K5D

**Real-time, Collaboration
Pipe Design**

August 2024

K5D Solution is a **vital real-time collaborative design platform** essential for advanced manufacturing companies in factory construction

Phase 1
2D Design

Phase 2
3D Design

Phase 3
4D Design

3D + Time + Digital Twin

Hyper Stage
Design simulation platform

Add-on

4D + Simulation AI

- AutoCAD and other 2D design programs are used to represent the height and area of parts and structures using lines, boxes, circles, etc.
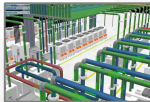- Drawings are created according to the rules of orthographic or isometric projection for architectural, mechanical, and other designs

- Using K5D, Revit, SolidWorks, Inventor, and others to create structures in solid form
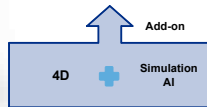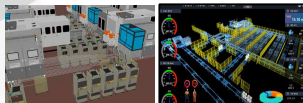- Shortening design lead times and utilizing data post-design for digital twins, PLM, and other applications

- Going beyond 3D design application, integrating processes to introduce cutting-edge 3D design techniques on-site
- Utilizing BIM for buildings, factories, and construction to advance towards digital twins

- Adding 4D + simulation / AI capabilities to provide more accurate design support
- Electronic representation of architecture and facilities
- Providing foundational databases for metaverse factories through facility simulation

02 K5D

Optimal for large-scale, high-capacity 3D-based piping design in factories, power plants, shipbuilding/ships, petrochemicals, etc. (automatic customized design for architecture, equipment, components, fire protection, etc.). Supports customer-centric customization with a domestic BIM solution

Automatic 2D / 3D conversion design
Cross-check functionality through simultaneous collaborative design

Providing design convenience with 6-directional view support (Front, Side (L/R), Top, Back, Bottom) for both 2D and 3D designs
Output of electronic drawings with scale and non-scale options (ISO drawings)
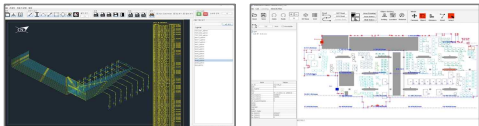
2D / 3D autonomous conversion
Cross-check support through
simultaneous collaborative design
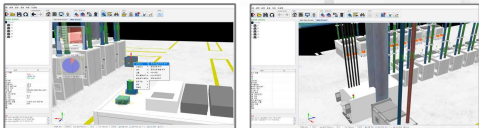
Shortening project timelines with proprietary PTP (Point To Point) inflection point method for automatic design

Convenient design and layout through inflection point (Point) coordinate settings
Custom insertion and connection by selecting equipment, materials, and components
Automatic checking of clearance, interference, and collision between objects
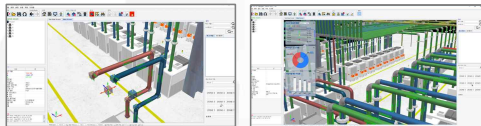
Automatic component insertion support
Component scale-up support

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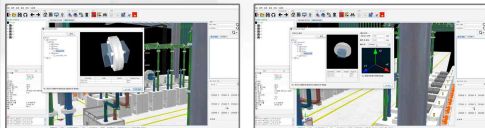
## Procedures For Building a BIM-based Digital Twin Factory Database

Real-time simultaneous access for 200+ users
Rendering support for 300GB+
BIM importer support for 100GB+ large-scale and high-capacity

Providing a comprehensive big data database including full sets, piping diagrams (relationship diagrams), quantities, BOM, costs, schedules, areas, volumes, etc.
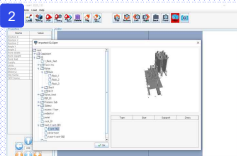
Embedded algorithms for load balancing, dispatching, authorization, and space (zone) management

• Support for BIM data compatibility and direct importing
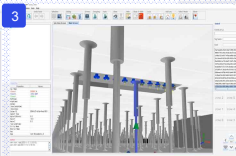• Programmatic workflow for projects, designers, importers, viewers, and simulators
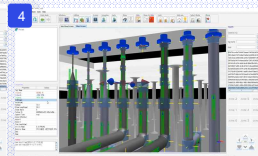
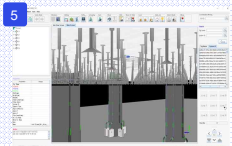**Building a BIM-based digital twin factory**
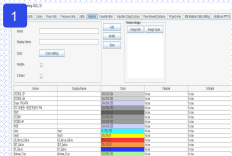
1 5D project setup
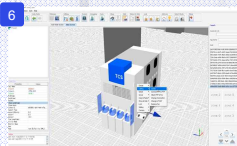
2 Creating/registering equipment library
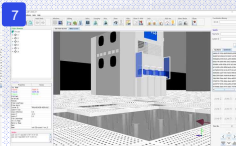
3 Importing BIM data

4 Simultaneous access collaborative design modeling

5 Registering and arranging architectural and facility information

6 Registering and arranging production equipment baseline information

7

8 Managing process BOM calculation systems and issuing construction drawings

Providing a robust dashboard for real-time collaborative design status. Visualization of real-time schedules, plans, workloads, statuses, histories, and statistics of design workers, along with data interface API

Mini status conversion
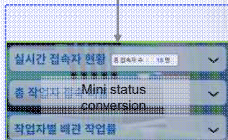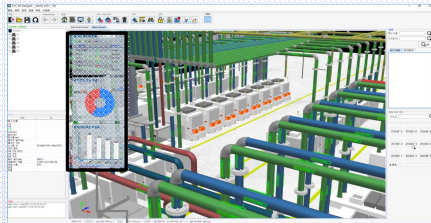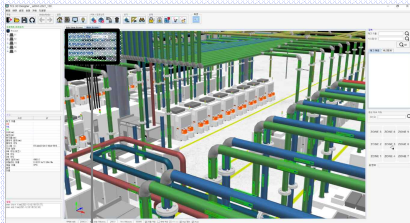
Real-time user status

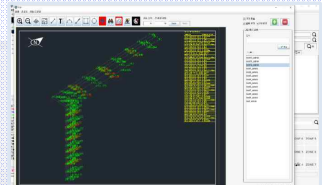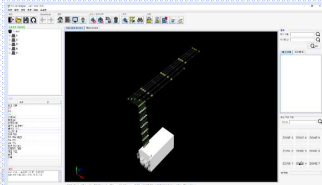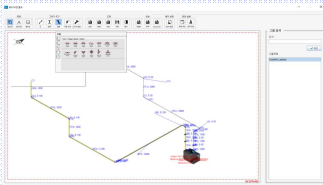Real-time connection ratio

Real-time design progress rate

K5D Drawing

Supporting automatic ISO drawing output functionality

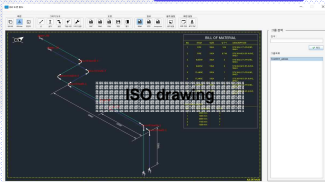Scale / Non-Scale Auto Drawing

Supporting AutoCAD API integration

K5D drawing processing

K5D shape drawing output

AutoCAD output

K5D ISO Drawing

AutoCAD drawing output

ISO drawing
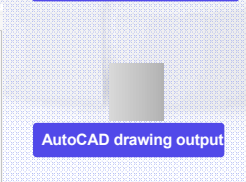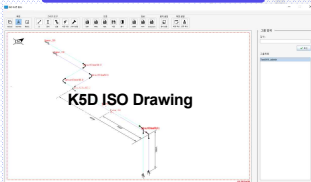
K5D Functions

- BIM-based design, shape, and attribute data
- Automatic batch input of all files
- (Using GPU parallel processing)
- (Supporting high-speed processing of large volumes)

Building a BIM data database for (Automatic quantity calculation, Object search, Favorites, Issue marking, Collaborative discussion)

Providing technical support for user-based operation through Open API support. Real-time integration with legacy system data

- Supporting on-site consistency with a mobile platform
- VR / AR service support

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07 K5D
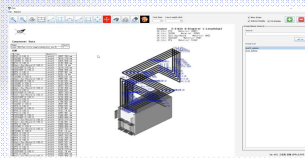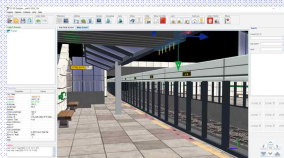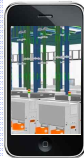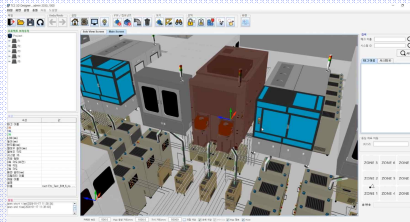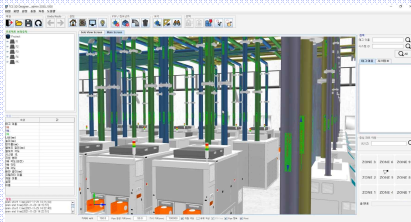
K5D Features

Items	K5D Core technology	K5D Features
Real-time & collaborative 3D engine	- Application of industrial, specialized, and large-capacity processing technologies	Developed in-house to meet demand conditions and customer needs
Real-time digital collaboration	- Support for simultaneous collaboration with over 200 users - Real-time synchronization, redo/undo support	Reducing space, time, and cost through collaborative system Early detection and correction of mutual design errors
User interface	- Perfect compatibility with domestic design environments using domestic solutions - Provides intuitive and visual convenience	Supporting automatic design functionality Automation support for integration with external data (Excel, drawings, text)
Visualization / Visibility	- Real-time dashboard support - Support for object information in design targets - Visualization of design errors and interlock support	Supporting various interlock features to enable even beginners can design
User/Admin functionality & history tracking management	- User/administrator, schedule, workload, assigned areas, permissions, security, and history management	Data management for activities based on user/administrator roles
Scalability	- Building digital twins - Establishing metaverse - Building XR / AR immersive education/training systems - Integration of period systems (MES, ERP, FMS, etc.) - ICT convergence	Assetization / Systemization of enterprises
The number of rendering objects	Processing over ten million objects (importer, rendering)	Handling large-scale factory projects
Pricing and maintenance	- More than 30% cheaper than foreign-developed solutions with domestically developed software - Swift response and customized support from a domestic developer	Considering domestic environment and cost-effectiveness, support for customized development and supply

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Expected benefits and expansion of K5D

Optimal essential digital twin construction tool for ensuring successful project execution and high-quality business outcomes → **Metaverse Factory**

Integrated tool focusing on digital twin and metaverse construction for enterprises

K5D

Expected benefits
Time and cost savings in design
Prevention of design errors
Real-time performance management
Enhanced quality management

Scalability
ICT-integrated 3D monitoring
Integration of MES / ERP with 3D information asset management
Simulation based on digital twin
Building an education and training system based on the metaverse

Top Core System Co., Ltd. Solution Videos

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