

HVAC solutions from Acal BFi

European leader in advanced technology solutions



About Acal BFi

We are a technology-led provider of customised electronics for industrial applications with design, manufacturing and distribution capabilities.

With our roots firmly founded in design expertise and engineering knowledge we are able to provide our customers with an extensive range of additional custom services along with access to leading-edge technologies. Working closely with world-leading suppliers we act as a technical partner to help solve our customer's design challenges.

We offer a strong and stable partnership to help you develop your products and bring them to market quickly.

Carefully selected technologies to support our chosen markets

We offer products across 12 specialist technology areas. Customers use our design-led expertise and expert consultation services to find the best technology solutions for their design, prototype and production needs. Each product area has a dedicated team of technical and sales support specialists available to ensure our customers get the best technical advice and pre- and post-sales support.

Consult. Design. Integrate.

As well as offering off-the-shelf products, we can also provide technical consultation for your design process, provide design and application advice and we can integrate the latest in advanced technologies seamlessly into your design ensuring a cost-effective solution with optimum performance.

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Advanced technology solutions for HVAC

Discover the wide range of advanced technology solutions, electronic components and custom services Acal BFi have to offer the designers and manufacturers of all types of air-conditioning and air-movement systems. Our products are suitable for use in many different types of air conditioning units systems including:

- HEVAC systems
- dMEV / MEV systems
- MVHR systems
- SRHR systems
- D-ERV systems
- DCV systems

HVAC solutions overview

In the 21st century we know that true air quality is about much more than dividing the acceptable from the unacceptable. Proper heating and ventilation are recognised as vital aspects of buildings where people can live and work in comfort, and be productive. Environmental legislation is being enforced to guarantee cleaner air that is free from toxins as well as ensuring improved system efficiency with new technologies such as heat recovery.

At Acal BFi we understand the varied requirements from simple control loops in heat-recovery, air-conditioning systems, heat pumps, humidifiers / de-humidifiers and industrial air-conditioning systems to the more complex control systems where dust and CO₂ measurements are made to control not only the temperature but also the air quality.

Our comprehensive solutions cover both component and system-level devices, which, combined with our experience of solving technical problems for key industry players, makes Acal BFi the ideal partner for your next design.



Sensing solutions for all HVAC / air conditioning applications

Humidity sensors

Humidity sensors, widely used in heat-recovery HVAC systems, are a mainstay of Acal BFi sales in the heat-recovery market. Our product offer covers all technology types, enabling us to offer the optimum price / performance compromise. Accuracy ranges from $\pm 1.7\%$ to $\pm 5.0\%$, and response times as quick as 1s. There are also dual-mode temperature and humidity sensors for applications where both parameters need to be measured using a single device.

Temperature sensors

We have a wide range of NTC thermistors for measuring temperature. Our range covers all types of construction including epoxy and glass beads. We also package the thermistors to form bespoke rugged temperature probes.

Board-mounted pressure sensors

Our range of PCB/board-mounted pressure sensors will find uses in small air-conditioning systems and blocked filter detection. We offer absolute, differential and gauge devices with multiple port configurations as well as pressure ratings with extended operating-temperature ranges (from -40°C to $+125^{\circ}\text{C}$).

Media-isolated pressure transducers

Historically our media-isolated pressure sensors have been used in systems moving large volumes of air. The range includes versions with and without temperature compensation with extended temperature ranges available.

Amphenol
Advanced Sensors



Honeywell



SHIBAURA



Case study

Acal BFi worked with a world-leading producer of heat pumps to design and manufacture temperature probes for use in their system.

The starting point was to understand the environmental challenges for the temperature sensors and identify the correct sensing element based on response time, temperature accuracy and accuracy range.

Acal BFi worked to develop a loom that had six individual temperature probes, each one specifically designed for the measurement function required. This resulted in using a variety of packaging technologies with some of the thermistors housed in stainless steel tubes with others using over-moulding techniques. The sensors were colour coded to ensure correct connection.





Airflow sensors

The Zephyr™ range of digital airflow sensors from Honeywell are available for airflow ranges as low as 10 SLPM (standard litres per minute) to as high as 300 SLPM with the industry's smallest Total Error Band, fast response times and high accuracy. The product range is configurable and customisable with a wide choice of port styles aimed at simplifying design and reducing production complexity.

Amphenol
Advanced Sensors

 **BOSCH**

Ultra small environment sensor

The Bosch BME280 is an ultra-small, single-sensor solution measuring ambient temperature, barometric pressure and humidity in a surface-mount LGA package measuring just 2.5mm x 2.5mm x 0.93mm.

Honeywell

CO₂ sensors

With CO₂ sensors optimised for indoor air quality, energy conservation applications and demand control ventilation (DCV), Acal BFi have a range of solutions for monitoring CO₂ concentration in air. The wide range incorporates ready-made transmitters and OEM units for those wanting to incorporate the technology into their own sensors.

 **SANGSHIN**

 **SHIBAURA**

Dust / particle sensors

Increasingly particle detection is becoming part of the control loop in systems monitoring air quality. Acal BFi offer a range of OEM modules that detect the dust-particle concentration in air by using optical sensing techniques.

 **SHIYEI**

 **TEWA**

Technical support when you need it

In many instances off-the-shelf sensors are just not good enough for what you need. You may get the right sensing element, but then have to design a housing and cabling system to ensure correct in system functionality, or the assembly has certain drawbacks (such as the wrong connector or the probe is too long). Acal BFi can simplify the process by working with you to create a sensor assembly customised to meet your exact needs.

Use our extensive technical support and expertise to help guide you to the correct sensing element from our range, then work with our engineers to design the perfect housing and connector assembly, simplifying your production process and improving your ROI.

We have designed custom assemblies for remote temperature probes, humidity sensors and multi-axis accelerometers.



Interconnect solutions



Interconnect solutions for domestic and industrial HVAC

Acal BFi have over 50 years of experience in specifying and supplying interconnect solutions. Our range encompasses small form-factor solutions for use in small domestic heat-recovery systems through to heavy-duty solutions for use in large, industrial HVAC. For those domestic applications requiring powercords and IEC connectors we also stock a wide range of applicable products.

Dustproof and waterproof connectors

We offer wire-to-wire and wire-to-board solutions where the environment mandates the use of connectors with a rating in excess of IP65. Our solutions extend to IP69K, with both circular and in-line options up to 32A.

Wire-to-board / wire-to-wire connectors

Our range includes general-purpose connectors covering IDC, crimp, screw and screw-less connections.

Heavy-duty industrial connectors

We offer modular, heavy duty industrial connectors from Harting (HAN® range) and Amphenol Industrial (heavy|mate® range).

IEC inlets and powercords

We have a wide range of IEC inlets including screw mount and snap-on mount, with optional indicators, fuses, switches and EMC filters. Our powercord range includes single-phase and three-phase powercords, with mains plugs suitable for all major countries. Equipment end can be stripped or terminated with an IEC connector.

Amphenol

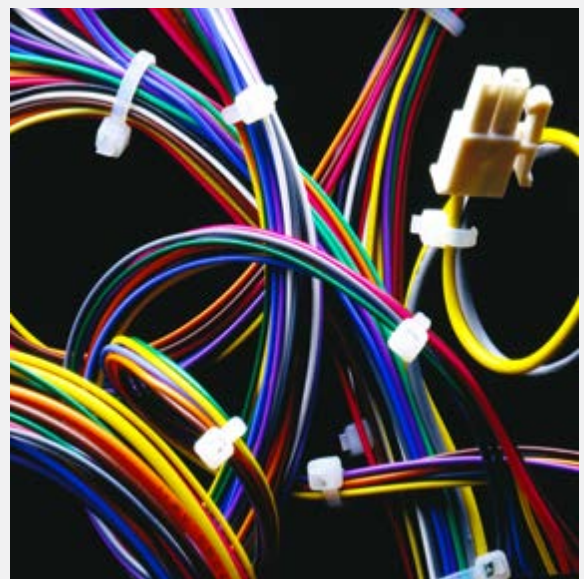


Cable assemblies and looms made to measure

Work with Acal BFi to manufacture your customised cable loom. Leverage our experience in connector assembly design and manufacture to improve your ROI. Acal BFi are able to produce cable assemblies and looms in accordance with your drawings. Whilst our experience extends across the whole spectrum, Acal BFi specialise in applications for industrial and harsh environments

Our expertise

- Inclusion of electromechanical products in loom (eg switches, relays and fuses)
- Shielded cable assemblies and harnesses
- Over-moulded cables
- Custom cables
- Manufacture of looms to customer drawings



Power supply solutions



Off-the-shelf power supplies meet the demand for increased efficiency

Our range of AC/DC converter products have an emphasis on high-conversion efficiency, small form-factor and long-term reliability. Our range of compact AC/DC converter modules and electronic transformers offer innovative options for small domestic solutions, whilst our closed-frame solutions are ideal for industrial systems needing a higher power.

50Hz toroidal transformers

- Nominal 230VAC input
- 20 to 300VA
- Designed and tested to EN61558
- Short circuit and overload protection on primary side

50Hz electronic transformers

- Package in same form-factor as standard 50Hz transformers
- 5W (EI30), 7.5W (EI38) and 10W (EI48) versions
- Isolated or non-isolated
- Regulated or unregulated

AC/DC converters

- Power ratings from 5W to 900W
- Universal input (85V to 260VAC)
- Convection cooled
- Fully standards compliant
- Open frame, closed frame, DIN and PCB mounting



Customised transformers and power solutions

Acal BFi's power supply design team can create custom power supplies to meet your needs, whether you need a custom toroidal transformer, electronic transformer or a complete AC/DC power supply.

Key advantages

- Shorter development cycles
- Wide range of supported topologies
- Standards compliant
- State-of-the-art logistics
- Manufactured in facilities accredited to ISO9001





No IoT expertise? No problem – Acal BFi can help

Acal BFi's European Wireless Technical Competence Centre (ETCC) provides consultancy, concepts and turnkey design of wireless solutions across Europe. Our key area of expertise is in the development of hardware and firmware solutions to add IoT functionality to a customer's product.

Specialist design team

Cross-functional team adept at working with all wireless technologies including wireless MOD bus.

System design

RF hardware, firmware and software design services to add wireless functionality to your products.

Cost-effective solutions

From initial component selection to overall design, our services are tailored to your needs and in tune with today's commercial challenges.

Off-the-shelf solutions supporting the most widely used IoT connection technologies

- 2G / 3G / 4G / LTE modules
- Embedded WiFi modules (serial to WiFi)
- Embedded ethernet solutions (serial to ethernet) suitable for factory 4.0
- Bluetooth / Bluetooth Low Energy modules



Wireless MODBUS case study

Acal BFi were approached by a European manufacturer of industrial air-cooling units who wanted to develop a wireless control system for these units based on the 2.4GHz wireless MODBUS standard.

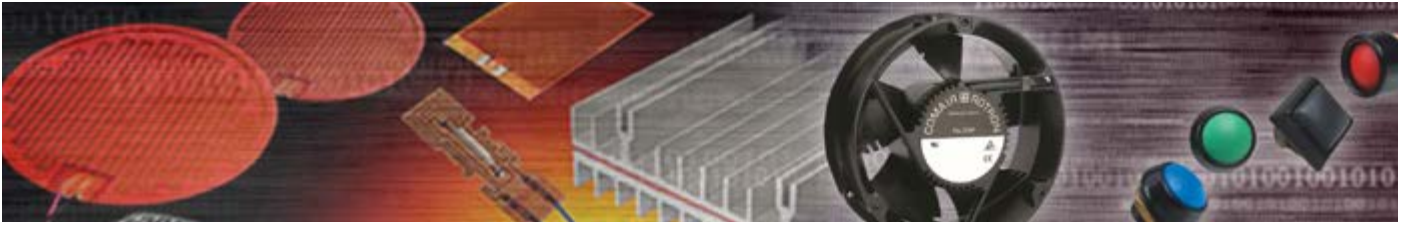
Working with the company's engineers Acal BFi developed a complete wireless sub-system capable of complying with the MODBUS system requirements, deployed as a single PCB solution.

Services provides

- Hardware design and development (concept/schematic/layout)
- Firmware (embedded software) design and development
- Project management
- Prototyping build and debug
- Pre-certification testing to ensure regulatory compliance



Electromechanical solutions



Electromechanical—heating, cooling and switches

Acal BFi offer a unique combination of design expertise and leading-edge technologies from our comprehensive range of thermal management and HMI products. Designed for external and industrial environments, we can offer a suitable solution and custom manufacturing service to assist your application.

Switches and keypads

Acal BFi have a wide range of panel switches and illuminators ideal for use in control panels associated with industrial air conditioning, all designed for operation in harsh environments typical for industrial equipment. We also offer a custom keypad design and manufacture service.

Heater mats

When used in cold environments, certain elements of the system may benefit from the addition of direct heating, such as compressor oil sumps and pipework. Our range of heating solutions are based on the very latest insulated silicone rubber heating elements and can be supplied as mats or as isolative jackets with an integral heating element. All products have UL and VDE approvals and are generally designed to meet the exact customer requirements.

Fans

For smaller domestic air-conditioning and heat-recovery systems Acal BFi offer a wide range of AC-powered blowers. The key differentiator for Acal BFi is our ability to work with our supplier base to produce customised versions for optimum performance in the customer's application.



HOLROYD



SUNON.

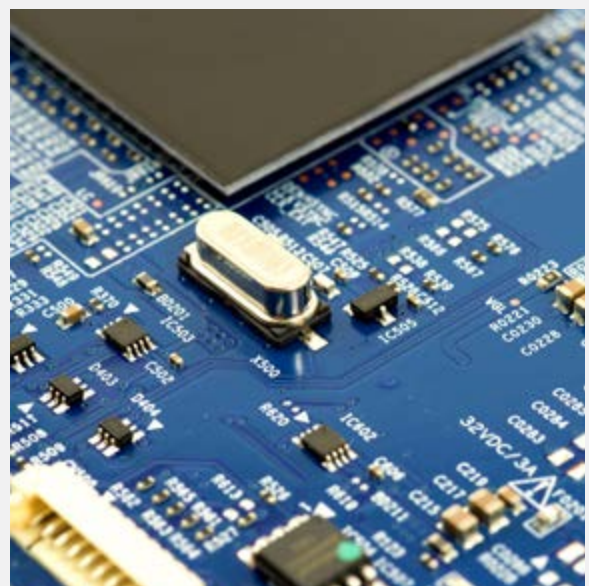


PCB-mounted product for control systems

We have a range of components suitable for use in microcontroller-based control systems used to control air-conditioning systems.

Our range includes

- Power management ICs
- LED indicators
- LED, relay and solenoid drivers
- Sounders and buzzers
- Crystals
- Oscillators
- Relays (signal and power)
- Screw and screwless connectors
- IDC connectors



Locator manufacturing and kitting solutions



Locator – electronics manufacturing services tailored to your needs

Established for more than 25 years and now operating as part of Acal BFi, Locator provide specialist sub-contract and kitting services. They offer a personalised service for their customers, building long-lasting partnerships based on flexibility and trust.



The benefits of outsourcing

By using our outsourcing services, companies can speed up production processes and introduce efficiencies which can release valuable resources to be redirected to core expertise and business needs.

The benefits can include financial improvements in cash flow and profitability, including reduced stock levels and administration, as well as an overall improved service to customers.

Our business has developed and grown from the benefits and reliability we offer our customers. We appreciate that outsourcing is a big step for a manufacturer and we work hard at building close relationships based on transparency and flexibility, to be able to effectively integrate into our client's business processes. Over the years we have developed a flexible array of supply chain services that go beyond simply the sourcing and purchasing processes, to encompass kitting, board-level assembly, complete box build, test and project management.

Our Locator services

Component sourcing

- Long lead-time, obsolete and hard to find components
- Global approved sources

Production kitting

- Timely delivery of kits to match production schedules
- Reduced inventory, warehousing and administration
- Vendor reduction (one vendor for all electronic components)
- Consistent supply and quality
- Improved cash flow

PCB assembly

- Surface mount – single and double sided
- Conventional – flow line and batch build
- Waveflow and hand soldering
- Automated conformal coating to MIL-1-46058C
- Prototype, low, medium and high volume manufacture

Test solutions

- Functional testing of PCBAs
- EMC pre-compliance testing

Logistic services

- Next day shipments / scheduled orders / just-in-time delivery
- Vendor management and buffer stocks



Further information about Acal BFi

Key acquisitions strengthen our technical expertise

To expand our design and manufacturing expertise, our parent company Acal plc have acquired several design and manufacturing companies in the last several years. Products supplied by these manufacturers are a strong part of our offer.

- **Plitron** – manufacturer of magnetic cores used in toroidal transformers
- **Contour** – design and manufacture of custom cabling and connector products
- **Flux** – designer and manufacturer of customised magnetics
- **Foss** – designer and manufacturer of customised fibre optic cabling
- **Noratel** – specialist custom transformer manufacturer
- **RSG** – custom-made power supply specialist
- **Myrra** – designer and manufacturer of power and magnetics
- **MTC** – high-quality ESD shielding, EMC products and services
- **Hectronic** – designer and manufacturer of embedded computers

International presence

Acal BFi operate in 12 countries throughout Europe. Each country has its own dedicated sales force and technical support teams.

- Belgium
- Denmark
- Finland
- France
- Germany
- Ireland
- Italy
- Norway
- Spain
- Sweden
- The Netherlands
- UK

We also have a presence in China, India, Poland, Slovakia, South Africa, South Korea, Sri Lanka and the USA.

Areas of expertise

- Communications (RF and wireless)
- Electronics manufacturing services
- Frequency control
- Embedded systems
- LEDs and lighting
- Emech
- Fibre optics
- Power / Magnetics
- EMC / EMI
- Photonics
- Interconnect
- Imaging



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