



GVI
Mobile Inverter
CAN Message Database

192-300301N6
10 March 2021



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Introduction

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.

The GVI 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.

This document shows the implemented communication objects like general CANOpen messages, default CANopen PDO messages and J1939 messages.

For full documentation please refer to the document 192-30030Nx GVI Configuration Manual and appropriate manuals 192-300300Nx_Product_Manual_for_GVI-C_D_E (LV) or 192-300302Nx_Product_Manual_for_GVI-G_H (HV)

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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CANopen PDO Fdbk



PARKER GVI: CANopen PDO Feedback Messages

Node_ID: default 6 (see GVI Configuration Manual)
 Baudrate: default 250 kbit/s

The protocol is based on CANopen with 11 bit identifier
 Based on CiA Draft Standard 301, version 4.01

Index	SubIdx	Object Name	Type	Unit	Res.	Obj. Range	Description
TxPDO1			Identifier: 0x180+Node_ID				Transmit Rate: default 10ms
0x2001	1	StatusAll	U16		1	0 - 65535	Bit 0: Ready To Switch On Dc bus is charged Bit 1: Switched On Drive is ready to enable (Main contactor is on, if used) Bit 2: Enabled Power stage enabled Bit 3: Tripped Power stage tripped due to error Bit 4: Current Ability Reduced Bit 5: Current Boost Activated Bit 6: Error Active If any error is active Bit 7: Warning Active If any warning is active Bit 8: Regeneration Power is from the drive to the battery Bit 10: Open Drain Output 1 On Only available with LV inverters Bit 11: Open Drain Output 2 On Only available with LV inverters Bit 12: Open Drain Output 3 On Only available with LV inverters Bit 13: Open Drain Output 4 On Only available with LV inverters Bit 14: Open Drain Output 5 On Only available with LV inverters Bit 15: Open Drain Output 6 On Only available with LV inverters
0x2052	19	CanSignalRotorSpeedInRpm	S16	rpm	1	-32768 - 32767	The actual filtered speed. Filter parameter: CanSignalSpeedFilterGain
0x2073	56	CanSignalRmsMotorCurrent	U16	Arms	1	0 - 2316	Scalar sum of filtered measured current & magnetisation current. Filter parameter: CanSignalRmsMotorCurrentFilterGain
0x2030	23	CanSignalFilteredVoltage	S16	Vdc	0.1	0 - 3276.7	Measured filtered DC bus voltage value. Filter parameter: CanSignalFilterGain
TxPDO2			Identifier: 0x280+Node_ID				Transmit Rate: default 10ms
0x2076	8	CanSignalActTorque	S16	Nm	0.1	-3276.8 - 3276.7	Actual torque
0x2073	2	DcBusCurrent	S16	Adc	1	-1125 - 1125	Estimated and filtered dc bus current
0x2001	5	DigitalInStatus	U16		1	0 - 65535	Bit 0: LV: DI1, Forward HV: DI1, HW_ID1 Bit 1: LV: DI2, Reverse HV: DI2, HW_ID2 Bit 2: LV: DI3, Interface_Mode_Select_1 HV: DI3 Bit 3: LV: DI4, Interface_Mode_Select_2 HV: DI4 Bit 4: LV: DI5, HW_ID1 HV: not used Bit 5: LV: DI6, HW_ID2 HV: not used Bit 6: LV: DI7 HV: not used Bit 7: LV: DI8 HV: not used Bit 8: LV: DI9 HV: not used Bit 9-11: LV: not used HV: not used Bit 12: LV: Keyswitch HV: MTO_IN1 (Pull_up) Bit 13: LV: not used HV: MTO_IN2 (Pull_down) Bit 14-15: LV: not used HV: not used
0x2095	9	AbilityAccelerationCurrent	S16	Arms	1	0 - 2316	Will be lower than limit if any reduction is active Reductions active due to physical reasons

PARKER GVI: CANopen PDO Feedback Messages

Node_ID: default 6 (see GVI Configuration Manual)
 Baudrate: default 250 kbit/s

The protocol is based on CANopen with 11 bit identifier
 Based on CiA Draft Standard 301, version 4.01

Index	SubIdx	Object Name	Type	Unit	Res.	Obj. Range	Description
TxPDO3			Identifier: 0x380+Node_ID				Transmit Rate: default 10ms
0x2095	19	ActualLimitationType	U8		1	0 - 15	Type of (reason for) actual limitation 0 = No limitation 1 = Event limitation 2 = Motor temperature limitation 3 = Low DC voltage limitation 4 = High DC voltage limitation 5 = Low speed limitation 6 = High speed limitation 8 = Dc power limitation 9 = External current limitation 10 = External torque limitation 11 = Heatsink temperature limitation 12 = Energy limitation 13 = Max current limitation 14 = Max voltage angle limitation 15 = Switching frequency limitation
0x2075	2	RegulatorStatus	U8		1	0 - 3	0 = Field weakening control not active 1 = Field weakening control active with no limitation 2 = Field weakening control active with current limitation 3 = Field weakening control active with angle limitation
0x2052	16	SensorAngle	S16	°	0.1	-180.0 - 179.9	Shows value from the active feedback sensor
0x2077	1	Iq	S16	Apk	1	-3276 - 3276	Measured instantaneous q-current
0x2077	2	Id	S16	Apk	1	-3276 - 3276	Measured instantaneous d-current
TxPDO4			Identifier: 0x480+Node_ID				Transmit Rate: default 100ms
0x2040	10	CanSignalMotorTemp	S16	°C	1	--32767 - 210	Motor Temperature Separately filtered motor temperature
0x2041	3	CanSignalInverterTemp	S16	°C	1	-50 - 130	Heatsink Temperature Separately filtered heat sink temperature
0x2020	13	ActualControlMode	U8		1	0 - 255	0 = Speed Mode 3 = AC Current Mode 5 = Torque Mode 8 = DC Voltage Mode
0x2029	6	ActiveEvents	U8		1	0 - 20	Number of active events

CANopen PDO Cmd



PARKER GVI: CANopen PDO Command Messages

Node_ID: default 6 (see GVI Configuration Manual)
Baudrate: default 250 kbit/s

The protocol is based on CANopen with 11 bit identifier
Based on CiA Draft Standard 301, version 4.01

Index	SubIdx	Object Name	Type	Unit	Res.	Obj. Range	Description
RxPDO1			Identifier: 0x200 + Node_ID				Transmit Rate: default 10 ms
0x2000	1	CommandAll	U16		1	0 - 65535	Bit 0: Switch on Bit 1: Speed Neutral Brake Ramp Parameterset Bit 3: Enable Bit 4: Regulator Set Bit 5: Active Current Boost Bit 6,7: Speed Ramp Parameter Set Bit 8: Ignore Low DC Bus Bit 9: Enable High Side Out (Pin 37) Bit 10: Open Drain Output 1 On Bit 11: Open Drain Output 2 On Bit 12: Open Drain Output 3 On Bit 13: Open Drain Output 4 On Bit 14: Open Drain Output 5 On Bit 15: Open Drain Output 6 On
							0 = set 0, 1 = set 1, 2 = set 2, 3 = set 3 Enable power stage Speed Controller PI Parameterset: 0 = set 0, 1 = set 1 0 = set 0, 1 = set 1, 2 = set 2, 3 = set 3 Only available with HV inverters Only available with LV inverters Only available with LV inverters Only available with LV inverters Only available with LV inverters Only available with LV inverters Only available with LV inverters
0x2000	2	CommandSpeed	S16	Rpm	1	-32768 - 32767	Speed Command Used in Speed Mode Control
0x2000	5	CommandAccelerationChange	U8	Rpm/4m	1	0 - 255	Acceleration slope in Speed mode Slope in rpm / dT: dT = 2 * SpeedChangeFactor
0x2000	6	CommandDecelerationChange	U8	Rpm/4m	1	0 - 255	Deceleration slope in Speed mode Slope in rpm / dT: dT = 2 * SpeedChangeFactor
RxPDO2			Identifier: 0x300 + Node_ID				Transmit Rate: default 10 ms
0x2000	3	CommandTorque	S16	Nm	0.1	-3276.8 - 3276.7	Torque Command, used in TorqueModeControl.
0x2000	4	CommandAcCurrent	S16	Arms	1	-2317 - 2316	Current Command, used in AcCurrentModeControl.
0x2000	10	CommandVoltage	S16	Vdc	0.1	0 - 3276.7	Voltage Command used in DCVoltageModeControl (Generator)
0x2020	12	RequestedControlMode	U8		1	0 - 255	0 = Speed Mode 3 = AC Current Mode 5 = Torque Mode 8 = DC Voltage Mode
RxPDO3			Identifier: 0x400 + Node_ID				Transmit Rate: default 10 ms
0x2099	6	AccTorqueLimit	S16	Nm	0.1	0 - 3276.7	Sets accelerating torque limit To be activated in ApplicationSetupWord
0x2099	7	BrakeTorqueLimit	S16	Nm	0.1	0 - 3276.7	Sets braking torque limit To be activated in ApplicationSetupWord
0x2094	3	PosDcCurrentLimit	S16	Adc	1	0 - 1039	Sets positive DC current limit To be activated in ApplicationSetupWord
0x2094	4	NegDcCurrentLimit	S16	Adc	1	0 - 1039	Sets negative DC current limit To be activated in ApplicationSetupWord

PARKER GVI: CANopen NMT, EMCY, SDO, Heartbeat

Node_ID: default 6 (see GVI Configuration Manual)
 Baudrate: default 250 kbit/s

The protocol is based on CANopen with 11 bit identifier
 Based on CiA Draft Standard 301, version 4.01

Command

Name	Type	Range	Description
NMT			
		Identifier: 0x00 + Node_ID	
NMT Command	U8	0 - 255	0x01, 1d = go to Operational 0x02, 2d = go to Stopped 0x80, 128d = go to Pre-operational 0x81, 129d = go to ResetNode 0x82, 130d: go to "Reset Communication"
Requested state of the CANopen slave			
RxSDO1			
		Identifier: 0x600+NodeID	
Command byte	U8	0 - 255	Service Data Object, request from the CANopen Master
Index	U16	0 - 65535	
Sub-Index	U8	0 - 255	
Data	U32		Data: can vary from 1 - 4 bytes

Feedback

Name	Type	Range	Description
EMCY			
		Identifier: 0x80+Node_ID	
Emergency Error Code	U16	0 - 65535	Emergency Error Code
Error Register	U8	0 - 255	Emergency Register
Not used	U8		
Event ID	U16	0 - 65535	Unique Event ID
SystemReaction	U8	0 - 255	
Not used	U8		
HEARTBEAT			
		Identifier: 0x700+Node_ID	Transmit Rate: default 100ms
NMT_State	U8		Heartbeat, also called "Node Monitoring", Indicates the current state of the CANopen slave
			0x00, 0d = Boot Up 0x04, 4d = Stopped
			0x05, 5d = Operational 0x7F, 127d = Pre-operational
TxSDO1			
		Identifier: 0x580+Node_ID	
Command Byte	U8	0 - 255	Service Data Object, reply from the CANopen slave
Index	U16	0 - 65535	
Sub-Index	U8	0 - 255	
Data	U32		Data: can vary from 1 - 4 bytes

PARKER GVI: J1939 Feedback Messages

SourceAddress: default 200 (see GVI Configuration Manual)
 Baudrate: default 250 kbit/s

The protocol is based on the J1939 std with 29 bit identifier
 DM1 functionality is not supported
 Address Claiming is not supported

SPN Name	Length h	Unit	Res.	Offset	SPN Range	Description
PGN 52480: Status			Priority: 6			Transmit Rate: default 10ms
StatusAll	16		1	0	0 - 65535	Bit 0: Ready To Switch On Bit 1: Switched On Bit 2: Enabled Bit 3: Tripped Bit 4: Current Ability Reduced Bit 5: Current Boost Activated Bit 6: Error Active Bit 7: Warning Active Bit 8: Regeneration Bit 10: Open Drain Output 1 On Bit 11: Open Drain Output 2 On Bit 12: Open Drain Output 3 On Bit 13: Open Drain Output 4 On Bit 14: Open Drain Output 5 On Bit 15: Open Drain Output 6 On
						Dc bus is charged Drive is ready to enable (Main contactor is on, if used) Power stage enabled Power stage tripped due to error If any error is active If any warning is active Power is from the drive to the battery Only available with LV inverters Only available with LV inverters Only available with LV inverters Only available with LV inverters Only available with LV inverters Only available with LV inverters
CanSignalRotorSpeedInRpm	16	rpm	1	-32768	-32768 - 31487	The actual filtered speed. Filter parameter: CanSignalSpeedFilterGain
CanSignalRmsMotorCurrent	16	Arms	1	0	0 - 2316	Scalar sum of filtered measured current & magnetisation current. Filter parameter: CanSignalRmsMotorCurrentFilterGain
CanSignalFilteredVoltage	16	Vdc	0.1	-3276.8	0 - 3276.7	Measured filtered DC bus voltage value. Filter parameter: CanSignalFilterGain
PGN 51712: Diagnostics 1			Priority: 6			Transmit Rate: default 10ms
CanSignalActTorque	16	Nm	0.1	-3276.8	-3276.8 - 3148.7	Actual torque
DcBusCurrent	16	Adc	1	-32768	-1125 - 1125	Estimated and filtered dc bus current
DigitalInStatus	16		1	0	0 - 64255	Bit 0: LV: DI1 Bit 1: LV: DI2 Bit 2: LV: DI3, Interface_Mode_Select_1 Bit 3: LV: DI4, Interface_Mode_Select_2 Bit 4: LV: DI5, HW_ID1 Bit 5: LV: DI6, HW_ID2 Bit 6: LV: DI7 Bit 7: LV: DI8 Bit 8: LV: DI9 Bit 9-11: LV: not used Bit 12: LV: Keyswitch Bit 13: LV: not used Bit 14-15: LV: not used
						HV: DI1, HW_ID1 HV: DI2, HW_ID2 HV: DI3 HV: DI4 HV: not used HV: not used HV: not used HV: not used HV: not used HV: MTO IN1 (Pull_up) HV: MTO_IN2 (Pull_down) HV: not used
AbilityAccelerationCurrent	16	Arms	1	0	0 - 64255	Will be lower than limit if any reduction is active Reductions will be active due to physical reasons

PARKER GVI: J1939 Feedback Messages

SourceAddress: default 200 (see GVI Configuration Manual)
 Baudrate: default 250 kbit/s

The protocol is based on the J1939 std with 29 bit identifier
 DM1 functionality is not supported
 Address Claiming is not supported

SPN Name	Length	Unit	Res.	Offset	SPN Range	Description
PGN 52224: Diagnostics 2			Priority: 6			Transmit Rate: default 10ms
ActualLimitationType	8		1	0	0 - 15	Type of (reason for) actual limitation 0 = No limitation 1 = Event limitation 2 = Motor temperature limitation 3 = Low DC voltage limitation 4 = High DC voltage limitation 5 = Low speed limitation 6 = High speed limitation 8 = Dc power limitation 9 = External current limitation 10 = External torque limitation 11 = Heatsink temperature limitation 12 = Energy limitation 13 = Max current limitation 14 = Max voltage angle limitation 15 = Switching frequency limitation
RegulatorStatus	8		1	0	0 - 3	0 = Field weakening control not active 1 = Field weakening control active with no limitation 2 = Field weakening control active with current limitation 3 = Field weakening control active with angle limitation
SensorAngle	16	°	0.1	-3276.8	-180.0 - 179.9	Shows value from the active feedback sensor
Iq	16	Apk	1	-3276	-3276 - 3276	Measured instantaneous q-current
Id	16	Apk	1	-3276	-3276 - 3276	Measured instantaneous d-current
PGN 52992: Diagnostics 3			Priority: 6			Transmit Rate: default 100ms
CanSignalMotorTemp	16	°C	1	-32768	-32767 - 210	Motor Temperature Separately filtered motor temperature
CanSignalInverterTemp	16	°C	1	-32768	-32767 - 210	Heatsink Temperature Separately filtered heat sink temperature
ActualControlMode	8		1	0	0 - 255	See RequestedControlMode in J1939 Cmd 0 = Speed Mode 3 = AC Current Mode 5 = Torque Mode 8 = DC Voltage Mode
ActiveEvents	8		1	0	0 - 20	Number of active events
PGN 52736: Events			Priority: 6			Transmit Rate: default 100ms
Event 1	16		1	0	0 - 64255	Event 1 ID Active Event1
Event 2	16		1	0	0 - 64255	Event 2 ID Active Event2
Event 3	16		1	0	0 - 64255	Event 3 ID Active Event3
Event 4	16		1	0	0 - 64255	Event 4 ID Active Event4

PARKER GVI: J1939 Command Messages

SourceAddress: default 200 (see GVI Configuration Manual)
 Baudrate: default 250 kbit/s

The protocol is based on the J1939 std with 29 bit identifier
 DM1 functionality is not supported
 Address Claiming is not supported

SPN Name	Length h	Unit	Res.	Offset	SPN Range	Description
PGN 51200: Command1			Priority: 3			Transmit Rate: default 10ms
CommandAll	16		1	0	0 - 65535	Bit 0: Switch on Bit 1,2: Speed Neutral Brake Ramp Parameterset 0 = set 0, 1 = set 1, 2 = set 2, 3 = set 3 Bit 3: Enable Enable power stage Bit 4: Regulator Set Speed Controller PI Parameterset: 0 = set 0, 1 = set 1 Bit 5: Active Current Boost Bit 6,7: Speed Ramp Parameter Set 0 = set 0, 1 = set 1, 2 = set 2, 3 = set 3 Bit 8: Ignore Low DC Bus Bit 9: Enable High Side Out (Pin 37) Only available with HV inverters Bit 10: Open Drain Output 1 On Only available with LV inverters Bit 11: Open Drain Output 2 On Only available with LV inverters Bit 12: Open Drain Output 3 On Only available with LV inverters Bit 13: Open Drain Output 4 On Only available with LV inverters Bit 14: Open Drain Output 5 On Only available with LV inverters Bit 15: Open Drain Output 6 On Only available with LV inverters
CommandSpeed	16	Rpm	1	-32768	-32768 - 31478	Speed Command Used in Speed Mode Control
CommandAccelerationChange	8	Rpm/4ms	1	0	0 - 250	Acceleration slope in Speed mode Slope in rpm / dT: dT = 2 * SpeedChangeFactor
CommandDecelerationChange	8	Rpm/4ms	1	0	0 - 250	Deceleration slope in Speed mode Slope in rpm / dT: dT = 2 * SpeedChangeFactor
PGN 50944: Command2			Priority: 3			Transmit Rate: default 10ms
CommandTorque	16	Nm	0.1	-3276.8	-3276.7 - 3148.7	Torque Command, used in TorqueModeControl.
CommandAcCurrent	16	Arms	1	-32768	-2317 - 2316	Current Command, used in AcCurrentModeControl.
CommandVoltage	16	Vdc	0.1	-3276.8	0 - 3148.7	Voltage Command used in DCVoltageModeControl (Generator)
RequestedControlMode	8		1	0	0 - 255	0 = Speed Mode 5 = Torque Mode 3 = AC Current Mode 8 = DC Voltage Mode
PGN 51456: Limits			Priority: 3			Transmit Rate: default 10ms
AccTorqueLimit	16	Nm	0.1	-3276.8	0 - 3148.7	Sets accelerating torque limit To be activated in ApplicationSetupWord
BrakeTorqueLimit	16	Nm	0.1	-3276.8	0 - 3148.7	Sets braking torque limit To be activated in ApplicationSetupWord
PosDcCurrentLimit	16	Adc	1	-32768	0 - 1039	Sets positive DC current limit To be activated in ApplicationSetupWord
NegDcCurrentLimit	16	Adc	1	-32768	0 - 1039	Sets negative DC current limit To be activated in ApplicationSetupWord