

			released. 2. Set throttle model as "Hall Active" throttle in GUI if you use that throttle model.
3,1	□□□ □	Frequent reset	May be caused by over-voltage, bad motor intermittent earthing problem, bad wiring, etc.
3,2	□□□ □□	Internal reset	May be caused by some transient fault condition like a temporary over-current, momentarily high or low battery voltage. This can happen during normal operation.
3,3	□□□ □□□	Hall throttle is open or short-circuit	When the throttle is repaired, a restart will clear the fault.
3,4	□□□ □□□□	Non-zero throttle on direction change	Controller won't allow a direction change unless the throttle or speed is at zero. Fault clears when throttle is released.
4,1	□□□□ □	Regen or Start-up over-voltage	Motor drive is disabled if an over-voltage is detected at start-up or during regen. The voltage threshold detection level is set during configuration.
4, 2	□□□□ □□	Hall sensor error	1. Incorrect or loose wiring or a damaged hall sensor. 2. Also be caused by incorrect hall angle configuration (60 degree or 120 degree).
4, 3	□□□□ □□□	Motor over-temperature	Motor temperature has exceeded the configured maximum. The controller will shut down until the motor temperature cools down.
The Red LED flashes once at power on as a confidence check and then normally stays Off. "1, 2" means the Red flashes once and after a second pause, flashes twice. The pause time between multiple flash code groups is two seconds.			

Table 2: KHB/HP Controller CAN Commands List

Version 1.1

You should specify when sending:

ID: Our default ID is 0x6B, so only the data frame with ID 107 can be received by our controller. However, it can be set by configuration program.

Frame type: data frame

Frame format: standard 11 bits ID

Length: the number of data field bytes

Data field: data[0] is the command which indicates the operation.

Controller response:

ID: The controller sends data frames with ID 115, 0x73. It also can be set by configuration program.

Frame type: data frame

Length: the number of data field bytes

Data field: The controller sends one or two data frames in response.

Commands definitions

Command **CCP_FLASH_READ**

Length 3

data[0] 0xF2

data[1] INFO_MODULE_NAME

data[2] 8

Controller response

Length 8

data[0]~data[7] Controller's model in ASCII format, 8 bytes.

Description: Getting controller's model no. E.g. 0x4B,0x42,0x4C is 'K' , 'B', 'L', 0x30 is '0' .
INFO_MODULE_NAME constant is defined as 64.

Command **CCP_FLASH_READ**

Length 3

data[0] 0xF2

data[1] INFO_SOFTWARE_VER

data[2] 2

Controller response

Length 2

data[0]~data[1] software version in BCD alike format, two bytes.

Description: Getting controller's software version, it also define as the controller's version, BCD alike format storage. E.g. 0x0A,0x01 should be parsed to ASCII characters '0' 'A' '0' '1' as the software version. INFO_SOFTWARE_VER constant is defined as 83.

Command **CCP_FLASH_READ**

Length 3

data[0] 0xF2

data[1] CAL_TPS_DEAD_ZONE_LOW

data[2] 1

Controller response

Length 1

data[0] TPS_Dead_Zone_Low

Description: Getting controller's Throttle low-end dead zone. CAL_TPS_DEAD_ZONE_LOW constant is defined as 4.

Command **CCP_FLASH_READ**
 Length 3
 data[0] 0xF2
 data[1] CAL_BRAKE_DEAD_ZONE_LOW
 data[2] 1
 Controller response
 Length 1
 data[0] Brake_Dead_Zone_Low

Description: Getting controller's Brake low-end dead zone. CAL_BRAKE_DEAD_ZONE_LOW constant is defined as 5.

Command **CCP_FLASH_READ**
 Length 3
 data[0] 0xF2
 data[1] CAL_TPS_DEAD_ZONE_HIGH
 data[2] 1
 Controller response
 Length 1
 data[0] TPS_Dead_Zone_High

Description: Getting controller's Throttle high-end dead zone. CAL_TPS_DEAD_ZONE_HIGH constant is defined as 38.

Command **CCP_FLASH_READ**
 Length 3
 data[0] 0xF2
 data[1] CAL_BRAKE_DEAD_ZONE_HIGH
 data[2] 1
 Controller response
 Length 1
 data[0] Brake_Dead_Zone_High

Description: Getting controller's Brake high-end dead zone. CAL_BRAKE_DEAD_ZONE_HIGH constant is defined as 39.

Command **CCP_A2D_BATCH_READ1**
 Length 1
 data[0] 0x1b
 Controller response
 Length 5
 data[0] Brake A/D
 data[1] TPS A/D
 data[2] Operation voltage A/D
 data[3] Vs A/D
 data[4] B+ A/D

Description: Data batch reading.

- 1) For operation voltage, B+, A/D value and voltage mapping relation is:
 $V = V_{ad} / 1.84$. (For 120V controller).
 $V = V_{ad} / 1.39$. (For 144V controller).
- 2) Vs is defined as the 5V power supply for Hall sensor, control panel, ect. A/D value and voltage mapping relation is: 120 ~ 134 mapping to 4.75 ~ 5.25V.
- 3) Brake and TPS are defined as the Brake and the Throttle analog input. A/D value and voltage mapping relation is: 0 ~ 255 mapping to 0 ~ 5V.

Command CCP_A2D_BATCH_READ2

Length 1

data[0] 0x1a

Controller response

Length 6

data[0] Ia A/D

data[1] Ib A/D

data[2] Ic A/D

data[3] Va A/D

data[4] Vb A/D

data[5] Vc A/D

Description: Data batch reading.

- 1) For Va, Vb, Vc, A/D value and voltage mapping relation is:
 $V = V_{ad} / 1.84$. (For 120V controller).
 $V = V_{ad} / 1.39$. (For 144V controller).
- 2) Ia, Ib and Ic are defined as the three phase current.

Command CCP_MONITOR1

Length 1

data[0] 0x33

Controller response

Length 6

data[0] PWM

data[1] enable motor rotation

data[2] motor temperature

data[3] Controller's temperature

data[4] temperature of high side FETMOS heat sink

data[5] temperature of low side FETMOS heat sink

Description: Data batch reading.

- 1) PWM is output duty cycle, from 0 to 100.
- 2) data[1] indicates enabling motor rotation or disabling. 1 - enable, 0 - disable.
- 3) data[2] is defined as the temperature of motor in Celsius temperature. If the temperature sensor is not connected, the controller returns 0xFF.
- 4) data[3]-data[5] are defined as controller inside temperature in Celsius temperature. The value of data[4] and data[5] are inaccurate below 30°C.

Command CCP_MONITOR2

Length 1

data[0] 0x37

Controller response

Length 5

data[0] MSB of mechanical speed in RPM

data[1] LSB of mechanical speed in RPM

data[2] present current accounts for percent of the rated current of controller

data[3] MSB of error code

data[4] LSB of error code

Description: Data batch reading.

- 1) Mechanical speed calculation: $(data[3] \ll 8) \mid data[4]$. If the speed out data is not match the real speed value, please configure the motor poles calibration data of the controller based on the driven motor.
- 2) Controller error status: $(data[3] \ll 8) \mid data[4]$,

data[3]M	7	6	5	4	3	2	1	0	data[3]L
	0x44	0x43	0x42	0x41	0x34	0x33	0x32	0x31	
data[4]M	7	6	5	4	3	2	1	0	data[4]L
	0x24	0x23	0x22	0x21	0x14	0x13	0x12	0x11	

if(data[3] << 8) | data[4]=0x4008, The corresponding error code is 0x43 and 0x14.

Command **COM_SW_ACC**
 Length 2
 data[0] 0x42
 data[0] COM_READING
 Controller response
 Length 1
 data[0] Current throttle switch status
 Description: Getting Throttle switch status, 1 – active, 0 – inactive. COM_READING constant is defined as 0.

Command **COM_SW_BRK**
 Length 2
 data[0] 0x43
 data[0] COM_READING
 Controller response
 Length 1
 data[0] Current Brake switch status
 Description: Getting Brake switch status, 1 – active, 0 – inactive. COM_READING constant is defined as 0.

Command **COM_SW_REV**
 Length 2
 data[0] 0x44
 data[0] COM_READING
 Controller response
 Length 1
 data[0] Current Reverse switch status
 Description: Getting Reverse switch status, 1 – active, 0 – inactive. COM_READING constant is defined as 0.

NOTICE:

1. CAN bus rate should be configured to 1Mbit/s.

2. If the command is out of above commands

Controller response

Length 1

data[0] CCP_INVALID_COMMAND

Description: CCP_INVALID_COMMAND constant is defined as 0xe3.

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