

FIGARO

„World leader in gas sensing innovation“



Figaro
in Harmony
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FGD2030

FIGARO ENGINEERING

From pioneering MOS gas sensing to safer heat pumps, HVAC and refrigeration

A concise history for heat-pump and HVACR manufacturers: the evolution of Figaro refrigerant leak detection

1968
First commercial TGS MOS sensor

2012
TGS832-F01 for stationary HVACR

TODAY
Sensors and pre-calibrated
modules

A company built around practical gas safety

Figaro's story began as Japan's expanding gas infrastructure brought a growing need for dependable gas detection. Founder Naoyoshi Taguchi identified tin dioxide (SnO₂) as a practical sensing material and developed a metal oxide semiconductor (MOS) sensor that could detect combustible and reducing gases with a simple circuit.

1968	Mass production and sales began under the TGS - Taguchi Gas Sensor - name.
1969	Figaro Engineering Inc. was founded in Japan.
1970s	Improved sensing materials and filters strengthened resistance to false alarms.
1980-86	Major Japanese awards recognised semiconductor gas-sensor development and industrialisation.
1996	ISO 9001 certification strengthened the quality management system.
2016-23	New Cosmos acquired major shares; Figaro marked 50 years, gained Global Niche Top 100 recognition and opened its European office in Germany.

A long-standing contribution to refrigerant leak detection

Figaro applied its MOS expertise to halocarbon refrigerants through the TGS832 family. Its two principal variants reflected an approach that remains central today: match the sensing technology and concentration range to the finished instrument.

The TGS832 family

TGS832-A00 - portable leak checking

Fast-response sensor for portable halocarbon detectors, with a typical range of 10-1,000 ppm.

TGS832-F01 - stationary monitoring

Announced in 2012 for refrigerants used in air-conditioning and refrigeration, including R134a, R404A, R407C and R410A. A filtered housing reduced the influence of alcohol and other interfering vapours, supporting durable fixed leak detectors.

A smaller, lower-power generation

Product	Role	Development advance
TGS2630	Fixed HVACR leak detection	Compact TO-5 MOS sensor for R32, R1234yf and selected other refrigerants. Its built-in filter improves selectivity; power is about 280 mW, compared with about 835 mW for the TGS832 family.

TGS3830	Portable suction-type detectors	Compact, quick-response MOS sensor with high sensitivity to R134a. A typical 5-100 ppm range and approximately 100-120 mW heater demand suit sensitive hand-held instruments.
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From sensor element to integration-ready module

The FCM26 series combined Figaro's semiconductor sensors with factory calibration, temperature compensation and defined outputs. Earlier FCM2630 modules for R32 already reduced the OEM work involved in analogue design and calibration. The latest FCM2610 and FCM2630 families extend this approach for A2L and A3 refrigerants, using dual sensing elements in relevant models to support long service life.

The continuing design principles: application-specific detection, interference resistance, long-term durability and easier OEM integration.

Current and forthcoming HVACR portfolio

Figaro now offers two development routes: sensing elements for OEMs that want control of electronics, algorithms and calibration; and pre-calibrated modules for manufacturers seeking to shorten development and simplify integration into appliance control or safety systems.

Product	Role / technology	Target	Positioning
TGS2630	MOS sensor - fixed systems	R32, R1234yf and selected refrigerants	Available. Compact, filtered and lower power than the TGS832 family.
TGS3830	MOS sensor - portable detector	R134a / halocarbons	Available. Fast response and high sensitivity at low ppm levels.
FCM2630-L	Compact pre-calibrated module	R32 (A2L)	Coming soon; final released specification to be confirmed.
FCM2630-G	Pre-calibrated module	R32 (A2L)	Portfolio designation supplied for this document; final specification to be confirmed.
FCM2610-L	Compact pre-calibrated module	R290 propane (A3)	Under development for embedded HVACR applications.
FCM2610-G	Dual-sensor module; IP55-oriented package	R290 propane (A3)	Coming soon; approximately 15-year expected-life positioning and IEC TS 63542 focus.
CDM7210	NDIR refrigerant module	R290 propane (A3)	Preliminary / under development; long-life and self-diagnostic positioning.

Key applications for heat-pump and HVACR manufacturers

The portfolio enables manufacturers to choose between a sensing element for a fully customised detector design and a pre-calibrated module for more direct integration into appliance control and safety functions.

Application area	Best-fit Figaro route	How it is used
R290 heat pumps	FCM2610-L/-G or CDM7210	Embedded refrigerant monitoring in domestic and commercial heat pumps using propane; the module provides a calibrated input for alarm, ventilation or appliance safety logic.
R32 heat pumps and air conditioning	FCM2630-L/-G or TGS2630	Pre-calibrated modules suit direct appliance integration; TGS2630 suits OEMs developing their own electronics, calibration and algorithms for split, multi-split or packaged systems.
Commercial refrigeration using R290	FCM2610-L/-G or CDM7210	Leak monitoring within cabinets, condensing units and other self-contained refrigeration equipment where compact integration, long service life and diagnostics are important.
Fixed HVACR detectors and control systems	TGS2630 or FCM modules	For detector manufacturers and system integrators monitoring plant, equipment enclosures or occupied areas and linking detection to alarms or control actions.
Portable service leak detection	TGS3830	High-sensitivity, fast-response R134a sensing for pump-driven hand-held instruments used by installers and maintenance engineers.

Why the module route matters to an OEM

- Factory calibration removes the need to characterise and calibrate every individual sensor.
- Integrated temperature compensation supports more consistent alarm behaviour across the specified environment.
- Filtered sensing, communication, alarm and fault outputs simplify connection to appliance control logic.
- Dual-sensor architecture supports the long design-life objectives of the latest module families.

Standards-led development

The latest modules are positioned around current refrigerant safety requirements including IEC TS 63542, relevant requirements of UL 60335-2-40 and JRA4068, depending on the model and target gas. A module can support an OEM's compliance work, but conformity of the completed appliance or detector still depends on its final design, installation and validation.

Supporting the transition to safer, lower-impact cooling

The HVACR industry is moving toward lower-global-warming-potential refrigerants, including mildly flammable A2L gases such as R32 and highly flammable A3 refrigerants such as R290. This makes dependable leak detection increasingly important in heat pumps, air conditioners, commercial refrigeration and associated safety systems.

Figaro's contribution is not a single product but a sustained development path: from the robust TGS832 platform, through smaller and lower-power sensors, to factory-calibrated semiconductor modules and a forthcoming NDIR option for R290.

What Figaro brings to HVACR OEMs

PROVEN FOUNDATION

Decades of MOS sensing experience, high-volume production and application work on selectivity and false-alarm resistance.

APPLICATION CHOICE

Different solutions for sensitive portable leak checking and continuous monitoring inside fixed equipment.

EASIER INTEGRATION

A choice between raw sensing elements and pre-calibrated modules, depending on the OEM development strategy.

LONG-TERM DEVELOPMENT

Dual-sensor semiconductor modules and the forthcoming CDM7210 NDIR route provide further options for service life, diagnostics and standards-led design.

From the TGS832 to the CDM7210, Figaro's direction has remained consistent: make dependable gas detection easier to build into the equipment that people rely on every day.

Document note. Products described as under development or coming soon may change before commercial release.

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