Stratomaster Smart Single

ASI-1

Airspeed indicator (ASI) with automatic flight log

The ASI-1 airspeed indicator is a 2.25" instrument that provides a wide range airspeed indication in both digital and analog formats. Airspeed in based on the pressure generated by a pitot tube system and a static port is provided as well for use by high speed aircraft.

In addition the ASI-1 provides a 24 entry automatic flight log that stores the duration of each of the last 24 flights, an air-distance trip counter and a current flight timer.
Airspeed can be indicated in statute miles per hour (mph), kilometers per hour (km/h) or nautical miles per hour (knots) with the air-distance being displayed in corresponding units.
The analog airspeed display can be scaled according to the aircrafts flying speed range and markers for Vs, Vf, Vno and Vne can be set.
ASI sensitivity can be calibrated by the user to cater for errors caused by pitot tube placement.

The ASI-1 instrument measures airspeed from 16mph to 250mph and is well suited to slow aircraft due to very good sensitivity and linearity at low air speeds.

The main display

Digital airspeed

Analog airspeed display

Air distance trip counter

Duration of flight since take-off
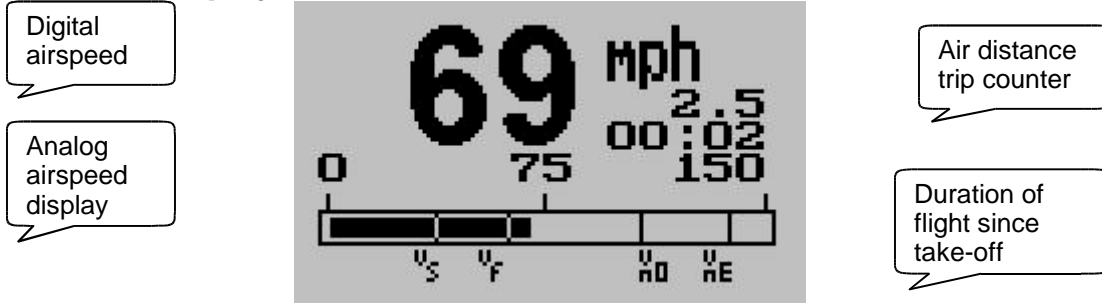
To view the flight log, use the relevant Menu function as described below.
The ASI-1 uses the following algorithm to determine if a flight is in progress:

If airspeed is greater than 30 mph for a duration of 60 seconds or more, a flight is started with a logbook entry. The flight ends if airspeed falls below 30 mph for 30 contiguous seconds.
During a flight the logbook cannot be viewed.

The above algorithm ensures that touch-and-goes will not result in the end of a flight and a logbook entry.

Should the instrument be switched off during a flight, this will end the flight and the log will reflect the time until the instrument was switched off. Should the instrument be switched on again during a flight, a new flight will start for logging purposes.

Note that the air distance trip counter measures distance flown through the air. This is not the same as distance flown over the ground unless you are flying at sea level at zero wind speed. The air distance shown is subject to under reading at altitude due to decreased air density.

Setting up the ASI-1

Press the Menu key to enter the menu. You can move forward and backwards in the menu by using the + and – keys. To change or select a menu item, move the highlight to the desired item and then press the Menu key. To end an edit or function, press the Menu key again.

To exit the menu and continue normal operation, select the ***Done*** function and press the Menu key. Note, all changes you have initiated during your session will only be remembered by the instrument if you exit the menu using the ***Done*** function.

View Log

Select this function to view the flight log.
The flight log contains the duration of each of the last 24 logged flights. Duration is displayed in hours and minutes.
Eight flights are displayed at a time, to navigate through the log, use the "+" and "-" keys, When you are finished, press "Menu".
Empty log entries are shown as "--:--".
The log, once started, cannot be cleared.

Note: You cannot select this function while a flight is in progress.

Reset AD

This function will set your air-distance trip counter to zero. Select the function and press "Menu" to set the trip counter to zero.
Note that you can have the trip counter reset to zero at the start of a flight. Select this mode with the RAD Menu function described below.

Contrast …

This function allows you to change the display contrast to your liking. You can select values from about 20 to 45. (can vary depending on display type).

ASI Cal

This function is used to calibrate your airspeed indicator. During the factory calibration a factor has been determined and entered here that will give you accurate airspeed provided your pitot tube is not influenced by pressure effects caused by airflow around your airframe.
The calibration works in % of the reading and you can increase or decrease the reading if required to help cancel out under or over reading of the airspeed indicator on your aircraft.
The original calibration factor has been written onto the back of your instrument.

Zero ASI

This setup allows your instrument to measure the zero airspeed reading of the airspeed sensor and set a calibration value internally for this. This is equivalent to some mechanical airspeed indicators that have an adjustment to set the needle to zero when the aircraft is not moving.
You would use this function occasionally if you see an airspeed reading when the aircraft is at rest. This may be caused by aging of the built in pressure sensor or related electronics.
When you perform this function, please make sure that no wind is blowing into the pitot tube as this would result in an incorrect internal calibration.

BL …

This function allows you to switch the display backlight on or off.

Dist in …

Select your preferred units. You can select statute miles, kilometers or nautical miles. According to this selection your airspeed will be indicated in mph, km/h or knots.

Hour …

Select if you want your minutes to be displayed as minutes (0-59) or as decimal fractions of a second (00-99) as used in commercial aviation. This setting influences the current flight time display and the flight log.

RAD …

Select if you want the air-distance counter to reset automatically at the start of a flight or if you want to reset manually only.
Note that you can reset the air distance counter at any time regardless of this setting.

ASI Scale …

This function allows you to set the scale of the analog airspeed indicator. This scale always starts at zero and continues to the value you select here. Scales from 50 to 400 can be selected. The scale is always applicable to the current units that you are using.
The scale will be shown on top of the analog speed display with an indication at half the scale (middle of the display) as well.

Vs, Vf, Vno, Vne

You can set up to four markers on the analog airspeed display. Vs would be your stall speed dirty or minimum safe flying speed. You may also choose to use this marker as your approach speed. Vf is your maximum flap speed, Vno is the maximum maneuvering speed or top end of the normal operating speed range. Vne is the never exceed maximum speed.
Selecting values for these markers above the speed scale will result in the marker not visible. Should markers be very close to each other, only the higher ranking marker will be shown.

ADC

This function is for technical personal. It is not used for ordinary operation of the unit.

Technical specifications:

Display temperature range (operational): -20 to +80 degrees C
Supply voltage: +8 to +18V. +24/28V with optional pre regulator.
Supply current: 35mA/70mA (backlight off/on)
Airspeed range: 16mph to 250mph
Airspeed resolution: 1 mph
Measurement accuracy: +/-1% at 85mph nominal.
Weight: 90 grams.

Warranty:
MGL avionics warrants their products for a period of one year from date of purchase against faulty workmanship. Warranty is limited to the replacement of faulty components and includes the cost of labor. Shipping costs are for the account of the purchaser.

Note for operation on supplies with inductive loads:

Any operation of electronic instrumentation on power supplies that are subject to high voltages caused by operation of inductive loads (starter motors, solenoids, relays) are required to be fitted with suitable protection.
All Smart Singles are guaranteed to withstand temporary over voltage up to 40V without additional protection. We recommend that measures are taken to prevent voltage transients in excess of this limit.
MGL Avionics recommends the fitment of a fuse in line with a 33V transorb (available from MGL Avionics at low cost) to protect electronic instruments, radios and intercom systems. Only one such arrangement is required for a cluster of instruments.
Please note that product warranty excludes damages caused by unprotected, unsuitable or incorrectly wired electrical supplies.

This instrument is not certified by the FAA. Fitting of this instrument to certified aircraft is subject to the rules and conditions pertaining to such in your country. Please check with your local aviation authorities if in doubt.
This instrument is intended for ultralight, microlight, homebuilt and experimental aircraft.

Operation of this instrument is the sole responsibility of the pilot in command (PIC) of the aircraft. This person must be proficient and carry a valid and relevant pilots license. This person has to make him/herself familiar with the operation of this instrument and the effect of any possible failure or malfunction. Under no circumstances does the manufacturer condone usage of this instrument for IFR flights.

Installing the ASI-1
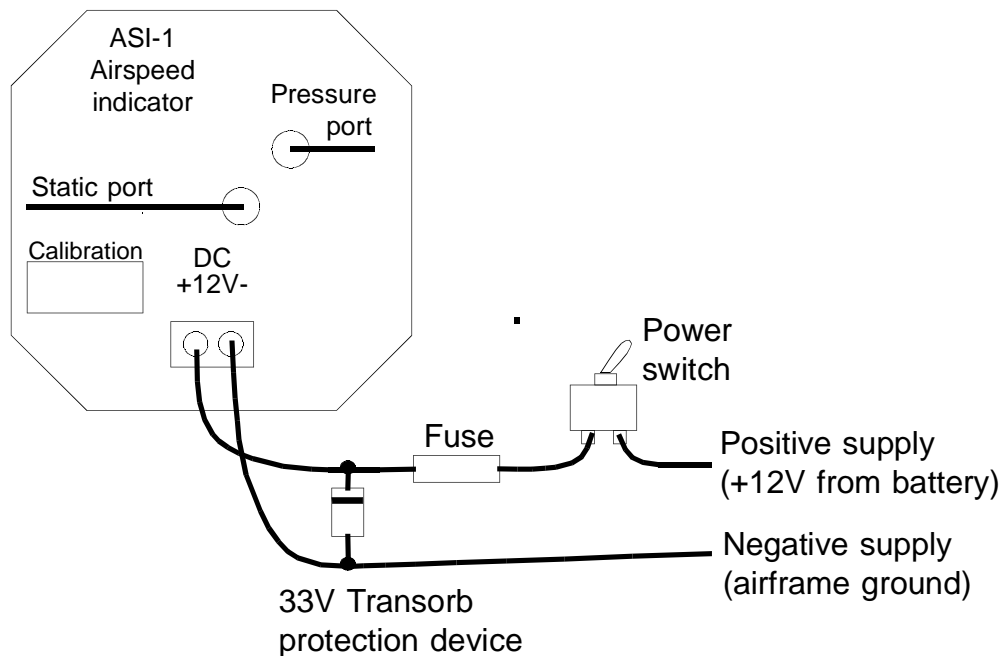
Connect the supply terminals to your aircraft's power supply (you need a dropping resistor or pre-regulator for 24/28V systems).
Install suitable power supply protection if you have a supply that can contain large voltage transients such as can be created by starter motors and solenoids.

Ensure that the supply voltage will not drop below 8V during operation as this may result in incorrect air speed readings.

Connect a pitot tube to the "pressure port" and if required connect the static port.

Pitot tubes are found in a large variety in at your aircraft parts shop, in mail order catalogs or you can make your own.

Contrary to popular belief, Pitot tubes are not carefully designed and calibrated but are simple orifices or tubes that get pointed in the direction that you are flying. The forward movement of the aircraft causes air to dam inside the pitot tube. This increases the pressure inside the tube.
Most small aircraft such as ultralights or microlights do not require a connection to a static port. In these cases, simply leave the static port open. Ensure however that the static port does not receive pressurized air due to the forward movement of the aircraft. Be especially critical of your pod or panel if you do not use a static port. Any build up of a pressure differential due to ram air or suction can lead to large errors of the indicated airspeed.

Static ports are usually mounted at a strategic position on the rear side of the aircraft fuselage for faster, pressurized aircraft.

Suitable pitot tubes can be made from a short piece of hollow aluminium or copper piping. Length and diameter are not important. Ensure that the front of the pitot tube has a suitable chamfer if you use thick walled tubing or you may introduce a speed reading error if you have a faster aircraft.
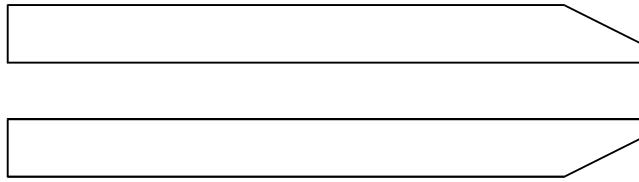
Chamfer leading
edge if you use
thick walled pipe as
a pitot tube

Example cross-section of thick walled pitot tube.

Suitable connection hose for both pitot tube and static port can be obtained from a hardware store or even a pet shop. Good quality tubing is often used for fish tanks and it has just the right diameter.

Please note that this kind of tubing is not advised for pressurized aircraft. In this case you would need to obtain aircraft grade tubing of suitable diameter. You would also have to use hose clamps to fasten the hose onto the Stratomaster pitot and static ports.

The ASI-1 allows you to calibrate the airspeed reading. This is done in the "ASI Cal" menu item. The main reason for this is to be able to remove errors introduced due to the airflow around your aircraft which may have an effect of your pitot tube pressure.