



Nordberg TC Series Crusher Automation System





Push Productivity—and Profitability—to the Maximum

Getting an edge up on the competition means increasing productivity while keeping operating costs down. To mining and aggregate producers, this means maximizing crusher performance and minimizing downtime. Achieving this goal requires a high degree of Total Control.

The Nordberg TC Series Automation System employs proven process control technology to optimize crusher performance while protecting the machine. During operation, the system allows operators to easily monitor and control crusher station parameters. Automatic setting adjustment control eliminates the need for continuous human surveillance, which saves money by reducing costly staff time.

A key advantage of the TC System is its ability to run the crusher at maximum operational limits at all times, while protecting against overpower, overload, and overforce.

Plus, a liner wear display and on-screen diagnostics help to better predict problems and schedule maintenance. The TC System provides total machine protection for the crusher and auxiliary devices—reducing costly downtime while boosting the bottom line.

Unlimited versatility

When it comes to versatility and expandability, the TC System is unsurpassed. Operators can control up to five crushers from a single workstation. Thinking of adding a crusher down the road? Simply add it to the existing Nordberg TC Series Automation System. No need to buy additional computers.

Plus, the system is very flexible. It can operate our Nordberg HP®, Nordberg MP®, and Nordberg SUPERIOR® primary gyratory crushers, and it uses an Allen Bradley® programmable logic controller (PLC), which makes it adaptable to any crushing plant application.

Take Total Control Of Your Crusher

Superior feed rate control

No other automation system offers complete automated feed rate control. The TC System uses dual PID (proportional integral derivative loops) tuning to achieve excellent feed control. It senses cavity level and power draw, then adjusts the feeder to optimize both set points. This ensures a high choke level, which results in the most productive and cost-efficient yield.

Low choke levels not only mean lost production—as much as 5 percent—but reduced product quality. High choke feed and an even load ensure a high level of interparticle crushing, achieving the best product shape.

Three key reasons to use the Nordberg TC Series Automated System

1. Total machine protection minimizes downtime
2. Complete control of the crusher from the control room simplifies operation and reduces costly staff time
3. Maximum volumetric capacity without overloading results in improved product quality, higher productivity, and greater efficiency

Three control modes increase productivity

The TC System allows you to choose between three control modes: Manual, Auto Setting and Auto Power. Manual mode gives the operator complete control of the crusher station, including opening and closing the crusher and starting and stopping the feeder. The Auto Setting mode maintains the crusher at the desired settings, while protecting it from ring bounce and over power conditions. The Auto Power mode also protects the crusher from these conditions, while automatically controlling the power draw.

Automated diagnostics limit downtime

Motor not starting? Feeder won't run? On-screen diagnostics help troubleshoot problems by showing possible causes involving shutdowns or not being able to start the motor. This helps protect your machine and eliminates costly downtime.



The PID tuning screen can be used by authorized personnel to tune PID loops to achieve proper feed rate control.



The Programs screen allows the operator to set the desired parameters—such as power and cavity level—for the Auto Setting and Auto Power control modes.



In order for one of the devices on the right side of the screen to operate, all of the boxes to the left of it must be green. Red boxes flag potential problems.

Powerful Data Analysis Tools Help Improve Performance

The TC System comes complete with flexible data logging and trending capabilities, making it an excellent management tool. This provides you with a wide range of information you can use to improve operations and better predict maintenance needs.

Accurate data logging*

The system stores the last 60 days of data to give you a comprehensive snapshot of operations. After 60 days, the system deletes the oldest data, replacing it with the most recent information. Alarms and warnings are also logged to ensure prompt resolution of problems.

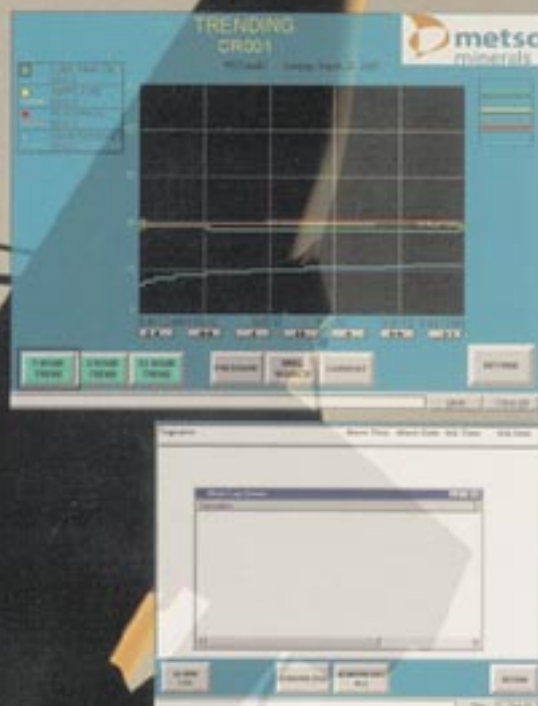
Total trending*

The versatile data trending function gives you up-to-the-minute status of operating parameters that can potentially shut down the machine. Every crusher signal is trended—including temperatures, pressures, feed rate, and power draw—so no programming is necessary. Trends can be displayed at 1-hour, 8-hour and 12-hour intervals, to help you pinpoint problems and simplify troubleshooting. The easy-to-use trending screen allows you to scroll through previous data and display actual values at a specific date and time.

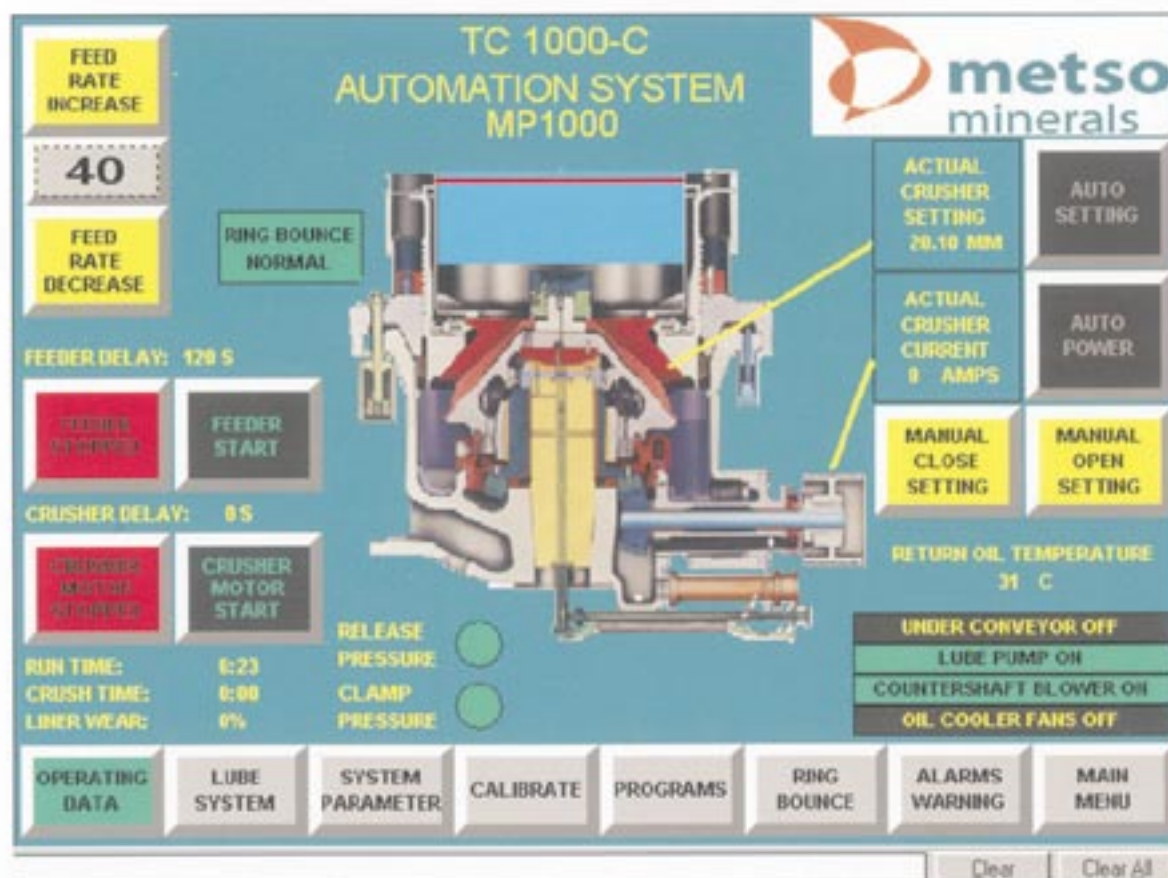
Expandable communications capability

Using an optional communication card, the TC System can communicate with virtually any existing DCS or plant control system. A data modem adds dial-in capabilities, so managers can review crusher data from a remote location. It also allows Metso Minerals service engineers to connect to the system for regular remote monitoring and troubleshooting.

* Not applicable to all TC Systems.



Constant monitoring of cavity level, power draw, and crushing force ensures maximum volumetric capacity without overloading. The result is improved product quality and higher productivity, as well as greater efficiency.



All interface screens are uncluttered, clearly communicating operating data and providing simple navigation to other functions.

User-friendly System Simplifies Operation

No automation system is simpler to use. Easy-to-read, full-color displays provide point-and-click navigation to key functions. Using the Nordberg TC Series Automation System, the operator can monitor and control the entire crusher station—including the feeder, crusher, and discharge conveyor—directly from the control room.

The system employs industry-proven Allen Bradley components to monitor every important parameter for most crushers, including:

- internal bearing temperature
- crushing force
- power
- crusher setting
- lubrication pressure, temperature and filter condition
- material level

Every aspect of the crusher and crusher station is controlled by the TC System. The entire lubrication system is controlled, including the air blower, immersion heaters, lube pump, and oil coolers. The system controls the hydraulic system, informing the operator of potential problems that may result from solenoid faults, leaks in the lines, or excessive repressurization. The system also protects the crusher drive motor against overload and starter faults. If power is too high, the system automatically takes corrective action.

The TC System delivers the flexibility and expandability operators demand. Additional connections can be made between the main motor and the TC System. For example, the motor stator and bearings can be monitored through one of these types of connections.