

BoltSafe Sensor PMS

BoltSafe Sensor PMS (Periodic Monitoring System) is a specially designed sensor to monitor the residual bolt load in bolted joints. In this way the uncertainty in achieving the desired residual bolt load can be removed. This will result in enhanced safety, dependable joints, better control and improved cost benefit both during installation and throughout the joint's service life.

The sensor

BoltSafe Sensor PMS is shaped as a regular washer, used as a washer, and is available in standard sizes to fit both metrical and imperial bolts in sizes from M30 to M64 (corresponding 1 1/4" to 2 1/2"). The design is rugged and able to withstand tough environments.

BoltSafe Sensor PMS employs an ASIC (Application Specific Integrated Circuit) in each unit, which performs all the signal conditioning and digital communication for each unit. This means that each BoltSafe Sensor will have its unique serial number for identification and traceability. The digital monitoring system measures both the residual bolt load and the sensor temperature. The calibration of the sensors is done once, and there is no need for re-calibration throughout the lifetime of the sensor when used within the specification.

BoltSafe Sensors PMS have a non-contacting interface and require no cable connections. During service, the unit is powered over an inductive interface connected to a handheld instrument, which means that there is no need for internal batteries in the sensor.

The BoltSafe Sensor PMS can be read by the handheld instrument SM-200 BoltSafe Reader in combination with a PMS-probe. The user can monitor the residual bolt load directly on the instrument.



The BoltSafe Sensor should always be placed directly under a nut to obtain the best possible accuracy of the residual bolt load.

General specification

Sizes:	To fit bolt sizes from M30 to M64 (Correspondingly 1 3/4" to 2 1/2") See enclosed table of dimensions
Full Scale Load (FS):	From 385 kN to 1794 kN dependent on Sensor size. (See table of dimensions)
Maximum Load at ambient temperature:	FS range x 1.3 (Load without affecting the validity of the calibration)
Temperature range:	-20°C to 70°C
Storage Temperature:	-20°C to 70°C
Total accuracy at ambient temperature (rms):	< 5 % FS (machined parallel surfaces in bolt-nut assembly)
Linearity:	< 1.5 % FS
Hysteresis:	< 0.9 % FS
Creep:	< 0.1 % FS
Repeatability:	< 0.5 % FS
Typical Temperature effects:	< ± 0.08 % FS/°C
Sealing:	IP66
Material:	Stainless Steel 17-4 PH, Condition H1025
Classification:	10.9
Sensor Output:	Serial digital signal
Power Supply:	Powered through electronic interface
Electrical Connection:	None – inductive /optical connection (no cable)
Intrinsic Safe Code:	II 2 G, EEx ib IIC T4 (upon special request)

Remarks:

Note that imperfections in the joining surfaces may lead to degraded accuracy in the reading of residual bolt load.

If the user, due to mechanical constraints, needs to use BoltSafe Sensors in other ways, there is a risk that the calibration will not be valid and that the accuracy cannot be maintained. Please contact your local distributor in each case.

Sensor Interface

The BoltSafe Sensor PMS will require no electrical connections. However, it is important that the docking area is available for the PMS-probe after the final bolting process. The data communication takes place by a combination of inductive and optical transmission.



Table of dimensions

See the enclosed table for physical dimensions and corresponding max load.

BoltSafe Sensor PMS Imperial Sizes

Size	Normal Bolt Size (mm)	Clearance Hole (mm)	Outside Diameter (mm)	Overall Thickness (mm)	Steel Wight (gr)	Clamping Load Class 10.9 (kN)
1 1/4"	31,8	32,3	67	20	401	437
1 3/8"	34,9	35,5	73	20	474	529
1 1/2"	38,1	38,7	78	20	535	629
1 5/8"	41,3	41,9	84	20	619	739
1 3/4"	44,5	45,1	86	20	628	857
1 7/8"	47,6	48,2	91	20	698	983
2"	50,8	51,4	98	20	816	1119
2 1/4"	57,2	57,8	108,8	23	1156	1416
2 1/2"	63,5	64,3	116,6	23	1289	1748

BoltSafe Sensor PMS Metric Sizes

Size	Normal Bolt Size (mm)	Clearance Hole (mm)	Outside Diameter (mm)	Overall Thickness (mm)	Steel Wight (gr)	Clamping Load Class 10.9 (kN)
M30	30	30,6	64,3	20	372	385
M33	33	33,6	68,4	20	413	480
M36	36	36,6	72,8	20	462	560
M39	39	39,6	78	20	528	670
M42	42	42,6	83	20	593	772
M45	45	45,6	87,6	20	655	905
M48	48	48,6	92	20	716	1018
M52	52	52,6	97,2	20	784	1221
M56	56	56,6	102	20	845	1408
M60	60	60,8	108	23	1083	1647
M64	64	64,8	114	23	1196	1794

For more information:

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