

PULP AND PAPER DIAPHRAGM SEAL

Reotemp's Pulp and Paper Diaphragm Seals are designed to withstand the harsh and highly viscous process media associated with the Paper and Pulp manufacturing process. Reotemp offers three styles that can be purchased with weld spuds, for new applications, or as replacements designed to fit into existing industry standard process fittings.



**TH Style: M44 x 1.25 THD
(1.3" Diaphragm)**



**TK Style: 2"-16 UNS THD
(1.5" Diaphragm)**



**S1 Style: Sleeve 1 Bolt 1.5"
(0.9" Diaphragm)**



**S2 Style: Sleeve 2 Bolt 1.5"
(1.5" Diaphragm)**

DIAPHRAGM SEALS

FEATURES / BENEFITS

- Welded Diaphragm for Maximum Durability
- Standard Sizes Common Within the Pulp and Paper Industry
- Welded Diaphragm for Maximum Durability
- Easy Cleanout of Diaphragm Cavity without Compromising Filled System

SPECIFICATIONS

Diaphragm	316/316L SS, Hast C-276
Lower Housing	316/316L SS, Hast C-276
Gasket	Viton & Kalrez (Style S1, S2, and TK Only), Klinger & Gylon (Style TH Only)
Threaded Swivel Nut	316SS

Process Temperature Limits		S1	S2	TH	TK
Metallic Lower	Viton Gasket	-15/400°F	-15/400°F	N/A	-15/400°F
	Kalrez O-Ring	30/620°F	30/620°F	N/A	30/620°F
	Klinger Gasket	N/A	N/A	-110/500°F	N/A
	Gylon Gasket	N/A	N/A	-110/500°F	N/A

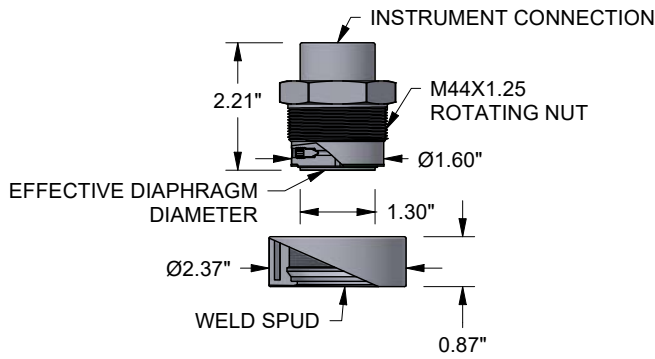
Ambient Temperature Limits Determined by the pressure instrument.

Minimum Recommended Span		S1	S2	TH	TK
2.5" & 3.5" Gauges		30 psi	30 psi	30 psi	15 psi
4", 4.5", & 6" Gauges		N/A	100 psi	75 psi	60 psi
Transmitter (Gauge Pressure)		15 psi	15 psi	30 psi	15 psi
Transmitter (Differential Pressure)		Not Recommended			
Differential Pressure Gauge (D40/42 Only)		N/A	N/A	N/A	N/A

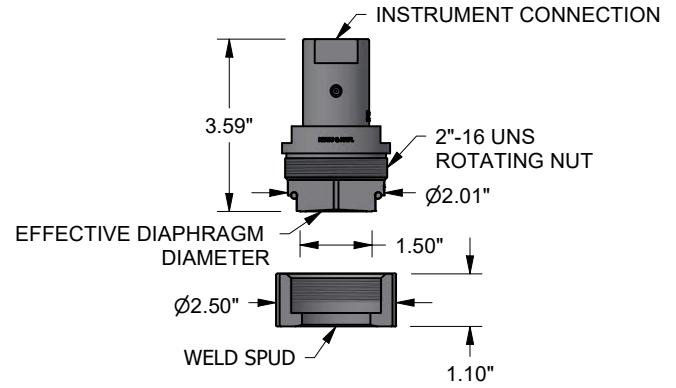
Weight	Note: Weights are approximate.	Weight in lbs	
		S1	S2
		2.3 lbs	3.5 lbs
		3.7 lbs	3.9 lbs

Maximum Working Pressure at 100°F:		S1	S2
		300 psi	300 psi
		600 psi	600 psi

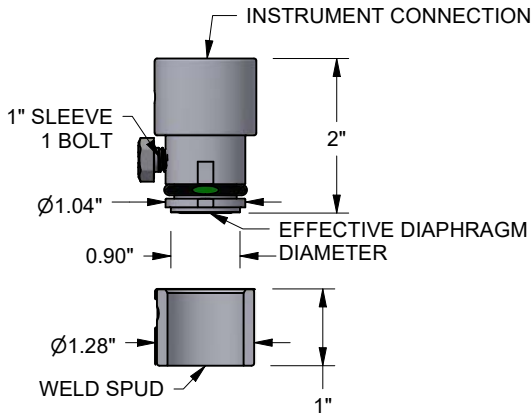
PULP AND PAPER DIAPHRAGM SEAL



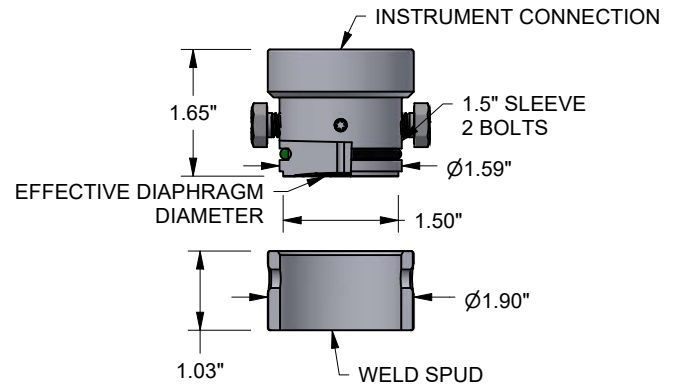
TH



TK



S1



S2

DIAPHRAGM SEALS

DSPP SUITABILITY GUIDE									
		Total Span (in psi)							
Gauge Size	Seal Model	15	30	45	60	75	100	160	200+
2.5"	S1 (0.9")	X	S	S	T	T	T	G	G
	TH (1.3")	T	T	G	G	G	G	G	G
	S2 & TK (1.5")	G	G	G	G	G	G	G	G
3.5"	S1 (0.9")	X	X	S	S	S	T	T	G
	TH (1.3")	T	T	G	G	G	G	G	G
	S2 & TK (1.5")	G	G	G	G	G	G	G	G
4.0"	S1 (0.9")	X	X	X	X	X	X	X	G
	TH (1.3")	X	X	X	T	T	T	G	G
	S2 & TK (1.5")	S	T	T	G	G	G	G	G
4.5"	S1 (0.9")	X	X	X	X	X	X	X	X
	TH (1.3")	X	X	X	X	S	S	T	G
	S2 & TK (1.5")	X	S	S	T	T	G	G	G
Transmitter	S1 (0.9")	S	S	S	S	T	T	T	G
	TH (1.3")	T	T	T	G	G	G	G	G
	S2 & TK (1.5")	G	G	G	G	G	G	G	G

*Total gauge span is additive of negative and positive pressures.

Example: -15 - 0 - 30 psi = 45 psi span

G Assembly will function correctly with minimal accuracy degradation.

T Assembly will function correctly given stable temperature.

S Assembly is highly sensitive to orientation and temperature variance. Reotemp cannot guarantee a stated accuracy.

X Assembly will not work. The diaphragm does not displace enough fill fluid to drive the pressure gauge.

PULP AND PAPER DIAPHRAGM SEALS

HOW TO ORDER: Choose options to build a part number. For example: **DSPPS14SSWSV-DTD-AS-TS**

SEAL TYPE	STYLE	INSTRUMENT CONNECTION	BODY MATERIAL	DIAPHRAGM MATERIAL	WELD SPUD (LOWER)	GASKET
DSPP = Pulp and Paper Seal	S1 = 1" Flush Mount Sleeve; 1-Bolt Connection S2 = 1.5" Flush Mount Sleeve Type; 2-Bolt Connection TH = 1.5" Flush Mount M44 x 1.25"; Threaded Connection TK = 2-1/8"-16 UNS Thread	2 = 1/2" Female NPT 4 = 1/4" Female NPT W = Low-Volume Connection for Smart Transmitters	S = 316SS H = Hast C-276 J = Titanium M = Monel A400 D = Alloy 20 N = Nickel 201 2 = Duplex 2205 F = 304SS Y = Iconel 625 G = Hast B Note: For TH & TK, rotating nut is non-wetted and always 316SS.	S = 316SS H = Hast C-276 J = Titanium M = Monel A400 D = Alloy 20 N = Nickel 201 2 = Duplex 2205 F = 304SS Y = Iconel 625 G = Hast B Note: Weld between diaphragm and body is process wetted. Same material should be selected.	XX = Weld Spud not included WS = 316SS Weld Spud Included HS = Hast C-276 Weld Spud	V = Viton (Style S1, S2, TK) K = Klinger C4401 (Style TH) Y = Gylon 3510 (Style TH) Z = Kalrez O-Ring (Style S1, S2, TK)
			Wetted	Wetted		

-DTD

-AS

-TS

INSTRUMENT MOUNT	FILL FLUID	OPTIONS
Direct Mount -DTD = Direct Mount, Threaded -DWD = Direct Mount, Welded -RTR = 6" Cooling Tower -STW = 3" Cooling Standoff Remote Mount -C?? = Armored Capillary, 1mm, Threaded -E?? = Armored Capillary, 1mm, Welded -F?? = PVC Coated Armor, 1mm, Threaded -G?? = PVC Coated Armor, 1mm, Welded Note: ?? = Length in feet (e.g. 05 = 5 feet) See Page 89 for Complete Mounting Guide, Including Capillary with Different Bore Sizes	-AS = Silicone DC200 -BH = Silicone 704 -C8 = Syltherm 800 -XX = No Fill Fluid See 95 for Complete Fill Guide	-TD = Teflon Coated Diaphragm (PTFE) -MR = MTR - Mill Test Report -TS = SS Tag (1-10 Characters) -PM = Positive Material Identification Certification See Page 156 for Additional Options
YYY = Dry Seal, No Instrument		

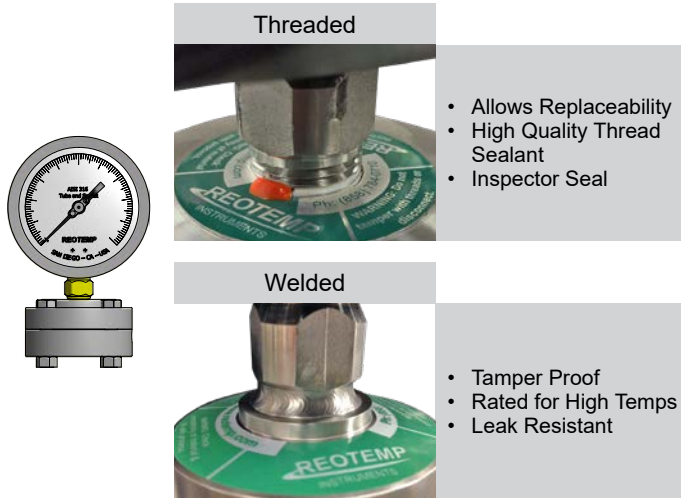
DIAPHRAGM SEALS

DIAPHRAGM SEALS

INSTRUMENT MOUNTING CONFIGURATIONS

DIRECT MOUNT

Direct Mounting a pressure gauge, switch, or transmitter is the most common diaphragm seal assembly.



- Allows Replaceability
- High Quality Thread Sealant
- Inspector Seal

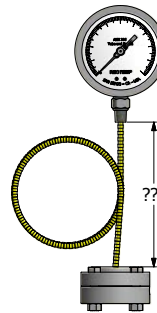
- Tamper Proof
- Rated for High Temps
- Leak Resistant

Code	Description	Max. Temp
-DTD	Threaded Instrument Connection	400°F
-DWD	Welded Instrument Connection	600°F

Assembly Notes: Welded connection recommended for pressure exceeding 1,500 psi for purposes of leak prevention.

REMOTE MOUNT

Remote Mounting a pressure instrument using flexible capillary is a common mounting method when the point of measurement is in a hazardous or inconvenient location.



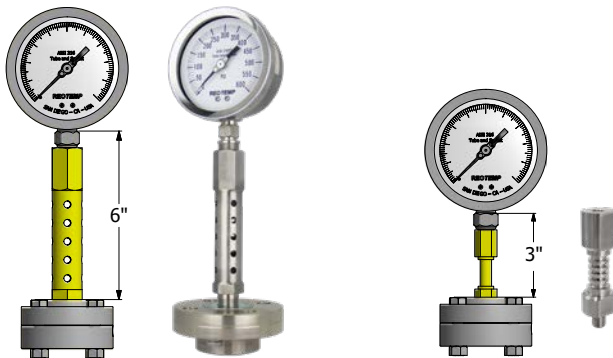
Code	Description
A	Armored, Threaded, 2mm
B	Armored, Welded, 2mm
W	PVC, Threaded, 2mm
P	PVC, Welded, 2mm
C	Armored, Threaded, 1mm
E	Armored, Welded, 1mm
F	PVC, Threaded, 1mm
G	PVC, Welded, 1mm
H	Armored, Threaded, 0.55mm
J	Armored, Welded, 0.55mm
K	PVC, Threaded, 0.55mm
L	PVC, Welded, 0.55mm

Note: ?? = Length in feet (e.g. 05 = 5 feet)

Assembly Notes: 2mm, 1mm, and .55mm are capillary inner diameter. Ambient temperature limit of PVC coated armor is 250°F. Process temperature limit of threaded connections is 400°F. Standard instrument connection is threaded (Smart Transmitters are welded), unless specified by customer.

COOLING ELEMENTS

Used in either high temp or cold temp applications, Cooling Elements mounted above diaphragm seals quickly normalize fluid temperature toward ambient. This protects the pressure instrument while still maintaining the convenience of a direct mount.

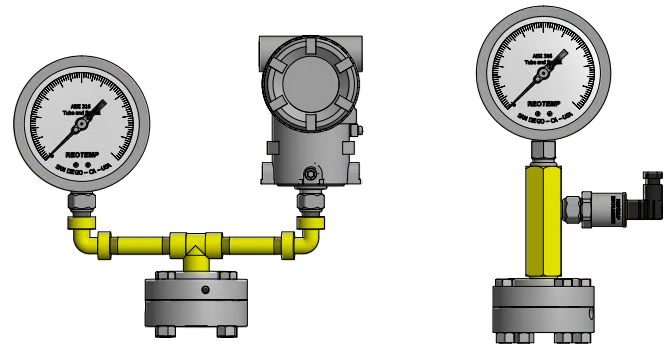


Code	Description	Max. Temp
-RTR	6" Cooling Tower	750°F
-STW	3" Cooling Standoff	600°F

Assembly Notes: Cooling elements are welded to diaphragm seal. Instruments are threaded to cooling element unless specified. All lengths are nominal.

TREE ASSEMBLIES

Tree Assemblies offer the ability to mount two pressure instruments onto one diaphragm seal, allowing the user to gain both a local indication and a remote signal without adding an additional pipe insertion.



Code	Description	Max. Temp
-TRE	Goal Post, Low Pressure Assembly (Max. 150 psi)	400°F
-TRX	Goal Post, Heavy Duty (Max. 3,000 psi)	600°F
-TRM	Compact Tree Assembly (Max. 3,000 psi)	600°F

Assembly Notes: Threaded joints are fully welded for consistent instrument orientation. Instrument connections are threaded unless specified by customer. Diaphragm seal must displace enough fluid to drive both instruments.

DIAPHRAGM SEALS

FILL GUIDE

Diaphragm seals are designed to protect pressure instruments from hot process media and corrosive chemicals while minimizing any negative effect on instrument accuracy and durability. A well-made diaphragm seal can achieve this goal only if it is properly assembled, filled, and tested. Reotemp's highly trained technicians use state-of-the-art equipment so that every diaphragm seal assembly is filled and tested to assure optimal instrument performance:

- ✓ 24-hour Minimum Fluid De-gassing
- ✓ Evacuated Instrument Chamber Up to 10⁻⁸ mbar Absolute
- ✓ Complete Fill Integrity Check
- ✓ Fill-port Leak Test
- ✓ Post-fill Static Test
- ✓ Verification of Instrument Calibration
- ✓ High-temp Pipe Sealant Option for Joints
- ✓ Tamper-proof (Inspection Seal) Lacquer used on All Threaded Joints
- ✓ Sturdy Diaphragm Packaging Protection

DIAPHRAGM SEALS

Part Number Code	Name	Description	Temperature Range (Vacuum Service <5psia)		Viscosity cst @ -77°F	Specific Gravity @ -77°F	Thermal Expansion cc/cc°C
STANDARD FILL FLUID							
AS	Silicone DC200 ¹	This is the standard fill fluid for most diaphragm seal applications.	-40°F to 400°F (-40°F to 250°F)	Yes	20	0.94	.00104
HIGH TEMP SILICONE							
BH	Silicone DC704 ¹	Standard for Smart Transmitters and capillary systems. Performs well in applications with high temperature and a deep vacuum.	0°F to 650°F (0°F to 450°F)	No	44	1.07	.00077
B1	Silicone DC710 ¹	Highest temperature rating; ideal for gauge seal assemblies. Too thick for capillary assemblies. Response time can become very slow in cold conditions.	50°F to 750°F (50°F to 400°F)	Yes	500	1.11	.00043
C8	Syltherm 800 ²	Low viscosity allows it to perform well in both low and high temperatures. Not recommended for vacuum service or at high temperatures when under low static pressure.	-40°F to 750°F (-40°F to 150°F)	No	9.5	0.93	.00136
B5	Silicone DC705 ¹	Performs very well in high temperatures when under vacuum. The high viscosity and freezing point of this fluid makes it a poor choice for cold or outdoor installations without heat tracing.	50°F to 675°F (50°F to 550°F)	Yes	175	1.09	.00096
B2	Silicone DC550 ¹	Similar high temperature performance as DC705, however it performs better at lower temperatures.	-40°F to 575°F (-40°F to 400°F)	No	125	1.07	.00076
FOOD GRADE							
AG	Glycerin USP	This is the standard fill fluid for most gauge seal assemblies for food, beverage, and pharmaceutical applications. Its high viscosity will cause very slow response at times in low temperature and outdoor installations.	60°F to 450°F (Not Suitable)	Yes	1100	1.26	.00061
BN	NEOBEE M20 ⁷	Low viscosity and a wide temperature range makes this the standard sanitary fill fluid for Smart Transmitters and capillary systems.	-10°F to 400°F (-10°F to 200°F)	No	10	0.92	.00101
BS	Food Grade Silicone	Highest temperature limit for food grade fluids. Because of its high viscosity it does not perform well in low temperatures.	20°F to 550°F (20°F to 250°F)	Yes	350	0.97	.00096
BP	Propylene Glycol	This is the fill fluid used when Glycol is called for on the customer specification. It has a very narrow temperature range.	0°F to 200°F (Not Suitable)	No	2.85	1.03	.00073
INERT (TYPICALLY FOR CHLORINE AND OXYGEN APPLICATIONS OR IN SILICONE-FREE ENVIRONMENTS)							
C1	Fomblin Y06 ⁴	Ideal inert fluid for transmitter applications. Relatively high vapor pressure above 200°F. Not recommended for use in high temperature situations with low static pressure.	-40°F to 450°F (0°F to 250°F)	No	71	1.88	.00086
C2	Halocarbon 6.3 ³	Standard inert fluid used in gauge seal assemblies.	-40°F to 400°F (-40°F to 200°F)	Yes	6.3	1.87	.00084
C3	Halocarbon 1.8 ³	Typically used in low temperature applications because of its low viscosity.	-110°F to 220°F (-100°F to 100°F)	No	1.8	1.82	.00084
C4	Fluorolube FS-5 ⁵	Similar performance to Halocarbon 6.3, however not suitable for vacuum service.	-40°F to 450°F (Not Suitable)	No	5	1.86	.00087
SPECIALTY							
CK	Krytox 1506 ⁶	Specialty fill fluid, inert.	-40°F to 350°F (-40°F to 300°F)	No	62	1.88	.00095
BE	Ethylene Glycol	Occasionally used in annular (O-ring) seal assemblies.	-25°F to 320°F (Not Suitable)	No	30	1.10	.00062
CT	Syltherm XLT ²	Used for very low process temperatures.	-150°F to 500°F (Not Suitable)	No	1.4	0.85	.00168

1 Trademark Dow Corning

3 Trademark Halocarbon Product Corporation

5 Trademark Hooker Chemical Company

7 Trademark Stepan Specialty Products

2 Trademark The Dow Chemical Company

4 Trademark AUSIMONT S.P.A

6 Trademark The Chemours Company FC, LLC

Note: PulsePlus™ fill fluids may have different physical properties than specified. Chemical composition and temperature ranges do not vary.

DIAPHRAGM SEAL OPTIONS

DIAPHRAGM SEALS

		MS4 MS6 MS8	W5 W6 W7	T5 T6 V5	W9FF W9FR	W9XT	W9FP	DSTC75	DSTC15 AND LARGER	DSTF05	DSTF75 AND LARGER	DSPP	OR	DXFR	
PULSATION PROTECTION (ONLY AVAILABLE WITH REOTEMP PRESSURE GAUGE MOUNTED TO SEAL)															
-PP	Pulse Plus™	✓	✓	✓	✓	✓	N/A	N/A	✓	N/A	✓	✓	✓	N/A	
DIAPHRAGM COATING															
-AU	Gold Plated Diaphragm	N/A	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	
-TC	Teflon Coated Diaphragm PTFE	N/A	✓	N/A	✓	✓	✓	N/A	✓	N/A	✓	✓	N/A	N/A	
-EP	Electropolished Diaphragm	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓	✓	N/A	N/A	
FILL															
-FW	Fill Port Welded Closed	STD ¹	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	
-VF	Fill for Vacuum Service	N/A	✓	N/A	✓	✓	✓	N/A	✓	N/A	✓	✓	N/A	N/A	
CLEANING AND FINISH															
-DG	Degreased, Shipped in Sealed Bag	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓	
-OX	Cleaned for Oxygen Service per ASME B40.1	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓	
-OY	Cleaned for Oxygen Service per MIL-STD-1330D	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓	
PLUG FOR FLUSH PORT															
-GS	1/4" SS Plug Installed	STD	STD	STD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	
-JS	1/2" SS Plug Installed	N/A	STD	STD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	
-GH	1/4" Hast C Plug Installed	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	
-JH	1/2" Hast C Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	
-GM	1/4" Monel Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	
-JM	1/2" Monel Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	
TAG OPTION															
-TS	Stainless Steel Tag (1-10 Characters)								✓						
-TM	Stainless Steel Tag (11-80 Characters)								✓						
-TP	Paper Tag								✓						
CERTIFICATION OPTIONS															
-NC	Certificate of NACE Compliance	✓	✓	N/A	✓	✓	✓	N/A	N/A	✓	✓	✓	N/A	✓	
-CM	General Material Conformance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
-MR	MTR - Mill Test Report Certificate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓	
-PM	PMI - Positive Material Identification Certificate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓	
-HT	Hydrostatic Test per ASME B31.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	
-HL	Helium Leak Test Certificate	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	

✓ Indicates that the option is available
 N/A Indicates the option is not available

¹ Standard on MS8, available on MS4 & MS6.