

VIEW K-K
BOOM ASSY WITH BOOM STRAPS WORKING AND JIB BACKSTAY STRAPS STOWED
REFER TO CAPACITY CHART IF JIB BACKSTAY LINKS AND STRAPS MAY REMAIN ON BOOM ASSY.
SCALE 0.080
FC4

SECTION B-B
SCALE 0.125

DETAIL A
SCALE 0.125

VIEW C-C
SCALE 0.125

86.0 M (282.2 FT)
#680 BOOM SHOWN

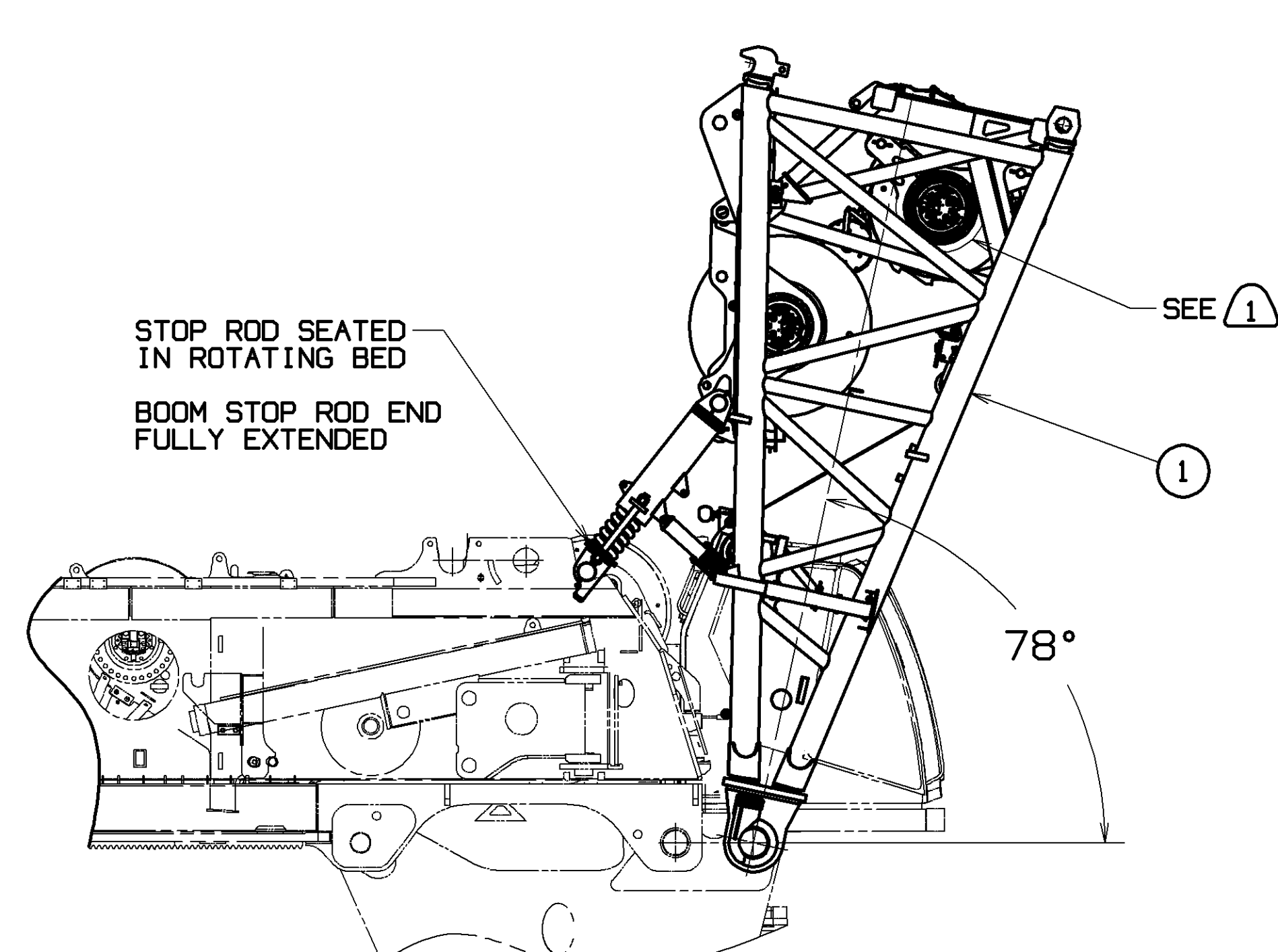
- 1 REQ'D FOR LUFFING JIB. LUFFING JIB WIRE ROPE GUIDES ON BOOM TOP AND 12M XH INSERT MAY REMAIN IN PLACE WITH BOOM ONLY MAKEUP. LUFFING DRUM IN BOOM BUTT MAY REMAIN IN PLACE WITH BOOM ONLY MAKEUP. ITEMS MAY BE IN OPERATING OR SHIPPING POSITION.
- 2 BUTT 6.00M I.D. TAG #81020304
- 3 INSERT 4.00M X-HEAVY I.D. TAG #81020307. SEE DELTA NOTE 30.
- 4 INSERT 12.00M X-HEAVY W/SHEAVES I.D. TAG #81021997
- 5 TOP 10.00M I.D. TAG #81022497. SEE DELTA NOTE 30.
- 6 INSERT 12.00M HEAVY I.D. TAG #81020425. SEE DELTA NOTE 30.
- 7 INSERT 6.00M HEAVY I.D. TAG #81020428. SEE DELTA NOTE 30.
- 8 INSERT 12.00M MEDIUM I.D. TAG #81021300. SEE DELTA NOTE 30.
- 9 INSERT 12.00M MEDIUM W/SUSPENSION I.D. TAG #81035137. SEE DELTA NOTE 30.
- 10 INSERT 12.00M HEAVY W/EQUALIZER I.D. TAG #81022605. SEE DELTA NOTE 30.
- 11 INSERT 12.00M X-HEAVY I.D. TAG #81034978. SEE DELTA NOTE 30.
- 12 STOWS IN PARTS BOX 81028467.
- 13 98.0M (321.5 FT) AND 104.0M (341.2 FT) BOOM REQUIRES INTERMEDIATE SUSPENSION ITEM R112. ITEM R112 IS OPTION 3 IN ITEM 105. 81035136. REFER TO BOOM LENGTH TABLE (SHEET 2) FOR SUSPENSION PENDANT BUTTON NUMBER. SEE SHEET 10 FOR OPERATIONAL INSTRUCTIONS.
- 14 REFER TO CAPACITY CHART IF JIB BACKSTAY STRAPS AND LINKS REMAIN ON BOOM ASSY. (SEE VIEW K-K)
- 15 ITEM R2 I.D. TAG #81023432 CALLED FOR ON TOP ASSY ITEM 4 AS STANDARD EQUIPPED. FOR SHEAVE CONFIGURATION REFER TO SHEET 8.
- 16 ITEM R3 I.D. TAG #81023435. ITEM R22 I.D. TAG #81028636. CALLED FOR ON TOP ASSY ITEM 4 AS OPTION #3 EQUIPPED. FOR SHEAVE CONFIGURATION REFER TO SHEET 8.
- 17 MAY BE MADE FROM ITEM 202.
- 18 MAY BE MADE FROM ITEM 201.
- 19 SEE SHEET 3 DETAIL D AND SHEET 4 DETAIL H FOR LIVE MAST ADJUSTMENT HOLE CONFIGURATION.
- 20 UPPER POINT ASSY I.D. TAG 81029770. MAY BE EQUIPPED WITH ROLLER ASSY 81036286 (CALLED FOR ON UPPER POINT ASSY FRAME ITEM 9 AS OPTION B).
- 21 MAXIMUM NUMBER OF 12.00M INSERTS W/EQUALIZER = 1
- 22 FOR BOOM STRAP COMPONENTS ON OPTIONAL INSERT REFER TO BOOM LENGTH TABLE ON SHEET 2.
- 23 USE FOR 2 PART LINE ON UPPER BOOM POINT. CAN BE USED WITH 28MM ROPE ONLY.
- 24 FOR ASSEMBLY AND RIGGING PURPOSE ONLY. STOWS ON 4M INSERT 81020306. SEE DETAIL R ON SHEET 6.
- 25 REFER TO SHEET 8 FOR COMPONENT CONFIGURATION. STOWS IN PARTS BOX 81028467.
- 26 WHEN CONFIGURED WITH LUFFING JIB ATTACHMENT THE 68.0M (223.1 FT) BOOM MUST USE ITEM 105 12M INSERT W/SUSPENSION 81035136 BECAUSE ITEM 102 12M INSERT 81021299 DOES NOT INCLUDE BACKSTAY STRAPS.
- 27 SEE BLOCK REEVING DRAWING 81033357 FOR 1 DRUM RIGGING CONFIGURATION OPTIONS AND INSTRUCTIONS. SEE RIGGING WINCH ASSY 81026267 FOR BLOCK AND WIRE ROPE ASSEMBLY.
- 28 SEE BLOCK REEVING DRAWING 81033352 FOR 2 DRUM RIGGING CONFIGURATION OPTIONS AND INSTRUCTIONS. SEE RIGGING WINCH ASSY 81026267 FOR BLOCK AND WIRE ROPE ASSEMBLY.
- 29 SUSPENSION PENDANT MAY APPEAR SLACK DURING RAISING AND OPERATION. CHECK SUSPENSION LOCATION AND PENDANT BUTTON NUMBER AND CONTINUE OPERATION.
- 30 IF EQUIPPED WITH LOWER BOOM CONNECTOR PIN COMPONENTS USED WITH HAND HELD CYLINDER (R204) 81030756 SEE DETAIL T ON SHEET 9.
IF EQUIPPED WITH MANUAL LOWER BOOM CONNECTOR PIN (R28) SEE DETAIL DD ON SHEET 9.

BILL OF MATERIAL					ASSEMBLY	
NO.	REQ'D	DESCRIPTION	UNIT	MATERIAL	QTY	NO.
BOOM RIGGING B10:680						
1	1	BUTT ASSY #680, 6.0M		81020303	2	
2	1	INSERT ASSY #680, 4.00M		81020306	3	
3	1	INSERT ASSY #680, 12M W/SHV		81021996	4	
4	1	TOP ASSY #680, 10.00M		81022496	5	
5						
6						
7						
NO. REQ'D FOR THE FOLLOWING ITEMS ARE IN THE BOOM LENGTH TABLE						
100	1	INSERT ASSY #680, 12.00M HEAVY		81020424	6	
101	1	INSERT ASSY #680, 6.00M HEAVY		81020427	7	
102	1	INSERT ASSY #680, 12.00M MEDIUM		81021299	8	
103	1	INSERT ASSY #680, 12M HV W/EG		81022604	9	
104	1	INSERT ASSY #680, 12.00M X-HEAVY		81034977	11	
105	1	INSERT ASSY #680, 12M W/SUSP		81035136	9	
106						
107						
OPTION 1: HOOK BLOCKS						
200	1	BLOCK HOOK 135MT 32WR 3SH		81023461		
201	1	BLOCK HOOK 450MT 32WR 10SH		81029960		
202	1	BLOCK HOOK 625MT 32WR 14SH		81029961		
203	1	BLOCK HOOK 325MT 32WR 7SH		81033345	17	
204	1	BLOCK HOOK 225MT 32WR 5SH		81033346	18	
205	1	BLOCK HOOK 100MT 28WR 3SH		81031987	23	
206	1	WEIGHT BALL SHVEL 22.2MT, 28MM & 32MM WR		81033344		
207	1	HOOK BLOCK 160MT 35H 32WR		84039500		
208	1	BLOCK 700MT 32WR 17SH		A10698		
OPTION 2: UPPER BOOM POINT						
300	1	UPPER POINT ASSY FRAME		81029769	20	
301						
BASIC REFERENCE ITEMS						
R1	4	STRAP 4M #680		81022539		
R2	1	BOOM POINT LOWER ASSY 8 SHEAVE		81023433	15	
R3	1	BOOM POINT LOWER ASSY 4 SHEAVE RT		81023436	16	
R4	4	LINK #680 BOOM STRAP		81025609		
R5	4	LINK #680 BOOM STRAP		81025610		
R6	2	STRAP 10M #680 TOP		81025639		
R7	1	LINK LIVE MAST		81026646		
R8	4	LINK LIVE MAST		81026647	19	
R9						
R10	1	CYLINDER HYDR SELF ASSY		81027165		
R11	4	LINK #680, 4M INSERT		81027236		
R12	2	PIN 1 HOLE W/HD 105.7 DIA X 170.0 LG		81028072		
R13	2	PIN 1 HOLE W/HD 105.7 DIA X 120.0 LG		81028073		
R14	4	COLLAR 139.7 OD X 106.0 ID X 50.0 LG		81028074		
R15	4	PIN 2 HOLE 25.4 DIA X 157.0 LG		81028216		
R16	4	PIN 1 HOLE W/HD 105.0 DIA X 121.1 LG		81028258		
R17	2	PIN 1 HOLE W/HD 127.0 DIA X 121.1 LG		81028259		
R18	4	COLLAR 106.5 MM I.D.		81028260		
R19	4	PIN 2 HOLE 19.05 DIA X 142.0 LG		81028262		
R20	2	COLLAR 128.2 MM I.D.		81028264		
R21	2	PIN 2 HOLE 19.05 DIA X 167.8 LG		81028265		
R22	1	BOOM POINT LOWER ASSY 4 SHEAVE LEFT		81028637	16	
R23	1	LOAD CELL LINK 238,140 KGS		84038492		
R24	2	LINK ASSY LOAD		84047535		
R25	1	LINK ASSY DEAD END		81042356	25	
R26	4	LINK ASSY		81042456		
R27	4	PIN SAFETY .250 DIA X 5.20 LG		81027802		
R28	2	PIN 2 HOLE 110.3 DIA X 242.9 LG		84036353		
NO. REQ'D FOR THE FOLLOWING REFERENCE ITEMS ARE IN THE BOOM LENGTH TABLE (SHEET 2)						
R100	2	PIN COTTER 1/4 DIA X 1.50 LG		562105		
R101	2	STRAP 12M #680, 681, 682		81020475		
R102	1	LINK #680 BOOM		81020476		
R103	1	PIN 1 HOLE W/HD 79.3 DIA X 121.1 LG		81020477		
R104	1	COLLAR 80.2MM I.D.		81020478		
R105	1	STRAP 6M #680		81021271		
R106	1	STRAP 12M #680 W/EQUALIZER		81027608		
R107	1	STRAP 12M #680 W/EQUALIZER		81027609		
R108	1	LINK #680 BOOM		81027655		
R109	1	LINK CONNECTING #680 12.00M W/STRUT		81028261		
R110	1	STRAP 12M #680 W/STRUT		81028322		
R111	1	STRAP 12M #680 W/STRUT		81028323		
R112	1	SUSPENDER WIRE ROPE #680		81036355	13	
R113	1	PIN 2 HOLE 19.05 DIA X 117.0 LG		A16804		
R114						
REFERENCE ITEMS FOR ASSEMBLY AND RIGGING PURPOSE ONLY						
R200	2	SHACKLE BOM TYPE SAFETY PIN - 55 M TON		81007187	12	
R201	2	SHACKLE 17 MTON		81024427	12	
R202	4	SHACKLE 40 MT ALLOY		81030038	12	
R203	2	PIN PULLER BOOM BUTT CAGE WELD		81030540	12	
R204	2	PIN PULLER ASSY HAND HELD		81030756	12	
R205	2	SLING LIFTING 100,000 LBSX10.83 FT		81038731	12	
R206	2	SLING LIFTING 1 LEGX4,000(LBS)X10.30(FT)		81038732	12	
R207	1	SLING LIFTING 20,000 LBSX5.25 FT		81038797	12	
R208	4	SLING LIFTING 25,000(LBS)X12.5(FT)		81040162	12	
R209	4	BUSHING 100X53X75.8		81038828	24	
R210						
REFERENCE OPTION 3: BOOM TOP DEAD END						
R300	1	LINK ASSY DEAD END		81042356	25	
REFERENCE OPTION 4: UPPER POINT DEAD END						
R400	1	LINK ASSY DEAD END		81042356	25	

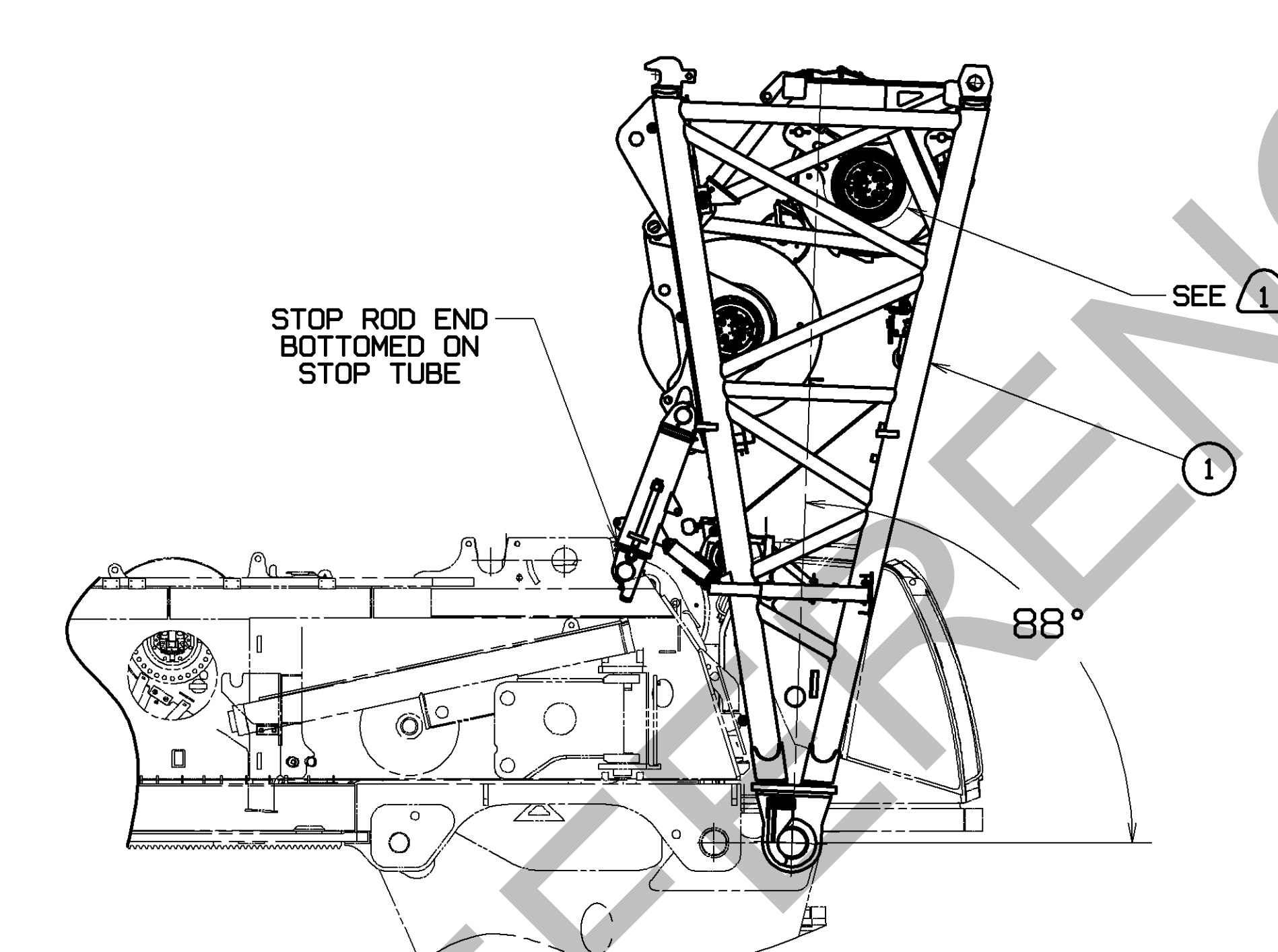
ITEMS REQ'D FOR VARIOUS BOOM LENGTHS - SEE SHEETS 3, 4, & 5 FOR BOOM MAKE-UP

BILL OF MATERIAL				ASSEMBLIES USED ON
QTY	DESCRIPTION	MATERIAL	QTY	NO.

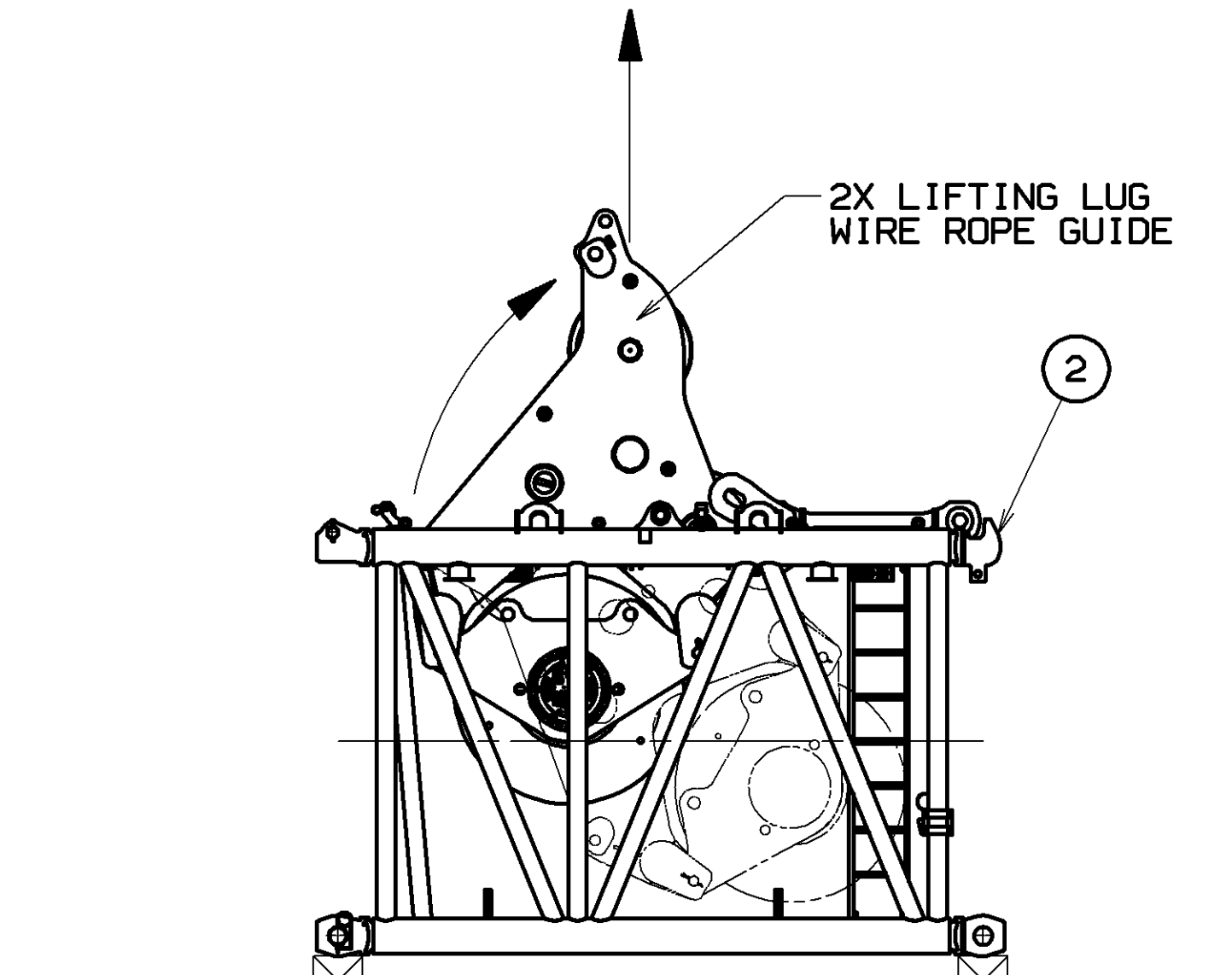
ITEM NO.		#680 INSERTS						STRAP						LINK			PIN		COTTER	COLLAR	SUSPENSION	
		X-HEAVY	HEAVY		MEDIUM		R101	R105	R106	R107	R110	R111	R102	R108	R109	R103	R113	R100	R104	R112 (23)	R8	
METERS	FEET	INSERT 12M (39.4FT) ASSY	INSERT 12M (39.4FT) ASSY	INSERT 6M (19.7FT) ASSY	INSERT 12M (39.4FT) ED ASSY	INSERT 12M (39.4FT) SUSP ASSY	STRAP 12M (39.4FT)	STRAP 6M (19.7FT)	STRAP SHORT W/EQUAL	STRAP LONG W/EQUAL	STRAP SHORT W/SUSP	STRAP LONG W/SUSP	LINK	LINK W/EQUAL	LINK CONNECT W/SUSP	PIN	PIN	COTTER	COLLAR	PENDANT BUTTON NUMBER SEE (13)	LIVE MAST ADJUSTMENT HOLE SEE (19)	
32	105.0	0	0	0	0	0	2	0	0	0	0	0	8	0	0	16	16	52	16	-	A	
38	124.7	0	0	1	0	0	2	2	0	0	0	0	12	0	0	20	20	60	20	-	A	
44	144.4	0	OR 0 1	0	1 0	0	2 4	0	2 0	2 0	0	0	12	4 0	0	24 20	24 20	68 60	24 20	-	A	
50	164.0	0	OR 0 1	1	1 0	0	2 4	2	2 0	2 0	0	0	16	4 0	0	28 24	28 24	76 68	28 24	-	A	
56	183.7	1	OR 0 1	0	1 0	0	4 6	0	2 0	2 0	0	0	16	4 0	0	28 24	28 24	76 68	28 24	-	A	
62	203.4	1	OR 0 1	1	1 0	0	4 6	2	2 0	2 0	0	0	20	4 0	0	32 28	32 28	84 76	32 28	-	A	
68	223.1	1	OR 0 1	0	1 0	1	4 6	0	2 0	2 0	2	2	28	4 0	2	40 28	40 28	100 76	40 28	-	A	
74	242.8	1	OR 0 1	1	1 0	1	4 6	2	2 0	2 0	0	0	32	4 0	2	44 32	44 32	108 84	44 32	-	B	
80	265.5	1	OR 0 1	0	1 0	1	4 6	0	2 0	2 0	0	0	32	4 0	2	44 32	44 32	108 84	44 32	-	B	
86	282.2	1	OR 0 1	1	1 0	1	4 6	2	2 0	2 0	0	0	36	4 0	2	48 36	48 36	116 92	48 36	-	B	
92	301.8	1	OR 0 1	0	1 0	1	4 6	0	2 0	2 0	0	0	36	4 0	2	48 36	48 36	116 92	48 36	-	B	
98	321.5	1	OR 0 1	1	1 0	1	4 6	2	2 0	2 0	2	2	40	4 0	2	52 48	52 48	124 116	52 48	2	B	
104	341.2	1	OR 0 1	0	1 0	1	4 6	0	2 0	2 0	2	2	40	4 0	2	52 48	52 48	124 116	52 48	1	B	



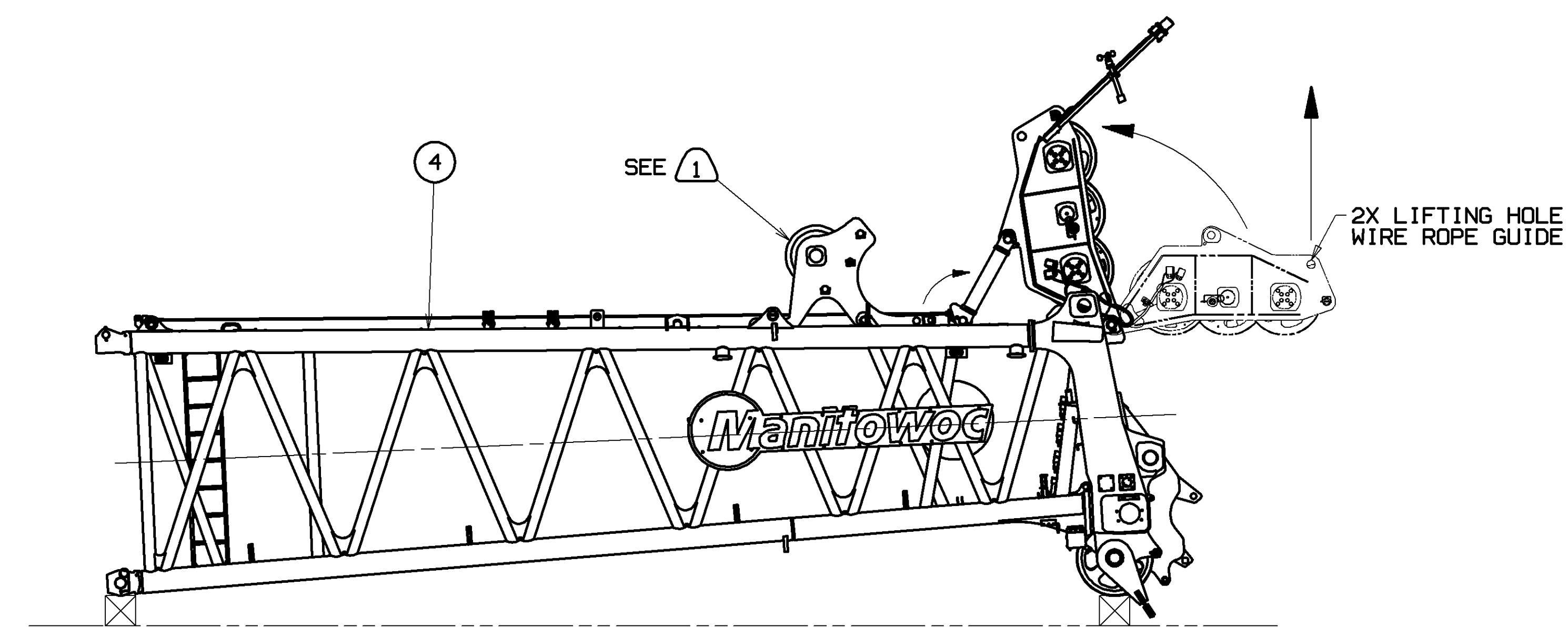
BOOM STOP START OF CUSHION
SCALE 0.025



BOOM STOP PHYSICAL STOP
SCALE 0.025



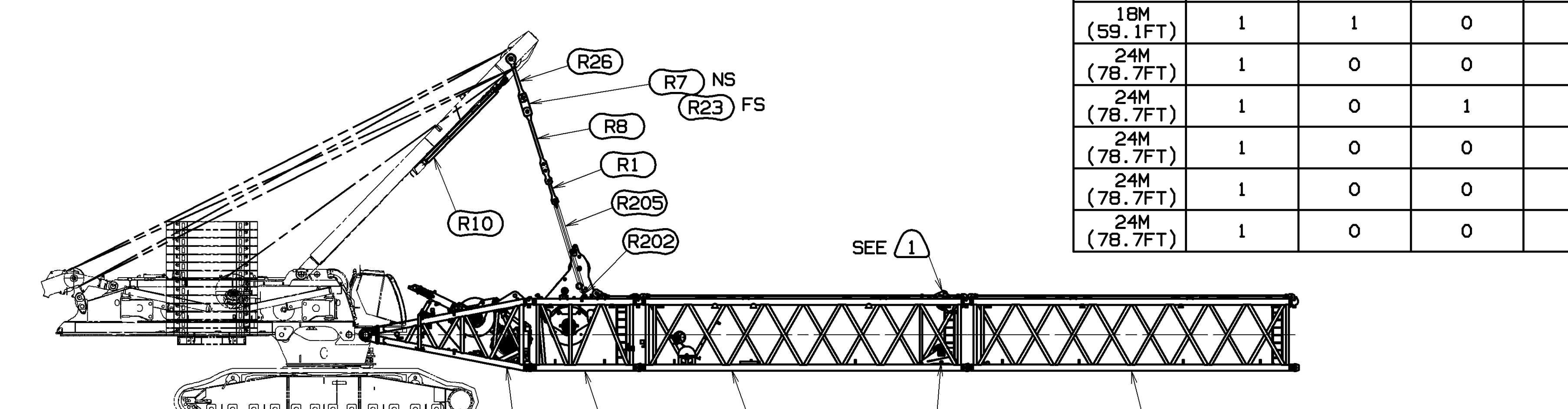
4M INSERT WIRE ROPE GUIDE ARRANGEMENT
SCALE 0.025



BOOM TOP WIRE ROPE GUIDE ARRANGEMENT
SCALE 0.025

BOOM HANDLING WITH MAST WITH LIVE MAST STRAPS AND LIFTING SLINGS ATTACHED TO LUGS ON 4M INSERT: MAXIMUM BOOM INSERTS THAT CAN BE CANTILEVERED BEYOND 4M INSERT IS AS FOLLOWS

LENGTH	12M (39.4FT) W/SHEAVES INSERT 81021996	6M (19.7FT) INSERT 81020427	12M (39.4FT) INSERT 81020424	12M (39.4FT) W/EQUALIZER INSERT 81022604	12M (39.4FT) INSERT 81034977	12M (39.4FT) INSERT 81021299	12M (39.4FT) INSERT 81035136
12M (39.4FT)	1	0	0	0	0	0	0
18M (59.1FT)	1	1	0	0	0	0	0
24M (78.7FT)	1	0	0	1	0	0	0
24M (78.7FT)	1	0	1	0	0	0	0
24M (78.7FT)	1	0	0	0	1	0	0
24M (78.7FT)	1	0	0	0	0	1	0
24M (78.7FT)	1	0	0	0	0	0	1

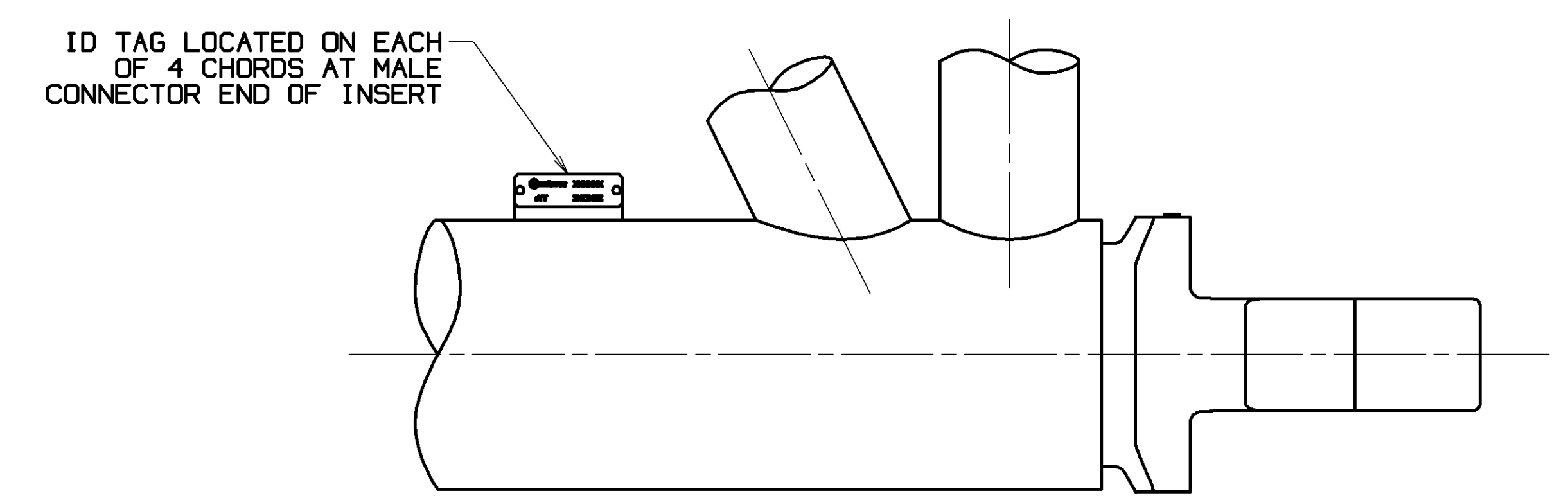


BOOM HANDLING WITH MAST (SEE TABLE)

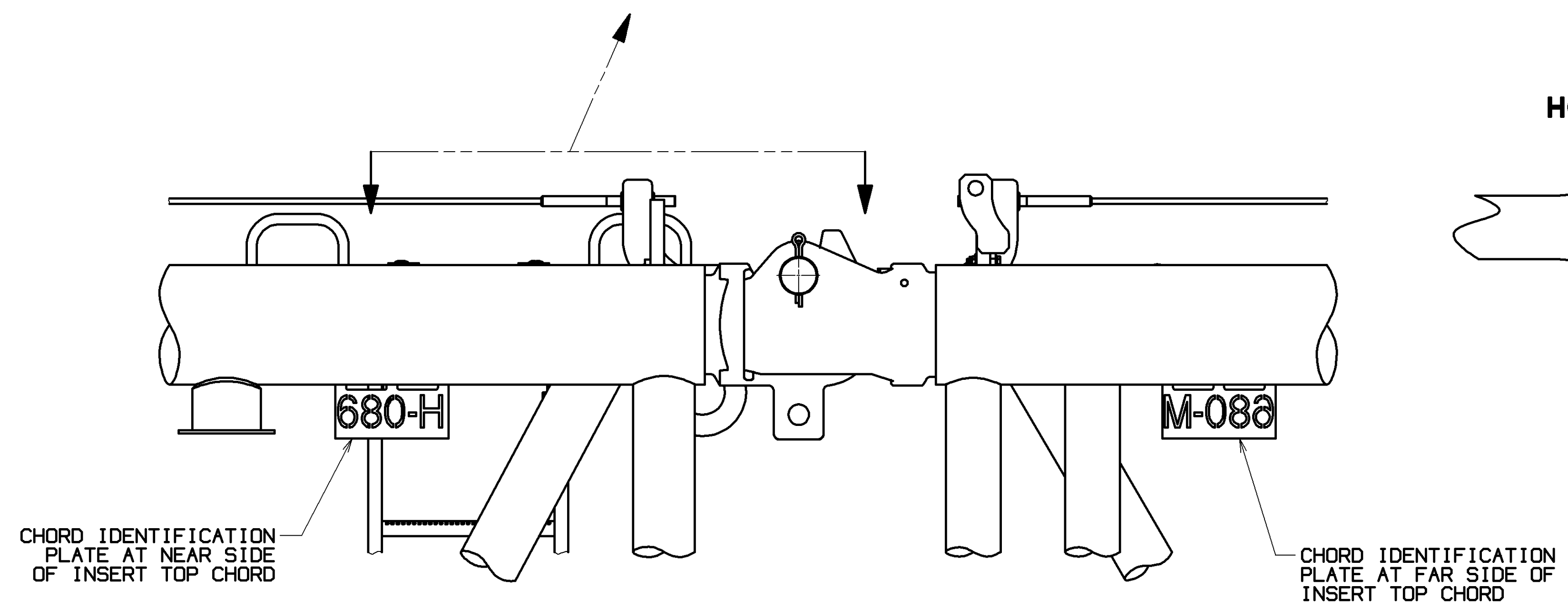
81018141
SHT 2 OF 10

PRIVATE LABELING REQUIREMENT TO CONFORM TO ENGINEERING SPECIFICATION 8629103794 FOR COMPONENTS LISTED IN SECTION 05-026
DATE 04-01-14
REV. LTK (FE)
Manitowoc Cranes, Inc.
Manitowoc, Wisconsin
MODEL MLC650
BOOM RIGGING
B10:680
81018141
SHT 2 OF 10

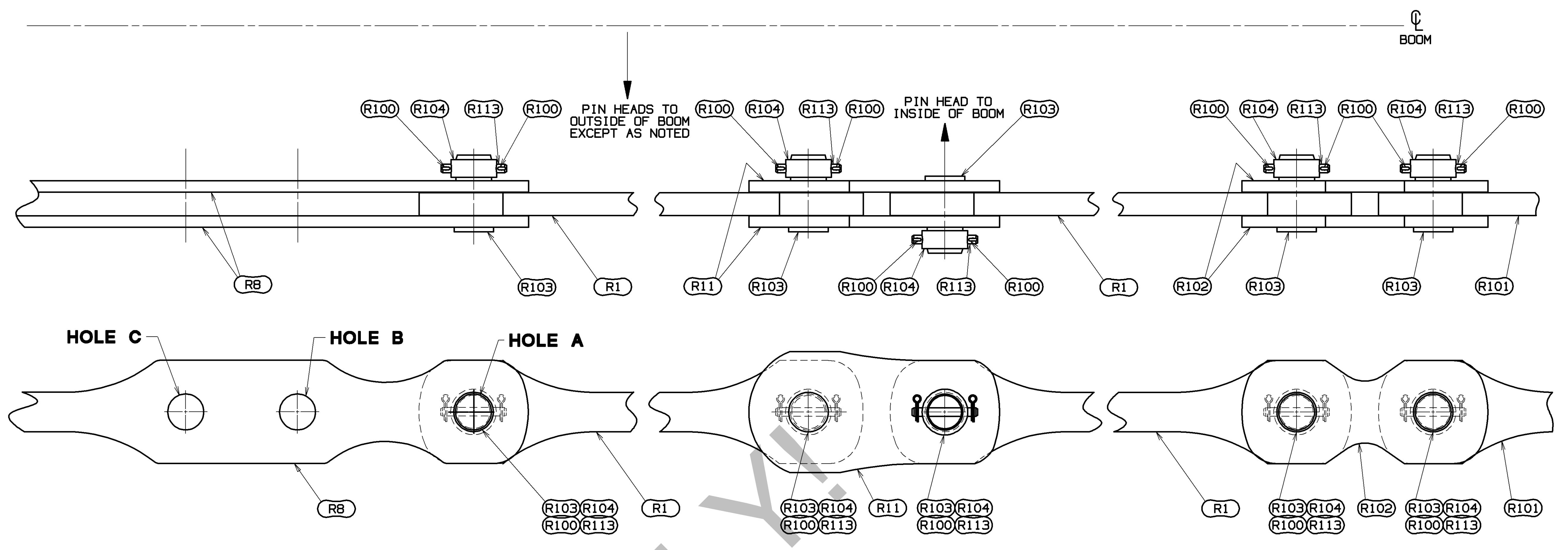
BILL OF MATERIAL				ASSEMBLIES USED ON
QTY	PKG	DESCRIPTION	MATERIAL	DATE



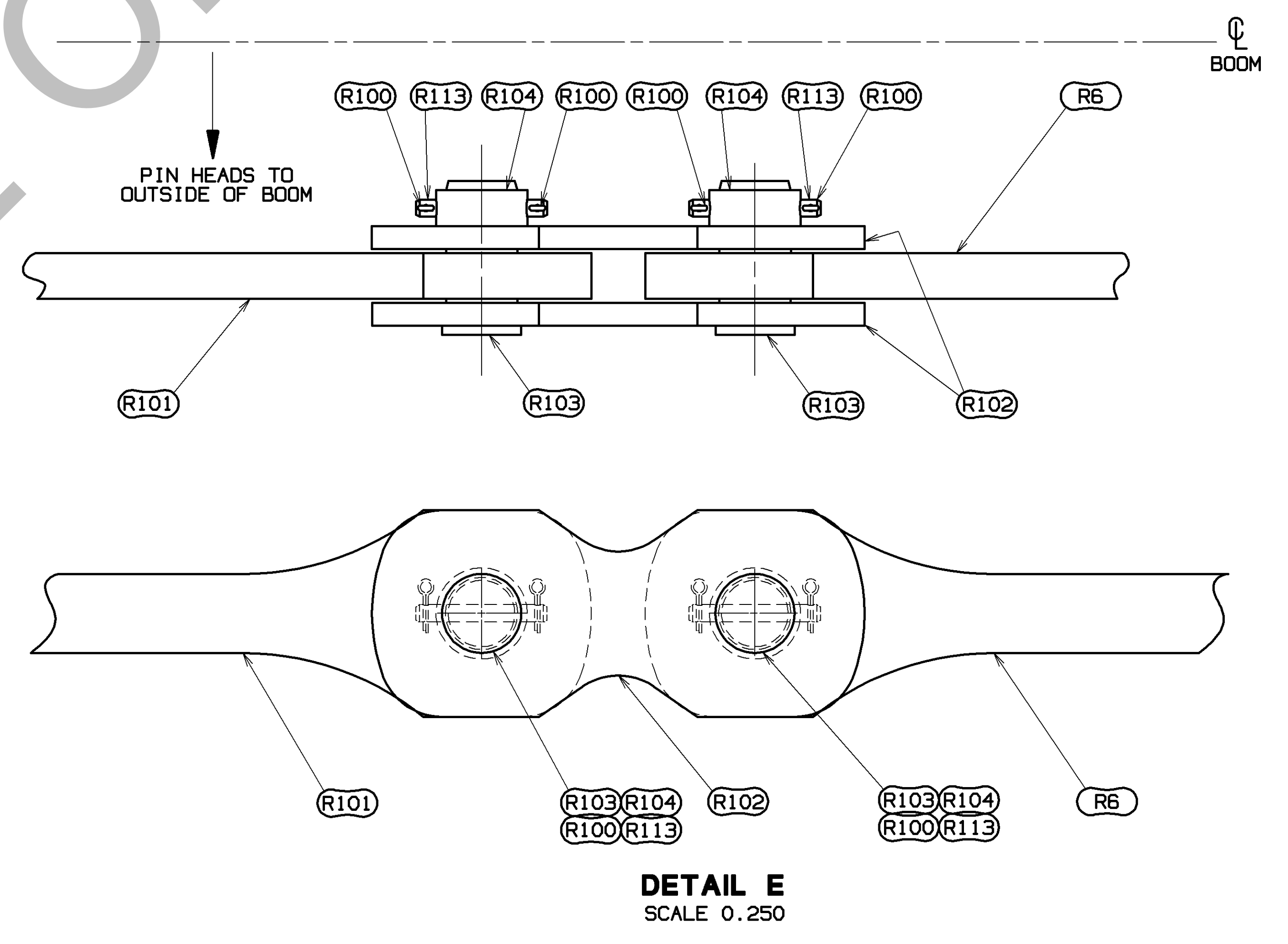
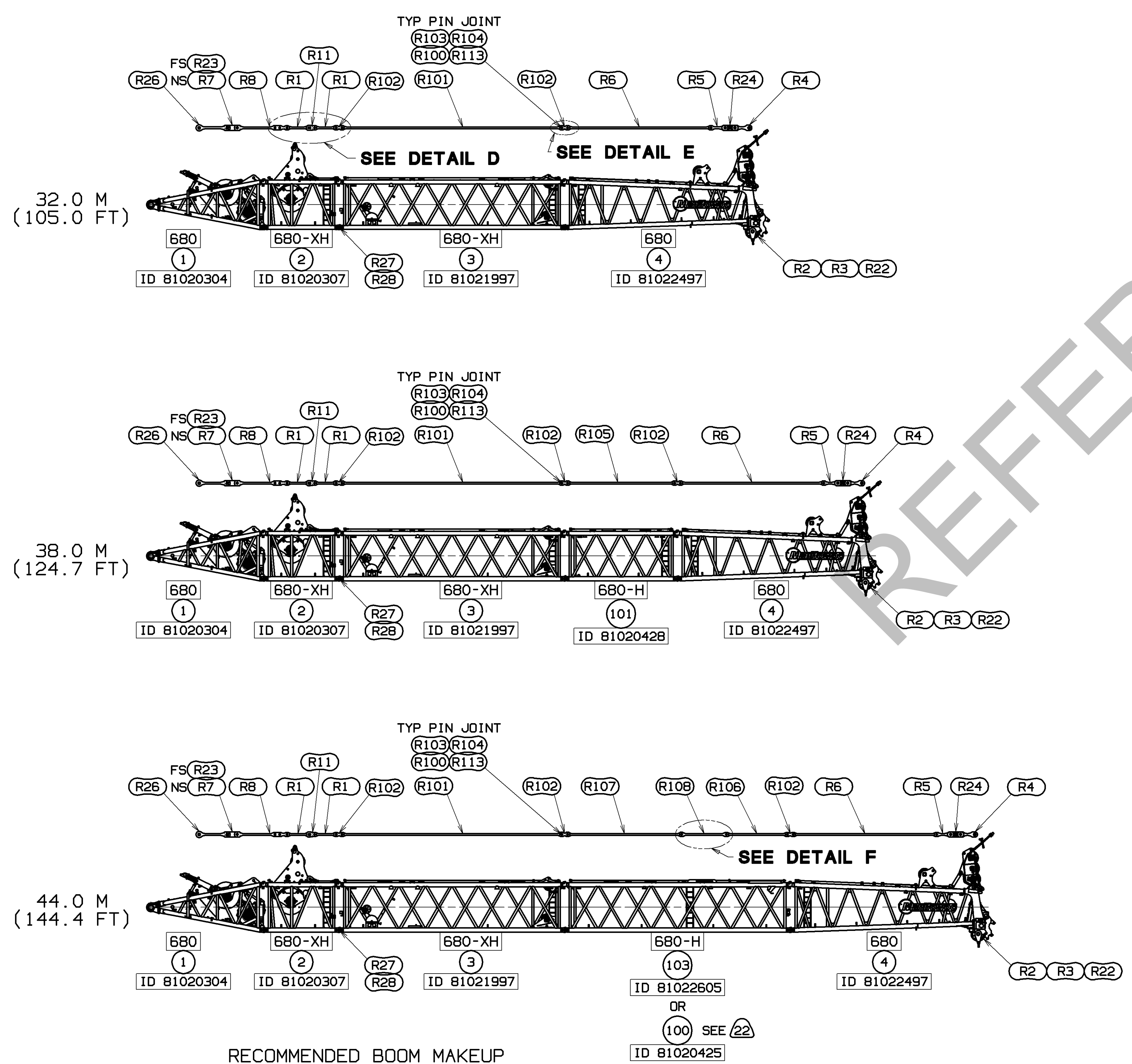
TYPICAL LOCATION OF INSERT ID TAGS
SCALE 0.250



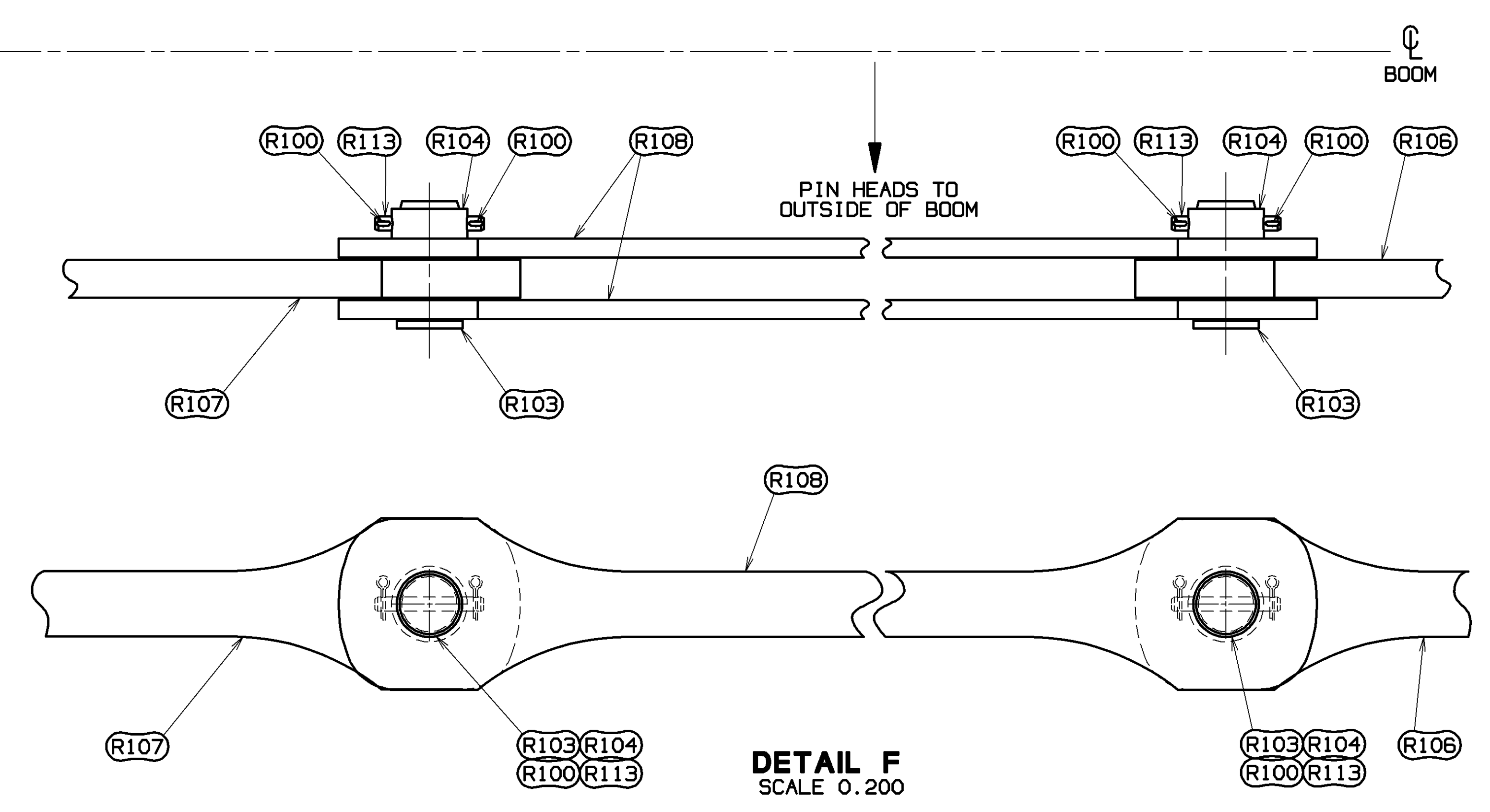
TYPICAL LOCATION OF BOOM CHORD IDENTIFICATION PLATE
SCALE 0.150



DETAIL D
TYPICAL LIVE MAST LINK HOLE "A" ATTACHMENT
FOR BOOM LENGTHS 32M (105.0 FT) THRU 68M (223.1 FT)
SCALE 0.200



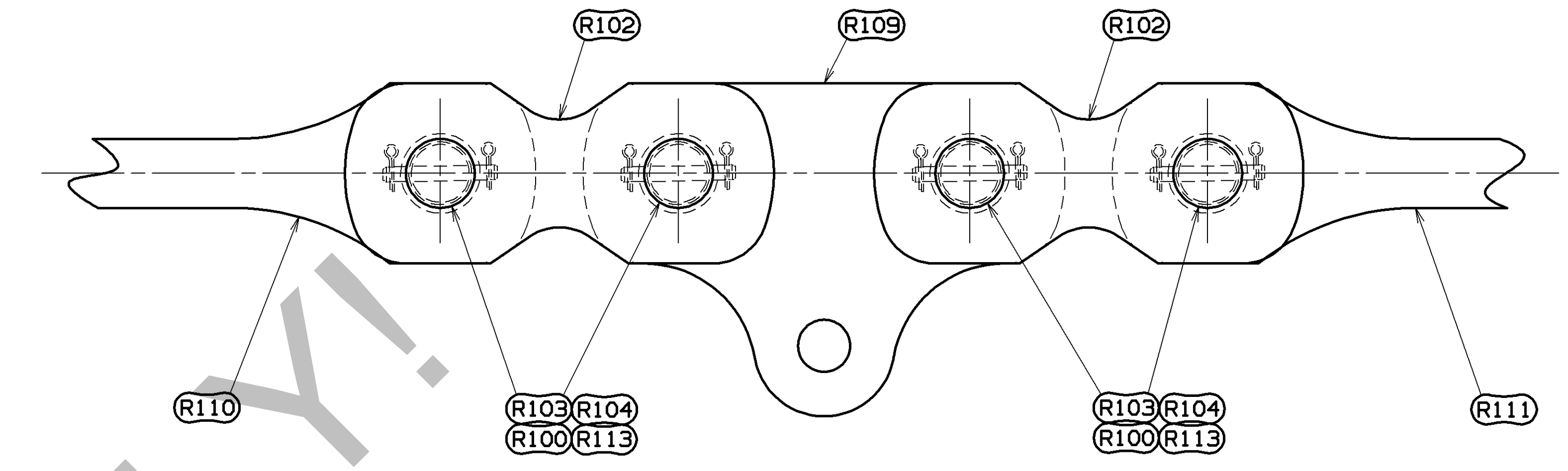
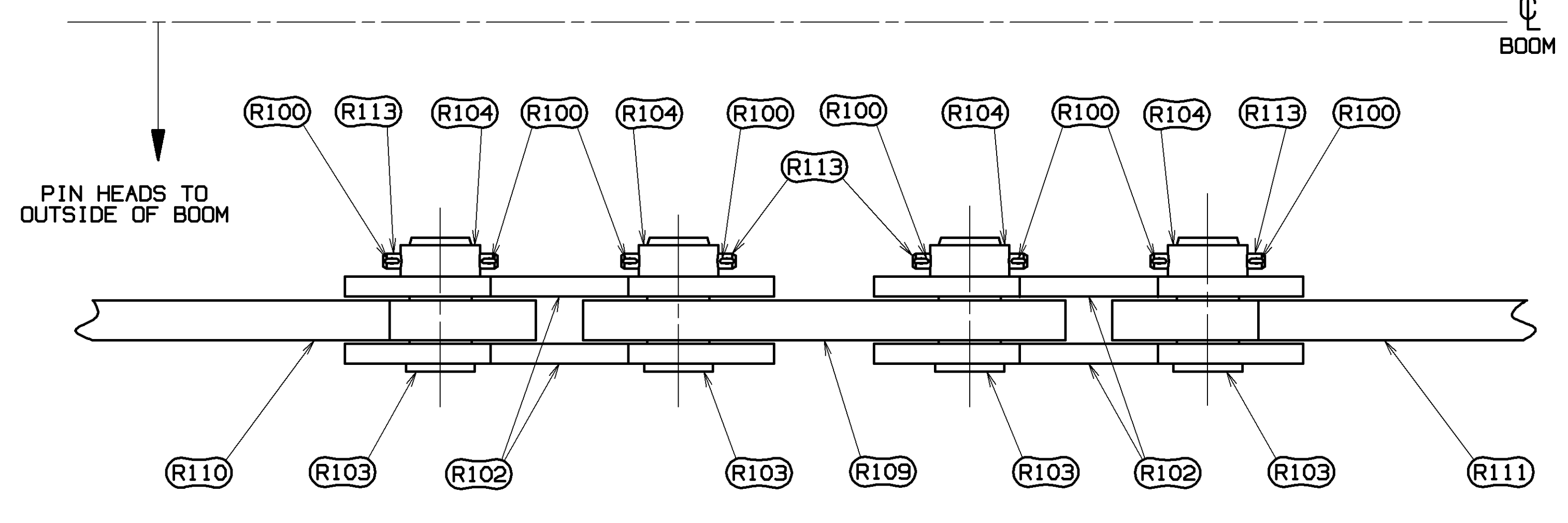
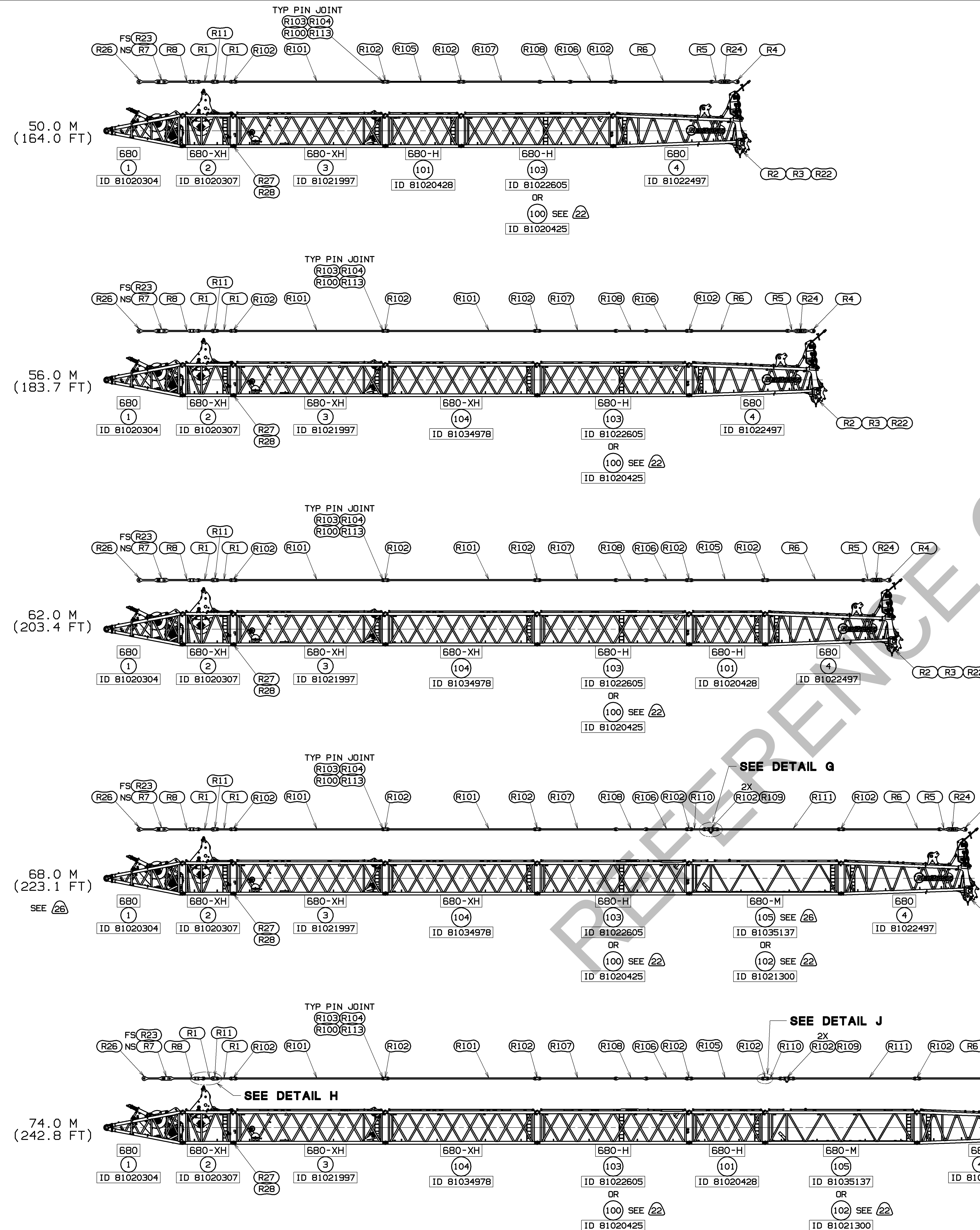
DETAIL E
SCALE 0.250



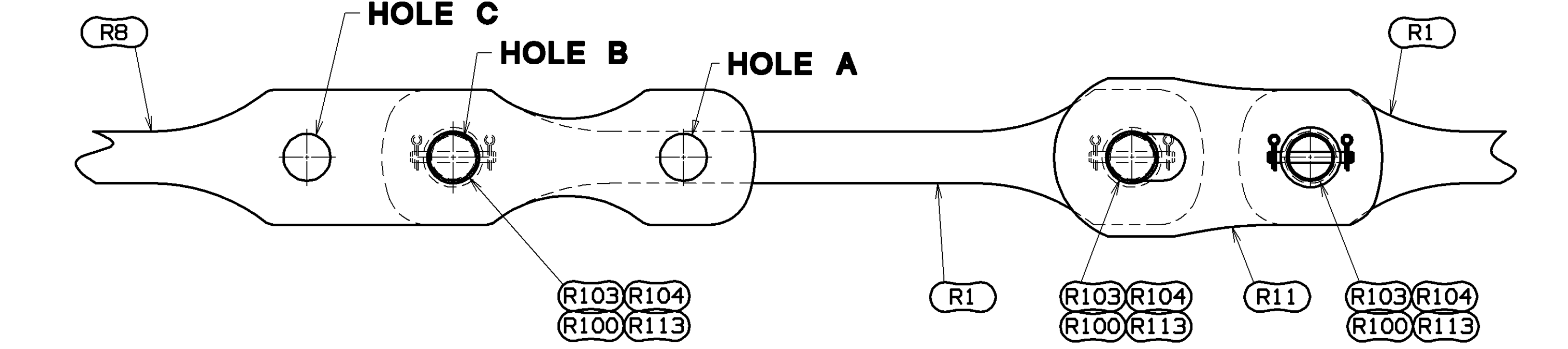
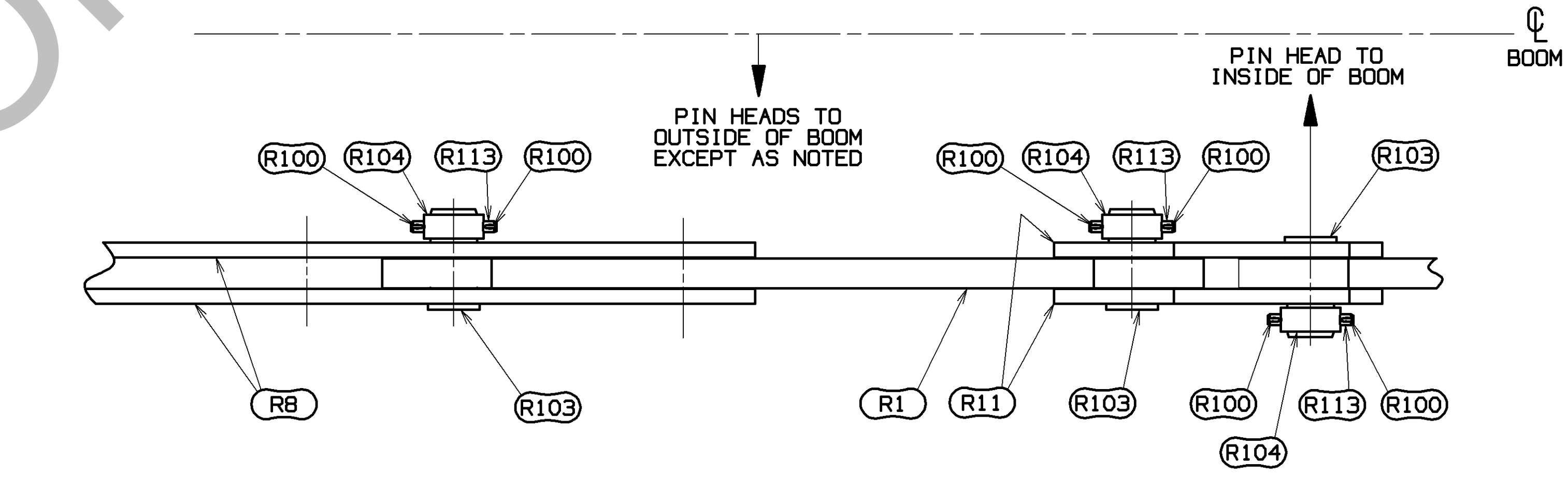
DETAIL F
SCALE 0.200

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SHT 3 OF 10

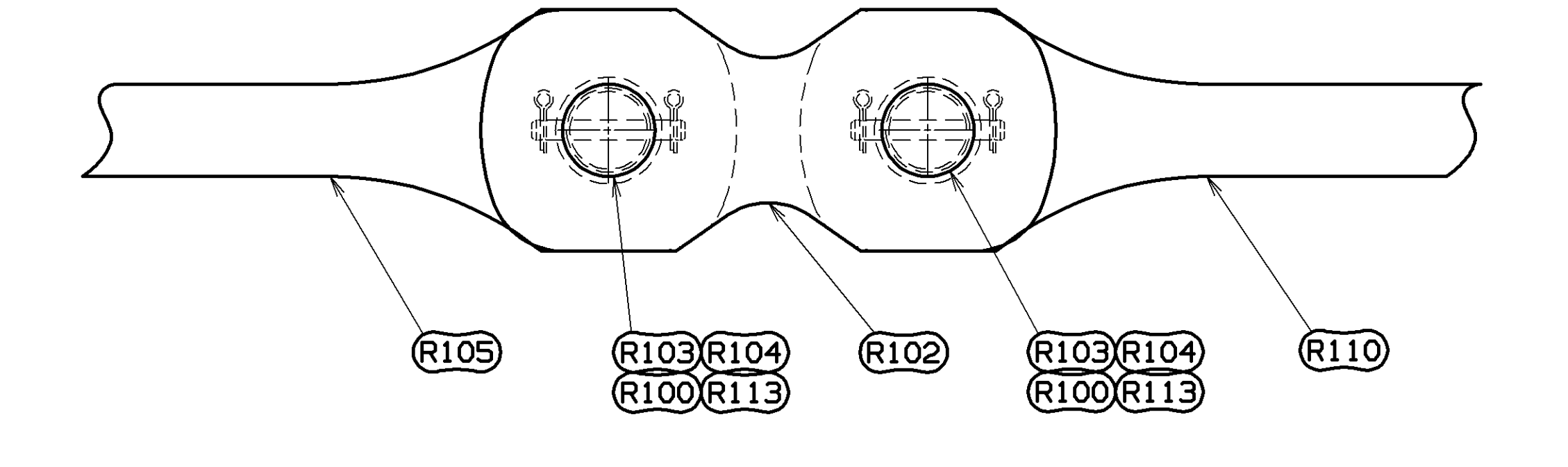
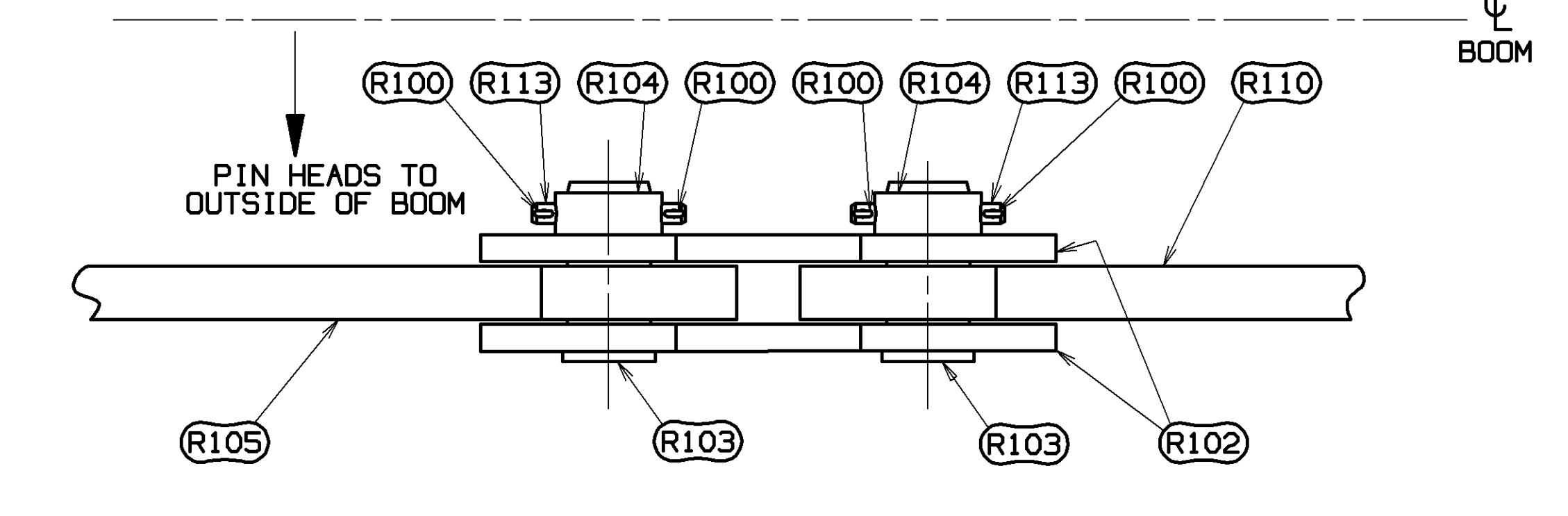
PRIVATE LABELING REQUIREMENT TO CONFORM TO ENGINEERING SPECIFICATION 6829103794 FOR COMPONENTS LISTED IN SECTION 05-1026
DATE 04-01-14
REV. LNK (FE)
MATERIAL MLC650
BOOM RIGGING
B10:680
81018141
SHT 3 OF 10



DETAIL G
SCALE: 0.200



DETAIL H
TYPICAL LIVE MAST LINK HOLE "B" ATTACHMENT
FOR BOOM LENGTHS 74M (242.8FT) THRU 104M (341.2FT)
SCALE 0.150



DETAIL J
SCALE 0.200

RECOMMENDED BOOM MAKEUP
FOR TYP PIN JOINT SEE SECTION B-B, VIEW C-C
AND DETAILS D, E, F, G, H & J

ASSEMBLIES USED ON

REVISIONS

QTY. NO.

81018141

SHT 4 OF 10

PRIVATE LABELING REQUIREMENT TO CONFORM TO SPECIFICATION 6829103794 FOR COMPONENTS LISTED IN 682900-05-026

DATE 04-01-14

REV. LVL. (FE)

DECIMAL PLACES	FRACTIONS	WELDING	WELDING
(1) PLACE 0.5	1/2	1/16	1/16
(2) PLACE 0.00	1/32	1/32	1/32
(3) PLACE 0.000	1/64	1/64	1/64

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TOLERANCE UNLESS OTHERWISE SPECIFIED

MANUFACTURING

MANITOWOC CRANES, INC.
MILWAUKEE, WISCONSIN

MODEL MLC650

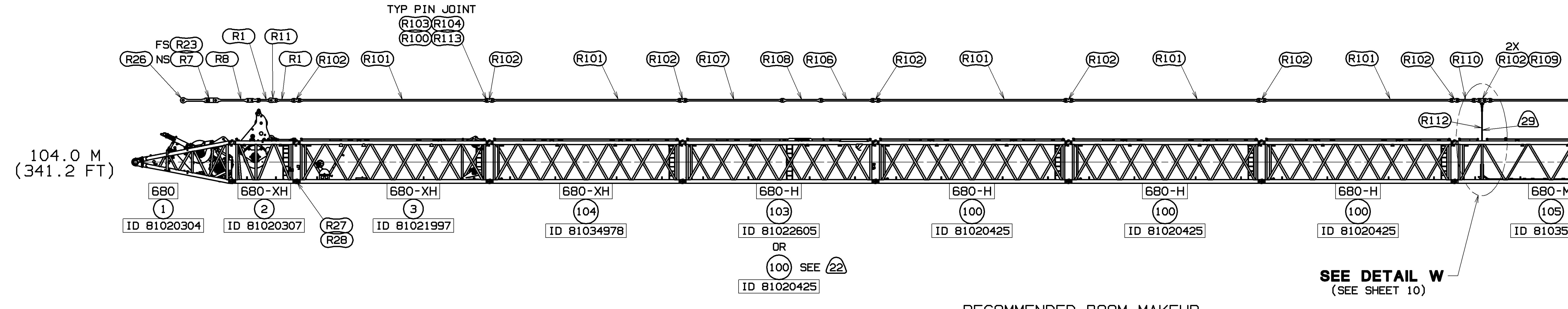
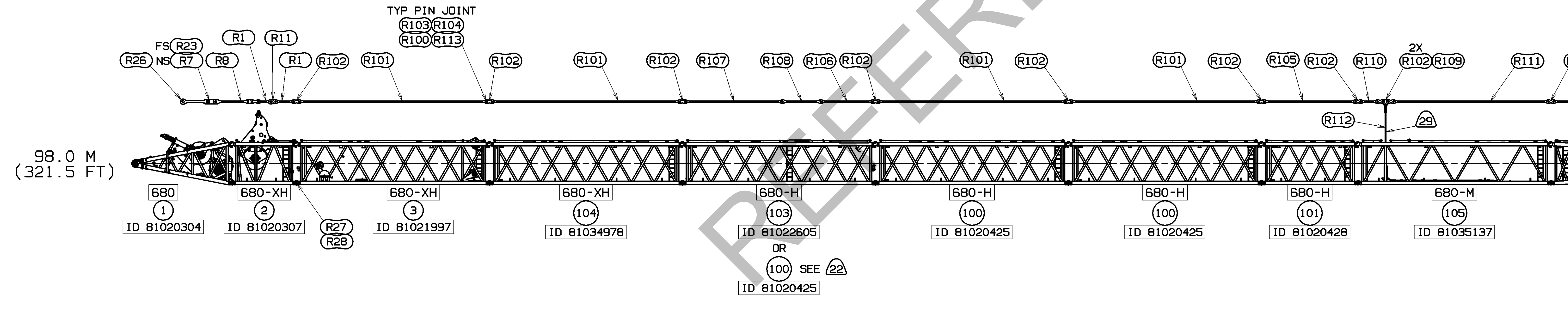
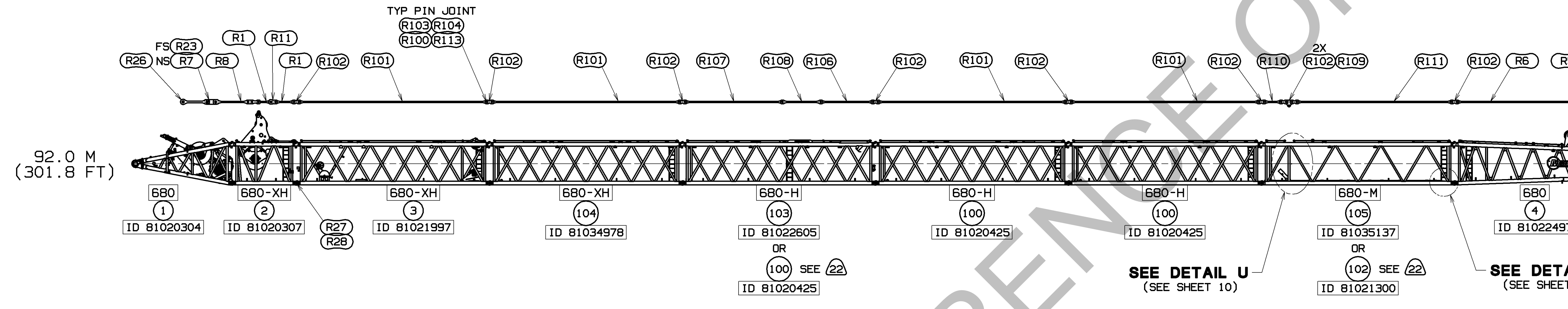
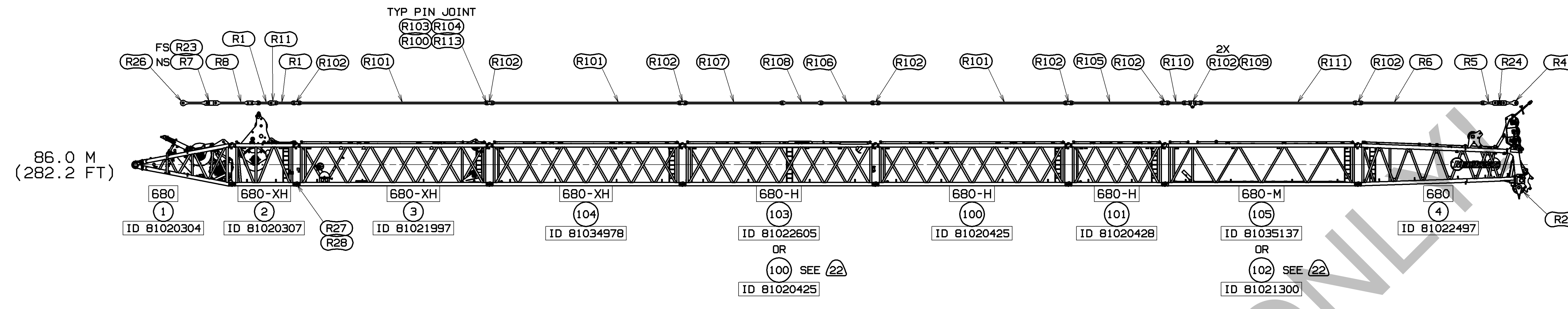
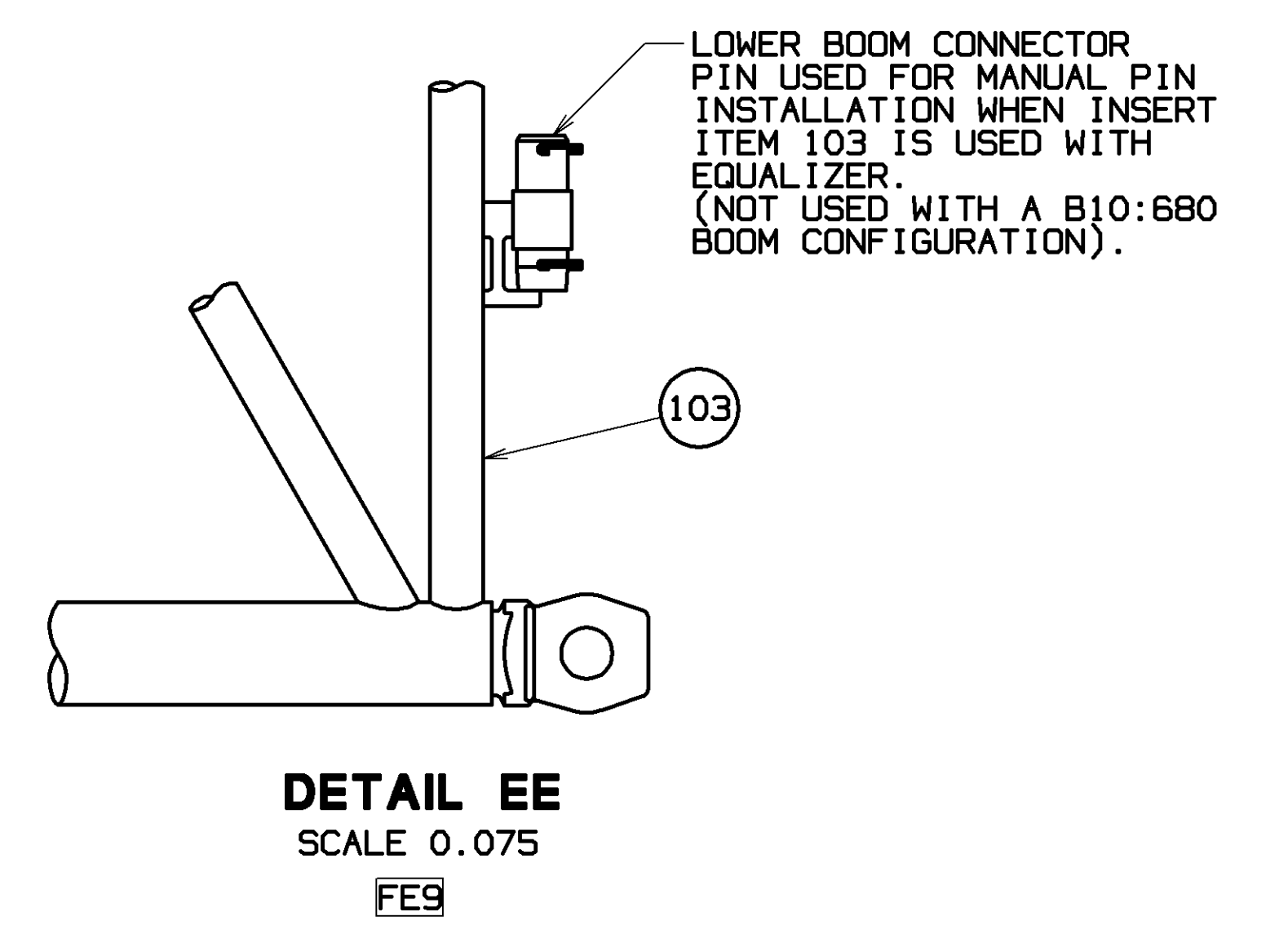
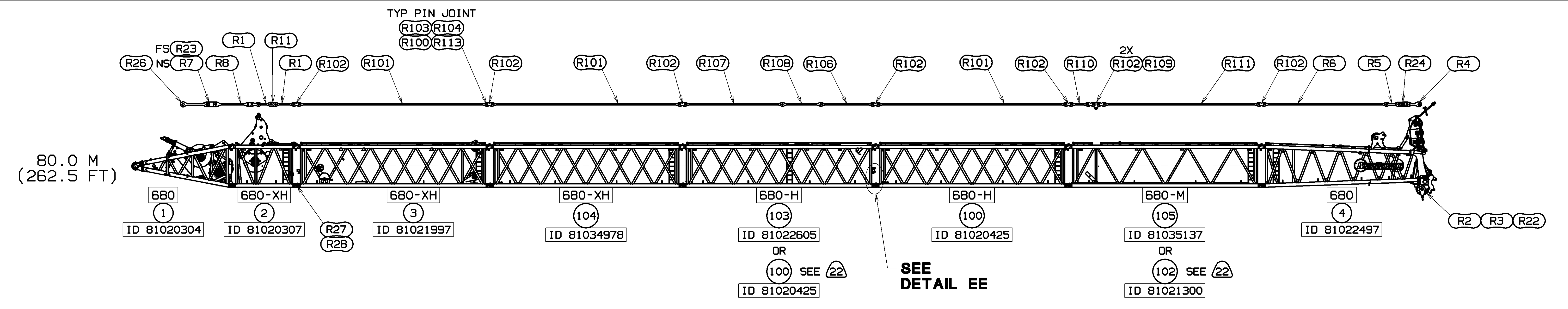
BOOM RIGGING

B10:680

81018141

SHT 4 OF 10

BILL OF MATERIAL				ASSEMBLIES USED ON
QTY	DESCRIPTION	MATERIAL	QTY	



RECOMMENDED BOOM MAKEUP
FOR TYP PIN JOINT SEE SECTION B-B, VIEW C-C
AND DETAILS E, F, G, H & J

SEE DETAIL W
(SEE SHEET 10)

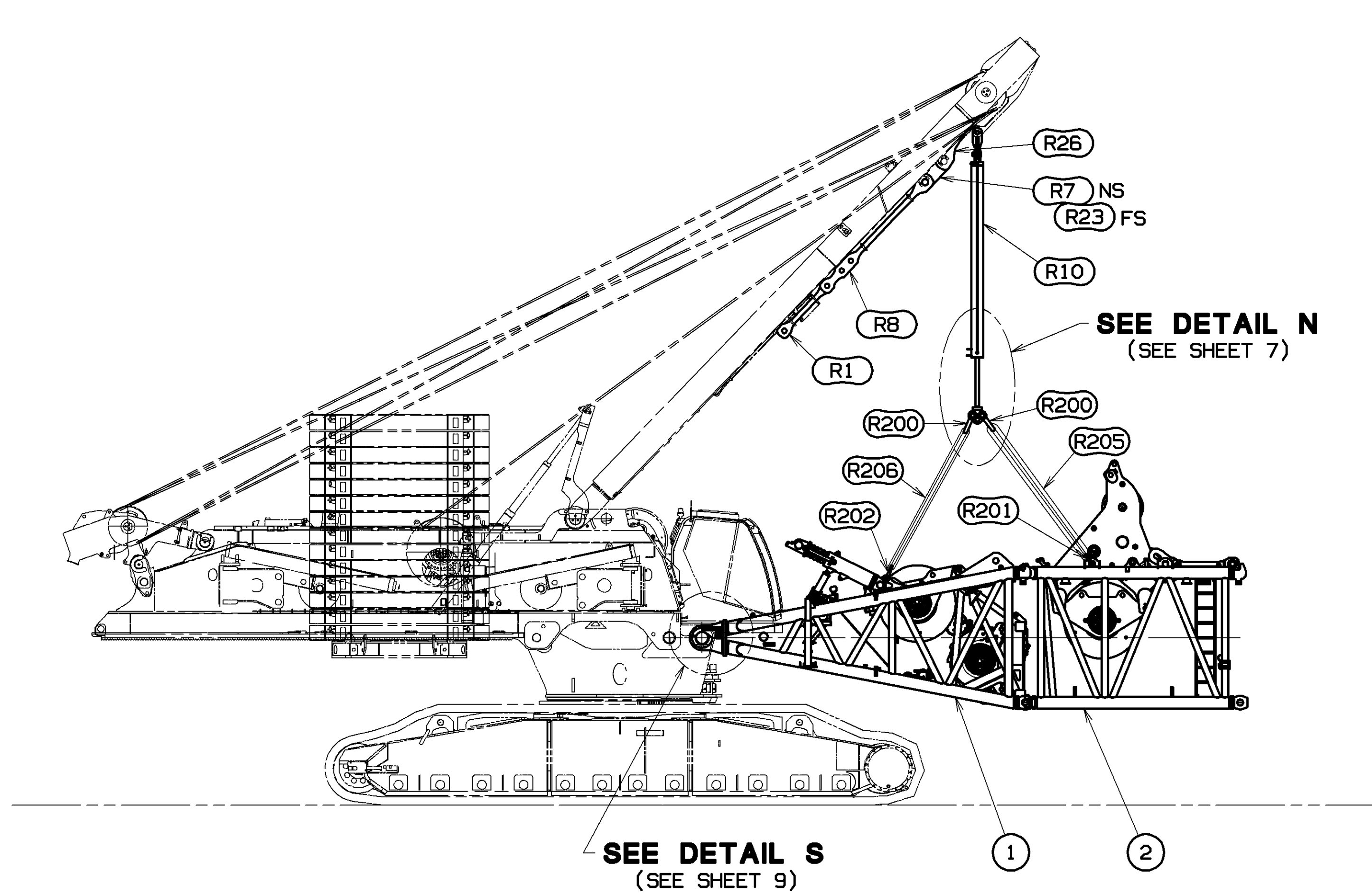
SEE DETAIL X
(SEE SHEET 10)

DO NOT SCALE THIS DRAWING

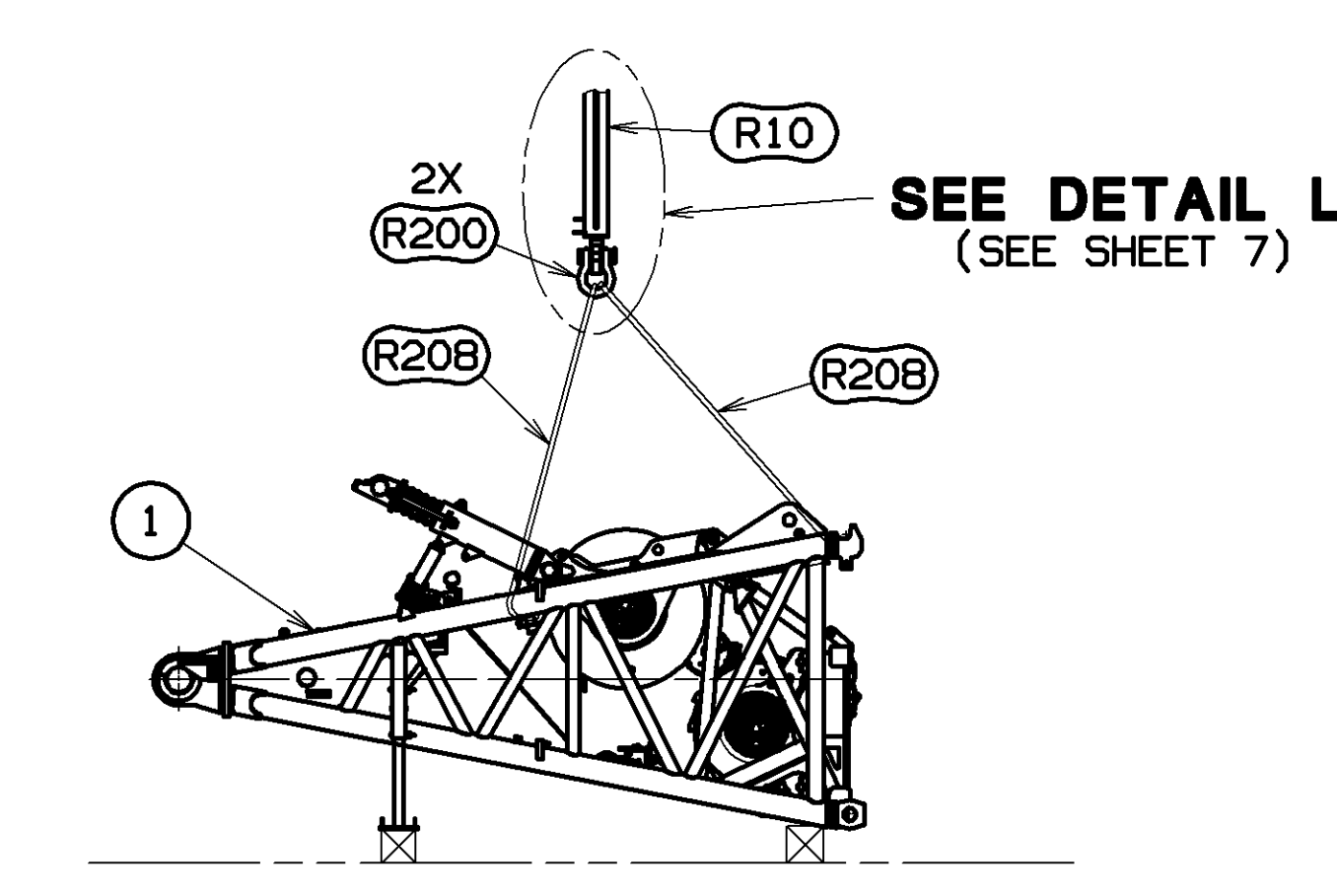
<small>THIS DRAWING IS THE PROPERTY OF MANNING-CORRIGAN, INC. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL IT IS LOANED, SUBJECT TO RETURN UPON DEMAND, AND ON EXPRESS CONDITION THAT IT IS NOT TO BE COPIED OR USED DIRECTLY OR INDIRECTLY IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF MANNING-CORRIGAN, INC.</small>	<small>DECIMAL PLACES</small> (1) PLACE 0.5 ±.12 ±.18 ±.03 (2) PLACE 0.00 ±.08 ±.12 ±.015 (3) PLACE 0.000 ±.008 ±.008 ±.002		<small>TOLERANCE UNLESS OTHERWISE SPECIFIED</small> FABRICATION ±.10 FEET ±.00 FEET MACHINING ±.005 INCHES ±.005 INCHES ±.005 INCHES ±.005 INCHES	<small>MANUFACTURER</small> Mannings-Corrigan, Inc. Manitowish, Wisconsin	<small>MODEL</small> ML650	<small>DESCRIPTION</small> BOOM RIGGING	<small>ITEM NO.</small> B10:680
	<small>DATE</small> 04-01-14		<small>REV. LTR.</small> FE				
	<small>DATE</small> 04-01-14		<small>REV. LTR.</small> FE				
	<small>DATE</small> 04-01-14		<small>REV. LTR.</small> FE				

PRIVATE LABELING
REQUIREMENT TO
CONFORM TO
ENGINEERING
SPECIFICATION
6829103794 FOR
COMPONENTS LISTED
IN 68290-05-026

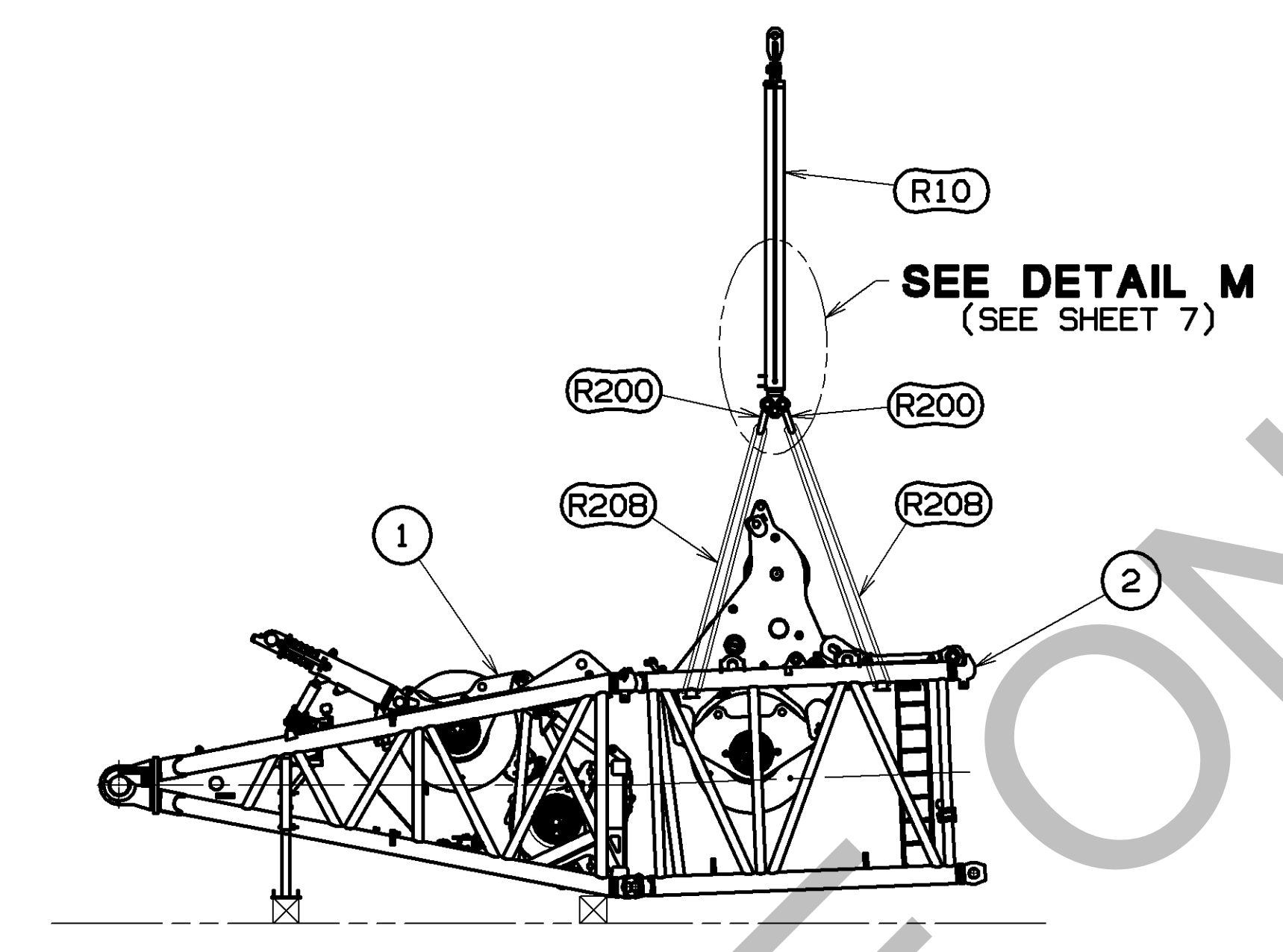
81018141
SHT 5 OF 10



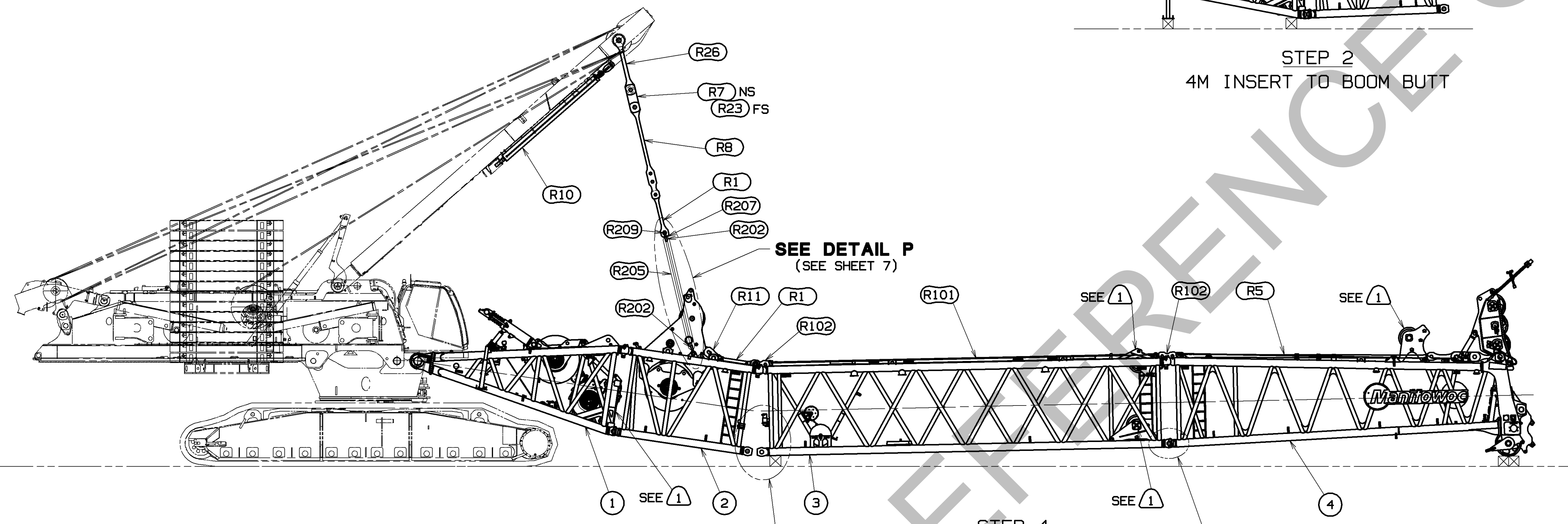
STEP 3
 BUTT/4M INSERT INSTALLATION



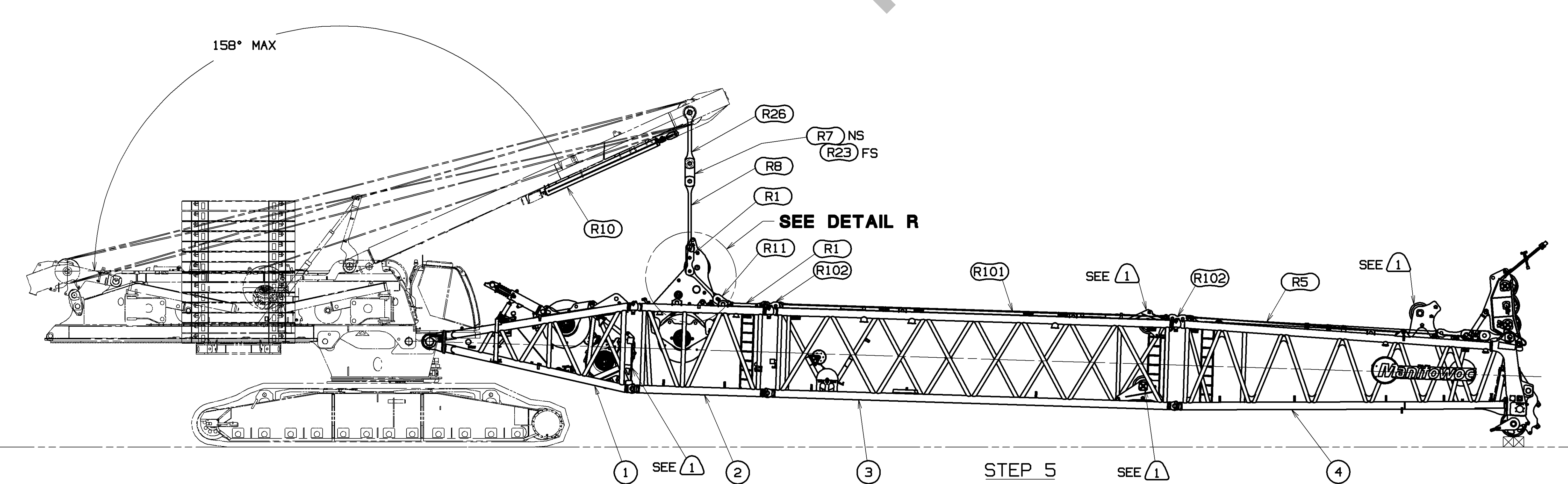
STEP 1
 BOOM BUTT WITH
 SUPPORT PEDESTAL DEPLOYED



STEP 2
 4M INSERT TO BOOM BUTT



STEP 4
 BOOM CLOSING



STEP 5
 STRAP HOOKUP

TO ASSEMBLE BOOM
 (MAST CAN BE USED TO ASSEMBLE ALL RIGGING COMPONENTS)

1. ASSEMBLE BOOM COMPLETE, WITHOUT BUTT AND 4M INSERT.
2. ATTACH ROPE GUIDES, STRAPS, LINKS AND PINS AS REQUIRED.
 (SEE 4M WIRE ROPE GUIDE ARRANGEMENT - SHEET 2)
 (SEE BOOM TOP WIRE ROPE GUIDE ARRANGEMENT - SHEET 2)
 (SEE LOWER BOOM CONNECTOR HYDRAULIC PIN INSTALLATION - DETAIL T SHEET 9). (SEE DELTA 30).
3. POSITION BOOM BUTT WITH SUPPORT PEDESTAL DEPLOYED. (STEP 1) (SEE DETAIL L ON SHEET 7)
4. ASSEMBLE 4M INSERT TO BOOM BUTT. (STEP 2) (SEE DETAIL M ON SHEET 7)
5. INSTALL BUTT/4M INSERT ASSEMBLY WITH MAST AND MAST CYLINDER. (OPTIONAL)

- BUTT/4M INSERT INSTALLATION (STEP 3)
1. SUPPORT BUTT/4M INSERT WITH MAST CYLINDER, SHACKLE AND SLINGS AND SHACKLE TO HANG APPROXIMATELY LEVEL. (SEE DETAIL N ON SHEET 7)
 2. POSITION HINGE PIN ALIGNMENT SUPPORT ON PIN (SEE DETAIL S ON SHEET 9)
 3. POSITION PIN PULLER ASSY (R204) INTO PIN PULLER CAGE WELDMENT (R203) AND ACTIVATE CYLINDER TO INSTALL HINGE PIN INTO BUTT. (SEE DETAIL S - BOOM HINGE PIN INSTALLATION ON SHEET 9)
 6. LOWER MAST TO DISCONNECT HANDLING SLINGS AND SHACKLES FROM LIVE MAST CYLINDER AND BUTT/4M INSERT ASSEMBLY.

WARNING:
 DO NOT BOOM DOWN MAST BEYOND 158° WITHOUT ATTACHING ASSIST CRANE OR MAST CAN FALL.

7. RAISE MAST AND STOW SELF-ASSEMBLING MAST CYLINDER (R10).
8. LOWER MAST OVER END ONLY TO ATTACH LIVE MAST STRAP (R1) TO CLOSING LUGS ON 4M INSERT WITH SHACKLE, SLING AND SHACKLE. (STEP 4) INSTALL BUSHINGS (R209) INTO STRAP (R1) HOLES WITH SHACKLE (R207) ATTACH SLING (R207) BETWEEN SLINGS (R205) AS SPREADER. (SEE DETAIL P ON SHEET 7).
9. BOOM UP TO CLEAR GROUND WITH 4M INSERT.
10. POSITION MACHINE TO ALIGN UPPER PIN CONNECTOR ON 4M INSERT WITH UPPER PIN CONNECTOR PINS ON 12M INSERT W/SHEAVES AND ENGAGE PINS. (STEP 4)
11. SLOWLY BOOM UP TO ALIGN LOWER PIN CONNECTOR HOLES ON 4M INSERT WITH LOWER CONNECTOR HOLES ON 12M INSERT/W SHEAVES.
12. INSTALL LOWER BOOM CONNECTOR PINS (R28). (SEE DETAIL DD ON SHEET 9)

WARNING:
 DO NOT BOOM UP PAST LOWER CONNECTOR HOLES. IF BOOMING UP CONTINUES AFTER CONNECTORS BOTTOM OUT OR AFTER PINS ARE INSERTED, DAMAGE TO MAST AND/OR BOOM BUTT/4M INSERT WILL OCCUR.

13. BOOM DOWN TO DISCONNECT BOOM HANDLING SLINGS AND SHACKLES FROM LIVE MAST STRAP (R1) AND 4M INSERT. REMOVE BUSHINGS (R209) FROM STRAP (R1) AND LOCATE TO STOWAGE POSITION ON 4M INSERT. (SEE DETAIL R)
14. BOOM DOWN TO ATTACH BOOM STRAPS ON MAST TO 4M INSERT STRAPS. (STEP 5)

WARNING:
 DO NOT BOOM DOWN MAST BEYOND 158° WITHOUT ATTACHING ASSIST CRANE OR MAST CAN FALL.

TO DISASSEMBLE BOOM

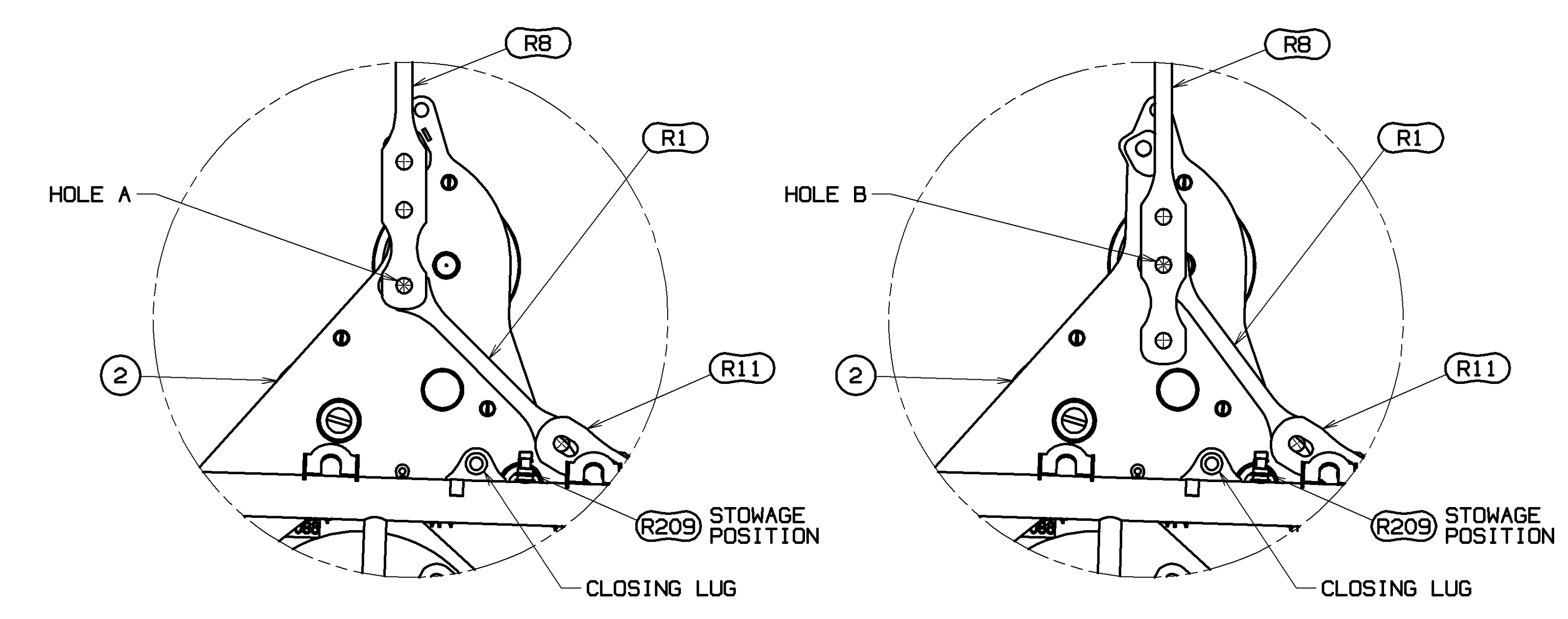
1. BOOM DOWN AND SUPPORT BOOM ON BLOCKING.
2. DISCONNECT MAST STRAPS FROM BOOM 4M INSERT STRAPS.
3. CONNECT STRAPS FROM MAST TO 4M INSERT LUGS WITH SHACKLES AND SLINGS.
4. BOOM UP TO REMOVE SLACK FROM BUTT/4M INSERT HANDLING SLINGS.

WARNING:
 DO NOT BOOM UP TO PUT EXCESSIVE TENSION INTO BUTT/4M INSERT HANDLING SLINGS (ENOUGH TENSION IS REQUIRED TO SUPPORT BUTT/4M INSERT WHEN LOWER PINS ARE REMOVED). LIFTING BOOM WITH HANDLING SLINGS WILL DAMAGE MAST AND/OR BOOM BUTT/4M INSERT.

5. REMOVE LOWER CONNECTOR PINS FROM 4M INSERT TO 12M W/SHEAVES AND BOOM DOWN TO BLOCKING TO DISENGAGE UPPER CONNECTOR PINS FROM 4M INSERT TO 12M INSERT W/SHEAVES.

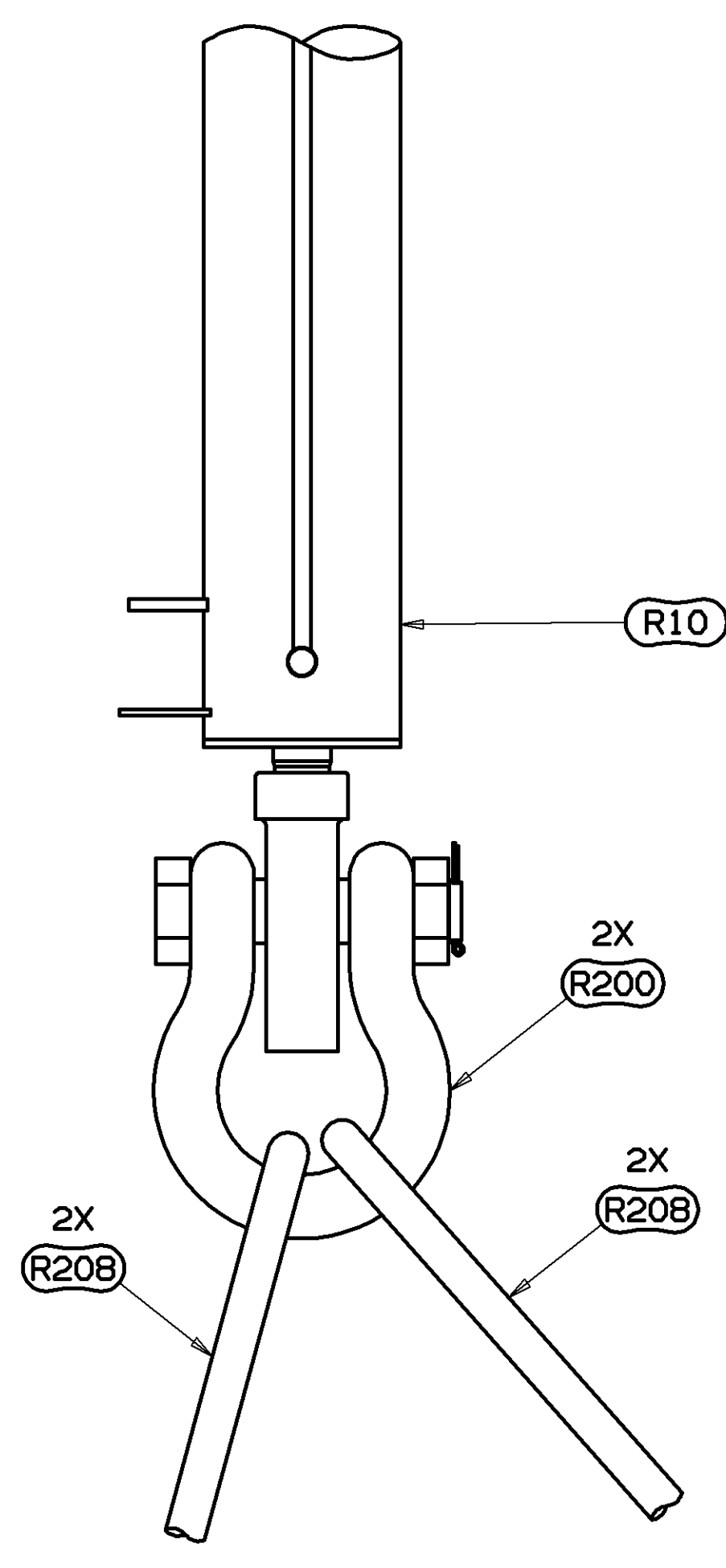
WARNING:
 BOOM MUST BE PROPERLY BLOCKED TO PREVENT SHIFTING DURING PIN REMOVAL.

6. SLOWLY BACK AWAY FROM BOOM.
7. REMOVE BOOM BUTT/4M INSERT FROM ADAPTER FRAME.
8. DISASSEMBLE 4M INSERT FROM BUTT.
9. DISASSEMBLE BOOM WITH SELF ASSEMBLY CYLINDER IF DESIRED.

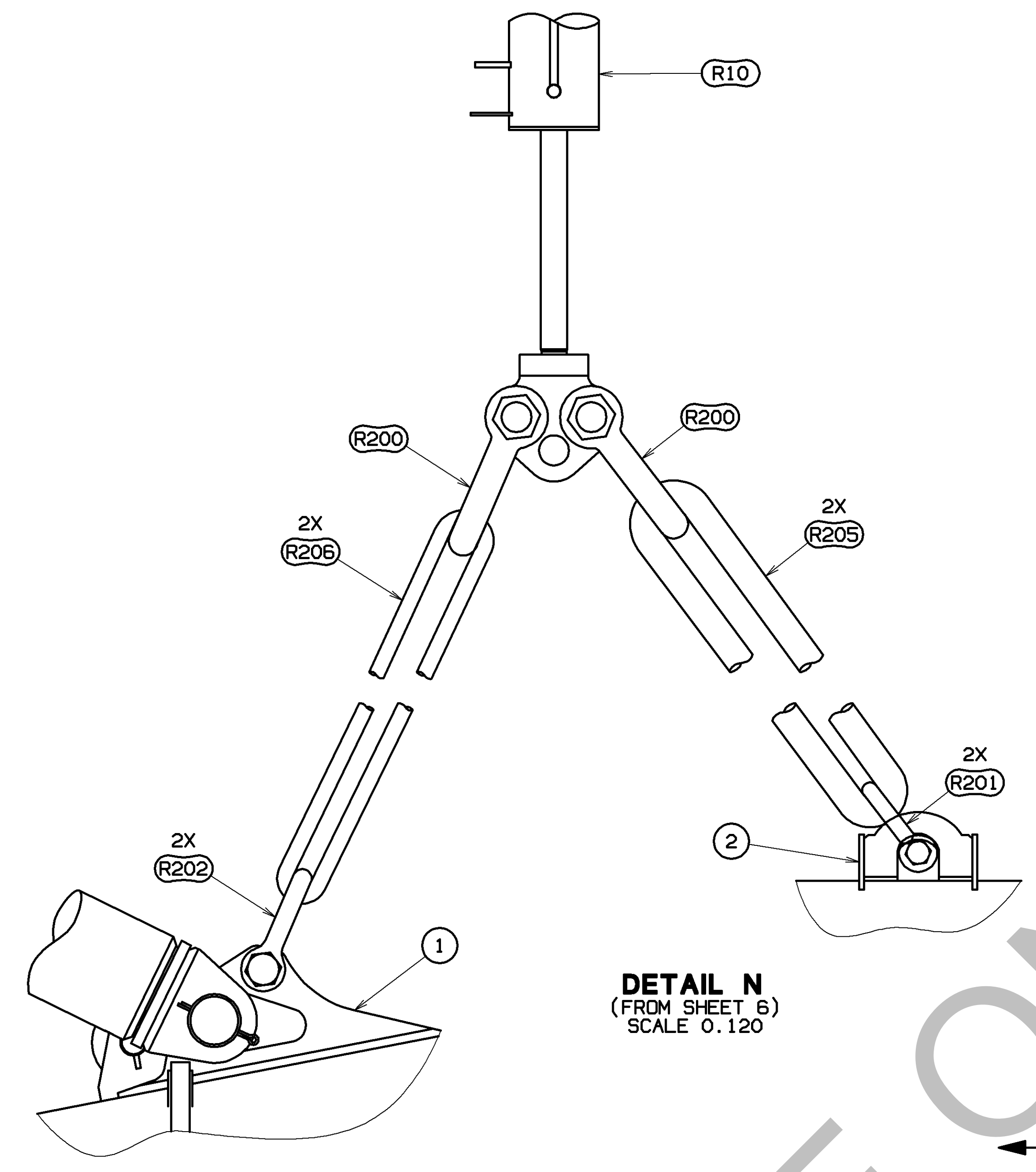


DETAIL R
 SCALE 0.50
 REFER TO BOOM LENGTH MAKE-UP TABLE - SHEET 2 FOR LIVE MAST ADJUSTMENT HOLE IDENTIFICATION

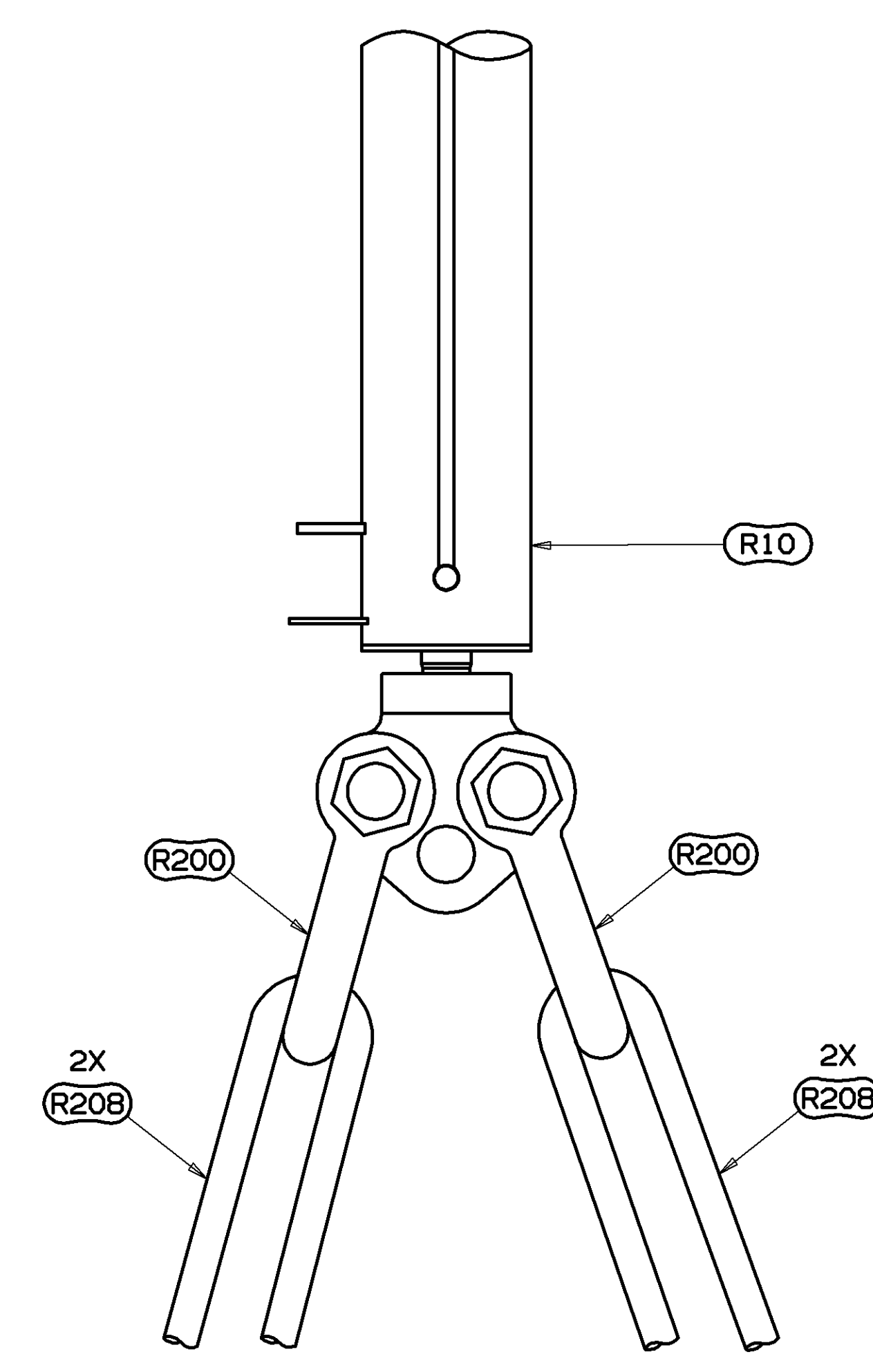
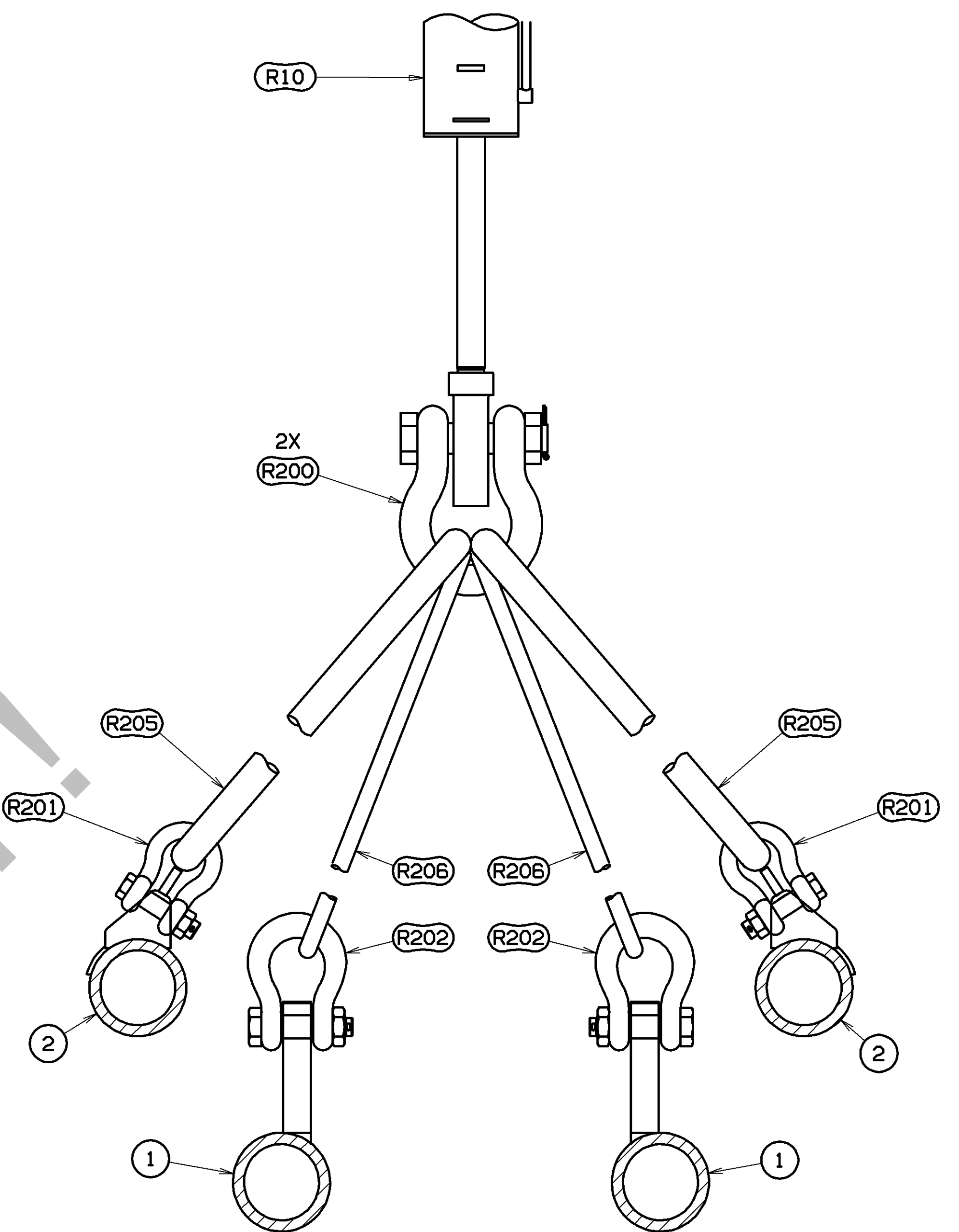
TOLERANCE UNLESS OTHERWISE SPECIFIED		MATERIAL		FINISH	
DECIMAL PLACES	FRACTIONS	DESCRIPTION	GRADE	PROCESS	REFERENCE
0.000	1/1000	STEEL	A36	BLK	AS SUPPLIED
0.00	1/64	STEEL	A36	BLK	AS SUPPLIED
0.01	1/32	STEEL	A36	BLK	AS SUPPLIED
0.02	1/16	STEEL	A36	BLK	AS SUPPLIED
0.05	1/32	STEEL	A36	BLK	AS SUPPLIED
0.10	1/16	STEEL	A36	BLK	AS SUPPLIED
0.15	1/16	STEEL	A36	BLK	AS SUPPLIED
0.20	1/8	STEEL	A36	BLK	AS SUPPLIED
0.30	1/8	STEEL	A36	BLK	AS SUPPLIED
0.50	1/4	STEEL	A36	BLK	AS SUPPLIED
1.00	1/2	STEEL	A36	BLK	AS SUPPLIED
2.00	1	STEEL	A36	BLK	AS SUPPLIED
3.00	1	STEEL	A36	BLK	AS SUPPLIED
4.00	1	STEEL	A36	BLK	AS SUPPLIED
5.00	1	STEEL	A36	BLK	AS SUPPLIED
6.00	1	STEEL	A36	BLK	AS SUPPLIED
8.00	1	STEEL	A36	BLK	AS SUPPLIED
10.00	1	STEEL	A36	BLK	AS SUPPLIED
12.00	1	STEEL	A36	BLK	AS SUPPLIED
15.00	1	STEEL	A36	BLK	AS SUPPLIED
20.00	1	STEEL	A36	BLK	AS SUPPLIED
25.00	1	STEEL	A36	BLK	AS SUPPLIED
30.00	1	STEEL	A36	BLK	AS SUPPLIED
40.00	1	STEEL	A36	BLK	AS SUPPLIED
50.00	1	STEEL	A36	BLK	AS SUPPLIED
60.00	1	STEEL	A36	BLK	AS SUPPLIED
80.00	1	STEEL	A36	BLK	AS SUPPLIED
100.00	1	STEEL	A36	BLK	AS SUPPLIED



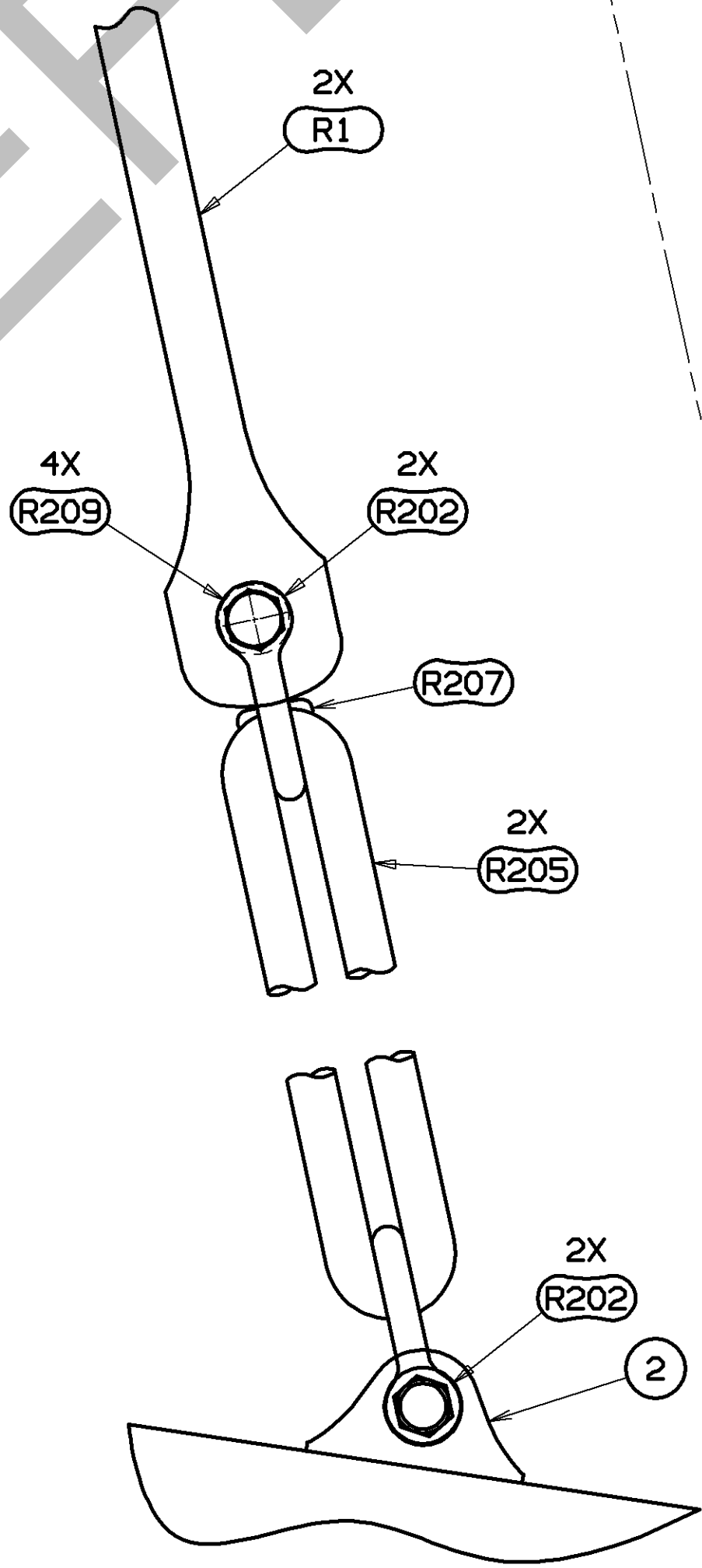
DETAIL L
(FROM SHEET 6)
SCALE 0.150



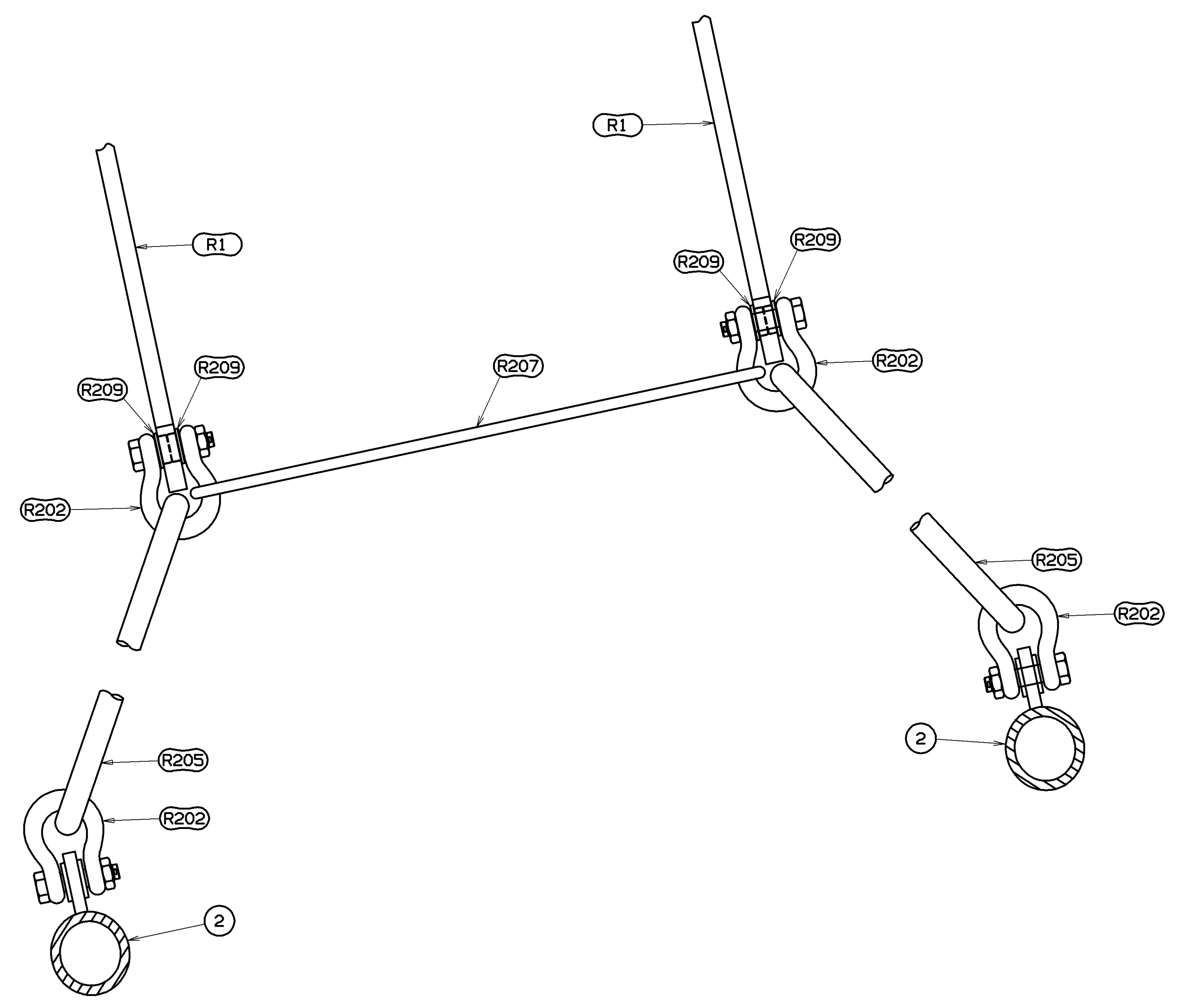
DETAIL N
(FROM SHEET 6)
SCALE 0.120



DETAIL M
(FROM SHEET 6)
SCALE 0.150



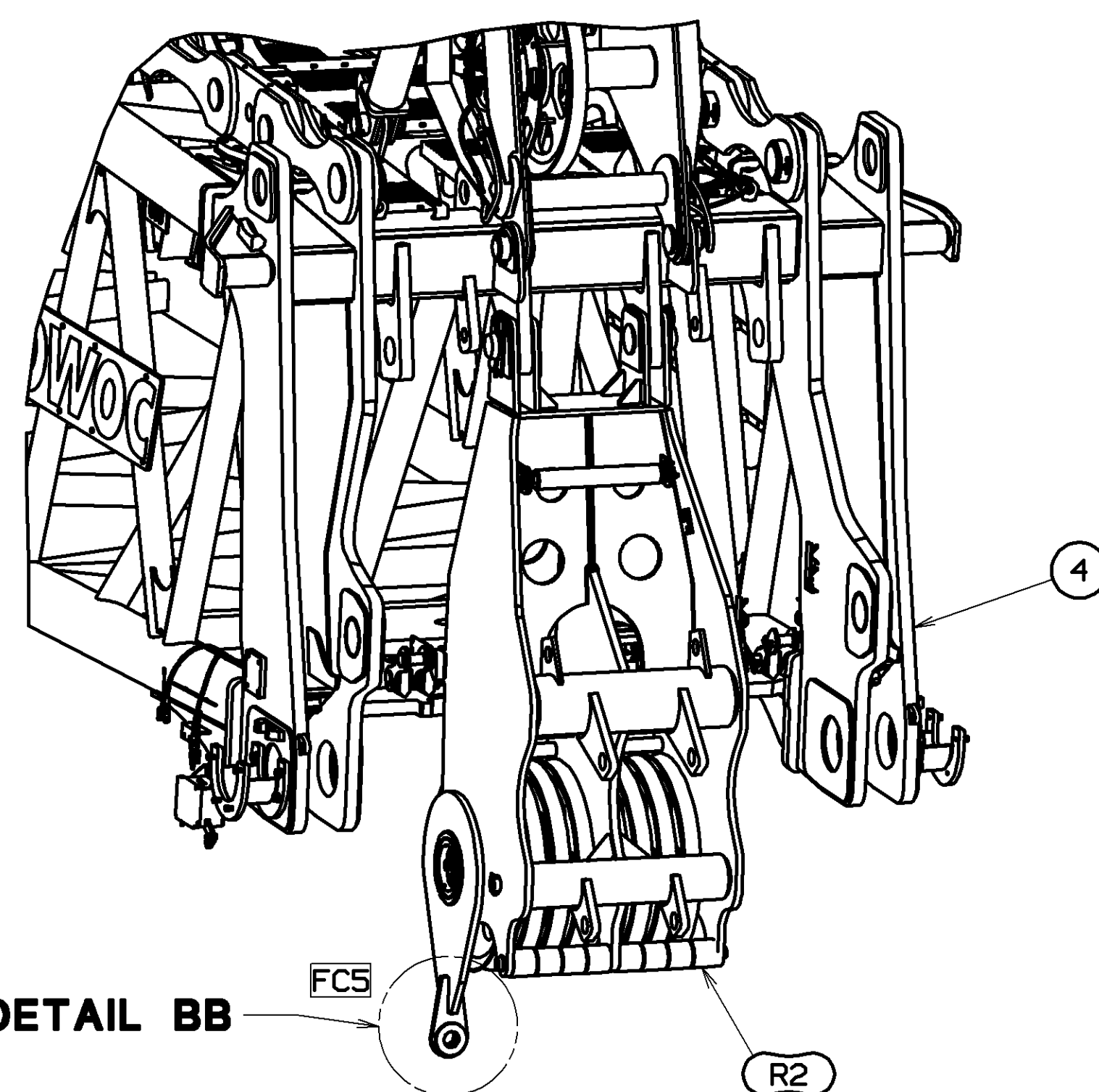
DETAIL P
(FROM SHEET 6)
SCALE 0.120



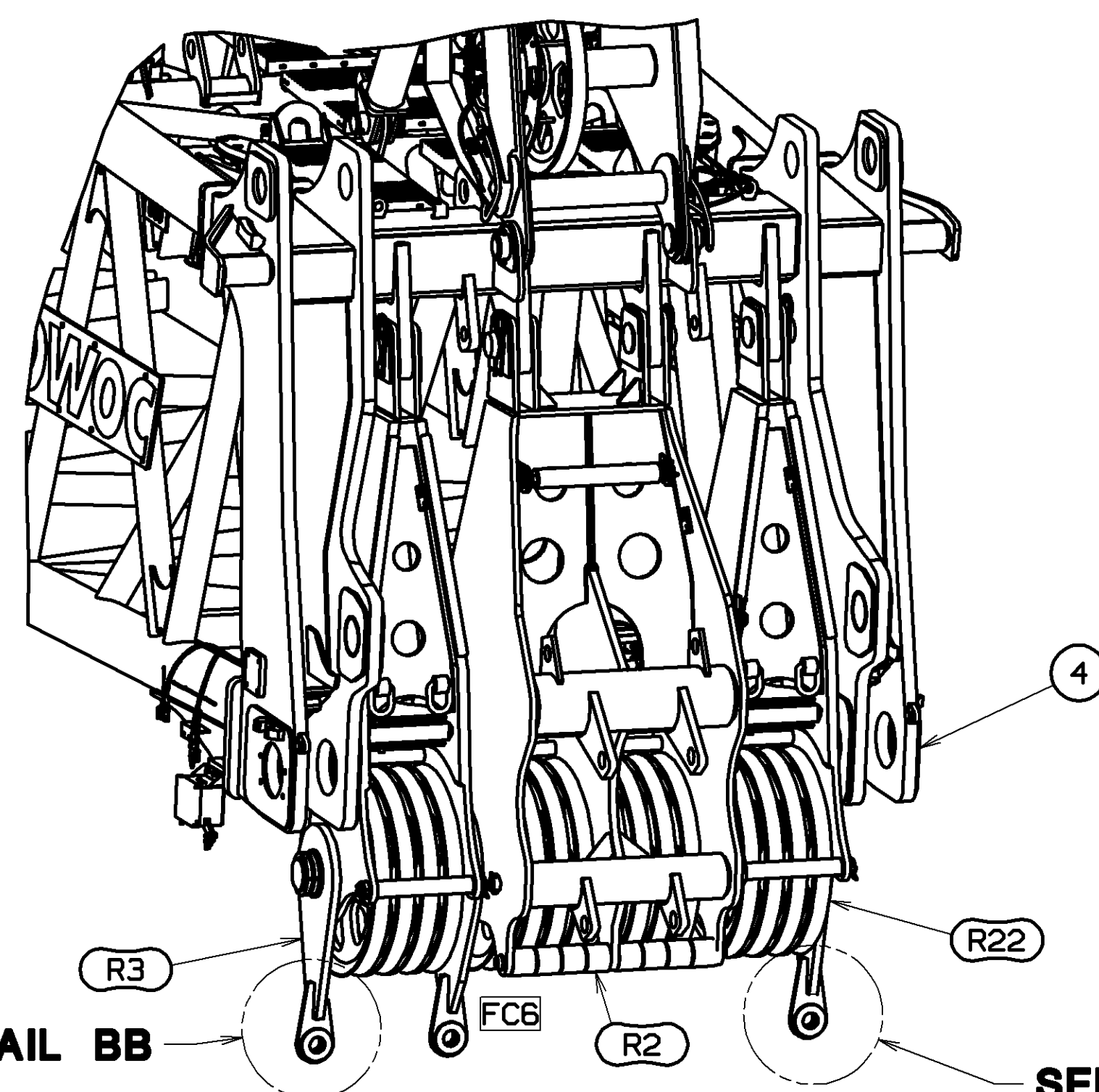
REFERENCE ONLY!

DECIMAL PLACES	FABRICATION	MACHINING	WELDING	OTHER
(1) PLACE 0.5	±.12	±.18	±.05	±.05
(2) PLACE 0.00	±.08	±.12	±.015	±.005
(3) PLACE 0.000	±.005	±.008	±.002	±.001

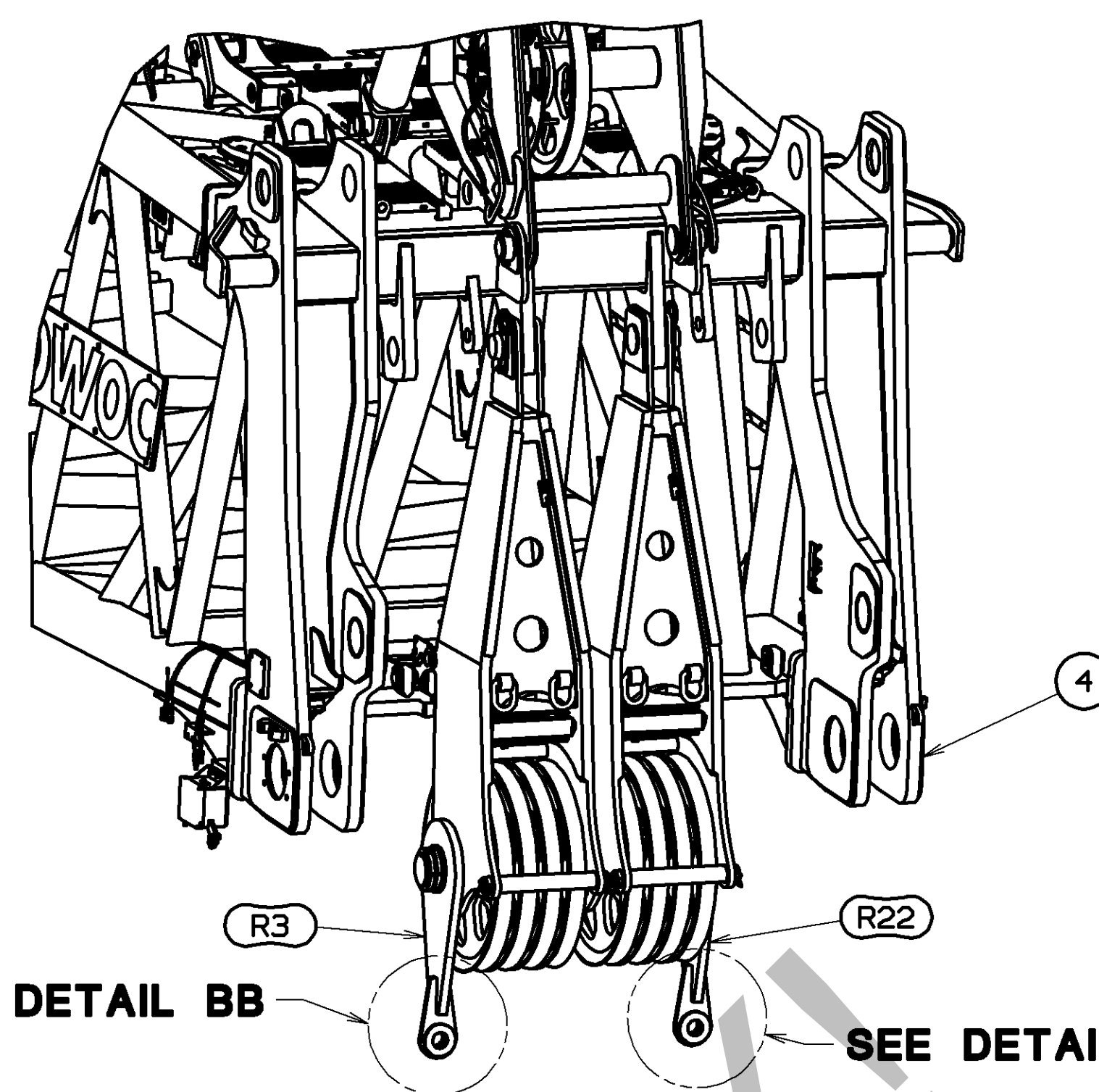
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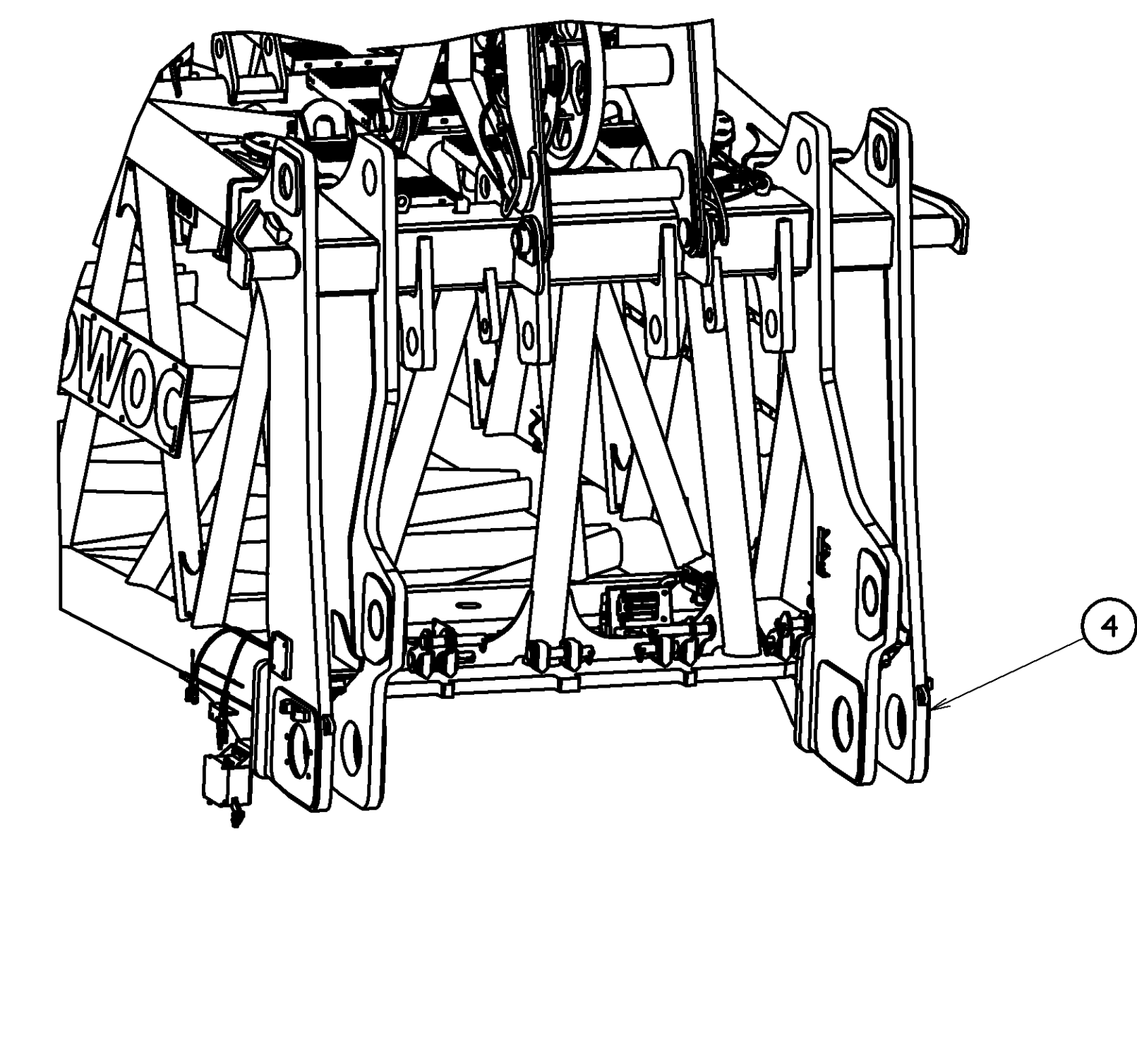
SEE DETAIL BB
BASIC W/O OPTION CONFIGURATION
 FOR BOOM ONLY
 8 SHEAVE CENTER SHEAVE PACK
 SCALE 0.050



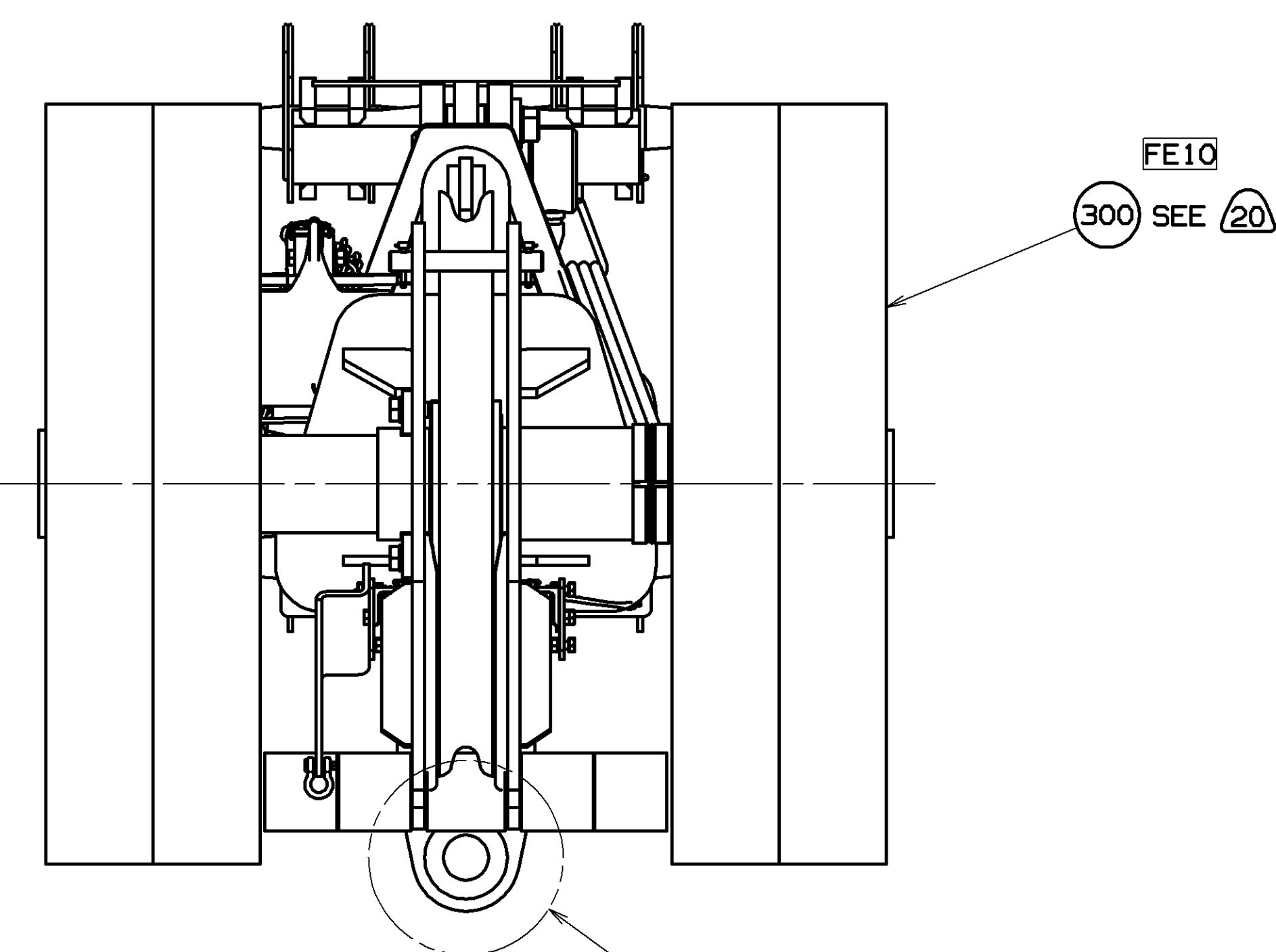
SEE DETAIL BB
BASIC W/OPTION CONFIGURATION
 FOR BOOM ONLY
 8 SHEAVE CENTER & (2) 4 SHEAVE SIDE PACK
 SCALE 0.050



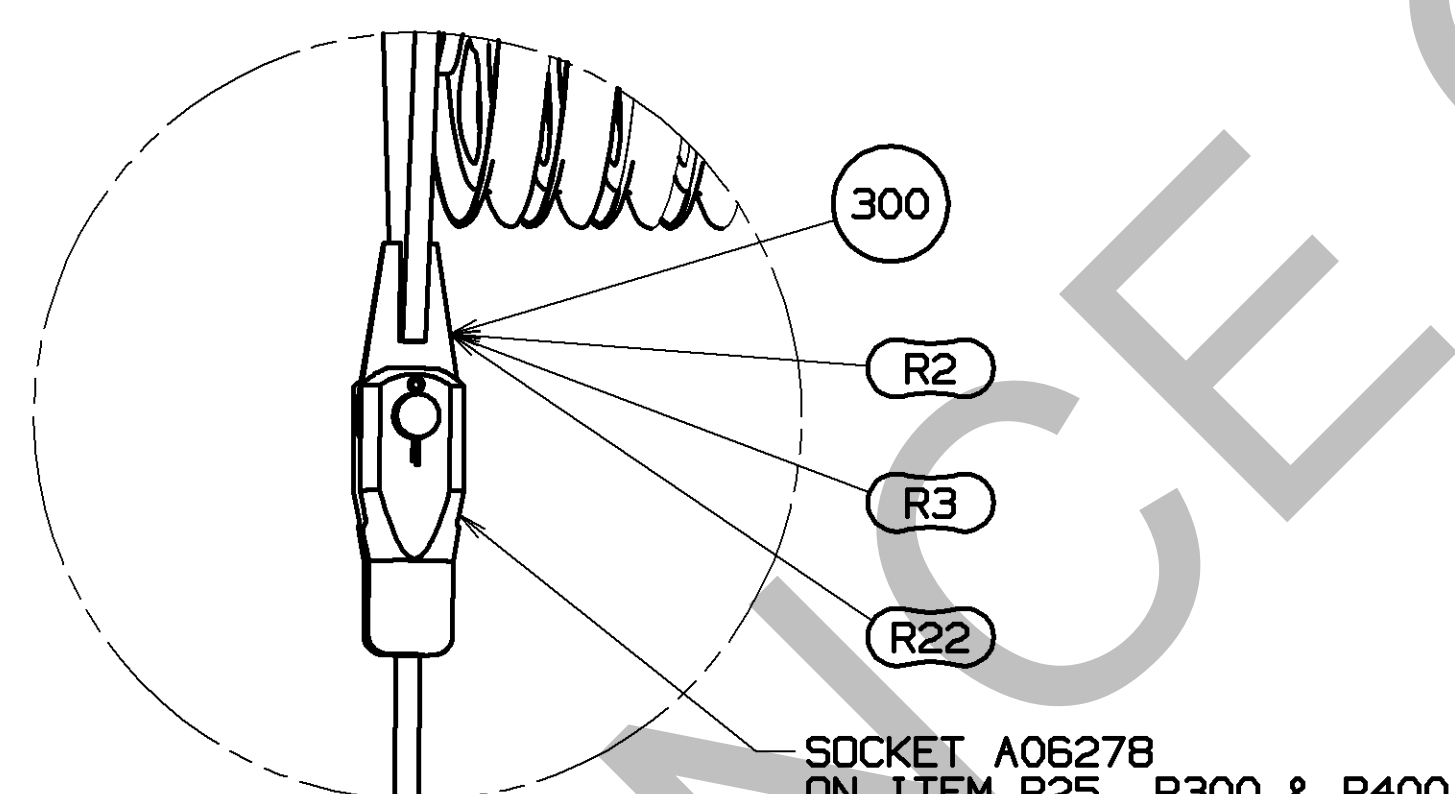
SEE DETAIL BB
OPTION W/O BASIC CONFIGURATION
 FOR BOOM ONLY OR BOOM W/LUFFING JIB
 (2) 4 SHEAVE CENTER PACKS
 SCALE 0.050



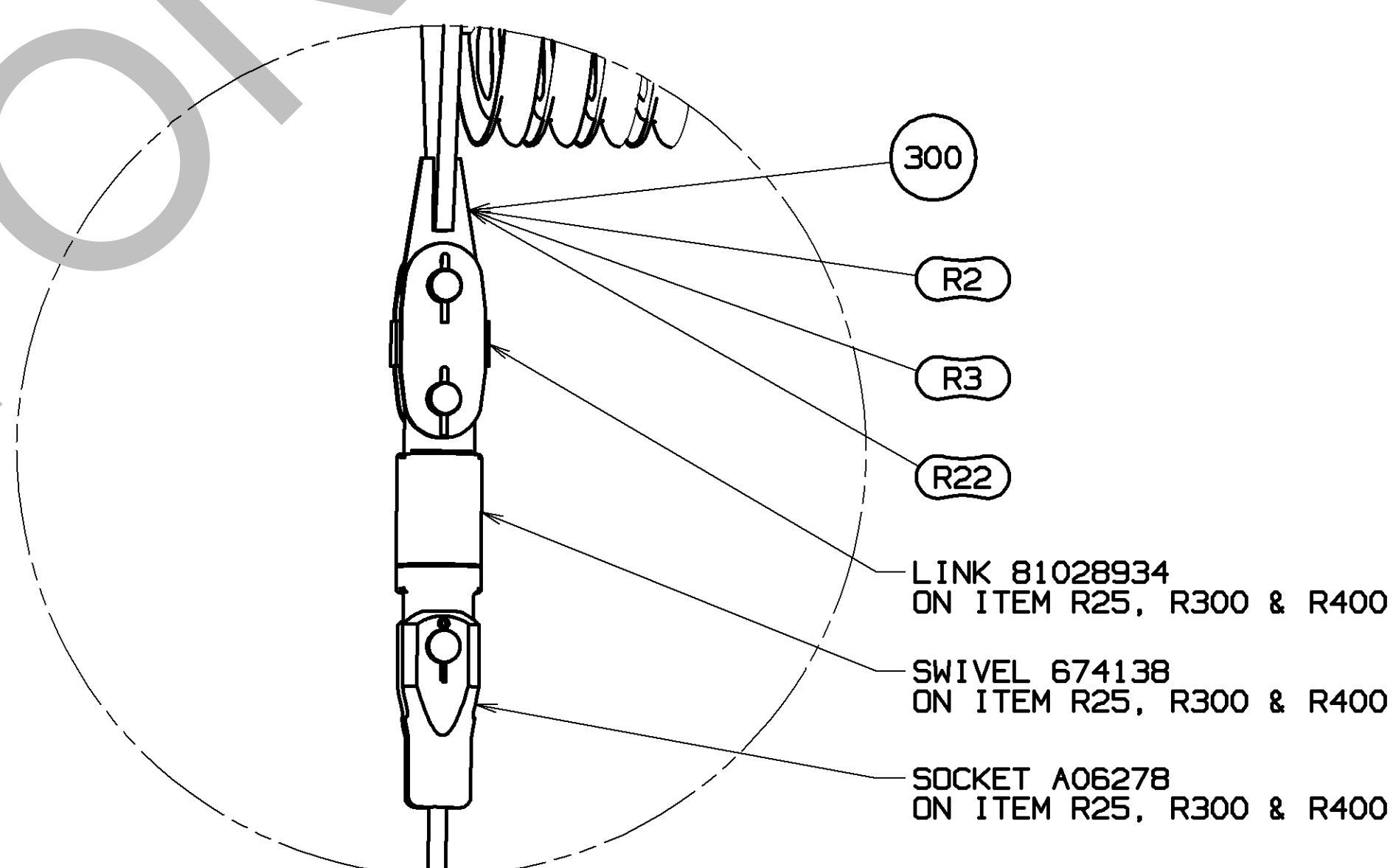
W/O BASIC AND OPTION CONFIGURATION
 FOR BOOM W/LUFFING JIB
 WITHOUT SHEAVE PACKS
 SCALE 0.050



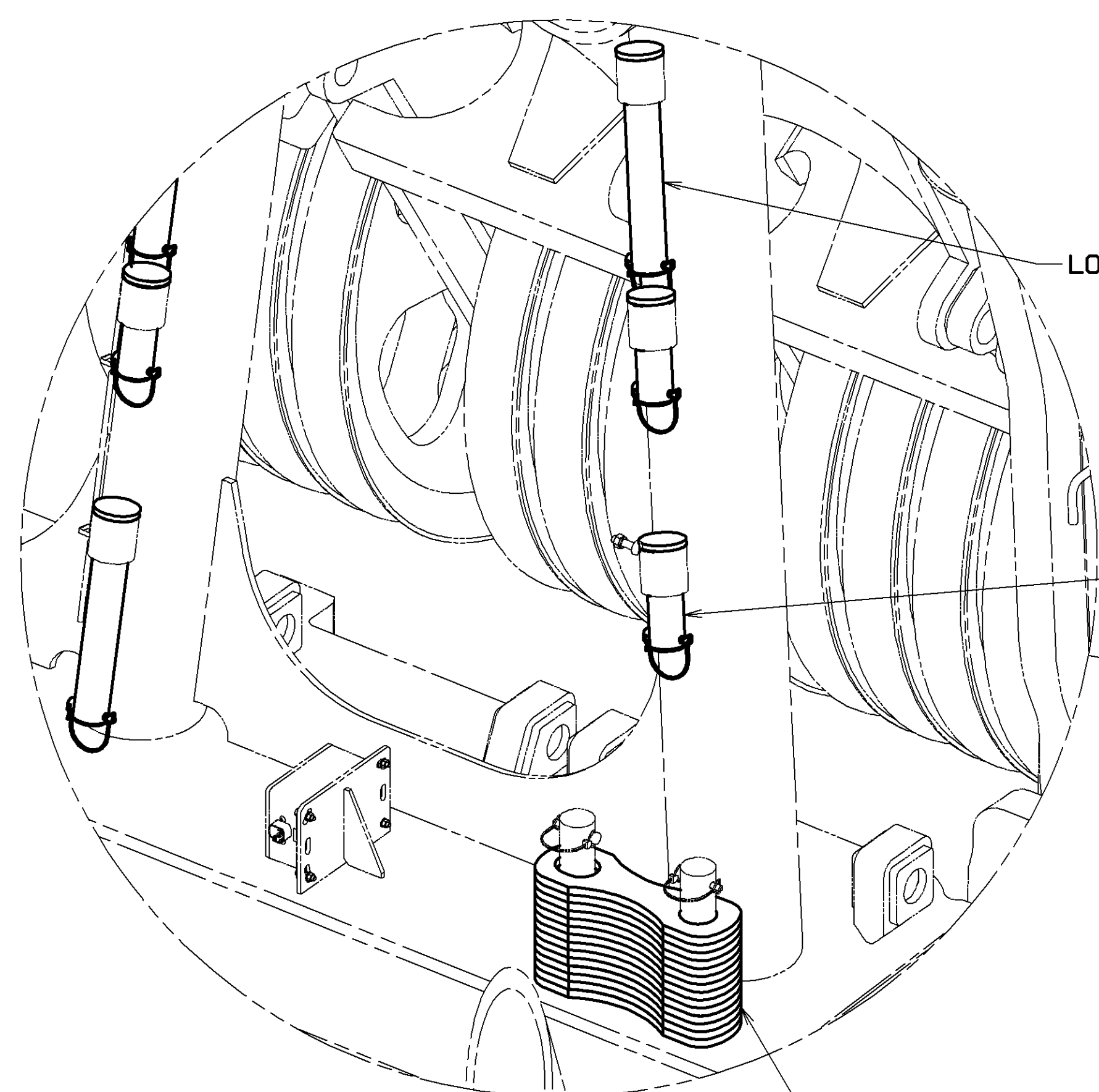
VIEW CC-CC
 (FROM SHEET 1)
 SCALE 0.150



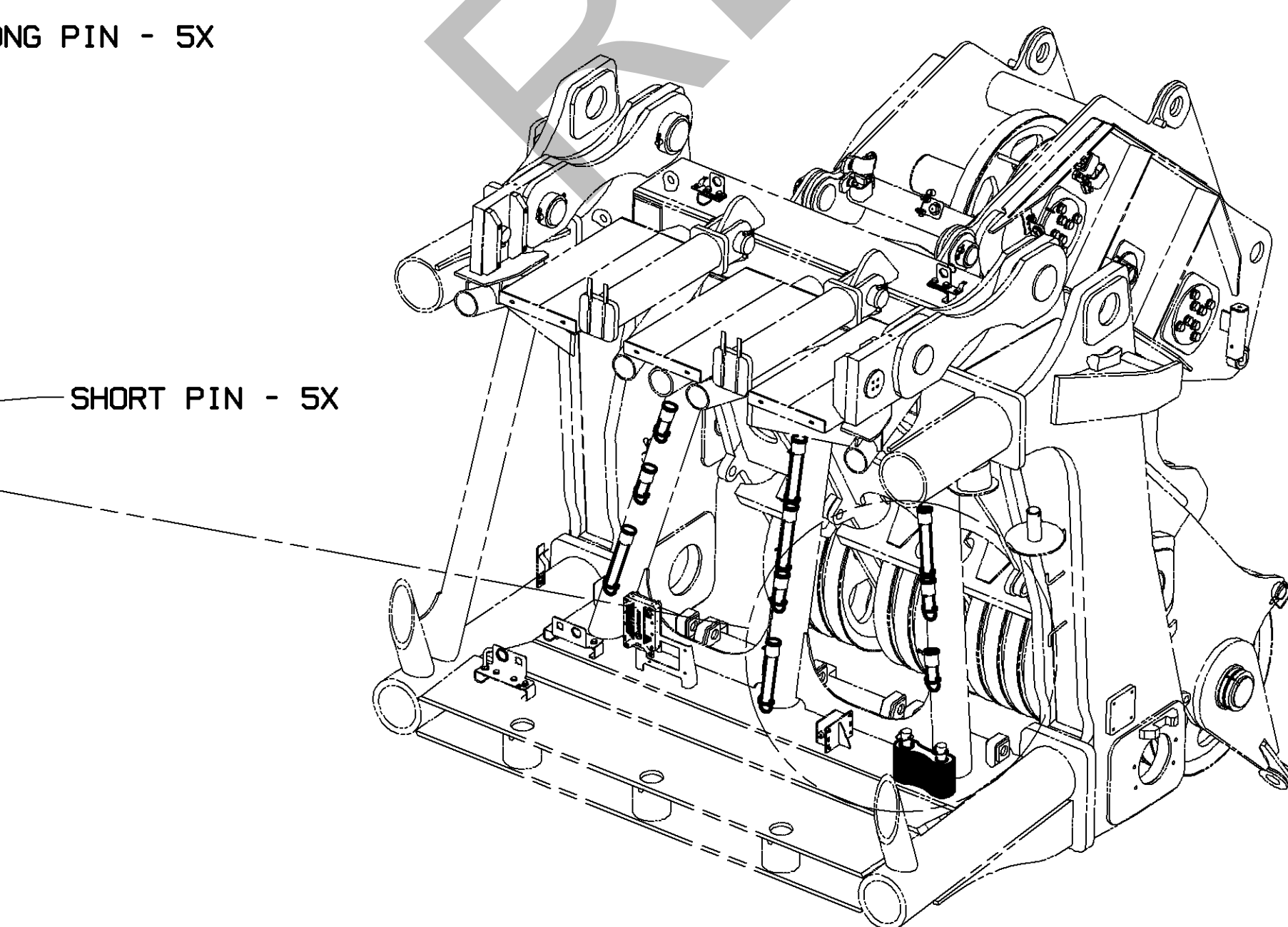
DETAIL BB
 ITEM R25, R300 & R400
 DEAD END W/O SWIVEL
 SCALE 0.100



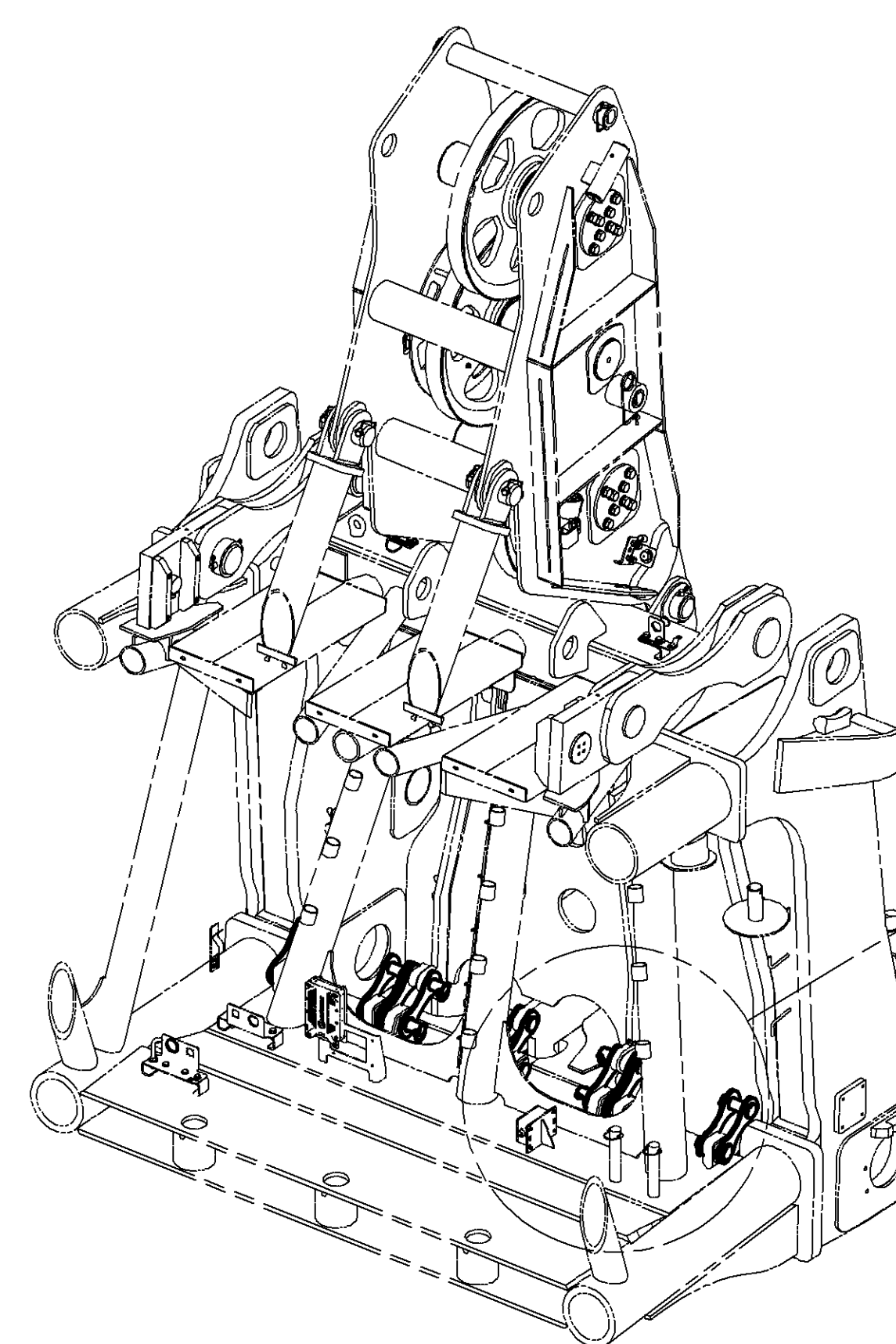
DETAIL BB
 ITEM R25, R300 & R400
 DEAD END W/SWIVEL
 SCALE 0.100



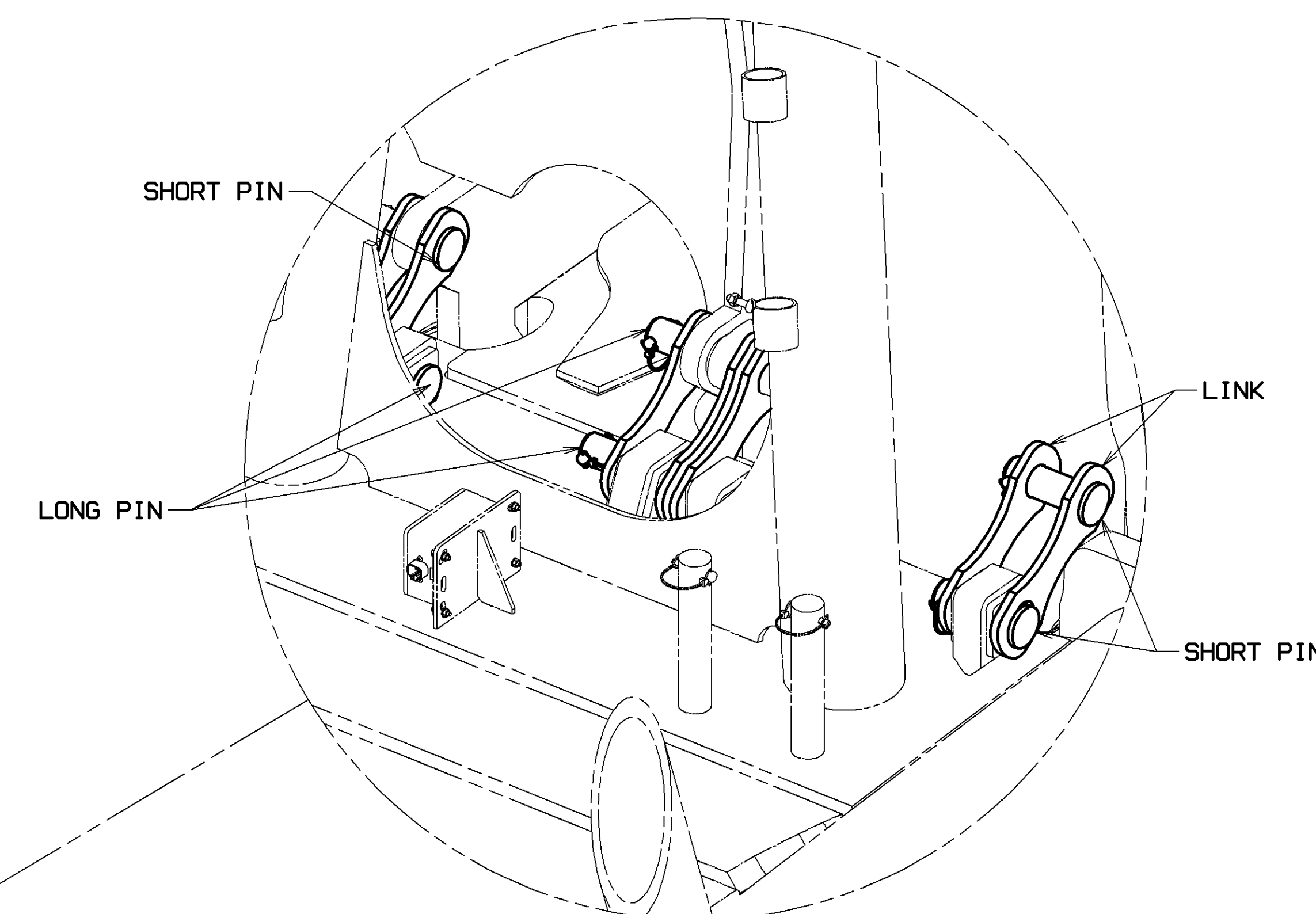
LINKS - SHEAVE PACK - 14X



LOWER SHEAVE POINT PINS AND LINKS IN STOWAGE POSITION.
 FOR SHIPPING OF BOOM TOP WITH LOWER BOOM POINT
 PIVOTED AWAY FROM BEARING PLATE OR FOR REMOVAL
 OF SHEAVE PACKS PER VARIOUS CONFIGURATIONS.
 SCALE 0.050

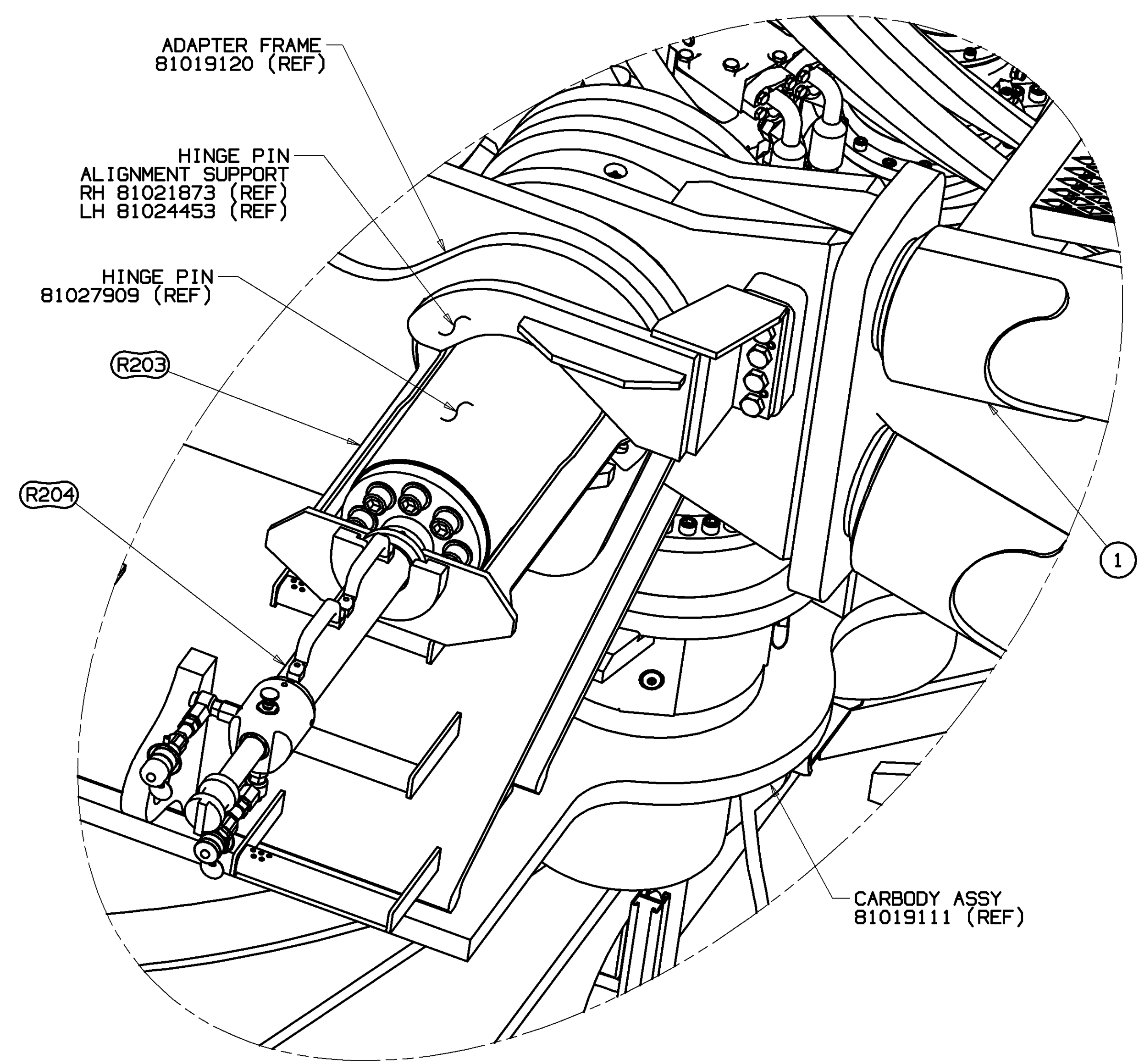


LOWER SHEAVE POINT PINS AND LINKS IN WORKING POSITION
 AND FOR SHIPPING OF BOOM TOP WITH LOWER BOOM
 POINT CONTACTING BEARING PLATE.
 SCALE 0.050

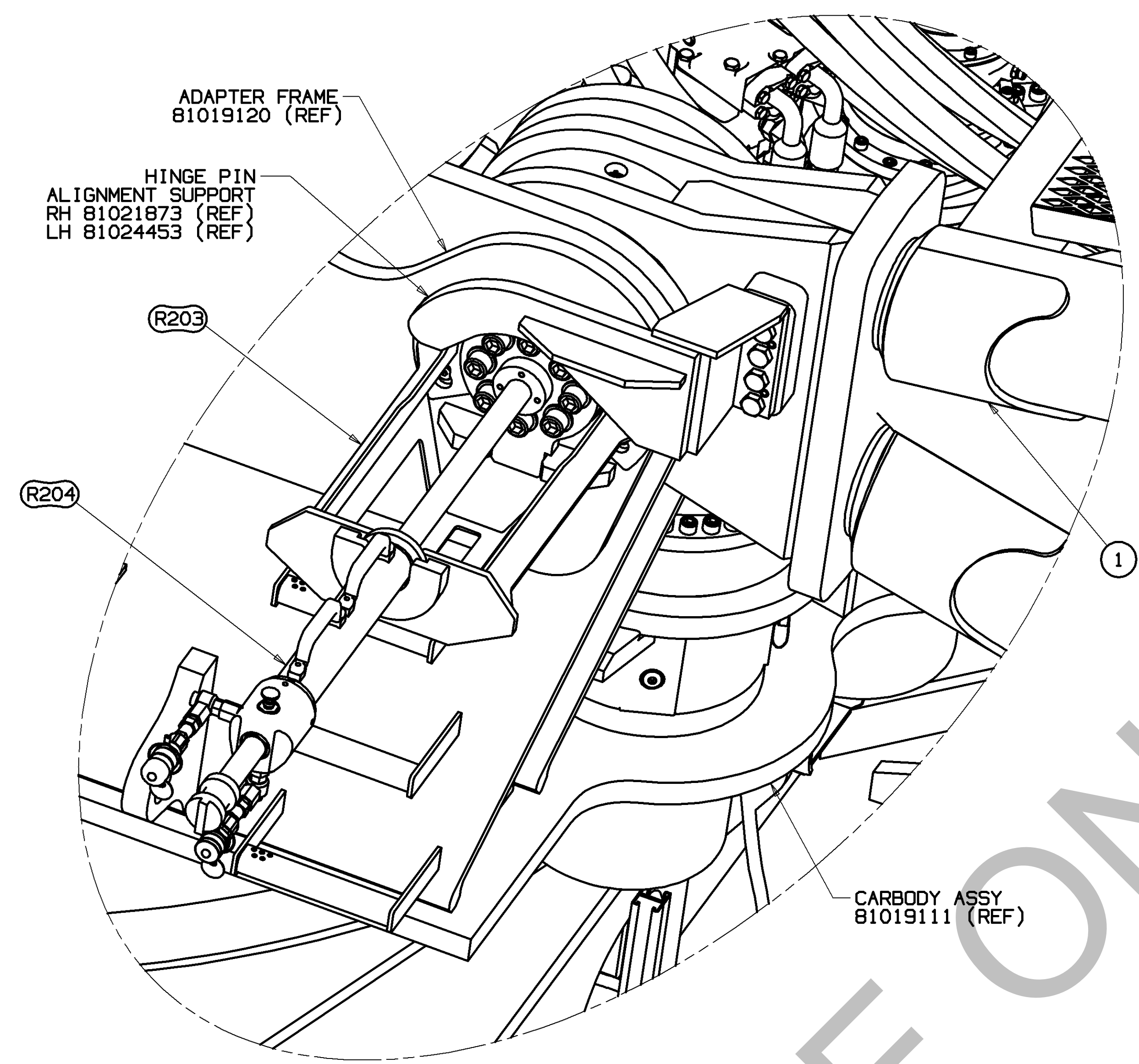


SHORT PIN
 LONG PIN
 LINK
 SHORT PIN

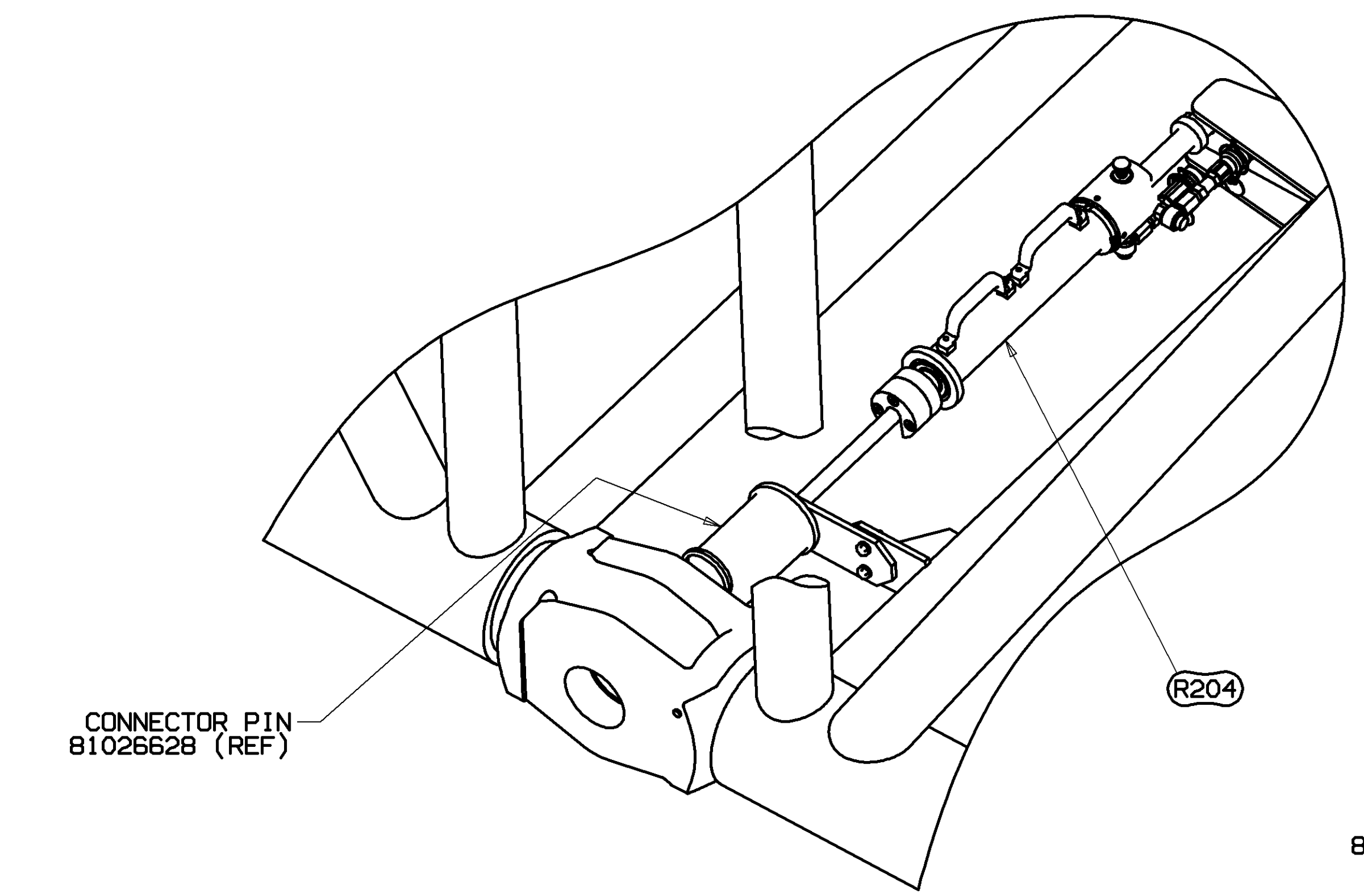
DECIMAL PLACES	FRACTIONS	INCHES	MACHINING	NOTES	DATE	BY	CHK	APP	MODEL	DESCRIPTION
(1) PLACE 0.5	1/2	1/2	1/2	DR. CDC	04-01-14				MLC650	BOOM RIGGING
(2) PLACE 0.00	1/16	1/16	1/16	CK. RHW						B10:680
(3) PLACE 0.000	1/64	1/64	1/64	APP TJA						



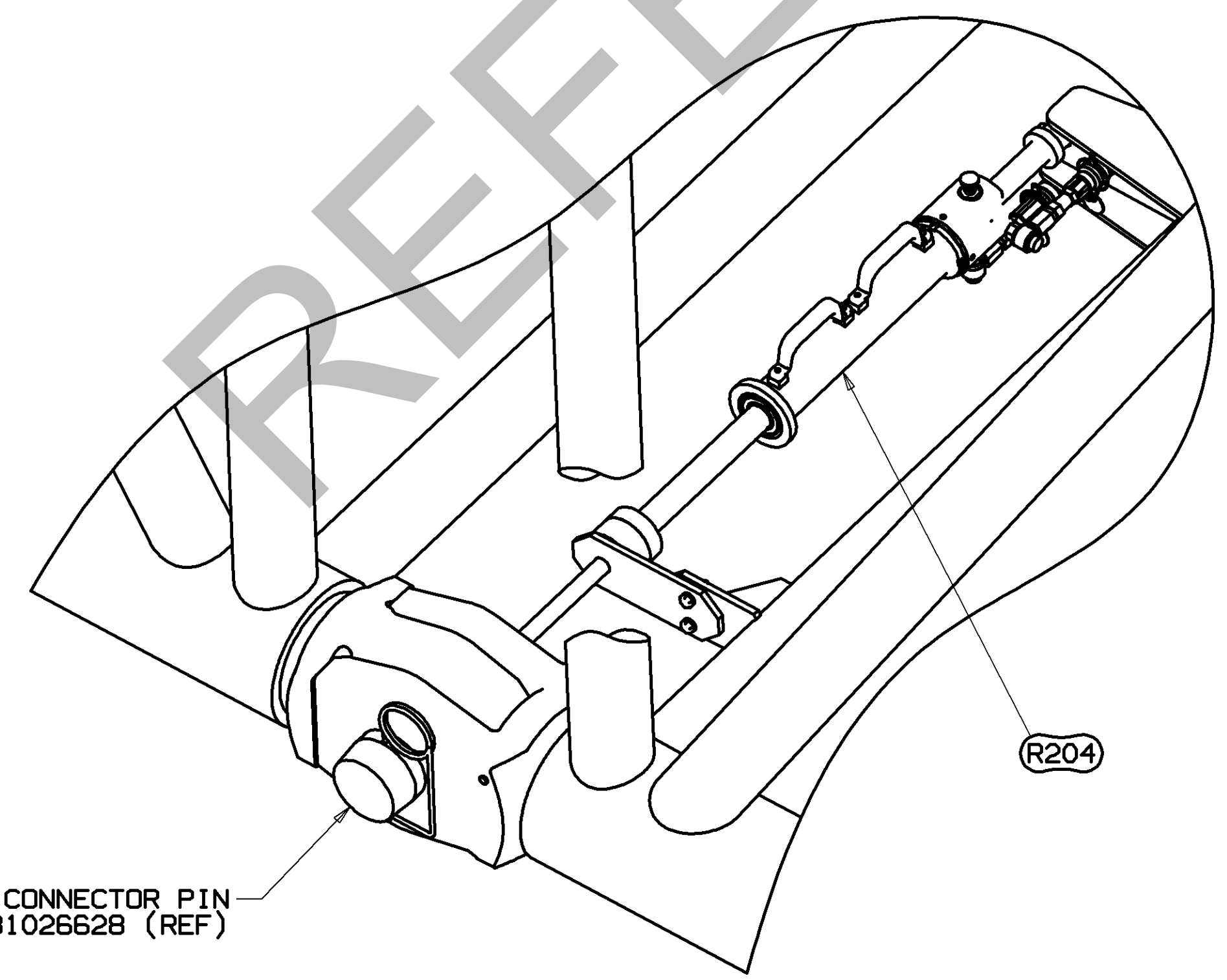
DETAIL S
BOOM HINGE INSTALLATION
PIN PULLER (R204) RETRACTED
(FROM SHEET 6)
SCALE 0.200



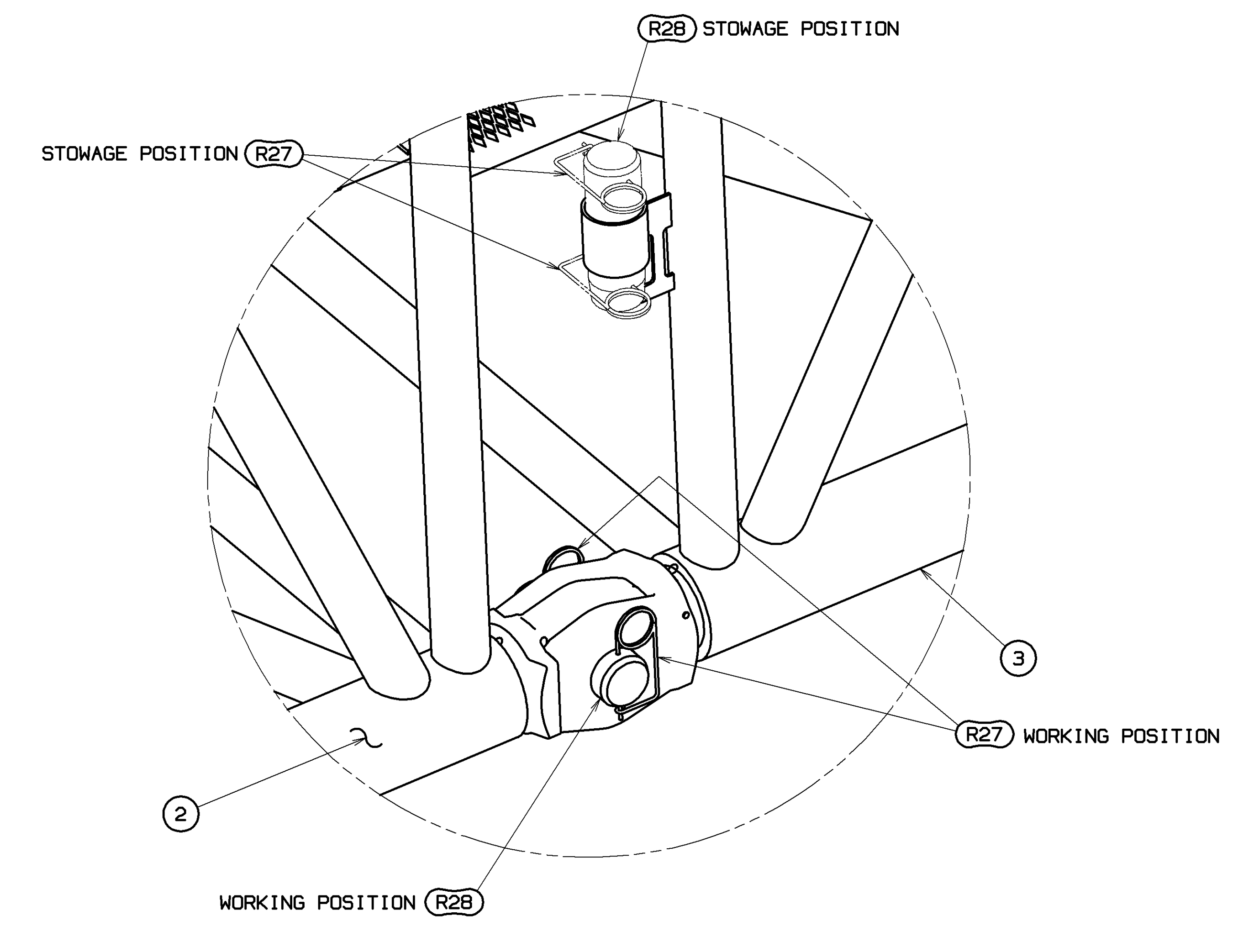
DETAIL S
BOOM HINGE INSTALLATION
PIN PULLER (R204) EXTENDED
(FROM SHEET 6)
SCALE 0.200



DETAIL T
TYPICAL LOWER BOOM
CONNECTOR HYDRAULIC PIN INSTALLATION
PIN PULLER (R204) RETRACTED
(FROM SHEET 6)
SCALE 0.150
SEE 30



DETAIL T
TYPICAL LOWER BOOM
CONNECTOR HYDRAULIC PIN INSTALLATION
PIN PULLER (R204) EXTENDED
(FROM SHEET 6)
SCALE 0.150
SEE 30



DETAIL DD
4M TO 12M INSERT LOWER BOOM CONNECTOR
MANUAL PIN INSTALLATION
(FROM SHEET 6)
SCALE 0.150
SEE 30
FE11

REFERENCE ONLY!

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	DECIMAL PLACES	FABRICATION				MACHINING
	(1) PLACE 0.5	±.12 ±.18 ±.03				±.015
	(2) PLACE 0.00	±.08 ±.12 ±.015				±.008
(3) PLACE 0.000	±.02 ±.03 ±.008	±.003	APPROX. 40°/90°			
<small>DATE: 04-01-14 REV. LVL.: FE11</small>						

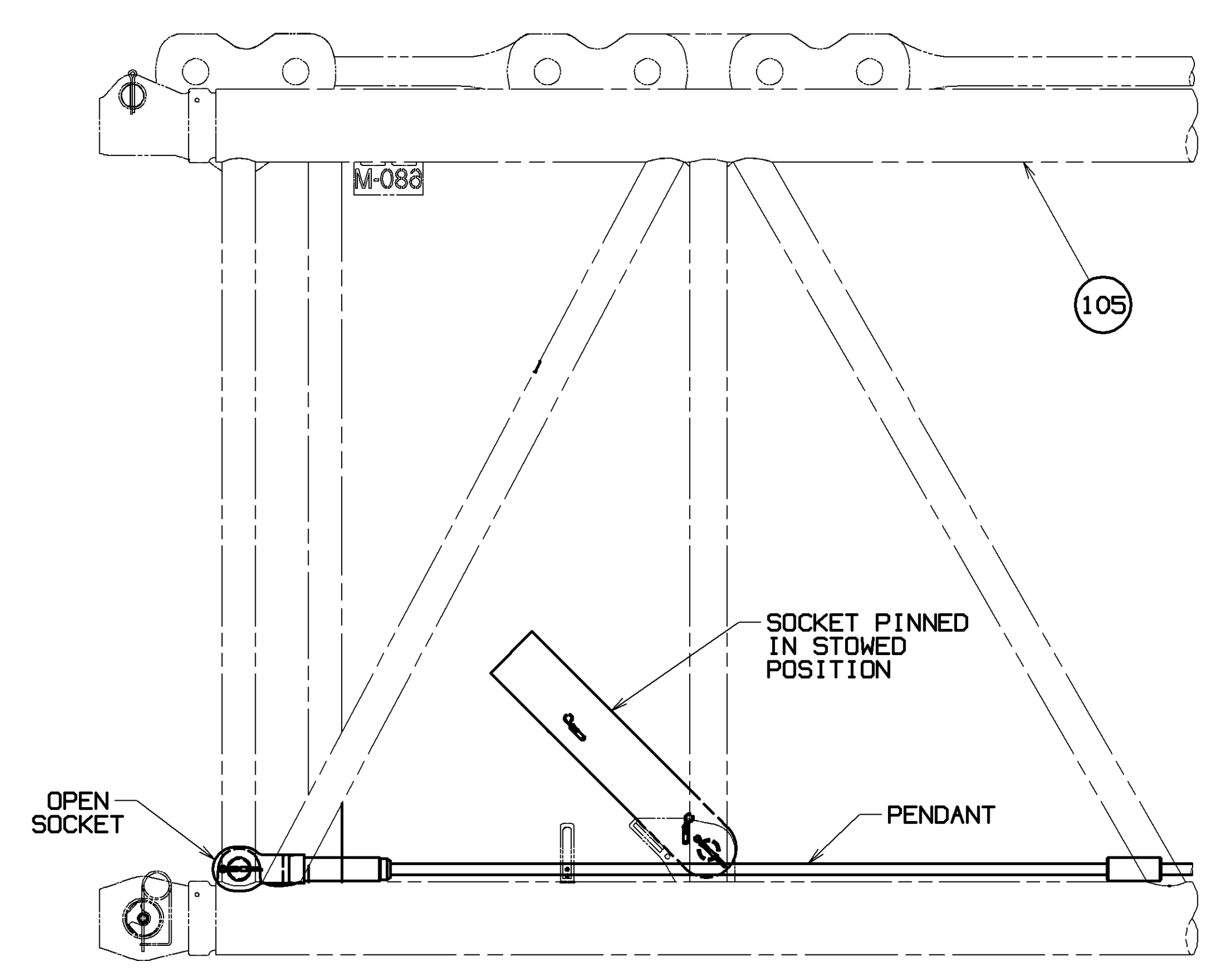
BILL OF MATERIAL				ASSEMBLIES USED ON
QTY	DESCRIPTION	MATERIAL	QTY	NO.

INTERMEDIATE SUSPENSION (R112) INSTALLATION

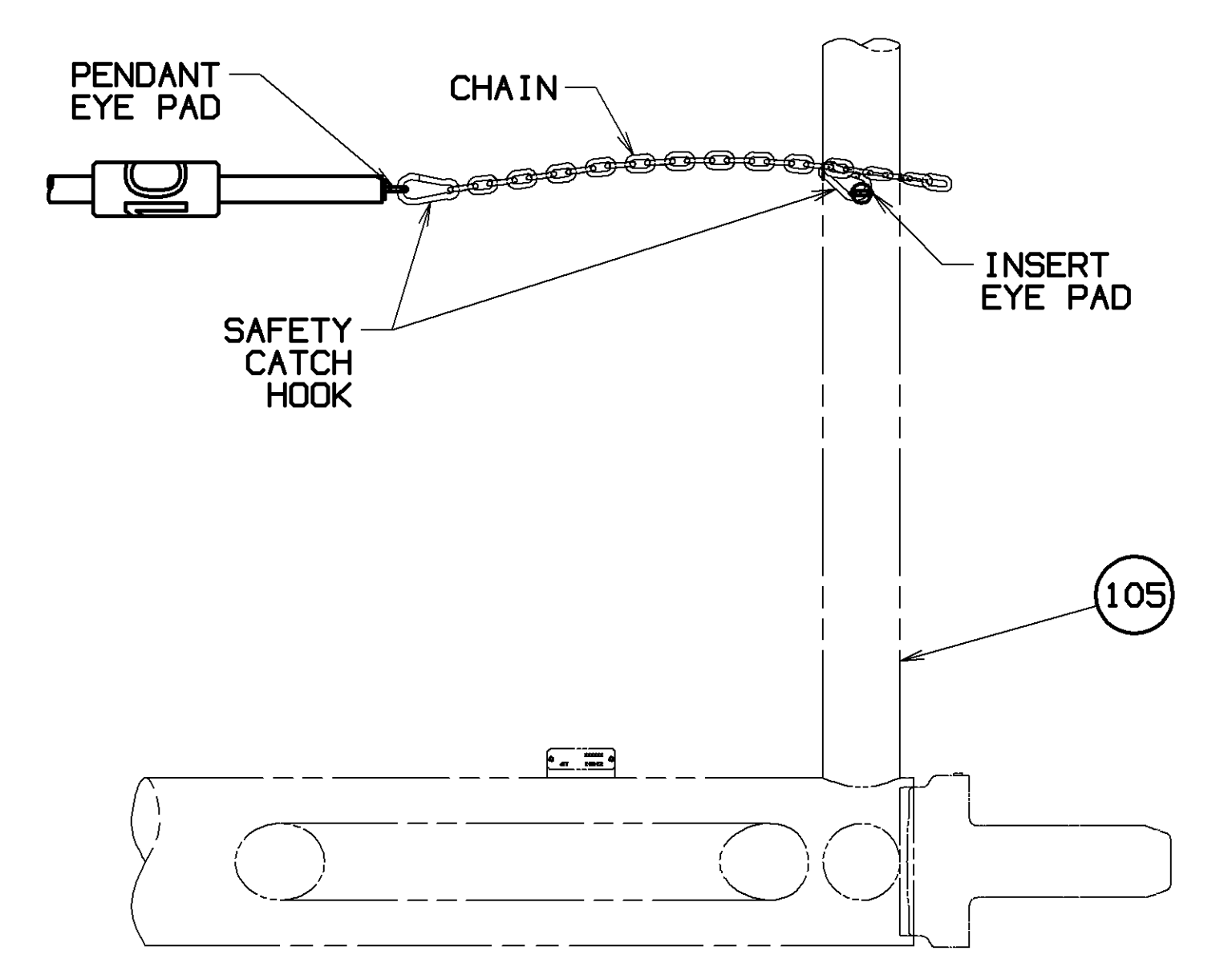
SEE BOOM MAKEUP VIEWS ON SHEETS 3, 4, & 5, AND BOOM LENGTH TABLE ON SHEET 2 FOR REQUIRED SUSPENSION & WIRE ROPE BUTTON IDENTIFICATION LOCATION.

1. REMOVE MULTI-BUTTON PENDANT FROM STOWED SHIPPING POSITION. (SEE DETAIL U & V)
2. ATTACH OPEN SOCKET END OF PENDANT TO CONNECTING LINK R109 AT TOP OF INSERT ITEM 105. (SEE DETAIL W-PREPPED NON-WORKING)
3. SLOWLY RAISE BOOM. AS THE STRAPS RISE, GUIDE THE INTERMEDIATE SUSPENSION PENDANTS THROUGH THE OPENINGS IN THE BOOM INSERT. STOP THE BOOM RAISING PROCEDURE WHEN THE REQUIRED PENDANT BUTTON NEARS THE SOCKET. FROM STOWED POSITION REMOVE BUTTON RETAINING HITCH PIN FROM SOCKET AND POSITION THE IDENTIFIED PENDANT BUTTON INTO SOCKET, REINSTALL BUTTON RETAINING HITCH PIN INTO SOCKET, LOCKING PENDANT IN POSITION. (SEE DETAIL W-PREPPED NON-WORKING)
4. RELOCATE SOCKET LOCKING HITCH PIN FROM SOCKET AND UPPER BRACKET HOLE TO LOWER BRACKET HOLE. (SEE DETAIL W-WORKING)
5. ATTACH PENDANT EYE PAD TO INSERT EYE PADS USING A SAFETY CATCH HOOK AT EACH END OF CHAIN. ADJUST PENDANT TENSION BY POSITIONING SAFETY CATCH HOOK IN APPROPRIATE CHAIN LINK. (SEE DETAIL X)
6. BOOM UP SLOWLY AS PENDANT BECOMES TIGHT AND SOCKET PIVOTS INTO WORKING POSITION. (SEE DETAIL W-WORKING)

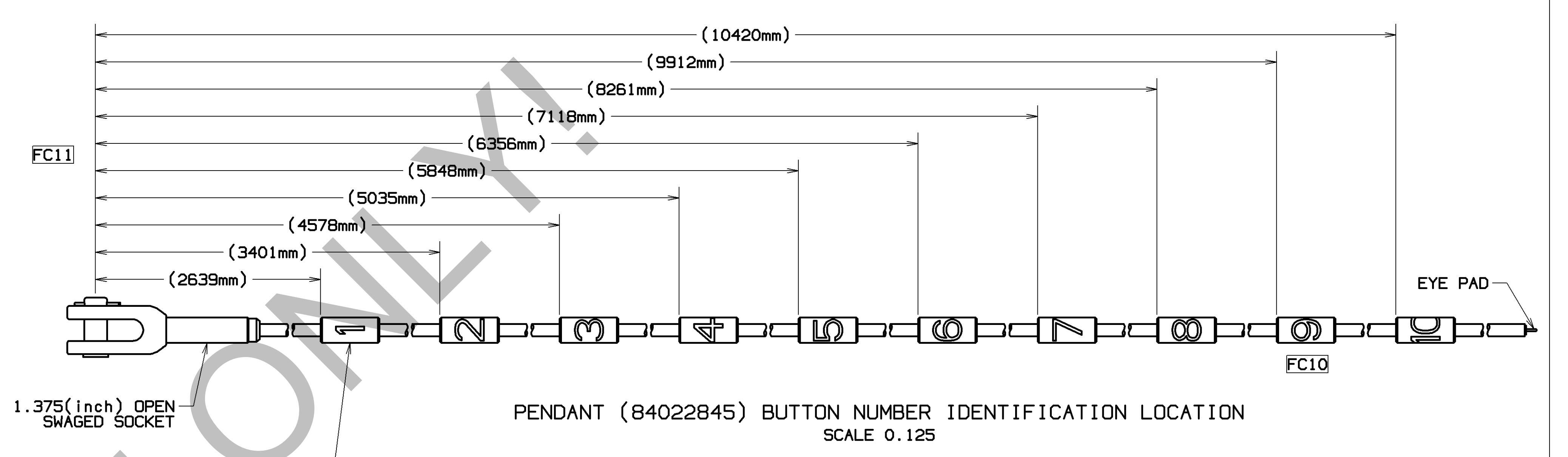
FOR REMOVAL OF INTERMEDIATE SUSPENSION REVERSE INSTALLATION STEPS 1 THRU 6, ASSURING SOCKET PIVOTS TOWARD STORAGE POSITION.
VERIFY THAT SLACK IN PENDANT CHAIN ALLOWS FOR SOCKET TO PIVOT INTO STOWED POSITION.



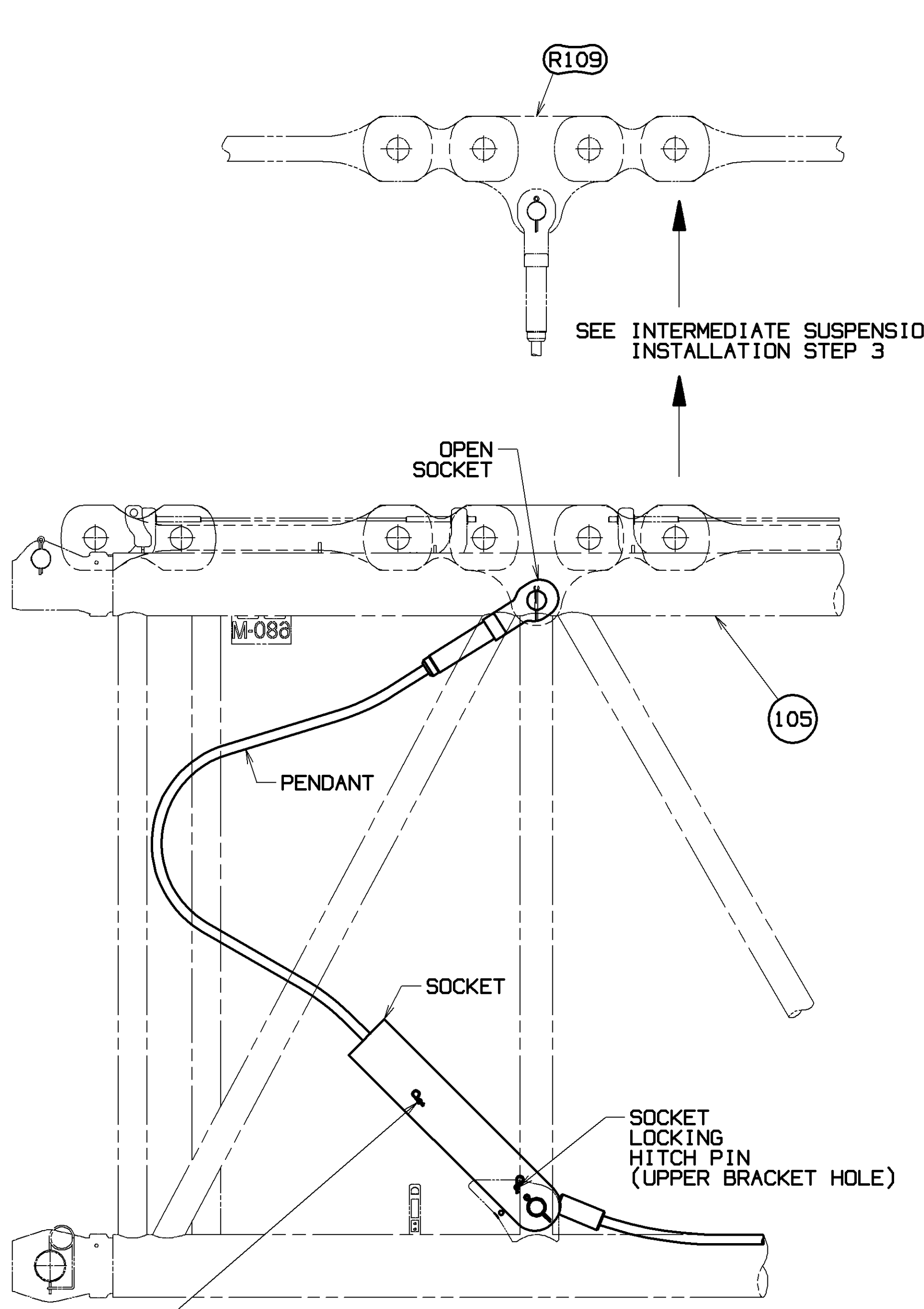
DETAIL U - STOWED SHIPPING
SUSPENSION WIRE ROPE #680
ITEM R112, 81036355
(FROM SHEET 5)
SUSPENSION PENDANTS STOWED POSITION FOR SHIPPING OR WHEN INSERT WORKING W/O SUSPENSION
SCALE 0.075



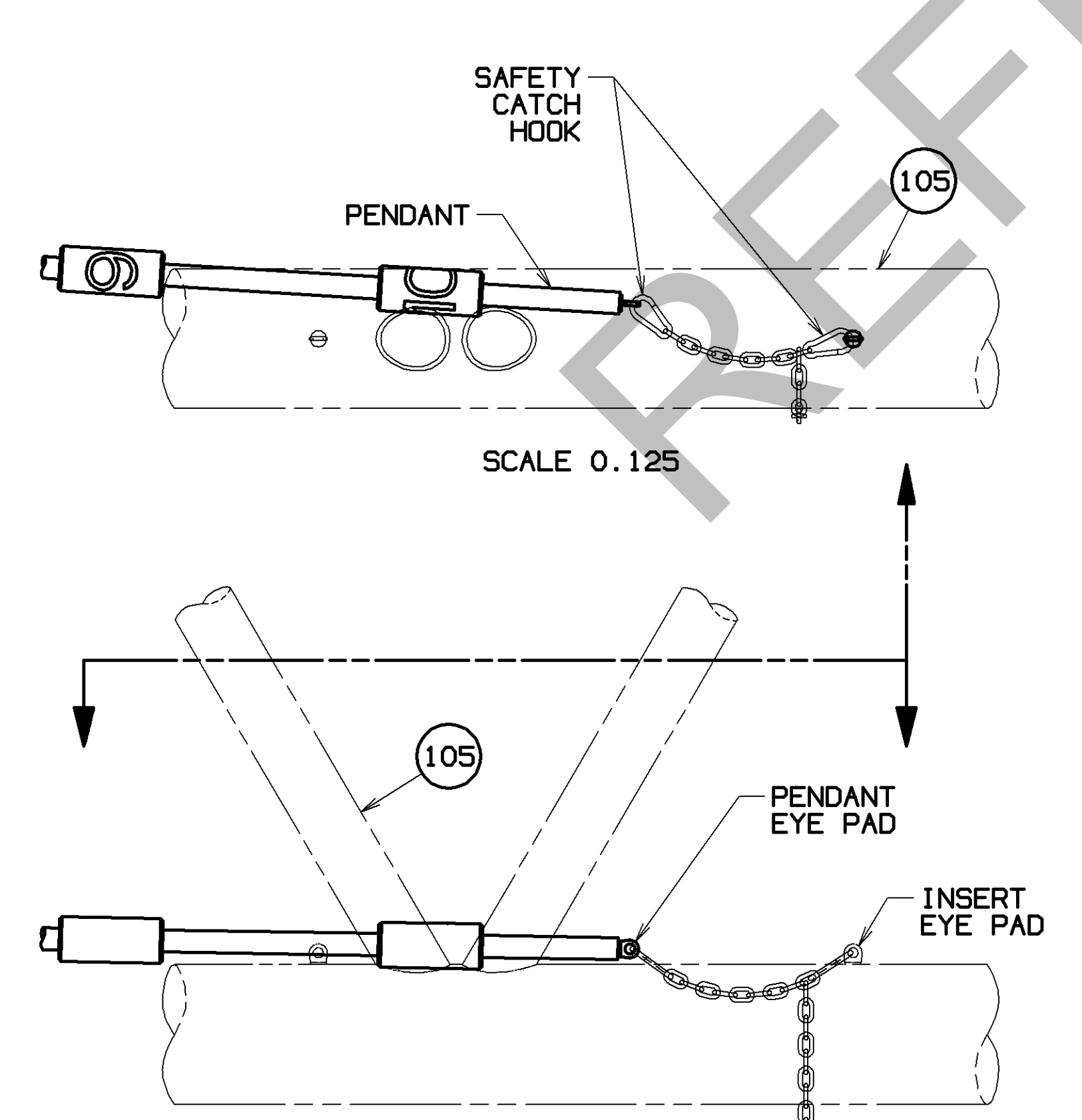
DETAIL V - STOWED SHIPPING
SUSPENSION WIRE ROPE #680
ITEM R112, 81036355
(FROM SHEET 5)
SUSPENSION PENDANTS STOWED POSITION FOR SHIPPING OR WHEN INSERT WORKING W/O SUSPENSION
SCALE 0.125



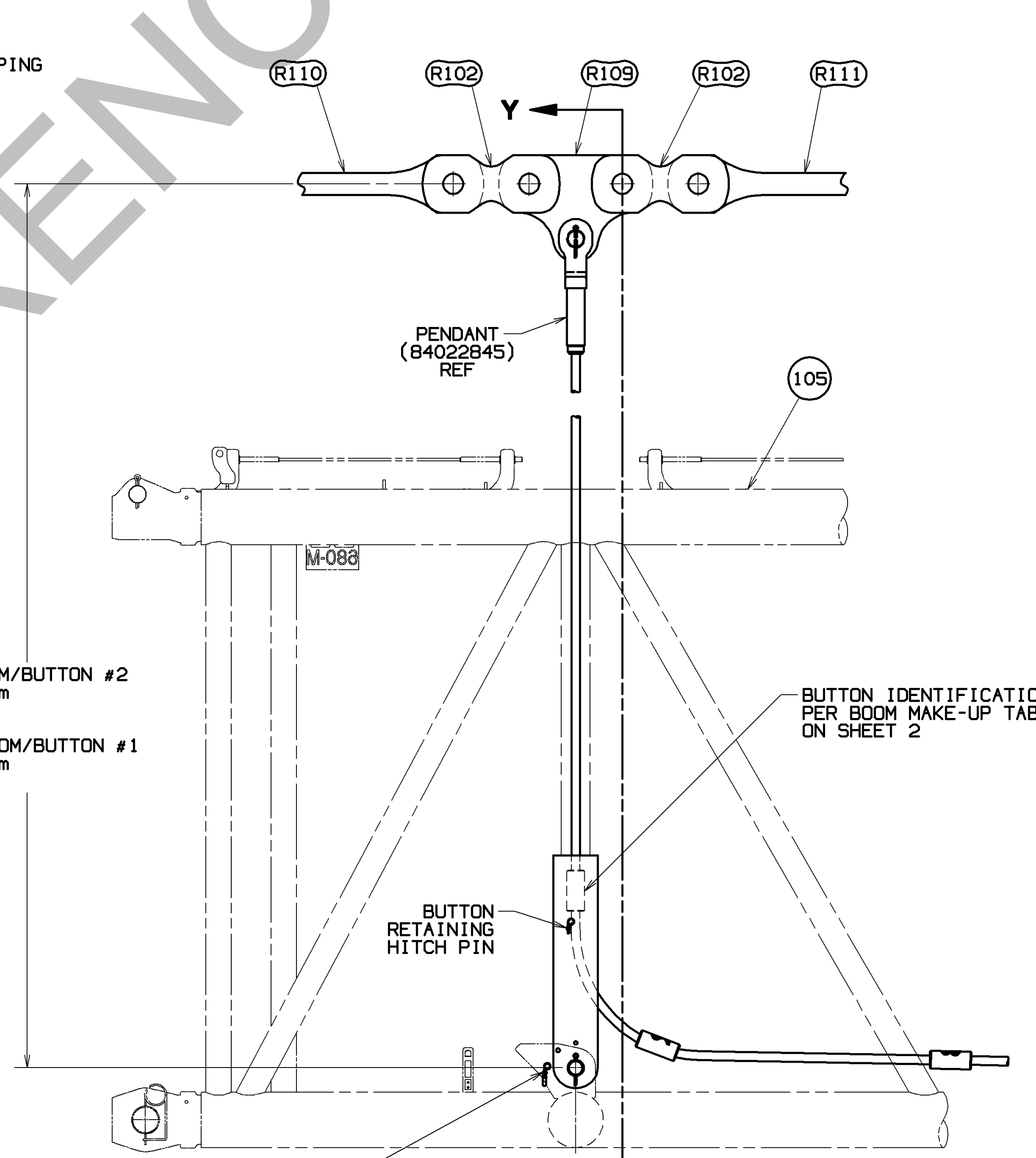
PENDANT (84022845) BUTTON NUMBER IDENTIFICATION LOCATION
SCALE 0.125



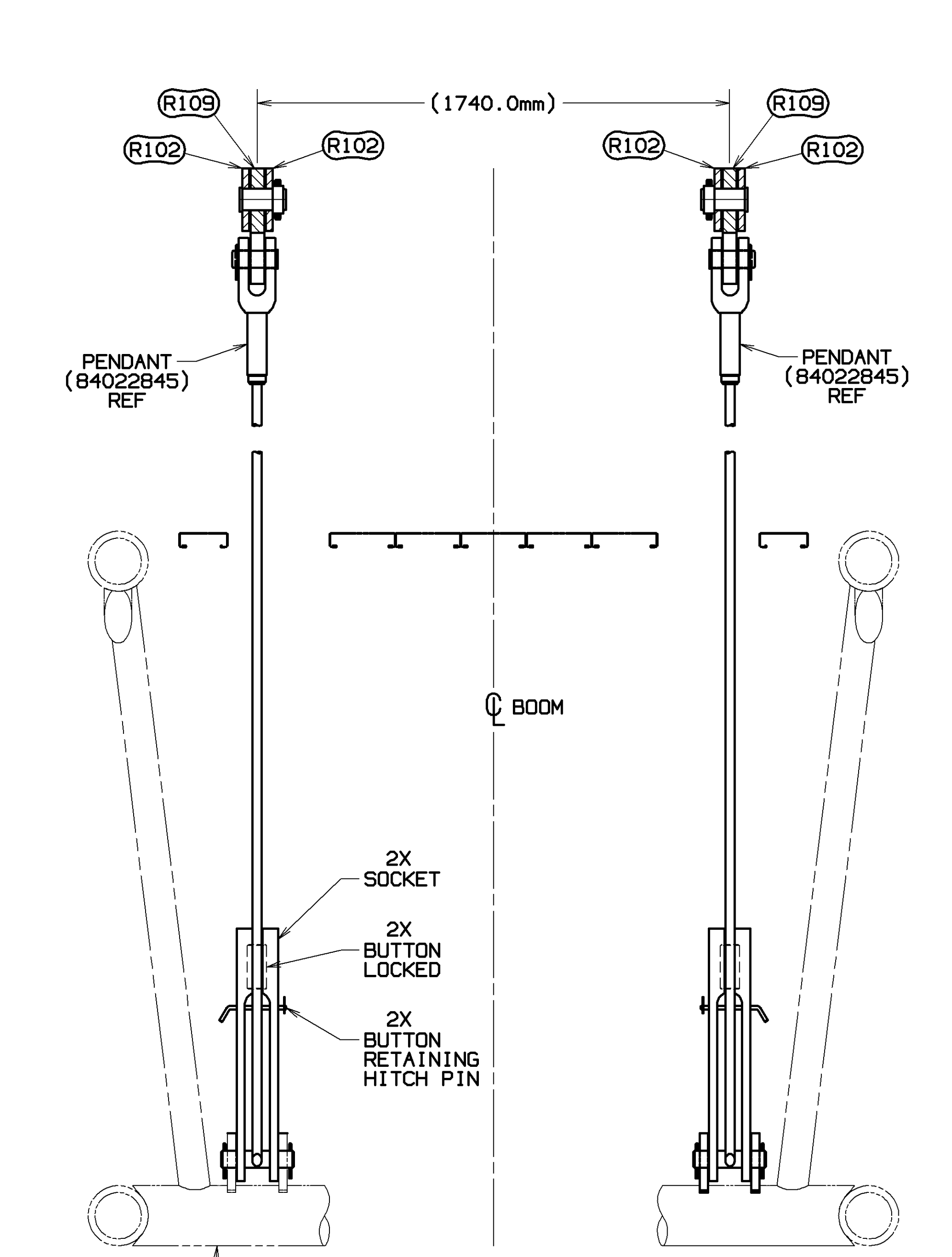
DETAIL W - PREPPED NON-WORKING
SUSPENSION WIRE ROPE #680
ITEM R112, 81036355
(FROM SHEET 5)
SUSPENSION SOCKET & ROPE LOCATION FOR PREPPED NON-WORKING BOOM LENGTHS 110M THRU 146M
SCALE 0.075



DETAIL X
SUSPENSION WIRE ROPE #680
ITEM R112, 81036355
(FROM SHEET 5)
SCALE 0.125



DETAIL W - WORKING
SUSPENSION WIRE ROPE #680
ITEM R112, 81036355
(FROM SHEET 5)
SUSPENSION SOCKET & ROPE LOCATION FOR WORKING BOOM LENGTHS 98M AND 104M
SCALE 0.075



SECTION Y-Y

SEE (29)
98M BOOM/BUTTON #2
4411.0mm
173.71in
104M BOOM/BUTTON #1
3649.0mm
143.71in

TOLERANCE UNLESS OTHERWISE SPECIFIED		FABRICATION		FINISHING		NOTES	
DECIMAL PLACES	FRACTIONS	F10 FEET	10 FEET	FINISHING	REVISIONS	DATE	BY
(1) PLACE 0.5	±.12	±.18	±.18	AS SHOWN	1	03-13-15	FEI
(2) PLACE 0.00	±.08	±.12	±.015	AS SHOWN	2		
(3) PLACE 0.000	±.008	±.008	±.008	AS SHOWN	3		

DR. AJB	MANITOWOC CRANES, INC.	BOOM RIGGING
CK. RHW	Manitowoc, Wisconsin	B10:680
APP. TJA	MODEL MLC650	

81018141
SHT 10 OF 10

PRIVATE LABELING REQUIREMENT TO CONFORM TO ENGINEERING SPECIFICATION 8229103794 FOR COMPONENTS LISTED IN 03200-03-036
DATE 03-13-15
REV. LNK
FEI
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SHT 10 OF 10