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Smart Sewer System 智能下水道系统 (Monitoring & Control)

下水管流量控制韩国占有率第一
打入美国辛辛那提等国际市场!!!



01 公司简介

HOPE
DREAM
FUTURE

融合IT公司是融合性IT的知名品牌。
用无人具备的诚信，正直，远大，
温暖而融合的我们的名牌解决方案与您一起发展



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创造未来的企业，
是韩国融合
IT公司

融合性IT的知名品牌

HOPE
DREAM
FUTURE

GLOBAL
INNOVATION
VISION

韩国顶级水务IT专业企业

- 上下水道领域的 测控技术以及基于GIS的大数据分析技术 领先于其他同类公司
- 通过持续研发 取得多项专利及性能认证
- 凭借积累的测控技术 有效管理城市设施 着眼于安全，努力推广IoT



GLOBAL
INNOVATION VISION

National R&D project and domestic installation

Yongin, Yeosu, Gwangmyeong, Namyangju, Osan, Pyeongtaek, Anyang, Wonju, Sokcho, Inje, Haman, Jinju, Changnyeong, Busan, Gwangju, Yeosu, LH corporation, Korea Rural community Corporation and more

Company History

- 2009 Established Korea Convergence IT(KCIT)
- 2015 Acquired Korea Information & Comm. Contactor Certification
- 2016 Acquired Korea Excellent Performance Certification
- 2016 Awarded sewer system & sewerage policy advisor contract
- 2017 Selected for Yongin city-supported project
- 2017 Received Award for Ministry of SMEs and Startups
- 2017 Participated in Eco-smart water R&D project 2-5 detailed R&D tasks were selected "Development of Membrane Filtering Intelligence Process Control and Real-time Performance Diagnosis, Analysis, Prediction Solution"
- 2017 Acquired Korea Electrical Contractor Certification
- 2017 Acquired GS Certification
- 2017 Awarded The Best Value Certificate by Gyeonggi Province
- 2018 Awarded Ministry of Science and ICT-supported commercialization project "Sewer Control System Based on Artificial Intelligence and IoT"
- 2018 Received "Hit-Product" Award given by a local newspaper
- 2018~2019 Awarded an "Overseas Market Development Project"
- 2019 Awarded an "Export Voucher Support Project"
- 2019 Awarded Ministry of Environment-supported International Collaboration for Localization Project "Localization of Cincinnati CSOs control"
- 2019 Won Best Award in the Regional SW Industry Development Contest
- 2019 Awarded for "Green Certification, MOE, KOREA"
- 2019 Awarded for "The best procurement"

HISTORY

- Patent(No.10-1050707) Initial rainfall control system using hydraulic gate
- Patent(No.10-1253532) Sewer monitoring and control system
- Patent(No.10-1985353) Measuring data analysis and control system based on emulator
- Patent(No.10-1994814) Operating reverse control system for seawater and river water in sewage tubes in coastal cities and low-rise areas
- Patent(No.10-2006226) System for measurement and control of sewage facilities using portal public data
- Copyright(C-2018-038438) Intelligent sewage control system
- Copyright(C-2018-038374) Sewage control monitoring system
- Copyright(C-2018-036336) Virtual data insertion emulator
- GOOD SOFTWARE(No.17-0479) Integrated control system for sewage facilities v1.0
- Performance certification(No.15-1414) Control of sewage ventilation using hydraulic water gate
- Green certification(GT-19-00768) Control of sewage technology using hydraulic water gate
- The best procurement(2019001-01) process control panel, KCIT-H, KCIT-V "Best Procurement product" was acquired from Korea Public Procurement Service



主要业务

MAIN BUSINESS

韩国融合IT提供新模式融合IT解决方案。

以诚信，正直，远大，
温暖来创造未来的企业。
韩国融合IT公司。



环境 (下水)

下水管道控制系统
污水处理厂的整合管理系统
下水管道的管理及监控系统
多功能管理系统
简易公共污水处理设施
非典污染减低设施
水质远程监视系统 (TMS)
水闸
流量计及水质测量仪器
开发处工艺及流通相关器材
信息通信及电器施工

环境 (上水)

净水厂及排水池整合管理体系
上水管网管理体系
水质远程监视系统 (TMS)
流量计及水质测量仪器
开发处理工艺及相关器材的流通
信息通信及电器施工

环境 (雨水)

保持水泵站的最佳运营体系
存储雨水渗透设施
降低污染设施
雨水二次利用 (再利用) 工艺
及优化运转
基于GIS的渗透位置地图制作
信息通信及电器施工



主要业务

环境 (河流)

河流的整合管理系统
河流水质远程监视 (TMS)
河流模型分析系统
水位计, 流速计, 水质测量仪器
信息通信及电器施工



环境 (能源)

太阳能发电系统
风力发电系统
电厂控制系统
焚烧炉管理系统
信息通信及电器施工



SI 及咨询

系统的策划、构建、维护、管理
大容量数据库的策划及构建
性能的分析及优化
构建安全防护解决方案
※ 为您代为开发系统
为您提供系统维护及构建大容量DB 方面的咨询

预防灾害

洪水预测及预警报
制作、分析灾害地图
诊断地区安全度
分析灾害状况
管理灾害危险地区
用各种传感器进行远程监控
信息通信及电器施工



建筑

智能管理大厦系统
工厂自动化系统
景观照明
智能家居服务
信息通信及电器施工



防范

CCTV 管制系统
儿童安心体系
信息通信及电器施工



教育

开发教育内容
IPTV,
智能手机平台制作



器材流通

电子流量计
超声波流量计
水质测量仪器
上水管
下水管
照明仪器
路灯柱



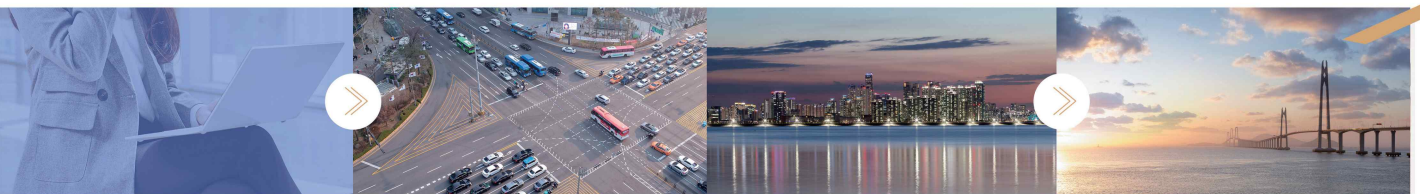
观光·娱乐

度假村的整合管理系统
自行车租赁体系
高尔夫场的管理体系
宣传管理体系
kiosk 制作
信息通信及电器施工
宣传 e-手册的制作



交通

构建整合管制中心
桥梁管理
隧道管理
路灯及信号灯的控制中心
信息通信及电器施工



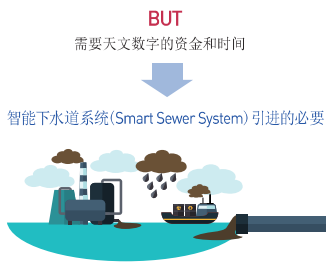
下水道重要事项

- 下水道老化
- 来历不明的水流入处理厂
- 施工缺陷或误接 (生活污水 雨水管, 雨水 污水管)
- 埋在地下难以确认问题
- 公路或河流边维护管理困难



为了完美解决问题?

1. 充分新设或者增设排水设施
2. 用大量人力和设备不断维护管理



Smart sewer system 概要

实时监测埋在地下的下水道, 掌握问题所在, 智能控制过多雨水流入处理厂或污染物流向河流的系统。



利用能够解决环境与污染问题的 IoT 人工智能控制技法的开发

I. 人工智能监视

监视来历不明的污水流入、管道破损、通水能力减退等现象

II. 人工智能控制

智能控制雨水及污染物

概要



“通过埋设在全城地下的蜘蛛网状下水管网内, 智能设置并传输水位、流量、水质等相关数据, 迅速准确地监测来历不明的水流入、漏水、老化、低洼城市中心的浸水危险因素, 并提出应对方案。”



安装传统传感器的困难事项

• 固定式 流量表 低效率

引入电力 | 现场控制箱 | 转换器 | 传感器

现场控制箱 (妨碍通行, 触电危险, 影响美观)

• 移动式 流量表 不便

操作人进入窰井连接笔记本电脑进行下载

智能的传输装置(iSoulik)

窰井内无线通信的传输装置 → 无需控制箱和埋设施工

18cm | 有线 | 电池

水位传感器 | 流速传感器

测定水位 | 多点传感器安装法

- 以电池为基础(可连接外部电源)
- 2G, 3G, LTE, LoRaWAN, Bluetooth
- 防水等级 IP68
- 最多可连接 4个传感器
- 水位
- 流速
- 水质等

改进监测方法

· 此前

基层测量监视问题发生地点的局限性
发生问题时，很难确认是哪一条线出了问题

重点放在分析不明进水(Infiltration/Inflow)

· 改进后

通过细致的测量，能迅速确认有问题的地区
以Smart的测量方式能降低构建成本

焦点放在迅速准确地发现问题

测量的准确性

· 此前

统一选择错误的计量仪器引发许多问题
不准确的测量和过度维护，引发故障

沙土及沉积物很多的情况
传感器安装在大型土质泥底
传感器位置、传感器安装方式
传感器类型及附件、安装位置、
传感器上安装传感器的数量、
温度传感器位置、
传感器多且复杂、
传感器安装在
传感器及固定座的
污染和破坏、
窰井淤积

· 改进后

选定测量仪符合管井状况和测量目的
构成应适合准确度和维护管理

接触流量表 (接触度高)
非接触流量表 (便于维护)

测定水位 (低值高测法)
CSO 测定 (多点测定)

云基础体系结构

· 此前

许多服务器、网络设备、Database ...
没有标准化的平台，分别构建

按处理分类项目种类，重复引进高价的设备(服务器、DATABASE、运营体系)、数据调查方式、长度、大数据分析代码体系等的标准不完善，不利于系统互连，大数据分析困难，且由于软件彼此不同，导致操作很困难。

· 改进后

高价购买装备，实现维护管理最优化
通过标准化平台，可以进行大数据的积累及分析

云(Cloud)：电话网络好像云一样的东西弥漫，看不见里面，普通用户无需了解内部情况，但在任何地方把手伸进云里去做自己想做的事情。在有网络连接的任何地方，都能保障享有同样的体验。

S/W based on Big-Data

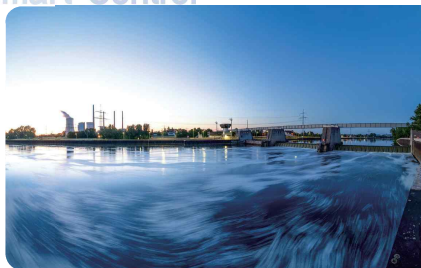
门户网站 Map 基础平台

用户应用程序

迅速性 - 迅速了解及预测问题的发生
便利性 - 方便操作人使用
有用性 - 通过大数据分析创造价值
经济性 - 有效执行，节约预算

管网及设备管理
收集 / 监测 / 过滤 / 趋势分析
渗入水/外部进水/漏分析
构建计算机模型-建模、决策

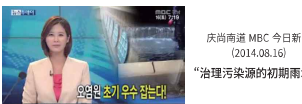
Smart Control



根据降雨量综合判断管道内流量、水质，从而开闭水闸。
根据污染负荷量来调节流入污水处理厂或排放至河流，从而提高污水处理厂的效率，保护水质。

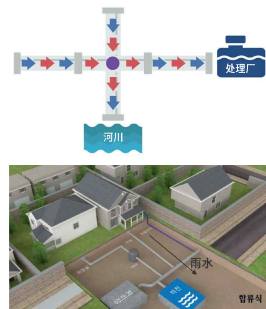


“用IT技术解决近期下水道排水方式的难题”



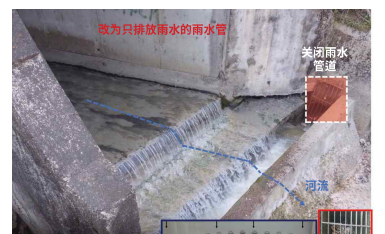
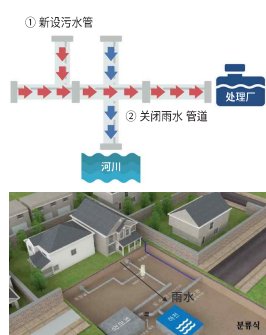
- Patent(No.10-1050707) : Initial rainfall control system using hydraulic gate
- Patent(No.10-1253532) : Sewer monitoring and control system
- Patent(No.10-1985353) : Measuring data analysis and control system based on emulator
- Performance certification(No.15-1414) : Control of sewage ventilation using hydraulic water gate
- GOOD SOFTWARE(No.17-0479) : Integrated control system for sewage facilities v1.0
- The best procurement(2019001-01) Process control panel, KCIT-H, KCIT-V

合流式排污方式及土丘现况



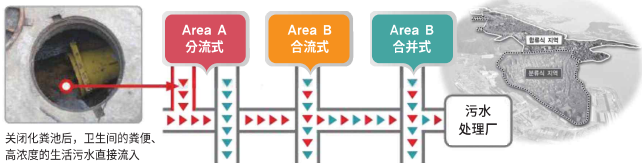
- 生活污水和雨水同时流入处理厂
- 降雨初期时，污染物通过雨水管道流入处理厂
- ▶ 持续降雨时，流入处理厂的雨水过多

分流式排污方式及土丘现况

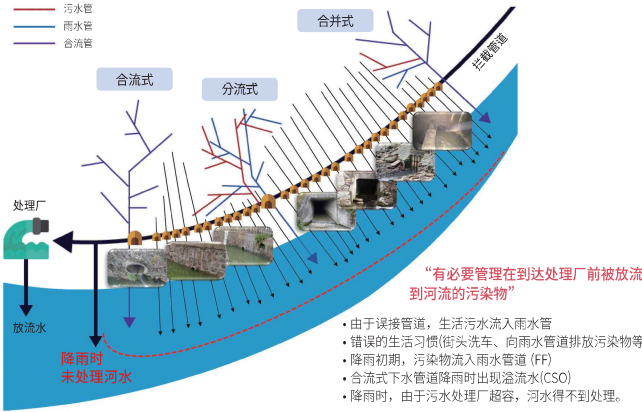


- 原则上应该只流入雨水
- 河流流入来历不明的污水和降雨初期的各种污染物
- ▶ 实施分流后，多个地区雨水管道无法关闭

合并式的关键事项



下雨时，从B地域(合流式)向管道以及处理厂内流入过多的雨水。由于处理厂容量有限，处理不了A地域(分流式)的高浓度污水。
▶ 投资较大的分流式下水管道工程效果低下



现有对策的问题点



无动力闸	电动式闸	空压式闸
<ul style="list-style-type: none"> · 动力弱，很难应付异物 · 很难根据情况调节流入量 · 无法远程监视：如发生故障，长期被闲置 	<ul style="list-style-type: none"> · 发动机位于闸门上端 · 需要比洪水位高的构筑物(8米以上) · 不适合设置管井与土丘 	<ul style="list-style-type: none"> · 薄弱的动力很难承受水压 · 闸门上没有动作传感器 · 控制箱和闸门的间隙有限



基本原理

来历不明的污·废水及降雨初期流入的污染物

分流式 | 处理厂流入过多雨水 | 合流式 | 降雨时分流式的效果减半 | 合并式

雨水管的生活污水及初期雨水污染物流入时，有什么方法能防止像合流式这种流入河的现象？
(分流式)此时打开雨水管道

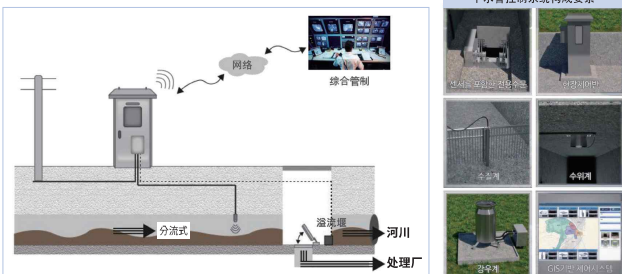
降雨时有什么防止像分流式一样雨水流入污水处理厂的方法？
(合流式+合并式)此时关闭雨水管道

用基于 IT 的解决方案解决上述问题

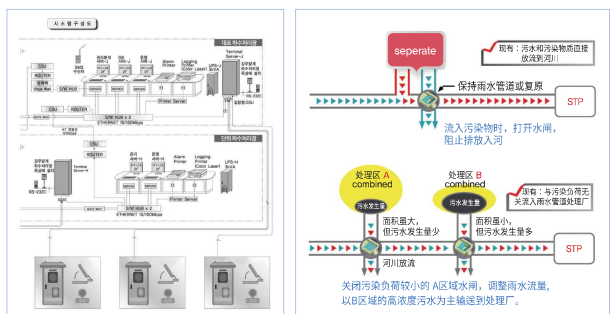
污染负荷大时，流入处理厂 | 污染负荷不大时，阻止流入处理厂

水闸 Open | 水闸 Close

系统构成要素



系统构成图 / 系统适用(例)



优点

强大的动力及动作传感器 ▶ 彻底克服各种异物及水压的妨碍因素

强大的动力及动作传感器 ▶ 彻底克服各种异物及水压的妨碍因素

韩国融合IT | TEST REPORT | KTR

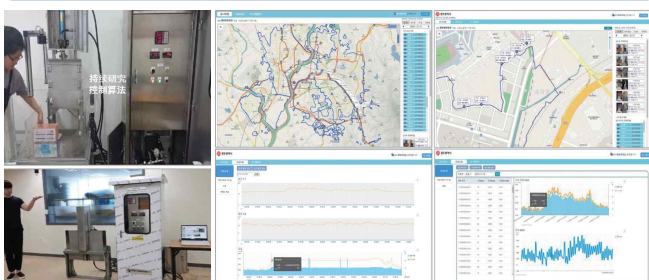
缝漏测试 | 载重测试 | 抗水性测试 | 耐久性测试

优点

现场定制型 3D设计&制作



优秀的算法及软件



引进现况 - approximately 150+

Area	Year	Site
- Jinju City Leehyun/Shinan Sewer maintenance work (1st)	2010	6
- Changnyeong city Bugok Sewer network control system	2012	3
- Jinju City Sewer BTL (2nd)	2012	1
- Haman City Gaya2nd Sewer maintenance work	2013	5
- Namyangju City Sampae-Gawun construction of driven duct (1st)	2013	2
- Namyangju City Dojeown Hyundai APT build up (2nd)	2014	1
- Changnyeong City Nanji STP-Sewer network control system (2nd)	2014	4
- Wonju City Taejang region sewer maintenance work	2014	6
- Gwangmyeong City Ahnyang stream collecting tube maintenance work (1st)	2015	5
- Yongin City BTL-sewer network control system (1st)	2015	8
- Jinju City Sewer BTL (3rd)	2015	41
- Yeosu City Sewer network control system (1st)	2015	1
- Yongin City Moheyon driven duct construction-sewer network control system (2nd)	2016	5
- Yeosu City Sewer network control system (2nd)	2016	7
- Busan City Non-point pollution reduction project (1st)	2016	1
- Osan City Sewer network control system	2016	2
- Busan City Non-point pollution reduction project (2nd)	2017	6
- Yeosu City Gananm town sewer pipe improvement work (3rd)	2017	7
- Gwangmyeong City Kia stream sewer network control system (2nd)	2017	2
- Yongin city Sujji region construction-sewer network control system (3rd)	2017	3
- Sokcho city 3 pump station control gate	2017	1
- Sokcho city 1 pump station control gate	2017	1
- Gwangju City STP Energy self-sustaining project (Instrumentation and control)	2018	5
- pyeongtaek City Watergate Control System for the Rainfall(1st)	2018	4
- Yongin City construction-sewer network control system (4th)	2018	5
- Ahnyang, Hagui stream collecting tube maintenance work	2019	5
- Pyeongtaek City Watergate Control System for the Rainfall(2nd)	2019	13
- Yongin gate control facility installation_ Sewer network control system (5th)	2019	4
- 幸辛那提 CSOs(合流式溢出水) 控制当地化	2019	1
total		155

- ▶ 对处理效率无异议
- ▶ 无需另设安装场地
- ▶ 利用尖端IT 便于远程监视和控制的维护管理,成本低廉
- ▶ 通过管网的体系化管理以及数据积累 计算出分析数据

再次购买率高
已扩散至韩国
各地市
并进军海外

窨井内可实现无线通信(3G, LTE, LoRa) - KC认证产品

"为远程数据收集提供模块型和灵活性的产业物联网(IoT)装置"



产品目录



iSoulik 使用电池、太阳能或商用电力, 是会自动连接其他公司传感器, 在同类产品中具有最高可靠性的强大装置, 其测定的感应数据可被云服务器以及/或专用服务器收集和传输。通过基于网络的图像数据管理系统(StreamView), 可实现数据的监视和控制, 且能和SCADA以及其他公司的软件、模型通用。

- 低成本: 无电力、通信等临时设备
低电池内置型, 低频率运行&维护管理, 云服务器储存数据
- 改进便利性: 提供多种通信方式
一体型装置 (便于安装、管理)
可远程计算数据收集周期, 内置电池电量预测算法
基于网络的监控系统, 自动感应及使用其他公司传感器
- 高效: 准确的数据收集 (可在下水管的超近处安装)
最多可同时识别4个传感器



Specifications

Data & Software <ul style="list-style-type: none"> Data Hosting Cyber-Security Software Integration SCADA Integration KCIT IoT Platform Software KCIT Go Mobile App Data Export Options Device Memory Data Communication Alarm Threshold Notification Alert System Health Check 	<ul style="list-style-type: none"> Secure Cloud or On-Premises TLS 1.2 Protocol REST API CSV, DNP3, OPC-UA, FTP Web-based from desktop, tablet, and/mobile iOS, Android CSV 8 GB Two-way Up to 4 per data stream SMS, email, voice Included 	Connectivity <ul style="list-style-type: none"> Communication Interface SIM Card(s) Cellular Roaming <ul style="list-style-type: none"> Configuration & Upgrads Data Transmission Antenna Built-In GPS 	<ul style="list-style-type: none"> Cellular(4G/3G/2G), LoRaWAN, Bluetooth Dual SIM slots Multi-network global SIM(s); data plan included supporting 140+ countries Remotely (over-the-air), USB PC connection Periodic, date-dependent External antenna support with backup internal antenna Included
Power <ul style="list-style-type: none"> Primary Power Supply Internal Battery Capacity Operational Run Time Battery Status/Notifications External Power Voltage Input 	<ul style="list-style-type: none"> Internal Lithium Battery(field-replaceable and non-rechargeable), 3.9 V DC 3A 32Ah Up to 5+ Years* Included Solar and line power: automatic power source switching 5-28VDC 	Mechanical Enclosure** <ul style="list-style-type: none"> LED Indicator Dimensions(WxHxD) Weight Enclosure Material Ingress Protection Operating Temperature Storage Temperature 	<ul style="list-style-type: none"> Included 13.2 cm x 16.5 cm x 7.3 cm (5.2 in. x 6.5 in. x 2.9 in.) 0.9 kg (2.0 lbs) Polycarbonate (UL 94V-0 and UV-resistant) IP 68 / NEMA 6P -40°C to 80°C (-40°F to 176°F) -40°C to 80°C (-40°F to 176°F)
Intrinsic Safety (optional) <ul style="list-style-type: none"> Approvals External Power 	<ul style="list-style-type: none"> USA/Canada Class I Div 1 Zone 0 ATEX Zone 0 IECEx 5-12VDC, 1.65 to 2.2A current limited 	Sensor Integration <ul style="list-style-type: none"> Sensor Ports Sensor Position Serial Interfaces Serial Protocols Serial Channels Analog Channels Discrete Channels 	<ul style="list-style-type: none"> 2 ports; supports up to 4 sensors using cable splitters External Hard-Wired RS485, RS232, SDI-12 Modbus RTU, ASCII, custom Up to 16 Up to 4 (4-20 mA, 0-27.5 V) Dry contact, open collector Up to 3 total inputs(up to 2 pulse counting) 32Hz max pulse frequency up to 1 output, max 2.8V 350mA, 12V

Measurement parameters and components

Measurement List <ul style="list-style-type: none"> Physical: Current, Door Position, Flow, Humidity, Incline, Level, Precipitation, Pressure, Soil Moisture, Solar Insolation, Temperature, Vibration, Wind Speed Chemical: Conductivity, Dissolved Oxygen (DO), Hydrogen Sulfide(H2S), ORP, Particulate Matter(PM), pH, Salinity, Total Suspended Solids (TSS) 	Configuration <ul style="list-style-type: none"> Power: Internal battery, External battery, Solar panel assembly, Line power Communication: Cellular(4G/3G/2G), LoRaWAN(optional), Bluetooth Server: Cloud, On-premises, Hybrid Antenna: External, Internal(backup) 	Dashboard <ul style="list-style-type: none"> StreamView data hub: Desktop, Tablet, Mobile SCADA: CSV / DNP3 / OPC-UA API: REST
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Level Sensor – Distance, Level, Volume



Performance	
• Operating Range	0.30 – 7.62m
• Beam Pattern	9° off axis
• Internal Temperature Compensation	
• Frequency	69kHz
• Accuracy	±0.25% of detected range
• Resolution	0.1 in. (2.5 mm)
• System Health Check	Programmable

Programming		Electrical	
• Interface with RS-485	Windows compatible software can be provided to adjust the internal parameters	• Supply Voltage	8-24 VDC
• Modbus RTU		• Total Current Draw	22 mA
• User selected units of measure		• Wiring Connection	4-conductor twisted-pair cable 4-pin micro-connector
Connectivity		Physical	
• Output	Modbus RTU(RS-485)	• blend upper housing	PC/PBT
		• Transducer Type	Ceramic, PVDF faced
Environmental			
• Ratings	NEMA 6P		
• Operating Temp	-30°~140°F (-34°~ 60°C)		

Velocity Sensor – Radar



Physical	
• Sensor body dimensions	Diameter 90mm x height 140mm (3.54in x 5.51in)
• Sensor body weight	Nominal 1kg (2.2lbs)
• Sensor body material	Valox 357
• Transducer cable extensions	2-core screened
• Maximum separation	Up to 1000m (3280ft)
• Mounting connection	Via 1" BSP back mounted thread or 20mm via supplied adaptor
	Optional mounting bracket is available from Pulsar
• Mounting angle	45° optimum and mounted at the center line of the channel with a clear uninterrupted view

Performance		Environmental	
• Velocity range	0.2-6m/(0.66-19.7 ft/s)	• Enclosure protection	IP68
• Operational range	Up to 3m height	• Max. and min. temperature (electronics)	-20°C to +60°C (-4°F to +140°F)
• Accuracy	The greater of 1.5% or 0.05m/s(0.16ft/s)		
• Optimum installation	Install at an angle of 45° in line with the flow. More information is provided within the manual-see the 'Locating the Micro-Flow-1 sensor' section 1.5m(4.92ft)	Programming	
• Max. channel width per sensor	K-Band(EM)	• PC programming	Micro-Flow+ HART PC
• Radar	20' inclusive	• Programming security	Via passcode
• Transmitter power	<15 dBm	• Programmed data integrity	Via non-volatile memory
• Beam width	20' inclusive	• PC setup and monitoring software	Compatible with Windows 7/8/10
• Wake-up time	Typically 4 seconds (warm-12 hours from last start-up)	Supply	
		• Operating voltage	10 – 28Vdc
		• Power consumption	Start-up = 20mA, Average current = 60 µA per hour when measurement of velocity is performed every 15 minutes
Approvals		Outputs	
• CE & radar approvals	Listed in the Certificate of Conformity within the manual	• Communication	HART compatible, 4-20mA loop-powered
• ATEX approval	Ex II 1GD, Ex ia IIC T4 Ga, Ex ia IIC T135°C Da (Directive 2014/34/EU)		

Quality Sensor – Electrical Conductivity, Salinity



Sensor	
• Dimensions	Diameter : 27 mm ; Length : 177 mm
• Weight	300 g (sensor + cable 3 meters)
• Material	PVC, DELRIN, stainless steel
• Maximum pressure	5 bars
• Connection	9 armored connectors, polyurethane jacket, bare-wires or waterproof Fisher connector
• Protection	IP68

Technical Characteristics	
• Measure principle	Conductivity sensor with 4 electrodes(2 graphic, 2 platinum)
• Measuring ranges of conductivity	0-200.0 µS/cm 0-2000 µS/cm 0.00-20.00 mS/cm 0.0-200.0 mS/cm
• Resolution	0.01 to 1 according the range
• Accuracy	± 1 % of the full range
• Measurement range for salinity	5-60 g/Kg
• Measure range TDS-KCl	0-133 000 ppm
• Response time	< 5 s
• Working temperature	0°C to + 50°C
• Temperature compensation	NTC
• Stocking temperature	-10°C to + 60°C
• Signal interface	Modbus RS-485 (standard) and SDI-12 (option)
• Maximum refreshing time	MAX < 1 s
• Sensor power-supply	5 to 12 volts
• Electric consumption	Standby : 25µA Average RS485 (1 measure/second) : 6.3 mA Average SDI12 (1 measure/second) : 9.2 mA Current pulse : 500 mA

Quality Sensor – DO(Dissolved Oxygen)



Sensor	
• Dimensions	Diameter : 25mm ; Length : 146mm
• Weight	Stainless steel version 450g (sensor + cable 3m)
• Material	Titanium version 300g(sensor + cable 3m)
• Maximum pressure	Stainless steel 316L, New : body in Titanium
• Connection	5 bars
• Connection	9 armored connectors, polyurethane jacket, bare wires or waterproof Fisher connector
• Protection	IP68

Technical Characteristics	
• Measure Principle	Optical measure by luminescence
• Measure ranges	0.00 to 20.00 mg/L 0.00 to 20.00 ppm 0-200%
• Resolution	0.01
• Accuracy	+/- 0.1mg/L +/- 0.1 ppm +/- 1 %
• Response time	90% of the value in less than 60 seconds
• Frequency of recommended measure	>5s
• Water move	No necessary move
• Temperature compensation	Via NTC
• Stocking temperature	-10°C to + 60°C
• Signal interface	Modbus RS-485 (standard) and SDI-12 (option)
• Sensor power-supply	5 to 12 volts
• Consumption	Standby 25 µA Average RS485 (1 measure/second) : 4.4 mA Average SDI12 (1 measure/second) : 7.3 mA Current pulse : 100 mA

Quality Sensor – PH, Redox



Sensor	
• Dimensions	Diameter : 27 / 21mm ; Length : 207mm
• Weight	350g (sensor + 3 m cable)
• Material	PVC, DELRIN, special pH glass, platinum, polyamide
• Pressure	5 bars
• Cable	Coaxial armored, polyurethane, bare wire or Fisher connector
• Protection	IP68

Temperature		ORP	
• Technology	NTC	• Measure Principle	Combined electrode (Redox/reference) : Platinum tip, Ag/AgCl AGAGCL, Gelled reference. (KCl)
• Range	0,00 °C à + 50,00 °C	• Range	- 1000 to + 1000 mV
• Resolution	0,01 °C	• Accuracy	± 2 mV
• Accuracy	± 0.5 °C	• Resolution	0,1 mV
• Response time	< 5 s	pH	
• Storage temperature	0 °C to + 60 °C	• Measure Principle	Combined electrode(pH/ref) : special glass, Ag/AgCl ref. Gelled electrolyte (KCl)
• Protection	IP 68	• Range	0 - 14 pH
• Interface	Modbus RS-485 / SDI-12 (option)	• Accuracy	± 0.1 pH
• Power supply	5 to 12 volts	• Resolution	0,01 pH
• Power consumption	Standby : 25 µA Average RS485 (1 measure/second) : 3.9 mA Average SDI12 (1 measure/second) : 6.8 mA Current pulse : 500 mA		

Quality Sensor – Turbidity



Sensor	
• Dimensions	Diameter : 27 mm ; Length : 170 mm
• Weight	300g(sensor + cable 3 meters)
• Material	PVC, DELRIN, Quartz, PMMA, Polyamide
• Maximum Pressure	5 bars
• Connection	9 armored connectors, polyurethane jacket, bare-wires or waterproof Fisher connector
• Degree of protection	IP68

Measures	
• Measure principle	Diffusion IR at 90°
• Measure ranges	0 to 4000 NTU in 5 ranges: 0 - 50 NTU 0 - 200 NTU 0 - 1000 NTU 0 - 4000 NTU
• Resolution	0.01 to 1 NTU - mg/L
• Accuracy	< 5% of the reading
• Working temperature	0°C to + 50°C
• Measure of temperature	Via CTN
• Stocking temperature	-10°C to + 60°C
• Signal interface	Modbus RS-485 (standard) and SDI-12 (option)
• Maximum refreshing time	< 1 second
• Sensor power-supply	5 to 12 volts
• Electric consumption	Standby : 40 µA Average RS485 (1 measure/second) : 6.0 µA Average SDI12 (1 measure/second) : 4.2 mA Current pulse : 500 mA

Antenna – 2G/3G/4G



Mechanical	
• Color	white
• Radome Material	High Heat ABS
• Dimension(Ht. x dia)	3,3"(8,38cm) x 1,44"(3,65cm)
• Operating Temperature	- 40°C to 85°C

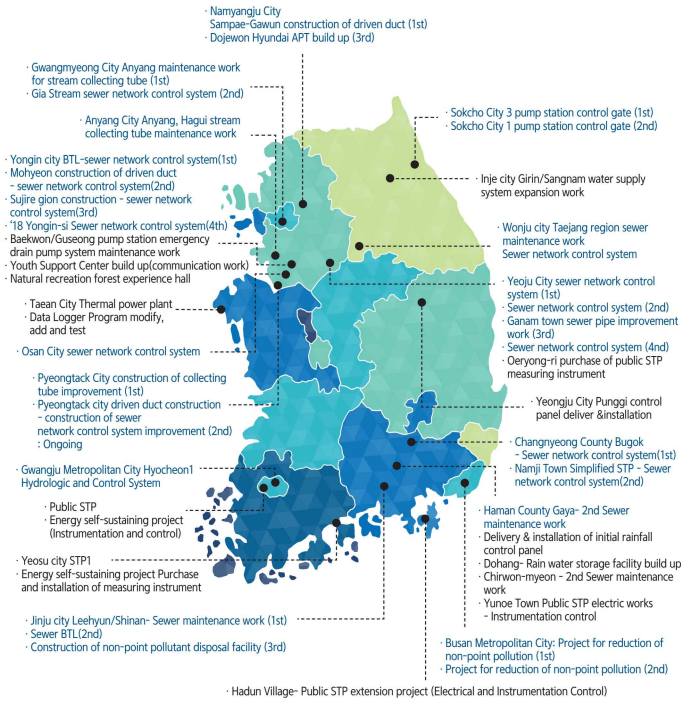
Electrical	
• Frequency Range	698-960 MHz, 1710-2700 MHz
• VSWR	698-806 MHz < 2,5 : 1,0 806-960 MHz < 2,0 : 1,0 1710-2110 MHz < 2,0 : 1,0 2110-2170 MHz < 2,5 : 1,0 2300-2700 MHz < 2,0 : 1,0
• Nominal Peak Gain	698-806 MHz 3,5 dBi 1710-1990 MHz 5,5 dBi 2100-2700 MHz 4,6 dBi
• Average Efficiency	698-806 MHz 90% (max : 95%) 1710-1990 MHz 91% (max : 95%) 2100-2700 MHz 80% (max : 86%)
• Polarization	Vertical
• Pattern	Omnidirectional
• Input Impedance	50 Ω
• Maximum Power	100 W
• Cable & Mount	MB195 (Sold Separately)
• Terminations	NMO or P-Mount w/Type N(f)

Rainfall Sensor



Specifications	
• Size	18 cm dia. x 30 cm high, (39 cm high with mounting base)
• Catchment Area	200 cm ²
• Resolution	0.1 mm per tip
• Accuracy	2% up to 25 mm/hr, 3% up to 50 mm/hr.
• Output	Magnetic reed switch (N.O.), rating 24VAC/DC 500mA
• Operating Temperature	-20 °C to + 50 °C (heated)
• Power	18 Watts for heater only
• Mounting	Clamp for 1" (1,34" dia.) iron pipe or 3 bolts on 160mm dia. circle
• Other	Leveling adjustment, thermostatic control for heater, intake screen

主要业绩



主要业绩(SI)

项目名称	签约年份	上级发包方
• 邮政事业本部智能型邮递信息系统的构建及稳定化项目	2019	I&S
• LG 电子 EBP 运营支援	2019	FC信息技术
• 现代百货店安卓 POS 系统构建	2019	韩国富士通咨询服务
• DICAS 开发劳务	2019	GADO系统
• 株 LG 化学_[R&D]GBT 分析系统 实验管理领域	2019	INFOGEN
• 2019 年度新 韩银行 S BASI 再构建项目	2019	GENSOFT
• 2019 年度新 韩银行个人信息保护系统构建项目	2019	GENSOFT
• 2019 年度 国民年金工团受托手册系统转移项目	2019	GENSOFT
• 友利 银行	2019	NANUM咨询
• 东国制药移动服务升级手机页面开发 2019	2019	ECO系统
• 高丽开发信息系统运营支援	2019	ECO系统
• 现代百货店	2019	世宗数据系统



The Press



庆南MBC今日新闻 (2014.08.16)
“消灭污染源！”

Sub, which comes early in the rainy season and flows as initial rainfall, rises with pollutants in the center of the city.

It's called the initial rainfall in the early stages of the rain, and it's basically a pollutant. After a long rain, the sewer level is relatively low, but pollution level in the first rainwater is as high as 15 times higher than pollution in the rain falling later.

The fact of initial rainfall in Jisu City is about 150 ppm, which is more polluted than water in the rain that fell after the stormy water quality of the Nam River. Because of this, Jisu City decided to shut down the initial inflow of Nam River.

It is a deswelling outlet. Depending on the rainfall, the weathervanes are automatically opened and closed. In this way, the initial rainfall trapped in the stream is sent to STP and only the clean rainwater is added to the Nam River. The initial rainfall is processed at a facility with a capacity of 20,000 tons and will start operating at the end of 2016.

It is expected that 20 tonnes of pollutant per year will be prevented from entering the Nam River.

[Interview] Mr. Park (official) We expect a drastic improvement in the area of Nam River. In advanced countries, they are already introducing a variety of advanced methods of purification. But KOREA is now at the beginning stage.

[Interview] Mr. Park (reporter) If we can control inflow of initial rainfall, we won't be able to improve the quality of the river. Projects for control of initial rainfall are regarded as the fundamental solution of the river quality cleanup project. This Nam River stands at the beginning of the first place. MBC NEWS FM YOUNGSI SEO.

龙仁新闻 (2015.12.29)
“在将排污与雨水分离后，得以和臭味真正告别。”
龙仁市对排污管网控制系统非常满意

The "smell" which had caused chronic complaints around Juljeon streamside, is gone away.

In case of a Yongin City demonstration, the "sewer network control system" for prevention of odor and improvement of water quality is being applied.

This is separating water from rainwater and the sewerage system.

The city installed the system in a sewer pipe and storm water charging tank into the TP in May.

The system was also installed in storm water dumping tank where the water pipe and sewer pipe join.

The city introduced a sewer network control system to improve water quality and eliminate the odor caused by torrential rains and rainy season.

According to the city administration, the storm water charging tank is categorized as a source of bad odor and water quality because rain and sewage flow into river at once in case of heavy rainfall.

However, it is virtually impossible to come up with a fundamental solution.

Non cities, such as the residential district, are maintained under the supervision of the sewer but the area associated with the existing community zone is covered by sewage pipes and storm water pipes together.

There are many areas where sewage change is connected to the sewage tube, and it is impossible to find and remove it unless it is carried out by means such as redevelopment business.

The sewer network control system is a way to install remotely controlled gate at storm water charging tank to isolate rainwater pipe.

When a large amount of rain and drain clean rain run into streams of without mixing sewage. In other words, it controls the flow of sewage and wastewater to the STP.

An official said "The stench was mostly caused by living near the sewer.

After introducing the system, the complaints have gone.

To improve water quality and solve the odor problem, we are planning to expand this system."

敬仁新闻 (2016.08.23)
敬仁市运用EPC方法，通过IT管理排污管网
通过在雨季期间控制排污管网的门，减少了污染总量

An IT company in Gyeonggi Province is attracting attention.

By combining sensors and IT technology to resolve problems presented by sewer pipes, Korea Convergence IT Co., which developed the technology to control sewer network with IT technology, announced on October 22 that it obtained the performance certification from the Small and Medium Business Administration (SBA) for the same.

EPC (Excellent Performance Certification) is designed for companies to assist with the development of technologies and extended purchase of SBA by enabling the government to prioritize products that have been validated.

The certified product is "Sewer Network Control System Using Hydraulic Device" for efficiency of rain and prevention of water pollution.

This system has the sewer pipe connected with STP at the gate and opens the gate during dry season or initial rainfall to STP to stop sewer flowing into river.

Also, if the rainfall continues, it blocks the gate and prevents rainwater from flowing into the STP.

CEO of KCIT PARK SUNG WOO said "The problems from superannuated sewer pipe can be solved without grand-scale engineering work.

Moreover, continuous maintenance is possible by remote monitoring and control of sewer pipes."

现代新闻 (2017.09.04)
通过IT解决了排污管道臭味扑鼻的问题。
监控在排污管网中安装水质质量传感器

Recently, an IT-based solution to the sewer pipe problems is attracting a lot of attention.

The sewer system underground, so it is difficult to find aging or poor pipes.

Also, maintenance is not easy because the main pipeline is installed under the river or road.

Therefore, rainwater that flows through the sewer pipe or various pollutants in living sewer or rain are injected into storm water pipe and discharged into stream.

Especially during heavy rainfall, the flooding due to over capacity of sewer pipes or the shortage of STP due to the overflow of STP have frequently worsened the problem.

IT has been applied as an alternative to preventing or solving complex sewer problems. The "Sewer Network Control System Using Hydraulic Device", by monitoring sewer by a sensor in real time and blocking inflow of living sewer or pollutants to river, blocks flow of overflow into STP.

It is rapidly spreading to the local autonomous communities, which have difficult or time-consuming sewer problems to solve, and is rapidly emerging as a solution to the inflow of pollutants, especially those of the four rivers, which are one of the causes of algal blooms.

Based on sensor and control devices that overcome the water pressure and substances, real-time monitoring and control of IT technologies is expected to remain competitive in the future. This has been made possible by a Korean IT based sewer solution that is very useful for prevention of environmental problems and disasters.

Park Sungwoo, CEO of KCIT, who developed this technology said, "This is a product developed by studying and researching the headaches faced by municipalities. It is highly adaptable and is currently operated in more than 100 sites, including Jisu, Haman, Changnyeong, Namyangju, Wonju, Gaeju, Yongin, Keangju, Kangju, and others, which are mostly rivers or seaports."

Newsis (2019.06.04)
期望依托龙仁市的支持，将前景光明的排污管网
控制软件公司的系统出口到美国

It is noteworthy that a SME company in the city, supported by Yongin City and Yongin Digital Industry Promotion Agency, is planning to export the sewer pipe control system to Cincinnati, Ohio.

Korea Convergence IT Co., Ltd., located in the Middle East, Gwangju, received a letter of intent from the MS&DC in charge of sewage treatment in Cincinnati City in hopes of installing its own control system.

The system features sensors attached to sewerage pipes to measure sewage flow and collect information to control the amount of sewage and rainwater entering the sewer treatment plant.

In particular, it appears that Cincinnati City's high interest is driven by the intelligent gate control technology based on the Internet of Things (IoT), which prevents pollutants from flowing into rivers when it rains.

Since last year, the City has provided support to the Yongin Digital Industry Promotion Agency and the company for the commercialization of IoT.

With more than \$3.3 million won including national and municipal responses, the city is supporting the growth and maturing of business promotion videos.

Cincinnati, which is planning to introduce Korea Convergence IT System Co., Ltd., is an advanced city in the US sewage sector and is known to lead the sewage policy globally. If the system would be recognized for its excellence, it is expected that the system exports will be made in many cities and nations.

Park Sungwoo, CEO of Korea Convergence IT, said, "We are grateful for Yongin City's help and it has gone beyond just overcoming the difficulties of the company."

A city official said, "We will support various companies in the jurisdiction to develop overseas markets and establish a growth platform."



铺设前后的照片 - 晋州



铺设前后的照片 - 晋州 罗佛川



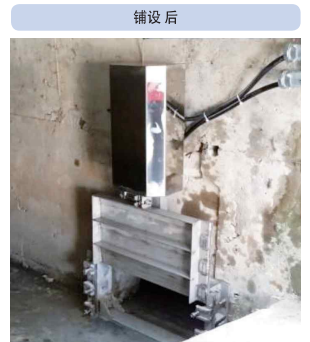
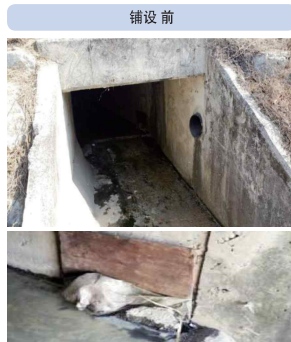
铺设前后的照片 - 南杨州 加云洞



铺设前后的照片 - 龙仁 BTL 6



铺设前后的照片 - 骊州



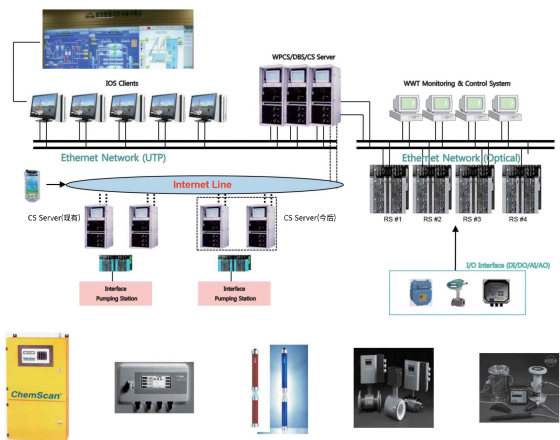
铺设前后的照片 - 原州 4



铺设前后的照片 - 平泽



测量·控制系统



- | 主要功能 | 适用领域 |
|---|---|
| <ul style="list-style-type: none"> · 容易与现有系统容易 · 新系统便于推广 · 有线无线等多种方式的通信网 · 提供以普适为基础的解决方案 · 维护管理人员及运营费最小化 · 稳定的备份及修复体系 · 提供决策系统 | <ul style="list-style-type: none"> · 净水厂、排水池、加压场 · 污水处理厂 · 村庄污水处理厂 · 废水处理厂、低流槽 · 中继泵站、窨井泵站 · 雨水泵站 · 各种预报-警报系统 · 焚化场 · 工厂自动化设施 · 发电厂设施 · 成套设备 |

上水管网维护管理系统



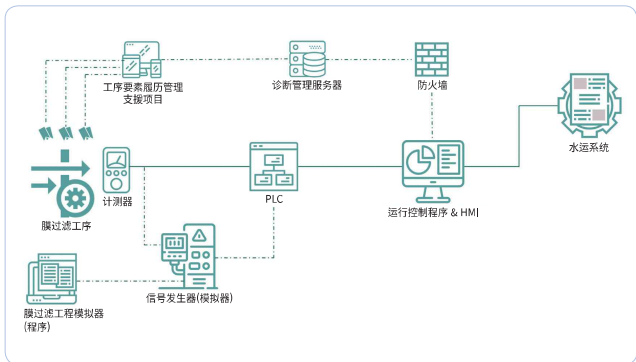
- | 主要功能 | 高级功能 |
|---|--|
| <ul style="list-style-type: none"> · 基于GIS的管网管理 · 收集计量数据 · 实时监控渗漏 · 与计量和分析结果联动的实时运营 · 运行模拟与决策系统 · 利用警报和分析资料的控制系统 · 通过流水率的分析得出绩效指标 · 远程检查及成本管理系统联动 | <ul style="list-style-type: none"> · 分析管网 · 优先选定安全管理对象 · 计量器、计测器设施的维修计划 |
| | 差异化功能 |
| | <ul style="list-style-type: none"> · NGIS遵守标准及GIS系统联动 · 可搭载多种管网监视功能 · 普适基础的解决方案 · 以大容量DB处理体系管理计量信息 |

环保智能上水道项目

- 项目单位名称：环保智能上水道事业团 (Phase II)
- 课题名称：膜过滤智能工序控制及实时性能诊断·分析·开发预测解决方案 (2-5)
- 执行期：2017.09~2021.02
- 主管研究机关：(株)韩国融合IT
- 委托研究机关：国民大学



环保智能上水道项目 - 研究开发内容的基本概念



环保智能上水道项目 - 维护管理升级技术

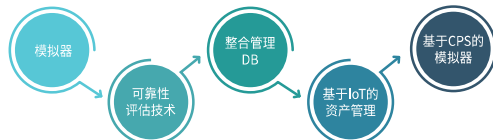
- | 模拟器 | 需求方定制型设计 |
|--|--|
| <ul style="list-style-type: none"> · 虚拟测控及控制信号 · 构建设施的计算模型 · 可实现多种实验及状况预设 | <ul style="list-style-type: none"> · 开发通用平台 · 制定确立术语、代码标准 · 设施的体系分类 · 异地DB整合平台 |
| 整合数据库 并构建决策系统 | 实时诊断性能 及分析方法 |
| <ul style="list-style-type: none"> · 实时诊断性能 · 分配流量、膜过滤等诊断及计算最佳运行条件 · 制定紧急运行预案 | <ul style="list-style-type: none"> · 开发各工序的运行评价要素 · 基于物联网的资产管理及履历管理 · 根据各工序的运行评价，提出改进对策 · 分析性能，开发模拟器 |

膜过滤智能工程控制和实时分析性能诊断及预测解决方案

环保智能上水道项目 - 研究开发成果及适用方案



可扩大至其他水处理领域



认证及资格



直接生产证明书

