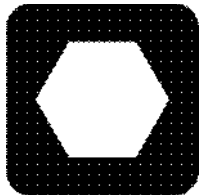


FM13V

Parts Manual



Ditch Witch®


FM13V

ISSUE NO. 02PL-05/11

For Replacement Copy Order **P/N 053-2253**

This manual contains information concerning the following models:
FM13V

Copyright 2010, 2011 by The Charles Machine Works, Inc.

 , Ditch Witch, CMW, AutoCrowd, Jet Trac, Roto Witch, Subsite, Fluid Miser, Power Pipe, Super Witch, Pierce Arrow, Zahn, The Underground, and The Underground Authority Worldwide are registered trademarks of The Charles Machine Works, Inc.

ID0258759

FOREWORD

This manual contains illustrated parts lists to help you select quality ProTech[®] Replacement parts for your Ditch Witch[®] equipment. Using other replacement parts will lessen the productivity of your equipment.

- ◆ Part numbers enclosed in a box are no longer available from The Charles Machine Works, Inc. Your local Ditch Witch dealer may be able to locate the part for you.
- ◆ Footnotes provide more information to help you identify parts shown in the manual.
- ◆ Assembly instructions and Tech Bits articles referenced in footnotes are available through your local Ditch Witch dealer.
- ◆ Description and specifications in this book were current at publication. However, The Charles Machine Works, Inc. reserves the right to improve equipment, so this manual might not reflect the most current improvements.
- ◆ Instructions on recommended equipment use and maintenance are in the Operator's Manual that was shipped with your equipment.

Keep the following in mind when ordering ProTech replacement parts:

- ◆ Specify parts you need by part number and description, not by illustration reference numbers.
- ◆ Have equipment model and serial number on hand to help ensure you get the right parts for your machine whether it's old or new.

Thank you for buying and using Ditch Witch equipment and ProTech replacement parts.

WARRANTY

DW WARRANTY Policy
July, 2005

POLICY 1: DITCH WITCH® EQUIPMENT AND REPLACEMENT PARTS LIMITED WARRANTY POLICY

Subject to the limitation and exclusions herein, free replacement parts will be provided at any authorized Ditch Witch dealership for any Ditch Witch equipment or parts manufactured by The Charles Machine Works, Inc. (CMW) that fail due to a defect in material or workmanship within one (1) year of first commercial use (Exception: 2 years for all SK500 Attachments). Free labor will be provided at any authorized Ditch Witch dealership for installation of parts under this warranty during the first year following "initial commercial" use of the serial numbered Ditch Witch equipment on which it is installed. The customer is responsible for transporting their equipment to an authorized Ditch Witch dealership for all warranty work.

EXCLUSIONS FROM PRODUCT WARRANTY

- All incidental or consequential damages.
- All defects, damages, or injuries caused by misuse, abuse, improper installation, alteration, neglect, or uses other than those for which products were intended.
- All defects, damages, or injuries caused by improper training, operation, or servicing of products in a manner inconsistent with manufacturer's recommendations.
- All engines and engine accessories (these are covered by original manufacturer's warranty).
- Tires, belts, and other parts which are subject to another manufacturer's warranty. (Such warranty will be available to purchaser.)
- ALL IMPLIED WARRANTIES NOT EXPRESSLY STATED HEREIN, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY.

IF THE PRODUCTS ARE PURCHASED FOR COMMERCIAL PURPOSES, AS DEFINED BY THE UNIFORM COMMERCIAL CODE, THEN THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE HEREOF AND THERE ARE NO IMPLIED WARRANTIES OF ANY KIND WHICH EXTEND TO A COMMERCIAL BUYER. ALL OTHER PROVISIONS OF THIS LIMITED WARRANTY APPLY INCLUDING THE DUTIES IMPOSED.

Ditch Witch products have been tested to deliver acceptable performance in most conditions. This does not imply they will deliver acceptable performance in all conditions. Therefore, to assure suitability, products should be operated under anticipated working conditions prior to purchase.

Defects will be determined by an inspection within thirty (30) days of the date of failure of the product or part by CMW or its authorized dealer. CMW will provide the location of its inspection facilities or its nearest authorized dealer upon inquiry. CMW reserves the right to supply remanufactured replacement parts under this warranty as it deems appropriate.

Extended warranties are available upon request from your local Ditch Witch dealer or CMW.

Some states do not allow exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply. Further, some states do not allow exclusion of or limitation of how long an implied warranty lasts, so the above limitation may not apply. This limited warranty gives product owner specific legal rights and the product owner may also have other rights which vary from state to state.

For information regarding this limited warranty, contact CMW's Product Support Department, P.O. Box 66, Perry, OK 73077-0066, or contact your local Ditch Witch dealer.

CONTENTS

FM13V

3" Centrifugal Pump - FM13V	34
500 Gal Tank & Plumbing - FM13V.....	36
500 Gal Tank Fill Plumbing - FM13V/FM25 ...	38
1000 Gal Tank Assembly - FM13V/FM25	40
1000 Gal Tank Plumbing - FM13V	40
Battery & Cables	30
Decal Location	8
Decal Location - FM13V/FM25 500g	10
Decal Location - FM13V/FM50/FM25 1000g	12
Electrical Schematic - FM13V	50
Engine - FM13V	32
Engine & Pump Mount - FM13V.....	22
FM13V Harness	46
FM50 Tank Fill Plumbing	44
Fuel Tank and Battery Mount - Begins	24
Fuel Tank and Battery Mount - Begins/Ends .	26
Fuel Tank and Battery Mount - Ends	28
Hopper - FM5/FM13/FM13V/FM25	14
Hopper Base - FM13V/FM25	16
Hopper Installation - FM13V.....	18
Platform Installation - FM13V	20
Umbrella Mount - FM13V	54

Accessories

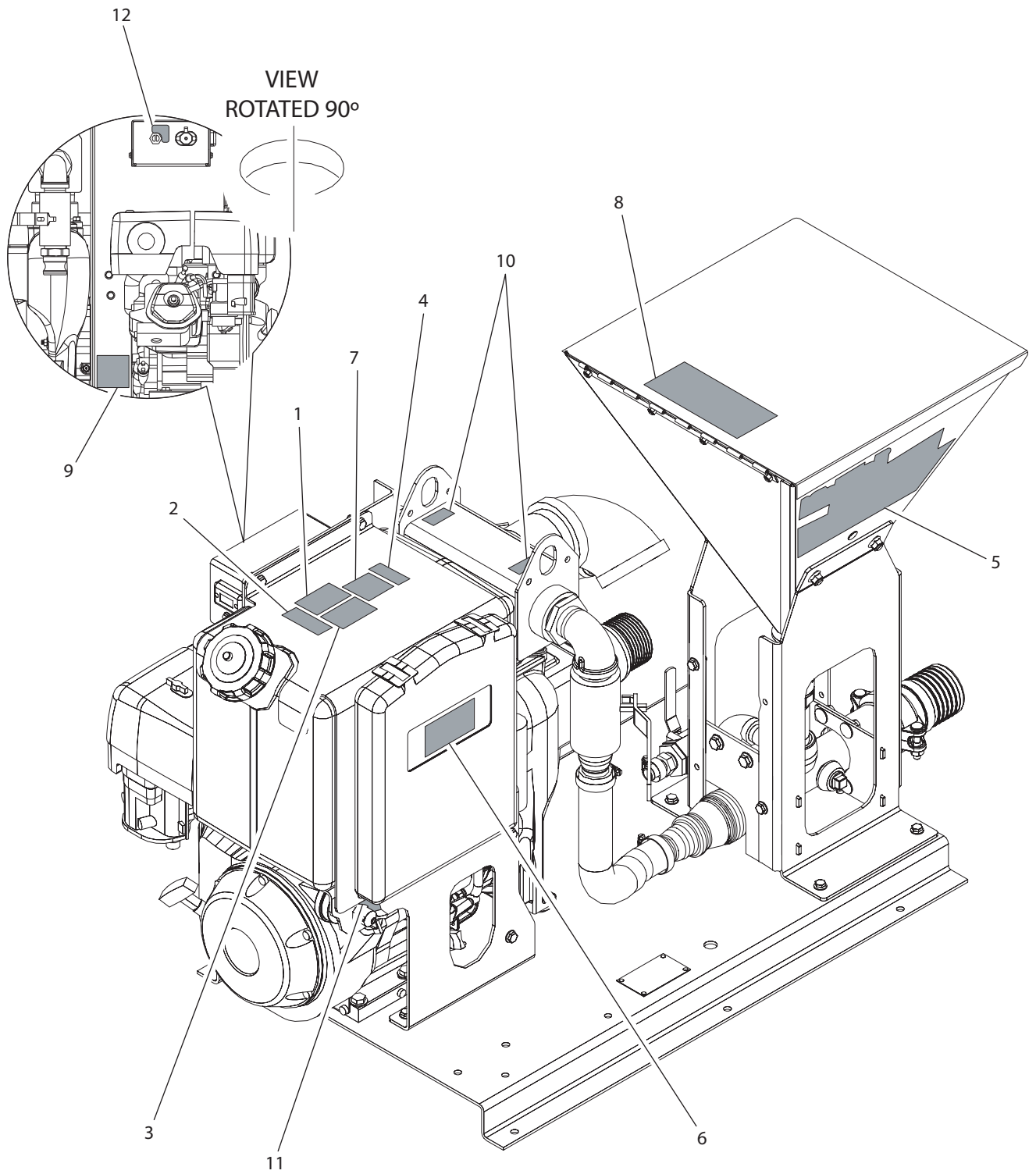
Drilling Fluid Transfer.....	64
Fluid Coupler Adapters	66
Fluid Mixing Accessories.....	58
Garden Hose Adapter	62
Water Transfer System.....	60

Miscellaneous

Bolt/Nut Torque Chart.....	70
Filters	75
Optional Kits	76
Parts Manual Change Request	77
Related Publications	74
Replacement O-Ring Chart.....	73
Warranty Registration	79

FM13V FLUID MIXER

DECAL LOCATION FM13V



DECAL LOCATION

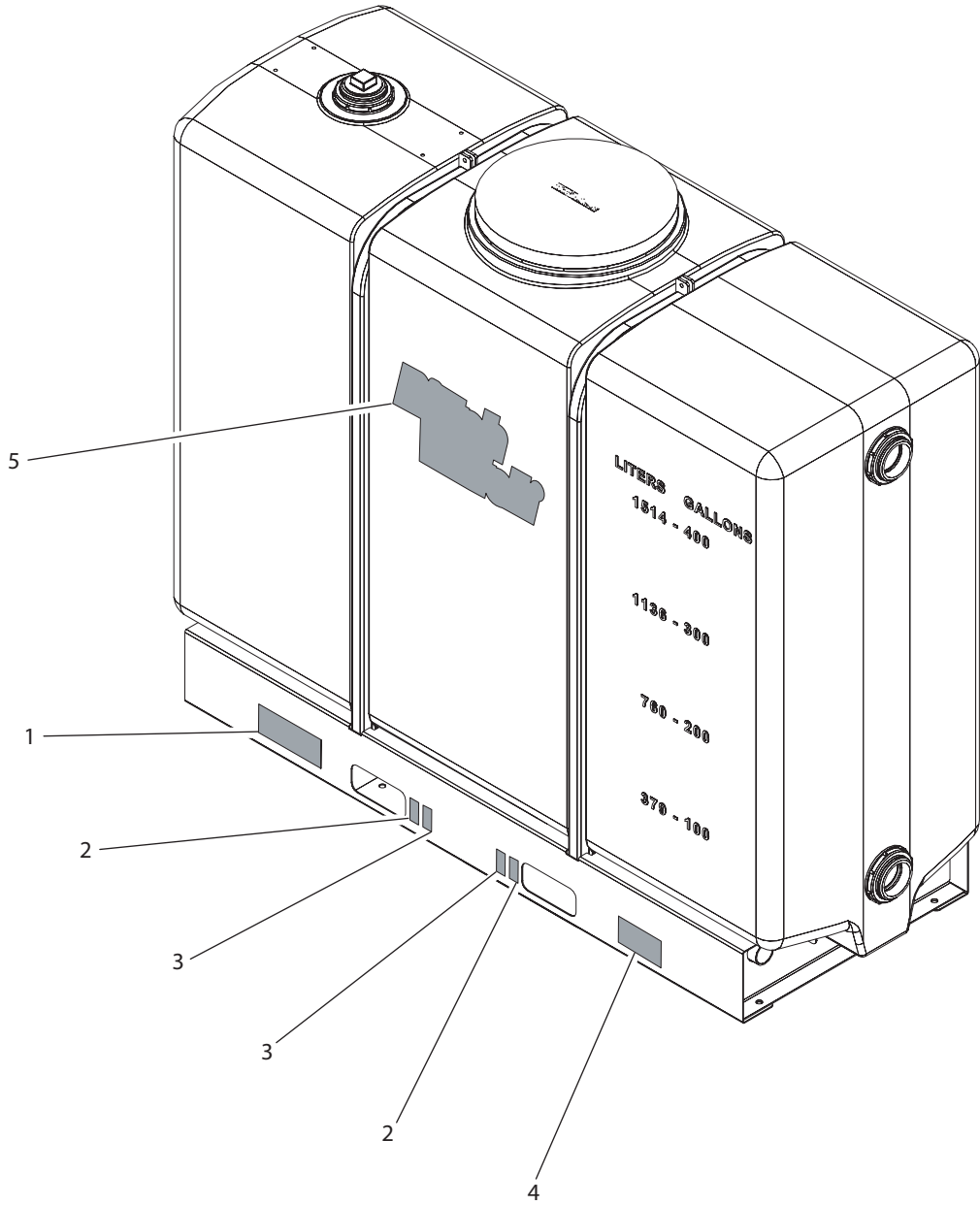
FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	270-1411		DECAL KIT - FM13V	
1	275-419	1	WARNING NO FLAME	
2	275-173	1	FUEL TANK (GASOLINE)	
3	275-355	1	CAUTION HOT PARTS	
4	275-203	1	BATTERY	
5	270-1392	2	FM13V MODEL ID	
6	273-475	1	NOTICE-READ MANUAL	
7	274-208	1	FUEL SHUTOFF ALERT	
8	274-049	1	DANGER ELECTROCUTION	
9	273-232	1	NOTICE LUBE FITTING	
10	274-442	2	LIFT LOCATION	
11	274-375	1	MASTER DISCONNECT SWITCH	
12	700-258	1	IGNITION SWITCH	

FOOTNOTES

DECAL LOCATION

FM13v FM25 500g



DECAL LOCATION

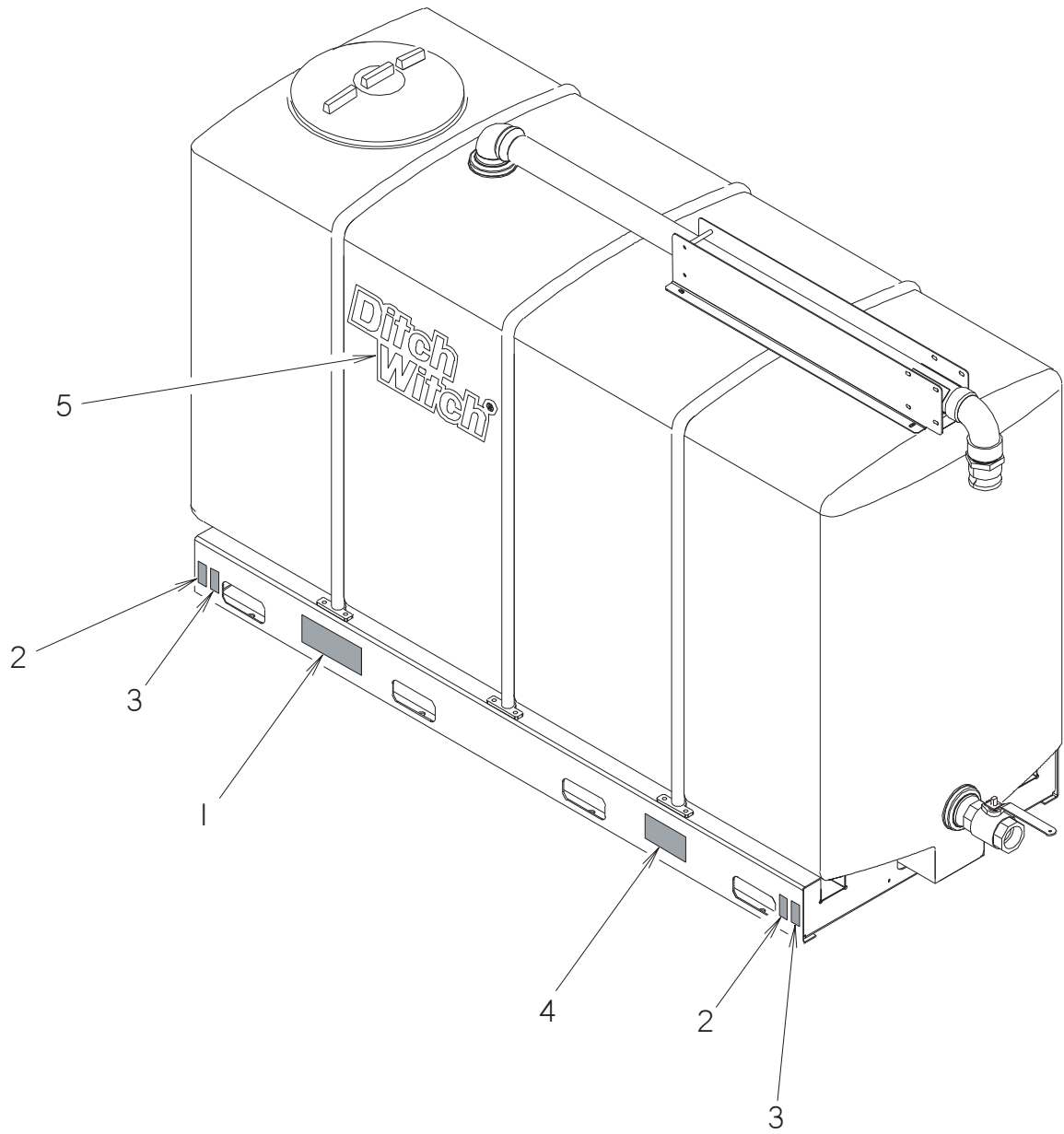
FM13v FM25 500g

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	270-1583		DECAL KIT - 500 GAL TANK	
1	274-049	2	DANGER ELECTROCUTION	
2	274-318	4	TIE DOWN LOCATION	
3	274-442	4	LIFT LOCATION	
4	274-817	2	NOTICE DO NOT LIFT	WITH FLUID
5	700-230	2	18" STACKED DITCH WITCH	

FOOTNOTES

DECAL LOCATION

FM13v FM50 FM25 1000g



DECAL LOCATION

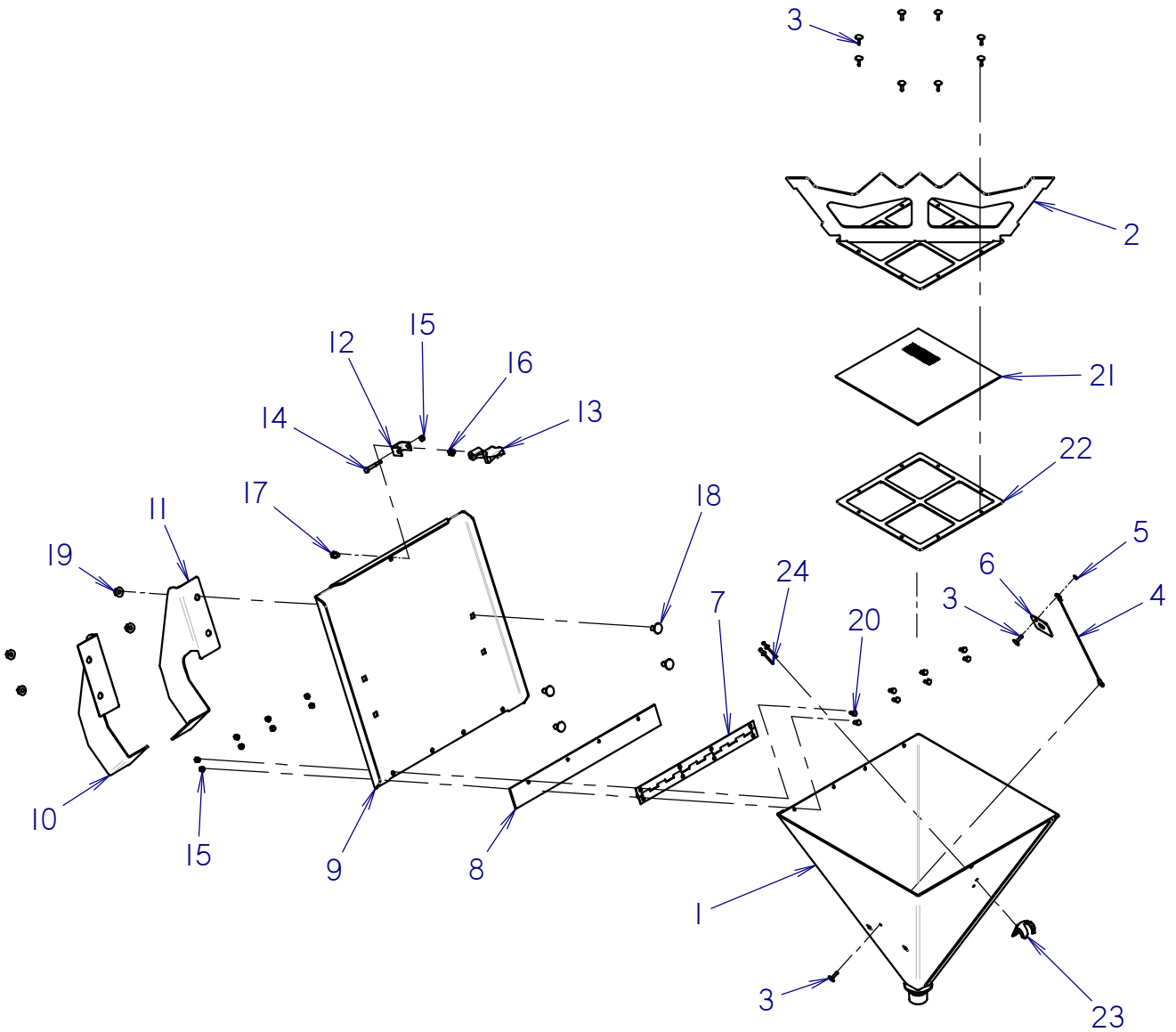
FM13v FM50 FM25 1000g

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	275-876		DECAL KIT - FM50 TANK	
1	274-049	2	DANGER ELECTROCUTION	
2	274-318	4	TIE DOWN LOCATION	
3	274-442	4	LIFT LOCATION	
4	274-817	2	NOTICE DO NOT LIFT	WITH FLUID
5	700-230	2	18" STACKED DITCH WITCH	

FOOTNOTES

HOPPER

FM5, FM13, FM13V, & FM25



HOPPER

FM5, FM13, FM13V, & FM25

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	309-293	1	HOPPER WELDMENT	
2	310-210	1	BAG CUTTER	
3	110-348	10	POP RIVET (3/16" X .664")	
4	110-239	1	LANYARD CABLE (13.5")	
5	106-205	1	WASHER (1.91")	
6	309-914	1	METER PLATE	
7	110-430	1	HINGE (1.4-5/8")	
8	117-597	1	WEATHER FLAP	
9	309-090	1	COVER	
10	310-567	1	LEFT BRACKET	
11	310-566	1	RIGHT BRACKET	
12	110-224	1	ANCHOR BRACKET	
13	110-222	1	HOOD LATCH	
14	106-093	1	SCREW (M6-1.00 X 45MM)	
15	106-538	9	LOCKNUT (M6-1.00,PRV TRQ,10.9)	
16	106-561	1	LOCKNUT (M8-1.25,PRV TRQ,10.9)	
17	107-519	1	SCREW (M8-1.25 X 12MM)	
18	107-700	4	CARRIAGE BOLT (M10-1.50X20MM)	
19	106-387	4	FLG LOCKNUT (M10-1.50)	
20	106-234	8	SCREW (M6-1.00 X 12MM)	
21	305-621	1	SCREEN	
22	309-355	1	SCREEN FRAME	
23	110-223	1	LATCH BRACKET	
24	110-253	2	POP RIVET (3/16" X 1/2")	

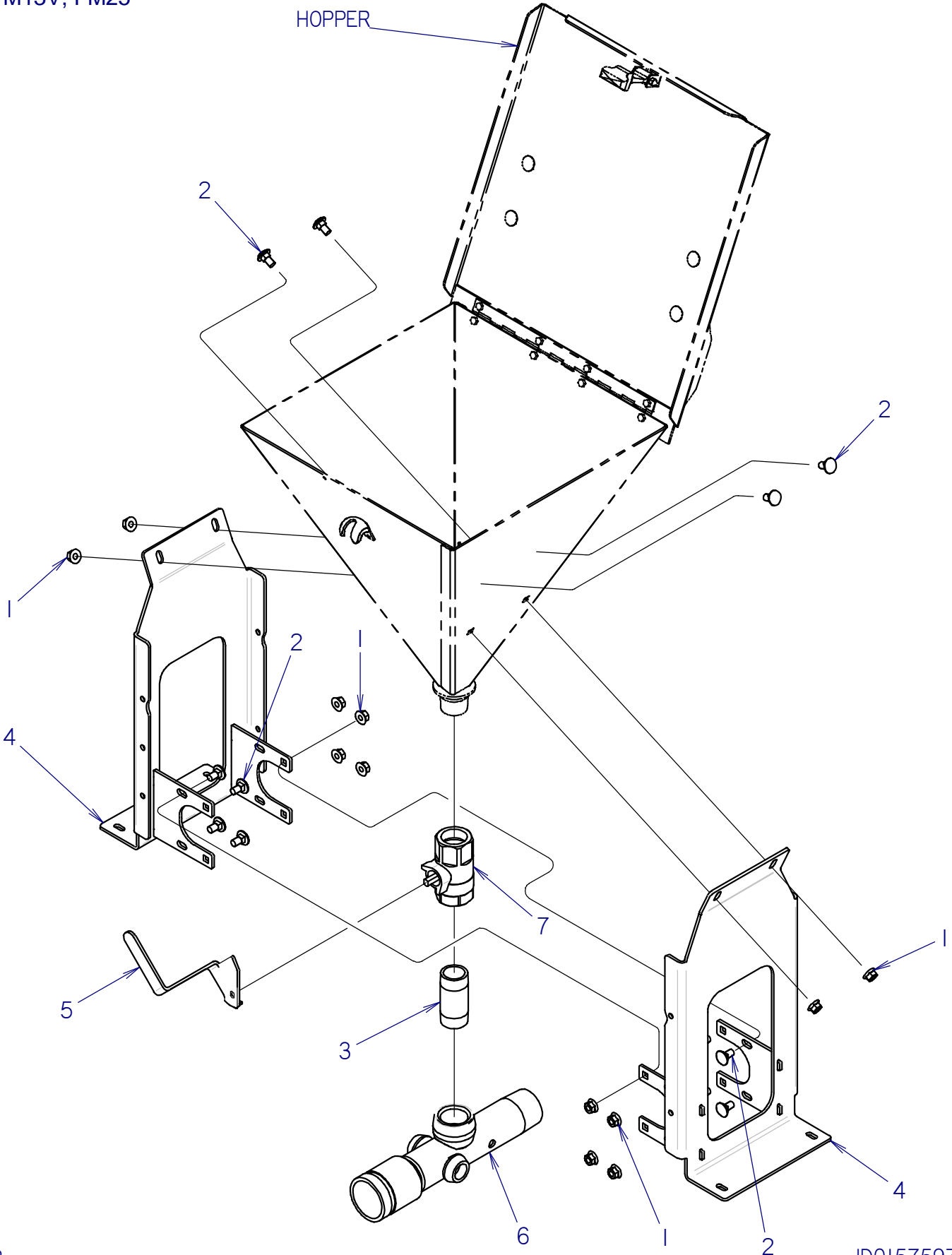
NOT SHOWN:

FOOTNOTES:

NOTE:

HOPPER BASE

FM13V, FM25



HOPPER BASE

FM13V, FM25

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	106-387	12	FLG LOCKNUT (M10-1.50)	
2	107-700	12	CARRIAGE BOLT (M10-1.50X20MM)	
3	150-1900	1	NIPPLE (20N-3.5")	
4	300-2478	2	HOPPER BASE	
5	300-4835	1	VALVE HANDLE	
6	310-327	1	MIXING VENTURI	
7	159-789	1	SHUT-OFF (20NF-20NF)	

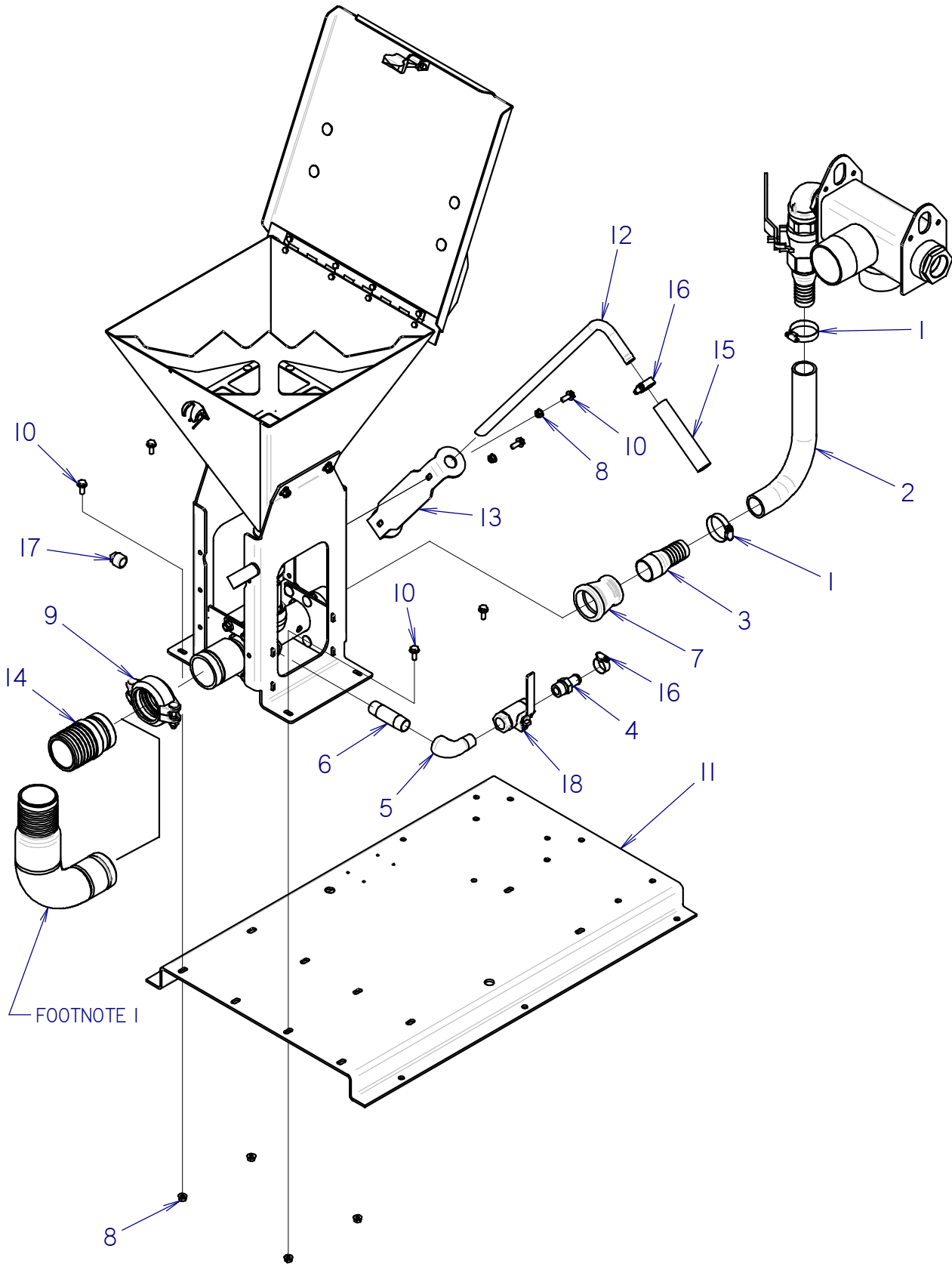
NOT SHOWN:

FOOTNOTES:

NOTE:

HOPPER INSTALLATION

FM13V



HOPPER INSTALLATION

FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	110-250	2	WORM CLAMP (1.25" TO 2.125")	
2	116-588	15	BULK HOSE (1-1/2",SOLD PER FT)	USE 1 @ 15"
3	155-188	1	S/O COUPLER (24N-24H)	
4	514-161	1	S/O COUPLER (12N-12H)	
5	153-197	1	STREET ELBOW (12N-12NF90)	
6	114-021	1	NIPPLE (12N-3 1/2")	
7	157-300	1	-32FPT X -24FPT REDUCER	
8	106-386	6	FLG LOCKNUT (M8-1.25)	
9	166-357	1	GROOVED COUPLING (40-40)	
10	106-991	6	FLG LK SCREW (M8-1.25 X 20MM)	
11	300-2726	1	MIXER BASE	
12	150-1411	1	SUCTION TUBE	
13	300-2535	1	BRACKET	
14	150-1413	1	S/O COUPLER (1-48, GROOVED)	SEE FOOTNOTE 1
15	115-374	36	BULK HOSE (3/4", SOLD PER 1")	
16	110-026	2	WORM CLAMP (1/2" TO 1-1/4")	
17	115-167	1	PLUG (12N, SQ)	USE 1 @ 36"
18	120-073	1	SHUT-OFF (12NF-12NF)	

NOT SHOWN:

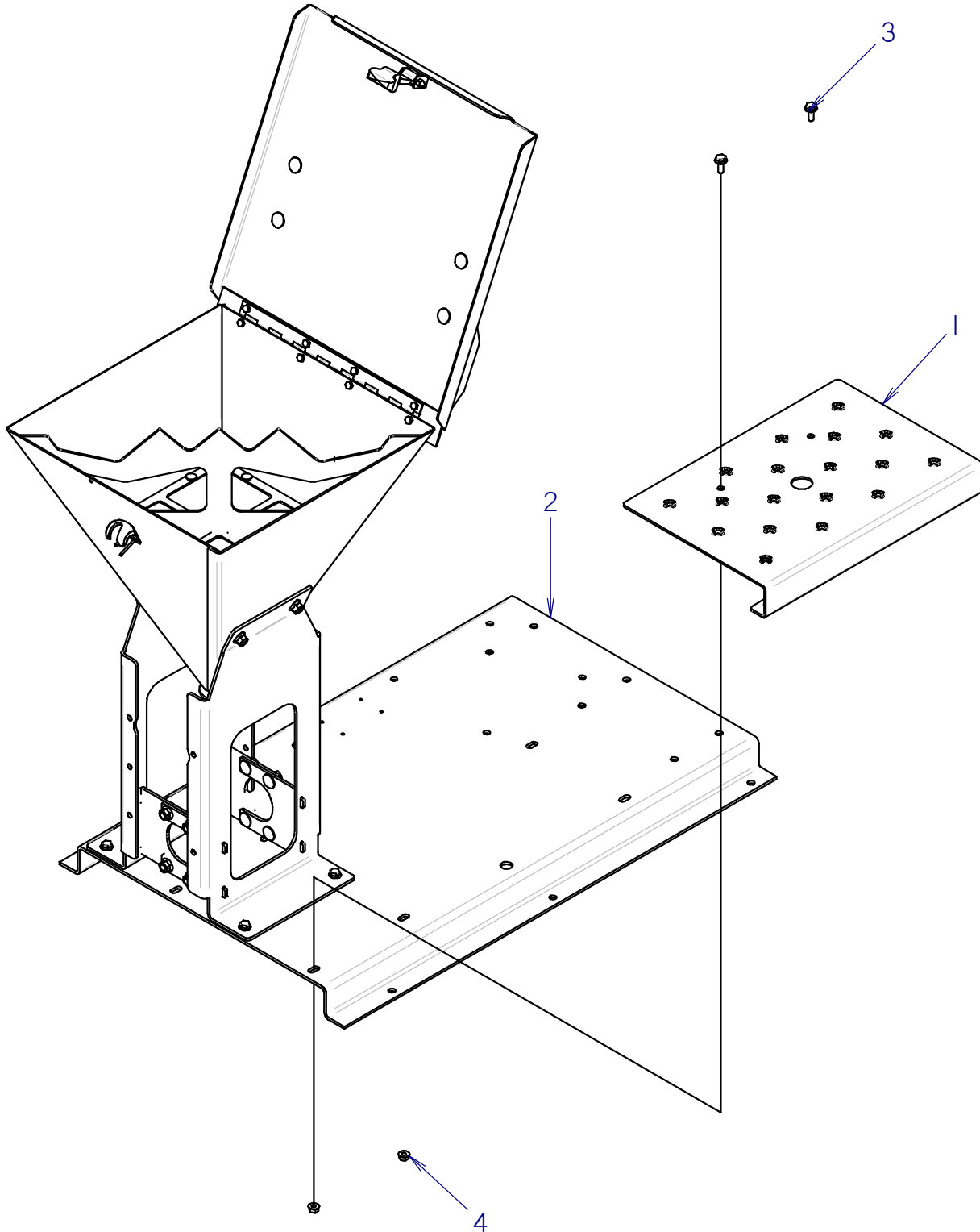
FOOTNOTES:

1. 310-326 RISER CAN BE USED IN PLACE OF REFERENCE 14 FOR INSTALLATIONS WHERE IT IS DESIRABLE TO MOUNT THE HOPPER ASSEMBLY CLOSER TO THE FLUID TANK.

NOTE:

PLATFORM INSTALLATION

FM13V



PLATFORM INSTALLATION

FM13V

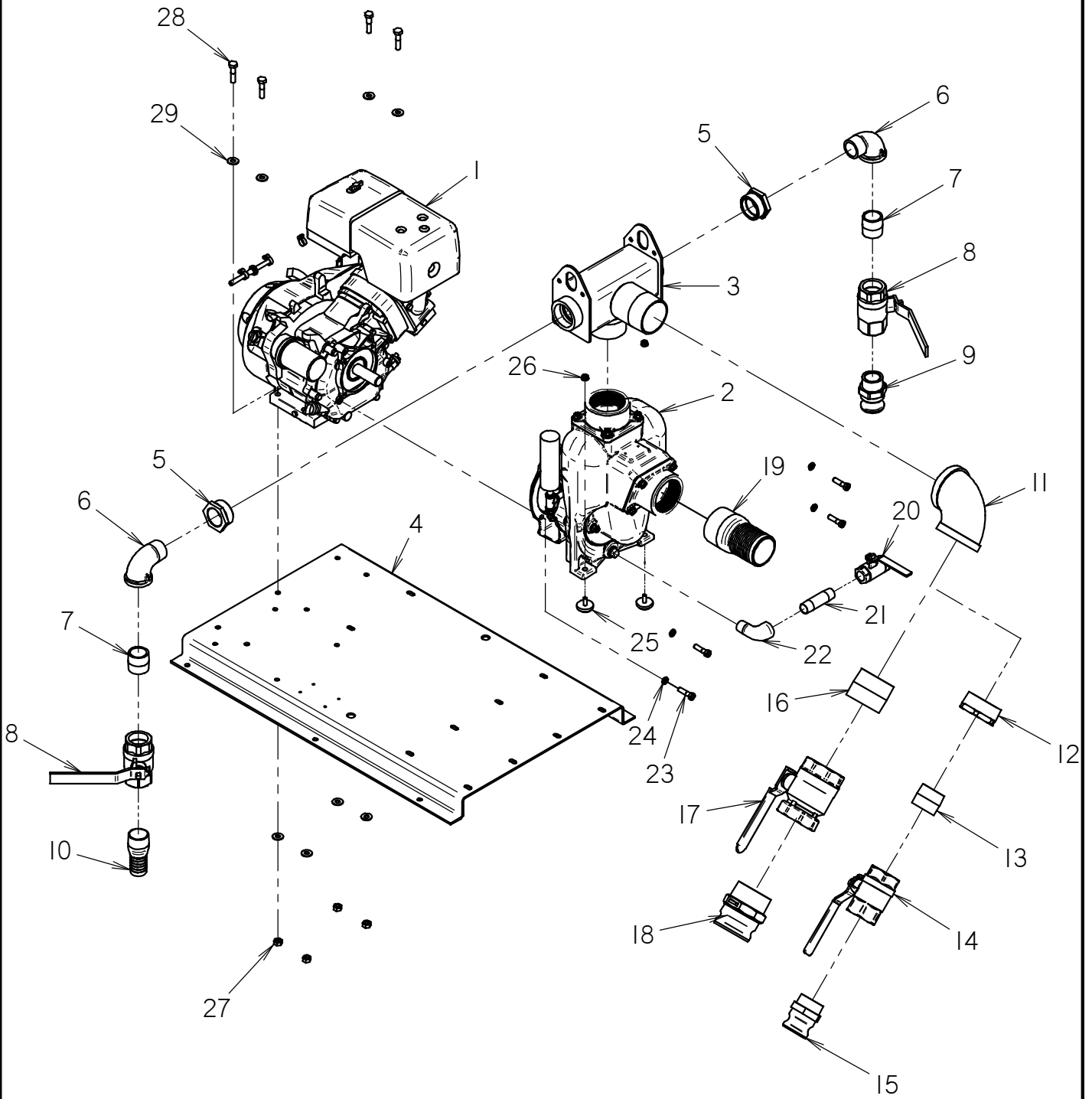
REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	300-2534	1	PLATFORM	
2	300-2726	1	MIXER BASE	
3	106-991	2	FLG LK SCREW (M8-1.25 X 20MM)	
4	106-386	2	FLG LOCKNUT (M8-1.25)	

NOT SHOWN:

FOOTNOTES:

NOTE:

ENGINE AND PUMP MOUNT FM13V



ENGINE AND PUMP MOUNT FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	195-1605	1	ENGINE (HONDA GX390 11.7 HP, EL)	SUPERSEDES 195-1092, SEE FOOTNOTES 3 & 4
2	149-979	1	CENTRIFUGAL PUMP	TORQUE COUPLING BOLTS TO 25 FT-LBS
3	300-2481	1	MANIFOLD	
4	300-2726	1	MIXER BASE	
5	115-087	2	REDUCER (32N - 24NF)	
6	114-031	2	STREET ELBOW (24N-24NF90)	
7	115-263	2	ALL THREAD (24N)	
8	159-790	2	SHUT-OFF (24NF-24NF)	
9	155-204	1	FHC ADAPTER (24-24N)	
10	155-188	1	S/O COUPLER (24N-24H)	
11	154-487	1	ELBOW (48NF-48NF90)	
12	155-265	1	REDUCER (48N-32NF)	
13	115-295	1	ALL THREAD (32N-2")	
14	120-059	1	SHUT-OFF (32NF-32NF)	
15	159-181	1	FHC ADAPTER (40-32N)	SEE FOOTNOTE 1
16	115-299	1	NIPPLE (48N-3")	
17	120-060	1	SHUT-OFF (48NF-48NF)	
18	155-263	1	FHC ADAPTER (56-48N)	SEE FOOTNOTE 2
19	514-168	1	S/O ADAPTER (48N-48H)	
20	120-073	1	SHUT-OFF (12NF-12NF)	
21	114-021	1	NIPPLE (12N-3 1/2")	
22	153-197	1	STREET ELBOW (12N-12NF90)	
23	105-156	4	BOLT (3/8-NC X 1-1/2")	TORQUE TO 25 FT-LBS
24	105-072	4	LOCK WASHER (3/8")	
25	116-525	2	BUMPER	
26	105-003	2	FLG LOCKNUT (5/16-NC)	
27	105-894	4	LOCKNUT (M10-1.50, PRV TRQ, 10.9)	
28	105-996	4	SCREW (M10-1.50 X 45MM)	
29	105-118	8	WASHER (3/8")	

NOT SHOWN:

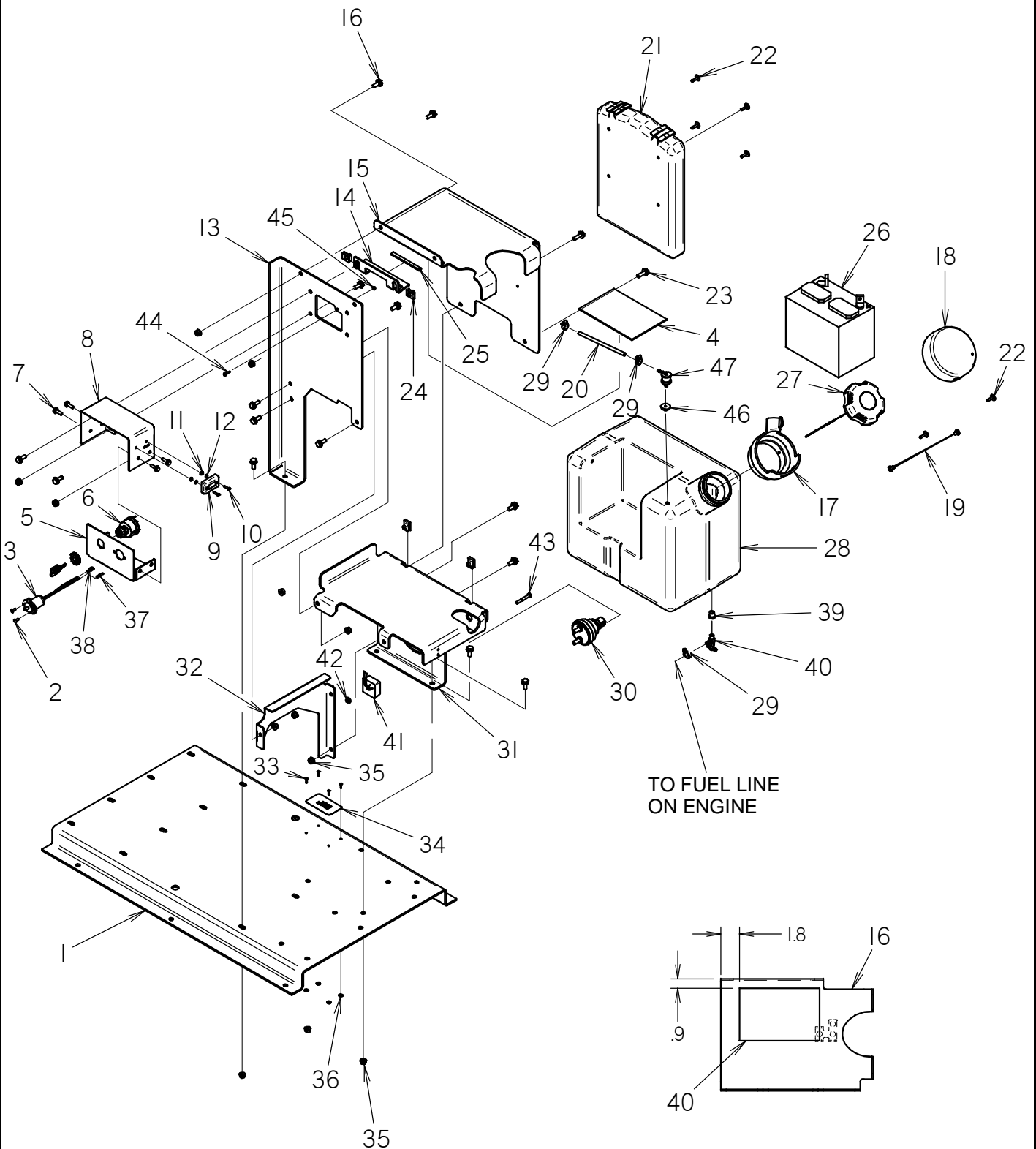
FOOTNOTES:

- 100-068 2" HOSE ADAPTER KIT CONSISTS OF REFERENCE NUMBERS 12 - 15.
- 100-067 3" HOSE ADAPTER KIT CONSISTS OF REFERENCE NUMBERS 16 - 18.
- ENGINE 195-1092 ENDS WITH S/N:
- ENGINE 195-1605 BEGINS WITH S/N:

NOTE:

FUEL TANK AND BATTERY MOUNT

FM13V
 BEGINS WITH S/N:CMWFM13VJ90000926



FUEL TANK AND BATTERY MOUNT

FM13V

BEGINS WITH S/N:CMWFM13VJ90000926

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	300-2726	1	MIXER BASE	
2	110-560	2	POP RIVET (3/16" X 1/2", ALUM)	
3	214-253	1	ACCESSORY SOCKET	
4	300-4473	1	PAD	
5	300-5719	1	PANEL	
6	215-1282	1	IGNITION SWITCH (GROUNDED)	SEE FOOTNOTE I
7	106-379	4	FLG LK SCREW (M6-1.00 X 20MM)	
8	300-2770	1	COVER	
9	214-519	1	TACHOMETER	
10	106-273	2	SCREW (#6-32 X 5/8" FLT BRASS)	
11	105-215	2	NUT (#6-32)	
12	195-418	2	LOCK WASHER (#10)	
13	300-2475	1	SUPPORT BRACKET	
14	300-2772	1	BATTERY HOLD DOWN	
15	300-2474	1	FUEL TANK BRACKET	
16	106-991	14	FLG LK SCREW (M8-1.25 X 20MM)	
17	362-1176	1	FUEL CAP COVER BASE	
18	362-1175	1	FUEL CAP COVER	
19	110-239	1	LANYARD CABLE (13.5')	
20	105-1436	27	BULK HOSE 3/16" (50 PSI)	
21	318-588	1	MANUAL COMPARTMENT	
22	110-348	6	POP RIVET (3/16" X .664')	
23	106-381	2	FLG LK SCREW (M8-1.25 X 25MM)	
24	106-551	4	CLIP NUT (M8-1.25)	
25	116-789	5	RUBBER EDGE TRIM 1/8" (FT)	USE 1 @ 5", LOCTITE 401
26	215-256	1	BATTERY (12V, 200 AMP)	USE 1 @ 5", LOCTITE 401
27	362-1480	1	FUEL CAP (RATCHET 3.50')	
28	364-1000	1	FUEL TANK	
29	110-249	3	WORM CLAMP (1/4" TO 5/8")	
30	217-819	1	BATTERY DISCONNECT SWITCH	
31	300-2472	1	TANK SUPPORT	
32	300-2711	1	BRACE	
33	106-282	4	DRIVE RIVET (1/8" X 1/2")	
34	270-2136	1	SERIAL NUMBER PLATE (3.5" X 2" X.020")	
35	106-386	12	FLG LOCKNUT (M8-1.25)	
36	106-280	4	WASHER (1/8", ALUMINUM)	
37	213-074	1	MALE TERMINAL (BULLET, .156)	
38	215-872	1	FMC TERMINAL (1/4") 14-16GA	
39	150-3002	1	BRASS BUSHING (O4N-02NF)	
40	156-064	1	S/O SHUT-OFF (O2N-03H90)	
41	213-198	1	VOLTAGE REGULATOR (12V)	
42	106-385	1	FLG LOCKNUT (M6-1.00)	
43	106-093	1	SCREW (M6-1.00 X 45MM)	
44	106-888	1	SCREW (M4-0.70 X 16MM)	
45	106-557	1	NUT (M4-.70)	
46	105-1557	1	GROMMET	
47	362-1530	1	SLOSH VALVE	

NOT SHOWN:

300-5962 AR SPACER PLATE
 106-859 2 SCREW (M4-0.70 X 12MM)
 217-710 1 MICRO RELAY (SPDT)

FOOTNOTES:

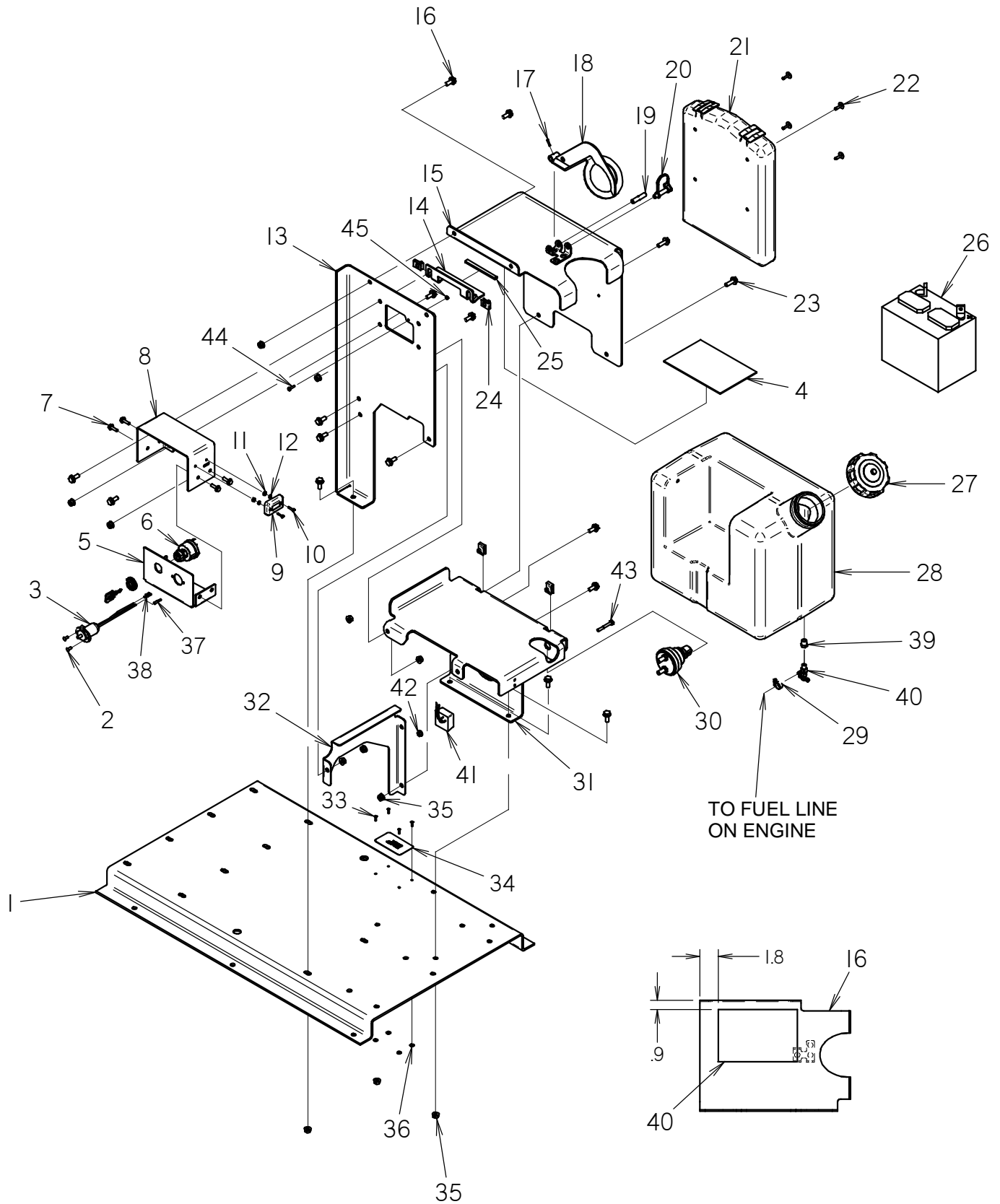
I. IGNITION SWITCH (215-1282) INCLUDES KEYS, 214-961 & SWITCH MOUNTING NUT, 214-962.

NOTE:

FUEL TANK AND BATTERY MOUNT

FM13V

BEGINS WITH S/N: , ENDS WITH S/N:



FUEL TANK AND BATTERY MOUNT FM13V

BEGINS WITH S/N: , ENDS WITH S/N:

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	300-2726	1	MIXER BASE	
2	110-560	2	POP RIVET (3/16" X 1/2", ALUM)	
3	214-253	1	ACCESSORY SOCKET	
4	300-4473	1	PAD	
5	300-5719	1	PANEL	
6	215-1282	1	IGNITION SWITCH (GROUNDED)	SEE FOOTNOTE 1
7	106-379	4	FLG LK SCREW (M6-1.00 X 20MM)	
8	300-2770	1	COVER	
9	214-519	1	TACHOMETER	
10	106-273	2	SCREW (#6-32 X 5/8" FLT BRASS)	
11	105-215	2	NUT (#6-32)	
12	195-418	2	LOCK WASHER (#10)	
13	300-2475	1	SUPPORT BRACKET	
14	300-2772	1	BATTERY HOLD DOWN	
15	300-3342	1	FUEL TANK BRACKET	
16	106-991	14	FLG LK SCREW (M8-1.25 X 20MM)	
17	105-535	1	ROLL PIN (1/8" X 5/8")	
18	364-1003	1	FUEL CAP LOCK	
19	183-978	1	PIN (9.5MM X 45MM)	
20	110-368	1	SNAPPER PIN (3/8" X 1-1/2")	
21	318-588	1	MANUAL COMPARTMENT	
22	110-348	4	POP RIVET (3/16" X .664")	
23	106-381	2	FLG LK SCREW (M8-1.25 X 25MM)	
24	106-551	4	CLIP NUT (M8-1.25)	
25	116-789	5	RUBBER EDGE TRIM 1/8" (FT)	USE 1 @ 5", LOCTITE 401
26	215-256	1	BATTERY (12V, 200 AMP)	USE 1 @ 5", LOCTITE 401
27	364-698	1	FUEL CAP	
28	364-1000	1	FUEL TANK	
29	110-249	1	WORM CLAMP (1/4" TO 5/8")	
30	217-819	1	BATTERY DISCONNECT SWITCH	
31	300-2472	1	TANK SUPPORT	
32	300-2711	1	BRACE	
33	106-282	4	DRIVE RIVET (1/8" X 1/2")	
34	270-2136	1	SERIAL NUMBER PLATE (3.5" X 2" X.020")	
35	106-386	12	FLG LOCKNUT (M8-1.25)	
36	106-280	4	WASHER (1/8", ALUMINUM)	
37	213-074	1	MALE TERMINAL (BULLET, .156)	
38	215-872	1	FMC TERMINAL (1/4") 14-16GA	
39	150-3002	1	BRASS BUSHING (O4N-02NF)	
40	156-064	1	S/O SHUT-OFF (O2N-03H90)	
41	213-198	1	VOLTAGE REGULATOR (12V)	
42	106-385	1	FLG LOCKNUT (M6-1.00)	
43	106-093	1	SCREW (M6-1.00 X 45MM)	
44	106-888	1	SCREW (M4-0.70 X 16MM)	
45	106-557	1	NUT (M4-.70)	

NOT SHOWN:

300-5962 AR SPACER PLATE
106-859 2 SCREW (M4-0.70 X 12MM)
217-710 1 MICRO RELAY (SPDT)

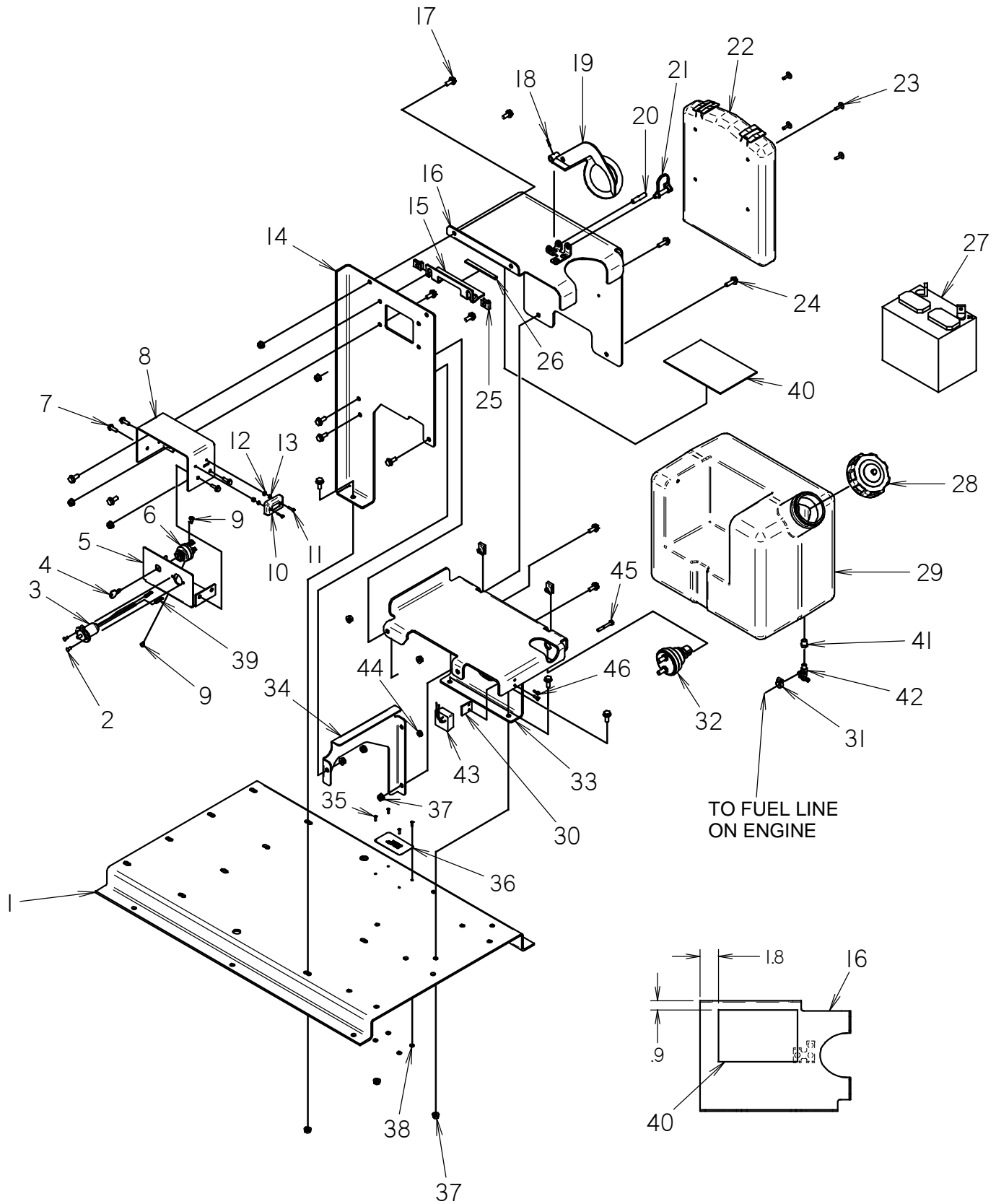
FOOTNOTES:

1. IGNITION SWITCH (215-1282) INCLUDES KEYS, 214-961 & SWITCH MOUNTING NUT, 214-962.

NOTE:

FUEL TANK AND BATTERY MOUNT

FM13V
ENDS WITH S/N CMWFM13VK90000925



FUEL TANK AND BATTERY MOUNT

FM13V

ENDS WITH S/N CMWFM13VK90000925

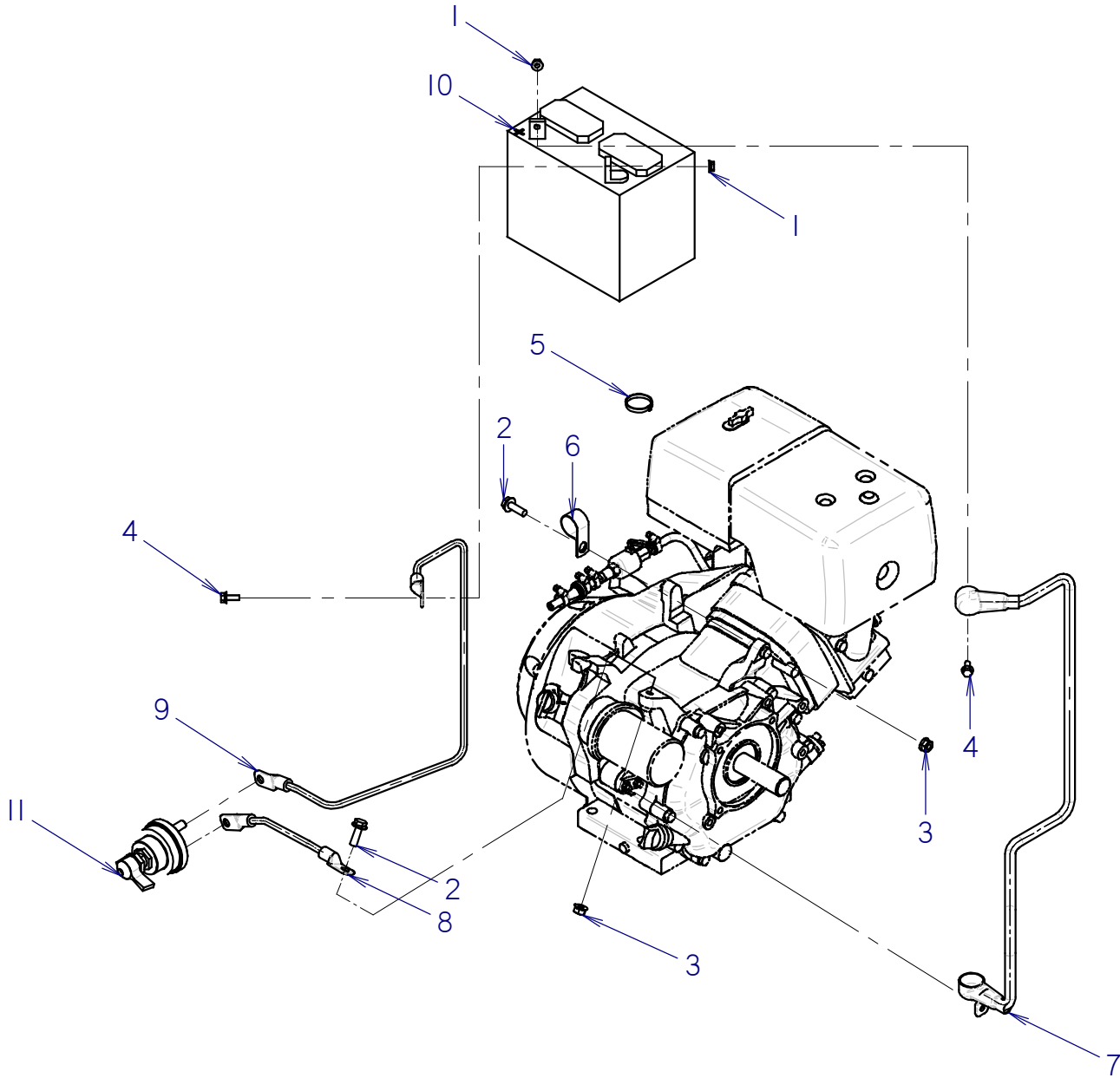
REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	300-2726	1	MIXER BASE	
2	110-560	2	POP RIVET (3/16" X 1/2", ALUM)	
3	214-253	1	ACCESSORY SOCKET	
4	215-020	1	KEY	
5	300-3605	1	PANEL	
6	215-164	1	IGNITION SWITCH	
7	106-379	4	FLG LK SCREW (M6-1.00 X 20MM)	
8	300-2770	1	COVER	
9	105-154	2	BOLT (#10-32 X 5/16", PAN SLT)	
10	214-519	1	TACHOMETER	
11	106-273	2	SCREW (#6-32 X 5/8" FLT BRASS)	
12	105-215	2	NUT (#6-32)	
13	195-418	2	LOCK WASHER (#10)	
14	300-2475	1	SUPPORT BRACKET	
15	300-2772	1	BATTERY HOLD DOWN	
16	300-3342	1	FUEL TANK BRACKET	
17	106-991	14	FLG LK SCREW (M8-1.25 X 20MM)	
18	105-535	1	ROLL PIN (1/8" X 5/8")	
19	364-1003	1	FUEL CAP LOCK	
20	183-978	1	PIN (9.5MM X 45MM)	
21	110-368	1	SNAPPER PIN (3/8" X 1-1/2")	
22	318-588	1	MANUAL COMPARTMENT	
23	110-348	4	POP RIVET (3/16" X .664")	
24	106-381	2	FLG LK SCREW (M8-1.25 X 25MM)	
25	106-551	4	CLIP NUT (M8-1.25)	
26	116-789	5	RUBBER EDGE TRIM 1/8" (FT)	USE 1 @ 5", LOCTITE 401
27	215-256	1	BATTERY (12V, 200 AMP)	
28	364-698	1	FUEL CAP	
29	364-1000	1	FUEL TANK	
30	300-5962	1	SPACER PLATE	
31	110-249	1	WORM CLAMP (1/4" TO 5/8")	
32	217-819	1	BATTERY DISCONNECT SWITCH	
33	300-2472	1	TANK SUPPORT	
34	300-2711	1	BRACE	
35	106-282	4	DRIVE RIVET (1/8" X 1/2")	
36	270-2136	1	SERIAL NUMBER PLATE (3.5" X 2" X.020")	
37	106-386	12	FLG LOCKNUT (M8-1.25)	
38	106-280	4	WASHER (1/8", ALUMINUM)	
39	215-476	2	RING TERMINAL (#10)	
40	300-4473	1	PAD	
41	150-3002	1	BRASS BUSHING (O4N-02NF)	
42	156-064	1	S/O SHUT-OFF (O2N-03H90)	
43	213-198	1	VOLTAGE REGULATOR (12V)	
44	106-385	1	FLG LOCKNUT (M6-1.00)	
45	106-093	1	SCREW (M6-1.00 X 45MM)	
46	106-859	2	SCREW (M4-0.70 X 12MM)	

NOT SHOWN:

FOOTNOTES:

NOTE:

BATTERY & CABLES FM13V



BATTERY & CABLES

FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	106-353	2	FLG NUT (M6-1.00)	
2	106-381	2	FLG LK SCREW (M8-1.25 X 25MM)	
3	106-386	2	FLG LOCKNUT (M8-1.25)	
4	106-712	2	FLG SCREW (M6-1.00 X 16MM)	
5	110-248	1	CABLE TIE (1/16" TO 1/4")	
6	110-333	1	BOLT-ON CLAMP (1")	
7	215-1152	1	BATTERY CABLE (6 GA X 35", RED)	
8	215-1155	1	BATTERY CABLE (6 GA X 10", BLK)	
9	215-1156	1	BATTERY CABLE (6 GA X 31", BLK)	
10	215-256	1	BATTERY (12V, 200 AMP)	
11	217-819	1	BATTERY DISCONNECT SWITCH	

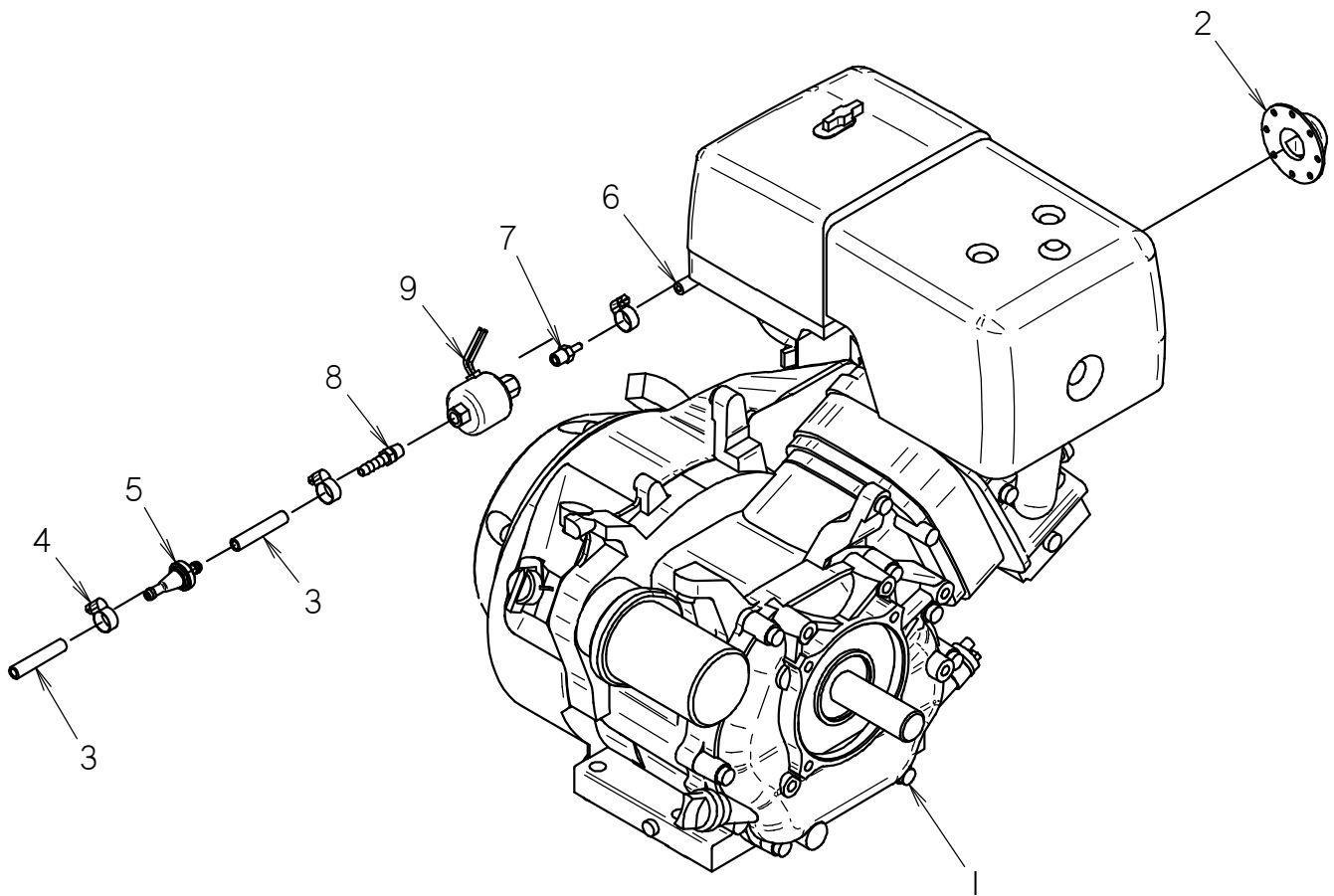
NOT SHOWN:

FOOTNOTES:

NOTE:

ENGINE

FM13V



ENGINE FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	195-1605	1	ENGINE (HONDA GX390 11.7 HP, EL)	SUPERSEDES 195-1092, SEE FOOTNOTES 2 & 3
2	195-192	1	EXHAUST DEFLECTOR	
3	105-1437	4	BULK HOSE 1/4" (50 PSI)	USE 2 @ 2"
4	110-249	3	WORM CLAMP (1/4" TO 5/8")	
5	195-1140	1	FUEL FILTER (04H-04H, IN-LINE)	
6	105-1436	9	BULK HOSE 3/16" (50 PSI)	
7	155-150	1	S/O COUPLER (02N-02H)	
8	155-107	1	COUPLER (1/8NPTX1/4OD,STR)	
9	195-1124	1	FUEL SOLENOID VALVE	SEE FOOTNOTE 1

NOT SHOWN:

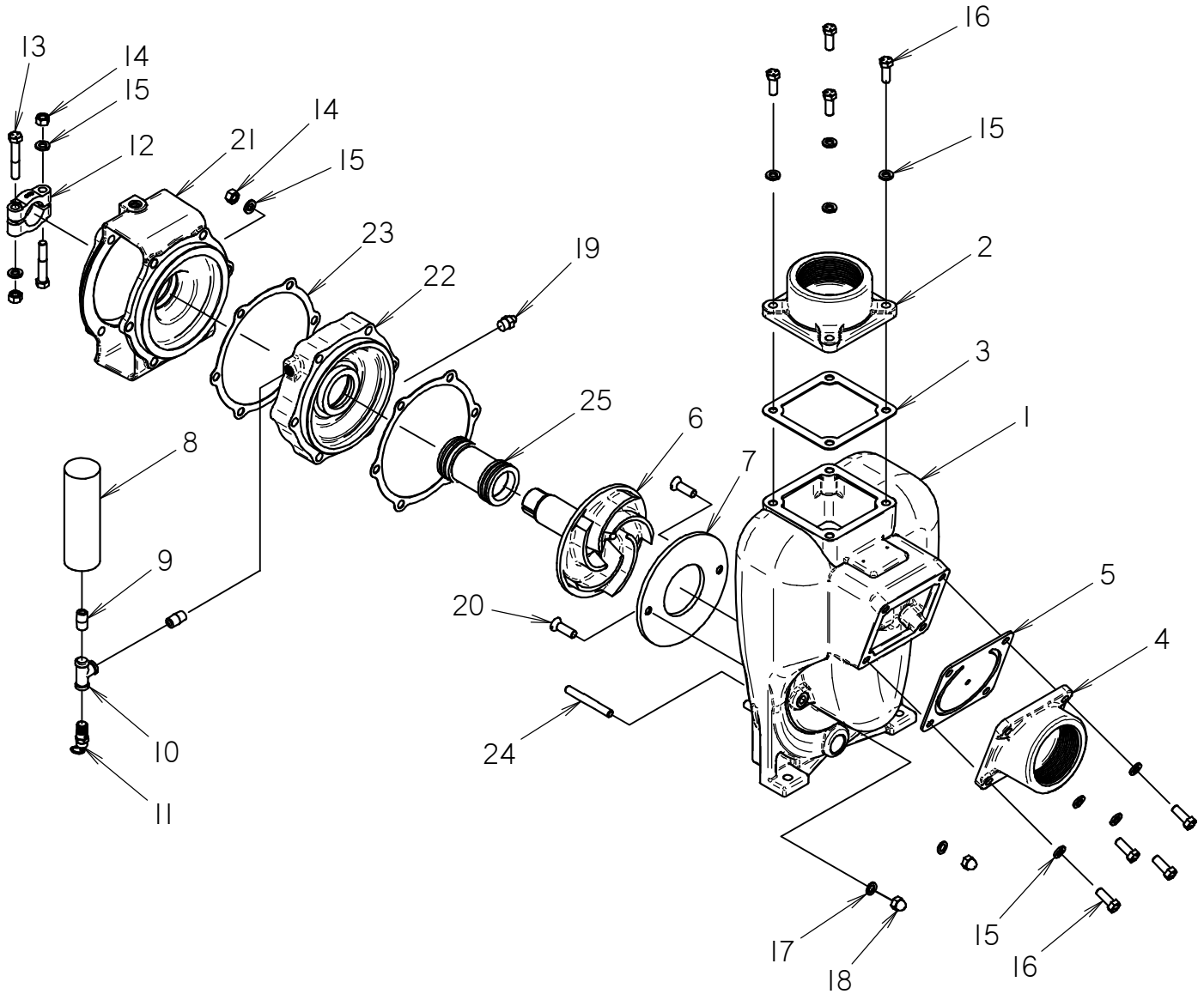
194-443	1	STARTER, ELECTRIC
499-572	1	STARTER SOLENOID
194-239	1	CARBURETOR (GX90)
195-159	1	AIR FILTER ELEMENT
194-238	1	MUFFLER
165-756	1	EXHAUST GASKET
313-230	1	MUFFLER HEAT SHIELD
217-758	1	LOW OIL PRESSURE SWITCH
153-546	1	CARBURETOR GASKET
153-545	1	MUFFLER GASKET
194-240	1	AIR FILTER COVER
194-241	1	PRE CLEANER CASE
194-242	1	PRE CLEANER CAP
194-243	1	PRE CLEANER GUIDE

FOOTNOTES:

1. NEW PRODUCTION, REPLACES RECTANGULAR (195-1244) FUEL SOLENOID.
2. ENGINE 195-1092 ENDS WITH S/N:
3. ENGINE 195-1605 BEGINS WITH S/N:

NOTE:

3" CENTRIFUGAL PUMP FM13V



3" CENTRIFUGAL PUMP FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	149-979	-	CENTRIFUGAL PUMP	INCLUDES REF NO:S 1-24
1	164-022	1	PUMP CASE	
2	499-396	1	DISCHARGE FLANGE	
3	153-802	1	GASKET	
4	499-395	1	INLET FLANGE	
5	117-506	1	FLAPPER	
6	310-746	1	IMPELLER (5.5")	
7	310-745	1	WEAR PLATE	
8	364-555	1	GREASE RESERVOIR	
9	115-129	2	ALL THREAD (04N) SCH 80	
10	115-130	1	TEE (04NF-04NF-04NF)	
11	153-423	1	RELIEF VALVE	
12	310-742	2	SHAFT CLAMP	INCLUDES REF NO:S 13-15
13	105-162	2	BOLT (3/8-NC X 2-1/4")	TORQUE TO 25 FT/LBS, ALTERNATING
14	105-053	8	NUT (3/8 NC) HEX	TORQUE TO 25 FT/LBS, ALTERNATING
15	105-072	16	LOCK WASHER (3/8")	
16	106-136	8	BOLT (3/8-NC X 1")	
17	153-558	2	ANNULAR GASKET	
18	107-730	2	ACORN NUT (3/8-NC)	
19	115-012	1	ZERK (04N)	
20	107-750	2	BOLT (3/8-NC x 1.25", CSK SLT)	
21	500-2010	1	ENGINE ADAPTER	
22	164-024	1	IMPELLER HOUSING	
23	500-2116	2	GASKET	
24	107-749	6	3/8-16 THREADED STUD	
25	191-110	1	SEAL KIT	INCLUDES REF NO. 3 & 23

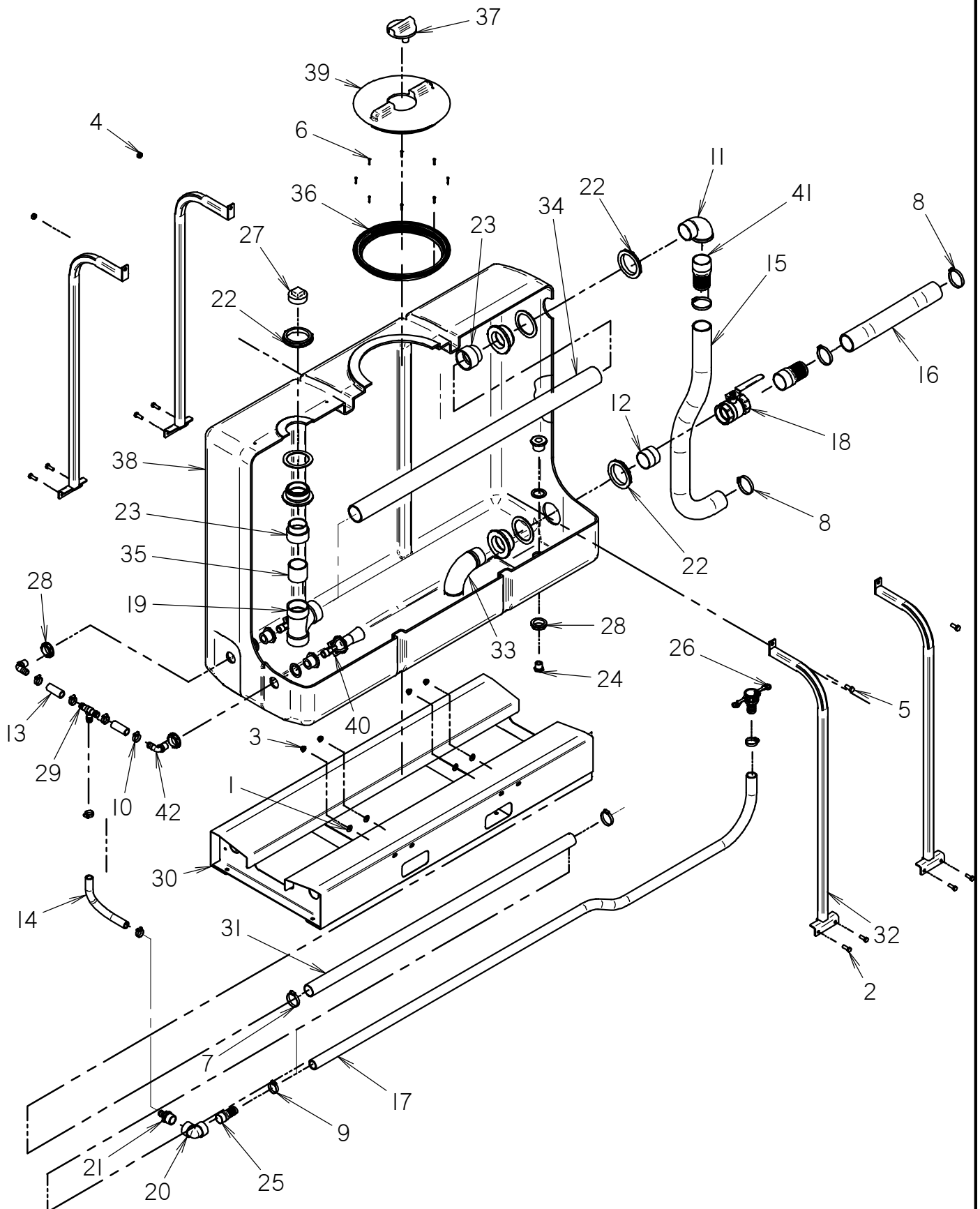
NOT SHOWN:

255-1018 AR PUMP SEAL GREASE

FOOTNOTES:

NOTE:

500 GAL TANK & PLUMBING FM13V



500 GAL TANK & PLUMBING FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	105-059	8	WASHER (7/16")	
2	105-247	8	SCREW (M12-1.75 X 35MM)	
3	106-709	8	FLG LK NUT (M12-1.75)	
4	107-319	2	LOCKNUT (M14-2.0,PRV TRQ.10.9)	
5	108-015	2	HHCS M14-2.0 X 35MM, 10.9, ZP	
6	108-072	8	SCREW (#10-16 X 1.25", PAN PLPS)	
7	110-134	2	WORM CLAMP (2.062" TO 2.750")	
8	110-169	4	WORM CLAMP (2.812" TO 3.750")	
9	110-250	2	WORM CLAMP (1.25" TO 2.125")	
10	110-353	6	WORM CLAMP (3/4" TO 1-1/2")	
11	114-017	1	STREET ELBOW (32N-32NF90)	
12	115-299	1	NIPPLE (48N-3")	
13	116-094	5	BULK HOSE (1", SOLD PER 1")	2@ 4"
14	116-094	15	BULK HOSE (1" SOLD PER 1")	
15	116-506	76	BULK HOSE (3", SOLD PER FT)	
16	116-506	18	BULK HOSE (3", SOLD PER FT)	
17	116-588	120	BULK HOSE (1-1/2", SOLD PER FT)	
18	120-060	1	SHUT-OFF (48NF-48NF)	
19	150-1405	1	TEE (48WF-48WF-48WF90, ABS)	
20	150-1628	1	ELBOW (24NF-24NF90, POLY)	
21	150-1683	1	S/O COUPLER (24N-16H)	
22	153-549	3	BK CONNECTOR (48NF-48NF, NYL)	
23	153-596	2	ADAPTER (48NF-48W, ABS)	
24	153-721	1	PLUG (16N POLY)	
25	155-188	1	S/O COUPLER (24N-24H)	
26	155-205	1	FHC BODY (20-24H)	
27	156-939	1	PLUG (48N)	
28	157-490	3	BK CONNECTOR (16NF POLY)	
29	159-863	1	S/O TEE (16H-16H-16H)	
30	300-2575	1	TANK BASE	
31	300-2784	1	PIPE 2" PVC .154"W X 69.5"	GLUE ONE END ONLY TO REF 16 -- DO NOT GLUE TO REF 20.
32	300-9815	4	TANK SUPPORT	
33	313-259	1	SUCTION ELBOW	
34	314-882	1	PIPE (-48 X 63.5" ABS)	GLUE ONE END ONLY TO REF 19 -- DO NOT GLUE TO REF 23
35	315-489	1	PIPE (-48 X 3.00", ABS)	
36	357-261	1	FILLWELL (16")	
37	357-263	1	TANK CAP (4")	
38	364-1001	1	TANK (POLYETHYLENE, 500 GAL)	
39	364-434	1	TANK CAP (16", VENTED)	
40	369-810	2	MIXING JET (16N,ORF.500", NY)	
41	514-168	2	S/O ADAPTER (48N-48H)	
42	514-215	2	S/O COUPLER (16N-16H90)	

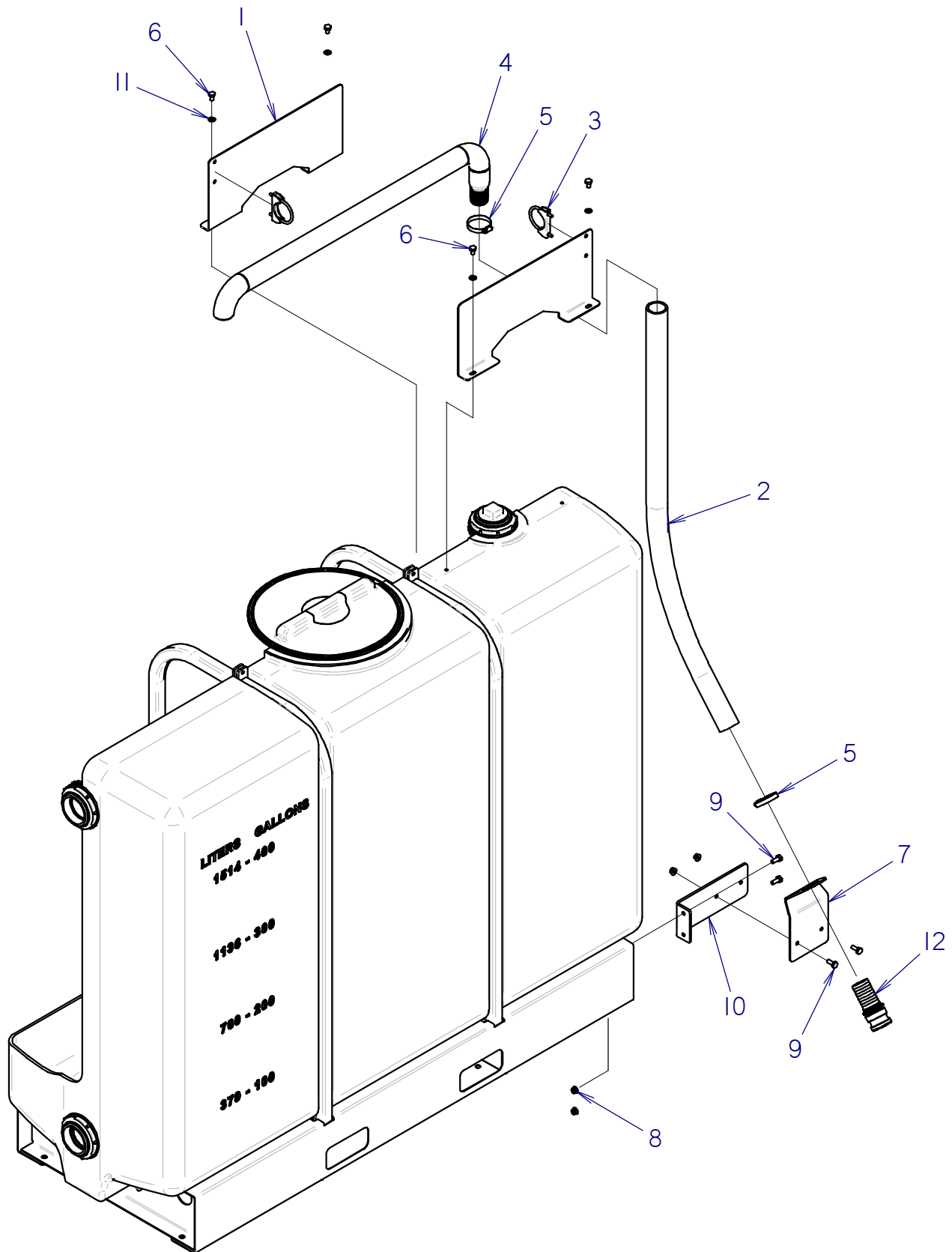
NOT SHOWN:

FOOTNOTES:

NOTE:

500 GALLON TANK FILL PLUMBING

FM13V, FM25



500 GALLON TANK FILL PLUMBING

FM13V, FM25

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	190-1189	-	TANK FILL KIT, 500 GAL	INCLUDES REF NO'S 1-12
1	300-2752	2	MOUNTING BRACKET	
2	116-505	57	BULK HOSE (2", SOLD PER FT)	USE 1 @ 57"
3	196-009	2	U-BOLT CLAMP (2.500")	
4	300-2754	1	FILL PIPE	
5	110-134	2	WORM CLAMP (2.062" TO 2.750")	
6	106-654	4	SCREW (M10-1.50 X 16MM)	
7	300-2750	1	BRACKET	
8	106-387	4	FLG LOCKNUT (M10-1.50)	
9	105-245	4	SCREW (M10-1.50 X 25MM)	
10	315-491	1	BRACKET	
11	106-390	4	WASHER (M10)	
12	149-119	1	FHC ADAPTER (32-32H)	

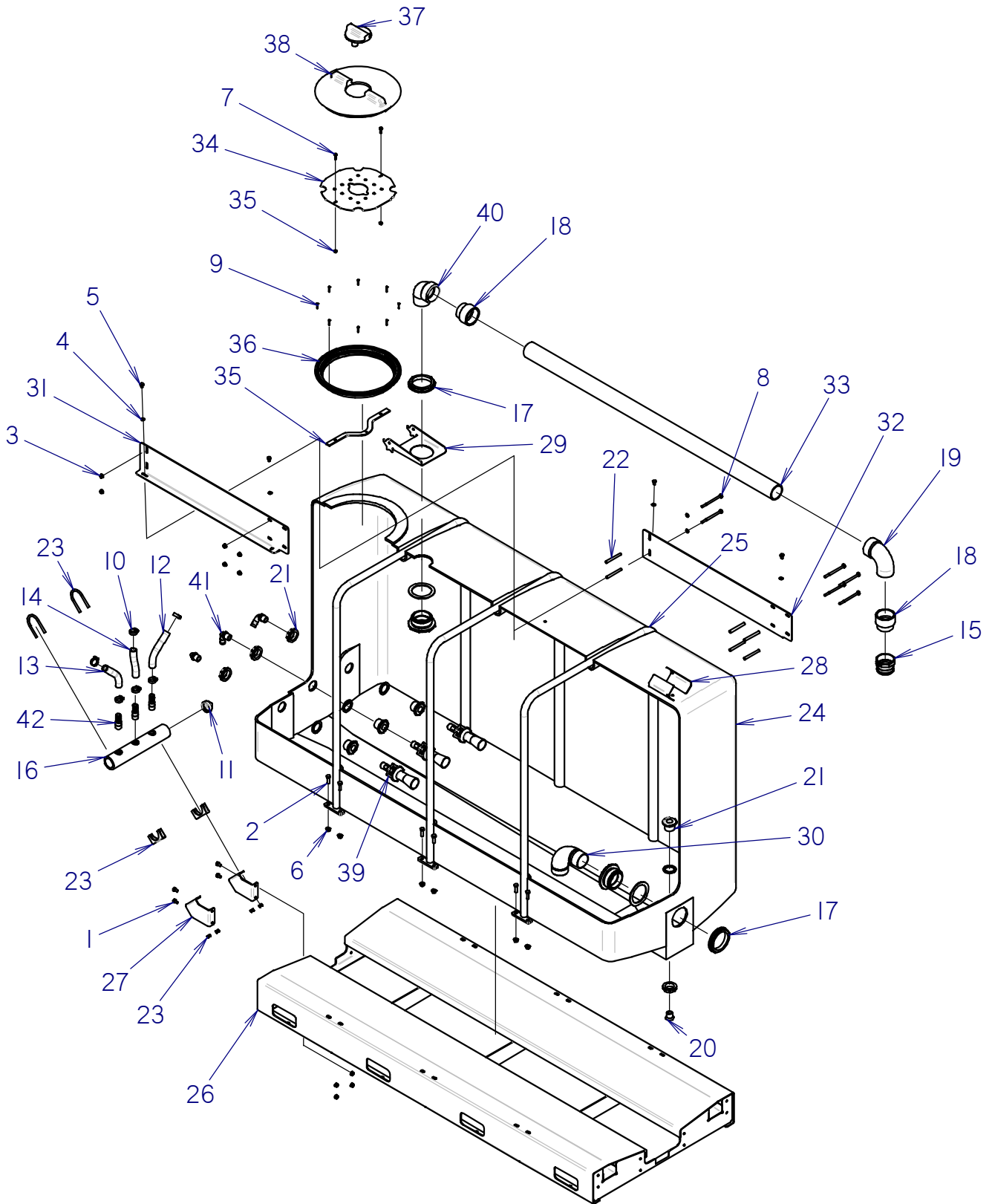
NOT SHOWN:

FOOTNOTES:

NOTE:

1000 GAL TANK ASSEMBLY

FM13V, FM25



1000 GAL TANK ASSEMBLY

FM13V, FM25

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	105-274	4	SCREW (M10-1.50 X 20MM, 10.9)	
2	106-333	12	SCREW (M12-1.75 X 40MM, 8.8)	
3	106-387	10	FLG LOCKNUT (M10-1.50)	
4	106-390	6	WASHER (M10)	
5	106-654	4	SCREW (M10-1.50 X 16MM)	
6	106-709	12	FLG LK NUT (M12-1.75)	
7	107-240	2	LK BOLT (5/16-NC X 1", NLK)	
8	107-420	6	SCREW (M10-1.50 X 140MM)	
9	108-072	8	SCREW (#10-16 X 1.25", PAN PLPS)	
10	110-353	6	WORM CLAMP (3/4" TO 1-1/2")	
11	114-008	1	PLUG (32N, SQ, GALV)	
12	116-094	9	BULK HOSE (1", SOLD PER 1")	
13	116-094	9	BULK HOSE (1", SOLD PER 1")	
14	116-094	7	BULK HOSE (1", SOLD PER 1")	
15	149-955	1	FHC CONNECTOR (56-48NF)	
16	149-971	1	MANIFOLD	
17	153-549	2	BK CONNECTOR (48NF-48NF, NYL)	
18	153-596	2	ADAPTER (48NF-48W, ABS)	
19	153-635	1	ST ELBOW, (48W-48WF90, ABS)	
20	153-721	1	PLUG (16N POLY)	
21	157-490	4	BK CONNECTOR (16NF POLY)	
22	178-858	6	3/8" SPACER BUSHING	
23	196-010	2	U-BOLT CLAMP (3")	
24	305-805	1	TANK (POLYETHYLENE, 1000 GAL)	SEE FOOTNOTE 1
25	305-868	3	TANK STRAP	
26	305-875	1	TANK BASE	
27	308-751	2	MOUNTING BRACKET	
28	309-608	2	BRACKE, PIPE SUPPORT	
29	310-602	1	MOUNTING BRACKET	
30	313-259	1	SUCTION ELBOW	
31	313-262	1	VENTURI MOUNT, LH	
32	313-265	1	VENTURI MOUNT, LH	
33	314-381	1	PIPE (-48 X 73.75" ABS)	
34	323-114	1	BAFFLE	
35	323-152	1	RETAINER	
36	357-261	1	FILLWELL (16")	
37	357-263	1	TANK CAP (4")	
38	364-434	1	TANK CAP (16", VENTED)	
39	369-810	3	MIXING JET (16N,ORF.500", NY)	
40	514-210	1	ST ELBOW, POLY (48NM-48NF90)	
41	514-215	3	S/O COUPLER (16N-16H90)	
42	514-311	3	S/O COUPLER (16N-16H)	

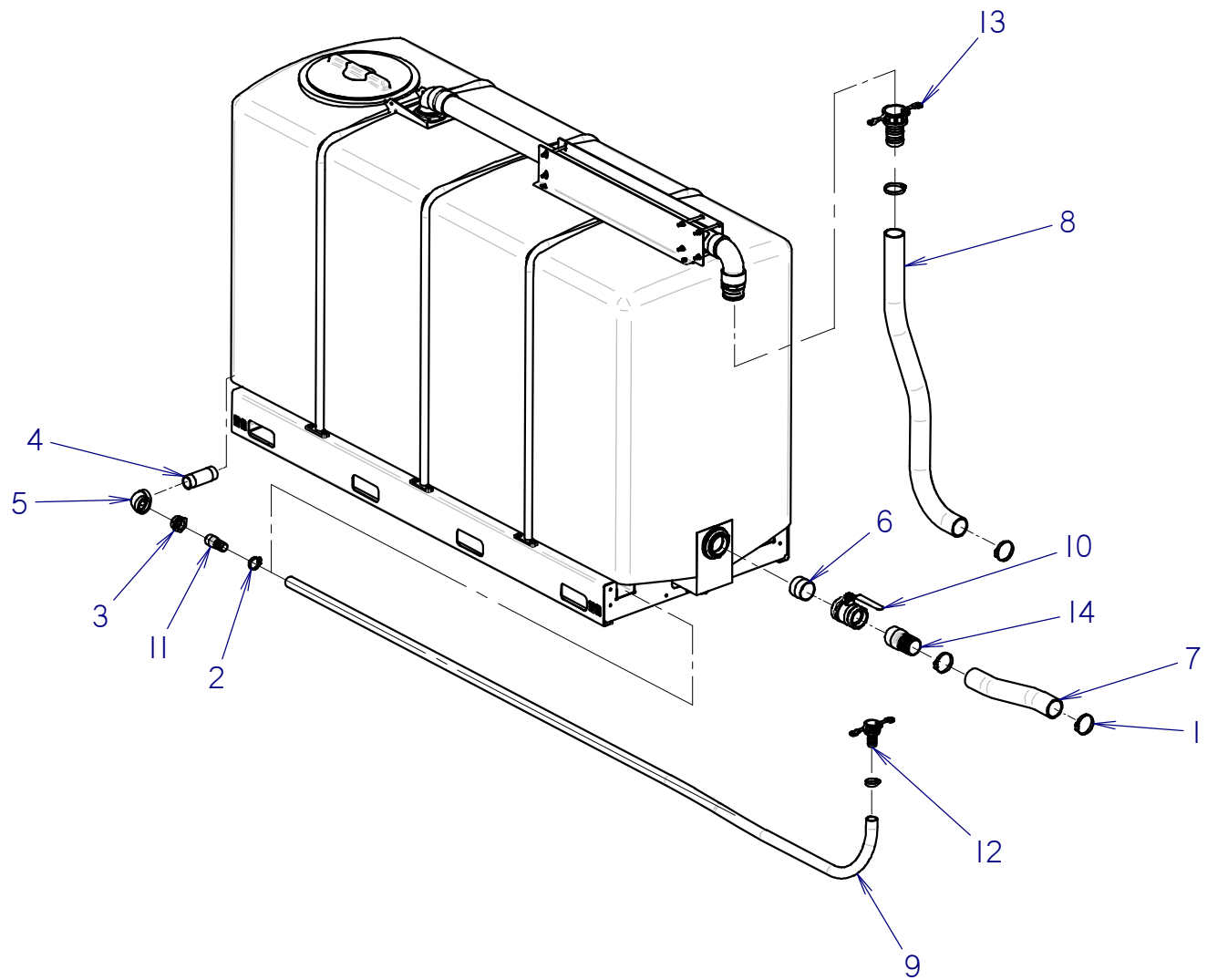
FOOTNOTES:

1. INCLUDES REFERENCE NUMBERS 9, 36, 37, & 38

NOTE:

1000 GAL TANK PLUMBING

FM13V



1000 GAL TANK PLUMBING

FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1	110-169	4	WORM CLAMP (2.812" TO 3.750")	
2	110-250	2	WORM CLAMP (1.25" TO 2.125")	
3	115-087	1	REDUCER (32N - 24NF)	
4	115-185	1	NIPPLE (32N-6")	
5	115-293	1	ELBOW (32NF-32NF90)	
6	115-299	1	NIPPLE (48N-3")	
7	116-506	30	BULK HOSE (3", SOLD PER FT)	
8	116-506	72	BULK HOSE (3", SOLD PER FT)	
9	116-588	160	BULK HOSE (1-1/2", SOLD PER FT)	
10	120-060	1	SHUT-OFF (48NF-48NF)	REPLACEMENT PART 499-400 LEVER
11	155-188	1	S/O COUPLER (24N-24H)	
12	155-205	1	FHC BODY (20-24H)	REPLACEMENT PART 116-491 SQUARE RING
13	155-264	1	FHC BODY (56-48H)	REPLACEMENT PART 116-736 SQUARE RING
14	514-168	1	S/O ADAPTER (48N-48H)	

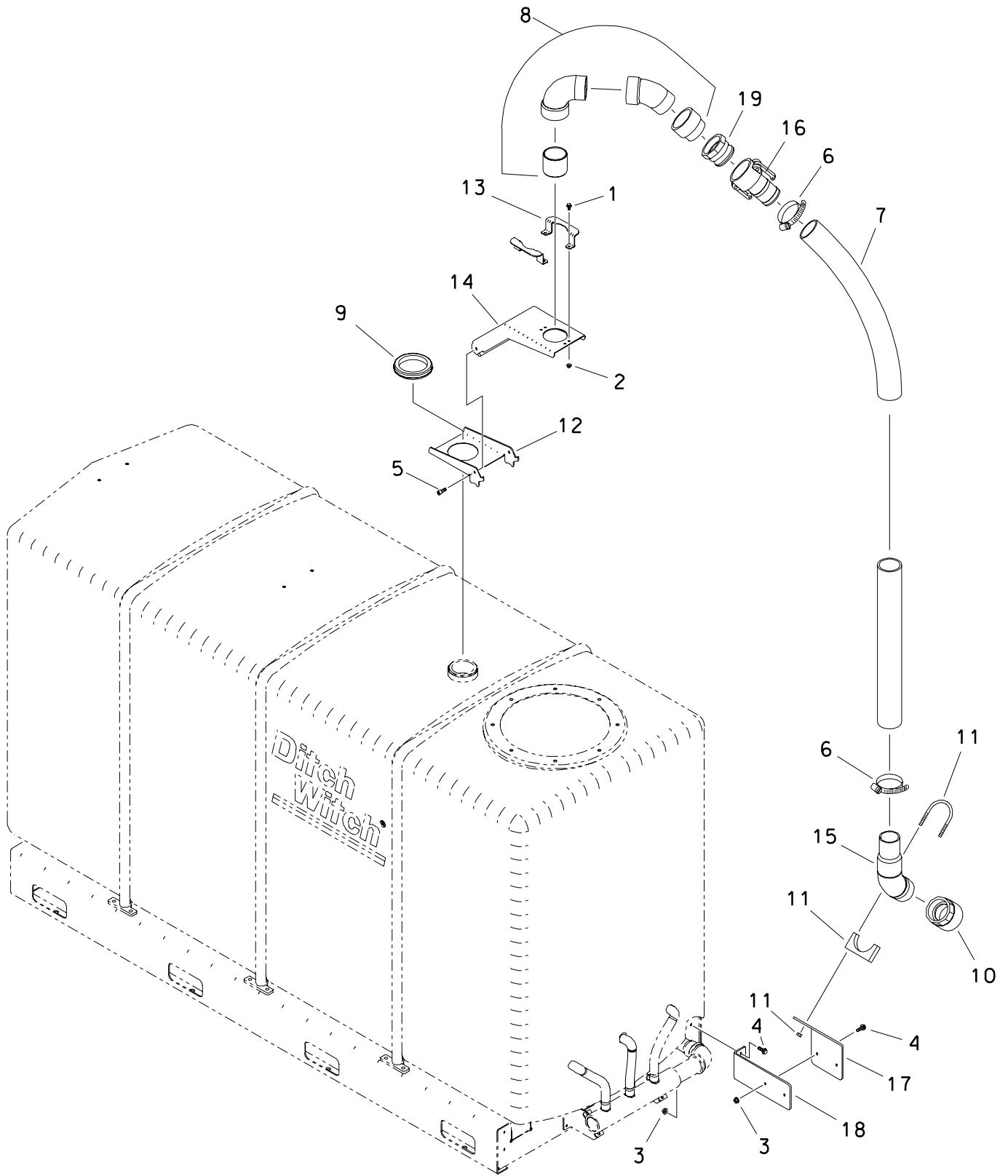
NOT SHOWN:

FOOTNOTES:

NOTE:

1. REFERENCE NUMBERS 1-14 ARE INCLUDED IN FM13V 1000 GALLON TANK SHIP KIT

FM50 TANK FILL PLUMBING



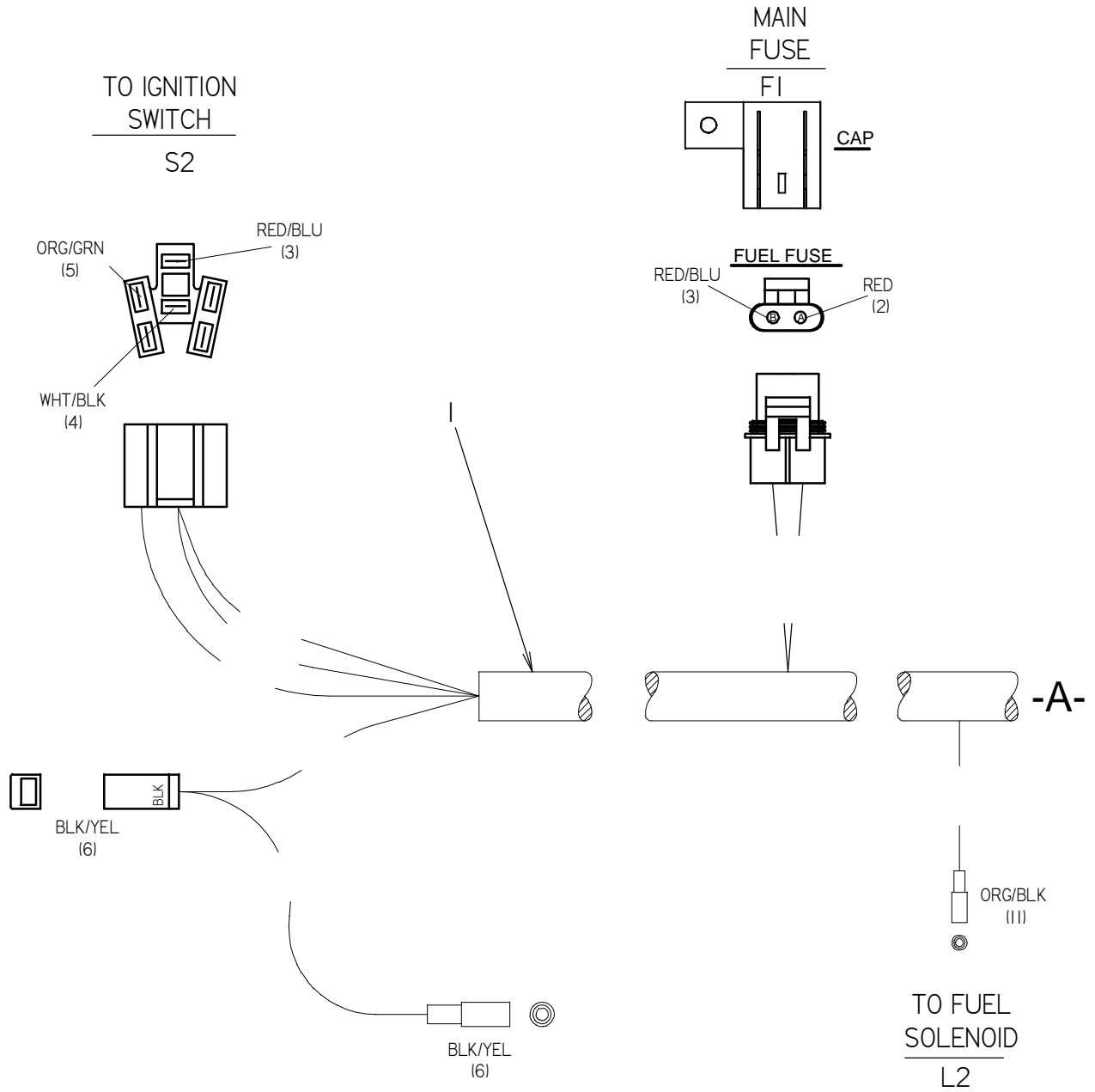
FM50 TANK FILL PLUMBING

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	101-093		TANK FILL KIT	
1.	106-380	4	FLG LK SCREW (M8-1.25 X 16MM)	
2.	106-386	4	FLG LOCKNUT (M8-1.25)	
3.	106-387	4	FLG LOCKNUT (M10-1.50)	
4.	106-724	4	FLG SCREW (M10-1.50 X 25MM)	
5.	107-746	2	SHLD BLT (M10 X 12MM, M8-1.25)	
6.	110-367	2	WORM CLAMP (3-1/4" TO 4-1/8")	
7.	116-506	AR	BULK HOSE (3", SOLD PER 1')	USE 1 @ 55.0"
8.	315-754	1	TANK FILL ELBOW	
	153-635	-	ST ELBOW, (48W-48WF90, ABS)	
	153-707	-	ST ELBOW, (48W-48WF45, ABS)	
	315-489	-	PIPE (-48 X 3.00", ABS)	
	153-596	-	ADAPTER (48N-48W, ABS)	
9.	153-549	-	BK CONNECTOR (48NF-48NF, NYL)	
10.	153-368	1	FHC BODY (3-1/2" FHC X 3"NPTF)	
	116-736		SQUARE RING GASKET (48)	
11.	195-993	1	U-BOLT CLAMP (3.5")	
12.	310-602	-	MOUNTING BRACKET	
13.	310-927	2	RETAINER BRACKET	
14.	315-438	1	MOUNTING BRACKET	
15.	315-488	1	ELBOW	
16.	155-264	1	FHC BODY (56-48H)	
	116-736		SQUARE RING GASKET (48)	
17.	315-490	1	BRACKET	
18.	315-491	1	BRACKET	
19.	149-955	1	FHC CONNECTOR (56-48NF)	

FOOTNOTES

FM13V HARNESS

FM13V HARNESS

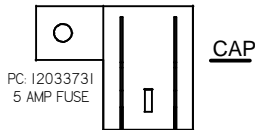


FM13V HARNESS

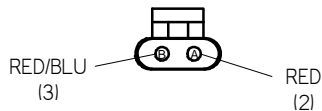
FM13V HARNESS

MAIN
FUSE

F1



FUEL FUSE



B RED/BLU (3)



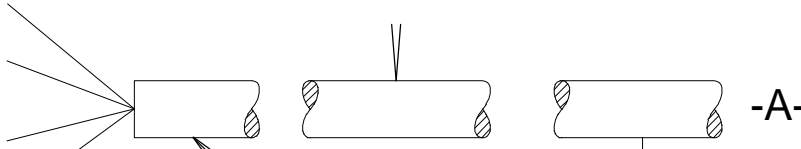
S WHT/BLK (4)



A ORG/GRN (5)



M BLK/YEL (6)



-A-

TO IGNITION
SWITCH

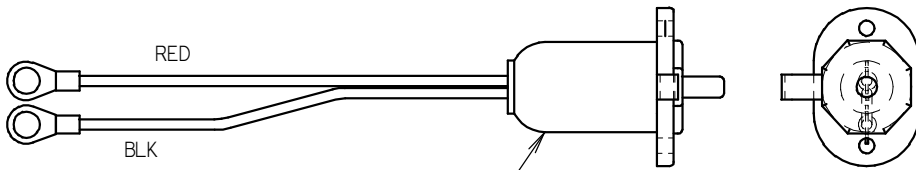
S2

TO FUEL
SOLENOID

L2

A RED

M BLK

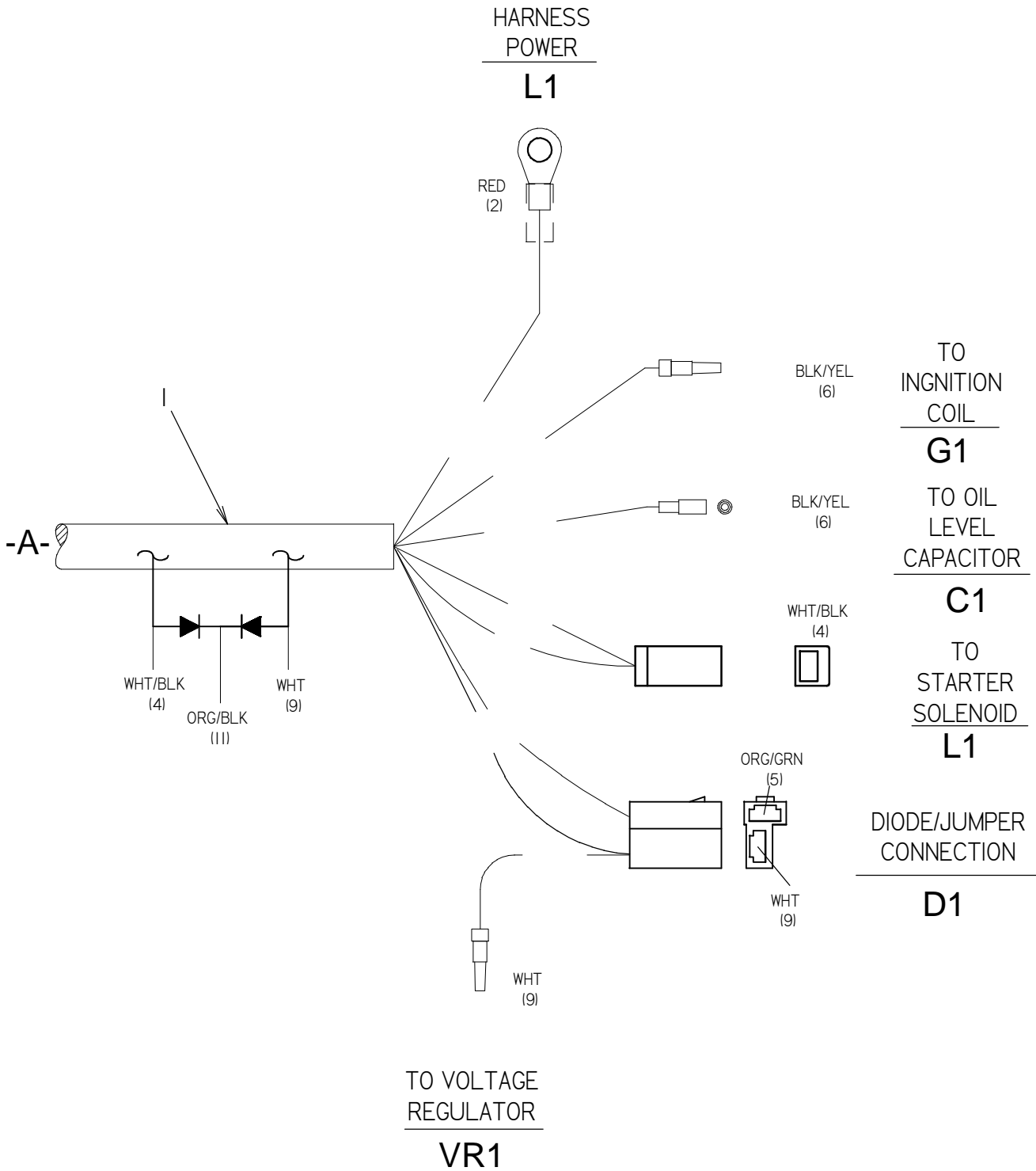


12V
ACCESSORY
SOCKET

E2

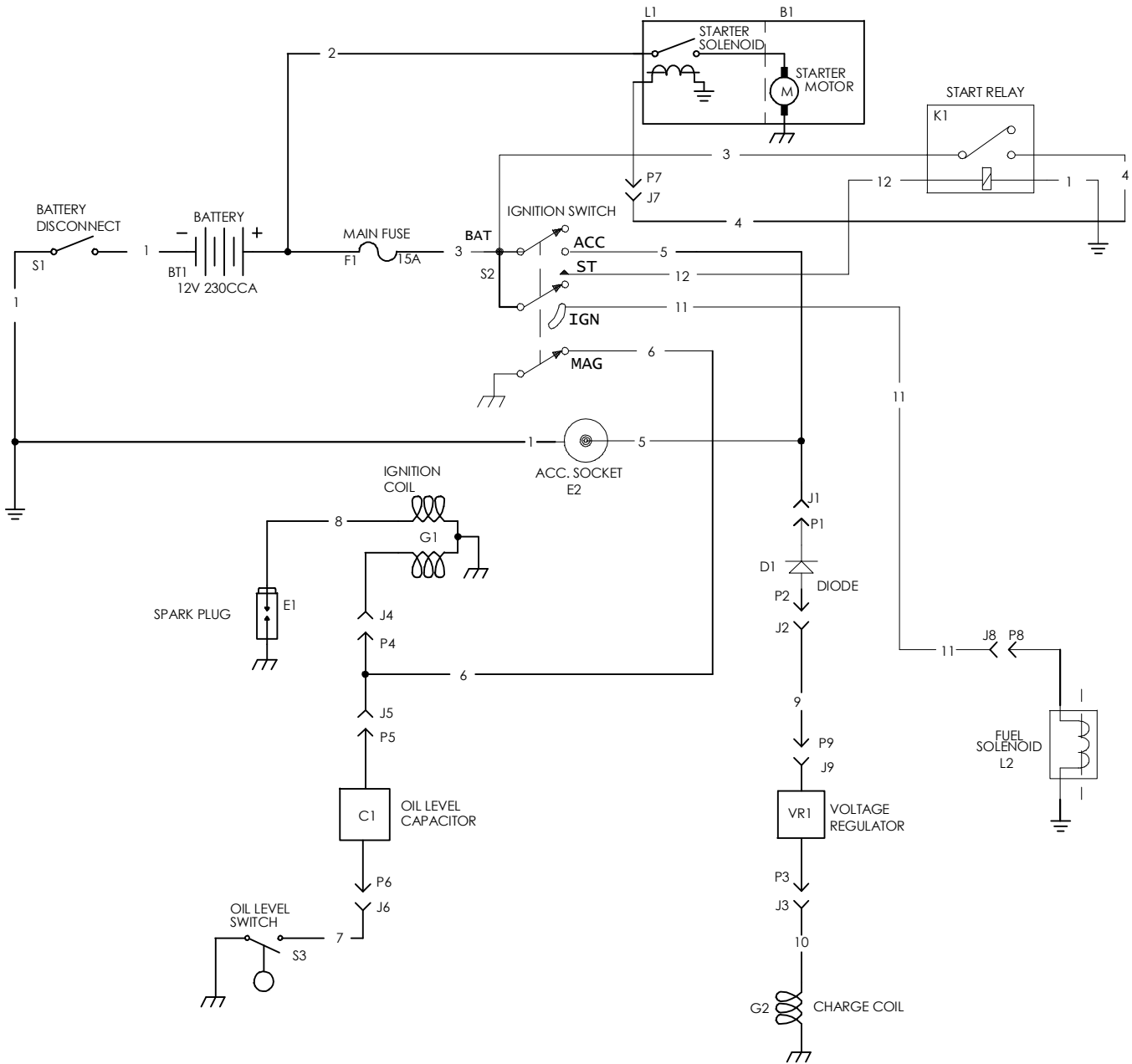
2

FM13V HARNESS
FM13V HARNESS



ELECTRICAL SCHEMATIC FM13V

3 AMP CHARGE CIRCUIT



ELECTRICAL SCHEMATIC

FM13V

ELECTRICAL COMPONENTS			
Ref. #	Part #	Component	Notes
B1	194-443	Starter	
BT1	215-256	Battery	12V, 230 CCA, RC30
C1	See Notes	Oil Level Capacitor	No service Part Available
E1		Spark Plug	
F1	217-811	Main Fuse	15A ATC
G1	See Notes	Transistorized Ignition Coil	No Service Parts Available
G2	See Notes	Charge Coil (3A)	No service Part Available, - 3 Amp Charge Circuit Only
J1	See Notes	Diode Connection	
J3	See Notes	Charge Coil Connection	
J4	See Notes	Ignition coil connection	
J5	See Notes	Oil Level Capacitor Connection	
J6	See Notes	Oil Level Switch Connection	
J7	See Notes	Start Connection	
J8	See Notes		
J9	See Notes		
K1	217-710	Start Relay	Micro (SPDT)
L1	499-572	Starter Solenoid	
L2	195-1124	Fuel Solenoid	
P1	See Notes	Diode Connection	
P3	See Notes	Charge Coil Connection	
P4	See Notes	Ignition coil connection	
P5	See Notes	Oil Level Capacitor Connection	
P6	See Notes	Oil Level switch Connection	
P7	See Notes	Start Connection	
P8	See Notes	Fuel Solenoid Connection	
P9	See Notes	Voltage Regulator Connection	
S1	217-819	Battery Disconnect	
S2	215-164	Ignition Switch	215 020 Key; Ends w/Sn:
S2	215-1282	Ignition Switch	Begins w/Sn:
S3	See Notes	Oil Level Switch	Part of Engine
VR1	213198	Voltage Regulator Connection	Male Bullet (yellow Wire) connects to female bullet on engine charge coil

ELECTRICAL SCHEMATIC

FM13V

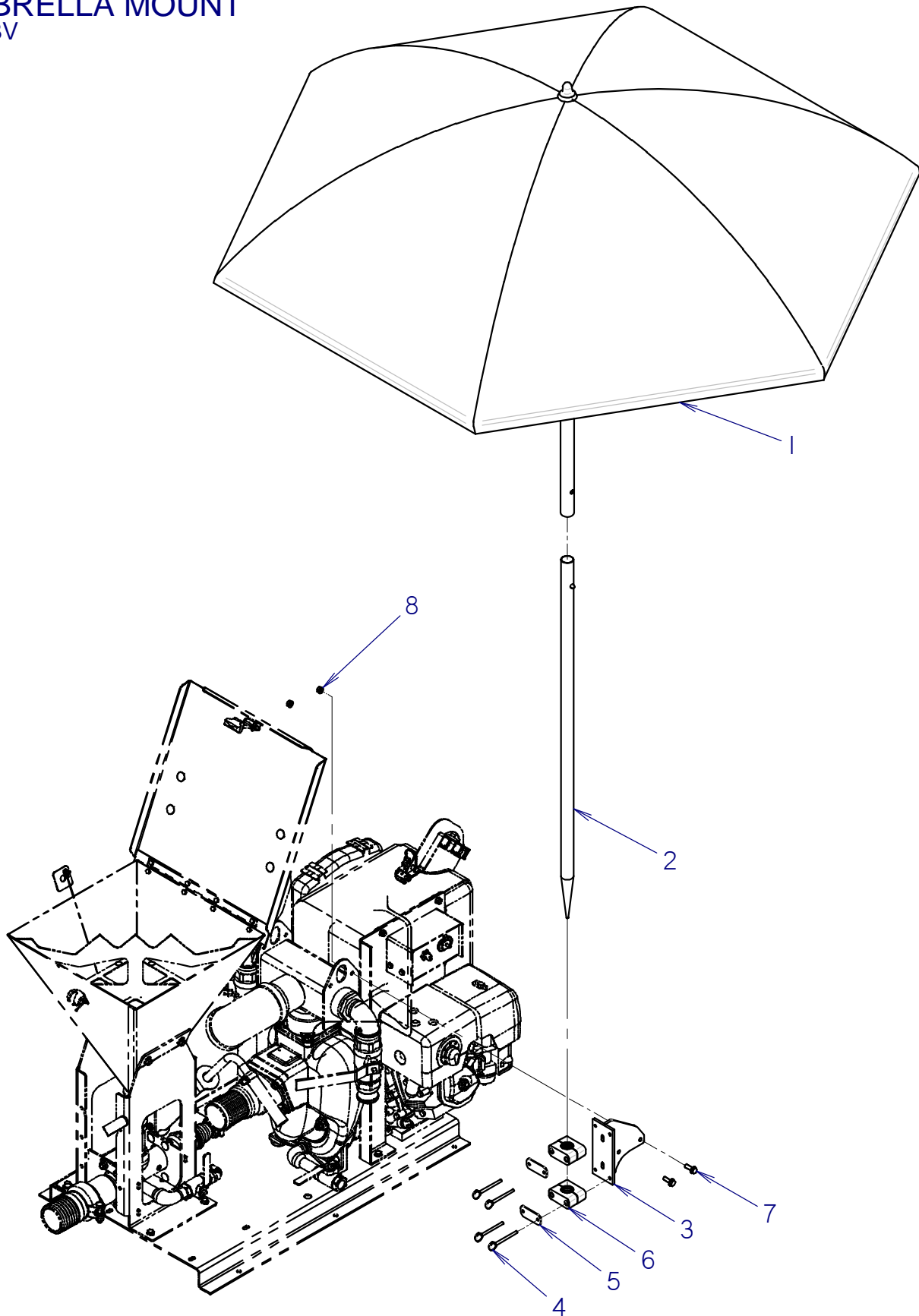
ELECTRICAL CIRCUITS

Circuit #	Wire Color	Function
1	blk	System Ground
2	red	Battery
3	red/blu	Fused Battery
4	wht/blk	Start Circuit
5	org/grn	Ignition Circuit
6	blk/yel	Magneto Shutdown Circuit
7	yel	Oil Level Switch to Oil Level Capacitor
8	blk	Spark Plug Wire
9	wht	Diode Anode to Voltage Regulator
10	wht	Voltage regulator to Charge Coil
11	org/blk	Diode Cathode to Fuel Solenoid
12	white	Start Relay

ELECTRICAL HARNESS

Ref. #	Part #	Qty.	Description
1	215-1212	1	FM13V HARNESS (ENDS WITH/Sn:
1	215-1610	1	FM13V HARNESS (BEGINS WITH/Sn:
2	214-253	1	Accessory Socket (Req's 1x - 215-872 Packard terminal, 1x 213-074 bullet)

UMBRELLA MOUNT FM13V



UMBRELLA MOUNT FM13V

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	190-1191		UMBRELLA KIT - FM13V	
1	344-700	1	UMBRELLA	INCLUDES REF. 2 308-652 UMBRELLA POLE
2	308-652	1	UMBRELLA POLE	
3	300-3184	1	UMBRELLA BRACKET	
4	105-621	4	WING BOLT (1/4-NC X 3")	
5	322-362	2	BACKUP SPACER	
6	111-026	2	BOLT-ON CLAMP (1-1/4", PAIR)	
7	106-381	2	FLG LK SCREW (M8-1.25 X 25MM)	
8	106-386	2	FLG LOCKNUT (M8-1.25)	

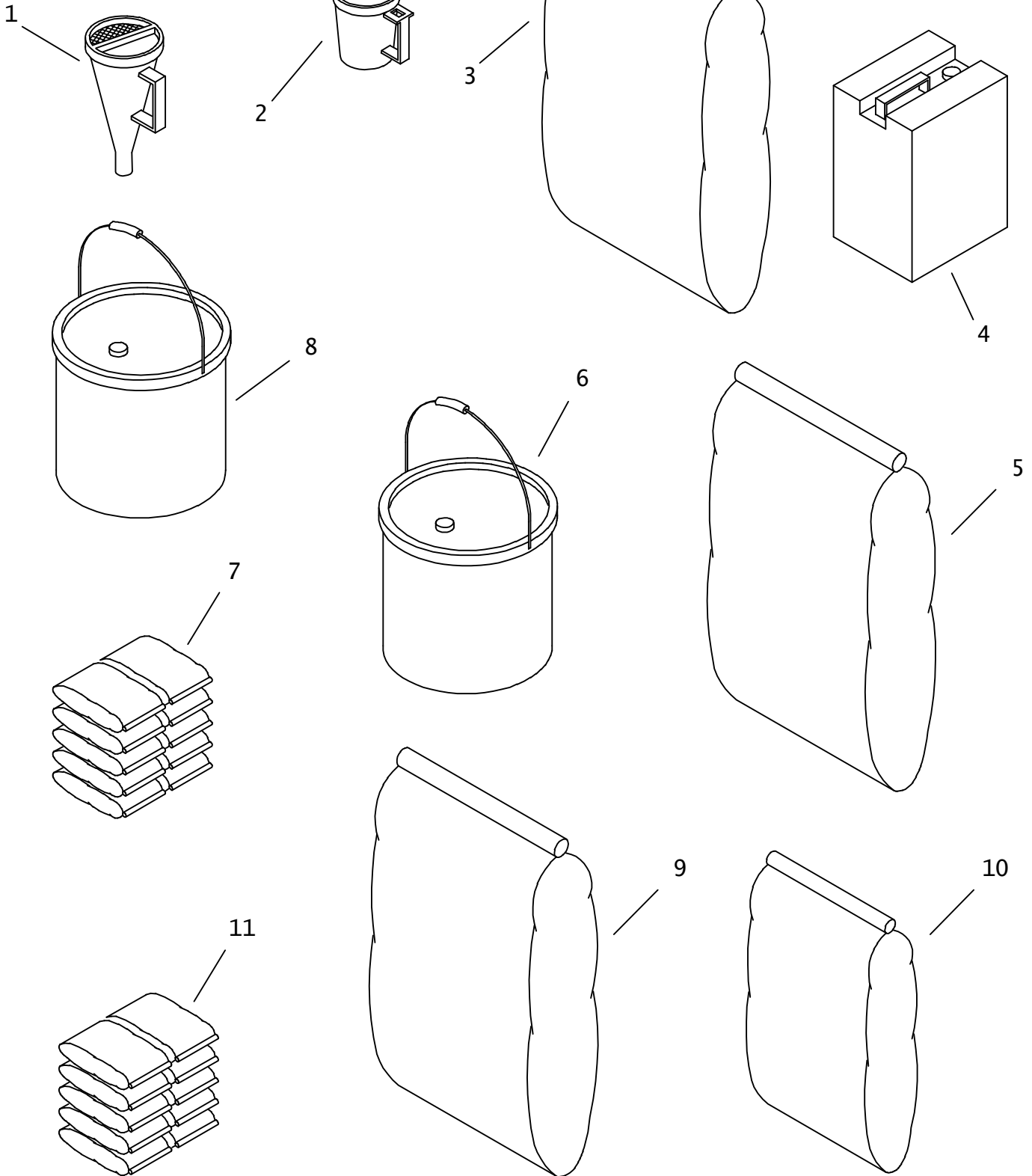
NOT SHOWN:

FOOTNOTES:

NOTE:

ACCESSORIES

FLUID MIXING ACCESSORIES



FLUID MIXING ACCESSORIES

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1.	259-195	1	VISCOSITY FUNNEL	
2.	259-196	1	VISCOSITY CUP	
3.	259-804	AR	BENTONITE, QUIK-GEL (50 LB)	
4.	259-805	AR	LIQUID POLYMER, EZ-MUD (5 GAL)	
5.	259-807	AR	BENTONITE, BORE-GEL (50 LB)	
6.	259-808	AR	VISCOSIFIER, LIQUI-TROL (5 GAL)	
7.	259-809	AR	POWDER POLYMER, QUIK-TROL (20 LB)	
8.	259-810	AR	WET AGENT, CON-DET (5 GAL)	
9.	259-821	AR	'PAC-R' FILTRATION CONTROL	
10.	259-822	AR	'BARAZAN D+' VISCOSIFIER	
11.	259-832	AR	'NO SAG' (20# BOX/10-2#BAGS)	

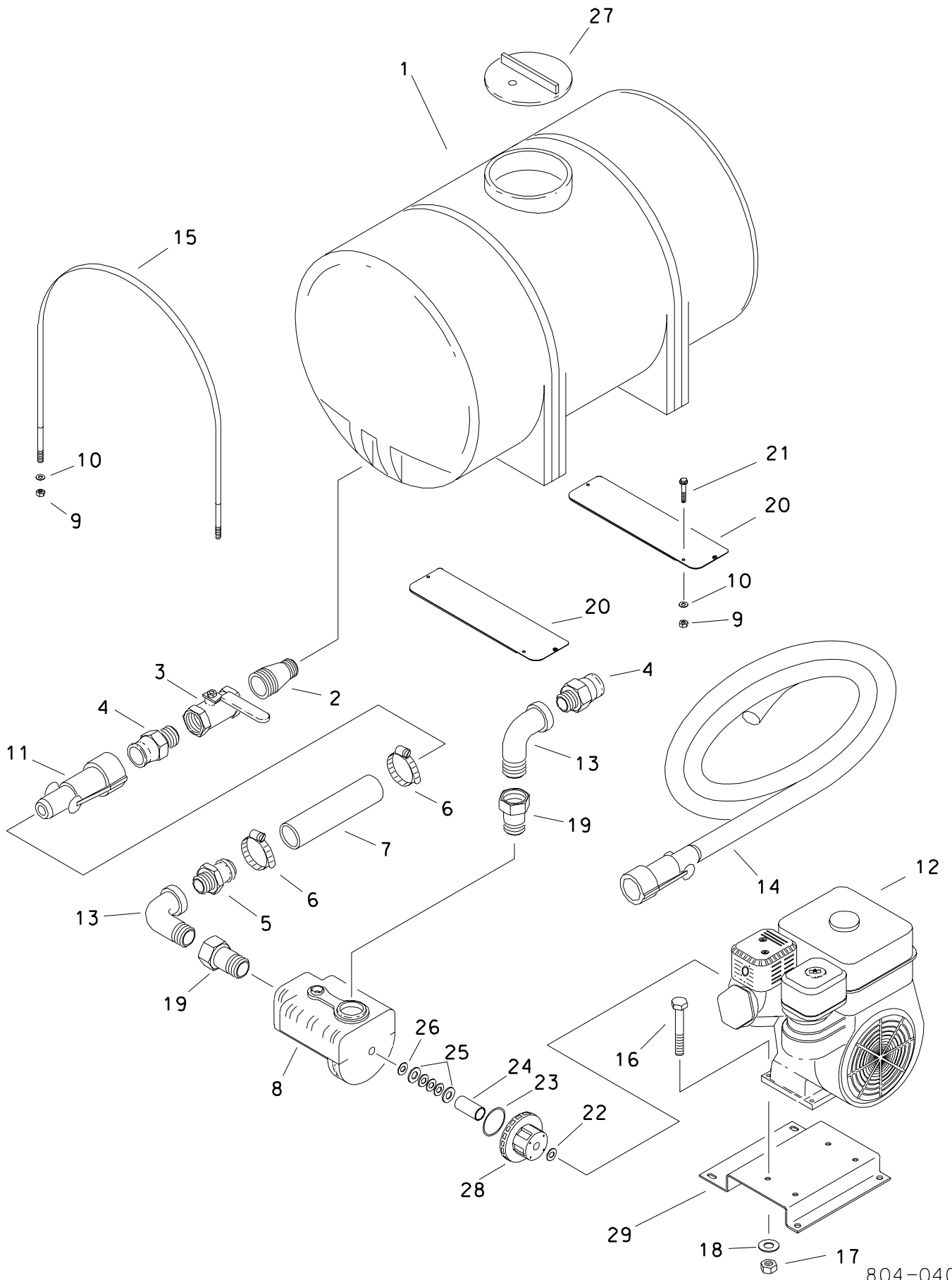
NOT SHOWN:

191-158	1	DRILLING FLUID TEST KIT
259-487	1	SHEAROMETER

FOOTNOTES:

NOTE:

WATER TRANSFER SYSTEM

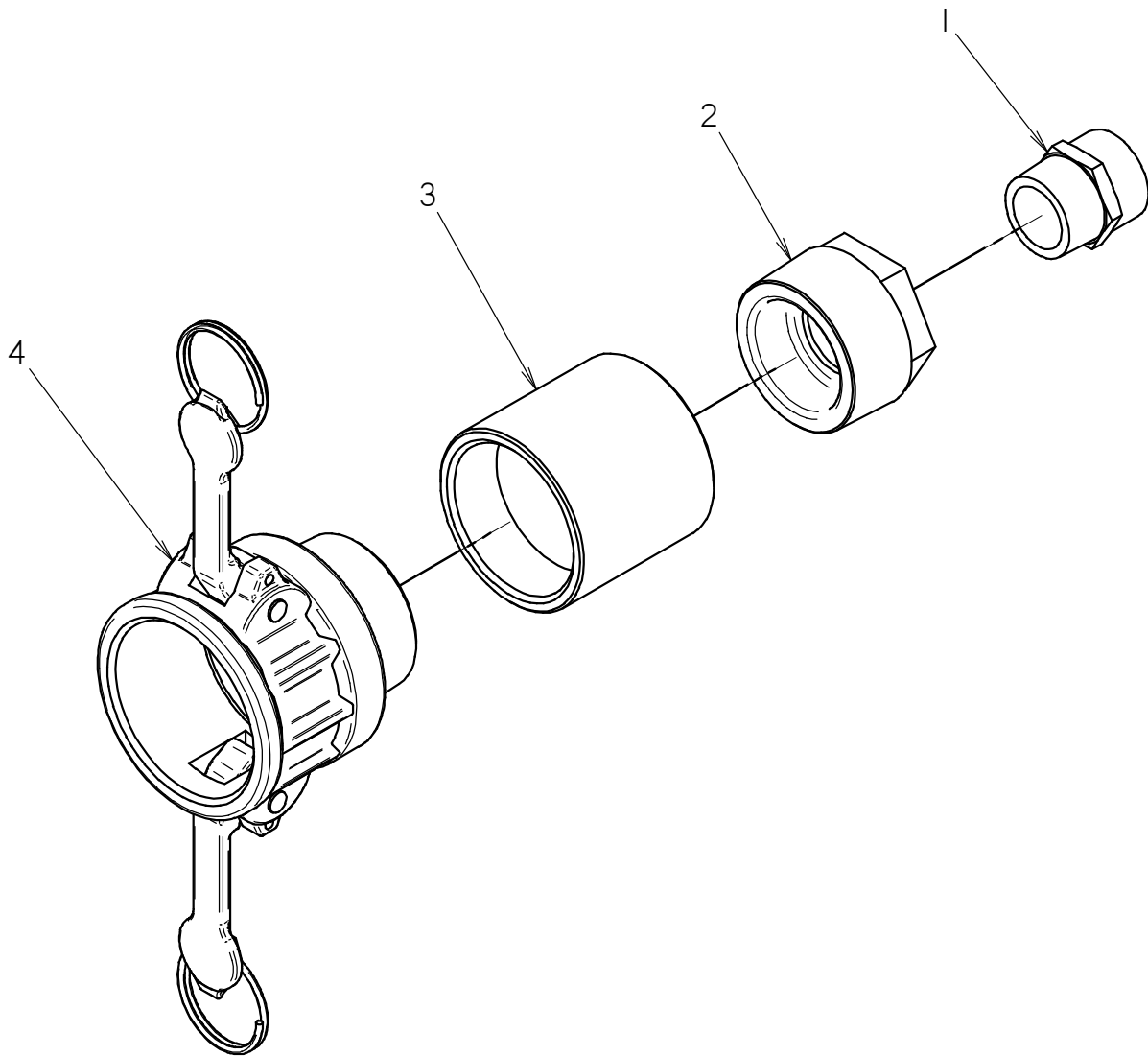


WATER TRANSFER SYSTEM

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	100-956		WATER TRANSFER SYSTEM	
1.	364-314	1	STORAGE TANK (325 GAL)	
	190-053		POLY-PATCH TANK REPAIR KIT	
2.	115-437	1	SWEDGE NIPPLE (32N-24N-6.5")	
3.	120-023	1	SHUT-OFF (24NF-24NF)	
4.	155-204	2	FHC ADAPTER (20-24N)	
5.	155-188	1	SLIP-ON COUPLER (24N-24H)	
6.	110-250	2	WORM CLAMP (1-1/4" TO 2-1/8")	
7.	116-782	AR	BULK HOSE (1-1/2", SOLD PER 1")	USE 1 @ 18"
8.	149-929	1	CENTRIFUGAL PUMP	INCL REF NO.'S 22 - 26
9.	105-065	4	LOCKNUT (1/2-NC)	
10.	105-071	4	WASHER (1/2")	
11.	155-205	1	FHC BODY (20-24H)	
	116-491		SQUARE RING (___ D70)	
12.	195-028	1	ENGINE-HONDA	
13.	115-044	2	STREET ELBOW (24N-24NF90)	
14.	154-440	1	HOSE (20FHC-300"-44)	
15.	365-374	2	TANK STRAP	
16.	105-130	4	BOLT (5/16-NC X 2-1/4")	
17.	105-089	4	LOCKNUT (5/16-NC)	
18.	105-117	4	WASHER (5/16")	
19.	115-087	2	REDUCER (32N-24NF)	
20.	344-901	2	BASE PLATE	
21.	105-067	2	BOLT (1/2-NC X 2-3/4")	
22.	500-860	1	SLINGER	
23.	500-248	1	O-RING (246 D70)	
24.	180-817	1	SLEEVE	
25.	191-017	1	PUMP SEAL KIT	
26.	165-834	1	SHIM (.015", IMPELLER)	
27.	364-434	1	TANK CAP (16", VENTED)	
28.	194-044	1	ENGINE ADAPTER	FOR HONDA & LOMBARDINI 5.5 HP ENGINES
29.	346-350	-	ENGINE MOUNT PLATE	NOT INCLUDED WITH SYSTEM

FOOTNOTES

GARDEN HOSE ADAPTER



GARDEN HOSE ADAPTER

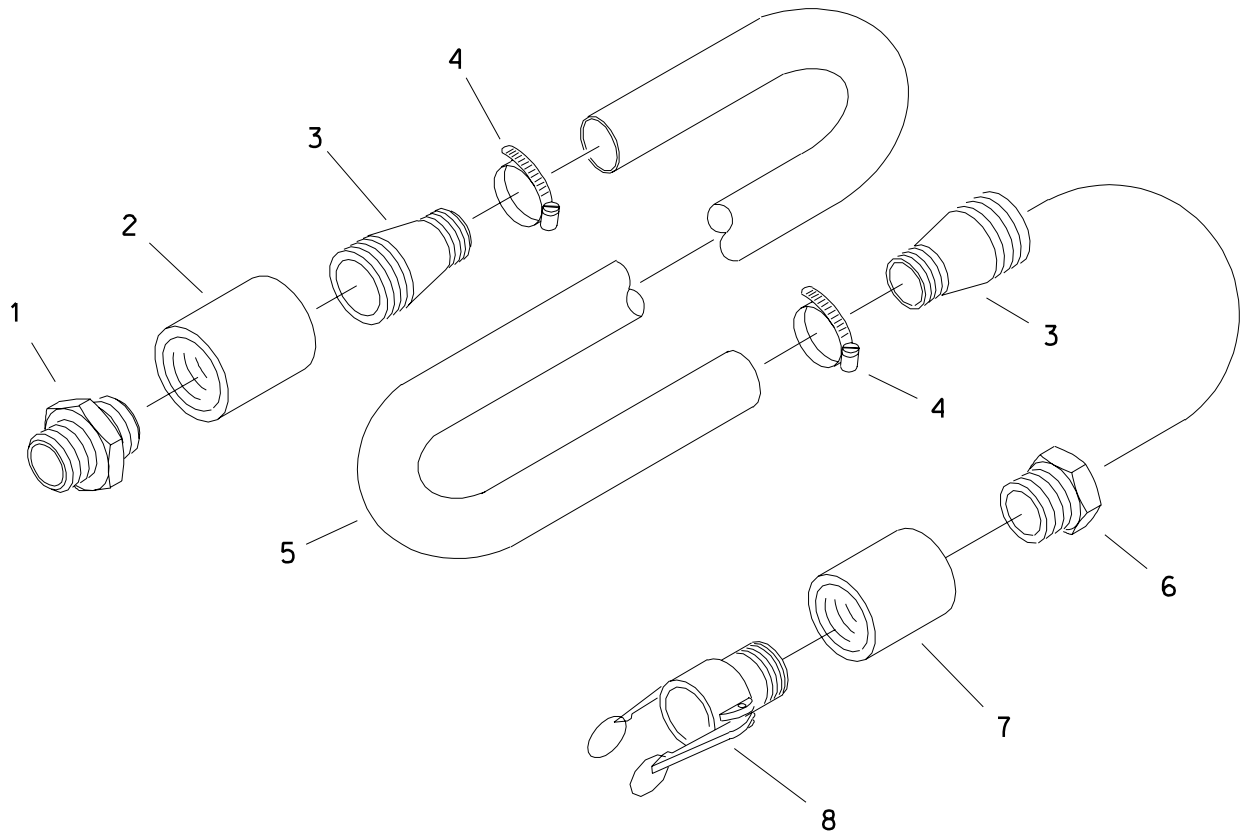
REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	159-891		GARDEN HOSE ADAPTER	INCL. REF No's 1 - 4
1	114-038	1	NIPPLE (12N-12NH)	
2	115-271	1	REDUCER (24N-12NF)	
3	115-134	1	COLLAR (24NF)	
4	159-500	1	FHC BODY (24-24N)	

NOT SHOWN:

FOOTNOTES:

NOTE:

DRILLING FLUID TRANSFER

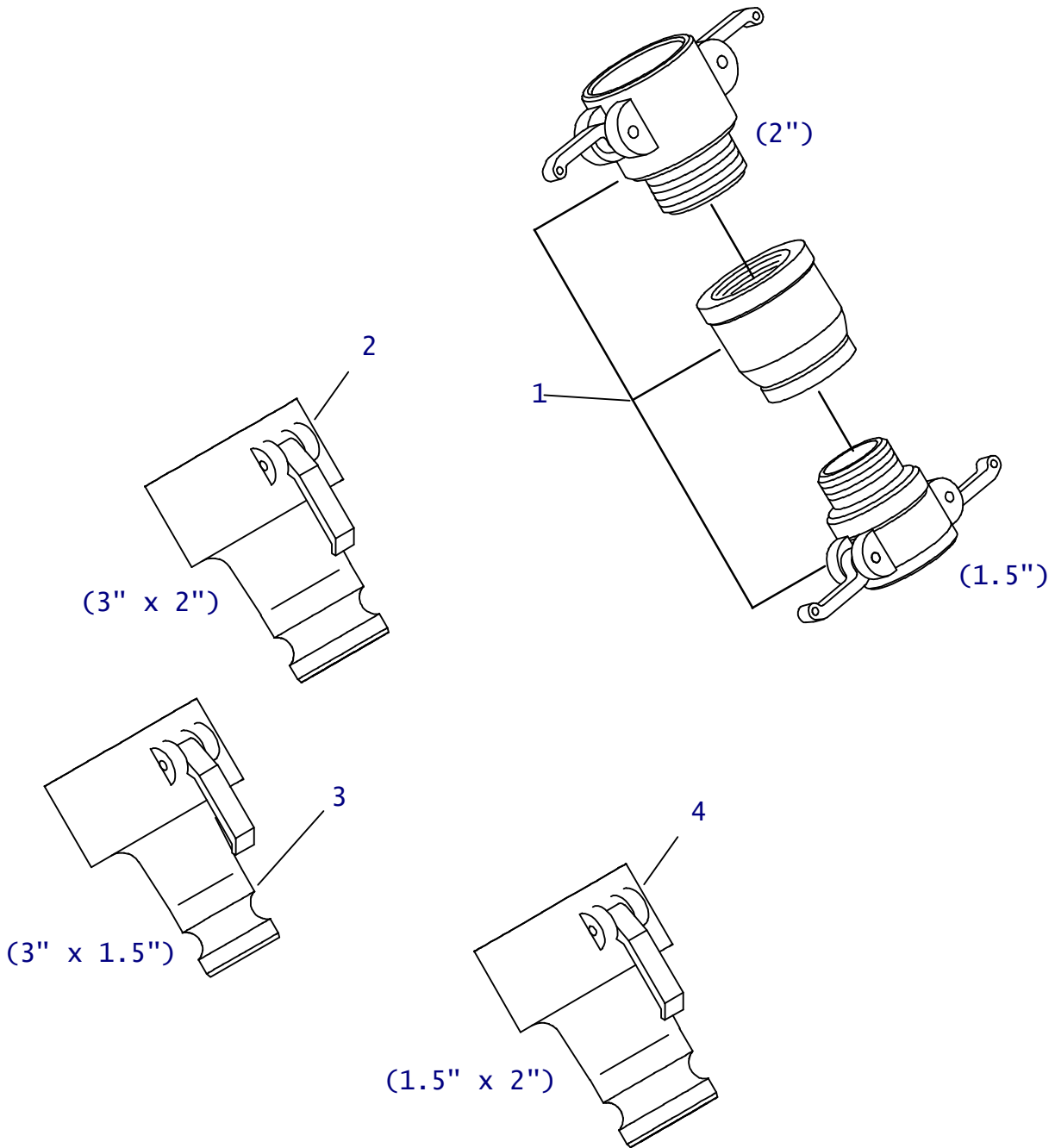


DRILLING FLUID TRANSFER

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
	159-890	-	TRANSFER HOSE ASSEMBLY	
1.	155-232	1	FHC ADAPTER (16-16N)	
2.	115-175	1	COLLAR (16NF)	
3.	514-311	2	S/O COUPLER (16N-16H)	
4.	110-353	2	WORM CLAMP (3/4" TO 1-1/2")	
5.	117-451	-	1" SUCTION HOSE (SOLD PER FT)	1 @ 50'
6.	514-314	1	REDUCER (24N-16NF)	
7.	115-134	1	COLLAR (24NF)	
8.	159-500	1	FHC BODY (24-24N)	

FOOTNOTES

FLUID COUPLER ADAPTERS



FLUID COUPLER ADAPTERS

REF NO.	PART NUMBER	QTY	DESCRIPTION	REMARKS
1.	191-226	1	FLUID COUPLER KIT	
	159-485	1	FHC BODY (32-32N)	
	157-300	1	FITTING	
	159-500	1	FHC BODY (24-24N)	
2.	157-792	1	FHC CPLR X ADPTR (48-32)	
	116-736	-	SQUARE RING GASKET (48)	
3.	157-793	1	FHC CPLR X ADPTR (48-24)	
	116-736	-	SQUARE RING GASKET (48)	
4.	150-1520	1	FHC CPLR X ADPTR (32-24)	
	116-735	-	GASKET (32)	

NOT SHOWN:

FOOTNOTES:

NOTE:

MISCELLANEOUS

SAE Bolt and Nut Torque Value Chart

Grade 5: UNC or UNF Thread

Size	Hex nut, or bolt tapped into hex nut, or d&t hole		Hex top deformed locknut		Flange nut, locknut, or bolt tapped into flange nut or d&t* hole	
	ft•lb	N•m	ft•lb	N•m	ft•lb	N•m
1/4	12	16	8	11	20	27
5/16	25	34	15	20	45	60
3/8	40	54	25	34	75	100
7/16	65	90	40	55	125	170
1/2	100	135	60	80	190	260
9/16	150	200	90	125	270	370
5/8	200	270	120	165	370	500
3/4	350	475	210	285	650	880
7/8	560	760	340	460	1250	1425
1	840	1140	500	680	1580	2145
1-1/8	1030	1400	320	840	1950	3645
1-1/4	1460	1980	880	1195	2760	3475

Grade 8: UNC or UNF Thread

Size	Hex nut, or bolt tapped into hex nut, or d&t hole		Hex top deformed locknut		Flange nut, locknut, or bolt tapped into flange nut or d&t* hole	
	ft•lb	N•m	ft•lb	N•m	ft•lb	N•m
1/4	14	19	10	14	24	33
5/16	30	40	18	25	50	70
3/8	55	73	35	50	90	125
7/16	85	115	50	70	140	190
1/2	130	175	80	110	220	300
9/16	190	260	110	150	310	420
5/8	260	355	160	245	430	585
3/4	450	610	270	365	750	1015
7/8	730	990	440	600	1210	1640
1	1090	1480	650	880	1320	2465
1-1/8	1550	2100	930	1260	2580	3500
1-1/4	2180	2955	1310	1780	3640	4935

*drilled and tapped

Metric Bolt and Cap Screw Torque Values

Size	Class 4.8				Class 8.8 and 9.8				Class 10.9				Class 12.9			
	Lubricated		Dry		Lubricated		Dry		Lubricated		Dry		Lubricated		Dry	
	N•m	ft•lb	N•m	ft•lb	N•m	ft•lb	N•m	ft•lb	N•m	ft•lb	N•m	ft•lb	N•m	ft•lb	N•m	ft•lb
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1600	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

Do not use these values if a different torque value or tightening procedure is given for specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class fasteners.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to strength of original.

Make sure fastener threads are clean and that the threads are properly started. This will prevent them from cross threading or galling when tightened.

Tighten plastic insert or crimped type steel locknuts to approximately 50% of dry torque indicated on chart. Apply torque to the nut - not the bolt head. Tighten toothed or serrated type locknuts to full torque value.

LUBRICATED means coated with lubricant. DRY means plain or zinc plated without any type of lubricant.

Hydraulic Cylinder Bolt Torque Chart

Bolt Size (inch)	Bolt Part No.	Cylinder Repair Kit Part No.	Torque (ft•lb)	Torque (N•m)
1/2	106-096	190-165	90-100	120-135
5/8	106-097	190-166 & 190-169	180-200	245-270
3/4	106-098	190-167 & 190-170	290-325	395-440
7/8	106-122	190-172 & 190-174	410-640	550-625
1	106-145	190-175 & 190-189	630-700	855-950
1-1/8	106-146	190-177	770-850	1045-1170

As a general rule:

- 1/2-inch bolts are used in cylinders with 1-inch rods
- 5/8-inch bolts are used in cylinders with 1 1/4-inch rods
- 3/4-inch bolts are used in cylinders with 1 1/2-inch rods
- 7/8-inch bolts are used in cylinders with 1 3/4-inch rods
- 1-inch bolts are used in cylinders with 2-inch rods (one with 1 3/4-inch)
- 1-1/8-inch bolts are used in cylinders with 2-1/4-inch rods

IMPORTANT: Do not reuse cylinder piston bolts when rebuilding a hydraulic cylinder. Each cylinder repair kit contains a new bolt. Use it. Lubricate lightly and torque to value shown on chart.

SAE & ORS Hydraulic Fitting Replacement O-Ring Chart

Fraction Size	Dash Size	SAE (Port Seal O-Ring)		ORS (Face Seal O-Ring)	
		Thread Size	O-Ring P/N	Thread Size	O-Ring P/N
1/16	1	NA	NA	NA	NA
1/8	2	5/16 - 24	NA	NA	NA
3/16	3	3/8 - 24	NA	NA	NA
1/4	4	7/16 - 20	155-760	9/16 - 18	157-037
5/16	5	1/2 - 20	NA	NA	NA
3/8	6	9/16 - 18	155-705	11/16 - 16	157-038
1/2	8	3/4 - 16	155-706	13/16 - 16	157-039
5/8	10	7/8 - 14	155-707	1 - 14	157-040
3/4	12	1-1/16 - 12	155-709	1-3/16 - 12	157-017
7/8	14	1-3/16 - 12	155-747	NA	NA
1	16	1-5/16 - 12	155-748	1-7/16 - 12	155-714
1-1/4	20	1-5/8 - 12	155-702	1-11/16 - 12	NA
1-1/2	24	1-7/8 - 12	157-001	2 - 12	NA
2	32	2-1/2 - 12	NA	NA	NA
2-1/2	40	3 - 12	NA	NA	NA
3	48	3-1/2 - 12	NA	NA	NA

Thread size indicates the diameter of the threaded area in fractions of an inch and number of threads per inch.

NA = not a current CMW part numbered o-ring, or dash size does not occur in current CMW applications

SAE = straight thread fitting that seals by sandwiching a hard o-ring between a shoulder on the male part and an angular surface at the mouth of the female port.

ORS = o-ring face seal; a type of fitting that seals by compressing a hard, captive o-ring between two flat parallel faces, one grooved for the o-ring and the other plain to act as the sealing surface

FM Series

Related Publications

Component	Ass'y	P/N
Model:		
Fluid Mixers Parts Manual		053-478
Fluid Mixers Operators Manual		054-513
Fluid Mixers Repair Guide (Service Manual)		N/A
Fluid Mixers Supplementary Maint. Guide - Trenchless		055-485
Fluid Mixers Special Tools Guide		052-901
Engine:		
MM5		
Honda 5.5hp Parts Manual - GX160K1TX	195-028	053-042
Honda 5.5hp Operators Manual - GX160K1TX		N/A
Honda 5.5hp Service (Shop) Manual - GX160K1TX		N/A
Lombardini 5.5hp ... Parts Manual - 15LD315K	195-196	N/A
Lombardini 5.5hp ... Operators Manual - 15LD315K		N/A
Lombardini 5.5hp ... Service (Shop) Manual - 15LD315K		N/A
MM9		
Honda 9hp Parts Manual - GX270PA2	195-194	N/A
Honda 9hp Operators Manual - GX270PA2		N/A
Honda 9hp Service (Shop) Manual - GX270PA2		N/A
Lombardini 10hp ... Parts Manual - 6LD435	195-197	N/A
Lombardini 10hp ... Operators Manual - 6LD435		N/A
Lombardini 10hp ... Service (Shop) Manual - 6LD435		N/A
FM5		
Honda 5.5hp Parts Manual - GX160K1TX	195-028	053-042
Honda 5.5hp Parts Manual - GX160K1QX	194-598	053-042
Honda 5.5hp Operators Manual - GX160K1TX & GX160K1TX		N/A
Honda 5.5hp Service (Shop) Manual - GX160K1TX & GX160K1TX		N/A
FM13		
Honda 13hp Parts Manual - GX390K1QXC	195-278	053-047
Honda 13hp Operators Manual - GX390K1QXC		N/A
Honda 13hp Service (Shop) Manual - GX390K1QXC		055-047
FM50		
Kubota Parts Manual – V3300EBG	499-348	N/A
Kubota Operators Manual – V3300EBG		054-076
Kubota Service (Shop) Manual – V3300EBG		N/A

Continued

FM Series

Filters

Engine:

MM5

Air Filter Parts Ass'y - Honda 5.5hp (GX160K1TX)	194-001
Element Set (primary, paper) - Honda (GX160K1TX)	N/A
(secondary, foam) - Honda (GX160K1TX)	N/A
Fuel Filter (04H-04H, in-line) - Honda 5.5hp (GX160K1TX)	194-002
Air Filter Parts Ass'y - Lombardini 5.5hp (15LD315K)	N/A
Element Set (primary, paper) - Lombardini (15LD315K)	N/A
(secondary, foam) - Lombardini (15LD315K)	N/A
Oil Filter Element (spin-on) - Lombardini 5.5hp (15LD315K)	N/A
Fuel Filter (0_H-0_H, in-line) - Lombardini 5.5hp (15LD315K)	N/A

MM9

Air Filter Parts Ass'y - Honda 9hp (GX270PA2)	194-104
Element Set (primary, paper) - Honda (GX270PA2)	N/A
(secondary, foam) - Honda (GX270PA2)	N/A
Fuel Filter (0_H-0_H, in-line) - Honda 9hp (GX270PA2)	194-107
Air Filter Parts Ass'y - Lombardini 10hp (6LD435)	194-109
Element Set (primary, paper) - Lombardini (6LD435)	N/A
(secondary, foam) - Lombardini (6LD435)	N/A
OIL Filter Element (spin-on) - Lombardini 10hp (6LD435)	194-108
Fuel Filter (0_H-0_H, in-line) - Lombardini 10hp (6LD435)	194-110

FM5

Air Filter Parts Ass'y - Honda 5.5hp (GX160K1QX & GX160K1TX)	194-001
Element Set (primary, paper) - Honda (GX160K1QX & GX160K1TX)	N/A
(secondary, foam) - Honda GX160K1QX & (GX160K1TX)	N/A
Fuel Filter (04H-04H, in-line) - Honda 5.5hp (GX160K1QX & GX160K1TX)	194-002

FM13

Air Filter Parts Ass'y - Honda (GX390K1QXC)	195-159
Element Set (primary, paper) - Honda (GX390K1QXC)	N/A
(secondary, foam) - Honda (GX390K1QXC)	N/A

FM50

Air Filter Parts Ass'y - Kubota - (V3300EBG)	499-360
Element Set (primary) - Kubota - (V3300EBG)	499-361
(secondary) - Kubota - (V3300EBG)	499-362
Oil Filter Element - Kubota - (V3300EBG)	194-268
Fuel Filter - Kubota - (V3300EBG)	153-829

Water {H2O}:

Water Strainer (2.250" x 7.0") - Y-Strainer, MM5, MM5D, MM5H	159-239
Strainer (4.000" x 9.0") - Y-Strainer, MM9, MM9D, MM9H, FM13	159-490

FM Series

Optional Kits

O-ring Repair Kit - FLG, ORS & SAE (15 different O-rings)	190-051
O-ring Repair Kit - Field Service (46 different O-rings)	190-052



Parts Manual Change Request

(Please print clearly)

Date: _____ Dealer No. (required): _____

Your Name: _____ Position: _____

Phone: _____ Fax: _____ E-mail: _____

Publication Information:

Parts Manual No.: _____ - _____ Model: _____

Illustration Part No.:	Manual Page No.:
1. _____ - _____	1. _____
2. _____ - _____	2. _____
3. _____ - _____	3. _____

Nature of Change Request:

- Text
- Graphics
- Missing Information

Describe change requested (if possible, include copy of publication page with changes marked.):

**Please fax completed form to
Parts Manual Department (580) 572-3525**

Thank you for taking the time to submit this request. We will contact you if further information is needed to process your request.

**A Note To
Ditch Witch
Equipment Owners:**

If your equipment was purchased through a Ditch Witch dealer, there is no need to read further.

However, if you purchased from any other source, please fill out the form on the reverse side and return it to us.

This will enable you to receive updates on this equipment as well as information on new products of interest.

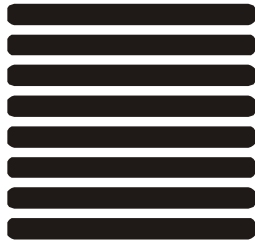
Thanks for using Ditch Witch equipment.

(Please Fold Along This Line And Seal At Bottom With Tape)



**NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES**

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 23 PERRY OKLAHOMA



POSTAGE WILL BE PAID BY

**The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989**



Ditch Witch[®] Registration Card

Please Type or Print All Information

Purchaser's Company Name

Attention

Street Address or P.O. Box

City

County

State

Zip

Nation

()

Phone Number With Area Code

Model

Serial Number

Attachments/Accessories

Serial Numbers

Attachments/Accessories

Serial Numbers

Attachments/Accessories

Serial Numbers

Name of Ditch Witch Dealership

Your Signature