

Thermodynamics assignment



**ASSIGN
BUSTER**

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 III.

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.