

MIC6 Configuration Data

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History of changes

Revision	Date	Changes	Author	Status
40579	2019-07-13	Updated the reference to a document (Binary File Transmission).	CK	Draft
0.3	2016-05-30	Add PickupSet and Pre-Trigger voltage speed/voltage curve points Add Pickup 4 (0x04C1) Add Pickup 5 (0x0501) Add Pickup 6 (0x0541) Add Redundancy Enable (0x0021)	Axel Ludszuweit	Draft
0.2	2016-03-24	Add description of GPO2, GPO3 contact type	Axel Ludszuweit	Draft
0.1	2015-10-06	Initial Revision	Axel Ludszuweit	Draft

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Document Management

Persons authorized to make changes

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Tools used for the creation of this document

Tool	Description	Version
LibreOffice	Text processing tool	5.0.2.2

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1 Introduction

For configuration purposes via J1939, Modbus and CANOpen the appropriate parameters should be transmitted via a binary file.

All parameters except fieldbus settings which can be configured via MICT should be settable by configuration via binary file.

These document describes these parameters.

Coding and layout of the binary file is not the scope of this document.

1.1 Purpose of this Document

These document describes the above mentioned parameters sent via binary file by Modbus, J1939 or CANOpen.

1.2 Further Applicable Documents

svn://motdev01.motortech.local/development/projects/98.007.0244/trunk/900-Software/910-Requirements/J1939/MIC6_J1939_BinaryFileTransmission.odt

Description of binary file layout and coding schemes

svn://motdev01.motortech.local/development/projects/98.007.0086/trunk/600-Miscellaneous/Id_value_list.odt

Detailed description of coding schema with variable lengths

1.3 Abbreviations

uint8	8 bit unsigned integer
uint16	16 bit unsigned int
uint32	32 bit unsigned int
uint64	64 bit unsigned int
int8	8 bit signed int
int16	16 bit signed int
int32	32 bit signed int
int64	64 bit signed int
float32	IEEE 754 single precision floating point number (32 bits)
float64	IEEE 754 double precision floating point number (64 bits)
string[xx]	string with length of xx
ID	identifier

2 Description of Parameter File

2.1 Timing

MOTORTECH deals with time as a steady raise physical size, therefore the following convention must be met if timings are configured via ID value lists:

- negative sign means earlier (*before top dead center* or *advance*)
- positive sign means later (*after top dead center* or *retard*)

The MICT used the terminology described in braces.

2.2 Identifier

The ID consists of index and subindex. The subindex is coded into the six least significant bits 5 to 0 with a range from 0 to 0x3F.

The other 10 most significant bits 15 to 6 build the index with a range from 0 to 0x3FF.

The index can be equated as $ID = 64 * Index + Subindex$.

15(MSB)	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0(LSB)
Index										Subindex					

The parameter file is a ID value list, the ID (identifier) defines the meaning of the appropriate value.

2.3 Table of configuration data

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
Configuration General					
0x0002	0x000	0x2	Four Stroke	uint8	

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x0005		0x5	Reset Position	float32	
0x0006		0x6	Ignition Release Speed	uint16	
0x0007		0x7	Security Speed	uint16	
0x0008		0x8	Nominal Speed	uint16	
0x0009		0x9	Overspeed	uint16	
0x000A		0xA	Analog Current Input Upper Limit	float32	
0x000B		0xB	Analog Current Input Lower Limit	float32	
0x000C		0xC	Analog Current Input Failure Threshold	float32	
0x000D		0xD	Analog Voltage Input Upper Limit	float32	
0x000E		0xE	Analog Voltage Input Lower Limit	float32	
0x000F		0xF	Analog Voltage Input Failure Threshold	float32	
0x0010		0x10	Aux Pickup Supply Voltage	float32	
0x0011		0x11	Aux Analog Input Supply Voltage	float32	
0x0012		0x12	Max Adv Firing Angle Change per Cycle	float32	
0x0013		0x13	Max Ret Firing Angle Change per Cycle	float32	
0x0014		0x14	Number of Coils per Cylinder	uint8	
0x0015		0x15	Cylinder Names Enabled	uint8	
0x0016		0x16	Engine Class	uint8	0 = inline; 1 = v engine
0x0017		0x17	Number of Cylinders	uint8	
0x0018		0x18	Show Banks in Reverse Order	uint8	1 = reversed order
0x001A		0x1A	Coil Data	string	
0x001B	0x1B	Secondary Short Enable Voltage	uint16		
0x001C	0x1C	Secondary Short Sensitivity	float32	0,98 ... 1,02, 1,02 means higher sensitivity	
0x001D	0x1D	Configuration Signature	uint32		
0x001E	0x1E	Max Power-On Speed	uint16		
0x001F	0x1F	Secondary Diagnostics Enable	uint8	0 = disable, 1 = enable	
0x0020	0x20	Reserved			
0x0021	0x21	Pickup Redundancy Enable	uint8	0 = disable, 1 = enable	
Configuration Misc Information					
0x0041	0x001	0x1	Site Description	string[40]	
0x0042		0x2	Site Location	string[40]	
0x0043		0x3	Module Description	string[40]	
0x0044		0x4	Engine Type Description	string[40]	
0x0045		0x5	Service Contact Line 1	string[40]	
0x0046		0x6	Service Contact Line 2	string[40]	
0x0047		0x7	Service Contact Line 3	string[40]	
0x0048		0x8	Service Contact Line 4	string[40]	
0x0049		0x9	Service Contact Line 5	string[40]	
Configuration Number of Outputs					
0x0081	0x002	0x1	Number of Ouputs Bank A	uint8	
0x0082		0x2	Number of Ouputs Bank B	uint8	
Configuration Pickup Input 1					
0x0401	0x010	0x1	Pickup Input Type	uint8	0 = passive 1 = active low 2 = active high
0x0402		0x2	Trigger Disc Type	uint8	0 = None 1 = N 2 = N+1 3 = N-1 4 = N magnets 5 = N-2 6 = N+1, extended index range 16 = Pin 32 = single magnet
0x0403		0x3	Number of Triggers	uint16	
0x0404		0x4	Crankshaft Speed	uint8	0 = camshaft; 1 = crankshaft speed
0x0405		0x5	Pickup Set	uint8	Only used if redundancy is enabled. The value is ignored otherwise
0x0406		0x6	Pre-Trigger Voltage Point 1 Speed	uint16	Only used for passive pickups
0x0407		0x7	Pre-Trigger Voltage Point 1 Voltage	float32	Used for passive and active pickups.

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x0408		0x8	Pre-Trigger Voltage Point 2 Speed	uint16	Only used for passive pickups. Must be >= Point 1 Speed.
0x0409		0x9	Pre-Trigger Voltage Point 1 Voltage	float32	Only used for passive pickups. Must be >= Point 1 Voltage
Configuration Pickup Input 2					
0x0441	0x011	0x1	Pickup Input Type	uint8	0 = passive 1 = active low 2 = active high
0x0442		0x2	Trigger Disc Type	uint8	0 = None 1 = N 2 = N+1 3 = N-1 4 = N magnets 5 = N-2 16 = Pin 32 = single magnet
0x0443		0x3	Number of Triggers	uint16	
0x0444		0x4	Crankshaft Speed	uint8	0 = camshaft; 1 = crankshaft speed
0x0445		0x5	Pickup Set	uint8	Only used if redundancy is enabled. The value is ignored otherwise
0x0446		0x6	Pre-Trigger Voltage Point 1 Speed	uint16	Only used for passive pickups
0x0447		0x7	Pre-Trigger Voltage Point 1 Voltage	float32	Used for passive and active pickups.
0x0448		0x8	Pre-Trigger Voltage Point 2 Speed	uint16	Only used for passive pickups. Must be >= Point 1 Speed.
0x0449		0x9	Pre-Trigger Voltage Point 1 Voltage	float32	Only used for passive pickups. Must be >= Point 1 Voltage
Configuration Pickup Input 3					
0x0481	0x012	0x1	Pickup Input Type	uint8	0 = passive 1 = active low 2 = active high
0x0482		0x2	Trigger Disc Type	uint8	0 = None 1 = N 2 = N+1 3 = N-1 4 = N magnets 5 = N-2 16 = Pin 32 = single magnet
0x0483		0x3	Number of Triggers	uint16	
0x0484		0x4	Crankshaft Speed	uint8	0 = camshaft; 1 = crankshaft speed
0x0485		0x5	Pickup Set	uint8	Only used if redundancy is enabled. The value is ignored otherwise
0x0486		0x6	Pre-Trigger Voltage Point 1 Speed	uint16	Only used for passive pickups
0x0487		0x7	Pre-Trigger Voltage Point 1 Voltage	float32	Used for passive and active pickups.
0x0488		0x8	Pre-Trigger Voltage Point 2 Speed	uint16	Only used for passive pickups. Must be >= Point 1 Speed.
0x0489		0x9	Pre-Trigger Voltage Point 1 Voltage	float32	Only used for passive pickups. Must be >= Point 1 Voltage
Configuration Pickup Input 4					
0x04C1	0x013	0x1	Pickup Input Type	uint8	0 = passive 1 = active low 2 = active high
0x04C2		0x2	Trigger Disc Type	uint8	0 = None 1 = N 2 = N+1 3 = N-1 4 = N magnets 5 = N-2 16 = Pin 32 = single magnet
0x04C3		0x3	Number of Triggers	uint16	
0x04C4		0x4	Crankshaft Speed	uint8	0 = camshaft; 1 = crankshaft speed
0x04C5		0x5	Pickup Set	uint8	Only used if redundancy is enabled. The value is ignored otherwise
0x04C6		0x6	Pre-Trigger Voltage Point 1 Speed	uint16	Only used for passive pickups
0x04C7		0x7	Pre-Trigger Voltage Point 1 Voltage	float32	Used for passive and active pickups.
0x04C8		0x8	Pre-Trigger Voltage Point 2 Speed	uint16	Only used for passive pickups. Must be >= Point 1 Speed.
0x04C9		0x9	Pre-Trigger Voltage Point 1 Voltage	float32	Only used for passive pickups. Must be >= Point 1 Voltage
Configuration Pickup Input 5					
0x0501	0x014	0x1	Pickup Input Type	uint8	0 = passive 1 = active low 2 = active high
0x0502		0x2	Trigger Disc Type	uint8	0 = None 1 = N 2 = N+1 3 = N-1 4 = N magnets

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
					5 = N-2 16 = Pin 32 = single magnet
0x0503		0x3	Number of Triggers	uint16	
0x0504		0x4	Crankshaft Speed	uint8	0 = camshaft; 1 = crankshaft speed
0x0505		0x5	Pickup Set	uint8	Only used if redundancy is enabled. The value is ignored otherwise
0x0506		0x6	Pre-Trigger Voltage Point 1 Speed	uint16	Only used for passive pickups
0x0507		0x7	Pre-Trigger Voltage Point 1 Voltage	float32	Used for passive and active pickups.
0x0508		0x8	Pre-Trigger Voltage Point 2 Speed	uint16	Only used for passive pickups. Must be >= Point 1 Speed.
0x0509		0x9	Pre-Trigger Voltage Point 1 Voltage	float32	Only used for passive pickups. Must be >= Point 1 Voltage
Configuration Pickup Input 6					
0x0541	0x015	0x1	Pickup Input Type	uint8	0 = passive 1 = active low 2 = active high
0x0542		0x2	Trigger Disc Type	uint8	0 = None 1 = N 2 = N+1 3 = N-1 4 = N magnets 5 = N-2 16 = Pin 32 = single magnet
0x0543		0x3	Number of Triggers	uint16	
0x0544		0x4	Crankshaft Speed	uint8	0 = camshaft; 1 = crankshaft speed
0x0545		0x5	Pickup Set	uint8	Only used if redundancy is enabled. The value is ignored otherwise
0x0546		0x6	Pre-Trigger Voltage Point 1 Speed	uint16	Only used for passive pickups
0x0547		0x7	Pre-Trigger Voltage Point 1 Voltage	float32	Used for passive and active pickups.
0x0548		0x8	Pre-Trigger Voltage Point 2 Speed	uint16	Only used for passive pickups. Must be >= Point 1 Speed.
0x0549		0x9	Pre-Trigger Voltage Point 1 Voltage	float32	Only used for passive pickups. Must be >= Point 1 Voltage
Configuration Cylinder Bank A					
0x0801	0x020	0x1	Bank Name	string[8]	
0x0802		0x2	Show Cylinders in Reverse Order	uint8	
Configuration Cylinder Bank B					
0x0841	0x021	0x1	Bank Name	string[8]	
0x0842		0x2	Show Cylinders in Reverse Order	uint8	
Configuration Cylinder Names					
0x0BC1	0x02F	0x1	Name of Cylinder 1	string[4]	
0x0BC2		0x2	Name of Cylinder 2	string[4]	
0x0BC3		0x3	Name of Cylinder 3	string[4]	
0x0BC4		0x4	Name of Cylinder 4	string[4]	
0x0BC5		0x5	Name of Cylinder 5	string[4]	
0x0BC6		0x6	Name of Cylinder 6	string[4]	
0x0BC7		0x7	Name of Cylinder 7	string[4]	
0x0BC8		0x8	Name of Cylinder 8	string[4]	
0x0BC9		0x9	Name of Cylinder 9	string[4]	
0x0BCA		0xA	Name of Cylinder 10	string[4]	
0x0BCB		0xB	Name of Cylinder 11	string[4]	
0x0BCC		0xC	Name of Cylinder 12	string[4]	
0x0BCD		0xD	Name of Cylinder 13	string[4]	
0x0BCE		0xE	Name of Cylinder 14	string[4]	
0x0BCF		0xF	Name of Cylinder 15	string[4]	
0x0BD0		0x10	Name of Cylinder 16	string[4]	
0x0BD1		0x11	Name of Cylinder 17	string[4]	
0x0BD2	0x12	Name of Cylinder 18	string[4]		
0x0BD3	0x13	Name of Cylinder 19	string[4]		
0x0BD4	0x14	Name of Cylinder 20	string[4]		
0x0BD5	0x15	Name of Cylinder 21	string[4]		
0x0BD6	0x16	Name of Cylinder 22	string[4]		
0x0BD7	0x17	Name of Cylinder 23	string[4]		

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x0BD8		0x18	Name of Cylinder 24	string[4]	
Configuration Schedule A					
0x0C01	0x030	0x1	Schedule Enabled	uint8	0 = disabled; 1 = enabled
0x0C02		0x2	Schedule Description	string[20]	
0x0C03		0x3	Timing Limit Min	float32	
0x0C04		0x4	Timing Limit Max	float32	
0x0C05		0x5	Cylinder Individual Timing Limit Min	float32	
0x0C06		0x6	Cylinder Individual Timing Limit Max	float32	
0x0C07		0x7	Base Timing	float32	
0x0C08		0x8	Potentiometer Enabled	uint8	
0x0C09		0x9	Potentiometer Timing CW	float32	
0x0C0A		0xA	Potentiometer Timing CCW	float32	
0x0C0B		0xB	Analog Current Input Enabled	uint8	
0x0C0C		0xC	Analog Current Input Timing at Lower Limit	float32	
0x0C0D		0xD	Analog Current Input Timing at Upper Limit	float32	
0x0C0E		0xE	Analog Current Input Timing Default	float32	
0x0C0F		0xF	Analog Voltage Input Enabled	uint8	
0x0C10		0x10	Analog Voltage Input Timing at Lower Limit	float32	
0x0C11		0x11	Analog Voltage Input Timing at Upper Limit	float32	
0x0C12		0x12	Analog Voltage Input Timing Default	float32	
0x0C13		0x13	Spark Duration	uint16	
0x0C14		0x14	Spark Intensity	uint16	
0x0C15		0x15	Max Breakdown Voltage	uint8	
0x0C16		0x16	Start Phase Spark Duration	uint16	
0x0C17		0x17	Start Phase Spark Intensity	uint16	
0x0C18		0x18	Start Phase Max Breakdown Voltage	uint8	
0x0C19	0x19	Start Phase Speed Limit	uint16		
0x0C1A	0x1A	Start Phase Time Limit	uint32		
0x0C1B	0x1B	Energy Limit	uint16		
0x0C1C	0x1C	Speed Curve Enabled	uint8	0 = disabled; 1 = enabled	
0x0C1D	0x1D	Number of Speed Points	uint8		
0x0C1E	0x1E	Start Phase Energy Limit	uint16		
Configuration Schedule A Speed Points Speed					
0x0C41	0x031	0x1	Speed of Point 1	uint16	
0x0C42		0x2	Speed of Point 2	uint16	
0x0C43		0x3	Speed of Point 3	uint16	
0x0C44		0x4	Speed of Point 4	uint16	
0x0C45		0x5	Speed of Point 5	uint16	
0x0C46		0x6	Speed of Point 6	uint16	
0x0C47		0x7	Speed of Point 7	uint16	
0x0C48		0x8	Speed of Point 8	uint16	
Configuration Schedule A Speed Points Timing					
0x0C81	0x032	0x1	Timing of Point 1	float64	
0x0C82		0x2	Timing of Point 2	float64	
0x0C83		0x3	Timing of Point 3	float64	
0x0C84		0x4	Timing of Point 4	float64	
0x0C85		0x5	Timing of Point 5	float64	
0x0C86		0x6	Timing of Point 6	float64	
0x0C87		0x7	Timing of Point 7	float64	
0x0C88		0x8	Timing of Point 8	float64	
Configuration Schedule B					
0x1001	0x040	0x1	Schedule Enabled	uint8	0 = disabled; 1 = enabled
0x1002		0x2	Schedule Description	string[20]	
0x1003		0x3	Timing Limit Min	float32	
0x1004		0x4	Timing Limit Max	float32	

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x1005		0x5	Cylinder Individual Timing Limit Min	float32	
0x1006		0x6	Cylinder Individual Timing Limit Max	float32	
0x1007		0x7	Base Timing	float32	
0x1008		0x8	Potentiometer Enabled	uint8	
0x1009		0x9	Potentiometer Timing CW	float32	
0x100A		0xA	Potentiometer Timing CCW	float32	
0x100B		0xB	Analog Current Input Enabled	uint8	
0x100C		0xC	Analog Current Input Timing at Lower Limit	float32	
0x100D		0xD	Analog Current Input Timing at Upper Limit	float32	
0x100E		0xE	Analog Current Input Timing Default	float32	
0x100F		0xF	Analog Voltage Input Enabled	uint8	
0x1010		0x10	Analog Voltage Input Timing at Lower Limit	float32	
0x1011		0x11	Analog Voltage Input Timing at Upper Limit	float32	
0x1012		0x12	Analog Voltage Input Timing Default	float32	
0x1013		0x13	Spark Duration	uint16	
0x1014		0x14	Spark Intensity	uint16	
0x1015		0x15	Max Breakdown Voltage	uint8	
0x1016		0x16	Start Phase Spark Duration	uint16	
0x1017		0x17	Start Phase Spark Intensity	uint16	
0x1018		0x18	Start Phase Max Breakdown Voltage	uint8	
0x1019		0x19	Start Phase Speed Limit	uint16	
0x101A		0x1A	Start Phase Time Limit	uint32	
0x101B		0x1B	Energy Limit	uint16	
0x101C		0x1C	Speed Curve Enabled	uint8	0 = disabled; 1 = enabled
0x101D		0x1D	Number of Speed Points	uint8	
0x101E		0x1E	Start Phase Energy Limit	uint16	
Configuration Schedule B Speed Points Speed					
0x1041	0x041	0x1	Speed of Point 1	uint16	
0x1042		0x2	Speed of Point 2	uint16	
0x1043		0x3	Speed of Point 3	uint16	
0x1044		0x4	Speed of Point 4	uint16	
0x1045		0x5	Speed of Point 5	uint16	
0x1046		0x6	Speed of Point 6	uint16	
0x1047		0x7	Speed of Point 7	uint16	
0x1048		0x8	Speed of Point 8	uint16	
Configuration Schedule B Speed Points Timing					
0x1081	0x042	0x1	Timing of Point 1	float64	
0x1082		0x2	Timing of Point 2	float64	
0x1083		0x3	Timing of Point 3	float64	
0x1084		0x4	Timing of Point 4	float64	
0x1085		0x5	Timing of Point 5	float64	
0x1086		0x6	Timing of Point 6	float64	
0x1087		0x7	Timing of Point 7	float64	
0x1088		0x8	Timing of Point 8	float64	
Configuration Firing Angle 1					
0x2001	0x080	0x1	Output Bank	uint8	
0x2002		0x2	Output	uint8	
0x2003		0x3	Firing Angle	float64	
0x2004		0x4	Output Delay	uint16	
0x2005		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 2					
0x2041	0x081	0x1	Output Bank	uint8	
0x2042		0x2	Output	uint8	
0x2043		0x3	Firing Angle	float64	
0x2044		0x4	Output Delay	uint16	

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x2045		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 3					
0x2081	0x082	0x1	Output Bank	uint8	
0x2082		0x2	Output	uint8	
0x2083		0x3	Firing Angle	float64	
0x2084		0x4	Output Delay	uint16	
0x2085		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 4					
0x20C1	0x083	0x1	Output Bank	uint8	
0x20C2		0x2	Output	uint8	
0x20C3		0x3	Firing Angle	float64	
0x20C4		0x4	Output Delay	uint16	
0x20C5		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 5					
0x2101	0x084	0x1	Output Bank	uint8	
0x2102		0x2	Output	uint8	
0x2103		0x3	Firing Angle	float64	
0x2104		0x4	Output Delay	uint16	
0x2105		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 6					
0x2141	0x085	0x1	Output Bank	uint8	
0x2142		0x2	Output	uint8	
0x2143		0x3	Firing Angle	float64	
0x2144		0x4	Output Delay	uint16	
0x2145		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 7					
0x2181	0x086	0x1	Output Bank	uint8	
0x2182		0x2	Output	uint8	
0x2183		0x3	Firing Angle	float64	
0x2184		0x4	Output Delay	uint16	
0x2185		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 8					
0x21C1	0x087	0x1	Output Bank	uint8	
0x21C2		0x2	Output	uint8	
0x21C3		0x3	Firing Angle	float64	
0x21C4		0x4	Output Delay	uint16	
0x21C5		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 9					
0x2201	0x088	0x1	Output Bank	uint8	
0x2202		0x2	Output	uint8	
0x2203		0x3	Firing Angle	float64	
0x2204		0x4	Output Delay	uint16	
0x2205		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 10					
0x2241	0x089	0x1	Output Bank	uint8	
0x2242		0x2	Output	uint8	
0x2243		0x3	Firing Angle	float64	
0x2244		0x4	Output Delay	uint16	
0x2245		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 11					
0x2281	0x08A	0x1	Output Bank	uint8	
0x2282		0x2	Output	uint8	
0x2283		0x3	Firing Angle	float64	
0x2284		0x4	Output Delay	uint16	
0x2285		0x5	Cylinder Index	uint16	0xFFFF = not assigned

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
Configuration Firing Angle 12					
0x22C1	0x08B	0x1	Output Bank	uint8	
0x22C2		0x2	Output	uint8	
0x22C3		0x3	Firing Angle	float64	
0x22C4		0x4	Output Delay	uint16	
0x22C5		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 13					
0x2301	0x08C	0x1	Output Bank	uint8	
0x2302		0x2	Output	uint8	
0x2303		0x3	Firing Angle	float64	
0x2304		0x4	Output Delay	uint16	
0x2305		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 14					
0x2341	0x08D	0x1	Output Bank	uint8	
0x2342		0x2	Output	uint8	
0x2343		0x3	Firing Angle	float64	
0x2344		0x4	Output Delay	uint16	
0x2345		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 15					
0x2381	0x08E	0x1	Output Bank	uint8	
0x2382		0x2	Output	uint8	
0x2383		0x3	Firing Angle	float64	
0x2384		0x4	Output Delay	uint16	
0x2385		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 16					
0x23C1	0x08F	0x1	Output Bank	uint8	
0x23C2		0x2	Output	uint8	
0x23C3		0x3	Firing Angle	float64	
0x23C4		0x4	Output Delay	uint16	
0x23C5		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 17					
0x2401	0x090	0x1	Output Bank	uint8	
0x2402		0x2	Output	uint8	
0x2403		0x3	Firing Angle	float64	
0x2404		0x4	Output Delay	uint16	
0x2405		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 18					
0x2441	0x091	0x1	Output Bank	uint8	
0x2442		0x2	Output	uint8	
0x2443		0x3	Firing Angle	float64	
0x2444		0x4	Output Delay	uint16	
0x2445		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 19					
0x2481	0x092	0x1	Output Bank	uint8	
0x2482		0x2	Output	uint8	
0x2483		0x3	Firing Angle	float64	
0x2484		0x4	Output Delay	uint16	
0x2485		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 20					
0x24C1	0x093	0x1	Output Bank	uint8	
0x24C2		0x2	Output	uint8	
0x24C3		0x3	Firing Angle	float64	
0x24C4		0x4	Output Delay	uint16	
0x24C5		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 21					

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x2501	0x094	0x1	Output Bank	uint8	
0x2502		0x2	Output	uint8	
0x2503		0x3	Firing Angle	float64	
0x2504		0x4	Output Delay	uint16	
0x2505		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 22					
0x2541	0x095	0x1	Output Bank	uint8	
0x2542		0x2	Output	uint8	
0x2543		0x3	Firing Angle	float64	
0x2544		0x4	Output Delay	uint16	
0x2545		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 23					
0x2581	0x096	0x1	Output Bank	uint8	
0x2582		0x2	Output	uint8	
0x2583		0x3	Firing Angle	float64	
0x2584		0x4	Output Delay	uint16	
0x2585		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration Firing Angle 24					
0x25C1	0x097	0x1	Output Bank	uint8	
0x25C2		0x2	Output	uint8	
0x25C3		0x3	Firing Angle	float64	
0x25C4		0x4	Output Delay	uint16	
0x25C5		0x5	Cylinder Index	uint16	0xFFFF = not assigned
Configuration ASO1 General					
0x4001	0x100	0x1	Number of Points	uint8	
0x4002		0x2	Global Timing Point Related	uint8	0 = absolute timing; 1 = global timing point related
0x4003		0x3	Aso Mode	uint8	0 = trailing rising edge; 1 = trailing falling edge
Configuration ASO1 Angles					
0x4041	0x101	0x1	ASO Angle 1	float64	
0x4042		0x2	ASO Angle 2	float64	
0x4043		0x3	ASO Angle 3	float64	
0x4044		0x4	ASO Angle 4	float64	
0x4045		0x5	ASO Angle 5	float64	
0x4046		0x6	ASO Angle 6	float64	
0x4047		0x7	ASO Angle 7	float64	
0x4048		0x8	ASO Angle 8	float64	
0x4049		0x9	ASO Angle 9	float64	
0x404A		0xA	ASO Angle 10	float64	
0x404B		0xB	ASO Angle 11	float64	
0x404C		0xC	ASO Angle 12	float64	
0x404D		0xD	ASO Angle 13	float64	
0x404E		0xE	ASO Angle 14	float64	
0x404F		0xF	ASO Angle 15	float64	
0x4050		0x10	ASO Angle 16	float64	
0x4051		0x11	ASO Angle 17	float64	
0x4052		0x12	ASO Angle 18	float64	
0x4053		0x13	ASO Angle 19	float64	
0x4054		0x14	ASO Angle 20	float64	
0x4055		0x15	ASO Angle 21	float64	
0x4056		0x16	ASO Angle 22	float64	
0x4057		0x17	ASO Angle 23	float64	
0x4058		0x18	ASO Angle 24	float64	
Configuration ASO1 Pulse Widths					
0x4081	0x102	0x1	ASO Pulse Width 1	uint16	
0x4082		0x2	ASO Pulse Width 2	uint16	

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x4083		0x3	ASO Pulse Width 3	uint16	
0x4084		0x4	ASO Pulse Width 4	uint16	
0x4085		0x5	ASO Pulse Width 5	uint16	
0x4086		0x6	ASO Pulse Width 6	uint16	
0x4087		0x7	ASO Pulse Width 7	uint16	
0x4088		0x8	ASO Pulse Width 8	uint16	
0x4089		0x9	ASO Pulse Width 9	uint16	
0x408A		0xA	ASO Pulse Width 10	uint16	
0x408B		0xB	ASO Pulse Width 11	uint16	
0x408C		0xC	ASO Pulse Width 12	uint16	
0x408D		0xD	ASO Pulse Width 13	uint16	
0x408E		0xE	ASO Pulse Width 14	uint16	
0x408F		0xF	ASO Pulse Width 15	uint16	
0x4090		0x10	ASO Pulse Width 16	uint16	
0x4091		0x11	ASO Pulse Width 17	uint16	
0x4092		0x12	ASO Pulse Width 18	uint16	
0x4093		0x13	ASO Pulse Width 19	uint16	
0x4094		0x14	ASO Pulse Width 20	uint16	
0x4095		0x15	ASO Pulse Width 21	uint16	
0x4096		0x16	ASO Pulse Width 22	uint16	
0x4097	0x17	ASO Pulse Width 23	uint16		
0x4098	0x18	ASO Pulse Width 24	uint16		
Configuration ASO2 General					
0x40C1	0x103	0x1	Number of Points	uint8	
0x40C2		0x2	Global Timing Point Related	uint8	0 = absolute timing; 1 = global timing point related
0x40C3		0x3	Aso Mode	uint8	0 = trailing rising edge; 1 = trailing falling edge
Configuration ASO2 Angles					
0x4101	0x104	0x1	ASO Angle 1	float64	
0x4102		0x2	ASO Angle 2	float64	
0x4103		0x3	ASO Angle 3	float64	
0x4104		0x4	ASO Angle 4	float64	
0x4105		0x5	ASO Angle 5	float64	
0x4106		0x6	ASO Angle 6	float64	
0x4107		0x7	ASO Angle 7	float64	
0x4108		0x8	ASO Angle 8	float64	
0x4109		0x9	ASO Angle 9	float64	
0x410A		0xA	ASO Angle 10	float64	
0x410B		0xB	ASO Angle 11	float64	
0x410C		0xC	ASO Angle 12	float64	
0x410D		0xD	ASO Angle 13	float64	
0x410E		0xE	ASO Angle 14	float64	
0x410F		0xF	ASO Angle 15	float64	
0x4110		0x10	ASO Angle 16	float64	
0x4111		0x11	ASO Angle 17	float64	
0x4112		0x12	ASO Angle 18	float64	
0x4113		0x13	ASO Angle 19	float64	
0x4114		0x14	ASO Angle 20	float64	
0x4115		0x15	ASO Angle 21	float64	
0x4116		0x16	ASO Angle 22	float64	
0x4117		0x17	ASO Angle 23	float64	
0x4118		0x18	ASO Angle 24	float64	
Configuration ASO2 Pulse Widths					
0x4141	0x105	0x1	ASO Angle 1	float64	
0x4142		0x2	ASO Angle 2	float64	
0x4143		0x3	ASO Angle 3	float64	

ID	Index		Name	Datatype	Remark	
	Index[15:6]	Subindex[5:0]				
0x4144		0x4	ASO Angle 4	float64		
0x4145		0x5	ASO Angle 5	float64		
0x4146		0x6	ASO Angle 6	float64		
0x4147		0x7	ASO Angle 7	float64		
0x4148		0x8	ASO Angle 8	float64		
0x4149		0x9	ASO Angle 9	float64		
0x414A		0xA	ASO Angle 10	float64		
0x414B		0xB	ASO Angle 11	float64		
0x414C		0xC	ASO Angle 12	float64		
0x414D		0xD	ASO Angle 13	float64		
0x414E		0xE	ASO Angle 14	float64		
0x414F		0xF	ASO Angle 15	float64		
0x4150		0x10	ASO Angle 16	float64		
0x4151		0x11	ASO Angle 17	float64		
0x4152		0x12	ASO Angle 18	float64		
0x4153		0x13	ASO Angle 19	float64		
0x4154		0x14	ASO Angle 20	float64		
0x4155		0x15	ASO Angle 21	float64		
0x4156		0x16	ASO Angle 22	float64		
0x4157		0x17	ASO Angle 23	float64		
0x4158		0x18	ASO Angle 24	float64		
Configuration Alarm 1						
0x4801		0x120	1	Description	string[20]	
0x4802			2	Function	uint16	
0x4803	3		Threshold	float32		
0x4804	4		Hysteresis	float32		
0x4805	5		Delay	uint32		
0x4806	6		Flags	uint32	1 = Engine Shutdown, 2 = Permanent Output 3 = Log Events	
0x4807	7		Outputs	uint32	1 = GPO1, 2 = GPO2, 4 = GPO3	
Configuration Alarm 2						
0x4841	0x121	1	Description	string[20]		
0x4842		2	Function	uint16		
0x4843		3	Threshold	float32		
0x4844		4	Hysteresis	float32		
0x4845		5	Delay	uint32		
0x4846		6	Flags	uint32		
0x4847		7	Outputs	uint32		
Configuration Alarm 3						
0x4881	0x122	1	Description	string[20]		
0x4882		2	Function	uint16		
0x4883		3	Threshold	float32		
0x4884		4	Hysteresis	float32		
0x4885		5	Delay	uint32		
0x4886		6	Flags	uint32		
0x4887		7	Outputs	uint32		
Configuration Alarm 4						
0x48C1	0x123	1	Description	string[20]		
0x48C2		2	Function	uint16		
0x48C3		3	Threshold	float32		
0x48C4		4	Hysteresis	float32		
0x48C5		5	Delay	uint32		
0x48C6		6	Flags	uint32		
0x48C7		7	Outputs	uint32		
Configuration Alarm 5						

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
0x4901	0x124	1	Description	string[20]	
0x4902		2	Function	uint16	
0x4903		3	Threshold	float32	
0x4904		4	Hysteresis	float32	
0x4905		5	Delay	uint32	
0x4906		6	Flags	uint32	
0x4907		7	Outputs	uint32	
Configuration Alarm 6					
0x4941	0x125	1	Description	string[20]	
0x4942		2	Function	uint16	
0x4943		3	Threshold	float32	
0x4944		4	Hysteresis	float32	
0x4945		5	Delay	uint32	
0x4946		6	Flags	uint32	
0x4947		7	Outputs	uint32	
Configuration Alarm 7					
0x4981	0x126	1	Description	string[20]	
0x4982		2	Function	uint16	
0x4983		3	Threshold	float32	
0x4984		4	Hysteresis	float32	
0x4985		5	Delay	uint32	
0x4986		6	Flags	uint32	
0x4987		7	Outputs	uint32	
Configuration Alarm 8					
0x49C1	0x127	1	Description	string[20]	
0x49C2		2	Function	uint16	
0x49C3		3	Threshold	float32	
0x49C4		4	Hysteresis	float32	
0x49C5		5	Delay	uint32	
0x49C6		6	Flags	uint32	
0x49C7		7	Outputs	uint32	
Configuration Alarm 9					
0x4A01	0x128	1	Description	string[20]	
0x4A02		2	Function	uint16	
0x4A03		3	Threshold	float32	
0x4A04		4	Hysteresis	float32	
0x4A05		5	Delay	uint32	
0x4A06		6	Flags	uint32	
0x4A07		7	Outputs	uint32	
Configuration Alarm 10					
0x4A41	0x129	1	Description	string[20]	
0x4A42		2	Function	uint16	
0x4A43		3	Threshold	float32	
0x4A44		4	Hysteresis	float32	
0x4A45		5	Delay	uint32	
0x4A46		6	Flags	uint32	
0x4A47		7	Outputs	uint32	
Configuration Alarm 11					
0x4A81	0x12A	1	Description	string[20]	
0x4A82		2	Function	uint16	
0x4A83		3	Threshold	float32	
0x4A84		4	Hysteresis	float32	
0x4A85		5	Delay	uint32	
0x4A86		6	Flags	uint32	
0x4A87		7	Outputs	uint32	

ID	Index		Name	Datatype	Remark
	Index[15:6]	Subindex[5:0]			
Configuration Alarm 12					
0x4AC1	0x12B	1	Description	string[20]	
0x4AC2		2	Function	uint16	
0x4AC3		3	Threshold	float32	
0x4AC4		4	Hysteresis	float32	
0x4AC5		5	Delay	uint32	
0x4AC6		6	Flags	uint32	
0x4AC7		7	Outputs	uint32	
Configuration Alarm 13					
0x4B01	0x12C	1	Description	string[20]	
0x4B02		2	Function	uint16	
0x4B03		3	Threshold	float32	
0x4B04		4	Hysteresis	float32	
0x4B05		5	Delay	uint32	
0x4B06		6	Flags	uint32	
0x4B07		7	Outputs	uint32	
Configuration Alarm 14					
0x4B41	0x12D	1	Description	string[20]	
0x4B42		2	Function	uint16	
0x4B43		3	Threshold	float32	
0x4B44		4	Hysteresis	float32	
0x4B45		5	Delay	uint32	
0x4B46		6	Flags	uint32	
0x4B47		7	Outputs	uint32	
Configuration Alarm 15					
0x4B81	0x12E	1	Description	string[20]	
0x4B82		2	Function	uint16	
0x4B83		3	Threshold	float32	
0x4B84		4	Hysteresis	float32	
0x4B85		5	Delay	uint32	
0x4B86		6	Flags	uint32	
0x4B87		7	Outputs	uint32	
Configuration Alarm 16					
0x4BC1	0x12F	1	Description	string[20]	
0x4BC2		2	Function	uint16	
0x4BC3		3	Threshold	float32	
0x4BC4		4	Hysteresis	float32	
0x4BC5		5	Delay	uint32	
0x4BC6		6	Flags	uint32	
0x4BC7		7	Outputs	uint32	
Configuration GPOs Normally Open					
0x5001	0x140	1	GPI1 Normally Open	uint8	0 = normally closed; 1 = normally opened
0x5002		1	GPI2 Normally Open	uint8	0 = normally closed; 1 = normally opened
0x5003		1	GPI3 Normally Open	uint8	0 = normally closed; 1 = normally opened
Configuration GPI Modes					
0x5041	0x141	1	GPO Mode	uint8	0 = disabled; 1 = CAN reset(1 s pulse); device reset (5 s pulse) 2 = Pushbutton on GPI
Configuration Secondary Voltage Estimation Calibration Bank A					
0x5401	0x150	1	Output 1	float32	-5,0 ... + 5,0
0x5402		2	Output 2	float32	
0x5403		3	Output 3	float32	
0x5404		4	Output 4	float32	
0x5405		5	Output 5	float32	
0x5406		6	Output 6	float32	
0x5407		7	Output 7	float32	

<i>ID</i>	<i>Index</i>		<i>Name</i>	<i>Datatype</i>	<i>Remark</i>
	<i>Index[15:6]</i>	<i>Subindex[5:0]</i>			
0x5408		8	Output 8	float32	
0x5409		9	Output 9	float32	
0x540A		A	Output 10	float32	
0x540B		B	Output 11	float32	
0x540C		C	Output 12	float32	
Configuration Secondary Voltage Estimation Calibration Bank B					
0x5441	0x151	1	Output 1	float32	-5,0 ... + 5,0
0x5442		2	Output 2	float32	
0x5443		3	Output 3	float32	
0x5444		4	Output 4	float32	
0x5445		5	Output 5	float32	
0x5446		6	Output 6	float32	
0x5447		7	Output 7	float32	
0x5448		8	Output 8	float32	
0x5449		9	Output 9	float32	
0x544A		A	Output 10	float32	
0x544B		B	Output 11	float32	
0x544C		C	Output 12	float32	