

**Model HDX Static Hydraulic
Universal Testing System****Reference Manual - Equipment**
M47-17033-EN Revision A

Electromagnetic Compatibility

Where applicable, this equipment is designed to comply with International Electromagnetic Compatibility (EMC) standards.

To ensure reproduction of this EMC performance, connect this equipment to a low impedance ground connection. Typical suitable connections are a ground spike or the steel frame of a building.

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Original Instructions

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About This Document

This Equipment Reference Manual has been prepared to provide customers with assembly drawings and schematics that pertain to the various models of HDX Static Hydraulic Universal Testing Systems. These drawings are provided for your use and Instron personnel use only. These drawings are the property of Instron and may be subject to return upon demand. The contents of this manual must not be copied or submitted to outside parties for use or examination.

How to Use This Document

The drawings included in this manual are arranged in numerical order for ease of locating any given drawing; refer to the “List of Drawings” section for a list of drawing titles and numbers. To determine which drawings pertain to your specific model of HDX testing system, use the information given in the “System Identification” section in conjunction with the “Options and Applicable Drawings” section.

System Identification

Your system has been given a unique serial number for system identification. This serial number can be found on the serial tag located on the rear of the frame.

The frame serial tag includes other important system information, including information on your frame’s configuration. Frame configuration information can also be found on your copy of the Instron quote.

Options and Applicable Drawings

This section provides a list of HDX testing system options and their applicable drawings. The options are listed in alphabetical order.

Not all options have applicable drawings. If any of the options purchased for your testing system are not listed here, then there are no drawings provided that pertain to that option.

1000HDX

General Assembly _____	R224940-3
Hydraulic Schematic _____	R235990-4A
HDX Power – Schematic _____	R234324-4
HDX Power – Wirelist Layout _____	R234325-3

1500HDX

General Assembly _____	R231326-3
Hydraulic Schematic _____	R234500-4F
HDX Power – Schematic _____	R234324-4
HDX Power – Wirelist Layout _____	R234325-3

1000HDX-G7, 1500HDX-G7

Handset Assembly – Schematic/Layout _____	R227736-3
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List of Drawings

The following is a list of all drawings that appear in this manual. The drawings are in numerical order for ease of locating.

General Assembly _____	R224940-3
Handset Assembly – Schematic/Layout _____	R227736-3
General Assembly _____	R231326-3
HDX Power – Schematic _____	R234324-4
HDX Power – Wirelist Layout _____	R234325-3
Hydraulic Schematic _____	R234500-4F
Hydraulic Schematic _____	R235990-4A

Appendix A

This section provides the Material Safety Data Sheet for the oil used in the hydraulic power supply (HPS).

Material Safety Data Sheet _____ Altra AW32 Oil

System Documentation

In addition to this Equipment Reference Manual, the following manuals are included under separate cover:

- Model HDX Series Static Hydraulic Universal Testing System – Pre-Installation Manual
Manual No. M47-17030-EN
- Model HDX Series Static Hydraulic Universal Testing System – Operating Instructions
Manual No. M47-17031-EN
- Model HDX Series Static Hydraulic Universal Testing System – System Concepts Manual
Manual No. M47-17032-EN

List of Drawings

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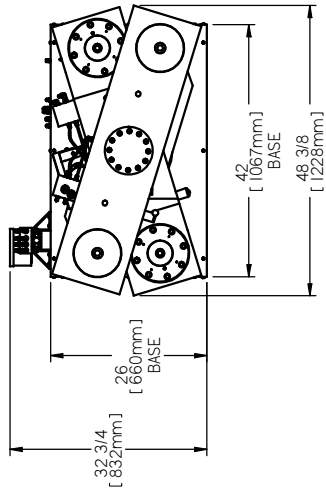


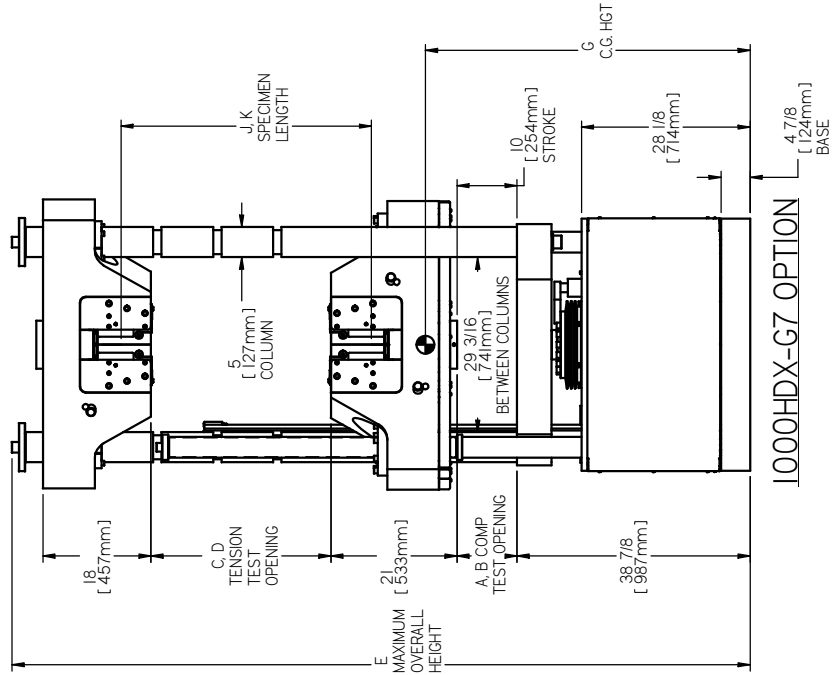
TABLE DIMENSIONS - SEE SHEET TWO SECTION "A-A"

OPTION DEPENDENT MEASUREMENTS

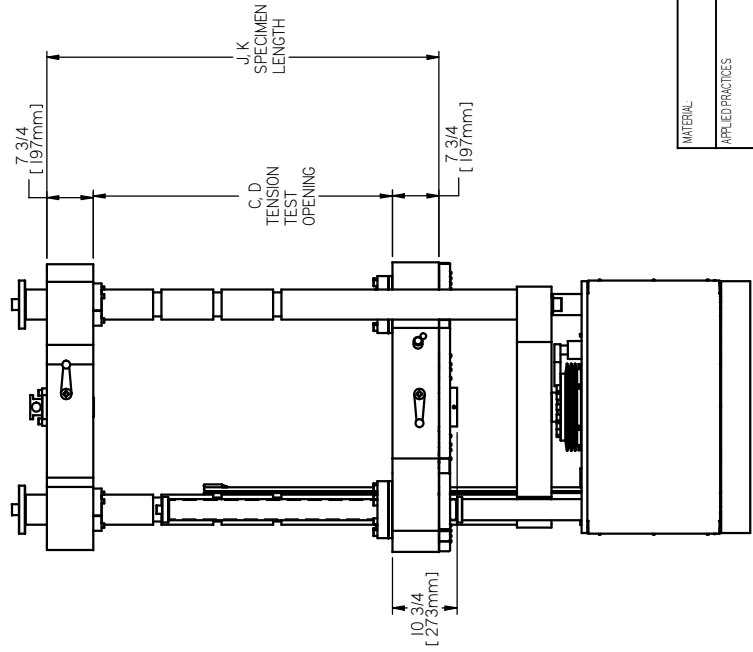
Option	A - MINIMUM COMPRESSION TEST OPENING		B - MAXIMUM COMPRESSION TEST OPENING		C - MINIMUM TENSION TEST OPENING		D - MAXIMUM TENSION TEST OPENING		E - MAXIMUM OVERALL HEIGHT		F - WEIGHT		G - CENTER OF GRAVITY HEIGHT		H - TIP-UP HEIGHT		J - MINIMUM TENSION SPECIMEN LENGTH		K - MAXIMUM TENSION SPECIMEN LENGTH	
	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg	in	mm	in	mm	in	mm	in	mm
G1B	0	0	39.5	1003	0	0	60	1524	133	3380	8100	3675	61	1540	126	3205	1575	400	72	1829
G7B	0	0	39.5	1003	0	0	40	1016	133	3380	9200	4175	66	1665	126	3205	1575	400	52	1321
G7C	0	0	59.5	1511	0	0	60	1524	153	3890	9700	4405	75	1895	146	3710	1575	400	72	1829

TABLE NOTES:

- A - MINIMUM COMPRESSION TEST OPENING MEASURED WITH PISTON FULLY EXTENDED AND ADJUSTABLE CROSSHEAD IN LOWEST POSITION.
- B - MAXIMUM COMPRESSION TEST OPENING MEASURED WITH PISTON FULLY RETRACTED AND ADJUSTABLE CROSSHEAD IN HIGHEST POSITION.
- C - MINIMUM TENSION TEST OPENING MEASURED WITH PISTON FULLY RETRACTED, ADJUSTABLE CROSSHEAD IN HIGHEST POSITION AND TENSION CROSSHEAD IN LOWEST POSITION.
- D - MAXIMUM TENSION TEST OPENING MEASURED WITH PISTON FULLY EXTENDED, ADJUSTABLE CROSSHEAD IN LOWEST POSITION AND TENSION CROSSHEAD IN HIGHEST POSITION.
- E - MAXIMUM OVERALL HEIGHT MEASURED WITH PISTON FULLY EXTENDED.
- G - CENTER OF GRAVITY MEASURED WITH PISTON FULLY EXTENDED AND ADJUSTABLE AND TENSION CROSSHEADS AT MAXIMUM HEIGHT.
- H - TIP-UP HEIGHT IS "CEILING" HEIGHT REQUIRED TO STAND THE MACHINE UPRIGHT FROM HORIZONTAL SHIPPING POSITION. DOES NOT INCLUDE CLEARANCE FOR LIFTING EQUIPMENT OR SHIPPING CONTAINER.
- J - MINIMUM TENSION SPECIMEN LENGTH MEASURED USING 6in (152mm) CLEARANCE BETWEEN ADJUSTABLE AND TENSION CROSSHEADS. PISTON FULLY RETRACTED AND 80% SPECIMEN ENGAGEMENT IN GRIP FACES WHEN GRIP FACES ARE FLUSH WITH CROSSHEAD.
- K - MAXIMUM TENSION SPECIMEN LENGTH MEASURED USING MAXIMUM CLEARANCE BETWEEN ADJUSTABLE AND TENSION CROSSHEADS. PISTON FULLY EXTENDED, AND 100% SPECIMEN ENGAGEMENT IN GRIP FACES WHEN GRIP FACES ARE FLUSH WITH CROSSHEAD. NOTE A SPECIMEN THIS LONG CANNOT BE TESTED, MUST ALLOW FOR SPECIMEN ELONGATION.



1000HDX-G7 OPTION



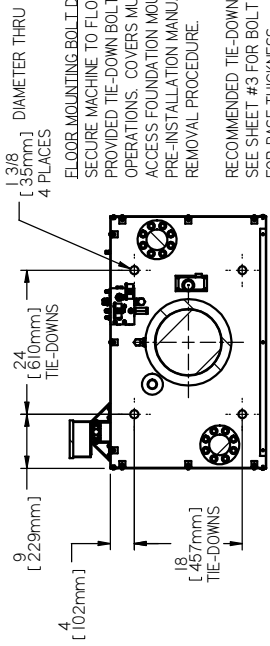
1000HDX-G1 OPTION

GENERAL NOTES:

1. NON-TABULATED DIMENSIONS ARE WITHIN THE FOLLOWING TOLERANCE US CUSTOMARY DIMENSIONS ARE +/- 1/32in METRIC DIMENSIONS ARE +/- 0.5mm
2. ALL DIMENSIONS, WEIGHTS AND CENTER OF GRAVITY (CG) ARE NOMINAL AND MAY BE AFFECTED BY ACCESSORIES AND OPTIONS
3. SEE PRE-INSTALLATION MANUAL FOR LIFTING AND HANDLING INSTRUCTIONS

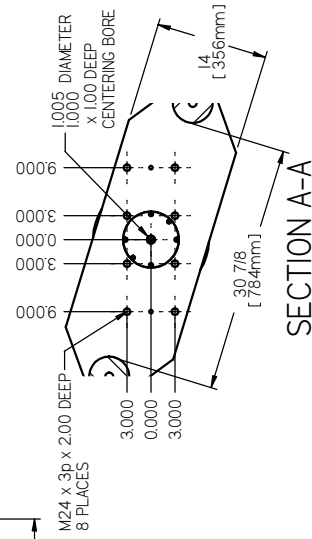
MATERIAL	D	52313	UPDATED FOR UPL REVIEW	9/27/08	JRH
APPLIED PRACTICES	C	51943	ADDED 1000HDX-G7C	2/14/08	JRH
SURFACE FINISH (25 UNLESS OTHERWISE NOTED)	B	51367	ADDED SHEET 3	11/5/08	JRH
FINISH	A		RELEASED	8/8/07	JRH
DATE	REV	ECO	REVISIONS	DATE	BY
7/16/07				7/16/07	
GENERAL ASSEMBLY 1000HDX					
DRWN	JRH	DATE	8/8/07	CHECKED	SOB
SO.		SHEET	1 OF 3		
INSTON INDUSTRIAL PRODUCTS			GROVE CITY, PENNSYLVANIA		
R224940-3			REV		

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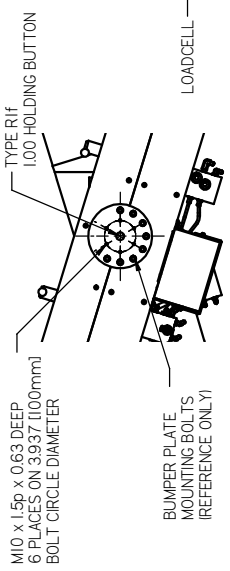


SECTION D-D
FLOOR MOUNTING BOLT DETAIL
(SOME PARTS REMOVED FOR CLARITY)

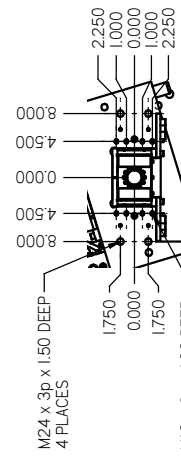
FIXTURE MOUNTING DETAIL



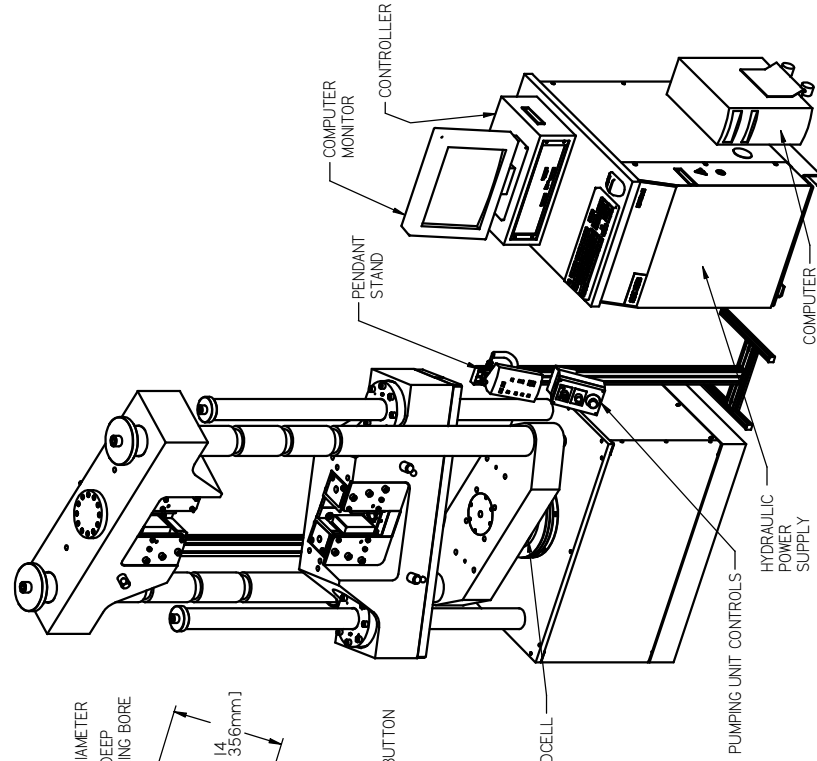
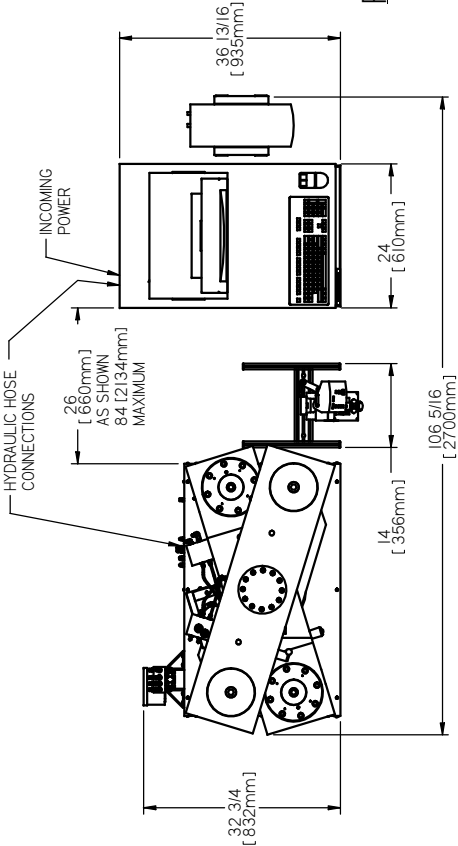
SECTION A-A
TABLE



SECTION B-B
BUMPER PLATEN



SECTION C-C
ADJUSTING CROSSHEAD
TOP AND TENSION
CROSSHEAD BOTTOM

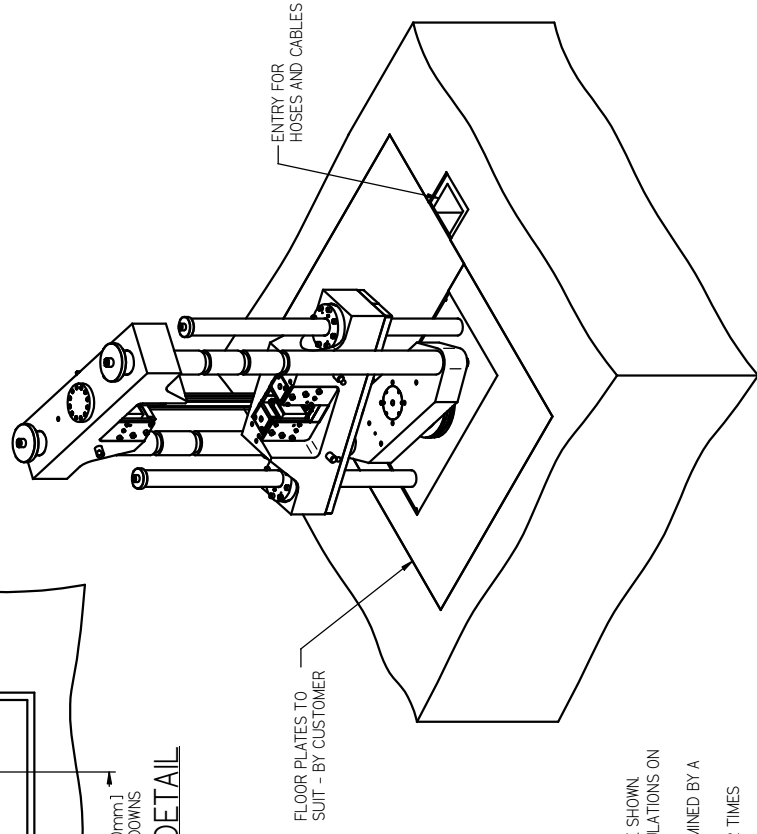
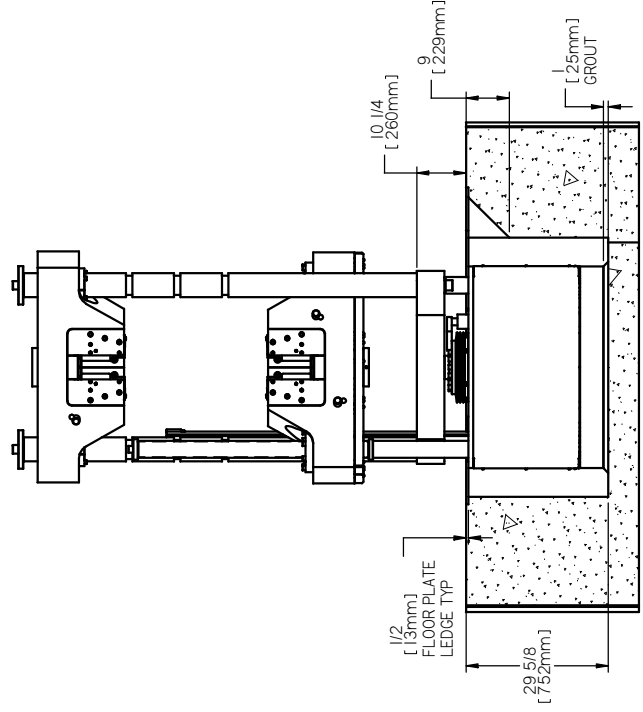
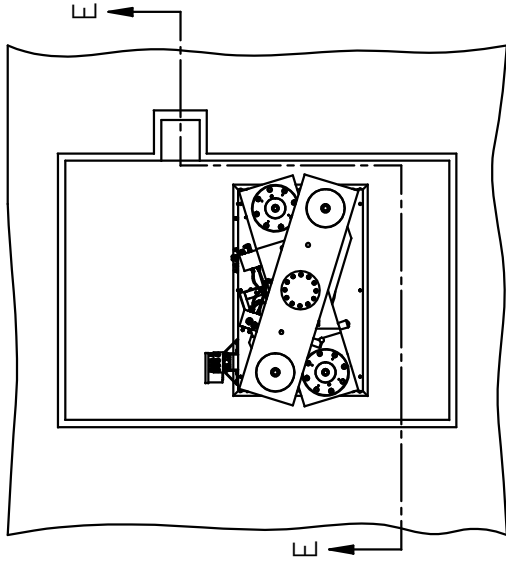
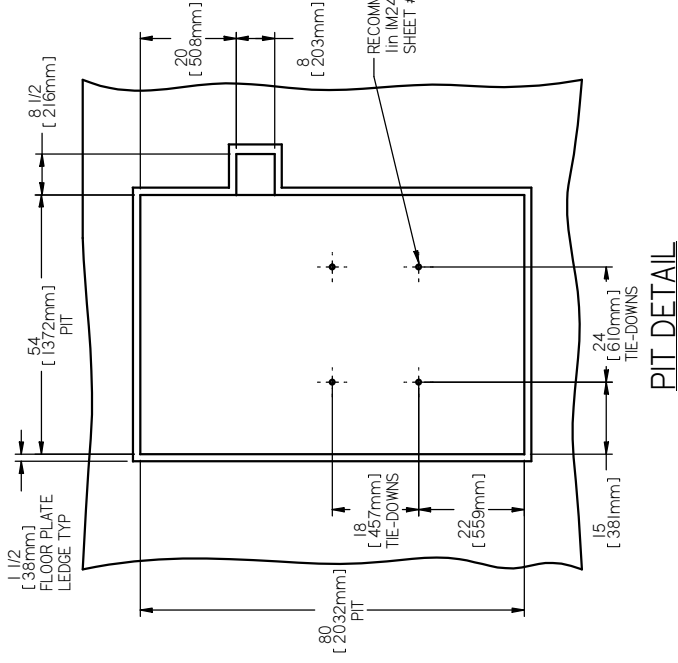


LIFTING POINTS
M30 x 3.5p x 3.0 DEEP
~MUST USE SHIPPING
BRACKETS TO LIFT ~
SEE PRE-INSTALLATION
MANUAL FOR LIFTING AND
HANDLING INSTRUCTIONS

LIFTING POINTS
M24 x 3p x 2.5 DEEP
ONE EACH SIDE
SEE PRE-INSTALLATION
MANUAL FOR LIFTING AND
HANDLING INSTRUCTIONS

MATERIAL	D	52/31E	UPDATED FOR UPL REVIEW	3/27/08	JRH
APPLIED PRACTICES	C	51943	ADDED 1000HDX-GTC	2/14/08	JRH
SURFACE FINISH (25 UNLESS OTHERWISE NOTED)	A	51367	ADDED SHEET 3	11/5/08	JRH
FINISH	REV	ECO	REVISIONS	8/8/07	JRH
DRUM	JRH	DATE	7/16/07	BY	
NO. OF SHEETS	2	OF	3	SHEET	2 OF 3
GENERAL ASSEMBLY					
1000HDX					
INSTRON INDUSTRIAL PRODUCTS GROVE CITY, PENNSYLVANIA					
R224940-3					

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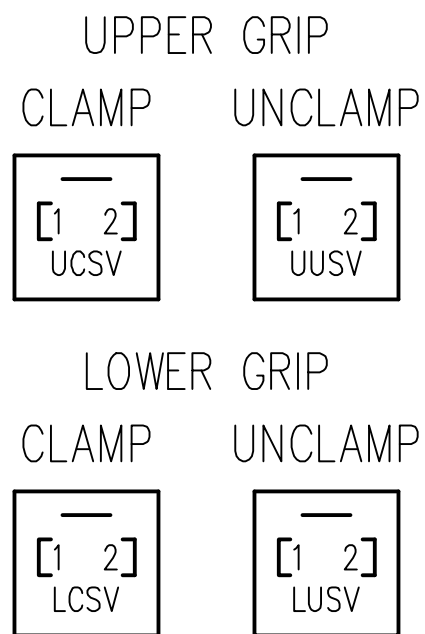
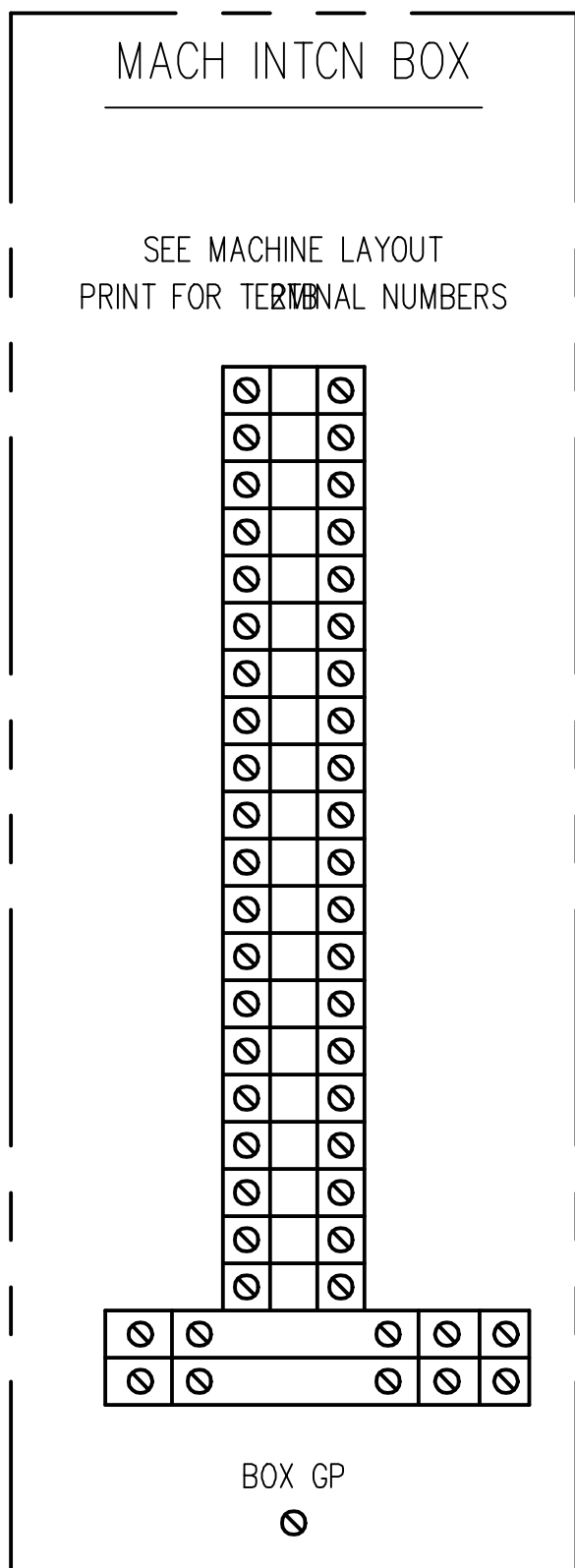
FOUNDATION INFORMATION

- RECOMMENDED MINIMUM PIT SIZE SHOWN. CUSTOMER TO CHECK LOCAL REGULATIONS ON PIT SIZE AND CONSTRUCTION.
- FOUNDATION SIZE TO BE DETERMINED BY A CERTIFIED CIVIL ENGINEER.
- SHOCK LOAD IS ESTIMATED AT 2 TIMES FRAME WEIGHT.

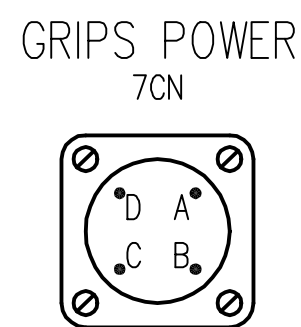
MATERIAL	D	52/313	UPDATED FOR UPL REVIEW	3/27/08	JRH
APPLIED PRACTICES	C	51943	ADDED 1000HDX-GTC	2/14/08	JRH
	B	51367	ADDED SHEET 3	11/5/08	JRH
	A		RELEASED	8/8/07	JRH
SURFACE FINISH (25 UNLESS OTHERWISE NOTED)	REV	ECO	REVISIONS	DATE	BY
FINISH				7/16/07	
MADE - TOLERANCES NOT OTHERWISE NOTED	DRAWN	JRH	CHECKED	SOB	8/8/07
X	+0.1	+0.015	+0.005	MADE FOR	3 OF 3
XX					
XXX					
XXXX					
FRACFINL +/- 0.04					
GENERAL ASSEMBLY					
1000HDX					
INSTRON INDUSTRIAL PRODUCTS					
GROVE CITY, PENNSYLVANIA					
R224940-3					
REV					
D					

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LAYOUT



EL BOX
INTCN BOX



WIRELIST

FROM		TO		WIRE				
TITLE	POS	TITLE	POS	NO.	PAIRS	COND	AWG	COLOR
MACH INTERCONNECT BOX CONNECTIONS								
2TB (INTCN BOX)	102	2TB	102	--		2TBS	METAL	JMPR
	103	,	103	--		4TBS	,	,
	G	,	G	--		2TBS	,	,
DIODE	BAND	2TB	17A	--				LEADS
	--	,	103	--				,
DIODE	BAND	2TB	18	--				LEADS
	--	,	103	--				,
DIODE	BAND	2TB	19A	--				LEADS
	--	,	103	--				,
DIODE	BAND	2TB	20	--				LEADS
	--	,	103	--				,
R1	1	2TB	17B	--				LEADS
	2	,	103	--				,
R2	1	2TB	19B	--				LEADS
	2	,	103	--				,
1CR	A1(+)	2TB	102	102		1	18	VIO
	A2(-)	,	17B	17B				GRY
	11	,	17	17				,
	14	,	17A	17A				,
	12	,	17B	17B				,
2CR	A1(+)	2TB	102	102		1	18	VIO
	A2(-)	,	19B	19B				GRY
	11	,	19	19				,
	14	,	19A	19A				,
	12	,	19B	19B				,

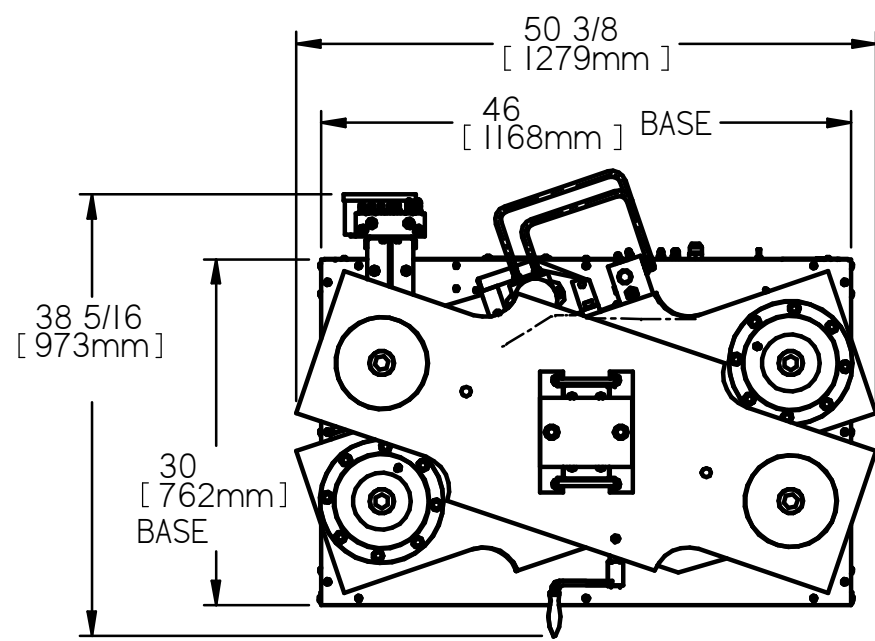
FROM		TO		WIRE				
TITLE	POS	TITLE	POS	NO.	PAIRS	COND	AWG	COLOR
GRIP SOLENOID CONNECTIONS								
UCSV (UPR CLMP)	CN-1	2TB	17A	17A	1	2	20	BLK
	CN-2	,	103	103				WHT
	N/C	,	G	G				SHD
UUSV (UPR UNCL)	CN-1	2TB	18	18	1	2	20	BLK
	CN-2	,	103	103				WHT
	N/C	,	G	G				SHD
LCSV (LWR CLMP)	CN-1	2TB	19A	19A	1	2	20	BLK
	CN-2	,	103	103				WHT
	N/C	,	G	G				SHD
LUSV (LWR UNCL)	CN-1	2TB	20	20	1	2	20	BLK
	CN-2	,	103	103				WHT
	N/C	,	G	G				SHD
GRIP HANDSET EXTN CABLE CONNS (SEE 227737-1 CBL)								
GCN (GRIP CN)	2	2TB	17	17	3	6	24	BLK
	1	,	102	102				WHT
	7	,	18	18				BLK
	4	,	19	19				GRN
	5	,	102	102				BLK
	9	,	20	20				RED
	SHELL	,	G	G				BRAID
2TB	G	BOX	GP	G		1	18	GN/YL
GRIP HANDSET CABLE CONNECTIONS (SEE 221256-2 CBL)								
INTCN BOX CABLE CONNECTIONS (SEE 223316-2 CBL)								

NOTES:

1. WHEN USED WITH A HDX MACHINE, ADD STRAIN RELIEF BUSHING, 300-8923-9024 TO THE UPPER & LOWER GRIP SOLENIOD CABLES.
2. BUSHINGS ARE PART OF THE MACHINE ASSEMBLY COMMON PARTS B/M.

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MATERIAL:		APPLIED PRACTICES:		THIRD ANGLE		SCHEMATIC/LAYOUT/LIST	
F	94979	E	94782	MADE FOR: HYD GRIPS		INSTRON INDUSTRIAL PRODUCTS	
		D	69499	SURFACE FINISH 125 UNLESS OTHERWISE NOTED		GROVE CITY, PENNSYLVANIA	
		ECO		HARDNESS:		REV	
				FINISH:		DATE: 11/5/08	
				TOLERANCES NOT OTHERWISE NOTED		DATE: 9/30/15	
				F0.1 F0.03 F0.015 F0.005		MOB	
				X X XX XXX		ADD BUSHING NOTE	
				ANGLAR: 1/4		ADD LATCHING RELAY	
				FRACTIONAL: 1/64		ADD DRAWING NUMBER AND ADD NOTE	
						2/3/11	
						BY	
						DATE: 11/5/08	
						S.O.	
						CHECKED:	
						DATE:	
						SHEET 2 OF 2	
						R227736-3	
						REV	
						F	

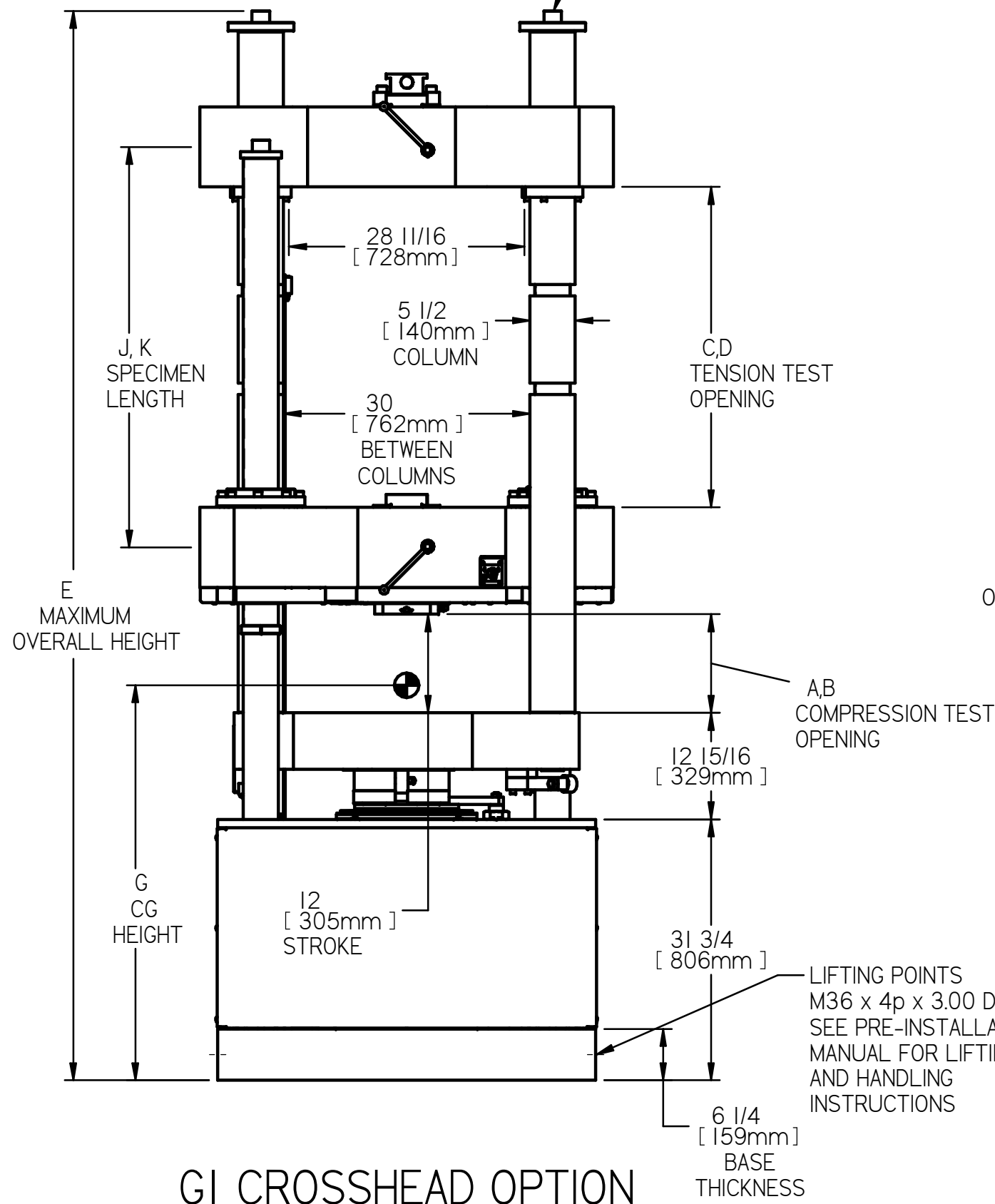


OPTION DEPENDENT MEASUREMENTS																					
	A - MINIMUM COMPRESSION TEST OPENING		B - MAXIMUM COMPRESSION TEST OPENING		C - MINIMUM TENSION TEST OPENING		D - MAXIMUM TENSION TEST OPENING		E - MAXIMUM OVERALL HEIGHT		F - WEIGHT		G - CENTER OF GRAVITY HEIGHT		H - TIP-UP HEIGHT		J - MINIMUM TENSION SPECIMEN LENGTH		K - MAXIMUM TENSION SPECIMEN LENGTH		
Option	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg	in	mm	in	mm	in	mm	in	mm	
G1B	0	0	48	1219	3	76	51	1295	142	3610	12200	5540	59	1500	133	3380	16.75	425	64.5	1638	
G7B	0	0	42	1067	0	0	42	1067	142	3610	13600	6175	65	1655	133	3380	15.75	400	54	1372	
G7C	0	0	66	1676	0	0	66	1676	166	4220	14115	6410	77	1960	157	3990	15.75	400	78	1981	
G8A	0	0	48	1219	0	0	0	0	115	2910	9500	4315	48	1220	117	2960	0	0	0	0	

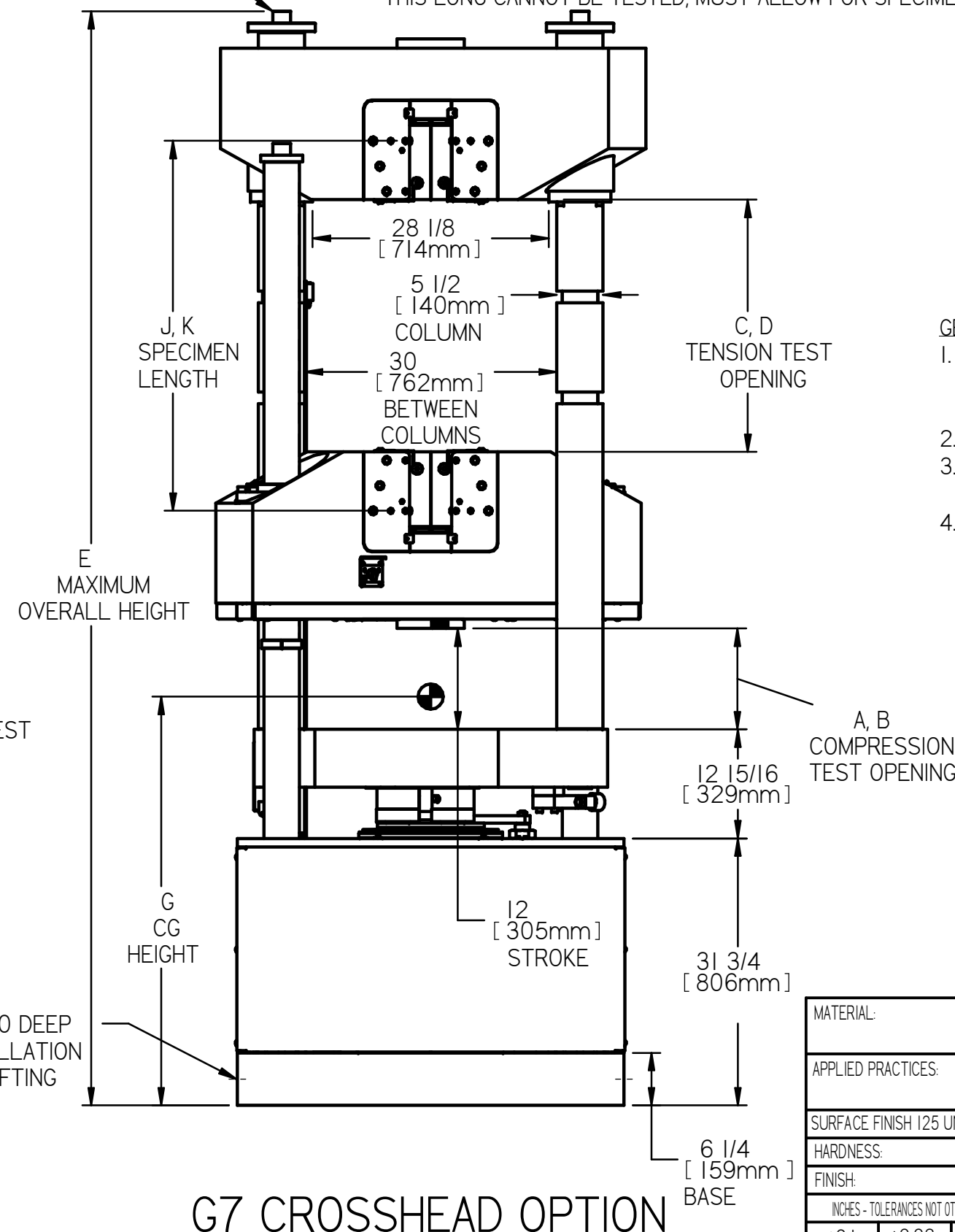
TABLE NOTES:

- A - MINIMUM COMPRESSION TEST OPENING MEASURED WITH PISTON FULLY EXTENDED AND ADJUSTABLE CROSSHEAD IN LOWEST POSITION.
- B - MAXIMUM COMPRESSION TEST OPENING MEASURED WITH PISTON FULLY RETRACTED AND ADJUSTABLE CROSSHEAD IN HIGHEST POSITION.
- C - MINIMUM TENSION TEST OPENING MEASURED WITH PISTON FULLY RETRACTED, ADJUSTABLE CROSSHEAD IN HIGHEST POSITION AND TENSION CROSSHEAD IN LOWEST POSITION.
- D - MAXIMUM TENSION TEST OPENING MEASURED WITH PISTON FULLY EXTENDED, ADJUSTABLE CROSSHEAD IN LOWEST POSITION AND TENSION CROSSHEAD IN HIGHEST POSITION.
- E - MAXIMUM OVERALL HEIGHT MEASURED WITH PISTON FULLY EXTENDED.
- G - CENTER OF GRAVITY MEASURED WITH PISTON FULLY EXTENDED AND ADJUSTABLE AND TENSION CROSSHEADS AT MAXIMUM HEIGHT.
- H - TIP-UP HEIGHT IS "CEILING" HEIGHT REQUIRED TO STAND THE MACHINE UPRIGHT FROM HORIZONTAL SHIPPING POSITION. DOES NOT INCLUDE CLEARANCE FOR LIFTING EQUIPMENT OR SHIPPING CONTAINER.
- J - MINIMUM TENSION SPECIMEN LENGTH MEASURED USING 6in [152mm] CLEARANCE BETWEEN ADJUSTABLE AND TENSION CROSSHEADS, PISTON FULLY RETRACTED, AND 80% SPECIMEN ENGAGEMENT IN GRIP FACES WHEN GRIP FACES ARE FLUSH WITH CROSSHEAD.
- K - MAXIMUM TENSION SPECIMEN LENGTH MEASURED USING MAXIMUM CLEARANCE BETWEEN ADJUSTABLE AND TENSION CROSSHEADS, PISTON FULLY EXTENDED, AND 100% SPECIMEN ENGAGEMENT IN GRIP FACES WHEN GRIP FACES ARE FLUSH WITH CROSSHEAD. NOTE A SPECIMEN THIS LONG CANNOT BE TESTED, MUST ALLOW FOR SPECIMEN ELONGATION.

LIFTING POINTS
M36 x 4p x 3.00 DEEP
2 PLACES
"MUST USE SHIPPING BRACKETS TO LIFT" - SEE PRE-INSTALLATION MANUAL FOR LIFTING AND HANDLING INSTRUCTIONS



G1 CROSSHEAD OPTION



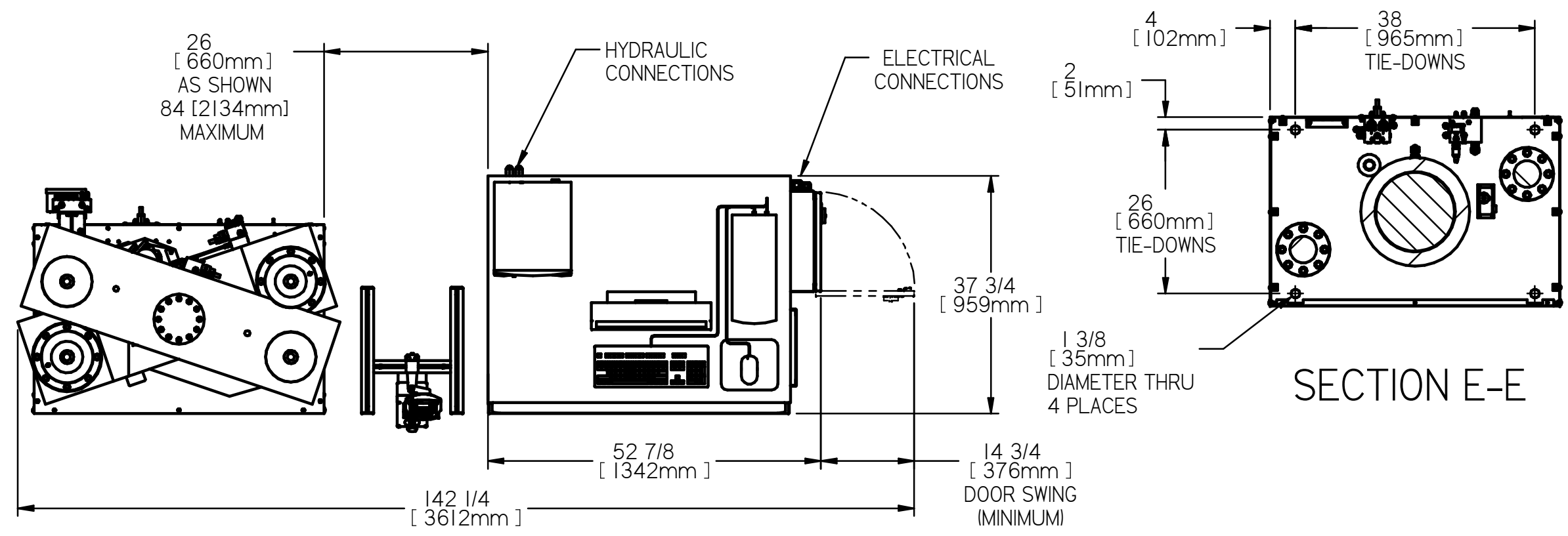
G7 CROSSHEAD OPTION

GENERAL NOTES:

1. NON-TABULATED DIMENSIONS ARE WITHIN THE FOLLOWING TOLERANCE
US CUSTOMARY DIMENSIONS ARE +/-1/32in
METRIC DIMENSIONS ARE +/-0.5mm
2. MACHINE SHOWN WITH VARIOUS OPTIONS.
3. ALL DIMENSIONS, WEIGHTS, AND CENTER OF GRAVITY ARE NOMINAL AND MAY BE AFFECTED BY ACCESSORIES AND OPTIONS.
4. SEE PRE-INSTALLATION MANUAL FOR LIFTING AND HANDLING INSTRUCTIONS.

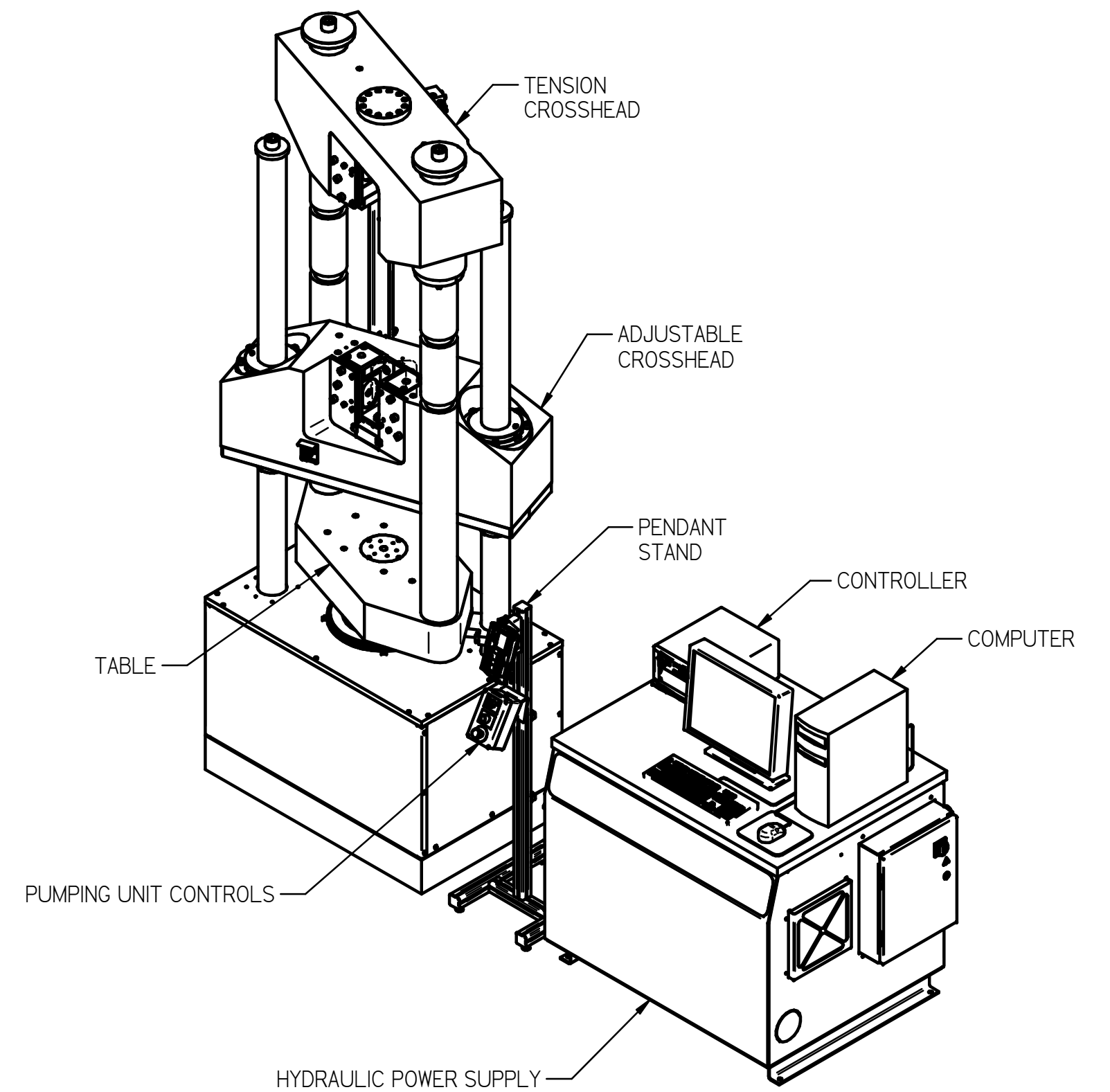
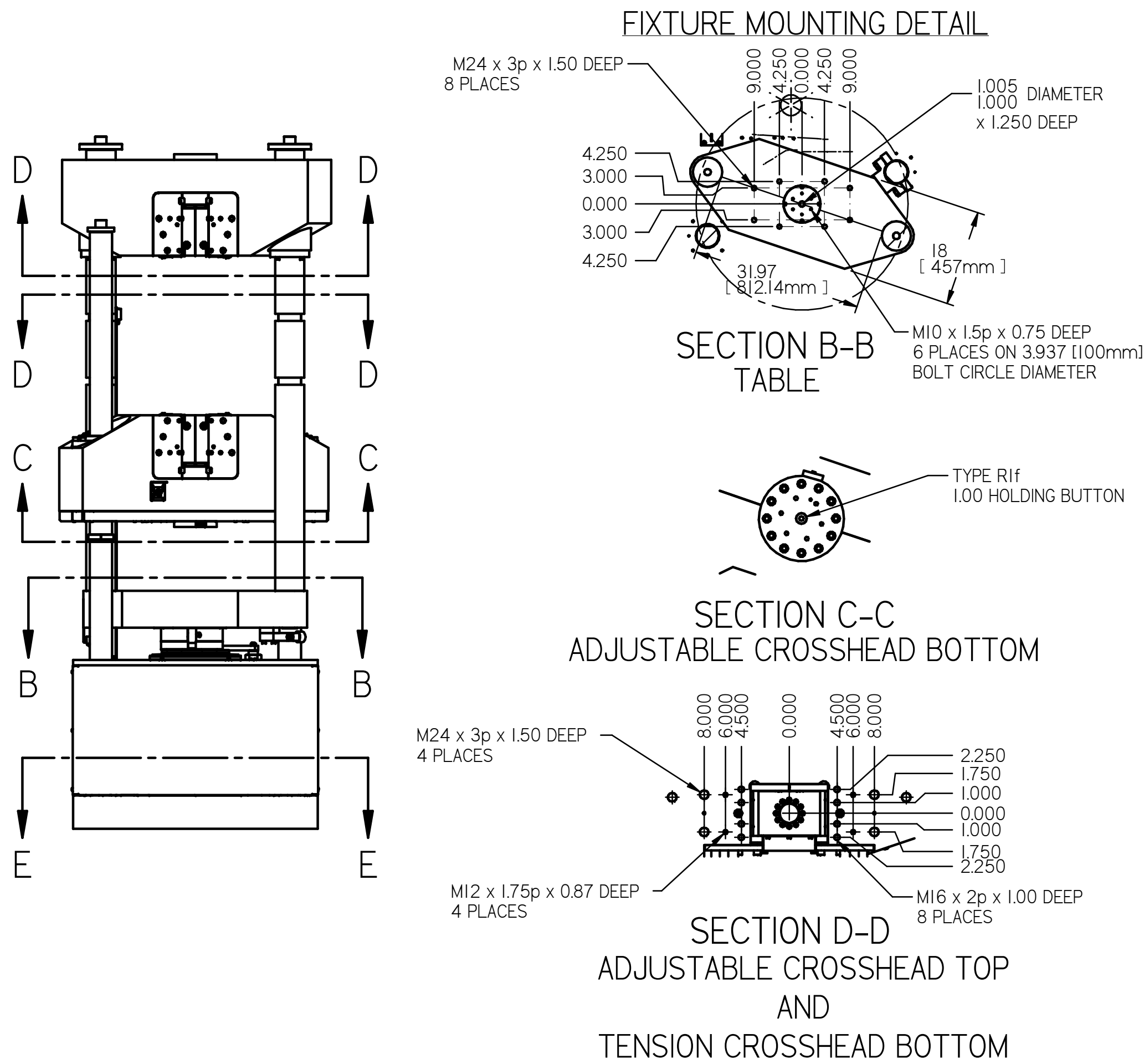
ENG REF: R226420-3

MATERIAL:		C	87689	NEW HPS ASSEMBLY	8-11-14	SAS
APPLIED PRACTICES:		THIRD ANGLE	B	ADDED TAB - G8A	2-6-13	GR
SURFACE FINISH 125 UNLESS OTHERWISE NOTED		A	70671	RELEASED	4-29-11	SAS
HARDNESS:		REV	ECO	REVISIONS	DATE	BY
FINISH:		GENERAL ASSEMBLY 1500HDX		DRAWN: SAS	DATE: 4-29-11	
INCHES - TOLERANCES NOT OTHERWISE NOTED				CHECKED:	DATE:	
±0.1	±0.03	±0.015	±0.005	S.O.	SHEET	1 OF 4
X	XX	XXX	XXXX	INSTRON INDUSTRIAL PRODUCTS		REV
ANGULAR: +/-0.5 DEGREE		FRACTIONAL: +/-1/64		GROVE CITY, PENNSYLVANIA		C



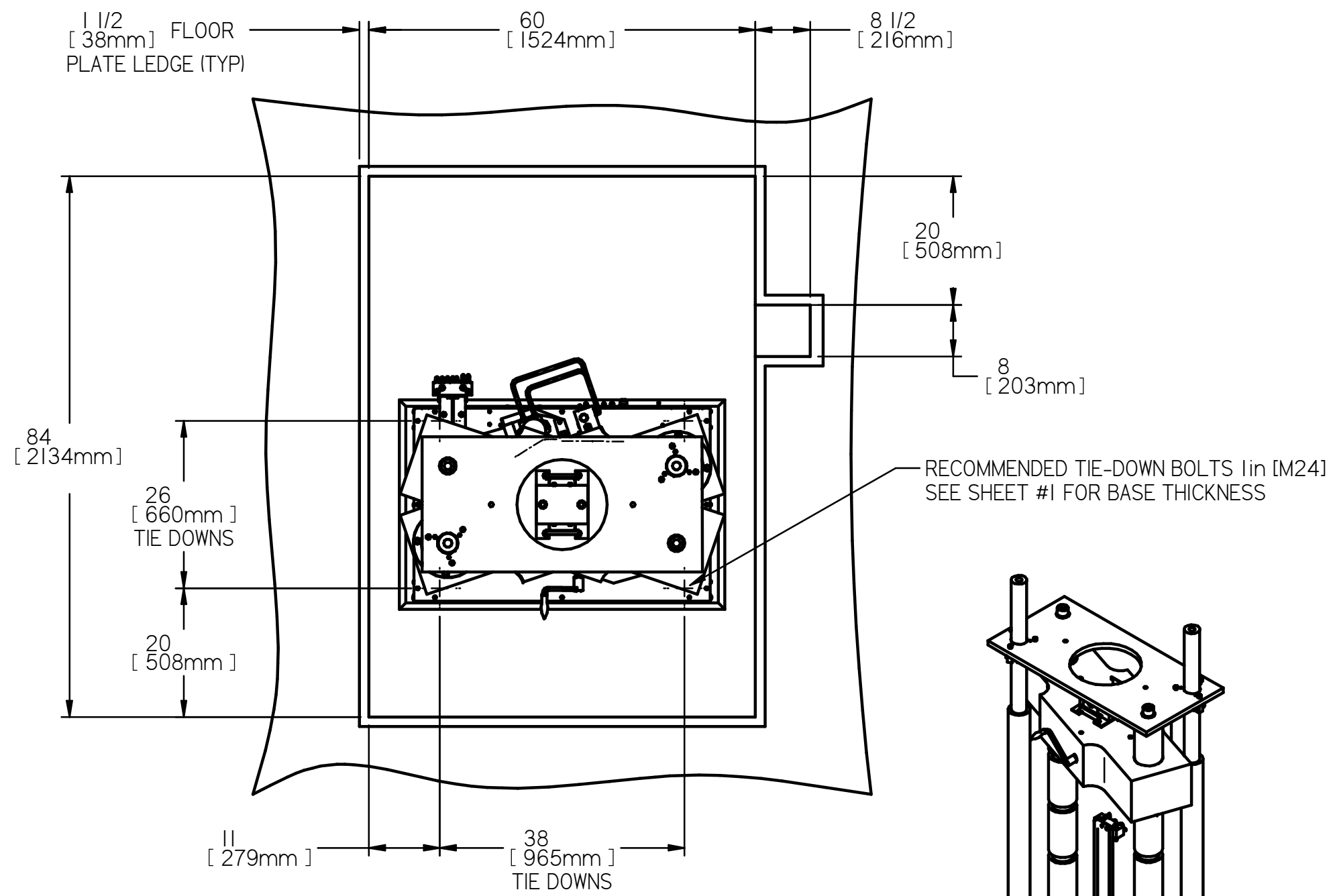
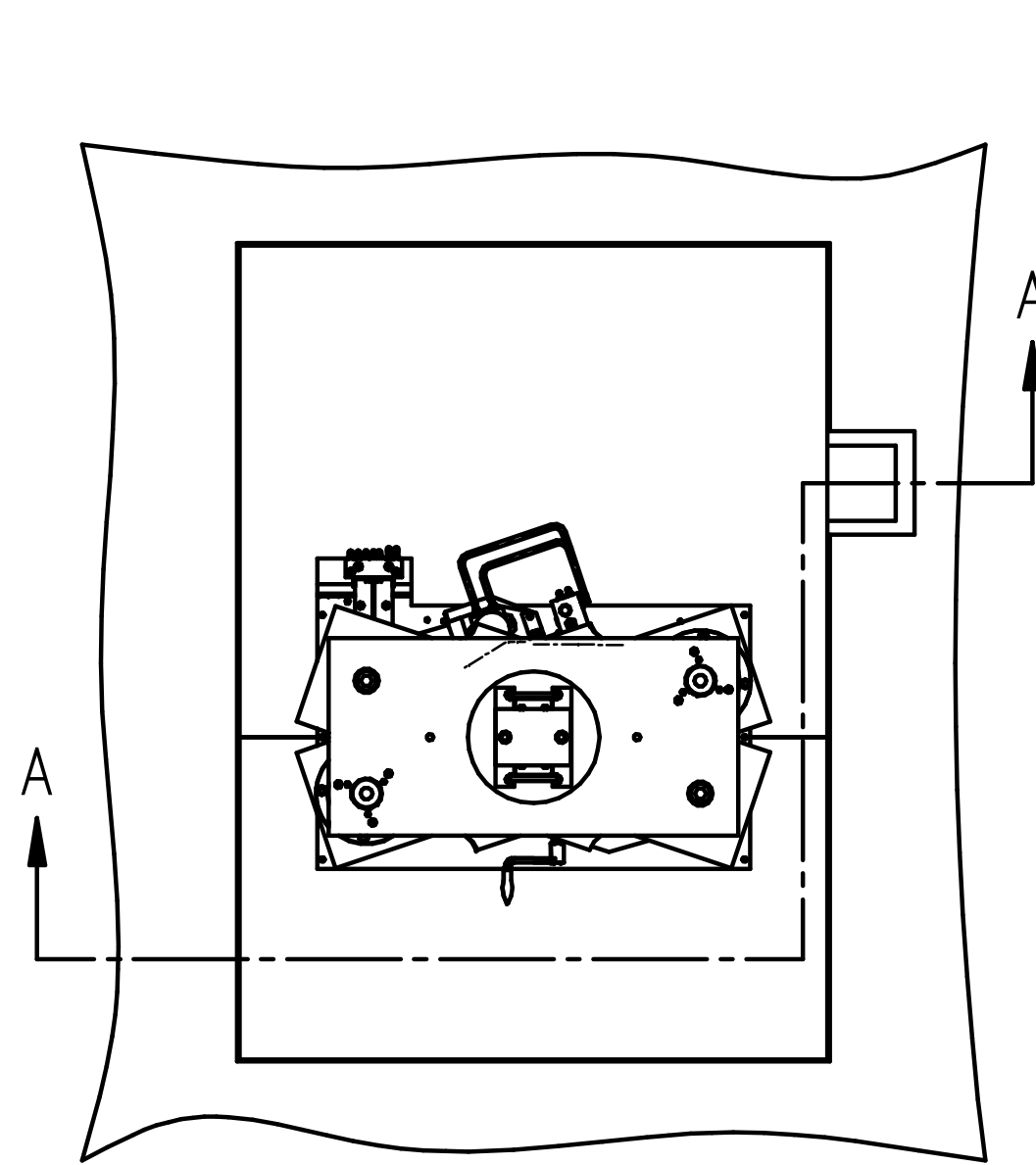
FLOOR MOUNTING BOLT DETAIL
 SECURE MACHINE TO FLOOR WITH CUSTOMER PROVIDED TIE-DOWN BOLTS PRIOR TO TESTING OPERATIONS. COVERS MUST BE REMOVED TO ACCESS FOUNDATION MOUNTING HOLES. SEE PRE-INSTALLATION MANUAL FOR COVER REMOVAL PROCEDURE.

RECOMMENDED TIE-DOWN BOLTS:
 SEE SHEET #3 FOR BOLT SIZE AND SHEET #1 FOR BASE THICKNESS.

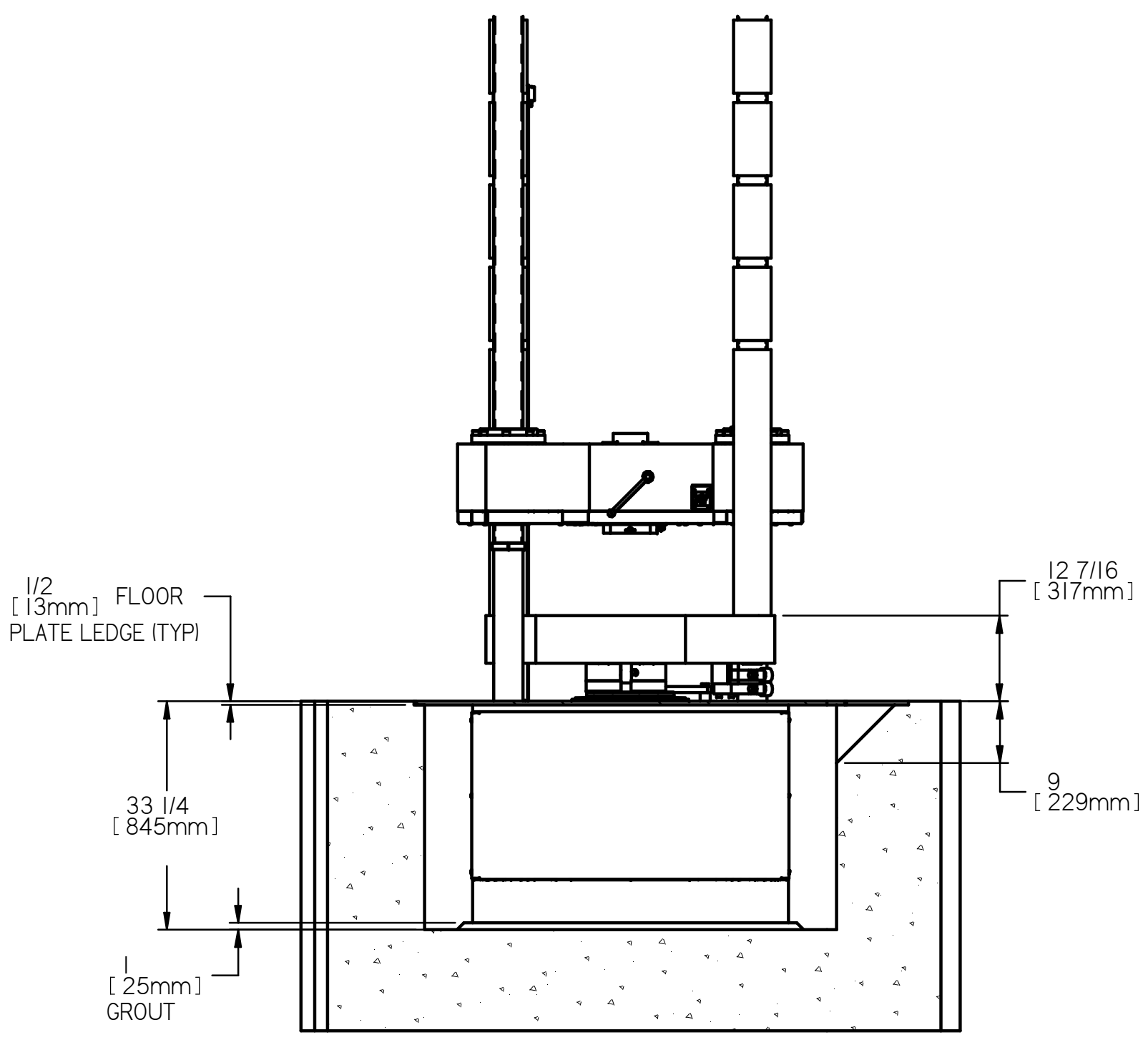
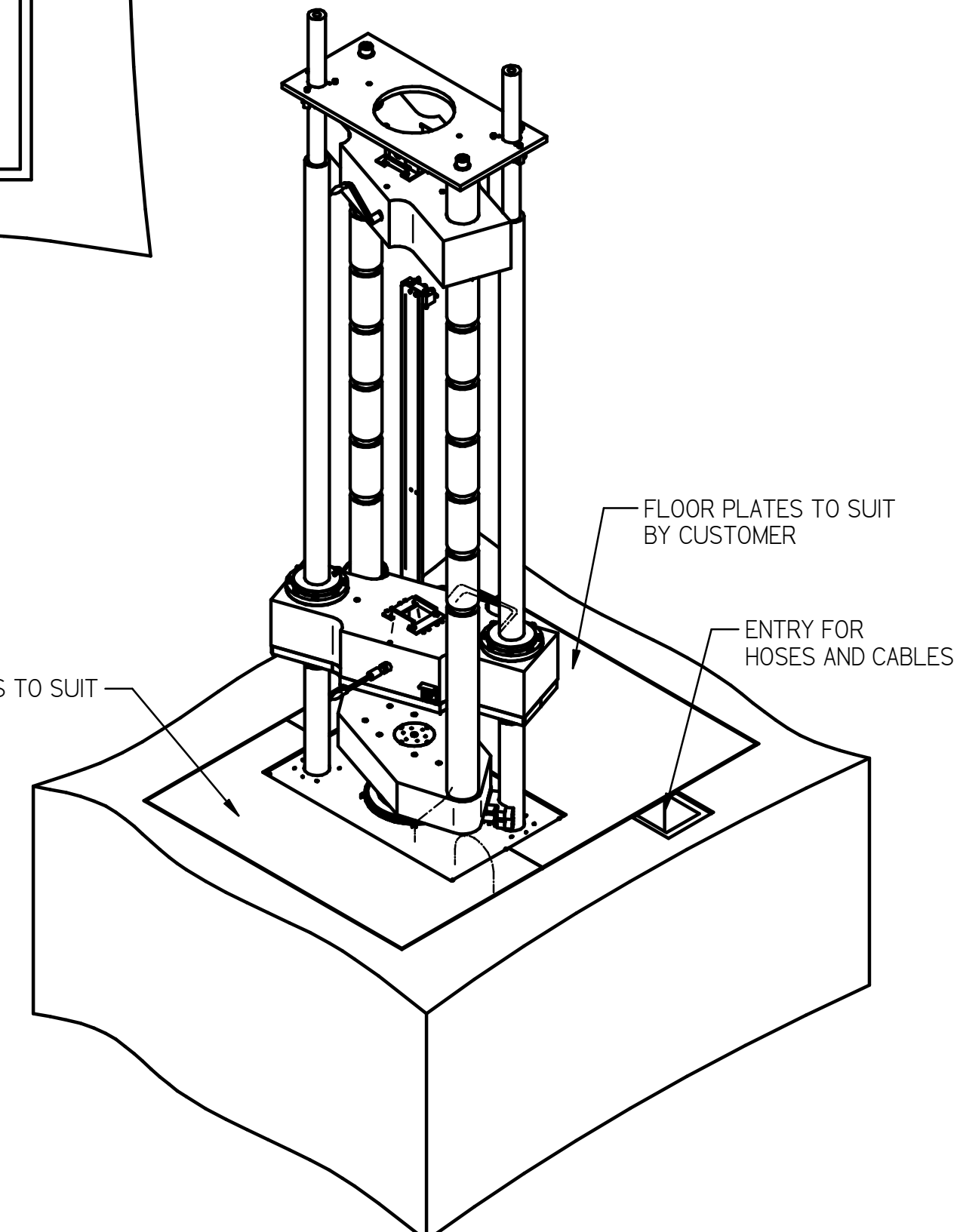


MATERIAL:	C	87689	NEW HPS ASSEMBLY	8-11-14	SAS
APPLIED PRACTICES:	THIRD ANGLE	B	ADDED TAB -G8A	2-6-13	GR
SURFACE FINISH 125 UNLESS OTHERWISE NOTED	A	70671	RELEASED	4-29-11	SAS
HARDNESS:	REV	ECO	REVISIONS	DATE	BY
FINISH:	GENERAL ASSEMBLY 1500HDX			DRAWN: SAS	DATE: 4-29-11
INCHES - TOLERANCES NOT OTHERWISE NOTED				CHECKED:	DATE:
±0.1	±0.03	±0.015	±0.005	S.O.	SHEET 2 OF 4
X	XX	XXX	XXXX	R231326-3	
ANGULAR: ±0.5 DEGREE	FRACTIONAL: ±1/64	MADE FOR INSTRON INDUSTRIAL PRODUCTS GROVE CITY, PENNSYLVANIA			REV C

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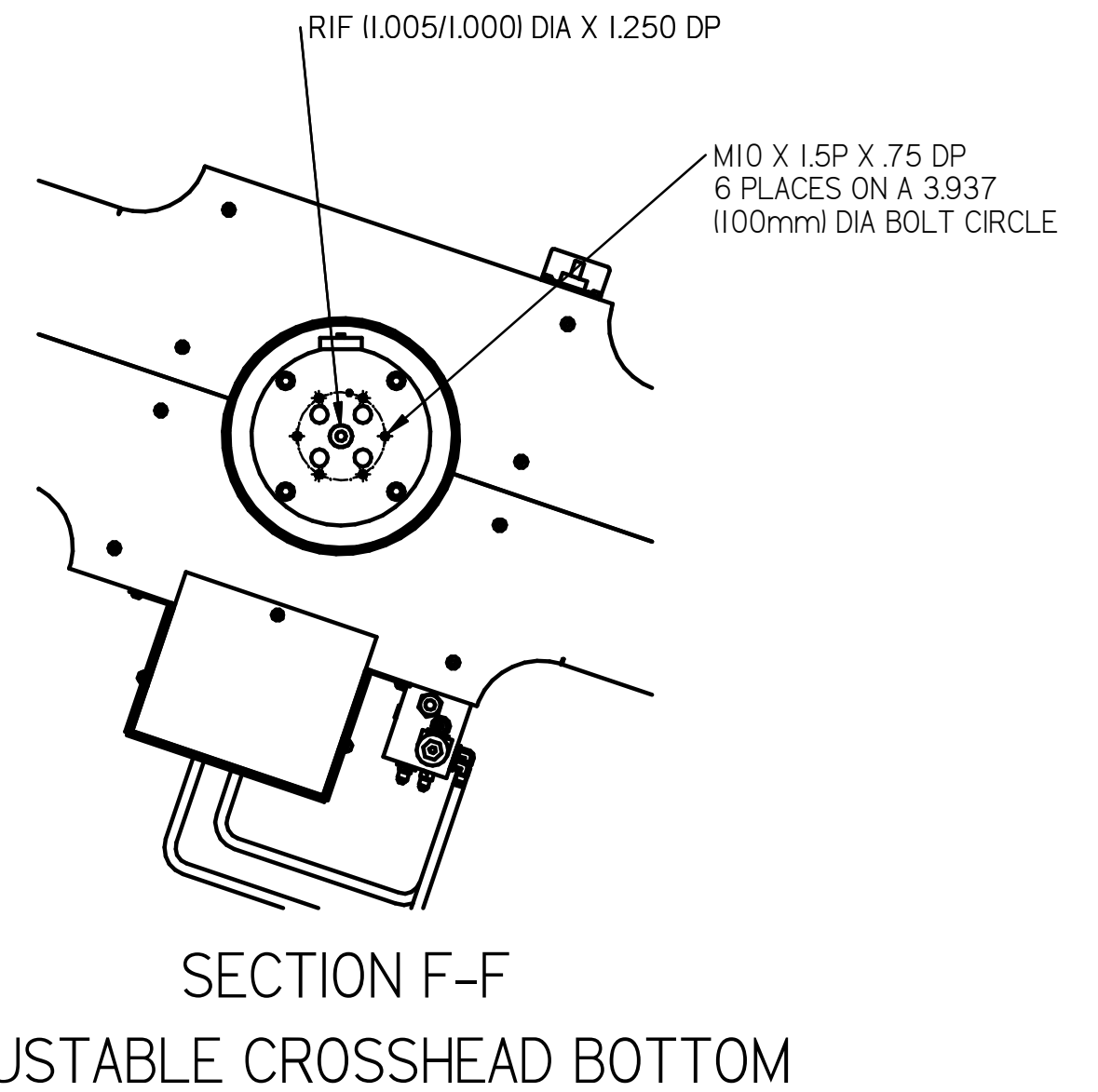
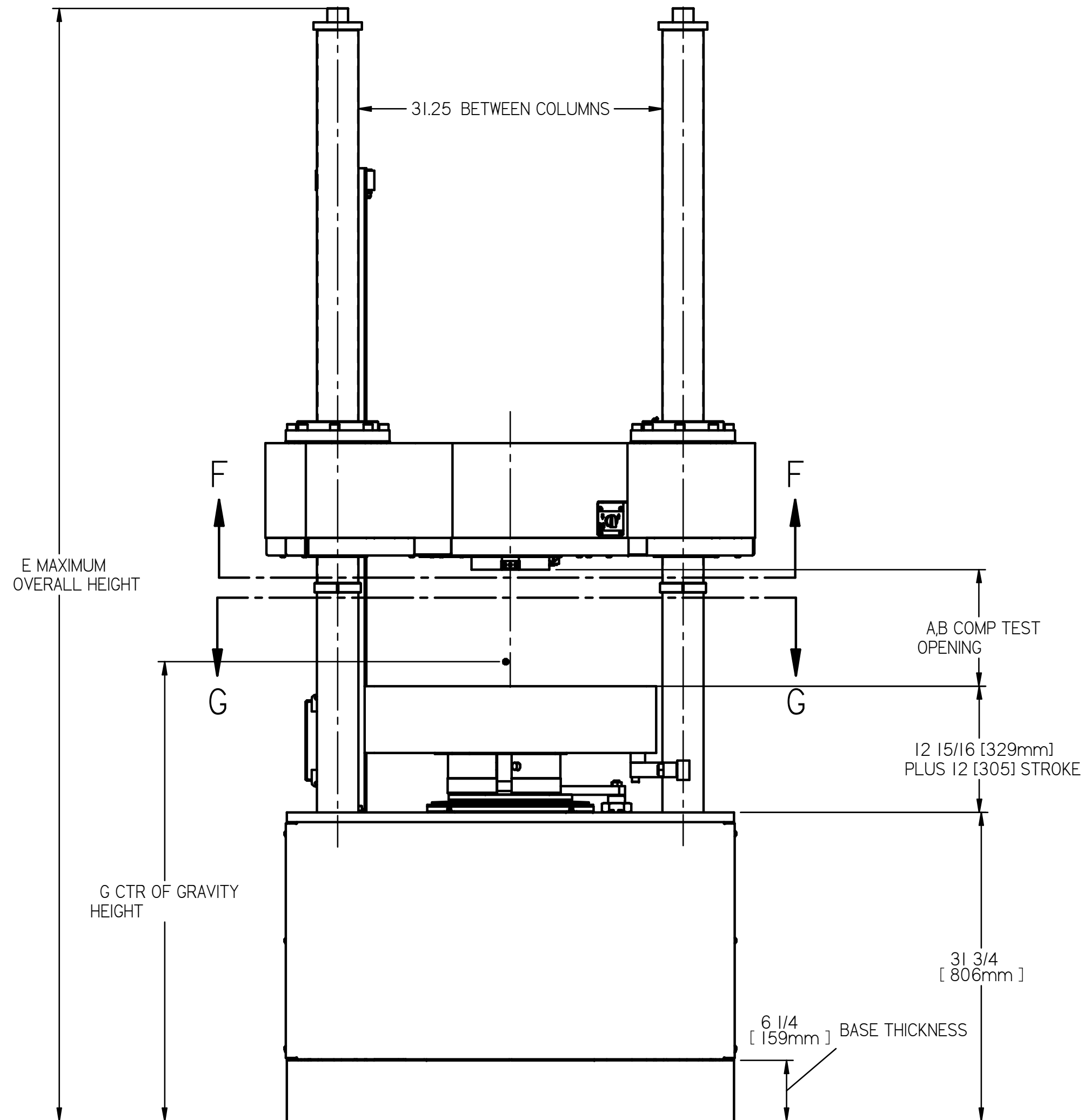
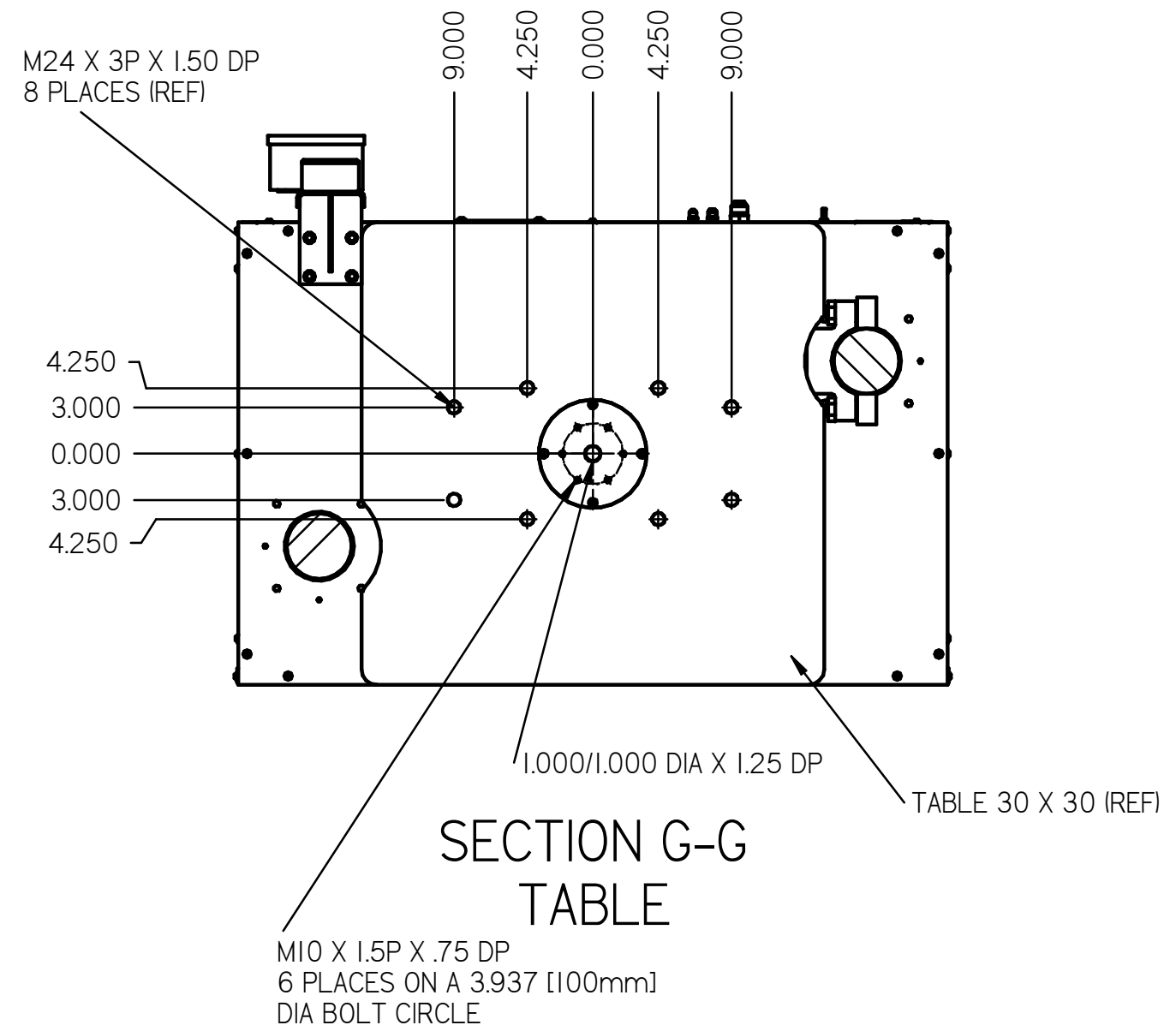
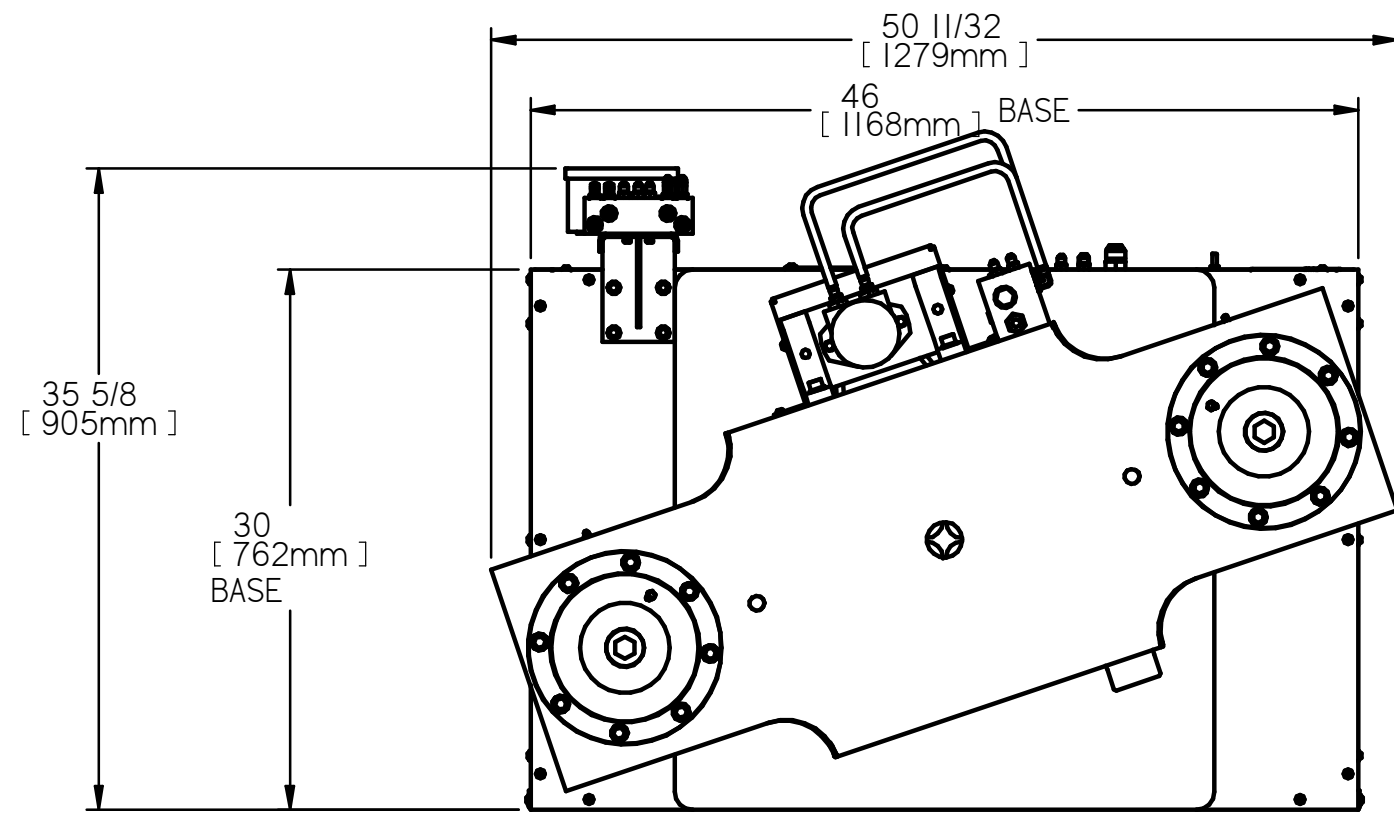
PIT DETAIL



SECTION A-A

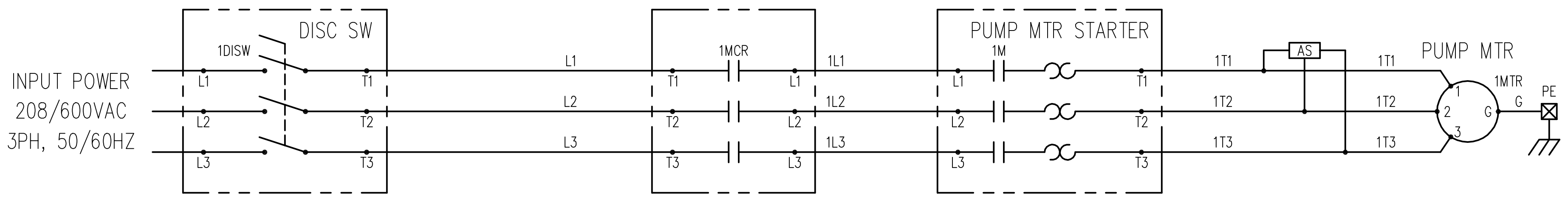
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MATERIAL:		C	87689	NEW HPS ASSEMBLY	8-11-14	SAS
APPLIED PRACTICES:		THIRD ANGLE	B	ADDED TAB - G8A	2-6-13	GR
SURFACE FINISH 125 UNLESS OTHERWISE NOTED		A	70671	RELEASED	4-29-11	SAS
HARDNESS:		REV	ECO	REVISIONS	DATE	BY
FINISH:		GENERAL ASSEMBLY 1500HDX			DRAWN: SAS	DATE: 4-29-11
INCHES - TOLERANCES NOT OTHERWISE NOTED		MADE FOR			CHECKED:	DATE:
±0.1	±0.03	±0.015	±0.005	S.O. SHEET 3 OF 4		
X	XX	XXX	XXXX	R231326-3		
ANGULAR: ±0.05 DEGREE		FRACTIONAL: ±1/164		INSTRON INDUSTRIAL PRODUCTS GROVE CITY, PENNSYLVANIA		REV C



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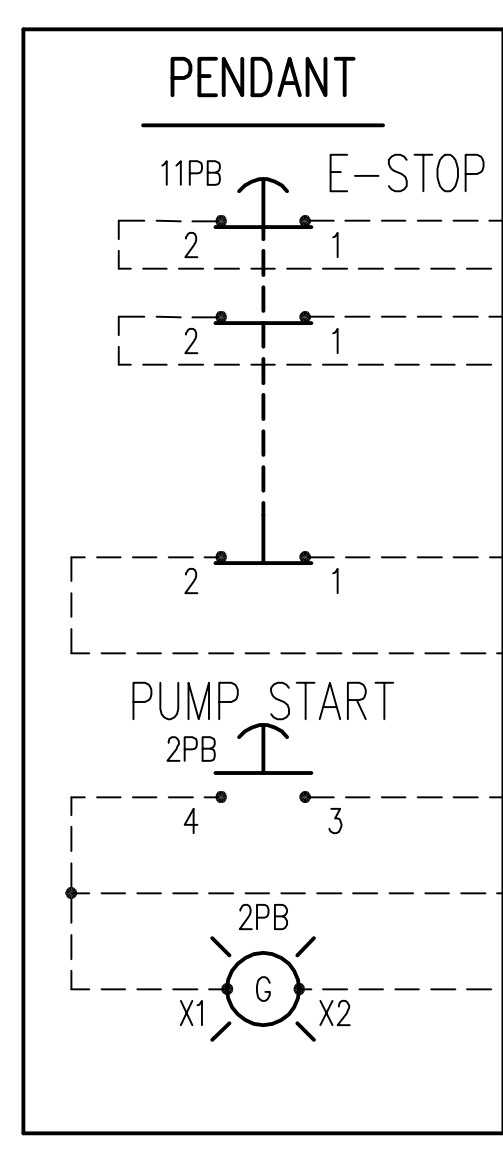
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APPLIED PRACTICES:		THIRD ANGLE	B	ADDED TAB -G8A	2-6-13	GR
SURFACE FINISH 125 UNLESS OTHERWISE NOTED		A	70671	RELEASED	4-29-11	SAS
HARDNESS:		REV	ECO	REVISIONS	DATE	BY
FINISH:		GENERAL ASSEMBLY 1500HDx			DRAWN: SAS	DATE: 4-29-11
INCHES - TOLERANCES NOT OTHERWISE NOTED					CHECKED:	DATE:
±0.1	±0.03	±0.015	±0.005	MADE FOR	S.O.	SHEET 4 OF 4
X	XX	XXX	XXXX	INSTRON INDUSTRIAL PRODUCTS		R231326-3
ANGULAR: ±.05 DEGREE	FRACTIONAL: ±.1/64		GROVE CITY, PENNSYLVANIA		REV C	



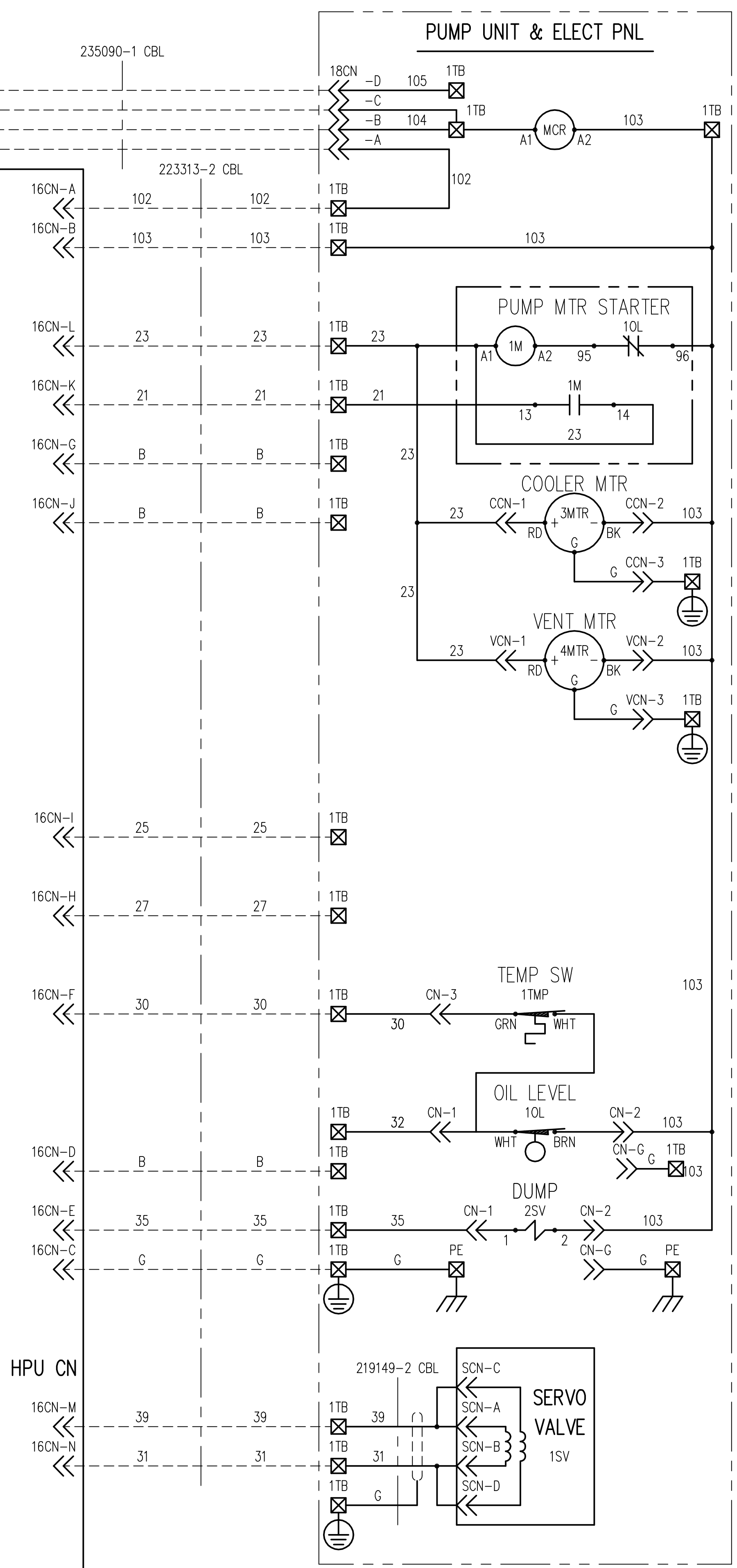
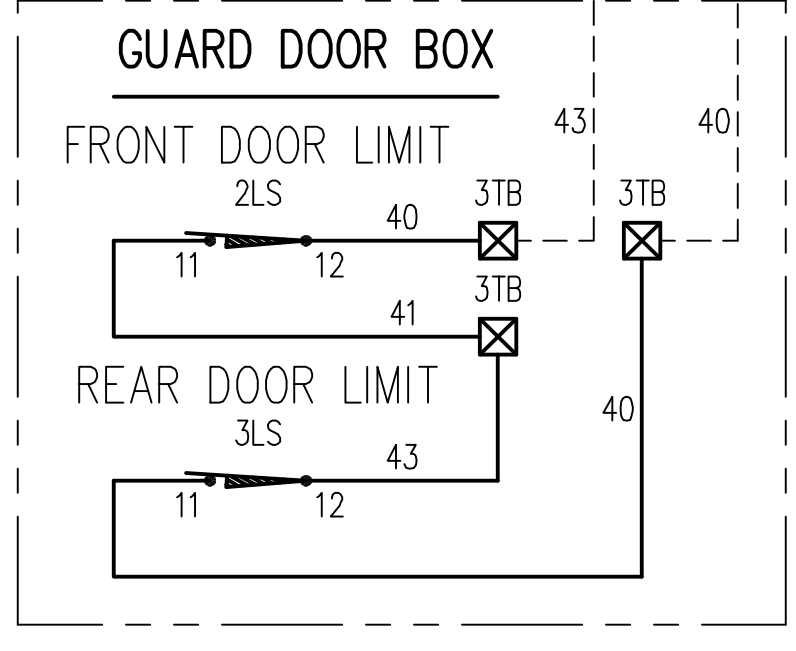
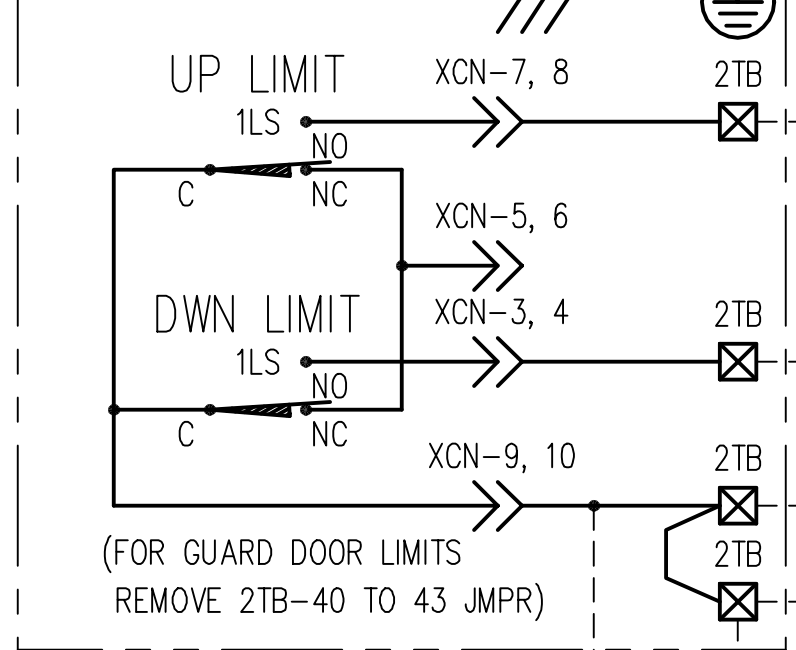
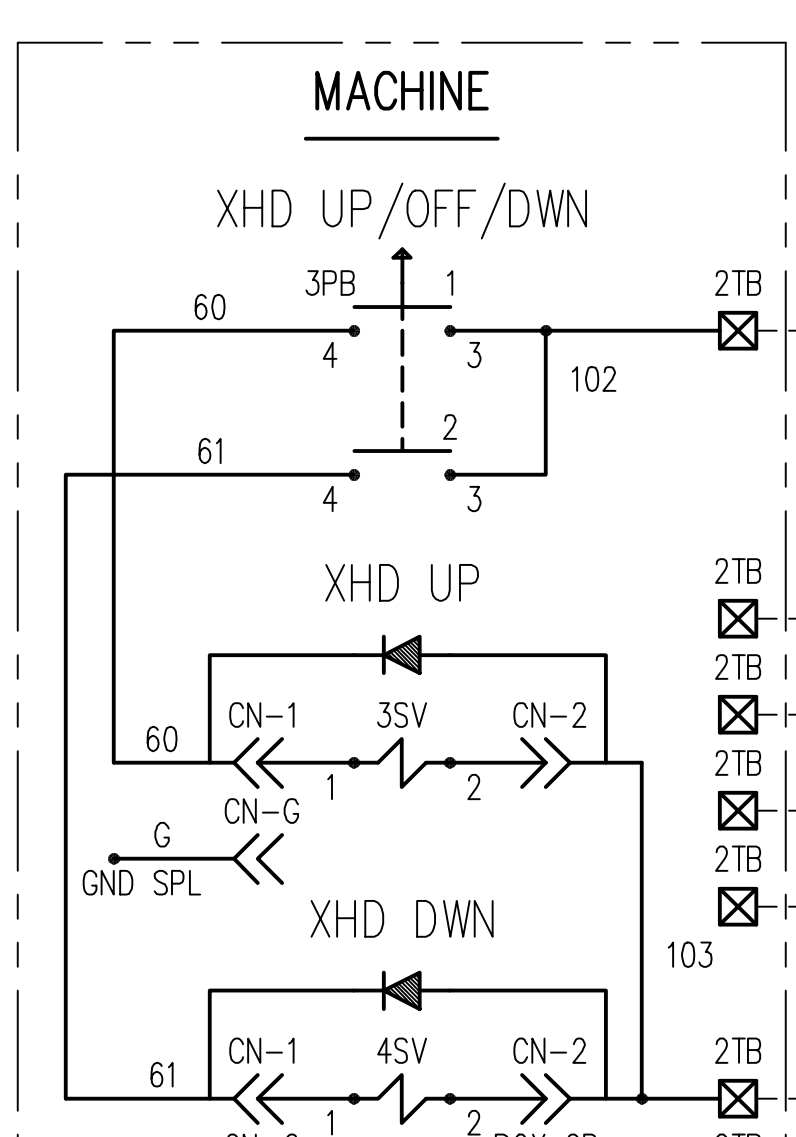
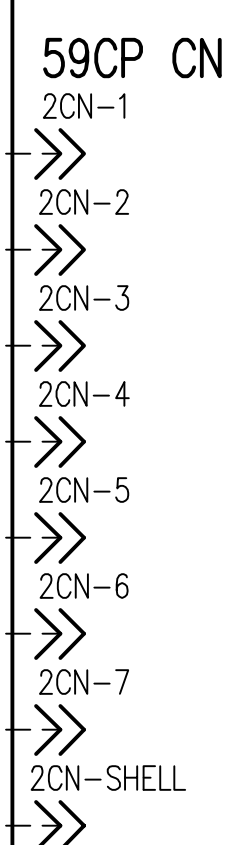
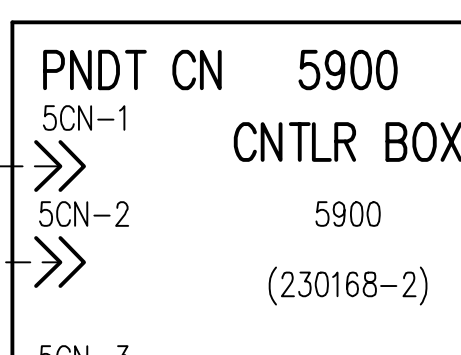
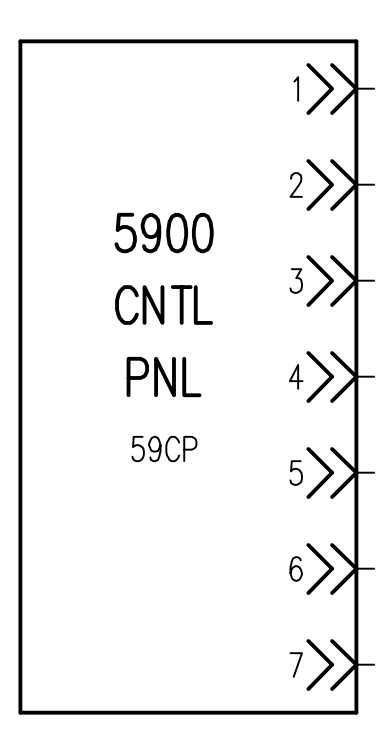
TB LEGEND
 1TB=TB ON PUMPING UNIT ELECTRICAL PNL.
 2TB=TB IN MACHINE MTD INTERCONNECT BOX.

LINE #

1
2
3
4
5
6
7
8
9
10
11
12
13



INPUT POWER
 85-264VAC, 1PH, 50/60HZ



DASHED LINES=CONNECTIONS PART OF RETROFIT

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MATERIAL:		APPLIED PRACTICES:	THIRD ANGLE	E	9103	ADD E-STOP ON/OFF AND MTR	11/20/15	BO
SURFACE FINISH 125 UNLESS OTHERWISE NOTED		FINISH:	D	3008	NO BOX OR AND ROOM	6/10/15	MB	
HARDNESS:		FINISH:	E	ECO	REVISIONS:	DATE:	BY:	
NOTES - DIMENSIONS NOT OTHERWISE NOTED		FINISH:	X	XXX	DATE:	11/28/13	BT	
+0.1 -0.03 ±0.015 ±0.006		FINISH:	X	XXX	DATE:			
MACHINE: 405.000		FINISH:	X	XXX	DATE:			
FRAMING: 11/14		FINISH:	X	XXX	DATE:			
S.O.		FINISH:	X	XXX	DATE:			
SHEET 1 OF 1		FINISH:	X	XXX	DATE:			
R234324-4		FINISH:	X	XXX	DATE:			
E		FINISH:	X	XXX	DATE:			

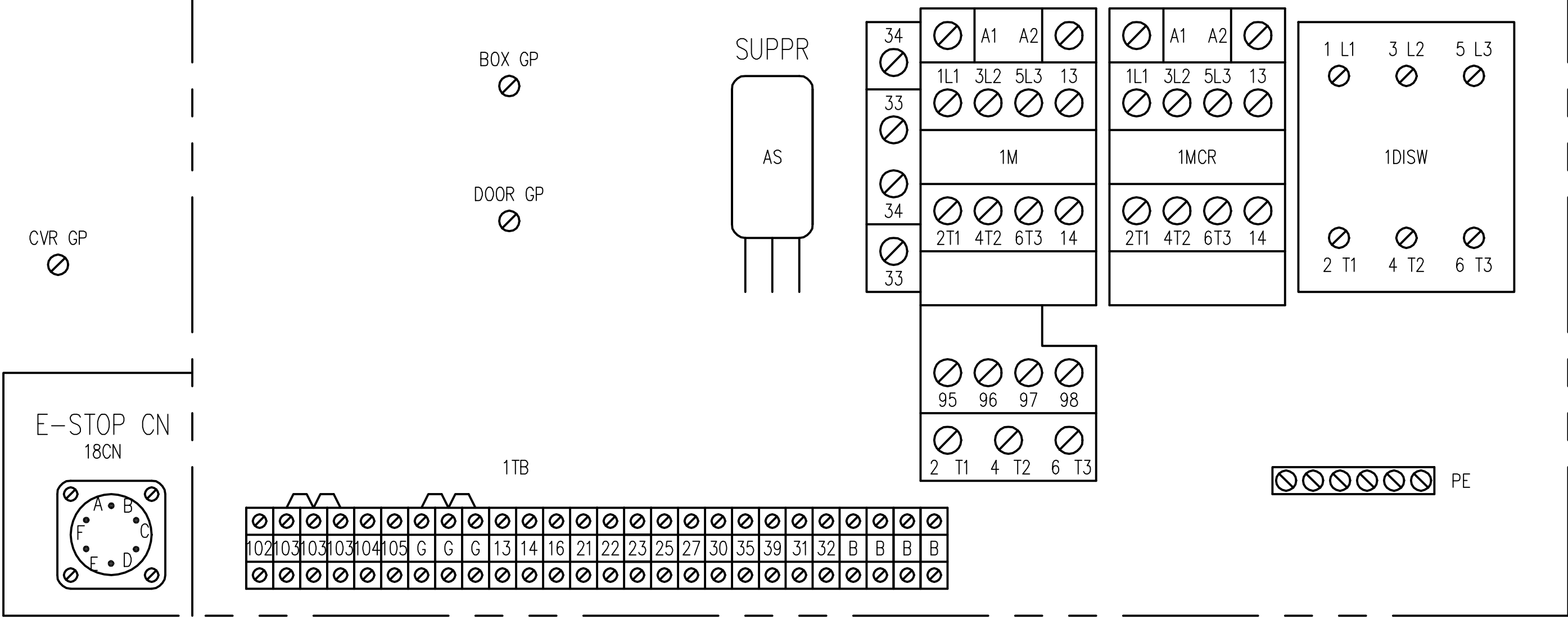
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ELECTRICAL PANEL

PUMP MTR STR

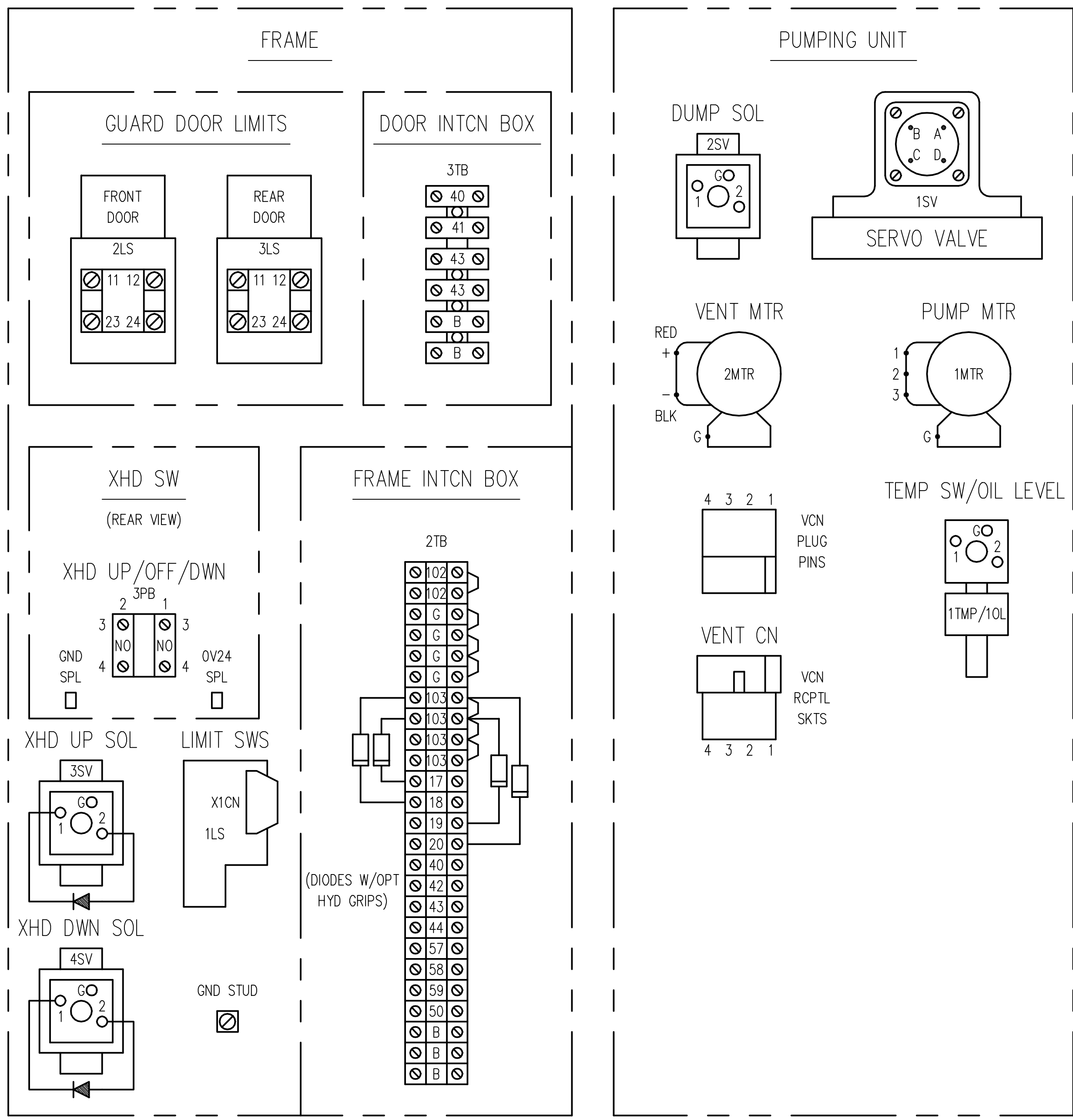
MCR

DISC SWITCH

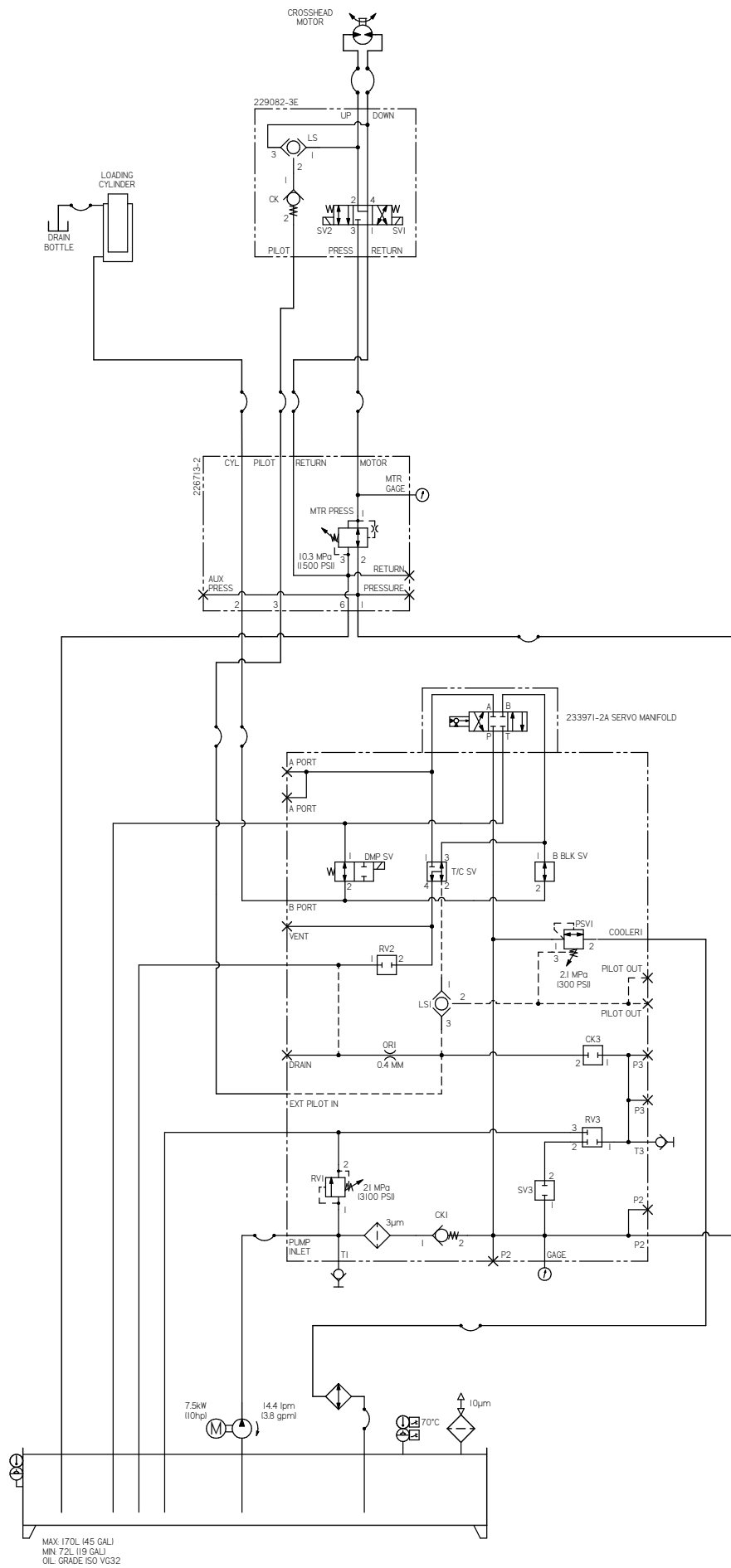


FRAME

PUMPING UNIT



MATERIAL:		APPLIED PRACTICES:		THIRD ANGLE	REV	ECO	DATE	BY
SURFACE FINISH 125 UNLESS OTHERWISE NOTED		HARDNESS:		FINISH:	INCHES - TOLERANCES NOT OTHERWISE NOTED		MADE FOR: 1500HDX WITH 5900 CNTLR	
F0.1 ±0.03		F0.015 ±0.005		LAYOUT HDX MACHINE		INSTRON INDUSTRIAL PRODUCTS		R234325-3
X X		XX .XXX		GROVE CITY, PENNSYLVANIA		S.O.		
ANODIZE: H15 DEG		FRACTIONAL: 1/64		DATE: 12/12/15		DATE: 6-10-15		REV
				DATE: 11-26-13		DATE:		E
				SHEET 1 OF 1				



MAX: 170L (45 GAL)
 MIN: 72L (19 GAL)
 OIL: GRADE ISO VG32

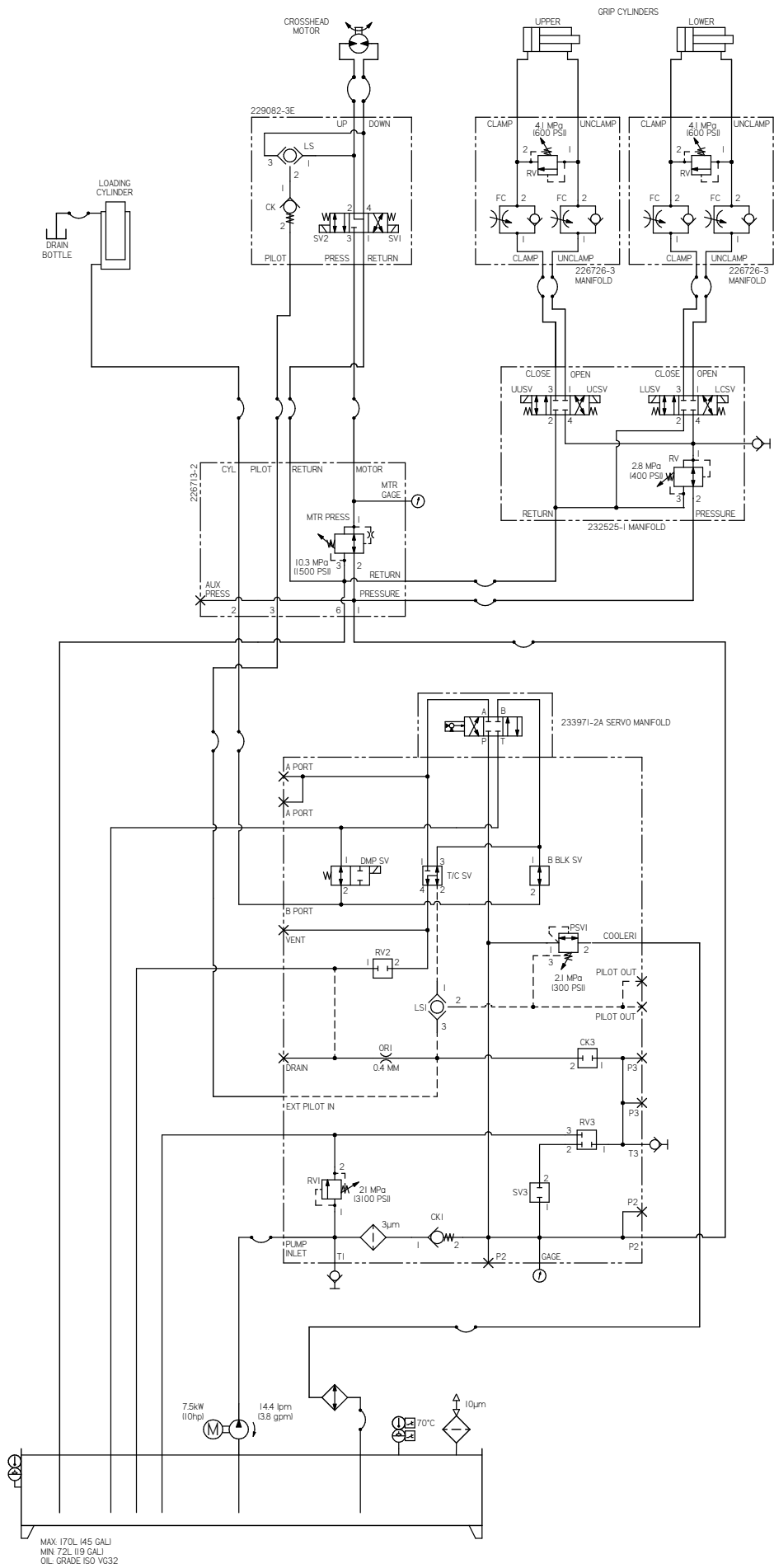
SCHEMATIC APPLICABLE TO THE FOLLOWING MODELS:
 1500HDX-G1

Hydraulic system and components are shown in simplified representation. Product design and specifications are subject to change without notice. Please refer to the latest revision of the product manual for detailed information.

UNIT		UNIT	
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50

HYDRAULIC SCHEMATIC
1500HDX

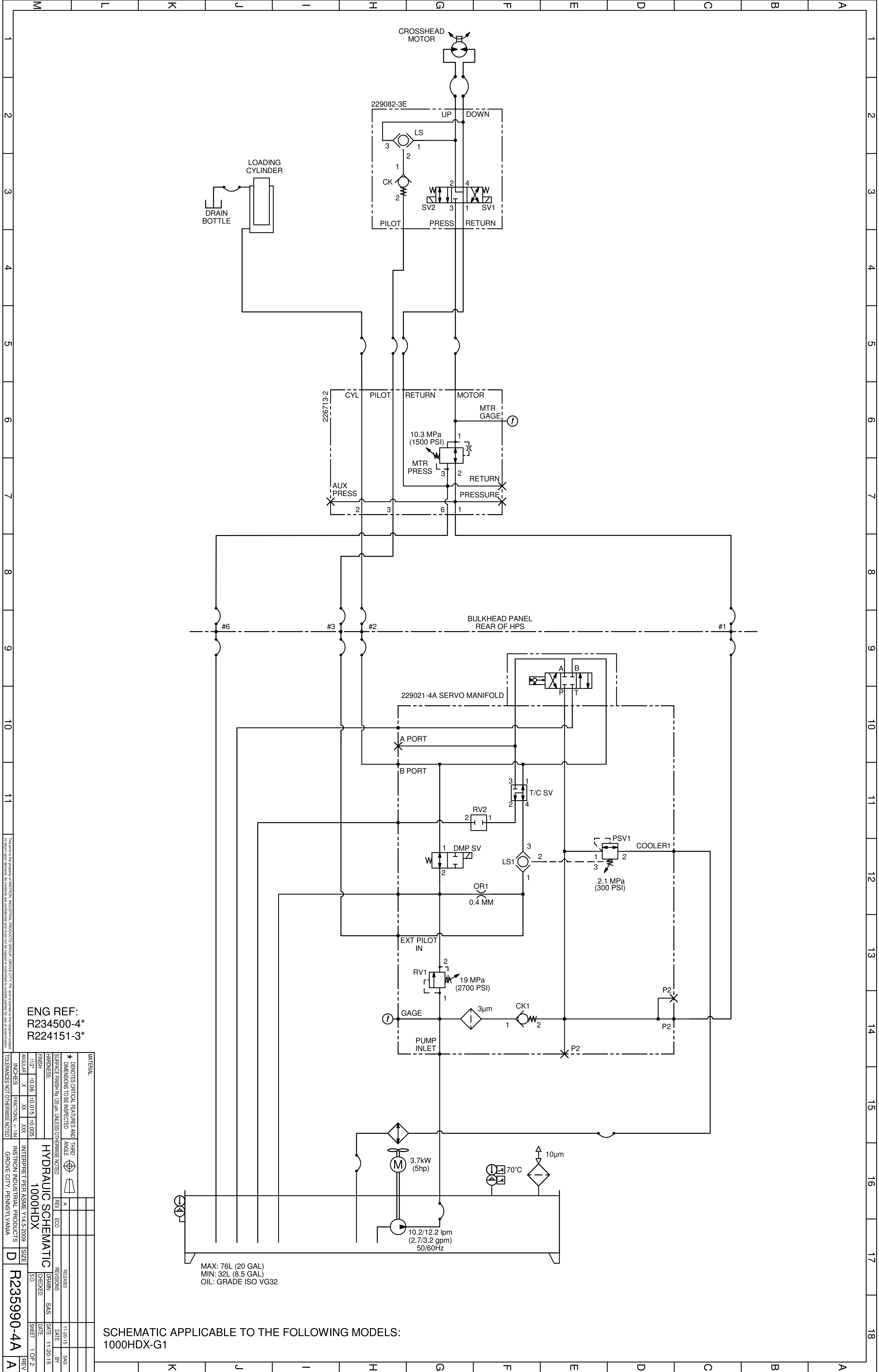
INDUSTRIAL HYDRAULIC PRODUCTS
 VIZIER ASSOCIATES
 1500HDX-G1
 R234500-4F



Hydraulic system and components are shown in this schematic for information only. Actual system configuration may vary. Always refer to the actual product manual for complete details.

ITEM NO.		DESCRIPTION	
1	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
2	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
3	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
4	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
5	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
6	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
7	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
8	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
9	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
10	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
11	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
12	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
13	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
14	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
15	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
16	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
17	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
18	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
19	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
20	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
21	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
22	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
23	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
24	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
25	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
26	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
27	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
28	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
29	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
30	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
31	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
32	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
33	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
34	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
35	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
36	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
37	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
38	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
39	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
40	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
41	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
42	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
43	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
44	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
45	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
46	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
47	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
48	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
49	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7
50	1500HDX	HYDRAULIC SCHEMATIC	1500HDX-G7

SCHEMATIC APPLICABLE TO THE FOLLOWING MODELS:
 1500HDX-G7



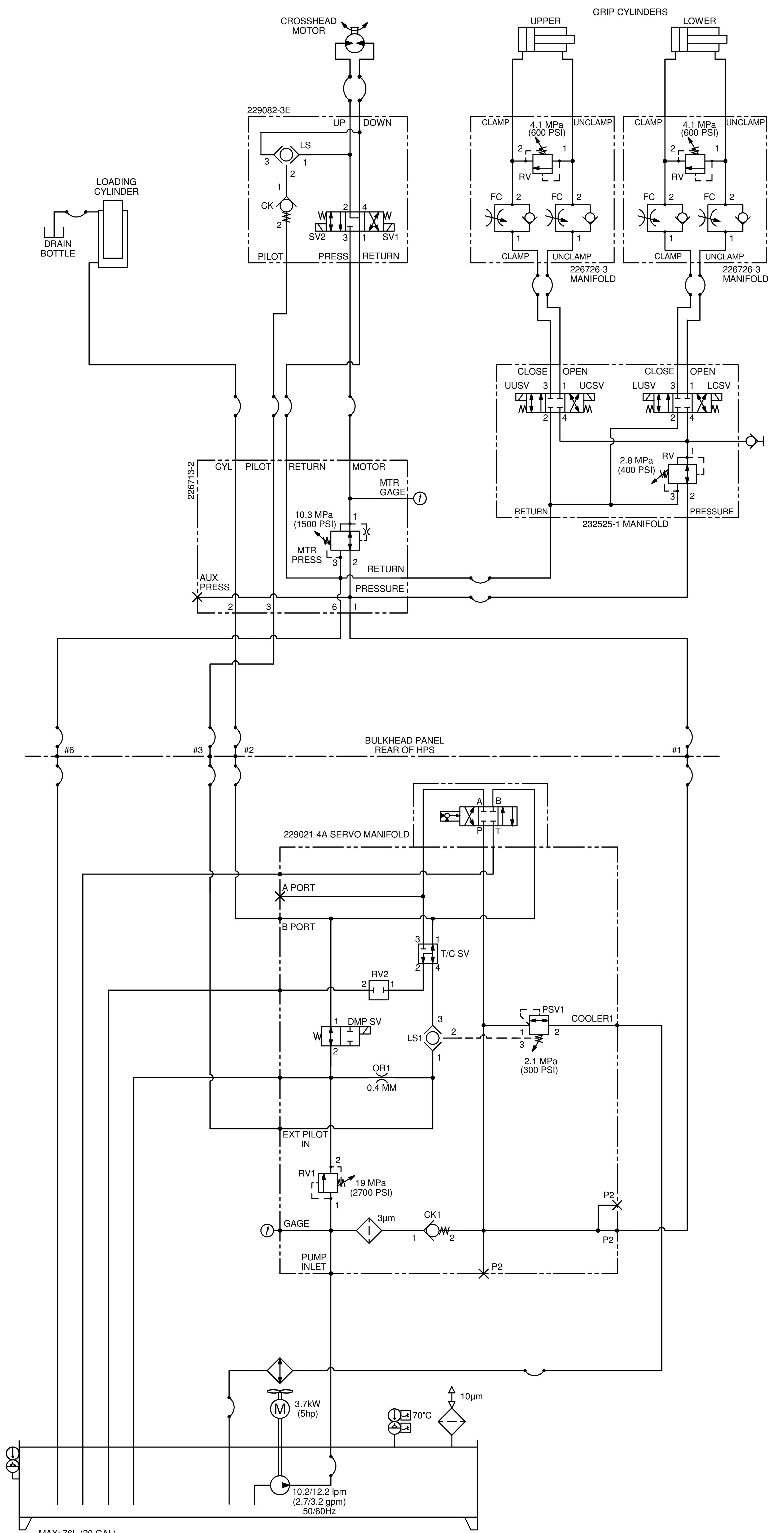
ENG REF:
R234500-4*
R224151-3*

MATERIAL:		THIRD ANGLE	
* DENOTES CRITICAL FEATURES AND DIMENSIONS TO BE INSPECTED		RELEASED	
SURFACE FINISH RA 125µm UNLESS OTHERWISE NOTED		DATE: 11-20-15	
HARDNESS:		BY: SAS	
FINISH: 1/2" ± 0.06 1/4" ± 0.015 1/8" ± 0.005		CHECKED: SAS	
ANGULAR: X XX XXX		DATE: 11-20-15	
TOLERANCES NOT OTHERWISE NOTED		SHEET: 1 OF 2	
INTERPRET PER ASME Y14.5-2009		DRAWN: SAS	
INSTROON INDUSTRIAL PRODUCTS GROVE CITY, PENNSYLVANIA		DATE: 11-20-15	
SIZE: D		REV: A	
R235990-4A			

MAX: 76L (20 GAL)
MIN: 32L (8.5 GAL)
OIL: GRADE ISO VG32

SCHEMATIC APPLICABLE TO THE FOLLOWING MODELS:
1000HDX-G1

This is a preliminary drawing. It is not intended for manufacturing. It is subject to change without notice.



MAX: 76L (20 GAL)
 MIN: 32L (8.5 GAL)
 OIL: GRADE ISO VG32

SCHEMATIC APPLICABLE TO THE FOLLOWING MODELS:
 1000HDX-G7

MATERIAL:		THIRD ANGLE	
* DENOTES CRITICAL FEATURES AND DIMENSIONS TO BE INSPECTED		RELEASED	
SURFACE FINISH RA 125μm UNLESS OTHERWISE NOTED		DATE: 11-20-15	
HARDNESS:		BY: SAS	
FINISH: 1/2" ± 0.06 1/4" ± 0.015 3/8" ± 0.005		CHECKED: SAS	
TOLERANCES: FRACTIONAL: ±.1RA DECIMAL: ±.01MM		DATE: 11-20-15	
INTERPRET PER ASME Y14.5-2009		SIZE	
INSTN IN INDUSTRIAL PRODUCTS GROVE CITY, PENNSYLVANIA		D R235990-4A	
TOLERANCES NOT OTHERWISE NOTED		SHEET 2 OF 2	
		REV	

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Appendix A

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identification

Product Name: Altra AW 32 Hydraulic Oil
Product Number: 11005
Synonyms: Antiwear Hydraulic Fluid, Petroleum Based Lubricant
Chemical Name: Hydrotreated heavy paraffinic distillate
Chemical Family: Petroleum Distillate
CAS Number: Blend

Company Identification

Allegheny Petroleum Products Co.
999 Airbrake Avenue
Wilmerding, PA 15148 USA
1-412-829-1990 (For product information)
1-800-424-9300 (For emergencies)
1-800-424-9300 or 1-703-527-3887 (CHEMTREC)

2. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT LISTING:

<u>Chemical Name</u>	<u>Amount</u>	<u>CAS Number</u>
HYDROTREATED PARAFFINIC DISTILLATE, DEWAXED	> 98.0 %	64742-65-0
ADDITIVES	< 2.0 %	Blend

(See Section 8 for exposure guidelines)

(See Section 15 for regulatory information)

HAZARDS DISCLOSURE

This product contains no known hazardous materials as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200.

As defined under Sara 311 and 312, this product contains no known hazardous materials.

3. HAZARDS IDENTIFICATION

***** EMERGENCY OVERVIEW *****
*
* Not expected to cause a severe emergency hazard. *
*

HMIS Rating - Health: 1
Flammability: 1
Reactivity: 0

NFPA Rating - Health: 1
Flammability: 1
Reactivity: 0
Special Hazard: N/A

POTENTIAL HEALTH EFFECTS

EYE:

Contact may cause eye irritation and redness.

SKIN:

Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).

INHALATION:

Inhalation of vapors or mist may be mildly irritating to the nose, throat, and respiratory tract.

INGESTION:

Small amounts swallowed during normal handling operations are not likely to cause injury.

CHRONIC EFFECTS:

No adverse effects have been documented in humans as a result of chronic exposure.

CARCINOGENICITY INFORMATION:

Based on OSHA 1910.1200 and IARC study requirements, this product does not require labeling.

4. FIRST AID MEASURES

EYE CONTACT FIRST AID:

Flush eye with water for 15 minutes.

Get medical attention if irritation develops or persists.

SKIN CONTACT FIRST AID:

Wash skin with soap and water.

(section 4 continued)

Thoroughly wash (or discard) clothing and shoes before reuse.

INHALATION FIRST AID:

Remove to fresh air.

If not breathing, give artificial respiration.

INGESTION FIRST AID:

If vomiting should occur spontaneously, keep airway clear.

NOTES TO PHYSICIAN:

Treat symptomatically.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

COC Flash Point: 248.9 C (480.0 F)

Autoignition Temperature: > 315.6 C (> 600.1 F)

FLAMMABLE LIMITS IN AIR

LEL: N/A

UEL: N/A

EXTINGUISHING MEDIA:

Carbon dioxide, foam, or dry powder. Water may be used to cool below flash point.

FIRE FIGHTING INSTRUCTIONS:

As in any fire, wear self-contained breathing apparatus pressure-demand MSHA/NIOSH (approved or equivalent) and full protective gear.

COMBUSTION PRODUCTS:

Fumes, smoke and carbon monoxide.

6. ACCIDENTAL RELEASE MEASURES

SAFEGUARDS (PERSONNEL):

Wear appropriate personal protective equipment.

INITIAL CONTAINMENT:

Absorb spills with inert material.

LARGE SPILLS PROCEDURE:

Contain spilled material.

Large spillage should be dammed-off and pumped into containers.

(section 6 continued)

Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

SMALL SPILLS PROCEDURE:

Clean up area by absorbent material.

Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

7. HANDLING AND STORAGE

HANDLING (PERSONNEL):

DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

Wash hands thoroughly after handling.

HANDLING (PHYSICAL ASPECTS):

Store in a cool dry area.

Keep container closed to avoid contamination.

STORAGE PRECAUTIONS:

Keep container closed when not in use.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

Not required under normal conditions of use. However, if unusual operating conditions exist, then provide sufficient mechanical ventilation to maintain exposure below PEL/TLV (s).

EYE / FACE PROTECTION REQUIREMENTS:

Where contact with this material is likely, eye protection is recommended.

SKIN PROTECTION REQUIREMENTS:

When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material.

RESPIRATORY PROTECTION REQUIREMENTS:

When there is potential for airborne exposures in excess of applicable limits, wear NIOSH/MSHA approved respiratory protection.

EXPOSURE GUIDELINES:

No Information Available.

9. PHYSICAL AND CHEMICAL PROPERTIES

FORM: Liquid
COLOR: Amber
ODOR: Characteristic
BOILING POINT: >425 F
VAPOR PRESSURE: Nil mm Hg
VAPOR DENSITY: >1 (Air = 1)
SOLUBILITY IN WATER: Nil
SPECIFIC GRAVITY: 0.861 at 60 deg F (Water = 1)
BULK DENSITY: 7.17 Pounds per Gallon at 60 Deg F
MELTING/FREEZING POINT ...: N/A F
% VOLATILES: Nil %
VISCOSITY: 32 cSt at 40 Deg C

10. STABILITY AND REACTIVITY

STABILITY:

Stable.

POLYMERIZATION:

Hazardous polymerization will not occur.

INCOMPATIBILITY WITH OTHER MATERIALS:

Avoid contact with strong oxidizing agents.

DECOMPOSITION:

In the case of a fire, oxides of carbon, hydrocarbons, fumes, and smoke may be produced.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS:

Minimal irritation on contact.

SKIN EFFECTS:

Practically non-toxic if absorbed. May cause mild irritation with prolonged and repeated exposure.

ACUTE ORAL EFFECTS:

Tests on similar materials indicate low order of acute oral toxicity.

ACUTE INHALATION EFFECTS:

Low acute toxicity expected on inhalation.

MISCELLANEOUS:

Please contact supplier for additional toxicological information.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL HAZARDS:

Ecotoxicological Information: No specific aquatic data available for this product.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:

Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

Do not flush to surface water or sanitary sewer system.

CONTAINER DISPOSAL:

Empty drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum reconditioner.

All other containers should be disposed of in an environmentally safe manner.

14. TRANSPORTATION INFORMATION

PRODUCT LABEL: Altra AW 32 Hydraulic Oil
D.O.T. SHIPPING NAME ...: Not regulated by DOT

15. REGULATORY INFORMATION

MISCELLANEOUS INFORMATION:

This material or all of its components are listed on the Inventory of Existing Chemical Substances under the Toxic Substance Control Act (TSCA).

16. OTHER INFORMATION

REASON FOR ISSUE ...: Revised
APPROVAL DATE: March 3, 2009
SUPERCEDES DATE: March 3, 2009
RTN NUMBER: 00011005 (Official Copy)

ADDITIONAL INFORMATION:

The data in this Material Safety Data Sheet relates only to the specific material designated herein.

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except that it is accurate to the best knowledge of Allegheny Petroleum
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material designated herein. Allegheny Petroleum Products Co. assumes no
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END OF MSDS

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Product Support: www.instron.com