display. See **Options Menu** section in the programming manual.

Each segment in the bar graph does not represent the same number of feet of change. The bar graph inner segments are more sensitive than the outer segments. For example, the first segment might show at only 20 feet per minute, while the 2nd segment might come on at 70 feet per minute. See the programming section to change the sensitivity of the bar graphs.

The maximum FPM that the bar graph represents can be selected in the programming mode.

If the rate of change in altitude exceeds 9990 FPM the vertical speed digits will blink and the reading will remain at 9990 FPM. A blinking bar graph means that the rate of climb or descent exceeds the maximum range of the bar graph. If this happens often, consider changing the range of the bar graph to the next higher scale.

COMPASS HEADING - The digits portion of the vertical speed indicator can be programmed to show the aircraft compass heading instead of the vertical speed. An external compass heading sensor must be installed (see Programming & Installation manual for details). When the compass heading is being shown, only three digits are used and the FPM indicator on the display is replaced with a HDG indicator. The analog up/down bar graphs still function normally showing the vertical speed.

Outside Air Temperature

The outside air temperature range is from -50EC to +92EC (-58EF to +197EF).

If the outside air temperature sensor is disconnected or defective, the outside air temperature portion of the display will be **EE** (error). In addition, without outside air temperature available, certain functions such as density altitude cannot be calculated and will display as a group of letter **E**'s to signify error.

TO VIEW TRUE AIR TEMPERATURE - Pressing and holding **[TAS/T]** will replace the indicated temperature readout with true air temperature which is indicated temperature corrected for temperature rise due to the speed of the aircraft. While being displayed, a **TAT** indicator will appear next to the readout. Releasing **[TAS/T]** will return the display to indicated outside air temperature. Note that indicated airspeed is replaced with true airspeed and indicated altitude is replaced with true altitude at the same time. Optional airspeed display selections will give different results. See **Options Menu** in the programming section.

Airspeed Indicator

The airspeed indicator range is from 30 to 473 knots indicated (15 to 162 knots with low airspeed option). The displayed airspeed will remain at zero until the airspeed reaches the minimum 30 (15 with low airspeed option).

The airspeed indicator can optionally be programmed to display airspeed in miles per hour (MPH) or Mach number instead of knots. The indicator shown would then be **MIAS** for MPH and **M** for Mach number. See the Programming Section.

ATI - Two diamond/arrow shaped indicators, called Airspeed Trend Indicators (ATI) are located just to the right of the airspeed digits. These are provided to tell at a glance if the airspeed is increasing or decreasing.

If the airspeed is increasing, the up-arrow is shown and if the airspeed is decreasing, the down-arrow is shown. The sensitivity of the ATI's is adjustable. See the Programming Section.

STALL - The airspeed digits will blink a warning whenever the airspeed is between the High Stall limit and the Low Stall limit (the stall range) **when the airspeed has entered the stall range from the upper limit.** When accelerating up through the stall range there is no warning. Decelerating down through the stall range will produce a warning and an optional alarm will sound at the Low Stall limit.

The High Stall limit represents the bottom of the green arc.

The Low Stall limit represents the bottom of the white arc. See the Programming Section on how to change the stall range and add/remove the optional audio alarm.

MACH LIMIT - The airspeed digits will blink a warning whenever the Mach number exceeds a preprogrammed Mach limit (for high altitude, high performance aircraft). If the airspeed indicator is programmed to normally display knots or mph, it will be forced to display Mach number as long as the Mach number is over the limit. See the Programming Section on how to change the Mach limit and add/remove the optional audio alarm.

GEAR - The **GEAR** indicator represents safe gear extension speed for those aircraft with retractable landing gear. This indicator is on whenever the airspeed is between the minimum instrument range (30 or 15) and the gear limit. If the aircraft does not have retractable landing gear, this indicator will never be on. See the Programming Section on how to change the gear limit.

FLAP - The **FLAP** indicator represents safe flap extension speed for those aircraft with flaps. This indicator is on whenever the airspeed is between the minimum instrument range (30 or 15) and the flap limit. If the aircraft does not have flaps, this indicator will never be on. See the Programming Section on how to change the flap limit.

The flap indicator also represents the top of the white arc.

V_{no} - The **V_{no}** indicator represents the maximum structural cruising speed for the aircraft. Whenever the airspeed exceeds the **V_{no}** limit, this indicator will provide a blink warning and an optional alarm. See the Programming Section on how to change the **V_{no}** limit.

The **V_{no}** indicator also represents the bottom of the yellow arc.

V_{ne} - The **V_{ne}** indicator represents the never exceed speed for the aircraft. Whenever the airspeed exceeds the **V_{ne}** limit, this indicator will provide a blink warning and an optional alarm. See the Programming Section on how to change the **V_{ne}** limit.

The **V_{ne}** indicator also represents the top of the yellow arc and the start of the red arc.

TO VIEW TRUE AIRSPEED - Pressing and holding **[TAS/T]** will replace the indicated airspeed readout with true air speed which is indicated airspeed corrected for temperature, pressure and compressibility. The **IAS** indicator will be replaced with a **TAS** indicator. Releasing **[TAS/T]** will return the display to indicated airspeed (or Mach). Note that indicated outside air temperature is replaced with true air temperature and

indicated altitude is replaced with true altitude at the same time. Optional airspeed display selections will give different results. See the **Options Menu** in the programming section.

Internal calculations are based on a .8 temperature recovery coefficient.

Altimeter

The altimeter range is from -2000 to +46,000 feet. The display may be programmed to round the altitude to the nearest 10 foot increments or show every foot. See the Programming Sections to change options.

HINT: There is another 10/1 option that takes control when the approach mode is selected. Selecting 10 foot increments for normal mode (less digit jitter when holding level) and 1 foot increments for approach mode allows setting a phony approach mode to view 1 foot increments if the need arises.

Turning the **[SET]** knob adjusts the altimeter setting. If the millibar option has been selected, the indicator will show **Mb** instead of **InHg**. Each click will change the altimeter setting by .01 InHg or 1 millibar. If the knob is pressed in at the same time that it is turned, each click will change the altimeter setting by .10 InHg or 10 millibar. See Programming Section to change InHg/millibar options.

TO VIEW DENSITY ALTITUDE - Press and hold **[DALT]**. Density altitude will replace indicated altitude as long as the control is held (with limitations as described in the next paragraphs). If a compass sensor is installed, heading can optionally be viewed in the VSI location at the same time.

TO VIEW PRESSURE ALTITUDE/ENCODER OUTPUT ALTITUDE - Press and hold **[PALT]**. Pressure altitude will initially replace indicated altitude. After three seconds the actual encoder output altitude is displayed. These two will alternate every three seconds as long as the switch is held. Encoder output altitude can be distinguished from pressure altitude because it is rounded to the nearest 100 feet and the last two digits are small zeros (altitude sent to transponder is also nearest 100 foot block).

Pressure Altitude looks like: **1 4 5 4 0**

Encoder Altitude looks like: **1 3 5 0 0** (may differ from rounded PALT... see below)

Pressure altitude of the flight reference altimeter is the altitude transmitted by the transponder. The encoder altitude and pressure altitude of the FENCODER may differ **if** the FENCODER has been corresponded with an external flight reference altimeter (not usually done). If that is the case, the encoder output altitude should match the pressure altitude of the external flight reference altimeter. If the FENCODER is also the flight reference altimeter (not corresponded with an external flight reference altimeter), the pressure altitude and encoder output altitude will match. Note that the encoder output altitude will show 13500 during the time the pressure altitude is from 13450 to 13549.

Be aware that the encoder output altitude is **really** a pressure altitude. The ATC radar equipment corrects the received altitude to an indicated altitude using their computer contained barometric altimeter setting to determine your indicated altitude.

TO VIEW TRUE ALTITUDE - Pressing and holding **[TAS/T]** will replace the indicated altitude readout with **approximate** true altitude which is altitude above sea level. Releasing **[TAS/T]** will return the display

to indicated altitude. Note that airspeed is replaced with true airspeed and temperature is replaced with true air temperature at the same time. It is important to note that the calculation of approximate true altitude by the instrument requires operator entry of two variables, 1) the elevation (height above sea level) of the ground station that **determined** (not just transmitted) your current altimeter setting and 2) the ground temperature (in EC) of that same ground station. The ground station should be as close as possible to your aircrafts current location.

WARNING: Do not use approximate true altitude for terrain clearance. Even with accurate entry of ground station elevation and temperature, the calculations yield only approximate results.

The ground station elevation and temperature are entered using the **ALt/GndSn** menu item in the programming mode. For those who need to use approximate true altitude, you must be familiar with the following sections of the programming manual:

- Entering Program Mode
- Menu Map
- Altitude/Alert Menu

FLIGHT LEVEL WARNING - The FENCODER altimeter setting automatically changes to 29.92 InHg (1013mb if selected) when ascending through 18,000 feet (adjustable for countries other than the USA) and blink a warning. The warning is provided in case there are other altimeters that need set. When descending through flight level 180 (again, adjustable) the altitude and altimeter setting will blink a warning to enter the current altimeter setting. The audio alarm may optionally be added to the warnings. See the programming manual for details.

Timeout

Timeout is a FENCODER characteristic that comes into use when setting the backlighting and setting altitude alert modes. Basically, it is a period of time when the normal function of a control is replaced by a different function. If the timeout period is 5 seconds, then the altered control keeps its new function until it has **not** been used for an amount of time equal to the timeout period. It is needed when adjusting the backlighting and all of the altitude alert modes. The timeout period ranges from 2 to 10 seconds and can be adjusted to the user's preference. After the timeout period runs out, the altered controls revert to their normal function.

The next topic, backlighting, is a good example of how timeout works. See the Programming Section on how to adjust the timeout period.

HINT: When learning the operation of the FENCODER, a higher timeout period is beneficial. After you become more experienced, the 3 second timeout is sufficient.

Backlighting

Backlighting is manually adjusted to allow for maximum control by the pilot. When the backlighting is off, pressing and releasing **[TAS/T]** and **[PALT]** at the **same** time turns the backlighting on. When the backlighting is first turned on, the timeout period begins and the **LGT** indicator on the display turns on. During the timeout period, the **[SET]** knob adjusts the backlight brightness instead of the altimeter setting. Turning the knob clockwise will increase the brightness and turning the knob counter-clockwise will decrease the brightness (think of a volume control). Any change of the **[SET]** knob during the timeout period will also **continue** to restart the timeout period. So even if the timeout period is 3 seconds, as long as the knob is not left idle for more than 3 seconds, it will keep its new function. At the end of the timeout period, the **LGT** indicator will turn off and the **[SET]** knob will return to being the altimeter setting control.

Turning the backlight off is a little different. Again press **[TAS/T]** and **[PALT]**. The **LGT** indicator will turn on, and after the timeout period the backlight and **LGT** indicator will turn off. Turning **[SET]** during the timeout period while the **LGT** indicator is still on will adjust the light intensity and cancel the turn off. Therefore, when the backlight intensity needs to be adjusted, the backlight does not need to be turned off and then back on.

The on/off state of the backlighting is maintained in the unit's nonvolatile memory so if the backlighting is on when the FENCODER is powered down, it will be on the next time the unit is powered up.

Altitude Alert

The altitude alert has three modes 1) Converge; 2) Hold; 3) Approach. All three modes are to provide pilot assistance in altitude management.

Converge mode provides warning when approaching an alert altitude.

Hold mode provides warnings and optional alarms when maintaining an alert altitude.

Approach mode provides warnings and optional alarms when descending to an alert altitude (decision height) during an instrument approach.

TO VIEW THE ALERT ALTITUDE - Press and release **[ALRT]**. The current alert altitude appears in place of indicated altitude and will remain on the display for the timeout period.

example: view current alert altitude

<u>action</u>	<u>display</u>	<u>comment</u>
	9 5 1 0	indicated altitude
press [ALRT]	4 0 0 0	current alert altitude
after timeout	9 5 1 0	indicated altitude

Viewing the alert altitude also **cancels any alert mode in progress**.

TO CHANGE THE ALERT ALTITUDE - Press **[ACK]** during the timeout period that the alert altitude is being viewed. 0 - - - appears in place of the alert altitude and the **[SET]** knob now controls the value of

the zero digit. Turning the knob clockwise will increase and counter-clockwise will decrease the value of the digit by one for each click. When the first digit is as desired, press **[ACK]** and the second digit becomes zero for adjustment. Continue through all five digits.

example: change alert altitude to 18000

<u>action</u>	<u>display</u>	<u>comment</u>
	9 5 1 0	indicated altitude
press [ALRT]	4 0 0 0	current alert altitude
press [ACK]	0 - - -	set 1st alert altitude digit
turn [SET]	1 - - -	one click CW to 1
press [ACK]	1 0 - -	set 2nd alert altitude digit
turn [SET]	1 8 - -	two clicks CCW to 8
press [ACK]	1 8 0 -	set 3rd alert altitude digit
press [ACK]	1 8 0 0	set 4th alert altitude digit
press [ACK]	1 8 0 0 0	set 5th alert altitude digit
press [ACK]	9 5 1 0	indicated altitude

Each of the above steps must be started within the timeout period after the end of the previous step. If the timeout period is allowed to expire before completing the final **[ACK]**, the alert altitude will remain the same as before the procedure was started.

Note that minus alert altitudes are not allowed.

ALERT ALTITUDE DISTANCES - The number of feet altitude between the alert altitude and a warning or alarm altitude in all the alert modes are programmed to suit pilot and aircraft. Two distances in feet are programmed by the user for converge and hold alert modes.

Figure 1 shows the warning and alarm altitudes created when the pre-programmed Converge Warning Distance and Hold Alarm Distance are 500 and 200 feet respectively and the alert altitude is 10,000 feet.

The distances in feet extend both above and below any alert altitude that is set.

A third distance, Approach Alarm Distance, is different in that it creates only one alarm altitude which is always above the entered alert altitude (decision height).

The programming section describes how to change the Converge Warning Distance, Hold Alarm Distance and the Approach Alarm Distance.

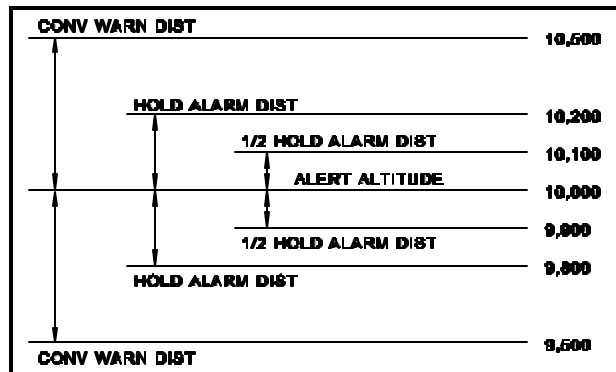


Figure 2

Definition of warning and alarm altitude for alert mode.

HOW CONVERGE MODE FUNCTIONS - When approaching an alert altitude during climb or descent, a blink warning begins when the altitude remaining to the alert altitude is less than the Converge Warning Distance. When the converge blink warning starts the audio sounds a short beep to alert the pilot.

When the aircraft reaches the Hold Alarm Distance, another short beep will sound and the FENCODER will automatically enter the hold mode. At this point the blink warning is still active. See Figure 3.

The programming section describes how to change the Converge Warning Distance.

STARTING CONVERGE MODE - There are two ways to enter the converge mode. The easiest, automatic, and most often used is to enter/change an alert altitude. After entering the last digit of a new alert altitude, the FENCODER will automatically enter converge mode if the altitude of the aircraft is **outside** the Hold Alarm Distance.

The second method is to press **[ALRT]** during the timeout period while viewing the alert altitude. This would most often be used when an alert altitude is left the same for a number of different changes of mode during practice airwork.

The **CONV** indicator is always displayed when the FENCODER is in converge mode.

Converge mode may be cancelled by pressing **[ALRT]** to view the alert altitude and letting it timeout.

HOW HOLD MODE FUNCTIONS - When maintaining an alert altitude, a blink warning begins when the aircraft distance away from the alert altitude is more than 2 the Hold Alarm Distance. The start of the blink warning is accompanied by a short beep. If the hold mode was just automatically entered from the converge mode, this is also the reason that the converge blink warning appears to continue.

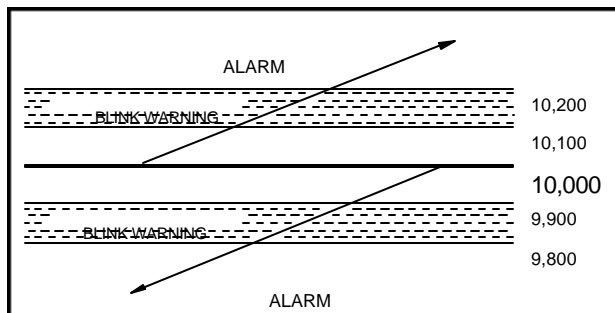


Figure 4

Hold warning and alarm for drift up and drift down from hold altitude using example altitudes and distances.

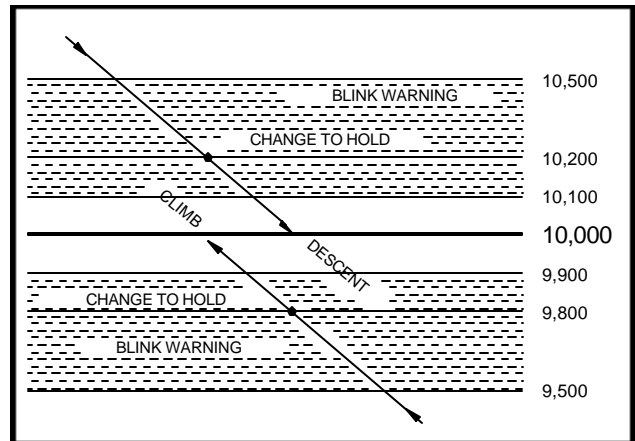


Figure 3

Converge warning and change points for both climb and descent using example altitudes and distances.

If the aircraft then returns inside the warning bands, the blink warning will stop.

If the aircraft continues to diverge from the alert altitude and ventures into the alarm zone defined by the Hold Alarm Distance, an alarm (if enabled by user programming) will sound. Pressing **[ACK]** will acknowledge and silence the audio alarm. Flying back inside the Hold Alarm Distance would also silence the alarm.

The programming section describes how to

change the Hold Alarm Distance.

STARTING HOLD MODE - There are four ways to enter the hold mode. The easiest is an automatic entry from the converge mode as described above.

The second method is to enter/change an alert altitude. After entering the last digit of a new alert altitude, the FENCODER will automatically enter hold mode if the altitude of the aircraft is **inside** the Hold Alarm Distance (fourth method is easier with same result).

The third method is to press **[ALRT]** during the timeout period while viewing the alert altitude. This would most often be used when an alert altitude is left the same for a number of different changes of mode during practice airwork or when the hold alarm was cancelled before flying back to the hold alert altitude.

The fourth method is to press **[ALRT]** as if to view the current alert altitude, but **continue holding** the switch up until the timeout period expires and the altitude display returns to indicated altitude. Then when the **[ALRT]** switch is released, the unit will automatically enter hold mode after calculating and entering an alert altitude based on the current indicated altitude rounded to the nearest hundred feet. This method is handy for entering hold mode after already leveling off.

Obviously the speed and ease of this method is defeated if the timeout period is set to a high number of seconds.

The **HOLD** indicator is always displayed when the FENCODER is in hold mode.

Hold mode may be cancelled by momentarily pressing **[ALRT]** to view the alert altitude and letting it timeout.

HOW APPROACH MODE FUNCTIONS - When approaching an alert altitude during descent, a blink warning and audio alarm (if enabled by user programming) begins when the altitude remaining to the alert altitude is less than the Approach Alarm Distance.

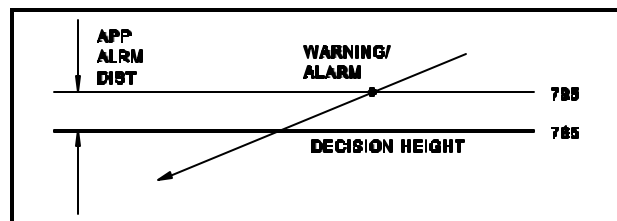


Figure 5

Approach mode altitude alert when the alert altitude is 765 feet and the Approach Alarm Distance is 30 feet.

The audio alarm and/or blink warning will continue for the number of Approach Alarm Seconds pre-programmed by the user or it may be cancelled by **[ACK]**. Setting the Approach Alarm Seconds to 2 to 4 seconds allows adequate notice of reaching decision height and then cancels itself so no further pilot action is necessary.

When in approach mode, the altitude readout will read to the nearest 10 feet or every foot depending on user pre-programming. This feature is separate from the 10/1 readout option for operation in other than approach mode.

The programming section describes how to change the Approach Alarm Distance, Approach Alarm Seconds and 10/1 foot option.

STARTING APPROACH MODE - There is only one way to enter the approach mode. The FENCODER must first be put in converge mode using an alert altitude that is **below** the aircraft altitude. Then press

[ALRT] [ALRT] [ALRT]. The first press views the alert altitude and cancels converge mode. The second (within timeout period of course) re-enters converge mode. The third (again within timeout period) enters approach mode.

The **APP** indicator is always displayed when the FENCODER is in approach mode.

Approach mode may be cancelled by pressing **[ALRT]** to view the alert altitude and letting it timeout. Pressing **[ACK]** after the start of the audio alarm and before the automatic cancel takes place will also cancel the approach mode.

Practicing

If you have power supplied to the unit, whether on a workbench or in the aircraft, you can practice all the features explained in this operations manual by putting the unit into a "demo" mode using the **Srv/SHOI/YES** menu selection as described in the programming manual. If you set your altimeter setting to 30.18 InHg, the demo mode will fly back and forth between 5000 and 6000 feet, with 20 seconds of flying level at those altitudes... without leaving the ground! The unit operates normally except that fake altitudes, airspeeds and temperatures are forced into the unit. So you can set altitude warnings, check true airspeeds etc.

Operation Summary

CHANGE ALTIMETER SETTING	[SET] to change by .01 increments [ACK] & [SET] together to change by .10
ACKNOWLEDGE/SILENCE ALARMS	[ACK]
VIEW TAS, TAT & TRUE ALTITUDE	[TAS]
VIEW PRESSURE ALTITUDE	[PALT]
VIEW DENSITY ALTITUDE	[DALT]
VIEW ENCODER ALTITUDE	[PALT] held for more than 3 seconds
VIEW ALERT ALTITUDE	[ALRT]
CHANGE ALERT ALTITUDE	[ALRT] [ACK] [SET] [ACK] [SET] etc. (unit will enter HOLD or CONV automatically)
START CONVERGE MODE	Automatic with change alert altitude or: [ALRT] [ALRT]
START HOLD MODE	Automatic with change alert altitude or: [ALRT] [ALRT] or: hold [ALRT] until timeout
START APPROACH MODE	[ALRT] [ALRT] [ALRT]
BACKLIGHT ON	[TAS/T] & [PALT]
BACKLIGHT OFF	[TAS/T] & [PALT] (off after timeout)
BACKLIGHT INTENSITY	[SET] during backlight ON or OFF timeout