



# Cummins



## 4B3.3M

### 65 HP @2600 RPM

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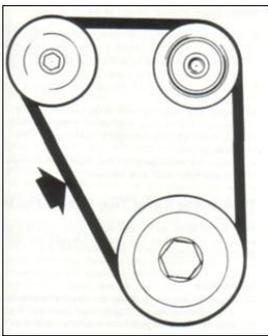
# Serpentine Pulley Kit & Balmar Alternator 621 Series (70 Amp, 100 Amp, 120 Amp, and 150 Amp) Cummins 4B3.3M

## INSTALLATION INSTRUCTIONS FOR **Balmar 621** ALTERNATOR WITH SERPENTINE BELT KIT.

1. **Tools Required:** 10mm, 12mm, 14mm, 17mm, sockets & #8 Allen Wrench for alternator mounting bracket. 27mm ½ Drive socket for the crankshaft bolt. 12mm wrench starter battery lug 17mm wrench starter motor mounting bolts. Philips screw driver small starter connection
2. **Before You Start: IMPORTANT!** Disconnect or isolate the starting battery.
3. **Crank Shaft Pulley:** While the original "V" belt is still in place loosen but **not** remove the 4 water pump pulley bolts, then slacken alternator adjusting arm and remove original "V" belt. Remove the Crankshaft Pulley by releasing the securing bolt with a 27mm socket. Standard thread "Lefty Loosey & Righty Tightly" To prevent the engine from rotating whilst applying pressure to release the crank shaft pulley securing bolt, it is suggested that the starter motor be removed, this will allow you to wedge a pry bar or similar item between the flywheel ring gear and the housing. This applies to the tightening process when the new Serpentine pulley is fitted. Ensure the battery power is disconnected & isolated before commencing and removing the electrical connections. Next, remove the starter motor. Do not overtighten main starter battery terminal when re assembling, terminal is fragile. With the securing bolt removed, the pulley should come off easily by hand. Note the key way location as you will position the replacement serpentine pulley #21 back on to the same key way, ensuring the key stays in position. Once the crank shaft serpentine pulley is correctly in place, re fit the securing bolt and torque to 270 ft lbs. We recommend applying medium strength Loctite to the threads of the securing bolt, as supplied in the kit #22.
4. **Alternator & Bracket:** The original alternator and bracket should be removed and replaced with custom bracket #9. To support the weight of the larger alternator we have strengthened the bracket and added a support plate #13 giving a hefty total of 5 securing points. Fit bracket, belt tensioning arm and mounting hardware per **illustration below**.
5. **Tightening Torques:** It is **important** to apply the correct tightening torques as **illustrated below**. As with many engines, the timing cover to which the bracket is mounted is constructed of aluminum and can strip out the threads if overtightened. It is recommended to use a small amount of Medium strength Loctite as provided on threaded fasteners except where lock nuts are used.
6. **Fit the 621 Series Alternator:** With the new bracket secured in place, fit the Balmar 621 Series Alt. The adjusting arm and main 10mm mounting fasteners should remain loose until the belt is fitted and tensioned.
7. **Fresh Water Pump Pulley:** Remove the 4 bolts that attach the fresh water pump pulley to the pump and attach the serpentine pulley #19 with the 4 bolts supplied #20. Re torque to 18 ft lbs . The final torquing of

the water pump pulley bolts are easier done with the belt in place and tensioned per below. This will help to prevent the pulley from turning whilst re torquing.

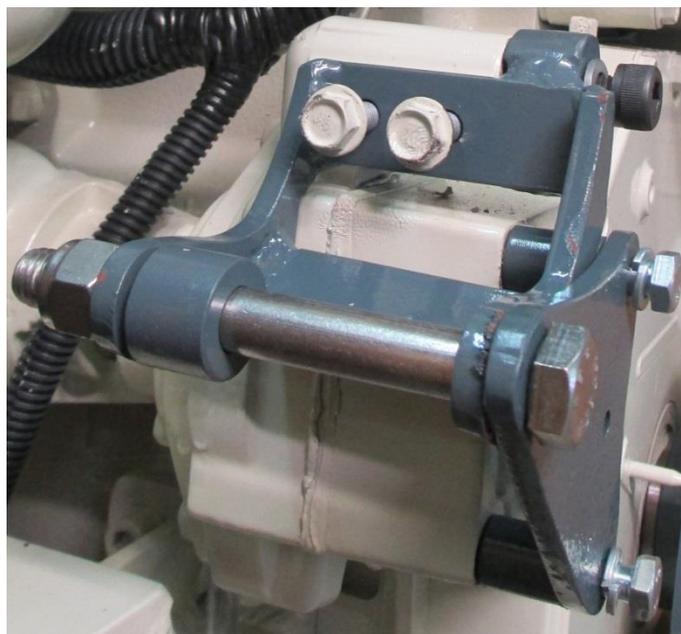
8. **Wiring:** Connect the alternator and the MC614 Smart regulator with the pre wired harness per the Balmar instruction package supplied with the alternator. **Important:** Size the battery cables to handle the increased amperage. Undersized cables can overheat and potentially cause a fire hazard. If your alternator has an insulated ground, (*identified by a dedicated ground terminal on the back of the alternator same size as the main positive output terminal*) the ground cable must match the size of the positive cable. [Link to Balmar Cable sizing chart](#). An engine wiring diagram is also supplied to assist the interface, most of which is “plug & play”.
9. **Serpentine Belt Tension** - Fit the serpentine belt #6. Tension should be adjusted using the alternator adjusting arm so that, with normal thumb pressure, the belt can be depressed  $\frac{3}{8}$  of an inch at the center of the longest span as shown. The new belt will require re tightening after a few hours of operation. This check should be done while the engine and belt are warm. Continue to check tension until the new belt no longer requires adjustment. Do Not Overtighten the belt.

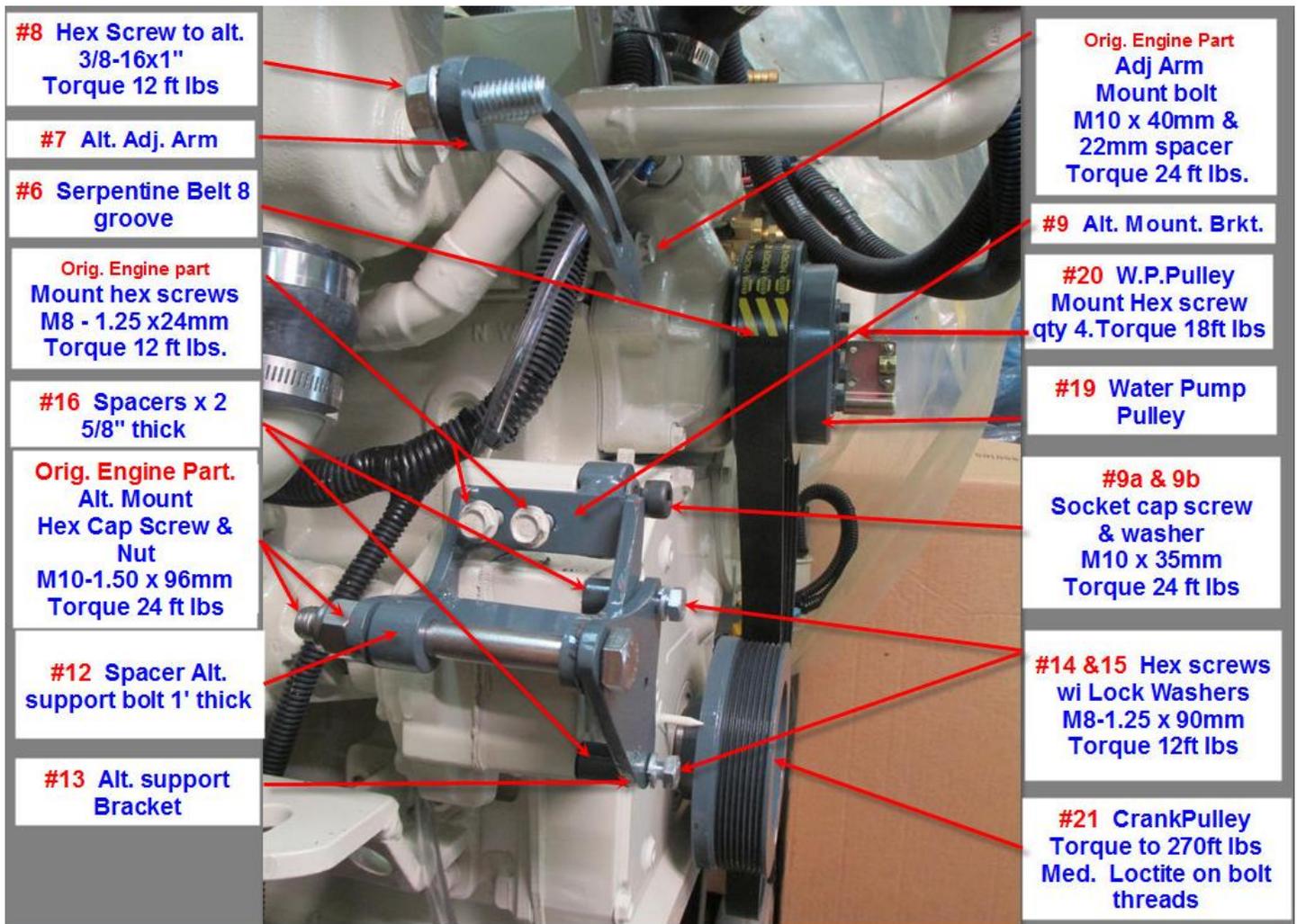


**Carry a spare!**

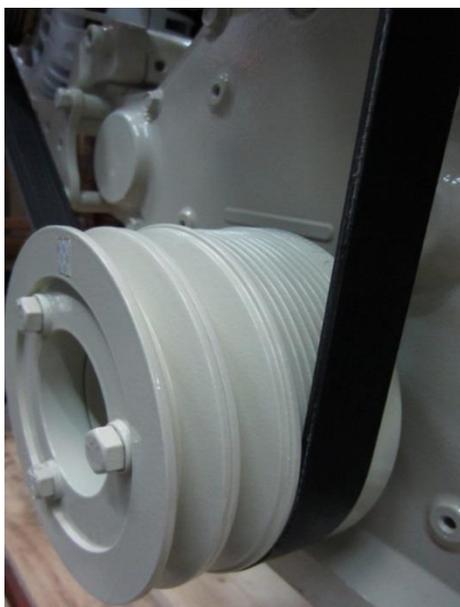
10. Following the fitting procedure, periodic checks should be made checking securing hardware and belt condition and tension. We have taken great care in compiling these installation instructions, information and specs contained are for your guidance in the hope they will assist you. If you feel this installation is beyond your comfort level, we recommend you have a certified mechanic either carry out the job or check over your installation before operating the engine.

If you have any questions during the installation, contact us for assistance.





REFERENCE NUMBERS, FASTENER SIZES, AND TORQUE SETTINGS



### Need Additional Pulleys?

If you require additional V belt pulleys these can be supplied as single pulleys and can be stacked as shown if more than one is needed. These pulleys are currently only available for the serpentine kit as shown and not for the original V belt pulley. If you are operating the original single V belt pulley, we can offer that as a replaceable double belt groove option.

Contact us for more information.

## -sizing battery cables

It may be necessary to increase the size of your battery cables to support the added amperage output of the Balmar alternator. The chart to the right indicates cable gauge required to handle current loads. When determining wire length, the "round-trip distance" both positive and negative wire runs between the alternator and the batteries being charged must be considered.

Should greater accuracy be desired in determining the optimal wire gauge, the following formula can be used:  $CM = K \times I \times LE$  (whereas CM represents the circular mil area of the conductor, K represents the mil-foot resistance of copper, I represents current, and L represents the length, in feet, of the round-trip cable run and E represents voltage drop in volts). When using this equation, a K constant of 10.75 indicates copper's mil-foot resistance and voltage drop should be calculated at 3% (the standard for critical functions affecting the safety of vessel passengers).

In addition wire gauge and quality, the quality of wiring connectors and terminations can have a direct effect on charging efficiency and safety. Be sure that all cable connections are secure and in excellent condition prior to operation of the charging system. Failure to do so could result in decreased performance, damage to the charging system or batteries, or in overheating and potential electrical fire. **NEVER operate your charging system if you have any concerns about the capacity or condition of your electrical wiring.**

Length (feet)	5	10	15	20	25	30	40	50	75
Amps									
75	8	6	4	2	2	1	1/0	2/0	4/0
100	8	4	2	2	1	3/0	4/0		
125	6	4	2	1	1/0	3/0	4/0		
150	6	2	1	1/0	2/0	3/0	4/0		
175	6	2	1	1/0	2/0	3/0	4/0		
200	4	2	1/0	2/0	3/0	4/0			
225	4	1	1/0	2/0	3/0	4/0			
250	4	1	2/0	3/0	4/0				
275	4	1	2/0	3/0	4/0				
300	2	1/0	3/0	4/0					
350	2	1/0	3/0	4/0					