



Modern Autogas Systems



STAG

automotive gas systems



MISSION:

To constantly improve our products in order to meet the expectations of our customers and the global market in the area of advanced systems using alternative energy sources.

VISION:

To become a leading global supplier of complete alternative energy systems.

company history

AC S.A. has a strong position in the global market of automotive gas systems products, due to our twenty years of experience production and distribution innovative products on to demanding world markets.

1986 - the establishment of the automotive parts manufacturer AC Wytwórnia Części Samochodowych (ACWCS), the legal predecessor of AC S.A.. Its primary business is the production of oil heaters for diesel engines and spare parts and accessories for motor vehicles,

1992 - AC expands its product range to include plastic products for the automotive market (fuel lines, insulation jackets and fuses) and electronic components,

1993 - in cooperation with engineers from the Starachowice factory, AC develops and launches the production of a new complete central unit for Star trucks. Soon afterwards, the company achieves the position of a major supplier of electrotechnical automotive components (both own and imported) to Polish truck manufacturers,

1995 - AC launches the production of electric wiring harnesses for towing hooks for foreign markets,

1999 - AC designs and begins manufacturing vacuum pressure systems for automotive gas systems (the STAG range: E, G, W, L, 50 and 100),

2003 - AC is awarded the ISO 9001:2000 quality management system certificate by BVQI, a recognised certification body in the automotive industry,

2004 - AC designs and begins manufacturing of sequential electronic controllers for automotive gas systems STAG-200,

2006 - AC improves its sequential systems and designs and launches the production of an innovative product in an aluminum casing STAG-300,

2008 - the STAG range is expanded to include a reduced size product designed for four-cylinder engines STAG-4; AC significantly increases its production capacity by purchasing two properties with a total interior floor space of 5,500 m² and modern machines and equipment; it also implements an MRP/ERP class integrated IT system for supporting management,

2009 - AC introduces STAG-300 plus with a 3D graphic map and a new generation of controllers for STAG-300 premium automotive gas systems able to communicate with every OBD automotive system. Also AC begins selling mechanical components for automotive gas systems of its own design – the AC reducer.

2010 - the market for LPG systems is conquered by the innovative STAG-300 premium controller, which is distinguished in the market by the Intelligent Auto-Correction System (IACS). The company launches two new products: Diagnostic Scanner SXC 1011 and Data Recorder. The foundations for the construction of the Research and Development Centre are made, PRIMAVERA P6 system – a system for managing Oracle projects – is purchased and implemented.

2011 - the construction of the Research and Development Centre is on the way. The AC's offer is extended to include STAG 400 DPI MODEL A1 controller – dedicated to VW Group direct-injection engines – which is the first in the world and the only controller in the market to ensure precise gas injection throughout the. Full RPM range.



about us

Located at the meeting point of four national parks in north-east Poland, AC S.A. is a rapidly developing company with more than 25 years' experience in designing and manufacturing highly advanced alternative energy systems for vehicles. It is a leading Polish and a significant global manufacturer and supplier of high quality components for automotive gas systems. Another important area of AC's operations is the production of electric wiring harnesses for the automotive industry. Our policy focuses on the main goal, which is to ensure the full customer satisfaction, by supplying innovative products of the highest quality. We supply safe solutions which represent good value for money and are environmentally friendly.





Thanks to its bold development plans, AC S.A. now:

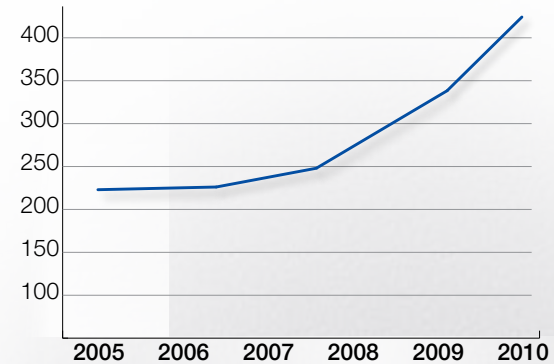
- has 13,000 m² of floor space, with its own research and development center,
- employs 300 full-time personnel,
- employs a team of 30 engineers in its research and development division,
- develops and launches the mass production of dozens of designs and prototypes of new products every year,
- has a modern machine park,
- highly-developed distribution network, with its own chain of Partner Service Workshops,
- works with several hundred automobile Workshops specialize specialising in installing AC products,
- Workshops specializing in installation of AC products,



All projects realised within the company are managed through a modern computer system, Primavera P6. The main objective of using the system is to reduce the project lead times, i.e. the time of waiting for an innovative product. The manufacturing process and products meet strict quality control requirements, and growing employment and increase of sales by 400% further confirms company's strong market position as indicated

by the following charts based on ISO 9001:2008 system. The security of products is confirmed by certifications of approval issued by the world-recognised Czech TUV Institute.

Employment in the years 2005 – 2010



Rate of growth in sales in the years 2005-2010



wide product range

AC S.A. offers a wide range of products available in a number of material and design variations, as well as consulting and aftersales services.

Our range includes over 200 innovative products, the most important of which are microchip controllers, reducers and injection rails for automotive gas systems. We have developed STAG gas injection microchip controllers which are now the most recognizable and most frequently purchased brand of electronic components for LPG/CNG systems.

Our wide range of products for the autogas system market includes:

- gas injection controllers,
- injection rails,
- reducers,
- emulators,
- testers,
- switches,
- fuel level indicators,
- timing advance processors,
- interfaces, including a Bluetooth interface,
- scanners.



The latest generation of controllers

AC S.A. has reached the world leaders in the field of autogas by applying modern technologies to manufacture technically advanced and innovative LPG/CNG injection controllers.

STAG 400 DPI * is a modern sequential injection controller. Designed for VW group direct petrol injection engines and it is the only controller on the market guaranteeing precise gas injection within full RPM range.

STAG 400 DPI is produced based on the latest technology and top-quality electronic components. And is equipped with innovative software featuring a number of functions which makes STAG 400 DPI the most advanced and best for the direct petrol injections engines today.



Advantages of the STAG-400 DPI system:

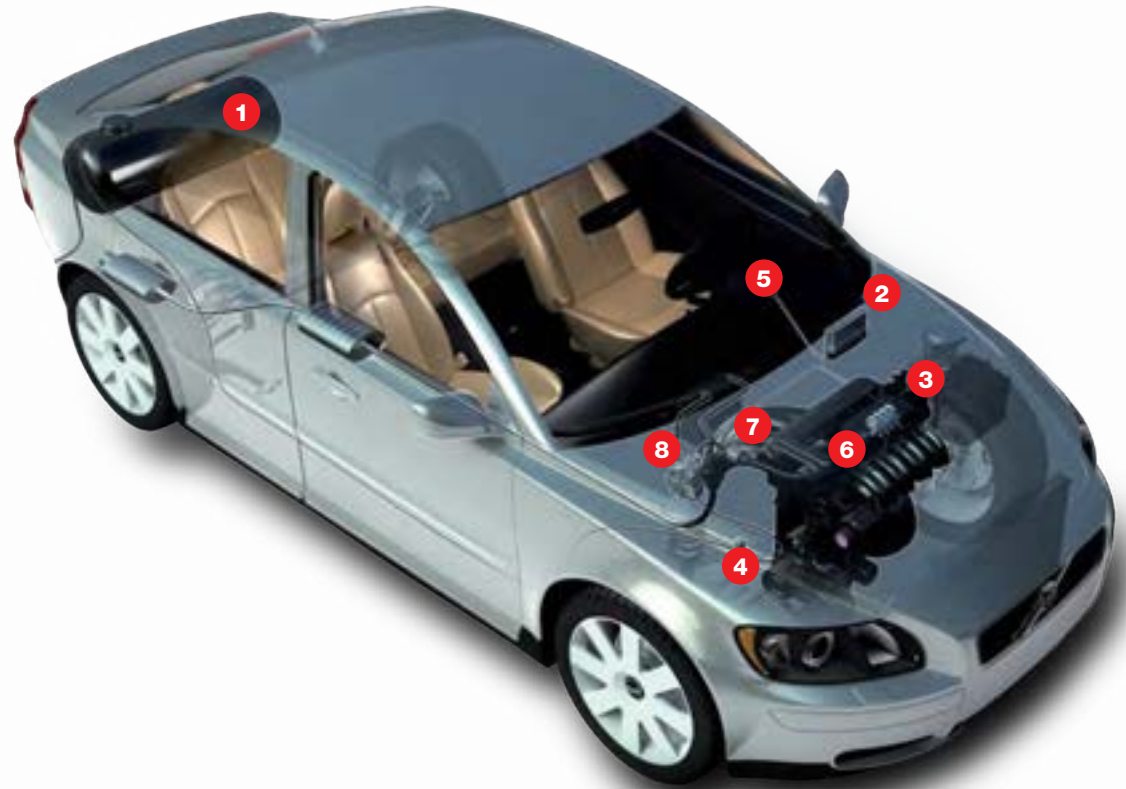
- precise gas injection within full RPM range,
- saves the key petrol engine operating parameters as for petrol supply,
- innovative gas dosage method to ensure stable engine operation,
- imperceptible automatic, switching to gas fueling,
- diagram of connection and calibration similar to that in other STAG controllers,
- use of new tools to allow quick calibration,
- extremely precise auto-calibration,
- built-in OBDII/EOBD adapter,
- extended auto-diagnosis system,
- integrated petrol pressure emulator,
- 3D graphic map,
- extra injection management,
- readout of ECU correction,
- monitoring of working parameters on an oscilloscope,
- clear calibration program.

*dedicated to VW Group engines; for the current list of engines visit www.ac.com.pl

automotive gas systems

Gas injection controllers, injection rails and reducers are the most commonly used products when installing gas system in a car. The installation of an LPG system in a car does not interfere with the engine's basic operation. Petrol is replaced with an alternative fuel, i.e. gas mixture. The gas fuel is delivered in a vaporized form and fed into a combustion chamber (cylinder) as a mixture, through intake valves. The point where the mixture is delivered depends on the engine type and its technical advancement.

- 1 Tank
- 2 STAG-300 premium controller
- 3 Gas injectors
- 4 Solenoid valve
- 5 P/G (petrol/gas) switch with indicator
- 6 PS O2 pressure sensor
- 7 Gas filter (vaporized phase)
- 8 Reducer





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2. Gas Injection Controllers - a modern, highly technologically advanced electronic design which is compatible with the most demanding petrol controllers; controls gas injection on the basis of sequential or non-sequential petrol injection.

The most important advantages of the controllers are:

- smooth and safe driving,
- designated for cars with engines with 1 to 8 cylinders, including turbocharged engines,
- compliant with the strict Euro 5 exhaust emission standards,
- easy to install and calibrate,
- 3D graphic map,
- the performance of vehicles equipped with STAG electronics is nearly the same as when they run on petrol.

AC S.A. offers the following controller models: STAG-300 premium, STAG-300 plus, STAG-4, STAG-200, STAG-150, STAG-100, STAG-50, STAG-XL, STAG-L plus.



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3. Injection Rail

The purpose of the injection rail is to ensure precise dosage of LPG/CNG in the vaporized phase into the engine cylinders.

The Injection Rails used by AC S.A.:

- Valtek,
- Valtek typ 34,
- Rail Apache,
- Magic Jet.



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8. AC R01 Reducer

The reducer is designed for automotive sequential gas injection systems. It converts the liquid gas into vaporized form.

The advantages of the reducer:

- modern design solutions,
- small size – easy installation,
- rotary connection terminals,
- stable performance parameters,
- working pressure can be finely adjusted.

autoparts

AC S.A.'s wide product range also includes parts and components used in the automotive sector, which allows us to cover a wide range of needs of automobile workshops and end users. We try to ensure that AC products are present in every vehicle on the road.

The automotive parts offered by AC S.A. include the following product groups:

- fuses,
- band clamps,
- band clips,
- wiring harness accessories,
- MTA pliers,
- insulated and non-insulated tips,
- connector kits,
- warning lamps and signals,
- accessories for tachographs,
- sockets and plugs,
- connection wires,
- car adaptors,
- spiral cables.



wiring harnesses

The production of wiring harnesses for the automotive industry and other industrial sectors related to electronics, automation and robotics is one of the key areas of AC S.A. operations. We specialise in processing wires with a cross-section of 0.35 mm² to 2.5 mm² and a length of 60 mm to 10,000 mm. The maximum size of the wires we process can be increased by adding further transporters to ampomators. Wiring harnesses are made of wires available in about 50 colours, of which 32 are the primary colours in the separator. The selection of colours in a wiring harness depends on the customer's individual preferences

We make wiring harnesses for:

- towing hooks,
- battery (ground) cables,
- automotive gas systems,
- tractors,
- fork-lift trucks and motorcycles,
- special-purpose vehicles (including ambulances and fire trucks).

Our wiring harnesses contain connectors made by companies like KET, SUMITOMO, TYCO (AMP), YAZAKI, MOLEX, FCI, BOSCH and MTA and other connectors selected for individual car brands and models or according to the customer's wishes

We are able to supply approx. 30,000 wiring harnesses, each made up of over 55 wires, per month. The parameters of our wiring harnesses comply with applicable quality and technical standards.

The wires are made according to the DIN 72551-6 standard and tip bending is compliant with PN-EN 60352-2. We cut wires within a section range of 0,22 mm² to 6,0 mm².

AC manufactures wiring harnesses using top class automatic wire processing machines (TYCO), weaving machines, reeling machines and jacket cutting machines. Wires are connected using spot welders. The fact that we use these machines makes us one of the leading companies in the industry.



modern machine park

AC S.A. has an advanced machine park. Most of our components are made using high-output, fully automated precision production lines.

In order to maintain our position as an industry leader, we continually upgrade our machines and equipment. Production is carried out in four main production departments: Electronics, SMD, Wiring Harnesses and the Mechanical Department. Electronic components are assembled by two different methods – Thru-Hole Technology and SMT technology. AC S.A. has two modern lines for SMT surface mounting with a total capacity of 80,000 units per hour.

The processing lines are equipped with latest generation fully automated machines and equipment, including ERSA N-Wave 330, Speedline MPM Accuflex and Momentum, FUJI NXT and ERSA HOTFLOW 7. Maestro 4M plate separator. The technologies we use allow one- and two-sided mounting of electronic components as well as spray soldering and glue mounting.

Casings for electronic components are made of aluminium or plastics. AC S.A. uses modern ENGEL tiebarless injection machines with an injection capacity of 40, 60 and 90 tons and volume of 100 to 250 cm³. We also manufacture injected parts made of polypropylene, polyamides, ABS and reinforced plastics, both for our own production and for other customers. The department also uses extruding machines for plastics and rubber pressing machines with a load of 220 bars and maximum vulcanisation temperature of 190 °C.

AC S.A. manufactures electrodes and injection mould cavities using modern, numerically controlled Swiss-made MIKRON HSM 500 machine tools. These machines provide a very high rate of repeatability of manufactured parts and have mapping precision of up to 1 micron.



The ACS.A. tool shop is equipped with electro-erosion machines and wire electro-erosion machines supplied by the Japanese company SODICK and automatic lathes OKUMA and STAR. Erosion can be carried out on any type of steel and also on non-ferrous metals.

The Wire Harnesses Department prepares wiring harnesses 60 to 10,000 mm in length and with a cross-section of 0.35 to 4.0 mm². Production is carried out on automated production lines: Komax Zeta 633, Komax Alpha 477, TYCO Ampomator, Komax Kappa 220 and 225, STRUNK and On-da-Taper, which operate in the TOPNET network.

All the machines have full crimping and seal application control as well as integrated tools for measuring the tip crimp height and tensile strength. All the wiring harnesses that we manufacture are computer tested



Partner Service Workshops

As the leading manufacturer of LPG systems, AC S.A. sets trends both in the latest market solutions and in the quality of customer service. In order to install and service STAG products at the highest level, the company created the chain of Partner Service Workshops.

The workshops for the chain are selected according to strict criteria emphasising the technical knowledge, relevant technical equipment and quality of service.

As the only company in Poland, AC provides its customers with the opportunity to have the LPG system installed in a reliable workshop where the manufacturer guarantees the quality of installation and warranty service. The most important factor in using the workshop services is the fact that after installation, the possibility to make periodical inspections and repairs of LPG system all over the country under the manufacturer's warranty.

All the partner shops are homogeneous which makes them easy to identify when travelling throughout the country.



Partner Service Workshops mean:

- Long-term professional services.
- Professional equipment of the workshop.
- High standards of installation and customer service.
- High level of warranty and post-warranty service.
- Systematic trainings and examinations to ensure appropriate qualifications of the installers.
- Constant supervision of the chain carried out by the Technical and Commercial Consultants of AC S.A.



Trainings and technical consultancy

The customers of AC S.A. can use the knowledge and experience of top-class specialists, designers and consulting engineers put at their disposal.

The Regional Technical and Commercial Consultants are a team of top-class professionals in the field of installation and adjustment of the STAG auto gas system. Each of the consultants is in charge of workshops in a selected area of Poland and offers them specialist advice and help with regard to the STAG system.

One of the tasks of the consultants is to organise and carry out trainings in the correct installation of the auto gas system. The technical trainings are famous for the very high level of knowledge taught and the information materials are thought very highly of by LPG system installers.

The range of knowledge shown by the installers participating in the trainings is recorded in the

Installer Passport – a document issued by AC S.A. which authorises its holder to install STAG systems which effectively verifies the store of knowledge and is the indicator of trust in the workshop for the customer.



Call Centre – the STAG brand users have at their disposal the technical support call centre at which the caller will receive very specialist and complete information on the correct operation of the equipment of the auto gas system on every working day between 8 a.m. and 4 p.m.

We share knowledge and experience with the customers in trade press, thematic web portals and during the cyclic conferences. On a special forum at www.ac.com.pl, the qualified AC S.A. employees offer their advice in the field of the optimum solution of problems related to gas supply systems in cars and they are also helpful in the selection of the most appropriate device.

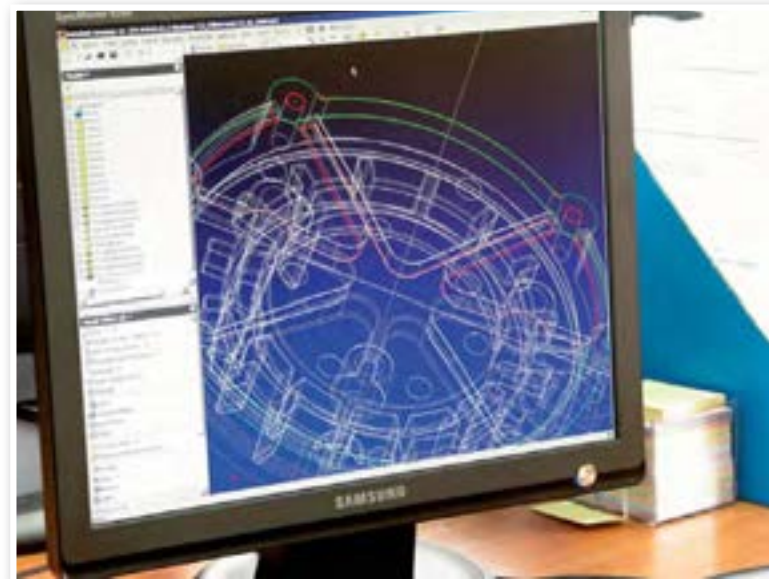
In order to ensure the highest level and professional service to our customers, the AC S.A. employees systematically raise their qualifications and improve their technical knowledge by participating as students in numerous trainings and in post-graduate doctoral courses in renowned universities.



Research and Development Centre

The policy adopted by AC S.A. focuses around the main objective, which is providing customers with top-quality, state-of-the-art products. The innovative character of products is ensured by the highly qualified and experienced team of over 30 electronic, mechanical and IT engineers.

The existing Research and Development Department significantly contributed to the fact that the company has become the leader among the manufacturers of LPG systems in Poland. Taking a step forward in the field of research, the company created the Research and Development Centre and started the construction of the new building for its needs in 2011. In the area of more than 2000 m², the team of designers and scientists will be able to continue the R&D works related to the development of new technologies for products used for supplying engines of motor vehicles with alternative fuels.



awards and distinctions

The awards and distinctions which we continue to receive attest to the high quality of our products, our excellent financial performance and our rapid development.



- **The Innovative Company** – the "National Leaders of Innovation and Development" Competition, the Regional Edition 2010 – the Podlaskie Province
- **The Innovative Product** – STAG 300 Premium – the "National Leaders of Innovation and Development" Competition, the Regional Edition 2010 – the Podlaskie Province
- **The title of the "Best Company of the Year 2009"** in the "Golden Hundred of Podlasie Enterprises" - a survey carried out by the Kurier Poranny,
- **The 1st place in category:** "The Biggest Effectiveness in Running Business Activity for the Year 2009" in the "Golden Hundred of Podlasie Enterprises" - a survey carried out by the Kurier Poranny,
- **"Podlasie Brand of the Year 2009"** for: "STAG-300 Premium Controller",
- **INPRO 2010** for STAG-300 premium,
- **INPRO 2010** for SXC 1011 Scanner,
- **"Innovations 2009"** in category "Production",
- **The Quality Certificate "Our Good One of Podlasie"** for STAG-300 premium,
- **"National Leaders of Innovation 2009"** for "Innovative Product",
- **"National Leaders of Innovation 2009"** for "Innovative Company",
- **"Innovations 2008"** in category "Production",
- **"Business Ambassador – Podlasie 2008"**,
- **"Innovations 2007"** in category "Production",
- **"Business Ambassador – Podlasie 2008"**
- **"Business Cheetahs 2007"** in the category "The Most Dynamic Company in the Podlaskie Province"
- **"Business Ambassador – Podlasie 2007"** for the Biggest Contribution of Export to Sales in 2006

AC S.A. in the world

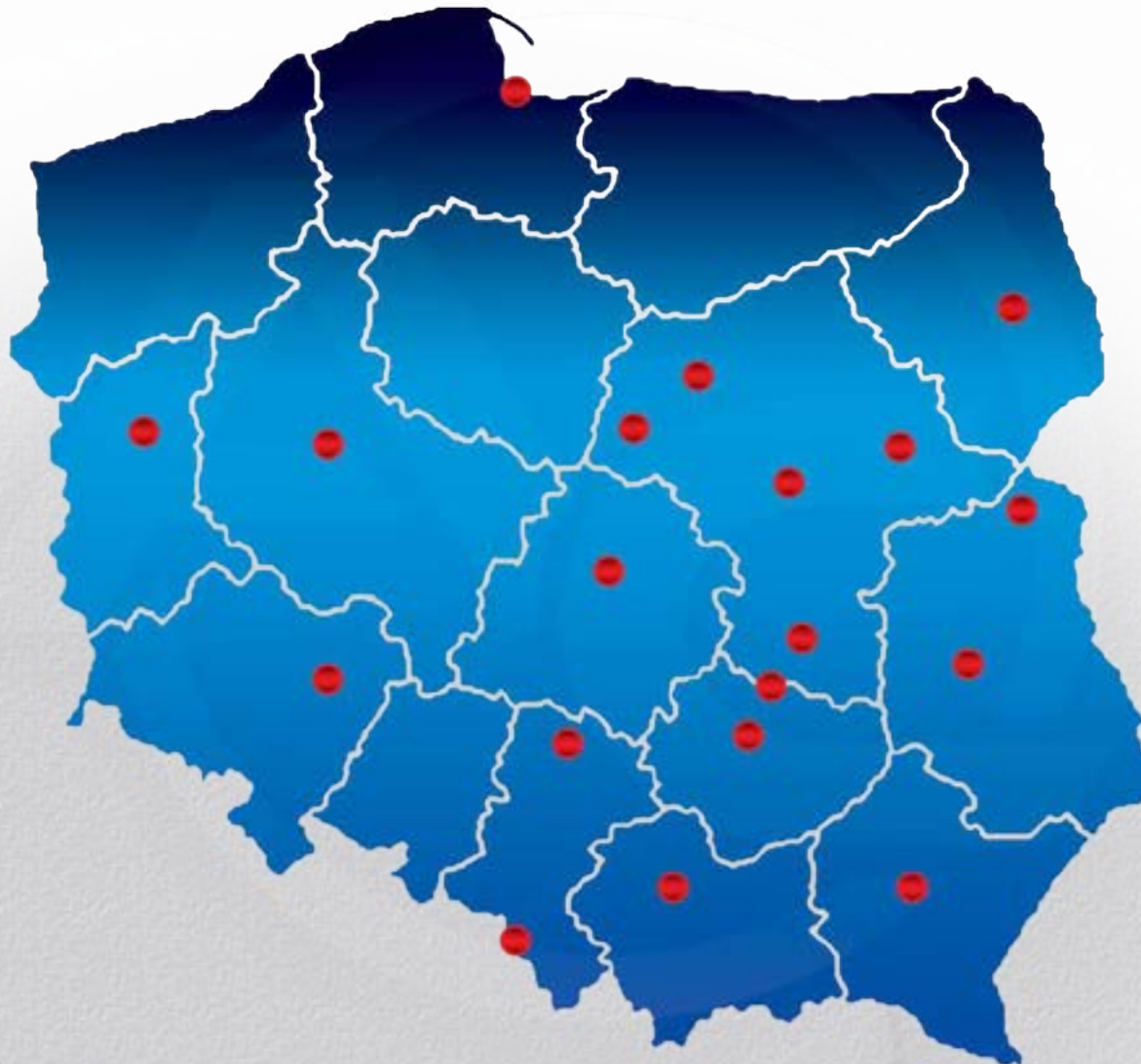
Our products are supplied to the largest automotive wholesalers and renowned automobile workshops all over the world.

Our export sales account for more than 50% of our revenues, which is the best proof of our customers' confidence in our products.



 Export

AC S.A. in Poland



AC S.A. is also well known among domestic customers for electronic circuits for the automotive industry. Polish automobile workshops appreciate AC S.A.'s products, particularly our range of products for automotive gas systems under the STAG. brand. The number of automobile workshops in which our logo is visible grows every year. Our distribution network consists of more than 15 outlets located all over the country.

contact details

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25 lat doświadczenia

25 years of experience

