



192-300308  
19.04.2023

## GVI

Mobile Inverter

*Application Note GVI-GVM Motor Datas*



ENGINEERING **YOUR** SUCCESS.

## Non-warranty clause

We checked the contents of this publication for compliance with the associated hardware and software. We can, however, not exclude discrepancies and do therefore not accept any liability for the exact compliance. The information in this publication is regularly checked, necessary corrections will be part of the subsequent publications.

English Master created.

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# 1 Introduction

## 1.1 About this document

### 1.1.1 Definitions

In this documentation the product Global Vehicle Inverter is referred to as “The motor controller” or GVI.

GVI is a family of motor controllers for use in systems with 24-650 DC (nominal) supply and power levels from 4,4 to 398 kVA. GVI frame sizes C, D, E are referred to as Low Voltage (LV) devices, frame sizes G and H are considered as High Voltage (HV) Devices. The GVI is suitable for most electric vehicle applications.

### 1.1.2 Terms and abbreviations

GVI	AC mobile inverter
LV	Low Voltage (24 – 96V)
HV	High Voltage (350 – 650V)
Application	A customer specific use of Parker hardware and software
CAN	Controller Area Network
Drive	Motor controller
NMT	Network management
OEM	Original equipment manufacturer
VMC	Vehicle master controller

### 1.1.3 This revision

This revision replaces all previous revisions of this document. Parker has made every effort to ensure that this document is complete and accurate at the time of printing. In accordance with our policy of continuous product improvement, all data in this document is subject to change or correction without prior notice.

### 1.1.4 Scope

The motor controller is a software configurable device. In a CAN (Controller Area Network) based system, the motor controller setup and operation can be managed by a vehicle master controller communicating over the CAN Bus.

The configuration of the drive can only be done with the CANopen protocol, which is implemented in the Parker GVI configuration tool.

Realtime command and feedback signals can be realized with the CANopen protocol (with 11 bit identifier) or the J1939 (with 29 bit identifier) and is called the *communication interface*, which is described in the document *192-300306Nx - GVI CAN Message Database* (exel format).

This document presents the general description for implementing a CANopen or J1939 communication interface between an IQAN master and a GVI inverter by means of an *External*

*Function*, which basically is a translation of the *192-300306Nx - GVI CAN Message Database* into IQAN format.

Before continuing with the configuration, ensure the Start-up and Commissioning section from the hardware manual (see chapter 1.1.5) has been completed and is fully understood. It is also helpful to have the Object Dictionary, the list of all parameters and variables the motor controller has available via the CAN bus, when reading through this manual.

### 1.1.5 Related documents

For more information about the inverter, see the following related documents.

Reference number	Document	Description
1	GVI Object Dictionary	The document is available from Parker as an HTML file
2	Product Manual for GVI-C D E	Parker EMDE Reference 192-300300Nx
3	Product Manual for GVI-G-H	Parker EMDE Reference 192-300302Nx
4	GVI CAN Message Database	Parker EMDE Reference 192-300301Nx

Table 1 References

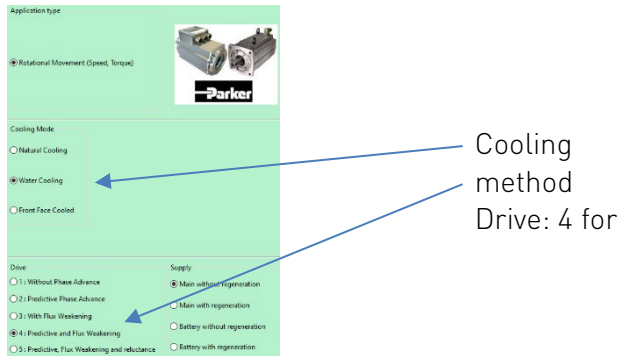
## 2 Motor Data Selection

Using this application note implies that you have at least the Parker tool MotorCycle V2.33, level 1 (or upper) and the Excel file Default-GVI-setting\_V1d.xlsx

### 2.1 Application

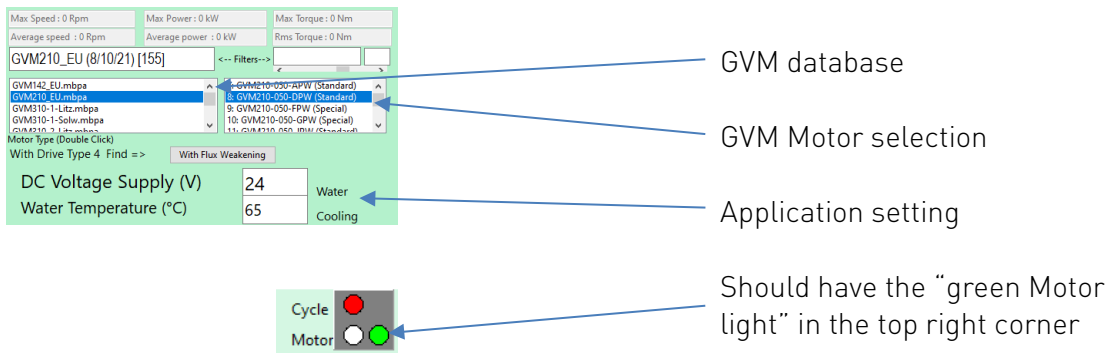
Open MotorCycle (this application note shows screenshots from V2.33 user level 1)

- Sheet **Application**: Select correct options.



### 2.2 Motor Choice

- Sheet **Motor choice**: Select the motor database according to the motor you want to extract data (GVM210050DPW for this tutorial).



### 2.3 Motor

- Sheet **Motor**: Do a screenshot of "Model Values in MotorCycle".

* Model Values in MotorCycle	
GVM210-050-DPW (Standard)	
KE ph-ph (25°C) :	9.057 V
KT (25°C) :	0.1418 Nm/A (I=260A)
R ph-ph :	0.00323 Ohms
Icc (25°C) :	371 Arms
Nb poles :	12
Inertia :	0.0087 kgm²
Lq ph-ph :	0.0388 mH (I=260A)
Ld ph-ph :	0.0448 mH
Tth Copper :	70.7 s
Tth Motor :	1.37 min
Nmax Meca :	8000 rpm
Max Torque :	82 Nm
Max Current :	680 Arms (rotor 25°C)
Predictive Phase Advance with the Current	
Phase Advance (to) :	-10 deg
Phase Advance (sat) :	10 deg

### 3 Configuration File

Open "Default-GVI-Setting\_V1\_d" Excel document and follow step/step description. Keep in mind all "Yellow" cells are to be filled

#### 3.1 System

Project      Motor/Drive      Motor Data      "Copy/past" MotorCycle

Customer	Formation				
Date	21/03/2022				
Engineer	Champion				
Motor	GVM210050DPW	Datasheet motor	Ke	Back Emf 1000	9.057
Inverter	GVI-C024-0350		Kt	Torque constant	0.1418
	GVI-C024-0350		Rb	Winding Resistance*	0.00323
	GVI-C048-0280		p	Motorpoles	12
	GVI-D024-0550		Lq	Inductance Lq*	0.0388
	GVI-D048-0450		Ld	Inductance Ld*	0.0448
	GVI-D048-0550		Ip	Max Current	680
	GVI-D080-0230				
	GVI-D080-0350				
	GVI-D080-0400				

\* Phase/Phase

\* Model Values in MotorCycle

GVM210-050-DPW (Standard)

- KE ph-ph (25°C) : 9.057 V
- KT (25°C) : 0.1418 Nm/A (I=260A)
- R ph-ph : 0.00323 Ohms
- lcc (25°C): 371 Arms
- Nb poles : 12
- Inertia : 0.0087 kgm<sup>2</sup>
- Lq ph-ph : 0.0388 mH (I=260A)
- Ld ph-ph : 0.0448 mH
- Tth Copper : 70.7 s
- Tth Motor : 1.37 min
- Nmax Meca : 8000 rpm
- Max Torque : 82 Nm
- Max Current : 680 Arms (rotor 25°C)

Predictive Phase Advance with the Current

- Phase Advance (Io) : 10 deg
- Phase Advance (sat) : 10 deg

#### 3.2 Vq / Vd

These sheets are to extract Vq and Vd versus current at 10° phase advance and extract d/q flux mapping for drive setting.

Need to use Motorcycle tool as follow. (Still with same selected motor)

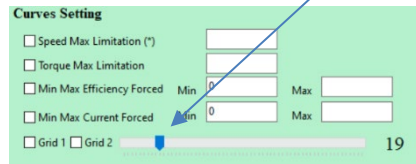
- Sheet Drive: select the GVI in the list.

Confirmation

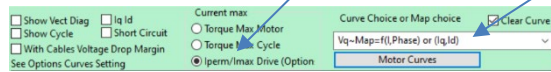
Drive Selected : GVI-C024-0350  
Do you want to transfer existing data in the drives options

Type	Manufacturer	Model	PARKER Part	Cooling Temperat	Permanent Curren	Maximum Curren	Nominal Voltage	Nominal Voltage	Maximum I
Mobile	Parker	GVI-C024-0350	GVI-C024-0350S1-	150	350	24	24	32	
Mobile	Parker	GVI-C048-0280	GVI-C048-0280S1-	120	280	48	48	63	
Mobile	Parker	GVI-D024-0550	GVI-D024-0550S1-	275	550	24	24	32	

- Sheet **Options**: Set Curves Setting to 19 (drag to the right)

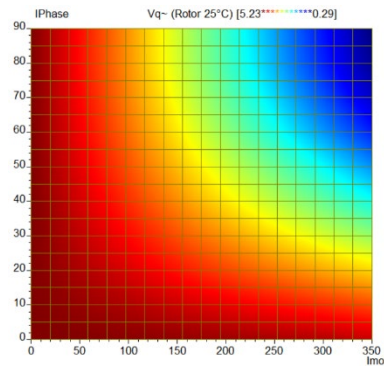


- Sheet **Motor**: select Iperm/Imax Drive (Option) and Vq~Map=f(I,Phase) or (Iq,Id)

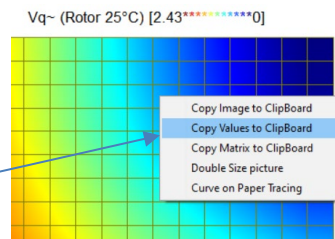


Plot curve => Motor Curves

Should have similar graph



Using right click:  
Copy values to ClipBoard



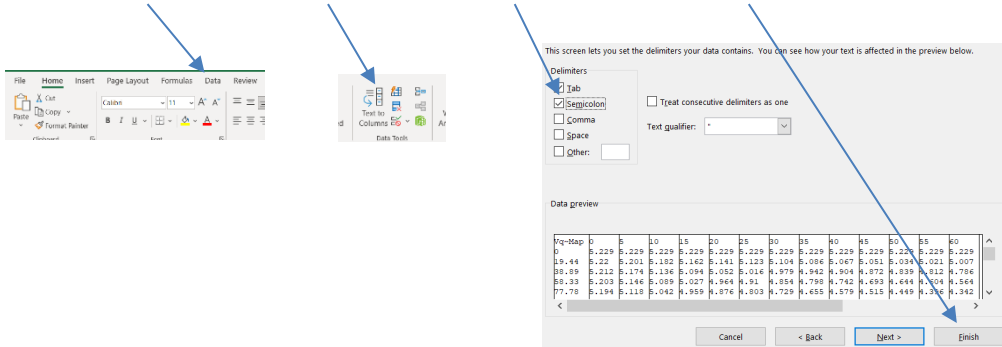
- Go to Excel file, select Sheet **Vq**.

Click on cell A1 and past data

	A
1	Vq~Map
2	0
3	19.44
4	38.89
5	58.33
6	77.78
7	97.22
8	116.7
9	136.1

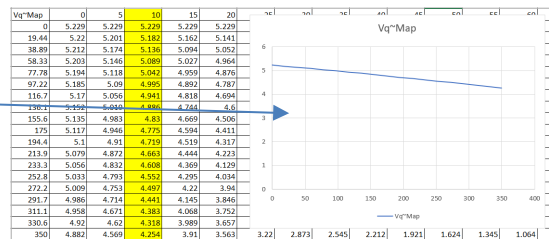
And acknowledge popup windows

- Select Data, Text to Columns, Delimiters "Semicolon", Finish

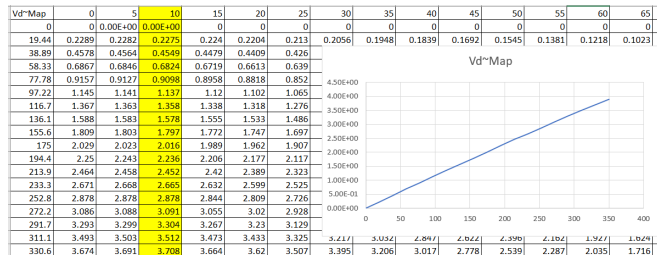
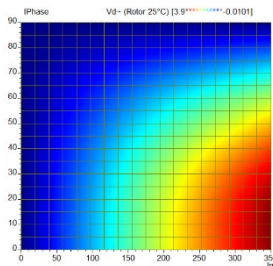


Acknowledge all following popup windows and graph result:

Thumb rule: this graph always looks like a "decreasing" line.



- Repeat same process for "Vd~Map=f(I,Phase) or (Iq,I<sub>d</sub>)"



Thumb rule: this graph always looks like an "increasing" line, starting from 0,0.

General		Customer	Formation	
Date			21 March 2022	
Engineer			Champion	
Motor type			GVM210050DPW	RM22 LV
temp sensor type			PTC600	
Inverter type/firmware			KTY84-130	N20100C03x04
			PT1000	
Datasheet motor				
Ka			9.057	Vrms/1000rpm
Ip			690	Arms
Kt			0.1418	Nmi/Arms
R			0.00323	Ohm
Lq			0.0388	mH
Ld			0.0448	mH
Motorpoles			12	
DC Voltage			24	

### 3.3 Motor Settings

Select from the list the correct motor sensor device (see motor datasheet).

Automatic values from "System".

