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PGS ICT820 J1939 ISSUE 1

SAE J1939 TECHNICAL INFORMATION

DEVICE PROFILE FOR PENNY AND GILES ICT820

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2 Change History

Issue	Date	Change	Author
1	28/01/13	Original	D. Searle

3 PGNs

3.1 PGN_PG 65400

ICT820 Position

PGICT820P

This parameter group is used to transmit position, limit flags, error status and access state information about the ICT820 sensor.

Transmission Repetition Rate: 10ms / 20ms / 30ms / 40ms / 50ms / 60ms / 70ms / 80ms / 90ms / 100mS (configurable)

Data Length:	4	
Extended Data Page:	0	
Data Page:	0	
PDU Format:	255	
PDU Specific:	120	PGN Supporting Information:
Default Priority:	3	
Parameter Group Number:	65400 (0x00FF78)	

Start Position	Length	Parameter Name	SPN
1-2	2 bytes	Position	1
3.1	1 bit	High Error Flag	4
3.2	1 bit	High Warning Flag	5
3.3	1 bit	Low Warning Flag	6
3.4	1 bit	Low Error Flag	7
4.1	2 bits	Sensor Error Status	8
4.3	2 bits	EEPROM Error Status	3
4.5	2 bits	Access State	20

3.2 PGN_PG 65416

ICT820 Temperature

PGICT820T

This parameter group is used to transmit the current temperature of the ICT820 sensor.

Transmission Repetition Rate: 1 s
 Data Length: 2
 Extended Data Page: 0
 Data Page: 0
 PDU Format: 255
 PDU Specific: 136 PGN Supporting Information:
 Default Priority: 3
 Parameter Group Number: 65416 (0x00FF88)

Start Position	Length	Parameter Name	SPN
1-2	2 bytes	Current Temperature	2

3.3 PGN_PG 65432

ICT820 Serial Number

PGICT820SN

This parameter group is used to transmit the serial number of the ICT820 sensor.

Transmission Repetition Rate: On request
 Data Length: 4
 Extended Data Page: 0
 Data Page: 0
 PDU Format: 255
 PDU Specific: 152 PGN Supporting Information:
 Default Priority: 3
 Parameter Group Number: 65432 (0x00FF98)

Start Position	Length	Parameter Name	SPN
1-4	4 bytes	Serial Number	9

3.4 PGN_PG 65480 ICT820 Command Acknowledge PGICT820CA

This parameter group is used to transmit an acknowledge message from the ICT820 sensor on successful receipt and processing of a command message.

Transmission Repetition Rate: On request
 Data Length: 1
 Extended Data Page: 0
 Data Page: 0
 PDU Format: 255
 PDU Specific: 200 PGN Supporting Information:
 Default Priority: 3
 Parameter Group Number: 65480 (0x00FFC8)

Start Position	Length	Parameter Name	SPN
1	1 byte	Acknowledged PDU Specific	19

3.5 PGN_PG 65496 ICT820 Max & Min Temperatures PGICT820MMT

This parameter group is used to transmit information about the maximum and minimum temperatures the ICT820 sensor has operated under.

Transmission Repetition Rate: On request
 Data Length: 4
 Extended Data Page: 0
 Data Page: 0
 PDU Format: 255
 PDU Specific: 216 PGN Supporting Information:
 Default Priority: 3
 Parameter Group Number: 65496 (0x00FFD8)

Start Position	Length	Parameter Name	SPN
1-2	2 bytes	Minimum Temperature	11
3-4	2 bytes	Maximum Temperature	10

3.6 PGN_PG 65408**ICT820 Set Start End Points****PGICT820SSEP**

This parameter group is transmitted to the ICT820 sensor to configure the start and end points.

Receipt of this command message is only processed by the ICT820 sensor if the Access State (SPN 20) equals 1 (Unlocked). The ICT820 sensor can be unlocked by sending PGN_PG 65422.

If Start Or End Position Selection (SPN 21) is equal to 0 (Start Position) the current mechanical position of the ICT820 sensor will be stored and used to represent the 0 Position output (SPN 1).

If Start Or End Position Selection (SPN 21) is equal to 1 (End Position) the current mechanical position of the ICT820 sensor will be stored and used to represent the 8191 Position output (SPN 1).

Changes to the start and end points are reflected in the Position output (SPN 1) immediately. To save the setting permanently into EEPROM, PGICT820SC (PGN 65411) must be received by the device.

Transmission Repetition Rate: As required

Data Length: 1

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 128

Default Priority: 3

Parameter Group Number: 65408 (0x00FF80)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1	1 byte	Start Or End Position Selection	21

3.7 PGN_PG 65411

ICT820 Save Configuration

PGICT820SC

This parameter group is transmitted to the ICT820 sensor to permanently store any configured attributes to EEPROM.

Receipt of this command message is only processed by the ICT820 sensor if the Access State (SPN 20) equals 1 (Unlocked). The ICT820 sensor can be unlocked by sending PGN_PG 65422.

Transmission Repetition Rate: As required

Data Length: 0

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 131

Default Priority: 3

Parameter Group Number: 65411 (0x00FF83)

PGN Supporting Information:

3.8 PGN_PG 65412**ICT820 Set Limit Thresholds****PGICT820SLT**

This parameter group is transmitted to the ICT820 sensor to configure the limit thresholds.

Receipt of this command message is only processed by the ICT820 sensor if the Access State (SPN 20) equals 1 (Unlocked). The ICT820 sensor can be unlocked by sending PGN_PG 65422.

If Position output (SPN 1) is less than Low Error Threshold (SPN 22) then Low Error Flag (SPN 7) will be set to 1.

If Position output (SPN 1) is less than Low Warning Threshold (SPN 23) then Low Warning Flag (SPN 6) will be set to 1.

If Position output (SPN 1) is greater than High Warning Threshold (SPN 24) then High Warning Flag (SPN 5) will be set to 1.

If Position output (SPN 1) is greater than High Error Threshold (SPN 25) then High Error Flag (SPN 4) will be set to 1.

Changes to the limit thresholds are reflected in the limit flags (SPN 4-7) immediately. To save the setting permanently into EEPROM, PGICT820SC (PGN 65411) must be received by the device.

Transmission Repetition Rate: As required

Data Length: 8

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 132

Default Priority: 3

Parameter Group Number: 65412 (0x00FF84)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1-2	2 bytes	Low Error Threshold	22
3-4	2 bytes	Low Warning Threshold	23
5-6	2 bytes	High Warning Threshold	24
7-8	2 bytes	High Error Threshold	25

3.9 PGN_PG 65413

ICT820 Set Baud Rate

PGICT820SBR

This parameter group is transmitted to the ICT820 sensor to configure the baud rate.

Receipt of this command message is only processed by the ICT820 sensor if the Access State (SPN 20) equals 1 (Unlocked). The ICT820 sensor can be unlocked by sending PGN_PG 65422.

Selectable options for the baud rate are defined in Baud Rate Selection - SPN 26.

Changes to the baud rate are not reflected immediately. To reflect baud rate changes the new baud rate must be saved permanently into EEPROM by sending PGICT820SC (PGN 65411), then power cycling the ICT820.

Transmission Repetition Rate: As required

Data Length: 1

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 133

Default Priority: 3

Parameter Group Number: 65413 (0x00FF85)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1	1 byte	Baud Rate Selection	26

3.10 PGN_PG 65414**ICT820 Set Frame Rate****PGICT820SFR**

This parameter group is transmitted to the ICT820 sensor to configure the frame rate of PGICT820P (PGN 65400) message.

Receipt of this command message is only processed by the ICT820 sensor if the Access State (SPN 20) equals 1 (Unlocked). The ICT820 sensor can be unlocked by sending PGN_PG 65422.

Selectable options for the frame rate are defined in Frame Rate Selection - SPN 27.

Changes to the frame rate are reflected in the transmission rate of PGICT820P (PGN 65400) immediately. To save the setting permanently into EEPROM, PGICT820SC (PGN 65411) must be received by the device.

Transmission Repetition Rate: As required

Data Length: 1

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 134

Default Priority: 3

Parameter Group Number: 65414 (0x00FF86)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1	1 byte	Frame Rate Selection	27

3.11 PGN_PG 65419

ICT820 Request Serial Number

PGICT820RSN

When this parameter group is transmitted to the ICT820 sensor, the sensor will reply with PGICT820SN (PGN 65432) message.

Transmission Repetition Rate: As required

Data Length: 0

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 139

Default Priority: 3

Parameter Group Number: 65419 (0x00FF8B)

PGN Supporting Information:

3.12 PGN_PG 65422**ICT820 Set Access State****PGICT820SAS**

This parameter group is transmitted to the ICT820 sensor to set the required access state, either locked or unlocked.

If Access Passcode (SPN 28) contains the word 'Customer' in Ascii code:

Byte 0:	0x43	'C'
Byte 1:	0x75	'u'
Byte 2:	0x73	's'
Byte 3:	0x74	't'
Byte 4:	0x6F	'o'
Byte 5:	0x6D	'm'
Byte 6:	0x65	'e'
Byte 7:	0x72	'r'

Then the device will be unlocked and Access State (SPN 20) will equal 1 (Unlocked).

If Access Passcode (SPN 28) contains any other code, then the device will be locked and Access State (SPN20) will equal 0 (Locked).

Transmission Repetition Rate: As required

Data Length: 8

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 142

Default Priority: 3

Parameter Group Number: 65422 (0x00FF8E)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1-8	8 bytes	Access Passcode	28

3.13 PGN_PG 65426**ICT820 Set Node ID****PGICT820SNI**

This parameter group is transmitted to the ICT820 sensor to configure the node.

Receipt of this command message is only processed by the ICT820 sensor if the Access State (SPN 20) equals 1 (Unlocked). The ICT820 sensor can be unlocked by sending PGN_PG 65422.

Changes to the node id are reflected immediately. To save the setting permanently into EEPROM, PGICT820SC (PGN 65411) must be received by the device.

Transmission Repetition Rate: As required

Data Length: 1

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 146

Default Priority: 3

Parameter Group Number: 65426 (0x00FF92)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1	1 byte	Node ID Selection	29

3.14 PGN_PG 65429**ICT820 Request Max & Min Temperatures****PGICT820RMMT**

When this parameter group is transmitted to the ICT820 sensor, the sensor will reply with PGICT820MMT (PGN 65496) message.

Transmission Repetition Rate: As required

Data Length: 0

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 149

Default Priority: 3

Parameter Group Number: 65429 (0x00FF95)

PGN Supporting Information:

4 SPNs

4.1 SPN_PG 1 Position

ICT820 Linear Position output.

Data Length:	2 bytes	
Resolution:	(Start Position – End Position)* / 8192 per bit, 0 offset	
Data Range:	0 to 8191 counts	Operational Range: same as data range
Type:	Measured	
Supporting Information:		
PGN reference:	65400	

NOTE:* The Start and End Positions are those set using PGNICT820SSEP.

4.2 SPN_PG 2 Current Temperature

Current temperature of the ICT820 core.

Data Length:	2 bytes	
Resolution:	1°C / bit, 0 offset	
Data Range:	-32768 to 32767 °C	Operational Range: same as data range
Type:	Measured	
Supporting Information:		
PGN reference:	65416	

4.3 SPN_PG 3 EEPROM Error Status

ICT820 EEPROM error status signal which indicates the status of the onboard EEPROM memory.

00 – EEPROM data status unknown
 01 – EEPROM data OK
 10 – EEPROM data default data
 11 – EEPROM data integrity error

Data Length:	2 bits	
Resolution:	4 states / 2 bit, 0 offset	
Data Range:	0 to 3	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65400	

4.4 *SPN_PG 4 High Error Flag*

ICT820 high error status flag. This flag is set when the position output is equal to or greater than the high error threshold (99% of stroke by default).

0 – Limit threshold not reached

1 – Limit threshold reached

Data Length:	1 bit	
Resolution:	2 states / 1 bit, 0 offset	
Data Range:	0 to 1	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65400	

4.5 *SPN_PG 5 High Warning Flag*

ICT820 high warning status flag. This flag is set when the position output is equal to or greater than the high warning threshold (97% of stroke by default).

0 – Limit threshold not reached

1 – Limit threshold reached

Data Length:	1 bit	
Resolution:	2 states / 1 bit, 0 offset	
Data Range:	0 to 1	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65400	

4.6 *SPN_PG 6 Low Warning Flag*

ICT820 low warning status flag. This flag is set when the position output is equal to or greater than the low warning threshold (3% of stroke by default).

0 – Limit threshold not reached

1 – Limit threshold reached

Data Length:	1 bit	
Resolution:	2 states / 1 bit, 0 offset	
Data Range:	0 to 1	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65400	

4.7 *SPN_PG 7 Low Error Flag*

ICT820 low error status flag. This flag is set when the position output is equal to or greater than the low error threshold (1% of stroke by default).

0 – Limit threshold not reached

1 – Limit threshold reached

Data Length:	1 bit	
Resolution:	2 states / 1 bit, 0 offset	
Data Range:	0 to 1	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65400	

4.8 *SPN_PG 8 Sensor Error Status*

ICT820 sensor error status signal which indicates the status of the device.

00 – Sensor OK

01 – Sensor coil short circuit

10 – Sensor coil open circuit

11 – Sensor unknown error

Data Length:	2 bits	
Resolution:	4 states / 2 bit, 0 offset	
Data Range:	0 to 3	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65400	

4.9 *SPN_PG 9 Serial Number*

The unique device serial number.

Data Length:	4 bytes	
Resolution:	n/a, 0 offset	
Data Range:	0 - 4294967295	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65432	

4.10 SPN_PG 10 Maximum Temperature

Maximum temperature the ICT820 core has reached.

Data Length:	2 bytes	
Resolution:	1°C / bit, 0 offset	
Data Range:	-32768 to 32767 °C	Operational Range: same as data range
Type:	Measured	
Supporting Information:		
PGN reference:	65496	

4.11 SPN_PG 11 Minimum Temperature

Minimum temperature the ICT820 core has reached.

Data Length:	2 bytes	
Resolution:	1°C / bit, 0 offset	
Data Range:	-32768 to 32767 °C	Operational Range: same as data range
Type:	Measured	
Supporting Information:		
PGN reference:	65496	

4.12 SPN_PG 19 Acknowledged PDU Specific

The PDU that is acknowledged.

Data Length:	1 byte	
Resolution:	n/a, 0 offset	
Data Range:	0 - 255	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65480	

4.13 SPN_PG 20 Access State

ICT820 access status indicator. The access state can be set using PGNICT820SAS message.

00 – Device Locked
 01 – Device Unlocked
 10 – Reserved
 11 – Reserved

Data Length:	2 bits	
Resolution:	4 states / 2 bit, 0 offset	
Data Range:	0 to 3	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65400	

4.14 SPN_PG 21 Start Or End Position Selection

Selection of the Start Position or End Position setting.

0x00 – Set the Start Position
 0x01 – Set the End Position

Data Length:	1 byte	
Resolution:	n/a, 0 offset	
Data Range:	0 - 255	Operational Range: 0 - 1
Type:	Status	
Supporting Information:		
PGN reference:	65408	

4.15 SPN_PG 22 Low Error Threshold

Low Error Threshold set point. The default is 82, approximately 1% of stroke.

Data Length:	2 bytes	
Resolution:	(Start Position – End Position)* / 8192 per bit, 0 offset	
Data Range:	0 to 8191counts	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65412	

NOTE:* The Start and End Positions are those set using PGNICT820SSEP.

4.16 SPN_PG 23 Low Warning Threshold

Low Warning Threshold set point. The default is 246, approximately 3% of stroke.

Data Length: 2 bytes
Resolution: (Start Position – End Position)* / 8192 per bit, 0 offset
Data Range: 0 to 8191counts Operational Range: same as data range
Type: Status
Supporting Information:
PGN reference: 65412

NOTE:* The Start and End Positions are those set using PGNICT820SSEP.

4.17 SPN_PG 24 High Warning Threshold

High Warning Threshold set point. The default is 7945, approximately 97% of stroke.

Data Length: 2 bytes
Resolution: (Start Position – End Position)* / 8192 per bit, 0 offset
Data Range: 0 to 8191counts Operational Range: same as data range
Type: Status
Supporting Information:
PGN reference: 65412

NOTE:* The Start and End Positions are those set using PGNICT820SSEP.

4.18 SPN_PG 25 High Error Threshold

High Error Threshold set point. The default is 8109, approximately 99% of stroke.

Data Length: 2 bytes
Resolution: (Start Position – End Position)* / 8192 per bit, 0 offset
Data Range: 0 to 8191counts Operational Range: same as data range
Type: Status
Supporting Information:
PGN reference: 65412

NOTE:* The Start and End Positions are those set using PGNICT820SSEP.

4.19 SPN_PG 26 Baud Rate Selection

Baud Rate selection byte.

0x00 – 50Kbs
0x01 – 125Kbs
0x02 – 250Kbs
0x03 – 500Kbs
0x04 – 1Mbs

Data Length: 1 byte
Resolution: n/a, 0 offset
Data Range: 0 - 255
Type: Status
Supporting Information:
PGN reference: 65413

Operational Range: 0 - 4

4.20 SPN_PG 27 Frame Rate Selection

Frame Rate selection byte.

0x00 – 100mS
0x01 – 10mS
0x02 – 20mS
0x03 – 30mS
0x04 – 40mS
0x05 – 50mS
0x06 – 60mS
0x07 – 70mS
0x08 – 80mS
0x09 – 90mS

Data Length: 1 byte
Resolution: n/a, 0 offset
Data Range: 0 - 255
Type: Status
Supporting Information:
PGN reference: 65414

Operational Range: 0 - 9

4.21 SPN_PG 28 Access Passcode

If this Access Passcode contains the word 'Customer' in Ascii code when received by the ICT820 device then the device will be unlocked and Access State (SPN 20) will equal 1 (Unlocked). Any other passcode will lock the device and Access State (SPN 20) will equal 0 (Locked).

Byte 0:	0x43	'C'
Byte 1:	0x75	'u'
Byte 2:	0x73	's'
Byte 3:	0x74	't'
Byte 4:	0x6F	'o'
Byte 5:	0x6D	'm'
Byte 6:	0x65	'e'
Byte 7:	0x72	'r'

Data Length:	4 bytes	
Resolution:	n/a, 0 offset	
Data Range:	0 - 4294967295	Operational Range: same as data range
Type:	Status	
Supporting Information:		
PGN reference:	65422	

4.22 SPN_PG 29 Node ID Selection

Node ID selection byte.

Data Length:	1 byte	
Resolution:	n/a, 0 offset	
Data Range:	0 - 255	Operational Range: 1 - 127
Type:	Status	
Supporting Information:		
PGN reference:	65426	