Technical **Datasheet**

Performance Series
Pressure Difference Switch
Models: 306 & 386

Key **Features**

- Precision stainless steel mechanism for arduous atmospheres and high humidity.
- Set point adjustable over whole range against calibrated scale with tamperproof adjuster.
- Weatherproof and Flameproof models ATEX and IECEX.
- Safety vented or blow out device as standard.
- Hermetically sealed microswitch option.
- Models for fixed switching differential, adjustable differential and HI-LO operation.
- Ranges available up to 4 bar (60 psi).
  Static pressure up to 15 bar (200psi).

Series **Overview**

- Designed in the mid-1970s and developed over subsequent years, the Performance Series switch range offers users the broadest range of options, the highest levels of set-point repeatability and the confidence of long term performance that a mature product such as this can prove.
- The model 306/386 Performance Series differential pressure switches utilise a nitrile diaphragm based sensor. This, when coupled with a precision stainless steel mechanism designed to minimise friction in the moving parts, helps deliver the market leading performance customers have come to expect from the series.

Product **applications**

The 306 / 386 Performance Series is suitable for a wide range of applications in:

- Oil & Gas
- Chemical
- Petrochemical
- Refining
- Power
- Food Industry

The choice of models available ensures that the 306 / 386 Perfomance Series is suitable for use in:

- Corrosive atmospheres
- Resistant to chemical attack

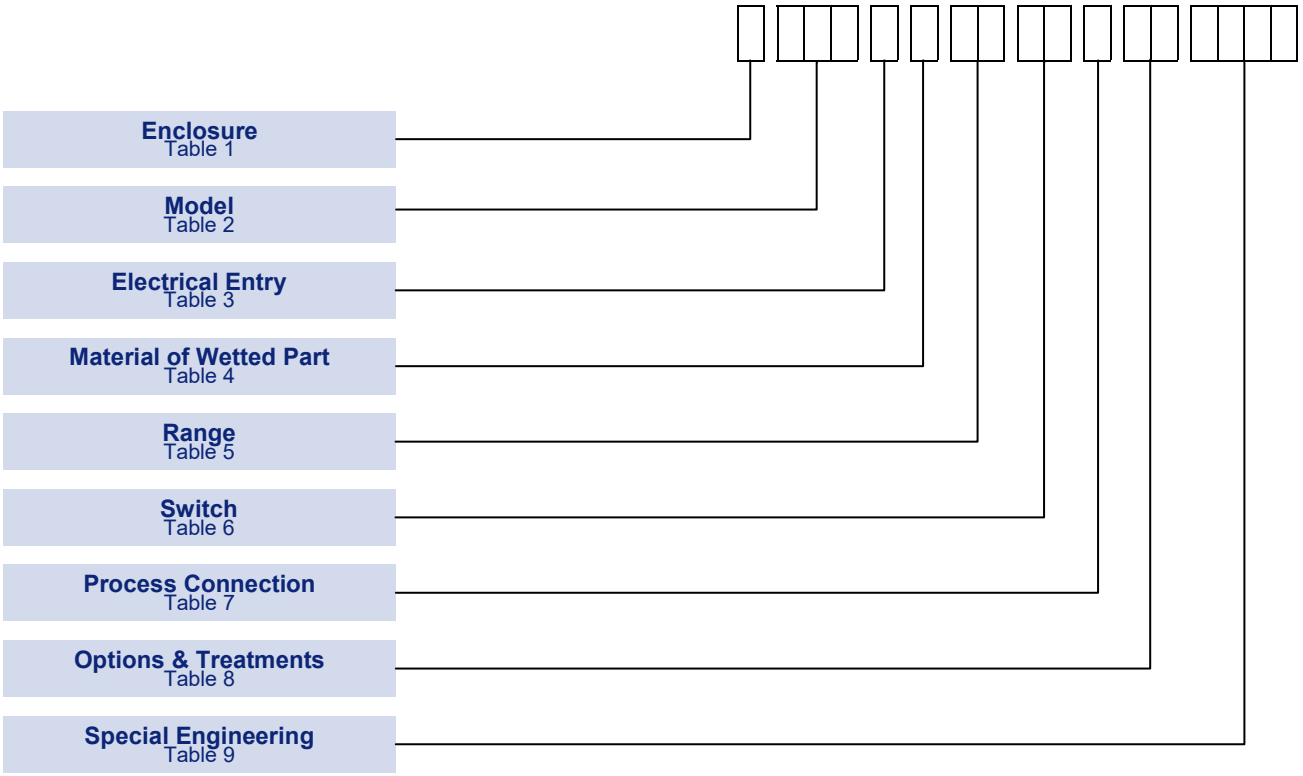
How can we **help you?**

Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our website at www.delta-mobrey.com to find your local support centre or call us on:

+44 (0) 1252 729140

How to order

Switches can be configured by selecting codes representing the desired features from the tables that follow. The chart below, describes how the model code is built up. For assistance in configuring a switch that best suits your needs, please contact your local sales office.



***NOTE**: Options shaded in the following tables are the most common options and are available on the quickest lead-times and at the lowest cost.*

***NOTE:** Only the most common options are shown in this data sheet. Should you require a feature that is not shown, please contact your local sales office for further details.*

Technical Specification

Accuracy:	Set point repeatability ± 1% of span at 20°C / 68°F ambient. Scale accuracy ±3% of full scale
Storage Temperature:	-25 to +60°C / -13 to +140°F
Ambient Temperature:	-25 to +60°C / -13 to +140°F Special build is also available for temperature down to -60°C (-76°F)
Maximum Process Temperature:	Subject to appropriate installation practice, the component parts will withstand up to +60°C (+140°F). For higher temperatures, refer to models 301 and S31
Enclosure classification:	IP66 / NEMA 4X / Flameproof Ex d
Switch output:	SPDT or DPDT snap action microswitch (standard) Hermetically sealed (optional)
Electrical rating:	See Table 6
Process Connection:	Rc 1/4 (BSP) Others (optional)
Approximate weight:	1.7kg / 3.7lb to 3.74kg / 8.1lb depending on model

Enclosure

FINISH
All enclosures except Type A are finished in light grey epoxy resin paint. Special finishes to order.

INTRINSIC SAFETY
Because of the low voltages and currency of I.S. circuits, we recommend using gold and/or sealed contacts.

NOTE: In the interest of safety and availability, not all enclosures are available with all wetted part materials. See Table 4.

Since Model 306 is not normally intended for corrosive media and atmospheres the stainless steel 'A' enclosure (available on Models 301/304/381) is provided only as a special.

Temperatures in Table 1 refer to limitations for certified enclosures.

See **TECHNICAL SPECIFICATION**

TABLE 1

ENCLOSURE TYPES	Code
Weatherproof Enclosures	
General Purpose The basic enclosure is pressure die-cast in zinc alloy, offering weather protection not less than NEMA 4 + 13/IP66.	W
For Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel with weather protection not less than NEMA 4X + 13/IP66.	A
Flameproof Enclosures Category 2 (Zone 1)	H
ATEX Ex db IIC T6 (-60 to +40°C), T4 (-60 to +80°C) II 2 G D Gravity die-cast enclosure in aluminium-silicon alloy. Suitable for outdoor use, IP66 / NEMA 4. Ex II 2 G D	
IECEx Ex db IIC	
ATEX Ex db IIC T6 (-60 to +40°C), T4 (-60 to +80°C) II 2 G D As Code H, but sand cast in high quality grey iron. Ex II 2 G D	K
IECEx Ex db IIC	
Exn Enclosures Category 3 (Zone 2).	N
Type of Protection Exn II T6 (-25 to +40°C), T4 (-25 to +80°C) II 3 G D As code 'W' but Exn. Weatherproof to NEMA 4/IP66. **Limited switching facility (see Table 6).** Ex II 3 G D	
As 'N' but with investment cast enclosure in austenitic stainless steel as 'A'.	O

Models

TABLE 2

	Code
Fixed Switching Differential See Tables 10A & 10B. Basic model giving close, fixed switching differential using proprietary microswitch operated by high integrity stainless steel mechanism. Set point field adjustable over full range against calibrated scale. SPDT & DPDT options available.	306
HI-LO Switching (Adjustable Gap) See Tables 10A & 10B. Two individual set points and separate electrical circuits, with independent adjustment against calibrated scale.	386

Electrical Entry

TABLE 3

Adaptors are available for other popular thread sizes.

Enclosures 'W' and 'N'
Standard option code 1(22mm dia) is provided with a nylon 22/20 reducer and fibre washer suitable for a standard M20 cable gland and back nut. Option code 0 elbow adaptor is factory fitted. Adaptor kits may also be provided retrospectively to fit at site if required. Ask for details. See diagrams for dimensions.

'W' and 'N' SAFETY NOTE
If a metal cable gland is site fitted it must either be earthed locally or an earth/gland plate must be used to connect the body of the gland at the enclosure earthing point. Earth/gland plates can be provided either factory fitted or in kit form for site assembly. Ask for details.

	Code
Enclosures W & N: Clearance for 20mm (3/4 in) outside dia conduit.	1
Enclosures H, K , A & O: M20 x 1.5 ISO thread (direct)	0
Enclosures H & K: 3/4-NPT INT.	3
Enclosure N: M20 x 1.5 straight adaptor (Approved).	0

Material of Wetted Parts

TABLE 4

MATERIAL	AVAILABILITY		Code
	Enclosure	Range	
Nitrile diaphragm & seal, aluminium alloy flanges.	W, H, N	ALL	D
Nitrile diaphragm & seal. Cast iron flanges.	K	B2, B3, B5, C6	E

Setting Ranges

TABLE 5

P_{max} = maximum working pressure

NOTE: For pressure difference switches maximum working pressure (P_{max}) and maximum static/line pressure mean the same.

P_{max}		RANGE			Code
bar	psi	**mbar**/bar	Code	**In.H_2O**/psi	
0.5	7	**-0.6 to +0.6**	B2	**-0.25 to +0.25**	B6
1	15	**-2.5 to +2.5**	B3	**-1 to +1**	BN
1	15	**0 to 5**	B5	**0 to 2**	BR
1	15	**-12.5 to +12.5**	BC	**-5 to +5**	BU
1	15	**3 to 25**	C6	**1 to 10**	CP
15	200	**5 to 120**	E1	**2 to 50**	E4
15	200	**50 to 350**	E8	1 to 5	E7
15	200	0.1 to 1.5	G5	1 to 20	GP
15	200	0.2 to 4	J0	2 to 60	J3

Switch Options

TABLE 6

On Models 306 & 386, only the switching options specified can be supplied. Please consult our engineers for further information.

Model 306

CSA RATING (RESISTIVE) § see note	IEC947-5-1 / EN 60947-5-1 RATING						Contact	Code
	Designation & Utilisation Category	Rated operational current I_e (A) at rated operational voltage U_e	Ui	Uimp	VA Rating Make	VA Rating Break		
5 Amps @ 110/250V AC Light Duty for AC only	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	432 28	72 28	SPDT DPDT	00 01
5 Amps @ 110/250V AC & 2 Amps @ 30V DC General purpose precision	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	432 28	72 28	SPDT DPDT	02 03
1 Amp @ 125V AC & ***§ 100mA @ 30V DC*** Gold Alloy contacts for low voltage switching	1A @ 125 VAC RESISTIVE (IEC 1058-1 / EN 61058-1)						SPDT DPDT	04 05
§ 5 Amps @ 110/250V AC & 5 Amps @ 30V DC Environmentally sealed	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.5kV	432 28	72 28	SPDT* DPDT*	08 09
§ 1 Amp @ 30V AC & 30V DC Environmentally sealed with gold contacts	AC14 E150	0.3A @ 120 V AC	125V	0.5kV	216	36	SPDT* DPDT*	0G 0H
5 Amps @ 250V AC & 2 Amps @ 30V DC Hermetically sealed. Gold plated silver contacts	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.5kV	432 28	72 28	SPDT DPDT	H2 H3† H6‡

† 2 Single pole, double throw, simultaneous falling under pressure
‡ 2 Single pole, double throw, simultaneous rising under pressure

Model 386

5 Amps @ 110/250V AC Light Duty for AC only	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	432 28	72 28	SPDT	20
5 Amps @ 110/250V AC & 2 Amps @ 30V DC General purpose precision	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	432 28	72 28	SPDT	22
1 Amp @ 125V AC & ***§ 100mA @ 30V DC*** Gold Alloy contacts for low voltage switching	1A @ 125 VAC RESISTIVE (IEC 1058-1/EN 61058-1)						SPDT	24
§ 5 Amps @ 110/250V AC & 5 Amps @ 30V DC Environmentally sealed	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.5kV	432 28	72 28	SPDT*	28
§ 1 Amp @ 30V AC & 30V DC Environmentally sealed with gold contacts	AC14 E150	0.3A @ 120 V AC	125V	0.5kV	216	36	SPDT*	2G
5 Amps @ 250V AC & 2 Amps @ 30V DC Hermetically sealed. Gold plated silver contacts	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.5kV	432 28	72 28	SPDT	H4

The electrical rating is dependent on the microswitch fitted to the instrument. The electrical ratings defined by each approval that the microswitch complies with and is shown on the product nameplate, ie CSA, or IEC. It should be noted that the instrument must be used within the electrical rating specified from the approval you require. This table lists the actual IEC ratings against the Designation & Utilisation Category marked on the nameplates. In the absence of any verification by CSA the microswitch § manufacturer's rating is stated in ***italics and bold.*** **If in doubt seek guidance from the factory.**

NOTE: For low energy circuits e.g. 30V and up to 100mA, we recommend using gold alloy contact switches.
Ui = rated insulation voltage Uimp = rated impulse to withstand voltage across contacts.

*Suitable for use with Exn Enclosures (See Table 1)

Process Connection

TABLE 7

Adaptors are available for applications where their use is permitted.

	Code
Rc 1/4 (1/4 BSP tr INT) to ISO 7/1	A

Options & Treatments

TABLE 8

Combinations available, apply for details.

	Code
Tropicalisation High humidity atmospheres.	01
Marine and Offshore Saline atmosphere or salt spray.	02
Ammonia process (wetted) parts and construction suitable for atmospheric ammonia.	03
Stainless steel pipe mounting bracket permits local 2” pipe work to be utilised for mounting the instrument.	10
Tagging - Variety of tagging methods are available.	APPLY FOR DETAILS
Applies when - no option is required and selection is made from special engineering	00

Special Engineering

TABLE 9

Last 4 digits of model code only used when special engineering is required.

	Code
Please consult Delta sales engineering for special requirements	**TBA**

Performance Data

TABLE 10

Due to manufacturing tolerances the figures quoted in these tables are for guidance only and are typical for weatherproof models.

Flameproof models may be up to 2 times higher depending on the range. Should the differential be critical for specific applications our engineers should be consulted prior to ordering.

MODEL 386: The switching differential on each point may be up to 1.5 times that of Table 10A & 10B. Care must be exercised, therefore, in specifying high differential switches on sensitive ranges, or set point separation less than 3 times switching differential.

MODELS 306, (386) **mbar units** **TABLE 10A**

Range Code	Range mbar/**bar**	SPDT OPTIONS					DPDT OPTIONS				
		00 (20)	02 (22)	04 (24)	08/0G (28/2G)	H2 (H4)	01	03	05	09/0H	H3/H6
B2	-0.6 to +0.6	0.2	0.2	0.2	-	-	0.4	0.4	0.5	-	-
B3	-2.5 to +2.5	0.4	0.8	0.4	0.8	-	0.8	1.2	0.8	1.2	-
B5	0 to 5	0.4	0.8	0.4	1.5	1.2	0.8	1.2	0.8	1.7	1.8
BC	-12.5 to +12.5	0.5	1.0	0.5	10	10	1.0	2.0	1.0	12	15
C6	3 to 25	0.5	1.0	0.5	10	10	1.0	2.0	1.0	12	15
E1	5 to 120	8	24	8	40	40	15	32	16	45	60
E8	50 to 350	25	75	25	44	44	50	100	50	50	64
G5	**0.1 to 1.5**	**50**	**150**	**50**	**200**	**200**	**100**	**200**	**100**	**250**	**290**
J0	**0.2 to 4**	**150**	**450**	**150**	**600**	**600**	**300**	**600**	**300**	**700**	**840**

MODELS 306, (386) **psi units** **TABLE 10B**

Range Code	Range in.H_2O/**psi**	SPDT OPTIONS					DPDT OPTIONS				
		00 (20)	02 (22)	04 (24)	08/0G (28/2G)	H2 (H4)	01	03	05	09/0H	H3/H6
B6	-0.25 to +0.25	0.08	0.08	0.08	-	-	0.16	0.16	0.2	-	-
BN	-1 to +1	0.16	0.3	0.16	0.32	-	0.3	0.5	0.3	0.48	-
BR	0 to 2	0.16	0.3	0.16	0.6	0.48	0.3	0.5	0.3	0.68	0.72
BU	-5 to +5	0.2	0.4	0.2	4	4	0.4	0.8	0.4	5	6
CP	1 to 10	0.2	0.4	0.2	4	4	0.4	0.8	0.4	5	6
E4	2 to 50	3	9.5	3	16	16	6	13	6	18	24
E7	**1 to 5**	**0.35**	**1**	**0.35**	**17.5**	**17.5**	**0.7**	**1.5**	**0.7**	**20**	**0.9**
GP	**1 to 20**	**0.7**	**2**	**0.7**	**3**	**3**	**1.5**	**3**	**1.5**	**3.6**	**4**
J3	**2 to 60**	**2**	**6.5**	**2**	**8.5**	**8.5**	**4.5**	**8.5**	**4**	**10**	**12**

Electrical Connections

Terminal Block
Cable entry is to a non-pinching terminal block made of a non-hygroscopic thermosetting plastic, suitable for cables up to 2.5mm²/14AWG.

Earthing/Grounding
An earthing stud is provided inside all weatherproof enclosures, adjacent to the entry. External earthing is standard on flameproof versions. Safety note see Table 3.

Dielectric Strength
The electrical assembly is capable of withstanding *2kV between live parts and earth/ground and 500V between open contacts.
* 1.2kV for micro switch Codes H2, H3, H4 and H6. Refer to Table 6.

Electrical Entry
Standard options are listed in Table 3. Other threads can be accommodated by adaptors. Dual entry available, see Table 3.

Optional Extras

Mounting Position/Location/Installation
Vertical as shown, IN DIMENSIONS, taking care to avoid siting in locations that transmit excessive shock or vibration. For further advice contact our engineers.

Pollution degree (EN60947-5-1)
All products are suitable for use in pollution degree 3. For extreme conditions where condensation may readily form, then sealed contacts should be used. See Table 6 Codes 08/09, 0G/0H, 2G, 28, H2/H3/H4/H6.

Electrical Isolation
These products are not suitable for electrical isolation. Always isolate circuit separately to carry out any electrical work.

Approvals

EUROPEAN DIRECTIVES

Low voltage Directive (LVD) 2014/35/EU.
Compliant to LVD

Pressure Equipment Directive (PED) 97/23/EC:
This product has a process connection size <=DN25 and is therefore categorised as sound engineering practice under Cat 3.3

ATEX APPROVALS

FLAMEPROOF:
Certificate No. BAS01ATEX2426X
EN 60079-0, EN 60079-1, EN 60079-31

For Zone 1 models **(Enclosure code H/K, see Table 1)**

II 2 GD	Ex db IIC T4 (Tamb -60°C to +80°C) Gb Ex tb IIIC T135°C (Tamb -60°C to +80°C) Db IP66
II 2 GD	Ex db IIC T6 (Tamb -60°C to +40°C) Gb Ex tb IIIC T85°C (Tamb -60°C to +40°C) Db IP66

GLOBAL CERTIFICATION

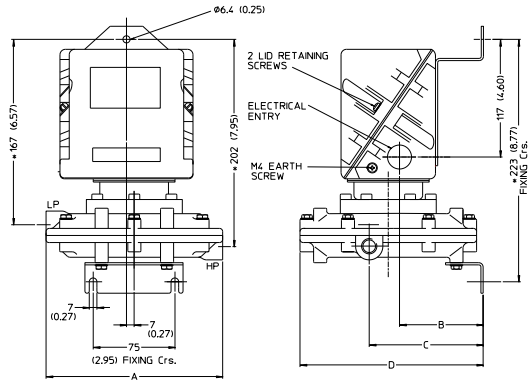
IECEx Certified
Ex db IIC T4 (Tamb -60°C to +80°C) Gb
Ex db IIC T6 (Tamb -60°C to +40°C) Gb

Certificate No. IECEx ITS 04.0006X
IEC 60079-0, IEC 60079-1

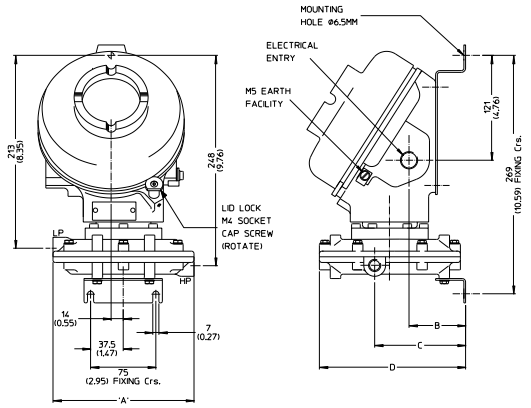
Dimensions

All dimensions mm (inches)

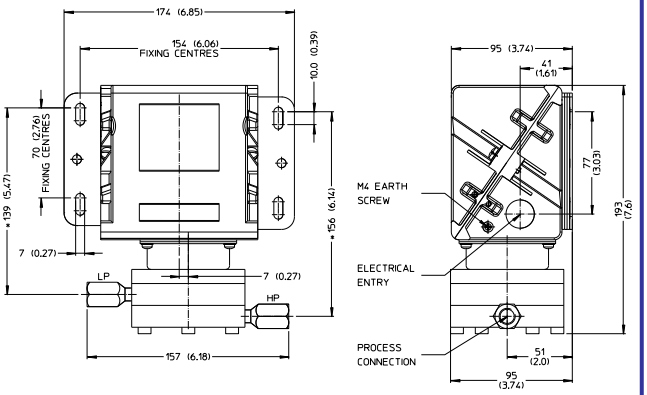
W & N ENCLOSURES RANGES UP TO C6 / CP



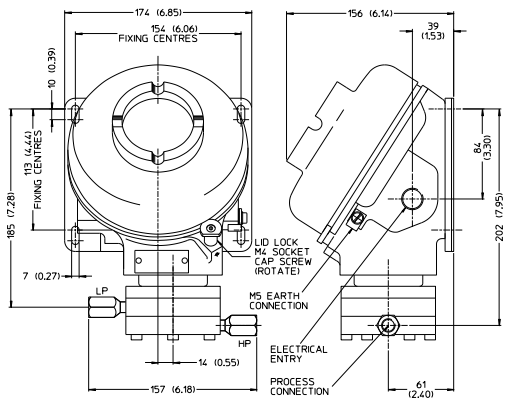
H & K ENCLOSURES RANGES UP TO C6 / CP



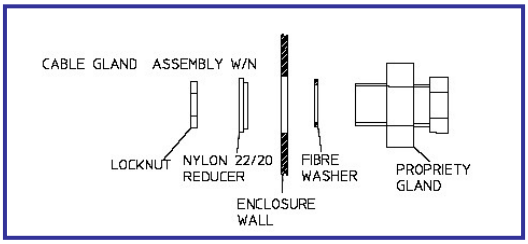
W & N ENCLOSURES RANGES E1/E4 & ABOVE



H & K ENCLOSURES RANGES E1/E4 & ABOVE



RANGE	Enclosure	A	B	C	D
B2 / B6	W & N	255 (10.0”)	121 (475”)	149 (5.86”)	259 (10.19”)
	H & K	255 (10.0”)	109 (4.29”)	149 (5.86”)	259 (10.19”)
B3 / BN / B5 / BR / BC / BU / C6 / CP	W & N	160 (6.29”)	77 (3.03”)	104 (4.09”)	164 (6.45”)
	H & K	160 (6.29”)	65 (2.55”)	104 (4.09”)	164 (6.45”)



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