

process measurement solutions



Solartron Mobrey Squing 2

vibrating fork point level measurement

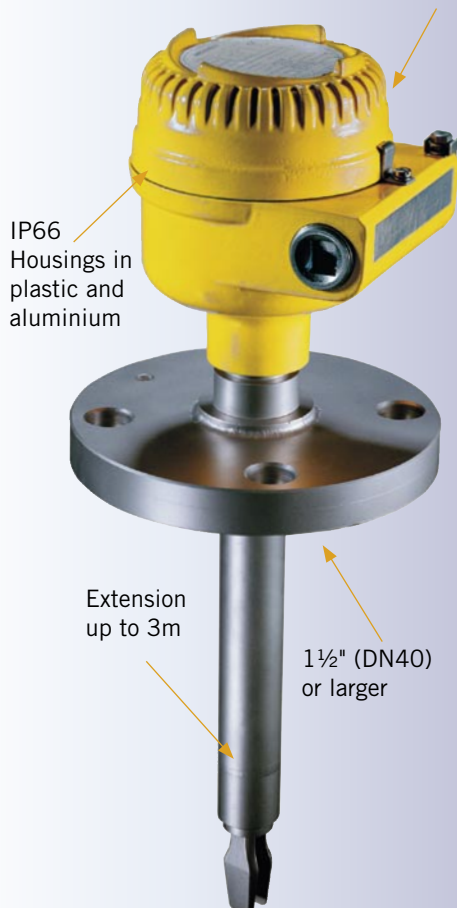
IP2024



Intrinsically Safe
EExia available



Explosion proof
EExd models



Squiring 2 vibrating fork level switch

Operation

The Squiring 2 is a liquid point level switch designed using the principle of a tuning fork. The Squiring 2 continuously monitors changes in its vibrating fork's natural resonant frequency. When the Squiring 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. Or 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) at standard or extended lengths to 3m
- Choice of international flanges and range of hygienic fittings
- Versatile switch outputs – Relay, Direct load switching, PLC/PNP
- ATEX hazardous area approval for explosion proof (EExd) and intrinsically safe (EExia) applications
- 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

Special features

Squiring 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 Squiring 2 is 'off' and will be constantly lit when the Squiring 2 is 'on'. The LED gives an indication that the Squiring 2 is functioning correctly and of course gives a local visual indication of the state of the wetside.

A mode switch allows the Squiring 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 is on the side of the housing, allowing the user to perform a functional test of the Squiring 2. By touching a magnet on the target the Squiring 2 output will change state for as long as the magnet is present.

Electronics

Standard two core cable with any power supply from 24 to 260V ac (24 to 60Vdc) is used to connect Squiring 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. Squiring 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) Squiring 2 to ATEX EExia approval interfaces directly with standard NAMUR (DIN 19234, IEC 60947-5-6) isolation amplifiers.

Short Fork Technology

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

SIL2 Certification

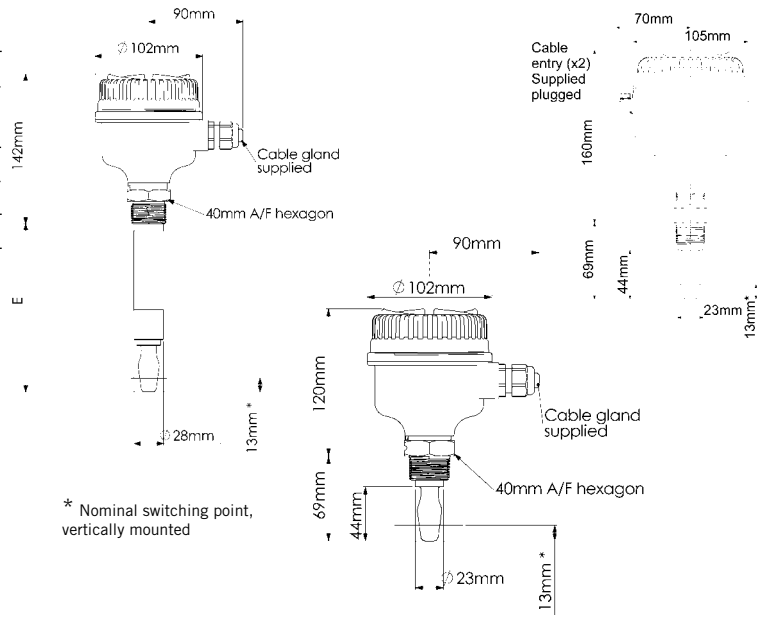
The Intrinsically Safe version of the Squiring 2 has been assessed and rated SIL2 for use as a Type B safety related subsystem in accordance with IEC61508. The I.S. Squiring 2, which already carries overfilling approval, is used together with a Namur barrier to provide a high level of fail safety when used in a high level application.

Mounting options

Threaded mounting

Standard threads	¾", 1", BSPT, BSPP, NPT
Max. op. press.	100b (-40 to +50° C) derates to 80b (at 150° C)
Max. op. temp.	+150° C wetside
Min. op. temp.	-40° C wetside/dryside
Max. amb. temp.	+80° C (at 60° C wetside)

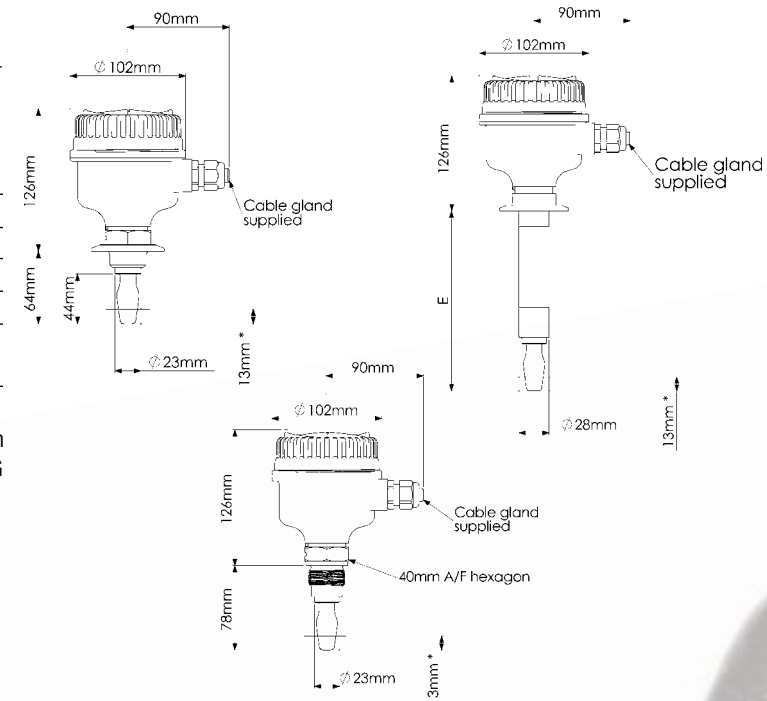
Notes:
 Max. length E = 3000mm.
 Extended models with ¾" & 1" threads,
 ¾" min E = 95mm, 1" E = 94mm
Accessories:
 For use with extended length Squing (1" models only), a stainless steel adjustable clamp gland is available.
 This is threaded 1½" BSPP for connection to the vessel, and allows the extended length Squing to be raised or lowered then clamped in position.
 Note: this limits max. operating pressure to 1.3bar (SK304)



Hygienic fitting

Standard fittings	Tri-Clover SMS DIN 11581 'O' Ring seal (1" BSPP)
Max. op. press.	30 bar
Max. op. temp.	+150° C wetside
Min. op. temp.	-40° C wetside/dryside
Max. amb. temp.	+80° C (at 60° C wetside)
Notes:	Max. length E = 3000mm Triclover min E = 105mm

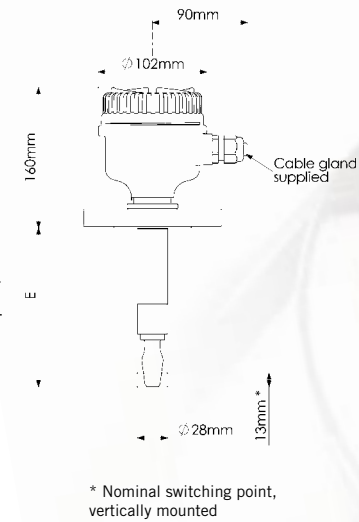
Options:
 Hand polished wetside to a finish better than 0.8µm meets the principal design criteria of 3A and EHEDG hygienic approvals
Accessories:
 For use with 2" (51mm) Tri-clover Squing 2, a mounting kit comprising vessel fitting, Nitrile seal and clamp ring is available (SK266)
 For use with 'O' ring seal Squing, a fitting boss with Viton 'O' ring is available (SK267)



Flange mounting

Standard flanges	ANSI, DIN, Mobrey (see ordering codes overleaf)
Max. op. press.	100b (-40 to +50° C) 80b (at 150° C) or flange rating, whichever is the lower
Max. op. temp.	+150° C wetside
Min. op. temp.	-40° C wetside/dryside
Max. amb. temp.	+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.



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)	
Code	Size	
1	1"	6 1.5" DN40 38mm
2	2" DN50 51mm	7 DN65
3	3" DN80	8 A Flange
4	4" DN100	9 G Flange
5	¾"	
Code	Fitting	
A	BSPT (R)	N PN100
B	BSPP (G)	P BSPP Hygienic fitting
D	NPT	Q Mobrey
G	#150 RF	R Tri-Clover clamp
H	#300 RF	S SMS hygienic fitting
J	#600 RF	T Tuchenhagen
K	PN10/16	V DIN 11851
L	PN25	W Adjustable
M	PN40	
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	IS NAMUR (EExia)	
Code	Surface finish	
1	Standard	
2	Hand polished (Ra <0.8µm)	
Code	Approvals	
A	ATEX (IS), FM (IS) (EExia)	
C	CSA	
E	ATEX (EExd)	
F	FM (EExd)	
N	Standard	
Code	Enclosures	
A	Glass nylon, M20	
D	Glass nylon, ½" NPT	
X	Al M25 (for EExd)	
Y	Al ¾" NPT (for EExd)	
Code	Length	
A	STD	
B	Ext 150mm	
C	Ext 300mm	
D	Ext 500mm	
E	Ext customer defined	
L	Semi-ext	

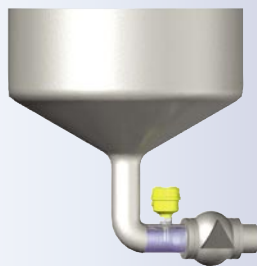
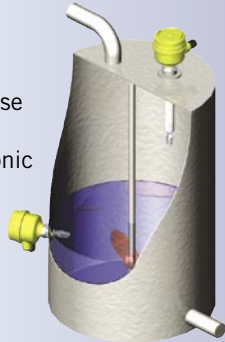
T D 1 A S 1 N A E2000 Typical part number

Applications



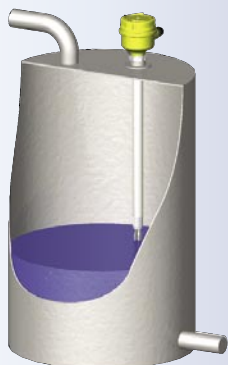
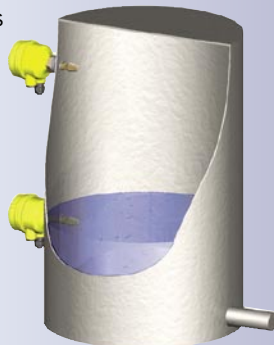
- Failsafe
- Manual test facility
- Heartbeat LED

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



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

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



- Hygienic surface finish
- Extended forks
- Install anywhere



74-00

Overfill protection

Spillage caused by overfilling can be hazardous to the environment and people, results 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.

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.

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.

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.

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.

Specifications

Construction

Housing/Enclosure	Aluminium alloy ASTM B26 356-T6 (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

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; ATEX II 1 G D, EExd IIC T5 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
Pending	CSA Explosion proof (XP), Intrinsically Safe (IS)

Solartron Mobrey will replace a faulty or failed Squing 2 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 Solartron Mobrey instruction manual IP2025. Solartron Mobrey 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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