

# Automation Support

## Compressor Performance Algorithms and PLC Support

When a PLC does not properly model the unit it is controlling, then unit optimization is rarely achieved, issues with safety occur, and reduced operating maps are likely.

ACI not only provides dynamic compressor performance curves to operators, but the same level of performance prediction can be provided to Automation Controls so that unit is properly modeled in the PLC.

### Robust Algorithms Provide:

- Load Predictions
- Flow Predictions
- Fuel Predictions
- Pressure Drop Considerations
- Proper Rod Load Considerations
- Crosshead Pin Reversal Considerations
- Low Volumetric Efficiencies
- Discharge Temperatures
- Safe Startup Maps
- And much more...

### Also Included:

- Load step sequencing chart with load indication for automation purposes
- Alerts for any known areas of concern during compressor operation
- Fast-executing code for Gas Compressibilities and Interstage Pressure Balancing routines
- Automation Methodologies
- Comparisons between PLC-based prediction routines against those from eRCM, or other OEM software

The collage displays several key software features:

- Unit #1 2-Stage Mode:** A table showing head end pockets and head ends for various load steps (1-6) across different stages (TA, 3A, 4A, H1, H2, H3, H4).
- Compare eRCM Load Predictions to PLC:** A graph comparing suction pressure (PSI) versus flow (GPM) for different load steps, showing areas where the PLC algorithm generates a plot and where eRCM algorithms are used.
- Unit #1 Data Tables:** Multiple tables providing detailed operational data including:
  - ITEMS:** Lists various parameters like 1.0% P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20, P21, P22, P23, P24, P25, P26, P27, P28, P29, P30, P31, P32, P33, P34, P35, P36, P37, P38, P39, P40, P41, P42, P43, P44, P45, P46, P47, P48, P49, P50, P51, P52, P53, P54, P55, P56, P57, P58, P59, P60, P61, P62, P63, P64, P65, P66, P67, P68, P69, P70, P71, P72, P73, P74, P75, P76, P77, P78, P79, P80, P81, P82, P83, P84, P85, P86, P87, P88, P89, P90, P91, P92, P93, P94, P95, P96, P97, P98, P99, P100.
  - TEMP VARIABLES:** Lists temperature-related variables like 10% Minimum VE2, 10% Minimum VE2 Section, 30000 Rod Load Limit Temp, 40000 Rod Load Limit Temp, 50000 Rod Load Limit Temp, 60000 Rod Load Limit Temp, 70000 Rod Load Limit Temp, 80000 Rod Load Limit Temp, 90000 Rod Load Limit Temp, 100000 Rod Load Limit Temp, 110000 Rod Load Limit Temp, 120000 Rod Load Limit Temp, 130000 Rod Load Limit Temp, 140000 Rod Load Limit Temp, 150000 Rod Load Limit Temp, 160000 Rod Load Limit Temp, 170000 Rod Load Limit Temp, 180000 Rod Load Limit Temp, 190000 Rod Load Limit Temp, 200000 Rod Load Limit Temp, 210000 Rod Load Limit Temp, 220000 Rod Load Limit Temp, 230000 Rod Load Limit Temp, 240000 Rod Load Limit Temp, 250000 Rod Load Limit Temp, 260000 Rod Load Limit Temp, 270000 Rod Load Limit Temp, 280000 Rod Load Limit Temp, 290000 Rod Load Limit Temp, 300000 Rod Load Limit Temp, 310000 Rod Load Limit Temp, 320000 Rod Load Limit Temp, 330000 Rod Load Limit Temp, 340000 Rod Load Limit Temp, 350000 Rod Load Limit Temp, 360000 Rod Load Limit Temp, 370000 Rod Load Limit Temp, 380000 Rod Load Limit Temp, 390000 Rod Load Limit Temp, 400000 Rod Load Limit Temp, 410000 Rod Load Limit Temp, 420000 Rod Load Limit Temp, 430000 Rod Load Limit Temp, 440000 Rod Load Limit Temp, 450000 Rod Load Limit Temp, 460000 Rod Load Limit Temp, 470000 Rod Load Limit Temp, 480000 Rod Load Limit Temp, 490000 Rod Load Limit Temp, 500000 Rod Load Limit Temp, 510000 Rod Load Limit Temp, 520000 Rod Load Limit Temp, 530000 Rod Load Limit Temp, 540000 Rod Load Limit Temp, 550000 Rod Load Limit Temp, 560000 Rod Load Limit Temp, 570000 Rod Load Limit Temp, 580000 Rod Load Limit Temp, 590000 Rod Load Limit Temp, 600000 Rod Load Limit Temp, 610000 Rod Load Limit Temp, 620000 Rod Load Limit Temp, 630000 Rod Load Limit Temp, 640000 Rod Load Limit Temp, 650000 Rod Load Limit Temp, 660000 Rod Load Limit Temp, 670000 Rod Load Limit Temp, 680000 Rod Load Limit Temp, 690000 Rod Load Limit Temp, 700000 Rod Load Limit Temp, 710000 Rod Load Limit Temp, 720000 Rod Load Limit Temp, 730000 Rod Load Limit Temp, 740000 Rod Load Limit Temp, 750000 Rod Load Limit Temp, 760000 Rod Load Limit Temp, 770000 Rod Load Limit Temp, 780000 Rod Load Limit Temp, 790000 Rod Load Limit Temp, 800000 Rod Load Limit Temp, 810000 Rod Load Limit Temp, 820000 Rod Load Limit Temp, 830000 Rod Load Limit Temp, 840000 Rod Load Limit Temp, 850000 Rod Load Limit Temp, 860000 Rod Load Limit Temp, 870000 Rod Load Limit Temp, 880000 Rod Load Limit Temp, 890000 Rod Load Limit Temp, 900000 Rod Load Limit Temp, 910000 Rod Load Limit Temp, 920000 Rod Load Limit Temp, 930000 Rod Load Limit Temp, 940000 Rod Load Limit Temp, 950000 Rod Load Limit Temp, 960000 Rod Load Limit Temp, 970000 Rod Load Limit Temp, 980000 Rod Load Limit Temp, 990000 Rod Load Limit Temp, 1000000 Rod Load Limit Temp.
  - Special Limits on P15 for Rod Load/Pin Reversals:** A table with columns for Max P15, Min P15, and other parameters.
  - Unit Safe Startup Table:** A table defining safe startup conditions for different load steps.
  - PLC Code Snippets:** Ladder logic and structured text code for PLC implementation, including comments and variable declarations.

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