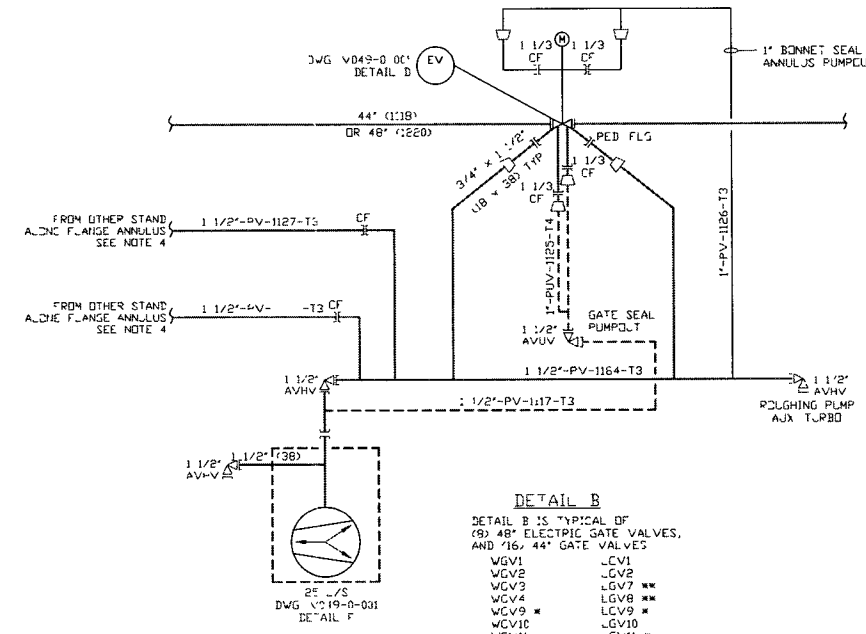
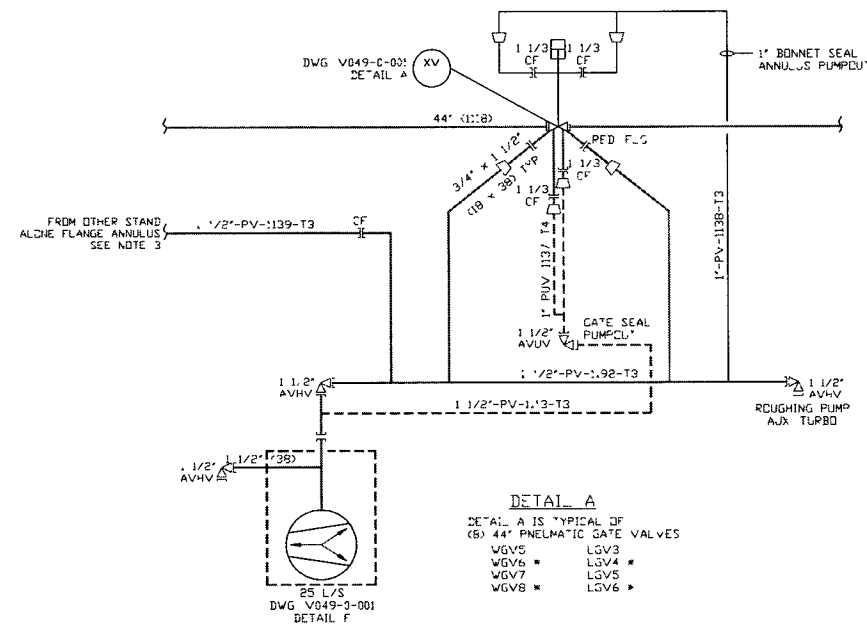


TABLE 1

VALVE	VACUUM LINE	1"-PV-125-T3	1"-PV-1126-T4	1/2"-PV-1127-T3	1/2"-PV-1184-T3	-
WGV1	1/2"-PV-1117-T3	1"-PV-1125-T3	1"-PV-1126-T4	1/2"-PV-1127-T3	1/2"-PV-1184-T3	-
WGV2	1/2"-PV-1118-T3	1"-PV-1128-T3	1"-PV-1129-T4	1/2"-PV-1130-T3	1/2"-PV-1186-T3	-
WGV3	1/2"-PV-1119-T3	1"-PV-1131-T3	1"-PV-1132-T4	1/2"-PV-1133-T3	1/2"-PV-1188-T3	1/2"-PV-1189-T3
WGV4	1/2"-PV-1120-T3	1"-PV-1134-T3	1"-PV-1135-T4	1/2"-PV-1136-T3	1/2"-PV-1190-T3	1/2"-PV-1191-T3
WGV5	1/2"-PV-1113-T3	1"-PV-1137-T3	1"-PV-1138-T4	1/2"-PV-1139-T3	1/2"-PV-1192-T3	-
WGV6	1/2"-PV-1124-T3	1"-PV-1140-T3	1"-PV-1141-T4	1/2"-PV-1142-T3	1/2"-PV-1193-T3	-
WGV7	1/2"-PV-1115-T3	1"-PV-1143-T3	1"-PV-1144-T4	1/2"-PV-1145-T3	1/2"-PV-1194-T3	-
WGV8	1/2"-PV-1116-T3	1"-PV-1146-T3	1"-PV-1147-T4	1/2"-PV-1148-T3	1/2"-PV-1195-T3	-
WGV9	1/2"-PV-230-T3	1"-PV-240-T3	1"-PV-241-T4	1/2"-PV-242-T3	1/2"-PV-265-T3	1/2"-PV-266-T3
WGV10	1/2"-PV-231-T3	1"-PV-243-T3	1"-PV-244-T4	1/2"-PV-245-T3	1/2"-PV-267-T3	1/2"-PV-268-T3
WGV11	1/2"-PV-232-T3	1"-PV-246-T3	1"-PV-247-T4	1/2"-PV-248-T3	1/2"-PV-269-T3	1/2"-PV-270-T3
WGV12	1/2"-PV-233-T3	1"-PV-249-T3	1"-PV-250-T4	1/2"-PV-251-T3	1/2"-PV-271-T3	1/2"-PV-272-T3
WGV13	1/2"-PV-330-T3	1"-PV-340-T3	1"-PV-341-T4	1/2"-PV-342-T3	1/2"-PV-362-T3	1/2"-PV-363-T3
WGV14	1/2"-PV-331-T3	1"-PV-343-T3	1"-PV-344-T4	1/2"-PV-345-T3	1/2"-PV-364-T3	1/2"-PV-365-T3
WGV15	1/2"-PV-332-T3	1"-PV-346-T3	1"-PV-347-T4	1/2"-PV-348-T3	1/2"-PV-366-T3	1/2"-PV-367-T3
WGV16	1/2"-PV-333-T3	1"-PV-349-T3	1"-PV-350-T4	1/2"-PV-351-T3	1/2"-PV-368-T3	1/2"-PV-369-T3
WGV17	1/2"-PV-425-T3	1"-PV-435-T3	1"-PV-436-T4	1/2"-PV-437-T3	1/2"-PV-443-T3	1/2"-PV-444-T3
WGV18	1/2"-PV-426-T3	1"-PV-438-T3	1"-PV-439-T4	1/2"-PV-440-T3	1/2"-PV-445-T3	1/2"-PV-446-T3
WGV19	1/2"-PV-525-T3	1"-PV-535-T3	1"-PV-536-T4	1/2"-PV-537-T3	1/2"-PV-543-T3	1/2"-PV-544-T3
WGV20	1/2"-PV-526-T3	1"-PV-538-T3	1"-PV-539-T4	1/2"-PV-540-T3	1/2"-PV-545-T3	1/2"-PV-546-T3
LGV1	1/2"-PV-682-T3	1"-PV-1601-T3	1"-PV-1602-T4	1/2"-PV-1603-T3	1/2"-PV-1634-T3	-
LGV2	1/2"-PV-683-T3	1"-PV-1604-T3	1"-PV-1605-T4	1/2"-PV-1606-T3	1/2"-PV-1636-T3	-
LGV3	1/2"-PV-678-T3	1"-PV-1607-T3	1"-PV-1608-T4	1/2"-PV-1609-T3	1/2"-PV-1638-T3	-
LGV4	1/2"-PV-679-T3	1"-PV-1610-T3	1"-PV-1611-T4	1/2"-PV-1612-T3	1/2"-PV-1639-T3	-
LGV5	1/2"-PV-680-T3	1"-PV-1613-T3	1"-PV-1614-T4	1/2"-PV-1615-T3	1/2"-PV-1640-T3	-
LGV6	1/2"-PV-691-T3	1"-PV-1616-T3	1"-PV-1617-T4	1/2"-PV-1618-T3	1/2"-PV-1641-T3	-
LGV7	1/2"-PV-725-T3	1"-PV-731-T3	1"-PV-732-T4	1/2"-PV-733-T3	1/2"-PV-747-T3	-
LGV8	1/2"-PV-825-T3	1"-PV-831-T3	1"-PV-832-T4	1/2"-PV-833-T3	1/2"-PV-847-T3	-
LGV9	1/2"-PV-726-T3	1"-PV-734-T3	1"-PV-735-T4	1/2"-PV-736-T3	1/2"-PV-749-T3	1/2"-PV-750-T3
LGV10	1/2"-PV-727-T3	1"-PV-737-T3	1"-PV-738-T4	1/2"-PV-739-T3	1/2"-PV-751-T3	1/2"-PV-752-T3
LGV11	1/2"-PV-826-T3	1"-PV-834-T3	1"-PV-835-T4	1/2"-PV-836-T3	1/2"-PV-849-T3	1/2"-PV-850-T3
LGV12	1/2"-PV-827-T3	1"-PV-837-T3	1"-PV-838-T4	1/2"-PV-839-T3	1/2"-PV-851-T3	1/2"-PV-852-T3

NOTES:

- DIMENSIONS IN () ARE IN MILLIMETERS
 - SEE TABLE 1 FOR PIPING LINE NUMBERS
 - FROM ADDITIONAL FLANGE ANNULUS FLANGE PAIR IDENTIFIED BY THE SPOOL PIECES THAT MAKE UP THE JOINT
 - FROM ADDITIONAL FLANGE ANNULUS FLANGE PAIR IDENTIFIED BY THE SPOOL PIECES THAT MAKE UP THE JOINT
- VALVE SPOOL/PIECE INTERFACE
- WGV5 B9/A1
 - WGV6 WCP1/BE-4
 - WGV7 B-9/A-1
 - WGV8 WCP2/BE-4
 - WGV9 WCP3/BE-4
 - WGV10 WCP4/BE-4
 - WGV11 WCP5/BE-4
 - WGV12 WCP6/BE-4
 - WGV13 WCP7/BE-4
 - WGV14 WCP8/BE-4
 - WGV15 WCP9/BE-4
 - WGV16 WCP10/BE-4
 - WGV17 WCP11/BE-4
 - WGV18 WCP12/BE-4
 - WGV19 WCP13/BE-4
 - WGV20 WCP14/BE-4
 - LGV1 A-7/A-1
 - LGV2 A-7/A-1
 - LGV3 A-7/A-1
 - LGV4 A-7/A-1
 - LGV5 A-7/A-1
 - LGV6 A-7/A-1
 - LGV7 A-7/A-1
 - LGV8 A-7/A-1
 - LGV9 A-7/A-1
 - LGV10 A-7/A-1
 - LGV11 A-7/A-1
 - LGV12 A-7/A-1



ELECTRONIC COPY

- TUBING ASSEMBLY FOR BEAM TUBE DEFLERABLES (INCLUDING) LA MID STATION
- THESE VALVES HAVE BUTTWELD CONNECTIONS ON ONE END AND THEREFORE HAVE ONLY ONE FLANGE ANNULUS PUMPQTS
- THESE VALVES HAVE BUTTWELD CONNECTIONS ON BOTH ENDS AND THEREFORE HAVE NO FLANGE ANNULUS PUMPQTS

LIGO-D961073-03-V

PROPRIETARY AND CONFIDENTIAL	
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION BELONGING TO PROCESS SYSTEMS INTERNATIONAL, INC. OR ITS AFFILIATED COMPANIES AND SHALL BE USED ONLY FOR THE PURPOSES FOR WHICH IT WAS SUPPLIED. IT SHALL NOT BE COPIED, REPRODUCED OR OTHERWISE USED, NOR SHALL SUCH INFORMATION BE FURNISHED IN WHOLE OR IN PART TO OTHERS EXCEPT IN ACCORDANCE WITH THE TERMS OF ANY AGREEMENT UNDER WHICH IT WAS SUPPLIED OR WITH THE PRIOR WRITTEN CONSENT OF PROCESS SYSTEMS INTERNATIONAL, INC. AND SHALL BE RETURNED UPON REQUEST.	
V049-0-001	P & ID LEGEND
DWG NO	DESCRIPTION
REFERENCE DRAWINGS	DESCRIPTION

UNLESS OTHERWISE SPECIFIED	3	AS-BUILT
DIMENSIONS ARE IN INCHES	2	ISSUE FOR FDR UPDATE
TOLERANCES:	1	ISSUE FOR FDR
FRACTIONAL 1/16"	0	ISSUE FOR DESIGN
ANGULAR/ARCH 1/4" 30° 3/64" 42°	P1	PRELIMINARY DESIGN UPDATE
TWO PLACE DECIMAL 2 005	USED ON	REV
THREE PLACE DECIMAL 2 005	DESCRIPTION	ISSUE DESCRIPTION
FINISHED SURFACE RING	DATE	CHKD
BREAK CORNERS IN OUT-	DRWN	DATE
REMOVE ALL BURRS	DESN	SCALE
		SHEET
		1 OF 1

DO NOT SCALE THIS DRAWING	3	AS-BUILT	LD	082598	0628
USED ON	2	ISSUE FOR FDR UPDATE	DMCW	RJW	102596
DESCRIPTION	1	ISSUE FOR FDR	REB	TS	RT
ISSUE DESCRIPTION	0	ISSUE FOR DESIGN	SM	DMCW	RJW
	P1	PRELIMINARY DESIGN UPDATE	SM	DMCW	RJW
	REV	DATE	SM	DMCW	RJW
	DATE	CHKD	SM	DMCW	RJW
	DATE	DRWN	SM	DMCW	RJW
	DATE	DESN	SM	DMCW	RJW
	DATE	SCALE	SM	DMCW	RJW
	DATE	SHEET	SM	DMCW	RJW
	DATE	1 OF 1	SM	DMCW	RJW

PROCESS SYSTEMS INTERNATIONAL INC.
 20 WALKUP DR WESTBOROUGH, MASSACHUSETTS 01581 USA

PIPING & INSTRUMENTATION DIAGRAM
 LIGO VACUUM EQUIPMENT
 112cm & 122cm GATE VALVES

CAR FILE V0490005
 SIZE D
 DWG NO V049-0-005
 REV 3

EDUCATION VERSION - NOT FOR COMMERCIAL USE