azbil

Harmonized Automation System

Harmonas-DEO™

R500

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http://www.azbil.com/products/factory/order.html

Azbil Corporation
Advanced Automation Company

Yamatake Corporation changed its name to Azbil Corporation on April 1, 2012.

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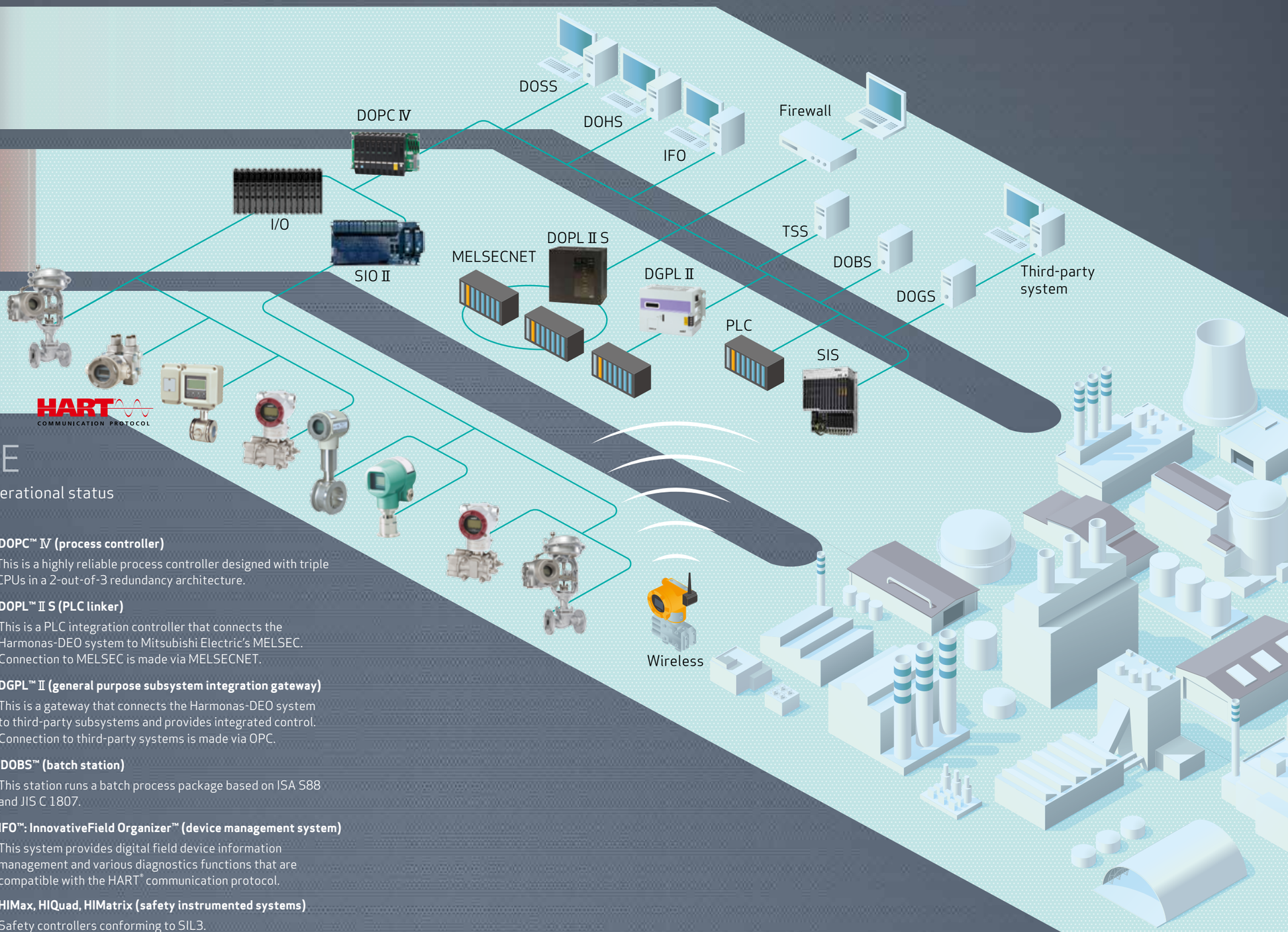
Harmonas-DEO™ —
A central pillar for data-driven smart factories in the age of IoT

Harmonas-DEO collects the wide variety of data generated at manufacturing sites, analyzes it in cyberspace, and then feeds the validated results back to the real world. The movement towards a data-driven society is gradually becoming reality with cyber-physical system (CPS) architecture that brings the cutting edge of innovation to manufacturing sites. Harmonas-DEO, the harmonized automation system, brings about cooperation between cyberspace, the manufacturing site, and operators, leading to value optimization for plants and factories.



SYSTEM ARCHITECTURE

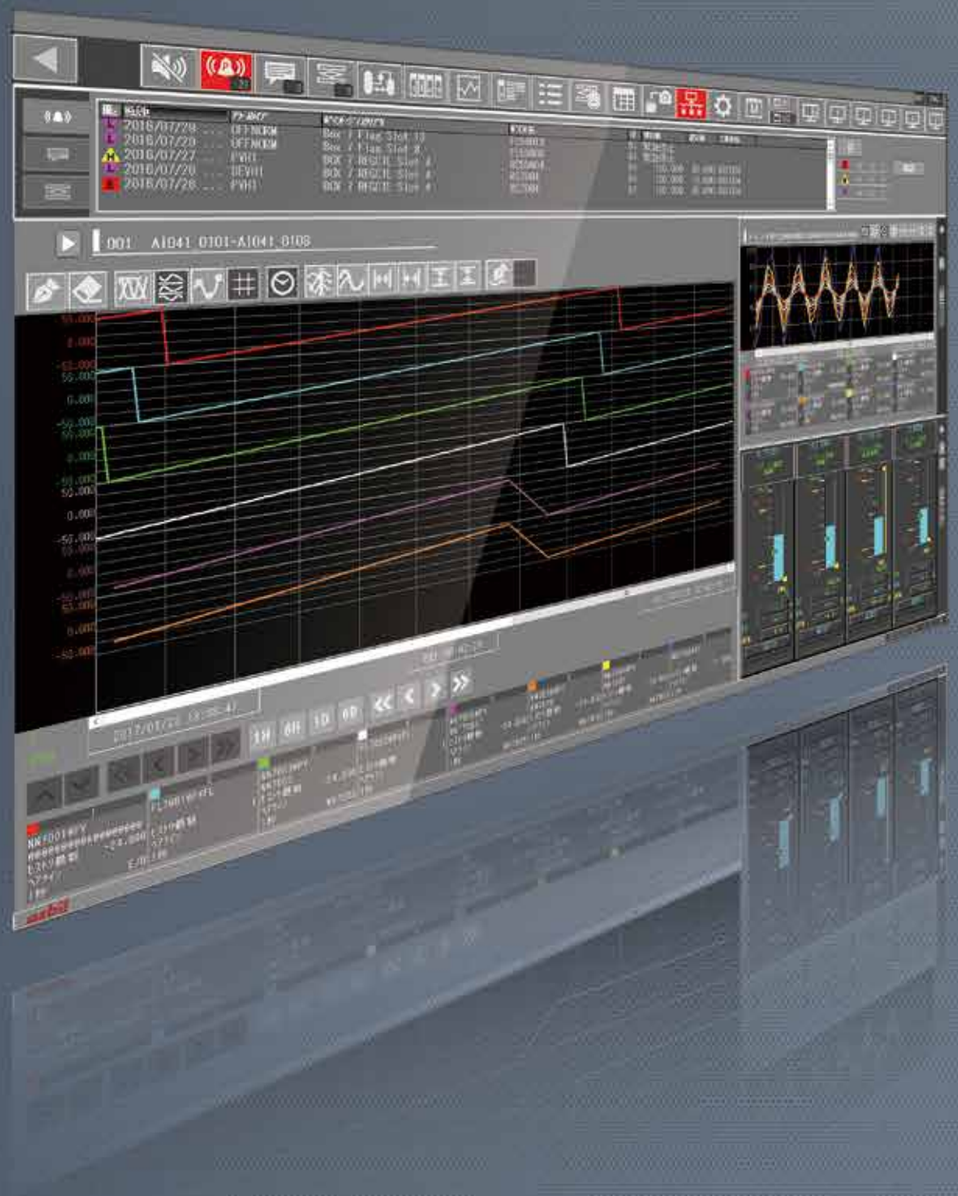
A scalable system that allows real-time tracking of operational status

- **DOSS (supervisory station)**
  This human-machine interface (HMI) is used for plant operating and monitoring tasks. It is also used as the engineering environment for the Harmonas-DEO system.
- **TSS (thin client supervisory server)**
  The DOSS operation monitoring screens are transmitted over a network, so monitoring of something like the DCS screen can be done from anywhere, rather than being restricted to a specific location like the control room.
- **DOHS™ (history station)**
  Process data, DCS alarms, and operational history handled by the Harmonas-DEO system are collected and stored here. DOHS serves as a platform for data analysis and other plant data utilization, with functions for viewing and outputting collected data.
- **DOGS™ (gateway station)**
  This is a gateway station that connects the Harmonas-DEO system to third-party systems. OPC DA 2.05a and OPC UA server functionality are provided.
- **DOPC™ Ⅳ (process controller)**
  This is a highly reliable process controller designed with triple CPUs in a 2-out-of-3 redundancy architecture.
- **DOPL™ Ⅱ S (PLC linker)**
  This is a PLC integration controller that connects the Harmonas-DEO system to Mitsubishi Electric's MELSEC. Connection to MELSEC is made via MELSECNET.
- **DGPL™ Ⅱ (general purpose subsystem integration gateway)**
  This is a gateway that connects the Harmonas-DEO system to third-party subsystems and provides integrated control. Connection to third-party systems is made via OPC.
- **DOBS™ (batch station)**
  This station runs a batch process package based on ISA S88 and JIS C 1807.
- **IFO™: InnovativeField Organizer™ (device management system)**
  This system provides digital field device information management and various diagnostics functions that are compatible with the HART® communication protocol.
- **HIMax, HIQuad, HIMatrix (safety instrumented systems)**
  Safety controllers conforming to SIL3.

OPERATION

“Human-centered” HMI supports prompt situational awareness and swift comprehension and decision-making, and provides guidance for correct operation

In this age of automation and computerization, even with the added element of IoT technology, people are still indispensable at manufacturing sites for the monitoring of plant and factory status and handling of irregularities. We provide an appropriate control monitoring interface that helps operators to maintain safe and stable plant control at manufacturing sites where the human factor is central to operation.



POINT 1

Multi-Information Window
for plant status comprehension

Information that is vital for operation and monitoring is well organized and arranged on the display, reducing the need to turn pages. This design leads to safer plant operation by ensuring that important information is not overlooked because it is in some other window.

POINT 2

Window-Set Call-up
for a standardized monitoring view

Predetermined sets of windows can easily be call up once the required operation and monitoring information is collected and registered. This eliminates gradual changes in screen layout due to increased operational proficiency, and standardizes the operation view.

POINT 3

Alarm Summary Screen
for quick access to relevant information

Graphical screens for checking the status of points where alarms were generated and operation screens can be easily accessed. Right-clicking an alarm brings up a troubleshooting screen, where fast action can be taken.

POINT 4

Remote Monitoring
just about anywhere

With a TSS server installed, the DCS can be monitored outside of the control room. The DCS screen can be viewed onsite while inspecting instrumentation, and operation from remote locations is also possible.

Developer viewpoint

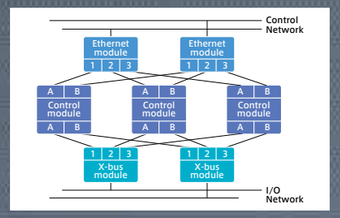
In the past, we followed the screen design of previous systems in order to maintain operator familiarity with the interface. However, when developing the Harmonas-DEO screens, we went back to the fundamentals of the DCS and asked what is truly indispensable for plant operation, and what functions are essential for safe plant operation. We then decided to take on the challenge of developing a new operation screen. Going forward, we intend to continue improving usability and comprehensibility in order to provide our customers with an interface that supports safe plant operation.

CONTROL

Highly reliable and maintainable controllers, for long-term stable plant operation

Harmonas-DEO offers high-performance controllers and modules that ensure the reliability needed for process control. The wide range of possible applications includes continuous processing, batch processing, assembly operation, and everything in between.

DOPC Ⅳ Process Controller



▲Triple-modular-redundant architecture

A triple modular redundancy architecture is used for the CPUs of DOPC Ⅳ. The redundant architecture adopts the "2 out of 3" standard used in systems requiring a high degree of reliability. Calculations are performed by 3 constantly synchronized CPUs, and by outputting after comparing results, the reliability of the output data is enhanced. Also, tripling of the CPU modules allows automatic recovery, except in the case of a permanent fault. The parallel redundancy system allows seamless switchover, without the unavoidable processing time required by standby redundancy systems when switching from the execution device to the standby device.

DOPL Ⅱ S (PLC linker)

A PLC integration controller that connects to Mitsubishi Electric's MELSEC via MELSECNET

DGPL Ⅱ (general purpose subsystem integration gateway)

A gateway that provides integrated monitoring and control across subsystems

SIO Ⅱ (signal I/O module)

Individually isolated I/O signal module

Digital field support

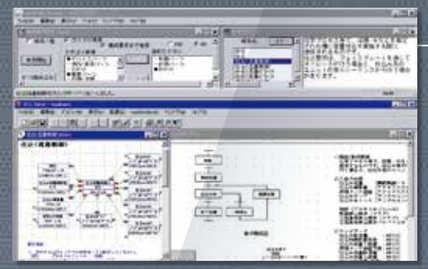
The system is integrated with field equipment that supports the HART® communication protocol. Maintenance work is improved by applications utilizing diagnostic information from intelligent field equipment. In addition, by means of constant monitoring of field equipment, small irregularities that would previously have gone unrecognized can be identified, resulting in more stable plant operation.

HART COMMUNICATION PROTOCOL

ENGINEERING

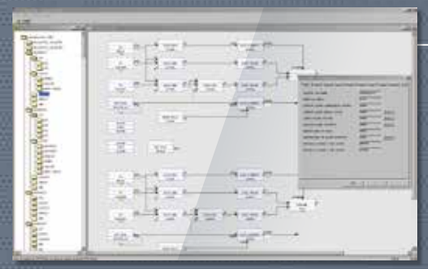
Highly efficient engineering environment improves productivity in the creation of control system architecture

Offers an environment for the efficient creation, debugging and control simulation of graphics, control logic, sequence programs, etc.



Control Application Builder & Library

Control Application Builder is an application for designing the control logic of systems. Various input/output and adjustment control points are provided in the form of separate parts, and control loops can be created simply by connecting the parts on the screen.
Since the resulting control flowcharts indicate relationships using arrow connections—including parts and signal flow—they can be used without alteration as instrumentation flowcharts.

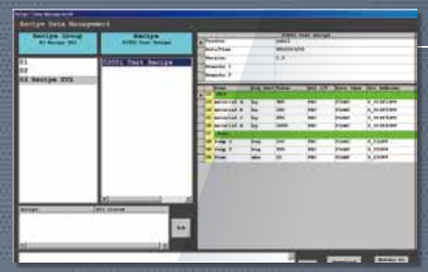


Soft Controller Simulator & Online Debugger

The Soft Controller Simulator offers the ability to create virtual process controllers on ordinary, general-purpose PCs.
Using the Online Debugger, the input/output signal flows and calculated values on flowcharts created with Control Application Builder can be checked. Since the debugger allows PID tuning, etc. to be performed from the level of individual parts, debugging can be carried out in an intuitive manner while looking at the flowchart.

VIEW Client Builder

This is a tool for creating graphics screens.
The equipment and instrumentation of which plants and factories consist—such as various types of valves, pumps and tanks—are provided as standard parts. Screens can be created simply by laying out the parts, indicating properties with different colors, and setting up conditions and information at the relevant points.
Creation of user-defined parts and utilization of scripts is also possible, allowing the design of operation monitoring screens that meet various requirements.

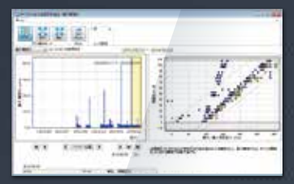


Recipe Loader

This tool supports data creation and download.
In addition to the HMI, data editing can also be performed in Excel, making data creation and alteration easy to carry out.
Switching between recipes is easy, since they can be selected in the loader and the corresponding data downloaded into the controller in one operation.

Technological solutions for data-driven smart plant and factory operation management in the IoT age

Big data collected in cyberspace from real-world manufacturing sites is analyzed and validated with the use of innovative IoT technology. With the optimal solutions thus obtained, we are continually changing into a data-driven society through the use of cyber physical system (CPS) architecture which brings innovation to the real world. Azbil supports the realization of data-driven plant and factory operation management through CPS architecture that bridges the gap between cyberspace and the real world, providing various solutions that have Harmonas-DEO at their center.



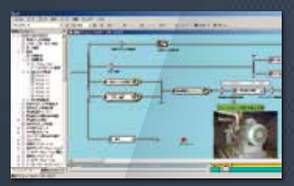
Control valve maintenance support system

PLUG-IN Valstaff

Collects data on the status of control valves in the field, facilitating optimal decision-making as to the necessity of maintenance and the actual maintenance tasks.

Alarm and Event Analysis Software

Detects causes of failure based on historical event data without generating a process model in the tool. By analyzing and assessing the soundness of alarm systems, it facilitates the introduction of improvements in operation.



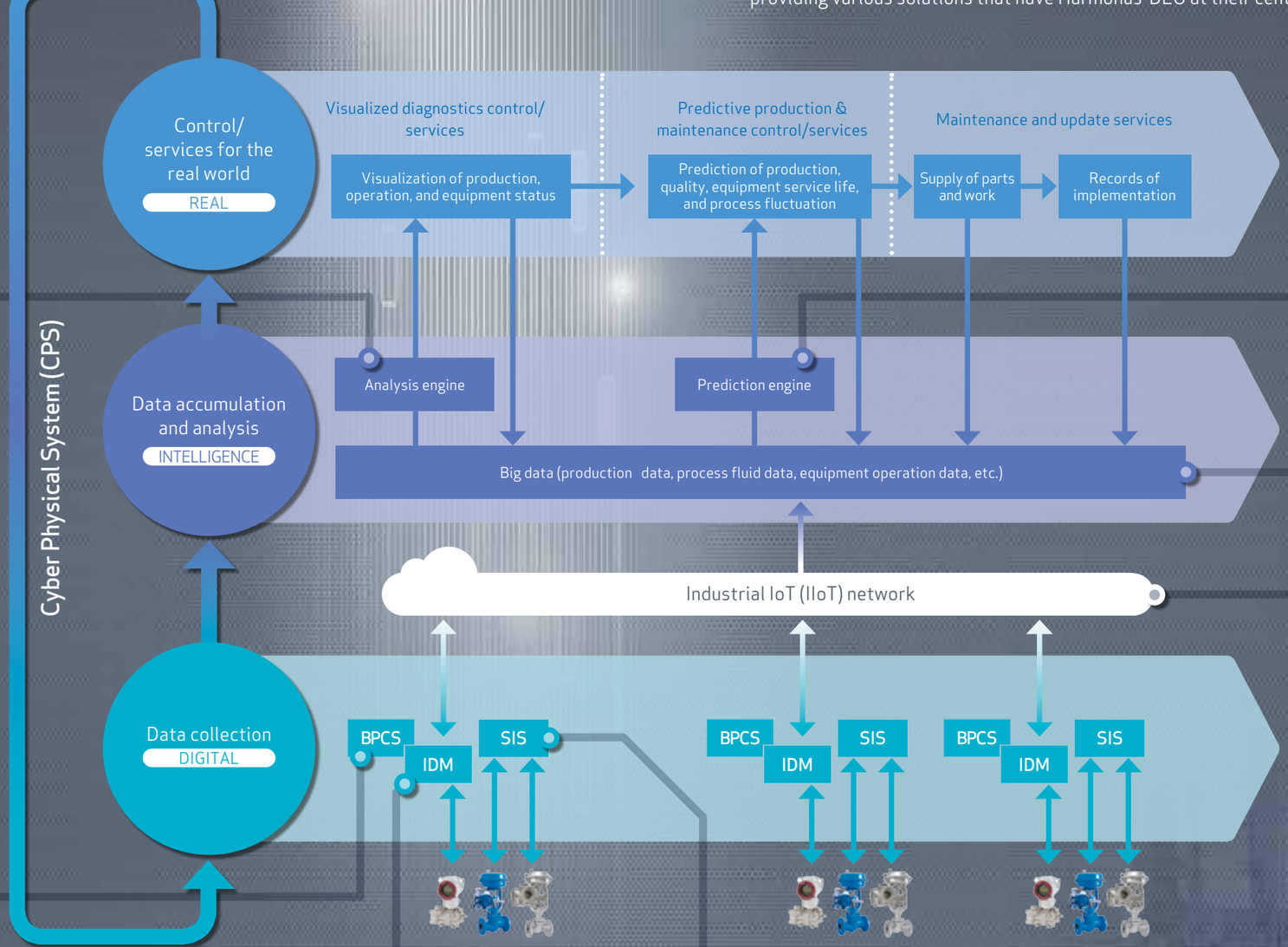
Operation Support System

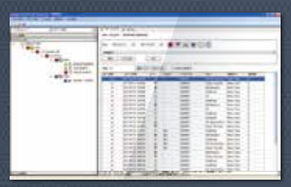
Knowledge Power™

Facilitates stable operation by automating and standardizing the application of operational know-how, such as operating procedures for non-steady states, and monitoring as performed from the viewpoint and using the techniques of experienced operators.

Harmonized Automation System

Harmonas-DEO





Device Management System

InnovativeField Organizer™

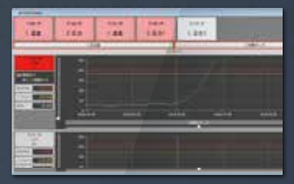
Constantly monitors the condition of field equipment and brings to light the symptoms of potential equipment failure. Facilitates safe, stable plant operation and greater efficiency in maintenance work.

HIMA SIS

BPCS : Basic process control system
SIS : Safety instrumented system
IDM : Intelligent device management

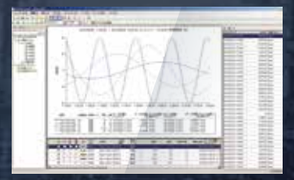
Malfunction prediction system based on analysis of big data from processes

This system provides comprehensive and constant monitoring of all types of device throughout the entire plant, and uses big data to predict equipment malfunctions. By giving operators early notification of problems, the system contributes to safe and stable plant operation.



Advanced Critical Trend Monitoring for Safety

Makes monitoring more effective by predicting and displaying future changes in important process variables that can lead to serious accidents. To keep the plant safe, an early warning alarm system is activated if any trend is predicted to reach a critical management value.



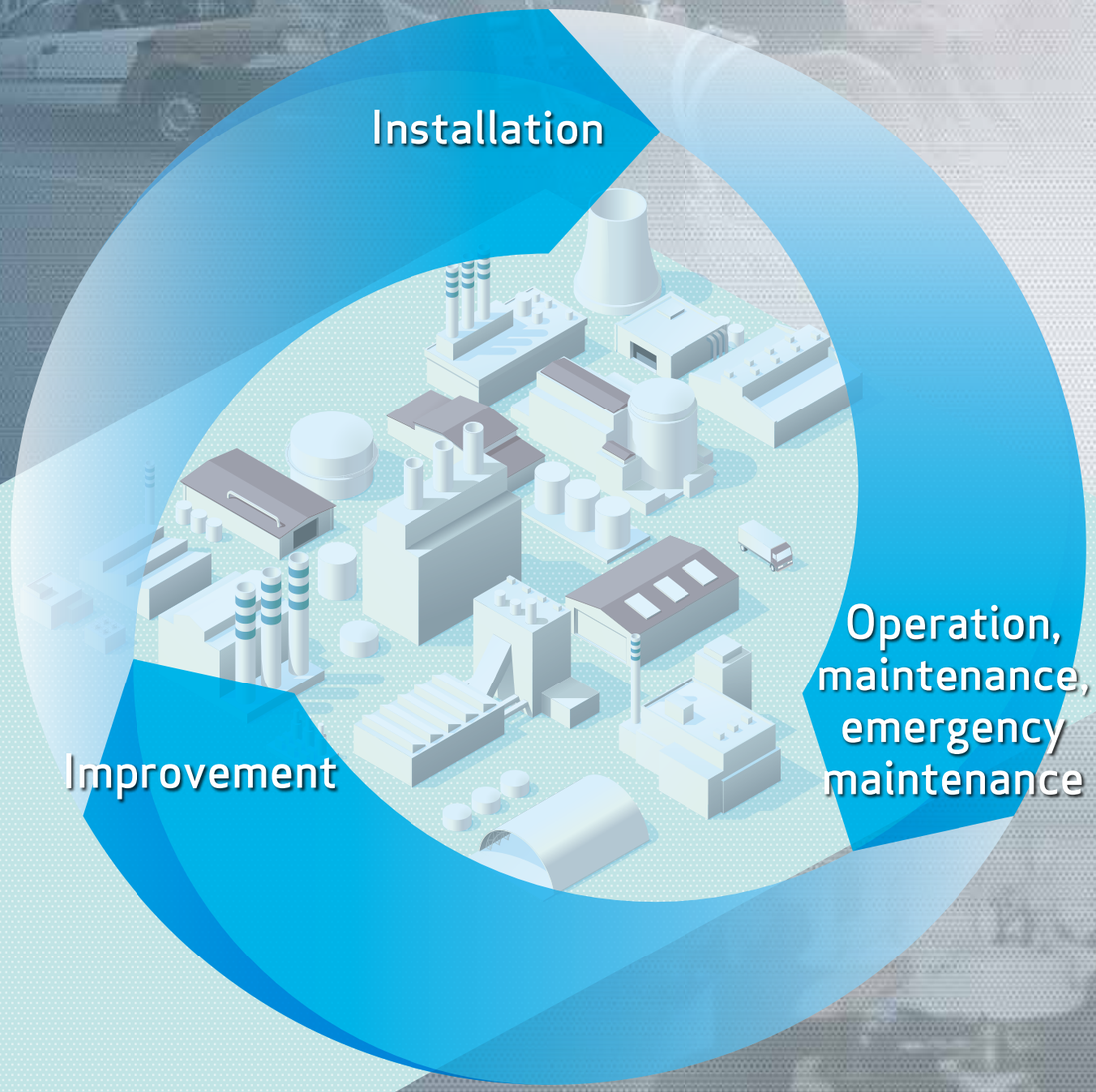
Integrated plant information management system

ePREXION™

This is a database platform supporting the management of data-driven plant operation in the age of IoT. The system supports the utilization of big data through the collection and integrated management of data from various DCS and PLC systems.

LIFE CYCLE SUPPORT

In response to various customer needs, we offer a wide range of services for different stages of the product life cycle, from implementation and operation through to eventual decommissioning.



Implementation Support

New installation work/restructuring work
From design through to the start of operation, we perform installation of new equipment or restructuring of existing equipment with thorough safety and quality management,using an integrated organizational structure that includes cooperating companies.

Environment improvement work
We perform environment improvement work based on the results of a diagnosis of the installation environment that surrounds the system's equipment.

Instrumentation engineering support
Our engineers carry out your required instrumentation engineering, preparing detailed control programs, custom applications, and graphics.

Test operation support
Our highly experienced technicians support the smooth start-up of your instrumentation system.

Instrument panel room design service
Based on ISO 11064, the flow of people's movements, monitor and operation desk layouts, and desk designs for easy operation, etc., we offer design of an instrument panel room space that is easy to work in.

Operation and Maintenance Support

Maintenance data book
On delivery, we include a data book giving all the information necessary for maintaining and updating the system.
In addition to our contact details for support and information on the composition of the system, etc., this data book also contains inspection histories and version update histories, and is utilized in the maintenance plan.

Periodic inspections
In order to prevent problems from occurring, system and equipment inspections and adjustments are implemented to maintain or restore system reliability.

Hard disk backup service
All hard disk data is stored on other media. This allows smooth recovery to be performed if a crash occurs.

No oxygen No moisture packs
These packs provide optimal storage conditions, protecting valuable replacement parts from oxygen, moisture and corrosive gases.

Virus diagnosis service
We verify the soundness of the system by searching for the presence of virus infections in applicable equipment, and propose responses and measures in the case of a virus being detected.

Emergency Maintenance Support

Service hotline
We have a free-dial emergency contact line, and can respond to urgent problems 24 hours a day, 365 days a year.

Emergency service
Technicians are dispatched upon receipt of emergency callout requests from customers. Our specialized technicians will work to repair the fault.

Parts management
We store the necessary replacement parts instead of the customer, our high-level quality control ensuring that we are always prepared for emergencies.

Improvement Support

Event analysis
Based on event information accumulated in the DCS, we organize awareness of qualitatively apprehended phenomena into a quantitative form, expose the inherent issues and propose corresponding measures for improvement.

DCS deterioration diagnosis service
In accordance with the installation environment and number of years of operation, we comprehensively examine and measure the state of deterioration of the system, and propose the best maintenance plan for maintaining its reliability and extending its life.

Installation environment diagnosis service
We measure and assess six environmental factors pertaining to the installation environment, determining the effects on the system and proposing corresponding measures. We then apply these results to the future long-term maintenance plan and propose an effective maintenance regime.