

ENGLISH

PHILIP SHAWCROSS

FOR AIRCRAFT

system
maintenance **2**




BELIN



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FOREWORD

FOR THE STUDENT

The aim

English for Aircraft will help you use aeronautical manuals more easily. It is designed for civilian or military technicians, engineers and mechanics and can be used with a qualified teacher in a training course or for self-study. It is for users of English with an intermediate level in written English.

The contents

There are 26 Modules, 4 Review Modules, an Exercise Key and an Index. Each Module covers a subject that will help you to read more efficiently. The subjects in Parts One and Two are more general than in Parts Three and Four. Do not forget to read the introduction at the beginning of each Part, as well as the following notes on how to use the book.

The Modules have short, practical explanations with authentic examples ("Notes") and exercises to enable you to put the points into practice immediately. The book is based on the principle of "learning by doing". You can check your answers in the Exercise Key.

The examples are taken from all aircraft systems in *Airbus Industrie*, *Boeing*, *Fokker*, *McDonnell Douglas* and various suppliers' Aircraft Maintenance Manuals, Checklists, Structural Repair Manuals, Illustrated Parts Catalogs, Service Bulletins, Airworthiness Directives, Flight Manuals, Training Manuals, etc.

Remember to use this book in conjunction with your own documentation. After each Module or two, look for examples in your own manuals and put into practice the approaches to reading explained here. Take your time to work through the book gradually.

The book is in English and there are no translations. "Think English!" It is easier than you imagine.

There is also a companion volume, *System Maintenance*, which is a selection of longer texts and activities from all the ATA chapters. This enables you to apply what you learn in this book to real examples and to choose the systems that interest you most.

Using the book

English for Aircraft is designed to adapt to different needs and different levels of English and is not just for the classroom. It can be integrated into your place of work and consulted regularly. Frequent use is more effective than prolonged periods of study. Compare the materials in *English for Aircraft* with the actual documents you work on every day.

Use *English for Aircraft*:

- in a classroom (with a group) as the backbone of a structured course;
- individually for self-study, revision or reference purposes;
- from A to Z, in a methodical progression, going from the basic points through to the more complex vocabulary;
- by choosing the Modules which cover the points which you find most important or most difficult.

Any learning process will include phases of acquisition (the "Notes" sections) and phases of application (the "Exercise" sections). These phases can be either collective or individual, but great benefit will be gained from the linguistic and technical exchange between students working together.

Examples and exercises

The first volume, the *Documentation Handbook*, contains the basic principles, structure and vocabulary of aeronautical English, with a large number of authentic one-sentence examples from all aircraft systems. The second volume, *System Maintenance*, provides extensive texts and illustrations from all ATA chapters as well

as activities which are not purely linguistic but also technically-based. A cross-reference system in *System Maintenance* enables you to move from one volume to the other and so consolidate your knowledge.

A Module often contains more than one exercise. Do not do them all at once. It is preferable to return to points you have already seen by doing the exercises in two or three stages and by choosing the related activities in *System Maintenance*.

The language used

The official language of aviation is American, as opposed to British English. This is why American spelling has been adopted throughout and, in the few cases where differences exist, American technical names have been preferred to British ones.

English for Aircraft reflects the language used in present-day aeronautical documentation. The examples are all taken from aircraft designed within the last twenty years and which will be in service until the year 2010 or 2025.

Simplified English

Since 1986, most aircraft and component maintenance manuals reflect the requirements of Simplified English, without implementing them entirely, as yet.

The general principles of Simplified English are described briefly in Module X. Nevertheless, we were not able to restrict ourselves to Simplified English in the Notes and examples of *English for Aircraft*. For many years to come, users of aeronautical documentation will have to deal with both Simplified and conventional English.

FOR THE TEACHER

Practical, relevant language

English for Aircraft is the result of years of extensive use of these materials with aircraft

technicians. The materials have evolved to cater for not only language-teaching but also practical and technical considerations. The technician's goal is technical rather than purely linguistic accuracy, and accuracy ultimately means safety. In other words, the teacher's first job is to allow his or her students to transform the language from a barrier into a tool. Therefore, the English used needs to become self-effacing and transparent. Style and grammar must know how to play second fiddle to content and purpose. It is important to remember that this is a field where students are particularly sensitive to the relevance of the material chosen.

Knowing about aircraft

The teacher who uses *English for Aircraft* with a class should have at least a superficial, first-hand knowledge of aircraft and aircraft systems, and preferably some basic scientific or technical notions. The world that lies behind each technical term and schematic, the world of aluminum alloy, steel, titanium, space-age materials, real-time computation and the harnessing of natural forces should captivate the teacher as much as it already does the students whose enthusiasm for their profession should fire any course and enhance language acquisition.

Course organisation

It is preferable to divide the course into a number of separate days, allowing the students to do a measured amount of self-study, preparation and application between the group sessions.

The points made above in "Using the book" are valid for the conduct of a course. It is essential to play on the complementarity of the *Documentation Handbook* and examples of documentation, taken preferably from aircraft and systems known to the students. It is also important to go beyond reading exercises to creative and communicative activities entailing group writing and oral exchange. This makes acquisition much more articulate and explicit.

Students need to be encouraged to approach texts in a more active, purposeful way: to know what

they want, to know what they are looking for and where to look for it, to know how to use the various signposts, to know how to classify information, etc.

The skills which *English for Aircraft* tries to develop lend themselves particularly well to computer-based activities reviewing the various points covered in the *Documentation Handbook*. These can be done individually or in a group.

Acknowledgements

I am extremely grateful to *Airbus Industrie*, *Air France* and *Air Inter* for kindly giving me access to all the documents and illustrations required in the preparation of *English for Aircraft*. I am also indebted to the many students who enabled me to improve and perfect the exercises contained in the books.

Philip Shawcross

PART



- A. WORD ORDER**
- B. LOCATION**
- C. VERB TENSES**
- D. INSTRUCTIONS, PROCEDURES**
- E. BASIC SENTENCE STRUCTURE**
- F. WORD ENDINGS**
- G. PREFIXES, SUFFIXES**

I N T R O D U C T I O N

Part One contains the basic aspects of English you will find in almost every line of every technical text.

Our objective here is to revise and consolidate your utilization of these parts of the language. Any mistakes are more serious because they cause complete errors of interpretation. You could confuse:

IDENTIFICATION (Module A: WORD ORDER)

if you do not identify the correct word in a group of words.

POSITION (Module B: LOCATION)

if you confuse "upper" and "lower".

TIME AND USE (Module C: VERB TENSES)

if you mix up "connect", "is connected", etc.

ORDERS (Module D: INSTRUCTIONS, PROCEDURES)

if you do not recognize an instruction and know the most common actions like "remove", "install", "release", "tighten", etc.

PARTS OF A SENTENCE (Module E: SENTENCE STRUCTURE)

To find information quickly and correctly you must know how English is constructed.

FUNCTION (Module F: WORD ENDINGS and Module G: PREFIXES, SUFFIXES)

if you do not distinguish between "actuate", "actuated", "actuator", "actuating", "actuates" and know the significance of the difference; and if you do not distinguish between "upstream" and "downstream".

These subjects are the easiest, but also the most important. They are explained and you can put them into practice at the end of each module and in the Review (p.48). You will find that we constantly return to them in this book and in the *System Maintenance* volume, as they are the foundations of technical English.

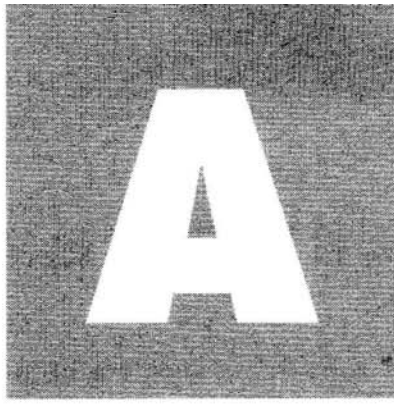
When you have finished an exercise, check your answers with the Exercise Key.

Remember that it is easier to recognize a point in isolation than in the middle of a long text!

A B B R E V I A T I O N S

Here are some conventional abbreviations used in this book and in many technical manuals:

ABBREVIATION	DEFINITION
a/c	aircraft
AD	Airworthiness Directive
a/l	airline
AMM	Aircraft Maintenance Manual
C/B	circuit breaker
CMM	Component Maintenance Manual
e.g. (exempli gratia)	for example
ft	feet
gal	gallon
i.e. (id est)	this is, that is to say, in other words
lb	pound
lt	light
m.daN	meter deca Newton
N.B. (Nota Bene)	take note
OIT	Operators Information Telex
oz	ounce
p.b.	push-button
p.s.i.	pounds per square inch
P/N	Part Number
re	with reference to, refer to
SB	Service Bulletin
S/N	Serial Number
SRM	Structural Repair Manual
TSM	Trouble Shooting Manual
TFU	Technical Follow-up
WDM	Wiring Diagram Manual



WORD ORDER

FLIGHT DECK

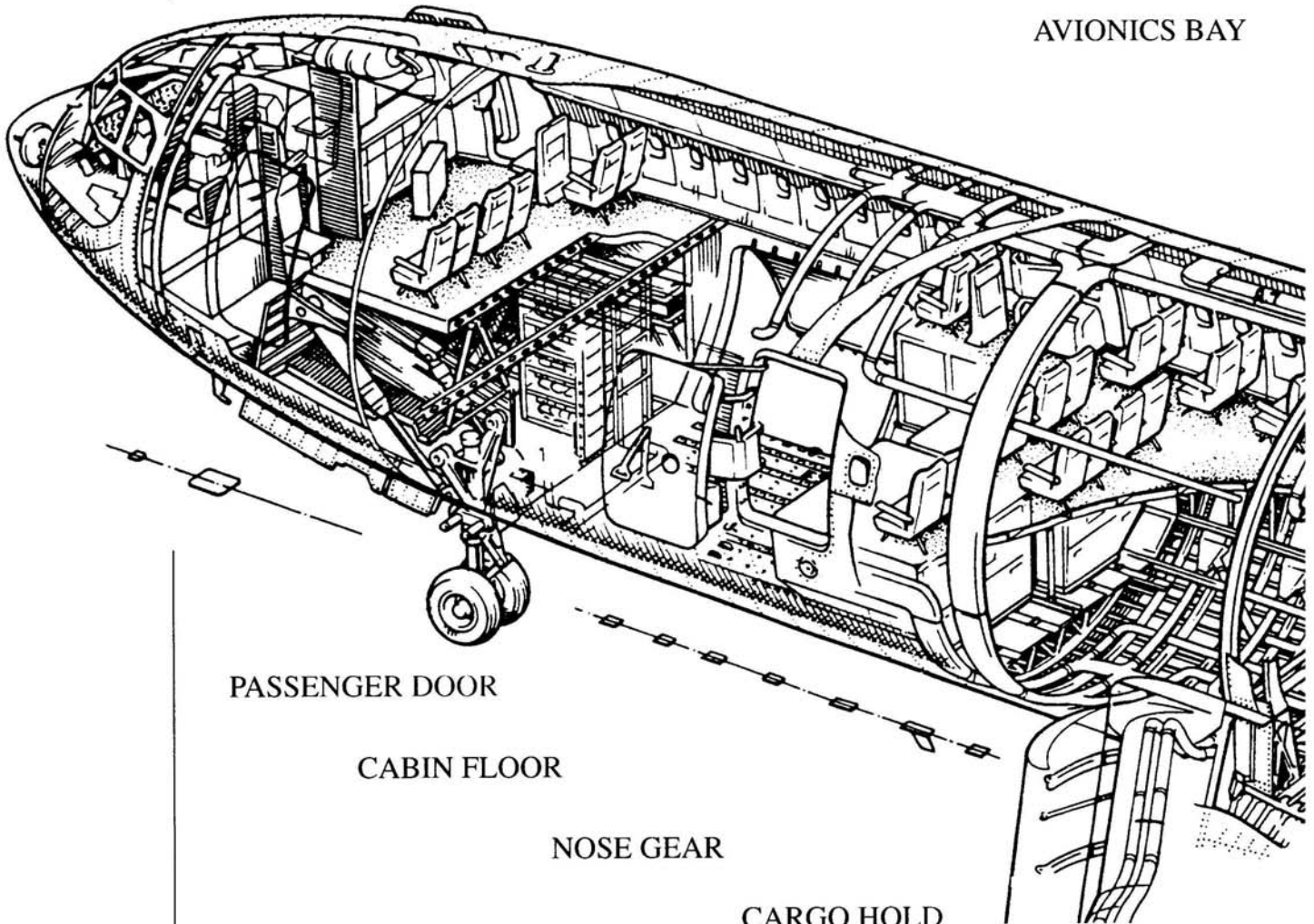
AIR CONDITIONING DUCTS

FORWARD GALLEY

WALL PANELS

SEAT UNITS

AVIONICS BAY



PASSENGER DOOR

CABIN FLOOR

NOSE GEAR

CARGO HOLD

ELECTRONIC RACKS

WING LEADING EDGE

FORWARD FUSELAGE

NOTES

The order of words in technical English is very important. Technical English uses a lot of compound words or “noun clusters”, that is a chain of words, e.g.

door lever

fuel tanks

ground servicing operations

left forward passenger door

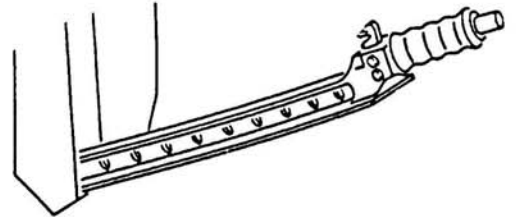
nose landing gear uplock box

aft cargo compartment door

proximity detector

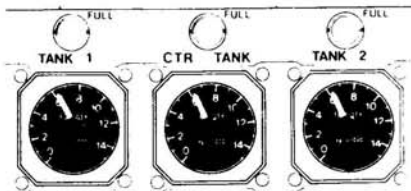
outer RH flap track fairing

attachment bolt heads



1 THE PRINCIPLE

The basic principle in a compound word is that one word is the component, or “key word”, and the other words are the qualifiers.



QUALIFIER	COMPONENT	MEANING
<i>door</i>	<i>lever</i>	lever of the door
<i>fuel</i>	<i>tanks</i>	tanks for fuel
<i>upper</i>	<i>deck</i>	deck on the top
<i>discharge</i>	<i>valve</i>	valve for discharging air, etc.

2 IN A TEXT

When a compound word/expression is in a text (e.g. the Maintenance Manual), the “key word” – the component – is the last word in the chain. The words before qualify the “key word” with more and more specific information:

LOCATION	SYSTEM/ FUNCTION	ASSEMBLY/ FUNCTION	SUB-ASSEMBLY	COMPONENT
<i>left</i>	<i>engine</i>	<i>mounting</i>	<i>bolt</i>	<i>washer</i>
<i>upper</i>	<i>rudder</i>	<i>servo</i>	<i>drive</i>	<i>rod</i>
<i>nose</i>	<i>gear</i>	<i>ground</i>	<i>safety</i>	<i>pin</i>

Remember that the “key word” is also the smallest item in the chain. The other words only help to identify it.

3 IN A LIST

In a text, the “key word” is the last word in the chain. But in a list (an IPL, IPC, etc.), the “key word” is usually the first word – to make identification easier. It is followed by a comma (“,”) or a dash (“-”) then the function, then the location, e.g.

box, uplock, nose landing gear

detector, proximity, aft cargo component door

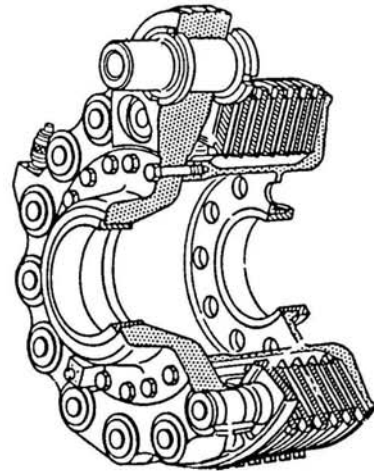
relay, isolating, starter power

This word order is unusual in a text with a verb.

4 CONFUSION

Careful! The sense of an expression depends on the word order. Look at these examples. The “key word” is in bold type:

<i>brake disc</i>	a disc on the brake unit
<i>disc brake</i>	a type of brake
<i>flight level</i>	aircraft standard altitude
<i>level flight</i>	horizontal flight
<i>tank center</i>	the center of the tank
<i>center tank</i>	the tank in the wing center box



You must be methodical. Analyse the context. Your interpretation must be coherent. Don't translate too literally. Find the reality of the aircraft behind the text.

5 SOME MORE EXAMPLES

– low pressure warning **switch**

– The *aileron supply shutoff valve* is a component of the *aileron system modular unit*.

– The *aft flap assembly* is a monospar structure and consists of the *spar nose ribs* and a *machine-tapered honeycomb trailing edge*.

– The *continuous loop sensing element* consists of an inconel tube filled with a ceramic core.

– *MLG shock strut servicing chart*

– *generator breaker light*

– *exhaust gas temperature thermocouple probe*

– The basic purpose of the *combined pack temperature and cabin temperature regulation system* is to control the amount of *hot trim air* mixed with *cold pack discharge air*.

E X E R C I S E S

You can now put this into practice. When you finish this exercise (and any exercise in the book), check your answers in the Exercise Key.

1 Choose the compound expression which agrees with the definition. Look at the example. The right answer is A: "SEAT BACK".

DEFINITION	A	B
back of the seat	SEAT BACK	BACK SEAT

DEFINITION	A	B
1. air used to cool hot air	AIR COOLING	COOLING AIR
2. to transfer from one circuit to another	SWITCHING CIRCUIT	CIRCUIT SWITCHING
3. procedure to check lights	LIGHT TEST	TEST LIGHT
4. signal sent back by the system	FEEDBACK SYSTEM	SYSTEM FEEDBACK
5. large groups (looms) of wires	WIRE LOOMS	LOOM WIRES
6. non-return valve	CHECK VALVE	VALVE CHECK
7. motor to move a valve	VALVE DRIVE	DRIVE VALVE
8. activates a valve electrically	SOLENOID VALVE	VALVE SOLENOID
9. air from engine compressor	BLEED AIR	AIR BLEED
10. system that provides hot air	AIR BLEED	BLEED AIR

2

Here are some common aircraft components in the incorrect order. Put them in the correct order. Look at the example:

Incorrect order: COLUMN CAPTAIN CONTROL

Correct order: CAPTAIN CONTROL COLUMN

1. HANDLE CONTROL SPOILER

.....

2. SYSTEM OXYGEN CREW FLIGHT

.....

3. UNIT DISPLAY LOWER

4. BULKHEAD AFT PRESSURE

5. PANEL LIGHTING EXTERIOR CONTROL

6. WING LEFT FAIRING HAND TIP

7. EDGE RIGHT TRAILING UPPER

8. FUEL INTEGRAL TANK

9. RECLINE BUTTON CONTROL

10. DOOR CARGO FITTINGS LOCK

11. DISTRIBUTION CABIN CONDITIONED SYSTEM AIR AFT

12. MAIN DOORS GEAR

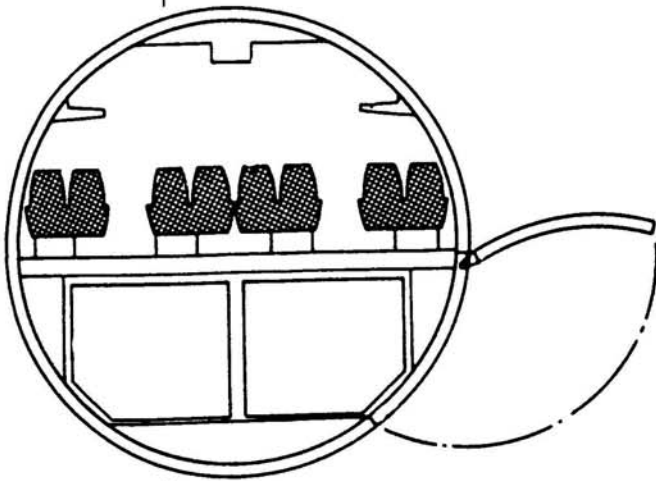
13. MARKER LIGHT INNER

14. BOX GEAR NOSE INTERPHONE

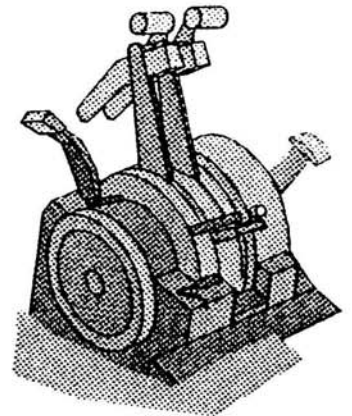
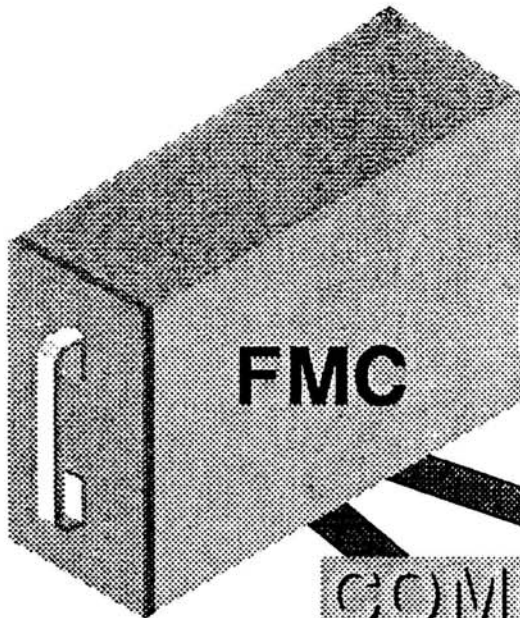
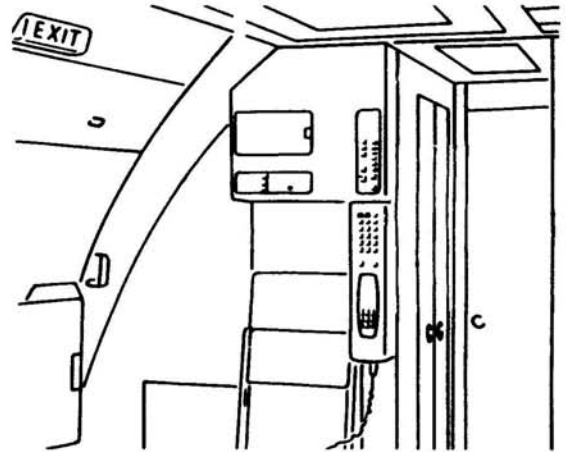
15. RECEPTACLE GROUND DOOR ACCESS POWER

B

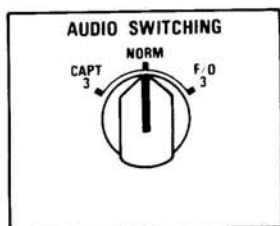
LOCATION



PURSERS CONTROL PANEL



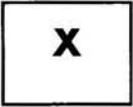



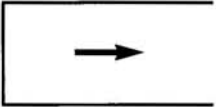
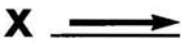
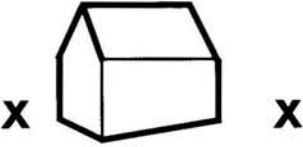


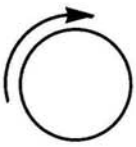
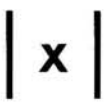

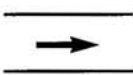
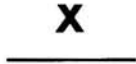

COMMANDS

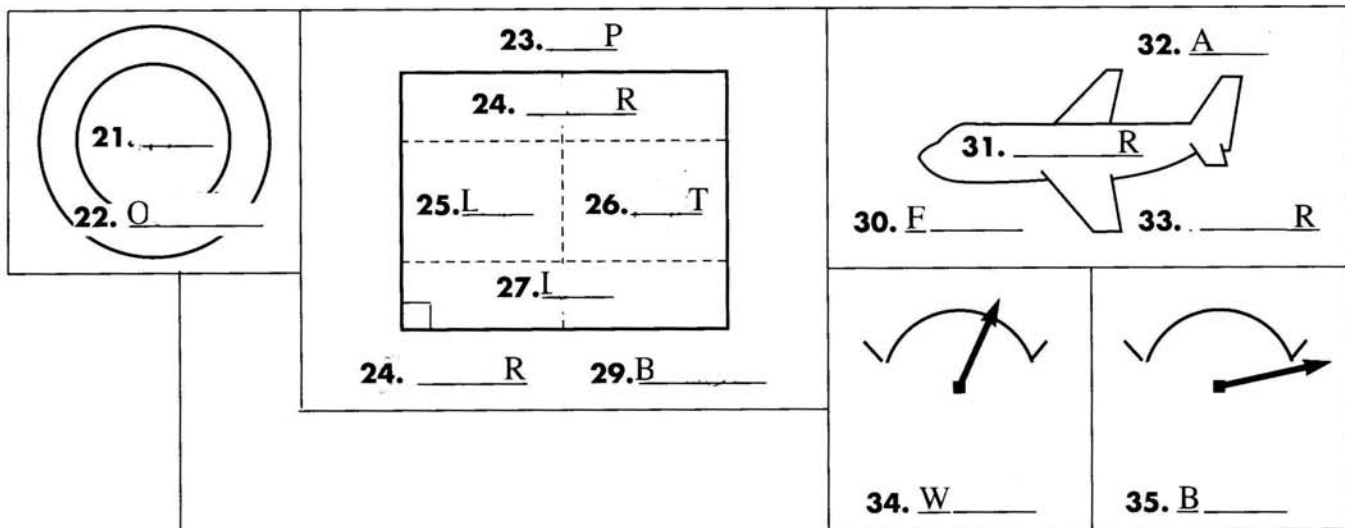


E X E R C I S E S

Use these words or groups of words to complete this page. The first or the last letter is given.

BETWEEN	UP	REAR	OUTER	OUT OF
THROUGH	IN	RIGHT	NEAR	OFF
OVER	ON	TOP	LEFT	CORNER
CENTER	IN FRONT OF	DOWN	ALONG	BOTTOM
FROM	AROUND	INNER	WITHIN	BEYOND
INTO	TO	LOWER	AFT	BEHIND
UNDER	AT	FORWARD	NEXT TO	UPPER

				
1. I _____	2. _____ N	3. A _____	4. _____ O	5. O _____ O
				
6. _____ G	7. I F _____	8. B _____	9. _____ P	10. _____ N
		FGB ACD	FGB ACD	
11. _____ D	12. _____ N	13. _____ R	14. N _____ T	15. _____ F
			... LONDON ... NEW YORK	
16. T _____	17. _____ R	18. U _____	19. _____ M	20. T _____



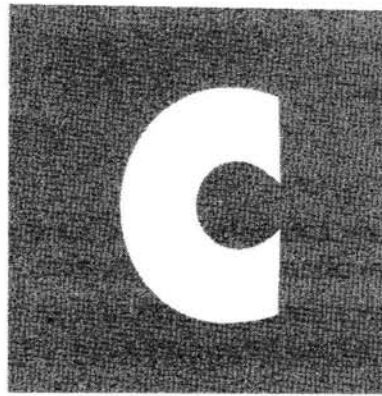
2

Fill in the blanks with the location words. (INTO & BETWEEN are used twice.)

RIGHT	AROUND	THROUGH	TOP
FROM	UPPER	BETWEEN	NEXT TO
BEYOND	FROM...TO	FRONT	INTO
WITHIN	OVER	REAR	ON
INNER	INTO	AFT	
ALONG	BETWEEN	OUT OF	

1. Engine No. 2 is the engine.
2. Slat N°1 is the slat.
3. The solenoid valve is mounted the pump.
4. The cabin is the hold.
5. Insert the motor the casing.
6. The cabin lights run the ceiling.
7. The plate runs frame 32 frame 57.
8. The tanks are located ribs 1 and 14.
9. The Purser station is at the of the cabin.
10. The center pedestal is the pilot stations.
11. The First Officer is the Captain.
12. The insulator is the wire.
13. The cable passes the cut-out.

14. The indication is tolerance. (OK)
15. The pointer is the red index! (FAULT)
16. The bulk cargo compartment is at the
17. The APU is of the pressure bulkhead.
18. The spoilers are on the wing surface.
19. Water flows the drain mast.
20. The aircraft has reached the of its climb.
21. Pour oil the tank to top it up.
22. Remove the cap the overflow pipe.



VERB TENSES

NOTES

In technical documents the number of tenses used is very limited. All these tenses are direct variants of the basic form of the verb: the **INFINITIVE**. Most technical verbs are regular.

INFINITIVE: <i>to connect</i>				
PRESENT SIMPLE	IMPERATIVE	GERUND	PAST	FUTURE
<i>connects</i>	<i>connect</i>	<i>connecting</i>	<i>connected</i>	<i>will connect</i>
<i>connect</i>				<i>shall connect</i>

1 THE INFINITIVE

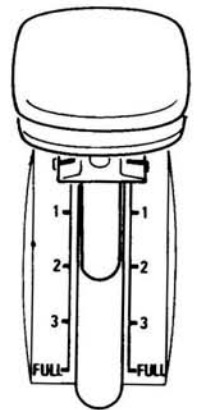
“To” + the basic form of the verb. In technical language it is used to express an action that is an objective, a reason or a purpose:

The lever is used *to extend* the flaps.

There is a knob *to set* the altitude.

To open the circuit, pull the circuit breaker.

(See also Module J: **PURPOSE**.)

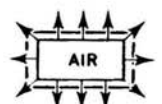


2 THE PRESENT SIMPLE

This is the essential tense of technical English and is the basic tense of all technical documentation. It is mainly used in the 3rd person singular (“it”) or 3rd person plural (“they”):

The light *illuminates* at 45 p.s.i. (singular)

The lights *illuminate* at 45 p.s.i. (plural)



The present simple is used to describe all generalities, systems, processes, repetitive phenomena, laws, etc:

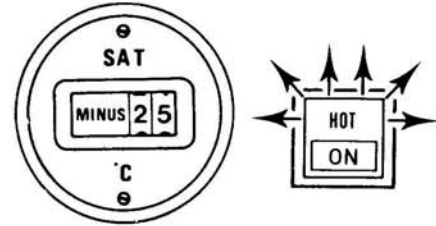
Air temperature *decreases* at high altitude.

The AC generator *supplies* 115 V current.

The cables *transmit* the order to the servocontrol.

The equipment *overheats* in hot weather.

Water *boils* at 100°C.



3 TO BE, TO HAVE

The verbs *to be* and *to have* are common.

To be indicates a state or condition:

The landing gear lever *is* at “down”. (singular)

The probes *are* on the forward fuselage. (plural)

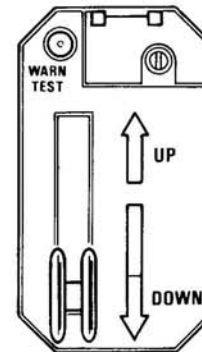
It is often followed by the past participle:

The window *is* cracked.

The valves *are* closed.

or by an adjective:

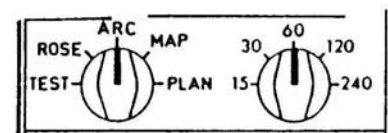
The seal *is* new.



To have indicates a possession or attribute:

The propeller *has* four blades. (singular)

The rotary selectors *have* five positions. (plural)



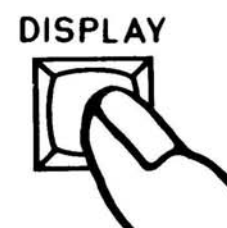
(See also Module P for TO BE and the PASSIVE.)

N.B. Do not confuse the present continuous, e.g. “The aircraft is taking off” (= now, at this moment) with the present simple: e.g. “The aircraft takes off after VR” (= in general, in all conditions).

4 THE IMPERATIVE

The imperative has the same form as the infinitive but without “to”, e.g. “rotate”, “disconnect”, “set”, “check”, touch”:

Set the selector to IGN A+B.



In the negative form, it is preceded by “do not”:

Do not touch hot brakes.

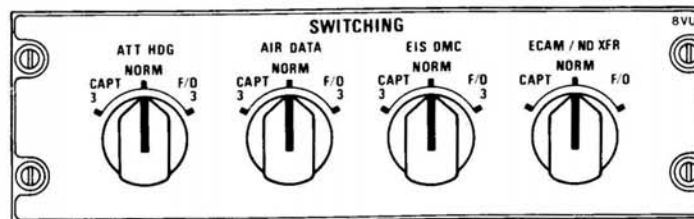
It is the simplest form of the verb. It is used for all instructions, procedures, checklists, etc.

(See also **Module D: INSTRUCTIONS, PROCEDURES.**)

5 THE GERUND

The gerund is the basic form of the verb + “ING”, e.g.

locking switching landing testing



It expresses a function or an activity.

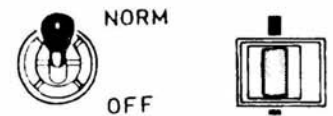
It can be the subject of a sentence. e.g.

Smoking is forbidden.

NO SMOKING

Downlocking is indicated on the gear panel.

Setting the switch to “off” closes the valve.



The gerund (or present participle) can also qualify a word.

It indicates its function, e.g.

cooling unit

retaining ring

uncoupling solenoid

(See also **Module F: WORD ENDINGS.**)



6 THE PAST PARTICIPLE

The past participle of regular verbs is the basic form of the verb + "ED" (just "D" when a verb ends in "E" and, if the last consonant is preceded by a vowel, the consonant is usually doubled):

tested checked selected timed transmitted

(See also Module F: WORD ENDINGS.)

Most technical verbs are regular, but here are some common irregular past participles:

INFINITIVE	PAST PART.	INFINITIVE	PAST PART.
<i>be</i>	<i>been</i>	<i>meet</i>	<i>met</i>
<i>do</i>	<i>done</i>	<i>override</i>	<i>overridden</i>
<i>draw</i>	<i>drawn</i>	<i>read</i>	<i>read</i>
<i>drive</i>	<i>driven</i>	<i>send</i>	<i>sent</i>
<i>feel</i>	<i>felt</i>	<i>set</i>	<i>set</i>
<i>fly</i>	<i>flown</i>	<i>shut</i>	<i>shut</i>
<i>hang</i>	<i>hung</i>	<i>stick</i>	<i>stuck</i>
<i>go</i>	<i>gone</i>	<i>tear</i>	<i>torn</i>
<i>have</i>	<i>had</i>	<i>wear</i>	<i>worn</i>
<i>lose</i>	<i>lost</i>	<i>wind</i>	<i>wound</i>

The past participle indicates a state, a condition, the result of an action, an action done, e.g.

Check LO LEVEL lights. ... *Extinguished*.

The antenna is *located* on the vertical stabilizer.

The contactor is *operated* by the switching logic.

The position is *monitored* by two magnetic indicators.

The leading edge is *damaged*.

(See also Module S: STATES, FAILURES, DAMAGE.)

7 THE FUTURE

The future is simply *will* (or *shall*) + the basic form of the verb:

The aircraft *will take off* at 09.45.

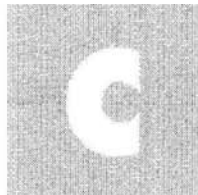
Will can be used for an intention or an action in the future. *Shall* indicates a necessity, an imperative or regulatory action and is usually used with *to be*, e.g.

The tanks *shall be drained* before the first flight of the day.

(See also Module M: POSSIBILITY, PROBABILITY, NECESSITY, CONDITIONS.)

8**SOME MORE EXAMPLES**

- The pack *regulates* the air temperature to between -7°C and $+73^{\circ}\text{C}$.
- When the gear *reaches* its fully extended position, the Piston Rod Locking Fingers *come* into contact with the Locking Sleeve.
- *Add* or *release* dry air or nitrogen to obtain correct dimension “x”.
- *Do not loosen* valve body until shock strut has been deflated.
- The indicator clip will shear off *to indicate* that the cartridge should be replaced.
- *Setting* the switch to ‘Trip’ de-energizes the APU generator field.
- The light *will come on* when the control moves from the first detent to full up.
- Steering is *controlled* by a wheel on either side of the flight deck.



VERB TENSES

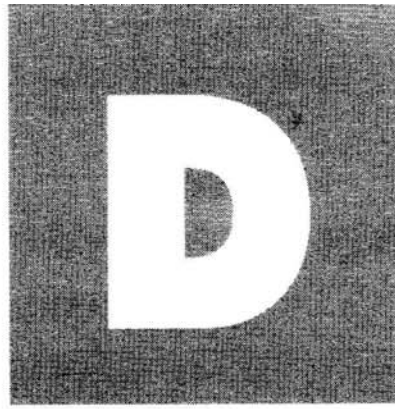
E X E R C I S E S

1 Choose the correct form of the verb to fill in the blanks below. Use the **INFINITIVE**, the **PRESENT SIMPLE** (with or without “s”), the **GERUND** or the **PAST PARTICIPLE**. Look at the example:

The sensor *detects* (DETECT) the temperature.

1. The oil is (COOL) by a heat exchanger.
2. The DC tie contactor (CONNECT) DC BUS 1 and DC BAT BUS
3. The recorder is used (RECORD) flight data.
4. The EMER EXIT LTswitch (HAVE) three positions.
5. If an overpressure is (DETECT), the valve opens.
6. (OPEN) the Bleed Valve causes one engine to supply both wings.
7. The engine parameters (BE) displayed on the panel.
8. Filter (CLOG) is indicated on the screen.
9. The outflow valve opens (DEPRESSURIZE) the cabin.
10. There (BE) an “audio cancel” push button on the center pedestal.
11. (REMOVE) the safety pin before aircraft departure.
12. The unit is (LOCATE) in the avionics bay.
13. The engine (DRIVE) the generator.
14. The probes (BE) electrically (HEAT)
15. Generator (OVERLOAD) causes load shedding.
16. (OPEN) the door (HAVE) access to the refuel/defuel coupling.

17. During the flight the escape slide is (ARM).
18. Flap (JAM) triggers a warning.
19. (USE) lockwire (SECURE) the fastener.
20. If the tire is (WEAR), (REMOVE) it.
21. The α -Probe (SENSE) the angle of attack.
22. (PULL) the Fire Handle (SHUT) down the engine.
23. The doors are (CLOSE) and (LOCK).
24. The Go-Around levers (TRIGGER) full thrust.
25. The line (BE) maintained by a clamp.
26. The pump (DELIVER) 80 l. a minute.
27. The fittings (BE) bolted to the pylon.
28. Propeller (FEATHER) is automatic in the event of engine failure.
29. The amber warning is (TRIGGER) by an overheat.
30. A short circuit (TRIP) the circuit breaker.



INSTRUCTIONS, PROCEDURES

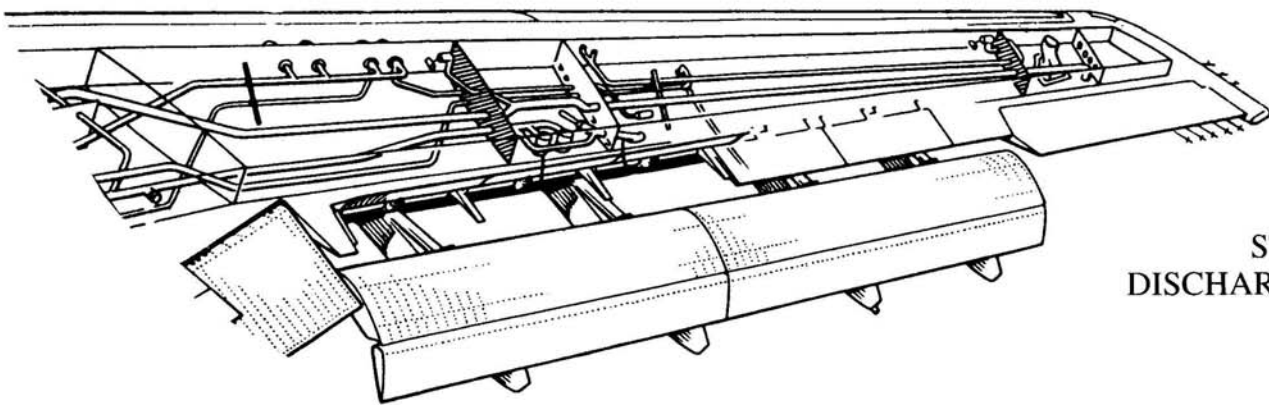
VENT SURGE TANK

FUEL PIPING

WING TIP

RIBS

FRONT SPAR



STATIC
DISCHARGERS

REAR SPAR

ALL SPEED AILERON

TRAILING EDGE FLAPS

FLAP TRACK FAIRINGS

WING

NOTES

Checklists, job-cards, test procedures, removal/installation procedures, etc. are the simplest types of technical document. The sentences are short. One sentence corresponds to one action or "step". Generally, only the **IMPERATIVE** is used.

(See also Module C: **VERB TENSES**.)

The first word is the instruction or action you do. Then the element, component, equipment, etc. concerned, e.g.

INSTRUCTION	COMPONENT
<i>de-energize</i>	(the)* aircraft electrical network
<i>disconnect</i>	electrical ground power unit
<i>close</i>	refuel/defuel panel access door
<i>remove</i>	refueling hose
<i>install</i>	caps on coupling
<i>remove</i>	access platform

*Often the articles "the" and "a" are not used.

In checklists, etc. the result of the action or the state of the system is indicated. Usually a past participle indicates the result or state (verb + "ED"):

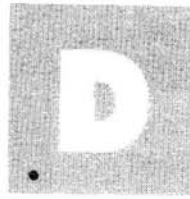
INSTRUCTION	COMPONENT	RESULT, STATE
<i>ensure</i>	engine instruments*	stabilized
<i>check</i>	CSD PRESS Light*	extinguished
<i>set</i>	engine ignition	as required
<i>make sure</i>	pack valve*	closed

*Often the words "is" and "are" are not used.

Here are some actions often made in checks, etc.

ACTION	MEANING
<i>adjust</i>	regulate
<i>carry out</i>	do, perform, execute
<i>check</i>	verify
<i>control</i>	command

ACTION	MEANING
<i>de-energize</i>	disconnect electrical power
<i>decrease</i>	make smaller, reduce
<i>depress</i>	press (≠ depressurize)
<i>ensure</i>	make sure, check
<i>increase</i>	make bigger, raise
<i>monitor</i>	follow, look at parameters
<i>observe</i>	look, watch, respect
<i>perform</i>	do, execute, carry out
<i>press</i>	push, depress
<i>record</i>	register, note, memorize
<i>release</i>	remove pressure, free
<i>remove</i>	take away
<i>set</i>	position, place, select



INSTRUCTIONS, PROCEDURES

EXERCISES

1 Choose the correct verb for each instruction in the procedures listed.

Instructions 1-6:

INSTALL TIGHTEN CLOSE RELEASE OPEN REMOVE

1. the access panel.
2. the four fasteners.
3. the faulty unit.
4. a new unit.
5. the four fasteners.
6. the access door.

Instructions 7-12:

UNLOCK REMOVE (x2) PLACE RAISE UNTIGHTEN DISCONNECT

7. the jack under the shock absorber.
8. the nut.
9. the jack.
10. and the nut.
11. the electrical wiring.
12. the wheel.

Instructions 13-17:

PRESS OBSERVE SET RELEASE RESET

13. the rotary selector to "A".
14. the push-button.
15. the blue light illuminates.
16. the push-button.
17. the rotary selector to "NORM".

Instructions 18-23:

DEPRESS CHECK RECORD ENSURE SET MONITOR

18. covers are removed.

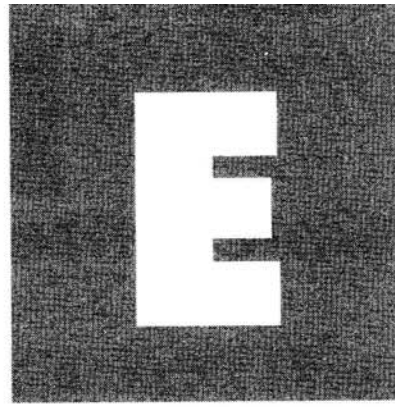
19. oil level.

20. master switch to ON.

21. START push-button.

22. indications.

23. ... any anomalies.



BASIC SENTENCE STRUCTURE

NOTES

It is important to identify the different parts of a technical sentence. Basically, they are: the **SUBJECT**, the **VERB**, the **OBJECT**, the **MEANS** and the **PURPOSE** (the **PURPOSE** = objective, aim, reason, goal, target...), e.g.

SUBJECT	VERB	OBJECT	MEANS	PURPOSE
The delta P switch	transmits	a signal	via the ECB	to shut down the APU.
The hot air	supplies	the slats	through the manifold	for leading edge de-icing.

In general, a “classical” sentence in English follows this structure: **SUBJECT – VERB – OBJECT – MEANS – PURPOSE**. Often the **PASSIVE** is used (see **Module P: ACTIVE/PASSIVE**). In the passive, the sentences above become:

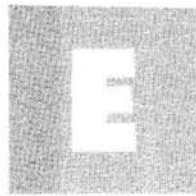
A signal *is transmitted* by the delta P switch, via the ECB, to shut down the APU.
The slats *are supplied* with hot air through the manifold for leading edge de-icing.

But there is a tendency to use “classical”, active, sentence structures more and more (see **Module X: SIMPLIFIED ENGLISH**).

When you read a sentence, identify the different parts. Some sentences do not have all these parts. With our original sentence we can make other simpler sentences.

SUBJECT	VERB	OBJECT	MEANS/PURPOSE
The delta P switch	transmits	a signal.	
A signal	shuts down	the APU.	
The delta P switch	transmits	a signal	to shut down the APU.
The delta P switch	transmits	a signal	via the ECB.

For more examples of sentence structure, see **Modules J (PURPOSE), O (MOVEMENT), Q (PROCESSES) and U (INSTALLATION)**.



BASIC SENTENCE STRUCTURE

EXERCISES

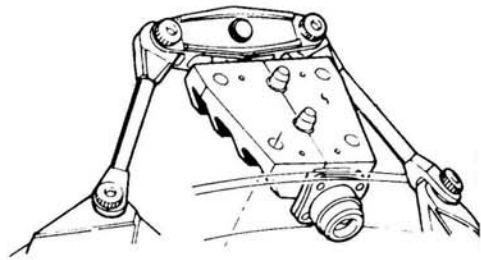
1 Use the examples in the notes to identify the subject, verb, object, means or purpose in the five sentences below.

1. The forward mount comprises four attach bolts.

SUBJECT

VERB

OBJECT



2. The actuator assembly has two electrical DC motors.

SUBJECT

VERB

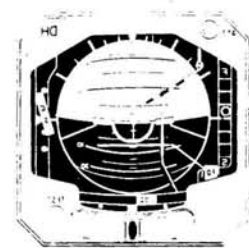
OBJECT

3. The aircraft attitude is indicated by a sphere.

SUBJECT

VERB

MEANS



4. Do not touch the hot parts to prevent burns.

VERB

OBJECT

REASON

5. This S/B recommends the installation of shims to improve fatigue life.

SUBJECT

VERB

PURPOSE

2

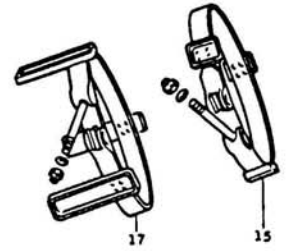
Identify the part of the sentence which is in bold type, as in the examples:

– **Two push-buttons** enable selection of the ALT ACQ modes.

“Two push-buttons” = the subject.

– The piping is attached by two clamps **in order to avoid vibration**.

“In order to avoid vibration” = the purpose or reason.



1. Each ground spoiler is positioned **under hydraulic pressure**.

2. Restrictors are installed **to limit the terminal velocity**.

3. **The pitch control channel** contains the computing circuitry for receiving data from the aircraft sensors.

4. Additional extension **actuates** the valve.

5. Heat from a broken duct can damage **airplane structure**.

3

Identify the parts of the paragraph below which are in bold type.

Extension and retraction of the nose gear is controlled (1) **by the selector valve**, and (2) **occurs** simultaneously with the operation of the main gear. (3) **An actuator** is pressurized (4) **to raise and to lower** the nose gear. The actuator acts directly (5) **on the nose gear trunnion**. A small actuator operates (6) **to lock and to unlock** the nose gear. A bypass valve linked to the nose gear lock mechanism (7) **prevents** hydraulic pressure from reaching the nose gear actuator before the gear unlocks. A cutout valve is incorporated (8) **to cut off the steering system hydraulic pressure** when the nose gear is retracted. (9) **Nose gear doors** are operated mechanically by gear retraction and extension movements (10) **through a cable system**.

- | | |
|---------|----------|
| 1. | 6. |
| 2. | 7. |
| 3. | 8. |
| 4. | 9. |
| 5. | 10. |

4

The parts of these sentences are in the incorrect order. Put them into the correct order as in the example:

is moved to the up position/to retract the gear,/the control handle

The control handle is moved to the up position to retract the gear.

or

To retract the gear, the control handle is moved to the up position.

1. are connected/to the steering cables/the rudder pedals

.....

2. 3000 psi hydraulic fluid/the metering valve/to the actuator/directs

.....

3. is/the compressor section/the source of compressed air

.....

4. entering the system/to prevent oil/seals/are installed

.....

5. a signal/the sensor/to turn on the red warning/provides

.....

6. controls/to dampen yaw axis movement/the yaw damper system/the rudder

.....

7. by two pumps/system pressure/is supplied

.....

8. two pumps/system pressure/supply

.....

9. the push-button/the system/resets/pushing

.....

10. the valve/opens and closes/to control the fuel flow/an electrical motor

.....

5

Try to put these different parts of a sentence into the correct order, as in the example.

transmit/to the monitoring unit/the two pressure transducers/the signals

The two pressure transducers transmit the signals to the monitoring unit.

Don't forget to check your answers with the Exercise Key.

1. the bleed air temperature/a precooler/controls

.....

2. the autobrake system/pushing LO, MED or MAX/arms

.....

3. to the seat tracks/with two fasteners/the seat unit/an attachment fitting/attaches

.....

4. of several transmitters/inhibits/an electronic device/the simultaneous selection

.....

5. the 115 V-400 Hz current/the exciters/to enable ignition/into high voltage, pulsating current/transform

.....

6. to control the aircraft/ the main information/presents/the screen

.....

7. from the engine HP compressor/by a heat exchange process/cooling/the pre-cooler/the hot air

.....

8. to open the valve/necessary/a minimum upstream pressure of 8 psig/is

.....

9. comprise/extending from frame 1 to frame 24/the lower section of the fuselage/3 skin panels

.....

10. with the screw the washer and the nut/the bolt/install

.....

11. to drive the valve/if the other motor does not operate/permits/the gear system/one motor

12. indicate/two green lines/that the protection is available/inside the speed scale

13. the air pressure an anti-ice valve/controls/at the required value

14. the position/two switches/according to a logic/give

15. under spring pressure/the poppet valve/on to the valve seat/moves

6

There is no punctuation in this paragraph. Read it and decide where the sentences are. Add the punctuation and capital letters, then compare your version with the original in the Key.

HYDRAULIC POWER TRANSFER UNIT
FIGURE 003

the filter bowl screws on to the flanged mounting it contains the filter element and holds it against the mounting a seal prevents leakage the bowl is screwed tight by means of a square tightening lug on the bottom surface the filter element has a support tube with a spigot which opens the inner valve when the filter element is fitted filter power of the element is 15 microns 0.0006 in. the red clogging indicator is protected by a transparent cap which is integral with the mounting the indicator becomes visible when any filter clogging causes pressure to drop to 6 bars 87 psi

cai kân

7

All the words in these 10 sentences are stuck together. Detach them, as in the example, in order to find the meaning of the sentences.

The surge-vent tank is designed to absorb the effect of fuel surges.

The surge-vent tank is designed to absorb the effect of fuel surges.

1. The gear can extend by free fall.

2. The overhead racks are mounted on the ceiling.

3. There is an interface between the fire detection system and the master warning controller.

4. Disconnect the return line from the case drain hose.

5. Any drop in voltage is detected by the voltage monitor.

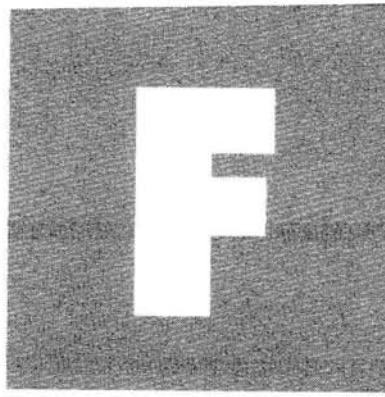
6. The ATC transponder is electrically supplied but not operating.

7. Check that the doors are flush with the fuselage skin.

8. The amber magnetic indicator shows the valve is in transit.

9. The ground spoilers are armed before landing.

10. The aircraft symbol is slaved to a computer.



WORD ENDINGS

NOTES

Always look at the end of a word. It can give you information about the function of the word:

heat heater heating heated heats

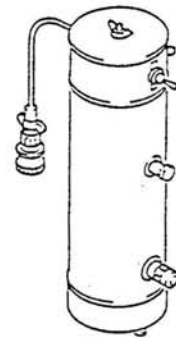
sense sensor sensing sensed senses

So, the ending (-er, -or, -ing, -ed, -s, -es) transforms the sense of the basic word.

1 -ER, -OR

The ending -er and -or indicate a component, agent or assembly which does an action or function:

WORD	DEFINITION
<i>heater</i>	a component which heats
<i>sensor</i>	a component which senses, detects
<i>handler</i>	an agent who handles, manipulates
<i>mixer</i>	an assembly which mixes
<i>damper</i>	a part which damps, absorbs



2 -ING

The ending -ing indicates an action (see Module C: THE GERUND) or a function:

WORD	ACTION/FUNCTION
<i>heating</i>	the action of increasing temperature
<i>sensing</i>	the function of detection
<i>smoking</i>	the action of making smoke, fumes
<i>leading</i>	to lead, to be in front
<i>braking</i>	the action of using the brakes

Many gerunds or present participles (ending in *-ing*) are used in compound words.

The *-ing* word indicates the function, the action or the condition of the other word, e.g. *cooling unit* (function), *sliding piston* (action), *operating speed* (condition)

3 -ED

The ending *-ed* is the ending of the regular simple past or regular past participle. When it is a participle, it often indicates a state or an action done and follows the verb *to be*:

WORD	SENTENCE
<i>heated</i>	The probes are heated in flight.
<i>sensed</i>	Air overheat is sensed by the detector.
<i>energized</i>	The aircraft is energized for ground tests.
<i>deflected</i>	The stabilizer is deflected 2° up.
<i>tested</i>	The box is tested every 50 hours.

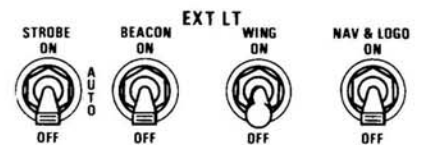
(For some irregular past participles see Module C.)

4 -S,-ES

The endings *-s*, *-es* at the end of a word can indicate different things:

A. THE PLURAL

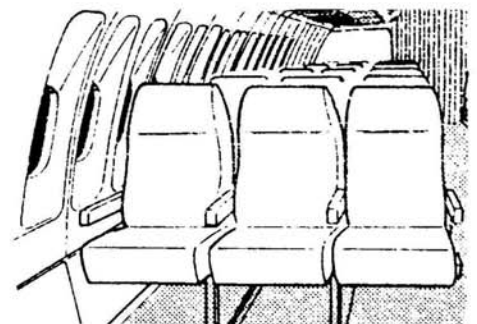
SINGULAR	PLURAL
<i>control</i>	<i>controls</i>
<i>switch</i>	<i>switches</i>
<i>assembly</i>	<i>assemblies</i>
<i>speed</i>	<i>speeds</i>



N. B. In compound words only the last word, the “key word”, is variable, i.e. singular or plural. e.g.

A three seat unit (not a three seats unit)

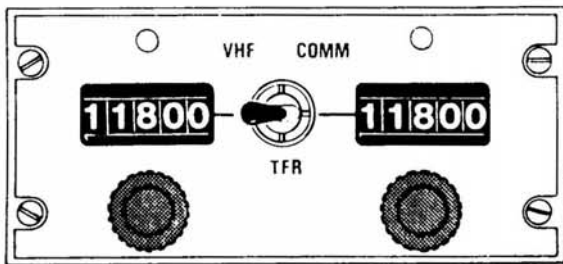
A gear microswitch installation (not a gear microswitches installation)



B. THE THIRD PERSON SINGULAR (“It” – see Module C: THE PRESENT SIMPLE)

VERB	THIRD PERSON SINGULAR
<i>heat</i>	<i>heats</i>
<i>sense</i>	<i>senses</i>
<i>transmit</i>	<i>transmits</i>
<i>press</i>	<i>presses</i>

N B. Many words are substantives and verbs. The “s” can indicate either a plural or the third person singular, e.g.



ATA Chapter 27 is the Flight *Controls*.
The trim wheel *controls* the Stabilizer.

There are two master *switches* on the engine panel.
The pilot *switches* from one frequency to the other.

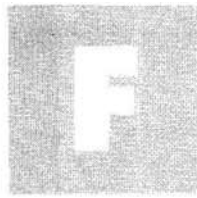
C. THE POSSESSIVE (’s and -s’ indicate the possessive)

the *flight’s* destination = the destination of the flight (singular)

the *pilots’* seats = the seats of the pilots (plural)

5 SOME MORE EXAMPLES

- All exterior lights are operated from a single Exterior Lighting control panel located in the center of the overhead panel.
- The APU engine exhaust gas temperature indicating system consists of a thermocouple probe connected to an indicator and operates on self-generated power.
- Flushing of the brake system is accomplished by connecting a ground hydraulic cart to the airplane so as to make a closed circuit.
- The pilots’ sunvisors are hinged to the upper windshield frame.
- The lavatory fire extinguishing system is a fixed system providing fire extinguishing capability to the lavatory compartment.
- The test fail logic and light are tested by pressing the lamp test button. While the button is pressed, switch S8 opens and forces the output of gate 14 to go to a logic one.
- The rate Gyro is the sensing element of the yaw damper coupler which is used to detect any yawing motion.
- When the landing gear is extended the valve remains blocked until the aircraft touches the ground.



WORD ENDINGS

EXERCISES

1 Write the form of the word which agrees with the definition. The basic word is in brackets () if it is different from the definition, as in the example:

DEFINITION

the function of verification (CHECK)
a device which loads

YOU WRITE

checking
a loader

- 1. A device which ignites
.....
- 2. A part which restricts
.....
- 3. A microswitch a signal
to the working unit (SEND)
.....
- 4. The function of a loader
.....
- 5. It stabilizes the pitch axis
.....
- 6. A lever that rocks lever
- 7. Ready for use (ARM)
.....
- 8. A light used when the a/c lands light
- 9. A machine that prints
.....
- 10. When the gear is up and (LOCK)
.....
- 11. OFF or (EXTINGUISH)
.....
- 12. Nosewheel (STEER)
.....
- 13. The rear edge of the wing (TRAIL) edge
- 14. To de-ice: the function
.....
- 15. The papers of the flight crew papers
- 16. A bottle to extinguish fires
.....
- 17. A cover/cap/plug that blanks cover
- 18. The names of the passengers names
- 19. When the flaps are down (EXTEND)
.....
- 20. It reverses the direction of thrust thrust



PREFIXES, SUFFIXES

NOTES

Many prefixes are common to all languages based on Latin, e.g. *anti-*, *co-*, *de-*, *hyper-*, *in-*, *inter-*, *post-*, *pre-*, *re-*, *trans-*, etc. They modify the sense of the word.

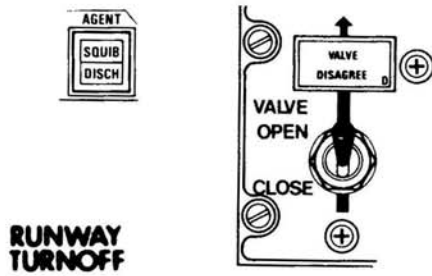
Some prefixes and suffixes are specifically English. Here are some frequently used in technical English: Often they are “location” words. (See Module B.)

PREFIX/ SUFFIX	MEANING	EXAMPLE WORD	DEFINITION OF WORD
<i>around</i>	180°/360°	<i>turnaround</i>	between arrival and departure
<i>back</i>	return behind	<i>feedback</i> <i>pushback</i> <i>background</i> <i>blowback</i> <i>turnback</i>	return of data push a/c from gate area behind, past experience pushed by air (slats) a/c returns to departure
<i>by</i>	next to	<i>bypass</i> <i>standby</i>	avoid, go round alternative, ready for use
<i>counter</i>	contrary, opposite	<i>counterclockwise</i> <i>counterorder</i> <i>counterrotating</i>	in direction contrary to movement of clock contrary command turning in different directions
<i>cross</i>	exchange, from side to side	<i>crossbeam</i> <i>crosswind</i> <i>crossfeed</i> <i>crosscheck</i>	transversal floor structure wind 90° to a/c supply one side from the other compare 2 instruments
<i>dis</i>	negation	<i>disconnect</i>	terminate connection

PREFIX/ SUFFIX	MEANING	EXAMPLE WORD	DEFINITION OF WORD
<i>dis</i>		<i>disagree</i>	non-conformity
<i>down</i>	descent, bottom, lower	<i>downtime</i> <i>downlock</i> <i>touchdown</i> <i>downlink</i> <i>downstream</i>	time a/c not operational fix landing gear extended moment wheels touch runway data transmission to ground lower point in a flow
<i>fore</i>	forward, in front of	<i>foreflap</i> <i>forecast</i>	front section of flap estimation
<i>in</i>	entry, ≠ out, interior	<i>input</i> <i>inlet</i> <i>intake</i> <i>inboard</i>	electronic, electrical, command, signal received entry for fluids entry of air on engine inner, inside, internal
<i>mid</i>	middle	<i>midspan</i>	in the middle of wing, blade, etc.
<i>mis</i>	badly, incorrectly	<i>misadjusted</i> <i>misfit</i> <i>misaligned</i> <i>mismatch</i>	incorrectly regulated incorrectly installed incorrectly aligned not corresponding
<i>off</i>	discontinuity, stopped	<i>offset</i> <i>offload</i> <i>take off</i> <i>turn off</i> <i>shutoff</i>	not in center remove load = unload a/c leaves the ground turn and leave runway stop
<i>on</i>	in contact, operating	<i>onload</i> <i>on-line</i>	put on board directly connected to computer
<i>out</i>	exit, away, ≠ in, deployment	<i>outboard</i> <i>output</i> <i>outlet</i> <i>outflow</i>	outer, external electronic, electrical, command signal produced exit for fluids exit for fluids

PREFIX/ SUFFIX	MEANING	EXAMPLE WORD	DEFINITION OF WORD
<i>out</i>		<i>cut out</i> <i>rollout</i> <i>readout</i> <i>layout</i>	de-activate deceleration on landing display, reading of data location, installation
<i>over</i>	above in excess, too much,	<i>overfly</i> <i>overheat</i> <i>overload</i> <i>overlap</i> <i>overpressure</i> <i>overspeed</i> <i>overflow</i> <i>override</i> <i>takeover</i>	fly on, across, above excessive temperature excessive load one surface partially on another excessive pressure excessive speed too full priority manual order take control
<i>post</i> <i>self</i>	after auto	<i>post flight</i> <i>self-contained</i> <i>self-regulating</i> <i>self-positioning</i> <i>self-held</i>	after the flight autonomous regulates itself positions itself maintains itself
<i>side</i> <i>sub</i>	lateral under	<i>sidewall</i> <i>subtask</i> <i>subassembly</i>	lateral surface secondary task 2nd level assembly
<i>through</i>	passage	<i>feedthrough</i> <i>throughput</i>	orifice for cables data flow
<i>twin</i>	two, double	<i>twin-aisle</i> <i>twin-engine</i>	2 aisles 2 engines
<i>un</i>	negation	<i>uncommanded</i> <i>unrelated</i> <i>unlocked</i> <i>unsafe</i>	not ordered with no connection not locked, not fastened dangerous
<i>under</i>	below,	<i>underpressure</i>	insufficient pressure

PREFIX/SUFFIX	MEANING	EXAMPLE WORD	DEFINITION OF WORD
<i>under</i>	too low	<i>undersurface</i>	lower side of wing
<i>up</i>	ascending, installation, make better	<i>backup</i> <i>uplock</i> <i>pickup</i> <i>upstroke</i> <i>upstream</i> <i>uplift</i> <i>update</i> <i>setup</i> <i>upgrade</i>	reserves, alternative fix landing gear retracted sensor, detector movement up high point in a flow refuel modify, make current preparation, installation raise, improve quality

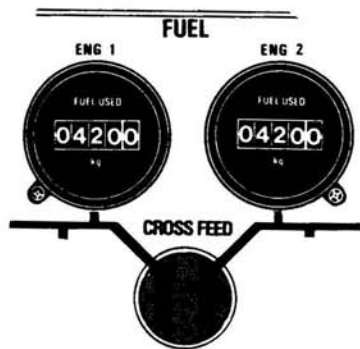
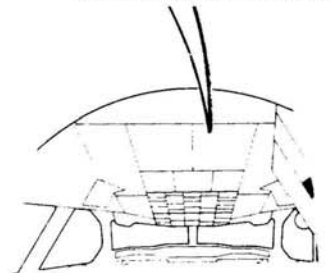


RUNWAY
TURN OFF



Underfloor

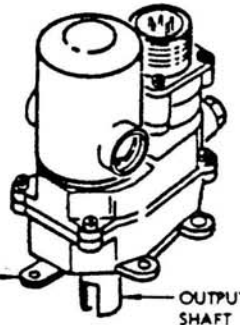
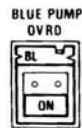
OVERHEAD PANEL



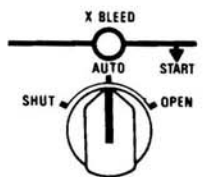
RUNWAY
TURN OFF



VERRIDE
HANDLE

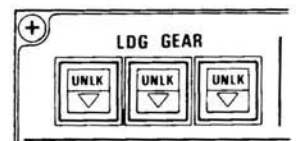
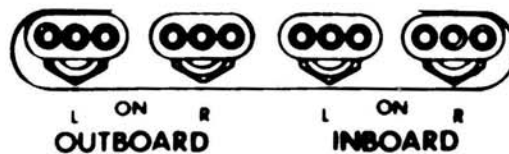


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325119 STEERING FEEDBACK

DISCONNECT



492351 INLET GUIDE VANE ACTR

DUCT
OVERHEAT



PREFIXES, SUFFIXES

EXERCISES

1

Make compound words with the prefixes/suffixes and the words below to correspond to the definitions. (One of the words and some prefixes and suffixes have to be used twice.) Look at the examples:

- transfer of hot air from one wing to the other - CROSSBLEED
- when aircraft leaves the ground - TAKEOFF

PREFIXES/SUFFIXES

UNDER	ON	OVER (2)	UN (2)	CROSS (2)	OUT
MIS	DOWN (2)	IN (2)	MID	DIS (2)	SELF
UP (2)	THROUGH	BACK	BY	AROUND	COUNTER

WORDS

SAND	RIDE	FEED	AGREE	REGULATING	TURN (2)
PICK	CONNECT	SET	LET	SPEED	SPAN
CHECK	ADJUST	LOCKED	TIME	CLOCKWISE	PUT
PRESSURE	COMMANDED	WIND	BOARD	SAFE	LOAD

- excessive speed
- dangerous
- insufficient pressure
- electronic signal received
- in direction contrary to clock
- entry of air, water etc.
- to compare two indications
- not ordered
- auto-regulating
- hole in structure to pass cables
- ready for use
- sensor,detector

- 13. to return to point of departure
- 14. to stop connection
- 15. external, outer
- 16. non-conformity
- 17. regulate badly
- 18. wind at 90° to a/c axis
- 19. priority order
- 20. gear extended and ...?...
- 21. time between a/c arrival and departure
- 22. middle of wing, blade etc.
- 23. preparation for work etc.
- 24. to place cargo etc. on a/c
- 25. time a/c or equipment inoperative

REVIEW ONE

1 Put together (match) the compound expressions below with the definitions or synonyms. Look at the example:

Temperature of the gas leaving the turbine = EXHAUST GAS TEMPERATURE

SERVO-CONTROL
BRAKE PEDALS
CROSSBLEED VALVE
SEAT RAILS
VERTICAL SPEED INDICATOR
RAM AIR INLET
PUSH BUTTON

ATTENDANT STATION
DOOR HANDLE
FUEL PUMP
BLEED AIR
THROTTLE LEVERS
FIRE HANDLE

CABIN WINDOWS
FIRE DETECTOR LOOP
FAN AIR VALVE
HYDRAULIC RESERVOIR
PROXIMITY DETECTOR
CIRCUIT BREAKER

1. They control the engines.
2. You hold this to open the door.
3. The passengers see through these.
4. Skydrol is stored here.
5. The seats are installed on these.
6. Dynamic air enters here.
7. They control the brakes.
8. It displays the rate of climb/descent.
9. It detects a door, etc. closed.
10. It shuts down the engine in an emergency.
11. Above (over) Captain and First Officer.
12. The cabin crew sit here.
13. It senses engine fire.
14. It isolates an electrical circuit.
15. A control that you press.

- 16. It drives a flight control surface.
- 17. It creates fuel flow.
- 18. It transfers air from side to side.
- 19. It controls air from the fan.
- 20. Air from engine compressor.

2 Many of the verbs in **CAPITALS** in the sentences below are in the incorrect tense. If the verb is correct, put a tick (✓). If it is incorrect, put a cross (x), then write the correct form on the line, as in the examples:

The batteries ARE LOCATING in the bay.
 The gear IS EXTENDED at 1500 ft.

are located
 ✓

- 1. The packs REGULATES the air temperature.
- 2. The C/B trips FOR PROTECT the circuit.
- 3. The engines DRIVING the generators.
- 4. The test bench TESTS the equipment.
- 5. The drain valves DRAIN\$ water from the tank.
- 6. REMOVING the chocks before push-back.
- 7. TRIPPING the C/B opens the circuit.
- 8. The speed IS REGULATING by a governor.
- 9. MAKE sure the flap travel area is clear.
- 10. The selector HAVE four positions.
- 11. TO TORQUE the bolt to the valve indicated.
- 12. A unit MONITORED the operation.
- 13. TO SMOKE is forbidden.

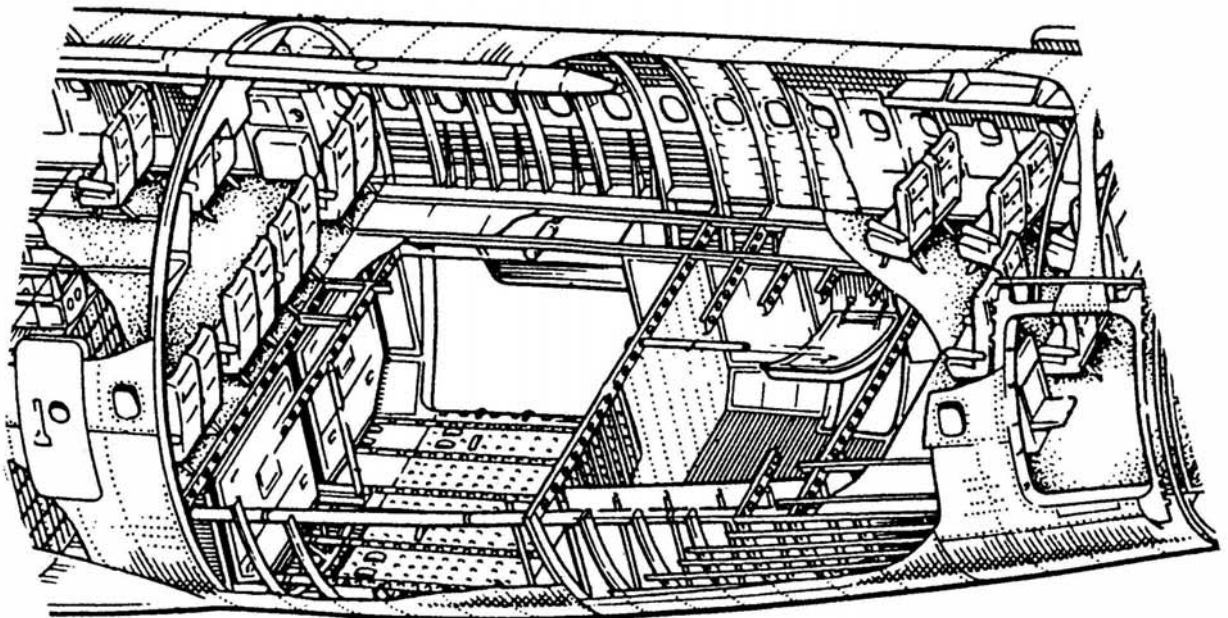
14. The tire pressure SHALL BE CHECKED every day.
15. Use the gage TO MEASURE the level.
16. The temperature DETECTS by a sensor.
17. The pump INCREASE the flow.
18. SET the lever to "DOWN" FOR EXTEND the gear.
19. There IS cracks on the frame, so CHECKING it.
20. The gas is RELEASING when the handle is PULLED.

3 On the page opposite there is a cutaway view of the rear fuselage. The descriptions of precise locations correspond to the 20 terms above and below the view. Find the term which agrees with (matches) each location.

1. Mounted on the longerons.
2. Opens outwards and upwards.
3. Under the cabin floor, on tracks, side by side.
4. From one side of the cabin to the other.
5. Installed on the inside of the passenger doors and attached to the door sill during the flight.
6. They run around the fuselage.
7. They run along the cabin between the seat units.
8. Opens inwards and upwards.
9. Faces aft near the pax. door.
10. On the inner skin perpendicular to the frames.
11. In front of the cargo door.
12. 8 seats abreast.
13. Along the top of the fuselage.

- 14. Opens outwards and forwards.
- 15. Between the skin and the wall panels.
- 16. Under the seat rails, at right angles to the cross beams.
- 17. Over the seats.
- 18. When down, inside and flush with the door.
- 19. Between two frames, parallel to the floor.
- 20. Two or three next to each other.

ESCAPE SLIDE CONTAINERS CABIN WINDOWS BALL MAT
 AFT PASSENGER DOOR DOOR HANDLE FRAMES CROSS BEAMS AISLE
 ATTENDANT SEAT



STRINGERS GLASS WOOL BLANKETS ANTENNA LONGERONS REAR
 CARGO DOOR OVERHEAD BAGGAGE RACKS SEAT UNIT ROW SEAT
 RAILS BULK CARGO DOOR

4 Think of all the actions you can do to these components. For example:
KNOB: rotate, turn, set, pull, push, adjust.

1. push-button
2. light
3. fire handle
4. covers
5. circuit breaker
6. brakes
7. rotary selector
8. screw
9. plug
10. throttle levers
11. oil level
12. switch
13. cargo door
14. switch guard
15. seat-belt
16. printed circuit board
17. current
18. jack
19. escape slide
20. control cables

5 It is important to be able to isolate the most important parts of a sentence. In this example the important parts are in bold type:

This valve controls the cold airflow bled from the fan exhaust which passes through the precooler in order **to regulate the temperature of** engine compressor **bleed air**.

In the examples below try to isolate the basic skeleton of the sentence by underlining the SUBJECT, the VERB and the KEY WORD(S).

1. Support arm

The support arm is a cast light alloy box section with integral connection forks. Each connection fork is provided with standardized and replaceable bushes.

The door is attached to the support arm by means of upper and lower connection links.

The lower connection link is also connected to the lifting shaft of the door locking mechanism. An adjustable door buffer attached to the inner face of the support arm acts as a limit stop and shock absorber when the door is fully opened. A door stay mechanism installed in the support arm locks the door in the fully open position. The mechanism comprises a release button, actuating rod and lever, bellcrank, spring-loaded rod and locking hook.

2. If the output voltage of the d-c regulator attempts to rise above 16 vdc, the emitter of Q2202 follows this rise decreasing the conduction through Q2202. The decrease in current through Q2202 results in the base voltage of Q2201 rising, which in turn, decreases the current through Q2201. The result is that the output voltage returns to 16 vdc.

3. General

The air bled from the fifth stage of the compressor passes through four duct sections and a line-mounted valve of the on-off type. At the forward bulkhead of the intake cowl, the anti ice system interfaces with the swirl nozzle in the intake lip. The spent air then enters the cavity of the intake cowl aft of the forward bulkhead. The air passes through holes in the inner cap of the bulkhead between the skin inner barrel and the bulkhead.

Finally, the air exhausts overboard through the flush duct in the outer barrel.

The airflow pressure is controlled by an anti-ice valve which is of the butterfly type and electrically-operated.

6 Try to put these different parts of a sentence into the correct order. Don't forget to check your answers with the Exercise Key.

1. through the reservoir filling system/the mechanic/to replenish the system/fills/the reservoir

.....

2. stores/the selected track number/ a battery-buffer memory/for later use

.....

3. the fuel supply/controls/to the other wing/a crossfeed valve

.....

4. to the cable/with the turnbuckle/the rod/connects/the lever

.....

5. a lever/to open the doors on the ground/a device/controls/without hydraulic power

.....

6. to personnel/must be depressurized/to prevent/the aileron control system/injury

.....

7. provides/to maintain or change attitude, altitude and heading/also/the AFCS/coordinated maneuvering

.....

8. to the retract port/the valve/when the flaps are retracted/pressure/directs/on each actuator

.....

9. the fuel control unit/from foreign material contamination/protects/the L.P. fuel filter

.....

10. the supply/for the system/contains/of oil/the oil tank

.....

11. the seals/in position/and/holds/a retaining ring/to make a pressure-tight joint/the pane

.....

12. 28 VDC/to turn on/a series circuit/through the lower contacts/the red light in the fire handle/applies

.....

13. amber lights/the STAB OUT-OF-TRIM indicators/on the pilot's control panel/are

.....

14. prevents/on the control quadrant/rapid movement/a gate/of the control lever

.....

15. frees/in the event of hydraulic power loss/the elevator control tabs/the tab lock-out mechanism/from both systems A and B

.....

7 Read these texts and complete the missing word-endings with **-ED, -OR, -ER, -ING** or **-S**.

1. The wing tank pump___ are locat___ in a collect___ box form___ by root Rib 1 and Rib 2. Rib 2 is seal___ except for vent hole___ at the top and clack valve___ at the bottom through which fuel gravitate___ into the enclosure. Two inward-open___ hing___ panel___ in Rib 2 provide access into this area. This configuration make___ sure that the pump___ are fully in fuel during flight maneuvers. Each pump has an intake pipe fitt___ with a strain___. A bypass pipe with suction valve enable___ the engine to get fuel by suction if the pump___ do not work.

2. The pump is of the variable-displacement type. The rotat___ assembly turn___ all the time that the engine operate___. The pump has nine piston___ which are connect___ to a moveable yoke plate. When the angle of the yoke plate change___, the stroke of the piston___ change___ and the output of the pump is increas___ or decreas___. The compensat___ valve supplie___ servo pressure to the actuat___ piston, which control___ the angle of the yoke. A solenoid valve (controll___ from the flight compartment) make___ it possible to change the operation of the pump so that it do___ not supply pressure to the system (depressuriz___ mode). The EDP include___ a block___ valve which isolate___ the pump from the hydraulic system when the pump operate___ in the depressuriz___ mode.

3. Each pressure reducing valve includes a control piston which operates a distribution slide valve through a spring R1 and a rock arm. When the pedal is released, the pressure at A is shut off and the brake port C is connected to the reservoir return B. When the pedal is pushed in, the volume of fluid moved by the master cylinder causes the displacement of the piston which then operates the rock arm and the slide valve; B is shut off and the pressure port A is connected to the brake port C. When line C is filled, the pressure pushes on the end of the slide valve (chamber D) which, through the rock arm, causes the spring R1 to compress; the control piston remains in the same position.

PART

2

- H. PHYSICAL CHARACTERISTICS**
- I. DIMENSIONS**
- J. PURPOSE**
- K. CONJUNCTIONS**
- L. ACTIONS**
- M. POSSIBILITY, PROBABILITY,
NECESSITY, CONDITIONS**



INTRODUCTION

The 6 modules that comprise Part Two can be divided into three categories:

GENERAL INFORMATION

- H. PHYSICAL CHARACTERISTICS
- I. DIMENSIONS

IMPORTANT LANGUAGE FUNCTIONS

- J. PURPOSE
- K. CONJUNCTIONS
- M. POSSIBILITY, PROBABILITY, NECESSITY, CONDITIONS

TECHNICAL VOCABULARY

- L. ACTIONS

The Language Functions need more time and concentration.

In J, we look at the different ways in which people talk about the objectives, targets, aims, functions of a system, etc.

In K, we try to distinguish between the different “link words”: words that connect the parts of a sentence and introduce cause, effect, comparison, addition, etc. Don’t worry. It takes a long time to assimilate them all. Learn them progressively, one at a time, starting with the most common ones.

In M, we use short but important words: “can”, “may”, “must”, “shall”, “need”, “should”, “if”, etc.





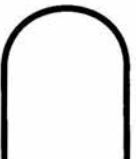
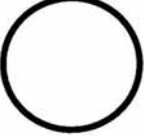


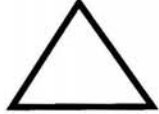
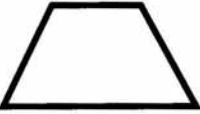


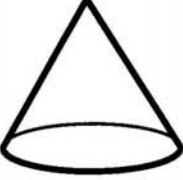

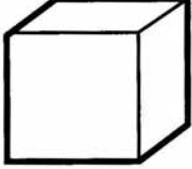
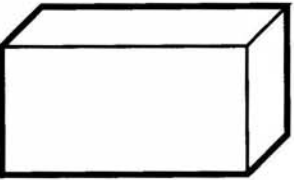

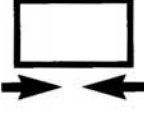
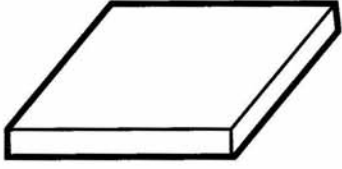
As in Part One, work gradually. Do not do all a module before continuing with the next one. Read the explanations. Study the examples. Do one exercise. Then go on to the next module. Come back to the previous module later and do another exercise. Later you will do the Review (p. 98). This is an easier, more effective way of learning. Think how several thin coats of paint are more resistant than one thick coat!



PHYSICAL CHARACTERISTICS


NOTES

1 SHAPES: LINES AND OBJECTS

 <i>straight</i>	 <i>curved</i>	 <i>undulating, wavy</i>	 <i>pointed, sharp</i>	 <i>rounded, blunt</i>
 <i>circular</i>	 <i>rectangular</i>	 <i>square</i>	 <i>triangular</i>	 <i>trapezoidal</i>
 <i>cylindrical</i>	 <i>spherical</i>	 <i>conical</i>	 <i>tapering</i>	 <i>cubic</i>
 <i>box shaped</i>	 <i>elongated, stretched</i>	 <i>shortened</i>	 <i>flat</i>	

2 COLORS

THE SPECTRUM					
<i>violet</i>	<i>blue</i>	<i>green</i>	<i>yellow</i>	<i>orange</i>	<i>red</i>
<i>mauve</i>	<i>cyan</i>		<i>amber</i>	<i>brown</i>	<i>magenta</i>
			<i>beige</i>	<i>pink</i>	

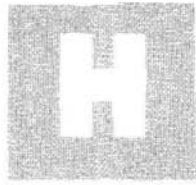
<i>black</i>	<i>grey</i>	<i>white</i>
		
<i>dark</i>		<i>light</i>

3 CHARACTERISTICS

SURFACE	MEANING
<i>clean</i>	free of dirt
<i>dirty</i>	contaminated, soiled
<i>greasy</i>	covered with grease
<i>matt</i>	surface that does not reflect
<i>oily</i>	covered with oil
<i>rough</i>	irregular, abrasive surface
<i>shiny</i> <i>hoş, ışıltılı</i>	surface which reflects
<i>smooth</i>	regular surface, polished

INTERNAL	MEANING	EXAMPLES
<i>corrosive</i>	eats into material	acid
<i>değişir</i> <i>flammable</i>	ignites quickly	fuel
<i>hassas</i> <i>fragile</i>	breaks easily	glass
<i>hard</i>	not easily penetrated, rigid	steel
<i>heavy</i>	great weight	iron
<i>hollow</i>	empty in the middle	tube
<i>inert</i> <i>inert</i>	gas that does not react <i>reaktif</i>	nitrogen
<i>light</i>	small weight	foil

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PHYSICAL CHARACTERISTICS

EXERCISES

1

Find the contrary of these characteristics. For example:

HARD – SOFT

1. FRAGILE
2. LIGHT
3. RIGID
4. CLEAN
5. ROUGH
6. HOLLOW
7. INERT
8. STRAIGHT
9. SHINY
10. POINTED

2

Find an item on an aircraft made of each of these materials.

1. COPPER
2. STAINLESS STEEL
3. HONEYCOMB
4. FABRIC
5. GLASS
6. ALUMINIUM ALLOY
7. PLASTIC
8. RUBBER
9. FOIL
10. COMPOSITE



3

Identify these descriptions. They are all different parts of the aircraft. Check your answers in the Exercise Key. (For notes on dimensions, see Module I.)

1. Conical with rounded end. Often black. Hollow. Mounted on end of fuselage.

.....

2. Made from laminated glass. Incorporates electrical resistance.

.....

3. Often L-shaped. Hollow tube with tapered end and small opening. Mounted on forward fuselage.

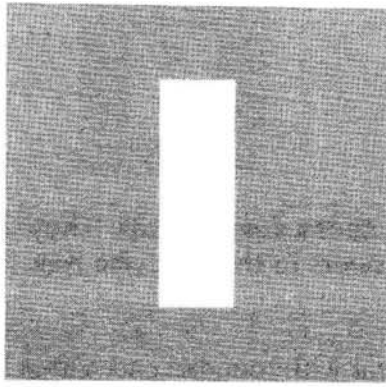
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4. Flexible. Made of rubber or plastic. Cylindrical. 3-4 cm. in diameter.

.....

5. Solid, cylindrical steel body with hexagonal head, between 10 and 20 cm long.

.....

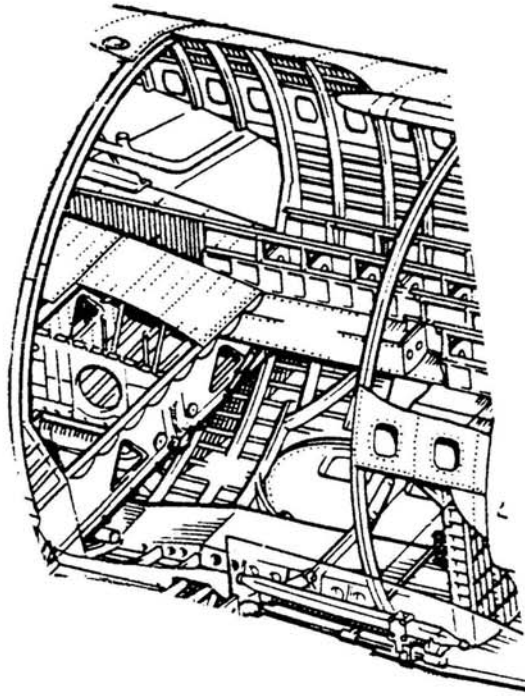


DIMENSIONS

WING CENTER BOX

MAIN FRAMES

WHEEL WELL



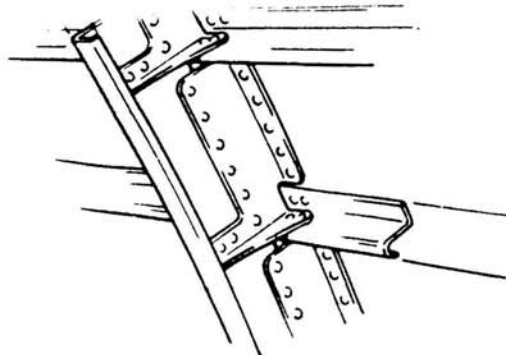
WINDOWS

LANDING GEAR DOOR

STRINGER

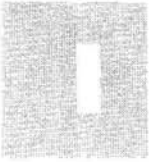
RIVET

CLEAT



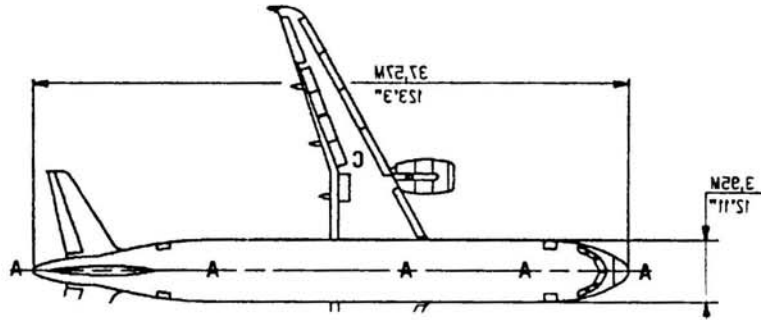
FRAME

CENTER FUSELAGE

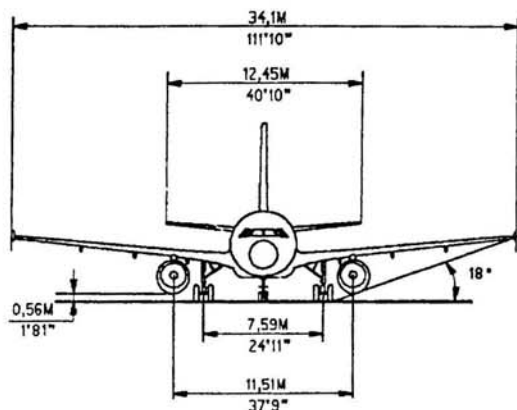


NOTES

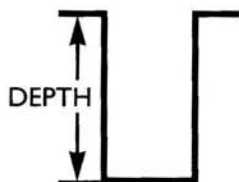
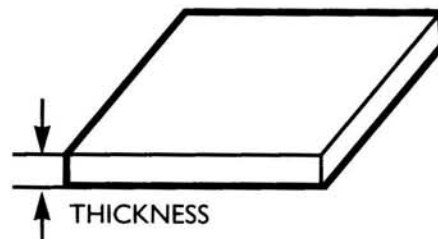
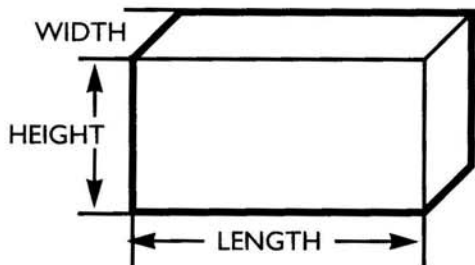
I MAIN AIRCRAFT DIMENSIONS



<i>aircraft centerline</i>	central reference axis (A)
<i>overall fuselage length</i>	total length of fuselage (37.5 m)
<i>datum (reference) fuselage length</i>	design length (sometimes without tail cone or nose cone)
<i>fuselage width</i>	distance from side to side (3.95 m)
<i>wingspan</i>	distance from one wing tip to the other (34.1 m)
<i>ground clearance</i>	distance from ground to lowest point on aircraft or engine.(0.56 m)
<i>wheel base</i>	distance from nose gear to main gear (12.64 m)
<i>height to tip of vertical stabilizer</i>	ground to top of fin (11.76 m)
<i>wheel track</i>	distance between 2 main gears (7.59 m)
<i>wing area</i>	surface of wing
<i>mean aerodynamic chord</i>	line from leading to tailing edge (C)



2 DESCRIBING DIMENSIONS



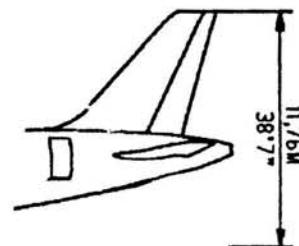
NOUN	ADJECTIVE	VERB
<i>measurement</i>		<i>measure</i>
<i>height</i>	<i>high</i>	
<i>length</i>	<i>long</i>	
<i>width</i>	<i>wide</i>	
<i>thickness</i>	<i>thick</i>	
<i>depth</i>	<i>deep</i>	
<i>weight</i>	<i>heavy</i>	<i>weigh</i>
<i>capacity</i>		<i>hold</i>

There are different ways to describe dimensions in English, using nouns, adjectives and verbs. The most common way is with an adjective or a verb, e.g.

The height of the vertical stabilizer is 11.76 m.
The vertical stabilizer is 11.76 m *high*.

The length of the fuselage is 37.57 m.
The fuselage is 37.57 m *long*.

The width of the fuselage is 3.95 m.
The fuselage is 3.95 m *wide*.





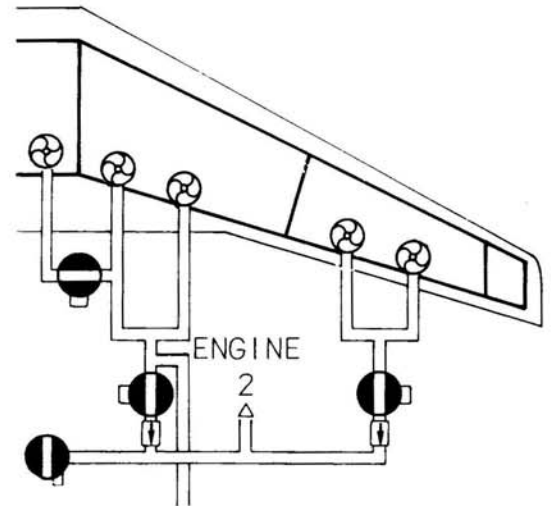
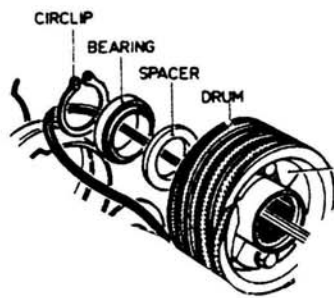
The thickness of the spacer is 2 mm.
The spacer is 2 mm *thick*.

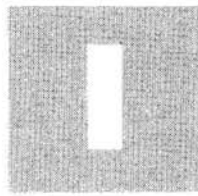
The depth of the wing center tank is 80 cm.
The wing center tank is 80 cm *deep*.

The weight of the aircraft is 57,000 kg.
The aircraft *weighs* 57,000 kg.

The measurements of the cargo hold are 2.09 m x 4.95 m.
The cargo hold *measures* 2.09 m x 4.95 m.

The capacity of the inner tank is 6,900 litres.
The inner tank *holds* 6,900 litres.



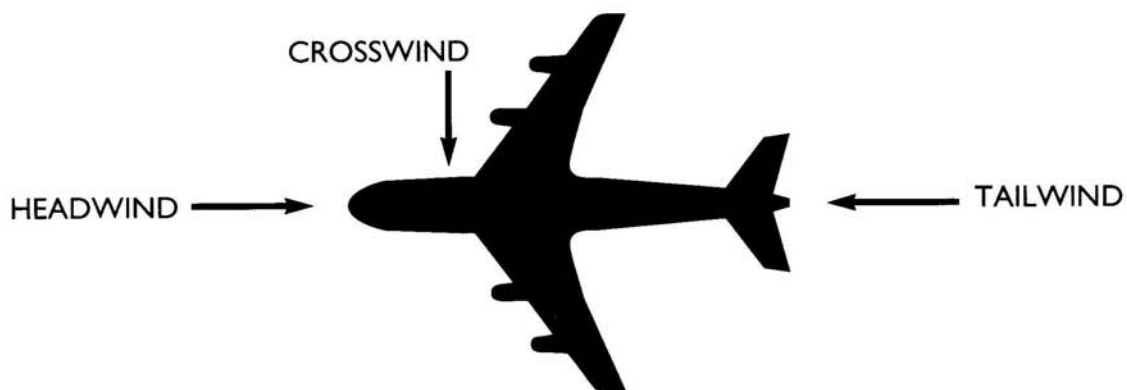


DIMENSIONS

EXERCISES

1 All these adjectives of dimension are with an incorrect contrary, e.g. **WIDE** is not the contrary of **LONG**. It is **SHORT**. Cross out the incorrect word and write the correct contrary in the right-hand column. If you have difficulty, look at the Exercise Key.

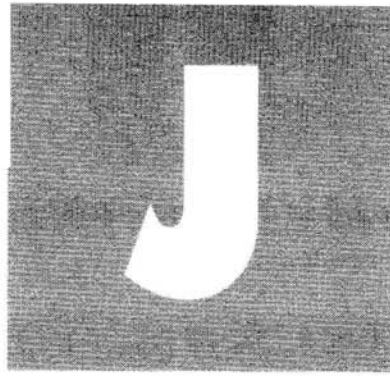
ADJECTIVE	INCORRECT CONTRARY	CORRECT CONTRARY
LONG	WIDE	.....
THICK	DEEP	.....
HIGH	LONG	.....
WIDE	HEAVY	.....
SHORT	SHALLOW	.....
THIN	LIGHT	.....
LOW	NARROW	.....
HEAVY	SHORT	.....
LIGHT	HIGH	.....
DEEP	THICK	.....
SHALLOW	THIN	.....
NARROW	LOW	.....



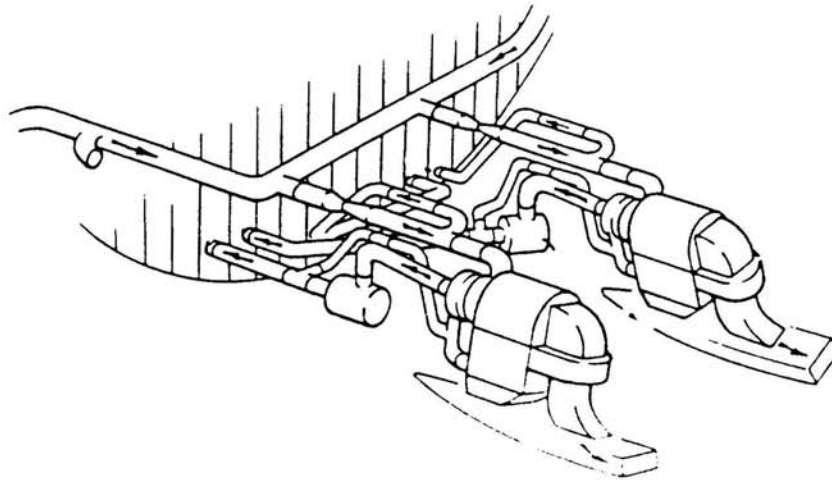
**2****What do these different values and units refer to? Look at the example:**

3,650 m = a length

1. 3,000 p.s.i.
2. 129.75 MHz
3. 115 V 400 Hz
4. 31,000 feet
5. 800°
6. 195 Kt
7. 48 bar
8. 22°C
9. 98% NI
10. 1013 mb
11. 6,000 r.p.m.
12. Feb 20/92
13. 29 VU
14. 240 liters/min
15. STA 1590
16. p.31-12-00
17. 0.5 mm
18. ATA 36
19. MSN 194
20. 93 NM
21. CFM 56
22. 75 daN
23. 26 WE
24. Fig. 002
25. 0.06 in dia.



PURPOSE



NOTES

Purpose = objective, target, function, aim, utilization. There are different ways to express purpose:

1. THE PURPOSE OF THE IS TO

The *purpose* of the test bench IS TO test the equipment.

The *purpose* of the Follow-up Mechanism IS TO shut the control valve.

The *purpose* of the drain valves IS TO drain water.

2. THE IS USED/DESIGNED/MADE TO

The test bench *is used to* test the equipment.

The Follow-up Mechanism *is designed to* shut the control valve.

The drain valves *are made to* drain water.

3. THE IS USED/DESIGNED/MADE FOR + "ING"

The test bench *is used for* testing the equipment.

The Follow-up Mechanism *is designed for* shutting the control valve.

The drain valves *are made for* draining water.

N.B. Sentences of types 1 and 2 are the most common in English.

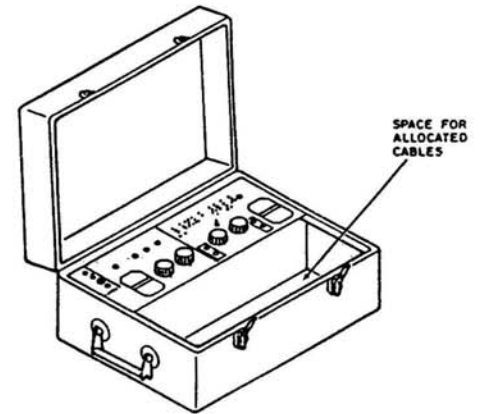
Remember:

to + infinitive

for + -ing

Not for to

Here are some other common ways to express PURPOSE or FUNCTION:



PROVIDES + noun

The oil system *provides* lubrication for the bearings.

A double step-down reduction-gear *provides* the drive for the propeller.

The APU *provides* electrical power for ground operation.

ACT AS, SERVE AS + noun, SERVE TO + infinitive

The spill valve in the fuel pump *acts as* a safety valve.

The APU *serves as* a supplemental power source when required in certain flight phases.

The air also *serves to* pressurize the labyrinth seals.

ENABLE, PERMIT, ALLOW + noun

(See Module P: ACTIVE AND PASSIVE for other applications)

Two transfer contactors *enable* complete AC supply by any of the three generators.

A swivel assembly *permits* the flow of hydraulic fluid.

A back-up unit *allows* constant monitoring.

SIMPLIFICATION

There is a tendency to simplify technical English in recent documentation (see Module X: SIMPLIFIED ENGLISH). In more recent documentation you will find sentences like these. Compare them with the sentences in sections 1 to 6 of these notes.

The test bench tests the equipment.

The follow-up mechanism shuts the control valve.

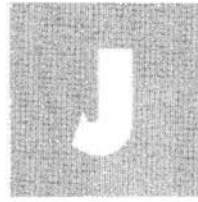
The drain valves drain water.

The oil system lubricates the bearings.

A double step-down reduction-gear drives the propeller.

The air pressurizes the labyrinth seals.

A back-up unit monitors constantly.



PURPOSE

EXERCISES

1 Identify the systems which agree with the purposes below and write the corresponding letter in the space. Look at the example:

The ? is designed to house the engine compressor. P

- | | |
|-------------------------|----------------------|
| A. GPU | I. SCAVENGE PUMP |
| B. THROTTLE LEVERS | J. DIM KNOB |
| C. RUDDER PEDALS | K. CONTROL WHEEL |
| D. CHECK VALVE | L. O-RING |
| E. SPOILER | M. BATTERIES |
| F. TEMPERATURE SENSOR | N. ANTENNA |
| G. CONSTANT SPEED DRIVE | O. FILTER |
| H. SURGE VENT TANK | P. COMPRESSOR CASING |

1. The purpose of the ? is to control the ailerons.
2. The ? is used to adjust the lights.
3. The ? is designed for transmitting signals.
4. The ? is made to seal unions and ensure tightness.
5. The ? provides electrical power on the ground.
6. The ? acts as a means of connecting the tanks to the atmosphere.
7. The ? serve to supply electrical power in an emergency.
8. The ? enable engine control.
9. The ? is designed to trap (catch, collect) particles.
10. The purpose of the ? is to coordinate turns and reduce lift on the wing.
11. The ? is used to rotate the generator at the same speed.
12. The ? serves to draw (suck, recover) oil or fuel.
13. The ? provides a flow in one direction.
14. The ? enables temperature monitoring.
15. The purpose of the ? is to control the aircraft on the yaw axis.



2

Complete these sentences with these words:

PURPOSE TO USED PROVIDES FOR ACTS ENABLES ARE

1. The accelerometer is made monitoring engine vibrations.
2. The accelerometer is designed monitor engine vibrations.
3. The accelerometer is to monitor engine vibrations.
4. The of the accelerometer is to monitor engine vibrations.
5. The accelerometer as an engine vibration monitoring device.
6. The accelerometer engine vibration monitoring.
7. The accelerometer engine vibrations to be monitored.
8. Engine vibrations monitored by the accelerometer.

3

Put together (match) the systems and components below with the descriptions of their purpose or function.

AIRBRAKES	OVERHEAD BAGGAGE RACKS
ARMREST	ELECTRICAL PUMP
JACKS	HORIZONTAL STABILIZER
VSI	ESCAPE SLIDE
CROSSFEED VALVE	THROTTLE LEVERS
WARNING LIGHTS	PASSENGER CALL BUTTON
SEAT RAILS	CARTRIDGE/SQUIB
PITOT TUBE	BUSBAR
CIRCUIT BREAKERS	SERVOCONTROLS
PROXIMITY DETECTOR	BRAKE FANS

1. They are used to cool the brakes.
-

2. Its purpose is to distribute electrical power.
-

3. They enable the a/c to be raised off the ground for maintenance.
-

4. They increase drag but do not reduce lift.

5. The passenger presses it to attract the cabin crew's attention.

6. It provides detection of door closure, shock absorber compression, etc.

7. They move the control surfaces.

8. It is used to evacuate the passengers in an emergency.

9. It supports your arm on a seat.

10. It is made to measure dynamic air pressure.

11. They are designed to protect electrical circuits.

12. They are used to increase and decrease engine thrust.

13. It provides pitch trim.

14. It provides rate of climb/descent information.

15. It enables a hydraulic system to be pressurized when the engines are shut down

16. It is made to discharge a fire extinguishing bottle.

17. They are designed to give a visual indication of a failure.

.....

18. They act as a support for the cabin seats.

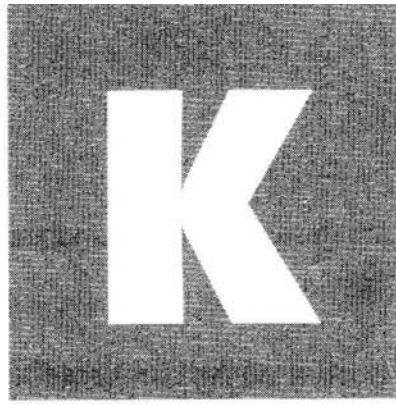
.....

19. They are used to stow carry-on baggage.

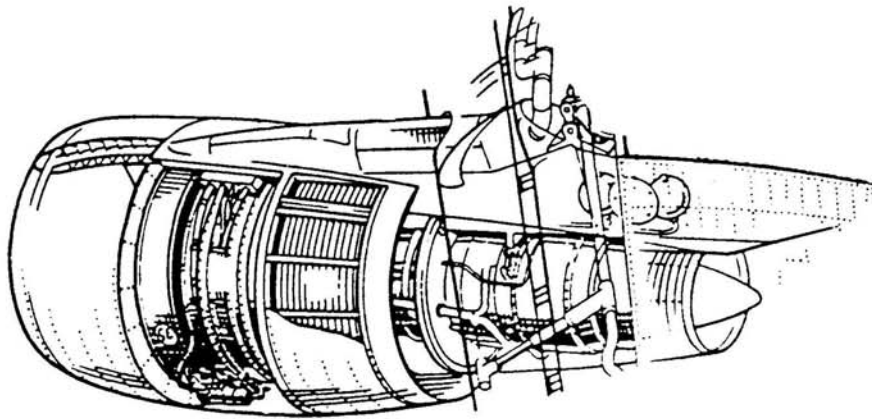
.....

20. Its purpose is to connect the fuel tanks in the two wings.

.....



CONJUNCTIONS



NOTES

Conjunctions are connection words. They connect the ideas in a sentence. They define the logical relation between the ideas. They are very important. These are conjunctions:

and but so as in order to if when

Each conjunction has a different function in the sentence.

CONJUNCTION	FUNCTION
<i>and</i>	addition, complementary (+)
<i>but</i>	difference, comparison, incompatibility (/)
<i>so</i>	consequence, result (\rightarrow)
<i>as</i>	reason, explanation (\leftarrow)
<i>in order to</i>	objective, purpose (∇)
<i>if</i>	condition (*)
<i>when</i>	time (\odot)

Notice how the sentence changes with the conjunction:

The part is removed	<i>and</i>	repaired in the workshop.
The part is removed	<i>but</i>	it is serviceable.
The part is removed	<i>so</i>	it must be replaced.
The part is removed	<i>as</i>	it is unserviceable.
The part is removed	<i>in order to</i>	repair it.
The part is removed	<i>if</i>	it is faulty.
The part is removed	<i>when</i>	it has 5,000 cycles.

These conjunctions have the same function, but their precise use or meaning may vary.

AND (+)	BUT (/)	SO (→)	AS (←)
<i>moreover</i>	<i>however</i>	<i>therefore</i>	<i>because</i>
<i>furthermore</i>	<i>whereas</i>	<i>consequently</i>	<i>because of</i>
<i>in addition</i>	<i>whilst</i>	<i>thus</i>	<i>due to</i>
<i>and also</i>	<i>although</i>	<i>as a result</i>	<i>since</i>
<i>as well as</i>	<i>despite</i>	<i>hence</i>	
	<i>in spite of</i>		
	<i>nevertheless</i>		
	<i>even though</i>		

IN ORDER TO (∇)	IF (*)	WHEN (⊙)
<i>so as to</i>	<i>provided (that)</i>	<i>as soon as</i>
<i>to</i>	<i>unless</i>	<i>until</i>
<i>so that</i>	<i>should</i>	<i>before</i>
	<i>after</i>	<i>as long as</i>
	<i>while</i>	

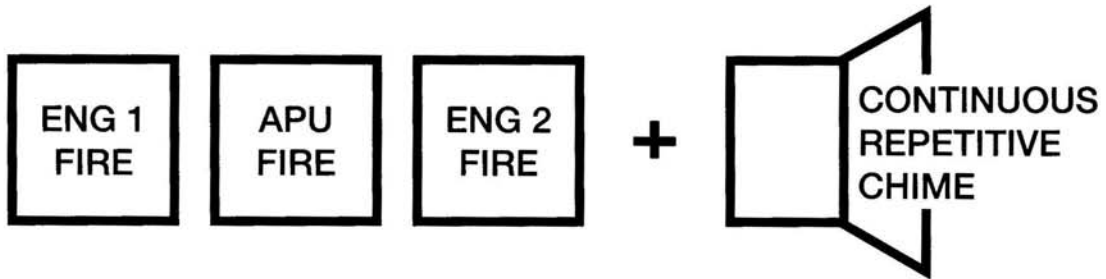
Here are some examples to identify the basic functions.

ADDITION, COMPLEMENTARITY (+)

The display gives horizontal *and* vertical position.

The THS is electrically commanded. *Moreover*, it has a mechanical back-up system.

In case of fire, the red warning light illuminates. *In addition*, the audio warning sounds.

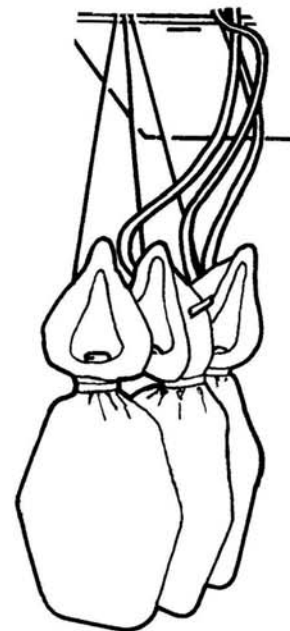


COMPARISON, DISTINCTION, INCOMPATIBILITY (/)

The relay is actuated by a microswitch, *but* the control is manual.
 The relay is actuated by a microswitch, *however*, the control is manual.
Although the relay is actuated by a microswitch, the control is manual.
Despite the actuation of the relay by a microswitch, the control is manual.
 Indication is automatic, *whereas* control is manual.

CONSEQUENCE (→)

The discharge valve is opened, *so* the air is released.
 The discharge valve is opened. *As a result*, the air is released.
 There is a short circuit, *therefore* the circuit breaker trips.
 The APU operates on the ground. *Thus* the cabin is ventilated.

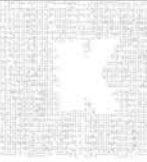


REASON (←)

The oxygen masks drop *because* the cabin altitude increases.
 The oxygen masks drop *because of* an increase in cabin altitude.
 The flight is delayed *due to* bad weather.
 The flight is delayed *as* the weather is bad.

OBJECTIVE (∇)

Press the POWER TEST push-button *in order to* test the window heating
 Open the door (*so as to*) have access to the panel.
 Energize the a/c *so that* the engineer can perform the pre-flight tests.

**CONDITION (*)**

If a drain valve leaks, the piston is changed.

The caution light illuminates, *if* the temperature rises.

The aircraft can depart *provided (that)* there are no No-go items.

If the APU is inoperative, the engines cannot be started *unless* there is an air start unit.

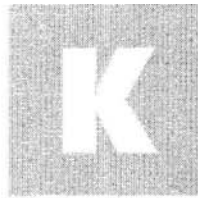
TIME (⊙)

When the aircraft touches down the spoilers extend.

The green arrows illuminate *as soon as* the gear is downlocked.

The red lights remain illuminated *until* the gear is downlocked.

The red lights remain illuminated *as long as* the gear is not downlocked.



CONJUNCTIONS

EXERCISES

1

Find the "odd man out", i.e. the conjunction which does not have the same general function or sense as the others. Look at the example:

AND, BUT, ALSO.

but

(BUT is the odd man out because it has a different function.)

- 1. SO, THEREFORE, BECAUSE.
- 2. DUE TO, CONSEQUENTLY, SO.
- 3. MOREOVER, UNTIL, AS SOON AS.
- 4. FURTHERMORE, ALTHOUGH, AND.
- 5. SINCE, WHEREAS, BUT.
- 6. BECAUSE OF, SO AS TO, DUE TO.
- 7. NEVERTHELESS, UNLESS, HOWEVER.
- 8. AS WELL AS, AND, EVEN THOUGH.
- 9. AS, PROVIDED THAT, DUE TO.
- 10. HOWEVER, UNTIL, ALTHOUGH.

2

Choose the conjunction that is most appropriate. Delete the others, as in the examples:

The INS is inoperative ~~AND/SO/HOWEVER~~ the aircraft is grounded.

The inner tanks are located between ribs 1 and 14 ~~THEREFORE/UNLESS/~~ WHEREAS the outer tanks are between ribs 14 and 27.

The gear doors can be closed on the ground ~~PROVIDED THAT/~~ ~~FURTHERMORE/SO THAT~~ there is hydraulic power.

- 1. The standby frequency is effective IF/SO THAT/AND the transfer key is pressed.
- 2. ADF sense antenna 1 is on the left lower fuselage THUS/SINCE/WHEREAS N° 2 is on the right.



- 3. The HUD enables landing BECAUSE/PROVIDED/ALTHOUGH visibility is poor.
- 4. The needle is in the green range AS A RESULT/UNLESS/THUS the nitrogen pressure is low.
- 5. The glide scale is displayed on the ADI IN ORDER TO/SO/MOREOVER it is repeated on the HSI.
- 6. The shut-off valve is electrically controlled IF/BUT/BECAUSE pneumatically operated.
- 7. Each seat back is hydraulically reclinable. FURTHERMORE/SO/AS you can manually fold the back forward.
- 8. The absence of the washer does not affect installation. IN ADDITION/HOWEVER/SO it should be mounted at the next removal.
- 9. Cables are worn DUE TO/DESPITE/BECAUSE an absence of protection.
- 10. The timer generates a reset signal IN ORDER TO/THEREFORE/IF the flag remains inactive for more than 350 ms.
- 11. The landing gear "ground/flight" microswitches close SO THAT/DESPITE/AS SOON AS the shock absorber is compressed.
- 12. Seat belts are fastened PROVIDED THAT/UNTIL/UNLESS the aircraft reaches its gate.
- 13. The probes are covered BECAUSE OF/IN ORDER TO/BECAUSE prevent contamination.
- 14. The rain repellent system is not used UNLESS/AS SOON AS/DESPITE the rain is very heavy.
- 15. The system was inoperative. THEREFORE/HOWEVER/SO the aircraft took off.

3

Use these basic conjunctions in the sentences 1-10 : "and", "but", "so", "so as to", "if", "due to", "although", "whereas". Look at the examples:

The aircraft network uses AC AND DC power.
 The F27 is a turboprop BUT the A 300 is a turbofan.
 The anti-shimmy is used SO AS TO to reduce nosewheel vibration.

- 1. The standby system is used the main system fails.
- 2. There is a pressure drop pump failure.
- 3. Both the low high levels are pre-adjusted.

4. Main wheel brakes can be applied at touchdown the nose gear shock absorber is not compressed.
5. The blower fan is inoperative the equipment may overheat.
6. The amplifier is designed to give the flight crew priority over the hostess.
7. Check the line for faults the antenna does not tune.
8. The card is faulty. it must be replaced.
9. VHF transceiver 1 is mounted on rack 3..... VHF transceiver 2 is moun-ted on rack 5.
10. Voltage reading is not an absolute indication of battery condition. it is recommended to have the batteries reconditioned if values are low.

4

Decide if these sentences are logical with their conjunctions. "YES" = logical, "NO" = illogical. If they are illogical, suggest another conjunction. Look at the examples:

There was an engine fire SO the extinguisher was discharged. Yes

There was an engine fire BECAUSE the extinguisher was discharged. No So

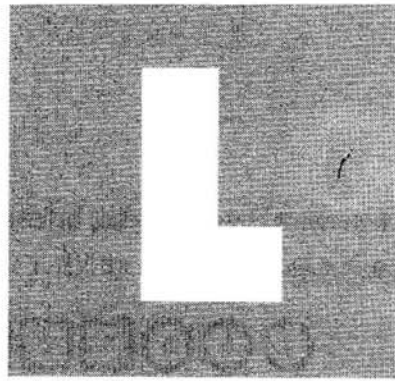
1. The leading edge is de-iced IN ORDER TO prevent ice formation.

2. The tire is not damaged AS a hard landing.

3. The seal is old HOWEVER it must be replaced.

4. The outflow valve is operated DUE TO regulate cabin pressure.

5. The part is serviceable THEREFORE it must be removed.



ACTIONS

NOTES

(See Module D: INSTRUCTIONS, PROCEDURES.)

In this module there are 50 (fifty) basic human actions which are defined with examples and some illustrations.

(See also Modules O: MOVEMENT, Q: PROCESSES, S: STATES and Y: MAINTENANCE VERBS for more technical [mechanical/electrical] actions.)

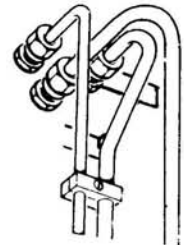
RAMP MECHANIC'S CHECKLIST

APPLY (put into application [instruction], put on [paint, varnish etc.], put into action [brakes, pressure etc.])

Apply the AMM procedure.

Sealant is *applied* every 500 hours.

The pilot *applies* the brakes.

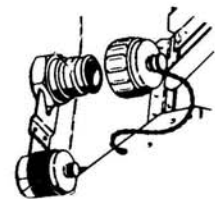


BEND (curve, put under tension, set at an angle)

The hose is *bent* for installation on the landing gear.

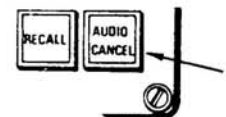
BLANK (close an opening temporarily with a cap, cover, plug etc.)

After PTU removal, *blank* the disconnected pipes.



CANCEL (suppress, stop, annul, destroy, clear)

The audio *cancel* push-button stops the aural warning (chime, bell, horn etc.).



CARRY OUT (do, execute, perform an action)

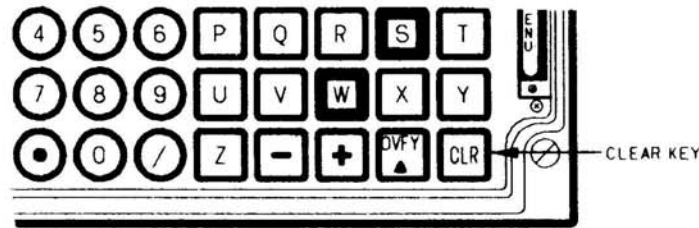
The mechanic *carries out* the operational test of the HF system.

CHECK (verify, make sure, test)

Check the phase sequence before cutting in the GPU.

CLEAR (remove an obstacle, information, display, etc.)

The screen is *cleared*, when another function key is pressed.

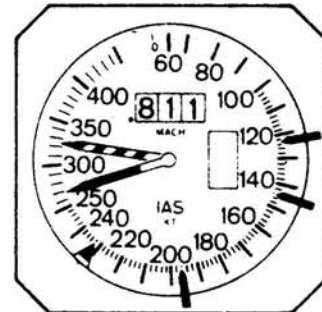


CLOSE (shut, ≠ OPEN)

The valve has 2 positions: *open and closed*.

COMPLY (WITH) (conform to, respect, obey regulations, instructions, plans etc.)

The airlines *comply with* Airworthiness Directives.



CONNECT (join, attach, link, fasten)

The ADC *is connected to* the flight instruments.

For the last 40 (forty) actions, the verb is blank in the example. Fill in the blank with the correct form of the verb, i.e. the imperative, the infinitive ("to" + the basic verb form) or the verb with an "-s", "-es", "-ed" or "-ing" ending. The answers are all in the Exercise Key.

DEACTIVATE (make inactive, stop, cut, isolate)

The wing anti-ice system is
when the a/c is on the ground.



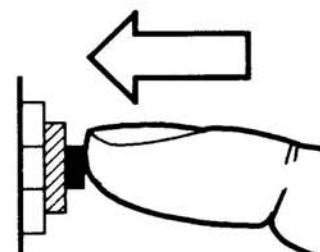
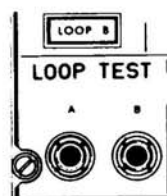
DE-ENERGIZE (cut electrical power)

An overheat thermostat the resistance when a window overheat condition exists.

DEPRESS (press, push, ≠ DEPRESSURIZE!)

N.B. "Depress" is the subject of the example sentence.

..... the LOOPS push-button tests the continuity of the fire detection loops.



EASE (move slowly, regularly, carefully without sudden movements)

The engine mount bolts are into position.

FASTEN (attach, secure)

The seat belts are at take-off.



FILL (make full, put into a container to a known quantity)

The water tank is during turnaround.

FULFIL(L) (satisfy, comply with, respect)

Maintenance practices must the Authorities' requirements.

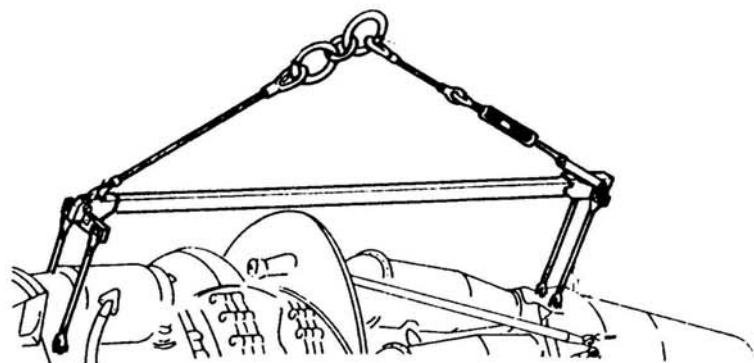
HANDLE (manipulate, touch, move)

Caution ! with care.



HOIST (raise using chain and pulley, a crane, ropes, etc.; pull up from above, lift)

The engine is into place under the pylon.



INCREASE (make larger, make higher, increment, augment)

The pilot NI to 97%.

JACK (UP) (raise, lift the aircraft off the ground using "jacks" for maintenance operations)

..... points are located under the nose and wings.



LEAVE (1. quit, part; 2. remain [to be left], not to remove)

1. The flight the gate at 16.45.
2. Do not foreign objects on the ground near the aircraft.

LET (permit, allow)

..... the tires cool before checking the pressure.

MARK (identify, label, designate)

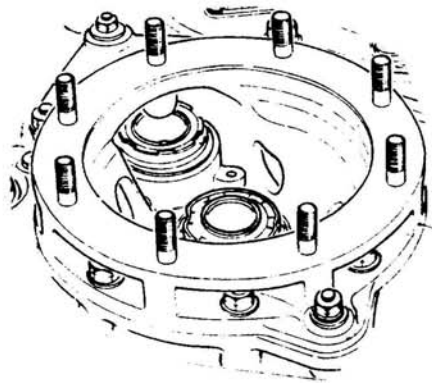
All components are with a serial number.

MATCH (fit together, put together two similar things, make points correspond)

Only use Part Numbers when replacing a component.

MOUNT (install, put into position)

Place new gasket over studs on gear box.



OBEY (follow orders, respect instructions, etc.)

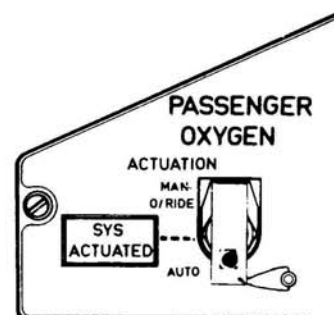
For test procedure, instructions in AEB 88905.

OPEN (uncover, ≠ close, shut)

During door , stand clear of door travel area.

OVERRIDE (neutralize an action, take priority over)

If the oxygen masks do not fall at 14,000 ft, the Flight Engineer the automatic system.





PLAN (make plans, project, schedule)

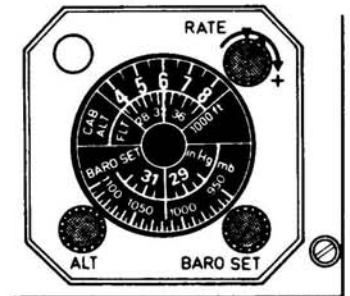
The overhaul is in November.

POSTPONE (delay, put back a date, make later)

As there is a workload problem, we must the C-check for a week.

PRESET (select in advance)

The cabin altitude is for cruise.



PRESS (push, depress)

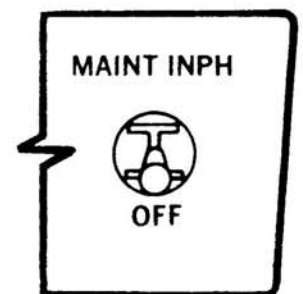
..... the light to test the bulb.

PUSH (press with force in order to move)

The tug (tractor) back the aircraft from the stand.

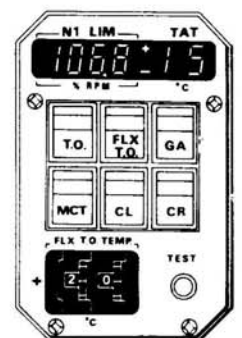
RAISE (move up, lift)

The switch must be to the MAINT INPH position to communicate with ground service personnel.



READ (1. receive information from instruments, etc.; 2. [for an instrument] show, indicate)

1. The crew must the height on the Radio Altimeter.
2. The NI limit computer 106.8%



REMOVE (take away, drop from the aircraft, ≠ install)

Before the aircraft leaves the line mechanic the ground safety pin.

REPLACE (remove a component and install another one)

Test the transducer on the bench. If it is unserviceable, it.

REQUEST (ask for)

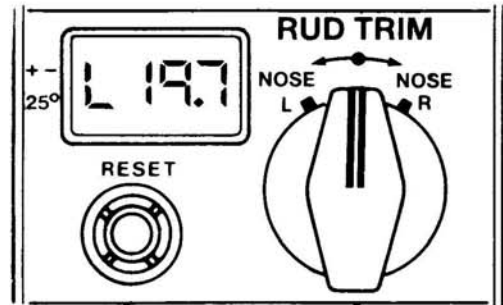
On arrival, the flight crew may technical assistance from the station.

REQUIRE (need, demand, be necessary)

If the management unit is faulty, a new one is

RESET (reposition, return to initial position, position at zero)

The Rudder Trim is to zero.

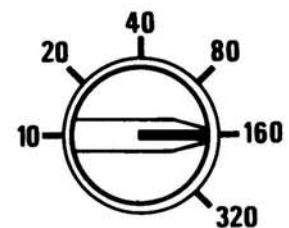


RIG (adjust, regulate – flight control linkage, engine controls, etc.)

Engine is performed after engine installation.

ROTATE (turn)

The range is selected by the rotary selector.

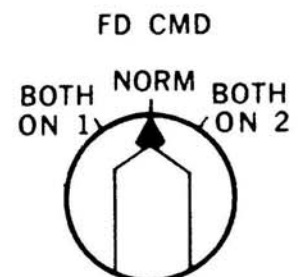


SEND (transmit, direct, cause to go)

The gyro data is to the Heading Control Unit.

SET (position, select, place, choose a value, push a C/B)

The FD Command rotary selector is at NORM.

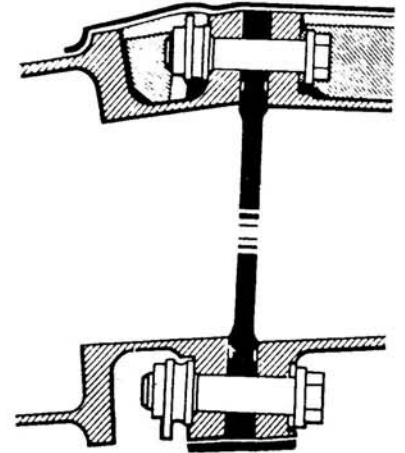


SHIFT (move sideways, translate, change the position of something)

The cargo containers can be from one bay to another.

TIGHTEN (turn a bolt, screw, etc. clockwise, ≠ loosen)

The bolts are with a torque wrench.

**TRIP (pull, open, disconnect a circuit breaker)**

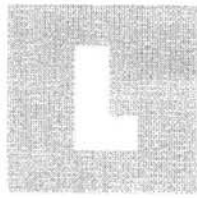
Before working on a circuit
the respective C/B.

USE (utilize, employ)

A torque wrench is to tighten bolts precisely.

WITHDRAW (remove, pull out, extract, take out of service)

After the SB, the old Part Number will be



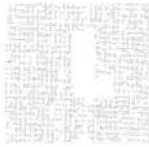
ACTIONS

E X E R C I S E S

1 Use the 50 verbs in the notes of this Module to complete these sentences. Fill in each blank with the correct verb, as in the example:

Conditioned air may be *used* for internal surface defogging.

1. fuel tanker hose couplings to the two aircraft refuel/defuel couplings.
2. the RESET button will turn off the blue call lights.
3. When the switch is in the OFF position all exterior service interphone Jacks are
4. switch to TEST; that stick-shaker vibrates.
5. the oil sump until the FULL indication appears in the sight glass.
6. Untighten and the mounting plate.
7. the antenna carefully, sufficient to gain access to the connector.
8. MS4 compound around the VHF and marker beacon antenna connectors.
9. all applicable ADF circuit breakers.
10. a check with a control station to test transmission and reception.
11. The course pointer is in either direction.
12. Connect the indicator to the test transmitter test cable 1489453. (= by means of: USE)
13. One unit is on the top of each flux valve.
14. the unit with great care during removal; a shock may result in damage.
15. No further lubrication is until the instrument is overhauled.



16. the aircraft electrical power network before performing the work.
17. Slowly the engine speed from idle to maximum permissible r.p.m.
18. After 3 unsuccessful attempts, the starter motor 5 minutes before trying again.
19. Ensure that you connectors and receptacles.
20. To change a wheel the corresponding gear is up.

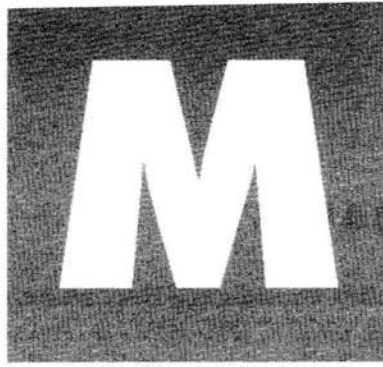
2

Choose the word in the list below which has the same meaning as the words or expressions in 1-25.

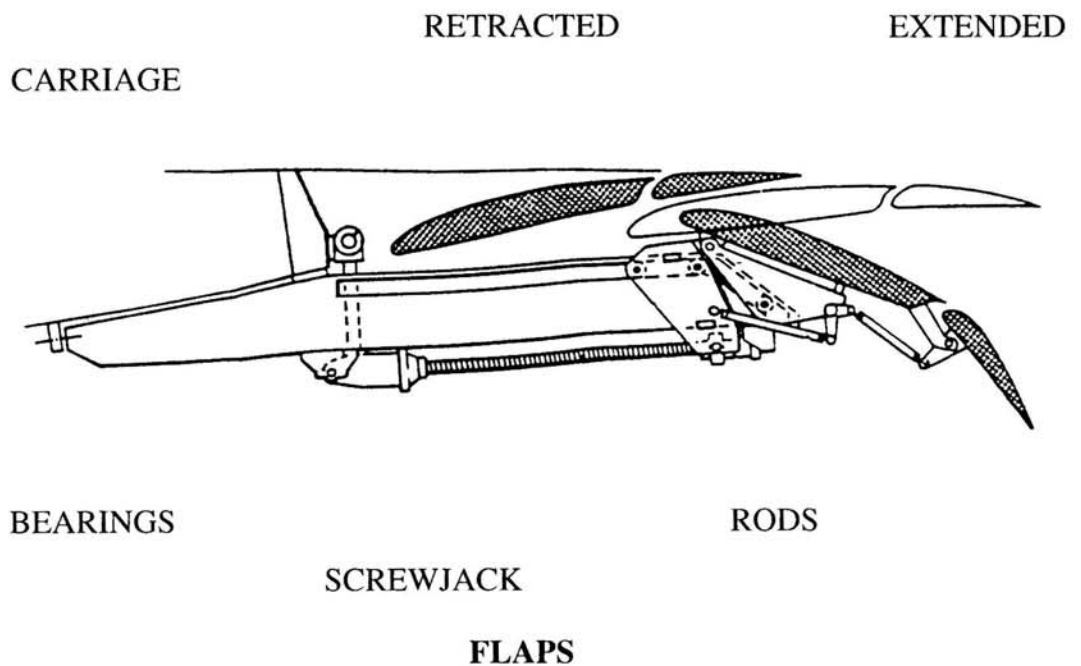
PRESET	RIG	USE	DE-ACTIVATE	MOUNT
CLOSE	MATCH	COMPLY	MARK	FASTEN
INCREASE	REMOVE	SHIFT	APPLY	CANCEL
SHIFT	REQUEST	JACK	EASE	READ
OVERRIDE	LET	CARRY OUT	RESET	CONNECT

1. join, attach, link
2. ask for, demand
3. conform to
4. utilize
5. move slowly and regularly
6. annul, suppress
7. take away, ≠ install
8. associate
9. select a value in advance
10. put into action
11. perform, do
12. install

13. isolate, make inactive
14. a belt, attach
15. move laterally or longitudinally
16. raise aircraft for wheel change or maintenance
17. shut
18. permit, allow
19. display, indicate
20. make bigger, increment
21. verify
22. reposition
23. adjust, regulate flight control or engine cables
24. identify
25. give priority order



POSSIBILITY, PROBABILITY, NECESSITY, CONDITIONS



NOTES

1 POSSIBILITY

Use *can* + infinitive to express possibility. (It is usually better than “it is possible to/that...”.)

Can expresses physical or technical possibility, capacity etc. For example:

The A320 *can* carry 172 passengers.

Coaxial cables *can* transmit numerous messages.

In the event of an engine failure, the remaining engine *can* power all the hydraulic systems through the PTU.

The APU *can* be started up to 25,000 feet.

2 PROBABILITY

May is used to indicate that an action or event could occur (happen). **Could** is also used.

In a technical context, this applies more to natural phenomena, unplanned technical incidents, failures, etc. For example:

In dense cloud, ice *may* form on the wings.

If there is a lot of traffic on arrival, the aircraft *may* have to hold before landing.

If the washer is perished (worn, old), the union *may* leak.

The assembly *may* be repaired before overhaul.

Hot oil *could* cause injury.

N.B. In everyday English, can and may are often interchangeable. In Simplified English, use only can.

3 NECESSITY

Must, shall and have to are commonly used to express necessity (Do not use: "It is necessary to/that".) e.g.

If the tire is deflated the mechanic *must* remove it.

When open on the ground, the landing gear bay doors *shall* be safetied (locked by a safety pin or sleeve).

During refueling, fire fighting equipment *has to* be available (ready for use).

Non-approved lubricants *shall not* be used.

N.B. In technical and legal English, shall does not indicate the future, but an idea of necessity. Shall = must.

The adjectives mandatory and compulsory are often employed in official documents, e.g.

Airworthiness Authority (i.e. FAA, DGAC, CAA, etc.) approval is *mandatory*.

It is *compulsory* to inform the Captain of any dangerous cargo.

Direct prohibitions take the following form:

It is *forbidden* to smoke during refueling.

Smoking during refueling is *prohibited*.

Should expresses a recommendation rather than a necessity:

Chocks *should* be placed under the main gear wheels during a night stop.

Need expresses a requirement, obligation, necessity:

The filter *needs* to be replaced every 500 hours.

The mechanics *need* a special tool for the job.

4 CONDITIONS

Conditions are usually associated with *if* and *should*. Other conditional words or expressions are in Module K: **CONJUNCTIONS** (provided that, unless).

In the event of and *in case of* also introduce conditional situations. In most technical documents, only the basic form of the conditional is employed, i.e. **present simple + present simple** or **present simple + future**, e.g.

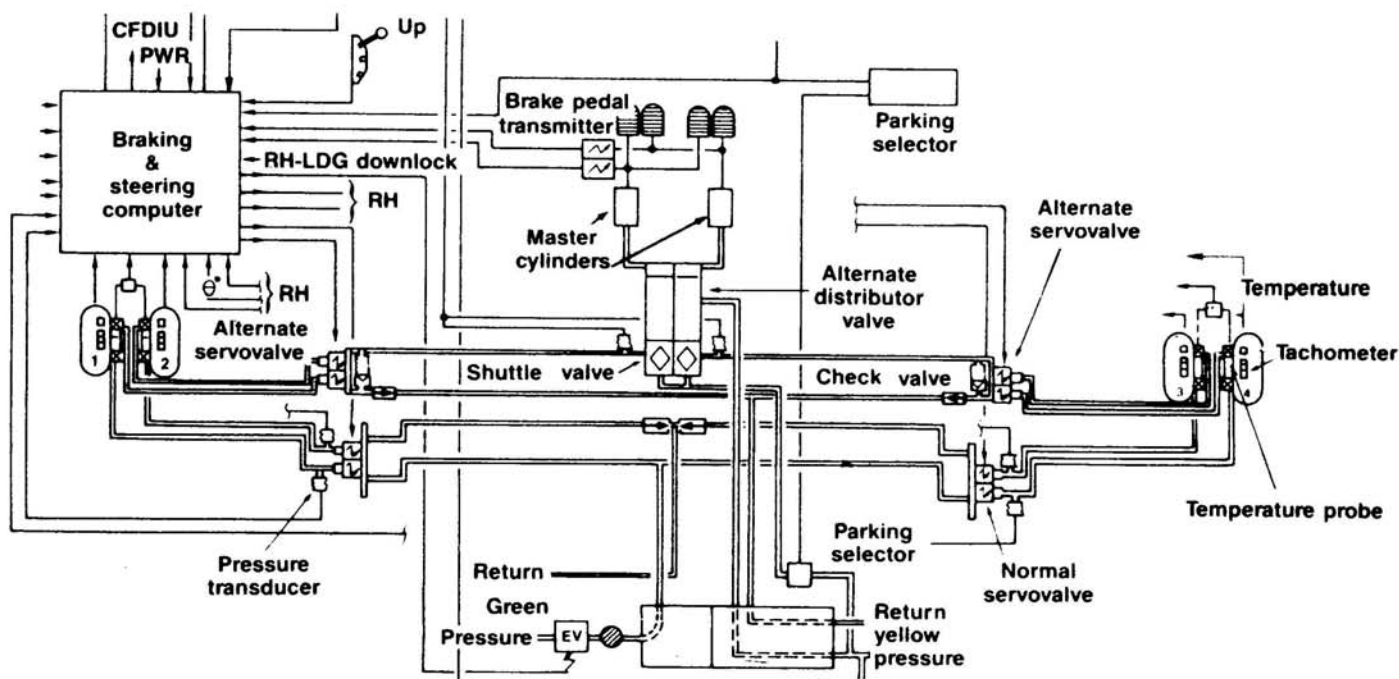
If the normal servovalve fails, the alternate servovalve takes over.

Should the normal servovalve fail, the alternate servovalve will take over.

In the event of normal servovalve failure, the alternate servovalve takes/will take over.

In case of normal servovalve failure the alternate servovalve will take over.

With minor variants of construction, these expressions are interchangeable.



5 SOME MORE EXAMPLES

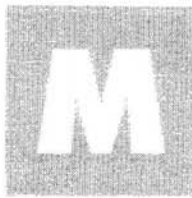
If one logic is not in accordance with the other, the TO CONFIG WARN failure message is triggered. **(Condition)**

The outer tank *can* hold 3,500 kg. **(Capacity)**

Water *may* accumulate in the lower fuselage. **(Probability)**

When the demand for cooling air decreases, the Ram Air Outlet *must* be closed. **(Necessity)**

The scavenge filter *should* be hand tightened. **(Recommendation)**



POSSIBILITY, PROBABILITY, NECESSITY, CONDITIONS

E X E R C I S E

1 Choose **CAN, MAY, MUST, SHOULD** or **NEED** to complete these sentences, as in the example:

The tanks **MUST** be drained before the first flight.

1. The handpump pressurize the yellow system.
2. The tires be damaged by a hard landing.
3. Only original parts be used, but approved equivalent parts be installed.
4. A safety pin be inserted on the ground.
5. Ice form on the wings.
6. Bird strikes damage the fan blades.
7. The checklist be performed before engine start.
8. Channel 1 replace Channel 2.
9. You special tooling for the test.
10. The crack be stopped immediately.
11. The FAA regulations be respected.
12. The green hydraulic system pressurize all the users.
13. The network a 27 VDC supply.
14. Skydrol burn or cause corrosion.
15. The circuit breaker be safetied before beginning work.
16. The engines provide 52 tonnes of thrust.
17. We 8,000 liters of fuel.
18. The tank contain 25,000 liters.

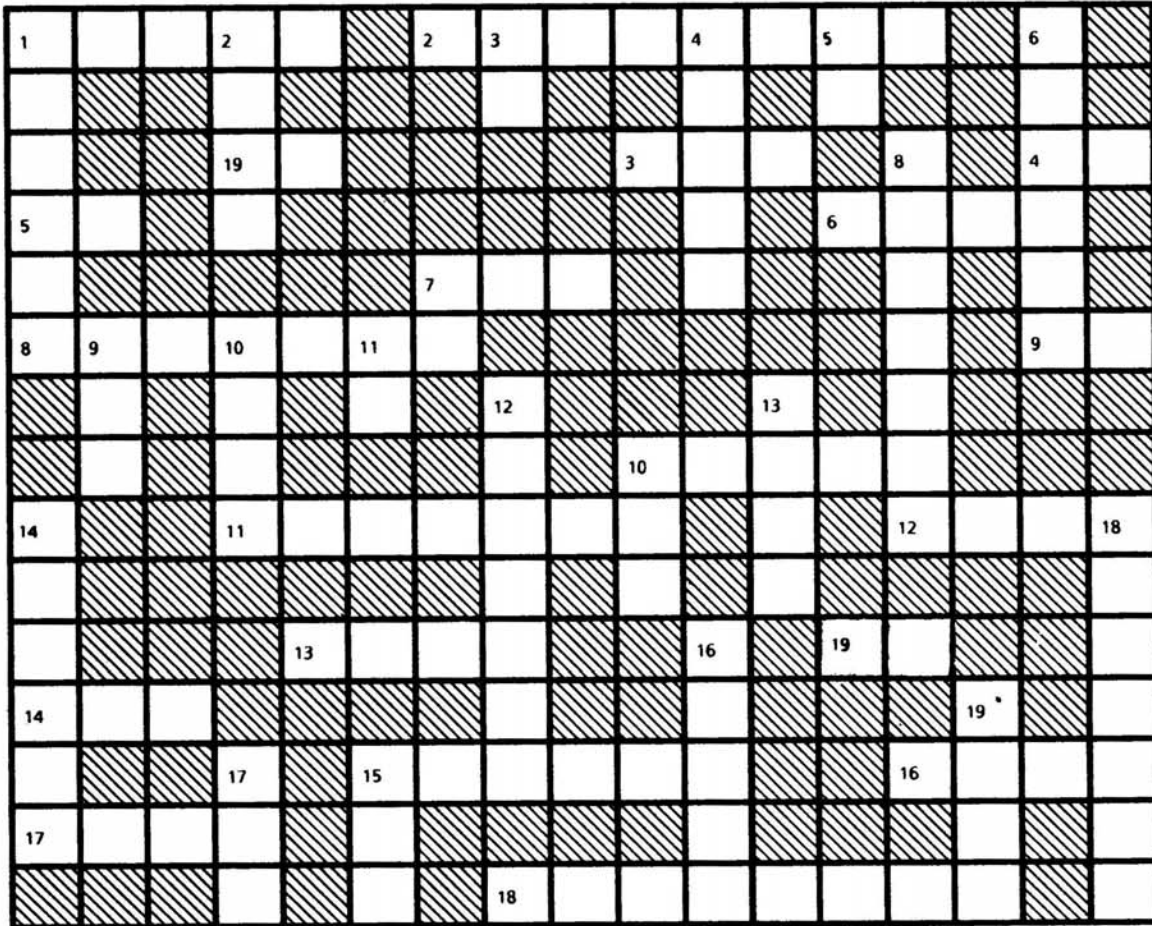


POSSIBILITY, PROBABILITY, NECESSITY, CONDITIONS

19. It..... snow in Chicago in January.
20. If necessary, the aircraft fly on one engine.
21. The safety pin be removed before flight.
22. When the APU is inoperative, the crew..... the GPU.
23. The unit be replaced, but it is not mandatory.
24. A failure on a no-go item be repaired.
25. You use a mask when you cut composite materials.

REVIEW TWO

1 Fill in the crossword.



ACROSS

1. mixture of metals (5)
2. distance from wing tip to wing tip (8)
3. to adjust cables etc.(3)
4. negative (2)
5. vertical movement (2)
6. to curve (4)
7. conjunction of contrast (3)
8. indicate, show (7)
9. for example (2)
10. transparent substance (5)
11. from one side to the other (7)

DOWN

1. circular movement (6)
2. above or(4)
3. ≠14 across
4. translate, move longitudinally (5)
5. since (2)
6. manipulate, touch (6)
7. expresses means (2)
8. ask for (7)
9. indicates action or function (3)
10. after (4)
11. for time or position (2)

ACROSS

- 12. check operation (4)
- 13. ≠ hard (4)
- 14. ≠ in (2)
- 15. ≠ straight(6)
- 16. necessity (4)
- 17. move gradually (4)
- 18. in spite of (8)
- 19. action performed (2)

DOWN

- 12. anti- or clockwise (7)
- 13. ≠ soft (4)
- 14. ≠ install (6)
- 15. possibility, to be able (3)
- 16. distance from side to side (5)
- 17. to position (3)
- 18. to secure, to screw (7)
- 19. ≠ pull

2 Put together (match) the words with the same meaning in the two columns below. The first example has been done for you.

- | | | |
|---------------|--------------------|-------------------------------|
| 1. aft | ✓ rear | A. return of information |
| 2. match | ..... | B. used to |
| 3. override | ..... | C. to position |
| 4. because of | ..... | D. dangerous |
| 5. pointed | ..... | E. forward part of wing |
| 6. perform | ..... | F. inboard |
| 7. bleed air | ..... | G. function of a loader |
| 8. clean | ..... | H. compulsory |
| 9. must | ..... | I. therefore |
| 10. feedback | ..... | J. maintains itself |
| 11. under | ..... | K. air from engine compressor |
| 12. armed | ..... | L. alternative system |
| 13. set | ..... | M. from side to side |
| 14. back-up | ..... | N. whilst |
| 15. mandatory | ..... | O. sharp |

- | | | |
|-------------------|-------|---------------------------------|
| 16. stretched | ..... | P. if |
| 17. loading | ..... | Q. carry out |
| 18. air bleed | ..... | R. below |
| 19. width | ..... | S. with no dirt |
| 20. self-held | ..... | T. due to |
| 21. so | ..... | U. axis |
| 22. inner | ..... | V. rear |
| 23. allow | ..... | W. priority manual order |
| 24. centerline | ..... | X. associate |
| 25. leading edge | ..... | Y. elongated |
| 26. however | ..... | Z. system that provides hot air |
| 27. designed to | ..... | AA. but |
| 28. whereas | ..... | AB. shall |
| 29. unsafe | ..... | AC. ready for use |
| 30. provided that | ..... | AD. permit, enable |

3 Some of the letters are missing in the words below. Try and complete as many as you can. All the words are in Modules A-M. Look at the example:

B_C_U_E *because*

L_A_I_G E_G_ *leading edge*

- | | | | |
|---------------------|-------|---------|-------|
| 1. MAN_ATO_Y | ..... | 4. T-ST | ..... |
| 2. COUNT_RCL_CKW_S_ | ..... | 5. A_ | ..... |
| 3. C_NT_RL_NE | ..... | 6. S_FT | ..... |

- | | |
|------------------------------|----------------------------|
| 7. SHO-LD | 19. CLE-R |
| 8. WHER-AS | 20. A-OUND |
| 9. D-PTH | 21. N-R-OW |
| 10. IN O-D-R TO | 22. B-CAUS- |
| 11. T-R-UGH | 23. MON-T-R |
| 12. R-M-VE | 24. P-SH |
| 13. RES-T | 25. T-IP |
| 14. H-N-YCOMB | 26. F-RWA-D |
| 15. R-BBER | 27. M-ST |
| 16. STRAI-HT | 28. REQ-E-T |
| 17. R-UGH | 29. C-OSS-EED |
| 18. HOW-V-R | 30. ALT-OUGH |

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PART

3

N. COMPARISONS

O. MOVEMENT

P. ACTIVE AND PASSIVE

Q. PROCESSES

R. FUNCTIONS

S. STATES, FAILURES, DAMAGE



INTRODUCTION

In Parts One and Two you saw most of the basic aspects of English. In Modules A to M there was more language than technology. In Part Three we will see the last two points of general English:

COMPARISONS (Module N)

ACTIVE AND PASSIVE (Module P)

We will then start looking at how English is used to describe different technical situations:

MOVEMENT (Module O)

Actions (“go up”, “flow”, “eject”, “deflect”, etc.) and other words (“about”, “alternating”, “clockwise”).

PROCESSES (Module Q)

Sequences, cause, effect, etc. using several conjunctions we already saw in Module K.

FUNCTIONS (Module R)

Expressing quantity, time, indication, composition, calculating, prevention, etc.

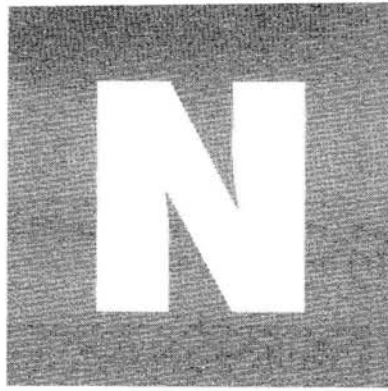
STATES, FAILURES, DAMAGE (Module S)

Examples of the most common normal and abnormal conditions grouped by the main aircraft systems.

So in Part Three we are building more specialized terms and language onto the basic foundations we became familiar with in Parts One and Two.

Do not forget to notice how all the things we saw in Modules A to M are used again in the examples in Part Three and in the Review on page 157. From time to time take a point you have already seen (word order, prepositions, conjunctions, endings, etc.) and find examples in your own technical documentation or in *English for Aircraft Volume 2 (System Maintenance)*.

Take your time. Do only a little at once. At work, when you read your documentation, try and find examples of what you have seen in this book.



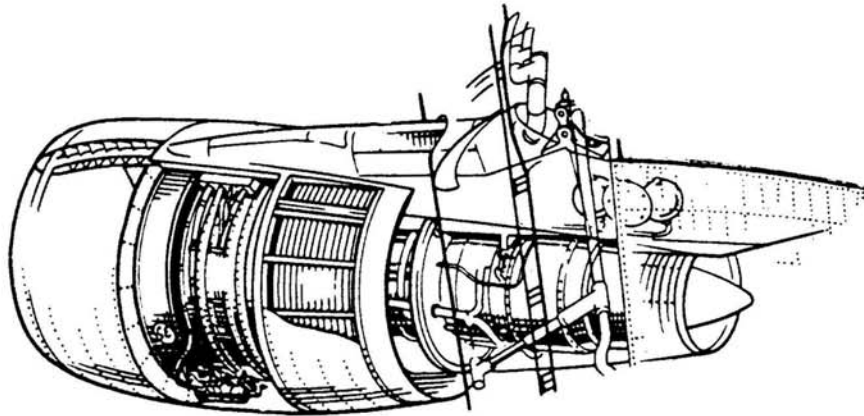
COMPARISONS

TURBOFAN

PYLON

AIR INTAKE

FIRE EXTINGUISHER
BOTTLE



COWLS

CORE ENGINE
THRUST REVERSER
POWER PLANT

EXHAUST NOZZLE

NOTES

You can compare things in different ways:

1 COMPARATIVES

Most short adjectives take “-er”, e.g.

ADJECTIVE	COMPARATIVE	ADJECTIVE	COMPARATIVE
<i>fast</i>	<i>faster</i>	<i>few</i>	<i>fewer</i>
<i>wide</i>	<i>wider</i>	<i>narrow</i>	<i>narrower</i>
<i>long</i>	<i>longer</i>	<i>deep</i>	<i>deeper</i>
<i>heavy</i>	<i>heavier (y → i)</i>	<i>hot</i>	<i>hotter (t → tt)</i>

Long adjectives, past and present participles and most adverbs are preceded by *more (+)* or *less (-)*, e.g.

BASIC FORM	COMPARATIVE
<i>difficult</i>	<i>more/less difficult</i>
<i>accurate</i>	<i>more/less accurate</i>
<i>reliable</i>	<i>more/less reliable</i>
<i>cracked</i>	<i>more/less cracked</i>
<i>damaged</i>	<i>more/less damaged</i>
<i>cooling</i>	<i>more/less cooling</i>
<i>time-consuming</i>	<i>more/less time-consuming</i>
<i>regularly</i>	<i>more/less regularly</i>
<i>slowly</i>	<i>more/less slowly</i>

There are some irregular or unusual cases:

ADJ/ADV	COMPARATIVE	ADJ/ADV	COMPARATIVE
<i>good</i>	<i>better</i>	<i>bad</i>	<i>worse</i>
<i>many, much</i>	<i>more</i>	<i>little</i>	<i>less</i>

All these comparatives are followed by “*than*” in a sentence, e.g.

The A321 is *longer than* the A320.

The new equipment is *more reliable than* the previous one.

The left wing is *less damaged than* the right one.

Carbon brakes wear *more slowly than* steel brakes.

Prevention is *better than* repair.

Use water *rather than* spirit. (*in place of, instead of*)

2 SUPERLATIVES

The *and -est* characterize the superlative. The same principles apply as for the comparative, e.g.

ADJECTIVE/ADVERB	COMPARATIVE
<i>fast</i>	<i>the fastest</i>
<i>accurate</i>	<i>the most/least accurate</i>

ADJECTIVE/ADVERB	COMPARATIVE
<i>damaged</i>	<i>the most/least damaged</i>
<i>slowly</i>	<i>the most/least slowly</i>
<i>good</i>	<i>the best</i>
<i>bad</i>	<i>the worst</i>
<i>many, much</i>	<i>the most</i>
<i>little</i>	<i>the least</i>
<i>few</i>	<i>the fewest</i>

Superlatives are usually followed immediately by a noun, e.g.

Concorde is *the fastest* civil transport.

The most damaged part of the fuselage is the forward section.

The best solution is the solution with *the shortest* downtime.

The radome is *the most exposed* part of the aircraft.

3 CONJUNCTIONS

(See Module K.)

A difference between two things can be expressed by words like:

but *whereas* *whilst* *however*

For example:

The ailerons are electrically controlled, *but* the rudder is mechanically controlled.

The left navigation light is red, *whereas* the right one is green.

Holds 1 and 4 take containers, *whilst* Hold 5 is a bulk compartment.

The primary flight controls are powered by three hydraulic systems. *However* the secondary controls are powered by two.

4 "AS"

***Than* expresses a difference. *As* expresses equality, identity or similarity, e.g.**

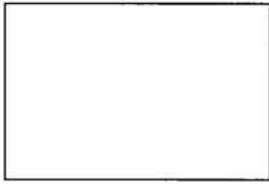
This equipment has *as* many functionalities *as* the other one.

The response time is *as* short *as* possible.

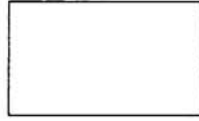
Channel 2 is used *as* much *as* Channel 1.

The wheel can be lifted *as* far *as* 105 mm. (up to)

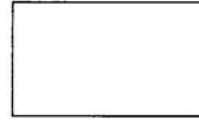
"Tailplane" means the same *as* "Horizontal Stabilizer".



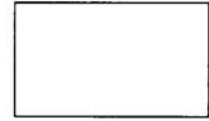
larger than



smaller than



the same as



5 DOUBLE COMPARATIVE

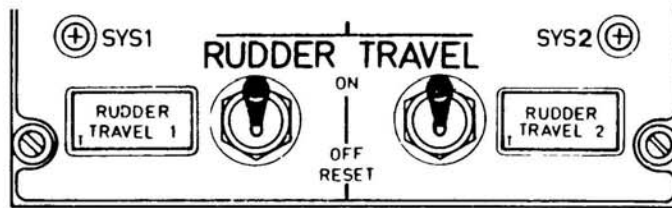
**Two comparatives are used to express two parallel progressions, states, etc.
For example:**

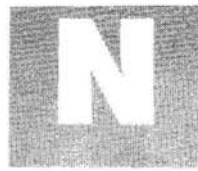
The higher the altitude, the colder the atmosphere.

The greater the flap extension, the slower the landing speed.

The longer the flight, the heavier the trip fuel.

The higher the airspeed, the lower the rudder deflection angle.





COMPARISONS

EXERCISES

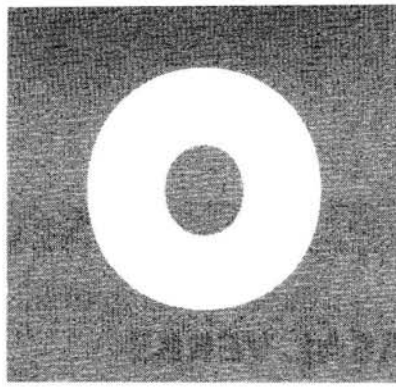
1 Complete these sentences by putting the adjective, adverb, etc. in the right form, as in the examples:

The B747 is *heavier than* (HEAVY) the DC10.

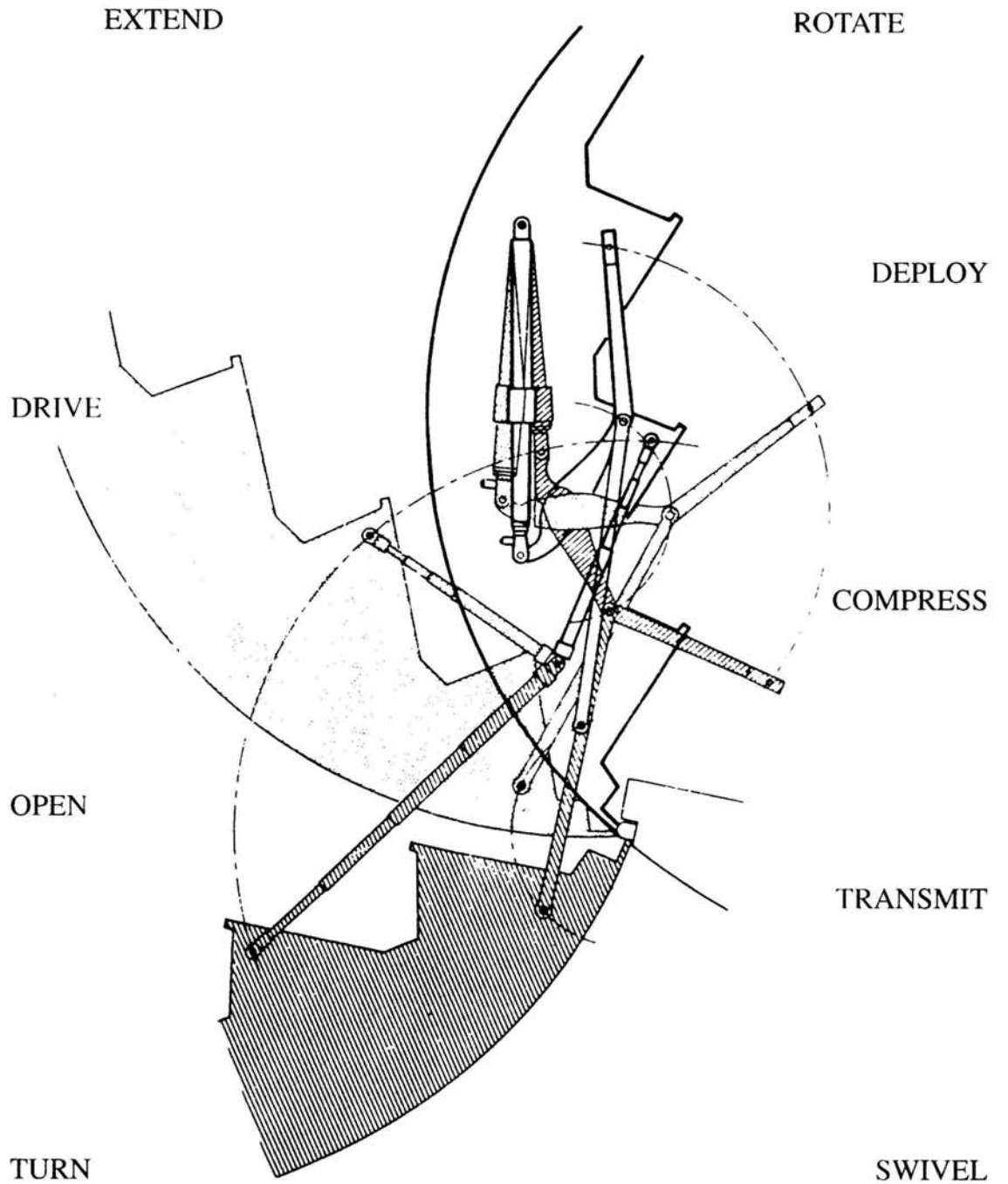
The B747 is *the largest* (LARGE) civil transport.

1. 80° C is (HOT) 80° F.
2. The (BIG) negative differential pressure is -85 mb.
3. There is (MUCH) fuel in the inner tank in the outer tank.
4. The First Class seats are (COMFORTABLE) the Economy Class seats.
5. The landing speed is (LOW) when the flaps are fully extended.
6. There are (FEW) seats abreast in First Class in Economy.
7. The MAX position provides (EFFICIENT) braking.
8. The A330 has a (LONG) range the A320.
9. A check valve is the (SAME) a non-return valve.
10. "Windshield" is American (*conjunction*) "windscreen" is British.
11. The ZFW is (LIGHT) the MTOW.
12. A turbofan is (EFFICIENT) a conventional jet engine.
13. The "endurance" is the (LONG) time an aircraft can fly without refueling.
14. The aircraft's "ceiling" is the (HIGH) altitude it can fly at.
15. Built-in test equipment is the (GOOD) way of trouble shooting quickly.

16. After 50 hours, the strut was (CRACKED) at the first inspection.
17. The reinforced areas offer (GOOD) resistance the non-reinforced areas.
18. Automatic braking enables the plane to decelerate (SMOOTHLY).
19. Fail-safe systems have (LITTLE) probability of failure other systems.
20. Microwave Landing Systems are (ACCURATE) conventional ILS.
21. ILS is installed at all major airports (*conjunction*) MLS is rare.
22. The (SHORT) the runway, the (HARD) the braking.
23. A jetty is (FAST) way of disembarking passengers.
24. There is (MUCH) risk of ice-formation when there are clouds in a clear sky.
25. The (HIGH) the engine speed, the (HOT) the EGT.
26. Engine 1 is (POWERFUL) Engine 2. (*equality*)
27. The square form factor also has (GOOD) mechanical properties triangular shapes.
28. The (LONG) the pathlength the (GOOD) the performance characteristics.
29. The design approach is to build the instrument (LARGE) possible.
30. The elevators are deflected symmetrically. The LH elevator is deflected (MUCH) the RH elevator.



MOVEMENT



AIRSTAIRS

NOTES

1 PHRASAL VERBS

The direction or type of movement is often expressed by simple verbs (*go, run, move, come, etc.*) + a preposition or adverb (see Module B). These are "Phrasal Verbs", e.g.

VERB	MEANING
<i>go up</i>	ascend, climb, increase
<i>go down</i>	descend, fall, decrease
<i>go along</i>	extend, move longitudinally
<i>go through</i>	penetrate, go in and out, inspect
<i>go over</i>	cross, exceed, move on top of, investigate, etc.

The context determines the exact meaning of the verb, e.g.

The wiring *goes up* the wall. (= is routed up)

The aircraft *goes up* to FL 310 for cruise. (= climbs to)

As the thrust increases, the fuel consumption *goes up*. (= increases)

The preposition is a rough (approximate) guide to the meaning of the verb. However, prepositions are used with all verbs of movement to specify the nature of the movement.

2 VERBS OF MOVEMENT

Here are 50 verbs used to describe different types of movement. (See also Module L.) For each verb, v = the verb, n = the corresponding nouns or substantives, p = the associated preposition(s) or adverbs, etc.

v. **ADVANCE** (move forward, especially throttle levers)

n. **ADVANCE** (especially throttle levers)

The throttles are *advanced* for power-up.

v. **BRAKE** (make a/c or engine decelerate)

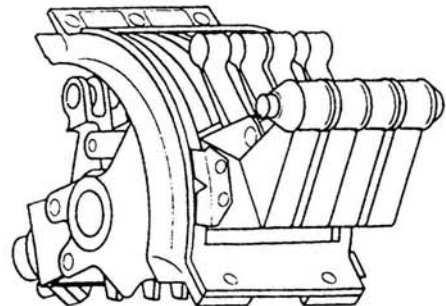
n. **BRAKES, BRAKING**

The thrust reverser helps to *brake* the aircraft.

v. **BRING** (carry, transport, move)

p. **TO, BACK, ALONG, DOWN, UP, etc.**

The catering truck *brings* the beverages to the aircraft.





- v. **BYPASS (avoid, go around)**
- n. **BYPASS VALVE**

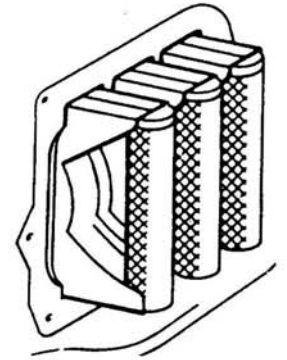
In the event of overpressure, the filter is *bypassed*.

- v. **CEASE (stop, discontinue)**

When Q22 *ceases* to conduct, the base circuit of Q2201 becomes open.

- v. **COIL (turn a wire around a core, etc.)**
- n. **COIL**
- p. **AROUND**

The emergency descent rope is *coiled* around an inertial drum, or reel.

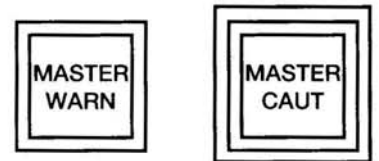


- v. **COLLAPSE (break down, fall apart)**
- n. **COLLAPSE**

If the safety sleeves are not mounted, the gear may *collapse* without hydraulic pressure.

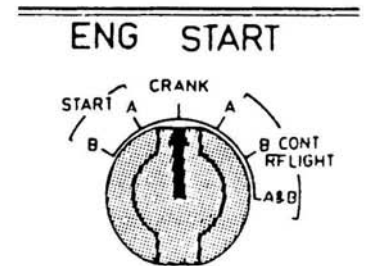
- v. **CONVEY (transmit, transport, carry)**
- n. **CONVEYOR, CONVEYANCE**
- p. **TO, FROM**

The monitoring channel *conveys* any fault messages to the Master Warning.



- v. **CRANK (rotate, motor an engine)**
- n. **CRANKING**

After a wet start the engine is *dry-cranked* before a second attempt.

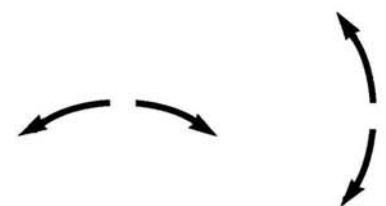


- v. **DECREASE (diminish, drop, fall)**
- n. **DECREASE**

As the aircraft descends the cabin altitude *decreases*.

- v. **DEFLECT (move from neutral, deviate)**
- n. **DEFLECTION**
- p. **ABOUT, FROM, TO, AROUND**

The surface *deflects* 20° about the axis.



v. **DISMANTLE** (disassemble, take apart, break down)

n. **DISMANTLING**

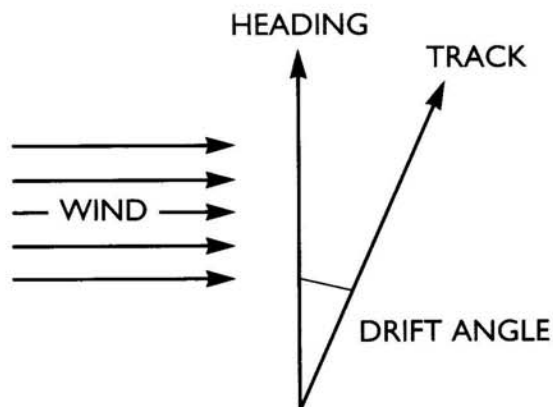
After removal, the assembly is *dismantled* for overhaul.

v. **DRIFT** (deviate, move sideways)

n. **DRIFT**

p. **FROM, AWAY, OFF**

Strong crosswinds cause the aircraft to *drift* off course.



v. **DROP** (fall, decrease, go down, remove)

n. **DROP**

If the output voltage of the DC regulator *drops* below 10 VDC, the emitter voltage follows this decrease.



v. **EJECT** (expel, blow or push out)

n. **EJECTION**

p. **FROM**

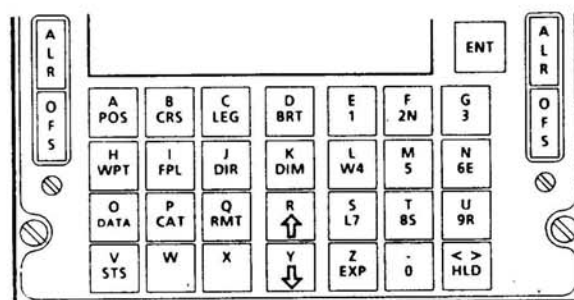
In the event of overpressure, the disc is *ejected*.

v. **ENTER** (put in, insert data)

n. **ENTRY, ENTRANCE**

p. **INTO, IN, ON**

The crew *enters* the coordinates in the INS.



v. **EXPAND** (increase in volume)

n. **EXPANSION**

An *expanded* scale displays the values in the middle range of the VSI.



v. **EXTEND** (stretch, make longer in space or time, occupy space)

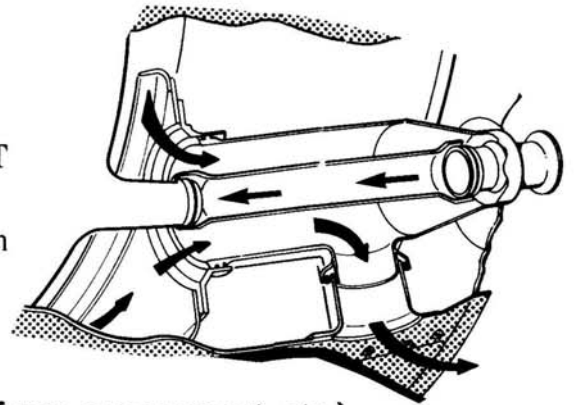
n. **EXTENSION**

p. **TO, UNTIL, FROM**

The avionics bay *extends* from frame 2 to frame 12.

- v. **FLOW** (circulate [fluids, liquids])
 n. **FLOW**
 p. **ALONG, THROUGH, INTO, OUT OF**

The air *flows* inside a double skin which acts as a heat exchanger.



- v. **IMPART** (communicate/transmit a force, a movement, etc.)
 p. **TO, FROM**

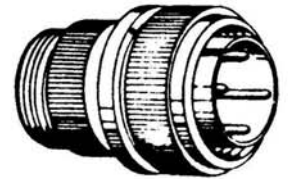
The beam *imparts* the strain to the box structure.

- v. **INGRESS** (move into, enter)
 n. **INGRESSION**

Water may *ingress* the casing under pressure.

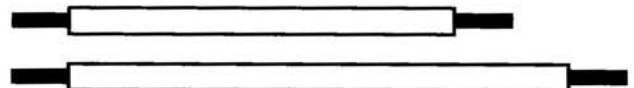
- v. **INSERT** (place inside)
 n. **INSERT, INSERTION**
 p. **INTO**

INSERT the male plug into the socket.



- v. **LENGTHEN** (make longer [re. shorten, widen, lighten, thicken, etc.])
 n. **LENGTH**

The cable is *lengthened* to avoid strain.



- v. **LIFT** (to raise, to move up, to carry)
 p. **UP, UP TO, INTO**

Lift the aileron into position on the wing.

- v. **MANEUVER** (operate, manipulate)
 n. **MANEUVER, MANEUVERING**

Maneuver the flight controls with caution on the ground.

- v. **MOTOR** (crank, rotate an engine)
 n. **MOTORING**

Motor the engine to remove excess fuel.

- v. **POSITION** (put in place, mount, set)
 n. **POSITIONING**
 p. **IN, ON, INTO, ONTO**

The engine is *positioned* under the pylon for mounting.



v. **PROTRUDE** (extend from, not to be flush)

p. **FROM, ABOVE, BELOW**

Overflow drains *protrude* from the side of the casing.

v. **REACH** (go as far as, attain, arrive at)

The *a/c* *reaches* Mach 0.85 in cruise.



v. **REDUCE** (decrease, diminish, make smaller)

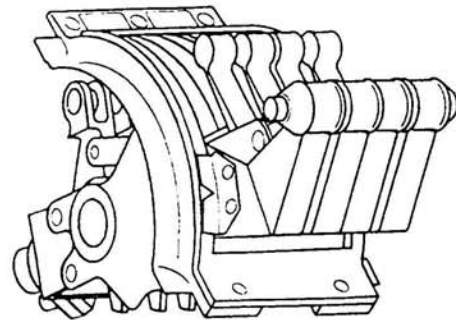
n. **REDUCTION**

p. **FROM, TO**

The thrust is *reduced* during descent.

v. **RETARD** (move throttle levers backwards, reduce power, ≠ advance)

The throttles are *retarded* at Flare.



v. **RETRACT** (move back into a housing or stowed position, ≠ extend)

n. **RETRACTION**

p. **INTO**

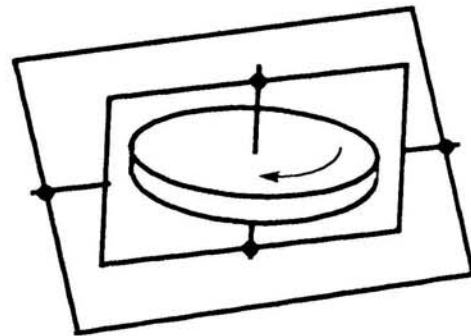
The crew *retracts* the Slats and Flaps after the initial climb.

v. **REVOLVE** (turn around an axis, rotate)

n. **REVOLUTION**

p. **AROUND, ABOUT, ON, AT**

The gyros *revolve* at a constant speed.



v. **ROUTE** (lay out/install wiring, cables, piping, etc.)

n. **ROUTING**

p. **ALONG, IN, UNDER, OVER, THROUGH**

The control cables are *routed* under the cabin floor.

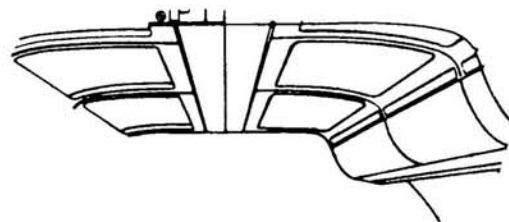


v. **RUN** (1. operate [machine, engine, company]; 2. extend in space)

n. **RUNNING**

The APU is *running* normally.

The fluorescent lights *run* along the ceiling.



- v. **SEND (dispatch, transmit)**
 p. **TO, FROM, TOWARDS, BY**

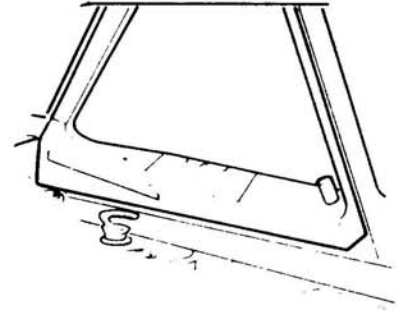
The transmitter *sends* a signal every 350 ms.

- v. **SHRINK (contract, ≠ expand)**
 n. **SHRINKAGE**

Once mounted, cooling enables the part to *shrink* to a tight fit.

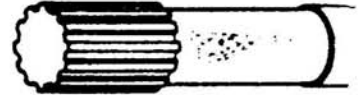
- v. **SLIDE (move linearly along a surface)**
 n. **SLIDE, ESCAPE SLIDE**
 p. **ALONG, TO, FROM, IN**

There is a *sliding* window on each side of the flight deck.



- v. **SPIN (rotate, revolve quickly)**
 n. **SPINNER**

The core *spins* at 10,500 R.P.M.



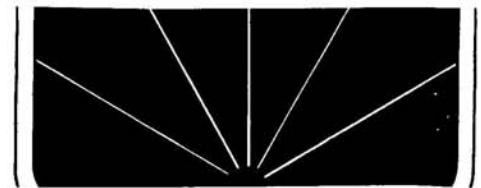
- v. **SPREAD (open or expand, extend, grow)**
 n. **SPREAD**
 p. **ALONG, THROUGHOUT, UP, DOWN**

The surface corrosion is *spreading* along the shaft.

- v. **SURROUND (enclose, envelop, be around, encircle)**
 A doubler *surrounds* the fuselage.

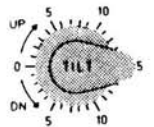
- v. **SWEEP (move from side to side)**
 n. **SWEEP**
 p. **ACROSS, SIDE TO SIDE**

The radar *sweeps* a 90° angle.



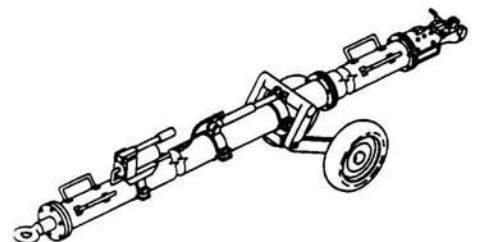
- v. **TILT (incline)**
 n. **TILT**
 p. **UP, DOWN, FORWARDS, BACKWARDS, SIDEWAYS**

The radar antenna can be *tilted* up or down.



- v. **TOW (pull, haul, draw)**
 n. **TOWBAR, TOWING**

Tugs *tow* the aircraft from the hangar to the apron.



v. **TRANSLATE** (move sideways, shift)

n. **TRANSLATION**

p. **FROM, TO**

At low speed the position of the drive rod is *translated*.

v. **TRANSMIT** (send by radio, etc.)

n. **TRANSMISSION, TRANSMITTER**

p. **TO, THROUGH, VIA**

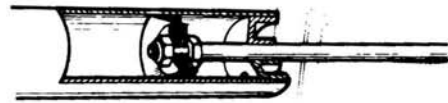
VHF messages are *transmitted* through two antennas on the upper and lower fuselage.

v. **TRAVEL** (move, be displaced)

n. **TRAVEL**

p. **FROM, TO**

The piston rod *travels* 40 cm.



v. **TURN** (move around an axis, rotate)

n. **TURN**

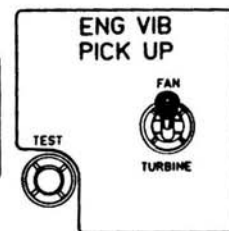
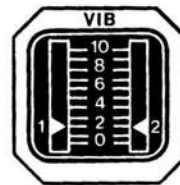
p. **AROUND, ABOUT, CLOCKWISE, COUNTERCLOCKWISE**

Turning the crank handle extends the gear in an emergency.

v. **VIBRATE** (oscillate, move quickly from side to side)

n. **VIBRATION**

If the engine *vibrates*, the vibration is detected by a pick-up.



v. **WIND** (move around an object, coil a cable, etc.)

n. **WINDING**

p. **AROUND**

Wind the cable around the drum.

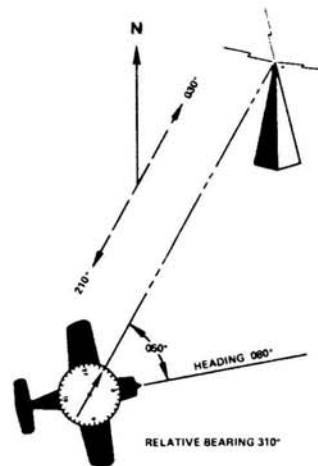
3 WORDS AND EXPRESSIONS OF MOVEMENT

(See also Module B: LOCATION.)

RELATIVE MOVEMENT

with respect to
in relation to

The aircraft's position is computed *with respect to* / *in relation to* navigation beacons.



ROTATING MOVEMENT

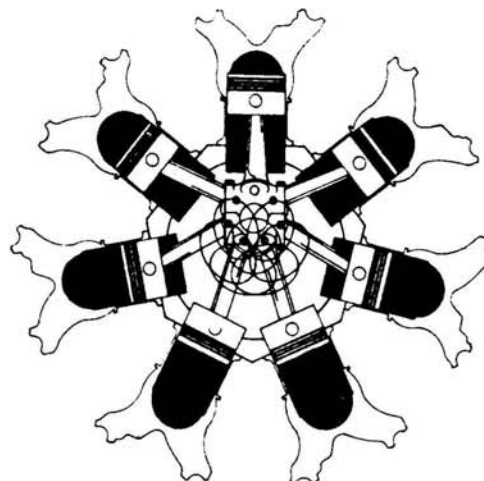
about
around
clockwise
counterclockwise
on

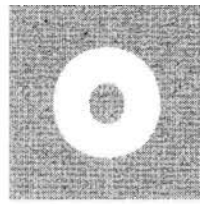
A gyro rotates *about* its axis.
The air circulates *around* the cabin.
Rotate the handle six turns *clockwise*.
Turn *counterclockwise* to loosen.
The blades rotate *on* a shaft.

OSCILLATING MOVEMENT

alternating
side to side
reciprocating

alternating current
The radar sweeps from *side to side*.
The piston engine has a *reciprocating* movement.





MOVEMENT

EXERCISES

1 Complete each of these sentences with one of the 50 verbs in the notes. Look at the example:

The hydraulic fluid *flows* through a check valve.


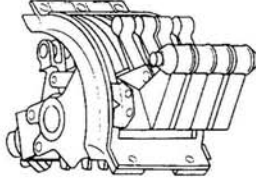

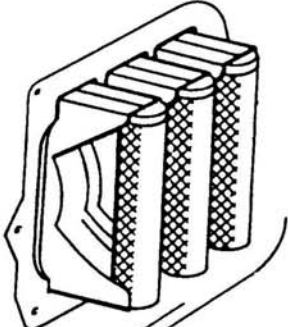
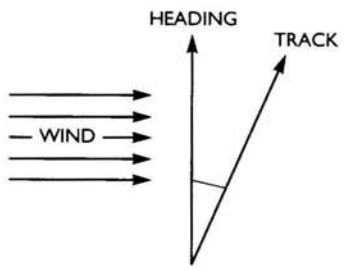

1. the safety pin on the nose gear.
2. A protective cover the instrument.
3. It takes eight man-hours to the unit.
4. The anti-shimmy prevents the nose gear from
5. When one pump fails, the pressure
6. Any leaking toilet fluid along the side of the fuselage.
7. The window in a groove or track.
8. To increase engine thrust, the throttle levers.
9. the guard to use the emergency switch.
10. Metal in hot weather.
11. The APU should 95% N1 in 25 seconds.
12. The rudder 30° left and right.
13. The windshield wipers the windshield.
14. Any new data is in the computer.
15. The flap carriages along the tracks.
16. The downlink any messages to the ground.
17. The crew seats can be up and down.
18. On a relay, the wire is around the core.
19. You can the pallets on the ball mat.
20. The wheels more slowly on a wet surface.

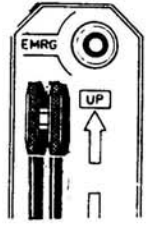
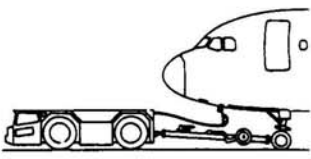



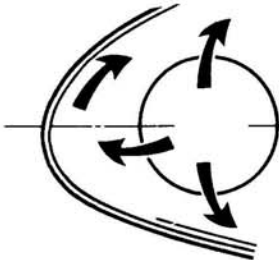
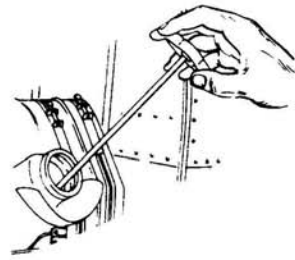
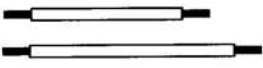



21. The aircraft is onto its downwind leg.
22. The flaps are 25° for landing.
23. The cracks are at an alarming rate.
24. Hydraulic lines are down the gear leg.
25. the aircraft on the painted line.
26. If the filter is clogged, the flow it.
27. Cold weather causes metal to
28. speed from 350 to 280 knots.
29. After a hung start, the engine is
30. If the cargo door is not locked, indicators from the bottom of the door.

2

Find the verb of movement which refers to each item in the illustrations below. The first and last letters are marked. The first word has been completed for you.

 <p>1. DeflecT</p>	 <p>2. R _ _ _ _ D</p>	 <p>3. T _ _ T</p>
 <p>4. W _ _ D</p>	 <p>5. D _ _ _ T</p>	 <p>6. S _ _ _ P</p>

 <p>7. R _ _ _ _ T</p>	 <p>8. T _ W</p>	 <p>9. E _ _ _ D</p>
 <p>10. S _ _ _ E</p>	 <p>11. D _ _ P</p>	 <p>12. F _ _ W</p>
 <p>13. I _ _ _ T</p>	 <p>14. L _ _ _ _ N</p>	 <p>15. P _ _ _ _ E</p>



ACTIVE AND PASSIVE

NOTES

In **Module E** we saw basic sentence structures:

SUBJECT	VERB	OBJECT	MEANS	PURPOSE
The hot air	supplies	the slats	through the manifold	for leading edge de-icing.

But in the **Description and Operation** sections of many documents the **passive** is much used. The **object and subject** are inverted and the **past participle of the verb** is used with the verb **to be**:

SUBJECT	VERB	AGENT	MEANS	PURPOSE
The slats	are supplied	with hot air	through the manifold	for leading edge de-icing.

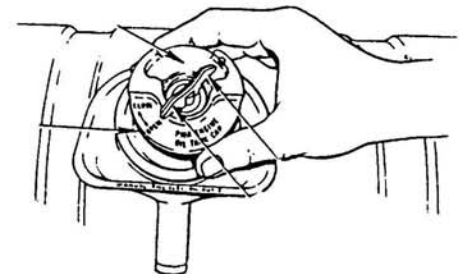
Passive sentences are impersonal. There is no mention of the person who does the action. **Only the action or function is indicated:**

The mechanic checks the oil level. (*active*)

The oil level is checked. (*passive*)

The crew sets the cabin altitude. (*active*)

The cabin altitude is set. (*passive*)



The **PASSIVE** is also used with **can, must, shall, may, need, should, could, etc.** (see **Module M**):

The gear doors *can be opened* from the ground.

The circuit *must be connected* to the bus.

The flight controls *shall be cycled* before take-off.

Both wheels *need not be changed* if the damage to the tire is not serious.
The oil level *should be replenished* after each flight.
The aircraft *could be towed* from the main gear.

Here are some more examples of active sentences and the equivalent passive forms:

Trim Indicators provide indication of stabilizer position.
Indication of stabilizer position is provided by trim indicators.
Stabilizer position is indicated by trim indicators.

You must operate the Aileron Trim switches together.
The Aileron Trim switches must be operated together.

Secure the panel.
The panel must be secured.

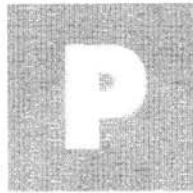
A target operates the proximity sensor.
The proximity sensor is operated by a target.

The passive verb can be followed by:

WORD	EXAMPLE
<i>by</i> (the agent, the "doer")	<i>moved by</i> the servo
<i>with</i> (the substance)	<i>supplied with</i> air
<i>from</i> (the origin)	<i>controlled from</i> the flight deck
<i>to</i> (the objective)	<i>advanced to</i> increase thrust
<i>to</i> (movement, connection)	<i>attached to</i> the bulkhead

(See also Module B: LOCATION.)

Note: In Simplified English, the use of the Passive is limited as much as possible and not used in Procedures. For more information see Module X.



ACTIVE AND PASSIVE

EXERCISES

1 Transform the active sentences (marked **A**) into passive ones and the passive sentences (marked **P**) into active ones. The words in brackets () are not necessary in the passive. Look at the examples:

The fuel flow controls the acceleration of the turbine rotor. (A)

The acceleration of the turbine rotor is controlled by the fuel flow.

The elevator control quadrant is connected to the elevator power control by a linkage. (P)

A linkage connects the elevator control quadrant to the elevator power control.

1. Fan air flow is controlled by the Fan Air Valve. (P)

.....

2. (A wire) connects the unit to the ground. (A)

.....

3. (The engineer) must inspect the air intakes for any damage. (A)

.....

4. The control cables are activated by the outboard control valve quadrant. (P)

.....

5. (The pilot) may display the weather image on the ND. (A)

.....

6. The panel is maintained in place with three screws. (P)

.....

7. (You) must set the master switch to OFF (A)

.....

8. (A device) monitors voltage and frequency. (A)

.....

9. The servos are powered by three hydraulic systems. (P)

10. A stop limits drum travel. (A)

11. The EPR activates the take-off warning horn. (A)

12. The light is illuminated by an overtemperature. (P)

13. (You) can adjust the rudder pedals with a screw. (A)

14. The system is re-aligned by the RESET push-button. (P)

15. (The pilot) can rotate the trim wheel 3 turns in either direction. (A)

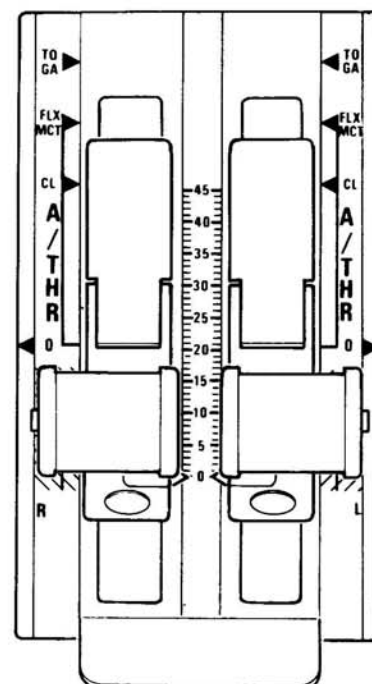
16. (The system) provides air leak detection on the hot air ducts. (A)

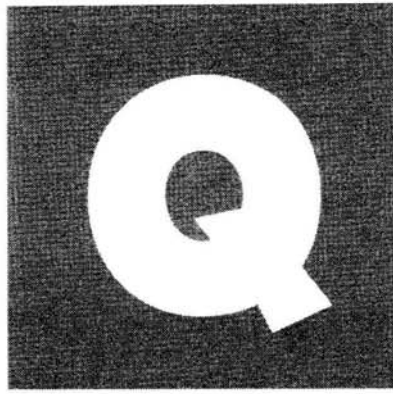
17. Smoke is detected by an optical sensor. (P)

18. (You) must safety and placard the thrust levers. (A)

19. Static electricity is transmitted by bonding jumpers. (P)

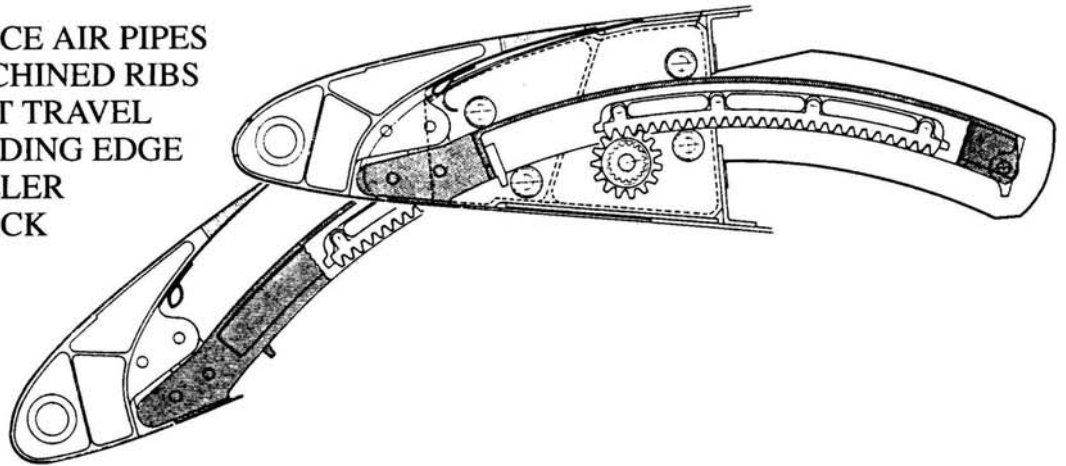
20. The C/B must be safetied. (P)





PROCESSES

DE-ICE AIR PIPES
MACHINED RIBS
SLAT TRAVEL
LEADING EDGE
ROLLER
TRACK



NOTES

A process is a sequence of actions, movements, etc. Let us look at some of the ways in which these actions can be linked (connected).

These words / expressions introduce the next step in the sequence. (See also Module K: CONJUNCTIONS.)

1 CAUSE AND EFFECT

RESULTING IN (+ -ing or substantive)

The ground allows CR5 to be forward-biased, *resulting in* a reduced voltage appearing at the Cathode of CR6.

THEREBY (+ -ing or substantive)

The reduced voltage will not allow Zener diode CR2 to conduct, *thereby* removing all the AC voltage from the first and second amplifiers.

TO RESULT IN, TO CAUSE

A shorted resistor *results in* increased gain in the amplifier and *causes* an offset in the on-course readout.

SO (+ -ing)

A voltage divider provides the voltages necessary to forward bias CR21, *so* allowing the detector to operate in the linear portion of the characteristic curve of the diode.

THEN (+ present simple or future)

If the difference network in the monitor detects a difference in the two signal inputs, *then* the carrier output will rise to an amplitude sufficient to close gate N° 1.

THUS (+ -ing)

Any voltage deviation of more than 0.2 volts causes a signal to be sent to the sensor unit, *thus* triggering a warning.

PRESENT PARTICIPLE (+ -ing)

The shorted secondary receives an induced voltage by the action of the alternating* armature flux, and the resulting* current flowing** through the turns of the compensating* winding establishes the opposing* magnetomotive force, *neutralizing**** the armature reactance.

N.B. The present participle is used in three different ways in this sentence:

* a direct qualifier of a substantive or noun, as in "Landing Gear";

** to describe an action in progress, i.e. "a current which flows through";

*** in the sense of "thus" or "so", introducing a consequence.

IN TURN

The decrease in current through Q22 results in the base-voltage of Q221 rising, which *in turn* decreases the current through Q221.

2 SEQUENCE IN TIME

WHEN

When K24 is energized, 27.5 VD is available at pin X of P2001.

ONCE, AS SOON AS (immediately, the moment something happens)

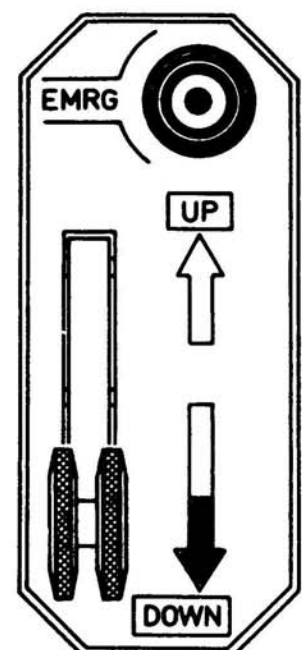
Once the 2800 Hz signal passes through the flag logic circuit, it is amplified *as soon as* the other conditions are fulfilled.

FIRST, SECONDLY, THEN, AFTERWARDS, FINALLY

First the control lever is set to DOWN.

Secondly the First Officer checks that the amber lights illuminate. *Then* the doors open.

Afterwards the gears extend and *finally* the main doors close again.





FUNCTIONS

NOTES

(See also Module J: PURPOSE.)

In this module, there are some expressions and words related to 12 common functions: **QUANTITY, DURATION, HAPPENING, INDICATING, INFORMING, INSPECTING, COMPOSITION, COMPUTING, MAKING POSSIBLE, COMPLIANCE, PREVENTION, and EQUIPPING.**

1 QUANTITY

A	A or B	A + B	A or B or C or D
<i>one</i>	<i>either ... or</i>	<i>both</i>	<i>any</i>

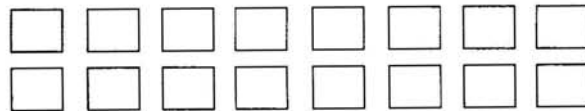
A+B+C	A, B, C, D	A+B+C+D (collectively)	A+B+C+D (individually)
<i>some</i>	<i>none</i>	<i>all</i>	<i>each</i>



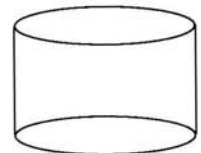
a few / several



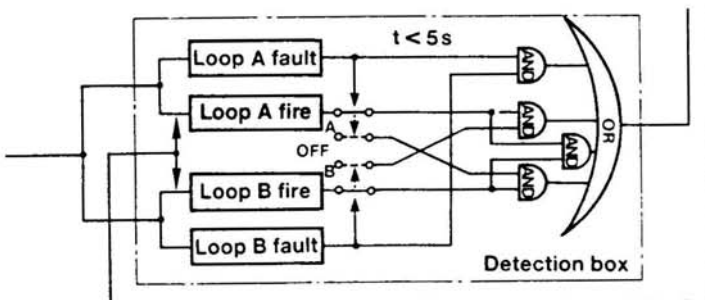
a little



many (How many?)



much (How much?)



In an *and-gate* *both* inputs must equal 1.
 In an *or-gate* *either* input may equal 1.
Each input is connected to the timer.
All the inputs are connected to the timer.
a few cans of oil/*a little* oil

2 DURATION

TO TAKE, TO LAST

A wheel change *takes* 50 minutes.

The flight *lasts* 2 hours

FOR (+ a period)

They will test the equipment *for* six hours. (future)

The plane has been grounded *for* three days. (past to present)

The plane was grounded *for* a week. (past to past)

SINCE (+ a starting point in the past)

The plane has been grounded *since* Tuesday. (past to present)

AGO (to indicate the starting point in the past)

The plane was grounded three days *ago*.

(i.e. The plane was grounded on Tuesday.)

FROM ... TO (to delimit a duration)

The unit was on the test bench *from* 8 a.m. *to* 4 p.m.

UNTIL (to indicate the end of a period)

Troubleshooting lasts *until* the failure is identified.

N.B. During = a moment inside a larger period. It is usually followed by a “vague” period like “the day”, “the night”, “the flight”, “the overhaul”, “the test” etc.

The failure occurred *during* climb.

ELAPSED TIME (time from the initial moment of a process – engine start, take-off run, etc.)

When the engine N1 reached 98%, the *time elapsed* was 55 seconds.

3 HAPPENING

TO OCCUR, TO TAKE PLACE, TO HAPPEN, TO RECUR (to occur again)

Autopilot disengagement *took place* at FL290.

Disengagement *recurred* immediately after the pilot reset the engagement lever.

Generator short circuits *happen* in wet weather.



IN THE EVENT OF, IN CASE OF (to introduce the circumstances of an event [= “if there is”])

In the event of a hydraulic system failure, the P.T.U. is used.

The oxygen masks drop *in case of* cabin depressurization.

4 INDICATING

DISPLAY, INDICATE, READ, READING, SCALE

Rate of Climb is *displayed* on the V.S.I.

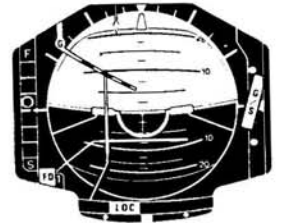
The V.S.I. *indicates* the Rate of Climb.

Rate of Climb is *read* on the V.S.I.

There is a Glide Slope *display* on the A.D.I.

There is a Glide Slope *scale* on the A.D.I.

There is a Glide Slope *reading* on the A.D.I.



5 INFORMING

NOTIFY, INFORM, ADVISE, REPORT, TELL

The Operations *notify* the Flight Crew *of* any changes in flight plan, meteorological conditions etc.

The NOTOC *informs* the crew *of* any restricted or dangerous cargo.

The EFIS *advises* the crew *of* the status of the aircraft.

The ground engineer *reports* any anomalies *to* the flight crew.

The coordinator *tells* the Captain when the passengers are ready to board.

6 INSPECTING

EXAMINE, INSPECT (both suggesting an overall viewing of a part or assembly for its general condition)

Examine/Inspect the condition of the external lighting.

CHECK (when you verify a particular value, etc.)

Check oil level.

Master Lever at ON ... *Checked*.

INVESTIGATE (a methodical research into the causes of a malfunction)

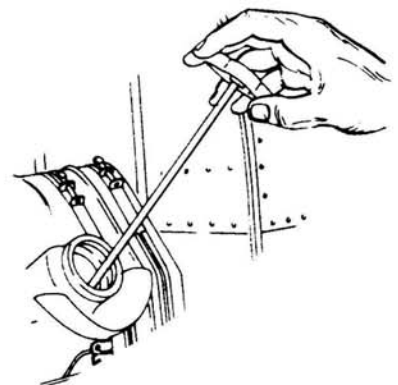
Remove the transponder and *investigate* in laboratory.

SCAN (to follow a predetermined route in order to check a series of values)

The First Officer *scans* the system panels. (re. *scanning pattern*)

TEST (to perform a sequence of actions to be sure something is operative)

Test the Fire Detection Loops.



7 COMPOSITION

COMPRISE, CONSIST OF

The assembly *comprises* G, H, I, J, K.

G	H	I	J	K
---	---	---	---	---

The assembly *consists of* G, H, I, J, K.

INCLUDE

The assembly *includes* M N O.

L	M	N	O	P
---	---	---	---	---

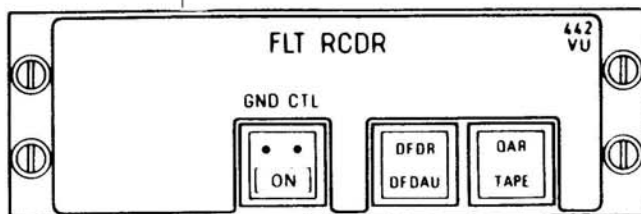
BE MADE UP OF (physical parts)

The gear *is made up of* a gear leg, a shock absorber, a boggie, two axles, four wheels etc.

BE BROKEN DOWN INTO (conceptual or organizational parts)

The Engineering Division *is broken down into* Maintenance, Overhaul, Material and Design.

8 COMPUTING



+	-	X	÷
<i>add</i>	<i>subtract</i>	<i>multiply</i>	<i>divide</i>
plus	minus	times	divided by

COUNT (add, record numbers)

n. (n. = noun) **COUNTER**

The Data Recorder *counts* the number of cycles.

COMPUTE, RECKON (calculate, perform complex operations using precise data)

n. **COMPUTER, DEAD RECKONING NAVIGATION**

The Maintenance Recorder *computes* the MTBF (Mean Time Between Failures).

The pilot can *reckon* his position without Nav aids.

ESTIMATE, EVALUATE, ASSESS (a projected calculation about something that you cannot measure directly or very precisely)

n. **ESTIMATION, EVALUATION, ASSESSMENT**

You can *estimate* the time of arrival. (ETA)

The number of manhours can be *assessed*.

9 MAKING POSSIBLE

Several verbs are used to express making a function or action sure or possible. They are often interchangeable, but the structure of the sentence may change.

PROVIDE, ENSURE, ASSURE (give, furnish, make sure)

The rocking lever *provides/ensures/assures* electrical pitch trim control.

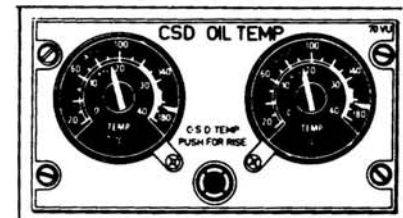
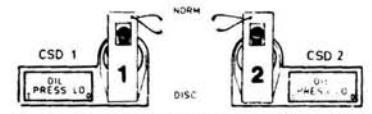
The CSD *provides/ensures/assures* constant generator speed.



PERMIT, ALLOW, ENABLE (make possible)

The rocking lever *permits/allows/enables* the pilot to control the pitch trim electrically.

The CSD *permits/allows/enables* the generator to rotate at a constant speed.



10 COMPLIANCE

When the Authorities issue an Airworthiness Directive (AD) or a manufacturer a Service Bulletin (SB) etc., the operator (i.e. the airline or carrier) must respect it.

He *enforces* or *obeys* the Directive. He *complies with* or *conforms to* the instructions.

He *applies* or *embodies* (i.e. to incorporate) the Service Bulletin on the aircraft by *carrying out* or *performing* the modifications.

11 PREVENTION

AVOID (keep away, go around, bypass, dispense with)

n. AVOIDANCE

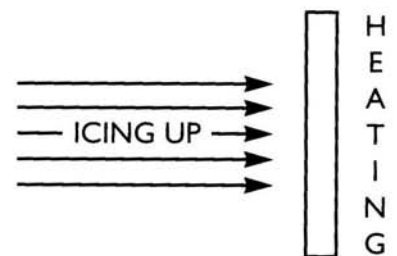
The center tank *avoids* making a “tech stop” for refueling on long flights.



PREVENT (stop something from happening)

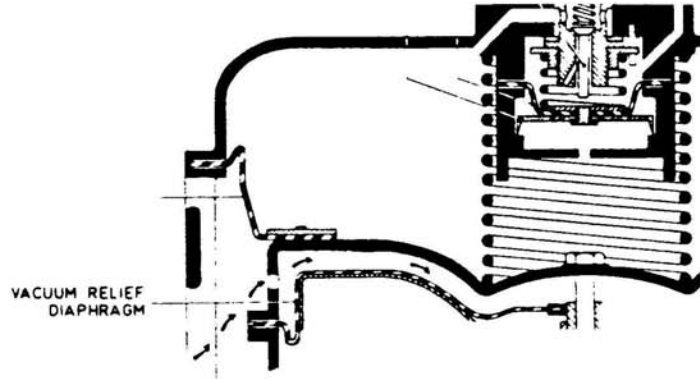
n. PREVENTION

Probe heating *prevents* the probes from icing up.



12 EQUIPPING

These verbs indicate that a component is part of an assembly.



EQUIP, FIT, PROVIDE, MOUNT

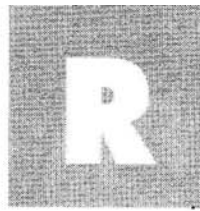
The Outflow Valve is *equipped** with a Vacuum Relief Diaphragm.

The Outflow Valve is *provided with* a Vacuum Relief Diaphragm.

The Outflow Valve is *fitted** with a Vacuum Relief Diaphragm.

A Vacuum Relief Diaphragm is *mounted on* the Outflow Valve.

* Double the P and the T before adding -ed.



FUNCTIONS

EXERCISES

1 Complete each sentence with one of the words in the Notes section of this module. Often there is more than one possibility. For example:

The LIGHTS control panel is PROVIDED/FITTED/EQUIPPED with a Dimming Knob.

1. the ground power phase sequence.
2. The hydraulic system of 3 independent systems.
3. The crew must their trip fuel.
4. the engines and APU have fire detection loops.
5. Turnaround 45 minutes.
6. The secondary flight controls the spoilers.
7. Birdstrikes usually during take-off or approach.
8. The Mode Annunciator the crew of the autopilot modes engaged.
9. A valve on the wing undersurface the tanks to be drained.
10. The circuit is before each flight.
11. In the of computer failure, the standby instruments are used.
12. The ADI the aircraft attitude.
13. How fuel do you need?
14. The anti-skid system the wheels from locking.
15. The Audio Control Panel is on the center pedestal.
16. The indicator 400 ft/min.
17. The radar the airspace in front of the airplane.
18. Quiet hours are 23.00 06.30.

19. channel 1 or channel 2 may lead.
20. The is graduated every 10 knots.
21. The Flight Engineer the ground crew of any failures.
22. The modification shall be by January 31st.
23. pilot has an oxygen mask.
24. the tires for cuts, wear and general condition.
25. the night, the main gear wheels are chocked.
26. The illumination of the caption light an overheat.
27. E.T.D.. Time of Departure.
28. The box only a few minutes to warm up.
29. The Fire Handle is with a built-in warning light.
30. The instinctive disconnect push-buttons the pilot to take over.



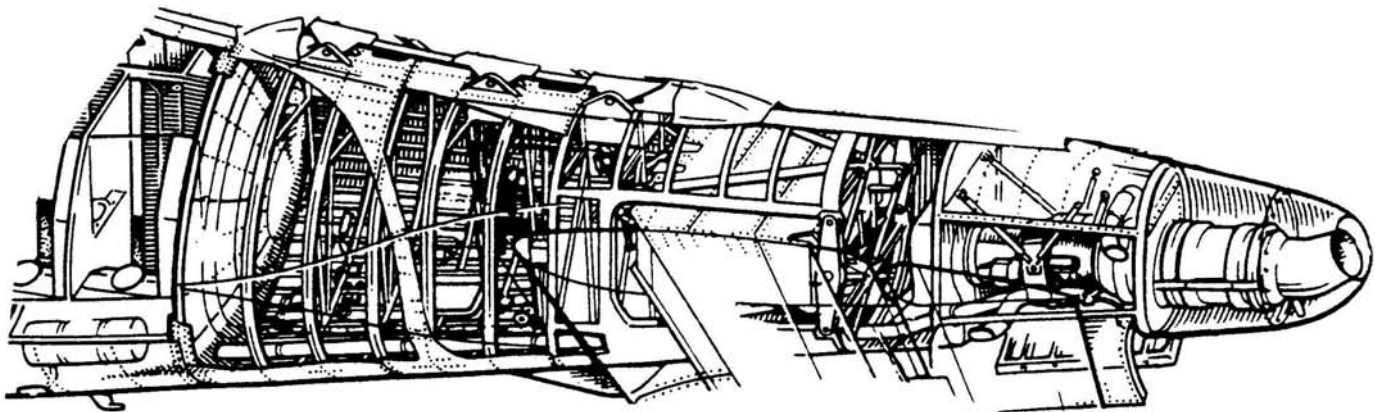
STATES, FAILURES, DAMAGE

FRAMES

PRESSURE
BULKHEAD

STRINGERS

DOUBLERS



DRAIN MAST

ACCESS
DOOR

EXHAUST

LAVATORY

A.P.U. MOUNTS

TRIMMABLE
HORIZONTAL
STABILIZER

TAIL CONE

NOTES: STATES

State or action completed:

COMPONENT	TO BE	PAST PARTICIPLE/ADJECTIVE
The circuit	is	closed.
The slats	are	extended.
The autopilot	is	armed.
The tank	is	full. (<i>adj.</i>)

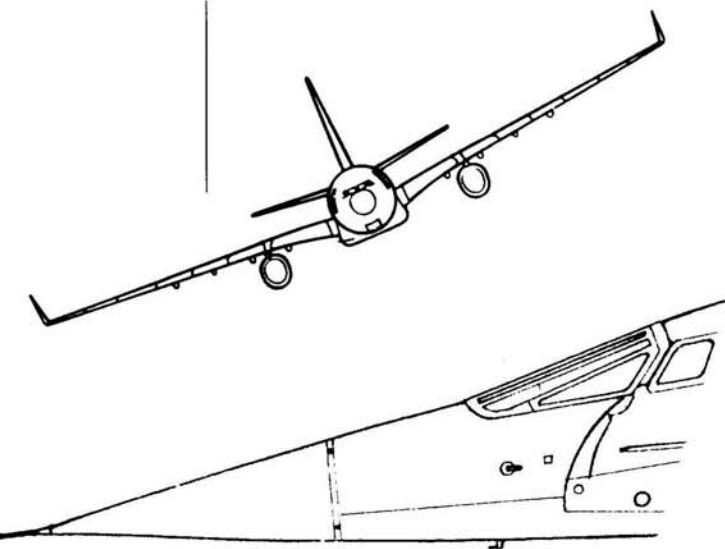
Action in progress:

COMPONENT	TO BE	PRESENT PARTICIPLE/ADJECTIVE
The light	is	flashing.
The doors	are	extending.

In Technical English, the present participle form is not frequent.

Here are some common states or conditions grouped in twelve general categories.

1 AIRCRAFT



BANKED (inclined laterally or tilted)

The *a/c* is *banked* during a turn.

CLEAN (with all secondary flight controls and gear retracted)

NOSE-DOWN, NOSE-UP (down or up pitch attitude of the aircraft or the stabilizer)

The *nose-up* attitude is read on the ADI scale.

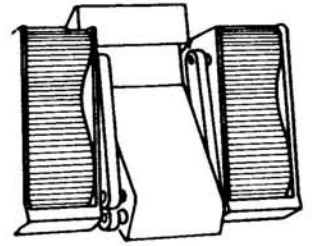
STEADY (regular, continuous, without change in configuration or velocity)

Cruise is *steady*, level flight.

2 BRAKES

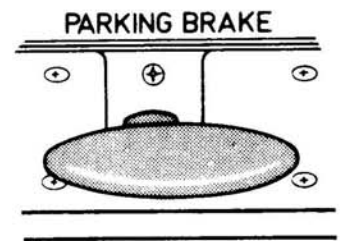
APPLIED, SET, ON (pressure on the brakes, operating, pedals pushed)

The brakes are *applied* during roll-out.
Parking brake *set*.



RELEASED (pressure removed from brakes)

The parking brake is *released* for pushback.



HOT (high temperature)

If the brakes are *hot* the brake fans are switched on or the firemen spray them with water.

3 ELECTRICAL CIRCUITS, NETWORKS

CLOSED (electrical continuity, the current flows)

When the microswitch is *closed* a signal is sent to the landing gear computer.



COLD (not energized, without electrical power)

When the engineer arrives the *a/c* network is *cold*.

EARTHED, GROUNDED (connected to the aircraft earth or ground)

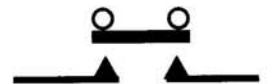


ENERGIZED, HOT (the circuit, network or a/c is supplied with electrical power, ≠ COLD, DE-ENERGIZED)

The circuit is *energized* by the ON/OFF push-button.

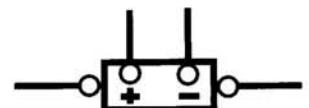
OPEN (no electrical continuity for a circuit, contact, switch or relay)

The switch is *open* and the circuit de-energized.



SHORTED, SHORT-CIRCUITED (accidental contact between two points on a circuit)

The circuit may be *shorted* by faulty insulation.



SHUNTED (current following an alternative path)

The rheostat controls the amount of current *shunted*.

4 CIRCUIT BREAKERS, SELECTORS

PULLED (circuit opened manually)



SAFETIED (breaker maintained in open position by a clip; also used for any other control, switch, lever etc.)

Circuit Breaker 16 xy shall be pulled and *safetied* before any work is performed on the system.

SET (1. \neq **PULLED**: Circuit Breaker in closed position, 2. Selector or switch positioned, placed)

The switch is *set* at ON.

TRIPPED (breaker opened automatically or manually)

In the event of overvoltage the C/B is *tripped*.

5 DATA, COMPUTERS

BACKED UP (supported by an alternative, redundant system which can take over)

Channel 1 is always *backed up* by Channel 2.

CLEARED (information or display removed, erased, deleted)

The screen is *cleared* automatically by the next operation.

DEBUGGED (problems, malfunctions removed)

Each unit is *debugged* before acceptance testing.

ISSUED (given, published, distributed)

The latest status is *issued* by the recorder.

ON-LINE, OFF-LINE (directly linked to the mainframe computer, or not)

These operations are performed *off-line* and integrated later.

SAFEGUARDED (protected from memory loss)

Each step is *safeguarded* against micro power cuts and faulty operations.

STORED, MEMORIZED (maintained in memory)

UPDATED (modified to conform to the most recent status)

The values have been *updated* in issue 5.

UPGRADED (modified to a better or higher level)

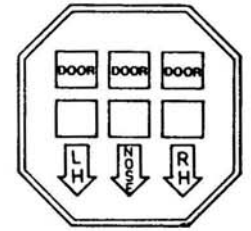
In the *upgraded* mode, there are more functionalities.



6 DOORS, VALVES, ETC.

CLOSED, SHUT (\neq OPEN)

All doors must be *shut* before departure.

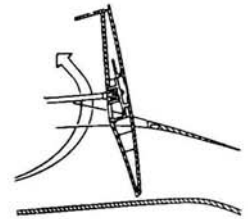


CLOSING, OPENING, IN TRANSIT (a valve or door in movement)

The amber lights indicate that the gear doors are *opening* or *closing*.

DEPLOYED (extended, unfolded, out)

The thrust reverser doors are *deployed* during landing roll-out.



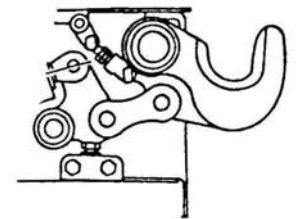
FLUSH (level with the adjacent structure, forming a continuous profile)

When the cargo doors are locked, the indicators must be *flush* with the skin.



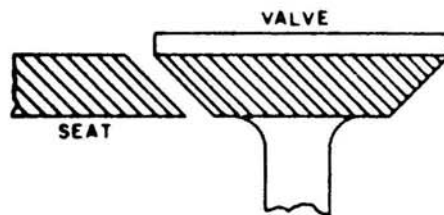
LATCHED, LOCKED (fastened, secured, maintained in position)

The proximity switches sense that the doors are closed and *locked*.



LOCKED (when screw etc. has received final turn)

Check that clamp screws are tightened and *locked*.



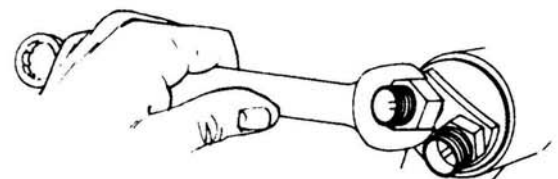
SEATED (for a valve, in contact with its seat or base)

STOWED (\neq deployed, enclosed in a compartment, etc. ready for use e.g. Landing Light, Escape Slide, Life Vest, Thrust Reverser Doors, etc.)

At 60 kt. the reverser doors are *stowed*.

TORQUED (tightened, screwed to a precise value)

The Bolts are *torqued* to 4,000 in-lbs.



7 FITTINGS

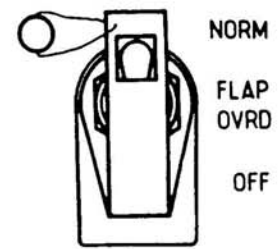
FASTENED, SECURED, TIGHT (fully or correctly attached, without movement)

Check that access panels are closed and *secured*.

LOOSE (\neq tight; also for a cable with insufficient tension)

SAFETIED (maintained fully secured with lockwire, etc.)

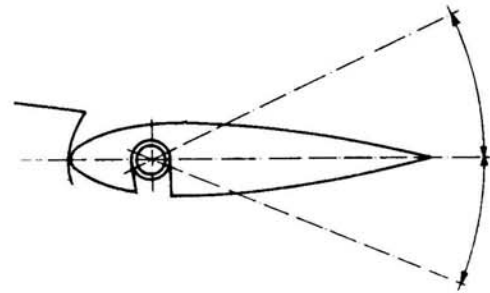
The master switch is *safetied*.



8 FLIGHT CONTROLS, LANDING GEAR

DEFLECTED (moved up or down, or from side to side, for control surfaces that move about an axis or neutral position [ailerons, elevators, rudder, trim])

The trimmable horizontal stabilizer is *deflected* 4° nose-up.



EXTENDED, DOWN, OUT (Flaps, Slats, Spoilers, Airbrakes, Landing Gear in operating position)

The spoilers are *extended* asymmetrically for turn coordination.

RETRACTED, UP, IN (\neq extended, down)

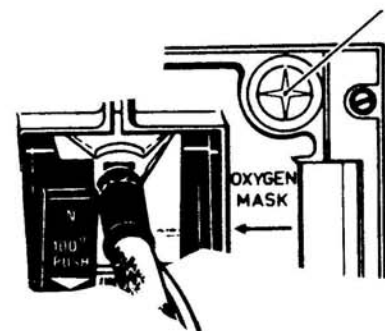
The flaps are *up* at VF.

TRIMMED (in an attitude where the aircraft is balanced for flight)

9 INDICATORS, WARNINGS

BLINKING (intermittent mechanical movement, like an eye)

The *blinking* of the fish-eye indicates oxygen flow.



CANCELLED (stopped, suppressed)

The audio warning is *cancelled* by this p.b.



CROSS-LINE

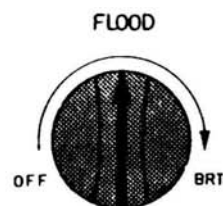




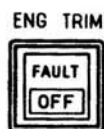
DELETED

MESSAGE

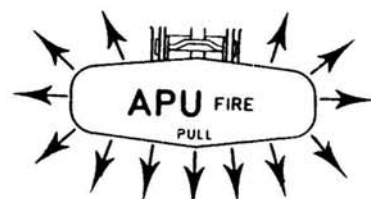
DIMMED (reduced brightness)



EXTINGUISHED (off, a light or indicator which is not activated)



FLASHING (intermittent illumination)
A *flashing* light attracts the crew's attention.



ILLUMINATED (on)
The Light is *illuminated*, the GPU can be cut in.



INHIBITED
The amber warnings are inhibited by the T/O *inhibit* p.b.



IN-LINE



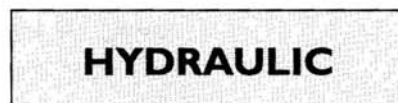
PULSING (regular change in intensity)



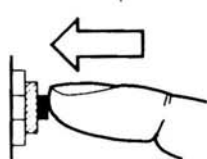
STRIPED/AMBER



REVERSE VIDEO (inscription against a different background)



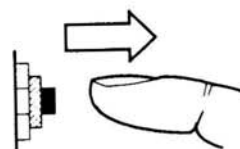
10 PUSH BUTTONS



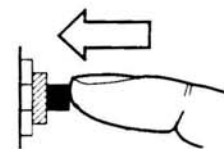
PRESSED



HELD
(pressed and maintained)



RELEASED
(pressure removed)



RESET
(pressed again)

11 SYSTEMS

ACTIVATED (made active, operational)

The fan is *activated* by an increase in temperature.

ARMED (ready to operate automatically, e.g. Autopilot, Ground Spoilers, Escape Slide, etc.)

DUMPED (dropped [fuel], unloaded [pump])

In the event of failure, the pump is *dumped*.

ENGAGED (operating)

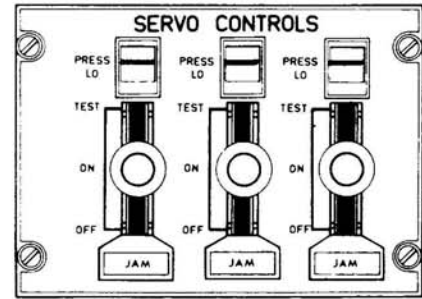
The Autopilot is *engaged* in Climb.

ISOLATED (to be separated, cut off, disconnected from the rest of the system)

In the event of jamming, the servo is *isolated*.

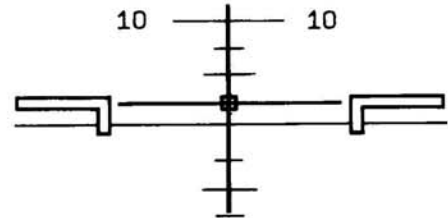
MONITORED (supervised, watched, followed)

The valve position is *monitored* by a feedback system.



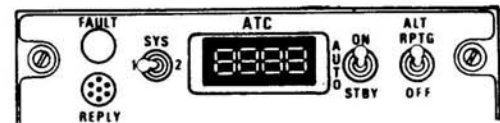
SLAVED TO (directly controlled by, dependent on)

The aircraft symbol is *slaved to* the computer output.

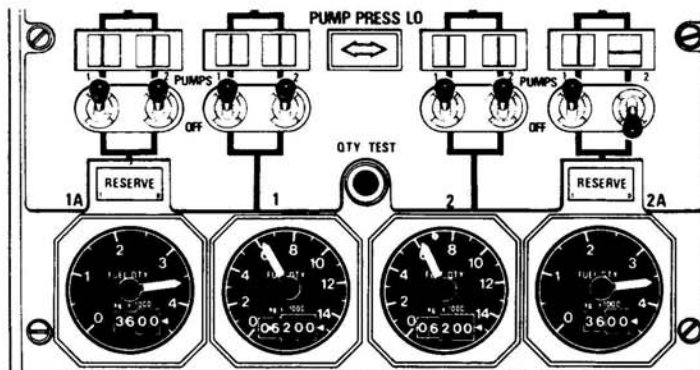


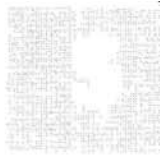
STANDBY (permanently ready to take over from the operating system in the event of failure or change, redundant)

At *STBY*, the ATC transponder is electrically supplied, but not operating.

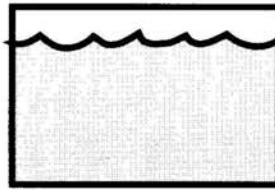


12 TANKS

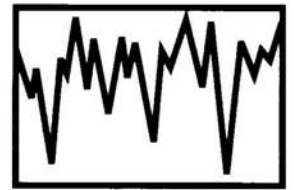




EMPTY



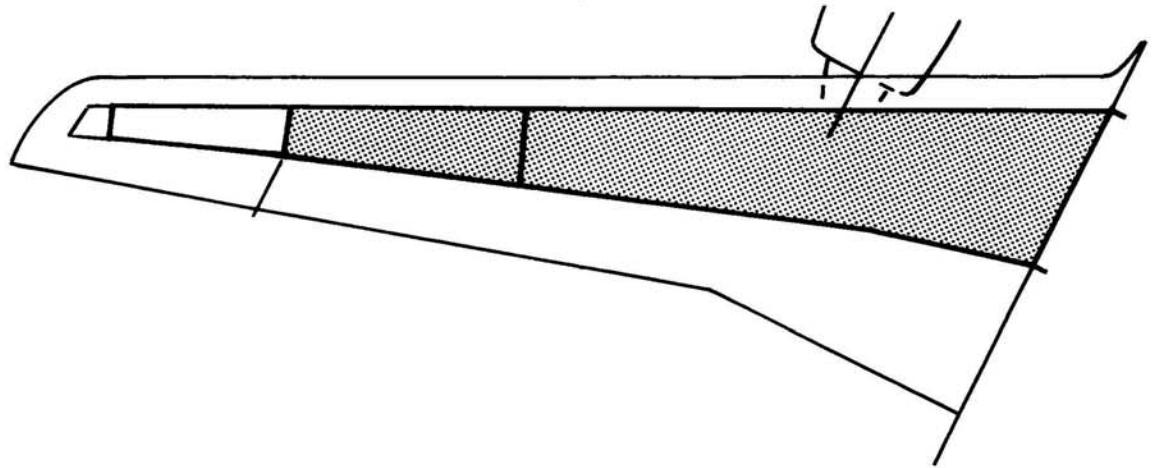
FULL

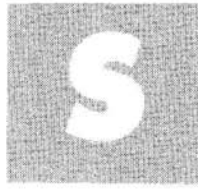


FROZEN

Water in the tanks may be *frozen* in cold weather.

VENTED (connected to the atmosphere)
The tanks are *vented* through the Vent Pipes.





STATES, FAILURES, DAMAGE

EXERCISES: STATES

1 Use these words to fill in the blanks in the 20 sentences below.

CLEARED	APPLIED	TORQUED	HOT
TRIPPED	EARTHED	SHUT	SET TO
FULL	OPEN	FLASHING	RELEASED
SAFETIED	CLEAN	HELD	IN TRANSIT
SECURED	ARMED	FLUSH	DEPLOYED

1. The wheel brake is upon an order from the anti-skid.
2. When the flaps are retracted the aircraft is
3. A short circuit can cause the circuit breaker to be
4. The main gear is with a locking sleeve during a night stop.
5. The Doors panel shows that all the doors are
6. The Amber magnetic indicator position shows that the valve is
7. The screw must be to 250 m.N.
8. The push-button is pressed and until the light illuminates.
9. With the G.P.U. connected, the aircraft is
10. The system is through a bonding strip.
11. the circuit breaker to the circuit.
12. The rotary selector is A + B.
13. The screen can be by pressing the CLR Key.
14. When the thrust reverse levers are pulled, the reverser doors are
15. The lockers are with a cotter pin.
16. The ground spoilers are before landing.
17. Replenish the oil level so that the tank is



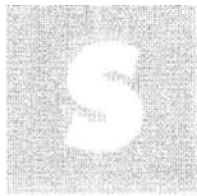
18. During the pre-flight check, the parking brake is
19. The warning lights may be steady or
20. Check that all the doors and surfaces are with the fuselage.

2

Find the terms which agree with these definitions. You have the number of letters in each word. Look at the example:

tightened to a precise value (7) *torqued*

1. the contrary of "deployed" (6)
2. OFF or ... (light) (12)
3. set to initial position (5)
4. computer operation protected (11)
5. improved, made better (8)
6. "earthed" or ... (8)
7. a synonym of "memorized" (6)
8. positive a/c pitch attitude (6)
9. the contrary of "tight" (5)
10. cut off from the system (8)



STATES, FAILURES, DAMAGE

NOTES: FAILURES, DAMAGE

In the second part of this module, you will find some common terms used to describe failure and damage, grouped in families of systems:

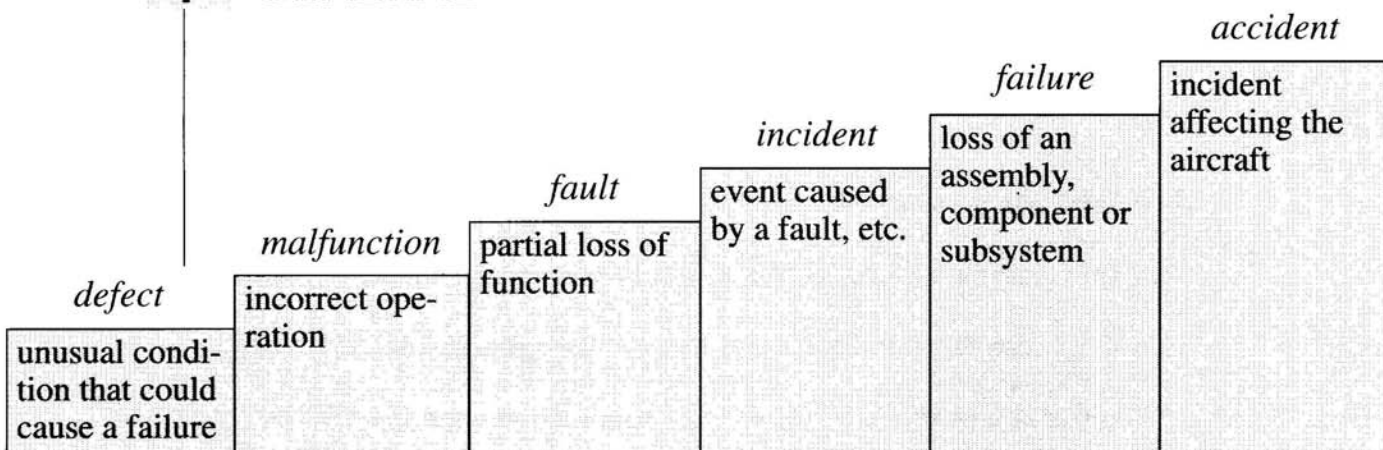
Structures used to express failures:

COMPONENT	TO BE	PAST PARTICIPLE
The leading edge	is	damaged.
The supports	are	cracked.

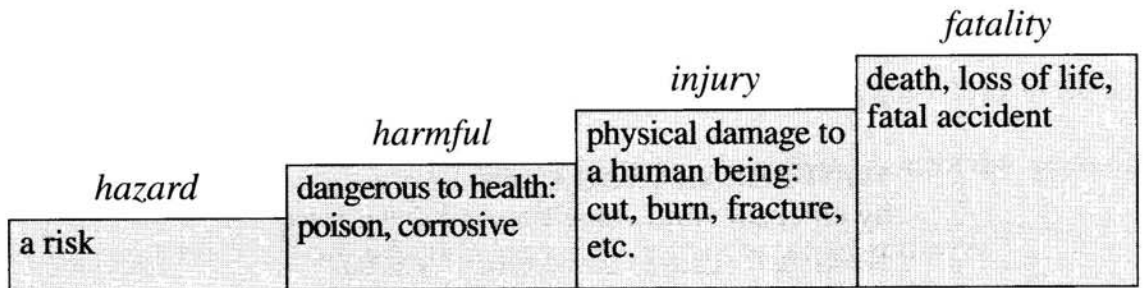
THERE IS/ARE	SUBSTANTIVE	COMPONENT
There is	damage	to/on the leading edge.
There are	cracks	on the supports.
There is	a cut	on the tire.

COMPONENT	TO HAVE	SUBSTANTIVE
The supports	have	cracks.
The tire	has	a cut.

1 GENERAL



Technical anomalies



Danger to human life

Minor defects

DOWNGRADING (loss of quality, drop in status, decrease in capacity)

If the upper modes are lost, the system is *downgraded*.

DRIFT, DEVIATION (departure from the planned course or planned value)

There is a 2% *drift* in reception.

INACCURACY (absence of precision)

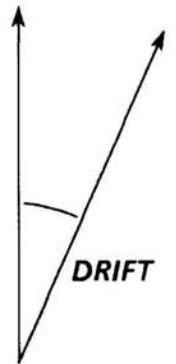
The *inaccuracy* of the radio bearing caused the a/c to be off course.

POOR (bad, insufficient)

VHF reception is very *poor*. You must repeat all the message.

OUT-OF-TOLERANCE (exceeding the permissible limits)

The clearance of 2.5 mm is *out-of-tolerance*. The tolerance is ± 1.5 mm.

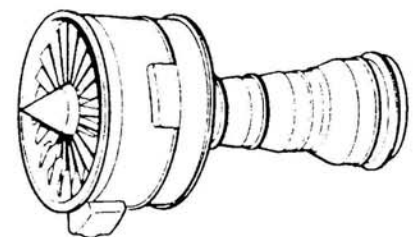


2 AERODYNAMICS, THERMODYNAMICS

BUFFETING (rapid turbulence)

INGESTION (bird, stone, object going into the engine)

There was a bird *ingestion* on engine N° 2 at 200 ft.



STALL (1. loss of aircraft lift; 2. loss of engine flux)

Stall may be caused by an excessive nose-up attitude at low speed.

SURGE (engine stall, resulting in violent vibrations and noise)

WET START, HUNG START (engine start with no “light off”, i.e. ignition; no flame is obtained, or insufficient speed)

After a *wet start*, cranking is performed.

WINDSHEAR (violent cutting movement of the wind, stress on a/c caused by different wind velocities and directions)

Windshear caused the loss of Flight 66.

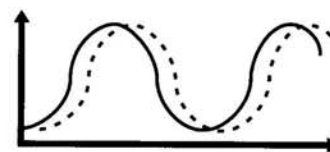
3 ELECTRICAL

NOISE (unwanted signal or frequency disturbing transmission or output)

OUT-OF-PHASE (not in phase)

OVERVOLTAGE (excessive voltage value, ≠ **UNDERVOLTAGE**)

126 VAC is *overvoltage* for a 115 VAC system.



SHORT, SHORT CIRCUIT (unwanted contact between two wires, terminals, etc.)

TRANSIENTS (a short oscillation caused by a sudden change in voltage or current)

4 FLUIDS

CONTAMINATION (undesired materials mixed with substance)

There is detergent *contamination* in the potable water system.

LEAK (an accidental hole or crack through which fluid escapes)

There is a *leak* on the hot air duct.

LEAKAGE

(the fluid that passes through the leak, the phenomenon of leaking)

OVERFILL (filled too much, fill above the maximum level)

OVERFLOW (the flow of fluid caused by an overflow)

OVERHEAT (be too hot, be dangerously hot)

Brake *overheat* triggers the BRAKES HOT light.

**BRAKES
HOT**

OVERPRESSURE

(excessive pressure, too high a pressure)

The HI PRESS light illuminates in the event of *overpressure*...

OVERTEMPERATURE (high temperature but less high than “overheat”)

SEEPAGE (n), **SEEP** (v) (gradual leakage causing a film or thin layer of fluid.)

SPILLAGE (n), **SPILL** (v) (result of leakage, fluid falling onto the ground, etc., = overflow)

If the automatic shut-off does not operate there may be a fuel *spillage*.

STAIN (dirty mark)

The lower fuselage often has blue *stains* made by toilet servicing fluid.

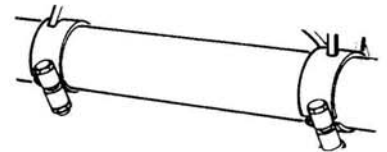
SURGE (irregular flow or movement of fluid, a transient rise, a sudden change in pressure, etc.)

The Surge-Vent tank is designed to absorb the effect of fuel *surges*.

5 MECHANICAL

CHAFING, RUBBING (wear or damage caused by friction)

If the clamps are loose, vibration may cause *chafing* on the pipes.



JAM, JAMMING, JAMMED (impossibility to move; seizing, locking)

In the event of a flap *jam*, the flaps cannot be extended or retracted.

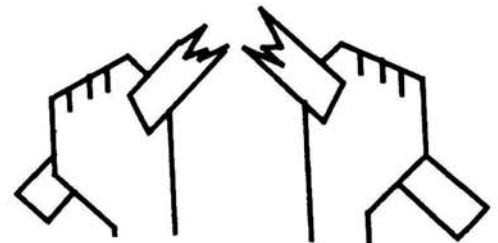
LOCKING, LOCKED (1. normal fastening, e.g. door; 2. moving parts maintained fixed)

Excessive brake pressure causes wheel *locking*.

MISSING (absent)

SHEAR (rupture, break, cut)

A *shear* pin is fitted on the tow-bar.



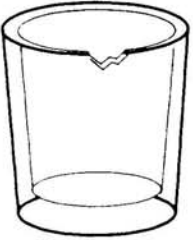
STIFFNESS, STIFF (ADJ.)
(difficult to move)

Without lubrication, the mechanism may be *stiff*.

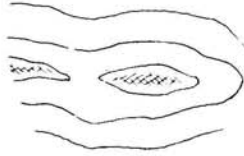
WEAR, WORN (the result of friction or use, the loss of surface qualities)

After 2,000 cycles, the assembly shows signs of *wear*.

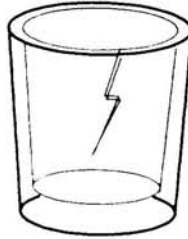
6 STRUCTURE



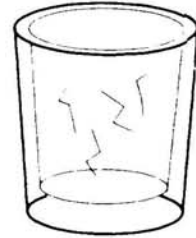
**CHIP/
CHIPPED**



**CORROSION/
CORRODED**



**CRACK/
CRACKED**



**CRAZING
(GLASS)/CRAZED**



**DENT/
DENTED**



**DISTORTION/
DEFORMATION/
DISTORTED**



**F.O.D.
(FOREIGN
OBJECT
DAMAGE)**



**LIGHTNING
STRIKE**



**PEELING/
PEELED**



SCRATCH
(superficial, linear damage removing small quantity of surface material)



STRIKE
(impact by foreign object – bird, stone, lightning, etc.)



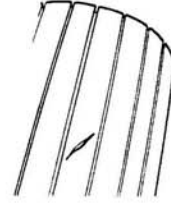
7 TIRES (US) / TYRES (GB)



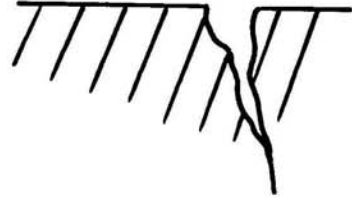
BLISTER

BANG

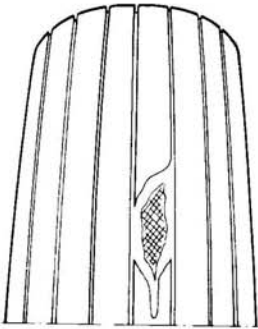
BURST



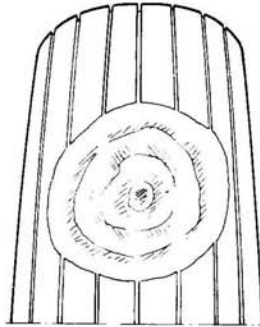
CUT



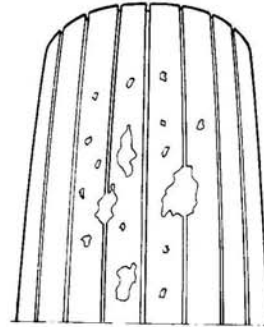
TEAR



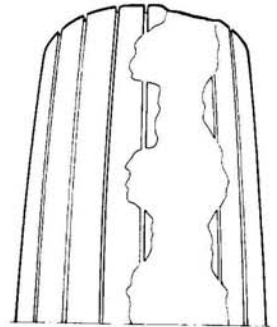
PEELED RIB



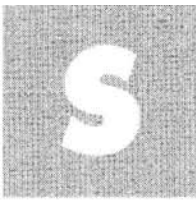
SKID



**TREAD
CHUNKING**



**TREAD
THROWN**



STATES, FAILURES, DAMAGE

EXERCISES: FAILURES, DAMAGE

3

Try and recognize the damage or failure from the description. You are given the first letter of each word. Look at the example:

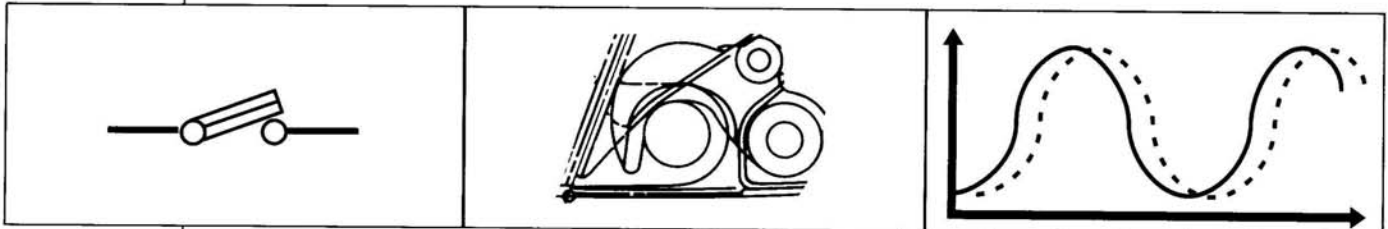
State of tire without pressure. *deflated*

- 1. Damage caused by lightning. L S
- 2. Temporary oscillation. T
- 3. When flight controls are hard to move. S
- 4. Interference to radio signals, etc. N
- 5. The crew reports any problems or ... I
- 6. Not in correct form. D
- 7. No engine ignition. W S
- 8. Undesired electrical contact. S
- 9. Object going into the engine. I
- 10. Rupture, breakage. S
- 11. The result of friction. C
- 12. A bird strike on the leading edge causes this. D
- 13. To leave correct path or value. D
- 14. Not in correct phase sequence. O O P
- 15. Oil in fuel, for example. C
- 16. Dangerous to humans. H
- 17. When flight control surfaces cannot move. J
- 18. This could cause cylinder discharge. O
- 19. Loss of some functions, etc. D

- 20. Too full. O
- 21. Loss of a system. F
- 22. The result of use. W
- 23. Slow, unwanted flow of fluid. S
- 24. Pieces removed from tire. C
- 25. Anti-skid avoids this. W L
- 26. Fuel on the ground. S
- 27. To operate badly. M
- 28. Sudden movement of fluid, air. S
- 29. Small fragment missing from edge of part. C
- 30. Delamination. P

4

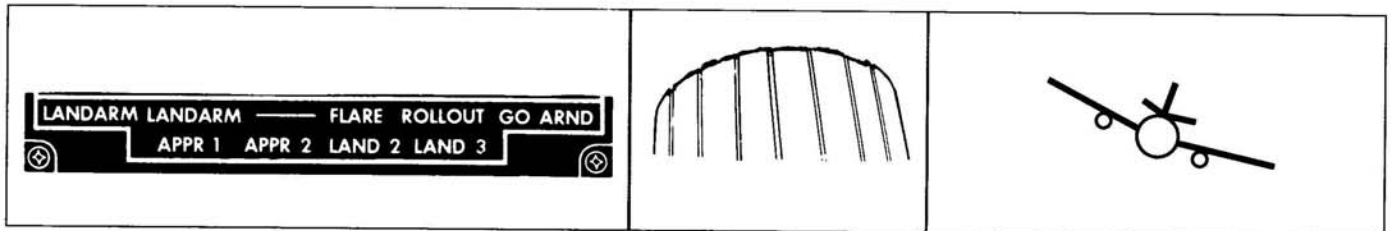
Find the words in both parts of Module S which refer to the illustrations below. You have the first letter, the number of letters that follow, and the associated system, etc. Number One has been done for you.



1. Circuit Closed

2. Door L

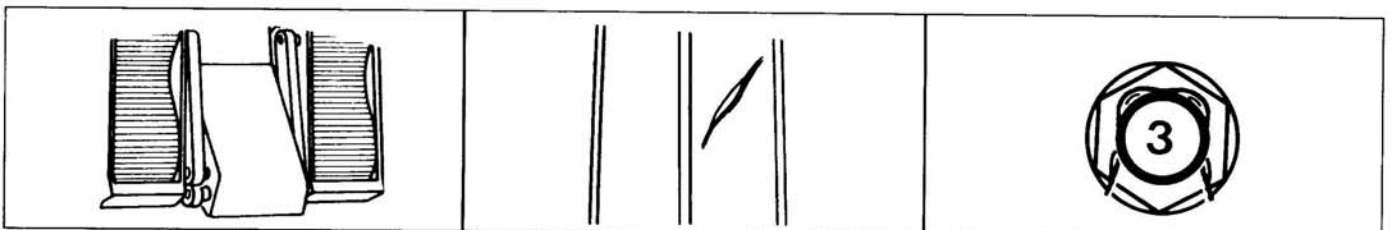
3. O -- O - Phase



4. Autopilot A

5. Tire W

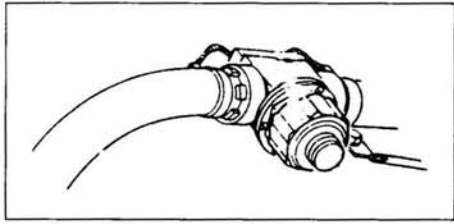
6. Aircraft B



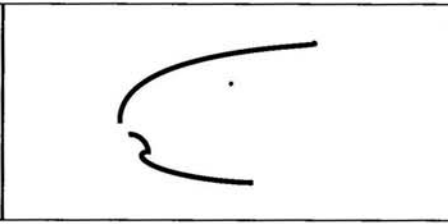
7. Brakes A

8. Tire C

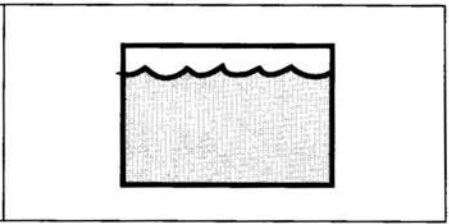
9. Breaker S



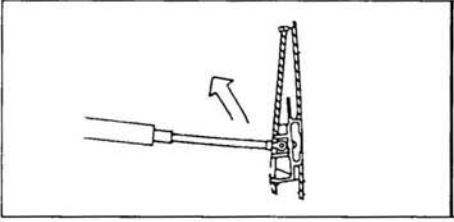
10. Fuel L ---



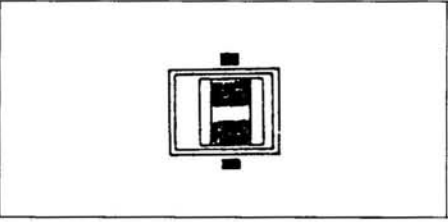
11. D --- on Leading Edge



12. Tank F ---



13. Thrust Reverser D-----



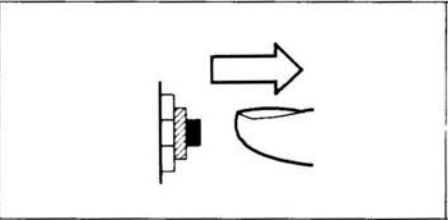
14. M.I. C --- L ---



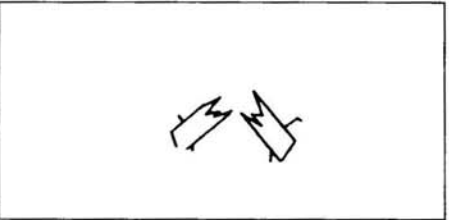
15. Lightning S -----



16. Window C -----



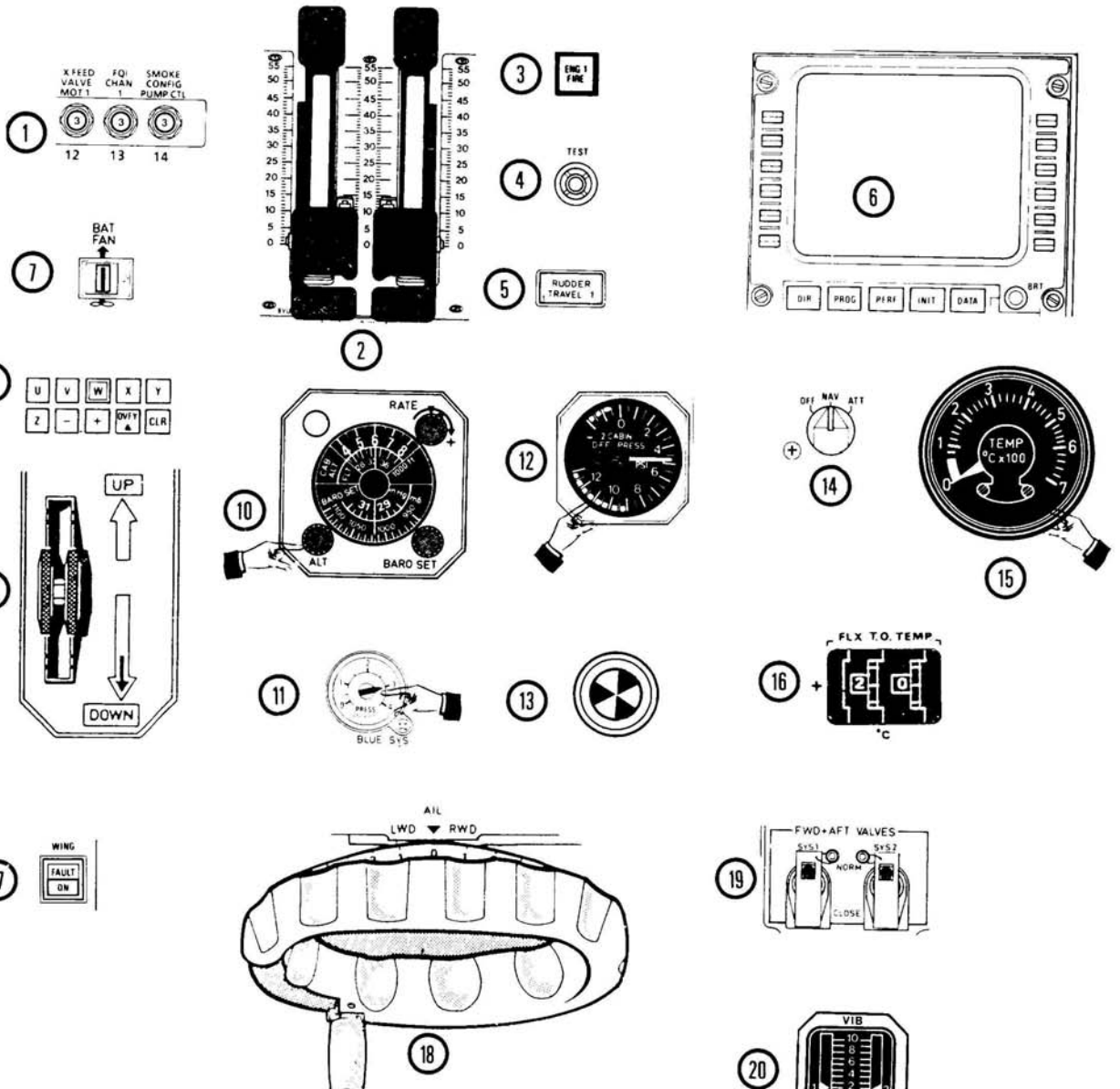
17. P/B R -----

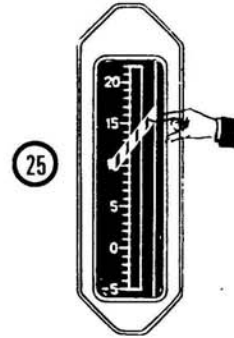
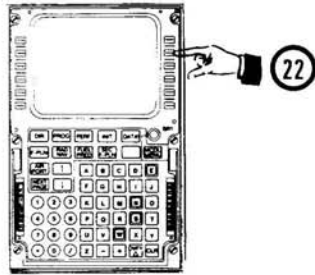
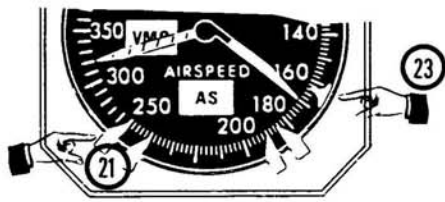


18. Pin S -----

REVIEW THREE

1 Look at the twenty-five cockpit controls and instruments (throttle levers, magnetic indicator, etc.). Write their names in the spaces on the following page.





1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.

14.
15.
16.
17.
18.
19.
20.
21.
22.
23.
24.
25.

2 Put together (match) these technical words in pairs of contraries.
Look at the example:

PULL ≠ PUSH

- | | | | | |
|------------------|-------------|----------|----------|--------------|
| INOPERATIVE | LOOSE | LOW | EMPTY | TWIN, DOUBLE |
| TRIP | PULL | OPEN | TIP | INSERT |
| TAKE-OFF | DE-ENERGIZE | INSTALL | STOW | UNDER |
| LOOSEN | HOLD | EXHAUST | OUTER | OFF |
| LOWER | TAIL | OUTGOING | INCREASE | APPLY |
| COUNTERCLOCKWISE | TOP UP | LOWER | | |

- | | | | | | |
|-------------|---|-------|------------|---|-------|
| TIGHTEN | ≠ | ..... | REMOVE | ≠ | ..... |
| DECREASE | ≠ | ..... | AIR INTAKE | ≠ | ..... |
| CLOSE | ≠ | ..... | HIGH | ≠ | ..... |
| OVER | ≠ | ..... | EXTRACT | ≠ | ..... |
| PUSH | ≠ | ..... | RELEASE | ≠ | ..... |
| UPPER | ≠ | ..... | GO AHEAD | ≠ | ..... |
| DEPLOY | ≠ | ..... | ENERGIZE | ≠ | ..... |
| SET (C/B) | ≠ | ..... | INNER | ≠ | ..... |
| INCOMING | ≠ | ..... | FULL | ≠ | ..... |
| SERVICEABLE | ≠ | ..... | DRAIN | ≠ | ..... |
| CLOCKWISE | ≠ | ..... | TIGHT | ≠ | ..... |
| SINGLE | ≠ | ..... | LANDING | ≠ | ..... |
| NOSE | ≠ | ..... | RAISE | ≠ | ..... |
| ON | ≠ | ..... | ROOT | ≠ | ..... |

3 Group these different types of failure, damage, malfunction, etc. under the right heading, as in the example.

OUT OF PHASE = **ELECTRICAL POWER**

OUT OF PHASE	F.O.D.	OVERHEAT	LEAK	JAM
WEAR	BLISTER	OVERFLOW	SHORT CIRCUIT	BIRD STRIKE
SHEARED	CLOGGED	DEFLATED	LOCKED	DENT
CRACK	STAIN	SURGE	SEEPAGE	PEELING
CUT	STALL	NOISE	CHAFING	TARNISHED
SCRATCH	STIFF	CHIP	RUNAWAY	OVERLOAD
CRAZING	VIBRATION	CORROSION	CONTAMINATION	HUNG START
CUT	FIRE	RUBBING	PLAY	LOOSE
FRETTING	FLASHOVER	SHUTDOWN	TRIPPED	DISCHARGE
BLOWN	CHUNKING	IMBALANCE	TRANSIENTS	MISSING
DISTORTED	SKID-MARK	TEAR	OVERSPEED	ASYMMETRY
CRAZING	FLAME-OUT	BURST	DRIFT	

AIR CONDITIONING	ENGINE	STRUCTURE

TIRES	ELECTRICAL POWER	FLIGHT CONTROLS

4 Choose the correct verb (A, B, or C) for each sentence. Sometimes you must look at the form of the verb (past participle, present, etc.). Remember that even the “incorrect” verbs in each sentence are interesting. You should know them.

1. The doors are closed and

- A. shut
- B. locking
- C. locked

2. Check and the oil level.

- A. top up
- B. complete
- C. fill

3. Before departure you must the logbook.

- A. report to
- B. sign
- C. clear

4. Refueling is
A. replenished
B. overflowed
C. completed
5. your work in the logbook.
A. Refill
B. Fill in
C. Fill
6. the safety pin.
A. Introduce
B. Enter
C. Insert
7. Drain, and refill the gearbox.
A. spray
B. flush
C. de-ice
8. the escape slide lever.
A. Disarm
B. De-arm
C. Unarm
9. The failure at 3000 feet during climb.
A. became
B. arrived
C. occurred
10. with lock wire.
A. Safety
B. Stain
C. Seal
11. Before performing the test, C/B 6XX.
A. trigger
B. dump
C. trip

12. the panel with Dzus fasteners.
A. Stow
B. Slide
C. Secure
13. The blue system failed, but the crew the flight.
A. stayed
B. overrode
C. pursued
14. The oxygen cylinder disc has
A. popped out
B. tripped
C. jacked up
15. In case of fire, the A.P.U.
A. cut out
B. cut in
C. shut down
16. The switch is at Loop A.
A. setting
B. selected
C. set
17. We have oil samples from Engine 1.
A. take
B. taking
C. taken
18. The controls are safetied and during the test.
A. noticed
B. placarded
C. reported
19. We have a new proximity detector.
A. energized
B. fitted
C. switched

- 20.** We have metal filings on the magnetic plug.
A. found
B. find
C. finding
- 21.** The failure was by a short circuit.
A. performed
B. occurred
C. caused
- 22.** We are the parameters on that engine.
A. monitoring
B. operating
C. steering
- 23.** The brake wear indicator is
A. troubleshooting
B. protruding
C. overriding
- 24.** We have checked and all the clamps to stop chafing
A. loosened
B. lost
C. tightened
- 25.** Two of the six fasteners were We have replaced th
A. handling
B. lubricating
C. missing
- 26.** "Can you the engine oil, please?"
A. dip
B. drip
C. drop
- 27.** To check the failure on unit N° 1, we units 1 and 2.
A. topped up
B. backed up
C. crossed over

- 28.** the PTT push-button to perform the test.
- A. release
 - B. depress
 - C. pull
- 29.** The damage bleed valve de-activation according to MEL and AMM
to operate the flight.
- A. requested
 - B. required
 - C. released
- 30.** The ELEC master warning light was
- A. tripped
 - B. triggered
 - C. discharged

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PART

4

- T . CONNECTIONS**
- U . INSTALLATION**
- V . UNITS**
- W . FALSE FRIENDS**
- X . SIMPLIFIED ENGLISH**
- Y . MAINTENANCE WORDS**



INTRODUCTION

In this last part of the *Documentation Handbook* we do three things:

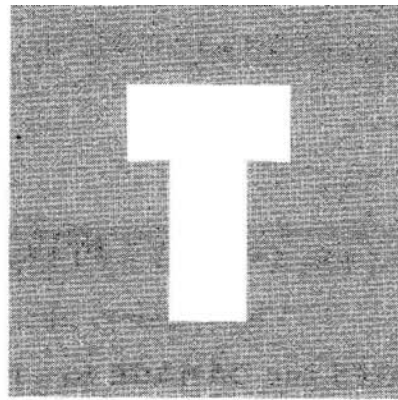
1. Look at the last two important technical functions: **CONNECTIONS** (Module T) and **INSTALLATION** (Module U) that we started covering in Part Three.
2. Give you some practical information and some more verb vocabulary in **UNITS, NUMBERS, ABBREVIATIONS** (Module V), **FALSE FRIENDS** (Module W) and **MAINTENANCE WORDS** (Module Y).
3. Give you some general information about the basic principles of **SIMPLIFIED ENGLISH** (Module X) used on the latest generation of aircraft and about how you can continue to improve your reading ability: **TIPS FOR FURTHER READING** (Module Z).

Review Four on p. 213 is an opportunity to revise all the things we have seen since the beginning of the book.

If you have read the *Handbook*, and especially if you have done all the exercises, you should find your documentation easier to use. Above all we hope you find it clearer, i.e. you know what to look for, where to look for it and what it means.

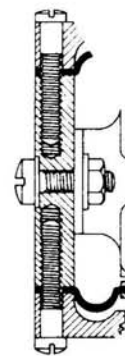
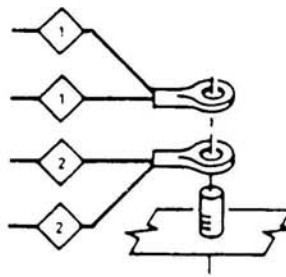
Remember that learning is not just something you do with a teacher and an "English book". Each time you use a manual at work you are in a position to consolidate what you have learned and learn more by using the principles and methods contained in the *Handbook*.

Finally, although all the examples are taken from aeronautical documentation, the basic language explained in Parts One and Two is the same language as general, everyday English.

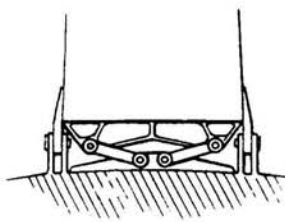


CONNECTIONS

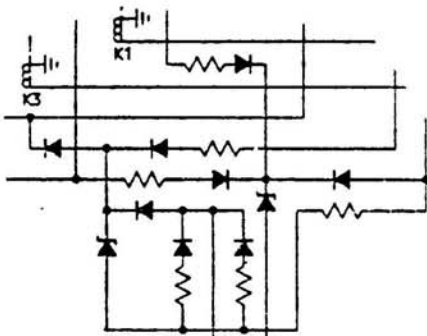
TERMINAL



SCREW
NUT
WASHER

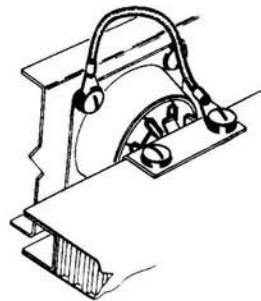


MOUNTS

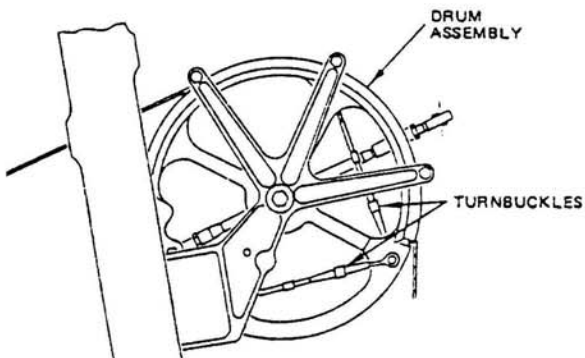
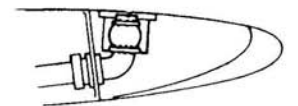


WIRING

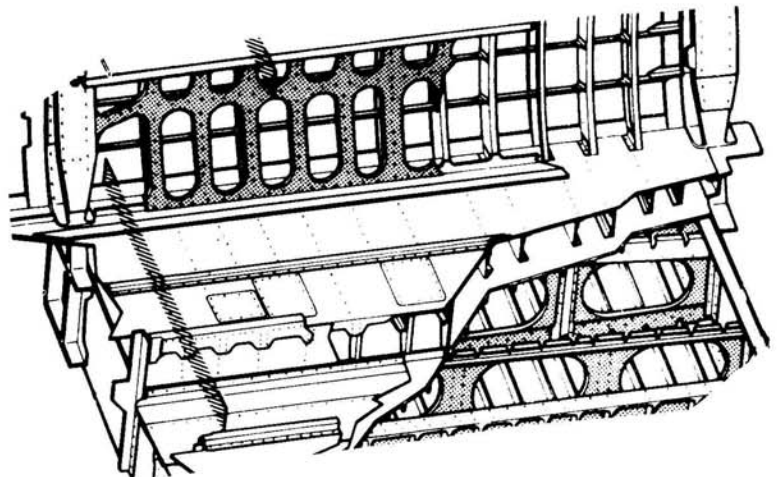
BONDING JUMPERS



UNIONS



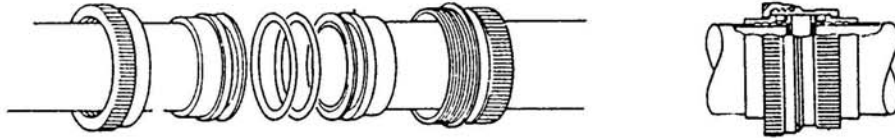
DRUM ASSEMBLY
TURNBUCKLES



RIVETING CLEATS

NOTES

Like **STATES** and **DAMAGE** (see Module **S** and **C**), the *past participle* often expresses connections between components. It follows the verb *to be*. e.g.



The fire detection system *is connected to* the Master Warning Controller.

The cabin seats *are attached to* floor rails.

The flight crew *is/are linked to* the ground by VHF.

The engine *is mounted on* a pylon.

The landing gear control unit *is interfaced with* several systems.

Together indicates a reciprocal connection, e.g.

The two parts of the seat belt *are fastened together*.

There is/there are can also introduce a substantive or name to express the type of connection. **Between** and **and** often indicate the connection, e.g.

There is a connection between the Fire Detection System *and* the Master Warning Controller.

There is a VHF link between the flight crew *and* the ground.

There is an interface between the landing gear control unit *and* several systems.

There is 3 mm. play between the door *and* fuselage.

GENERAL CONNECTIONS

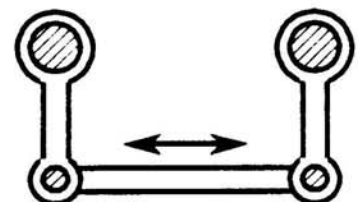
CONNECTED TO (electrical or mechanical connections)

The Utility Bus *is connected to* the Essential Bus.

The hand mikes *are connected to* the side consoles.

INTERCONNECTED (connected together and acting on each other)

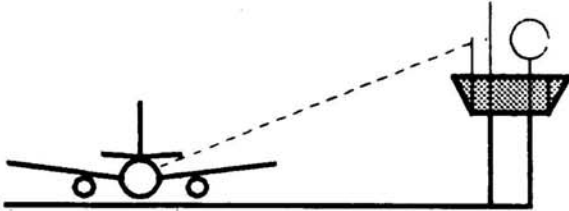
The Capt. and F/O control columns *are interconnected*.



INTERSECT (cross, meet)

Runways 35 and 27 *intersect*.

The two curves *intersect* at the critical point.



LINKED (physical or radio connection)

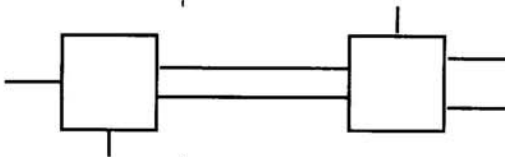
The gear leg and shock absorber are *linked* by scissors.

The aircraft are *linked* to their base by the Company frequency.

RELATED TO (abstract connection, cause, effect, etc.)

The power setting is *related to* the take-off weight, the Outside Air Temperature and the altitude of the field.

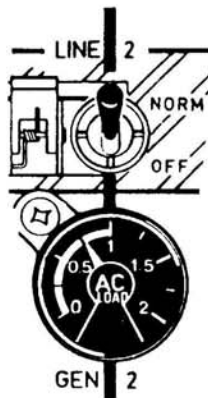
2 ELECTRICAL CONNECTIONS



INTERFACE (verb or noun) (contact; the point where two systems, computers, etc. are connected)

The DFDR *interfaces* the FDIU.

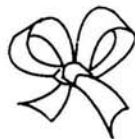
There is an *interface* between the DFDR and the FDIU.



ON LINE (connected to a power supply or a data network [computer etc.])

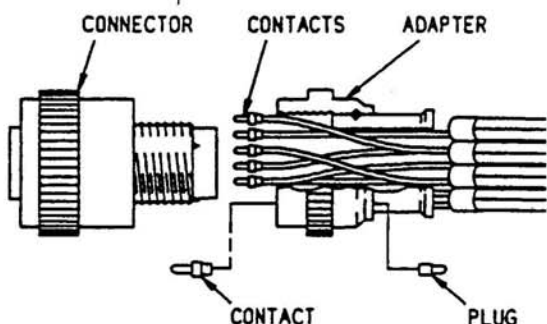
The engine generator must come *on line* to supply the aircraft network.

The terminal is *on line* and the transactions are performed in real time.



TIED (attached with a rope, cable, etc.; when two parallel bus-bars are connected)

The BUS TIE push-button enables the main buses to be *tied*.

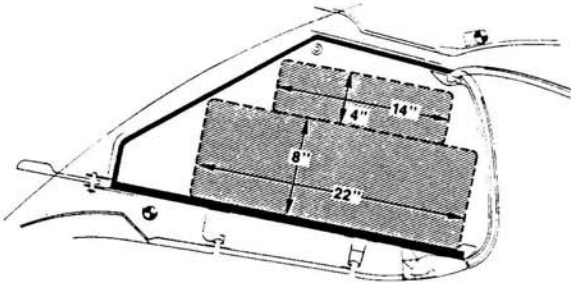


WIRED (connected with wires or cables)

The Wiring Diagram shows how the circuits are *wired*.

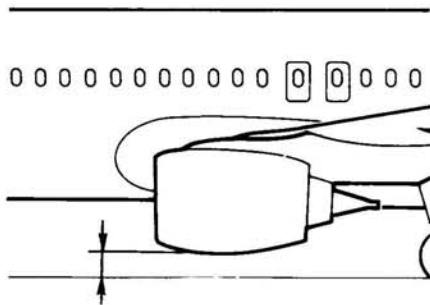
The switch guards are *wired* to the instrument panel.

3 MECHANICAL CONNECTIONS



ATTACHED ([general term] connected, mounted, installed)

The overhead racks are *attached* to the ceiling.



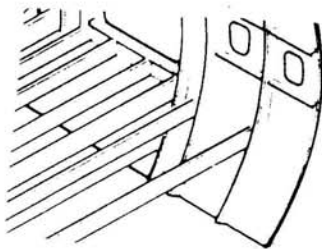
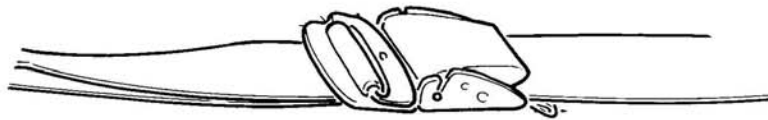
CLEARANCE (the distance between a moving object and another – fixed – object)

Ground *clearance* is the distance between the bottom of the engine and the ground.

Fan Blade *clearance* is the distance between the tip of the fan blades and the casing.

FASTENED (attached, secured, maintained in position [usually unfastened easily])

The seat belts are *fastened* during take-off and landing.



FITTED (precisely installed, mounted [permanent installation])

The cross beams are *fitted* to the frames.

FIXED (attached)

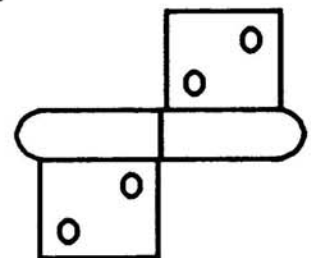
The Map Light is *fixed* to the flight deck wall on a bracket.

HANG, HUNG (suspend, suspended)

For installation, the engine is *hung* from a hoist.

HINGED (articulated on free-rotating connection)

The Rudder is *hinged* on the Vertical Stabilizer.



HOOKED (maintained in position by a hook or latch)

The gear doors are *hooked* by an uplock box.

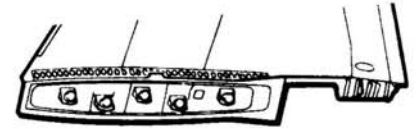


INSTALLED ([most general word of connection] mounted on, fitted to)

The APU is *installed* in the tail cone.

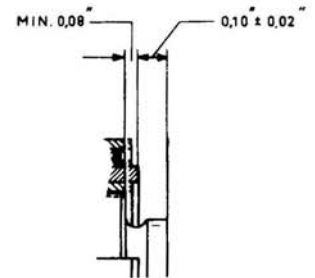
MATED (joined together, two matched surfaces connected)

The wings are *mated* on the wing center box.



MOUNTED (installed + on, under, above, below, over, etc.)

The radionavigation antennas are *mounted* on the fuselage centerline.



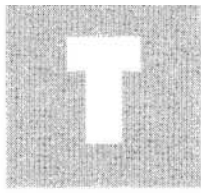
PLAY (distance of free movement [see also clearance])

The PLAY in the mechanism must not exceed 3 mm.

SPLICED (joined by mixing or superimposing cables, structure, etc.)

The cables were *spliced* to increase their length.

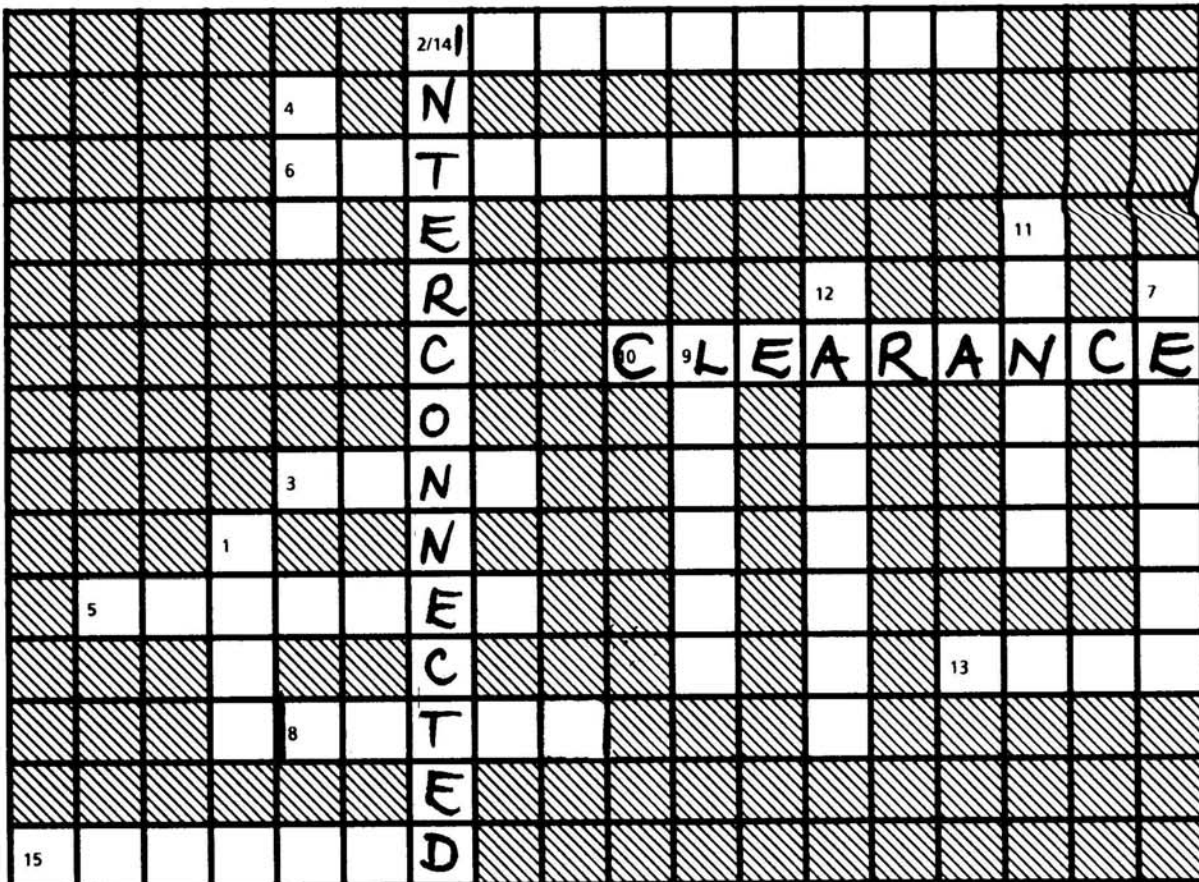




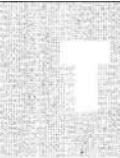
CONNECTIONS

EXERCISES

1 Complete this crossword of "connection" words. Two words are there already. Find the other words from these definitions. The number of letters is in brackets.

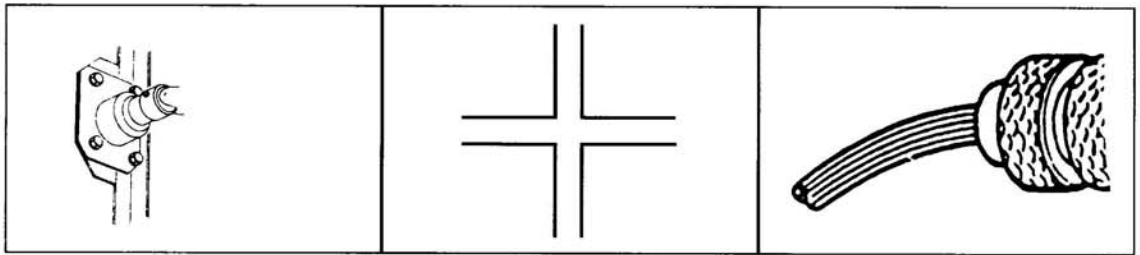


1. Distance a part can move. (4)
2. Connected together and acting on each other. (14)
3. Suspended. (4)
4. To install permanently and with precision. (3)
5. When two wires are connected. (7)
6. To cross. (9)
7. Abstract connection, e.g. influence, cause and effect, etc. (7)
8. Two surfaces joined. (5)
9. Connected by radio. (6)
10. Distance between a moving object and another. (9)
11. Articulated. (6)
12. Maintained in position but can be quickly unlocked. (8)
13. When two busbars are connected. (4)
14. Connection between two units. (9)
15. Installed on. (7)



2

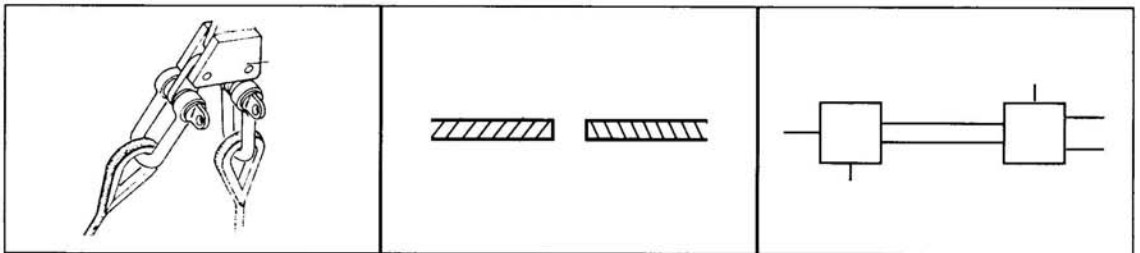
Different connections are illustrated below. Identify them without looking at the notes in this Module. Example I has been done for you.



1. MOUNTED

2. I-----T

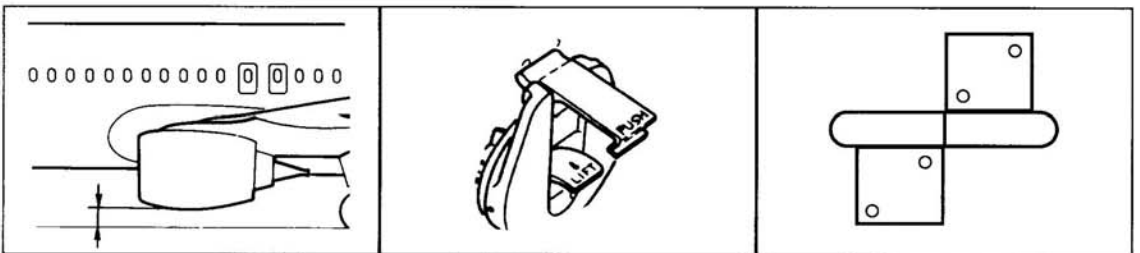
3. W---D



4. Suspended or H--G

5. P--Y

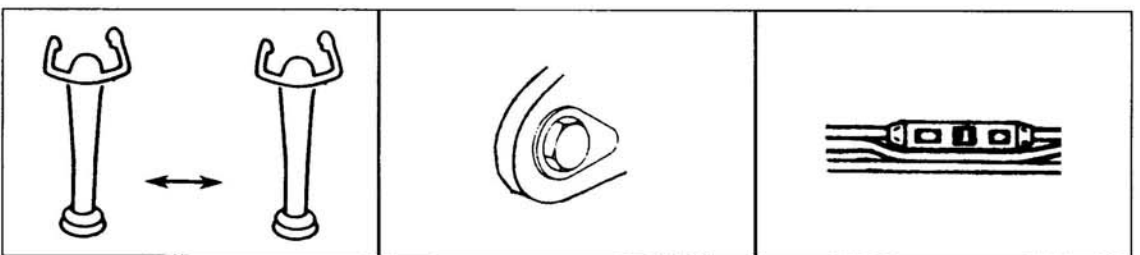
6. I-----E
between 2 units



7. Ground C-----E

8. F-----D

9. H-----D

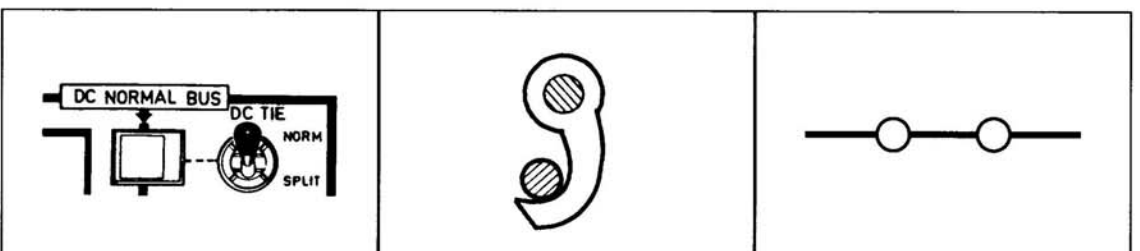


10. Flight Controls

11. F-----D

12. Cables S-----D

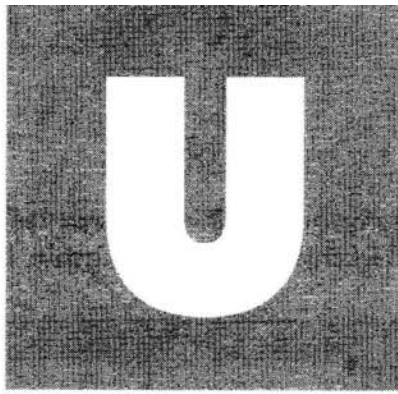
I-----D



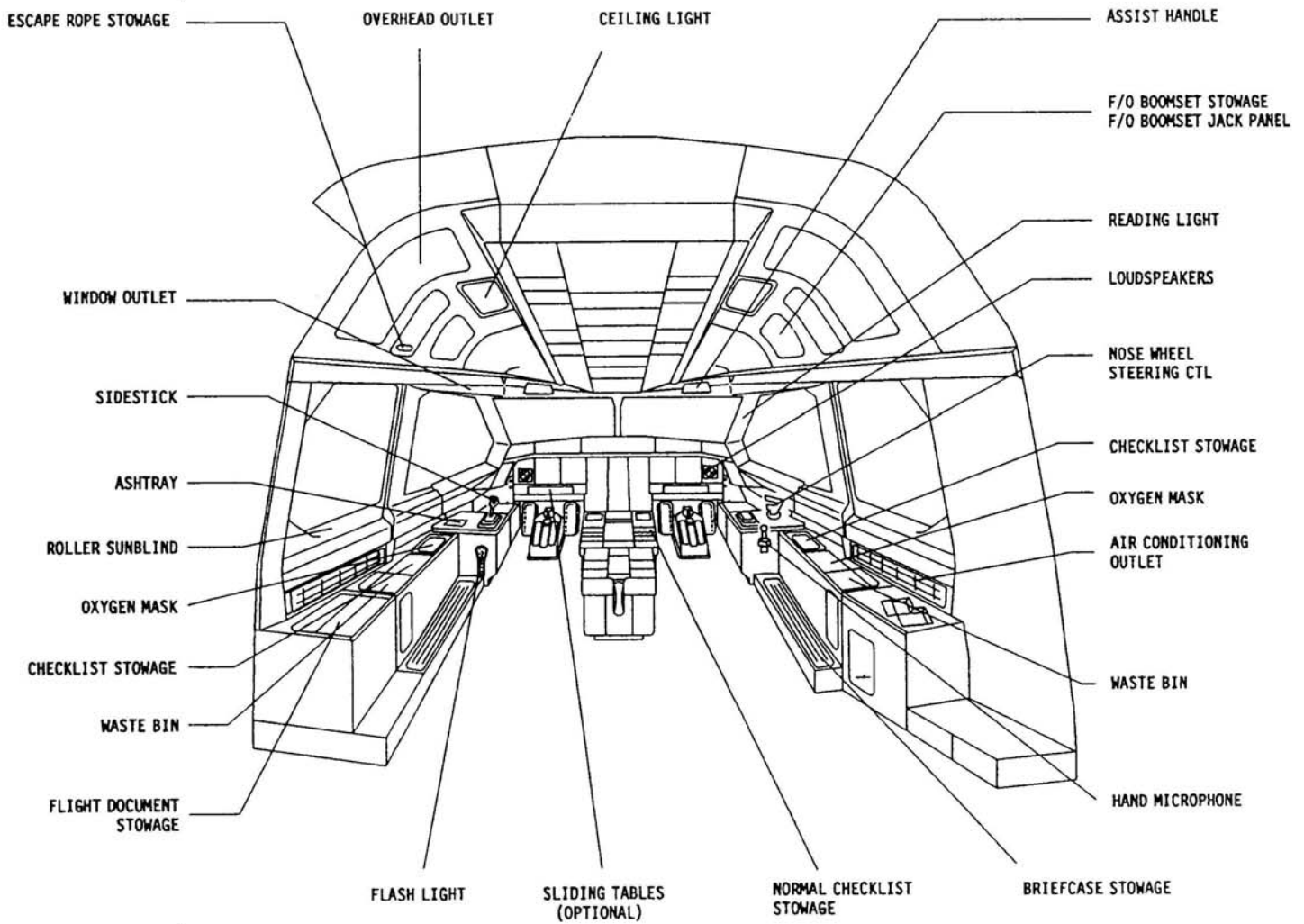
13. Bus-bars T--D

14. H-----D

15. Generator O--L--E



INSTALLATION





N O T E S

This module describes some of the expressions which are used with the verbs in Modules L and T. They correspond to different types of installation. There are:

ADJECTIVES

twin, airtight, shock-proof, retractable, adjustable, airborne, axial, failsafe, grease-free.

PRESENT PARTICIPLES

overlapping, self-locking, sliding, vibration-isolating, rotating, retaining.

PAST PARTICIPLES

self-held, self-contained, reinforced, grounded, sealed, air cooled, spring-loaded.

SUBSTANTIVES OR NOUNS

swivel, wing-to-fuselage, two-spool, toggle, time-delay, test, series, quick-disconnect, gimbal, plug-type.

VERBS

tie-down, stop, push-pull, plug-in.

CATEGORIES OF WORDS

-ABLE

-able at the end of an action = can be, able to be:

EXPRESSION	MEANING
<i>adjustable</i> (fitting) (rod)	can be adjusted
<i>heat shrinkable</i> (rod)	can be retracted after heating
<i>interchangeable</i> (black box)	can be exchanged
<i>line-replaceable</i> (unit)	can be replaced in line
<i>retractable</i> (gear)	can be retracted
<i>rotatable</i> (parts)	can be repaired and returned to service

-ED, etc. (PAST PARTICIPLE)

The past participle indicates the result of an action, or how the action is performed:

PARTICIPLE	MEANING
<i>air-cooled</i>	cooled by air
<i>built-in</i> (test)	incorporated, included
<i>engine-driven</i> (generator)	an engine drives it
<i>ground-based</i> (navaids)	based on the ground
<i>sealed</i> (compartment)	made airtight

-FREE

-free at the end of a word = without, absence of:

WORD	MEANING
<i>dust-free</i>	with no dirt or dust
<i>grease-free</i>	with no lubricant
<i>problem-free</i>	with no problems
<i>shimmy-free</i>	without nose wheel vibration

-ING

-ing at the end of the verb indicates that the installation or component does this action or is of this type:

VERB + -ING	MEANING
<i>overlapping</i> (skin plates)	they are partially superimposed
<i>quick-setting</i> (instrument)	it is adjusted rapidly
<i>retaining</i> (plate)	it holds something in position
<i>rotating</i> (beacon)	it rotates
<i>sliding</i> (window)	it moves longitudinally on tracks or rails.



-MOUNTED

-mounted shows how or where a part is installed:

EXPRESSION	MEANING
<i>door-mounted</i> (escape slide)	installed on a door
<i>rear-mounted</i> (engines)	engines installed at the tail of the aircraft
<i>spring-mounted</i> (seat)	installed on springs

NUMBERS

NUMBER	ADJECTIVE/PREFIX	EXAMPLE
1	<i>one</i>	one-way flow
1	<i>single</i>	single-seat aircraft.
1	<i>uni-</i>	unidirectional beam
2	<i>two</i>	two-seat unit*
2	<i>twin</i>	twin-engine aircraft
2	<i>double</i>	double-skin fuselage
2	<i>bi-</i>	biplane
2	<i>dual</i>	dual-antenna radar
3	<i>three</i>	three-phase current*
3	<i>tri-</i>	triplexed system
3	<i>triple</i>	triple-pole switch
4	<i>4/four</i>	4-blade propeller*
12	<i>12/twelve</i>	12-tonne thrust*
X	<i>multiple</i>	multiple-disk brakes*
X	<i>multi-</i>	multipurpose control and display unit

* NB. Note that qualifying words like seat, phase, blade, tonne and disk are invariable in this case. They do not take an "s".

POINT-TO-POINT

Connection between two points:

EXPRESSION	MEANING
<i>back-to-back</i> (seating)	backs touching
<i>edge-to-edge</i> (joint)	sides in contact, not overlapping
<i>fuel-to-air</i> (ratio)	proportions of fuel and air

EXPRESSION	MEANING
<i>metal-to-metal</i> (connection)	two metal surfaces in contact
<i>wing-to-fuselage</i> (mating)	junction between the wing and the fuselage.

-PROOF

-proof = protected from, cannot be damaged by:

ADJECTIVE	MEANING
<i>fire-proof</i> (compartment)	fire can not damage
<i>foolproof</i> (connection)	can not be connected incorrectly
<i>leak-proof</i> (piping)	fluid can not escape
<i>shockproof</i> (recorder)	can not be damaged by shocks
<i>waterproof</i> (watch)	water can not enter

-RELATED

Caused by or has a relation with:

Temperature-related (corrosion). Temperature is one of the causes of the corrosion.

-SAFE

Does this without danger to the aircraft:

A *failsafe system* is a conception of redundancy; part of the system can fail but the function is preserved by the rest of the system.

SELF-

Self- = an automatic or reflexive action:

ADJECTIVE	MEANING
<i>self-aligning</i> (bearing)	it centers itself
<i>self-contained</i> (power source)	autonomous, independent
<i>self-held</i> (selector)	maintains itself in position automatically (magnetically or under spring pressure)
<i>self-locking</i> (nut)	locks automatically
<i>self-lubricating</i> (joint)	has an independent means of lubrication



SHAPE (FORM)

Shape indicated by comparison with a letter, etc.

EXPRESSION	MEANING
<i>L-sectioned</i> (extrusion)	a section in the form of an “L”
<i>T-junction</i>	connection in the form of a “T”
<i>box-shaped</i>	structure in the form of a box

NOUNS

Nouns are often used to qualify other nouns (see Module A):

EXPRESSION	MEANING
<i>heavy duty</i> (tires)	made for hard utilization
<i>quick-disconnect</i> (fastener)	unfastened rapidly
<i>series</i> (connection)	connected in series
<i>time-delay</i> (device)	installation which is delayed before operating

-TIGHT

-tight means that the substance mentioned cannot escape, or indicates the degree of torque:

EXPRESSION	MEANING
<i>airtight</i> (fuselage)	air can not leave
<i>watertight</i> (casing)	water can not move from a compartment
<i>hand-tight</i> (nut)	fastened only by hand

-TYPE

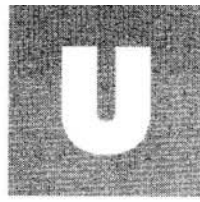
-type indicates the variety of the component:

A *plug-type* door operates like a plug.

VERBS

An action expresses what the component does or how it is installed:

EXPRESSION	MEANING
<i>push-pull</i> (rod)	moving longitudinally in two directions
<i>stop</i> (hole)	stops cracks
<i>tie-down</i> (fitting)	used to attach



INSTALLATION

EXERCISES

1

Find the expressions which agree with these definitions of types of installation. Look at the examples:

cooled by air

air-cooled

installed on an engine

engine-mounted

not affected by impacts

shock-proof

- 1. incorporated, part of assembly
- 2. can be adjusted
- 3. with no dust
- 4. a light that rotates
- 5. cannot be damaged by fire
- 6. autonomous, independent
- 7. fastener that can be disconnected quickly
- 8. can be replaced
- 9. a window that slides
- 10. locks automatically
- 11. a seat-unit with 3 seats
- 12. a generator driven by the engine
- 13. connection between two metal parts
- 14. based on the ground
- 15. with no parasites
- 16. a plug that cannot be connected incorrectly
- 17. cabin with two aisles

- 18.** circular seal (ring)
- 19.** partly superimposed
- 20.** holds something in place
- 21.** door between flight deck and cabin
- 22.** installed on a pylon
- 23.** rod moving longitudinally
- 24.** lubricated by its own means
- 25.** ratio between lift and drag

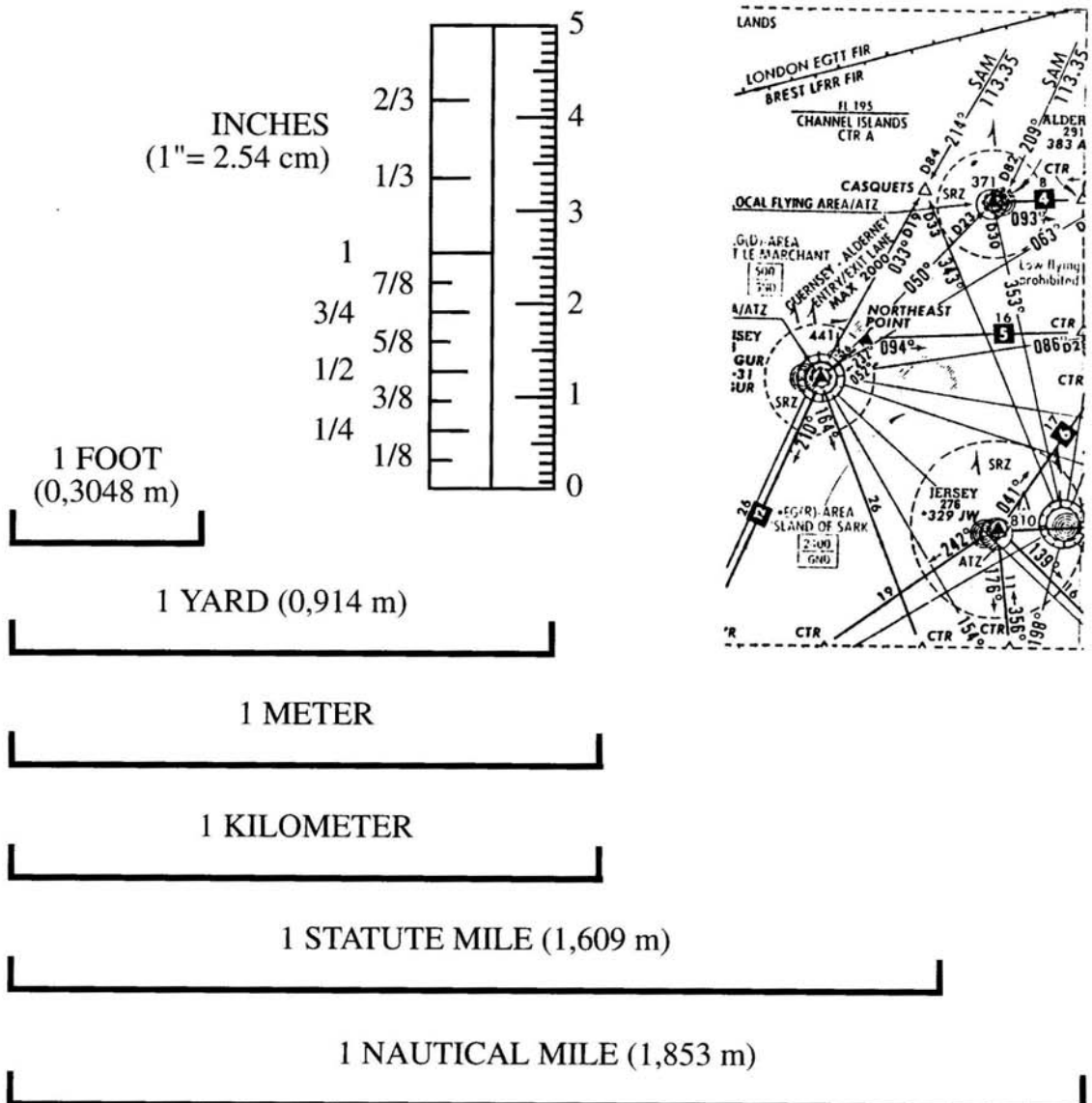


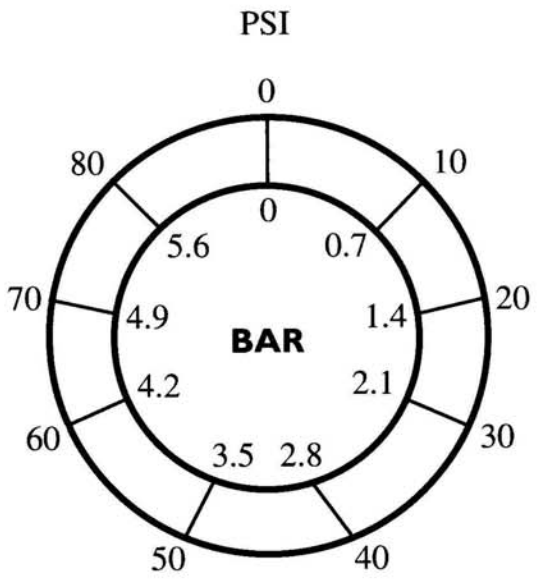
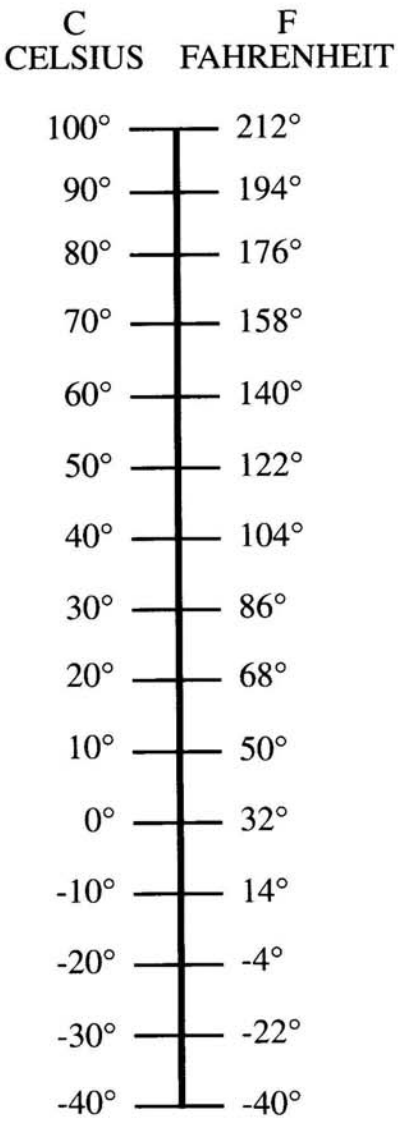
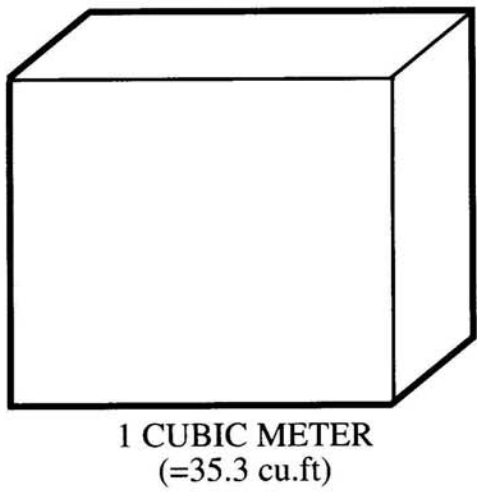
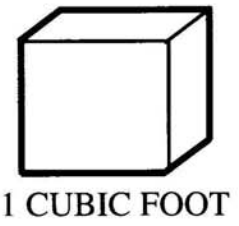
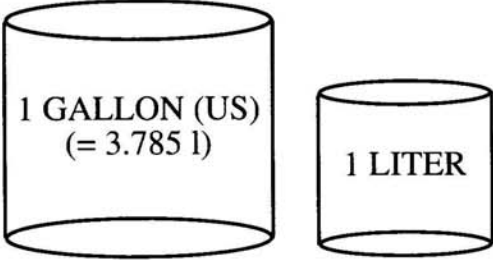
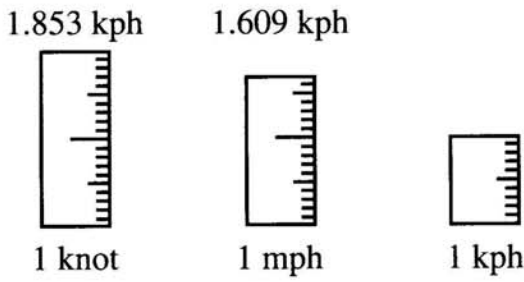
UNITS

NOTES

This module contains general information about units of measurement, time, numbers, common abbreviations, etc. which may be useful.

UNITS OF MEASUREMENT







COMMON ABBREVIATIONS			
B.T.U	British Thermal Unit	lb	pound
cu.in	cubic inch	m	mile, meter
daN	decaNewton	mph	mile per hour
cwt	hundred weight	mpg	mile per gallon
ft	foot	nm	nautical mile
ft.lb	foot-pound	oz	ounce
fl.oz	fluid ounce	psi	pound per square in.
gal	gallon	pt	pint
hp	horse power	rpm	revolutions per minute
in	inch, inches	sq. ft	square foot
kt	knot	yd	yard

BASIC NUMBERS				
1 one	9 nine	17 seventeen	25 twenty-five	60 sixty
2 two	10 ten	18 eighteen	30 thirty	70 seventy
3 three	11 eleven	19 nineteen	36 thirty-six	80 eighty
4 four	12 twelve	20 twenty	37 thirty-seven	90 ninety
5 five	13 thirteen	21 twenty-one	38 thirty-eight	100 one hundred, a hundred
6 six	14 fourteen	22 twenty-two	39 thirty-nine	
7 seven	15 fifteen	23 twenty-three	40 forty	
8 eight	16 sixteen	24 twenty-four	50 fifty	

DECIMALS, FRACTIONS ...	
12.75	twelve decimal (point) seven five
1/2	(a) half
1/3	(a) third
1/4	(a) quarter, (a) fourth
2/3	two thirds
3/4	three quarters, three fourths
5/6	five sixths
etc...	

LARGE NUMBERS

245	two hundred (and) forty-five
890	eight hundred (and) ninety
7,650	seven thousand six hundred (and) fifty
25,800	twenty five thousand eight hundred

ORDINAL NUMBERS

1st	first
2nd	second
3rd	third
4th	fourth
5th	fifth
etc...	

QUANTITIES

14,700 lbs.	fourteen thousand seven hundred pounds.
48 psi	forty-eight psi

REFERENCES

P/N 659-8500/B	P N six five nine dash eight five zero zero slash B
RWY 25	Runway two five
AZ 962	Alitalia nine six two
Stand B 06	Stand Bravo zero six

TIME

For professional use, only use the 24-hour clock. Divide time into hours and minutes, e.g.

07.15	seven fifteen
10.40	ten forty
12.00	twelve hundred, noon or twelve noon
14.50	fourteen fifty
15.00	fifteen hundred
19.30	nineteen thirty
23.45	twenty-three forty-five
24.00	twenty-four hundred or midnight

DAYS

Monday Tuesday Wednesday Thursday Friday Saturday Sunday

MONTHS

January February March April May June July August September
October November December

**YEAR**

The year, like the time, is divided in two:

1992 : nineteen / ninety-two

SYMBOLS

'	"	°
<i>minute</i>	<i>second</i>	<i>degrees</i>
<i>foot</i>	<i>inch</i>	

OPERATIONS

+	-	x	÷	=
<i>plus</i>	<i>minus</i>	<i>times</i>	<i>divided by</i>	<i>equals</i>

1:3	one to three
12/20	twelve over twenty, twelve out of twenty
%	percent
ft/min	feet per minute
>	is greater than
<	is less than
≥	is greater than or equal to
√	square root
√4	root 4
x²	x squared, the square of x
x³	x cubed, the cube of x

PUNCTUATION

.	<i>period, full stop</i>
:	<i>colon</i>
[] ()	<i>brackets, parentheses</i>
,	<i>comma</i>
-	<i>dash</i>
-	<i>hyphen</i>
;	<i>semi-colon</i>
/	<i>slash, stroke</i>
...	<i>ellipsis</i>



FALSE FRIENDS

STRIP LIGHTING

CEILING

OVERHEAD BAGGAGE RACKS

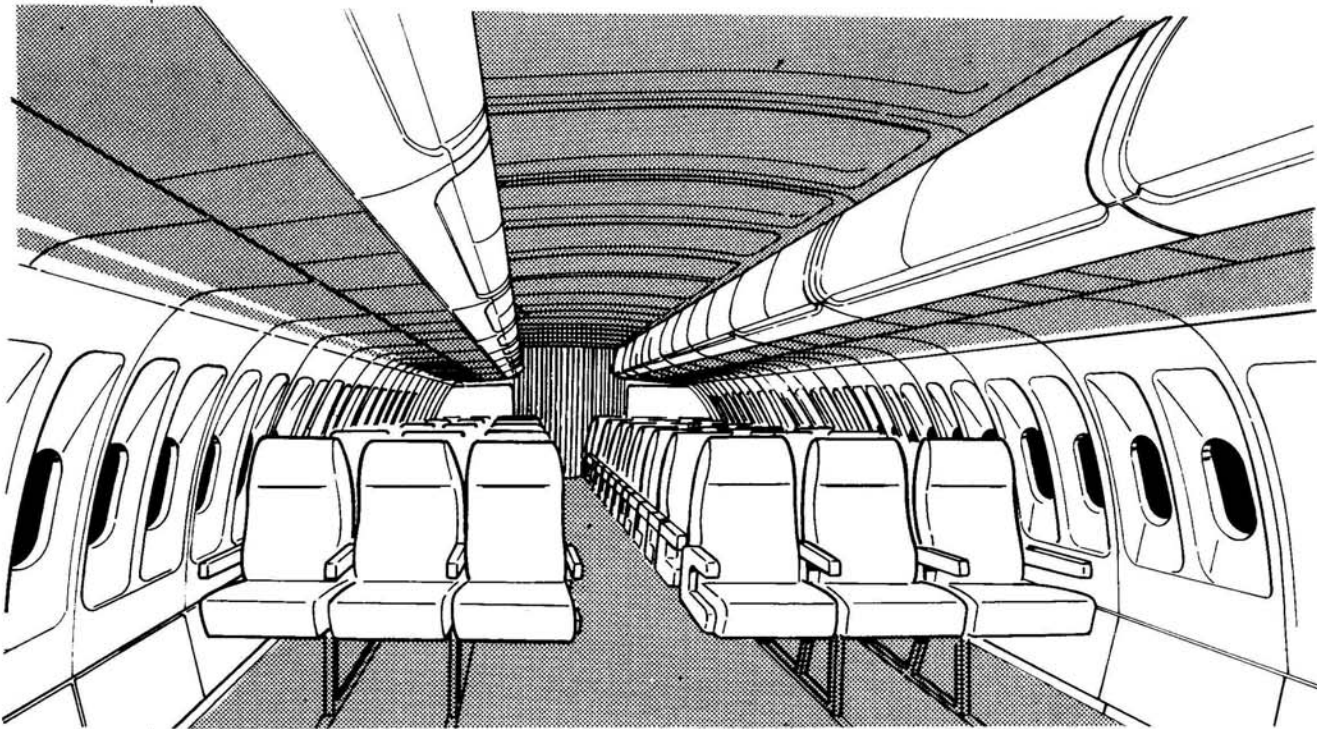
READING LIGHTS

PASSENGER SERVICE UNITS

HEADREST

CURTAIN

WINDOWS



AISLE

WALL PANELS

ARM REST

SEAT UNITS

SEAT BACK

FLOOR

SEAT CUSHIONS

SEAT RAILS

EMERGENCY LIGHTING

FLOOR PROXIMITY LIGHTING

ESCAPE PATH MARKINGS

N O T E S

Here are some words which often cause confusion. You have their real meaning and their "false" meaning. They are used here in a technical context.

WORD	MEANS	DOES NOT MEAN
<i>actual</i>	real	present
<i>also</i>	in addition	as a result, so
<i>alternating</i>	oscillating	alternative
<i>alternative</i>	another, secondary	A.C.
<i>charge</i>	restore battery	load
	bill, invoice (money)	
<i>circuit</i>	electrical wiring	system
<i>complete</i>	terminate, finish	replenish
<i>control</i>	command, order	check
<i>current</i>	present	common
<i>delay</i>	being late	delivery time
<i>demand</i>	need, insist	ask for
<i>depress</i>	press, push	depressurize
<i>fulfil(l)</i>	satisfy, respect	fill
<i>good</i>	high quality	correct
<i>important</i>	significant, valuable	big
<i>insulate</i>	protect thermally, electrically, phonically	isolate
<i>introduce</i>	present, put into practice	insert
<i>isolate</i>	cut off, separate	insulate
<i>large</i>	big	wide
<i>let</i>	allow, permit	leave
<i>planning</i>	activity of making a plan	schedule
<i>prevent</i>	stop from doing, inhibit	warn
<i>previous</i>	preceding	planned
<i>pylon</i>	engine attachment	pedestal
<i>replenish</i>	top up level	fill

WORD	MEANS	DOES NOT MEAN
<i>require</i>	need	ask for
<i>retard</i>	pull back throttle levers	delay
<i>security</i>	protection from intentional human action (terrorism, theft, spying, etc.)	safety
<i>then</i>	after that	consequently



FALSE FRIENDS

EXERCISES

Find the synonym or expression on the right which agrees with (matches) the word on the left. You can check your answers in the Exercise Key.

- | | | |
|-----------------|-------|--------------------------|
| 1. CONTROL | ..... | A. REQUIRES ATTENTION |
| 2. PREVIOUS | ..... | B. TERMINATED |
| 3. ISOLATE | ..... | C. RESPECT, SATISFY |
| 4. CIRCUIT | ..... | D. LATE, BEHIND SCHEDULE |
| 5. ACTUAL | ..... | E. PROTECT |
| 6. REQUIRE | ..... | F. EFFECTIVE, REAL |
| 7. ALTERNATING | ..... | G. ANTICIPATE, STOP |
| 8. LARGE | ..... | H. EXCELLENT |
| 9. RETARD | ..... | I. PUSH |
| 10. PYLON | ..... | J. TOO, IN ADDITION |
| 11. CHARGE | ..... | K. AT THE MOMENT |
| 12. COMPLETE | ..... | L. GIVE PERMISSION |
| 13. INSULATE | ..... | M. ADD FLUID |
| 14. DEPRESS | ..... | N. THE ONE BEFORE |
| 15. GOOD | ..... | O. ANOTHER |
| 16. LET | ..... | P. DONE TO A BATTERY |
| 17. DELAY | ..... | Q. BETWEEN ENGINE + WING |
| 18. ALSO | ..... | R. COMMAND |
| 19. FULFIL(L) | ..... | S. ELECTRICAL ASSEMBLY |
| 20. THEN | ..... | T. A.C. |
| 21. IMPORTANT | ..... | U. NEXT |
| 22. PREVENT | ..... | V. NEED |
| 23. ALTERNATIVE | ..... | W. REDUCE THRUST |
| 24. CURRENT | ..... | X. BIG |
| 25. REPLENISH | ..... | Y. SEPARATE |

2

Use the words in this module to complete these sentences. Do not forget the correct form!

1. Insert a safety pin to the gear from retracting.
2. "AFTER TAKE-OFF checklist....."
3. There is a short on the board.
4. There is a 20-minute
5. All the conditions are
6. The burn-off (trip fuel) was 600 kg more than planned.
7. The motor servicing every 750 cycles.
8. the oil cool before checking the level.
9. The cabin is with glass wool blankets.
10. A synthetic voice says ".....," on landing.
11. D.C.: Direct Current, A.C.: Current.
12. the shock absorber/battery.
13. The engines are mounted on
14. There is a amount of fuel under the engine.
15. The crew experienced this problem on the flight.
16. the oil level in the gearbox.
17. the push-button and observe the lights come on.
18. In case of a leak, that part of the system is
19. Only use quality products.
20. The standard is revision 6.
21. The valve regulates the flow and shuts off the supply.
22. The computer the engine speed.
23. Set the master lever to OFF. press the APU fire push-button.
24. It is to respect the procedure.
25. There is an, back-up supply.



SIMPLIFIED ENGLISH

TREAD

REINFORCING PLYS

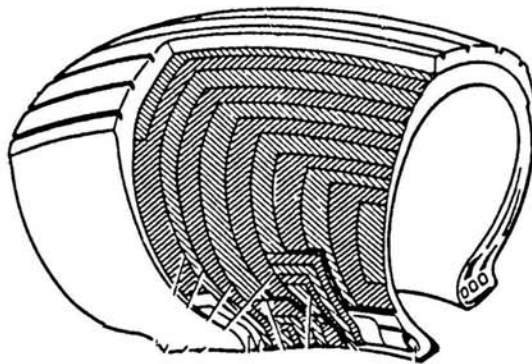
BREAKERS

SHOULDER

SIDEWALL

PLIES

BEAD STRIPS



PLY OVERLAPS

LINER

BEAD

CARCASS

NOTES

1 INTRODUCTION

“Simplified English” originated in the early 1980s with the European airlines’ (AEA) and European airline manufacturers’ (ACEMA) determination to establish a standardized and basic form of the English language for use in maintenance documentation. Between 1981 and 1986 working groups analyzed the verbs used in Maintenance Manuals, established a list of recommended verbs, defined the writing rules of Simplified English and produced a *Simplified English Dictionary* including a word list of approved terms and a *Guide for the preparation of aircraft maintenance documentation in the international aerospace maintenance language*.

These rules, and the principles that guide them, began to be applied in the second half of the 1980s to the maintenance documentation of the latest generation of aircraft and some of their equipment. It is a long and gradual process: Simplified English is not frozen and its application, even today, is only partial. Obviously, it is absent from all documents produced before 1985.

2 OBJECTIVES

The purpose of Simplified English is to make life easier for the writers (technical editors) and users (technicians, mechanics) of maintenance documents.

Simplified English is designed to:

1. *standardize and reduce* the number of words used, i.e. avoid using more than one word with the same meaning and defining one meaning for each word used;
2. *standardize and simplify* the syntax and grammar used, in order to make maintenance texts clearer and simpler.

N.B. For the moment at least, Simplified English only applies to certain essential maintenance documents like the Aircraft Maintenance Manual, Overhaul Manuals, Component Maintenance Manuals etc. It is not used in engineering, flight, day-to-day or operations documents or in regulations. However, there is a tendency to respect the principle of a simpler language even in these texts.

The language and terminology explained in this book, and the examples given, are not necessarily in Simplified English. The purpose of this book is, of course, to help use existing documentation (most of which is not in Simplified English) and not define how it should be written!

3 PRINCIPLES OF SIMPLIFIED ENGLISH: WORDS

The standardization of technical words as they appear in the Simplified English Dictionary only applies to *general* technical words. Specific manufacturers' terminology or technical names (e.g. Droop Signal Unit, Rotor Active Clearance Control) and manufacturing processes and malfunctions (e.g. milling, reaming, pitting, tapering, etc.) are not affected.

ONE MEANING, ONE WORD

When there are different words with the same meaning, Simplified English decides which word will be used, e.g., from the words in this list:

notify advise inform tell

You must use *tell*.

ONE WORD, ONE MEANING

When a word has different meanings, usually only one of these meanings is selected and alternative words are attributed to the other senses of the word:

extinguish = to stop a fire, to cause to stop burning

"Extinguish" for a light (indicator lights illuminated/extinguished) is expressed by *go off*.

ONE WORD, ONE FUNCTION

In general, only one part of speech or function is permitted for each word, e.g.

heat (noun) = energy as a result of movement of molecules.

The verb to *heat* is replaced by to *increase the temperature*.

leak (noun) = a crack or hole which accidentally lets fluid or light go into or come out of something.

The verb to *leak* is replaced by a construction with *is a leak, are leaks*...

So, there is a tendency to reduce the number of verbs permitted and to avoid the use of irregular verbs whenever possible, e.g.

Split is replaced by *divide*.

Lay is replaced by *put down*.

As a result of the reduction in the number of verbs permitted there are many expressions of the type *make/become* + adjective or noun, e.g.

VERB	SIMPLIFIED ENGLISH
to straighten	<i>to make/become straight</i>
to analyze	<i>to make an analysis</i>
to check	<i>to make sure, to do a check</i>
to bank	<i>to make a bank</i>
to splice	<i>to make a splice</i>

As an indication, here is an alphabetical list of the verbs used in Simplified English:

<i>accept</i>	<i>bond</i>	<i>complete</i>	<i>disengage</i>
<i>adapt</i>	<i>break</i>	<i>compress</i>	<i>divide</i>
<i>add</i>	<i>breathe</i>	<i>connect</i>	<i>do</i>
<i>adjust</i>	<i>burn</i>	<i>contain</i>	<i>drain</i>
<i>agree</i>	<i>calibrate</i>	<i>continue</i>	<i>drink</i>
<i>align</i>	<i>can</i>	<i>control</i>	<i>energize</i>
<i>apply</i>	<i>cancel</i>	<i>correct</i>	<i>erase</i>
<i>arm</i>	<i>catch</i>	<i>count</i>	<i>examine</i>
<i>assemble</i>	<i>cause</i>	<i>cut</i>	<i>extend</i>
<i>attach</i>	<i>change</i>	<i>decrease</i>	<i>extinguish</i>
<i>balance</i>	<i>charge</i>	<i>deflate</i>	<i>fall</i>
<i>be</i>	<i>clean</i>	<i>defuel</i>	<i>feather</i>
<i>become</i>	<i>close</i>	<i>disarm</i>	<i>feel</i>
<i>bend</i>	<i>collect</i>	<i>disassemble</i>	<i>fill</i>
<i>bleed</i>	<i>come</i>	<i>discard</i>	<i>fire</i>
<i>blow</i>	<i>compare</i>	<i>disconnect</i>	<i>flash</i>

<i>flow</i>	<i>listen</i>	<i>put</i>	<i>solder</i>
<i>follow</i>	<i>lock</i>	<i>read</i>	<i>speak</i>
<i>get</i>	<i>loosen</i>	<i>receive</i>	<i>start</i>
<i>give</i>	<i>lower</i>	<i>recommend</i>	<i>stay</i>
<i>go</i>	<i>lubricate</i>	<i>refer to</i>	<i>stop</i>
<i>grind</i>	<i>machine</i>	<i>refuel</i>	<i>subtract</i>
<i>ground</i>	<i>measure</i>	<i>reject</i>	<i>supply</i>
<i>hang</i>	<i>mix</i>	<i>release</i>	<i>support</i>
<i>have</i>	<i>moor</i>	<i>remove</i>	<i>tell</i>
<i>hear</i>	<i>move</i>	<i>repair</i>	<i>tighten</i>
<i>help</i>	<i>multiply</i>	<i>replace</i>	<i>touch</i>
<i>hit</i>	<i>must</i>	<i>retract</i>	<i>tow</i>
<i>hold</i>	<i>obey</i>	<i>rub</i>	<i>transmit</i>
<i>identify</i>	<i>occur</i>	<i>safety</i>	<i>try</i>
<i>ignore</i>	<i>open</i>	<i>schedule</i>	<i>tune</i>
<i>include</i>	<i>operate</i>	<i>seal</i>	<i>turn</i>
<i>inflate</i>	<i>paint</i>	<i>see</i>	<i>twist</i>
<i>install</i>	<i>park</i>	<i>send</i>	<i>use</i>
<i>keep</i>	<i>point</i>	<i>set</i>	<i>wear</i>
<i>kill</i>	<i>polish</i>	<i>shake</i>	<i>weigh</i>
<i>know</i>	<i>pressurize</i>	<i>show</i>	<i>weld</i>
<i>latch</i>	<i>pull</i>	<i>smell</i>	<i>wind</i>
<i>let</i>	<i>push</i>	<i>soak</i>	<i>write</i>

4 WRITING RULES: SYNTAX AND GRAMMAR

Simplified English uses these rules to clarify and simplify technical texts:

COMPOUND EXPRESSIONS (“NOUN CLUSTERS”)

No group of words, or “noun clusters”, has more than 3 nouns together. So, for example:

CARGO DOOR LOCKSHAFT PROXIMITY DETECTOR **becomes**
THE PROXIMITY DETECTOR ON THE LOCKSHAFT OF THE CARGO DOOR

But, when the “noun cluster” is an official technical term, you can use hyphens (“-”) to clarify the relation between the words. Thus, this is possible:

THE CARGO-DOOR LOCKSHAFT PROXIMITY-DETECTOR

ELIMINATE ABSTRACT NOTIONS IN FAVOR OF DESCRIPTIONS

Avoid constructions introduced by abstract verbs such as *provide*, *enable*, *achieve*, *ensure*, *accomplish* and *obtain*. So:

... THAT PROVIDES RUDDER PEDAL ADJUSTMENT **becomes**

... THAT ADJUSTS THE RUDDER PEDALS

NOT TOO MUCH INFORMATION IN EACH SENTENCE**The following sentence:**

Pressure oil from the pump is delivered to a spring-loaded relief valve, which has a double function as it controls the pressure of oil available for the lubrication of the cabin blower, the pneumatic compressor and the extension drive shaft support and acts as a pressure reducing valve in the internal lubrication system.

becomes:

Pressurized oil from the pump is supplied to a spring-loaded relief valve. The valve has two functions. It controls the pressure of oil available to lubricate the cabin blower, the pneumatic compressor and the support of the extension drive-shaft. It is also a pressure-reducing valve in the internal oil system.

VERBS: TENSES PERMITTED

Only some forms or verb tenses are permitted:

INFINITIVE/IMPERATIVE	PRESENT SIMPLE
<i>connect</i>	<i>connects/connect</i>
<i>see</i>	<i>sees/see</i>

PRETERITE	PAST PARTICIPLE
<i>connected</i>	<i>connected</i>
<i>saw</i>	<i>seen</i>

These forms can be used with *will, can, must, is, are, etc.*, e.g.

It *will disconnect* at 45 psi.

You *must disarm*...

You *can set*...

PAST PARTICIPLE

The primary use of the past participle is to indicate a state, a condition etc. (see Module S) with *is/are*:

If the part *is damaged*...

When the slats *are extended*...

The thrust reversers *are deployed*.

PASSIVE/ACTIVE (see Module P)

Use only the active voice in procedures. In Description and Operation sections, use the active as much as possible. One sentence in ten can be passive. Wherever possible, a passive form becomes active:

The gearbox is moved by the engine.
becomes: The engine *moves* the gearbox.

Low oil pressure is shown by a warning light.
becomes: A warning light *shows* low oil-pressure.

In procedures, use you, we or the imperative:

The tanks are drained.
becomes: *You drain* the tanks. **or:** *Drain* the tanks.

SENTENCES

Maximum length: 20 words. No more than 3 “clauses” (parts of a sentence with a verb) in each sentence. Look at the following sentence:

A drop-cord, which retains the lamp assembly when you change the bulb, connects the housing to the frame.

In the sentence there are 3 clauses:

- main clause: “A drop-cord connects the housing to the frame”;
- subordinate clause: “which retains the lamp assembly”;
- time clause: “when you change the bulb”.

USE OF TABULAR LAYOUT TO MAKE INFORMATION CLEAR

A VARIETY OF SENTENCE LENGTH: A SUCCESSION OF LONG AND SHORT SENTENCES.

PARAGRAPHS

Maximum length: 6 sentences.
Avoid one-sentence paragraphs.
Change of paragraph = change of subject.
Variation in paragraph length.

WARNINGS, CAUTIONS

Warnings and Cautions must be imperatives not theoretical explanations of danger or risk:

Prolonged contact of oil on the skin could result in intoxication through absorption, as this type of engine oil contains additives.

becomes: Do not let oil stay on your skin for a long time as it can cause injury.

PUNCTUATION

Stricter use of punctuation to articulate and clarify documents.

A colon (:) indicates information is to follow, e.g.

WARNING: make sure that you have....

The wing structure includes: two main spars, 26 ribs, machined webs...

A dash (-) is used to clarify tabulations, lists, etc.

The following circuits are affected:

- APU fuel pump circuit,
- APU emergency shut-down circuit,
- APU fire extinguishing circuit.

A hyphen (-) joins words which are directly associated in a word cluster:

wing center-box, threaded-type connection, shut-off valve;

seventy-four, four-to-one, 3-seat unit, back-to-back;

de-energize, de-icing, post-flight, anti-skid.

Parentheses or brackets are used to refer to references or figures:

(see figure 1.12)

They are also used to isolate information in the middle of a sentence, and to give step or item numbers in a procedure.

The semi-colon (;) makes a more definite mark than a comma (,) and often indicates groups of items.

5 CONCLUSION

This short and simplified overview of Simplified English is not exhaustive. It is only made to give a fast introduction to its principles and application. Simplified English is still at an early stage in its development and implementation. Some of the individual decisions may look unsatisfactory. But it will help to make much aircraft documentation more rational and easier to use all round the world.

6 SOME RANDOM EXAMPLES OF SIMPLIFIED ENGLISH

These examples are only to give you a "feel" for the style of Simplified English and show the difference with conventional editing:

Put a warning notice on the HP ground connector to tell the persons not to pressurize the pneumatic system.

Make sure that all the circuits are isolated before you supply electrical power to the aircraft.

The structure is an extension to the fuselage and gives easy access to the air conditioning and hydraulic equipment.

Disconnect the return line of the hydraulic power from the case drain hose.

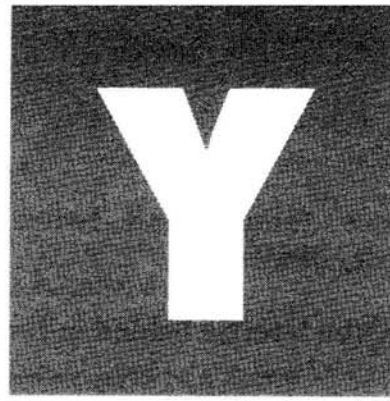
Move the spring (15) and remove the pin (14).

You must remove the sense-line between the air-cycle machine and the anti ice valve before you start these procedures.

The APU LP fuel shut-off valve has a ball valve assembly and an actuator assembly. You can remove the actuator, with the valve in position, without the necessity to drain the system.

The N1 predictive value shows the N1 value that will be reached by the engine LP rotor for the given position of the thrust lever.

You can get access to the holes forward of the main landing gear bay. Light-alloy panels close the holes.



MAINTENANCE WORDS

NOTES

This module contains about fifty words used in maintenance documents and not included in the other modules. They are divided into **ELECTRICAL** terms, **ELECTRONIC** terms and **MECHANICAL** terms.

v = verb

n = noun, substantive

adj = adjective, qualifier

1 ELECTRICAL TERMS

APPLY (*v*) (send, supply, connect a voltage to a particular point)

Apply 5v to pin 519.

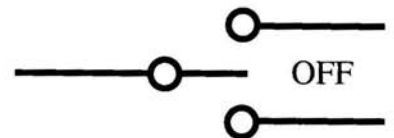
CRIMPED (be pressed or pinched together for joining)

DOUBLE THROW (*adj*) (switch that can be moved in two directions)

DROP (*v, n*) (decrease, go down, decrement
(≠ increase))

If the voltage *drops*, it is detected by the voltmeter. (*v*)

Any *drop* in voltage is detected by the voltmeter. (*n*)

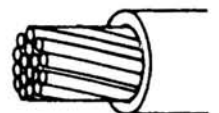


EFFICIENCY (*n*) (ratio to measure productivity; ratio of energy input to energy output)

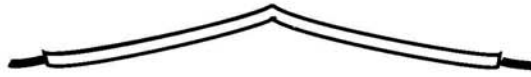
70% *efficiency*

GATE (*n*) (a device that outputs a signal when certain inputs are received)

INSULATE (*v*) (protect conductivity of electrical wiring with plastic, rubber, glass etc.)



KINK (*v, n*) (small bend, twist, non-linearity in wire)



LAG (*v, n*) (be late, be behind in time; the delay between two signals, current etc.)

LOAD (*v, n*) (make something support a demand)

When the generator *load* is too high, the galley is shed.



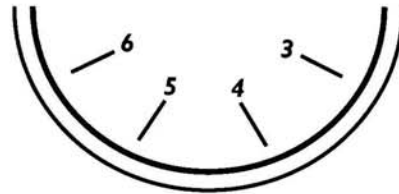
PEAK (*v, n*) (reaches a high point or maximum value)

The current oscillates between 14.2 and 16.4 amps; it *peaks* at 16.4 amps. (*v*)

The current *peak* is 16.4 amps. (*n*)



RANGE (*v, n*) (the extent of a variation or movement; the arc on an instrument which indicates this variation)



RATING (*n*), **RATE** (*v*) (the value attributed to an instrument, device, motor etc. [*n*]; to attribute a value [*v*])

The output is *rated* at 250 KVA.

SHIELDED (protected from mechanical damage or the effect of magnetic fields etc.)

Wiring is *shielded* in critical areas.



SOLDERED (wires, components, integrated circuits, etc., connected by the application of heat and soft metal [solder] using a soldering iron)

STAGE (*n*) (level, degree, step, section, element in a circuit)

STEP-DOWN (*adj*) (reduction from one level to another)

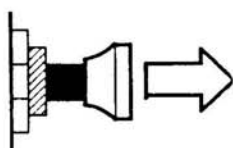
A *step-down* transformer converts 115 VAC to 28 VAC.

STRIP (*v*) (1. remove the insulation from a conductor in order to connect it; 2. remove the accessories from a piece of equipment)

SWAGE (*v*) (connected by folding a metal edge to hold wiring in place)

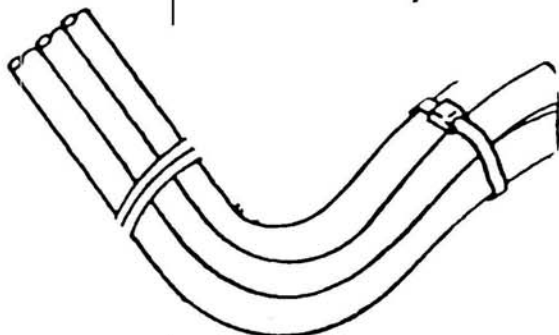
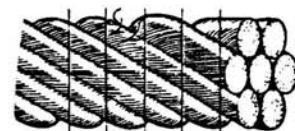


TOGGLE-TYPE (*adj*) (description of a switch moving between two poles)



TRIP (*v*) (open, pull, trigger a circuit breaker manually or automatically, ≠ set)

TWIST (*v*) (coil, wind, turn around in a spiral – intentionally or unintentionally)



WAVE (*n*) (undulation, undulating movement)

WOUND (from the verb to wind; see twisted)

WIRE BUNDLE, WIRE LOOM (*n*) (group or assembly of wires connected together)

2 ELECTRONIC TERMS

BATCH (*n*) (group, set)

BUG (*n*) (defect in program, etc.; see *debugging*: final removal of defects)

DOWNTIME (*n*) (time the system is not operational due to failure or maintenance)

E.D.P./ELECTRONIC DATA PROCESSING (*n*) (computerized handling of information)

FIELD (*n*) (area, part of screen, etc. to be filled with data)

FILE (*n*) (section of memory containing specific data)

LOG ON, LOG OFF (*v*) (record the beginning and end of use of a system)

NETWORK (*n*) (system of all the computers, terminals, links, interfaces, users, etc.)

SAFEGUARD (*v*) (protect the data entered from unintentional destruction by human error or a power failure)

STORE (*v*) (memorize, keep in a file, etc.)

3 MECHANICAL TERMS

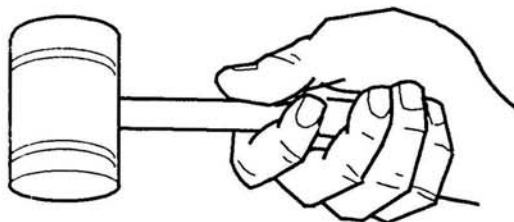
COAT (*v, n*) (cover with a layer of paint, varnish or protection; a layer of protection)



DISCARD (*v*) (throw away, scrap, reject, destroy)

All non-rotable or consumable parts are *discarded* after use; they are not repaired or overhauled.

GRIP (*v, n*) (hold tightly, seize; part of handle held in the hands)



LAY (*v*) (install material or wiring horizontally)

MACHINE (*v*) (work or shape a part with a machine tool [lathe, milling machine, etc.]

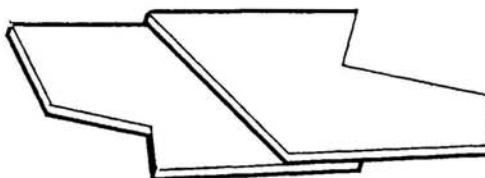
MESH (*v, n*) (interaction of two gear wheels)



MILL (*v*) (remove material using a rotating head)

OVERHAUL (*v, n*) (complete maintenance action; IL and D- check on aircraft; repair and check equipment for a new potential of operating hours)

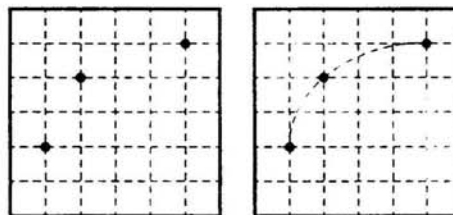
OVERLAP (*v, n*) (partial superimposition of two surfaces, e.g. lapjoint on fuselage skin panels)



PLOT (*v*) (mark points on a graph, curve, plan or chart)

RETAIN (*v*) (maintain in position, keep)

SCRAP (*v*) (see Discard)



SERVICING (*n*) (light maintenance and checks while aircraft is in operation)
Servicing is performed during the turnaround.

SPIN (*v*) (to rotate quickly about an axis, e.g. Gyro)

THREAD (*n, v*) (groove, spiral mark on screw, bolt, nut, etc.)

TWIST (*v*) (turn wire or material about itself, rotate, torque)

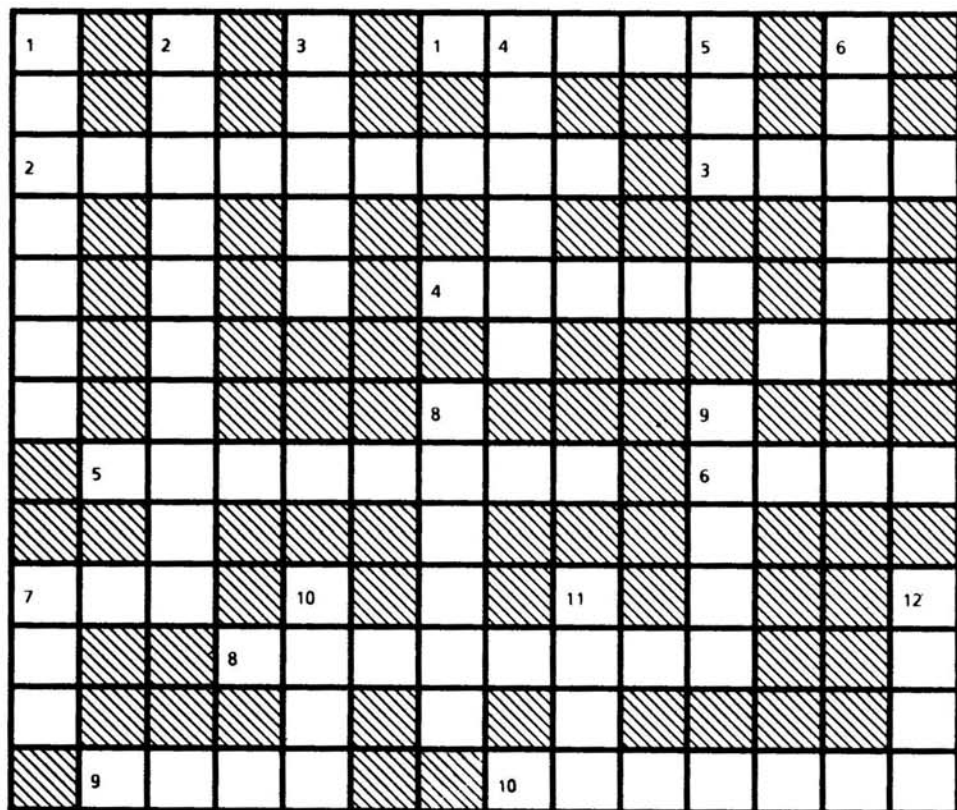
WIPE (*v*) (use a piece of fabric [cloth, rag] to remove surface dirt, etc.)



MAINTENANCE WORDS

EXERCISES

1 Complete this crossword using the words explained in the notes of this Module.



ACROSS

1. = memorize
2. protect data
3. maximum value
4. group
5. protect
6. a C/B pops or is pulled
7. install horizontally
8. when machine is unserviceable
9. mark values on a curve
10. organization of wires, connections, components

DOWN

1. = scrap
2. measurement of output
3. record beginning of use
4. groove on screw, etc.
5. handling information
6. mechanical means of connecting wires, etc.
7. delay between two signals, etc.
8. value estimated
9. part of a circuit, etc.
10. layer
11. remove dirt with cloth, etc.
12. small bend in wire

2

Find the words and expressions which refer to these common IATA telex abbreviations.

- | | | | | | | | |
|-------------|--------------------------|----------|--------------------------|-----------|--------------------------|-----------|--------------------------|
| 1. BFR | <input type="checkbox"/> | 11. A/C | <input type="checkbox"/> | 21. UNKN | <input type="checkbox"/> | 31. WILAD | <input type="checkbox"/> |
| 2. NTFY | <input type="checkbox"/> | 12. RQ | <input type="checkbox"/> | 22. ADV | <input type="checkbox"/> | 32. REYT | <input type="checkbox"/> |
| 3. WILCT | <input type="checkbox"/> | 13. PREV | <input type="checkbox"/> | 23. RGDS | <input type="checkbox"/> | 33. SKED | <input type="checkbox"/> |
| 4. TKS | <input type="checkbox"/> | 14. ACK | <input type="checkbox"/> | 24. ETA | <input type="checkbox"/> | 34. A/L | <input type="checkbox"/> |
| 5. BLK | <input type="checkbox"/> | 15. MEL | <input type="checkbox"/> | 25. ASAP | <input type="checkbox"/> | 35. ASWR | <input type="checkbox"/> |
| 6. MSN | <input type="checkbox"/> | 16. RE | <input type="checkbox"/> | 26. OFLD | <input type="checkbox"/> | 36. FLT | <input type="checkbox"/> |
| 7. ABD, O/B | <input type="checkbox"/> | 17. ATD | <input type="checkbox"/> | 27. CK | <input type="checkbox"/> | 37. SRY | <input type="checkbox"/> |
| 8. AS PER | <input type="checkbox"/> | 18. CFM | <input type="checkbox"/> | 28. AOG | <input type="checkbox"/> | 38. HNDLG | <input type="checkbox"/> |
| 9. DEL | <input type="checkbox"/> | 19. QRP | <input type="checkbox"/> | 29. RCMD | <input type="checkbox"/> | 39. APR | <input type="checkbox"/> |
| 10. KT | <input type="checkbox"/> | 20. LT | <input type="checkbox"/> | 30. RUSHR | <input type="checkbox"/> | 40. FRAV | <input type="checkbox"/> |

- | | |
|----------------------------------|-----------------------|
| 1. according to | 21. ask for |
| 2. time a/c should arrive | 22. with reference to |
| 3. response | 23. remove from a/c |
| 4. recommend ✕ | 24. prior to |
| 5. inform | 25. first available |
| 6. on board | 26. turn back to ramp |
| 7. flight | 27. the one before |
| 8. regret, apologize | 28. notify |
| 9. confirm | 29. verify |
| 10. urgent a/c parts | 30. unit of speed |
| 11. 4th month | 31. very quickly |
| 12. not GMT | 32. airplane |
| 13. will inform | 33. will get in touch |
| 14. manufacturer's S/N | 34. schedule |
| 15. defines No-Go | 35. confirm receipt |
| 16. thank you | 36. cargo in hold 5 |
| 17. time a/c left | 37. airline |
| 18. handling | 38. not known |
| 19. with reference to your telex | 39. to be late |
| 20. before signature | 40. answer quickly |

3 Read these extracts of reports from the log book (tech. log) and do the exercises.

EXTRACT ONE

After take-off, L.H. engine TEMP HI and REGUL FAULT lights came on and LH bleed valve closed automatically. QRF. Following actions performed:
Replaced both HP bleed valves S/N P555 and HP bleed pressure sensor signal hose 47 HA.

The fault recurred during the subsequent test run-up.

No discrepancy was found during visual inspect of:

- ducts downstream of the fan air valve.
- the precooler and fan air valve plate
- the fan air valve.

Normal operation of the bleed air system resumed after replacement of HP bleed valve and pneumatic controller.

A. Answer the questions.

1. Which valve closed automatically?

.....

2. Did the a/c turn back on the ground?

.....

3. Is part 47 HA an electrical part?

.....

4. Does “subsequent” mean: i) necessary, ii) following, or iii) resulting?

.....

5. Which part of the aircraft is used for a “test run-up”?

.....

6. Which word means “difference, anomaly, fault”?

.....

7. Which word means “farther down the line”?

.....

8. What is the fan air valve mounted on?

.....

9. Does “resume” mean: i) start again, ii) investigated or iii) summarized?

.....

EXTRACT TWO

Take-off was aborted at 70 Kt. as IAS flag in Capt. ASI came into view. As an interim measure the indicator was switched to ADC 2 and the a/c returned to service. At base, ADC N° 1 was replaced and IAS indicators were swapped.

B. Answer the questions.

1. Is this a QRF?

.....

2. Was the ASI measured?

.....

3. Does "switched to" mean: i) energized, ii) activated or iii) transferred?

.....

4. At the base were the indicators: i) crossed over, ii) scrapped or iii) recalibrated?

.....

EXTRACT THREE

C. Put these words in the correct place in this extract.

BLEEDS
ALL
RAMP

UNTIMELY
DELAYED
PRIOR TO

MANUAL
RUN
DROPPED

At LPA, just¹ T/O², ground auxiliary valve and³ 4 pressure regulating valves had⁴ closure. Cabin altitude⁵ to minus 2,200 feet with PNEU warning on MWP. Closed all air⁶ and depressurized cabin by opening⁷ depressurization valve. Return to⁸. A/C⁹ for 0h35 min.

EXTRACT FOUR

During cruise at FL 310, N° 2 RH window outer ply cracked under normal heating conditions. Procedure applied. Flight pursued at FL 200. A technical investigation is requested. Panel replaced at MAD by IB Engineering.

D. Answer the questions.



1. Did the First Officer windshield crack?

.....

2. What other parts have a “ply”: i) galleys, ii) tires or iii) APU?

.....

3. What did they apply?

.....

4. Who changed the panel?

.....

EXTRACT FIVE

E. Put these words in the correct place in this extract.

REPLACED STUCK DEACTIVATED DUE TO AS GATE

Plane returned to¹ from taxiway² nacelle anti-ice valve of engine N° 2³ in closed position.⁴ an interim action, the valve was⁵ in open position. Final repair at FRA where anti-ice valve was⁶.

EXTRACT SIX

F. Put these words in the right place in this extract.

CAME ON REPLACED REVEALED SOUNDED CAUTIONARY
 DIVERTED REPETITIVE REMAINED BOTH LEAVING

30 minutes after¹ CDG, SMOKE MWP and² chime³. MID COMPT SMOKE caption light⁴.⁵ bottles were discharged but warning light⁶ on. A/C was⁷ to BOD. Inspection⁸ no abnormalities. As a⁹ measure, the following parts were¹⁰.

EXTRACT SEVEN

Pressurization on Syst 2. During climb, cabin rate of climb dropped -500 ft./min. Delta P increased. Uncontrollable with RATE Knob. Valves closed. Operation OK on SYS 1. See previous log entries 888949-888967-899304.

G. Answer the questions.

1. What a/c system is involved (concerned)?

.....

2. What was abnormal?

.....

3. How much did cabin rate of climb decrease?

.....

4. Did Delta P decrease too?

.....

5. Did crew use RATE Knob?

.....

6. How did they solve the problem?

.....

7. Was this the first case of this incident?

.....

REVIEW FOUR

1 Complete these sentences with words from Modules N-W. You have some help in parentheses.

1. 5,000 feet is than 1,000 meters. (LENGTH)
2. The B 747 is the civilian transport. (WEIGHT)
3. The ailerons are up and down.
4. A.T.A. or Time of Arrival. (REAL)
5. A cans of oil are required. (A SMALL NUMBER)
6. pilot has a reading light.
7. The portable oxygen cylinder is in a locker.
8. The operating range is 150° 230° C.
9. There is 3 mm. between the two parts. (FREE DISTANCE)
10. System 1 System 2 can be used. (ALTERNATIVE)
11. The cabin is with fiberglass blankets. (PROTECTED)
12. There is a oil under the engine. (A SMALL QUANTITY)
13. The cabin attendants can be called from Passenger Service Unit.
14. A VHF antenna is on the upper fuselage. (INSTALLED)
15. The manufacturer a revision after each modification.
16. The engine should 98% N1 in 50 seconds.
17. The incident occurred climb.
18. Doors must be closed and (SECURED)
19. Overpressure in the light illuminating.
20. Two busbars are together. (CONNECTED)
21. Wing anti-icing ice formation on the wing.

22. The bolt is loosened by being rotated (←)
23. Turning the Park Brake handle the brakes.
24. The lever moves the bell crank which in moves the cable.
25. When the secondary flight controls are retracted, the airplane is
26. The warning lights are steady or (INTERMITTENT)
27. If the oil level is low, it is by the engineer.
28. The landing gear of four main gears and a nose gear. (COMPOSITION)
29. engines are protected by fire detection loops.
30. The weather is on the screen.
31. If there is an overvoltage the circuit breaker is.....
32. Press the push-button to the system to zero.
33. Engine removal 8 hours. (DURATION)
34. The audio warning can be (STOPPED)
35. When the doors are closed, they should be with the fuselage skin (AT THE SAME LEVEL)

2 These questions refer to Modules A to Y. Try and find the word which agrees with the explanation, definition or question. Test your knowledge. Do not refer to the modules for the answer. The number of letters is given, and the first example has been done for you. Check your answers in the Exercise Key.

1. A decrease, a decrement. D R O P
2. Contrary of “thick”. - - - - -
3. The pylon is the wing and the engine. - - - - -
4. To put out a light or fire. - - - - -
5. Indicates action performed. - -

- 6. Prefix meaning "exceeding". -----
- 7. Adjust flight control cables. ----
- 8. Distance between two parts. -----
- 9. Used for electrical wiring. C - P P --
- 10. To "feed" or -----
- 11. Like the movement of a clock. -----
- 12. Mixture of metals. -----
- 13. Gear and surfaces retracted, or free of dirt. -----
- 14. Irregular, abrasive surface. -----
- 15. Contrary of "upper". -----
- 16. When door etc and fuselage are aligned. -----
- 17. Rectilinear. -----
- 18. Entry of air, water, fuel, etc. -----
- 19. Compare two indications. -----
- 20. Return of data, position, etc. -----
- 21. The rear of the wing. ----- EDGE
- 22. A machine that prints. -----
- 23. Detection or S -----
- 24. The cables run the cut-out. ----- H
- 25. the selector to "A + B". ----
- 26. Past participle of "drive". -----
- 27. When the part is (*wear*) it is replaced. -----
- 28. The damage is located 4 o'clock. --
- 29. The Bleed Valve enables one engine to supply wings. -----

30. the A.P.U. cool before checking the oil. ---
31. The probes (be) electrically (heat). --- -----
32. Suppress, stop, annul, clear. -----
33. The forward cabin is row 1 row 12. ----- --
34. Wind perpendicular to a/c. -----
35. Reception is bad or P ---
36. The of the THS is to trim the a/c. P -----
37. Fasten (door, fitting, etc.) -----
38. Electrical, thermal, phonic protection. ----- N
39. The flight was delayed a failure. --- --
40. Lower point in a flow, system, etc. -----
41. The engine provide 22,000 lbs of thrust. ---
42. Not locked. -----
43. This is fragile. with care. -----
44. A check valve is the same a non-return valve. --
45. Return to initial position. -----
46. When a control, etc. is difficult to move. S ---
47. Ice form on the wings. ---
48. Introduces a result or consequence. --
49. The (great) the weight, the (great) the thrust.

50. To remove electrical power. -----
51. The control is electrical the power is hydraulic. W ----- S
52. Contrary of "wide". -----

53. covers are used to stop an open pipe. B -----
54. Difference between heading and course. D -----
55. Same as "furthermore". M -----
56. "Above" or -----
57. The flight controls about an axis. -----
58. Contrary of "advance". The pilot must do it on touchdown. -----
59. The job 2 hours. -----
60. The contrary of "much" and "more" are "little" and -----
61. Regular, continuous movement. S -----
62. Incorrect operation. -- L -----
63. It equals 2.54 cm. -----
64. The a/c's "ceiling" is the altitude it can fly at. -----
65. To make longer. -----
66. The wing and wing center box are joined T -----
67. Press, hold and (*push-button*) -----
68. To screw, torque or T -----
69. 1 nautical mile per hour. -----
70. Cockpit windows are fixed or S -----
71. Immediately, the moment something happens. -- -----
72. speed from 250 to 320 knots. -----
73. Impact by foreign object, e.g. bird, stone, lightning. ----- K -
74. the blue or the green system. -----
75. The handle is S -----
76. To be too hot. -----

77. The crew of three members. ----- I -----
78. Contrary of "subtract". ----
79. Phase. ---- --
80. A few gallons, a fuel. L -----
81. Without dust. ----- E
82. The Artificial Horizon the attitude. D -----
83. Intermittent light. -----
84. It locks automatically. -- L - - - - - G
85. Several but not all. S ----
86. Cannot be damaged by fire. ----- R -----
87. Contrary of "bottom". ----
88. The safety the part from moving. ---- V -----
89. pilot has an instrument panel. ---- H
90. Replace the seal it is worn. --
91. Real, effective. -----
92. = "must". S -----
93. Can be replaced in line. -----
94. The seal is worn replace it. --
95. "/" is a "stroke" or -----
96. Cooled by air. ---- - - - - -
97. System that takes hot air from compressor. ---- - - - - -
98. The gear leg is on the wing box. H -----
99. Preceding, the one before. -----
100. This is the question. -----



TIPS FOR FURTHER READING

NOTES

1 IDENTIFYING THE MAIN ELEMENTS

In the future, when you read a text, do not always read it linearly. We recommend you try and identify the main parts of each sentence. This will train you to find the “key” to the text more quickly. It will also give you a better “feel” for the structure of the sentence. You will be able to distinguish between what is important and what is secondary. This will save time and make your use of English more productive and interesting.

As an example, here is a short text repeated six times. Each time just one element is highlighted (in bold type):

Text 1. **The subjects**

Text 2. **The verbs**

Text 3. **The compound expressions (or “word clusters”)**

Text 4. **Prepositions and location words**

Text 5. **The main clauses**

Text 6. **List of components.**

If you put this technique into practice on your own texts, you will find you soon have a better visual and intellectual command of the texts.

TEXT 1: SUBJECT OF THE SENTENCE

The two outflow valves are flange-mounted to the front side of the rear pressure bulkhead just above floor level in a sound-proofed box with a quick-removable cover. **Each valve** consists of two major sections: an outflow poppet section and a control chamber section. **The main diaphragm** separates the two sections and forms a flexible air-tight partition between them. **The outflow poppet section** consists of a spider-type base, to the center of which a pedestal and a baffle-type support are mounted.

The spring-loaded outflow poppet, consisting of two parts, is mounted on the main diaphragm and is guided in its center by a pin, which slides in a bush in the pedestal.

A **vacuum relief diaphragm** is clamped at its periphery between the two parts of the outflow poppet and is attached at its center to the pedestal. Normally it rests on the baffle-type support and forms together with the outflow poppet head a separate chamber, which is connected to cabin pressure via holes in the poppet valve.

TEXT 2: VERBS

The two outflow valves **are flange-mounted** to the front side of the rear pressure bulkhead just above floor level in a sound-proofed box with a quick-removable cover.

Each valve **consists of** two major sections: an outflow poppet section and a control chamber section. The main diaphragm **separates** the two sections and **forms** a flexible air-tight partition between them. The outflow poppet section **consists of** a spider-type base, to the center of which a pedestal and a baffle-type support **are mounted**.

The spring-loaded outflow poppet, **consisting of** two parts, **is mounted** on the main diaphragm and **is guided** in its center by a pin, which **slides** in a bush in the pedestal. A vacuum relief diaphragm **is clamped** at its periphery between the two parts of the outflow poppet and **is attached** at its center to the pedestal. Normally **it rests** on the baffle-type support and **forms** together with the outflow poppet head a separate chamber, which **is connected** to cabin pressure via holes in the poppet valve.

TEXT 3: COMPOUND EXPRESSIONS

The two **outflow valves** are **flange-mounted** to the front side of the **rear pressure bulkhead** just above **floor level** in a **sound-proofed box** with a **quick-removable cover**.

Each valve consists of two major sections: an **outflow poppet section** and a **control chamber section**. The main diaphragm separates the two sections and forms a **flexible air-tight partition** between them. The **outflow poppet section** consists of a **spider-type base**, to the center of which a pedestal and a **baffle-type support** are mounted.

The **spring-loaded outflow poppet**, consisting of two parts, is mounted on the main diaphragm and is guided in its center by a pin, which slides in a bush in the pedestal. A **vacuum relief diaphragm** is clamped at its periphery between the two parts of the **outflow poppet** and is attached at its center to the pedestal. Normally it rests on the **baffle-type support** and forms together with the **outflow poppet head** a separate chamber, which is connected to **cabin pressure** via holes in the **poppet valve**.

TEXT 4: PREPOSITIONS AND LOCATION WORDS

The two outflow valves are flange-mounted **to** the **front** side of the **rear** pressure bulkhead just **above** floor level **in** a sound-proofed box with a quick-removable cover.

Each valve consists of two major sections: an outflow poppet section and a control chamber section. The main diaphragm separates the two sections and

forms a flexible air-tight partition **between** them. The outflow poppet section consists of a spider-type base, **to the center** of which a pedestal and a baffle-type support are mounted.

The spring-loaded outflow poppet, consisting of two parts, is mounted **on** the main diaphragm and is guided **in its center** by a pin, which slides **in** a bush **in** the pedestal. A vacuum relief diaphragm is clamped **at** its periphery **between** the two parts of the outflow poppet and is attached **at its center to** the pedestal. Normally it rests **on** the baffle-type support and forms together with the outflow poppet head a separate chamber, which is connected **to** cabin pressure **via** holes **in** the poppet valve.

TEXT 5: MAIN CLAUSES

The two outflow valves are flange-mounted to the front side of the rear pressure bulkhead just above floor level in a sound-proofed box with a quick-removable cover.

Each valve consists of two major sections: an outflow poppet section and a control chamber section. **The main diaphragm separates the two sections** and forms a flexible air-tight partition between them. **The outflow poppet section consists of a spider-type base,** to the center of which a pedestal and a baffle-type support are mounted.

The spring-loaded outflow poppet, consisting of two parts, **is mounted on the main diaphragm** and is guided in its center by a pin, which slides in a bush in the pedestal. **A vacuum relief diaphragm is clamped at its periphery between the two parts of the outflow poppet** and is attached at its center to the pedestal. **Normally it rests on the baffle-type support** and forms together with the outflow poppet head a separate chamber, which is connected to cabin pressure via holes in the poppet valve.

TEXT 6: LIST OF COMPONENTS

The two outflow **valves** are flange-mounted to the front side of the rear pressure bulkhead just above floor level in a sound-proofed **box** with a quick-removable **cover**.

Each valve consists of two major sections: an *outflow poppet* section and a control **chamber** section. The main **diaphragm** separates the two sections and forms a flexible air-tight **partition** between them. The outflow poppet section consists of a spider-type **base**, to the center of which a **pedestal** and a baffle-type **support** are mounted.

The spring-loaded outflow **poppet**, consisting of two parts, is mounted on the main **diaphragm** and is guided in its center by a **pin**, which slides in a **bush** in the **pedestal**. A vacuum relief **diaphragm** is clamped at its periphery between the two parts of the outflow **poppet** and is attached at its center to the **pedestal**. Normally it rests on the baffle-type **support** and forms together with the outflow poppet **head** a separate **chamber**, which is connected to cabin pressure via holes in the poppet **valve**.

2 VOCABULARY LEARNING

Here are some suggestions on how to memorize new words more effectively. If you have a more active attitude you will find it easier and pleasanter.

Translation is not always the best way to learn new words. One word in English may have different meanings in your language. e.g. *hold*. How would you translate these sentences?

Hold the handle. *Hold* push-back for 10 minutes.

Hold the tool in place. The latch *holds* the door closed.

The aircraft is *holding*. The cargo is loaded in the *hold*.

Translating each case may hide the basic sense which is common to all these uses of the word *hold*.

It is easier to understand and remember words when you see them in a context. Don't worry if at the beginning you only have a rough, approximate idea of the word. You will see that precision comes with use and that in the meantime you will have learnt a lot.

Here are a few ways of placing words in their context, by association:

FAMILIES e. g. Vehicles

tanker, loader, car, truck, ambulance, bus, minibus, catering truck, tug, trolley...

SERIES/SEQUENCES e.g. Flight

push-back, taxiing, line-up, take-off run, rotation, lift-off, climb, level-off, cruise, descent, approach, final, flare, touchdown, roll-out, taxiing...

ASSOCIATION e.g. Brakes

apply, release, lock, cool, set, wear...

CONTRARIES

Push/Pull, Up/Down, In/Out, Long/Short, Heavy/Light, Black/White, Thick/Thin, Landing/Take-off, Top/Bottom, Wing Tip/Wing Root...

SYNONYMS

Perform/Carry Out/Do, Close/Shut, Aircraft/Plane, Flight Deck/Cockpit, Wheel Well/Landing Gear Bay, Check valve/Non-return valve...

VISUAL ASSOCIATION when you are working on the aircraft or using diagrams.

COMMON ROOTS e.g. Air

Aircraft, Airborne, Airbus, Airbrakes, Airfield, Airfoil, Airport, Airline, Airway,...

Then invent your own ways. Make a game and a challenge of it. Make your own vocabulary more personal. Link it directly to your own experiences, knowledge, ideas, etc. Test yourself during the day – a few seconds from time to time. You will be surprised by the difference it makes!



TIPS FOR FURTHER READING

EXERCISE

1 You will often find that more than one word is used for the same thing in technical language. Put together (match) the words with the same meaning.

SMALL	TRIP (v)	DEFECTIVE	GO BACK	SOCKET
POD	BAD	DEPRESS	STOP	REMAIN
GEAR BAY	U/S	INDICATOR LIGHT	CORRECT	STEADY
ISOLATION	FLIGHT	DISAGREEMENT	MOUNT	DUE TO

- | | | | |
|-------------------|-------|-----------------|-------|
| 1. INOP | ..... | 11. CEASE | ..... |
| 2. NACELLE | ..... | 12. LEG | ..... |
| 3. FIT | ..... | 13. RETURN | ..... |
| 4. STAY | ..... | 14. POOR | ..... |
| 5. WHEEL WELL | ..... | 15. PRESS | ..... |
| 6. SLIGHT | ..... | 16. BECAUSE OF | ..... |
| 7. POP | ..... | 17. DISCREPANCY | ..... |
| 8. CONTINUOUS | | 18. RECEPTACLE | |
| 9. SHUT OFF | | 19. RIGHT | |
| 10. CAPTION LIGHT | | 20. FAULTY | |

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EXERCISE

KEY

Only use this Exercise Key after completing an exercise. Sometimes there are two or more correct answers (e.g. C1 example 19).

A1

1/B 2/B 3/A 4/B 5/A 6/A 7/A 8/B 9/A 10/A

A2

1. Spoiler Control Handle 2. Flight Crew Oxygen System 3. Lower Display Unit 4. Aft Pressure Bulkhead 5. Exterior Lighting Control Panel 6. Left Hand Wing Tip Fairing 7. Upper Right Trailing Edge 8. Integral Fuel Tank 9. Recline Control Button 10. Cargo Door Lock Fittings 11. Aft Cabin Conditioned Air Distribution System 12. Main Gear Doors 13. Inner Marker Light 14. Nose Gear Interphone Box 15. Ground Power Receptacle Access Door

N.B. Remember that usually only the last word in a compound expression can be plural (i.e. + s).

B1

1. in 2. on 3. at 4. into 5. out of 6. along 7. in front of 8. behind 9. up 10. down 11. around 12. between 13. near 14. next to 15. off 16. through 17. over 18. under 19. from 20. to 21. inner 22. outer 23. top 24. upper 25. left 26. right 27. lower 28. corner 29. bottom 30. forward 31. center 32. aft 33. rear 34. within 35. beyond

B2

1. right 2. inner 3. on 4. over 5. into 6. along 7. from to 8. between 9. front 10. between 11. next to 12. around 13. through 14. within 15. beyond 16. rear 17. aft 18. upper 19. out of 20. top 21. into 22. from

C1

1. cooled 2. connects 3. to record 4. has 5. detected 6. Opening 7. are 8. clogging 9. to depressurize 10. is 11. Remove 12. located 13. drives 14. are, heated 15. overloading 16. Open, to have 17. armed 18. jamming 19. Use, to secure/Using, secures 20. worn, remove 21. senses 22. Pull, to shut down/Pulling, shuts down 23. closed, locked 24. trigger 25. is 26. delivers 27. are 28. feathering 29. triggered 30. trips

D1 1. open 2. release 3. remove 4. install 5. tighten 6. close 7. place
8. unlock 9. raise 10. untighten, remove 11. disconnect 12. remove 13. set
14. press 15. observe 16. release 17. reset 18. ensure 19. check 20. set
21. depress 22. monitor 23. record

E1 1. Subject: the forward mount; Verb: comprises. Object: four attach bolts.
2. Subject: the actuator assembly; Verb: has; Object: two electrical DC motors.
3. Subject: the aircraft attitude; Verb: is indicated; Means: by a sphere.
4. Verb: Do not touch; Object: the hot parts; Purpose/reason: to prevent burns.
5. Subject: this S/B; Verb: recommends; Object: the installation of shims;
Purpose: to improve fatigue life.

E2 1. means 2. purpose, reason 3. subject 4. verb 5. object

E3 1. means 2. verb 3. subject 4. purpose, reason 5. object 6. purpose, reason
7. verb 8. purpose, reason 9. subject 10. means

E4 1. The rudder pedals are connected to the steering pedals.
2. The metering valve directs 3000 psi to the actuator.
3. The compressor section is the source of compressed air *or* The source of compressed air is the compressor section.
4. Seals are installed to prevent oil entering the system.
5. The sensor provides a signal to turn on the red warning.
6. The yaw damper systems controls the rudder to dampen yaw axis movement.
7. System pressure is supplied by two pumps.
8. Two pumps supply system pressure.
9. Pushing the push-button resets the system.
10. An electrical motor opens and closes the valve to control the fuel flow.

E5 1. A precooler controls the bleed air temperature.
2. Pushing LO, MED or MAX arms the autobrake system.
3. An attachment fitting attaches the seat unit to the seat tracks with two fasteners.
4. An electronic device inhibits the simultaneous selection of several transmitters.
5. The exciters transform the 115V-400 H2 current into high voltage, pulsating current to enable ignition.
6. The screen presents the main information to control the aircraft.
7. The precooler cools the hot air from the engine HP compressor by a heat exchange process.

8. A minimum upstream pressure of 8 psig is necessary to open the valve.
9. The lower section of the fuselage comprises 3 skin panels extending from frame 1 to frame 24.
10. Install the bolt with the screw, the washer and the nut.
11. The gear system permits one motor to drive the valve if the other motor does not operate.
12. Two green lines inside the speed scale indicate that the protection is available.
13. An anti-ice valve controls the air pressure at the required value.
14. Two switches give the position according to a logic.
15. The poppet valve moves on to the valve seat under spring pressure.

E6

The filter bowl screws on to the flanged mounting. It contains the filter element and holds it against the mounting. A seal prevents leakage. The bowl is screwed tight by means of a square tightening lug on the bottom surface.

The filter element has a support tube with a spigot which opens the inner valve when the filter element is fitted.

Filter power of the element is 15 microns (0.0006 in.).

The red clogging indicator is protected by a transparent cap which is integral with the mounting. The indicator becomes visible when any filter clogging causes pressure to drop to 6 bars (87 psi).

E7

1. The gear can extend by freefall.
2. The overhead racks are mounted on the ceiling.
3. There is an interface between the fire detection system and the master warning controller.
4. Disconnect the return line from the case drain hose.
5. Any drop in voltage is detected by the voltage monitor.
6. The ATC transponder is electrically supplied but not operating.
7. Check that the doors are flush with the fuselage skin.
8. The amber magnetic indicator shows the valve is in transit.
9. The ground spoilers are armed before landing.
10. The aircraft symbol is slaved to a computer

F1

1. igniter 2. restrictor 3. sends 4. loading 5. stabilizer 6. rocking lever
7. armed 8. landing light 9. printer 10. locked 11. extinguished 12. steering
13. trailing edge 14. de-icing 15. the flight crew's papers 16. fire extinguisher
17. blanking cover 18. the passengers' names 19. extended 20. thrust reverser

- G1** 1. overspeed 2. unsafe 3. underpressure 4. input 5. counterclockwise
6. inlet 7. crosscheck 8. uncommanded 9. self-regulating 10. feedthrough
11. standby 12. pickup 13. turnback 14. disconnect 15. outboard
16. disagree 17. misadjust 18. crosswind 19. override 20. downlocked
21. turnaround 22. midspan 23. set-up 24. onload 25. downtime

REVIEW ONE

- 1** 1. throttle levers 2. door handle 3. cabin windows 4. hydraulic reservoir
5. seat rails 6. ram air inlet 7. brake pedals 8. vertical speed indicator
9. proximity detector 10. fire handle 11. overhead panel 12. attendant station
13. fire detect loop 14. circuit breaker 15. push-button 16. servo-control
17. fuel pump 18. crossbleed valve 19. fan air valve 20. bleed air

- 2** CORRECTIONS
1. regulate 2. to protect 3. drive 5. drain 6. remove 8. is regulated 10. has
11. torque 12. monitors 13. smoking 16. is detected 17. increases 18. (“set”
is correct) to extend 19. are, check 20. released (“pulled” is correct)

- 3** 1. seat rails 2. rear cargo door 3. containers 4. cross beams 5. escape slide
6. frames 7. aisles 8. bulk cargo door 9. attendant seat 10. stringers 11. ball
mat 12. row 13. antenna 14. aft passenger door 15. glass wool blankets
16. longerons 17. overhead baggage racks 18. door handle 19. cabin windows
20. seat unit

The other verbs are all correct.

- 4** 1. press, depress, push, hold, maintain, release
2. illuminate, extinguish, come on, go off, turn on, turn off, switch on, switch off
3. pull, lower, turn
4. remove, install, set
5. trip, set, reset, pull, push, open
6. apply, release, set
7. set, turn, rotate, reset
8. tighten, loosen, torque, lock, turn, safety
9. connect, disconnect, insert, remove
10. advance, retard, pull, push
11. check, replenish, top up, top off
12. set
13. close, open, lock, latch, check
14. raise, lower, open, safety
15. fasten, unfasten

16. replace, extract, remove, repair, install
17. measure, increase, decrease, check
18. raise, lower, extend, retract, position
19. deploy, arm, disarm, inflate, deflate, fold, install, remove
20. rig, adjust, tighten, loosen, check

5

1. Support arm

The support arm is a cast light alloy box section with integral connection forks. Each connection fork is provided with standardized and replaceable bushes. The door is attached to the support arm by means of upper and lower connection links.

The lower connection link is also connected to the lifting shaft of the door locking mechanism. An adjustable door buffer attached to the inner face of the support arm acts as a limit stop and shock absorber when the door is fully opened. A door stay mechanism installed in the support arm locks the door in the fully open position. The mechanism comprises a release button, actuating rod and lever, bellcrank, spring-loaded rod, and locking hook.

2. If the output voltage of the d-c regulator attempts to rise above 16 vdc, the emitter of Q2202 follows this rise decreasing the conduction through Q2202. The decrease in current through Q2202 results in the base voltage of Q2201 rising, which in turn, decreases the current through Q2201. The result is that the output voltage returns to 16 vdc.

3. General

The air bled from the fifth stage of the compressor passes through four duct sections and a line-mounted valve of the on-off type. At the forward bulkhead of the intake cowl, the anti ice system interfaces with the swirl nozzle in the intake lip. The spent air then enters the cavity of the intake cowl aft of the forward bulkhead. The air passes through holes in the inner cap of the bulkhead between the skin inner barrel and the bulkhead.

Finally, the air exhausts overboard through the flush duct in the outer barrel. The airflow pressure is controlled by an anti ice valve which is of the butterfly type and electrically operated.

6

1. The mechanic fills the reservoir through the reservoir filling system to replenish the system.
2. A battery-buffer memory stores the selected track number for later use.
3. A crossfeed valve controls the fuel supply to the other wing.
4. The rod connects the lever to the cable with the turnbuckle.
5. A lever controls a device to open the doors on the ground without hydraulic power.
6. The aileron control system must be depressurized to prevent injury to personnel.

7. The ACFS also provides coordinated maneuvering to maintain or change attitude, altitude and heading.
8. When the flaps are retracted the valve directs pressure to the retract part on each actuator.
9. The L.P. fuel filter protects the fuel control unit from foreign material contamination.
10. The oil tank contains the supply of oil for the system.
11. A retaining ring holds the pane and the seals in position to make a pressure-tight joint.
12. A series circuit applies 28 VDC through the lower contacts to turn on the red light in the fire handle.
13. The STAB OUT-OF-TRIM indicators are amber lights on the pilot's control panel.
14. A gate on the control quadrant prevents rapid movement of the control lever.
15. In the event of hydraulic power loss from both systems A and B the tab lock-out mechanism frees the elevator control tabs.

7

1. The wing tank pumps are located in a collector box formed by root Rib 1 and Rib 2. Rib 2 is sealed except for vent holes at the top and clack valves at the bottom through which fuel gravitates into the enclosure. Two inward-opening hinged panels in Rib 2 provide access into this area. This configuration makes sure that the pumps are fully in fuel during flight maneuvers. Each pump has an intake pipe fitted with a strainer. A bypass pipe with suction valve enables the engine to get fuel by suction if the pumps do not work.
2. The pump is of the variable-displacement type. The rotating assembly turns all the time that the engine operates. The pump has nine pistons which are connected to a moveable yoke plate. When the angle of the yoke plate changes, the stroke of the pistons changes and the output of the pump is increased or decreased. The compensator valve supplies servo pressure to the actuator piston, which controls the angle of the yoke. A solenoid valve (controlled from the flight compartment) makes it possible to change the operation of the pump so that it does not supply pressure to the system (depressurized mode). The EDP includes a blocking valve which isolates the pump from the hydraulic system when the pump operates in the depressurized mode.
3. Each pressure reducing valve includes a control piston which operates a distribution slide valve through a spring R1 and a rocker arm. When the pedal is released, the Yellow pressure at A is shut off and the brake port C is connected to the reservoir return B.
When the pedal is pushed in, the volume of fluid moved by the master cylinder causes the displacement of the piston which then operates the rocker arm and the slide valve; B is shut off and the pressure port A is connected to the brake port C. When line C is filled, the pressure pushes on the end of the slide valve (chamber D) which, through the rocker arm, causes the spring R1 to compress; the control piston remains in the same position.

H1

1. tough, strong, resistant, robust 2. dark, heavy 3. flexible, pliable 4. dirty
5. smooth, calm 6. solid 7. volatile 8. curved, wavy; 9. matt 10. blunt,
rounded

H2

1. wire 2. landing gear, engine, struts, etc. 3. floor panels, control surfaces,
galleys 4. seat covers, curtains 5. windows, windshield 6. skin panels
7. insulation, knobs, selectors, handles 8. tires, seals, stops 9. glasswool
insulation covering 10. secondary structure, fairings, control surfaces

H3

1. radome 2. windshield 3. pitot tube, probe 4. hose 5. bolt, screw

I1

long/short thick/thin high/low wide/narrow short/long thin/thick low/high
heavy/light light/dark *or* heavy deep/shallow shallow/deep narrow/wide

I2

1. hydraulic pressure 2. radio frequency 3. AC voltage and frequency 4. altitude
5. EGT 6. airspeed 7. tire pressure 8. cabin/outside temperature 9. low
pressure engine spool rotation speed 10. atmospheric pressure 11. rotation speed
12. date 13. panel reference 14. flow 15. fuselage station 16. page reference
17. depth, length, clearance 18. pneumatic system 19. aircraft manufacturer's
serial number 20. distance in nautical miles 21. engine type 22. torque
23. component reference 24. figure 25. diameter of a hole

J1

1. K/control wheel. 2. J/dim knob. 3. N/antenna. 4. L/O-ring. 5. A/GPU.
6. H/surge vent tank. 7. M/batteries 8. B/throttle levers. 9. O/filter.
10. E/spoiler. 11. G/constant speed drive. 12. I/scavenge pump 13. D/check
valve. 14. F/temperature sensor. 15. C/rudder pedals

J2

1. for 2. to 3. used 4. purpose 5. acts. 6. provides 7. enables 8. are

J3

1. brake fans 2. busbar 3. jacks 4. airbrakes 5. passenger call button
6. proximity detector 7. servocontrols 8. escape slide 9. armrest 10. pitot
tube 11. circuit breakers 12. throttle levers 13. horizontal stabilizer 14. VSI
15. electrical pump 16. squib, cartridge 17. warning lights 18. seat rails
19. overhead baggage racks 20. crossfeed valve

K1

1. because 2. due to 3. moreover 4. although 5. since 6. so as to 7. unless
8. even though 9. provided that 10. until

K2

1. if 2. whereas 3. although 4. unless 5. moreover 6. but 7. furthermore
8. however 9. due to 10. if 11. as soon as 12. until 13. in order to
14. unless 15. however

K3

1. if 2. due to 3. and 4. although 5. so 6. so as (to) 7. if 8. so 9. whereas
10. but

K4

1. yes 2. no/despite 3. no/so, therefore 4. no/in order to, so as to, to
5. no/nevertheless, but

(NOTES pp 84-89)**L**

de-activated de-energizes depressing eased fastened filled fulfil(l)
handle hoisted increases jacking leaves (left)/leave let marked matching
mounting obey opening overrides planned postpone preset press pushes
raised read, reads removes replace request required reset rigging
rotating sent set shifted tightened trip used withdrawn

L1

1. connect 2. pressing, depressing 3. de-activated 4. set; check 5. fill
6. remove 7. raise, remove, shift, withdraw 8. apply 9. trip, set, reset
10. carry out 11. rotated 12. using 13. mounted 14. handle 15. required
16. de-energize 17. increase 18. leave 19. match, connect, mark 20. jacked

L2

1. connect 2. request 3. comply 4. use 5. ease 6. cancel 7. remove
8. match 9. preset 10. apply 11. carry out 12. mount 13. de-activate
14. fasten 15. shift 16. jack 17. close 18. let 19. read 20. increase
21. check 22. reset 23. rig 24. mark 25. override

M1

1. can 2. may 3. should, may 4. must 5. may 6. can, may 7. must 8. can
9. need 10. must 11. must 12. can 13. needs 14. may 15. must 16. can
17. need 18. can 19. may 20. can 21. must 22. needs 23. may 24. must
25. must

REVIEW TWO

1

ACROSS

1. alloy 2. wingspan 3. rig 4. no 5. up 6. bend 7. but 8. display 9. e.g.
10. glass 11. through 12. test 13. soft 14. out 15. curved 16. must
17. ease 18. although 19. ed

DOWN

1. around 2. over 3. in 4. shift 5. as 6. handle 7. by 8. request 9. ing
10. post 11. at 12. counter 13. hard 14. remove 15. can 16. width 17. set
18. tighten 19. push

2

1. V/rear 2. X/associate 3. W/priority manual order 4. T/due to 5. O/sharp
6. Q/carry out 7. K/air from engine compressor 8. S/with no dirt 9. AB/shall
10. A/return of information 11. R/below 12. AC/ready for use 13. C/to
position 14. L/alternative system 15. H/compulsory 16. Y/elongated
17. G/function of a loader 18. Z/system that provides hot air 19. M/from side
to side 20. J/maintains itself 21. I/therefore 22. F/inboard 23. AD/permit,
enable 24. U/axis 25. E/forward part of wing 26. AA/but 27. B/used to
28. N/whilst 29. D/dangerous 30. P/if

3

1. mandatory 2. counterclockwise 3. centerline 4. test 5. at/as 6. soft
7. should 8. whereas 9. depth 10. in order to 11. through 12. remove
13. reset 14. honeycomb 15. rubber 16. straight 17. rough 18. however
19. clear 20. around 21. narrow 22. because 23. monitor 24. push 25. trip
26. forward 27. must 28. request 29. crossfeed 30. although

N1

1. hotter than
2. biggest
3. more ... than
4. more comfortable than
5. lower
6. fewer ... than
7. more efficient, the most efficient
8. longer ... than
9. same as
10. whereas, while, whilst, but
11. lighter than
12. more efficient than
13. longest
14. highest
15. best
16. more cracked than
17. better ... than
18. more smoothly
19. less ... than
20. more accurate than
21. whereas, while, whilst, but
22. shorter ... harder
23. the fastest
24. more ... than
25. higher ... hotter
26. as powerful as
27. better ... than
28. longer ... better
29. as large as
30. as much as

O1

1. insert, position
2. surrounds
3. dismantle
4. vibrating
5. drops, decreases
6. spreads, runs
7. slides, runs
8. advance
9. lift
10. expands
11. reach
12. deflects
13. sweep
14. entered, sent, inserted
15. run
16. sends, transmits, conveys
17. tilted
18. wound, coiled
19. position, slide, revolve
20. brake
21. turning
22. extended
23. spreading
24. routed
25. tow
26. bypasses
27. shrink
28. decrease
29. cranked, motored
30. protrude

O2

1. deflect
2. retard
3. tilt
4. wind
5. drift
6. sweep
7. retract
8. tow
9. expand
10. slide
11. drop
12. flow
13. insert
14. lengthen
15. protrude

P1

1. The Fan Air Valve controls the fan air flow.
2. The unit is connected to (the) ground.
3. The air intakes must be inspected for any damage.
4. The outboard control valve quadrant activates the control cables.
5. The weather image may be displayed on the ND.
6. Three screws maintain the panel in place.
7. The master switch must be set to OFF.
8. Voltage and frequency are monitored.
9. Three hydraulic systems power the servos.
10. Drum travel is limited by a stop.
11. The take-off warning horn is activated by the EPR.
12. An over-temperature illuminates the light.
13. The rudder pedals can be adjusted with a screw.
14. The RESET push-button re-aligns the system.
15. The trim wheel can be rotated 3 turns in either direction.
16. Air leak protection is provided on the hot air ducts.
17. An optical sensor detects smoke.
18. The thrust levers must be safetied and placarded.
19. Bonding jumpers transmit static electricity.
20. Safety the C/B or you must safety the C/B.

R1

1. check, test 2. consists 3. compute, calculate, assess 4. both 5. lasts, takes
6. include 7. occur, happen, take place 8. informs, advises 9. enables, allows,
permits 10. tested, checked 11. event, case 12. displays, indicates 13. much
14. prevents 15. mounted 16. reads, indicates 17. scans 18. from ... to
19. either 20. scale, display 21. informs, notifies 22. embodied, applied
23. each 24. inspect, examine, check 25. during 26. indicates 27. estimated
28. takes 29. fitted, provided, equipped 30. enable, allow

S1

(STATES)

1. released 2. clean 3. tripped 4. safetied 5. shut 6. in transit 7. torqued
8. held 9. hot 10. earthed 11. trip ... open 12. set to 13. cleared
14. deployed 15. secured 16. armed 17. full 18. applied 19. flashing
20. flush

S2

(STATES)

1. stowed 2. extinguished 3. reset 4. safeguarded 5. upgraded 6. grounded
7. stored 8. nose-up 9. loose 10. isolated

S3

(FAILURES AND DAMAGE)

1. lightning strike 2. transient 3. stiff 4. noise 5. incidents 6. distorted
7. wet start 8. short circuit 9. ingestion 10. shear 11. chafing 12. dent
13. drift 14. out of phase 15. contamination 16. harmful 17. jam, jamming
18. overpressure, overtemperature 19. downgrading 20. overfill 21. failure
22. wear 23. seepage 24. chunks 25. wheel locking 26. spillage
27. malfunction 28. surge 29. chip 30. peeling.

S4

(FAILURES AND DAMAGE)

1. circuit closed 2. door latched 3. out of phase 4. autopilot armed 5. tire
worn 6. aircraft banked 7. brakes applied 8. tire cut 9. breaker safetied
10. fuel leak 11. dent on leading edge 12. tank full 13. thrust reverser
deployed 14. M.I. cross-line 15. lightning strike 16. window cracked 17. P/B
released 18. pin sheared

REVIEW THREE

1 1. circuit breakers 2. throttle levers, thrust levers 3. warning light 4. push-button 5. indicator light, caption light 6. CRT, screen, display unit 7. magnetic indicator 8. keys 9. gear control lever 10. knob 11. pointer, needle 12. range, arc 13. magnetic annunciator 14. rotary selector 15. dial 16. thumbwheel 17. push-button light 18. handwheel 19. guarded master switches 20. linear indicator 21. bugs 22. line key, selection key 23. index 24. switch, toggle switch 25. flag

2 tighten/loosen decrease/increase close/open over/under push/pull upper/lower deploy/stow set/trip incoming/outgoing serviceable/inoperative clockwise/counter-clockwise single/twin *or* double nose/tail on/off remove/install air intake/exhaust high/low extract/insert release/apply go ahead/hold energize/de-energize inner/outer full/empty drain/top up tight/loose landing/take-off raise/lower root/tip

3 AIR CONDITIONING: overheat, leak, overflow, surge.

ENGINE: hung start, shutdown, imbalance, overspeed, flame-out, surge, seepage, stall, chip, vibration, contamination, fire.

STRUCTURE: corrosion, F.O.D., wear, bird strike, sheared, dent, crack, distorted, loose, fretting, stain, peeling, chafing, tarnished, scratch, crazing, rubbing.

TIRES: wear, blister, deflated, cut, blown, chunking, skid mark, tear, burst.

ELECTRICAL POWER: out of phase, short circuit, noise, runaway, overload, flashover, tripped, discharge, transients, drift.

FLIGHT CONTROLS: jam, clogged, locked, stiff, runaway, play, missing, asymmetry, drift.

4 1. locked 2. top up 3. sign 4. completed 5. fill in 6. insert 7. flush 8. disarm 9. occurred 10. safety 11. trip 12. secure 13. pursued 14. popped out 15. shut down 16. set 17. taken 18. placarded 19. fitted 20. found 21. caused 22. monitoring 23. protruding 24. tightened 25. missing 26. dip 27. crossed over 28. depress 29. required 30. triggered

T1

1. play 2. interconnected 3. hung 4. fit 5. spliced 6. intersect 7. related
8. mated 9. linked 10. clearance 11. hinged 12. fastened 13. tied
14. interface 15. mounted

T2

1. mounted 2. intersect 3. wired 4. hung 5. play 6. interface 7. clearance
8. fastened 9. hinged 10. interconnected 11. fitted 12. spliced 13. tied
14. hooked 15. on line

U1

1. built-in 2. adjustable 3. dust-free 4. rotating light 5. fireproof 6. self-
contained 7. quick-disconnect fastener 8. replaceable 9. sliding window
10. self-locking 11. a 3-seat unit 12. engine-driven generator 13. metal-to-
metal 14. ground-based 15. bug-free, problem free, parasite free 16. fool
proofed plug 17. twin-aisle cabin 18. O-ring 19. overlapping 20. retaining
21. flight deck door 22. pylon-mounted 23. push-pull 24. self-lubricating
25. lift-to-drag ratio

W1

1/R 2/N 3/Y 4/S 5/F 6/V 7/T 8/X 9/W 10/Q 11/P 12/B 13/E 14/I
15/H 16/L 17/D 18/J 19/C 20./U 21/A 22/G 23/O 24/K 25/M

W2

1. prevent 2. completed 3. circuit 4. delay 5. fulfilled 6. actual 7. requires
8. let 9. insulated 10. retard, retard 11. alternating 12. charge 13. pylons
14. large 15. previous 16. replenish 17. depress 18. isolated 19. good
20. current 21. also 22. controls 23. then 24. important 25. alternative

Y1

ACROSS

1. store 2. safeguard 3. peak 4. batch 5. insulate 6. trip 7. lay
8. downtime 9. plot 10. network

DOWN

1. discard 2. efficiency 3. log on 4. thread 5. EDP 6. swaged 7. lag
8. rating 9. stage 10. coat 11. wipe 12. kink

Y2

1. AS PER 2. ETA 3. ASWR 4. RCMD 5. ADV 6. ABD, O/B 7. FLT
 8. SRY 9. CFM 10. AOG 11. APR 12. LT 13. WILAD 14. MSN
 15. MEL 16. TKS 17. ATD 18. HNDLG 19. REYT 20. RGDS 21. RQ
 22. RE 23. OFLD 24. BFR 25. FRAV 26. QRP 27. PREV 28. NTFY
 29. CK 30. KT 31. ASAP 32. A/C 33. WILCT 34. SKED 35. ACK
 36. BLK 37. A/L 38. UNKN 39. DEL 40. RUSHR

Y3**EXTRACT ONE**

1. LH bleed valve 2. No, in flight 3. No, a hose is for fluids 4. subsequent = following 5. the engine 6. discrepancy 7. downstream 8. a plate 9. start again

EXTRACT TWO

1. No: a QRP 2. No: measure = action, step 3. transferred 4. crossed over

EXTRACT THREE

1. prior to 2. run 3. all 4. untimely 5. dropped 6. bleeds 7. manual
 8. ramp 9. delayed

EXTRACT FOUR

1. Yes 2. tires 3. the procedure 4. Iberia engineering

EXTRACT FIVE

1. gate 2. due to 3. stuck 4. as 5. deactivated 6. replaced

EXTRACT SIX

1. leaving 2. repetitive 3. sounded 4. came on 5. both 6. remained
 7. diverted 8. revealed 9. cautionary 10. replaced

EXTRACT SEVEN

1. system 2 pressurization 2. cabin rate of climb 3. -500 ft/min 4. No, it increased. 5. Yes, but it had no effect. 6. By switching to system 1. 7. No, there were 3 previous cases.

REVIEW FOUR**1**

1. longer 2. heaviest 3. deflected, moved 4. actual 5. few 6. each
 7. stowed, housed, located 8. to 9. play or clearance 10. or 11. insulated
 12. little 13. any 14. mounted, located, installed 15. issues 16. reach
 17. during 18. locked 19. results 20. tied 21. prevents 22. counterclockwise
 23. applies, releases, sets 24. turn 25. clean 26. flashing, pulsing
 27. replenished 28. consists 29. both, all 30. displayed 31. tripped, popped
 32. reset 33. takes 34. cancelled 35. flush

2

1. drop 2. thin 3. between 4. extinguish 5. ed 6. over 7. rig 8. play
9. copper 10. supply 11. clockwise 12. alloy 13. clean 14. rough 15. lower
16. flush 17. straight 18. inlet 19. cross-check 20. feedback 21. trailing
22. printer 23. sensing 24. through 25. set 26. driven 27. worn 28. at
29. both 30. let 31. are ... heated 32. cancel 33. from ... to 34. crosswind
35. poor 36. purpose 37. lock 38. insulation 39. due to 40. downstream
41. can 42. unlocked 43. handle 44. as 45. reset 46. stiff 47. may 48. so
49. greater ... greater 50. de-energize 51. whereas 52. narrow 53. blanking
54. drift 55. moreover 56. over 57. deflect 58. retard 59. takes, lasts
60. less 61. steady 62. malfunction 63. inch 64. highest 65. lengthen
66. together 67. release 68. tighten 69. knot 70. sliding 71. as soon as
72. increase 73. strike 74. either 75. secured 76. overheat 77. consists
78. add 79. out of 80. little 81. dustfree 82. displays 83. flashing 84. self-
locking 85. some 86. fire-proof 87. top 88. prevents 89. each 90. if/as
91. actual 92. shall 93. line-replaceable 94. so 95. slash 96. air-cooled
97. air bleed 98. hinged 99. previous 100. last

Z1

1. U/S 2. pod 3. mount 4. remain 5. landing gear bay 6. small 7. trip
8. steady 9. isolation 10. indicator light 11. stop 12. flight 13. go back
14. bad 15. depress 16. due to 17. disagreement 18. socket 19. correct
20. defective

INDEX

This index refers to pages which contain a short explanation, definition or illustration of the word in question.

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