

CIAC Aeroclube de Canela
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QUICK REFERENCE HANDBOOK

QRH

PIPER PA30 TWIN COMANCHE – PT-BKI

REVISÃO 02 DE 08/06/2021



INTENCIONALMENTE EM BRANCO



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INTRODUÇÃO

Este QRH é um compêndio de todas as emergências descritas no POH (Pilot's Operating Handbook).

Embora estejam descritas várias possibilidades de pannes neste manual ele não é exaustivo, ou seja, não contempla toda a gama de anormalidades que equipamentos complexos podem apresentar. Entretanto apresenta os que tem alguma probabilidade de acontecer mais elevada.

Não deve ser desconsiderado que em última instância o julgamento e processo decisório é uma atribuição do comandante do voo.

Caso deseje imprimir este manual para seu estudo pessoal sugere-se o uso de folhas tamanho A5.

O QRH é escrito em inglês na sua versão original e aqui também para manter não apenas a fidelidade, mas também a qualidade da instrução fornecida pelo CIAC Aeroclube de Canela.

MEMORY ITEMS

Os itens que devem ser memorizados e devem ser executados sem referência inicial no checklist devido ao tempo disponível para resolução ou manutenção do controle da aeronave estão descritos apenas neste manual e no seguinte formato: **LETRAS MAIÚSCULAS E EM NEGRITO**.

O aluno deve memorizar estas ações de modo que se perguntado em qualquer momento do voo deve saber recitá-las imediatamente.

Os memory items descritos neste manual são:

- **ENGINE FAILURE DURING TAKE OFF**
- **ENGINE POWER LOSS DURING CLIMB**
- **ENGINE POWER LOSS DURING FLIGHT**
- **POWER OFF LANDING (BOTH ENGINES)**
- **SINGLE ENGINE GO AROUND**
- **PROPELLER OVERSPEED**
- **ENGINE FIRE DURING START**
- **FIRE IN FLIGHT – ENGINE FIRE**
- **SPIN RECOVERY**



NEAREST SUITABLE AIRPORT

Este termo descrito em alguns checklists quer dizer que não se deve ser estendido o voo mais do que o necessário para pousar na pista mais próxima. Este termo não abre margens para discussão sobre “qual aeródromo tem manutenção disponível”, sobre “qual aeródromo me é mais conveniente” ou sobre “qual aeródromo eu ‘gostaria’ de pousar”. O pouso deve de fato ser feito no aeródromo mais próximo pois estender o voo em determinada condição anormal pode gerar mais riscos desnecessários a segurança do voo, de seus ocupantes e do ambiente em que se encontram.

DEFINIÇÕES DE NOTA CUIDADO E ALERTA

Utilizaremos na construção de nossos manuais do CIAC Aeroclube de Canela as definições oficiais de nota cuidado e alerta. estas palavras serão escritas da seguinte maneira e com estas definições:

NOTA: um procedimento operacional, técnica, outra informação considerada essencial a ser enfatizada ponto informação contidas nas notas podem também estar relacionadas com a segurança.

CUIDADO: um procedimento operacional ou técnica que pode resultar em danos aos componentes ou equipamentos caso não seja seguido.

ALERTA: um procedimento ou técnica que pode resultar em machucados severos ou perdas de vidas caso não seja seguido.

Em alguns manuais esta definição em inglês também é válida:

NOTE: an operating procedure, technique, etc. considered essential to emphasize. Information contained in notes may also be safety related.

CAUTION: an operating procedure, technique, etc. that may result in damage to equipment if not followed

WARNING: an operating procedure, technique, etc. that may result in personal injury or loss of life if not followed.



EMERGENCY PROCEDURES

1 ENGINE PROCEDURES

1.1 DETERMINING INOPERATIVE ENGINE

Dead Foot, Dead Engine: The airplane will yaw in the direction of the dead engine. Rudder pressure required to maintain directional control will be on the side of the good engine.

Verified By Throttle: Manifold pressure gauges in tachometers will indicate near normal readings and **should not be used** to determine an inoperative engine. Partially retard the throttle of the engine that is believed to be inoperative. There should be no changing control pressures or engine sound if the correct throttle has been selected.



1.2 ENGINE FAILURE DURING TAKE OFF ROLL

- If 78Kt has not been attained:

THROTTLES.....IDLE
BRAKING.....MAXIMUM

- If insufficient runway remains for stopping:

FUEL SELECTOR.....OFF
MASTER SWITCH.....OFF

AVOID OBSTACLES

Any indication of a sluggish or rough running engine is reason to discontinue takeoff

- If between 78 Kt and 91 kt:

The pilot **MUST DECIDE WHETHER TO ABORT THE TAKEOFF OR CONTINUE ON A SINGLE ENGINE**. Consideration must be given to runway remaining, weight, density altitude, obstacles, weather in pilot capability.

- If 91 Kt has been attained.

If sufficient runway remains for a normal landing, **LAND STRAIGHT AHEAD**

- If insufficient runway remains:

ROTATE.....PERFORM
LANDING GEAR.....RETRACT
WING FLAPS.....RETRACT
AIRSPEED.....MAINTAIN Vyse – Blue Line (91Kt)

Initiate [Engine Power Loss During Climb](#) Procedure.



1.3 ENGINE POWER LOSS DURING CLIMB

AIRSPEED ESTABLISH Vyse – Blue line (91Kt)
RUDDER APPLY TOWARDS OPERATING ENGINE
AILERON BANK 5° INTO OPERATING ENGINE
TURN AND BANK INDICATOR ½ BALL DISPLACED
THROTTLE FULL POWER (BOTH)
PROPELER..... FULL FWD (BOTH)
MIXTURE FULL RICH
LANDING GEAR RETRACT
WING FLAPS RETRACT
INOPERATIVE ENGINE IDENTIFY

WARNING: Proactively identify the inoperative engine. If there is another pilot onboard ask for confirmation.

THROTTLE IDLE
PROPELER..... FEATHER
MIXTURE CUT OFF

Initiate [Engine Securing Procedure.](#)



1.4 ENGINE POWER LOSS DURING FLIGHT

The most important aspect of engine failure is the necessity to maintain lateral and directional control.

IF AIRSPEED IS BELOW V_{mca} (78 Kt) REDUCE POWER ON BOTH ENGINES AND LOWER NOSE OF AIRCRAFT AS REQUIRED TO MAINTAIN CONTROL AND INCREASE SPEED TO V_{ysc} (91Kt).

RUDDERAPPLY TOWARDS OPERATING ENGINE
AILERONBANK 5° INTO OPERATING ENGINE
TURN AND BANK INDICATOR ½ BALL DISPLACED
THROTTLE FULL POWER (BOTH)
PROPELLER.....FULL FWD (BOTH)
MIXTURE FULL RICH
INOPERATIVE ENGINEIDENTIFY

WARNING: Proactively identify the inoperative engine. If there is another pilot onboard ask for confirmation.

OPERATIVE ENGINE..... ADJUST POWER AS REQUIRED

Initiate [Engine Securing Procedure](#).



1.5 ENGINE SECURING PROCEDURE (FEATHERING PROCEDURE)

Before securing the engine try to identify the cause of the malfunction:

Fuel Selector..... Switch To Tank Containing Fuel
Cross Feed As Required
Electric Fuel Pump..... On
Magnetos Switch On
Mixture..... Full Rich
Alternate Air On
Engine Gauges Check For Indication Of Cause Of Power Loss

- If propeller is stopped:

Stator.....Engage
Engage until windmills

- If power is restored:

Electric Fuel Pump..... Off
Alternate Air Off

- If power cannot be restored:

Mixture..... Idle Cut Off
Fuel Selector..... Off
Electric Fuel Pump..... Off
Magnetos Switch Off
Cowl Flap..... Closed
Propeller Control Feather Position
Generator Or Alternator Off
Electrical Load Reduce If Necessary

Land as soon as possible at the nearest suitable airport.

Initiate [Single Engine Operation On Cross Feed](#) if necessary.



1.6 SINGLE ENGINE OPERATION ON CROSS FEED

The fuel cross feed system should be used only during emergency conditions and only in level flight.

Inoperative Engine Side Fuel Valve On “MAIN” Or “AUX”
Operative Engine Side Cross Feed On

NOTE: do not put both fuel selector valves on cross feed.

Before landing the fuel system should be taken off cross feed by the following procedure:

Operative Engine Side Fuel Valve On Inboard Main Tank
Inoperative Engine Side Fuel Valve Off
Operative Engine Side Electric Fuel Pump On



1.7 AIR START (UNFEATHERING PROCEDURE)

Magneto Switch On
Mixture.....Rich
Fuel Selector..... Switch to Tank Containing Fuel
Electric Fuel Pump..... On
Throttle ¼ In. Opened
Propeller Control..... Forward Cruise Setting
Starter.....Engage Until Propeller Windmills

When engine starts, adjust throttle, propeller and mixture controls.

Oil Pressure.....Check
Electric Fuel Pump..... Off
Cowl Flap..... As Required
Generator Or Alternator On

Warm engine at approximately 2000 RPM and 15 in. Hg.



1.8 ENGINE ROUGHNESS IN FLIGHT

Affected engine:

Alternate Air On

- If roughness continues after one minute:

Alternate Air Off

In the interim:

Mixture Adjust For Maximum Smoothness

Electric Fuel Pump On

Fuel Selector Switch Tanks

Engine Gauges Check For Indication Of Cause Of Power Loss

Magnetos Check Left Then Right Then Both

If operation is satisfactory on one Magneto, continue at reduced power and standard mixture to the nearest suitable airport.



1.9 POWER OFF LANDING (BOTH ENGINES OUT)

Locate suitable field, preferably with an alternate.
Determine wind direction.

BEST GLIDE & SPIRAL PATTERN96 Kt At 3600 lb
PROPELLERS FEATHER
RADIO SET 121.5, TUNE TRANSPONDER TO 7700
MAYDAY BROADCAST



1.10 GEAR DOWN EMERGENCY LANDING PROCEDURE

When committed to landing:

ELT	Activate Manually
Throttles	Full Aft - Closed
Fuel Selectors	Off
Mixture Controls	Idle Cut Off
Magneto Switches	Off
Seatbelts And Harnesses	Tight
Door	Open (At Pilot Discretion)
Wing Flaps	As Required

**WARNING: Glide ratio is reduced radically when gear is lowered.
Landing gear down operational time is approximately 7 seconds.**

Landing Gear	Lower Just Before Touchdown
Master Switch	Off

Touchdown should normally be made at the slowest possible airspeed.



1.11 GEAR UP EMERGENCY LANDING PROCEDURE

A gear up landing should only be made during an emergency when:

- A) The surface is too soft or rough for a gear down landing.
- B) A field is too short (pilot discretion).
- C) Ditching (a forced water landing) is necessary.

Wing Flaps	Up
Throttles	Full Left - Closed
Fuel Selectors	Off
Mixture Controls	Idle Cut Off
Magneto Switches	Off
Door	Open (At Pilot Discretion)
Master Switch	Off



1.12 SINGLE ENGINE LANDING

On final approach when it is certain the field can be reached:

Landing Gear Extend
Wing Flaps Extend 15 Degrees
Airspeed Blue Line (91kt)



1.13 SINGLE ENGINE GO AROUND

POWERFULL POWER
RUDDERAPPLY TOWARDS OPERATING ENGINE
AILERONBANK 5° INTO OPERATING ENGINE
TURN AND BANK INDICATOR ½ BALL DISPLACED
LANDING GEARRETRACT
WING FLAPSRETRACT
AIRSPEEDESTABILISH Vyse (91KT)

NOTE: Aircraft will not climb with gear and flaps extended.



1.14 HIGH OIL TEMPERATURE

Cowl Flaps..... Open
Mixture Enrich
Power Reduce If Necessary
Airspeed Maintain Above 113 Knots

Land as soon as possible at the nearest suitable airport and investigate cause.

Prepare for engine power loss during flight procedure.



1.15 LOSS OF OIL PRESSURE

Land as soon as possible at the nearest suitable airport and investigate cause.

Prepare for engine power loss during flight procedure.



1.16 LOSS OF FUEL PRESSURE

NOTE: the most common cause of fuel pressure loss is fuel exhaustion due to improper fuel management.

In the event of fuel pressure loss:

Fuel Selector Switch To A Tank Containing Fuel
Electric Fuel Pump On
Mixture Enrich

- If pressure is not regained:

Electric Fuel Pump Off

Initiate [Engine Power Loss During Flight](#) procedure.



1.17 HIGH CYLINDER HEAD TEMPERATURE

Excessive cylinder head temperature may parallel high oil temperature, and the procedure for handling is the same. Refer to high oil temperature procedure (above).



1.18 PROPELLER OVERSPEED

Affected engine:

PROPELLER CONTROLAFT - DECREASE RPM
THROTTLE RETARD
AIRSPPEED REDUCE
THROTTLE REQUIRED TO REMAIN BELOW 2700 RPM

Feather propeller if necessary.

Land as soon as possible at the nearest suitable airport and investigate cause.

NOTE: if an overspeed condition should occur refer to Lycoming Service Bulletin 369F for appropriate corrective action after landing.



2 ICING

2.1 INDUCTION SYSTEM ICING

It is very rare but possible for ice to form in the engines induction system. The first indication of induction systemizing is usually a drop in fuel flow followed by engine roughness.

Alternate Air Full On
Throttle Full Open
Mixture Adjust For Maximum Smoothness

When ice is cleared:

Alternate Air Full Off
Throttle Normal Cruise Setting
Mixture Adjust To EGT Gauge
Fuel Flow Gauge Monitor For Recurrence



2.2 GYRO SUCTION FAILURE

The Twin Comanche is equipped with dual vacuum pumps. If one of the vacuum pumps should fail, a mechanical indicator will identify “left” or “right” and the remaining pump will take over the load.

- If a problem should arise where suction is lost:

Suction below 4.8 in. Hg.

RPM Increase To 2700 RPM
Altitude Decent To Maintain 4.8 In. Hg.

Use electric turn coordinator and magnetic compass to monitor artificial horizon and directional gyro.

If adequate gyro suction cannot be maintained initiate VFR or partial panel IFR procedures as appropriate.

Land as soon as possible at the nearest suitable airport and investigate the cause.



3 ELECTRICAL FAILURES

NOTE: The ammeter normally indicates battery charge or discharge. Depressing and holding the alternator “LEFT or “RIGHT” press-to-test switch will indicate the output off the corresponding alternator. The outputs of the two alternators should be approximately equal.

Ammeter Indicates Battery Discharge

Check press-to-test switches. If output of one alternator is ZERO, reduce non-essential electrical load until ammeter indicates charging, and proceed with flight. Check circuit breaker off the defective alternator. If tripped, reduce load to a minimum and attempt to reset. Allow for a two to five minutes cooling off. Before attempting to reset any circuit breaker. Reset only once.

CAUTION: The alternator circuit breaker and voltage regulator selector switch should never be operated when the engine is running except in an emergency.

- If both alternators read zero, reduce electrical load to a minimum:

Voltage Regulator Selector Switch “AUX” Position

Voltage Regulator Circuit Breakers Reset If Necessary

- If one or both alternators return online (ammeter indicates battery charging) reinstate electrical load (as ammeter indication permits):
- If output is not restored:

Voltage Regulator Selector Switch Return To “MAIN” Position

Both Alternator Circuit Breakers Off

A defective alternator will trip the system’s overvoltage relay. reset the overvoltage relay by turning the master switch “OFF”, waiting a minimum of 6 seconds for the overvoltage relay to reset, and then returning the master switch to the “ON” position.



Activate alternators one at a time by resetting the respective alternator circuit breaker and then resetting the overvoltage relay again if necessary. when the defective alternator is identified, continue flight on the remaining alternator. operate only with essential load if necessary.

If both alternators are defective, or for any other reason the electrical system cannot be restored, maintain minimal electrical load and land as soon as possible at the nearest airport.

With both alternators inoperative the battery is the only remaining source of power.

- If the battery is depleted:

Land Without Wing Flaps Vapp 87 Kt

Initiate [Manual Gear Extension](#) procedure.



4 FIRE

4.1 ENGINE FIRE DURING START

Affected engine:

STARTER.....CONTINUE CRANKING
MIXTUREIDLE CUT OFF
THROTTLEOPEN
ELECTRIC FUEL PUMPOFF
FUEL SELECTOR.....OFF
IF FIRE CONTINUESESTINGUISH WITH BEST AVAILABLE MEANS

NOTE: USE RADIO IF NECESSARY, TO CALL FOR FIRE FIGHTING ASSISTANCE.



4.2 FIRE IN FLIGHT

DETERMINE SOURCE OF FIRE.....ELECTRICAL OR ENGINE

- If electrical fire: (or smoke in the cabin)

Master Switch Off
Vents Open
Door..... Open (If Necessary) As An Exhaust
Cabin Heater..... Off
Oxygen (If Equipped) As Required

Land as soon as possible without flaps (Vapp 87 Kt).

Initiate [Manual Gear Extension](#) procedure.

- If engine fire:

Affected engine:

THROTTLEFULL AFT – CLOSED
MIXTURECUT OFF
FUEL SELECTOR.....OFF
ELECTRIC FUEL PUMP CHECK OFF

Initiate [Engine Power Loss During Flight](#) Procedure.



5 LANDING GEAR

5.1 LANDING GEAR FAILURE

- 1) Prior to executing emergency procedure:

Master Switch Check On
Landing Gear Circuit Breakers Check And Reset As Required

If breakers are reset (closed), continue with emergency procedure:

- 2) If landing gear operates, but green (gear down - locked lamp fails to illuminate:

Navigation Lights Check Off
Landing Gear Indicator Light Replace As Required

NOTE: If this procedure is due to an electrical failure, landing gear position lights and warning horn will be inoperative.

- 3) if landing gear fails to operate, initiate [Manual Gear Extension](#) procedure.



5.2 MANUAL GEAR EXTENSION

Airspeed Below 87 Knots
Landing Gear Switch Gear Down Locked Position
Motor Release Arm Disengage & Push Forward
Through Full Travel

Allow landing gear to fall.

Gear Extension Handle Remove From Stowage

- if left socket is not in clear position, place handle in right socket.

Gear Extension Handle Engage Slot And Twist Clockwise To Secure.

Extended handle and rotate forward until left socket is in clear position.

Gear Extension Handle Place In Left Socket And Secure

Extend handle and rotate full forward to extend landing gear and (if installed) emergency safety lock will engage.

Handle locked in full forward position indicates landing gear is down and (if installed) emergency safety lock engaged. Gear down locked indicator should be on.

Do not retract landing gear with handle in socket.

CAUTION: do not re-engage landing gear operating motor in flight. To reduce the landing gear side loads to a minimum, avoid a crosswind landing and high-speed turns while taxiing.



5.3 LANDING GEAR UP LANDING

Just before landing:

Cabin	Secure For Emergency
Flaps	Up
Throttle	Idle
Fuel Selector	Off
Mixture	Cut Off
Master Switch	Off



6 SPIN RECOVERY

WARNING: The Twin Comanche is certified as a normal category airplane. Intentional spins are prohibited.

THROTTLESIDLE
AILERONS NEUTRAL
RUDDER FULL OPPOSITE TO THE DIRECTION OF ROTATION
CONTROL WHEEL BRISKLY FORWARD FOOD TRAVEL
RUDDER NEUTRAL WHEN ROTATION STOPS
CONTROL WHEEL
..... BACK PRESSURE TO RECOVER FROM DIVE

NOTE: application of the ailerons opposite the direction of rotation can expedite recovery off the Twin Comanche



7 MISCELLANEOUS

7.1 OPEN DOOR IN FLIGHT

If latches are not secure, the door will trail slightly open and airspeed will be slightly reduced.

Buffeting may be experienced

Too close door in flight:

Airspeed	Below 87 Knots
Cabin Vents	Close
Storm Window	Open
Slip Airplane	Facing Door Into Wind
Latch	Secure

An open dooring flight presents no real danger. However, the high level of noise caused by an open door can give concern to passengers and be distracting to the pilot. If unable to close the door in flight, land as soon as possible at the nearest suitable airport with approximately a 9 kt increase over normal landing speed.



8 EMERGENCY DESCENT

1) Oxygen system failures

This particular airplane is not equipped with oxygen system therefore oxygen system failures will not be described

2) Other emergencies:

In the event of an emergency where are thermal shock to the agents in passenger discomfort are overridden by other factors (search as a fire that cannot be extinguished) which require getting the airplane on the ground as quickly as possible, the additional action offer rolling the aircraft to a 40 to 45 degree bank and descending in a spiral destroys a large portion of lift and increases rate of descent substantially.



9 SIMULATED SINGLE ENGINE OPERATION

Neste manual será contemplado a sessão que menciona a operação de monomotor simulado. Entretanto é proibido a sua execução abaixo de 5000 Ft. AGL conforme descrito na seção 3 do SOP do CIAC Aeroclube de Canela.

NOTA: O CIAC Aeroclube de Canela não tem por padrão simular panes em baixa altura.

Simulated engine failure of a multi-engine aircraft is the most dangerous form of training a pilot is likely to experience. It is recommended that in order to remain proficient, the pilot should practice single engine operation periodically, and only with an experienced multi engine instructor. Simulated engine failure should be performed at an altitude that will allow enough room for safe recovery (5000 ft terrain clearance is recommended) should control of the airplane be lost.

AIRSPEED LESS THAN 109 KT
LEFT ENGINE THROTTLE RETARD
RIGHT ENGINE.....FULL POWER
RUDDERTOWARD OPERATING ENGINE
AILERON BANK 5 DEGREES INTO OPERATING ENGINE
TURN AND BANK INDICATOR ½ BALL DISPLACED
LEFT ENGINE PROPELLER FEATHER
MAINTAIN AIRSPEED ABOVE VSSE 84 KT

NOTE: While Vsse is the accepted airspeed below which an engine should never be intentionally failed, it is recommended that the airspeed never be allowed to fall below the blue line when operating on a single engine (91kt).

NOTE: Due to a symmetrical thrust, the airplane will you enroll toward the dead engine. Maintaining wings level and holding the ball of the turn and bank indicator in the center can increase Vmca as much as 20 knots. In addition, the high drag caused by the wings level, ball centered configuration can reduce single engine climb performance as much as 300 feet per minute.

NOTE: To overcome the yaw and roll moments induced by an engine failure, bank approximately 5 degrees into the operating engine, and



displace the ball of the turn and bank indicator approximately $\frac{1}{2}$ ball width toward the operating engine.



REVISÕES

REVISÃO	DATA	EDITADO POR	APROVADO POR	ITENS REVISADOS
01	07/05/2021	Guilherme S. Pigatto	Bruno Ramm	Revisão Geral do QRH.