

Technical manual for HP8480

Main battery switch with current monitor.

- + Main switch status output.
- + Battery discharge warning output.
- + Rain light output (setup option).



Date: 2024-04-05\KT

Page 1 of 12

Table of content

1) Product description	3
2) Electric installation	4
2.1) Example 1	4
2.2) Example 2	5
3) Mechanic installation.....	7
4) CAN bus messages	8
4.1) Setup message	8
4.2) Status message.....	9
5) Technical specifications	10
6) Factory calibration of current sensors	11
7) Version history	12

1) Product description.

The main function is a high power battery switch designed for current up to 1000A. The high current is achieved by connecting 9 or 18 (depending on model) Power MOSFET, each specified to handle 250 ampere, transistors in parallel.

Additional features:

- a) A low loss current sensor monitors if the battery is charged or discharged.
Both available as signal on CAN bus, and output for driving "Discharging" warning light.
- b) Low power output for driving "Rain light" (independent of main switch).
- c) Electronic current limit on low power outputs.
Switch Off if current above 10A for more than 1 second.
Automatic reset (switch On) after 20 seconds.
- d) Temperature sensor.
- e) Automatic switch to PowerDown mode after 30 seconds with Main-Switch off.
Only input 1..4 and Light output may be used then HP8480 is in Power down.

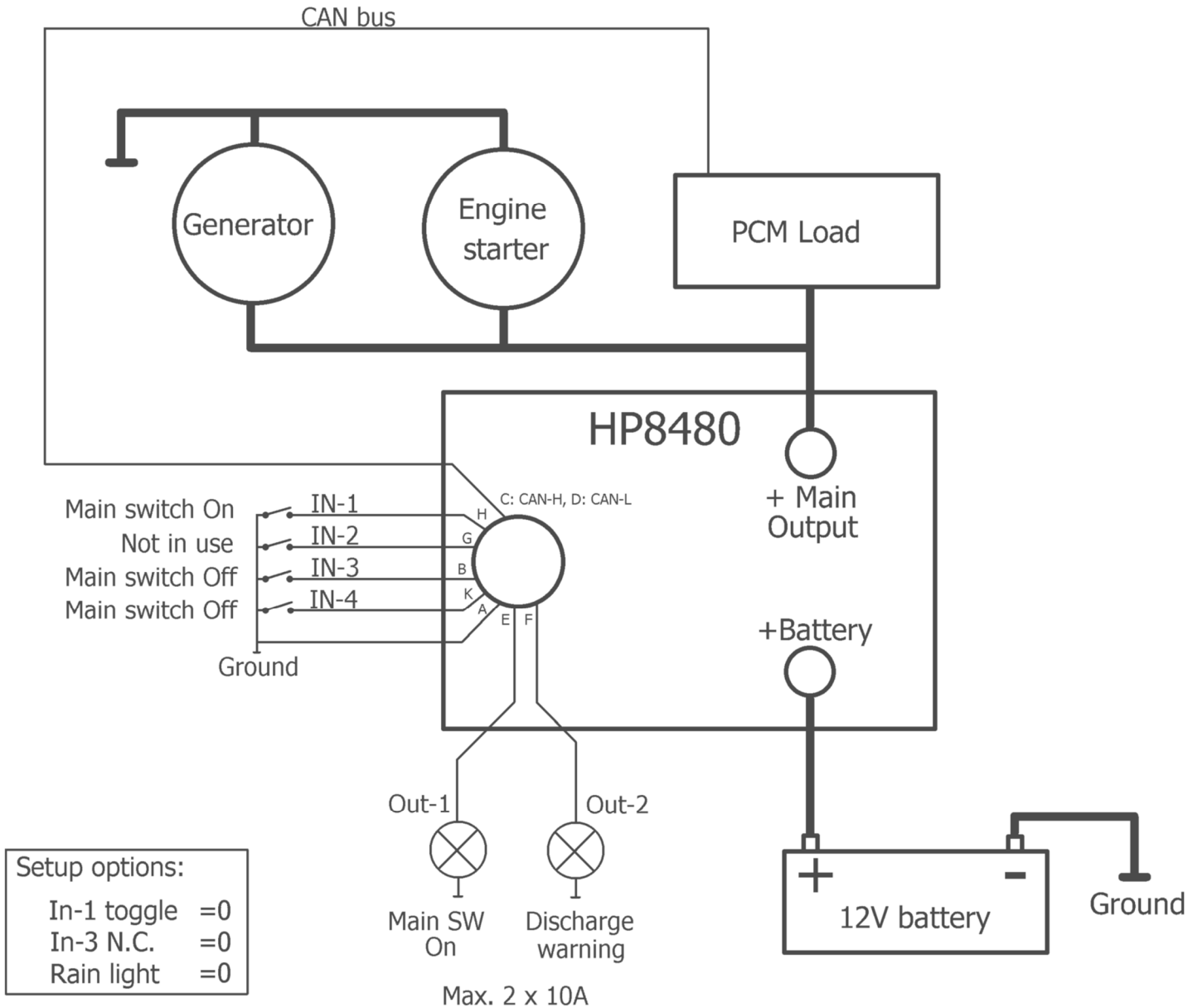
2) Electric installation

Connect battery to M8 bolt terminal marked "+ Battery".

Connect all electric equipment (incl. engine starter, charger) to M8 bolt terminal marked "+ Main Output".

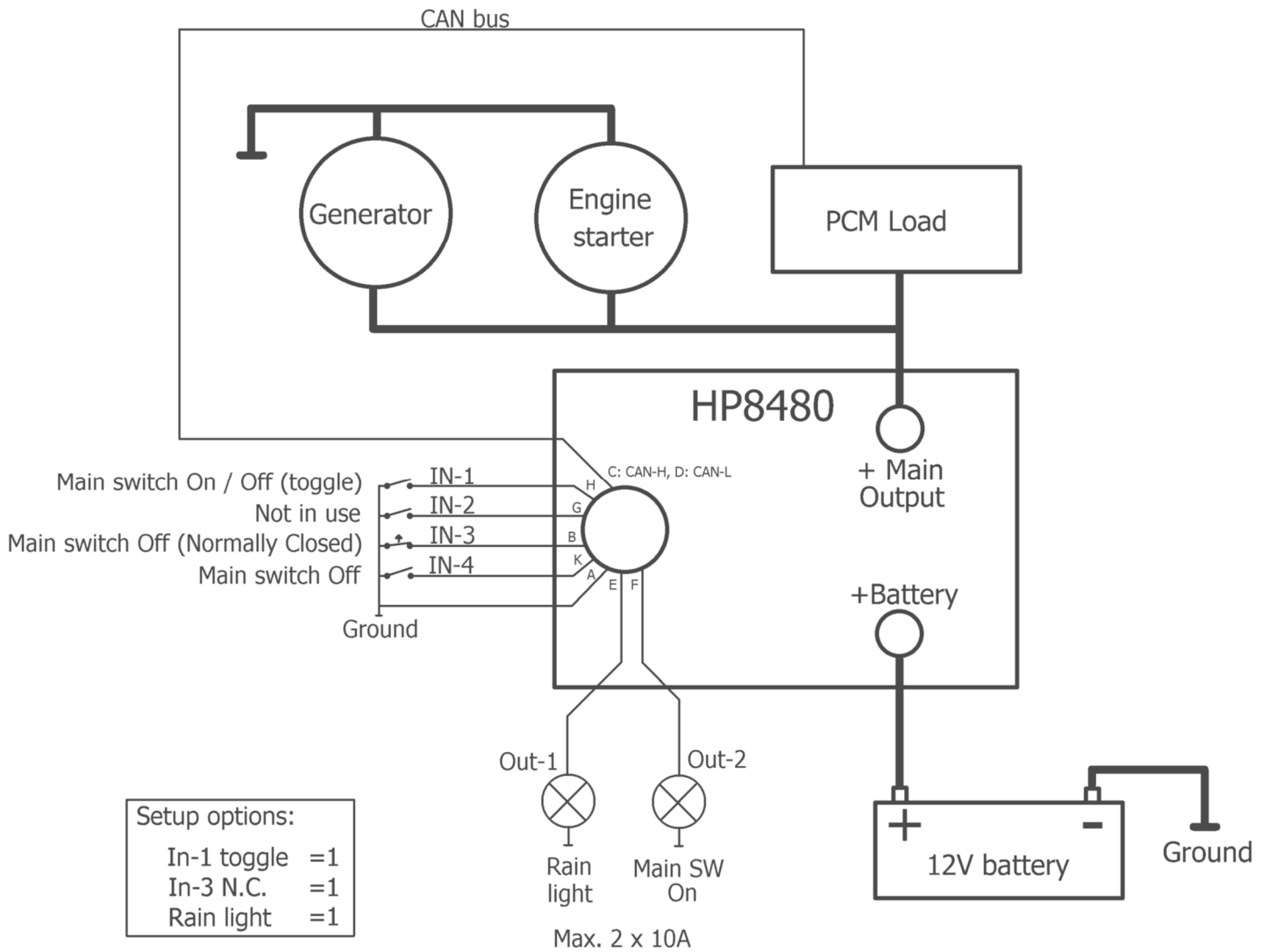
2.1) Example 1

All setup options = 0.



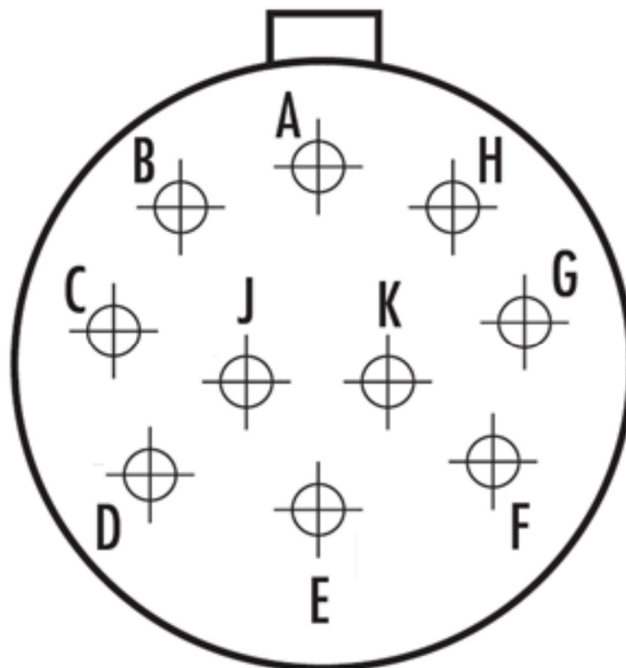
2.2) Example 2

All setup options = 1.



Technical manual for HP8480

Pinout of the 12 pole Auto sport connector	
Pin	Signal
A	Ground (connect to minus pole on battery).
B	IN-3: Input to set Main switch Off (active low).
C	CAN-High.
D	CAN-low (internal terminated with 470R)
E	If Rain light option = 0: Out-1: On when 'Main switch On (not delayed), Max. 10A.
	If Rain light option = 1 Out-1: Rain light output.
F	If Rain light option = 0: Out-2: Discharge warning signal, max. 10A.
	If Rain light option = 1 Out-2: On when 'Main switch On (not delayed), Max. 10A.
G	IN-2: Input to toggle Light output On/Off (active low, internal pull-up resistor).
H	IN-1: Input to set Main switch On (active low, internal pull-up resistor).
J	Data: Serial data signal for maintenance, etc.
K	IN-4: Input to set Main switch Off (active low).



Mating male connector: Male Souriau 8STA6-12-98PN

3) Mechanic installation

Recommended torque for M5	5Nm	(Mounting screws)
Recommended torque for M8 bolts	24Nm	(Main power nuts)

4) CAN bus messages

4.1) Setup message

Fixed CAN-ID= 0xFF0001

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0				Byte order	Bit rate			
1	CAN base ID, Low byte.							
2	CAN base ID, Mid byte 1.							
3	CAN base ID, Mid byte 2.							
4	CAN base ID, High byte							
5	Current threshold for detecting charging / discharging.							
6	Not used (set to 0).				Rain light	Short delay	In-3 N.C.	In-1 toggle
7	Not used (set to 0).							

Bit rate 1= 1MBit, 2= 500 Kbit, 3= 250 KBit. Default= 1 (1Mbit)

Byte order 0= Low-byte / High-byte, 1= High-byte / Low-byte. Default= 0.

Current threshold Default= 10 (1 Amp).

In-1 toggle Input 1 toggle Main switch On / Off.

In-3 N.C. Logic for In-3 emergency switch inverted.
Main switch Off if not connected to GND (for normally closed switch).

Short delay Delay before switching Main off reduced from 2 sec. to 300ms.

Rain light 0= No Rain light output: Out1= Main switch status, Out2= Discharge status.
1= Rain light output: Out1= Rain light output, Out2= Main switch status.

4.2) Status message

Automatic send each second.

CAN-ID= CAN base ID + 0. Default= 0x480

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Status bits – se details below.							
1	Battery current [100mA] (signed value) Positive value for charging, and negative value for discharging battery.							
2								
3	Battery voltage [mV] (unsigned value).							
4								
5	Current drawn from Safety light output [100mA] (unsigned value).							
6	Current drawn from Discharge warning output [100mA] (unsigned value).							
7	Temperature [degree] (signed value).							

Status bit 0	Main switch status: 0= Off, 1= On.
Status bit 1	Discharging status: 1= More than current threshold drawn from battery (default 1A).
Status bit 2	Charging status: 1= Charge current above current threshold (default 1A).
Status bit 3	Light switch status: 0= Off, 1= On.
Status bit 4	Discharge warning output status: 0= Off, 1= On.
Status bit 5	Temperature warning: 1= Temperature above 80 degree.
Status bit 6	Temperature high: 1= Temperature above 110 degree.
Status bit 7	Not in use, set to 0.

For firmware version below 1.4, Status message is sent each second (=1Hz).

For firmware version 1.4 and above, Status message is sent each 100ms (=10Hz).

Note: This message is not send when HP8480 is in Power-Down mode.

5) Technical specifications

Power supply	7..18VDC (connected to 12V battery).	
Supply current, active	< 60mA	
Supply current, power down	< 6mA (entered after 30 seconds with Main Switch Off).	
Main switch voltage drop @20A	<3mV (18 PMOS version) <5mV (9 PMOS version)	
Current accuracy, Main switch (< 45A)	+/- 0,3A	+/-2%
Current accuracy, Main switch (> 45A)	+/- 1,0A	+/-20%
Current accuracy, Safety light output	+/- 0,1A	+/-5%
Battery voltage accuracy	+/-50mA	+/-1%
Temperature accuracy	+/- 0,5 degree @25 degree. +/- 1 degree from -10 to 85 degree. +/- 2 degree from -10 to 125 degree.	

6) Factory calibration of current sensors

Required equipment:

- a) Power source able to deliver 12V / 20 ampere.
- b) 20 Ampere load for Main-switch current.
- c) 5 Ampere load for Low current outputs.
- d) Serial data interface.
- e) PC running KTTerm.exe + osID.h file for HP8480.

Calibration sequence:

- a) Connect +12V to HP8480.
- b) Connect serial data interface + start KTTerm on PC + load osID.h file for HP8480.
- c) Check data connected: Press "SW version".
- d) Select: Task=MAIN(00) Event= CALIBRATE (09).
- e) Connect 20Amp load to "+ Main output"
- f) Calibrate main current sensor: Press "Send"
- g) Connect 5 Amp load to Out-1 (Light output)
- h) Wait 1 sec.
- i) Calibrate current sensor on Out-1: Press "Send"
- j) Connect 5 Amp load to Out-2
- k) Wait 1 sec.
- l) Calibrate current sensor on Out-2: Press "Send"

Note:

- a) If Main switch is off, does the HP8480 automatic switch to Power-down mode after 30 seconds.
- b) Calibrating HP8480 is not possible in PowerDown mode.

7) Version history

Ver	Date	Change note
1.4	2021-03-14	Interval between sending Status message (default CAN ID= 0x480) changed from 1 second (1Hz) to 100ms (10Hz)
1.5	2023-12-13	Switching Main output Off delayed 2 seconds. Out-1 changed: Now On when Main switch On (before new delay timer).
1.6	2024-04-01	4 setup options added: Input 1 toggle Main switch On / Off. Logic for In-3 emergency switch inverted. Delay before switch off Main switch reduced to 300ms. Rain light option (switch signal on Out-1 and Out-2).