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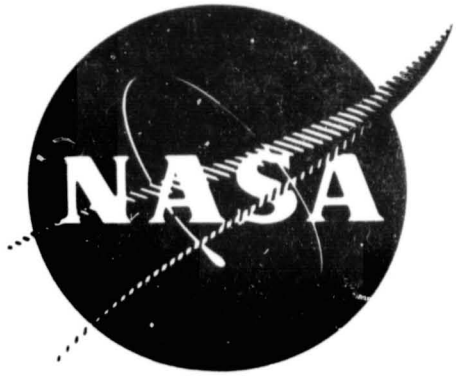
JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA



ATTITUDE CONTROL PROPULSION COMPONENTS

This work was performed for the Jet Propulsion Laboratory, California Institute of Technology, sponsored by the National Aeronautics and Space Administration under Contract NAS7-100.

VOLUME I

NOVEMBER 1974

BY

IIT RESEARCH INSTITUTE

Chicago, Illinois

FOREWARD

This book was prepared by IIT Research Institute for the Jet Propulsion Laboratory (JPL) under Contract No. 953830, IITRI Project C6309. The project was administered by the Liquid Propulsion Section of JPL. Ms. Maryann Cheny served at Contract Negotiator and Mr. R. K. Baerwald was Technical Manager.

The program was administered by the Information Sciences section of IIT Research Institute under Mr. Peter B. Schipma, Manager. Mr. Alan K. Stewart, Associate Information Scientist, was project leader. Ms. Milda Tamulionis, Assistant Engineer, conducted the survey and Ms. Sharon R. Pyrce, Technical Assistant, extracted and converted data and prepared the various indexes, lists, and summaries.

We are also indebted to the manufacturers and contractors who graciously provided the information in this book. These contributors are credited on their inclusion in the Vendor Directory, Section 6.3, of this book.

TABLE OF CONTENTS

I. INTRODUCTION

1.1 Purpose

This catalog is intended to serve as a point of departure for the spacecraft attitude control system designer. It is hoped that the information on flight-qualified hardware contained herein will enable the interested party to determine which components are presently available and how closely these items satisfy anticipated requirements. To this end, every effort has been made to include as much engineering information on each component as possible, consistent with usefulness and catalog size limitations.

1.2 Scope

The contents of this catalog include components which have been qualified for use with spacecraft monopropellant hydrazine and inert gas attitude control systems. Thrust ranges up to 44.5 N (10.0 lbf) for hydrazine and inert gas systems were considered. Additionally, some components qualified for uses other than spacecraft attitude control are included because they are suitable for use in attitude controls systems. Specifically, liquid components are included if they provide for flow equivalent to 0.25 lbm/sec N_2H_4 at 1.0 psid, or if the ESEOD (equivalent square edge orifice diameter) given is less than 0.32 in. For gaseous flow,* an upper limit equivalent to 450 SCFM N_2 (at 20 atmospheres and 60°F) was employed. This limit converts to a maximum flow coefficient, C_v, of 2.55.

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* Standard conditions of 60°F and 1 atmosphere were used when reporting data for appropriate components.

Catalog size limitations have restricted the contents to the following items: filters (both gas and liquid), propellant isolation valves, relief valves, gas pressure regulators, fill and vent (manual) valves, hydrazine thrusters, cold gas jet valves, pressure transducers, and temperature transducers.

A comprehensive survey of available spacecraft propellant and pressurant tanks, with engineering data, may be found in the 1974 version of NASA's AEROSPACE TANKS catalog. An abbreviated listing of spacecraft tanks is given in Section 4.1; however, for other possible suitable tanks, the designer should refer to AEROSPACE TANKS.

1.3 Organization

The data sheets for each components are arranged in three basic catagories as follows:

1) Propellant Control Subassemblies - those components which are typically located upstream of the thruster/valve assemblies.
2) Thruster Valve Assemblies - those components which are directly involved in the production or regulation or impulse.
3) Transducers - pressure and temperature transducers which may have been used at any point in the propulsion subsystem.

Components within each subcategory are ordered according to the increasing value of a primary performance parameter as follows:

Thrust -

Thrusters, Hydrazine

Flow -

Valves, Propellant Isolation
Valves, Check
Valves, Fill and Vent
Valves, Hydrazine Thruster
Valves, Cold Gas Jet

Pressure -

Valves, Relief (Cracking Pressure)
Regulators, Gas Pressure (Regulated Pressure)
Transducers, Pressure (Maximum Operating)

Temperature -

Transducers, Temperature (Maximum Measurement)

Size -

Filters, Gas (Absolute Micron Rating, Secondarily by Flowrate)
Filters, Liquid (Absolute Micron Rating, Secondarily by Flowrate)

Data for a given component is arranged with primary performance parameters listed in an assumed generally decreasing order of importance to the designer. The absence of information for any entry on the data sheet indicated that the information was not provided by our sources. We have indicated "N/A" only when an entry was definitely determined not to be applicable to the particular component. When thrust or flow information was not provided, data sheets were ordered at the back of the section alphabetically.

The indexes, located in Section 5, provides summaries of selected data for all data sheets and is arranged to facilitate the rapid location of entries. Information has been abbreviated as much as possible to fit in a concise format. Double dashes (--) are used to indicate that the data was not available.

The Component-Ordered Data Summary lists the component, manufacturer, part number, program and data sheet number for each entry. The organization of this summary is first alphabetically by component, within component alphabetically by manufacturer, within manufacturer alphanumerically by part number.

The Manufacturer-Ordered Data Summary lists the manufacturer, part number, prime contractor, component, and data sheet for each entry. The organization of the summary is first alphabetically by manufacturer and within manufacturer alphanumerically by part number.

The Program-Ordered Data Summary lists the program or vehicle on which the component was used, the name of the component, manufacturer, part number, and data sheet number for each entry. Organization of the summary is first alphabetically by program, within program alphabetically by component name, within component alphabetically by manufacturer, and within manufacturer alphanumerically by part number.

Section 6 contains appendixes and general reference matter including a list of abbreviations most frequently used in the catalog; a list of acronyms of the major NASA launches and contractor names; a vendor directory of manufacturers and prime contractors mentioned in Section 4; and two reference lists of bibliographic information concerning the reference numbers cited on data sheets in Section 4.

1.4 Updating

1.4.1 Submittal of Additional Data Sheets

Over 170 American manufacturers were contacted and requested

to supply engineering data on relevant components. In spite of the magnitude of this effort, some manufacturers of important components may have been overlooked. Other manufacturers were heavily involved in new proposal efforts and could not afford the time necessary to complete data sheets on each item they manufacture. For these reasons, and because information on new components should be similarly available to all potential users, provisions have been made for adding data sheets to each catalog as that information becomes available.

This section contains a set of blank data sheets identical to those found in Section 4.0. Any manufacturer of a relevant component who would like to include that item in this catalog should duplicate the corresponding data sheet, complete it in as much detail and in the same manner as others found herein, and send it to:

Mr. R. K. Baerwald
Liquid Propulsion Section
Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, California 91103.

The data sheets will then be reproduced and distributed to catalog holders by the Jet Propulsion Laboratory. JPL reserves the right to reject for inclusion those data sheets which are either grossly incomplete or not in keeping with the context of the catalog. In either case the data sheet will be returned to the contributor with an explanation of the rejection.

While JPL will bear the expense of reproduction and distribution, it must not be inferred that JPL is liable for expenses incurred by the manufacturer in compiling and completing the submitted data sheets. Additionally, no time schedule for

distribution of accepted data sheets is implied, although the time between acceptance of a data sheet and its distribution will be kept as short as possible.

1.4.2 Distribution

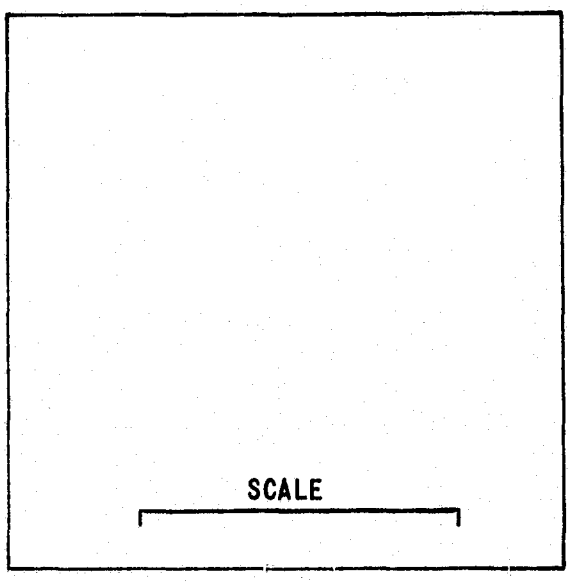
The original catalog distribution list may be found in the front of this catalog. Any catalog holder whose name does not appear on this list but who wishes to be included in update distributions should submit his name and address to Mr. R. K. Baerwald of JPL. Any address on the original distribution list which is incorrect, incomplete, or which will cause delay in the receipt of data sheets should be similarly corrected. Catalog holders should reference their Catalog Number (see cover sheet) in all correspondence.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

RATING ..... _____ MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... _____ scc/s of _____ @ _____ N/cm^2, _____ ^oC
(_____ SCFM of _____ @ _____ PSID, _____ ^oF)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

- OPERATING ..... _____ N/cm^2 (_____ PSIA)
- PROOF ..... _____ N/cm^2 (_____ PSIA)
- BURST ..... _____ N/cm^2 (_____ PSIA)
- MIN. ELEMENT COLLAPSE DIFFERENTIAL .. _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ ^oC (_____ ^oF)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

- CONSTRUCTION ..... _____
- ELEMENT ..... _____

CONNECTION -

- INLET ..... _____
- OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

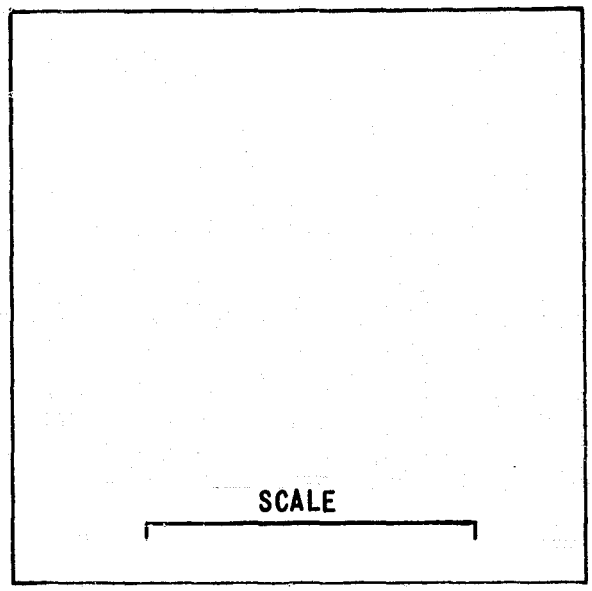
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

RATING ..... _____ MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... _____ kg/sec of _____ @ _____ N/cm^2, _____ °C
(_____ lbm/sec of _____ @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	_____ N/cm^2	(_____ PSIA)
PROOF	_____ N/cm^2	(_____ PSIA)
BURST	_____ N/cm^2	(_____ PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

ELEMENT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

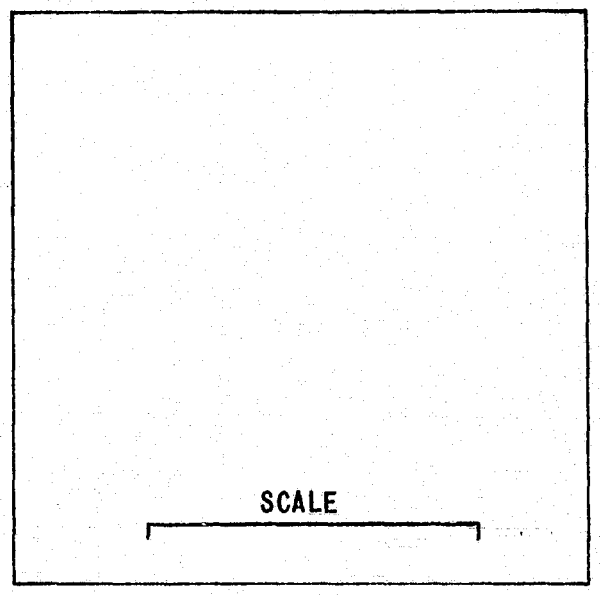
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

QUALIFIED..... _____

FLOWN..... _____

LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
(_____ lbm/sec @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... _____

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH _____

INTEGRAL FILTER ..... _____ MICRONS ABSOLUTE

LIFE ..... _____ CYCLES

PRESSURES -

OPERATING	_____ N/cm^2	(_____ PSIA)
PROOF	_____ N/cm^2	(_____ PSIA)
BURST	_____ N/cm^2	(_____ PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... _____ Vdc

POWER ..... _____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... _____ Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... _____

SEATS ..... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... _____ kg (_____ lbm)

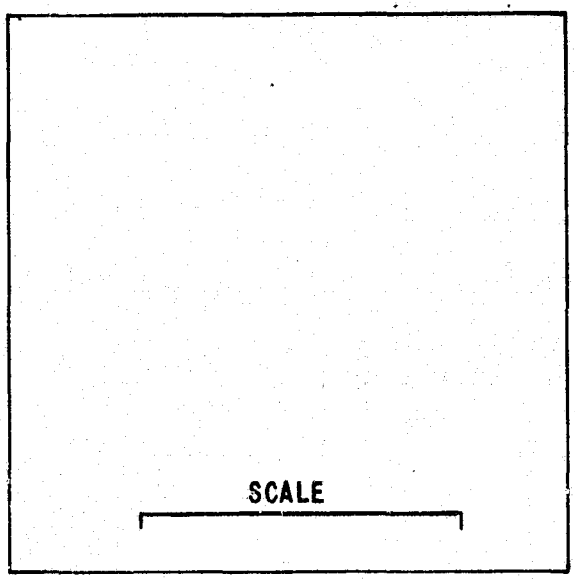
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

CRACKING PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ scc/s @ _____ N/cm^2, _____ ^oC
(_____ SCFM @ _____ PSID, _____ ^oF)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ ^oC (_____ ^oF)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

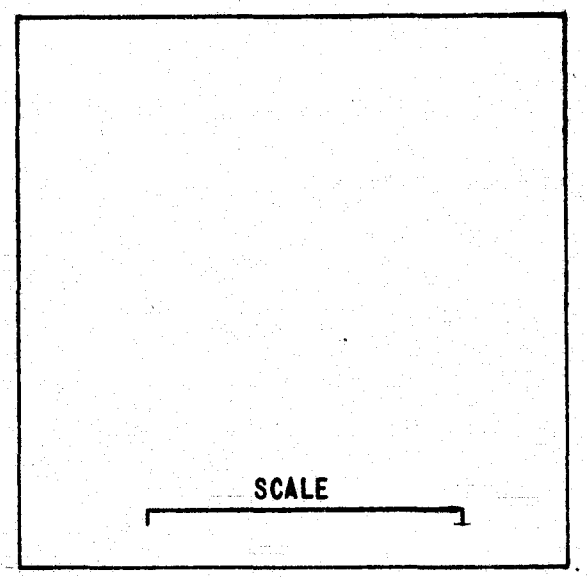
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

RATED FLOW AT DIFFERENTIAL PRESSURE -

NOMINAL ..... _____ scc/c @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

EMERGENCY ..... _____ scc/s @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

CRACKING PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

LIFE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

SURGE PRESSURE ..... ZERO TO _____ N/cm^2 WITH MAX RISE RATE OF _____ $N/(cm^2\text{-sec})$
(_____ PSIA) (_____ PSIA/sec)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr of _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s of _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

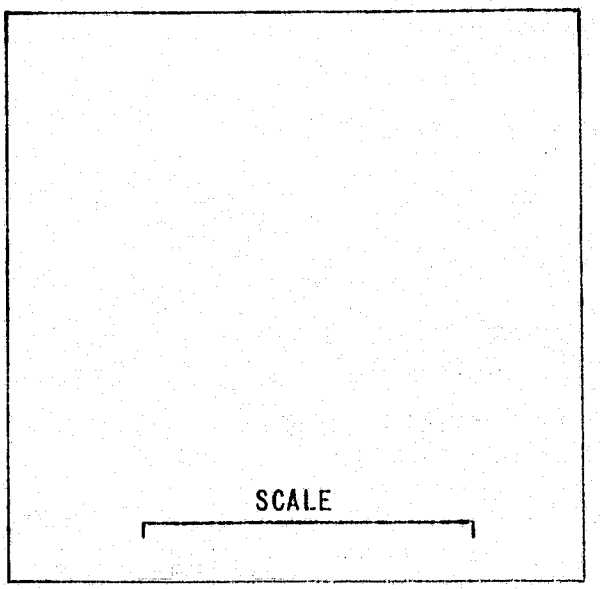
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

QUALIFIED..... _____

FLOWN..... _____

LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

INLET PRESSURE RANGE ..... _____ N/cm^2 (_____ PSIA)

REGULATED OUTLET PRESSURE ..... _____ ± _____ N/cm^2 @ _____ scc/s FLOW RATE RANGE
(_____ ± _____ PSIA @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... _____ scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(_____ SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

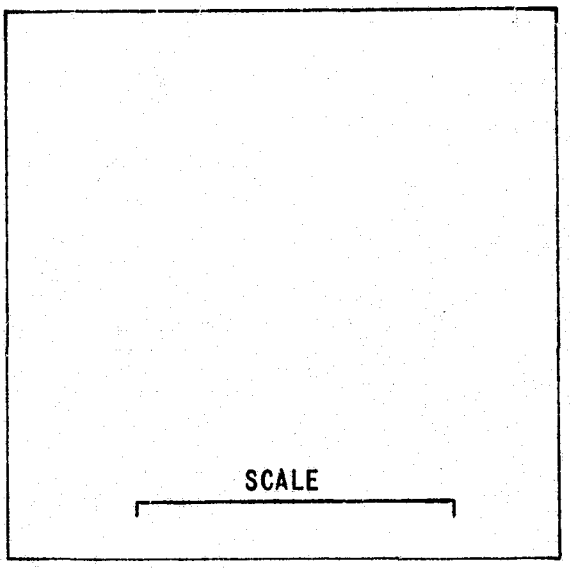
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 FILL AND VENT VALVE

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 VALVE, FILL AND VENT

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

RATED FLOW AT DIFFERENTIAL PRESSURE (ACROSS BOTH FLIGHT AND GROUND HALVES IN EITHER DIRECTION) -

LIQUID ..... _____ kg/sec OF _____ @ _____ N/cm^2, _____ ^oC

(_____ lbm/sec OF _____ @ _____ PSID, _____ ^oF)

GAS ..... _____ scc/s OF _____ @ _____ N/cm^2, _____ ^oC

(_____ SCFM OF _____ @ _____ PSID, _____ ^oF)

INTEGRAL FILTRATION ..... _____ MICRONS ABSOLUTE

LIFE ..... _____ CYCLES

PRESSURES -

OPERATING ..... _____ N/cm^2 (_____ PSIA)

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ ^oC (_____ ^oF)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

DESCRIPTION OF GROUND HALF ..... _____

SPACECRAFT CONNECTION ..... _____

MASS (FLIGHT HALF ONLY)..... _____ kg (_____ lbm)

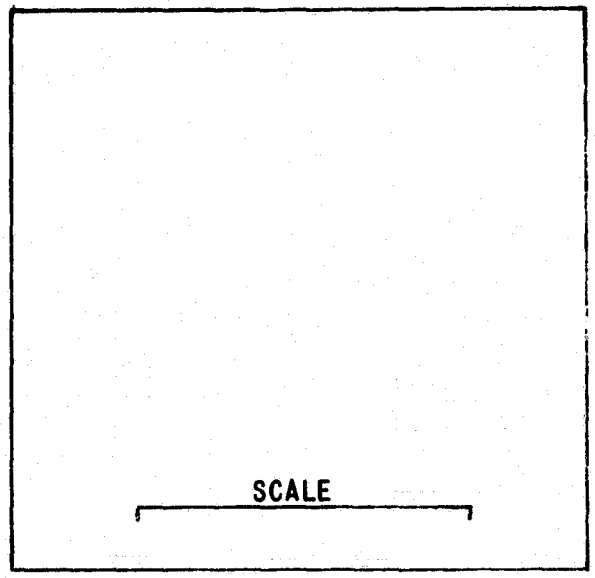
OTHER SIGNIFICANT CHARACTERISTICS ....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.1 THRUSTER, HYDRAZINE

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

VALVE MANUFACTURER..... _____ PART NUMBER _____

HEATER MANUFACTURER..... _____ PART NUMBER _____

SENSOR MANUFACTURERS.....

TEMPERATURE TRANSDUCER .... _____ PART NUMBER _____

PRESSURE TRANSDUCER ..... _____ PART NUMBER _____

PROGRAM..... _____

CONTRACTING AGENCY ..... _____

PRIME CONTRACTOR ..... _____

STATUS

QUALIFIED ..... _____

FLOWN ..... _____

LAUNCH VEHICLE ..... _____

AVAILABILITY ..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.1 THRUSTER, HYDRAZINE

PROPELLANT..... _____

VACUUM THRUST RANGE ..... _____ N (_____ lb_f)

INLET PRESSURE RANGE ..... _____ N/cm^2 (_____ PSIA)

INLET TEMPERATURE RANGE ..... _____ ^oC (_____ ^oF)

MINIMUM IMPULSE BIT ..... _____ N-sec @_____ N/cm^2 INLET P,_____ ^oC CATALYST BED TEMP.

(_____ lb_f-sec @ _____ PSIA, _____ ^oF CATALYST BED TEMP)

IMPULSE BIT REPEATABILITY @ ..... _____ N/cm^2 (_____ PSIA) INLET PRESSURE:

3σ REPEATABILITY	PULSE NUMBER
± _____ %	_____
± _____ %	_____
± _____ %	_____

CENTROID LOCATION REPEATABILITY FOR _____ sec VALVE ON-TIME:

3σ REPEATABILITY	PULSE NUMBER
± _____ %	_____
± _____ %	_____
± _____ %	_____

CHAMBER PRESSURE ROUGHNESS ..... ± _____ %

RESPONSE -

TIME FROM VALVE-ON SIGNAL TO 90% STEADY STATE P_c: _____ sec

TIME FROM VALVE-OFF SIGNAL TO 10% STEADY STATE P_c: _____ sec

STEADY STATE VACUUM SPECIFIC IMPULSE ..... _____ N-sec/kg (_____ lb_f-sec/lbm)

LIFE -

TOTAL IMPULSE ..... _____ N-sec (_____ lb_f-sec)

TOTAL THROUGHPUT ..... _____ kg (_____ lbm)

TOTAL NUMBER OF COLD STARTS ..... _____ @ _____ ^oC (_____ ^oF)

TOTAL NUMBER OF PULSES..... _____

STEADY STATE DUTY CYCLE -

TOTAL ON-TIME ..... _____ sec

MAXIMUM ON-TIME ..... _____ sec

PULSE MODE DUTY CYCLE -

TEMPERATURE AT START OF PULSE TRAIN ..... _____ ^oC (_____ ^oF)

NOMINAL PULSE TRAIN LENGTH ..... _____ PULSES

NOMINAL ON-TIME(S) ..... _____ sec

NOMINAL OFF-TIME(S) ..... _____ sec

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.1 THRUSTER, HYDRAZINE continued

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

INJECTOR -

PATTERN OF PROPELLANT DISTRIBUTION ..... _____

INJECTOR PRESSURE DROP AT FLOW RATE ..... _____ N/cm^2 @ _____ kg/sec

(_____ PSID @ _____ lbm/sec)

CATALYST -

TYPE ..... _____

PELLET SIZE(S) ..... _____

RETENTION TECHNIQUE ..... _____

BED DIAMETER ..... _____ cm (_____ in)

BED LENGTH ..... _____ cm (_____ in)

BED LOADING ..... _____ kg/sec/cm^2 (_____ lbm/sec/in^2)

HEATER -

NOMINAL SUPPLY VOLTAGE ..... _____ Vdc,

MAXIMUM POWER ..... _____ WATTS @ _____ Vdc, _____ ^oC (_____ ^oF)

CATALYST BED TEMPERATURE ..... _____ ^oC (_____ ^oF)

VALVE -

THRUSTER-VALVE INTERFACE DESCRIPTION ..... _____

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

EXTERNAL LEAKAGE ..... _____ scc/s OF ____ @ _____ N/cm^2 (_____ PSIA)

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.1 THRUSTER, HYDRAZINE continued

MATERIAL -

CHAMBER ..... _____

STANDOFF ..... _____

CATALYST RETAINER ..... _____

MASS -

WITH VALVE ..... _____ kg (_____ lbm)

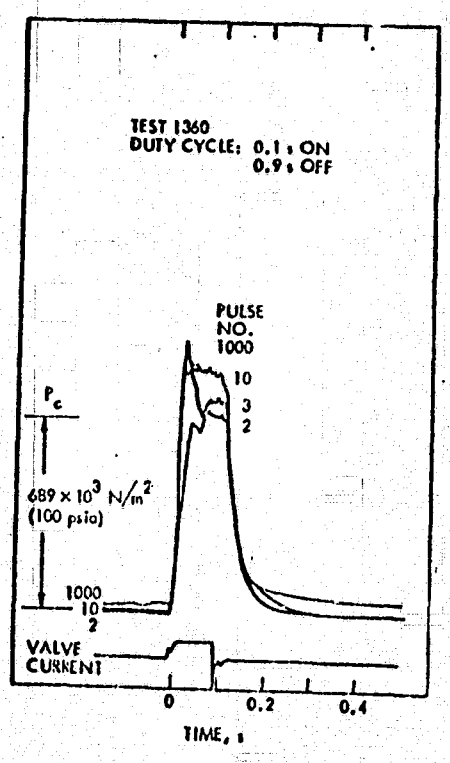
WITHOUT VALVE ..... _____ kg (_____ lbm)

OTHER ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Pulsing Specific Impulse vs Pulse Number

Impulse Bit vs Pulse Number



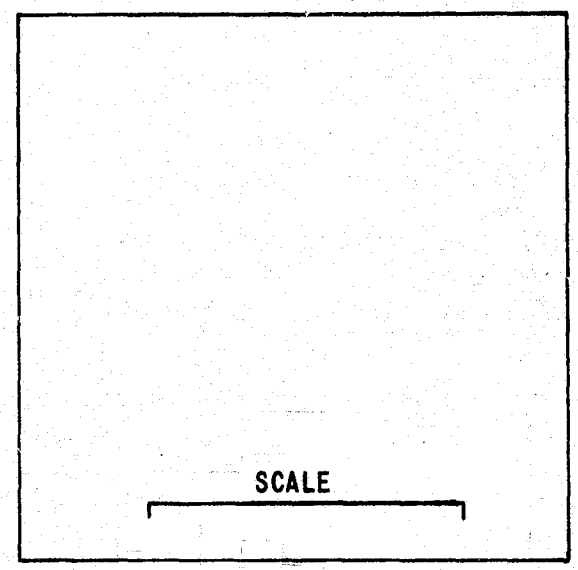
Typical Pulse Trace

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.2 VALVE, HYDRAZINE THRUSTER

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.2 VALVE, HYDRAZINE THRUSTER

TYPE ..... _____

USED WITH THRUSTER ..... _____

DESIGN FLOW MEDIA ..... _____

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
(_____ lbm/sec @ _____ PSID, _____ °F)

RESPONSE TIME -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE _____ °C
(_____ PSIA INLET PRESSURE _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA _____ °F)

LIFE ..... _____ CYCLES

INTEGRAL FILTRATION ..... _____ MICRONS ABSOLUTE

PRESSURES -

OPERATING INLET RANGE ..... _____ N/cm^2 (_____ PSIA)

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

SUPPLY VOLTAGE RANGE ..... _____ Vdc

POWER REQUIREMENTS ..... _____ WATTS @ _____ Vdc, _____ °C (_____ °F)

DIELECTRIC STRENGTH ..... _____ mA MAXIMUM CURRENT LEAKAGE
@ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAX. VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... _____

SEATS ..... _____

MASS ..... _____ kg (_____ lbm)

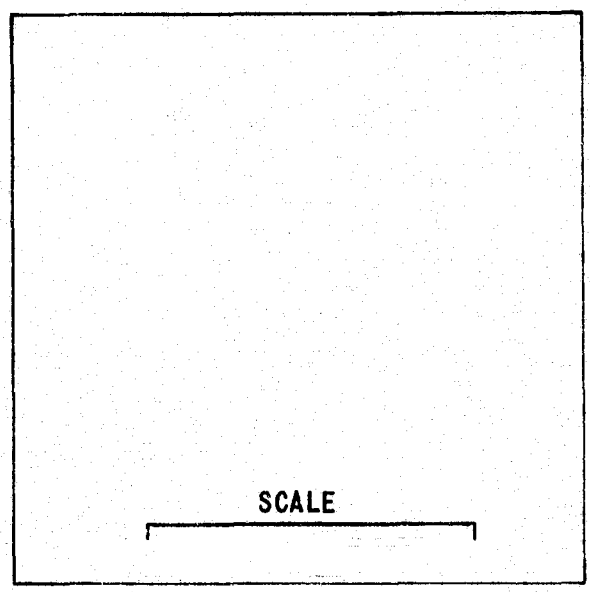
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.3 VALVE, COLD GAS JET

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.3.3 VALVE, COLD GAS JET

PROPELLANT ..... _____

VACUUM THRUST RANGE ..... _____ N (_____ lb_f)

INLET PRESSURE RANGE ..... _____ N/cm^2 (_____ PSIA)

INLET TEMPERATURE RANGE ..... _____ °C (_____ °F)

RATED FLOW AT PRESSURE DIFFERENTIAL .. _____ scc/s @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA, _____ °F)

MIN. COMMANDED PULSE WIDTH
(SIGNAL ON TO SIGNAL OFF) ..... _____ ms

LIFE ..... _____ CYCLES

PRESSURES -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

LEAKAGE -

INTERNAL ..... _____ scc/HR OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... _____ Vdc

POWER REQUIREMENTS ..... _____ WATTS @ _____ Vdc, _____ °C (_____ °F)

DIELECTRIC STRENGTH ..... _____ mA MAXIMUM CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (GAMMA @ 6 in)

NOZZLE ..... _____ REMOVABLE FROM VALVE
_____ INTEGRAL WITH VALVE

NOZZLE AREA RATIO ..... _____

MATERIALS -

CONSTRUCTION ..... _____

SEATS ..... _____

CONNECTIONS -

INLET ..... _____

ELECTRICAL ..... _____

MASS ..... _____ kg (_____ lbm)

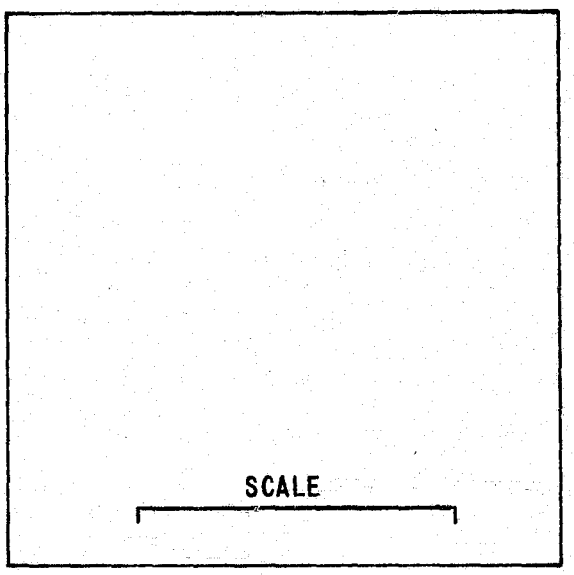
OTHER SIGNIFICANT CHARACTERISTICS ....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.4.1 TRANSDUCER, PRESSURE

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

- QUALIFIED..... _____
- FLOWN..... _____
- LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.4.1 TRANSDUCER, PRESSURE

OPERATING PRINCIPLE ..... _____

DESIGN USE ..... _____

OPERATING PRESSURE RANGE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ ^oC (_____ ^oF)

OUTPUT VOLTAGE RANGE ..... _____ Vdc

TIME CONSTANT ..... _____ sec

DEAD VOLUME ..... _____ cm^3 (_____ in^3)

THERMAL SENSITIVITY SHIFT ..... ± _____ % OF FULL SCALE/^oC

THERMAL ZERO SHIFT ..... ± _____ % OF FULL SCALE/^oC

LINEARITY ..... ± _____ % OF FULL SCALE

HYSTERESIS ..... ± _____ % OF FULL SCALE

REPEATABILITY ..... ± _____ % OF FULL SCALE

ACCELERATION ERROR ..... _____ % OF FULL SCALE/G

VIBRATION ERROR ..... _____ % OF FULL SCALE/G

LIFE ..... _____ CYCLES

SUPPLY VOLTAGE RANGE ..... _____ VOLTS dc

SUPPLY CURRENT RANGE ..... _____ AMPERES

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

OUTPUT IMPEDENCE ..... _____ Ohms

OUTPUT REGULATION ..... _____ % CHANGE IN OUTPUT OVER THE FULL RANGE OF INPUT VOLTAGE

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

EXTERNAL LEAKAGE ..... _____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

MATERIALS ..... _____

MOUNTING PROVISIONS ..... _____

CONNECTIONS -

ELECTRICAL ..... _____

PRESSURE ..... _____

MASS ..... _____ kg (_____ lbm)

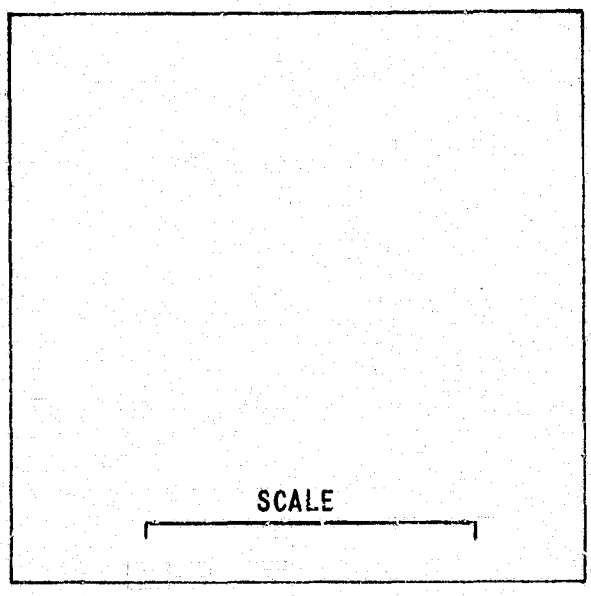
OTHER SIGNIFICANT CHARACTERISTICS ...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.4.2 TRANSDUCER, TEMPERATURE

MANUFACTURER _____

PART NUMBER _____



PICTORIAL REPRESENTATION
(CROSS SECTION, SCHEMATIC,
DRAWING, PICTURE, ENVELOPE, ETC.)

PROGRAM..... _____

CONTRACTING AGENCY..... _____

PRIME CONTRACTOR..... _____

STATUS

QUALIFIED..... _____

FLOWN..... _____

LAUNCH VEHICLE..... _____

AVAILABILITY..... _____

COST/PROCUREMENT INFORMATION... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.4.2 TRANSDUCER, TEMPERATURE

TYPE ..... _____

DESIGN USE ..... _____

TEMPERATURE MEASUREMENT RANGE ..... _____ °C (_____ °F)

SENSITIVITY ..... ± _____ °C (± _____ °F)

ERROR BAND ..... _____ °C (_____ °F)

THERMAL TIME CONSTANT ..... _____ sec

SUPPLY VOLTAGE RANGE ..... _____ Vdc

NOMINAL RESISTANCE ..... _____ Ω @ _____ °C (_____ °F)

MAXIMUM CONTINUOUS CURRENT ..... _____ AMPERES

DIELECTRIC STRENGTH ..... _____ mA MAXIMUM CURRENT LEAKAGE
@ _____ VOLTS rms, Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MOUNTING PROVISIONS ..... _____

MATERIAL ..... _____

CONNECTION-ELECTRICAL ..... _____

MASS ..... _____ kg _____ lbm

OTHER SIGNIFICANT CHARACTERISTICS... _____

_____

_____

2. GENERAL DISCUSSION

2.1 Component Use

Although this catalog is entitled ATTITUDE CONTROL PROPULSION COMPONENTS, the items described herein have been or could be used in systems performing functions other than attitude control, including velocity control and orbit adjustment. The cataloged components can be used in a seemingly endless number of arrangements depending upon what the propulsion subsystem designer wishes to accomplish. Typical inert gas and hydrazine propulsion systems, as well as a combination thereof, are shown schematically in Figure 1, which also depicts one or more uses for each of the catalog components.

As mentioned in Section 1.2, only those items commonly found in inert gas or hydrazine propulsion systems are included as catalog items. For an in-depth discussion of these and other unmanned spacecraft propulsion systems the interested party should refer to "SATELLITE AUXILIARY - PROPULSION SELECTION TECHNIQUES," by L. B. Holcomb, TR32-1505, November 1970, Jet Propulsion Laboratory, Pasadena, California.

2.2 Inert or Cold Gas Systems.

An inert gas system is inherently simple because of its utilization of one non-reacting gaseous propellant. A schematic diagram of this type of system is shown in Figure 1a.

The fill and vent (manual) valve is used for charging the system. An isolation valve seals the system until activation. The gas pressure regulator maintains the correct pressure to the inert gas thrusters, which are usually solenoid valves with integral expansion nozzles. A filter retains particulate contamination to prevent valve seat damage and subsequent leakage and a relief valve precludes overpressurization of the downstream portion in the event of regulator failure. Pressure transducers monitor system performance and are used to indicate propellant consumption.

An advantage of this system is its high reliability; disadvantages include low specific impulse and high pressure.

2.3 Hydrazine Systems

A typical blow-down hydrazine system is shown schematically in Figure 1b. In this case, the inlet pressure to each hydrazine thruster decreases as the propellant is expended. Some schemes utilize a separate pressurant tank and pressure regulator, as depicted in Figure 1c, to maintain a constant propellant pressure.

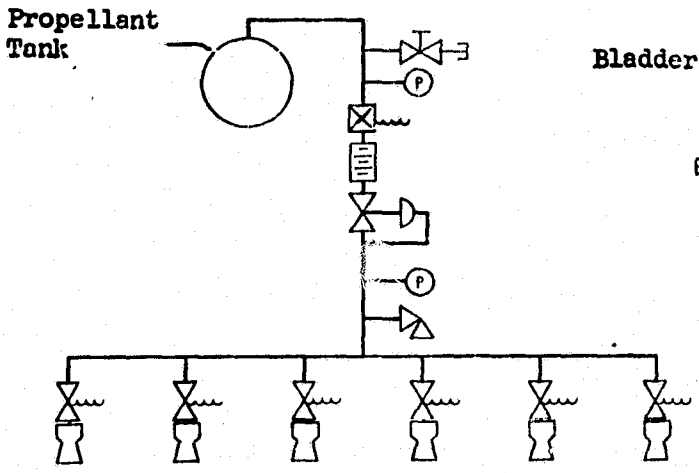
As with the cold gas system, an isolation valve is used to seal the system or, in some cases, a branch of the system, until ready for use. Pressure and temperature transducers monitor system performance and propellant usage.

While offering the advantages of lower pressures and higher specific impulse, the blow-down hydrazine system has an additional requirement for a device to positively locate the propellant. This device may be in the form of a

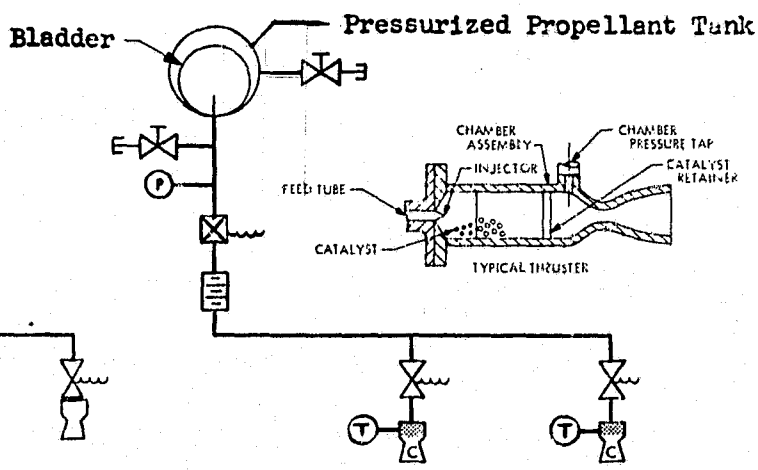
bladder or diaphragm separating propellant and pressurant; surface tension devices may also be used. In the case of spin-stabilized spacecraft, the centrifugal force located the liquid propellant and these devices are not necessary.

As implied by the schematic diagrams in Figure 1, most of the components in this catalog may be procured as discreet items. Exceptions are the hydrazine thrusters of Section 4.3.1 which are, in general, only obtainable from the manufacturer as a thruster/valve assembly. The valve for which the thruster was designed and for which the given engineering data are applicable is referenced on the thruster data sheet.

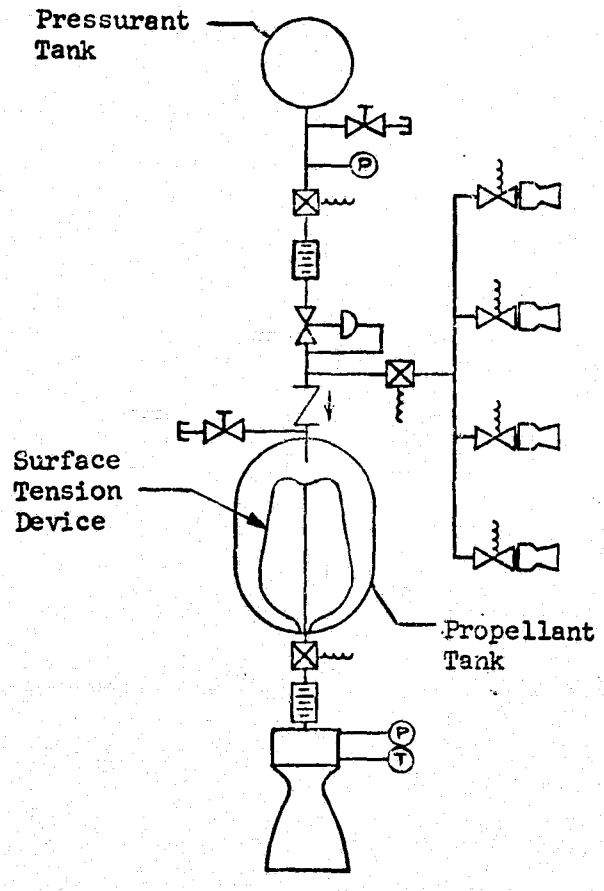
Figure 1



a) Typical Inert Gas Attitude Control System



b) Typical Hydrazine Attitude Control System



c) Miscellaneous Combinations

Propellant Control Subassemblies

- Filter, Gas/Liquid
- Isolation Valve
- Relief Valve
- Check Valve
- Gas Pressure Regulator
- Fill And Vent Valve

Thruster/Valve Assemblies

- Hydrazine Thruster Valve
- Hydrazine Thruster
- Inert or Cold Gas Jet Valve

Transducers

- (P) Pressure Transducer
- (T) Temperature Transducer

3. VARIABLES AND UNITS

The National Aeronautics and Space Administration announced in NASA Policy Directive NPD 2220.4 dated September 14, 1970, "Measurement values employed in NASA Technical Reports, Technical Notes, Technical Memoranda, Contractor Reports, and Special Publications shall be expressed in the International System of Units (SI)." A recent paper by D. E. Carmody of McDonnel Douglas states that: "Aerospace will, in all probability, be among the very first industries to be affected when the United States government, after 180 years of debate, finally decides to 'go metric.'" Hopefully the use of these units in Attitude Control Propulsion Components will be beneficial to this effort.

Contributors supplied almost all engineering data in English Units. Exceptions were leakage rates, which are generally quoted in metric units throughout the industry. Since English units are still the most familiar to personnel in the aerospace community, these units are retained in parentheses throughout the catalog.

The International System of Units (Systeme International d' Unites which is designated SI in all languages) is the system of units recognized by the majority of industrial nations. The 11th through 14th General Conference on Weights and Measures meeting from 1960 to 1971 have refined the International System of Units to a state of completeness and coherence that make it attractive for all applications.

The system is based on seven fundamental units from which all necessary units can be derived:

Length	meter (m)
mass	kilogram (kg)
time	second (s)
electric current	ampere (A)
thermodynamic temperature	kelvin (K)
amount of substance	mole (mol)
luminous intensity	candela (cd)

A computer program was utilized to convert English/Metric units of length, area, weight, volume, pressure, and others. On reason for generating this program was the desire to have the result in SI units, not just non-standard metric units. The 36 conversion factors in an expandable array convert from English to SI and SI to English. Another feature of the program is a precision algorithm which checks that the new unit represents the same degree of accuracy as the original. The number of significant (non-zero) digits of the original units becomes the number of significant digits, assigned from left to right, of the converted unit. All extraneous digits are truncated.

Those contributors supplying additional catalog data (see Section 1.4, Updating) should attempt to follow a conversion methodology similar to that explained here. Reference should be made to NASA publication SP-7012, "THE INTERNATIONAL SYSTEM OF UNITS: Physical Constants and Conversion Factors".

A summary of the conversion factors used throughout the catalog follows:

TO CONVERT FROM	TO	MULTIPLY BY
°C	°F	$t_F = (t_c \times 9/5) + 32$
°F	°C	$t_c = (5/9)(t_F - 32)$
hr	sec	3600
in	cm	2.540
in	m	.0254
kg	lb	2.205
lbf	N	4.448
lbm	kg	.4536
lb/ft^3 of GHe	SCFM	89.76
lb/ft^3 of GN_2	SCFM	12.80
lb/ft^3 of GO_2	SCFM	11.20
lbm/min	lbm/sec	.0166
min	sec	60
oz	kg	.02835
oz	lbm	.06250
psia	N/cm^2	.68948
psid	N/cm^2	.68948
psig	psia	psia = psig + 15
SCCH	SCCS	.000277
SCCM	SCCH	59.9
SCCS	SCFM	.0021
SCFM	SCCS	472
sec	hr	.0002778
sec	min	.01667

4.1 VOLUME-ORDERED DATA SUMMARY

1. LIQUID TANKS

VOLUME CU M	VOLUME CU IN	PRESSURE N/SQ M	PRESSURE PSI	CONTENTS	PROGRAM/VEHICLE	DATA SHEET NUMBER
.007780	457	413	600	N2H4 AND N2	INTELSAT III	IV-32
.007980	487	275	400	N2H4	HS 310	IV-34
.008140	497	275	400	--	IDCS	IV-35
.008140	497	275	400	HYDRAZINE	SKYNET	IV-36
.008190	500	206	300	HYDRAZINE	EXPLORER-B	IV-37
.011400	697	212	308	N2H4	MARINER/MARS	IV-42
.018020	1,100	413	600	N2H4	DSCS-II	IV-59
.022790	1,391	299	435	N2H4	GEOS	IV-64
.037690	2,300	444	645	N2H4	ERTS	IV-87
.037690	2,300	368	535	N2H4	PIONEER	IV-88
.037690	2,300	275	400	N2H4	ATS F&G	IV-89
.037690	2,300	262	380	N2H4	MVM	IV-90
.037690	2,300	368	535	N2H4	OATS	IV-91
.055230	3,370	344	500	N2H4 N2	MODEL 35	IV-111
.061880	3,776	413	600	N2H4 AND N2	MODEL 35	IV-116
.062030	3,785	--	--	N2H4	LES	IV-117

4.1 VOLUME-ORDERED DATA SUMMARY

1. LIQUID TANKS

VOLUME CU M	VOLUME CU IN	PRESSURE N/SQ M	PRESSURE PSI	CONTENTS	PROGRAM/VEHICLE	DATA SHEET NUMBER
.091210	5,565	250	364	HYDRAZINE AND GN2	VIKING LANDER CAPSULE	IV-133
.091210	5,565	241	350	N2H4	FLEET SAT-COM	IV-134
.091450	5,580	241	350	N2H4	P-95	IV-136
.091450	5,580	241	350	N2H4	P-95	IV-137
.091780	5.600	241	350	HYDRAZINE	P-95	IV-138
.112000	6,835	377	547	--	VIKING ORBITOR '75	IV-142
.128700	7,853	165	240	N2O4	MMBPS	IV-147
.129400	7,900	166	242	--	MMBPS	IV-148
.129400	7,900	166	242	--	MMBPS	IV-149
.220310	13.442	206	300	MMH AND NTO	MM	IV-157
.718060	43.811	227	330	--	VIKING	IV-166

2. GAS TANKS

VOLUME CU M	VOLUME CU IN	PRESSURE N/SQ M	PRESSURE PSI	CONTENTS	PROGRAM/VEHICLE	DATA SHEET NUMBER
.000204	12	2,757	4,000	METHANE	OSO	V-9
.000313	19	4,357	6,320	HE & CO2	VIKING	V-17
.000490	30	2,413	3,500	--	BIOSATELLITE	V-29
.001000	65	2,068	3,000	--	IDCS	V-54
.001100	68	2,068	3,000	N2	SCOUT PROJECT	V-58
.001390	85	4,136	6,000	--	MARINER/MARS	V-65
.001430	87	4,136	6,000	N2	MARINER/MARS	V-66
.001700	104	2,240	3,250	GAS, N2	DISCOVERER, PIONEER	V-81
.001700	104	155	225	--	LES	V-82
.001850	113	2,757	4,000	--	VELA HOTEL	V-86
.001850	113	2,275	3,300	N2	MARINER/MARS	V-87
.001850	113	2,768	4,015	N2	VELA 3	V-88
.003760	230	2,757	4,000	HE METHANE	OSO	V-146
.006240	381	1,758	2,550	N2	MARINER/MARS	V-200
.006550	400	2,495	3,620	--	HEOS-A	V-210
.006780	414	3,033	4,400	--	VELA V AND VI	V-213

2. GAS TANKS

VOLUME CU M	VOLUME CU IN	PRESSURE N/SQ M	PRESSURE PSI	CONTENTS	PROGRAM/VEHICLE	DATA SHEET NUMBER
.007810	477	2,378	3.450	--	ATS	V-229
.007830	478	2,378	3,450	N2	ATS	V-231
.007860	480	1,389	2.015	FREON 14	NIMBUS	V-232
.011430	697	2,768	4.015	N2	VELA 4	V-266
.014600	894	1,723	2,500	FREON 14	NIMBUS	V-292
.016380	1.000	3,033	4,400	--	VIKING ORBITER ' 75	V-314
.020800	1,275	2,068	3.000	N2	ORBITAL SOLAR OBSERVATORY H	V-329
.021190	1,293	2,078	3.015	AR	EGO AND POGO	V-331
.025870	1,579	2,633	3,820	N2	LUNAR ORBITER	V-349
.026630	1.625	2,785	4,040	--	MARINER MARS '71	V-356
.046770	2,854	723	1.050	02	BIOS	V-420
.056470	3,446	2,757	4.000	N2	MMBPS	V-427
.056900	3,475	2,757	4.000	--	MMBPS	V-430
.074570	4,550	586	850	H2	BIOS	V-437
.130600	7,914	--	--	--	VIKING ORBITER	V-470

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Aircraft Porous Media (16)

PART NUMBER AC6875853

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION... 5 to 9 units - $600

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... .01 m (.5 in) Inline Braze

DESIGN FLOW MEDIA ..... GHe

RATING ..... 5 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 1.7×10^5 scc/s of _____ @ _____ N/cm², _____ °C
(3.8×10^2 SCFM of _____ @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	2768 N/cm²	(4015 PSIA)
PROOF	3678 N/cm²	(5335 PSIA)
BURST	5526 N/cm²	(8015 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm²	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

ELEMENT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... .17 kg (0.38 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10180-01

PROGRAM..... OSO-1

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... Hughes Aircraft

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Delta DM-19

AVAILABILITY..... 8 to 10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... .0063 m (.25 in) Inline Filter Assembly

DESIGN FLOW MEDIA ..... GN_2

RATING ..... 10 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 3.3×10^3 scc/s of GN_2 @ .6 N/cm², 23 °C
(7.0 SCFM of GN_2 @ 1 PSID, 75 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	2757 N/cm²	(4000 PSIA)
PROOF	4136 N/cm²	(6000 PSIA)
BURST	965.2 N/cm²	(1400 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	2757 N/cm²	(4000 PSIA)

OPERATING TEMPERATURE RANGE ..... +4.4 to +60 °C (+40 to 140 °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... Titanium

ELEMENT ..... 304 L Stainless Steel

CONNECTION -

INLET ..... .0063 m (.25 in) tube x .018 wall

OUTLET .....

MASS ..... .13 kg (.30 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Vacco Industries (46)

PART NUMBER SL-81019

PROGRAM.....	Lunar Orbiter
CONTRACTING AGENCY.....	
PRIME CONTRACTOR.....	Boeing Co.
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Atlas Agena SLV-3
AVAILABILITY.....	8 to 10 weeks
COST/PROCUREMENT INFORMATION...	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Inline Filter Assembly

DESIGN FLOW MEDIA ..... Gaseous Nitrogen

RATING ..... 12 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 4.7×10^3 scc/s of GN_2 @ 10 N/cm^2, 23 °C
(10 SCFM of GN_2 @ 15 PSID, 75 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	2633 N/cm^2	(3820 PSIA)
PROOF	3950 N/cm^2	(5730 PSIA)
BURST	5267 N/cm^2	(7640 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -53 to 71 °C (-65 to 160 °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 L Stainless Steel

ELEMENT ..... same

CONNECTION -

INLET ..... 1/4 o.d. tube x .035 wall

OUTLET ..... same

MASS ..... .014 kg (.033 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

63

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10178-01

PROGRAM.....

CONTRACTING AGENCY..... JPL

PRIME CONTRACTOR..... Martin Marietta Corp.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... 8 to 10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... .00952 m (.375 in) Inline Filter Assembly

DESIGN FLOW MEDIA ..... Helium

RATING ..... 12 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 7.5×10^3 scc/s of He @ 3 N/cm^2, 23 °C
(16 SCFM of He @ 5 PSID, 75 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	2757 N/cm^2	(4000 PSIA)
PROOF	4136 N/cm^2	(6000 PSIA)
BURST	10273 N/cm^2	(14900 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -1.1 to +32 °C (±30 to 90° F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 L Stainless Steel

ELEMENT ..... same

CONNECTION -

INLET ..... 3/8 o.d. tube x .050

OUTLET ..... same

MASS ..... .45 kg (1.0 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

16

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Vacco Industries (46)

PART NUMBER SL-81500

PROGRAM..... Apollo

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... N.A.A.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Saturn

AVAILABILITY..... 8 to 10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Inline Filter Assembly

DESIGN FLOW MEDIA ..... Gaseous Helium

RATING ..... 12 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 1.8×10^4 scc/s of He @ 6.8 N/cm^2, 23 °C
(40 SCFM of He @ 10 PSID, 75 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	689.4 N/cm^2	(1000 PSIA)
PROOF	2413 N/cm^2	(3500 PSIA)
BURST	4826 N/cm^2	(7000 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -170 to $^{71}_{+160}$ °C (-275 to °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 L Stainless Steel

ELEMENT ..... same

CONNECTION -

INLET ..... 1/4 o.d. tube x .035 wall

OUTLET ..... same

MASS ..... .1 kg (.3 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Vacco Industries (46)

PART NUMBER S2-8846

PROGRAM..... LEM

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Grumman

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... 8 to 10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Inline Filter Assembly

DESIGN FLOW MEDIA ..... Gaseous Helium

RATING ..... 15 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 6.3×10^{4} scc/s of He @ 1.9 N/cm², 18 °C
(1.3×10^{2} SCFM of He @ 2.8 PSID, 65 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	2757 N/cm²	(4000 PSIA)
PROOF	3668 N/cm²	(5320 PSIA)
BURST	5515 N/cm²	(8000 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm²	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -53 to 71.1 °C (-65 to 160 °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 L Stainless Steel

ELEMENT .....

CONNECTION -

INLET ..... 3/8 o.d. tube x .040 wall

OUTLET ..... same

MASS ..... .19 kg (.43 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Aircraft Porous Media (16)

PART NUMBER AC6875855

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION... 5 to 9 units - $1450

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... .01 m (.5 in) Inline Braze

DESIGN FLOW MEDIA ..... GHe

RATING ..... 15 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 1.7×10^5 scc/s of _____ @ _____ N/cm², _____ °C
(3.8×10^2 SCFM of _____ @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	1216 N/cm²	(1765 PSIA)
PROOF	1616 N/cm²	(2345 PSIA)
BURST	2423 N/cm²	(3515 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm²	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

ELEMENT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... .19 kg (0.43 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Brumswick Corp. Wintec Div. (24)

PART NUMBER 3228-506

PROGRAM.....	Classified
CONTRACTING AGENCY.....	USAF
PRIME CONTRACTOR.....	
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	
AVAILABILITY.....	
COST/PROCUREMENT INFORMATION...	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... GN_2

RATING ..... 25 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 6995 scc/s of _____ @ 244 N/cm², 21 °C
(14.82 SCFM of _____ @ 355 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

- OPERATING ..... N/A N/cm² (_____ PSIA)
- PROOF ..... N/A N/cm² (_____ PSIA)
- BURST ..... N/A N/cm² (_____ PSIA)
- MIN. ELEMENT COLLAPSE DIFFERENTIAL .. 689.4 N/cm² (1000 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... N/A scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

- CONSTRUCTION ..... N/A
- ELEMENT A1S1-304

CONNECTION -

- INLET ..... N/A
- OUTLET ..... N/A

MASS ..... 0.006 kg (0.01 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 14228-502

PROGRAM..... Classified

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... GN_2

RATING ..... 25 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 9440 scc/s of GN_2 @ 310 N/cm^2, 21 °C
(20 SCFM of GN_2 @ 450 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	3595 N/cm^2	(5215 PSIA)
PROOF	5181 N/cm^2	(7515 PSIA)
BURST	6905 N/cm^2	(10,015 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	3585 N/cm^2	(5200 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... N/A scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 300 Series Cres

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET ..... MS-33656-4 Style "E"

OUTLET ..... MS-33656-4 Style "E"

MASS ..... 0.1 kg (0.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10132-01

PROGRAM.....	Apollo
CONTRACTING AGENCY.....	NASA
PRIME CONTRACTOR.....	Rockwell
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Saturn
AVAILABILITY.....	8 to 10 weeks
COST/PROCUREMENT INFORMATION...	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE	.0063 m (.25 in) Inline Filter Assembly
DESIGN FLOW MEDIA	GN_2
RATING	40 MICRONS ABSOLUTE
RATED FLOW @ PRESSURE DIFFERENTIAL	1.99×10^5 scc/s of GN_2 @ 10 N/cm^2, 23 °C (423 SCFM of GN_2 @ 15 PSID, 75 °F)
CAPACITY @ MAX. PRESSURE DIFFERENTIAL	_____ gms @ _____ N/cm^2 (_____ PSID)
PRESSURES -	
OPERATING	689.4 N/cm^2 (1000 PSIA)
PROOF	1406 N/cm^2 (2040 PSIA)
BURST	2813 N/cm^2 (4080 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL	_____ N/cm^2 (_____ PSIA)
OPERATING TEMPERATURE RANGE	-170 to 76.6 °C (-275 to +170 °F)
EXTERNAL LEAKAGE	_____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)
MATERIAL -	
CONSTRUCTION	304 L Stainless Steel
ELEMENT	Same
CONNECTION -	
INLET	1/4 o.d. tube x .035 wall
OUTLET	Same
MASS	.1 kg (.3 lbm)
OTHER SIGNIFICANT CHARACTERISTICS	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 12204-508

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... He

RATING ..... 60 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 3×10^3 scc/s of He @ 106 N/cm^2, _____ °C
(8 SCFM of He @ 155 PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	217 N/cm^2	(315 PSIA)
PROOF	320 N/cm^2	(465 PSIA)
BURST	837 N/cm^2	(1215 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	106 N/cm^2	(155 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... 0.001 scc/s of He @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 300 Series Cres

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET MS-24385-4

OUTLET AND-10050-4

MASS ..... 0.3 kg (0.8 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 11204-501

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... He

RATING ..... 60 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 1.8×10^4 scc/s of He @ 1.7 N/cm^2, 15 °C
(40 SCFM of He @ 2.5 PSID, 60 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	N/A N/cm^2	(_____ PSIA)
PROOF	N/A N/cm^2	(_____ PSIA)
BURST	N/A N/cm^2	(_____ PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	137 N/cm^2	(200 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... N/A scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... SS-304 L

ELEMENT ..... 304 L

CONNECTION -

INLET ..... N/A

OUTLET ..... N/A

MASS ..... 0.06 kg (0.1 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Brumswick Corp. Wintec Div. (24)

PART NUMBER 12204-505

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... He

RATING ..... 74 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 3×10^3 scc/s of He @ 137 N/cm^2, 15 °C
(8 SCFM of He @ 200 PSID, 60 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ .34 N/cm^2 (.50 PSID)

PRESSURES -

OPERATING	N/A N/cm^2	(_____ PSIA)
PROOF	N/A N/cm^2	(_____ PSIA)
BURST	N/A N/cm^2	(_____ PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	137 N/cm^2	(200 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... N/A scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.10 kg (0.15 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

MANUFACTURER Brumswick Corp. Wintec Div. (24)

PART NUMBER 15204-516

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... yes

FLOWN.....

LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.1 FILTER, GAS

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... He

RATING ..... 74 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 1.9×10^5 scc/s of He @ 128 N/cm^2, 15 °C
(403 SCFM of He @ 186 PSID, 60 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	138 N/cm^2	(201 PSIA)
PROOF	148 N/cm^2	(215 PSIA)
BURST	N/A N/cm^2	(_____ PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	137 N/cm^2	(200 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... N/A scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 300 Series Cres

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET .....

OUTLET .....

MASS ..... 0.68 kg (1.5 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10064-01

PROGRAM.....	COMSAT, Intelsat IV Communication Satellite
CONTRACTING AGENCY.....	USAF
PRIME CONTRACTOR.....	Hughes Aircraft
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Atlas Centaur
AVAILABILITY.....	8 to 10 weeks
COST/PROCUREMENT INFORMATION...	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... .0063 m (.25 in) Inline filter assembly

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 10 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .011 kg/sec of N_2H_4 @ _____ N/cm², _____ °C
(.025 lbm/sec of N_2H_4 @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	217 N/cm²	(315 PSIA)
PROOF	320 N/cm²	(465 PSIA)
BURST	837.7 N/cm²	(1215 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm²	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... Titanium

ELEMENT .....

CONNECTION -

INLET ..... 1/4 o.d. tube x .020 wall

OUTLET ..... same

MASS ..... 0.1 kg (0.3 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Vacco Industries (45,46)

PART NUMBER F1D10182-01 and -02

PROGRAM.....	Communications Technology Satellite
CONTRACTING AGENCY.....	
PRIME CONTRACTOR.....	Hamilton Standard
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	
AVAILABILITY.....	8 to 10 weeks
COST/PROCUREMENT INFORMATION...	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... .004763 m (.1875 in) Inline Filter Assembly

DESIGN FLOW MEDIA ..... Hydrazine

RATING ..... 10 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .011 kg/sec of N_2H_4 @ 3 N/cm², 23 °C
(.025 lbm/sec of N_2H_4 @ 5 PSID, 75 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. 0.1 gms @ 6.8 N/cm² (10 PSID)

PRESSURES -

OPERATING	273 N/cm²	(396 PSIA)
PROOF	409 N/cm²	(594 PSIA)
BURST	1092 N/cm²	(1584 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	273 N/cm²	(396 PSIA)

OPERATING TEMPERATURE RANGE ..... +4.4 to 71.1 °C (+40 to 160 °F)

EXTERNAL LEAKAGE ..... 1×10^{-6} scc/s of He @ 217 N/cm² (@ 315 PSIA)

MATERIAL -

CONSTRUCTION ..... Titanium

ELEMENT ..... 316 L Stainless Steel (F.H.)

CONNECTION -

INLET ..... 3/16 o.d. tube x .016 wall

OUTLET ..... same

MASS ..... .10 kg (.23 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

-01 Dynamic Unit
-02 Production Unit

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10151-01

PROGRAM..... Communications Technology Satellite (CTS)

CONTRACTING AGENCY..... Communications Research Center, Canada

PRIME CONTRACTOR..... Hamilton Standard

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... 8 to 10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... .006 m (.25 in) Inline Filter Assembly

DESIGN FLOW MEDIA ..... Anhydrous Hydrazine

RATING ..... 10 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .02 kg/sec of N_2H_4 @ 6.8 N/cm^2, 23 °C
(.05 lbm/sec of N_2H_4 @ 10 PSID, 75 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	206 N/cm^2	(300 PSIA)
PROOF	310 N/cm^2	(450 PSIA)
BURST	827.3 N/cm^2	(1200 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	306 N/cm^2	(300 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F) Ambient

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 L Stainless Steel

ELEMENT ..... Same

CONNECTION -

INLET ..... 1/4 tube x .020 wall

OUTLET ..... Same

MASS ..... .22 kg (.50 lbm)

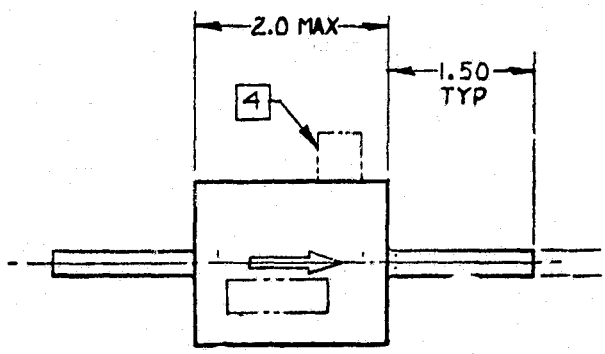
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Wintec (54)

PART NUMBER 15241-685
(TRW P/N EQ1-464)



PROGRAM..... Atmosphere Explorer

CONTRACTING AGENCY..... NASA/GSFC

PRIME CONTRACTOR..... RCA

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE..... Thor Delta

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Metal Mesh

DESIGN FLOW MEDIA ..... Hydrazine

RATING ..... 15 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 0.0009 kg/sec of N_2H_4 @ .68 N/cm^2, 21 °C
(0.02 lbm/sec of N_2H_4 @ 1.0 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. 0.25 gms @ 1.3 N/cm^2 (2.0 PSID)

PRESSURES -

OPERATING	413 N/cm^2	(600 PSIA)
PROOF	620 N/cm^2	(900 PSIA)
BURST	1654 N/cm^2	(2400 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	172 N/cm^2	(250 PSIA)

OPERATING TEMPERATURE RANGE ..... 5 to 50 °C (41 to 122 °F)

EXTERNAL LEAKAGE ..... $1x10^{-7}$ scc/s of He @ 517 N/cm^2 (@ 750 PSIA)

MATERIAL -

CONSTRUCTION ..... All stainless welded-in-line

ELEMENT ..... Twilled dutch double weave wire cloth

CONNECTION -

INLET ..... } 0.250 o.d. s.s. tube brazed into system using
OUTLET ..... } Aeroquip process

MASS ..... 0.1 kg (0.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 15241-647

PROGRAM..... 777

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 15 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .02 kg/sec of N_2H_4 @ 6.8 N/cm^2, 21 °C
(.05 lbm/sec of N_2H_4 @ 1.0 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	424 N/cm^2	(615 PSIA)
PROOF	701 N/cm^2	(1017 PSIA)
BURST	928 N/cm^2	(1347 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	172 N/cm^2	(250 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... 1×10^{-7} scc/s of He @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 300 Series Cres

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET ..... Tube .250 o.d.

OUTLET ..... Tube .250 o.d.

MASS ..... 0.1 kg (0.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Vacco Industries (46)

PART NUMBER E-81916-4-15

PROGRAM..... Titan III

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Martin Marietta Corp.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... 8 to 10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Element Assembly

DESIGN FLOW MEDIA ..... Hydrazine

RATING ..... 15 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .100 kg/sec of N_2H_4 @ 2 N/cm², 23 °C
(.222 lbm/sec of N_2H_4 @ 4 PSID, 75 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	275 N/cm²	(400 PSIA)
PROOF	460 N/cm²	(668 PSIA)
BURST	612 N/cm²	(888 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm²	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 303 Stainless Steel

ELEMENT ..... Special cartridge

CONNECTION -

INLET ..... Special cartridge

OUTLET ..... same

MASS ..... .34 kg (.75 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 15241-526

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 15 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .108 kg/sec of _____ @ _____ N/cm^2, _____ °C
(.240 lbm/sec of _____ @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	135 N/cm^2	(196 PSIA)
PROOF	268 N/cm^2	(390 PSIA)
BURST	355 N/cm^2	(515 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	170 N/cm^2	(248 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION MC-999-0058

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET ..... Tube .631 o.d.

OUTLET ..... Tube .379 o.d.

MASS ..... 0.130 kg (0.287 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 15241-525

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Saturn

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

100

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... N_2O_4

RATING ..... 15 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .217 kg/sec of _____ @ _____ N/cm^2, _____ °C
(.480 lbm/sec of _____ @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	134 N/cm^2	(195 PSIA)
PROOF	131 N/cm^2	(190 PSIA)
BURST	355 N/cm^2	(515 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	170 N/cm^2	(248 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... N/A scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION MC-999-0058

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET ..... Tube .631 o.d.

OUTLET ..... Tube .504 o.d.

MASS ..... 0.133 kg (0.294 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

101

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 15312-501-1

PROGRAM..... P95 Satellite

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 25 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .034 kg/sec of N_2H_4 @ 1 N/cm², 21 °C
(.075 lbm/sec of N_2H_4 @ 2 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	286 N/cm²	(415 PSIA)
PROOF	630 N/cm²	(915 PSIA)
BURST	837 N/cm²	(1215 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	275 N/cm²	(400 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... * _____ scc/s of GN_2 @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION	300 Series Cres
ELEMENT	300 Series Cres

CONNECTION -

INLET	AN-818-GJ "B" nut & MS20819-GJ sleeve
OUTLET	AN-818-GJ "B" nut & MS20819-GJ sleeve

MASS ..... 0.34 kg (0.75 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

*No bubbles @ 286 N/cm² (415 psia) submerged in Freon TF for 2 minutes.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Brunswick Corp. Wintec Division (24)

PART NUMBER 15312-501-3

PROGRAM..... P95 Satellite

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 25 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .034 kg/sec of N_2H_4 @ 1 N/cm^2, 21 °C
(.075 lbm/sec of N_2H_4 @ 2 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	286 N/cm^2	(415 PSIA)
PROOF	630 N/cm^2	(915 PSIA)
BURST	1182 N/cm^2	(1715 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	275 N/cm^2	(400 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... * _____ scc/s of GN_2 @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 300 Series Cres

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET ..... Tube .375 o.d.

OUTLET ..... Tube .375 o.d.

MASS ..... 0.20 kg (0.46 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

*No bubbles @ 286 N/cm^2 (415 psia) submerged in Freon TF for 2 minutes.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10106-01

PROGRAM	ERTS
CONTRACTING AGENCY	NASA
PRIME CONTRACTOR	Rocket Research
STATUS	
QUALIFIED	Yes
FLOWN	Yes
LAUNCH VEHICLE	
AVAILABILITY	8 to 10 weeks
COST/PROCUREMENT INFORMATION	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Inline Filter Assembly

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 25 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... _____ kg/sec of _____ @ _____ N/cm^2, _____ °C
(_____ lbm/sec of _____ @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	413 N/cm^2	(600 PSIA)
PROOF	682 N/cm^2	(990 PSIA)
BURST	910 N/cm^2	(1320 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F) Ambient

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 Stainless Steel

ELEMENT .....

CONNECTION -

INLET .....

OUTLET .....

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

C-2

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10106-02

PROGRAM..... ERB

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... Rocket Research

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE.....

AVAILABILITY..... 8-10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Inline Filter Assembly

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 25 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... _____ kg/sec of _____ @ _____ N/cm^2, _____ °C
(_____ lbm/sec of _____ @ _____ PSID, _____ °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	606 N/cm^2	(880 PSIA)
PROOF	910 N/cm^2	(1320 PSIA)
BURST	1820 N/cm^2	(2640 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F) Ambient

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 Stainless Steel

ELEMENT .....

CONNECTION -

INLET .....

OUTLET .....

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Vacco Industries (46)

PART NUMBER F1D10093-01 and -02

PROGRAM..... Mariner and Viking

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Martin Marietta Corp.

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE..... Atlas Centaur

AVAILABILITY..... 8 to 10 weeks

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Inline Filter Assembly

DESIGN FLOW MEDIA ..... Nitrogen Tetroxide

RATING ..... 35 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... .19 kg/sec of MMH @ 2 N/cm^2, 21 °C
(.44 lbm/sec of MMH @ 3 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm^2 (_____ PSID)

PRESSURES -

OPERATING	206 N/cm^2	(300 PSIA)
PROOF	517 N/cm^2	(750 PSIA)
BURST	827.3 N/cm^2	(1200 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	206 N/cm^2	(300 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F) Ambient

EXTERNAL LEAKAGE ..... _____ scc/s of _____ @ _____ N/cm^2 (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 304 L Stainless Steel

ELEMENT ..... Same

CONNECTION -

INLET ..... .500 o.d. tube x .049 wall

OUTLET ..... Same

MASS ..... .75 kg (1.6 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

	Overall Length	End Connections
-01	6.300	.500 o.d. tube x .049 wall
-02	7-1/4	AN818-8J

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

MANUFACTURER Brunswick Corp. Wintec Div. (24)

PART NUMBER 15228-572

PROGRAM..... Viking

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN..... No
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.2 FILTER, LIQUID

TYPE ..... Woven wire

DESIGN FLOW MEDIA ..... N_2H_4

RATING ..... 35 MICRONS ABSOLUTE

RATED FLOW @ PRESSURE DIFFERENTIAL .... 1.04 kg/sec of H_2O @ 217 N/cm², 21 °C
(2.30 lbm/sec of H_2O @ 315 PSID, 70 °F)

CAPACITY @ MAX. PRESSURE DIFFERENTIAL.. _____ gms @ _____ N/cm² (_____ PSID)

PRESSURES -

OPERATING	382 N/cm²	(555 PSIA)
PROOF	568 N/cm²	(825 PSIA)
BURST	754 N/cm²	(1095 PSIA)
MIN. ELEMENT COLLAPSE DIFFERENTIAL ..	372 N/cm²	(540 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

EXTERNAL LEAKAGE ..... N/A scc/s of _____ @ _____ N/cm² (@ _____ PSIA)

MATERIAL -

CONSTRUCTION ..... 300 Series Cres

ELEMENT ..... 300 Series Cres

CONNECTION -

INLET ..... Flange-3 - .250-28 UNJF-3A studs

OUTLET ..... Flange-4 - .187 dia. holes

MASS ..... 0.1 kg (0.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Wright Components, Inc. (23)

PART NUMBER 15447

PROGRAM..... NRL Radiation Experiment

CONTRACTING AGENCY..... Naval Research Laboratory

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... 18-24 weeks ARO

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Co-axial

DESIGN FLOW MEDIA ..... NH_3 (liquid or gaseous)

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
(_____ lbm/sec @ _____ PSID, _____ °F)
equiv. of 0.018" dia (C_D = 0.8)

RESPONSE -

OPEN ..... 15 ms @ _____ Vdc, ____ N/cm^2 INLET PRESSURE, _____ °C
(____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... 15 ms @ _____ Vdc, ____ N/cm^2, _____ °C
(____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... Ball, Detenting

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 50 ms @ 24 Vdc (MAXIMUM)

TO CLOSE ..... 50 ms @ 24 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH ..... No

INTEGRAL FILTER ..... None MICRONS ABSOLUTE

LIFE ..... 2×10^6 CYCLES

PRESSURES -

OPERATING	0-251 N/cm^2	(0-365 PSIA)
PROOF	320 N/cm^2	(465 PSIA)
BURST	527 N/cm^2	(765 PSIA)
REVERSE CRACKING	N/A N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... 0-60 °C (32-140 °F)

LEAKAGE -

INTERNAL ..... .007 scc/hr OF He @ 137 N/cm^2 (_____ PSIA) 200 psid

EXTERNAL ..... 2×10^{-6} scc/s OF He @ 137 N/cm^2 (_____ PSIA) 200 psid

SUPPLY VOLTAGE RANGE ..... 22-26 Vdc

POWER ..... 3 WATTS MAX @ 24 Vdc, 24 °C (76 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 12 Vdc pull in

DIELECTRIC STRENGTH ..... 50 mA MAX. CURRENT LEAKAGE @ 500 VOLTS rms, 60 Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... Stainless Steel

SEATS ..... EPR 515-8

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued P/N 15447

CONNECTION -

INLET	Special Flange
OUTLET	Special Flange
ELECTRICAL	JTIH-8-3p (101) 2 Reqd

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____
STATIC ACCELERATION	_____ G's
MASS	0.158 kg (0.35 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Wright Components, Inc. (23)

PART NUMBER 15512-1

PROGRAM.....	SOLRAD-X
CONTRACTING AGENCY.....	Naval Research Laboratory
PRIME CONTRACTOR.....	
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	
AVAILABILITY.....	18-24 weeks ARO
COST/PROCUREMENT INFORMATION...	

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Coaxial, solenoid, detenting, 2-way

DESIGN FLOW MEDIA ..... N_2H_4, NH_3

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
(_____ lbm/sec @ _____ PSID, _____ °F)
equiv. to 0.018 in orif. dia. @ C_D = 0.65

RESPONSE -

OPEN ..... 50 ms @ 24 Vdc, 275 N/cm^2 INLET PRESSURE, 24 °C
(400 PSIA INLET PRESSURE, 76 °F)

CLOSE ..... 50 ms @ 24 Vdc, 275 N/cm^2, 24 °C
(400 PSIA, 76 °F)

LATCHING MECHANISM - TYPE - ..... Ball detenting

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 50 ms @ 24 Vdc (MAXIMUM)

TO CLOSE ..... 50 ms @ 24 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH ..... No

INTEGRAL FILTER ..... None MICRONS ABSOLUTE

LIFE ..... 1000 CYCLES

PRESSURES -

OPERATING	86.1-275 N/cm^2	(125-400 PSIA)
PROOF	689 N/cm^2	(1000 PSIA)
BURST	1034 N/cm^2	(1500 PSIA)
REVERSE CRACKING	N/A N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -23 - +62.7 °C (-10 - +145 °F)

LEAKAGE -

INTERNAL ..... .003 scc/hr OF He @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... 1×10^{-6} scc/s OF He @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... 22-26 Vdc

POWER ..... 0.42 WATTS MAX @ 12 Vdc, 24 °C (76 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 13.7 Vdc pull in

DIELECTRIC STRENGTH ..... 50 mA MAX. CURRENT LEAKAGE @ 500 VOLTS rms, 60 Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... Stainless steel

SEATS ..... AFE-102; EPR 515-8

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 15512-1

CONNECTION -

INLET	Special flange
OUTLET	Special flange
ELECTRICAL	JTIH-8-303

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____
STATIC ACCELERATION	_____ G's
MASS	0.15 kg (0.34 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Wright Components, Inc. (23)

PART NUMBER 15625

PROGRAM.....	Les 8/9, DISCOS, Solrad A and B
CONTRACTING AGENCY.....	
PRIME CONTRACTOR.....	Hamilton Standard, Naval Research Lab, TRW Systems, Avco Systems
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	
AVAILABILITY.....	18-24 weeks ARO
COST/PROCUREMENT INFORMATION...	

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Co-axial

DESIGN FLOW MEDIA ..... Ammonia

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
(_____ lbm/sec @ _____ PSID, _____ °F)
Equiv. to 0.018 dia. (C_D = 0.65)

RESPONSE -

OPEN ..... 30 ms @ 24 Vdc, _____ N/cm^2 INLET PRESSURE, 23 °C
(_____ PSIA INLET PRESSURE, 75 °F)

CLOSE ..... 30 ms @ 24 Vdc, _____ N/cm^2, 23 °C
(_____ PSIA, 75 °F)

LATCHING MECHANISM - TYPE - ..... Ball Detenting

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 30 ms @ 24 Vdc (MAXIMUM)

TO CLOSE ..... 30 ms @ 24 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH ..... No

INTEGRAL FILTER ..... None MICRONS ABSOLUTE

LIFE ..... 1000 CYCLES

PRESSURES -

OPERATING	251 N/cm^2	(365 PSIA)
PROOF	320 N/cm^2	(465 PSIA)
BURST	424 N/cm^2	(615 PSIA)
REVERSE CRACKING	N/A N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... 0-60 °C (32-140 °F)

LEAKAGE -

INTERNAL ..... .003 scc/hr OF He @ 79.2 N/cm^2 (115 PSIA)

EXTERNAL ..... 1.2×10^{-7} scc/s OF He @ 79.2 N/cm^2 (115 PSIA)

SUPPLY VOLTAGE RANGE ..... 22-26 Vdc

POWER ..... 10 WATTS MAX @ 24 Vdc, 24 °C (76 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 16 Vdc pull in

DIELECTRIC STRENGTH ..... 0.5 mA MAX. CURRENT LEAKAGE @ 500 VOLTS rms, 60 Hz

INSULATION RESISTANCE ..... 10 MΩ @ 100 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... stainless steel

SEATS AFE-102

103

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 15625

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 0.15 kg (0.34 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Wright Components, Inc. (23)

PART NUMBER 15675

PROGRAM..... SOLRAD XI

CONTRACTING AGENCY..... Naval Research Laboratory

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... 18-24 weeks ARO

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE	Co-axial, Solenoid, Detenting, 2-way
DESIGN FLOW MEDIA	Hydrazine
RATED FLOW AT PRESSURE DIFFERENTIAL	_____ kg/sec @ _____ N/cm^2, _____ °C (_____ lbm/sec @ _____ PSID, _____ °F) equiv. to 0.043 in. dia. (C_D = 0.65)
RESPONSE -	
OPEN	30 ms @ 24 Vdc, _____ N/cm^2 INLET PRESSURE, 23 °C (_____ PSIA INLET PRESSURE, 75 °F)
CLOSE	30 ms @ 24 Vdc, _____ N/cm^2, 23 °C (_____ PSIA, 75 °F)
LATCHING MECHANISM - TYPE -	Ball Detenting
MINIMUM ELECTRICAL PULSE WIDTH -	
TO OPEN	30 ms @ 24 Vdc (MAXIMUM)
TO CLOSE	30 ms @ 24 Vdc (MAXIMUM)
OPEN/CLOSED POSITION INDICATION SWITCH	No
INTEGRAL FILTER	None MICRONS ABSOLUTE
LIFE	1000 CYCLES
PRESSURES -	
OPERATING	206 N/cm^2 (0-300 PSIA)
PROOF	310 N/cm^2 (450 PSIA)
BURST	413 N/cm^2 (600 PSIA)
REVERSE CRACKING	N/A N/cm^2 (_____ PSIA)
OPERATING TEMPERATURE RANGE	-10-+60 °C (+14-+140 °F)
LEAKAGE -	
INTERNAL	0.55 scc/hr OF He @ 79.2 N/cm^2 (115 PSIA)
EXTERNAL	1.0×10^{-6} scc/s OF He @ 79.2 N/cm^2 (115 PSIA)
SUPPLY VOLTAGE RANGE	24-32 Vdc
POWER	18 WATTS MAX @ 28 Vdc, 24 °C (76 °F)
MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW	16 Vdc Pull-in
DIELECTRIC STRENGTH	50 mA MAX. CURRENT LEAKAGE @ 500 VOLTS rms, 60 Hz
INSULATION RESISTANCE	10 MΩ @ 500 Vdc
MAXIMUM VALVE MAGNETIC FIELD DENSITY -	
ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
DE-ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
MATERIAL -	
CONSTRUCTION	Stainless steel
SEATS	AFE-102

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 15675

CONNECTION -

INLET ..... Special flange

OUTLET ..... Special flange

ELECTRICAL ..... JTIH-8-3p(101); 2 required

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 0.24 kg (0.35 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Consolidated Controls Corp (20)

PART NUMBER 669900

PROGRAM.....	Apollo
CONTRACTING AGENCY.....	
PRIME CONTRACTOR.....	Rockwell International
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Saturn
AVAILABILITY.....	180 days
COST/PROCUREMENT INFORMATION...	$10,000

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Solenoid Latching Valve

DESIGN FLOW MEDIA ..... Helium, Oxygen

RATED FLOW AT PRESSURE DIFFERENTIAL ... .00226 kg/sec @ 17 N/cm^2, 15 °C
(0.005 lbm/sec @ 25 PSID, 60 °F) He

RESPONSE -

OPEN ..... 50 ms @ 18 Vdc, ____ N/cm^2 INLET PRESSURE, ____ °C
(____ PSIA INLET PRESSURE, ____ °F)

CLOSE ..... 50 ms @ 18 Vdc, ____ N/cm^2, ____ °C
(____ PSIA, ____ °F)

LATCHING MECHANISM - TYPE - ..... Magnetic

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 75 ms @ 18 Vdc (MAXIMUM)

TO CLOSE ..... 75 ms @ 18 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH Yes

INTEGRAL FILTER ..... None MICRONS ABSOLUTE

LIFE ..... 8000 CYCLES

PRESSURES -

OPERATING ..... 0-3112 N/cm^2 (0-4514 PSIA)

PROOF ..... 4663 N/cm^2 (6764 PSIA)

BURST ..... 6214 N/cm^2 (9014 PSIA)

REVERSE CRACKING ..... N/A N/cm^2 (____ PSIA)

OPERATING TEMPERATURE RANGE ..... -1.1 - 65 °C (30-150 °F)

LEAKAGE -

INTERNAL ..... 20 scc/hr OF He @ 0-3112 N/cm^2 (0-4514 PSIA)

EXTERNAL ..... 1 x 10^{-6} scc/s OF He @ 4663 N/cm^2 (6764 PSIA)

SUPPLY VOLTAGE RANGE ..... 18-33 Vdc

POWER ..... 2.1 amps ~~WATTS MAX~~ @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 33 Vdc

DIELECTRIC STRENGTH ..... 2 mA MAX. CURRENT LEAKAGE @ 1000 VOLTS rms, 60 Hz

INSULATION RESISTANCE ..... 1000 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

DE-ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION A286

SEATS ..... 440 A

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued P/N 669900

CONNECTION -

INLET ..... 1/4 Braze 304L

OUTLET 1/4 304L

ELECTRICAL ..... Leads

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... 16.4 G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from 20 to 2000 Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT N/A Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... 20 G's

MASS ..... 0.95 kg (2.1 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Compatibility - - - - - Nitrogen tetroxide
Hydrazine
Helium
Nitrogen
Methyl Alcohol
Freon

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Whittaker Corp. (37)

PART NUMBER 137455

PROGRAM..... Agena

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Lockheed Missiles and Space Center

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Motor actuated slide gate valve

DESIGN FLOW MEDIA ..... UDMH per MIL-D-25604, IRFNA per ~~MIL-P-7254~~ Type IIIβ

RATED FLOW AT PRESSURE DIFFERENTIAL ... .000333 kg/sec @ .34 N/cm^2, 15 °C
(.00735 lbm/sec @ .50 PSID, 60 °F)

RESPONSE -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... _____

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH _____

INTEGRAL FILTER ..... _____ MICRONS ABSOLUTE

LIFE ..... _____ CYCLES

PRESSURES -

OPERATING	79.2 N/cm^2	(115 PSIA)
PROOF	_____ N/cm^2	(_____ PSIA)
BURST	_____ N/cm^2	(_____ PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -12 to 60 °C (+10 to 140 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... 22-28 Vdc

POWER ..... _____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... _____ Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... _____

SEATS ..... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued P/N 137455

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering Corp. (33)

PART NUMBER V27200-454

PROGRAM..... COMSAT

CONTRACTING AGENCY..... France

PRIME CONTRACTOR..... ADAR Engineering Corp.; Paris, France

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE..... Delta DSV-3

AVAILABILITY..... Pre engineered hardware made to customer order.

COST/PROCUREMENT INFORMATION... Specific quotation can be offered firm within 2 weeks of the inquiry.

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... .0063 in (.25 in) N.C. Sol. Latch

DESIGN FLOW MEDIA ..... GN_2

RATED FLOW AT PRESSURE DIFFERENTIAL ... .00350 kg/sec @ 50 N/cm^2, 21 °C
(.00772 lbm/sec @ 73 PSID, 70 °F)

RESPONSE -

OPEN ..... 25 ms @ 27 Vdc, 256 N/cm^2 INLET PRESSURE, 21 °C
(372 PSIA INLET PRESSURE, 70 °F)

CLOSE ..... 25 ms @ 27 Vdc, 256 N/cm^2, 21 °C
(372 PSIA, 70 °F)

LATCHING MECHANISM - TYPE - ..... Magnetic

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 50 ms @ 27 Vdc (MAXIMUM)

TO CLOSE ..... 50 ms @ 27 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH ..... No

INTEGRAL FILTER ..... 25 MICRONS ABSOLUTE

LIFE ..... 2.5×10^5 CYCLES

PRESSURES -

OPERATING	2506 N/cm^2	(3635 PSIA)
PROOF	3761 N/cm^2	(5455 PSIA)
BURST	5009 N/cm^2	(7265 PSIA)
REVERSE CRACKING	N/A N/cm^2	(PSIA)

OPERATING TEMPERATURE RANGE ..... -20 to +65.5 °C (-4 to +150 °F)

LEAKAGE -

INTERNAL ..... .395 scc/hr OF GN_2 @ 2495 N/cm^2 (3620 PSIA)

EXTERNAL ..... 1×10^{-6} scc/s OF GN_2 @ 2495 N/cm^2 (3620 PSIA)

SUPPLY VOLTAGE RANGE ..... 25-27 Vdc

POWER ..... 30 WATTS MAX @ 27.2 Vdc, 20 °C (68 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... N/A Vdc

DIELECTRIC STRENGTH ..... mA MAX. CURRENT LEAKAGE @ VOLTS rms, Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... nT @ 1 m (GAMMA @ 6 in)

DE-ENERGIZED ..... nT @ 1 m (GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION .....

SEATS ..... Polyimide/ST/ST

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V27200-454

CONNECTION -

INLET 33656-4

OUTLET 33656-4

ELECTRICAL PTIH-8-4p

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 0.19 kg (0.43 lbm) actual

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering (33)

PART NUMBER V27200-513

PROGRAM..... ELMS Program

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR..... Grumman

STATUS

QUALIFIED..... Yes, completed 8/30/74

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE	
DESIGN FLOW MEDIA	GN_2
RATED FLOW AT PRESSURE DIFFERENTIAL ... .051 ESEO (CD = .65)	_____ kg/sec @ _____ N/cm^2, _____ °C (_____ lbm/sec @ _____ PSID, _____ °F)
RESPONSE -	
OPEN	25 ms @ 24 Vdc, 2413 N/cm^2 INLET PRESSURE, _____ °C (3500 PSIA INLET PRESSURE, _____ °F)
CLOSE	25 ms @ 32 Vdc, 2413 N/cm^2, _____ °C (3500 PSIA, _____ °F)
LATCHING MECHANISM - TYPE -	Magnetic-dual coil
MINIMUM ELECTRICAL PULSE WIDTH -	
TO OPEN	100 ms @ 24 Vdc (MAXIMUM)
TO CLOSE	100 ms @ 24 Vdc (MAXIMUM)
OPEN/CLOSED POSITION INDICATION SWITCH	N/A Available on module version & adaptable to this design
INTEGRAL FILTER	25/μ MICRONS ABSOLUTE
LIFE	1×10^6 CYCLES
PRESSURES -	
OPERATING	2413 N/cm^2 (3500 PSIA)
PROOF	3620 N/cm^2 (5250 PSIA)
BURST	4826 N/cm^2 (7000 PSIA)
REVERSE CRACKING	N/A N/cm^2 (_____ PSIA)
OPERATING TEMPERATURE RANGE	-34 to 65.5 °C (-30 to 150 °F)
LEAKAGE -	
INTERNAL	3.08×10^{-8} scc/hr OF GN_2 @ 150-2413 N/cm^2 (218-3500 PSIA)
EXTERNAL	1×10^{-6} scc/s OF He @ 2413 N/cm^2 (3500 PSIA)
SUPPLY VOLTAGE RANGE	24-32 Vdc
POWER	42 WATTS MAX @ 32 Vdc, 21 °C (70 °F)
MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW	32 Vdc
DIELECTRIC STRENGTH	.5 mA MAX. CURRENT LEAKAGE @ 700 VOLTS rms, 60 Hz
INSULATION RESISTANCE	_____ MΩ @ _____ Vdc
MAXIMUM VALVE MAGNETIC FIELD DENSITY -	
ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
DE-ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
MATERIAL -	
CONSTRUCTION	ST/ST Welded
SEATS	ST/ST

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V27200-513

CONNECTION -

INLET MS33656G6MOD

OUTLET MS33656G6MOD

ELECTRICAL PT1H-8-3P

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 0.2 kg (0.6 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

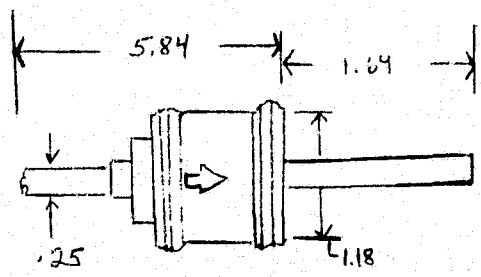
Integral filter, position indication available as option

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Moog, Inc. (35,54)

PART NUMBER 50-436



PROGRAM..... Earth Atmosphere Explorer (Orbit Adjust Propulsion System)

CONTRACTING AGENCY..... NASA/GSFC

PRIME CONTRACTOR..... RCA (TRW)

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Thor Delta

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE	Solenoid operated, single seat, single coil
DESIGN FLOW MEDIA	N_2H_4
RATED FLOW AT PRESSURE DIFFERENTIAL	0.009 kg/sec @ 8.2 N/cm², _____ °C (0.02 lbm/sec @ 12 PSID, _____ °F)
RESPONSE -	
OPEN	10 ms @ 26 Vdc, 413 N/cm² INLET PRESSURE, 50 °C (600 PSIA INLET PRESSURE, 22 °F)
CLOSE	30 ms @ 35.5 Vdc, 34 N/cm², 5 °C (50 PSIA, 41 °F)
LATCHING MECHANISM - TYPE -	N/A
MINIMUM ELECTRICAL PULSE WIDTH -	
TO OPEN	_____ ms @ _____ Vdc (MAXIMUM)
TO CLOSE	_____ ms @ _____ Vdc (MAXIMUM)
OPEN/CLOSED POSITION INDICATION SWITCH	None
INTEGRAL FILTER	None MICRONS ABSOLUTE
LIFE	10,000 CYCLES
PRESSURES -	
OPERATING	424 N/cm² (615 PSIA)
PROOF	630 N/cm² (915 PSIA)
BURST	837 N/cm² (1215 PSIA)
REVERSE CRACKING	_____ N/cm² (_____ PSIA)
OPERATING TEMPERATURE RANGE	+5.0 to +50.0 °C (+41 to +122 °F)
LEAKAGE -	
INTERNAL	1 scc/hr OF N_2 @ 58-527 N/cm² (85-765 PSIA)
EXTERNAL	1×10^{-7} scc/s OF He @ 527 N/cm² (765 PSIA)
SUPPLY VOLTAGE RANGE	22-36 Vdc
POWER	25 WATTS MAX @ 32.5 Vdc, 20 °C (68 °F)
MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW	35.5 Vdc
DIELECTRIC STRENGTH	1 mA MAX. CURRENT LEAKAGE @ 500 VOLTS rms, 60 Hz
INSULATION RESISTANCE	100 MΩ @ 500 Vdc
MAXIMUM VALVE MAGNETIC FIELD DENSITY -	
ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
DE-ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
MATERIAL -	
CONSTRUCTION	Cres. Teflon seal
SEATS	Single Teflon fixed to body

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 50-436

CONNECTION -

INLET	Braze fitting
OUTLET	Braze fitting
ELECTRICAL	"Pigtail" leads

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____

STATIC ACCELERATION	_____ G's
MASS	0.1 kg (0.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

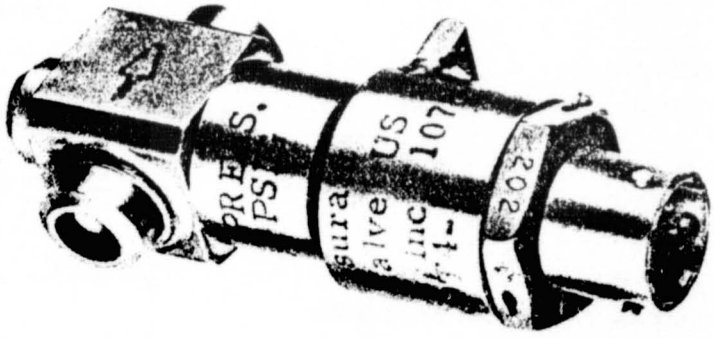
All welded construction

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Pyronetics (54)

PART NUMBER (TRW P/N EQ13-50)



PROGRAM..... Atmosphere Explorer

CONTRACTING AGENCY..... NASA/GSFC

PRIME CONTRACTOR..... RCA

STATUS

- QUALIFIED.....
- FLOWN..... Dec. 73
- LAUNCH VEHICLE..... Thor-Delta

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Normally open squib operated

DESIGN FLOW MEDIA ..... Hydrazine

RATED FLOW AT PRESSURE DIFFERENTIAL ... .009 kg/sec @ .6 N/cm^2, 21 °C
(.02 lbm/sec @ 1 PSID, 70 °F)

RESPONSE -

OPEN ..... 20 ms @ 28 Vdc, 413 N/cm^2 INLET PRESSURE, 21 °C
(600 PSIA INLET PRESSURE, 70 °F)

CLOSE ..... N/A ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... _____

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... N/A ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH None

INTEGRAL FILTER ..... None MICRONS ABSOLUTE

LIFE ..... 1 CYCLES

PRESSURES -

OPERATING	413 N/cm^2	(600 PSIA)
PROOF	620 N/cm^2	(900 PSIA)
BURST	1654 N/cm^2	(2400 PSIA)
REVERSE CRACKING	_____ N/cm^2	(N/A PSIA)

OPERATING TEMPERATURE RANGE ..... 5-50 °C (41-122 °F)

LEAKAGE -

INTERNAL ..... 1×10^{-7} scc/hr OF He @ 413 N/cm^2 (600 PSIA)

EXTERNAL ..... 1×10^{-7} scc/s OF He @ 413 N/cm^2 (600 PSIA)

SUPPLY VOLTAGE RANGE ..... 28 Vdc

POWER ..... 126 WATTS MAX @ 28 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 1.0 Vdc

DIELECTRIC STRENGTH ..... N/A mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... N/A MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... N/A nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... N/A nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... Stainless Steel all welded

SEATS ..... N/A

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N TRW EQ13-50

CONNECTION -

INLET	1/4" Stainless Tube w/braze fitting
OUTLET	1/4" Stainless Tube w/braze fitting
ELECTRICAL	4 pin bayonet connector

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____
STATIC ACCELERATION	_____ G's
MASS	.15 kg (.34 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering Corp. (33)

PART NUMBER V27200-339

PROGRAM.....	Aerobee
CONTRACTING AGENCY.....	NASA/Goddard
PRIME CONTRACTOR.....	NASA/Goddard
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	
AVAILABILITY.....	Pre engineered hardware made to customer order.
COST/PROCUREMENT INFORMATION...	Specific quotation can be offered firm within 2 weeks of inquiry.

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Pulse valve

DESIGN FLOW MEDIA ..... GHe

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
Capacity .110 ESEO CD=.65 (_____ lbm/sec @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... 8 ms @ 24 Vdc, 458 N/cm^2 INLET PRESSURE, 21 °C
(665 PSIA INLET PRESSURE, 70 °F)

CLOSE ..... 4 ms @ _____ Vdc, 458 N/cm^2, 21 °C
(665 PSIA, 70 °F)

LATCHING MECHANISM - TYPE - ..... N/A

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... N/A ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... N/A ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH N/A

INTEGRAL FILTER ..... N/A MICRONS ABSOLUTE

LIFE ..... 1×10^6 CYCLES

PRESSURES -

OPERATING	458 N/cm^2	(665 PSIA)
PROOF	689 N/cm^2	(1000 PSIA)
BURST	1034 N/cm^2	(1500 PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -40to48.8°C (-40 to+120 °F)

LEAKAGE -

INTERNAL ..... 6 scc/hr OF He @ 458 N/cm^2 (665 PSIA)

EXTERNAL ..... 0 scc/s OF He @ 458 N/cm^2 (665 PSIA)

SUPPLY VOLTAGE RANGE ..... 24-32 Vdc

POWER ..... 24 WATTS MAX @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 32 Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... ST/ST

SEATS ..... 303/BUNA N

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V27200-339

CONNECTION -

INLET	Plug in
OUTLET	Plug in
ELECTRICAL	Deutsch DH02-10SL-4P

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____

STATIC ACCELERATION	_____ G's
MASS	0.170 kg (0.375 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Circle Seal Corporation
James, Pond, & Clark Div.
(30)

PART NUMBER V-4341

PROGRAM..... Space Shuttle

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Rockwell International

STATUS

QUALIFIED.....

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION... 1 to 4 units - $4000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Isolation Propellant electrically operated

DESIGN FLOW MEDIA ..... N_2O_4, MMH

RATED FLOW AT PRESSURE DIFFERENTIAL ... .045 kg/sec @ 3.4 N/cm², -53 to 121 °C
(.10 lbm/sec @ 5.0 PSID, -65 to 250 °F)

RESPONSE -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm² INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm², _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... _____

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH _____

INTEGRAL FILTER ..... _____ MICRONS ABSOLUTE

LIFE ..... 500 CYCLES

PRESSURES -

OPERATING	0-210 N/cm²	(0-305 PSIA)
PROOF	306 N/cm²	(445 PSIA)
BURST	TBS N/cm²	(TBS PSIA)
REVERSE CRACKING	_____ N/cm²	(_____ PSIA)
OPERATING TEMPERATURE RANGE	_____ °C	(_____ °F)

LEAKAGE -

INTERNAL ..... .2 scc/hr OF _____ @ _____ N/cm² (_____ PSIA)

EXTERNAL ..... 8×10^{-8} scc/s OF _____ @ _____ N/cm² (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... _____ Vdc

POWER ..... _____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 28 Vdc

DIELECTRIC STRENGTH ..... 2 mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... Cres

SEATS ..... Teflon Cres

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V-4341

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 2 kg (6 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering (33)

PART NUMBER V27200-195

PROGRAM..... Classified Re-entry vehicles

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR..... TRW Systems

STATUS

- QUALIFIED..... Yes, by TRW
- FLOWN..... Yes
- LAUNCH VEHICLE..... Unknown

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... 2 way N/C

DESIGN FLOW MEDIA ..... N_2O_4, N_2H_4

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
.20 in ESEO (CD = .65) (_____ lbm/sec @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... 10 ms @ 28 Vdc, 203 N/cm^2 INLET PRESSURE, 21 °C
(295 PSIA INLET PRESSURE, 70 °F)

CLOSE ..... 10 ms @ _____ Vdc, 203 N/cm^2, 21 °C
(295 PSIA, 70 °F)

LATCHING MECHANISM - TYPE - ..... N/A

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH N/A

INTEGRAL FILTER ..... 1×10^5 MICRONS ABSOLUTE

LIFE ..... 20,000 CYCLES

PRESSURES -

OPERATING	203 N/cm^2	(295 PSIA)
PROOF	424 N/cm^2	(615 PSIA)
BURST	630 N/cm^2	(915 PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -28 to 73.8 °C (-20 to +165 °F)

LEAKAGE -

INTERNAL ..... 015 scc/hr OF N_2H_4 @ 203 N/cm^2 (295 PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... 21-32 Vdc

POWER ..... 56 WATTS MAX @ 28 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... _____ Vdc no intermittent

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... 50 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... ST/ST

SEATS ..... ST/ST - Teflon

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V27200-195

CONNECTION -

INLET	Flared .0064 m (.25 in)
OUTLET	Plug 3/4-20
ELECTRICAL	P1T

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____
STATIC ACCELERATION	_____ G's
MASS	0.2 kg (0.5 lbm)
OTHER SIGNIFICANT CHARACTERISTICS	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering Corp. (33)

PART NUMBER V27200-411

PROGRAM..... Classified

CONTRACTING AGENCY..... Air Force

PRIME CONTRACTOR..... Hamilton Standard

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY..... Pre engineered hardware made to customer order.

COST/PROCUREMENT INFORMATION... Specific quotation can be offered firm within 2 weeks of inquiry.

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... .019 in (.75 in) N.C. Sol.

DESIGN FLOW MEDIA ..... N_2H_4

RATED FLOW AT PRESSURE DIFFERENTIAL ... .050 kg/sec @ _____ N/cm^2, _____ °C
(.11 lbm/sec @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... 15 ms @ 24 Vdc, 386 N/cm^2 INLET PRESSURE, 21 °C
(561 PSIA INLET PRESSURE, 70 °F)

CLOSE ..... 15 ms @ _____ Vdc, 275 N/cm^2, 21 °C
(400 PSIA, 70 °F)

LATCHING MECHANISM - TYPE - ..... N/A

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH N/A

INTEGRAL FILTER ..... N/A MICRONS ABSOLUTE

LIFE ..... 5×10^3 CYCLES

PRESSURES -

OPERATING	397 N/cm^2	(576 PSIA)
PROOF	590 N/cm^2	(857 PSIA)
BURST	822 N/cm^2	(1193 PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... 4.4to71.1 °C (+40to+160 °F)

LEAKAGE -

INTERNAL ..... 20 scc/hr OF N_2 @ 34-386 N/cm^2 (50-561 PSIA)

EXTERNAL ..... 5×10^{-6} scc/s OF He @ 386 N/cm^2 (561 PSIA)

SUPPLY VOLTAGE RANGE ..... 24-36 Vdc

POWER ..... 38 WATTS MAX @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... N/A Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... 304 ST/ST - Teflon

SEATS ..... _____

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V27200-411

CONNECTION -

INLET	Special face seal
OUTLET	Special face seal
ELECTRICAL	P/T

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____

STATIC ACCELERATION	_____ G's
MASS	0.2 kg (0.6 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Marotta Scientific Controls (53)

MODEL NO. MV17DB

PART NUMBER 280096

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Northrop, Aerojet, Boeing, GD/CA

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... N.C. 2 way, 2 pos. .00952m (.375 in) T.S.

DESIGN FLOW MEDIA ..... Air, N_2

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
(_____ lbm/sec @ _____ PSID, _____ °F)

Equiv. orifice dia. .150
Cd = .6

RESPONSE -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... N/A

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH _____

INTEGRAL FILTER ..... _____ MICRONS ABSOLUTE

LIFE ..... _____ CYCLES

PRESSURES -

OPERATING	0-182 N/cm^2	(0-265 PSIA)
PROOF	355 N/cm^2	(515 PSIA)
BURST	699.8 N/cm^2	(1015 PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)
OPERATING TEMPERATURE RANGE	-53 to 71.1 °C	(-65 to 160 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... _____ scc/s , OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... 110-125 Vdc

POWER ..... _____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... _____ Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... 300 Ser. STN. STL.

SEATS ..... KEL-F

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 280096

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 1.2 kg (2.7 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering (33)

PART NUMBER V27200-120 & -121

PROGRAM..... Nimbus & OAO

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... General Electric

STATUS

QUALIFIED..... by General Electric & Valcor Engineering

FLOWN..... Yes

LAUNCH VEHICLE..... Thor Agena/Atlas Agena

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... _____

DESIGN FLOW MEDIA ..... GN_2 or air

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C

Capacity .150 ESEO (CD = .65) (_____ lbm/sec @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... 15 ms @ 23 Vdc, 37 N/cm^2 INLET PRESSURE, 21 °C
(54 PSIA INLET PRESSURE, 70 °F)

CLOSE ..... 15 ms @ _____ Vdc, 37 N/cm^2, 21 °C
(54 PSIA, 70 °F)

LATCHING MECHANISM - TYPE - ..... N/A

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH N/A

INTEGRAL FILTER ..... 25 MICRONS ABSOLUTE Inlet & Outlet

LIFE ..... 1×10^5 CYCLES

PRESSURES -

OPERATING	37 N/cm^2	(54 PSIA)
PROOF	148 N/cm^2	(215 PSIA)
BURST	182 N/cm^2	(265 PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -62 to 48.8 °C (-80 to 120 °F)

LEAKAGE -

INTERNAL ..... .5 scc/hr OF h4 @ 37 N/cm^2 (54 PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... 16-32 Vdc

POWER ..... 35 WATTS MAX @ 32 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 32 Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... _____

SEATS ..... ST/ST - Buna N

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V27200-120 & -121

CONNECTION -

INLET 33414E6

OUTLET ..... Pad

ELECTRICAL ..... Solder lugs

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 0.1 kg (0.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Marotta Scientific Control (53)

MODEL NO. MV229A

PART NUMBER 281022

PROGRAM..... MGO Tank

CONTRACTING AGENCY..... U.S. Army

PRIME CONTRACTOR..... Chrysler

STATUS

QUALIFIED..... yes

FLOWN..... no

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE	Solenoid, 2 X 2, N.C.
DESIGN FLOW MEDIA	Hyd. fluid, MIL-H-6083
RATED FLOW AT PRESSURE DIFFERENTIAL	_____ kg/sec @ _____ N/cm^2, _____ °C (_____ lbm/sec @ _____ PSID, _____ °F)
Equiv. orifice dia.	0.233
RESPONSE -	
OPEN	_____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE, _____ °C (_____ PSIA INLET PRESSURE, _____ °F)
CLOSE	_____ ms @ _____ Vdc, _____ N/cm^2, _____ °C (_____ PSIA, _____ °F)
LATCHING MECHANISM - TYPE -	
MINIMUM ELECTRICAL PULSE WIDTH -	
TO OPEN	_____ ms @ _____ Vdc (MAXIMUM)
TO CLOSE	_____ ms @ _____ Vdc (MAXIMUM)
OPEN/CLOSED POSITION INDICATION SWITCH	
INTEGRAL FILTER	_____ MICRONS ABSOLUTE
LIFE	_____ CYCLES
PRESSURES -	
OPERATING	0-2078 N/cm^2 (0-3015 PSIA)
PROOF	3113 N/cm^2 (4515 PSIA)
BURST	5181 N/cm^2 (7515 PSIA)
REVERSE CRACKING	_____ N/cm^2 (_____ PSIA)
OPERATING TEMPERATURE RANGE	-31 to 51.6 °C ambient (-25 to 125 °F)
LEAKAGE -	
INTERNAL	120 scc/hr OF _____ @ _____ N/cm^2 (3015 PSIA)
EXTERNAL	_____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)
SUPPLY VOLTAGE RANGE	18-30 Vdc
POWER	_____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)
MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW	_____ Vdc
DIELECTRIC STRENGTH	_____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz
INSULATION RESISTANCE	_____ MΩ @ _____ Vdc
MAXIMUM VALVE MAGNETIC FIELD DENSITY -	
ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
DE-ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
MATERIAL -	
CONSTRUCTION	AL. ALY. 2024-T4
SEATS	Nylon

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 281022

CONNECTION -

INLET ..... C8F24502 (7/8 - 14 UNF - 3B)

OUTLET ..... Same

ELECTRICAL .....

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... .9 kg (2 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Circle Seal Corp.
James, Pond & Clark Div.
(30)

PART NUMBER V-4339

PROGRAM..... Space Shuttle

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Rockwell International

STATUS

QUALIFIED.....

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION... 1 to 4 units - $1500

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Isolation Propellant Vernier

DESIGN FLOW MEDIA ..... MMH

RATED FLOW AT PRESSURE DIFFERENTIAL ... .0648 kg/sec @ 13 N/cm^2, _____ °C
(0.143 lbm/sec @ 20 PSID, _____ °F)

RESPONSE -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... _____

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH _____

INTEGRAL FILTER ..... _____ MICRONS ABSOLUTE

LIFE ..... 5 CYCLES min

PRESSURES -

OPERATING	0-210 N/cm^2	(0-305 PSIA)
PROOF	306 N/cm^2	(445 PSIA)
BURST	TBS N/cm^2	(TBS PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -1.1 to 65.5 °C (+30 to 150 °F)

LEAKAGE -

INTERNAL ..... 18 scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... 5×10^{-6} scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... _____ Vdc

POWER ..... _____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 24-32 Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... CRES

SEATS ..... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V-4339

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... .4 kg (1 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Consolidated Controls Corp. (20)

PART NUMBER 3795

PROGRAM..... P-95

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Lockheed Missiles & Space Co.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION... 5 to 10 units - $8000

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Solenoid Latching Valve, positive shut-off

DESIGN FLOW MEDIA ..... N_2H_4

RATED FLOW AT PRESSURE DIFFERENTIAL ... .072 kg/sec @ 12 N/cm², 15 °C
Includes double cavitating venturi (.16 lbm/sec @ 18 PSID, 60 °F)

RESPONSE -

OPEN ..... 50 ms @ 22 Vdc, 0-250 N/cm² INLET PRESSURE, ____ °C
(0-364 PSIA INLET PRESSURE, ____ °F)

CLOSE ..... 50 ms @ 22 Vdc, ____ N/cm², ____ °C
(____ PSIA, ____ °F)

LATCHING MECHANISM - TYPE - ..... Magnetic

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 75 ms @ 22 Vdc (MAXIMUM)

TO CLOSE ..... 75 ms @ 22 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH Yes

INTEGRAL FILTER ..... 200 MICRONS ABSOLUTE

LIFE ..... 5000 CYCLES

PRESSURES -

OPERATING	0-251 N/cm²	(0-365 PSIA)
PROOF	424 N/cm²	(615 PSIA)
BURST	561 N/cm²	(815 PSIA)
REVERSE CRACKING	275-361 N/cm²	(400-525 PSIA)

OPERATING TEMPERATURE RANGE ..... +4.4to60 °C (+40to+140 °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF GN_2 @ 286 N/cm² (415 PSIA)

EXTERNAL ..... 5×10^{-6} scc/s OF He @ 286 N/cm² (415 PSIA)

SUPPLY VOLTAGE RANGE ..... 22-32 Vdc

POWER ..... 2.04 amps ~~WATTS~~ MAX @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 37 Vdc

DIELECTRIC STRENGTH ..... .250 mA MAX. CURRENT LEAKAGE @ 500 VOLTS rms, 60 Hz

INSULATION RESISTANCE ..... 1000 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

DE-ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION 304L

SEATS ..... TFE

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 3795

CONNECTION -
- INLET ..... 3/8 Braze
- OUTLET ..... 3/8 Braze
- ELECTRICAL .....

LAUNCH ENVIRONMENT -
- RANDOM VIBRATION -
  - WIDE BAND LEVEL ..... 16.9 G_{rms}
  - MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from 20 to 2000 Hz
- SINUSOIDAL VIBRATION -
  - SWEEP RATE ..... 3 OCTAVES/min
  - MAX G LEVEL (0-PEAK) ..... 3 g's AT 500 - 1000 Hz
    _____ AT _____ Hz
    _____ AT _____ Hz

ACOUSTIC VIBRATION -
- OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -
- WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec
- SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz
- AMPLIFICATION FACTOR (Q) .....

STATIC ACCELERATION ..... 20 G's

MASS ..... 1.02 kg (2.25 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Circle Seal Corporation
James, Pond & Clark Div.
(30)

PART NUMBER V-4340

PROGRAM..... Space Shuttle

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Rockwell International

STATUS

QUALIFIED.....

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION... 1 to 4 units - $4000

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Valve, Propellant Main Supply

DESIGN FLOW MEDIA ..... N_2O_4, MMH

RATED FLOW AT PRESSURE DIFFERENTIAL ... .0943 kg/sec @ 3.4 N/cm², _____ °C
(.208 lbm/sec @ 5.0 PSID, _____ °F)

RESPONSE -

OPEN ..... 5 sec ms @ _____ Vdc, _____ N/cm² INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... 5 sec ms @ _____ Vdc, _____ N/cm², _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... _____

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH _____

INTEGRAL FILTER ..... _____ MICRONS ABSOLUTE

LIFE ..... 500 CYCLES

PRESSURES -

OPERATING	0-210 N/cm²	(0-305 PSIA)
PROOF	306 N/cm²	(445 PSIA)
BURST	TBS N/cm²	(TBS PSIA)
REVERSE CRACKING	_____ N/cm²	(_____ PSIA)
OPERATING TEMPERATURE RANGE	-1.1 to 65.5 °C	(+30 to 150 °F)

LEAKAGE -

INTERNAL ..... .2 scc/hr OF _____ @ _____ N/cm² (_____ PSIA)

EXTERNAL ..... 8 x 10^{-8} scc/s OF _____ @ _____ N/cm² (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... _____ Vdc

POWER ..... _____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 28 Vdc

DIELECTRIC STRENGTH ..... 2 mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... Cres

SEATS ..... Teflon/Brass

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V-4340

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 2 kg (6 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering Corp. (33)

PART NUMBER V47200-16

PROGRAM.....	LEM
CONTRACTING AGENCY.....	NASA
PRIME CONTRACTOR.....	Grumman
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Saturn
AVAILABILITY.....	Pre engineered hardware made to customer order.
COST/PROCUREMENT INFORMATION...	Specific quotation can be offered firm within 2 weeks of inquiry.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE	.0158 m (.625 in) Sol Dual Flow
DESIGN FLOW MEDIA	N_2H_4 and UDMH 50/50
RATED FLOW AT PRESSURE DIFFERENTIAL ... Equiv. orifice .00764 m diam. (.301 in)	_____ kg/sec @ _____ N/cm^2, _____ °C (_____ lbm/sec @ _____ PSID, _____ °F)
RESPONSE -	
OPEN	30 ms @ 28 Vdc, 131 N/cm^2 INLET PRESSURE, 21 °C (190 PSIA INLET PRESSURE, 70 °F)
CLOSE	30 ms @ _____ Vdc, 131 N/cm^2, 21 °C (190 PSIA, 70 °F)
LATCHING MECHANISM - TYPE -	N/A
MINIMUM ELECTRICAL PULSE WIDTH -	
TO OPEN	_____ ms @ _____ Vdc (MAXIMUM)
TO CLOSE	_____ ms @ _____ Vdc (MAXIMUM)
OPEN/CLOSED POSITION INDICATION SWITCH	Yes. Some versions - magnetic
INTEGRAL FILTER	25 MICRONS ABSOLUTE
LIFE	1×10^5 CYCLES
PRESSURES -	
OPERATING	182 N/cm^2 (265 PSIA)
PROOF	355 N/cm^2 (515 PSIA)
BURST	527 N/cm^2 (765 PSIA)
REVERSE CRACKING	_____ N/cm^2 (_____ PSIA)
OPERATING TEMPERATURE RANGE	-53 to 82.2 °C (-65 to 180 °F)
LEAKAGE -	
INTERNAL	10 scc/hr OF N_2H_4 @ 131 N/cm^2 (190 PSIA)
EXTERNAL	0 scc/s OF He @ 131 N/cm^2 (190 PSIA)
SUPPLY VOLTAGE RANGE	21-32 Vdc
POWER	40 WATTS MAX @ 30 Vdc, 21 °C (70 °F)
MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW	30 Vdc
DIELECTRIC STRENGTH	_____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz
INSULATION RESISTANCE	100 MΩ @ 500 Vdc
MAXIMUM VALVE MAGNETIC FIELD DENSITY -	
ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
DE-ENERGIZED	_____ nT @ 1 m (_____ GAMMA @ 6 in)
MATERIAL -	
CONSTRUCTION	ST/ST
SEATS	ST/ST - Ethylene Propylene

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V47200-16

CONNECTION -

INLET	5/8 Weld stubs
OUTLET	5/8 Weld stubs
ELECTRICAL	P/T

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____

STATIC ACCELERATION	_____ G's
MASS	1.0 kg (2.3 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Consolidated Controls Corp.(20)

PART NUMBER 3490-5

(Originally manufactured by
National Water Lift Co.)

PROGRAM.....	Apollo
CONTRACTING AGENCY.....	
PRIME CONTRACTOR.....	Rockwell International
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Saturn
AVAILABILITY.....	180 days
COST/PROCUREMENT INFORMATION...	5 to 10 units - $8000

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Solenoid latching; single stage

DESIGN FLOW MEDIA ..... MMH or N_2H_4/UDMH

RATED FLOW AT PRESSURE DIFFERENTIAL ... .14 kg/sec @ 2 N/cm^2, 15 °C
(.33 lbm/sec @ 4 PSID, 60 °F)

RESPONSE -

OPEN ..... 50 ms @ 18 Vdc, ____ N/cm^2 INLET PRESSURE, ____ °C
(____ PSIA INLET PRESSURE, ____ °F)

CLOSE ..... 50 ms @ 18 Vdc, ____ N/cm^2, ____ °C
(____ PSIA, ____ °F)

LATCHING MECHANISM - TYPE - ..... Magnetic

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 100 ms @ 18 Vdc (MAXIMUM)

TO CLOSE ..... 100 ms @ 18 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH Poppet position

INTEGRAL FILTER ..... No MICRONS ABSOLUTE

LIFE ..... 4000 CYCLES

PRESSURES -

OPERATING	0-258 N/cm^2	(0-375 PSIA)
PROOF	382 N/cm^2	(555 PSIA)
BURST	506 N/cm^2	(735 PSIA)
REVERSE CRACKING	N/A N/cm^2	(____ PSIA)

OPERATING TEMPERATURE RANGE ..... 4.4to40.5 °C (+40to105 °F)

LEAKAGE -

INTERNAL ..... 20 scc/hr OF He @ 258 N/cm^2 (375 PSIA)

EXTERNAL ..... 5×10^{-6} scc/s OF He @ 382 N/cm^2 (555 PSIA)

SUPPLY VOLTAGE RANGE ..... 18-33 Vdc

POWER ..... 2.04 ~~WATTS~~ Amps MAX @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 33 Vdc

DIELECTRIC STRENGTH ..... 2 mA MAX. CURRENT LEAKAGE @ 560 VOLTS rms, ____ Hz

INSULATION RESISTANCE ..... 1000 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

DE-ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... 304 L

SEATS ..... TFE

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 3490-5

CONNECTION -
- INLET ..... 0.630 o.d.; .025 wall tube
- OUTLET ..... 0.630 o.d.; .025 wall tube
- ELECTRICAL ..... leads

LAUNCH ENVIRONMENT -
- RANDOM VIBRATION -
  - WIDE BAND LEVEL ..... 16.4 G_{rms}
  - MAX POWER SPECTRAL DENSITY ..... .15 G^2/Hz from 100 to 1000 Hz
- SINUSOIDAL VIBRATION -
  - SWEEP RATE ..... N/A OCTAVES/min
  - MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz
    _____ AT _____ Hz
    _____ AT _____ Hz
- ACOUSTIC VIBRATION -
  - OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES
- SHOCK RESPONSE -
  - WAVE FORM PEAK-LEVEL OF ..... 30 G's FOR .001 sec
  - SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz
  - AMPLIFICATION FACTOR (Q) .....
- STATIC ACCELERATION ..... 70 G's

MASS ..... 0.68 kg (1.5 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Marotta Scientific Controls (53)

MODEL NO. MV197K

PART NUMBER 281233

PROGRAM..... STINGER(improved "RED EYE" Weapon System)

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... GD/Pomona

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Coaxial, magnetic, shut-off

DESIGN FLOW MEDIA ..... N_2, inert gas

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
Equiv. orifice dia. .03 (_____ lbm/sec @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... _____ ms @ _____ Vdc, _____ N/cm^2 INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... _____ ms @ _____ Vdc, _____ N/cm^2, _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... N/A

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... _____ ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH _____

INTEGRAL FILTER ..... _____ MICRONS ABSOLUTE

LIFE ..... _____ CYCLES

PRESSURES -

OPERATING	0-4698 N/cm^2	(0-6815 PSIA)
PROOF	8628.8 N/cm^2	(12,515 PSIA)
BURST	17,247 N/cm^2	(25,015 PSIA)
REVERSE CRACKING	_____ N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -42 to 71°C ambient (-45 to 160°F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)

SUPPLY VOLTAGE RANGE ..... 18-30 Vdc

POWER ..... _____ WATTS MAX @ _____ Vdc, _____ °C (_____ °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... _____ Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... _____ MΩ @ _____ Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... 17-4 PH

SEATS ..... Nylon

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 281233

CONNECTION -

INLET ..... _____

OUTLET ..... _____

ELECTRICAL ..... _____

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... .2 kg (.6 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering Corp. (33)

PART NUMBER V27200 - 437

PROGRAM.....	Apollo
CONTRACTING AGENCY.....	NASA
PRIME CONTRACTOR.....	Fairchild Camera
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Saturn
AVAILABILITY.....	Pre engineered hardware made to customer orde
COST/PROCUREMENT INFORMATION...	Specification can be offered firm within 2 weeks of inquiry.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... .0063 in (.25 in) N.C. Sol-Latch

DESIGN FLOW MEDIA ..... GN_2

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
(_____ lbm/sec @ _____ PSID, _____ °F)

Metering--Basic Capacity .030 in ESEO

RESPONSE -

OPEN ..... 20 ms @ 24 Vdc, 27 N/cm^2 INLET PRESSURE, 21 °C
(40 PSIA INLET PRESSURE, 70 °F)

CLOSE ..... 15 ms @ 24 Vdc, 27 N/cm^2, 21 °C
(40 PSIA, 70 °F)

LATCHING MECHANISM - TYPE - ..... Magnetic - Dual Coil

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 50 ms @ 22 Vdc (MAXIMUM)

TO CLOSE ..... 50 ms @ 22 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH No

INTEGRAL FILTER ..... 15 MICRONS ABSOLUTE

LIFE ..... 1×10^5 CYCLES

PRESSURES -

OPERATING	29 N/cm^2	(43 PSIA)
PROOF	44 N/cm^2	(65 PSIA)
BURST	62 N/cm^2	(90 PSIA)
REVERSE CRACKING	N/A N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -17to+65.5 °C (0 to +150 °F)

LEAKAGE -

INTERNAL ..... .03 scc/hr OF GN_2 @ 17 N/cm^2 (25 PSIA)

EXTERNAL ..... 1×10^{-6} scc/s OF HC @ 17 N/cm^2 (25 PSIA)

SUPPLY VOLTAGE RANGE ..... 22-32 Vdc

POWER ..... 20 WATTS MAX @ 32 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... N/A Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... Bura N/ST/ST

SEATS ..... _____

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N V27200-437

CONNECTION -

INLET MS2438654

OUTLET ..... Special tube

ELECTRICAL ..... Solder lugs

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... _____ G_{rms}

MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... _____ OCTAVES/min

MAX G LEVEL (0-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... _____ G's

MASS ..... 0.15 kg (0.35 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Metering orifice (replaceable)

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Consolidated Controls Corp.(20)

PART NUMBER 3490-4
(Originally manufactured by
National Water Lift Co.)

PROGRAM.....	Apollo
CONTRACTING AGENCY.....	
PRIME CONTRACTOR.....	Rockwell International
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Saturn
AVAILABILITY.....	180 days
COST/PROCUREMENT INFORMATION...	5 to 10 units - $8000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Solenoid latching; single stage

DESIGN FLOW MEDIA ..... N_2O_4

RATED FLOW AT PRESSURE DIFFERENTIAL ... .29 kg/sec @ 4 N/cm², 15 °C
(.66 lbm/sec @ 7 PSID, 60 °F)

RESPONSE -

OPEN ..... 50 ms @ 18 Vdc, ____ N/cm² INLET PRESSURE, ____ °C
(____ PSIA INLET PRESSURE, ____ °F)

CLOSE ..... 50 ms @ 18 Vdc, ____ N/cm², ____ °C
(____ PSIA, ____ °F)

LATCHING MECHANISM - TYPE - ..... Magnetic

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 100 ms @ 18 Vdc (MAXIMUM)

TO CLOSE ..... 100 ms @ 18 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH Poppet position

INTEGRAL FILTER ..... No MICRONS ABSOLUTE

LIFE ..... 4000 CYCLES

PRESSURES -

OPERATING ..... 258 N/cm² (375 PSIA)

PROOF ..... 382 N/cm² (555 PSIA)

BURST ..... 506 N/cm² (735 PSIA)

REVERSE CRACKING ..... N/A N/cm² (____ PSIA)

OPERATING TEMPERATURE RANGE .....+4.4to+40.5°C (+40to+105 °F)

LEAKAGE -

INTERNAL ..... 20 scc/hr OF He @ 258 N/cm² (375 PSIA)

EXTERNAL .....5 x 10^6 scc/s OF He @ 382 N/cm² (555 PSIA)

SUPPLY VOLTAGE RANGE ..... 18-33 Vdc

POWER ..... 2.04 Amps ~~WATTS~~=MAX @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 33 Vdc

DIELECTRIC STRENGTH ..... 2 mA MAX. CURRENT LEAKAGE @ 560 VOLTS rms, ____ Hz

INSULATION RESISTANCE ..... 1000 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

DE-ENERGIZED ..... ____ nT @ 1 m (____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... 304 L

SEATS ..... TFE

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 3490-4

CONNECTION -

INLET ..... 0.630 o.d.; .025 wall tube

OUTLET ..... 0.630 o.d.; .025 wall tube

ELECTRICAL ..... leads

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL ..... 16.4 G_{rms}

MAX POWER SPECTRAL DENSITY ..... .15 G^2/Hz from 100 to 1000 Hz

SINUSOIDAL VIBRATION -

SWEEP RATE ..... N/A OCTAVES/min

MAX G LEVEL (O-PEAK) ..... _____ AT _____ Hz

_____ AT _____ Hz

_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF ..... 30 G's FOR .011 sec

SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz

AMPLIFICATION FACTOR (Q) ..... _____

STATIC ACCELERATION ..... 70 G's

MASS ..... 0.68 kg (1.5 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Consolidated Controls Corp. (20)

PART NUMBER 72513

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Lockheed Missiles and Space Co.

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY..... 180 days

COST/PROCUREMENT INFORMATION... 5 to 10 units - $8000

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... Propellant management and isolation

DESIGN FLOW MEDIA ..... N_2H_4

RATED FLOW AT PRESSURE DIFFERENTIAL ... .4 kg/sec @ 8.2 N/cm², _____ °C
(1 lbm/sec @ 12 PSID, _____ °F)

RESPONSE -

OPEN ..... 50 ms @ 24 Vdc, _____ N/cm² INLET PRESSURE, _____ °C
(_____ PSIA INLET PRESSURE, _____ °F)

CLOSE ..... 50 ms @ 24 Vdc, _____ N/cm², _____ °C
(_____ PSIA, _____ °F)

LATCHING MECHANISM - TYPE - ..... Magnetic

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 75 ms @ 24 Vdc (MAXIMUM)

TO CLOSE ..... 75 ms @ 24 Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH Yes

INTEGRAL FILTER ..... 100 MICRONS ABSOLUTE

LIFE ..... 500 CYCLES

PRESSURES -

OPERATING	0-237 N/cm²	(0-345 PSIA)
PROOF	355 N/cm²	(515 PSIA)
BURST	372 N/cm²	(540 PSIA)
REVERSE CRACKING	275-344 N/cm²	(400-500 PSIA)

OPERATING TEMPERATURE RANGE ..... +4.4to+60 °C (+40to+140 °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF GN_2 @ 237 N/cm² (0-345 PSIA)

EXTERNAL ..... 1×10^{-6} scc/s OF He @ 237 N/cm² (345 PSIA)

SUPPLY VOLTAGE RANGE ..... 24-33 Vdc

POWER ..... 2.42 ~~WATTS~~ amps MAX @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 30 Vdc

DIELECTRIC STRENGTH ..... 250 mA MAX. CURRENT LEAKAGE @ 500 VOLTS rms, 60 Hz

INSULATION RESISTANCE ..... 1000 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... 304 L

SEATS ..... TFE

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued

P/N 72513

CONNECTION -
- INLET ..... 3/4 Braze
- OUTLET ..... 3/4 Braze
- ELECTRICAL ..... Conn.

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -
- WIDE BAND LEVEL ..... 16.9 G_{rms}
- MAX POWER SPECTRAL DENSITY ..... _____ G^2/Hz from 20 to 2000 Hz

SINUSOIDAL VIBRATION -
- SWEEP RATE ..... 3 OCTAVES/min
- MAX G LEVEL (0-PEAK) ..... 5 g's AT 500 - 1000 Hz
  _____ AT _____ Hz
  _____ AT _____ Hz

ACOUSTIC VIBRATION -
- OVERALL SOUND PRESSURE LEVEL ..... _____ dB FOR _____ MINUTES

SHOCK RESPONSE -
- WAVE FORM PEAK-LEVEL OF ..... _____ G's FOR _____ sec
- SHOCK SPECTRUM-PEAK RESPONSE OF ..... _____ G's AT _____ Hz
- AMPLIFICATION FACTOR (Q) .....

STATIC ACCELERATION ..... 20 G's

MASS ..... 1.5 kg (3.5 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

MANUFACTURER Valcor Engineering Corp. (33)

PART NUMBER V27200-320

PROGRAM..... APS

CONTRACTING AGENCY..... Japan

PRIME CONTRACTOR..... Sunny Ltd., Tokyo

STATUS

QUALIFIED.....

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY..... Pre engineered hardware made to customer order

COST/PROCUREMENT INFORMATION... Specific quotation can be offered firm within 2 weeks of inquiry.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION

TYPE ..... .0063 m. (.25 in) N.C. Sol.

DESIGN FLOW MEDIA ..... H_2O_2

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ kg/sec @ _____ N/cm^2, _____ °C
Capacity C_v=.07 minimum (_____ lbm/sec @ _____ PSID, _____ °F)

RESPONSE -

OPEN ..... 20 ms @ 24 Vdc, 434 N/cm^2 INLET PRESSURE, 21 °C
(630 PSIA INLET PRESSUPE, 70 °F)

CLOSE ..... _____ ms @ _____ Vdc, 434 N/cm^2, 21 °C
(630 PSIA, 70 °F)

LATCHING MECHANISM - TYPE - ..... N/A

MINIMUM ELECTRICAL PULSE WIDTH -

TO OPEN ..... 50 ms @ _____ Vdc (MAXIMUM)

TO CLOSE ..... _____ ms @ _____ Vdc (MAXIMUM)

OPEN/CLOSED POSITION INDICATION SWITCH N/A

INTEGRAL FILTER ..... N/A MICRONS ABSOLUTE

LIFE ..... 5×10^5 CYCLES

PRESSURES -

OPERATING	444 N/cm^2	(645 PSIA)
PROOF	630 N/cm^2	(915 PSIA)
BURST	837 N/cm^2	(1215 PSIA)
REVERSE CRACKING	N/A N/cm^2	(_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -51 to +160 °C (-60to+320 °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF H_2O_2 @ _____ N/cm^2 (630 PSIA)

EXTERNAL ..... 0 scc/s OF H_2O_2 @ _____ N/cm^2 (630 PSIA)

SUPPLY VOLTAGE RANGE ..... 18-30 Vdc

POWER ..... 40 WATTS MAX @ 30 Vdc, 21 °C (70 °F)

MAXIMUM CONTINUOUS VOLTAGE WITHOUT PROPELLANT FLOW ..... 30 Vdc

DIELECTRIC STRENGTH ..... _____ mA MAX. CURRENT LEAKAGE @ _____ VOLTS rms, _____ Hz

INSULATION RESISTANCE ..... 100 MΩ @ 500 Vdc

MAXIMUM VALVE MAGNETIC FIELD DENSITY -

ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

DE-ENERGIZED ..... _____ nT @ 1 m (_____ GAMMA @ 6 in)

MATERIAL -

CONSTRUCTION ..... ST/ST

SEATS ..... ST/ST - Teflon

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.3 VALVE, PROPELLANT ISOLATION continued P/N V27200-320

CONNECTION -

INLET	MS33656-4
OUTLET	MS33654-4
ELECTRICAL	P/T

LAUNCH ENVIRONMENT -

RANDOM VIBRATION -

WIDE BAND LEVEL	_____ G_{rms}
MAX POWER SPECTRAL DENSITY	_____ G^2/Hz from _____ to _____ Hz

SINUSOIDAL VIBRATION -

SWEEP RATE	_____ OCTAVES/min
MAX G LEVEL (0-PEAK)	_____ AT _____ Hz
	_____ AT _____ Hz
	_____ AT _____ Hz

ACOUSTIC VIBRATION -

OVERALL SOUND PRESSURE LEVEL	_____ dB FOR _____ MINUTES

SHOCK RESPONSE -

WAVE FORM PEAK-LEVEL OF	_____ G's FOR _____ sec
SHOCK SPECTRUM-PEAK RESPONSE OF	_____ G's AT _____ Hz
AMPLIFICATION FACTOR (Q)	_____
STATIC ACCELERATION	_____ G's
MASS	1.1 kg (2.5 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Internal permeable iron is 17-4PH. Valve is suitable for N_2H_4 and N_2O_4 service as well as H_2O_2.

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2391214

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE .....

DESIGN FLOW MEDIA ..... N_2, CO_2

CRACKING PRESSURE ..... $1.7 \pm .17$ N/cm^2 ($2.5 \pm .25$ PSIA)

RESEAT PRESSURE ..... 1.3 N/cm^2 (2.0 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 4×10^{-2} scc/s @ _____ N/cm^2, _____ °C
(1 SCFM @ _____ PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 0 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION .....

SEAT .....

CONNECTIONS -

INLET .....

OUTLET .....

MASS ..... .04 kg (0.1 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Fairchild Industries
Stratos Div. (31)

PART NUMBER 834000

PROGRAM..... OWS

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... NASA

STATUS

QUALIFIED..... Yes

FLOWN..... No

LAUNCH VEHICLE.....

AVAILABILITY..... Not in production. Available on special order

COST/PROCUREMENT INFORMATION... $1000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... Inverted, spring loaded

DESIGN FLOW MEDIA ..... GN_2

CRACKING PRESSURE ..... 15.6 ± .34 N/cm² (22.7 ± .5 PSIA)

RESEAT PRESSURE ..... 14.9 N/cm² (21.7 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 10 scc/s @ 6.2 N/cm², _____ °C
(.021 SCFM @ 9.0 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm² (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm²
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... 22.5 N/cm² (32.7 PSIA)

BURST PRESSURE ..... 34.9 N/cm² (50.7 PSIA)

OPERATING TEMPERATURE RANGE ..... +15to +35 °C (+59to +95 °F)

LEAKAGE -

INTERNAL ..... 36 scc/hr OF GN_2 @ 14.6 N/cm²
(21.2 PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm²
(_____ PSIA)

EXTERNAL ..... 59 scc/s OF _____ @ _____ N/cm²
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... .0047 m (.18 in) tube

OUTLET ..... .0063 m (.25 in) tube

MASS ..... .068 kg (0.15 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

225

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Sterer Engineering Co. (16)

PART NUMBER 48343

PROGRAM..... Viking '75

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... 1975

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... _____

DESIGN FLOW MEDIA ..... GN_2

CRACKING PRESSURE ..... 44 ± 3 N/cm^2 (65 ± 5 PSIA)

RESEAT PRESSURE ..... 35 N/cm^2 (52 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 3.0×10^3 scc/s @ 41 N/cm^2, _____ °C
(6.5 SCFM @ 60 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... 2000 CYCLES

PROOF PRESSURE ..... 93.0 N/cm^2 (135 PSIA)

BURST PRESSURE ..... 355 N/cm^2 (515 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 0.1 scc/hr OF GN_2 @ 0-35 N/cm^2
(0-52 PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 1.3×10^{-5} scc/s OF GN_2 @ 42 N/cm^2
(61 PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.1 kg (0.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Whittaker Corp. (37)

PART NUMBER 145485 (-7)

PROGRAM..... Agena Discoverer

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Lockheed Missile and Space Div.

STATUS

QUALIFIED..... Yes. Whittaker Qual. Test Report No. 60-762

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... Incorporates a pressure actuating (pilot) poppet and differential piston relief valve with ~~squib override.~~

DESIGN FLOW MEDIA ..... He gas + UDMH vapors and He gas + IRFNA vapors

CRACKING PRESSURE ..... 51 N/cm^2 (75 PSIA)

RESEAT PRESSURE ..... 48 N/cm^2 (71 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 3.7×10^4 scc/s @ 42 N/cm^2, _____ °C
(80 SCFM @ 62 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... 93.0 N/cm^2 (135 PSIA)

BURST PRESSURE ..... 182 N/cm^2 (265 PSIA)

OPERATING TEMPERATURE RANGE ..... 0 to 48.8 °C Ambient (+32 to 120 °F)

LEAKAGE -

INTERNAL ..... 1200 scc/hr OF _____ @ 47 N/cm^2
(69 PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... MS24385-6 for 3/8 T.S.

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

See also Whittaker Qualification Test Report No. 60-762.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2396249

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

CRACKING PRESSURE ..... 96.5 ±6.8 N/cm^2 (140 ± 10 PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (110 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 4.7×10^3 scc/s @ _____ N/cm^2, _____ °C
(10 SCFM @ _____ PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... 382 N/cm^2 (555 PSIA)

BURST PRESSURE ..... 506 N/cm^2 (735 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 0 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

C-3

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2391246

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... _____

DESIGN FLOW MEDIA ..... He

CRACKING PRESSURE ..... 165 N/cm^2 (240 PSIA)

RESEAT PRESSURE ..... 151 N/cm^2 (220 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... _____ scc/s @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... 79.2 N/cm^2 (115 PSIA)

BURST PRESSURE ..... 837.7 N/cm^2 (1215 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 20 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.04 kg (0.09 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 230200-2 230201

PROGRAM..... Mariner 69

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... TRW Systems

STATUS

QUALIFIED..... yes, by TRW

FLOWN.....

LAUNCH VEHICLE..... Atlas Agena

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... Test Port (1/4 Tube Size) Welded

DESIGN FLOW MEDIA ..... GN_2

CRACKING PRESSURE ..... 188-199 N/cm^2 (274to289 PSIA)

RESEAT PRESSURE ..... 188 N/cm^2 (274 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... $1.0x10^3$ scc/s @ 203 N/cm^2, 21 °C
(2.3 SCFM @ 295 PSID, 70 °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... 188-304 N/cm^2 (274to304 PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... 1000 CYCLES

PROOF PRESSURE ..... 406 N/cm^2 (589 PSIA)

BURST PRESSURE ..... 492 N/cm^2 (714 PSIA)

OPERATING TEMPERATURE RANGE ..... -59 to +48.8 °C (-74°F to +120 °F)

LEAKAGE -

INTERNAL ..... 5 scc/hr OF GN_2 @ 188 N/cm^2
(274 PSIA)

BURST DIAPHRAGM ..... 1×10^{-7} scc/s OF He @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 1×10^{-7} scc/s OF He @ 406 N/cm^2
(589 PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... .521 kg (1.15 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Ametek/Calmec Div. (41,16)

PART NUMBER 1113

PROGRAM.....	Mariner '71
CONTRACTING AGENCY.....	NASA
PRIME CONTRACTOR.....	
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Atlas Agena
AVAILABILITY.....	
COST/PROCUREMENT INFORMATION...	10 units - $5700

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE .....

DESIGN FLOW MEDIA ..... N_2

CRACKING PRESSURE ..... 233 N/cm^2 (340 PSIA)

RESEAT PRESSURE ..... 199 N/cm^2 (290 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 755 scc/s @ 234 N/cm^2, _____ °C
(1.60 SCFM @ 340 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... 4000 CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... 230 ± 6.8 N/cm^2 (335 ± 10 PSIA)

OPERATING TEMPERATURE RANGE ..... -37 to 71.1 °C (-35 to +160 °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... Welded S.S.

SEAT .....

CONNECTIONS -

INLET .....

OUTLET .....

MASS ..... .612 kg (1.35 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 193790-4

PROGRAM..... SE-5

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Rockwell Int'l, Rocketdyne Div.

STATUS

QUALIFIED..... yes, by Rocketdyne

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... Direct acting, pneumatic

DESIGN FLOW MEDIA ..... GN_2, N_2O_4, N_2H_4

CRACKING PRESSURE ..... 234 N/cm² (340 PSIA)

RESEAT PRESSURE ..... 220 N/cm² (320 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 2360 scc/s @ 254 N/cm², _____ °C
(50 SCFM @ 369 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... N/A N/cm² (N/A PSID)

LIFE -

BURST DIAPHRAGM ..... N/A CYCLES AT ZERO TO _____ TO ZERO N/cm²
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... 1000 CYCLES

PROOF PRESSURE ..... 281 ± 3 N/cm² (409 ± 5 PSIA)

BURST PRESSURE ..... 371 ± 3 N/cm² (539 ± 5 PSIA)

OPERATING TEMPERATURE RANGE ..... -53to71.1 °C (-65to160 °F)

LEAKAGE -

INTERNAL ..... 5 scc/hr OF GN_2 @ 13-219 N/cm²
(19 to319 PSIA)

BURST DIAPHRAGM ..... N/A scc/s OF _____ @ _____ N/cm²
(_____ PSIA)

EXTERNAL ..... 10 scc/s OF GN_2 @ 281±3 N/cm²
(409±5 PSIA)

MATERIAL -

CONSTRUCTION ..... Cres and Teflon

SEAT .....

CONNECTIONS -

INLET .....

OUTLET .....

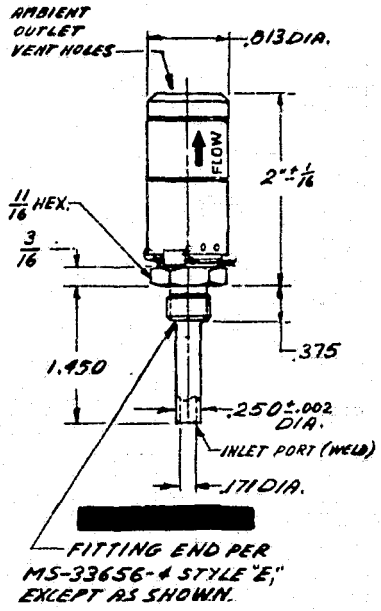
MASS ..... .49 kg (1.1 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Filter . . . . . 10 μ absolute

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF



Scale: Half Size

MANUFACTURER SieBelAir Corp. (51)

PART NUMBER 1488, BASIC

PROGRAM..... APOLLO

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Aerojet Liquid Rocket Co.

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE..... Saturn

AVAILABILITY..... 8 to 16 weeks ARO depending on quantity

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... Inverted direct operated

DESIGN FLOW MEDIA ..... GN_2, GHe, Air

CRACKING PRESSURE ..... 241 ± 6 N/cm² (350 ± 10 psid PSIA)

RESEAT PRESSURE ..... 224 N/cm² (325 psid PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 9.4×10^2 scc/s @ 255 N/cm², 21 °C
(2.0 SCFM @ 370 PSID, 70 °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... N/A N/cm² (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... N/A CYCLES AT ZERO TO _____ TO ZERO N/cm²
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... 50,000 CYCLES

PROOF PRESSURE ..... 492 N/cm² (715 PSIA)

BURST PRESSURE ..... 1044 N/cm² (1515 PSIA)

OPERATING TEMPERATURE RANGE ..... -53 to 71.1 °C (-65 to +160 °F)

LEAKAGE -

INTERNAL ..... 2.0 scc/hr OF GN_2 @ 199 N/cm² (290 PSIA)

BURST DIAPHRAGM ..... N/A scc/s OF _____ @ _____ N/cm² (_____ PSIA)

EXTERNAL ..... 1×10^{-5} scc/s OF GN_2 @ 199 N/cm² (290 PSIA)

MATERIAL -

CONSTRUCTION ..... Cres and Al. Al.

SEAT ..... Kynar

CONNECTIONS -

INLET ..... MS-33656-4 or.006m(.25 in) weld tube

OUTLET ..... Ambient dump

MASS ..... .068 kg (.15 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2391237

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE .....

DESIGN FLOW MEDIA ..... Air, N_2

CRACKING PRESSURE ..... 396 N/cm² (575 PSIA)

RESEAT PRESSURE ..... 379 N/cm² (550 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 1.9×10^4 scc/s @ _____ N/cm², _____ °C
(42 SCFM @ _____ PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm² (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm²
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... 699.8 N/cm² (1015 PSIA)

BURST PRESSURE ..... 975.6 N/cm² (1415 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF _____ @ _____ N/cm²
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm²
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm²
(_____ PSIA)

MATERIAL -

CONSTRUCTION .....

SEAT .....

CONNECTIONS -

INLET .....

OUTLET .....

MASS ..... .04 kg (.09 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2396245

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... _____

DESIGN FLOW MEDIA ..... Air, N_2

CRACKING PRESSURE ..... 448 N/cm^2 (650 PSIA)

RESEAT PRESSURE ..... 393 N/cm^2 (570 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 1.34×10^5 scc/s @ _____ N/cm^2, _____ °C
(285 SCFM @ _____ PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... 579 N/cm^2 (840 PSIA)

BURST PRESSURE ..... 958.3 N/cm^2 (1390 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 0 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.14 kg (0.32 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Fairchild Industries
Stratos Div. (31)

PART NUMBER 56-399

PROGRAM..... X-15

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR..... Rockwell International

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... Not in production. Available on special order.

COST/PROCUREMENT INFORMATION... $1000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... Directing acting, spring loaded

DESIGN FLOW MEDIA ..... GN_2

CRACKING PRESSURE ..... 2078.5 ± 6 N/cm² (3014.7 ±10 PSIA) *

RESEAT PRESSURE ..... 2009.6 N/cm² (2714.7 PSIA) *

RATED FLOW AT PRESSURE DIFFERENTIAL ... 1.08×10^5 scc/s @ _____ N/cm², _____ °C
(230 SCFM @ _____ PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm² (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm²
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... 5000 CYCLES

PROOF PRESSURE ..... 4147 N/cm² (6014.7 PSIA)

BURST PRESSURE ..... 6215.4 N/cm² (9014.7 PSIA)

OPERATING TEMPERATURE RANGE ..... -53 to +71.1 °C (-65 to +160 °F)

LEAKAGE -

INTERNAL ..... 300 scc/hr OF _____ @ 34 N/cm²
(50 PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm²
(_____ PSIA)

EXTERNAL ..... 299 scc/s OF _____ @ _____ N/cm²
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... Al Alloy, Cres

SEAT ..... Mylar

CONNECTIONS -

INLET ..... Special

OUTLET ..... None

MASS ..... 0.11 kg (0.25 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Made in several settings as follows:

Part No.	Cracking Pressure	Reseat Pressure
56-399-01	2078.5 N/cm² (3014.7 psia)	2009.6 N/cm² (2914.7 psia)
56-399-02	2638 N/cm² (3827 psia)	2578 N/cm² (3740 psia)
56-399-03	2747 N/cm² (3985 psia)	2664 N/cm² (3865 psia)

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Tavco, Inc. (36)

PART NUMBER 2394222

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... _____

DESIGN FLOW MEDIA ..... Air, N_2

CRACKING PRESSURE ..... 2585 N/cm^2 (3750 PSIA)

RESEAT PRESSURE ..... 2344 N/cm^2 (3400 PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 2×10^3 scc/s @ _____ N/cm^2, _____ °C
(5 SCFM @ _____ PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 0 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Ametek/Calmec (42)

PART NUMBER 615

PROGRAM..... Lunar Orbiter

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... yes

FLOWN.....

LAUNCH VEHICLE..... Atlas Agena

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... _____

DESIGN FLOW MEDIA ..... N_2

CRACKING PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 7.0×10^3 scc/s @ 172 N/cm^2, _____ °C
(15 SCFM @ 250 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... +1.6 to 29 °C (+35 to 85 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... .31 kg (.70 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Filter in inlet

051

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Ametek/Calmec (42)

PART NUMBER 1039

PROGRAM..... MOL RCS

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... S.S. Burst Disc, Checkout Port

DESIGN FLOW MEDIA ..... He, N_2O_4, MMH

CRACKING PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 6.3×10^4 scc/s @ 165 N/cm^2, _____ °C
(134 SCFM @ 240 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -28 to 71.1 °C (-20 to 160 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... .90 kg (2.0 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

MANUFACTURER Ametek/Calmec (42)

PART NUMBER 1049

PROGRAM..... AAP

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.4 VALVE, RELIEF

TYPE ..... S.S. Burst Disc, Checkout Port

DESIGN FLOW MEDIA ..... N_2

CRACKING PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RATED FLOW AT PRESSURE DIFFERENTIAL ... 4×10^4 scc/s @ 241 N/cm^2, _____ °C
(89 SCFM @ 350 PSID, _____ °F)

BURST DIAPHRAGM RUPTURE PRESSURE ..... _____ N/cm^2 (_____ PSID)

LIFE -

BURST DIAPHRAGM ..... _____ CYCLES AT ZERO TO _____ TO ZERO N/cm^2
(ZERO TO _____ TO ZERO PSIA)

VALVE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -6.6 to 51.6 °C (+20 to 125 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

BURST DIAPHRAGM ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... .90 kg (2.0 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 155340-4; 212121

PROGRAM..... SE-5

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Rockwell Int'l, Rocketdyne Div.

STATUS

- QUALIFIED..... yes, by Rocketdyne
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE ..... Poppet, 3/8 Tube Size

DESIGN FLOW MEDIA ..... GN_2 and N_2O_4

RATED FLOW AT DIFFERENTIAL PRESSURE -

NOMINAL ..... 566 scc/c @ 20 N/cm^2, _____ °C
(1.2 SCFM @ 30 PSID, _____ °F)

EMERGENCY ..... _____ scc/s @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

CRACKING PRESSURE ..... 11 N/cm^2 (17 PSIA)

RESEAT PRESSURE ..... 10 N/cm^2 (15 PSIA)

LIFE ..... _____ CYCLES

PROOF PRESSURE ..... _____ N/cm^2 (_____ PSIA)

SURGE PRESSURE ..... ZERO TO _____ N/cm^2 WITH MAX RISE RATE OF _____ $N/(cm^2\text{-sec})$
(_____ PSIA) (_____ PSIA/sec)

BURST PRESSURE ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE .....-1.1 to +48.8 °C (+30°F to 120 °F)

LEAKAGE -

INTERNAL ..... 0.8 scc/hr of He @ 0-216 N/cm^2 Outlet
(0-314 PSIA)

EXTERNAL ..... 1.0 scc/s of GN_2 @ 216 N/cm^2 Both Ports
(314 PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... .11 kg (0.25 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Filter . . . . . 10 μ Nominal

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 255360-3 255361

PROGRAM..... Viking Orbiter '75

CONTRACTING AGENCY..... NASA/JPL

PRIME CONTRACTOR..... Martin Marietta Corp

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE ..... Poppet (series), Welded Assembly

DESIGN FLOW MEDIA ..... He, MMH and N_2O_4

RATED FLOW AT DIFFERENTIAL PRESSURE -

NOMINAL ..... 387 scc/c @ 8.2 N/cm^2, 21± 15 °C
(8.2 SCFM @ 12 PSID, 70± 5 °F)

EMERGENCY ..... 1.18×10^5 scc/s @ 86.1 N/cm^2, 21± 15 °C
(250 SCFM @ 125 PSID, 70± 5 °F)

CRACKING PRESSURE ..... 5.1± .6 N/cm^2 (7.5± 1 PSID)

RESEAT PRESSURE ..... 31 N/cm^2 (745 PSIA)

LIFE ..... 10,000 CYCLES

PROOF PRESSURE ..... 423 N/cm^2 (614 PSIA)

SURGE PRESSURE ..... ZERO TO 286 N/cm^2 WITH MAX RISE RATE OF 31,026 $N/(cm^2\text{-sec})$
(415 PSIA) (45,000 PSIA/sec)

BURST PRESSURE ..... 1112 N/cm^2 (1614 PSIA)

OPERATING TEMPERATURE RANGE ..... -6.6 to +51.6 °C (+20°F to +125 °F)

LEAKAGE -

INTERNAL ..... 1.0×10^{-6} scc/hr of He @ 9.99-285 N/cm^2 (14.5 to 414 PSIA)

EXTERNAL ..... 1×10^{-7} scc/s of He @ 285 N/cm^2 (414 PSIA)

MATERIAL -

CONSTRUCTION ..... Cres and Teflon

SEAT .....

CONNECTIONS -

INLET .....

OUTLET .....

MASS ..... .32 kg (0.71 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Series Filters.....15 Micron Nominal

18 Micron ABS

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2324212

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE ..... _____

DESIGN FLOW MEDIA ..... Air, N_2

RATED FLOW AT DIFFERENTIAL PRESSURE -

NOMINAL ..... 9.4×10^3 scc/c @ _____ N/cm^2, _____ °C
(20 SCFM @ _____ PSID, _____ °F)

EMERGENCY ..... _____ scc/s @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

CRACKING PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

LIFE ..... _____ CYCLES

PROOF PRESSURE ..... 3113 N/cm^2 (4515 PSIA)

SURGE PRESSURE ..... ZERO TO _____ N/cm^2 WITH MAX RISE RATE OF _____ $N/(cm^2\text{-sec})$
(_____ PSIA) (_____ PSIA/sec)

BURST PRESSURE ..... 5181 N/cm^2 (7515 PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr of _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 0 scc/s of _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.480 kg (1.06 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER Marotta Scientific Controls (53)

MODEL NO. CVM504

PART NUMBER 801602

PROGRAM.....	Saturn
CONTRACTING AGENCY.....	NASA
PRIME CONTRACTOR.....	
STATUS	
QUALIFIED.....	yes
FLOWN.....	yes
LAUNCH VEHICLE.....	
AVAILABILITY.....	
COST/PROCUREMENT INFORMATION...	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE ..... .0063 m (.25 in), Free flow check

DESIGN FLOW MEDIA .....

RATED FLOW AT DIFFERENTIAL PRESSURE - Capacity .17 ESEO (C_d = .6), Flow factor F = .285

NOMINAL ..... _____ scc/c @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

EMERGENCY ..... _____ scc/s @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

CRACKING PRESSURE ..... .3-5 N/cm^2 (.5-8 PSIG)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

LIFE ..... _____ CYCLES

PROOF PRESSURE ..... 6205 N/cm^2 (9000 PSIA)

SURGE PRESSURE ..... ZERO TO _____ N/cm^2 WITH MAX RISE RATE OF _____ $N/(cm^2-sec)$
(_____ PSIA) (_____ PSIA/sec)

BURST PRESSURE ..... 16,547 N/cm^2 (24,000 PSIA)

OPERATING TEMPERATURE RANGE ..... -53 to 71.1 °C (-65 to 160 °F)

LEAKAGE -

INTERNAL ..... 0 scc/hr of _____ @ 0-4136 N/cm^2
(0-6000 PSIA)

EXTERNAL ..... 0 scc/s of _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... ST. STL.

SEAT .....

CONNECTIONS -

INLET .....

OUTLET .....

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 212870-2 212871

PROGRAM..... Mariner 69

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... TRW Systems

STATUS

- QUALIFIED..... yes, by TRW
- FLOWN.....
- LAUNCH VEHICLE..... Atlas Agena

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE ..... Poppet (Dual Check); 1/4 Tube Size; Welded Assembly

DESIGN FLOW MEDIA ..... GN_2, MMH and N_2O_4

RATED FLOW AT DIFFERENTIAL PRESSURE -

NOMINAL ..... _____ scc/c @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

EMERGENCY ..... _____ scc/s @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

CRACKING PRESSURE ..... 9.6 N/cm^2 Max (14 PSIA)

RESEAT PRESSURE ..... 10 N/cm^2 Min (15 PSIA)

LIFE ..... _____ CYCLES

PROOF PRESSURE ..... 406 N/cm^2 (589 PSIA)

SURGE PRESSURE ..... ZERO TO _____ N/cm^2 WITH MAX RISE RATE OF _____ $N/(cm^2\text{-sec})$
(_____ PSIA) (_____ PSIA/sec)

BURST PRESSURE ..... 485 $N(cm^2)$ (704 PSIA)

OPERATING TEMPERATURE RANGE ..... 373 °C (704 °F)

LEAKAGE -

INTERNAL ..... 0.8 scc/hr of GN_2 @ 0-247 N/cm^2 outlet
(0-359 PSIA)

EXTERNAL ..... 1×10^{-7} scc/s of He @ 0-406 N/cm^2
(0-589 PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... .27 kg (0.60 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Filters, Nominal . . . 5 μ
Filters, Absolute . . 18 μ

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 255510-2 255511

PROGRAM..... Mariner 71

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Martin Marietta Corp

STATUS

- **QUALIFIED**..... yes, by HTL Industries
- **FLOWN**.....
- **LAUNCH VEHICLE**..... Atlas Agena

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE	Poppet, 3/8 Tube Size, Welded Assembly
DESIGN FLOW MEDIA	GN_2, MMH, N_2O_4
RATED FLOW AT DIFFERENTIAL PRESSURE -	
NOMINAL	_____ scc/c @ _____ N/cm^2, _____ °C
	(_____ SCFM @ _____ PSID, _____ °F)
EMERGENCY	_____ scc/s @ _____ N/cm^2, _____ °C
	(_____ SCFM @ _____ PSID, _____ °F)
CRACKING PRESSURE	11±.6 N/cm^2 (16±1 PSIA)
RESEAT PRESSURE	_____ N/cm^2 (- PSIA)
LIFE	_____ CYCLES
PROOF PRESSURE	402 N/cm^2 (584 PSIA)
SURGE PRESSURE	ZERO TO _____ N/cm^2 WITH MAX RISE RATE OF _____ $N/(cm^2\text{-sec})$
	(_____ PSIA) (_____ PSIA/sec)
BURST PRESSURE	533 $N(cm^2)$ (774 PSIA)
OPERATING TEMPERATURE RANGE	-37 to +51.6 °C (-35°F to +125 °F)
LEAKAGE -	
INTERNAL	0.8 scc/hr of GN_2 @ 9.99-257 N/cm^2 (14.5-374 PSIA)
EXTERNAL	1×10^{-7} scc/s of He @ 271 N/cm^2 (394 PSIA)
MATERIAL -	
CONSTRUCTION	Cres and Teflon
SEAT	
CONNECTIONS -	
INLET	
OUTLET	
MASS	.3 kg (0.8 lbm)
OTHER SIGNIFICANT CHARACTERISTICS	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 232129

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Philco Ford

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.5 VALVE, CHECK

TYPE ..... Solenoid shut off

DESIGN FLOW MEDIA ..... Air, N_2

RATED FLOW AT DIFFERENTIAL PRESSURE -

NOMINAL ..... _____ scc/c @ _____ N/cm^2, _____ °C
(_____ SCFM @ _____ PSID, _____ °F)

EMERGENCY ..... 4×10^2 scc/s @ _____ N/cm^2, _____ °C
(1 SCFM @ _____ PSID, _____ °F)

CRACKING PRESSURE ..... _____ N/cm^2 (_____ PSIA)

RESEAT PRESSURE ..... _____ N/cm^2 (_____ PSIA)

LIFE ..... _____ CYCLES

PROOF PRESSURE ..... 3457 N/cm^2 (5015 PSIA)

SURGE PRESSURE ..... ZERO TO _____ N/cm^2 WITH MAX RISE RATE OF _____ $N/(cm^2\text{-sec})$
(_____ PSIA) (_____ PSIA/sec)

BURST PRESSURE ..... 4629 $N(cm^2)$ (6715 PSIA)

OPERATING TEMPERATURE RANGE ..... -53 to +135 °C (-65 to 275 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr of _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... .016 scc/s of _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... Metalic

CONNECTIONS -

INLET ..... _____

OUTLET ..... _____

MASS ..... .594 kg (1.31 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Fairchild Industries
Stratos Div. (31)

PART NUMBER 601000

PROGRAM..... OAO

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... G.A.C.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... Not in production. Available on special order

COST/PROCUREMENT INFORMATION... $4000-6000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Single, direct acting

DESIGN FLOW MEDIA ..... GN_2

INLET PRESSURE RANGE ..... 44.6 - 2248.1 N/cm^2 (64.7-3260.7 PSIA)

REGULATED OUTLET PRESSURE ..... 3 ± .3 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(5 ± 0.5 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 47 scc/s @ 44.6 N/cm^2 INLET PRESSURE RANGE
(0.1 SCFM @ 64.7 PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 14.6 N/cm^2 (21.2 PSIA) Max.

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... 10,000 CYCLES

PRESSURES, INLET -

PROOF ..... 3371 N/cm^2 (4890 PSIA)

BURST ..... 5612 N/cm^2 (8140 PSIA)

PRESSURES, OUTLET -

PROOF ..... 17.7 N/cm^2 (25.7 PSIA)

BURST ..... 22.5 N/cm^2 (32.7 PSIA)

OPERATING TEMPERATURE RANGE ..... -34 to +65.5 °C (-30 to +150 °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... .0005 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... 17-4 PH, 300 Series Cres

SEAT .....

CONNECTION -

INLET ..... MS 33514-4

OUTLET ..... MS 33514-4

MASS ..... 0.4 kg (0.9 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Incorporates relief valve to vent excessive outlet pressure.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2346340

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE .....

DESIGN FLOW MEDIA ..... Air, N_2

INLET PRESSURE RANGE ..... 96.5-458 N/cm^2 (140-665 PSIA)

REGULATED OUTLET PRESSURE ..... 5.1 ± 1.3 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(7.5 ± 2.0 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 755 scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(1.60 SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE - .025 lb/min

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... .58 kg (1.3 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Sterer Engineering (16)

PART NUMBER 25210-1

PROGRAM..... Mariner Mars '71

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... _____

DESIGN FLOW MEDIA ..... GN_2

INLET PRESSURE RANGE ..... 0-2078 N/cm^2 (0-3015 PSIA)

REGULATED OUTLET PRESSURE ..... 10 ± .6 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(15 ± 1 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 533.17 scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(1.1296 SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... 3113 N/cm^2 (4515 PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.279 kg (0.617 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Sterer Engineering (16)

PART NUMBER 46240

PROGRAM..... VO '75

CONTRACTING AGENCY..... NASA/JPL

PRIME CONTRACTOR..... Martin Marietta

STATUS

QUALIFIED..... Yes

FLOWN..... 1975

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	
DESIGN FLOW MEDIA	GN_2
INLET PRESSURE RANGE	355-3113 N/cm^2 (515-4515 PSIA)
REGULATED OUTLET PRESSURE	17 ± 1.0 N/cm^2 @ 0-3068 scc/s FLOW RATE RANGE
	(25 ± 1.5 PSIG @ 0-6.5 scf/m FLOW RATE RANGE)
FLOW RATE RANGE	0-3.0x10^3 scc/s @ 355-3113 N/cm^2 INLET PRESSURE RANGE
	0-6.5 SCFM @ 515-4515 PSIA INLET PRESSURE RANGE)
OUTLET LOCKUP PRESSURE	_____ N/cm^2 (_____ PSIA)
DYNAMIC PERFORMANCE -	
MAX. INLET PRESSURE CHANGE RATE	689.4 N/cm^2/Min (1000 PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	±2 N/cm^2 OVER * N/cm^2 INLET PRESSURE RANGE
	(±3 PSIA OVER _____ PSIA INLET PRESSURE RANGE)
LIFE	10^6 CYCLES
PRESSURES, INLET -	
PROOF	4664 N/cm^2 (6765 PSIA)
BURST	6215 N/cm^2 (9015 PSIA)
PRESSURES, OUTLET -	
PROOF	72.3 N/cm^2 (105 PSIA)
BURST	93.0 N/cm^2 (135 PSIA)
OPERATING TEMPERATURE RANGE	0 to 71.1°C (32 to 160°F)
LEAKAGE -	
INTERNAL	1.0 scc/hr OF GN_2 @2768 N/cm^2 (4015 PSIA)
EXTERNAL	1.39x10^{-5} scc/s OF GN_2 @2768 N/cm^2 (4015 PSIA)
MATERIAL -	
CONSTRUCTION	347 CRES, 7075 T73 A1
SEAT	Vespal
CONNECTION -	
INLET	.25 O.D. 347 CRES tubing
OUTLET	.312 O.D. 347 CRES tubing
MASS	0.39 kg (0.88 lbm)
OTHER SIGNIFICANT CHARACTERISTICS	

*355-3113 N/cm^2 (515-4515 psia)

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Marotta Scientific Controls (53,54)

MODEL NO. RV74A

PART NUMBER 226154

PROGRAM..... Apollo

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... Aerojet

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Regulator, Relief
DESIGN FLOW MEDIA	Air, N_2
INLET PRESSURE RANGE	551 - 3102 N/cm^2 (800 - 4500 PSIA)
REGULATED OUTLET PRESSURE	* 24 to 434 N/cm^2 @ _____ scc/s FLOW RATE RANGE (35 to 630 PSIG @ _____ scf/m FLOW RATE RANGE)
FLOW RATE RANGE	** _____ scc/s @ _____ N/cm^2 INLET PRESSURE RANGE Flow Factor=.12 (_____ SCFM @ _____ PSIA INLET PRESSURE RANGE)
OUTLET LOCKUP PRESSURE	344 N/cm^2 (500 PSIA)
DYNAMIC PERFORMANCE -	
MAX. INLET PRESSURE CHANGE RATE	_____ N/cm^2/Min (_____ PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE (± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)
LIFE	_____ CYCLES
PRESSURES, INLET -	
PROOF	4664 N/cm^2 (6765 PSIA)
BURST	7766.9 N/cm^2 (11265 PSIA)
PRESSURES, OUTLET -	
PROOF	_____ N/cm^2 (_____ PSIA)
BURST	_____ N/cm^2 (_____ PSIA)
OPERATING TEMPERATURE RANGE	-17 to 71.1 °C (0 to 160 °F)
LEAKAGE -	
INTERNAL	_____ scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)
EXTERNAL	_____ scc/s OF _____ @ _____ N/cm^2 (_____ PSIA)
MATERIAL -	
CONSTRUCTION	_____
SEAT	_____
CONNECTION -	
INLET	_____
OUTLET	_____
MASS	9.07 kg (2.00 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

*Range determined by 1-4 spring selection

**Flow determined by flow factor x inlet pressure

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Fairchild Industries
Stratos Div. (31)

PART NUMBER 617000

PROGRAM..... OAO

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... G.A.C.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... Not in production. Available on special order.

COST/PROCUREMENT INFORMATION...

280

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Single, Pilot loaded

DESIGN FLOW MEDIA ..... GN_2

INLET PRESSURE RANGE ..... 113-2699 N/cm^2 (165-3915 PSIA)

REGULATED OUTLET PRESSURE ..... 26 ± 2 N/cm^2 @ $2x10^3$ scc/s FLOW RATE RANGE
(38 ± 3 PSIG @ 5 scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 472-2360 scc/s @ 113 N/cm^2 INLET PRESSURE RANGE
(1-5 SCFM @ 165 PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 40.4 N/cm^2 (58.7 PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... 5000 CYCLES

PRESSURES, INLET -

PROOF ..... 3371 N/cm^2 (4890 PSIA)

BURST ..... 5612 N/cm^2 (8140 PSIA)

PRESSURES, OUTLET -

PROOF ..... 82.7 N/cm^2 (120 PSIA)

BURST ..... 13.1 N/cm^2 (190 PSIA)

OPERATING TEMPERATURE RANGE ..... -34 to +65.5 °C (-30 to +150 °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... .0005 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... 17-4 PH, 300 Series Cres

SEAT ..... Kynar, Polyimide

CONNECTION -

INLET MS33514-4

OUTLET MS33514-4

MASS ..... .54 kg (1.2 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ..... Incorporates relief valve to vent excess outlet pressure.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Sterer Engineering (43)

PART NUMBER 34810

PROGRAM.....	Project 169
CONTRACTING AGENCY.....	USAF
PRIME CONTRACTOR.....	TRW Systems
STATUS	
QUALIFIED.....	yes
FLOWN.....	
LAUNCH VEHICLE.....	
AVAILABILITY.....	
COST/PROCUREMENT INFORMATION...	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Series redundant valving elements

DESIGN FLOW MEDIA ..... Nitrogen

INLET PRESSURE RANGE ..... _____ N/cm^2 (_____ PSIA)

REGULATED OUTLET PRESSURE ..... 34 ± _____ N/cm^2 @ _____ scc/s FLOW RATE RANGE
(50 ± _____ PSIA @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 1.1×10^3 scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(2.5 SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 36.1 N/cm^2 (52.2 PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... 113-2768 N/cm^2 (165-4015 PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... 20-62 N/cm^2 (30-90 PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -45 to 93.3 °C (-50 to 200 °F)

LEAKAGE -

INTERNAL ..... 1.0 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... _____ kg (_____ lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Sterer Engineering (16)

PART NUMBER 33120-1

PROGRAM..... ERTS

CONTRACTING AGENCY..... NASA/Goddard

PRIME CONTRACTOR..... TRW/GE

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE .....

DESIGN FLOW MEDIA ..... Freon 14

INLET PRESSURE RANGE ..... 1389 N/cm^2 (2015 PSIA)

REGULATED OUTLET PRESSURE ..... 37-41 ± _____ N/cm^2 @ _____ scc/s FLOW RATE RANGE
(55-60 ± _____ PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... $4x10^2$ - $3.9x10^3$ scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(1-8.3 SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... 2078 N/cm^2 (3015 PSIA)

BURST ..... 5526 N/cm^2 (8015 PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 2×10^{-5} scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.58 kg (1.3 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2344344

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE .....

DESIGN FLOW MEDIA ..... Air, N_2

INLET PRESSURE RANGE ..... 113-148 N/cm^2 (165-215 PSIA)

REGULATED OUTLET PRESSURE ..... 68.9 ± 6.8 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(100 ± 10 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 9.4×10^3 scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(20 SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 10 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION .....

SEAT .....

CONNECTION -

INLET .....

OUTLET .....

MASS ..... 0.3 kg (0.7 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Fairchild Industries
Stratos Div. (31)

PART NUMBER 385000

PROGRAM..... LM (ascent engine tank pressure regulator)

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... G.A.C.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY..... Not in production. Available on special order.

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Dual, Pilot-loaded (Series Redundant)	
DESIGN FLOW MEDIA	He	
INLET PRESSURE RANGE	285.9 - 2423.3 N/cm^2	(414.7 - 3514.7 PSIA)
REGULATED OUTLET PRESSURE	121-125 ± 2 N/cm^2 @ 66,080 scc/s FLOW RATE RANGE	
	(176-182 ± 4 PSIG @ 140 scf/m FLOW RATE RANGE)	
FLOW RATE RANGE	66,080 scc/s @ 285.9 - 2423.3 N/cm^2 INLET PRESSURE RANGE	
	(140 SCFM @ 414.7 - 3514.7 PSIA INLET PRESSURE RANGE)	
OUTLET LOCKUP PRESSURE	_____ N/cm^2	(_____ PSIA)
DYNAMIC PERFORMANCE -		
MAX. INLET PRESSURE CHANGE RATE	_____ N/cm^2/Min	(_____ PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	±_____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE	
	(±_____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)	
LIFE	5000 CYCLES	
PRESSURES, INLET -		
PROOF	3678 N/cm^2	(5335 PSIA)
BURST	5526 N/cm^2	(8015 PSIA)
PRESSURES, OUTLET -		
PROOF	234 N/cm^2	(340 PSIA)
BURST	355 N/cm^2	(515 PSIA)
OPERATING TEMPERATURE RANGE	-65 to +71.1 °C	(-85 to +160 °F)
LEAKAGE -		
INTERNAL	101 scc/hr OF _____ @ _____ N/cm^2	
		(_____ PSIA)
EXTERNAL	.00033 scc/s OF _____ @ _____ N/cm^2	
		(_____ PSIA)
MATERIAL -		
CONSTRUCTION	17-4 PH, 300 Series Cres	
SEAT	Kynar	
CONNECTION -		
INLET	3/8 inch tube stub	
OUTLET	1/2 inch tube stub	
MASS	1.3 kg	(2.9 lbm)
OTHER SIGNIFICANT CHARACTERISTICS		

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER: Fairchild Industries Stratos Div. (31)

PART NUMBER: 63-036

PROGRAM..... Apollo (Command Module RCS, LMRCS)

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... Rockwell International, Grumman Aircraft

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE.....

AVAILABILITY..... Not in production. Available on special order.

COST/PROCUREMENT INFORMATION... $6000-9000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Dual, Pilot Loaded (Series Redundant)	
DESIGN FLOW MEDIA	He	
INLET PRESSURE RANGE	192.8 - 3112.7 N/cm^2	(279.7-4514.7 PSIA)
REGULATED OUTLET PRESSURE *	____ ± ____ N/cm^2 @ 1.4×10^4 scc/s FLOW RATE RANGE	
	(____ ± ____ PSIG @ 30 scf/m FLOW RATE RANGE)	
FLOW RATE RANGE	____ scc/s @ ____ N/cm^2 INLET PRESSURE RANGE	
	(____ SCFM @ ____ PSIA INLET PRESSURE RANGE)	
OUTLOCKUP PRESSURE	139 ~~215~~ N/cm^2	(203 ~~313~~ PSIA) Depending on Setting (See below)
DYNAMIC PERFORMANCE -		
MAX. INLET PRESSURE CHANGE RATE	____ N/cm^2/Min	(____ PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± ____ N/cm^2 OVER ____ N/cm^2 INLET PRESSURE RANGE	
	(± ____ PSIA OVER ____ PSIA INLET PRESSURE RANGE)	
LIFE	7000 CYCLES	
PRESSURES, INLET -		
PROOF	4674 N/cm^2	(6780 PSIA)
BURST	6215 N/cm^2	(9015 PSIA)
PRESSURES, OUTLET -		
PROOF	279 N/cm^2	(405 PSIA)
BURST	355 N/cm^2	(515 PSIA)
OPERATING TEMPERATURE RANGE	-65 to +71.1 °C	(-85 to +160 °F)
LEAKAGE -		
INTERNAL	17 scc/hr OF ____ @ ____ N/cm^2	(____ PSIA)
EXTERNAL	.00005 scc/s OF ____ @ ____ N/cm^2	(____ PSIA)
MATERIAL -		
CONSTRUCTION	17-4 PH, 300 Series Cres	
SEAT	Kynar	
CONNECTION -		
INLET	.0063 m (.25 in) tube stub	
OUTLET	.0063 m (.25 in) tube stub	
MASS	1.3 kg	(2.9 lbm)
OTHER SIGNIFICANT CHARACTERISTICS		

* Primary regulator: 124± 2 to 200± 2 N/cm^2 (181±3 to 291±3 psig)
Secondary regulator: 127± 2 to 203± 2 N/cm^2 (185± 3 to 295± 3 psig)
Depending on application.

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Fairchild Industries
Stratos Div. (31)

PART NUMBER 65-168

PROGRAM..... Saturn IV-B

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... M.D.C.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Saturn

AVAILABILITY..... Not in production. Available on special order.

COST/PROCUREMENT INFORMATION... $6000-9000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Dual, Pilot Loaded (Series Redundant)
DESIGN FLOW MEDIA	He
INLET PRESSURE RANGE	251.4 - ~~2216.4~~ N/cm² (364.7 - 3214.7 PSIA)
REGULATED OUTLET PRESSURE	* _____ ± _____ N/cm² @ _____ scc/s FLOW RATE RANGE
	(_____ ± _____ PSIG @ _____ scf/m FLOW RATE RANGE)
FLOW RATE RANGE	7.0×10^3 scc/s @ 251 N/cm² INLET PRESSURE RANGE
	(15 SCFM @ 365 PSIA INLET PRESSURE RANGE)
OUTLET LOCKUP PRESSURE	150 N/cm² (217.7 PSIA)
DYNAMIC PERFORMANCE -	
MAX. INLET PRESSURE CHANGE RATE	_____ N/cm²/Min (_____ PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± _____ N/cm² OVER _____ N/cm² INLET PRESSURE RANGE
	(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)
LIFE	5000 CYCLES
PRESSURES, INLET -	
PROOF	3319 N/cm² (4815 PSIA)
BURST	5526 N/cm² (8015 PSIA)
PRESSURES, OUTLET -	
PROOF	268 N/cm² (390 PSIA)
BURST	441 N/cm² (640 PSIA)
OPERATING TEMPERATURE RANGE	-23 to 51.6 °C (-10 to 125 °F)
LEAKAGE -	
INTERNAL	149 scc/hr OF _____ @ _____ N/cm²
	(_____ PSIA)
EXTERNAL	.0002 scc/s OF _____ @ _____ N/cm²
	(_____ PSIA)
MATERIAL -	
CONSTRUCTION	17-4 PH, 300 Series Cres
SEAT	Kynar
CONNECTION -	
INLET	MC124-C4
OUTLET	MC124-C4
MASS	1.3 kg (3.0 lbm)
OTHER SIGNIFICANT CHARACTERISTICS	

* Primary 135 ± 2 N/cm² (196 ± 3 psig)
Secondary 137 ± 2 N/cm² (200 ± 3 psig)

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 234635

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE .....

DESIGN FLOW MEDIA ..... Air, N_2

INLET PRESSURE RANGE ..... 699.8-2078 N/cm^2 (1015-3015 PSIA)

REGULATED OUTLET PRESSURE ..... 137 ± to 258 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(200 ± to 375 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 4.7×10^3 scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(10 SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.2 kg (0.6 lbm)

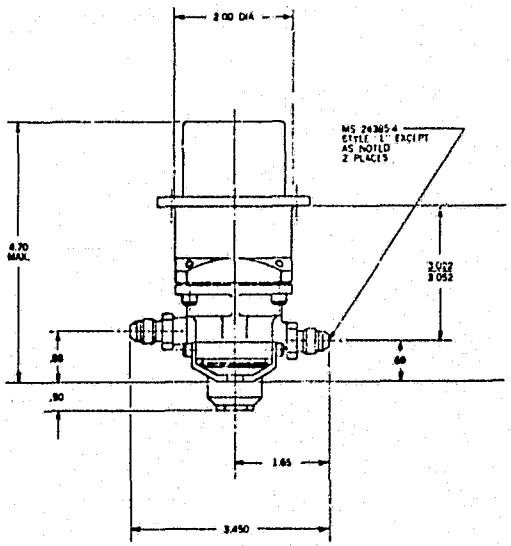
OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Consolidated Controls Corp

PART NUMBER 6890



PROGRAM..... Minutemen III

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR..... Rockwell International Corp.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Minuteman III

AVAILABILITY..... 180 days

COST/PROCUREMENT INFORMATION... 5 to 10 units - $12,000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Single stage
DESIGN FLOW MEDIA	He
INLET PRESSURE RANGE	2520-286 N/cm^2 (3655-415 PSIA)
REGULATED OUTLET PRESSURE	162 to 170 N/cm^2 @ 0-1220 scc/s FLOW RATE RANGE (236 to 247 PSIG @ 0 to 26 scf/m FLOW RATE RANGE)
FLOW RATE RANGE	0-1220 scc/s @ 286-2520 N/cm^2 INLET PRESSURE RANGE (0 to 26 SCFM @ 415-3655 PSIA INLET PRESSURE RANGE)
OUTLET LOCKUP PRESSURE	180 N/cm^2 (262 PSIA)
DYNAMIC PERFORMANCE -	
MAX. INLET PRESSURE CHANGE RATE	2×10^6 N/cm^2/Min (3×10^6 PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± N/cm^2 OVER 286-2520 N/cm^2 INLET PRESSURE RANGE (± 15.1 PSIA OVER 415-3655 PSIA INLET PRESSURE RANGE)
LIFE	10,000 CYCLES
PRESSURES, INLET -	
PROOF	4147 N/cm^2 (6015 PSIA)
BURST	6215 N/cm^2 (9015 PSIA)
PRESSURES, OUTLET -	
PROOF	268 N/cm^2 (390 PSIA)
BURST	424 N/cm^2 (615 PSIA)
OPERATING TEMPERATURE RANGE	-28to+32 °C (-20to+90 °F)
LEAKAGE -	
INTERNAL	10 scc/hr OF He @ 2520 N/cm^2 (3655 PSIA)
EXTERNAL	2.7×10^{-4} scc/s OF He @ 2520 N/cm^2 (3655 PSIA)
MATERIAL -	
CONSTRUCTION	304L
SEAT	440A
CONNECTION -	
INLET	MS 24385-4E
OUTLET	MS 24385-4E
MASS	0.68 kg (1.5 lbm)
OTHER SIGNIFICANT CHARACTERISTICS	

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Fairchild Industries Stratos Div. (31)

PART NUMBER 332000

PROGRAM.....	Minutemen III
CONTRACTING AGENCY.....	USAF
PRIME CONTRACTOR.....	Bell Aerospace
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	
AVAILABILITY.....	In production
COST/PROCUREMENT INFORMATION...	$4000-6000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Single, pilot-loaded	
DESIGN FLOW MEDIA	He	
INLET PRESSURE RANGE	286-2423 N/cm^2	(415-3515 PSIA)
REGULATED OUTLET PRESSURE	165 ± 2 N/cm^2 @ 11,800 scc/s FLOW RATE RANGE	
	(240 ± 4 PSIG @ 25 scf/m FLOW RATE RANGE)	
FLOW RATE RANGE	11,800 scc/s @ 286-2423 N/cm^2 INLET PRESSURE RANGE	
	(25 SCFM @ 415-3515 PSIA INLET PRESSURE RANGE)	
OUTLET LOCKUP PRESSURE	180 N/cm^2	(262 PSIA)
DYNAMIC PERFORMANCE -		
MAX. INLET PRESSURE CHANGE RATE	____ N/cm^2/Min	(____ PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± ____ N/cm^2 OVER ____ N/cm^2 INLET PRESSURE RANGE	
	(± ____ PSIA OVER ____ PSIA INLET PRESSURE RANGE)	
LIFE	5000 CYCLES	
PRESSURES, INLET -		
PROOF	3612 N/cm^2	(5240 PSIA)
BURST	4816 N/cm^2	(6985 PSIA)
PRESSURES, OUTLET -		
PROOF	217 N/cm^2	(315 PSIA)
BURST	424 N/cm^2	(615 PSIA)
OPERATING TEMPERATURE RANGE	-6.6 to 65.5 °C	(20 to150 °F)
LEAKAGE -		
INTERNAL	101 scc/hr OF ____ @ ____ N/cm^2	(____ PSIA)
EXTERNAL	.0041 scc/s OF ____ @ ____ N/cm^2	(____ PSIA)
MATERIAL -		
CONSTRUCTION	17-4 PH, 300 Series Cres	
SEAT	Kynar	
CONNECTION -		
INLET	MS 24385-4	
OUTLET	MS 24385-1	
MASS	0.54 kg	(1.2 lbm)
OTHER SIGNIFICANT CHARACTERISTICS		

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Marotta Scientific Controls (53)

MODEL NO. RS572VB

PART NUMBER 280601

PROGRAM..... SAFEGUARD

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR..... Avco

STATUS

QUALIFIED..... yes

FLOWN..... yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE .....

DESIGN FLOW MEDIA ..... Inert gas

INLET PRESSURE RANGE ..... 379-2068 N/cm^2 (550-3000 psig)

REGULATED OUTLET PRESSURE ..... 172 ± 17 N/cm^2 @ 1.98×10^5 scc/s FLOW RATE RANGE

(250 ± 25 PSIG @ 420 scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 1.98×10^5-1.53×10^5 scc/s @ 389-217 N/cm^2 INLET PRESSURE RANGE

(420-325 SCFM @ 565-315 PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 217 N/cm^2 (315 PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE

(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... 5181 N/cm^2 (7515 PSIA)

BURST ..... 13,799 N/cm^2 (20,015 PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... 7.2 to 73.8 °C (+45 to 165 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2

(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2

(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... AL. ALY.

SEAT ..... Nylon

CONNECTION -

INLET .....

OUTLET .....

MASS ..... 1.70 kg (3.76 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ..... max. without filter unions

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Consolidated Controls Corp. (20)

PART NUMBER 6894

(Originally manufactured by National Water Lift Co.)

PROGRAM	Mariner '71, Viking Orbiter '75
CONTRACTING AGENCY	JPL
PRIME CONTRACTOR	Martin Marietta Corp.
STATUS	
QUALIFIED	Yes
FLOWN	Yes
LAUNCH VEHICLE	
AVAILABILITY	180 days
COST/PROCUREMENT INFORMATION	5 to 10 units - $12,000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Single stage	
DESIGN FLOW MEDIA	GN_2 or He	
INLET PRESSURE RANGE	_____ N/cm^2	(4015-475 PSIA)
REGULATED OUTLET PRESSURE	175 ± 5 N/cm^2 @ 7693 scc/s FLOW RATE RANGE	
	(255 ± 8 PSIG @ 16.3 scf/m FLOW RATE RANGE)	
FLOW RATE RANGE	0-7693 scc/s @ 327-2768 N/cm^2 INLET PRESSURE RANGE	
	(0-16.3 SCFM @ 475-4015 PSIA INLET PRESSURE RANGE)	
OUTLET LOCKUP PRESSURE	_____ N/cm^2	(280 PSIA)
DYNAMIC PERFORMANCE -		
MAX. INLET PRESSURE CHANGE RATE	2×10^6 N/cm^2/Min	(3×10^6 PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± 10.4 N/cm^2 OVER 327-2768 N/cm^2 INLET PRESSURE RANGE	
	(± 15.1 PSIA OVER 475-4015 PSIA INLET PRESSURE RANGE)	
LIFE	20,000 CYCLES	
PRESSURES, INLET -		
PROOF	4147 N/cm^2	(6015 PSIA)
BURST	6077 N/cm^2	(8815 PSIA)
PRESSURES, OUTLET -		
PROOF	289 N/cm^2	(420 PSIA)
BURST	424 N/cm^2	(615 PSIA)
OPERATING TEMPERATURE RANGE	-1.1to48.9 °C	(+30to120 °F)
LEAKAGE -		
INTERNAL	20 scc/hr OF GN_2 @ 2768 N/cm^2	(4015 PSIA)
EXTERNAL	1×10^{-6} scc/s OF He @ 2768 N/cm^2	(4015 PSIA)
MATERIAL -		
CONSTRUCTION	304 L	
SEAT	440 A	
CONNECTION -		
INLET		
OUTLET		
MASS	0.834 kg	(1.84 lbm)
OTHER SIGNIFICANT CHARACTERISTICS		

Compatible with the saturated vapors of N_2O_4; MMH; N_2H_4

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER TRW Systems (28)

PART NUMBER JPL 10000055

PROGRAM..... Mariner '69

CONTRACTING AGENCY..... Jet Propulsion Laboratory

PRIME CONTRACTOR.....

STATUS

QUALIFIED..... Mariner '64

FLOWN..... Mariner '64, '69

LAUNCH VEHICLE.....

AVAILABILITY..... Not in manufacture

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Single Stage direct acting - tank pressurization

DESIGN FLOW MEDIA ..... Gaseous nitrogen

INLET PRESSURE RANGE ..... 248-2482 N/cm^2 (360-3600 PSIA)

REGULATED OUTLET PRESSURE ..... 195 ± 2 N/cm^2 @ 1888 scc/s FLOW RATE RANGE
(283 ± 3 PSIG @ 4 scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 56 scc/s @ 212 N/cm^2 INLET PRESSURE RANGE
(.12 SCFM @ 308 PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 217 N/cm^2 (316 PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... 7.446×10^7 N/cm^2/Min 2137- (1.080×10^8 PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± 6.8 N/cm^2 OVER 2482 N/cm^2 INLET PRESSURE RANGE
(± 10 PSIA OVER 3100-3600 PSIA INLET PRESSURE RANGE)

LIFE ..... Limited CYCLES

PRESSURES, INLET -

PROOF ..... 3723 N/cm^2 (5400 PSIA)

BURST ..... 5460 N/cm^2 (7920 PSIA)

PRESSURES, OUTLET -

PROOF ..... 1861 N/cm^2 (2700 PSIA)

BURST ..... 2730 N/cm^2 (3960 PSIA)

OPERATING TEMPERATURE RANGE ..... -10to+75 °C (+14to+167 °F)

LEAKAGE -

INTERNAL ..... 4.0 scc/hr OF GN_2 @ 212 N/cm^2 (308 PSIA)

EXTERNAL ..... .00027 scc/s OF GN_2 @ 212 N/cm^2 (308 PSIA)

MATERIAL -

CONSTRUCTION ..... 6061 T651 Al Alloy

SEAT ..... 6061 T651 Al Alloy

CONNECTION -

INLET ..... .0063m (.25 in) tube - welded

OUTLET ..... .0063m (.25 in) tube - bolt flange

MASS ..... .63 kg (1.4 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 146650-10 146931

PROGRAM..... Centaur

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... General Dynamics/Convair Aerospace Div.

STATUS

QUALIFIED..... Yes, by GD/CA

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Single stage

DESIGN FLOW MEDIA ..... He

INLET PRESSURE RANGE ..... 337-313 N/cm^2 (490-455 PSIA)

REGULATED OUTLET PRESSURE ..... 204 to 217 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(297 to 315 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 4.2×10^3 scc/s @ 337-313 N/cm^2 INLET PRESSURE RANGE
(8.9 SCFM @ 490-455 PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 215-227 N/cm^2 (312-330 PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... 200 CYCLES

PRESSURES, INLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... 299 N/cm^2 (435 PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -73.3^{+51}_{6} °C fluid (-100^{+125} °F)

LEAKAGE -

INTERNAL ..... 4.9×10^2 scc/hr OF He @ 337-313 N/cm^2 (490-455 PSIA)

EXTERNAL ..... 1 scc/s OF _____ @ 337-313 N/cm^2 (490-455 PSIA)

MATERIAL -

CONSTRUCTION ..... Aluminum and Cres

SEAT .....

CONNECTION -

INLET .....

OUTLET .....

MASS ..... 1.1 kg (2.5 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Filter - - - - - - - 5 Micron Nominal

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 146650-11 146709

PROGRAM..... Centaur

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... General Dynamics/Convair Aerospace Div.

STATUS

QUALIFIED..... Yes, by GD/CA

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Single stage

DESIGN FLOW MEDIA ..... He

INLET PRESSURE RANGE ..... 2326-492 N/cm^2 (3375-715 PSIA)

REGULATED OUTLET PRESSURE ..... 303 to 327 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(440 to 475 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 4.2×10^3 scc/s @ 2326-492 N/cm^2 INLET PRESSURE RANGE
(8.9 SCFM @ 3375-715 PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 313-337 N/cm^2 (455-490 PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... 200 CYCLES

PRESSURES, INLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (640 PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... -73.3 - +51.6°C fluid (-100-+125°F)
-20 - +51.6° C ambient (-5-+125° F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... 1.1 kg (2.5 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

Filter - - - - - - - 5 μ nominal

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER: Fairchild Industries Stratos Div. (31)

PART NUMBER: 679000

PROGRAM..... Saturn IVB, Saturn S-IVB

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... M.D.C.

STATUS

- QUALIFIED..... Yes
- FLOWN..... Yes
- LAUNCH VEHICLE..... Saturn

AVAILABILITY..... Not in production. Available on special order.

COST/PROCUREMENT INFORMATION... $6,000-9,000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Dual Pilot-Loaded (Series Redundant)	
DESIGN FLOW MEDIA	He	
INLET PRESSURE RANGE	423.8 - 2216.4 N/cm^2	(614.7 - 3214.7 PSIA)
REGULATED OUTLET PRESSURE	324-344 ± 6.8 N/cm^2 @ _____ scc/s FLOW RATE RANGE	
	(470-500 ± 10 PSIG @ 10-30 scf/m FLOW RATE RANGE)	
FLOW RATE RANGE	14,160 scc/s @ 423.8 N/cm^2 INLET PRESSURE RANGE	
	(30 SCFM @ 614.7 PSIA INLET PRESSURE RANGE)	
OUTLET LOCKUP PRESSURE	333 N/cm^2	(484 PSIA) (primary)
DYNAMIC PERFORMANCE -		
MAX. INLET PRESSURE CHANGE RATE	_____ N/cm^2/Min	(_____ PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE	
	(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)	
LIFE	5000 CYCLES	
PRESSURES, INLET -		
PROOF	3309 N/cm^2	(4800 PSIA)
BURST	5515 N/cm^2	(8000 PSIA)
PRESSURES, OUTLET -		
PROOF	537 N/cm^2	(780 PSIA)
BURST	896.3 N/cm^2	(1300 PSIA)
OPERATING TEMPERATURE RANGE	-65 to 71.1 °C	(-85 to +160 °F)
LEAKAGE -		
INTERNAL	2.42×10^4 scc/hr OF _____ @ _____ N/cm^2	
	(_____ PSIA)	
EXTERNAL	977 scc/s OF _____ @ _____ N/cm^2	
	(_____ PSIA)	
MATERIAL -		
CONSTRUCTION	17-4 PH, 300 Series Cres	
SEAT	Polyimide, Kynar	
CONNECTION -		
INLET	MC223 Fitting with MC-124-C4W Not	
OUTLET	MC223 Fitting with MC-124-C4W Not	
MASS	1.1 kg	(2.6 lbm)
OTHER SIGNIFICANT CHARACTERISTICS		

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Marotta Scientific Controls (53)

MODEL NO. RV99A

PART NUMBER 280778

PROGRAM.....

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Reducer - 2 Stage

DESIGN FLOW MEDIA ..... He, N_2, Air

INLET PRESSURE RANGE ..... 424-2078 N/cm^2 (615-3015 PSIA)

REGULATED OUTLET PRESSURE ..... 324 ± 6.8 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(470 ± 10 PSIA @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 2.28 scc/s @ 334 N/cm^2 INLET PRESSURE RANGE
upstream flow factor = .5
downstream flow factor = .8
(3.32 SCFM @ 485 PSIA outlet PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... 361 N/cm^2 (525 PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... 3113 N/cm^2 (4515 PSIA)

BURST ..... 4147 N/cm^2 (6015 PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (4515 PSIA)

BURST ..... 4147 N/cm^2 (6015 PSIA)

OPERATING TEMPERATURE RANGE ..... -6.6 to 48.8 °C ambient (+20 to 120 °F)

LEAKAGE -

INTERNAL ..... _____ scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... _____ scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... Cres 300 Series

SEAT ..... Nylon

CONNECTION -

INLET ..... MS33649-6 .00952 m (.375 in) T.S.

OUTLET ..... MS33649-6 .00952 m (.375 in) T.S.

MASS ..... 4.5 kg (10 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Tavco, Inc. (16)

PART NUMBER 2346334

PROGRAM.....

CONTRACTING AGENCY.....

PRIME CONTRACTOR.....

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

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ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... _____

DESIGN FLOW MEDIA ..... _____

INLET PRESSURE RANGE ..... 630-2630 N/cm^2 (915-3815 PSIA)

REGULATED OUTLET PRESSURE ..... 482 ± 17 N/cm^2 @ _____ scc/s FLOW RATE RANGE
(700 ± 25 PSIG @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 2.04×10^3 scc/s @ _____ N/cm^2 INLET PRESSURE RANGE
(4.33 SCFM @ _____ PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE
(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... _____ CYCLES

PRESSURES, INLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... 0.1 scc/hr OF _____ @ _____ N/cm^2
(_____ PSIA)

EXTERNAL ..... 0 scc/s OF _____ @ _____ N/cm^2
(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.81 kg (1.8 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Allen Design, Inc. (27)

PART NUMBER 13890

PROGRAM..... Aerobee

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Aerojet Mfg.

STATUS

QUALIFIED.....

FLOWN..... Yes

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION... One - $710

100 - $365

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE ..... Spring loaded regulator

DESIGN FLOW MEDIA ..... GHe

INLET PRESSURE RANGE ..... 131-355 N/cm^2 (190-515 PSIA)

REGULATED OUTLET PRESSURE ..... _____ ± _____ N/cm^2 @ _____ scc/s FLOW RATE RANGE

(_____ ± _____ PSIA @ _____ scf/m FLOW RATE RANGE)

FLOW RATE RANGE ..... 80 scc/s @ 27 N/cm^2 INLET PRESSURE RANGE

(.17 SCFM @ 40 PSIA INLET PRESSURE RANGE)

OUTLET LOCKUP PRESSURE ..... _____ N/cm^2 (_____ PSIA)

DYNAMIC PERFORMANCE -

MAX. INLET PRESSURE CHANGE RATE ..... _____ N/cm^2/Min (_____ PSIA/Min)

MAX. REGULATED PRESSURE OSCILLATION . ± _____ N/cm^2 OVER _____ N/cm^2 INLET PRESSURE RANGE

(± _____ PSIA OVER _____ PSIA INLET PRESSURE RANGE)

LIFE ..... 100,000 CYCLES

PRESSURES, INLET -

PROOF ..... 699 N/cm^2 (1015 PSIA)

BURST ..... 1044 N/cm^2 (1515 PSIA)

PRESSURES, OUTLET -

PROOF ..... _____ N/cm^2 (_____ PSIA)

BURST ..... _____ N/cm^2 (_____ PSIA)

OPERATING TEMPERATURE RANGE ..... _____ °C (_____ °F)

LEAKAGE -

INTERNAL ..... * _____ scc/hr OF _____ @ 11 N/cm^2/min

(16 PSIA) /min

EXTERNAL ..... None scc/s OF _____ @ _____ N/cm^2

(_____ PSIA)

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTION -

INLET ..... _____

OUTLET ..... _____

MASS ..... 0.13 kg (0.30 lbm)

OTHER SIGNIFICANT CHARACTERISTICS .....

*Internal leakage measured into .30m (12 in) length of .0063m (.25 in) tubing.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

MANUFACTURER Whittaker Corp. (37)

PART NUMBER 123035

PROGRAM.....

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR..... Lockheed Missile and Space Div.

STATUS

- QUALIFIED..... Yes
- FLOWN.....
- LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

BIR

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.6 REGULATOR, GAS PRESSURE

TYPE	Single-stage, pressure-balanced gage regulator	
DESIGN FLOW MEDIA	He	
INLET PRESSURE RANGE	2492-217 N/cm^2	(3615-315 PSIA)
REGULATED OUTLET PRESSURE	____ ± ____ N/cm^2 @ ____ scc/s FLOW RATE RANGE	
	(____ ± ____ PSIA @ ____ scf/m FLOW RATE RANGE)	
FLOW RATE RANGE	____ scc/s @ ____ N/cm^2 INLET PRESSURE RANGE	
	(____ SCFM @ ____ PSIA INLET PRESSURE RANGE)	
OUTLET LOCKUP PRESSURE	____ N/cm^2	(____ PSIA)
DYNAMIC PERFORMANCE -		
MAX. INLET PRESSURE CHANGE RATE	____ N/cm^2/Min	(____ PSIA/Min)
MAX. REGULATED PRESSURE OSCILLATION	± ____ N/cm^2 OVER ____ N/cm^2 INLET PRESSURE RANGE	
	(± ____ PSIA OVER ____ PSIA INLET PRESSURE RANGE)	
LIFE	____ CYCLES	
PRESSURES, INLET -		
PROOF	3113 N/cm^2	(4515 PSIA)
BURST	4147 N/cm^2	(6015 PSIA)
PRESSURES, OUTLET -		
PROOF	68.9 N/cm^2	(100 PSIA)
BURST	86.1 N/cm^2	(125 PSIA)
OPERATING TEMPERATURE RANGE	-73.3 to 37.7 °C	(-100 to +100 °F) Fluid
LEAKAGE -		
INTERNAL	12,000 scc/hr OF ____ @ 2492 N/cm^2	(3615 PSIA)
EXTERNAL	0 scc/s OF ____ @ ____ N/cm^2	(____ PSIA)
MATERIAL -		
CONSTRUCTION	Aluminum	
SEAT	____	
CONNECTION -		
INLET	AND10050-8	
OUTLET	MS24386-8	
MASS	0.72 kg	(1.6 lbm)
OTHER SIGNIFICANT CHARACTERISTICS		

See also Whittaker Test Report No. 59-741

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 FILL AND VENT VALVE

MANUFACTURER Consolidated Controls Corp. (20)

PART NUMBER 72580

PROGRAM..... P95

CONTRACTING AGENCY..... USAF

PRIME CONTRACTOR..... Lockheed Missiles and Space Co., Inc.

STATUS

QUALIFIED..... Yes

FLOWN..... Yes

LAUNCH VEHICLE..... Agena

AVAILABILITY..... 180 days

COST/PROCUREMENT INFORMATION... 5 to 10 units - $2000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 VALVE, FILL AND VENT

TYPE ..... Manual

DESIGN FLOW MEDIA ..... N_2

RATED FLOW AT DIFFERENTIAL PRESSURE (ACROSS BOTH FLIGHT AND GROUND HALVES IN EITHER DIRECTION) - .012 in (0.5 in) orifice

LIQUID ..... _____ kg/sec OF _____ @ _____ N/cm², _____ °C
(_____ lbm/sec OF _____ @ _____ PSID, _____ °F)

GAS ..... _____ scc/s OF _____ @ _____ N/cm², _____ °C
(_____ SCFM OF _____ @ _____ PSID, _____ °F)

INTEGRAL FILTRATION ..... 200 MICRONS ABSOLUTE

LIFE ..... 100 CYCLES

PRESSURES -

OPERATING	2492 N/cm²	(3615 PSIA)
PROOF	3733 N/cm²	(5415 PSIA)
BURST	6215 N/cm²	(9015 PSIA)

OPERATING TEMPERATURE RANGE ..... -34to+60 °C (-30to140 °F)

LEAKAGE -

INTERNAL ..... 5 scc/hr OF GN_2 @ 2492 N/cm² (3615 PSIA)

EXTERNAL ..... .0002 scc/s OF GN_2 @ 2492 N/cm² (3615 PSIA)

MATERIAL -

CONSTRUCTION ..... Cres

SEAT ..... Cres

CONNECTIONS -

DESCRIPTION OF GROUND HALF ..... MS Tube Fitting 0.56-18 UNF

SPACECRAFT CONNECTION ..... Brazed Tube .00952 in (.375 in)

MASS (FLIGHT HALF ONLY)..... 0.45 kg (1.0 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ....

Compatible with gaseous Nitrogen, Nitrogen Tetroxide, UDMH, Water, etc.

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 FILL AND VENT VALVE

MANUFACTURER Consolidated Controls Corp. (20)

PART NUMBER 72855

PROGRAM.....	P-50
CONTRACTING AGENCY.....	USAF
PRIME CONTRACTOR.....	Lockheed Missiles and Space Co., Inc.
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Agena
AVAILABILITY.....	180 days
COST/PROCUREMENT INFORMATION...	5 to 10 units - $2000

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 VALVE, FILL AND VENT

TYPE ..... Manual

DESIGN FLOW MEDIA ..... GN_2 or N_2H_4

RATED FLOW AT DIFFERENTIAL PRESSURE (ACROSS BOTH FLIGHT AND GROUND HALVES IN EITHER DIRECTION) - equivalent to .012 in (0.5 in) orifice size

LIQUID ..... _____ kg/sec OF _____ @ _____ N/cm^2, _____ °C
(_____ lbm/sec OF _____ @ _____ PSID, _____ °F)

GAS ..... _____ scc/s OF _____ @ _____ N/cm^2, _____ °C
(_____ SCFM OF _____ @ _____ PSID, _____ °F)

INTEGRAL FILTRATION ..... 200 MICRONS ABSOLUTE

LIFE ..... 100 CYCLES

PRESSURES -

OPERATING	237 N/cm^2	(345 PSIA)
PROOF	355 N/cm^2	(515 PSIA)
BURST	234 N/cm^2	(340 PSIA)

OPERATING TEMPERATURE RANGE ..... -34to+60 °C (-30to140 °F)

LEAKAGE -

INTERNAL ..... 5 scc/hr OF GN_2 @ 2492 N/cm^2 (3615 PSIA)

EXTERNAL ..... .0002 scc/s OF GN_2 @ 2492 N/cm^2 (3615 PSIA)

MATERIAL -

CONSTRUCTION ..... Cres

SEAT ..... Cres

CONNECTIONS -

DESCRIPTION OF GROUND HALF ..... MS Tube Fitting

SPACECRAFT CONNECTION ..... Brazed Tube

MASS (FLIGHT HALF ONLY)..... 0.544 kg (1.20 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ...

Dash No.	Outlet Fitting	Flow	Inlet Fitting
-1	.00952 in (.375 in)	2.0 lbm/GN_2	.50-20 UNF
-3	.0190 in (.750 in)	1.0 CFMH_2O	.875-14 UNF

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 FILL AND VENT VALVE

MANUFACTURER Hughes Aircraft Co. (52)

PART NUMBER 325-7167

PROGRAM.....	Intelsat IV A Westar Anik
CONTRACTING AGENCY.....	Telesat Corp., Western Union, Comsat Corp.
PRIME CONTRACTOR.....	
STATUS	
QUALIFIED.....	Yes
FLOWN.....	Yes
LAUNCH VEHICLE.....	Atlas Centaur
AVAILABILITY.....	6 months lead time
COST/PROCUREMENT INFORMATION...	$1400

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 VALVE, FILL AND VENT

TYPE ..... In-line ball

DESIGN FLOW MEDIA ..... N_2H_4

RATED FLOW AT DIFFERENTIAL PRESSURE (ACROSS BOTH FLIGHT AND GROUND HALVES IN EITHER DIRECTION) -

LIQUID ..... .0250 kg/sec OF _____ @ 20 N/cm^2, _____ °C
(.0553 lbm/sec OF _____ @ 30 PSID, _____ °F)

GAS ..... _____ scc/s OF _____ @ _____ N/cm^2, _____ °C
(_____ SCFM OF _____ @ _____ PSID, _____ °F)

INTEGRAL FILTRATION ..... None MICRONS ABSOLUTE

LIFE ..... 1200 CYCLES

PRESSURES -

OPERATING	286 N/cm^2	(415 PSIA)
PROOF	4147 N/cm^2	(6015 PSIA)
BURST	5526 N/cm^2	(≤8015 PSIA)

OPERATING TEMPERATURE RANGE ..... -28 to 76.6 °C (-20 to 170 °F)

LEAKAGE -

INTERNAL ..... .50 scc/hr OF _____ @ _____ N/cm^2 (_____ PSIA)

EXTERNAL ..... 1.4×10^{-5} scc/s OF He @ 355 N/cm^2 (515 PSIA)

MATERIAL -

CONSTRUCTION ..... Titanium Alloy, 6AL-4V

SEAT .....

CONNECTIONS -

DESCRIPTION OF GROUND HALF ..... AND 818-4J (1/4")

SPACECRAFT CONNECTION .....

MASS (FLIGHT HALF ONLY)..... 0.12 kg (0.27 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ....

225

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 FILL AND VENT VALVE

MANUFACTURER Wright Components Inc.

PART NUMBER 12183

PROGRAM..... MSD

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Naval Research Labs

STATUS

QUALIFIED..... in process

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY..... special order; 18-24 weeks ARO

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 VALVE, FILL AND VENT

TYPE ..... Manual

DESIGN FLOW MEDIA ..... Hydrazine

RATED FLOW AT DIFFERENTIAL PRESSURE (ACROSS BOTH FLIGHT AND GROUND HALVES IN EITHER DIRECTION) - equivalent to 0.156 in diam $C_D = 0.65$

LIQUID ..... _____ kg/sec OF _____ @ _____ N/cm^2, _____ °C
(_____ lbm/sec OF _____ @ _____ PSID, _____ °F)

GAS ..... _____ scc/s OF _____ @ _____ N/cm^2, _____ °C
(_____ SCFM OF _____ @ _____ PSID, _____ °F)

INTEGRAL FILTRATION ..... None MICRONS ABSOLUTE

LIFE ..... 250 CYCLES

PRESSURES -

OPERATING	0-251 N/cm^2	(0-365 PSIA)
PROOF	424 N/cm^2	(615 PSIA)
BURST	837.7 N/cm^2	(1215 PSIA)

OPERATING TEMPERATURE RANGE ..... -28 to 71 °C (-20 to 160 °F)

LEAKAGE -

INTERNAL ..... 5.4×10^{-3} scc/hr OF He @ 79.2 N/cm^2 (115 PSIA)

EXTERNAL ..... 1.5×10^{-6} scc/s OF _____ @ 79.2 N/cm^2 (115 PSIA)

MATERIAL -

CONSTRUCTION ..... 304 Cres

SEAT ..... 300 series stainless

CONNECTIONS -

DESCRIPTION OF GROUND HALF ..... face seal with 4 threaded holes

SPACECRAFT CONNECTION ..... special flange

MASS (FLIGHT HALF ONLY)..... 0.15 kg (0.35 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ....

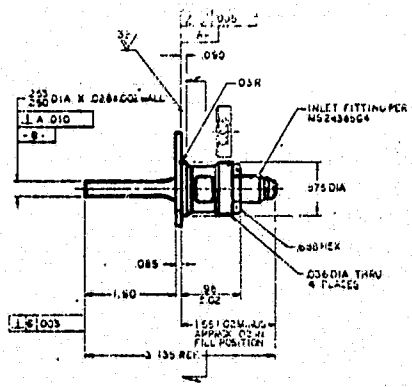
327

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 FILL AND VENT VALVE

MANUFACTURER Pyronetics, Inc. (59)

PART NUMBER 1831



PROGRAM..... Viking '75

CONTRACTING AGENCY..... NASA

PRIME CONTRACTOR..... Martin Marietta

STATUS

QUALIFIED..... Yes

FLOWN.....

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

C-4

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 VALVE, FILL AND VENT

TYPE ..... In-line, flange mounted, manually operated

DESIGN FLOW MEDIA ..... GHe, GN_2

RATED FLOW AT DIFFERENTIAL PRESSURE (ACROSS BOTH FLIGHT AND GROUND HALVES IN EITHER DIRECTION) -

LIQUID ..... 0.068 kg/sec OF H_2O @ 13 N/cm^2, _____ °C
(0.15 lbm/sec OF H_2O @ 20 PSID, _____ °F)

GAS ..... _____ scc/s OF _____ @ _____ N/cm^2, _____ °C
(_____ SCFM OF _____ @ _____ PSID, _____ °F)

INTEGRAL FILTRATION ..... _____ MICRONS ABSOLUTE

LIFE ..... 550 CYCLES

PRESSURES -

OPERATING	382 N/cm^2	(555 PSIA)
PROOF	768.7 N/cm^2	(1115 PSIA)
BURST	1513 N/cm^2	(2195 PSIA)

OPERATING TEMPERATURE RANGE ..... +5to50.5 °C (+41to123 °F)

LEAKAGE -

INTERNAL ..... $1.7X10^{-3}$ scc/hr OF He @ 382 N/cm^2 (555 PSIA)

EXTERNAL ..... $1.3X10^{-7}$ scc/s OF He @ 27 N/cm^2 (40 PSIA)

MATERIAL -

CONSTRUCTION ..... 304 L CRES

SEAT .....

CONNECTIONS -

DESCRIPTION OF GROUND HALF .....

SPACECRAFT CONNECTION .....

MASS (FLIGHT HALF ONLY)..... 0.07 kg (0.17 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ....

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 FILL AND VENT VALVE

MANUFACTURER HTL Industries, Inc. (21)

PART NUMBER 255620-3 255921-3
255610-2 Ground Fitting

PROGRAM..... Viking Orbiter '75

CONTRACTING AGENCY.....

PRIME CONTRACTOR..... Martin Marietta

STATUS

QUALIFIED..... Yes, by HTL

FLOWN..... 1975

LAUNCH VEHICLE.....

AVAILABILITY.....

COST/PROCUREMENT INFORMATION...

ATTITUDE CONTROL PROPULSION COMPONENT DATA SHEET

4.2.7 VALVE, FILL AND VENT

TYPE ..... Fill and Drain

DESIGN FLOW MEDIA ..... GN_2, MMH, N_2O_4

RATED FLOW AT DIFFERENTIAL PRESSURE (ACROSS BOTH FLIGHT AND GROUND HALVES IN EITHER DIRECTION) -

LIQUID ..... .12 kg/sec OF H_2O @ 51 N/cm^2, _____ °C

(.28 lbm/sec OF H_2O @ 75 PSID, _____ °F)

GAS ..... 8.0×10^{-3} scc/s OF GN_2 @ 17 N/cm^2, _____ °C

(17 SCFM OF GN_2 @ 25 PSID, _____ °F)

INTEGRAL FILTRATION ..... None MICRONS ABSOLUTE

LIFE ..... 100 CYCLES

PRESSURES -

OPERATING ..... 0-2768 N/cm^2 (0-4015 PSIA)

PROOF ..... 4147 N/cm^2 (6015 PSIA)

BURST ..... 11,042 N/cm^2 (16,015 PSIA)

OPERATING TEMPERATURE RANGE ..... -3.8 to +51.6 °C (+25 to +125 °F)

LEAKAGE -

INTERNAL ..... .003 scc/hr OF He @ 44-2768 N/cm^2 (65-4015 PSIA)

EXTERNAL ..... .005 scc/s OF He @ 44-2768 N/cm^2 (65-4015 PSIA) Cap only

MATERIAL -

CONSTRUCTION ..... _____

SEAT ..... _____

CONNECTIONS -

DESCRIPTION OF GROUND HALF ..... Drawing 255610

SPACECRAFT CONNECTION ..... _____

MASS (FLIGHT HALF ONLY)..... 0.13 kg (0.30 lbm)

OTHER SIGNIFICANT CHARACTERISTICS ....