SPECTEC
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w w w . s p e c t e c s e n s o r s . c o m

N170 & N171 Bulletin

Digispec Zero Speed Sensor (HF, HHF, HHFQ)

Non-Incendive / Increased Safety

3/8, 1/2, 5/8, 11/16, 3/4, M12, M16 & M18

PRODUCT DESCRIPTION

SPECTEC's Non-Incendive / Increased Safety zero speed sensors are designed for installation in CL 1, Div 2 or Zone 2 hazardous locations and do not require a safety barrier. They are offered in a wide variety of configurations as outlined on page 2.

These sensors are actuated by gear teeth and other ferrous targets.

Variations with dual sensors or directional output are also available. Custom sensors can also be created to meet specific needs.

INSTALLATION

CAUTION: This sensor MUST be installed following the details specified in the Installation Instruction Document #85047N.

SPECIFICATIONS

Supply Voltage:	5 to 30 Vdc @ ≤15 mA
Output Voltage:	See page 2 (25 mA maximum current sinking)
Frequency Range:	0 Hz to ~20 kHz
Rise/Fall Time:	.04 / .18 µs Nominal
Air Gap:	5DP: ≤ .160" 48DP: ≤ .025"
Magnetization:	700 -1600 Gauss
Direction signal:	Forward Logic 1 (high)
(as applicable)	(target rotating toward alignment mark) Reverse Logic 0 (low, 0.06V max) (target rotating away from alignment mark)
Connection:	Connector or lead wires, See page 2
Construction:	300 Series Stainless Steel Solid Epoxy Encapsulation

CERTIFICATIONS for N170 & N171

USA:
N170: Class I, Division 2
GROUP ABCD T6...T5
N171: Class I, II, III, Division 2
GROUP ABCDEFG T6...T5
Class I, Zone 2, AEx nC IIC T6...T5

FM C US APPROVED

Canada:
Class I, Division 2
GROUP ABCD T6...T5
Class I, Zone 2, Ex nL IIC T6...T5
T5 @ -40°C ≤ T_{amb} ≤ +85°C
T6 @ -40°C ≤ T_{amb} ≤ +65°C

ATEX & UKEX:
II 3 G Ex ec IIC T6...T3 Gc
FM08ATEX0067X
FM22UKEX0109X

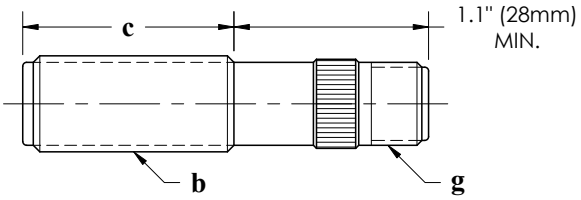
FM APPROVED

CE:
Compliance with
EN55011, EN50082-2

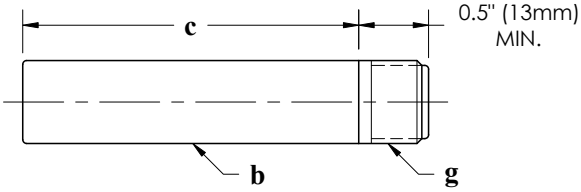
IECEx:
Ex ec IIC T6...T3 Gc
IECEx FMG 16.0003X
T3 @ -40°C ≤ T_{amb} ≤ +135°C
T4 @ -40°C ≤ T_{amb} ≤ +120°C
T5 @ -40°C ≤ T_{amb} ≤ +85°C
T6 @ -40°C ≤ T_{amb} ≤ +65°C

Please Note: Some Feature Selection options may reduce the high limit of the temperature range

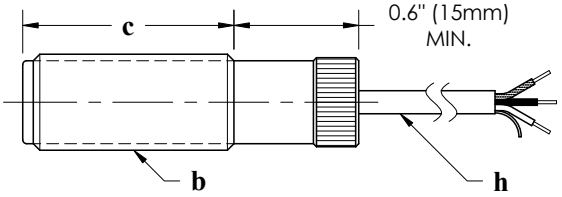
N170 K shell type, knurled (shown below)
A shell type, all-thread (knurl removed)
H shell type, hex (knurl replaced by hex)



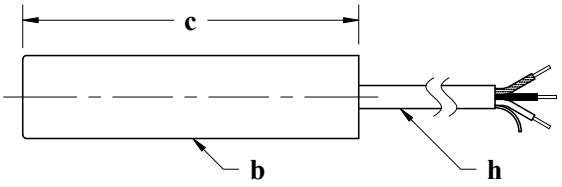
N170 S shell type, smooth (custom units available)



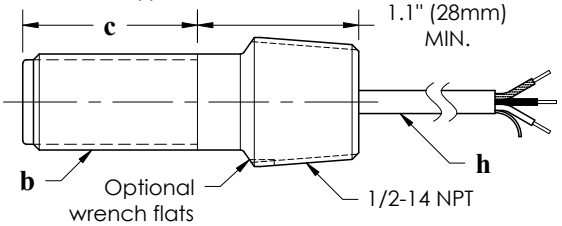
N171 K shell type, knurled (shown below)
A shell type, all-thread (knurl removed)
H shell type, hex (knurl replaced by hex)



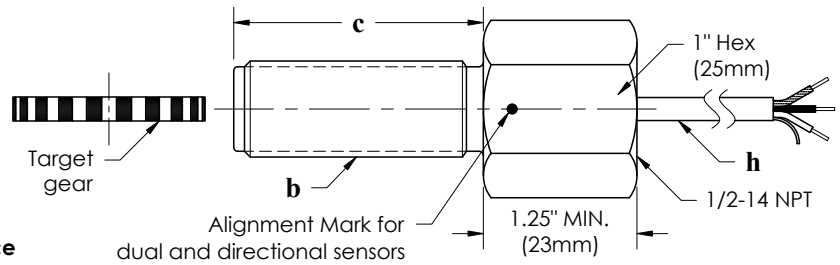
N171 S shell type, smooth (custom units available)



N171 X shell type



N171 Y shell type



02/12/2026 Rev: 7 Approved March 27th, 2026

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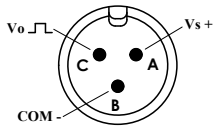
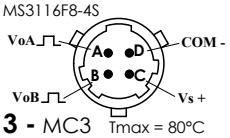
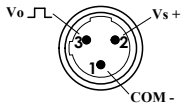
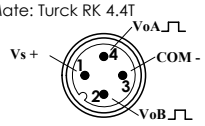
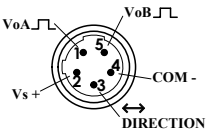
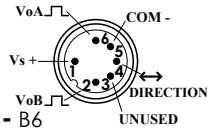
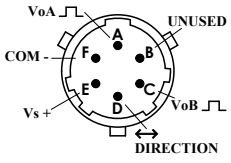
FEATURE SELECTION for N170-abcgj and N171-abchj

SPECTEC P/N	a Shell Type	b Thread / Diameter	c Thread Length	Connection Type		j Output Signal
				g Connector (N170 Only)	h Lead Wires (N171 Only)	
N170- (Connector Version) **or** **N171-** (Lead Wire Version)	**K** **A** **H**	**0 -** 3/8-24 UNF **1 -** 1/2-20 UNF **2 -** 5/8-18 UNF **3 -** 11/16-24 UNEF **4 -** 3/4-16 UNF **5 -** 3/4-20 UNEF **6 -** M12x1 **7 -** M16x1.5 **8 -** M18x1 **9 -** M18x1.5	**0 -** 0.75" (19mm) **1 -** 1.0" to 1.3" (25-33mm) **2 -** 1.5" to 1.8" (38-45mm) **3 -** 2.0" (51mm) **4 -** 2.5" (64mm) **5 -** 3.0" to 3.5" (76-89mm) **6 -** 4.0" (101mm) **7 -** 6.0" (152mm) **8 -** 8.0" (203mm) **9 -** 10.0" (254mm)	**1 -** MO3 Mate: Amphenol MS3106A10SL-3S  **2 -** B4 Mate: Amphenol MS3116F8-4S  **3 -** MC3 Tmax = 80°C Mate: Turck KB 3T  **4 -** MD4 Tmax = 80°C Mate: Turck RK 4.4T  **5 -** MC5 Tmax = 80°C Mate: Turck KB 5T  **6 -** MD6 Tmax = 80°C Mate: Turck RK 6T  **7 -** B6 Mate: Amphenol MS3116F10-6S  	**1 -** 12" (.3m) **2 -** 36" (1m) **3 -** 120" (3m) **4 -** 198" (5m) **5 -** 396" (10m) Length of 12" (.3m) uses individual wires, all longer lengths use shielded cable 18 to 24 AWG (depending on shell size) TFE insulation Red - Supply Black - Common White - Output A Yellow - Output B Green - Direction Shield - Floating (Not connected to shell, please ground to instrumentation) NOTE: Other lead wire lengths and insulation materials are available as special order.	**Standard Hall Sensor (HF, HHF, HHFQ)** **1 -** 0-5V, NPN(TTL) **2 -** 0-10V, NPN **3 -** 0-Vs, NPN **4 -** 0-Vs, NPN OC **5 -** 0-Vs, PNP OC **6 -** 0-Vs, NPN/PNP **Differential Hall Sensor (HFd, HHFd, HHFdQ)** **A -** 0-5V, NPN(TTL) **B -** 0-10V, NPN **C -** 0-Vs, NPN **D -** 0-Vs, NPN OC **E -** 0-Vs, PNP OC **F -** 0-Vs, NPN/PNP
	S	**0 -** ø3/8" (9.5mm) **1 -** ø1/2" (12.7mm) **2 -** ø5/8" (15.9mm)	Same as above			
	X (N171 only)	**1 -** 1/2-20 UNF **2 -** 5/8-18 UNF **3 -** 11/16-24 UNEF **4 -** 3/4-16 UNF **5 -** 3/4-20 UNEF	**0 -** 0.7" (18mm) **1 -** 1.3" (33mm) **4 -** 2.5" (64mm) **7 -** 6.0" (152mm) **8 -** 8.0" (203mm)			
	Y (N171 only)	**2 -** 5/8-18 UNF **5 -** 3/4-20 UNEF **7 -** M16x1.5 **8 -** M18x1 **9 -** M18x1.5	**1 -** 1.1" (28mm) **3 -** 2.0" (51mm) **5 -** 3.0" (76mm) **6 -** 4.0" (101mm) **7 -** 6.0" (152mm) **8 -** 8.0" (203mm) **9 -** 10.0" (254mm)			

Variants:

N170-abcgjD Dual Sensor (HHF) - with quadrature output for manual sensing of direction

N170-abcgjQ Directional Sensor (HHFQ) - with quadrature and directional output when properly aligned

P/N Examples:

N170-K3412 K shell type, 11/16-24 x 2.5" thread, MO3 connector, 0-10V output

N171-Y2321 Y shell type, 5/8-18 x 2.0" thread, 36" leads, 0-5V output

Please Note: Some combinations of options are not possible, please contact sales with any questions.

For Dual Sensor (HHF), thread size must be 1/2-20 or M12x1 or larger

For Directional Sensor (HHFQ), thread size must be 5/8-18 or M16x1.5 or larger, thread length must be 2.0" or longer

Some output options are only available with thread lengths of 1.5" or longer (2.0" or longer for 'S' shell type)

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SPECIALTY MODELS for N170 and N171

SPECTEC P/N	a Shell Type	b Thread / Diameter	c Thread Length	Connection Type		j Output Signal
				g Connector (N170 Only)	h Lead Wires (N171 Only)	
N170-92	**H**	Customer specific shell 1/2-20 UNF thread		Connector, MD4		0-12V, NPN
N171-90 (was N191-90)	**S**	Customer specific shell ø18mm w/ 2-bolt flange			Lead Wires 120" (3m)	0-Vs, NPN w/ 5k pull-up & directional output
N171-93	**H**	Customer specific shell 3/4-20 UNEF thread, 316L SS			Lead Wires 900" (75ft, 23m) EPDM Insulation, Tmax = 85°C	0-Vs, NPN OC

Old P/N to New P/N correlations:

N170-01 → N170-K2213
N170-02 → N170-K2214
N170-03 → N170-K0615
N170-90 → N170-S1434

N171-01 → N171-A2333
N171-02 → N171-K2541
N171-03 → N171-Y2634
N171-17 → N171-Y2334
N171-18 → N171-Y5333
N171-80 → N171-K1243

N174-03 → N170-K2523D
N175-03 → N171-A5333D
N175-04 → N171-Y5334D
N190-03 → N170-S2471Q
N191-90 → N171-90

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