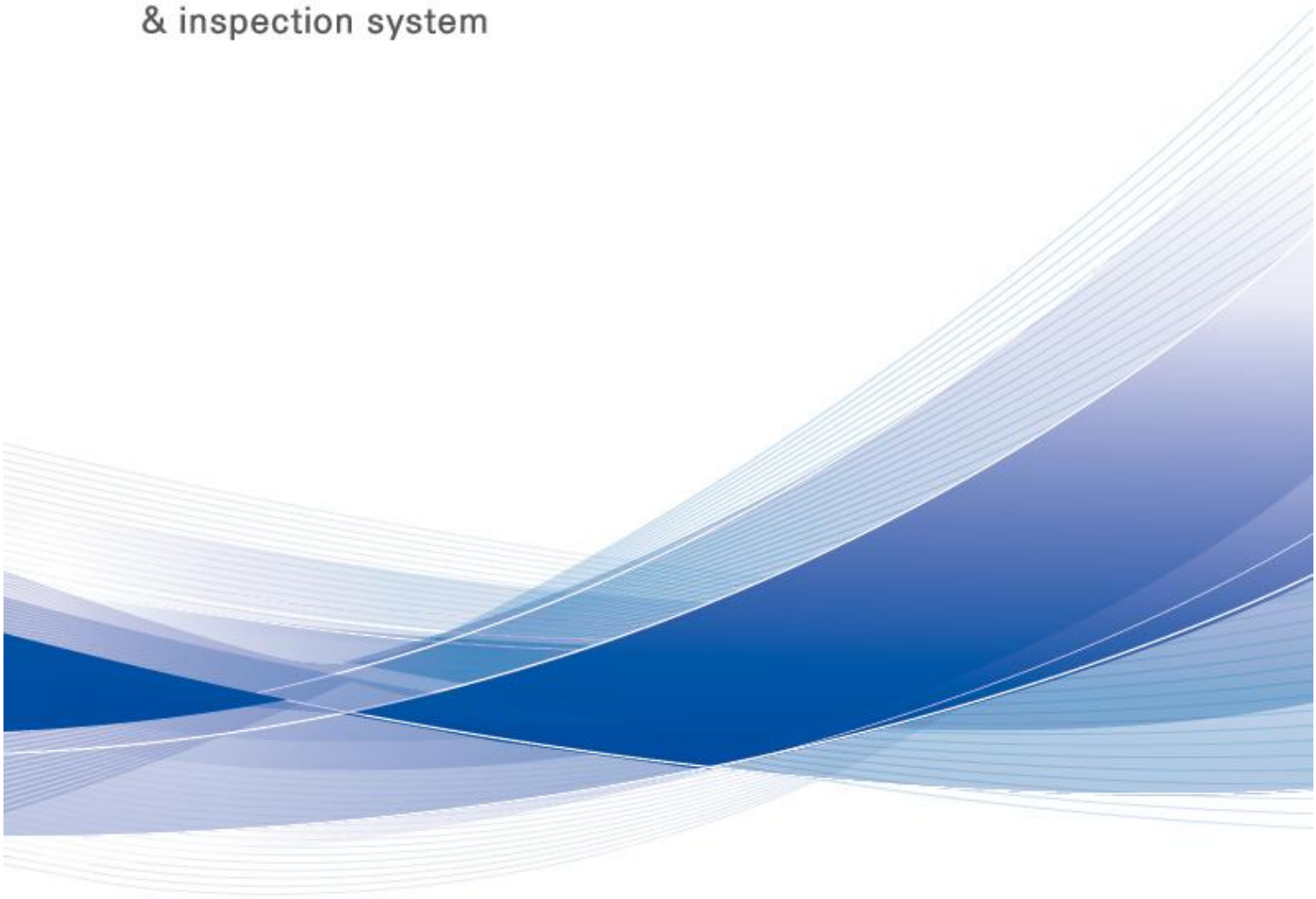
MONITECH

Total solution of real-time weld quality control
& inspection system



MONITECH Monitech Co.,Ltd.

History

1998

- Established Monitech Korea
- Developed Korea's first ARC/SPOT welding monitoring system

2000 – 2010

2000
- Obtained a patent for SPOT monitoring system (1st in Korea)

2003
- Developed Korean's first TIG monitoring system

2005
- Converted to a corporation

2007
- Developed Weld Checker for TIG, PLASMA and SAW
- Developed an integrated portable monitoring system (For integrated measurement of ARC/SPOT/TIG/Temperature)
- Received the "100 Outstanding Patent Product Award"
- Obtained a patent on the welding quality monitoring method and device

2011 – 2016

2012
- Developed the world's first real -time ultrasonic welding monitoring system
- Developed F/PROOF SYSTEM supplied to Hyundai, Kia Motors

2014
- Established "Monitech Scholarship Award" for the Korean Welding and Joining Society

2015
- Relocated the head office to the newly built plant building (Gamjeon-dong, Busan)
- Established R&D Center (Seoul)
- Designated as a supplier of smart factory 3.0

2016
- registered Total 13 Patents receivel
- Business Leader Awards
- Designated as a Promising Export company

Business Area

Intelligent Weld System

- Real-time ARC, SPOT and TIG welding quality monitoring system
- Real-time micro spot welding quality monitoring system
- Vision Inspection System
- High speed real-time thermal imaging welding quality monitoring system
- Real-time ultrasonic and laser welding monitoring and quality evaluation system
- Big data analysis and integrated control system

→ Real-time process quality evaluation, predctive systems

Company Profile

“Monitech will contribute to the world by the fusion of humanity and technology”

Since its establishment in 1998, we have been constantly walking a single path developing real-time welding monitoring and quality evaluation system and providing solutions to customers in Korea, and worldwide.

With objectives of precision measurement, analysis and predictive maintenance to solve various problems occurred in welding and associated process, we have developed and supplied diverse range of fine comprehensive solutions such as advanced real-time measurement system and real-time quality evaluation algorithm, big data analysis, etc.

As a result, **we grew to become a world's top 3 real-time welding quality monitoring company** recognized for it's best technology and excellent quality by customers at home and abroad.

We are well recognized for our technology from many leading companies all over the world we are in the forefront of the convergence of IT and welding by developing real-time MIG, MAG, TIG, SPOT and MICRO SPOT welding quality evaluation system, real-time high speed thermal imaging monitoring and quality evaluation system, real-time laser welding monitoring and quality evaluation system, real-time ultrasonic welding monitoring and quality evaluation system and real-time quality evaluation system built with advanced algorithm (nut, bolt projection).

We will continue to devote ourselves to providing customers with creative values exceeding their expectation by constantly challenging our capacity for the development of innovative products beyond the limits of technology and market.

Technological Know-how of Monitech

Certificates

1. Certified by Quality Management System (ISO 9001) 2015. 07
2. Certified by Environmental Management System (ISO 14001) 2015. 08
3. Certified as a research laboratory by the government 2011. 08
4. Obtained CE Marks (3 kinds) 2015. 04
5. Designated as an INNO-BIZ company 2010. 01
6. Recognized as a venture enterprise 2011. 10
7. Designated as a ppuri technology specialized company 2015. 03
8. Designated as a promising export company 2016. 06

Intellectual Property Rights

1. Patent No.10-0525013
2. Patent No.10-0561087
3. Patent No.10-0760655
4. PatentNo. 10-0958038
5. Patent No. 10-1017503
6. Patent No. 10-1081750
7. Patent No. 10-1125216
8. Patent No. 10-1222440
9. Patent No. 10-1229311
10. Patent No. 10-1390385
11. Patent No. 10-1404608
12. Patent No. 10-1636247

Major Clients

Automobile

Electronics

Shipbuilding & Heavy Industry

Welding Material

University and R&D Center

Exclusive Distributorship

Contents

Welding monitoring system

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Welding process measurement and equipment

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Inspection and integrated monitoring S/W

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01 Welding quality monitoring system

Welding Expert ARC SPOT TIG & PLASMA

Main Features

- Measurement respective current pulse(SPOT)
- High current inverter DC measuring circuit (SPOT) (1st in Korea)
- Patent on initial high frequency and high voltage protection technology(TIG, PLASMA)

System Overview

- Provides welding signals maximum of 31 I/O's
- Provides real-time welding quality evaluation (F/Proof) & production management informatization system
- Production history search, Cp/Cpk analysis, standard work sheet daily checklist and automatic reporting

Benefits

- Optimal system for evaluation of welding process and data control
- Reducing loss in process 〉Process stabilization 〉Reducing failure rate 〉Result in cost savings
- Optimized for systematic real-time data management
- Providing customized monitoring system
- 6 SIGMA management
- One-click report production

Main Functions and Specification

	ARC Welding	SPOT Welding	TIG & PLASMA Welding
Model Name	WET-3000A	WET-4000S	WET-3000T
Main Management Items	Current, voltage, gas flow, weld time, tip replacement interval, data upper/lower limits management and production management	Current, voltage, weld time, pneumatic (force), coolant temperature, heat input, welding omission prevention, tip/dressing replacement interval, data upper/lower limits management and production management	Current, voltage, gas flow, ARC time, vemaing gas(option) tip replacement interval, data upper/lower limits management, original spot management and production management
Mearement Range	AC, DC, Inv. DC, pulsed MIG (Possible to measure up to 2000A)	AC, DC, Inv. DC, Condensor DC (Possible to measure up to 200kA)	AC, DC, Inv. DC, pulsed MIG (Possible to measure up to 2000A)
I/O	Maximum 31 I/O (Management by equipment, model, and beads No.)	Maximum 15 I/O (Management by equipment, model, point and current)	Maximum 31 I/O MIG (Management by equipment, model and bead)
Network S/W	Supports networking with maximum 25 units (optional)		
Input Power	AC 220V/50~60H_z		
Size	Main- 220(W) X 190(H) X 110(D) / Touch PC - 510(W) X 326(H) X 50(D)		

S/W Main Screens

Main screen (SPOT)

Main screen (ARC)

Data search (list)

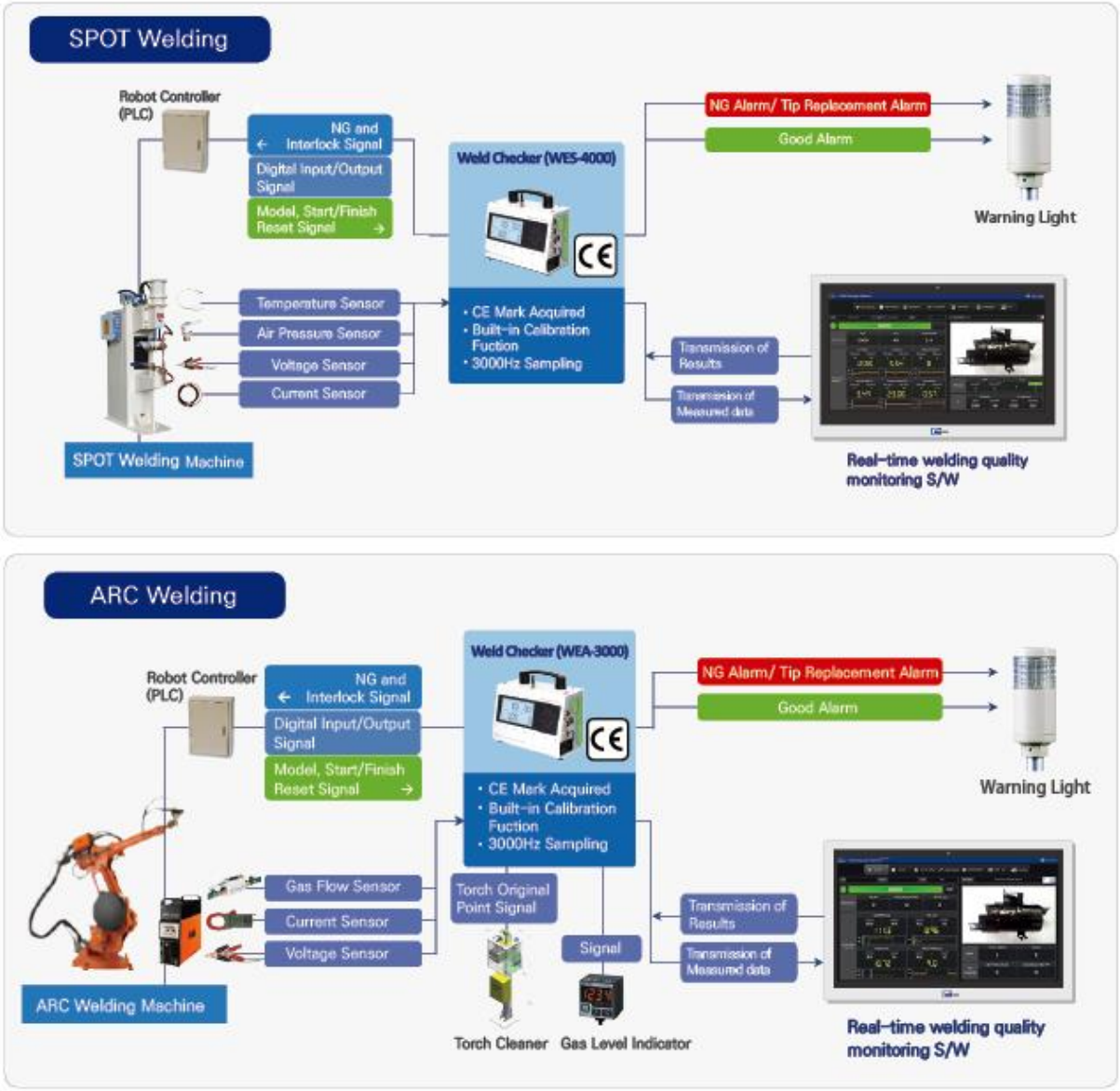
Data search (graph)

Data search (CP/Cpk)

Setup

Standard Worksheet

Basic Configuration of Welding Monitoring System



Main Clients

SEJONG INDUSTRIAL CO.,L | ILJIN | 한전원자력연료 KEPCO NUCLEAR FUEL | 평화홀딩스(주) | (株)一志테크

HWASHIN | S&T Motiv | 성우하이텍 | Delivered to more than 600 companies

02 Intelligent welding monitoring system

WET-4000SI Patent No. 10-1390385 NUT & BOLT Projection

Main Features

- World's best system built with quality evaluation function for an individual welded joint performed by intelligent real time welding quality estimation algorithm that starts operating upon the very high precision sampling on welding waveform is made. (Patent registered and commercialized first in the world)

System Overview

High-speed sampling › Signal processing › Pattern analysis › Individual welded joint quality estimation › Output

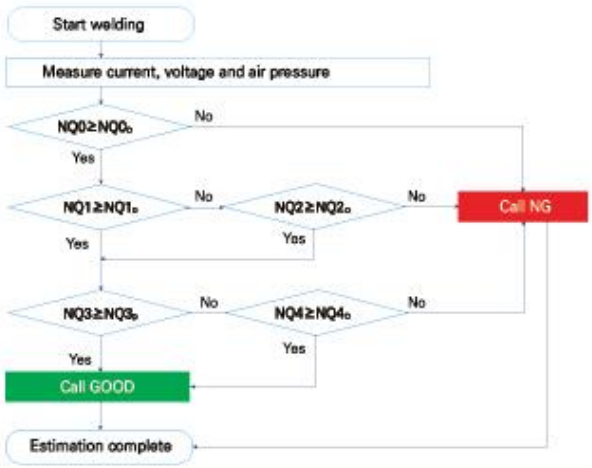
Benefits

- System we provide is an innovative intelligent monitoring system providing users with test results indicating "NG" or "GOOD" with accuracy of more than 95% upon completing the welding of the nut and bolt on each individual welded joint, unlike an ordinary case using average values in F/Proof management system, in which the management of the upper and lower limits to the output values of welding process is available but the quality control on each individual welded joint is inadequate.

Applications

- Nut and bolt projection (M6, M6 and M10), ring projection, cup projection welding, etc.

Quality estimation Algorithm Flowchart

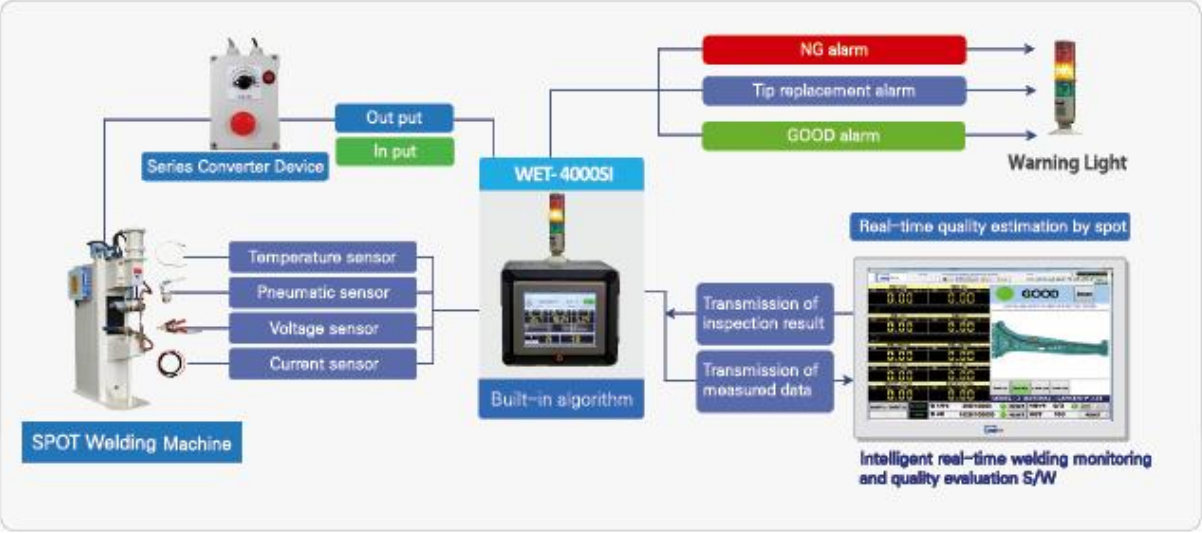


Example of Real-time Welded Joint Quality Inspection Algorithm

Examples of the real-time welding defect detection ability

Item	Type of Failure	Ability to determine failure	
		Common monitoring (No algorithm)	Intelligent algorithm
Nut	Nut upside down	10% or less	95% or higher
	Nut re-welded		
	Nut missing		
Bolt	Bolt missing		
	Missing bolt emboss		

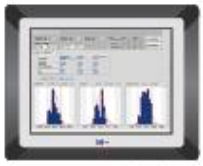
Basic Configuration of Nut & Bolt Projection Welding System



S/W Main Screens

Main screen (SPOT)

Data search (graph)



Data search (CP/Cpk)

Settings model registration

Setup – welding Spot registration

Main Clients

HWASHIN | ILJIN | (株)一志테크 | PHA | 성우하이텍

현성테크 | and more

03 Welding calibration master equipment

Welding Expert ARC SPOT DUO CE

Main Features

ARC

SPOT

- Optimized for monitoring equipment and welding machine calibration usage (Master calibration equipment)
- Automatic storage, analysis, evaluation function (including S/W) of all welding data in the high capacity SD memory
- Simultaneous support of various communication methods (Wi-Fi, LAN (TCP/IP), RS-485, and RS-232: when used as a terminal in network)
- Build-in function for various data analysis and automatic report production

Weld Checker Specification and Types

* Optional ** Provided when used for network only
*** Choose one between gas flow and pneumatic

Model Name		WEA-3000	WES-3000	WES-3000F	WED-3000	WED-3000F
Process		ARC	Resistance	Resistance + Force	ARC + Force	ARC + Force + Resistance
Functions		Current, voltage, gas flow, welding time, start section, delete, Data upper/lower limits management, etc.	Current, voltage, weld time, pneumatic(force), coolant temperature, heat input, welding spot omission prevention, tip/dressing replacement interval, data upper/lower limits management and production management	WES-3000 function + digital force meter	Both ARC and SPOT function included	Both WED-3000 + digital force meter function included
Current Range		Max. 2,000A	Max. 200kA	Max. 200kA	ARC: Max. 2,000A Resistance: Max. 200kA	ARC: Max.2,000A Resistance: Max. 200kA
Voltage Range		Max. 100V	Max. 10V	Max. 10V	Max. 100V	Max. 100V
* Gas Flow		○	-	-	○***	-
Welding Force		-	-	-	-	○
* Pneumatic		-	○	○	○○***	-
Measuring Welder		AC, DC Inverter DC, Rectifier DC and Condensor DC				
Measuring Frequency		3,000 Cycle/sec				
Included S/W		Weld Manager Viewer(For data guery only)				
Size(mm)		220(W) X 189(D)X110(H)				
Weight(Kg)		2.5				
Power		AC 1000/220V, 50/60Hz				
Data Storage		4 Giga SD MEMORY CARD				
** Comm. Types	RS-232	○	○	○	○	○
	RS-485	○	○	○	○	○
	LAN	○**	○**	○**	○**	○**
	Wi-Fi	○**	○**	○**	○**	○**

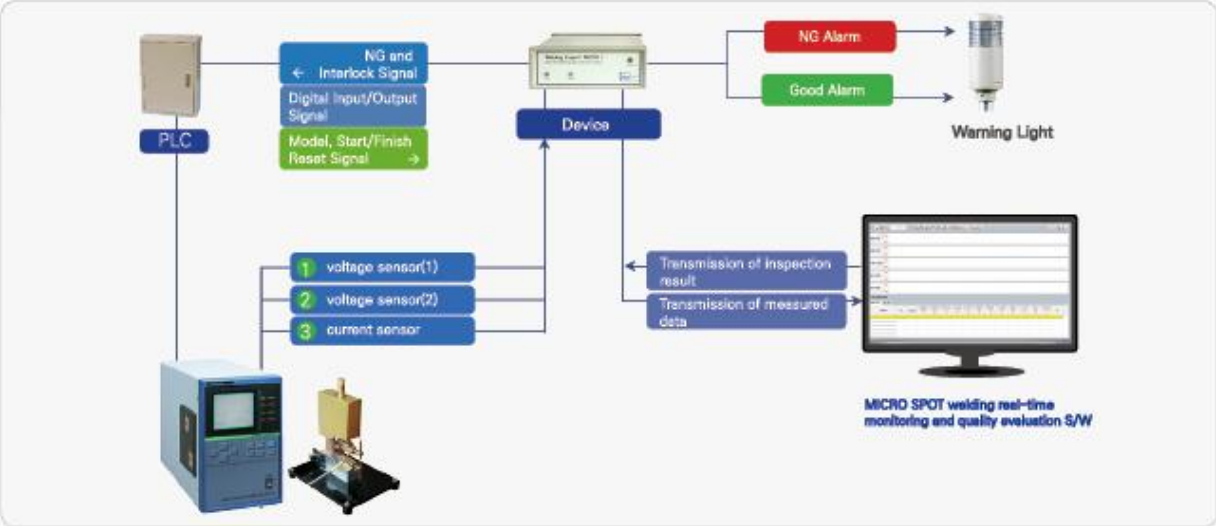
04 MICRO SPOT welding monitoring system

WEMS-3000 MICRO SPOT

System Overview

- It maximizes quality improvement of the product through welding quality evaluation on a real-time basis by measuring current and voltage of MICRO SPOT welding.
- It is a monitoring system built with quality estimation algorithm to satisfy customer requirements that are difficult to determine welding quality by only average current and welding time displayed in the welder
- By utilizing the monitoring system built with quality algorithm, it helps increase product quality stability

Basic Configuration of MICRO SPOT Welding System



S/W Main Functions

Item	Content	Item	Content
Basic Function	Manage Upper/lower limits by each model Manage voltage display function (Maximum, average) Separate list of measurement items (total, NG,GOOD) Manage settings of X-Rs chart (Storage up to 5 data and inquiry (date, electrode number) Graph and Cp/Cpk management Save NG data waveform	Additional Function	Develop and apply user-defined quality determination algorithm (Optional), Link with server PC situation, Check monitoring device On/Off

Applications

Prismatic secondary battery

cylindrical secondary battery

Main Clients

SAMSUNG SAMSUNG SDI | LG Chem

05 High speed thermal imaging welding monitoring system

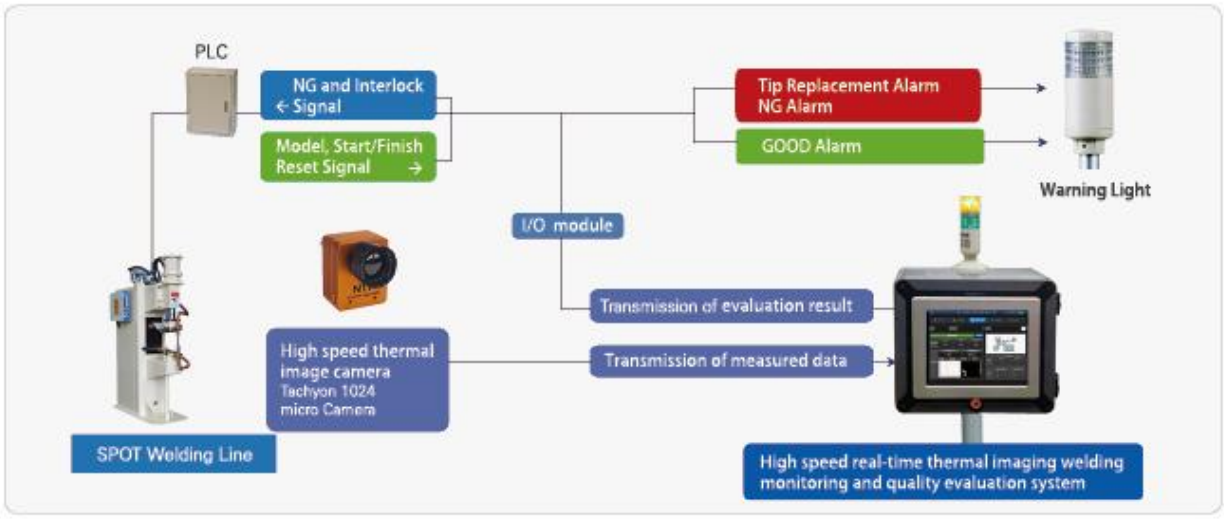
Main Features

- High speed real-time thermal image monitoring for quality control of various welding process
- Scan speed: provide 2D thermal image analysis S/W analyzing 1,000 frames/second
  - Possible to apply a 1,000/2,000/10,000 frame camera depending on the application (optional)(1,000 fps standard)
- USB or Ethernet communication
- Use PbSe detector produced by a next generation new proprietary technology
- Provide dedicated real-time management S/W

Main Purposes

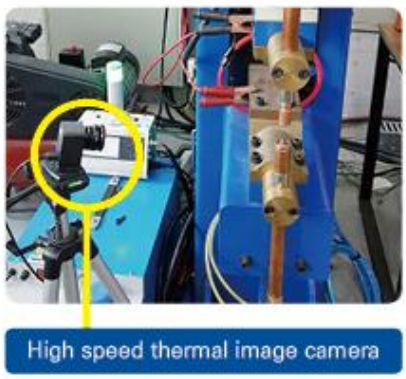
- Optimized for soldering/brazing process monitoring
- Resistance welding (SPOT, Seam)
- TIG welding, ARC welding and Laser welding
- Resistance seam welding in steel roll production process
- Applicable to real-time quality control of other various processes

Basic Configuration of System



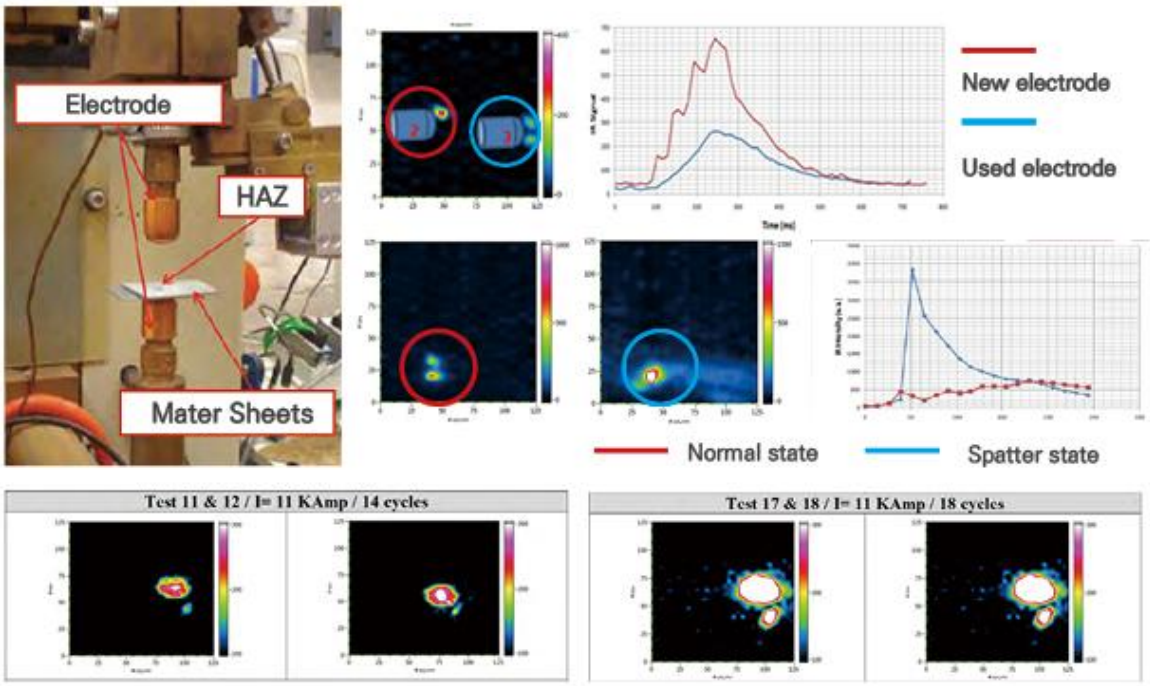
S/W Main Screen

Application case #1 (SPOT Welding)



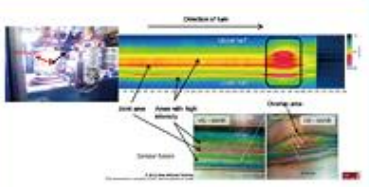
Application Area

- RSW (Resistance Spot Welding) Monitoring

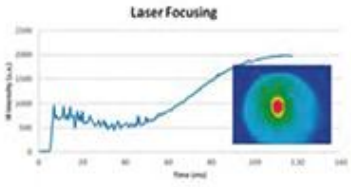


Weld time vs the heated area of the weld zone

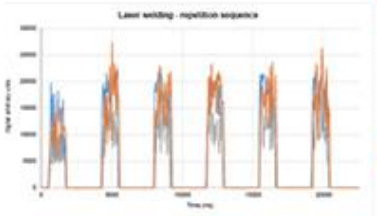
- Example 1) TIG Welding processe

Type		Type	Examples of traced defects
normal state		Failure state	① Lack of over lap ② Voids ③ Shortage in inert gas

- Example 2) Laser Beam Welding & Laser Cutting Process



1) Monitoring of focusing process



2) Monitoring of processing repetition

- Laser의 Spot size

Spot size of laser: The MATRIX1024 model of 0.2mm ~13mm is applied to monitoring of a fine substrate in the laser welding processing.

- Application Result

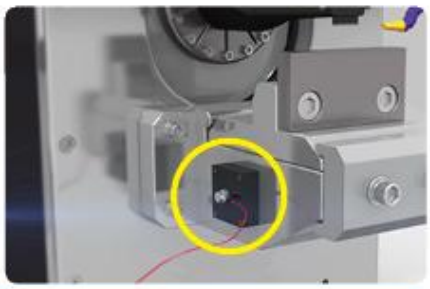
1) Monitoring of automatic focusing process of the laser system
2) Process repeatability 3) Identifies cooling speed of substrates

06 Ultrasonic welding monitoring system

Product Features

- Real-time management S/W with an algorithm of acceptance experience of welding experts
- The initial conditions can be set by users directly on change of materials or installation of highly intuitive sensors
- Highly reliable quality determination can be made using an artificial intelligence algorithm and DMM (Decision Making Matrix)
- Development and application of predictive maintenance index based on various data analysis result.

Basic Configuration of ultrasonic welding monitoring system



Sensor

Welding Features

Main Screens (OK screen)

OK specimen

Main Screens (NG screen)

NG specimen

The world's first commercialized ultrasonic welding and quality evaluation system

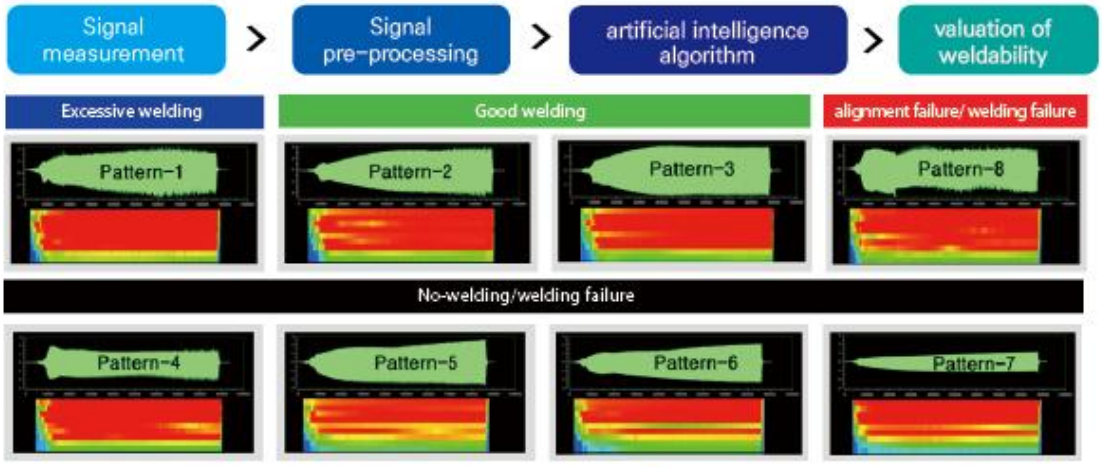
WEU-1000 Ultrasonic welding

Quality inspection of ultrasonic welded joints (The only real-time non-destructive evaluation method available)

Evaluation Items	Objectives	Evaluation Methods	Evaluation Tools
Weld Monitoring	Real-time lot evaluation of welded joint quality (Non-constructive, lot)	Real-time welding waveform pattern analysis	Artificial intelligence algorithm
Tensile-test	Welding quality evaluation (Destructive test, sampling)	U-tensile test by test item	Tensile Tester
Bond density	Micro-bond analysis Mechanical interlock analysis (Destructive test, Sampling)	Check microscope of welded section	Fluorescence microscope
Post weld thickness	Evaluation of optimal welding energy depending on the change in material thickness (Non-destructive, and Lot or Sampling)	Measure material thickness by welding time	LVDT Sensor
Microstructure	Measurement of bond characteristics in bonding interface Micro crack etc. (Destructive test and Sampling)	Analyze bonding interface using a SEM, etc.	SEM
Micro Hardness	Measurement of change in hardness depending on welding time (Destructive test and Sampling)	Measure weld interface, pitch, hardness using a hardness tester	Hardness Tester(V_H)

Determine NG/GOOD of welded joints by identifying ultrasonic welding signal pattern

- Determine NG/GOOD of welded joints by analyzing waveform using an algorithm based on the experiences of welding experts.
- Predict welding state by analyzing waveform



Applications

- Battery for electric cars
- Battery for hybrid electric cars
- Battery for ESS usage
- Automotive connectors, etc.
- Solar panels, etc.

Main Clients

SAMSUNG SAMSUNG SDI | LG Chem

07 Laser welding monitoring system

Main Features

- System to manage welding quality and process on a real-time basis by measuring the strength of reflected plasma and infrared rays generated during laser welding
- Determining NG/GOOD of welding joints and producing NG signals (buzzer, flashing light, interlock, etc.) on a real-time basis.
- Automatic storing of measured data and providing of various analysis tools
- Securing component reliability by conducting a real-time lot inspection of laser welded joints
- Analyzing reasons for welding defects and preparing countermeasures
- Responding to various laser sources such as ND-YAG, Fiber, CO_2 laser, etc.

Main Purposes

- Quality control of TWB laser welding in the automobile body manufacturing process
- Management of welding process for electric car batteries
- Real-time management of other various laser welding process

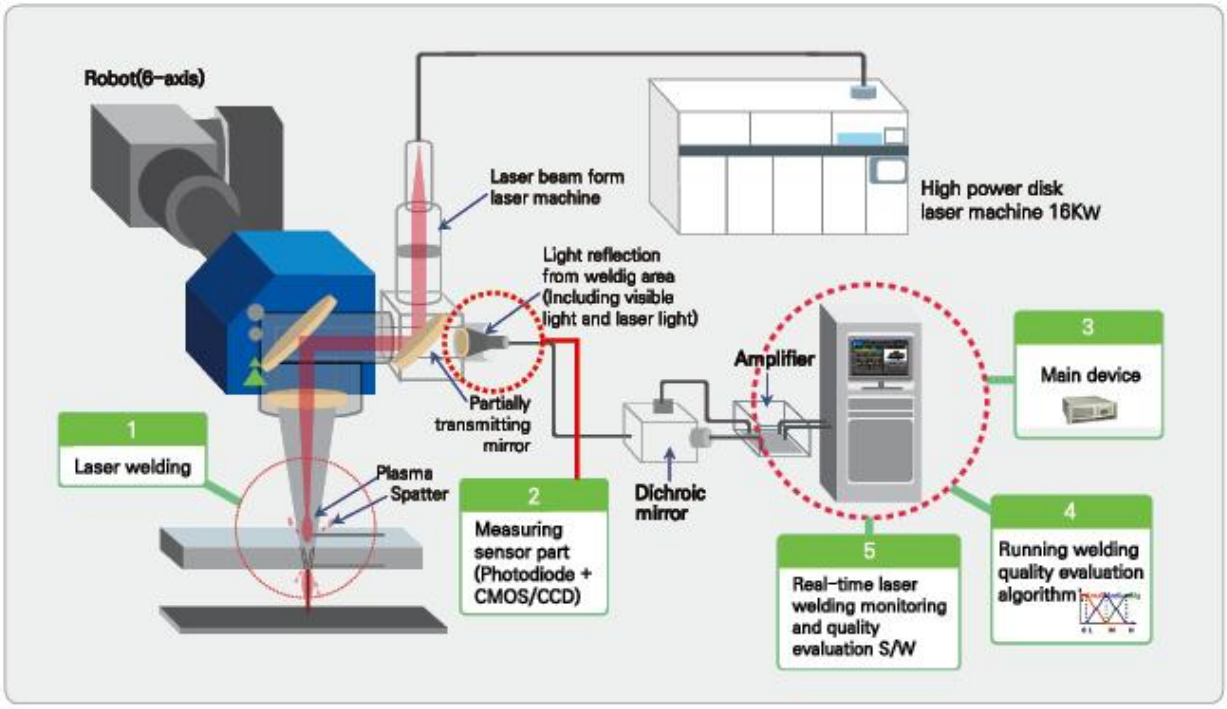
Applications

- Automobile, electronics, electronic units, aircraft parts, etc.

Benefits

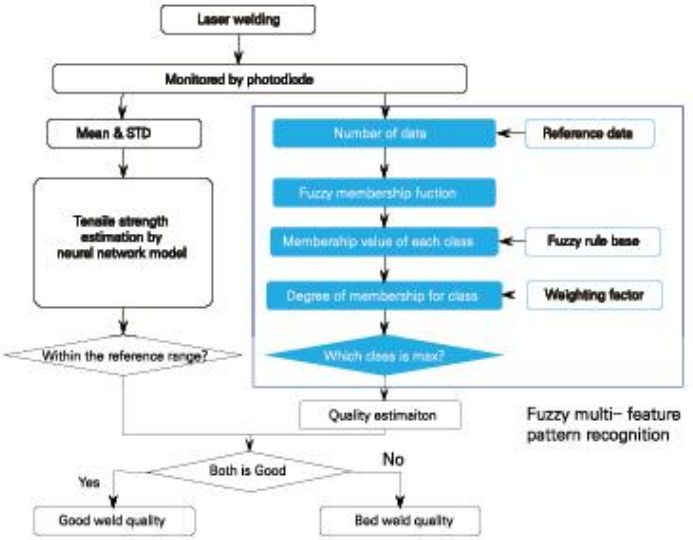
- Real-time monitoring (detecting) of the quality of welded joints
- Securing product quality and reliability
- Automation and productivity maximization

Basic Configuration of Laser Welding Monitoring System



Welding quality determination algorithm (artificial intelligence algorithm)

Welding quality determination algorithm using NN and fuzzy pattern identification technology



Fuzzy multi- feature pattern recognition

Classification of welded joint quality

Good

Class I	Class II
Tensile strength more than the base material Adequate heat input, Similar to the reference signal Stable signal	Tensile strength more than criteria Slightly low heat input Similar to the reference signal Unstable signal

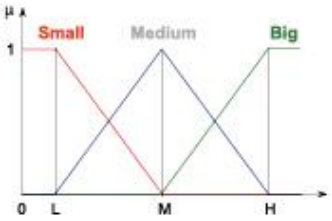
Bad

Class I	Class II
Tensile strength lower than criteria Low heat input Lower than the reference signal Stable signal	Tensile strength lower than criteria Low protective gas More than the reference signal Unstable signal

Fuzzy Rule Base

	Sensor Signal	
	UP	DOWN
Class I	Medium	Small
Class II	Small	Medium
Class III	Small	Big
Class IV	Big	Small

Fuzzy Membership Function



Set upper/lower limits using signals in the proper welding conditions
LP = 4 kW, WS = 7.5 m/min,
WFR = 2A

Reference signal
Number out of the limits

S/W screen configuration

Main screen

Data search screen

Setup screen

Main Clients

SAMSUNG SAMSUNG SDI | 광명산업(주) and more

08 Welding force measuring gauge

Welding Expert FORCE SPOT

Main Features

- Small and light , easy to carry
- Easy operation
- Automatic reset when the maximum value is measured
- The servo gun ensures a perfect noise protection
- Contineous value and holing fuction in accordance with change of force

Main Purposes

- Management of force in SPOT welding production lines in the automobile, electrical device and electronics industry

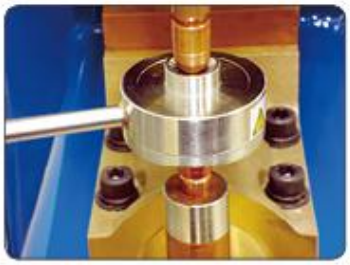
Specification

Model Name	WEF-1000
Measuring range	Max. 30kgf / 100kgf / 1 Ton /2 Tons (to be confirmed when ordering)
Nonlinearity	0.5% R.O
Safe Overload	150% R.O
Accuracy	2% F.S
Digit number displayed	1 decimal place
Main functions	Peak hold function
Load vell dimension	52(D) X 14(H) X 355.5(L)mm
Power Supply	1.5 V AAA Battery X 4

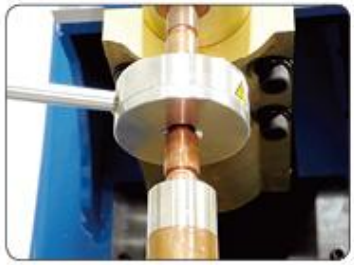
Force Sensor Types

Sensor type	Model name	Measuring range
Non-conductive		30~100kg
		1 Ton /2 Ton
Insulated		1 Ton

Examples of usage



load cell upper sensor part



load cell lower sensor part

Insulated load cell

09 Current and force gauge

Welding Expert HANDY SPOT

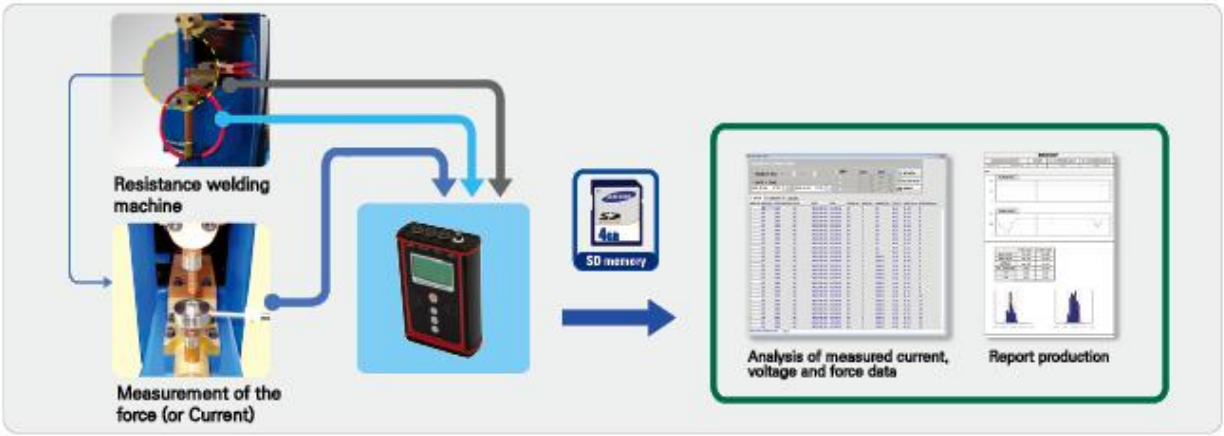
Main Features

- Current, voltage and force of resistance welding can be measured in one equipment
- Palm-sized and rechargible bettery powered
- Measurement data stored in SD memory/exclusive Data viewer S/W included
- Inverter DC, AC, Condenser DC, etc. are measurable
- Multi-pulse current is measurable by each pulse

Main Purposes

- Essential equipment for welding quality control when producing auto parts and electronic products
- Excellent performance when actual output of welding equipment is regularly inspected and maintained.
- It can be used for internal calibration of welding machines

Basic Configuration of handy



Specification

Model Name	WEH-3000
Size	105(W) X 170(D) X 45(H)
Weight(kg)	0.8
Input (Rechareable)	AC 100/220V, 50/60Hz (Free Voltage)
Measurement channel	Current, voltage, cycle time (weld time) and force
Current measuring range	AC: ±200 kA * DC: 1~200 kA
Voltage measuring range	AC: ±10V * DC: 0~10V
Force measuring range	Max. 300N, 1kN, 2kN, 10kN, or 20kN (to be confirmed when ordering)
Data storage	SD Memory

Force sensor types

Sensor type	Model name	Measuring range
Non-conductive		30~100kg
		1 Ton /2 Ton
Insulated		1 Ton

10 Advanced current and force gauge (Professional)

Welding Expert HANDY PRO SPOT

Main Features

※ HANDY PRO is a professional version of HANDY with additional functions as listed below.

- Simultaneous measuring of current and force
- Display of measurement results in graphs and data
- Data query in the equipment
- 7 inch TFT-LCD (800*480) panel is used
- Touch screen (resistive type)

Main Purposes

- Essential equipment for welding quality control when producing auto parts and electronic products
- Excellent performance when actual output of welding equipment is regularly inspected and maintained.
- It can be used as an internal calibration instrument for welding machines

S/W Screen Functions

Main screen

Settings

Real-time simultaneous display of results by graphs and data

Specification

Model Name	WEHP-3000
Size (mm)	155(W) X 255(D)X 59.4(H)
Weight(kg)	1.4
Input (Rechargeable)	AC 100/220V, 50/60Hz (Free Voltage)
Measurement channel	Current, voltage and force
Current measuring range	AC: ±100 kA * DC: 1~200 kA
Force measuring range	Max. 300N, 1kN, 2kN, 10kN, 20kN (to be confirmed when ordering)
Data storage	Built-in SD Memory + USB
Built-in battery	8000mAh

Force sensor types

Power engagement	Model name	Measuring range
Non-conductive		30~100kg
		1 Ton /2 Ton
insulated		1 Ton
power engaged		1 Ton

11 Measuring analyzing equipment for WPS/PQR

Patent No. 10-1081750
and 10-1125216
Welding Expert WPS

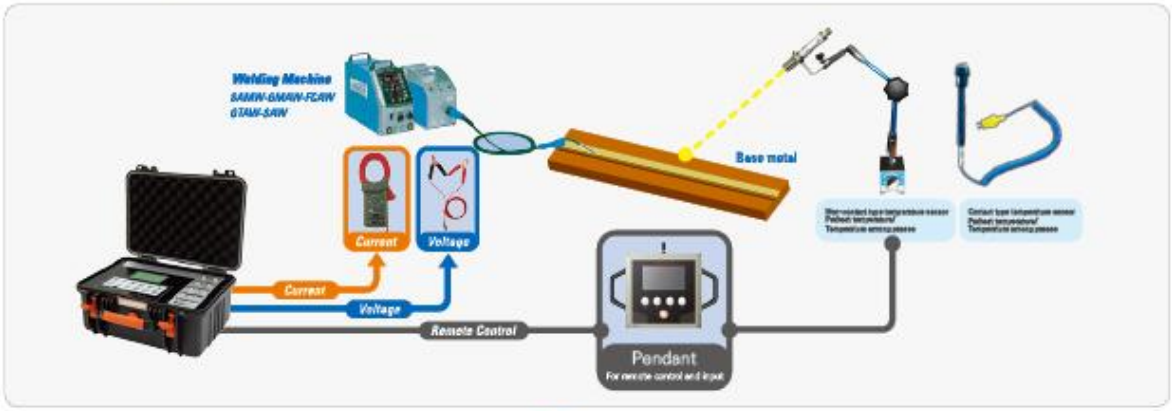
Main Features

- It allows a worker to perform precise welding upto 500 passes per one specimen and to collect data
- SMAW, GMAW, GTAW*, FCAW, SAW and TANDEM welding are available (GTAW optional)
- Current, voltage, welding speed, heat input, preheating and automatic control of interpass temperature
- Automatic production of report and output in EXCEL format
- Powered by high capacity battery (18,000mAh)

Main Purposes

- Essential equipment to nuclear relate industries, chemical plant, shipbuilding, wind power industry, etc.
- Obtaining the most reliable WPS and PQR data
- It can be used as an internal calibration reference instrument for welding machines

Basic Configuration of WPS



Specification

Model Name	WEW-7000
Size(mm)	415(W)X325(D)X195(H)
Weight(kg)	5.5
Applicable process	SMAW, GMAW, GTAW*,FCAW, SAW (TANDEM Available) * Optional
Maximum number of Pass	Sequential measurement and storage up to 500 passes each test specimen
Data inquiry	Data query through an exclusive LCD (main body) or data query and analysis using exclusive S/W
Data storage	Automatic storage in a SD Memory card
Measuring item	Current, voltage, welding speed, welding time, heat input, preheat temperature and inter-pass temperature
Product composition	Main body + Exclusive Pendant + Sensor + S/W

S/W Main Functions

- View to DB List

  Bead number, inter-pass temperature, current (Max. Min and Ave) Voltage (Max. Min and Ave), welding speed and heat input (Max. Min and Ave)

- View Ddetailed data

  Indication of each bead in detailed graph, able to set the upper and lower limit and calculate its spread

Output of WPS/PQ Record

Main Clients

Hyundai Heavy Industries, Doosan Heavy Industries, EEW Korea, Daewoo Shipbuilding & Marine Engineering, Doosan Engineering & Construction, Korea Institute of Industrial Technology, etc.

12 Welding waveform analysis management equipment

Main Features

- Real-time waveform analysis of ARC / RESISTANCE / SAW / TIG / PLASMA welding
- Procide exclusive S/W for waveform analysis (Stretch and Shrink , various calculation, analysis and comparison of waveform, etc.)
- 15" LCD and industrial embedded PC are built in a briefcase to enhance portability
- Various output ports (4 USB ports, 1 LAN port and 1 RGB port)
- Waveform sampling maximum 200kS/s

Main Purposes

- Essential equipment for welding related research and process improvement (This is a basic equipment being used in most of large companies, research institutes, universities, etc.)
- S/W installed exclusively for collection and analysis of various welding result waveforms
- The best solution to identify problems in welding process and improvement status (6 sigma management, etc.)
- Used as an standard internal calibration instrument for welding machine and various gauges
- Continuous free S/W update is provided
- In case of research purpose, various combinations of measurement channels are available (Max. 8 channels)

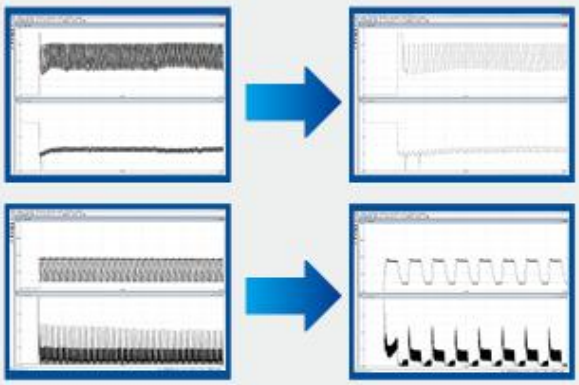
Specification

	ARC/SAW	RESISTANCE	TIG / PLASMA
Model Name	WEM-7000		
Size(mm)	460(W) X 325(D) X 170(H)		
Weight(kg)	About. 8Kg		
Power	AC 100/220V, 50/60Hz (Free Voltage)		
Measurement channel	Current, voltage, feeding speed, etc.	Current, voltage, force, etc	Current, voltage, feeding speed, etc.
Current range	Max 2,000A (AC&DC)	Max 200kA (AC, DC& Inverter DC)	Max 2,000kA (AC & DC)
Voltage range	Max. 100V (200V is also available)	Max. 10V (20V is also available)	Max. 10V (20V is also available)
Feeding speed	Max. 2,800CPM	-	Max. 2,800CPM
Force	-	Max. 1 Ton (10kgf,30kgf,100kgf,1Ton)	-
Others	Combinations of ARC+ RESISTANCE+TIG(PLASMA) are available in a machine • ARC + RESISTANCE • ARC + TIG(PLASMA) • SPOT + TIG(PLASMA) • ARC + RESISTANCE + TIG(PLASMA) Interlink with a high speed camera is available (optional)		

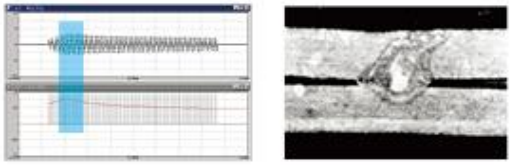
Examples of Software Functions

- Evaluation of overall performance of welding machines
- Evaluation of usability of welding materials
- Evaluation of ARC stability during welding
- Evaluation of feedability of welding wires
- Evaluation of characteristics of ARC Start
- Evaluation of pulse waveform during pulse welding
- Automatic calculation of the number of normal short-circuit and abnormal short circuit
- Automatic creation of dynamic resistance graph of resistance welding
- Real-time force change of resistance welding (optional)
- 4 types of measuring method and Autozero function
- Size Stretch & Shrink analysis and comparison of waveform
- Continuous measurement for a long time (related to the number of sampling units)
- Various built-in functions including texting and converting measured values to EXCEL format

Examples of enlargement of ARC/ RESISTANCE waveform

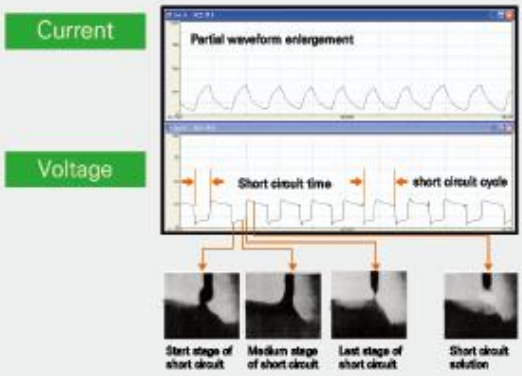


- Waveform generating spatter in resistance welding

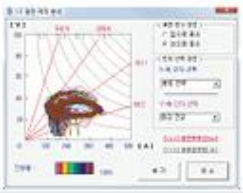


spatter generation due to the increase of dynamic resistance peak value

Short circuit transfer waveform of ARC welding



- Waveform calculation by section
- Current and voltage distribution curve



Main Clients

• Heavy Industry	POSCO Research Institute, Samsung Heavy Industries, Hyundai Heavy Industries, Hyundai Steel, Dongkuk Steel, Volvo, Hanjin Heavy Industries and Construction, Doosan Infracore, STX Offshore and Shipbuilding, Daewoo Shipbuilding & Marine Engineering, Sungdong Shipbuilding and Marine Engineering, etc.
• Automobile · Battery	Hyundai Motor, Kia Motors, Sejong Industrial, Hwashin, Dong Wha Industrial, LG Electronics, Samsung Electronics, Nexcon Technology, Power Logics, Teckraf, SKME, Samsung SDI (Vietnam Plant), etc.
• Institutes · Universities	Korea Institute of Industrial Technology, RIST, Pukyong National University, Hanyang University, Yonsei University, Chonnam University, Chonbuk University, Korea Polytechnics, POSTECH, Dong-Eui University, Korea Aerospace University, Korea Electrotechnology Research Institute, Institute for Advanced Engineering, etc.
• Welding materials · Welding machines	KISWEL, Chosun Welding, SeAH ESAB, Korea Weldtech, Korea KOBE Welding, Hyosung Power & Industrial Systems, Maeil Precision Machinery, Easywel, etc.

13 Integrated management and control system

MIS (Monitech Intergration System)

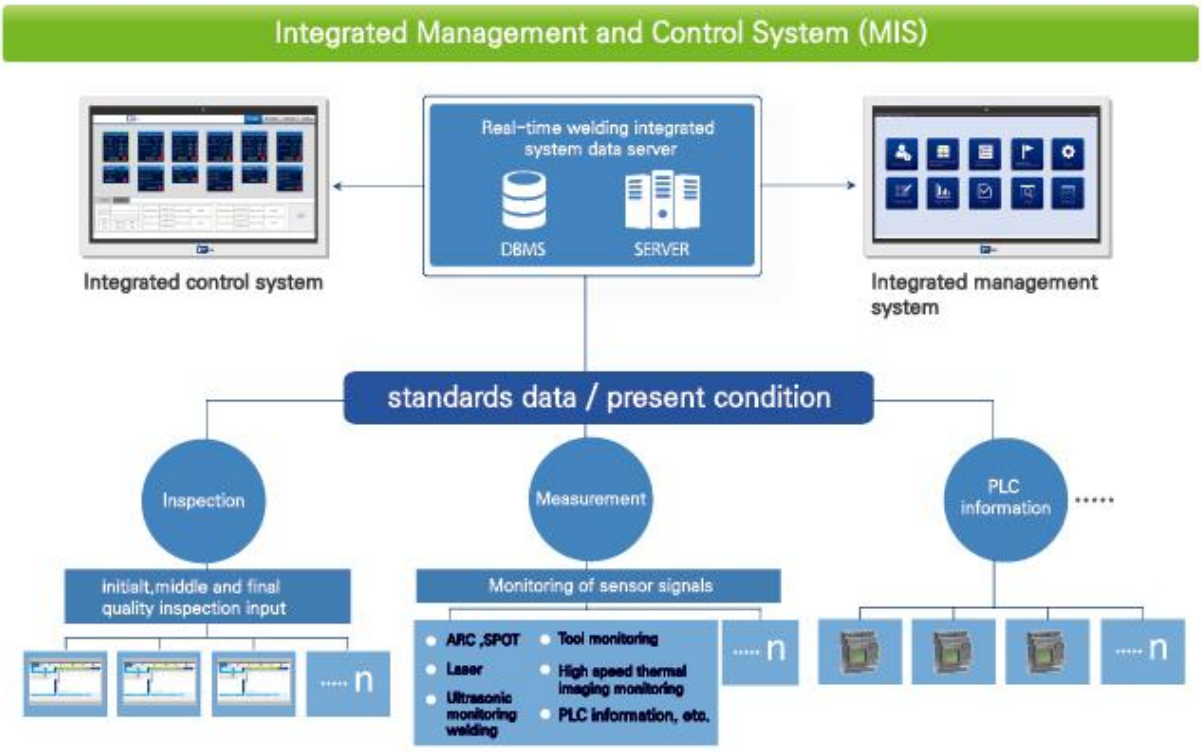
System Overview

- A system designed to control and monitor inspection results, measurements, PLC information, etc. acquired in the on-site process by integrating them all together.
  The initial, interim and final products inspection record computerized management S/W + ARC/SPOT welding monitoring S/W + PLC inspection S/W, etc.
  S/W essential for integrated factory management that enables you to analyze, inquire and control data regardless of the number of computers connected to the system as it is integrated into one place.

Main Features

- Cumputerization of measured data
- Real-time data measurement and control
- Data analysis and report creation
- Integrated network management

Basic Configuration of Integrated Management and Control System (S/W)



Main Purpose

- Process inspection management
- Welding process management
- Other inspection process management
- Other process information management (PLC, etc.)

Example of S/W Main Screens

Integrated management system

Initial, middle and final inspection record computerized management system

ARC/SPOT welding monitoring system

Integrated control system

Integrated management system (main screen of each menu)

Windows for information input

S/W Main Features

- Reference information management
- Item management
- Worker management
- Cp/Cpk process capability index analysis
- Time series data query and analysis
- Data management
- Integrated process control

13 Integrated management and control system

MIS (Monitech Intergration System)

Benefits

- Control user's basic information (user history management)
- Product production history and traceability management
  - Check and management of production date/time, etc. by user choice
- Real-time welding status and integrated control function, Determination of the product quality through real-time monitoring and 1 to many integrated management
- Process and facility management
  - Control and management of each process and facility conditions
- Establishment of production plan - Sheet for production plan by car model
- Interface with internal server network
  - Monitoring system integrated data management through construction of server
- Interface with ERP, MES enterprise management system
- Most suitable for integrated management of the first, middle and final inspection system in addition to real-time welding inspection management

Main Clients

Eunhye Co., Ltd., Changsung Corporation, Kyungjeon, BRM Co., Ltd., Wonpoong Industrial and more

14 Inspection record computerized management system for the Initial, middle, and final products

IM (Inspection Manager)

System Outline

- It has computerized system that used to manual inspection of the first, meddle, and final manufactured products.
  It makes an operator more convernlent to manage and creates a database to easier to track LOT.
  It is the same as the initial, middle ans final inspection record computerized management system in MIS.

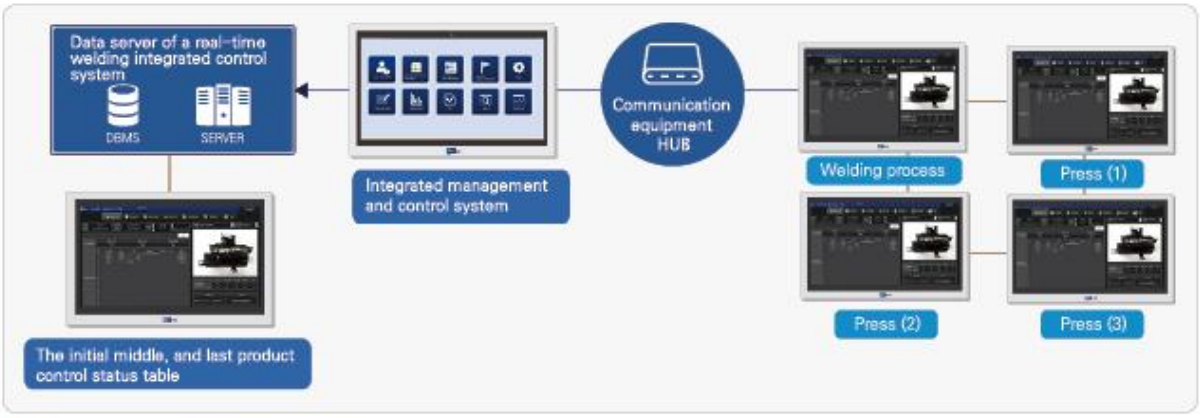
Product feature

- Computerization of measured data
- Automatic input of measured data by using RS communication
- Embedded with data analysis and report creation

Application Area

- Management of automobile manufacturing inspection process
- Other inspection process control

A diagram of the computerized control system of the initial middle, and final product inspection



Example of S/W Main Screens

S/W function guidance

- Work standard registration control
- Inspection time setting control
- Alarm setting control (TTS)
- Inspection item registration control
- Inspection equipment registration control
- Product image photographing and automatic storing
- Computerized control of trouble shooting data
- Work item bookmark
- Digital inspection device link and automatic data input

Real-time welding quality control and inspection solution

Real-time welding monitoring system

01. Welding quality monitoring system (ARC/SPOT/TIG)
02. Intelligent welding monitoring system (NUT & BOLT Projection welding)
03. Welding calibration master equipment (ARC/SPOT/DUO)
04. MICRO SPOT welding monitoring system
05. High speed thermal imaging welding monitoring system
06. Ultrasonic welding monitoring system
07. Laser welding monitoring system

Welding process measurement and equipment

08. Welding force measuring gauge (FORCE)
09. Current and force gauge (HANDY)
10. Advanced current and force gauge (HANDY PRO)
11. Measuring analyzing equipment for WPS/PQR (WPS)
12. Welding waveform analysis management equipment (MULTI)

Inspection and integrated monitoring S/W

13. Integrated management and control system (MIS)
14. Inspection record computerized management system for the Initial, middle, and final products (IM)

MONITECH Monitech co.,ltd.

ISO 9001 / ISO 14001 / INNOBIZ / Venture

Head office / R&D Center
92, Saebyeoksijang-ro, Sasang-gu, Busan, 46987, KOREA
Tel. +82-51-311-8691
Fax. + 82-51-311-8692
E-mail. monitech01@naver.com
Homepage www.monitech.co.kr
Blog. http://blog.naver.com/yuria85

Seoul branch / R&D Center
304, Sanjeong building
23, Gukhoe-daero 66-gil,
Yeongdeungpo-gu, Seoul,
07237, KOREA
Tel. +82-2-780-8691
Fax. +82-0303-0953-0954
E-mail. monitech2@naver.com