

Mobrey Squing 2

Vibrating fork point level measurement



Squing 2 vibrating fork level switch

Squing 2 is a liquid point level switch designed using the tuning fork principle. The Squing 2 continuously monitors changes in its vibrating fork's natural resonant frequency. When the Squing 2 is used as a low alarm, the liquid in the vessel drains down past the fork resulting in a change of its frequency; this is detected by the electronics which switches the output state. When used as a high alarm, the liquid rises in the vessel, contacts with the forks and again the output switches.



Features

- 3/4" and 1" Threaded (BSPT, BSPP, NPT) as standard or extended lengths to 3m/10 feet
- Choice of international flanges and range of hygienic fittings
- Versatile switch outputs – Relay, direct load switching, PLC/PNP
- Hazardous area approval for explosion proof (Exd) and intrinsically safe (Exia) applications by ATEX, FM, CSA & IECEx
- Halar/PFA coating for chemical resistance
- Continuous operating temperature up to 150°C and pressure up to 100 bar g
- No mechanical parts – maintenance free

Short Fork Technology

Using short fork technology pioneered by Mobrey and many years of application experience, the Squing 2 is designed for use in virtually all applications. Extensive research has maximised the operational effectiveness of the fork design while keeping in mind the practical consideration of a level switch that is suitable for most liquids, including coatings, aerated liquids, and slurries.

Special features

Squing 2 has a status indicating 'heart-beat' LED which can be seen at all times through a lens in the cover. The LED will flash (once per second) when the Squing 2 is 'off' and will be constantly lit when the Squing 2 is 'on'. The LED gives an indication that the Squing 2 is functioning correctly and gives a local visual indication of the state of the wetside.

A mode switch allows the Squing 2 to be set to switch from wet to dry (typically low alarm) or from dry to wet (typically high alarm). You may also select a time delay from 0.3, 1, 3, 10, or 30 seconds.

A magnetic test point on the side of the housing allows the user to perform a functional test of the Squing 2. By touching a magnet on the target the Squing 2 output will change state for as long as the magnet is present.



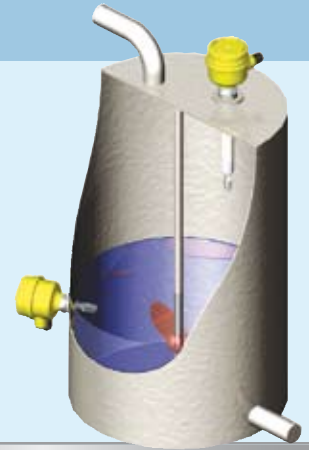
Applications

Overfill protection

Spillage caused by overfilling can be hazardous to the environment and people, resulting in lost product and incurring costs of clean up operations. Squing 2 is a failsafe limit level switch with built-in highly visible 'heartbeat LED' to reassure you that it is always ready to detect and signal overfill at any time.

Provided as standard, the magnetic test point on the unit allows for simple on-site functional test providing re-assurance of operation without removing the unit from your tank.

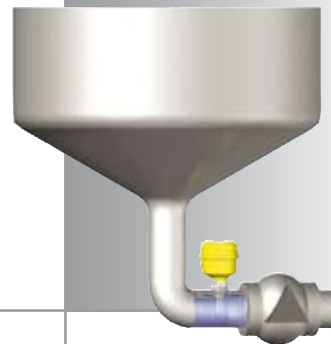
- Failsafe
- Manual test facility
- Heartbeat LED



Limit detection

Often batch processing tanks contain stirrers/agitators to ensure the mixing and product 'fluidity'. With the standard user selectable time delay from 0.3 to 30 seconds, there is no chance of false switching due to splashing caused by stirrers/agitators.

A choice from a range of different electronics provides the benefit of trouble-free integration into your existing system especially as existing wiring can be utilised.



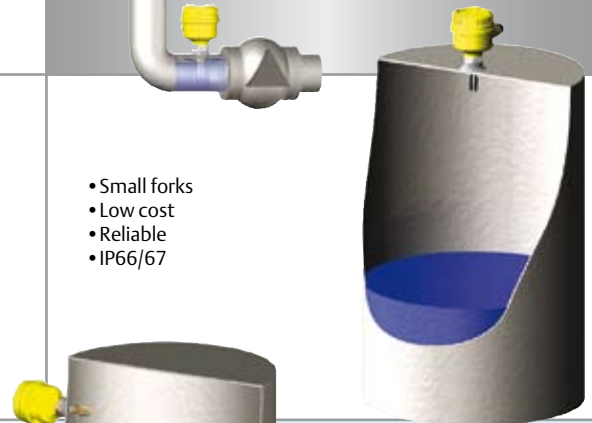
- Time delay switching option
- Resistance to false switching
- Choice of electronic outputs

Pipe installation (pump protection)

Short forks for minimum intrusion wetside allows simple low cost installation at any angle into your pipes or vessels. With the forks projecting in only 69mm, the Squing 2 can be installed in small diameter pipes. By selecting the option of direct load switching electronics, Squing 2 is ideal for reliable pump control and can be used to protect against pump dry running.

With a range of housings types rated IP66/67 the Squing 2 can be installed in almost any environment.

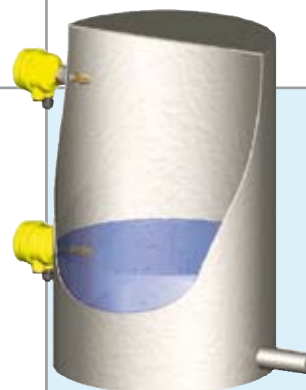
- Small forks
- Low cost
- Reliable
- IP66/67



High and low level alarm

Maximum and minimum detection in tanks containing many types of liquid is measured using Squing 2. The robust Squing 2 operates continuously at temperatures up to 150°C and operating pressure to 100 bar g making it perfect for use as a high or low level alarm. Available with industry standard flanges to ANSI and BS standards from stock, or other international standards to order and with forks constructed in various materials such as stainless steel, Hastelloy C, or with ECTFE (Halar)/PFA coatings.

- Range of process connections
- High temperature
- High pressure
- Plastic or aluminium housing



Hygienic applications

With the option of highly polished forks with a surface finish (Ra) better than 0.8µm, the Squing 2 meets the principle design criteria of 3A and EHEDG for equipment used in the manufacture of hygienic applications like food, beverage, and pharmaceutical. Manufactured in stainless steel the Squing 2 is robust enough to withstand steam cleaning (CIP) routines at temperatures up to 150°C.

Working in viscous liquids and liquids with high solids content, the Squing 2 will ignore low/medium density foams and aeration.

- Hygienic surface finish
- Extended forks
- Install anywhere



Technical specification

Electronics

Standard two core cable with any power supply from 24 to 260V ac (24 to 60V dc) is used to connect Squing 2 in series with the load and achieve direct load switching. The output acts as a simple SPST switch that changes with liquid presence. Alternatively use the switching function of the SPCO relay electronics output. Squing 2 also has the option of electronics to be interfaced directly to a PLC using the PNP transistor output model (three-wire).

Intrinsically Safe (IS) Squing 2 to ATEX EExia approval interfaces directly with standard NAMUR (DIN 19234, IEC 60947-5-6) isolation amplifiers.

SIL2 Certification

The Intrinsically Safe version of the Squing 2 has been assessed and rated SIL2 for use as a Type B safety related subsystem in accordance with IEC61508, when configured as a high level alarm only in conjunction with a Namur barrier.

Mounting options

Threaded mounting

Standard threads	¾", 1", BSPT, BSPP, NPT
Maximum operating pressure	100b (-40 to +50°C) derates to 80b (at 150°C)
Maximum operating temperature	+150°C wetside
Minimum operating temperature	-40°C wetside/dryside
Maximum ambient temperature	+80°C (at 60°C wetside)

Notes:

Max. length E = 3000mm.

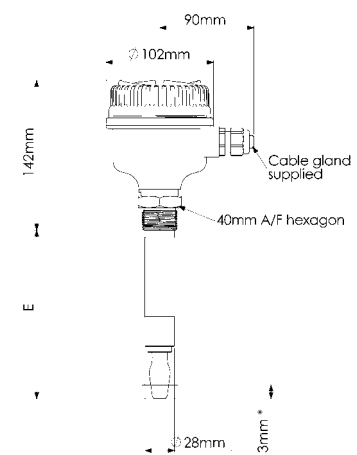
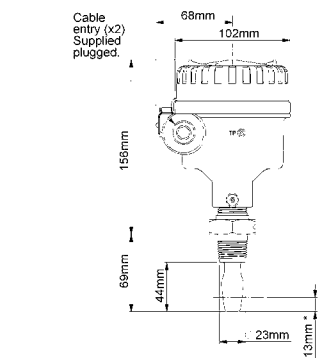
Extended models with ¾" and 1" threads,
¾" min E = 95mm, 1" E = 94mm

Accessories:

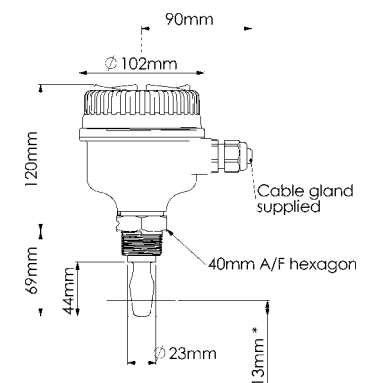
For use with extended length Squing (1" models only), a stainless steel adjustable clamp gland is available.

This is threaded 1½" BSPP for connection to the vessel, and allows the extended length Squing to be raised or lowered then clamped in position.

Note: this limits max. operating pressure to 1.3bar (SK304)



* Nominal switching point, vertically mounted



Mounting options

Flange mounting

Standard flanges	ANSI, DIN, Mobrey (see ordering codes overleaf)
Maximum operating pressure	100b (-40 to +50°C) 80b (at 150°C) or flange rating, whichever is the lower
Maximum operating temperature	+150°C wetside
Minimum operating temperature	-40°C wetside/dryside
Maximum ambient temperature	+80°C (at 60°C wetside)

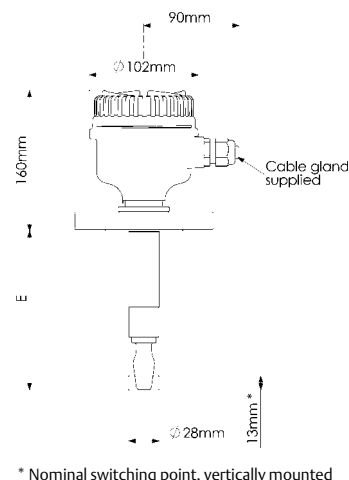
Notes:

Max. length E = 3000mm. Min. E = 89mm

Options:

For use with corrosive liquids having condensing vapours, flanged Squing can be supplied with the wetside fully Halar/PFA co-polymer coated.

Maximum extended length E = 1000mm.



Hygienic fitting

Standard fittings	Tri-Clover, SMS, DIN 11581, 'O' Ring seal (1" BSPP)
Maximum operating pressure	30 bar
Maximum operating temperature	+150°C wetside
Minimum operating temperature	-40°C wetside/dryside
Maximum ambient temperature	+80°C (at 60°C wetside)
Notes:	Max. length E = 3000mm Triclover min E = 105mm

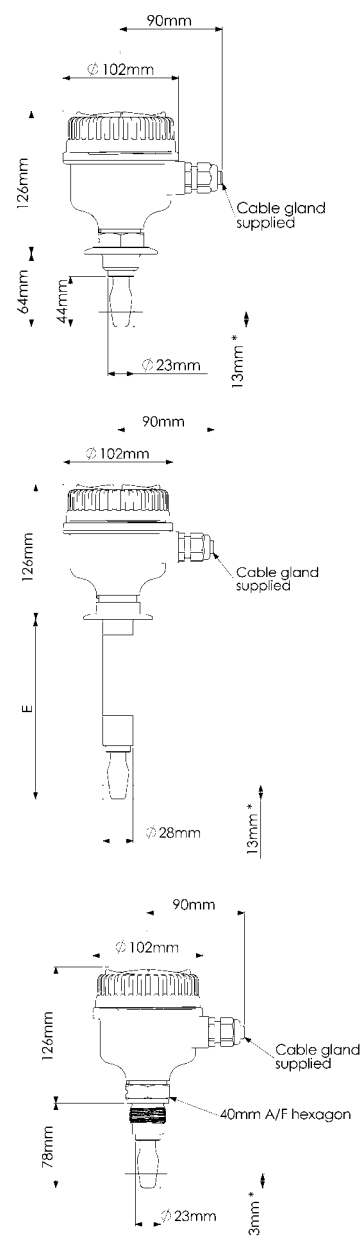
Options:

Hand polished wetside to a finish better than 0.8µm meets the principal design criteria of 3A and EHEDG hygienic approvals.

Accessories:

For use with 2" (51mm) Tri-clover Squing 2, a mounting kit comprising vessel fitting, Nitrile seal and clamp ring is available (SK266)

For use with 'O' ring seal Squing, a fitting boss with Fluorocarbon (FPM/FKM) 'O' ring is available (SK267)



Ordering information

Code	Product
T	Squing 2
Code	Material
D	316L Stainless steel (1.4404)
E	316L Stainless steel 3.1B Certs (1.4404)
F	Halar/PFA, 316L stainless steel (1.4404)
G	Halar/PFA, 316L stainless steel 3.1B Certs. (1.4404)
C ¹	Hastelloy C, solid hastelloy
Code	Size
1	1"
2	2" / DN50 / 51mm
3	3" / DN80
4	4" / DN100
5	¾"
6	1.5" / DN40 / 38mm
7	DN65
8	A Flange
9	G Flange
Code	Fitting
A	BSPT (R)
B	BSPP (G)
D	NPT
G	#150 RF
H	#300 RF
J	#600 RF
K	PN10/16
L	PN25
M	PN40
N	PN100
P	BSPP Hygienic fitting
Q	Mobrey
R	Tri-Clover clamp
S	SMS hygienic fitting
T	Tuchenhagen
V	DIN 11851
Code	Electronic type
B	PNP/PLC low voltage (3 wire) 24 to 60V dc
R	Relay (SPCO)
S	Direct load switching (mains 2 wire) 24 to 264Vac 50/60Hz, 24 to 60Vdc
C ^{2 3}	IS NAMUR (EExia)
Code	Surface finish
1	Standard
2 ⁴	Hand polished (Ra <0.8µm)
Code	Approvals and housing
NA	Standard (no approvals), M20 conduits, glass nylon
ND	Standard (no approvals), ½" NPT conduits, glass nylon
GY	FM and CSA (Unclassified, safe area), ¾" conduits, aluminium
GT	FM and CSA (Unclassified, safe area), ¾" conduits, 316 stainless steel
AA ⁵	ATEX and FM (IS), M20 conduits, glass nylon
AD ⁵	ATEX and FM (IS), ½" NPT conduits, glass nylon
CA ⁵	CSA (IS) and Non Incendive, M20 conduits, glass nylon
CD ⁵	CSA (IS) and Non Incendive, ½" NPT conduits, glass nylon

Ordering information

HA ⁵	IECEX (IS), M20 conduits, glass nylon
HD ⁵	IECEX (IS), ½" NPT conduits, glass nylon
EX ⁶	ATEX (Exd), M20 conduits, aluminium
ES ⁶	ATEX (Exd), M20 conduits, 316 stainless steel
FY ⁶	FM (Exd), ¾" conduits, aluminium
FT ⁶	FM (Exd), ¾" conduits, 316 stainless steel
DY ⁶	CSA (Exd), ¾" conduits, aluminium
DT ⁶	CSA (Exd), ¾" conduits, 316 stainless steel
JX ⁶	IECEX (Exd), M20 conduits, aluminium
JS ⁶	IECEX (Exd), M20 conduits, 316 stainless steel
Code	Length
A ⁷	Standard length (44 mm)
H	Standard length flange (102 mm)
B ⁸	Ext 150mm
C ⁸	Ext 300mm
D ⁸	Ext 500mm
L ⁹	Semi-ext (116 mm)
	Specific extended fork Length
E ¹⁰	Extended, customer specified length in millimetres

T	D	1	A	R	1	NA	A	Typical ordering information
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Notes:

- 1 Only in conjunction with threaded fitting A and D.
- 2 Only in conjunction with approval and housing AA, AD, CA, CD, HA and HD.
- 3 Conforms to SIL 2 of IEC 61508 as a Type B safety related subsystem when ordered as T***C*A**, T***C*C**, T***C*H** and configured as a high level alarm in conjunction with a Namur barrier.
- 4 Only in conjunction with hygienic fitting P, R, S, V or T.
- 5 Only in conjunction with electronic type C.
- 6 Not in conjunction with electronic type C. Not available with length L.
- 7 Not available with flanged models. For flanged models use length H.
- 8 Not available with hygienic fitting R. Extended lengths for this must be ordered as T**R***E***.
- 9 Only available with material TD and TE and threaded fittings 1A, 1B and 1D.
- 10 Halar/PFA coating is available up to 1000mm maximum. Halar/PFA coating is NOT available on threaded options.



Specifications

Construction

Housing/Enclosure	Aluminium alloy ASTM B26 356-T6, B360.0, stainless steel 316L (M20 or ¾" cable entry) Nylon PA66 30% GF (M20 or ½" NPT cable entry)
Threaded connections	R ¾" and 1" (BSPT); G ¾" and 1" (BSPP); ¾" and 1" NPT
Hygienic connections	TriClover, SMS, BSPP flush mount, Tuchenhagen, DIN 11851 Flanges to ANSI B16.5 (1.5" or larger) and BS4504 (DN40 or larger)
Extended lengths	Available to max 3m.
Coating	Halar (ECTFE) / PFA co-polymer (1000mm max.). Hand polished to better than 0.8µm in accordance with EHEDG and 3A
Ingress protection	IP66/67

Operating conditions

Wetside temperature range	-40°C to +150°C
Ambient temperature range	-40°C to +80°C (derated to 50°C at 150°C wetside)
Wetside pressure range	-0.25 bar g to +100 bar g at 50°C
Liquid specific gravity range	0.6 to 2.0
Liquid viscosity range	0.2 to 10,000 cps
Switching point (water)	13mm from tip (vertical) / from edge (horizontal) of fork
Hysteresis (water)	+/- 1mm nom.
Switching delay	User selectable 0.3, 1, 3, 10, 30 seconds delay dry to wet / wet to dry

Electrical connections

Electrical connections	Direct load switching (two wire) 24 to 264V ac 50/60Hz, 24 to 60V dc Solid state PNP output for direct interface to PLCs (three wire) 24 to 60V dc SPCO single relay for voltage free contacts Intrinsically Safe (IS) NAMUR to DIN 19234, IEC 60947-5-6
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Approvals/certificates

E.M.C. Directive	EN61326 Emissions to Class B. Immunity to industrial location requirements
L.V. Directive	EN61010-1 Pollution degree 2, Category II (264V max) Pollution degree 2, Category III (150V max)
Approvals/Certs	ATEX: II 1 G D, EExia IIC T5; II 1/2 G D, EExd IIC T6 FM: XP/II/1/ABCD/T6 Ta = 75C; T4 Ta = 125C; Type 4X IS/II/1/ABCD/T* Ta = 80C; IP6X; I/O/AEx ia IIC T* Ta = 80C CSA: CLI, Div1, Gps. A, B, C, D; Exia IIC T5; CLI Div2, Gps. A, B, C, D CLI, Div1, Gps. A, B, C, D; Exd IIC T6 SIL2 of IEC61508 as a type B safety related subsystem when configured as a high level alarm in conjunction with a Namur barrier.
Pending	IECEx (Exd, tD), IECEx (Exia, iaD)

A faulty or failed Squing 2 will be replaced with a new unit provided that the fault or failure is reported either directly or via an accredited Agent, within a period of 1 year from the date of supply, and the product has been installed and used in accordance with instruction manual IP2025.

Emerson Process Management reserves the right to examine such product and to refuse replacement at its discretion if the above conditions are not met.

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