

## RD500AS / CMS Hard-Facing

Optimised welding robot for manganese steel rails, frogs and crossings  
3 axes unit for automatic work, prepared for 4 axes joint welding

### System Overview



Complete system with *Miller* power source, feeder and gun

Easy to handle system for fast mounting and *In-Situ* reconditioning with Multi-Area, Multi-Layer welds and predefined, optimised welding parameters for all kind of hard facing work at various rails, frogs or crossings.

Specialised Auto-Start-Program for every job.



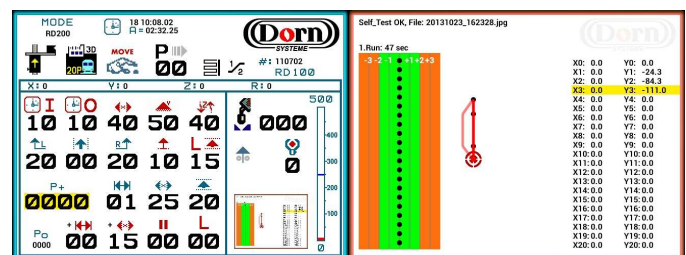
Welding unit RD500 with optional remote RD100E



Android Tablet, wireless Remote and Quality Management

Provable welding functions and documentation by Android Tablet or Phone. Permanently memorised welding parameters, 3D-positions and distances.

Integrated Quality-Management and units Self-Test. Easy to use, without special computer knowledge.



Self-Test documented 100% repeatability of speeds & positions



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**System Components for Worldwide Outdoor Use**

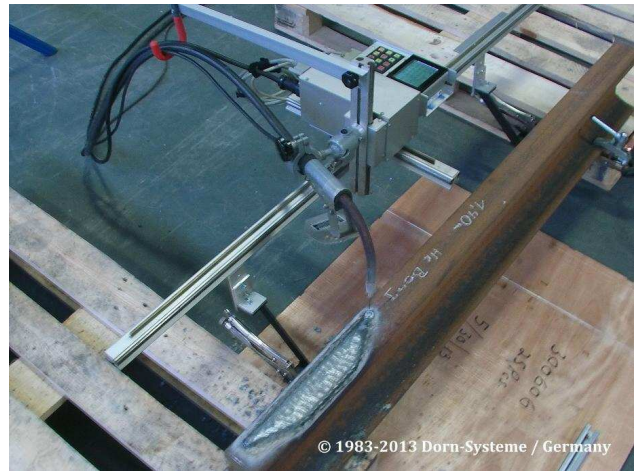
*XMT 350* Power Source with 1 or 3 phase, 50/60 Hz input with Auto-Line function for extremely constant output power. Wide range of input power, fluctuations because of long line connection or generator, are tolerated.

Switching power supply *NT72* to RD500 can be used from 100-240 VAC, 50/60 Hz input.

*SuitCase X-TREME* wire feeder for constant feeder speed also with package length of 4.5 m.



Power Source. Wire Feeder, Power Supply



RD500AS/CMS, movement area: 1300\*400\*200 mm

**Special welding sequence for fast line-mode welds  
with self shielded wires**

Line-Mode welding with constant movement and small size, fast oscillation

Straight lines, also at rough surface, will be worked out by a special welding sequence for self shielded wires. Because of more slag and gas coming out of weld, weld centre and symmetry may be a bit irregular. To prevent this and get an extremely uniform line, fast oscillation (>2 Hz) movement with small amplitude (0.5 mm – wire diameter) is used.




This method guarantees for best connection to work piece and wash-out inclusions of slag or dirt.


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### Multi-Area Teach-In and Special Functions


#### Setting of Teach-In Points

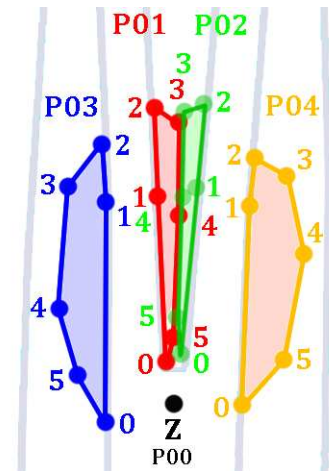
For repeated works at same rail, or different rail of same type, all needed areas can be predefined. For all areas, the reference-point P0000 from program P00 is used as Z-zero-point and all coordinates X,Y,Z are set to zero. All other points from all areas use this point P0000/00 as reference and can be set wherever needed. At repeated works, drive rail will be mounted at same position and only point Z P0 has to be newly set. All other points are memorised permanently on Chip-Card, internal or external memory.

To predefine all points and areas, up to 4 layers with 4 different sized areas can be used. Smallest areas are fixed in program P01, P02, P03, P04. Every area's position and size, will be adjusted with 6 Teach-In points 0-5 and setting occurs easily by manual movement to the point and pressing buttons OFF  + PLUS . All programs (P01,02,03,04), which belong to the same layer are marked as multi-area program .

To separate one multi-area from the following, the next program (P05, P10,P15,P20) is marked as NO multi-area .


Next layers with a bit larger sized areas and different positioning can start with programs P06...P11...P16.

After input and setting of all parameters, points and areas, the complete welding procedure can be permanently memorised by pressing of button SAVE .











To have fast and easy work with optimised results, for every kind of crossing, frog or rail, the specialised welding data can be used and welding can start directly after setting of Zero-Point Z and switching to start-program (P01,P06,P11,P16).

#### Special Functions

For examination and testing of positions, areas and movement of unit, some helper-functions are integrated. By switching off the torch symbol , complete sequences can be done without welding.

Special additional Keyboard-Functions:

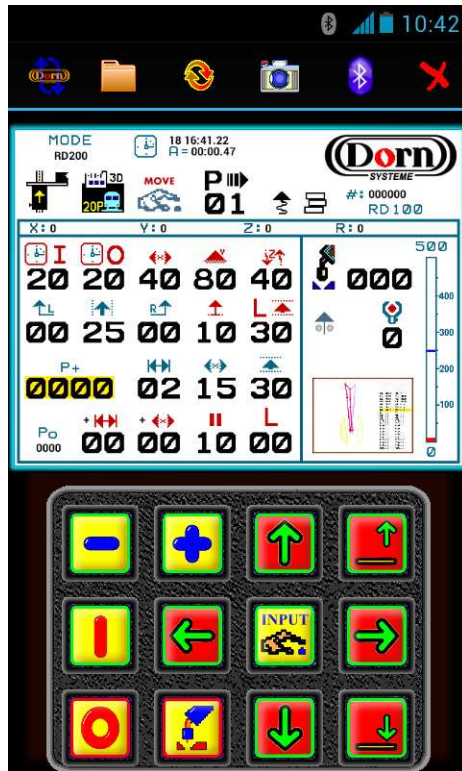
-  Drive and automatically movement to activated point P0000-P0005 inside selected area.
-  Drive and automatically movement to calculated START-Position of this line L00-LXX.
-  Drive and automatically movement to calculated END-Position of this line L00-LXX.
-  Drive and automatically movement to calculated X and Z-Position inside of this line LXX.

For setting of additional weld-lines, parallel to points P0000, P0001, P0002, the unit can be switched from Area-Mode  to Line-Mode . Start-position can be wherever needed and welding can be stopped with button GUN  (with dwell and lift-off) or button OFF  for immediate end of weld.








*Android powered Tablet or Phone*  
 -for Quality-Management and wireless Data-Transfer  
 -with Android Application RD2000\_32.apk

### Screenshot from Mobile Phone

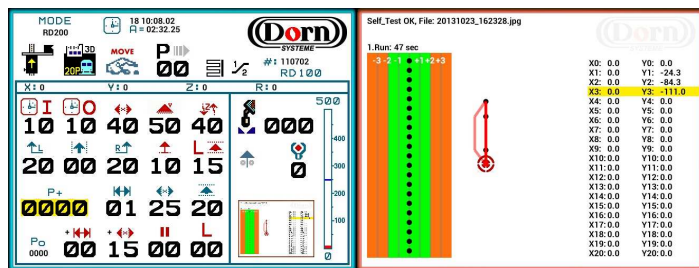


Easy-to-use touch-screen display to view all functions and parameters to fully control the welding robot. All features for positioning, teach-in, wire-feeder, fine adjustment while welding, will be sent without dwell.

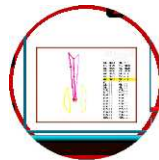
### Main Menu

-  Open File-Explorer to create new workspace, view files...  
...touch open folder to close and navigate backwards.
-  Load / Save welding parameters, load default...
-  Make photos for documentation, saved to folder "Camera".
-  Wireless connect to specified unit, or disconnect.
-  Save actual data and EXIT program.

### Self-Test program for QM...

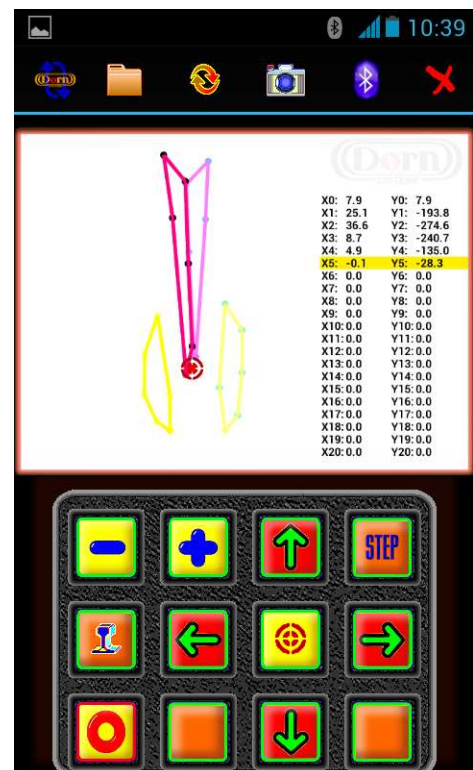


The main screen shows a small picture of actual points, areas and gun position. By touching main screen, it changes between standard and expanded shape-view.



In Shape-View, all used points and areas can be viewed to prove and examine to have right parameters and program. At the right side, X and Y coordinates of the first 21 points are displayed. The yellow marked line shows the last used point accompanying to the actual program or area. Distances can be viewed in steps or mm and can be used to calculate real sizes and costs of weld.

The keyboard-view always switches to useable, possible functions for the actual mode. In mode Shape-View, arrow keys are used to position the shape inside display and buttons plus, minus can be used to resize and adjust.

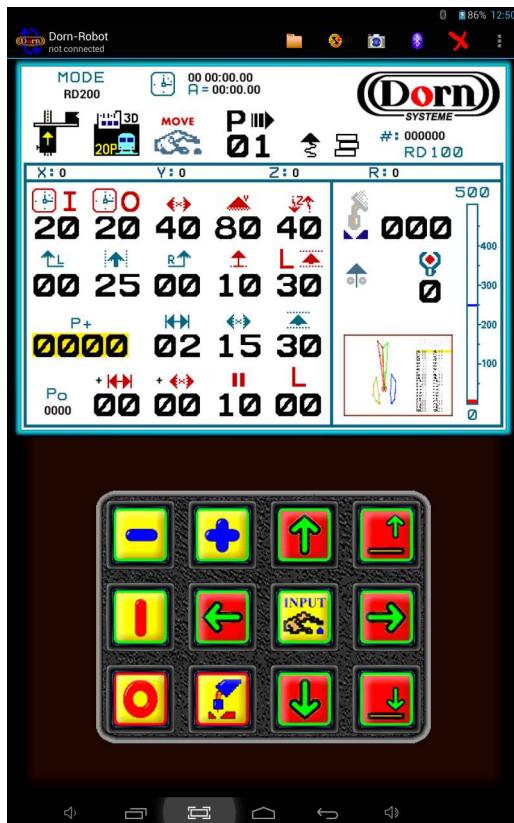


## Android Powered Software

For all kind of Android phones or tablets, one single application *RD2000\_32.apk* can be used.


Android device's minimum requirements are display resolution of 800\*400 pixel (phone), dual core processor with 1 GHz, Android version 4.0.3, wireless support and second backside Camera for photographs or videos. – all newer units will be supported.

All needed functions for easy and wireless remote of welding units, quality management and documentation, camera functionality and an optimized file-explorer, are included. For every workplace a new folder can be created and all files, corresponding to this job, will be memorized inside of this folder. Folder structure and file names will be created automatically for easy to find and organize repeated works.




### Main Functions


Create a new folder for your workspace.

-press menu *Explorer* .



-open main Explorer menu .



Choose *New Folder*  and create your workspace.

Return to RD2000 app with *BACK* .

Connect via Bluetooth  with your welding unit.

Most functions are one-click, self-explaining and no special computer knowledge is needed.

Open menu *Transfer Data...*  to:

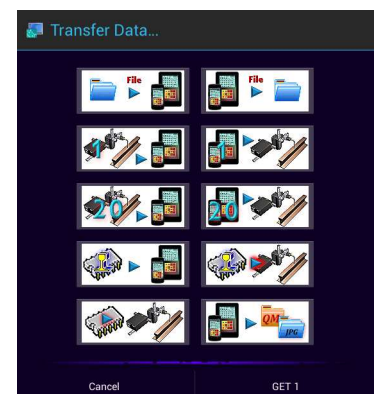
Transfer file with all welding parameters from/to welding unit.


Transfer single welding program or parameters from/to welding unit.


Transfer all 20 welding programs or parameters from/to welding unit.

Transfer special joint-welding data from/to welding unit.

Transfer special welding program or create quality-management-file.



Use menu *Camera*  to create photographs or videos for documentation of your work.

Use main *Menu*  to initialize units self-test or load default welding parameters.



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### **Temperature Control by Welding Sequence and Count-Down-Timer**

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

For automatically control of rail temperature, for every area, a count-down-timer is used. After every line at one area, the welding unit changes position in direction to next line of next cooled down area, to spend time.

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 hard facing, interpass temperature is much important and should be checked continuously by infrared thermometer and count-down-timer should be adjusted. If you cool down the rail with water beneath, please prevent weld surface from water drops by swimming cover out of cork.



Two area welding at frog part, for best edges