RW1000 Stationary Welder (Containerized)

General Description of Stationary FBW Plant Model RW1000

Flash Butt Rail Welder Model RW1000 is designed for flash butt welding of rails with cross sections area from 4900 sq.mm up to 10'000 sq. mm under stationary condition, with flash removing immediately after welding.

The RW1000 rail-welder is ready for service stationary condition rail welding system. System can be mounted at factory or at field line, as per project conditions required. Unit is designed to run with high flash point fluid, all cables and hoses are fitted with fire proof sleeves and spiral protection. The system is complete with hydraulic pump station and internal cooling system. An electronic control system is designed to provide a stable welding process according to preset parameters and provide highest quality of welding joints.

Hydraulic power provided by custom design pump station. Electrically driven pumps provide power for the welder and oil cooling circuits. A industrial radiator type cooler complete with circulation pump provides continuous circulation of hydraulic fluid through the cooler and filter system to ensure that welding head operates within correct temperature range. The cooler is electrically driven from external power. System could be equipped with tube heat ex-changer by customer request.

Rail Welding Machine Model RW1000

Rail welding is carried out by utilizing the principle of flash resistance welding. The RW1000 machine can weld rails with a cross section up to 10,000mm^2, with flash removal device integrated within the welding head.

The welding head consists of four principal assemblies:

1. Two columns (fix and movable) with clamp cylinder/devices
2. Rack, assembled with upset cylinders
3. Welding transformers 2 PCs
4. Welding electrodes
5. Flash removal device

The welder consists of a heavy duty structural steel frame comprising a rigid base structure that supports the rail being welded. The two columns and rack of the welding machine are connected together by two guide/slide shafts. One column of the machine carries the two welding transformers and horizontal alignment gear. The other column carries vertical gear and connected to the two upset cylinders.

Vertically mounted cylinders located on the top part of each column provide the clamping force to grip the welder on the rails to be welded.

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Contact with the rail is by means of Chrome Copper electrodes, that can be changed to suit different rail sizes.

Each end of the base structure is extended and carries an entry feed roller system to ensure the rail enters the weld area in line. The alignment of rails is automatic, however, a manual override system exists to allow adjustments for special rail welding.

Powered flash doors ensure operator safety and a built in extractor system gives a dust free working environment.

A control panel mounted on the front of the welder allows the operator to set correct position of each rail for welding. The panel is complete with visual indicators that confirm status of essential parts of the welder.

The structure also carries the independently operated shear device.

System of internal passages ensures that coolant continuously flows through welding transformers, electrodes to provide correct temperature range.

Hydraulic hoses of the unit are of the multi-wire core high pressure type. Hoses are fitted with fire proof sleeves and spiral protection.

Range Of Application

RW1000 welding machine is designed for flash butt welding of rails to continuous string at stationary condition of rail section up to 10,000 mm² of different grade material by regular and pulse process.
-minimum length rail to weld 0.8m (for test welds)

Production Rate

Up to 15 welds per hour (flash removal included) for regular process
Up to 25 welds per hour (flush removal included) for pulse process
Note: production rate depends on site conditions.

Advantages of the RW1000

Welding machine Model RW1000 is designed to provide highest standard on quality and tolerances of rail welding in stationary conditions with very high production pace. Welding machine model RW1000 completes a welding cycle from aligning to flash removing in one automatic sequence.

Hydraulic system of RW1000 welding head equipped with hydraulic accumulator circuit that provide high upset velocity to ensure good welding quality on rails with high Si content or modern rail steel materials.

RW1000 stationary Flash Butt rail welding machine - smaller and lighter compare to similar machined of other manufacturers, mostly suitable for the stationary rail welding plant conditions, but also can be used as a field unit for welding string. RW1000 stationary FBW welding

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plant will be fit in standard shipment containers for easy mobilization, set up and re-location.

Low power consumption (220 KVA) and low energy consumption (2.0 KW/h for one weld of 60 kg/m rail type). Power factor is not less than 0.8.

Another advantage is minimum rail metal consumption during Pulse Flashing (10-15 mm) and short upset (9-12 mm).

Clamping System and Precise Alignment

Welding machine model RW1000 has a clamping system of two vertically mounted cylinders that clamps the rails in top/foot with high force, to achieve required clamp force. This makes sure that the rails do not slip during welding and upsetting and thus contributes to high quality welding.

Alignment provides by mean of alignment rollers and system of alignment shields and knives. Plant equipped with automatic alignment system and also have possibility for manual adjustment by vertical/horizontal gears.

Technical Data RW1000

RATED VOLTAGE MAINS/GENSET	380V/50Hz
RATED PRIMARY CURRENT (50% DUTY CYCLE)	800 Amps
RATED POWER (50% DUTY CYCLE)	300 KVA
RATED WORKING HYDRAULIC PRESSURE	1800 PSI
RATED UPSET FORCE	800 KN
RATED CLAMPING FORCE	2000 KN
UPSET SPEED, NOT LESS	30 MM/SEC
ALIGNMENT, WITHIN	0.2 MM
MASS	8800 KG
OVERALL DIMENSION (W*H*L)	1170x2665x3620mm
PRODUCTION RATE	15 WELDS/HR (Regular process) 25 WELDS/HR (Pulse process)

NOTE: production rate depends on site conditions and efficiency

Modern Control and Review System

The automatic weld process controlled by Allan Bradley Controller CompactLogix proofed in more than 200 welding plants around the world. Control circuits with current, pressure, voltage and distance transducers integrated with Allan Bradley controller CompactLogix along with Weld Monitoring Solution (WMS) weld analyzer system record of the most important parameters, control and monitoring welding quality. Modern system of current and voltage feed backs automatically compensate

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deviations which occur during the welding process. The system can store a wide range of welding programs

Welding Machine control consists of:
-Allan Bradley Industrial CompactLogix Controller with self-diagnostic for the automatic working sequence of the machine incorporated in electric cabinet. Industrial Controller CompactLogix control and regulate the whole weld process according with selected welding parameters program.
-operators control panel (located at welding head) for the machine function.
-net of emergency stop buttons.

Typical sequence of welding program as follow:
a) preheating stage
b) flashing/pulse stage/s
c) boost stage/s
d) upset (usually within 12 mm at selected hydraulic pressure)
e) forging stage
f) shearing of excess weld material
g) release of machine from rails

Single phase power is controlled from the electronic power logic system. The control of the voltage is by means of two large capacity SCR devices. Special control cards are used to control the voltage output. These control cards are complete with the necessary safety and control devices to ensure correct welding voltage parameters are maintained.

The ALLEN BRADLEY control unit can receive modified welding data via an IBM compatible computer interface. This feature allows for reprogramming to weld various rail sections and rails with different metallurgy. The programmable controller has process control program logic to maintains a required current density at the weld process. This density is controlled via feedback and signals to a hydraulic servo control valve in the welder operating circuit.

Electric Cabinet

as part of the control system, comprising:
-Circuit breakers and starters with thermal and magnetic cut-out, 0-voltage cut-out
-Protective circuits
-WESCON voltage control board designed for voltage control
-SCR assembly
-Current and voltage transducers
-Servo valves control boards
-Air cooling circuits with filters
-Allan Bradley Industrial CompactLogix Controller

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-Weld Monitoring Solution (WMS) Computer with independent power supply
-24VDC and 10VDC power supplies
Weld Monitoring Solution analyzing system

Weld Monitoring Solution analyzing system

Welding plant fit with computer based Weld Monitoring Studio recording system designed to monitor critical parameters of welding process that include:

a) Voltage
b) Current
c) Displacement
d) Forging force
e) Time

The Weld Monitoring Solution is designed specifically for the management of welds produced using the flash-butt process. The Weld Monitoring Solution relies on the Distance, Current, Voltage, Pressure transducers (and timers) in providing a reliable and high quality analysis of each weld.

Welding charts can be viewed on a monitor or in print form (hardcopy or PDF). At the end of each weld will show weld result on the screen, the system also provides calibration routine for transducers and welding parameters adjustment. Detailed welding data is stored for retrieval at the operator's convenience.

System equipped with two monitors: one at control room and another at operator station.

The original weld data are recorded and stored on the Hard Disk and can at any time later be recalled for analyzing or print out. The full original weld data are digitally stored (not only the graphic curves) which allows later recall with all details. Every weld will be stored in individually named file at folder related to the date of weld committed; project, customer, welding date and time, welding site, program name, welder serial #, location and related information is added to every welding file.

Reading from transducer taken over 100 times per second (at crucial areas) that provide extremely accurate reading, all data string can be easily accessed for review. Zoom functions allow showing important details of the individual curves. Base on recorded data system make conclusion on weld quality.

Weld Monitoring Solution consists of:

Hardware

- Pentium computer industrial version
- Color display, 2 PCs
- Back-up set

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- Keyboard and mouse

Software

- Operating system WIN10(or above), licensed version
- Weld Monitoring Solution, licensed version
- Weld Monitoring Solution Viewer Software, for office use
- Restoration software

Hydraulic Unit

The hydraulic system consists of the electric motor driving the REXROTH pressure variable pump. The pump and motor are mounted on top of a reservoir unit (tank) at 250L volume. The reservoir is equipped with oil level warning floats, temperature control switches, level indicators, return line filters, breathers and internal magnetic dirt traps.

REXROTH pump is designed to allow for remote (automatic) pressure control via a proportional relief valve. This valve system is pre piped and mounted on the reservoir. A high pressure filter system is mounted to the pump pressure port.

An electrically driven hydraulic pump is used in a constant pressure mode to provide power for all movements of the welding head and circulation circuit.

Sequence controlled (via programmable controller) solenoid valves ensure that the process of the weld production is correct at all times.

An external cooling circuit is installed and this consists of an additional hydraulic pump which circulates oil through a large capacity air/oil cooler. Flow from the cooler is directed through the return filter back to tank, thus ensuring constant cooling and filtration.

The system is fitted with high temperature and low level warning lights. A low level "SHUT DOWN" system is also fitted to the reservoir.
System could be updated by oil/coolant heat exchanges per Customer request.

Cooler

Stationary Plant RW1000 equipped with powerful cooler unit specially designed for FB Welding operation and provide accurate range of coolant temperature according with preset values. Programming/re-programming could be easily done by mean of HONEYWELL Control Panel.

GenSet (optional)

Stationary FBW Welding Plant supplied with modern GenSet of 500kVA (or over) provides power for all welding plant's needs (CAT C15 or similar) in standard silence housing. GenSet has protection circuits with external socket breaker and emergency stop circuit.

Optionally (by request) Plant can be set up to utilize outside adequate main line power.

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Container

Stationary FBW welding plant will be supplied in standard shipping size containers modified for on site welding production. With one container content welding plant with hydraulic pump station and cooler, another container content control room with all related equipment and panels and separate GenSet with silence housing providing electric power for welding purposes.

Commissioning and Start - UP

RW provides a 21 calendar day in country visit for set up and commissioning as a part of equipment contract.

Commissioning service includes:

- setting welder into operation
- training and certification of customer's personnel
- assistance during production start-up

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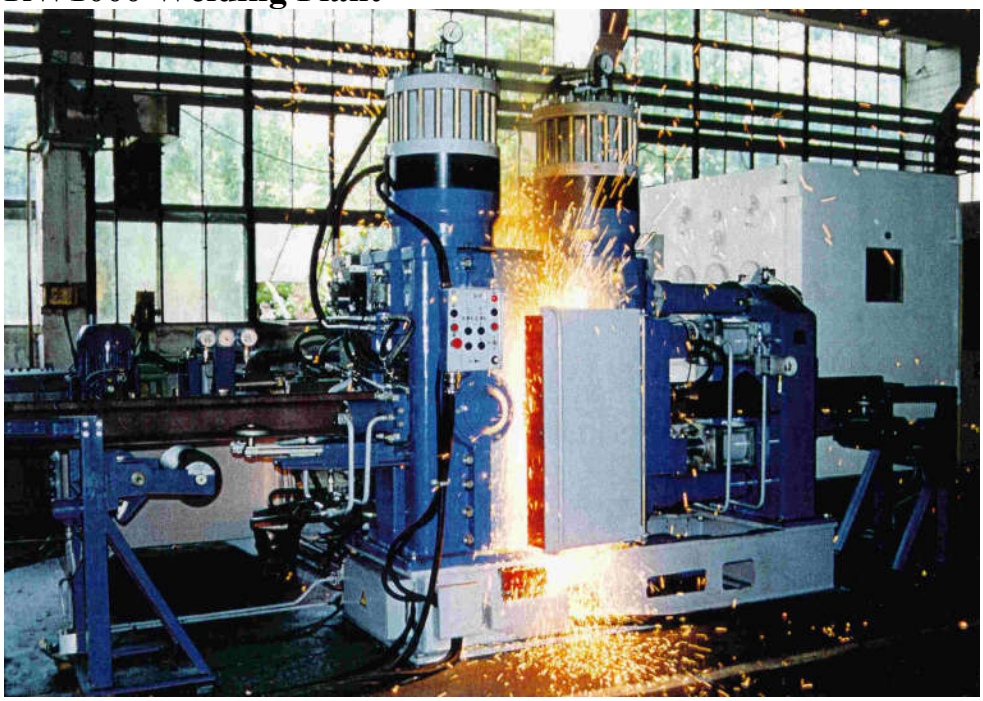
RW1000 Welding Plant



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APPENDIX A. RW1000 LAYOUT (for reference only)