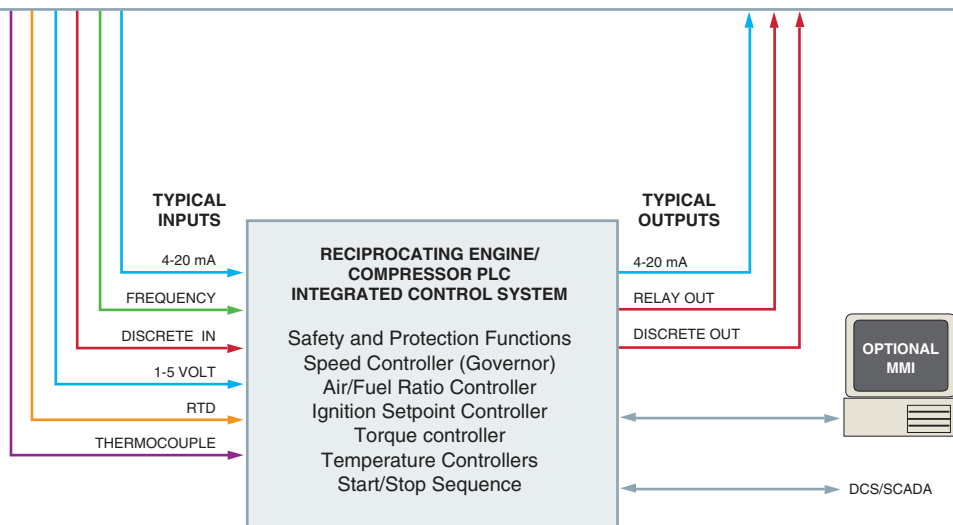
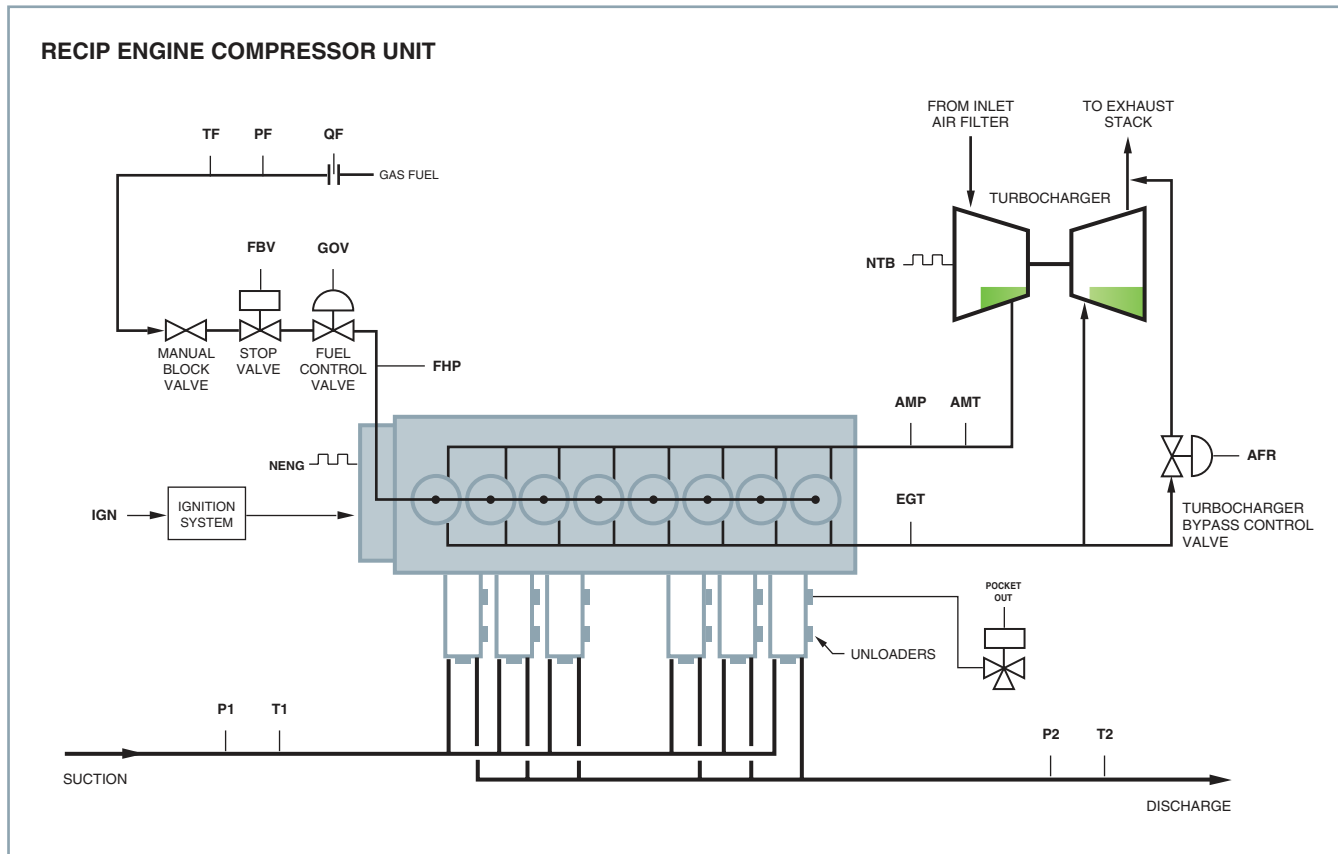


# RECIPROCATING GAS ENGINE/COMPRESSOR INTEGRATED CONTROL SYSTEM



MAY 2012



Simplified schematic showing typical control I/O for a recip engine/compressor system.



## APPLICATION

Petrotech's custom integrated control systems provide cost-effective complete or partial control retrofits for reciprocating engine or electric motor driven compressor packages. The PLC-based system can include speed control (governor), torque control, air/fuel ratio control, ignition timing setpoint generation, temperature controllers, capacity control, DCS/SCADA interface, and a graphic operator interface for system status, trending, and data logging.

## ADVANTAGES

- **Integrated control capability:**

Control algorithms, sequencing and protection are integrated into a single platform. This eliminates the need for additional hardware and communication links, thereby providing a less complicated, more cost-effective solution.

- **Open architecture system:**

Application control package's portability allows customer choice of platform, reducing need for additional spare parts and training expenses. Available PLCs include Allen-Bradley, Siemens, General Electric, Modicon Quantum, and other customer specified equipment.

- **Standard industrial components:**

Non-proprietary, commonly available parts are less costly and more easily serviced by customer's on-site personnel. Much longer time to obsolescence than proprietary systems.

- **Reliability:**

ALL control functions are performed by tested and proven industrial PLC equipment, not by MS-DOS based computer equipment which is not designed to function as a "controller".

- **Simplified interface to DCS or SCADA:**

Communication tasks are handled with a separate, dedicated module in the PLC, increasing data rate and simplifying network installation.

- **Non-proprietary interfaces:**

Interfaces in the form of 4-20 mA, RTD, frequency, thermocouple, and dry contact I/O allow simple integration into existing sequence/protection logic controller, making very low-cost partial control upgrades simple and practical.

- **Improved fuel regulation:**

Fast loop sampling rate, combined with modern digital control techniques improve steady-state setpoint control, and reduce overshoot during transients.

- **Improved start-up reliability:**

Petrotech's governor ensures safe and efficient transition from starting air to self-sustaining operation to idle speed and to load using multi-stage adaptive fuel ramp controllers.

- **Fail-safe features:**

Redundant critical shutdowns; open/short monitoring of mA inputs and thermocouples; readback monitoring of outputs, and special self-check features improve safety.

- **Improved operator information with optional HMI:**

Optional MS Windows-based graphic operator interface displays start-up sequencing, speeds, temperatures, operating points, and alarm/shutdown status. Optional data logging and trending can be used as part of a preventative maintenance program.

- **Rugged:**

Control panels can be custom fabricated for installation in explosive/corrosive environments.

- **Flexibility:**

The control system package can accommodate many different control strategies based on the customer's need and budget.

## TYPICAL CONTROLLERS/SPECIAL FEATURES

- Governor/speed control
- Torque control
- Air/fuel ratio control
- Ignition timing setpoint generation
- Capacity control
- Process temperature controls
- Engine/compressor diagnostics
- Engine/compressor performance calculations
- Start/stop sequencing
- Process valve sequencing
- Auxiliary pump control

## CUSTOMER SELECTABLE COMPONENTS FOR THE CONTROL SYSTEM

### Advanced Programmable controller:

- Allen-Bradley.
- GE FANUC 90-70
- MODICON Quantum.
- Siemens/TI 505.
- All major DCS/PLC/RTU

### Graphic operator interface (HMI), alphanumeric display (low-end) plus panel meters for NHP, NLP, and EGT:

- Allen-Bradley Redi-Panel/Panel View
- Siemens OP/TP Series
- Customer specified

### Graphic operator interface (HMI) package (high-end) display:

#### HMI Hardware:

- Intecolor industrial computer and monitor
- IBM industrial computer and monitor
- Texas Microsystems industrial computer and monitor
- XYCOM industrial computer and monitor
- Nortech industrial computer and monitor
- NEMATRON industrial computer and monitor
- Customer specified

#### HMI Software:

- WonderWare InTouch®
- Citech®
- Intellution®
- RS View®
- Customer specified

### Critical function redundancy for fail-safe action:

- Independent mini PLC for cross-check trips in the event of a main PLC failure
- Independent fail-safe redundant relay string for critical faults
- Multiple fuel shutoff valves and control valves



## CUSTOMER SELECTABLE COMPONENTS FOR THE CONTROL SYSTEM - Continued

### Communication interface for DCS or SCADA:

- MODBUS.
- Profibus.
- Ethernet.
- Control Net.
- Custom interfaces.

### Type of control panel enclosure:

- Custom fabricated enclosure
- Stainless steel purged enclosure for hazardous locations
- Standard Rittal type enclosures



*One of six engine/compressor local unit control panels.*



*Torque control interface panel for a gas pipeline station.*



*Compressor capacity control system upgrade for three units, featuring HydroCOM actuators with stepless torque control system, local control panels, RS485 network, and UPS backup power system.*

## PETROTECH RECIPROCATING MACHINERY CONTROLS EXPERIENCE

Petrotech has provided control systems for the following machinery. For a more detailed description of reciprocating machinery controls experience, refer to bulletin 03005, "Applications and Capabilities" for a User's List of Reciprocating Machinery Control Systems.

- Clark TCVC-20, TCVA-16, HBA-8, BA-8M, TRA-8M, HBA-6, TLA-6
- Cooper Bessemer GMWA-10, GMV-10, GMWC-6, GMWA-6, 12Z330, 14-4
- Ingersoll-Rand KVT-16, KVR-16, KVS-12, 2HHE-VE
- Worthington 168-LTC, LT-8
- Waukeshaw 7042
- Rolls-Royce Allen 5016
- Ruston 16 RKG
- Electric motor drive Ariel compressor

Petrotech, Inc.  
151 Brookhollow Esplanade  
New Orleans, Louisiana 70123  
USA

Phone: (504) 620-6600  
Fax: (504) 620-6601  
Email: [info@petrotechinc.com](mailto:info@petrotechinc.com)  
Website: [www.petrotechinc.com](http://www.petrotechinc.com)