CAN Frames for controlling the iWheel

CAN configuration
CAN Bus speed: **1MBps**
Sample point: **62.5%** of a bit time.

Setpoints: write commands

	CAN Frame ID (dec)	Data								Period (ms)
		B0	B1	B2	B3	B4	B5	B6	B7	
LEFT	266	Left Motor Setpoint Type	Left Speed Setpoint MSB (int16s, mm/s)	Left Speed Setpoint LSB (int16s, mm/s)	Left Current Setpoint MSB (int16s, mA)	Left Current Setpoint LSB (int16s, mA)				**less than 1s**
RIGHT	298	Right Motor Setpoint Type	Right Speed Setpoint MSB (int16s, mm/s)	Right Speed Setpoint LSB (int16s, mm/s)	Right Current Setpoint MSB (int16s, mA)	Right Current Setpoint LSB (int16s, mA)				**less than 1s**

Important notes

- Setpoint frames (write commands) must be sent periodically at a frequency higher than 1 frame/second. There is a 1 second timeout that make the motor stops if no more frames are sent.
- Range for current Setpoint is +/- 2000mA
- We consider an approximately 192mm radius wheel for speed setpoint.

Variables: read commands

Motor

	CAN Frame ID (dec)	Data								Period (ms)
		B0	B1	B2	B3	B4	B5	B6	B7	
LEFT	256	Speed MSB (int16s, **RPM**)	Speed LSB (int16s, **RPM**)	**Accel.MSB (int16s, ???)**	**Accel.LSB (int16s, ???)**					4
	257	Battery Voltage (int8u, dV)	Controller Temperature (int8u, ºC)	Odometry Ticks MSB (int32s)	Odometry Ticks (int32s)	Odometry Ticks (int32s)	Odometry Ticks LSB (int32s)	CPU Usage (int8u, %)		40
RIGHT	288	Speed MSB (int16s, **RPM**)	Speed LSB (int16s, **RPM**)	**Accel.MSB (int16s, ???)**	**Accel.LSB (int16s, ???)**					4
	289	Battery Voltage (int8u, dV)	Controller Temperature (int8u, ºC)	Odometry Ticks MSB (int32s)	Odometry Ticks (int32s)	Odometry Ticks (int32s)	Odometry Ticks LSB (int32s)	CPU Usage (int8u, %)		40
	290	Estimated Pose X (int16s, mm)	Estimated Pose X (int16s, mm)	Estimated Pose Y (int16s, mm)	Estimated Pose Y (int16s, mm)	Estimated Pose Z (int16s, mm)	Estimated Pose Z (int16s, mm)	Estimated Pose PSI (int16s, mrad)	Estimated Pose PSI (int16s, mrad)	40

- Odometry: 60 ticks/rotor revolution
- **The unit for speed is revolutions per minute (RPM)**
- We consider an approximately 192mm radius wheel for pose estimation.

Normal force sensor

	CAN Frame ID (dec)	Data								Period (ms)	
		B0	B1	B2	B3	B4	B5	B6	B7		
LEFT	512	Force N MSB (int16s, cN) (1Kg=9.8N)	Force N LSB (int16s, cN) (1Kg=9.8N)	Debugging (not important)	Debugging (not important)					50	
	513	Offset N MSB (int 16s dN)	Offset N LSB (int 16s dN)							1000	Only during first 60 secons
RIGHT	544	Force N MSB (int16s, dN) (1Kg=9.8N)	Force N LSB (int16s, dN) (1Kg=9.8N)	Debugging (not important)	Debugging (not important)					50	
	545	Offset N MSB (int 16s dN)	Offset N LSB (int 16s dN)							1000	Only during first 60 secons

- Frames 513 and 545 refer to the offset for normal force on left and right wheel respectively. The offset is just the mean value of the normal force on the startup (while no force applied) so if you subtract the offset from the normal force while no force is applied you obtain 0. Then, you will obtain the force applied to the shaft always subtracting the offset.

   REMEMBER: The offset value only has sense if you don't apply any force to the shaft during the first two seconds from startup.