

NOTICE -- WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR ANY OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSONS OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
E	REVISED & REDRAWN SHEET 1. ADDED SHEETS 2,3 & 4. COMBINED 79K80269, 79K90269, 79K80268 & 79K90268. 1. UPDATED VENDOR ADDRESS. 2. MOVED VACUUM VALVE ASSY. TO SHEET 3. 3. MOVED THERMOCOUPLE ASSY. AND ELECTRICAL SCHEM TO SHEET 4. 4. WAS SHEET 1 OF 1.	2002/09/09	E. THOMPSON T. ADAMS
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

REQUIREMENTS FOR VACUUM VALVE

- SERVICE: VACUUM JACKETS FOR LOX, LH2, LHe, AND LN2
- OPERATING PRESSURE: 0 PSIA (VACUUM) TO 65 PSIG
- CRACKING PRESSURE: 16 TO 24 PSIG.  
TEST WHILE INCREASING PRESSURE WITH VALVE IN VERTICAL UPRIGHT POSITION WITHOUT CAP.
- RESET PRESSURE: RELIEF VALVE SHALL RESEAT AT 10 PSIG (MIN) WHILE DECREASING PRESSURE AND THE VALVE IS IN THE UPRIGHT POSITION
- TEST PRESSURE: 1 1/2 x MAX OPERATING PRESSURE
- BURST PRESSURE: 4 x INLET PRESSURE
- 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.
- CONNECTION: NOMINAL 1" WELD
- LEAKAGE: BUBBLE TIGHT INTERNALLY FOR INTERNAL VACUUM OF 10-7 TORR & EXTERNAL PRESSURE OF 15 PSIG HELIUM FOR ONE MINUTE.
- OPERATING TEMPERATURE: -65°F TO 200°F.
- CLEANING: CLEAN, PROTECT & INSPECT PER KSC-C-123 VC PRIOR TO INSTALLATION
- LUBRICATION: USE KRYTOX 240 AC, OR USA DESIGN ENGINEERING APPROVED EQUAL, SPARINGLY ON O-RINGS AND ALL THREADED SURFACES, EXCEPT THERMOCOUPLE THREADS.

NOTE: THIS DRAWING COMBINES 79K80268, 79K90268, 79K80269 & 79K09269. DO NOT USE LISTED DRAWINGS FOR NEW PROCUREMENT. USE EXISTING COMPONENTS UNTIL DEPLETED

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      DECIMALS      ANGLES			CHECKER						STRESS	
		—      0.010      —			ENGINEER						ENGINEER	
		MATERIAL _____			SUBMITTED A. RODRIQUES 6/23/78 R. L. FISHER 6/21/78				DWG SIZE B 79K14672			
KSC GSE		HEAT TREATMENT _____			APPROVED I. MOORE 6/27/78		WEIGHT CHECKER				DATE	
NEXT ASSY		USED ON					CODE 22264					
APPLICATION		FINAL PROTECTIVE FINISH _____					SCALE NONE		UNIT WEIGHT			
									SHEET 1 OF 5			

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

- 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: CPC/CRYOLAB  
12501 TELECOM DR.  
TAMPA FL. 33637
- 18. USE EPOXY (VAC SEAL) 2886000 ON THREADS WHEN ASSEMBLING THERMOCOUPLE TO VACUUM ISOLATION VALVE AS SUPPLIED BY PHYSICAL ELECTRONICS, 6509 FLYING CLOUD DR EDEN PRAIRIE, MN. 55344 OR USA DESIGN ENG APPROVED EQUAL
- 19. THIS ITEM IS A PART OF VENDOR SOFT GOODS KIT  
PART NUMBER 7152/7153
- 20. ITEMS 7 THRU 16 MAKE UP CAP ASSEMBLY WITH CHAIN.  
VENDOR PART NUMBER SV3-088-KSCCAP
- 21. ITEMS 7 THRU 13 MAKE UP CAP ASSEMBLY WITH OUT CHAIN.  
VENDOR PART NUMBER SV3-88-KSCCAPNC

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: 1 1/2 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<sup>-9</sup> 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. REPEATIBILITY: 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

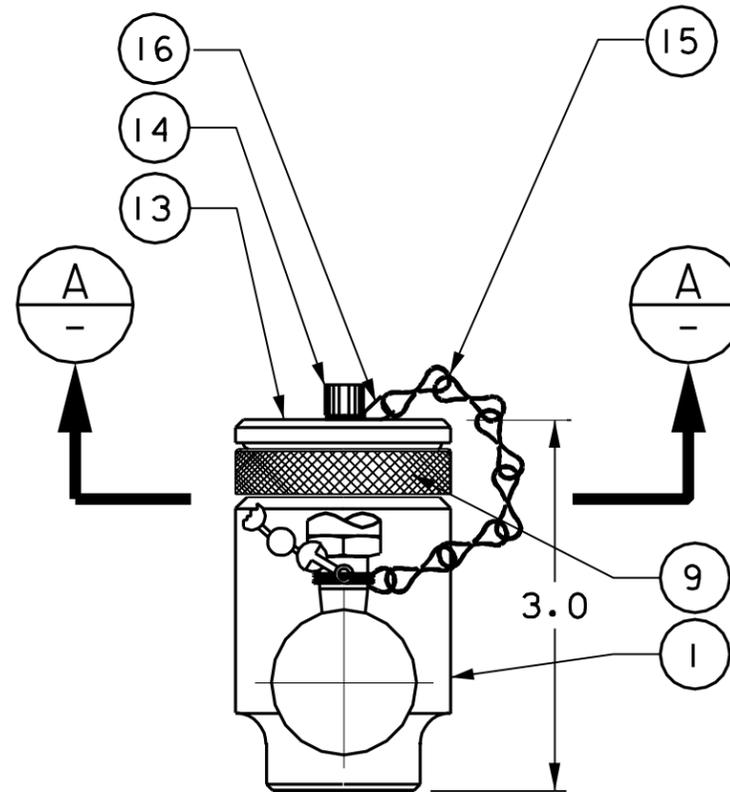
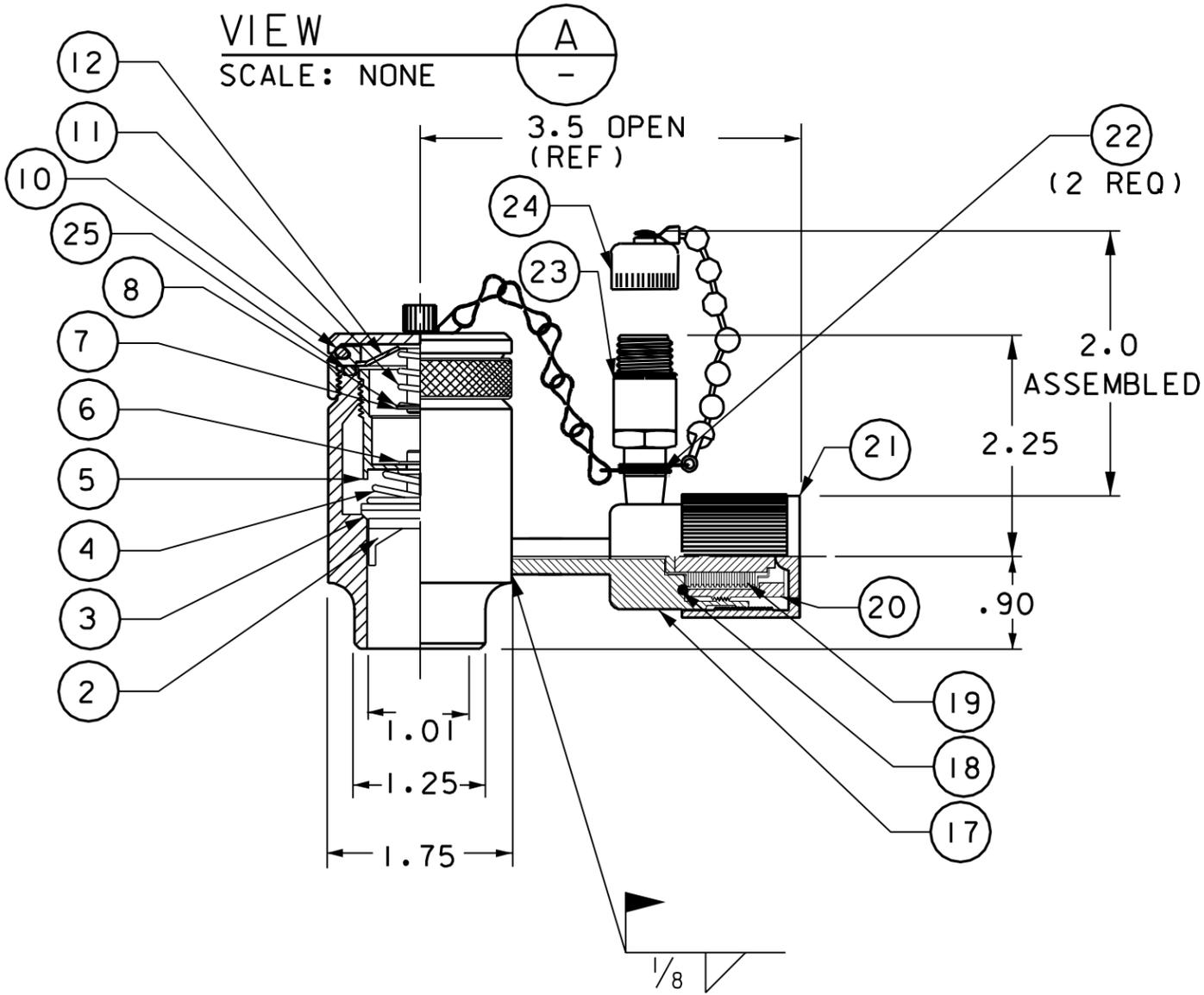
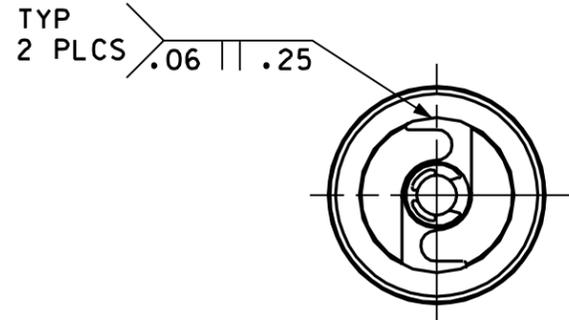
THIS COMPUTER DRAWING WAS  
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FILED UNDER THE DRAWING NUMBER

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

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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)

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.	2002/09/19	E. THOMPSON T. ADAMS
F	1. ADDED ITEM 25	2006/02/23	H. HANNAH T. ADAMS



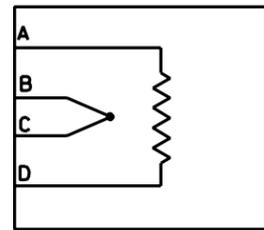
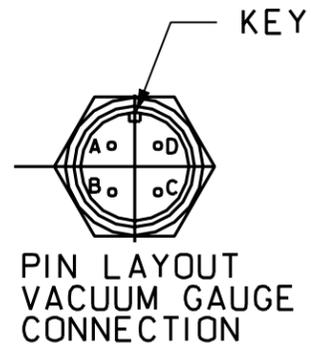
VACUUM VALVE ASSY  
SCALE: NONE -1, -2, -3, -4

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

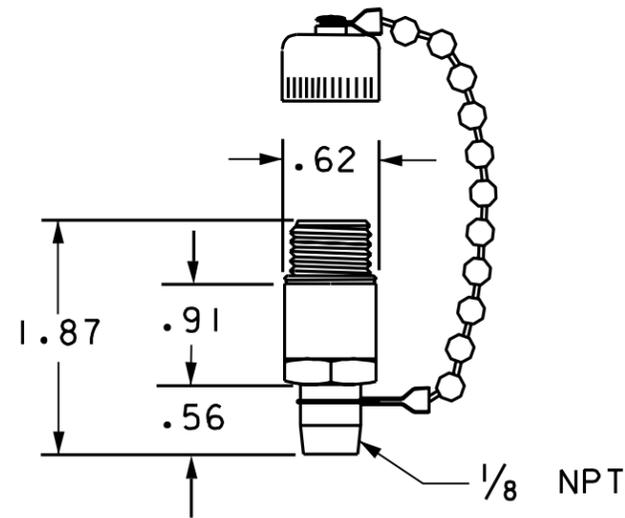
REVISIONS

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



A-D HEATER -3.6 +/- .5 OHMS  
 B-C THERMOCOUPLE  
 -2.6 +/- .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.

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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)	DUPONT VITON A	PARKER V1164-75
4	38981	RELIEF SPRING	302 CRES	
5	38967	PLUG	316L CRES	
6	23040163	RETAINING RING	CRES	
7	WS2-055P	WASHER	304 CRES	
8	6335	RETAINING RING	15-7 MoCRES	
9	23072	BODY WELDMENT		
10	-4125-32	O-RING (SIZE: AS568-125)	DUPONT VITON A	PARKER V1164-75
11	X3Z8V3-088-5N4	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	F-15609	RETAINING RING	CRES	
17	F-16617	BODY	304L CRES	
18	-4015-32	O-RING (SIZE: AS568-015)	DUPONT VITON A	PARKER V1164-75
19	-7804	BELLOWS ASSY	COPPER/KEL-F	
20	-7803	RETAINING NUT	BRASS	
21	-38973	CAP	BRASS	
22	-6362	RETAINING RING	302 CRES	
23	2-2100-31	THERMOCOUPLE	CRES	
24	10-101951-85	CAP ASSY		
25	-4124-32	O-RING (SIZE: AS568-124)	DUPONT VITON-A	PARKER V1164-75

19

19

19

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

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