


NRH27C CAN Rotary Hall-Effect Sensor

PGS-NRH27C J1939 ISSUE 1

SAE J1939 TECHNICAL INFORMATION

CURTISS-WRIGHT INDUSTRIAL DIVISION PENNY & GILES SENSORS

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Change History

Issue	Date	Change	Author
1	02/11/15	Created	D Searle
2	13/04/23	Company information updated	N Banach

PGNs

PGN_PG 65400

NRH27C Rotary Position

PGNRH27CRP

This parameter group is used to transmit dual channel rotary positional information about the NRH27C sensor.

Transmission Repetition Rate: 25mS / 50mS / 100mS

Data Length: 5

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 120

Default Priority: 3

Parameter Group Number: 65400 (0x00FF78)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1-2	2 bytes	Rotary Position Channel 1	1
3-4	2 bytes	Rotary Position Channel 2	2
5.1	2 bits	Channel 1 Status	3
5.3	2 bits	Channel 2 Status	4
5.5	4 bits	System Status	5
6	1 byte	Channel 1 Error Flags	6
7	1 byte	Channel 2 Error Flags	7

PGN_PG 65401

NRH27C Acknowledge

PGNRH27A

This parameter group is used to transmit an acknowledgement message on successful receipt of a configuration command (PGN_PG 65402).

Transmission Repetition Rate: As required

Data Length: 8
 Extended Data Page: 0
 Data Page: 0
 PDU Format: 255
 PDU Specific: 120
 Default Priority: 3
 Parameter Group Number: 65401 (0x00FF79)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1	1 byte	Command ID	8
2-8	7 bytes	0x00 (for factory use)	

PGN_PG 65402

NRH27C Configuration Command

PGNRH27CC

This parameter group is used to configure the NRH27C device. See SPN_PG 9 (Command ID) and SPN_PG 10 (Command Data) for available commands. When a configuration command has been successfully received and processed the NRH27C will reply with an acknowledgement (PGN_PG 65401).

Transmission Repetition Rate: As required

Data Length: 8
 Extended Data Page: 0
 Data Page: 0
 PDU Format: 255
 PDU Specific: 120
 Default Priority: 3
 Parameter Group Number: 65402 (0x00FF80)

PGN Supporting Information:

Start Position	Length	Parameter Name	SPN
1	1 byte	Command ID	8
2-8	7 bytes	Command Data	9

SPNs***SPN_PG 1 Rotary Position Channel 1***

NRH27C Angle of rotation for channel 1 output.

Data Length:	2 bytes**	
Resolution:	0.022* degrees/bit, 0 offset	
Data Range:	0 to 1440 degrees	Operational Range: 0 to 360 degrees
Type:	Measured	
Supporting Information:		
PGN reference:	65400	

Note:

* 360 degrees using least significant 14 bits

** Position data is transmitted in MOTOROLA format (i.e. most significant byte first)

SPN_PG 2 Rotary Position Channel 2

NRH27C Angle of rotation for channel 2 output.

Data Length:	2 bytes**	
Resolution:	0.022* degrees/bit, 0 offset	
Data Range:	0 to 1440 degrees	Operational Range: 0 to 360 degrees
Type:	Measured	
Supporting Information:		
PGN reference:	65400	

Note:

* 360 degrees using least significant 14 bits

** Position data is transmitted in MOTOROLA format (i.e. most significant byte first)

SPN_PG 3 Channel 1 Status

NRH27C Status signal which indicates the status of channel 1.

00 – Disabled
01 – Enabled / Normal Operation
10 – Error
11 – Not Available

Note: Bit order is LSB 1

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

SPN_PG 4 Channel 2 Status

NRH27C Status signal which indicates the status of channel 2.

- 00 – Disabled
- 01 – Enabled / Normal Operation
- 10 – Error
- 11 – Not Available

Note: Bit order is LSB 1

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

SPN_PG 5 System Status

NRH27C status signal which indicates the status of the system. Any value other than 0 represents an internal system error. Outputs should be ignored if there is a system error.

- 0000 – System OK
- xxxx – System Error

Data Length:	4 bits	
Resolution:	2 states/4 bit, 0 offset	
Data Range:	0 to 16	Operational Range: same as data range
Type:	Measured	
Supporting Information:		
PGN reference:	65400	

SPN_PG 6 Channel 1 Error Flags

Channel 1 Error Flags indicates error states of various diagnostic available for channel 1.

Bit Position	Error Description
LSB 1	ADC Failure
2	ADC Saturation (Electrical failure or field too strong)
3	Analogue Gain Below Trimmed Threshold (Likely reason: field too weak)
4	Magnetic Field Too Weak
5	Magnetic Field Too Strong
6	Analogue Gain Above Trimmed Threshold (Likely reason: field too strong)
7	Analogue Chain Rough Offset Compensation: Clipping
MSB 8	Device Supply Vdd Greater than 7V

Note: Bit order is LSB 1

For each bit:

0 – No error

1 – Error

Data Length:	1 byte**	
Resolution:	256, 0 offset	
Data Range:	0 to 256	Operational Range: same as data range
Type:	Measured	
Supporting Information:		
PGN reference:	65400	

Note:

** Position data is transmitted in MOTOROLA format (i.e. most significant byte first)

SPN_PG 7 Channel 2 Error Flags

Channel 2 Error Flags indicates error states of various diagnostic available for channel 2.

Bit Position	Error Description
LSB 1	ADC Failure
2	ADC Saturation (Electrical failure or field too strong)
3	Analogue Gain Below Trimmed Threshold (Likely reason: field too weak)
4	Magnetic Field Too Weak
5	Magnetic Field Too Strong
6	Analogue Gain Above Trimmed Threshold (Likely reason: field too strong)
7	Analogue Chain Rough Offset Compensation: Clipping
MSB 8	Device Supply Vdd Greater than 7V

Note: Bit order is LSB 1

For each bit:

0 – No error

1 – Error

Data Length: 1 byte**

Resolution: 256, 0 offset

Data Range: 0 to 256

Operational Range: same as data range

Type: Measured

Supporting Information:

PGN reference: 65400

Note:

** Position data is transmitted in MOTOROLA format (i.e. most significant byte first)

SPN_PG 8 Command ID

This SPN is used to identify which command to process on receipt of a configuration command (PGN_PG 65402). Additional data needed to process the command if needed is set in SPN_PG 9 (Command Data).

When used in the Acknowledge message (PGN_PG 65401) this SPN will reflect the command that has been processed.

Data Length: 1 byte
 Resolution: 256, 0 offset
 Data Range: 0 to 256
 Type: Measured
 Supporting Information:
 PGN reference: 65401 / 65402

Operational Range: 1 to 7

Value	Command
0x01	Unlock
0x02	Node ID
0x03	Frame Rate
0x04	Baud Rate
0x05	Output Direction
0x06	Zero
0x07	Save

SPN_PG 9 Command Data

This SPN is used for any additional data needed to process the command (SPN_PG 8) if needed. It is always 7 bytes long with unused bytes set to 0x00.

Data Length: 7 bytes
 Resolution: n/a
 Data Range: n/a
 Type: Measured
 Supporting Information:
 PGN reference: 65402
 Operational Range: n/a

Command (SPN_PG 8)	Data Bytes (SPN_PG 9)	Description
(0x01) Unlock	Byte 1 – 0x2A ('*') Byte 2 – 0x55 ('U') Byte 3 – 0x4E ('N') Byte 4 – 0x4C ('L') Byte 5 – 0x4F ('O') Byte 6 – 0x43 ('C') Byte 7 – 0x4B ('K')	This command unlocks the device for configuration. No other commands will be processed until the NRH27C first receives this Unlock command.
(0x02) Node ID	Byte 1 – New Node ID In the range of 0x00 – 0xF7	This command sets the Node ID for the device.
(0x03) Frame Rate	Byte 1 – New Frame Rate Chosen from: 1 – 25mS 2 – 50mS 3 – 100mS	This command sets the Frame Rate for the device.
(0x04) Baud Rate	Byte 1 – New Baud Rate Chosen from: 1 – 50 Kbps 2 – 125 Kbps 3 – 250 Kbps 4 – 500 Kbps 5 – 1 Mbps	This command sets the Baud Rate for the device. It is updated at next power up.
(0x05) Output Direction	Byte 1 – Channel Where: 0x00 – Channel 1 0x01 – Channel 2 Byte 2 – Direction Where: 0x00 – Counter Clockwise 0x01 – Clockwise	This command sets the output direction for a channel.
(0x06) Zero	Byte 1 – Channel Where: 0x00 – Channel 1 0x01 – Channel 2	This command sets the current position to 0° for a channel.
(0x07) Save	Unused, set all to 0x00	This command saves any previous configuration settings permanently to EEPROM.