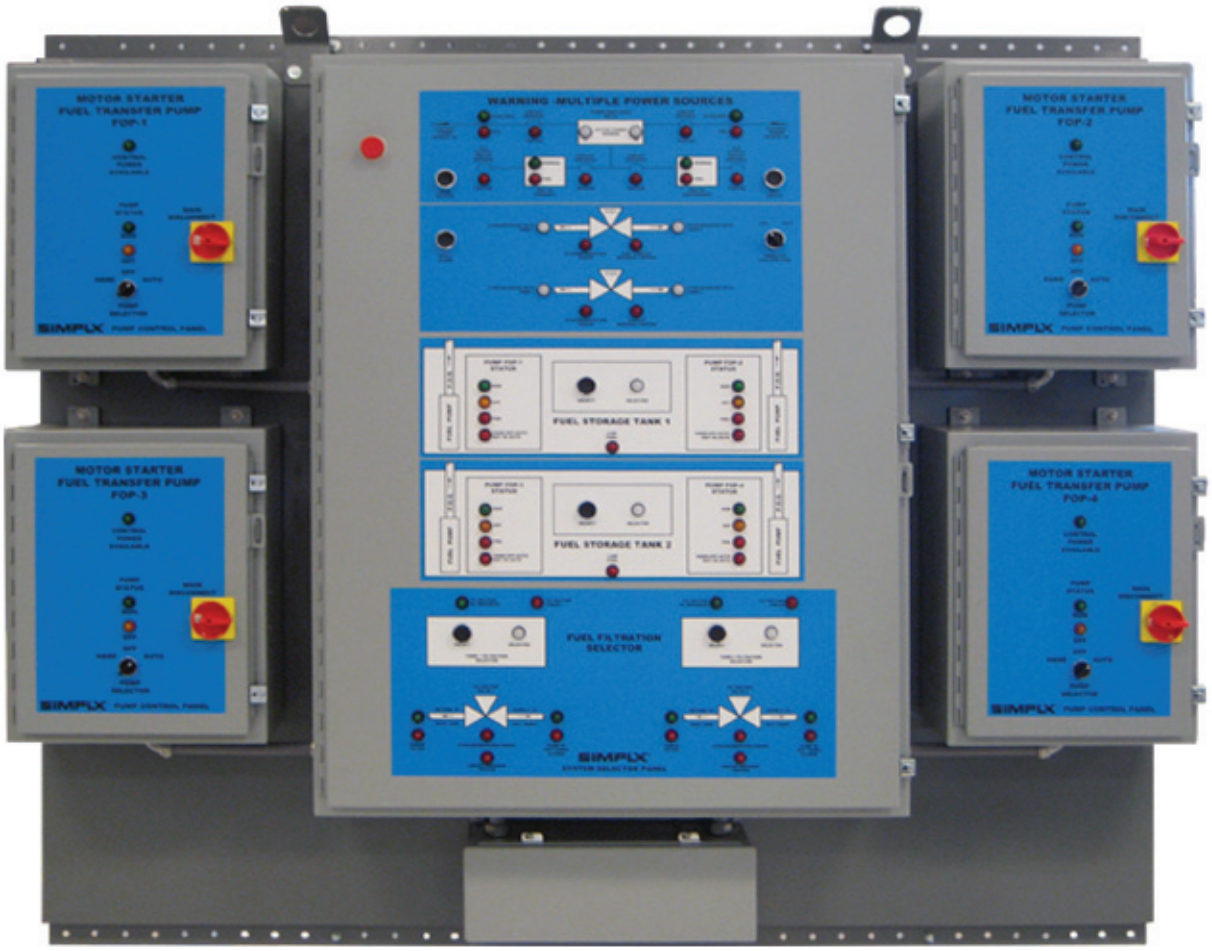
Mission Critical
Fuel Supply Systems



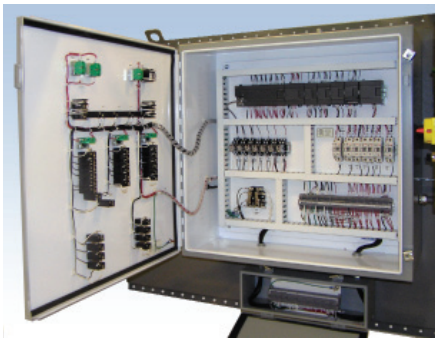
Insight Onsite

SIMPLEX®

Simplex Mission Critical Fuel Supply Systems are comprehensive, integrated, project-matched fuel management systems for diesel and turbine generators used in critical applications demanding the highest reliability, such as data centers, public safety and security nodes, transportation hubs and other applications where utmost dispatch dependability is essential. The scope of Mission Critical Fuel Supply Systems spans from the point of fuel delivery to the facility to the engine fuel pump, potentially covering every aspect of the system except basic infrastructure, such as pipe and bulk supply tanks. Essentially, the Simplex System includes the critical elements of active control in the delivery, storage, transfer and management of fuel to the engine.

Elements

1. System master control panel
   a. Management of main fuel supply tanks
   b. Control of main supply pumps
   c. Integration of alarms
   d. Integration of main tank gauges
   e. Operator interface
2. Main transfer pump sets
   a. Duplex pump sets of conservative, robust design
3. Fuel oil day tanks and day tank control panels
   a. Double-wall day tanks
   b. Integrated tank fill valves
   c. Integrated day tank controllers
4. Overflow return tanks, pumps and controllers
5. Fuel filtration and conditioning systems
   a. Automated single or multi-tank filtration systems
6. Main tank filling systems
   a. Main tank fuel ports, with or without on-board transfer pump
   b. Fuel port controller for single or multi-tank filling
7. Receiving line filtration systems
8. Receiving tank and transfer pump controllers
9. Engine fuel filter skids
10. Remote monitoring panels
11. Network interface modules



Attributes

1. PLC based control
2. Full networked operation of all elements of the Simplex System and network interface to BMS
3. UL Listings
4. Double-wall tank constructions
5. A high level of redundancy
   a. Redundant PLC controllers
   b. Dual power supplies
   c. Back-up level sensors
   d. Dual elements wherever possible
   e. Layered alarm systems
   f. Full manual backups
6. Pipe fittings, pipeline sensors and valves of ferrous construction, socket-welded or flanged mounting
7. Pumps of cast iron construction, flanged fittings
8. Conservative materials selection and application
9. Industrial control devices
10. Comprehensive services, including design and submittal consultation, start-up, operator training, commissioning, fast-response service
11. Field presence for technical and service support
12. Comprehensive manuals

Simplex, Inc.
5300 Rising Moon Road
Springfield, IL 62711-6228

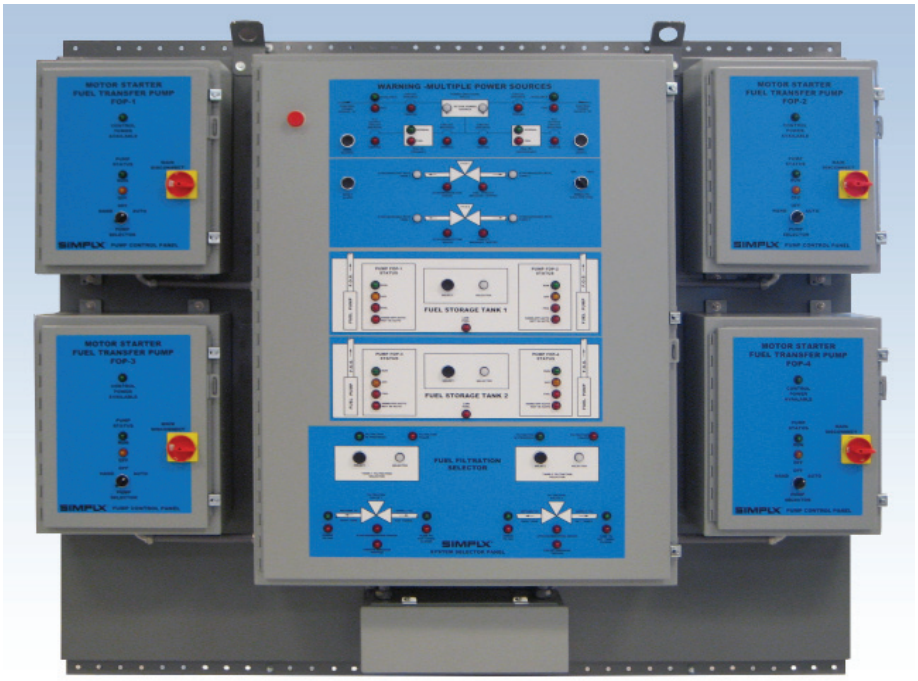
217-483-1600
Fax 217-483-1616
www.simplexdirect.com

Printed in the USA • 1012-06.00

Master Control Panel

Simplex UL Listed Industrial Control Panel, as follows

1. UL508 listed industrial control panel. NEMA4, wall mountable, hinged, lockable and gasketed access door. Finish painted dark gray polyurethane enamel over epoxy primer. White interior.
2. PLC based control system.
   a. Dual, redundant PLC system with auto-polling and auto backup reversion
   b. Internal modem
   c. Ethernet and MODBUS communication capability
3. Mimic type control panel with one-line schematic overlaid on systematic alarm and switch panel
4. Dual power supply with preferred source relay; normal, fail indicators and alarms.
5. Master alarm audible signal with silence pushbutton
6. Master indicator press-to-test pushbutton
7. Fuel storage tank control panels (2)
   a. Return valve open, closed, tripped indicators
   b. Main tank selector pushbuttons, 1-2
   c. Pump control (2): selector switch, auto-off-manual indicators
   d. Tank auto switchover at low using external input from UST monitoring system.
   e. Duplex pump alternator
8. Remote valve control relays with synchronization error sensors
9. Industrial, oiltight control devices and LED



10. Remote alarm outputs, via Ethernet/ MODBUS
11. Pump starters for remote pumps. NEMA4 enclosed, wall mountable, hinge-open front door, full-voltage, circuit breaker combination motor starter. Control power transformer
    a. HOA switch
    b. Run indicator
    c. Power available indicator
    d. Current sensor for interface with system selector panel.

Printed in the USA • 1012-06.00
Design subject to change without notice.

217-483-1600
Fax 217-483-1616
www.simplexdirect.com

Simplex, Inc.
5300 Rising Moon Road
Springfield, IL 62711-6228

Duplex pump

Open skidded design with containment, pad mountable, indoor, duplex pump set under control of Master Control Panel. Starters included with pump set or integrated with master panel.

1. Duplex Positive displacement gear pumps, cast iron body, mechanical shaft seal, machined steel gears construction, typical 45 gpm at 150 psi, 1800 RPM, 7.5 HP, 230/460-3-60v, TEFC direct drive. Flanged inlet/outlet.
2. Pressure relief valve, integral to each pump
3. Duplex type strainer, 3-inch, cast-iron construction
4. Vacuum gauge inlet and outlet of strainer, with isolation valves
5. Differential pressure switch across strainer with alarm contacts to PLC
6. Leak detector in skid containment basin, with alarm contacts to PLC
7. Flow switch, each pump, with alarm contacts to PLC
8. Fusible link valve on inlet, ferrous construction
9. Ball type shutoff valves, each pump in/out, 2-inch and main in/out: 3-inch
10. Check valves each pump, cast iron or steel, swing-type, 2-inch
11. Main outlet pressure gauge with shutoff
12. 3-inch flanged main inlet and outlet
13. All-welded or flanged construction of piping and devices. All ferrous fittings and devices. Schedule 80. 200psi or greater rated.
14. Controller: Intended for slaved operation from Master Control Panel. Includes PLC and MODBUS interface for transmission of pump-run signals from remote controller and transmission of alarm indication and pump running indications to remote controller.
15. Dual power inlet, 460-3-60v, with power transfer relay and power available/connected/fail indicators to MODBUS network.
16. Pump starters for each pump. NEMA1 enclosed, unit mounted, hinge-open front door, full-voltage, 3-phase circuit breaker combination motor starter, with control power transformer, HOA switch, run indicator, power available indicator

Day Tank

Day Tank consisting of the following principle elements:

1. Double-wall UL142 tank of required capacity
2. Day tank controller including redundant level sensors
3. Fill control valves

Simplex Double-Wall Tank

1. UL142 secondary containment tank, double wall construction.
2. Capacity as required, typically 200-600 gallons
3. Pipe fittings, top mounted, including primary and secondary emergency vents
4. Leak sensor
5. Dual redundant inlet valves, motorized, self-closing, including limit switches. Motorized drain/commissioning valve

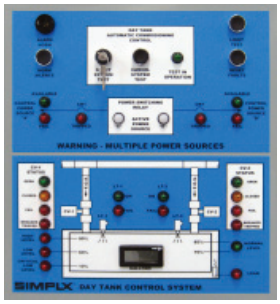
Simplex, Inc.
5300 Rising Moon Road
Springfield, IL 62711-6228

217-483-1600
Fax 217-483-1616
www.simplexdirect.com

Printed in the USA • 1012-06.00

Day Tank Controller

1. UL508 listed industrial control panel. NEMA4, tank mountable, hinged, lockable and gasketed access door. Finish painted dark gray polyurethane enamel over epoxy primer, white interior
2. PLC based control system.
   a. MODBUS communication capability
   b. Day tank differential level control with critical low level and critical high-level integration.
   c. Communication with Master Panel
   d. Ultrasonic level transmitter, dual redundant, with waveguides. 4-20mA output
3. Mimic type control panel with one-line schematic overlaid on systematic alarm and switch panel
4. Dual power supply with preferred source relay; normal, fail indicators and alarms.
5. Master alarm audible signal with silence pushbutton
6. Master indicator press-to-test pushbutton
7. Dual level transmitter integration, backup reversion
8. Digital display of tank level
9. LED alarm indicators with common press-to-test pushbutton
10. Remote alarm outputs via MODBUS



Main Tank SmartPump

Simplex SmartPump for use in filling of one or multiple remote bulk storage tanks:

1. 3-inch quick disconnect coupling with check valve and isolation/ shutoff valve
2. 3-inch pipe thread fitting for connection of fill line
3. Weatherproof and lockable steel enclosure with leak/ spill containment basin and basin hand pump. Painted white. Suitable for pad mounting.
4. Controller with PLC based and MODBUS compatible control for monitoring, high level detection and control of fill valve of each remote bulk supply tank
5. Digital level indicator
6. Level transmitters for field/contractor installation
7. Fill valve, 3-inch, motorized ball valve for field/contractor installation
8. 300 GPM transfer pump, including check valve and shutoff valve

217-483-1600
Fax 217-483-1616
www.simplexdirect.com

Simplex, Inc.
5300 Rising Moon Road
Springfield, IL 62711-6228

SIMPLEX®

Main Tank Filtration System

1. Outdoor, weatherproof, pad-mountable enclosure, also suitable for indoor installation. 2-inch NPT.
2. On-board, integrated digital controller with MODBUS communication
3. Inlet, outlet ball-type shutoff valves
4. Check valve
5. Pressure/vacuum gauges
6. Pressure transducers, flow switches, water detector.
7. Circulation pump, 10-50GPM and 0.75 – 5.0 HP
8. Filtration elements:
   a. Strainer, 100 mesh
   b. Pre-filter, 5 micron
   c. Final filter, 2 micron
   d. Water coalescer, separator, 10PPM

Receiving Tank Filtration System

This is a static system inserted in the transfer line from the SmartPump to either an intermediate receiving tank of the bulk fuel storage tanks. Whenever fuel is transferred, filtration occurs. There is no active control as part of this system. This system consists of the following principle elements:

1. Filter-separator, nominal 300 GPM. 10-micron particulate filtration. 10PPM water coalescing/separation
2. Inlet and outlet shutoff valves
3. Filter differential pressure gauge and contacts
4. Water detection sensor and contacts

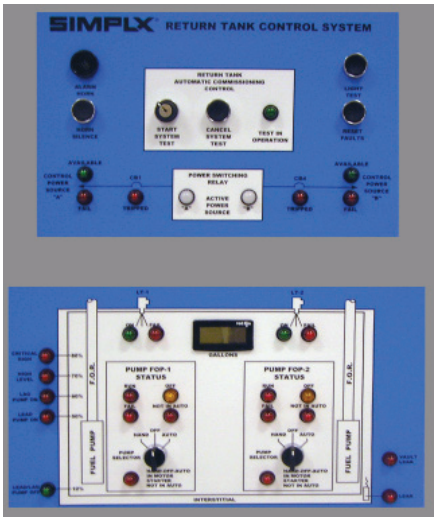
Simplex, Inc.
5300 Rising Moon Road
Springfield, IL 62711-6228

217-483-1600
Fax 217-483-1616
www.simplexdirect.com

Printed in the USA • 1012-06.00

Overflow-return Tank and Controller

1. UL142 secondary containment tank, double wall construction.
   a. Capacity as specified, typically 200-600 gallons
   b. Pipe fittings, top mounted, per specification requirement, including primary, secondary emergency vents
   c. Leak sensor
   d. Gravity inlet fitting from day tank overflow manifold
   e. Duplex submersible pumps, 30-40 GPM at 20-foot head, 1.5HP; equipped with check valve, shutoff valves and flexible fittings
2. Controller:
   a. UL508 listed industrial control panel. NEMA4, wall or tank mountable
   b. PLC based control system with MODBUS communication protocol
   c. Differential level control with high level alarms
   d. Ultrasonic level transmitter, dual redundant, with waveguides. 4-20mA output
   e. Mimic type control panel with one-line schematic overlaid on systematic alarm and switch panel
   f. Dual power supply
   g. Master alarm audible signal with silence pushbutton
   h. Master indicator press-to-test pushbutton
   i. Duplex pump starters



217-483-1600
Fax 217-483-1616
www.simplexdirect.com

Simplex, Inc.
5300 Rising Moon Road
Springfield, IL 62711-6228

Network Interface Module

For remote, wall mounted installation, NEMA4 enclosed. Use to interface the Simplex Fuel Supply System network to generator switchgear or BMS. Includes PLC with MODBUS or Ethernet input and either MODBUS/Ethernet and/or discrete relay contact outputs.

Engine Fuel Filter Skid

Skidded assembly of duplex, canister-type, filter-separators with 3-way, two port selector valve, differential pressure gauge with contacts, hand priming pump, shutoff valves, drip basin.

Simplex, Inc.
5300 Rising Moon Road
Springfield, IL 62711-6228

217-483-1600
Fax 217-483-1616
www.simplexdirect.com

Printed in the USA • 1012-06.00
Design subject to change without notice.