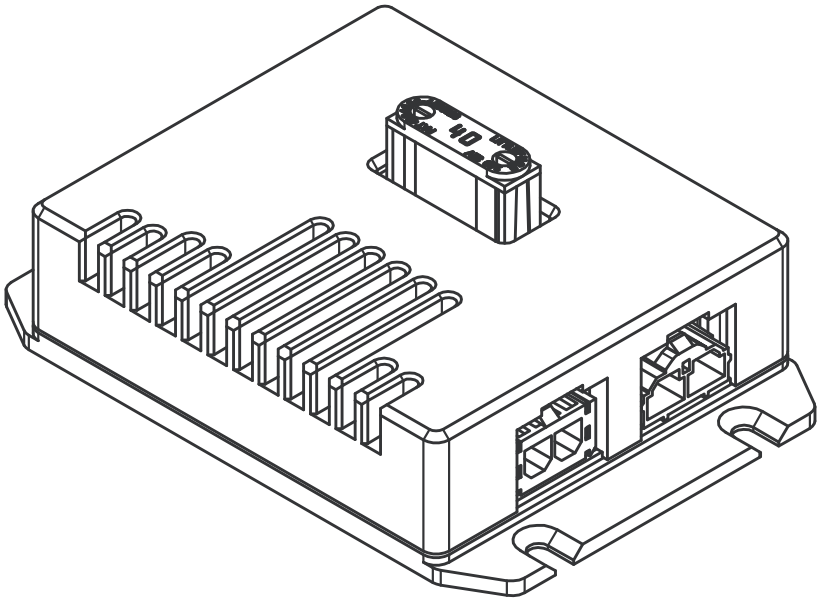

PM3 Pump Amplifier

User Guide

torqbyte_

Congratulations on the purchase of your new Torqbyte PM3 !

Torqbyte PM3 is the most robust and advanced pump amplifier on the market. In order to take full advantage of this product's capabilities, it is important to familiarize yourself with the proper installation and maintenance instructions contained in this user guide. Please take some time to review it in detail. For more information and updates on the PM3 and its accessories, please visit us at torqbyte.com

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Warnings and Disclaimer

- This product is intended for racing applications and off-road use only and never for use on highways or public roads.
- This installation procedure is not for novices. Install and use this product with EXTREME caution.
- The fuel pump is an extremely dangerous point of failure due to a combination of electricity and fuel. This unit can supply the fuel pump assembly with dangerous levels of electrical energy.
- If you are not proficient in proper wiring techniques and familiar with basic electrical theory, DO NOT attempt this installation. Obtain help from a trained professional or contact us for technical assistance.
- Any misuse, improper installation, tampering, or misapplication of this product will void its warranty and could result in property damage, injury, or death.
- This product is designed for positive 12V systems with a negative chassis ground. DO NOT install this product on vehicles with other power or ground configurations.
- This product is designed to be controlled by OEM switched output pump controllers with a variable frequency drive (VFD) or pulse width modulated (PWM) outputs switching between 12V and Ground (0V). DO NOT use this unit with linear output drives or with switched drives generating output voltages other than 12V and 0V.
- By installing this unit, you agree with and accept the Warranty and Terms and Conditions on the last page of this user guide.

General Precautions

- The unit must NEVER get wet or be exposed to excessive moisture. It must be mounted on the inside of the vehicle at all times.
- The unit must not be covered (with carpeting, for example) or placed in direct contact with any sources of heat.
- The vehicle's battery must be disconnected before installing this unit.
- The current draw of the desired fuel pump to be driven by the unit must be must be known in advance and appropriately-sized wiring must be used for the entire wiring connection between the unit and the pump and between the unit and the battery. This concern is discussed in more detail later on in this manual.
- The colors of wires in and out of the unit should NEVER be reversed and all the polarity (+ve and –ve) markings on the unit must be STRICTLY adhered to. Reversing the polarity of any wires could damage or destroy the unit and could damage or destroy the vehicle's electrical system, and could also result in a fire hazard.
- The unit should be installed in such a way so that its top-mounted fuse can be visually inspected and accessed for replacement if required.
- Do not attempt to disassemble and/or repair the unit yourself as this will void the warranty.

System Block Diagram

PM3 can be configured for standalone operation with the OEM fuel pump modulator or it can be slaved to a Torqbyte CM5 to boost the CM5's output current capability from 18A to 36A. The standalone configuration is shown in Figure 1.

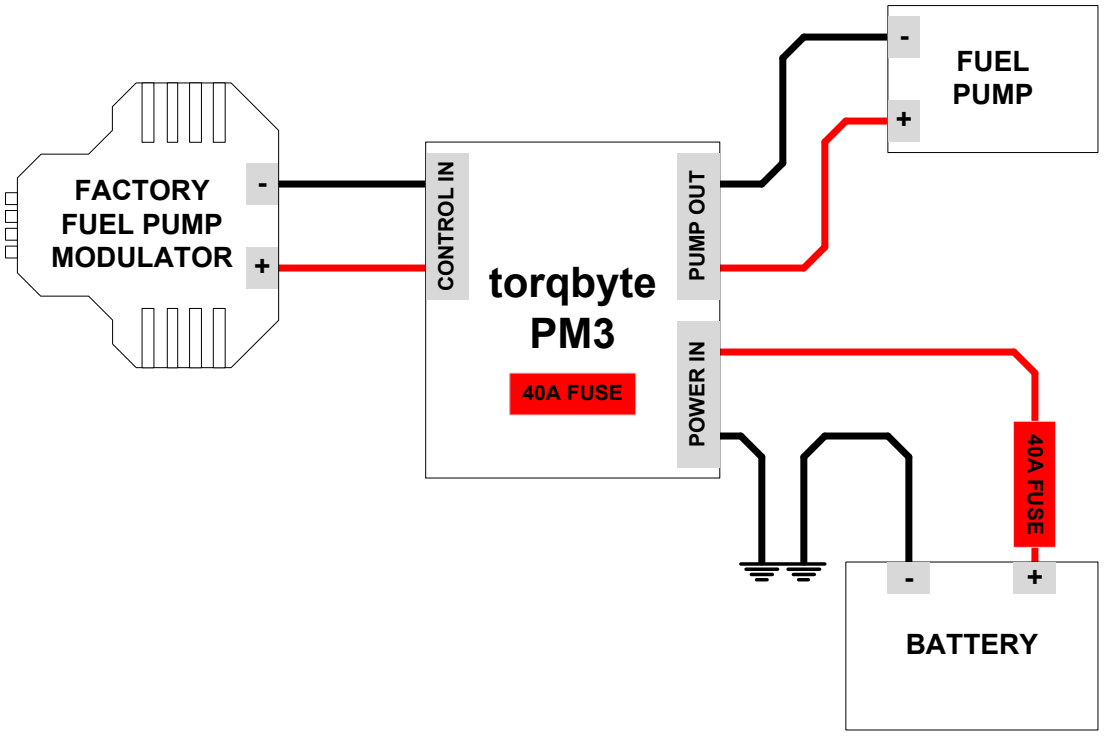


Figure 1

The CM5-Slaved configuration is shown in Figure 2.

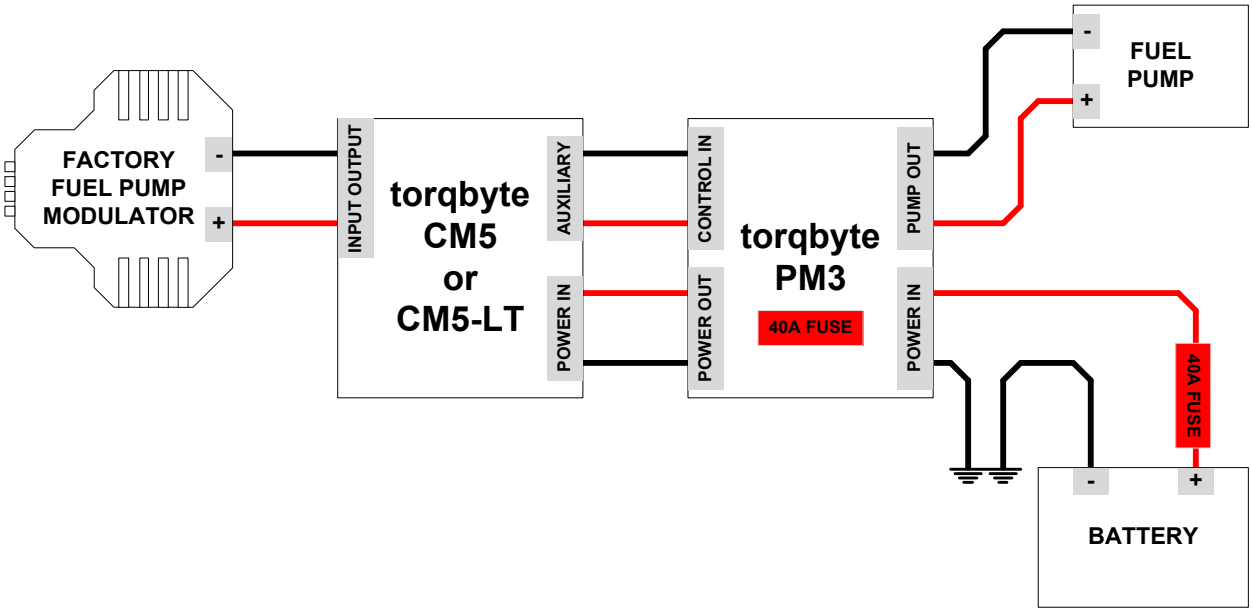


Figure 2

Kit Contents

NOTE: It is recommended that you retain the original packaging in case you need to ship your PM3 or any of its contents back to Torqbyte in the future.

Item	Quantity	Part Number
PM3 Main Unit	1	345520
Wiring: *Standalone Option* • Power In Pigtail 8” Long • Control In Pigtail 8” Long • Pump Out Pigtail 8” Long	 1 1 1	
Wiring: *CM5-Slaved Option* • Power In Pigtail 8” Long • Control In Plug-n-Play Jumper • Power Out Plug-n-Play Jumper • Pump Out Pigtail 8” Long	 1 1 1 1	
10AWG-12AWG Wire Splices (Yellow)	4	D-406-0002
14AWG-16AWG Wire Splices (Blue)	2 / 0	D-406-0003

ITEMS REQUIRED BUT NOT INCLUDED

- Crimp On Ring Terminals
- Additional Lengths of 10AWG or 14AWG SXL Wire
- Automotive 40A Fuse and Automotive 40A Fuse Holder
- Additional Sealed Wire Splices
- Mounting Screws and Hardware

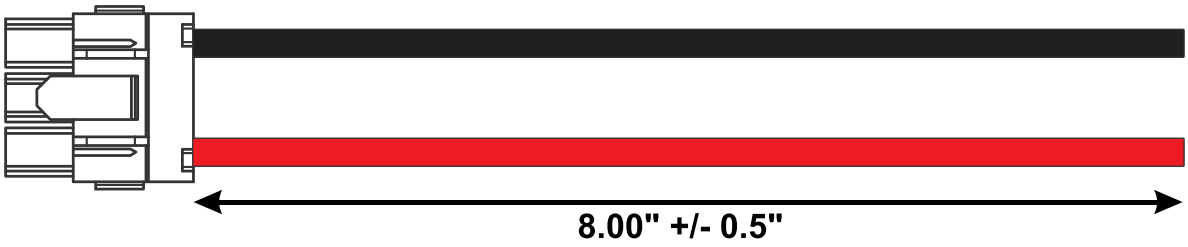
Standalone Pigtail Wire Kit

The Standalone kit comes with three 8” long pigtails as follows:

Standalone Power In Pigtail

Standalone Control In Pigtail

Standalone Pump Out Pigtail



CM5 or CM5-LT-Slaved Pigtail Wire Kit

The CM5 or CM5-LT-slaved kit comes with four 8” long pigtails as follows:

CM5 Power Out Plug-n-Play Pigtail

Standalone Power In Pigtail

CM5 Control In Plug-n-Play Pigtail

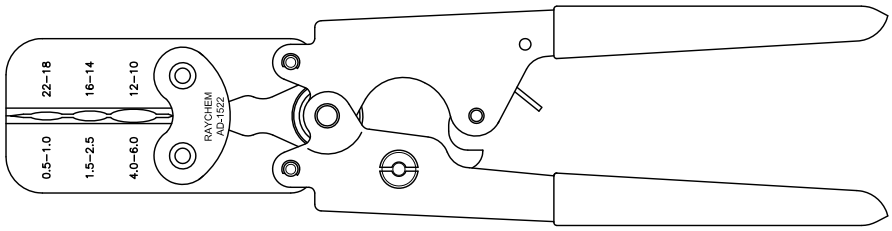
Standalone Pump Out Pigtail

General Wiring Information

The supplied wiring uses the automotive-grade SXL wire. This wire has the temperature rating and abrasion/chemical resistance that make it suitable for this application. It is strongly recommended that the installation be completed with equivalent or better-than wire type.

Wire splices are required to complete this installation. The included wire splices are automotive grade and provide sealing when properly heatshrunk. It is strongly recommended to crimp these splices with a manufacturer-recommended crimping tool. TE Connectivity crimper AD-1522, shown in Figure 5, is available from the manufacturer's distributors *mouser.com* and *digikey.com* along with other online distributors.

NOTE: If you prefer to avoid doing any wiring, we can supply you with a custom-made set of wire harnesses suited to your application. We require only a basic hand-drawn sketch with some lengths and terminal sizes. Please contact us for pricing and lead-time information.



Wire Splices

If additional splices are required, it is recommended to use the TE Connectivity Duraseal splices shown in the table below:

Part No.	Wire Gauge	Color	Wire Strip Length	Recommended Crimper	Supplier	Supplier
D-406-0003	12-10 AWG	Yellow	3/8" - 1/2"	AD-1522	Mouser	Digikey
D-406-0002	16-14 AWG	Blue	1/4" - 3/8"	AD-1522	Mouser	Digikey
D-406-0001	22-18 AWG	Red	1/4" - 3/8"	AD-1522	Mouser	Digikey

Alternately, the following GM splices can also be used and can be crimped using the same AD-1522 crimping tool shown in Figure 5:

Part No.	Color	Wire Gauge	Supplier	Recommended Crimper
19168448	Yellow	12-10 AWG	General Motors	TE AD-1522 or GM J-38125-8 (12085115)
19168447	Blue	16-14 AWG	General Motors	TE AD-1522 or GM J-38125-8 (12085115)
19168446	Red	22-18 AWG	General Motors	TE AD-1522 or GM J-38125-8 (12085115)

Ring Terminals

This installation requires the use of ring terminals. However, they are not included in the supplied kit due to a variety of bolt sizes specific to each user's application. The table below shows some ring terminals from TE Connectivity's Duraseal product family.

Part No.	Wire Gauge	Screw Size	Wire Strip Length	Recommended Crimper	Supplier	Supplier
B-106-1503	12-10 AWG	#10	1/4"	AD-1522	Mouser	Digikey
B-106-1803	12-10 AWG	5/16"	1/4"	AD-1522	Mouser	Digikey
B-106-1993	12-10 AWG	3/8"	1/4"	AD-1522	Mouser	Digikey

Fuse Information

The PM3 unit is supplied with a brand new 40A fuse. If a new fuse is required at some point in the future, we recommend using the same fuse the unit was originally supplied with shown in the table below.

WARNING: The original fuse supplied by Torqbyte comes with epoxy insulation on the two exposed live terminal tabs on top of the fuse. If installing a new fuse, this epoxy will not be there so it must be ensured that the exposed live tabs NEVER come in contact with any grounded metal surface.

Part No.	0299040.ZXNV
Description	Automotive Fuse 40A 32VDC
Manufacturer	Littelfuse
Supplier	Mouser / DigiKey

Connector Information

Although the required mating connectors are all provided with the supplied pigtails, should the user want to replace those included with their own custom wiring, information about the unit's mating connectors is provided below:

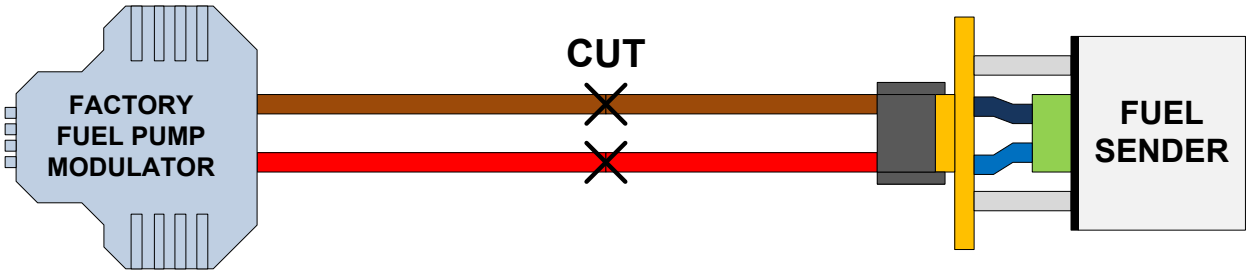
Connectors	**POWER IN** and **POWER OUT**
Maximum Current Capacity	36A
Wire Gauge	10 AWG
Wire Type	SXL-10
Mating Connector	Molex Mini-Fit Sr. 42816-0212
Connector Contacts	Molex Mini-Fit Sr. 42815-0011
Manual Crimper	Molex 63811-1600
Contact Durability	30 Mate and Unmate cycles

Connector	**PUMP OUT**
Maximum Current Capacity	36A
Wire Gauge	10 AWG
Wire Type	SXL-10
Mating Connector	Molex Mini-Fit Sr. 42816-0312
Connector Contacts	Molex Mini-Fit Sr. 42815-0011
Manual Crimper	Molex 63811-1600
Contact Durability	30 Mate and Unmate cycles

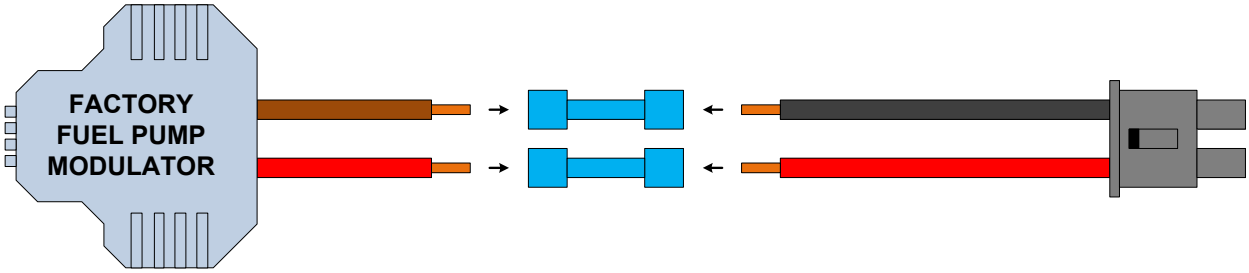
Connector	**CONTROL IN**
Maximum Current Capacity	18A
Wire Gauge	14 AWG
Wire Type	SXL-14
Mating Connector	Molex Sabre 44441-2002
Connector Contacts	Molex Sabre 43375-1001
Manual Crimper	Molex 63811-7300
Contact Durability	25 Mate and Unmate cycles

Factory Fuel Pump Modulator Connection

1. Ensure both battery terminals are disconnected from the battery before starting the installation.
2. Cut the positive (+) and negative (–) wire between the factory fuel pump modulator and the connector that plugs into to the factory fuel sender. Make the cut at a location convenient for your application.

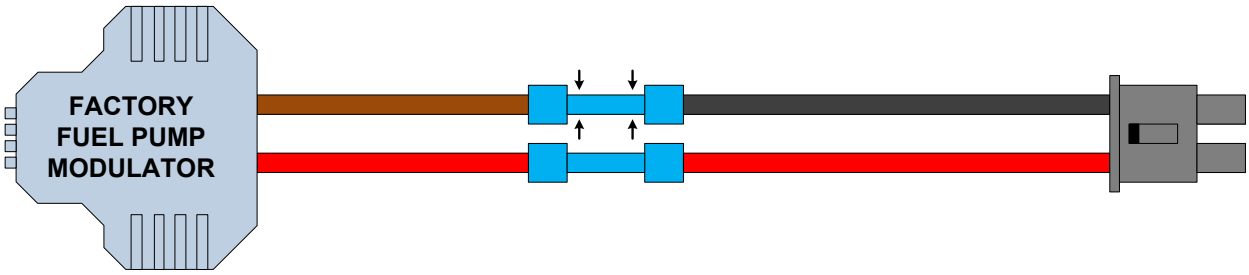


3. Strip 1/4” off each wire end and insert into the supplied blue wire splice as shown.

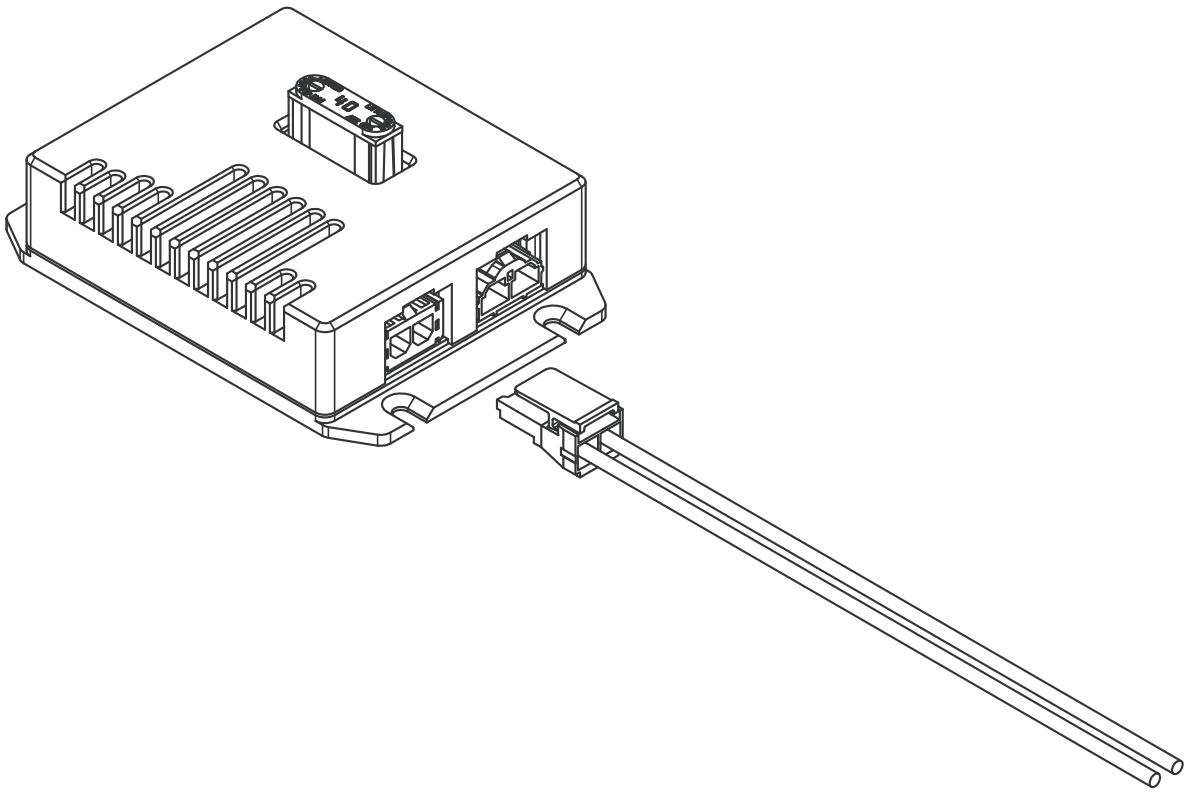


4. Crimp each splice at each end and gently tug on the wires to make sure they are crimped securely. Using a heat gun, heatshrink both splices until the liquid adhesive melts and completely seals the wires.

   NOTE: Concentrate the heat on the splice and not the wire. Excessive heating of the wire insulation can cause it to melt or become degraded causing it to fail in the future.



5. Plug the harness into PM3's **CONTROL IN** connector.



Medium Power Pump Wiring

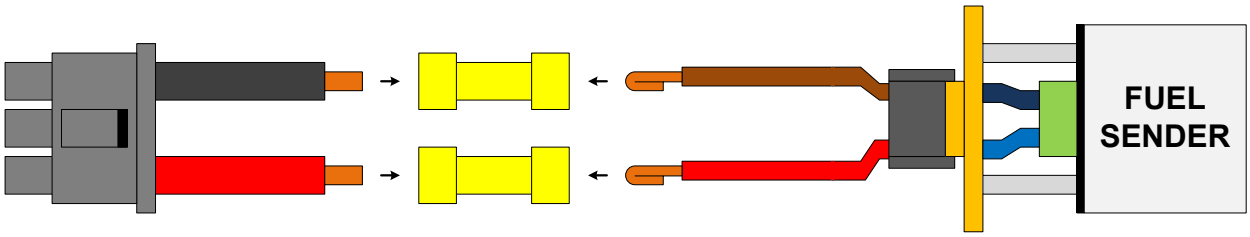
Depending on your set-up, determine the maximum current the pump will draw in a stalled condition (i.e. pumping at 100% duty into a blocked off line) and choose the correct gauge of wiring as per Table 6 below.

NOTE: Some factory in-tank fuel senders use wire gauge suited for the factory pump which may not be sufficient if an upgraded pump is being installed. Make sure you are using adequately-sized wiring all the way between the PM3 and the fuel pump.

We recommend the automotive SXL wire sized as per the table below.

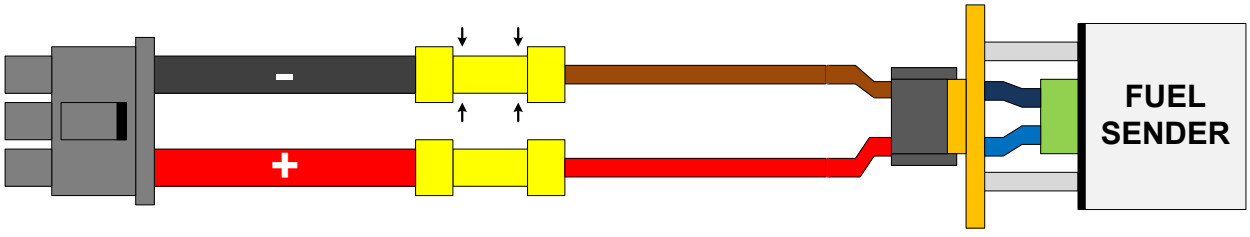
Wire Gauge	Wire Type	Temperature Rating	Max Current
10 AWG	SXL SAE J-1128	-51°C to +125°C	40A
12 AWG	SXL SAE J-1128	-51°C to +125°C	30A
14 AWG	SXL SAE J-1128	-51°C to +125°C	25A

1. If using the PM3 to power a pump that draws less than 20A under any operating condition, 14AWG wires will be sufficient. Given that the included Pump Out pigtail is supplied with 10AWG wires and a pair of yellow wire splices intended for 10AWG or 12AWG wires, you will need to strip at least 5/8" length of 14AWG wire, twist it and fold it over on itself, as shown, before crimping it.



2. Crimp each splice at each end and gently tug on the wires to make sure they are crimped securely. Using a heat gun heatshrink both splices until the liquid adhesive melts and completely seals the wires.

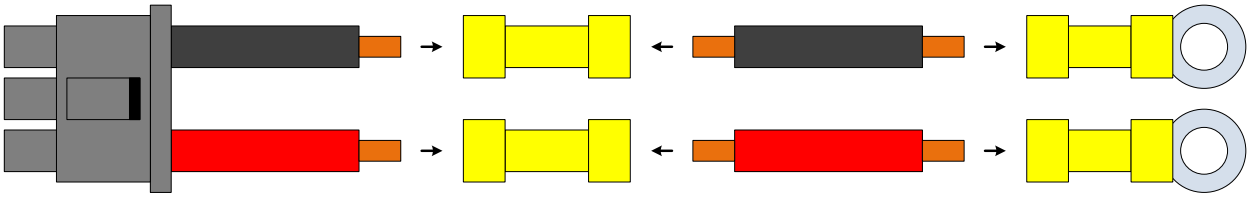
   NOTE: Concentrate the heat on the splice and not the wire. Excessive heating of the wire insulation can cause it to melt or become degraded, causing it to fail in the future.



High Power Pump Wiring

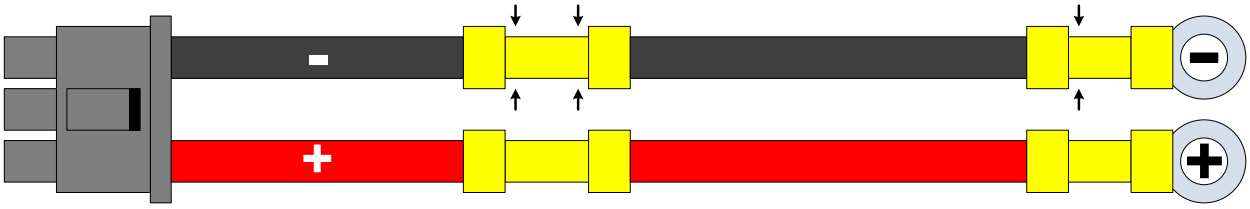
1. If using the PM3 to power a pump that draws more than 20A in any condition, such as an inline high-performance aftermarket pump, 10AWG or 12AWG wires are recommended as are terminal lugs that will attach directly to the pump. For those applications complete wiring as shown below.

   NOTE: Ensure that exposed ring terminals are kept dry and protected from possible shorts. Never modify the factory fuel sender in any way in an attempt to get thicker gauge wires into it. Instead consider purchasing an aftermarket fuel sender assembly that includes provisions for thicker wiring.



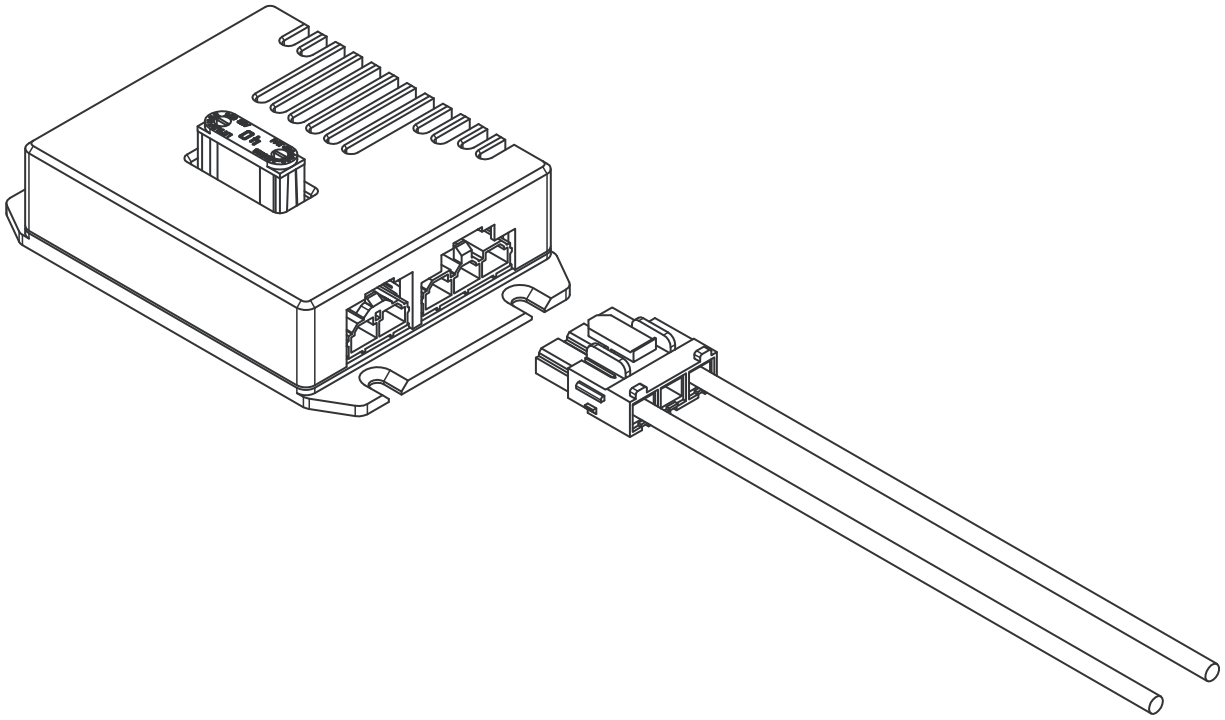
2. Strip 3/8" - 1/2” from the wire ends.
3. Crimp each splice at each end and at the ring terminals and gently tug on the wires to make sure they are crimped securely. Using a heat gun heatshrink both splices until the liquid adhesive melts and completely seals the wires.

   NOTE: Concentrate the heat on the splice and not the wire. Excessive heating of the wire insulation can cause it to melt or become degraded causing it to fail in the future.



4. Attach the ring terminals to the pump ensuring you use a ring washer and a locking washer to prevent vibration-induced loosening. Torque the retaining nuts as per pump manufacturer’s recommendations.

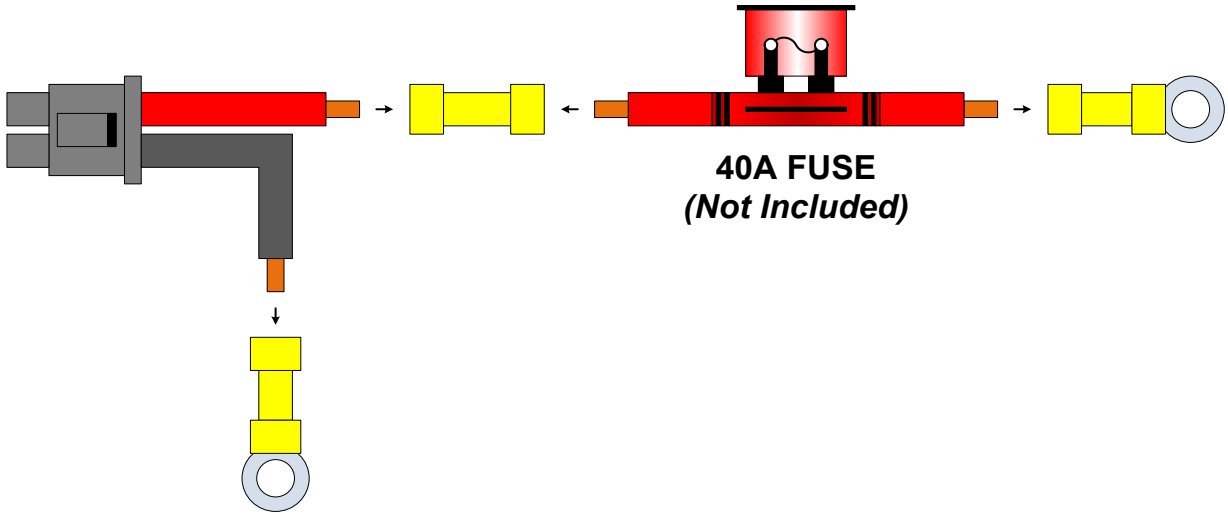
5. Plug the harness into PM3's **PUMP OUT** connector.



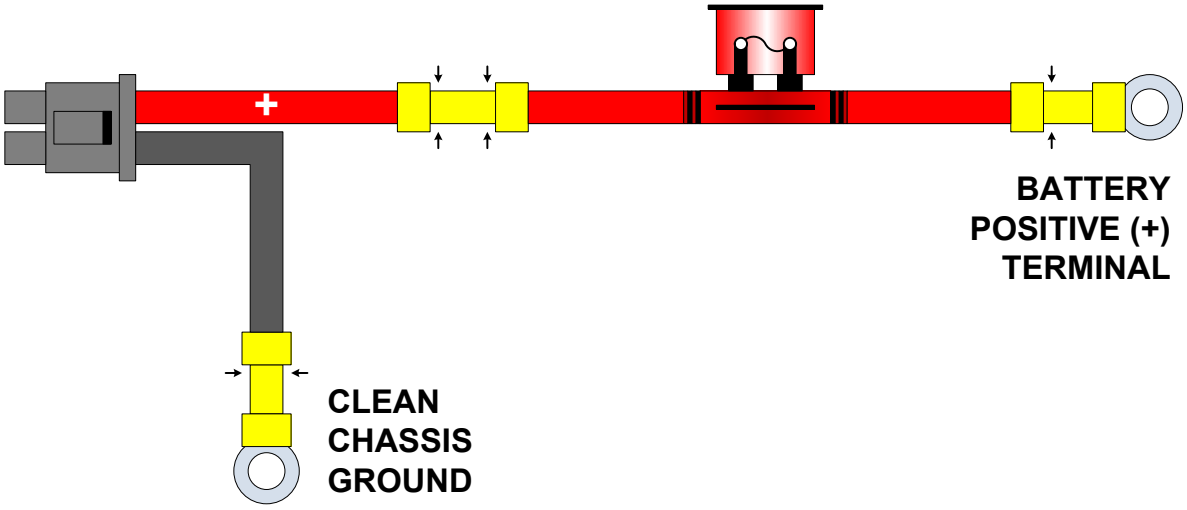
Input Power Wiring

Power connection to the PM3 should include a permanent attachment to the positive (+) battery terminal and a connection to the negative (–) ground connection somewhere on the chassis. The positive (+) connection should be as short as possible and should not be made to a switched circuit. The negative (–) connection should be made to an electrically conductive surface that is free of paint, rust, oil and grease. Both connections should be made using ring terminals.

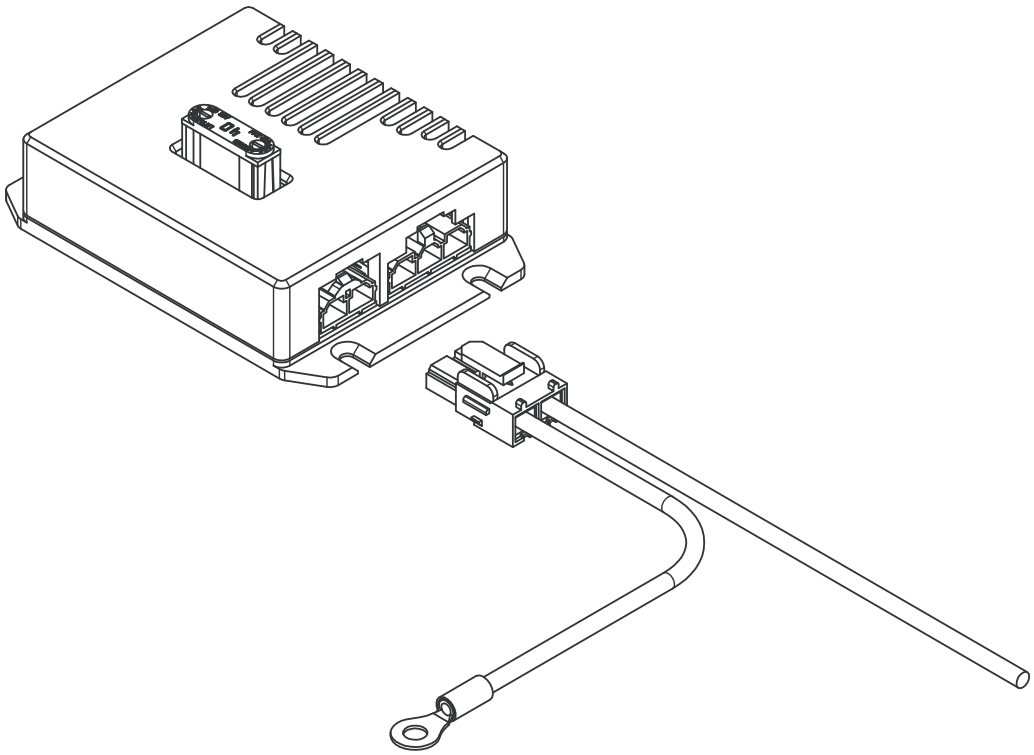
NOTE: Unless the PM3 is mounted within 6” of the battery (such as in vehicles with a trunk-mounted battery) it is recommended that a 40A fuse be installed right at the battery to protect the input power wiring from shorts.



1. Strip 3/8" - 1/2” from the wire ends.
2. Crimp each splice at each end and at the ring terminals and gently tug on the wires to make sure they are crimped securely.
3. Using a heat gun heatshrink both splices until the liquid adhesive melts and completely seals the wires.
   NOTE: Concentrate the heat on the splice and not the wire. Excessive heating of the wire insulation can cause it to melt or become degraded causing it to fail in the future.



4. Plug the harness into PM3's **POWER IN** connector.

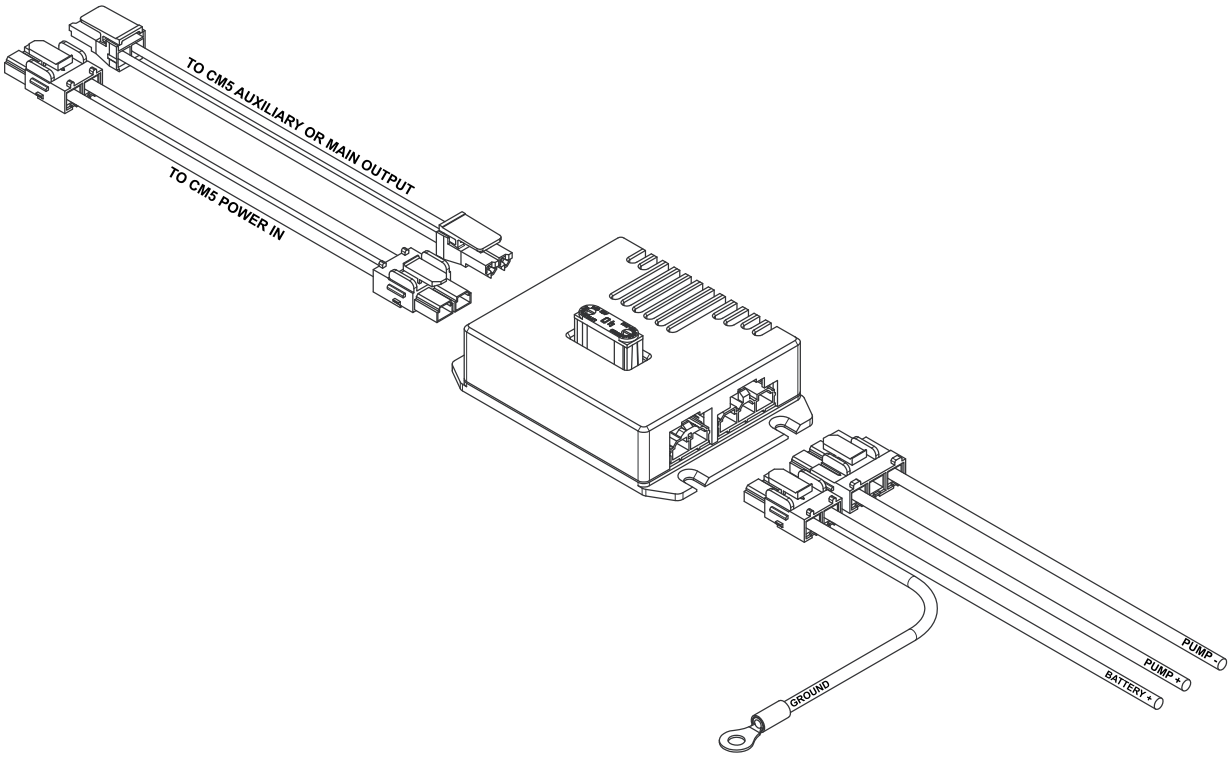


5. Reconnect the battery and ensure the fuel pump operates as expected.

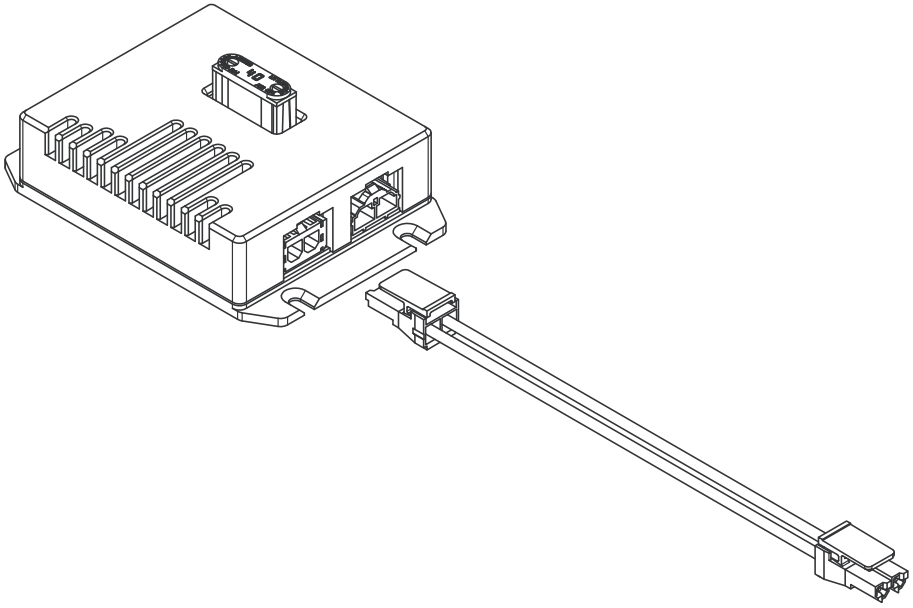
NOTE: Accidentally plugging the power harness into the PM3's **POWER OUT** connector instead of the PM3's **POWER IN** connector WILL DESTROY the unit.

Optional: CM5-Slaved Installation

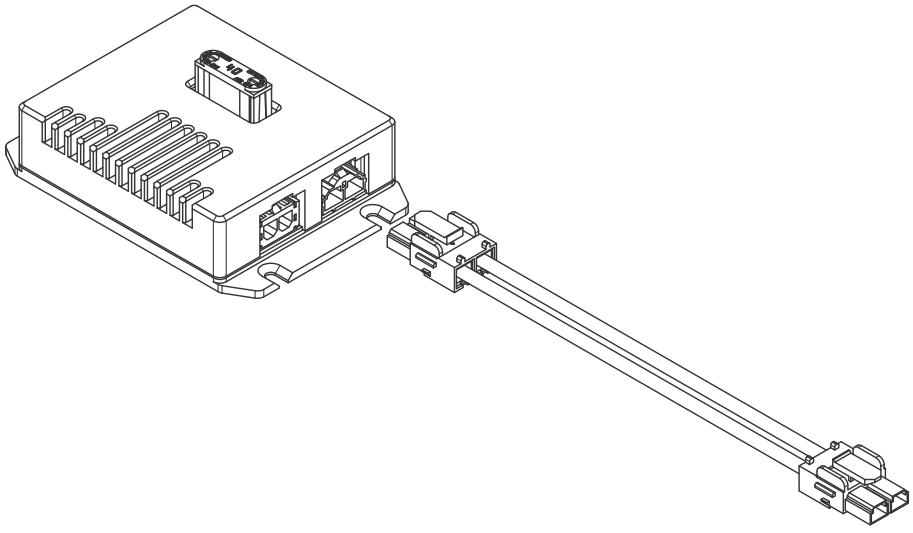
To install the PM3 as a slave to the Torqbyte CM5 or the Torqbyte CM5-LT, follow the steps outlined in Medium Power Pump Wiring or High Power Pump Wiring and Input Power Wiring paragraphs above.



1. Observing the wire color/polarity (Red+) and (Black-) plug one end of the Control In Plug-n-Play Jumper pigtail into PM3's **CONTROL IN** connector and plug the other end into CM5's **AUXILIARY OUT** connector or the CM5-LT's **AUX** connector.



2. Observing the wire color/polarity (Red+) and (Black-) plug one end of the Power Out Plug-n-Play Jumper pigtail into PM3's **POWER OUT** connector and plug the other end into CM5's **POWER IN** connector or CM5-LT's **BATTERY** connector.
   NOTE: If your CM5's MAIN output is already driving another pump, that pump's maximum current will need to be subtracted from 36A to determine the maximum current that can be supplied to the PM3's pump. The reason for this limit is the current carrying capacity of the 10AWG wires. This can be avoided by not using the supplied Power Out Plug-n-Play Jumper pigtail (i.e. not using the PM3 to supply CM5 with power) and wiring each unit to the battery using a separate positive power connection.



Warranty

Terms and Conditions

This Torqbyte product is warranted to be free from defects in workmanship and material for a period of one (1) year from the original date of purchase. Torqbye retains the sole and exclusive right to determine whether this warranty applies to the selected product, assume any obligation or liability, and undertake any action therein under the terms and conditions of this warranty.

This warranty is non-transferrable and applies only to the original retail purchaser. Warranty claims must include dated and authentic proof of purchase as well as pre-paid transit.

This warranty applies solely to the repair and replacement of the selected Torqbyte product, and shall under no circumstances exceed the original purchase price of the product.

Any misuse, improper installation, improper calibration or configuration, tampering, or misapplication of this Torqbyte product could result in property damage, injury, or death. Install and use this product at your own risk.

In no event shall Torqbyte be held liable whatsoever to you or any party related to you for any indirect, incidental, exceptional, consequential, special, exemplary, or punitive damages, injury, costs or lost profits incurred due to product failure or failure of any part of the product or this software, even if Torqbyte has been advised of the possibility of such damages. In any event, Torqbyte's total aggregate liability to you for all damages of every kind and type (regardless of whether based in contract or tort) shall not exceed the purchase price of the product.

In the event of a suspected defect, the consumer must contact Torqbyte via either the Contact Us Page at http://torqbyte.com/pages/contact-us or email, at support@torqbye.com in order to discuss the nature of the defect and attempt to resolve the issue. At Torqbyte's discretion, a Return Merchandise Authorization (RMA) number may be issued for a warranty return. Returns will only be accepted with an accompanying RMA number and may result in repair, replacement, or refund of the selected product.

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