1. Specifications

1.1 *Shape and Dimensions*

The accompanying technical drawing (No. 88MD-109C--*see attachment*) illustrates the fundamental design of the oxygen sensor.

1.2 *Characteristics*

During normal operating mode, the sensor's output voltage will range from 11.0 to 15.0mV under the following standard conditions:

a) standard atmospheric pressure
b) temperature at 25˚C ± 1˚C
c) relative humidity at 60% ± 5%

1.3 *Characteristic Data (typical values--see attachment)*

Fig. 1: Oxygen concentration versus output voltage characteristics
Fig. 2: Temperature versus output voltage characteristics
Fig. 3: Linearity of output voltage under accel. life test
Fig. 4: Long term stability of output voltage at room temperature

1.4 *Life Span*

The life span of the sensor is defined as the elapsed time period until the output voltage of the sensor falls to 70% or less than the initial output voltage of the sensor. These specifications apply under the following conditions:

a) standard atmospheric pressure
b) temperature of 25˚C ± 1˚C
c) relative humidity of 60% ± 5%

The life span of the sensor can be expressed by the following equation:

Life span = oxygen concentration level (%) x operational hours (h)
(at constant temperature of 20˚ ± 1˚C)

1.5 *Storage and Operating Temperature*

Storage temperature should be between -20˚C and +60˚C.

Operating temperature should be between 5˚C and 40˚C. This corresponds to the effective range of the internal temperature compensation circuit.

2. Handling Instructions

1) Do not expose the sensor to a temperature outside the range between -20˚C and +60˚C.

2) Whether in use or in storage, keep the sensor either horizontal or in a vertical position with the tip of the sensor (where the hexagonal nut is locked into place) pointing downwards only. This will prevent output signal fluctuations which could be caused if the cathode were to dry out.

3) Prevent condensation on the sensing element.

4) Do not subject the sensor to excessive shock or vibration.

5) The sensor must be connected to equipment which has an input impedance of 1000K ohms or higher.

6) The equipment to which the sensor is connected should not generate a counter-electromotive force, i.e. it must NOT charge the sensor.

7) Do not attempt to disassemble or repair the sensor.

3. Testing Procedures Prior to Shipment

KE-25 sensors are tested and passed by using the test procedures as shown in the attached Table 89T-027B.

4. Warranty

Figaro warrants that KE sensors, when used under normal conditions, will be free from defects in material and workmanship for a period of one (1) year from date of shipment. At its discretion, Figaro will repair or replace any sensor which is found to be defective in materials or workmanship while subjected to normal use and service during this warranty period. The company shall not be obliged to repair or replace any units found to be defective due to damage, unreasonable use, or which have been opened or otherwise physically altered. Sensors shall be warranted to meet the following conditions for a period of one year after the date of purchase from Figaro:

1) Va Test : 7.7mV ~ 15.0mV (KE-25)
2) Accuracy Test : $(Va - V_0) / (V_{100} - V_0) = 0.21 \pm 0.02$
3) Vibration Test (directional alignment) : the sensor is rotated 270˚ once per second for 10 seconds, during which time Vair is recorded. From the original value, output voltage observed in this test should within be ±0.5mV for KE-25.

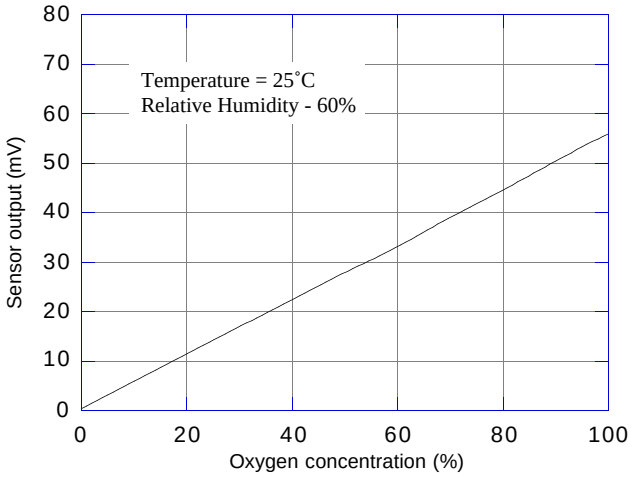

Fig. 1 - Oxygen concentration vs. output voltage characteristics of KE-25 (typical values)

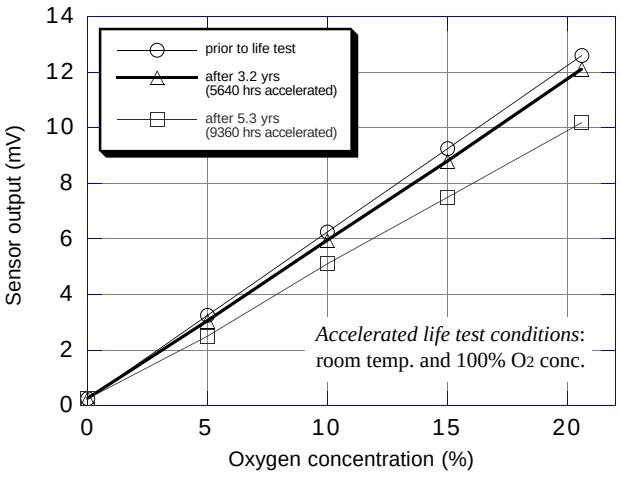

Fig. 3 - Linearity of KE-25 output voltage under accelerated life test (typical values)

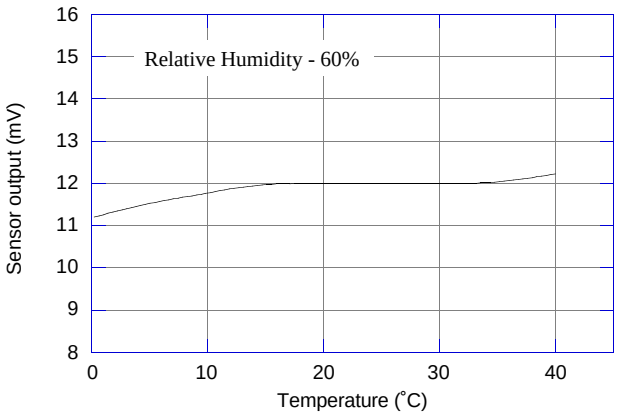

Fig. 2 - Temperature vs. output voltage characteristics of KE-25 (typical values)

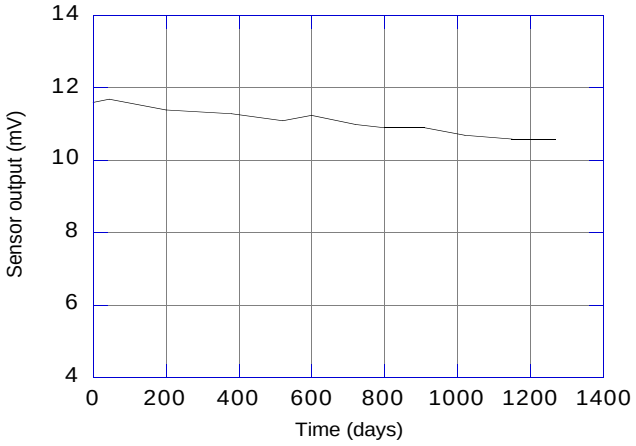

Fig. 4 - Long term stability of KE-25 output voltage at room temperature (typical values)

Table 89T-027B
Testing procedure for KE-25

Test Items	Test Method	Acceptance Std
Output voltage	Output voltage (Va) in normal air measured by voltmeter	Va = 11.0~15.0mV at 25˚C/60%RH
Linearity	Output voltage in 0% O_2 (V_0) and in 100% O_2 (V_{100}) as measured by voltmeter	$V_0 \leq 0.5$mV V_{100} = 50.0~75.0mV
Temperature characteristics	Output voltage at 40˚C (V_H) and at 5˚C (V_L) measured by voltmeter	V_H/Va = 0.91 ~ 1.09 V_L/Va = 0.91 ~ 1.09
Accuracy	Calc. by V_0, V_{100}, and Va	$(Va-V_0)/(V_{100}-V_0)$ = 0.21±0.02
Casings	Visual inspection	Casing damage free
Dimensions	Outer dimensions measured by side calipers & scales	Dimensions meet spec. in drawing 88MD-109C