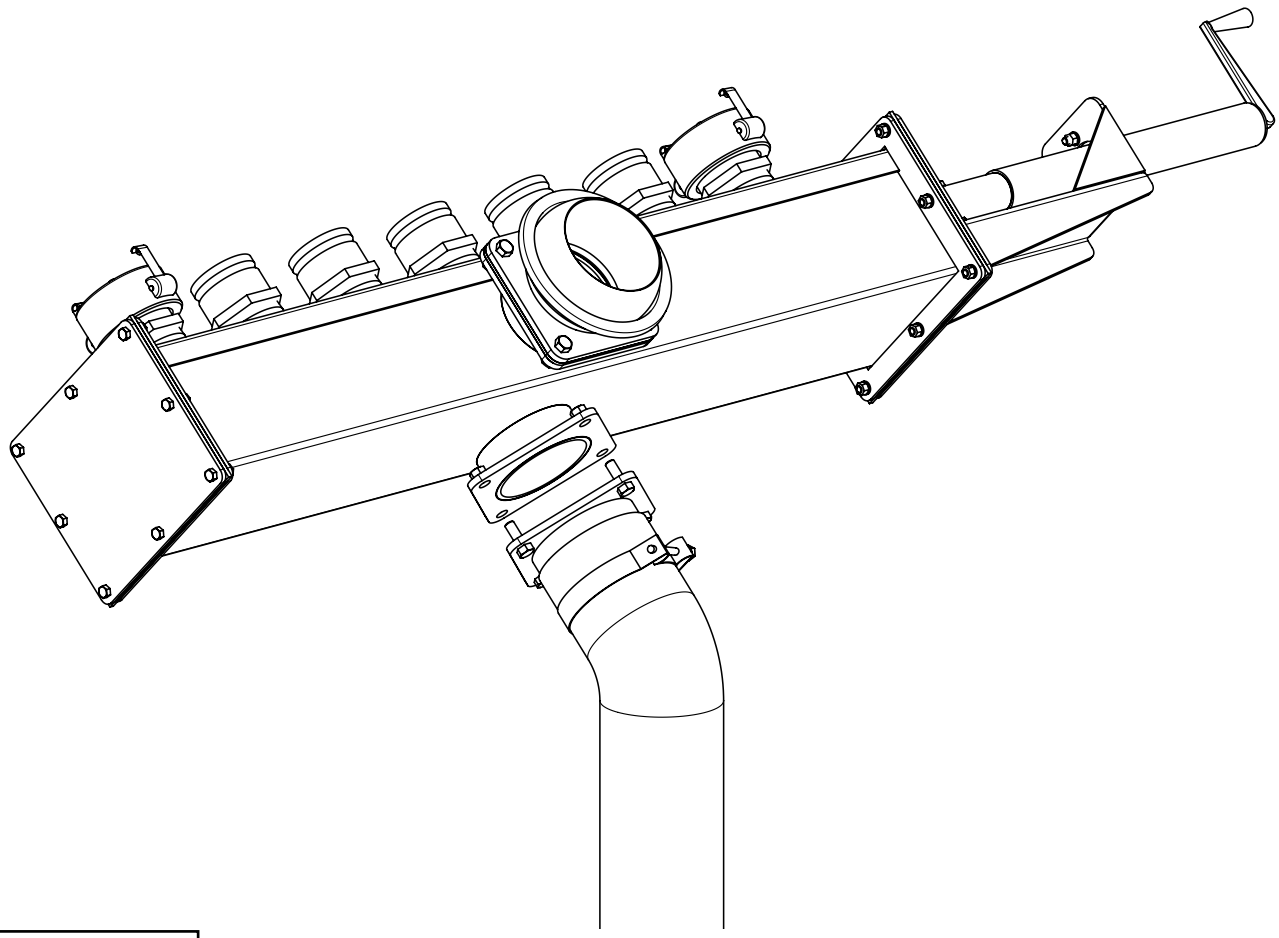
LM300004 REV A
09/18/2009

SIOUX
AUTOMATION CENTER, INC.
QUALITY PEOPLE, QUALITY PRODUCTS

SAC Liquid Manure Manifold

5-7 port & 8-9 port

PARTS & OPERATION MANUAL



ASSEMBLY
CALIBRATION
OPERATION
REPLACEMENT PARTS

READ complete manual CAREFULLY
BEFORE attempting operation

SAC - SIOUX AUTOMATION - 877 1ST AVE. NW - SIOUX CENTER, IA 51250
PH: (712)-722-1488 - TOLL FREE: 1-866-722-1488
WWW.SIOUXAUTOMATION.COM

GENERAL INFORMATION

1. Unless otherwise specified, high-strength (grade5) (3 radial-line head markings) hex head bolts are used throughout assembly of this piece of equipment.

2. Whenever terms "LEFT" and "RIGHT" are used in this manual it means from a position behind wagon and facing forward.

3. When placing a parts order, refer to this manual for proper part numbers and place order by PART NO. and DESCRIPTION.

4. Read assembly instructions carefully. Study assembly procedures and all illustrations before you begin assembly. Note which parts are used in each step. This unit must be assembled in proper sequence or complications will result.

TABLE OF CONTENTS

General information 3
Safety , Signal Words 4
Equipment Safety Guidelines 5
Lighting and Marking 6
Safety Sign Care 6
Tire Safety 6
Bolt Torque 7
Base Manifold Parts Breakdown 8-11
Base Manifold Assembly Instructions 12
Setting Actuator Limit Switch 13
Toolbar Mounting Bracket 14-15
Toolbar Mounting Bracket Assembly Instructions 16
Flow Meter Brackets Breakdown 17-20
Flow Meter Brackets Assembly Instructions 21-23
Control Wiring Breakdown 24
Operation of Manifold 25
Raven Controller Instructions 26

SAFETY

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH!

SIGNAL WORDS

Note: use of following signal words DANGER, WARNING, and CAUTION with safety messages. Appropriate signal word for each has been selected using following guidelines:

DANGER:

Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death. This signal word is to be limited to most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

WARNING:

Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION:

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If you have questions not answered in this manual , require additional copies, or if your manual is damaged, please contact your dealer or Sioux Automation Inc., 877 1st Ave. NW Sioux Center, IA 51250 ph: (712)-722-1488 or 866-722-1488 http://www.siouxautomation.com

SAFETY...YOU CAN LIVE WITH IT

EQUIPMENT SAFETY GUIDELINES

Every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury, study the following precautions and insist those working with you, or you yourself, follow them.

In order to provide a better view, certain illustrations in this manual may show an assembly with a safety shield removed. However, equipment should never be operated in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace shield prior to use.

Replace any caution, warning, danger or instruction safety decal that is not readable or is missing. Location of such decals is indicated in this booklet.

Do not attempt to operate this equipment under the influence of alcohol or drugs.

Review safety instructions with all users annually.

Operator should be a responsible adult. DO NOT ALLOW PERSONS TO OPERATE OR ASSEMBLE THIS UNIT UNTIL THEY HAVE DEVELOPED A THOROUGH UNDERSTANDING OF SAFETY PRECAUTIONS AND HOW IT WORKS.

To prevent injury or death, use a tractor equipped with a roll over protective system (ROPS). Do not paint over, remove, or deface any safety signs or warning decals on your equipment. Observe all safety signs and practice instructions on them.

Never exceed limits of a piece of machinery. If its ability to do a job, or to do so safely is in question DON'T TRY IT.

SAFETY TIPS

- Keep hand, feet, and clothing away from moving parts.
- DO NOT climb on or enter machine during operation.
- DO NOT make high speed maneuvers when operating or towing machine.
- Disengage clutch and remove keys before servicing.
- Keep ALL shields in place
- DO NOT allow riders
- DO NOT attempt to clean, oil, or adjust machine while in motion

Regardless of the care used in the design and construction of equipment, there are many points that can not be completely safeguarded without interfering with accessibility and efficient operation. A careful operator is the best insurance against an accident.

LIGHTING AND MARKING

It is the responsibility of customer to know lighting and marking requirements of local highway authorities and to install and maintain equipment to provide compliance with regulations. Add extra lights when transporting at night or during periods of limited visibility.

Lighting kits are available from your dealer or from manufacturer.

SAFETY SIGN CARE

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or have become illegible.
- Replacement parts that displayed a safety sign should also display current sign.
- Safety signs are available from your distributor, dealer parts department, or factory.

How to install safety signs:

- Be sure that installation area is clean and dry.
- Decide on exact position before you remove backing paper.
- Remove smallest portion of split backing paper.
- Align decal over specified area and carefully press small portion with exposed sticky backing in place.
- Slowly peel back remaining paper and carefully smooth remaining portion of decal into place.
- Small air pockets can be pierced with a pin and smoothed out using piece of decal backing paper.

TIRE SAFETY

- Failure to follow proper procedures when mounting a tire on a rim can produce an explosion which may result in a serious injury or death.
- Do not attempt to mount a tire unless you have proper equipment and experience to do job.
- Inflating or servicing tires can be dangerous. Whenever possible, trained personnel should be called to service and/or mount tires.
- Always order and install tires and wheels with appropriate type and load capacity to meet or exceed anticipated weight to be placed on the equipment.

REMEMBER

Your best assurance against accidents is a careful and responsible operator. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or manufacturer.

BOLT TORQUE
TORQUE DATA FOR STANDARD NUTS, BOLTS, AND CAPSCREWS.

Tighten all bolts to torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt chart as guide. Replace hardware with same grade bolt.

NOTE: Unless otherwise specified, high-strength Grade 5 hex bolts are used throughout assembly of equipment.

Torque Specifications

Bolt Torque for Standard bolts *

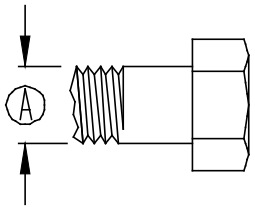
	GRADE 2		GRADE 5		GRADE 8	
"A"	lb-ft	(N.m)	lb-ft	(N.m)	lb-ft	(N.m)
1/4"	6	(8)	9	(12)	12	(16)
5/16"	10	(13)	18	(25)	25	(35)
3/8"	20	(27)	30	(40)	45	(60)
7/16"	30	(40)	50	(70)	80	(110)
1/2"	45	(60)	75	(100)	115	(155)
9/16"	70	(95)	115	(155)	165	(220)
5/8"	95	(130)	150	(200)	225	(300)
3/4"	165	(225)	290	(390)	400	(540)
7/8"	170	(230)	420	(570)	650	(880)
1"	225	(300)	630	(850)	970	(1310)

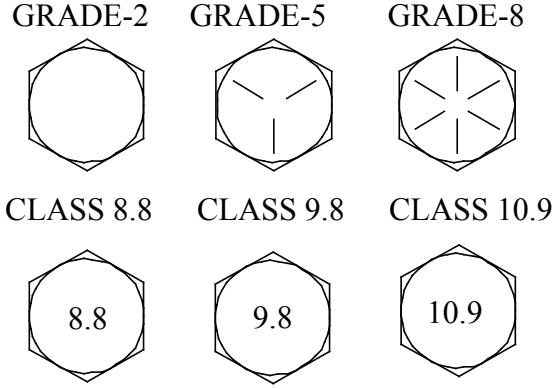
Bolt Torque for Metric bolts *

	CLASS 8.8		CLASS 9.8		CLASS 10.9	
"A"	lb-ft	(N.m)	lb-ft	(N.m)	lb-ft	(N.m)
6	9	(13)	10	(14)	13	(17)
7	15	(21)	18	(24)	21	(29)
8	23	(31)	25	(34)	31	(42)
10	45	(61)	50	(68)	61	(83)
12	78	(106)	88	(118)	106	(144)
14	125	(169)	140	(189)	170	(230)
16	194	(263)	216	(293)	263	(357)
18	268	(363)	--	--	364	(493)
20	378	(513)	--	--	515	(689)
22	516	(699)	--	--	702	(952)
24	654	(886)	--	--	890	(1206)

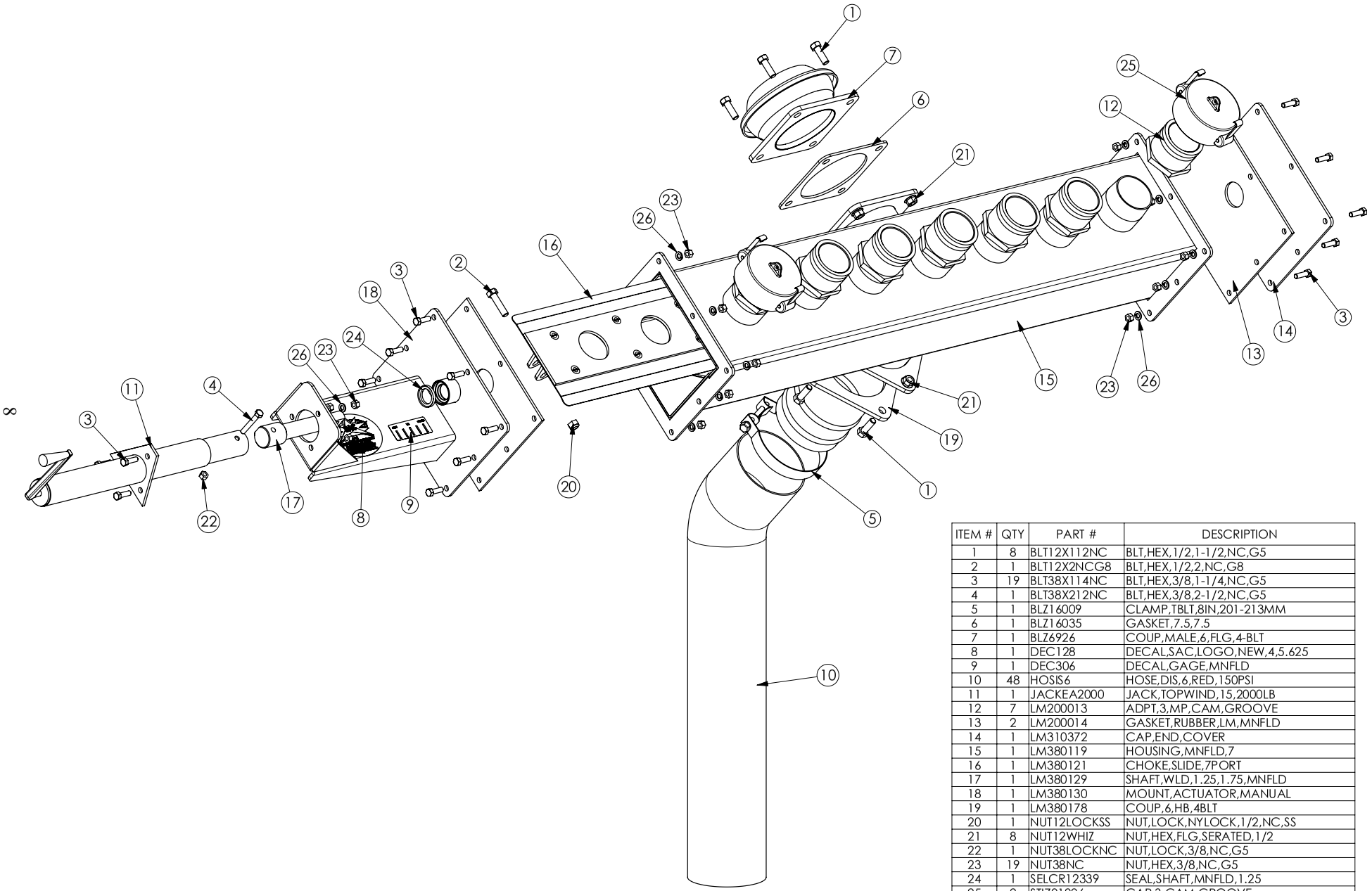
Torque figures indicated are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values
by 5%.

* GRADE or CLASS value for bolts and capscrews are identified by their head markings.



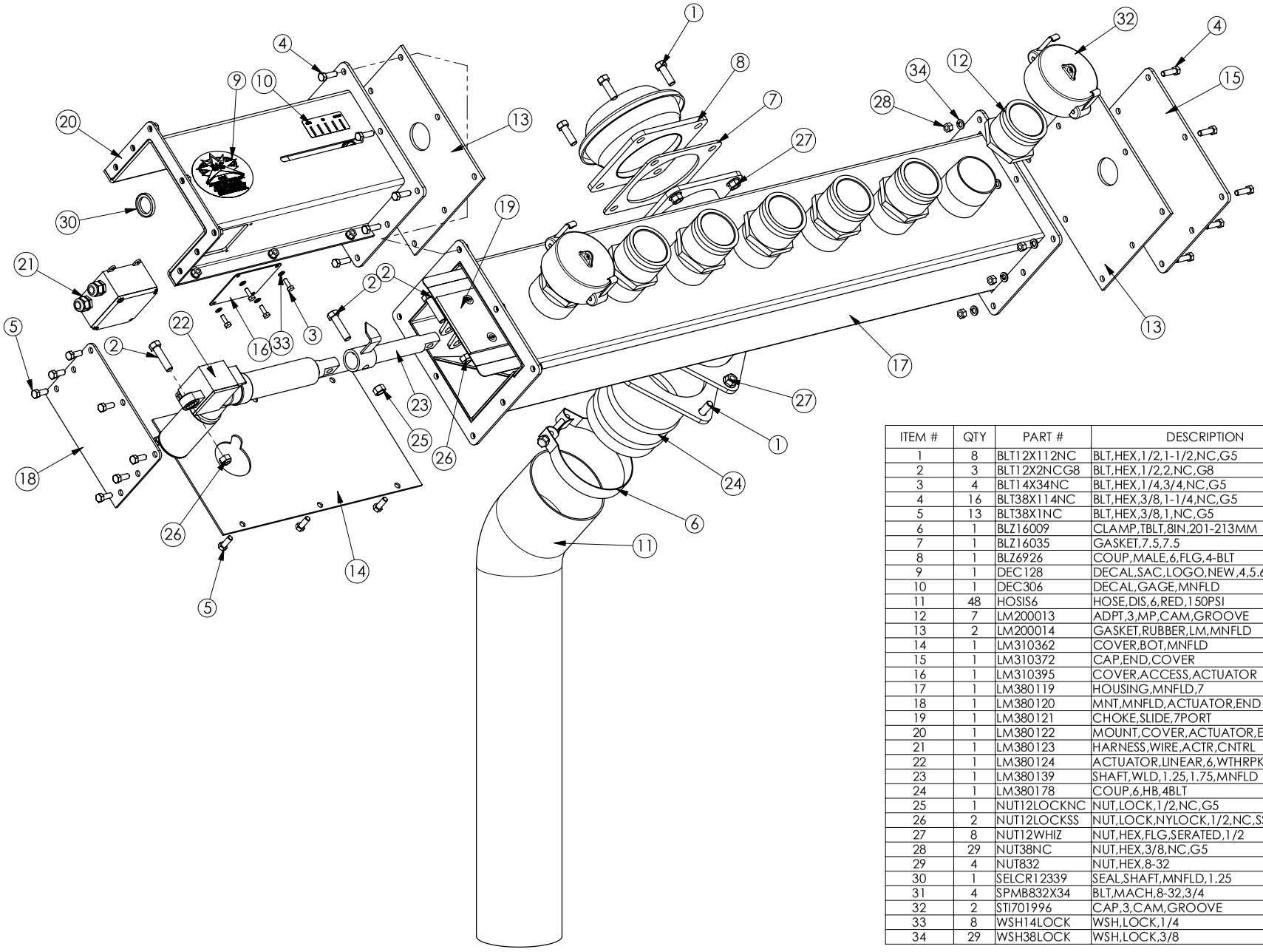


5-7 PORT MANUAL MANIFOLD PARTS BREAKDOWN



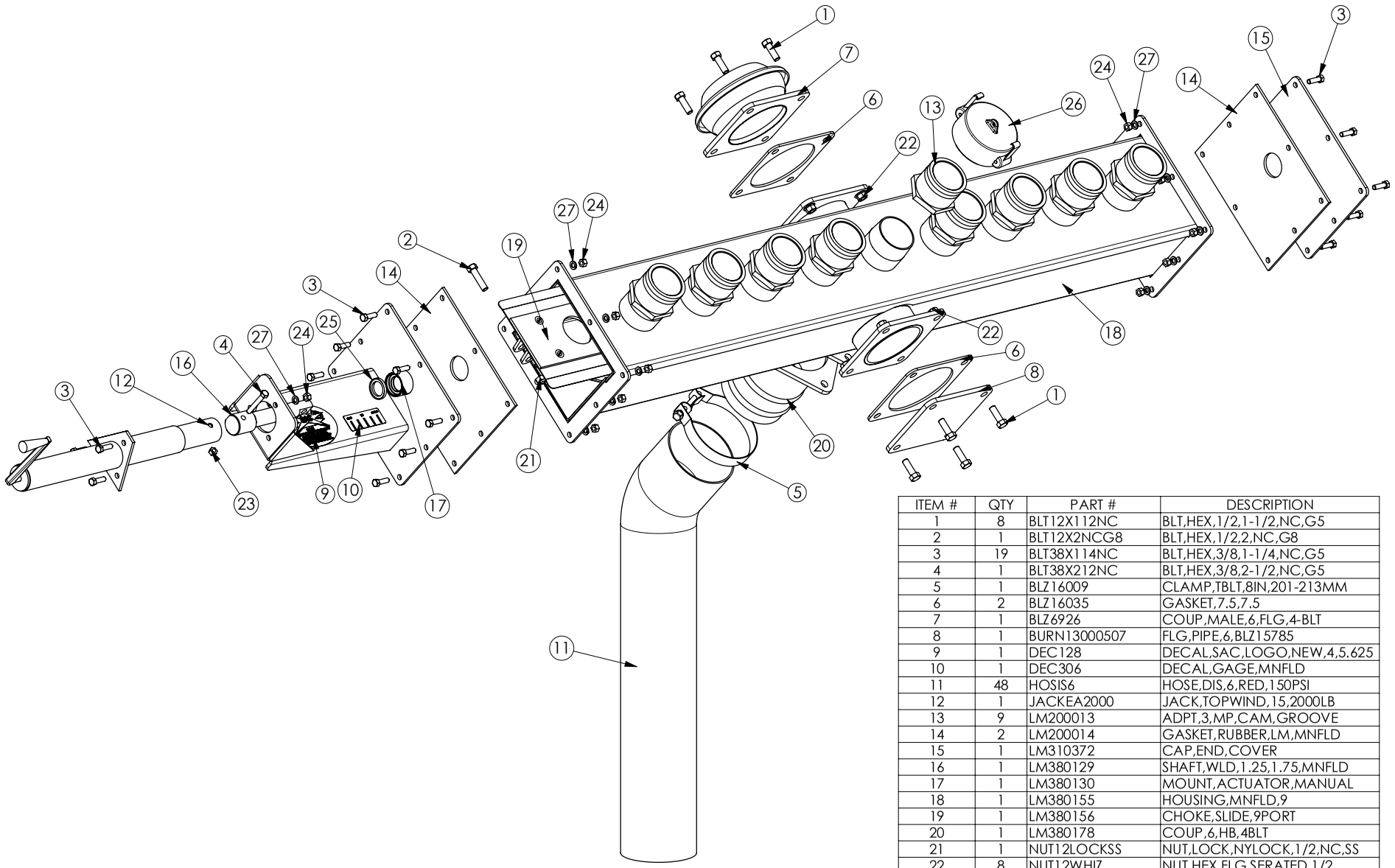
ITEM #	QTY	PART #	DESCRIPTION
1	8	BLT12X112NC	BLT,HEX,1/2,1-1/2,NC,G5
2	1	BLT12X2NCG8	BLT,HEX,1/2,2,NC,G8
3	19	BLT38X114NC	BLT,HEX,3/8,1-1/4,NC,G5
4	1	BLT38X212NC	BLT,HEX,3/8,2-1/2,NC,G5
5	1	BLZ16009	CLAMP,TBLT,8IN,201-213MM
6	1	BLZ16035	GASKET,7.5,7.5
7	1	BLZ6926	COUP,MALE,6,FLG,4-BLT
8	1	DEC128	DECAL,SAC,LOGO,NEW,4,5.625
9	1	DEC306	DECAL,GAGE,MNFLD
10	48	HOSIS6	HOSE,DIS,6,RED,150PSI
11	1	JACKEA2000	JACK,TOPWIND,15,2000LB
12	7	LM200013	ADPT,3,MP,CAM,GROOVE
13	2	LM200014	GASKET,RUBBER,LM,MNFLD
14	1	LM310372	CAP,END,COVER
15	1	LM380119	HOUSING,MNFLD,7
16	1	LM380121	CHOKE,SLIDE,7PORT
17	1	LM380129	SHAFT,WLD,1.25,1.75,MNFLD
18	1	LM380130	MOUNT,ACTUATOR,MANUAL
19	1	LM380178	COUP,6,HB,4BLT
20	1	NUT12LOCKSS	NUT,LOCK,NYLOCK,1/2,NC,SS
21	8	NUT12WHIZ	NUT,HEX,FLG,SERATED,1/2
22	1	NUT38LOCKNC	NUT,LOCK,3/8,NC,G5
23	19	NUT38NC	NUT,HEX,3/8,NC,G5
24	1	SELCR12339	SEAL,SHAFT,MNFLD,1.25
25	2	STI701996	CAP,3,CAM,GROOVE
26	19	WSH38LOCK	WSH,LOCK,3/8

5-7 PORT AUTO MANIFOLD PARTS BREAKDOWN



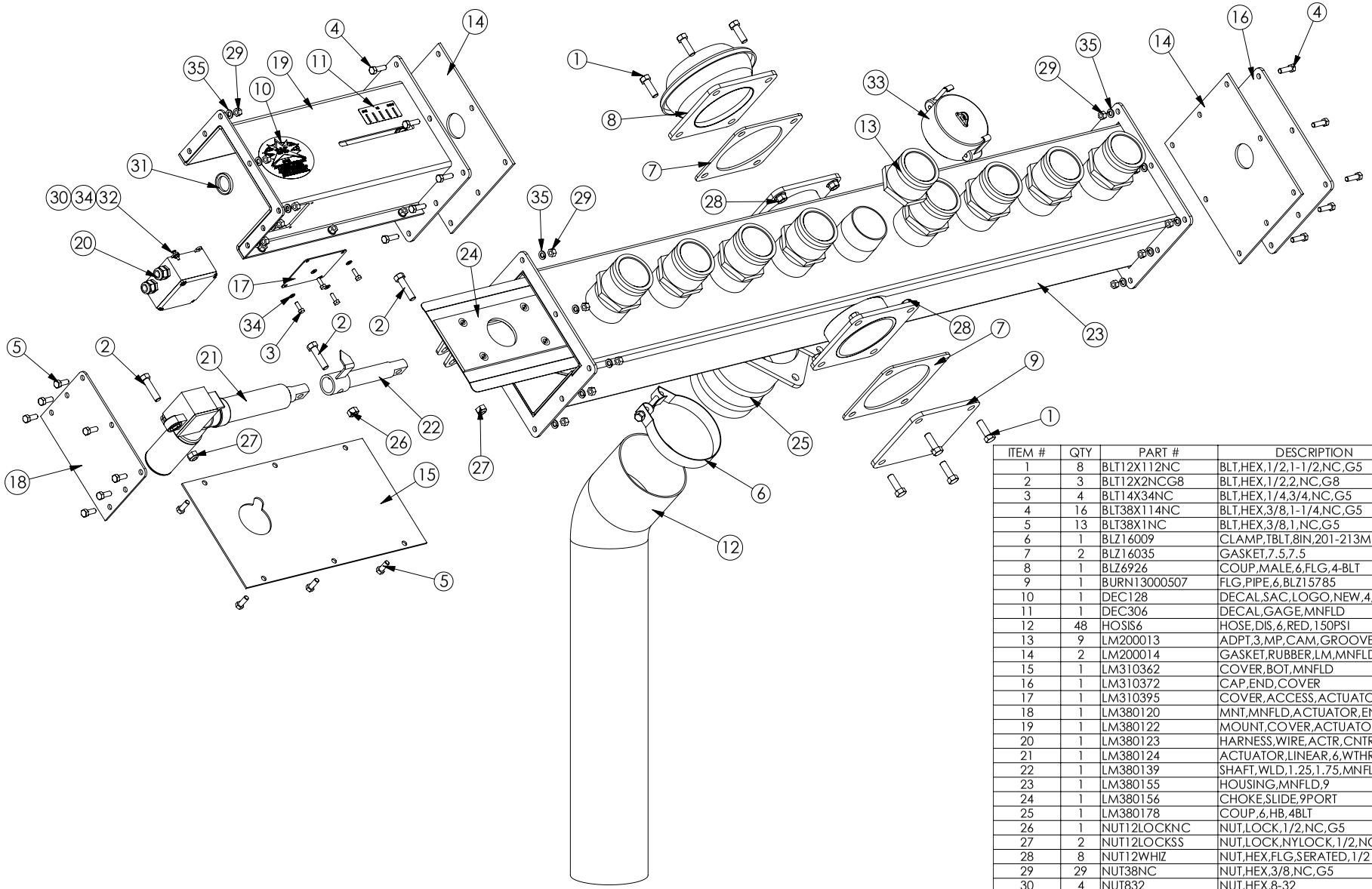
ITEM #	QTY	PART #	DESCRIPTION
1	8	BLT12X112NC	BLT,HEX,1/2,1-1/2,NC,G5
2	3	BLT12X2NCG8	BLT,HEX,1/2,2,NC,G8
3	4	BLT14X34NC	BLT,HEX,1/4,3/4,NC,G5
4	16	BLT38X114NC	BLT,HEX,3/8,1-1/4,NC,G5
5	13	BLT38X1NC	BLT,HEX,3/8,1,NC,G5
6	1	BLZ16009	CLAMP,TBLT,8IN,201-213MM
7	1	BLZ16035	GASKET,7.5,7.5
8	1	BLZ6926	COUP,MALE,6,FLG,4-BLT
9	1	DEC128	DECAL,SAC,LOGO,NEW,4,5.625
10	1	DEC306	DECAL,GAGE,MNFLD
11	48	HOSIS6	HOSE,DIS,6,RED,150PSI
12	7	LM200013	ADPT,3,MP,CAM,GROOVE
13	2	LM200014	GASKET,RUBBER,LM,MNFLD
14	1	LM310362	COVER,BOT,MNFLD
15	1	LM310372	CAP,END,COVER
16	1	LM310395	COVER,ACCESS,ACTUATOR
17	1	LM380119	HOUSING,MNFLD,7
18	1	LM380120	MNT,MNFLD,ACTUATOR,END
19	1	LM380121	CHOKE,SLIDE,7PORT
20	1	LM380122	MOUNT,COVER,ACTUATOR,END
21	1	LM380123	HARNESS,WIRE,ACTR,CNTRL
22	1	LM380124	ACTUATOR,LINEAR,6,WTHRPK
23	1	LM380139	SHAFT,WLD,1.25,1.75,MNFLD
24	1	LM380178	COUP,6,HB,4BLT
25	1	NUT12LOCKNC	NUT,LOCK,1/2,NC,G5
26	2	NUT12LOCKSS	NUT,LOCK,NYLOCK,1/2,NC,SS
27	8	NUT12WHIZ	NUT,HEX,FLG,SERATED,1/2
28	29	NUT38NC	NUT,HEX,3/8,NC,G5
29	4	NUT832	NUT,HEX,8-32
30	1	SELCR12339	SEAL,SHAFT,MNFLD,1.25
31	4	SPMB832X34	BLT,MACH,8-32,3/4
32	2	STI701996	CAP,3,CAM,GROOVE
33	8	WSH14LOCK	WSH,LOCK,1/4
34	29	WSH38LOCK	WSH,LOCK,3/8

8-9 PORT MANUAL MANIFOLD PARTS BREAKDOWN



ITEM #	QTY	PART #	DESCRIPTION
1	8	BLT12X112NC	BLT,HEX,1/2,1-1/2,NC,G5
2	1	BLT12X2NCG8	BLT,HEX,1/2,2,NC,G8
3	19	BLT38X114NC	BLT,HEX,3/8,1-1/4,NC,G5
4	1	BLT38X212NC	BLT,HEX,3/8,2-1/2,NC,G5
5	1	BLZ16009	CLAMP,TBLT,8IN,201-213MM
6	2	BLZ16035	GASKET,7.5,7.5
7	1	BLZ6926	COUP,MALE,6,FLG,4-BLT
8	1	BURN13000507	FLG,PIPE,6,BLZ15785
9	1	DEC128	DECAL,SAC,LOGO,NEW,4,5.625
10	1	DEC306	DECAL,GAGE,MNFLD
11	48	HOSIS6	HOSE,DIS,6,RED,150PSI
12	1	JACKEA2000	JACK,TOPWIND,15,2000LB
13	9	LM200013	ADPT,3,MP,CAM,GROOVE
14	2	LM200014	GASKET,RUBBER,LM,MNFLD
15	1	LM310372	CAP,END,COVER
16	1	LM380129	SHAFT,WLD,1.25,1.75,MNFLD
17	1	LM380130	MOUNT,ACTUATOR,MANUAL
18	1	LM380155	HOUSING,MNFLD,9
19	1	LM380156	CHOKE,SLIDE,9PORT
20	1	LM380178	COUP,6,HB,4BLT
21	1	NUT12LOCKSS	NUT,LOCK,NYLOCK,1/2,NC,SS
22	8	NUT12WHIZ	NUT,HEX,FLG,SERATED,1/2
23	1	NUT38LOCKNC	NUT,LOCK,3/8,NC,G5
24	19	NUT38NC	NUT,HEX,3/8,NC,G5
25	1	SELCR12339	SEAL,SHAFT,MNFLD,1.25
26	1	STI701996	CAP,3,CAM,GROOVE
27	19	WSH38LOCK	WSH,LOCK,3/8

8-9 PORT AUTO MANIFOLD PARTS BREAKDOWN



ITEM #	QTY	PART #	DESCRIPTION
1	8	BLT12X112NC	BLT,HEX,1/2,1-1/2,NC,G5
2	3	BLT12X2NCG8	BLT,HEX,1/2,2,NC,G8
3	4	BLT14X34NC	BLT,HEX,1/4,3/4,NC,G5
4	16	BLT38X114NC	BLT,HEX,3/8,1-1/4,NC,G5
5	13	BLT38X1NC	BLT,HEX,3/8,1,NC,G5
6	1	BLZ16009	CLAMP,TBLT,8IN,201-213MM
7	2	BLZ16035	GASKET,7.5,7.5
8	1	BLZ6926	COUP,MALE,6,FLG,4-BLT
9	1	BURN13000507	FLG,PIPE,6,BLZ15785
10	1	DEC128	DECAL,SAC,LOGO,NEW,4,5.625
11	1	DEC306	DECAL,GAGE,MNFLD
12	48	HOSIS6	HOSE,DIS,6,RED,150PSI
13	9	LM200013	ADPT,3,MP,CAM,GROOVE
14	2	LM200014	GASKET,RUBBER,LM,MNFLD
15	1	LM310362	COVER,BOT,MNFLD
16	1	LM310372	CAP,END,COVER
17	1	LM310395	COVER,ACCESS,ACTUATOR
18	1	LM380120	MNT,MNFLD,ACTUATOR,END
19	1	LM380122	MOUNT,COVER,ACTUATOR,END
20	1	LM380123	HARNESS,WIRE,ACTR,CNTRL
21	1	LM380124	ACTUATOR,LINEAR,6,WTHRPK
22	1	LM380139	SHAFT,WLD,1.25,1.75,MNFLD
23	1	LM380155	HOUSING,MNFLD,9
24	1	LM380156	CHOKE,SLIDE,9PORT
25	1	LM380178	COUP,6,HB,4BLT
26	1	NUT12LOCKNC	NUT,LOCK,1/2,NC,G5
27	2	NUT12LOCKSS	NUT,LOCK,NYLOCK,1/2,NC,SS
28	8	NUT12WHIZ	NUT,HEX,FLG,SERATED,1/2
29	29	NUT38NC	NUT,HEX,3/8,NC,G5
30	4	NUT832	NUT,HEX,8-32
31	1	SELCR12339	SEAL,SHAFT,MNFLD,1.25
32	4	SPMB832X34	BLT,MACH,8-32,3/4
33	1	STI701996	CAP,3,CAM,GROOVE
34	8	WSH14LOCK	WSH,LOCK,1/4
35	29	WSH38LOCK	WSH,LOCK,3/8

MANIFOLD ASSEMBLY INSTRUCTIONS

BASE MANIFOLD ASSEMBLY INSTRUCTIONS

1. Insert slide gate LM380121(7port) or LM380156(9 port) into the manifold housing LM380119(7port) or LM380155(9 port). Make sure mount is down and plastic is up. The slide should be installed between the tabs and top of the housing. Push the slide in until it is completely in the housing.

2. Turn male quick connect (LM200013) onto threaded outlet ports using some type of thread sealant. Use included quick connect caps (STI701996) to seal ports if not needed.

3. Cap end of manifold. Use (LM200014) gasket & (LM310372) end plate to cap one end of the housing. Place LM200014 between housing and LM310372 for seal. Use 3/8 x 1-1/4 bolts, lock washers, and nuts to fasten.

4. Assemble 6" hose quick connect to inlet of manifold. Use BLZ6926 and BLZ16035 to seal the connection. Use 1/2" x 1-1/2" bolts and 1/2" flange nuts to fasten.

5. Cap opposite inlet to manifold. Use BLZ1603, BURN13000507, 1/2" x 1-1/2" bolts, and 1/2" flange nuts.

6. Assemble clean out outlet. Clean out outlet must be located opposite side from 3" outlets. First attach clean out, either kit LM390047 (manual clean out) or LM390049 (auto clean out). Use 1/2 x 1-1/2" bolts and flange nuts to attach. Locate actuator of the clean out or manual handle up so valve can completely drain. Then bolt LM380178 with 1/2" x 1-1/2" bolts and flange nuts to clean out. After Slip 48" of red 6" flex hose over hose barb and clamp with BLZ16009.

NOTE: FOLLOW ONE OF THE FOLLOWING DIRECTIONS BASED ON WHICH MANIFOLD IS BEING ASSEMBLED.

MANUAL CONTROL ASSEMBLY INSTRUCTIONS

1. Insert LM380129 inside the end of JACKEA2000 use a 3/8" x 2-1/2" bolt and 3/8" lock nut to fasten.

2. Insert SELCR12339 into machined housing of LM380130. Use some standard grease to help with insertion as well as grease the inside of seal to help shaft slide easier.

3. Insert shaft end of the jack into the end hole of LM380130 and then through the seal. Jack may need to be extended to pass completely through. Fasten jack to LM380130 with three 3/8" x 1-1/4" bolts, lock washers, and nuts.

4. Fasten the shaft, connected to jack, to the slide mounts inside manifold housing. Slide LM200014 over shaft before fastening.. Use a 1/2" x 2" grade 8 bolt and lock nut to fasten shaft to the mounts on the slide.

5. Positioning LM200014 and the assembled LM380130 over mounting holes of the manifold housing, fasten using 3/8" x 1-1/4" bolts, lock washers, and nuts. Jack may be adjusted to help fasten.

ACTUATED CONTROL ASSEMBLY INSTRUCTIONS

NOTE: See Setting Limit Switch page in this manual before beginning the following assembly steps.

1. Mount LM380123 inside LM380122. The box should be mounted with the wire outlets pointed away from the seal housing. Use the box as a template for drilling holes into LM380122. Position box so it does not interfere with the actuator movement.

2. Fasten LM380120 to LM380124 using a 1/2" x 2" grade 8 bolt and lock nut. Use illustrations in this manual to determine orientation.

3. Fasten LM380139 to shaft end of LM380124 using a 1/2" x 2 grade 8 bolt and lock nut. Make sure shaft is positioned as in illustration with pointer up.

4. Insert SELCR12339 into machined housing of LM380122. Use some standard grease to help with insertion as well as grease the inside of seal to help shaft slide easier.

5. Fasten assembled LM380120 to LM380122. Start by sliding shaft through the hole the seal was placed in. Then use 3/8" x 1" bolts, lock washers, and nuts to fasten the two parts together.

6. Fasten shaft, connected to the actuator, to the slide inside manifold housing. Slide LM200014 over shaft before fastening. Use a 1/2" x 2" grade 8 bolt and locknut to fasten shaft to the mounts on the slide.

7. Connect plugs between LM380124 and LM380123. Then fasten LM310362 to the bottom of LM380124. Use 3/8" x 1" bolts, lock washers, and nuts to fasten. Route power cable out through hole in the bottom of LM310362.

8. Fine tune the limit switch on the actuator. See Limit Switch instructions to set. Limit Switch must be set properly before operation or permanent damage could be done to the actuator. After final setting the limit switches, fasten LM310395 to LM380122 with four 1/4" x 3/4" bolts and lock washers.

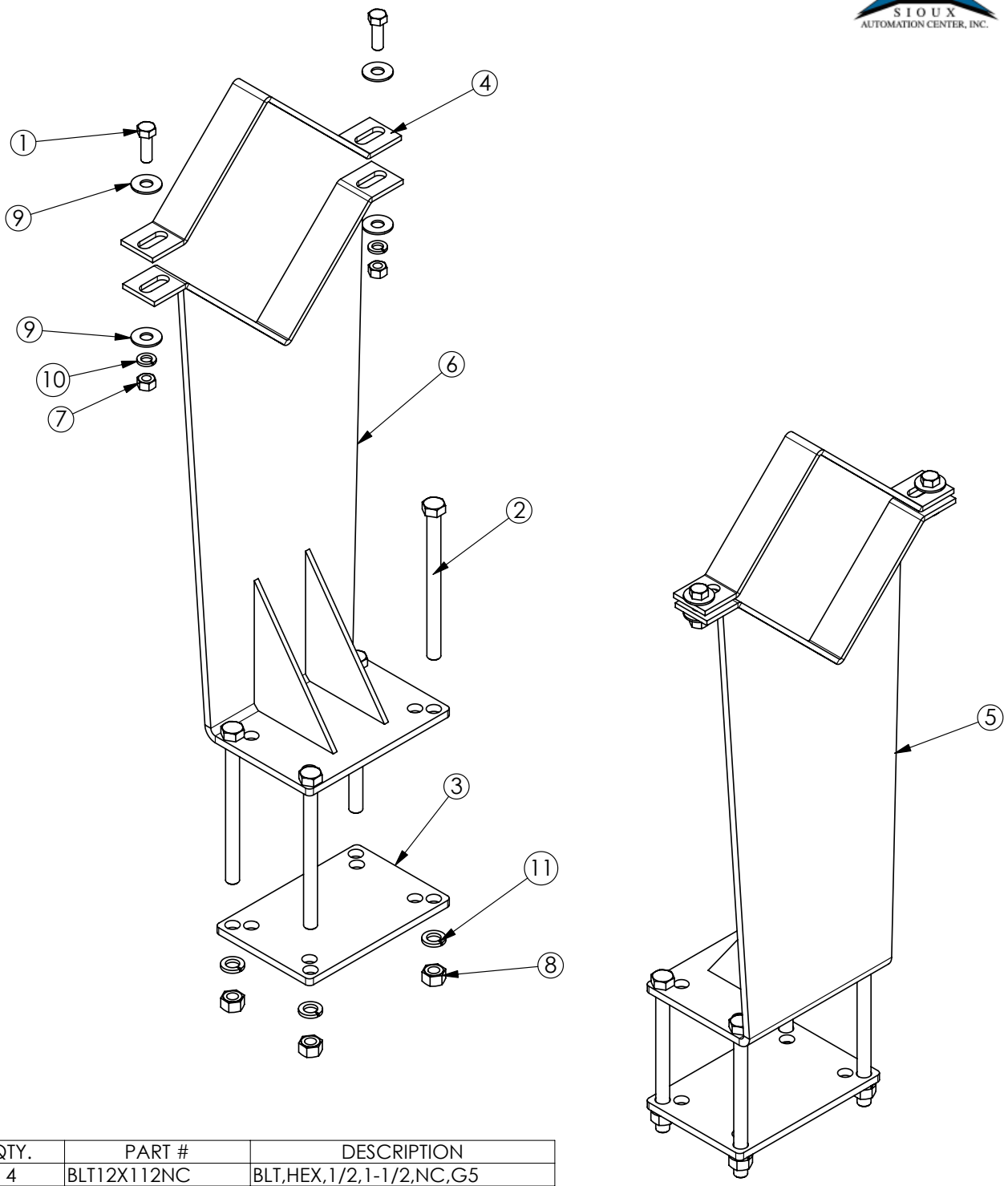
SETTING ACTUATOR LIMIT SWITCH

Follow the steps below for setting the limit switch in the electric actuator. The following steps must be followed to prevent permanent damage to the actuator.

Note: Do not install actuator into housing until instructed.

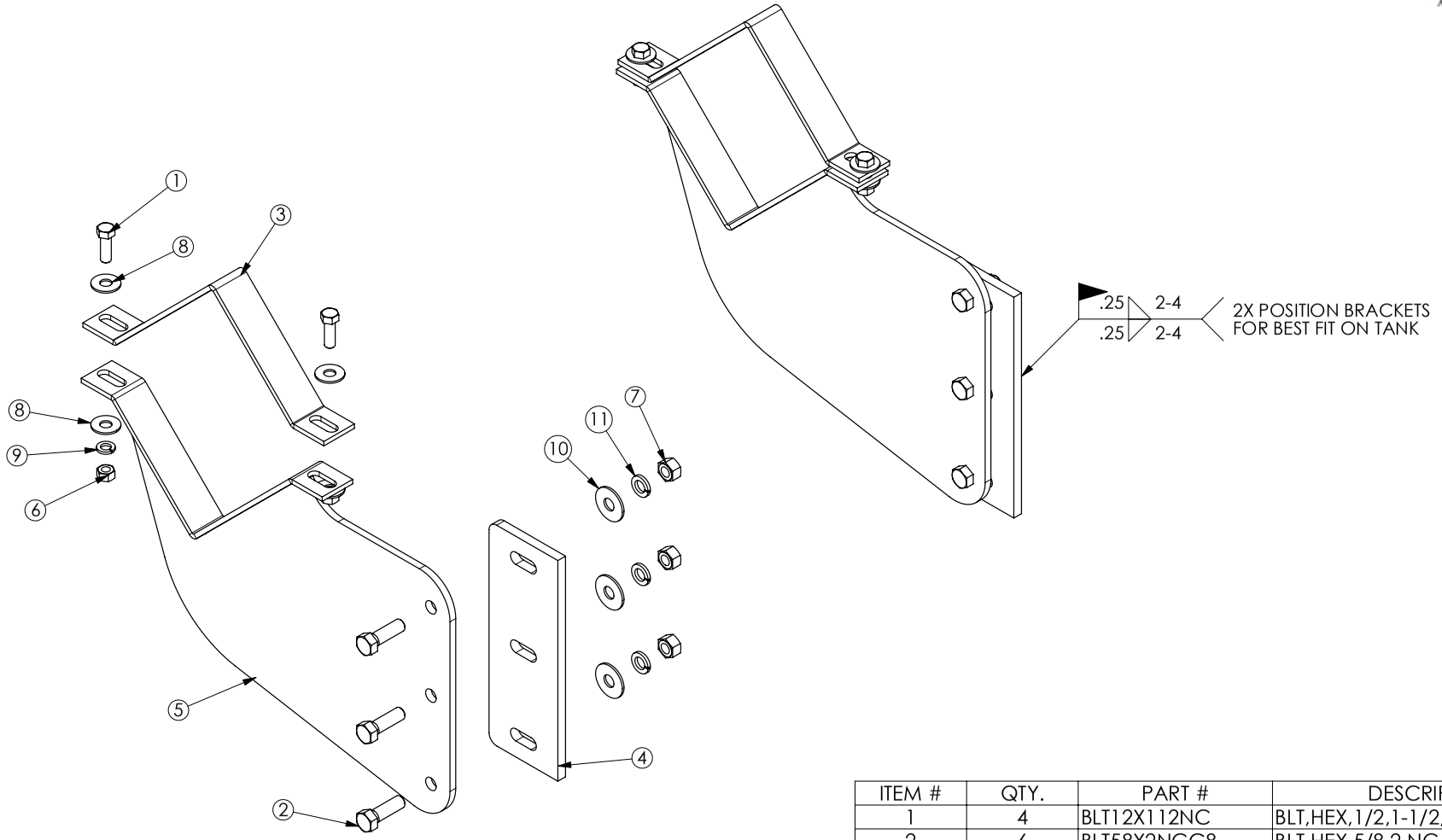
1. Properly connect & secure all connection between the relay box and actuator.
2. Extend the actuator until it reaches upper limit by supplying 12V DC power to (green wire) (be aware tube will spin until limit is hit).
3. Open limit switch cover (four Phillips screws).
4. Loosen Allen screw holding cam for extend limit switch with (Allen wrench size). Note: the extend limit switch will have black wire leads.
5. Retract actuator until item stops by supplying 12V DC power to (yellow wire) (tube will spin until limit is hit).
6. Rotate tube in or out to reach desired length (length center to center).
7. Extend actuator until it reaches desired length (center to center length).
8. Rotate & tighten extend limit cam (taken loose on step #4) until you here it activates extend limit, light clicking noise).
9. Extend and retract several times to ensure limit settings fall within tolerances.
10. Reinstall limit switch cover.
11. Install into manifold housing and secure with ½" bolts supplied.
12. Fully extend actuator and check several items.
    a. Proper manifold slide position.
        i. Remove one output hose on manifold.
        ii. Visually check to ensure slide plate has closed off material output.
        iii. Adjust extend limit switch as required to achieve required setting.
    b. Slide plate is not bottoming out against frame.
        i. Extend actuator until it stops.
        ii. Listen or use test light to ensure limit switch stops actuator movement not the manifold frame.
            1. Testing with test light or Digital Multi Meter (DMM) capable or reading DC volts 6-15Volts.
            2. Peel back loom covering the two wires going into the bottom side of actuator motor.
            3. Press and hold extend/decrease button.
            4. Poke through the wire insulation on one wire.
            5. Test light or DMM should not light or read zero volts.
            6. Poke through other wire to verify a reading of zero volts
        iii. Adjust extend limit switch as required to achieve required setting.
        iv. Improper setting will cause undue wear on actuator motor.
13. Fully retract actuator and check several items.
    a. Proper Manifold position.
        i. Output hole should be fully visible.
        ii. If adjustment is required refer to step 12.
    b. Slide Plate is not bottoming out again frame.
        i. Press and hold retract/increase button.
        ii. Refer to step 12 for testing & adjustment instructions.
14. Fully extend and retract actuator three times to ensure proper settings have been achieved.
15. Replace all covers and guards.
16. System is properly set and ready for operation.

TOOLBAR MOUNTING BRACKETS (6” OR 7” TUBE)



ITEM #	QTY.	PART #	DESCRIPTION
1	4	BLT12X112NC	BLT,HEX,1/2,1-1/2,NC,G5
2	8	BLT58X8NC	BLT,HEX,5/8,8,NC,G5
3	2	LM310232	BRKT,MNFOLD,TOOLBAR
4	2	LM310366-1	CLAMP,MANIFOLD,PNT
5	1	LM380126	MNT,MAN,RH,WLD
6	1	LM380127	MNT,MAN,LH,WLD
7	4	NUT12NC	NUT,HEX,1/2,NC,G5
8	8	NUT58NC	NUT,HEX,5/8,NC,G5
9	8	WSH12FLAT	WSH,FLAT,1/2
10	4	WSH12LOCK	WSH,LOCK,1/2
11	8	WSH58LOCK	WSH,LOCK,5/8

TANK MOUNTING BRACKETS



ITEM #	QTY.	PART #	DESCRIPTION
1	4	BLT12X112NC	BLT,HEX,1/2,1-1/2,NC,G5
2	6	BLT58X2NCG8	BLT,HEX,5/8,2,NC,G8
3	2	LM310366-1	CLAMP,MANIFOLD,PNT
4	2	LM310422	MNT,MNFLD,WAGON,WLD
5	2	LM380163	MNT,MNFLD,TANK,RR
6	4	NUT12NC	NUT,HEX,1/2,NC,G5
7	6	NUT58NCG8	NUT,HEX,5/8,NC,G8
8	8	WSH12FLAT	WSH,FLAT,1/2
9	4	WSH12LOCK	WSH,LOCK,1/2
10	6	WSH58FLATG8	WSH,FLAT,5/8,G8
11	6	WSH58LOCKG8	WSH,LOCK,5/8,G8

MANIFOLD MOUNTING INSTRUCTIONS

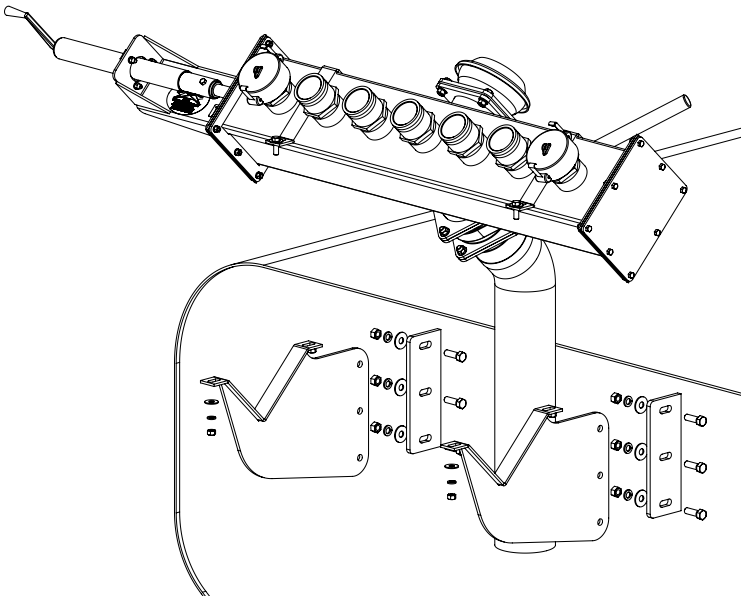
TANK MOUNTED MANIFOLD MOUNT

1. Locate the best position for the manifold on tank. Make sure brackets or manifold will not interfere with any incorporation mounts, or with the tank when bar is raised or lowered. Also determine position for best routing of supply and outlet hoses. Do not hinder and safety features of the tank or injector.

2. After determining the best position for the manifold, weld two LM310422 to the tank. Make sure the center to center spacing is that the manifold mounting brackets will fall between the ports of the manifold. The 3" manifold ports must be orientated up and to the rear of the tank.

3. Then bolt two LM380163 to each of the LM310422. Orientate the smooth side down and the "V" up. Use three 5/8" x 2" bolts, flat washers, lock washers, and nuts per side.

4. Seat manifold inside the "V" of the two LM380163. Then place two LM310366-1 over top and fasten. Use four 1/2" x 1-1/2" bolts with flat washers on top and bottom, lock washers, and nuts.

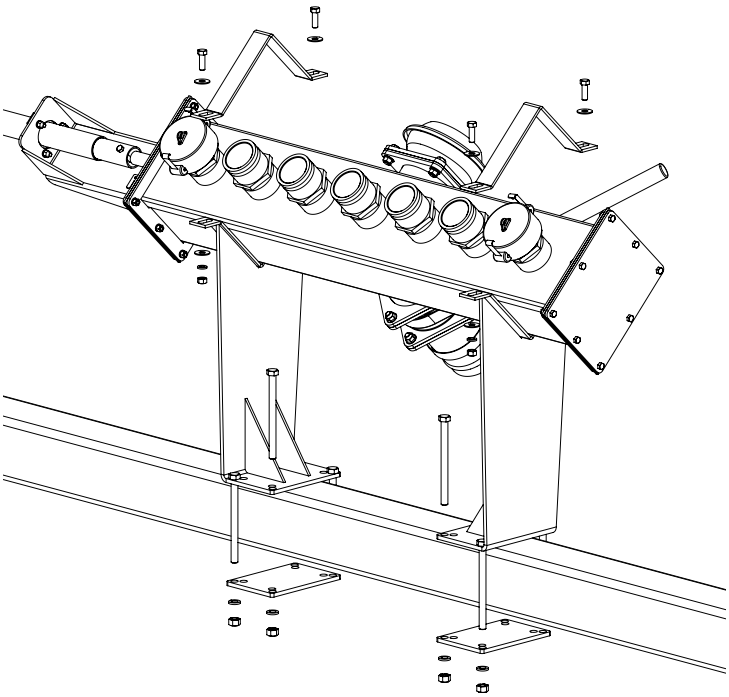


TOOLBAR MOUNTED MANIFOLD MOUNT

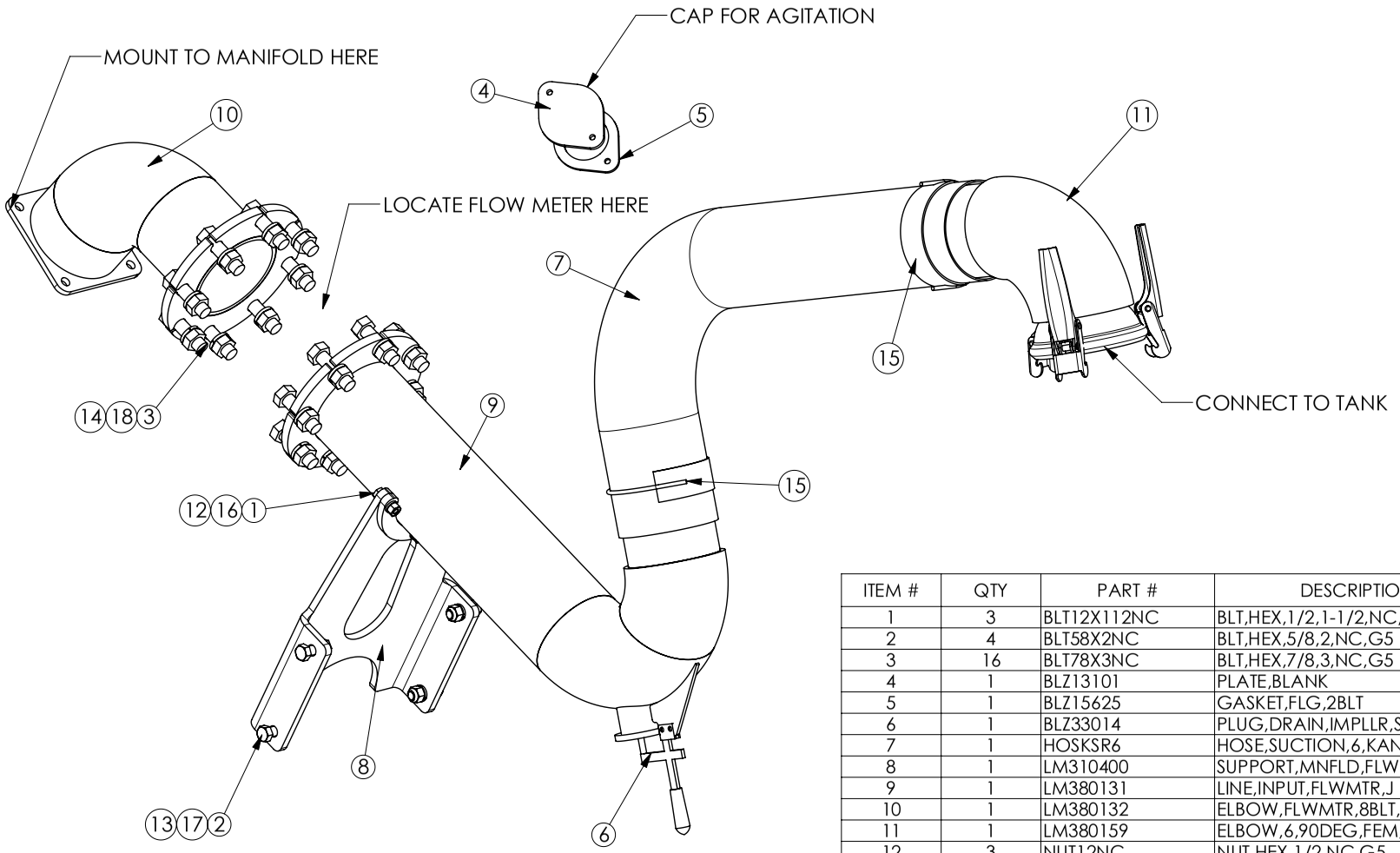
1. Locate the best position for the manifold on bar. Make sure brackets or manifold will not interfere with any incorporation mounts, or with the tank when bar is raised or lowered. Also determine position for best routing of supply and outlet hoses. Do not hinder and safety features of the tank or injector.

2. Before mounting brackets, determine the left and right mounting brackets. Looking from the rear of the injector, LM380126 is the left hand bracket and LM380127 is the right hand bracket. The gussets should be to the inside. Set brackets on toolbar and space so that mounts will fit between the ports of the manifold. Use two LM310232 from underneath the bar to attach LM380126 and LM380127 to the bar. Make sure to use the set of holes which will fit tightest to the tube. Fasten with four 5/8" x 8" bolts, lock washers, and nuts for each bracket.

3. Seat manifold inside the "V" of LM380126 and LM380127. Then place two LM310366-1 over top and fasten. Use four 1/2" x 1-1/2" bolts with flat washers on top and bottom, lock washers, and nuts.

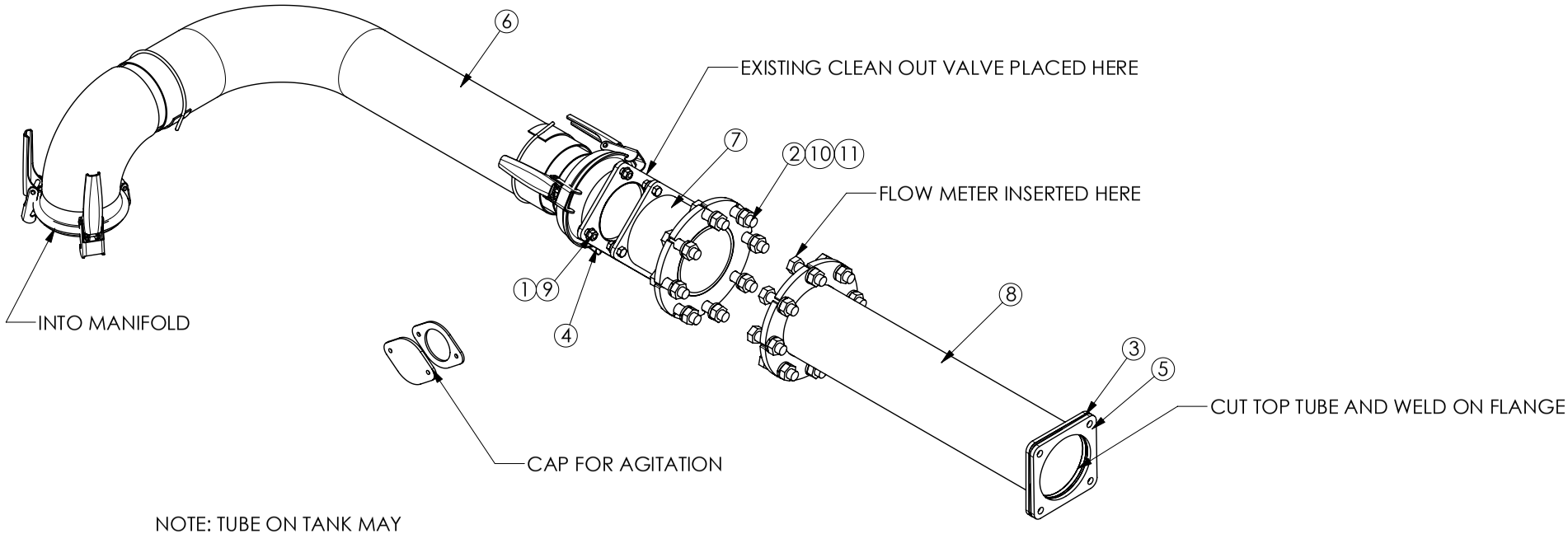


FLOW METER BRACKETS FOR SAC TRAILER



ITEM #	QTY	PART #	DESCRIPTION
1	3	BLT12X112NC	BLT,HEX,1/2,1-1/2,NC,G5
2	4	BLT58X2NC	BLT,HEX,5/8,2,NC,G5
3	16	BLT78X3NC	BLT,HEX,7/8,3,NC,G5
4	1	BLZ13101	PLATE,BLANK
5	1	BLZ15625	GASKET,FLG,2BLT
6	1	BLZ33014	PLUG,DRAIN,IMPLLR,SLURRY
7	1	HOSKSR6	HOSE,SUCTION,6,KANALINE
8	1	LM310400	SUPPORT,MNFLD,FLWMTR
9	1	LM380131	LINE,INPUT,FLWMTR,J
10	1	LM380132	ELBOW,FLWMTR,8BLT,4BLT
11	1	LM380159	ELBOW,6,90DEG,FEM,HB,SHRT
12	3	NUT12NC	NUT,HEX,1/2,NC,G5
13	4	NUT58NC	NUT,HEX,5/8,NC,G5
14	16	NUT78NC	NUT,HEX,7/8,NC,G5
15	2	SPPLC6	CLAMP,SPIRAL,6
16	3	WSH12LOCK	WSH,LOCK,1/2
17	4	WSH58LOCK	WSH,LOCK,5/8
18	16	WSH78LOCK	WSH,LOCK,7/8

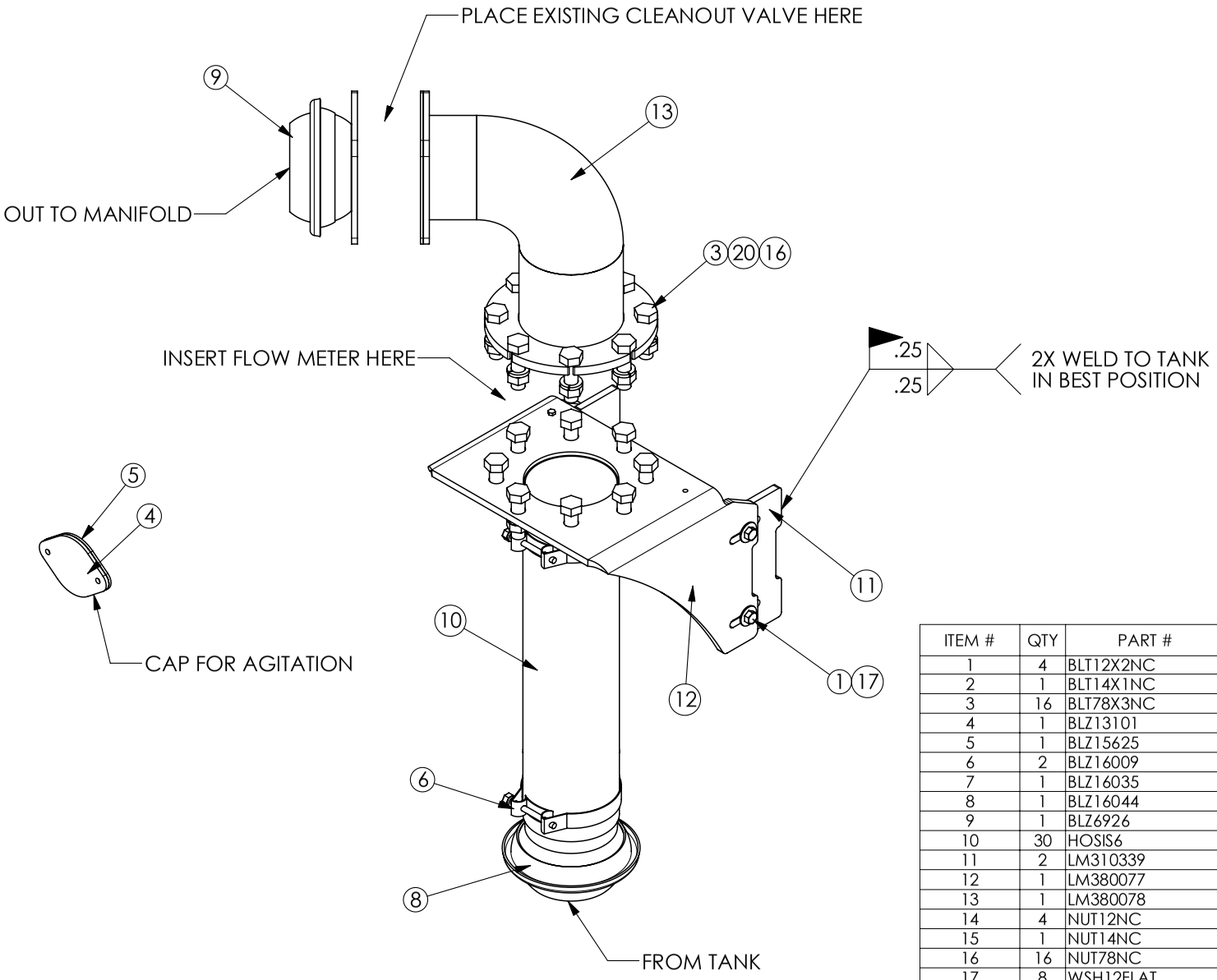
FLOW METER BRACKETS FOR TOP TANK MOUNT



NOTE: TUBE ON TANK MAY NEED TO BE RAISED FOR FLOW METER TO FIT PROPERLY

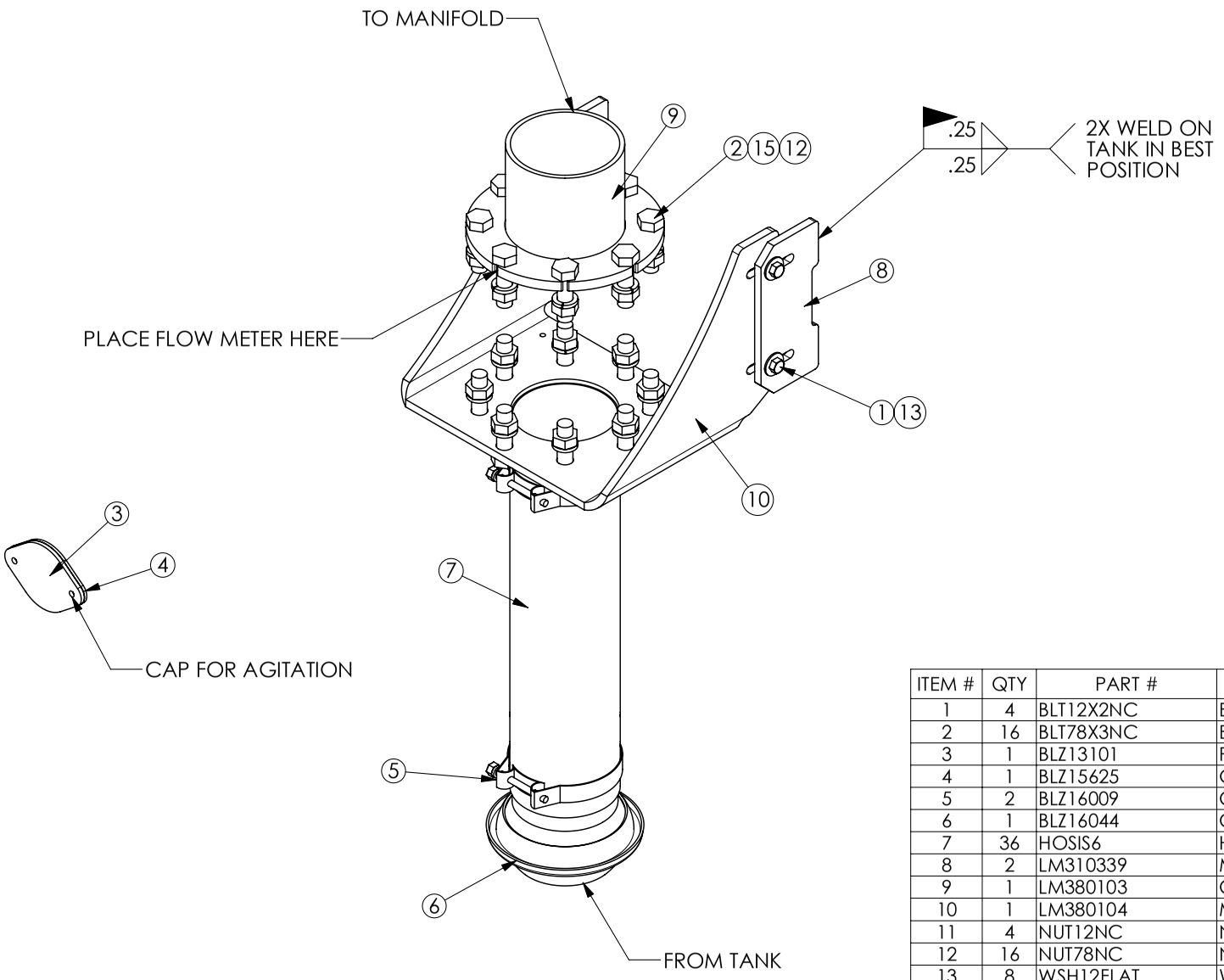
ITEM #	QTY	PART #	DESCRIPTION
1	8	BLT12X114NC	BLT,HEX,1/2,1-1/4,NC,G5
2	16	BLT78X3NC	BLT,HEX,7/8,3,NC,G5
3	1	BLZ16035	GASKET,7.5,7.5
4	1	BLZ6926	COUP,MALE,6,FLG,4-BLT
5	1	BURN13000030	FLG,PIPE,6
6	1	LM380161	HOSE,ASSY,6,48,F,90,F,STR
7	1	LM380162	MNT,FLWMTR,6,6,STR
8	1	LM380164	MNT,FLWMTR,6,30,STR,3OUT
9	8	NUT12WHIZ	NUT,HEX,FLG,SERATED,1/2
10	16	NUT78NC	NUT,HEX,7/8,NC,G5
11	16	WSH78LOCK	WSH,LOCK,7/8
12	1	BLZ13101	PLATE,BLANK
13	1	BLZ15625	GASKET,FLG,2BLT

FLOW METER BRACKETS FOR REAR MOUNT



ITEM #	QTY	PART #	DESCRIPTION
1	4	BLT12X2NC	BLT,HEX,1/2,2,NC,G5
2	1	BLT14X1NC	BLT,HEX,1/4,1,NC,G5
3	16	BLT78X3NC	BLT,HEX,7/8,3,NC,G5
4	1	BLZ13101	PLATE,BLANK
5	1	BLZ15625	GASKET,FLG,2BLT
6	2	BLZ16009	CLAMP,TBLT,8IN,201-213MM
7	1	BLZ16035	GASKET,7.5,7.5
8	1	BLZ16044	COUP,MALE,6
9	1	BLZ6926	COUP,MALE,6,FLG,4-BLT
10	30	HOSIS6	HOSE,DIS,6,RED,150PSI
11	2	LM310339	MOUNT,SPACER,FLWMTR,RR
12	1	LM380077	MOUNT,WAGON,FLWMTR,WLD
13	1	LM380078	COUP,FLG,FLWMTR,WLD
14	4	NUT12NC	NUT,HEX,1/2,NC,G5
15	1	NUT14NC	NUT,HEX,1/4,NC,G5
16	16	NUT78NC	NUT,HEX,7/8,NC,G5
17	8	WSH12FLAT	WSH,FLAT,1/2
18	4	WSH12LOCK	WSH,LOCK,1/2
19	1	WSH14LOCK	WSH,LOCK,1/4
20	16	WSH78LOCK	WSH,LOCK,7/8

FLOW METER BRACKETS FOR FRONT MOUNT



ITEM #	QTY	PART #	DESCRIPTION
1	4	BLT12X2NC	BLT,HEX,1/2,2,NC,G5
2	16	BLT78X3NC	BLT,HEX,7/8,3,NC,G5
3	1	BLZ13101	PLATE,BLANK
4	1	BLZ15625	GASKET,FLG,2BLT
5	2	BLZ16009	CLAMP,TBLT,8IN,201-213MM
6	1	BLZ16044	COUP,MALE,6
7	36	HOSIS6	HOSE,DIS,6,RED,150PSI
8	2	LM310339	MOUNT,SPACER,FLWMTR,RR
9	1	LM380103	COUP,FLG,FLWMTR,FR,WLD
10	1	LM380104	MOUNT,WAGON,FLWMTR,FR,WLD
11	4	NUT12NC	NUT,HEX,1/2,NC,G5
12	16	NUT78NC	NUT,HEX,7/8,NC,G5
13	8	WSH12FLAT	WSH,FLAT,1/2
14	4	WSH12LOCK	WSH,LOCK,1/2
15	16	WSH78LOCK	WSH,LOCK,7/8

INSTALLATION OF FLOW METER BRACKETS

Installation of Flow Meter Components

1. Remove existing manure plumbing setup AFTER pump.
2. Cap agitation line on tank with provided parts.
3. Locate flow meter bracket on tank wall, and it must fall within these parameters.
    1. Flow meter requires a ***straight line run into and exit ing meter for proper accuracy.*** All measurements are from flow meter center.
    2. Input length must be no less than five times hose diam eter.
    3. Output length must be no less than two times hose diameter.
4. Plumb in new parts per assembly details.
5. Ensure directional flow arrow on flow meter is pointing proper direction of material flow.
6. Check to ensure Flow meter control wires are pointed down. Thus preventing water from entering control box. If not please contact Sioux Automation Inc.

Installation of Flow Meter Brackets on SAC Trailer

1. Remove 6” male quick connector on top of manifold and replace with LM380132.

2. Fasten flowmeter to LM380132. Use 7/8” x 3” bolts, lock washers, and nuts. Make sure flow arrow is pointing towards the manifold. Do not locate the extrusion on flowmeter vertical.

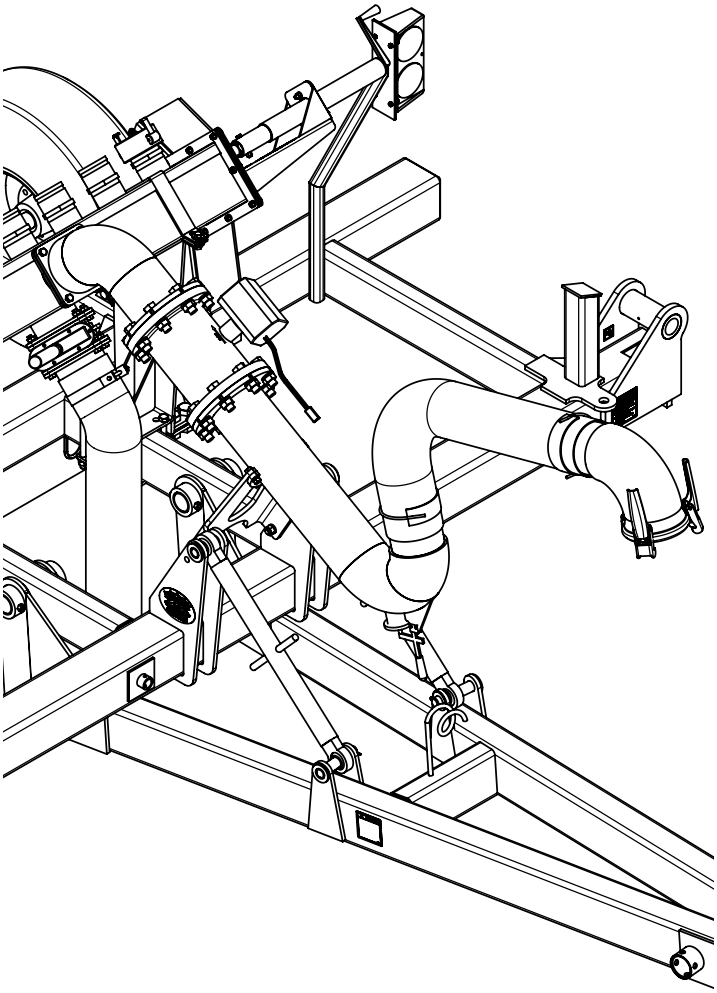
3. Fasten LM310400 to SAC trailer. Place LM310400 between tierod mounts and fasten with four 5/8” x 2” bolts, lock washers, and nuts.

4. Next fasten LM380131 to the flowmeter with the outlet pointed vertical. Use 7/8” x 3” bolts, lock washers, and nuts to fasten. Then attach LM380131 to LM310400 using three 1/2” x 1-1/2” bolts, lock washers, and nuts.

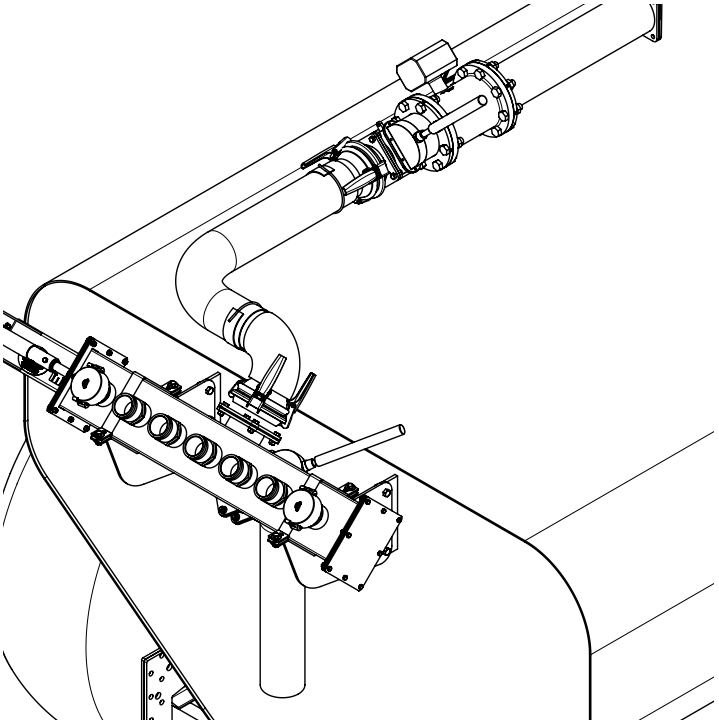
5. Install BLZ33014 at the bottom of LM380131. After installation, lock cap tight to seal tube. Make sure cap is centered over outlet.

6. Install 6” hose over outlet on LM380131 and clamp. Attach LM380159 to the other end of the hose and clamp. Finally connect LM380159 to tank outlet.

7. Remove agitation hose from tank and cap agitation line.



INSTALLATION OF FLOW METER BRACKETS



Installation of Flow Meter Brackets Top of Tank

Top mounted flow meter will only work with pumps mounted to the front of the tank.

1. Remove agitation hose from tank and cap agitation line with supplied cap (BLZ13101) and gasket (BLZ15625).

2. Lay out all components as shown in the illustration and parts breakdown drawing. Estimate the assembly length with flexible hose included. Measure and cut off the 6" hard line on top of the tank so flow meter components can be installed.

Note: 6" hard line hose must be spaced far enough above tank so that the bolt flange of the flow meter clears. Line may need to be raised to accomplish this.

3. Weld the four bolt flange (BURN13000030) on to the end of the 6" hard line cut off on the top of the tank. After welding repaint unpainted areas to prevent corrosion.

4. Bolt the four bolt flange end of LM380164 to the welded on flange. Use gasket (BLZ16035) to seal connection. Fasten with four 1/2" x 1-1/4" bolts, lock washers, and nuts.

5. Mount the flow meter to LM380164. Make sure extrusion on flow meter is not pointing straight up. Rotate extrusion minimum of a 45 degree angle. Use eight 7/8" x 3" bolts, lock washers, and nuts.

6. Mount LM380162 to the other end of the flow meter. Use eight 7/8" x 3" bolts, lock washers, and nuts.

Note: Custom brackets may need to be made to help support flow meter brackets

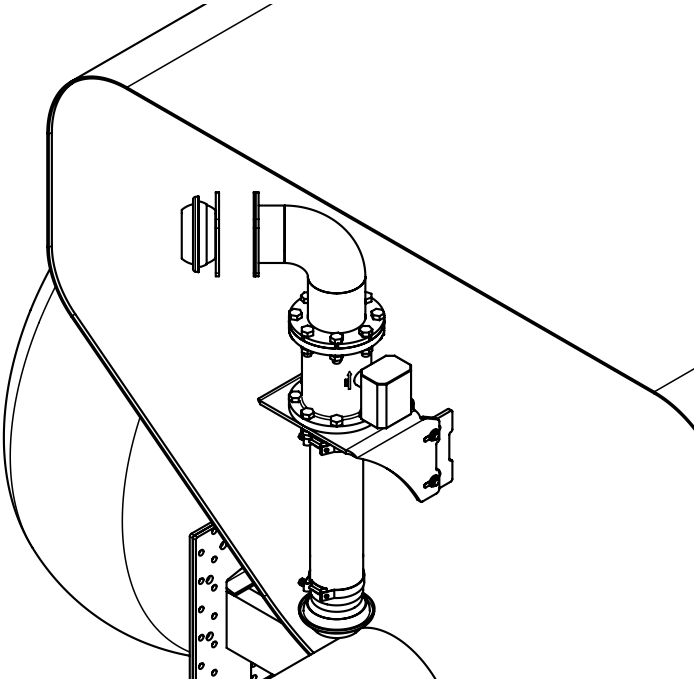
7. Install removed gate valve from original tank equipment. Mount to four bolt flange of LM380162.

8. Fasten four bolt flange male quick coupler to LM380162 or gate valve if used. Use four 1/2" x 1-1/4" bolts, lock washers, and nuts.

9. Connect 6" flexible hose (LM380161) between manifold and flow meter assembly. Elbow connects to manifold and straight end connects to quick coupler.

INSTALLATION OF FLOW METER BRACKETS

Installation of Flow Meter Brackets Rear of Tank



1. Position two weld on brackets (LM310339) so that the flow meter mount (LM380077) can be bolted 24” directly above pump. Weld brackets in place and fasten LM380077 with four 1/2” x 2 bolts, flat washers, lock washers, and nuts.

2. Assemble hose to connect flow meter mount (LM380077) with pump. Assemble quick connect fitting (BLZ16044) onto the 6” flexible hose (HOSIS6) and connect to pump outlet. Fasten other end to LM380077. Use two 6” hose clamps, one for each end.

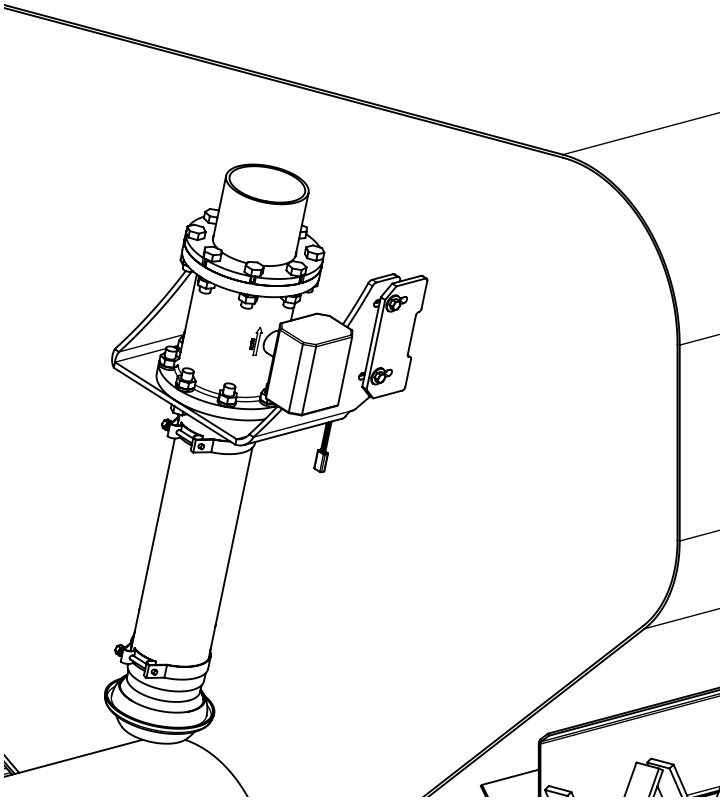
3. Mount flow meter to top of LM380077. Fasten with 7/8” x 3” bolts, lock washers, and nuts. Be sure that the flow direction arrow on the flow meter is pointing up.

4. Fasten elbow (LM3800078) to the top of the flow meter. Use 7/8” x 3” bolts, lock washers, and nuts. Make sure to point elbow in the direct best suited for routing the outlet hose.

5. If applicable, reinstall clan out valve to elbow. Other wise mount (BLZ6926) quick coupler to flange on elbow or clean out valve.

6. Connect quick connect to manifold with 6” hose.

Installation of Flow Meter Brackets Front of Tank



1. Position two weld on brackets (LM310339) so that the flow meter mount (LM380104) can be bolted 24” directly above pump. Weld brackets in place and fasten LM380104 with four 1/2” x 2 bolts, flat washers, lock washers, and nuts.

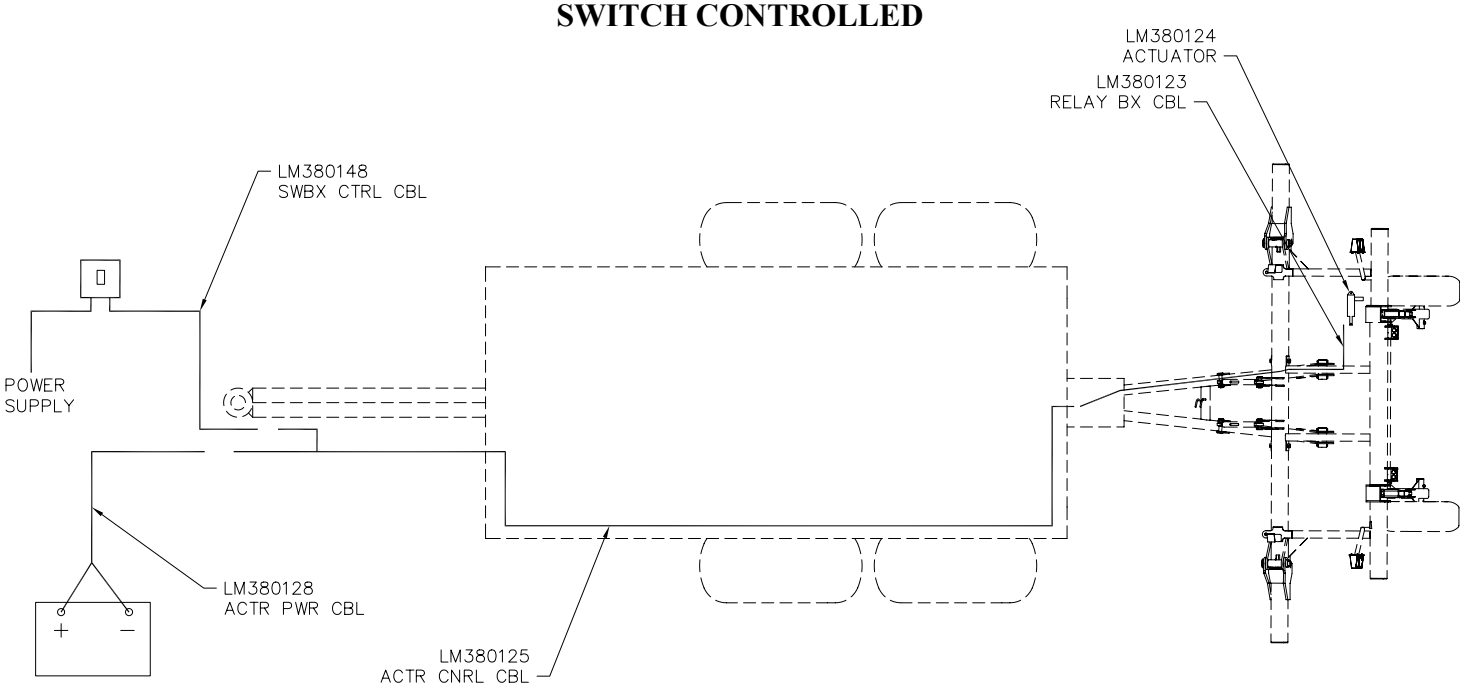
2. Assemble hose to connect flow meter mount (LM380104) with pump. Assemble quick connect fitting (BLZ16044) onto the 6” flexible hose (HOSIS6) and connect to pump outlet. Fasten other end to LM380104. Use two 6” hose clamps, one for each end.

3. Mount flow meter to top of LM380104. Fasten with 7/8” x 3” bolts, lock washers, and nuts. Be sure that the flow direction arrow on the flow meter is pointing up.

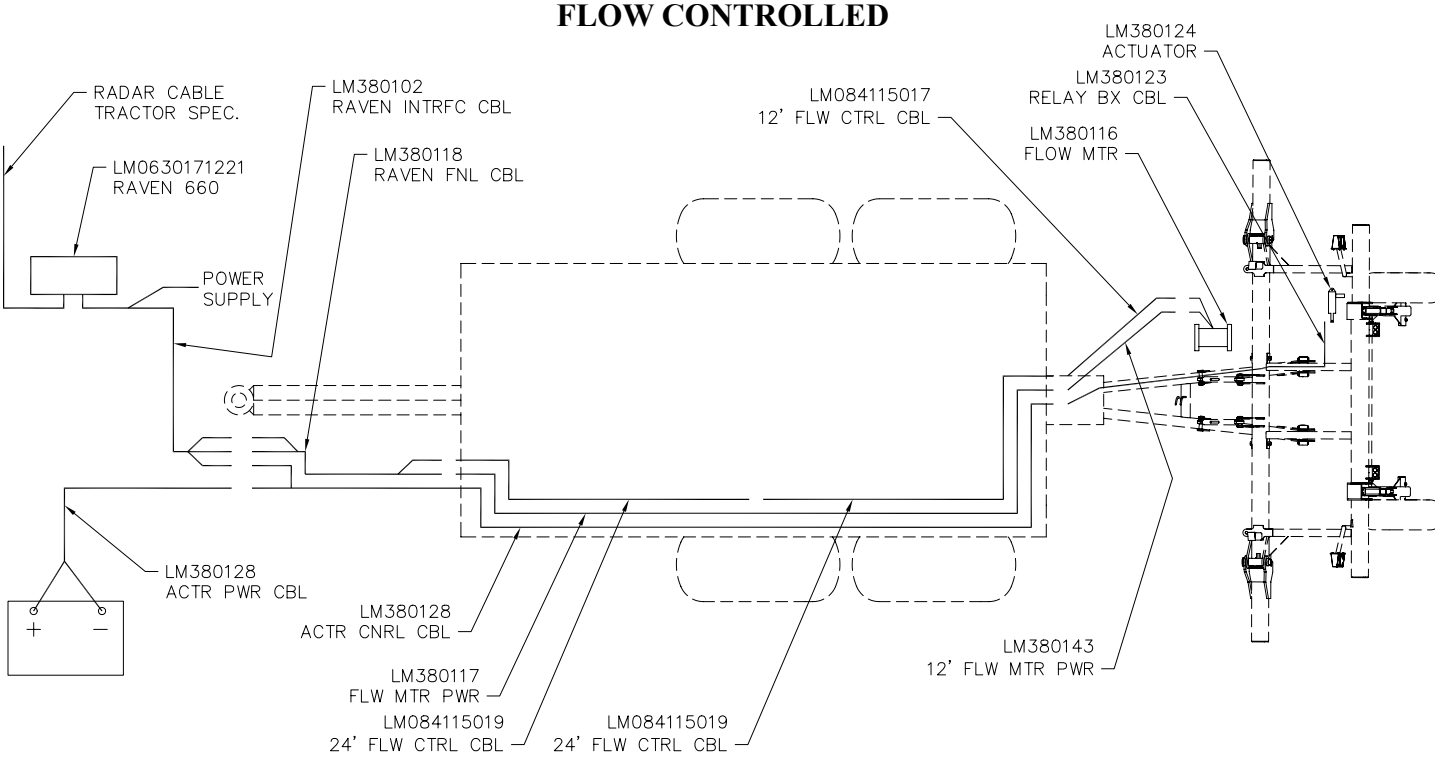
4. Fasten straight flange (LM380103) to the top of the flow meter. Use 7/8” x 3” bolts, lock washers, and nuts. Make sure to point elbow in the direct best suited for routing the outlet hose.

5. Connect LM380103 to hard line hose on top of tank.

SWITCH CONTROLLED



FLOW CONTROLLED



WIRING HARNESS INSTALLATION

Route wire harnesses as shown above. Keep wire harnesses clear of any pinch points. Secure plug connections at hitches and where ever nessessary. Power will need to be accessed from tractors battery.

BEFORE OPERATION

Before operation check the following.
-Check that all hoses are connected securely and are routed so they can not be pinched. Check hoses for cracks or have if they have been punctured. Replace any damaged components. Also check if any hoses are plugged with debris.
-Make sure manifold has been cleared of any debris that may be trapped inside. Use the 6” clean out or unfasten the end cap of the manifold to inspect housing.
-If equipped, check wiring harnesses and connections. Make sure connections are secure and wires are routed safely.
-Read all manuals before operating for the first time and before seasonal use. Including controller, flow meter, injector, and manifold manuals.

OPERATION

MANUAL ACTUATED
Adjust jack on manifold open or closed to help reach the desired flow rate. Based on tank size in gallons versus the distance needed to unload. Opening will increase gallons per acre, while closing will decrease the gallons per acre.

ACTUATED WITH SWITCH CONTROL
Use the momentary switch in the cab to open or close the slide in the manifold to reach the desired flow rate. Based on tank size in gallons versus the distance needed to unload. Adjustment to the slide may be made at anytime during the unloading.

ACTUATED WITH FLOW CONTROL
Use the a controller to adjust the actuator to a set amount of gallons per acre. Controllers will vary with setup, please inquire the controller manual or company representative for proper controller setup.

AFTER OPERATION

Open the 6” clean out after operation to remove all manure from housing. If manure is left in the housing during low temperatures, it could possibly freeze and damage the manifold. Inspection of the housing is also recommended. Plastic and other debris may accumulate inside the housing and need to be cleared out of the manifold routinely. Debris could cause uneven flow thru the outlet ports as well.

Installation of Raven Controller & Harnesses

Note: Any and all information listed here may be superseded at anytime. Be sure to fully read and understand Raven Controller Installation and Service Manual. (Granular Application)

1. Mount 660 Controller inside cab at a readily visible and accessible position. (Hardware not included)
2. Determine boom switch location. Must be within six feet of controller. Switch is used start/stop meter flow in the field.
3. Ensure there are no parts that will interfere with switch location. (Ex. Existing wires or circuit boards.)
4. Drill one 7/16 hole, and secure switch in location.
5. Route controller cable to 660 controller and other end down to tractor hitch.
6. Route required wires for boom switch to the newly installed switch and hookup per drawing specifics. Wires are located in console cable wire harness.
7. Route Power supply wires (Red & White) to 12 Volt DC & grounding location.
8. Route & hook up speed sensor harness to 660 Controller. (Customer specific)(Ex. Radar, GPS, or wheel magnets)
9. Route & secure Final cable from hitch along tongue.
10. Hook up 2-way flat connector in Final cable to Valve control located on hose apron.
11. Hook up flow control cable to at the end of the Final cable.
12. Route and secure flow control cable along inside of tank frame. Do not allow cables to droop or hang allowing for catch points. Loop excess length under frame. (Front mount pumps skip to step 13.)
13. Connect to Flow meter
14. Repeat steps 11-13 for flow meter power cable.

Initial Console Programming

When system is first powered up the console will flash informing applicator to program console. Once these steps are completed it will be retained in memory.

The following information is specific for liquid manure applications.

1. US-Volume per acre
2. SP2-Radar speed sensor. Unless using wheel magnets
3. GR1-Single Bed Belt
4. C-F-Fast Valve
5. Boom 1 – Width Determined by number of shanks multiplied by the spacing in inches. (Ex. 5 shanks on 30 inch spacing, boom width will be 150)
6. Boom 2 – Width will be zero
7. Speed Cal – start with 598 This will need to be tested to ensure accuracy. Refer to 660 Controller Manual for steps on checking accuracy.
8. Meter Cal – 50 (Determined by tag on Flow Meter cable)
9. Valve Cal – 743
10. Rate 1 – User specified in Gallons per acre (GPA)
11. Rate 2 – User specified in GPA

Once this is completed the flashing “CAL” will stop. The console is now programmed. Once all programming information is verified as accurate write down these numbers on tag located in Raven Controller Manual, and keep in a safe place for any future reference.

Maintenance

- Refer to Owners Manual for Raven Controller for all maintenance information.
- Refer to Owners Manual for Krohne Flow Meter for all maintenance information.
- When washing down system do not allow direct strike with power washer on flow meter control box. May break seal on control box and damage system. Hand wash is preferred to prevent damage.
- When system is not to be used for extended periods of time take steps to protect control box from direct exposure to sunlight.

QUALITY PEOPLE, QUALITY PRODUCTS

SAC • Sioux Automation • 877 1st Ave NW • Sioux Center, IA 51250
PH: (712-722-1488) • Toll Free: 1-866-722-1488
www.siouxautomation.com