

# [Thermodynamics assignment](https://assignbuster.com/thermodynamics-assignment/)

Radial line – indicates minimum or maximum limits 2. Arc – indicates an allowable operational range 3. Typically directly on instrument face, but may be painted on the instrument glass 4. Index mark -?? white mark on glass, “ slippage marks” (used where color markings are on the glass), extends from glass onto case B. Colors 1. Green arc – safe, or normal range of operation 2. Blue line/arc – allowable value under special operating conditions 3. Yellow arc – caution range, typically -time or -condition limited operation 4. Red radial/line – unsafe, maximum or minimum safe operating limits C. MAT

Privileges – as related to instruments themselves – very limited 1. “ Steam Gauges/ Round Dial” a. Can inspect for installation, condition, mounting, marking and operation of instruments ( and cables, wires, fluid lines, etc. ) b. Can fix cosmetic flaws (paint case or markings on glass) c. But cannot open the instrument case to repair anything inside -?? must be sent to an approved instrument repair station d. Inoperative/defective instruments are basically “ remove and replace” items – cables, wires, fluid lines, may be repaired/replaced as needed 2. “ Glass Panel” a. Some maintenance permitted/prescribed by manufacturers .

SOCIO does allow A&P to perform certain tasks as “ maintenance” 1 . ) Following flow chart diagnostics, removing and replacing components Ill. Instrument Principles (measuring/sending UN its) A. Pressure Measuring Instruments 1. Mechanisms a. Bourbon tube 1 A brass coiled tube that straightens with pressure 2. ) used for higher pressures – above 10 SSI b. Diaphragm (wafer) 1 A thin brass or bronze disk 2. ) used for lower pressures – below 10 SSI c. Bellows 1 A series of diaphragms 2. ) Used for lower pressures that have wider ranges of pressures 2. (pressure) systems a. Oil pressure 1 .

Used as an indication of oil pressure provided to the engine 2. ) Usually a bourbon tube with a “ pick up” (send unit) just after the oil pump 3. ) Small restriction (snubbed) prevents fluctuating gauge 4. ) Modern aircraft are replacing the bourbon tubes with electric transmitters b. MAP 1 . ) used as indirect indication of power developed by the engine 2. ) Diaphragm/bellows (various configurations) senses pressure in intake manifold, after throttle valve 3. ) In inches of mercury (intuit. Hog. ) – 29. 92 when engine shut down c. Fuel pressure 1 Used to give an indication of fuel pressure supplied to the carburetor or eel control unit 2. Float carburetor – senses pressure at inlet of carburetor 3. ) Injection – pressure before fuel nozzles, measures at flow divider d. Temperature reading (using pressure) 1 Bourbon tube is connected to a bulb sealed with methyl chloride 2. ) As temperature increases, pressure in sealed bulb increases 3. ) Used commonly on small aircraft for engine oil temperature e. Engine pressure Ratio (PER) 1 Utilizes a differential pressure gauge 2. ) Provides an indication of thrust produced by turbojets and turbofans 3. ) Ratio between turbine discharge and compressor inlet (Opt to Opt) B.

Electrical Measuring Instruments 1 . Resistance type -?? Rationale or Wheatstone bridge a. Sending unit 1 . ) A coil of wire whose resistance changes greatly with temperature, theorist (bulb, RE) b. Indicator 1 . ) A small permanent magnet (pointer) positioned between two magnetic coils (Rationale), or a galvanometer “ bridge” (Wheatstone) c. Principle of operation 1 . ) As temperature changes, current changes, strength of magnetic field changes d. Systems 1 Oil temperature 2. ) Carburetor air temperature 2. Thermocouple type – uses dissimilar metals to create potential, independently a.

Probe (send unit) Consists of two dissimilar metals 1 Copper and constant 2. ) Iron and constant 3. ) Chromed and alum b. Indicator – uses basic current measuring device, known as a galvanometer (measures the direction of a small current flow) c. Leads – specific to the instrument system 1 . ) precise length and resistance (cannot be altered) d. Operation 1 consists of two junctions at the same temperature, no current flows 2. ) uses on cylinder head temperature and exhaust gas temperature gauges C. Speed Measuring Instruments 1 . Tachometer a. Purpose – to measure the engine’s speed (RPM) .

Types 1 Mechanical and magnetic i. Mechanical: spinning weights compress spring, moving pointer ii. Magnetic: spinning magnet moves drag cup and pointer 2. ) Electronic i. Uses the breaker points in the magneto to determine engine RPM 3. ) A. C. Electrical i. Uses engine driven A. C. Generator (tact-generator), synchronous motor, and magnetic drag cup to move indication pointer 4. ) Turbine engine Tachometer i. Usually uses A. C. Electrical tact, with indicator marked in “%RPM” 5. ) Multi- engine (or helicopter) tachometer i. Has two needles within the indicator (helicopter: engine and rotor D.