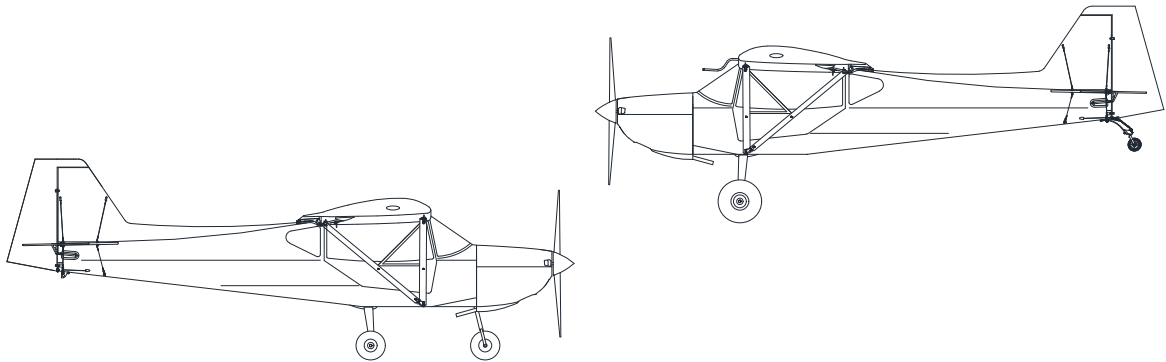


RANS

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**



U.S. Department
of Transportation
**Federal Aviation
Administration**

Small Airplane Directorate
Manufacturing Inspection Office
901 Locust Street, Room 301
Kansas City, Missouri 64106

October 22, 2014

Mr. Randy Schlitter
RANS Design, Inc.
4600 Highway 183 Alt
Hays, Kansas 67601

Dear Mr. Schlitter:

The Federal Aviation Administration (FAA) National Kit Evaluation Team (NKET) completed an evaluation of the RANS Design, model S-19 Venterra Quick Build and S-20 Raven Standard kits at your facility on September 23-25, 2014. These kits are defined by the Packing List dated 09/24/2014 (S-19 QB) and 09/01/2013 (S20). The team determined that these kits may allow an amateur builder to meet the major portion requirement of title 14, Code of Federal Regulations part 21, Certification Procedures for Products and Parts, § 21.191 (g).

We will advise the Aircraft Certification Service' Certification Procedures Branch to add the kits to the Revised Listing of Amateur-Built Aircraft Kits (Kit List) located on the FAA website. This evaluation does not mean that the S-19 or S-20 aircraft or RANS Design, Inc. are FAA "*certified, certificated, or approved*", and it is inappropriate to represent either as such.

RANS Design, Inc. should notify this office in writing if ownership of the company changes and or if there are changes made to the evaluated kit that may affect its potential to meet the major portion requirement. Failure to notify this office may result in removal of the kit from the Kit List.

If you have any questions, please contact the Manufacturing Inspection Office (MIO) at (816) 329-4180

Sincerely,

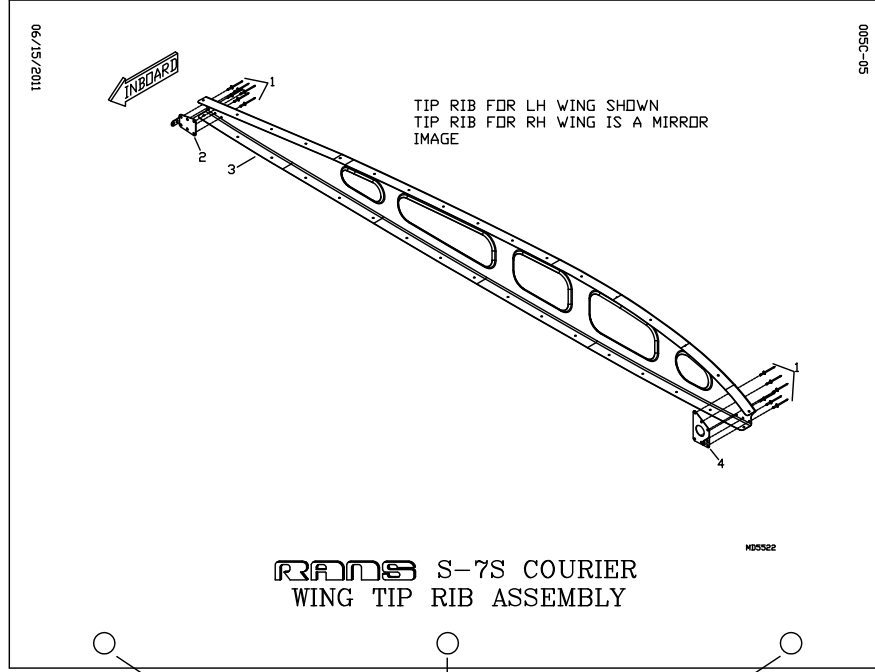
James E. Jackson
Manager, Manufacturing Inspection Office, ACE-180

Enclosure—Amateur-Built Aircraft Fabrication and Assembly Checklist

STEP 1:

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

PARTS DRAWING PAGE



3-HOLE PUNCH

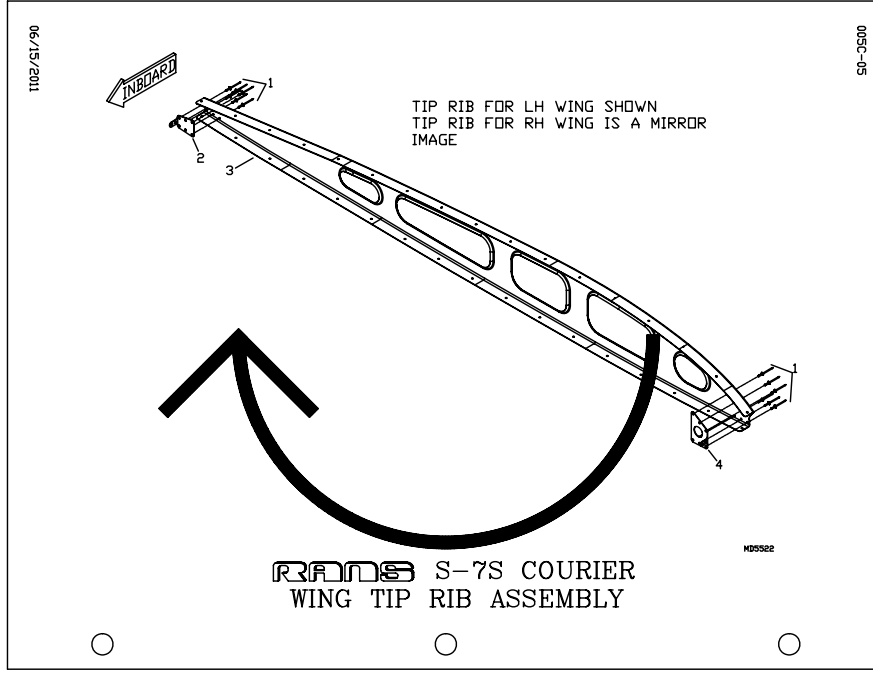
EXAMPLE ONLY.
MAY NOT REPRESENT ACTUAL PAGES
FROM YOUR MANUAL.

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

PAGE 005C-06

S-7S COURIER - WING - TIP RIB ASSEMBLY

# DESCRIPTION	PART NUMBER	QUANTITY
1. 1/8" ALUMINUM RIVET	AAQC-41	24
2. RIB CLIP TRAILING EDGE - LH	KPW0372-L	4
2. RIB CLIP TRAILING EDGE - RH	KPW0372-R	4
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

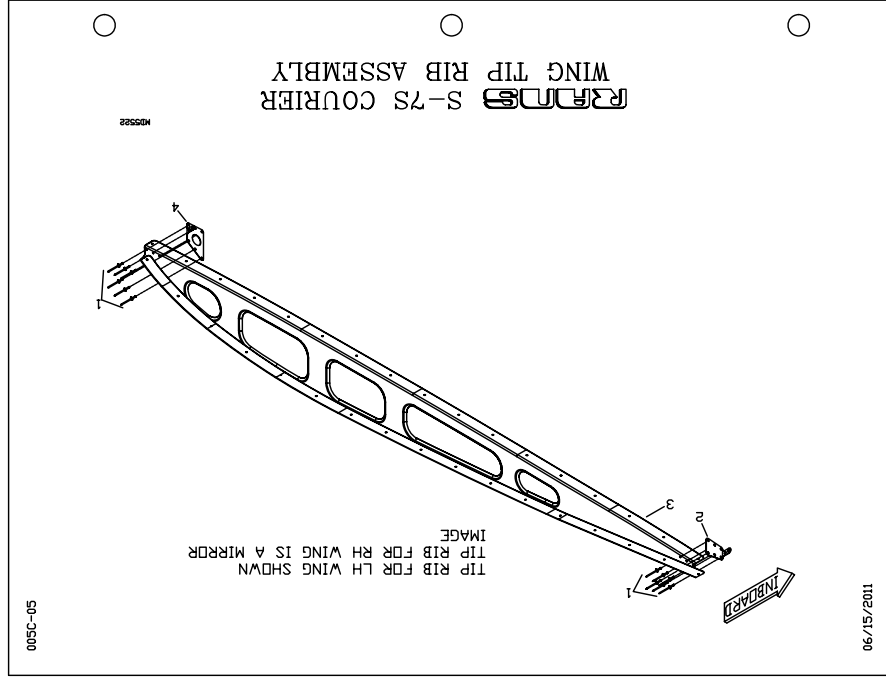
EXAMPLE ONLY.
MAY NOT REPRESENT ACTUAL PAGES
FROM YOUR MANUAL.

SEE NEXT PAGE

STEP 3:

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

PARTS DRAWING PAGE



PARTS DESCRIPTION PAGE

PAGE 005C-06

S-75 COURIER - WING - TIP RIB ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" ALUMINUM RIVET	AAPQ-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.

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

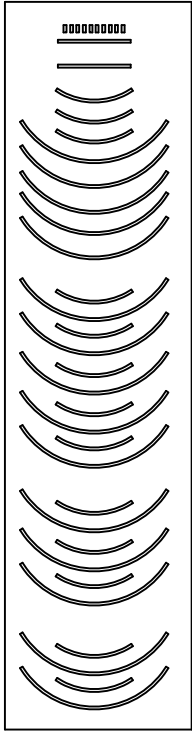
9/1/2013

REV. A

RRRDS S-20 RAVEN PLACARDS / LABELS / MARKERS

MD5619 - ORIG REV.

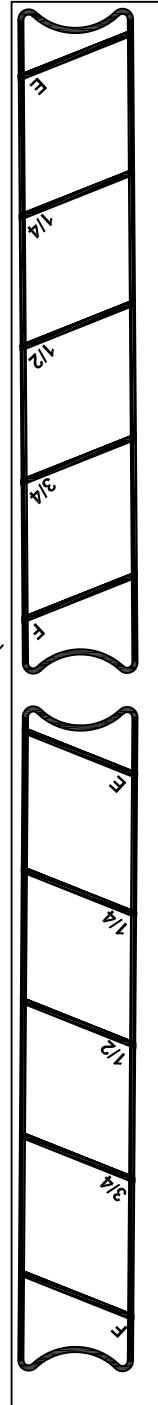
PLACARD SHEETS NOT SHOWN TO SCALE



EXPERIMENTAL

EXPERIMENTAL

PASSENGER WARNING
THIS AIRCRAFT IS AMATEUR BUILT AND DOES NOT COMPLY WITH THE FEDERAL SAFETY REGULATIONS FOR STANDARD AIRCRAFT



WARNING
AIRCRAFT FLIGHT CAN BE DANGEROUS. FLY AT YOUR OWN RISK.
This aircraft is amateur built and does not comply with the Federal Aviation Administration (FAA) safety regulations for standard aircraft. It is intended for use by experienced pilots only. The FAA has issued a Special Airworthiness Certificate (SAC) for this aircraft. The pilot is responsible for ensuring that the aircraft is airworthy and that all safety regulations are followed. The FAA has issued a Special Airworthiness Certificate (SAC) for this aircraft. The pilot is responsible for ensuring that the aircraft is airworthy and that all safety regulations are followed.

FUEL TANK CAPACITY
TOTAL OF 26 GALLONS APPROXIMATE
AVIATION GASOLINE 100LL GRADE
FOR ADDITIONAL INFORMATION SEE ENGINE OPERATING MANUAL

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AVIATION GASOLINE 100LL GRADE
FOR ADDITIONAL INFORMATION SEE ENGINE OPERATING MANUAL

BAGGAGE LIMIT: 50 LBS FWD OF S-3 & 30 LBS AFT OF S-3

BAGGAGE LIMIT: 50 LBS FWD OF S-3 & 30 LBS AFT OF S-3

OPEN DOORS AT OR BELOW 65 MPH. RESUME CRUISE. DO NOT EXCEED 100 MPH.

OPEN DOORS AT OR BELOW 65 MPH. RESUME CRUISE. DO NOT EXCEED 100 MPH.

CAUTION
FUEL VALVE
OFF ON

CAUTION
FUEL TANK CAPACITY
TOTAL OF 26 GALLONS APPROXIMATE
AVIATION GASOLINE 100LL GRADE
FOR ADDITIONAL INFORMATION SEE ENGINE OPERATING MANUAL

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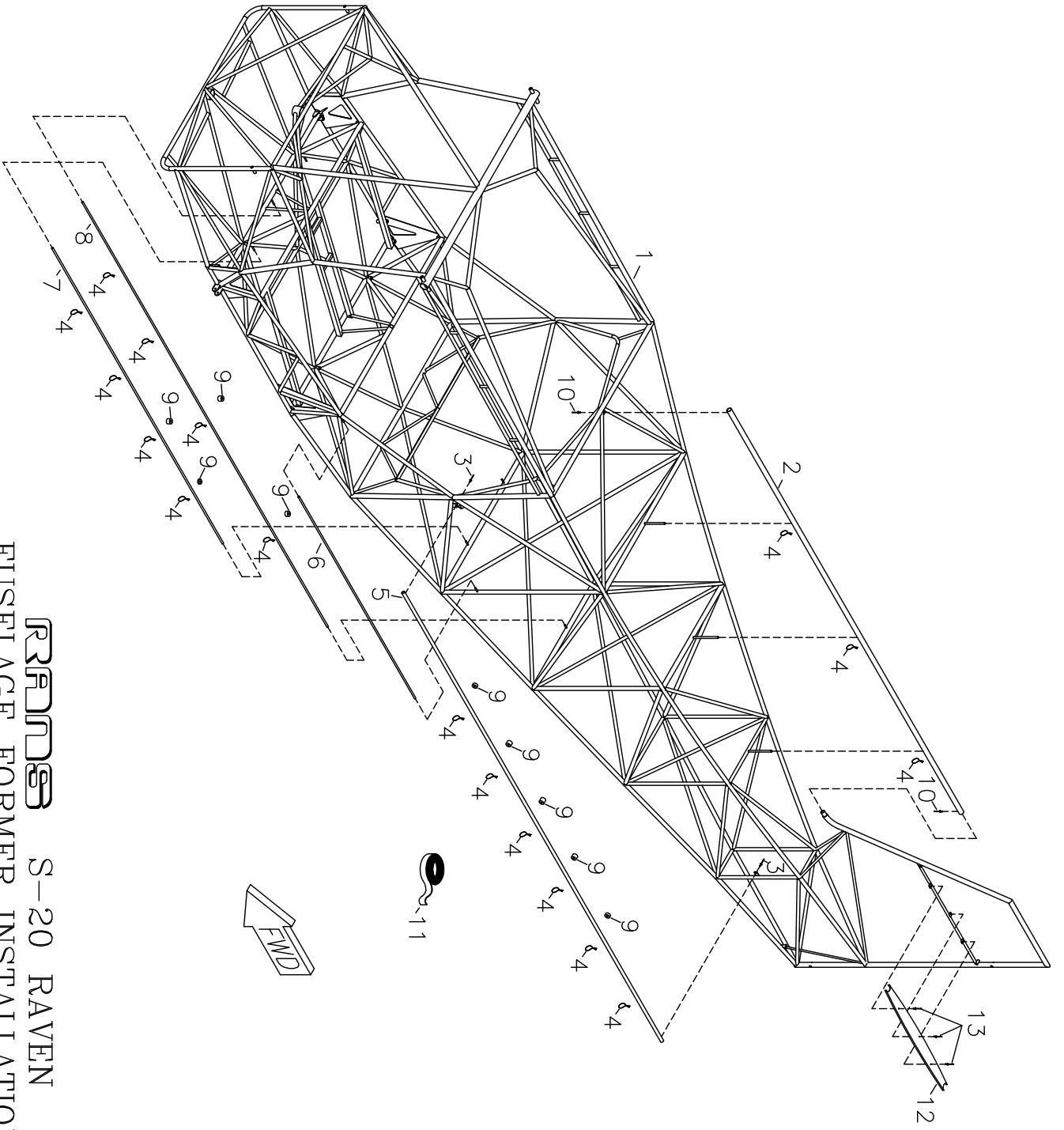
CAUTION
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RANS S-20 RAVEN - PLACARDS / LABELS / MARKERS

#	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



RRRMMBS S-20 RAVEN
FUSELAGE FORMER INSTALLATION

MD4168

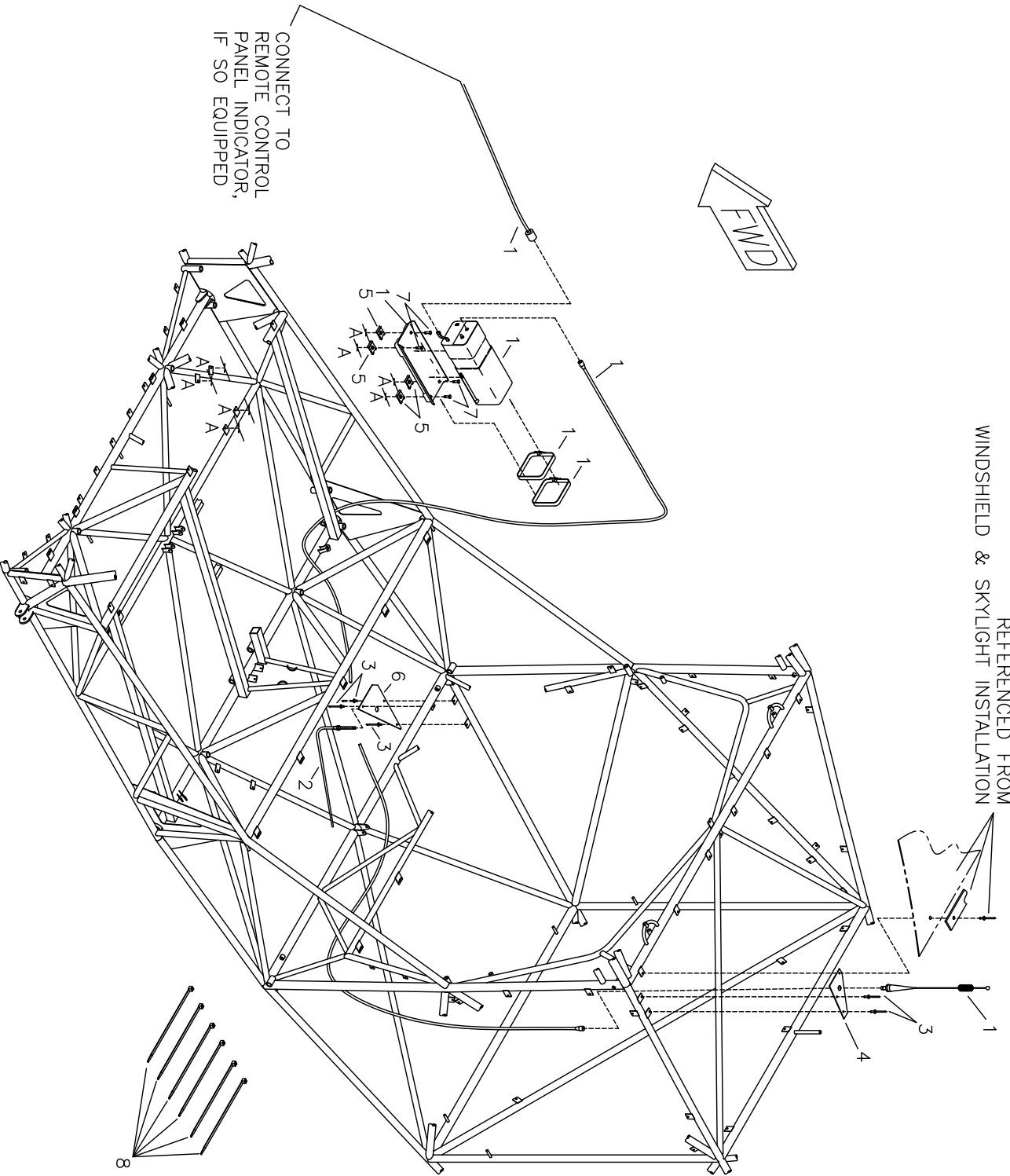
RANS S-20 RAVEN - FUSELAGE FORMER INSTALLATION

#	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

REFERENCED FROM
WINDSHIELD & SKYLIGHT INSTALLATION



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

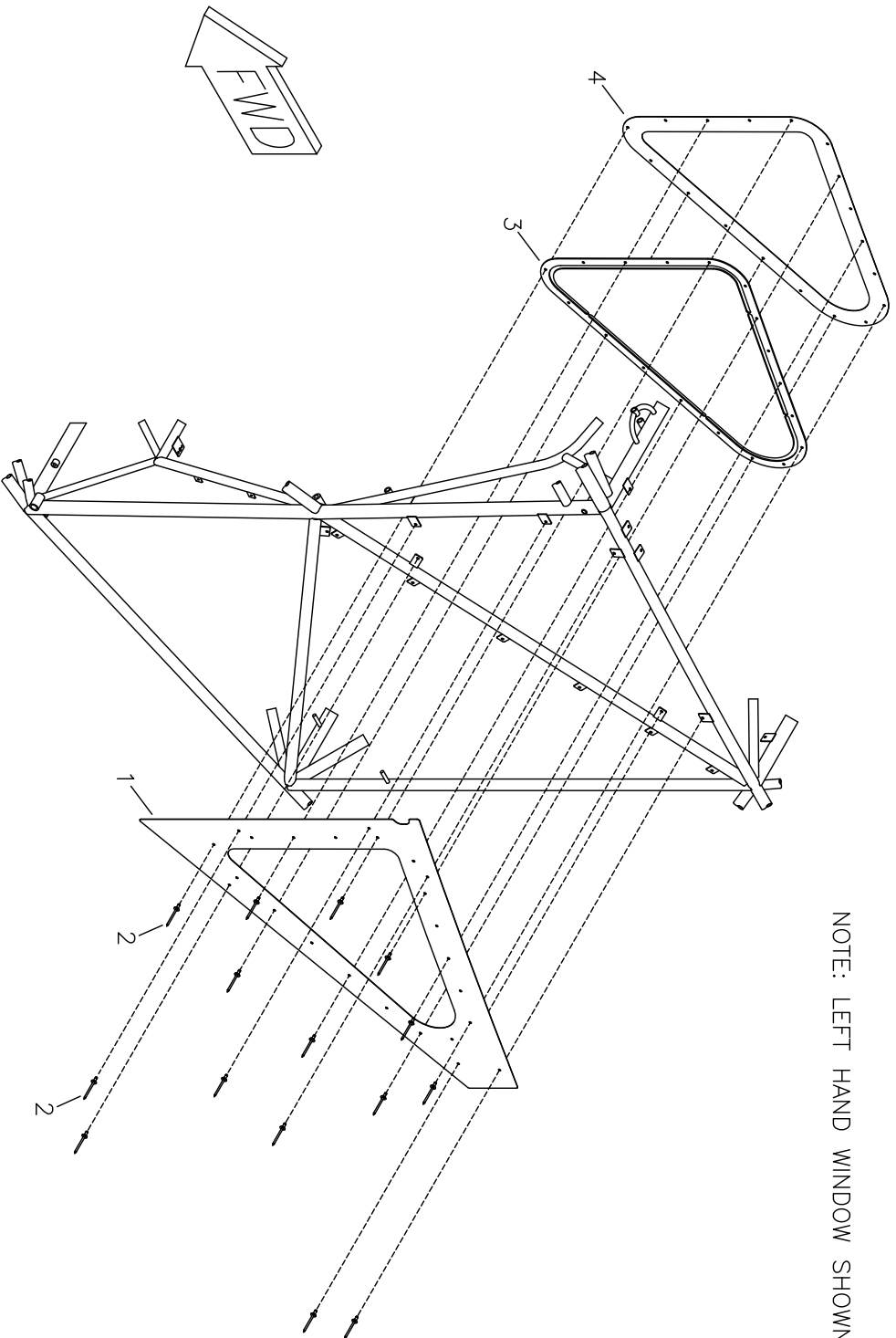
MD4197

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



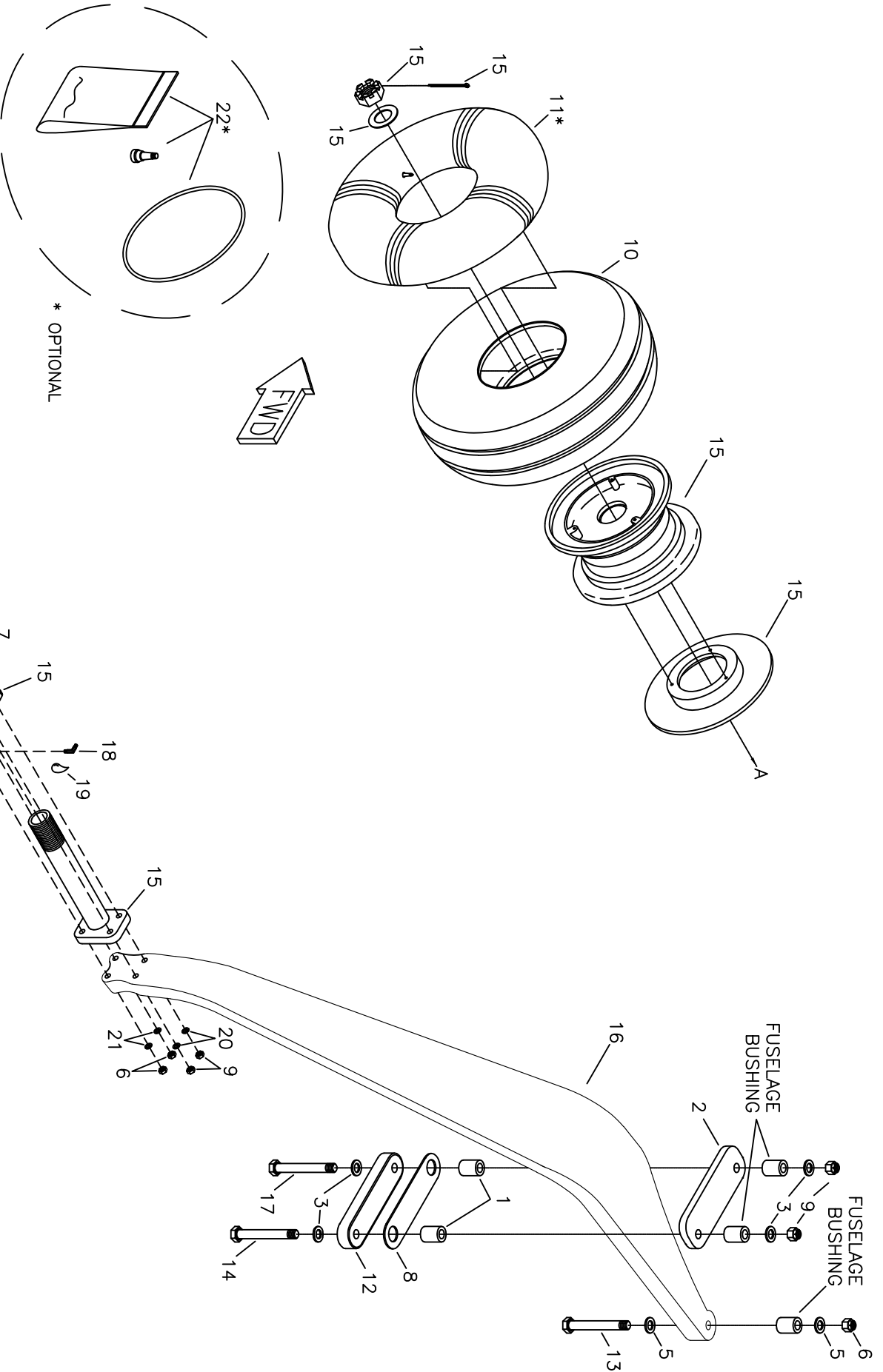
ALL RIVETS: 1691-0410 AVEX

MD5586

RRF0108 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



* OPTIONAL

RR-20 RAVEN
TAILDRAGGER – MAIN GEAR
ASSEMBLY AND INSTALLATION

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

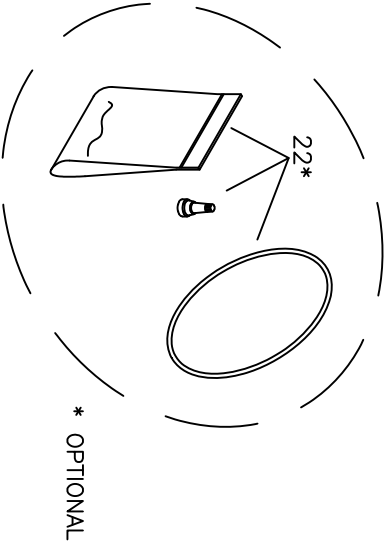
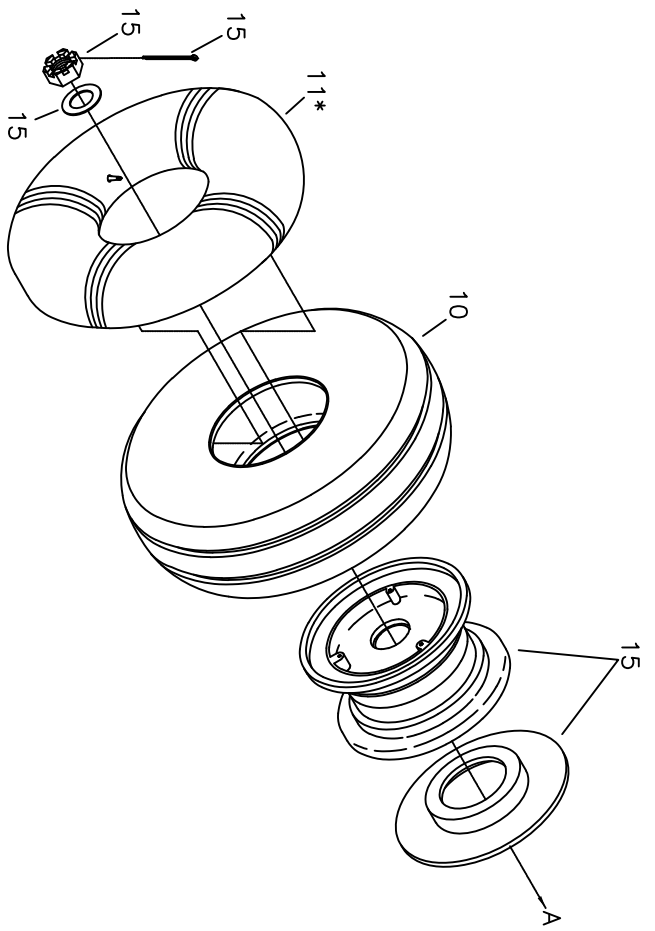
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Landing Gear Spacer Bushing	KPMG0179	4
2.	Top Main Gear Clamp Plate	KPMG0206	2
3.	5/16" Thick Washer	AN960-516	4
4.	3/8" Bolt	AN6-26A	4
5.	3/8" Thick Washer	AN960-616	6
6.	3/8" Tensile Nut	AN365-624A	6
7.	5/16" Bolt	AN5-25A	4
8.	Main Gear Anti-chafe Strip	KPMG0216	2
9.	5/16" Tensile Nut	AN365-524A	8
10.	800 x 6 Tire	KSMG0024	2
11.	Optional - 800 x 6 Tube ** (-2 KSBS0043)	KSMG0023	2
12.	Bottom Main Gear Clamp Plate	KPMG0208	2
13.	3/8" Bolt	AN6-31A	2
14.	5/16" Bolt	AN5-32A	2
15.	Hyd Brake Assy - 6" Dual Piston	KSBS0050	2
16.	Gear Leg - Taildragger - LH	KPMG0227-L	1
16.	Gear Leg - Taildragger - RH	KPMG0227-R	1
17.	5/16" Bolt	AN5-40A	2
18.	45-degree Elbow - Flare 1/4" Tube to 1/8" NPT	AN823-4D	2
19.	Thread Sealant *	-----	0
20.	5/16" Thin Washer	AN960-516L	4
21.	3/8" Thin Washer	AN960-616L	4
22.	Optional - MATCO Tubeless Kit for 6" Wheels ** (-2 KSMG0023)	KSBS0043	2

* Builder Supplied

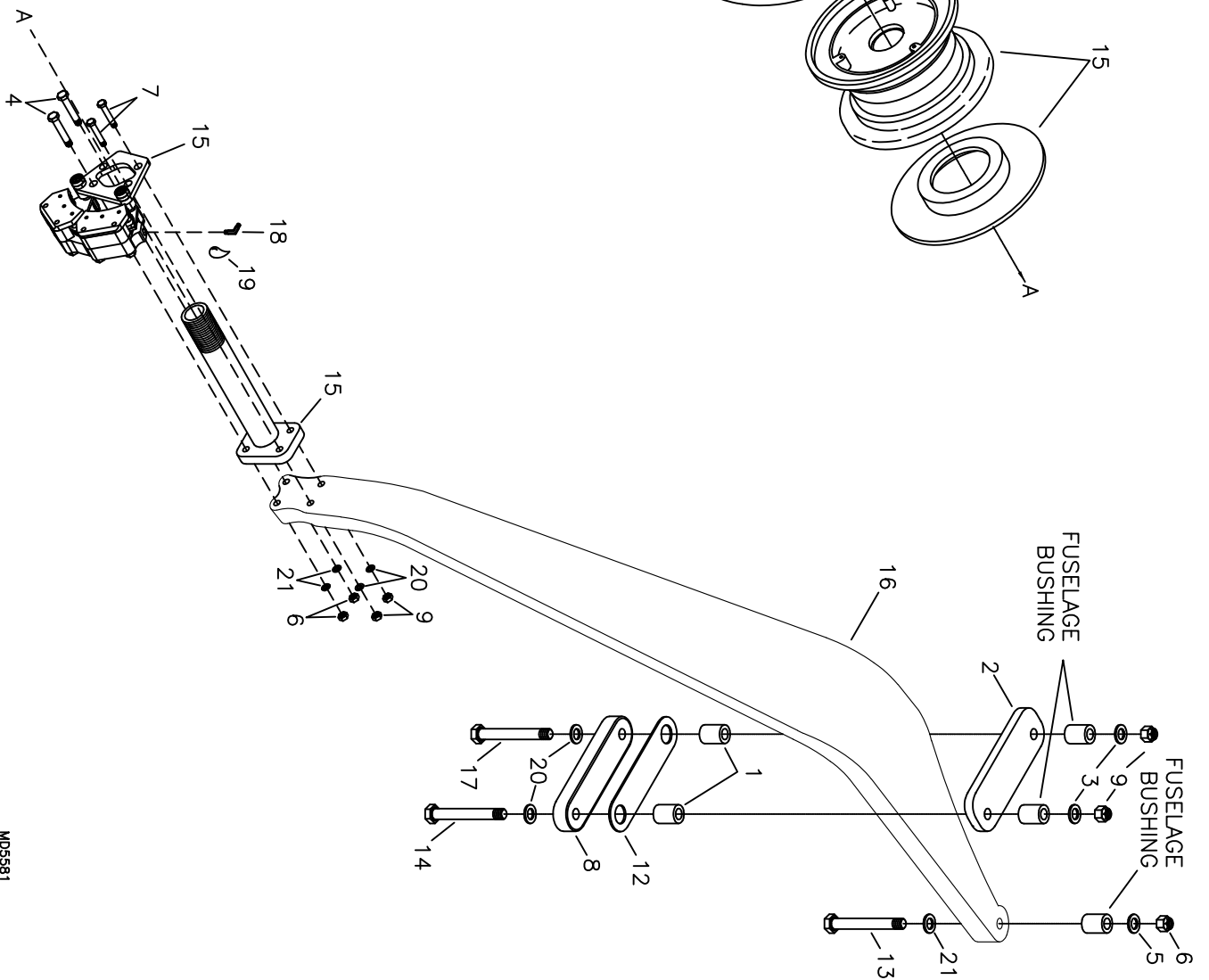
** May be purchased seperately, call RANS Parts Dept. for pricing

9/1/2013

REV. B



* OPTIONAL



RRRND88 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	KPMG0179	4
2.	Top Main Gear Clamp Plate	KPMG0206	2
3.	5/16" Thick Washer	AN960-516	4
4.	3/8" Bolt	AN6-26A	4
5.	3/8" Thick Washer	AN960-616	4
6.	3/8" Tensile Nut	AN365-624A	6
7.	5/16" Bolt	AN5-25A	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.	Optional - 600 x 6 Tube ** (-2 KSBS0043)	KSMG0016	2
12.	Main Gear Anti-chafe Strip	KPMG0216	2
13.	3/8" Bolt	AN6-31A	2
14.	5/16" Bolt	AN5-32A	2
15.	Hyd Brake Assy - 6" Dual Piston	KSBS0050	2
16.	Gear Leg - Trike - LH	KPMG0228-L	1
16.	Gear Leg - Trike - RH	KPMG0228-R	1
17.	5/16" Bolt	AN5-40A	2
18.	45-degree Elbow - Flare 1/4" Tube to 1/8" NPT	AN823-4D	2
19.	Thread Sealant *	-----	0
20.	5/16" Thin Washer	AN960-516L	8
21.	3/8" Thin Washer	AN960-616L	6
22.	Optional - MATCO Tubeless Kit for 6" Wheels ** (-2 KSMG0016)	KSBS0043	2

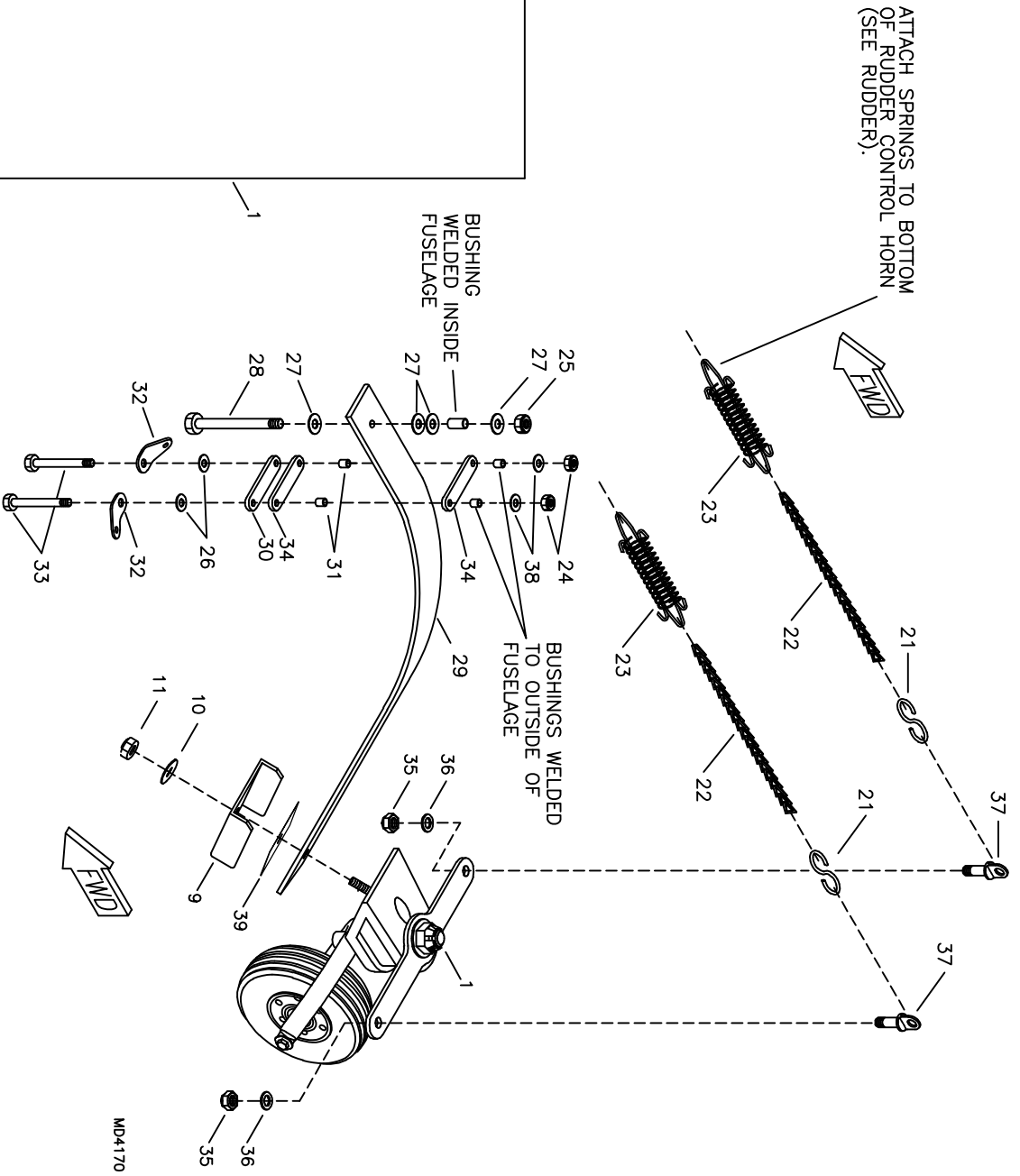
* Builder Supplied

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

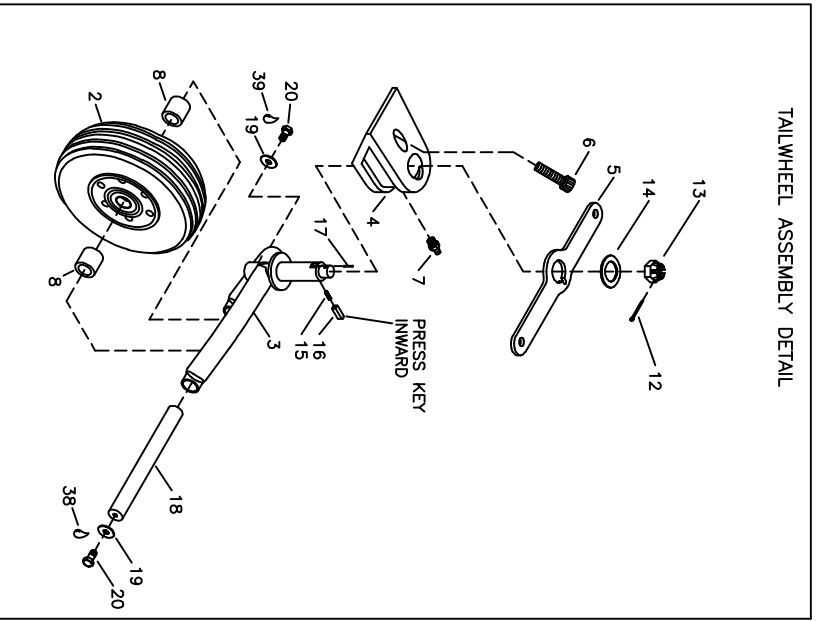
9/1/2013

REV. B

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



TAILWHEEL ASSEMBLY DETAIL



RRRND08 S-20 RAVEN TAILWHEEL ASSEMBLY AND INSTALLATION

MD4170

#	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	2
27.	5/16" Thick Washer	AN960-516	4
28.	5/16" Bolt	AN5-20A	1
29.	Tail Spring	KPTG0042	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.	3/16" Thin Washer	AN960-10L	2
39.	Loctite Blue *****	----	0

* Supplied in tail wheel assembly.

**Builder Modifies

*** Builder must fabricate from raw stock

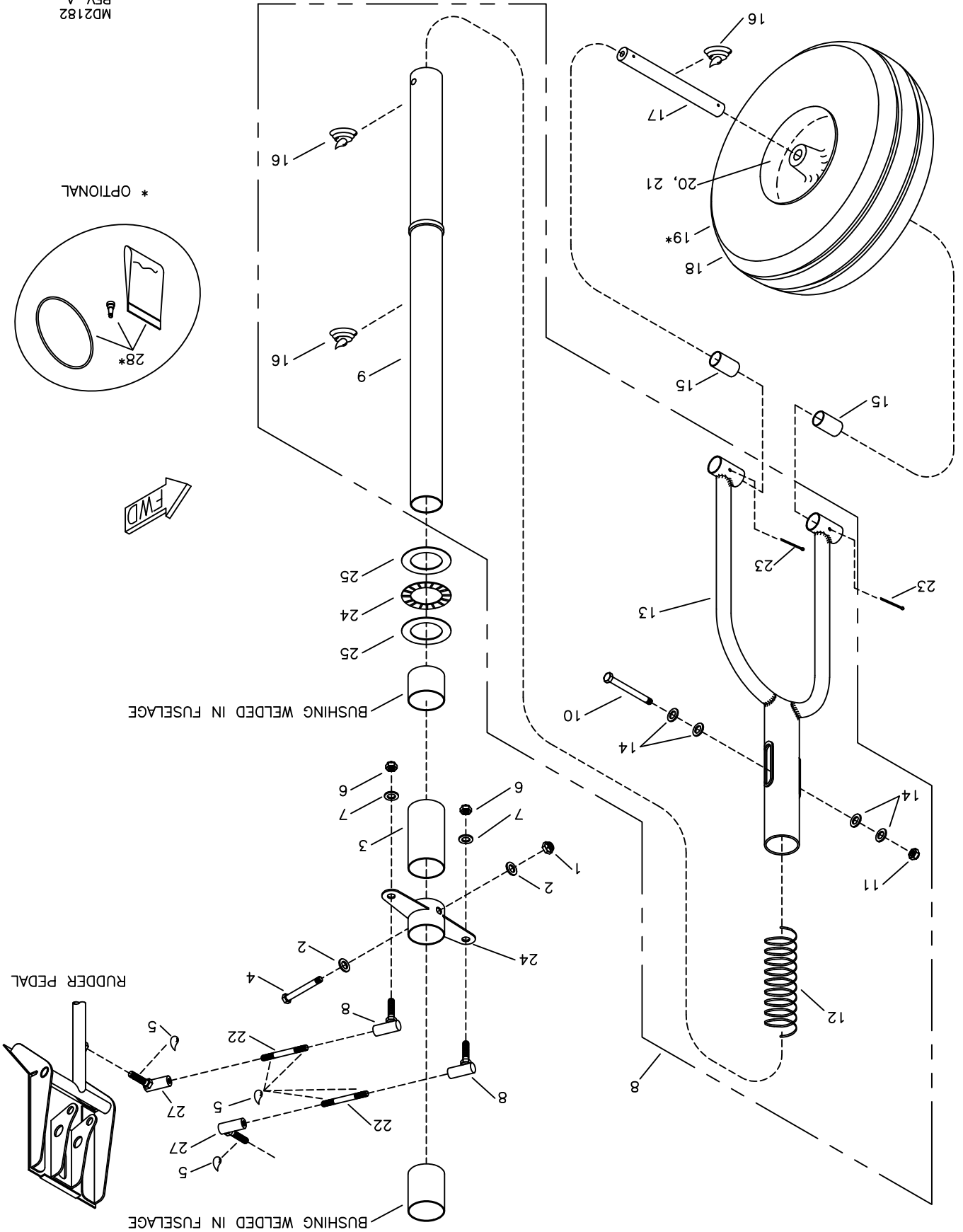
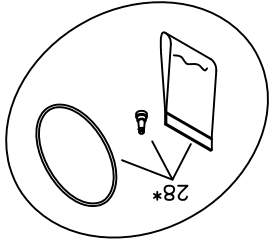
****Modified Attach Tang - Refer to Horizontal Stabilizer & Elevator Installation

***** Builder Supplied

RRRND S-20 RAVEN NOSE GEAR ASSEMBLY & INSTALLATION

MD2182 REV. A

* OPTIONAL



RANS S-20 RAVEN - NOSE GEAR ASSEMBLY & INSTALLATION

#	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.	Optional - 15 X 6.00-6 Tube **** (-1 KSBS0043)	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
28.	Optional-MATCO Tubeless Kit for 6" Wheels **** (-1 KSMG0016)	KSBS0043	1

* Builder Supplied

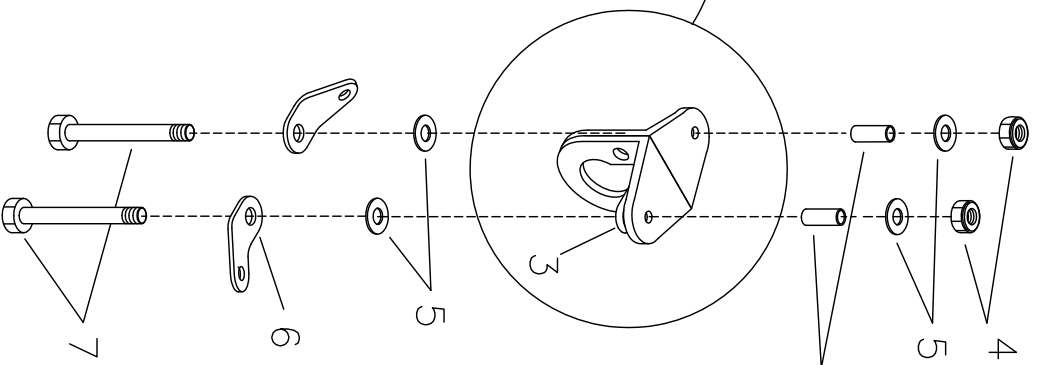
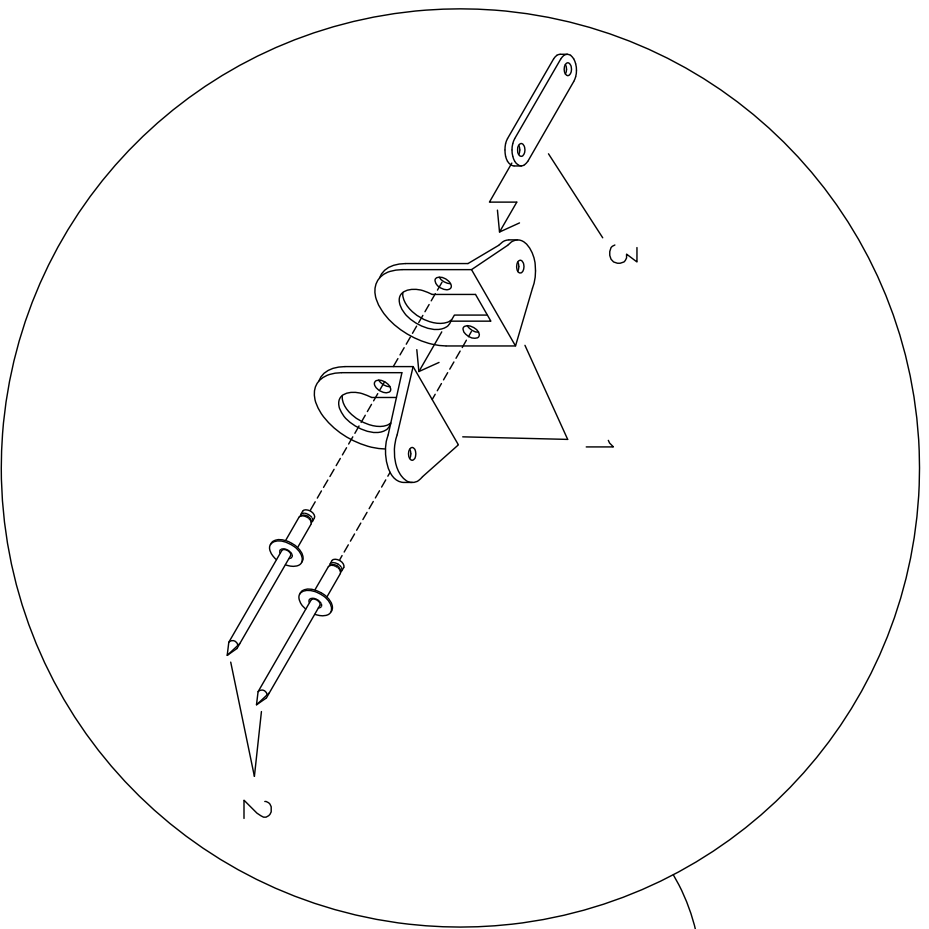
** Supplied with Nose Gear Strut/Fork Assembly.

*** Builder Modifies

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

9/1/2013

REV. A



BUSHINGS WELDED TO OUTSIDE OF FUSELAGE AT TAIL

REVISION S-20 RAVEN
TAIL TIE-DOWN INSTALLATION

MD55594
REV. - ORIG

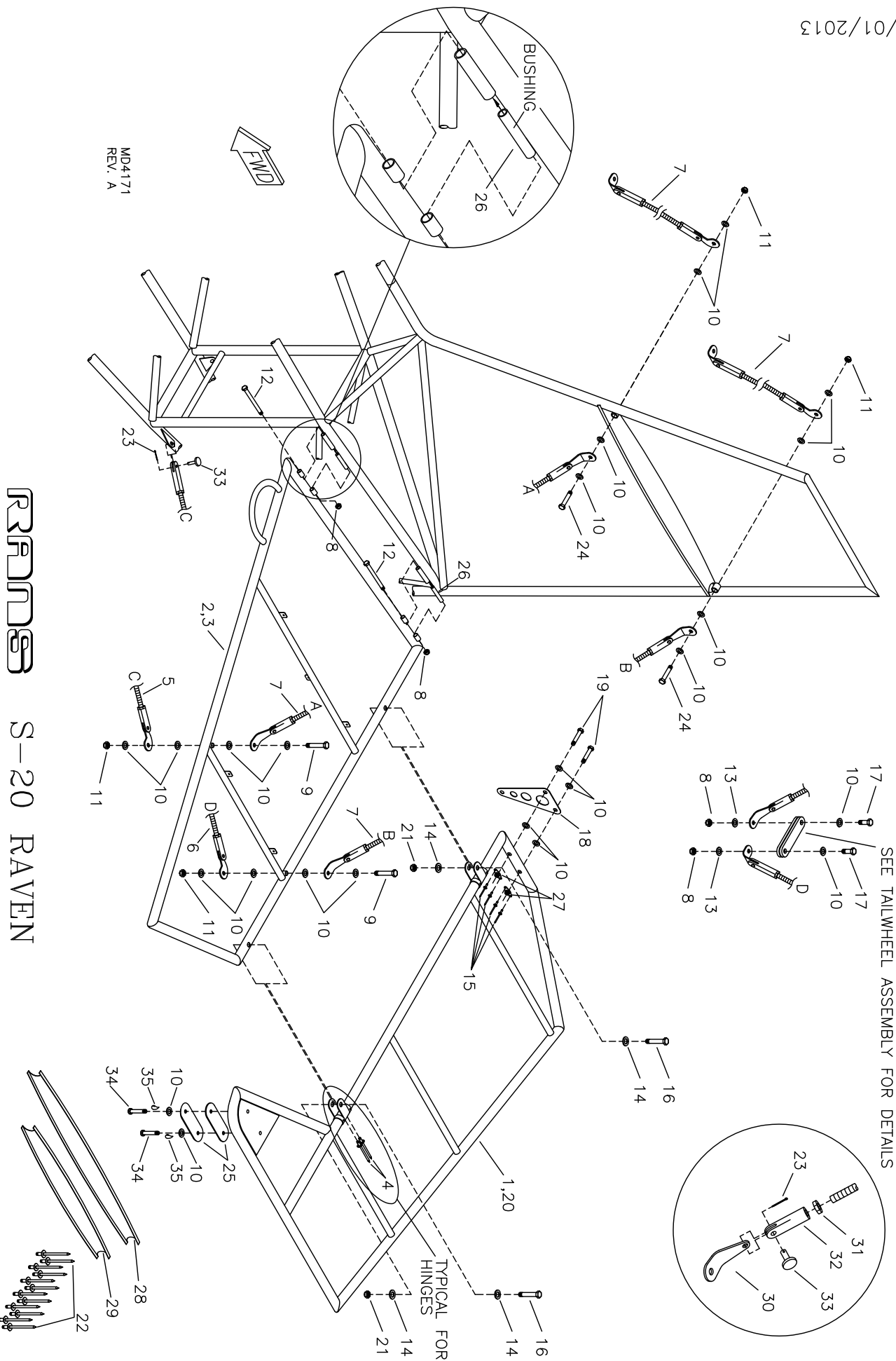
RANS S-20 RAVEN - TAIL TIE-DOWN INSTALLATION**TRIKE ONLY**

#	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

RRR008 S-20 RAVEN HORIZONTAL STABILIZER & ELEVATOR ASSEMBLY AND INSTALLATION

MD4171
REV. A



SEE TAILWHEEL ASSEMBLY FOR DETAILS

TYPICAL FOR HINGES

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

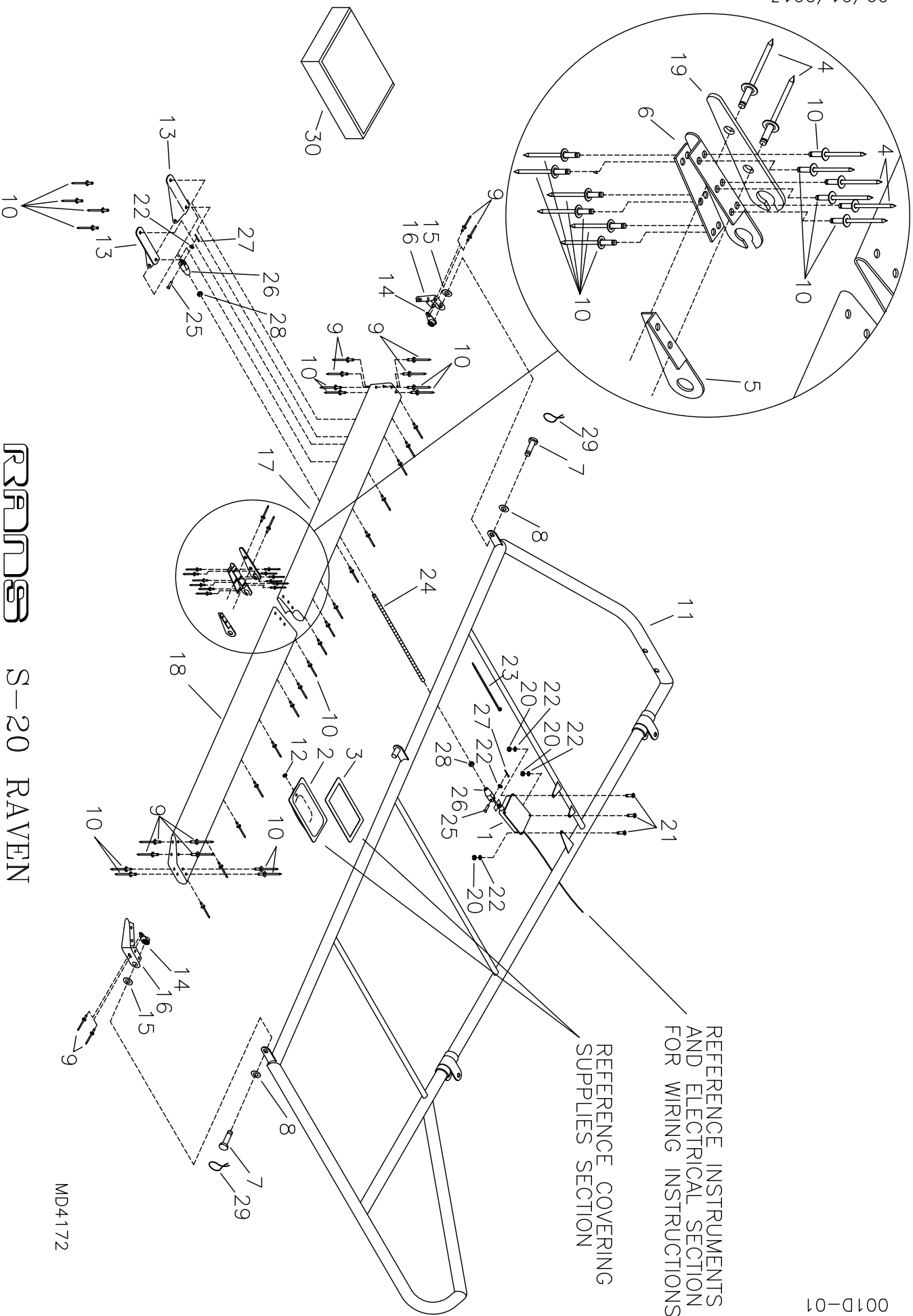
* Builder Supplied

** Builder Modifies

9/1/2013

REV. A

RRR100 S-20 RAVEN TRIM TAB ASSEMBLY AND INSTALLATION



REFERENCE INSTRUMENTS
AND ELECTRICAL SECTION
FOR WIRING INSTRUCTIONS

REFERENCE COVERING
SUPPLIES SECTION

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

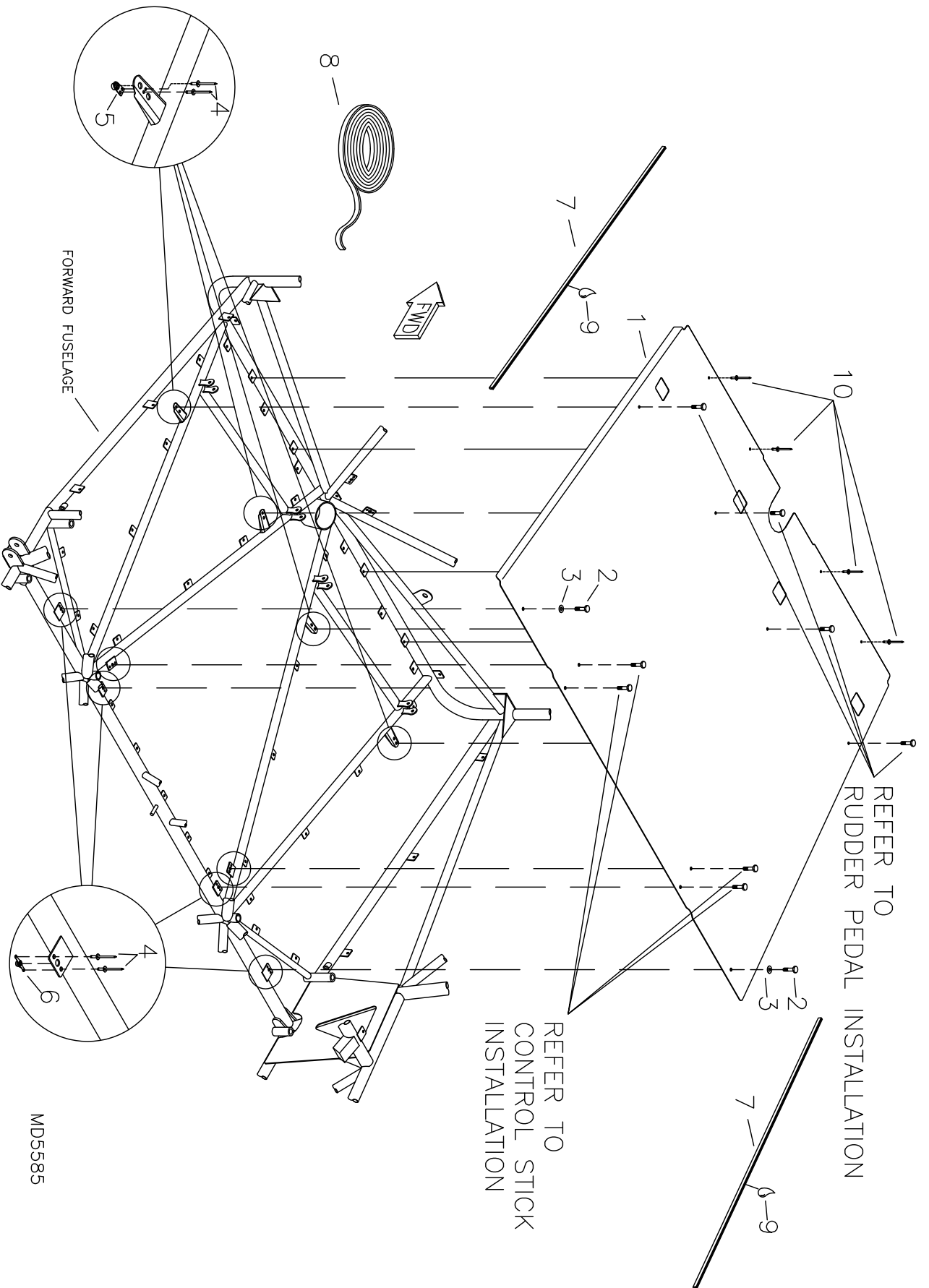
** Referenced from Horizontal Stabilizer & Elevator Assembly and Installation

*** Included in Trim Servo Kit

**** Builder Supplied

9/1/2013

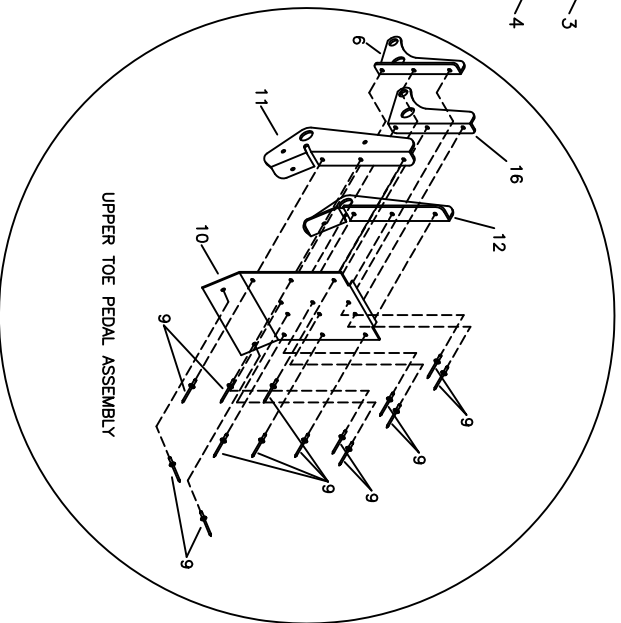
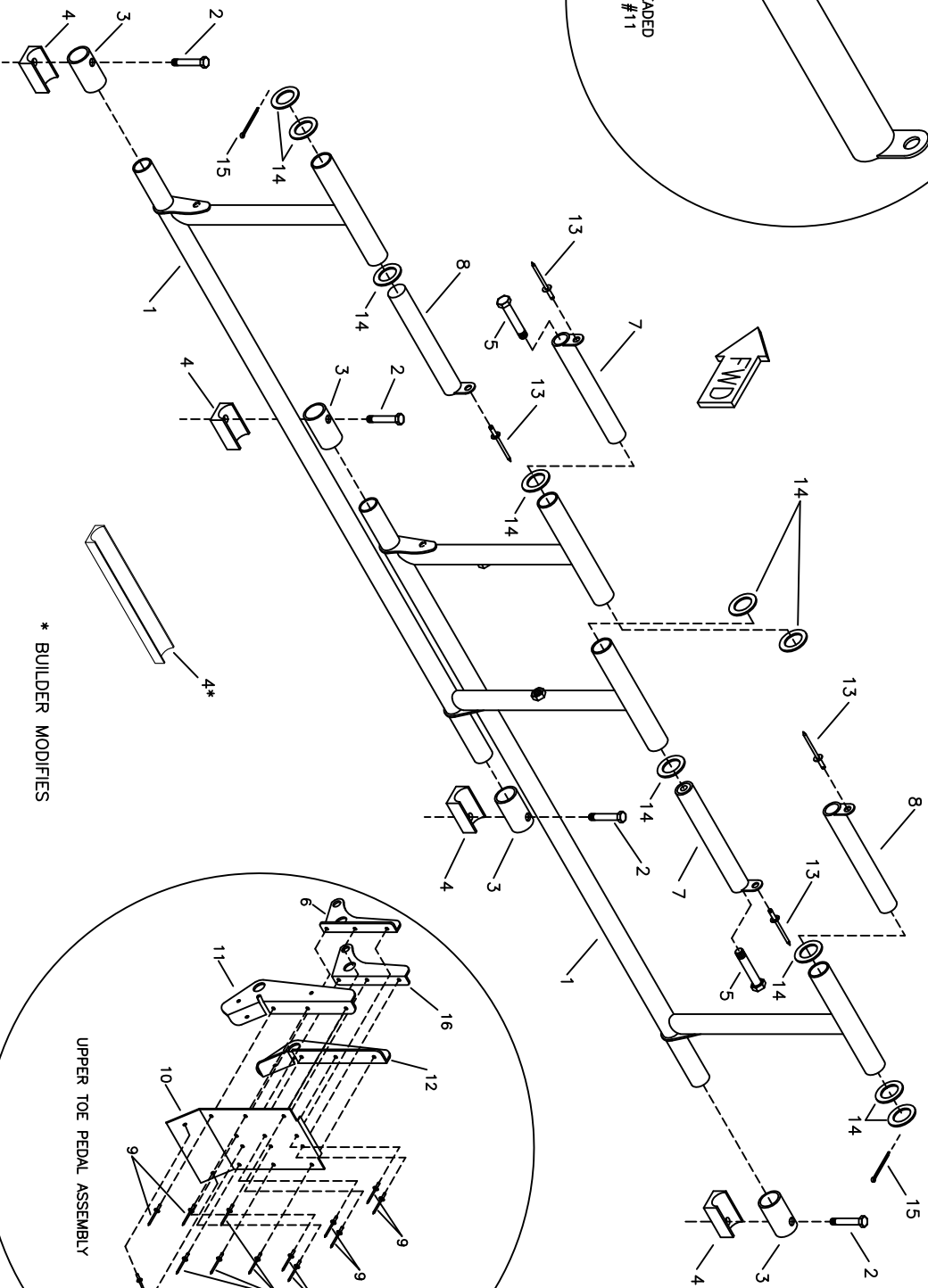
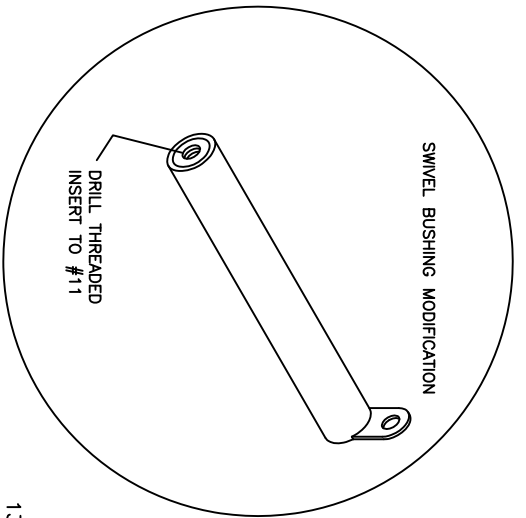
RRFINDS S-20 RAVEN FLOORBOARD INSTALLATION



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



RRP S-20 RAVEN RUDDER PEDAL INSTALLATION

MD2600
REV. B

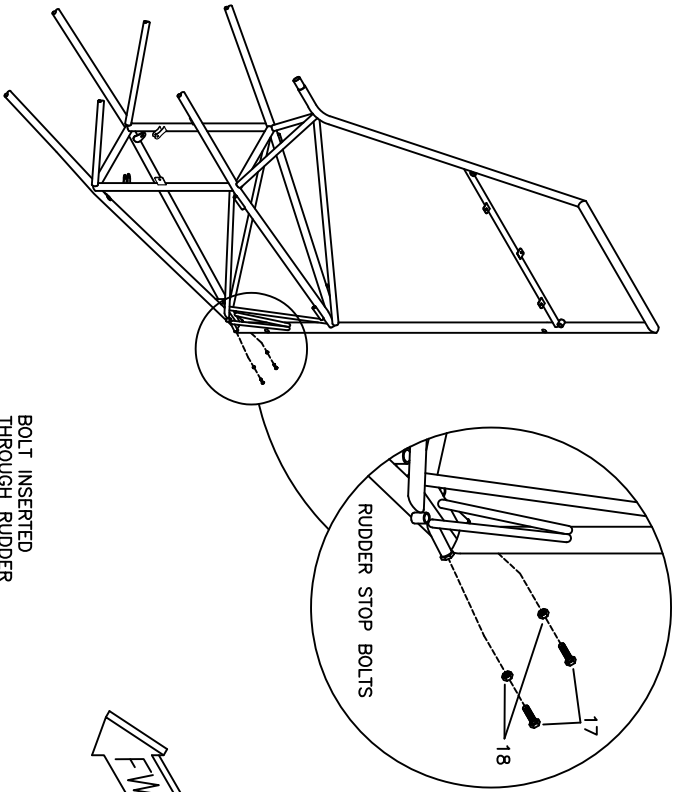
RANS S-20 RAVEN - RUDDER PEDAL INSTALLATION

#	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

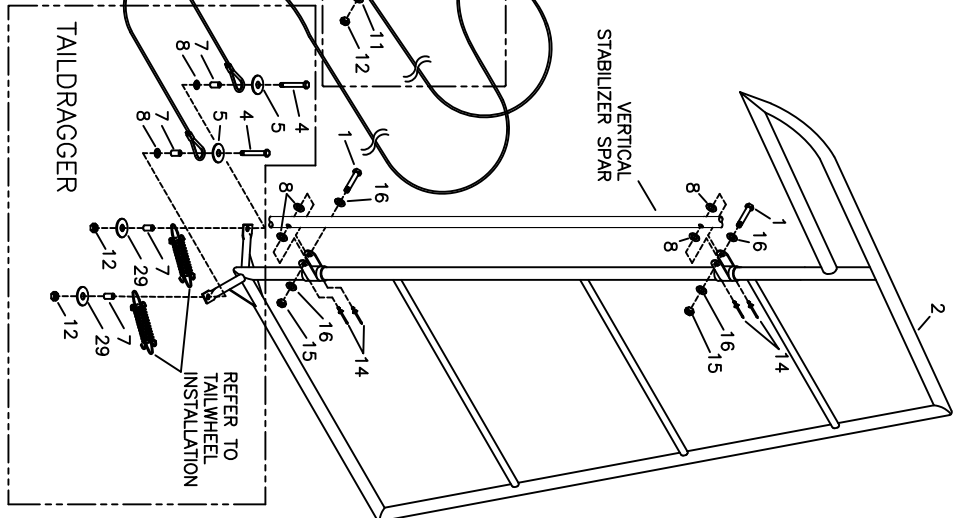
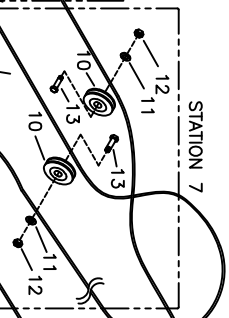
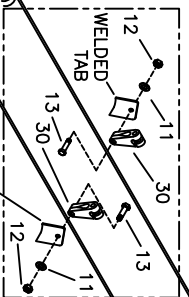
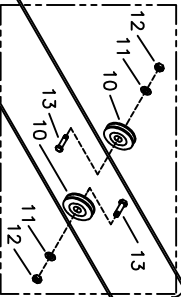
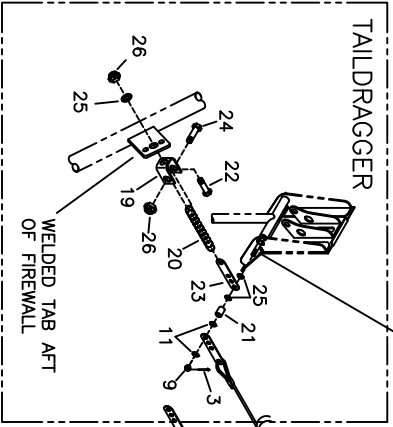
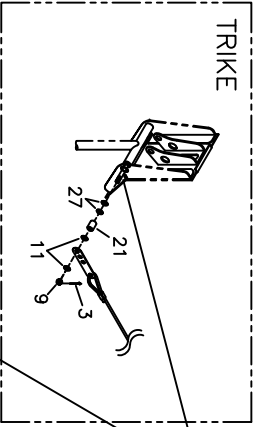
* Builder Modifies

9/1/2013

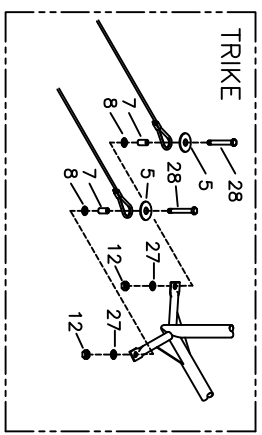
REV. B



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



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



RRR-008 S-20 RAVEN
 RUDDER SYSTEM ASSEMBLY & INSTALLATION

RANS S-20 RAVEN - RUDDER SYSTEM ASSEMBLY & INSTALLATION

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/4" Bolt	AN4-14A	2
2.	Rudder Frame Assembly - RANS	KARD0020	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

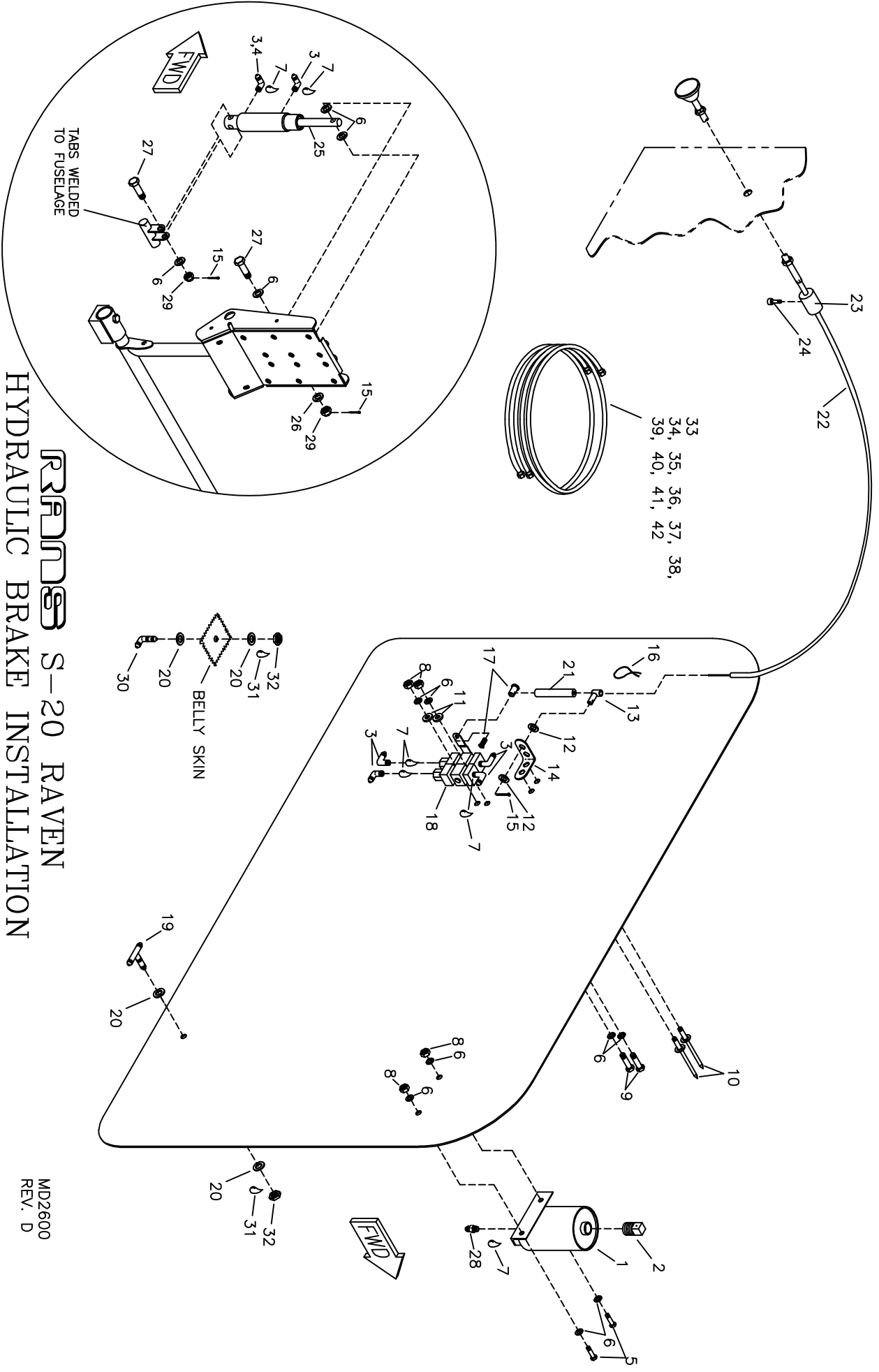
* Builder must fabricate from raw stock.

** TAILDRAGGER only

*** TRIKE only

9/1/2013

REV. B



RAVEN S-20 RAVEN
HYDRAULIC BRAKE INSTALLATION

MD2600
 REV. D

RANS S-20 RAVEN

HYDRAULIC BRAKE INSTALLATION

PAGE 001H-02

#	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 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.	Bulkhead 90-degree Elbow - Flare 1/4" Tube	AN833-4D	2
31.	Loctite Blue **	----	0
32.	Nut - Flared Tube Bulkhead	AN924-4D	3
33.	Braided Brake Line Kit - S-20	KSBS0038	1
34.	Braided Line - 22" Reservoir to Bulkhead Tee ****	KSBS0038-1	0
35.	Braided Line - 9" - Bulkhead Tee to Cylinders ****	KSBS0038-2	0
36.	Braided Line - 18.75" - RH to LH Cylinders ****	KSBS0038-3	0
37.	Braided Line - 15" - LH Cylinders to Park Valve ****	KSBS0038-4	0
38.	Braided Line - 30" - Bulkhead to Wheel Brakes ****	KSBS0038-7	0
39.	Braided Line - 87" - Park Valve to RH Bulkhead - TR *****	KSBS0051	1
40.	Braided Line - 69" - Park Valve to LH Bulkhead - TR *****	KSBS0052	1
41.	Braided Line - 43" - Park Valve to RH Bulkhead - TD *****	KSBS0053	1
42.	Braided Line - 63" - Park Valve to LH Bulkhead - TD *****	KSBS0054	1

*Supplied w/ Brake Reservoir

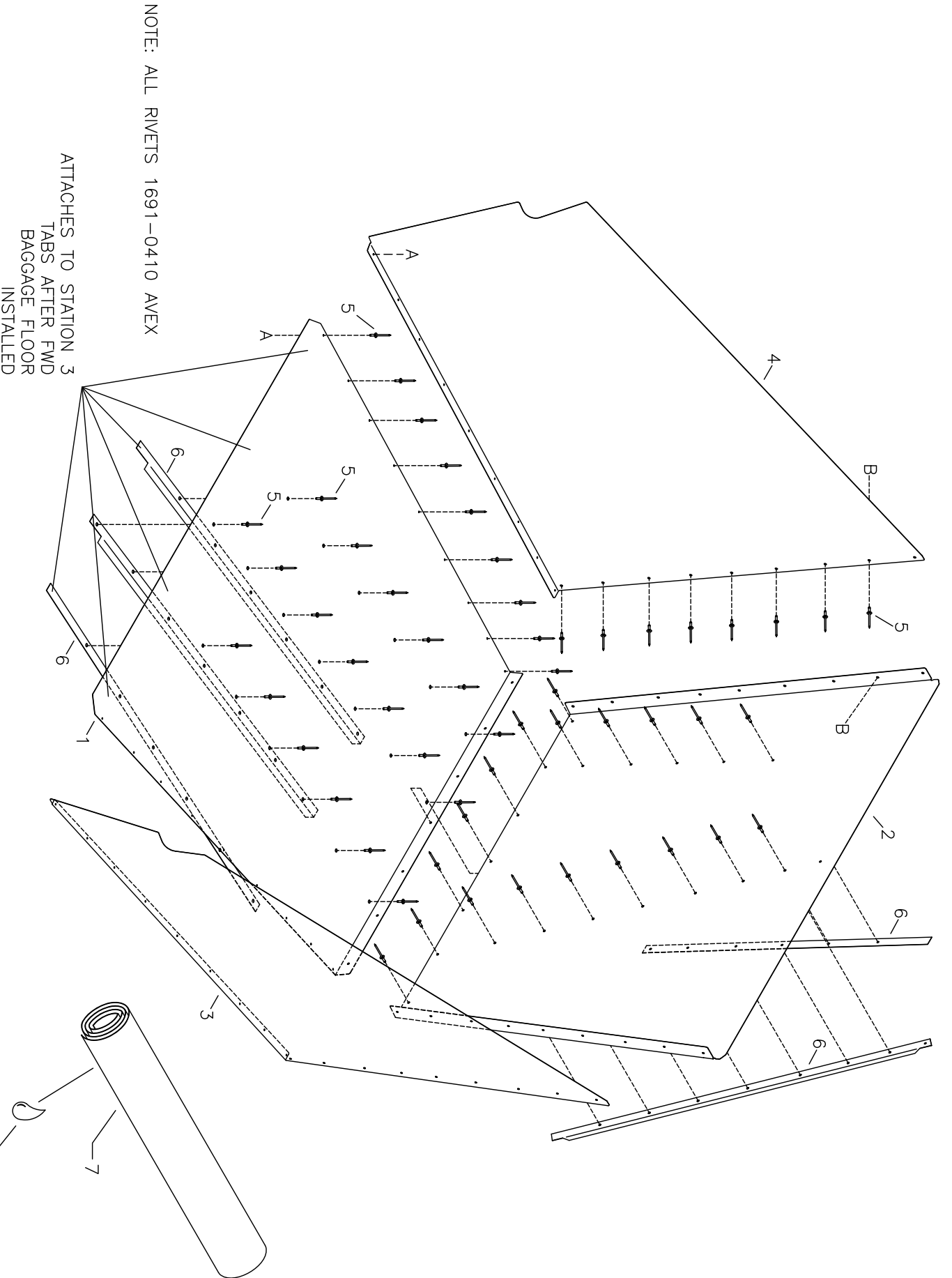
** Builder Supplied

*** Supplied w/ Parking Brake

**** Supplied w/ KSBS0038

***** Supplied w/ Gear leg

9/1/2013
REV. A



RRRINDOS S-20 RAVEN
AFT BAGGAGE COMPARTMENT ASSEMBLY

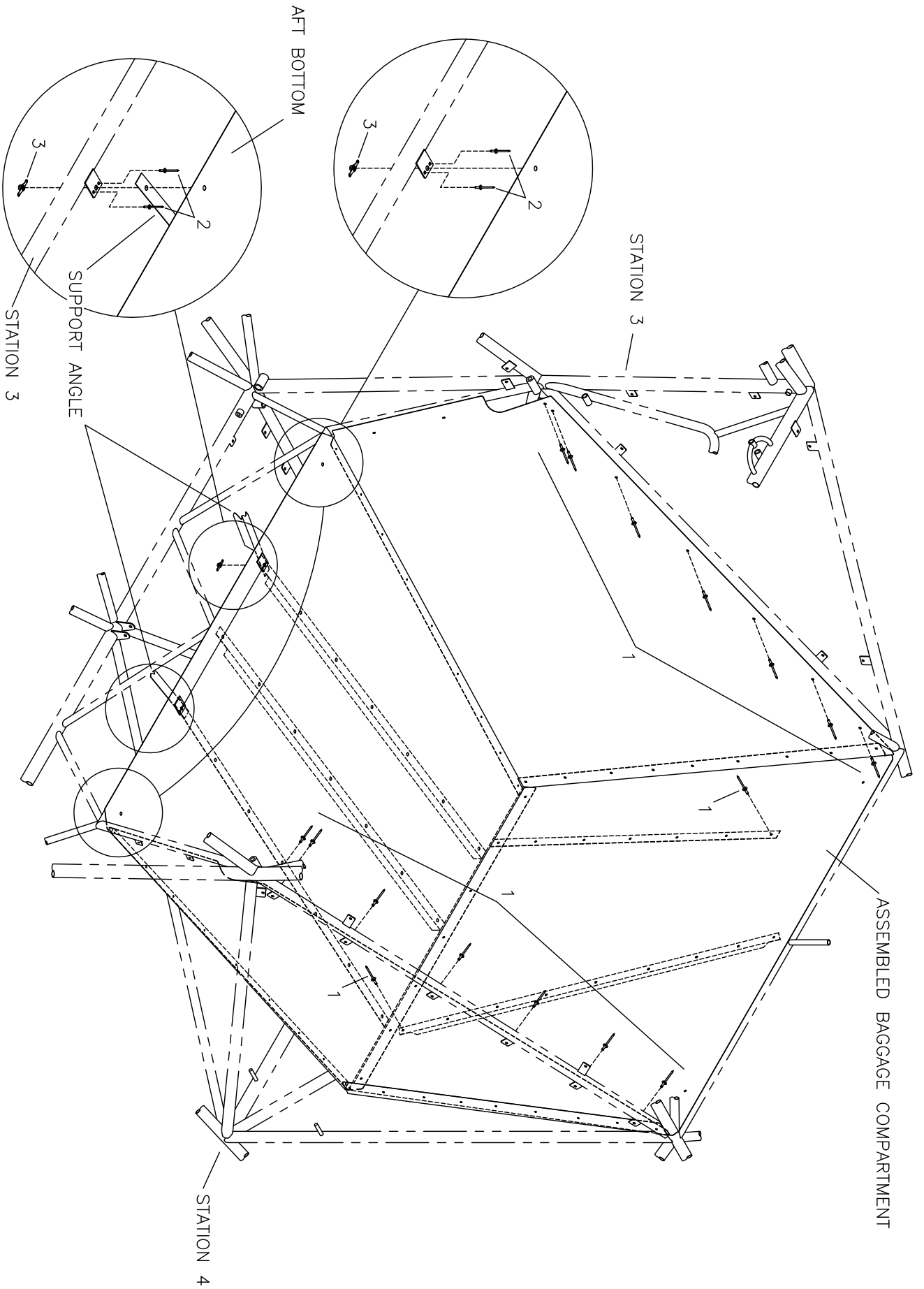
RANS S-20 RAVEN - AFT BAGGAGE COMPARTMENT ASSEMBLY

#	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

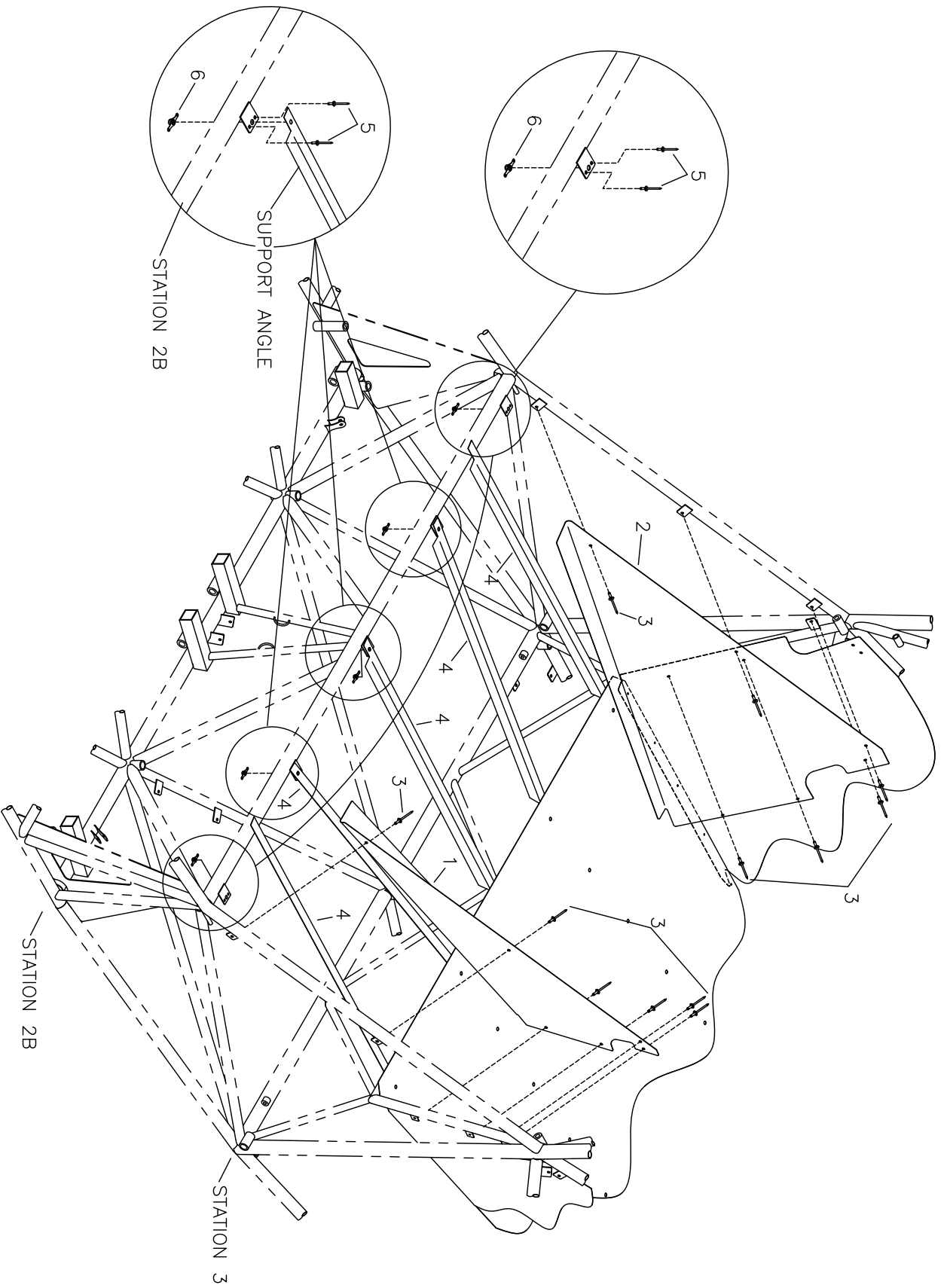


RRRINDOS S-20 RAVEN
AFT BAGGAGE COMPARTMENT INSTALLATION

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



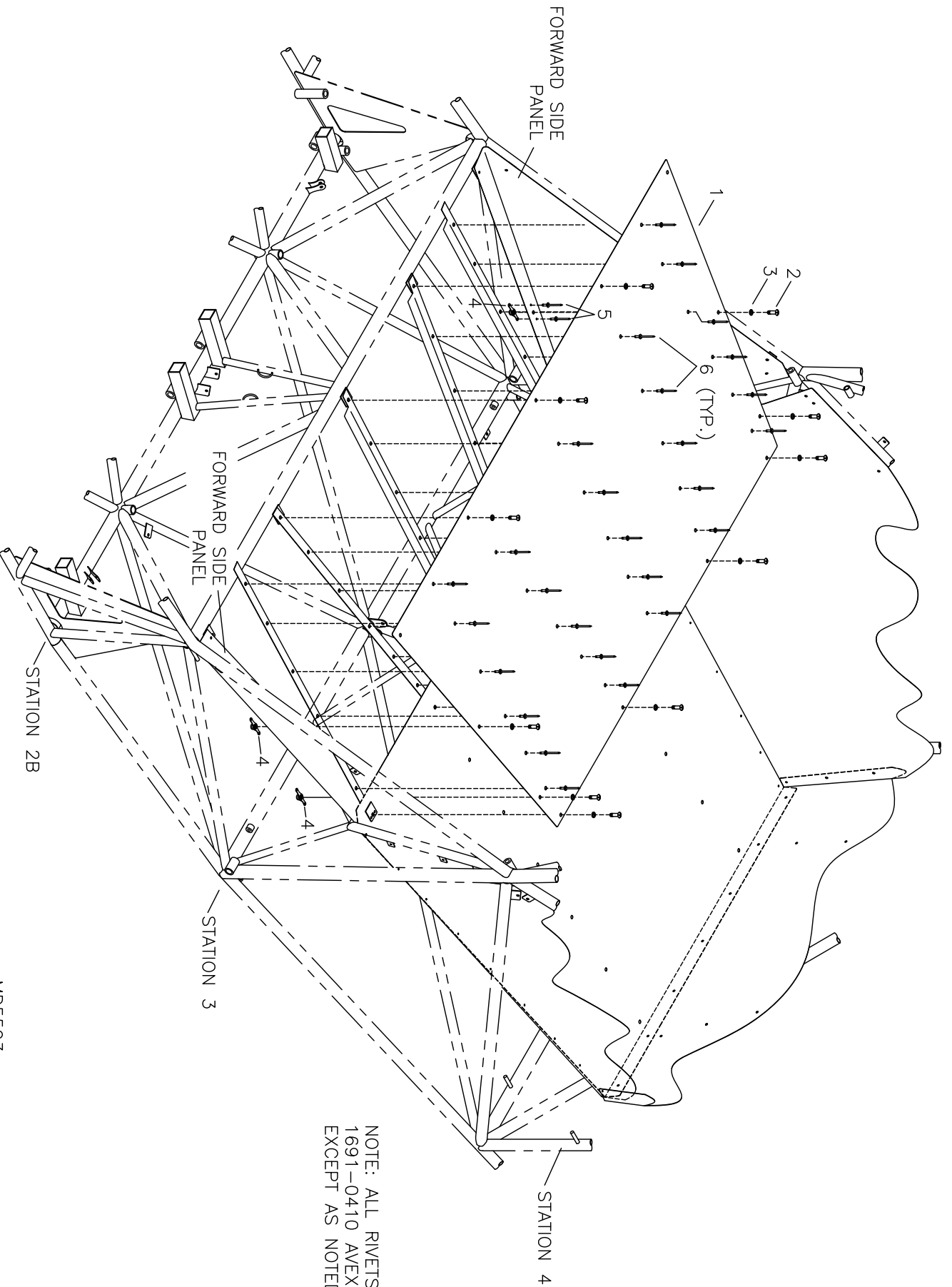
RRRINDOS S-20 RAVEN
SIDES - FORWARD BAGGAGE COMPARTMENT INSTALLATION

MD5593
 REV. A

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



NOTE: ALL RIVETS
 1691-0410 AVEX
 EXCEPT AS NOTED

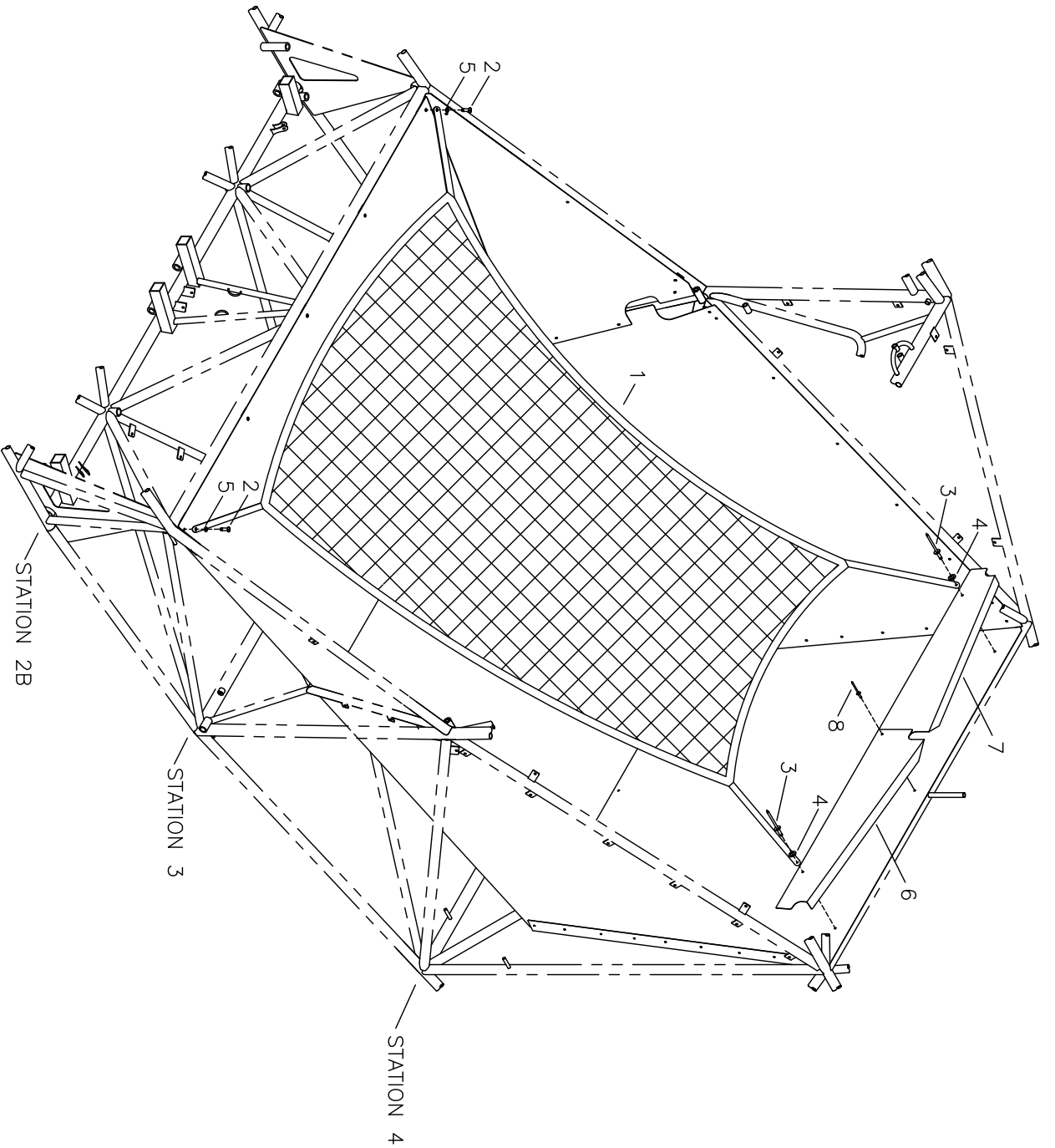
PRINCIPALS S-20 RAVEN

MD5593
 REV. A

FLOOR - FORWARD BAGGAGE COMPARTMENT INSTALLATION

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

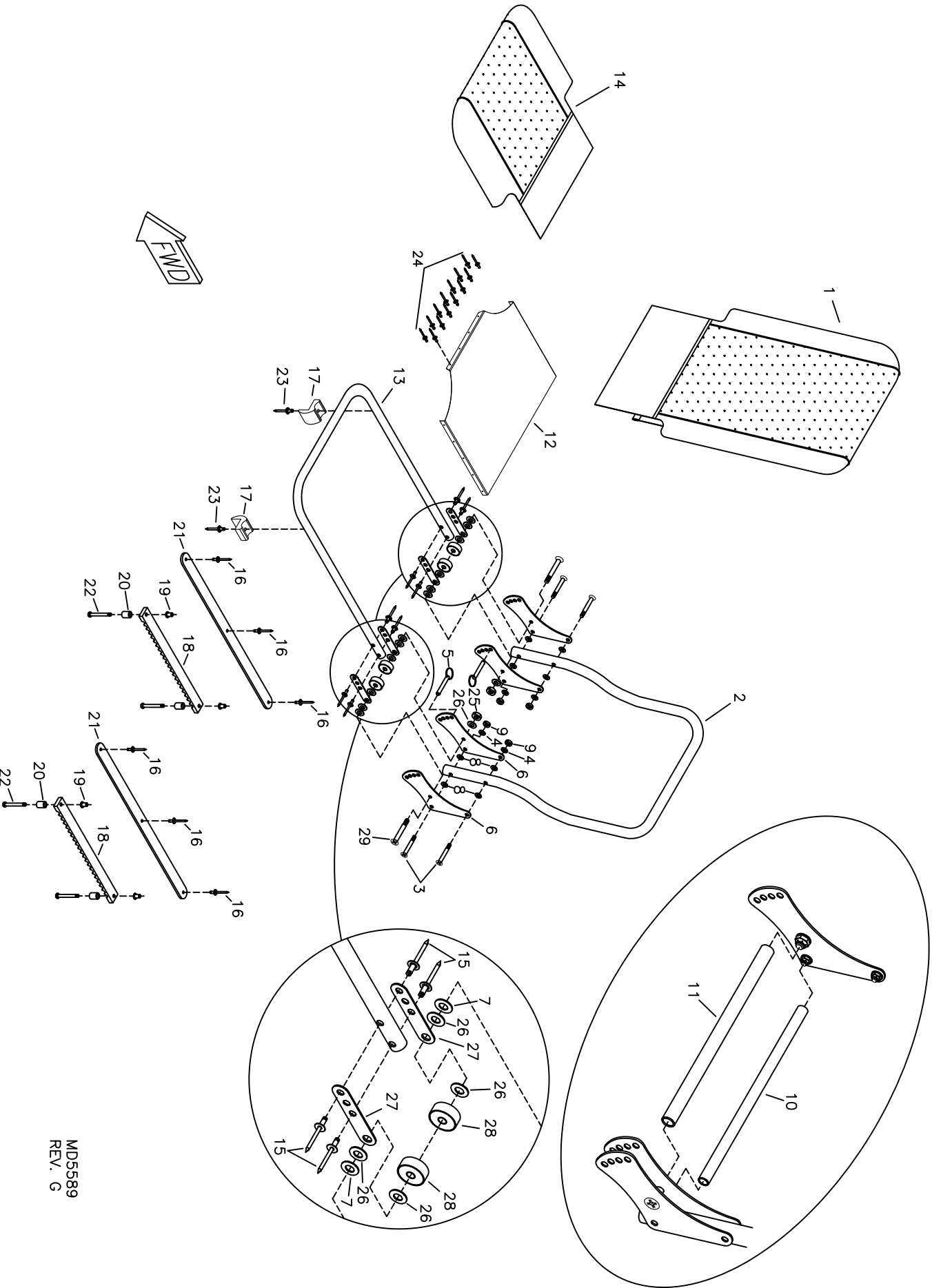


RRRINDOS S-20 RAVEN
CARGO NET INSTALLATION

MD5593

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



**RAPTOR S-20 RAVEN
SLIDING SEAT ASSEMBLY**

MD5589
REV. G

RANS S-20 RAVEN - SLIDING SEAT ASSEMBLY

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Seat Back Cushion	KAST0035	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 Back Tube	KPST0136	2
11.	Seat Bottom Tube	KPST0135	2
12.	Seat Bottom Pan	KPST0131	2
13.	Sliding Seat Bottom Frame	KPST0127	2
14.	Seat Bottom Cushion	KAST0036	2
15.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-62	16
16.	1/8" Stainless Steel Rivet - Flush	CCC-42	12
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	AN3-11A	8
23.	3/16" Stainless Steel Rivet - Cherry Q	CCPQ-64	4
24.	1/8" Aluminum Rivet - Avex	1691-0410	28
25.	1/4" Shear Nut	AN364-428A	4
26.	1/4" Thin Washer	AN960-416L	20
27.	Multi-Hole Tang	ST-16-FLAT	8
28.	Bearing	SR4APP	8
29.	1/4" Countersunk Machine Screw	MS24694-S111	4

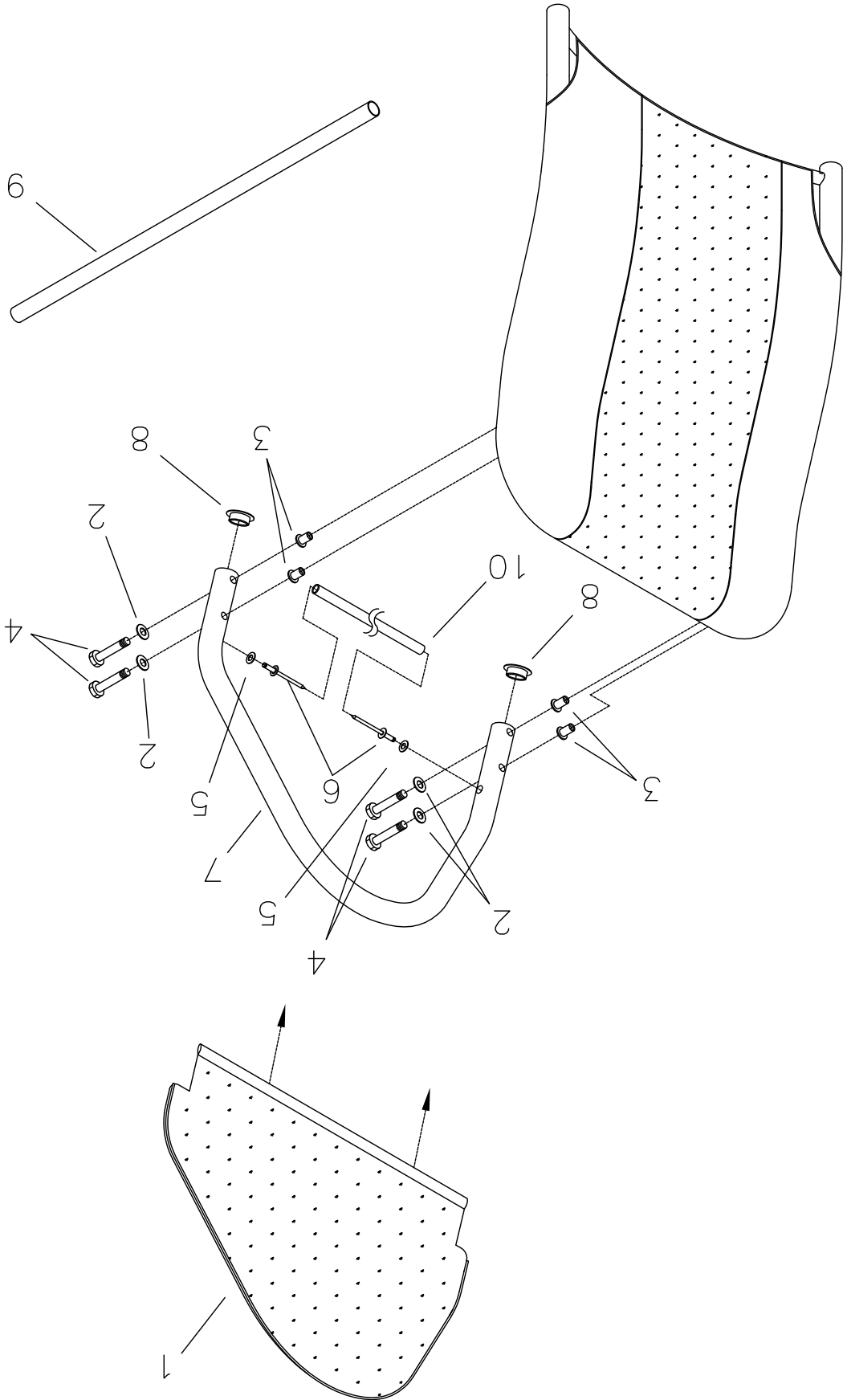
* Fabricate from Raw Stock

9/1/2013

REV. G

RANDS S-20 RAVEN OPTIONAL HEADREST ASSEMBLY

MD5108

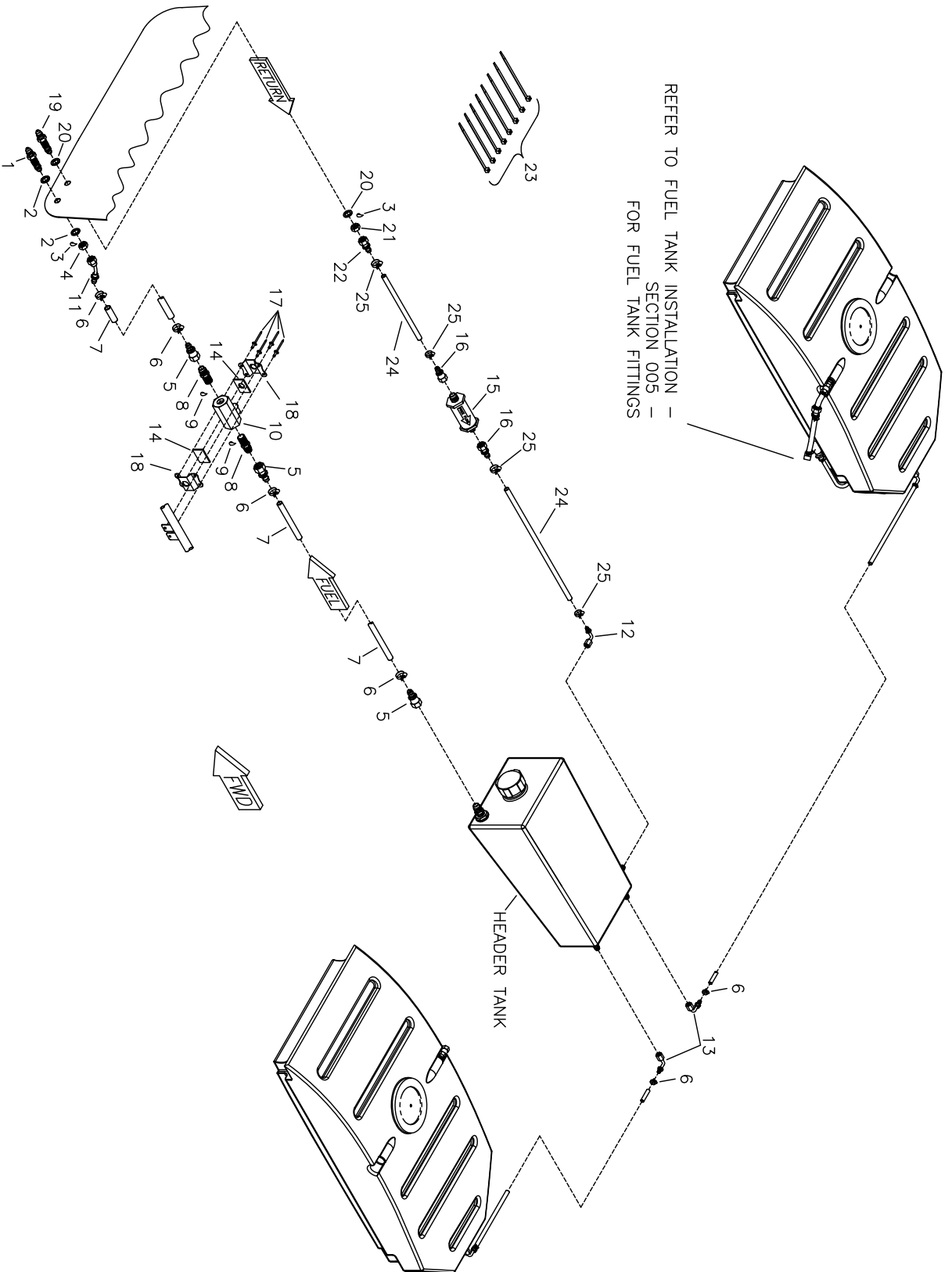


RANS S-20 RAVEN - OPTIONAL - SEAT HEADREST ASSEMBLY AND INSTALLATION

#	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

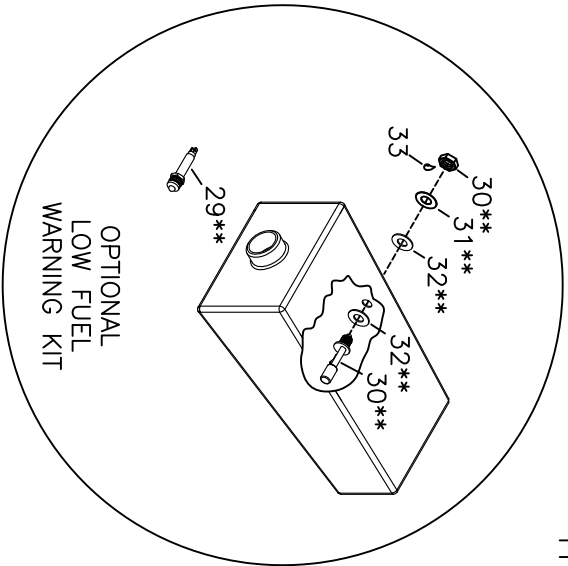
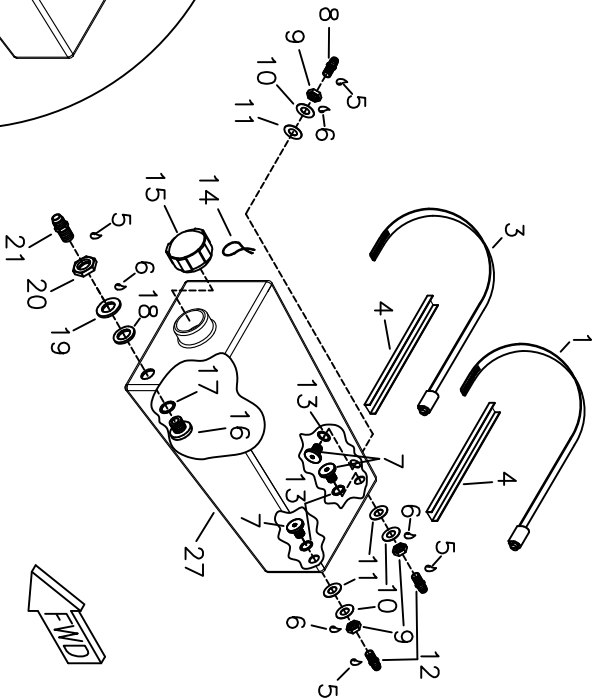
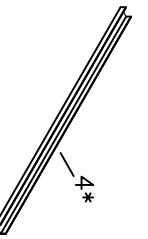
* Builder Supplied

** Builder must fabricate from raw stock.

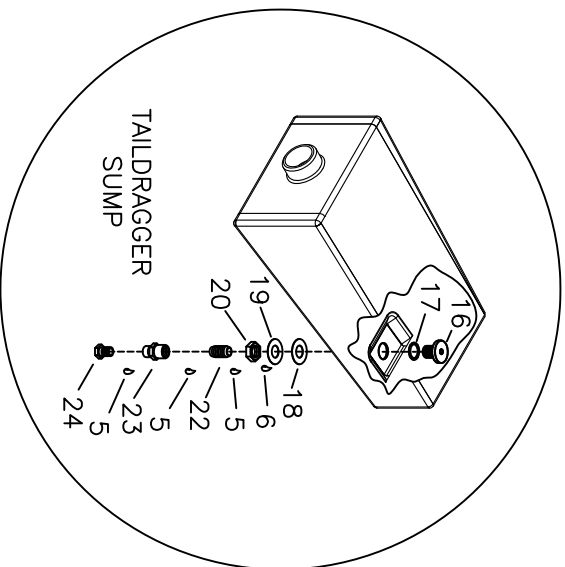
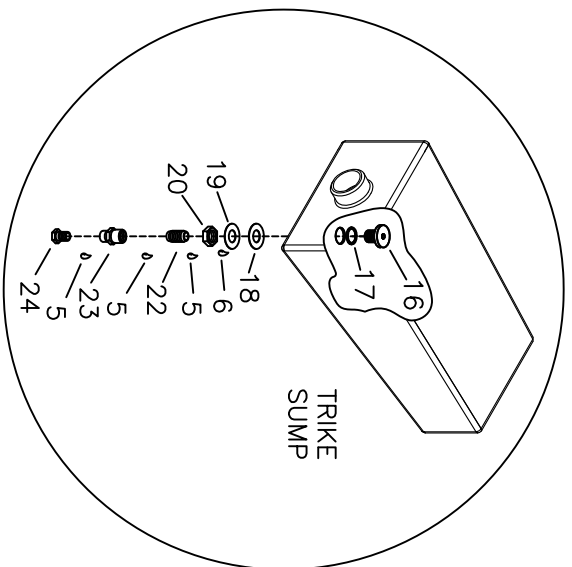
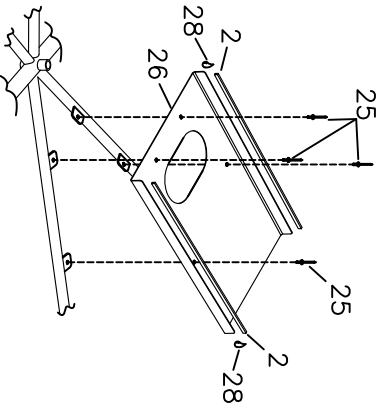
*** Builder Modifies

9/1/2013

REV. C



* MUST MODIFY
** LOW FUEL WARNING KIT IS OPTIONAL



RRR 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.	1/2" Tank Withdrawal Fitting - LH thread	KPFS0117	3
8.	Straight Fitting - Flare 1/4" Tube to 1/8" NPT	AN816-4D	1
9.	Nut - 1/2" Bulkhead - LH Thread	KPFS0118	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

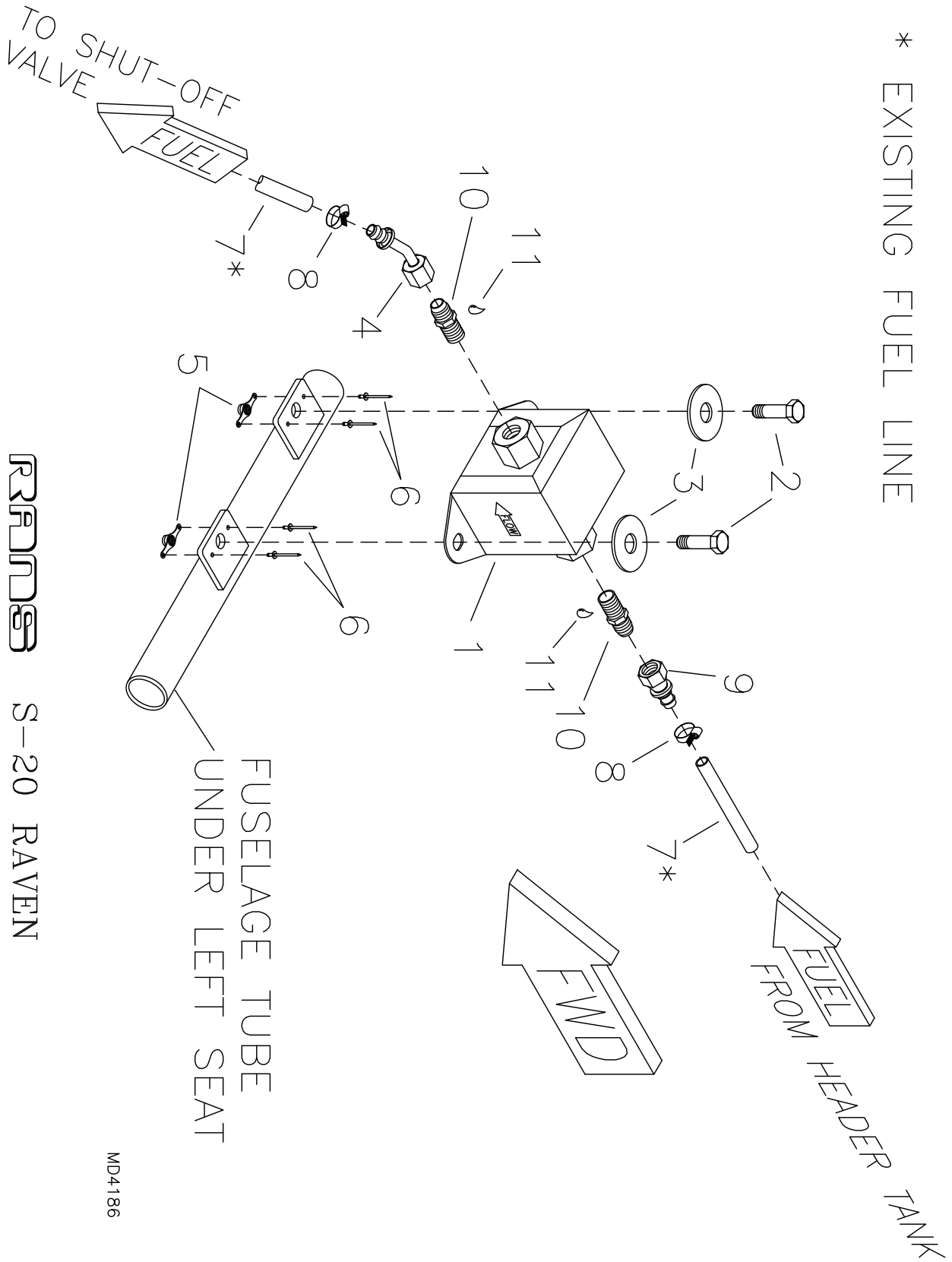
** Builder Supplied

*** Low Fuel Warning Kit is Optional

9/1/2013

REV. C

* EXISTING FUEL LINE



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

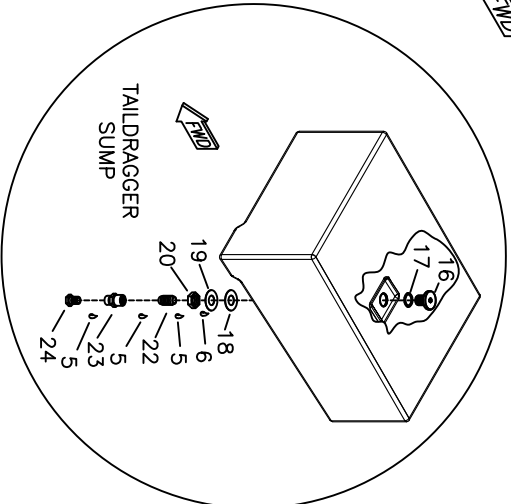
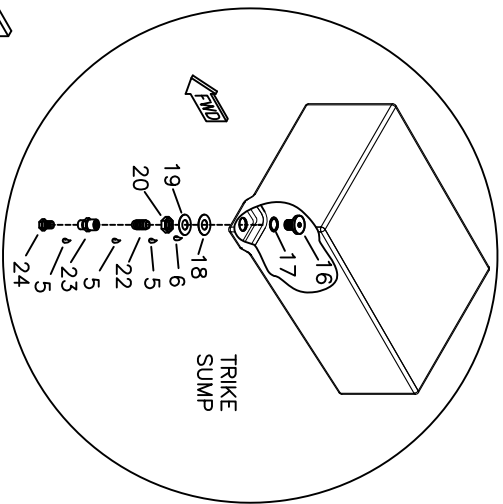
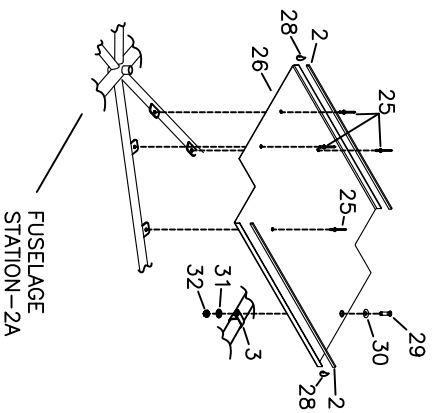
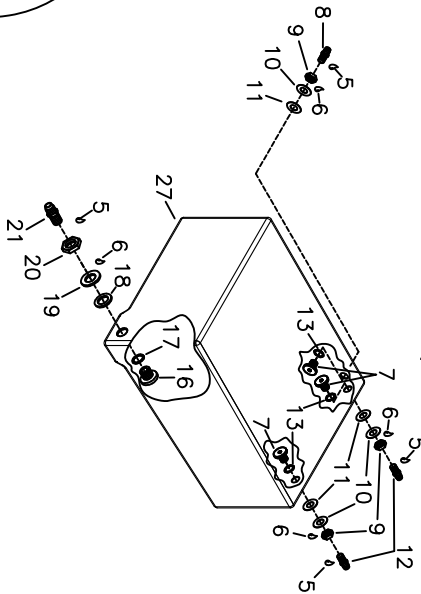
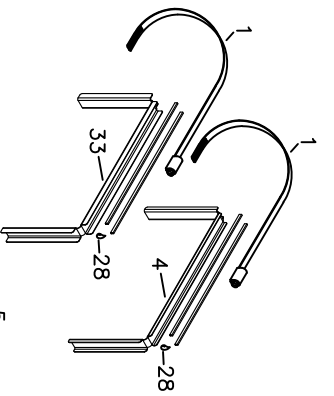
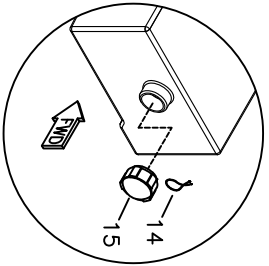
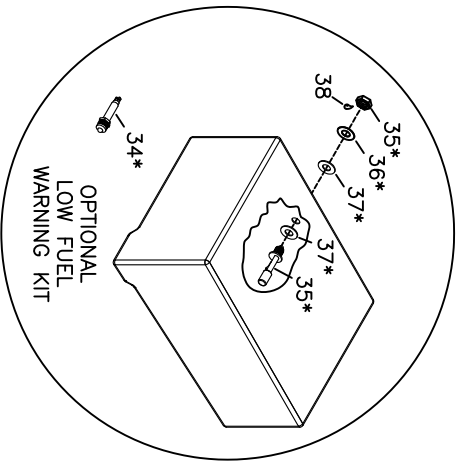
MD4186

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

RRRrrrr S-20 RAVEN
OPTIONAL
6.9 GALLON HEADER TANK

MD4186
REV. B

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

KAFS0002

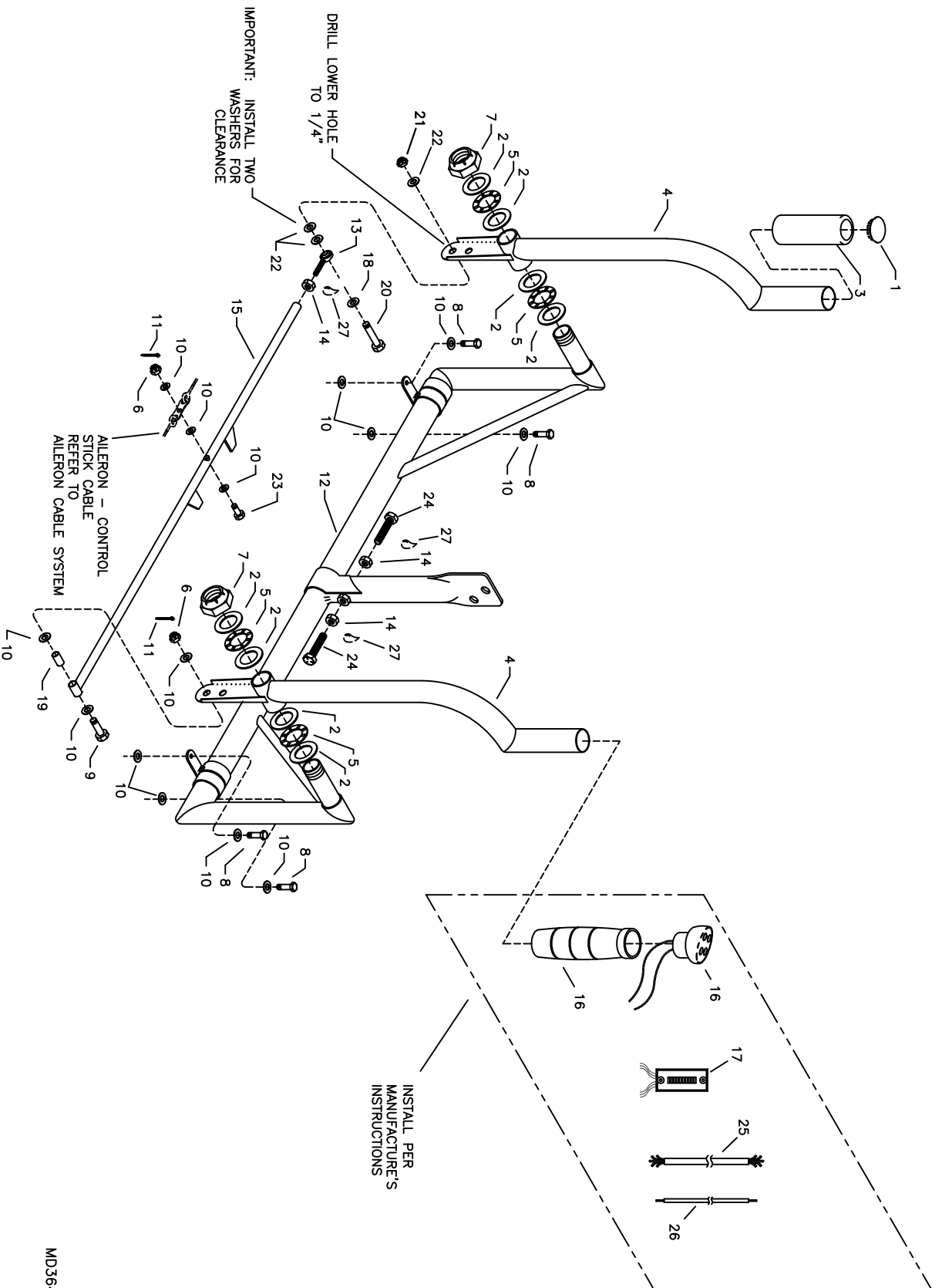
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	15" Hose Clamp	KSHW0100	2
2.	Rubber Edging	8510K11	7 ft
3.	5/8" Plain Clamp	AN742-D10	1
4.	6.9 Gal. Header Tank Mount Channel - AFT	KPFS0110	1
5.	Thread Sealant *	----	0
6.	Loctite Blue *	----	0
7.	1/2" Tank Withdrawal Fitting - LH thread	KPFS0117	3
8.	Straight Fitting - Flare 1/4" Tube to 1/8" NPT	AN816-4D	1
9.	Nut - 1/2" Bulkhead - LH Thread	KPFS0118	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
38.	DOW 730 Sealant *	----	0

* Builder Supplied

** Low Fuel Warning Kit is Optional

9/1/2013

REV. C



RRRMM S-20 RAVEN
CONTROL STICK ASSEMBLY & INSTALLATION

MD3649

RANS S-20 RAVEN - CONTROL STICK ASSEMBLY & INSTALLATION

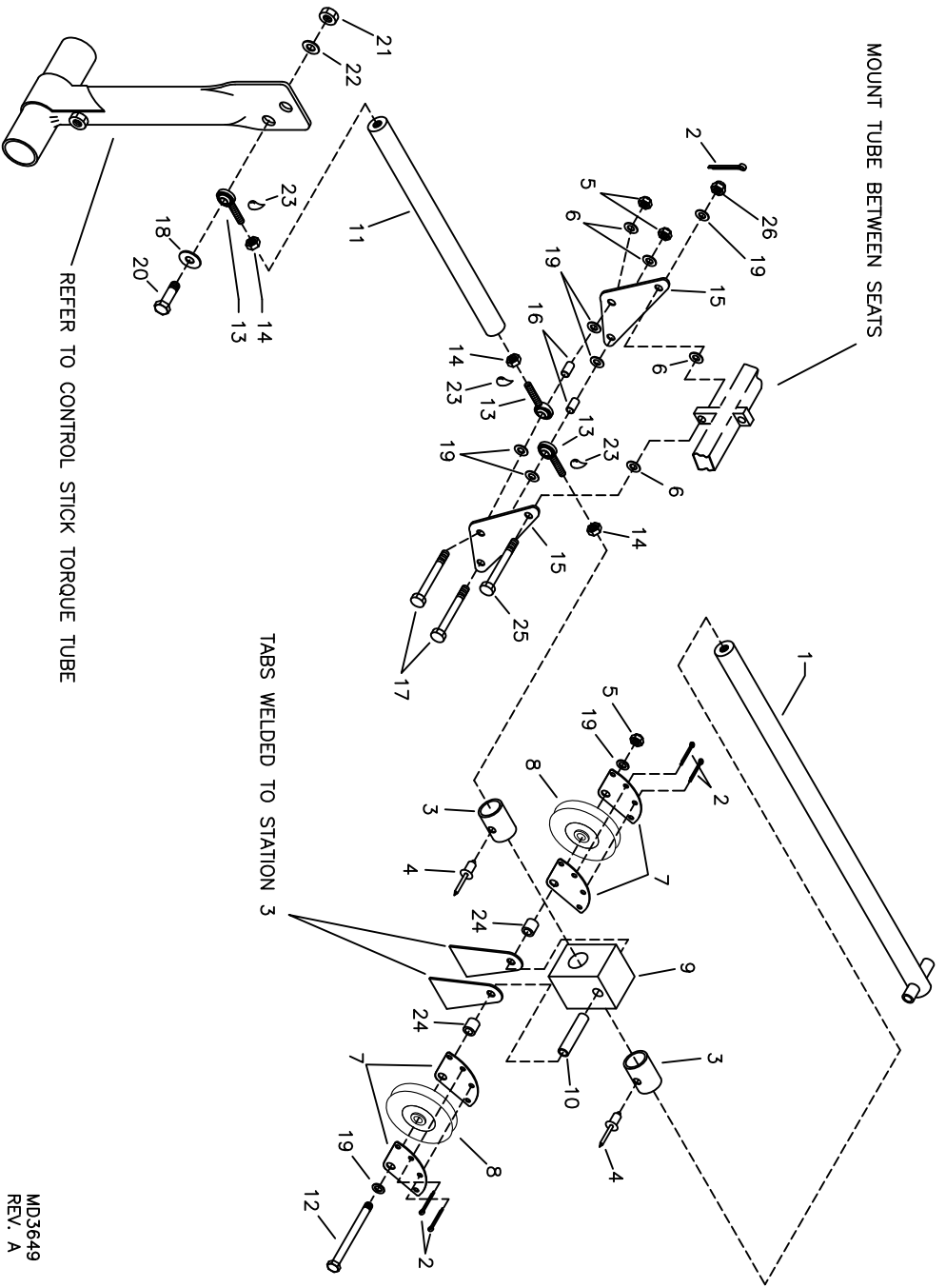
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	7/8" End Cap	CS-EC	1
2.	Bearing Washer	CS-BW	8
3.	Control Stick Grip	CS-G	1
4.	Control Stick	KPCS0072	2
5.	Thrust Bearing	CS-TB	4
6.	3/16" Castle Nut	AN310-3	2
7.	3/4" Nyloc Nut	CS-3/4LOCNUT	2
8.	3/16" Bolt	AN3-6A	4
9.	3/16" Bolt - drilled shank	AN3-11	1
10.	3/16" Thin Washer	AN960-10L	14
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	KSHW0119	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



**RAVEN 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

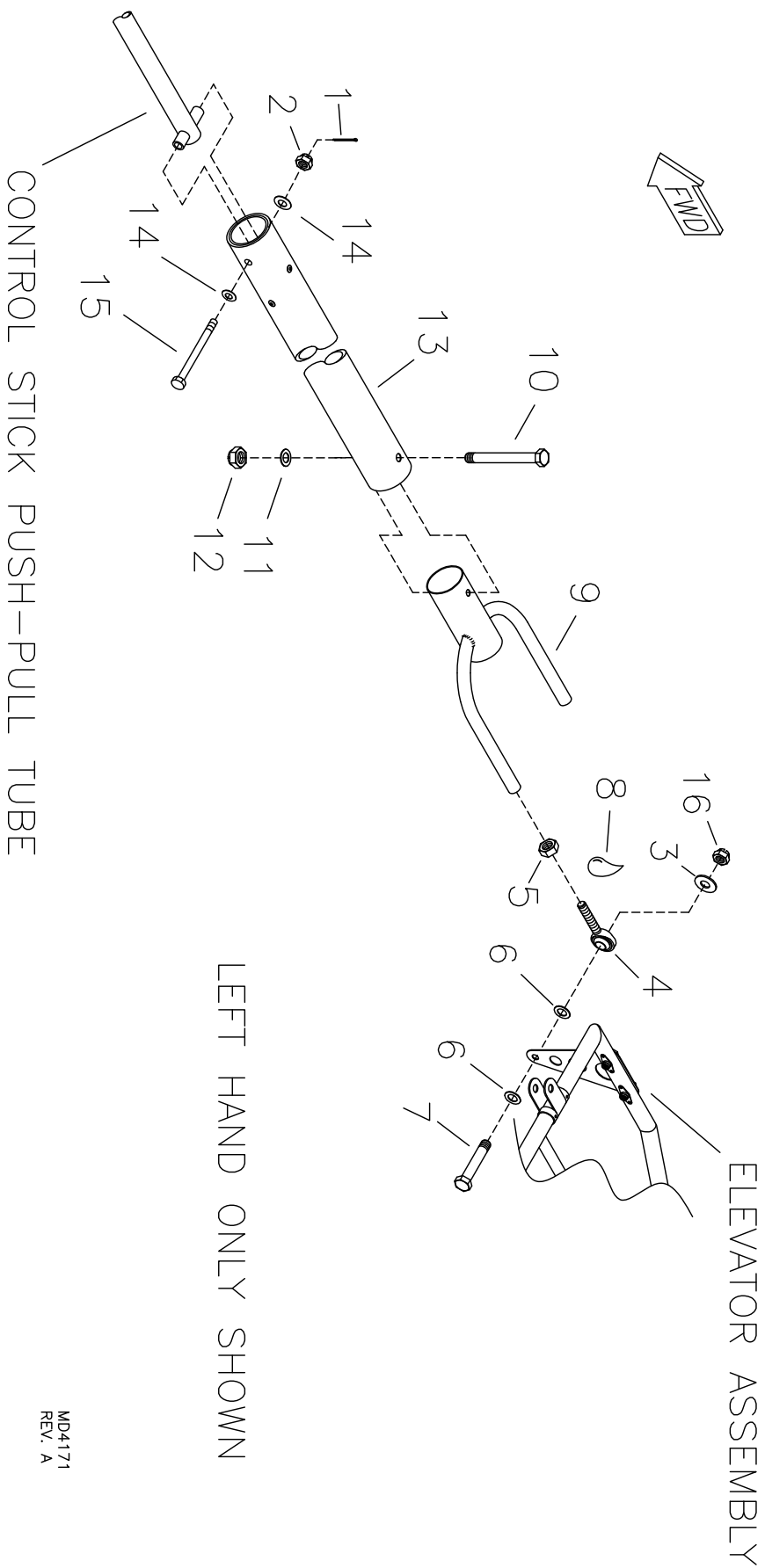
* Fabricate from Raw Stock

** Builder Modifies

*** Builder Supplied

9/1/2013

REV. A



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

MD4171
 REV. A

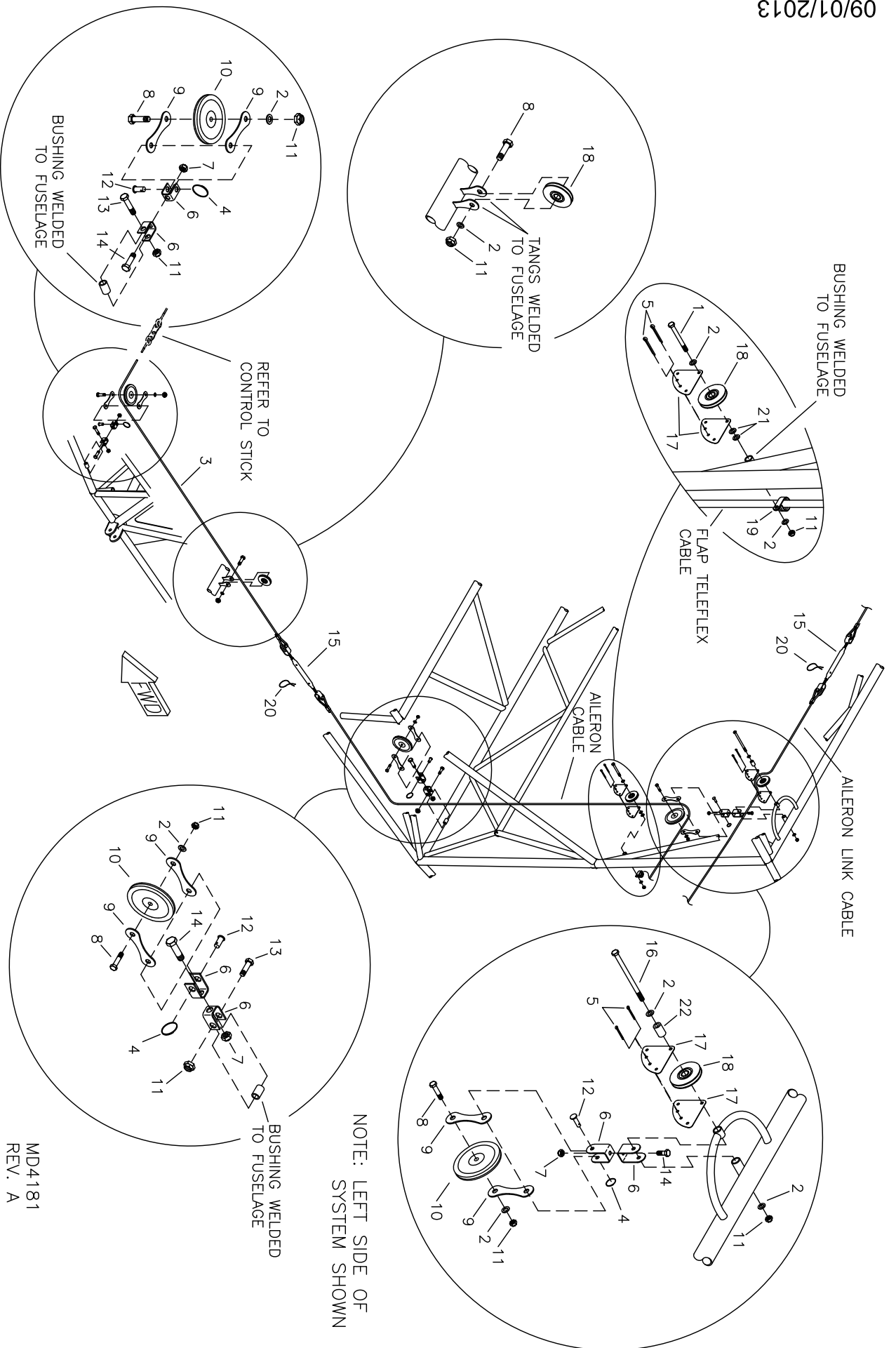
RANS S-20 RAVEN - ELEVATOR PUSH-PULL TUBE ASSEMBLY & INSTALLATION

#	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



NOTE: LEFT SIDE OF SYSTEM SHOWN

PRATT & WHITNEY 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

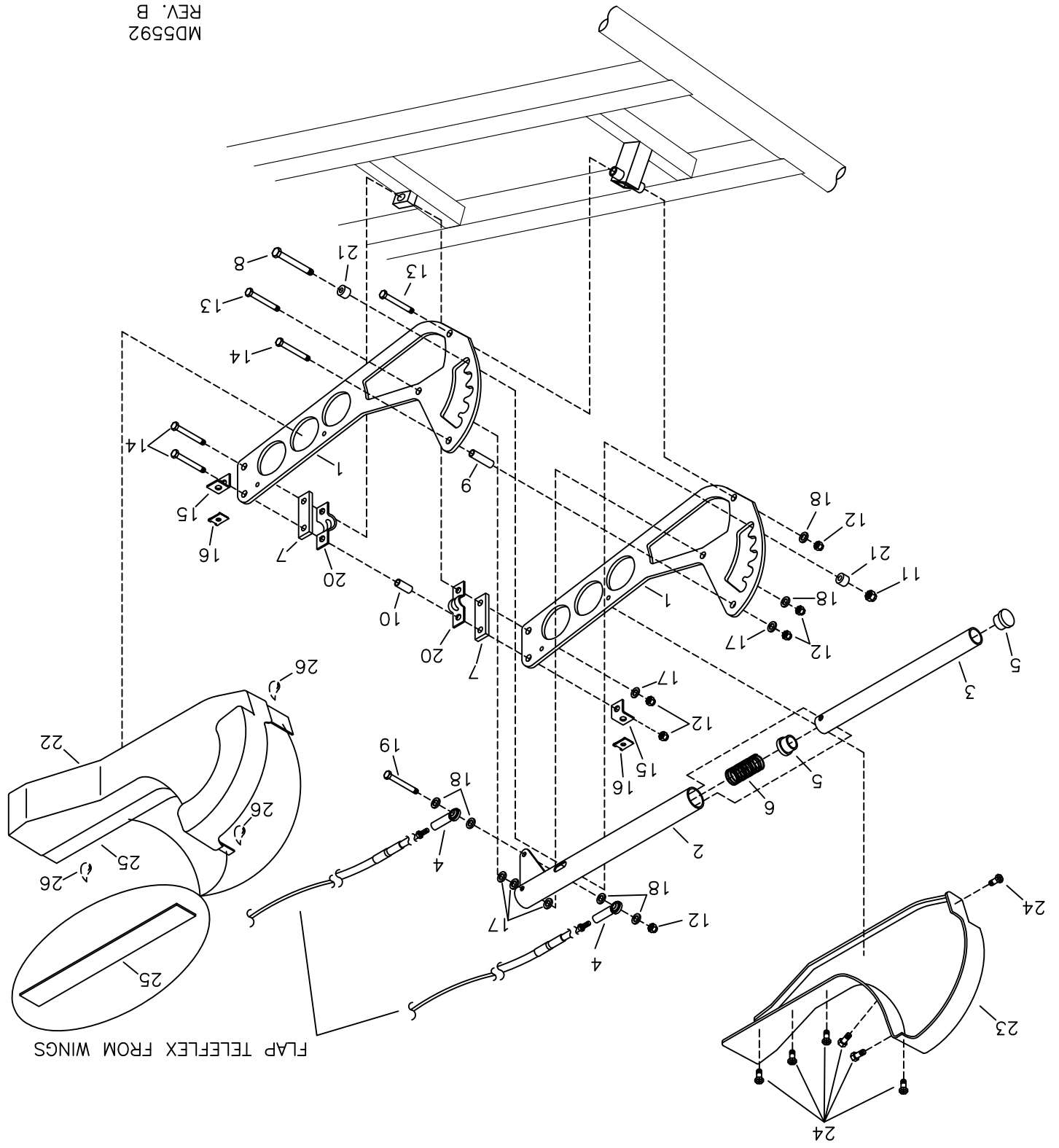
** Builder Supplied

9/1/2013

REV. A

RRMS S-20 RAVEN FLAP LEVER ASSEMBLY

MD5592
REV. B



FLAP TELEFLEX FROM WINGS

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

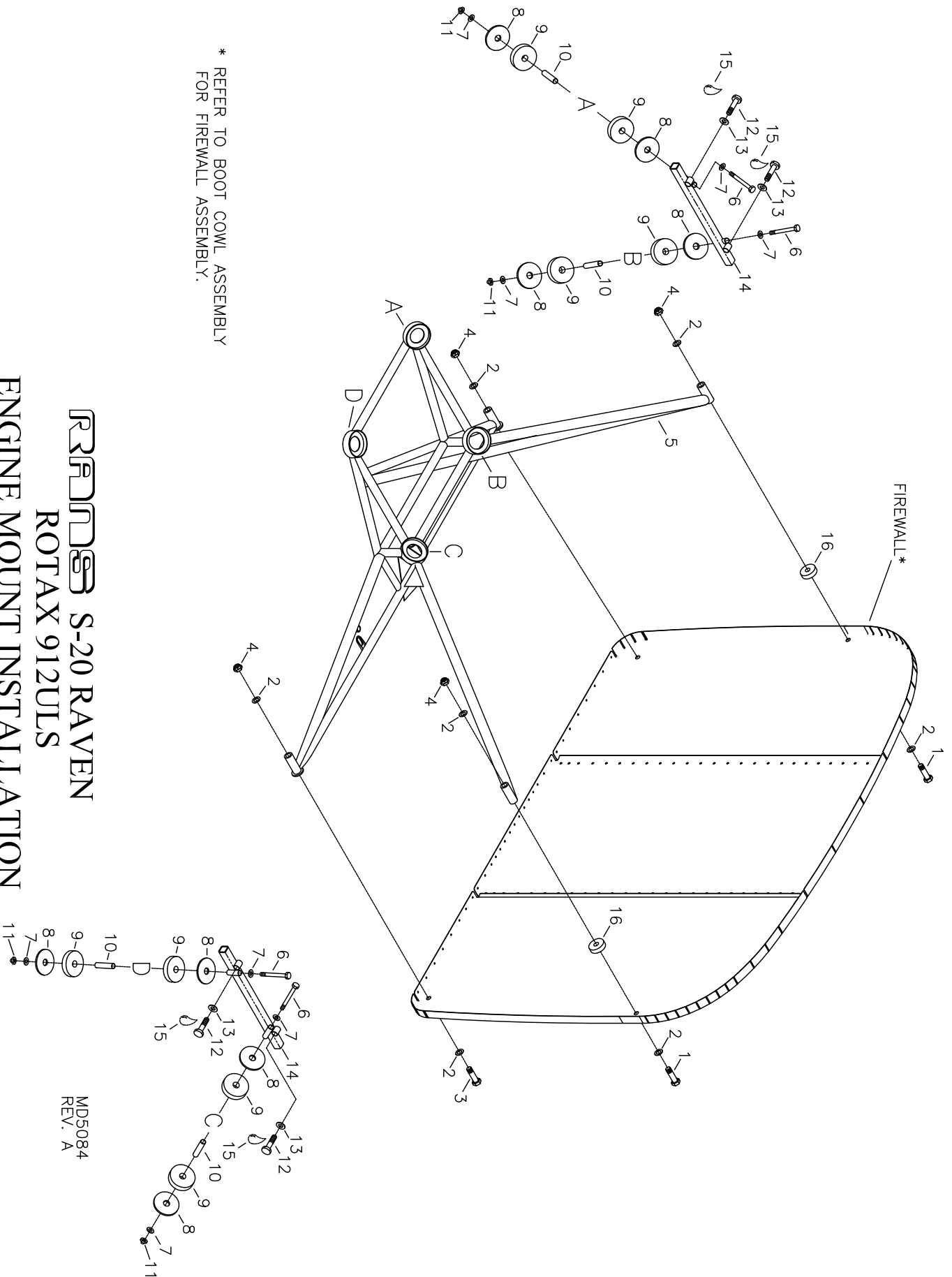
**** Builder Supplied

9/1/2013

REV. B

* REFER TO BOOT COWL ASSEMBLY FOR FIREWALL ASSEMBLY.

ROBIN S-20 RAVEN ROTAX 912ULS ENGINE MOUNT INSTALLATION

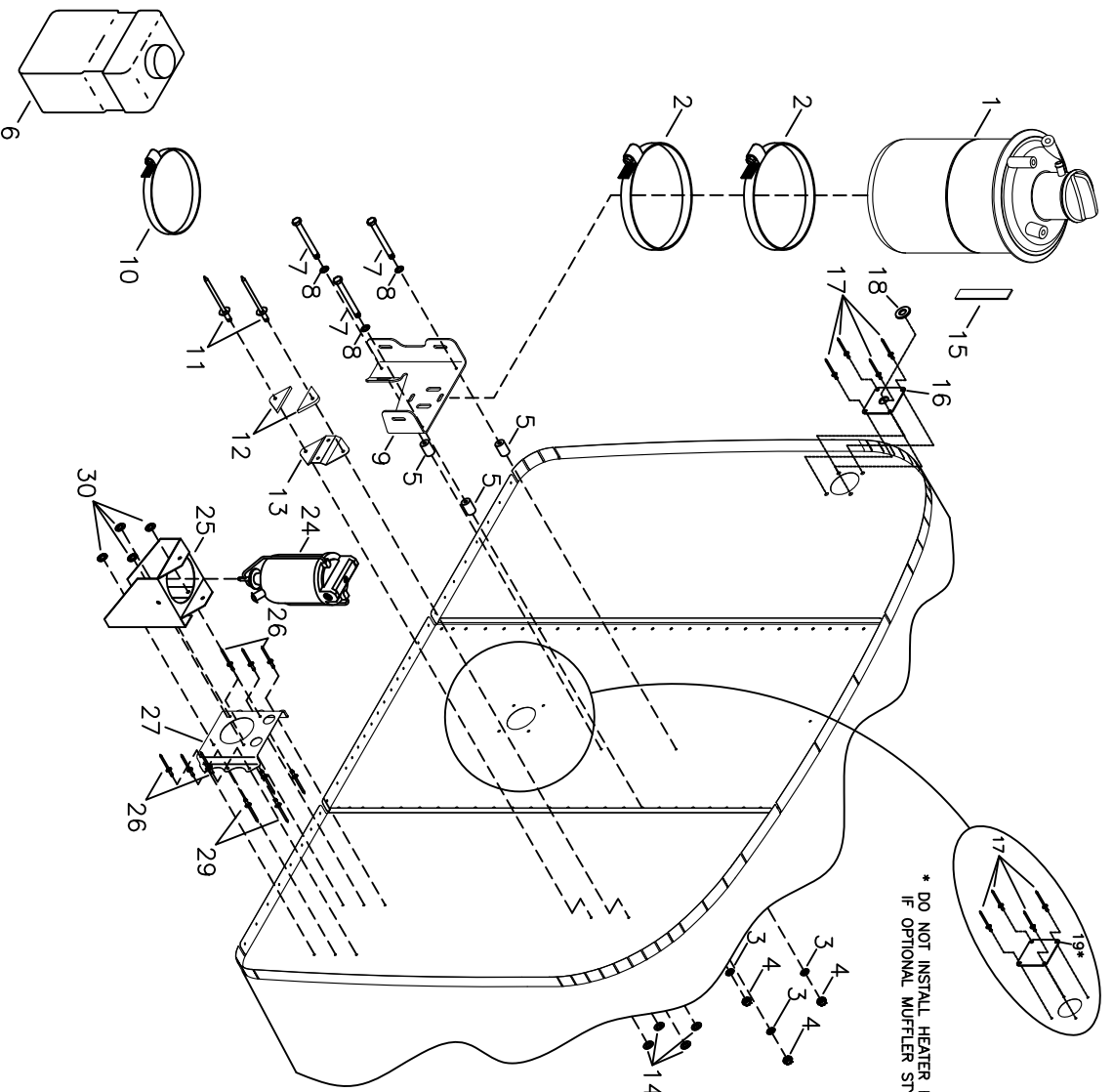


MD5084
REV. A

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



* DO NOT INSTALL HEATER HOLE PATCH
IF OPTIONAL MUFFLER STYLE HEATER IS TO BE INSTALLED

ROTAX S-20 RAVEN
ROTAX 912ULS
FIREWALL ITEMS INSTALLATION

MD5135
 REV. A

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

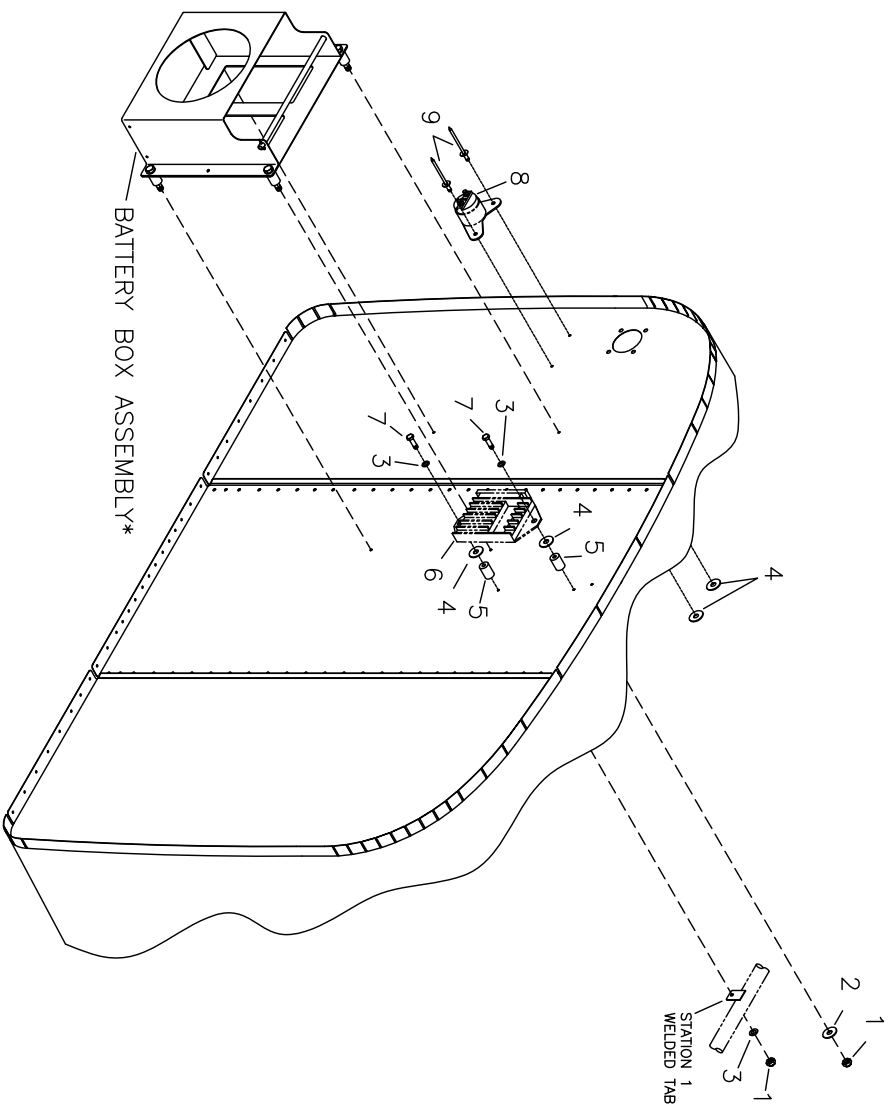
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Oil Tank *	----	0
2.	Hose Clamp - 6"	5-5288	2
3.	3/16" Thick Washer	AN960-10	3
4.	3/16" Tensile Nut	AN365-1032A	3
5.	3/8" x 0.058" x 1/2" Aluminum Bushing **	KAAC0044-3	0
6.	Overflow Bottle	KSPW0072	1
7.	3/16" Bolt	AN3-10A	3
8.	3/16" Thin Washer	AN960-10L	3
9.	Oil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

* Supplied with Engine

** Builder must fabricate from raw stock

9/1/2013

REV. A



* REFER TO BATTERY BOX ASSEMBLY AND INSTALLATION

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

MD5135
REV. A

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

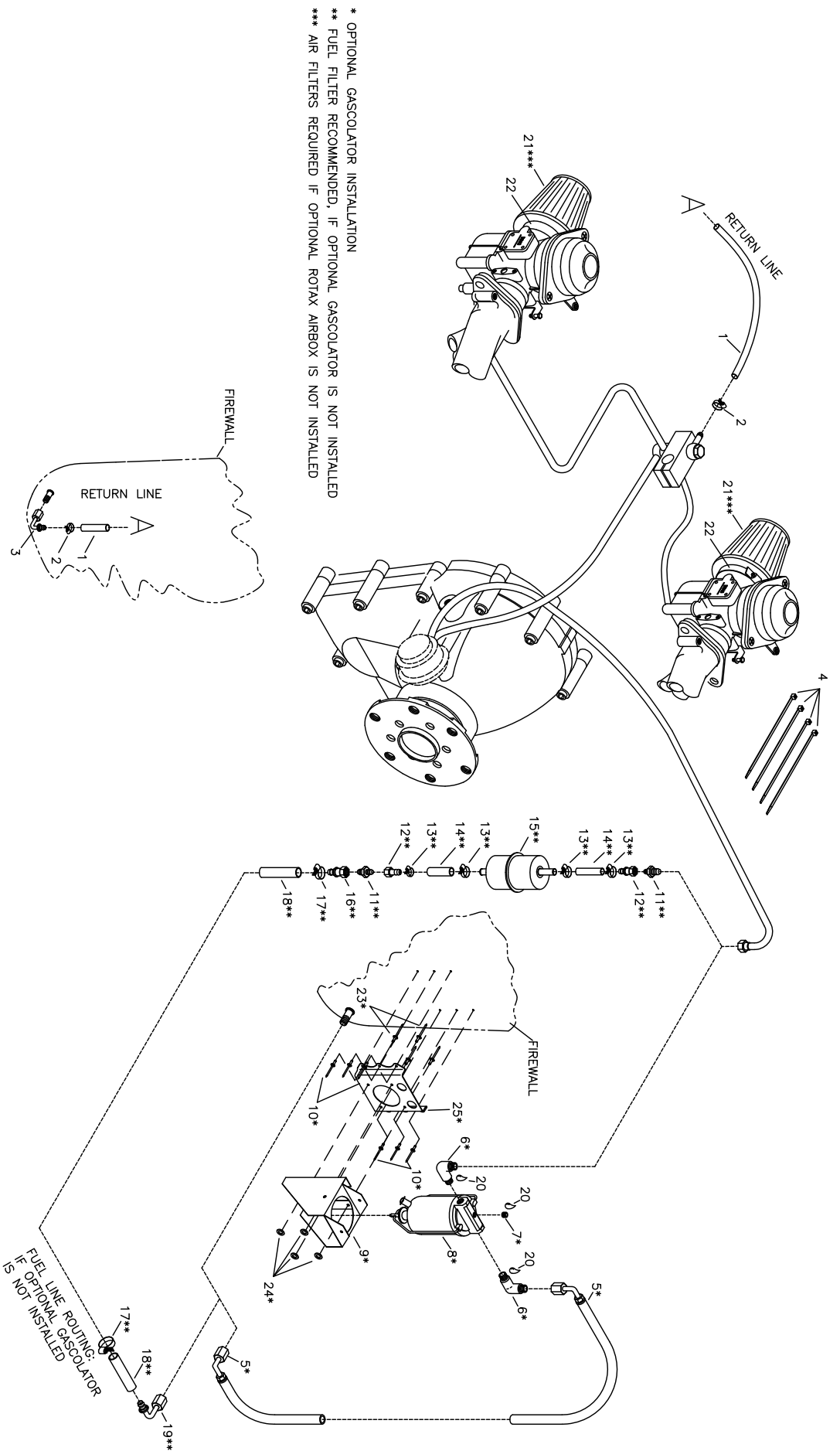
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Shear Nut	AN364-1032A	2
2.	3/16" Large Washer	AN970-3	1
3.	3/16" Thin Washer	AN960-10L	3
4.	#10 Washer - Stainless Steel	BSHW0022	4
5.	3/8" x .058" x 3/16" Aluminum Bushing *	KAAC0044-3	0
6.	Regulator / Rectifier **	-----	0
7.	3/16" Bolt	AN3-7A	2
8.	Starter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

* Fabricate from Raw Stock

** Supplied with Engine

9/1/2013

REV. A



HONDA S-20 RAVEN
 ROTAX 912UJS
 FUEL LINE INSTALLATION - FIREWALL FORWARD

MD4187
 REV. A

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

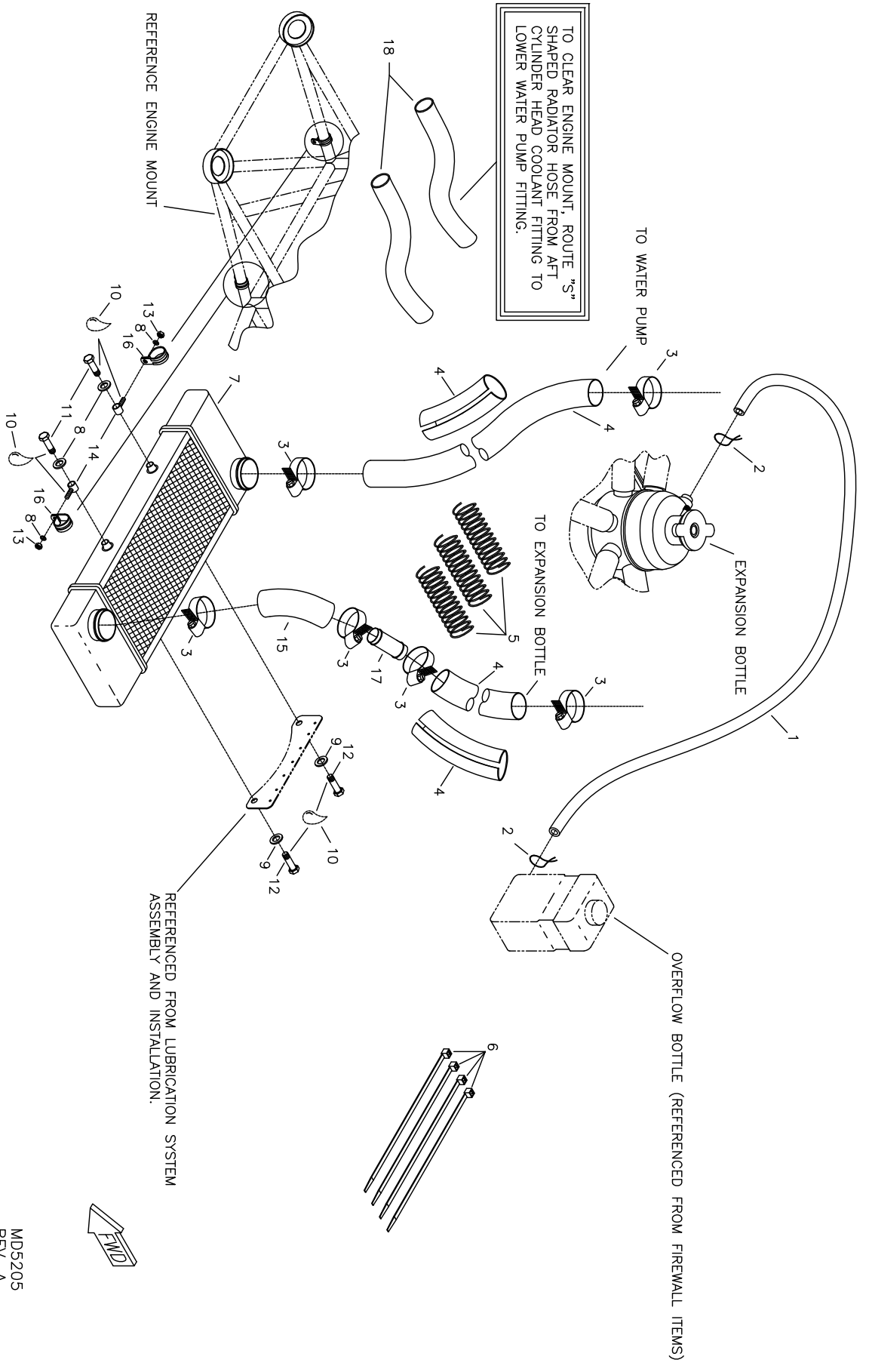
*** Fuel Filter recommended if Optional Gascolator is not installed.

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

***** Available from RANS Parts Dept.

9/1/2013

REV. A



ROTAX S-20 RAVEN
ROTAX 912U LS
COOLING SYSTEM INSTALLATION

MD5205
 REV. A



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

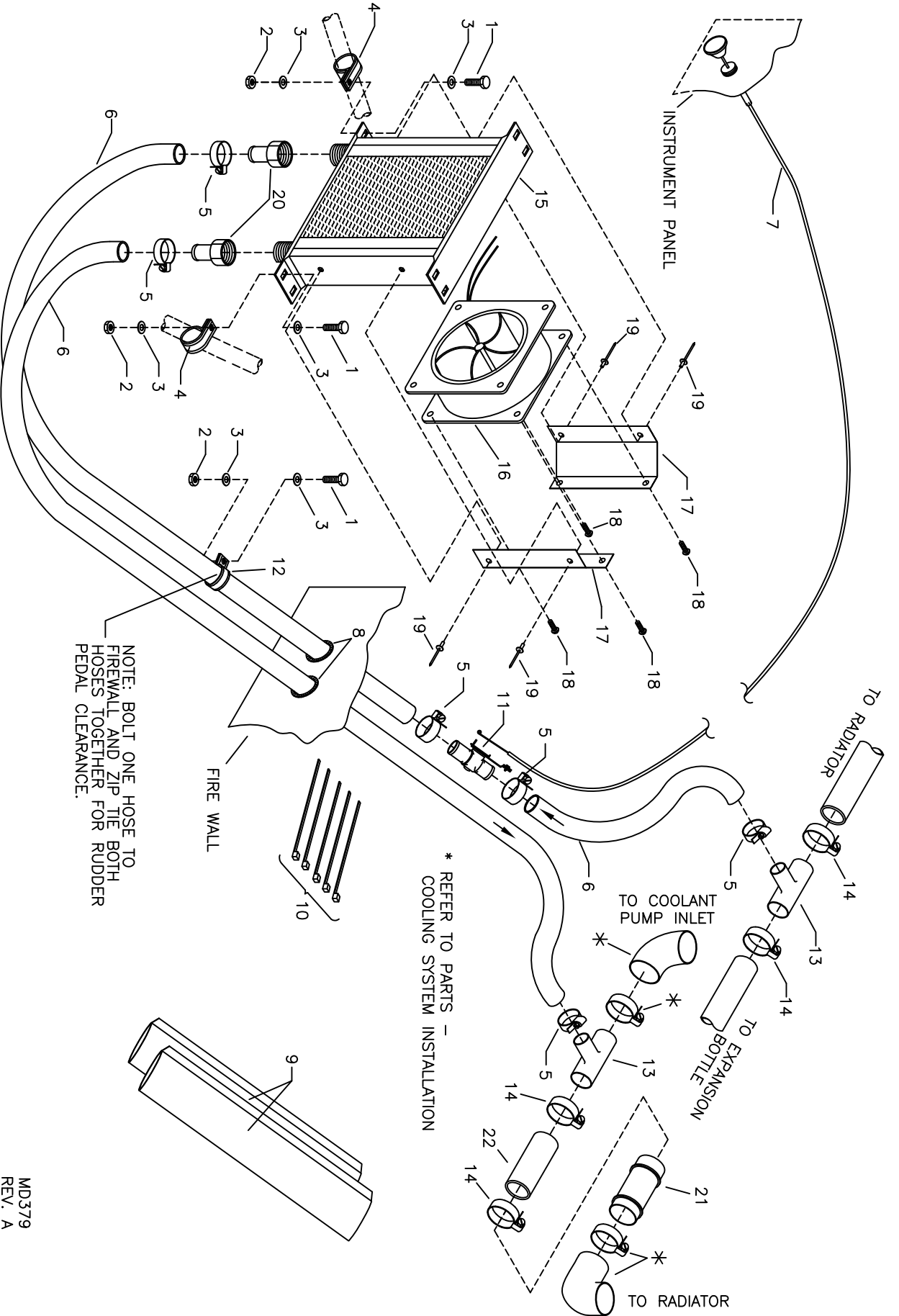
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	5/16" Overflow Hose	EGCS-OFH	3 ft.
2.	Safety Wire *	-----	0
3.	Hose Clamp - 1 1/2"	5-5216	6
4.	Radiator Hose - 1"	RADIATOR HOSE	3 ft.
5.	Hose Spring	EGCS-HS	3
6.	Nylon Tie	N-TIES	4
7.	Radiator	KSPW0071	1
8.	1/4" Thick Washer	AN960-416	4
9.	1/4" Thin Washer	AN960-416L	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

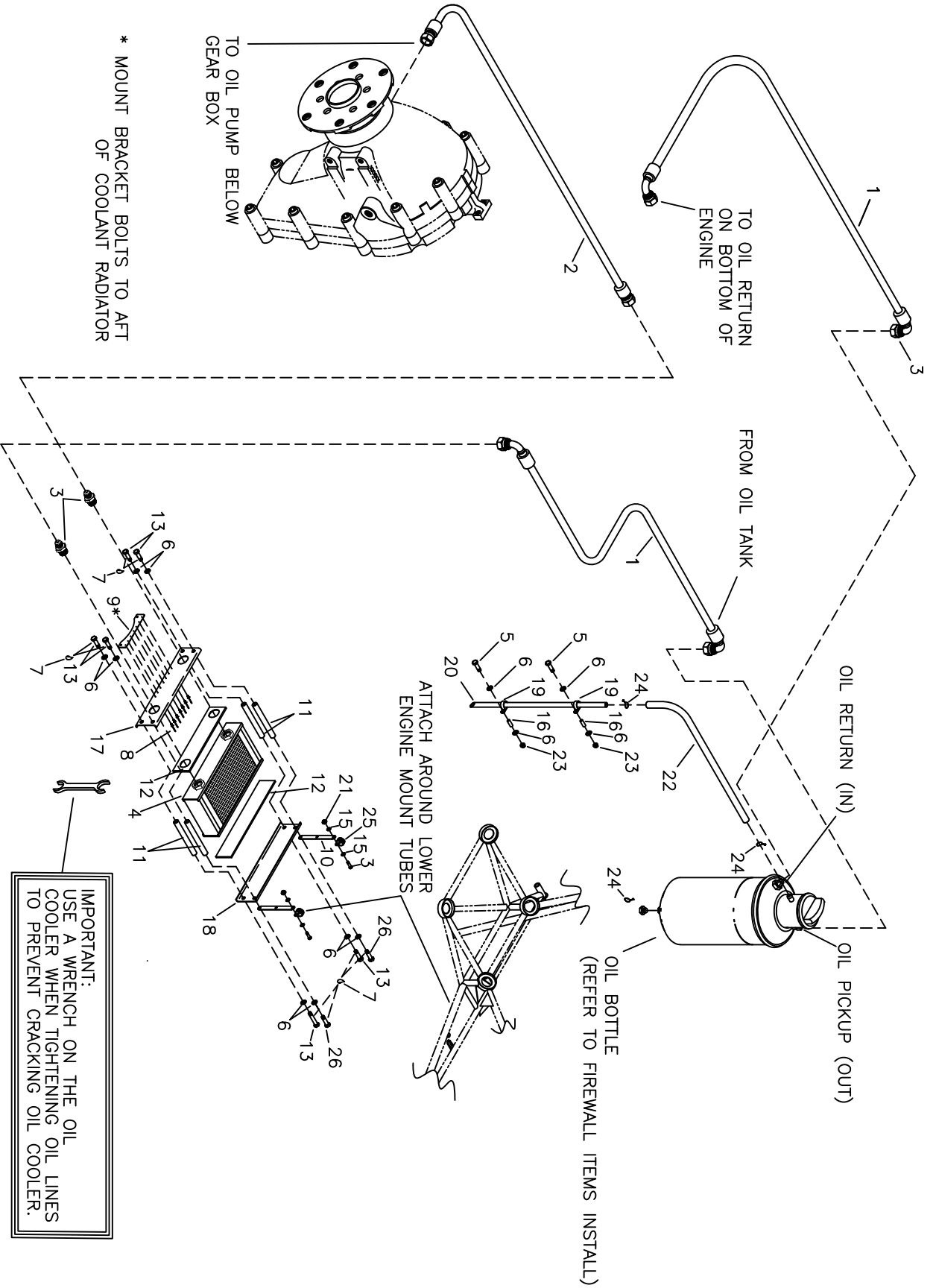


RRP008 S-20 RAVEN
ROTAX 912ULS
 OPTIONAL HEATER INSTALLATION - RADIANT STYLE

MD379
 REV. A

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



RRR **S-20 RAVEN**
ROTAX 912ULS
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

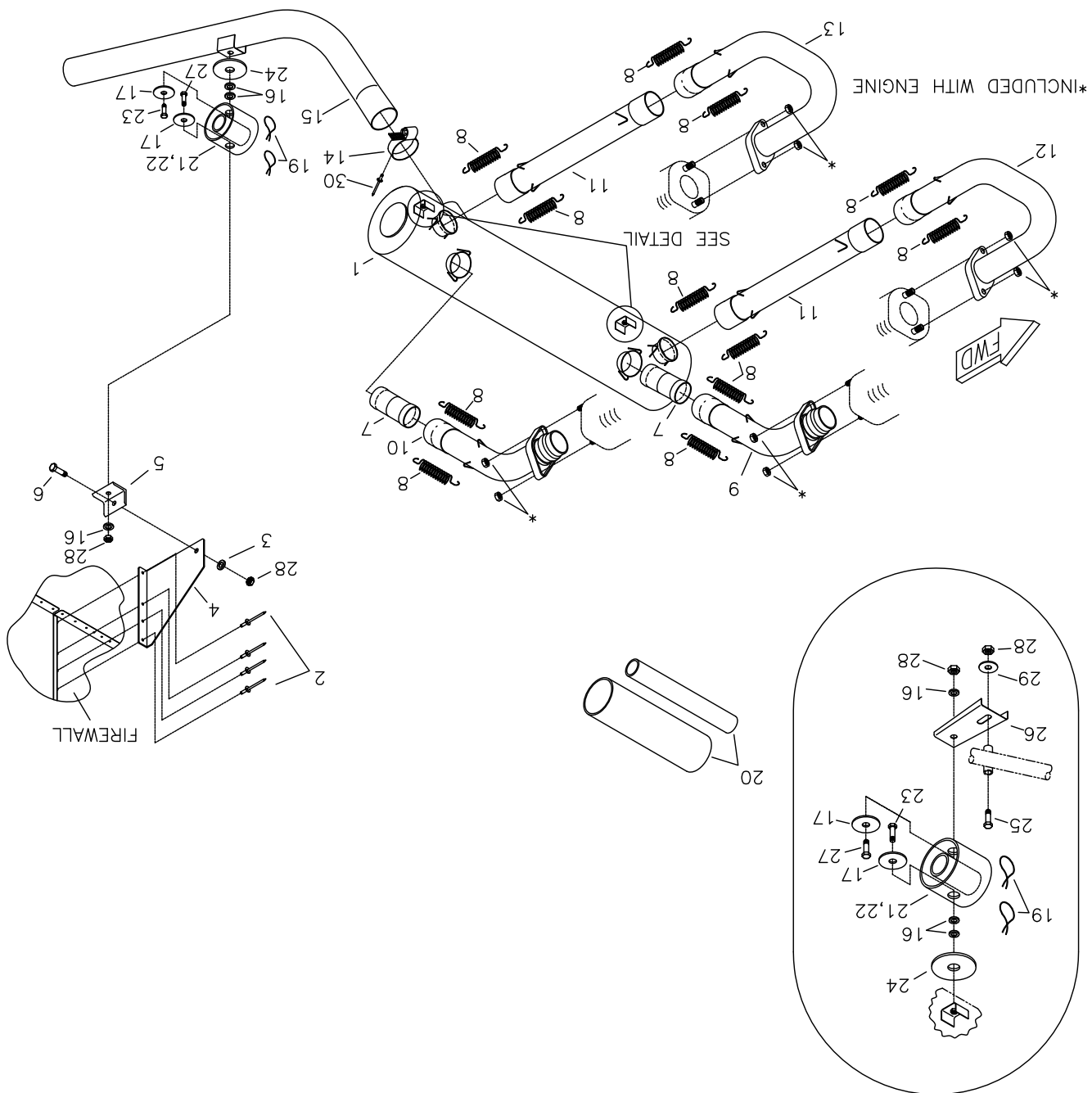
*** Builder must fabricate from raw stock

9/1/2013

REV. C

RRMS S-20 RAVEN ROTAX 912ULS MUFFLER ASSEMBLY

MDS201
REV. A



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

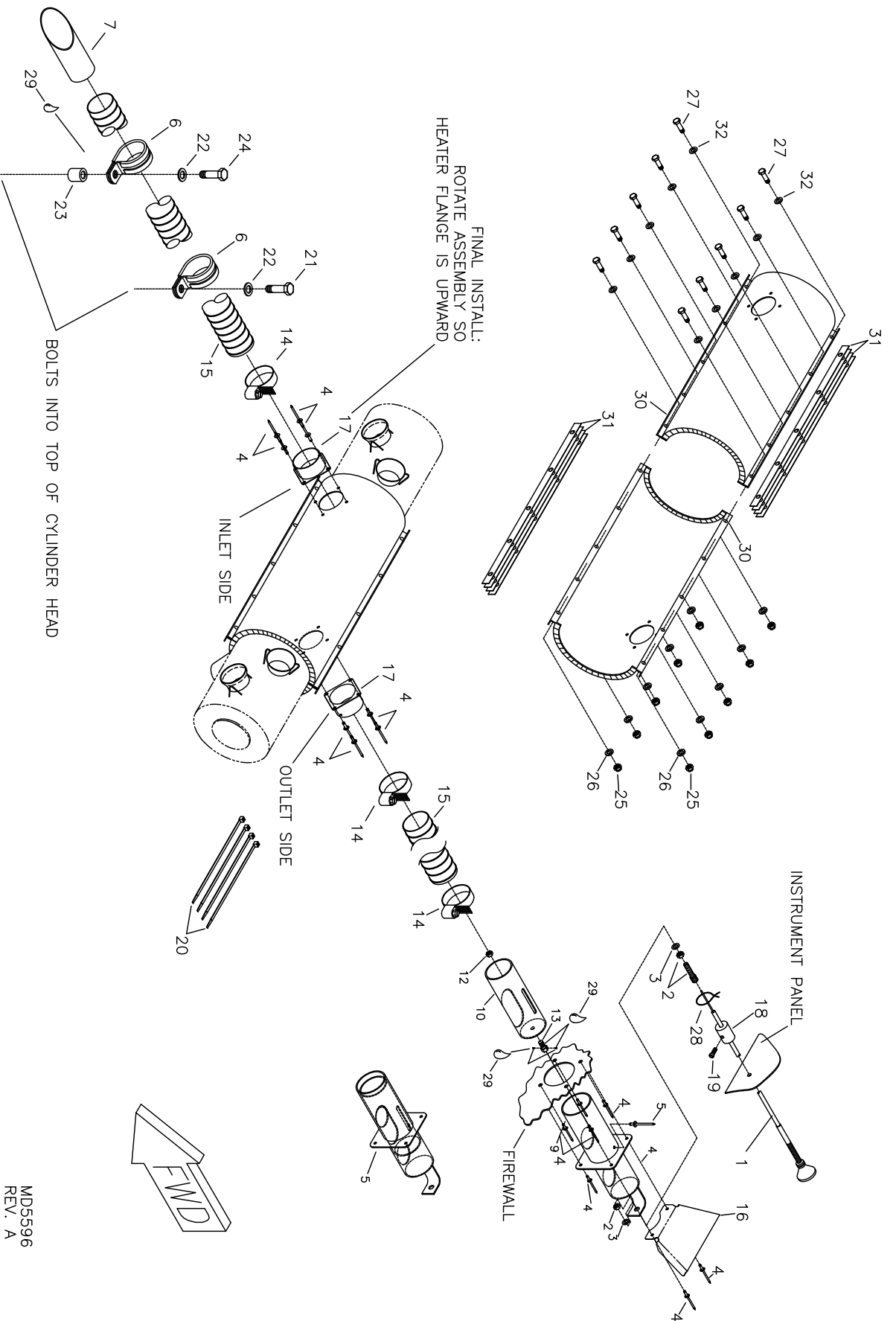
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	S-19 / S-20 Muffler	KPEX0071	1
2.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-43	4
3.	1/4" Thin Washer	AN960-416L	1
4.	Exhaust Mount Bracket	KPEX0076	1
5.	Tail Pipe Support - Angle	KPEX0075	1
6.	1/4" Bolt	AN4-5A	1
7.	Muffler Canister Coupler	KPEX0072	2
8.	Muffler 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

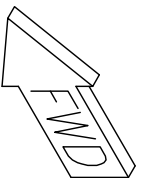
REV. A



RAVEN S-20 RAVEN

ROTAX 912ULS

OPTIONAL CABIN HEATER INSTALLATION - MUFFLER STYLE



MD5596
REV. A

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 / Creet 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

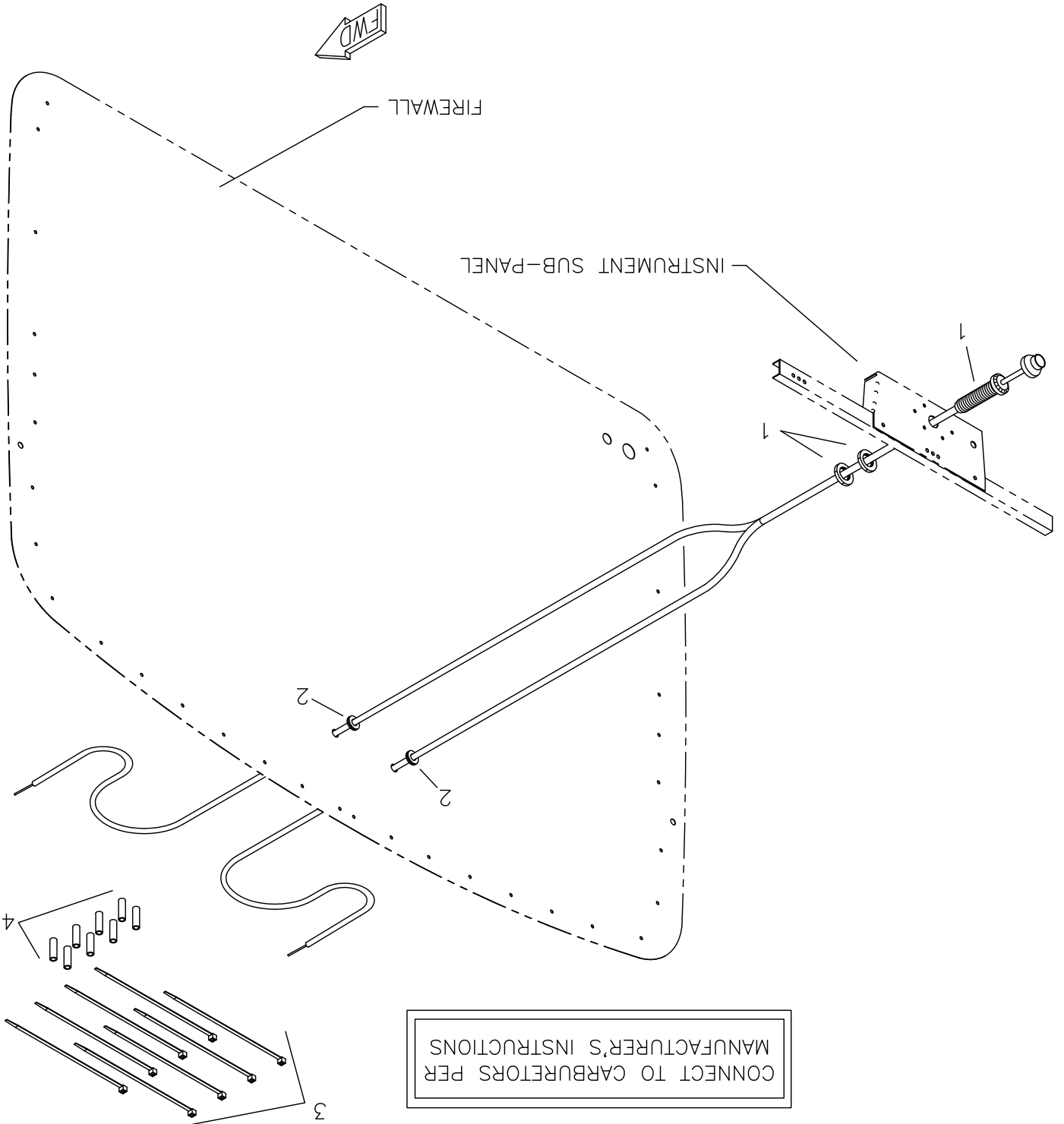
*** Builder Supplied

9/1/2013

REV. A

RANDS S-20 RAVEN ROTAX 912UIS THROTTLE ASSEMBLY

MD5597



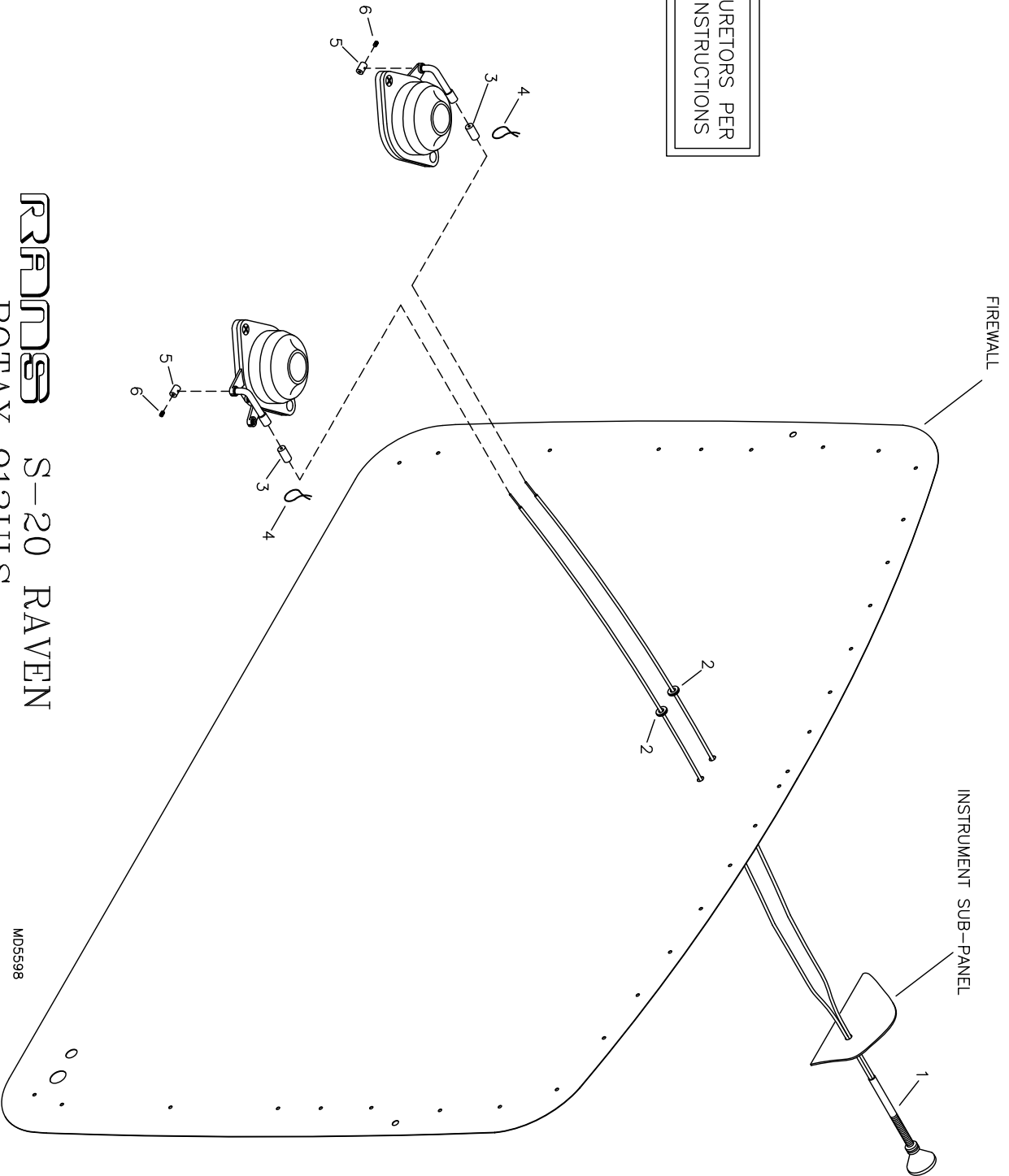
RANS S-20 RAVEN - ROTAX 912ULS - THROTTLE CONTROL ASSEMBLY

#	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



RRRND88 S-20 RAVEN
 ROTAX 912ULS
 CHOKE CONTROL ASSEMBLY

MDS598

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

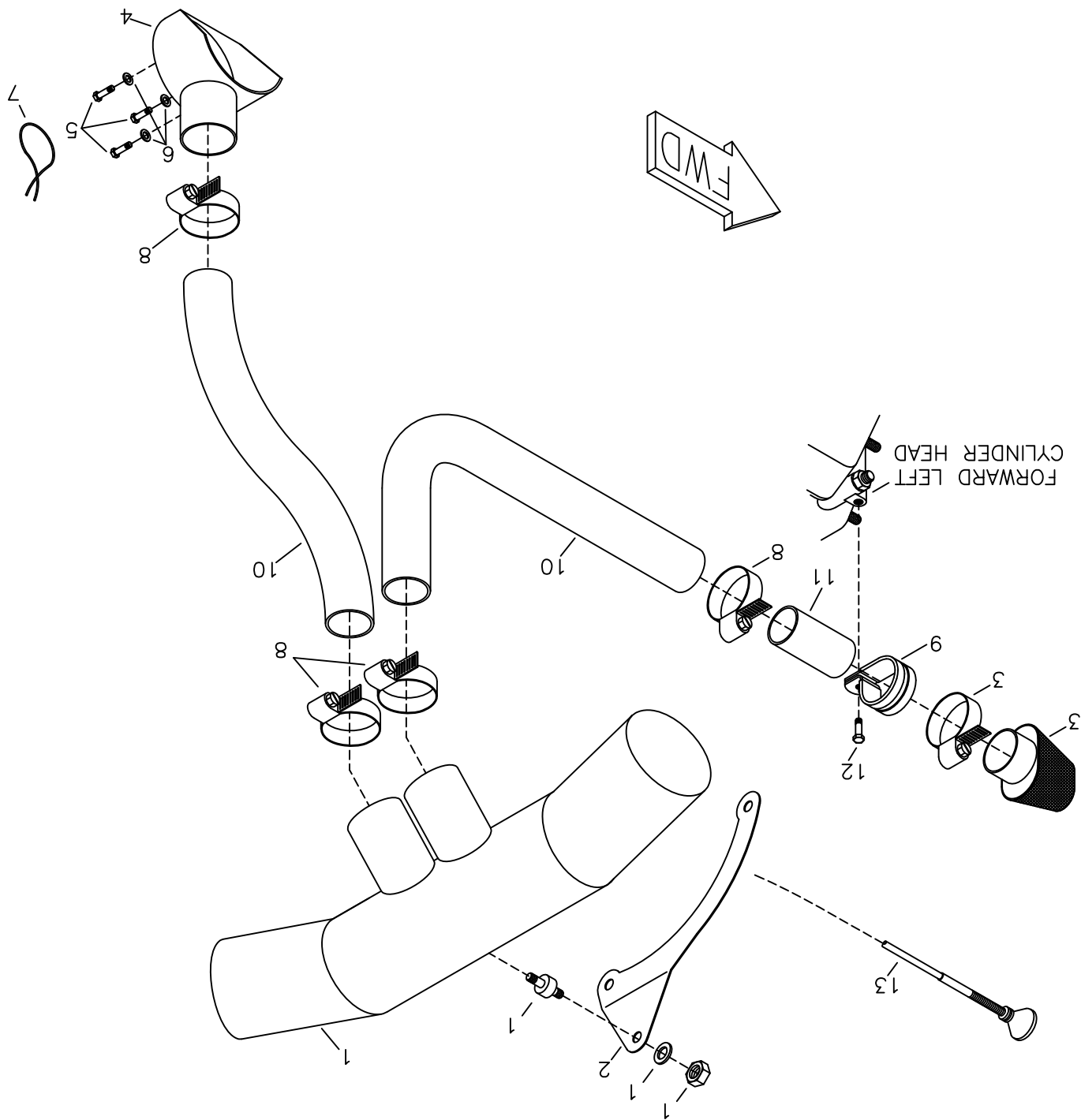
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Choke Cable Assembly - Dual	KSCS0026	1
2.	3/16" Rubber Grommet	KSAC0002	2
3.	Cable Housing Endcap	ENDCAP-12000	2
4.	Safety Wire *	-----	0
5.	Barrel Stop **	-----	0
6.	Set Screw **	-----	0

* Builder Supplied

** Supplied with Choke Cable Assembly

RRMS S-20 RAVEN ROTAX 912UIS OPTIONAL AIRBOX ASSEMBLY

MD5464



RANS S-20 RAVEN - ROTAX 912ULS - OPTIONAL AIRBOX ASSEMBLY

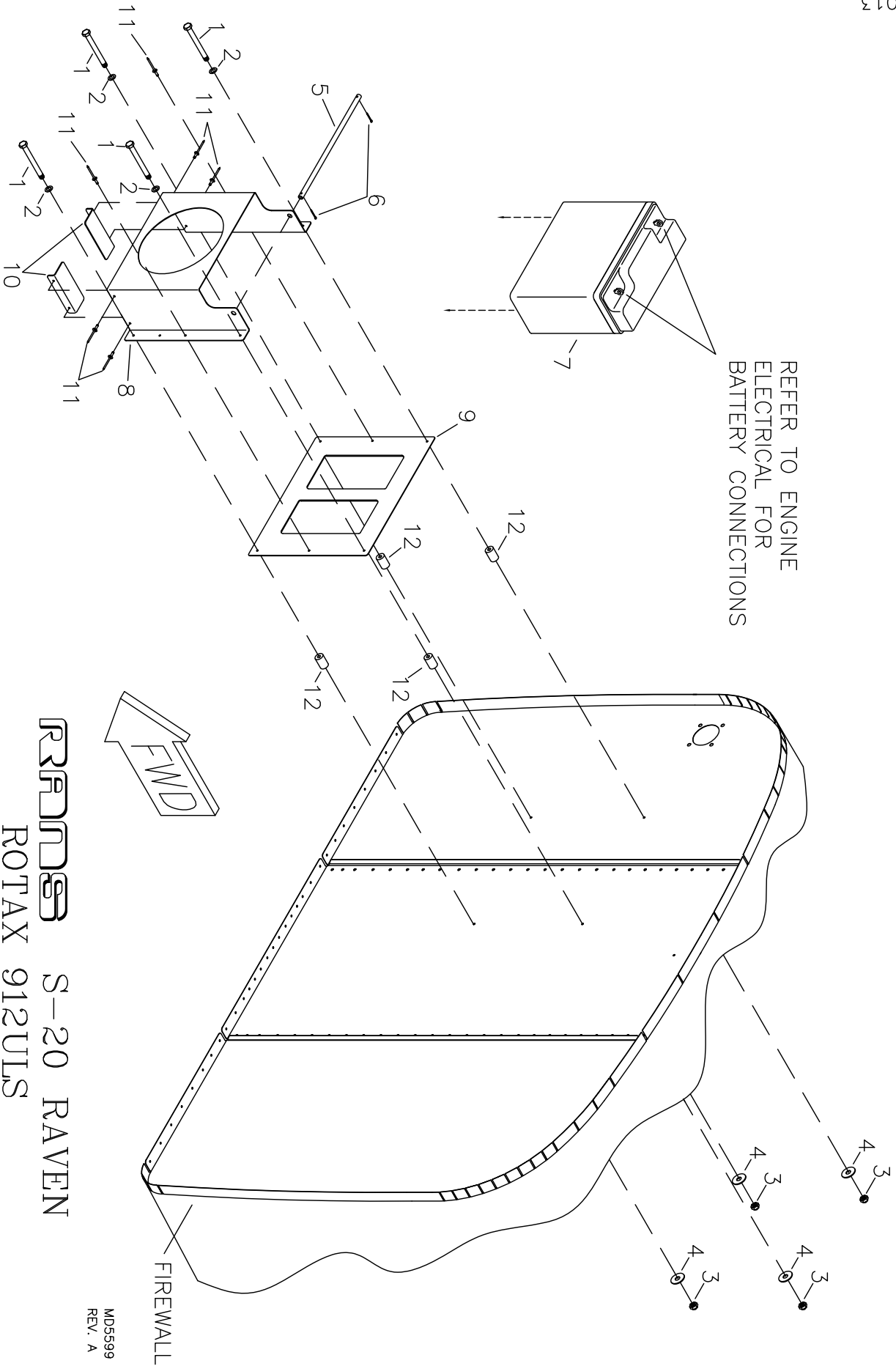
RANS Part Assembly # KAPW0055 (with Airbox), KAPW0056 (without Airbox)

#	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

REFER TO ENGINE ELECTRICAL FOR BATTERY CONNECTIONS



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

MDS599
 REV. A

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

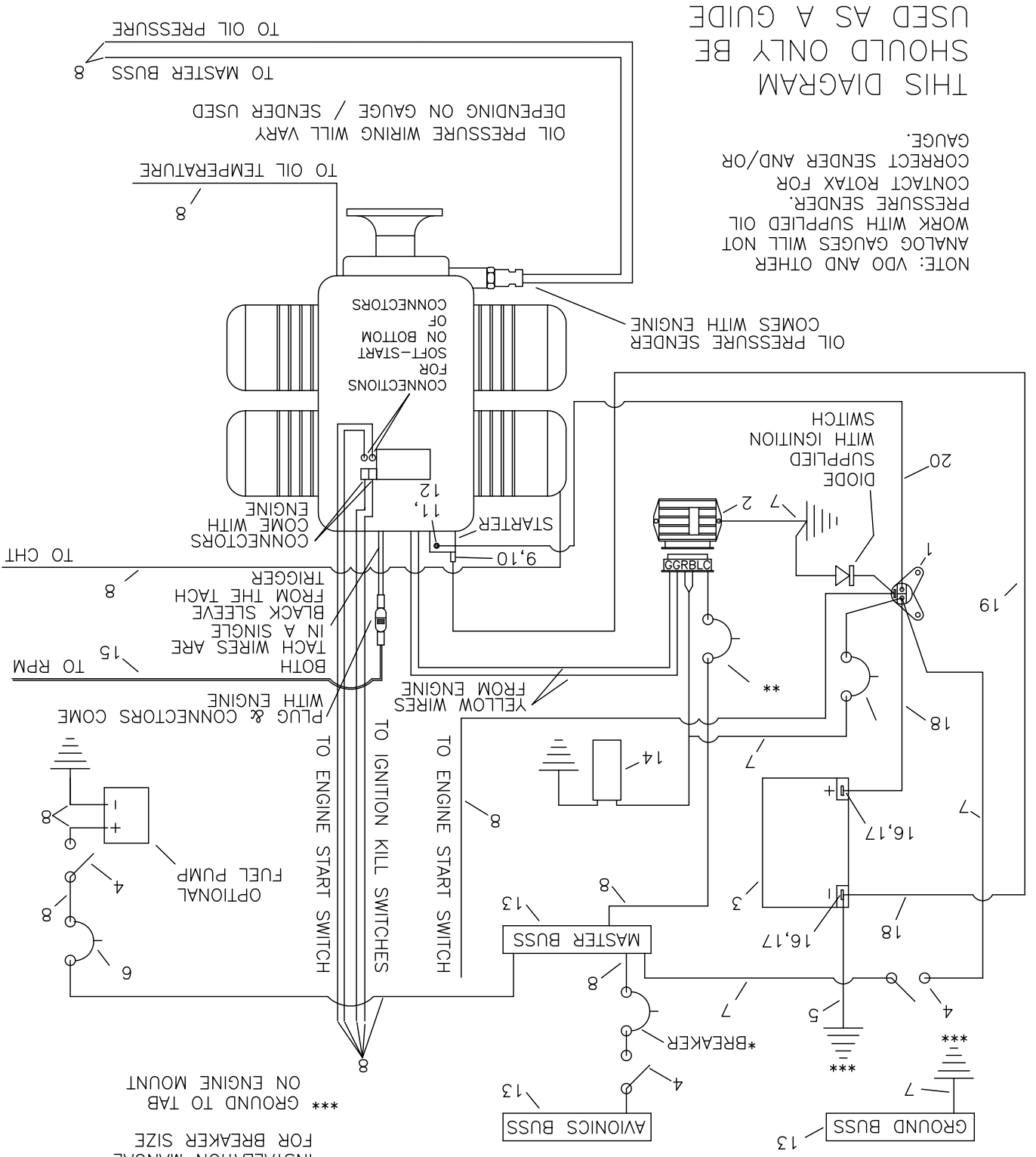
*** Fabricate from Raw Stock

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



NOTE: VDO AND OTHER ANALOG GAUGES WILL NOT WORK WITH SUPPLIED OIL PRESSURE SENDER. CONTACT ROTAX FOR CORRECT SENDER AND/OR GAUGE.
 THIS DIAGRAM SHOULD ONLY BE USED AS A GUIDE

RRRDS 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

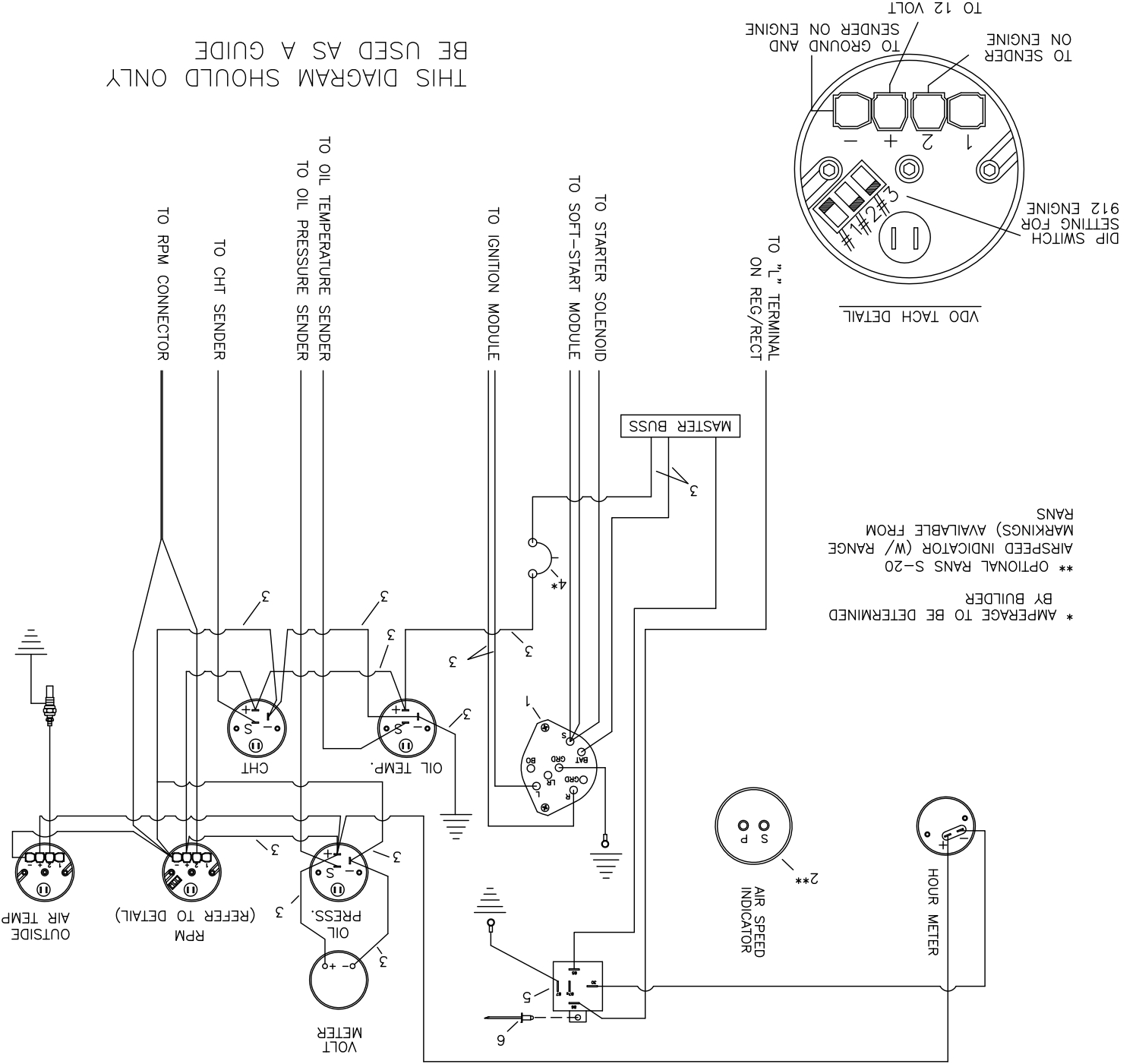
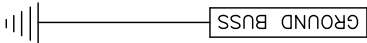
*** Builder Supplied

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

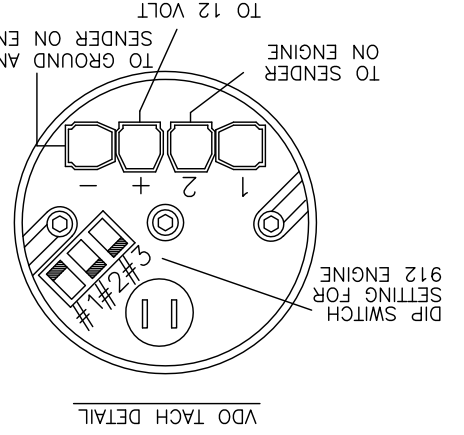
9/1/2013

REV. A

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



* AMPERAGE TO BE DETERMINED BY BUILDER
** OPTIONAL RANS S-20 AIRSPEED INDICATOR (W/ RANGE MARKINGS) AVAILABLE FROM RANS



THIS DIAGRAM SHOULD ONLY BE USED AS A GUIDE

MDS231 REV. A

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

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

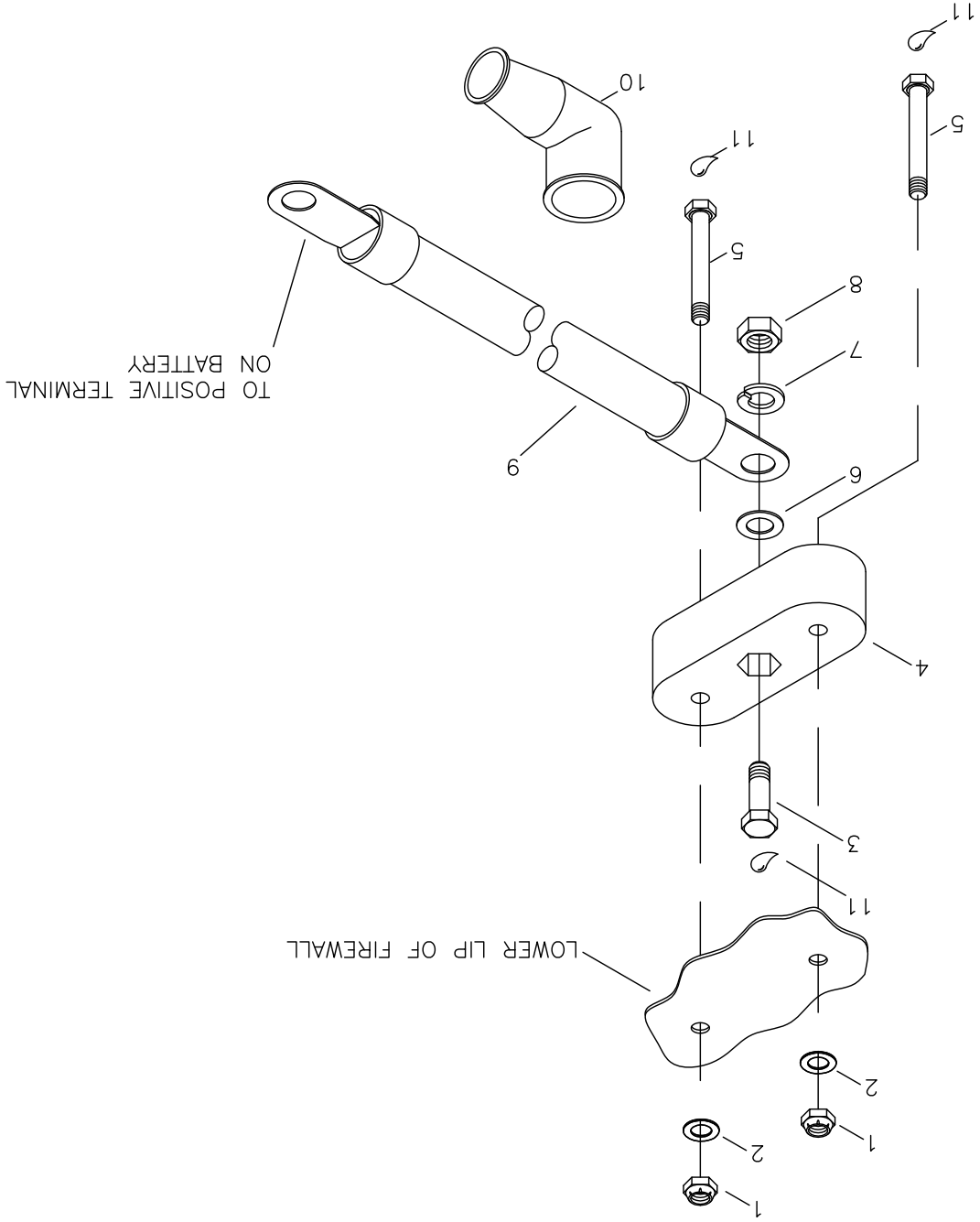
* Builder supplied

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

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

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

MD5501



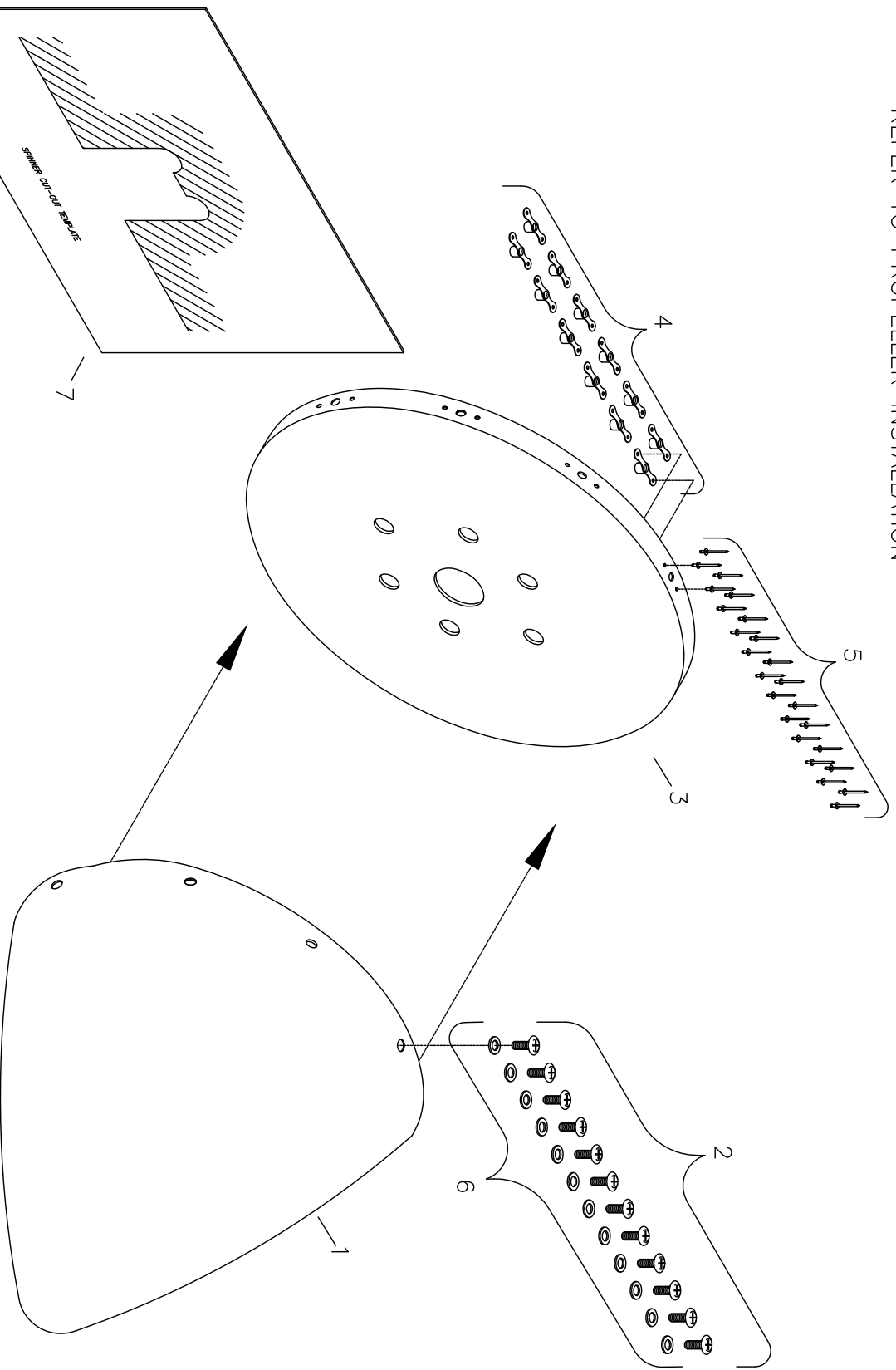
RANS S-20 RAVEN - ROTAX 912ULS - OPTIONAL REMOTE CHARGING POST

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

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



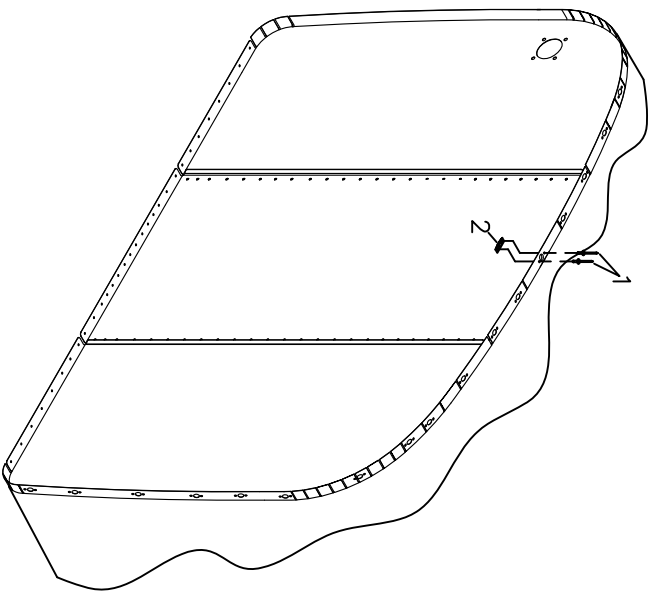
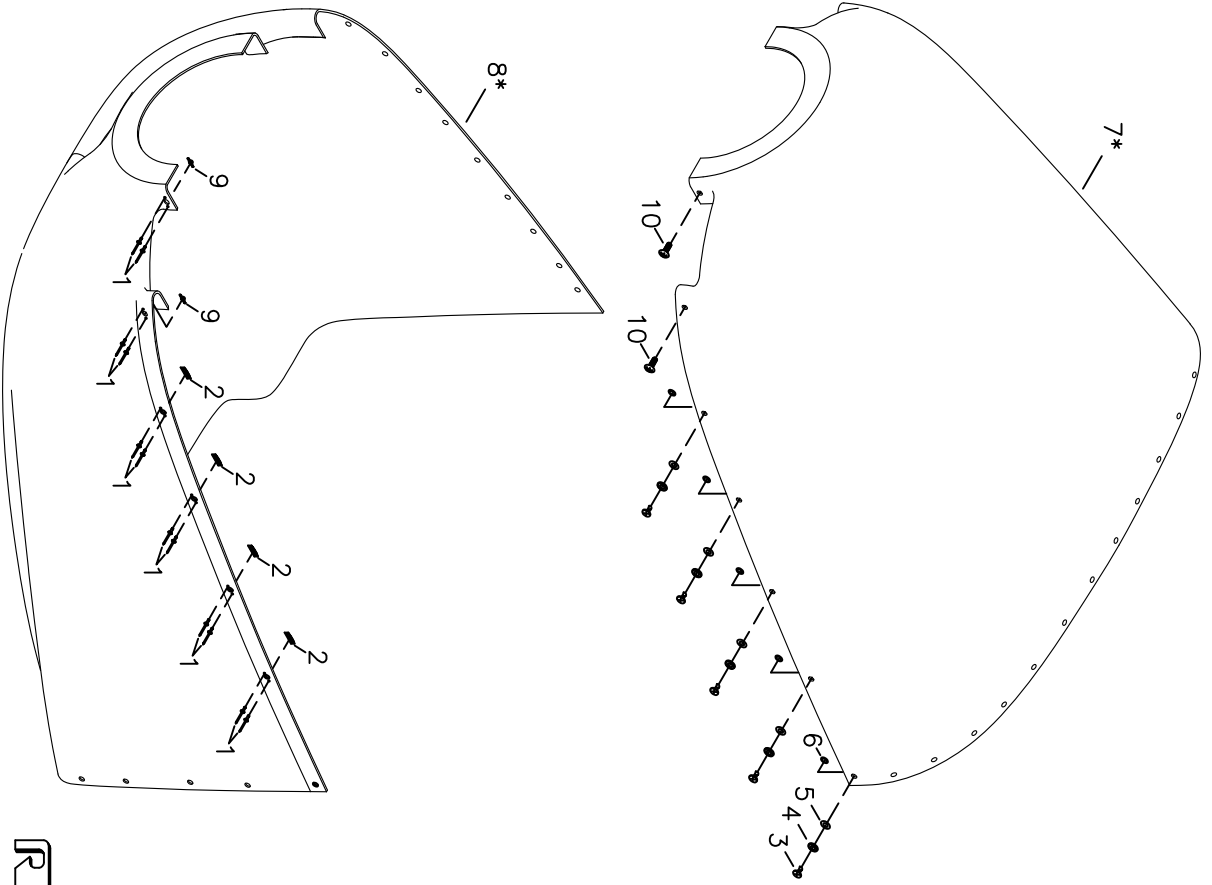
REDUCED S-20 RAVEN
ROTAX 912ULS
11.3" SPINNER ASSEMBLY

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 912U/LS
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

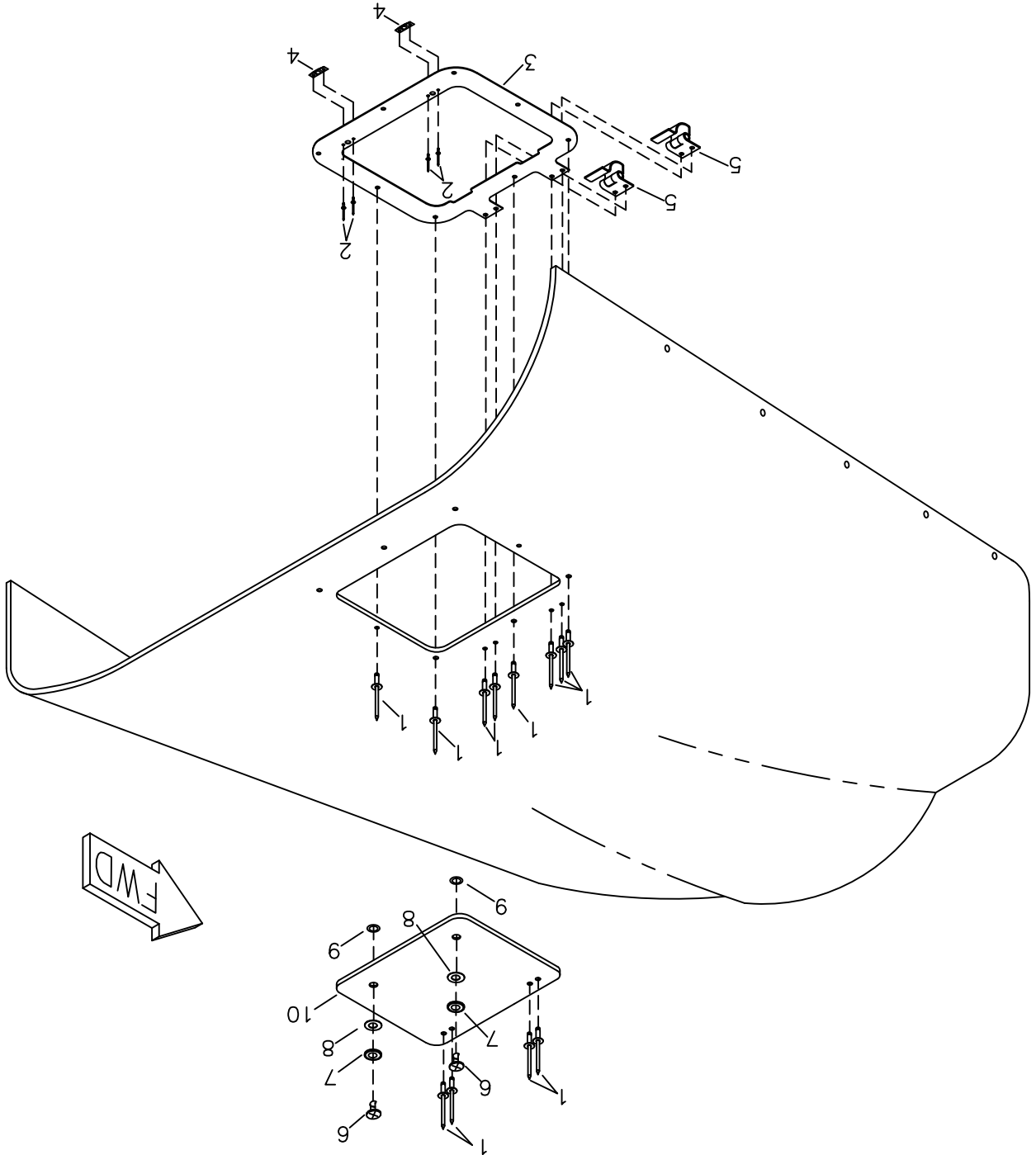
** Use as needed for secure attachment

9/1/2013

REV. A

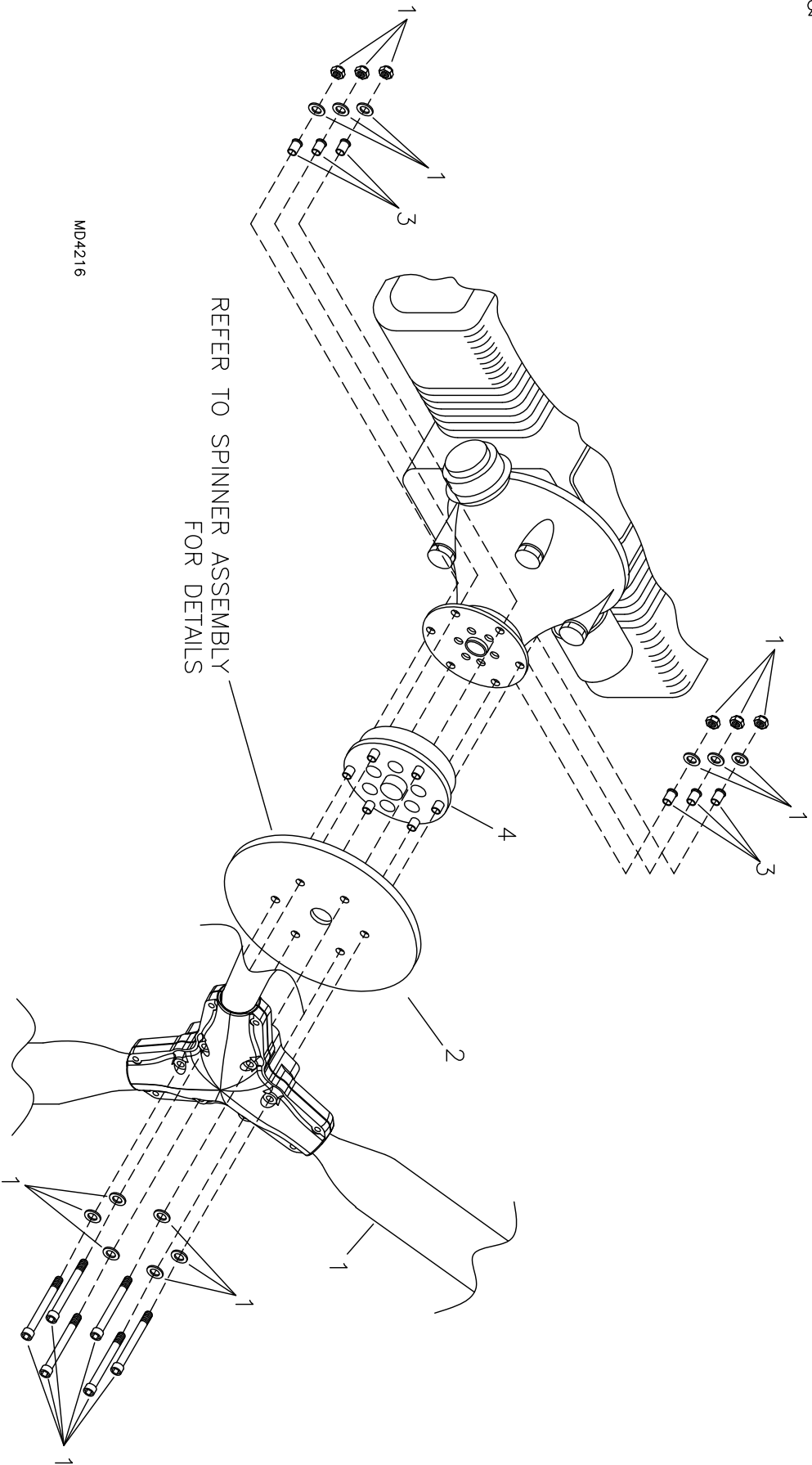
RRMS S-20 RAVEN ROTAX 912ULS OIL CHECK DOOR INSTALLATION

MDS140
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



REFER TO SPINNER ASSEMBLY FOR DETAILS

MD4216

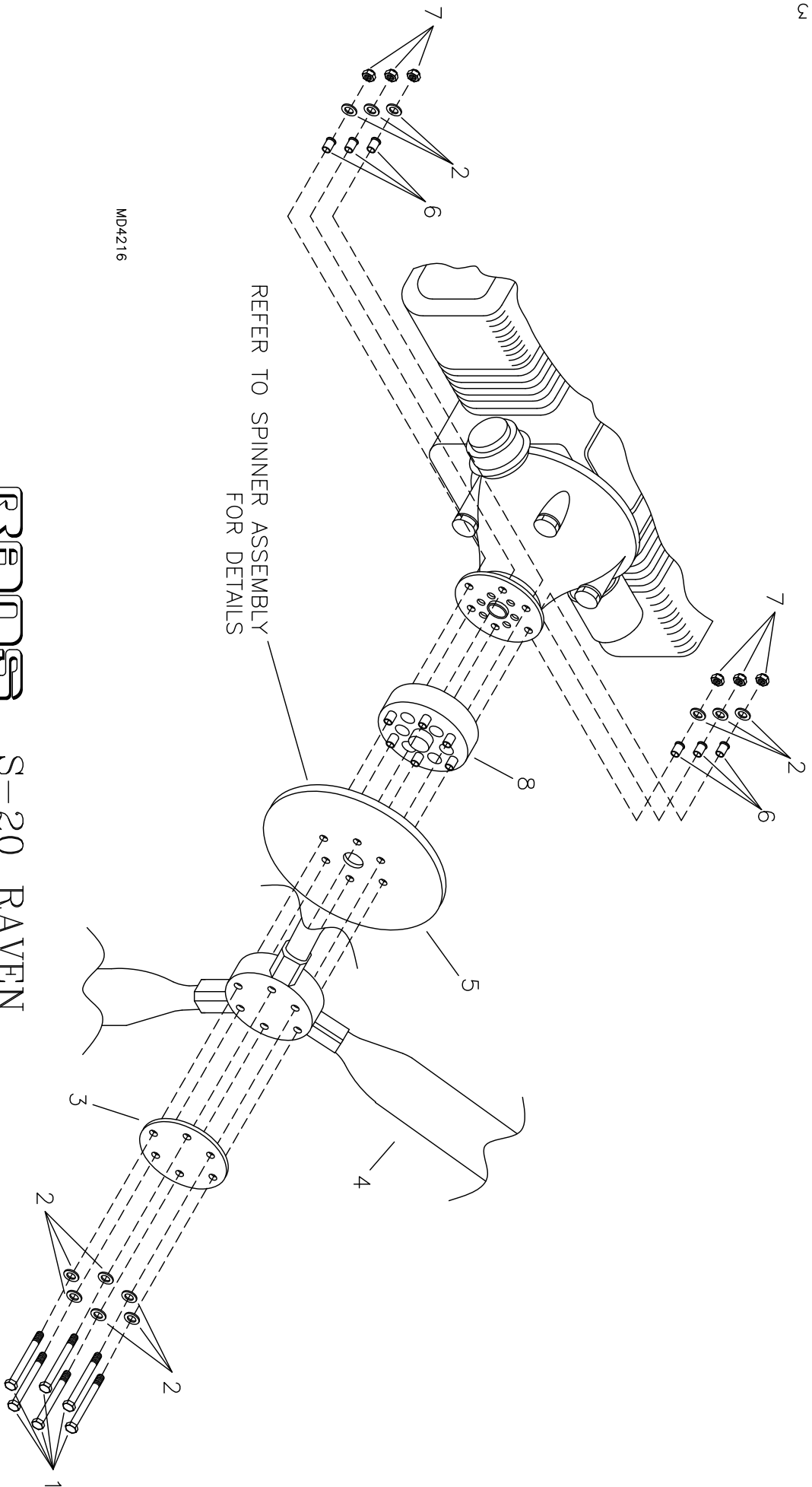
RAVEN S-20 RAVEN
ROTAX 912ULS
 OPTIONAL WHIRL WIND PROPELLER INSTALLATION

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



MD4216

RAVEN S-20 RAVEN
ROTAX 912U LS
 OPTIONAL WARP DRIVE PROPELLER INSTALLATION

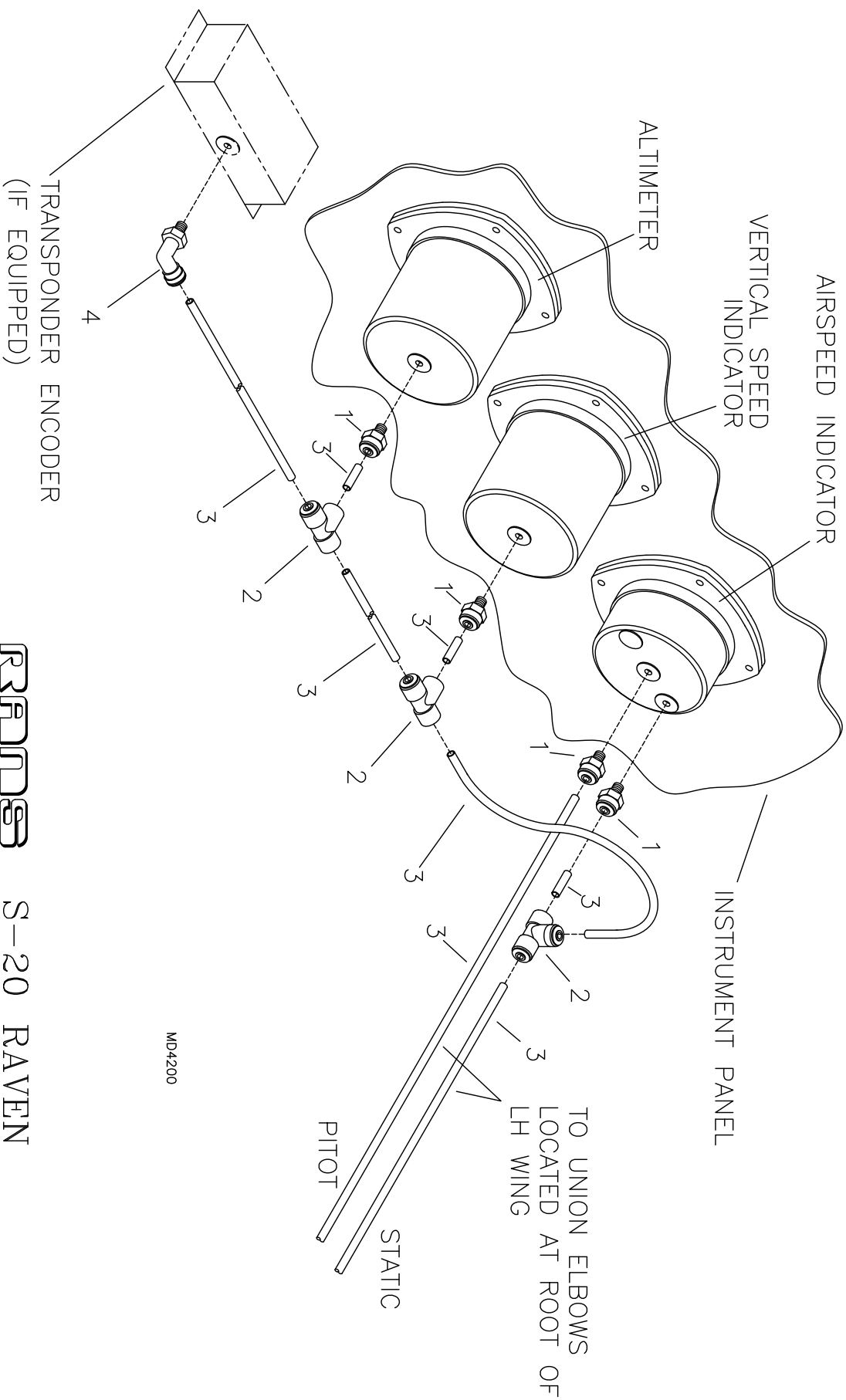
RANS S-20 RAVEN - ROTAX 912ULS - WARP DRIVE PROP INSTALLATION

#	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

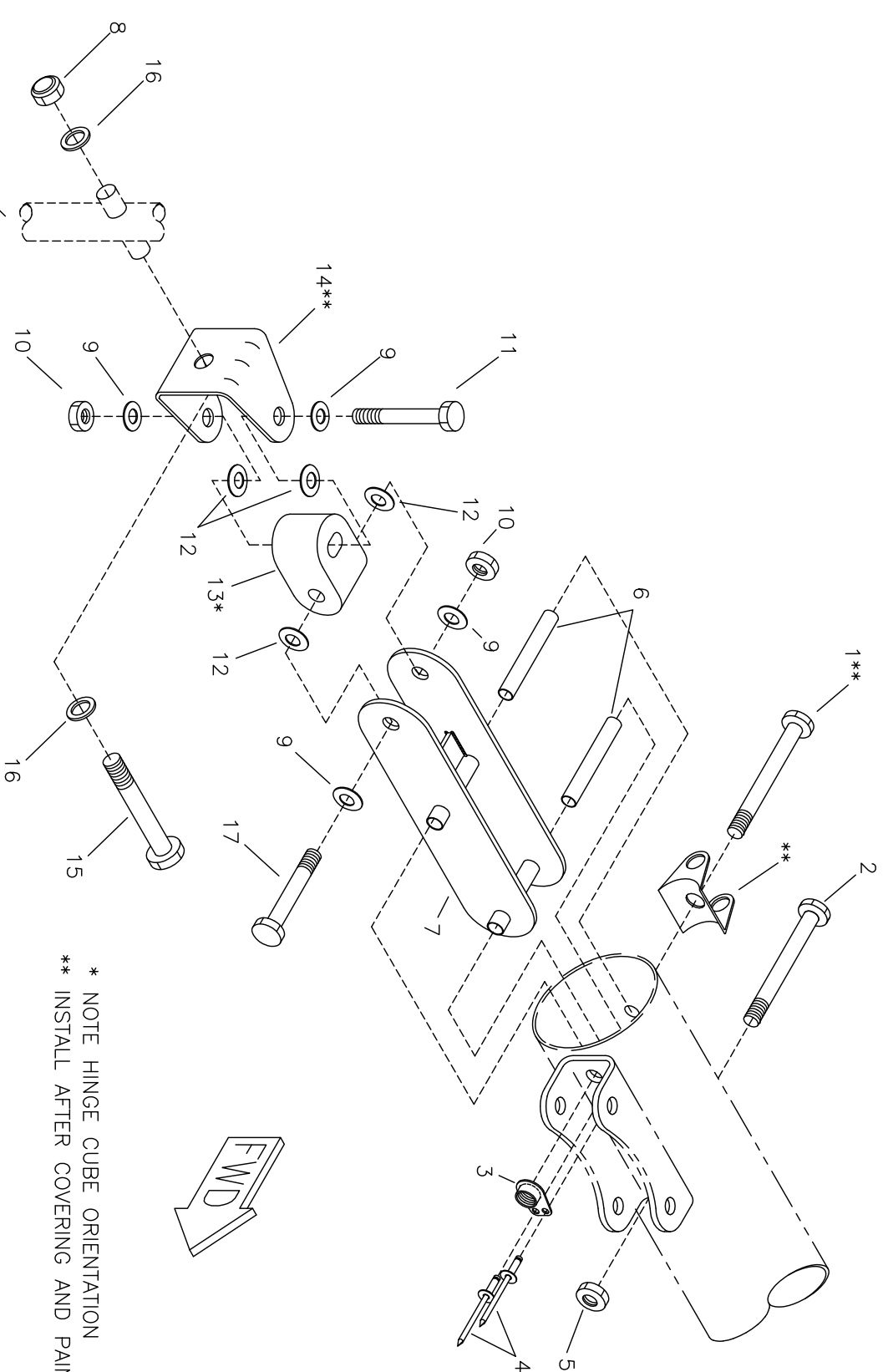


RRRARD S-20 RAVEN PITOT/STATIC TO INSTRUMENTS INSTALLATION

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 separately, call RANS Parts Dept. for pricing



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

MD4201

RAVEN S-20 RAVEN
WING - UNIVERSAL HINGE

FUSELAGE
 STATION 3
 VERTICAL RISER

RANS S-20 RAVEN - WING - UNIVERSAL HINGE

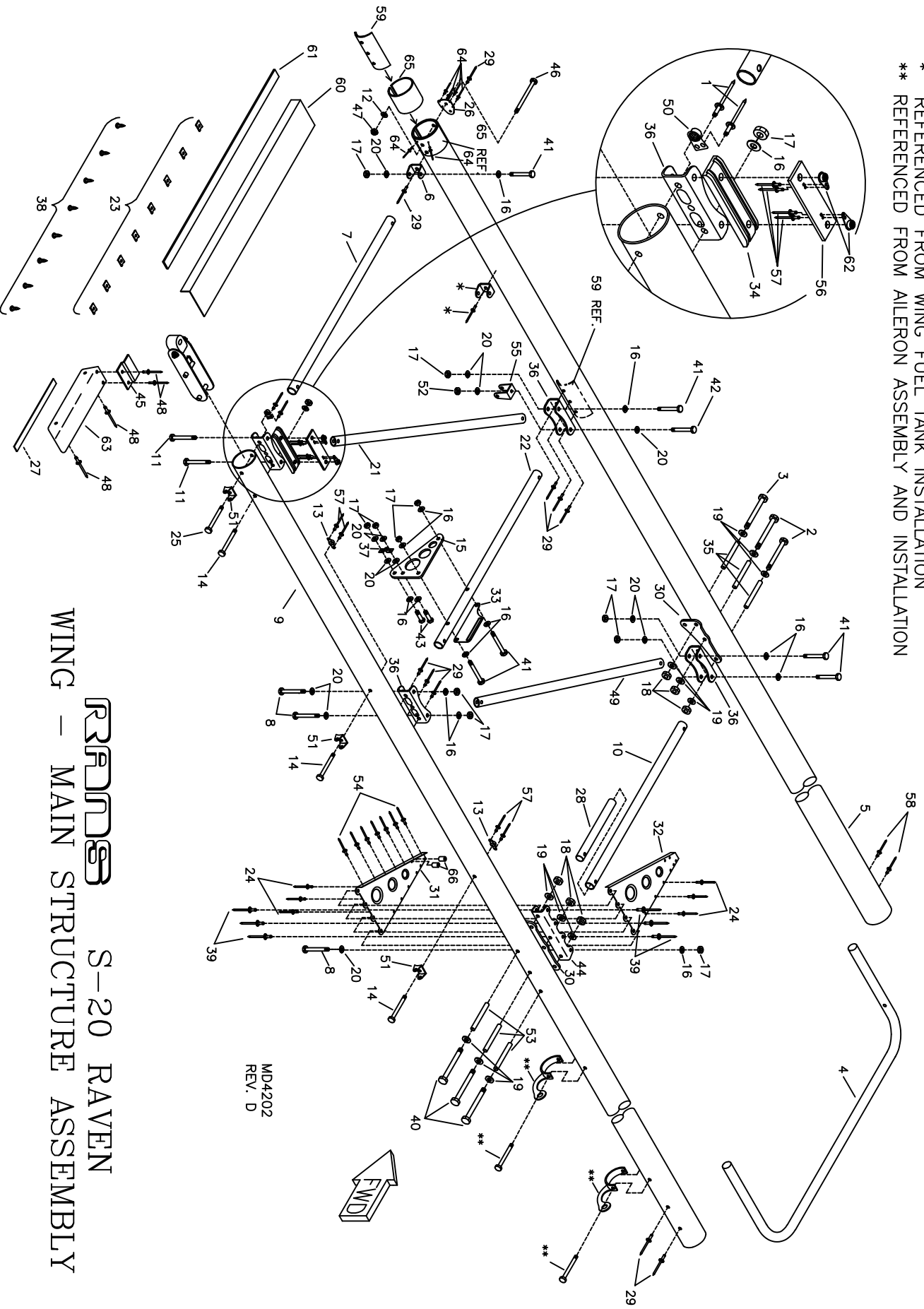
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt * **	AN3-24A	0
2.	3/16" Bolt *	AN3-23A	0
3.	3/16" Side By Side Nut Plate *	MS21086-L3	0
4.	3/32" Aluminum Rivet *	40APR3/8	0
5.	3/16" Shear Nut *	AN364-1032A	0
6.	Aluminum Bushing - 1/4" x .028 x 1 7/8" ***	KPWI0613	1
7.	Trailing Edge Spar Root Fitting 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

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



RRRNDSS S-20 RAVEN
WING - MAIN STRUCTURE ASSEMBLY

MD4202
 REV. D

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	20
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

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

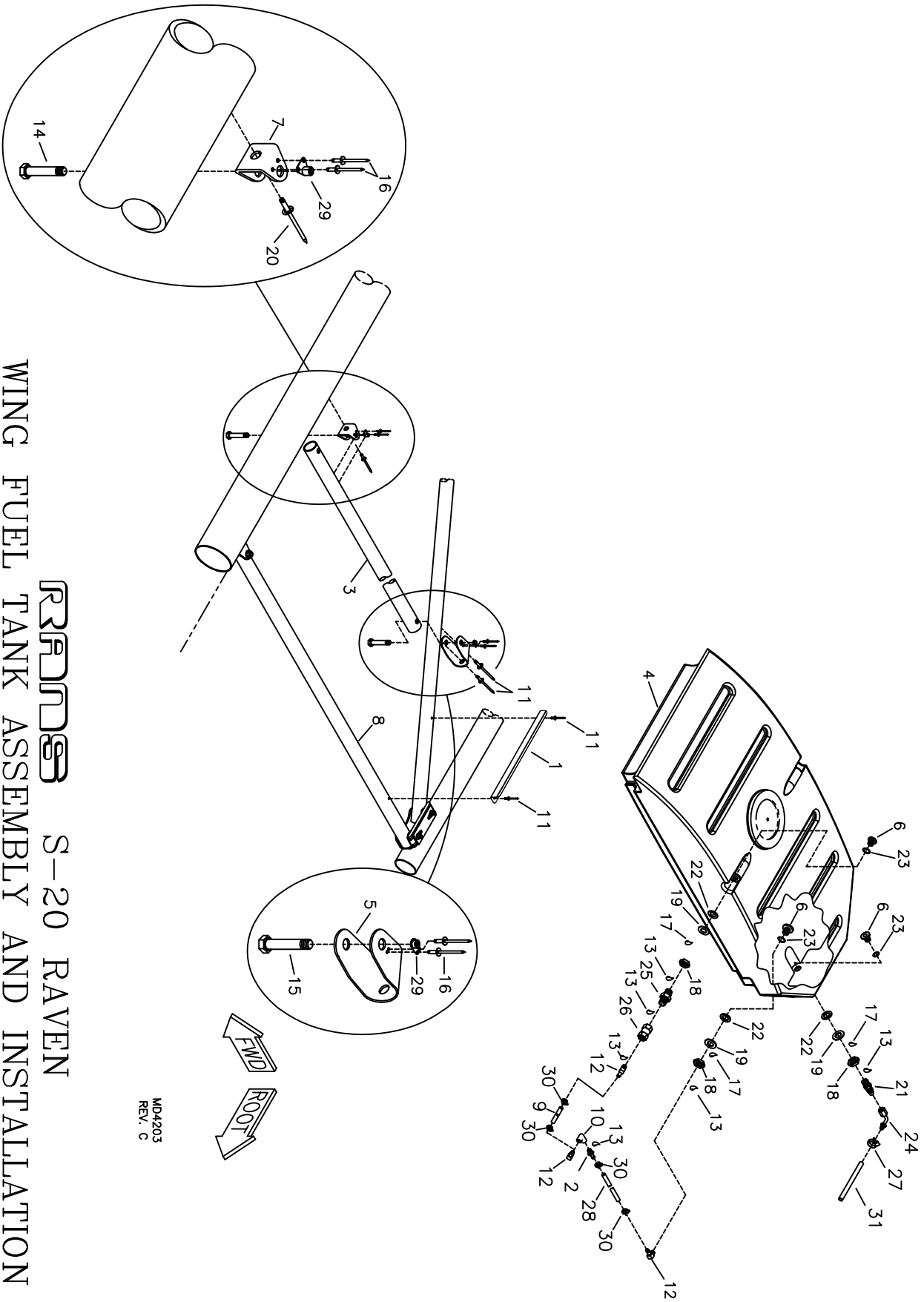
#	DESCRIPTION	PART NUMBER	QUANTITY
42.	3/16" Bolt	AN3-16A	2
43.	3/16" Bolt	AN3-5A	4
44.	U-Bracket	KPCS0213	2
45.	Flap Fillet Attach Strip *	KPFL0141	1
46.	3/8" Bolt	AN6-35A	2
47.	3/8" Tensile Nut	AN365-624A	2
48.	1/8" Aluminum Rivet - Avex	1691-0410	8
49.	Drag Brace	KPWI0375	2
50.	3/16" Side by Side 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

RRR-008 S-20 RAVEN WING FUEL TANK ASSEMBLY AND INSTALLATION



MD4203
REV. C

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.	1/2" Tank Withdrawal Fitting - LH thread	KPFS0117	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 - 1/2" Bulkhead - LH Thread	KPFS0118	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

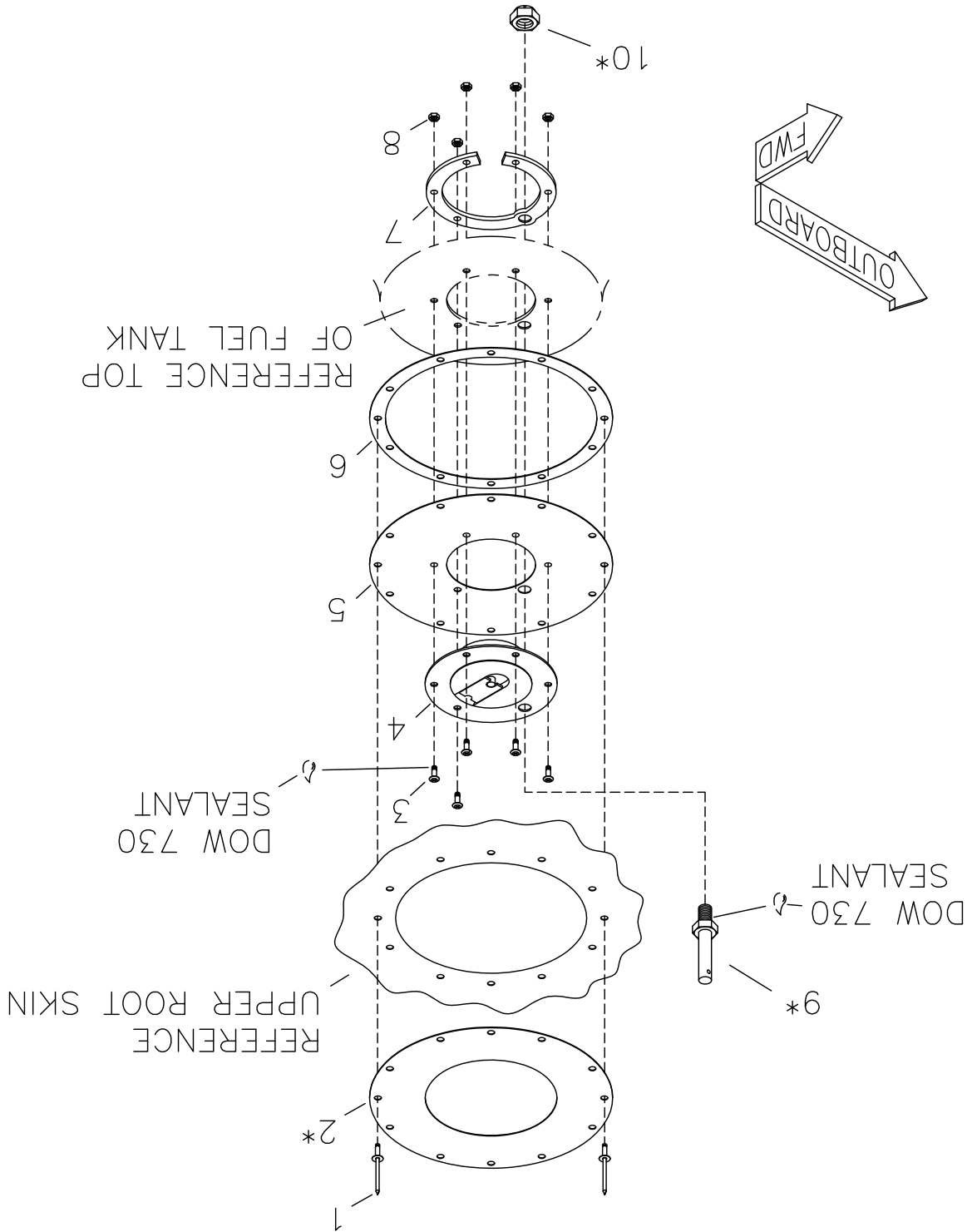
9/1/2013

REV. D

RPNRS S-20 RAVEN FUEL CAP ASSEMBLY

MDS543
REV. A

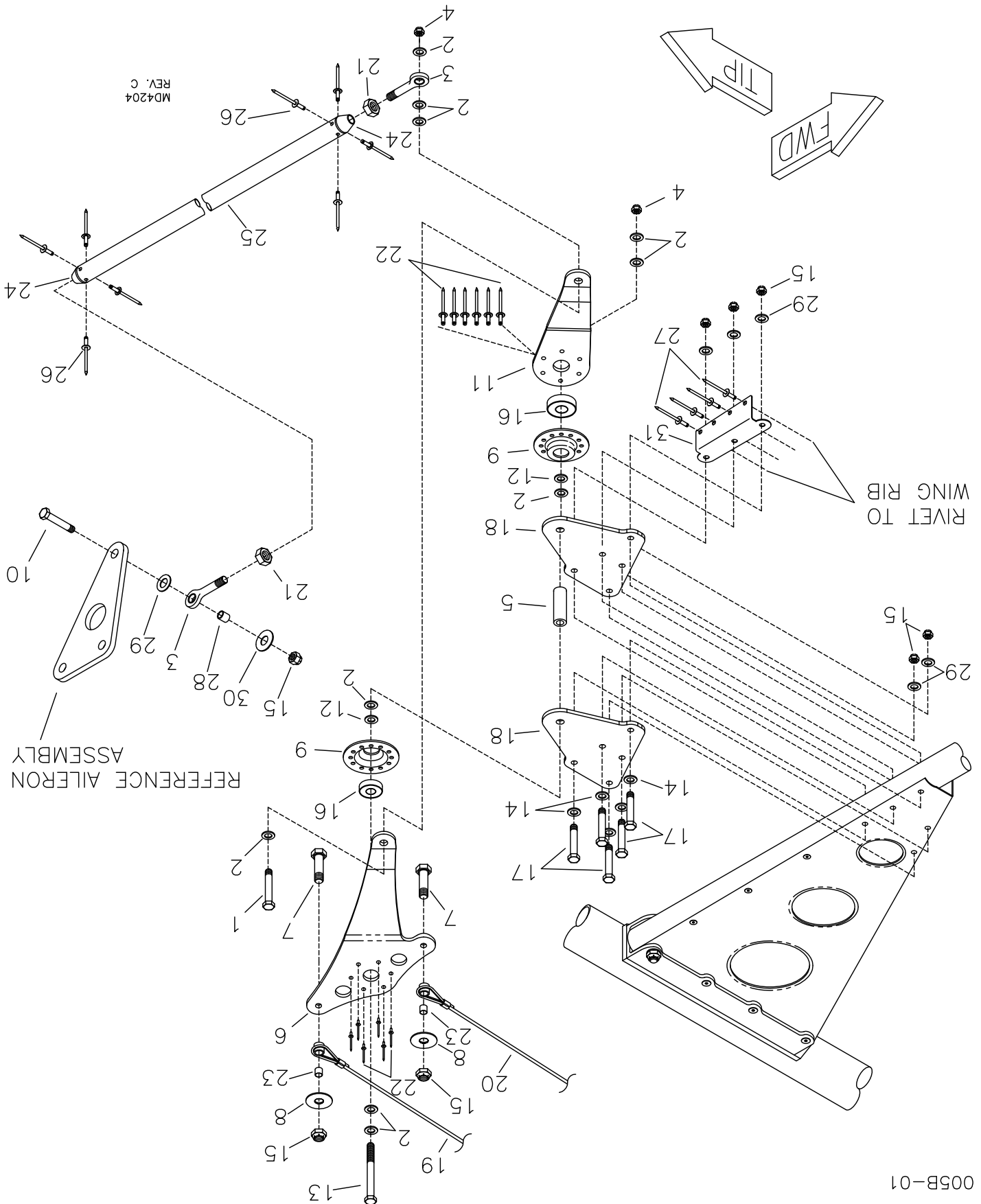
* INSTALL AFTER COVERING



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

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



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

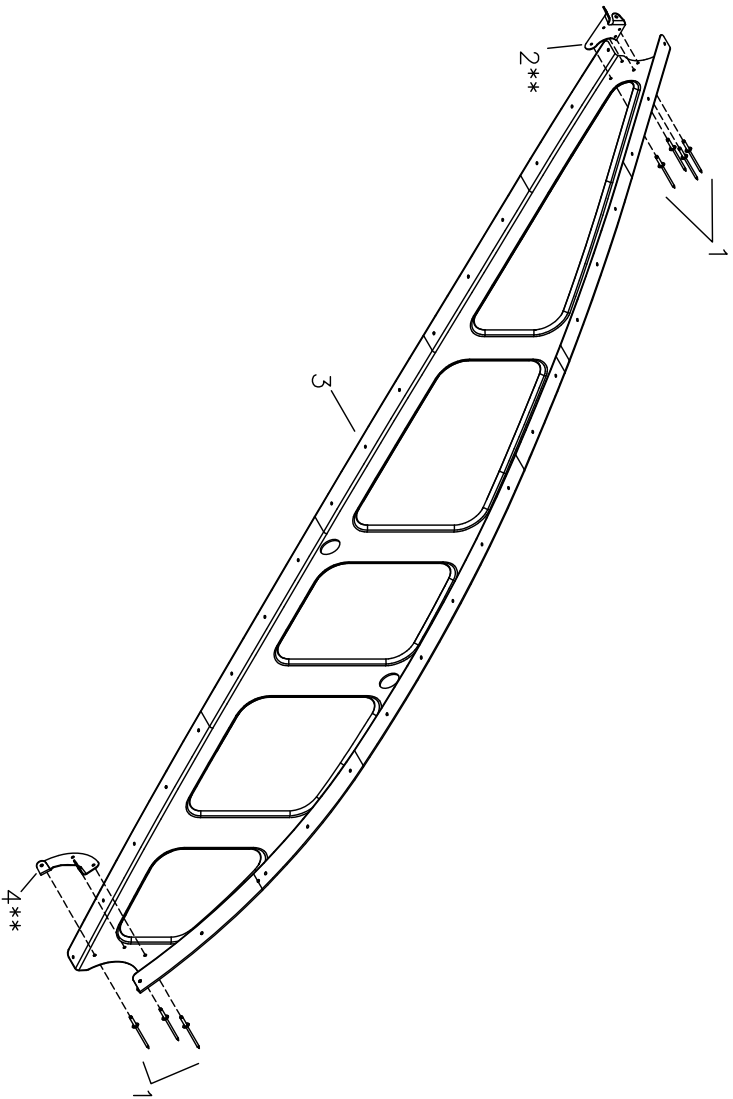
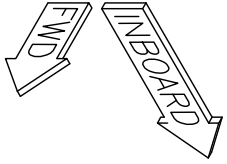
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/4" Bolt	AN4-12A	2
2.	1/4" Thick Washer	AN960-416	20
3.	Male Rod End	NM-4	4
4.	1/4" Shear Nut	AN364-428A	4
5.	Bushing - 3/8" x .058" x 1.06" *	SB-3/8X3	1
6.	Bell Crank Upper Arm - RH	KPCS0290-R	1
6.	Bell Crank Upper Arm - LH	KPCS0290-L	1
7.	3/16" Bolt	AN3-6A	4
8.	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

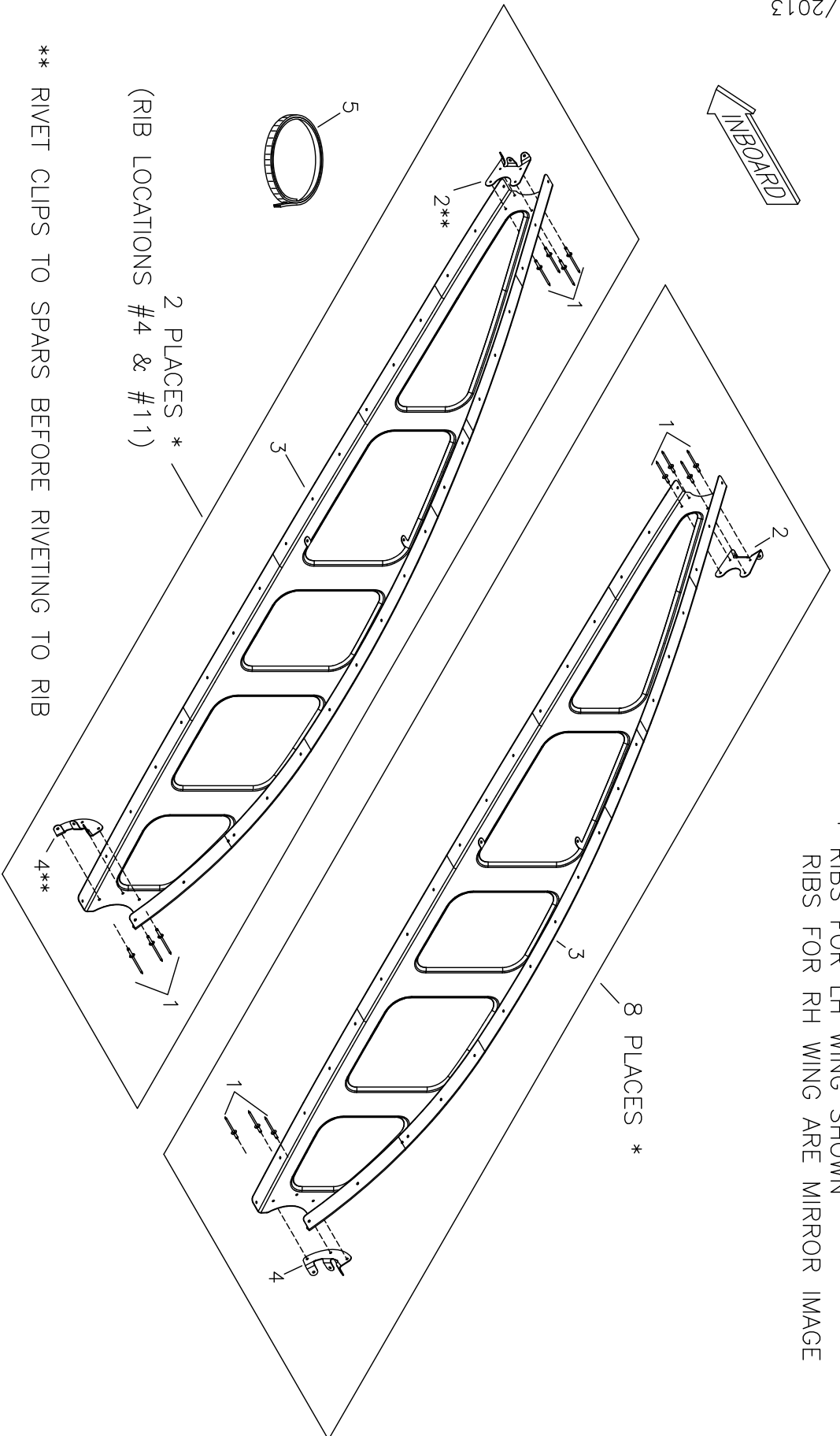
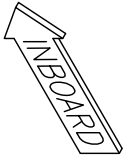
** BUILDER MODIFIES

RRRNDSS 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



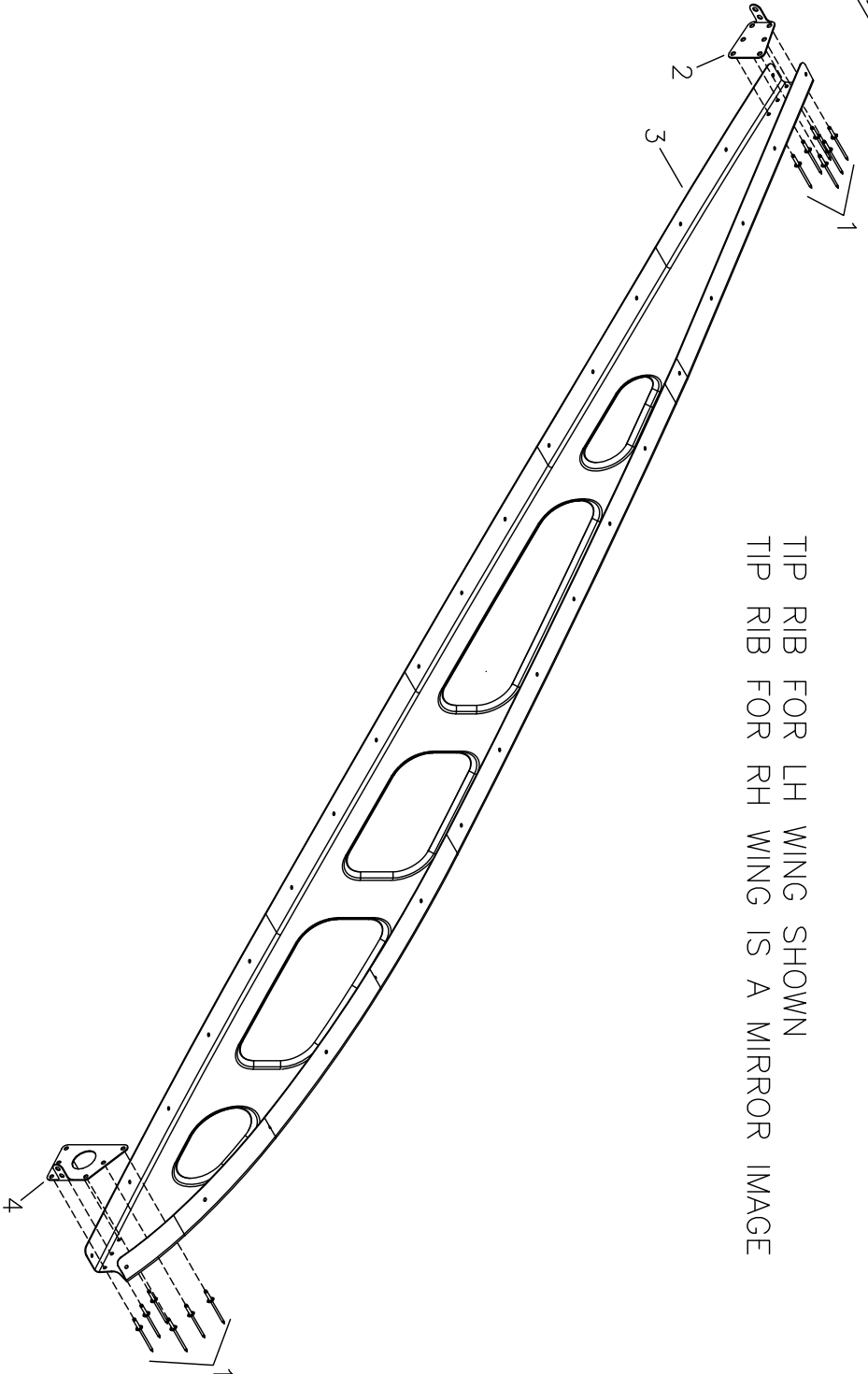
* RIBS FOR LH WING SHOWN
RIBS FOR RH WING ARE MIRROR IMAGE

** RIVET CLIPS TO SPARS BEFORE RIVETING TO RIB

RRRDNDS 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

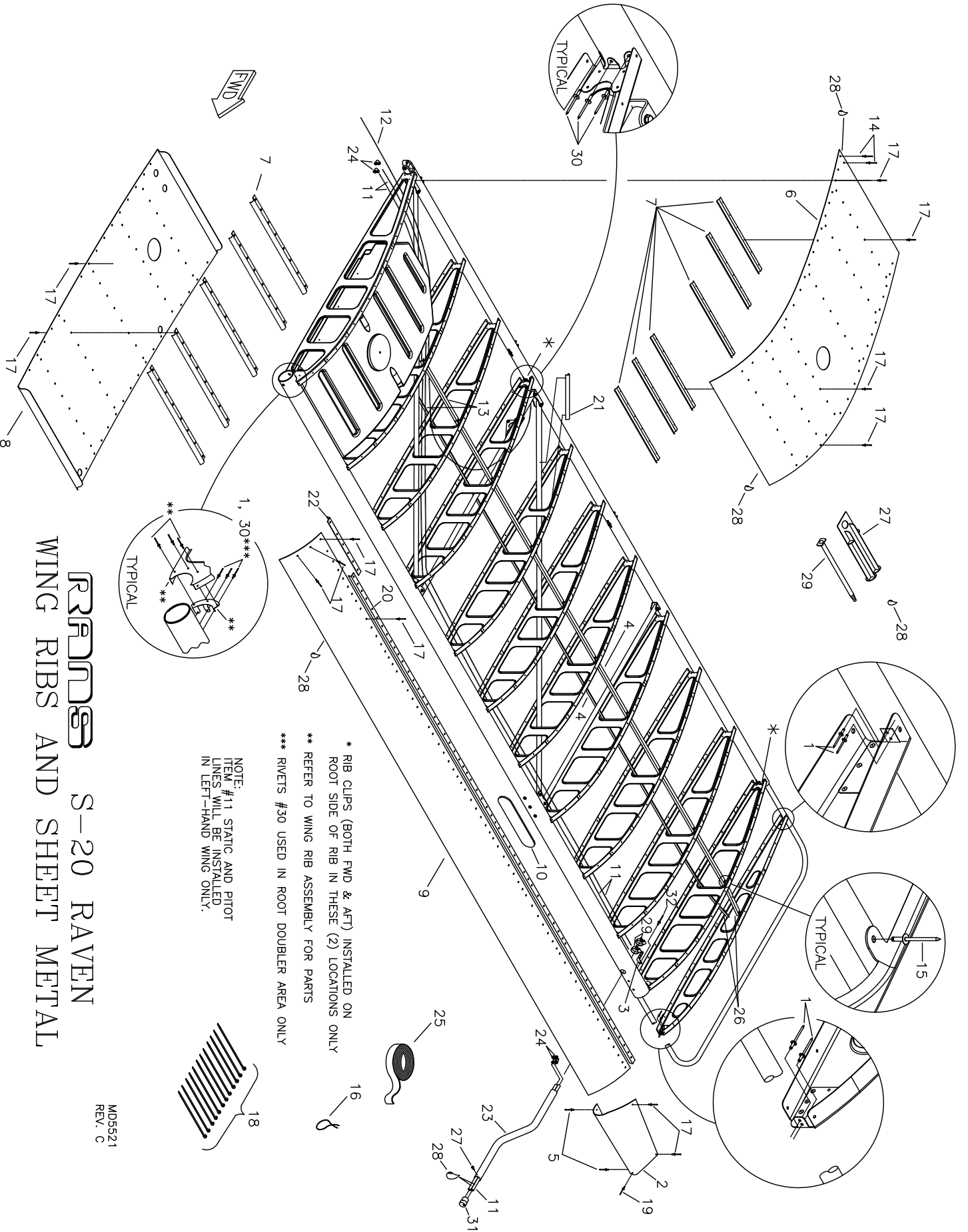


TIP RIB FOR LH WING SHOWN
TIP RIB FOR RH WING IS A MIRROR IMAGE

RRANDS 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



R-20 RAVEN
WING RIBS AND SHEET METAL

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

** REFER TO WING RIB ASSEMBLY FOR PARTS

*** RIVETS #30 USED IN ROOT DOUBLER AREA ONLY

MD5521
 REV. C

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

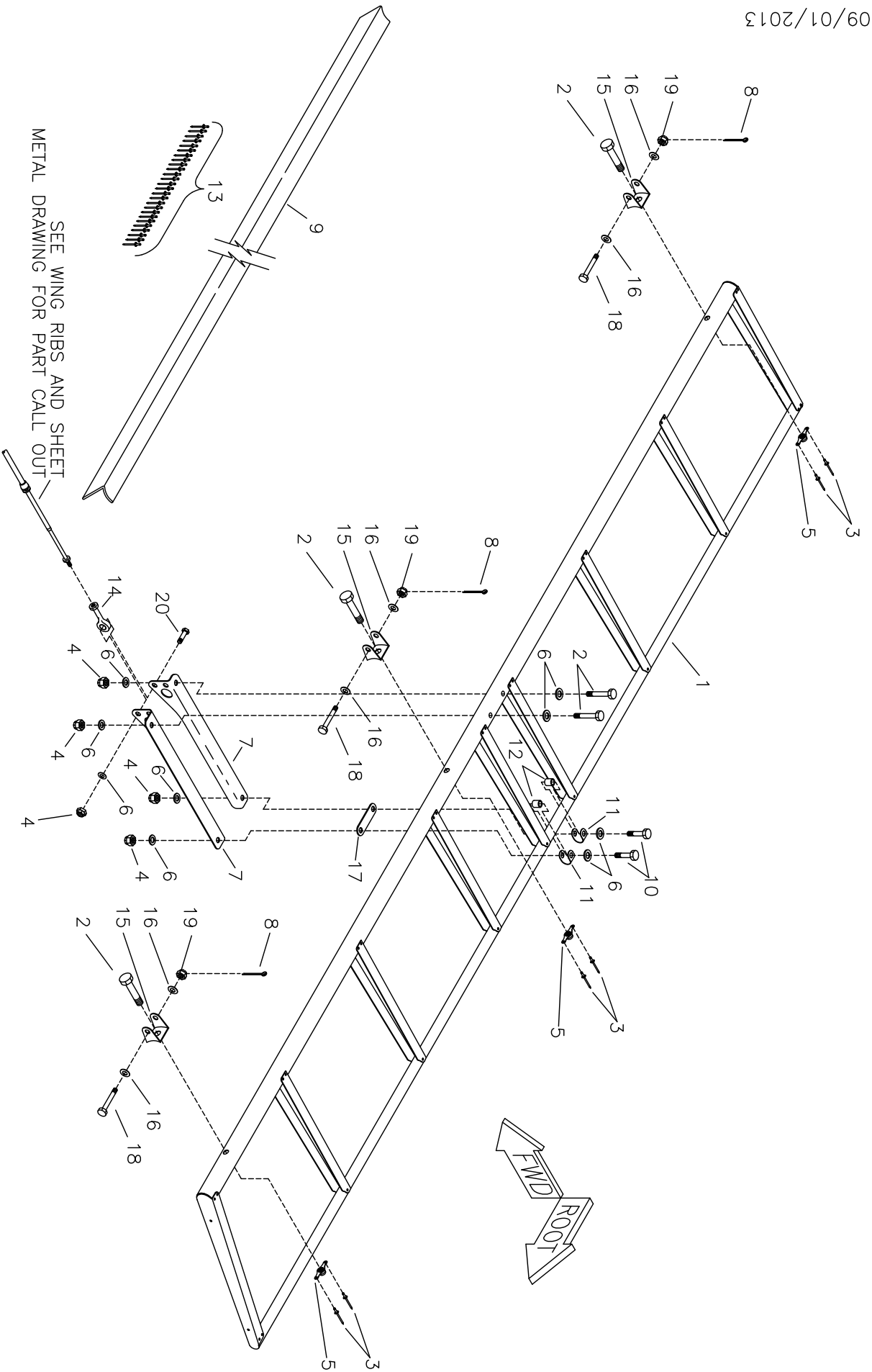
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	68
2.	Leading Edge Tip Wrap - RH	KPWI0359-R	1
2.	Leading Edge Tip Wrap - LH	KPWI0359-L	1
3.	Mount Angle	ST-16-BENT	1
4.	Rib Stringer - Outboard	KPWI0550	4
5.	1/8" Aluminum Rivet - Avex	1691-0410	4
6.	Upper Root Skin - Wing	KPWI0569	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

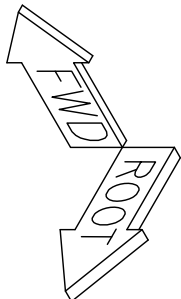
RANS S-20 RAVEN - WING - FLAP ASSEMBLY AND INSTALLATION

#	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

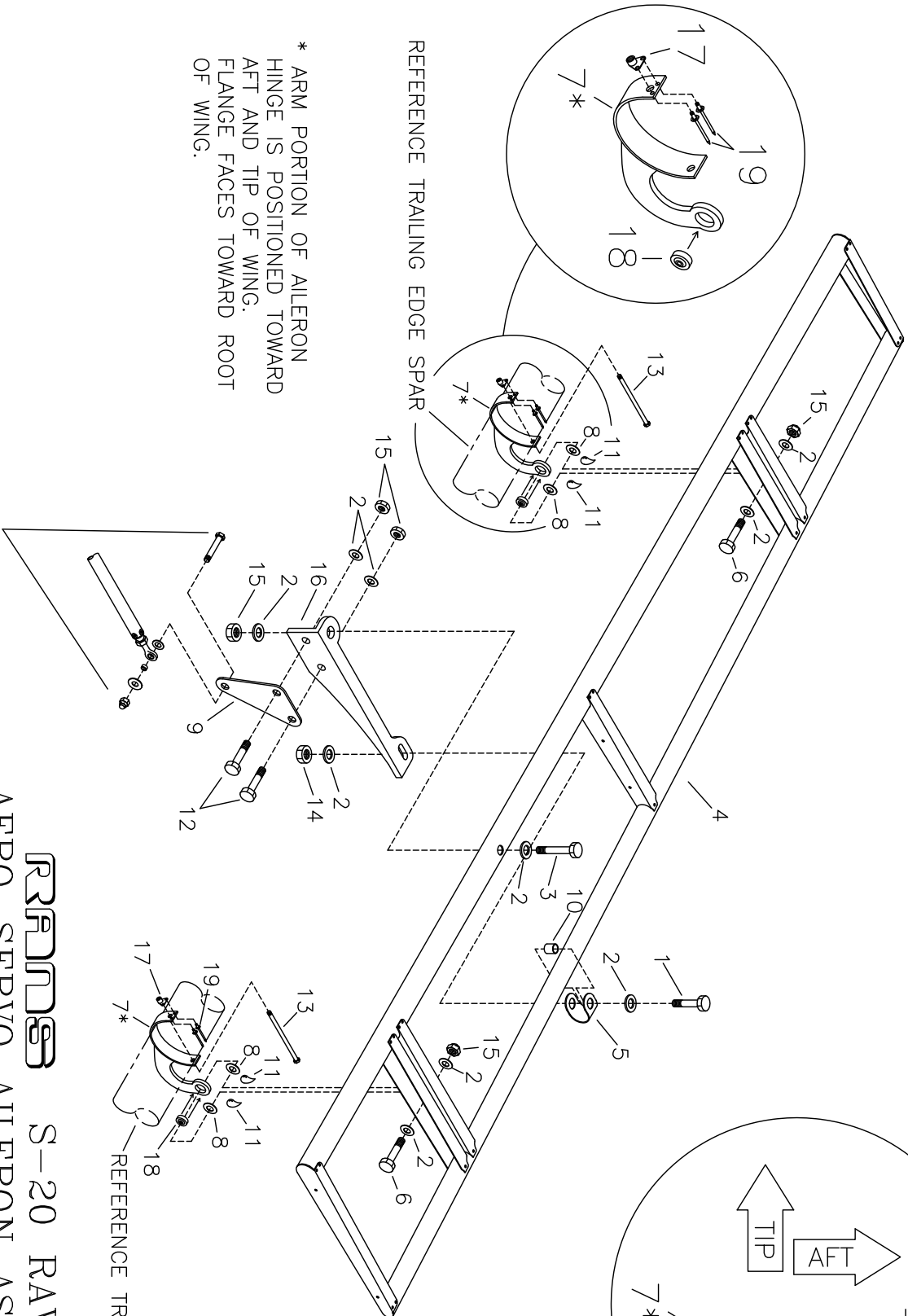
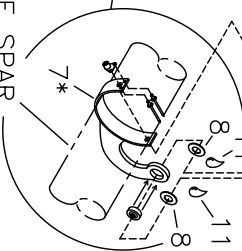
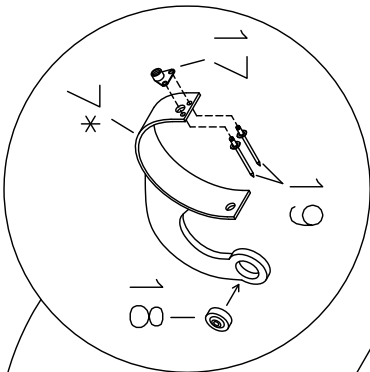
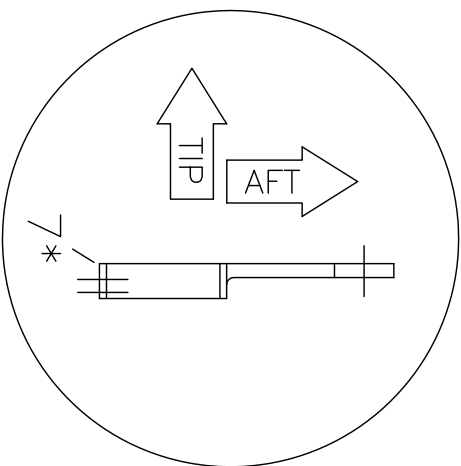
* Builder fabricates from KPWI0613

9/1/2013

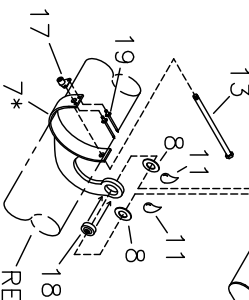
REV. B



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

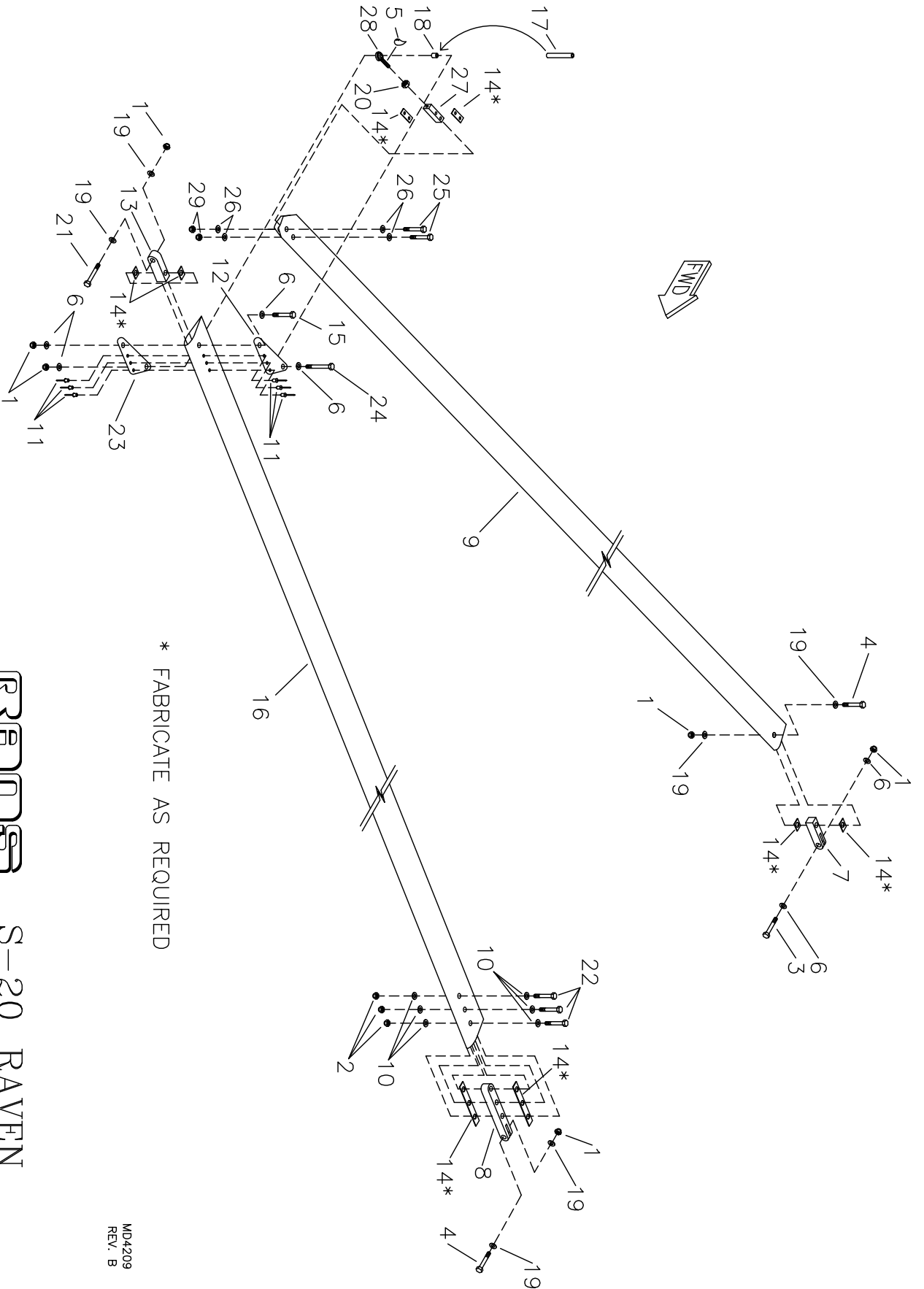
RAVEN S-20 RAVEN AERO-SERVO AILERON ASSEMBLY AND INSTALLATION

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

RRRINDOS S-20 RAVEN
LIFT STRUT ASSEMBLY & INSTALLATION

MD4209
REV. B

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

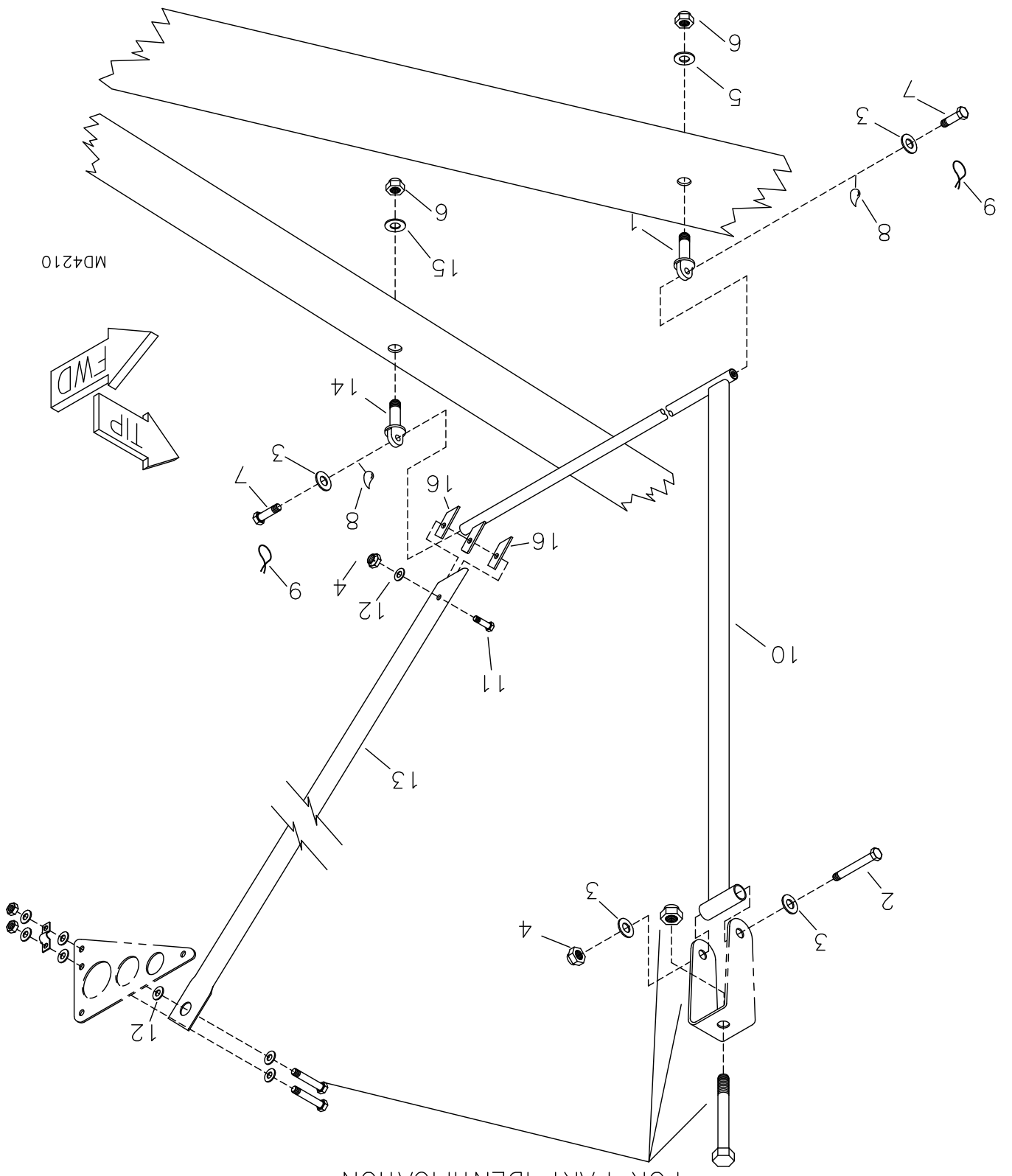
** Use only if necessary.

*** Builder Supplied

9/1/2013

REV. B

RPM S-20 RAVEN JURY STRUT INSTALLATION



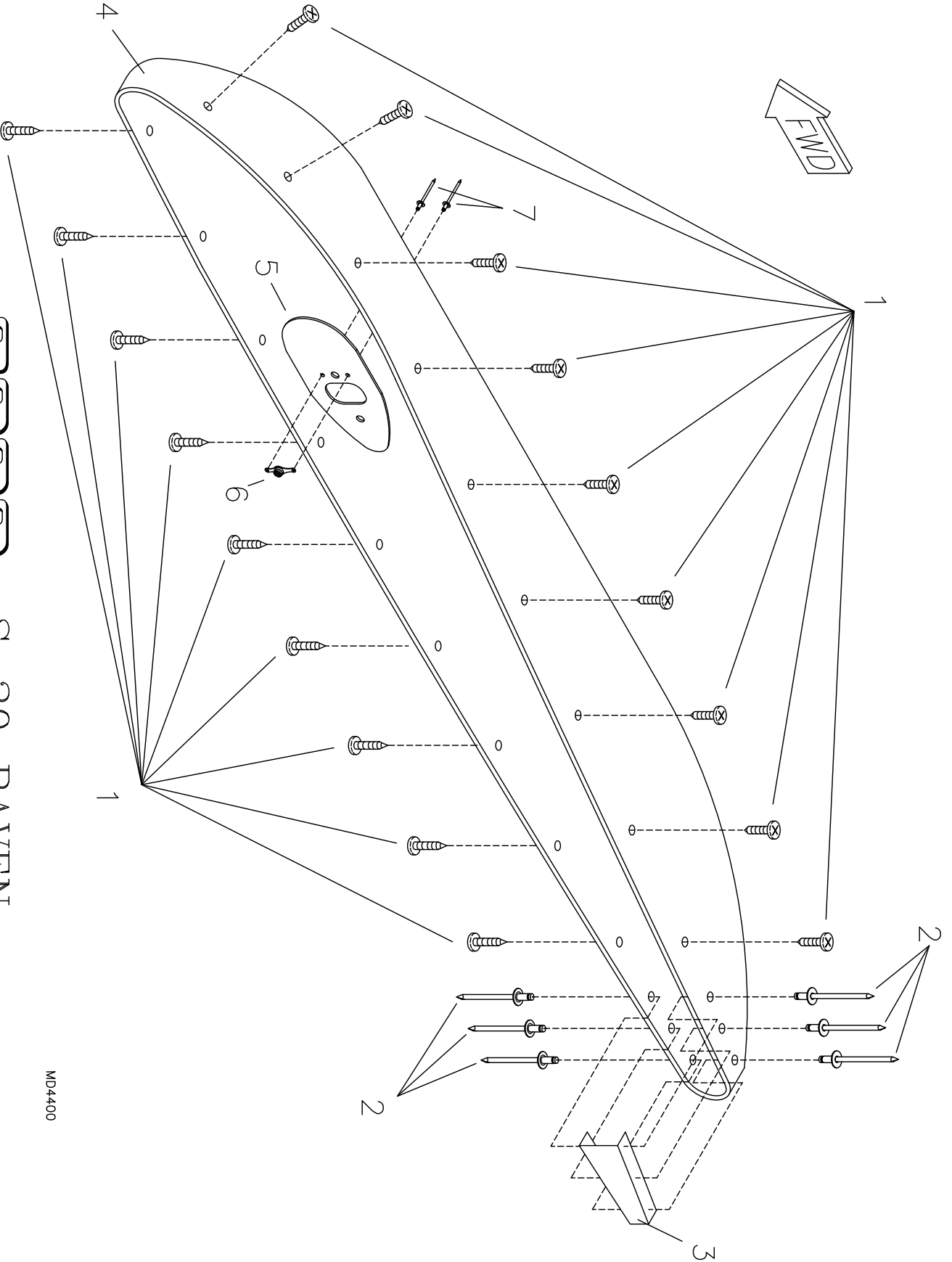
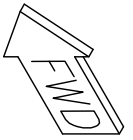
REFER TO WING SECTION
FOR PART IDENTIFICATION

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

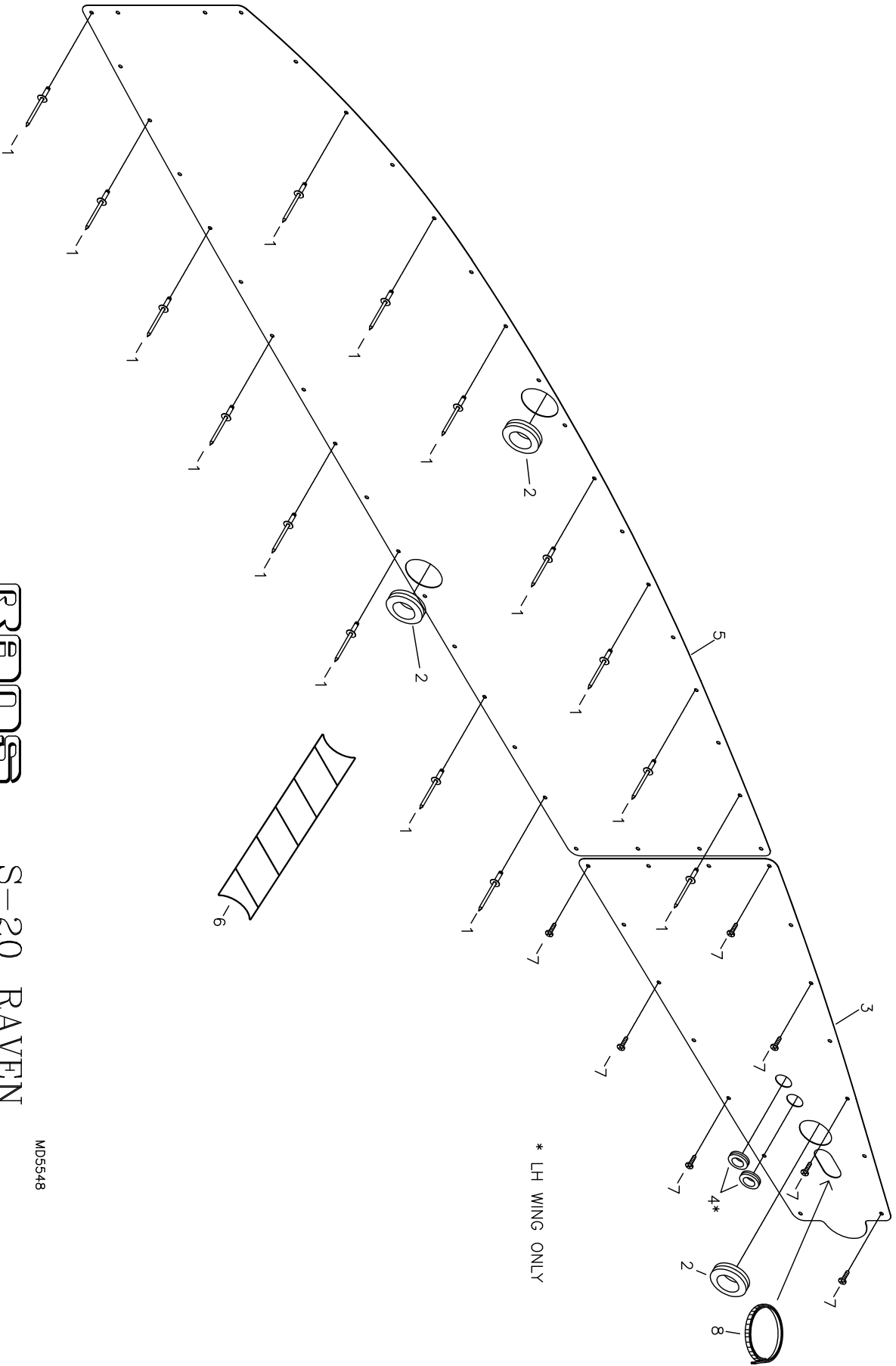


RRRMDSS S-20 RAVEN
WING TIP ASSEMBLY AND INSTALLATION

MD4400

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

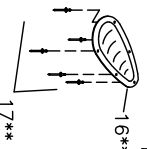
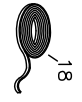
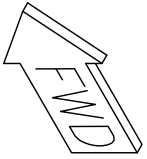
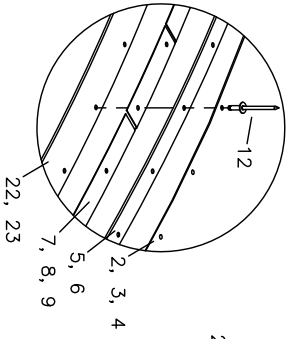
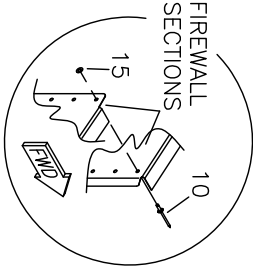
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/32" Aluminum Rivet	40APR1/8	72
2.	Rubber Grommet	MS35489-17	6
3.	Root Rib Closeout - AFT	KPWI0573	2
4.	Rubber Grommet	MS35489-6	2
5.	Root Rib Closeout - FWD	KPWI0609	2
6.	Fuel Sight Gauge Decal - LH *	KPPL0024-L	0
6.	Fuel Sight Gauge Decal - RH *	KPPL0024-R	0
7.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

* Referenced from Placards/Labels/Markers

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

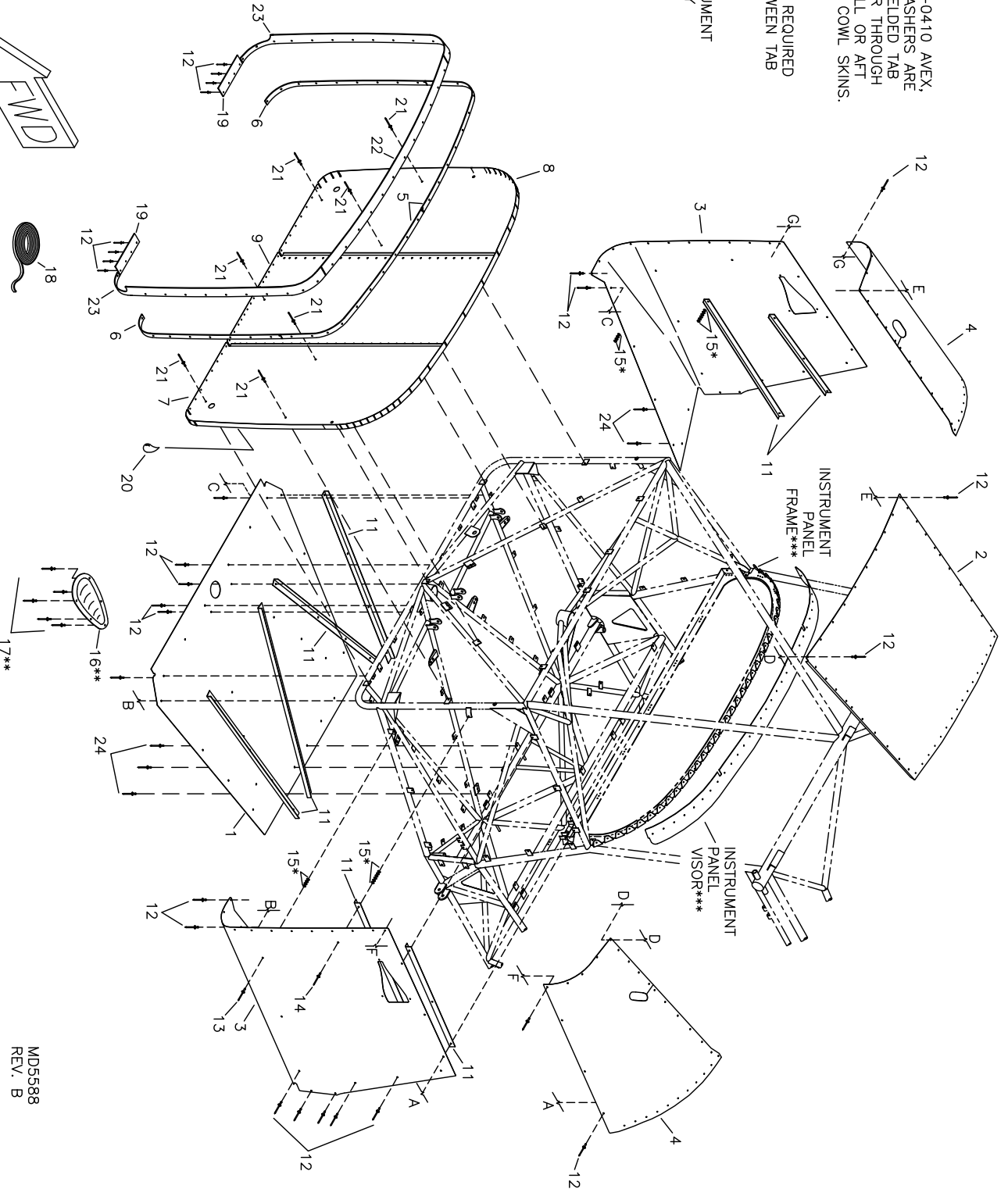
* USE WASHERS AS REQUIRED TO FILL GAP BETWEEN TAB AND STIFFENER.

** REFER TO INSTRUMENT PANEL ASSEMBLY



MDS5688
REV. B

RRRND S-20 RAVEN BOOT COWL ASSEMBLY



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

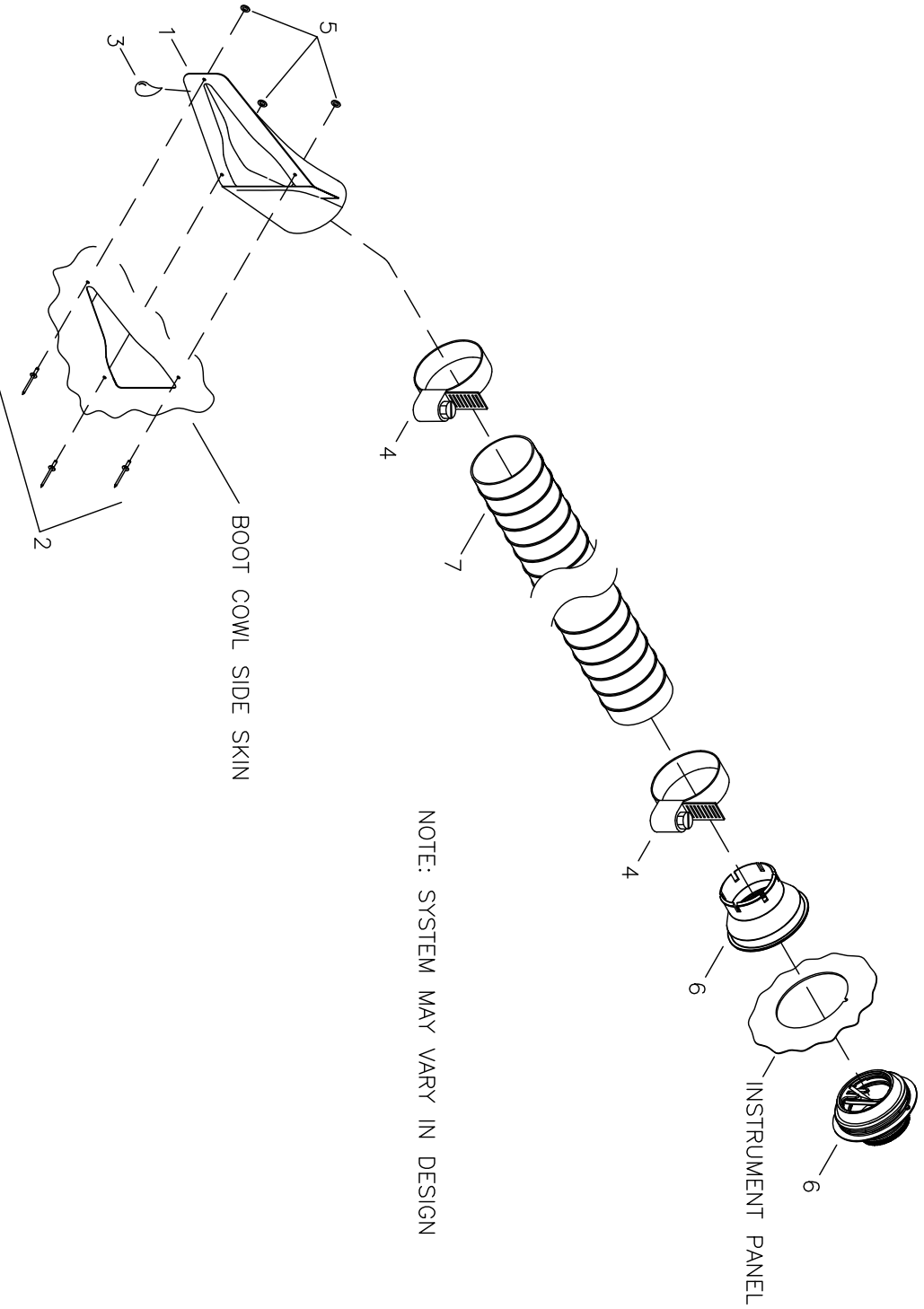
* Builder Modifies

** Taildragger Only

*** Builder Supplied

9/1/2013

REV. B



NOTE: SYSTEM MAY VARY IN DESIGN

PRIMA S-20 RAVEN
VENT SYSTEM INSTALLATION

MD5062
 REV. -- A

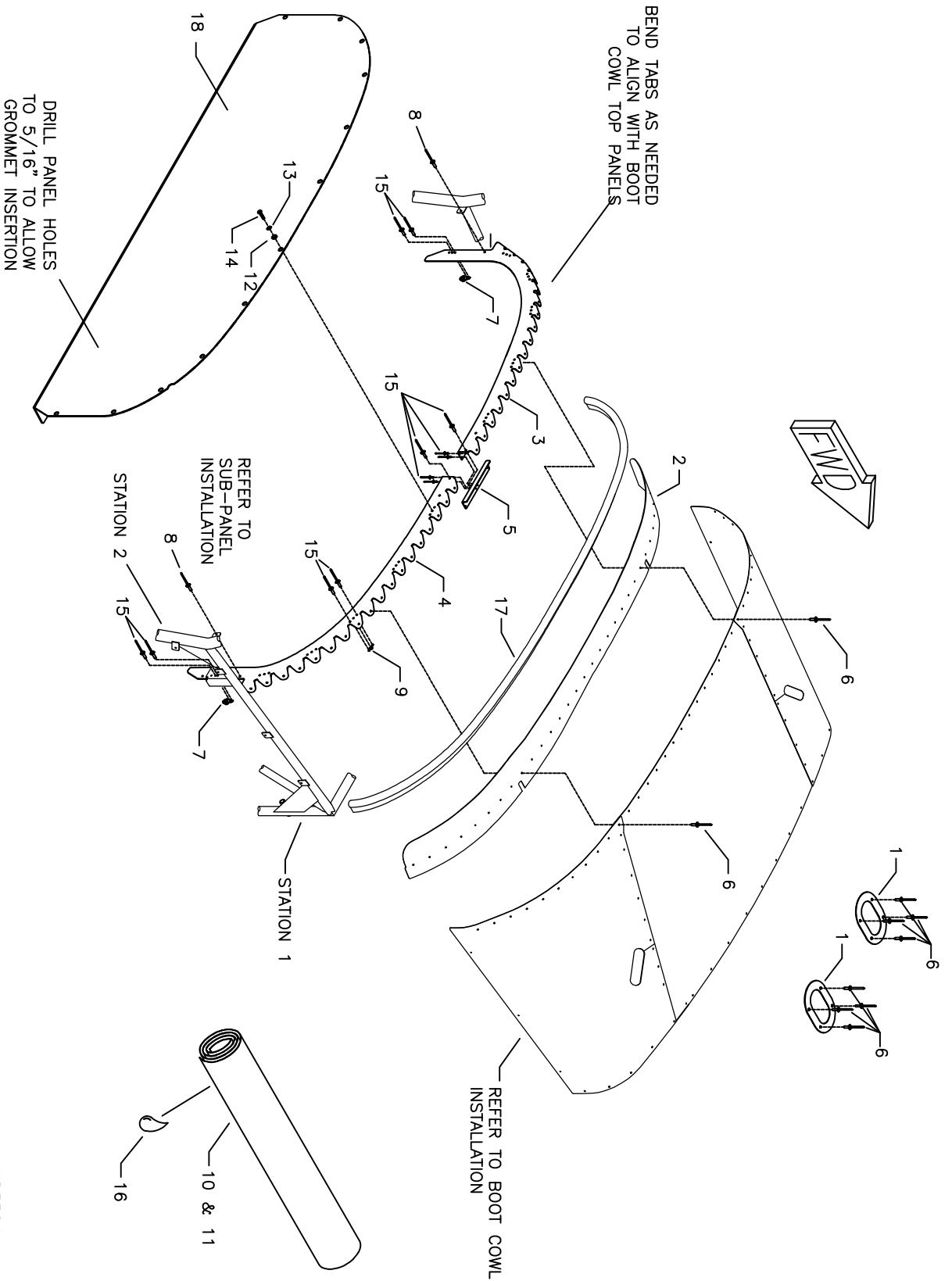
RANS S-20 RAVEN - VENT SYSTEM INSTALLATION

#	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
REV. - B



RANS S-20 RAVEN

INSTRUMENT PANEL INSTALLATION

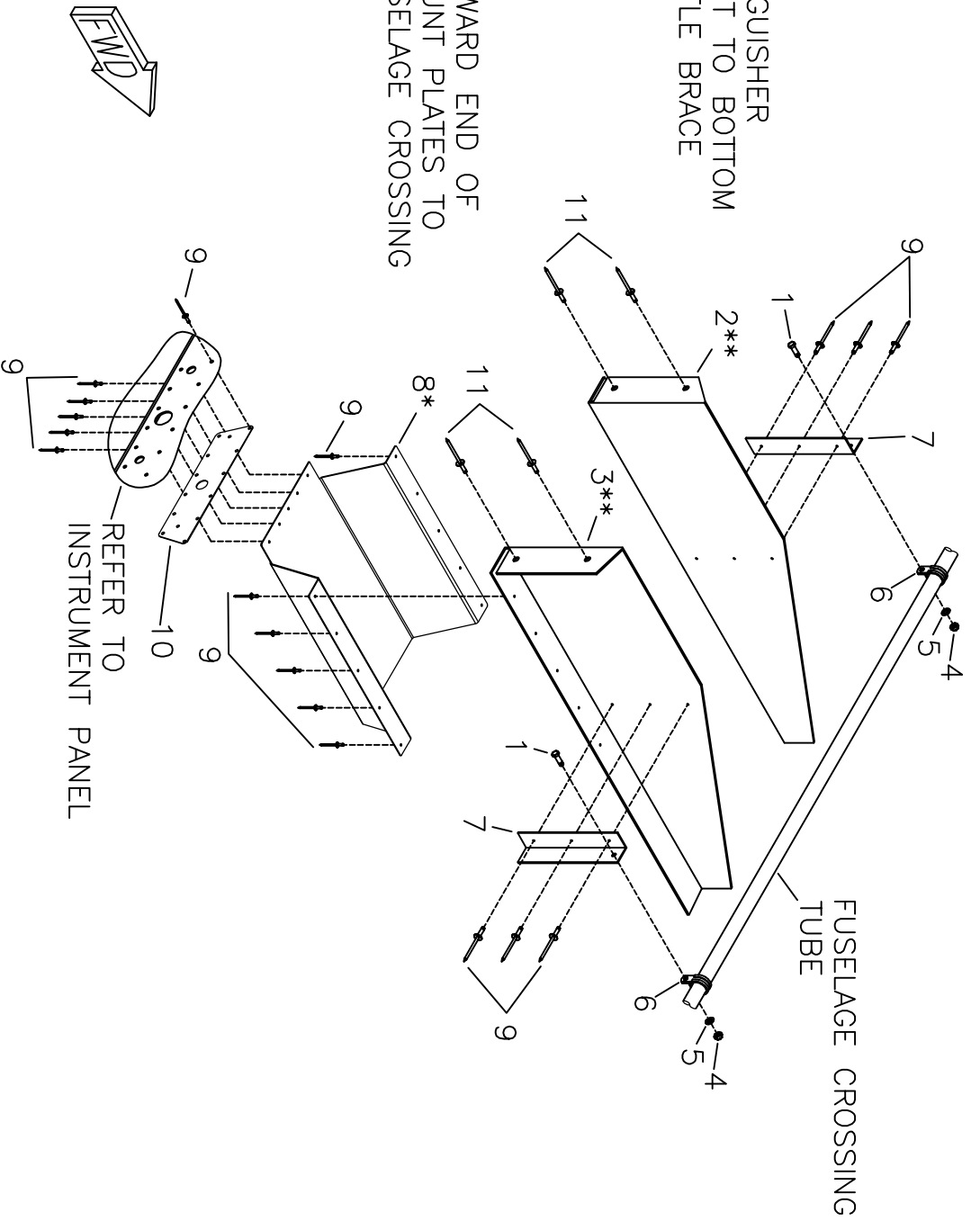
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Oval Glare Shield Ring	KPIP0147	2
2.	Instrument Panel Visor	KPIP0143	1
3.	Instrument Panel Frame - LH	KPIP0157-L	1
4.	Instrument Panel Frame - RH	KPIP0157-R	1
5.	Instrument Panel Frame Doubler	KPIP0158	1
6.	1/8" Aluminum Rivet - Avex	1691-0410	38
7.	8-32 Single-Ear Nut Plate	MS21051-08	2
8.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	2
9.	8-32 Nut Plate	MS21047-08	10
10.	Dash Cover Fabric - Optional *	KPIN0127	0
11.	Dash Foam - Optional *	KPIN0128	0
12.	3/16" Rubber Grommet	KSAC0002	12
13.	#8 Washer	AN960-8	12
14.	#8 Pan Head Machine Screw	MS27039-0809	12
15.	3/32" Aluminum Rivet	40APR1/8	24
16.	Contact Spray Adhesive - 3M Super 77 Spray **	----	0
17.	Trimlock Cushion Lip	4100C-1/16	5ft
18.	Instrument Panel - Blank	KPIP0156	1

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

** Builder Supplied

*FIRE EXTINGUISHER
MAY MOUNT TO BOTTOM
OF THROTTLE BRACE

**TRIM FORWARD END OF
RADIO MOUNT PLATES TO
CLEAR FUSELAGE CROSSING
TUBE



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

MD5584
 REV. A

RANS S-20 RAVEN

INSTRUMENT SUB-PANEL & RADIO MOUNT PLATES INSTALLATION

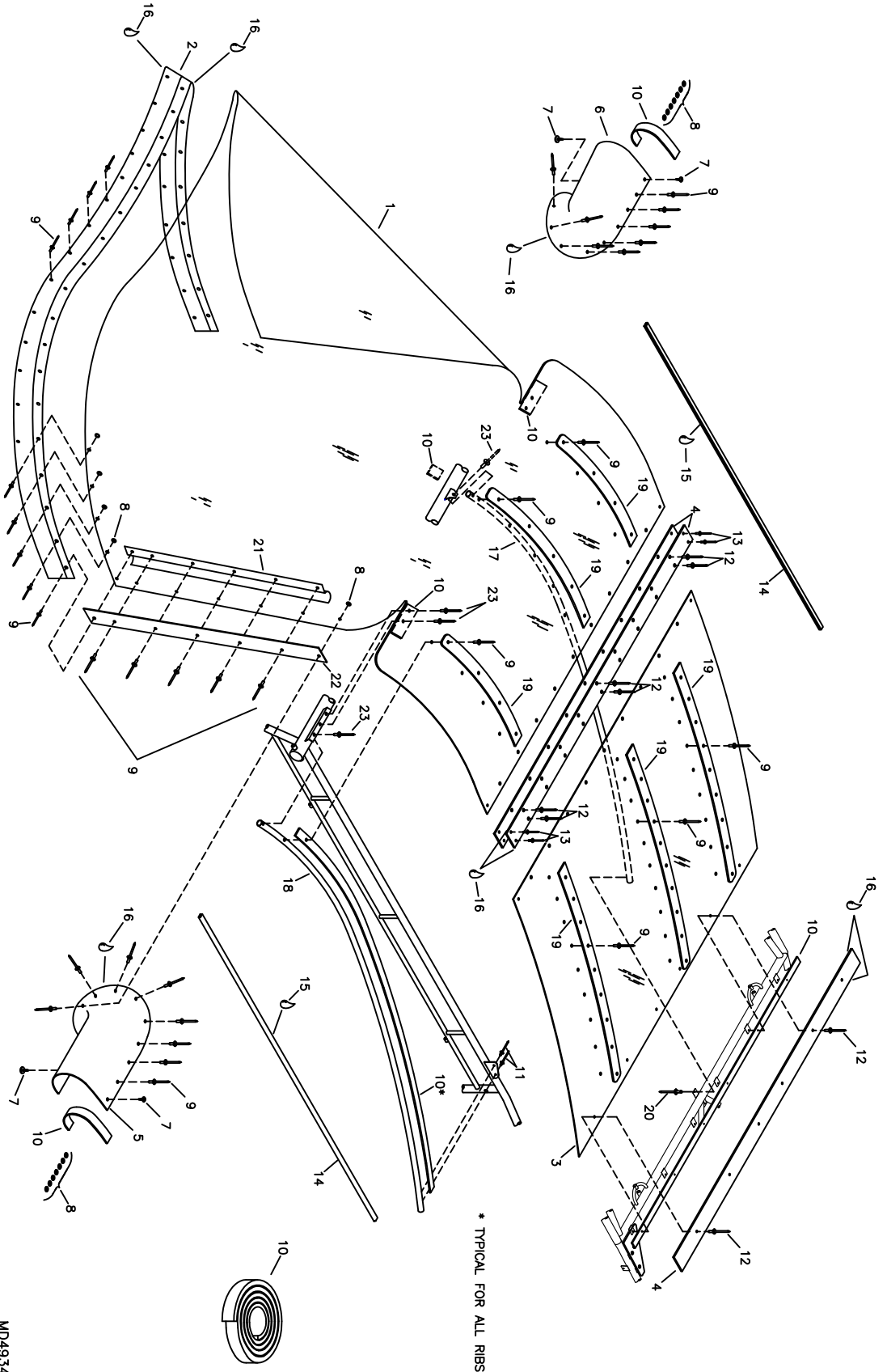
PAGE 006A-04

#	DESCRIPTION	PART NUMBER	QUANTITY
1.	3/16" Bolt	AN3-4A	2
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	2
5.	3/16" Thin Washer	AN960-10L	2
6.	1/2" Cushion Clamp	MS21919-DG8	2
7.	3/4" x 3/4" x .063" Aluminum Angle *	KAAC0044-12	1
8.	Throttle Brace and Fire Extinguisher Mount	KPIP0149	1
9.	1/8" Aluminum Rivet - Cherry Q	AAPQ-42	33
10.	Sub-Panel Reinforcement	KPIP0150	1
11.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4

* Fabricate from Raw Stock

9/11/2018

RAVEN S-20 RAVEN WINDSHIELD & SKYLIGHT INSTALLATION



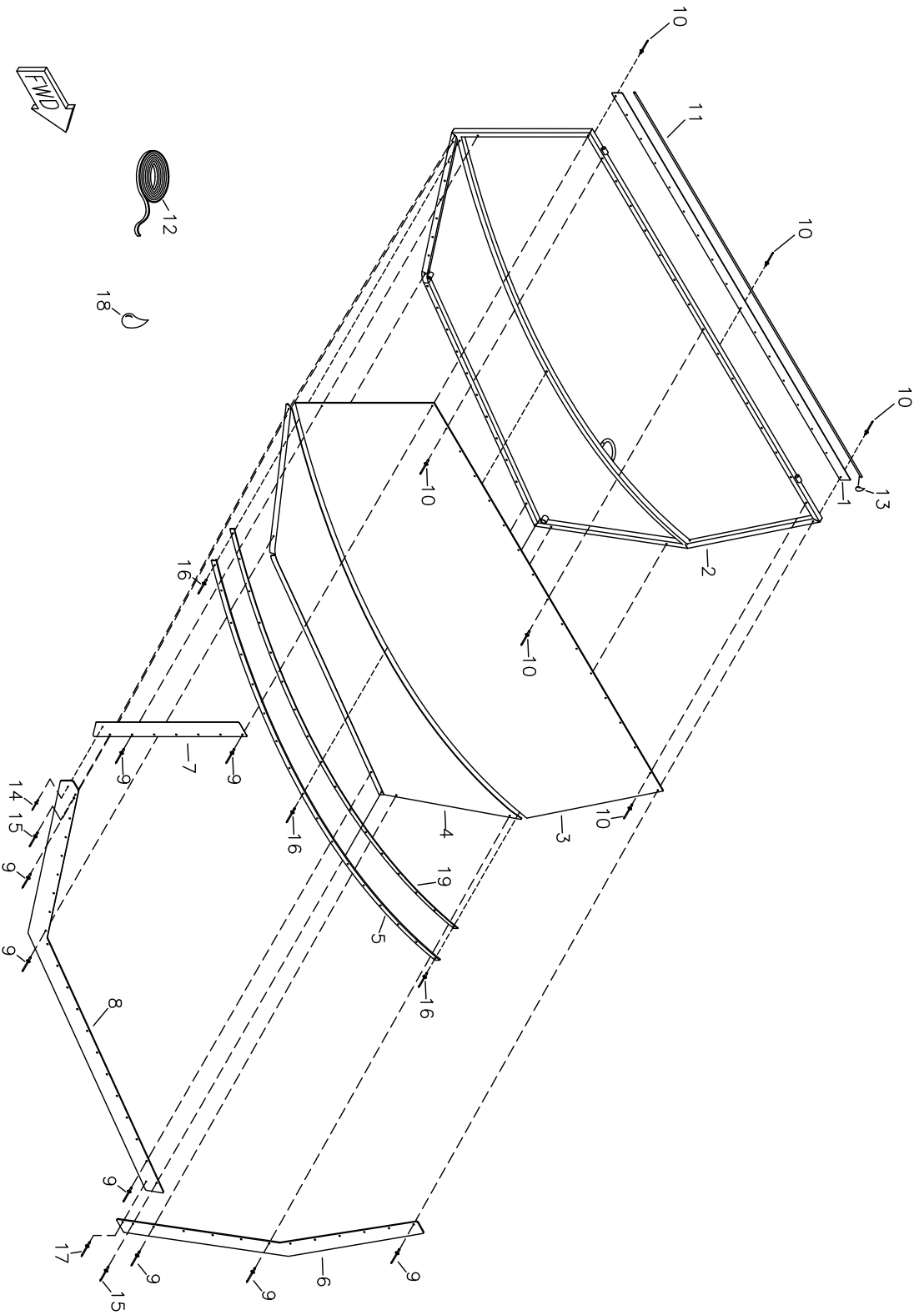
MD4934

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



RRR0008 S-20 RAVEN
DOOR ASSEMBLY

MD55582
 REV. B

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

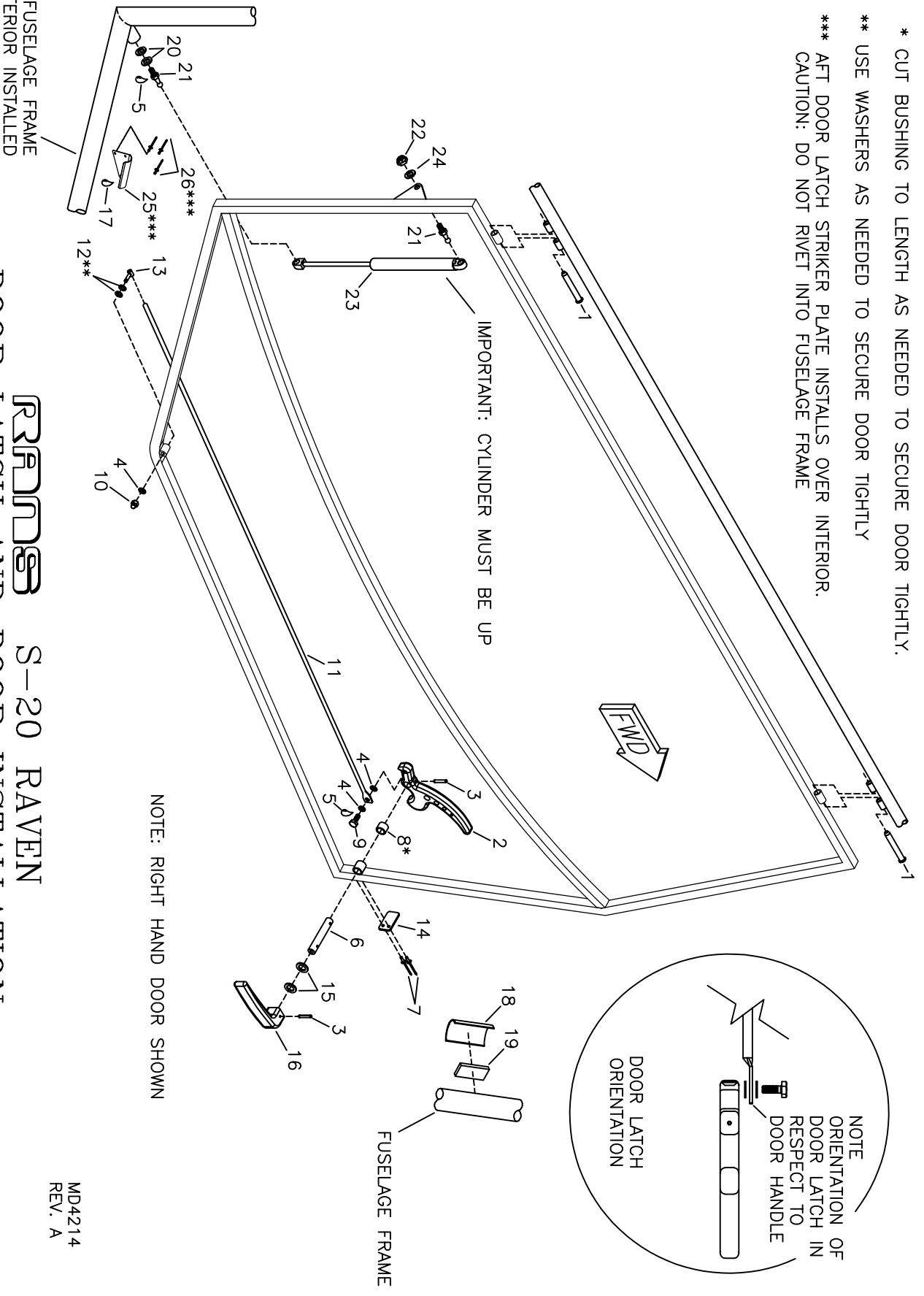
* Builder Modifies

** 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



RRR S-20 RAVEN
DOOR LATCH AND DOOR INSTALLATION

MD4214
 REV. A

RANS S-20 RAVEN
DOOR LATCH AND DOOR INSTALLATION

PAGE 007A-04

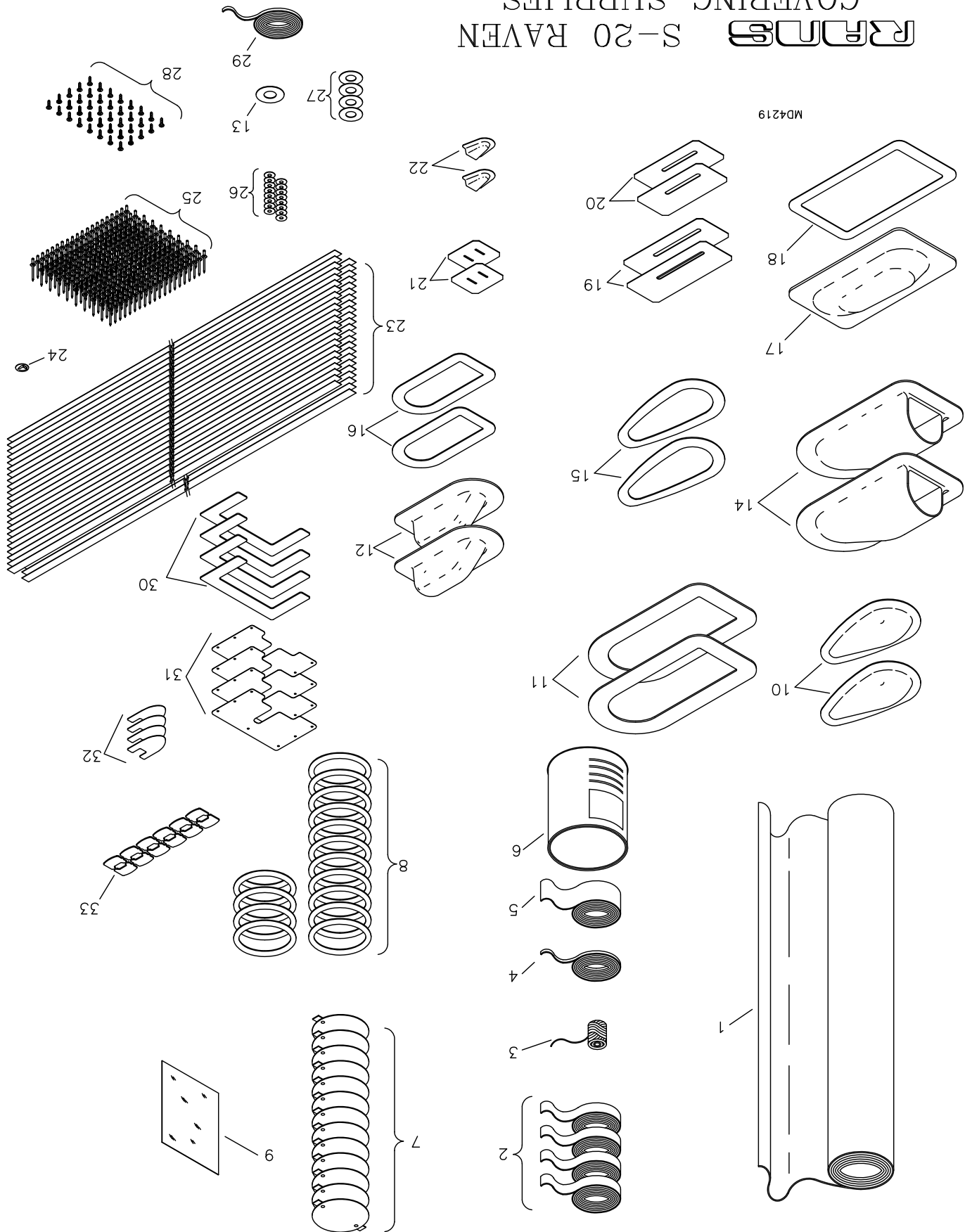
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Self Locking Clevis Pin	KSHW0045	4
2.	Door Handle - Inner	KPDR0143	2
3.	1/8" x 3/4" Roll Pin	KSHW0090	4
4.	3/16" Thin Washer	AN960-10L	6
5.	Loctite Blue *	----	0
6.	Raw Stock - 3/8" x .095" Aluminum Tube	KPST0132	1
6.	Axle Tube - 3/8" x .095" x 2.25" **	KPST0132	0
7.	1/8" Stainless Steel Rivet - Cherry Q	CCPQ-42	4
8.	Door Spacer Bushing, 1/2" x .058" x .375" **	KPAC0278	1
9.	3/16" Bolt	AN3-4A	2
10.	3/16" Shear Acorn Nut	22NKM02	2
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.	3/8" Thick Washer	AN960-616	4
16.	Door Handle - Outer	KPDR0144	2
17.	Adhesive or Double Stick Tape *	----	0
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 Strut	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

*Builder Supplied

** Builder fabricates from raw stock

9/1/2013
 REV. A

RANDS S-20 RAVEN COVERING SUPPLIES



MD4219

RANS S-20 RAVEN - COVERING SUPPLIES

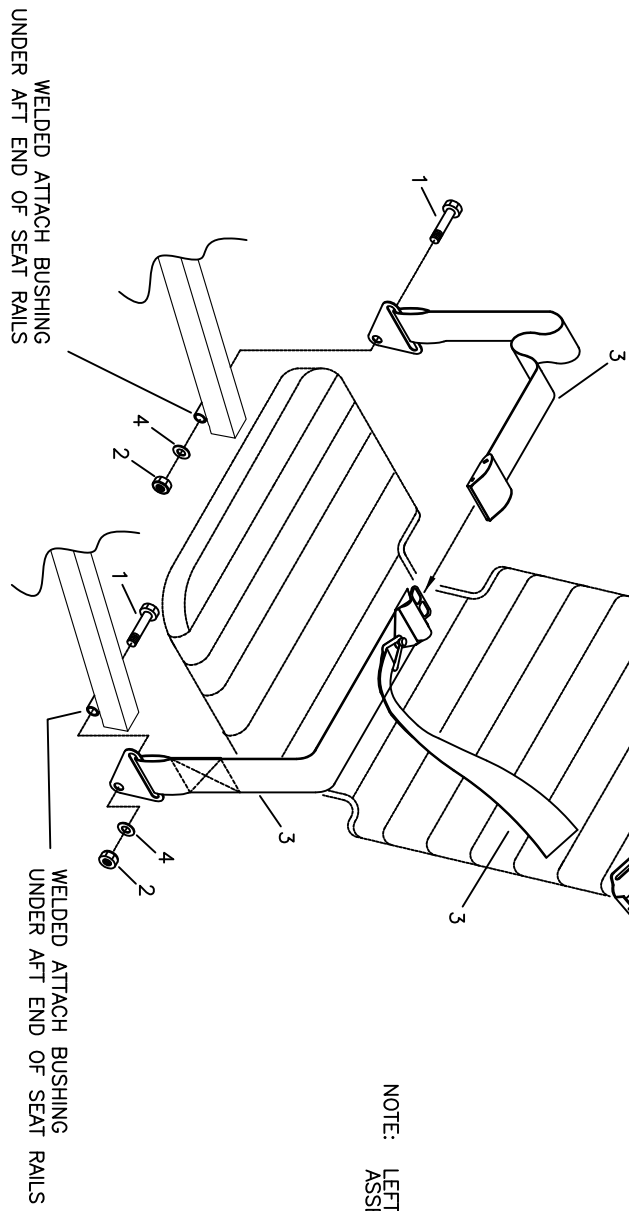
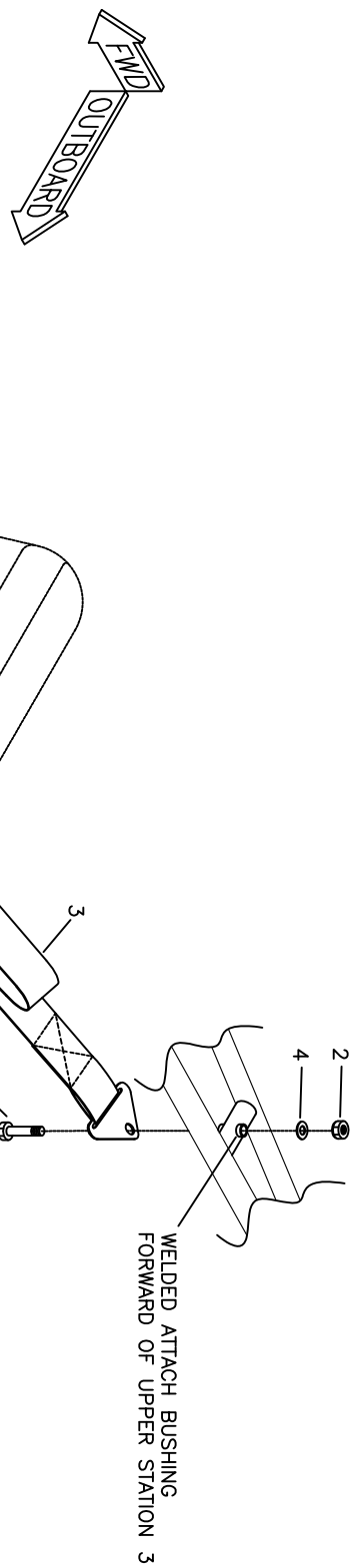
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Aircraft Fabric	SF102	39 yds
2.	2" Surface Tape	2 TAPE	4 rls
3.	Rib Lacing	RIB LACING	5 ft
4.	1/4" Rib Tape	RIB TAPE	4 ft
5.	4" Surface Tape	4 TAPE	40 ft
6.	Aircraft Fabric Adhesive (Optional) *	KSCV0001	0 gal
7.	Inspection Plate	CV-IP	13
8.	Inspection Ring	CV-IR	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



NOTE: LEFT SEAT BELT ASSEMBLY SHOWN.

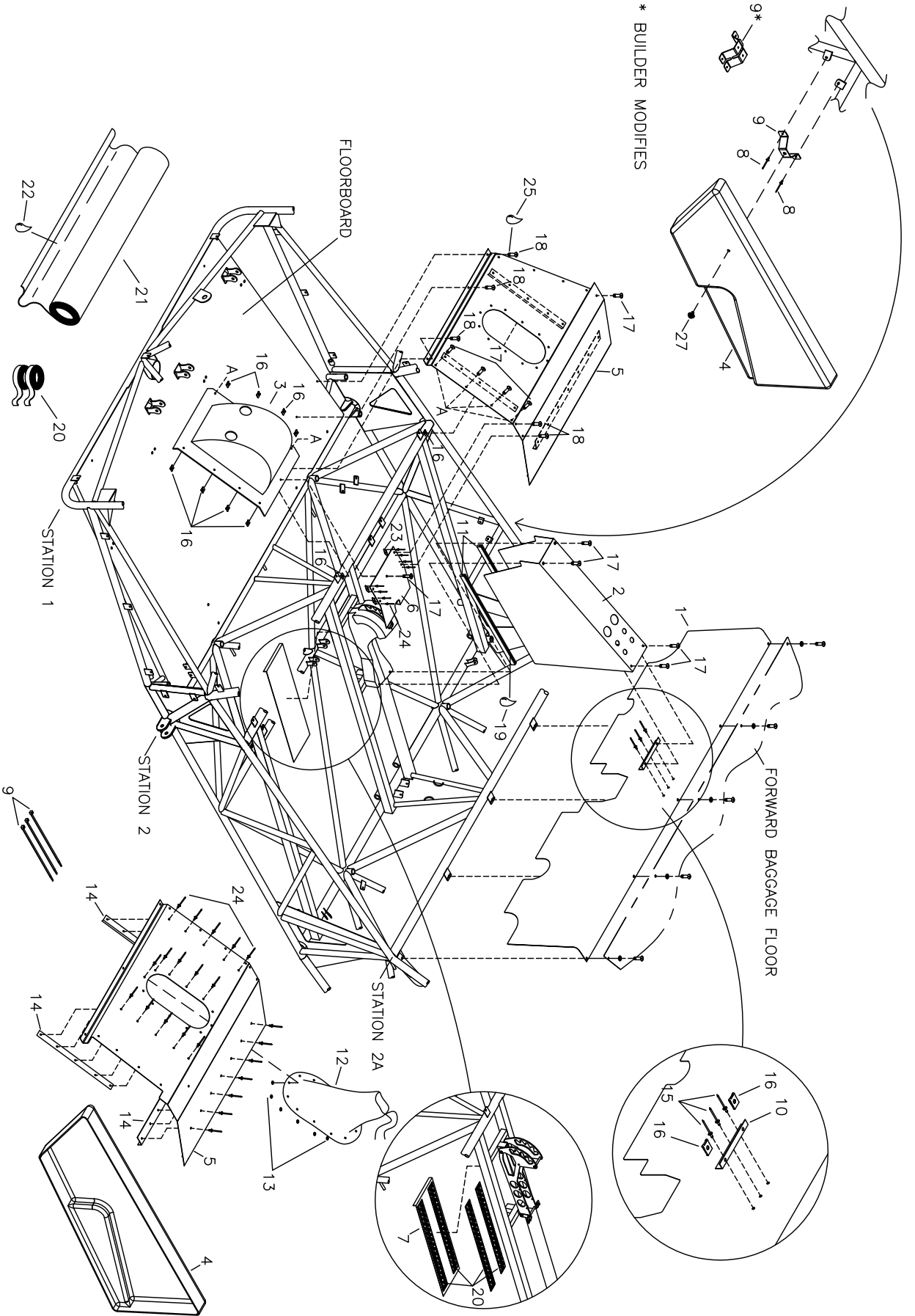
MD5590

RRRONDOS S-20 RAVEN SEAT BELT INSTALLATION

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

* BUILDER MODIFIES



RRRINDS 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

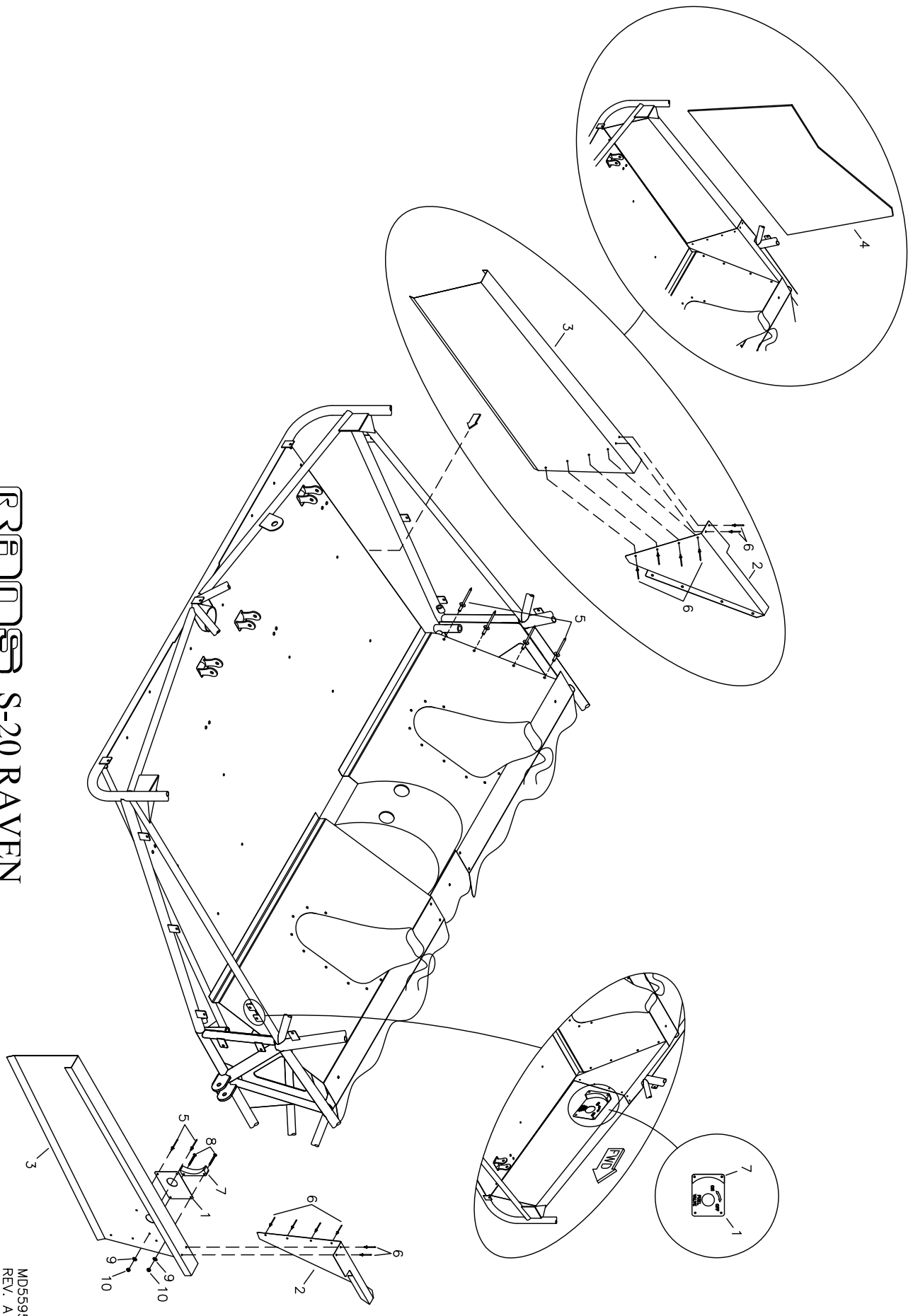
**** Refer to Flap Lever Assembly ***** May be purchased separately, call RANS Parts Dept.

***** Builder Modifies

9/1/2013

REV. B

RRRINDOS S-20 RAVEN INTERIOR INSTALLATION - FWD



MD5595
REV. A

RANS S-20 RAVEN - INTERIOR INSTALLATION - FWD

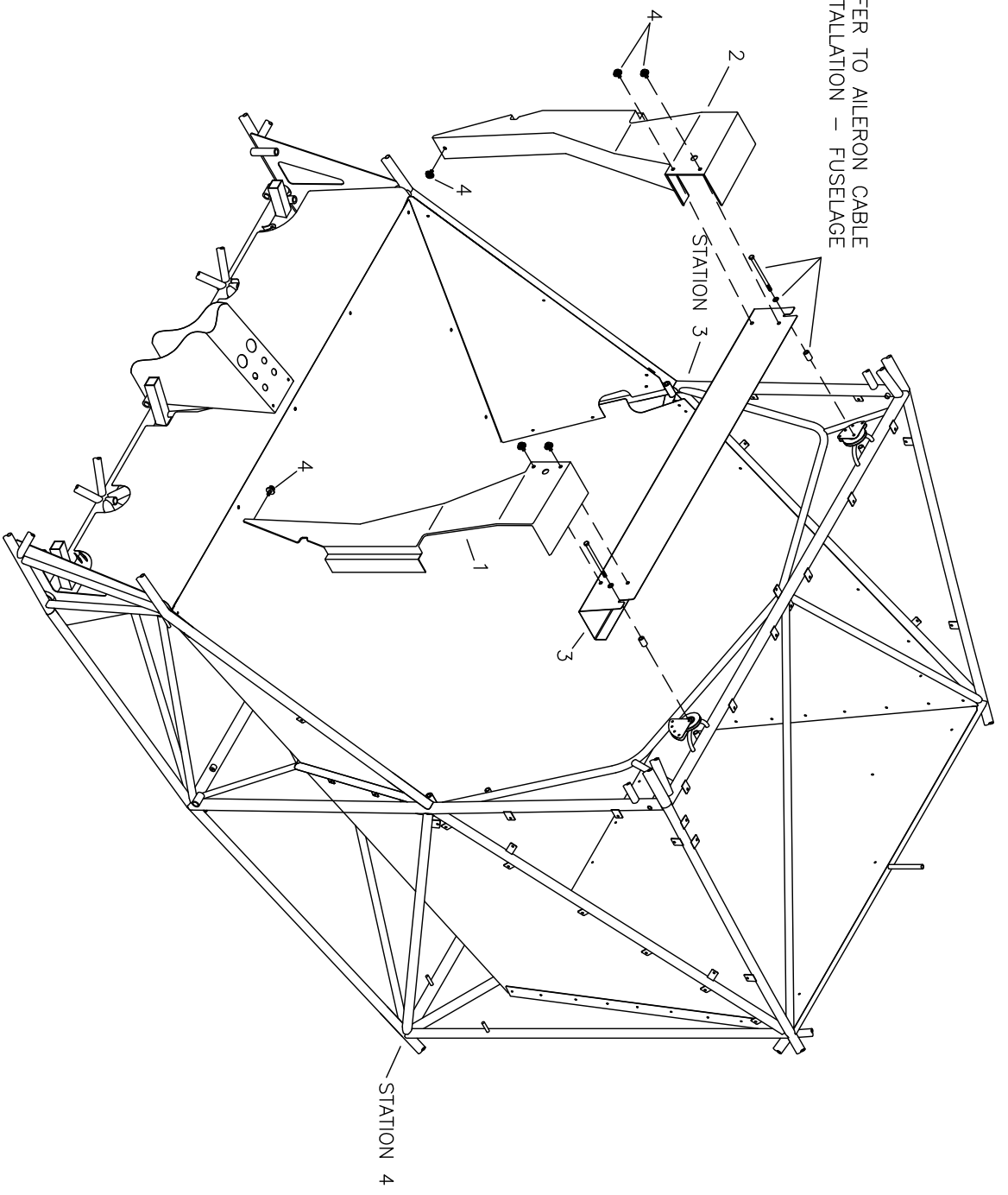
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Fuel Valve Indicator Plate	KPIN0131	1
2.	AFT Side Kick Panel - LH	KPIN0120-L	1
2.	AFT Side Kick Panel - RH	KPIN0120-R	1
3.	FWD Side Kick Panel - LH	KPIN0121-L	1
3.	FWD Side Kick Panel - RH	KPIN0121-R	1
4.	Side Kick Panel *	KPIN0123	0
5.	1/8" Aluminum Rivet - Avex	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



RAVEN S-20 RAVEN
STATION 3 CLOSEOUT

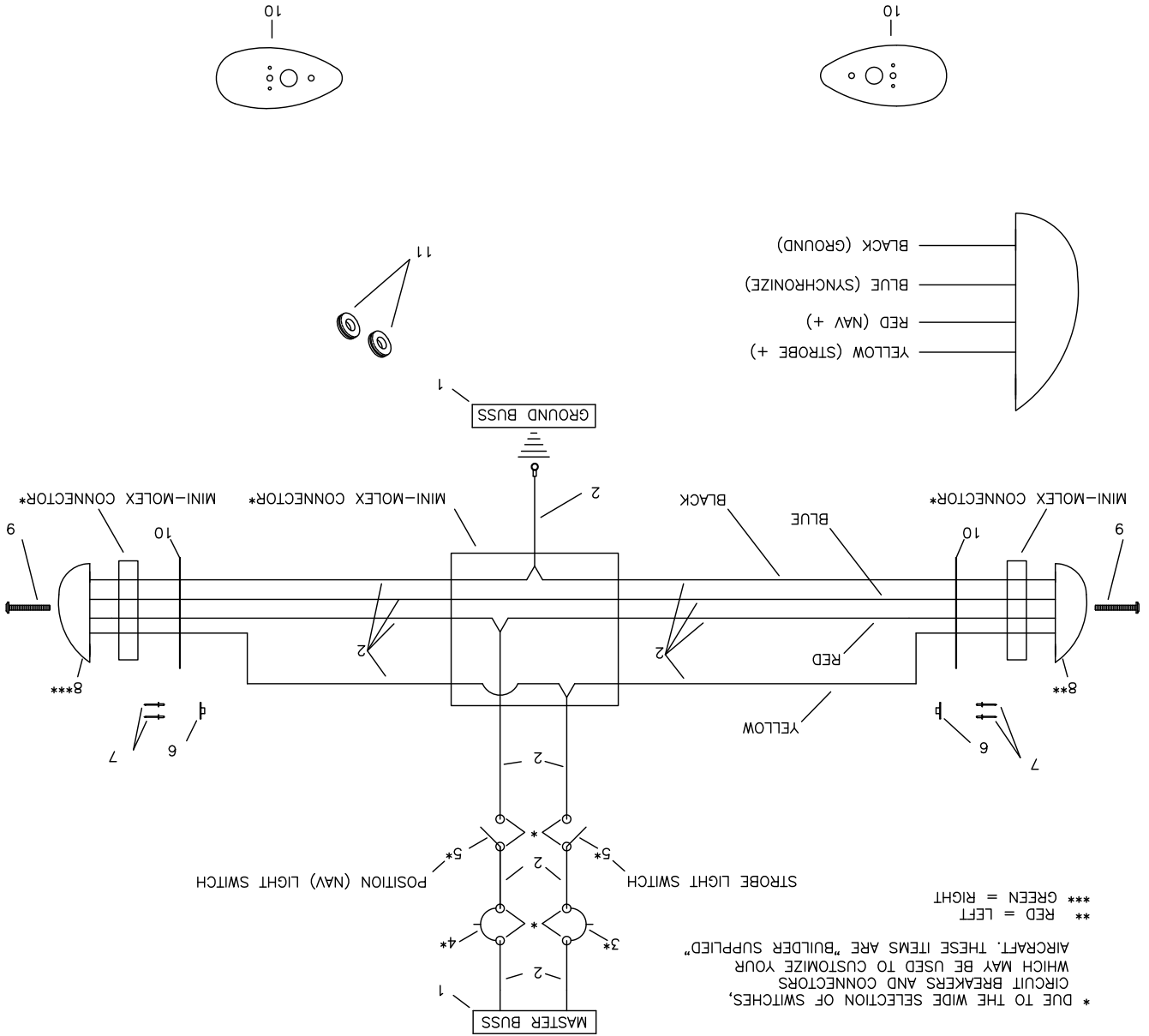
MD5595

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

RRMS S-20 RAVEN OPTIONS AVEO STROBE INSTALLATION

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

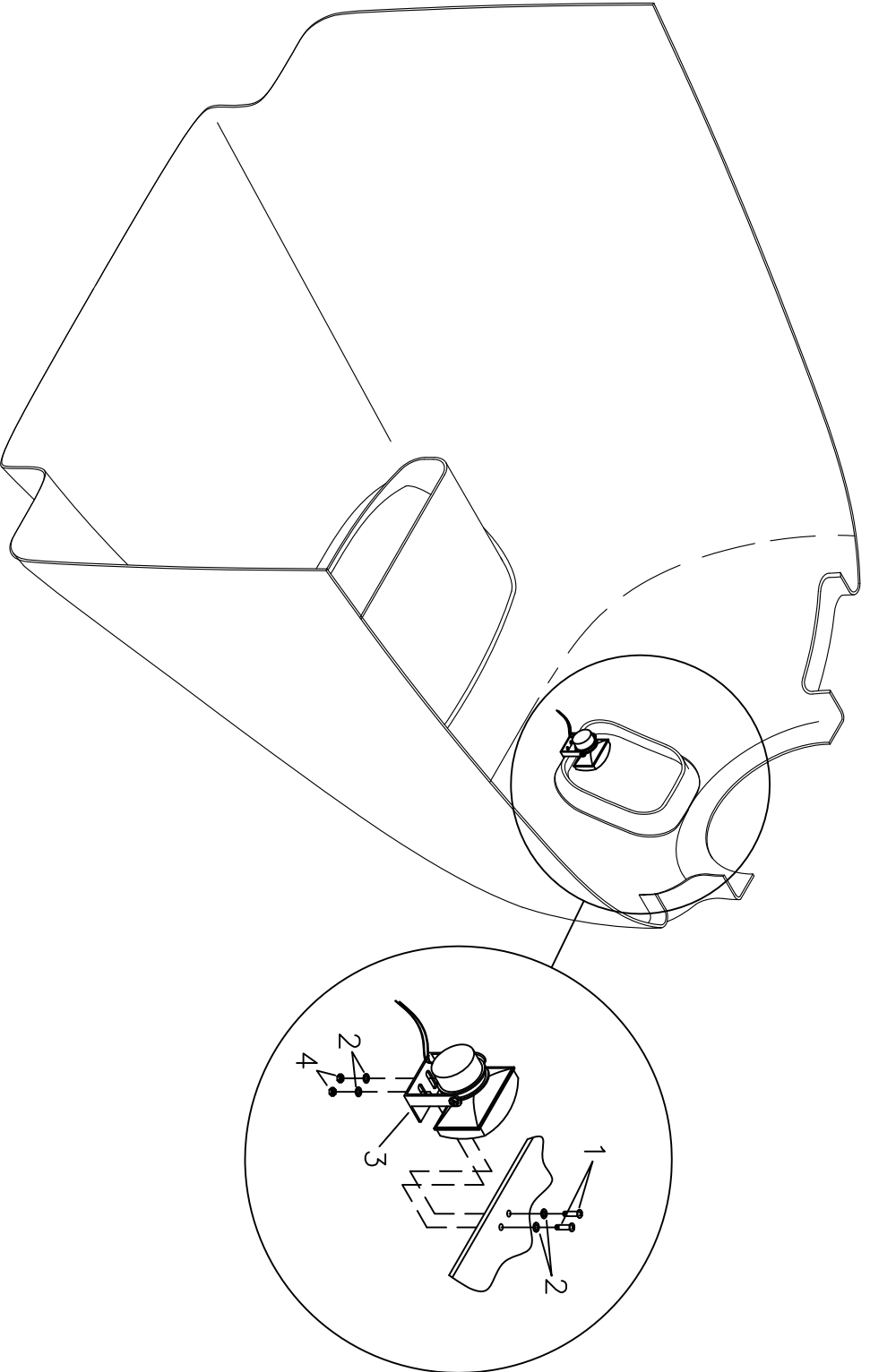
* Builder Supplied

** 4 separate 18 gauge wires may also be used

*** included with Wing Tip

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

9/1/2013



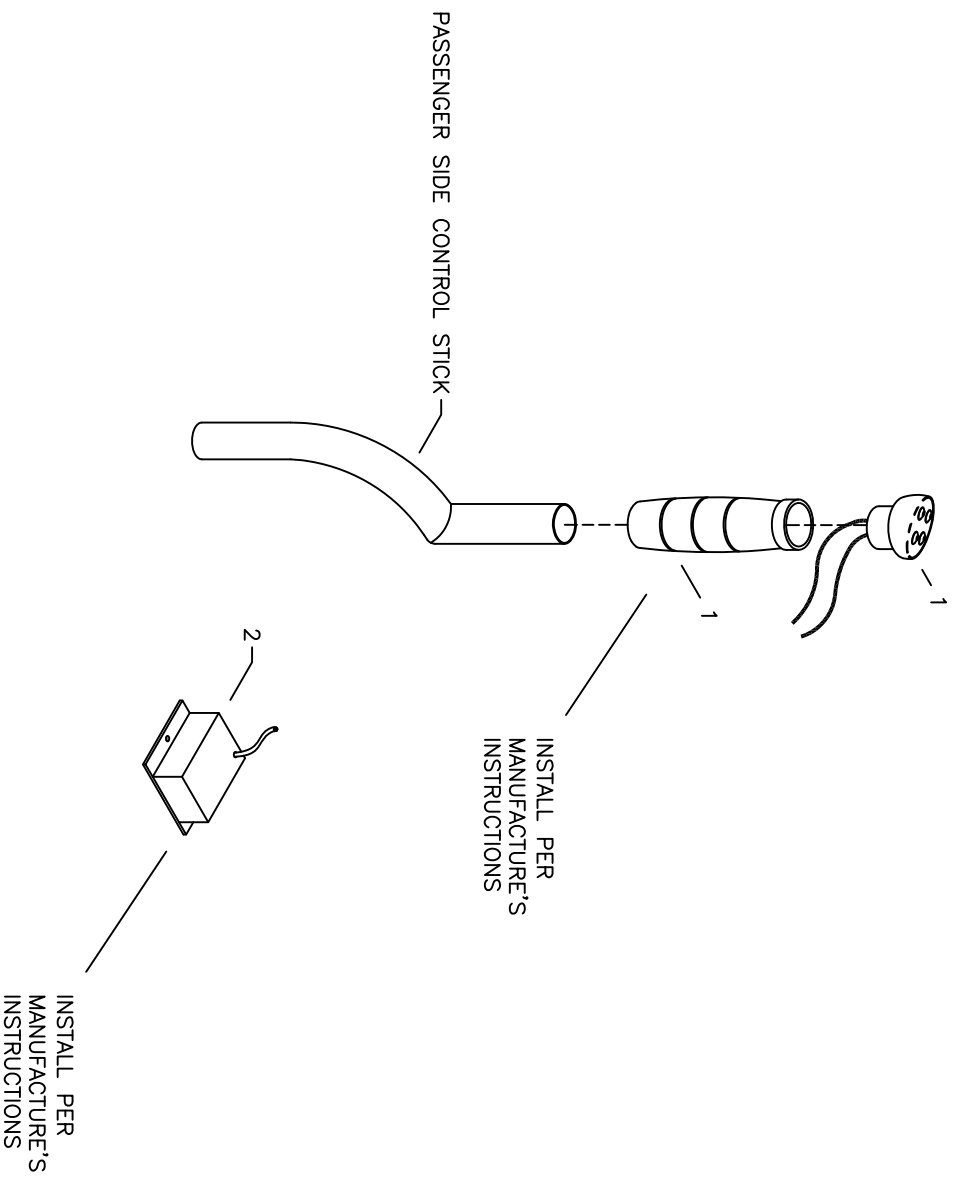
**REVISION S-20 RAVEN
OPTIONS**

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



REVISION S-20 RAVEN
OPTIONS

PASSENGER SEAT ELECTRIC ELEVATOR TRIM

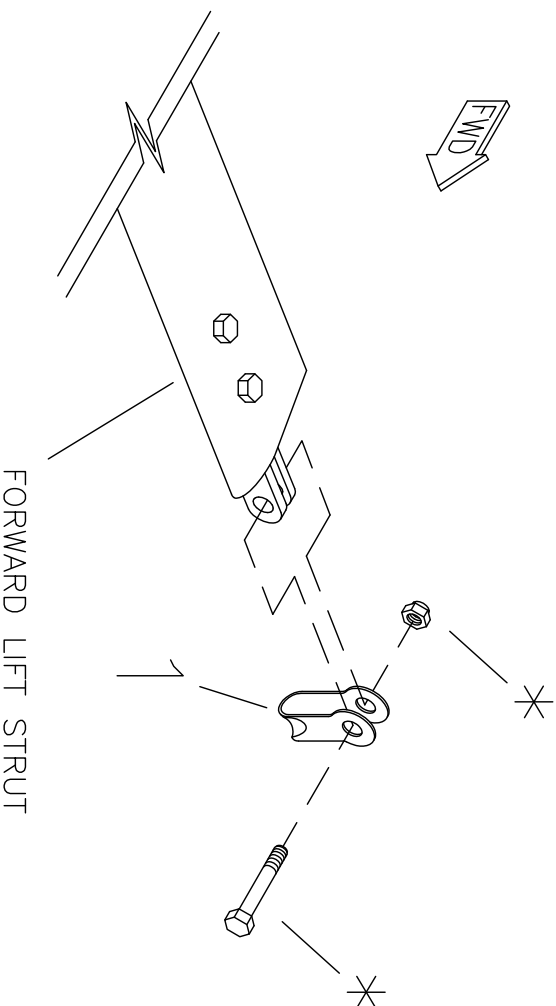
MD3649

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



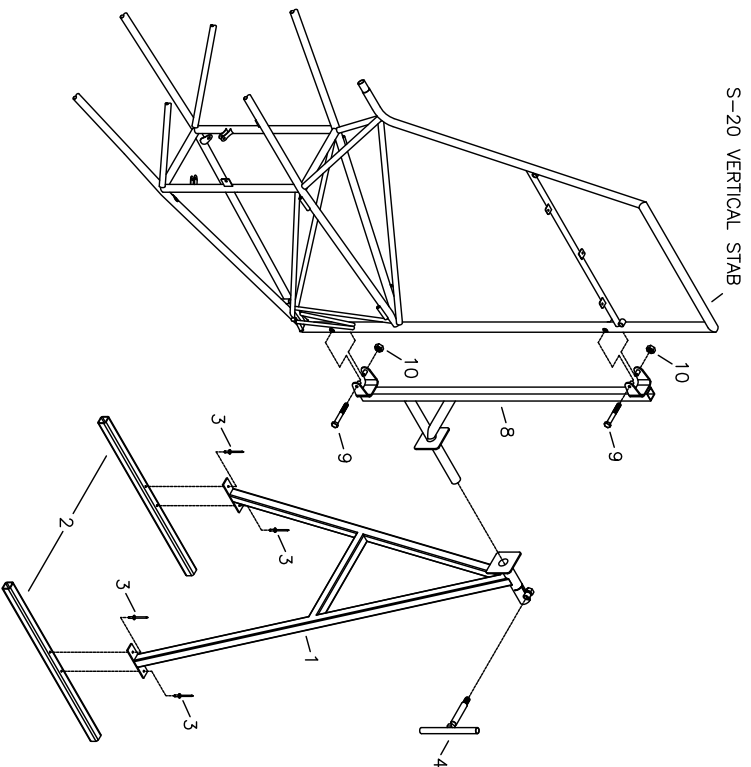
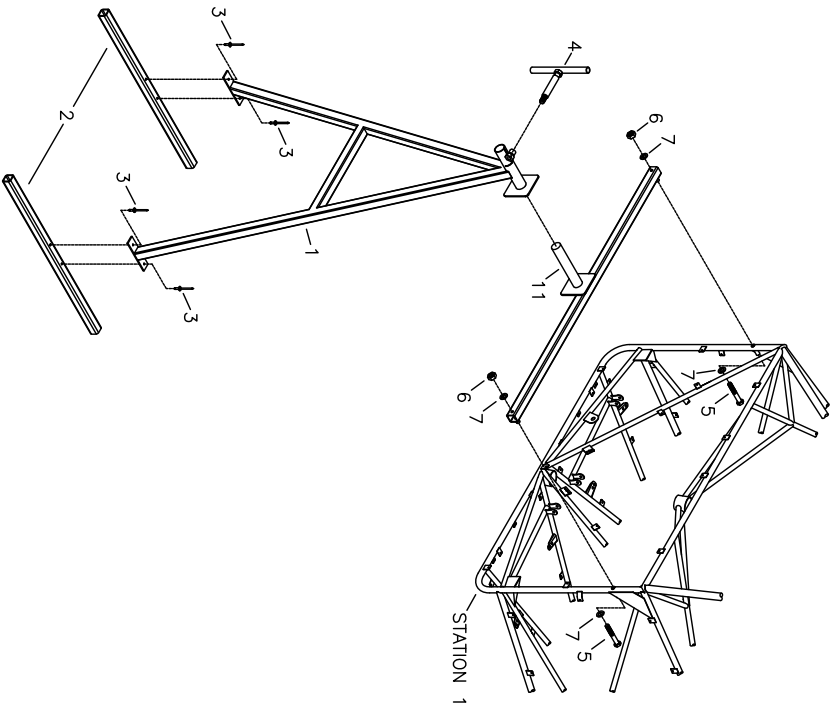
RRRMMMS S-20 RAVEN OPTIONS THE DOWN SHACKLE INSTALLATION

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

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

COVER / PAINT
STANDS ARE NOT
AVAILABLE FROM
RANS.

REFER TO
FIGURE DRAWING
MANUAL FOR
PLANS TO BUILD
YOUR OWN



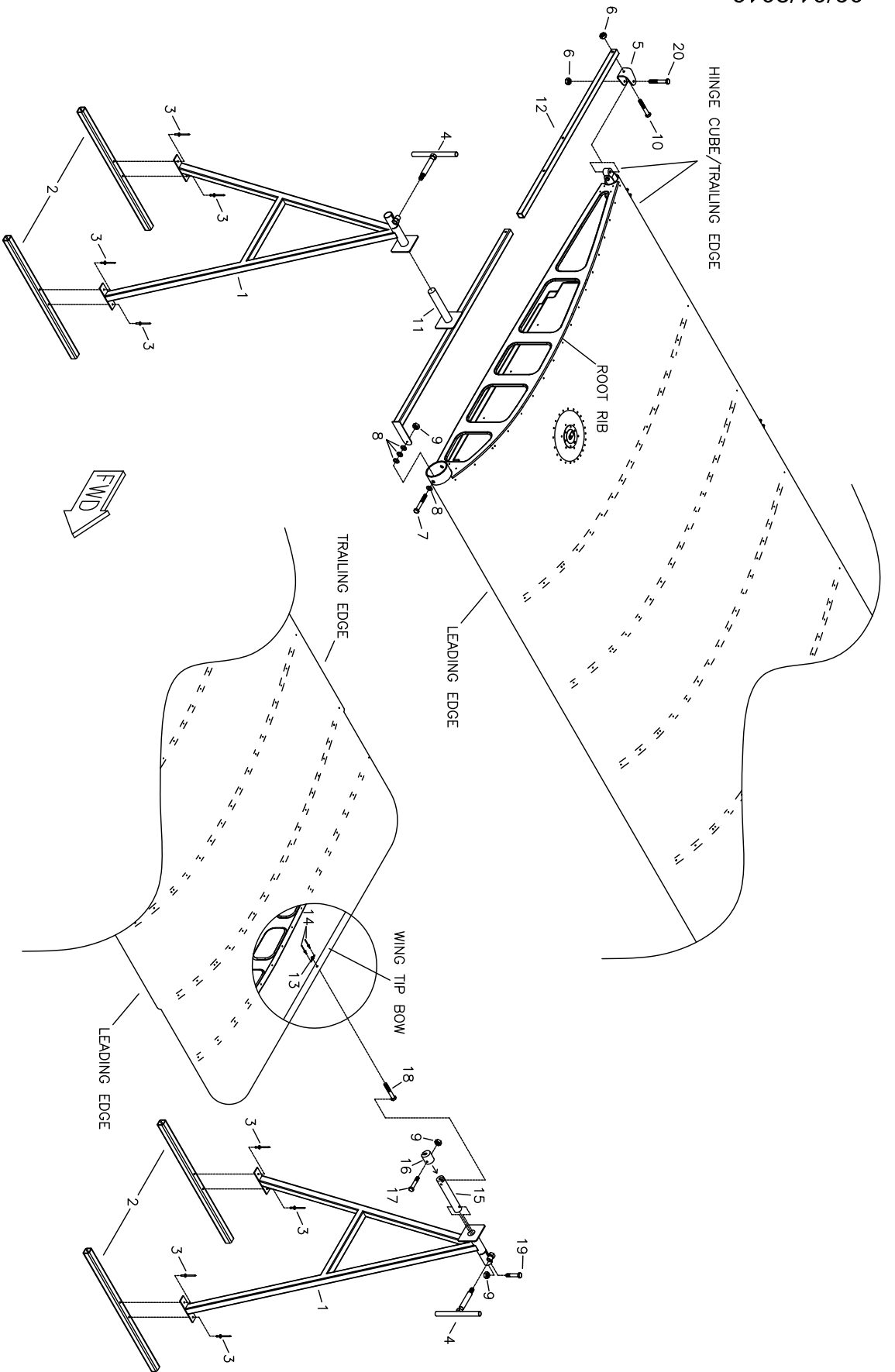
RRRINDOS S-20 RAVEN
OPTIONS

COVER / PAINT STANDS - FUSELAGE

MDS5624
 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

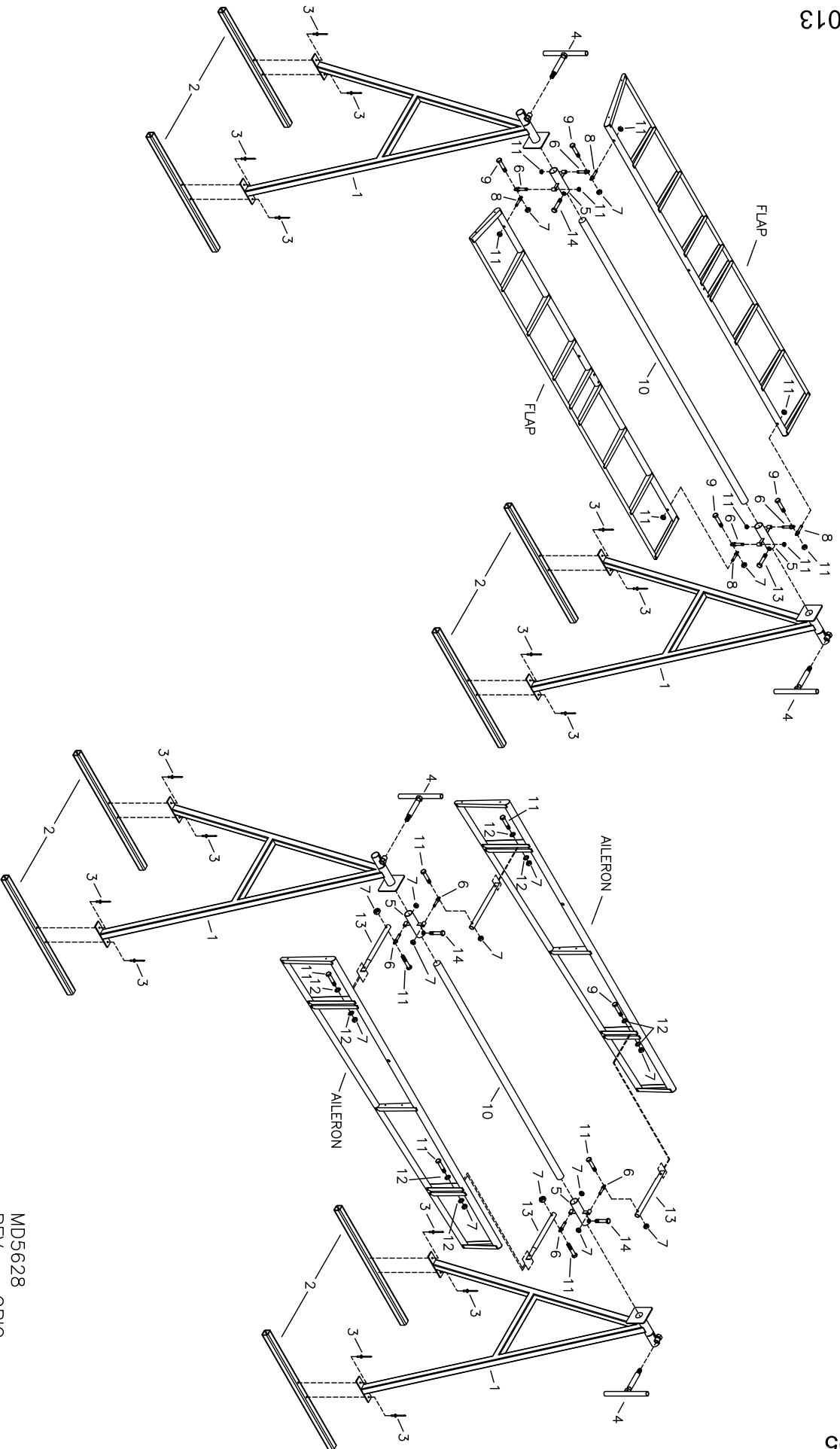


RRRINDOS S-20 RAVEN
OPTIONS
COVER / PAINT STANDS - WING

MDS5625
 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



RRFORD S-20 RAVEN
OPTIONS

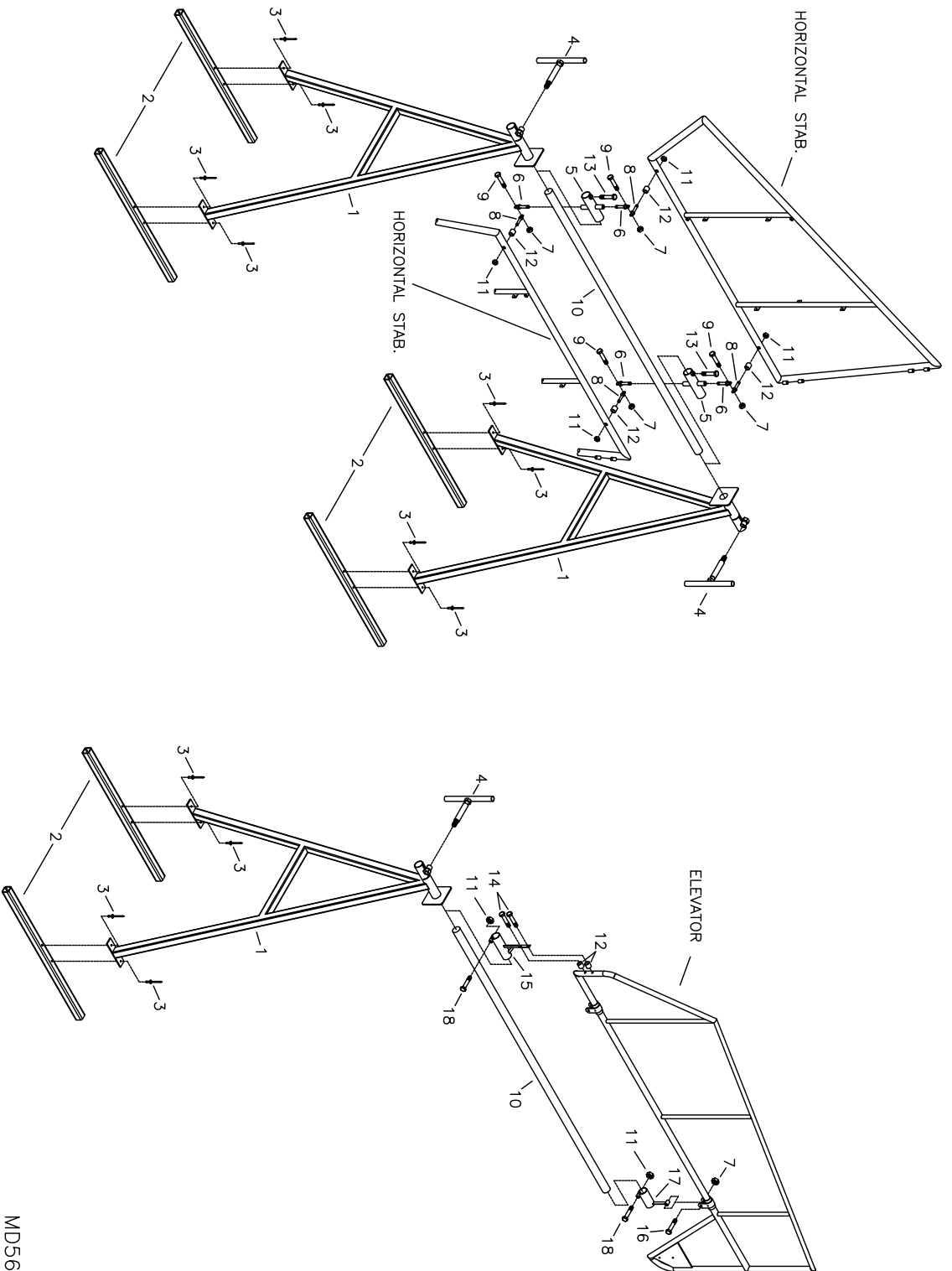
COVER / PAINT STANDS - FLAPS & AILERONS

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



RRP S-20 RAVEN
OPTIONS

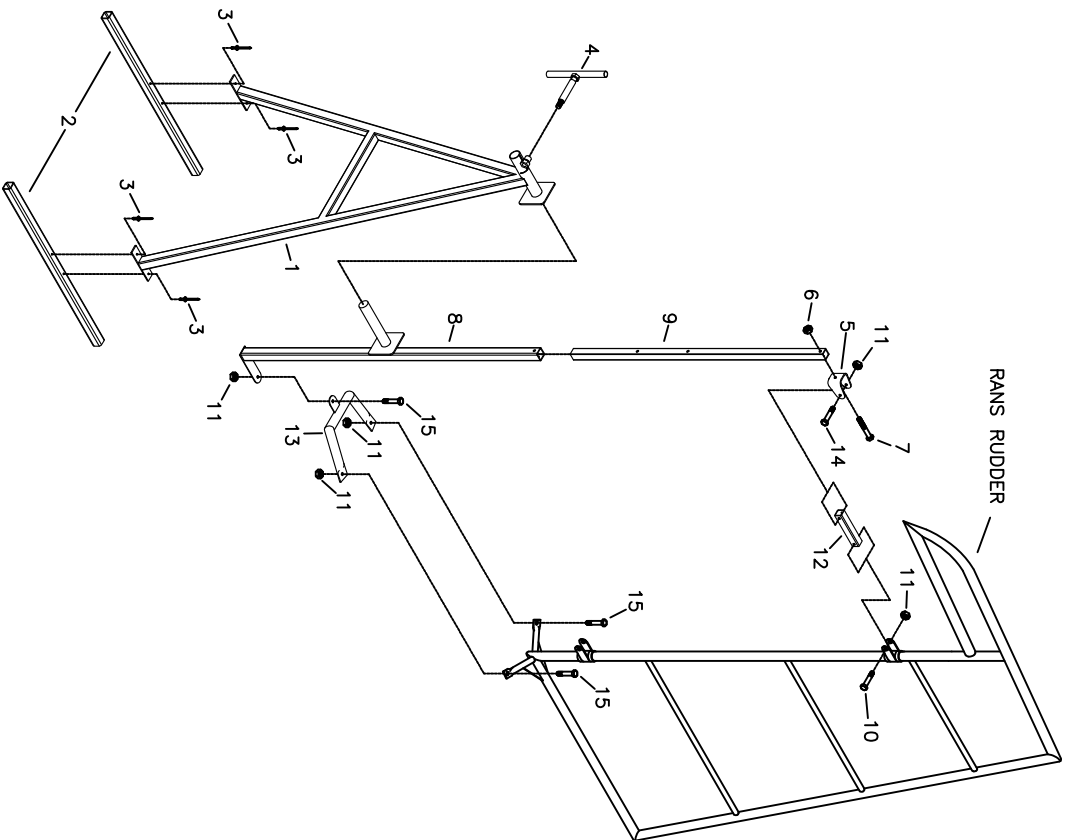
COVER / PAINT STANDS - HORIZONTAL STABILIZERS & ELEVATORS

MDS5626
 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

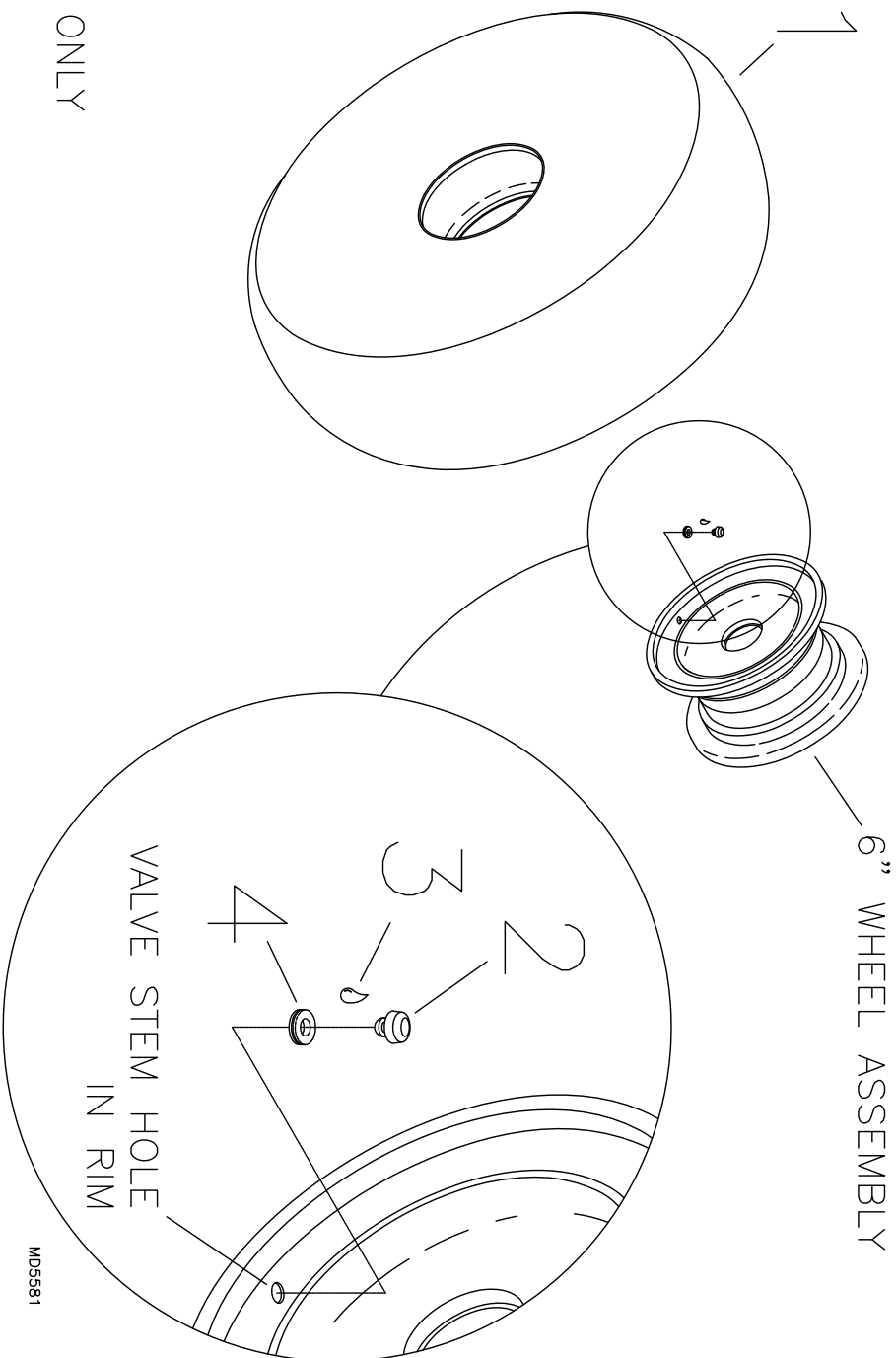


RANS S-20 RAVEN
OPTIONS
COVER / PAINT STANDS - RUDDER

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



FOR TAILDRAGGERS ONLY

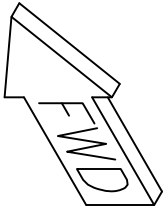
REFER TO TAILDRAGGER – MAIN GEAR ASSEMBLY AND INSTALLATION

RRRND08 S-20 RAVEN
 OPTIONS
 26" ALASKAN WHEELS

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

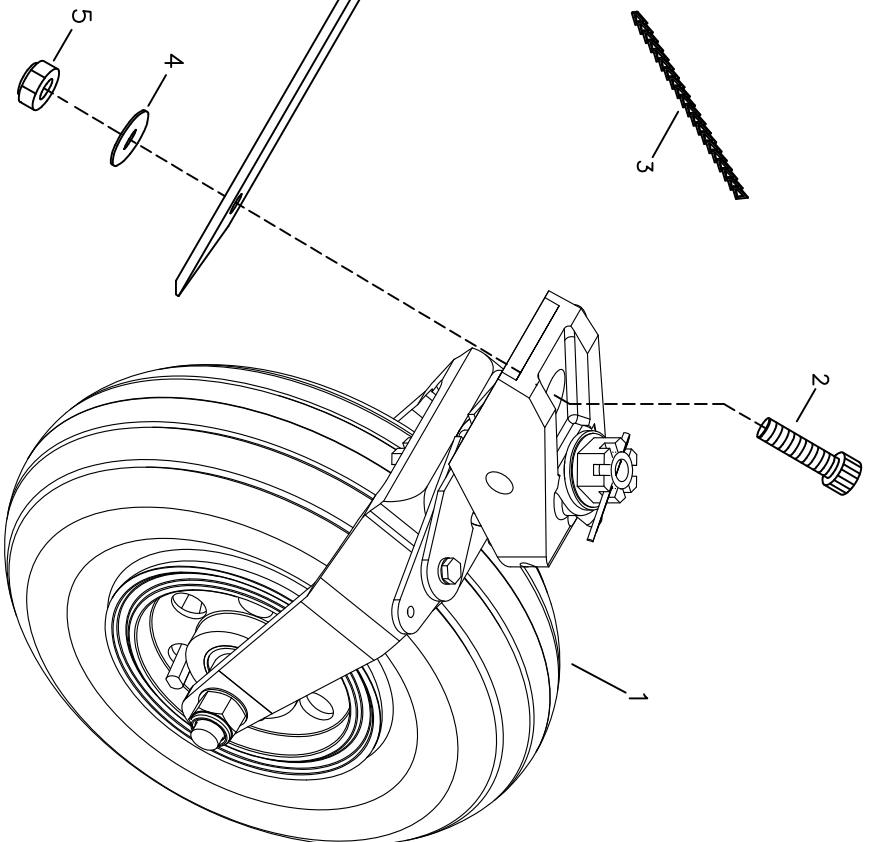
#	DESCRIPTION	PART NUMBER	QUANTITY
1.	Tire - 26" Alaskan	KSMG0028	2
2.	Grommet Plug	9K13-DRBUMP	2
3.	Adhesive - Superglue *	-----	0
4.	Rubber Grommet	MS35489-6	2

* Builder Supplied



REFERENCE TAIL SPRING

REFER TO TAILWHEEL ASSEMBLY FOR COMPLETE INSTALLATION



MD4170

RRRND88 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

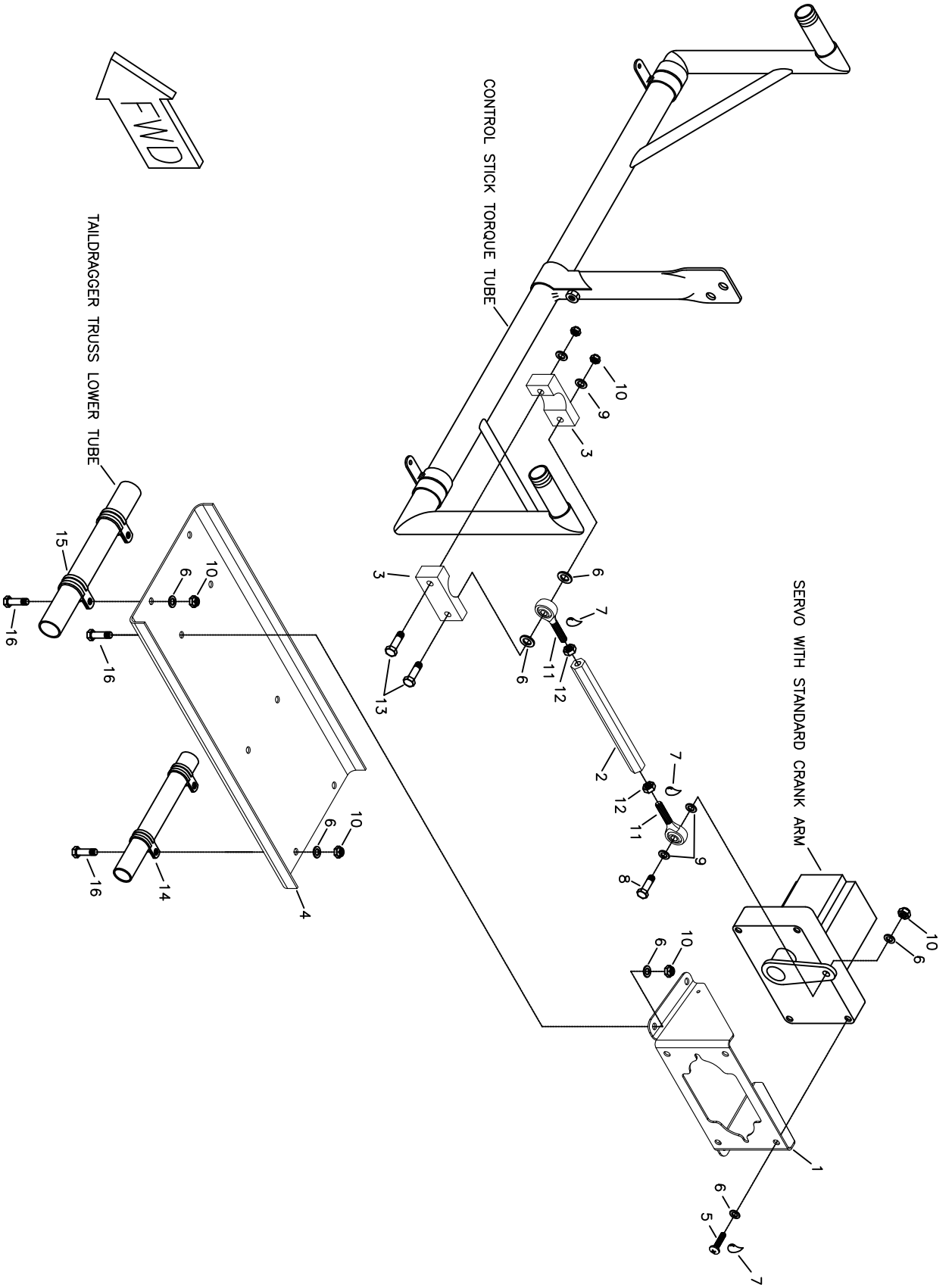
PARTS PAGES

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010G-02

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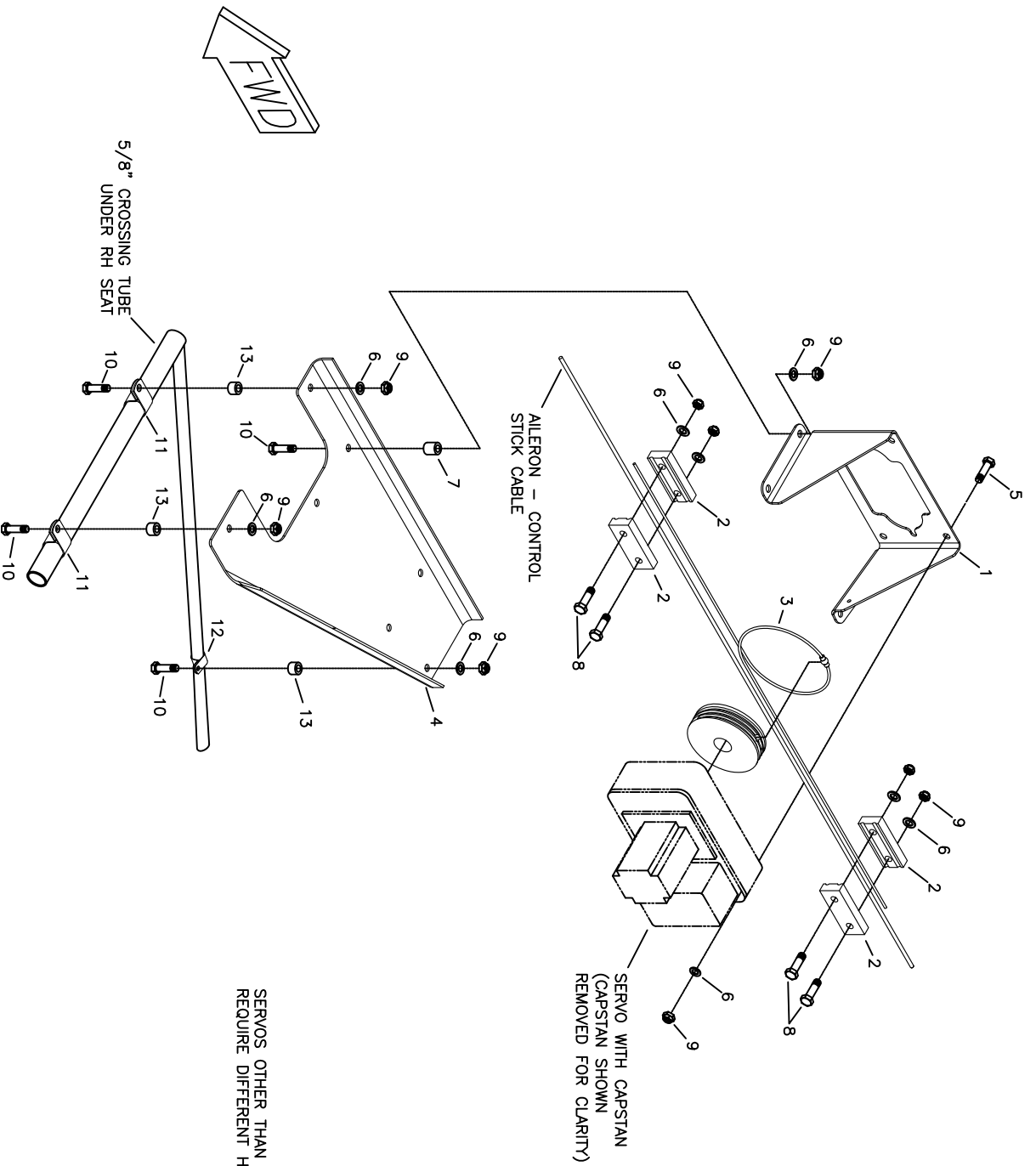
RRRMMB S-20 RAVEN
OPTIONS - PITCH SERVO INSTALLATION

MD3649
 REV. - ORIG

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



SERVOs OTHER THAN GARMIN MAY
REQUIRE DIFFERENT HARDWARE

PRATT & WHITNEY S-20 RAVEN OPTIONS - ROLL SERVO INSTALLATION

MD3649
REV. A

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

9/1/2013

REV. A