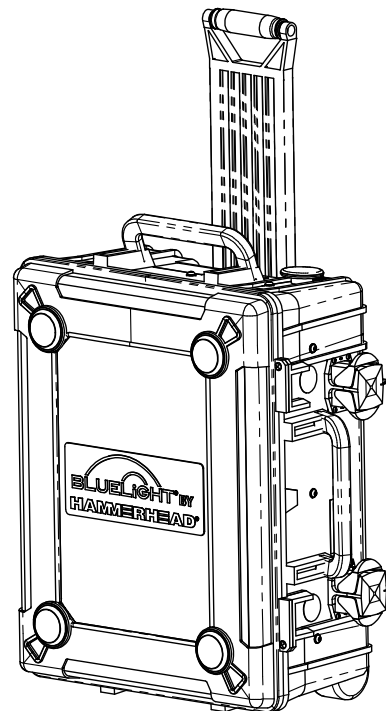
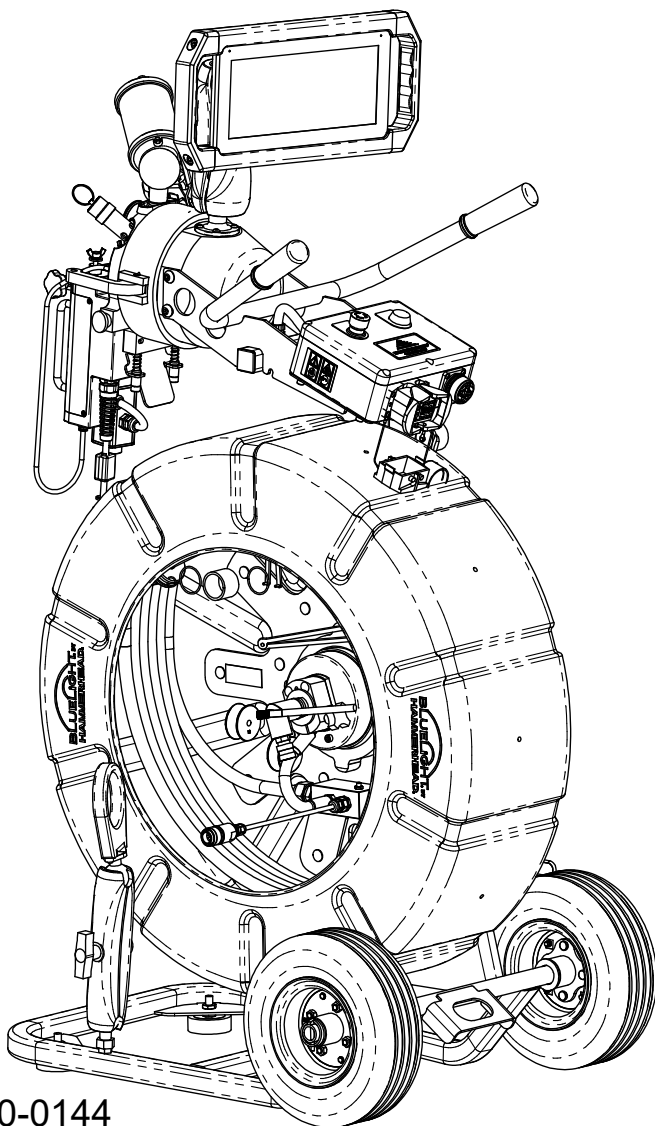




# Parts Manual

## Bluelight LED CIPP Lining System

MODEL BL 144HH System



960-0144



Issue: V1.0



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## Bluelight LED CIPP Lining System

**BL 144HH**

For replacement copy order P/N 960-0144  
Updated 04/20/2026

Descriptions and specifications were current at the time of publication. However, The Charles Machine Works, Inc. (HammerHead Trenchless) reserves the right to make changes in engineering, design and specifications; add improvements; or discontinue manufacturing at any time without notice or obligation. This manual may not reflect the most current version of your machine. Please visit [www.hammerheadtrenchless.com](http://www.hammerheadtrenchless.com) for the most recent and up to date version.



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# Welcome

## HOW TO USE THIS MANUAL

This manual contains illustrations and parts list of components and assemblies which make up various HammerHead® models. Each page consists of the name of the assembly or component, a figure number, reference numbers, part numbers, part names, and the quantities of the parts used.

Assembly or component names help identify the illustration and parts for each figure. This name also helps locate the general area of the machine where the assembly or component can be located.

Figure numbers are used to identify each assembly or component and to group these assemblies or components into major categories.

Reference numbers shown in a column refers to the numbered parts in the illustration. This ties the part in the illustration to the part number and description in the parts list. Part numbers are used to identify individual parts or part assemblies.

Part descriptions provide the name of the part, plus additional information such as dimensional specifications and what parts are grouped together to form part assemblies, which helps you identify the part(s).

Quantities listed for each figure are only for that assembly or component and not the total used per machine unless stated so in the "Remarks" column.

This parts manual is not intended to be a complete guide for machine service or repairs. Contact your HammerHead dealer for any of your service or technical requirements.

## ORDERING PARTS

Parts for repair or replacement are available through the worldwide network of authorized HammerHead dealers. The use of aftermarket replacement parts in your HammerHead equipment reduces performance and overall equipment life and may also void or interfere with the factory warranty.

Use only genuine HammerHead parts from your authorized dealer for repair or replacement. Always give the serial number and model number of the machine for which parts are being ordered. When ordering parts for component(s), which are not manufactured by HammerHead Trenchless Equipment, also give the serial number of that component(s). Order all parts by part number, part name, and quantity needed. Do not order parts by illustration reference numbers.

## UPDATING AND REORDERING MANUALS

The parts lists, illustrations, and specifications in this manual are based on the latest information available at the time of publication. Your machine may have product improvements and options not yet contained in this manual. Please check the web site [www.hammerheadtrenchless.com](http://www.hammerheadtrenchless.com) for any updates.

The Charles Machine Works, Inc. reserves the right to make changes at any time without notice or obligation to you. Your dealer will receive notice of these changes and can assist you with accurate parts identification when ordering.

A copy of this manual is supplied with each machine. Additional copies are available through your dealer. When ordering additional manuals, use the reorder number listed on the front cover and the quantity needed. Electronic copies of this manual are also available on the web at [www.hammerheadtrenchless.com](http://www.hammerheadtrenchless.com).

## OPERATING INSTRUCTIONS

Instructions on recommended equipment use and maintenance can be found in the Operator's Manual shipped with your equipment. Operator's Manuals are also available on the web at [www.hammerheadtrenchless.com](http://www.hammerheadtrenchless.com).

Thank you for buying and using Genuine HammerHead® Trenchless Equipment, parts and accessories.

## HammerHead Trenchless® Limited Warranty

The Charles Machine Works, Inc. dba HammerHead Trenchless ("HammerHead") warrants that all new products it manufactures (with the exception of cured in place pipe consumable materials, which are covered by a separate warranty) will be free from defects in materials, under normal use and service, for one year after delivery to the purchaser (or such other party as the purchaser may direct) or 1000 operating hours, whichever occurs first. The warranty period for any item repaired or replaced pursuant to this warranty shall be the remainder, if any, of the original, defective Product's warranty period.

For any covered issue during the warranty period, Buyer must timely notify HammerHead in writing of such defect, and HammerHead shall, at its option, supply a functionally equivalent replacement product or request the return of the product to its plant in Lake Mills, Wisconsin so that HammerHead may repair it, each without charge. Such repair or replacement is the purchaser's sole and exclusive remedy against Hammerhead, whether in contract or arising out of warranties, representations, or defects. Hammerhead reserves the right to use remanufactured replacement parts under this warranty as it deems appropriate.

No item may be returned without prior written authorization from HammerHead.

This warranty does not cover:

- CIPP Consumables
- Defects other than those in materials (including but not limited to workmanship and design defects)
- Transportation expenses in connection with the repair or replacement of covered products
- Failures caused due to a product that has been installed or used in a manner inconsistent with written warnings, instructions, or recommendations by HammerHead, including but not limited to in product decals or in the owner's guide/user manual; or installed in a manner inconsistent with applicable law or standard industry practices
- Any product that has been neglected, altered, misused, abused, or used in any way which, in HammerHead's opinion, adversely affects its performance
- Failures caused by improper storage; handling installation or maintenance; use of non-HammerHead approved parts or materials; unapproved modifications or alterations; or use of unapproved accessories
- Failures caused by outside influence, including but not limited to Acts of God, fire, or other accident
- Wear items or components failing due to normal wear
- Items that are not manufactured by us (which are warranted only to the extent of the original manufacturer's warranty and subject to their allowance to us, if found defective by them)
- Any additional training or consulting services which may be provided by HammerHead or its representatives or agents (nor shall such training or services extend any product warranty period)
- Damages that arose in whole or in part due to HammerHead's reliance upon drawings, specifications, samples, descriptions, documentation, requirements, requests, or instructions received from the customer, the installer, or either of their agents
- Charges for labor and/or parts beyond those needed to complete the warranted repair or replacement

HammerHead reserves the right to modify, alter, and improve any product without incurring any obligation to replace any product previously sold without such modification, alteration, or improvement. No person is authorized to give any other warranty, or to assume any additional obligation on HammerHead's behalf unless made in writing, and signed by an officer of HammerHead.

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**DURING PERIODS OF NONUSE. IN NO EVENT SHALL HAMMERHEAD'S LIABILITY EXCEED THE PURCHASE PRICE OF THE PRODUCT.**

**NO ACTION AGAINST HAMMERHEAD ARISING OUT OF OR RELATED TO THIS WARRANTY MAY BE FILED NO MORE THAN ONE (1) YEAR AFTER THE CLAIM ARISES.**

**HAMMERHEAD TRENCHLESS®  
LAKE MILLS, WISCONSIN**



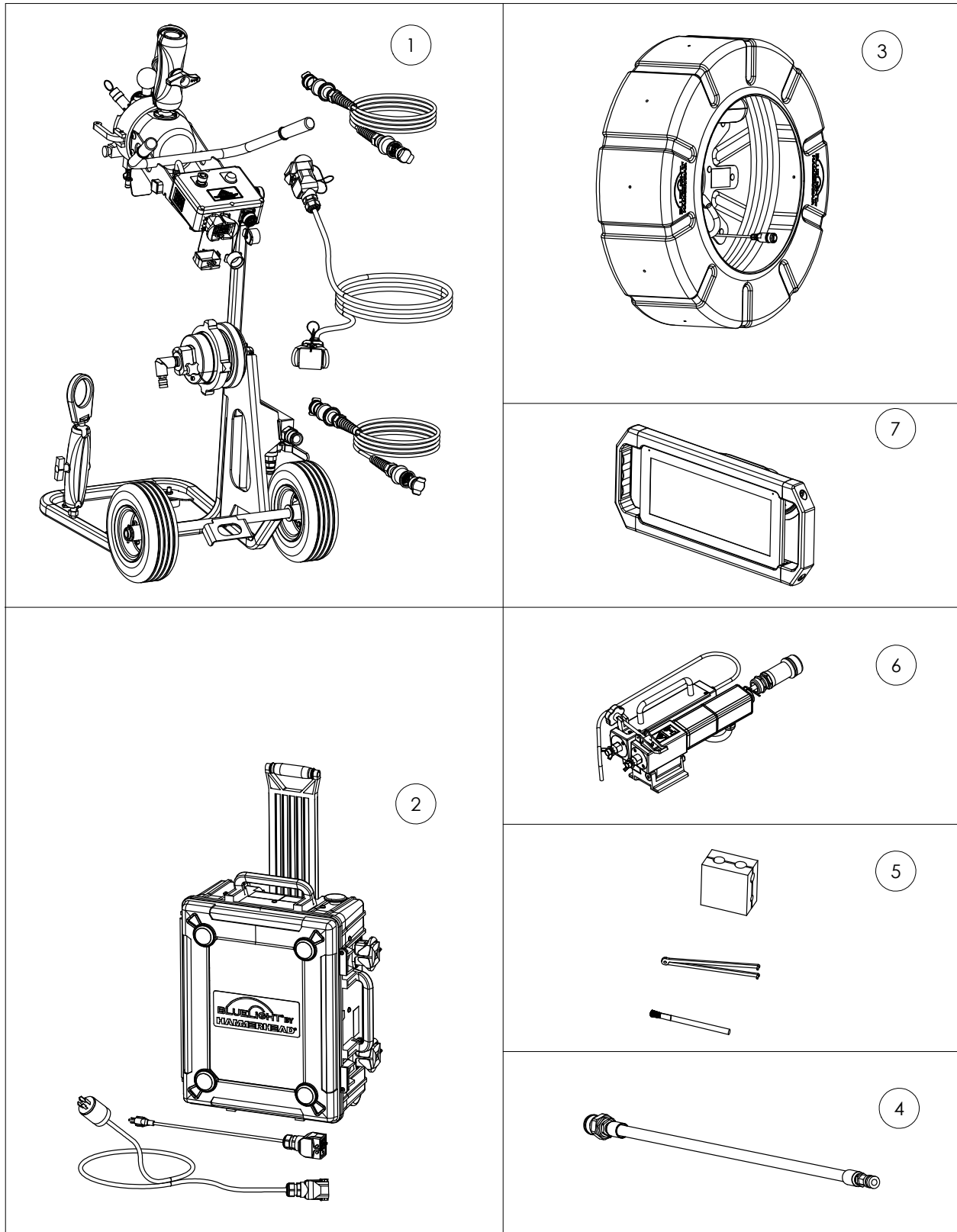
# ***BL 144HH 40m System***\_\_\_\_\_

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# 144HH 40m System Assemblies

ASSEMBLY P/N 934-2115



# 144HH 40m System Assemblies

ASSEMBLY P/N 934-2115

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-4020	BLUELIGHT TROLLEY ASSEMBLY	1	USED IN ALL MODELS
2	934-3093	BL3 POWER SUPPLY ASSY - DOM	1	USED IN ALL MODELS
3	934-0948	40m 144HH DRUM ASSEMBLY	1	USED IN ALL MODELS
4	934-0613	HOSE ASSEMBLY, AIR	1	USED IN ALL MODELS
5	934-0815	CLEANING KIT, LIGHTHEAD		USED IN ALL MODELS
6	934-3012	PROPULSION UNIT ASSY	1	USED IN ALL MODELS
7	934-3044	CONTROL PANEL ASSEMBLY	1	USED IN ALL MODELS

NOT SHOWN:

FOOTNOTES:

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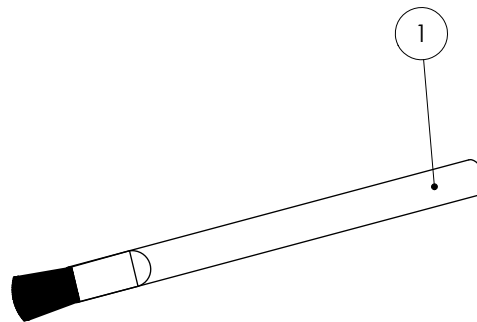
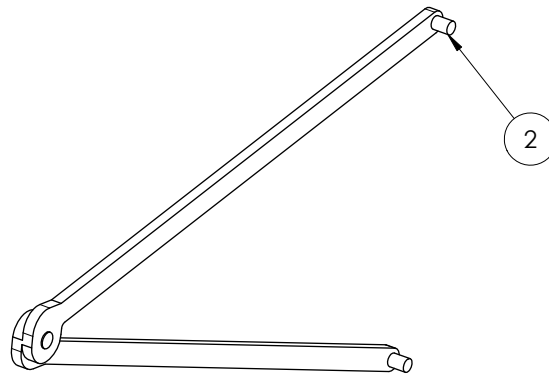
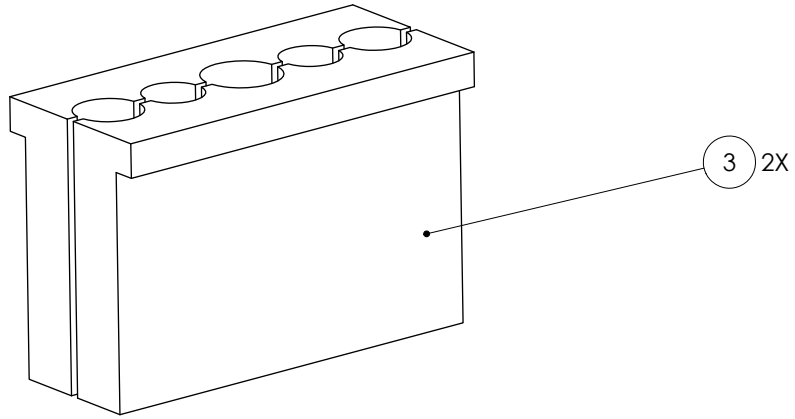
# Accessories ---

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# Cleaning Kit

ASSEMBLY P/N 934-0815



# Cleaning Kit

ASSEMBLY P/N 934-0815

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0813	BRUSH, LIGHTHEAD CLEANING	1	
2	934-0814	WRENCH, 4mm SPANNER	1	
3	934-0824	CLAMP, LIGHTHEAD	2	

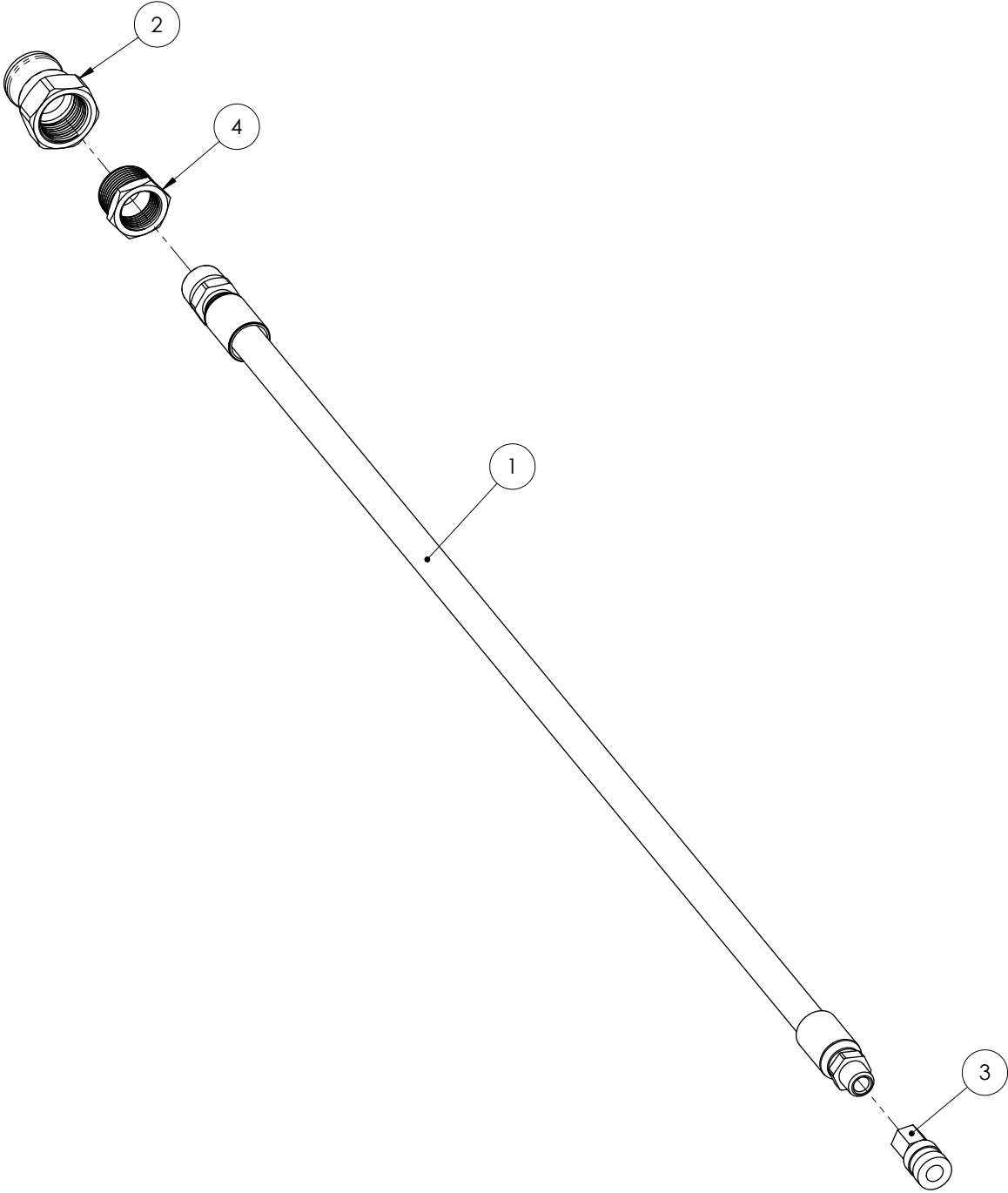
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FOOTNOTES:

NOTE:

# Air Hose Assembly

ASSEMBLY P/N 934-0613



# Air Hose Assembly

ASSEMBLY P/N 934-0613

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0775	HOSE, BL AIR SUPPLY	1	
2	922-1156	PT MALE 1"	1	
3	934-0616	AIR QUICK CONNECT, 3/8 NPT F	1	
4	934-0774	BUSHING, 16MP X 12FP SS	1	

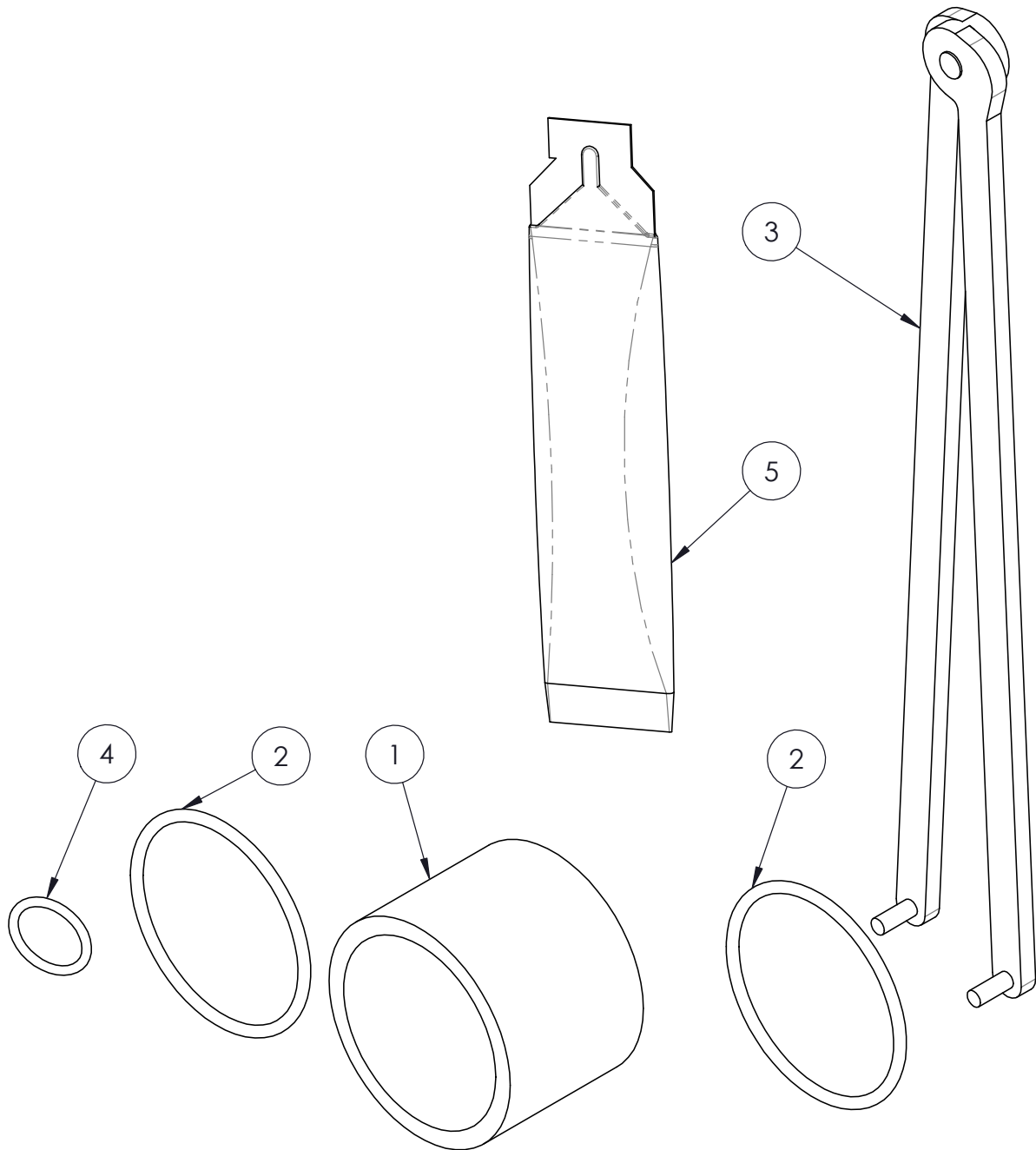
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FOOTNOTES:

NOTE:

# Spare Glass Kit

ASSEMBLY P/N 934-0981



# Spare Glass Kit

ASSEMBLY P/N 934-0981

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0432	CYLINDRICAL GLASS, 144	1	
2	934-0911	O-RING, 35mm x 2mm	2	
3	934-0814	SPANNER WRENCH, Ø3mm X 7.3mm PIN	1	
4	934-0595	O-RING, 11.5mm X 1.5mm	1	
5	934-1030	GREASE, DIELECTRIC O-RING	1	

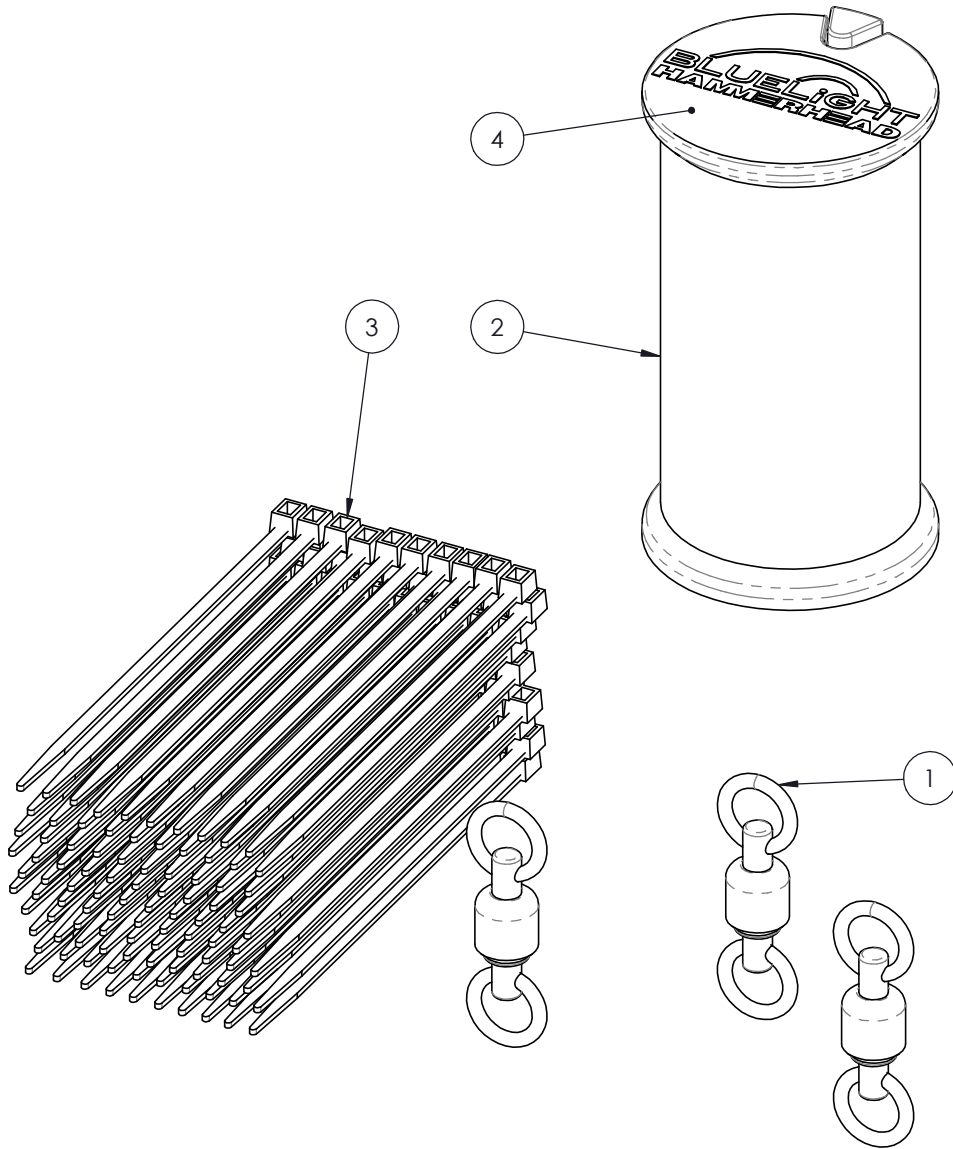
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FOOTNOTES:

NOTE:

# Pull in Place Kit

ASSEMBLY P/N 934-0991



# Pull in Place Kit

ASSEMBLY P/N 934-0991

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0993	#9 STAINLESS SWIVEL	3	
2	934-0995	STRING, 064/144 PULL KITL	1	
3	934-3176	CABLE TIE, 4" - BLUE	100	
4	934-0994	SPOOL, 064/144 PULL KIT	1	

NOT SHOWN:

FOOTNOTES:

NOTE:



# ***Bluelight Decals***\_\_\_\_\_

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# System Decals

## SIDE VIEW

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-1016	DECAL, BL OP STATION, HH	1	
2	270-6773	PATENT	1	
3	934-1028	SERIAL PLATE, 144 DRUM	1	
4	934-1009	DECAL, POWER CASE, HH	1	

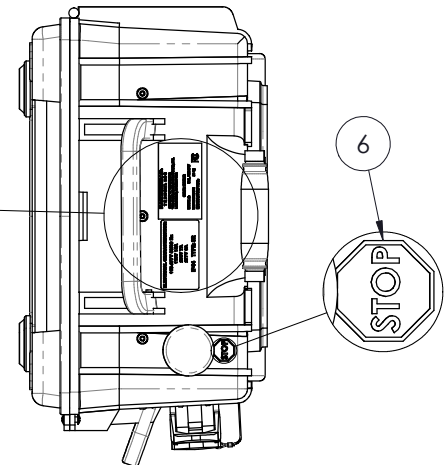
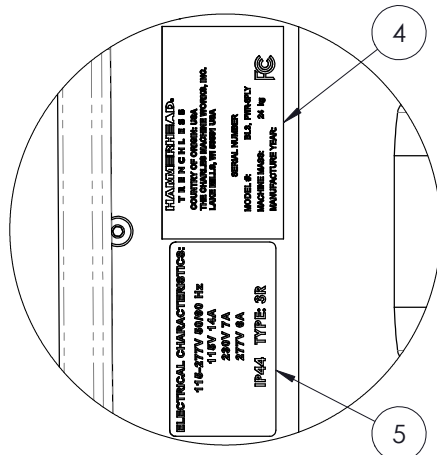
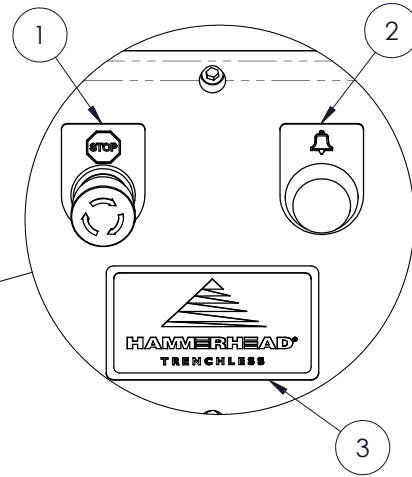
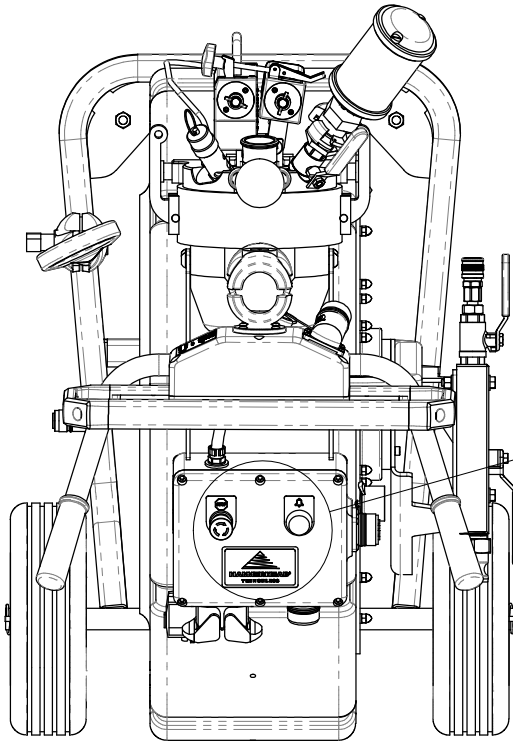
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FOOTNOTES:

NOTE:

# System Decals

TOP VIEW



# System Decals

## TOP VIEW

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-1001	DECAL, REMOTE-STOP	1	
2	934-1002	DECAL, ALARM	1	
3	934-1012	DECAL, JUNCTION, HH	1	
4	934-1015	SERIAL PLATE, BL PWR-SPLY	1	
5	934-1006	DECAL, BL NAME PLATE	1	
6	273-601	ENGINE STOP	1	

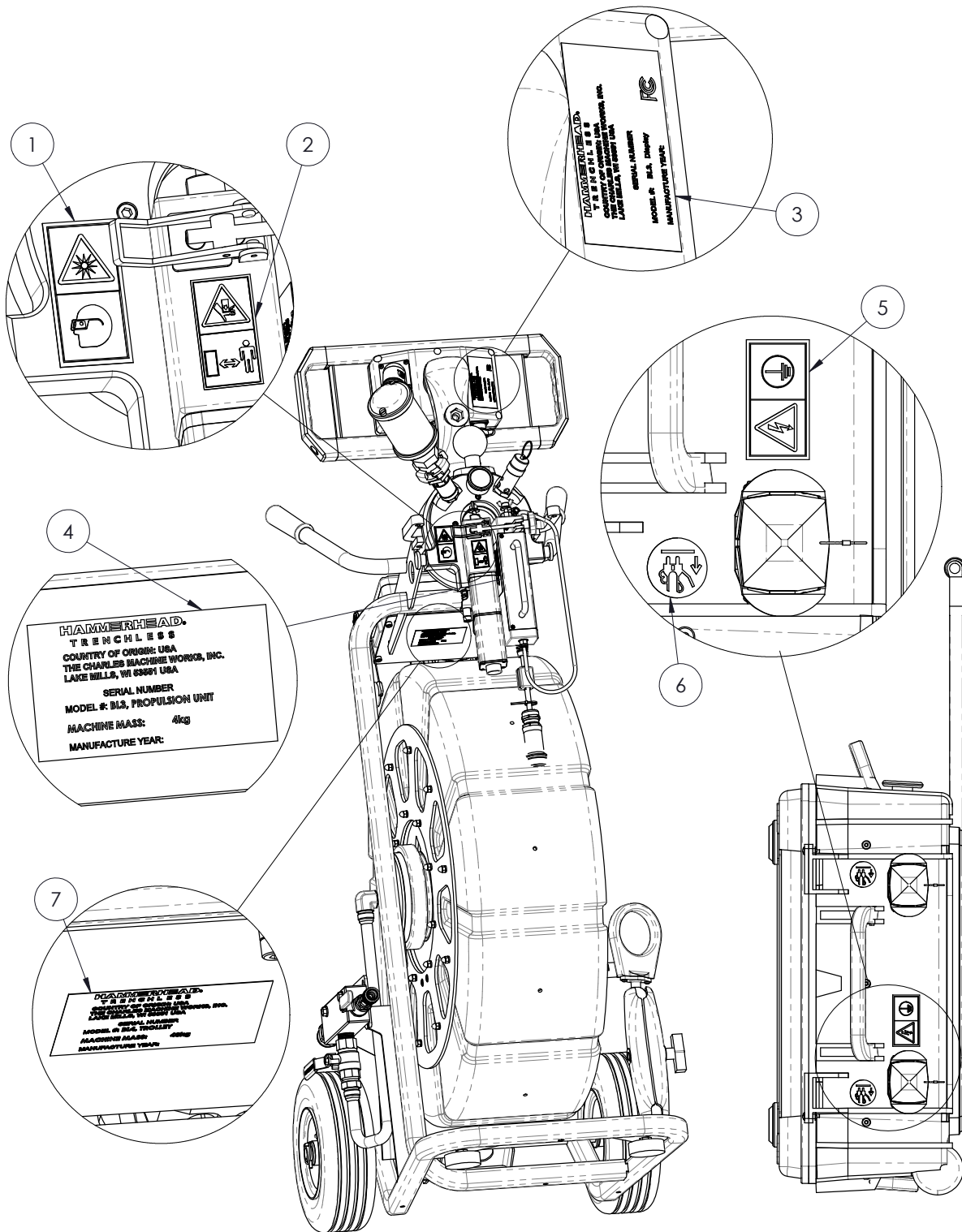
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FOOTNOTES:

NOTE:

# System Decals

## FRONT AND BACK



# System Decals

## FRONT AND BACK

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-1005	DECAL, EYE PROTECTION	1	
2	934-1007	DECAL, HAND CRUSH (INT)	1	
3	934-1022	SERIAL PLATE, BL DISPLAY	1	
4	934-1023	SERIAL PLATE, BL PROP UNIT	2	
5	934-1004	DECAL, WARNING GROUND	1	
6	934-1003	DECAL, UNPLUG	2	
7	934-1019	SERIAL PLATE, BL TROLLEY	1	

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FOOTNOTES:

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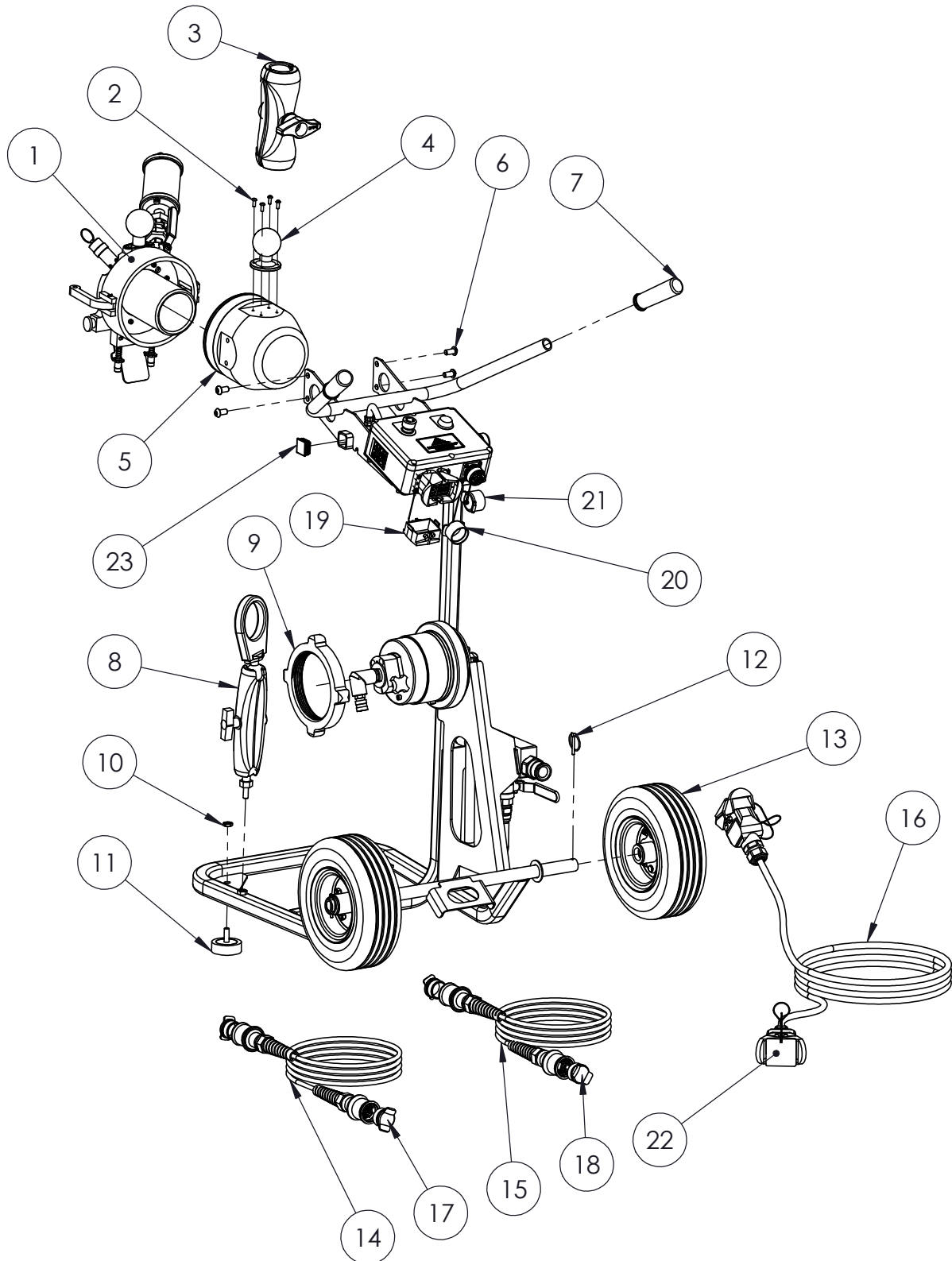
# **Bluelight Trolley**\_\_\_\_\_

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# Trolley Assembly

ASSEMBLY P/N 934-4020



# Trolley Assembly

ASSEMBLY P/N 934-4020

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0278	6" CAMLOCK TERM, PROPULSION	1	
2	934-0470	SCREW, M5-0.8mm X 14mm BHSC SS	4	
3	934-0679	ARM, D-SIZE BALL GRIP	1	
4	934-0660	RAM MOUNT D, ROUND	1	
5	934-0297	GARAGE CONE	1	
6	934-0487	SCREW, M10-1.5 X 20mm BH SS	4	
7	922-2171	HANDLE GRIP, 4.5"	2	
8	934-0601	ASSEMBLY, GUIDE RING	1	
9	934-0482	NUT, HUB BL	1	
10	934-0629	NUT, JAM, M10 - SS	2	
11	934-0628	FOOT, RUBBER, M10 X 28mm STUD	2	
12	934-0632	LINCH PIN, w/LOCKING RING	2	
13	922-1128	WHEEL, D-QL	2	
14	934-3050	CABLE ASSEMBLY, 15LF, JCT-PROP	1	
15	934-3051	CABLE ASSEMBLY, 15LF, JCT-CTRL	1	
16	934-3059	CABLE ASSY, 15 LF, JCT-PWR SPLY	1	
17	934-3081	HFB HOOD COVER - BLUE	2	
18	934-3083	HFB HOOD COVER - BLACK	2	
19	934-0664	COVER, 6B POWER CONNECTOR	1	
20	934-3080	HFB HOUSING COVER - BLUE	1	
21	934-3082	HFB HOUSING COVER - BLACK	1	
22	934-3116	SQUARE HAN COVER - BLK	2	
23	934-4014	END CAP, SQUARE	1	

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FOOTNOTES:

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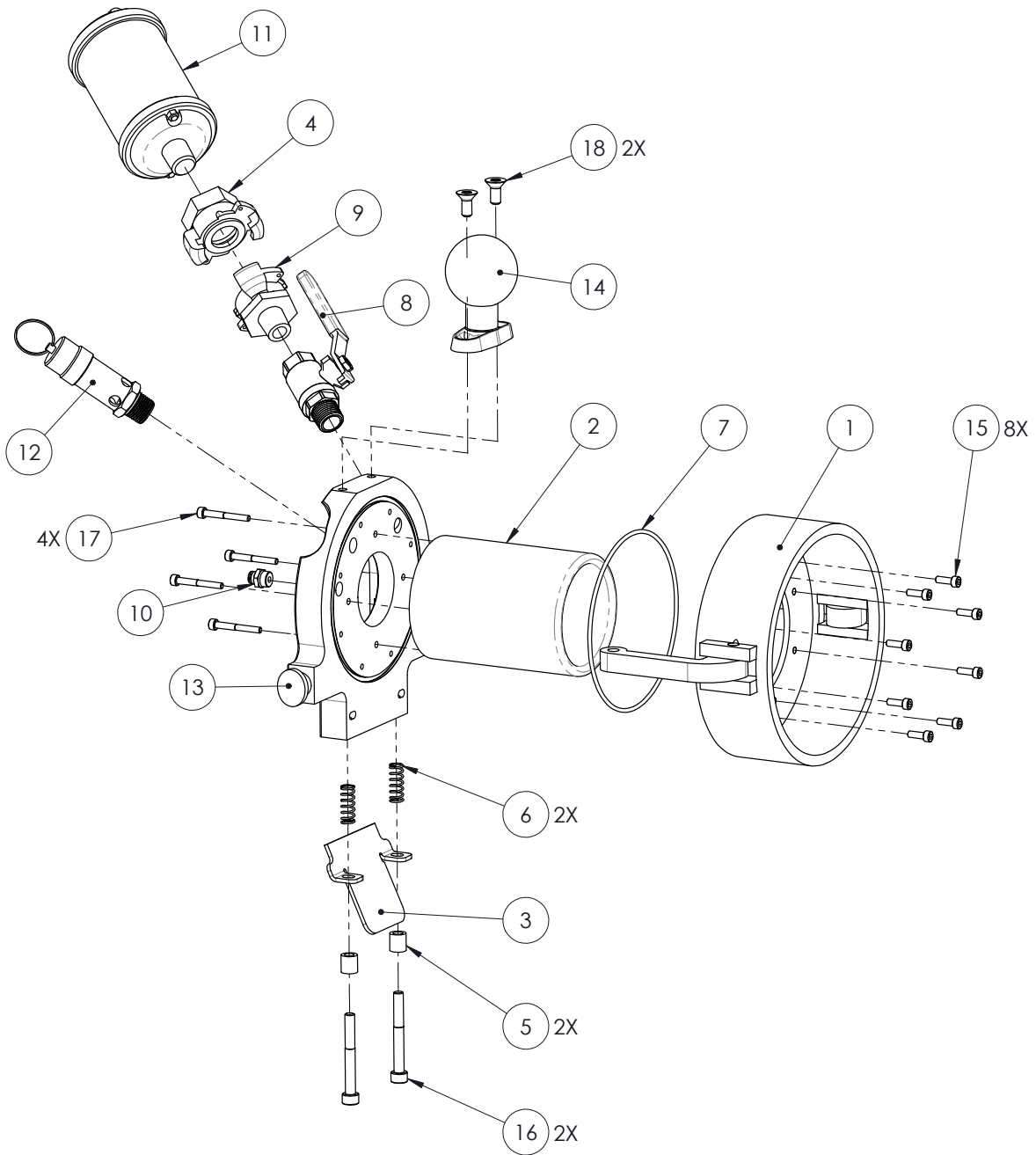
# **Trolley Components**\_\_\_\_\_

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# 6" Camlock Terminal

ASSEMBLY P/N 934-0278



# 6" Camlock Terminal

ASSEMBLY P/N 934-0278

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0262	CAMLOCK COUPLING, 6" FEMALE	1	
2	934-0263	GUARD, 6" CAMLOCK	1	
3	934-0264	LOCKING PLATE - 6" CAMLOCK	1	
4	934-0722	COUPLING, 1/2" BSPP F- EURO CLAW	1	
5	934-0265	BUSHING, .315 ID X .551"L SS	2	
6	934-0266	SPRING, COMPRESSION - SS	2	
7	934-0267	O-RING, 139.5mm X 3mm	1	
8	922-1236	BALL VALVE, 1/2" M X F	1	
9	934-0269	COUPLING, 1/2" BSPP - EURO CLAW	1	
10	934-0271	FITTING, 1/4 MNPT X 6mm TUBE	1	
11	934-0682	MUFFLER, 1/2" NPT	1	
12	922-1235	VALVE, PRESSURE RELIEF, 25 PSI, 1/2 NPT	1	
13	934-0633	MOUNTING PLATE - 6" CAMLOCK	1	
14	934-0683	RAM MOUNT D, SQUARE	1	
15	934-0272	SCREW, SHCS M5X15 SS	8	
16	934-0273	SCREW, SHCS M8X65 SS	2	
17	934-0274	SCREW, SHCS M5X40 SS	4	
18	934-0689	SCREW, 5/16-28 X 3 /4 FHSC SS	2	

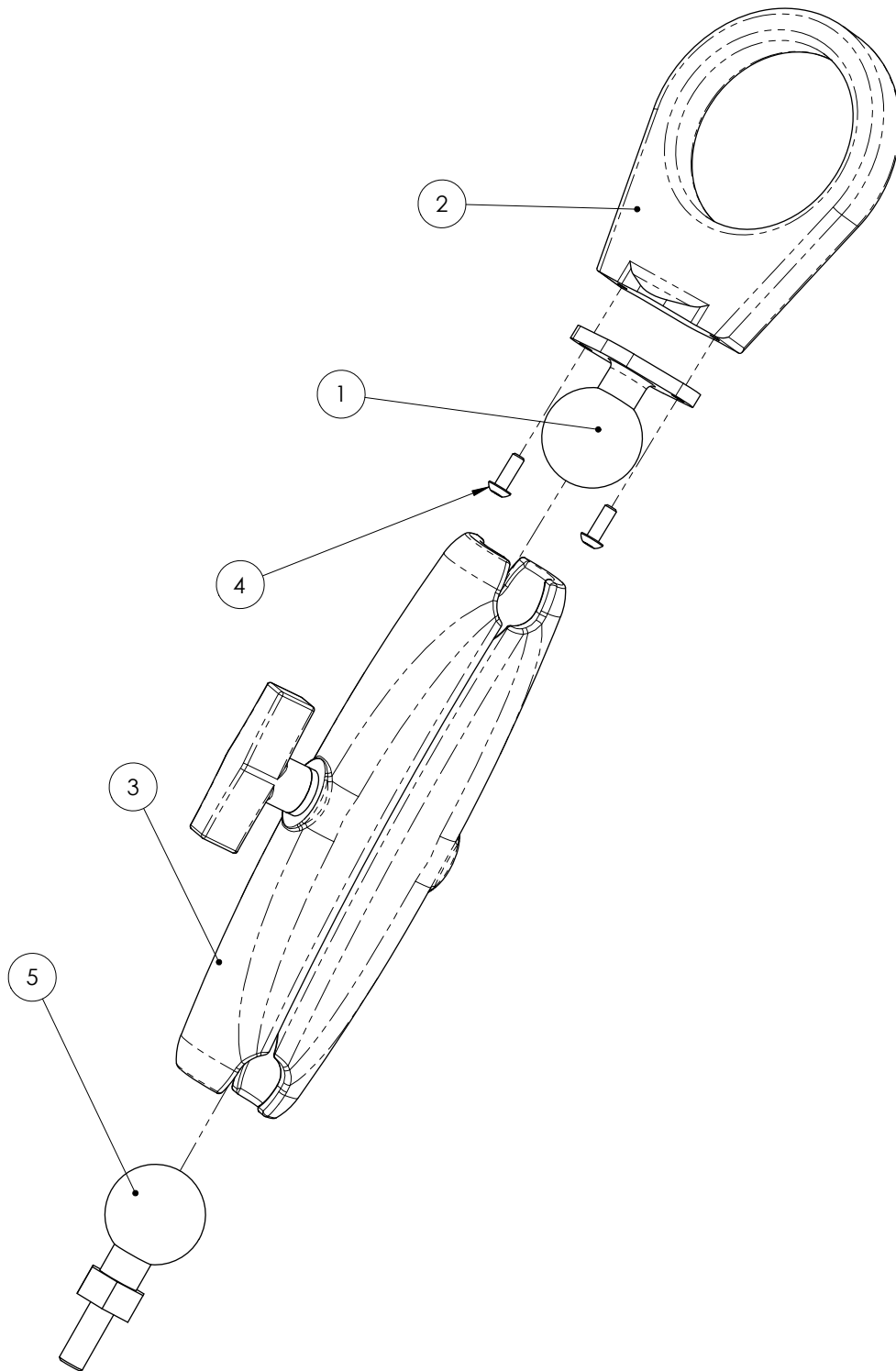
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FOOTNOTES:

NOTE:

# Guide Ring

ASSEMBLY P/N 934-0601



# Guide Ring

ASSEMBLY P/N 934-0601

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0602	RAM MOUNT, C, DIAMOND	1	
2	934-0603	GUIDE, BL	1	
3	934-0604	ARM, C-SIZE BALL GRIP	1	
4	934-0470	SCREW, M5-0.8mm X 14mm BHSC SS	2	
5	934-0661	RAM MOUNT C, M10 STUD	1	

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FOOTNOTES:

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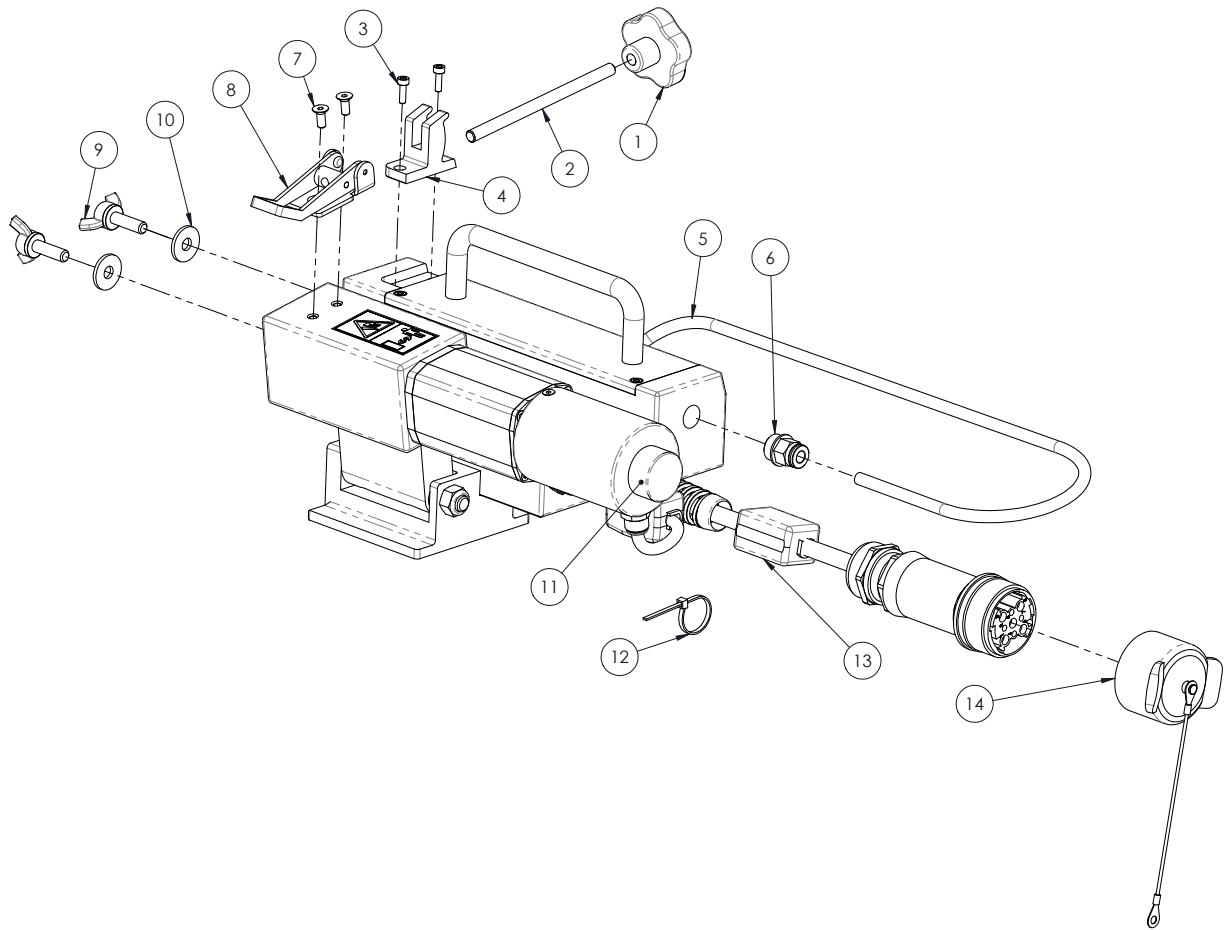
# ***Propulsion Components***\_\_\_\_\_

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# Propulsion Unit Assy

ASSEMBLY P/N 934-3012



# Propulsion Unit Assy

ASSEMBLY P/N 934-3012

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
---------	-------------	-------------	-----	---------

1	934-0442	KNOB, M6 THREAD, ALUMINUM	1	
2	934-0441	THREADED STUD, M6-1x100mm, SS	1	
3	934-3192	SCREW, SHCS M3 X 10mm SS	2	
4	934-0466	FORK, PROPULSION UNIT	1	
5	934-0641	TUBE, 4mm ID X 36"L - BLK	1	
6	934-3189	1/4 BSPP X 6mm TUBE, AIR FITTING	1	
7	934-0440	SCREW, M4-0.7 X 10mm, FHCS SS	2	
8	934-3191	LATCH, ADJ., M6 X 1mm	1	
9	934-3194	THUMB SCREW, M6 X 20mm SS	2	
10	934-0462	WASHER, FLAT M6 OVERSIZED SS	2	
11	934-0454	BUMPER, PUSH-IN TIGHT-GRIP	1	
12	934-3176	CABLE TIE, 3" - 0.9" BLACK	1	
13	934-0806	FERRITE CORE, PROPULSION ADAPTER	1	
14	934-3080	HFB HOUSING COVER - BLUE	1	

NOT SHOWN:

FOOTNOTES:

NOTE:



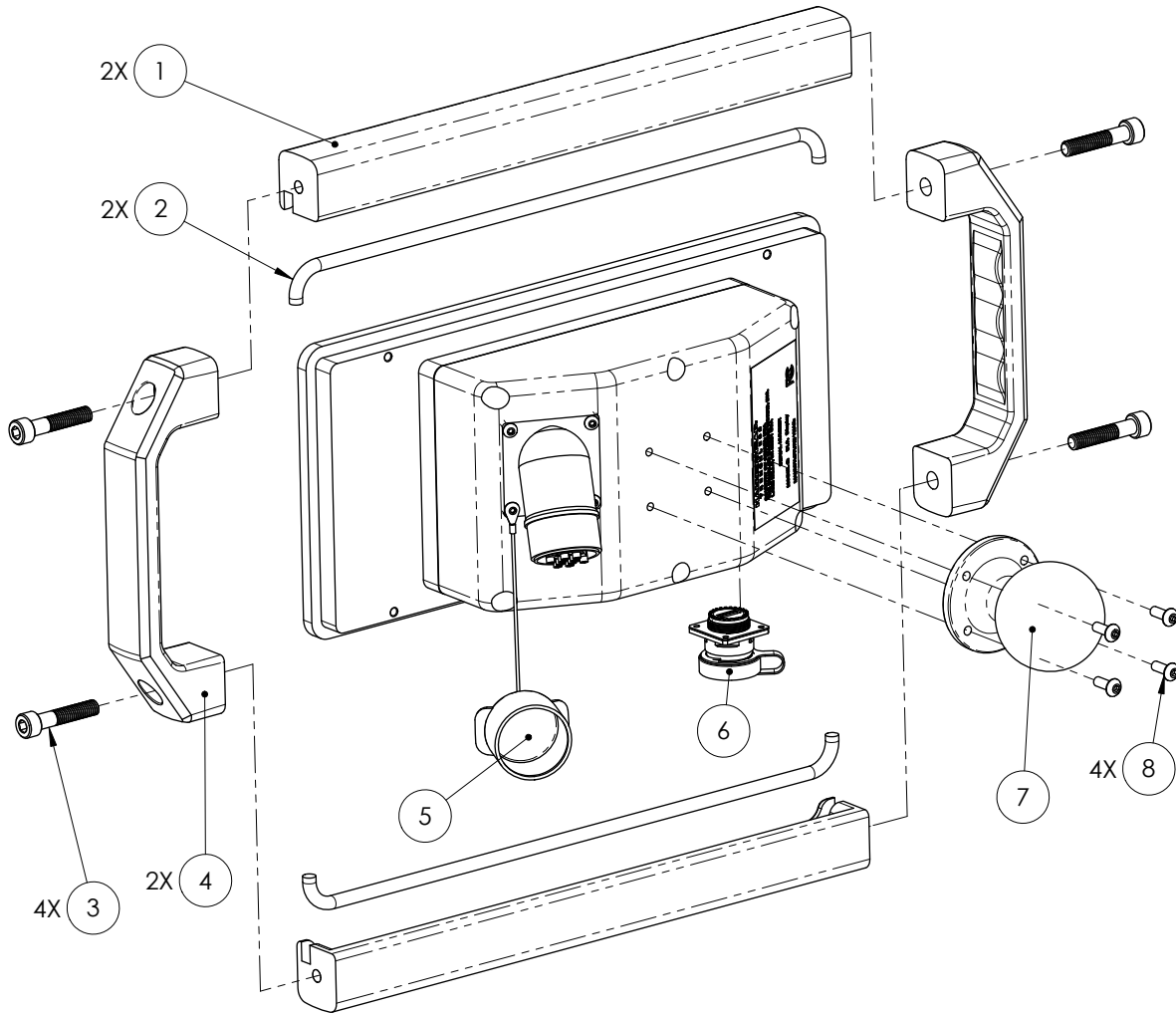
# ***Display Components***\_\_\_\_\_

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# Control Panel Assy

ASSEMBLY P/N 934-3044



# Control Panel Assy

ASSEMBLY P/N 934-3044

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0731	FRAME RAIL, CONTROL PANEL	2	
2	934-0730	O-RING CORD, 1/4 X 14.5"	2	
3	934-0646	SCREW, M8-1.25mm X 40mm, SHCS SS	4	
4	934-0644	HANDLE, GRIP - CTRL PANEL	2	
5	934-3082	HFB HOUSING COVER - BLACK	1	
6	934-0685	CAP, THREADED USB SOCKET	1	
7	934-0660	RAM MOUNT D, ROUND	1	
8	934-0470	SCREW, M5-0.8mm X 14mm BHSC SS	4	

NOT SHOWN:

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
9	934-0859	SOFTWARE, BLUELIGHT CONTROLLER	1	

FOOTNOTES:

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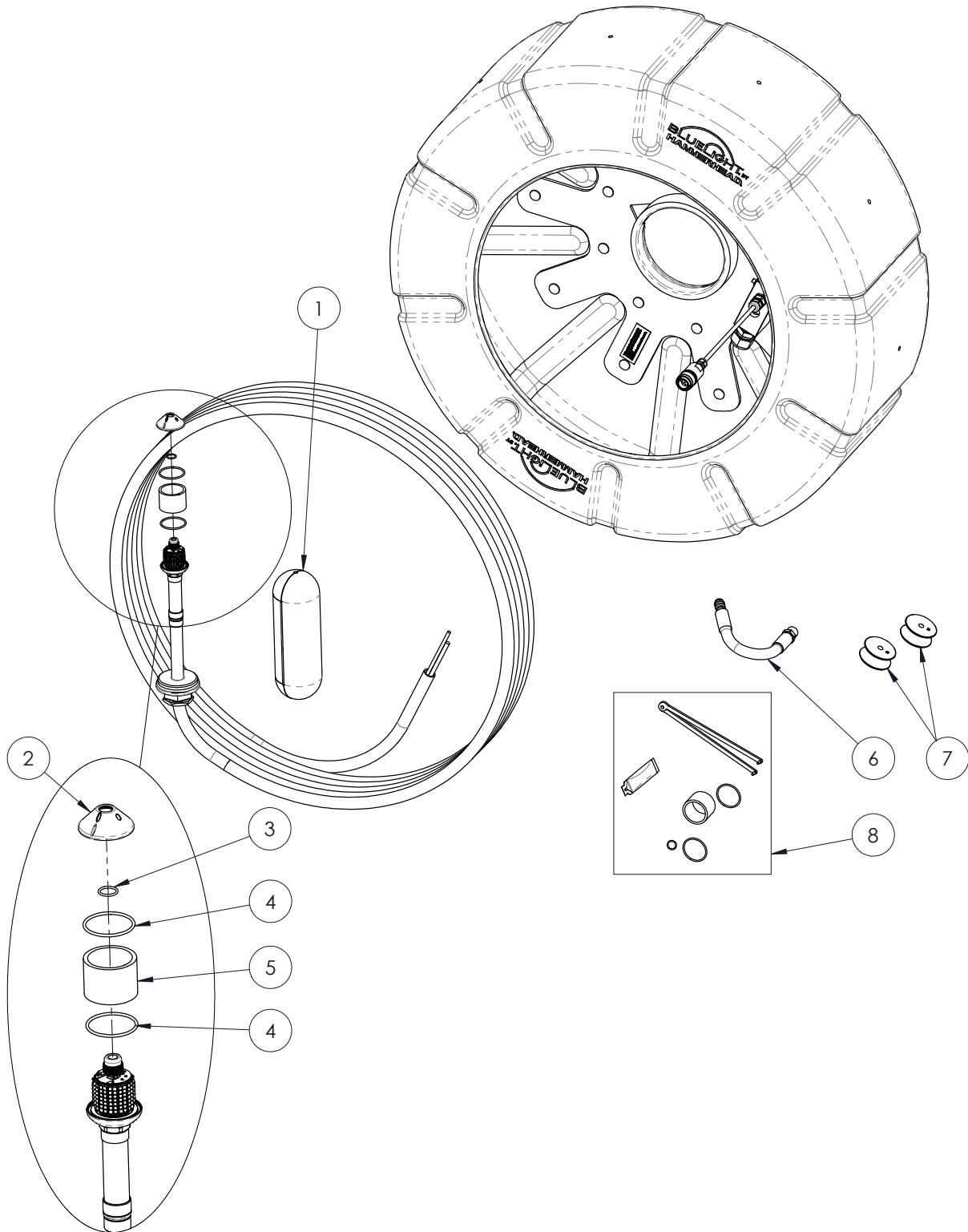
# ***Drum Assembly***\_\_\_\_\_

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# Drum Assembly 144HH 40m

ASSEMBLY P/N 934-0948



# Drum Assembly 144HH 40m

ASSEMBLY P/N 934-0948

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0110	PROTECTIVE COVER	1	
2	934-0915	FRONT GLASS RETAINER, 144HH	1	
3	934-0306	O-RING 12mm x 1.50mm	1	
4	934-0911	O-RING 35mm x 2mm	2	
5	934-0432	CYLINDRICAL GLASS, 144	1	
6	934-0804	HOSE, BL PX AIR	1	
7	934-0213	DRIVE WHEEL, 18mm	2	
8	934-0981	SPARE GLASS KIT, 144HH	1	

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FOOTNOTES:

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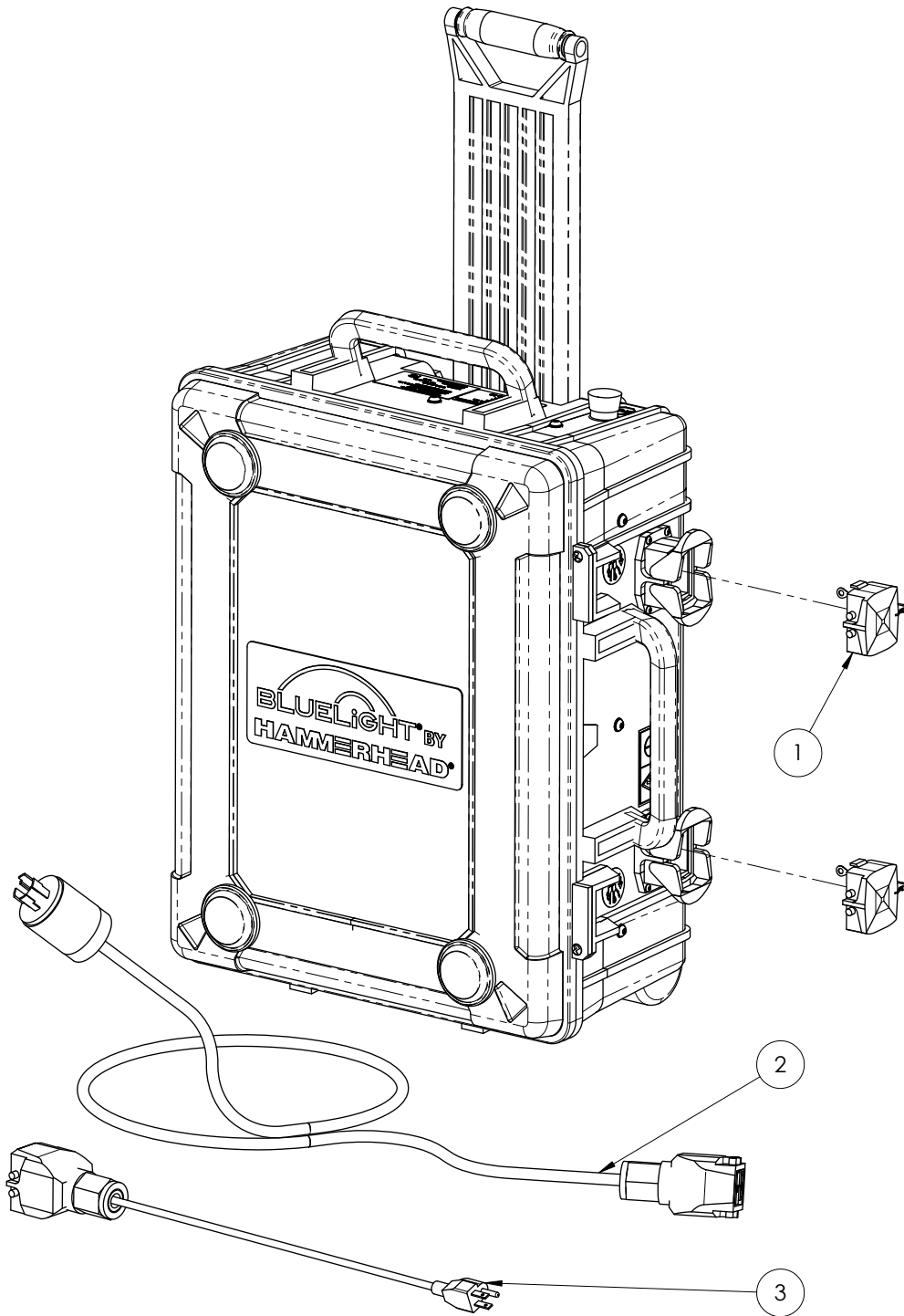
# ***Power Supply — Dom\_\_\_\_\_***

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# Power Supply Assy

ASSEMBLY P/N 934-3093



# Power Supply Assy

ASSEMBLY P/N 934-3052

REF NO.	PART NUMBER	DESCRIPTION	QTY	REMARKS
1	934-0664	COVER, 6B POWER CONNECTOR	2	
2	934-0758	GENERATOR CABLE ASSY, DOM	1	
3	934-0392	POWER CORD, PWR-SPLY	1	

NOT SHOWN:

FOOTNOTES:

NOTE:



# **Appendix**

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# Torque Standards - Hydraulic Fittings

## O—RING BOSS FITTINGS

Assembly Torque (+10% —0)													
Dash Size	Nom. Size (Inch)	SAE Size	Female Thread	Male Thread	O-Ring	O-Ring Boss		O-Ring Boss		Hollow Hex		Hex Head	
						Non-Adjustable		Adjustable		Plugs			
			I.D. (IN)	O.D. (IN)	I.D. (IN)	ft-lbs. (in-lbs.)	N-m	ft-lbs. (in-lbs.)	N-m	ft-lbs. (in-lbs.)	N-m	ft-lbs. (in-lbs.)	N-m
-2	1/8	5/16-24	17/64	5/16	17/64	-	-	-	-	(30)	4	(85)	10
-3	3/16	3/8-24	21/64	3/8	21/64	-	-	-	-	(55)	6	(155)	18
-4	1/4	7/16-20	25/64	7/16	25/64	26	35	(180)	20	(120)	14	22	29
-5	5/16	1/2-20	29/64	1/2	29/64	30	40	30	40	(170)	19	23	32
-6	3/8	9/16-18	1/2	9/16	1/2	35	46	35	46	34	46	29	40
-8	1/2	3/4-16	11/16	3/4	11/16	60	80	60	80	60	80	52	70
-10	5/8	7/8-14	13/16	7/8	13/16	100	135	100	135	100	135	85	115
-12	3/4	1-1/16-12	31/32	1-1/16	31/32	135	185	135	185	135	185	135	183
-14	7/8	1-3/16-12	1-7/64	1-3/16	1-7/64	175	235	175	235	175	235	175	237
-16	1	1-5/16-12	1-15/64	1-5/16	1-15/64	200	270	200	270	200	270	200	271
-20	1-1/4	1-5/8-12	1-35/64	1-5/8	1-35/64	250	340	250	340	250	340	250	339
-24	1-1/2	1-7/8-12	1-51/64	1-7/8	1-51/64	305	415	305	415	305	415	305	414
-32	2	2-1/2-12	2-27/64	2-1/2	2-27/64	375	510	375	510	375	510	375	509

### NOTE:

Ensure the threads and sealing surfaces are free from nicks, burrs, scratches or any foreign material. Lubricate the o-ring with a light coat of oil. To tighten adjustable o-ring fittings, hold the fitting and tighten the nut. To tighten non-adjustable o-ring fittings, tighten the fitting. When tightening together fittings with dissimilar coatings, torque to 115% of maximum recommended torque value for a given size.

## O—RING FACE SEAL FITTINGS

Dash Size	Nom. Size (Inch)	Thread Size	Female Thread	Male Thread	Assembly Torque (+10% —0) (Primary Method)		Flats from Wrench Resistance (FFWR) (Secondary Method)		O-Ring I.D. (Inch)
					ft-lbs. (in-lbs.)	N-m	Tube Nuts	Swivel & Hose	
			I.D. (IN)	O.D. (IN)					
-4	1/4	9/16-18	1/2	9/16	18	25	1/2	3/4	5/16
-6	3/8	11/16-16	11/16	11/16	30	40	1/2	3/4	3/8
-8	1/2	13/16-16	3/4	13/16	40	55	1/2	3/4	1/2
-10	5/8	1-14	13/16	1	60	80	1/2	3/4	5/8
-12	3/4	1-3/16-12	1-7/64	1-3/16	85	115	1/2	1/2	3/4
-16	1	1-7/16-12	1-23/64	1-7/16	110	150	1/2	1/2	15/16
-20	1-1/4	1-11/16-12	1-19/32	1-11/16	150	205	1/2	1/2	1-3/16
-24	1-1/2	2-12	1-59/64	2	230	315	1/2	1/2	1-1/2

## PIPE FITTINGS

Nom. SAE Dash Size	Fractional Size	Threads Per Inch	Turns from Finger Tight
2	1/8	27	2-3
4	1/4	18	2-3
6	3/8	18	2-3
8	1/2	14	2-3
12	3/4	14	2-3
16	1	11-1/2	1.5-2.5
20	1-1/4	11-1/2	1.5-2.5
24	1-1/2	11-1/2	1.5-2.5
32	2	11-1/2	1.5-2.5

### NOTE:

Ensure the threads and sealing surfaces are free from nicks, burrs, scratches or any foreign material. Lubricate the o-ring with a light coat of oil. To tighten adjustable o-ring fittings, hold the fitting and tighten the nut. To tighten non-adjustable o-ring fittings, tighten the fitting. When tightening together fittings with dissimilar coatings, torque to 115% of maximum recommended torque value for a given size.

# Torque Values - SAE Fasteners

GRADE 5: UNC OR UNF THREAD

Size	Coarse Thread		Fine Thread	
	ft-lbs	N-m	ft-lbs	N-m
1/4	6	8.5	8	11
5/16	13	18	15	20.5
3/8	25	35	30	40
7/16	40	55	45	60
1/2	60	80	70	95
9/16	90	120	95	130
5/8	120	165	145	200
3/4	210	285	240	325
7/8	320	435	350	475
1	480	650	560	760
1-1/8	700	950	780	1060
1-1/4	1020	1385	1100	1545

## NOTE:

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.

GRADE 8: UNC OR UNF THREAD

Size	Coarse Thread		Fine Thread	
	ft-lbs	N-m	ft-lbs	N-m
1/4	10	13	11	15
5/16	20	27	22	29.5
3/8	35	47	40	55
7/16	55	75	65	88
1/2	90	120	95	130
9/16	120	165	135	185
5/8	180	245	195	265
3/4	300	405	340	460
7/8	500	680	560	760
1	800	1085	920	1250
1-1/8	1180	1600	1340	1815
1-1/4	1720	2330	1900	2575

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# Torque Values - Metric Fasteners

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-lbs.	N-m	ft-lbs.	N-m	ft-lbs.	N-m	ft-lbs.	N-m	ft-lbs.	N-m	ft-lbs.	N-m	ft-lbs.	N-m	ft-lbs.
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

## NOTE:

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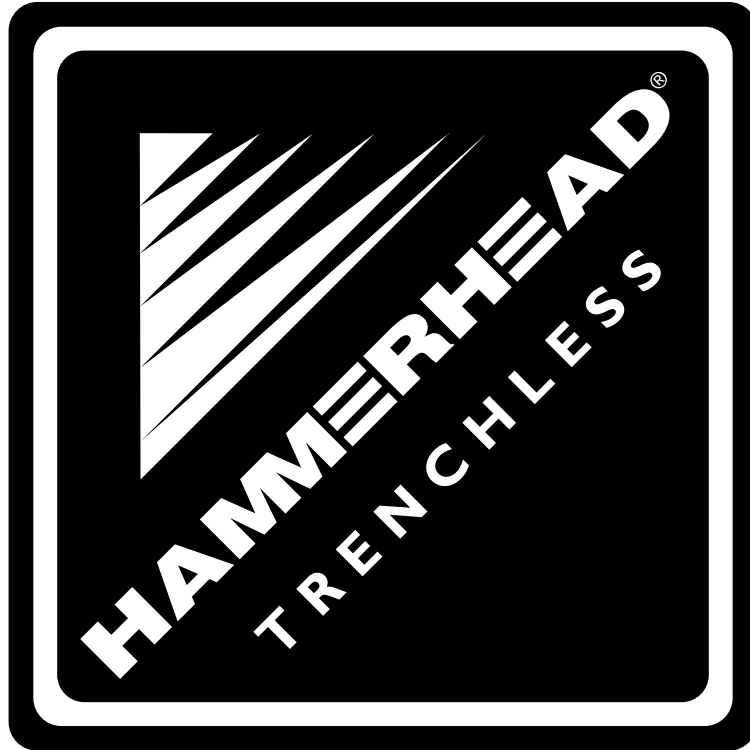
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