



Temperature Measurement and ERW Welding Control System



TWO COLOR EYE®

What are the benefits of two color eye?

Our pyrometer is free from the following factors, such as

- Measuring angle
- Roughness of material surface
- Smoke and water vapor
- Radiation rate of measuring object
- Out of focus



Two color eye indicates precise temperature only if a part of the object to be measured stays in a part of the scope of viewing area of the glass fiber eye.

How we can measure the welding temperature?

- Incidental light is taken into the converter through the optical fiber.
- Optical fiber is long enough (8m) to separate the converter from a strong electromagnetic field around the welding point.
- Customizing the optical head is available in order to fit in various measuring point.
- Measuring sight is kept clean by purging air on the optical head.



※Optical Fiber



※Optical Head

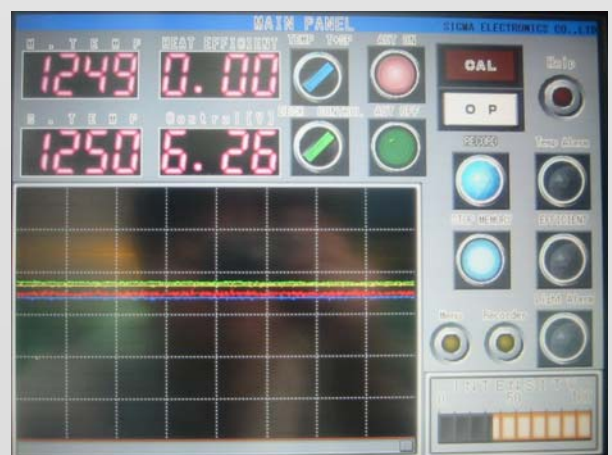
SPECIFICATION

◆Pyrometer's common specification

- Measuring range : 600~2000°C
(Select the span of 600°C in this range. Ex. 900~1500°C for ERW)
- Accuracy : $\pm 2^{\circ}\text{C}$ / 12hour
(Temperature calibration enables automatic and immediate temperature correction.)
- Response time : 10m sec
- Output voltage : DC1~5V
- Calibration: Built-in calibrator performs automatic 3point calibration.
(In case of measuring range is 900~1500°C,
it's calibrated at 1000, 1200, 1400°C.)

◆Controller's specification

- Control method: PID control
- option: Controller following on the manufacturing line speed is available, by which welding temperature is kept stable under changing manufacturing line speed by taking line speed signal in it.)
- Welder control voltage: DC0~10V at max
- Set it to the control voltage of the welder.
- Isolated amplifying converter is applied.

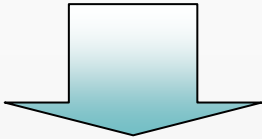


※Actual temperature control

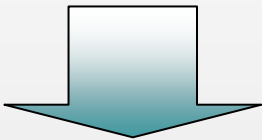
Why you need our pyrometer?

●The welding temperature of ERW tube always fluctuates. It's because of the following reasons,

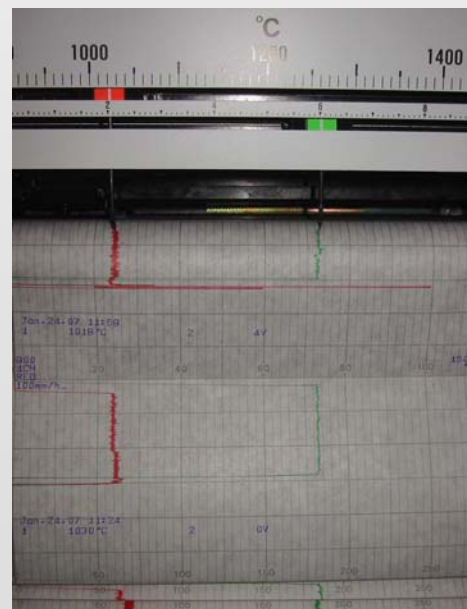
- Operator's sight is not good enough.
- Thickness of hoop material is uneven.
- Condition of the impeder is not stable.
- Forming line speed is not stable.
- Forming condition is not stable..



●Welding temperature normally fluctuates for these reasons.

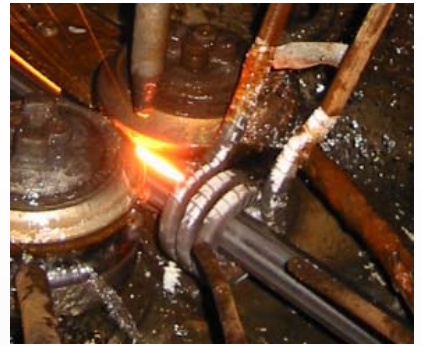


- Two color eye would never overlook such welding temperature fluctuation.
- Two color eye would keep controlling the welding temperature stable.
- Two color eye would alert when irregular welding temperature is found despite of the temperature control.

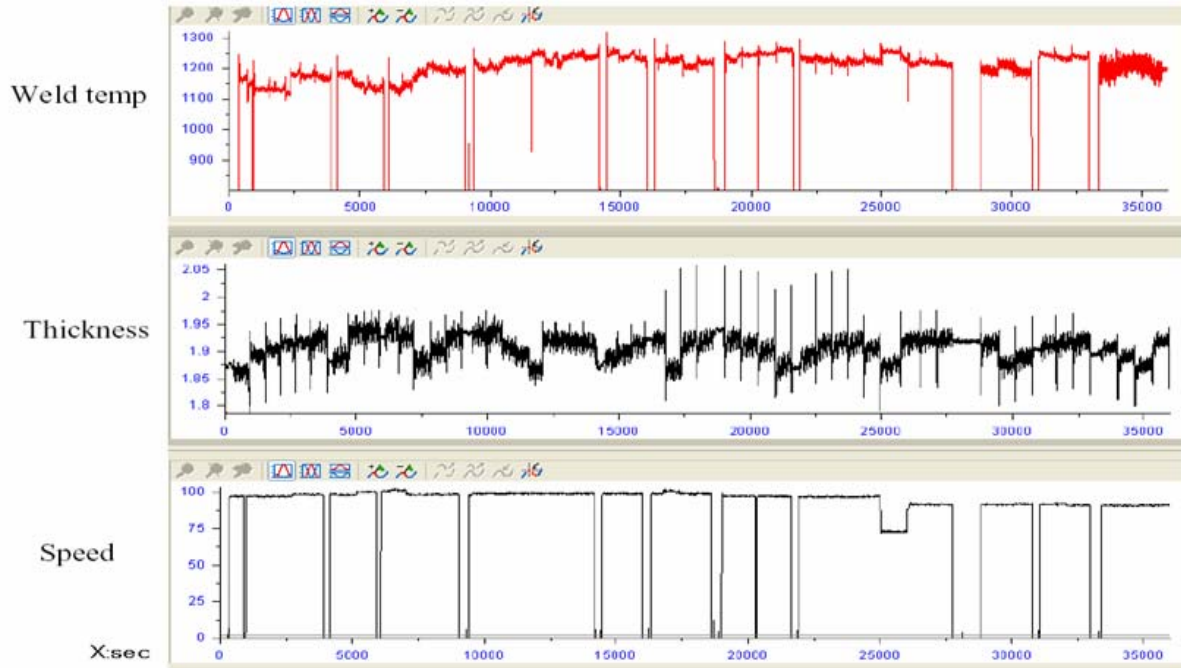


EFFECT

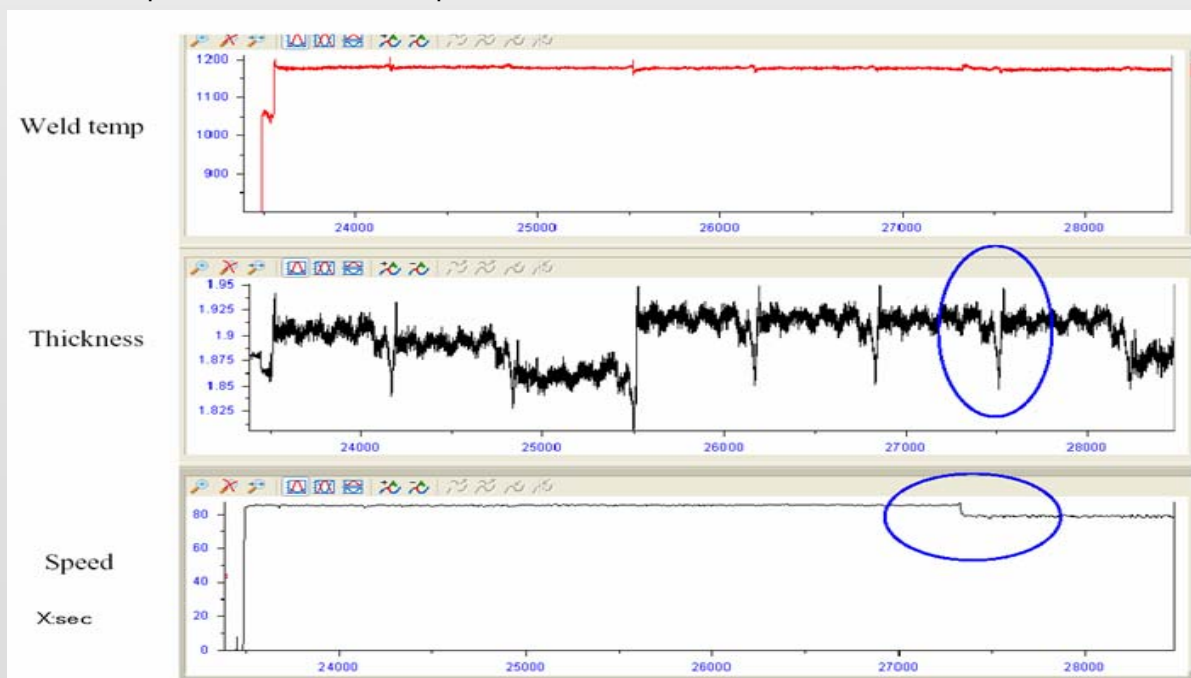
- PID controller works for two color eye.
- The followings are the actual data in a certain company.



In case of the controller is not used. (Welding temperature fluctuates due to hoop thickness and line speed.)



In case of controller is working. (Welding temperature is well controlled even when the hoop thickness and line speed fluctuate.)



Good results of temperature control.

MAINTENANCE

- Normal maintenance
 - Cleaning of optical parts
 - Cleaning with a cotton bud on the optical head is required only once a week.
 - One-push temperature calibration should be checked everyday.
- Periodical maintenance
 - Check and correction of the sensor and automatic calibrator is required.
 - We calibrate light /electric signal converter sent back from you.

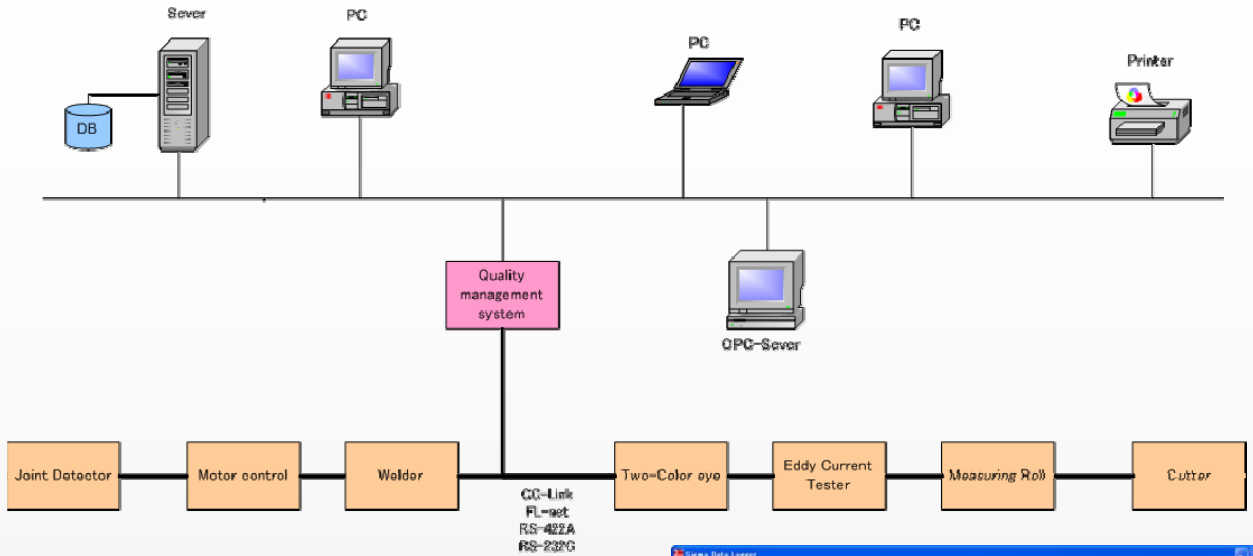


DIMENSION

- Main Unit
 - 530 × 570 × 1590 (mm)
 - 20.87 * 22.44 * 62.6 (in)
- Cooling Box
 - 530 × 460 × 470(mm)
 - 20.87 * 18.11 * 18.5(in)
- Recorder
 - 180mm (7.09 in) chart width
 - 2pens(standard)
 - 1ch:Temperature
 - 2ch:Wedling Control Voltage
- Optical Fiber
 - $\Phi 20$ (0.78 in) × 8m (26.67 f)
- Operation panel
 - 10 inches Touch panel

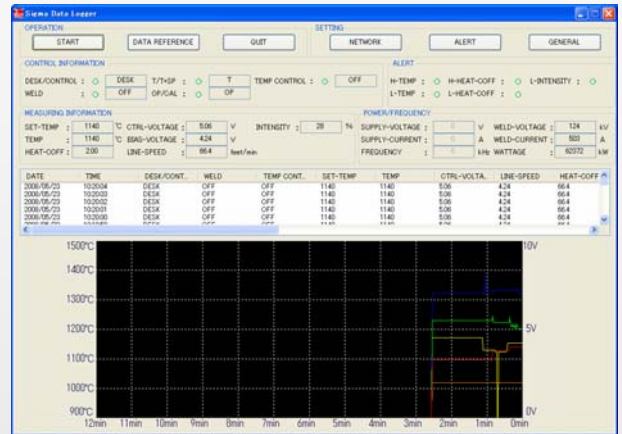


DATA LOGGING



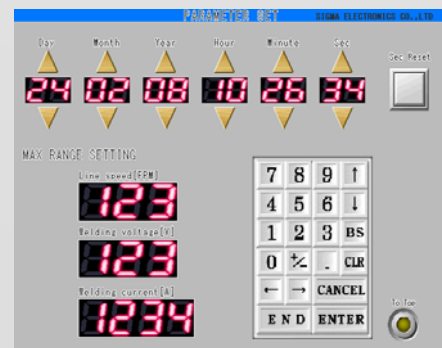
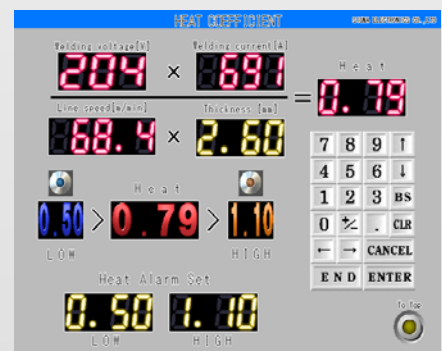
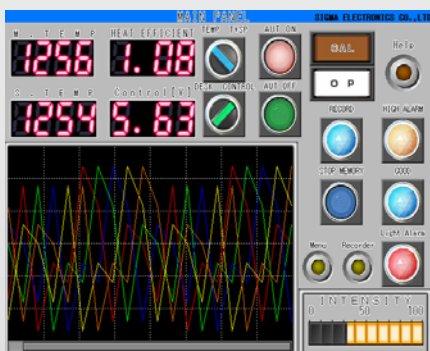
● Data about ERW manufacturing process are measured.

- Real time display
- Database record
- Summarized and printed
- Check and analyze over defective tubes



OPERATION PANEL [sample]

※Sigma Data Logger



CUSTOMERS 1

DOMESTIC		
ERW and Quenching (Temperature measuring and welding control)		
Company Name	社名	Country
Sumitomo Pipe & Tube Co., Ltd.	住友鋼管(株)	Japan
Nittetsu Steel Pipe Co., Ltd.	日鉄鋼管(株)	Japan
Maruichi Steel Tube Ltd.	丸一鋼管(株)	Japan
Hokkaido Maruichi Steel Tube Ltd.	北海道丸一鋼管(株)	Japan
Kyushu Maruichi Steel Tube Ltd.	四国丸一鋼管(株)	Japan
Shikoku Maruichi Steel Tube Ltd.	九州丸一鋼管(株)	Japan
JFE Steel Corporation	JFEスチール(株)	Japan
Nagoya Pipe Co., Ltd.	名古屋パイプ(株)	Japan
Daiwa Steel Tube Industries Co., Ltd.	大和鋼管工業(株)	Japan
Okajima-Pipe Co., Ltd.	岡島パイプ(株)	Japan
Mory Industries Inc.	モリ工業(株)	Japan
Nisshin Steel Co., Ltd.	日新製鋼(株)	Japan
Nisshin Kokan Co., Ltd.	日新鋼管(株)	Japan
Toshida Kogyo Co., Ltd.	トシダ工業(株)	Japan
Hitachi, Ltd.	(株)日立製作所	Japan
Etc.	等	
Quenching & Annealing (Thermometry)		
Kansai Electric Power Co., Inc.	関西電力(株)	Japan
Institute of Nuclear Fuel Development	動力炉核燃料開発事業団	Japan
Mori Kougyo K.K.	モリ工業(株)	Japan
Sumitomo Osaka Cement Co., Ltd.	住友大阪セメント(株)	Japan
Ehime University	姫路工業大学	Japan
Nippon Yakin Kogyo Co., Ltd	日本冶金工業(株)	Japan
Futaba Sangyo K.K.	フタバ産業(株)	Japan
I.H.I	石川島播磨重工業(株)	Japan
Etc.	等	

CUSTOMERS 2

OVERSEAS	
ERW and Quenching (Temperature measuring and welding control)	
Chung Hung Steel Corporation(中鴻鋼鐵)	Taiwan
Mayer Steel Pipe Corporation(美亜鋼管)	Taiwan
Tension Steel Industries Co., Ltd.(天聲鋼鐵)	Taiwan
Founder Land Co., Ltd.(逢聯企業)	Taiwan
Vulcan Industrial Corporation(世全鋼鐵)	Taiwan
Shang Hsing Steel Industries Co., Ltd.(祥興鋼鐵工業)	Taiwan
Shye-Shyang Mechanical Industrial Company Ltd.(協祥機械)	Taiwan
Maruichi Metal Product Co., Ltd.(丸一金属制品)	China
Guangzhou You-ri automotive parts Co.,Ltd.(広州友日汽车配件)	China
Wuxi TSD Co.,Ltd.(無錫TSD汽車部件有限公司)	China
Vietnam Mayer Co.,Ltd.	Vietnam
Vietnam Steel Products ,Ltd.	Vietnam
PT. Indonesia Nippon Steel Pipe	Indonesia
P.T. Indonesia Steel Tube Work, Ltd.	Indonesia
Matsushita Refrigeration Industries	Malaysia
Auto metal Co., Ltd.	Thailand
Premium Steel Processing Co., Ltd.	Thailand
Siam matsushita Steel Co., Ltd.	Thailand
Thaisteel Pipe Industry Co., Ltd.	Thailand
Allied Tube & Conduit (Illinois)	USA
Century Tube Corporation	USA
Allied Tube & Conduit (Philadelphia)	USA
Tectron Tube	USA
Creform Corporation	USA
Siat S.A.	Argentina
Etc.	

History

- 1961 : Research and development ~Dichroic-radiation thermometer
- 1964 : Sigma Electronics Co.,Ltd. is Established
Developed Dichroic-radiation thermometer "Two Color Eye"
- 1965 : Developed Temperature controller "R-180-FHCC"
- 1970 : Developed Thermometer "D-100-FM"
- 1982 : Developed Temperature controller "AR-1802-FHCS"
- 1986 : Developed Thermometer "D-114-FMA-S"
- 1993 : President was awarded the prize by the chief of the Science and Technology Agency in recognition of his service for "the invention and development of the pyrometer and temperature controller for industrial use".
- 1994 : President was awarded a Yellow Ribbon Medal by the Emperor of Japan in recognition of his service for Japanese basic industries to strengthen their competitive position in world market by enhancing the quality control technology in the steel and pipe manufacturing industry.
- 1997 : Developed Temperature controller "TPR-10-FHS"
- 1999 : Developed software to assist temperature controller
- 2001 : Software division was established
- 2002 : Developed "The quality control system of the welded tube"
- 2003 : Affiliated company, Sigma Software System Co., Ltd. was Established
- 2004 : Developed "High frequency induction heating furnace"



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