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Work Order # KEDS DOCUMENT

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NOTE: THIS DRAWING COMBINES 79K80268, 79K90268, 79K80269 & 79K90269. DO NOT USE LISTED DRAWINGS FOR NEW PROCUREMENT. USE EXISTING COMPONENTS UNTIL DEPLETED

REQUIREMENTS FOR VACUUM VALVE

1. SERVICE: VACUUM JACKETS FOR LOX, LH2, LHe, AND LN2 SYSTEMS.
2. MAXIMUM ALLOWABLE OPERATING PRESSURE (MAWP): 65 PSIG
3. CRACKING PRESSURE: 16 TO 24 PSIG. TEST WHILE INCREASING PRESSURE WITH VALVE IN VERTICAL UPRIGHT POSITION WITHOUT CAP.
4. RESET PRESSURE: RELIEF VALVE SHALL RESEAT AT 10 PSIG (MIN) WHILE DECREASING PRESSURE AND THE VALVE IS IN THE UPRIGHT POSITION.
5. TEST PRESSURE: 1 1/2 x MAX OPERATING PRESSURE
6. BURST PRESSURE: 4 x INLET PRESSURE
7. OPERATION: INSTALLED SEAL OFF VALVE IS SPRING LOADED TO SEAL OFF & MAINTAIN VACUUM IN VACUUM INSULATED COMPONENTS AFTER EVACUATION. VALVE SHALL HAVE A PORT CONNECTION FOR VACUUM PUMPING AND A INTEGRAL RELIEF CAPABILITY TO RELIEVE POSITIVE PRESSURE IF IT OCCURS IN THE ANNULAR SPACE. THE VALVE SHALL ALSO HAVE A VACUUM ISOLATION VALVE WHICH WILL BE WELDED TO THE SEAL OFF VALVE. THE ISOLATION VALVE SHALL HAVE A 1/8" FNPT PORT FOR INSTALLATION OF A PRESSURE SENSING ELEMENT. THE ISOLATION VALVE SHALL HAVE THE ABILITY TO ISOLATE THE PRESSURE SENSING DEVICE FROM THE VACUUM ANNULUS.
8. CONNECTION: NOMINAL 1" WELD
9. LEAKAGE: BUBBLE TIGHT INTERNALLY FOR INTERNAL VACUUM OF 10-7 TORR & EXTERNAL PRESSURE OF 15 PSIG HELIUM FOR ONE MINUTE.

10. OPERATING TEMPERATURE: -65°F TO 200°F.
11. CLEANING: CLEAN, PROTECT & INSPECT PER KSC-C-123 VC PRIOR TO INSTALLATION. (SI CPC 216-3)
12. LUBRICATION: USE KRYTOX 240AC, KRYTOX GPL206 OR USA DESIGN ENGINEERING APPROVED EQUAL, SPARINGLY ON O-RINGS AND ALL THREADED SURFACES, EXCEPT THERMOCOUPLE THREADS.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
F	REVISED SHEET 1.3 & 4 ADDED SHEETS 1A & 5. 1. MOVED NOTES 13 THRU 21 TO SHEET 1A. 2. WAS SHEET 1 OF 4	2006/02/23	H. HANNAH T. ADAMS
G	REVISED SHEETS 1, 1A, 3 & 5 REDRAWN, NO CHANGE SHEETS 2 & 4 1. REVISED REQUIREMENTS 11 AND 12 THIS SHEET.	2008/07/14	H. HANNAH T. ADAMS
H	REVISED & REDRAWN SHEET 1A. REDRAWN, NO CHANGE SHEETS 1 & 2 THRU 5. REF PV-6-444635 & LSR 11-2980. 1. NO CHANGE THIS SHEET.	2009/02/27	H. HANNAH T. ADAMS
J	REVISED SHEETS 1 & 1A CUSTOMER REDLINES 1. CORRECTED NOTE. 2. REVISED WORDING OF REQUIREMENTS 1. & 2.	2010/8/31	H. HANNAH P. THOMAS

THIS COMPUTER DRAWING WAS CREATED IN MICROSTATION AND FILED UNDER THE DRAWING NUMBER

		UNLESS OTHERWISE SPECIFIED		ORIGINAL DATE OF DRAWING 4-26-78		VACUUM VALVE ASSEMBLY		JOHN F. KENNEDY SPACE CENTER, NASA KENNEDY SPACE CENTER FLORIDA			
		DIMENSIONS ARE IN INCHES		DRAFTER						CHECKER	
SEE ENGINEERING RECORDS		TOLERANCES ON FRACTIONS		CHECKER						STRESS	
		DECIMALS		ENGINEER						ENGINEER	
		ANGLES		ENGINEER G. ROSKA							
		MATERIAL		SUBMITTED A. RODRIQUES 6/23/78							
		HEAT TREATMENT		R. L. FISHER 6/21/78							
NEXT ASSY		USED ON		APPROVED		WEIGHT CHECKER		DATE			
APPLICATION		FINAL PROTECTIVE FINISH		I. MOORE 6/27/78		CODE 22264		SCALE			
						NONE		UNIT WEIGHT			
								SHEET 1 OF 5			

DWG SIZE B 79K14672

13. OXYGEN COMPATIBILITY OF SOFT GOODS: NOT APPLICABLE

14. AGE CONTROL: NOT APPLICABLE

15. IDENTIFICATION: ALL ASSEMBLIES SHALL BE IDENTIFIED BY MEANS OF A FIRMLY ATTACHED WEATHERPROOF TAG WHICH IS STAMPED, ENGRAVED OR ETCHED WITH THIS DWG NO. & REVISION LETTER

16. TORQUE VALUES: CAP (ITEM 9) HAND TIGHT
CAP (ITEM 21) HAND TIGHT

17. VENDOR: LESLIE CONTROLS, INC
C/O CPC-CRYOLAB
12501 TELECOM DR.
TAMPA, FL. 33637
CAGE CODE:35795

18 USE SEALANT ON THREADS WHEN ASSEMBLING THERMOCOUPLE TO VACUUM ISOLATION VALVE. ACCEPTABLE PRODUCTS ARE AS FOLLOWS:

1. TORR SEAL; VARIAN VACUUM TECHNOLOGIES; 121 HARTWELL AVE., LEXINGTON, MA, 02421-3133
2. LOX 8 PASTE; FLOURAMICS INC; 18 INDUSTRIAL AVE, MAHWAH, NJ; (800) 922-0075; CAGE 28017

19 THIS ITEM IS A PART OF VENDOR SOFT GOODS KIT
PART NUMBER F-18066-SGK

20. ITEMS 7 THRU 15 MAKE UP CAP ASSEMBLY WITH CHAIN.
VENDOR PART NUMBER SV3-088-KSCCAP

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
F	THIS SHEET ADDED 1. NOTES 13 THRU 21 MOVED FROM SH 1.	2006/02/23	H. HANNAH T. ADAMS
G	1. REVISED NOTES 17 THRU 20. 2. ADDED FLAG TO NOTE 18.	2008/ 07/14	H. HANNAH T. ADAMS
H	1. REVISED NOTE 18.	2009/ 02/27	H. HANNAH T. ADAMS
J	1. REVISED NOTE 17: ADDED CAGE CODE. 2. DELETED NOTE 21.	2010/ 08/31	H. HANNAH P. THOMAS

THIS COMPUTER DRAWING WAS
CREATED IN MICROSTATION AND
FILED UNDER THE DRAWING NUMBER

CODE IDENT NO.	DWG SIZE	79K14672
22264	B	SHEET 1A OF

REQUIREMENTS FOR PRESSURE SENSING THERMOCOUPLE

1. SERVICE: VACUUM JACKETS FOR LOX, LH2, LHe, AND LN2
2. DESIGN PRESSURE: 0 PSIA (VACUUM) TO 65 PSIG
3. TEST PRESSURE: 1½ X MAX POSITIVE PRESSURE
4. OPERATION: THE PRESSURE SENSING ELEMENT SHALL CONSIST OF A THERMOCOUPLE WELDED TO A HEATER FILAMENT. VARYING PRESSURE AROUND THE HEATER FILAMENT SHALL CAUSE A VARIATION IN FILAMENT TEMPERATURE & A RESULTING CHANGE IN VOLTAGE OUTPUT BY THE THERMOCOUPLE. ELECTRICAL INPUT TO THE FILAMENT & THERMOCOUPLE OUTPUT INDICATION SHALL BE PROVIDED BY EXTERNAL EQUIPMENT
5. PRESSURE SENSING SENSITIVITY: 12 MILLIVOLTS AT 0.01 MICRONS AND 95 MILLIAMPS OF HEATER CURRENT WITH AN ACCURACY OF ± 1 MICRON AT 10 MICRONS, ± 3 MICRONS AT 80 MICRONS AND +100/-50 MICRONS AT 375 MICRONS. CALIBRATION MEDIUM SHALL BE DRY AIR.
6. PRESSURE SENSING TEMPERATURE COMPENSATION: 39° TO 150°F
7. HEATER POWER REQUIREMENTS: 100 MA (NOMINAL MAX VALUE)
8. CONNECTIONS: MECHANICAL-1/8" NPT
ELECTRICAL-TO MATE WITH PC-06A-8-4S(SR)
(BENDIX CO)
9. LEAKAGE: LEAK RATE NOT TO EXCEED 2x10⁻⁹ SCC/SEC OF GHe
10. CLEANLINESS: KSC-C-123, LEVEL VC
11. VOLTAGE OUTPUT: FULL VOLTAGE OUTPUT SHALL BE 12MV ± 0.1 MV AT 1 MICRON. TEST WITH 10K OHMS (MIN) LOAD
12. OUTPUT IMPEDANCE: NOT APPLICABLE (NON-INDUCTIVE CIRCUIT)
13. ACCURACY: TOLERANCE SHALL BE ± 1 MICRON AT 1 THRU 10 MICRONS PRESSURE; ± 5 MICRONS AT 100 MICRONS; +100 , -50 MICRONS AT 400 THRU 500 MICRONS. TOLERANCE TO INCLUDE ERROR IN METER (FREDRICKS/TELEVAC B2A-1-BAT OR EQUAL)
14. ZERO BALANCE: NOT APPLICABLE (SINGLE ENDED CIRCUIT)
15. REPEATABILITY: WITHIN ACCURACY ABOVE
16. RESOLUTION: RESOLUTION OF THE OUTPUT VOLTAGE SHALL BE INFINITE

17. CURRENT DRAIN: 100 MA (MAX)
18. OUTPUT NOISE: NOT APPLICABLE
19. INSULATION RESISTANCE: GREATER THAN 1000 MEGOHMS, MEASURED WITH 50 V DC BETWEEN ALL TERMINALS CONNECTED IN PARALLEL & THERMOCOUPLE BASE
20. COMPONENT MARKING: VENDOR'S PART NO. SHALL APPEAR PERMANENTLY & LEGIBLY UPON THE ASSEMBLY.
21. MOUNTING ATTITUDE: ANY POSITION
22. TESTING: THE MANUFACTURER SHALL PROVIDE WRITTEN CERTIFICATION THAT EACH ASSEMBLY HAS BEEN DIMENSIONALLY, FUNCTIONALLY, PROOF, & LEAK TESTED PER ITEMS 5,6,7,8,& 9
23. PACKAGING: PER MANUFACTURER'S STANDARD PRACTICE PROVIDED THAT PACKAGING IS SUFFICIENT TO PROTECT COMPONENT AGAINST DAMAGE DURING SHIPMENT. EXTERIOR SHIPPING CONTAINER SHALL CONFORM TO FREIGHT CLASSIFICATION RULES & APPLICABLE CONTAINER SPECIFICATIONS
24. AGE CONTROL: NOT APPLICABLE
25. MANUFACTURER: FREDRICKS CO., TELEVAC DIVISION
2400 PHILMONT AVENUE
HUNTINGTON VALLEY, PA 19006
26. APPROVAL: ANY CHANGE TO THE COMPONENTS DESCRIBED BY THIS DWG REQUIRES PRIOR USA DESIGN ENGINEERING APPROVAL
27. HEATER AND THERMOCOUPLE RESISTANCE: AS SHOWN ON SH 4. IF EITHER RESISTANCE VALUE IS OUTSIDE THE SPECIFIED LIMITS, THE THERMOCOUPLE ASSY SHALL BE TESTED AT 5 TO 15 MICRONS VACUUM WITH 100 MILLIAMPS HEATER CURRENT. OUTPUT SHALL BE 12 MILLIVOLTS, OPEN CIRCUIT ± 10 %

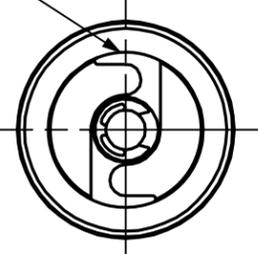
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
E	THIS SHEET ADDED	2002/09/09	E. THOMPSON T. ADAMS
G	REDRAWN, NO CHANGE	2008/07/14	H. HANNAH T. ADAMS
H	REDRAWN, NO CHANGE	2009/02/27	H. HANNAH T. ADAMS

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CODE IDENT NO.	DWG SIZE	79K14672
22264	B	SHEET 2 OF

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2 PLCS
.06 || .25

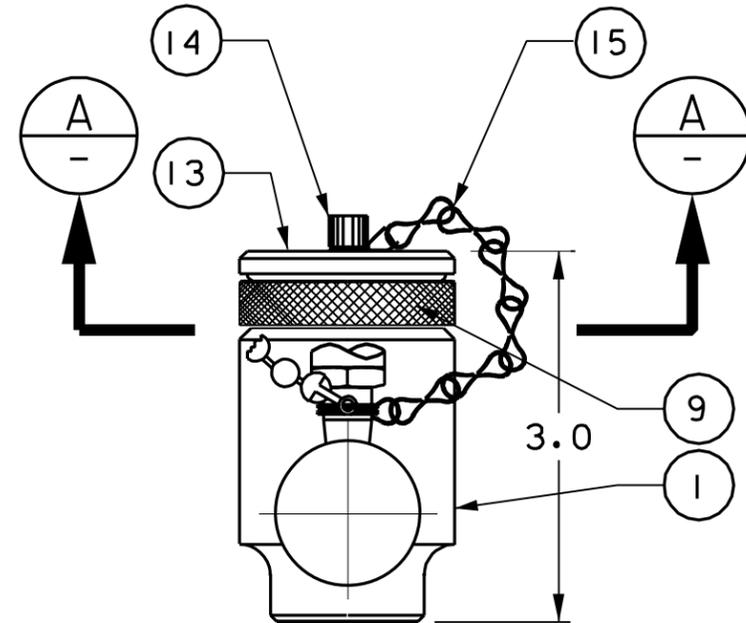
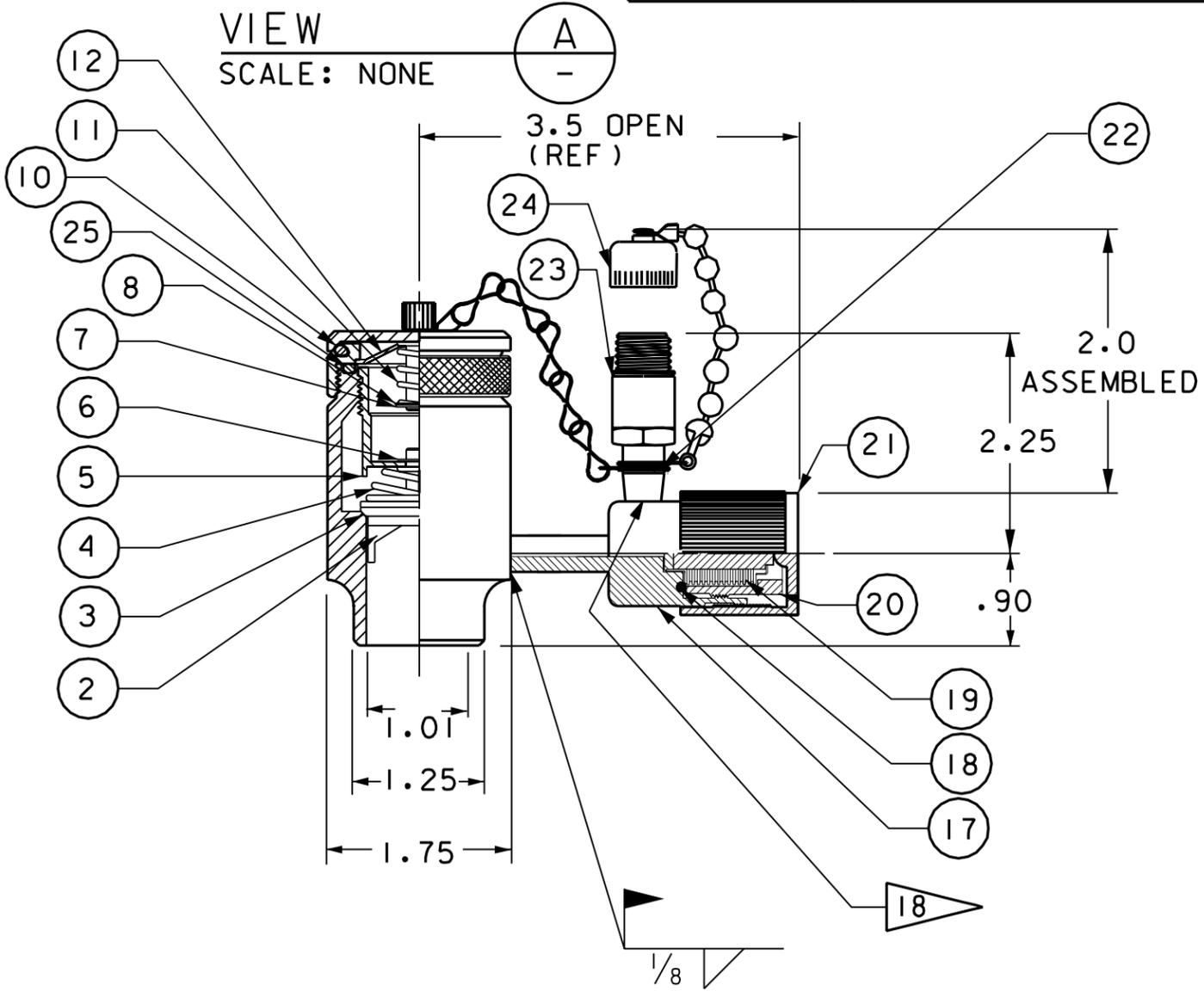


VALVE ASSY. PART NO.	CONFIGURATION
79K14672-1	NOT FOR NEW PROCUREMENT OR INSTALLATION. USE 79K14672-4
79K14672-2	NOT FOR NEW PROCUREMENT OR INSTALLATION. USE 79K14672-3
79K14672-3	WITH CHAIN, 24 PSIG RELIEF PRESSURE (VENDOR P/N SV8247-9)
79K14672-4	WITHOUT CHAIN, 24 PSIG RELIEF PRESSURE (VENDOR P/N SV8247-10) - NOT FOR NEW PROCUREMENT

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
E	THIS SHEET ADDED. 1. VACUUM VALVE ASSY WAS ON SHEET 1. 2. DELETED 5 & 15 PSIG RELIEF PRESSURE. 3. INC. DATA FROM 79K80269, 79K90269, 79K80268 & 79K90268. 4. ADDED 79K14672-4.	2002/09/29	E. THOMPSON T. ADAMS
F	1. ADDED ITEM 25	2006/02/23	H. HANNAH T. ADAMS
G	1. ADDED FLAG NOTE 18. 2. ADDED "NOT FOR NEW PROCUREMENT" ON -4 ASSY. 3. ITEM 22 WAS 2 REQ. 4. REMOVED ITEM 16	2008/07/14	H. HANNAH T. ADAMS
H	REDRAWN, NO CHANGE	2009/02/27	H. HANNAH T. ADAMS

VIEW

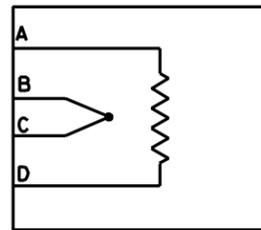
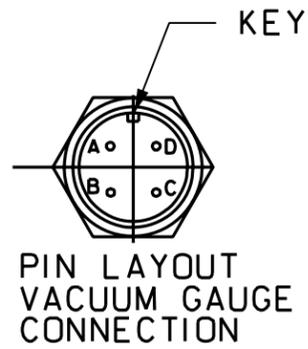
SCALE: NONE



VACUUM VALVE ASSY
SCALE: NONE -1, -2, -3, -4

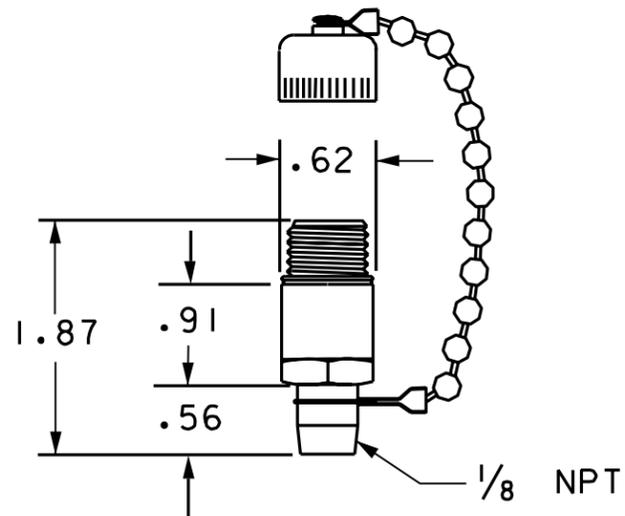
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CODE IDENT NO.	DWG SIZE	79K14672
22264	B	SHEET 3 OF



A-D HEATER $-3.6 \pm .5$ OHMS
 B-C THERMOCOUPLE
 $-2.6 \pm .5$ OHMS
 B (TC+) C (TC-)

ELECTRICAL SCHEMATIC
 SCALE: NONE



THERMOCOUPLE ASSY
 SCALE: NONE

USE THE B2A-1-BAT ANALOG
 INSTRUMENT (AS SUPPLIED BY
 FREDERICKS/TELEVAC P/N
 2-3001-101 OR EQUAL) TO READ
 VACUUM LEVELS WITH THIS
 THERMOCOUPLE.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
E	THIS SHEET ADDED	2002/09/09	E. THOMPSON T. ADAMS
F	PARTS LIST MOVED TO SHEET 5 I. WAS SH 4 OF 4.	2006/02/23	H. HANNAH T. ADAMS
G	REDRAWN, NO CHANGE	2008/ 07/14	H. HANNAH T. ADAMS
H	REDRAWN, NO CHANGE	2009/ 02/27	H. HANNAH T. ADAMS

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CODE IDENT NO.	DWG SIZE	79K14672
22264	B	SHEET 4 OF

ITEM NO.	VENDOR PART NO.	NOMENCLATURE	MATERIAL	REMARKS
1	-38966	VALVE BODY	304L CRES	
2	-38969	DISC	316L CRES	
3	-4118-32	O-RING (SIZE AS568-118)	AMS 7276	
4	-38981	RELIEF SPRING	302 CRES	
5	-38967	PLUG	CF3M CRES	
6	-23040163	RETAINING RING	PH 15-7 CRES	
7	WS2-055	WASHER	304 CRES	
8	-6335	RETAINING RING	PH 15-7 Mo CRES	
9	-23072	CAP WELDMENT	304 CRES	
10	-4125-32	O-RING (SIZE: AS568-125)	AMS 7276	
11	-38972	SPRING	302 CRES	PASSIVATE
12	-38971	Z-BAR	304 CRES	
13	8247-1-01	POPPET	304 CRES	
14	-23010322T	SCREW-SOCKET HEAD CAP	300 SERIES CRES	10-32x1/2"
15	67624POA9	JACK CHAIN	304 CRES	
16	NOT USED			
17	F-16617	BODY	304L CRES	
18	-4015-32	O-RING (SIZE: AS568-015)	AMS 7276	
19	-7804	BELLOWS ASSY	COPPER/KEL-F	
20	-7803	RETAINING NUT	BRASS	
21	-38973	CAP	BRASS	ELECTROLESS NICKEL PLATED
22	F-16616	RETAINING RING	316 CRES	
23	-7801	THERMOCOUPLE	CRES	FREDERICKS PN: 2-2100-31
24	-7802	CAP ASSY	ALUM	
25	-4124-32	O-RING (SIZE: AS568-124)	AMS 7276	

19

19

19

A

19

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
F	THIS SHEET ADDED 1. MOVED PARTS LIST FROM SH4. 2. REVISED PN FOR ITEM 3, 10, 11, 14, AND 17. 3. DELETED NAS 1593 FROM O-RINGS. SUBSTITUTED PARKER COUMPOUND. 4. CORRECTED ITEM 3 & 10 PART NUMBER.	2009/02/23	H. HANNAH T. ADAMS
G	1. EXTENSIVELY REVISED VENDOR PART NUMBERS. 2. ADDED SPECIFIC FLAG NOTE A.	2008/07/14	H. HANNAH T. ADAMS
H	REDRAWN, NO CHANGE	2009/02/27	H. HANNAH T. ADAMS

SPECIFIC NOTES:

A THERMOCOUPLE SHALL BE PHYSICALLY AND ELECTRICALLY COMPATIBLE WITH FREDRICKS/TELEVAC P/N 2-3001-101 ANALOG INSTRUMENT.

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CODE IDENT NO.	DWG SIZE	79K14672
22264	B	SHEET 5 OF 5