

Messrs.

SPECIFICATION

Model:

Project:

Distributor:

Reference:



Fujikura Ltd.

Sold in North America by:
Servoflo Corporation
75 Allen Street Lexington, MA 02421
Tel: 781-862-9572

www.servoflo.com / info@servoflo.com

1. General;

This document describes the performance specifications of Fujikura Smart Pressure Sensors, AP2 and AG2 series.

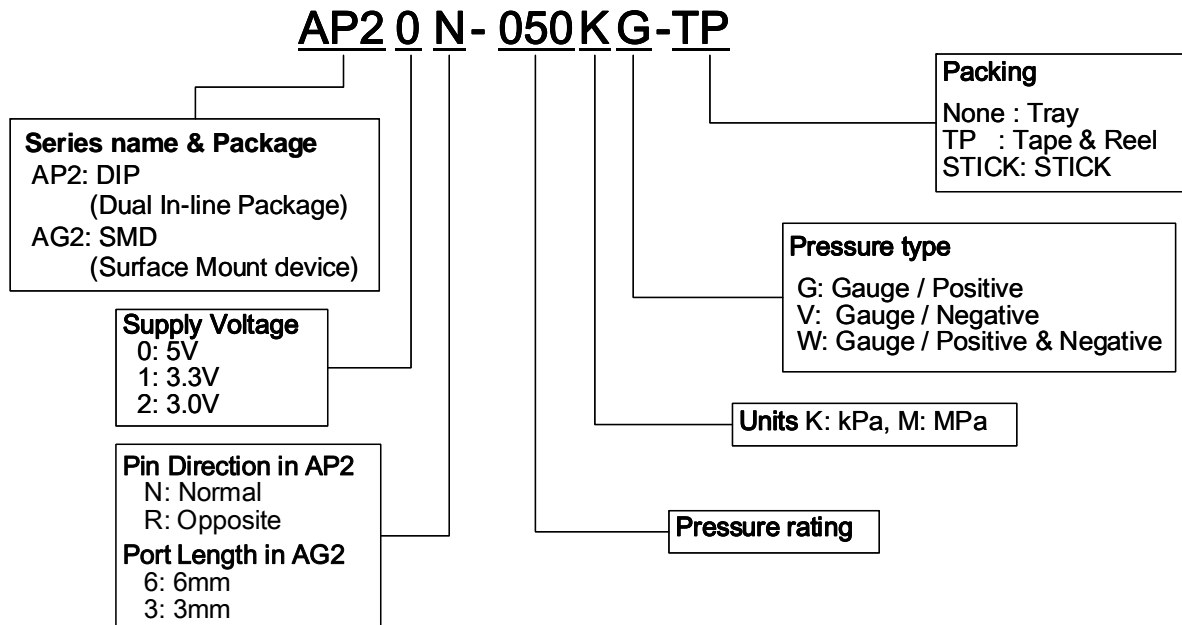
2. Principle;

Fujikura Smart Pressure Sensor is composed of a silicon piezoresistive pressure sensing chip and digital signal conditioning circuit. The low-level signal from the sensing chip is amplified, compensated, calibrated, and finally converted to a high-level output signal that is proportional to the applied pressure.

Table shown below is revision records of this specification

Rev.				
Est	7/Sep/2012	O. Kitamura	Preliminary	
	Date	Name	Comment	Mark

3. Name code



4. Pressure range & rating;

Model	Rated (Measurable) pressure range	Unit
AP2** - 025KG	0 ~ 25	kPa
AP2** - 050KG	0 ~ 50	
AP2** - 100KG	0 ~ 100	
AP2** - 200KG	0 ~ 200	
AP2** - 001MG	0 ~ 1000	
AP2** - 100KV	0 ~ -100	
AP2** - 100KW	-100 ~ 100	
AG2** - 025KG	0 ~ 25	
AG2** - 050KG	0 ~ 50	
AG2** - 100KG	0 ~ 100	
AG2** - 200KG	0 ~ 200	
AG2** - 001MG	0 ~ 1000	
AG2** - 100KV	0 ~ -100	
AG2** - 100KW	-100 ~ 100	

5.Package outline dimensions, Electrical pin connections, Marking and Weight;

Refer the attached drawings.

The following table shows the drawing No.

Model	Package outline dimensions & Marking	Electrical pin connections
AP20N AP21N AP22N	9-771-001	9-771-003
AP20R AP21R AP22R	9-771-002	
AG203 AG213 AG223	9-771-004	9-771-006
AG206 AG216 AG226	9-771-005	

6. Weight & Delivery style

Series	Weight
AP2 series	Approximately 1.4 grams
AG2*3 series	Approximately 0.3 grams
AG2*6 series	Approximately 0.4 grams

Series	Delivery style
AP2** – ****	Tray
AG2** – ****	
AP2** – **** – STICK	Stick
AG2** – **** – TP	Tape & Reel

7. Absolute maximum rating;

Items	Symbols	Ratings	Units
Maximum load pressure	Pmax+	1MPa: 1.5 times of rated pressure Others: Twice of rated pressure	
Maximum input voltage	Vs	6	VDC
Compensated Temperature range	Topt1	0~85	degree C
Operating temperature range	Topt2	-40~125	degree C
Storage temperature range	Tstg	-40~125	degree C
Operating Humidity range	Hopt	30~85 (non-condensing)	%RH
Storage Humidity range	Hstg	30~85 (non-condensing)	%RH
Insulation durability	-	AC500V, 1minute.	
Insulation impedance	-	100MΩ min. (DC500V)	

8. Recommended operating conditions;

Items	Symbols	Conditions			Units
		AP20* AG20*	AP21* AG21*	AP22* AG22*	
Rated pressure	Popt	See chapter 4			kPa
Type of pressure	-	Gauge			
Pressure media	-	Non-corrosive gas			
Supply Voltage	Vs	5.0±0.25	3.3±0.165	3.0±0.15	VDC

9. Electrical characteristics;

Items	Symbols	Ratings			Units
		AP20* AG20*	AP21* AG21*	AP22* AG22*	
Maximum current consumption	Ic	3	2	2	mA *3
Minimum load resistance	RL	2.5k			Ohm
Offset voltage	Voff	0.2±0.0675	0.3±0.0405	0.15±0.054	V *1,5,6
Output voltage at full scale	Vfs	4.7 ±0.0675	3.0 ±0.0405	2.85 ±0.054	V *1,5,6
Output span voltage	SV	4.5	2.7	2.7	
Accuracy	Error	±1.5	±1.5	±2.0	%FS *1,2
		(±0.0675)	(±0.0405)	(±0.054)	V
Output resolution		2.5	1.7	1.5	mV
Response time (Typ)	tr	1			msec *4

(Vs=5VDC for AP20, 3.3VDC for AP21, 3.0VDC for AP22, ambient temperature Ta=25 degreeC)

Notes;

*1) Error excludes the ratio metric effect of changes of supply voltage Vs.

*2) Accuracy consists of the following:

Non-linearity, Temperature errors over the temperature range 0 to 85 degree C, Pressure hysteresis, Calibration error of sensitivity and offset.

*3) Maximum current consumption is defined as the load resistance is 1 MΩ.

*4) Response time is defined as the time for the change in output voltage from 10% to 90% of its final value when the input pressure makes a step change.

*5) Voff and Vfs of 100KV models are defined as below,

Voff at 0kPa, Vfs at -100kPa

*6) Voff and Vfs of 100KW models are defined as below,

Voff at -100kPa, Vfs at +100kPa

10. Transfer Function;

$$V_{out} = V_s \times ((P \times \alpha) + \beta) \pm (\text{Pressure Error} \times \text{Temperature Error Multiplier} \times \alpha \times V_s)$$

V_s = supply voltage 5.0, 3.3, 3.0 \pm 5% (V) :

The output voltage (V_{out}) is not perfectly ratiometric with the power supply voltage

P = Input Pressure (kPa)

8-1. $V_s = 5.0 \pm 5\%$ (V)

Model	Pressure Range	α	β	Pressure Error (kPa)
AP20* – 025KG	0 ~ 25kPa	0.036	0.04	0.375
AG20* – 025KG				
AP20* – 050KG	0 ~ 50kPa	0.018	0.04	0.75
AG20* – 050KG				
AP20* – 100KG	0 ~ 100kPa	0.009	0.04	1.5
AG20* – 100KG				
AP20* – 200KG	0 ~ 200kPa	0.0045	0.04	3.0
AG20* – 200KG				
AP20* – 001MG	0 ~ 1000kPa	0.0009	0.04	15
AG20* – 001MG				
AP20* – 100KV	0 ~ -100kPa	-0.009	0.04	1.5
AG20* – 100KV				
AP20* – 100KW	-100 ~ 100kPa	0.0045	0.49	3.0
AG20* – 100KW				

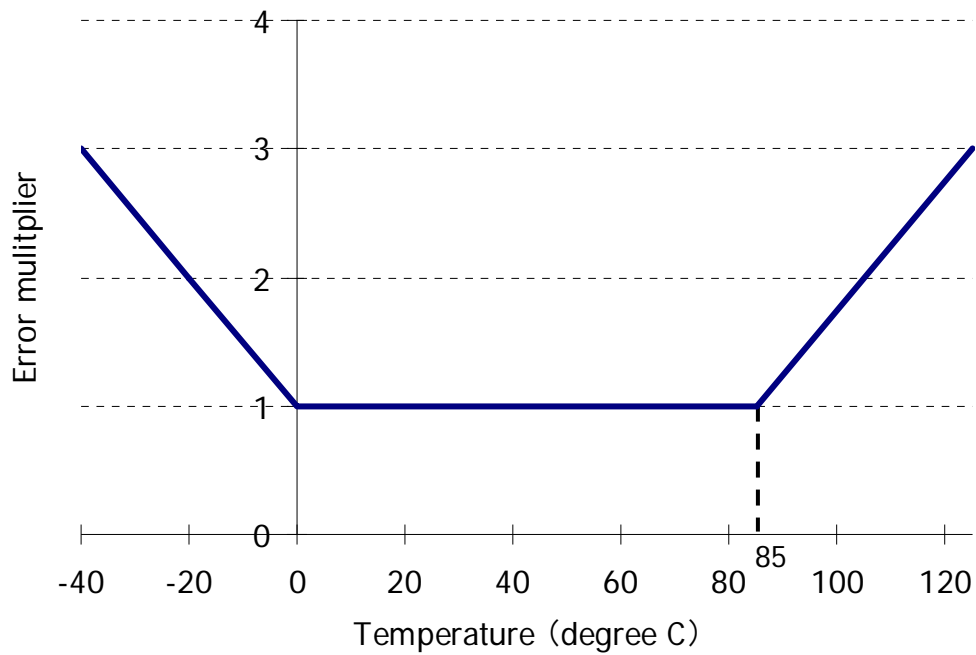
8-2. $V_s = 3.3 \pm 5\%$ (V)

Model	Pressure Range	α	β	Pressure Error (kPa)
AP21* – 025KG	0 ~ 25kPa	0.03273	0.09091	0.375
AG21* – 025KG				
AP21* – 050KG	0 ~ 50kPa	0.01636	0.09091	0.75
AG21* – 050KG				
AP21* – 100KG	0 ~ 100kPa	0.00818	0.09091	1.5
AG21* – 100KG				
AP21* – 200KG	0 ~ 200kPa	0.00409	0.09091	3.0
AG21* – 200KG				
AP21* – 001MG	0 ~ 1000kPa	0.000818	0.09091	15
AG21* – 001MG				
AP21* – 100KV	0 ~ -100kPa	-0.00818	0.09091	1.5
AG21* – 100KV				
AP21* – 100KW	-100 ~ 100kPa	0.00409	0.5	3.0
AG21* – 100KW				

8-3. $V_s = 3.0 \pm 5\%$ (V)

Model	Pressure Range	α	β	Pressure Error (kPa)
AP22* - 025KG	0 ~ 25kPa	0.036	0.05	0.5
AG22* - 025KG				
AP22* - 050KG	0 ~ 50kPa	0.018	0.05	1
AG22* - 050KG				
AP22* - 100KG	0 ~ 100kPa	0.009	0.05	2
AG22* - 100KG				
AP22* - 200KG	0 ~ 200kPa	0.0045	0.05	4
AG22* - 200KG				
AP22* - 001MG	0 ~ 1000kPa	0.0009	0.05	20
AG22* - 001MG				
AP22* - 100KV	0 ~ -100kPa	-0.009	0.05	2
AG22* - 100KV				
AP22* - 100KW	-100 ~ 100kPa	0.0045	0.5	4
AG22* - 100KW				

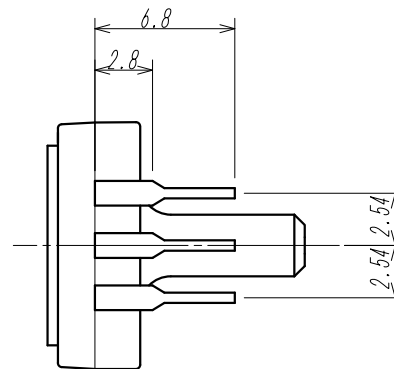
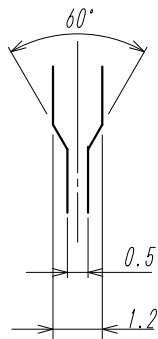
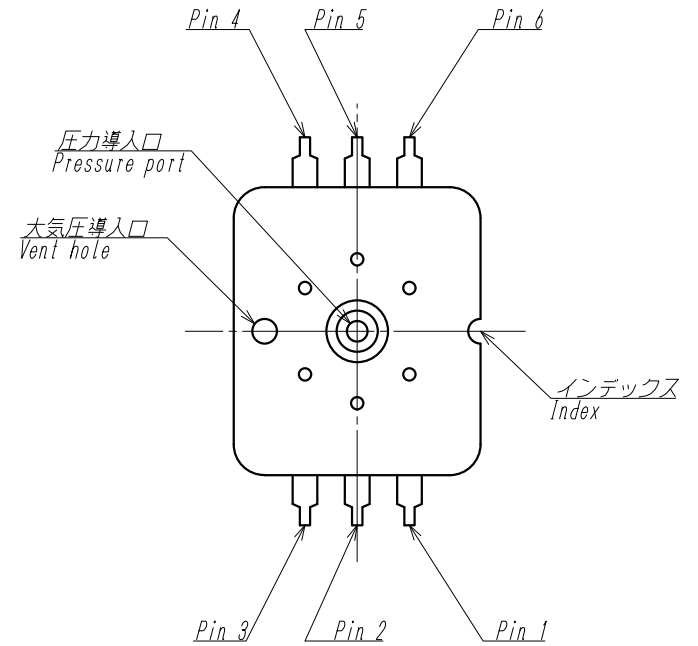
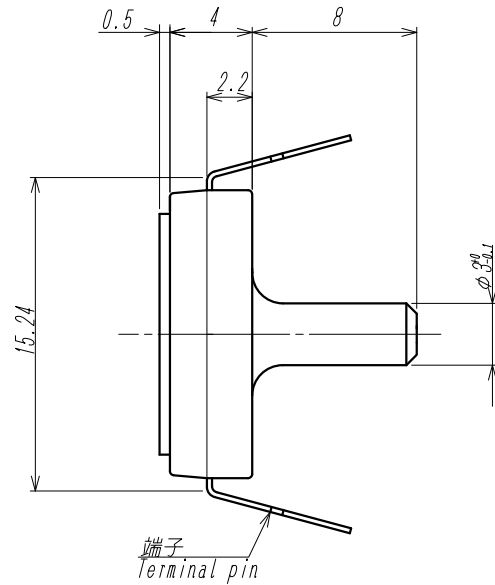
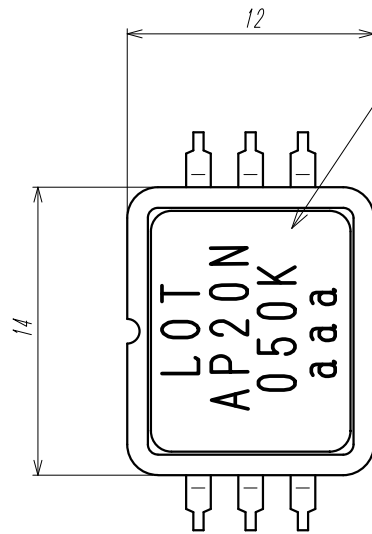
Temperature Error Multiplier



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LOT : year(0-9) month(0-9,X,Y,Z) day(00-31)
AP20N : type of sensor
050K : pressure range
aaa : customized code



Unless otherwise specified, tolerance: +/-0.1mm

PART NO.	部品名 NAME OF PART	材質 MAT'L	個数 QTY.	摘要 REMARKS
PROJECT NAME :				
第3角法 TOP ANGLE PROJECTION	名称TITLE			
単位UNITS mm	AP2xN series			
尺度SCALE 4:1	Outline & Marking diagram			
DATE OF ISSUE 8/JUN/2012	図面番号DRAWING NO.			REV. MARK
DATE OF DESIGN 8/JUN/2012	9-771-001			◇

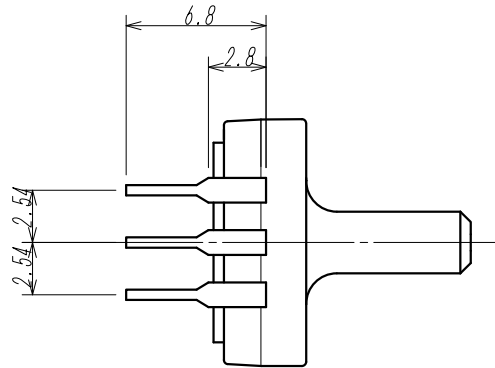
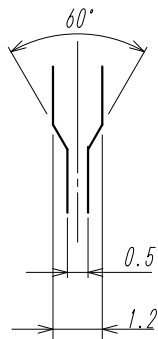
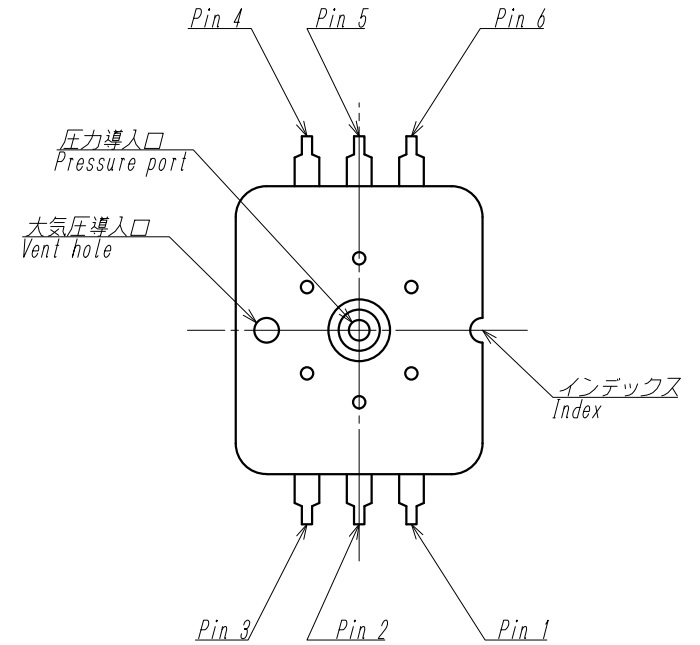
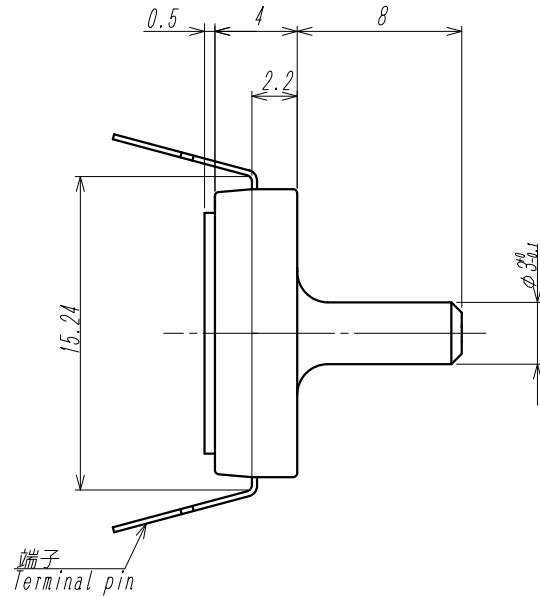
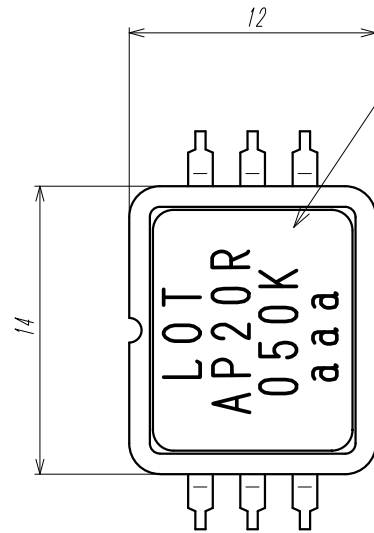
承認 APPROVED BY
 O. Kitamura
 設計 DESIGNED BY
 Y. Matsuki

検図 CHECKED BY
 H. Nishida
 製図 DRAWN BY
 Y. Matsuki



◇	変更 REVISIONS	年月日 DATE	変更者 BY
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LOT : year(0-9) month(0-9,X,Y,Z) day(00-31)
AP20R : type of sensor
050K : pressure range
aaa : customized code



Unless otherwise specified, tolerance: +/-0.1mm

PART NO.	部品名 NAME OF PART	材質 MAT'L	個数 QTY.	摘要 REMARKS
PROJECT NAME :				
第3角法 TOP ANGLE PROJECTION	名称TITLE			
単位UNITS mm	AP2xR series			
尺度SCALE 4:1	Outline & Marking diagram			
DATE OF ISSUE 8/JUN/2012	図面番号DRAWING NO.			REV. MARK
DATE OF DESIGN 8/JUN/2012	9-771-002			◇

承認 APPROVED BY
O. Kitamura

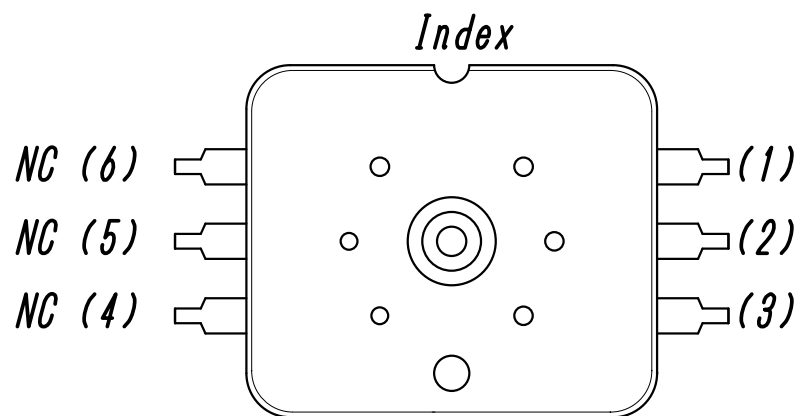
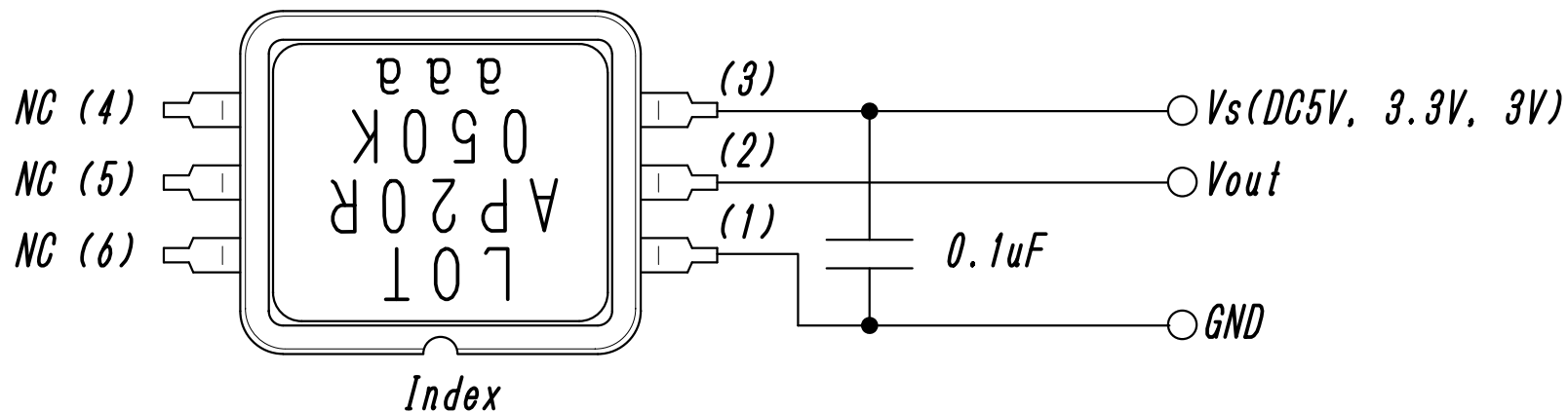
検図 CHECKED BY
H. Nishida

設計 DESIGNED BY
Y. Matsuki

製図 DRAWN BY
Y. Matsuki



MARK	変更 REVISIONS	年月日 DATE	変更者 BY
◇			



PART NO.	部品名 NAME OF PART	材質 MAT'L	個数 QTY.	摘要 REMARKS
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PROJECT NAME :

第3角法
3RD ANGLE PROJECTION

単位 UNITS
mm

尺度 SCALE
FREE

DATE OF ISSUE
8/JUN/2012

DATE OF DESIGN
8/JUN/2012

名称 TITLE

AP2xx series
Connection diagram

図面番号 DRAWING NO.

9-771-003

REV. MARK



MARK

変更 REVISIONS

年月日
DATE

変更者
BY



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Fujikura Ltd.
Tokyo Japan

承認 APPROVED BY

O.Kitamura

検図 CHECKED BY

Y.Uchiumi

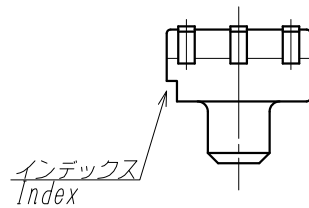
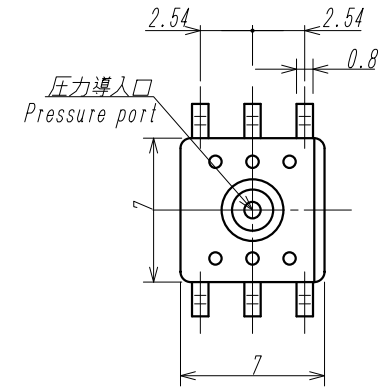
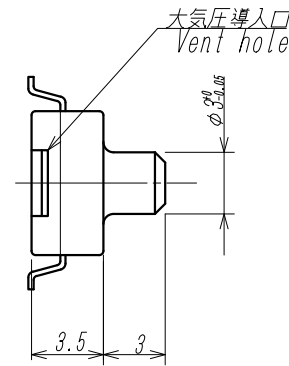
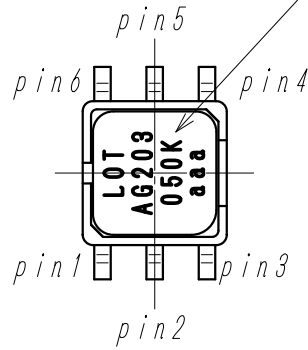
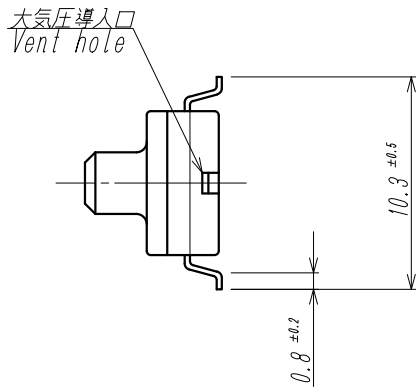
設計 DESIGNED BY

H.Nishida

製図 DRAWN BY

H.Nishida

LOT : year(0-9) month(0-9,X,Y,Z) day(00-31)
AG203 : type of sensor
050 : pressure range
aaa : customized code



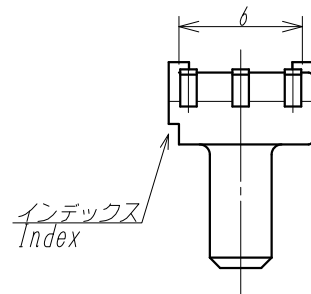
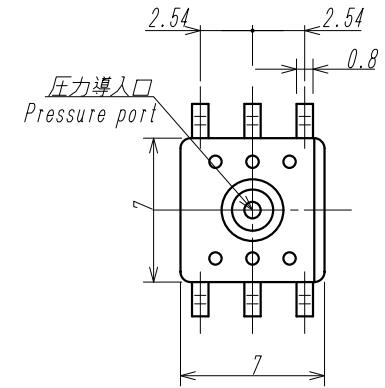
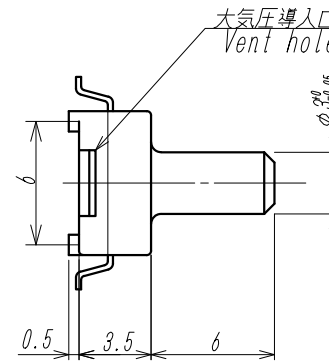
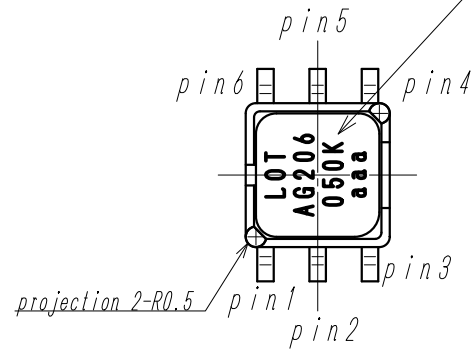
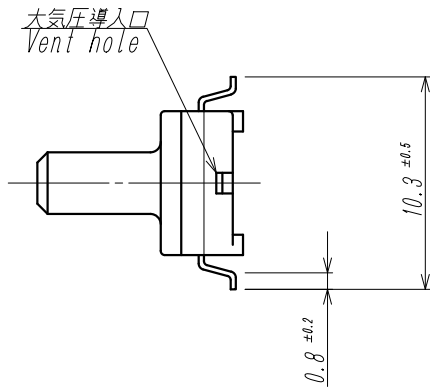
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PART NO.	部品名 NAME OF PART	材質 MAT'L	個数 QTY.	摘要 REMARKS
PROJECT NAME :				
第3角法 TOP ANGLE PROJECTION	名称TITLE			
単位UNITS mm	AG2x3 series			
尺度SCALE 4:1	Outline & Marking diagram			
DATE OF ISSUE 8/JUN/2012	図面番号DRAWING NO.			REV. MARK
DATE OF DESIGN 8/JUN/2012	9-771-004			◇

承認 APPROVED BY O. Kitamura	検図 CHECKED BY H. Nishida
設計 DESIGNED BY Y. Matsuki	製図 DRAWN BY Y. Matsuki

◇	変更 REVISIONS	年月日 DATE	変更者 BY	Fujikura
MARK				

LOT : year(0-9) month(0-9,X,Y,Z) day(00-31)
AG206 : type of sensor
050 : pressure range
aaa : customized code



Unless otherwise specified, tolerance: +/-0.1mm

PART NO.	部品名 NAME OF PART	材質 MAT'L	個数 QTY.	摘要 REMARKS
PROJECT NAME :				

第3角法 TOP ANGLE PROJECTION	名称TITLE
単位UNITS mm	AG2x6 series
尺度SCALE 4:1	Outline & Marking diagram

承認 APPROVED BY
O. Kitamura

検図 CHECKED BY
H. Nishida

設計 DESIGNED BY
Y. Matsuki

製図 DRAWN BY
Y. Matsuki

DATE OF ISSUE
8/JUN/2012
DATE OF DESIGN
8/JUN/2012

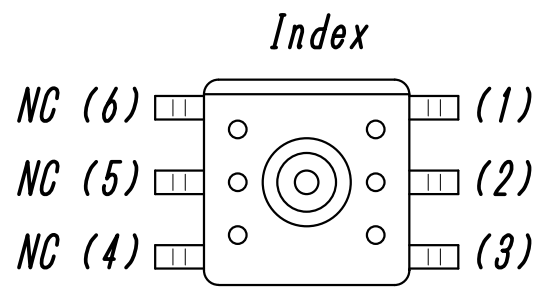
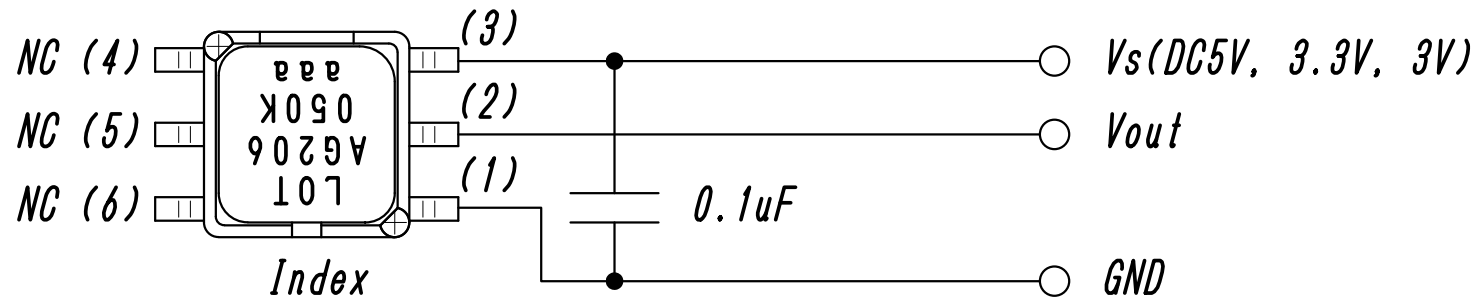
図面番号 DRAWING NO.

9-771-005

REV. MARK


MARK	変更 REVISIONS	年月日 DATE	変更者 BY
◇			





PART NO.	部品名 NAME OF PART	材質 MAT'L	個数 QTY.	摘要 REMARKS
PROJECT NAME :				
第3角法 3RD ANGLE PROJECTION	名称 TITLE			
単位 UNITS mm	AG2xx series Connection diagram			
尺度 SCALE FREE	図面番号 DRAWING NO.			REV. MARK
DATE OF ISSUE 8/JUN/2012	9-771-006			◇
DATE OF DESIGN 8/JUN/2012				

承認 APPROVED BY O.Kitamura	検図 CHECKED BY Y.Uchiumi
設計 DESIGNED BY H.Nishida	製図 DRAWN BY H.Nishida

◇	変更 REVISIONS	年月日 DATE	変更者 BY	 フジクラ Fujikura Ltd. Tokyo Japan
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