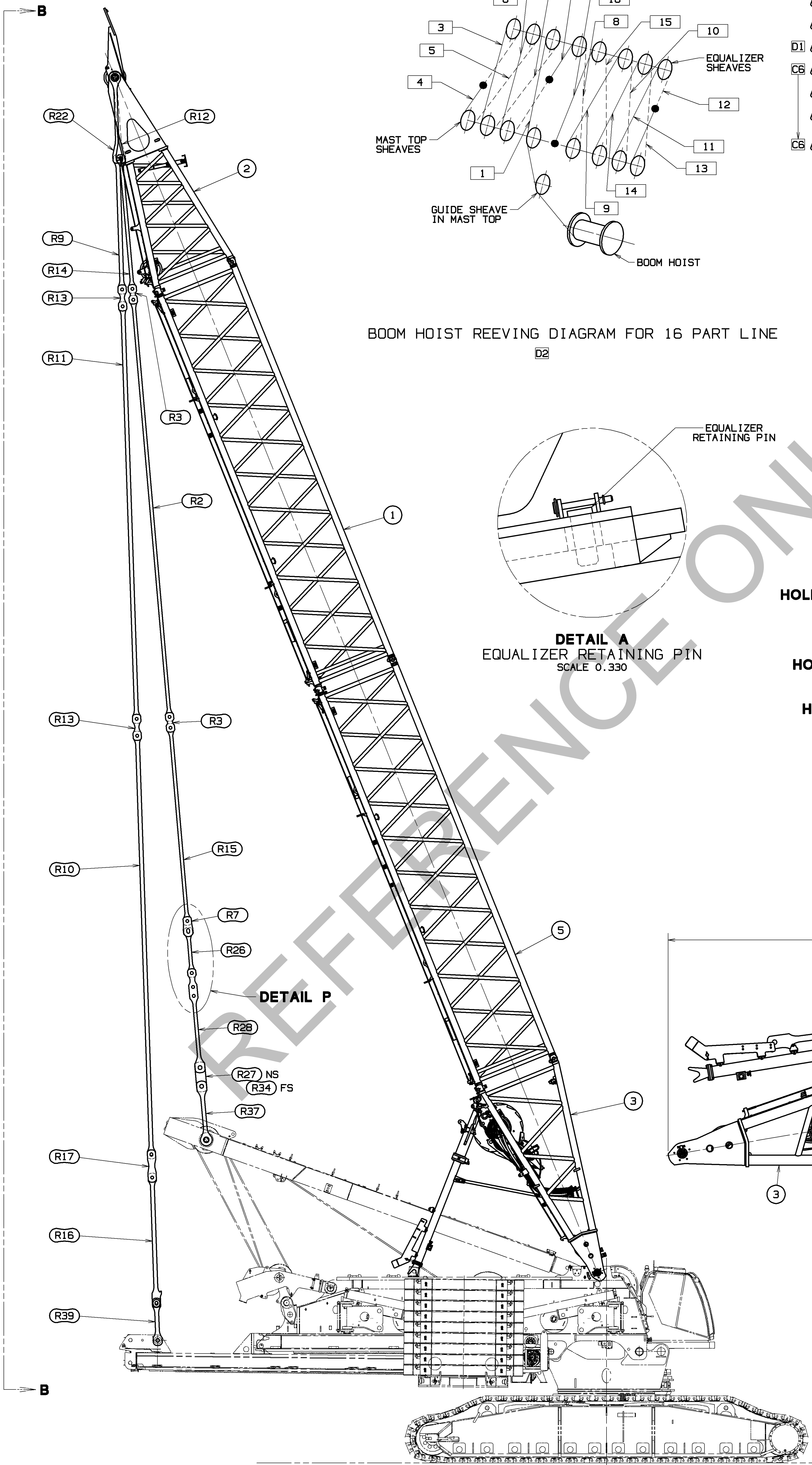
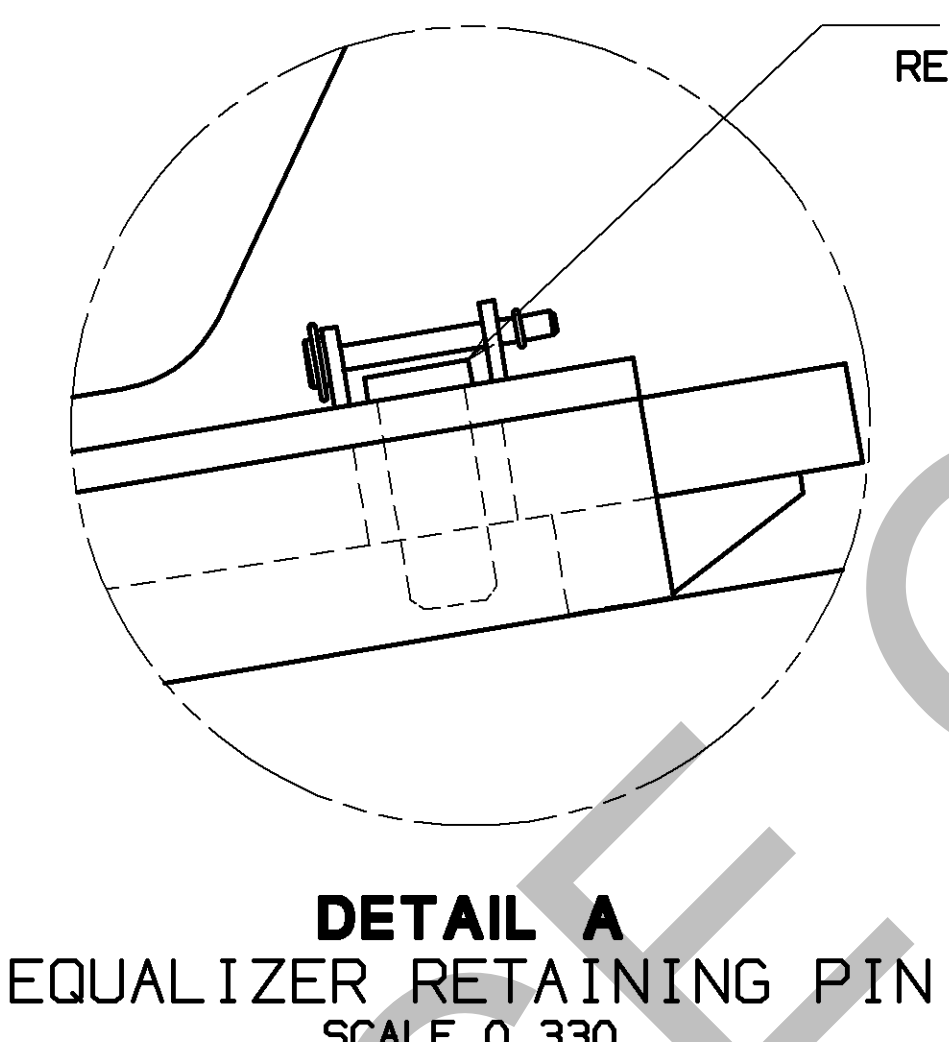


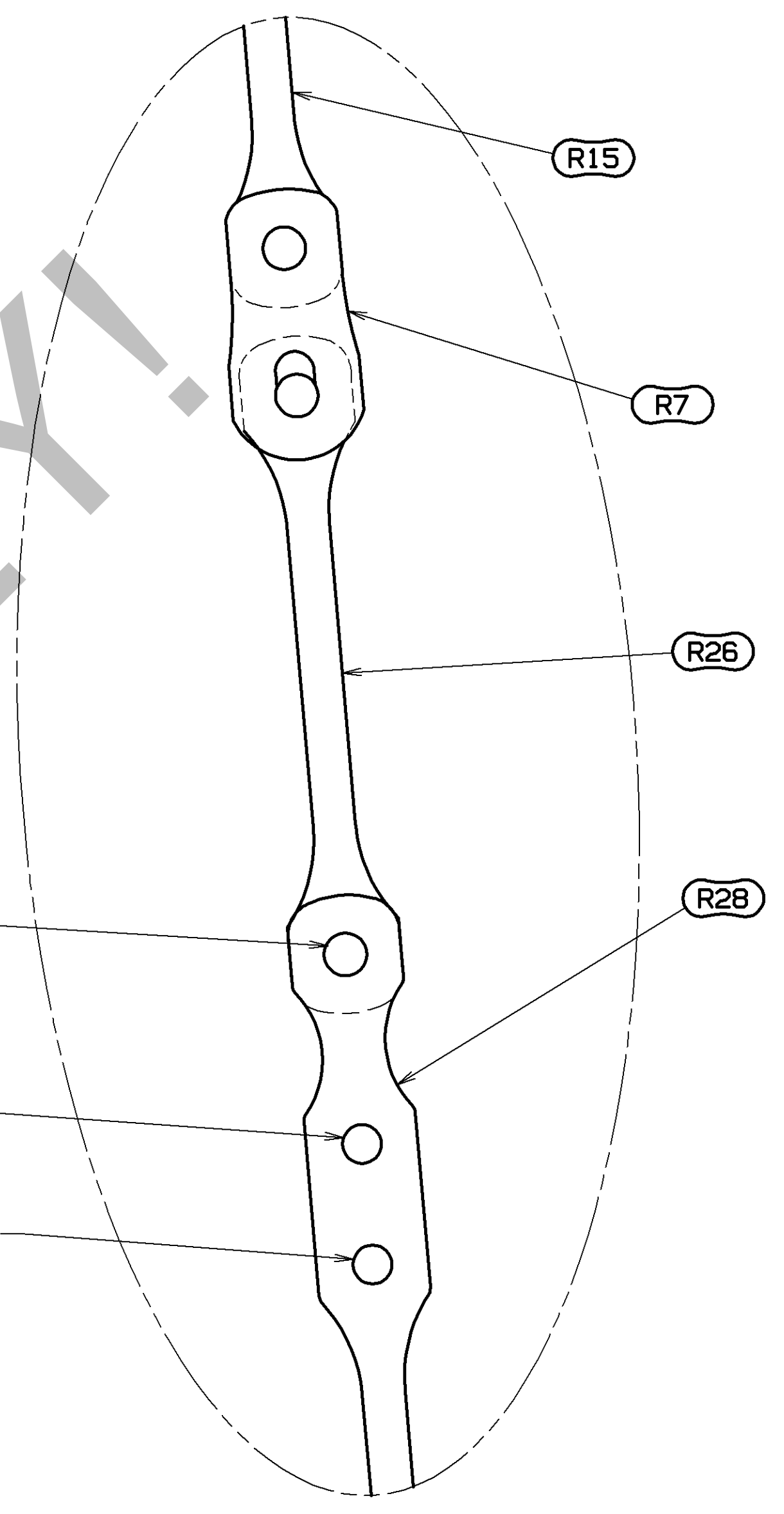
VIEW B-B
SCALE 0.050



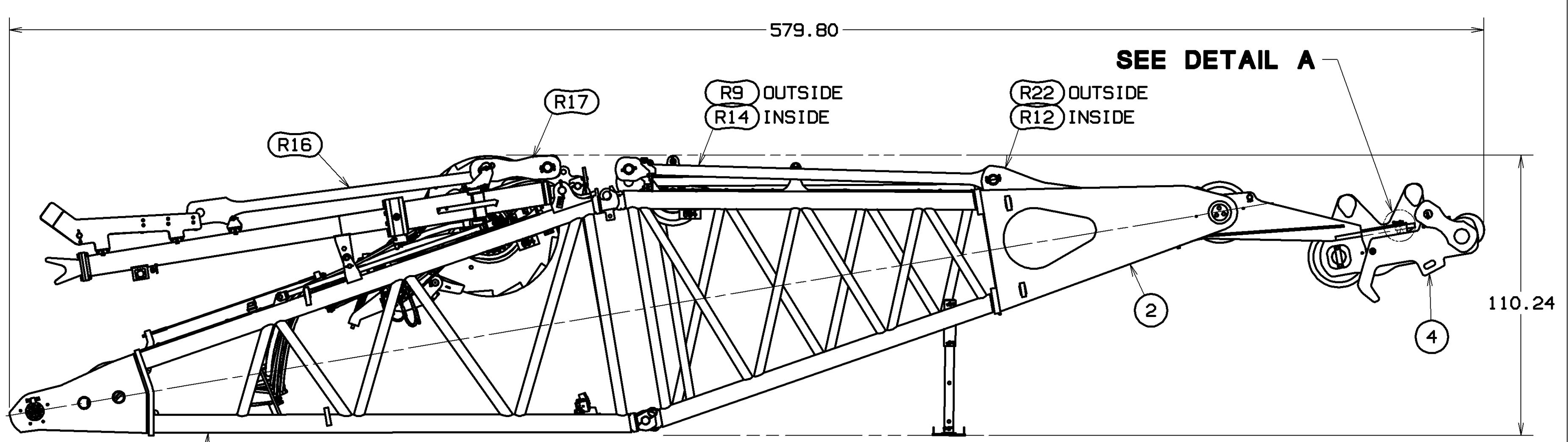
BOOM HOIST REEVING DIAGRAM FOR 16 PART LINE



DETAIL A
EQUALIZER RETAINING PIN
SCALE 0.330



DETAIL P
SCALE 0.100



MAST TRANSPORTATION PACKAGE
TOTAL SHIPPING WEIGHT: 54,800 LBS (24,857 KGS) E1
MAST BUTT (ITEM 3): 21,803 LBS (9,890 KGS) E2
MAST TOP (ITEM 2): 18,400 LBS (8,346 KGS) E3
EQUALIZER (ITEM 4): 4,057 LBS (1,840 KGS) E4
DRUM 5 ROPE: 10,540 LBS (4,781 KGS) E5

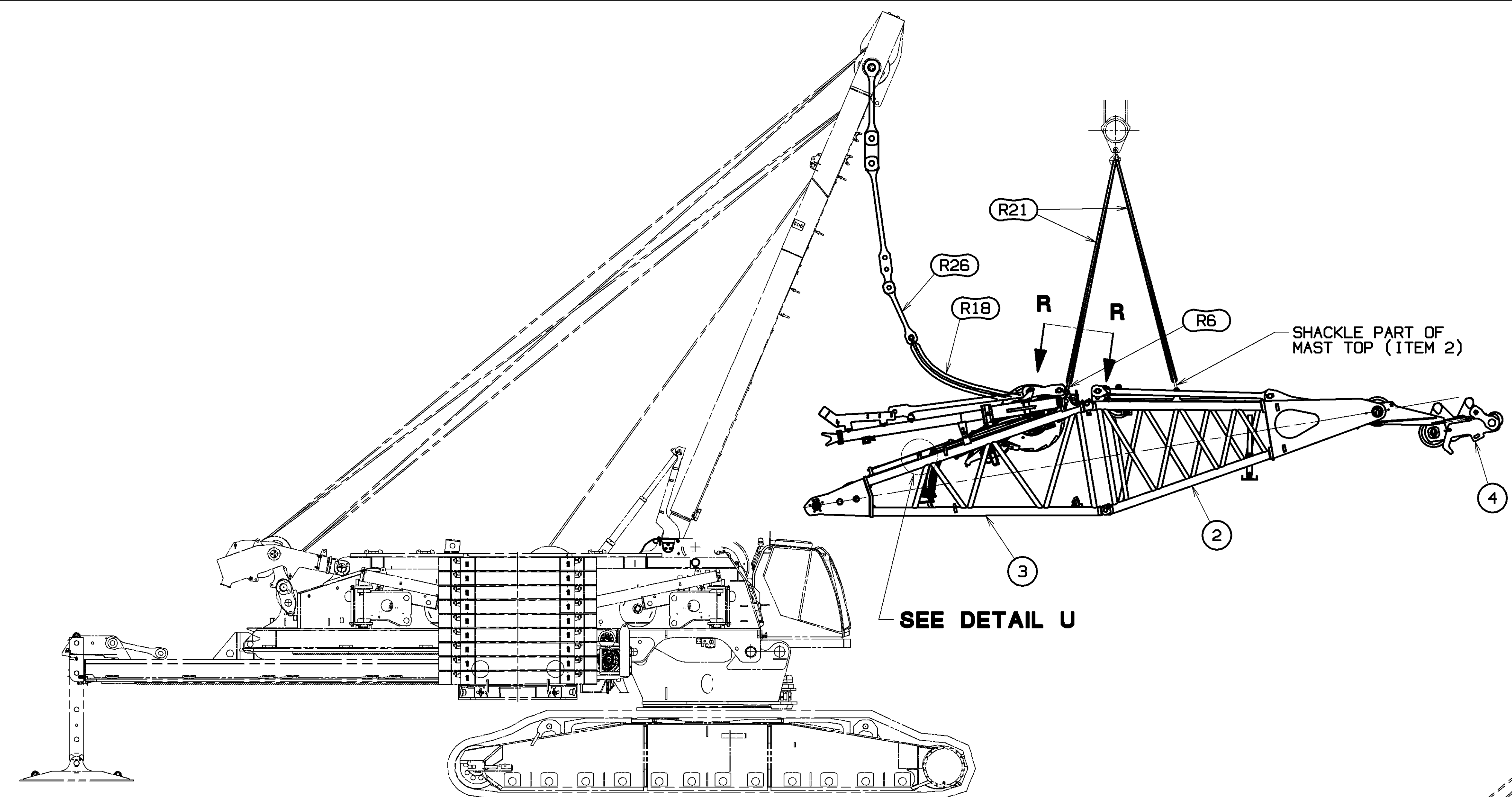
- 1 TOP 6M I.D. TAG #81025379
- 2 INSERT 12M (81025376) I.D. TAG #81025377
- 3 INSERT 12M (81034593) I.D. TAG #81035741
- 4 BUTT 6M I.D. TAG #81025382
- 5 STRAPS/LINKS AND HARDWARE SHIPS WITH MAST ASSEMBLY 81022688.
- 6 LINKS AND HARDWARE SHIPS WITH VPCMAX BEAM ASSEMBLY 81031411.
- 7 FOR ASSEMBLY AND RIGGING PURPOSE ONLY. STOWS IN STORAGE BOX 81028467.
- 8 FOR ASSEMBLY AND RIGGING PURPOSE ONLY. STOWS ON MAST BUTT (ITEM 3). SEE DETAIL U ON SHEET 2.

BILL OF MATERIAL				ASSEMBLY
QTY	DESCRIPTION	MATERIAL	QTY	NO.
MAST RIGGING M10:684				
1	1	INSERT ASSY #684, 12M	81025376	2
2	1	MAST ASSY #684, 6M TOP	81025378	1
3	1	MAST ASSY #684, 6M BUTT	81025380	4
4	1	EQUALIZER ASSY	81027149	
5	1	INSERT ASSY #684, 12M	81034593	3
BASIC REFERENCE ITEMS				
R1	2	PIN COTTER 1/4 DIA X 1.50 LG	562105	
R2	2	STRAP 12M #680, 681, 682	81020475	
R3	8	LINK #680 BOOM	81020476	
R4	30	PIN 1 HOLE W/HD 79.3 DIA X 121.1 LG	81020477	
R5	32	COLLAR 80.2MM I.D.	81020478	
R6	2	SHACKLE 17 MTON	81024427	
R7	4	LINK #680, 4M INSERT	81027236	
R8	2	SHACKLE 40MT ALLOY	81030038	
R9	2	STRAP TOP #684 MAST 50.8 X 109.0	81034595	
R10	2	STRAP 12M #684 MAST 50.8 X 109.0	81034597	
R11	2	STRAP 12M #684 MAST 50.8 X 109.0	81034598	
R12	4	LINK STRAP	81034600	
R13	8	LINK STRAP	81034602	
R14	2	STRAP 6M #684 MAST TOP	81036855	
R15	2	STRAP 12M #684 MAST	81036856	
R16	2	STRAP 3.7M MAST 50.8 X 108.6	81036999	
R17	4	LINK	81037000	
R18	2	SLING LIFTING 100,000 LBSX10.83 FT	81038731	
R19	1	SLING LIFTING 20,000 LBSX5.25 FT	81038797	
R20	4	BUSHING 100X53X75.8	81038828	
R21	4	SLING 70000 LBS 16.4 FT	81042116	
R22	4	LINK ASSY	81042471	
R23	32	PIN 2 HOLE 19.05 DIA X 117.0 LG	A16804	
R24				
R25	4	PIN COTTER 3/16 DIA X 1.50 LG	562085	
R26	2	STRAP 4M #680	81022539	
R27	1	LINK LIVE MAST	81026646	
R28	4	LINK LIVE MAST	81026647	
R29	2	PIN 1 HOLE W/HD 105.7 DIA X 170.0 LG	81028072	
R30	2	PIN 1 HOLE W/HD 105.7 DIA X 120.0 LG	81028073	
R31	4	COLLAR 139.7 X 106.0 ID X 50 LG	81028074	
R32	4	PIN 2 HOLE 25.4 DIA X 157.0 LG	81028216	
R33	2	COLLAR 131.0 MM ID	81033386	
R34	1	LOAD CELL LINK 238,140 KGS	81034118	
R35	2	PIN 2 HOLE 12.7 DIA X 167.0 LG	81039284	
R36	2	PIN 1 HOLE W/HD 79.3 DIA X 153.1 LG	81039569	
R37	4	LINK ASSY	81042456	
R38	2	PIN 1 HOLE 130.0 X 175.0 LG	81020965	
R39	4	LINK ASSY	84020978	
R40				
R41	2	PIN PULLER ASSY HAND HELD	81030756	
R42	2	PIN PULLER CAGE WELDMENT	81040833	
R43				
R44				
R45				

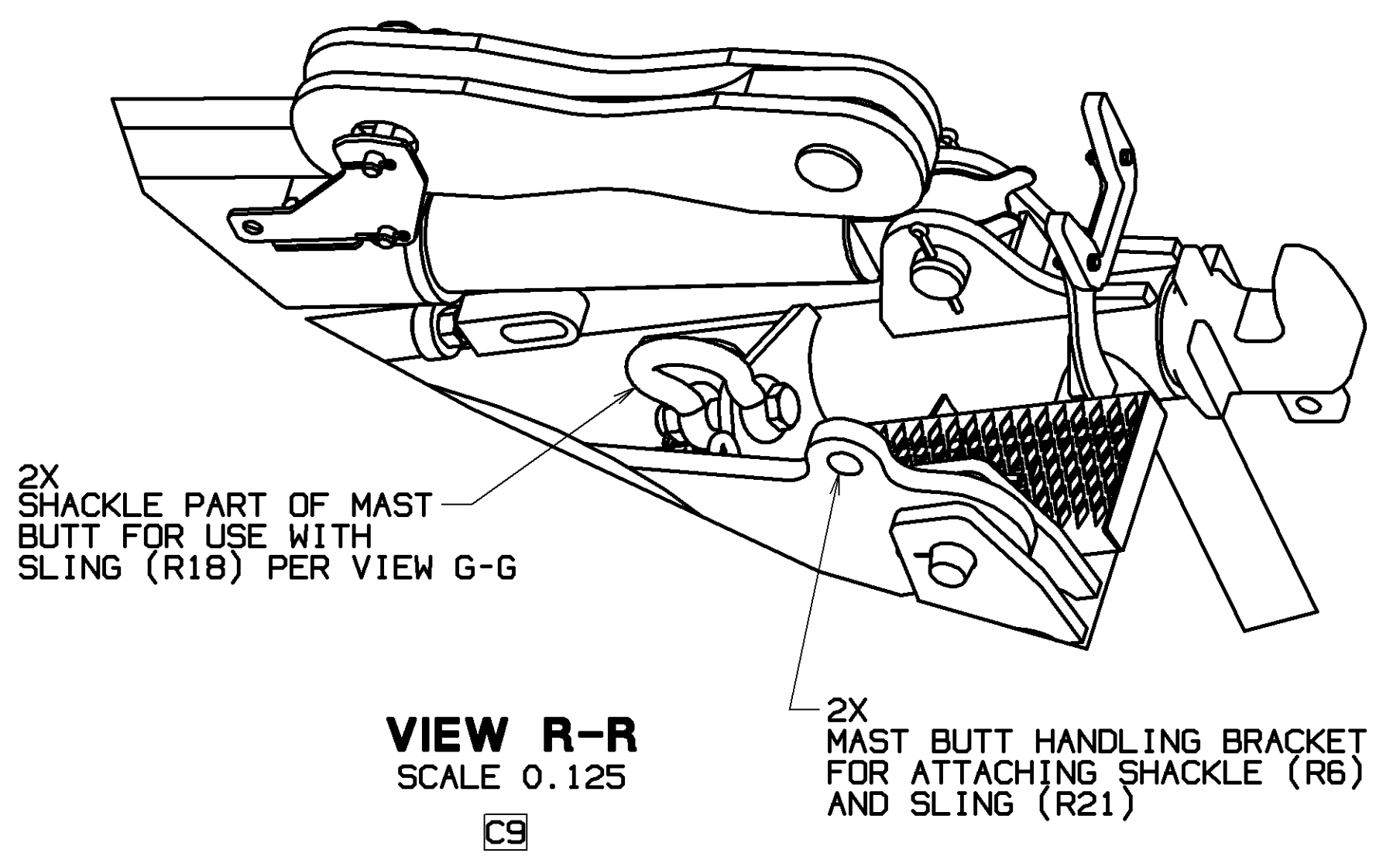
PRIVATE LABELING
REQUIREMENT TO
CONFORM TO
ENGINEERING
SPECIFICATION
8829103794 FOR
COMPONENTS LISTED
IN SECTION 06-026
DATE
06-09-15
REV. NO.
F
81025005
SHT 1 OF 4

TOLERANCE UNLESS OTHERWISE SPECIFIED		MATERIAL		MANUFACTURING	
DECIMAL PLACES	FRACTIONS	DR. NPH	MANITOWOC, WISCONSIN	MAST RIGGING	
(1) PLACE 0.0	1/16 1/8 1/4 1/2 3/4 1	DR. NPH	MODEL MLC650	M10:684	
(2) PLACE 0.00	1/32 1/16 1/8 1/4 1/2 3/4 1	APP. NPH			
(3) PLACE 0.000	1/64 1/32 1/16 1/8 1/4 1/2 3/4 1				

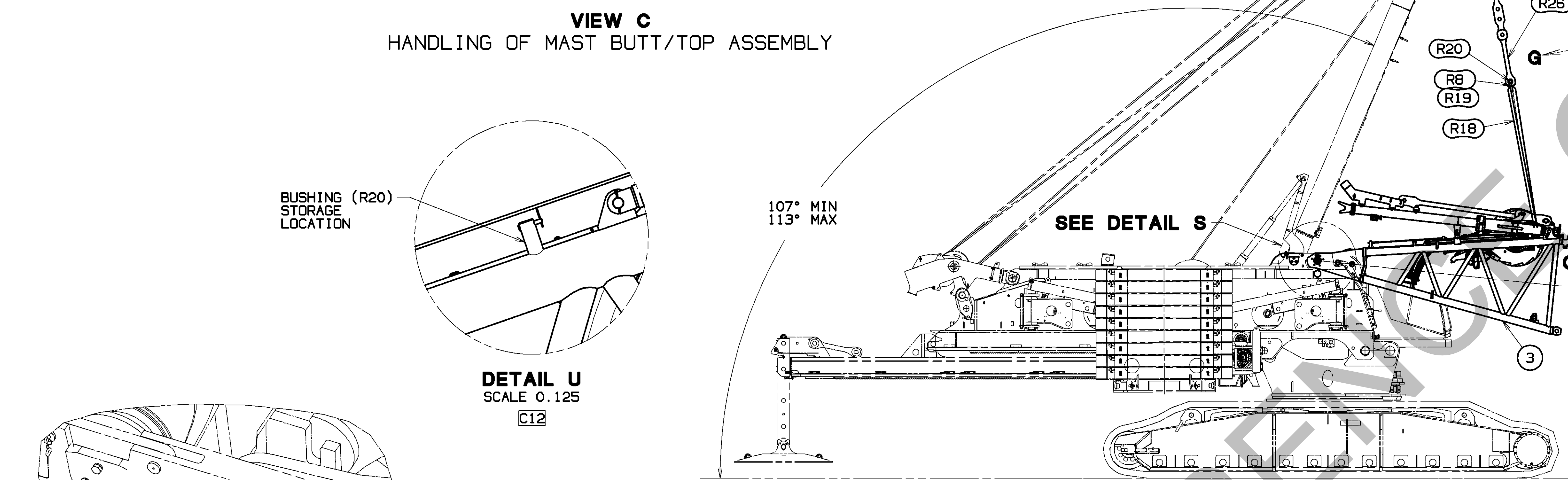
BILL OF MATERIAL				ASSEMBLIES USED IN
QTY	PKG	DESCRIPTION	MATERIAL	REF. NO.



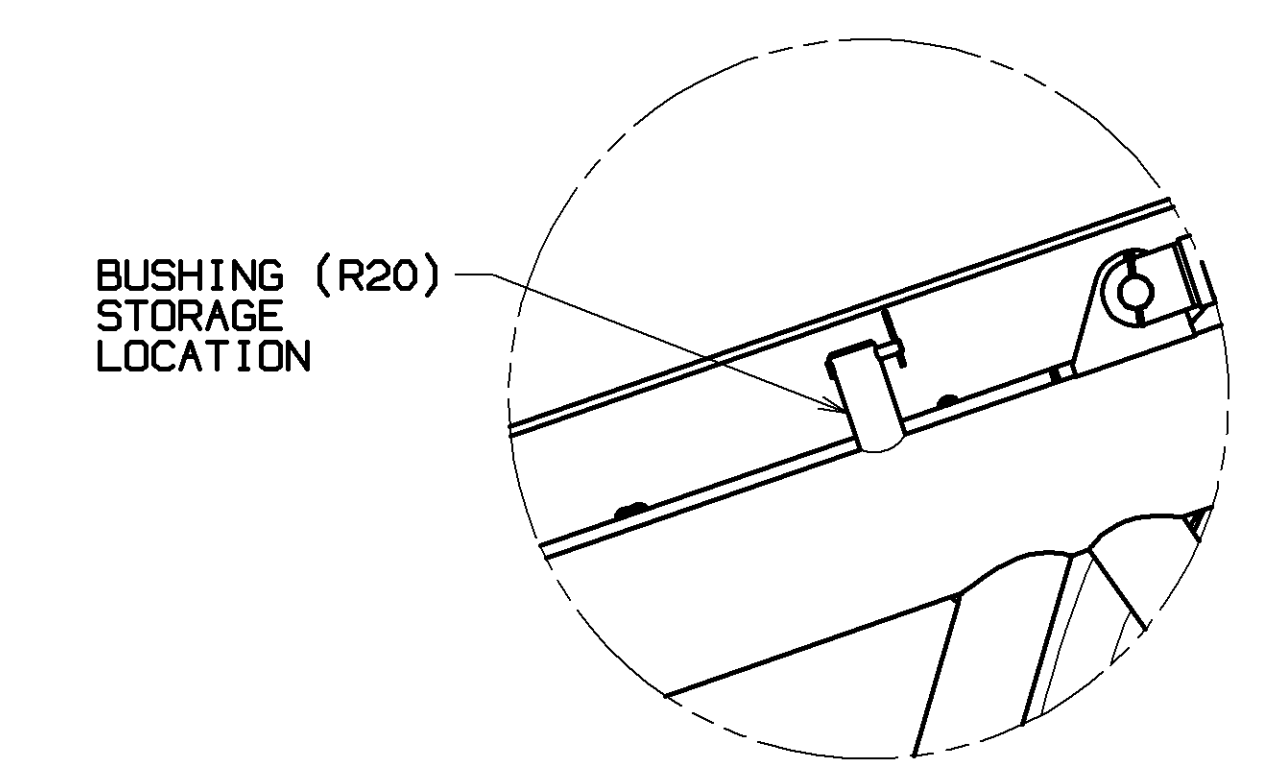
VIEW C
HANDLING OF MAST BUTT/TOP ASSEMBLY



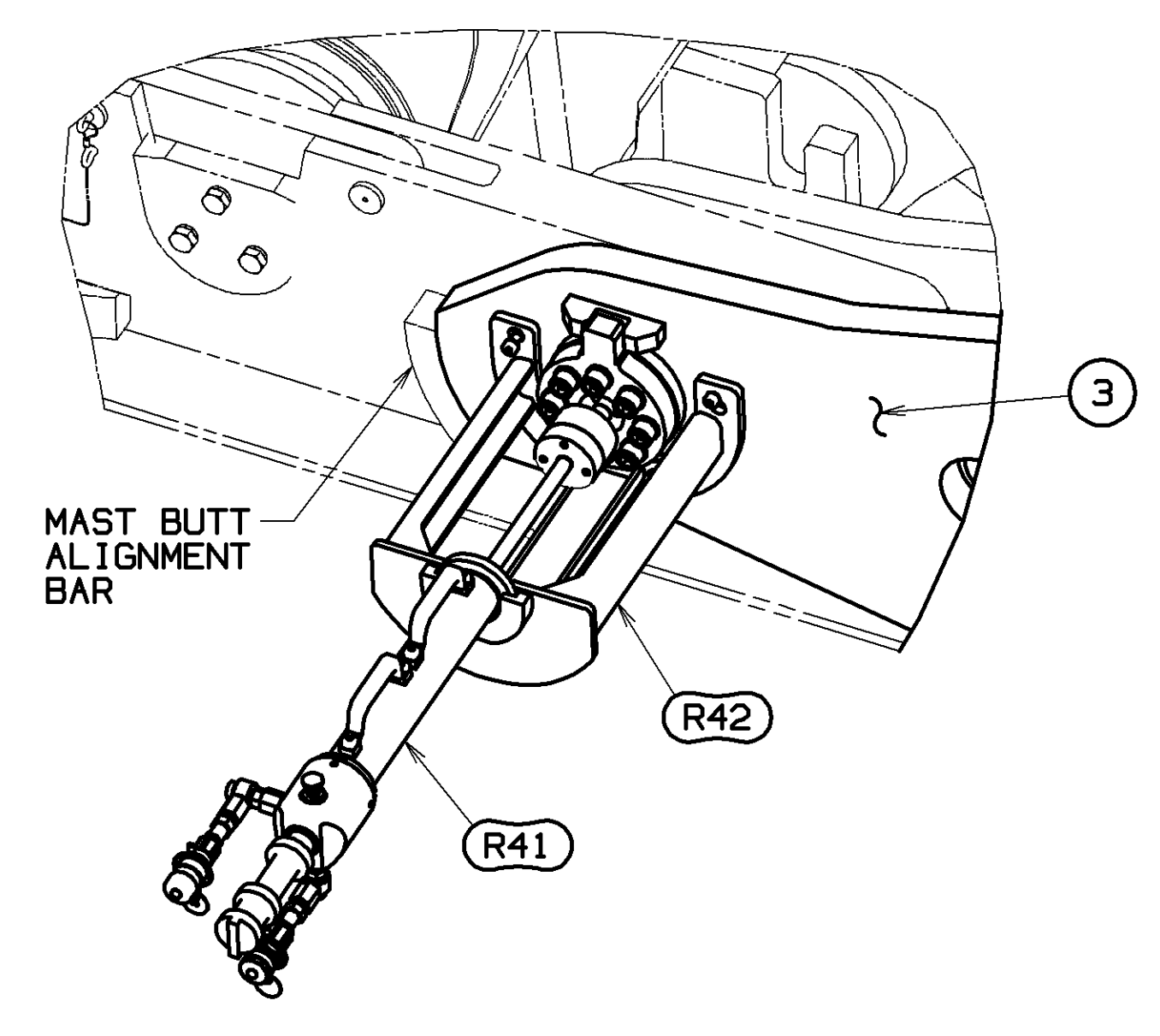
VIEW R-R
SCALE 0.125



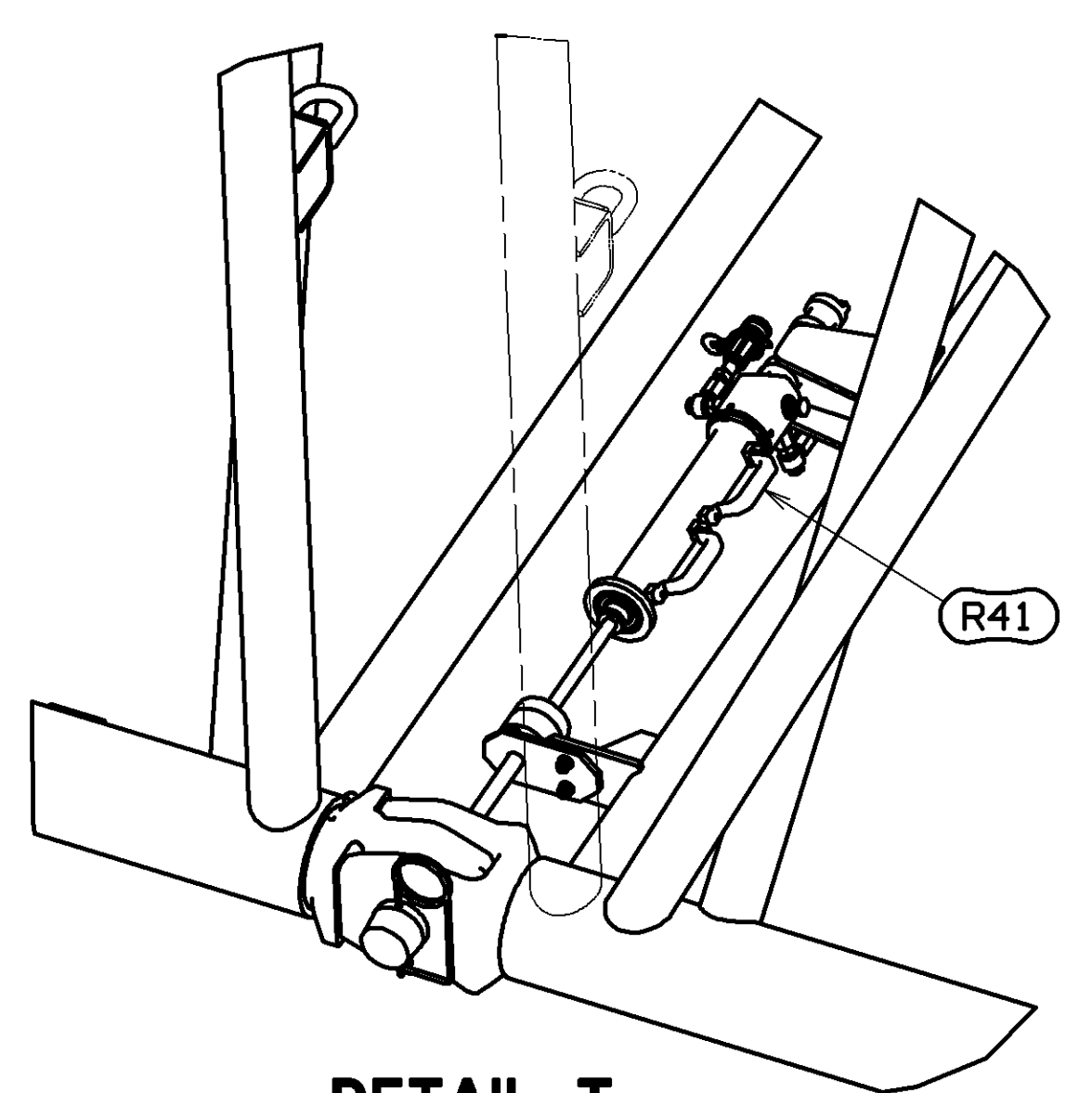
VIEW D
MAST BUTT ASSEMBLY TO ROTATING BED
AND SEPARATION OF MAST TOP FROM MAST BUTT



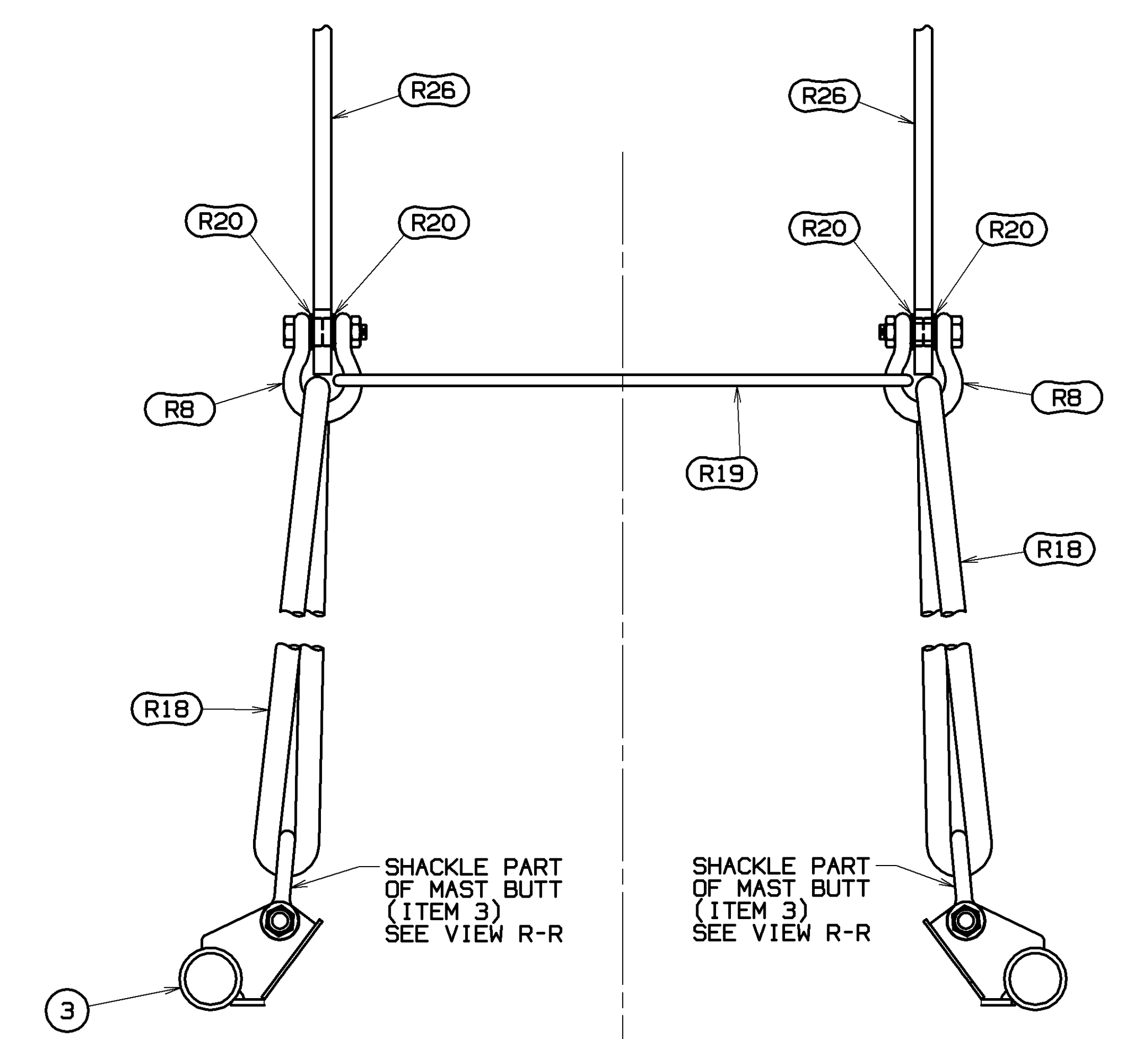
DETAIL U
SCALE 0.125



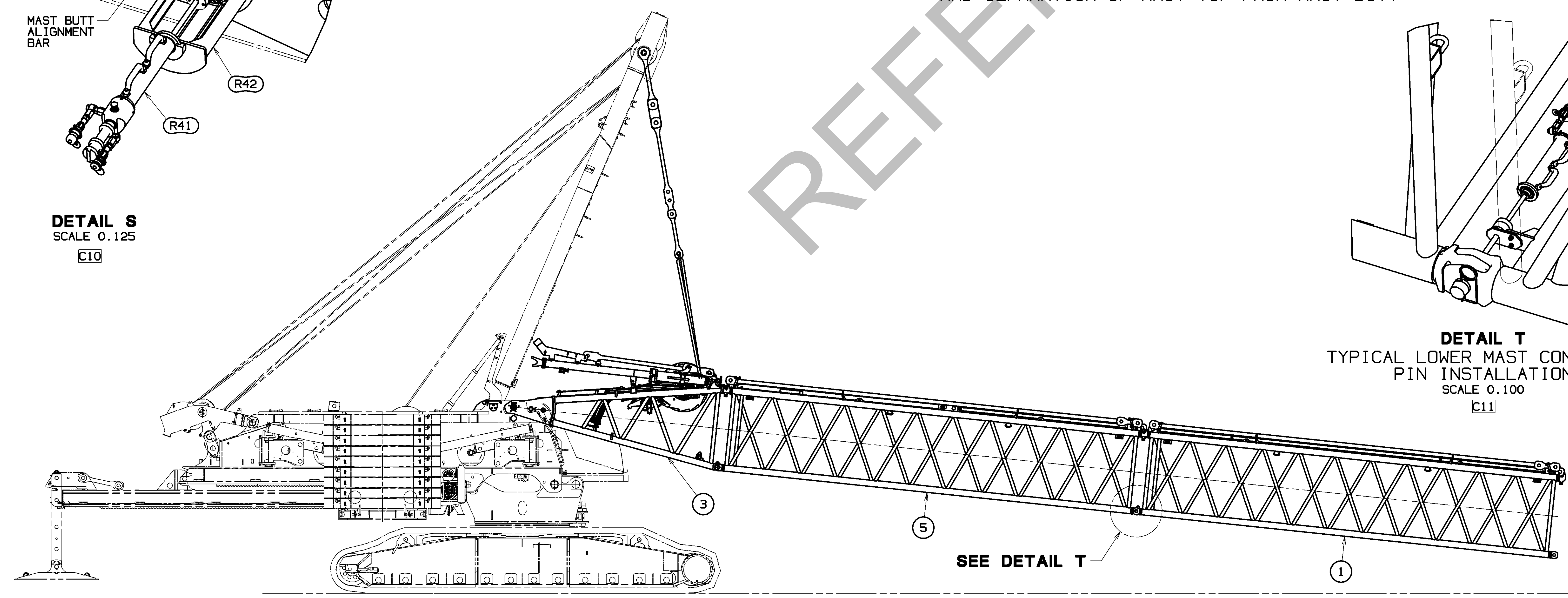
DETAIL S
SCALE 0.125



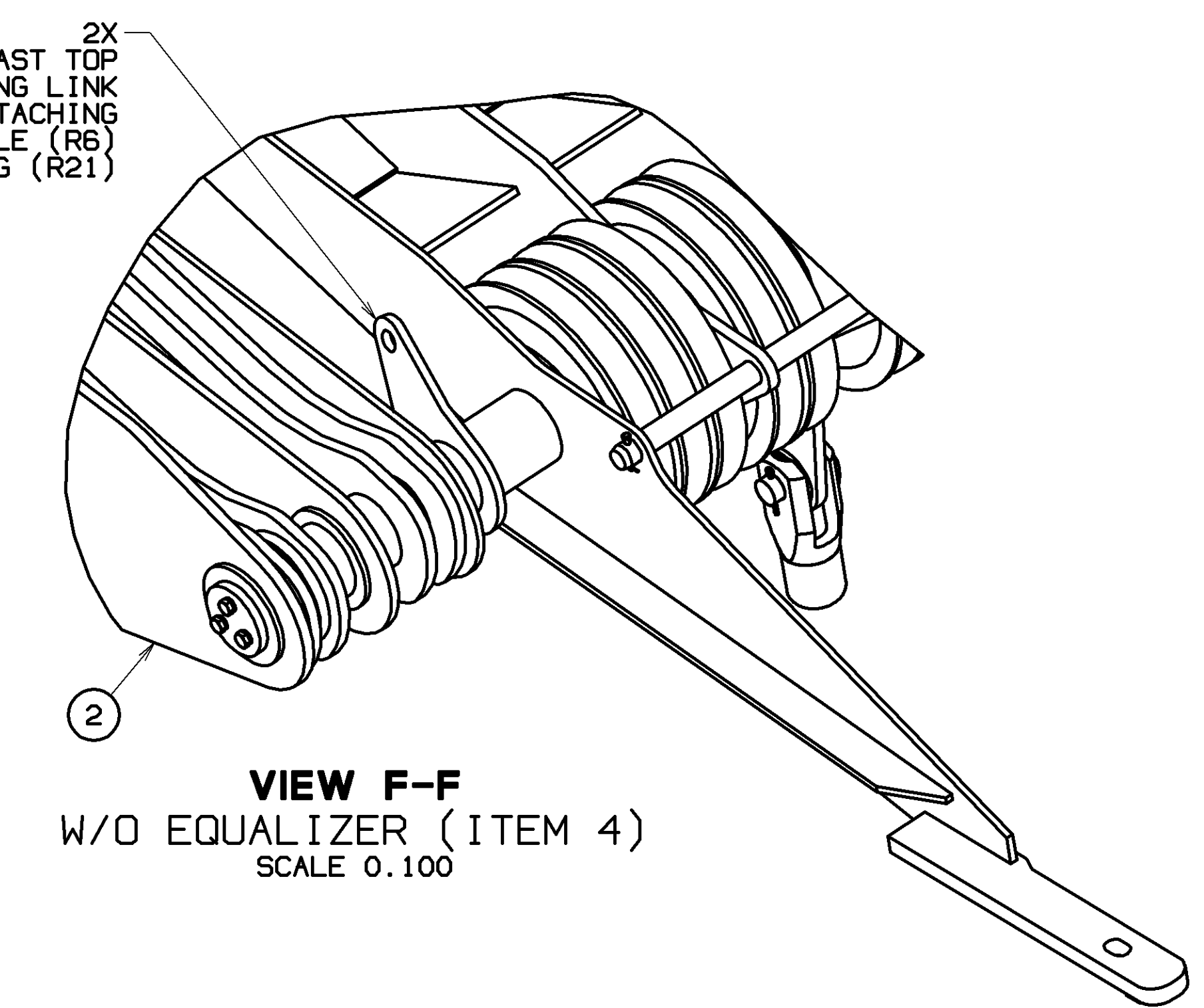
DETAIL T
TYPICAL LOWER MAST CONNECTOR
PIN INSTALLATION
SCALE 0.100



VIEW G-G
SCALE 0.080



VIEW E
ASSEMBLY OF MAST INSERTS



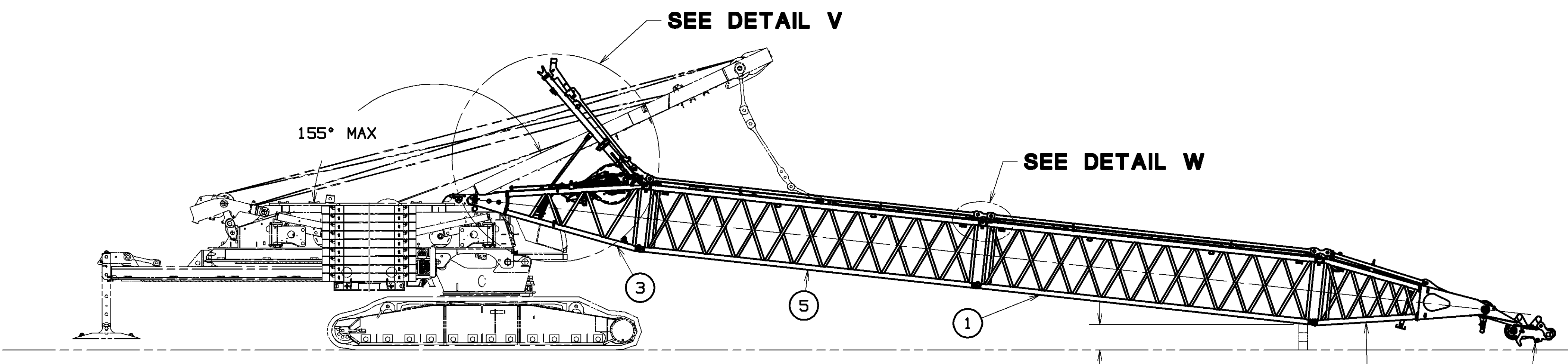
VIEW F-F
W/O EQUALIZER (ITEM 4)
SCALE 0.100

MAST ASSEMBLY PROCEDURE

- 1) ASSEMBLE VPC-MAX BEAM, AUXILIARY MEMBER, AND SERIES 1, 2, OR 3 COUNTERWEIGHTS.
- 2) ATTACH LIFTING SLINGS AND SHACKLES TO LIVE MAST LINKS (R26) AND FIXED MAST BUTT (ITEM 3) AS SHOWN IN VIEW G-G.
- 3) ATTACH ASSIST CRANE TO MAST BUTT/TOP ASSEMBLY USING (4) SLINGS (R21) AND AN ADDITIONAL (2) SHACKLES (R6). (SEE VIEW R-R).
- 4) RAISE LIVE MAST WHILE LIFTING FIXED MAST BUTT/TOP INTO PLACE. LIFTING SLINGS FROM LIVE MAST SHOULD REMAIN SLACK WHILE ASSEMBLING FIXED MAST BUTT/TOP (SEE VIEW C).
- 5) ALIGN MAST BUTT HINGE PIN HOLES WITH ROTATING BED PIN HOLES. POSITION PIN PULLER (R41) INTO PIN PULLER CAGE WELDMENT (R42) AND ACTIVATE CYLINDER TO INSTALL MAST HINGE PIN INTO ROTATING BED (SEE DETAIL S).
- 6) POSITION LIVE MAST BETWEEN 107° AND 113° AND ENGAGE MAST HOIST DRUM PAWL. LOWER FIXED MAST BUTT/TOP ASSEMBLY WITH ASSIST CRANE UNTIL THE LIVE MAST IS SUPPORTING THE ASSEMBLY.
WARNING: LIVE MAST ANGLES GREATER THAN 113° WILL DAMAGE COMPONENTS
- 7) DISCONNECT SLINGS (R21) FROM MAST BUTT (ITEM 3) AND ATTACH THEM TO THE LINK ON THE MAST TOP SHAFT (SEE VIEW F-F). THE ASSIST CRANE WILL BE USED TO SEPARATE THE MAST TOP (ITEM 2) FROM THE BUTT.
- 8) REMOVE THE LOWER PIN CONNECTING THE MAST BUTT AND TOP. SEPARATE THE MAST TOP FROM THE BUTT (SEE VIEW D).
- 9) ASSEMBLE MAST INSERTS (ITEM 1 AND 5). BOTH INSERTS CAN BE CANTILEVERED FROM THE MAST BUTT (SEE VIEW E). (FOR LOWER CONNECTOR PIN INSTALLATION SEE DETAIL T).

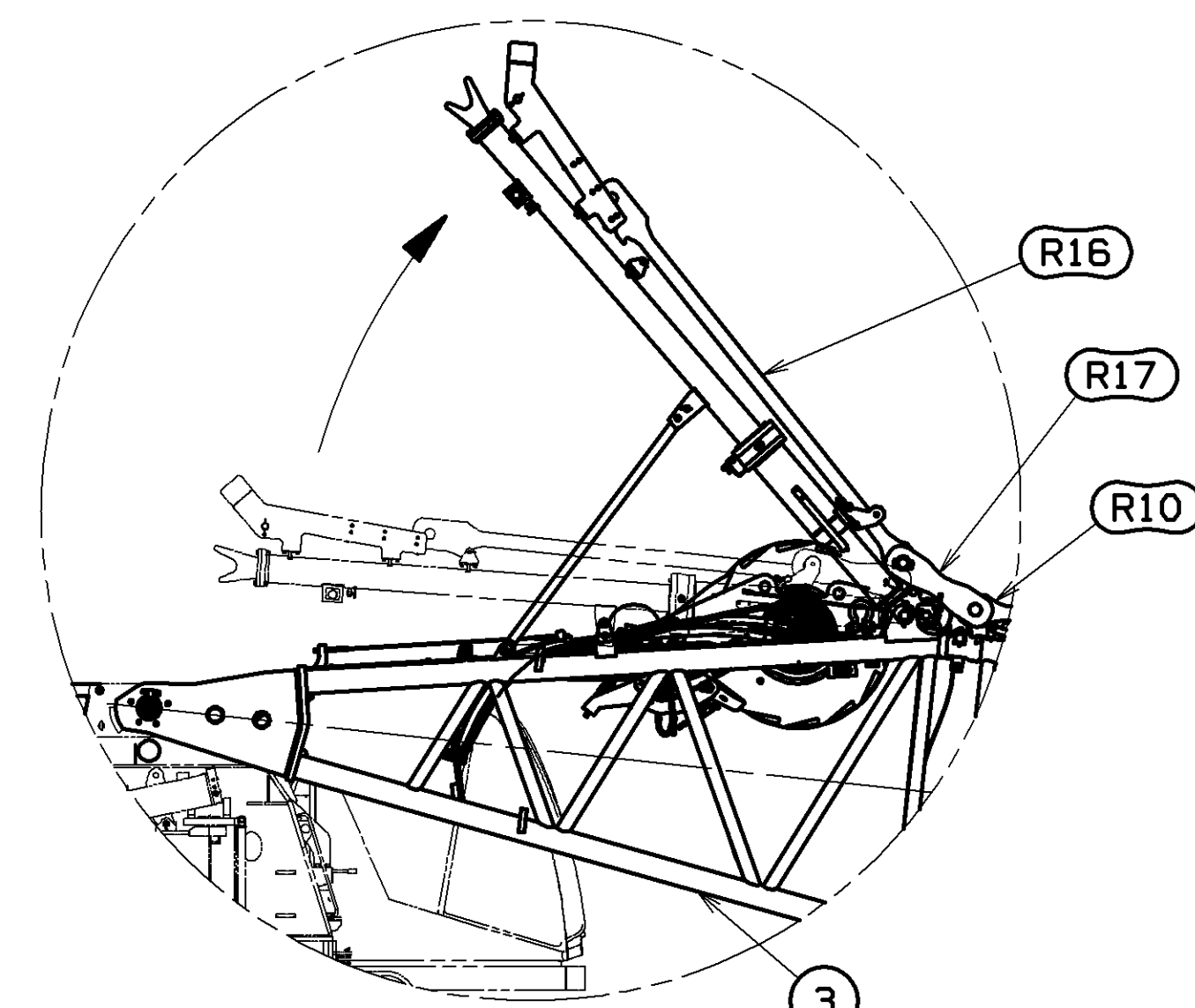
TOLERANCE UNLESS OTHERWISE SPECIFIED		FABRICATION		FINISHING		MATERIAL		DATE	
DECIMAL PLACES	F. TO FEET	IN. FEET	IN. FEET	FINISHING	DR. NPH	DR. NPH	DR. NPH	DATE	REV. LNK
(1) PLACE 0.5	±.12	±.12	±.12	TO BE	DR. NPH	DR. NPH	DR. NPH	06-09-15	F
(2) PLACE 0.00	±.06	±.12	±.015	BY	DR. NPH	DR. NPH	DR. NPH		
(3) PLACE 0.000	±.006	±.006	±.006	DATE	APP NPH	APP NPH	APP NPH		
ANGLES		11.25°		90°/90°					
<small>THIS DRAWING IS THE PROPERTY OF MARITIME CRANES, 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 DETRIMENTAL TO OUR INTERESTS.</small>						Maritowoc Cranes, Inc. Maritowoc, Wisconsin MODEL MLC650 M10:684		PRIVATE LABELING REQUIREMENT TO CONFORM TO ENGINEERING SPECIFICATION 8629103794 FOR COMPONENTS LISTED IN 86290-06-026 DATE 06-09-15 REF. LNK F 81025005 SHT 2 OF 4	

BILL OF MATERIAL				ASSEMBLIES USED ON
QTY	ITEM NO	DESCRIPTION	MATERIAL	DATE

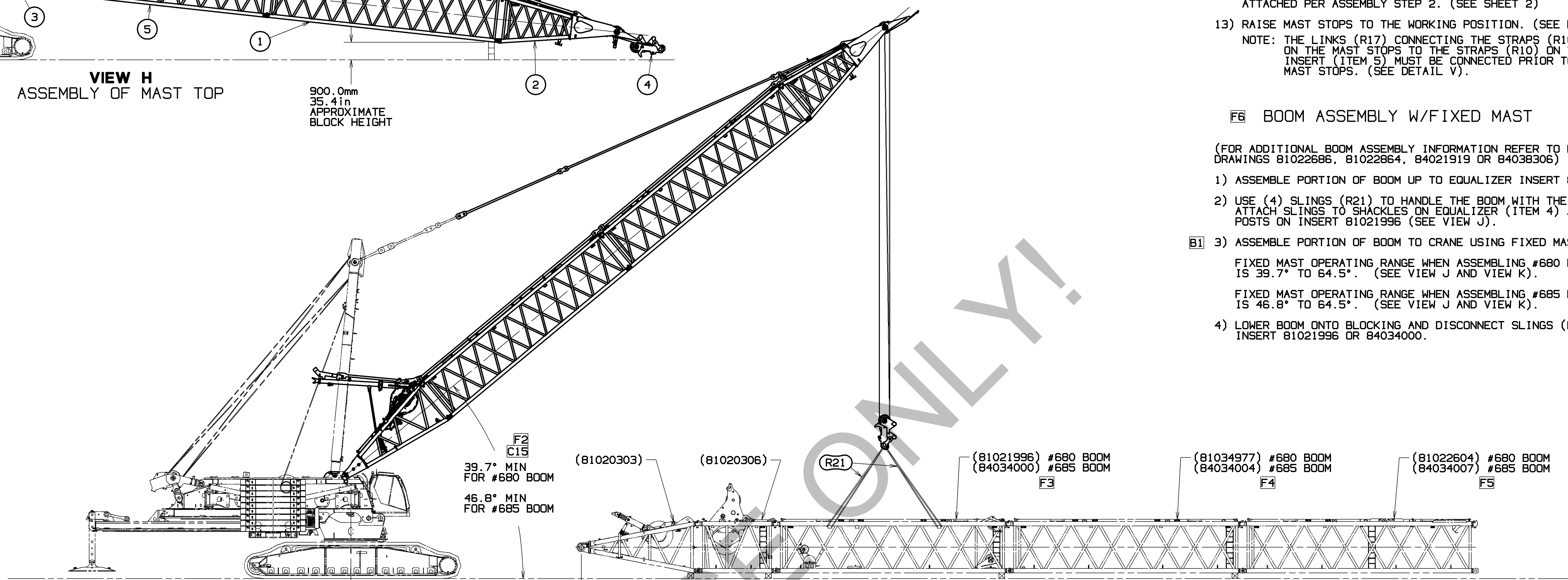


VIEW H ASSEMBLY OF MAST TOP

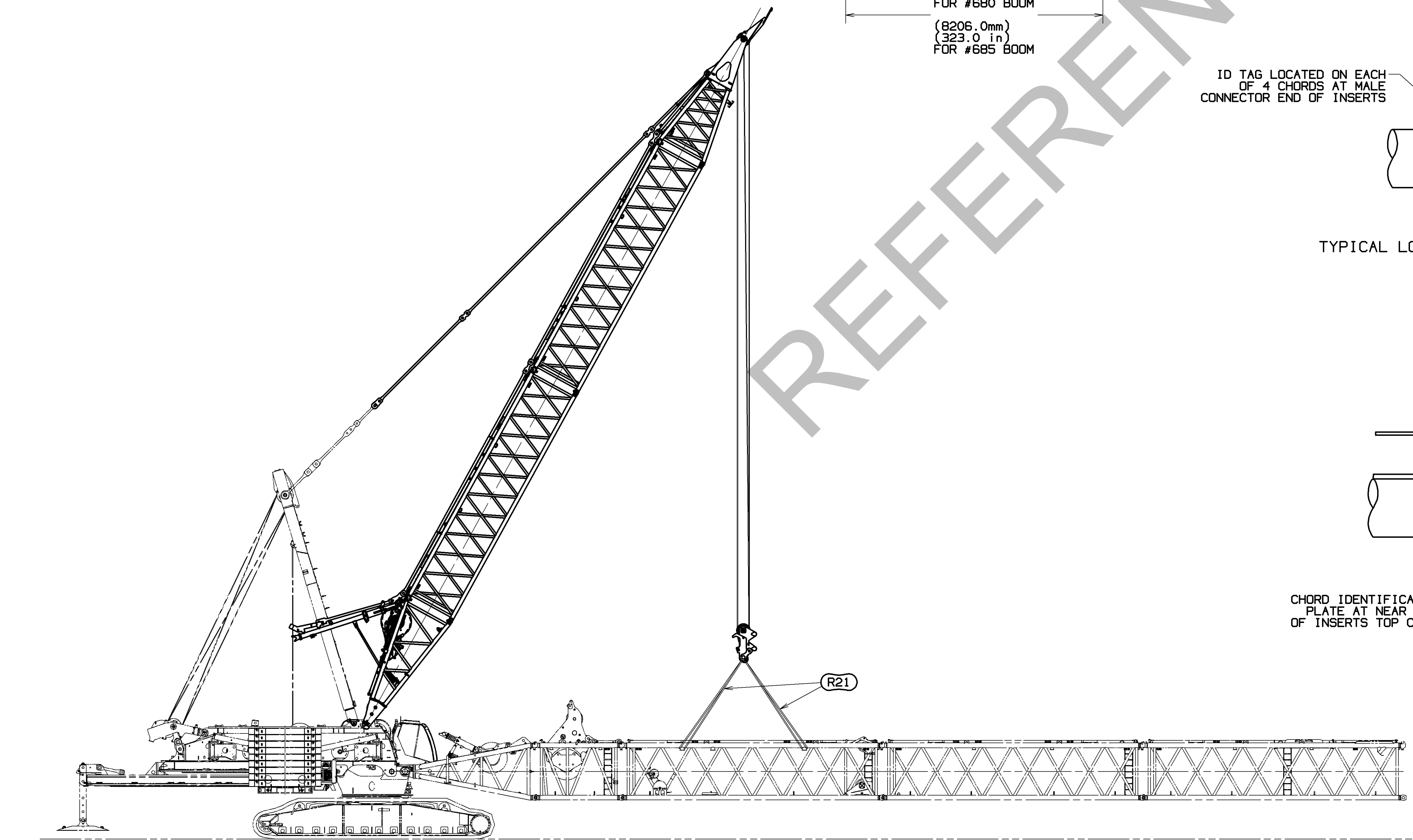
900.0mm
35.41in
APPROXIMATE
BLOCK HEIGHT



DETAIL V
SCALE 0.020
C13

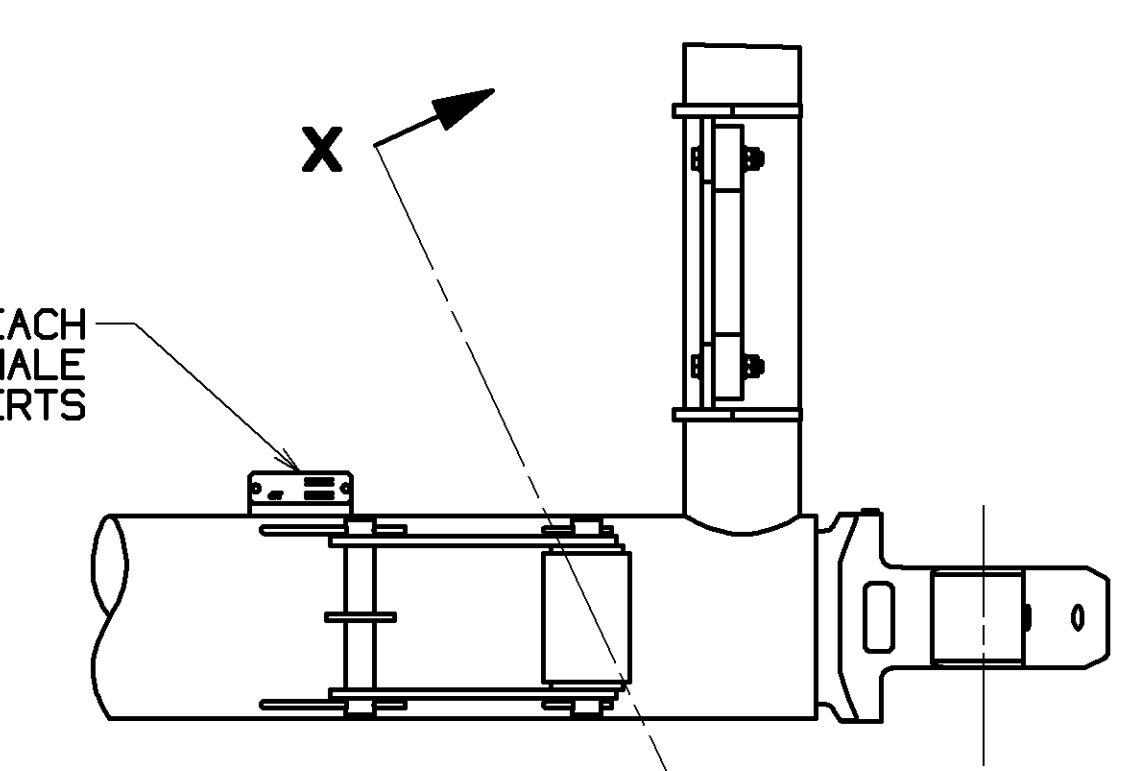


VIEW J
BOOM HANDLING WITH FIXED MAST

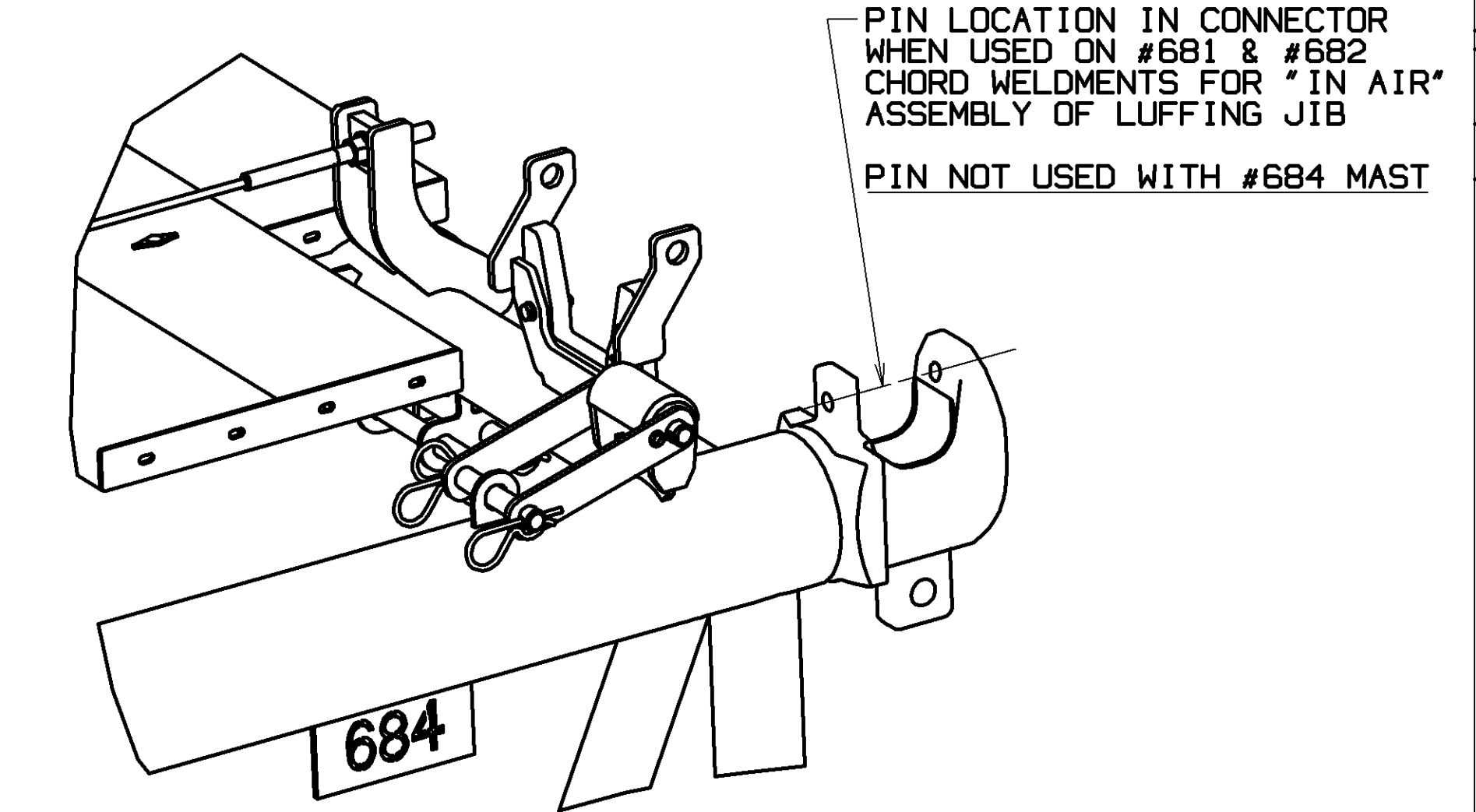


VIEW K
BUTT/EQUALIZER ASSY TO ADAPTER FRAME
HINGE USING FIXED MAST

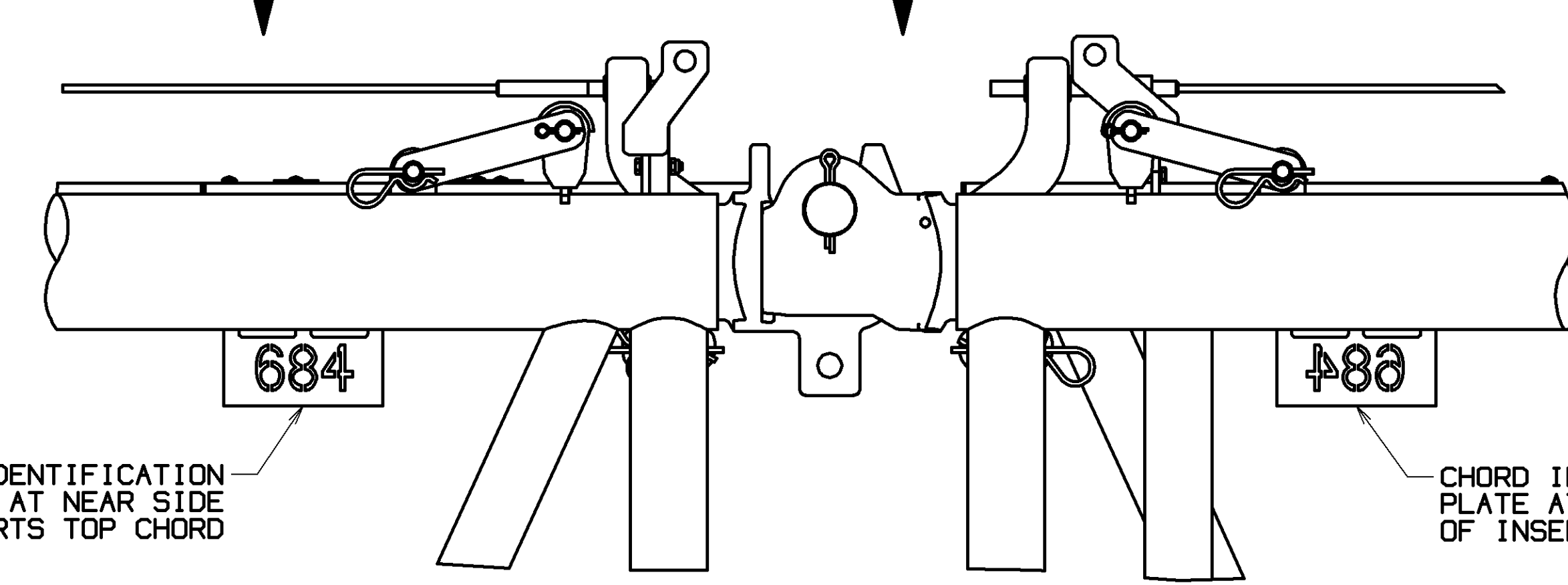
ID TAG LOCATED ON EACH
OF 4 CHORDS AT MALE
CONNECTOR END OF INSERTS



TYPICAL LOCATION OF INSERT IDENTIFICATION TAGS
SCALE 0.150
E7



VIEW X-X
UPPER MALE CONNECTOR PIN HOLE
SCALE 0.150
E8



DETAIL W
LOCATION OF MAST CHORD IDENTIFICATION PLATE
(STRAPS AND LINKS NOT SHOWN FOR CLARITY)
SCALE 0.150
E8

- MAST ASSEMBLY PROCEDURE CONTINUED
- MAST MUST BE BLOCKED PRIOR TO ASSEMBLING MAST TOP. THE ENTIRE WEIGHT OF THE MAST CANNOT BE SUPPORTED BY THE MAST BUTT. APPROXIMATE MINIMUM BLOCK HEIGHT 900 MM (SEE VIEW H).
 - WITH MAST SUPPORTED BY BLOCKING, ASSEMBLE MAST TOP (ITEM 2).
 - STARTING AT THE MAST TOP AND WORKING TOWARDS THE BUTT, CONNECT LINKS TO STRAPS (SEE VIEW B-B ON SHEET 1). DETACH LIFTING SLINGS, SHACKLES AND BUSHINGS PREVIOUSLY ATTACHED PER ASSEMBLY STEP 2. (SEE SHEET 2)
 - RAISE MAST STOPS TO THE WORKING POSITION. (SEE DETAIL V)
NOTE: THE LINKS (R17) CONNECTING THE STRAPS (R16) ON THE MAST STOPS TO THE STRAPS (R10) ON THE MAST INSERT (ITEM 5) MUST BE CONNECTED PRIOR TO RAISING MAST STOPS. (SEE DETAIL V).

- E6 BOOM ASSEMBLY W/FIXED MAST
- (FOR ADDITIONAL BOOM ASSEMBLY INFORMATION REFER TO BOOM RIGGING DRAWINGS 81022686, 81022664, 84021919 OR 84036306)
- ASSEMBLE PORTION OF BOOM UP TO EQUALIZER INSERT 81022604 OR 84034007.
 - USE (4) SLINGS (R21) TO HANDLE THE BOOM WITH THE FIXED MAST. ATTACH SLINGS TO SHACKLES ON EQUALIZER (ITEM 4) AND SLING POSTS ON INSERT 81021996 (SEE VIEW J).
 - ASSEMBLE PORTION OF BOOM TO CRANE USING FIXED MAST.
FIXED MAST OPERATING RANGE WHEN ASSEMBLING #680 BOOM IS 39.7° TO 64.5°. (SEE VIEW J AND VIEW K).
FIXED MAST OPERATING RANGE WHEN ASSEMBLING #685 BOOM IS 46.8° TO 64.5°. (SEE VIEW J AND VIEW K).
 - LOWER BOOM ONTO BLOCKING AND DISCONNECT SLINGS (R21) FROM INSERT 81021996 OR 84034000.

81025005
SHT 3 OF 4

PRIVATE LABELING
REQUIREMENT TO
CONFORM TO
ENGINEERING
SPECIFICATION
8829103794 FOR
COMPONENTS LISTED
IN SECTION 06-03E

DATE
06-09-15

REV. LVL.
F1

MANITOWOC CRANES, INC.
MILWAUKEE, WISCONSIN

MODEL MLC650

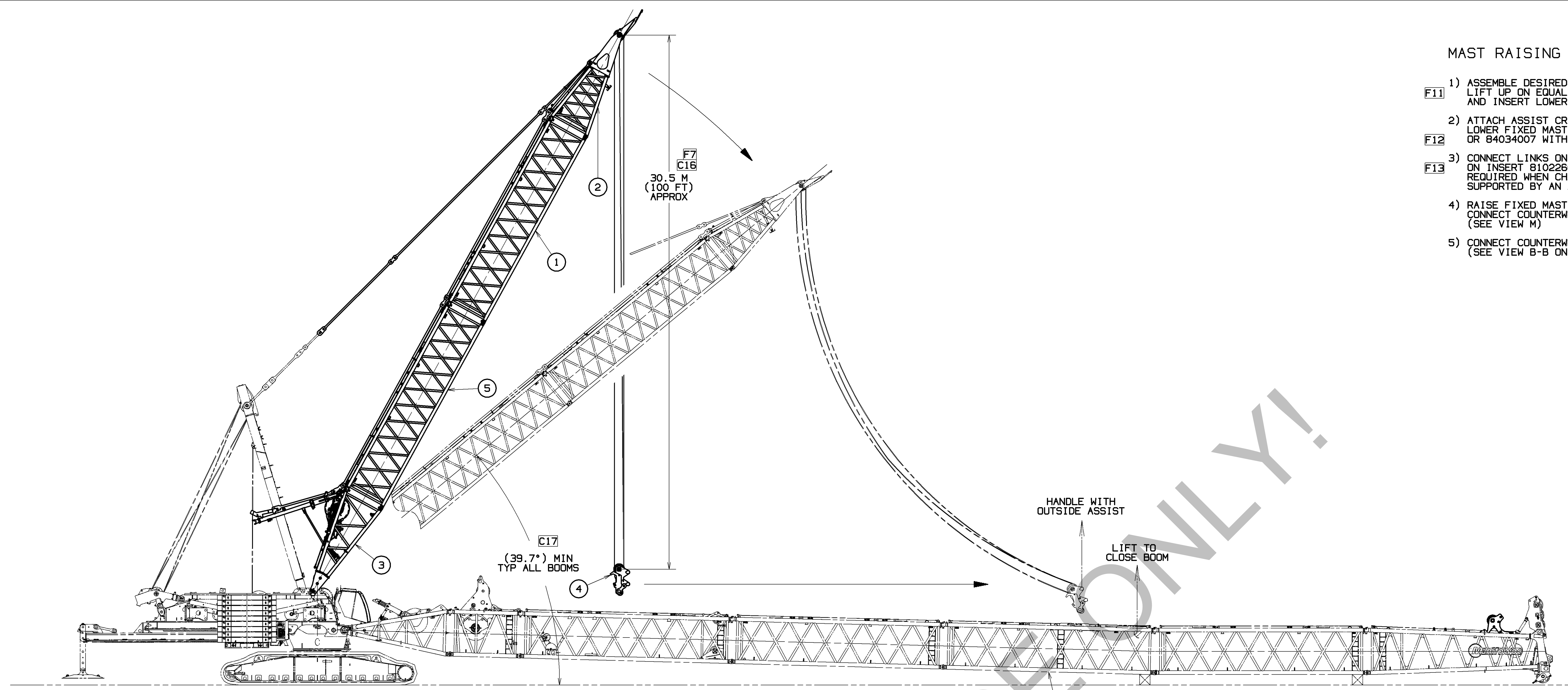
MAST RIGGING
M10:684

81025005
SHT 3 OF 4

BILL OF MATERIAL			
QTY	DESCRIPTION	MATERIAL	ASSEMBLY USED ON

MAST RAISING USING BOOM AS HOLDBACK

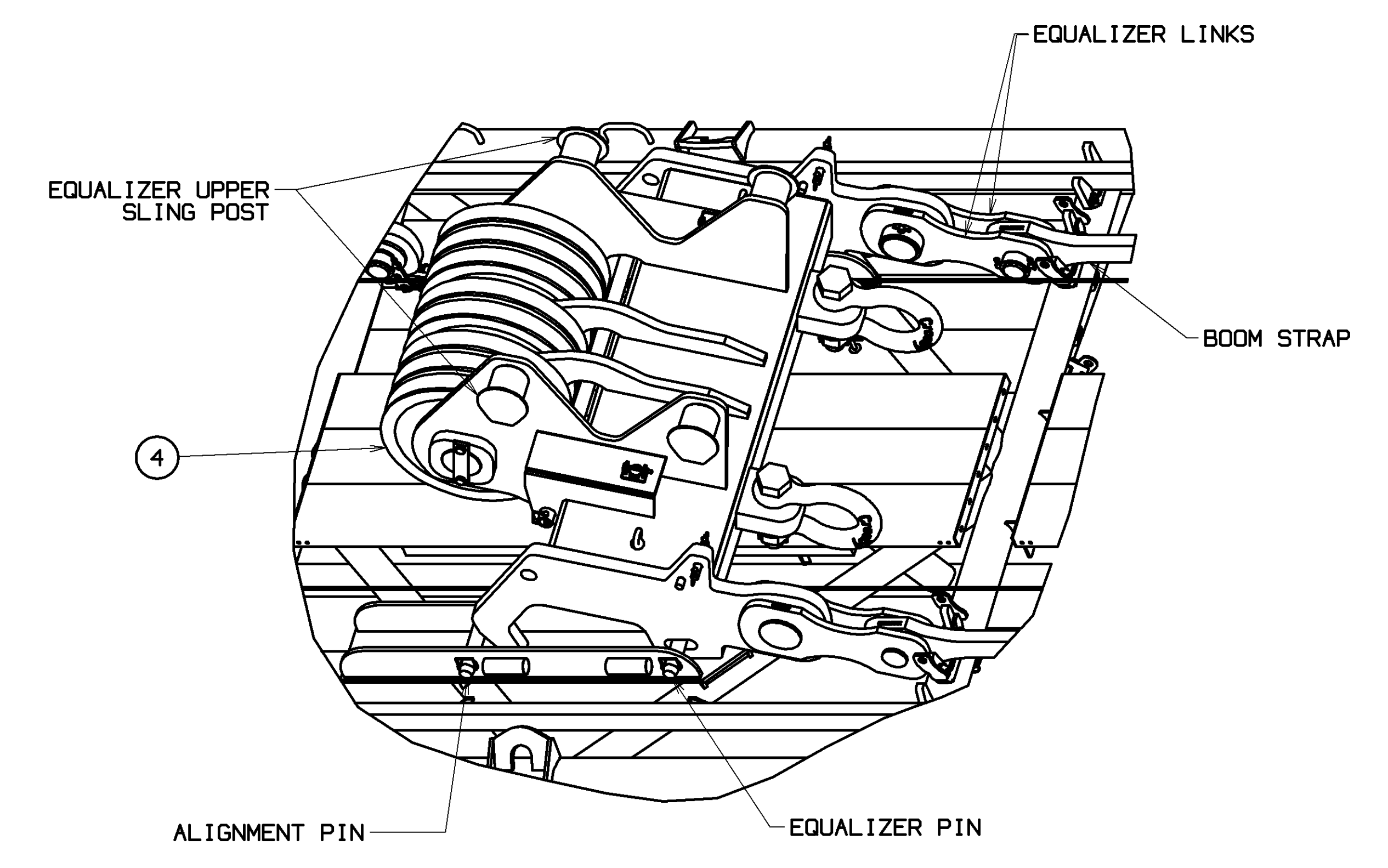
- F11 1) ASSEMBLE DESIRED BOOM LENGTH, USING OUTSIDE ASSIST TO CLOSE BOOM, LIFT UP ON EQUALIZER INSERT (81022604 OR 84034007) AT SLING POSTS AND INSERT LOWER BOOM CONNECTOR PINS. (SEE VIEW L)
- F12 2) ATTACH ASSIST CRANE TO EQUALIZER (ITEM 4) UPPER SLING POSTS, LOWER FIXED MAST WHILE PULLING EQUALIZER TOWARDS INSERT 81022604 OR 84034007 WITH ASSIST CRANE. (SEE VIEW L)
- F13 3) CONNECT LINKS ON EQUALIZER TO BOOM STRAPS AND LOWER ONTO RAILS ON INSERT 81022604 OR 84034007. EQUALIZER PINS (SEE VIEW N) ARE REQUIRED WHEN CHANGING BOOM LENGTHS WHERE THE EQUALIZER IS NOT SUPPORTED BY AN ASSIST CRANE OR CONNECTED TO THE BOOM STRAPS.
- 4) RAISE FIXED MAST TO 67° (NORMAL OPERATING ANGLE IS 68°) TO CONNECT COUNTERWEIGHT STRAPS TO LINKS ON VPC-MAX BEAM. (SEE VIEW M)
- 5) CONNECT COUNTERWEIGHT STRAPS (R16) TO LINKS (R39) ON VPC-MAX BEAM. (SEE VIEW B-B ON SHEET 1)



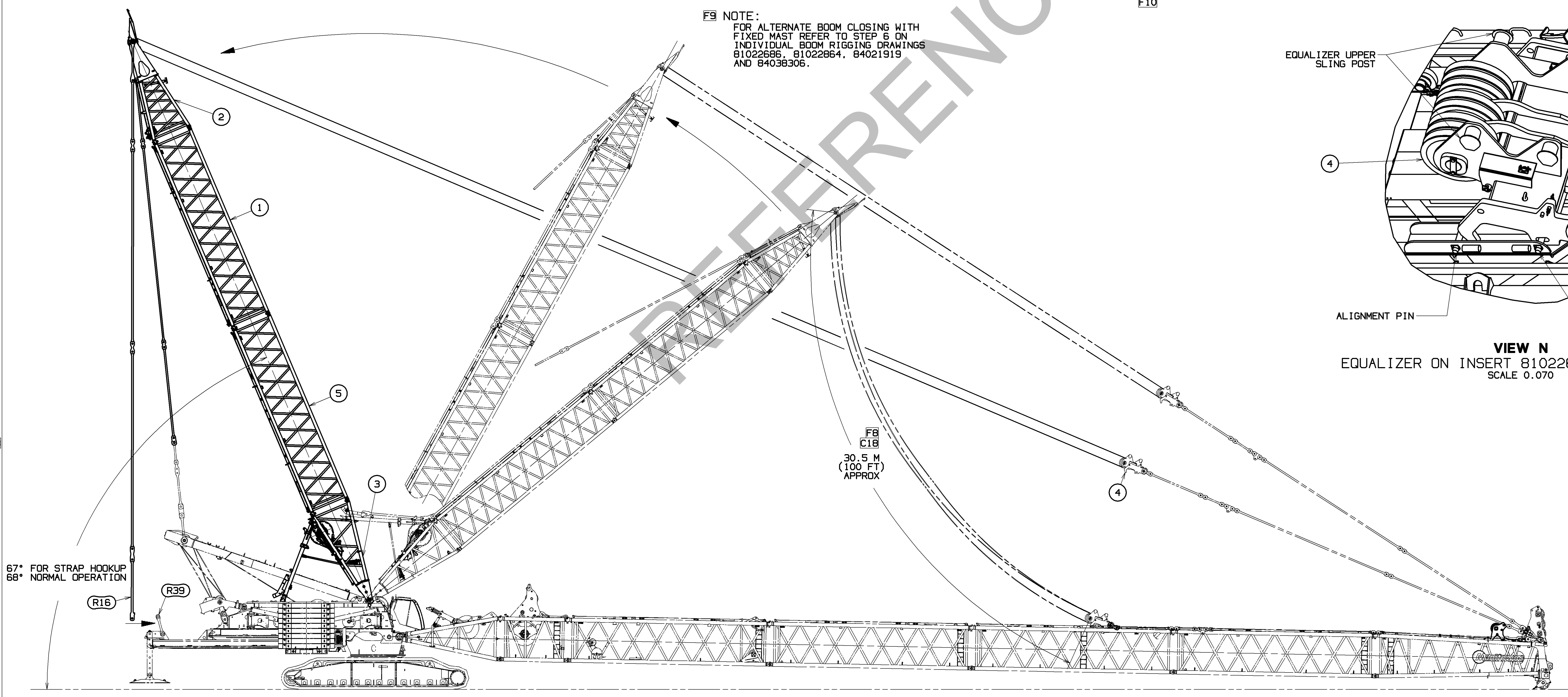
VIEW L
BOOM CLOSING WITH OUTSIDE ASSIST

(81022604) #680 BOOM
(84034007) #685 BOOM

F9 NOTE:
FOR ALTERNATE BOOM CLOSING WITH FIXED MAST REFER TO STEP 6 ON INDIVIDUAL BOOM RIGGING DRAWINGS 81022686, 81022664, 84021919 AND 84038306.



VIEW N
EQUALIZER ON INSERT 81022604 OR 84034007
SCALE 0.070



VIEW M
EQUALIZER TO STRAPS ASSEMBLY

DO NOT SCALE THIS DRAWING

F8C18

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DECIMAL PLACES	FRACTIONS	ANGLE	WELDING	DR: NPH	MODEL: MLC650	DATE: 06-09-15	REV: 1
(1) PLACE 0.5	1/16	± 1/16	WELDING	DR: NPH	MODEL: MLC650	DATE: 06-09-15	REV: 1
(2) PLACE 0.00	1/32	± 1/32	WELDING	DR: NPH	MODEL: MLC650	DATE: 06-09-15	REV: 1
(3) PLACE 0.000	1/64	± 1/64	WELDING	DR: NPH	MODEL: MLC650	DATE: 06-09-15	REV: 1

PRIVATE LABELING REQUIREMENT TO CONFORM TO ENGINEERING SPECIFICATION 8629103794 FOR COMPONENTS LISTED IN 06200-06-006
DATE: 06-09-15
REV: 1
81025005
SHT 4 OF 4