

V-30 Supercharger w/ Chassisworks Gear Drive

Technical Guide



**For use with
V-30 Supercharger w/ Chassisworks
Gear Drive Combination**



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FOREWORD

All information, illustrations and specifications contained herein are based on the latest product information available at the time of this publication. Changes to the manual may be made at any time without notice. Contact Vortech Engineering for any additional information regarding this kit and any of these modifications at (805) 247-0226 7:00am-3:30pm PST.



Take note of the following before proceeding:

- 1. THIS IS A RACE PRODUCT. NO WARRANTY IS IMPLIED.**
2. Some fabrication will be necessary to fit your application.
3. Proper installation of this accessory requires general automotive mechanic knowledge and experience. Please browse through each step of this instruction manual prior to beginning the installation to determine if you should refer the job to a professional installer/technician. Please contact your dealer or Vortech Engineering for possible installers in your area.
4. Oiling systems will vary depending your application. We have provided **examples** of various ways the oiling system could be set up. Consult an engine builder to help select the correct combination for your application.
5. Vortech is not responsible for any clutch, transmission, drive-line or engine damage.

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!!BEFORE YOU BEGIN!!

Please read through this entire instruction booklet

The oil systems covered in this user guide are a general overview of the more common oil systems used with V-30 superchargers. However, it is recommended to speak with an engine builder to determine the best oil system for your application. **OIL SYSTEM EXAMPLES ARE LOCATED NEAR THE BACK OF THIS MANUAL.** As with any power enhancing product, V-30 superchargers are designed to be used on healthy, well-maintained engines. Vortech Engineering is not responsible for engine damage.



SERVICE INFORMATION

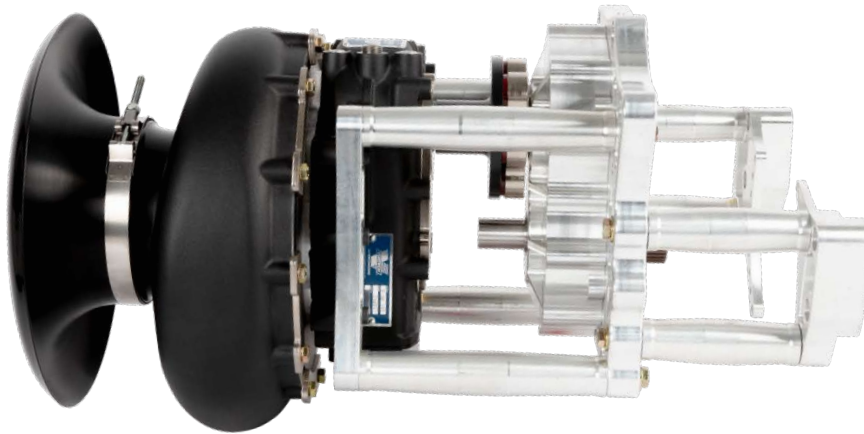
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Due to the extreme operating environment of the V-30 supercharger, it is critical that you send it in for regular service after 50 runs or any time you have a concern with the condition of the supercharger. When it is sent in for service, we will completely disassemble the supercharger and check the condition of each individual component. Keep in mind, once the supercharger is taken apart, you will automatically be **REQUIRED** to replace the bearings and seals as those components don't get reused under any circumstances. If any component is damaged, you will be notified with your available options as well as cost of repairs. No repairs will be done without customer authorization. If you have any further questions, please contact your representative or call us directly at (805)247-0226 7:00am-3:30pm PST.

GEAR DRIVE INFORMATION

IMPORTANT: THIS IS A RACE PRODUCT. NO WARRANTY IS IMPLIED.



The gear drive provided with this kit is a true racecar component. Because of this, fabrication will be required in order to properly mate the gear drive to your application. Further, there are four unfinished spacers included with your gear drive that need to be machined to length after taking careful measurements. This is also covered in this instruction manual. We highly recommend having a trained professional take care of any fabrication in order to avoid serious injury or death.

READ ALL INSTRUCTIONS COMPLETELY AND THOROUGHLY UNDERSTAND THEM BEFORE PROCEEDING. FOR ASSISTANCE WITH THE GEAR DRIVE INSTALLATION OR TO REPORT MISSING COMPONENTS RELATED TO THE GEAR DRIVE, PLEASE CALL CHASSISWORKS TECH SUPPORT AT (916)388-0288.

FOR ASSISTANCE WITH THE V-30 SUPERCHARGER OR TO REPORT MISSING COMPONENTS RELATED TO THE V-30 SUPERCHARGER, PLEASE CALL VORTECH TECH SUPPORT AT (805)247-0226.

TECHNICAL GUIDE INFORMATION

IMPORTANT: THIS IS A RACE PRODUCT. NO WARRANTY IS IMPLIED.



THIS TECHNICAL GUIDE PROVIDES A GENERAL OVERVIEW OF THE PREPARATION AND INSTALLATION PROCEDURES OF THE GEAR DRIVE ASSEMBLY. THE COMPONENTS DEPICTED IN THIS TECHNICAL GUIDE ARE FOR BIG BLOCK CHEVY ENGINES, HOWEVER THE OVERALL INSTALLATION AND PREPARATION PROCEDURES ARE VERY SIMILAR FOR A VARIETY OF OTHER APPLICATIONS.

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1. V-30 SUPERCHARGER FEATURES

A. Located on the top of the supercharger is a vent port that is capped by a 3/8" NPT plug. The purpose of the vent is to help keep internal gear case temperatures low, resulting in cooler oil temperatures. A 3/8" NPT X 90° X 3/8" hose barb fitting (not pictured) has been provided, however you're welcome to use a different fitting that'll better suit your application. Keep in mind that it'll be necessary to attach a vent line to the vent port. If you are running an oil catch can, we suggest plumbing the vent line into the oil catch can.



Fig. 1-a: Gear case vent

B. You'll notice that there is a long length of black 1/4" nylon tubing that connects the 1/8" NPT X 90° X 1/4" hose push connector on the volute to the lower oil cap on the gear case. This is what's called an "air assist." The purpose of this is to help atomize the oil and allow for a more uniform oil spray within the gear case.

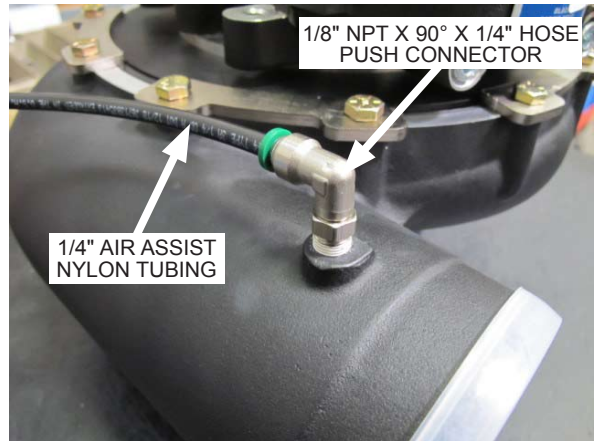


Fig. 1-b: Air assist fitting

C. To make sure that no oil makes its way into the volute, there is a one-way check valve installed in-line with the air assist. The arrow on the one-way check valve must point towards the 1/8" MNPT X 1/8" FNPT X 90° fitting. Further, there is a restrictor nozzle between the lower oil cap and the 1/8" MNPT X 1/8" FNPT X 90° fitting. This restrictor nozzle has a .010" orifice that is sized specifically for our application. If the restrictor nozzle is ever removed, it is critical that it goes back into the lower oil cap in the same direction that it was installed, with the tiny orifice pointed towards the lower oil cap. Lastly the 1/4" nylon tubing connects to the one-way check valve using a 1/8" NPT X 1/4" hose push connector.

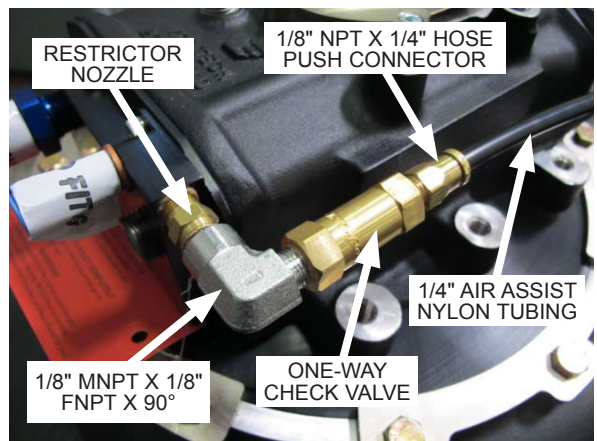


Fig. 1-c: Check valve assembly

1. V-30 SUPERCHARGER FEATURES

D. On the lower oil cap, you'll notice two fittings and one extra port that's plugged off. The larger of the two fittings is used for oil drain. This fitting is 3/8" NPT X -10 JIC. The long steel fitting is the oil feed nozzle. Included with each supercharger is a 1/8" NPT X 90° X -4 JIC fitting (not pictured) that is to be used to attach your pressurized oil source to the oil feed fitting. Lastly, there is one 3/8" NPT plug located closest to the oil feed fitting. In the instance where you can't use the standard oil drain location, you can move the oil drain fitting to the 3/8" NPT port closest to the oil feed fitting.

NOTE: If you choose to use a different oil drain fitting, it should not be smaller than -8 JIC or 1/2".

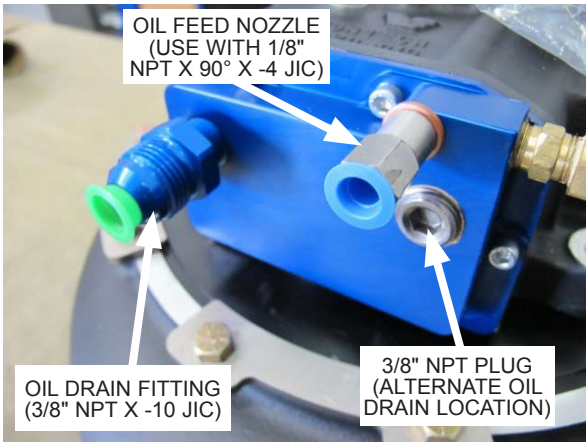


Fig. 1-d: Oil feed and oil drain

E. The supercharger has six 3/8"-16 threaded holes and six 5/16"-18 threaded holes. It is important that you use to the 3/8"-16 threaded holes as your primary mounting holes. It's not uncommon to leave the 5/16"-18 holes unused, however they can be used to add additional support if necessary.

NOTE: Depending on how you mount your supercharger, it may be necessary to alter the position of the air assist assembly in case of a clearance issue. If so, remember that the restrictor nozzle and the flow arrow on the one-way check valve point towards the lower oil cap.

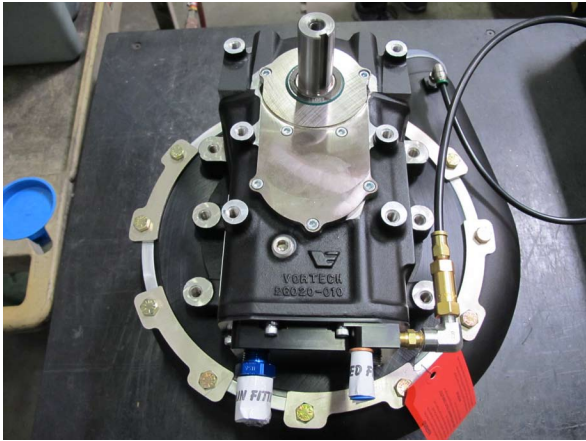


Fig. 1-e: Gear case mounting bosses

F. Each supercharger includes a bellmouth and a T-bolt clamp. The purpose of the bellmouth is to better direct the incoming air into the supercharger. Depending on which specific supercharger you have, the bellmouth will mount directly to the volute or to a bellmouth adapter (as pictured). Use the provided T-bolt clamp to secure the bellmouth to the volute or bellmouth adapter.

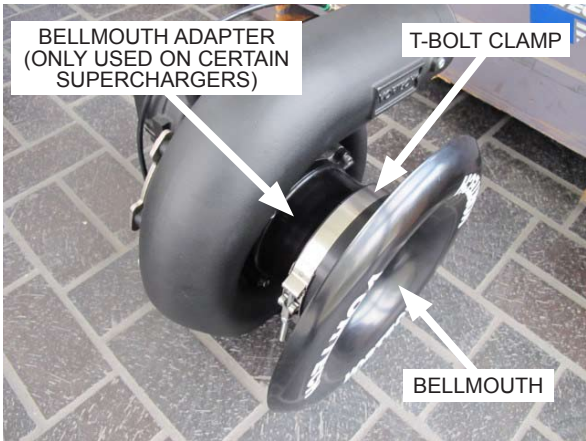


Fig. 1-f: Bellmouth

2. STANDOFF SPACER MEASUREMENT & MACHINING

- A. In order to measure the necessary standoff shoulder length of the four unfinished spacers, the motor plate, balancer and crank trigger wheel (if used) must be installed prior to taking measurements, otherwise measure from the front face of the engine block. Place a straight edge along the front face of the balancer. Using calipers, measure the distance between the front face of the engine block and the front face of the balancer. If you are using a motor plate, measure from the forwardmost face of the motor plate and the front face of the balancer and/or trigger wheel. This is the **MEASURED LENGTH** and will be plugged into a formula in the next step.



Fig. 2-a: Standoff spacer measurement

NOTE: The CDS crank trigger wheel is integrated into the drive hub and must not be installed for measurement.

- B. In order to calculate your standoff spacer shoulder length, you will need to know the thickness of the engine mount blocks. These mounts get attached to the front of the engine block. Use the chart below and the formula on the next page to calculate the standoff shoulder length:



Fig. 2-b: Engine mount blocks

NOTE: Your engine mount blocks may differ from the ones shown, depending on your application.

ENGINE BLOCK	TYPE	ENGINE MOUNT THICKNESS
CHEVROLET	SBC, BBC, LSX	1.500"
FORD	SBF 302-351, BBF 429-460	1.000"
	MODULAR	0.750"
MOPAR	GEN-2 426 HEMI	1.250"
	GEN-3 HEMI	1.000"
	B-BLOCK 383-440	1.250"
OLDSMOBILE	OLDSMOBILE V8	1.000"
AFTERMARKET	ALAN JOHNSON 481X, ALL PONTIAC V8	1.500"
	ALAN JOHNSON TFX HEMI, BRAD ANDERSON HEMI	1.250"
	*CN BLOCKS BBC	0.000"
	* NOONAN HEMI	0.000"

* Manufacturer integrates or provides a mounting face for the CDS standoff. Measure from the mounting face to the balancer or crank trigger wheel. No additional engine mount thickness is necessary for this calculation.

2. STANDOFF SPACER MEASUREMENT & MACHINING

C. Using the provided standoff spacer drawing and formula below as reference, machine the standoff spacers to the proper dimensions, making sure to also drill and tap the end of the spacer being machined. However, keep the following in mind:

- i. **STANDOFF SHOULDER LENGTH** must be within $\pm .020$ " of calculated value.
- ii. All four **STANDOFF SHOULDER LENGTHS** must be within $.005$ " of each other.

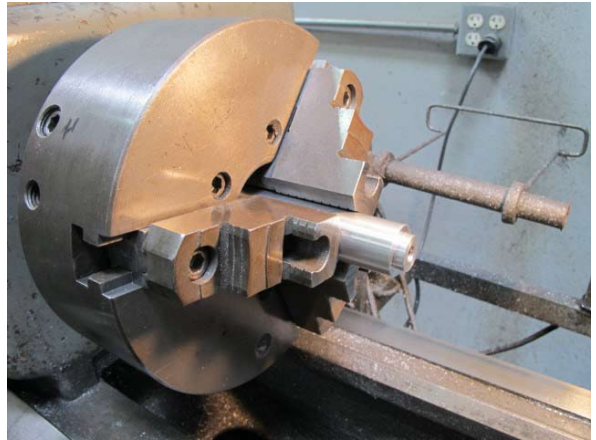
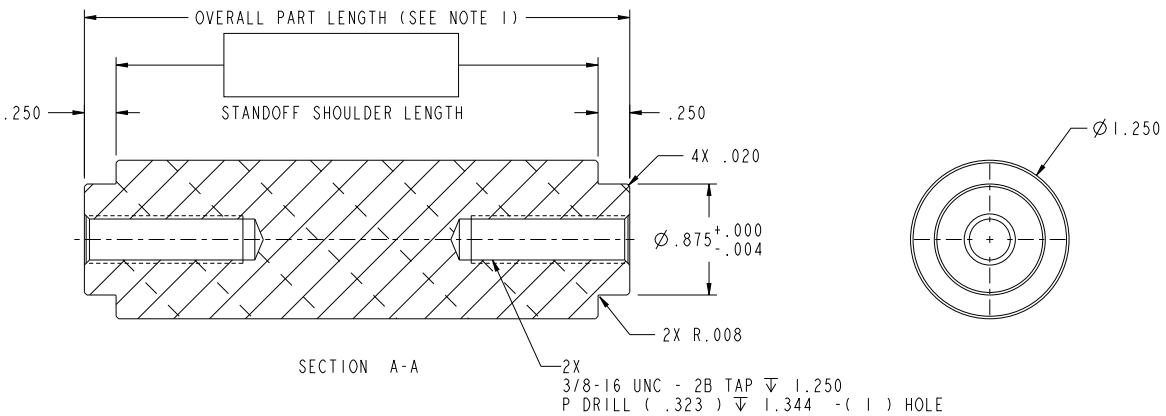


Fig. 2-c: Final machining of standoff spacers

$$\text{MEASURED LENGTH} + 1.800 \text{ CONSTANT} - \text{ENGINE MOUNT THICKNESS} = \text{STANDOFF SHOULDER LENGTH}$$

NOTES:

1. OVERALL PART LENGTH IS STANDOFF SHOULDER LENGTH PLUS .500
2. STANDOFF SHOULDER LENGTH MUST BE WITHIN $\pm .020$ OF CALCULATED VALUE
3. ALL 4 STANDOFF SHOULDER LENGTHS MUST BE WITHIN $.005$ OF EACH OTHER



$$\text{MEASURED LENGTH} + 1.800 \text{ CONSTANT} - \text{ENGINE MOUNT THICKNESS FROM CHART} = \text{STANDOFF SHOULDER LENGTH}$$

DESCRIPTION	
STANDOFF SHOULDER LENGTH	
Chris Nelson's CHASSISWORKS INC. 8661 YOUNGER CREEK DRIVE SACRAMENTO, CA 95828 (916) 388-0288 FAX 388-0295	PART NO. 7993-162-X
7/15/19	DWG: 7993-162-X

3. CRANK HUB INSTALLATION

- A. The crank hub comes partially assembled for shipping purposes. Remove the three 5/16"-18 socket head cap screws (shoulder) and three nylon washers securing the two pieces of the crank hub together.



Fig. 3-a: Crank hub assembly

- B. Locate the provided bag of drive bushings. There are eighteen bushings in total, six of which are larger than the rest. In this step, we will need the twelve smaller bushings. Firmly press the twelve bushings onto the standoffs on the crank hub base.



Fig. 3-b: Install drive bushings

- C. Using three 3/8"-16 x 1.25" black oxide socket head cap screws, secure the crank hub base to the balancer. Torque the screws to 27 ft-lbs.

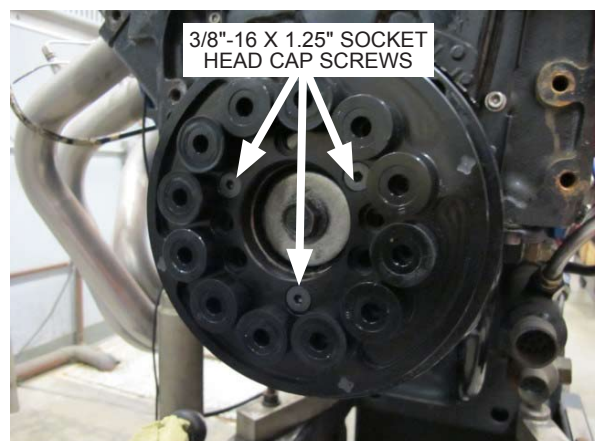


Fig. 3-c: Install crank hub base

3. CRANK HUB INSTALLATION

- D. Install the crank hub cover to the crank hub base and secure using the previously removed 5/16"-18 socket head cap screws (shoulder) and three nylon washers. Torque the screws to 13 ft-lbs or 150 in-lbs.



Fig. 3-d: Install crank hub cover

4. CRANK TRIGGER MOUNT & TIMING POINTER INSTALLATION

NOTE: Your crank trigger mount may differ from the one shown, depending on your application.

- A. If you decide to use a remote crank trigger, you will need to drill and tap the crank trigger mount to accept your choice of crank trigger. Using the three provided 10-32 x .625" flat head screws, assemble the crank trigger mount as shown. Torque the screws to 3 ft-lbs or 40 in-lbs.



Fig. 4-a: Assemble crank trigger mount

- B. If you decide to use a remote crank trigger, use two 7/16"-14 x 1.75" socket head cap screws and two 7/16" lock washers to temporarily install the passenger side engine mount block to the engine. Next, temporarily install the crank trigger mount to the passenger side engine mount block using the two provided 1/4"-20 x .750" socket head cap screws and two 1/4" washers. Mark the center of the crank trigger wheel on the crank trigger mount. Remove the crank trigger mount, then drill and tap the center mark to fit your choice of crank trigger. Remove the passenger side mounting block and set aside as it will be reinstalled in a later step.

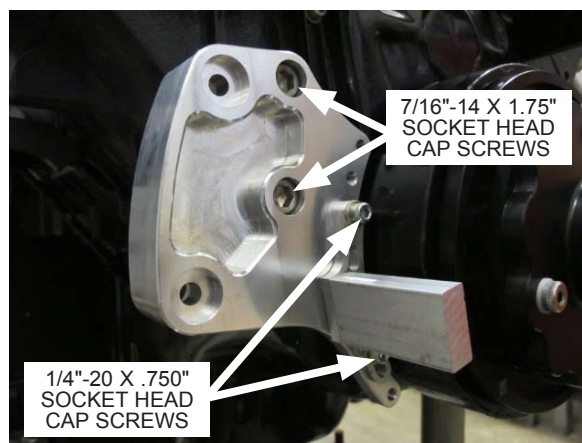


Fig. 4-b: Mark center of crank trigger wheel on crank trigger mount

- C. Using two 8-32 x .375" socket head cap screws, loosely install the timing pointer to the driver side engine mount block. Using two 7/16"-14 x 1.75" socket head cap screws and two 7/16" lock washers, temporarily install the driver side engine mount block to the engine. **SET THE ENGINE TO TDC AND ADJUST THE TIMING POINTER TO ZERO ON THE BALANCER**, then tighten the two 8-32 x 3.75" socket head cap screws. Remove the driver side engine mount block and set aside as it will be reinstalled in a later step.

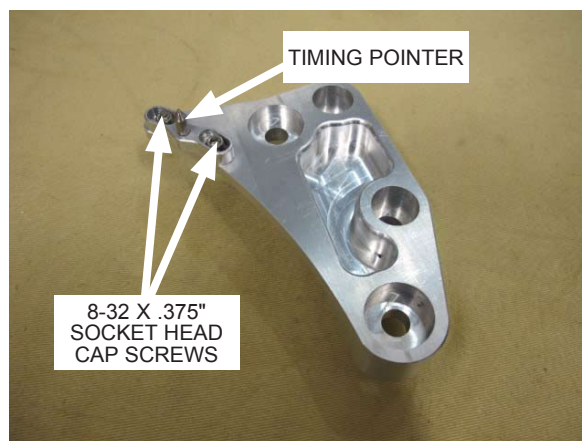


Fig. 4-c: Install timing pointer

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5. ENGINE MOUNT BLOCKS INSTALLATION

- A. Locate the standoff spacers that you had machined in **SECTION 2** as they will be installed to the engine mount blocks before being installed to the engine. The standoff spacers are designed to fit into the larger countersunk holes on the engine mount blocks. With all four standoff spacers installed, secure them to **BOTH** engine mount blocks using a 3/8"-16 x 1.25" hex head cap screw and a 3/8" washer on each standoff spacer. Torque the screws to 27 ft-lbs.

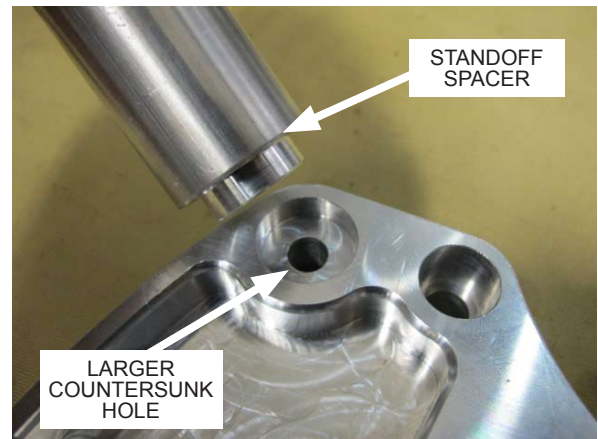


Fig. 5-a: Install standoff spacers to both engine mount blocks

- B. Loosely install the **BOTH** engine mount blocks with the standoff spacers to the engine block using four 7/16"-14 x 1.75" socket head cap screws and four 7/16" lock washers. They will be torqued to spec in a later step.

NOTE: Passenger side shown. Repeat for driver side.



Fig. 5-b: Install both engine mount blocks

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6. GEAR DRIVE ASSEMBLY INSTALLATION

- A. Insert the splined input shaft to the crank hub assembly previously installed to the balancer.



Fig. 6-a: Install gear drive assembly

- B. Align the gear drive assembly with the standoff spacers and allow them to pilot themselves into the receiving holes on the gear drive assembly. Once the standoff spacers are in position on the gear drive assembly, secure the gear drive assembly to the standoff spacers using four 3/8"-16 x 1.25" hex head cap screws and four 3/8" washers.

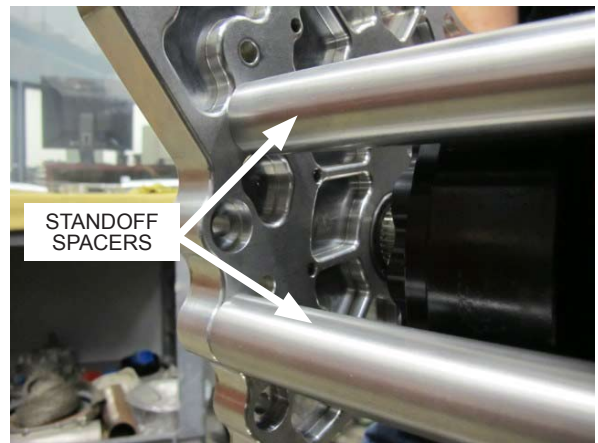


Fig. 6-b: Secure standoff spacers to gear drive assembly

- C. At this time, go back and torque the 7/16"-14 x 1.75" engine mount block screws to 44 ft-lbs.

NOTE: Passenger side shown. Repeat for driver side.

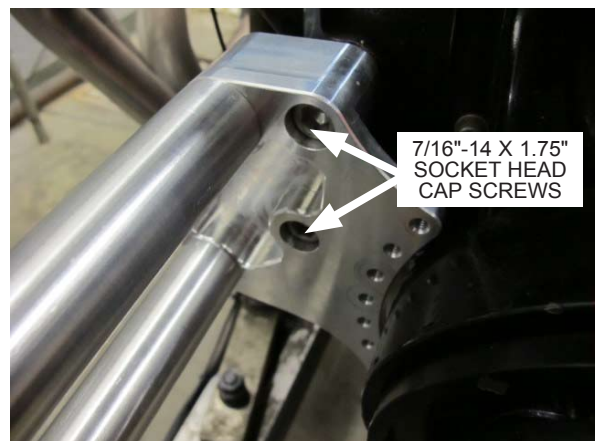


Fig. 6-c: Secure engine block mount screws

6. GEAR DRIVE ASSEMBLY INSTALLATION

- D. Once the mounting block screws are torqued to spec, proceed to torque the 3/8"-16 x 1.25" hex head cap screws that secure the gear drive assembly to the four standoff spacers to 27 ft-lbs.

NOTE: Passenger side shown. Repeat for driver side.

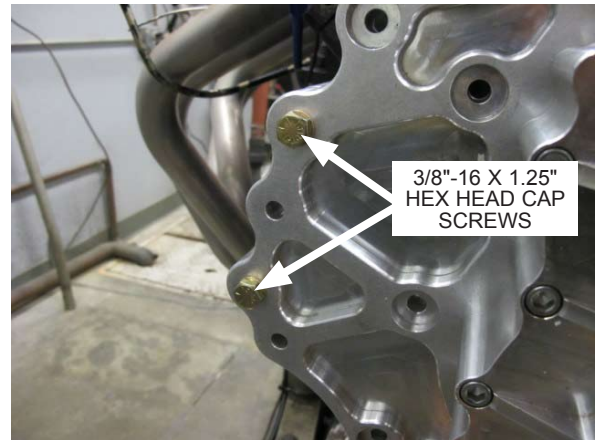


Fig. 6-d: Secure standoff spacer screws

- E. If you decided to use a remote crank trigger, install the crank trigger mount with the installed crank trigger to the passenger side engine mount block and resecure it using the two previously used 1/4"-20 x .750" socket head cap screws and two 1/4" washers. Lastly, verify that the engine is still at TDC and verify that the timing pointer on the driver side engine mount block remains pointed to ZERO on the balancer. Adjust as necessary.

7. SUPERCHARGER MOUNT INSTALLATION

- A. Locate the keyway and place it on the supercharger input shaft. Next, slide the supercharger hub onto the input shaft, making sure to align it with the keyway.

NOTE: Due to the tight tolerances of the input shaft and the supercharger hub, it may be necessary to heat the supercharger hub so it can safely be installed to the input shaft. This can be done by heating it with a torch or placing it on a hot plate. DO NOT force the supercharger hub onto the input shaft. DO NOT overheat the hub as it might melt the input seal.

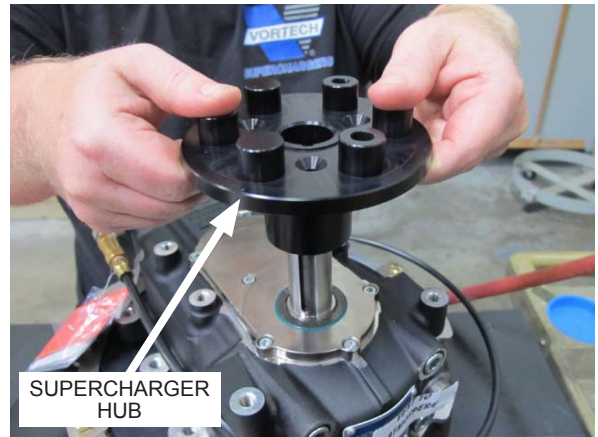


Fig. 7-a: Install supercharger hub

- B. With the supercharger hub installed, secure it using the provided 3/8"-24 x 1.75" hex head cap screw, 3/8" washer and hub retainer. Torque the screw to 35 ft-lbs. At this time, locate the six remaining drive bushings and install them to the six standoffs on the supercharger hub.



Fig. 7-b: Secure supercharger hub using provided screw and retainer

- C. Locate the two provided supercharger mounts and four standoffs. Keep in mind that there is a "top" and "bottom" to these mounts, so they can only be installed one way.



Fig. 7-c: Supercharger mounts

7. SUPERCHARGER MOUNT INSTALLATION

- D. Install the supercharger mounts to each side of the supercharger and secure using six 3/8"-16 x 1.50" hex head cap screws and 3/8" washers. Torque the screws to 27 ft-lbs.

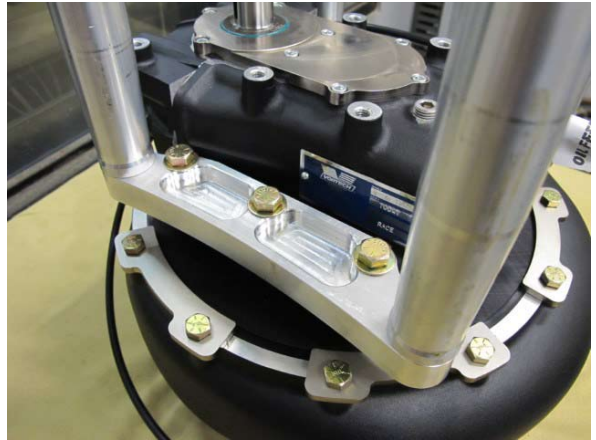


Fig. 7-d: Install supercharger mounts

- E. Align the gear drive output shaft with the six bushings on the supercharger input shaft, then seat the standoffs into the gear drive base plate. With everything seated, secure the standoffs using four 3/8"-16 x 1.50" hex head cap screws and torque them to 27 ft-lbs.

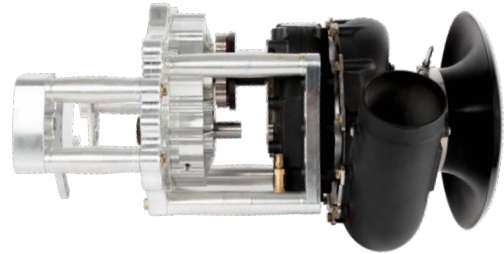


Fig. 7-e: Install supercharger to gear drive assembly

8. GEAR DRIVE OIL & BREATHER VENT INSTALLATION

- A. Located at the top edge of the gear drive assembly is an oil fill port. Fill the gear drive assembly with **5OZ OF 75/90 SYNTHETIC GEAR OIL**.

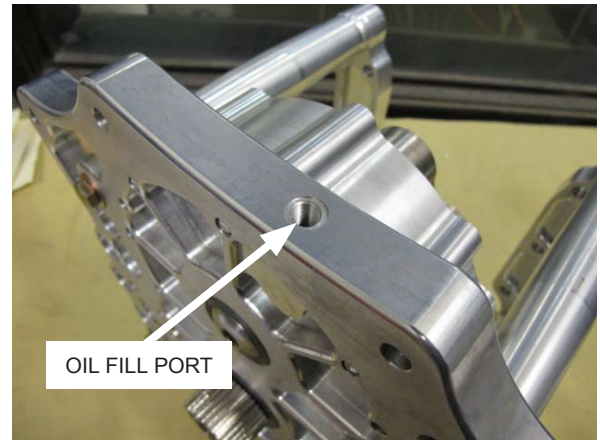


Fig. 8-a: Oil fill port

- B. After the oil is added to the gear drive assembly, install the 90° breather fitting to the same hole where the oil was added. This fitting will be used to install a breather vent line. Using your choice of 1/4" breather vent line, cut one end of the breather vent line so it square and not cut at an angle. Install one end of the breather vent line to the fitting, then route the other end of the breather vent line to a location of your choice, making sure that the breather vent line is routed above the 90° breather fitting. The breather vent line must be routed in a way to avoid having any dips in order to avoid fluid collecting within the breather vent line. A vented breather fitting is also provided if you choose not to utilize a breather vent line.

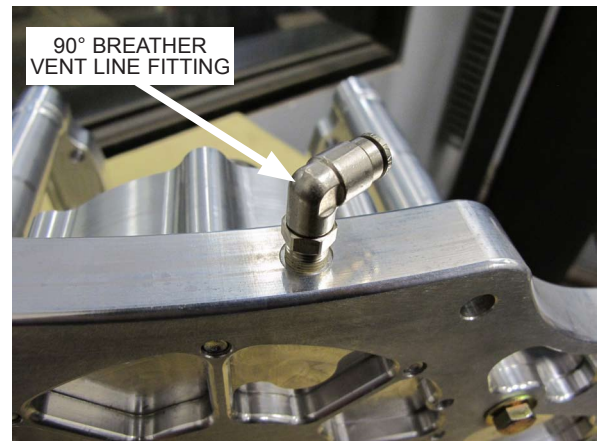


Fig. 8-b: 90° breather vent line fitting

- C. Located on the bottom side of the gear drive assembly are two brass plugs. The lowest of the two brass plugs will be used as the oil drain. Be sure to change the gear drive assembly oil at regular maintenance intervals along with the supercharger oil.



Fig. 8-c: Oil drain plug

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9. FINAL CHECK

- A. Check all fittings, nuts, bolts and clamps for tightness. Pay particular attention to oil and fuel lines around moving parts, sharp edges and exhaust system parts. Make sure all wires and lines are properly secured with clamps or tie-wraps.
- B. Recheck to be sure that no hoses, wires, etc. are near exhaust headers or moving parts. Look also for any signs of fluid leakage.
- C. **PLEASE TAKE SPECIAL NOTE:** Operating the vehicle without ALL the subassemblies completely and properly installed may cause **FAILURE OF MAJOR COMPONENTS.**

APPENDIX A. OIL SYSTEM NOTES

NOTE: Step A applies to vehicles using a dedicated oil reservoir only.

- A. If you choose to run a dedicated reservoir, you will be required to use an oil feed pump. If you choose to go this route, we suggest using the following oil pump:

TURBOWERX EXA PUMP

P/N: TWX-300-24V



Fig. A-A: TurboWerx Exa Pump

NOTE: Steps B and C do not apply to vehicles using a dry sump oil system.

- B. Regardless of how you decide to feed oil to the supercharger, it will be necessary to use a scavenge pump to get the oil out of the supercharger and back into the oil pan or oil reservoir. For this, we suggest using the following pump:

HOLLEY 140 GPH BLACK ELECTRIC FUEL PUMP

P/N: 12-815-1

This pump is originally designed to pump fuel, however with the removal of an internal screen, it will be able to pump oil. The modification is covered in the next step.



Fig. A-B: Holley Black Pump

- C. Carefully remove the lower pump cover by using a 3/8" socket to remove the five retaining screws. Remove the internal screen from the location shown in Fig. A-C, then reinstall the lower pump cover and secure using the five previously removed screws. Be sure not to damage the gasket during this process.

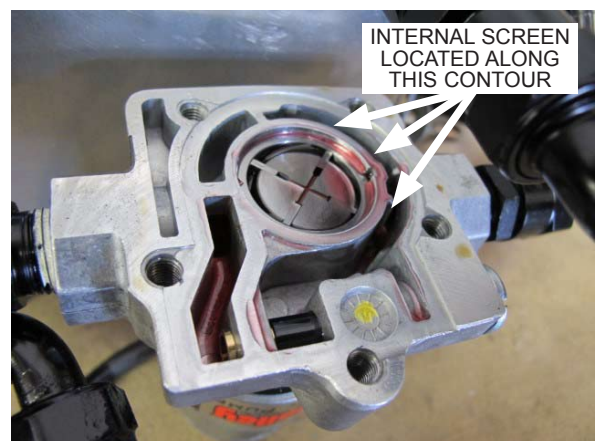
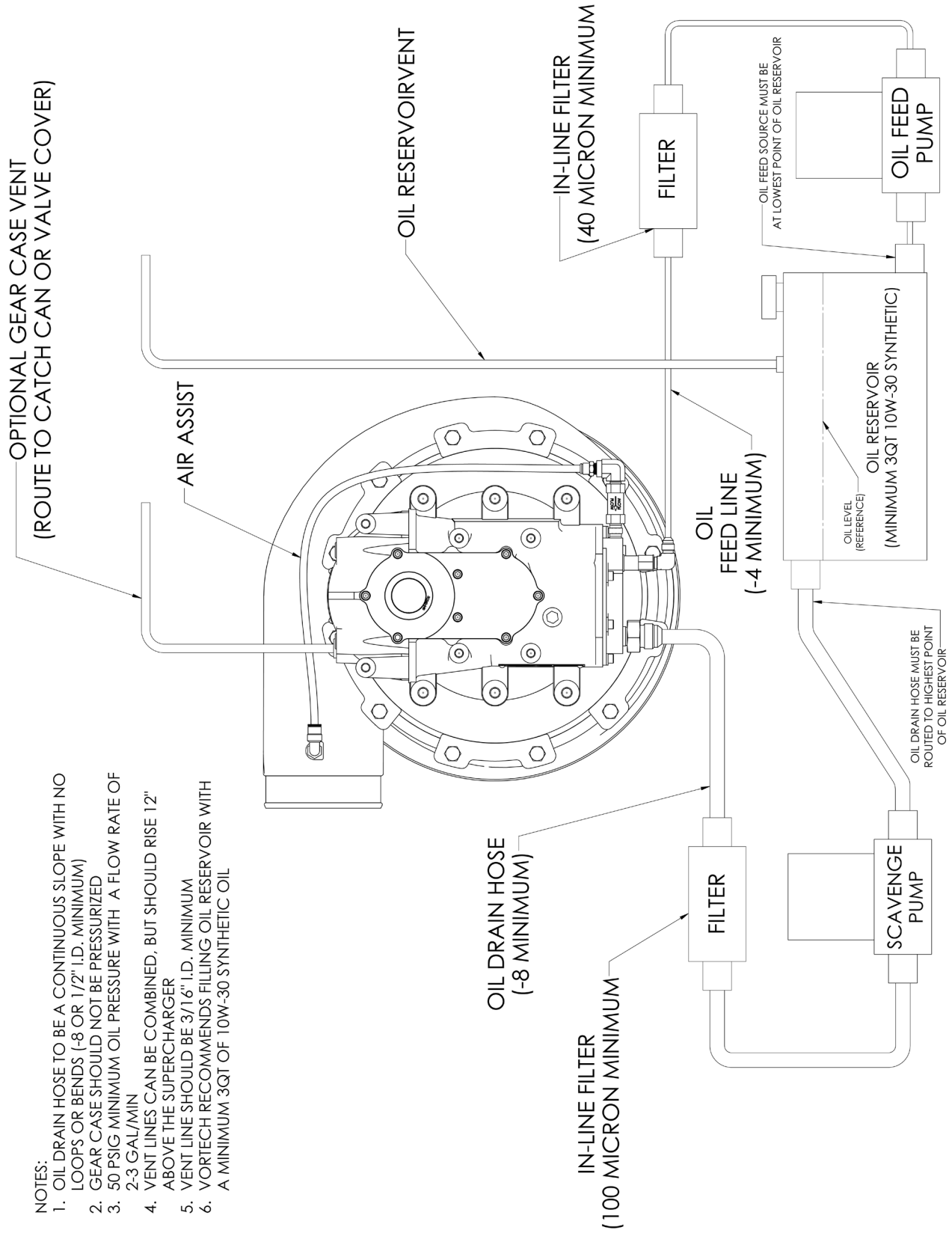


Fig. A-C: Holley Black Pump modification

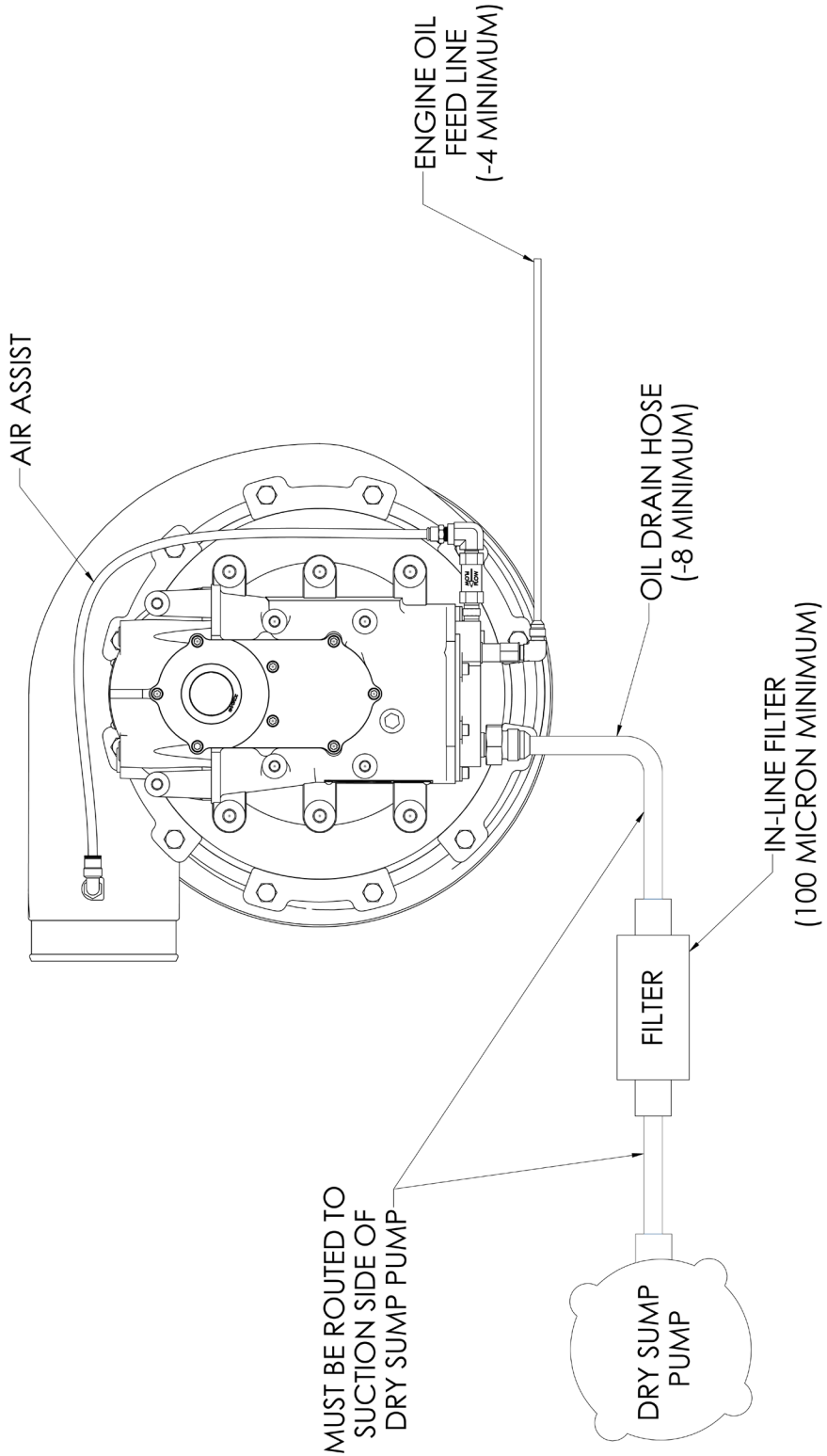
APPENDIX B. DIAGRAM, OIL SYSTEM, DEDICATED RESERVOIR



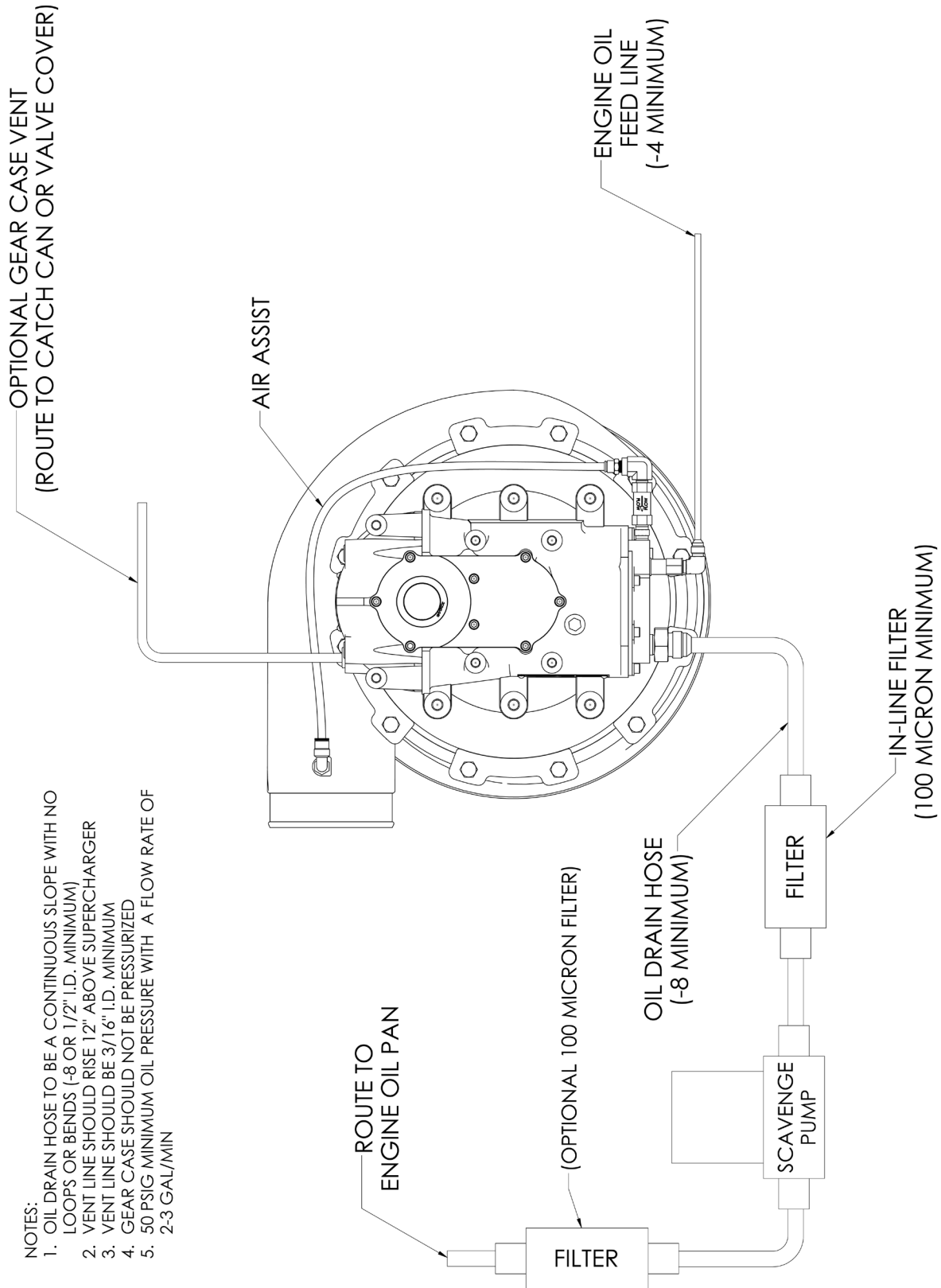
- NOTES:
1. OIL DRAIN HOSE TO BE A CONTINUOUS SLOPE WITH NO LOOPS OR BENDS (-8 OR 1/2" I.D. MINIMUM)
 2. GEAR CASE SHOULD NOT BE PRESSURIZED
 3. 50 PSIG MINIMUM OIL PRESSURE WITH A FLOW RATE OF 2-3 GAL/MIN
 4. VENT LINES CAN BE COMBINED, BUT SHOULD RISE 12" ABOVE THE SUPERCHARGER
 5. VENT LINE SHOULD BE 3/16" I.D. MINIMUM
 6. VORTECH RECOMMENDS FILLING OIL RESERVOIR WITH A MINIMUM 3QT OF 10W-30 SYNTHETIC OIL

APPENDIX C. DIAGRAM, OIL SYSTEM, DRY SUMP

- NOTES:
1. OIL DRAIN HOSE TO BE A CONTINUOUS SLOPE WITH NO LOOPS OR BENDS (-8 OR 1/2" I.D. MINIMUM)
 2. GEAR CASE SHOULD NOT BE PRESSURIZED
 3. 50 PSIG MINIMUM OIL PRESSURE WITH A FLOW RATE OF 2-3 GAL/MIN
 4. DRY SUMP SYSTEMS CAN OMIT USING GEAR CASE VENT



APPENDIX D. DIAGRAM, OIL SYSTEM, ENGINE OIL FED



- NOTES:
1. OIL DRAIN HOSE TO BE A CONTINUOUS SLOPE WITH NO LOOPS OR BENDS (-8 OR 1/2" I.D. MINIMUM)
 2. VENT LINE SHOULD RISE 12" ABOVE SUPERCHARGER
 3. VENT LINE SHOULD BE 3/16" I.D. MINIMUM
 4. GEAR CASE SHOULD NOT BE PRESSURIZED
 5. 50 PSIG MINIMUM OIL PRESSURE WITH A FLOW RATE OF 2-3 GAL/MIN



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