Sinusoidal Wave Controller KLS Broadcast CAN Protocol 1.1

1．Communication Criterion

CAN Bus Rate：250Kbps

The specifications of Data Link Layer is mainly based on CAN2.0B and SAE J1939 Protocol.

We use 29-bit identifier of extension CAN frame and redefine them,here is the assignation table for 29-bit identifier：

PDU：Protocol Data Unit.It includes extension format ID of 29-bit identifier and data field，of which ID7-0 maps SA，ID15-8 maps PS，ID23-16 maps PF，ID24 maps DP，ID25 maps R，ID28-26 maps P.

Definition：P-Priority，R-Reservation，DP-Data Page，PF-PDU Format，PS-PDU Specific，SA-Source Address

The definition of PS is decided by PF,if PF is 0-239,PS is for Destination Address DA;if PF is 240-255,PS contains Group Extension Value GE.

IDENTIFIER 11BITS										S R R	I D E	IDENTIFIER EXTENSION 18BITS																	
PRIORITY			R	DP	PDU FORMAT(PF)						S R R	I D E	PF		PDU SPECIFIC(PS)								SOURCE ADDRESS(SA)							
3	2	1	1	1	8	7	6	5	4	3			2	1	8	7	6	5	4	3	2	1	8	7	6	5	4	3	2	1
28	27	26	25	24	23	22	21	20	19	18			17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

2.Message 1

OUT	IN	ID（0x0CF11E05）						Period(ms)
controller	instrument	**P**	**R**	**DP**	**PF**	**PS**	**SA**	50
		3	0	0	241	30	05	
Data								
1	LSB of speed in RPM	Actual speed(RPM) =（（MSB*256）＋LSB）, 1rpm/bit;						
2	MSB of speed in RPM	Range ：0-6000，maps actual mechanical speed 0-6000rpm;						
3	LSB of motor current	Actual current =（（MSB*256）＋LSB）/ 10, 0.1A/bit;						
4	MSB of motor current	Range：0-4000，maps actual current 0-400A;						
5	LSB of battery voltage	Actual voltage =（（MSB*256）＋LSB）/ 10, 0.1V/bit;						
6	MSB of battery voltage	Range ：0-1800，maps actual voltage 0-180V;						
7	LSB of error code	**BIT7**	**BIT6**	**BIT5**	**BIT4**	**BIT3**	**BIT2**	**BIT1**	**BIT0**
		ERR 7	ERR 6	ERR 5	ERR 4	ERR 3	ERR 2	ERR 1	ERR 0
8	MSB of error code	**BIT7**	**BIT6**	**BIT5**	**BIT4**	**BIT3**	**BIT2**	**BIT1**	**BIT0**
		ERR 15	ERR 14	ERR 13	ERR12	ERR 11	ERR 10	ERR 9	ERR 8
Position of Error code	**Name**	**Description**						
ERR0	Identification error	The operation of Identification Angle failed.Please try to do it again according to the instruction of how to use Identification function from our website.It can be downloaded by free.						
ERR1	Over voltage	1．Battery voltage is too high for the controller.Check battery volts and configuration.						
ERR2	Low voltage	1．Check battery volts and configuration. 2．Battery voltage is too low for the controller.Battery voltage is lower than the Under voltage setting. 3. Charge the battery if necessary.						
ERR3	reserved							
ERR4	stall	The motor still can't provide speed feedback after controller outputs command for 2 seconds.It						

		could be related with the problem of speed sensors or phase wires.
ERR5	Internal volts fault	1. Measure that B+ & PWR are correct when measured to B- or RTN. 2. There may be excessive load on the +5V supply caused by too low a value of Regen or throttle potentiometers or incorrect wiring. 3. Controller is damaged. Contact Kelly for warranty repairing.
ERR6	Over temperature	1. The controller temperature has exceeded 100℃. The controller will be stopped but will restart when temperature falls below 80℃.
ERR7	Throttle error at power-up	1. This error code will be trigger when there is a valid throttle signal above TPS Low setting after Power up.In other words,the initial output of throttle pot or hall throttle is above throttle Effective starting position setting in the user program or Android App.TPS Low is the same as Throttle effective starting position setting.Please try to configure the throttle effective starting Position or disable foot switch again in user program or Android App. 1. Throttle signal is higher than the preset 'dead zone' at Power On. Fault clears when throttle is released. 2. Please use Kelly's user program to set up the right pedal type if you use "hall"pedal.
ERR8	Reserved	
ERR9	Internal reset	1. 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.
ERR10	Hall throttle is open or short-circuit	1. Please check if the throttle pedal has a short-circuit or open circuit. 2. When the throttle is repaired, a restart will clear the fault.
ERR11	Angle sensor error	1.Speed sensor type error，customers may set the correct sensor type through user program or App. Please download how to use Identification function instruction from our website. 2.Incorrect wiring.

		3.Speed sensor is damaged or defective.Or feedback signal is erratic.						
ERR12	Reserved							
ERR13	Reserved							
ERR14	Motor over-temperature	1. Motor temperature has exceeded the configured maximum,the controller will shut down until the motor temperature cools down. 2. Can change motor max temperature through user program.						
ERR15	Hall Galvanometer sensor error	1. Hall galvanometer device is damaged inside the controller. 2. This error code is only valid for KLS-8080I controller.						

3. Message 2

OUT	IN	ID（0x0CF11F05）						Period(ms)
controller	instrument	**P**	**R**	**DP**	**PF**	**PS**	**SA**	50
		3	0	0	241	31	05	
Data								
1	Throttle signal	0~255 maps 0~5V.						
2	Controller temperature	Offset:40，actual temperature = controller temperature - 40, 1℃/bit;						
3	Motor temperature	Offset:30，actual temperature = controller temperature - 30, 1℃/bit;						
4	Reserved							
5	Status of Controller	**BIT7**	**BIT6**	**BIT5**	**BIT4**	**BIT3** **BIT2**		**BIT1** **BIT0**
		Reserved	Reserved	Reserved	Reserved	Status of feedback： 0:stationary，		Status of command： 0 Neutral，

#	Name		1:forward 2:backward， 3:reserved		1:forward 2:backward， 3:reserved	
		BIT7	**BIT6**	**BIT5**	**BIT4**	**BIT3**	**BIT2**	**BIT1**	**BIT0**
6	Status of Switch Signals	Boost switch	Foot switch	Forward switch	Backward switch	12V brake switch	Hall C	Hall B	Hall A
7	Reserved								
8	Reserved								