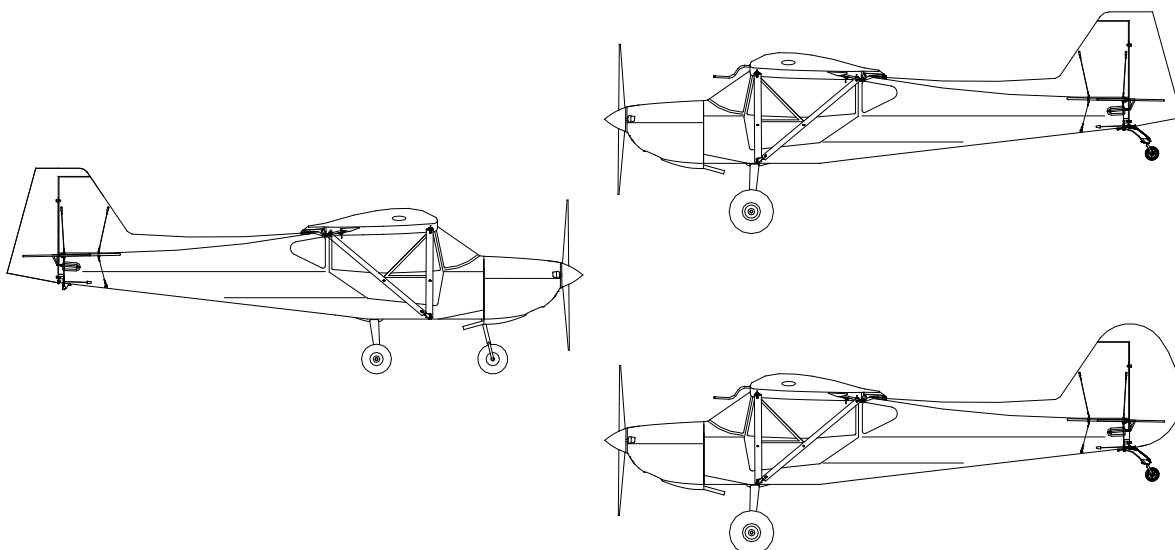




S-20 RAVEN

PARTS MANUAL



Serial Number:

Registration Number:

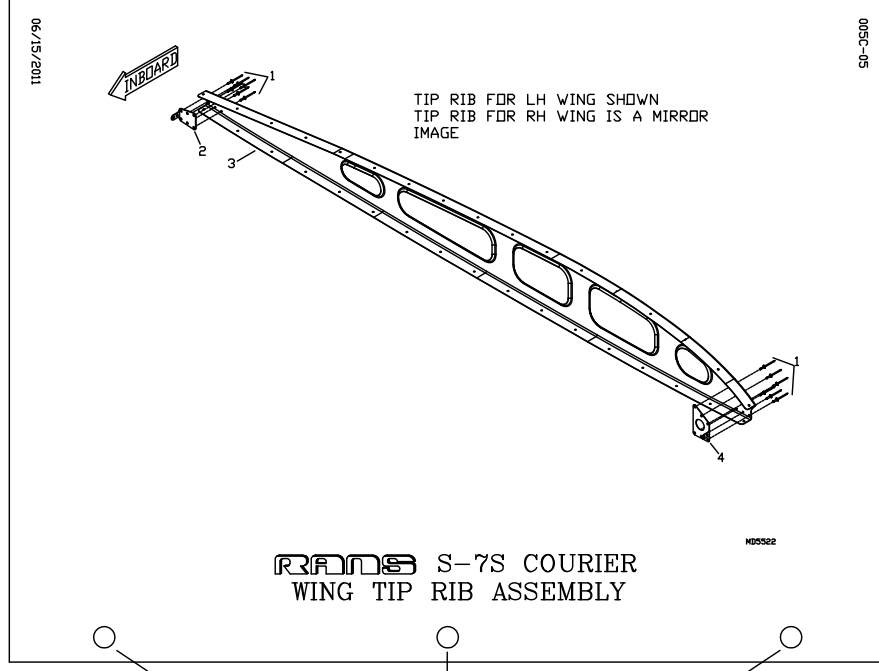
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RANS DESIGNS
4600 HWY 183 Alt
HAYS, KANSAS, USA 67601
785-625-6346
www.rans.com

STEP 1:

PARTS MANUAL AS SHIPPED or PRINTED.
PLACE IN 3-RING BINDER TO SECURE.

PARTS DRAWING PAGE



3-HOLE PUNCH

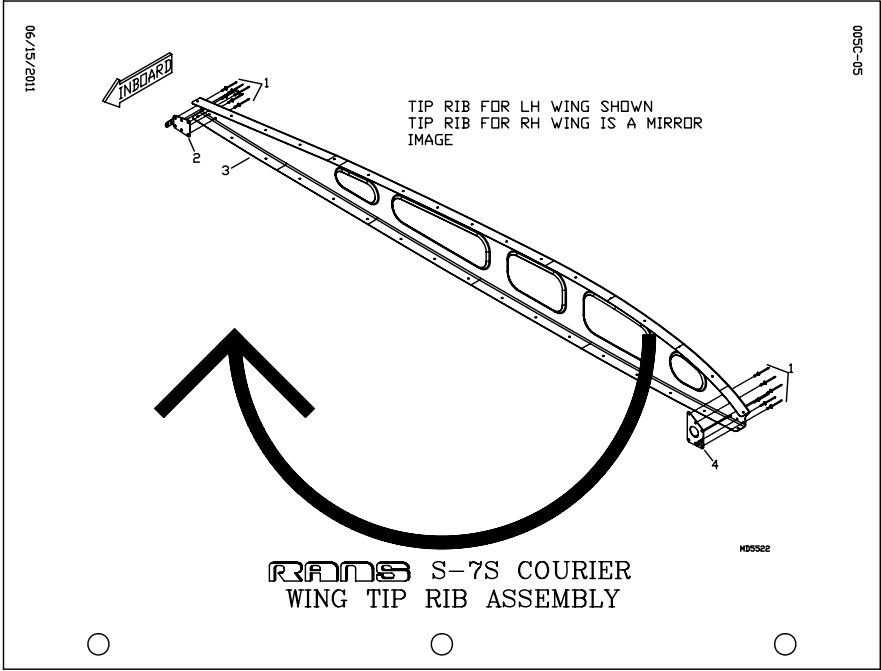
EXAMPLE ONLY.
MAY NOT REPRESENT ACTUAL PAGES
FROM YOUR MANUAL.

SEE NEXT PAGE

STEP 2:

OPEN 3-RING BINDER.
REMOVE PARTS DRAWING PAGE AND
ROTATE 180° TO FACE
CORRESPONDING
PARTS DESCRIPTION PAGE.
REPEAT FOR REMAINING PAGES

PARTS DRAWING PAGE



PARTS DESCRIPTION PAGE

S-7S COURIER - WING - TIP RIB ASSEMBLY				PAGE 005C-06
#	DESCRIPTION	PART NUMBER	QUANTITY	
1.	1/8" ALUMINUM RIVET	AAQ-41	24	
2.	RIB CLIP TRAILING EDGE - LH	KPW0372-L	4	
2.	RIB CLIP TRAILING EDGE - RH	KPW0372-R	1	
3.	WING TIP RIB - LH	KPW0544-L	1	
3.	WING TIP RIB - RH	KPW0544-R	1	
4.	RIB CLIP LEADING EDGE - LH	KPW0373-L	1	
4.	RIB CLIP LEADING EDGE - RH	KPW0373-R	1	

6/15/2011

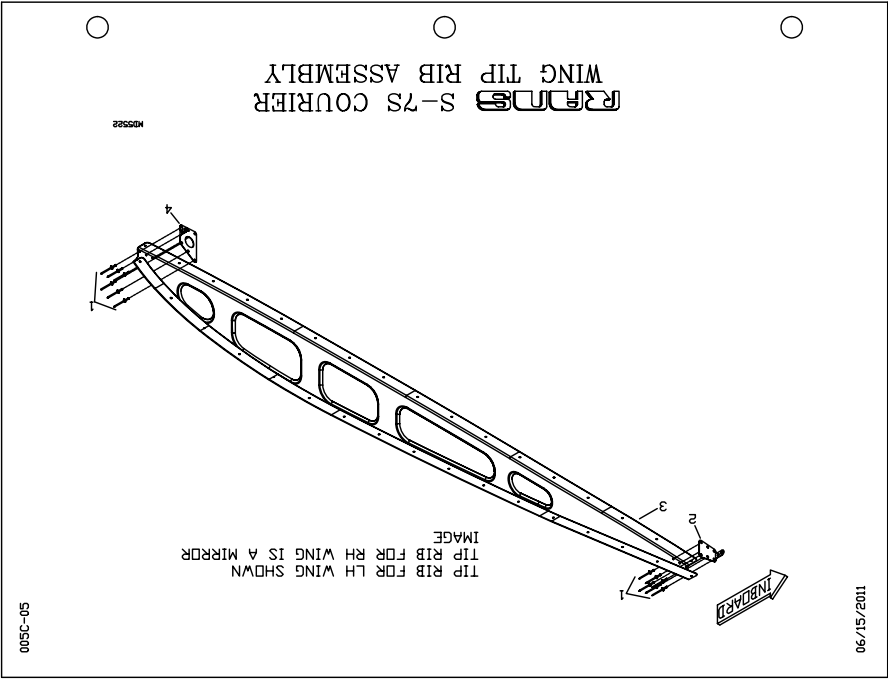
EXAMPLE ONLY.
MAY NOT REPRESENT ACTUAL PAGES
FROM YOUR MANUAL.

SEE NEXT PAGE

STEP 3:

PARTS DRAWING PAGE
FACES CORRESPONDING
PARTS DESCRIPTION PAGE
WHEN FINAL SECURED IN
BINDER

PARTS DRAWING PAGE



PARTS DESCRIPTION PAGE

S-7S COURIER - WING - TIP RIB ASSEMBLY			
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" ALUMINUM RIVET	AAPO41	24
2.	RIB CLIP TRAILING EDGE - LH	KPW0372-L	4
2.	RIB CLIP TRAILING EDGE - RH	KPW0372-R	1
3.	WING TIP RIB - LH	KPW0544-L	1
3.	WING TIP RIB - RH	KPW0544-R	1
4.	RIB CLIP LEADING EDGE - LH	KPW0373-L	1
4.	RIB CLIP LEADING EDGE - RH	KPW0373-R	1

EXAMPLE ONLY.
MAY NOT REPRESENT ACTUAL PAGES
FROM YOUR MANUAL.

RANS S-20 RAVEN - GENERAL

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Assembly Manual - S-20 RAVEN	ASSEMBLY MANUAL (20)	1
2.	Flight Log	FLIGHT LOG	1
3.	Maintenance Log	MAINTENANCE LOG	1
4.	RANS Decals - White **	RANS DECAL-W	0
4.	RANS Decals - Black **	RANS DECAL-B	0
5.	S-20 Decal - White **	KPPL0027	0
5.	S-20 Decal - Black **	KPPL0026	0
6.	Raw Stock Kit - S-20 RAVEN	KAAC0046	1
7.	3/4" x 3/4" x 42" Aluminum Angle *	KAAC0046-1	1
8.	3/4" x .035" x 84" Aluminum Tubing *	KAAC0046-3	1
9.	1/2" x .035" x 144" Aluminum Tubing *	KAAC0046-4	2
10.	1/4" x .028" x 28' Aluminum Tubing *	KAAC0046-5	1
11.	3/4" x .058" x 2" Aluminum Tubing *	KAAC0046-6	1
12.	1/2" diameter Nylon Tubing x 7" *	KAAC0046-10	1

* Supplied in Raw Stock Kit

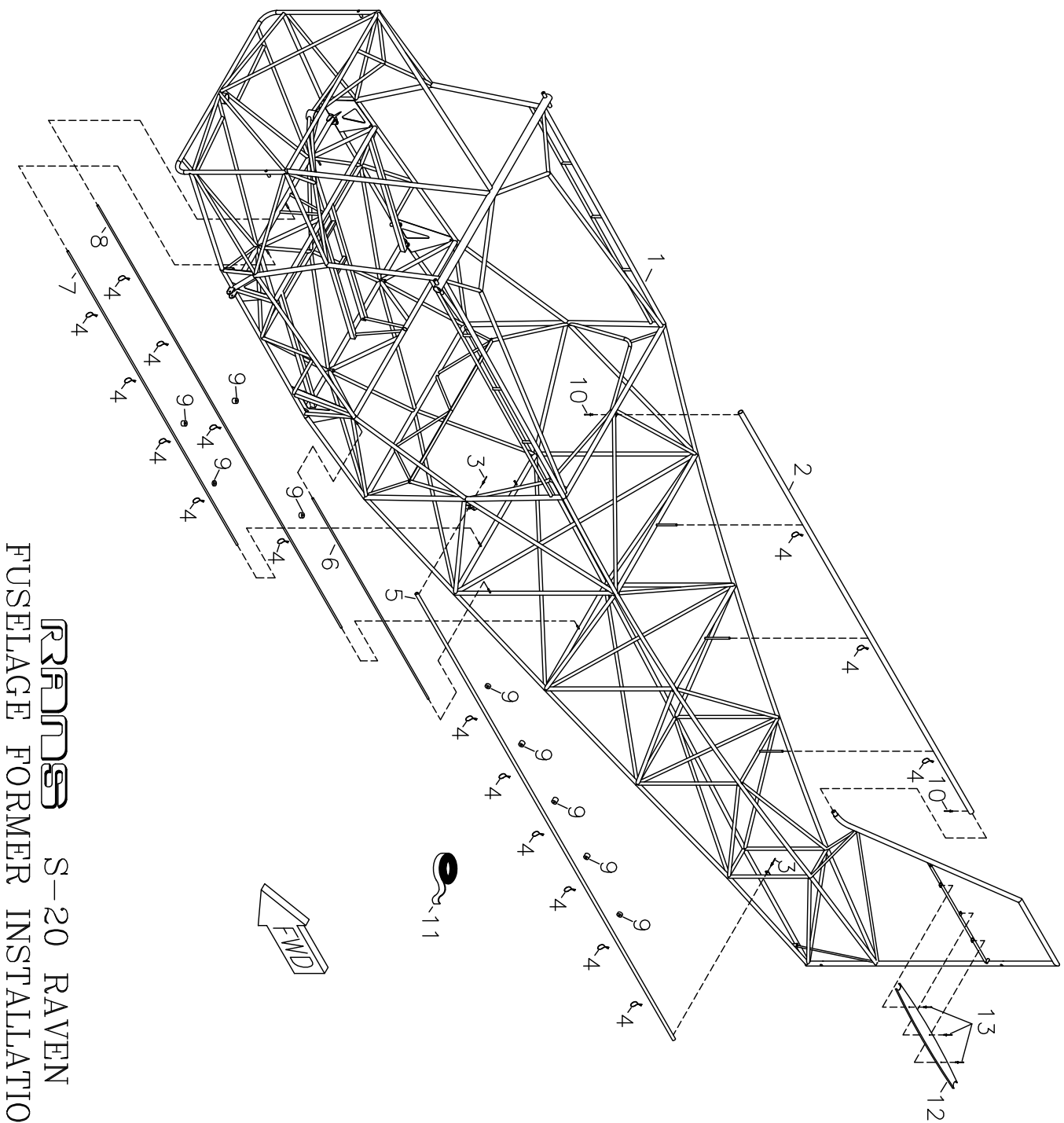
** May be purchased seperately, call RANS Parts Dept. for pricing

9/1/2013

REV. A

RANS S-20 RAVEN - PLACARDS / LABELS / MARKERS

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Placard Sheet - S-20	KPPL0028	1
2.	Passenger Warning Decal	KPPL0008	1
3.	Range Decals	RANGE DECAL	1
4.	Fuel Sight Gauge Decal - LH	KPPL0024-L	1
4.	Fuel Sight Gauge Decal - RH	KPPL0024-R	1
5.	Experimental Decal	KPPL0007	2



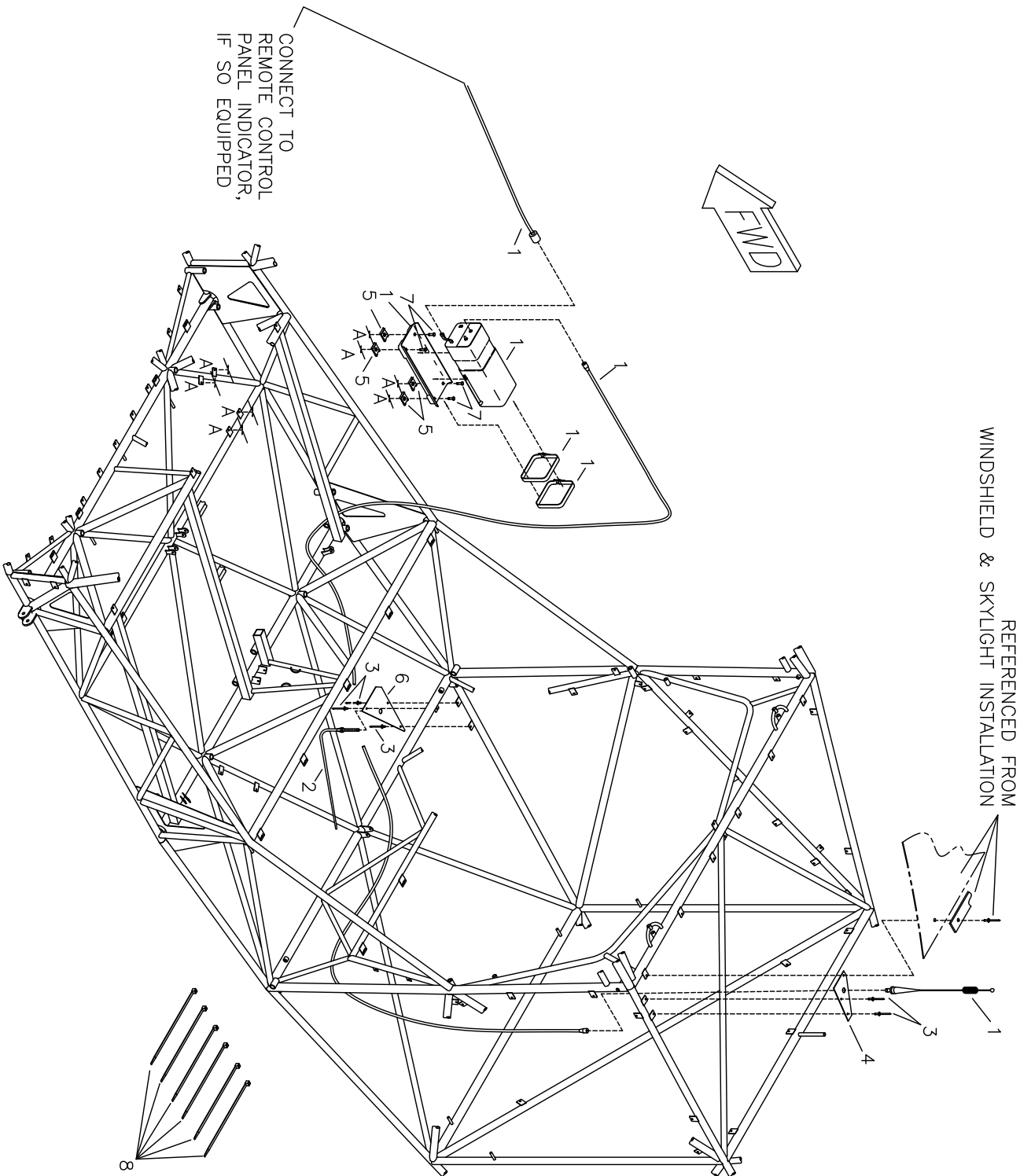
RRP008 S-20 RAVEN
FUSELAGE FORMER INSTALLATION

RANS S-20 RAVEN - FUSELAGE FORMER INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Fuselage - S-20 RAVEN	KAFU0055	1
2.	Top Former, 3/4" x .035" x 83" *	KAAC0046-3	0
3.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	4
4.	Safety Wire **	-----	0
5.	Center Side Former, 1/2" x .035" x 99" *	KAAC0046-4	0
6.	Lower Side Former , 1/4" x .028" x 42" *	KAAC0046-5	0
7.	Outer Belly Former , 1/4" x .028" x 70" *	KAAC0046-5	0
8.	Center Belly Former , 1/4" x .028" x 96" *	KAAC0046-5	0
9.	Former Stand-Off, 1/2" Nylon Tubing x X" *	KAAC0046-10	0
10.	1/8" Stainless Steel Rivet - Cherry-Q	CCPQ-42	2
11.	Anti-Chafe Tape **	-----	0
12.	Compression Rib - Vertical Stabilizer	KPVS0051	1
13.	1/8" Aluminum Rivet - Avex	1691-0410	3

* Builder must fabricate from raw stock

** Builder Supplied



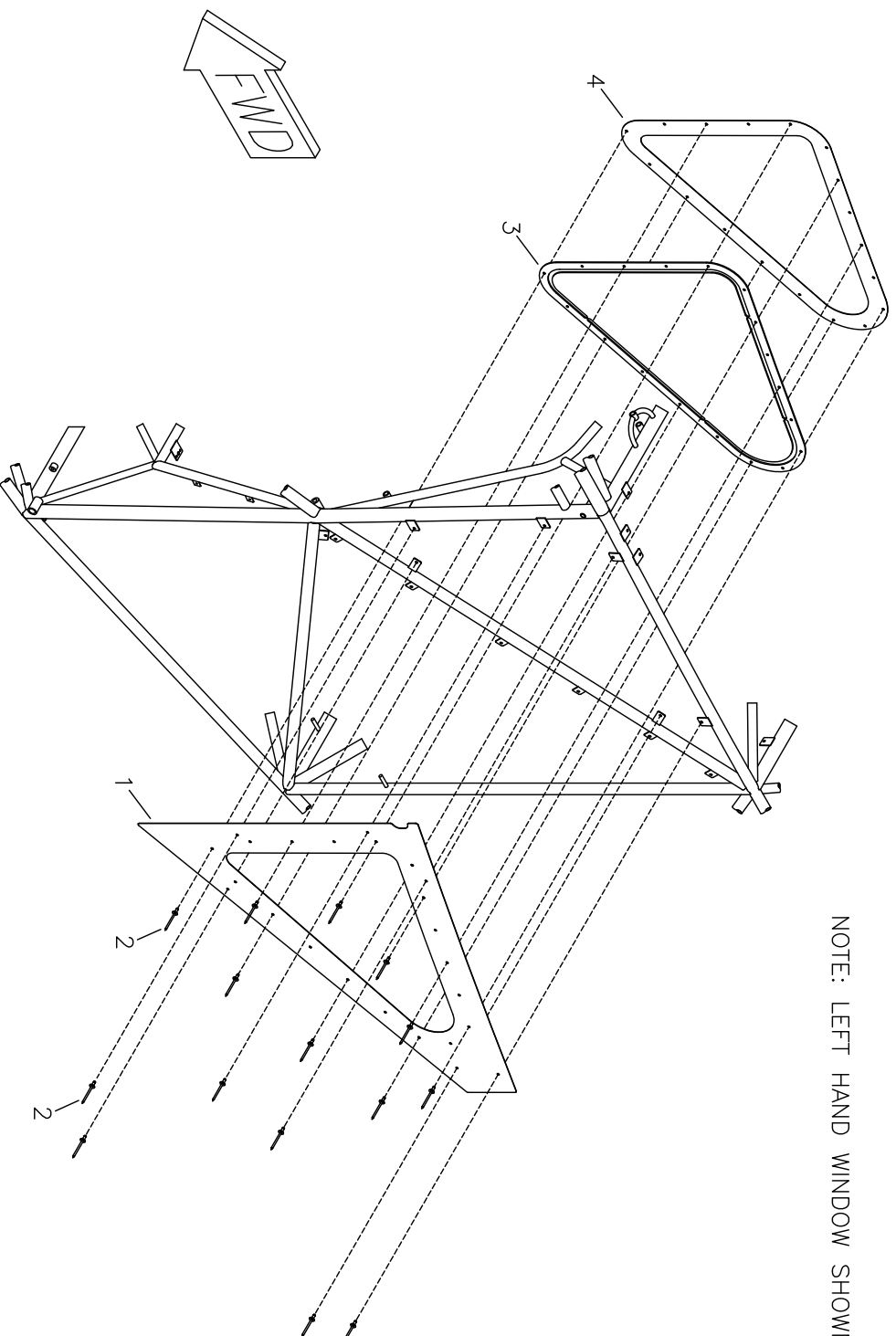
RRRNNSS S-20 RAVEN
EMERGENCY LOCATOR TRANSMITTER & COMMUNICATION ANTENNA INSTALLATION

RANS S-20 RAVEN - ELT & COMMUNICATION ANTENNA MOUNT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Emergency Locator Transmitter *	-----	0
2.	Communication Antenna *	-----	0
3.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	5
4.	Antenna Mount Plate - ELT	KPAV0011	1
5.	Tinnerman	LHA4972-5-62	4
6.	Antenna Backing Plate - COMM	KPAV0029	1
7.	Pan Head Machine Screw	MS35206-228	4
8.	Plastic Tie-7.5"	N-TIES	6

* Builder Supplied

NOTE: LEFT HAND WINDOW SHOWN



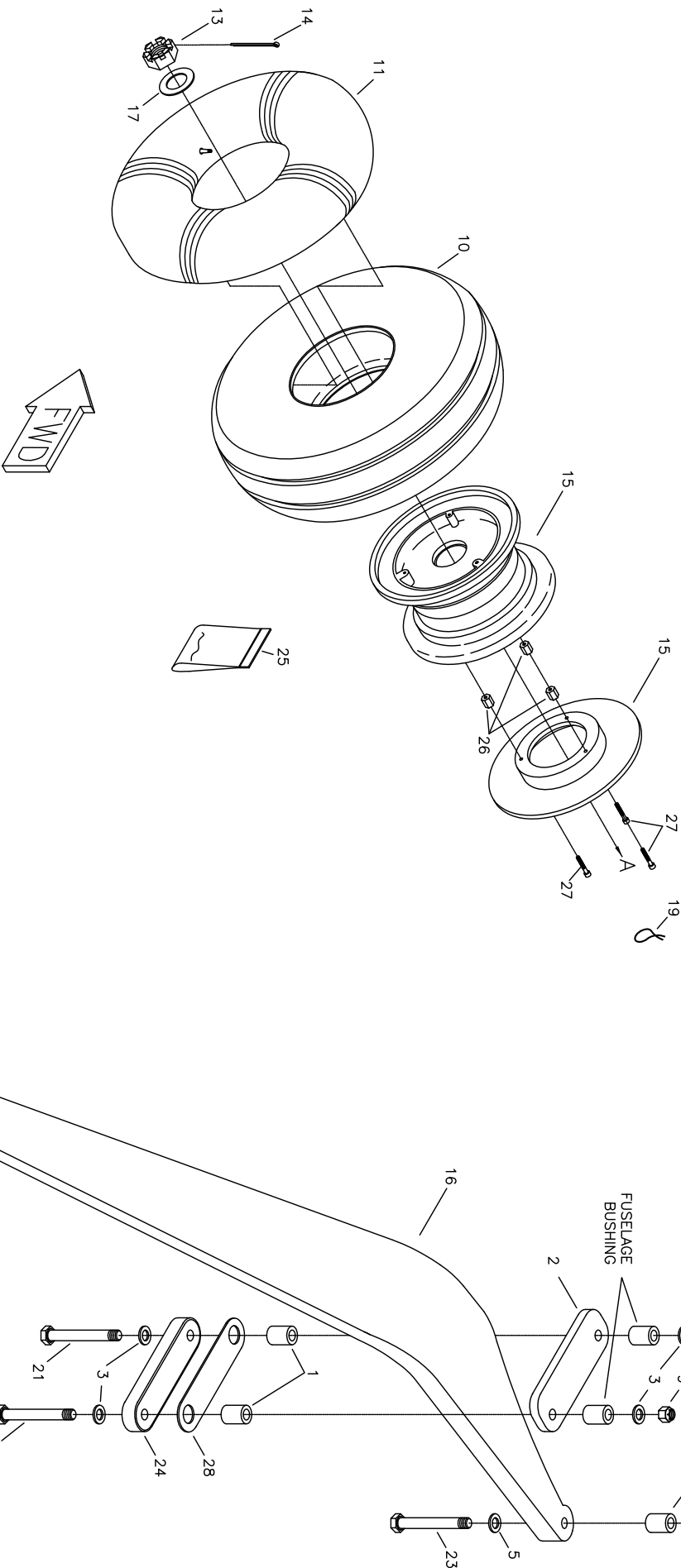
ALL RIVETS: 1691-0410 AVEX

MD5586

RFDN83 S-20 RAVEN BAGGAGE WINDOW INSTALLATION

RANS S-20 RAVEN - BAGGAGE WINDOW INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1 .	Baggage Window Trim Panel	KPFU0681	2
2 .	1/8" Aluminum Rivet - Avex	1691-0410	48
3 .	Baggage Window/Spacer	KPFU0680	2
4 .	Baggage Window Capture Ring	KPFU0682	2



MD5681
REV. A

RAVEN S-20 RAVEN TAILDRAGGER – MAIN GEAR ASSEMBLY AND INSTALLATION

RANS S-20 RAVEN - TAILDRAGGER - MAIN GEAR ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Landing Gear Spacer Bushing	KPMG0211	4
2.	Top Main Gear Clamp Plate	KPMG0206	2
3.	5/16" Thick Washer	AN960-516	12
4.	3/8" Bolt	AN6-27A	4
5.	3/8" Thick Washer	AN960-616	8
6.	3/8" Tensile Nut	AN365-624A	6
7.	5/16" Bolt	AN5-26A	4
8.	Axle Spacer - 1/2"	KSMG0027	2
9.	5/16" Tensile Nut	AN365-524A	8
10.	800 x 6 Tire	KSMG0024	2
11.	800 x 6 Tube	KSMG0023	2
12.	Axle **	----	0
13.	Castle Nut **	----	0
14.	Cotter Pin **	----	0
15.	Hydraulic Brake Assembly, 6"	KSBS0030	2
16.	Gear Leg - Taildragger - RH	KPMG0209-R	1
16.	Gear Leg - Taildragger - LH	KPMG0209-L	1
17.	Washer **	----	0
18.	45-degree Elbow - Flare 1/4" Tube to 1/8" NPT	AN823-4D	2
19.	Safety Wire *	----	0
20.	Thread Sealant *	----	0
21.	5/16" Bolt	AN5-40A	2
22.	5/16" Bolt	AN5-31A	2
23.	3/8" Bolt	AN6-27A	2
24.	Bottom Main Gear Clamp Plate	KPMG0208	2
25.	MATCO Adaptor Kit	KSBS0032	1
26.	Disc Spacer ***	----	0
27.	Socket Head Cap Screw ***	----	0
28.	Main Gear Anti-chafe Strip	KPMG0216	2

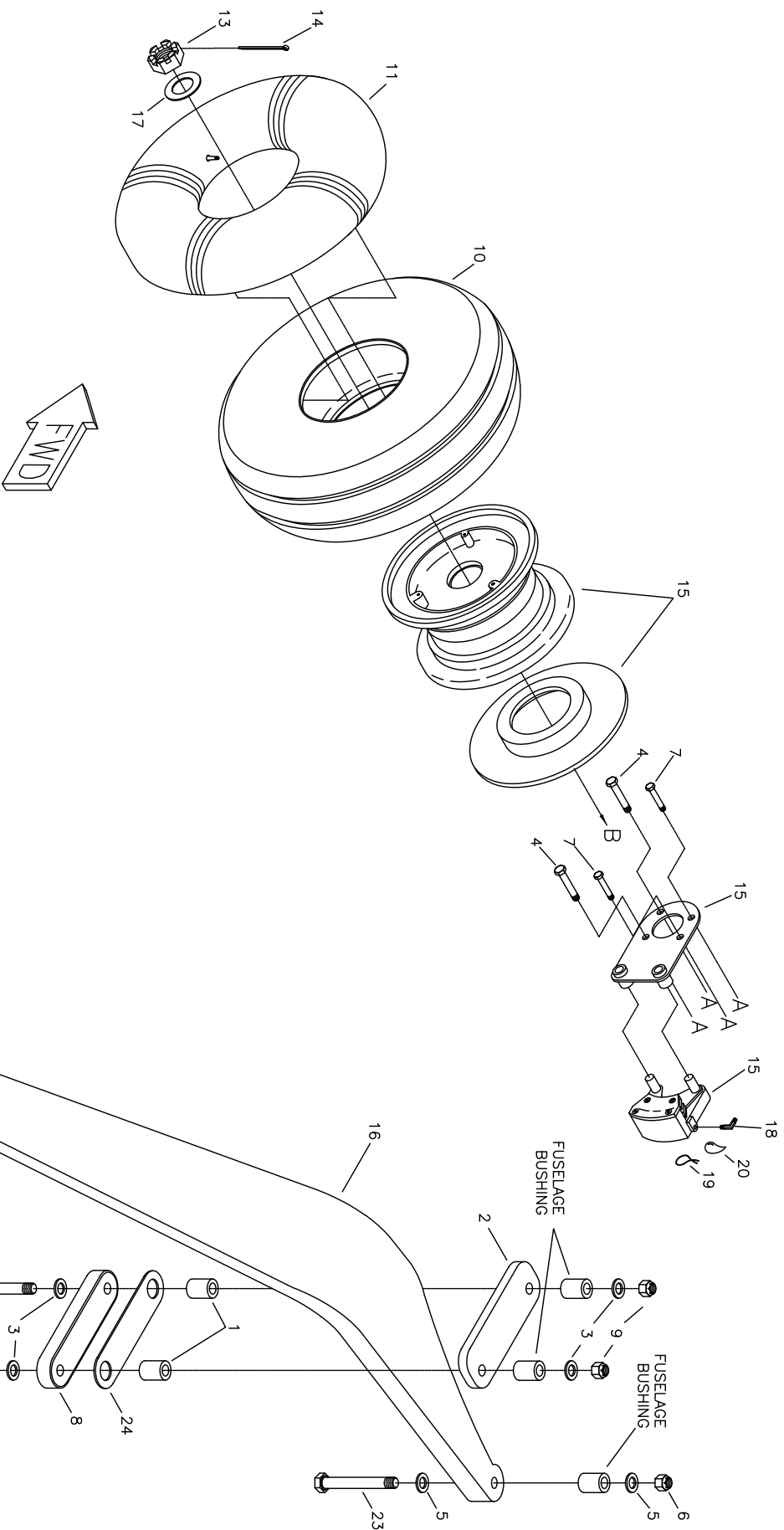
* Builder Supplied

** Supplied with KSBS0030

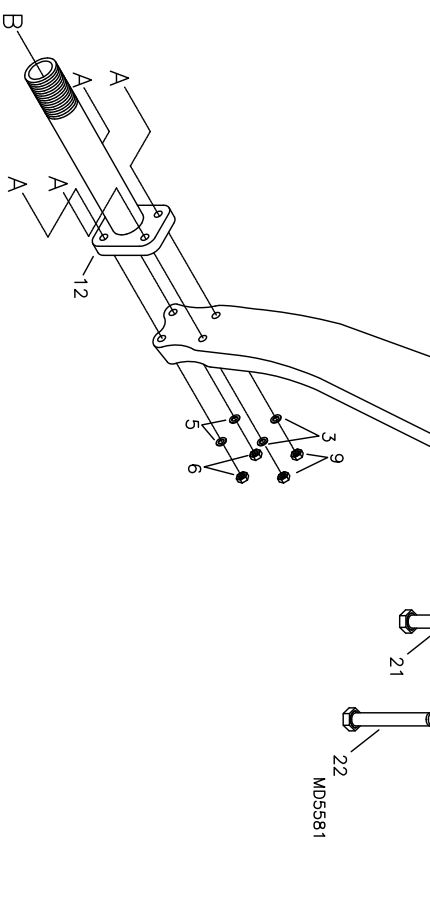
*** Supplied with KSBS0032

9/1/2013

REV. A



RAVEN S-20 RAVEN TRIKE – MAIN GEAR ASSEMBLY AND INSTALLATION



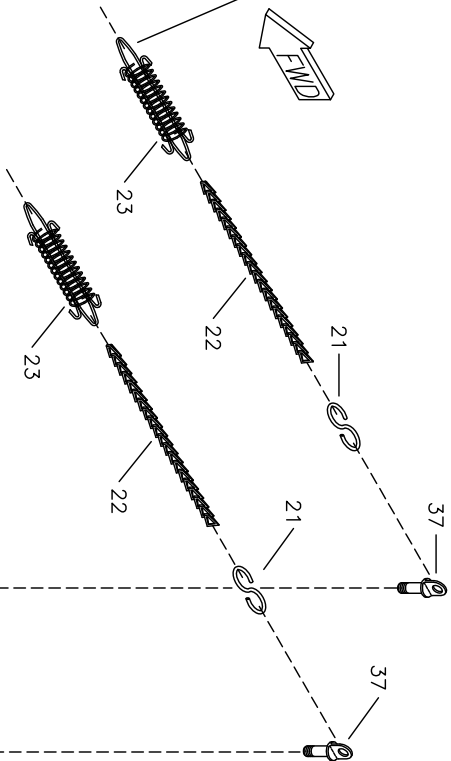
RANS S-20 RAVEN - TRIKE - MAIN GEAR ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Landing Gear Spacer Bushing	KPMG0211	4
2.	Top Main Gear Clamp Plate	KPMG0206	2
3.	5/16" Thick Washer	AN960-516	12
4.	3/8" Bolt	AN6-23A	4
5.	3/8" Thick Washer	AN960-616	8
6.	3/8" Tensile Nut	AN365-624A	6
7.	5/16" Bolt	AN5-22A	4
8.	Bottom Main Gear Clamp Plate	KPMG0208	2
9.	5/16" Tensile Nut	AN365-524A	8
10.	600 x 6 Tire	KSMG0008	2
11.	600 x 6 Tube	KSMG0016	2
12.	Axle **	----	0
13.	Castle Nut **	----	0
14.	Cotter Pin **	----	0
15.	Hydraulic Brake Assembly, 6"	KSBS0030	2
16.	Gear Leg - Trike - LH	KPMG0205-L	1
16.	Gear Leg - Trike - RH	KPMG0205-R	1
17.	Washer **	----	0
18.	45-degree Elbow - Flare 1/4" Tube to 1/8" NPT	AN823-4D	2
19.	Safety Wire *	----	0
20.	Thread Sealant *	----	0
21.	5/16" Bolt	AN5-40A	2
22.	5/16" Bolt	AN5-31A	2
23.	3/8" Bolt	AN6-31A	2
24.	Main Gear Anti-chafe Strip	KPMG0216	2

* Builder Supplied

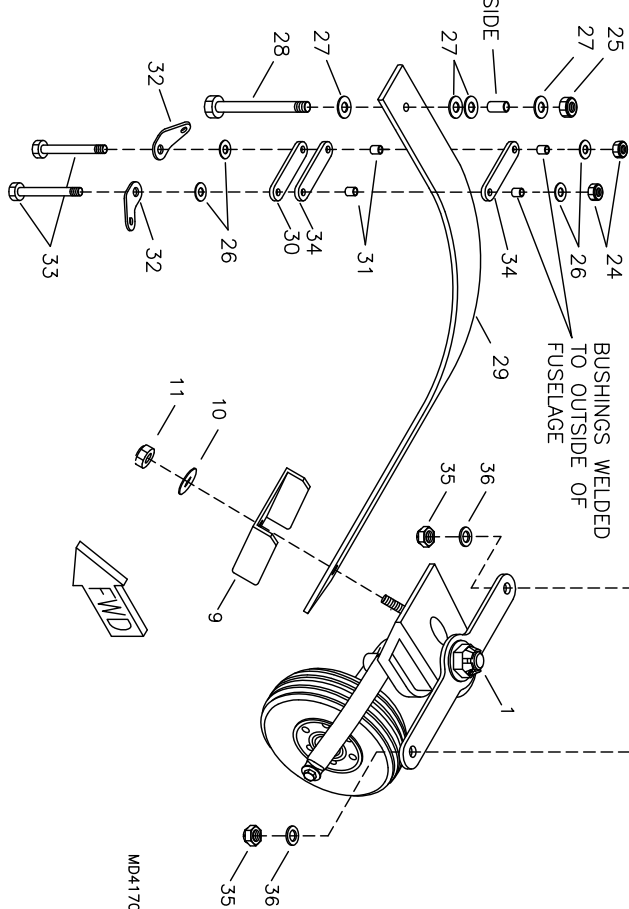
** Supplied with KSBS0030

ATTACH SPRINGS TO BOTTOM
OF RUDDER CONTROL HORN
(SEE RUDDER).

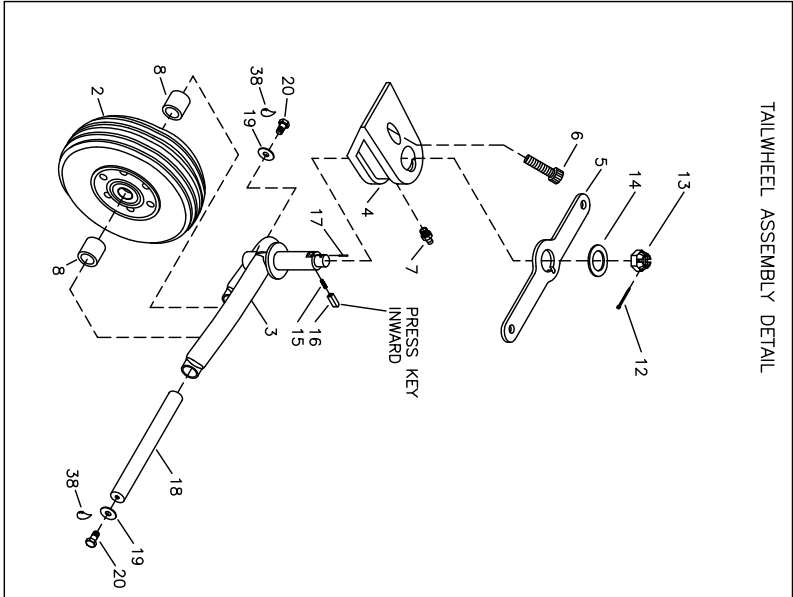


BUSHING
WELDED INSIDE
FUSELAGE

BUSHINGS WELDED
TO OUTSIDE OF
FUSELAGE



TAILWHEEL ASSEMBLY DETAIL



RAVEN S-20 RAVEN TAILWHEEL ASSEMBLY AND INSTALLATION

RANS S-20 RAVEN - TAIL WHEEL ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	8" Pneumatic Tailwheel Assembly	KATG0006	1
2.	Tailwheel *	KSTG0010	0
3.	Tailwheel - Fork *	KPTG0039	0
4.	Tailwheel - Swivel Block *	KPTG0003	0
5.	Tailwheel - Steer Horn *	KPTG0004	0
6.	Socket Head Cap Screw *	KSHW0058	0
7.	Grease Fitting *	11-151	0
8.	Spacer Bushing - 3/4" X .058" Alum Tube *	-----	0
9.	Tailwheel - Spring Channel *	KPTG0007	0
10.	3/8" Thick Washer *	AN960-616	0
11.	3/8" Tensile Loc Nut *	AN363-624A	0
12.	Large Cotter Pin *	MS24665-285	0
13.	1/2" Castle Nut *	AN320-8	0
14.	1/2" Thick Washer *	MS27183-17	0
15.	Tailwheel - Tension Spring *	KSTG0003	0
16.	Tailwheel - Tension Key *	KPTG0006	0
17.	Tailwheel - Spring Pin *	T19-094-0625	0
18.	Axle *	KPTG0040	0
19.	3/16" Large Washer *	AN970-3	0
20.	3/16" Bolt *	AN3-3A	0
21.	S-Hook - Steer Horn	TW-SHOOK	2
22.	Chain - Steer Horn **	TW-C	1
23.	Spring - Steer Horn	TW-S-SPR	2
24.	3/16" Tensile Nut	AN365-1032A	2
25.	5/16" Tensile Nut	AN365-524A	1
26.	3/16" Thick Washer	AN960-10	4
27.	5/16" Thick Washer	AN960-516	4
28.	5/16" Bolt	AN5-20A	1
29.	Tail Spring	KPTG0024	1
30.	Pillow Block Strap	PBS	1
31.	Aluminum Tailwheel Bushing, 1/4" x .028" x .31" ***	KAAC0046-5	0
32.	Attach Tang ****	KPHS0041	0
33.	3/16" Bolt	AN3-21A	2
34.	Gear Strap	KPTG0036	2
35.	1/4" Shear Nut	AN364-428A	2
36.	1/4" Thick Washer	AN960-416	2
37.	1/4" Eyebolt	AN43B-5A	2
38.	Loctite Blue *****	-----	0

* Supplied in tail wheel assembly. ** Builder Modifies

*** Builder must fabricate from raw stock.

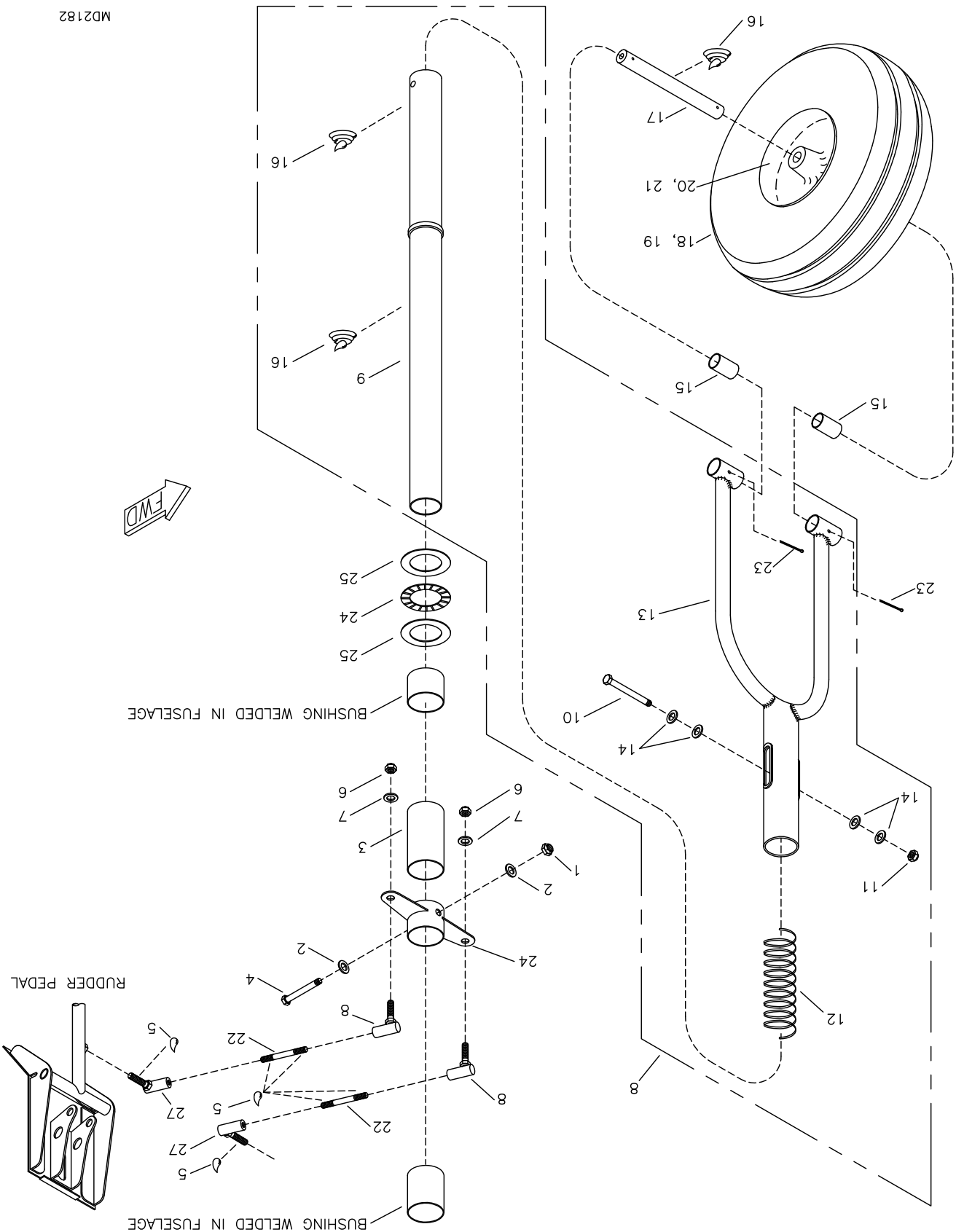
**** Modified Attach Tang - Refer to Horizontal Stabilizer & Elevator Installation

***** Builder Supplied

9/1/2013

RPM S-20 RAVEN NOSE GEAR ASSEMBLY & INSTALLATION

MD2182

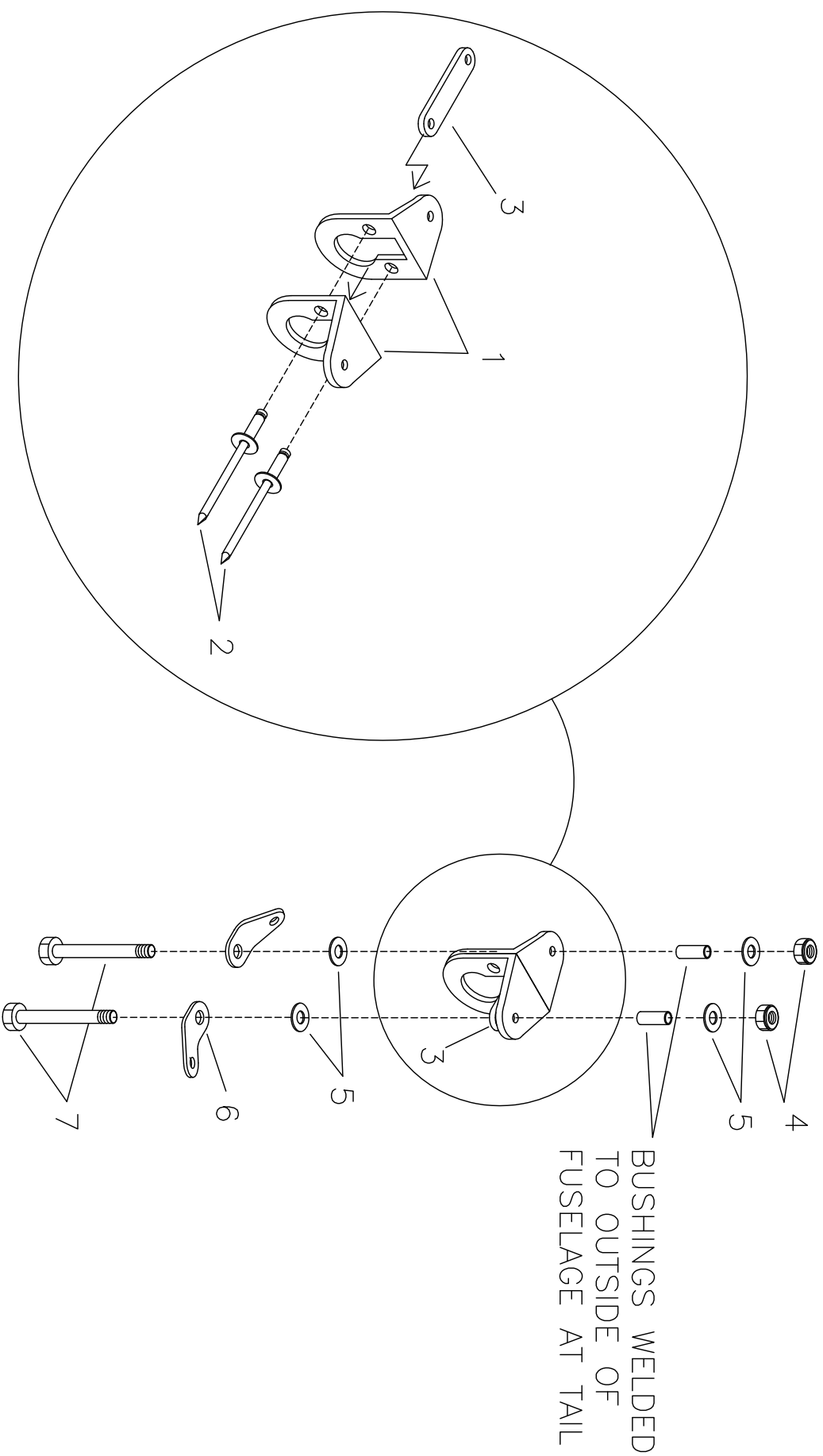


#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Shear Nut	AN364-1032A	1
2.	3/16" Thin Washer	AN960-10L	2
3.	Stop Ring	KPNG0027	1
4.	3/16" Bolt	AN3-20A	1
5.	Loctite Blue *	-----	0
6.	1/4" Shear Nut	AN364-428A	2
7.	1/4" Thin Washer	AN960-416L	2
8.	Nose Gear Strut/Fork Assembly	KANG0019	1
9.	Nose Gear Strut **	KPNG0076	0
10.	1/4" Bolt **	AN4-24A	0
11.	1/4" Shear Nut **	AN364-428A	0
12.	Spring **	4259	0
13.	Fork **	KPNG0001	0
14.	1/4" Plastic Washer **	PW-4	0
15.	Nose Gear Wheel Bushing ***	NG-WB-T	2
16.	Grease *	-----	0
17.	Nose Gear Axle	KPNG0002	1
18.	15 X 6.00-6 Tire	KSMG0013	1
19.	15 X 6.00-6 Tube	KSMG0016	1
20.	Hegar Nosewheel Hub Kit	LG-NW-HUB	1
21.	6" Hegar Nosewheel Rim Kit	LG-NW-RIM	1
22.	Steer Rod, 2 7/8"	KPNG0017	2
23.	Large Cotter Pin	MS24665-285	2
24.	Steer Horn	KPNG0020	1
25.	Bearing Washer	TRA2435	2
26.	Thrust Bearing	NTA2435	1
27.	Steering Rod Linkage	NG-SL	4

* Builder Supplied

** Supplied with Nose Gear Strut/Fork Assembly.

*** Builder Modifies



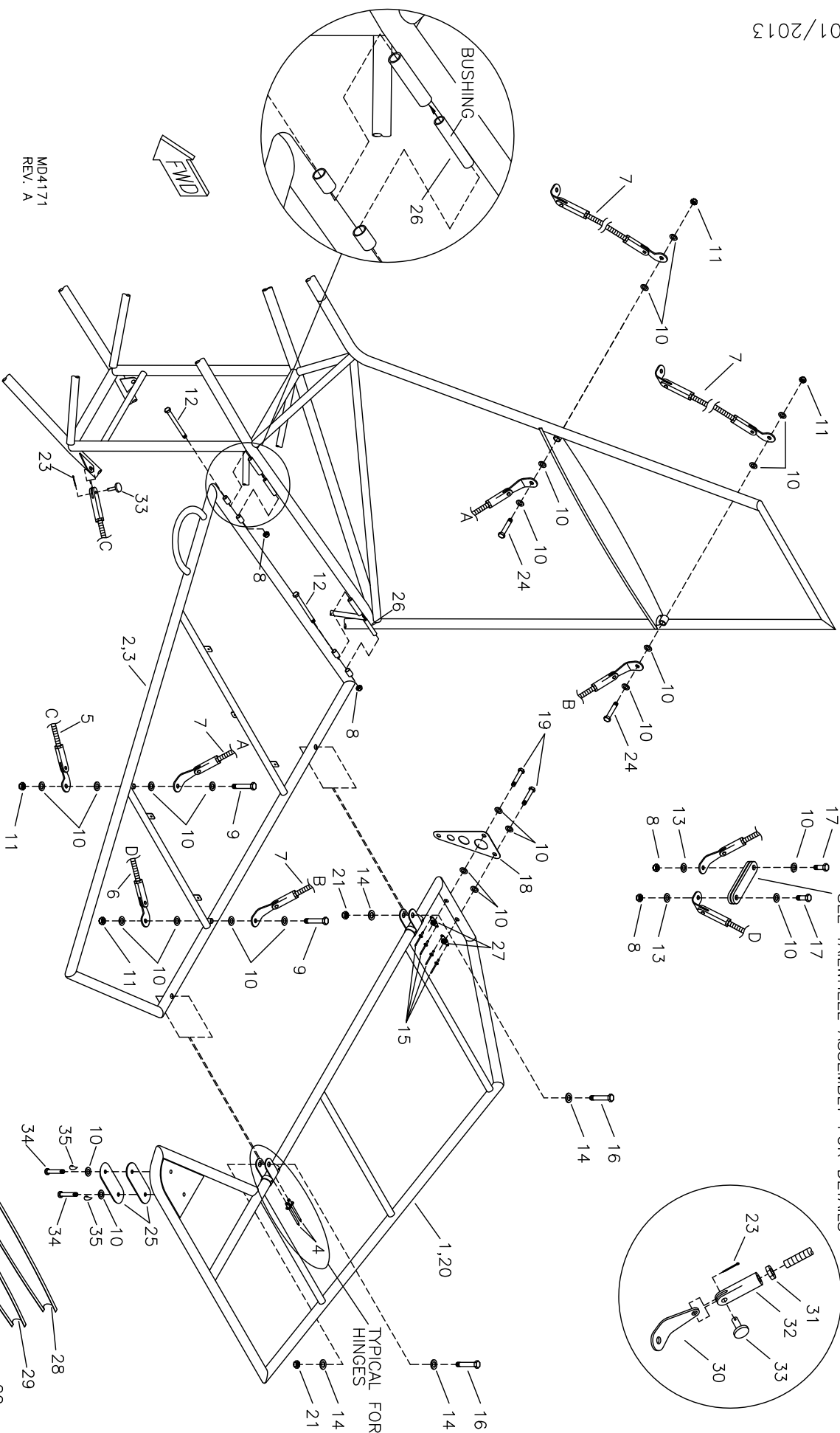
REPAIR S-20 RAVEN
TAIL TIE-DOWN INSTALLATION

MD55594
REV. - ORIG

RANS S-20 RAVEN - TAIL TIE-DOWN INSTALLATION**TRIKE ONLY**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Tail Tie-Down Angle	KPFU0686	2
2.	1/8" Stainless Steel Rivet - Cherry-Q	CCPQ-46	2
3.	Pillow Block Strap	PBS	1
4.	3/16" Tensile Nut	AN365-1032A	2
5.	3/16" Thick Washer	AN960-10	4
6.	Attach Tang *	KPHS0041	0
7.	3/16" Bolt	AN3-15A	2

* Modified Attach Tang - Refer to Horizontal Stabilizer & Elevator Installation



RAVEN S-20 RAVEN **HORIZONTAL STABILIZER & ELEVATOR** **ASSEMBLY AND INSTALLATION**

MD4171
 REV. A

RANS S-20 RAVEN - HORIZONTAL STABILIZER. & ELEVATOR ASS'Y & INST'

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Elevator, LH	KAEL0010	1
2.	Horizontal Stabilizer Assembly, LH	KAHS0020-LH	1
3.	Horizontal Stabilizer Assembly, RH	KAHS0020-RH	1
4.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	8
5.	Lower Forward Rod	KPHW0003	2
6.	Lower AFT Rod	KPHW0002	2
7.	Top Rod	KPHW0004	4
8.	3/16" Shear Nut	AN364-1032A	6
9.	3/16" Bolt	AN3-15A	4
10.	3/16" Thin Washer	AN960-10L	40
11.	3/16" Tensile Nut	AN365-1032A	6
12.	3/16" Bolt	AN3-33A	4
13.	3/16" Thick Washer	AN960-10	2
14.	1/4" Thin Washer	AN960-416L	8
15.	3/32" Aluminum Rivet	40APR1/8	8
16.	1/4" Bolt	AN4-14A	4
17.	3/16" Bolt	AN3-5A	2
18.	Elevator Horn	KPEL0029	2
19.	3/16" Bolt	AN3-11A	4
20.	Elevator, RH	KAEL0021	1
21.	1/4" Shear Nut	AN364-428A	4
22.	1/8" Aluminum Rivet - Avex	1691-0410	10
23.	Small Cotter Pin	MS24665-134	16
24.	3/16" Bolt	AN3-14A	2
25.	1/4" Lead Sheet *	-----	0
26.	Aluminum Bushing, 3/8" x .095 x 1.50	KPAC0060	4
27.	3/16" Nut Plate	K-1000-3	4
28.	Inner Compression Rib-Horizontal Stabilizer	KPHS0038	2
29.	Outer Compression Rib-Horizontal Stabilizer	KPHS0037	2
30.	Attach Tang **	KPHS0041	14
31.	Jam Nut	AN315-640-R	8
31.	Jam Nut	AN315-640-L	8
32.	Tie Rod End	AN665-10L	8
32.	Tie Rod End	AN665-10R	8
33.	Clevis Pin	AN393-9	16
34.	3/16" Truss Head Screw	AN526-C1032-R12	4
35.	Loctite Blue *	-----	0

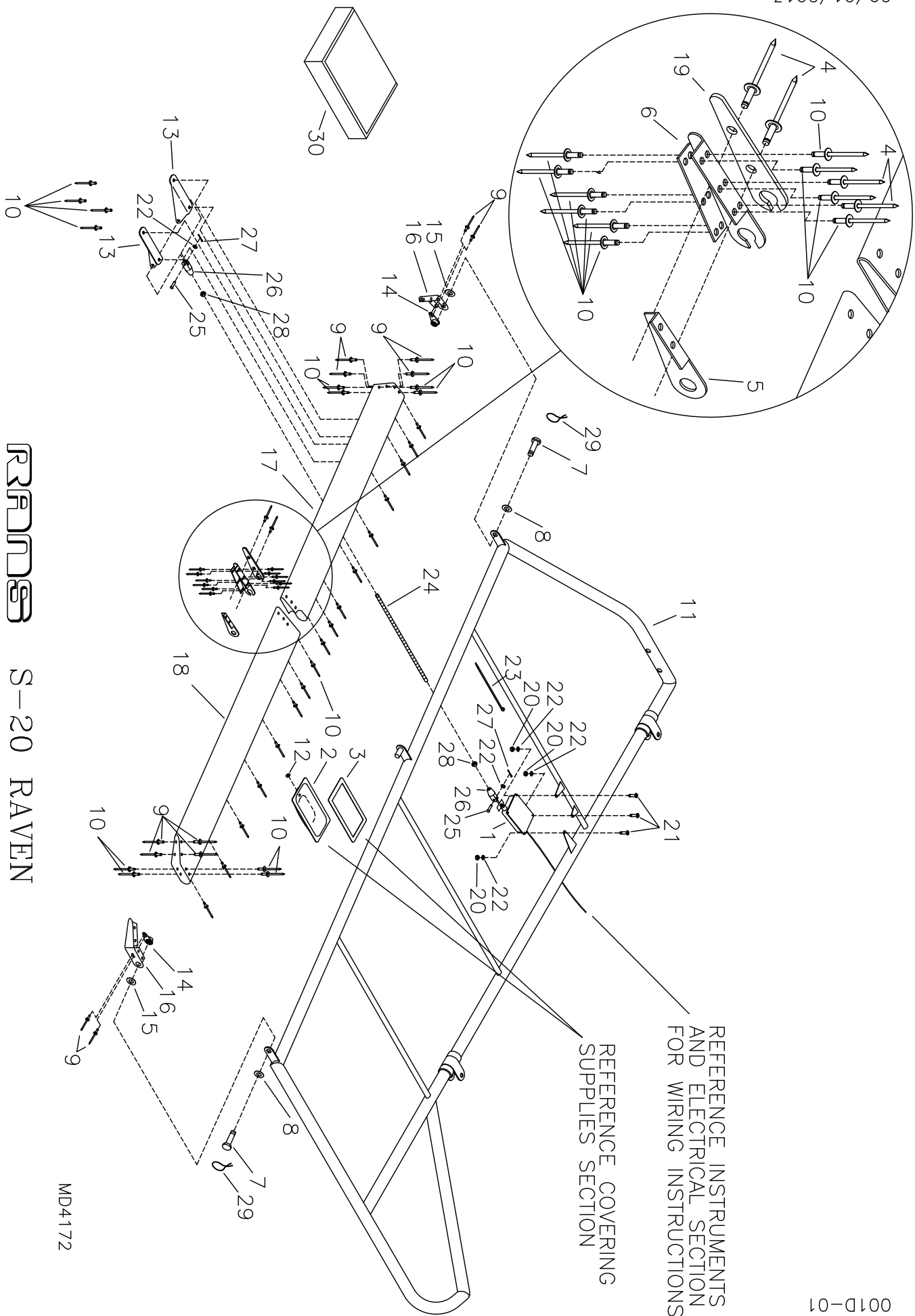
* Builder Supplied

** Builder Modifies

9/1/2013

REV. A

RAVEN S-20 RAVEN
TRIM TAB ASSEMBLY AND INSTALLATION



RANS S-20 RAVEN - TRIM TAB ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Trim Servo ***	KSTR0001-1	0
2.	Trim Exit Cover *	KPCV0026	0
3.	Trim Exit Ring *	KPCV0027	0
4.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	4
5.	Hinge Lock	KPTR0018	1
6.	Trim Tab Center Rib	KPTR0011	1
7.	3/16" Bolt - drilled head	AN3H-5A	2
8.	3/16" Thin Washer	AN960-10L	2
9.	3/32" Aluminum Rivet	40APR1/8	12
10.	1/8" Aluminum Rivet - Cherry Q	AAPQ-41	40
11.	Elevator - RH **	KAEL0021	0
12.	3/16" Rubber Grommet	KSAC0002	1
13.	Trim Tab Horn - LH	KPTR0024-L	1
13.	Trim Tab Horn - RH	KPTR0024-R	1
14.	3/16" Single-Ear Nut Plate	MS21051-L3	2
15.	3/16" Thick Washer	AN960-10	2
16.	Trim Tab End Rib	KPTR0012	2
17.	Trim Tab, Inboard	KPTR0013	1
18.	Trim Tab, Outboard	KPTR0014	1
19.	Trim Tab Center Rib Doubler	KPTR0015	1
20.	Nut	MS21083N04	3
21.	Machine Screw	MS35206-218	3
22.	1/8" Small Brass Washer	AN960-B4	5
23.	Plastic Tie - 4"	MS3367-4-9	1
24.	Push Rod ***	KSTR0001-3	0
25.	Clevis Pin ***	KSTR0001-5	0
26.	Clevis ***	KSTR0001-4	0
27.	Cotter Pin ***	KSTR0001-6	0
28.	Jam Nut ***	KSTR0001-8	0
29.	Safety Wire ****	-----	0
30.	Trim Servo Kit	KSTR0001	1

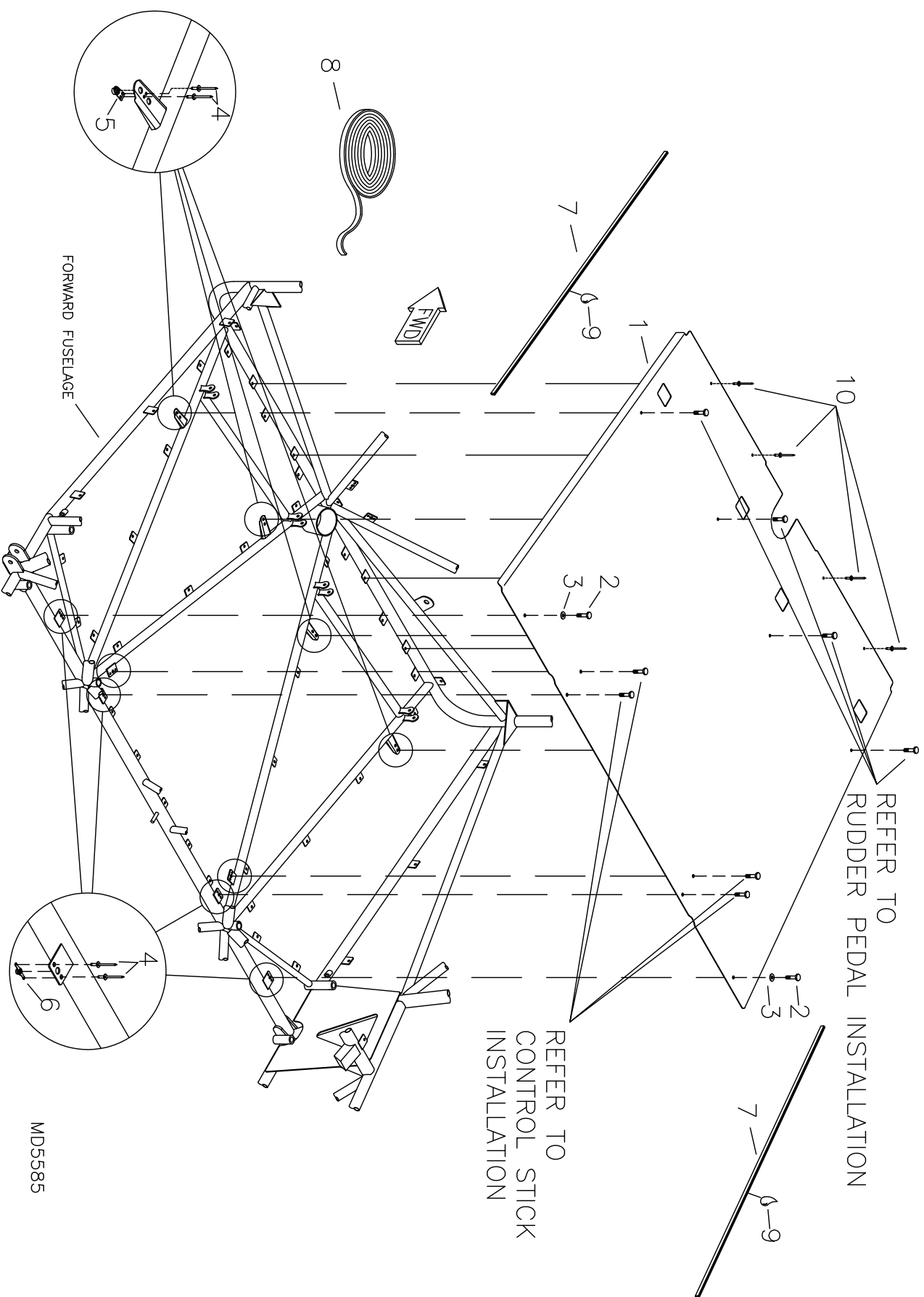
* Referenced from Covering Supplies Section

** Referenced from Horizontal Stabilizer & Elevator Assembly and Installation

*** Included in Trim Servo Kit

**** Builder Supplied

9/1/2013



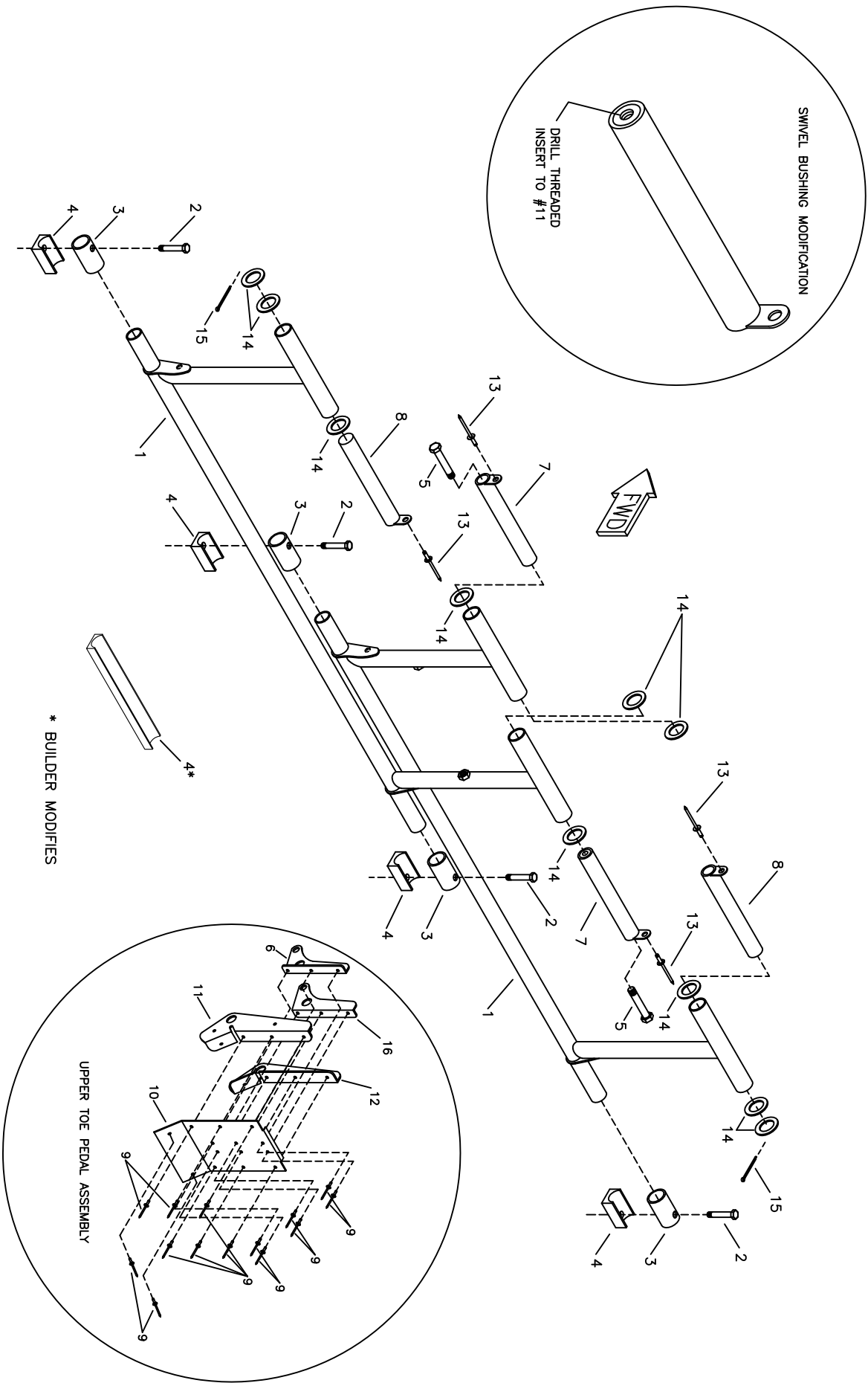
REFINIS S-20 RAVEN
FLOORBOARD INSTALLATION

MD55585

RANS S-20 RAVEN - FLOORBOARD INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Floorboard	KPIN0098	1
2.	3/16" Bolt	AN3-3A	2
3.	3/16" Thin Washer	AN960-10L	2
4.	3/32" Aluminum Rivet	40APR1/8	20
5.	3/16" Side by Side Nut Plate	MS21086-L3	4
6.	3/16" Nut Plate	K-1000-3	6
7.	Rubber Trim	X1011	4 ft
8.	1/2" Black Foam Tape	KSAC0021	14 ft
9.	Adhesive - Superglue *	-----	0
10.	1/8" Aluminum Rivet - AVEX	1691-0410	4

* Builder Supplied



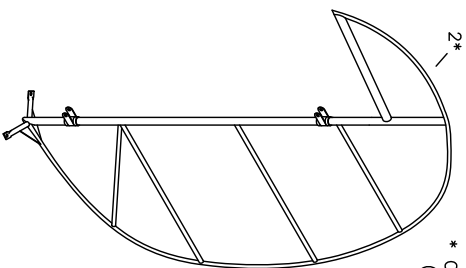
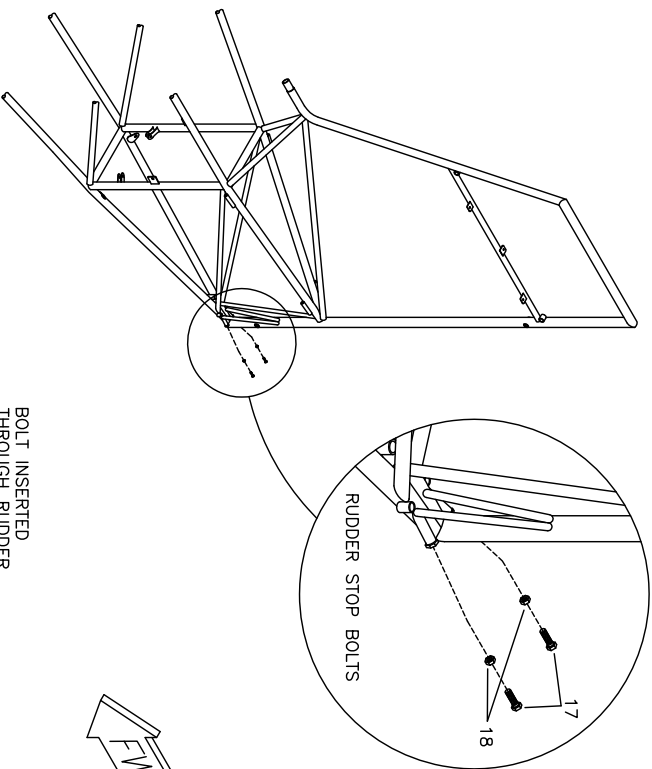
RFD S-20 RAVEN
RUDDER PEDAL INSTALLATION

MD2600
REV. B

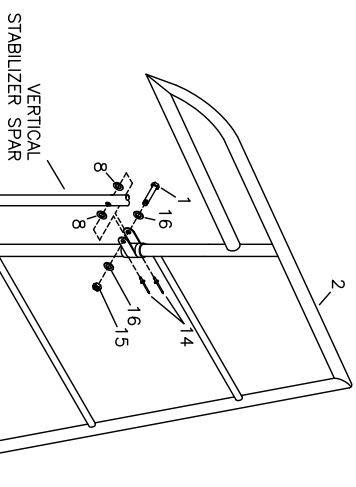
RANS S-20 RAVEN - RUDDER PEDAL INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Rudder Pedal	KPCS0066	2
2.	3/16" Bolt	AN3-12A	4
3.	Rudder Pedal Bushing	KPCS0017	4
4.	Brake Saddle *	KPCS0319	1
5.	3/16" Bolt - drilled shank	AN3-15	2
6.	Rudder Pedal - Cylinder Attach Bracket - LH	KPCS0300-L	4
7.	Swivel Bushing w/insert	KPCS0075	2
8.	Swivel Bushing	KPCS0056	2
9.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	56
10.	Rudder Pedal - Web	KPCS0301	4
11.	Rudder Pedal - Hinge Plate - LH	KPCS0302-L	4
12.	Rudder Pedal - Hinge Plate - RH	KPCS0302-R	4
13.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-62	4
14.	1/2" Plastic Washer	KSAC0005	12
15.	Large Cotter Pin	MS24665-285	2
16.	Rudder Pedal - Cylinder Attach Bracket - RH	KPCS0300-R	4

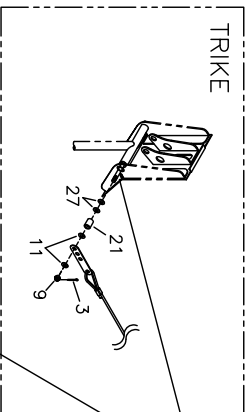
* Builder Modifies



* OPTIONAL CLASSIC RUDDER
(SHOWN FOR REFERENCE)

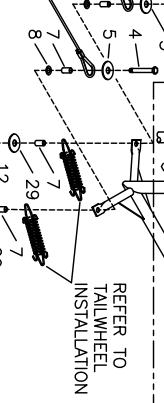
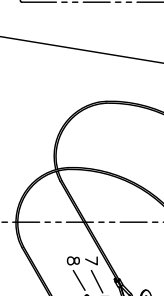
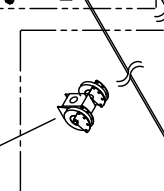
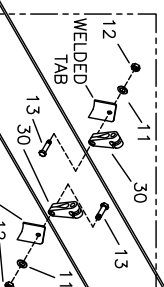
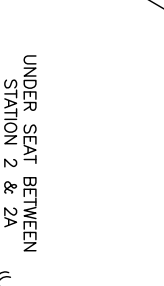
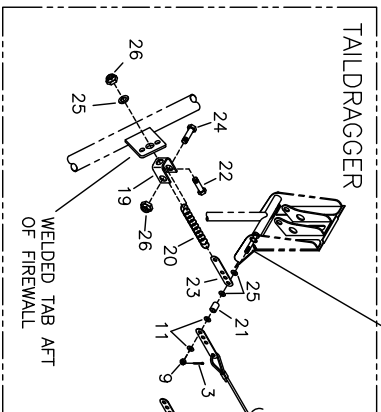


TRIKE



BOLT INSERTED
THROUGH RUDDER
PEDAL SWIVEL BUSHING.
REFER TO RUDDER
PEDAL INSTALLATION

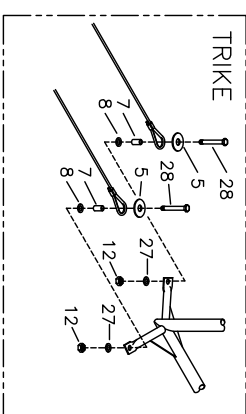
TAILDRAGGER



REFER TO CONTROL STICK
PUSH-PULL TUBE INSTALLATION

IMPORTANT:

RUDDER CABLES MUST CROSS
AFTER PULLEYS AT STATION 7.
RIGHT HAND CABLE CROSSES
OVER TOP OF LEFT HAND CABLE.



RUDDER SYSTEM ASSEMBLY & INSTALLATION

RRR S-20 RAVEN

MD5591
REV. A

RANS S-20 RAVEN - RUDDER SYSTEM ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/4" Bolt	AN4-14A	2
2.	Rudder Frame Assembly - RANS (-1 CLASSIC Option)	KARD0020	1
2.	Rudder Frame Assembly - CLASSIC Option (-1 RANS)	KARD0021	1
3.	Small Cotter Pin	MS24665-134	2
4.	3/16" Bolt **	AN3-11A	2
5.	3/16" Large Washer	AN970-3	2
6.	Rudder Cable Assembly	KPCS0270	2
7.	Aluminum Tailwheel Bushing, 1/4" x .028" x .31" *	KAAC0046-5	0
8.	1/4" Thick Washer	AN960-416	6
9.	3/16" Castle Nut	AN310-3	2
10.	Small Pulley	AN210-1A	4
11.	3/16" Thin Washer	AN960-10L	10
12.	3/16" Shear Nut	AN364-1032A	8
13.	3/16" Bolt	AN3-6A	6
14.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4
15.	1/4" Shear Nut	AN364-428A	4
16.	1/4" Thin Washer	AN960-416L	4
17.	1/4" Plain Bolt	KSHW0016	2
18.	1/4" Plain Nut	AN345-416	2
19.	U-Bracket **	RL-205-T	2
20.	Rudder Return Spring **	KSCS0024	2
21.	Aluminum Bushing, 1/4" x .028" x .25" *	KAAC0046-5	0
22.	3/16" Bolt **	AN3-4A	2
23.	Multi-Hole Tang **	ST-16-FLAT	2
24.	3/16" Bolt **	AN3-7A	2
25.	3/16" Thin Washer **	AN960-10L	6
26.	3/16" Shear Nut **	AN364-1032A	4
27.	3/16" Thick Washer ***	AN960-10	6
28.	3/16" Bolt ***	AN3-7A	2
29.	3/16" Large Washer **	AN970-3	2
30.	Cable Guide	HA-144	2

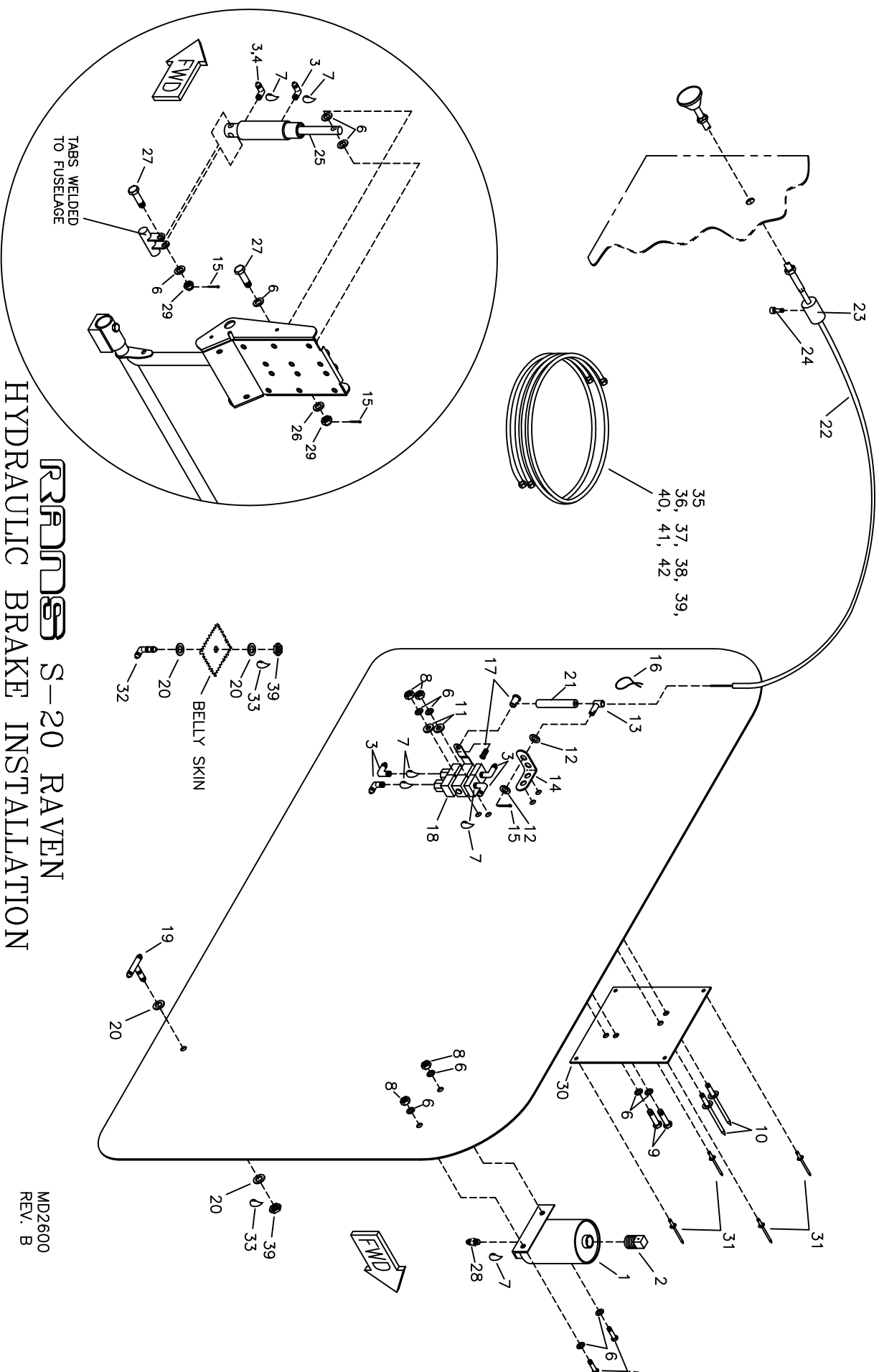
* Builder must fabricate from raw stock.

** TAILDRAGGER only

*** TRIKE only

9/1/2013

REV. A



S-20 RAVEN HYDRAULIC BRAKE INSTALLATION

MD2600
REV. B

RANS S-20 RAVEN - HYDRAULIC BRAKE INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Hydraulic Brake Reservoir	KSBS0034	1
2.	Vented 1/8" Cap Plug *	-----	0
3.	90-degree Elbow - Flare 1/4" Tube to 1/8" NPT	AN822-4D	11
4.	45-degree Elbow - Flare 1/4" Tube to 1/8" NPT	AN823-4D	1
5.	3/16" Bolt	AN3-3A	2
6.	3/16" Thin Washer	AN960-10L	16
7.	Thread Sealant **	-----	0
8.	3/16" Shear Nut	AN364-1032A	4
9.	3/16" Bolt	AN3-12A	2
10.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-62	2
11.	Rubber Washer ***	-----	0
12.	1/4" Thick Washer	AN960-416	2
13.	Cable Housing Swivel Stop	KPBS0009	1
14.	Cable Housing Swivel Stop Bracket	KPBS0010	1
15.	Small Cotter Pin	MS24665-134	13
16.	Safety Wire **	-----	0
17.	Cable Swivel Stop & Screw	2361	1
18.	Parking Brake	KSBS0007	1
19.	Bulkhead Tee - Flare 1/4" Tube	AN834-4D	1
20.	7/16" Thick Washer	AN960-716	6
21.	Blue Fuel Line - 1/4"	FS-FL	2 in
22.	Control Cable	4-336	1
23.	Cable Friction Block	T-STOP	1
24.	Socket Head Cap Screw	T-SC	1
25.	Master Brake Cylinder w/ Drilled Shaft	KSBS0048	4
26.	3/16" Thick Washer	AN960-10	4
27.	3/16" Bolt - drilled shank	AN3-10	8
28.	Straight Fitting - Flare 1/4" Tube to 1/8" NPT	AN816-4D	1
29.	3/16" Castle Nut	AN310-3	8
30.	Park Brake Backing Plate	KPBS0008	1
31.	1/8" Aluminum Rivet - Cherry Q	AAPQ-41	4
32.	Bulkhead 90-degree Elbow - Flare 1/4" Tube	AN833-4D	2
33.	Loctite Blue **	-----	0
34.	Nut - Flared Tube Bulkhead	AN924-4D	3
35.	Braided Brake Line Kit - S-20	KSBS0038	1
36.	Braided Line - 22" - Reservoir to Bulkhead Tee ****	KSBS0038-1	0
37.	Braided Line - 9" - Bulkhead Tee to Cylinders ****	KSBS0038-2	0
38.	Braided Line - 18.75" - RH to LH Cylinders ****	KSBS0038-3	0
39.	Braided Line - 15" - LH Cylinders to Park Valve ****	KSBS0038-4	0
40.	Braided Line - 87" - Park Valve to RH Bulkhead ****	KSBS0038-5	0
41.	Braided Line - 69" - Park Valve to LH Bulkhead ****	KSBS0038-6	0
42.	Braided Line - 30" - Bulkhead to Wheel Brakes ****	KSBS0038-7	0

* Supplied with Brake Reservoir.

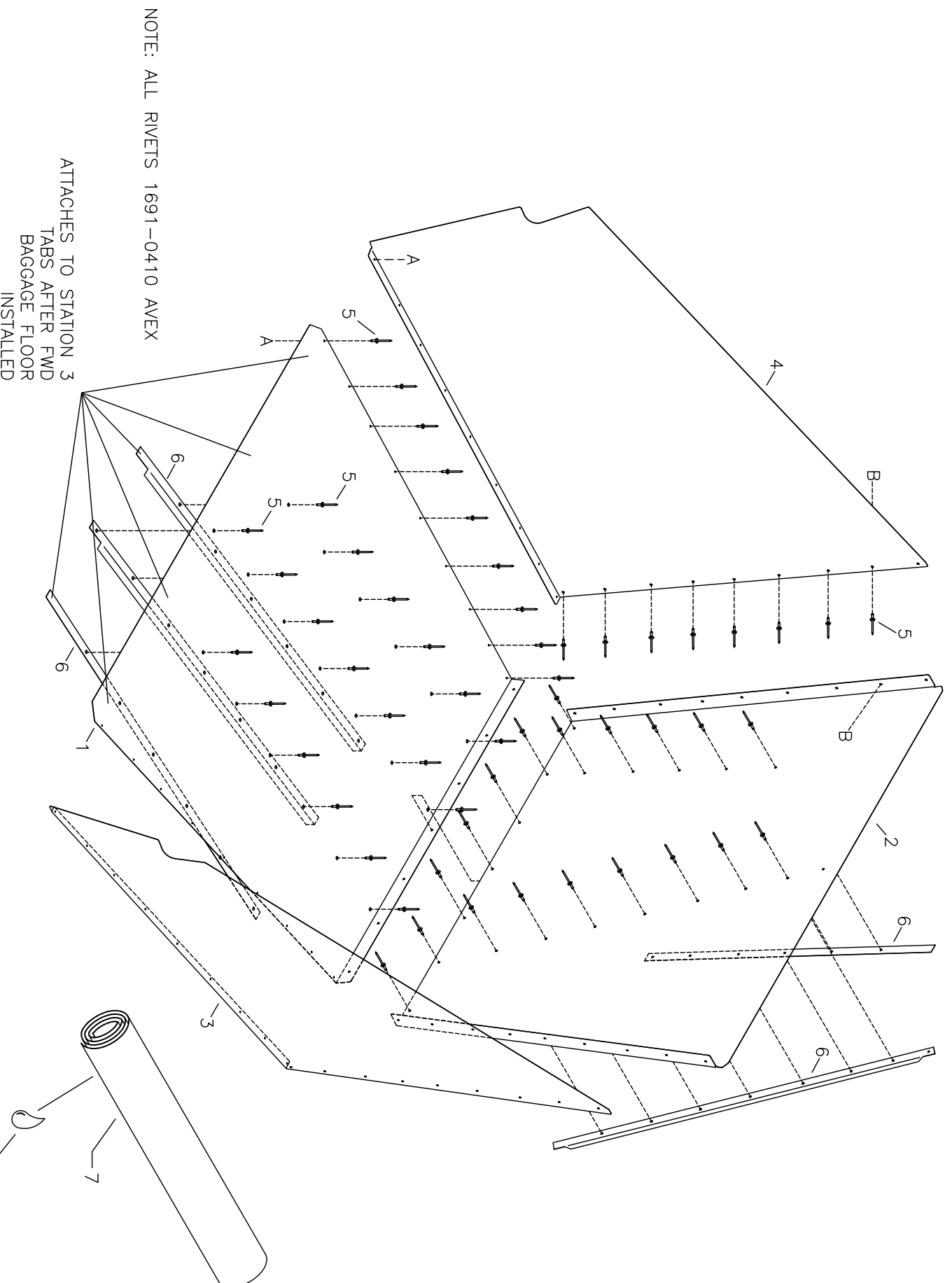
** Builder supplied

*** Supplied with Parking Brake

**** Supplied with KSBS0038

9/1/2013

REV. B



RRR S-20 RAVEN
AFT BAGGAGE COMPARTMENT ASSEMBLY

MD55593
REV. A

RANS S-20 RAVEN - AFT BAGGAGE COMPARTMENT ASSEMBLY

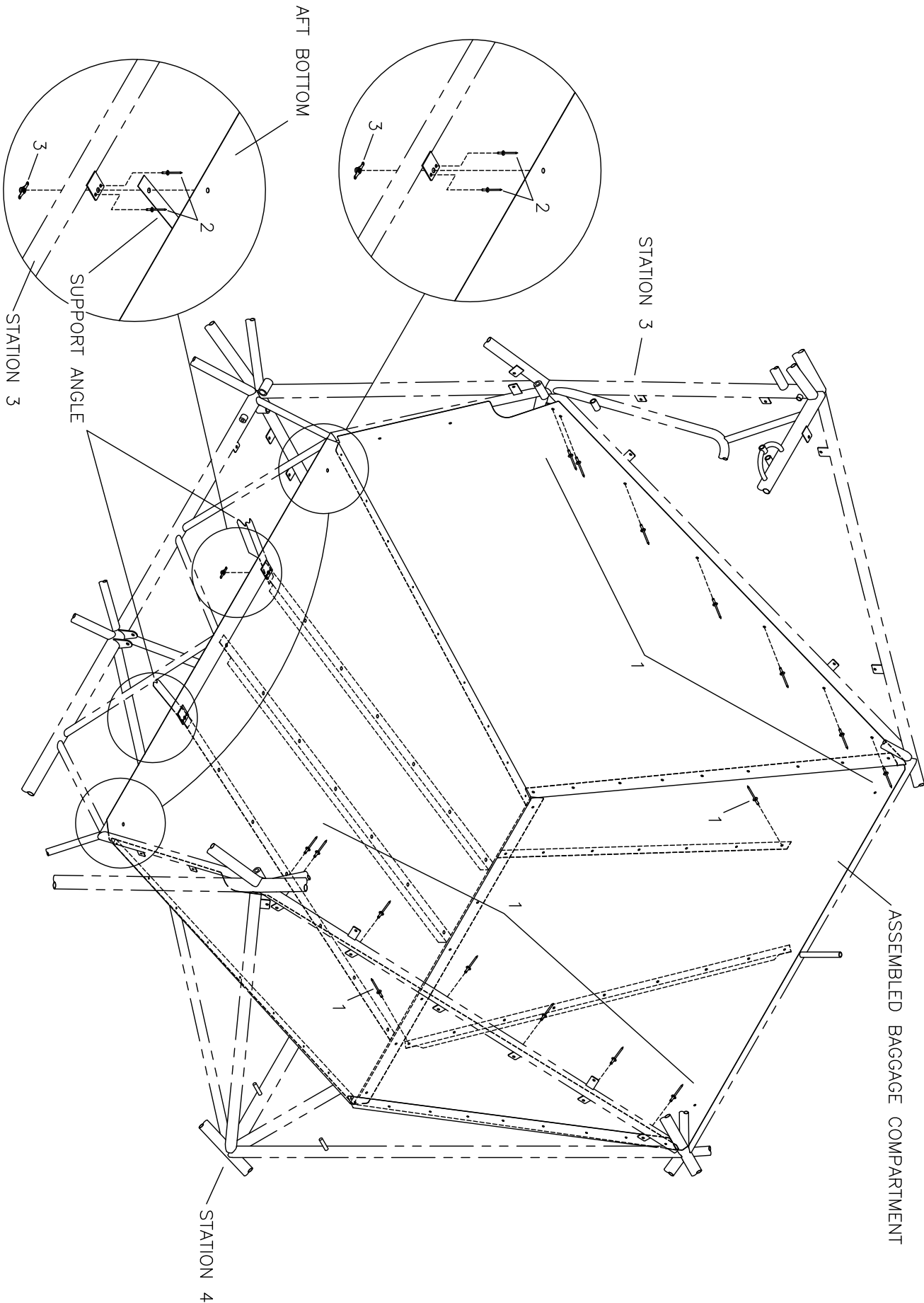
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Aft Bottom - Baggage Compartment	KPIN0091	1
2.	Back - Baggage Compartment	KPIN0092	1
3.	Aft Side - Baggage Compartment - LH	KPIN0093-L	1
4.	Aft Side - Baggage Compartment - RH	KPIN0093-R	1
5.	1/8" Aluminum Rivet - Avex	1691-0410	72
6.	Support Angle - Baggage Compartment *	KPIN0096	3
7.	Baggage Compartment Fabric - Optional **	-----	4 yds
8.	Contact Cement Adhesive - 3M Super 77 Spray ***	-----	0

* Builder Modifies

** May be purchased seperately, call RANS Parts Dept. for pricing

*** Builder Supplied

9/1/2013

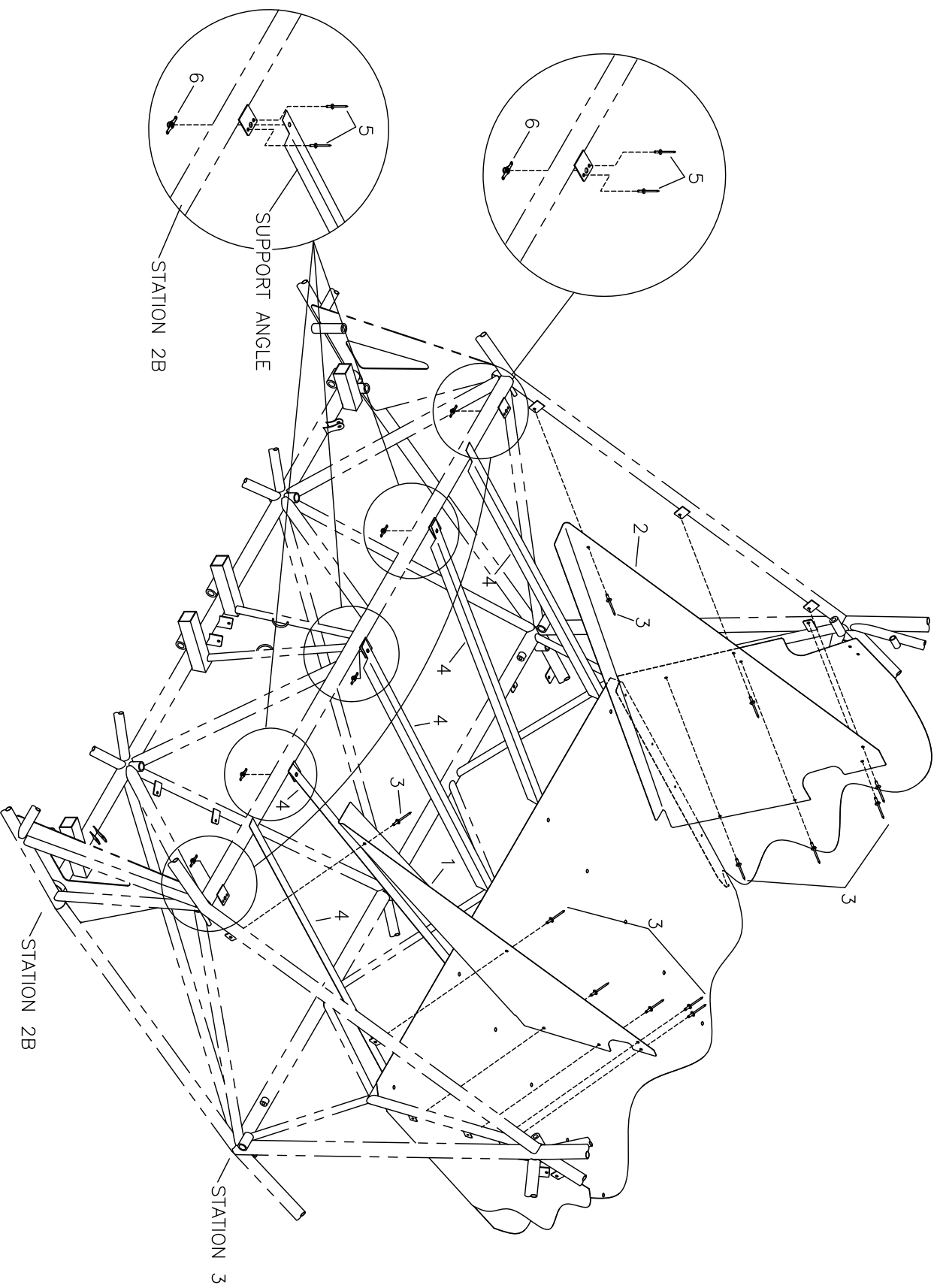


RAVEN S-20 RAVEN
AFT BAGGAGE COMPARTMENT INSTALLATION

MD5593
REV. A

RANS S-20 RAVEN - AFT BAGGAGE COMPARTMENT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" Aluminum Rivet - Avex	1691-0410	16
2.	3/32" Aluminum Rivet	40APR1/8	8
3.	8-32 Nut Plate	MS21047-08	4



REF ID: A12345 S-20 RAVEN

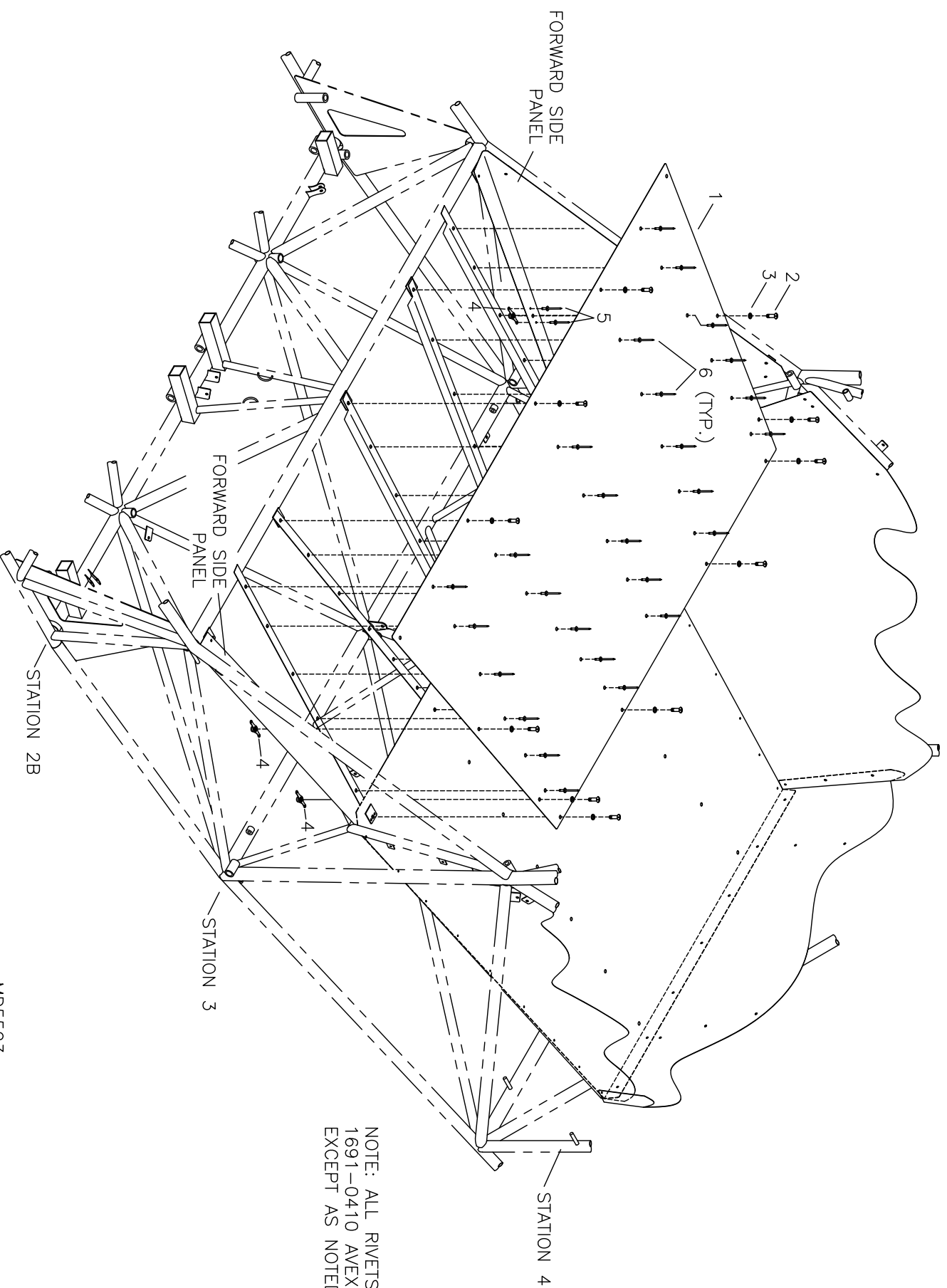
MD5593
REV. A

SIDES - FORWARD BAGGAGE COMPARTMENT INSTALLATION

RANS S-20 RAVEN - SIDES - FORWARD BAGGAGE COMPARTMENT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Forward Side - Baggage Compartment - LH	KPIN0094-L	1
2.	Forward Side - Baggage Compartment - RH	KPIN0094-R	1
3.	1/8" Aluminum Rivet - Avex	1691-0410	12
4.	Support Angle - Baggage Compartment *	KPIN0096	2
5.	3/32" Aluminum Rivet	40APR1/8	10
6.	8-32 Nut Plate	MS21047-08	5

* Builder Modifies

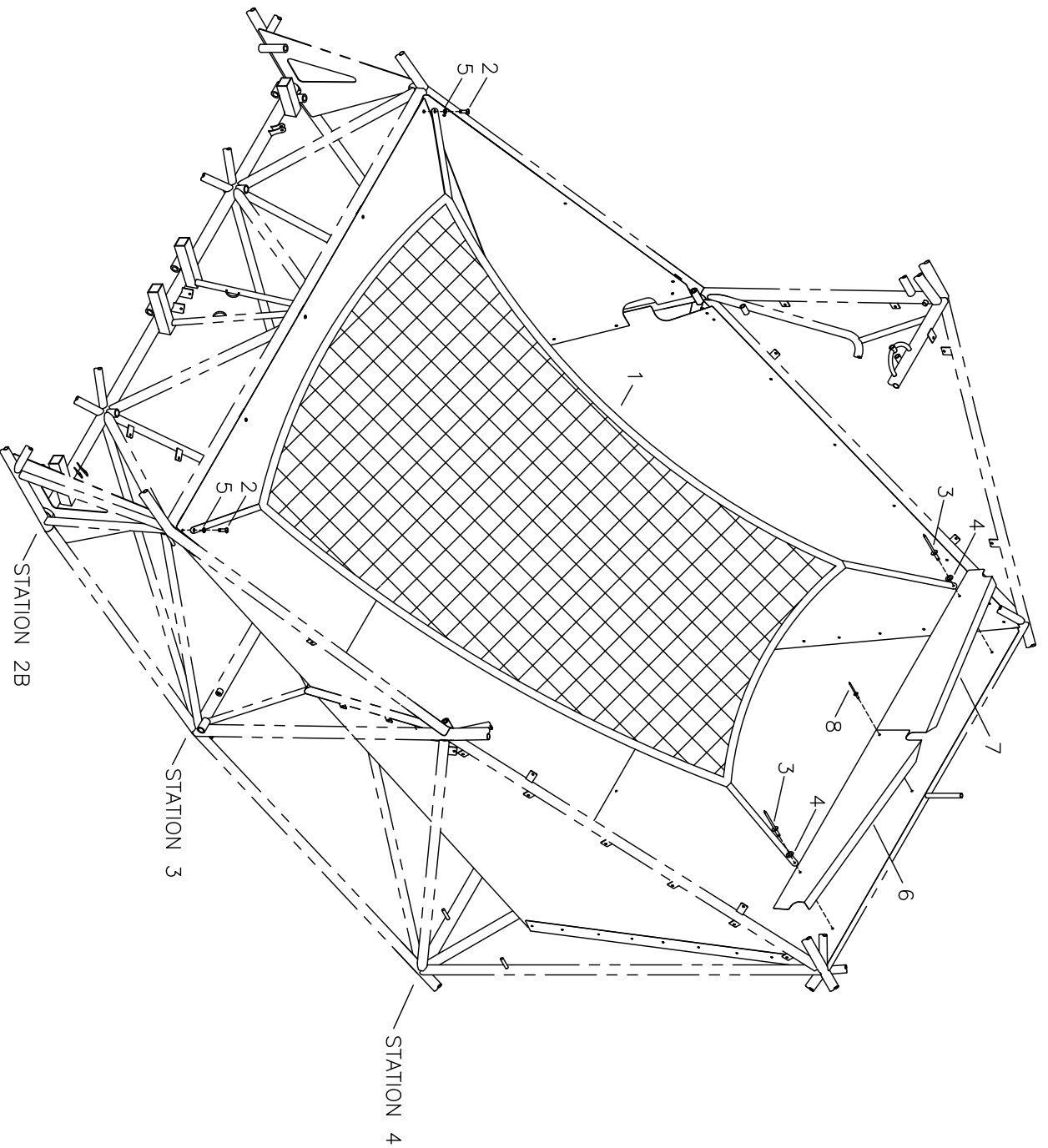


REF ID: A123456
FLOOR - FORWARD BAGGAGE COMPARTMENT INSTALLATION

MD5593
REV. A

RANS S-20 RAVEN - FLOOR - FORWARD BAGGAGE COMPARTMENT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Forward Bottom - Baggage Compartment	KPIN0090	1
2.	8-32 Machine Screw	AN526-832R10	11
3.	#8 Small Brass Washer	AN960-B8	11
4.	3/32" Aluminum Rivet	40APR1/8	8
5.	8-32 Nut Plate	MS21047-08	4
6.	1/8" Aluminum Rivet - Avex	1691-0410	27

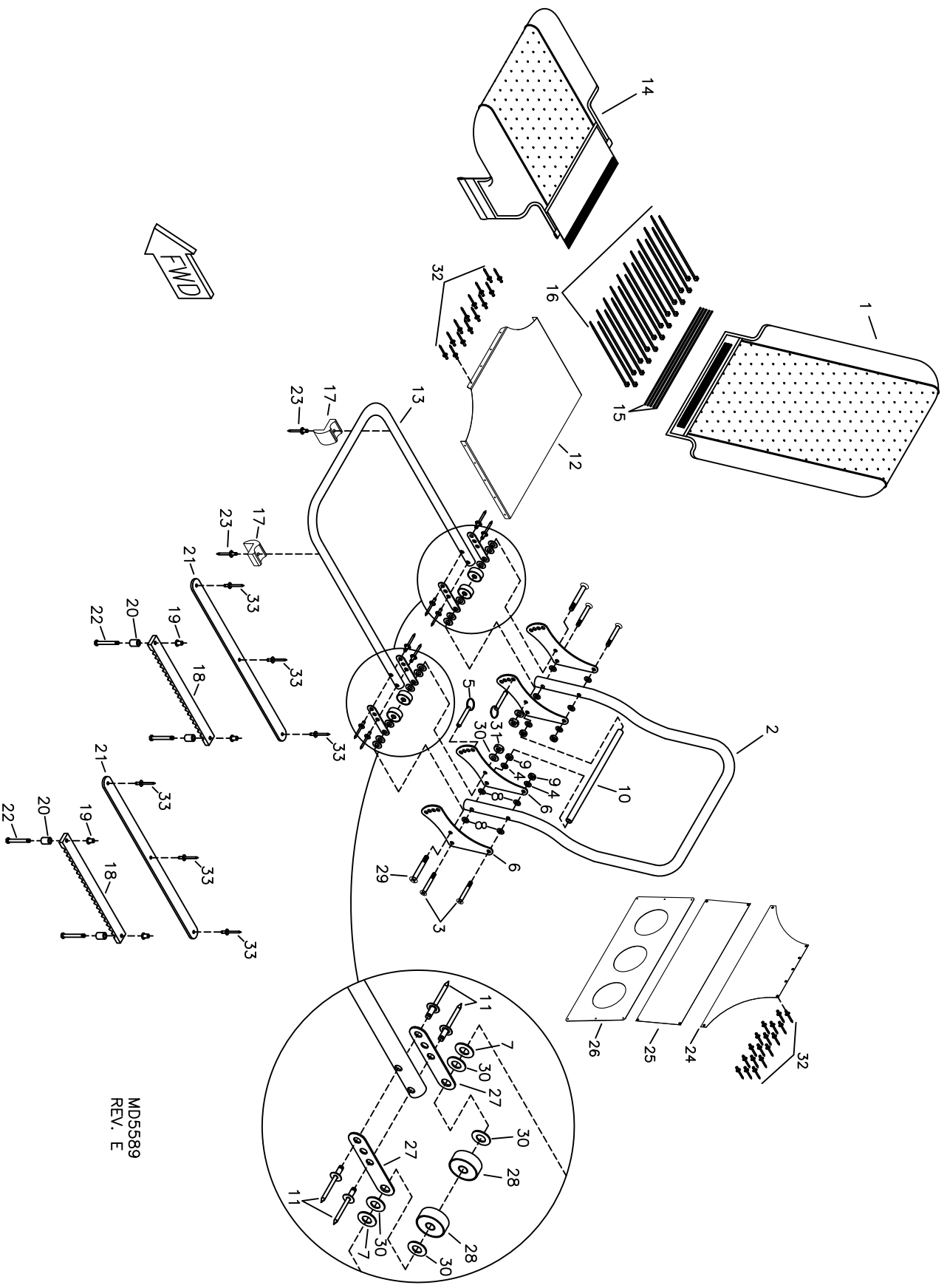


Raven S-20 RAVEN CARGO NET INSTALLATION

MD55593

RANS S-20 RAVEN - CARGO NET INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Cargo Net	KPIN0105	1
2.	8-32 Machine Screw	AN526-832R10	2
3.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-64	2
4.	#10 Washer - Stainless Steel	BSHW0022	2
5.	#8 x 3/4" Stainless Steel Washer	KSHW0080	2
6.	Top Back - Baggage Compartment - LH	KPIN0095-L	1
7.	Top Back - Baggage Compartment - RH	KPIN0095-R	1
8.	1/8" Aluminum Rivet - Avex	1691-0410	1



RFD S-20 RAVEN
SLIDING SEAT ASSEMBLY

MD5589
REV. E

RANS S-20 RAVEN - SLIDING SEAT ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Seat Back Cushion	ST-SBC-A	2
2.	Seat Back Frame	ST-SBF	2
3.	3/16" Countersunk Machine Screw	MS24694-S67	8
4.	3/16" Thin Washer	AN960-10L	12
5.	1/4" Quick Pin	PIN 1/4X1.2	4
6.	Seat Side Plate	KPST0130	8
7.	1/4" Plastic Washer	PW-4	8
8.	3/16" Thick Washer	AN960-10	16
9.	3/16" Shear Nut	AN364-1032A	12
10.	Seat Internal Tube, 1/2" x .035" x 13.75" * **	KAAC0046-4	0
11.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-62	16
12.	Seat Bottom Pan	KPST0131	2
13.	Sliding Seat Bottom Frame	KPST0127	2
14.	Seat Bottom Cushion	ST-SBTC-A	2
15.	Lacing Wires (stick), 36" x 1/16"	TG-LW-1/16	5
16.	Nylon Tie - 15"	LONG-N-TIE	40
17.	Slider Block	KPST0124	4
18.	Sliding Seat Position Rail	KPST0128	4
19.	3/16" Rivet Nut	MS27130-A25K	8
20.	Seat Stop Tube, 3/8" x .095" x 1/2" *	KPST0132	1
21.	Sliding Seat Rail Plate	KPST0129	4
22.	3/16" Bolt	AN3-12A	8
23.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-64	4
24.	Seat Back Plate - Upper	KPST0073-1	2
25.	Seat Back Plate - Middle	KPST0073-2	2
26.	Seat Back Plate - Lower	KPST0073-3	2
27.	Multi-Hole Tang	ST-16-FLAT	8
28.	Bearing	SR4APP	8
29.	1/4" Countersunk Machine Screw	MS24694-S111	4
30.	1/4" Thin Washer	AN960-416L	20
31.	1/4" Shear Nut	AN364-428A	4
32.	1/8" Aluminum Rivet - Avex	1691-0410	62
33.	1/8" Stainless Steel Rivet - Flush	CCC-42	12

* Fabricate from Raw Stock

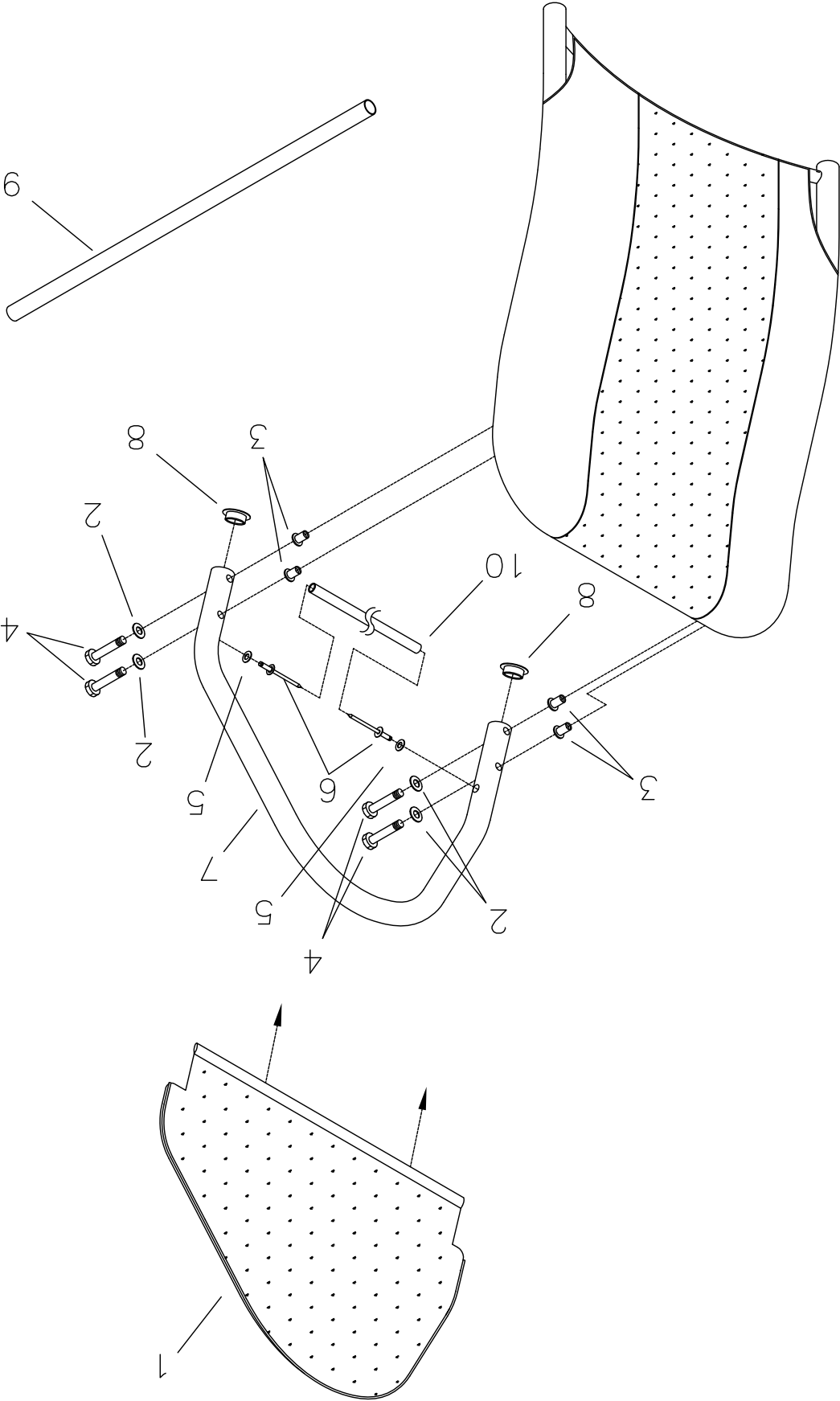
** Builder determines length

9/1/2013

REV. E

OPTIONAL HEADREST ASSEMBLY

MD5108

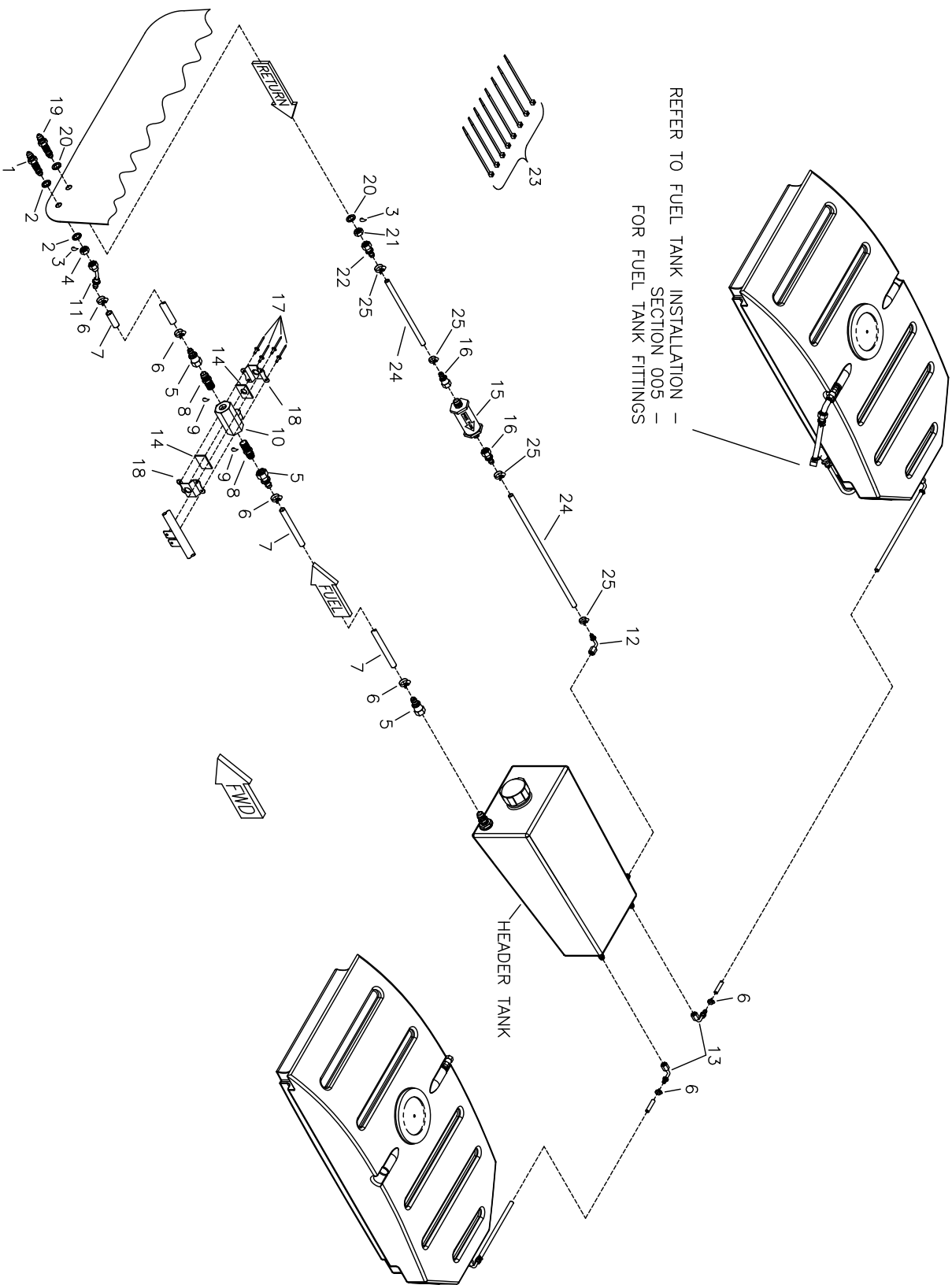


RANS S-20 RAVEN - OPTIONAL - SEAT HEADREST ASSEMBLY AND INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Headrest Cover	ST-HRC-A	2
2.	3/16" Thin Washer	AN960-10L	8
3.	3/16" Rivet Nut	MS27130-A25K	8
4.	3/16" Bolt	AN3-13A	8
5.	3/16" Thick Washer	AN960-10	4
6.	3/16" Aluminum Rivet - Cherry Q	AAPQ-64	4
7.	Headrest Frame	ST-HRF(6/12)	2
8.	1" End Cap	1 CAP	4
9.	Headrest - Raw Stock Kit	KAAC0014	2
10.	Headrest Internal Tube, 1/2" x .035 x X * **	KAAC0014-1	0

* Fabricate from Raw Stock

** Builder determines length



RAVEN S-20 RAVEN FUEL SYSTEM - FUSELAGE

RANS S-20 RAVEN - FUEL SYSTEM - FUSELAGE

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Union - Flared Tube - Bulkhead	AN832-6D	1
2.	9/16" Thick Washer	AN960-916	2
3.	Loctite Blue *	-----	0
4.	Nut - Flared Tube Bulkhead	AN924-6D	1
5.	3/8" Hose Fitting	30682-6-6	3
6.	Hose Clamp - 7/8"	5-6203	6
7.	Black Fuel Line - 3/8"	27004	5 ft
8.	Nipple - Flared Tube & Pipe Thread	AN816-6D	2
9.	Thread Sealant *	-----	0
10.	Fuel Valve	KSFS0018	1
11.	45 Degree Fitting	33782-6-6	1
12.	90 degree 1/4" Hose Fitting	33982-4-4	1
13.	90 degree 3/8" Hose Fitting	33982-6-6	2
14.	Fuel Valve Silicone Pad ***	KPFS0106	1
15.	Check Valve	KSFS0036	1
16.	1/4" Hose Fitting	30682-6-4B	2
17.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	4
18.	Fuel Valve Mount Bracket	KPFS0037	2
19.	Union - Flared Tube - Bulkhead	AN832-4D	1
20.	7/16" Thick Washer	AN960-716	2
21.	Nut - Flared Tube Bulkhead	AN924-4D	1
22.	1/4" Hose Fitting	30682-4-4	1
23.	Plastic Tie - 7.5"	N-TIES	8
24.	Black Fuel Line - 1/4"	KSFS0002	6 ft
25.	Hose Clamp - 5/8"	5-6202	4

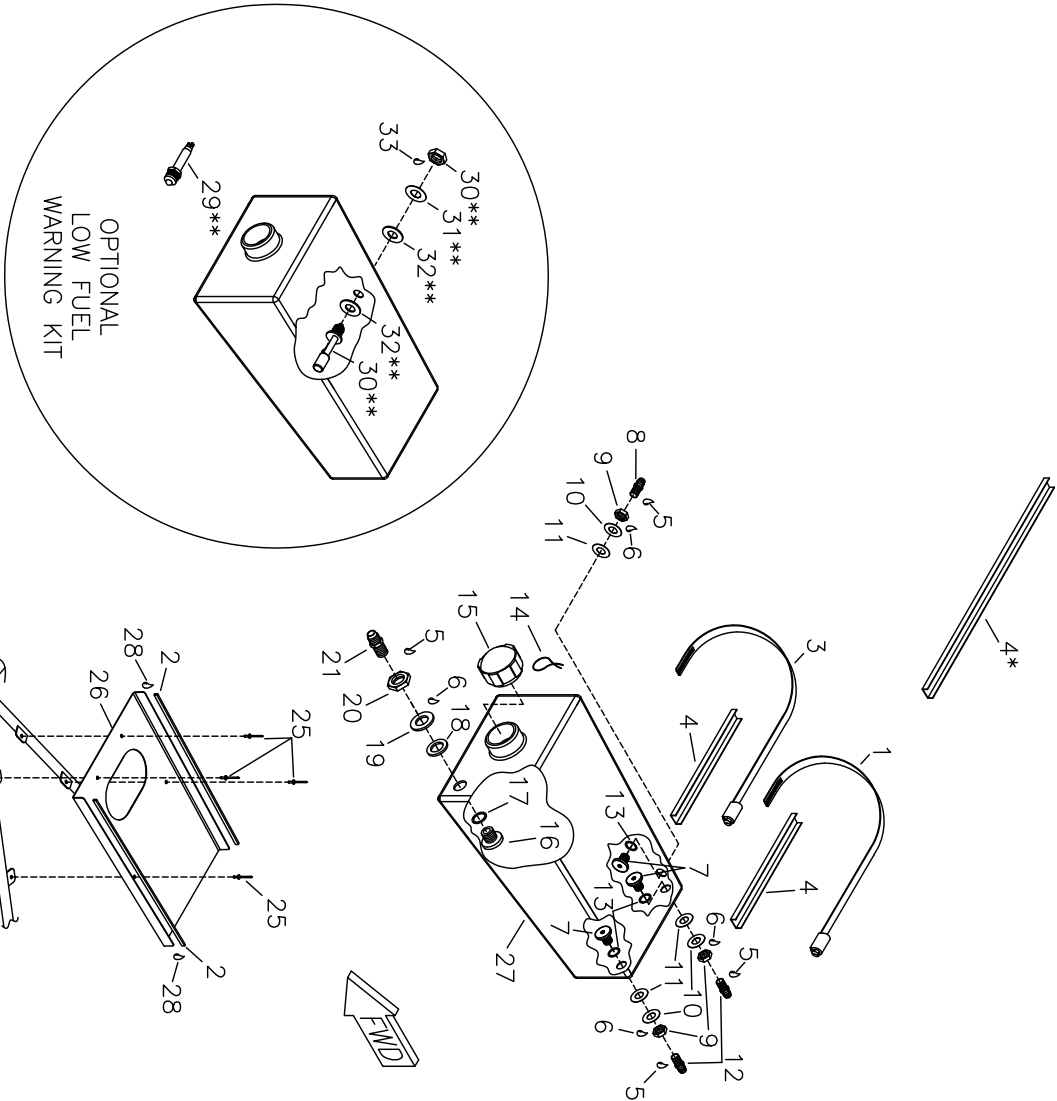
* Builder Supplied

** Builder must fabricate from raw stock.

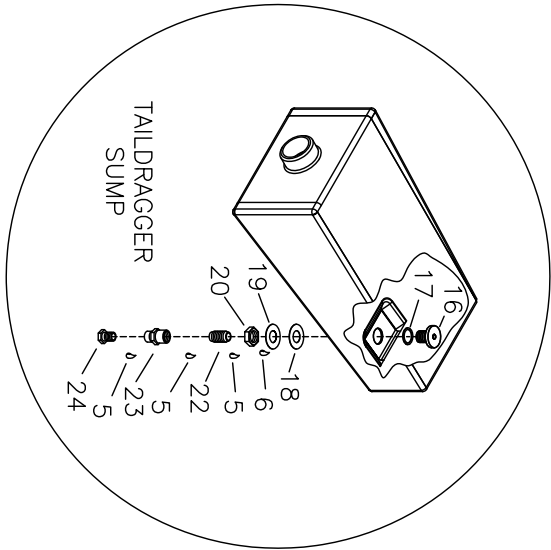
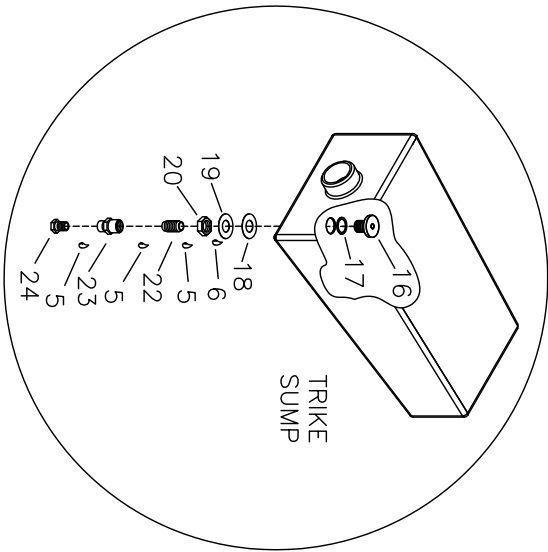
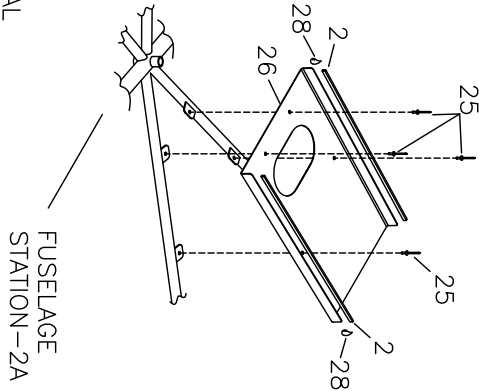
*** Builder Modifies

9/1/2013

REV. C



* MUST MODIFY
** LOW FUEL WARNING KIT IS OPTIONAL



RAVEN S-20 RAVEN FUEL SYSTEM - 2.75 GALLON HEADER TANK

RANS S-20 RAVEN - FUEL SYSTEM - 2.75 GALLON HEADER TANK

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	8" Hose Clamp	KSHW0091	1
2.	Rubber Edging	8510K11	3 ft
3.	10" Hose Clamp	KSHW0047	1
4.	2.75 Gal. Header Tank Mount Channel *	KPFS0108	1
5.	Thread Sealant **	-----	0
6.	Loctite Blue **	-----	0
7.	Tank Withdrawal Fitting	KPFS0017	3
8.	Straight Fitting - Flare 1/4" Tube to 1/8" NPT	AN816-4D	1
9.	Nut - Flared Tube Bulkhead	AN924-5D	3
10.	1/2" Thick Washer	AN960-816	3
11.	Rubber Washer	KSFS0010	3
12.	Straight Fitting	AN816-6-2D	2
13.	O-Ring	KSFS0009	3
14.	Safety Wire **	-----	0
15.	Fuel Cap	KSFS0007	1
16.	3/4" Bulkhead Fitting	KSFS0037	2
17.	O-Ring - 3/4" Bulkhead	KSFS0039	2
18.	Rubber Washer	KSFS0016	2
19.	3/4" Thick Washer	AN960-1216	2
20.	Nut - 3/4" Bulkhead - Reverse Thread	KSFS0038	2
21.	Nipple - Flared Tube & Pipe Thread	AN816-6D	1
22.	Close Nipple	KSFS0021	1
23.	Reducer	KSFS0022	1
24.	Flush Valve	KSFS0011	1
25.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4
26.	2.75 Gal. Header Tank Mount	KPFS0107	1
27.	Header Tank - 2.75 Gal.	KPFS0104	1
28.	Adhesive - Superglue **	-----	0
29.	Red LED Indicator Light, 12V ***	KSES0071	1
30.	Low Fuel Warning Switch ***	KSES0072	1
31.	5/8" Thick Washer (AN960-1016) ***	TW-5/8-W	1
32.	5/8" Rubber Washer ***	KSFS0040	2
33.	DOW 730 Sealant **	-----	0

* Builder Modifies

** Builder Supplied

*** Low Fuel Warning Kit is Optional

9/1/2013

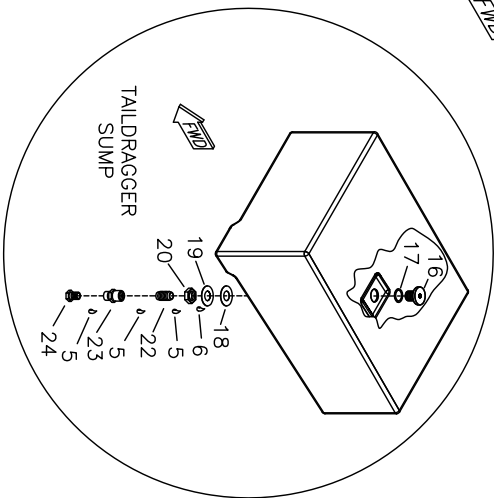
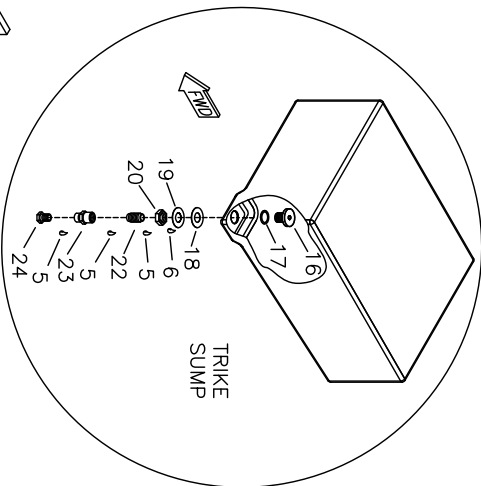
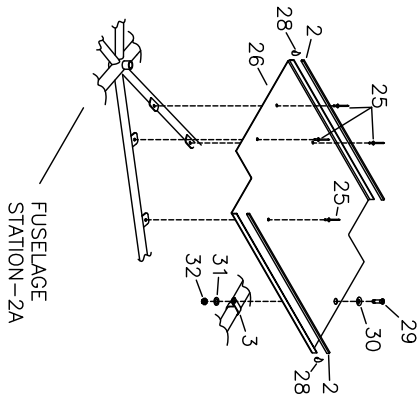
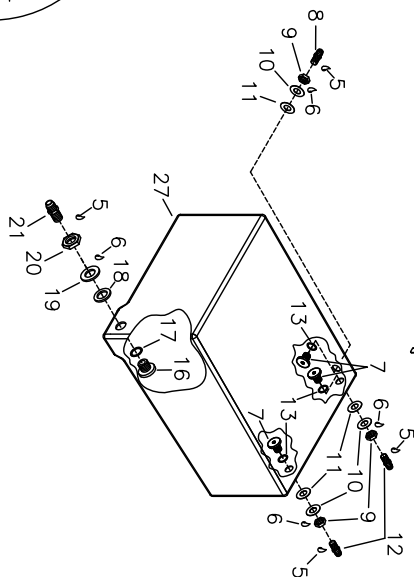
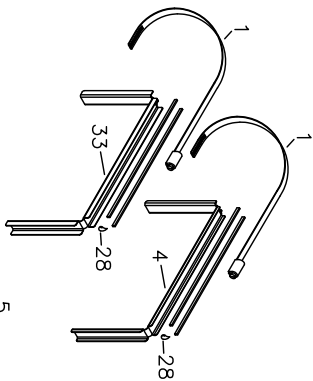
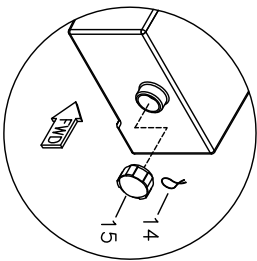
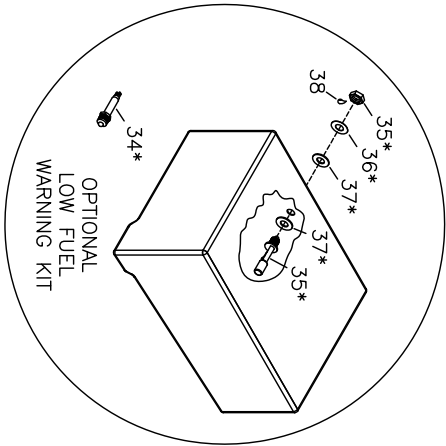
REV. A

RANS S-20 RAVEN - FUEL SYSTEM - OPTIONAL ELECTRIC FUEL PUMP

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Fuel Pump - Electric	KSPW0077	1
2.	3/16" Bolt	AN3-3A	2
3.	#10 Washer - Stainless Steel	BSHW0022	2
4.	45 Degree Fitting	33782-6-6	1
5.	3/16" Nut Plate	K-1000-3	2
6.	3/32" Aluminum Rivet	40APR1/8	4
7.	Black Fuel Line - 3/8" *	27004	0
8.	Hose Clamp	5-6203	2
9.	3/8" Hose Fitting	30682-6-6	1
10.	Straight Fitting	AN816-6-2D	2
11.	Thread Sealant **	-----	0

* Existing fuel line

** Builder Supplied



* LOW FUEL WARNING KIT IS OPTIONAL

RRR S-20 RAVEN OPTIONAL 6.9 GALLON HEADER TANK

MD4186
REV. A

RANS S-20 RAVEN - FUEL SYSTEM - OPTIONAL 6.9 GALLON HEADER TANK**KAFS0002**

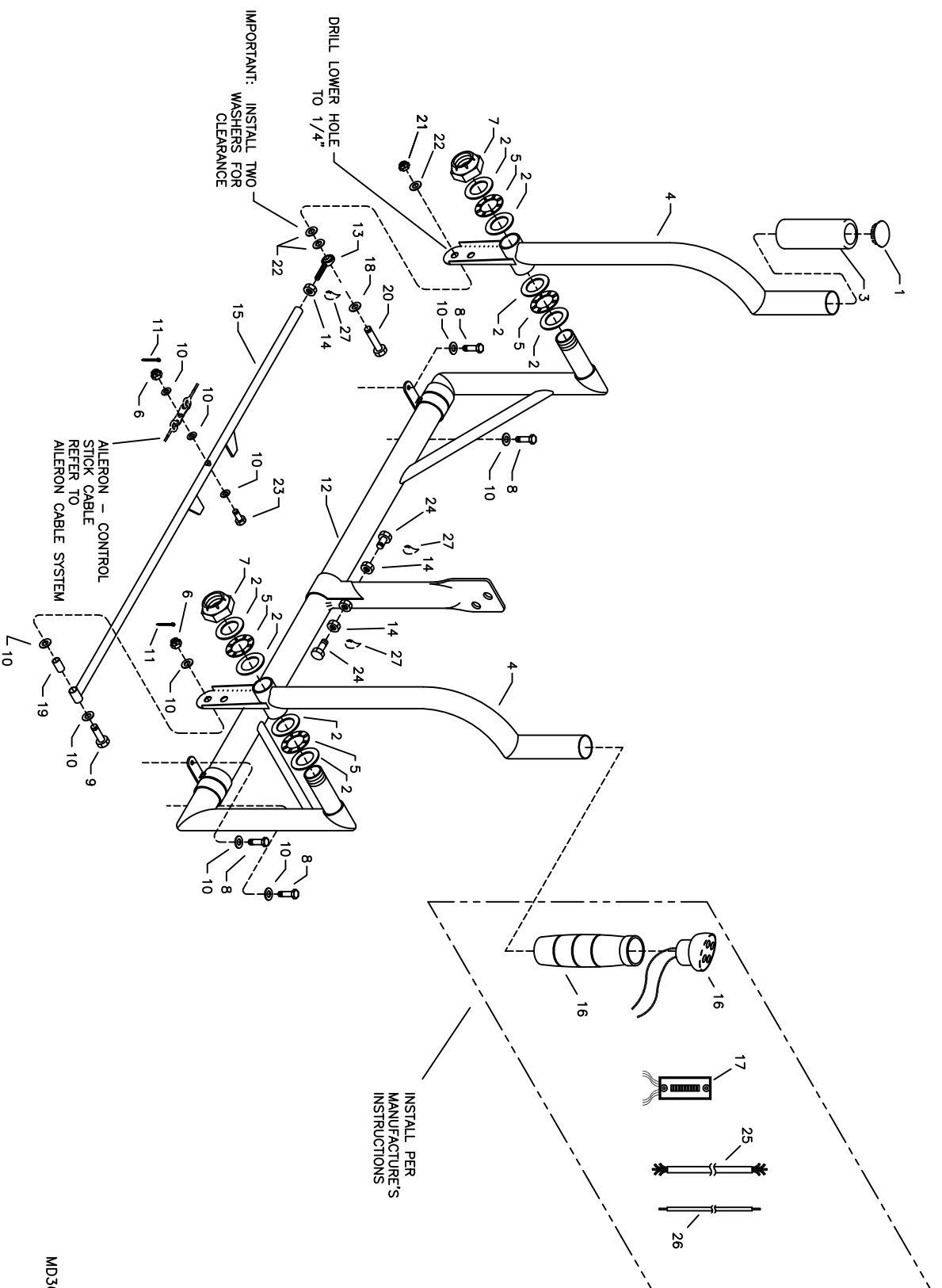
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	15" Hose Clamp	KSHW0100	2
2.	Rubber Edging	8510K11	7 ft
3.	5/8" Plain Clamp	AN742-D10	1
4.	6.9 Gal. Header Tank Mount Channel - AFT	KPFS0110	1
5.	Thread Sealant *	-----	0
6.	Loctite Blue *	-----	0
7.	Tank Withdrawal Fitting	KPFS0017	3
8.	Straight Fitting - Flare 1/4" Tube to 1/8" NPT	AN816-4D	1
9.	Nut - Flared Tube Bulkhead	AN924-5D	3
10.	1/2" Thick Washer	AN960-816	3
11.	Rubber Washer	KSFS0010	3
12.	Straight Fitting	AN816-6-2D	2
13.	O-Ring	KSFS0009	3
14.	Safety Wire *	-----	0
15.	Fuel Cap	KSFS0007	1
16.	3/4" Bulkhead Fitting	KSFS0037	2
17.	O-Ring - 3/4" Bulkhead	KSFS0039	2
18.	Rubber Washer	KSFS0016	2
19.	3/4" Thick Washer	AN960-1216	2
20.	Nut - 3/4" Bulkhead - Reverse Thread	KSFS0038	2
21.	Nipple - Flared Tube & Pipe Thread	AN816-6D	1
22.	Close Nipple	KSFS0021	1
23.	Reducer	KSFS0022	1
24.	Flush Valve	KSFS0011	1
25.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4
26.	6.9 Gal. Header Tank Mount	KPFS0109	1
27.	Header Tank - 6.9 Gal.	KPFS0103	1
28.	Adhesive - Superglue *	-----	0
29.	3/16" Countersunk Machine Screw	MS24694-S50	1
30.	3/16" Countersunk Washer	NAS1169-10L	1
31.	3/16" Thick Washer	AN960-10	1
32.	3/16" Shear Nut	AN364-1032A	1
33.	6.9 Gal. Header Tank Mount Channel - FWD	KPFS0111	1
34.	Red LED Indicator Light, 12V **	KSES0071	1
35.	Low Fuel Warning Switch **	KSES0072	1
36.	5/8" Thick Washer (AN960-1016) **	TW-5/8-W	1
37.	5/8" Rubber Washer **	KSFS0040	2

* Builder Supplied

** Low Fuel Warning Kit is Optional

9/1/2013

REV. A



R3000 S-20 RAVEN CONTROL STICK ASSEMBLY & INSTALLATION

MD3649

RANS S-20 RAVEN - CONTROL STICK ASSEMBLY & INSTALLATION

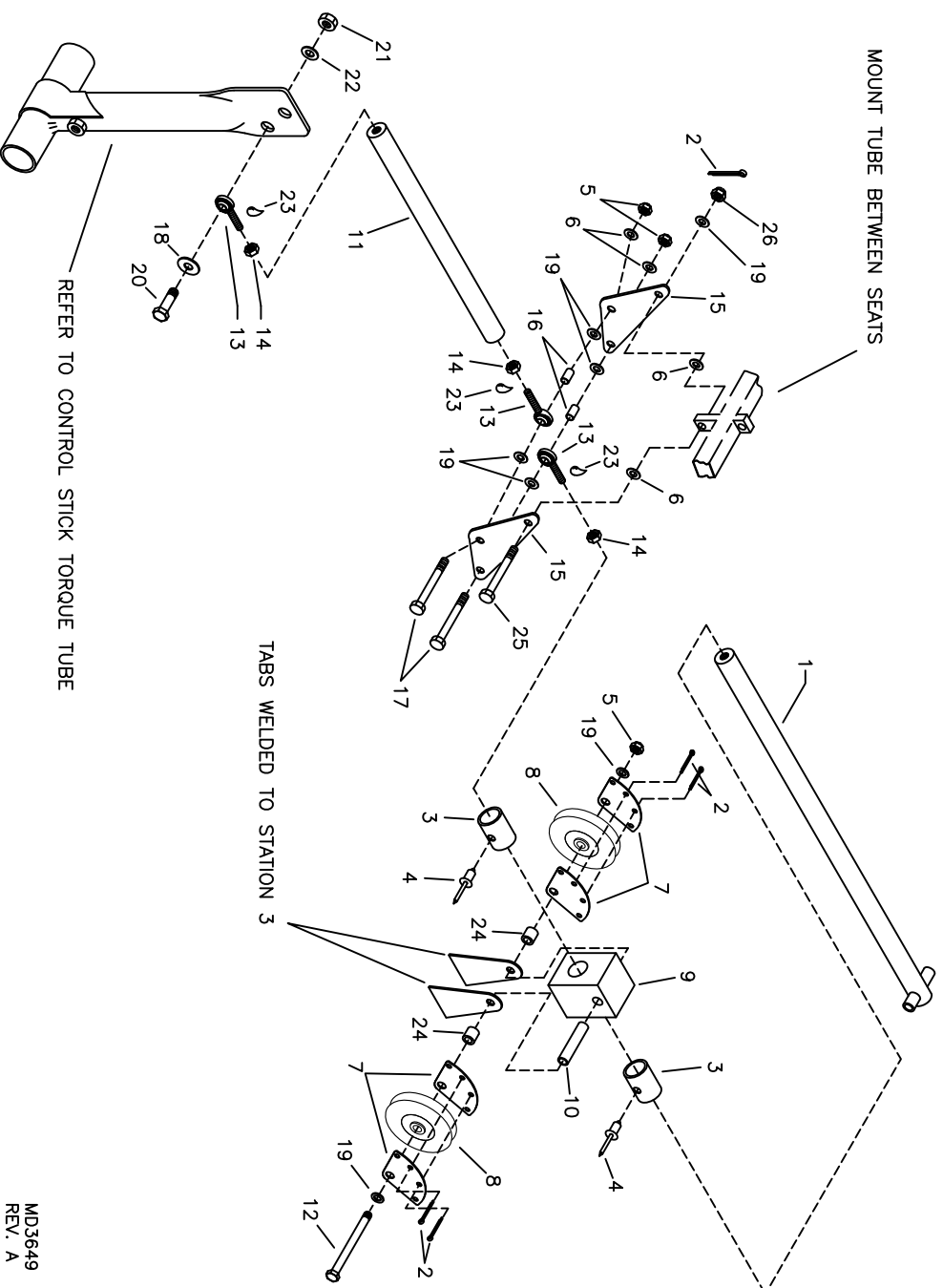
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	7/8" End Cap	CS-EC	1
2.	Bearing Washer	CS-BW	8
3.	Control Stick Grip	CS-G	1
4.	Control Stick	KPCS0072	2
5.	Thrust Bearing	CS-TB	4
6.	3/16" Castle Nut	AN310-3	2
7.	3/4" Nyloc Nut	CS-3/4LOCNUT	2
8.	3/16" Bolt	AN3-6A	4
9.	3/16" Bolt - drilled shank	AN3-10	1
10.	3/16" Thin Washer	AN960-10L	10
11.	Small Cotter Pin	MS24665-134	2
12.	Control Stick Torque Tube	CS-TT-A	1
13.	Male Rod End, 1/4" x 1/4"	NM-4	1
14.	1/4" Plain Nut	AN345-416	3
15.	Control Stick Link Tube	CS-CSLT-3	1
16.	MAC Control Stick Grip	KSCS0016	1
17.	Trim Position Indicator **	-----	0
18.	1/4" X 5/8" Steel Washer	KSHW0075	1
19.	Aluminum Bushing, 1/4" x .028" x 17/32" *	KAAC0046-5	0
20.	1/4" Bolt	AN4-10A	1
21.	1/4" Shear Nut	AN364-428A	1
22.	1/4" Thick Washer	AN960-416	3
23.	3/16" Bolt - drilled shank	AN3-12	1
24.	1/4" Plain Bolt	KSHW0094	2
25.	5 Wire Bundle - 26 Gauge Wire	KSES0022	26 ft
26.	20 Gauge Wire ***	-----	0
27.	Loctite Blue ***	-----	0

* Fabricate from Raw Stock

** Included in Trim Servo Kit

*** Builder Supplied

9/1/2013



REVEN S-20 RAVEN **CONTROL STICK PUSH-PULL TUBE** **ASSEMBLY & INSTALLATION**

MD3649
 REV. A

RANS S-20 RAVEN - CONTROL STICK PUSH-PULL TUBE ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	5/8" Push Pull Tube, 35"	KPCS0268	1
2.	Small Cotter Pin	MS24665-134	5
3.	Aluminum Stop Sleeve, 3/4" x .058" x 3/4" *	KAAC0046-6	0
4.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	2
5.	3/16" Shear Nut	AN364-1032A	3
6.	3/16" Thin Washer	AN960-10L	4
7.	Small Cable Keeper **	KPCS0207	1
8.	Small Pulley	AN210-1A	2
9.	Sliding Block	KPCS0263	1
10.	Aluminum Bushing, 1/4" x .028" x 1.125" *	KAAC0046-5	0
11.	5/8" Push Pull Tube, 12"	KPCS0267	1
12.	3/16" Bolt	AN3-31A	1
13.	Male Rod End, 1/4" x 1/4"	NM-4	3
14.	1/4" Plain Nut	AN345-416	3
15.	Side Plate	KPAC0154	2
16.	Aluminum Bushing, 1/4" x .028" x 3/8" *	KAAC0046-5	0
17.	3/16" Bolt	AN3-11A	2
18.	1/4" X 5/8" Steel Washer	KSHW0075	1
19.	3/16" Thick Washer	AN960-10	7
20.	1/4" Bolt	AN4-10A	1
21.	1/4" Shear Nut	AN364-428A	1
22.	1/4" Thick Washer	AN960-416	1
23.	Loctite Blue ***	-----	0
24.	Aluminum Bushing, 3/8" x .095" x .33" **	KPAC0060	1
25.	3/16" Bolt - drilled shank	AN3-11	1
26.	3/16" Castle Nut	AN310-3	1

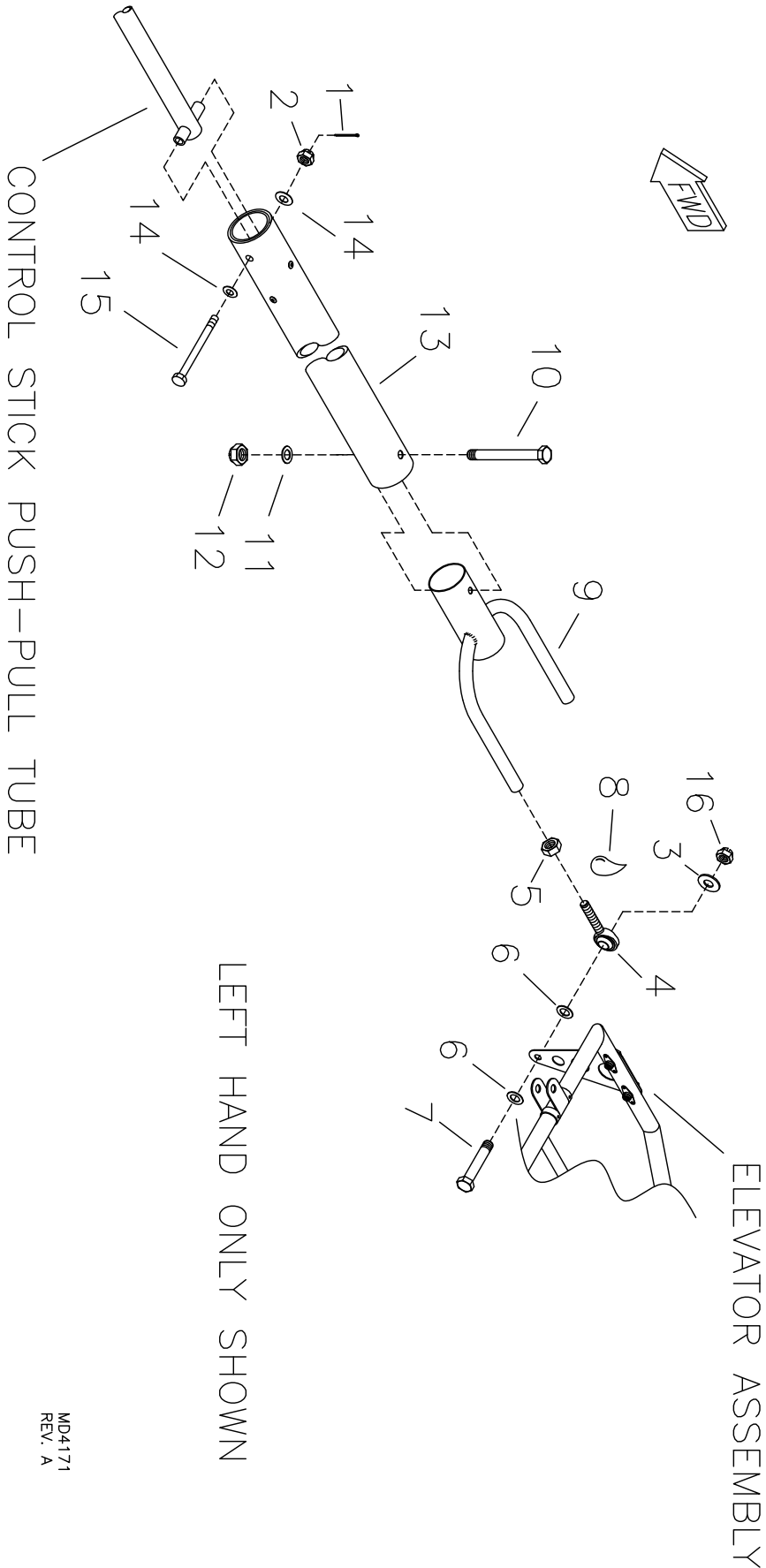
* Fabricate from Raw Stock

** Builder Modifies

*** Builder Supplied

9/1/2013

REV. A



RAVEN S-20 RAVEN
ELEVATOR PUSH-PULL TUBE
ASSEMBLY & INSTALLATION

MD4171
REV. A

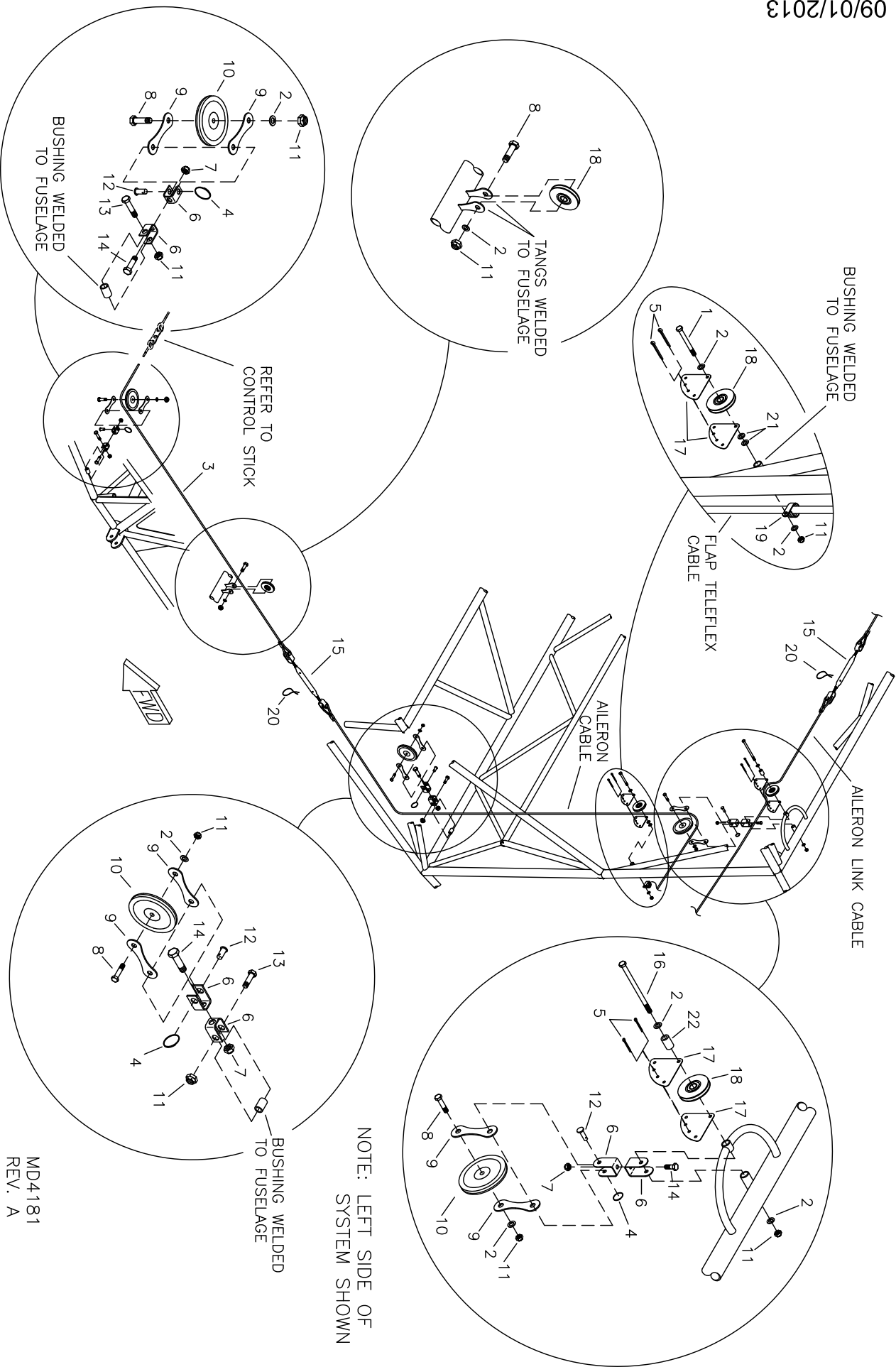
RANS S-20 RAVEN - ELEVATOR PUSH-PULL TUBE ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Small Cotter Pin	MS24665-134	1
2.	1/4" Castle Nut	AN310-4	1
3.	1/4" X 5/8" Steel Washer	KSHW0075	2
4.	Male Rod End, 1/4" x 1/4"	NM-4	2
5.	1/4" Plain Nut	AN345-416	2
6.	1/4" Thin Washer	AN960-416L	4
7.	1/4" Bolt	AN4-10A	2
8.	Loctite Blue *	-----	0
9.	Elevator Yoke	KPEL0032	1
10.	3/16" Bolt	AN3-17A	1
11.	3/16" Thick Washer	AN960-10	1
12.	3/16" Shear Nut	AN364-1032A	1
13.	Elevator Push-Pull Tube	KPCS0266	1
14.	1/4" Thick Washer	AN960-416	2
15.	1/4" Bolt - drilled shank	AN4-20	1
16.	1/4" Shear Nut	AN364-428A	2

* Builder Supplied

9/1/2013

REV. A



REFID S-20 RAVEN
AILERON CABLE SYSTEM INSTALLATION - FUSELAGE

MD4181
REV. A

RANS S-20 RAVEN - AILERON CABLE SYSTEM INSTALLATION - FUSELAGE

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt	AN3-16A	2
2.	3/16" Thin Washer	AN960-10L	16
3.	Aileron - Control Stick Cable	KPCS0269	1
4.	Loc Ring	RL 27 1/4	6
5.	Small Cotter Pin	MS24665-134	8
6.	U-Bracket	RL-205-T	12
7.	3/16" Tensile Nut	AN365-1032A	6
8.	3/16" Bolt	AN3-6A	8
9.	Hummer Tang	T12-HT6	12
10.	Pulley	AN210-2A	6
11.	3/16" Shear Nut	AN364-1032A	16
12.	3/16" Clevis Pin	MS20392-2C17	6
13.	3/16" Bolt	AN3-7A	4
14.	3/16" Bolt	AN3-3A	6
15.	Turnbuckle	RL-335-AT	3
16.	3/16" Bolt	AN3-31A	2
17.	Small Cable Keeper *	KPCS0207	2
18.	Small Pulley	AN210-1A	6
19.	3/8" Cushion Clamp	MS21919-WDG6	2
20.	Safety Wire **	-----	0
21.	3/16" Thick Washer	AN960-10	4
22.	Aluminum Bushing, 3/8" x .095" x 1/2" *	KPAC0060	1

* Builder Modifies

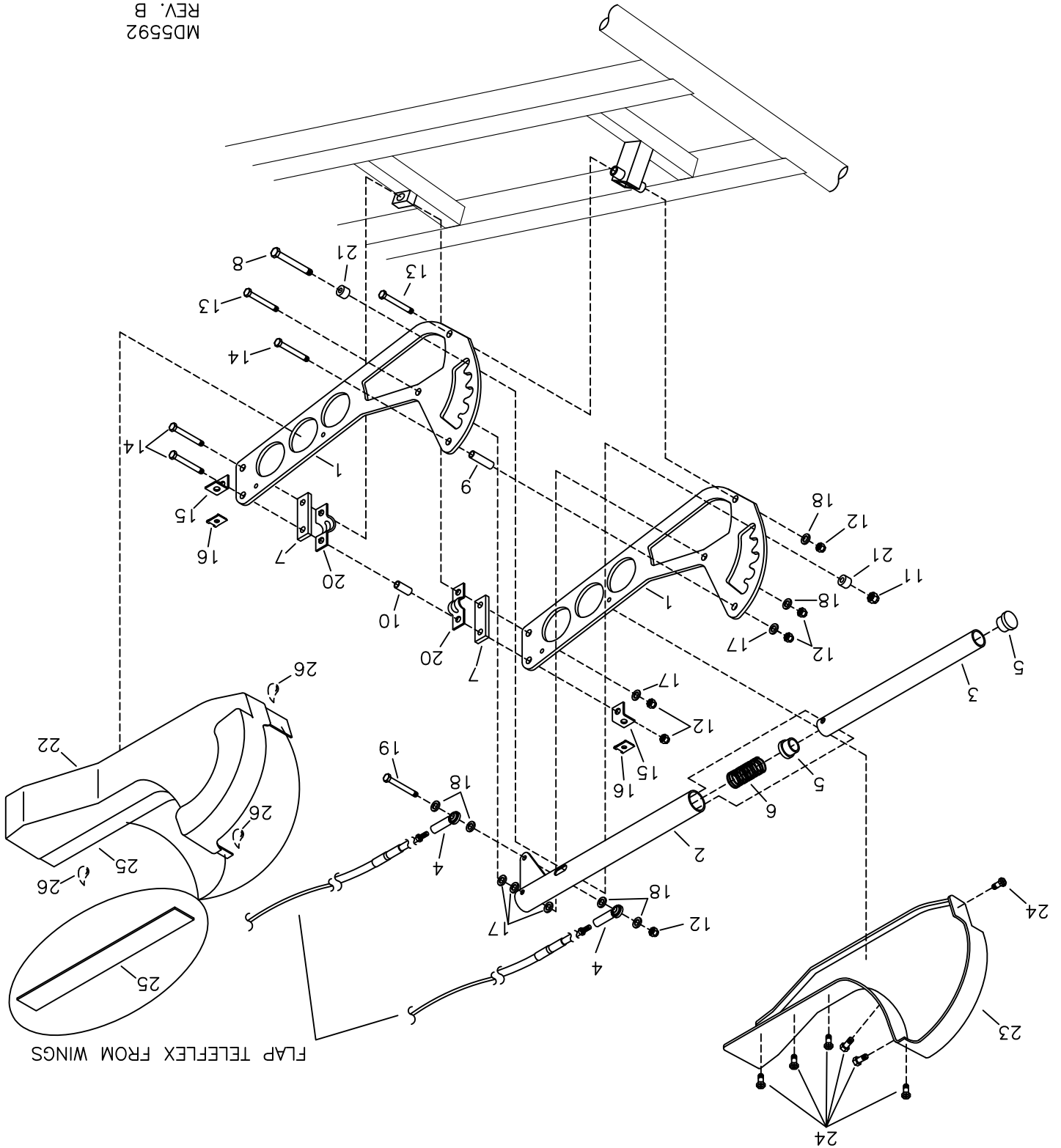
** Builder Supplied

9/1/2013

REV. A

RAMS S-20 RAVEN FLAP LEVER ASSEMBLY

MD5592
REV. B



RANS S-20 RAVEN - FLAP LEVER ASSEMBLY AND INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Flap Lever Side Plate	KPFL0159	2
2.	Flap Handle	KPFL0044	1
3.	Flap Trip Release Tube	KPFL0045	1
4.	Female Rod End	NF-3	2
5.	Endcap	3/4 ENDCAP	2
6.	Spring	C-21	1
7.	Plastic Shim	KPAC0121	2
8.	1/4" Bolt	AN4-20A	1
9.	Spacer Bushing, 1/4" x .028" x 1.00" *	KAAC0046-5	0
10.	Spacer Bushing, 1/4" x .028" x .625" *	KAAC0046-5	0
11.	1/4" Shear Nut	AN364-428A	1
12.	3/16" Shear Nut	AN364-1032A	6
13.	3/16" Bolt	AN3-14A	2
14.	3/16" Bolt	AN3-15A	3
15.	Angle Bracket ** ***	KPAC0004	2
16.	Tinnerman ***	A1789-8Z-1	2
17.	3/16" Thick Washer	AN960-10	5
18.	3/16" Thin Washer	AN960-10L	6
19.	3/16" Bolt	AN3-11A	1
20.	Teleflex Retainer Bracket	KSCS0001	2
21.	Roller Bushing, 3/8" x .058" x 3/8" *	SB-3/8x2	1
22.	Flap Lever Cover - LH ***	KPIN0118-L	1
23.	Flap Lever Cover - RH ***	KPIN0118-R	1
24.	#4 Small Pan Head Screw ***	4X1/4 PHS	7
25.	Flap Lever Cover Splice **	KPIN0125	1
26.	PVC Cement ****	-----	0

* Fabricate from Raw Stock

** Builder Modifies

*** Part of Interior Installation

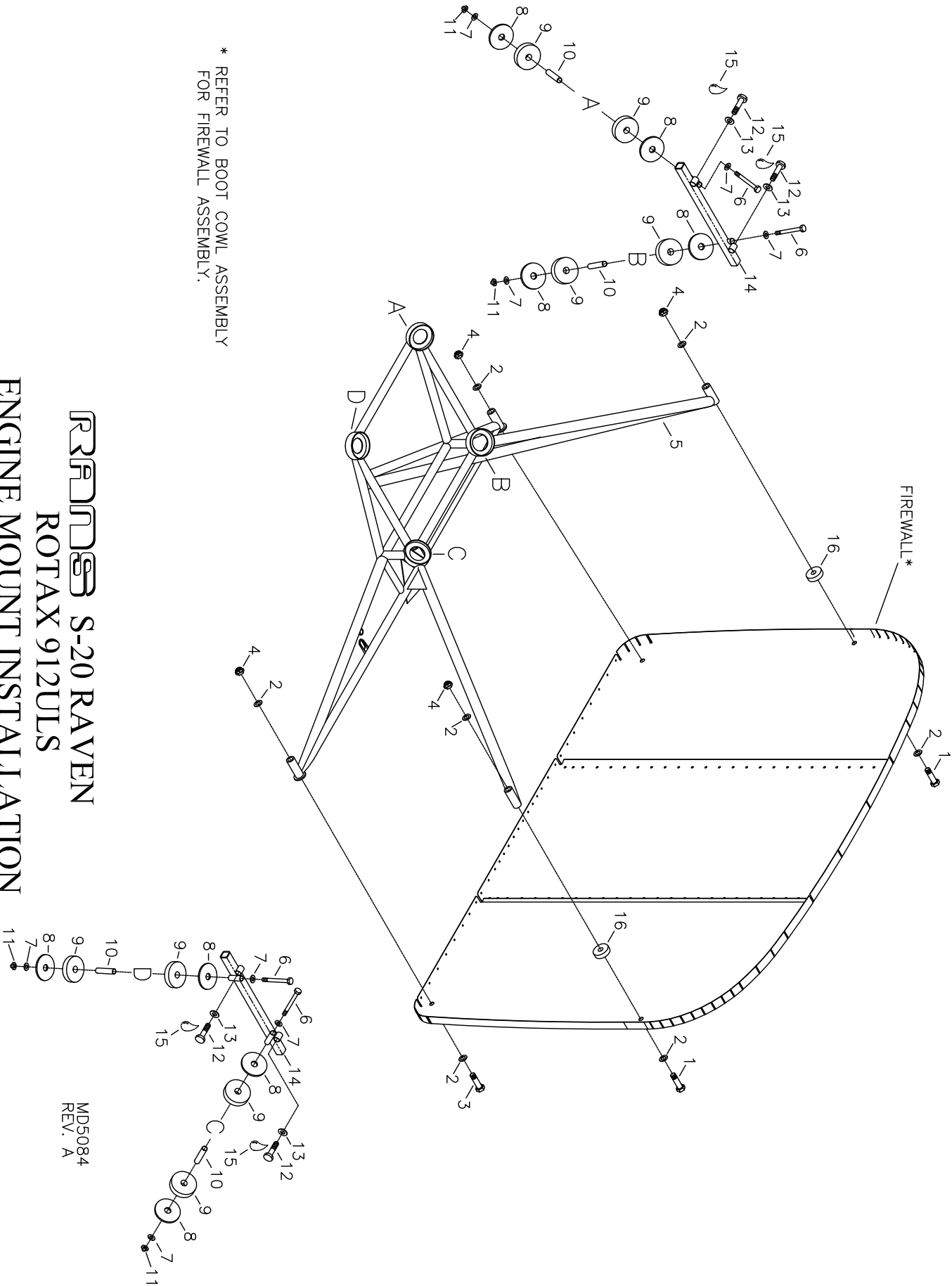
**** Builder Supplied

9/1/2013

REV. B

* REFER TO BOOT COWL ASSEMBLY
FOR FIREWALL ASSEMBLY.

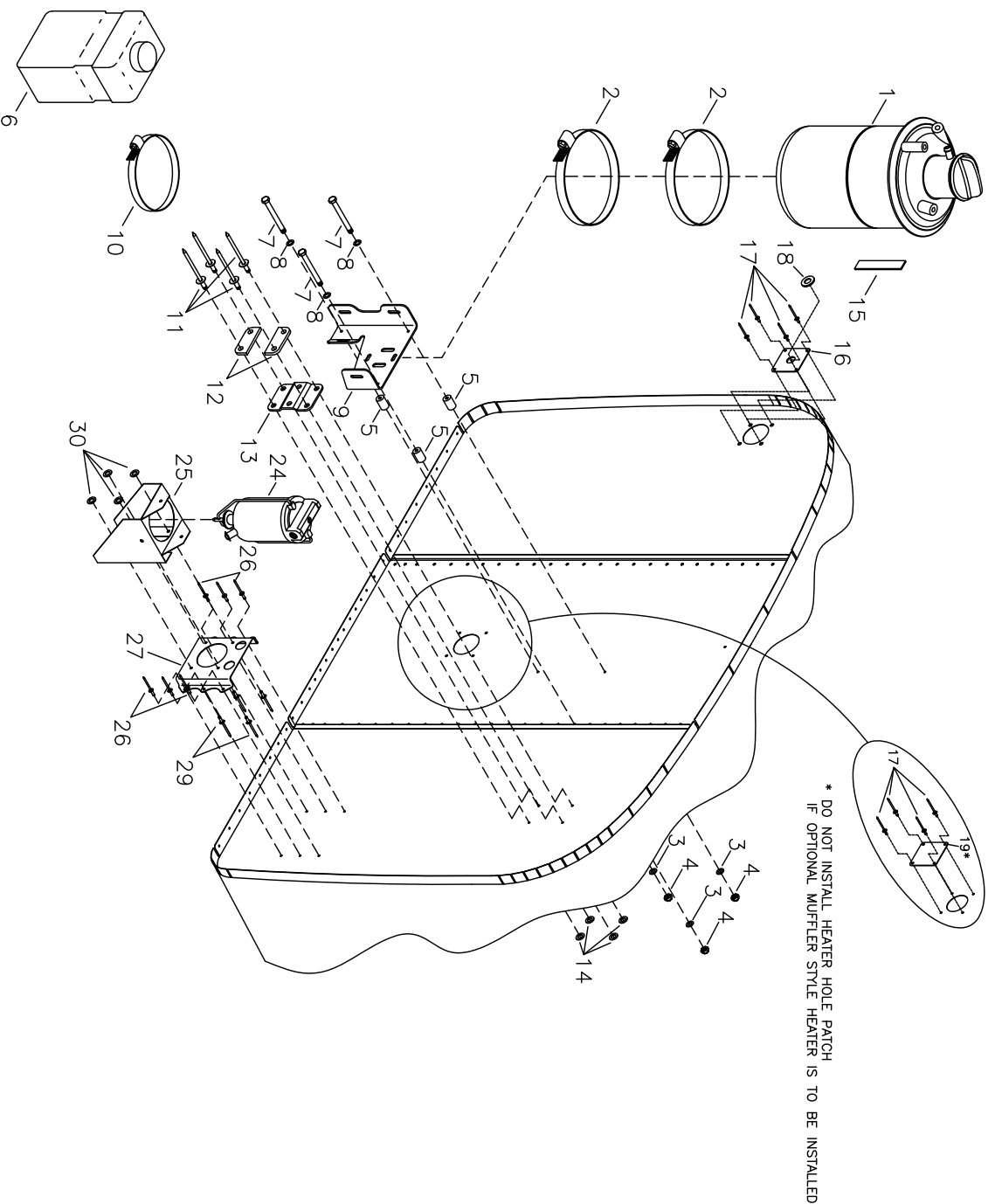
ROBIN S-20 RAVEN
ROTAX 912ULS
ENGINE MOUNT INSTALLATION



RANS S-20 RAVEN - ROTAX 912ULS - ENGINE MOUNT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	5/16" Bolt	AN5-35A	2
2.	5/16" Thick Washer	AN960-516	8
3.	5/16" Bolt	AN5-34A	2
4.	5/16" Tensile Nut	AN365-524A	4
5.	Engine Mount	KPPW0274	1
6.	3/8" Bolt	AN6-33A	4
7.	3/8" Thick Washer	AN960-616	8
8.	Washer	912DONUT-2	8
9.	Rubber Washer	912DONUT-3	8
10.	Bushing	912DONUT-4	4
11.	3/8" Tensile Loc Nut	AN363-624A	4
12.	10mm Bolt	875-550	4
13.	10mm Loc-Washer	945-753	4
14.	912 Engine Attachment	EG-FEA-912	2
15.	Loctite Blue *	-----	0
16.	Engine Mount Spacer	KPAC0273	2

* Builder Supplied



ROTAX S-20 RAVEN ROTAX 912ULS FIREWALL ITEMS INSTALLATION

RANS S-20 RAVEN - ROTAX 912ULS - FIREWALL ITEMS INSTALLATION

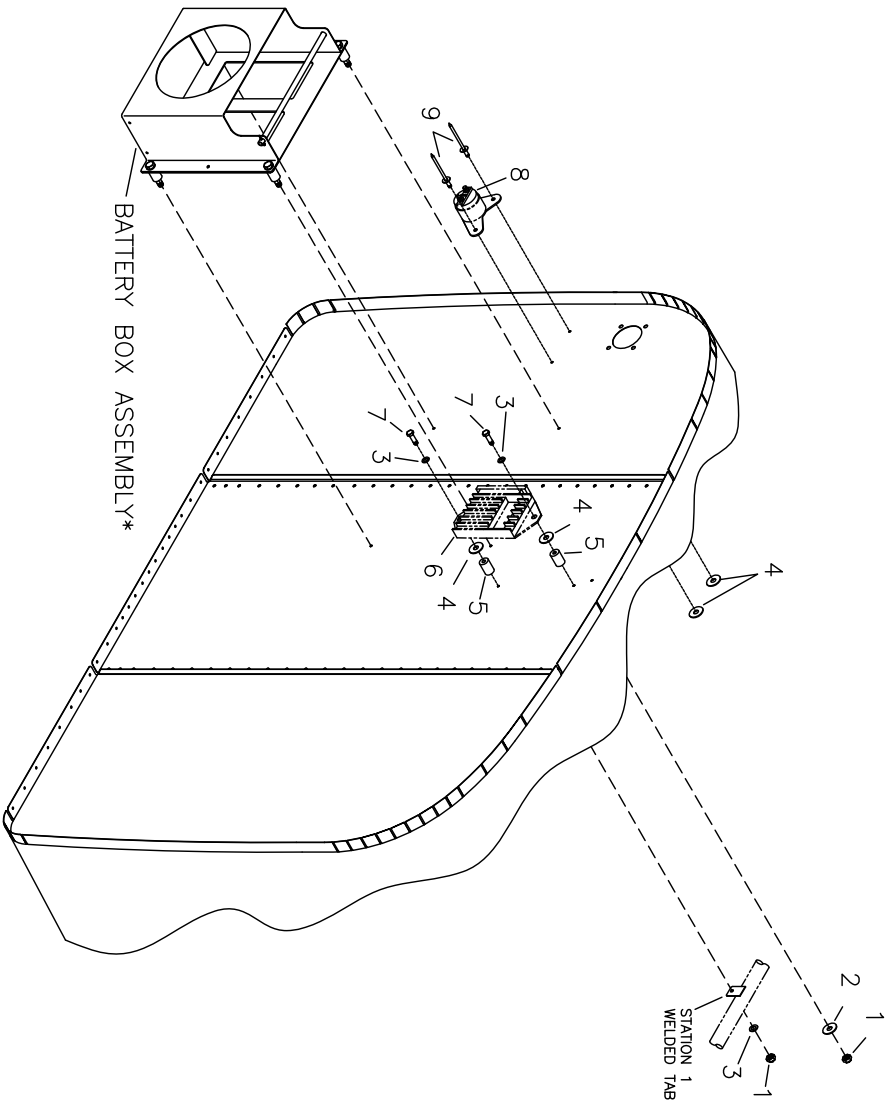
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Oil Tank *	-----	0
2.	Hose Clamp - 6"	5-5288	2
3.	3/16" Thick Washer	AN960-10	3
4.	3/16" Tensile Nut	AN365-1032A	3
5.	3/8" x 0.058" x 1/2" Aluminum Bushing **	KAAC0044-3	0
6.	Overflow Bottle	KSPW0072	1
7.	3/16" Bolt	AN3-10A	3
8.	3/16" Thin Washer	AN960-10L	3
9.	Oil Bottle Mount	KPPW0261	1
10.	Hose Clamp - 4"	5-5256	1
11.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-44	4
12.	Spacer Shim - Mount Bracket	KPPW0230	2
13.	Mount Bracket - Coolant Recovery Bottle	KPPW0231	1
14.	1/8" Small Brass Washer	AN960-B4	4
15.	1" Black Foam Tape	KSAC0011	3
16.	.025 " Sheet (2" x 2") **	KAAC0042-12	1
17.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-62	8
18.	Rubber Grommet	MS35489-17	1
19.	Heater Hole Patch	KPFW0015	1

* Supplied with Engine

** Builder must fabricate from raw stock

9/1/2013

REV. A



* REFER TO BATTERY BOX ASSEMBLY AND INSTALLATION

ROTAX S-20 RAVEN
ROTAX 912ULS
FIREWALL ELECTRICAL ITEMS INSTALLATION

RANS S-20 RAVEN - ROTAX 912ULS - ENGINE ELECTRICAL ACCESSORY INSTALLATION

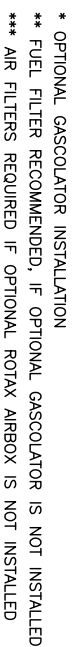
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Shear Nut	AN364-1032A	2
2.	3/16" Large Washer	AN970-3	1
3.	3/16" Thin Washer	AN960-10L	3
4.	#10 Washer - Stainless Steel	BSHW0022	4
5.	3/8" x .058" x 3/16" Aluminum Bushing *	KAAC0044-3	0
6.	Regulator / Rectifier **	-----	0
7.	3/16" Bolt	AN3-7A	2
8.	Starter Solenoid **	-----	0
9.	3/16" Aluminum Rivet - Cherry Q	AAPQ-62	2

* Fabricate from Raw Stock

** Supplied with Engine

9/1/2013

REV. A

MD4187
REV. A

FUEL LINE INSTALLATION – FIREWALL FORWARD

RANS S-20 RAVEN - ROTAX 912ULS - FUEL SYSTEM - FIREWALL FORWARD
WITH OPTIONAL GASCOLATOR

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Black Fuel Line - 1/4"	KSFS0002	3 ft
2.	Hose Clamp - 5/8"	5-6202	2
3.	45 degree 1/4" Hose Fitting	KSFS0023	1
4.	Plastic Tie - 7.5"	N-TIES	4
5.	Fuel Line Assembly - Firewall to Gascolator *	KPFS0102	1
6.	90 Degree Fitting *	AN822-6D	2
7.	1/8" Pipe Plug *	PIPE-PLUG 1/8	1
8.	Gascolator *	KSPW0067	1
9.	Gascolator Bracket *	KSPW0066	1
10.	1/8" Stainless Steel Rivet - Cherry Q *	CCPQ-41	6
11.	Reducer - External Thread - Flared Tube ***	AN919-6D	2
12.	1/4" Hose Fitting ***	30682-4-4	1
13.	Hose Clamp - 5/8" ***	5-6202	4
14.	Black Fuel Line - 1/4" ***	KSFS0002	0.5 ft
15.	Fuel Filter **, ***, ****	-----	0
16.	3/8" Hose Fitting ***	30682-6-6	1
17.	Hose Clamp - 7/8" ***	5-6203	2
18.	Black Fuel Line - 3/8" ***	27004	2 ft
19.	90 degree 3/8" Hose Fitting ***	33982-6-6	1
20.	Thread Sealant ****	-----	0
21.	Air Filter ****, *****	EG-AF-912	0
22.	63mm Clamp *****	-----	0
23.	1/8" Stainless Steel Rivet - Cherry Q *	CCPQ-42	4
24.	1/8" Small Brass Washer *	AN960-B4	4
25.	Gascolator Mount *	KPPW0277	1

* Optional Gascolator ** Contact ROTAX for recommended fuel filter

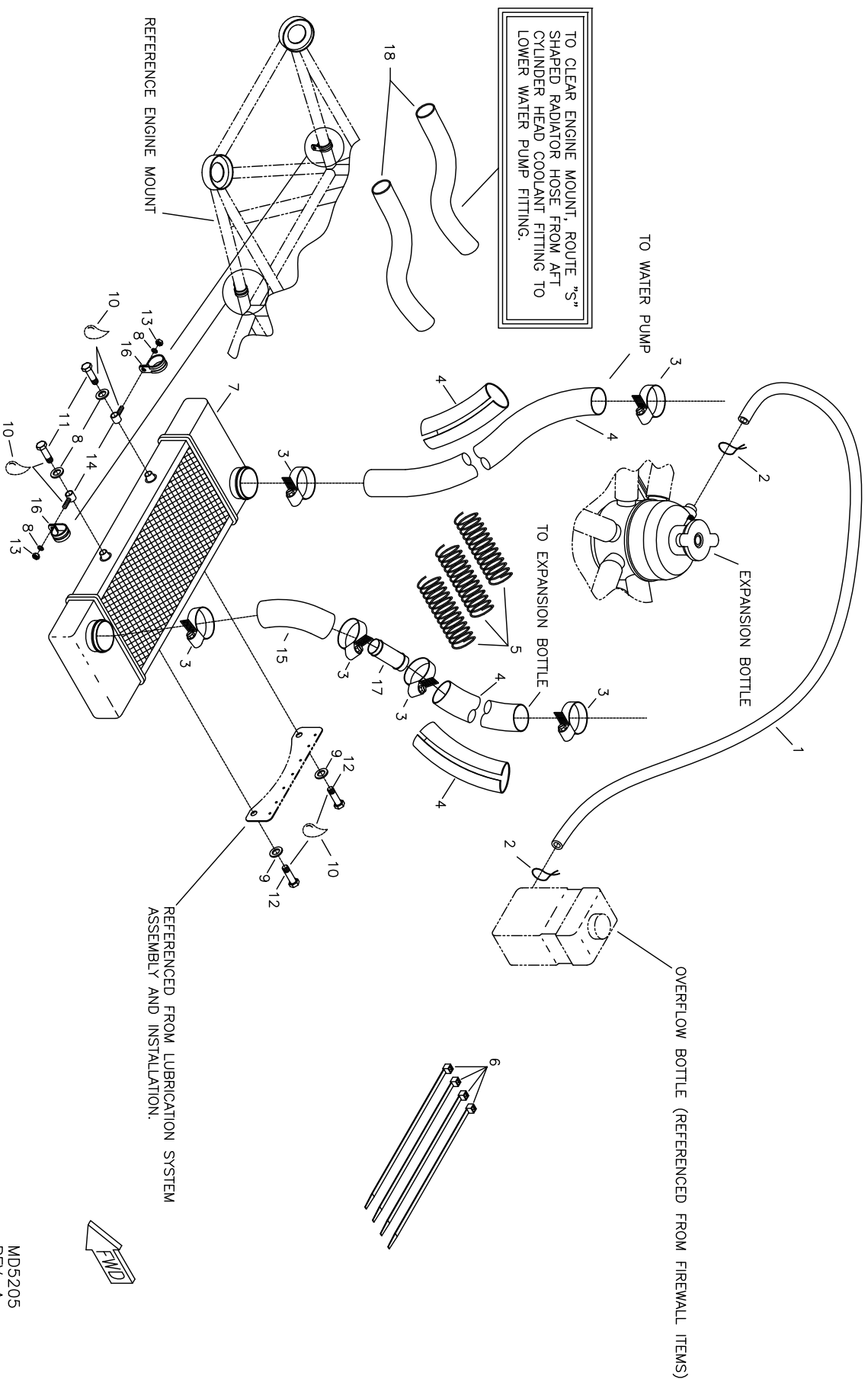
*** Fuel Filter recommended if Optional Gascolator is not installed.

**** Builder Supplied ***** Supplied with Air Filter

***** Available from RANS Parts Dept.

9/1/2013

REV. A



ROTAX S-20 RAVEN ROTAX 912ULS COOLING SYSTEM INSTALLATION

MD5205
REV. A



RANS S-20 RAVEN - ROTAX 912ULS - COOLING SYSTEM INSTALLATION

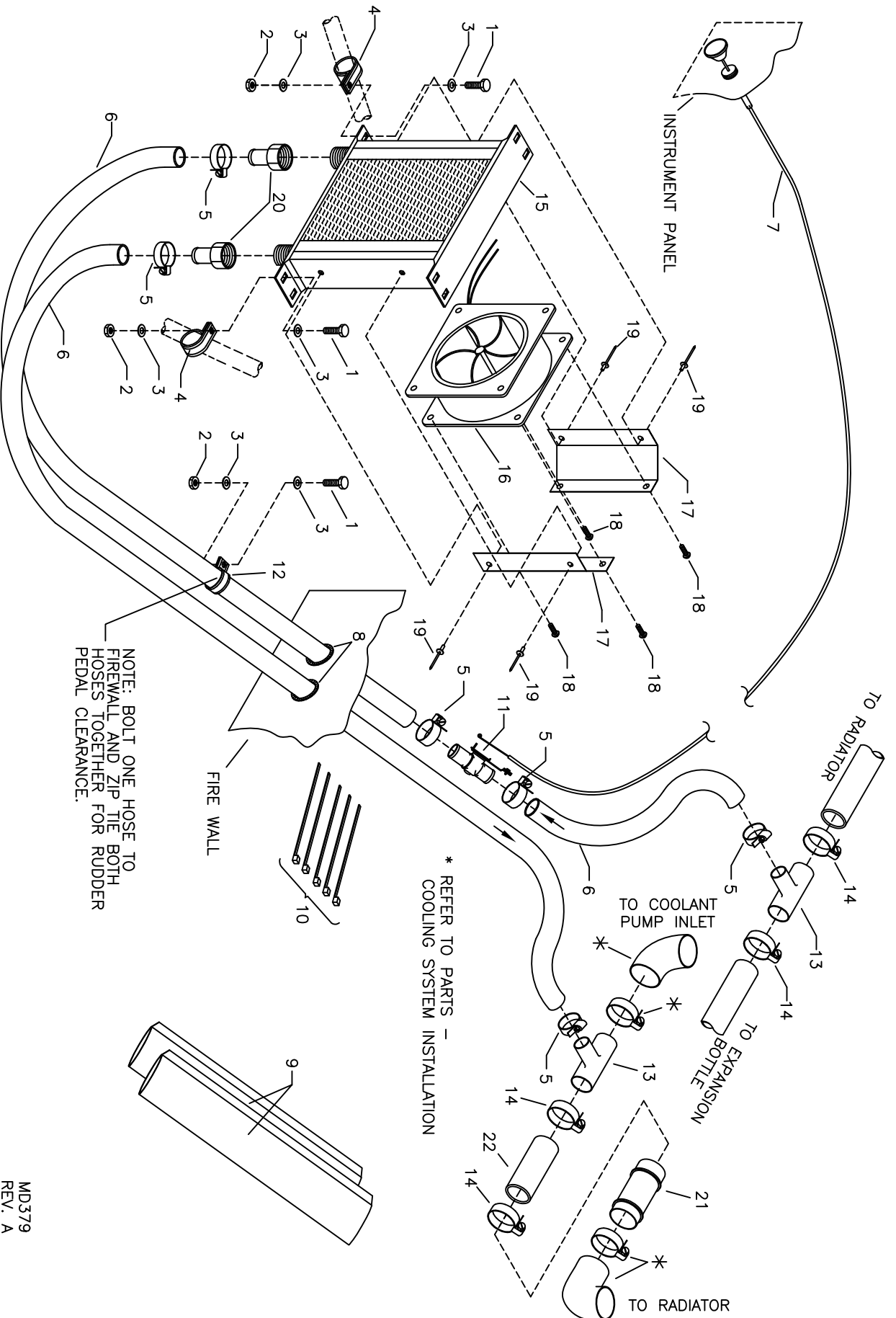
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	5/16" Overflow Hose	EGCS-OFH	3 ft.
2.	Safety Wire *	-----	0
3.	Hose Clamp - 1 1/2"	5-5216	6
4.	Radiator Hose - 1"	RADIATOR HOSE	3 ft.
5.	Hose Spring	EGCS-HS	3
6.	Nylon Tie	N-TIES	4
7.	Radiator	KSPW0071	1
8.	1/4" Thick Washer	AN960-416	4
9.	1/4" Thin Washer	AN960-416L	2
10.	Loctite *	-----	0
11.	6MM Bolt	M6X16 BOLT	2
12.	6MM Bolt	M6X12 BOLT	2
13.	6mm Hex Nut	6MM HEX NUT	2
14.	Radiator Mount	KPPW0278	2
15.	Pre-formed Radiator "U" Shaped Hose **	KSPW0075	1
16.	5/8" Cushion Clamp	MS21919-DG10	2
17.	Cooling Tube Union	KPPW0189	1
18.	Pre-formed Radiator "S" Hose	KSPW0025	2

* Builder Supplied

** Builder Modifies

9/1/2013

REV. A

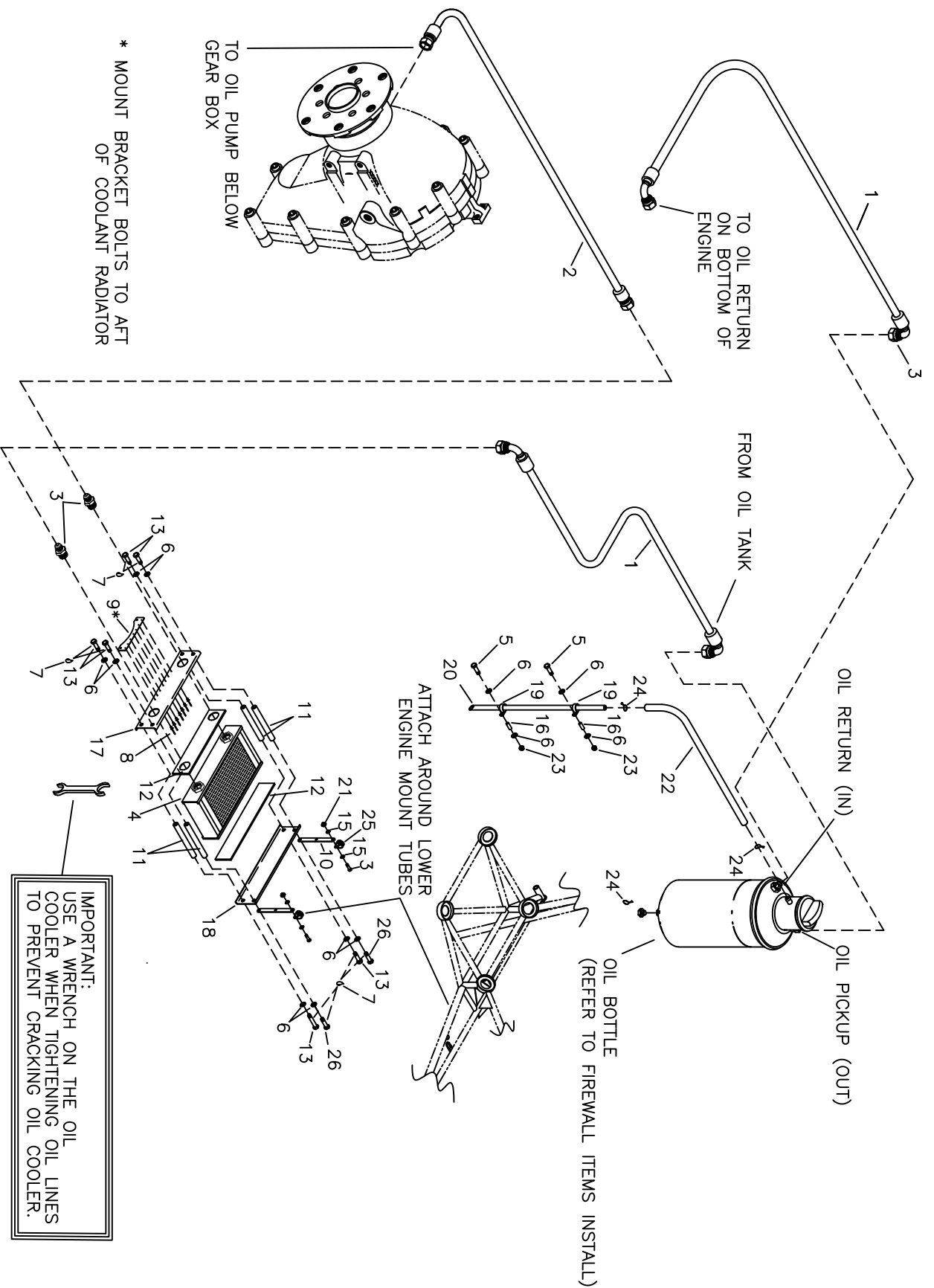


MD379
REV. A

Rotax S-20 RAVEN ROTAX 912ULS OPTIONAL HEATER INSTALLATION – RADIANT STYLE

RANS S-20 RAVEN - ROTAX 912ULS - OPTIONAL HEATER INSTALLATION**RADIANT STYLE - KAAC0050**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt	AN3-4A	3
2.	3/16" Shear Nut	AN364-1032A	3
3.	3/16" Thin Washer	AN960-10L	6
4.	1/2" Cushion Clamp	MS21919-DG8	2
5.	Hose Clamp - 1"	5-5210	6
6.	5/8" Heater Hose	HEATER HOSE 5/8	6 ft
7.	Control Cable	4-336	1
8.	Serrated Grommet Strip	KSAC0023	8 in
9.	Hose Cover	H-HC	2
10.	Plastic Tie - 7.5"	N-TIES	5
11.	Control Valve	277813	1
12.	1" Cushion Clamp	MS21919-DG16	1
13.	1" To 5/8" Tee	H-TEE	2
14.	Hose Clamp - 1 1/2"	5-5216	4
15.	Heater Core	21608	1
16.	Fan	032207	1
17.	Fan Mounting Plate	H-HFMP	2
18.	3/16" Truss Head Screw	AN526-C1032-R12	4
19.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	4
20.	5/8" Nipple	80146	2
21.	Cooling Tube - Union	KPPW0189	1
22.	1" Radiator Hose	RADIATOR HOSE	0.5 ft



ROTAX 912ULS S-20 RAVEN LUBRICATION ASSEMBLY AND INSTALLATION

RANS S-20 RAVEN - ROTAX 912ULS - LUBRICATION SYSTEM ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Oil Line Assembly - ROTAX 912ULS	KSPW0133	2
2.	Oil Line Assembly - ROTAX 912ULS	KSPW0134	1
3.	Oil Cooler Adaptor	KSPW0112	2
4.	Oil Cooler	KSPW0085	1
5.	3/16" Bolt	AN3-11A	2
6.	3/16" Thin Washer	AN960-10L	12
7.	Loctite Blue *	-----	0
8.	1/8" Stainless Steel Rivet - Flush	CCC-42	7
9.	Oil Cooler Mount Bracket	KPPW0271	1
10.	Mount Bracket - Radiator	KPAC0174	2
11.	Threaded Bushing - Oil Cooler	KPPW0280	4
12.	.093 Silicone Sheet **	KPPW0254	2
13.	3/16" Bolt	AN3-4A	6
14.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	7
15.	3/16" Thick Washer	AN960-10	4
16.	3/8" x 0.058" x 3/4" Aluminum Bushing ***	KAAC0044-3	0
17.	Oil Cooler Mount - Upper	KPPW0272	1
18.	Oil Cooler Mount - Lower	KPPW0276	1
19.	3/8" Plain Clamp	AN742-D6	2
20.	3/8" x .035" Aluminum Tube ***	KAAC0044-14	1
21.	3/16" Shear Nut - Steel	AN364-1032C	2
22.	Medium Temperature Tubing	KSPW0069	2 ft
23.	3/16" Shear Nut	AN364-1032A	2
24.	Safety Wire *	-----	0
25.	5/8" Cushion Clamp	MS21919-DG10	2
26.	3/16" Bolt	AN3-5A	4

* Builder Supplied

** Builder Modifies

*** Builder must fabricate from raw stock

9/1/2013

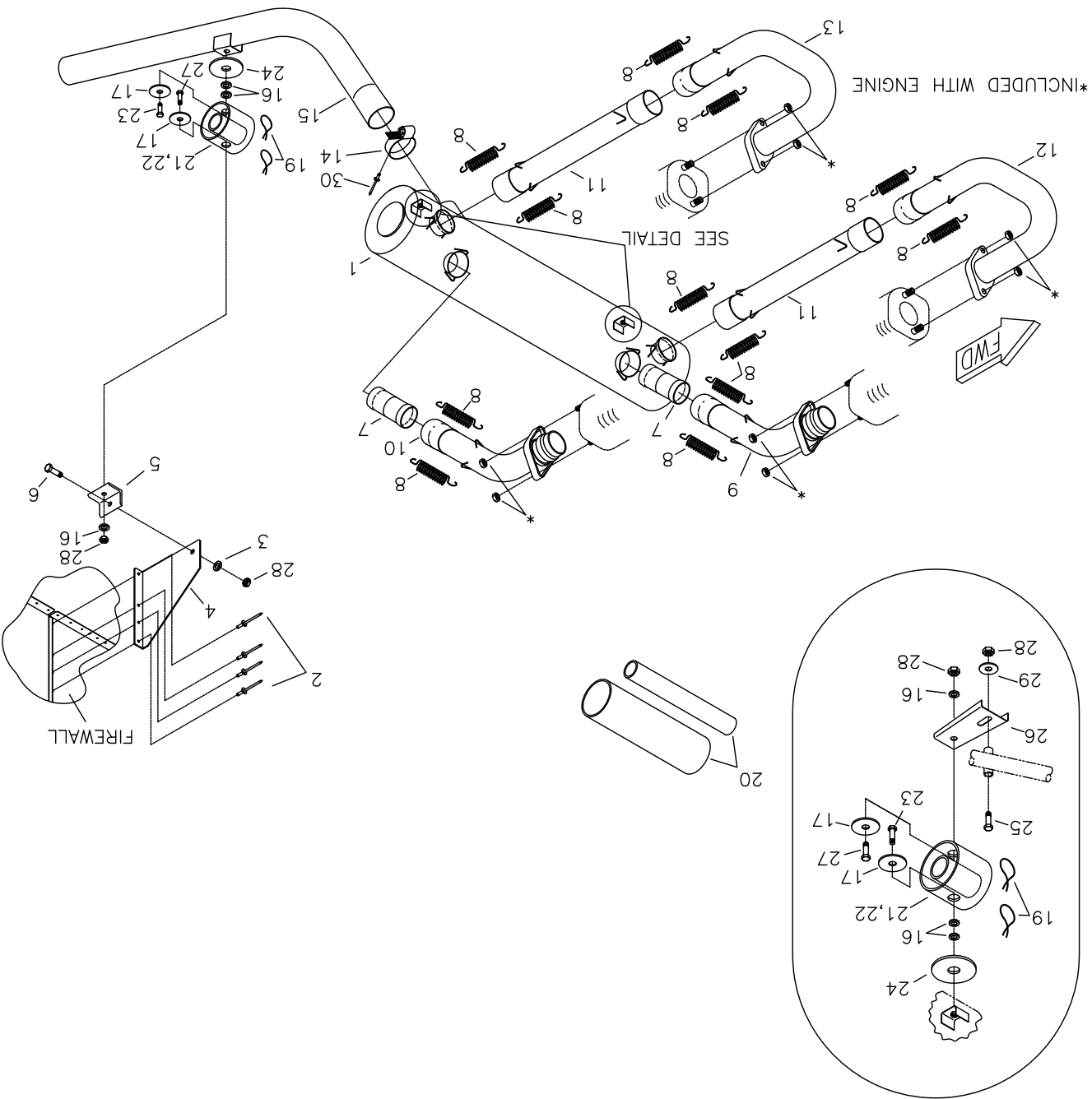
REV. C

MUFFLER ASSEMBLY

ROTAX 912ULS

RAMPS S-20 RAVEN

MD5201
REV. A



RANS S-20 RAVEN - ROTAX 912ULS - MUFFLER ASSEMBLY

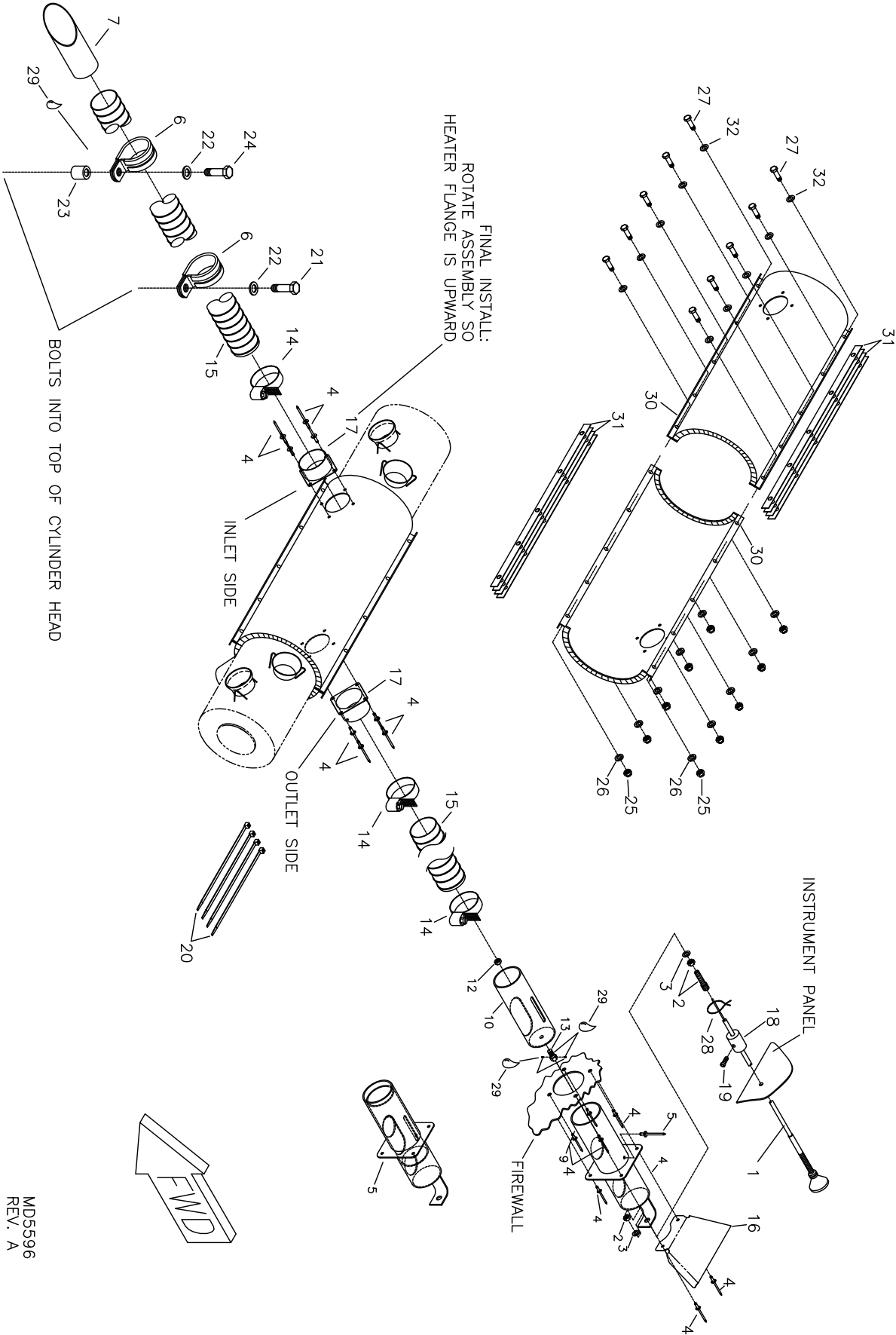
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	S-19 / S-20 Muffler	KPEX0071	1
2.	1/8" Stainless Steel Rivet - Cherry Q	AAPQ-43	4
3.	1/4" Thin Washer	AN960-416L	1
4.	Exhaust Mount Bracket	KPEX0076	1
5.	Tail Pipe Support - Angle	KPEX0075	1
6.	1/4" Bolt	AN4-5A	1
7.	Muffler Canister Coupler	KPEX0072	2
8.	Muffler Spring	KSEX0002	12
9.	Aft Top Pipe - RH	KPEX0069	1
10.	Aft Top Pipe - LH	KPEX0070	1
11.	Forward Manifold #2 Pipe	KPEX0068	2
12.	Forward Manifold #1 Pipe - RH	KPEX0022	1
13.	Forward Manifold #1 Pipe - LH	KPEX0020	1
14.	Hose Clamp - 2 1/4"	5-5228	1
15.	Tail Pipe Extension	KPEX0067	1
16.	1/4" Thick Washer	AN960-416	8
17.	Formed Washer	KPAC0053	6
18.	6mm Hex Nut	6MM HEX NUT	3
19.	Safety Wire *	-----	0
20.	912 Muffler Raw Stock Kit	KAAC0017	1
21.	Rubber Hose - 3/4" o.d. x 1 3/8" **	KAAC0017-1	0
22.	Rubber Hose - 1 1/4" o.d. x 1 3/8" **	KAAC0017-2	0
23.	6MM Bolt	M6X20 BOLT	6
24.	1/8" Aluminum Washer	EG-AW	3
25.	1/4" Bolt	AN4-16A	2
26.	Muffler Attach Channel	KPEX0027	2
27.	1/4" Plain Bolt	KSHW0016	3
28.	1/4" Shear Nut - Steel	AN364-428C	6
29.	1/4" Large Washer	AN970-4	2
30.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-44	1

* Builder Supplied

** Fabricate from Raw Stock

9/1/2013

REV. A



ROTAX S-20 RAVEN
ROTAX 912ULS
OPTIONAL CABIN HEATER INSTALLATION - MUFFLER STYLE

RANS S-20 RAVEN - ROTAX 912ULS - CABIN HEATER INSTALLATION**MUFFLER STYLE - KAAC0048**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Control Cable	4-336	1
2.	Adjustable Cable Ferrule	12553	1
3.	1/4" Plastic Washer	PW-4	2
4.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	12
5.	1/8" Aluminum Rivet - Cherry Q *	AAPQ-42	0
6.	1-1/2" Cushioned Clamp	MS21919-DG24	2
7.	Inlet Tube	H-OT	1
8.	Air Diverter Assembly	KASY0006	1
9.	Air Diverter - Slide *	KASY0006-1	0
10.	Air Diverter - Body *	KASY0006-2	0
11.	Set Screw	KSHW0043	2
12.	6mm Hex Nut	6MM HEX NUT	1
13.	Reverse Cable Stop	BPHW0006	1
14.	Hose Clamp - 1 3/4"	5-5220	3
15.	1 1/2" Heater Duct / Crete Hose	CREET HOSE	5 ft
16.	Cabin Heat Shield	KPFU0653	1
17.	Heater Flange Assembly	KPSY0030	2
18.	Cable Friction Block	T-STOP	1
19.	Socket Head Cap Screw	T-SC	1
20.	Nylon Tie - 15"	LONG-N-TIE	4
21.	6MM Bolt	M6X16 BOLT	1
22.	1/4" Thin Washer	AN960-416L	2
23.	3/8" x 0.058" x 1/2" Aluminum Bushing **	KAAC0044-3	0
24.	6MM Bolt	M6X30 BOLT	1
25.	3/16" Shear Nut - Steel	AN364-1032C	10
26.	3/16" Thick Washer	AN960-10	10
27.	3/16" Bolt	AN3-4A	10
28.	Safety Wire ***	-----	0
29.	Loctite Blue ***	-----	0
30.	Heater Wrap	KPSY0070	2
31.	Shim - Heater Wrap	KPSY0071	8
32.	3/16" Thin Washer	AN960-10L	10

* Component of KASY0006

** Fabricate from Raw Stock

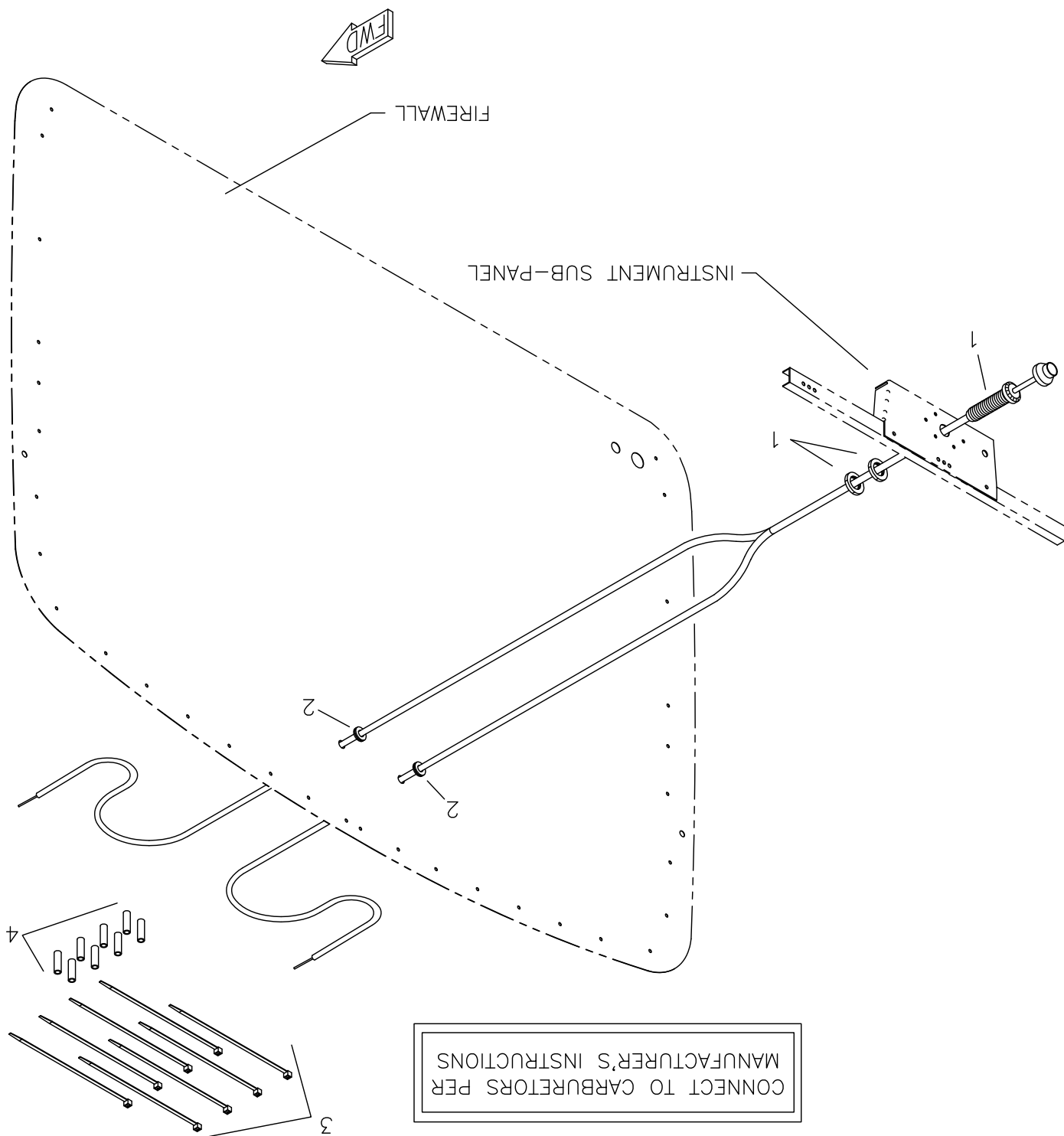
*** Builder Supplied

9/1/2013

REV. A

RANDS S-20 RAVEN ROTAX 912ULS THROTTLE ASSEMBLY

MD5597



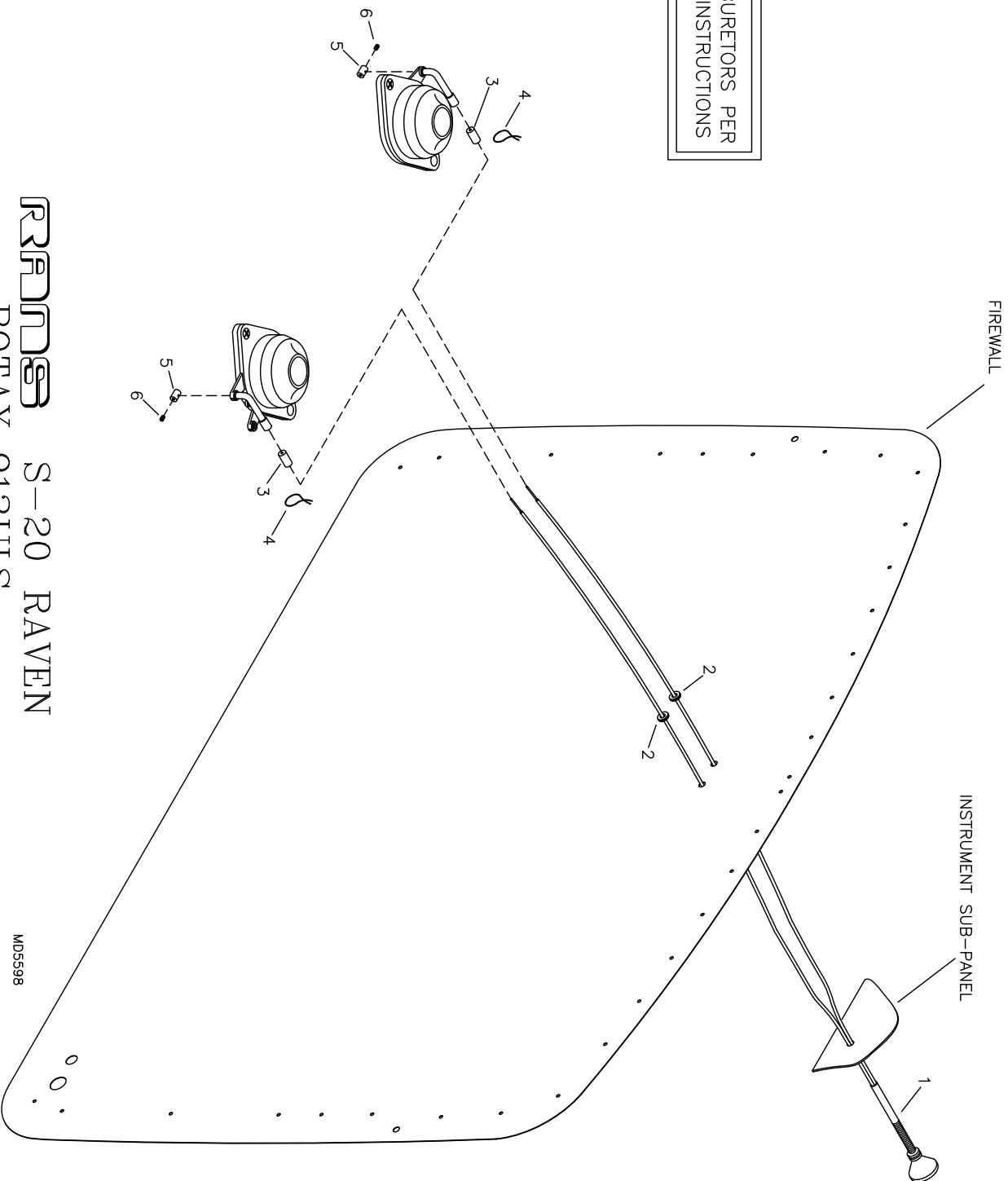
RANS S-20 RAVEN - ROTAX 912ULS - THROTTLE CONTROL ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1 .	Throttle Cable Assembly - Dual	KSCS0025	1
2 .	3/16" Rubber Grommet	KSAC0002	2
3 .	Plastic Tie - 7.5"	N-TIES	8
4 .	Blue Fuel Line - 1/4" *	FS-FL	12 in

* Builder Modifies



CONNECT TO CARBURETORS PER
MANUFACTURER'S INSTRUCTIONS



RRR008 S-20 RAVEN
ROTAX 912ULS
CHOKE CONTROL ASSEMBLY

MDS598

RANS S-20 RAVEN - ROTAX 912ULS - CHOKE CONTROL ASSEMBLY

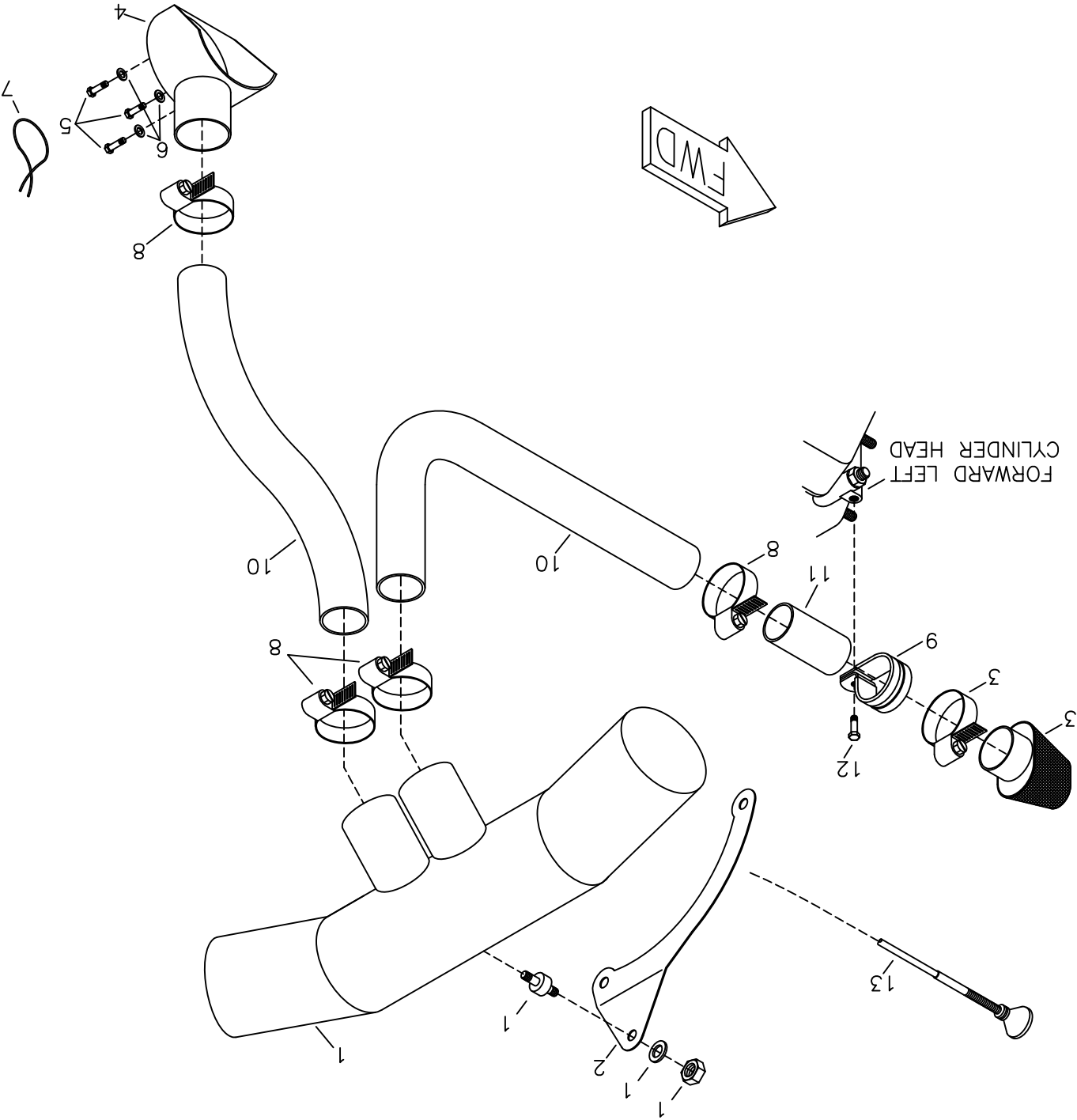
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Choke Cable Assembly - Dual	KSCS0026	1
2.	3/16" Rubber Grommet	KSAC0002	2
3.	Cable Housing Endcap	ENDCAP-12000	2
4.	Safety Wire *	-----	0
5.	Barrel Stop **	-----	0
6.	Set Screw **	-----	0

* Builder Supplied

** Supplied with Choke Cable Assembly

RRMS S-20 RAVEN ROTAX 912ULS OPTIONAL AIRBOX ASSEMBLY

MD5464



RANS S-20 RAVEN - ROTAX 912ULS - OPTIONAL AIRBOX ASSEMBLY**RANS Part Assembly # KAPW0055 (with Airbox), KAPW0056 (without Airbox)**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Rotax Airbox Assembly - OPTIONAL **	KSPW0115	1
2.	Airbox Support Bracket	KPPW0264	1
3.	Air Filter	SN-2540	1
4.	Heat Exchanger	KPPW0263	1
5.	3/16" Bolt - Drilled Head	AN3H-4A	3
6.	1/4" Thick Washer	AN960-416	3
7.	Safety Wire *	-----	0
8.	Hose Clamp - 2 3/4"	5-5236	4
9.	2-1/2" Cushioned Clamp	MS21919-DG40	1
10.	2-1/2" Duct Hose	KSPW0087	5 ft
11.	Intake Splice Tube	KPPW0281	1
12.	6MM Bolt	M6x20 BOLT	1
13.	Control Cable	4-336	1

* Builder Supplied

** May be purchased seperately, call RANS Parts Dept. for pricing

9/1/2013



RESERVED S-20 RAVEN
ROTAX 912ULS
BATTERY BOX ASSEMBLY AND INSTALLATION

RANS S-20 RAVEN - ROTAX 912ULS - BATTERY BOX ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt	AN3-10A	4
2.	3/16" Thin Washer	AN960-10L	4
3.	3/16" Shear Nut	AN364-1032A	4
4.	3/16" Large Washer	AN970-3	4
5.	Battery Bar *	BAT-BAR-503/582	1
6.	Small Cotter Pin	MS24665-134	2
7.	Battery **	PS12150-NB	0
8.	Battery Box Front Plate	BAT-BOX-1	1
9.	Battery Box Mount Plate	BAT-BOX-2	1
10.	Battery Box Support Angle	BAT-BOX-3	2
11.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	6
12.	3/8" x .058" x 1/2" Aluminum Bushing ***	KAAC0044-3	0

* Builder Modifies

** May be purchased seperately, call RANS Parts Dept. for pricing

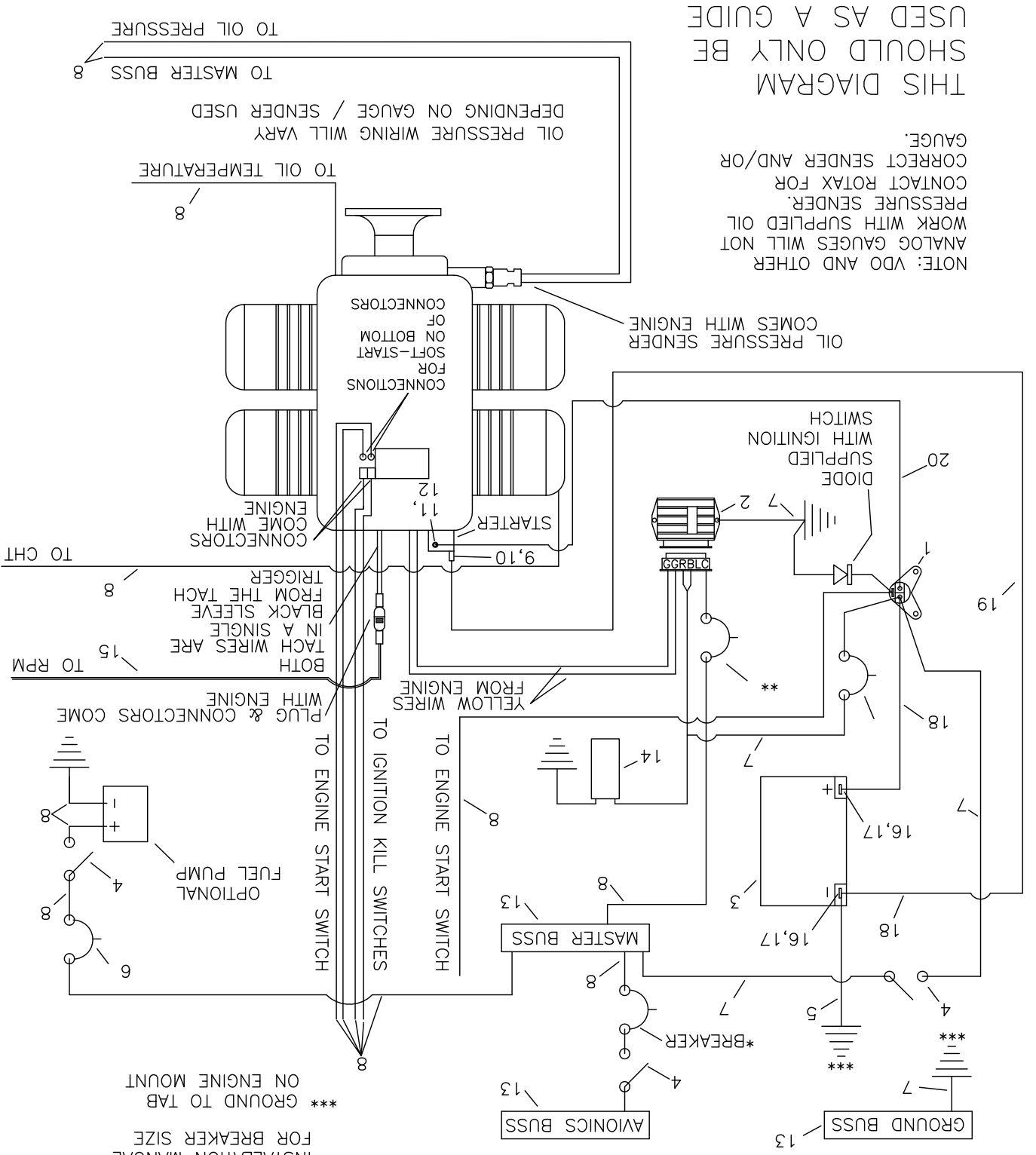
*** Fabricate from Raw Stock

9/1/2013

REV. A

DUE TO THE WIDE SELECTION OF SWITCHES, CIRCUIT BREAKERS AND CONNECTORS WHICH MAY BE USED TO CUSTOMIZE YOUR AIRCRAFT, THESE ITEMS ARE "BUILDER SUPPLIED"

* AMPERAGE TO BE DETERMINED BY BUILDER
** REFER TO ROTAX INSTALLATION MANUAL FOR BREAKER SIZE
*** GROUND TO TAB ON ENGINE MOUNT



ROTAX S-20 RAVEN ROTAX 912ULS ENGINE ELECTRICAL

MD5231
REV. A

RANS S-20 RAVEN - ROTAX 912ULS - ENGINE ELECTRICAL

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Solenoid *	----	0
2.	Regulator/Rectifier *	----	0
3.	Battery **	----	0
4.	Switch ***	----	0
5.	Battery / Ground Cable	KAES0004	1
6.	5 Amp Breaker ***	----	0
7.	12 Gauge Wire ***	----	0
8.	14 Gauge Wire ***	----	0
9.	1/4" Bolt	AN4-10A	1
10.	1/4" Shear Nut - Steel	AN364-428C	1
11.	1/4" Loc Washer	AN935-416L	2
12.	6mm Hex Nut	6MM HEX NUT	1
13.	Electrical Buss Bar *** ****	AMW 636	0
14.	Capacitor - 22,000 microFarad / 25v ***	----	0
15.	2 Plex 20 Gauge Wire ***	----	0
16.	3/16" Shear Nut - Steel	AN364-1032C	2
17.	3/16" Bolt	AN3-3A	2
18.	Battery / Solenoid Cable	KAES0019	1
19.	Starter / Ground Cable	KAES0008	1
20.	Solenoid / Starter Cable	KAES0007	1

* Supplied with Engine

** Referenced from Battery Box Assembly and Installation

*** Builder Supplied

**** May be purchased separately, call RANS Parts Dept. for pricing

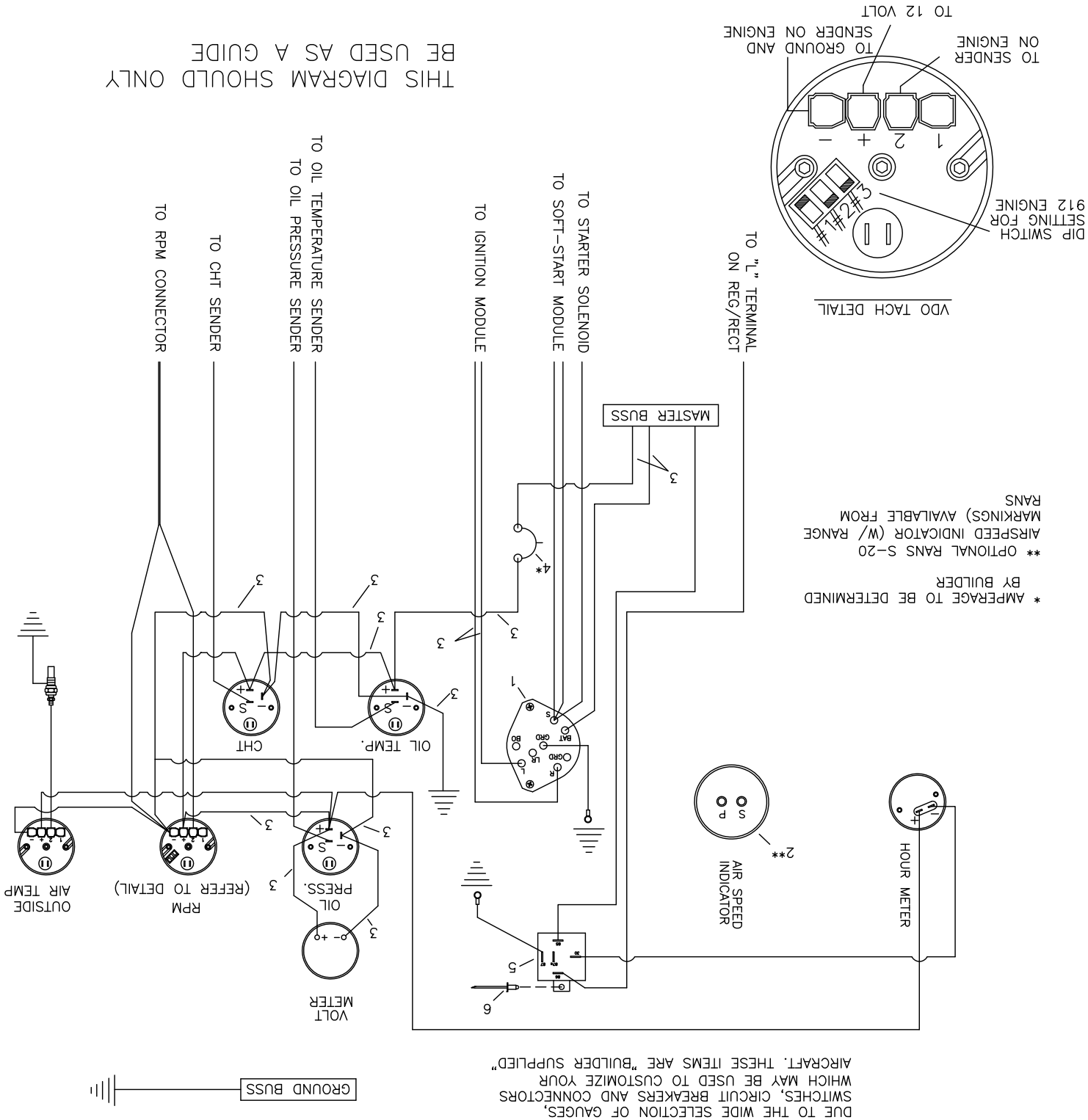
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REV. A

RPM S-20 RAVEN ROTAX 912ULS ANALOG INSTRUMENTS/ELECTRICAL - SAMPLE SCHEMATIC

09/01/2013

MD5231
REV. A



RANS S-20 RAVEN - ROTAX 912ULS - ANALOG INSTRUMENTS & ELECTRICAL**SAMPLE SCHEMATIC**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Switch - Ignition	KSES0027	1
2.	Optional RANS S-20 Airspeed Indicator - 3-1/8" * **	KSAV0017	0
3.	14 Gauge Wire *	-----	0
4.	Breaker *	-----	0
5.	Optional Hour Meter Relay Assembly ** ***	KAES0016	0
6.	3/16" Aluminum Rivet - Cherry Q ** ***	AAPQ-62	0

* Builder supplied

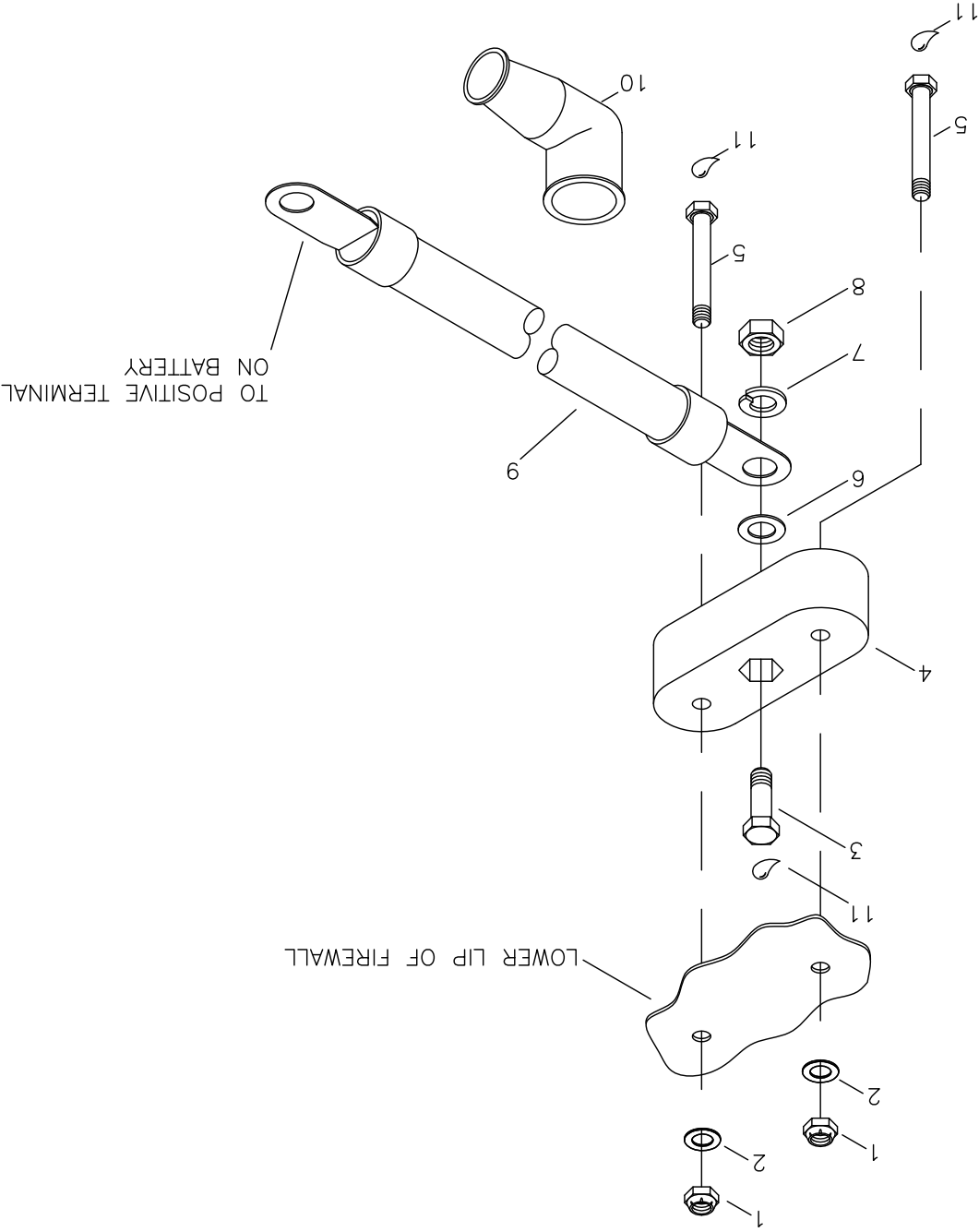
** May be purchased seperately, call RANS Parts Dept. for pricing

*** Required if installing Analog Instruments - Not required with most Digital Systems

9/1/2013

OPTIONAL REMOTE CHARGING POST ROTAX 912ULS RMS S-20 RAVEN INSTALLATION

MD5501



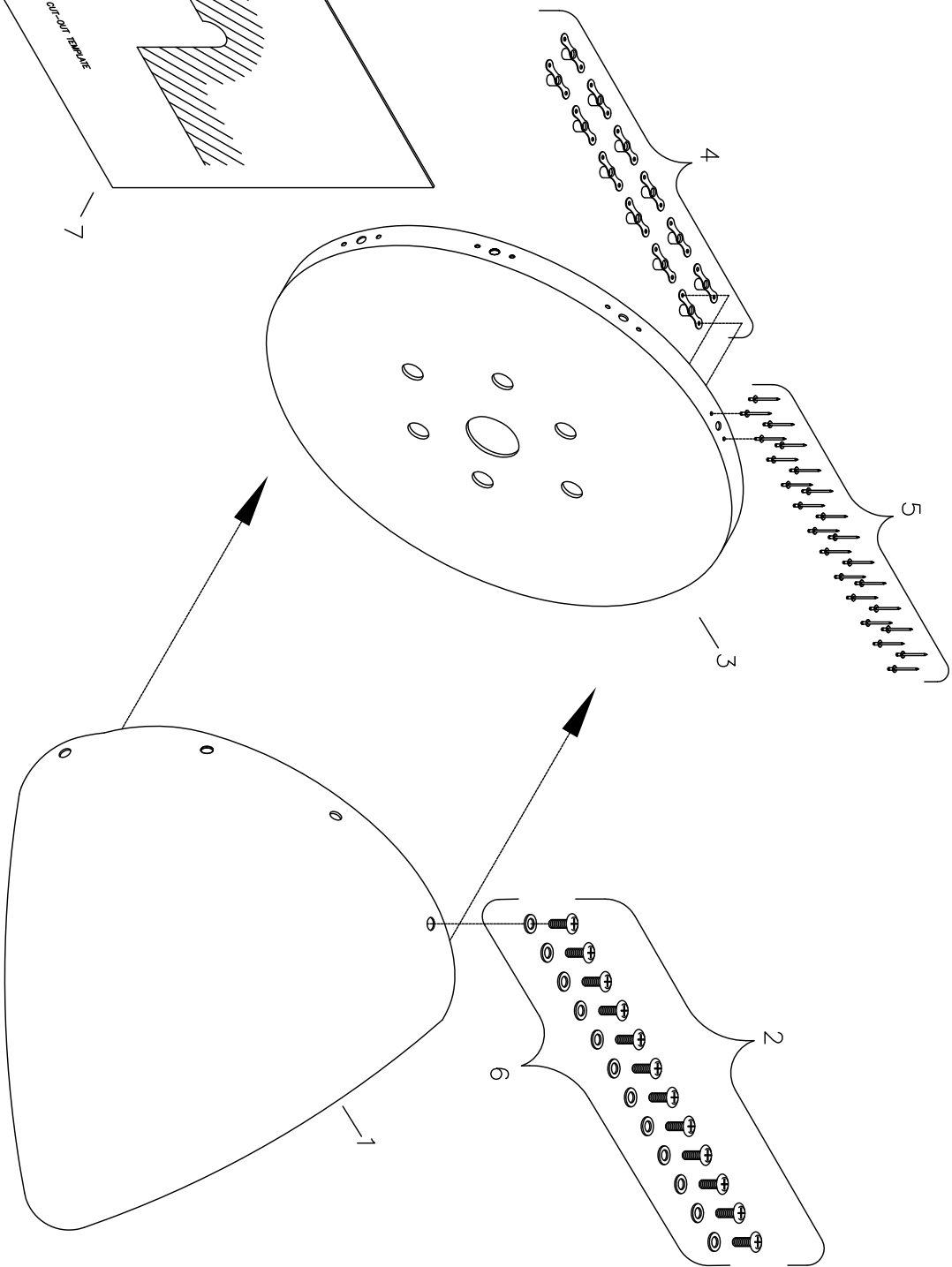
RANS S-20 RAVEN - ROTAX 912ULS - OPTIONAL REMOTE CHARGING POST**KPES0029**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Shear Nut - Steel	AN364-1032C	2
2.	3/16" Thin Washer	AN960-10L	2
3.	1/4" Plain Bolt	1/4 X 1 BOLT	1
4.	Isolator Block	KPES0026	1
5.	3/16" Bolt	AN3-7A	2
6.	1/4" Thick Washer	AN960-416	1
7.	1/4" Loc Washer	AN935-416L	1
8.	1/4" Plain Nut	AN345-416	1
9.	Remote Battery Charger Cable	KAES0017	1
10.	Terminal Boot	MS25171-3S	1
11.	Silicone Seal *	-----	0

* Builder supplied

9/1/2013

NOTE: 1" PROP EXTENSION REQUIRED.
REFER TO PROPELLER INSTALLATION



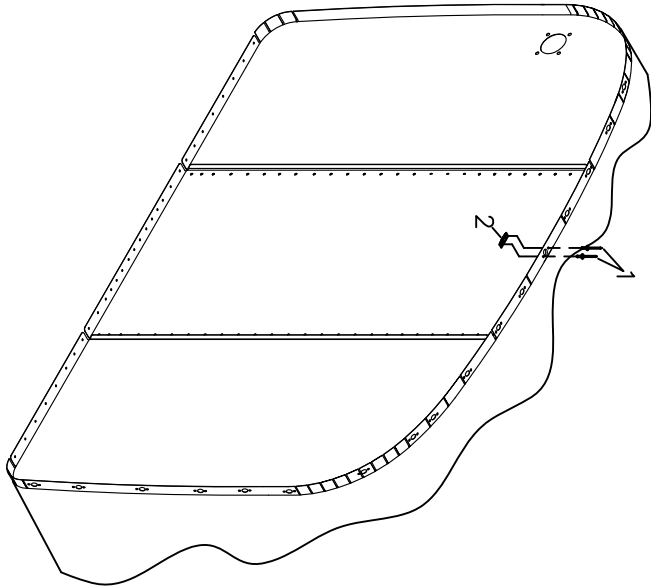
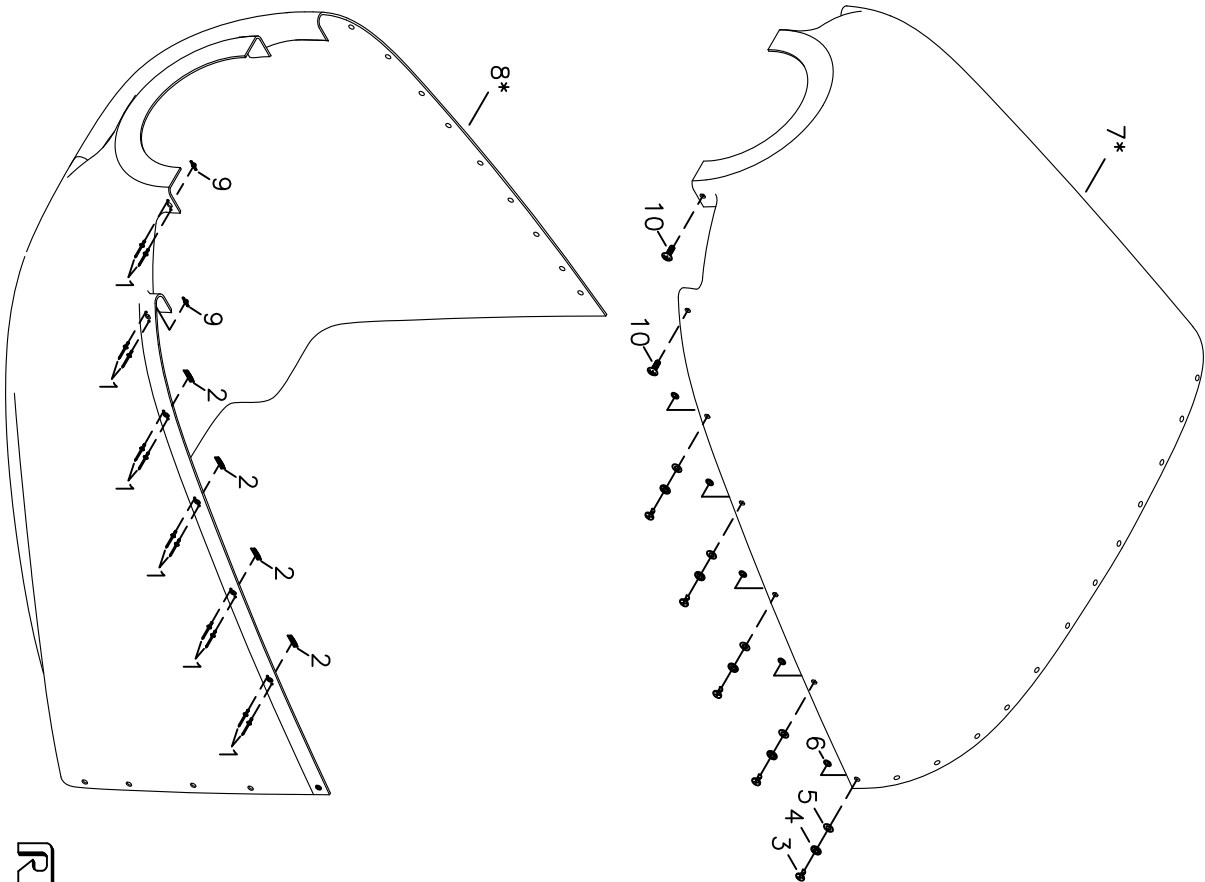
REDUCED S-20 RAVEN
ROTAX 912ULS
11.3" SPINNER ASSEMBLY

MD5146
REV. A

RANS S-20 RAVEN - ROTAX 912ULS - 11.3" SPINNER ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Spinner Dome - 11.3"	KSPW0095	1
2.	Pan Head Phillips Bolt (5/8" long)	KSHW0071	12
3.	Spinner Backing Plate - 11.3" - 912ULS	KPPW0296	1
4.	3/16" Nut Plate	K-1000-3	12
5.	3/32" Aluminum Rivet	40APR1/4	24
6.	3/16" Thin Washer	AN960-10L	12
7.	Spinner Cut-out Template *	-----	0

* Refer to Figures Manual for Spinner Cut-out Template



* IMPORTANT:
INSTALLATION OF COWLING
REQUIRES BOOT COWL,
ENGINE, PROP EXTENSION AND
SPINNER BACKING PLATE
TO BE INSTALLED.

ROTAX S-20 RAVEN
ROTAX 912ULS
COWLING ASSEMBLY AND INSTALLATION

MD5141
REV. A

RANS S-20 RAVEN - ROTAX 912ULS - COWLING ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/32" Aluminum Rivet	40APR1/4	82
2.	1/4 Turn Receptacle	#302	37
3.	1/4 Turn Stud **	#200	4
3.	1/4 Turn Stud **	#240	4
3.	1/4 Turn Stud **	#180	37
4.	Rubber Washer	#201	37
5.	Wear Washer Nylon	#103	37
6.	Snap Ring	#101	37
7.	S-20 Cowling - Upper - Fiberglass - 912	KPCW0040-F	1
7.	S-20 Cowling - Upper - Optional - Carbon Fiber - 912 *	KPCW0040-C	1
8.	S-20 Cowling - Lower - Fiberglass - 912	KPCW0041-F	1
8.	S-20 Cowling - Lower - Optional - Carbon Fiber - 912 *	KPCW0041-C	1
9.	8-32 Nut Plate	MS21047-08	4
10.	#8 Truss Head Screw	AN515-8R7	4

* Optional

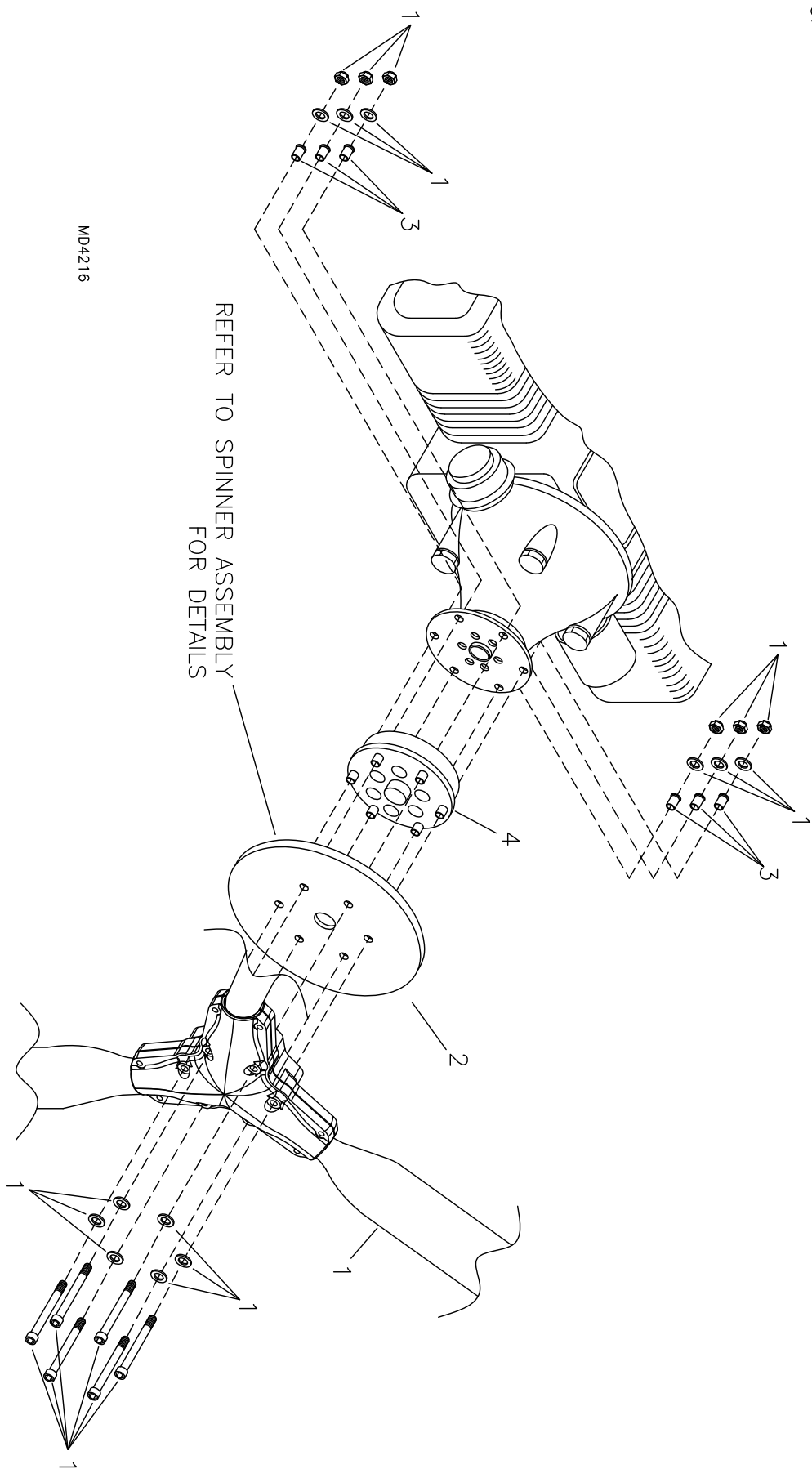
** Use as needed for secure attachment

9/1/2013

REV. A

RANS S-20 RAVEN - ROTAX 912ULS - OIL CHECK DOOR INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" Aluminum Rivet - Avex	1691-0410	18
2.	3/32" Aluminum Rivet	40APR1/4	4
3.	Reinforcement Ring - Maintenance Hatch	KPCW0015	1
4.	1/4 Turn Receptacle	#302	2
5.	Oil Door Hinge	KSHW0053	2
6.	1/4 Turn Stud	#180	2
7.	Rubber Washer	#201	2
8.	Wear Washer Nylon	#103	2
9.	Snap Ring	#101	2
10.	Maintenance Hatch	KPCW0036	1



S-20 RAVEN
ROTAX 912ULS
OPTIONAL WHIRL WIND PROPELLER INSTALLATION

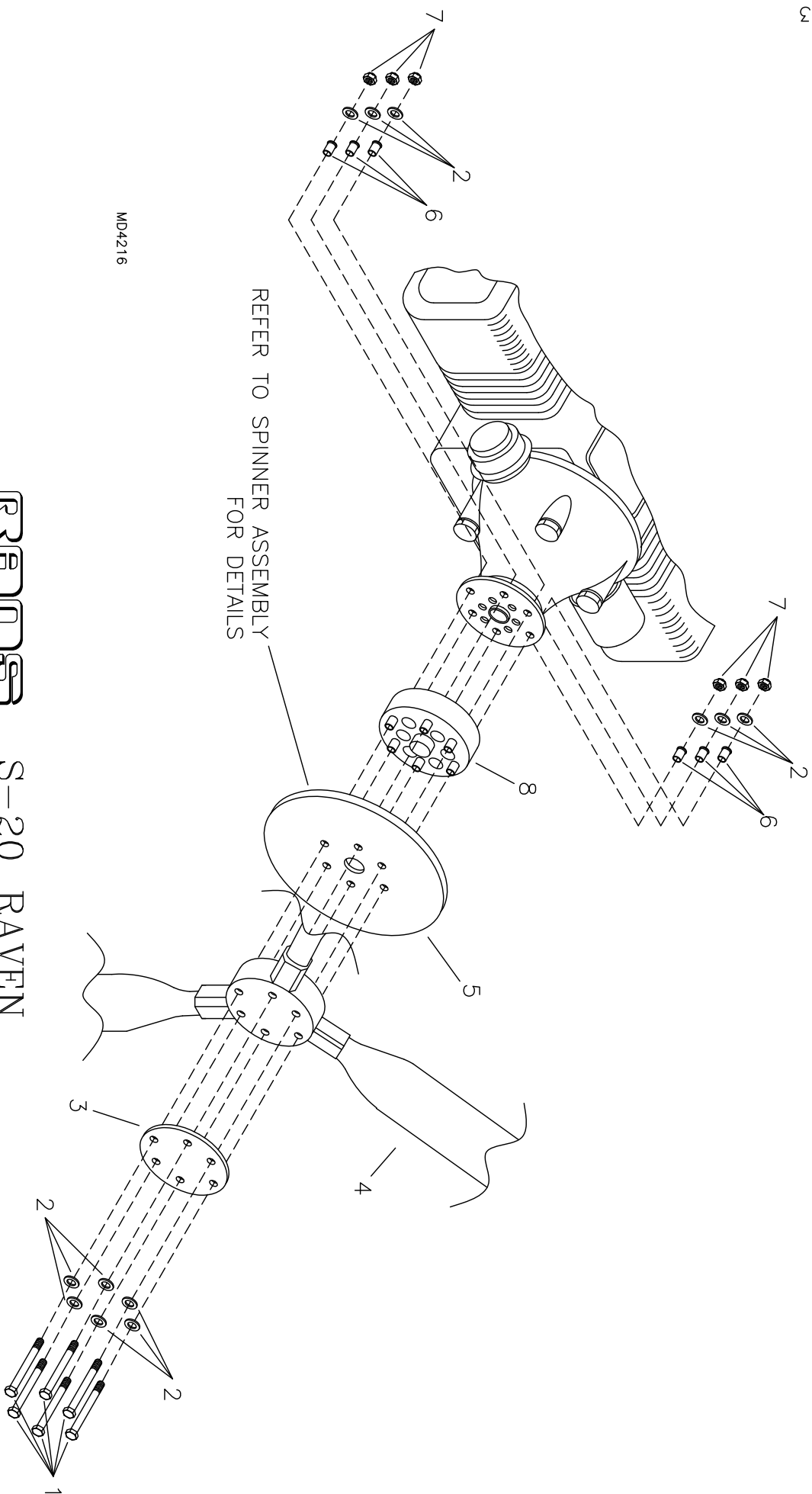
RANS S-20 RAVEN - ROTAX 912ULS - WHIRL WIND PROP INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3-Blade - Whirl Wind Propeller - 70" - 912ULS *	KSPR0001	1
2.	Spinner Backing Plate, 12" **	-----	0
3.	Flange Bushing - 912	KPPW0038	6
4.	1" Prop Extension Assembly	KAPW0034	1

* Mounting Hardware included with Prop

** Referenced from 12" Spinner Assembly

RED RAVEN ROTAX 912ULS OPTIONAL WARP DRIVE PROPELLER INSTALLATION



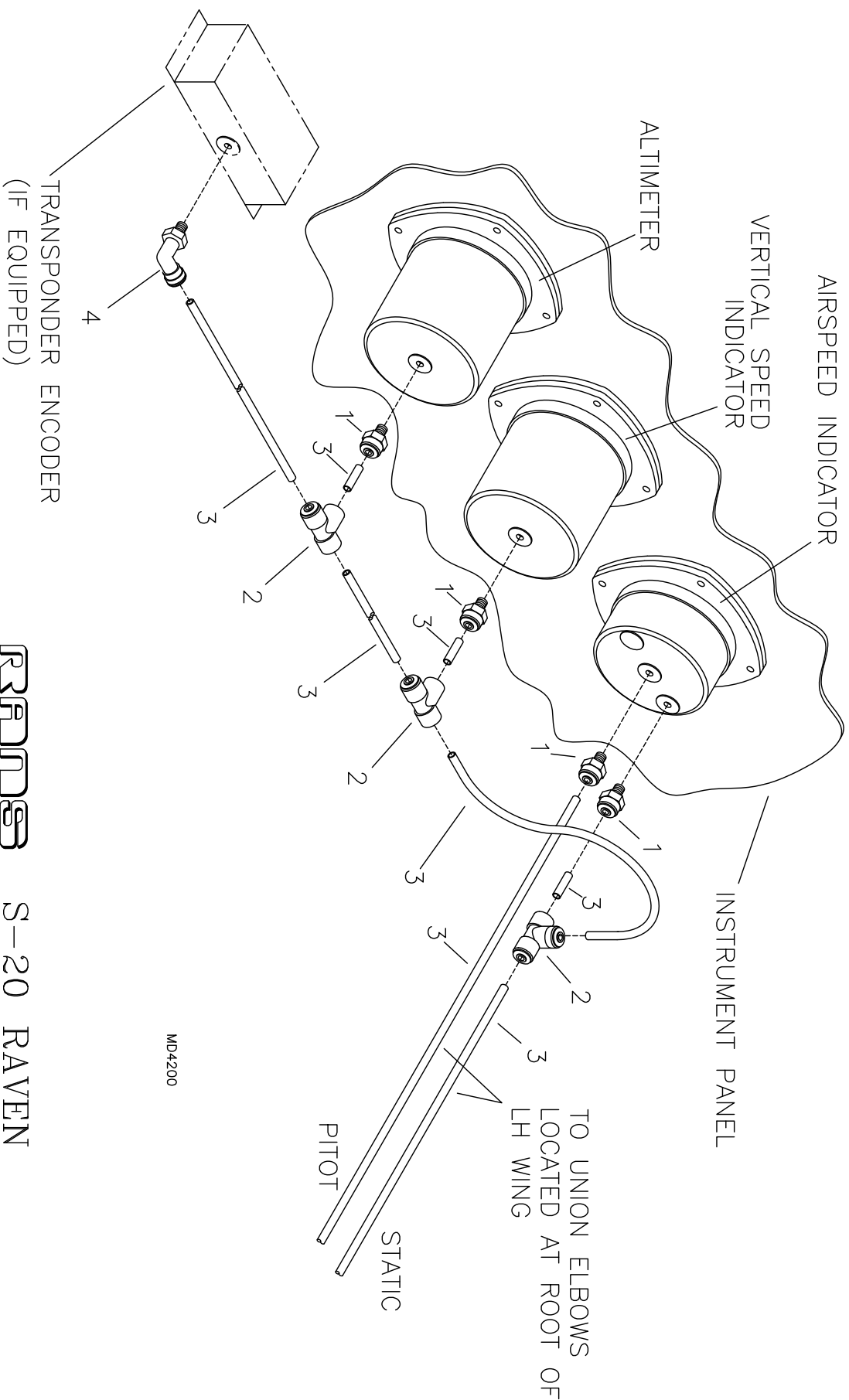
RANS S-20 RAVEN - ROTAX 912ULS - WARP DRIVE PROP INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	8MM X 120MM Bolt	M8x1.25x120	6
2.	5/16" Thick Washer	AN960-516	12
3.	Crush Plate	KPPW0183	1
4.	3-Blade - Warp Drive Propeller - 70" - 912ULS *	KSPR0002	1
5.	Spinner Backing Plate, 12" **	-----	0
6.	Flange Bushing - 912	KPPW0038	6
7.	8MM Nut	M8x1.25 Nut	6
8.	1" Prop Extension Assembly	KAPW0012	1

* May be ordered with Nickel Leading Edge and/or Tapered Tips

** Referenced from 12" Spinner Assembly

TYPICAL ANALOG INSTRUMENT INSTALLATION SHOWN



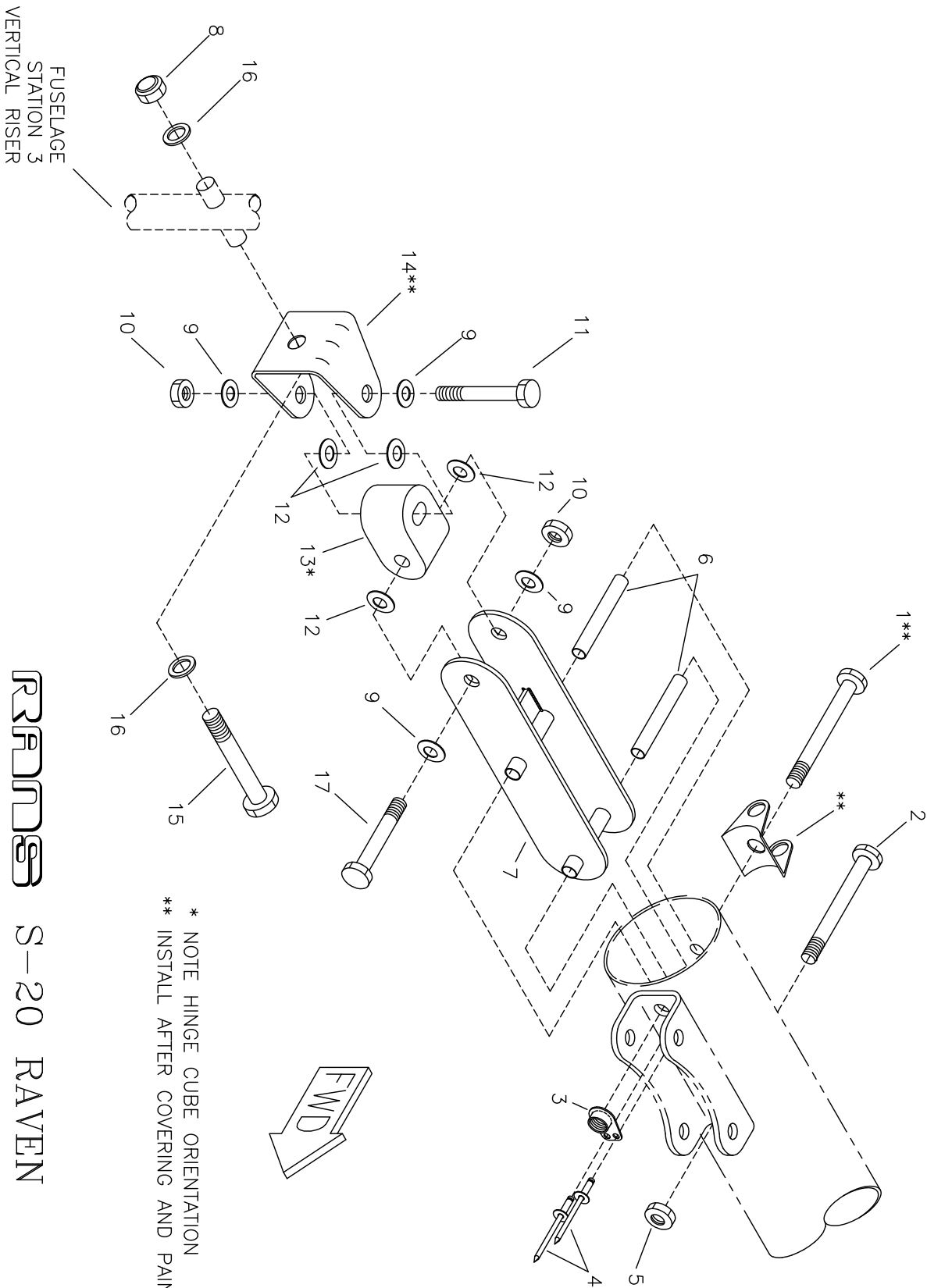
MD4200

RAVEN S-20 RAVEN
PITOT/STATIC TO INSTRUMENTS
INSTALLATION

RANS S-20 RAVEN - PITOT/STATIC TO INSTRUMENTS INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1 .	Male Connector *	KSPT0002	0
2 .	Union Tee *	KSPT0003	0
3 .	Pitot/Static Tubing *	KSPT0004	0
4 .	90 Degree Elbow *	KSPT0006	0

* May be purchased seperately, call RANS Parts Dept. for pricing



* NOTE HINGE CUBE ORIENTATION
** INSTALL AFTER COVERING AND PAINTING

MD4201

RAVEN S-20 RAVEN
WING - UNIVERSAL HINGE

RANS S-20 RAVEN - WING - UNIVERSAL HINGE

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt * **	AN3-24A	0
2.	3/16" Bolt *	AN3-23A	0
3.	3/16" Side By Side Nut Plate *	MS21086-L3	0
4.	3/32" Aluminum Rivet *	40APR3/8	0
5.	3/16" Shear Nut *	AN364-1032A	0
6.	Aluminum Bushing - 1/4" x .028 x 1 7/8" ***	KPWI0613	1
7.	Trailing Edge Spar Root Fitting Assembly	W-TES-RF	2
8.	5/16" Tensile Nut	AN365-524A	2
9.	1/4" Thick Washer	AN960-416	8
10.	1/4" Shear Nut	AN364-428A	4
11.	1/4" Bolt	AN4-16A	2
12.	1/4" Thin Washer	AN960-416L	8
13.	Hinge Cube	KPWI0520	2
14.	1" Stainless Steel U-Bracket **	SU-118	2
15.	5/16" Bolt	AN5-16A	2
16.	5/16" Thick Washer	AN960-516	4
17.	1/4" Bolt	AN4-15A	2

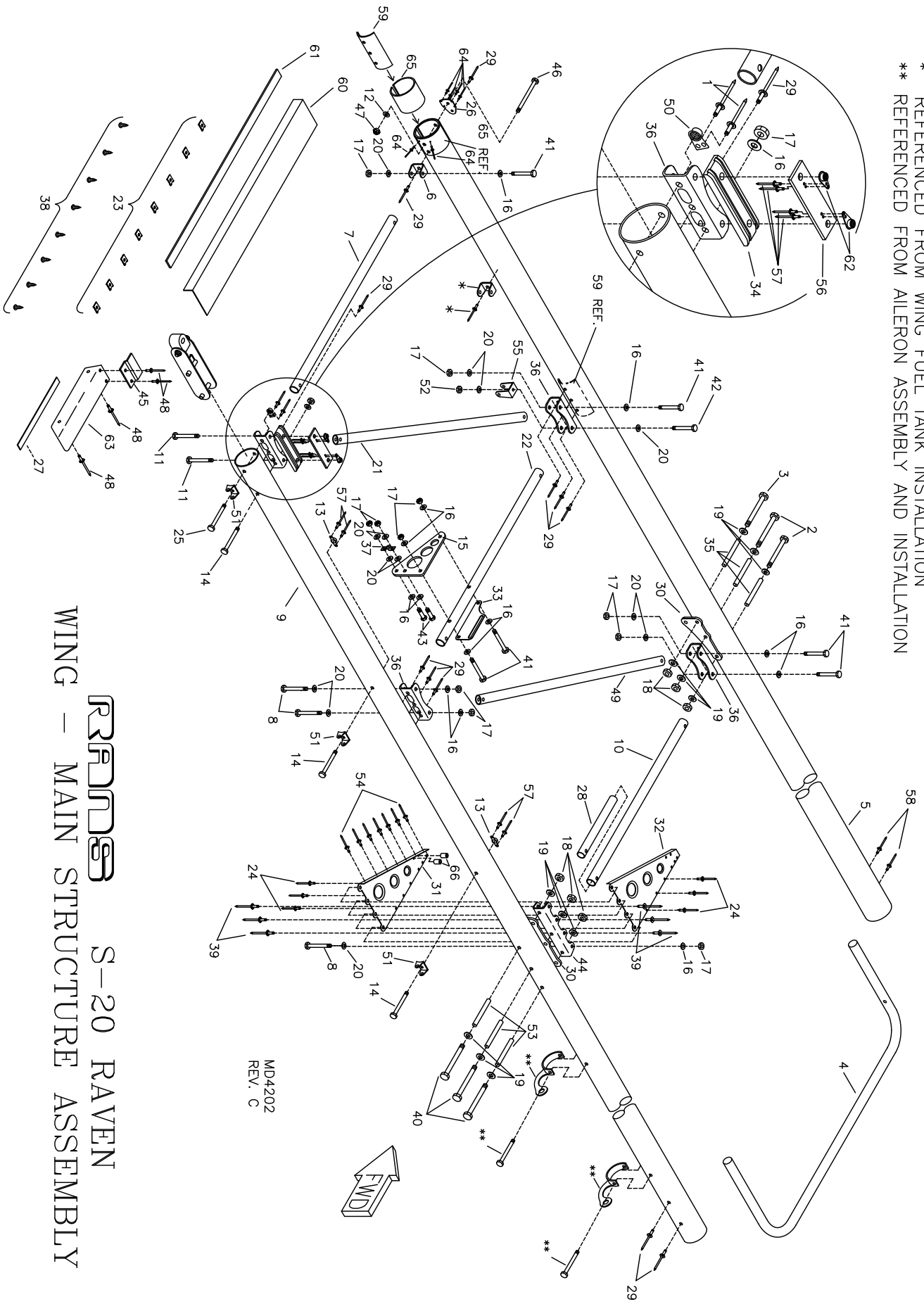
* Referenced from Wing - Main Structure.

** Installed post covering and painting.

*** Builder fabricates from KPWI0613

9/1/2013

* REFERENCED FROM WING FUEL TANK INSTALLATION
** REFERENCED FROM ALERON ASSEMBLY AND INSTALLATION



RANS S-20 RAVEN - WING - MAIN STRUCTURE ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/32" Aluminum Rivet	40APR3/8	4
2.	1/4" Bolt	AN4-36A	4
3.	1/4" Bolt	AN4-35A	2
4.	Tip Bow	KPWI0377	2
5.	Leading Edge Spar - RH	KPWI0579-R	1
5.	Leading Edge Spar - LH	KPWI0579-L	1
6.	U-Bracket	S2-SAB	2
7.	Inner Compression Tube	WC-IO	2
8.	3/16" Bolt	AN3-14A	4
9.	Trailing Edge Spar - RH	KPWI0580-R	1
9.	Trailing Edge Spar - LH	KPWI0580-L	1
10.	Compression Tube	KPWI0588	2
11.	3/16" Bolt	AN3-20A	4
12.	3/8" Thick Washer	AN960-616	2
13.	3/16" Nut Plate	K-1000-3	4
14.	3/16" Bolt	AN3-23A	6
15.	Teleflex Retainer	TG-EH	2
16.	3/16" Thin Washer	AN960-10L	28
17.	3/16" Shear Nut	AN364-1032A	24
18.	1/4" Shear Nut	AN364-428A	12
19.	1/4" Thin Washer	AN960-416L	24
20.	3/16" Thick Washer	AN960-10	26
21.	Drag Brace	KPWI0374	2
22.	Compression Tube	KPWI0376	2
23.	Tinnerman	A1789-8Z-1	16
24.	1/8" Aluminum Rivet - Cherry Q	AAPQ-44	12
25.	3/16" Bolt	AN3-24A	2
26.	Leading Edge Patch	KPWI0356	2
27.	Foam Strip, 1/4" x 1/2"	FS-1/4"x1/2"	2 ft
28.	Compression Tube Doubler	KPWI0353	2
29.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-64	22
30.	Strut Attach Plate	W-SAP	4
31.	Bell Crank Brace - Control System	KPCS0211	2
32.	Bell Crank Brace - Control System	KPCS0212	2
33.	Cable Guide	CS-OCG	2
34.	Aileron Cable Rub Block - LH	KPCS0091-L	1
34.	Aileron Cable Rub Block - RH	KPCS0091-R	1
35.	Spacer Bushing - 3"	SB-3/8X3	6
36.	Long Wing Channel	W-WCL	8
37.	Teleflex Retainer Bracket	KSCS0001	2
38.	#8 Pan Head Screw	8X1/2 PHS	16
39.	3/16" Aluminum Rivet - Cherry Q	AAPQ-62	12
40.	1/4" Bolt	AN4-26A	6
41.	3/16" Bolt	AN3-15A	12

9/1/2013

REV. C

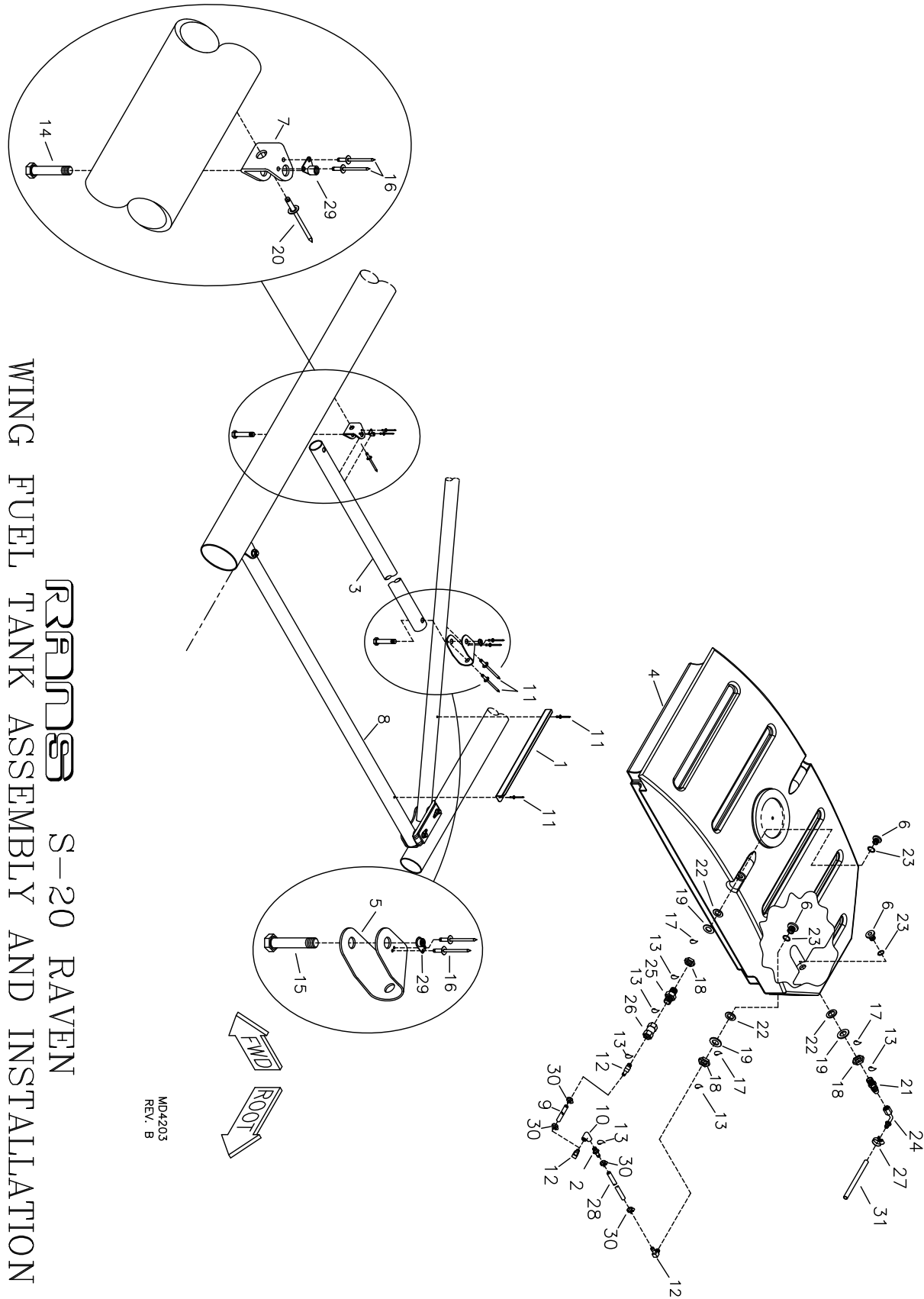
RANS S-20 RAVEN - WING - MAIN STRUCTURE ASSEMBLY - CONTINUED

#	DESCRIPTION	PART NUMBER	QUANTITY
42.	3/16" Bolt	AN3-16A	2
43.	3/16" Bolt	AN3-5A	4
44.	U-Bracket	KPCS0213	2
45.	Flap Fillet Attach Strip *	KPFL0141	1
46.	3/8" Bolt	AN6-35A	2
47.	3/8" Tensile Nut	AN365-624A	2
48.	1/8" Aluminum Rivet - Avex	1691-0410	8
49.	Drag Brace	KPWI0375	2
50.	3/16" Side by Side Nut Plate	MS21086-L3	2
51.	Wing Hinge Bracket	W-HB	6
52.	3/16" Tensile Nut	AN365-1032A	2
53.	Spacer Bushing - 2"	SB-3/8X2	6
54.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	14
55.	Jury Strut Bracket	JS-BK	2
56.	Top Plate - Rub Block	KPCS0092	2
57.	3/32" Aluminum Rivet	40APR1/4	16
58.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-62	4
59.	Leading Edge Spar Doubler	KPWI0264	2
60.	Wing Root Bottom Gap Seal - LH	KPWI0694-L	1
60.	Wing Root Bottom Gap Seal - RH	KPWI0694-R	1
61.	1/2" Black Foam Tape	KSAC0021	9 ft
62.	3/16" Single-Ear Nut Plate	MS21051-L3	4
63.	Fillet - Flap - LH	KPFL0160-L	1
63.	Fillet - Flap - RH	KPFL0160-R	1
64.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-44	12
65.	Leading Edge Spar Root Doubler	KPWI0355	2
66.	Bushing - Bellcrank Brace - 3/8" x .095" x 1" *	KPWI0620	1

* Builder Modifies

9/1/2013

REV. C



REPAIR S-20 RAVEN
WING FUEL TANK ASSEMBLY AND INSTALLATION

MD4203
REV. B

RANS S-20 RAVEN - WING - FUEL TANK ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Fuel Tank Retainer Angle - LH	KPFS0105-L	1
1.	Fuel Tank Retainer Angle - RH	KPFS0105-R	1
2.	Straight Withdrawal Fitting	8330	2
3.	Outer Tank Support	KPFS0040	2
4.	Fuel Tank	KPFS0092	2
5.	U Bracket	KPAC0055	2
6.	Tank Withdrawal Fitting	KPFS0017	6
7.	U-Bracket	S2-SAB	2
8.	Inner Compression Tube *	WC-IO	0
9.	Clear Fuel Line - 1/4"	KSFS0008	18 in
10.	Elbow - Internal Thread	AN916-1D	2
11.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	8
12.	90 Degree Withdrawal Fitting	8342	6
13.	Thread Sealant **	-----	0
14.	3/16" Bolt	AN3-14A	2
15.	3/16" Bolt	AN3-13A	2
16.	3/32" Aluminum Rivet	40APR1/8	8
17.	Loctite Blue **	-----	0
18.	Nut - Flared Tube Bulkhead	AN924-5D	6
19.	1/2" Thick Washer	AN960-816	6
20.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-64	2
21.	Straight Fitting	AN816-6-2D	2
22.	Rubber Washer	KSFS0010	6
23.	O-Ring	KSFS0009	6
24.	45 Degree Fitting	33782-6-6	2
25.	1/8" NPT Nipple	KSAC0032	2
26.	Coupler	AN910-1D	2
27.	Hose Clamp - 7/8"	5-6203	2
28.	Black Fuel Line - 1/4"	KSFS0002	3 ft
29.	3/16" Side by Side Nut Plate	MS21086-L3	4
30.	Hose Clamp - 5/8"	5-6202	8
31.	Black Fuel Line - 3/8"	27004	13 ft

* Referenced from Wing - Main Structure.

** Builder Supplied

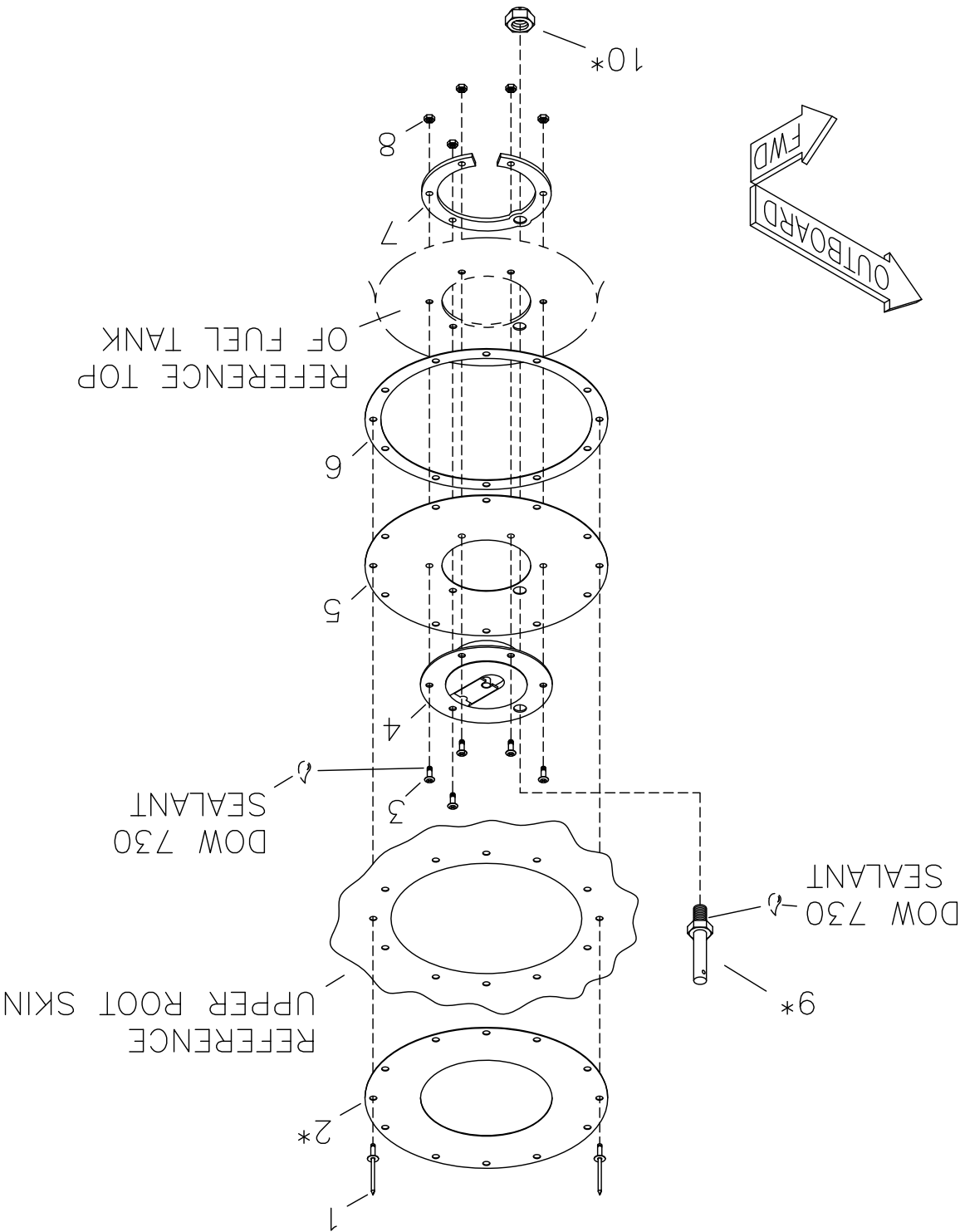
9/1/2013

REV. B

RPM S-20 RAVEN FUEL CAP ASSEMBLY

MD5543
REV. A

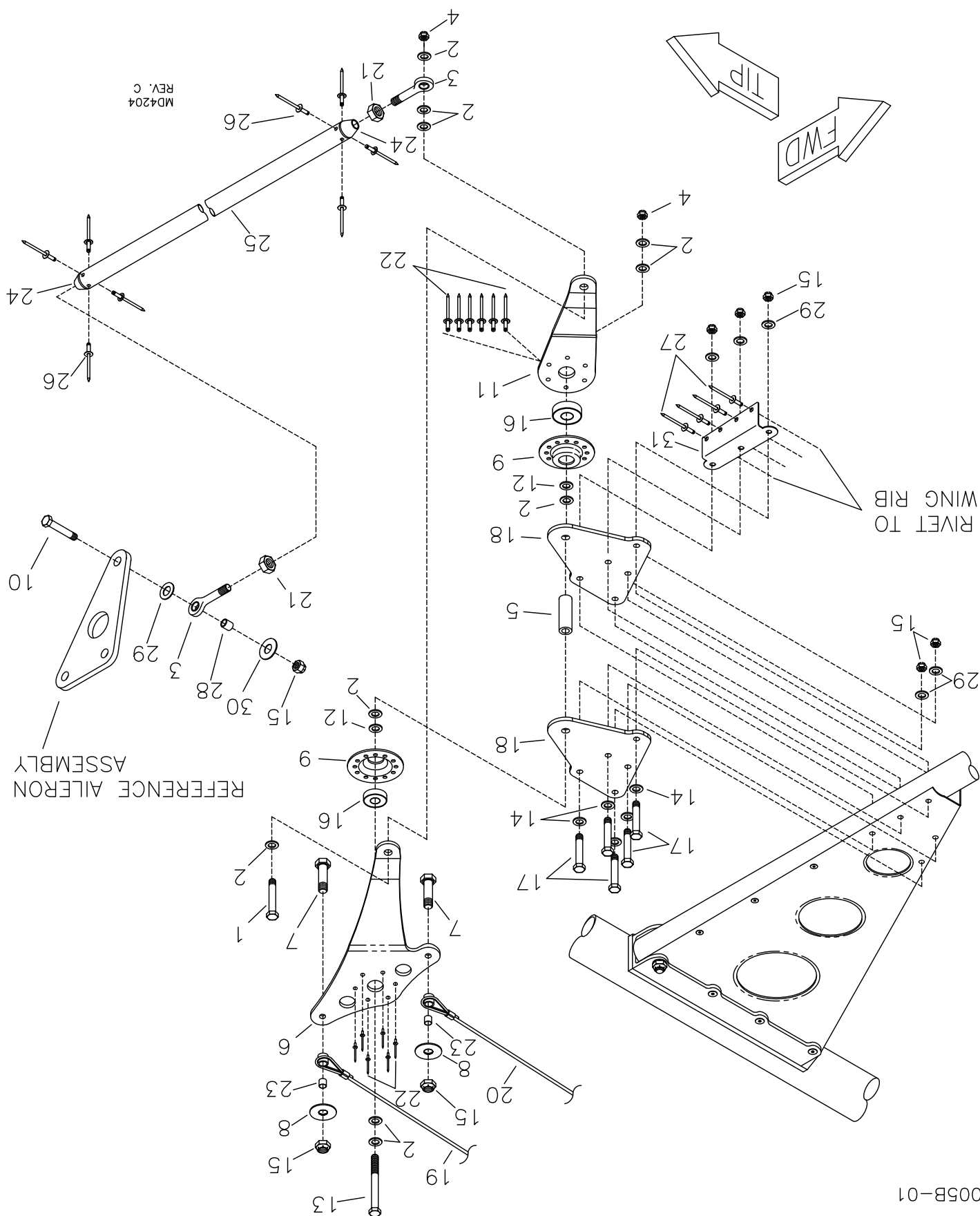
* INSTALL AFTER COVERING



RANS S-20 RAVEN - WING - FUEL CAP ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" Aluminum Rivet - Avex	1691-0410	24
2.	Cover Ring	KPWI0616	2
3.	3/16" Countersunk Machine Screw	MS24694-S53	10
4.	Fuel Cap Assembly - Flush	KSFS0035	2
5.	Fuel Scupper	KPWI0615	2
6.	Capture Ring	KPWI0547	2
7.	Retainer	KPWI0614	2
8.	3/16" Shear Nut - Steel	AN364-1032C	10
9.	Fuel Vent	KPFS0101	2
10.	3/8" Shear Nut	AN364-624A	2

RRMS S-20 RAVEN AILERON BELL CRANK AND CABLE INSTALLATION - WING



RANS S-20 RAVEN - WING - AILERON BELLCRANK AND CABLE INSTALLATION

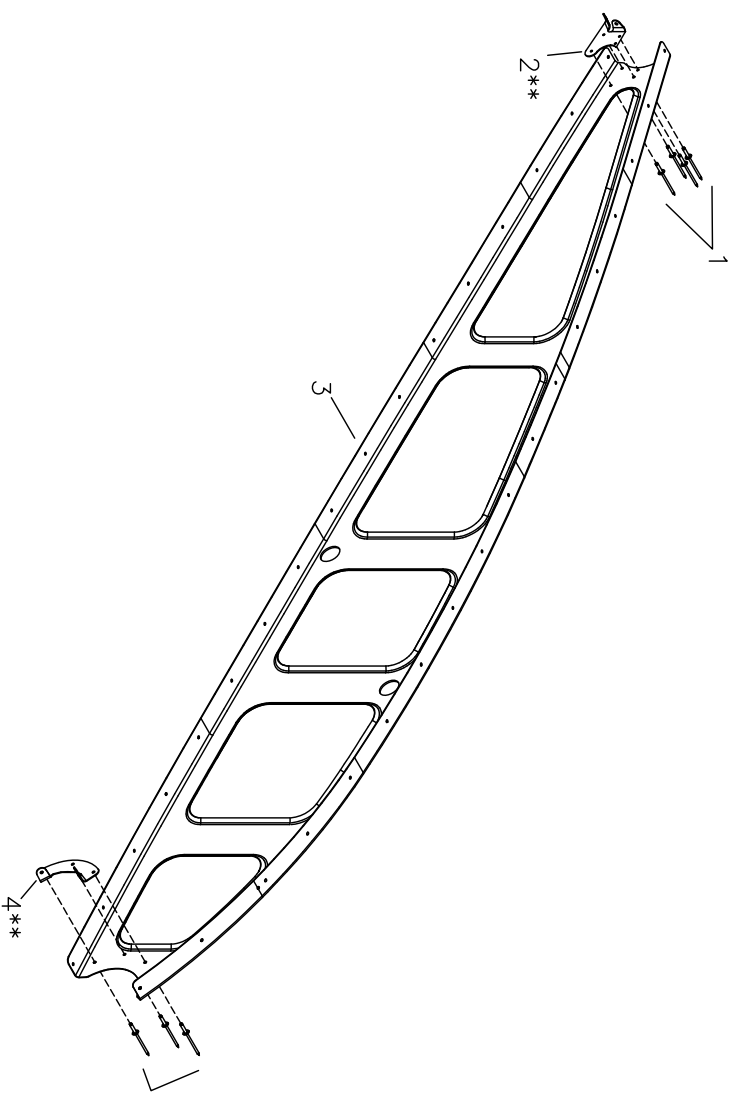
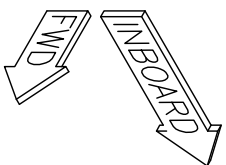
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/4" Bolt	AN4-12A	2
2.	1/4" Thick Washer	AN960-416	20
3.	Male Rod End	NM-4	4
4.	1/4" Shear Nut	AN364-428A	4
5.	Bushing - 3/8" x .058" x 1.06" *	SB-3/8X3	1
6.	Bell Crank Upper Arm - RH	KPCS0290-R	1
6.	Bell Crank Upper Arm - LH	KPCS0290-L	1
7.	3/16" Bolt	AN3-6A	4
8.	3/16" Large Washer	AN970-3	4
9.	Bearing Flange	BR-FLNG	4
10.	3/16" Bolt	AN3-7A	2
11.	Bell Crank Lower Arm	KPCS0291	2
12.	1/4" Thin Washer	AN960-416L	4
13.	1/4" Bolt	AN4-24A	2
14.	3/16" Thin Washer	AN960-10L	10
15.	3/16" Shear Nut	AN364-1032A	18
16.	Bearing	SR4APP	4
17.	3/16" Bolt	AN3-16A	10
18.	Bell Crank Mount	KPCS0292	4
19.	Aileron Cable	KPCS0264	2
20.	Aileron Link Cable	KPCS0265	2
21.	1/4" Plain Nut	AN345-416	4
22.	1/8" Aluminum Rivet - Cherry Q	AAPQ-44	24
23.	Bushing-Aileron	KPAC0182	4
24.	3/4" Push-Pull Tube End Fitting	CS-3/4PTEF	4
25.	Push-Pull Tube - Aileron	KPCS0218	2
26.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	16
27.	1/8" Aluminum Rivet - Avex	1691-0410	8
28.	Aluminum Bushing - 1/4" x .028 x 3/8" **	KPWI0613	0
29.	3/16" Thick Washer	AN960-10	12
30.	#10 Washer - Stainless Steel	BSHW0022	2
31.	Rib Reinforcement - Bellcrank - LH	KPWI0552-L	1
31.	Rib Reinforcement - Bellcrank - RH	KPWI0552-R	1

* Builder fabricates from SB-3/8X3

** Builder fabricates from KPWI0613

9/1/2013

REV. C



* RIB FOR RH WING SHOWN
RIB FOR LH WING IS A MIRROR IMAGE

** BUILDER MODIFIES

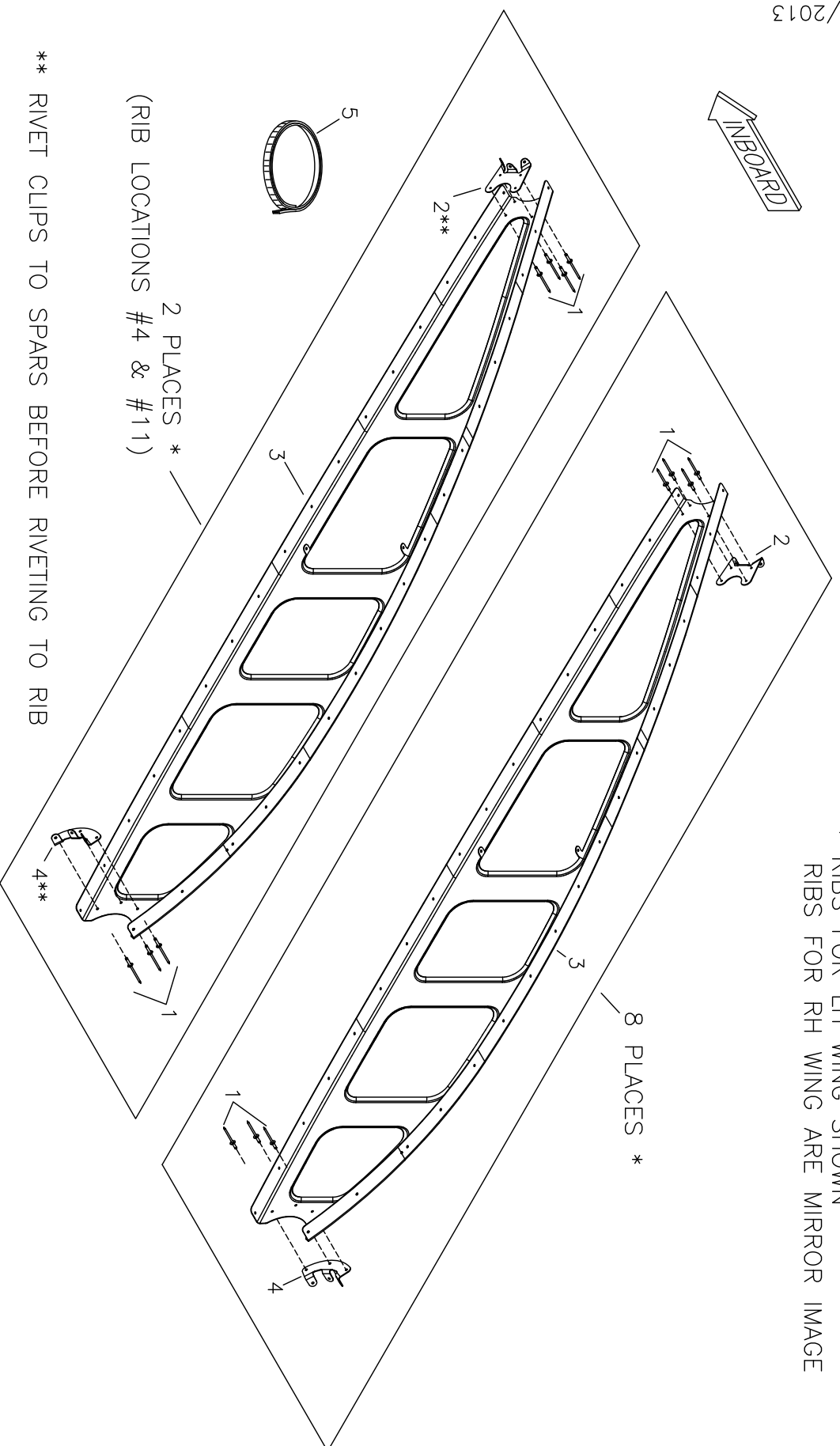
RAVEN S-20 RAVEN **WING – ROOT RIB ASSEMBLY**

MD5541

#	DESCRIPTION	PART NUMBER	QUANTITY
1 .	1/8" Aluminum Rivet - Cherry Q	AAPQ-41	14
2 .	Rib Attach Clip - AFT *	KPWI0460	2
3 .	Root Rib - LH	KPWI0571-L	1
3 .	Root Rib - RH	KPWI0571-R	1
4 .	Rib Attach Clip - FWD *	KPWI0459	2

*Builder modifies

9/1/2013

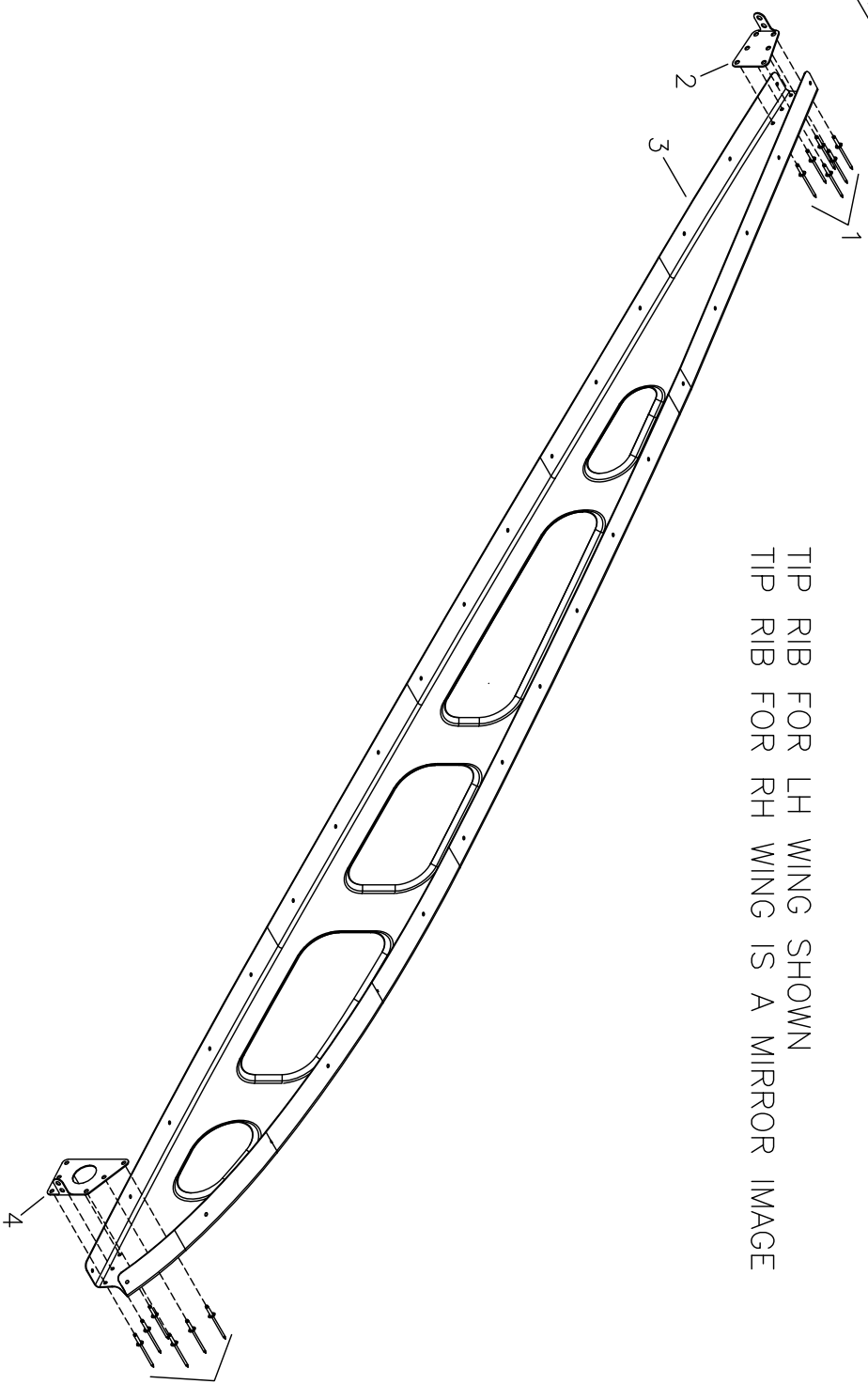


RANGES S-20 RAVEN WING RIB ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" Aluminum Rivet - Cherry Q	AAPQ-41	140
2.	Rib Attach Clip - AFT	KPWI0460	20
3.	Wing Rib - RH	KPWI0543-R	10
3.	Wing Rib - LH	KPWI0543-L	10
4.	Rib Attach Clip - FWD	KPWI0459	20
5.	Serrated Grommet Strip	KSAC0023	15 in

INBOARD

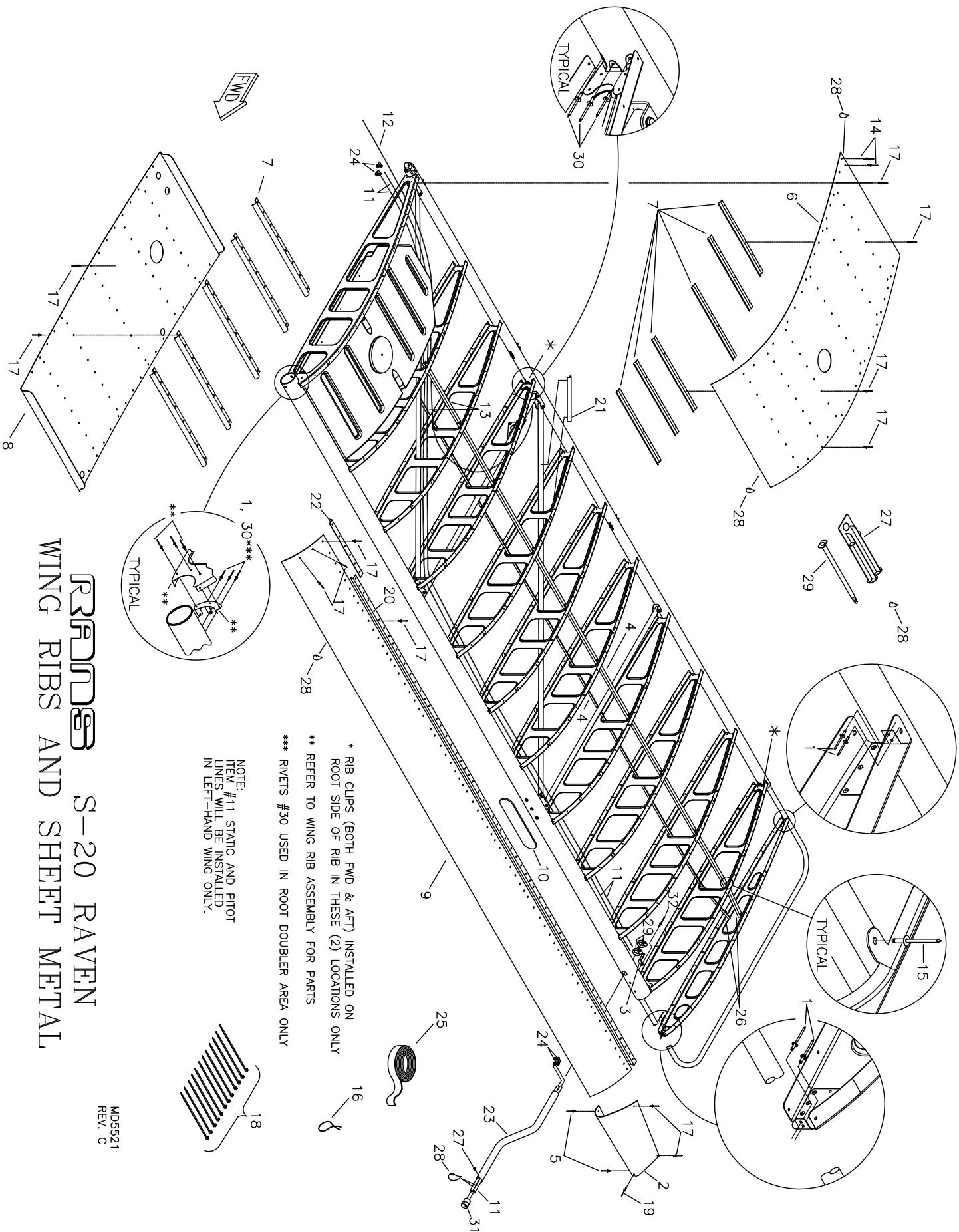
TIP RIB FOR LH WING SHOWN
TIP RIB FOR RH WING IS A MIRROR IMAGE



RAVEN S-20 RAVEN
WING TIP RIB ASSEMBLY

MD5522

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" Aluminum Rivet - Cherry Q	AAPQ-41	24
2.	Rib Clip Trailing Edge - LH	KPWI0372-L	1
2.	Rib Clip Trailing Edge - RH	KPWI0372-R	1
3.	Wing Tip Rib - RH	KPWI0544-R	1
3.	Wing Tip Rib - LH	KPWI0544-L	1
4.	Rib Clip Leading Edge - LH	KPWI0373-L	1
4.	Rib Clip Leading Edge - RH	KPWI0373-R	1



REFIN S-20 RAVEN WING RIBS AND SHEET METAL

- * RIB CLIPS (BOTH FWD & AFT) INSTALLED ON ROOT SIDE OF RIB IN THESE (2) LOCATIONS ONLY
- ** REFER TO WING RIB ASSEMBLY FOR PARTS
- *** RIVETS #30 USED IN ROOT DOUBLER AREA ONLY

NOTE:
ITEM #11 STATIC AND PITOT
LINES WILL BE INSTALLED
IN LEFT-HAND WING ONLY.

MD5521
REV. C

RANS S-20 RAVEN - WING - RIBS & SHEET METAL

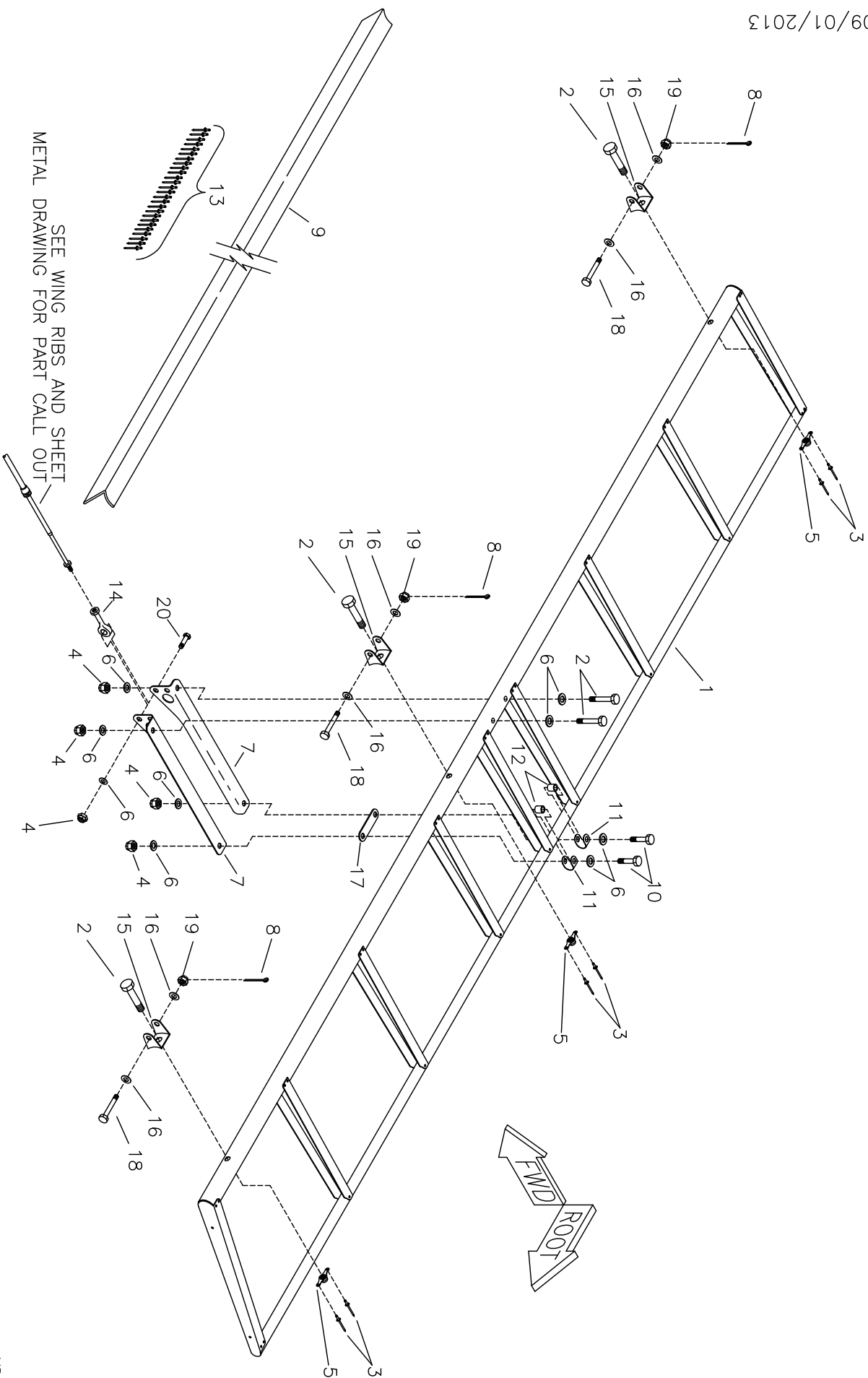
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	68
2.	Leading Edge Tip Wrap - RH	KPWI0359-R	1
2.	Leading Edge Tip Wrap - LH	KPWI0359-L	1
3.	Mount Angle	ST-16-BENT	1
4.	Rib Stringer - Outboard	KPWI0550	4
5.	1/8" Aluminum Rivet - Avex	1691-0410	4
6.	Upper Root Skin - Wing	KPWI0569	2
7.	Root Skin Stiffener	KPWI0574	22
8.	Lower Root Skin - Wing - RH	KPWI0570-R	1
8.	Lower Root Skin - Wing - LH	KPWI0570-L	1
9.	Wing Leading Edge Wrap	KPWI0551	2
10.	Bolt Cover	KPWI0208	2
11.	Pitot/Static Tubing	KSPT0004	60 ft
12.	Flap Teleflex - 14'	MORSE CABLE-14	2
13.	Rib Stringer - Inboard	KPWI0575	4
14.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4
15.	1/8" Aluminum Rivet - Cherry Q	AAPQ-41	44
16.	Safety Wire **	-----	0
17.	1/8" Stainless Steel Rivet - Flush	CCC-42	380
18.	Plastic Tie - 7.5"	N-TIES	16
19.	3/32" Aluminum Rivet	40APR1/8	2
20.	Leading Edge Wrap Stringer - Outboard	KPWI0567	2
21.	Anti-Chafe *	KPWI0612	1
22.	Leading Edge Wrap Stringer - Inboard	KPWI0576	2
23.	Pitot/Static Tube	KPPT0012	1
24.	Union Elbow	KSPT0005	4
25.	Double Stick Foam Tape **	-----	0
26.	Rib Stringer - Tip Rib *	KPWI0582	2
27.	#4 Small Pan Head Screw	4X1/4 PHS	1
28.	Silicone Seal - Clear **	-----	0
29.	Hose Clamp - 7/8"	5-6203	2
30.	1/8" Aluminum Rivet - Cherry Q	AAPQ-43	68
31.	Pitot/Static Probe Fitting	KPPT0013	1
32.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-64	1

* Builder Modifies

** Builder supplied.

9/1/2013

REV. C



RAVEN S-20 RAVEN FLAP ASSEMBLY AND INSTALLATION

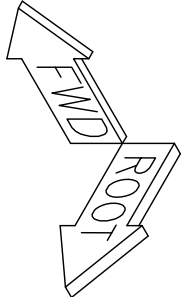
RANS S-20 RAVEN - WING - FLAP ASSEMBLY AND INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Flap Frame Assembly	KAFL0016	2
2.	3/16" Bolt	AN3-14A	10
3.	3/32" Aluminum Rivet	40APR1/8	12
4.	3/16" Shear Nut	AN364-1032A	10
5.	3/16" Nut Plate	K-1000-3	6
6.	3/16" Thin Washer	AN960-10L	18
7.	Flap Horn Attach Angle - RH	KPFL0094-R	2
7.	Flap Horn Attach Angle - LH	KPFL0094-L	2
8.	Small Cotter Pin	MS24665-134	6
9.	Control Surface Gap Seal	GAP-2	4
10.	3/16" Bolt	AN3-10A	4
11.	Aileron Clip	W-A-CLIP	4
12.	Aluminum Bushing - 1/4" x .028" x 1/2" *	KPWI0613	0
13.	1/8" Aluminum Rivet - Avex	1691-0410	26
14.	Female Rod End	NF-3	2
15.	Wing Hinge Bracket	W-HB	6
16.	3/16" Thick Washer	AN960-10	14
17.	Aileron Clip	KPAC0191	2
18.	3/16" Bolt - drilled shank	AN3-15	6
19.	3/16" Castle Nut	AN310-3	8
20.	3/16" Bolt	AN3-6A	2

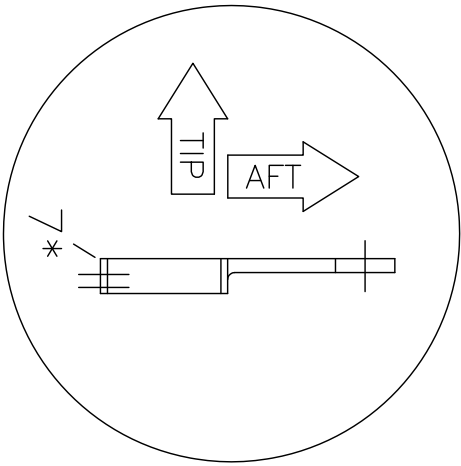
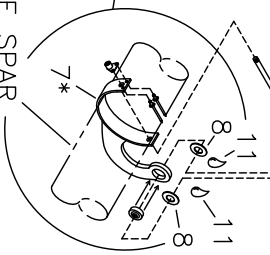
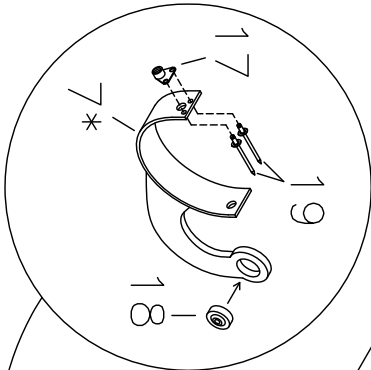
* Builder fabricates from KPWI0613

9/1/2013

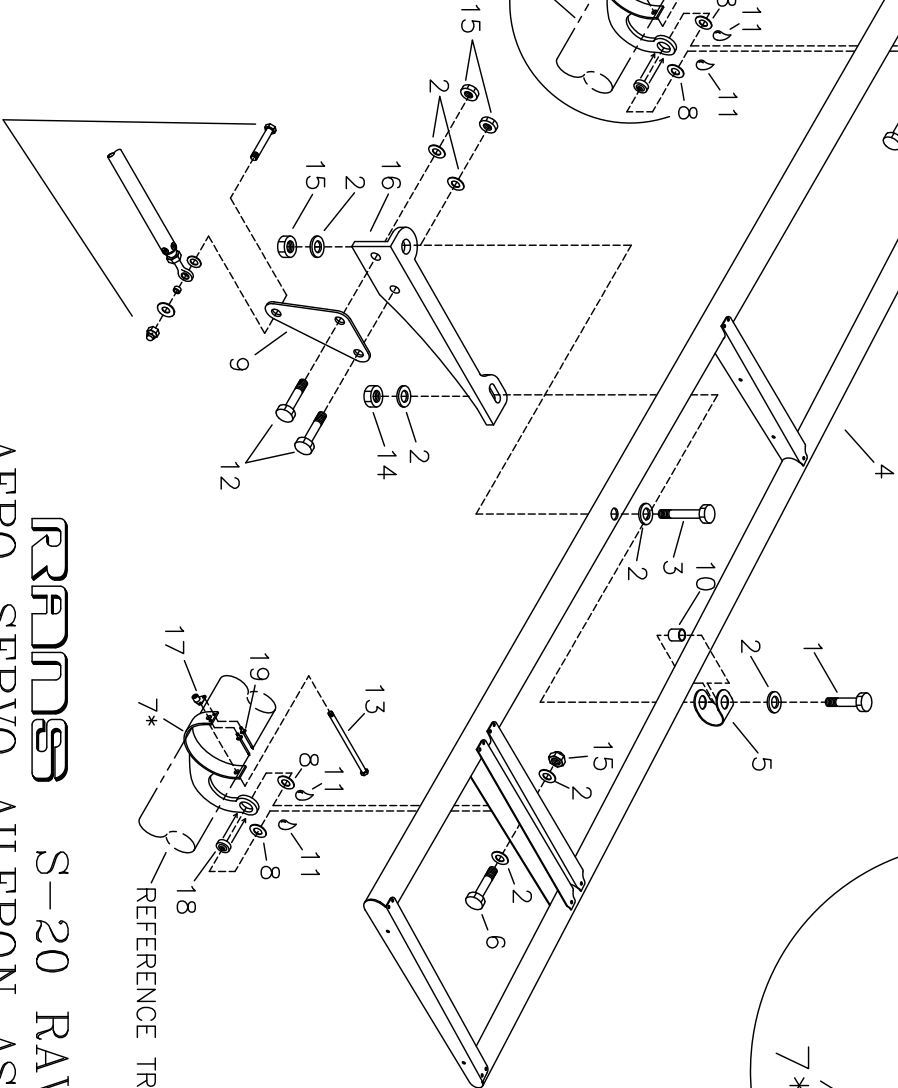
REV. B



NOTE: RIGHT AILERON SHOWN



* ARM PORTION OF AILERON HINGE IS POSITIONED TOWARD AFT AND TIP OF WING. FLANGE FACES TOWARD ROOT OF WING.



REFERENCE TRAILING EDGE SPAR

MD5545
REV. A

REFERENCE AILERON BELLCRANK AND
CABLE INSTALLATION

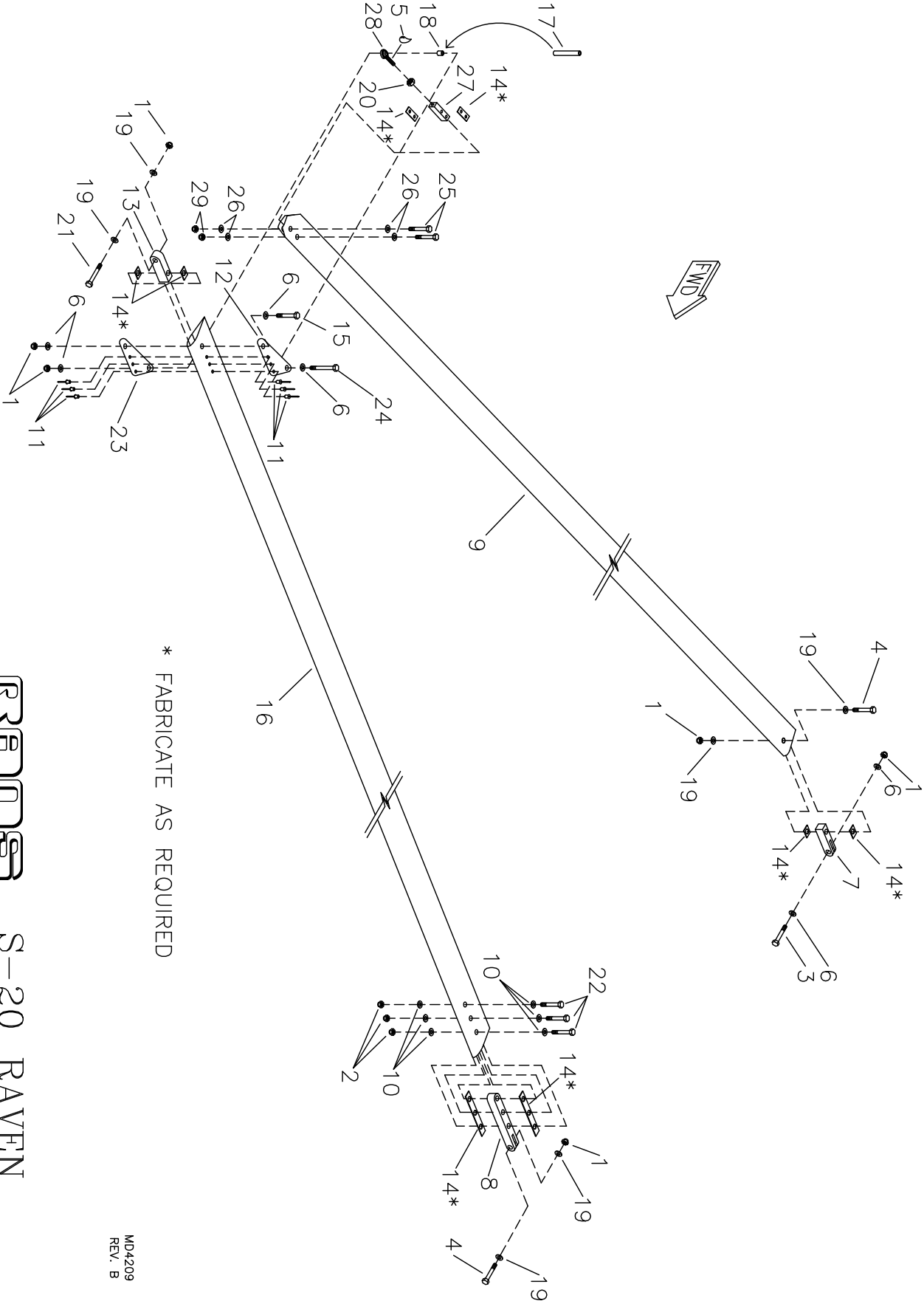
RAVEN S-20 RAVEN AERO-SERVO AILERON ASSEMBLY AND INSTALLATION

RANS S-20 RAVEN - WING - AERO-SERVO AILERON ASSY AND INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt	AN3-10A	2
2.	3/16" Thin Washer	AN960-10L	16
3.	3/16" Bolt	AN3-20A	2
4.	Aileron Frame Assembly	KAAL0015	2
5.	Aileron Clip	W-A-CLIP	2
6.	3/16" Bolt	AN3-7A	4
7.	Aileron Hinge - LH	KPAL0112-L	2
7.	Aileron Hinge - RH	KPAL0112-R	2
8.	3/16" Thick Washer	AN960-10	8
9.	Aileron Horn	KPAL0124	2
10.	Aluminum Bushing - 1/4" x .028" x 1/2" *	KPWI0613	0
11.	Adhesive - Superglue **	-----	0
12.	3/16" Bolt	AN3-4A	4
13.	3/16" Bolt	AN3-25A	4
14.	3/16" Shear Acorn Nut	22NKM02	2
15.	3/16" Shear Nut	AN364-1032A	8
16.	Aileron Attach Angle - RH	KPAL0125-R	1
16.	Aileron Attach Angle - LH	KPAL0125-L	1
17.	3/16" Side by Side Nut Plate	MS21086-L3	4
18.	3/16" Spherical Bearing	KSHW0089	4
19.	3/32" Aluminum Rivet	40APR1/4	8

*Builder fabricates from KPWI0613

** Builder supplied



* FABRICATE AS REQUIRED

MD4209
REV. B

RAVEN S-20
LIFT STRUT ASSEMBLY & INSTALLATION

RANS S-20 RAVEN - WING - LIFT STRUT ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	5/16" Shear Nut	AN364-524A	12
2.	1/4" Shear Nut	AN364-428A	6
3.	5/16" Bolt	AN5-12A	2
4.	5/16" Bolt	AN5-13A	4
5.	Loctite Blue ***	-----	0
6.	5/16" Thick Washer	AN960-516	12
7.	AFT Connector - Lift Strut	LS-ACU-2	2
8.	Forward Lift Strut Connector	KPLS0051	2
9.	AFT Lift Strut	KPLS0050	2
10.	1/4" Thin Washer	AN960-416L	12
11.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-64	12
12.	Gusset Plate	116-S-GUSS-A	2
13.	Lower Connector - Lift Strut	LS-SC-F-ALUM	2
14.	Universal Shim - .020 SHT. x 75" x 8" * **	UNV-SHIM	3
15.	5/16" Bolt	AN5-17A	2
16.	FWD Lift Strut	KPLS0049	2
17.	Raw Stock Kit - Adjustable Lift Strut	KAAC0020	1
18.	Aluminum Bushing - 3/8" x .035" x 1/2" *	KAAC0020-1	0
19.	5/16" Thin Washer	AN960-516L	12
20.	3/8" Plain Nut	MS35650-3382	2
21.	5/16" Bolt	AN5-14A	2
22.	1/4" Bolt	AN4-15A	6
23.	Gusset Plate	116-S-GUSS-B	2
24.	5/16" Bolt	AN5-11A	2
25.	3/16" Bolt	AN3-13A	4
26.	3/16" Thick Washer	AN960-10	8
27.	3/4" Adjuster End	S-AE-3/4	2
28.	Rod End	3/8X24 ROD END	2
29.	3/16" Shear Nut	AN364-1032A	4

* Builder must fabricate from raw stock

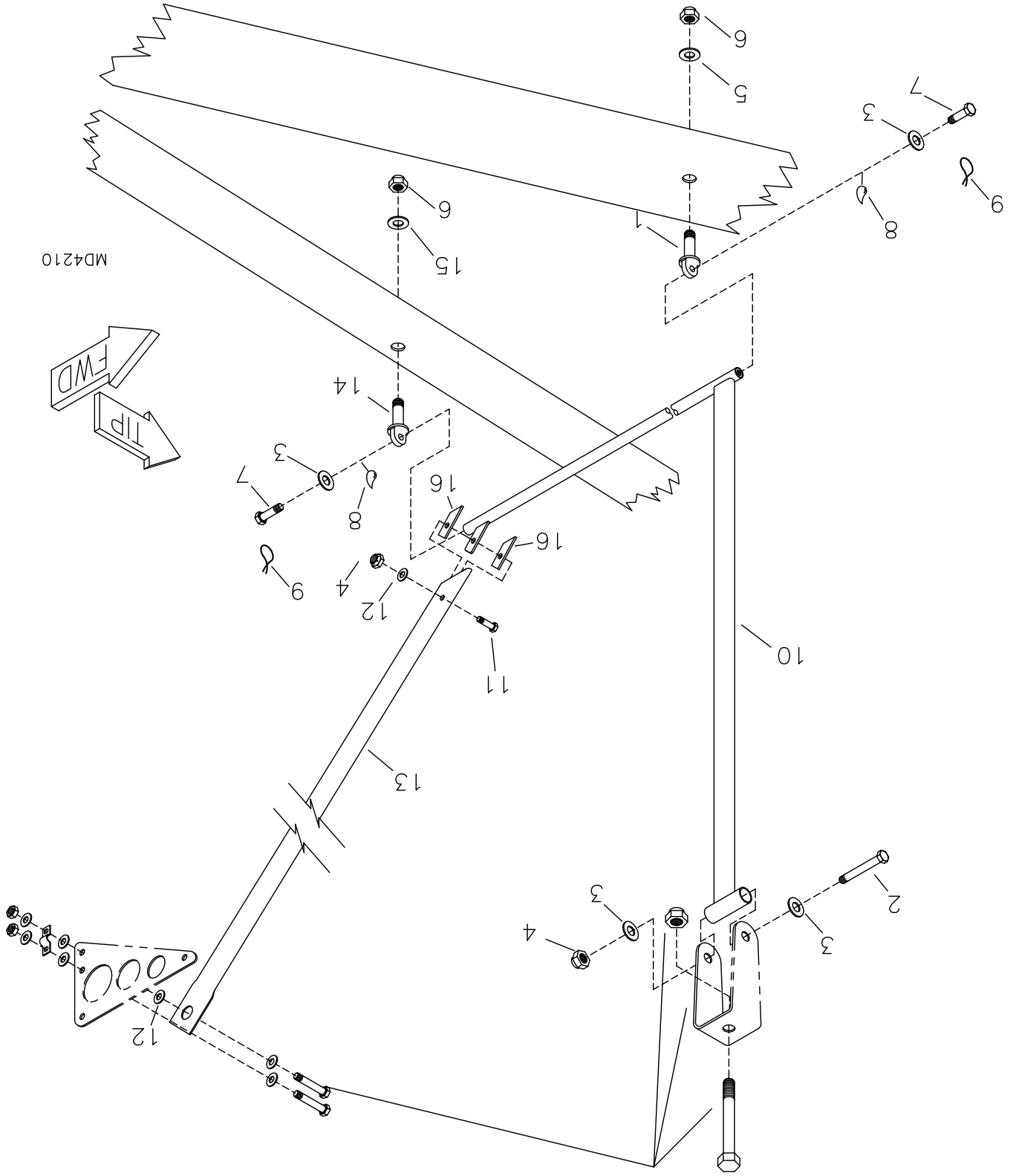
** Use only if neccessary.

*** Builder Supplied

9/1/2013

REV. B

RMS S-20 RAVEN JURY STRUT INSTALLATION



RANS S-20 RAVEN - WING - JURY STRUT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/4" Eyebolt	AN43B-15A	2
2.	3/16" Bolt	AN3-14A	2
3.	3/16" Thin Washer	AN960-10L	8
4.	3/16" Shear Nut	AN364-1032A	2
5.	1/4" Thin Washer	AN960-416L	2
6.	1/4" Tensile Nut	AN365-428A	4
7.	3/16" Bolt - drilled head	AN3H-4A	4
8.	Loctite Blue *	-----	0
9.	Safety Wire *	-----	0
10.	FWD Jury Strut	KPJS0017	2
11.	3/16" Bolt	AN3-6A	2
12.	3/16" Thick Washer	AN960-10	4
13.	AFT Jury Strut	KPJS0018	2
14.	1/4" Eyebolt	AN43B-14A	2
15.	1/4" Thick Washer	AN960-416	2
16.	Plastic Shim **	KPAC0121	4

* Builder Supplied

** Builder Modifies



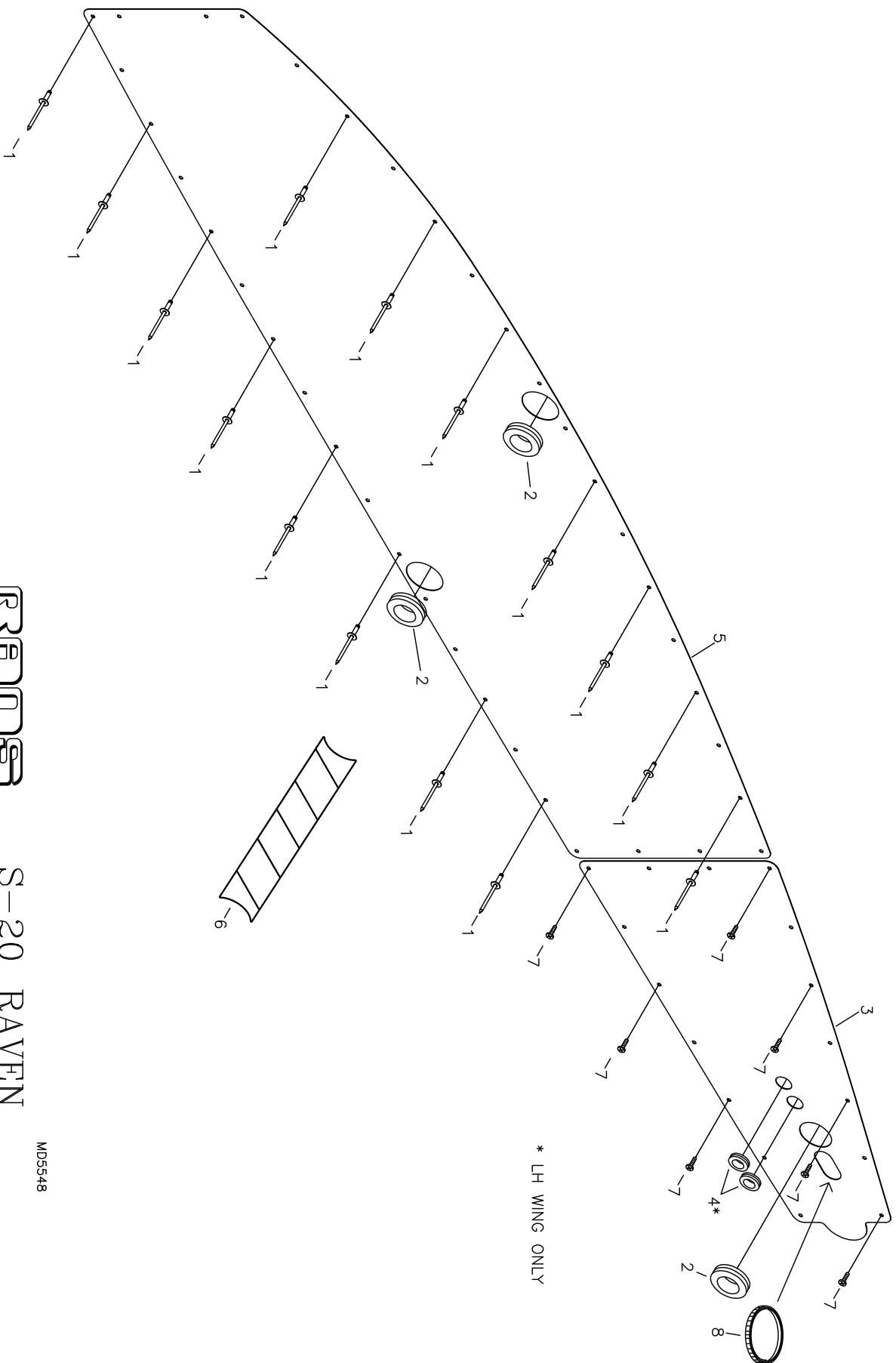
REFUGES S-20 RAVEN WING TIP ASSEMBLY AND INSTALLATION

RANS S-20 RAVEN - WING - WING TIP ASSEMBLY AND INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	#6 Pan Head Screw	6RX1/2 PHS	36
2.	1/8" Aluminum Rivet - Avex	1691-0410	12
3.	Aft Closure - Wing Tip	KPWI0381	2
4.	Wing Tip - RH - Carbon Fiber (optional)	KPWI0583-R	1
4.	Wing Tip - LH - Carbon Fiber (optional)	KPWI0583-L	1
4.	Wing Tip - RH - Fiberglass	KPWI0378-R	1
4.	Wing Tip - LH - Fiberglass	KPWI0378-L	1
5.	Strobe Light Mount - AVEO	KPWI0541	2
6.	3/16" Nut Plate	K-1000-3	2
7.	3/32" Aluminum Rivet	40APR1/8	4

RAVEN S-20 RAVEN ROOT SKIN INSTALLATION

MD5548



#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/32" Aluminum Rivet	40APR1/8	72
2.	Rubber Grommet	MS35489-17	6
3.	Root Rib Closeout - AFT	KPWI0573	2
4.	Rubber Grommet	MS35489-6	2
5.	Root Rib Closeout - FWD	KPWI0609	2
6.	Fuel Sight Gauge Decal - LH *	KPPL0024-L	0
6.	Fuel Sight Gauge Decal - RH *	KPPL0024-R	0
7.	#4 Small Pan Head Screw	4X1/4 PHS	36
8.	Serrated Grommet Strip	KSAC0023	6 in

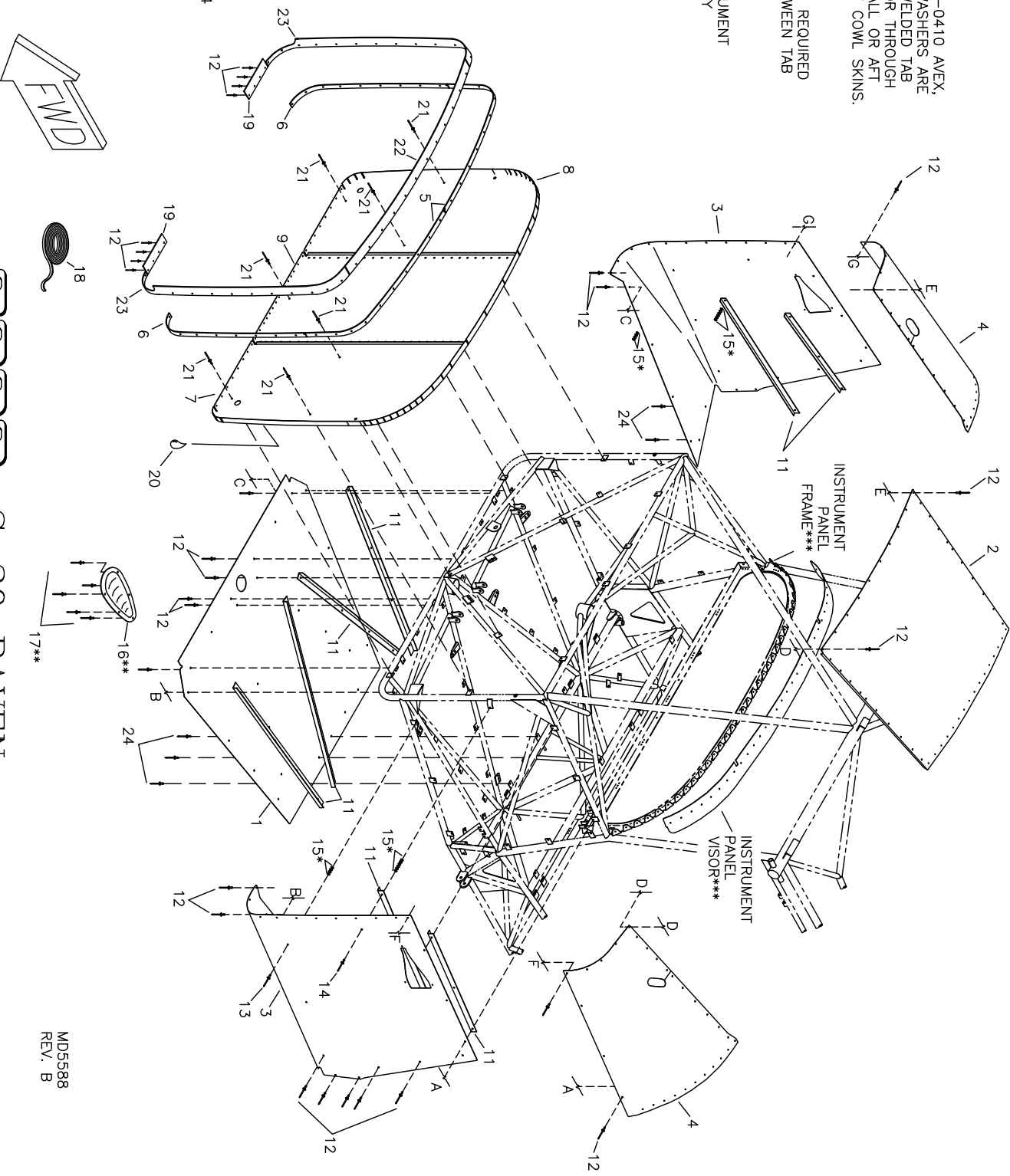
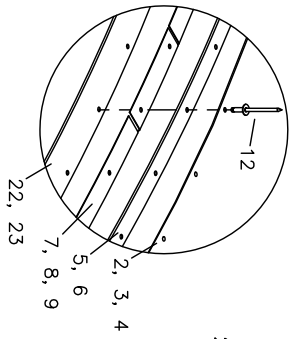
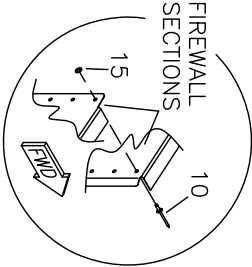
* Referenced from Placards/Labels/Markers

9/1/2013

NOTE: ALL RIVETS 1691-0410 AVEX,
EXCEPT WHERE WASHERS ARE
USED BETWEEN WELDED TAB
AND STIFFENER OR THROUGH
FRONT OF FIREWALL OR AFT
OF BOTTOM BOOT COWL SKINS.

* USE WASHERS AS REQUIRED
TO FILL GAP BETWEEN TAB
AND STIFFENER.

** REFER TO INSTRUMENT
PANEL ASSEMBLY



S-20 RAVEN
BOOT COWL ASSEMBLY

MD5588
REV. B

RANS S-20 RAVEN - BOOT COWL ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Bottom Boot Cowl Skin	KPFU0687	1
2.	Forward Top Boot Cowl Skin	KPFU0688	1
3.	Side Boot Cowl Skin	KPFU0689	2
4.	Top Side Boot Cowl Skin	KPFU0690	2
5.	Boot Cowl Spacer Strip - Top	KPFU0691	2
6.	Boot Cowl Spacer Strip - Side	KPFU0692	2
7.	Firewall - Side - Left	KPFW0037-L	1
8.	Firewall - Side - Right	KPFW0037-R	1
9.	Firewall - Center	KPFW0038	1
10.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-41	44
11.	Skin Stiffener - Boot Cowl	KPFU0685	8
12.	1/8" Aluminum Rivet - Avex	1691-0410	211
13.	1/8" Aluminum Rivet - Cherry Q	AAPQ-44	2
14.	1/8" Aluminum Rivet - Cherry Q	AAPQ-45	2
15.	1/8" Small Brass Washer	AN960-B4	64
16.	Nose Gear Exit Fairing (Flap Exit Fairing) **	CV-FX	1
17.	1/8" Aluminum Rivet - Avex **	1691-0410	5
18.	Double Stick Foam Tape ***	-----	0
19.	Cowling Attach Strap - Bottom *	KPFU0584	1
20.	Truck Bed Lining Spray ***	-----	0
21.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	7
22.	Cowling Attach Strap - Top	KPFU0694	1
23.	Cowling Attach Strap - Side	KPFU0695	2
24.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	9

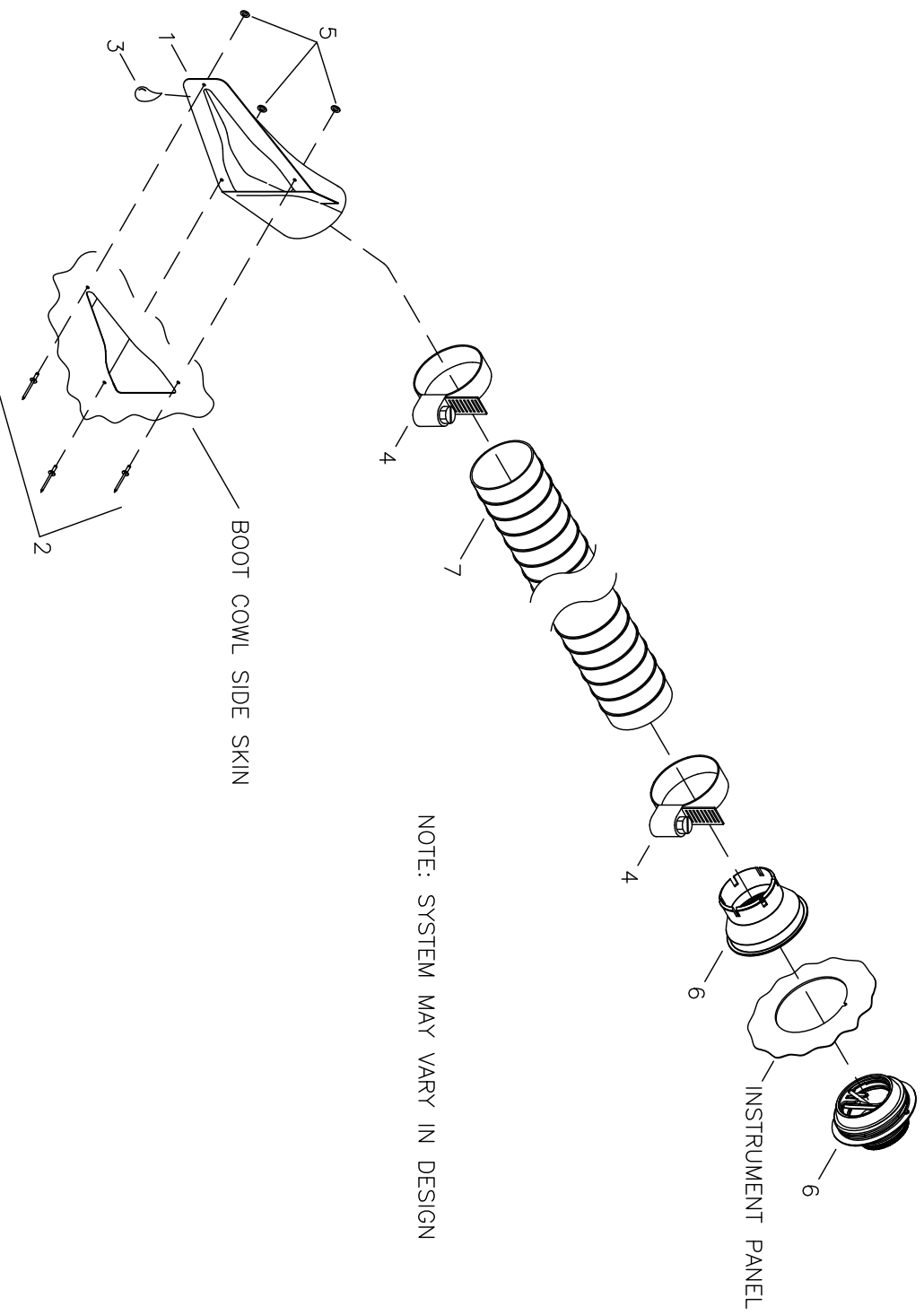
* Builder Modifies

** Taildragger Only

*** Builder Supplied

9/1/2013

REV. B



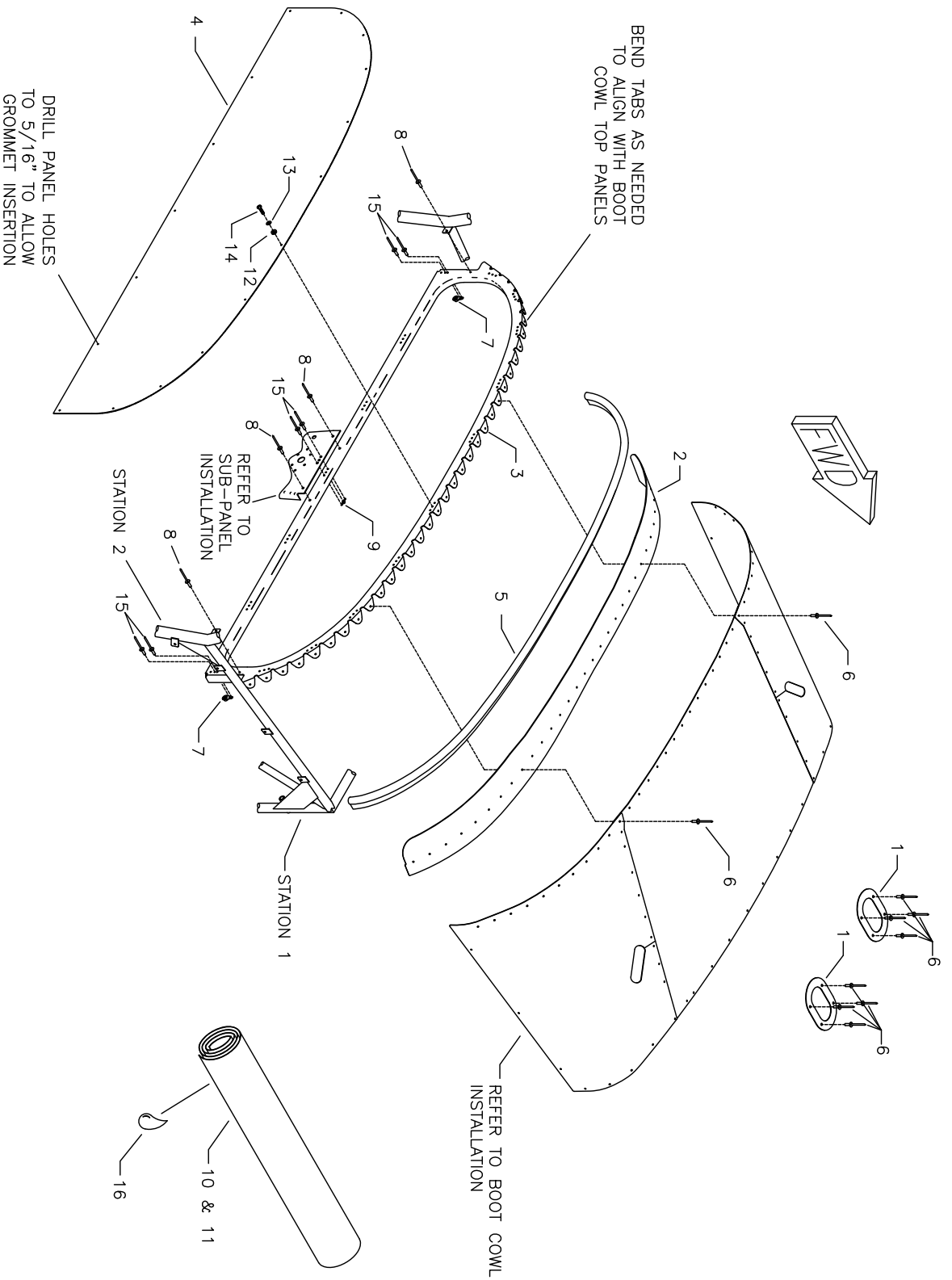
Raven S-20 RAVEN VENT SYSTEM INSTALLATION

MD5062
REV. - A

RANS S-20 RAVEN - VENT SYSTEM INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Air Vent NACA Scoop	KSFU0004	2
2.	1/8" Aluminum Rivet - Avex	1691-0410	6
3.	Silicone Seal *	-----	0
4.	Hose Clamp - 2 1/4"	5-5228	4
5.	1/8" Small Brass Washer	AN960-B4	6
6.	Eyeball Air Vent	KSFU0006	2
7.	2" Fresh Air Duct	KSFU0005	1

* Builder Supplied



RAVEN S-20 RAVEN INSTRUMENT PANEL ASSEMBLY

MD5584

RANS S-20 RAVEN - INSTRUMENT PANEL INSTALLATION

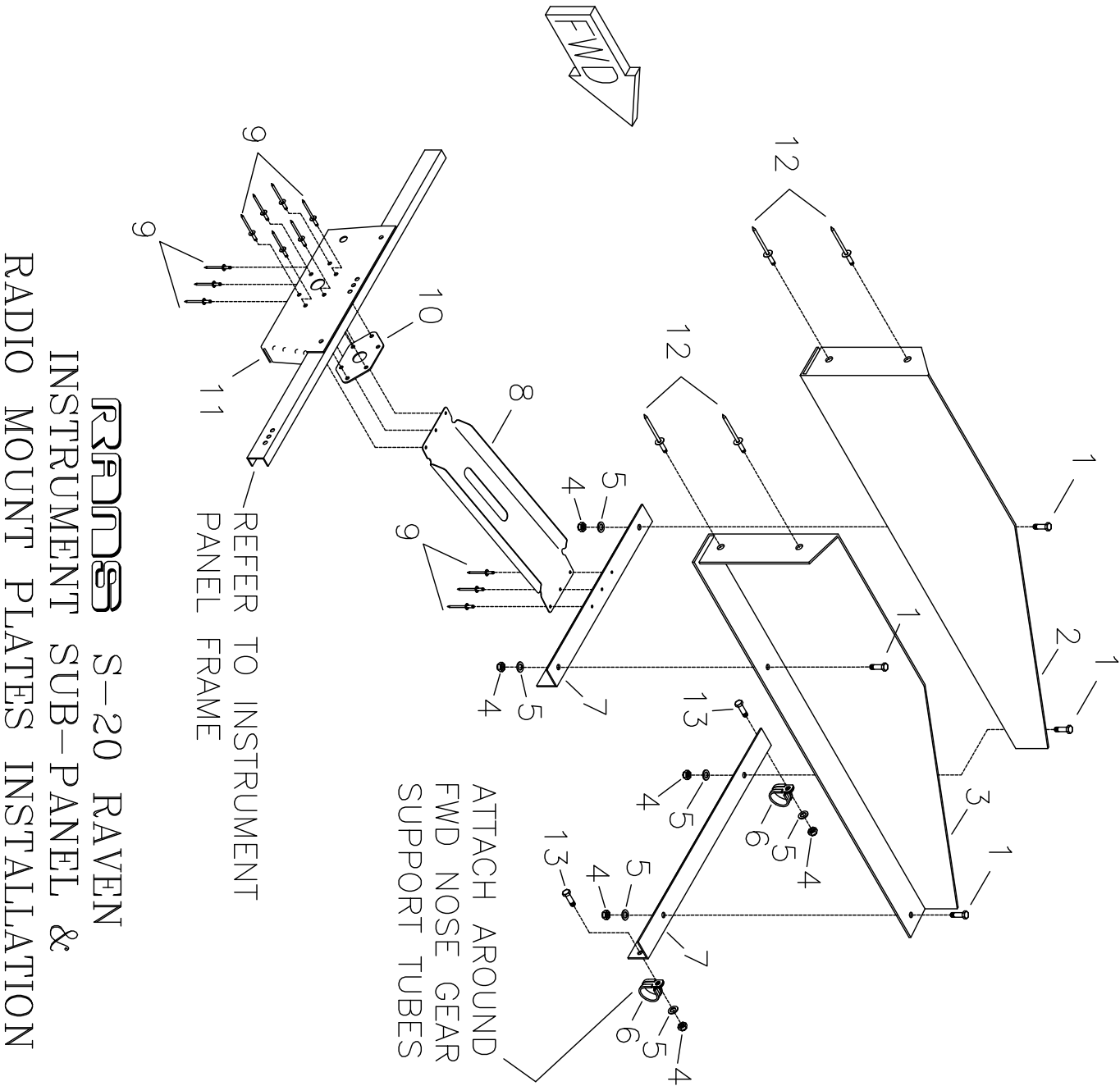
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Oval Glare Shield Ring	KPIP0147	2
2.	Instrument Panel Visor	KPIP0143	1
3.	Instrument Panel Frame	KPIP0140	1
4.	Instrument Panel - Standard Blank	KPIP0134	1
5.	Trimlock Cushion Lip	4100C-1/16	5 ft
6.	1/8" Aluminum Rivet - Avex	1691-0410	38
7.	8-32 Single-Ear Nut Plate	MS21051-08	2
8.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4
9.	8-32 Nut Plate	MS21047-08	15
10.	Dash Cover Fabric - Optional *	KPIN0127	0
11.	Dash Foam - Optional *	KPIN0128	0
12.	3/16" Rubber Grommet	KSAC0002	17
13.	#8 Small Brass Washer	AN960-B8	17
14.	#8 Pan Head Machine Screw	MS27039-0809	17
15.	3/32" Aluminum Rivet	40APR1/8	34
16.	Contact Cement Adhesive - 3M Super 77 Spray **	-----	0

* May be purchased separately, call RANS Parts Dept. for pricing

** Builder Supplied

9/1/2013

REV. A



RRF008 S-20 RAVEN
INSTRUMENT SUB-PANEL &
RADIO MOUNT PLATES INSTALLATION

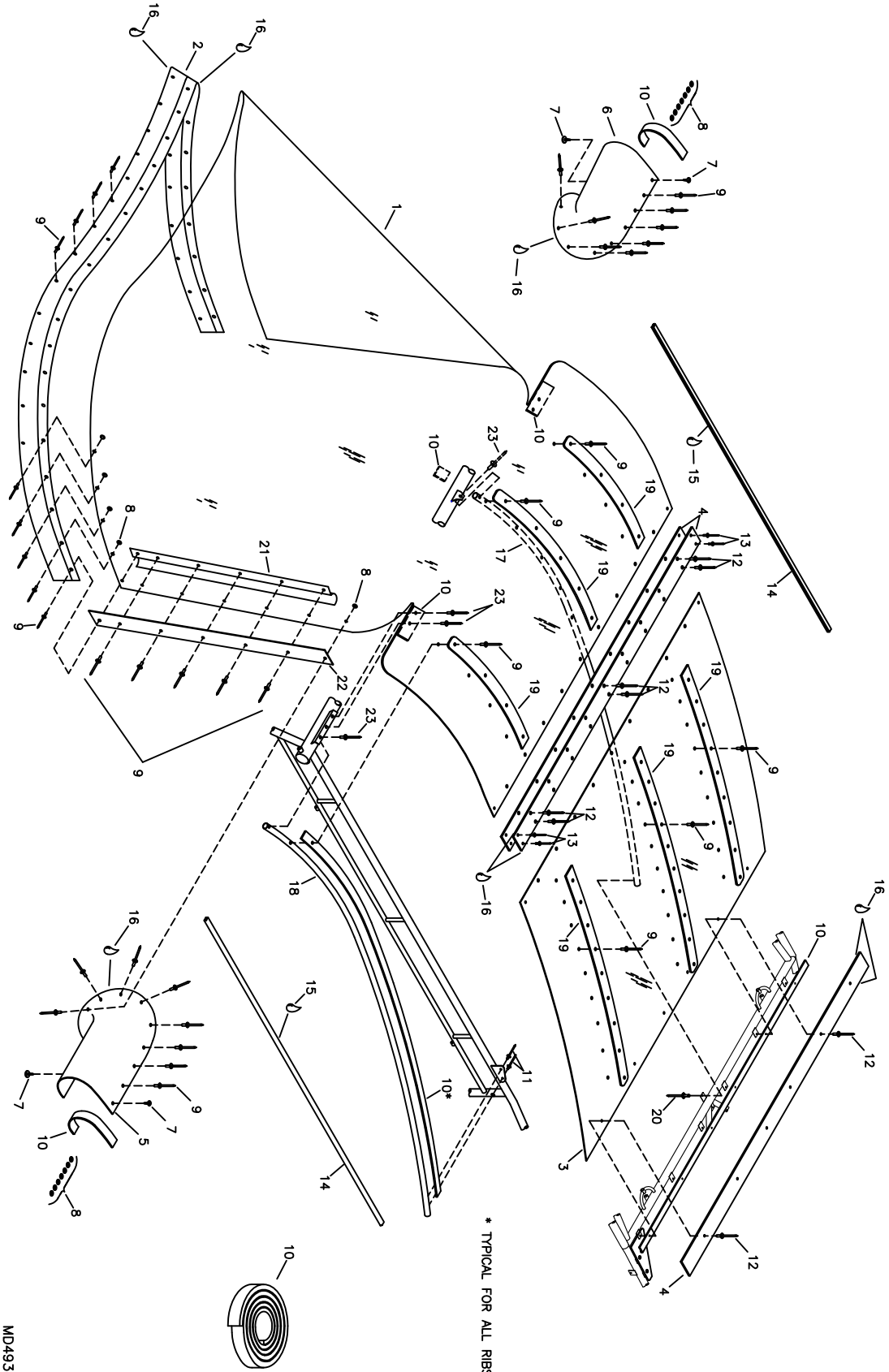
RANS S-20 RAVEN - INSTRUMENT SUB-PANEL & RADIO MOUNT PLATES INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt	AN3-3A	4
2.	Radio Mount Plate - Double - LH	KPAV0003-L	1
3.	Radio Mount Plate - Double - RH	KPAV0003-R	1
4.	3/16" Shear Nut	AN364-1032A	6
5.	3/16" Thin Washer	AN960-10L	6
6.	1/2" Cushion Clamp	MS21919-DG8	2
7.	3/4" x 3/4" x .063" Aluminum Angle *	KAAC0046-1	0
8.	Instrument Panel Reinforcement	KPFU0652	1
9.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	12
10.	Throttle Reinforcement	KPIP0121	1
11.	Instrument Sub-Panel	KPIP0142	1
12.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4
13.	3/16" Bolt	AN3-4A	2

* Fabricate from Raw Stock

9/1/2013

RAVEN S-20 RAVEN
WINDSHIELD & SKYLIGHT INSTALLATION



MD4934

RANS S-20 RAVEN - WINDSHIELD & SKYLIGHT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Windshield	KPWS0062	1
2.	Windshield Hold Down Strip	KPWS0063	1
3.	Skylight	KPWS0059	1
4.	Mating Strip	WS-WSSLS	3
5.	Wing Cuff - LH	WS-CUFF-LH	1
6.	Wing Cuff - RH	WS-CUFF-RH	1
7.	#6 Pan Head Screw	6RX1/2 PHS	4
8.	1/8" Small Brass Washer	AN960-B4	39
9.	1/8" Aluminum Rivet - Avex	1691-0410	107
10.	1/2" Black Foam Tape	KSAC0021	18 ft
11.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	4
12.	1/8" Aluminum Rivet - Cherry Q	AAPQ-44	24
13.	3/32" Aluminum Rivet	40APR1/4	4
14.	Rubber Trim	X1011	8 ft
15.	Adhesive - Superglue *	-----	0
16.	Silicone Seal - Clear *	-----	0
17.	Center Rib	KPWS0027	1
18.	Outer Rib	KPWI0364	2
19.	Skylight Trim Strip **	KPWS0010	3
20.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	1
21.	Windshield Attach	KPWS0060	2
22.	Windshield Trim Strip	KPWS0061	2
23.	1/8" Stainless Steel Rivet - Flush	CCC-42	7

* Builder Supplied

** Builder Modifies

9/1/2013

RANS S-20 RAVEN - DOOR ASSEMBLY, LEXAN AND TRIM**LEXAN & TRIM**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Upper Trim Strip *	KPDR0077	2
2.	Door Frame Assembly - LH	KADR0012-L	1
2.	Door Frame Assembly - RH	KADR0012-R	1
3.	Door - Lexan - Upper *	KPDR0129	2
4.	Door - Lexan - Lower - RH *	KPDR0130-R	1
4.	Door - Lexan - Lower - LH *	KPDR0130-L	1
5.	Channel Extrusion *	KPDR0131	2
6.	Door Trim - FWD *	KPDR0126	2
7.	Door Trim - AFT *	KPDR0127	2
8.	Door Trim - Lower *	KPDR0128	2
9.	1/8" Aluminum Rivet - Cherry Q	AAPQ-43	72
10.	1/8" Aluminum Rivet - Avex	1691-0410	64
11.	Rubber Edging	8510K11	8 ft
12.	1/2" Black Foam Tape	KSAC0021	20 ft
13.	Adhesive - Superglue **	-----	0
14.	3/32" Aluminum Rivet	40APR1/8	2
15.	1/8" Aluminum Rivet - Cherry Q	AAPQ-44	4
16.	1/8" Aluminum Rivet - Cherry Q	AAPQ-45	34
17.	1/8" Aluminum Rivet - Cherry Q	AAPQ-41	2
18.	Silicone Seal **	-----	0
19.	1/2" Acrylic Foam Tape	KSAC0078	8.5 ft

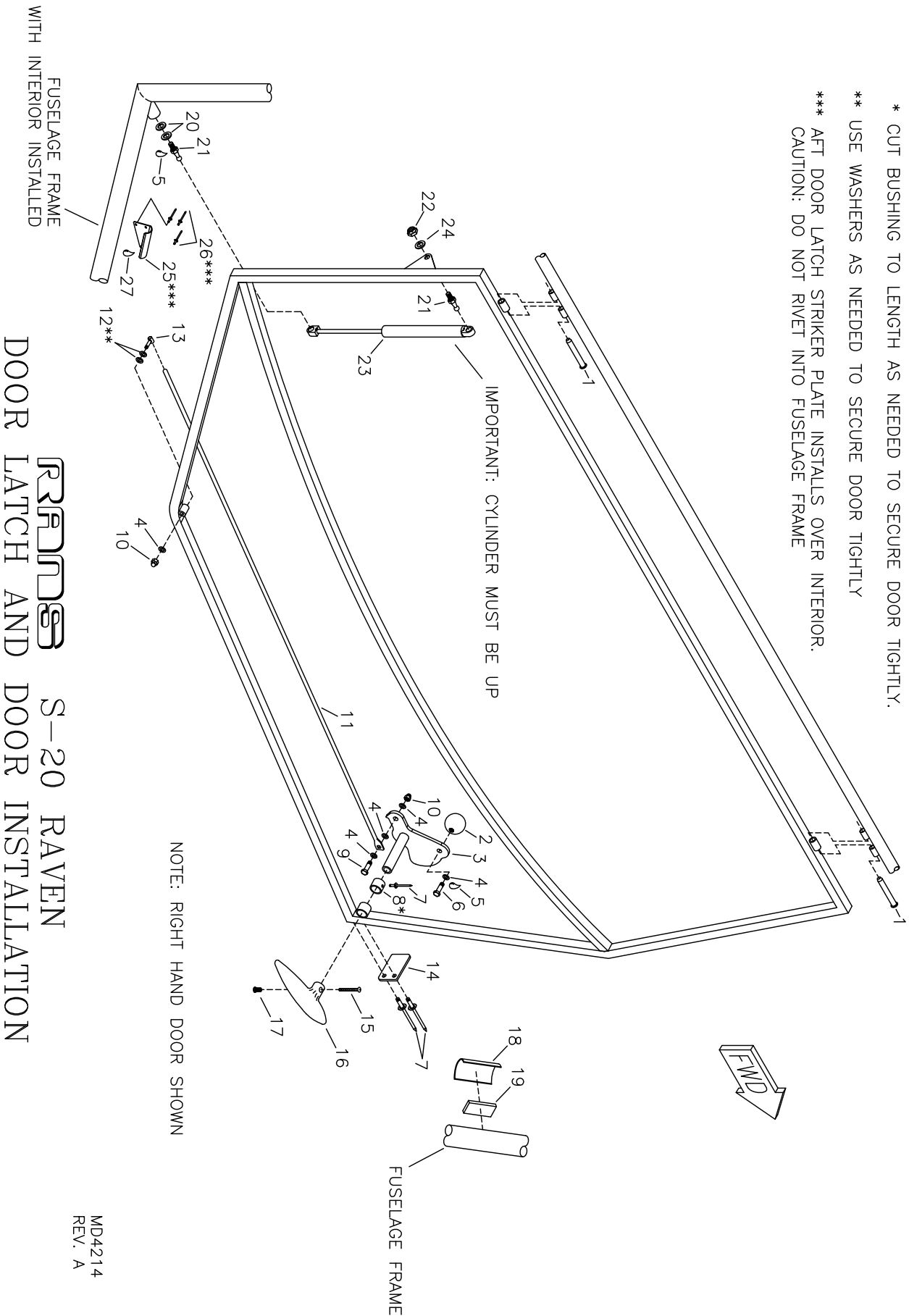
* Builder Modifies

** Builder Supplied

9/1/2013

REV. B

- * CUT BUSHING TO LENGTH AS NEEDED TO SECURE DOOR TIGHTLY.
 - ** USE WASHERS AS NEEDED TO SECURE DOOR TIGHTLY
 - *** AFT DOOR LATCH STRIKER PLATE INSTALLS OVER INTERIOR.
- CAUTION: DO NOT RIVET INTO FUSELAGE FRAME



RR-20 RAVEN DOOR LATCH AND DOOR INSTALLATION

MD4214
REV. A

RANS S-20 RAVEN - DOOR LATCH AND DOOR INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Self-Locking Clevis Pin	KSHW0045	4
2.	Door Knob - 1" Black	KSHW0093	2
3.	Handle Plate - LH	KPDR0110-L	1
3.	Handle Plate - RH	KPDR0110-R	1
4.	3/16" Thin Washer	AN960-10L	10
5.	Loctite Blue *	-----	0
6.	3/16" Bolt	AN3-3A	2
7.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	6
8.	Door Spacer Bushing, 1/2" x .058 x 3/8" **	KPAC0278	1
9.	3/16" Bolt	AN3-4A	2
10.	3/16" Shear Acorn Nut	22NKM02	4
11.	Door Latch	KPDR0113	2
12.	3/16" Thick Washer	AN960-10	4
13.	Door Pivot Bushing	KPDR0057	2
14.	Handle Stop Plate	KPDR0111	2
15.	Button Head Screw	KSHW0024	2
16.	Door Handle	KPDR0026	2
17.	Brass Flange Nut	KSHW0025	2
18.	Door Latch Striker Plate	KPDR0122	2
19.	3/4" Acrylic Foam Tape *	-----	0
20.	5/16" Thick Washer	AN960-516	4
21.	Ball Stud	KSHW0021	4
22.	5/16" Loc-Nut - Course	KSHW0022	2
23.	Gas Spring	KSHW0078	2
24.	5/16" Thin Washer	AN960-516L	2
25.	Aft Door Latch Striker Plate - LH	KPDR0125-L	1
25.	Aft Door Latch Striker Plate - RH	KPDR0125-R	1
26.	1/8" Aluminum Rivet - Avex	1691-0410	6
27.	Adhesive or Double Stick Tape *	-----	0

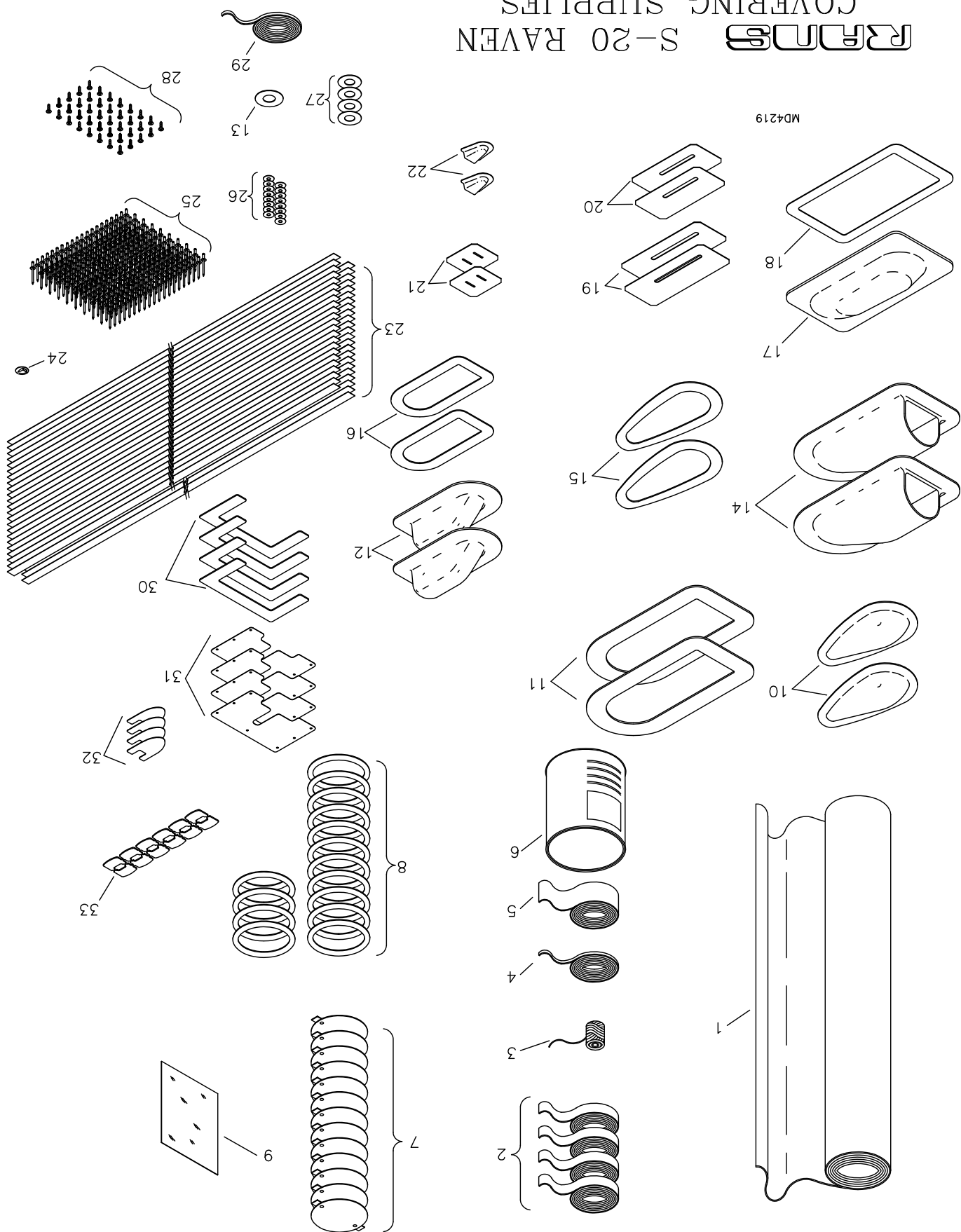
* Builder Supplied

** Builder fabricates from raw stock

9/1/2013

REV. A

RRRS S-20 RAVEN COVERING SUPPLIES



RANS S-20 RAVEN - COVERING SUPPLIES

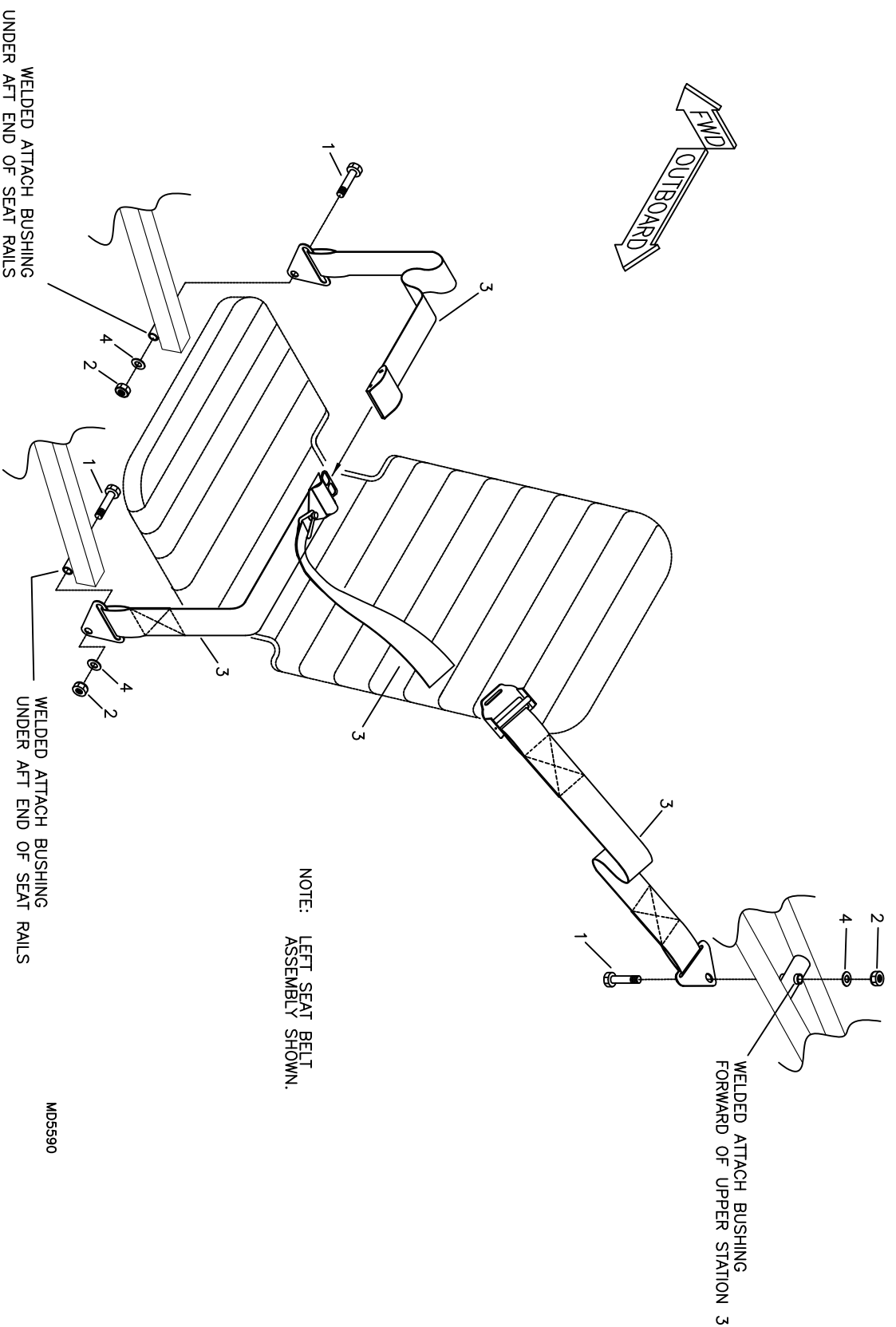
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Aircraft Fabric	SF102	39 yds
2.	2" Surface Tape	2 TAPE	4 rls
3.	Rib Lacing	RIB LACING	5 ft
4.	1/4" Rib Tape	RIB TAPE	4 ft
5.	4" Surface Tape	4 TAPE	40 ft
6.	Aircraft Fabric Adhesive (Optional) *	KSCV0001	0 gal
7.	Inspection Plate	CV-IP	13
8.	Inspection Ring	CV-IR	17
9.	.020 Lexan, 6" x 6" - S-7 / S-20	KAAC0042-5	1
10.	Flap Teleflex Exit	KPWI0226	2
11.	Aileron Push-Pull Tube Exit Ring	KPWI0348	2
12.	Elevator Yoke Exit	KPCV0028	2
13.	Lexan Ring, 2"	KPCV0038	1
14.	Aileron Push-Pull Tube Exit	KPWI0349	2
15.	Flap Teleflex Exit Ring	KPCV0010	2
16.	Elevator Yoke Exit Ring	KPCV0029	2
17.	Trim Exit Cover	KPCV0026	1
18.	Trim Exit Ring	KPCV0027	1
19.	Trailing Edge Strut Attach Plate Exit	KPCV0034	2
20.	Leading Edge Strut Attach Plate Exit	KPCV0035	2
21.	Jury Strut Bracket Exit	KPCV0036	2
22.	Rudder Cable Exit	CV-RX	2
23.	Cover Strap	KPCV0012	47
24.	Seaplane Grommet	AN231-4	1
25.	1/8" Aluminum Rivet - Avex	1691-0410	722
26.	Drain Grommet	KSCV0003	16
27.	Brake Line Exit Ring	KPCV0061	4
28.	#4 Small Pan Head Screw ***	4X1/4 PHS	70
29.	2 Way Tape - 1/4" *	2W-TAPE	0
30.	Exit Ring - Aileron Hinge - Aileron **	KPCV0058	2
31.	Exit Cover - Aileron Hinge - Aileron **	KPCV0059	1
32.	Exit Ring - Aileron Hinge - Wing **	KPCV0060	1
33.	Rudder / Elevator Hinge Reinforcement **	KPCV0063	1

* Builder Supplied

** Builder Modifies

*** Use to mount removable Exit Fairings and Covers

9/1/2013

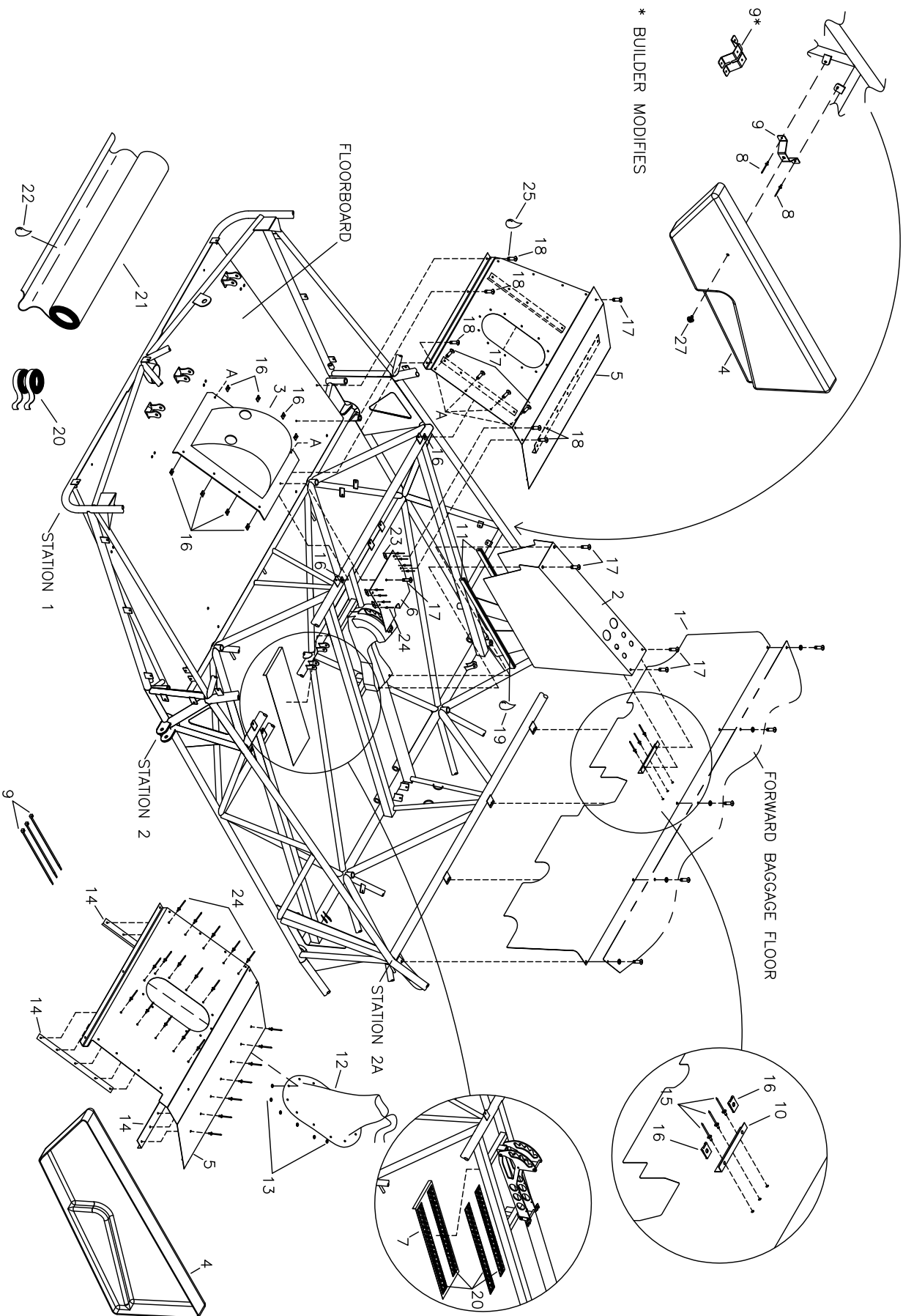


RRR S-20 RAVEN SEAT BELT INSTALLATION

MD5590

RANS S-20 RAVEN - SEAT BELT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	5/16" Bolt	AN5-15A	6
2.	5/16" Shear Nut	AN364-524A	6
3.	Seat Belt Kit	KAST0025	2
4.	5/16" Thin Washer	AN960-516L	6



R3F0103 S-20 RAVEN
INTERIOR INSTALLATION - AFT

MD5595
REV. B

RANS S-20 RAVEN - INTERIOR INSTALLATION - AFT

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Station 2A Closeout	KPIN0099	1
2.	Middle Console	KPIN0122	1
3.	Rudder Cable Closeout	KPIN0101	1
4.	Seat Side Closeout - RH	KPIN0142-R	1
4.	Seat Side Closeout - LH	KPIN0142-L	1
5.	Control Stick Closeout - LH	KPIN0126-L	1
5.	Control Stick Closeout - RH	KPIN0126-R	1
6.	Flap Lever / Control Stick Closeout	KPIN0124	1
7.	Lower Flap Lever Closeout	KPIN0110	1
8.	1/8" Aluminum Rivet	AAPQ-42	4
9.	Side Closeout Retainer	KPIN0143 *****	1
10.	Support Angle - Baggage Compartment *	KPIN0096	0
11.	Rubber Trim	X1011	2 ft
12.	Control Stick Boot	KPIN0013	2
13.	1/8" Small Brass Washer	AN960-B4	24
14.	Skin Stiffener - Boot Cowl **	KPFU0685	1
15.	1/8" Aluminum Rivet - Avex	1691-0410	27
16.	Tinnerman	A1789-8Z-1	21
17.	#8 Pan Head Screw	8X1/2 PHS	15
18.	#6 Pan Head Screw	6RX1/2 PHS	10
19.	Adhesive - Superglue ***	-----	0
20.	Velcro - Adhesive Back ***	-----	0
21.	Interior Fabric - Optional *** *****	-----	2 yds
22.	Contact Cement Adhesive - Brush On ***	-----	0
23.	Tinnerman	A6196-6Z-1	4
24.	3/32" Aluminum Rivet	40APR1/8	32
25.	Loctite Blue ***	-----	0
26.	Flap Lever Cover - LH ****	KPIN0118-L	0
26.	Flap Lever Cover - RH ****	KPIN0118-R	0
27.	Screw Rivet	M60-0580-01	2

* Use Drop-Off from Baggage Compartment Installation

** Use Drop-Off from Boot Cowl Assembly *** Builder Supplied

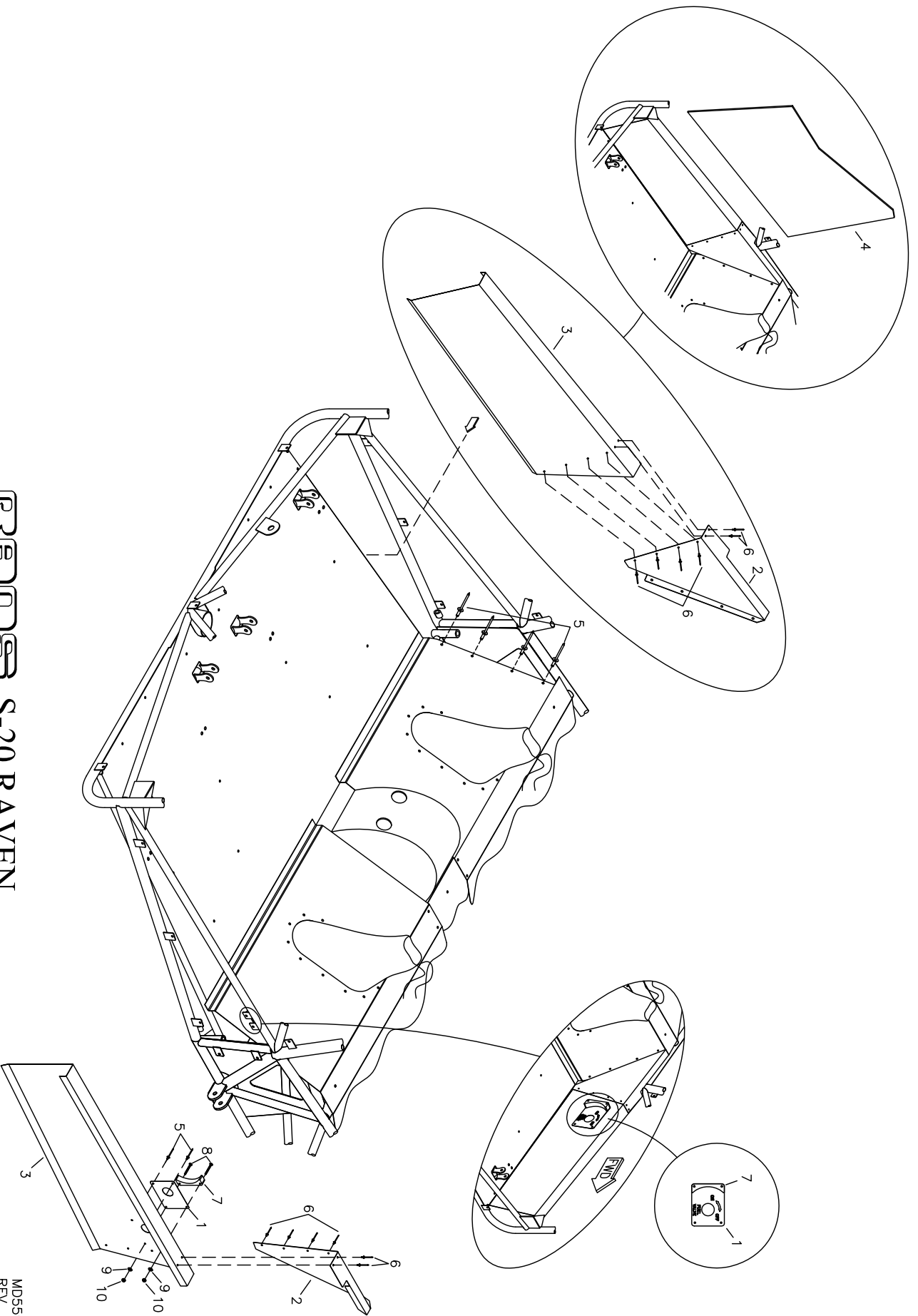
**** Refer to Flap Lever Assembly ***** May be purchased separately, call RANS Parts Dept.

***** Builder Modifies

9/1/2013

REV. B

RRR S-20 RAVEN INTERIOR INSTALLATION - FWD



MD5595
REV. A

RANS S-20 RAVEN - INTERIOR INSTALLATION - FWD

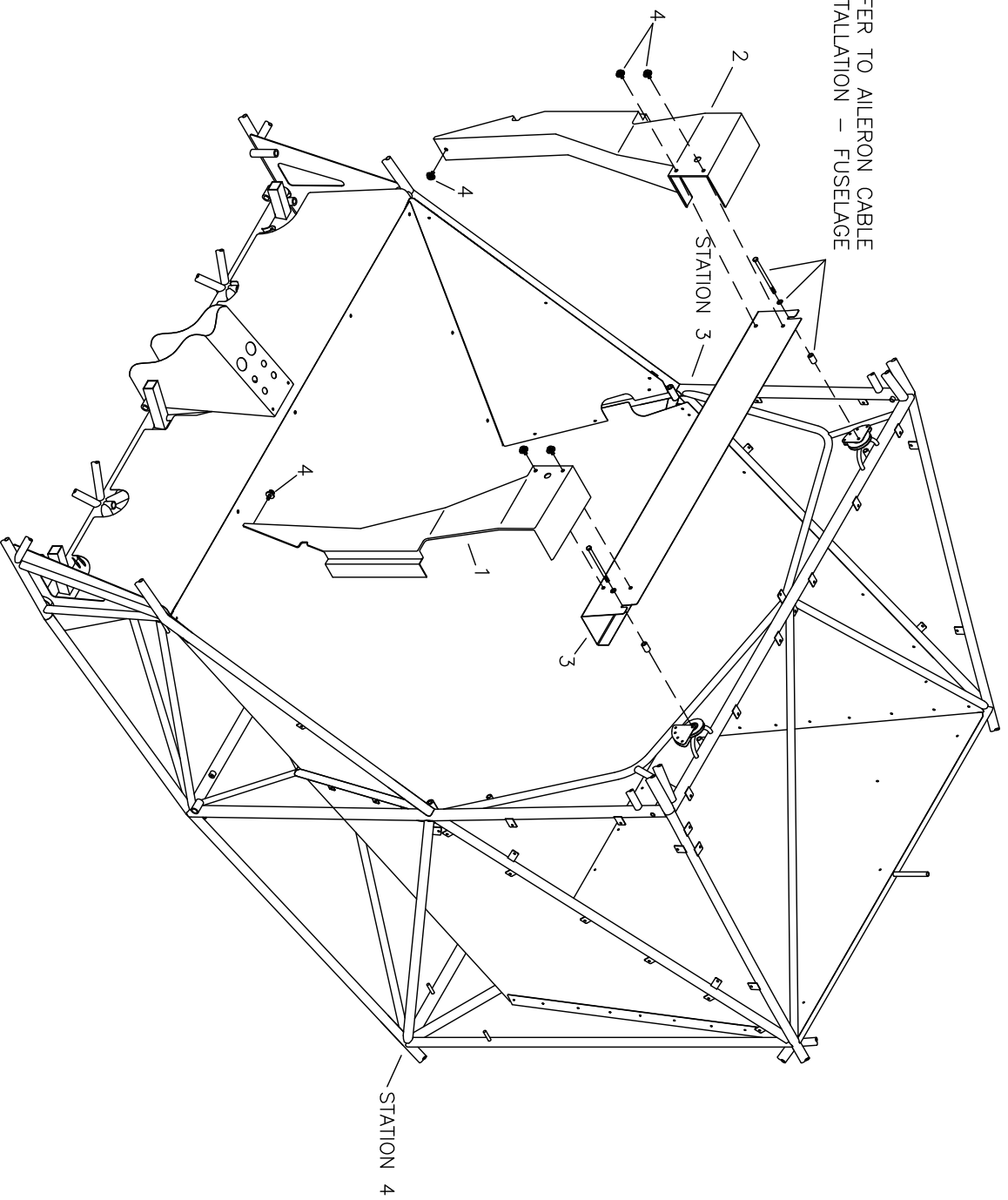
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Fuel Valve Indicator Plate	KPIN0131	1
2.	AFT Side Kick Panel - LH	KPIN0120-L	1
2.	AFT Side Kick Panel - RH	KPIN0120-R	1
3.	FWD Side Kick Panel - LH	KPIN0121-L	1
3.	FWD Side Kick Panel - RH	KPIN0121-R	1
4.	Side Kick Panel *	KPIN0123	0
5.	1/8" Aluminum Rivet - Avex	1691-0410	10
6.	3/32" Aluminum Rivet	40APR1/8	12
7.	Fuel Valve Guard	KPIN0130	1
8.	Brass Bolt	MS35214-20	2
9.	1/8" Small Brass Washer	AN960-B4	2
10.	#4-40 Nut	AN364-440A	2

* Builder Supplied

9/1/2013

REV. A

REFER TO ALERON CABLE
SYSTEM INSTALLATION – FUSELAGE

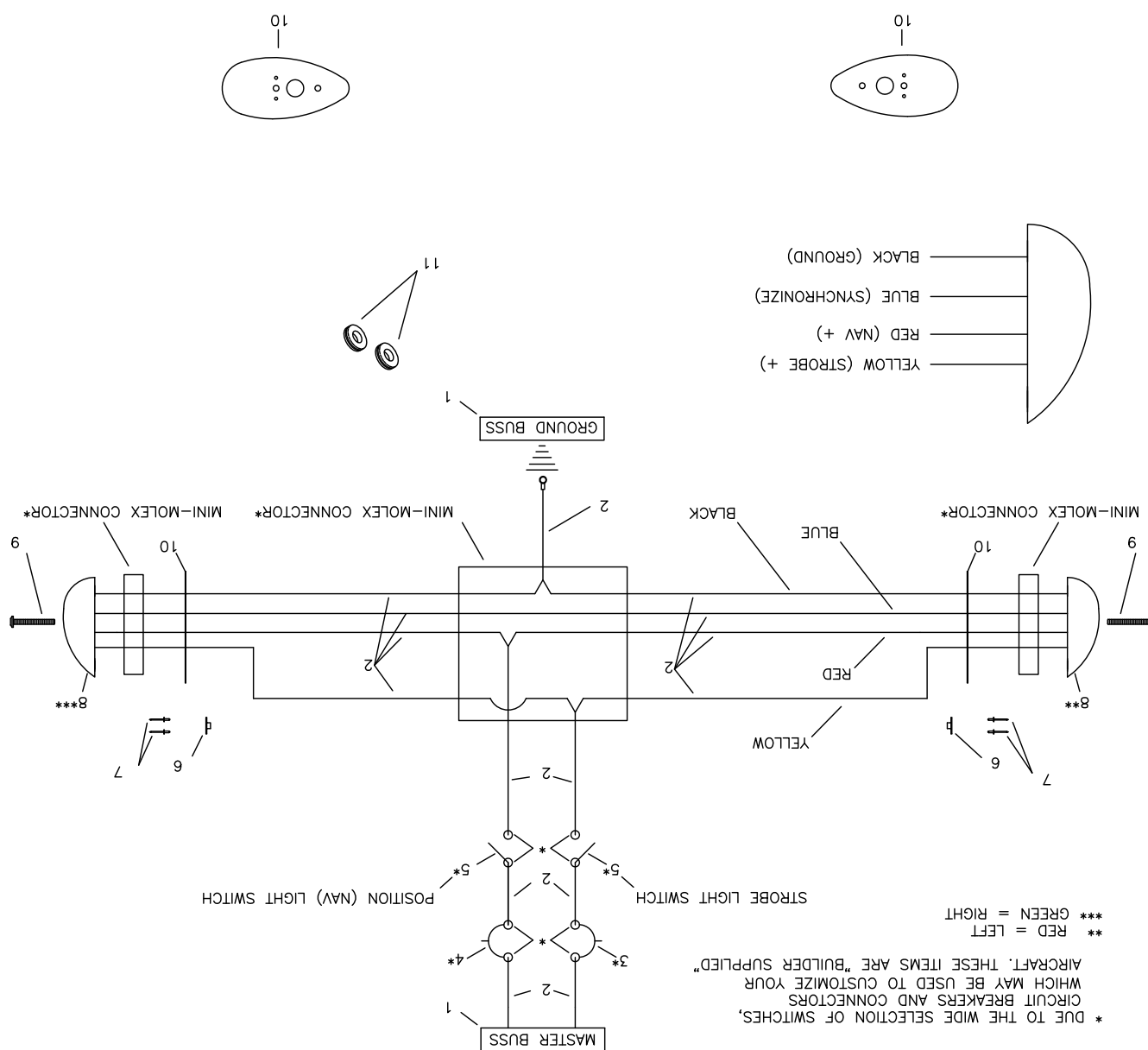


SECTION S-20 RAVEN
STATION 3 CLOSEOUT

RANS S-20 RAVEN - STATION 3 CLOSEOUT

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Station 3 Closeout - Side - LH	KPIN0113-L	1
2.	Station 3 Closeout - Side - RH	KPIN0113-R	1
3.	Station 3 Closeout - Upper	KPIN0115	1
4.	Screw Rivet	M60-0580-01	6

MD2668



RANS S-20 RAVEN - OPTIONS - AVEO STROBE INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Electrical Buss Bar * ****	AMW 636	0
2.	4-Wire Bundle - 18 Gauge Wire * **	KSES0060	0
3.	Circuit Breaker - 5 amp *	-----	0
4.	Circuit Breaker - 2 amp *	-----	0
5.	Switch *	-----	0
6.	3/16" Nut Plate ***	K-1000-3	0
7.	3/32" Aluminum Rivet ***	40APR1/8	0
8.	Strobe Light Set - AVEO	KSES0059	1 set
9.	10-32 Socket Head Cap Screw	KSHW0115	2
10.	Strobe Light Mount - AVEO ***	KPWI0541	0
11.	Rubber Grommet	MS35489-6	2

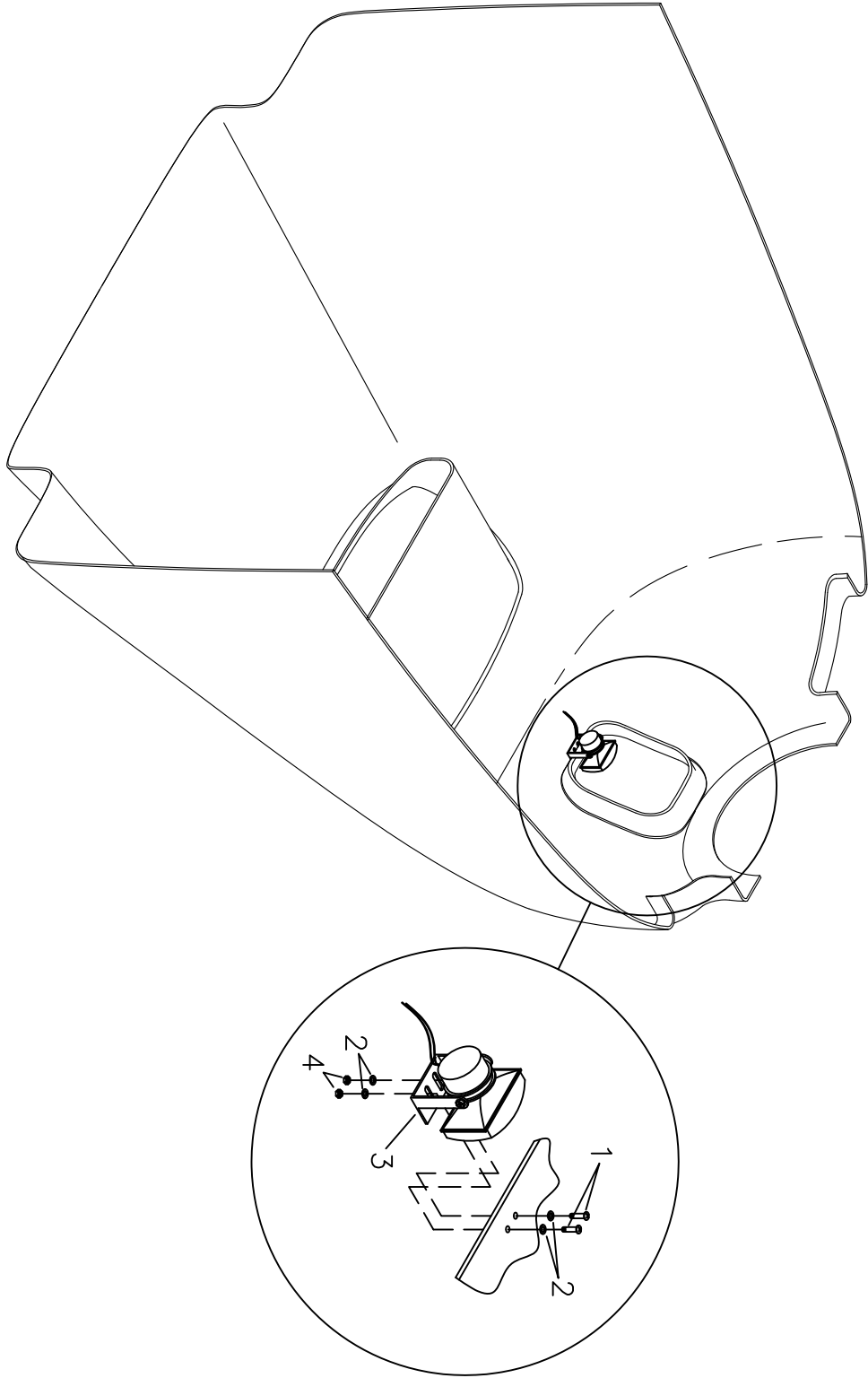
* Builder Supplied

** 4 separate 18 gauge wires may also be used

*** included with Wing Tip

**** May be purchased separately, call RANS Parts Dept. for pricing

9/1/2013



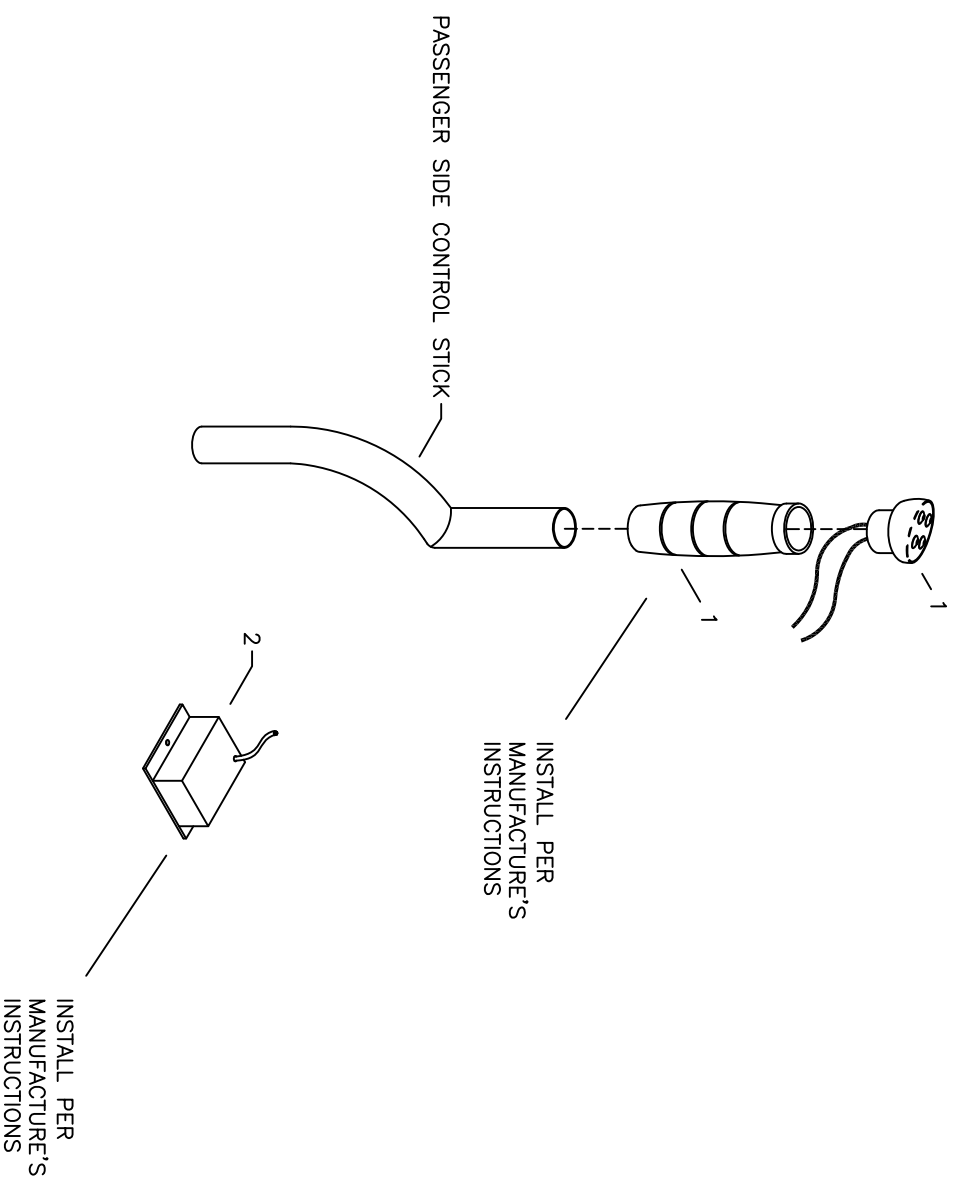
REPLACES S-20 RAVEN
OPTIONS

COWLING LANDING LIGHT INSTALLATION

MD5498
REV. A

RANS S-20 RAVEN - OPTIONS - COWLING LANDING LIGHT INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	#8 Truss Head Screw	AN515-8R7	2
2.	#8 Small Brass Washer	AN960-B8	4
3.	Landing Light	KSES0068	1
4.	8-32 Shear Nut	AN364-832A	2



MD3649

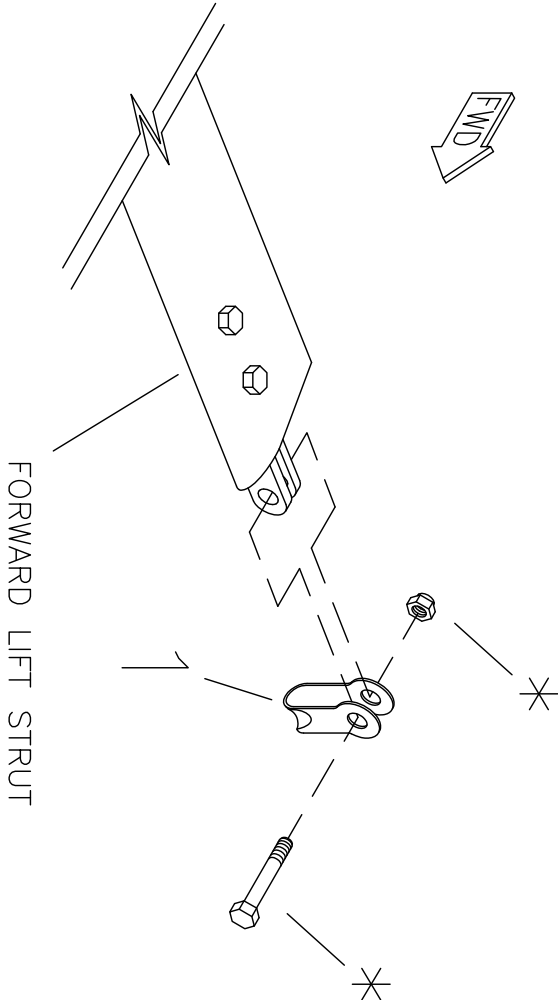
REDA S-20 RAVEN OPTIONS

PASSENGER SEAT ELECTRIC ELEVATOR TRIM

RANS S-20 RAVEN - OPTIONS - PASSENGER SEAT ELECTRIC ELEVATOR TRIM**KAAC0054**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	MAC Control Stick Grip	KSCS0016	1
2.	Servo Relay Deck	KSCS0027	1

* REFER TO LIFT STRUT ASSEMBLY & INSTALLATION

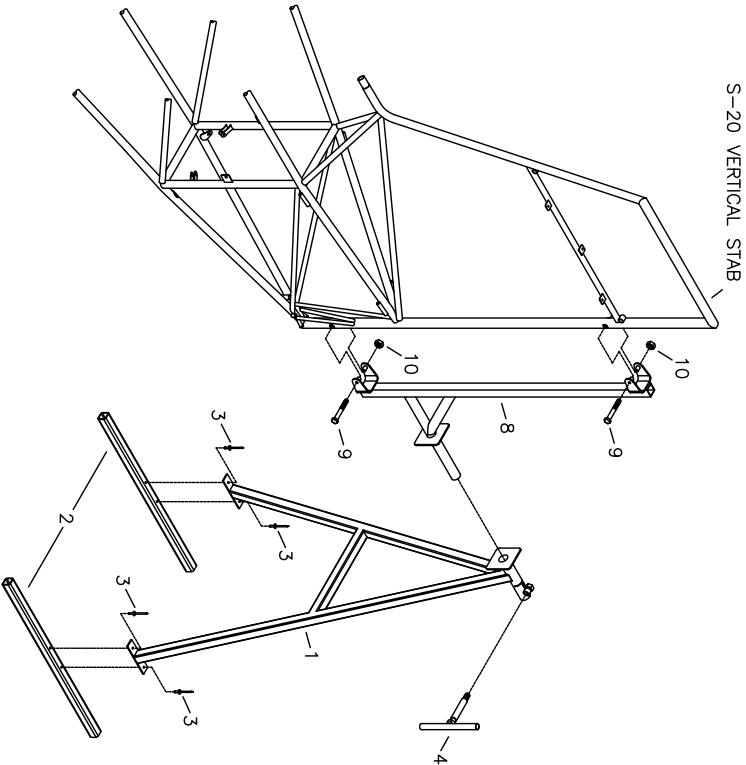
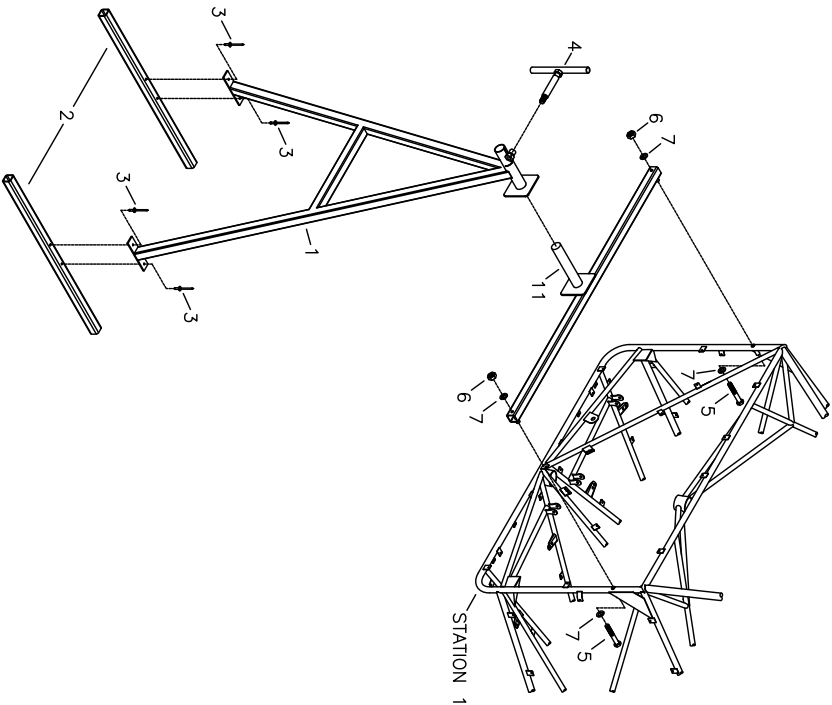


FORWARD LIFT STRUT

RAVEN S-20
OPTIONS
THE DOWN SHACKLE INSTALLATION

RANS S-20 RAVEN - OPTIONS - TIE DOWN SHACKLE INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1 .	Shackle - Tie Down	KPAC0240	2



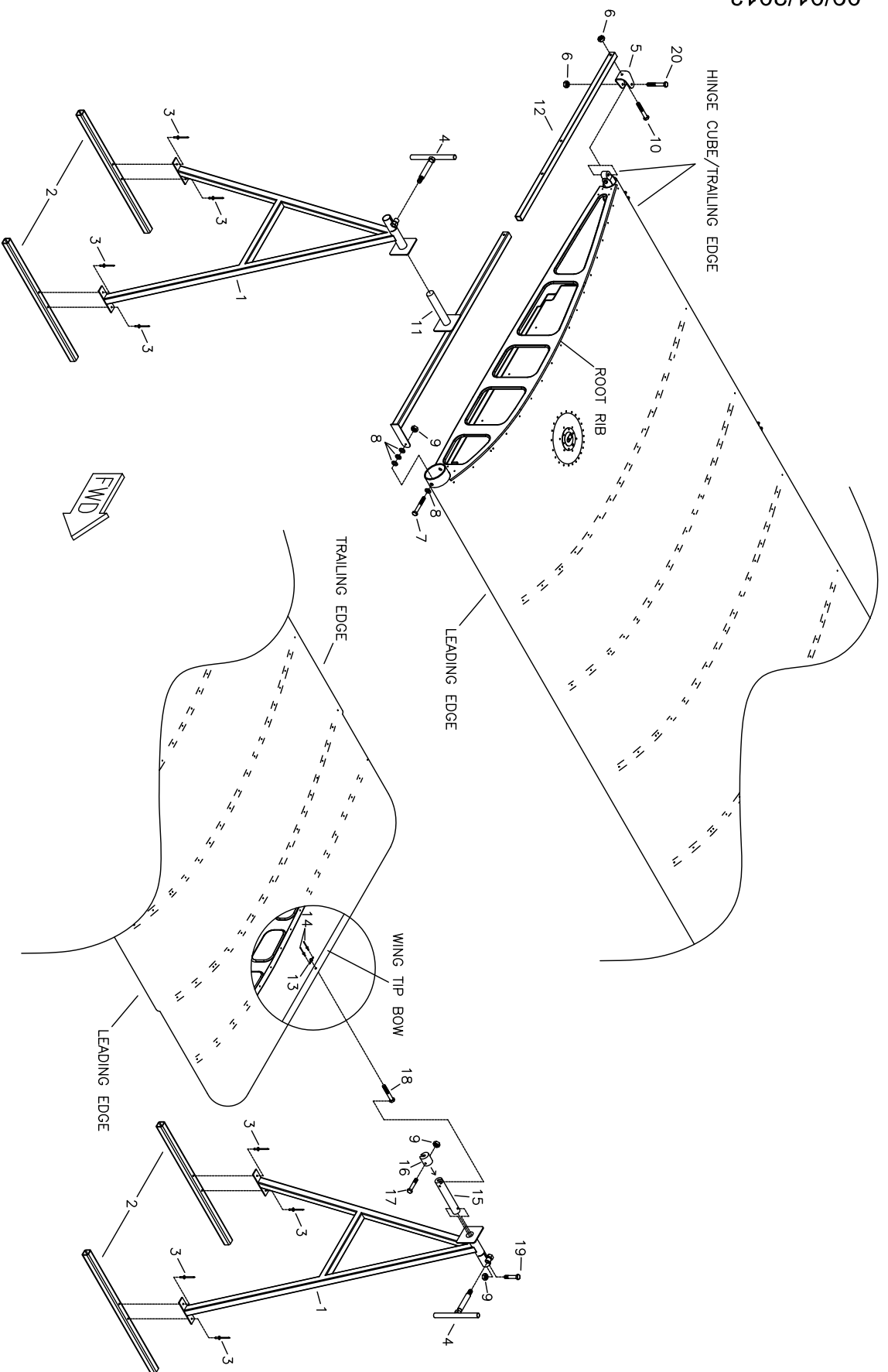
REVISIONS S-20 RAVEN
OPTIONS

COVER / PAINT STANDS - FUSELAGE

MD5624
REV. — ORIG

RANS S-20 RAVEN - OPTIONS - COVER / PAINT STANDS - FUSELAGE

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	A-Frame Stand	KP-100	2
2.	A-Frame Stand - Base	KP-100-5	4
3.	3/16" Aluminum Rivet - Cherry Q	AAPQ-64	8
4.	"T" Lock Handle	KP-107	2
5.	1/4" Bolt	AN4-32A	2
6.	1/4" Shear Nut	AN364-428A	2
7.	1/4" Thick Washer	AN960-416	4
8.	AFT Fuselage Attach	KP-112	1
9.	3/16" Bolt	AN3-26A	2
10.	3/16" Shear Nut	AN364-1032A	2
11.	FWD Fuselage Attach	KP-101	1

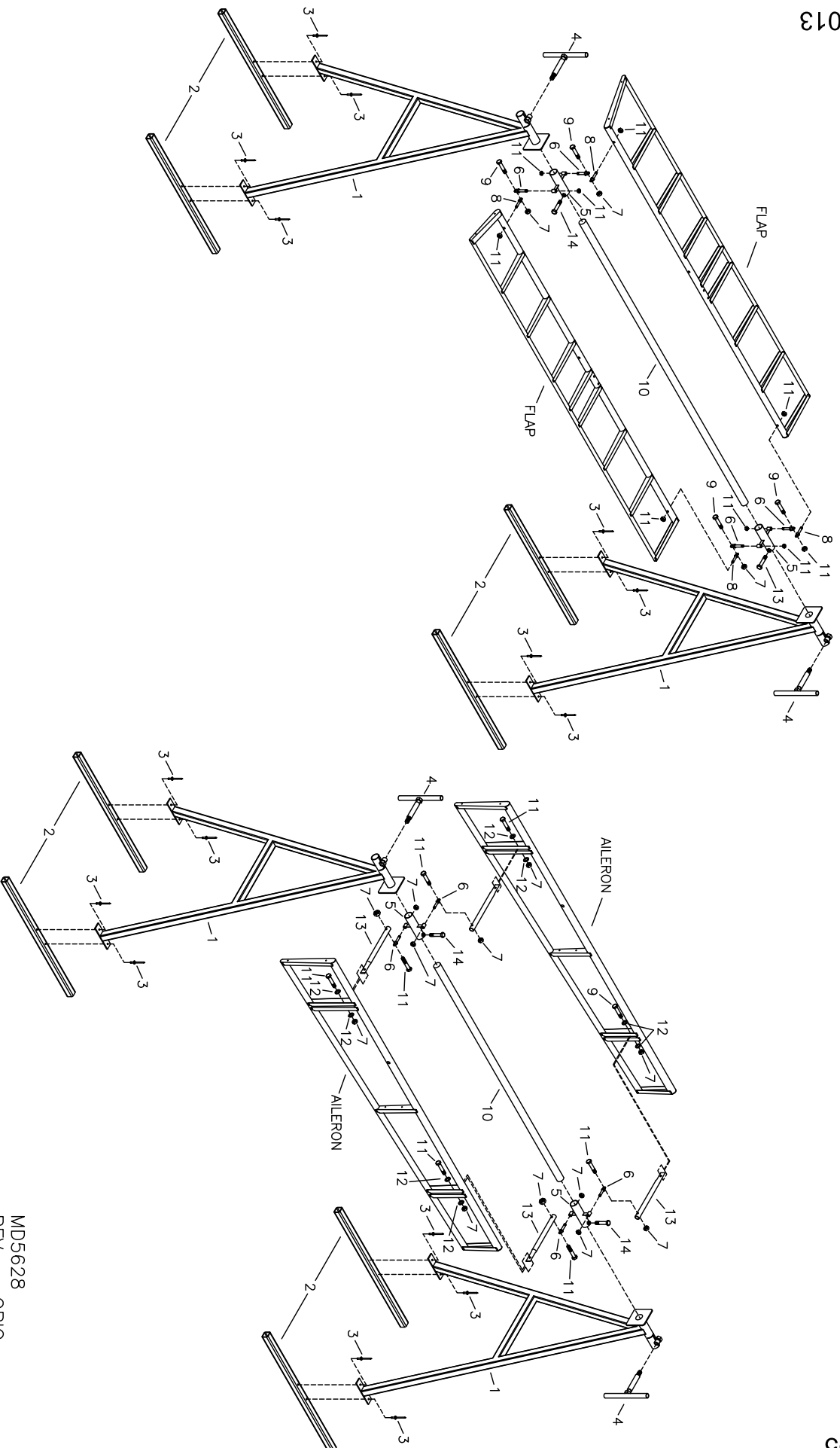


REFINISH S-20 RAVEN
OPTIONS
COVER / PAINT STANDS - WING

MD5625
REV. - ORIG

RANS S-20 RAVEN - OPTIONS - COVER / PAINT STANDS - WING

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	A-Frame Stand	KP-100	2
2.	A-Frame Stand - Base	KP-100-5	4
3.	3/16" Aluminum Rivet - Cherry Q	AAPQ-64	8
4.	"T" Lock Handle	KP-107	2
5.	1" Stainless Steel U-Bracket	SU-118	1
6.	1/4" Shear Nut	AN364-428A	2
7.	3/16" Bolt	AN3-10A	1
8.	3/16" Plastic Washer	PW-3	4
9.	3/16" Shear Nut	AN364-1032A	3
10.	1/4" Bolt	AN4-13A	1
11.	Wing Root Attach	KP-103	1
12.	Wing Root Attach - Extension	KP-103-4	1
13.	3/16" Nut Plate	K-1000-3	2
14.	3/32" Aluminum Rivet	40APR1/8	4
15.	Wing Tip Pivot - Spindle	KP-117-1	1
16.	Wing Tip Pivot - Retainer	KP-117-2	1
17.	3/16" Bolt	AN3-15A	1
18.	3/16" Bolt	AN3-21A	1
19.	3/16" Bolt	AN3-13A	1
20.	1/4" Bolt	AN4-15A	1



RFMD S-20 RAVEN OPTIONS

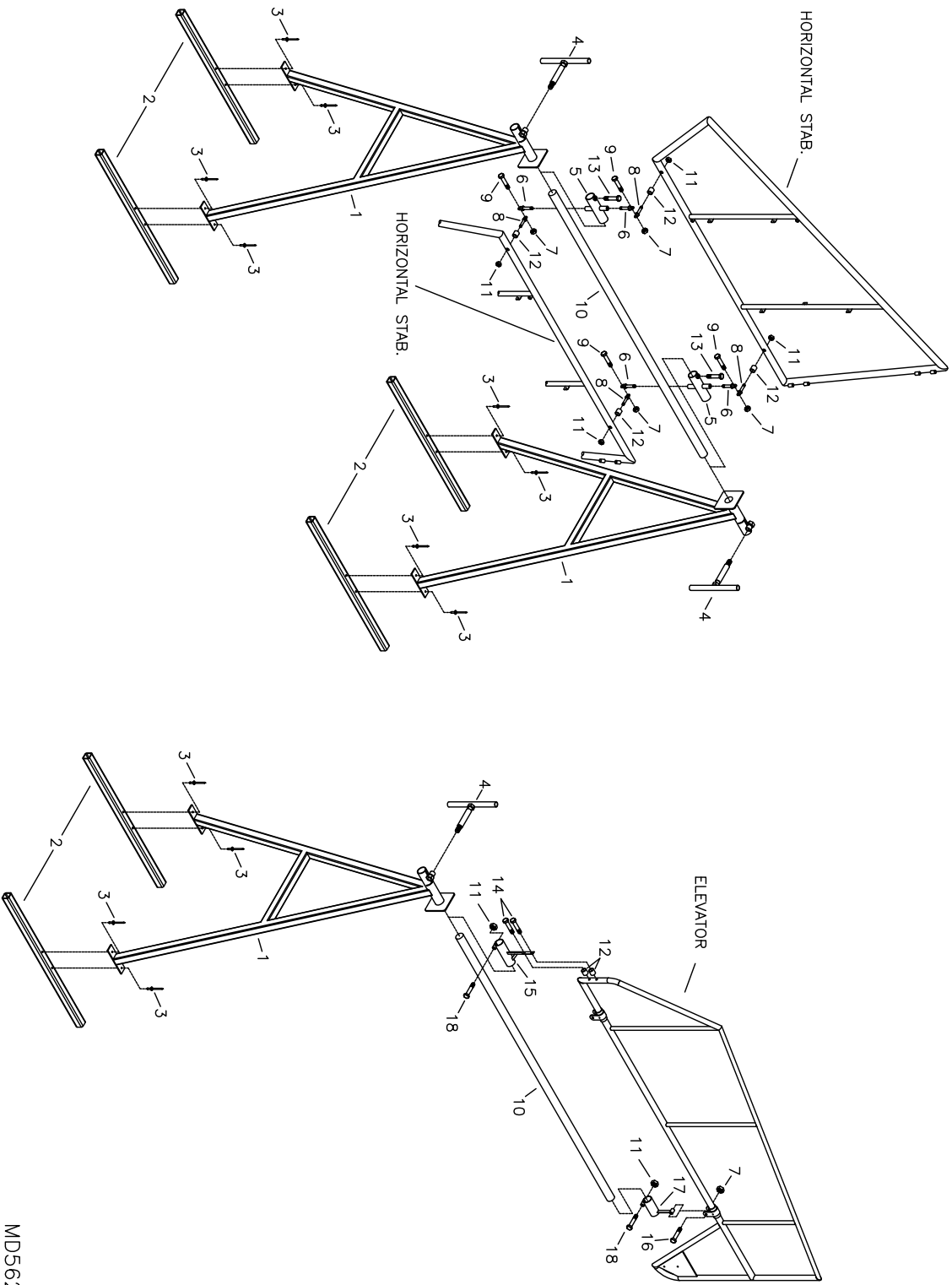
COVER / PAINT STANDS - FLAPS & AILERONS

MD5628
REV. - ORIG

RANS S-20 RAVEN - OPTIONS - COVER / PAINT STANDS - FLAPS & AILERONS

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	A-Frame Stand	KP-100	2
2.	A-Frame Stand - Base	KP-100-5	4
3.	3/16" Aluminum Rivet - Cherry Q	AAPQ-64	8
4.	"T" Lock Handle	KP-107	2
5.	Paint Stand	KP-108	2
6.	3/16" Eye Bolt	AN42B-12A	4
7.	3/16" Shear Nut	AN364-1032A	12
8.	3/16" Eye Bolt	AN42B-22A	4
9.	3/16" Bolt	AN3-4A	4
10.	1" x 8.5 ft - Tube or Dowel *	-----	0
11.	3/16" Bolt	AN3-7A	8
12.	3/16" Thin Washer	AN960-10L	8
13.	Aileron Attach	KP-118	4
14.	1/4" Plain Bolt	KSHW0016	2

* Builder Supplied



S-20 RAVEN
OPTIONS

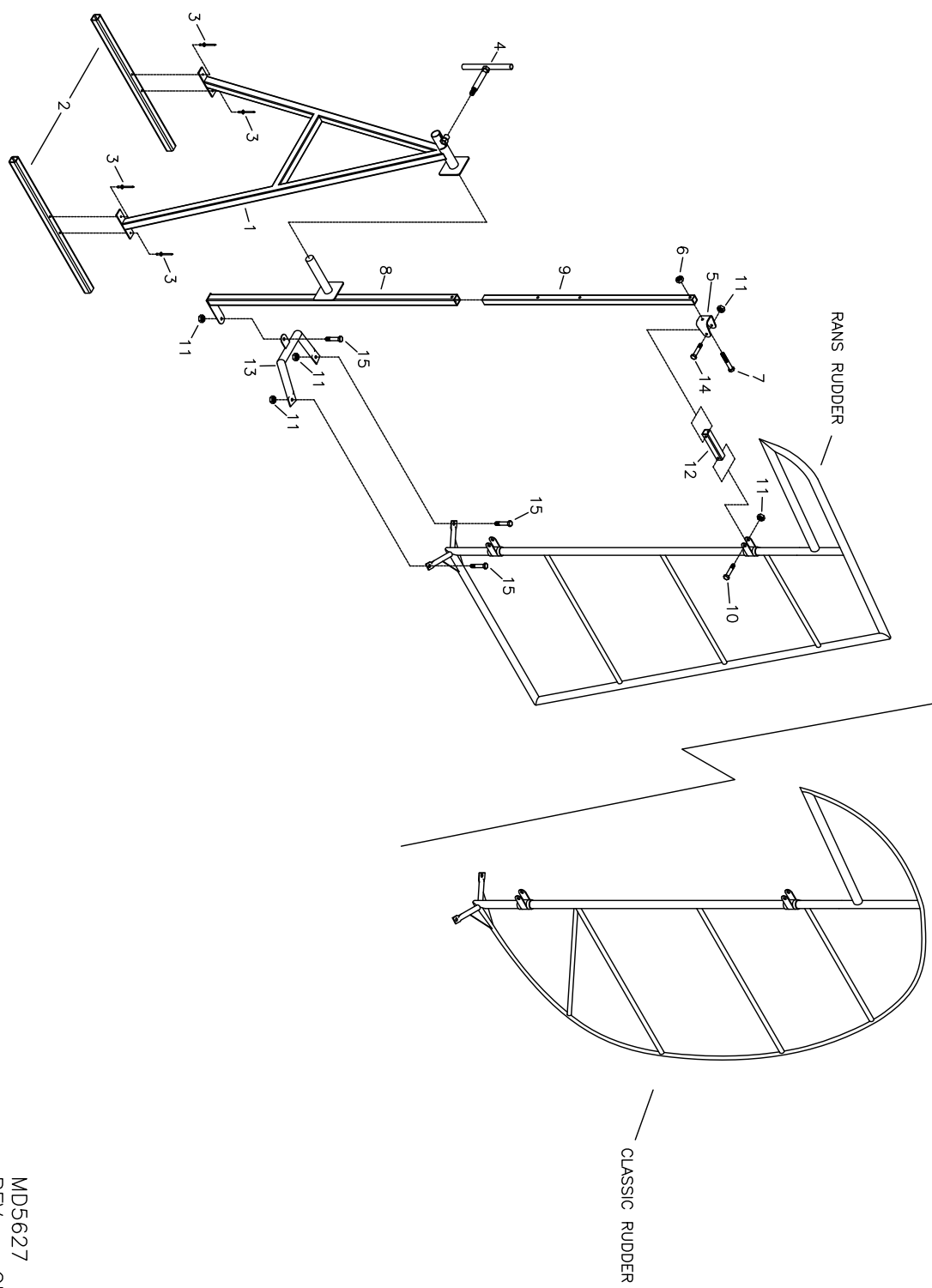
COVER / PAINT STANDS - HORIZONTAL STABILIZERS & ELEVATORS

MD5626
REV. - ORIG

RANS S-20 RAVEN - OPTIONS - COVER / PAINT STANDS - HORZ. STABS & ELEVATORS

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	A-Frame Stand	KP-100	2
2.	A-Frame Stand - Base	KP-100-5	4
3.	3/16" Aluminum Rivet - Cherry Q	AAPQ-64	8
4.	"T" Lock Handle	KP-107	2
5.	Paint Stand	KP-109	2
6.	3/16" Eye Bolt	AN42B-12A	4
7.	3/16" Shear Nut	AN364-1032A	8
8.	1/4" Eye Bolt	AN43B-20A	4
9.	3/16" Bolt	AN3-4A	4
10.	1" x 8.5 ft - Tube or Dowel *	-----	0
11.	1/4" Shear Nut	AN364-428A	8
12.	Aluminum Spacer Bushing - 3/8" x .058" x 1/2"	SB-3/8X1/2X058	4
13.	1/4" Plain Bolt	KSHW0016	2
14.	3/16" Bolt	AN3-17A	4
15.	Elevator Root Attach	KP-119	2
16.	3/16" Bolt	AN3-14A	2
17.	Elevator Outer Attach	KP-120	2
18.	1/4" Bolt	AN4-15A	4

* Builder Supplied

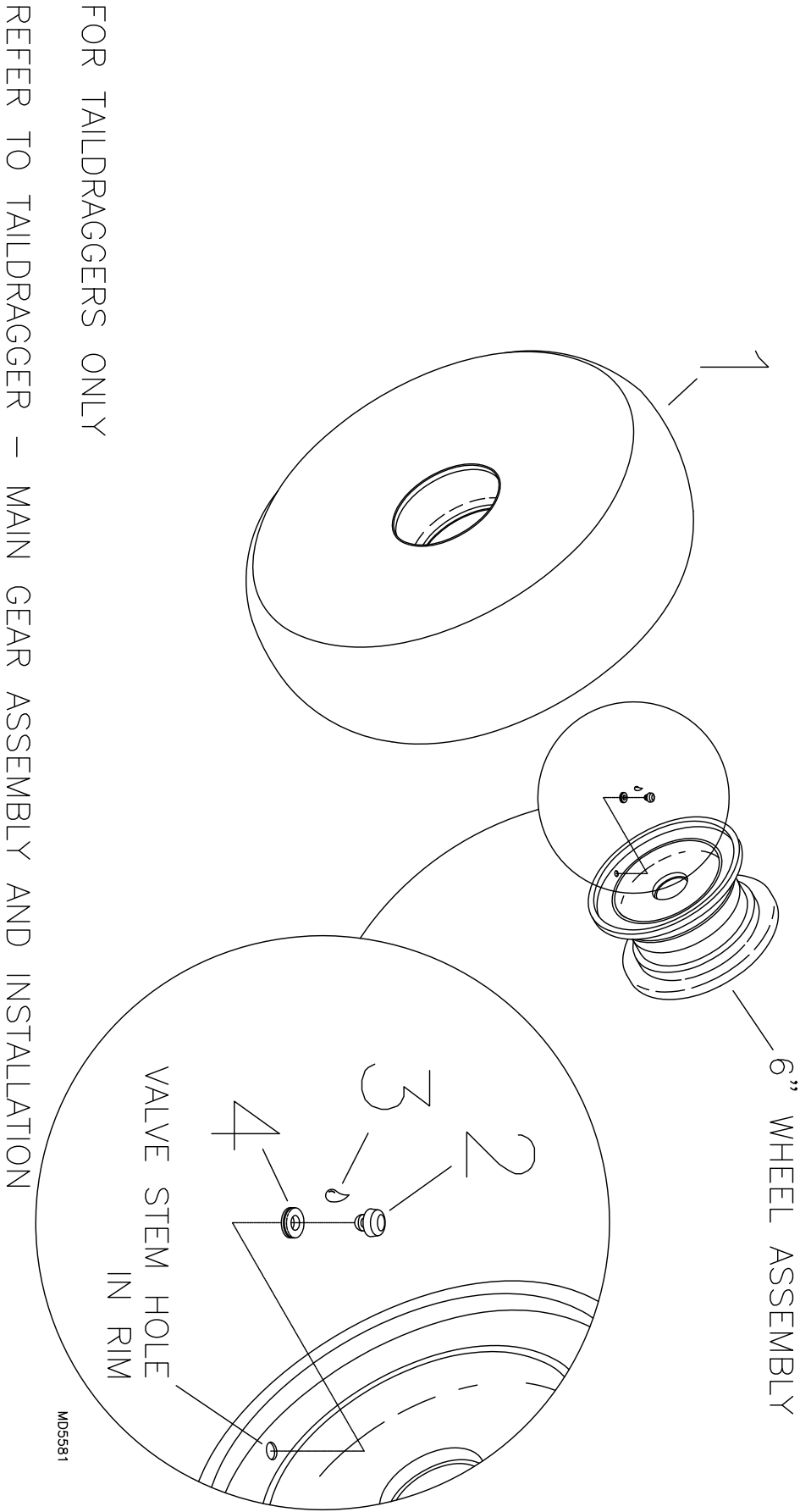


RANS S-20 RAVEN
OPTIONS
COVER / PAINT STANDS - RUDDER

MD5627
REV. - ORIG

RANS S-20 RAVEN - OPTIONS - COVER / PAINT STANDS - RUDDER

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	A-Frame Stand	KP-100	1
2.	A-Frame Stand - Base	KP-100-5	2
3.	3/16" Aluminum Rivet - Cherry Q	AAPQ-64	4
4.	"T" Lock Handle	KP-107	1
5.	1" Stainless Steel U-Bracket	SU-118	1
6.	1/4" Shear Nut	AN364-428A	1
7.	1/4" Bolt	AN4-13A	1
8.	Wing Root Attach	KP-103	1
9.	Wing Root Attach - Extension	KP-103-4	1
10.	3/16" Bolt	AN3-14A	1
11.	3/16" Shear Nut	AN364-1032A	5
12.	Upper Rudder Support Tube	KP-121	1
13.	Lower Rudder Support	KP-122	1
14.	3/16" Bolt	AN3-15A	1
15.	3/16" Bolt	AN3-4A	3

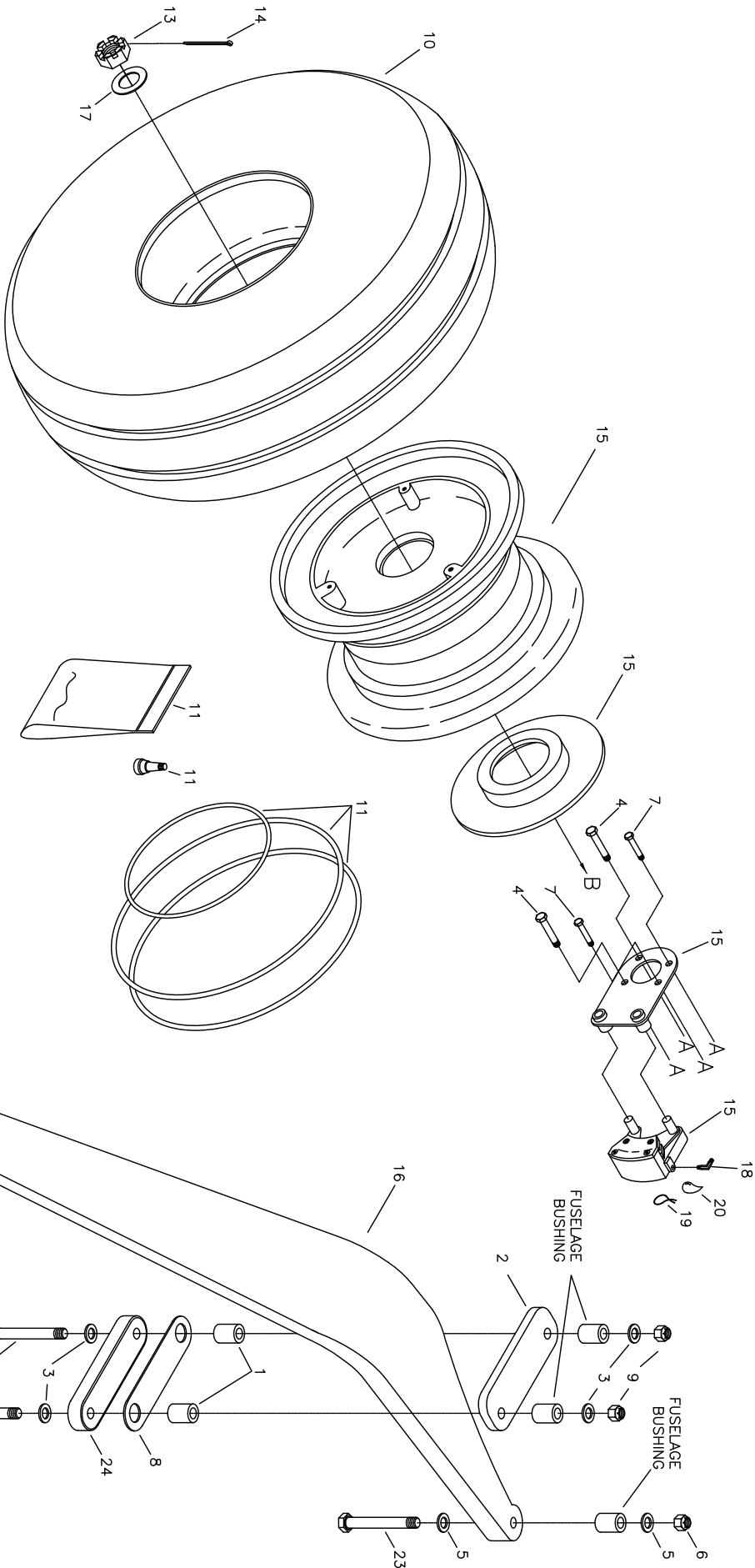


RRR S-20 RAVEN
OPTIONS
26" ALASKAN WHEELS

RANS S-20 RAVEN - OPTIONS - 26" ALASKAN WHEELS**TAILDRAGGER ONLY**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Tire - 26" Alaskan	KSMG0028	2
2.	Grommet Plug	9K13-DRBUMP	2
3.	Adhesive - Superglue *	-----	0
4.	Rubber Grommet	MS35489-6	2

* Builder Supplied



FOR TAILDRAGGERS ONLY

REFER TO TAILDRAGGER – MAIN GEAR
ASSEMBLY AND INSTALLATION

RAVEN S-20 RAVEN
OPTIONS
10" TIRE OPTION

RANS S-20 RAVEN - OPTIONS - 10" TIRE OPTION**TAILDRAGGER ONLY**

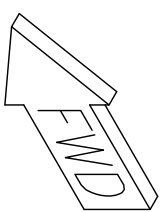
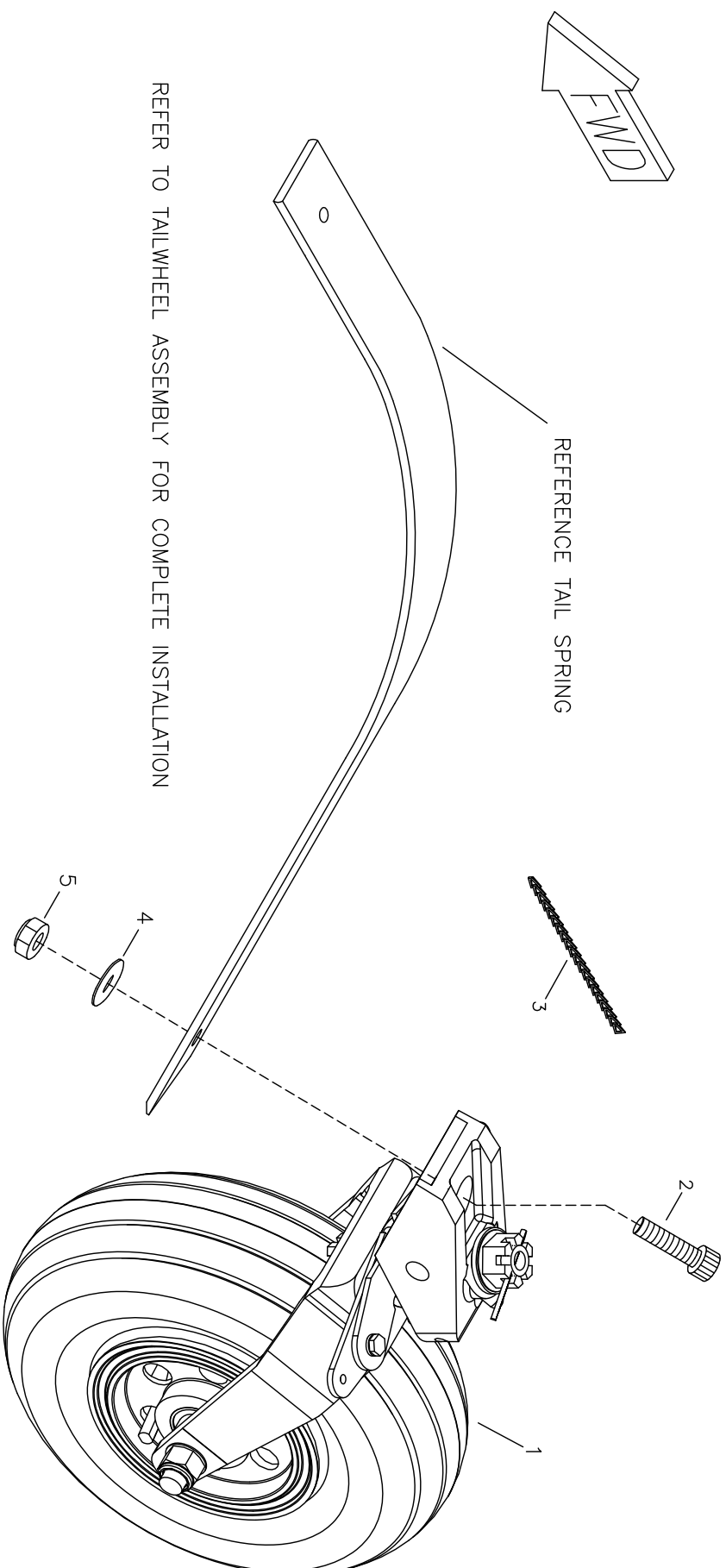
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Landing Gear Spacer Bushing	KPMG0211	4
2.	Top Main Gear Clamp Plate	KPMG0206	2
3.	5/16" Thick Washer	AN960-516	12
4.	3/8" Bolt	AN6-23A	4
5.	3/8" Thick Washer	AN960-616	8
6.	3/8" Tensile Nut	AN365-624A	6
7.	5/16" Bolt	AN5-22A	4
8.	Main Gear Anti-chafe Strip	KPMG0216	2
9.	5/16" Tensile Nut	AN365-524A	8
10.	8.50 x 10 Tire	KSMG0029	2
11.	Tubeless Kit - 10"	KSBS0041	2
12.	Axle **	----	0
13.	Castle Nut **	----	0
14.	Cotter Pin **	----	0
15.	Hydraulic Brake Assembly,10"	KSBS0040	2
16.	Gear Leg - Taildragger - LH	KPMG0209-L	1
16.	Gear Leg - Taildragger - RH	KPMG0209-R	1
17.	Washer **	----	0
18.	45-degree Elbow - Flare 1/4" Tube to 1/8" NPT	AN823-4D	2
19.	Safety Wire *	----	0
20.	Thread Sealant *	----	0
21.	5/16" Bolt	AN5-40A	2
22.	5/16" Bolt	AN5-31A	2
23.	3/8" Bolt	AN6-27A	2
24.	Bottom Main Gear Clamp Plate	KPMG0208	2

* Builder Supplied

** Supplied with KSBS0040

9/1/2013

REV. A



REFERENCE TAIL SPRING

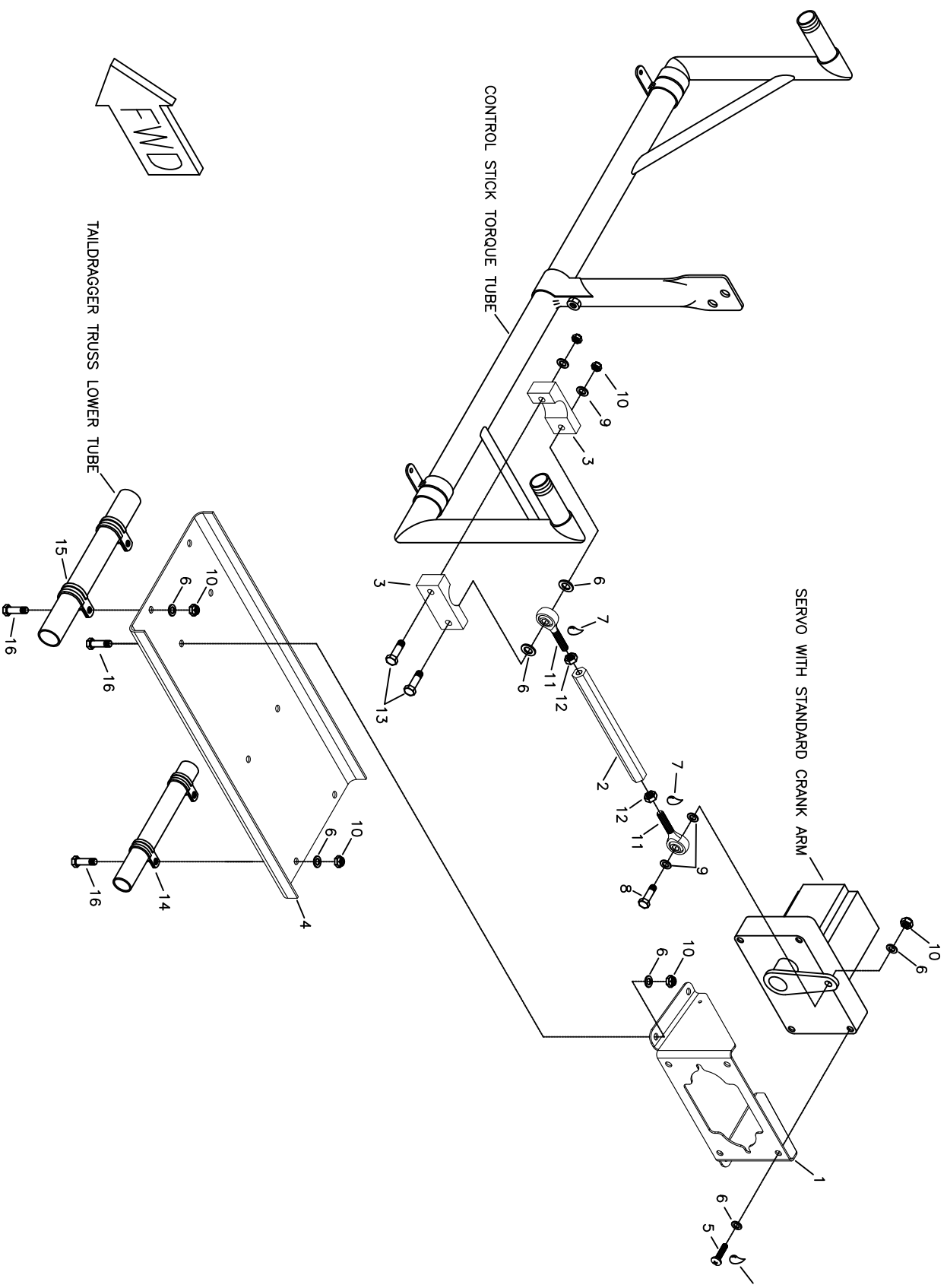
REFER TO TAILWHEEL ASSEMBLY FOR COMPLETE INSTALLATION

RRM S-20 RAVEN OPTIONS 10" TAILWHEEL ASSEMBLY AND INSTALLATION

RANS S-20 RAVEN - OPTIONS - 10" TAILWHEEL**TAILDRAGGER ONLY**

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	10" Pneumatic Tailwheel Assembly *	KSTG0011	1
2.	Socket head Cap Screw	KSHW0058	1
3.	Chain - Steer Horn	TW-C	1
4.	3/8" Thick Washer	AN960-616	1
5.	3/8" Tensile Loc-Nut	AN363-624A	1

* Replaces KATG0006 Tailwheel Assembly

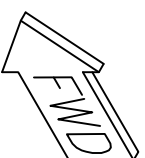
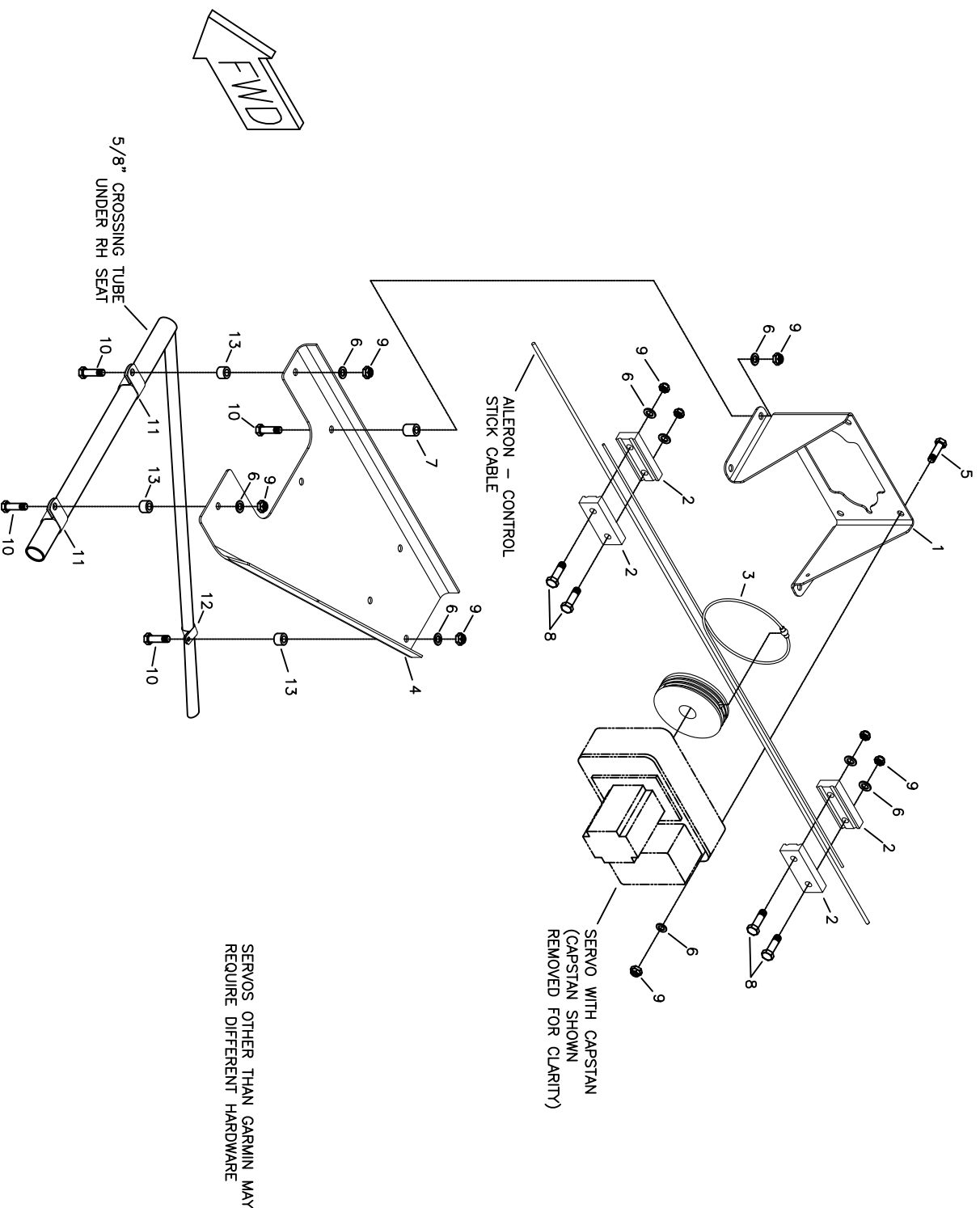


RAVEN S-20 RAVEN OPTIONS - PITCH SERVO INSTALLATION

RANS S-20 RAVEN - OPTIONS - PITCH SERVO INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Autopilot Servo Mount	KPFU0665	1
2.	Autopilot Control Link Tube	KPCS0298	1
3.	Autopilot Control Stick Clamp	KPCS0294	2
4.	Autopilot Control Stick Mount	KPCS0297	1
5.	3/16" Truss Head Screw	AN526-C1032-R12	4
6.	3/16" Thin Washer	AN960-10L	14
7.	Loctite Blue *	-----	0
8.	3/16" Bolt	AN3-6A	1
9.	3/16" Thick Washer	AN960-10	4
10.	3/16" Shear Nut	AN364-1032A	7
11.	3/16" Male Rod End	CM-3	2
12.	3/16" Plain Nut	AN345-10	2
13.	3/16" Bolt	AN3-13A	2
14.	5/8" Cushion Clamp	MS21919-DG10	2
15.	3/4" Cushion Clamp	MS21919-DG12	2
16.	3/16" Bolt	AN3-4A	8

* Builder Supplied



OPTIONS - ROLL SERVO INSTALLATION

RANS S-20 RAVEN - OPTIONS - ROLL SERVO INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Autopilot Servo Mount	KPFU0665	1
2.	Autopilot Cable Clamp	KPCS0295	4
3.	Autopilot Roll Control Cable	KPCS0316	1
4.	Autopilot Cable Control Mount	KPCS0296	1
5.	3/16" Bolt	AN3-3A	4
6.	3/16" Thin Washer	AN960-10L	15
7.	Aluminum Bushing - 3/8" x .095" x 3/8" *	KPST0132	1
8.	3/16" Bolt	AN3-7A	4
9.	3/16" Shear Nut	AN364-1032A	11
10.	3/16" Bolt	AN3-6A	7
11.	5/8" Plain Clamp	AN742-D10	2
12.	1/2" Plain Clamp	AN742-D8	1
13.	Aluminum Bushing - 3/8" x .095" x 5/16" *	KPST0132	0

* Builder Modifies