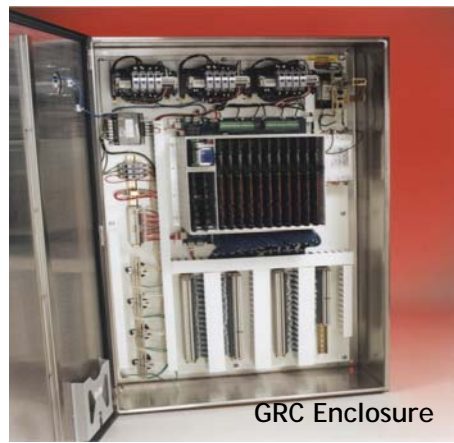


Graphic Rapper Controllers for Electrostatic Precipitators

Smart, highly functional rapper control system for optimal ash removal

Intelligent control of mechanical rappers on electrostatic precipitators is vital to efficient particle removal. NWL's Graphic Rapper

Controller (GRC) is an outstanding rapper control system with tremendous functionality, programmability and diagnostic capability.



Graphic Rapper Controller Product Overview

The GRC consists of three major components:

- **Smart CPU (S-CPU)** – our S-CPU is the most powerful rapper controller in the industry. It has the capacity to control up to **1024 rappers** and includes the following capabilities:
 - Provide trending data and charts for various rapper and ESP parameters
 - Store up to 5 automatic rapper programs based on boiler load or time of day
 - Diagnose opacity upset conditions and proper rapper operation
 - Manage rapping operation to enable maximum removal with minimal re-entrainment
 - Control rapping frequency, including patented **RIP/RAP** function
- **Smart Rap (S-Rap)** – the “rapper board” which executes signals from the S-CPU:
 - Interface with up to 16 rappers on a single card
 - Backup rapper control in the event of S-CPU failure
 - Up to 64 S-Rap boards can be controlled by a single S-CPU
- **Hand-Held Programmer (HHP)** – LCD display that has numerous features, including:
 - 16 line, 40 character display
 - Display trend graphs and operating data
 - Create and modify programs
 - Troubleshoot system faults



Graphic Rapper Controller Features

- **Ramped Intensity Pulse Rapping (RIP/RAP)** – NWL's patented* RIP/RAP feature applies a series of raps with increasing force to more efficiently clean collector plates. The first rap is low energy, loosening the dust layer at the top of the plate. By gradually increasing the intensity of the raps in very quick succession, the layers are sequentially dislodged and agglomerated as they drop into the ash hopper. This procedure both improves particle removal and minimizes the potential for re-entrainment.
- **Opacity Spike Detection** – this feature correlates sudden increases in opacity with rapper operation to track and identify inefficient rappers. **NWL'S GRC is the only rapper controller to incorporate this troubleshooting tool.** Requires 4-20 mA signal from opacity monitor and 2 parameter inputs (time from ESP to monitor and % spike) to the program.
- **Anti-Coincidence Grouping** – programmable feature that will prevent simultaneous firing of rappers located serially to gas flow. The program will fire the lowest number rapper in the sequence; the others will fire in succession after a timed delay. This eliminates opacity spikes due to poorly coordinating rapping sequences.
- **Power Off/Reduced Power Rapping (POR/RPR)** – the system can send a signal to the ESP voltage controller to de-energize (Power Off Rapping) or decrease (Reduced Power Rapping) Switchmode or T/R secondary voltage in the corresponding field prior to rapping. This feature improves ash removal and minimizes re-entrainment.
- **R-Scan** – diagnostic function that periodically sends a small energy pulse to each rapper to check for proper response. Allows user to conduct 100% test of all rappers within minutes.
- **Automatic Program Control** – 5 separate rapper programs can be loaded into the GRC. Program will automatically change based on boiler load or time of day. If no input is received, default program is activated.
- **Auto Lift Calibration** – the resistance of a magnetically activated rapper will increase at higher temperatures, thereby reducing its intensity. Normal wear and tear also takes its toll on these devices. This feature enables the user to set the desired rise in inches, so that there is no need to adjust rapper lift with changing weather or aging conditions.
- **Precipitator Control and Management System (PCAMS)** – the GRC can function as a stand-alone unit but can be integrated with NWL's PCAMS to enable remote operation and control of your rapper system, while linking it to your entire ESP operation.

Unmatched Capability

NWL has been the undisputed leader in ESP power supplies and controls for over two generations through constant innovation and outstanding customer support. We stand ready to assist you any way we can.

*US Patent nos. 4928456 & 5015267

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