



## TEAM TIP

**Release Date:** April 18, 2018

# LEV

**Communication #:** L-18-04-01

**Model Year(s):** ALL

— Confidential and Proprietary —

**VERSION: R01 (April 18, 2018)**

### IMPORTANT

If you are working with a printed copy, please verify you have the most current version of these instructions.

## SUBJECT

GEM Cold Weather Operation and State of Charge

## PURPOSE

GEM has observed instances where customers operating in cold weather are reporting vehicles slowing down at a higher state of charge, as if batteries are low.

This Team Tip was released to inform dealers of cold weather effects on battery range of GEM vehicles, and how to calculate a customer's estimated range based on ambient temperature.

## AFFECTED MODELS

| MODEL YEAR | MODELS | VEHICLE IDENTIFICATION NUMBER RANGE                                                                                 |
|------------|--------|---------------------------------------------------------------------------------------------------------------------|
| ALL        | e2     | Reference Unit Inquiry on the dealer website or the Service Bulletin list on the STOP site to lookup affected VINs. |
|            | e4     |                                                                                                                     |
|            | e6     |                                                                                                                     |
|            | eL XD  |                                                                                                                     |

## INFORMATION

Cold weather can have a drastic effect on all electric vehicles. The colder the ambient storage temperature, the slower the rate of charge and discharge of batteries. In the application of an electric vehicle like GEM, cold weather will drastically decrease the achieved range on a charge.

### NOTE

All Polaris/GEM electric vehicles with lead-acid batteries do not factor battery temperature into state of charge. If batteries are stored at cold temperatures, the amount of available stored energy on a full charge is reduced. This is most pronounced at temperatures below 32°F.

If a user is completely reliant on the battery meter's state of charge for determining range, GEM recommends that the vehicle be charged and stored in a location where the temperature is at least 50°F before use. When the vehicle has been stored in a warm location, the vehicle's battery meter will display a more accurate state of charge; even if the GEM is used in colder temperatures, as long as it is used periodically, and does not sit idle for an extended period.

If the vehicle cannot be stored in a warm location, a user can estimate vehicle range being reduced approximately 10% for every 15°F below 80°F as captured in the table below:

| TEMP (° F) | BATTERY CAPACITY (%) |
|------------|----------------------|
| 80         | 100                  |
| 65         | 90                   |
| 50         | 80                   |
| 35         | 70                   |
| 20         | 60                   |
| 5          | 50                   |
| -10        | 40                   |
| -25        | 30                   |

### NOTE

"TEMP" column refers to the ambient temperature that a vehicle was stored in.

Vehicles equipped with Li-Ion batteries will also experience range reduction due to cold, but the state of charge is more accurately captured on the vehicle display.

### NOTE

There are many things that can affect a vehicle's range on a charge: driving style, terrain, increased vehicle payloads, cab heater usage and other electrical accessory usage. Even though things like these can decrease a vehicle's range, they should be accounted for in the state of charge reading. If you are working on a MY16-18 core GEM vehicle, and suspect that the cab heater's usage is not being accounted for in the state of charge, reference Team Tip L-18-04-02.