ANALYZED

PNEUMATIC SERVICES TRAILER
C-105
LOG/105/22

A.R. Littleboy January 1956

ANALYZED

A V ROE CANADA LIMITED

MALTON ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT: C-105 REPORT NO: LOG/105/22

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TITLE: PNEUMATIC SERVICES TRAILER

Classification cancelled / Changed to UNCLASS
By authority of AVCS
Date 22 Sept 56
Signature
Unit / Rank / Appointment AVCS

PREPARED BY A.R. Littlbboy DATE Jan.11, 1956

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FORM 1316A

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A. V. ROE CANADA LIMITED
MALTON ONTARIO
TECHNICAL DEPARTMENT (Aircraft)

REPORT No LOG/105/22
SHEET No 1

AIRCRAFT:		PREPARED BY	DATE
C-105	Pneumatic Services Trailer.	A.R. Littleboy	January, 1956
		CHECKED BY	DATE

Introduction

A mobile servicing unit is required to charge (with air or nitrogen) the following aircraft and ground equipment pneumatic systems.

(1)	Emergency systems storage bottle	)
(2)	All aircraft accumulators (5)	) Nitrogen
(3)	Main and nose undercarriage tires	)
(4)	Armament Pack Hoist	) Air.

The equipment will be used at:-

(a) The aircraft turn around facility
(b) At any dispersal point where limited aircraft servicing is carried out.
(c) First line maintenance hangars.
(d) Second line maintenance hangars.

As it is required that in an emergency, air can be used in place of nitrogen, in the aircraft systems, the servicing unit must therefore be capable of operating in a dual capacity, and compress air as readily as nitrogen.

System Capacity.

(1) Aircraft emergency system (Nitrogen)

Maximum charging pressure	5000 p.s.i.
Capacity "free air"	70 cu. ft.
Estimated loss between flights	12 cu. ft.

Servicing consists of topping up as required between flights. The system will only become fully discharged during emergency or, if dismantled.

(2) Aircraft Accumulators (5) Nitrogen)

Charging pressure range	1000 - 3300 p.s.i.
Capacity "free air"	60 cu. ft.
Estimated loss between periodic inspections	10 cu. ft.

The frequency of inspection has not been finally established, accumulators will only become fully discharged if system is dismantled.

(3) Tires (Air)

Tires main undercarriage charging pressure	240 p.s.i.
Approximate capacity (4 tires) free air	60 cu. ft.
Tires nose undercarriage charging pressure	170 p.s.i.

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(3) Cont'd....

Approximate capacity (2 tires) free air	10 cu. ft.
Estimated loss (total) between servicing	10 cu. ft.

(4) Armament Hoist (Air)

Charging pressure	3000 p.s.i.
Working range	3000 p.s.i. - 1200 p.s.i.
Effective Volume	260 cu. ft.
Number of operations per charge	18

Suggested Capacity of Nitrogen/Air Compressor

Compressor out put	10 cu. ft. free air per minute.
Nitrogen	4 commercial bottles
Total capacity (Nitrogen bottles)	570 cu. ft. (free air)

Daily Servicing One Aircraft.

Nitrogen

Emergency bottle	12 cu. ft. charging time, 1 - 2 min.
Accumulators	10 cu. ft. charging time, 1 min.

One set of 4 commercial nitrogen bottles will provide 25 daily inspection services.

Air

Tires	10 cu. ft. charging time, 1 min.
Armament hoist (18 operations)	260 cu. ft. charging time, 26 mins.

Note: The total "charge" volume of the aircraft accumulators and emergency bottle is approximately equal to the capacity of one commercial nitrogen bottle.

Nitrogen/Air Compressor Trailer Unit.

Summary of Requirements

The equipment is required to charge various aircraft and ancillary equipment pneumatic systems, both in a hangar and at dispersal points.

The equipment must be capable of satisfactory operation under the following conditions:-

/3.....Cont'd

Summary of Requirements Cont'd...

Temperatures ranging from -65° to +160°F.

Humidity up to 100%, including conditions wherein condensation will take place on the equipment.

Sand resistance under conditions of airborne sand particles.

Resistance to salt spray, atmosphere containing salt laden moisture.

Fungus - When exposed to fungus growth as encountered in tropical climates.

Operating position up to 15° of horizontal.

The ignition and electrical system to be suitably shielded to prevent causing radio interference.

The equipment must be capable of being towed over "improved" road surfaces at speeds up to 20 miles per hour.

The unit will comprise:-

A trailer chassis mounted on suitable pneumatic wheels (preferably three) and be equipped with a parking brake and tow bar. The towing eye to consist of a ring of 2 inch internal diameter and 1 inch sections.

Upon the chassis will be mounted:-

A gasoline engine driving a compressor with a capacity of 10 cu. ft. of free air per minute and a cutout pressure of 5250 p.s.i.

Provisions shall be made for the convenient mounting of four standard commercial nitrogen bottles.

These bottles are to be arranged with a view to ease of replacement and at a point where they do not effect the balance of the chassis, so as to cause the trailer unit to tip up while the bottles are being changed.

The equipment required to function in a dual capacity i.e. as an air compressor or a nitrogen compressor. In the latter case the nitrogen will be drawn from commercial storage bottles mounted on the trailer.

A suggested schematic arrangement of the system is given on figure 1, of this report.

A. V ROE CANADA LIMITED
MALTON - ONTARIO
TECHNICAL DEPARTMENT (Aircraft)

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C-105	PNEUMATIC SERVICES TRAILER.	A.R. Littleboy	January 1956
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DESCRIPTION OF SYSTEM.

System No. 1, Nitrogen.

The contents of the 4 commercial nitrogen bottles (b) is read on gauge (a). To operate the unit as a nitrogen compressor, select "Nitrogen" on master control, this operates valves c.e.i.n.o. (for clarity, these are shown as separate valves). Nitrogen then flows from bottle "b" through valve "c" to pressure reducing valve "d" where it is reduced to zero pressure. The gas passes through valve "e" to compressor inlet "f". The pressure outlet port of the compressor is connected to mechanical separator "h" which is the first stage for removing oil and moisture. The gas passes through valve "i" to unloading valve "j", the bypass of which remains closed until cut out pressure is reached (5250 p.s.i.) The gas passes to bottle "l" which ensures smooth operation of the unloading valve "j".

The gas passes through to valve "o" to valves "p" "q" "r" (these are shown as separate valves, operated by one lever). The desired pressure charging range is selected and the appropriate pressure reducing valve set. ("s" or "t"). Gauge "u" registers line pressure. The gas passes through chemical dryer "v" to shut off valve "w" and so to charging line "x".

System No. 2, Air.

Select "Air" on master control which operates valves c.e.i.n.o. The nitrogen part of the system is isolated. Air is drawn in to the compressor through valve "e" and passes out through valve "i" to unloading valve "k" and air bottle "m", through valve "n" to selector valves "p" "q" "r" and to charging hose "x" as described in system 1.

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MALTON ONTARIO
TECHNICAL DEPARTMENT (Aircraft)

REPORT No. FIG. 1
SHEET No.

PREPARED BY	DATE
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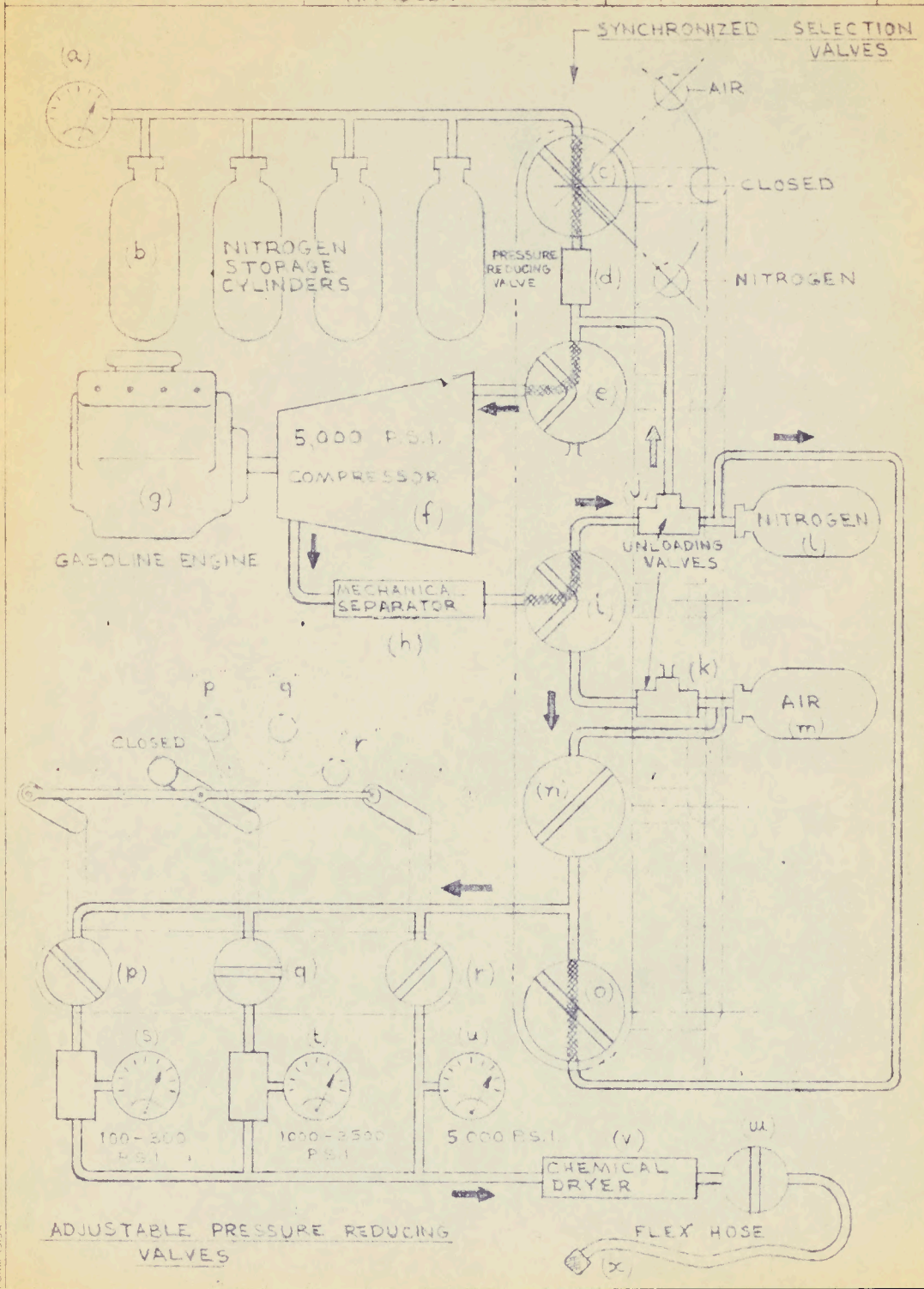
AIRCRAFT: C 105
AIR-NITROGEN PRESSURE RIG

SCHEMATIC.
INDICATES NITROGEN SELECTION



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