

Setup of the SEVCON GEN4 size 8 300V 300A motor controller

Application Note EK025-GB – December 2025

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1 Introduction

1.1 Summary

The purpose of this application note is to implement a SEVCON GEN4 size 8 high-voltage three-phase controller.

To do this, the following issues must be resolved:

- Is the logic power supply 12V or 24V?
- What should be done about the 300V battery voltage setting?
- How should the power capacitors be pre-charged?
- Update to the latest software version!

Initially, tests are being carried out on a ME1306 synchronous motor using a 96VDC lead-acid battery.

A second phase will involve an application for an asynchronous motor.

All the information about the controller came from the BorgWarner AC Motor Controller Gen4 HV Size 8/10 Reference Manual [1].



Fig. 1. The SEVCON GEN4 size 8 300V 300A forced air cooled reference 634H83210 [2].

1.2 Wiring diagram of the SEVCON GEN4 size 8

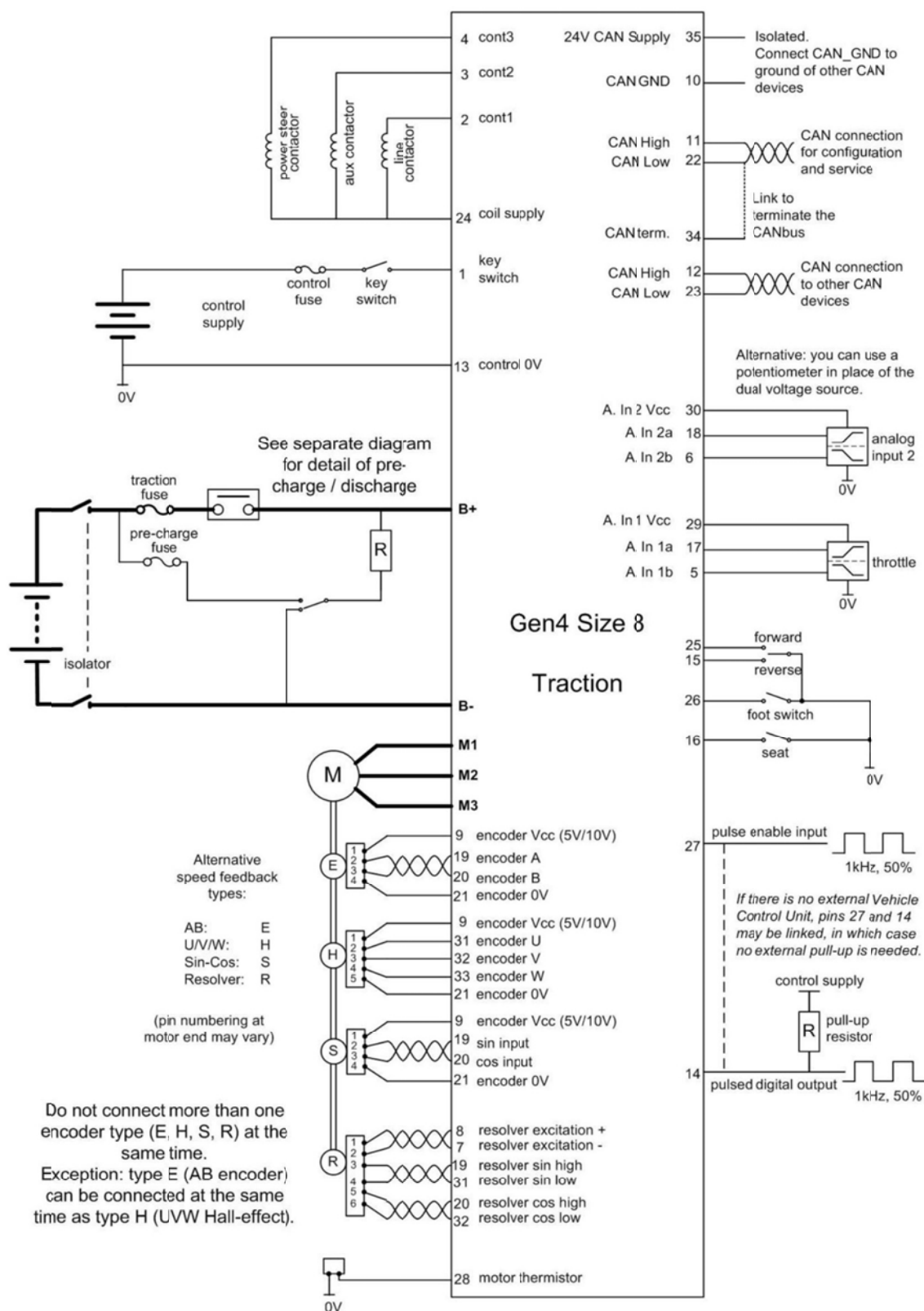


Fig. 2. Single traction wiring diagram of the SEVCON GEN4 size 8 [1].

1.3 Pre-charge wiring diagram of the SEVCON GEN4 size 8

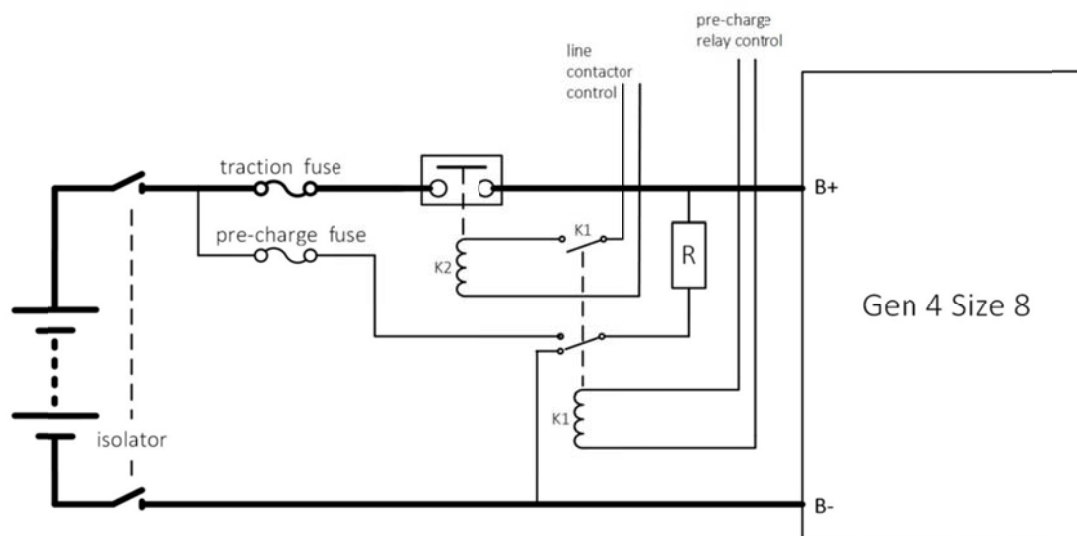


Figure 22 – Line contactor and pre-charge wiring diagram (Gen4 size 8 or 10)

Components required for the precharge and discharge circuit are listed in the following table

Name	Function	Required specification		Comment
		Size 8	Size 10	
F1	Pre-charge fuse	20 A 600 Vdc Slow blow	20 A 1000 Vdc Slow blow	
F2	Main traction fuse	425A 600 Vdc Semiconductor fuse	450A 800V dc Semiconductor fuse	
K1	Pre-charge and discharge contactor	Single pole change over with auxiliary contact 600 Vdc 10 A	Single pole change over with auxiliary contact 800V dc 10A	Must be wired such that in the normally closed position R1 is connected to the B- terminal
K2	Main line contactor	Single pole 600 Vdc 500A	Single pole 800V dc 500A	Must be interlocked so that K2 can only close if K1 is energised.
R1	Pre-charge and discharge resistor	Resistance 100Ω to 1kΩ Pulse voltage 600 V Energy pulse 200 J Power 50 W	Resistance 100Ω to 1kΩ Pulse voltage 1000 V Energy pulse 200 J Power 50 W	Must be overload protected with thermal cut out and or fuse

Table 25 – Pre-charge and line contactor components

Fig. 3. Pre-charge wiring diagram of the SEVCON GEN4 size 8 [1].

2 Study with the ME1306 PMSM motor

2.1 The ME1306 motor

The ME1306 PMSM motor has a DATE CODE 20 05 20 and the serial number #20.05.014. The value of the thermal sensor is ~~589 Ohms~~ @ 23°C.

The power wiring has been validated with SEVCON GEN4 Low Voltage controller:

- Phase U FRONT on M1
- Phase V MIDDLE on M3
- Phase W REAR on M2

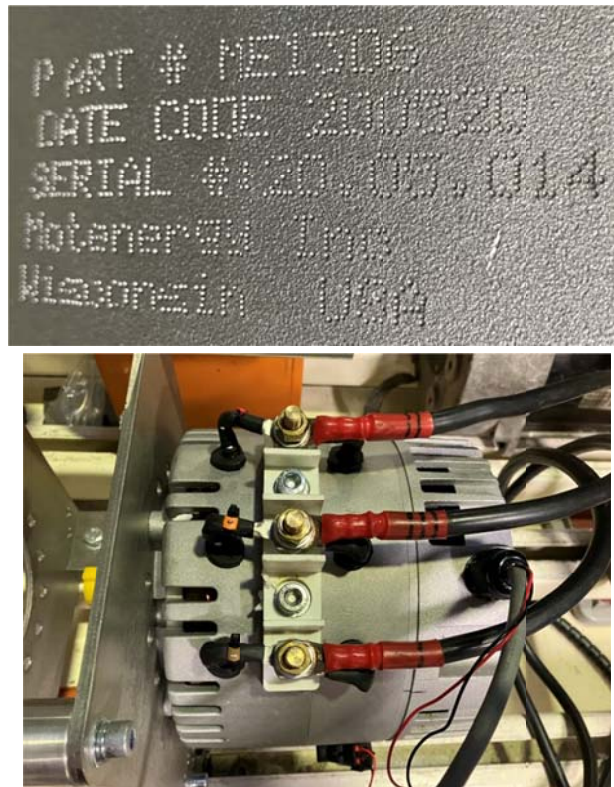


Fig. 4. The Motenergy ME1306 PMSM motor.

2.2 The SEVCON GEN4 size 8 controller



Fig. 5. The SEVCON GEN4 size 8 controller 634H83210 [2].

2.3 Wiring of the SEVCON GEN4 size 8 controller and the motor

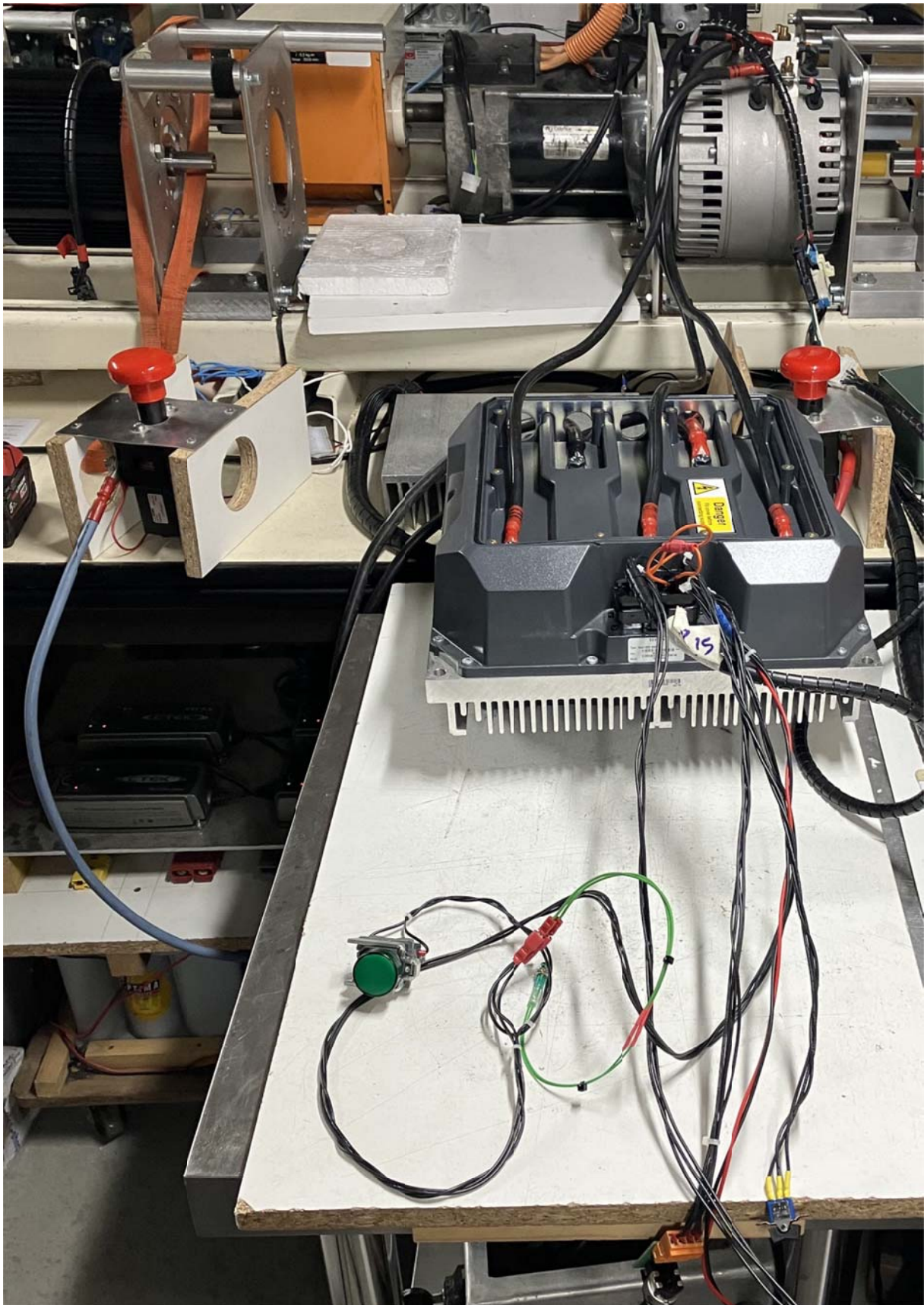


Fig. 6. The SEVCON GEN4 size 8 controller 634H83210 [2].

2.4 The DVTC software

The CAN bus is set at 250 kHz. The software DVTC version is 2025.05b. There is a creation of an EDS file :

EVolution5_pc0x10052c1e_rev0x00010010.eds

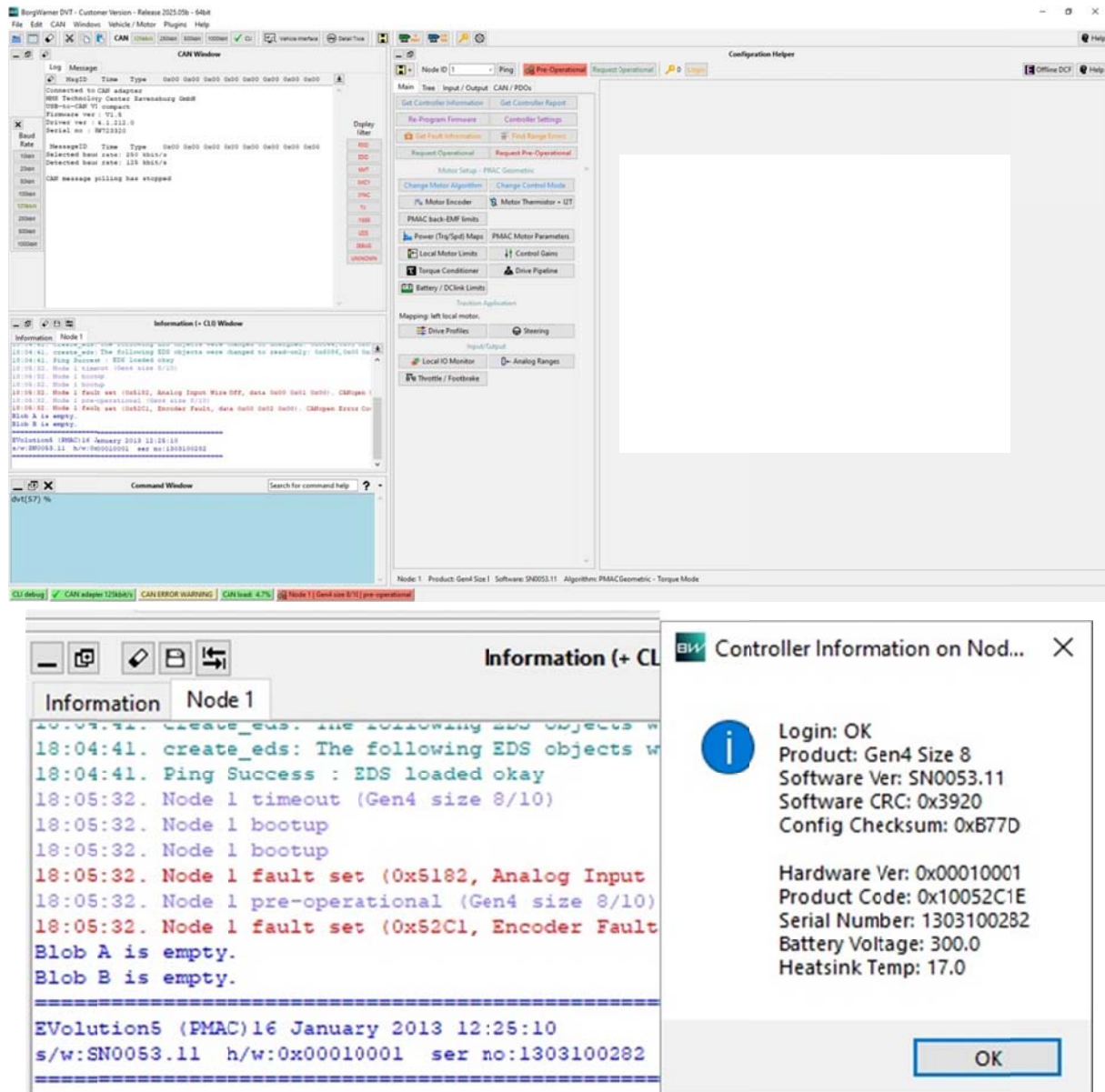


Fig. 7. The DVTC software version 2025.05b [5].

2.5 Setup of the controller

- Disconnect the other devices from the CAN bus (ITC Display, ClearView, GEN4...) and make sure that the 120 ohms terminating resistor is present.
- « Stay in Pre-Operational » for saving the DCF file: (635 kb, no errors)

2025-12-10-MOTOR-SN0053-11-GEN4-Size-8-Original-Config-18h10.dcf

- The software version is “SN0053.11” and it is very old software for PMSM synchronous motor. It is not the latest version of the synchronous motor software SN0053.30.

- « Go Preoperational » then load the new software "**1005_evo5_pmac_SN0053.30.dld**" for synchronous PMSM motor, there are errors (normal):

Loaded dll: VCI4 Tcl9.0 64bit (./bin//x64//dvtint_vci4_tcl90.dll). Version 3.6

DVT License expiry date: 25/10/2026

Licensed user: KIT ELEC SHOP. Provided by: KIT ELEC SHOP

```
veh_if: wrap for ticks: 42949672
veh_if: setting start_ticks 2203713
veh_if: wrap for ticks: 42949672
veh_if: setting start_ticks 3254130
17:13:08. Vehicle Interface trace started
17:13:27. Vehicle Interface trace stopped
17:13:27. Vehicle Interface trace data saved
17:13:27. Vehicle Interface reading main settings from node 1 to add to trace
17:13:27. Vehicle Interface trace save completed
Stopping VPDO IO monitor: invalid bareword "Timeout"
in expression "Timeout";
should be "$Timeout" or "{Timeout}" or "Timeout(...)" or ...
veh_if: wrap for ticks: 42949672
veh_if: setting start_ticks 8740672
17:22:18. Vehicle Interface trace started
17:22:36. Vehicle Interface trace stopped
17:22:36. Vehicle Interface trace data saved
17:22:36. Vehicle Interface reading main settings from node 1 to add to trace
17:22:36. Vehicle Interface trace save completed
Unable to determine graph names and pole pairs. Please manually set. Returned: can't read "median_angle": no such variable
veh_if: wrap for ticks: 42949672
veh_if: setting start_ticks 14332166
17:31:38. Vehicle Interface trace started
17:32:02. Vehicle Interface trace stopped
17:32:02. Vehicle Interface trace data saved
17:32:02. Vehicle Interface reading main settings from node 1 to add to trace
17:32:02. Vehicle Interface trace save completed
veh_if: wrap for ticks: 42949672
veh_if: setting start_ticks 15087741
17:32:52. Vehicle Interface trace started
17:33:54. Vehicle Interface trace stopped
17:33:54. Vehicle Interface trace data saved
17:33:54. Vehicle Interface reading main settings from node 1 to add to trace
17:33:54. Vehicle Interface trace save completed
veh_if: wrap for ticks: 42949672
veh_if: setting start_ticks 16941388
veh_if: wrap for ticks: 42949672
veh_if: setting start_ticks 17663268
Error docking window .info with command .subpane_v add .info -weight 1; .subpane_v insert 1 .info. Err: .info already
added
{646 506010} {668 668} {678 506001}
found 1 memory ranges in C:/Borgwarner-DCF-DLD/1005_evo5_pmac_SN0053-30-Gen4-size8-
size10/1005_evo5_pmac_SN0053.30.dld (modified 10/15/2013 - 15:48:30):
```

```
17:11:08. Node 1 operational (Gen4 size 8/10)
17:11:08. Opening EDS file : EVolution5_pc0x10052c1e_rev0x00010010.eds
17:11:09. Ping Success : EDS loaded okay
Blob A is empty.
Blob B is empty.
```

=====

```
EVolution5 (PMAC)16 January 2013 12:25:10
s/w:SN0053.11 h/w:0x00010001 ser no:1303100282
```

=====

```
17:20:34. Login Access Level: 0x04
17:20:36. fpo: NMT state change failed. SDO write to 0x2800,0 timedout
17:20:39. fpo: Traction State: POWER_OFF
```

17:20:39. fpo: Local line contactor not mapped. This may prevent change to preop until a key recycle.

17:20:47. Node 1 bootup

17:20:47. Node 1 bootup

Flash NVM copy A updated.

Flash NVM copy B updated.

Blob A is empty.

Blob B is empty.

=====17:20:48. Node 1 pre-operational (Gen4 size 8/10)

=====

EVolution5 (PMAC)16 January 2013 12:25:10

s/w:SN0053.11 h/w:0x00010001 ser no:1303100282

=====

17:20:52. Node 1 fault set (0x4681, Unit in pre-operational, data 0x00 0x00 0x00). CANopen Error Code: 0x1000

17:22:00. Node 1 bootup

17:22:00. Node 1 bootup

Flash NVM copy A updated.

Flash NVM copy B updated.

Blob A is empty.

Blob B is empty.

=====17:22:00. Node 1 pre-operational (Gen4 size 8/10)

=====

EVolution5 (PMAC)16 January 2013 12:25:10

s/w:SN0053.11 h/w:0x00010001 ser no:1303100282

=====

17:22:05. Node 1 fault set (0x4681, Unit in pre-operational, data 0x00 0x00 0x00). CANopen Error Code: 0x1000

17:22:07. Login Access Level: 0x00

17:22:07. fpo: NMT master (node 1) requested Operational

17:22:08. Node 1 operational (Gen4 size 8/10)

17:22:10. Node 1 fault cleared (0x4681, Unit in pre-operational, data 0x00 0x00 0x00). CANopen Error Code: 0x0000

17:26:32. Login Access Level: 0x04

17:26:34. fpo: NMT state change failed. SDO write to 0x2800,0 timedout

17:26:37. fpo: Traction State: POWER_OFF

17:26:37. fpo: Local line contactor not mapped. This may prevent change to preop until a key recycle.

17:26:51. Node 1 bootup

17:26:52. Node 1 bootup

Blob A is empty.

Blob B is empty.

=====

EVolution5 (PMAC)16 January 2013 12:25:1017:26:52. Node 1 pre-operational (Gen4 size 8/10)

s/w:SN0053.11 h/w:0x00010001 ser no:1303100282

=====

17:26:56. Node 1 fault set (0x4681, Unit in pre-operational, data 0x00 0x00 0x00). CANopen Error Code: 0x1000

17:31:19. Login Access Level: 0x04

17:31:19. fpo: NMT master (node 1) requested Operational

17:31:19. Node 1 operational (Gen4 size 8/10)

17:31:21. Node 1 fault cleared (0x4681, Unit in pre-operational, data 0x00 0x00 0x58). CANopen Error Code: 0x0000

17:31:29. Node 1 bootup

17:31:29. Node 1 bootup

Flash NVM copy A updated.

Flash NVM copy B updated.

Blob A is empty.

Blob B is empty.

=====17:31:30. Node 1 operational (Gen4 size 8/10)

=====

EVolution5 (PMAC)16 January 2013 12:25:10

s/w:SN0053.11 h/w:0x00010001 ser no:1303100282

=====

17:33:24. Node 1 fault set (0x45CA, Vcap cutback for regen torque, data 0x01 0x70 0x64). CANopen Error Code: 0x3100

17:33:25. Node 1 fault cleared (0x45CA, Vcap cutback for regen torque, data 0x00 0x00 0x00). CANopen Error Code: 0x0000

17:33:27. Node 1 fault set (0x45CA, Vcap cutback for regen torque, data 0x01 0x70 0x64). CANopen Error Code: 0x3100

17:33:27. Node 1 fault cleared (0x45CA, Vcap cutback for regen torque, data 0x00 0x00 0x3F). CANopen Error Code: 0x0000

17:36:27. Node 1 timeout (Gen4 size 8/10)

17:36:31. Node 1 bootup

17:36:31. Node 1 bootup

Flash NVM copy A updated.
Flash NVM copy B updated.
Blob A is empty.
Blob B is empty.

=====17:36:31. Node 1 operational (Gen4 size 8/10)

=====

EVolution5 (PMAC)16 January 2013 12:25:10
s/w:SN0053.11 h/w:0x00010001 ser no:1303100282

=====

18:03:47. create_eds: Filename to save: K:/USERS/SEVCON-Parametrages/2025-12-11-ME1306-GEN4-SIZE-8-KIT-ELEC-SHOP/2025-12-12-ME1306-SN0053-11-GEN4-Size-8-Config-presque-OK-18h03.dcf
18:03:47. create_eds: Saving dcf parameter values from node 1
18:04:18. create_eds: Complete saving DCF file from node 1
18:04:37. Login Access Level: 0x04
18:04:39. fpo: NMT state change failed. SDO write to 0x2800,0 timedout
18:04:42. fpo: Traction State: POWER_OFF
18:04:42. fpo: Local line contactor not mapped. This may prevent change to preop until a key recycle.
18:04:50. Node 1 bootup
18:04:50. Node 1 bootup
Blob A is empty.
Blob B is empty.

=====

EVolution5 (PMAC)16 January 2013 12:25:1018:04:51. Node 1 pre-operational (Gen4 size 8/10)

s/w:SN0053.11 h/w:0x00010001 ser no:1303100282

=====

18:04:55. Node 1 fault set (0x4681, Unit in pre-operational, data 0x00 0x00 0x00). CANopen Error Code: 0x1000
18:05:47. Login Access Level: 0x04
18:05:47. fpo: Already requested pre-operational
18:05:49. Node 1 bootup
Waiting for bootloader.....
Bootloader on node 1: Gen4 (D0701.0001)
Starting download of firmware....
Bootloader on node 1: Gen4 (D0701.0001)

DLD file memory area information
Start Address: 0x007B8000
End Address: 0x007EBF00
Section size: 0x00033F01

programming dsp-zeffer on node 1OK
block checksum 0x012f90d9
attempting to exit bootloader with checksum: 0x90d9
18:08:54. Node 1 fault set (0x5043, Static Range Error, data 0x00 0x00 0x00). CANopen Error Code: 0x6300
18:08:54. Node 1 fault set (0x5044, Dynamic Range Error, data 0x00 0x00 0x00). CANopen Error Code: 0x6300
18:08:54. Node 1 fault set (0x4F41, Internal SW Fault, data 0x00 0x00 0x00). CANopen Error Code: 0x6100
18:08:54. Node 1 bootup
18:08:54. Node 1 fault set (0x5043, Static Range Error, data 0x00 0x00 0x00). CANopen Error Code: 0x6300
18:08:54. Node 1 fault set (0x5044, Dynamic Range Error, data 0x00 0x00 0x00). CANopen Error Code: 0x6300
18:08:54. Node 1 fault set (0x4F41, Internal SW Fault, data 0x00 0x00 0x00). CANopen Error Code: 0x6100
18:08:54. Node 1 bootup
18:08:54. Node 1 fault set (0x5043, Static Range Error, data 0x00 0x00 0x00). CANopen Error Code: 0x6300
18:08:54. Node 1 fault set (0x5044, Dynamic Range Error, data 0x00 0x00 0x00). CANopen Error Code: 0x6300
18:08:54. Node 1 fault set (0x4F41, Internal SW Fault, data 0x00 0x00 0x00). CANopen Error Code: 0x6100
Node 1 EDS file missing: EVolution5_pc0x10052c1e_rev0x00010016.eds. To generate the EDS file type "create_eds 1"
18:08:54. Node 1 pre-operational (Gen4 size 8/10)
Flash NVM copy B updated.
Flash NVM copy A updated.
Blob A is empty.
Blob B is empty.
Range error for 0x2C30, 0x08
Range error for 0x5821, 0x00
Range error for 0x461E, 0x01

=====

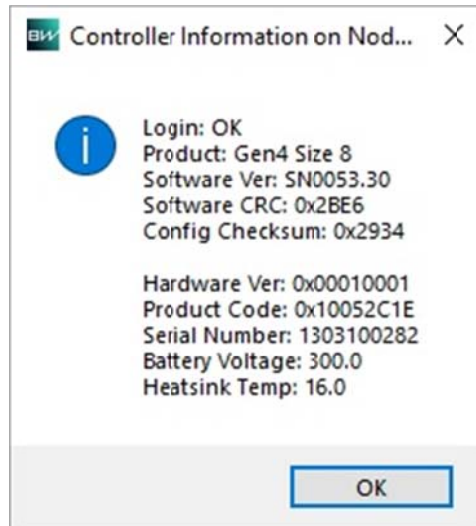
EVolution5(PMAC)Tue Sep 17 13:28:49 2013
s/w:SN0053.30 h/w:0x00010001 ser no:1303100282

=====

18:08:58. Node 1 fault set (0x4681, Unit in pre-operational, data 0x00 0x00 0x00). CANopen Error Code: 0x1000

- Closing the DVTC software the « Power Recycle ». A new EDS file has been created.

EVolution5_pc0x10052c1e_rev0x00010016.eds



- « Go Pre-operational » and loading the partial motor DCF file into the controller: no error and no warning

2019-10-16-ME0913-0705-0013-GEN4-4827-48V-VERT-Partiel-moteur-17h39.dcf

(and also : 2025-12-12-ME1306-SN0053-11-GEN4-Size-8-Config-presque-OK-18h03.dcf)

Loaded dll: VCI4 Tel9.0 64bit (./bin/x64/dvtint_vei4_tel90.dll). Version 3.6

DVT License expiry date: 25/10/2026

Licensed user: KIT ELEC SHOP. — Provided by: KIT ELEC SHOP

16:33:43. Opening DCF file: C:/Borgwarner DCF DLD/DCF/2025-10-09-ME1306-0705-0015-GEN4-4845-KES-Config-OK-17h39.dcf

16:31:58. Node 1 pre-operational (Gen4 80V 350A)

16:31:58. Opening EDS file : Gen4_pc0x07055023_rev0x0001002d.eds

16:31:58. Ping Success : EDS loaded okay

Blob A is empty.

Blob B is empty.

BorgWarner Gen4 (PMAC) Tue Oct 15 15:41:10 2024

s/w:0705.0015 h/w:0x00040004 ser no:1307101934

16:32:00. Node 1 fault set (0x4681, Unit in pre-operational, data 0x00 0x00 0x00). CANopen Error Code: 0x1000

16:32:03. Opening EDS file : Gen4_pc0x07055023_rev0x0001002d.eds

16:33:25. dl_def: logged in... and in preop.

16:33:30. Node 1 fault set (0x5044, Dynamic Range Error, data 0x2C 0x02 0x01). CANopen Error Code: 0x6300

Range error for 0x2C02, 0x01

Range error for 0x2C02, 0x01

Range error for 0x2C02, 0x01

Range error for 0x2C02, 0x02

16:33:31. Node 1 fault set (0x45C4, High Battery cutout, data 0x04 0x04 0x0A). CANopen Error Code: 0x3100

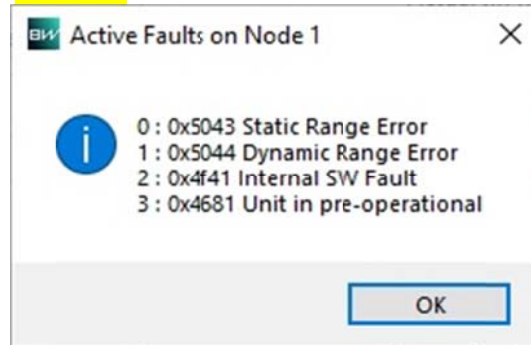
16:33:39. dl_def (send_sdos): sdo_wnx 1 0x4617 0x1 0xffffffffffffffffffffffffffffffff...

Range error for 0x4641, 0x02

Range error for 0x6075, 0x00

16:33:43. dl_def: C:/Borgwarner DCF DLD/DCF/2025-10-09 ME1306-0705-0015-GEN4-4845-KES-Config-OK-17h39.def downloaded to device OK
 16:33:43. dl_def: Checking def has downloaded okay
 16:33:43. dl_def: Software version name in def matches unit: 0705.0015
 16:33:44. dl_def: Configuration checksum in def matches unit: 0xd40a

- « Recycle Power » and relaunch of DVTC.
- The CAN bus is at **250 kHz**. There are some errors :



- Use the button “Find Range Error”:
 0x2C30.8 BDI reset level = 10%
 0x5821 Minimum pre-charge level = 90V
 0x461E User Definable motor temperature cutback map
 0x4641.45 Scaling = 1
 0x4641.46 Scaling = 1
- Set encoder supply to +5V:

Encoder Configuration [0x4630]

Used for encoder configuration parameters.

Encoder Pull Up for AB	Enabled	▼
Encoder Type	UVW only	▼
Encoder Offset	0.0	Degrees
Sin input minimum (trough) voltage	1.9750915750915816	V
Sin input maximum (peak) voltage	4.033699633699647	V
Cos input minimum (trough) voltage	1.982417582417589	V
Cos input maximum (peak) voltage	4.039560439560453	V
Actual sin minimum (trough) voltage	0.0	V
Actual sin maximum (peak) voltage	0.0	V
Actual cos minimum (trough) voltage	0.0	V
Actual cos maximum (peak) voltage	0.0	V
Variable Encoder Supply	5.0	V
Multipole Sin-cos / Resolver waves per mechanical rotation	1.0	
Encoder offset	-7.8125	Degrees
Sin-cos / UVW latency select	SINCOS Renishaw 231L	▼
Sin-cos / UVW latency fine adjust	0.0	us
Sin-cos tracking min warning voltage	0.0	V
Sin-cos tracking max warning voltage	0.0	V

- Check the motor parameters:

AC Motor data [0x4641]

Motor data. This is specific to the motor type.

Maximum Stator Current (Is max)	275.0	A(RMS)
Minimum Magnetizing Current (Im min)	0.0	A(RMS)
Number of Pole Pairs (npp)	4.0	
Rated Stator Current	220.0	A(RMS)
Stator Inductance PMAC (Ls)	89.94340896606441	uH
Nominal battery voltage	100.0	V
Current control proportional gain (Kp)	1.0	
Iq max headroom (PMAC geometric)	98.9990234375	%
Current control integral gain (Ki)	0.002471923828125	
Voltage Constant (Ke)	0.02789306640625	V/rads
Openloop start FW%	0.0	%
Frequency / Mod index control Kp	0.009765625	
Frequency / Mod index control Ki	0.0009765625	
Max drive mod index	89.990234375	%
Max brake mod index	0.0	%
D-axis current controller proportional gain	0.0	
D-axis current controller integral gain	0.0	
Percentage minimum allowed saturation of Ls	39.9993896484375	%
Iq and Id Kp scaling factor for low-frequency PWM.	1.0	
Iq and Id Ki scaling factor for low-frequency PWM.	1.0	
Magnetic gearbox breakout torque	0.0	Nm

- Set the digital level to **LOW**:

General Digital Input Configuration [0x4680]

Configurations which affect all digital inputs

Inputs active

- Input/output configuration:

 Node ID Ping  Operatio

Main Tree **Input / Output** CAN / PDOs

VPDO Mapping to VehApp (TracApp/PumpApp/BattApp)

Press "Read Values" for detailed I/O information

Local Motor Control

Node Controls:

Local Digital Inputs

# of Inputs:	3
Digital In. 1:	Forward Switch Pin.25
Digital In. 2:	Reverse Switch Pin.15
Digital In. 3:	FS1 switch Pin.26
Digital In. 4:	Not Mapped Pin.16
Digital In. 5:	Not Mapped
Digital In. 6:	Not Mapped
Digital In. 7:	FS1 switch
Digital In. 8:	Not Mapped
Digital In. 9:	Footbrake switch
Digital In. 10:	Not Mapped
Digital In. 11:	Not Mapped

Local Analog Inputs

# of Inputs:	1
Analog In. 1:	Throttle Input Voltage Pin.17
Analog In. 2:	Not Mapped Pin.05
Analog In. 3:	Not Mapped Pin.18
Analog In. 4:	Not Mapped Pin.06
Analog In. 5:	Not Mapped Pin.28

Local Contactor Outputs

# of Outputs:	3
Contactor 1:	External LED Pin.02
Contactor 2:	External LED Pin.03
Contactor 3:	External LED Pin.04

 Disable all IO mapping

- The voltage of the **HV500** power relay is 24V and (18V) **11V** after one second:
- The voltage of the power relay is 24V and 18V after one second:

Contactor Output Configuration [0x2D00]		
Pull-In Voltage	24.0	V
Pull-In Time	1.0	Seconds
Hold-In Voltage	18.0	V

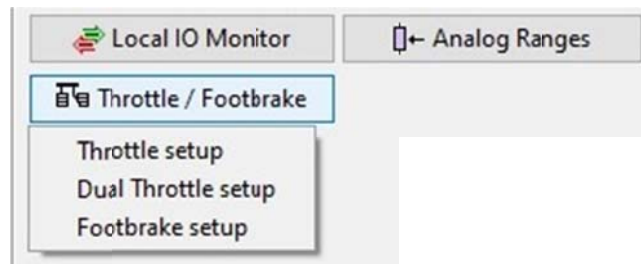
- Checking of « Voltage Control Enable » for voltage reduction to 24V on all analogue outputs :

Voltage Control Enable [0x2D01]	
Voltage Control Enable for Contactor Drives 1..8 0xFF	
Line Contactor	On
Pump Contactor	On
Power Steer Contactor	On
Electromechanical Brake	On
External LED	On
Traction Motor Cooling Fan	On
Buzzer	On
Horn	On
Voltage Control Enable for Contactor Drives 9..16 0x7F	
Lights	On
Service	On
Motor Isolation	On
Precharge Output	On
Belt Electromechanical Brake	On
Belt ChangeOver Contactor	On
Electro-mechanical Park brake	On

- Check "Reduce to Hold Level Enable" only on the power relay to reduce the voltage to 18V after one second:

Reduce to Hold Level Enable [0x2D02]	
Reduce to Hold Level Enable for Contactor Drives 1..8 0x01	
Line Contactor	On
Pump Contactor	Off
Power Steer Contactor	Off
Electromechanical Brake	Off
External LED	Off
Traction Motor Cooling Fan	Off
Buzzer	Off
Horn	Off
Reduce to Hold Level Enable for Contactor Drives 9..16 0x00	
Lights	Off
Service	Off
Motor Isolation	Off
Precharge Output	Off
Belt Electromechanical Brake	Off
Belt ChangeOver Contactor	Off
Electro-mechanical Park brake	Off

- Set the throttle voltage pin N°22 with the button “Throttle / Footbrake” and “**Throttle setup**”:



Throttle. Setting start value to 0.0: OK

Throttle. Setting end value to 1.0: OK

Throttle. Start 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

Throttle. End 9.68359375 9.6953125 9.70703125 9.70703125 9.70703125 9.70703125 9.70703125 9.7109375 9.7109375 9.71875

Throttle. Start voltage lower than end voltage.

Throttle. Setting start volts to 0.1: OK

Throttle. Setting end volts to 9.38359375: OK

- Adjustment of the potentiometer voltage from 0.10V to 4.75V max: OK with “Speed Limit Mode = Fixed at maximum” (not “Proportional to throttle”).

Throttle parameters [0x2910]

Parameters to configure Throttle Input.

Throttle Flags		Hex value: 0x0044
Proportional Braking	No	▼
Directional Throttle	No	▼
Speed Limit Mode	Fixed at maximum	▼
Braking Directional Throttle	No	▼
Reverse Speed Limit Encoding (Gen4 slip s/w)	No	▼
Handbrake Fault	Enabled	▼
Proportional Speed Limit in Braking (Gen4 Slip + D8)	Disabled	▼
Allow step change in steer angle	No	▼
Virtual FS1	Disabled	▼
Absolute Steer Angle in single traction	Disabled	▼
Separate Seat Regen Braking settings	Disabled	▼
Slave Left Motor Speed Inversion	Disabled	▼
Brake Light when Neutral Braking (customer s/w only)	Disabled	▼
Inching functionality (customer s/w only)	Generic	▼
Proportional Speed Limit in Drive (customer s/w only)	Enabled	▼
Throttle input characteristic	Linear	▼
Throttle Start Voltage 1	0.1015625	V
Throttle Start Value 1	0.0	P.U.
Throttle End Voltage 1	4.75	V
Throttle End Value 1	1.0000000000000002	P.U.

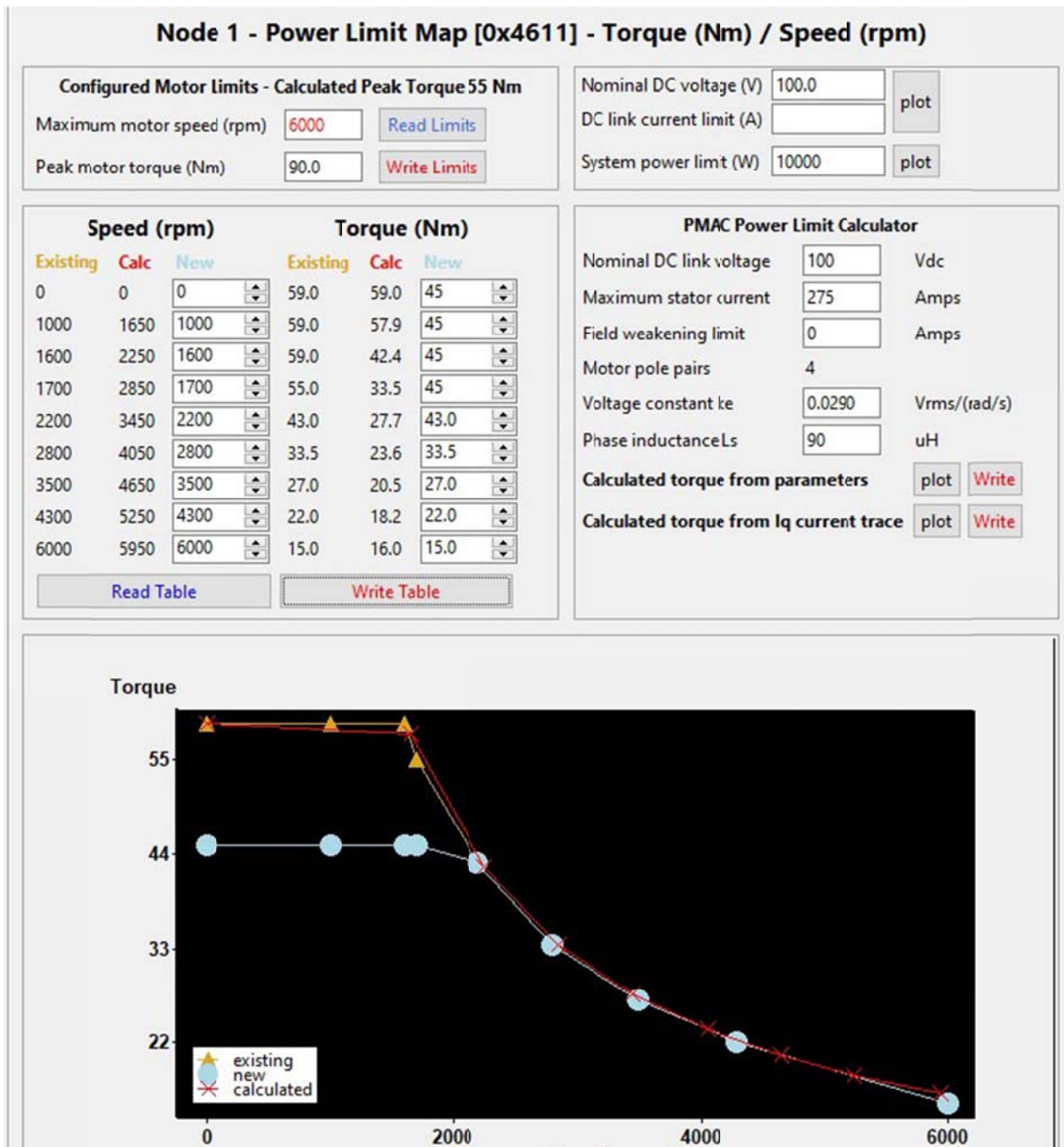
- « Baseline Profile » half power **and 5000 rpm**

Traction baseline profile [0x2920] Driveability Select 1 Profile [0x2921] Driveability Select 2 Profile [0x2922]				
	[0x2920]	[0x2921]	[0x2922]	
Torque applied during drive	50.0	100.0	100.0	%
Torque applied during a direction change	0.0	12.0	12.0	%
Torque applied when neutral braking	0.0	5.0	5.0	%
Torque applied when footbraking	0.0	5.0	5.0	%
Maximum Speed in forward direction	5000.0	4480.0	2240.0	rpm
Maximum Speed in reverse direction	5000.0	840.0	840.0	rpm
Ramp up rate during drive	200.0	200.0	200.0	%/s
Ramp up rate during direction change braking	200.0	60.0	60.0	%/s
Ramp up rate during neutral braking	200.0	5.0	5.0	%/s
Ramp up rate during footbraking	200.0	5.0	5.0	%/s
Ramp down rate during drive	200.0	400.0	400.0	%/s
Ramp down rate during direction change braking	200.0	60.0	60.0	%/s
Ramp down rate during neutral braking	200.0	400.0	400.0	%/s
Ramp down rate during footbraking	200.0	5.0	5.0	%/s
Speed limit ramp up rate when in torque mode	1000.0	2000.0	2000.0	rpm/s
Speed limit ramp down rate when in torque mode	1000.0	2000.0	2000.0	rpm/s

- Gain values: "Integral Gain" is equal to 0: there is less risk of instability on the speed regulation.

Current Control	Modulation Index	Speed Control / Limit
Speed control Gains [0x4651]		
Used to set up the speed control / limit loop		
Speed proportional gain	0.03125	
Speed integral gain	0.0	
Low speed proportional gain	0.0	
Rollback integral gain	0.0	
Low speed integral gain	0.0	
dw/dt gain	0.0	
Integral initialization factor	1.0	
Speed calculation filter pole	1.52587890625e-5	
Pre-limit speed	150.0	rpm
Maximum speed limit ramp down rate	10000.0	rpm/s

- Value of the « Torque Maps 1 » : 45 Nm max , 100V , 100A and 10 kW



- « Motor overspeed protection » :

Motor overspeed protection [0x4624]

Motor overspeed protection rpm

- Check the « Battery current limit [0x4623] » : **no active**

Overview	Speed Control / Limit	DC current limit	Vdcmap
Battery current limit [0x4623]			
Allows configuration of battery (DC link) current limit			
Maximum battery charge current	0.0	A	
Maximum battery discharge current	0.0	A	
Cutback range	0.0		0x4623, 3 Cutback range Hex: 0x0000 Scaled Range: 0 to 32767
Battery current estimation correction factor	1.0		Specifies over what range in amps battery current cutback is applied (if using the integral gain in 0x4623,7 this can be considered the proportional gain). Set to 0 to disable battery current limit cutback
Battery current cutback ramp up rate	5.0		
Battery current cutback ramp down rate	5.0		
Battery current limit integral gain	0.0		
Minimum battery charge current speed	0.0	rpm	

- Check the « Masters Battery current limit Parameters [0x2870] » : **deactivated**

Master Battery Current Limit Parameters [0x2870]		
Master Battery (DC link) Current Limit Parameters		
Battery current limit data source	Disabled	▼
Maximum battery discharge current	0.0	A
Maximum battery recharge current	0.0	A
Maximum battery discharge current in Drive Profile 1	0.0	%
Maximum battery discharge current in Drive Profile 2	0.0	%
Maximum battery discharge power	0.0	kW
Maximum battery recharge power	0.0	kW
Maximum battery discharge current in Drive Profile 3	0.0	%

- ~~Remark : with the standard configuration and sensor with BLACK and WHITE cables:~~
- Remark : with the standard configuration and sensor with THIN BLACK and RED cables:

Motor Temperature 1 (Measured - T1)

Mode PTC

High Temperature Voltage (PTC) 7.5 V

Low Temperature Voltage (PTC) 6.0 V

Switch source 0x00

PTC type KTY84

Failure torque cutback rate 5.0 s

Failure torque recovery rate 5.0 s

- ... the motor temperature measurement is “not” correct ! 6°C (Heatsink 16°C) for 17.2-21.1°C (17.3°C) in the room with forced-air heating (start at 16°C).

Vehicle Interface

Not logging 0:03

Watch: 18 PDOs

1, Target Id	0.0	A
1, Target Iq	0.0	A
1, Id	-0.25	A
1, Iq	0.0625	A
1, Ud	0.0	V
1, Uq	0.0	V
1, Voltage modulation	0.0	%
1, Capacitor Voltage	102.8125	V
1, Measured inductance	89.943408	uH
1, Voltage limit circle magnitude	29696	A
1, Maximum fluxing current	178	A
1, Maximum iq allowed	273	A
1, Motor Temperature 1 (Measured - TH1)	6	DegC
1, Torque actual value	0.0	Nm
1, Max velocity - left motor	0	RPM
1, Battery Current	0.0	A
1, Torque demand value	0.0	Nm
1, Velocity	0	RPM

Node Status

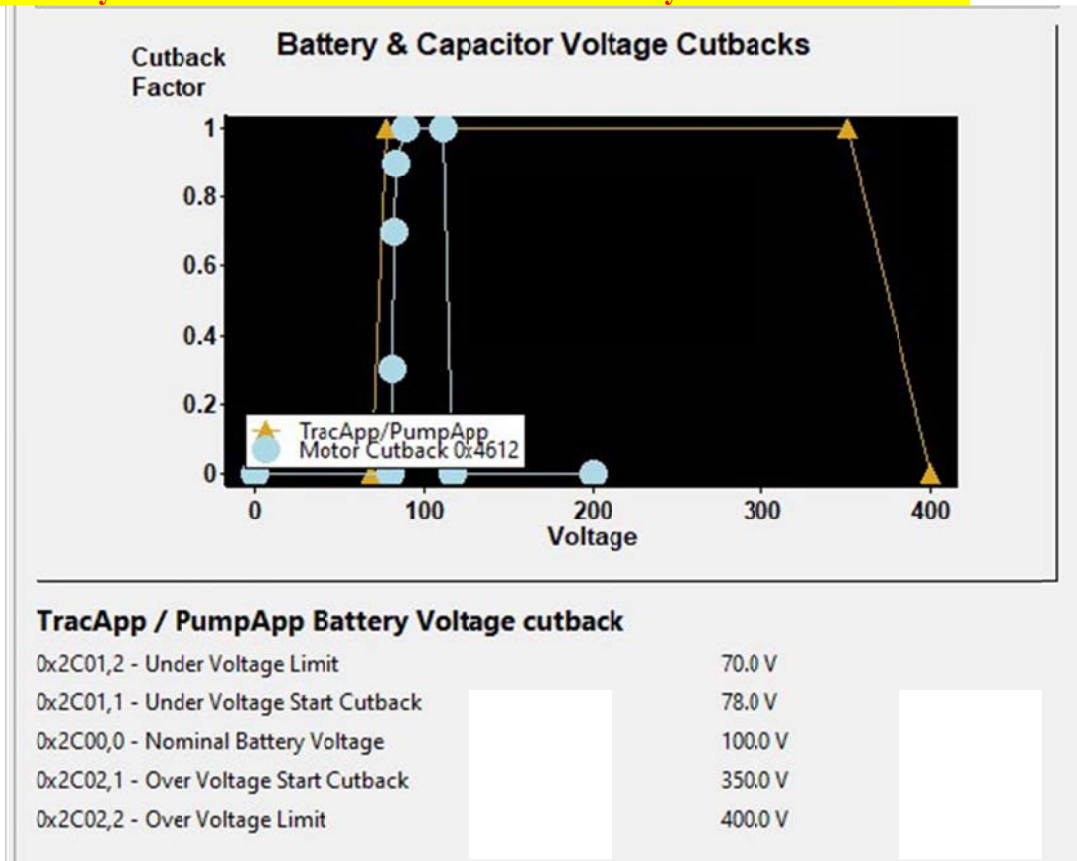
☒ Node 1 | Sync 20ms HBeat Op No faults set

Logging Options

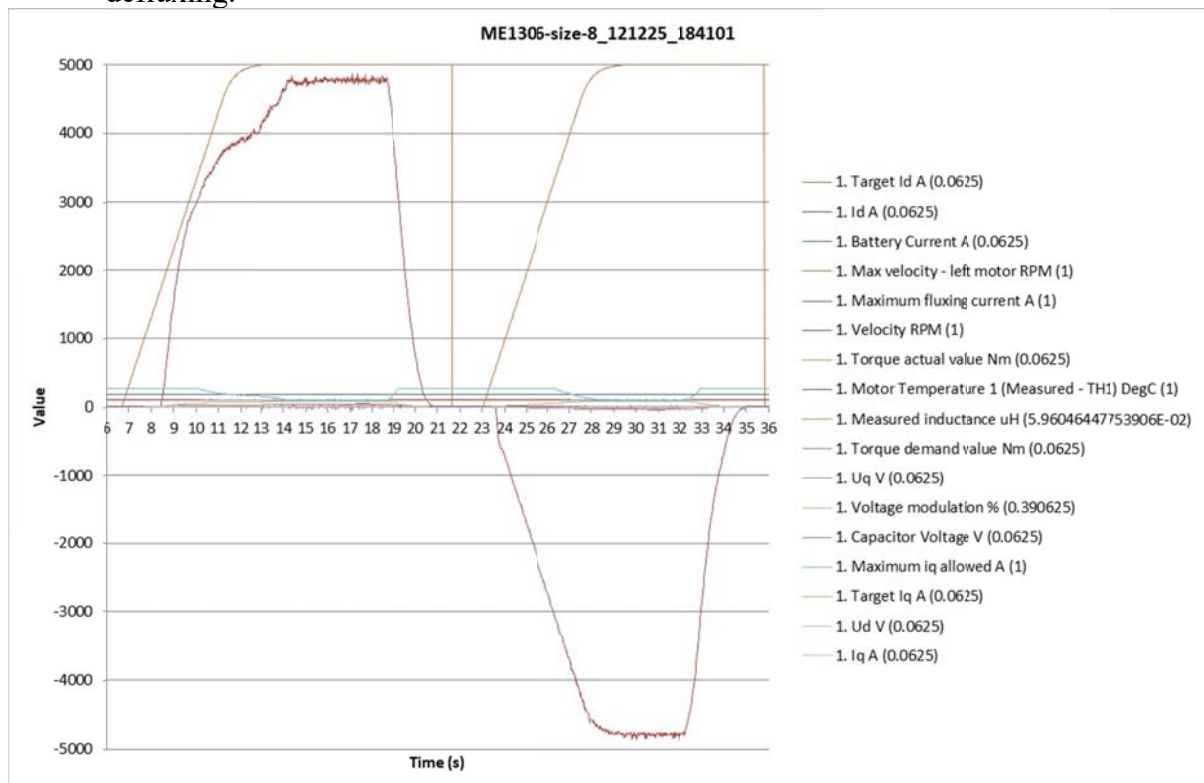
Log Directory: ..\..\common\veh_if_log ... Filename: ME1306-size-8 Log Viewer: Open sheet

☐ Save main settings in trace ☒ Increment file name (date/time)

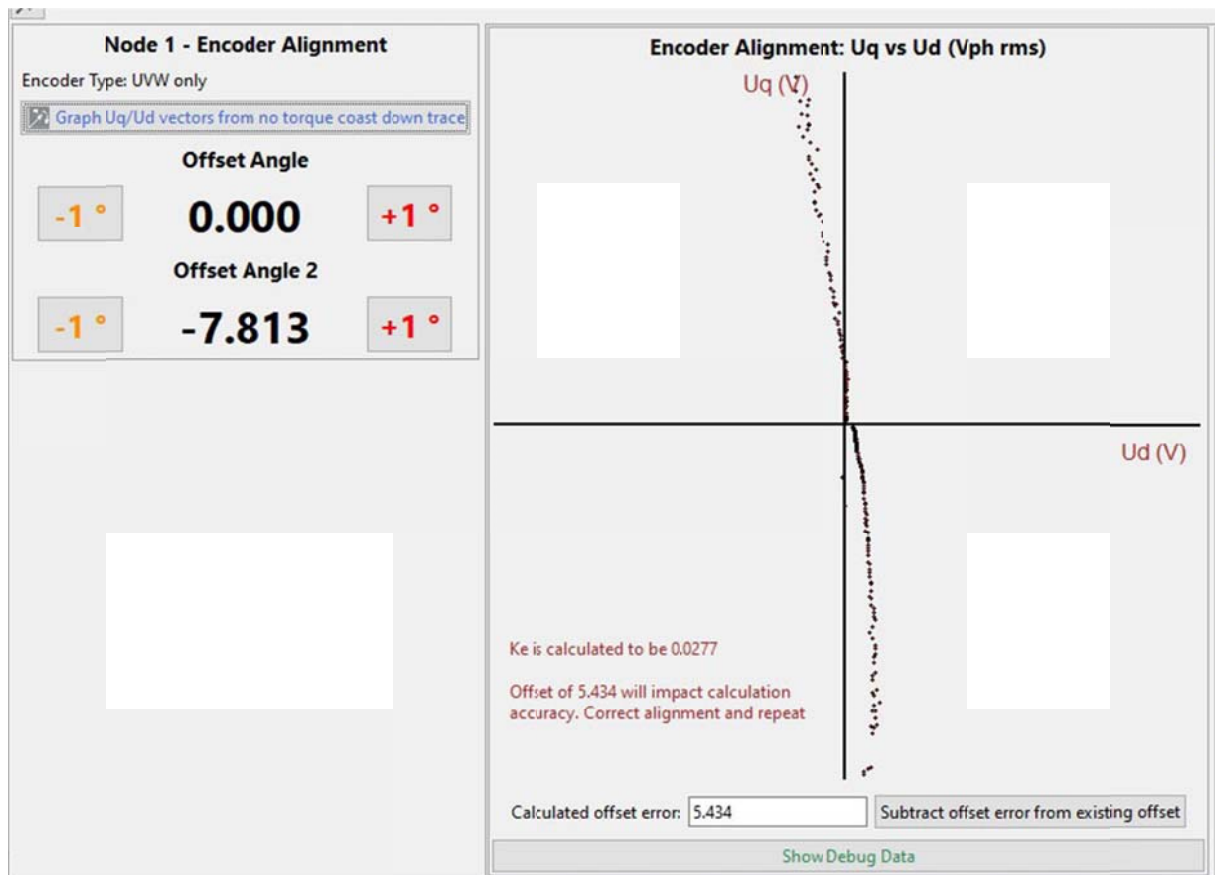
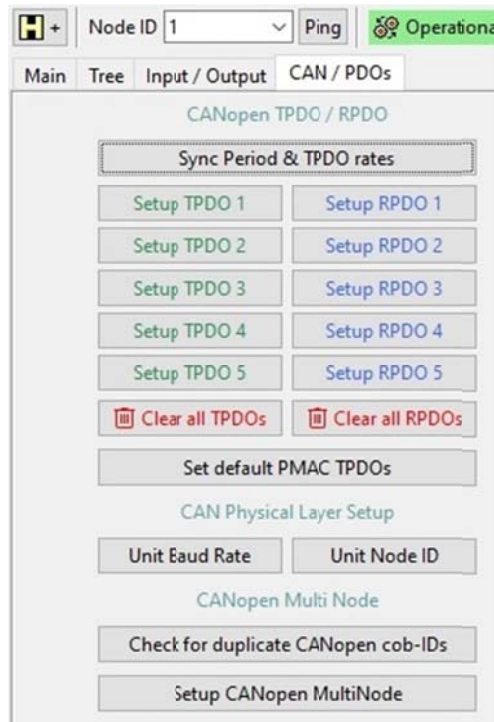
- Checking the cut-off thresholds of the 96V lead battery **from 80V to 400V max!**
- **The yellow curve MUST BE OVER the battery fixed value of 300V !**



- « Recycle Power » and relaunch of DVTC. There are no more errors.
- The motor runs FORWARD at +4700 rpm and REVERSE at -4700 rpm with no defluxing.



- “Set Default PMAC TPDOs” and launch a data’s acquisition with 50%, no brake torque, deflux = 0A and +5000 rpm. Nmax = +4250 rpm.



- The encoder is correctly aligned!

- ~~Reduce the “Current control proportional gain (Kp)” from 2.5 to 2.5.~~
- ~~Subtract +0.000. Set $K_e = 0.0291$ instead of 0.0288 and set deflux at 100A.~~
- ~~Set 100% and 5% torques brakes.~~
- ~~Set integral speed gain to 0x0001 and Baseline profile to +/- 4000 rpm.~~
- “Recycle Power” for the configuration to be updated. All is OK !
- In 125 kHz and in "Pre Operational" to save the DCF file: (666 kb, SN0053.30, no error))

2025-12-12-ME1306-SN0053-30-GEN4-Size-8-Config-OK-18h50.dcf

3 Study with an asynchronous FLUX VECTOR motor

4 Bibliography

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- [4] Thierry LEQUEU, « Exemple de câblage du circuit électrique d'un véhicule », www.e-kart.fr/documentation/trucs-astuces/279-exemple-de-cablage-du-circuit-electrique-d-un-kart , consulté le 27 octobre 2025.
- [5] T. LEQUEU, S. JACQUES, « AN-EK016-FR - Utilisation de DVTC pour les variateurs SEVCON GEN4 », consulté le 27 octobre 2025 sur : www.e-kart.fr/documentation/tutoriaux/699-an-ek016-fr-utilisation-de-dvtc-pour-les-variateurs-sevcon-gen4

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