AMVAJE ABI
ELECTRONICS INDUSTRY

Amvaje Abi

Active Magnetic Bearing (AMB) v1 & v2 Control System

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Amvaje Abi: A Legacy of Expertise and Commitment to Quality

Amvaje Abi Company stands at the forefront of the industry, boasting over two decades of invaluable experience in designing, manufacturing, and advancing control systems and precision tools. Specializing in various sectors, particularly oil and gas, this knowledge-based company has earned its reputation as a trailblazer in Iran.

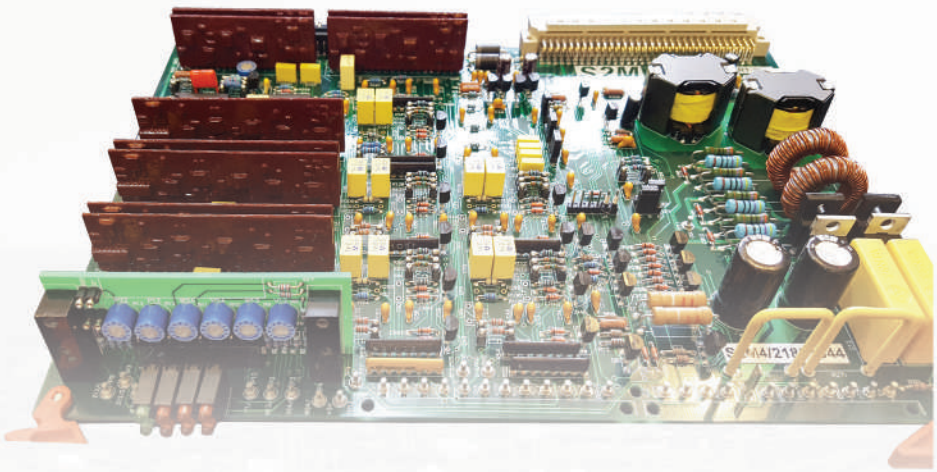
Established in 2002 with a mission to develop electronic systems tailored to the nation's needs, Amvaje Abi has evolved significantly over the years. In 2010, facing economic sanctions and stringent restrictions, the company successfully diversified into the production of control systems and precision tools, consistently delivering top-notch products across industries like oil and gas, mining, and steel.

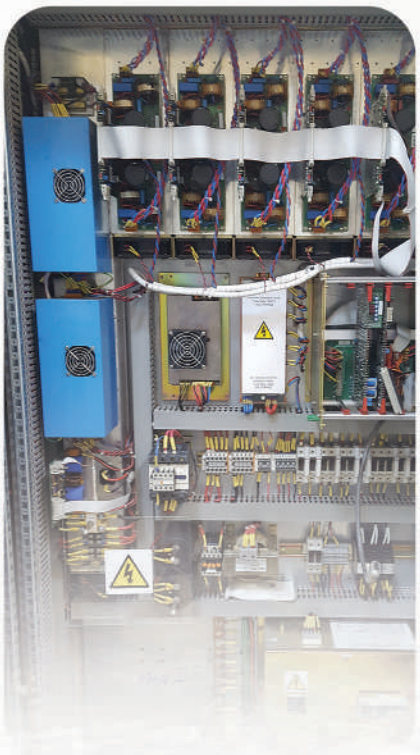
Amvaje Abi's journey includes remarkable milestones, such as expanding R&D units, stringent quality control measures, and efficient production in the engineering department in Shiraz. Complemented by a management and commercial branch in Tehran, the company operates with a dedicated team of over 50 experts and skilled engineers, all alums of prestigious universities in the country.

In its commitment to international standards, Amvaje Abi has earned membership in the EP and AVL list of the Ministry of Petroleum and the National Petrochemical Company. The company has also secured multiple certifications and approvals from renowned organizations like the Association of Oil and Gas Industry Equipment Manufacturers and the Industrial Automation Companies Association.

With a portfolio boasting over 200 successful products, Amvaje Abi has achieved essential certifications domestically and internationally and has also seen exclusive use in major Iranian refineries and petrochemical plants by getting an exclusive MESC Code. Notable among these are the Pars South Gas Complex, Khangiran, Parsian, Shazand Oil, and numerous other significant petrochemical complexes.

Building on its rich experiences, Amvaje Abi has ventured into international trade, exporting its high-quality products to various countries. Committed to excellence, development, support, and the incorporation of cutting-edge technologies, the company has solidified its position as a leading force in Iran's electronic and industrial control industry and is recognized as a dependable supplier.





AMB V.1

In high-speed rotating machinery, contact bearings are not feasible due to the heat generated by friction at high speeds, leading to potential damage to the contact bearings. Therefore, in this category of machines, the shaft is levitated in the air using a Magnetic Bearing System to prevent damage. The Active Magnetic Bearing (AMB) control system is a closed-loop control system with a digital controller designed and built to stabilize the suspension of magnetic bearings. Additionally, to enhance system safety, critical parameters such as radial and axial positions, rotational speed, temperatures at various points of the machine, etc., are monitored by this system during machine operation. In case of deviations beyond specified limits, warning or shutdown commands are issued.

Magnetic bearing systems consist of two main parts: Bearings and the Control-Drive Unit (AMB), which the Control-Drive Unit is Amvaje Abi's product.

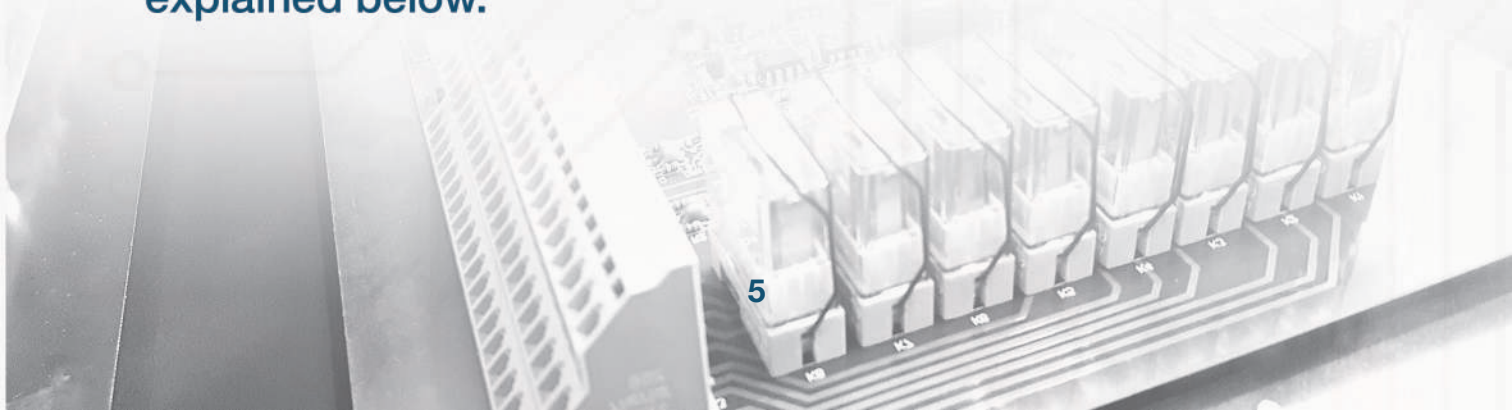
Key features

- Application in Turbo Expanders, Gas Turbines, Generators, and rotating machinery
- Based on advanced digital and linear control systems

The overall performance of the electronic modules in this system is as follows:

- Before the turbine or turbo expander axis starts rotating, it is levitated by five pairs of bearings to reduce friction and achieve high speeds. The axis can reach speeds up to 45,000 RPM depending on gas pressure.
- Sensors in the system send information related to the axis, including rotational speed, bearing operating temperature, and shaft position in the bearing, to the control unit.
- The control unit processes the data sent by the control modules, and adjustments are made to the bearings if necessary.
- Bearings are magnetized by five Axial and Radial Amplifier cards, which essentially act as the power drive for the bearings. Any changes are corrected through this process to adjust the shaft position.
- Operating conditions of the system are visible through user interfaces, and in case of issues, alarms are sent to other control systems such as DCS and ESD.
- The system has a dedicated UPS that provides primary power, ensuring uninterrupted and fault-tolerant operation.

The company produces cards and modules, which will be explained below.



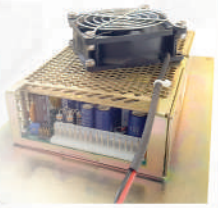
Modules

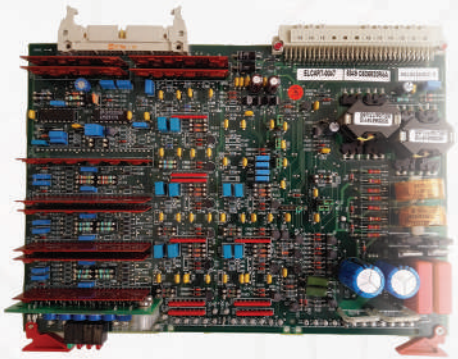
High Power DC-CD Converter

- Output Power Supply Converter Of Bearings And Actuators
- Input: 160VDC-120VDC
- Output: 24V 3A , ±150V 10A , Maximum Power 2000W
- Applicable As Resources In General And Industrial Applications

Medium Power AC-DC Converter

- Power Supply Converter Of Digital And Analog Control Circuits And Signal Processing
- Input: 100VAC-240VAC , 4.5A 60-50Hz
- Output: +5V 20A, +24V 3A and ±15V 2A , Total maximum power 185W
- Containing Compact And Small Size, Suitable For Use As Power Sources For General And Industrial Applications





Detection Board

- Signal conditioning, position sensors, and bearing temperature card
- It contains hybrid detector modules with a thermal coefficient of ±50ppm/℃
- With Six position sensor inputs and two Bearing temperature sensor inputs
- Filtered analog output for applying to the Digital control loop module

Data Management PCB

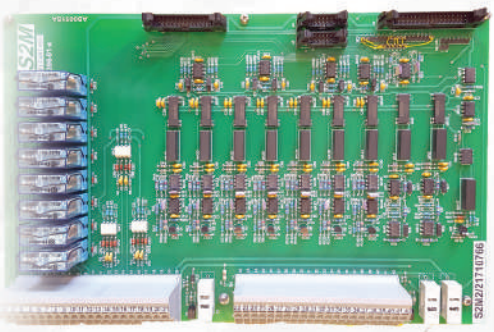
- Communication set and control card
- Coordinator and bridge between Data logger, HMI, and Control loop
- Based on advanced telecommunication processors

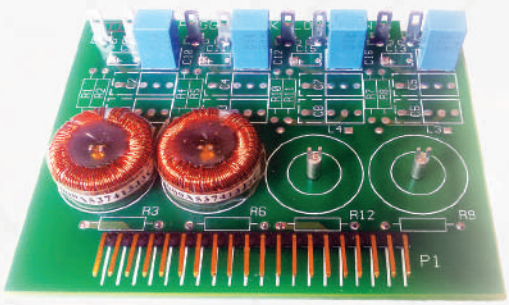
Digital Control Loop

- Position-oriented digital control card
- Production of position-oriented command signals based on position sensors
- Based on advanced DSP processors
- Control software based on advanced digital controls

Customer Interface

- Communication module between monitors and system control cards
- Production of 5-1V, 20-4mA standard signals for system's monitors
- Set Point signals for working sets





Tuning Piggy Backs

- Modules of setting the dynamic parameters of the set
- Compensation caused by cable length delay
- Oscillator tuning compensation

Axial And Radian Amplifier

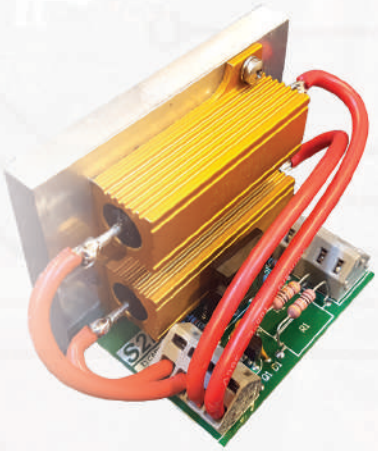
- Power of actuator bearings system
- Control loop command Converter to bearing differential power
- Input power: ±150VDC

Battery Charger

- System's main battery charger
- Input: 145VDC Nominal Non-Regular
- Charger operation in series

Fuse Board Module

- System's main fuse box
- Power Distribution for bearing actuator amplifiers

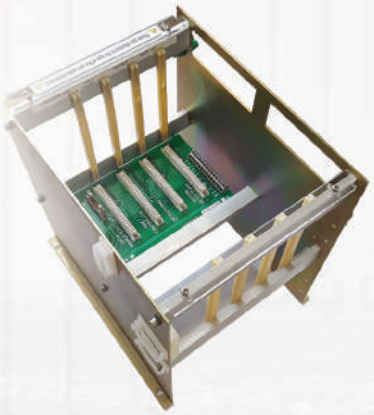


Capacitor-Discharge Module

- Discharging the charge of the main capacitors of the system in case of a voltage drop
- Rapid discharge of the power supply capacitor in ShutDown

Motherboard Rack

- Motherboard rack of the system's main cards
- Power distribution between Data Management Detection and Control Loop cards

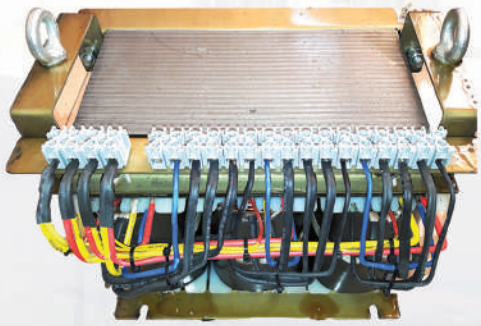


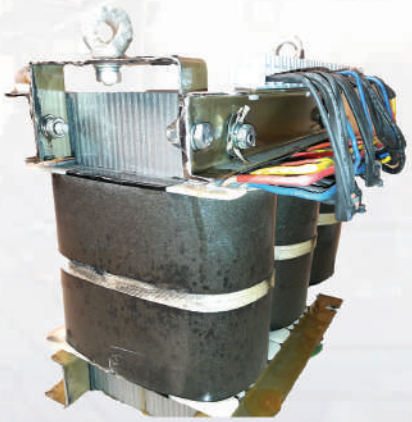
Surge Limiter

- Input power spike protection filter
- Three-phase power supply input protection

3-Phase Main Transformer

- System's main power transformer
- 3-Phase star connection Selectable inputs: 350V, 380V, 400V, 440V
- Output: 100V 3-Phase Delta connection
- Rated Power: 5350VA



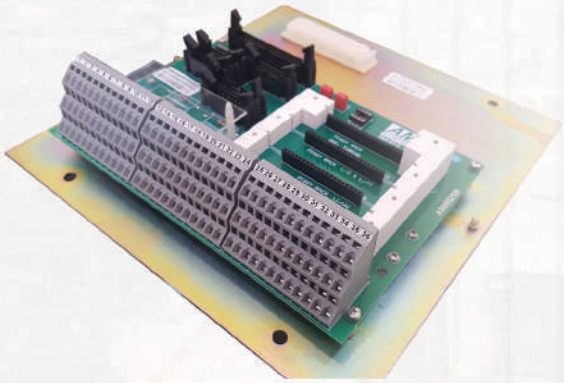


HMI Panel

- It contains an LCD screen and a color indicator to announce the status of the system parameters.
- Display system alarms with details along with sound

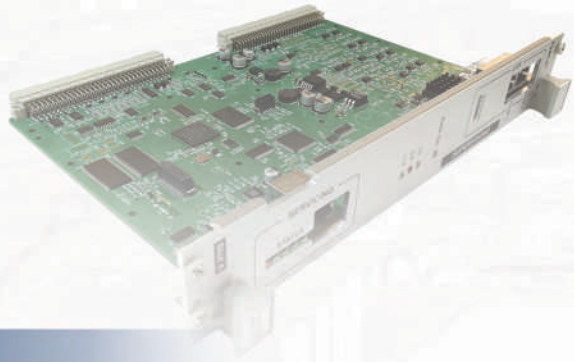
Data Logger Interface

- Interface between Data Logger and Data Management card
- Power supply of Data Logger system
- Ability to set log parameters by the user



Signal Machine Interface

- Compensation Panel of the system's dynamic parameters
- Containing slots for Piggy backs compensator



AMB V.2

This system is an upgraded version of the AMB v1 (E300) control system, which utilizes Profinet standard module-to-module communications in its design. Considering the importance of system availability, a more robust and modular power supply system, including UPS, has been employed compared to the E300 version. Additionally, the communication set, Data Logger, and HMI modules of this system are selected from standard and common modules.

Key features of this system:

- Standard Profinet-based inputs/outputs
- Monitoring module with standard mV outputs based on Machinery systems
- Modular power supply and UPS system with TMR stability
- Advanced Tuning, Engineering Analysis, and Diagnostics software.

Detection Board

- Sensor Interface Board for Magnetic Bearing Control Cabinet
- ±15VDC , +24VDC

Control Loop Board

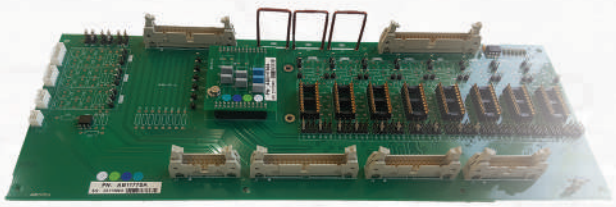
- Digital Controller for Magnetic Bearing Control Cabinet
- ±15VDC

Supervising Board

- Board for Checking Parameters, Generating Alarms & Trips
- ±15VDC

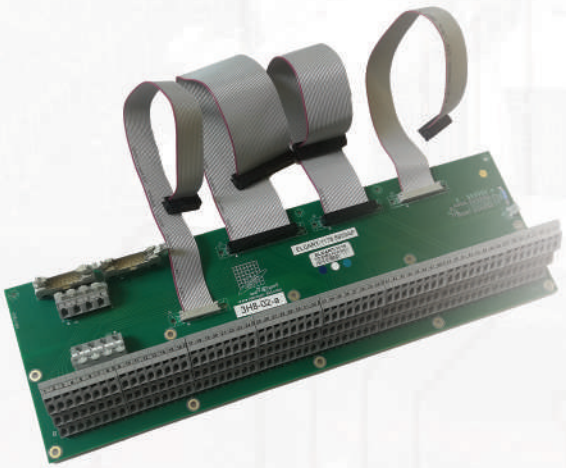
Monitoring Board

- BNC Connection Board for Position Monitoring
- ±15VDC , +24VDC



Machine Signals Interface Tuning Board

- Adjust the parameters of the AMB v2 control system according to its installation conditions.

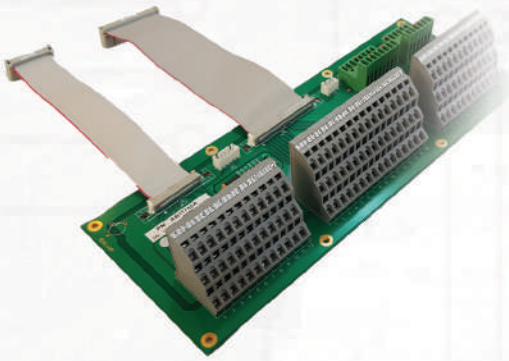


Machine Signals Interface Terminal Block Board

- AMB V2 magnetic bearing control system sensors are connected through this card.
- The wires of the sensors are connected to the terminal block on this card and connected to the Machine Signals Interface Tuning Board card by a flat cable

Secured Interface Board Signals

- Can be optionally installed on the AMB v2 control system.
- Used to comply with broader safety requirements, including the following:
  - Transfer the unprocessed signals of the sensors with minimal processing to an independent external safety device.
  - To provide dedicated warning signals such as vibration, temperature, speed
  - To transfer some analog signals to PLC to control external devices with high-speed dynamic data.



Secured Interface Board With Terminal Blocks

- Can be optionally installed on the AMB v2 control system.
- Connecting the input and output signals to the Secured Interface Board
- Wires are connected to the terminal blocks of this card and transferred to the Secured Interface Board by a flat cable.

Backplane And Rack

- Slot Rack for Placement& Communication of Magnetic Bearing Control Cabinet Boards

Company's Services

- Engineering and Manufacturing Services:

- Designing various electronic and control systems.
- Reverse engineering and redesigning electronic cards and control systems.
- Electronic component assembly and mass production of various electronic and control systems.
- Testing and quality control of electronic cards.

- Specialized commercial services:

- Consultation and procurement of industrial control systems.
- Consultation and procurement of various electronic, telecommunication, and precision instruments.
- Consult and procure remote control wireless systems.

- Specialized Repairs:

- Specialized repair of electronic cards and precision instruments for refineries and petrochemical plants.

- Training and Technical Engineering Support

- Updating and Upgrading electronic and control systems

- Control Systems Integration and Commissioning

In addition to its diverse and prominent activities, Amvaje Abi Company, with its essential capabilities, is recognized as one of the active companies in the field of designing and integrating control systems and precision instruments. This includes implementation, commissioning, support, and maintenance. The Instrument and Control System Department of Amvaje Abi, with over 15 years of practical experience in industrial automation and precision instruments, has become a key player in providing suitable solutions for major industries, including oil and gas, petrochemicals, steel, etc.

The primary activities and services of the Instrument and Control System Department at Amvaje Abi:

- Consultation and Engineering
- Software design and development
- Conducting FAT processes
- Upgrading and Revamping
- Procurement of project components
- SAT
- Commissioning
- Repair and Maintenance
- Training
- Project Management
- Design of engineering documents and documentation
- Control systems Integration and precision instruments
- Cybersecurity Based On Project Requirements

Customers

شرکت ملی نفت ایران

شرکت ملی گاز ایران

شرکت ملی صنایع پتروشیمی

I.G.T.C
شرکت پالایش گاز ایلام

شرکت مجتمع گاز پارس جنوبی
SPGC

شرکت پالایش گاز شهید هاشمی نژاد
Shahid Hasheminejad Gas Refinery Company

Jahanpars
Engineering and Construction Co.

شرکت پتروشیمی امیرکبیر (سهامی عام)

شرکت پالایش گاز پارسیان

شرکت پالایش نفت شازند اراک

شرکت صنایع پتروشیمی خلیج فارس
Persian Gulf Petrochemical Industries Co.
PGPIC
شرکت پتروشیمی پارس
(سهامی عام)
Pars Petrochemical Co.

شرکت صنایع پتروشیمی خلیج فارس
Persian Gulf Petrochemical Industries Co
PGPIC
پتروشیمی تندگویان

شرکت صنایع پتروشیمی خلیج فارس
Persian Gulf Petrochemical Industries Co.
PGPIC
شرکت گروه پتروشیمی سرمایه‌گذاری ایرانیان
شرکت پتروشیمی لردگان
(سهامی عام)

شرکت صنایع پتروشیمی خلیج فارس
Persian Gulf Petrochemical Industries Co.
PGPIC
شرکت پتروشیمی نوری (برزویه) سهامی عام

شرکت
مهندسی و ساختمان ماشین سازی اراک
MSA Engineering & Construction Co.

RPC
شرکت پتروشیمی رازی
RAZI PETROCHEMICAL CO.

MAPSA
Engineering Service Company

GS
فولاد یزد
YAZD GHADIR STEEL

شرکت ملی مناطق نفت خیز جنوب
شرکت بهره برداری نفت و گاز گچساران

Regal
PETROCHEMICAL

ABSUN ZOLAL
SUSTAINABLE & CREATIVE SOLUTIONS

MAD
Mahdi Abad Mining Complex
مجتمع معدنی سرب و روی و باریت مهدی آباد

شرکت امن پژوه نوآوران فارس

Certificates and Standards

Implemented Standards

- IEC 61508-7-210
- BSI BS EN 60079-0
- BSI BS EN 60079-1
- BSI BS EN 60079-20-1
- BSI BS EN 60079-7
- IEC 61132-2 2017
- IEC-60529
- IPC 2221B
- IPC 2222A
- IPC 7351B
- IPC 7711C.7721C
- IPC A-600J
- IPC A-610F A1-2016
- ISO IEC 80079-34-2018
- ISO9001-2015

Membership Certificate Of Industrial Automation Companies Association


انجمن صنفی شرکت‌های اتوماسیون صنعتی
گواهی عضویت
صنعت الکترونیک امواج آبی
شماره عضویت: ۹۸۱۰۲ تاریخ صدور: ۱۳۹۹/۰۶/۰۱
شروع عضویت: ۱۳۹۸/۰۶/۰۱ اعتبار تا تاریخ: ۱۴۰۰/۰۷/۳۰
Association of Industrial Automation Companies
CERTIFICATE OF MEMBERSHIP
MEMBERSHIP NO: 98102 ISSUE DATE: Aug.22.2020
REGISTRATION DATE: Aug.23.2019 VALID UNTIL: Oct.21.2021

Membership Certificate Of Association of Oil and Gas Industry Equipment Manufacturers


گواهی عضویت
شرکت صنعت الکترونیک امواج آبی

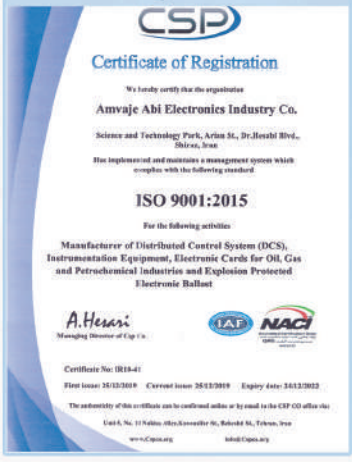
Operation License

Membership in the AVL of the Oil Ministry

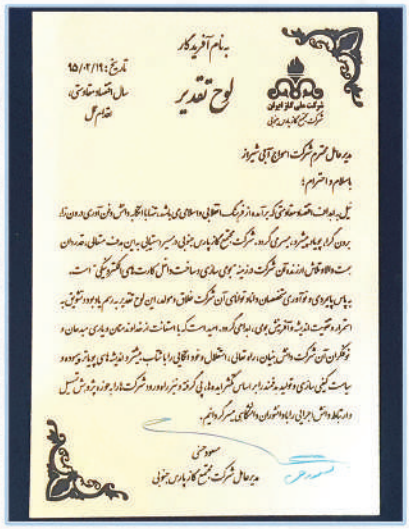
Knowledge enterprise Apporval

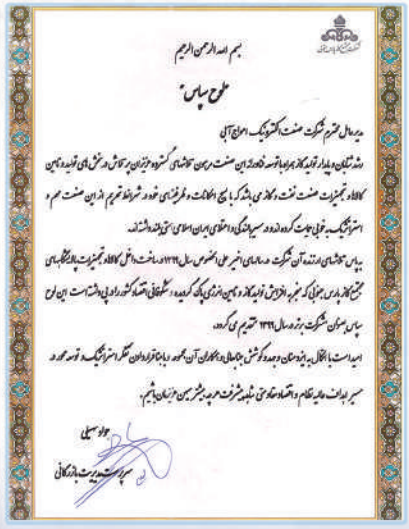

کارگروه ارزیابی شرکت‌ها و موسسات دانش‌بنیان

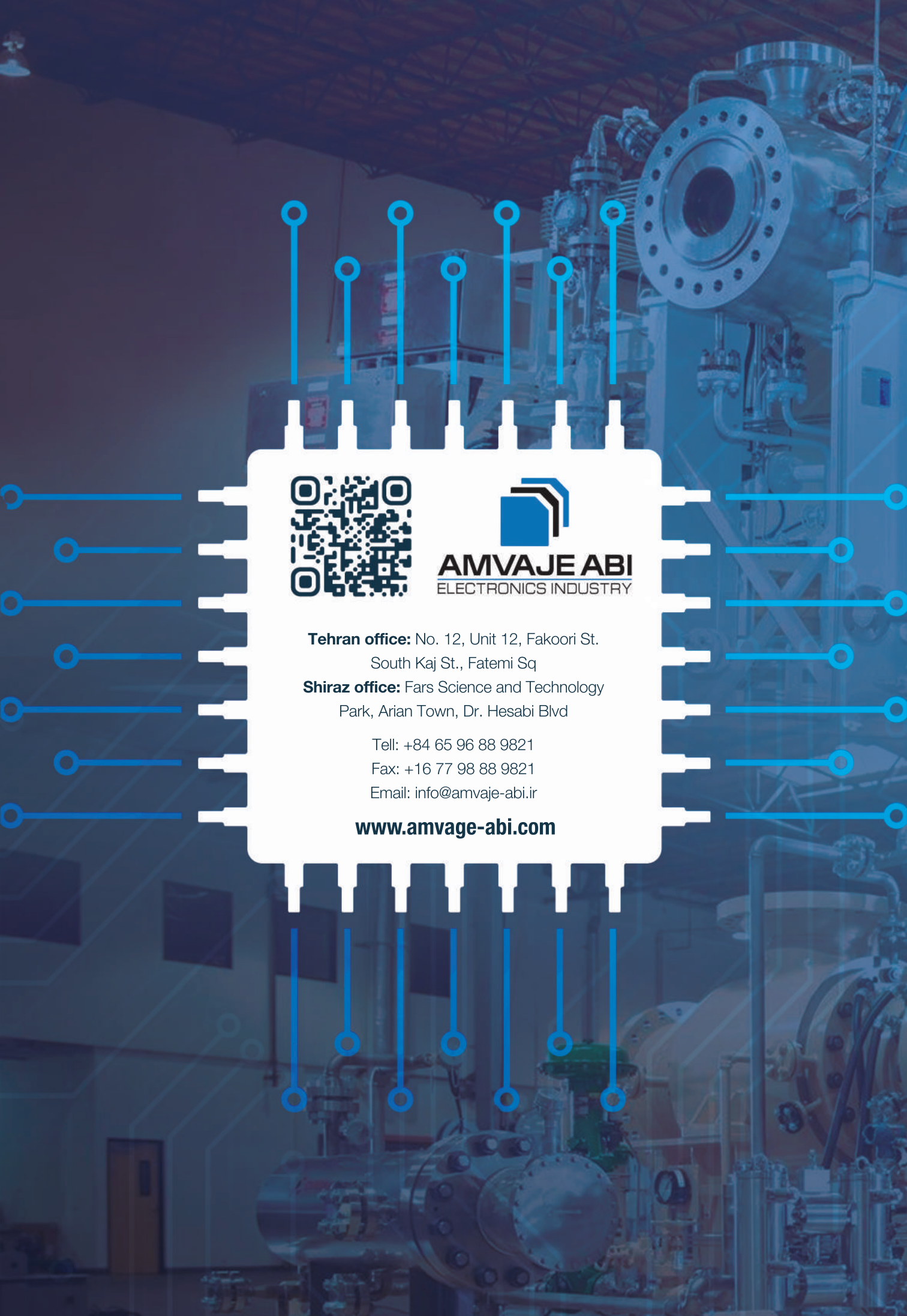
Quality Control According To ISO9001


CSP
Certificate of Registration
We hereby certify that the organization
Amvaje Abi Electronics Industry Co.
Science and Technology Park, Arian St., Dr.Heshi Blvd., Shiraz, Iran
Has implemented and maintains a management system which complies with the following standard
ISO 9001:2015
For the following activities
Manufacturer of Distributed Control System (DCS), Instrumentation Equipment, Electronic Cards for Oil, Gas and Petrochemical Industries and Explosion Protected Electronic Ballast
A.Hesari
Managing Director of Csp Co.
IAF NACI
Certificate No: IR18-41
First issue: 25/12/2018 Current issue: 26/12/2019 Expiry date: 24/12/2022

Appreciation Letters







AMVAJE ABI
ELECTRONICS INDUSTRY

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