



NRH27C

No-Contact, Rotary Position Sensor

- **Non-Contact – Hall-effect technology**
- **Wear-Free – no mechanical degradation**
- **CANbus J1939 output**
- **Simple mounting, low-profile design**
- **360° Measurement angle**
- **5V or 9-30V supply options**
- **Dual Hall-effect sensors**
- **On-board diagnostics – pre-defined error messages**
- **Encapsulated electronics**
- **Sealing up to IP69K (connector dependent)**
- **AMP or Deutsch connector options**
- **Flying-lead option**
- **Protective cable conduit option**



The NRH27C is a CANbus output sensor from the family of NRH27x No-Contact, Rotary Position Sensors that offers the optimal combination of performance, safety and cost. All variants utilise proven Hall-effect, sensing technology and are accommodated in a low-profile (9.5mm) housing with a compact footprint of just 36 x 35mm.

The full range of the digital output span corresponds to a rotation of 360°, and the positional information is determined by the angle of the supplied magnet relative to the sensor body. The maximum air gap between magnet and sensor is 7mm, while concentric offsets of up to 2mm can be tolerated with minimal impact on output linearity. The magnet can be supplied in a convenient carrier, housed in a bolt, as a plug or loose.

Innovative circuit design allows the sensor to be powered from a regulated 5V supply or a varying voltage in the range of 9-30V, such as a vehicle's battery.

Two physically independent, Hall-effect sensing signals are sent separately with the CAN message structure, to allow for system error checking of the positional data meaning high-performing, safety-critical applications can easily be addressed. Furthermore, an on-board diagnostic function means pre-defined error messages can be sent to define the present state of the sensor. The versatile, factory-programmable electronics can be easily set to different baud and/or frame rates according to system requirements.

A fully-encapsulated design offers exceptional levels of performance with respect to water and dust, shock, vibration and temperature, meaning the sensor is ideal for use in hostile, on- and off-highway vehicle environments.

Connection options are industry-standard AMP Supersal (IP68 rated) or Deutsch DT04 series (IP67 rated) connectors, or simple flying leads for customer termination. The sensor can also be supplied with a protective conduit for the cabling.

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CONFIGURATION & ORDERING CODES

NRH27C-XXX-XX-XX-X-X-XXX-XX

Type	Output	Direction	Baud Rate	Node ID (Hexadecimal)	Frame Rate	Magnet	Cable	Connector
NRH27C	X	X	X	XX	X	X	XXX	XX
	J	3	1	01-F7	1	O	P2C	C0
		4	2		2	B	P2N	C1
		5	3		3	P		C2
		6	4		4	M		
		5						

OUTPUT

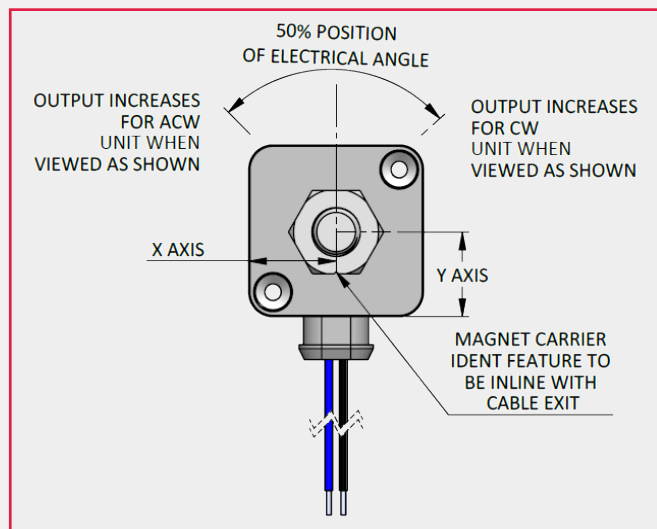
NRH27C-X-X-X-XX-X-X-XXX-XX

Code	Description
J	J1939 Protocol

DIRECTION

NRH27C- X-X-X-XX-X-X-XXX-XX

Code	Description
3	Both clockwise
4	Both anti-clockwise
5	Output 1 clockwise, Output 2 anti-clockwise
6	Output 1 anti-clockwise, Output 2 clockwise



BAUD RATE

NRH27C- X-X-X-XX-X-X-XXX-XX

Code	Description
1	50 kbit/s
2	125 kbit/s
3	250 kbit/s
4	500 kbit/s
5	1 Mbit/s

NODE ID (IN HEXADECIMAL)

NRH27C- X-X-X-XX-X-X-XXX-XX

Code	Description
01	Factory set between 01 and F7

FRAME RATE

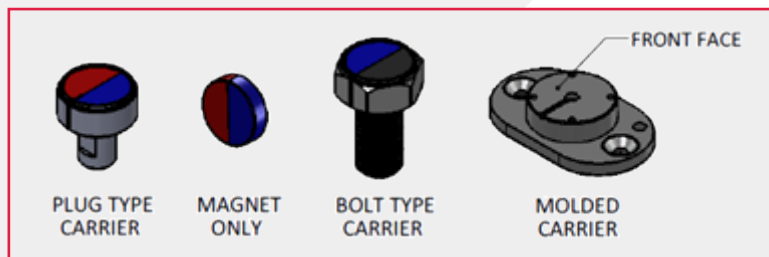
NRH27C- X-X-X- XX-X-X-XXX-XX

Code	Description
1	25 ms
2	50 ms
3	100 ms
4	10 ms

MAGNET

NRH27C- X-X-X- XX- X-X-XXX-XX

Code	Description
O	Molded carrier
B	Bolt type carrier
P	Plug type carrier
M	Magnet only



CABLE

NRH27C-XX-X-X-XX-X-X-XXX-XX

Code	Description
P2C	0.2m length with protective conduit tube (for C1 and C2 connector options)
P2N	0.2m length, no conduit tube (for no connector option, C0)

CONNECTOR

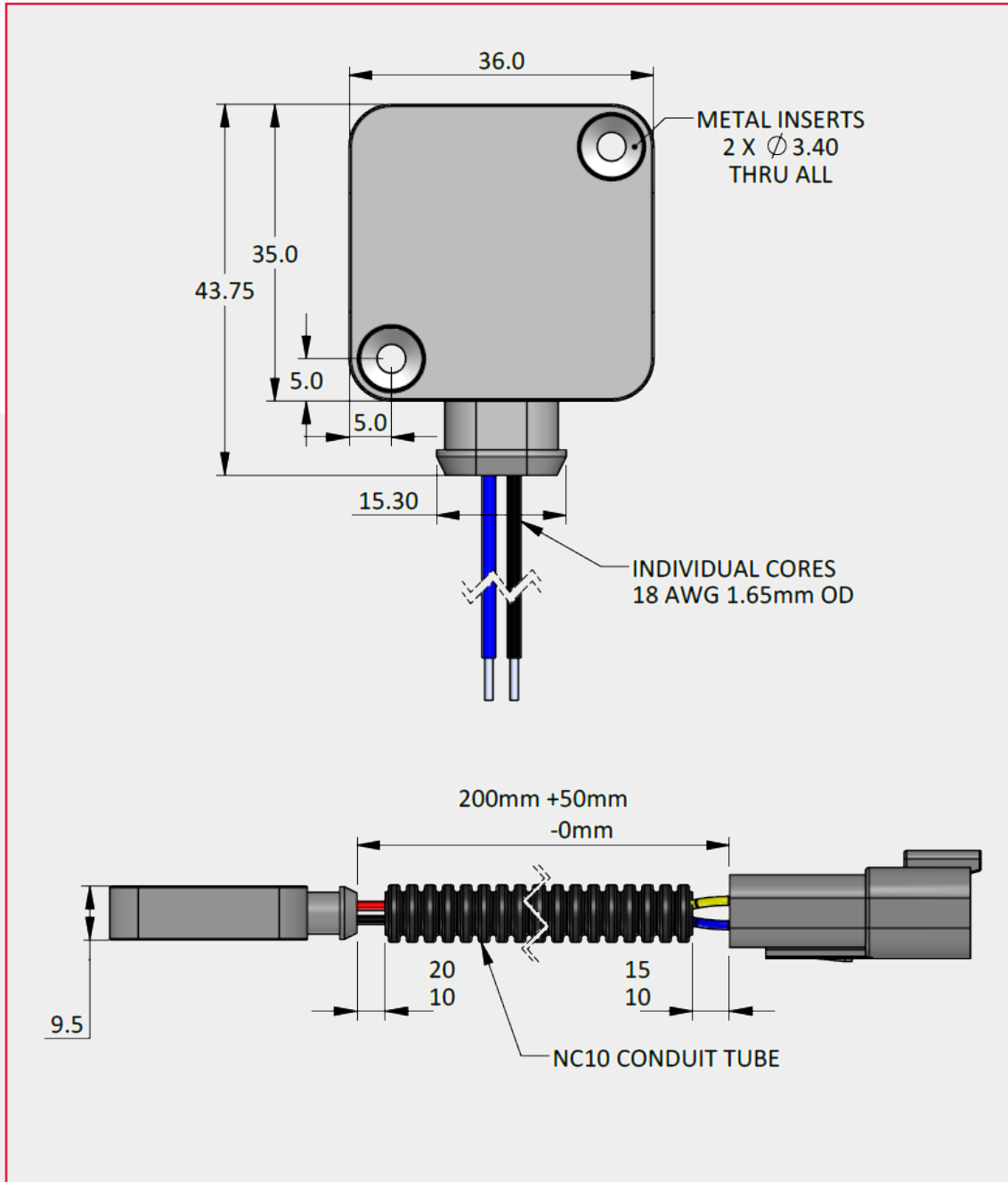
NRH27C-XX-X-X-XX-X-X-XXX-**XX**

Code	Description
C0	No connector, 4-way flying leads
C1	Deutsch DT04
C2	AMP Superseal

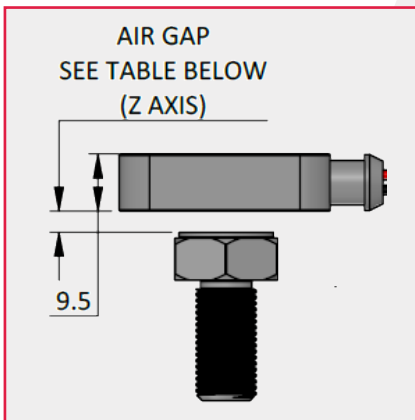
INSTALLATION

MECHANICAL

Sensor



Magnet



Magnet Type

BOLT & PLUG TYPE

MOLDED CARRIER

MAGNET ONLY

Air Gap

2-7mm

1.5-6.5mm from front face of carrier

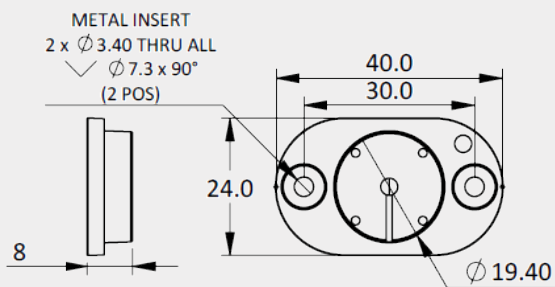
3-8mm

NOTE

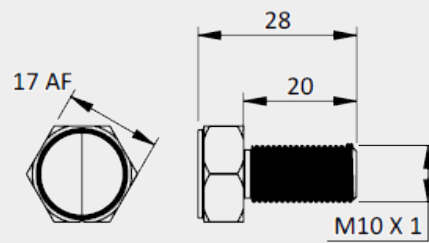
All stated specifications are based on a nominal air gap of 3.5mm. Per the table above, other air gaps are possible but some specifications may vary. Please consult Curtiss-Wright for further details.

If the unit is operated when the magnet is outside the recommended air gap, the output will default to error message 0xFFFF

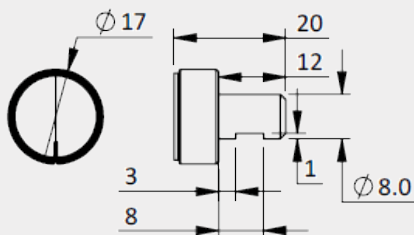
Molded Carrier



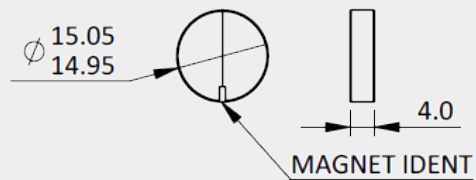
Bolt Type



Plug Type



Magnet Only

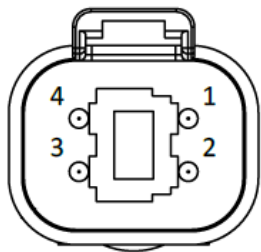


ELECTRICAL CONNECTIONS

Flying Leads (C0)

Color	Function
BLACK	GND (0V)
RED	Vsupply
BLUE	CANL
YELLOW	CANH

Deutsch DT04 (C1)

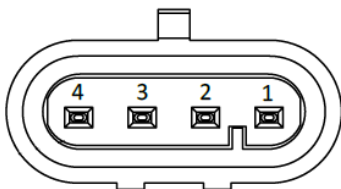


Deutsch DT04 4P-E004 with gold contact 0460-202-1631

Mating Part No: DT06-4S-**** (plug) & 0462-201-1631 (pins)

Pin	Function
1	GND (0V)
2	Vsupply
3	CANL
4	CANH

AMP Superseal (C2)



AMP 1.5 Superseal 282106-1

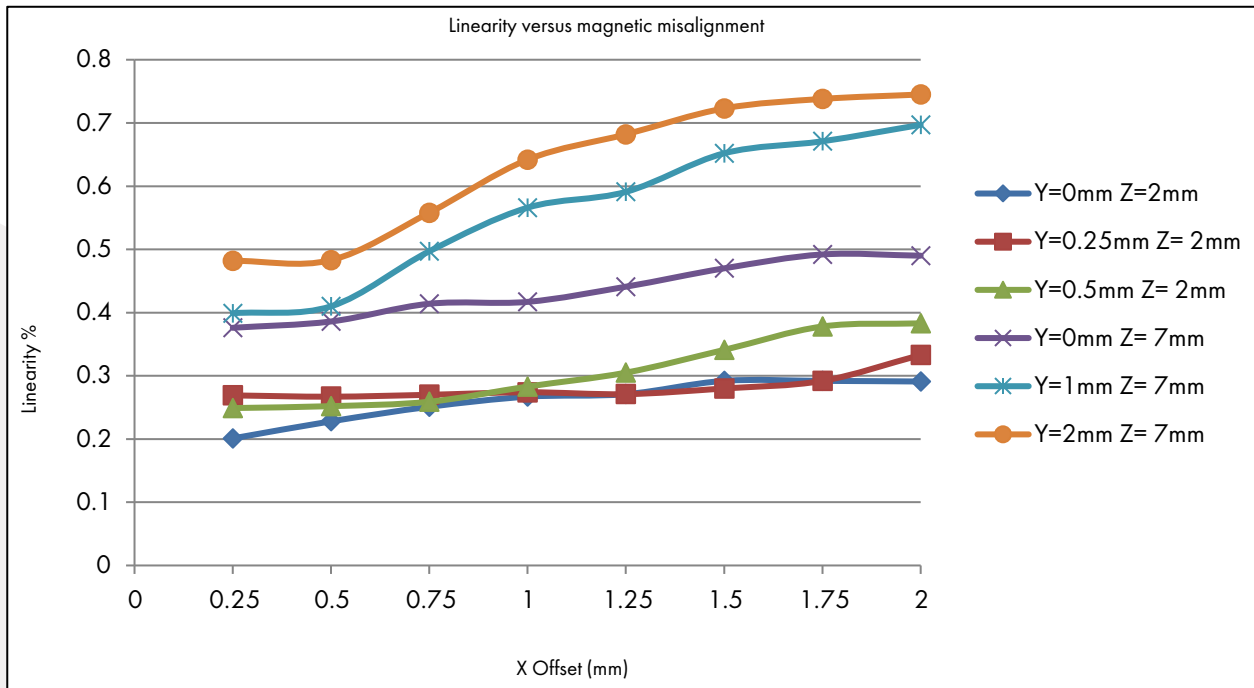
Mating Part No: 282088-X (plug) & 183025-1 (pins)

Pin	Function
1	GND (0V)
2	Vsupply
3	CANL
4	CANH

SPECIFICATIONS

ELECTRICAL

MEASUREMENT RANGE	360°
SUPPLY VOLTAGE	5Vdc \pm 0.5Vdc or 9-30Vdc unregulated – auto-selects
SUPPLY CURRENT	<60mA
SUPPLY REVERSE POLARITY PROTECTION	Yes
SHORT-CIRCUIT PROTECTION	Yes, all connections to all connections
OVER-VOLTAGE PROTECTION	Up to 40Vdc at ambient temperature
POWER-ON SETTLEMENT	<1s
RESOLUTION	14-bit (0.022° / lsb)
TEMPERATURE COEFFICIENT	< \pm 30ppm/°C
LINEARITY	< \pm 0.4%



OUTPUTS

OUTPUT NOISE	\pm 1 bit
INPUT/OUTPUT DELAY	Max = selected frame rate

For additional data on the message structure refer to document NRH27C-J1939

MECHANICAL

MECHANICAL ANGLE	360° continuous
MAXIMUM OPERATING SPEED	3600°/s
WEIGHT	<100g
MOUNTING	2x Ø3.4mm holes with Ø7.3mm x 90° CSK
CABLE	18AWG 1.65mm OD

ENVIRONMENTAL

OPERATING	-40°C to 85°C (derate by 5°C for each 1Vdc increase above 26Vdc of Vsupply)
STORAGE TEMPERATURE RANGE	-55°C to 125°C
SEALING	Sensor body IP69K, IP68, IP67 AMP connector IP68 when fully mated Deutsch connector IP67 when fully mated
VIBRATION	BS EN 60068-2-64:1995 section 8.4 (31.4gn rms) 20-2000Hz random
SHOCK	3m drop onto concrete and 2500g
MTTF	>150 years
ELECTROMAGNETIC INTERFERENCE	Directive 2014/30/EU (EN 61000-4-3:1999, RF modified to 100V/m)
SALT SPRAY	EN 60068-2-52; 1996 test Kb severity 2 (48 hrs)
HUMIDITY	EN60068-2-30; 2005 severity Db (55°C, 93%RH)

IMPORTANT INFORMATION

Whilst Curtiss-Wright Industrial Division has designed this sensor to meet a range of applications it is the responsibility of the customer to ensure it meets their specific requirement.

Curtiss-Wright makes no warranty or representation in respect of product fitness or suitability for any particular design application, environment, or otherwise, except as may subsequently be agreed in contract for the sale and purchase of products. Customers should therefore satisfy themselves of the actual performance requirements and subsequently the product's suitability for any particular design application and the environment in which the product is to be used.

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