



Fischer Panda GmbH

SAE J1939 Interface Description

fpCAN

Customer description - VCS Generators
Rev. 1.36

published by
Department for electronics and software development

July 23, 2026

1 Revision history

Revision	Date	Changes
1.36	2026-07-23	- Document created based on customer documentation

Contents

1	Revision history	1
2	Preamble	3
2.1	CAN communication description	3
3	ISO functions	4
3.1	ISO Acknowledgement	4
3.2	ISO Request	6
3.3	ISO Transport Protocol – Data Transfer	7
3.4	ISO Transport Protocol – Connection Management	8
3.5	ISO Transport Protocol – Connection Management, RTS group function	9
3.6	ISO Transport Protocol – Connection Management, CTS group function	10
3.7	ISO Transport Protocol – Connection Management, EOM group function	11
3.8	ISO Transport Protocol – Connection Management, BAM group function	12
3.9	ISO Transport Protocol – Connection Management, Abort group function	13
3.10	ISO Address Claim	14
3.11	ISO Commanded Address	16
4	SAE-J1939 functions	18
4.1	J1939 EEC1 – Electronic Engine Controller #1	18
4.2	J1939 A1DOC1 - Aftertreatment 1 Diesel Oxidation Catalyst 1	19
4.3	J1939 DPF C1 – Diesel Particulate Filter Control 1	20
4.4	J1939 GTACPP – Generator Total AC Percent Power	22
4.5	J1939 GPCACR – Generator Phase C AC Reactive Power (3-Phase Module)	23
4.6	J1939 GPCACP – Generator Phase C AC Power (3-Phase Module)	24
4.7	J1939 GPCAC – Generator Phase C Basic AC Quantities (3-Phase Module)	25
4.8	J1939 GPBACRP – Generator Phase B AC Reactive Power (3-Phase Module)	26
4.9	J1939 GPBACP – Generator Phase B AC Power (3-Phase Module)	27
4.10	J1939 GPBAC – Generator Phase B Basic AC Quantities (3-Phase Module)	28
4.11	J1939 GPAACR – Generator Phase A AC Reactive Power	29
4.12	J1939 GPAACP – Generator Phase A AC Power	30
4.13	J1939 GPAAC – Generator Phase A Basic AC Quantities	31
4.14	J1939 GAAC – Generator Average Basic AC Quantities	32
4.15	J1939 HOURS – Engine Hours	33
4.16	J1939 ET1 – Engine Temperatures 1	34
4.17	DD1 – Dash Display 1	35
5	Special functions - Proprietary PGNs	36
5.1	PROPA00 – Remote Procedure Request	36
5.1.1	The fields within the 29-bit Identifier	37
5.2	PROPB00 – Response for PROPA00 RPC-request	39
5.3	PROPB01 – Generator System Information	40
5.4	PROPB03 – Generator System RPM	42
5.5	PROPB05 – Generator System Temperatures	43
5.6	PROPB0F – Service Hour Counter	44
5.7	PROPB25 – fpCAN Device Info	45
6	Remote Procedure Requests	46
6.1	Introduction to the topic	46
6.2	Functionality	46
6.3	Request types	46
6.4	Endianness of the RPC-PGNs	46
6.5	Notice for sending RPC requests	46

6.6	RPC-ID 0x000d – Clear errors/warnings	47
6.7	RPC-ID 0x0012 – Automatic start mode	49
6.8	RPC-ID 0x008b – Service done	51
6.9	RPC-ID 0x008e – Set CPU in Power-Save-Mode (Sleep controller)	52
6.10	RPC-ID 0x0093 – Read software release	53
6.11	RPC-ID 0x0094 – Read serial number	54
6.12	RPC-ID 0x009c – Remote start of Generator	56
6.13	RPC-ID 0x009e – Power on via RPC	58

Index	1
--------------	----------

2 Preamble

2.1 CAN communication description

The protocol consists of the general ISO 11992 part which is responsible for addressing and arbitration as well as the data flow, the SAE-J1939 portion of usable frames from the automotive and commercial vehicle segment and the special fpCAN containing the part not yet shown in the standards precisely in order to realize until now non-existent features and enhancements.

The fpCAN is ISO / SAE-J1939 / NMEA2000® conform and also uses a bitrate of 250 kbits per second and a 29-bit extended Identifier and can be mixed with NMEA2000®. The orientation of the data is always LSB first unless explicitly defined otherwise.

3 ISO functions

The ISOBUS-Standard describes the main functions process control, data exchange and arbitration that are used in SAE-J1939, NMEA2000® and fpCAN. The structure of data is the same in all these standards.

3.1 ISO Acknowledgement

PGN 59392 (0xE800)

Specification: This message is provided by ISO 11783 for a handshake mechanism between transmitting and receiving devices. This message is the possible response to acknowledge the reception of a “normal broadcast” message or the response to a specific command to indicate compliance or failure. The application layer is responsible for determining when this message is desired, outside of network management requirements specified by this standard (e.g. response to ISO Request message). The destination address of this PGN shall always contain a destination specific address.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	232	0	X
hex	6	0	0	E8	00	X
PGN	leer	59392 (E800)				

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:		
Byte	Data Type	Data Field
0	DD177	0x00 = Positive Acknowledgment;
	DF52	0x01 = Negative Acknowledgment;
		0x02 = PGN supported but access denied;
		0x03 to 0xFF = Reserved
1	DD177	Group Function of PGN being acknowledged.
	DF52	This field identifies for a device the specific group
		function of a PGN being acknowledged or declined. This
		field is not used if the PGN being acknowledged or
2	DD001	declined is not a group function PGN.
	DF52	
3		reserved bits, all set to logic 1
4		reserved bits, all set to logic 1
5	DD009	Parameter Group Number (PGN) expressed in binary,
		LSB first
	DF52	
6		PGN
7		PGN
	Single Frame	

3.2 ISO Request

PGN 59904 (0xEA00)

Specification: ISO 11783 defines this message to provide a method for *requesting the transmission of a PGN* from a network device or devices. As defined by ISO, this message has a *data length of 3 bytes* with no padding added to complete the single frame. The appropriate response to this message is based on the PGN being requested, and whether the receiver supports the requested PGN. See section 3.4.2 of 11783-3 for the rules governing the response to this PGN.

Note that the destination address must be entered.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	234	0	X
hex	6	0	0	EA	00	X
PGN	59904 (EA00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	-	-	-	-	-

Content:

Byte	Data Type	Data Field
DB0	DD009 DF52	Parameter Group Number (PGN) expressed in binary, LSB first
DB1		PGN
DB2	DD001	PGN
	Single Frame	

3.3 ISO Transport Protocol – Data Transfer

PGN 60160 (0xEB00)

Specification: ISO 11783 defines this PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN represents a single packet of a multipack message and is used in conjunction with PGN 60416. Once a connection has been established or a broadcast announcement has been made, this message is transmitted using the timing and handshake requirements in section 3.10 of 11783-3 until all the message's packets are transmitted or the transmission is aborted. Although this PGN is addressable, when used with the Broadcast Announce Message (BAM) method, the destination shall be 255.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	235	0	X
hex	6	0	0	EB	00	X
PGN	60160 (EB00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Byte	Data Type	Data Field
0	DD180	0x00 = Positive Acknowledgment;
	DF52	0x01 = Negative Acknowledgment;
		0x02 = PGN supported but access denied;
		0x03 to 0xFF = Reserved
1	DD181	Multipack data:
	DF52	56 bits organized as seven 8-bit bytes, each of the bytes is transmitted in the same order as it would in a standard (i.e., single frame) message. Unused bytes shall be filled with 0xFF.
2		
3		
4		
5		
6		
7		
Single Frame		

3.4 ISO Transport Protocol – Connection Management

PGN 60416 (0xEC00)

Specification: ISO 11783 defines this group function PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN's role in the transport process is determined by the group function value found in the first data byte of the PGN.

RTS - When the group function is **Request To Send (RTS)**, the PGN is asking a specific node on the network for permission to transmit a larger than 8 byte message to the node. This process is referred to as opening a connection.

CTS - If the group function is **Clear To Send (CTS)**, the PGN is notifying the transmitter of a multipack message how many packets the node is ready to receive and which packets have been received successfully. This group function is the proper response to an RTS group function to start the transmission of the multipack data and allows the receiver to control the flow of data throughout the multipack transmission.

EOM - When the group function is **End Of Message (EOM)**, the PGN is notifying the transmitter of a multipack message that all packets were received successfully. This group function signals the successful conclusion of a transmission started with the RTS group function thus closing the connection.

ABORT - When the group function is **Abort**, the PGN is notifying the transmitter or receiver of the multipack message that the other partner is terminating the connection without completing the transfer of the message. This group function can also be used to refuse the connection when the RTS group function is initially received.

BAM - When the group function is **Broadcast Announce Message (BAM)**, the PGN is notifying all network nodes that a multipack message is about to be transmitted on the network. Because the BAM group function is broadcast, no further handshake is required.

For a complete description of this PGN's usage and timing requirements see section 3.10 of 11783-3.

3.5 ISO Transport Protocol – Connection Management, RTS group function

PGN 60416 (0xEC00)

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	236	0	X
hex	6	0	0	EC	00	X
PGN	60416 (EC00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Byte	Data Type	Data Field	Values	Default
0	DD179	0x10 = Request to Send;	0x01	RTS (0x10)
	DF52	0x11 = Clear to Send;	-	
		0x13 = End of Message;	0xFF	
		0x20 = Broadcast Announce Message;		
		0xFF = Abort;		
		0x00 to 0xF, 0x12, 0x14 to 0x1F,		
		0x21 to 0xFE = Reserved		
1	DD007	Number of routes, waypoint, event,	9	
	DF54	mark, etc.	-	
			1785	
2				
3	DD180	Multi-packet frame counter	0x01	
	DF52		-	
			0xFF	
4	DD001	reserved bits, all set to logic 1		
	DF52			
5	DD009	Parameter Group Number (PGN) expressed		
	DF52	in binary, LSB first		
6		PGN		
7		PGN		
	Single Frame			

3.6 ISO Transport Protocol – Connection Management, CTS group function

PGN 60416 (0xEC00)

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	236	0	X
hex	6	0	0	EC	00	X
PGN	60416 (EC00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Byte	Data Type	Data Field	Values	Default
0	DD179	0x10 = Request to Send;	0x01	CTS (0x11)
	DF52	0x11 = Clear to Send;	-	
		0x13 = End of Message;	0xFF	
		0x20 = Broadcast Announce Message;		
		0xFF = Abort;		
1		0x00 to 0xF, 0x12, 0x14 to 0x1F, 0x21 to 0xFE = Reserved		
	DD180	Number of frames that can be sent	0x01	
	DF52	Multi-packet frame counter, valid	-	
		range 0x01 to 0xFF	0xFF	
2	DD180	Number of next frames to be transmitted	0x01	
	DF52	Multi-packet frame counter, valid	-	
		range 0x01 to 0xFF	0xFF	
3	DD001	reserved bits, all set to logic 1		
	DF52			
4		reserved bits, all set to logic 1		
5	DD009	Parameter Group Number (PGN) expressed		
	DF52	in binary, LSB first		
6		PGN		
7		PGN		
	Single Frame			

3.7 ISO Transport Protocol – Connection Management, EOM group function

PGN 60416 (0xEC00)

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	236	0	X
hex	6	0	0	EC	00	X
PGN	60416 (EC00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Byte	Data Type	Data Field	Values	Default
0	DD179	0x10 = Request to Send;	0x01	EOM (0x13)
	DF52	0x11 = Clear to Send;	-	
		0x13 = End of Message;	0xFF	
		0x20 = Broadcast Announce Message;		
		0xFF = Abort;		
		0x00 to 0xF, 0x12, 0x14 to 0x1F,		
		0x21 to 0xFE = Reserved		
1	DD007	Total message size, bytes	9	
	DF54		-	
			1785	
2				
3	DD180	Total number of frames received	0x01	
	DF52		-	
			0xFF	
4	DD001	reserved bits, all set to logic 1		
	DF52			
5	DD009	Parameter Group Number (PGN) expressed		
	DF52	in binary, LSB first		
6		PGN		
7		PGN		
	Single Frame			

3.8 ISO Transport Protocol – Connection Management, BAM group function

PGN 60416 (0xEC00)

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	236	0	X
hex	6	0	0	EC	00	X
PGN	60416 (EC00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Byte	Data Type	Data Field	Values	Default
0	DD179	0x10 = Request to Send;	0x01	BAM (0x20)
	DF52	0x11 = Clear to Send;	-	
		0x13 = End of Message;	0xFF	
		0x20 = Broadcast Announce Message;		
		0xFF = Abort;		
		0x00 to 0xF, 0x12, 0x14 to 0x1F,		
		0x21 to 0xFE = Reserved		
1	DD007	Total message size, bytes	9	
	DF54		-	
			1785	
2				
3	DD180	Total number of frames to be transmitted	0x01	
	DF52		-	
			0xFF	
4	DD001	reserved bits, all set to logic 1		
	DF52			
5	DD009	Parameter Group Number (PGN) expressed		
	DF52	in binary, LSB first		
6		PGN		
7		PGN		
	Single Frame			

3.9 ISO Transport Protocol – Connection Management, Abort group function

PGN 60416 (0xEC00)

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	236	0	X
hex	6	0	0	EC	00	X
PGN	60416 (EC00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Byte	Data Type	Data Field	Values	Default
0	DD179	0x10 = Request to Send;	0x01	Abort (0xFF)
	DF52	0x11 = Clear to Send;	-	
		0x13 = End of Message;	0xFF	
		0x20 = Broadcast Announce Message;		
		0xFF = Abort;		
		0x00 to 0xF, 0x12, 0x14 to 0x1F, 0x21 to 0xFE = Reserved		
1	DD001	reserved bits, all set to logic 1		
	DF52			
2				
3				
4				
5	DD009	Parameter Group Number (PGN) expressed		
	DF52	in binary, LSB first		
6		PGN		
7		PGN		
Single Frame				

3.10 ISO Address Claim

PGN 60928 (0xEE00)

Specification: This network management message is used to claim network address, reply to devices requesting the claimed address, and to respond with device information (NAME) requested by the ISO Request (PGN 059904) or Complex Request Group Function (PGN 126208).

If a Complex Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

If no request able fields have been included with the Complex Request, then the response is to return this PGN, just like responding to the ISO Request (PGN 059904) described above.

If the Complex Request (PGN 126208) includes one or more request able fields, then the response shall be filtered by the one or more fields and field values contained within the request.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	238	0	X
hex	6	0	0	EE	00	X
PGN	60928 (EE00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Bits	Data Type	Data Field	Length	Values	Default
0-20	DD173	NMEA2000® Unique Number assigned	21		0
	DF52	by manufacturer to ensure that the			
		NAME field for each manufactured			
		device is unique.			
21-31	DD172	NMEA2000® Manufacturer Code	11		0
	DF52				
32-34	DD201	Device Instance Lower	3		
	DF52	(ISO ECU Instance)			
35-39	DD174	Device Instance Upper	5		
	DF52	(ISO Function Instance)			
40-47	DD171	NMEA2000® Function Code	8		
	DF52				
48	DD175	Dominant Bits	1		
	DF52				
49-55	DD170	NMEA2000® Device Class	7		
	DF52				
56-59	DD169	System Instance (ISO Device	4	0	
	DF52	Class Instance)		-	
				15	
60-62	DD168	Industry Group	3		4
	DF52				Marine
63	DD001	reserved bit, all set to logic 1	1		
	DF52				
	Single Frame				

3.11 ISO Commanded Address

PGN 65240 (0xFED8)

Specification: ISO 11783 defined this message to provide a mechanism for assigning a network address to a node. The NAME information in the data portion of the message must match the name information of the node whose network address is to be set. ISO 11783-5 requires this message to be sent using the BAM Transport Protocol method. The appropriate response to this message is defined in section 5.2.3 of 11783-5.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	254	216	X
hex	X	0	0	FE	D8	X
PGN	65240 (FED8)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

Content:

Bits	Data Type	Data Field	Length	Values	Default
0-20	DD173	NMEA2000® Unique Number assigned	21		0
	DF52	by manufacturer to ensure that the			
		NAME field for each manufactured			
		device is unique.			
21-31	DD172	NMEA2000® Manufacturer Code	11		0
	DF52				
32-34	DD201	Device Instance Lower	3		
	DF52	(ISO ECU Instance)			
35-39	DD174	Device Instance Upper	5		
	DF52	(ISO Function Instance)			
40-47	DD171	NMEA2000® Function Code	8		
	DF52				
48	DD175	Dominant Bits	1		
	DF52				
49-55	DD170	NMEA2000® Device Class	7		
	DF52				
56-59	DD169	System Instance (ISO Device	4	0	
	DF52	Class Instance)		-	
				15	
60-62	DD168	Industry Group	3		4
	DF52				Marine
63	DD001	reserved bit, all set to logic 1	1		
	DF52				
64-71	DD176	New Source Address:	8		
	DF52	0x00 to 0xFB (0 to 251)=Claimable			
		NMEA 2000 network address space			
		0xFC (252) = Reserved			
		0xFD (253) = Reserved			
		0xFE (254) = Null address			
		0xFF (255) = Global address			
	BAM				

4 SAE-J1939 functions

4.1 J1939 EEC1 – Electronic Engine Controller #1

PGN 61444 (0xF004)

Type: Broadcast all 100ms

Description: Contains the engine load and the engine speed from the engine control unit (e.g. Hatz)

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	240	4	X
hex	X	0	0	F0	04	X
PGN	61444 (F004)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits			SPN513	SPN190				

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0		8	uint8	not used	X	X
1		8	uint8	not used	X	X
2	513	8	uint8	Engine Load (from ECU)	1 % / -125	-125 ... 125
3	190	16	uint16	Engine Speed (from ECU)	1/8 rpm	0 ... 8031.8
4						
5		8	uint8	not used	X	X
6		8	uint8	not used	X	X
7		8	uint8	not used	X	X

4.2 J1939 A1DOC1 - Aftertreatment 1 Diesel Oxidation Catalyst 1

PGN 64800 (0xFD20)

Type: Broadcast all 500 ms

Description: Handles diagnostic and operational data from the diesel oxidation catalyst.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	253	32	X
hex	6	0	0	FD	20	X
PGN	64800 (FD20)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 4765							

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	4765	16	uint16	Intake Temperature	0,03125 °C/bit	-273 ... 1734,96875 °C
1					-273 offset	
2						
3						
4						
5						
6						
7						

4.3 J1939 DPF C1 – Diesel Particulate Filter Control 1

PGN 64892 (0xFD7C)

Type: Broadcast cyclic single frame (1000ms)

Description: The engine Electronic Control Unit (ECU) uses DPF C1 to broadcast regeneration statuses, filter conditions, and active DPF lamp commands.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	253	124	X
hex	X	0	0	FD	7C	X
PGN	64892 (FD7C)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN		3700, 3701	3703	3708	3710		3698	

Content:

Byte	SPN	Data Length	Data Type	Parameter	Resolution / Offset	Data Range
1	3700	Bit 2-3		Active Regeneration Status	0 ... 3	0 ... 3
				0 = Not Active		
				1 = Active		
				2 = Regeneration Needed		
				3 = Not Available		
1	3701	Bit 4-6		DPF Status	0 ... 7	0 ... 7
				0 = Regeneration not needed		
				1 = Regen. needed, lowest level		
				2 = Regen. needed, moderate level		
				3 = Regen. needed, highest level		
				4-6 = reserved for SAE assignm.		
				7 = not available		
2	3703	Bit 2-3		DPF Regeneration Inhibited due to Inhibit Switch	0 ... 3	0 ... 3
				0 = Not Inhibited		
				1 = Inhibited		
				2 = Reserved for SAE assignment		
				3 = Not Available		
3	3708	Bit 4-5		DPF Regeneration Inhibited due to Neutral Gear Switch	0 ... 3	0 ... 3
				0 = Not Inhibited		
				1 = Inhibited		
				2 = Reserved for SAE assignment		
				3 = Not Available		
4	3710	Bit 0-1		DPF Regeneration Inhibited due to Parking Brake	0 ... 3	0 ... 3
				0 = Not Inhibited		
				1 = Inhibited		
				2 = Reserved for SAE assignment		
				3 = Not Available		
6	3698	Bit 2-4		Exhaust Gas High Temperature	0 ... 7	0 ... 7
				0 = Off		
				1 = On - solid		
				2-6 = reserved for SAE assignm.		
				7 = not available		

4.4 J1939 GTACPP – Generator Total AC Percent Power

PGN 64911 (0xFD8F)

Type: Broadcast all 250 ms

Description: This PGN contains quantities for the instantaneous AC power from the generator, as percentages of rated power.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	6	0	0	253	143	X
hex	6	0	0	FD	8F	X
PGN	64911 (FD8F)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 3590		SPN 3591		SPN 3592			

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	3590	16	uint16	Generator total percent kW (real power)	0,0078125 %/bit -251 offset	-251 ... 250,99 %
1						
2	3591	16	uint16	Generator total percent kVA (apparent power)	0,0078125 %/bit -251 offset	-251 ... 250,99 %
3						
4	3592	16	uint16	Generator total percent kvar (reactive power)	0,0078125 %/bit -251 offset	-251 ... 250,99 %
5						
6						
7						

4.5 J1939 GPCACR – Generator Phase C AC Reactive Power (3-Phase Module)

PGN 65019 (0xFDFB)

Type: Broadcast cyclic single frame (100ms)

Description: Reactive power, power factor and power factor lagging of generator phase C.

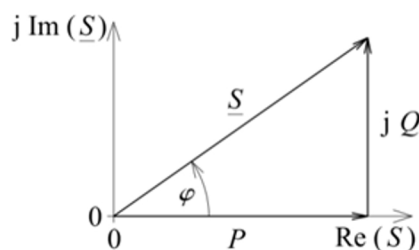


Figure 1: Power Triangle

$$\sqrt{P^2 + Q^2}$$

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	253	251	X
hex	3	0	0	FD	FB	X
PGN	65012 (FDF4)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2459				SPN 2467		SPN 2521	

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2459	32	uint32	Generator Phase C	1 var/bit	-2E9 ... 2E9
1				Reactive Power	-2E9 var offset	
2						
3						
4	2467	16	uint16	Generator Phase C	$\frac{1}{16384}$ /bit	-1 ... +1
5				Power factor ($\frac{TruePowerP}{ApparentPowerS}$)		
6	2521	16	uint16	Generator Phase C	4 states/2 bit	00 = Leading
				Power factor	0 offset	01 = Lagging
7				lagging		10 = Error
						11 = Not Available
						or Not Installed

4.6 J1939 GPCACP – Generator Phase C AC Power (3-Phase Module)

PGN 65020 (0xFDFC)

Type: Broadcast cyclic single frame (100ms)

Description: Real power and apparent power of generator phase C.

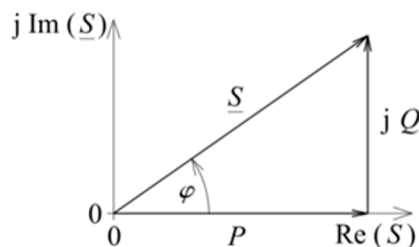


Figure 2: Power Triangle

$$\sqrt{P^2 + Q^2}$$

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	253	252	X
hex	3	0	0	FD	FC	X
PGN	65020 (FDFC)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2455				SPN 2463			

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2455	32	uint32	Generator Phase C	1 W/bit	-2E9 ... 2E9
1				Real Power	-2E9 W offset	
2						
3						
4	2463	32	uint32	Generator Phase C	1 VA/bit	-2E9 ... 2E9
5				Apparent Power	-2E9 VA offset	
6						
7						

4.7 J1939 GPCAC – Generator Phase C Basic AC Quantities (3-Phase Module)

PGN 65021 (0xFDFD)

Type: Broadcast cyclic single frame (100ms)

Description: Generator Phase C, Line-Line AC RMS voltage, Line-N AC RMS voltage, AC frequency and AC current.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	253	253	X
hex	3	0	0	FD	FD	X
PGN	65021 (FDFD)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2443		SPN 2447		SPN 2439		SPN 2451	

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2443	16	uint16	Generator AC Voltage C	1 V/bit	0 ... 65535 V
1				RMS Line to Line	0 offset	
2	2447	16	uint16	Generator AC Voltage C	1 V/bit	0 ... 65535 V
3				RMS Line to Neutral	0 offset	
4	2439	16	uint16	Generator AC Frequency	$\frac{1}{128}$ Hz/bit	0 ... 501,9921875 Hz
5				phase C	0 offset	
6	2451	16	uint16	Generator AC Current	1 A/bit	0 ... 65535 A
7				RMS phase C	0 offset	

4.8 J1939 GPBACRP – Generator Phase B AC Reactive Power (3-Phase Module)

PGN 65022 (0xFDFE)

Type: Broadcast cyclic single frame (100ms)

Description: Reactive power, power factor and power factor lagging of generator phase B.

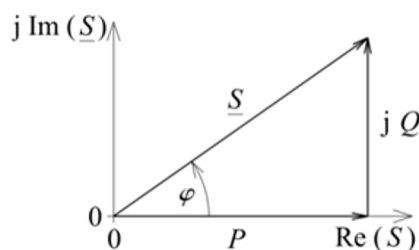


Figure 3: Power Triangle

$$\sqrt{P^2 + Q^2}$$

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	253	254	X
hex	3	0	0	FD	FE	X
PGN	65022 (FDFE)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2458				SPN 2466		SPN 2520	

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2458	32	uint32	Generator Phase B	1 var/bit	-2E9 ... 2E9
1				Reactive Power	-2E9 var offset	
2						
3						
4	2466	16	uint16	Generator Phase B	$\frac{1}{16384}$ /bit	-1 ... +1
				Power factor		
5				$(\frac{TruePowerP}{ApparentPowerS})$		
6	2520	16	uint16	Generator Phase B	4 states/2 bit	00 = Leading
				Power factor	0 offset	01 = Lagging
7				lagging		10 = Error
						11 = Not Available
						or Not Installed

4.9 J1939 GPBACP – Generator Phase B AC Power (3-Phase Module)

PGN 65023 (0xFDFF)

Type: Broadcast cyclic single frame (100ms)

Description: Real power and apparent power of generator phase B.

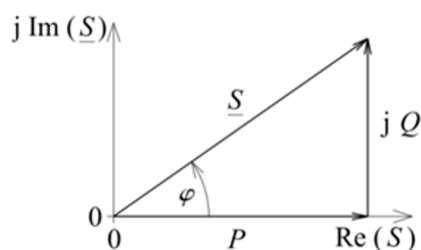


Figure 4: Power Triangle

$$\sqrt{P^2 + Q^2}$$

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	253	255	X
hex	3	0	0	FD	FF	X
PGN	65023 (FDFF)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2454				SPN 2462			

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2454	32	uint32	Generator Phase B	1 W/bit	-2E9 ... 2E9
1				Real Power	-2E9 W offset	
2						
3						
4	2462	32	uint32	Generator Phase B	1 VA/bit	-2E9 ... 2E9
5				Apparent Power	-2E9 VA offset	
6						
7						

4.10 J1939 GPBAC – Generator Phase B Basic AC Quantities (3-Phase Module)

PGN 65024 (0xFE00)

Type: Broadcast cyclic single frame (100ms)

Description: Generator Phase B, Line-Line AC RMS voltage, Line-N AC RMS voltage, AC frequency and AC current.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	254	0	X
hex	3	0	0	FE	00	X
PGN	65024 (FE00)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2442		SPN 2446		SPN 2438		SPN 2450	

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2442	16	uint16	Generator AC Voltage B	1 V/bit	0 ... 65535 V
1				RMS Line to Line	0 offset	
2	2446	16	uint16	Generator AC Voltage B	1 V/bit	0 ... 65535 V
3				RMS Line to Neutral	0 offset	
4	2438	16	uint16	Generator AC Frequency	$\frac{1}{128}$ Hz/bit	0 ... 501,9921875 Hz
5				phase B	0 offset	
6	2450	16	uint16	Generator AC Current	1 A/bit	0 ... 65535 A
7				RMS phase B	0 offset	

4.11 J1939 GPAACR – Generator Phase A AC Reactive Power

PGN 65025 (0xFE01)

Type: Broadcast cyclic single frame (100ms)

Description: Reactive power, power factor and power factor lagging of generator phase A.

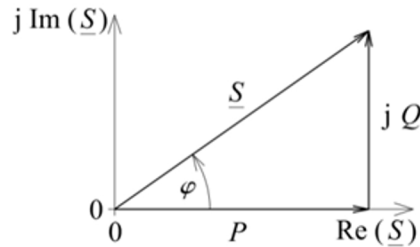


Figure 5: Power Triangle

$$\sqrt{P^2 + Q^2}$$

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	254	1	X
hex	3	0	0	FE	01	X
PGN	65025 (FE01)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2457				SPN 2465		SPN 2519	

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2457	32	uint32	Generator Phase A	1 var/bit	-2E9 ... 2E9
1				Reactive Power	-2E9 var offset	
2						
3						
4	2465	16	uint16	Generator Phase A	$\frac{1}{16384}$ /bit	-1 ... +1
5				Power factor ($\frac{TruePowerP}{ApparentPowerS}$)		
6	2519	16	uint16	Generator Phase A	4 states/2 bit	00 = Leading
				Power factor	0 offset	01 = Lagging
7				lagging		10 = Error
						11 = Not Available
						or Not Installed

4.12 J1939 GPAACP – Generator Phase A AC Power

PGN 65026 (0xFE02)

Type: Broadcast cyclic single frame (100ms)

Description: Real power and apparent power of generator phase A.

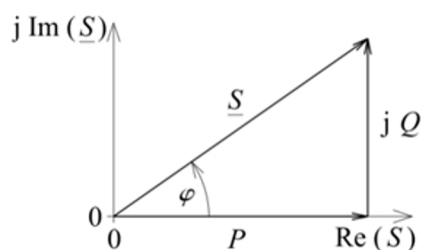


Figure 6: Power Triangle

$$\sqrt{P^2 + Q^2}$$

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	254	2	X
hex	3	0	0	FE	02	X
PGN	65026 (FE02)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2453				SPN 2461			

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2453	32	uint32	Generator Phase A	1 W/bit	-2E9 ... 2E9
1				Real Power	-2E9 W offset	
2						
3						
4	2461	32	uint32	Generator Phase A	1 VA/bit	-2E9 ... 2E9
5				Apparent Power	-2E9 VA offset	
6						
7						

4.13 J1939 GPAAC – Generator Phase A Basic AC Quantities

PGN 65027 (0xFE03)

Type: Broadcast cyclic single frame (100ms)

Description: Generator Phase A, Line-Line AC RMS voltage, Line-N AC RMS voltage, AC frequency and AC current A.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	254	3	X
hex	3	0	0	FE	03	X
PGN	65027 (FE03)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 2441		SPN 2445		SPN 2437		SPN 2449	

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2441	16	uint16	AC Voltage A	1 V/bit	0 ... 65535 V
1				RMS Line to Line	0 offset	
2	2445	16	uint16	AC Voltage A	1 V/bit	0 ... 65535 V
3				RMS Line to Neutral	0 offset	
4	2437	16	uint16	AC Frequency	$\frac{1}{128}$ Hz/bit	0 ... 501,9921875 Hz
5				phase A	0 offset	
6	2449	16	uint16	AC Current	1 A/bit	0 ... 65535 A
7				RMS phase A	0 offset	

4.14 J1939 GAAC – Generator Average Basic AC Quantities

PGN 65030 (0xFE06)

Type: Broadcast cyclic single frame (100 ms)

Description: Generator Average Line-Line AC RMS Voltage, Generator Average Line-Neutral AC RMS Voltage, Generator Average AC Frequency and Generator Average AC RMS Current.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	3	0	0	254	6	X
hex	3	0	0	FE	06	X
PGN	65030 (FE06)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN	2440		2444		2436		2448	

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	2440	16	uint16	Generator Average	1 V/bit	0 ... 65535 V
1				Line-Line AC	0 offset	
				RMS Voltage		
2	2444	16	uint16	Generator Average	1 V/bit	0 ... 65535 V
3				Line-Neutral	0 offset	
				AC RMS Voltage		
4	2436	16	uint16	Generator Average	$\frac{1}{128}$ Hz/bit	0 ... 501,9921875 Hz
5				AC Frequency	0 offset	
6	2448	16	uint16	Generator Average	1 A/bit	0 ... 65535 A
7				AC RMS Current	0 offset	

4.15 J1939 HOURS – Engine Hours

PGN 65253 (0xFEE5)

Type: Broadcast cyclic single frame (100 ms)

Description: Operating hour counter.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	254	229	X
hex	X	0	0	FE	E5	X
PGN	65253 (FEE5)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN	247				249			

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	247	32	uint32	Operating Hours	3 min ($\frac{1}{20}$ h)	0 ... 214748364,75 h
1				(motor running)	0 offset	
2						
3						
4	249	32	uint32	Not used	-	-
5						
6						
7						

4.16 J1939 ET1 – Engine Temperatures 1

PGN 65262 (0xFEEE)

Type: Broadcast cyclic single frame (1000 ms)

Description: Generator Temperatures.

NOTE

The engine fuel temperature and the engine oil temperature are only available with engines with engine control unit (ECU) and when this ECU is in operation / when the diesel engine is running.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	254	238	X
hex	X	0	0	FE	EE	X
PGN	65262 (FEEE)					

Data Bytes:

Bits	8	8	16		16		8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
Bits	SPN 110	SPN 174	SPN 175		SPN 176		SPN 52	SPN 1134

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	110	8	uint8	Engine coolant temp. 0xFE = short circuit 0xFF = not available	1 °C/bit offset -40	-40 ... 213 °C
1	174	8	uint8	Engine fuel temp. 0xFE = short circuit 0xFF = not available	1 °C/bit offset -40	-40 ... 213 °C
2	175	16	uint16	Engine oil temp. 0xFE = short circuit 0xFF = not available	$\frac{1}{32}$ °C/bit offset -273	-273 ... 1735 °C
3						
4	176	16	uint16	Not used	-	-
5						
6	52	8	uint8	Not used	-	-
7	1134	8	uint8	Not used	-	-

4.17 DD1 – Dash Display 1

65276 (0xFEFC)

Type: Broadcast cyclic single frame (1000ms).

Description: Fuel level – ratio of volume of fuel to the total volume of fuel storage container.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	254	252	X
hex	X	0	0	FE	FC	X
PGN		65276 (FEFC)				

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN		96						

Content:

Byte	SPN	Data Length	Data Type	Parameter	Resolution / Offset	Data Range
0		8 bits	uint8	0xFF		
1	96	8 bits	uint8	Fuel Level 1	0,4 % / bit gain 0 offset	0 ... 100 %
2		8 bits	uint8	0xFF		
3		8 bits	uint8	0xFF		
4		8 bits	uint8	0xFF		
5		8 bits	uint8	0xFF		
6		8 bits	uint8	0xFF		
7		8 bits	uint8	0xFF		

5 Special functions - Proprietary PGNs

5.1 PROPA00 – Remote Procedure Request

PGN 61184 (0xEF00)

Type: Single frame, target oriented, partially routed via »fpControl CAN Interface – SAE J1939« (fpControl CI-SAE J1939) ¹

Description: Special function for parameter request and for producing special operation. Using PROPA00 a remote procedure request is sent to a device which acknowledges with a PROPB00 message (PGN 65280) as described in 5.2 as broadcast. The possible requests are displayed in the chapter “RPC-Requests”. An RPC-ID and up to 3 parameters (3 x 16 bits) can be transferred. **Unlike most of the standard PGNs the RPC-ID and parameters are big endian encoded.**

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	239	XX	X
hex	X	0	0	EF	XX	X
PGN	61184 (EF00)					

NOTE: »XX« in field PS must be replaced with the destination address. Refer to 5.1.1.

Data Bytes:

Bits	16	16	16	16
Name	RPD-ID	Param 1	Param 2	Param 3
SPN				

Content:

Byte	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	16	uint16	Request RPC-ID	-	0...65535
1					
2	16	uint16	Request Parameter 1	-	0...65535
3					
4	16	uint16	Request Parameter 2	-	0...65535
5					
6	16	uint16	Request Parameter 3	-	0...65535
7					

¹»fpControl CAN Interface – SAE J1939«: <https://knowledgebase.fischerpanda.de/?p=4052>

5.1.1 The fields within the 29-bit Identifier

Field		Meaning	Description	Comment
Prio		Priority	Priority of the message on the CAN bus. Messages of higher importance are sent before those of lower priority.	»0« has the highest priority.
Parameter Group Number	EDP DP	Extended Data Page Data Page	With EDP and DP, four different data pages can be selected for J1939 messages (Parameter Group).	EDP = 0 and DP = 0: SAE J1939 Parameter Groups
	PF	PDU Format	Protocol Data Unit Format – defines whether the message is intended for a specific device in the CAN bus or for the entire network.	1 ... 239: A specific device in the CAN bus should be addressed by this CAN message. The PS field contains the destination address.
				240 ... 255: All devices in the CAN bus should be addressed by this CAN message. The PS field contains a Group Extension.
	PS	PDU Specific	Protocol Data Unit Specific – based on the value of the PF field	If the message is intended for a specific device (PF ≤ 239), PS is the destination address of this device. »XX« must be replaced with a destination address != 0.
				If the message is intended for all devices (PF > 240), PS is the group extension field and enables a higher number of possible broadcast messages.
SA		Source Address	Address of the device sending the current message.	»X« must be replaced with the source address.

NOTE:

The destination address in the PS field must always be a value != 0. The destination address »0« isn't used by any Fischer Panda device.

5.2 PROPB00 – Response for PROPA00 RPC-request

PGN 65280 (0xFF00)

Type: Broadcast single frame, partially routed via »fpControl CAN Interface – SAE J1939« (fpControl CI-SAE J1939) ²

Description: RPC-Response frame for PROPA00 (refer to 5.1) and for file transfer. In case of an error the RPC-ID and 0xFFFF_{hex} in parameter fields 1-3 will be transferred.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	255	0	X
hex	X	0	0	FF	00	X
PGN	65280 (FF00)					

Data Bytes:

Bits	16	16	16	16
Name	Function	Param 1	Param 2	Param 3
Bits				

Content:

Byte	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	16	uint16	Requested RPC-ID	-	0...65535
1					
2	16	uint16	Request Parameter 1	-	0...65535
3					
4	16	uint16	Request Parameter 2	-	0...65535
5					
6	16	uint16	Request Parameter 3	-	0...65535
7					

²»fpControl CAN Interface – SAE J1939«: <https://knowledgebase.fischerpanda.de/?p=4052>

5.3 PROPB01 – Generator System Information

PGN 65281 (0xFF01)

Type: Broadcast cyclic single frame (250 ms)

Source: fpControl

Description: This frame is sent cyclic from generator controller to the panel. Different states and display messages are contained which can also be evaluated from extern.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	255	1	X
hex	X	0	0	FF	01	X
PGN	65281 (FF01)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN	520200		520192	520195	520193	520201	520202	520203

Content:

Byte	SPN	Data Length	Data Type	Parameter	Resolution / Offset	Data Range
0	520200	16 bits	uint16	System battery voltage	$\frac{1}{10}$ V / bit	0...6553,5
1					0 offset	
2	520192	8 bits	uint8	System state	0 – 255	0...255
				0 = Standby (Generator is stopped)		
				1 = Self-test		
				2 = Preheat		
				3 = Starting (Starter on)		
				4 = Starting		
				5 = Start-up phase (Starter off)		
				6 = Override phase		
				(Frequency control)		
				7 = Warm-up phase		
				(Switching to voltage		
				control with checking		
				oil pressure)		
				8 = Normal mode		
				(Generator is running)		
				9 = Stopping phase		
				possibly with turbo lag		
				10 = Error occurred		
				11 to 255 are unused		

Byte	SPN	Data Length	Data Type	Parameter	Resolution / Offset	Data Range
3	520195	8 bits	uint8	Error code if in error state	0 – 255	0...255
4	520193	8 bits	uint8	Delay until next state	0 – 255	0...255
5	520201	8 bits	uint8	Cyclic recurring unacknowledged warnings. Warnings are toggled per cycle, that means every 500 ms for example 1, 6, 3, 4, 1, 6, 3, 4... and so on. If a warning has been acknowledged Show Warning=0 until the next warning	0 – 255	0...255
6	520202	8 bits	uint8	Cyclic recurring all active warnings. Warning is active if $\neq 0$. A warning is active if it is acknowledged and no longer displayed but still present. This warning is displayed cyclic.	0 – 255	0...255
7	520203	8 bits	uint8	Special config bits:	0 – 255	0...255
		Bit 0		1 = automatic start active, 0 = automatic start inactive		
		Bit 1		1 = automatic start requested, genset will try to start		
		Bit 2		Not used		
		Bit 3		Not used		
		Bit 4		1 = teach start request		
		Bit 5		1 = Actuator max position test		
		Bit 6		1 = Actuator teaching OK		
		Bit 7		1 = Actuator teaching failed	0 – 255	0...255

5.4 PROPB03 – Generator System RPM

PGN 65283 (0xFF03)

Type: Broadcast cyclic single frame (100 ms)

Source: fpControl or Inverter

Description: Generator RPM. In case of iSeries generators the RPM is sent by the inverter. PROPB03 is required for the "Start without inverter" function.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	255	3	X
hex	X	0	0	FF	03	X
PGN	65283 (FF03)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN	520230							

Content:

Byte	SPN	Data Length (bits)	Data Type	Parameter	Resolution / Offset	Data Range
0	520230	16	uint16	Engine Speed	1 rpm / bit	0 ... 65535
1				(sent from inverter)	0 offset	
2		8			-	-
3		8			-	-
4		8			-	-
5		8			-	-
6		8			-	-
7		8			-	-

5.5 PROPBO5 – Generator System Temperatures

PGN 65285 (0xFF05)

Type: Broadcast cyclic single frame (100 ms)

Source: fpControl

Description: Temperature Information about the system.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	255	5	X
hex	X	0	0	FF	05	X
PGN	65285 (FF05)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN	520204	520205	520206					

Content:

Byte	SPN	Data Length	Data Type	Parameter	Resolution / Offset	Data Range
0	520204	8 bits	uint8	Temperature Winding	1 °C / bit	-40 ... 213 °C
				0xFE = short circuit	-40 offset	
				0xFF = not available		
1	520205	8 bits	uint8	Temperature Exhaust	1 °C / bit	-40 ... 213 °C
				0xFE = short circuit	-40 offset	
				0xFF = not available		
2	520206	8 bits	uint8	Temperature MCU	1 °C / bit	-40 ... 213 °C
				0xFE = short circuit	-40 offset	
				0xFF = not available		
3		8 bits	uint8			
4		8 bits	uint8			
5		8 bits	uint8			
6		8 bits	uint8			
7		8 bits	uint8			

5.6 PROPB0F – Service Hour Counter

PGN 65295 (0xFF0F)

Type: Broadcast cyclic single frame (100 ms)

Description: Service Hour Counter.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	255	15	X
hex	X	0	0	FF	0F	X
PGN	65295 (FF0F)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN	520223							

Content:

Byte	SPN	Data Length	Data Type	Parameter	Resolution / Offset	Data Range
0	520223	32 bits	uint32	Service Hour Counter [LSB]	3 min (1/20 h)	0 ... 214748364,75 h
1				[second byte]	0 offset	
2				[third byte]		
3				[MSB]		
4		8 bits	uint8	-	-	-
5		8 bits	uint8	-	-	-
6		8 bits	uint8	-	-	-
7		8 bits	uint8	-	-	-

5.7 PROPB25 – fpCAN Device Info

PGN 65317 (0xFF25)

Type: Broadcast cyclic single frame (1 s).

Description:

- Sends Bus ID, Module ID, Software Version and Serial Number of each detected fpCAN device.
- Cycles through the detected fpCAN devices on each transmit.

Structure of the 29-bit identifier:

Bits	3	1	1	8	8	8
Name	Prio	EDP	DP	PF	PS	SA
dec	X	0	0	255	37	X
hex	X	0	0	FF	25	X
PGN	65317 (FF25)					

Data Bytes:

Bits	8	8	8	8	8	8	8	8
Name	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7
SPN	520243	520244	520245	520246				

Content:

Byte	SPN	Data Length	Data Type	Parameter	Resolution / Offset	Data Range
0	520243	8 bits	uint8	Bus ID	1 / bit 0 offset	0 ... 255
1	520244	8 bits	uint8	Module ID	1 / bit 0 offset	0 ... 255
2	520245	16 bits	uint16	Software Version	1 / bit 0 offset	0 ... 65535
3						
4	520246	32 bits	uint32	Serial Number	1 / bit 0 offset	0 ... 4.294.967.296
5						
6						
7						

Encoding of »Software Version«

Upper nibble MSB	Lower nibble MSB	LSB
Release Candidate 0-15	Major Version 0-15	Minor Version 0-255

6 Remote Procedure Requests

6.1 Introduction to the topic

Although basic runtime information will be made available on the J1939/NMEA2000® bus it is not possible to map all functionality to the standard PGNs. Because of the necessity to make those unmapped parameters/functions accessible the FP-Bus supports a simplified RPC-mechanism.

6.2 Functionality

It is possible to request/set specific data and/or request the execution of a function on a FP-Bus device. Therefore, the RPC-mechanism uses the proprietary Fischer Panda Messages PGNs PropA00 (PGN 61184) and PropB00 (PGN 65280). PropA00 is used to send the request and due to its definition as address oriented PGN the request can either be sent to an individual device (unicast) or to all devices (multicast). The device processing the request will check if the requested RPC-ID is known to it. If so, it will acknowledge it with sending the answer on PropB00, if not it will not respond anything. In case of an error while processing a request the parameter fields 1-3 of the corresponding response would be set to 0xFFFF_{hex}. PropB00 will always be broadcasted, so that every device on the bus is able to process it (if necessary).

6.3 Request types

The RPC-ID is a unique identifier for individual functions on FP-Bus devices. The identifier itself is 15 bits wide and is represented by the lower 15 bits of the first word of an RPC-Request/-Response. The MSB (bit 15) categorizes it into »read- and write-requests«. The MSB set to 1 indicates a »write-request« (e.g. write something into a register, execute a function that changes parameters, conditions etc.), whereas the MSB set to 0 indicates a read-request (e.g. request of a special parameter, condition etc.).

6.4 Endianness of the RPC-PGNs

Unlike most of the standard PGNs the content of the RPC-PGNs is **big endian** encoded.

6.5 Notice for sending RPC requests

NOTICE

Property damage to the generator control due to cyclic remote procedure requests.

Most remote procedure requests write to the EEPROM.

Frequent writing to the EEPROM can lead to the rapid destruction of this component.

Send remote procedure requests only once, never cyclically.

6.6 RPC-ID 0x000d – Clear errors/warnings

Type: R / W

Description: This RPC clears errors/warnings. If the generator ran into an error - after clearing it resets the generator-status to 0 (standby).

ATTENTION: If the generator-control is in automatic-start mode and there is still an active start request (e.g. by digital input or RPC-ID 0x809c) the generator will try to start again after clearing an error.

Read Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	-	-	-
param #1	-	-	-
param #2	-	-	-
param #3	-	-	-

Read Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	-	-	-
param #1	-	-	-
param #2	-	-	-
param #3	-	-	-

Write Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x800d	-	-
param #1	0xffff: clears all warnings 0x0000 – 0x00ff clears individual warning	1 / bit 0 offset	0 ... 65535
param #2	0xffff: clears error	1 / bit 0 offset	0 ... 65535
param #3	-	-	-

Write Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x800d	-	-
param #1	echoed value of request	1 / bit 0 offset	0 ... 65535
param #2	echoed value of request	1 / bit 0 offset	0 ... 65535
param #3	-	-	-

6.7 RPC-ID 0x0012 – Automatic start mode

Type: R / W

Description: This RPC informs about the status of the automatic start mode (Read Request) and is used to activate/deactivate the automatic start mode (Write Request).

NOTE

At the iControl2 system activating the automatic start is only possible using the control panel.

Read Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x0012	-	-
param #1	-	-	-
param #2	-	-	-
param #3	-	-	-

Read Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x0012	-	-
param #1	0: automatic start-mode off 1: automatic start-mode on	1 / bit 0 offset	0 ... 1
param #2	minimum value	1 / bit 0 offset	0 ... 1
param #3	maximum value	1 / bit 0 offset	0 ... 1

Write Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x8012	-	-
param #1	0: automatic start-mode off 1: automatic start-mode on	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

Write Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x8012	-	-
param #1	0: automatic start-mode off 1: automatic start-mode on	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

6.8 RPC-ID 0x008b – Service done

Type: W

Description: Resetting the service interval to the number of operating hours defined for the relevant generator type.

Write Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x808b	-	-
param #1	0x0001 = service done	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

Write Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x808b	-	-
param #1	0x0001 = service done	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

6.9 RPC-ID 0x008e – Set CPU in Power-Save-Mode (Sleep controller)

Type: W

Description: Remote Power Off.

The panel sends this RPC frame with the first payload word set to “1” which turns off the control.

Write Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x808e	-	-
param #1	0 = Running 1 = Turn off the control	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

Write Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x808e	-	-
param #1	echoed value of request	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

6.10 RPC-ID 0x0093 – Read software release

Type: R

Description: Being requested this RPC delivers the software release of the device.

Read Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x0093	-	-
param #1	[MSB] = server address [LSB] = client address	1 / bit 0 offset	0 ... 65535
param #2	-	-	-
param #3	-	-	-

Read Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x0093	-	-
param #1	[MSB] = Bus address [LSB] = Module ID	1 / bit 0 offset	0 ... 65535
param #2	Software Release format [xx].[yy]	1 / bit 0 offset	0 ... 65535
param #3	-	-	-

6.11 RPC-ID 0x0094 – Read serial number

Type: R

Description: Being requested this RPC delivers the serial number of the addressed device.

Read Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x0094	-	-
param #1	Client address	1 / bit 0 offset	0 ... 65535
param #2	-	-	-
param #3	-	-	-

Read Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x0094	-	-
param #1	[MSB] = Bus address [LSB] = Modul ID	1 / bit 0 offset	0 ... 65535
param #2	Serial number, [MSW]	1 / bit 0 offset	0 ... 65535
param #3	Serial number, [LSW]	-	-

How does an RPC request for the serial number work in practice? Let's dive into it:

In this example we will request the serial number of two communication interfaces using PROP A00 (PGN 61184) (refer to ??). A remote procedure request for RPC ID 0x0094 is sent to each device which acknowledges with PROP B00 (PGN 65280) (refer to ??) as broadcast. Parameter #1 (Payload1) contains the bus address of the subscriber whose serial number is to be requested. In this example it is address »234« (hex. 0xEA). This request must be carried out separately for each bus subscriber whose serial number is required.

Bus	CAN-ID	PGN	DLC	Symbol	Daten
1	18EFF07h	61184	8	PropA	FP_RPC_Request_Code = 0094h - read (/write) s/n FP_RPC_Request_Payload1 = 00EAh FP_RPC_Request_Payload2 = 0000h FP_RPC_Request_Payload3 = 0000h FP_RPC_Request_WriteReq = 0

Figure 7: Example for an RPC request for the serial number

In our example, we also request the serial number of the second communication interface with the address »235«. Below you can see the acknowledgements (PROPB00) of both interfaces to our requests.

Zeit	Bus	Typ	ID / Symbol	Prio	PGN	SA	DA	DLC	Daten
8,6497	1	Rx	PropB_00	3	65280	234	255	8	00 94 EA 00 00 00 47
29,4692	1	Rx	PropB_00	3	65280	235	255	8	00 94 EB 00 FF FF FF FF

Figure 8: Acknowledgements (PROPB00) of both interfaces to the request for the serial number

The contents of the acknowledgement messages in detail:

Read Response	Acknowledgement of the first request	Acknowledgement of the second request
RPC-ID	0x0094	0x0094
param #1	[MSB] = Bus address = 0xEA = 234 dec,	[MSB] = Bus address = 0xEB = 235 dec,
	[LSB] = Modul ID = 0x09 (Com. Interface)	[LSB] = Modul ID = 0x09 (Com. Interface)
param #2	Serial number, [MSW] = 0x0000	Serial number, [MSW] = 0xFFFF = 65535 dec *)
param #3	Serial number, [LSW] = 0x0047 = 71 dec	Serial number, [LSW] = 0xFFFF = 65535 dec

*) The second interface requested in this example is a development hardware and does not have a valid serial number, therefore 0xFFFF.

6.12 RPC-ID 0x009c – Remote start of Generator

Type: R / W

Description: The functionality of this RPC is based on the remote-start feature using the dedicated digital input on the generator control unit. A switch closing the circuit between this digital input and GND would request a generator remote start-procedure. Analogously sending a write request with payload 1 will do. Sending 0 would be the equivalent of opening the switch again. Thinking of a virtual switch (e.g. in a remote application's GUI) the answer Frames of either 0x809c or 0x009c will contain the position (0/1) of this switch. **So that the generator can be started receiving this message the automatic-start mode must be activated.**

Read Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x009c	-	-
param #1	-	-	-
param #2	-	-	-
param #3	-	-	-

Read Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x009c	-	-
param #1	position of remote GUI's switch	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

Write Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x809c	-	-
param #1	1 = start 0 = stop	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

Write Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x809c	-	-
param #1	position of remote GUI's switch	1 / bit 0 offset	0 ... 1
param #2	-	-	-
param #3	-	-	-

6.13 RPC-ID 0x009e – Power on via RPC

Type: W

Description: With this RPC ID, the controller can be switched on via a bus command (remote power on).

Write Request	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x809e	-	-
param #1	0x0001 = remote power on	1 / bit 0 offset	0 ... 1
param #2	don't care	-	-
param #3	don't care	-	-

Write Response	Parameter definition	Resolution / Offset	Data Range
RPC-ID	0x809e	-	-
param #1	echoed value of request	-	-
param #2	-	-	-
param #3	-	-	-

Note: The system can be **switched off** again using **RPC-ID 0x008e**.

Note: If there are several CAN interfaces in the fpCAN bus (several generator systems) you can "wake up" individual systems instead of all together (destination address DA: FF). In this case, the destination address of the corresponding CAN interface must be selected in the PROPA00 message (PGN 61184).



Fischer Panda GmbH

Otto-Hahn-Str. 40
33104 Paderborn
Germany
D PHONE +49 5254 9202-0
Email: info@fischerpanda.de
Web: <https://www.fischerpanda.de/>