Cubic SF6 Sensor Solution

Spec & Pin definition

SF6-015
SF6 gas sensor

Pin Definition
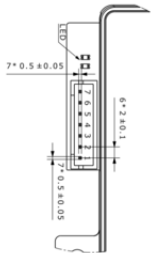
No.	Pin	Description
1	Power	Power input (+5V)
2	GND	Power input (ground terminal)
3	COM	Modbus-RTU
4	OUT1	OC digital output
5	OUT2	Equipment failure (active low)
6	OUT3	Gas leakage alarming (active low)
7	OUT4	Reserve

SF6-015 Sensor Specification	
Target gas	Sulfur hexafluoride (SF6)
Working principle	NDIR (non-dispersive infrared) technology
Measurement range	0~1500ppm
Resolution	1 ppm
Accuracy	±2%FS
Repeatability	≤±1%FS
Response time	T90<30s (diffusion)
Data refresh time	≤1s
Preheating time	<15s
Output	1. Modbus-RTU
	2. TTL/OC digital output
Protection grade	IP54
Working pressure	80kPa~120kPa[1]
Working condition	-20 ~ 60℃, 0~95%RH (non-condensing)
Storage condition	-30 ~ 70℃, 0~95%RH (non-condensing)
Power supply	5V±5% DC, ripple wave<100mV
Average working current	≤130mA
Peak current	<260mA
Lifetime	10+ years
Dimension	L63.2*W38.5*H19.2 mm
Remarks: ①The response time and detection accuracy test condition are based on atmospheric pressure 101kPa.	

Performance

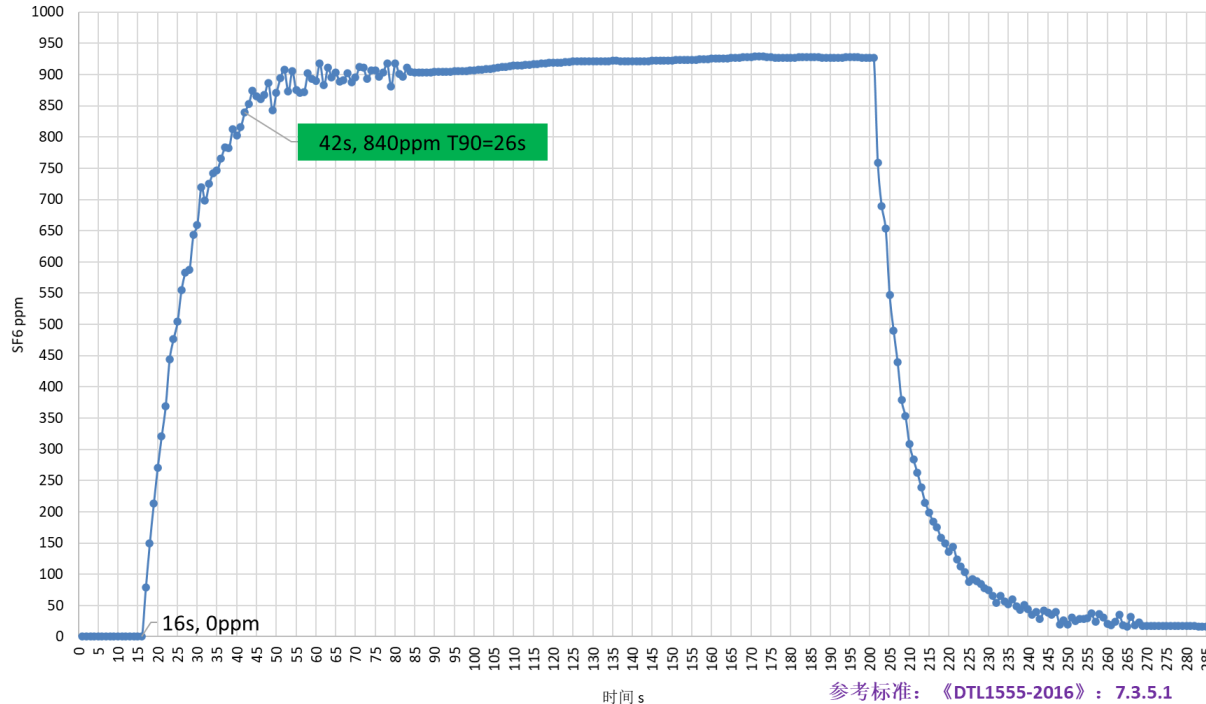Accuracy curve

+-2%FS=+-30ppm
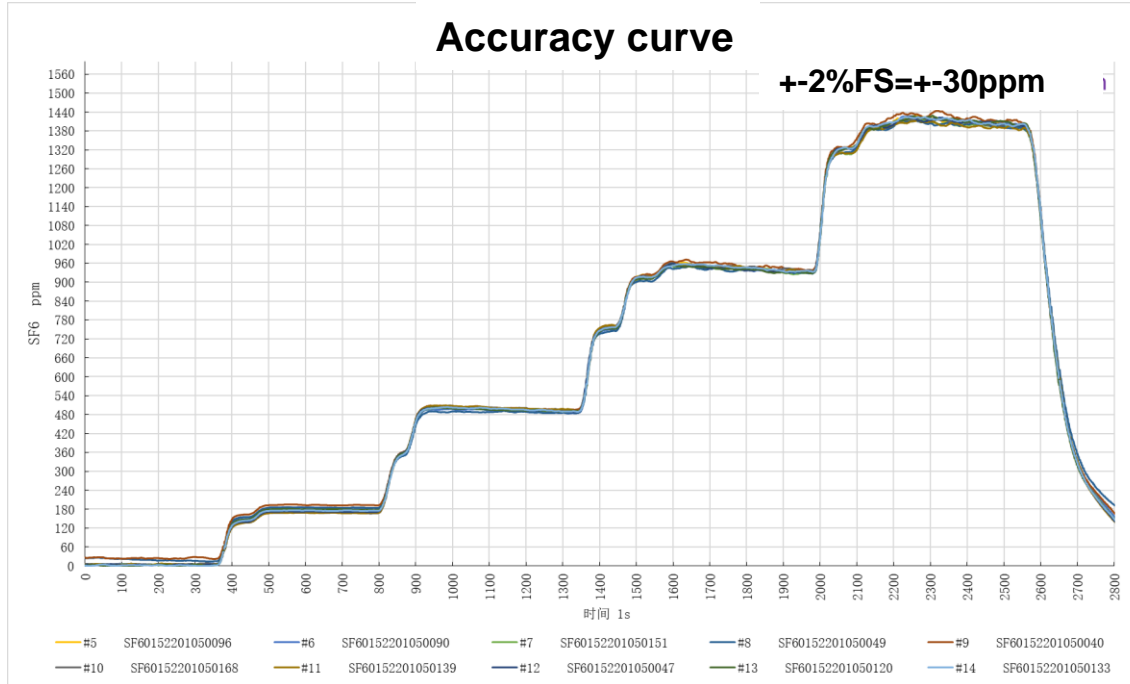
Accuracy definition： The maximum relative deviation or maximum absolute deviation allowed between the sensor concentration read value and the standard value.

Test at 5 concentration points: 0ppm,200ppm,500ppm,1000ppm,1500ppm

Response time

Response time curve

SF6 ppm

42s, 840ppm T90=26s

16s, 0ppm

时间 s

参考标准：《DTL1555-2016》：7.3.5.1

Response time definition：

the time from the intake air to the stable indication value of the device is specified as the response time when it reaches 90% of the stable indication value.

Test method:
input SF6 standard gas with a concentration of about 1000μL/L, and read the stable indication value after the indication value is stable. Remove the standard gas, introduce pure air, and after the instrument returns to zero, then introduce standard gas with a concentration of 1000 μL/L, start timing from the introduction of standard gas into the device, and record the time taken when the display value of the device reaches 90% of the stable value.

Spec comparison

Manufacturer	Cubic	Smartgas	Note
Product	NDIR gas sensor SF6-015	NDIR gas sensor BASIC EVO	
Measurement range	0-1500ppm	0-1500ppm	
Resolution	1ppm	1ppm	
Accuracy	±2%FS	±2%FS	
Repeatability	≤1.5%FS	≤±20ppm	
Initialization to first reading	10s		
Preheating to stabilized reading	15s	<2 minutes (start-up time); <30min full spec	
Data refresh cycle	1s		
Response time	T90<30s (1000ppm concentration, diffusion)	T90<60s (1000ppm concentration, diffusion)	Fast response
Detection limit	≤5ppm	≤10ppm	More sensitive
Operation temp.	-20~60℃ (0~95%RH,non-condensing)	-20~40℃ (0~95%RH,non-condensing)	Wider working range
Storage temp.	-30~70℃ (0~95%RH,non-condensing)	-20~60℃ (0~95%RH,non-condensing)	Wider storage range
Ambient air pressure	80kPa~120kPa	80kPa~115kPa	

Spec comparison

Manufacturer	Cubic	Smartgas	Note
Product	NDIR gas sensor SF6-015	NDIR gas sensor BASIC EVO	
Long term stability(zero)	≤±2%FS / 12 months	≤±30ppm / 12 months	
Long term stability(span)	≤±2%FS / 12 months	≤±30ppm / 12 months	
Temp. drift (zero)	≤±0.1%FS / ℃	≤±3 ppm FS / ℃	Less drift in 0ppm
Temp. drift (span)	≤±0.15%FS / ℃	≤±6 ppm per ℃	Less drift in 1500ppm
Pressure drift	±0.1%/mbar	+0.1% of actual reading/mbar	
Supply voltage	5VDC ±5%, ripple wave<100mV	3.3V~6 VDC ±5%	
Average work current	≤130mA	<600mA	
Peak current	<260mA@5VDC	<400mA@3.3V,<240mA@5V	
Power consumption	≤0.7W	≤0.8W	
Digital output signal	1.Modbus ASCII 2.RTU 5V TTL	1.Modbus ASCII 2. RTU via UART	
Protection	IP54	IP54	
Lifetime	10+ years	<10 years	

Thank you

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