

FlightTech INTERCOMS

ITC-404SP Four Place Stereo Panel
Mount Intercom with Enhanced
Noise Reduction Technology



Introduction

Congratulations on purchasing the new FlightTech ITC-404SP panel mount intercom. The ITC-404SP is designed using the latest in noise canceling and printed circuit board technology. With proper installation, the ITC-404SP will give many years of reliable cockpit communications for both the pilot and passengers.

FlightTech ITC-404SP Features

Enhanced Noise Reduction

The ITC-404SP features Enhanced Noise Reduction or ENRI. The ENRI feature will eliminate or greatly reduce all background noise picked up by the headset microphone. Sounds such as engine noise and wind noise that are commonly heard with voice operated intercoms when the microphone circuits are open, are eliminated with ENRI.

Pilot Isolate

At times, it is desirable for the pilot to listen to ATC and allow the passengers to communicate while not interfering with the pilot. The Pilot Isolate switch in the "ALL" position allows the pilot to hear and talk to every one connected to the intercom. In the "PILOT" position, the pilot will only hear the communication radio audio.

Pilot & Co-Pilot PTT

The ITC-404SP includes PTT functions for both the Pilot and Co-Pilot and depending on which PTT switch is enabled, either the Pilot or Co-Pilot will key the communications radio and be able to speak.

Auxiliary Audio Stereo Input

A Stereo Auxiliary input is provided allowing a tape or CD player to be connected to the ITC-404SP. The audio output is Stereo and requires Stereo headphones for proper operation.

Auxiliary Audio Muting

The Auxiliary audio will mute when audio from the Communication radio or Intercom audio occurs.

Cellular Phone Interface

The Cell Phone interface will connect the pilot's headphones to a Cellular Phone. Unlike headphones with built-in cell jacks, the audio to the phone from the pilot headset is derived from the intercom audio processor, eliminating engine noise or other background noise that may be heard during the phone call. Connection between the ITC-404SP and the cellphone is done through a patch cord with 2.5mm plugs.

Fail Safe

In the event that power should fail to the intercom, the pilot's headset is automatically connected directly to the radio microphone and headphone inputs.

Unpacking

The ITC-404SP intercom comes complete ready for installation and includes the following.

- Intercom Unit
- Four 1/4" Stereo Headphone Jacks and mounting hardware
- Four Microphone Jack and mounting hardware
- Connector Housing and Terminals
- Installation Manual
- Drill Template for mounting the intercom
- Face Plate, Vertical and Horizontal

Carefully review the contents to ensure that all of the items are included. If you find missing parts, contact the factory.

Installation

Mounting the Control Panel requires four holes in the instrument panel and can easily be secured in place by the Volume Control mounting nut and a 4-40 screw. Refer to the DRILL DRAWING (Fig. 1) for correct holes sizes and locations. In addition to the Fig. 1, a separate drilling template is enclosed.

Control Panel Label, After the holes are drilled and the control panel is checked for proper mounting, the Control Panel Label can be applied. Make sure the surface is clean form oil or drill chips. Remove the back protective cover from the label and apply it to the instrument carefully aliening the holes. Insert the control panel and install the Volume control nut.

Cable Connections, The main cable is connected to the intercom through two ten pin connectors that provide the Power, Audio Inputs and Headphone connections for the Pilot, Co-pilot and Passengers. Refer to Page 8 for the connector connections.

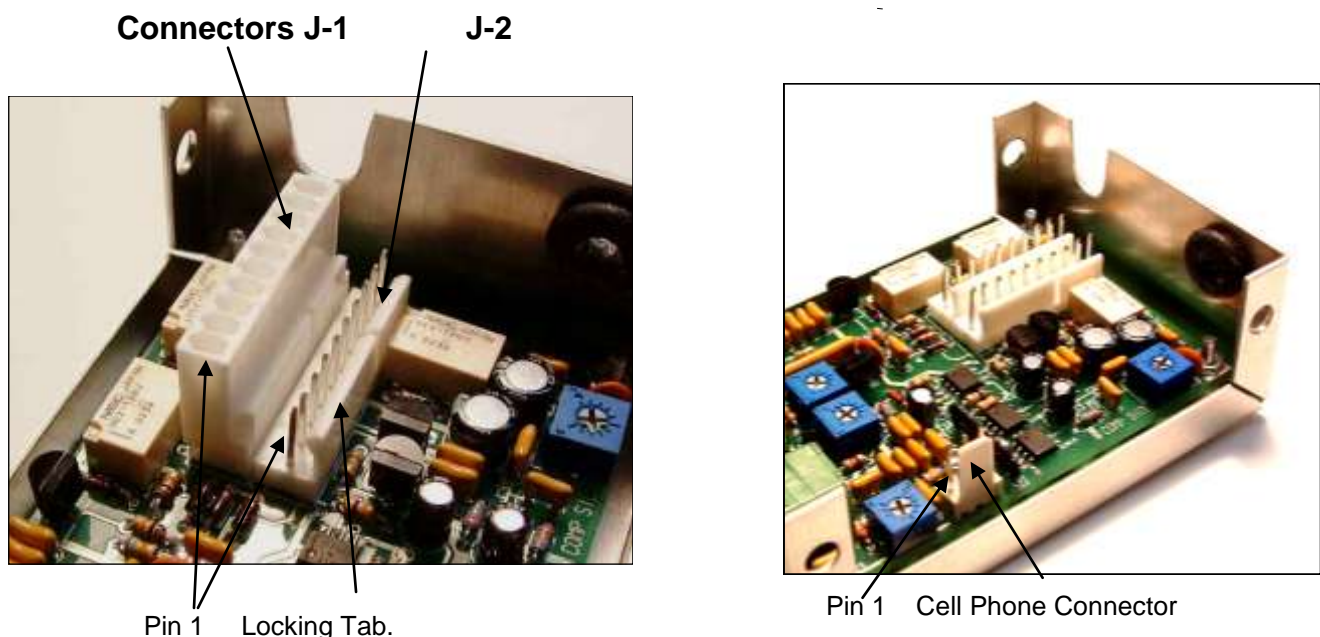
The cable connector is a **Molex KK-100 Series** housing and crimp terminals. The terminals can be crimped onto wire size ranging from 22 to 26 gage. 24 gage wire is recommended for the intercom installation.

Recommended tools for installing the terminals are, Molex Crimp Tool part # 11-01-0185 Hand Crimping Tool.. Refer to the photo, on page 6 of the two 10 pin connectors for the locations of pin 1 through 10. Note that there are locking and polarity tabs on the plug housing and socket housing. Refer to page 8 for the pin connections.

Located along the side of the circuit board is J-3, a three terminal connector for the Cellular phone cable. Refer to page 8 for the terminal connections.

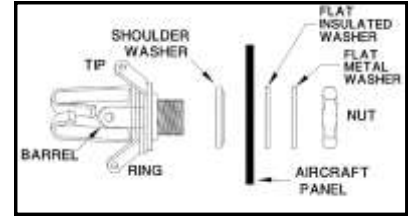
Power (12-28 VDC) and Ground wires should be 22 Gage wire with a 1 amp fuse or circuit breaker in line with the Plus Voltage line.

Microphone cables as well as headphone cables should be a shielded cable . All ground or shield connections should be terminated at one point at the connector.



Mounting Microphone and Headphone Jacks

1. Locate the mounting areas making sure that the jacks will not interfere with any aircraft control components. (The jack contacts will expand when a plug is inserted into the jack.)
2. Drill 3/8" diameter holes for the headphone jacks.
3. Drill 1/2" diameter holes for the microphone jacks and install with the insulating washers supplied. (see Fig. 7)



Stereo Headphones

The ITC-404SP is designed to work STEREO HEADPHONES. Using MONO headphones could cause damage to the intercom. If mono headphones are to be used with the intercom, either install a SPST switch to the RING lead on the Stereo headphone jack or leave the terminal unconnected.

Cellular Phone Jack

The 2.5mm jack terminal diagram is located on page 7 and the intercom connector, J3 is located on page 8.

Auxiliary Audio Stereo Input

The Auxiliary Audio input is available for connecting a portable CD Player or other audio device to the intercom system.

Push-to-Talk Switch

The ITC-404SP will accept both Pilot and Co-Pilot PTT switch installation. SPST push button switch's can be used with one terminal connected to ground and the other terminal connected to socket S1-7 for the Pilots PTT and S1-9 for the Co-Pilot's PTT.

Operation of the ITC-404SP

The ITC-404SP is one of the simplest intercoms available to operate, plug in the headphones, turn on the power and start talking. It's that easy!

With the ITC-404SP Enhanced Noise Reduction circuit, there are no squelch controls or functions to contend with. Since there are no squelch function either manual or automatic, it is not necessary to kick-start the audio with the first spoken word. Also, the missed words due to long pauses are gone. Simply talk.

Volume and Power Control

Turning the Volume control clock wise will turn on power to the intercom and increase the intercom volume. This controls the amplitude of the headsets microphone heard by the pilot and passengers. The volume control has no effect of the auxiliary audio or the communications radio audio level.

Pilot/All Switch

The Pilot/All switch controls the audio heard by the pilot and passengers. In the ALL position, the Pilot, Passengers, Auxiliary audio and Communication Audio can be heard by everyone.

With the switch in the Pilot position, the pilot will hear audio from the communication radio but not the passengers or the auxiliary audio. There will be no side-tone heard by the pilot.

Headphones and ENRI

As with any intercom installation, the amount of ambient noise heard through the Passive ear cups is dependent on the quality of the headphones. The better the Passive headphones, the better the noise reduction.

What the passive headphones do not do, is reduce or eliminate the noise picked up by the headset microphone and heard when the intercoms audio path is open. This where the ENRI function comes into action, eliminating or reducing the background noise heard by the headset microphone.

NOTE: for best results, it is necessary to speak close to the headset microphone.

ANR Headsets ANR Headsets provide additional noise reduction at the headset's ear cups but some background audio from the headset microphone can still be heard. ANR headsets used in conjunction with the ITC-404SP ENRI intercom will have an added benefit of no microphone noise. ANR headsets are not required for the Electronic Noise Reduction circuit to operate.

Push-to-Talk

The ITC-404SP features Pilot and Co-Pilot PTT function allowing either the pilot or co-pilot to key and talk on the communication radio. When ever the pilots PTT is pushed, only the pilot will be able to talk but when the co-pilot PTT is keyed, the audio path is switch from the pilots microphone to the co-pilots microphone. The pilot can still talk through the intercom but not to the radio.

Auxiliary Stereo Audio & Muting Function

When a device such as a CD player is connect to the intercom and stereo headphones are used, pilot and passengers can enjoy music while on long trips.

The Auxiliary Audio will mute when one of two things take place.

1. When ever there is audio present from the communication radio.
2. During Intercom communications.

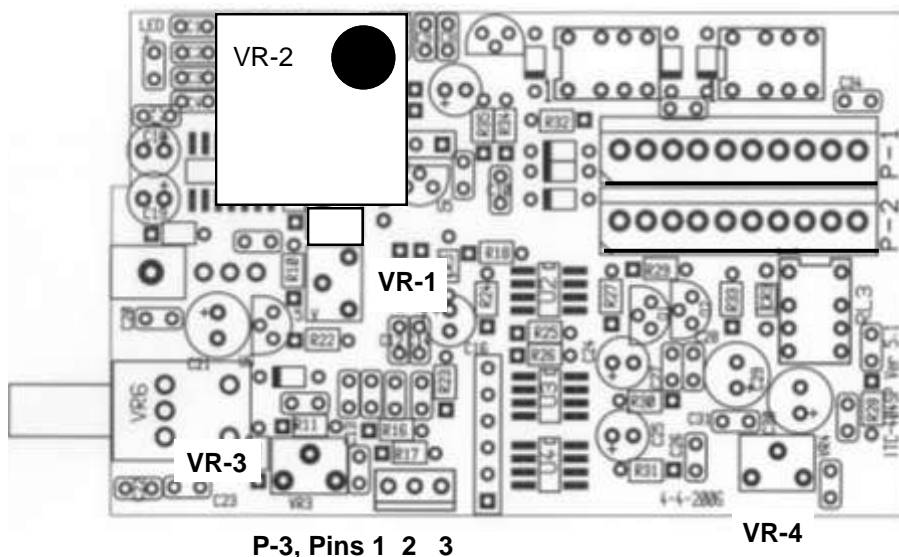
The muting action from either source will effect all the headsets and auxiliary audio will remain muted for several seconds after the intercom audio or radios audio stops.

Intercom Internal Adjustment

- There are four potentiometers located on the intercom circuit board VR-1 Microphone Gain, VR-2, Noise Reduction, VR-3, Cell Phone Mic Level and VR-4, Radio Audio Balance. All the pots are set at the factory for normal operation but depending on the type of headphone and ambient background noise during flight, some minor adjustment may be required. To make any changes, remove the top cover and refer to Fig 8 for the locations of VR-1, VR-2, VR-3 and VR-4.

NOTE: The ITC-404SP's Audio Processor has been upgraded to an improved version. The change has required the addition of a small printed circuit board and the relocation of adjustments, VR-1 and VR-2.

VR-2, the Noise Reduction Control is located on the small PCB. VR-1 has been moved from it's original position.



*LisghtSpeed mic gain adjustment is located on the back side of the microphone.

Refer to Fig. 8

Adjustment of Mic Gain, VR-1 and Noise Reduction Control, VR-2

In some aircraft it may be necessary to adjust both the Microphone gain control and the Noise Reduction control.

Microphone output levels vary for different brands of headsets and for best results, mixing headsets is not recommended. Headset microphones with high outputs can result in some background noise being heard and it will be necessary to adjusted VR-1 to eliminate the amount of sound heard by the microphones.

Some headset manufactures* include a microphone gain control on the microphone. This gain adjustment should be turned to the lowest setting for best results. Refer to the headset manual for the location of the adjustment.

If background noise is still heard, VR-2 the Noise Reduction Control and be increased. When adjusting VR-2, at a point about 3/4 rotation, a sharp drop off of audio will be heard. This is the maximum noise location on the pot, back up slightly for proper adjustment.

High Noise Environment

It has been found that in aircraft such as open cockpit airplanes, wind passing over the microphone and high engine power settings such as take off and climb will produce a popping sound in the intercom. For wind noise, it is recommended that a wind muff be used on the microphone. High engine power settings are a bit more difficult to deal with and may be reduced by adjusting the microphone level control for the lower setting. During normal cruise power setting, there should be no outside noise coming through the intercom.

Communication Radio Line Balance

When toggling the Pilot/ISO switch, a difference in the radio audio level may be heard. To correct this level difference, a level balance pot, **VR-4** can be adjusted to set the audio level. Locate VR-4 and while listening to the communication radio audio through the PILOTS headphone position, toggle the PILOT/ISO switch. Adjust VR-4 until a even audio level is heard in both the PILOT and ISO position.

Cellular Phone Interface

The Cell Phone interface includes a microphone level adjustment to provide the proper audio level to the cellular phone microphone audio level. The factory setting should be correct for most phones and can be verified by making a call and noting the speech quality on the called phone. If the audio is too low or clipping is heard, adjust VR-3 for the proper audio level.

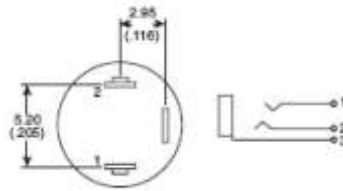
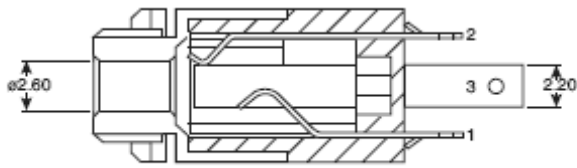
After the adjustments are set and before closing the case, check to ensure that no wires are pinched or broken. Reassemble the two parts of the case and tighten the two screws in the bottom of the case.

Service

With your new FlightTech ITC-404SP intercom properly installed, you will enjoy many years of trouble free operation. In the event of a problem and after checking the obvious, fuse, jacks or wiring, you should contact the FlightTech Intercom Technical Support center for suggestions or returning the intercom for repair.

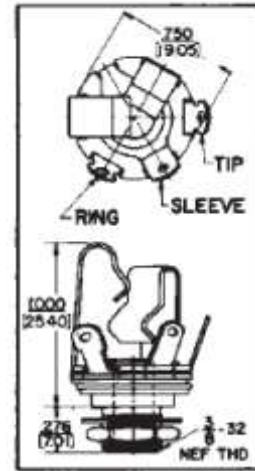
The FlightTech phone numbers are located on the back cover of this manual.

2.5 mm Cellular Phone jack.



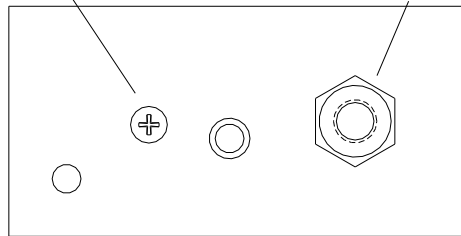
Pin 1, Mic to J3-1
 Pin 2, Audio to J3-2
 Pin 3, shield to J3-3

Microphone and Stereo Headphone Jack



4-40 x 3/8 screw

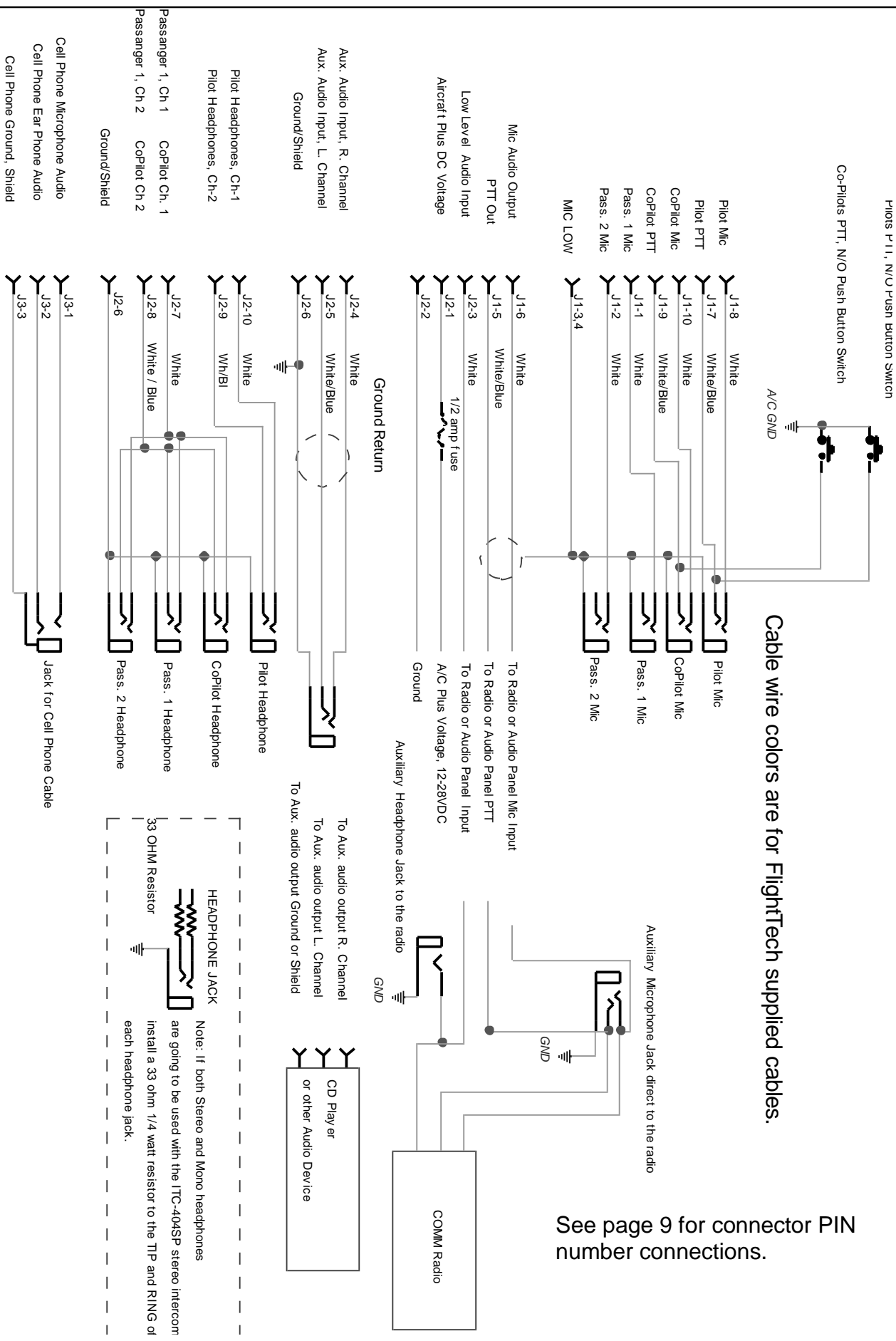
Volume Control Nut



Instructions for FAA Form 337

The ITC-404SP can usually receive an airworthiness approval by submitting the FAA form 337, *Major Repair and Alteration (Airframe, Power plant, Propeller or Appliance)*. For the ITC-404SP, the following text can be used as a guide.

1. Installed FlightTech ITC-404SP Panel Mount Intercom, as per the manufactures instructions provided by the manufacturer, DesignTech Systems.
2. Installed intercom unit (location in instrument panel) in plane sight of the pilot and connected to the avionics buss through a 1 Amp fuse. Jacks were installed on each side (location). Push-To-Talk buttons installed (locations).
3. This unit has a fail-safe feature built-in, in the event of a power failure to the intercom, the pilots headset can be connected directly to the radio headphone input and microphone.
4. **All work was done in accordance with manufacturer's instructions, FAR43, AC43.13-1B** Chapter 11 (Electrical Systems), Section 5 (electrical wire rating), Section 6 (aircraft electrical wire selection), Section 7 (table of acceptable wires), Section 8 (wiring installation requirements), Section 9 (environment protection and inspection), Section 11 (clamping), Section 12 (wire insulation and lacing string tie), Section 13 (splicing), Section 15 (grounding and bonding), Section 17 (connectors), AC43.13-2A Chapter 2 (Radio Installations).
5. Weight and Balance/Equipment list was amended.
6. Instructions for continued airworthiness: Annual visual and operational inspection as per AC43.13-1B, Chapter 12, Section 1, -1 (Avionics equipment maintenance), 12-9a (inspection of avionics systems).



Cable wire colors are for FlightTech supplied cables.

See page 9 for connector PIN number connections.

| JACK-1, PIN # | CONNECTION | JACK-2, PIN # | CONNECTION | JACK -3 | CONNECTION |
|---------------|---------------|---------------|-----------------|---------|------------------------------|
| J1-1 | PASSENGER MIC | J2-1 | A/C PLUS VOLT | J3-1 | CELL PHONE MIC, TIP |
| J1-2 | PASSENGER MIC | J2-2 | GROUND | J3-2 | CELL PHONE HP AUDIO, RING |
| J1-3 | MIC LOW SIDE | J2-3 | LOW LEVEL AUDIO | J3-3 | GROUND/SHIELD |
| J1-4 | MIC LOW SIDE | J2-4 | AUX STEREO IN | | |
| J1-5 | PTT OUT | J2-5 | AUX STEREO IN | | |
| J1-6 | MIC AUDIO OUT | J2-6 | GROUND | | |
| J1-7 | PILOT PTT | J2-7 | PASS HP AUDIO | | |
| J1-8 | PILOT MIC | J2-8 | PASS HP AUDIO | | |
| J1-9 | COPILOT PTT | J2-9 | PILOT HP AUDIO | | |
| J1-10 | COPILOT MIC | J2-10 | PILOT HP AUDIO | | |
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NOTES

ITC-404SP Technical Data

- Power Requirements: 12 to 28 VDC @ 40ma
- Size: Main Unit, 3.25" L x 2.2"W x 1.2" H
- Weight: 4oz
- Microphone inputs: 4
- Headphone output: 4 Stereo, 150 ohms
- Auxiliary Audio input: 600 ohm

3-YEAR UNCONDITIONAL WARRANTY

“FlightTech Intercoms” are warranted against defects for three years from date of purchase from authorized distributors and dealers. Within the three year period, the FlightTech Intercom will be repaired or exchanged (at our option) without charge for parts or labor. Simply return your intercom along with proof of purchase, return postage of \$6.00 (within USA) and it will be repaired or replaced within two weeks. Warranty does not cover transportation cost or product misuse, accidental damage, owner tampering or reworking.

Except as provided herein, either FlightTech Intercoms or DesignTech Systems makes no warranties, expressed or implied, including warranties or merchantability and fitness for a particular purpose.

NOTE: Some states do not permit limitations or exclusions of implied warranties, therefore, the aforesaid limitations (s) may not apply to the purchaser.

FlightTech Intercoms

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