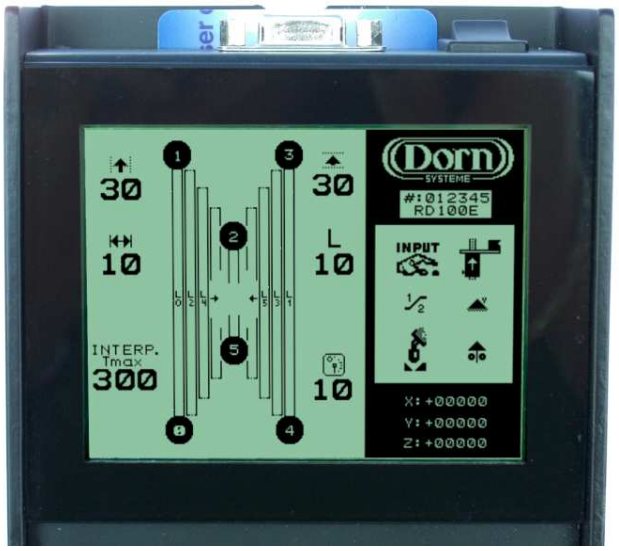
RD 500 / RD 200 HardFace
Repair Welding of Manganese Rails

Overview Parts

- Special hard facing program for high quality, easy work.
- 3D Real time computing, RD 500 for up to 3 meter, RD 200 for up to 30 meter.
- Positioning by Teach-In points with easiest set-up and adjustment.
- Simplified operating system with Auto-Start by chip-card.
- Easy mounting directly at rail bottom with fast mounting clamps.
- Easiest handling by one man.

System Parts

1 Remote Pendant Control RD100E
2 Drive Unit and Weaver
3 Distance Support
4 Drive Rail, standard length 1.5 / 2 m
5 Weaving Arm, 40 cm
6 Distance Rail, 30 cm
7 Turn able Gun Holder
8 Mounting Knob Drive Unit
9 Mounting Knob Support
10 Chip-Card with *HardCrane* Auto-Start
11 USB and RS232 Port
12 Power Supply (42/120/230 VAC)
13 Infrared Thermometer (up to 550 ℃, Option: Auto-Temperature-Control)



RD 100E (Evolution)

Remote Pendant Control for easiest handling

- Optimised operating program *HardFace* with 6 Teach-In-Points and maximised functionality.
- Special mode for filling layers.
- Automatic Lift-Off and Start/Stop dwell times.
- Automatically adjustment of XYZ-positioning with memory function.

- USB- and RS232-Port for data transfer.
- Chip-Card slot for special weld data.
- Computer-Aided Quality Management.

Worksheet Repair Welding of Manganese Rails

(Preparation and General, Step by Step)

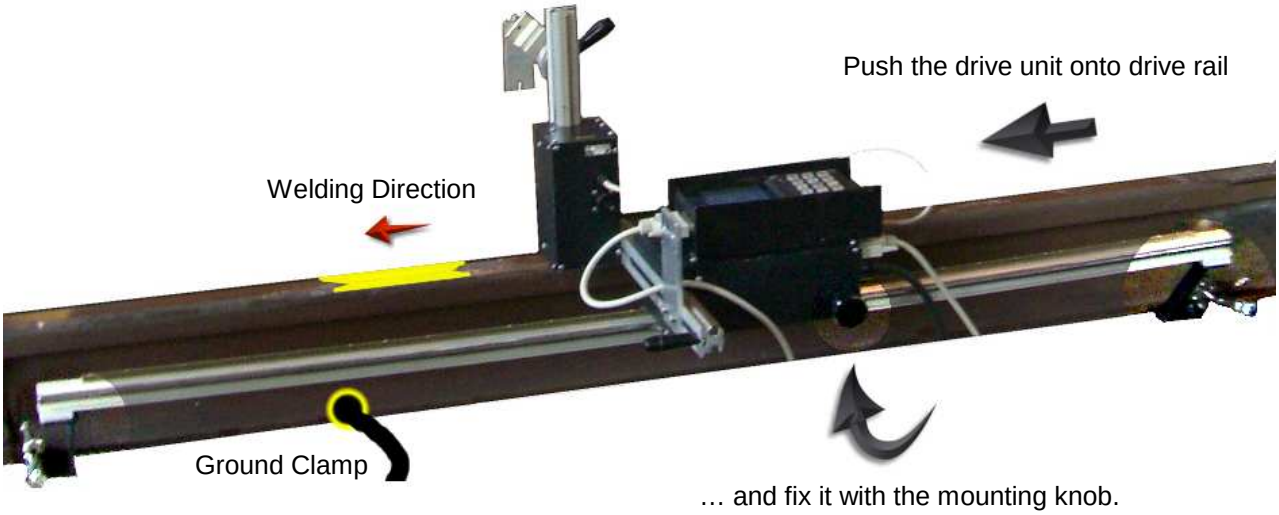
I) Preparation

Clean surface from all dirt and oil and remove deformed or work-hardened parts by grinding. Don't be too much economical in grinding. If the earlier used wire is unknown, grinding should be done as much as needed, to receive only original ground material of rail.

Manganese rails are sensible against high temperatures. If repair has to be done again and again, two or three build-up, buffer layers should be foreseen at grinding time.
Crack- or edge-filling should be done with appropriate build-up materials before hardfacing.
Deposit thickness of hardfacing layers should be less than 8 mm, depending on wire and drive parameters, two or three layers maximum.

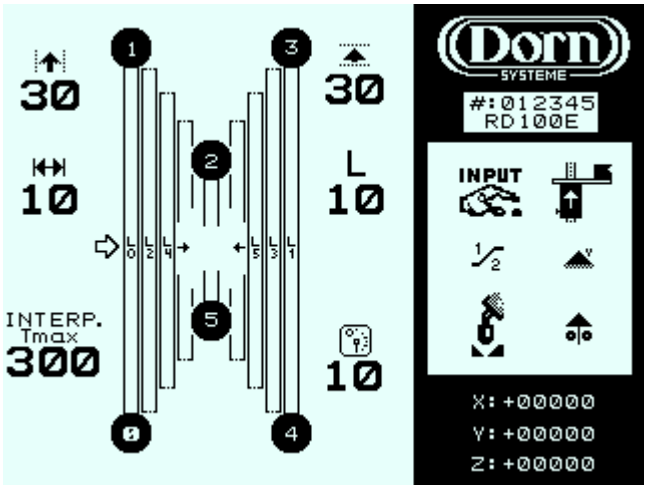
II) Mounting of the Welding Unit

Special positioning adjustment is not needed and mounting can be done at left or right side. Because of the torch-package and cable connection, the preferred position should be closer to wire feeder.



Prepare power source and wire feeder, and fix the ground cable close to planned welding.
Mount the torch with turn-able gun holder and fix it vertical to work-piece.

III) Setting of Teach-In-Points



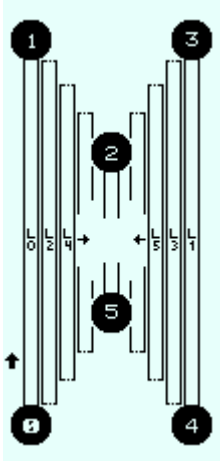
The remote pendant control RD500E shows the optimised welding program for working with 6 Teach-In points.
All welding parameters, which needs not to be changed (Start/Stop dwell, Lift-Off, manual speeds), will be calculated in the background and can be adjusted in Set-Up mode.

Description of Symbols

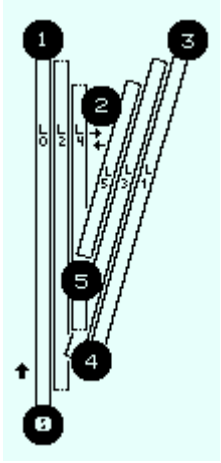
- Drive Speed
- Distance to Layers
- Weaver Width
- L Longitudinal Layer
- Count Down Timer
- Tmax Temperatures
- Active points will be shown in **BOLD**

Variations of Teach-In Points

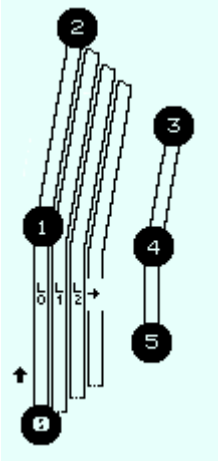
2 area straight rail



2 area frog part



single area bend rail or edges



Movement and adjustment of parameters will be done the same way as working with standard program. Use key INPUT to select movement and positioning mode and use keys , , , , , to move the torch above point P0. Adjust wire Stick-Out with 30 to 35 mms and fix this point with buttons + . Continue Teach-In with P1, P2, P3, P4, P5 to set all points.

Select point P0 with keys + , and press + to activate auto-positioning movement in direction to P0. In fast mode drive, the unit will stop above P0.

IV) Preheating

For preheating, manually drive the unit to end of rail , .

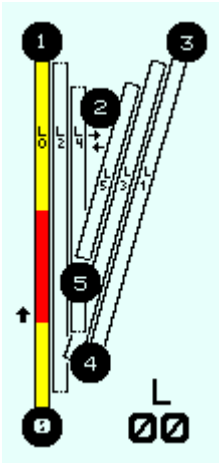
Preheating temperature depends on rail material, wire and welding power.
The rail should be heated up with equally tempered scale and extensive areas. At cold weather underneath of 20 °C, this should be done carefully without creating of *hot spots* –don't be impatiently.

V) Filling Layers
(…if needed)

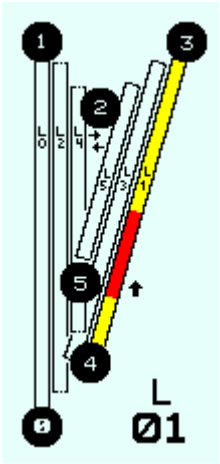
Choose crack resistant, appropriate wires, which can be deposited in an unlimited number of layers.
Select point P0 and press keys + to activate auto-positioning movement in direction to P0.
Manually drive the unit to start-position of filling layer. Use buttons + to change to edge filling mode .

Move the cursor to layer number L and use keys , to select L00 or L01.
If layer L00 is selected the unit will follow the left edge (zero-line), otherwise it will follow the right edge.

L00 is selected and drive will follow parallel to line 0-1,



L01 parallel to line 4-3



The width of filling can be adjusted from 0 (line) up to 20 mm, small amplitudes are preferred.
Please check interpass temperature.

Start welding with key . Welding can be stopped anytime with button or with dwell times and lift off.

Filling should be done as often as needed to get a solid closely flat surface. Small rolls at beginning and end of weld, will be planed from following complete layer.

If more than one filling layer is needed, the following layer should overlap the previous layer (some mm), to reduce tension of rail. -This should be foreseen at grinding time.

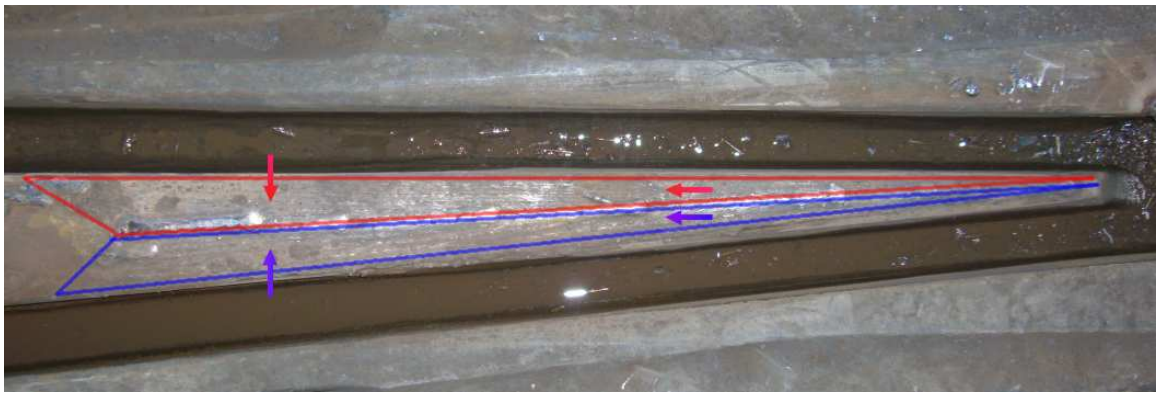
If edge filling is completed, use buttons + to change back to standard hardfacing mode .
Select point P0 and press keys + to activate auto-positioning movement in direction to P0.
The unit will drive to position of P0 in fast mode drive.

VI) Standard Hardfacing

Creating of buffer- or filling-layers can be done the same way as hardfacing layers. The movement parameters and welding area can be the same. For thickness control the movement speed can be changed, but for less rail tension and best connection, weld direction should never be changed. Choose crack resistant, appropriate wires, which can be deposited in an unlimited number of layers.

For hardfacing, change wire, position the unit above P0 (+), check preheat temperature and start welding ( ).

Observe welding and check interpass temperature. If the rail gets too hot, adjust Count Down Timer with higher amount. The unit will change between left and right layer lines until the two areas will overlap at mid of rail. Movement and positioning will be done automatically and the count down time should be used to clean next start position and cut off wire, for better ignition.



Before automatically start of every run of line, the display will show a message. Please protect your eyes from flash. If more time is needed, program can be interrupted with key or and continued again with key .

General Advice of Work

Welding at big parts, means very high mechanical stress for the work-piece. To make it happen, some basic rules should be noticed. For manganese hardfacing, interpass temperature is much important. If you cool down the rail with water beneath, please prevent weld surface from water drops, e.g. by swimming cover out of cork.
For highest hardness, also the cooling down should not be too fast and special isolation will be needed.

Please follow the general guidance notes from wire producers and welding technology institutes. For every work, a welding procedure specification sheet must be available and should be followed. Our units will easily support your quality management system and all advantages with computer aided quality assurance and documentation should be used.
Final responsibility must be that of the builder/user.

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