

■ TRATOM PT GAGE INFORM



TRATOM Series

We are thinking for you first

SEBA 压力传感器



■ TRATOM PT GAGE INFORM



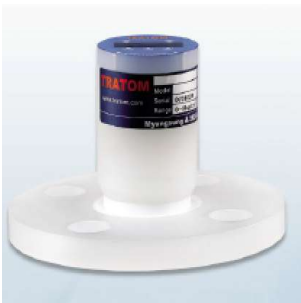
TRATOM Series

产品选型	产品信息	
MSP1000 – PE – MF 1/2 – 8K–D24 1、类型： RP：PT外螺纹 MSP1000(常规) MSP1010(可用于HF) MSP1000S(SLURRY使用) MSP2000(自带显示器) MSP2010(自带显示器, 可用于HF) 2、连接方式： MF:扩口 3、产品口径： 1/4:1/4寸 3/8:3/8寸 1/2:1/2寸 注释： PE:主体材质PTFE 8K：测量范围0–8公斤 D24：供电DC24	 MSP1000/MSP1010 MSP1000S	常用连接方式：扩口 工作温度：0 ~ 60℃ Power Source：DC 18 ~ 30V 信号输出: 4 ~ 20mA 精度：±0.5% F.S 导线：2线制 Load Resistance：500Ω at DC 24V. 应用案例：三安半导体、中芯国际、KCTECH、STI、LG
	 MSP2000/MSP2010	

■ TRATOM PT GAGE INFORM



TRATOM Series

产品选型	产品信息	
MSP3100 – PE – F 1/2 – 8K–D24 1、类型： MSP3100:法兰连接 MSP3110:法兰连接可用于HF MSP7000EX:内衬防爆 MSP7010EX:内衬防爆可用于HF 2、连接方式： F:法兰连接 3、产品口径： 1/4 :1/4寸 3/8 :3/8寸 1/2 :1/2寸 3/4 :1/4寸 1/1 :1寸 注释： PE:主体材质PTFE 8K：测量范围0-8K D24：供电DC24	 MSP3100/MSP3110	常用连接方式：法兰 工作温度：0 ~ 60℃ Power Source：DC 18 ~ 30V 信号输出: 4 ~ 20mA 精度：±0.5% F.S Load Resistance：500Ω at DC 24V. 应用案例：三安半导体、中芯国际、KCTECH、STI、LG
	 MSP7000EX/MSP7010EX 防爆认证	

■ TRATOM PT GAGE INFORM

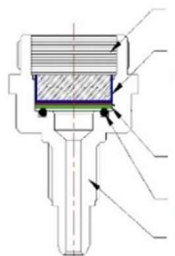
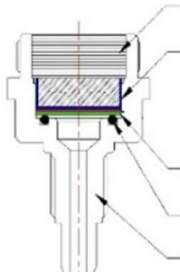
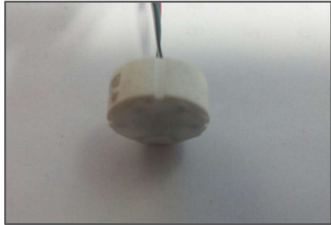
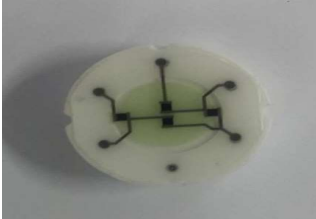


TRATOM Series

产品选型	产品信息	
MSP5000 – SS – RP 1/2 – 8K–D24 1、连接方式： PR:PT外螺纹 PV:VCR连接 2、产品口径： 1/4 :1/4寸 3/8 :3/8寸 1/2 :1/2寸 注释： SS:主体材质不锈钢 8K：测量范围0-8K D24：供电DC24	 MSP5000	常用连接方式：外螺纹/VCR 工作温度：0 ~ 60℃ Power Source：DC 18 ~ 30V 信号输出：4 ~ 20mA 精度：±0.5% F.S 防爆认证 (本质安全防爆) Load Resistance：500Ω at DC 24V. 应用案例：三安半导体、中芯国际、KCTECH、STI、LG

TRATOM PT SENSOR & IMPROVED



	MSP1000 Series	MSP1010 Series (氢氟酸)	备 注
A. 外 形			1. Body尺寸变更 - 相比之下，新型氢氟酸 (MSP1010)产品的主体部体积和常规款相同。
B. 内部 结构	 SENSOR 고정용 링 SENSOR (사파이어 센서) PFA막 0.2T 퍼플러 오링 PTFE HOUSING	 SENSOR 고정용 링 SENSOR (사파이어 센서) PFA막 0.2T 퍼플러 오링 PTFE HOUSING	1. 与P社同样结构的不锈钢传感器停产 2. 与S社(日本)同样结构变更 (2017年的产品)
C. Sensor部	 <陶瓷材质 传感器>	 < Sapphire 传感器>	1. 传感器: - 现有: 陶瓷 - 变更: Sapphire

■ TRATOM PT GAGE INFORM



Item	TRATOM (SEBA & MYEONG-SUNG)	PMC
VIEW		
Name	MSP7000S Series	PG 5500
Sensor	Piezo Strain Gauge Sensor	Strain Gauge Sensor
Sensor Material	Sapphire (与日本Surpass公司一样方式)	
Pressure Range	0 ~ 8kgf/cm ²	0 ~ 8kgf/cm ²
Power Supply	24V CD or Free Voltage	24V DC
Output Signal	4-20mA	4-20mA
Display	4 Digit & 3Digit(Low, High) -Bar graph: 3 Color & 1 Line	4 Digit - Bar graph: 2 Color & 2Line
Case	Resident Coating	Resident Coating
Sensor Part	Teflon & Sus & Sensor 一体型.	以Flange链接的两层结构.

TRATOM PT GAGE IMPROVED



	MSP7010EX	MSP7010EX	备 注
外 部			*改善 前 隔膜型 Flange *改善 后 一般型 Flange
内 部			*改善 前 Strain Gauge Sensor *改善 后 Piezo Strain Gauge Sensor (Sapphire)
传感器	Strain Gauge Sensor	Piezo Strain Gauge Sensor	
传感器表面	SUS	Sapphire	
气密维持	SUS RING, PFA膜	Perfluor O-ring & PFA膜	

F. MSP7000EX 特征



[MSP-7000EX
Image]

- ① 3色一体型 Bar graph.
→ 采用识别性优秀的一体型LED
不会有混乱的顾虑.
- ② 4Digit & 3Digit(Low, High).
→ Low, High的压力值用 3Digit 表示
容易判断设定的 Setting值.
- ③ 一体型 Sensor.
→ Teflon & Sus & Sensor의 one body
以一体型 2部分构造形式, 现有 Flange
Type 改善 leak 问题及安保.
- ④ 合理地 Price.
→ 比其他公司具有更合理的 Price .

根据测量压力 label 变形 Bar graph



<Low>

<Middle>

<High>

TRATOM SENSOR TEST REPORT



* Sapphire Crystal 传感器在氢氟酸溶化实验评价结果

- 1) 在韩国陶瓷工艺技术院，Sapphire Crystal 传感器的49 %HF(氢氟酸)溶液中，溶化的Al含量分析成绩书.
- 2) 在国际上验证的Al 氢氟酸溶化安全标准为8ng/day以下，并在氢氟酸原液中，可以维持2年性能 (在美国 Entegris Sapphire 传感器资料上选取)
- 3) MyungSung公司在韩国陶瓷工艺技术院委托验出的Al 溶化量为5.37ng/day，以确保安全性.



시험 성적서

한국세라믹기술원 우52851 경상남도 진주시 소호로 101(충무공동) (Tel:055-792-2500, Fax:055-792-2530)	성적서번호 : 2016-3142 페이지 (1) / (총 1)	
--	--	---

1. 의뢰자
 ○ 기관명/성명 : ㈜명성인스트루먼트 / 김철구
 ○ 주 소 : 서울특별시 금천구 벚꽃로 244(가산동, 벚산5차빌딩 806호)
 ○ 의뢰일자 : 2016년 11월 10일

2. 시험성적서의 용도 : 품질관리
 3. 시험 시료명/물질 : MSP-8100
 4. 시험기간 : 2016년 11월 10일 ~ 2016년 11월 22일
 5. 시험방법 : 습식분석 및 기기분석
 6. 시험환경
 ○ 온도 : (22 ± 1) °C , 습도 : (40 ± 5) % R.H.
 7. 시험결과

시료명	시험분석항목	시험분석결과	시험분석방법	비고
MSP-8100	Al (μg/L)	1	5.09	습식분석 및 기기분석
		2	0.95	
		3	7.97	
		4	1.42	
		5	0.85	
	평균(5EA)	3.26		
	Al (ng/day)	5.37		

참고) 1. 상기 분석에 사용된 ICP-MS는 Perkin-Elmer DRC II임.
 2. 상기 분석은 49% HF에 용출된 Al 함량분석 결과이고 용출시험 기간은 10일임.
 3. Al 용출량(ng/day)은 다음수식을 적용하여 계산하였음.

$$Al \text{ 용출량}(ng/day) = Al \text{ 검출량}(\mu g/L) \times (1000ng/\mu g) \times (0.03L) \times (Sensor \ surface/Exp. \ surface) \times (1/Exp. \ days)$$

 4. Sensor surface는 5.5mm 직경 surface이고, Exp. surface는 10mm 직경 surface임.

인 시험자 : 이 명 규 	기술책임자 : 최 철 호 
---	---

2016 . 11 . 22

한국세라믹기술원



비고) 이 성적서는 의뢰자가 제시한 시료 및 시료명으로 시험한 평가결과로서 원재 제품에 대한 품질 및 성능을 보장하지 않습니다.

■ TRATOM SAPPHIRE SENSOR LITERATURE



* Entegris Sapphire Crystal 产品资料介绍

[参考附件] Sapphire_based pressure transducers.pdf

- 1) 在Sapphire Crystal 传感器，49%HF(氢氟酸)溶液的Al溶化速度确认为8ng/day以下。
- 2) 测量Entegris Sapphire 传感器产品的Al溶化速度确认为7.1ng/day。
- 3) 以上条件下，制作的Entegris的压力转换器，在49% 氢氟酸环境下，维持2年稳定的性能。
- 4) MyungSung公司在韩国陶瓷工艺技术院委托验出的Al溶化量为5.37ng/day，考虑到测试环境的数据偏差，结果为Entegris类似的性能。

Advances in Electronics Manufacturing Technology

V-EMT 1:14 (14 June 2004)



Sapphire-based pressure transducers with stable long-term operation in concentrated hydrofluoric acid

Abstract

As device dimensions shrink and etch tolerances become tighter, controlling the dispense rate of hydrofluoric acid (HF) in semiconductor manufacturing processes is becoming more important since it directly affects etch rates in most applications. We discuss the long-term performance of a sapphire-based pressure transducer designed for use in pressurized fluid dispensing systems where aggressive chemicals such as HF may be used. Transducers were fitted in an application using 49% HF. The transducers were removed after five, nine and 24 months use and their measurement characteristics determined. The performance change of all units was found to be less than ± 0.06 PSIG ($<0.2\%$ of their 0-30 PSIG measurement span). The sapphire sensing element was also found to be stable in HF, contributing less than eight nanograms (ng) of aluminum per sensor per day when immersed in 49% HF at room temperature.

David Albrecht
Entegris, Inc.

Introduction

Liquid pressure sensors have found numerous applications in semiconductor fabs including: installation after a pump to ensure the pump is working within specification; installation to ensure valves, nozzles and other system subcomponents are functioning properly; liquid level measurement; and overall system diagnostics and use in pressurized fluid dispensing systems to make certain that the correct flow is dispensed.

Controlling the dispense rate of hydrofluoric acid (HF) in semiconductor manufacturing processes is extremely important since it directly affects etch rates in most applications. Inadvertent over- or under-use of HF can cause too much or too little etching, and increase wafer defects and processing costs. The effect on yield becomes even more pronounced as manufacturers move to smaller line width processes where lower tolerances of variations in etch depths require tighter process control. The instrumentation and methods for controlling HF volume dispense have therefore become critical to production control. Although a very common chemical in semiconductor processing, HF is also one of the most aggressive. Maintaining tight control over HF volume dispense requires pressure sensors that are able to withstand

long periods in contact with high concentrations of HF. As semiconductor device technology has progressed, the requirements on contamination control have also become more stringent. Parts in contact with process chemicals must not introduce contamination downstream. Pressure sensors for use with HF are most commonly constructed with metal or ceramic coated with TEFLON® material. However, these are known to degrade over time and may introduce contaminants to the liquid, which can damage critical material integrity.

This paper presents the performance results of a sapphire pressure sensor, with no moving parts that can be used in direct contact with HF for extended periods of time with little or no effect on its performance, or introduction of contaminants [1].

Methodology

To test the pressure sensors ability to withstand long-term exposure to HF, six model 4150 single port sapphire NT® Pressure Transducers manufactured by Entegris (numbered 1-6 for reference) were installed in an actual fab application using room temperature 49% HF. This level of HF concentration is well above that typically used for wafer contact and so provides a particularly stringent test. The 4150 units are designed to measure 0-30 PSIG with an accuracy of $\pm 1\%$ full scale (± 0.3 PSI). A cutaway diagram of a 4150 unit is shown in Figure 1.

For more papers by this company, or to contact the author, go to www.vertilog.com and retrieve paper V-EMT 1:14

© 2004 Vertilog Ltd. All rights reserved.

■ MSP 기밀 TEST – (타사비교TEST)-(01)



1. 型号 : MSP-7000EX , SPSA-1 (TPC Mechatronics公司)

2. TEST 设备

2-1. GP-10 Recorder (制造厂 : YOKOGAWA)

2-2. N2 Gas 加压箱.

3. Test 条件

3-1. 气体 : N2 Gas

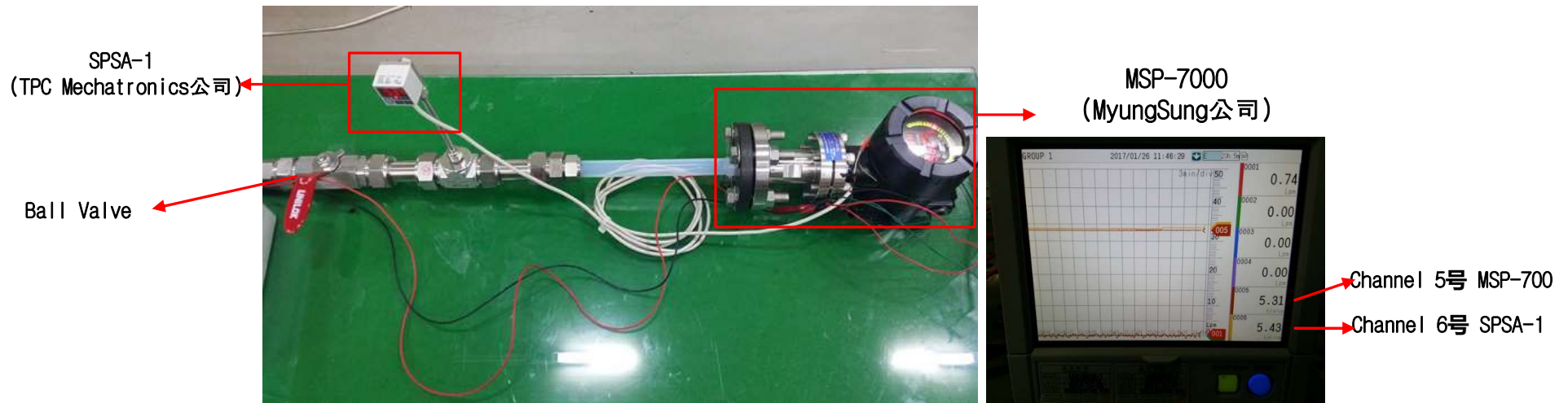
3-2. 气密 Test Time : 24Hr

4. Test 방법

4-1. 初期 N2 Gas 注入后, 约6小时压力稳定.

4-2. 压力 5.36kgf/cm² 设定.

4-3. 经过24小时以后, 确认以上两个产品的压力变化.

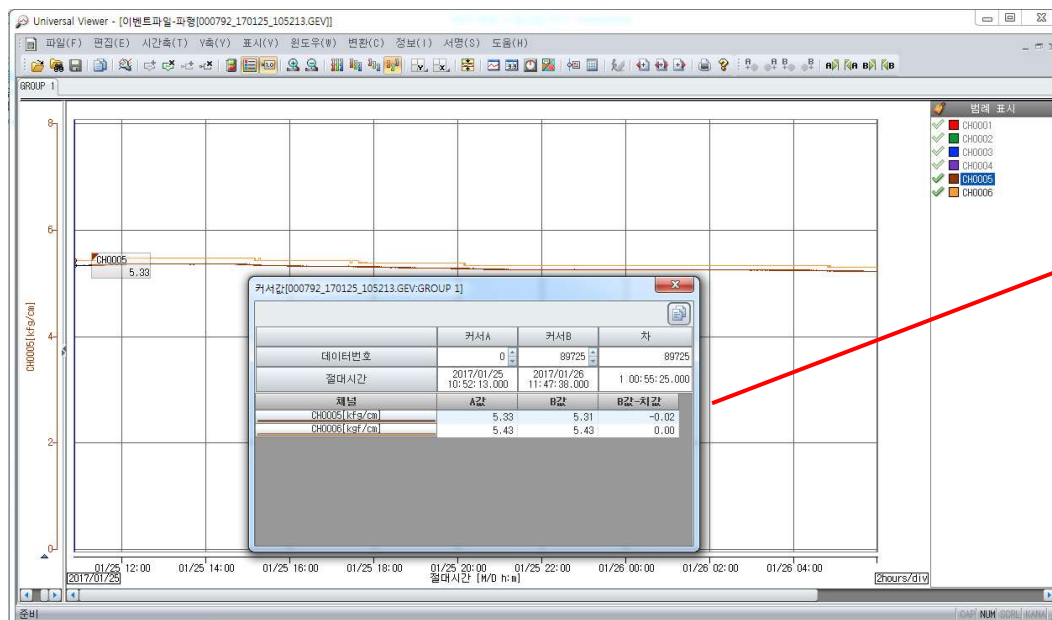


TEST 照片

MSP 气密测试 – (与其他公司比较测试)-(02)



5. 气密测试结果



커서값[000792_170125_105213.GEV:GROUP 1]			
	커서A	커서B	차
데이터번호	0	89725	89725
절대시간	2017/01/25 10:52:13.000	2017/01/26 11:47:38.000	1 00:55:25.000
채널	A값	B값	B값-치값
CH0005(kgf/cm)	5.33	5.31	-0.02
CH0006(kgf/cm)	5.43	5.43	0.00



GP-10 饭内爹
DATA

Channel1	测试前-压力	测试后-压力	偏差	合格标准 (0.5%↓)
CH5 MSP7000EX	5.33	5.31	-0.02	-0.37%
CH6 SPSA-1	5.43	5.43	0.00	0.00%

- 以上两个产品的气密性，确认为无异常

■ TRATOM APPLICATION-(1)



◆ Maker



◆ Equipments manufacturer



◆ End User



■ TRATOM APPLICATION-(2)



Section	Model	User	Process	Q'ty/year	Remark
压力 传感器	MSP-1000-PE	HYNIX/SILTRON/KEC/松岛 Nano Fab/现代Solar, millinet Solar, BOE Hydys(中国), LG Solar	CCSS/WET	620	
	MSP-1000-PP	SILTRON/HanYangENG/ShinSungENG/第一纺织, LG Solar	CCSS/WET	160	
	MSP-1000-SS	SILTRON/第一纺织	CCSS/WET	80	
	MSP-2000-PE	SILTRON/KEC/第一纺织/ BOE Hydys(中国)/ LG P6, LG Solar, LG P9	CCSS/WET	670	
	MSP-2000-PP	SILTRON/ LG P6	CCSS/WET	60	
	MSP-2000-SS	HYNIX/SILTRON/STI	CCSS/WET	20	
	MSP-3000-PE	SDI	CCSS/WET	60	
	MSP-5000-SS	LG Display P8	CCSS/WET	70	
	MSP-6000-PE	SILTRON/三永纯化	CCSS/PLANT	45	
	MSP-7000-PE	SILTRON/LG Display P8,P9 /SEC/现代 Solar, millinet Solar	CCSS	220	

■ TRATOM APPLICATION-(3)



Section	Model	User	Amount	year	Remark
压力传感器	MSP1010	天津中芯	32	2019.5	
	MSP1000/MSP1010	西安隆基	24	2020.3	
	MSP5000(防爆)	泉州三安半导体	8	2020.6	
	MSP1000/MSP1010	眉山通威	38	2020.11	
	MSP1000	上海盛美	385	2017-2021年	
	MSP1000/MSP1010	浙江鑫柔	15	2020.5	