Product Description产品描述

CO2 Engine™ K30

Sensor module and OEM platform

传感器模块及OEM器件

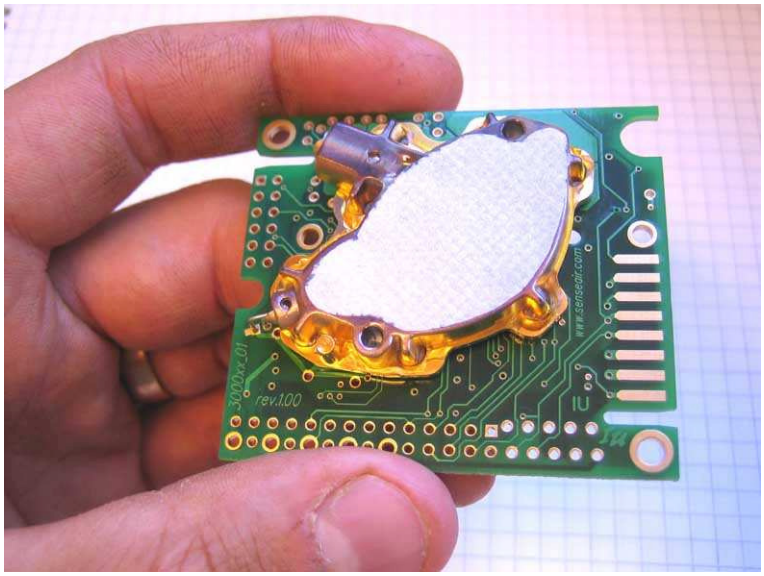


Figure 1图1. CO_2Engine™ K30

General概述

- The **K30** sensor platform CO_2Engine™ K30 can be customized for a variety of sensing and control applications. This platform is designed to be an OEM module for built-in applications in a host apparatus, and hence should be optimized for its tasks during a dialog between SenseAir and the OEM customer. This document is to be considered as the starting point for such a dialog.
  二氧化碳K30传感器模块为OEM器件，可内置于一个主控装置内，因此具体应用需要经过SenseAir与OEM客户协商，本文件即为开启该种协商的起始文件。
- This document describes an appearance of the K30 sensor platform named CO_2Engine™ K30-STA.
  本文件描述了名为CO_2Engine™ K30-STA的二氧化碳K30传感器PCB模块

I/O notations used in this document, terminal positions and some important **K30** platform PCB dimensions are described at the next two pages.
本文件中使用的输入/输出说明，端子位置及K30模块的PCB板的尺寸在以下两页中做出了描述。

Terminal descriptions 端子描述

The table below specifies what terminals and I/O options are available in the general **K30** platform *(see also the layout picture Fig. 2)*. Please note, however, that in the CO2Engine™ K30-STA default configuration, only OUT1, OUT2, OUT3, OUT4, Din1, Din2 and Status have any pre-programmed functions. These are described in the chapter *"Default Configuration"*.

下面表格显示了K30模块所含端子及输入/输出选择（在图2中参照模块布板图）。在CO2Engine™ K30-STA 模块的默认配置中，只有OUT1, OUT2, OUT3, OUT4, Din1, Din2 和 Status有编程功能，具体细节请参照《默认设置》章节。

Functional group 功能组	**Descriptions and ratings 描述及额定值**
Power supply供电	
G+ referred to G0: 电源正负	Absolute maximum ratings 4.5 to 14V, stabilized to within 10% 4.5 to 9V preferred operating range. **Unprotected against reverse connection!** 最大额定值4.5 to 14V，稳定工作值范围4.5 to 9V（10%偏差），无电源接错保护
Serial Communication通讯	
UART (TxD, RxD) 通讯端口UART (TxD, RxD)	CMOS, ModBus communication protocol. Logical levels corresponds 3.3V powered logics. Refer *"ModBus on CO2 Engine K30 "* for electrical specification. CMOS, ModBus 通讯协议，电源3.3V，电源描述请参考*"ModBus on CO2 Engine K30 "*
Outputs 输出	
OUT1 输出1	Buffered linear output 0..4 or 1..4VDC or 0..10V or 2..10V, depending on specified power supply and sensor configuration. R_{OUT} < 100 Ω, R_{LOAD} > 5 kΩ **Load to ground only**! Resolution 10mV (8.5 bits in the range 0..4V). 线性输出0..4/ 1..4VDC/0..10V /2..10V, 根据供电电源及传感器配置输出有所变化，只能接地， 分辨率10mV (8.5 bits in the range 0..4V).
OUT2 输出2	Buffered linear output 0..4 or 1..4VDC or 0..5V or 1..5V, depending on specified power supply and sensor configuration. R_{OUT} < 100 Ω, R_{LOAD} > 5 kΩ **Load to ground only!** Resolution 5mV Can be used as alternative for OUT1, or for a second data channel, or in an independent linear control loop, such as a housing temperature stabilization 线性输出0..4/ 1..4VDC/0..10V /2..10V, 根据供电电源及传感器配置输出有所变化，只能接地， 分辨率5mV， 可用作输出1的替代输出或第二信道或独立输出
OUT3 输出3	CMOS **unprotected**. Digital (High/Low) output. High Output level in the range 2.3V min to DVDD = 3.3V. (1 mA source) Low output level 0.75V max (4 mA sink) Can be used for gas alarm indication, or for status indication etc. CMOS未保护，数字输出，输出最大值 2.3V-3.3V (1 mA) ，输出最小值0.75V(4 mA），可用于气体报警或状态指示
OUT4 输出4	CMOS **unprotected.** Digital (High/Low) output. High Output level in the range 2.3V min to DVDD = 3.3V. (1 mA source) Low output level 0.75V max (4 mA sink) Can be used for gas alarm indication, or for status indication etc. CMOS未保护，数字输出，输出最大值 2.3V-3.3V (1 mA) ，输出最小值0.75V(4 mA），可用于气体报警或状态指示

Status 状态	CMOS **unprotected.** High Output level in the range 2.3V min to DVDD = 3.3V. (1 mA source) Low output level 0.75V max (4 mA sink) CMOS未保护，数字输出，输出最大值 2.3V-3.3V (1 mA) ，输出最小值0.75V(4 mA)
Inputs输入	
Din0, Din1, Din2, Din3, Din4 输入Din0, Din1, Din2, Din3, Din4	Digital switch inputs, pull-up 120k to DVCC 3.3V. Driving it Low or connecting to ground G0 activates input. Pull-up resistance is decreased to 4..10k during read of input or jumper. Advantages are lower consumption most of the time the input/jumper is kept low and larger current for jumpers read in order to provide cleaning of the contact.
	Can be used to initiate calibration or to switch output range or to force output to predefined state. All depends on customer needs. 数字开关输入120k，DVCC 3.3V，连接G0激活输入，电阻在读取输入或跳线时读值为4..10k，功率较低，读取跳线时电流增大，可用于校准或开关输出范围或强行设置输出状态

Optional jumper field 跳线选项

Din0, Din1, Din2, Din3, Din4 输入Din0, Din1, Din2, Din3, Din4	Digital switch inputs, pull-up 120k to DVCC 3.3V. Connecting to ground G0 activates input. Pull-up resistance is decreased to 4..10k during read of input or jumper. Advantages are lower consumption most of the time the input/jumper is kept low and larger current for jumpers read in order to provide cleaning current. They are the same as inputs on IDC connector. Can be used to initiate calibration or to switch output range or to force output to predefined state. All depends on customer needs. 数字开关输入120k，DVCC 3.3V，连接G0激活输入，电阻在读取输入或跳线时读值为4..10k，功率较低，读取跳线时电流增大，可用于校准或开关输出范围或强行设置输出状态

I²C extension. I²C拓展

Contact SenseAir for information	Pull-up of SDA and SCL lines to 3.3V. 电压3.3V

General PCB overview
PCB电路板概况

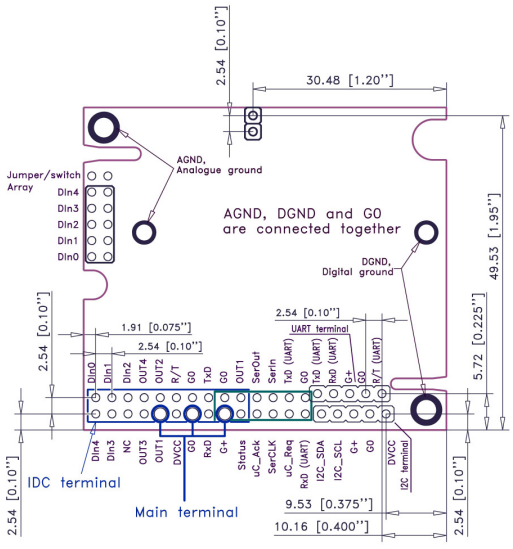


Figure 2图2 . CO2Engine™ K30 *I/O notations, terminal positions and some important dimensions for mounting the K30 platform PCB into a host system (Top view). The blue filled pins are defined by default.*

O2Engine™ K30模块，输入输出，端子位置，尺寸安装图（顶视图）

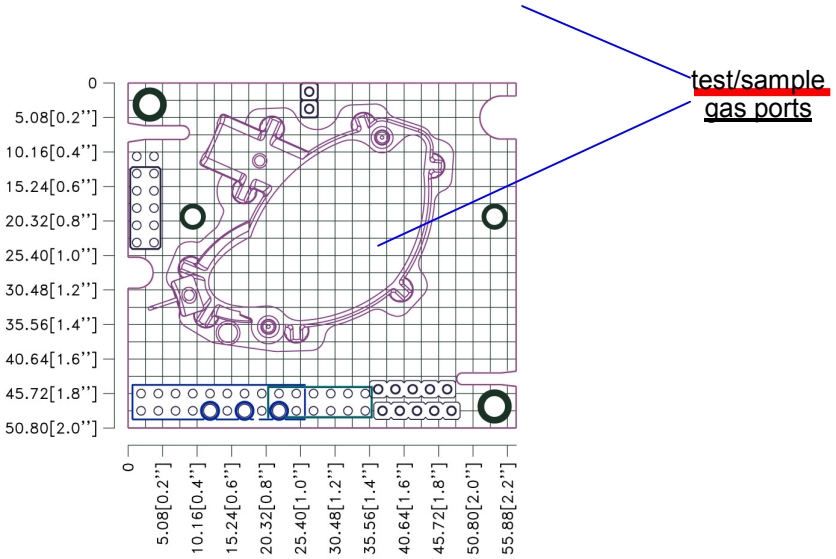


Figure 3图3 . CO2Engine™ K30 *OBA position.*
CO2Engine™ OBA 位置图

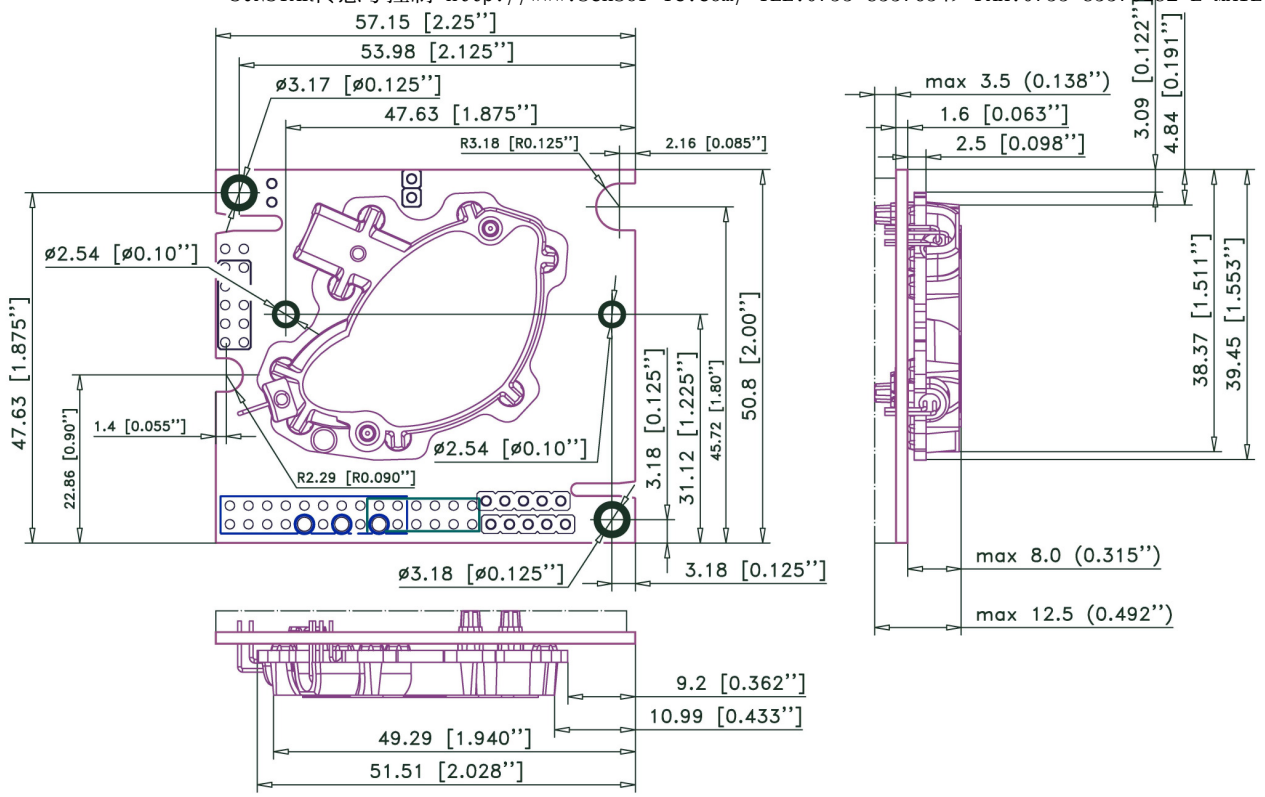


Figure 4图4 . CO_2Engine™ K30 *mechanical drawing.* CO_2Engine™ K30机械制图

Installation安装

The modules are factory calibrated and ready for use directly after power up. There are several alternative ways to connect the CO_2Engine™ K30 to a host system (see also figure2):

模块已经过出厂校验，可以通电后直接使用。有几种方法可选来连接CO_2Engine™ K30到主系统（见图2）

Do not use edge connector for connection to the host system without discussion with SenseAir!

不要再未经SenseAir允许的情况下使用边缘连接器连接到主系统。

1. Using “UART connector”, including terminals for power supply (G+ and G0), UART (TxD, RxD).
使用“UART”连接器，包括供电端子（G+和G0），UART（TxD, RxD）

2. Using the 3 pins **main terminal**. Available signals are power supply (G+ and G0) and the buffered analogue output (OUT1). A variety of user selections exist for this option regarding standard 5.08 mm pitch components and mounting alternatives (top/bottom).
使用3针主端子。可用信号是供电（G+和G0）以及缓冲模拟量输出（输出1）。关于标准的5.08mm节矩部件和安装选择（顶部、底部），这里有多种选择提供给用户。

3. Using 20 pin connector strips, or **IDC connector**, most of the system information is reached.
使用20针连接条，或IDC连接器，大多数系统信息可以获取。

Host integration considerations and EMI shielding

主机集成和EMI防护

If an IDC connector is being used to connect the K30 module to a host PCB, this connector can in some situations be used as the only fixture. If instead fixing the K30 PCB using mechanical poles and screws, no more than 2 positions should be considered. This is because the PCB should not be exposed to any mechanical stress, and it is small and lightweight enough for just 2 attachment points.

如果IDC连接器可以用来将K30模块连接到主电路板上，那么这个连接器就可以在某些环境中用作唯一固定装置。如果使用改锥和螺丝来固定K30电路板，只需要考虑最多两个位置。因为电路板不能曝露在任何机械压力下，而且它又小又轻，只需要固定两个点即可。

To provide means for attachments, there are 4 possible screw holes available, all of them having a collar that is electrically connected to ground (G0). These connections are, however, not totally equivalent:

提供多个固定点，有四个螺丝孔可选，所有的孔都带有轴圈用来接地（G0）。尽管如此，这些连接也不完全是相同的。

- The two screw points in the upper left corner (having the IDC and edge connectors faced downwards, as in Figure 2) are connected to the *analogue* ground. They are the preferred choice for connection to some EMI shield, if so is required. This is normally necessary only if the application is such that large EMFs are foreseen. If this option is being used, precaution must be taken so as to exclude any power supply currents!
  Sensor reading instability is an indication of the need for shielding, or of improper enclosure system groundings.

  在左上角的两个螺丝孔（向下有IDC和边缘连接器，见图2）是用来连接模拟接地，这是对于一些EMI防护的首选连接方式。只有当应用中存在大量EMF时这个通常是必需的。如果这种方式被采用，那么必须采取防护措施来排除任何供电电流。传感器读数不稳时就表明需要采取防护措施了，或存在不正确的围护系统接地。

- The two screw points in the right bottom corner are connected to the *digital* ground. Connection to some EMI housing shield is less effective when this option is used, but on the other hand the sensor may be powered via these connections.

  在右下角的两个螺丝孔是用来连接数字接地的。当选择这种固定方式后，连接到一些EMI外壳防护就会减少效果，但是另一方面，传感器也许可以通过这些连接供电。

Note 1: To avoid ground loops, one should avoid connecting the analogue and digital grounds externally! They are connected internally on the K30 PCB.
注意1：为了避免接地环路，应该避免模拟和数字外部接地。它们必须在K30电路板内部连接。

Note 2: The terminals are not protected against reverse voltages and current spikes! Proper ESD protection is required during handling, as well as by the host interface design.
注意2：端子是不能防御反向电流和电流峰值的。通过主机接口设计，在操作过程中需要有正确的ESD保护，

Default functions /configurations
出厂设置/配置

Outputs . 输出

The basic CO2Engine™ K30-STA configuration is a simple analogue output sensor transmitter signal directed to OUT1 and OUT2. Via the edge connector serial communication terminal, the CO_2 readings are available to an even higher precision (Modbus protocol), together with additional system information such as sensor status, analogue outputs, and other variables.

基本的CO2Engine™ K30-STA配置只是一个简单的模拟量输出传感器，变送信号为OUT1和OUT2。通过边缘连接器连续通讯端子，CO2 读数可以达到一个比较高的精度（Modbus 协议），连同其他系统信息如传感器状态，模拟量输出和其他可变因素

Terminals 端子	Output 输出	Correspondence 一致性
OUT1 输出1	0,0…4,0 VDC	0…2000 ppm CO_2
OUT2 输出2	1,0…5,0 VDC	0…2000 ppm CO_2

Table II. Default analogue output configuration for CO2Engine™ K30-STA
模拟量输出出厂配置

The basic CO2Engine™ K30-STA configuration provides digital outputs to indicate if CO_2 concentration exceeds alarm threshold.
基本的CO2Engine™ K30-STA配置提供数字输出来指示CO2浓度高于报警点

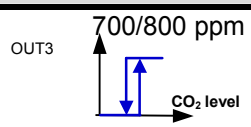
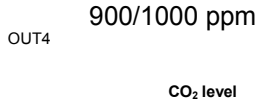
Terminals 端子	Output 输出	Correspondence 一致性
OUT3 输出3	Logical levels: Low <0.75V High>2.3V and <3.3V	
OUT4 输出4	Logical levels: Low <0.75V High>2.3V and <3.3V	

Table II. Default digital output configuration for CO_2Engine™ K30-STA
数字输出出厂配置

Calibration校验

The default sensor OEM unit is maintenance free in normal environments thanks to the built-in self-correcting ***ABC* algorithm** *(Automatic Baseline Correction)*. This algorithm constantly keeps track of the sensor's lowest reading over a 7,5 days interval and slowly corrects for any long-term drift detected as compared to the expected fresh air value of 400 ppm CO_2.
在一般环境下，传感器可以通过内置的ABC algorithm来进行校验。这种运算法则会在7到5天的间隔内不间断地跟踪传感器的最低读数，同时慢慢地改善这一时期内的空气到预期的400ppm CO_2

Rough handling and transportation might, however, result in a reduction of sensor reading accuracy. With time, the ABC function will tune the readings back to the correct numbers. The default "tuning speed" is however limited to about 30 ppm/week. For post calibratio
convenience, in the event that one cannot wait for the ABC algorithm to cure any calibration offset, two switch

inputs Din1 and Din2 are defined for the operator to select one out of two prepared calibration codes. If Din1 is shorted to ground, for a minimum time of 8 seconds, the internal calibration code **bCAL** *(background calibration)* is executed, in which case it is assumed that the sensor is operating in a fresh air environment (400 ppm CO_2). If Din2 is shorted instead, for a minimum time of 8 seconds, the alternative operation code **CAL** *(zero calibration)* is executed in which case the sensor must be purged by some gas mixture free from CO_2 (i.e. Nitrogen or Soda Lime CO_2 scrubbed air). If unsuccessful, please wait at least 10 seconds before repeating the procedure again. Make sure that the sensor environment is steady and calm! Refer calibration procedure description on the next page.

粗糙的运输，可能降低传感器读取的准确性。 随着时间的推移，ABC会将读取值调整正确。默认的调整速度设定在30ppm每周。

为了日后校准的便利，如果您来不及等待ABC algorithm来矫正，您可以使用两个预设的开关Din1和Din2来选择一个定义好的校正码

如果将Din1接地短路，在至少8秒后，内置的调节码**bCAL** *(background calibration)*会被激活，系统会假设传感器工作在一个空气清新的环境中(400 ppm CO_2)。

如果是Din2被接地短路，在至少8秒后，将执行调节码**CAL** *(zerocalibration)*，在此情况下传感器必须清楚一些二氧化碳气体混合物（例如混杂了含有氮气或者碱石灰的CO_2的空气）。

如果不成功的话，请等待至少10秒后再重复之前的操作。确认传感器所处的环境是稳定的。参阅下一页描述的校准程序。

Input Switch Terminal (normally open)	**Default function** (when closed for minimum 8 seconds)
Din1	**bCAL** (background calibration) assuming 400 ppm CO_2 sensor exposure
Din2	**CAL** (zero calibration) assuming 0 ppm CO_2 sensor exposure

Table III. Switch input default configurations for CO_2Engine™ K30

输入开关终端I (常开)	**默认功能** (when closed for minimum 8 seconds)
Din1	**bCAL** (后台校准) 假定传感器处于400 ppm CO_2 环境中
Din2	**CAL** (零校准) 假定传感器处于0 ppm CO_2环境中

表格III， 输入开关针对CO_2Engine™ K30的默认配置

Calibration procedure校准流程

The zero calibration procedure is as follow:
零点校准流程如下：

1. Connect the sensor on top with a tube (soft tubing 2x4 mm) and a nipple (nylon tubing 30x0.8x2.2 mm), see Figure 4 below. There are 2 alternative positions for nipple attachment.
1. 用一根软管（软管2x4 mm）连接到传感器顶端的一个接口（尼龙管30x0.8x2.2 mm），参见下面图四。这里有两个附属的调节接口。
2. Let a gas mixture flow into the sensor through the applied tube. The flow shall be in the range of 0.3 – 1.0 liter/minute during 3 minutes. Keep the gas mixture flowing during the whole procedure.
2. 将混合的气体通过软管输入传感器3分钟，流量应保持在0.3~1.0升/分。确保整个过程中输入的都是混合气体。
3. Short circuit the Din2 for a minimum time of 8 seconds.

3. 将Din2短路至少8分钟。
4. Verify the zero calibration. The meter shall show 0 ppm CO2.
4. 确认是零校准。计量器显示0 ppm CO_2
5. If zero calibration is not executed (sensor detected unstable gas concentration) wait 10sec and repeat steps 3 and 4 again. Do not breath on the sensor!
5. 如果执行的不是零校准（传感器检测不稳定的气体浓度）请等待10秒后重复步骤3和4。注意不要在传感器周围呼吸

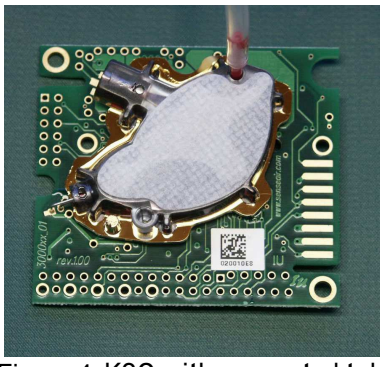


Figure 4. K30 with connected tube

Self-diagnostics 自我诊断

The system contains complete self-diagnostic procedures. A full system test is executed automatically every time the power is turned on. In addition, constantly during operation, the sensor probes are checked against failure by checking the valid dynamic measurement ranges. All EEPROM updates, initiated by the sensor itself, as well as by external connections, are checked by subsequent memory read back and data comparisons. These different system checks return to the system RAM. If this byte is not zero, the logic output terminal Status will be put into Low level state. The full error codes are available from the UART port or via I^2C communication. *Offset regulation error* and *Out of Range* are the only bits that are reset automatically after return to normal state. All other error bits have to be reset after return to normal by UART overwrite, or by power off/on.

系统包含完整的自我诊断程序。每次通电的时候，系统检验都会自动执行。另外，在经常的操作过程中，传感器探头通过检查有效的动力测量范围来避免失败。所有的 EEPROM 更新，都是通过随后记忆的回读校验和数据对比来核对，但起初是通过传感器本身，也可以通过外部连接。这些各自的系统检查返回的错误字节给系统 RAM。如果这个字节不是 0，逻辑输出终端将处于低水平状态。完整的错误编码从 UART 接口或是通过 I^2C 通讯是可以得到的。补偿调节错误和超出范围这些位，返回正常状态后可以自动重新设置。其他错误位必须通过 UART 重写或是拔插电源返回正常状态后重新设置。

Output Terminal 输出端	Default function 缺省功能
Status 状态	High level = OK ; Low level = Fault 高水平=OK 低水平=错误

Table IV. Default Logic output configured for CO_2Engine™ K30
表格 IV，缺省逻辑输出配置针对 CO_2Engine™ K30

Error code and action plan (error code can be read via one of communication channels)
错误编码和行动计划（错误编码可以通过一个通讯通道读出）

Bit # 位	Error Code 错误编码	Error description 错误描述	Suggested action 建议的措施
0	1	Fatal Error 重大错误	Try to restart sensor by power OFF/ON. Contact local distributor. 试着给传感器重新通电，联系当地的代理商
1	2	Offset regulation error 补偿调节错误	Try to restart sensor by power OFF/ON. Contact local distributor. 试着给传感器重新通电，联系当地的代理商
2	4	Algorithm Error. Indicate wrong EEPROM configuration. 运算错误 指出错误的 EEPROM 配置	Try to restart sensor by power OFF/ON. Check detailed settings and configuration with software tools. 试着给传感器重新通电 用软件工具检查详细的设置及配置
3	8	Output Error Detected errors during output signals calculation and generation. 输出错误 在输出信号计算和发生期间删除错误	Check connections and loads of outputs. Check detailed status of outputs with software tools. 检查输出的连接和负载 用软件工具检查详细的输出状态
4	16	Self-Diagnostic Error. May indicate the need of zero calibration or sensor replacement. 自我诊断错误 指出零点校准的需要或更换传感器	Check detailed self-diagnostic status with software tools. Contact local distributor. 用软件工具详细的检查自我诊断状态。 联系当地代理商
5	32	Out Of Range Error Accompanies most of other errors. Can also indicate overload or failures of sensors and inputs. Resets automatically after source of error disappearance. 超出范围错误 伴随着其他大部分错误，也能指出传感器和输入的超载或故障 错误消失后自动重新设置	Check connections of temperature and relative humidity probe (if mounted). Try sensor in fresh air. Perform CO_2 background calibration. Check detailed status of measurements with software tools. *See Note 1!* 检查温度和相对湿度探头的连接（墙面型）。 把传感器放到新鲜的空气当中，执行 CO2 校准。用软件工具检查测量的状态。见注意事项 1
6	64	Memory Error Error during memory operations. 记忆错误 记忆操作时的错误	Check detailed settings and configuration with software tools. 用软件工具检查详细的设置及配置。

Note 1. *Any probe is out of range. Occurs, for instance, during over-exposure of CO_2 sensor, in which case the*

error code will automatically reset when the measurement values return to normal. Could also indicate the need
of zero point calibration. If the CO_2 readings are normal, and still the error code remains, any other sensor probe mounted (if any) can be defect, or the connection to this probe is broken.
注意事项 1. 探头超出范围。例如发生在 CO2 传感器过度暴露期间。对于这种情况，测量值正常后，错误编码将自动重新设置，也可以用零点校准。如果 CO2 读数正常，错误编码仍然存在, 其他传感器探头可以监测，或者连接的这个探头坏了。
Remark*: If several errors are detected at the same time the different error code numbers will be added together into one single error code!*
备注：如果几个错误被同时删除，不同的错误编码将一起被加入到一个单一的错误编码。

CO_2Engine™ K30-STA - Technical specification
技术指标

General Performance:
总体性能
Storage Temperature Range .....-30 to +70 ℃
贮藏温度范围
Sensor Life Expectancy .....> 15 years
传感器寿命 最少 15 年

Maintenance Interval ..维护间隔.....no maintenance required 没有要求

Self-Diagnostics .....complete function check of the sensor module
自我诊断 传感器模块的功能检验

Warm-up Time 预热时间..... 1 min1 分钟

Conformance with the standards .....Emission: EN61000-6-3:2001
依照的标准 Immunity: EN61000-6-2:2001
RoHS directive 2002/95/EG

Operating Temperature Range .....0 to 50 °C
操作温度范围
Operating Humidity Range .....0 to 95% RH (non-condensing)
操作湿度范围

Operating Environment 操作环境.....Residential, commercial, industrial spaces and Potentially dusty air ducts used in HVAC (Heating Ventilation and Air-Conditioning) systems.
住宅，商业，工业领域供暖通风及有灰尘的管道里，

Electrical / Mechanical:
电气/机械

Power Input 电压输入.....4,5-14 VDC, stabilized to within 10% (external protection circuits required)
4.5-14VDC+-10% （要求有外置保护电路）

Current Consumption .....40 mA average
< 150 mA peak current (averaged during IR lamp ON, 120 msec)
< 300 mA peak power (during IR lamp start-up, the first 50 msec)

电流损耗 平均 40m
150mA 最大（红外线开，120msec）
300mA 最大 （红外线启动，第一次 50msec）

Electrical Connections 电气连接.....terminals not mounted 不安装的端子
(G+, G0, OUT1, OUT2, Din1, Din2, Status, TxD, RxD)

Dimensions .....5,1 x 5,7 x 1,4 cm (Length x Width x approximate Height)
尺寸 5,1 x 5,7 x 1,4 cm (长 x 宽 x 高)

Sensing Method 传感方式..... non-dispersive infrared (NDIR) waveguide technology with automatic background calibration algorithm ABC NDIR 波导管技术，ABC 自校准功能

Sampling Method 抽样方式..... diffusion 扩散

Response Time (S) 响应时间 ..... 20 sec diffusion time 20 秒

Measurement Range 测量范围.....0 - 5 000 ppm

Sensitivity. 敏感度.....± 20 ppm ± 1 % of measured value
± 20 ppm ± 测量值的 1 %

Accuracy 精度.....± 30 ppm ± 5 % of measured value
± 30 ppm ± 测量值的 5 %

Pressure Dependence.....+ 1.6 % reading per kPa deviation from normal pressure, 100 kPa
压力特性

On-board calibration support .....Din1 switch input to trigger Background Calibration @ 400 ppm CO_2 Din2 switch input to trigger Zero Calibration @ 0 ppm CO_2
校准支持 切换输入到自校准@400PPM
切换输入到零点校准@0PPM

Linear Signal Outputs:
线性型号输出

D/A Conversion Accuracy D/A 转换精度.....± 2 % of reading ± 20 mV

OUT1 D/A Resolution.....10 mV
Linear Conversion Range .....0 - 4 VDC for 0 - 2 000 $ppm_{vol.}$
线性转换范围

Electrical Characteristics 电特性.....OUT < 100 . R_{LOAD} > 5 k , Power input > 4,5 V
OUT1 D/A 分辨率 10Mv
0 - 4 VDC for 0 - 2 000 $ppm_{vol.}$
OUT < 100 . R_{LOAD} > 5 k , Power input > 4,5 V

Digital Outputs 数字输出:

Electrical Characteristics 电特性 High Output level in the range 2.3V min to DVDD = 3.3V. (1 mA source)
Low output level0.75V max (4 mA sink).
Protection 56R resistor in series.
高输出水平（在最小 2.3V 到 DVDD=3V）（1mA）
低输出水平 （最大 0.75V（4mA），

UART Serial com port
UART 序列接口

Protocol 协议.....MODBUS open protocol, refer specification and registers definitions
MODBUS 开放协议
Hardware interface .....CMOS UART with RxD, TxD
硬件接口

Baud Rate 波特率 9600