EM5P1 electromechanical PTO

BICT project

extCAN signals definition ver.1.1

extCAN signal definitions

Message received by BCI (Rx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF00FE	0x0FF00	EM5P1_BB_requests_1	100	100	6	Cyclic	0	0	00	0xFE		Prop

SPN label	Byte	Bit	Length	State	Resolution	Offset	Operating range Data range	Unit	Note
Pump_max_speed	0	0	16		1.0	0.0	0 - 3800	rpm	Int32
Pump_max_torque	2	0	16		1.0	0.0	0 - 530	Nm*	Int32
Mode_Pressure	4	0	1		1.0	0.0	0 - 1	Dimensionless	Boolean
Inactive				0x00					
Active				0x01					
Mode_Speed	4	1	1		1.0	0.0	0 - 1	Dimensionless	Boolean
Inactive				0x00					
Active				0x01					
Mode_eLoadSensing	4	2	1		1.0	0.0	0-1	Dimensionless	Boolean
Inactive				0x00					
Active				0x01					
Pump_rot_direction	4	3	1		1.0	0.0	0 - 1	Dimensionless	Boolean
Clockwise				0x00				Right Pump rotation	
Counterclockwise				0x01				Left Pump rotation	

* sent "Dimensionless" in the CAN message   ** sent via BICT as CAN message to EM5P1

extCAN signal definitions

Message received by BCI (Rx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF00FE	0x0FF00	EM5P1_BB_requests_1	100	100	6	Cyclic	0	0	00	0xFE		Prop

CAN messages used by bodywork ECU(s) to setup parameters and control requests via the BICT file to the EM5P1 ECU (IQAN). To be used by bodybuilders that uses External bodywork CAN bus!

Pump_max_speed: Max speed which the hydraulic pump can handle OR if the flow in the system needs to be maximized for whatever reason. (3800 rpm is Max available speed)

Pump_max_torque: Max torque (pressure) which the hydraulic pump can handle OR if the flow in the system needs to be maximized for whatever reason. (530Nm is electric motor limit)*.

Mode_Pressure/Speed/eLS: Which mode that is used for the EM5P1 PTO *.

Pump_rot_direction: Which rotation direction the pump will spin. Clockwise/counterclockwise is hydraulic pump rotation direction (electric motor will rotate in opposite direction!)*.

Every value in parameter outside of "operating range" will result in an error and electric motor will stop its operation.

* sent "Dimensionless" in the CAN message   ** sent via BICT as CAN message to EM5P1

extCAN signal definitions

Message received by BCI (Rx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF01FE	0x0FF01	EM5P1_BB_requests_2	100	100	6	Cyclic	0	0	01	0xFE		Prop

SPN label	Byte	Bit	Length	State	Resolution	Offset	Operating range Data range	Unit	Note
Pump_speed_slope	0	0	16		1.0	0.0	0 – 1000	rpm/100ms	Int32
Pump_torque_slope	2	0	16		1.0	0.0	0 – 1000	Nm/100ms	Int32
Pump_size	4	0	16		1.0	0.0	10000 - 250000	mm3	Int32
Delta_pressure_eLS	6	0	16		1.0	0.0	0 – 100	bar	Int32

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extCAN signal definitions

Message received by BCI (Rx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF01FE	0x0FF01	EM5P1_BB_requests_2	100	100	6	Cyclic	0	0	01	0xFE		Prop

CAN messages used by bodywork ECU(s) to setup parameters and control requests via the BICT file to the EM5P1 ECU (IQAN). To be used by bodybuilders that uses External bodywork CAN bus!

Pump_speed_slope: Maximal rpm change that the hydraulic pump can handle, in rpm/100ms. 1000 in this parameter means rpm change of 10´000 rpm per second*. Hydraulic pump information is needed for this parameter.

Pump_torque_slope: : Maximal torque change that the hydraulic pump can handle, in Nm/100ms. 50 in this parameter means a change of 500 Nm per second on the electric motor*. Hydraulic pump information is needed for this parameter.

Pump_size: This parameter is the hydraulic pump size in mm3. A value of 250´000 means a pump size of 250cm3*.

Delta_pressure_eLS: This is the desired differential pressure in a Load Sensing system (eLS)*.

Every value in parameter outside of "operating range" will result in an error and electric motor will stop its operation.

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extCAN signal definitions

Message received by BCI (Rx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF02FE	0x0FF02	EM5P1_BB_req_cmd	100	100	6	Cyclic	0	0	02	0xFE		Prop

SPN label	Byte	Bit	Length	State	Resolution	Offset	Operating range Data range	Unit	Note
Speed_cmd	0	0	16		1.0	0.0	0 – 3800	rpm	Int32
Torque_cmd	2	0	16		1.0	0.0	0 - 530	Nm	Int32
Request_oil	4	0	1		1.0	0.0	0 - 1	On/Off	Boolean
Off				0x00					
On				0x01					

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extCAN signal definitions

Message received by BCI (Rx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF02FE	0x0FF02	**EM5P1_BB_req_cmd**	100	100	6	Cyclic	0	0	02	0xFE		Prop

CAN messages used by bodywork ECU(s) to setup parameters and control requests via the BICT file to the EM5P1 ECU (IQAN). To be used by bodybuilders that uses External bodywork CAN bus!

Speed_cmd: Desired speed of the hydraulic pump when running in "Speed mode". The speed command should NOT be higher than the hydraulic system or hydraulic pump can withstand. Every command outside of "operating range" will result in an error and electric motor will seize of operation.
Torque_cmd: Desired torque (pressure) of the hydraulic pump when running in "Torque mode"*. The torque (pressure) command should NOT be higher than the hydraulic system or hydraulic pump can withstand. Every command outside of "operating range" will result in an error and electric motor will seize of operation.
Request_oil: When this parameter is active ("1"), the electrical machine will be activated in commanded mode and requested speed/torque or start the eLS function*.

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extCAN signal definitions

Message sent by BCI (Tx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF002E	0x0FF00	EM5P1_signals	100	100	6	Cyclic	0	0	00	0x2E		Prop

SPN label	Byte	Bit	Length	State	Resolution	Offset	Operating range Data range	Unit	Note
Actual_speed	0	0	16		1.0	0.0	0 - 3800	rpm	Int32
Actual_torque	2	0	16		1.0	0.0	0 – 530	Nm*	Int32
EM5P1_error	4	0	1		1.0	0.0	0-1	Dimensionless	Boolean
Inactive				0x00					
Active				0x01					
Mode_Pressure	4	1	1		1.0	0.0	0-1	Dimensionless	Boolean
Inactive				0x00					
Active				0x01					
Mode_Speed	4	2	1		1.0	0.0	0-1	Dimensionless	Boolean
Inactive				0x00					
Active				0x01					
Mode_eLoadSensing	4	3	1		1.0	0.0	0-1	Dimensionless	Boolean
Inactive				0x00					
Active				0x01					

* received "Dimensionless" in the CAN message   ** sent via BICT as CAN message to External CAN bus

extCAN signal definitions

Message sent by BCI (Tx)**

Identifier	PGN	PGN label	Tmin	Tmax	Default Priority	Message Type	DPext	DP	Group Extension	Source	Destination	Standard/ proprietary
18FF002E	0x0FF00	EM5P1_signals	100	100	6	Cyclic	0	0	00	0x2E		Prop

Actual_speed: Feedback from electric motor of real measured actual speed

Actual_torque: Feedback from electric motor of real measured actual torque on the motor

Mode_NotAvailable: See available error modes below, become true ("1") when one or more errors are active. Electric motor will not run in this case.

Mode_Pressure/Speed/ELoadSensing: Status feedback signal that the mode request is acknowledged.

Any of below EM5P1 errors activates Bodywork warning in ICL, these errors can be read in IQANgo app

- CAN communication error between Inverter and IQAN ECU

- Pressure sensor error/failure when running in mode eLS

- Start up Error during startup of system

- More than one mode (Speed/Torque/eLS) requested from BICT at the same time

- HVIL Error in EM5P1

- Coolant pump error

- Inverter error

- CAN signal out of range error

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