

SafeSite CMFTS Simplifies:

The SafeSite CMFTS is delivered with your fuel tank and includes a site schematic drawing showing conduit layout, and specific point-to-point wiring diagrams for each component. This helps to simplify the installation process and minimize on site expenses.



SafeSite Critical Mission Fuel Transfer System

The SafeSite (Critical Mission Fuel Transfer System) is designed for use in critical applications such as backup power facilities, data centers, institutional boiler supply, hospitals and anything requiring the highest degree of reliability. The CMFTS intelligently integrates all of the fuel system components into one simple automated package.

The CMFTS is designed using state of the art equipment and technologies. All of the statuses and alarm conditions will be displayed on a Operator Interface Terminal (digital touch screen display). The complete system can be interfaced and monitored from most building management systems. The CMFTS is engineered to the highest standards and is built and tested to UL508A standards and labeled accordingly.



CMFTS Integrates the Following into One System:

- Multiple Main Storage Tanks
- Multiple Generator Day / Belly Tanks
- Duplex Pump Controls
- Return Pump Controls
- Automatic Pump Alternation Sequencing
- Pump / Motor Status Monitoring
- Main Tank Leak and Level Monitoring
- Day / Belly Tank Leak and Level Monitoring
- Boiler Supply
- Piping and Piping Sump Monitoring
- Automatic Fuel Polishing System

Key System Features:

- Automatic Fuel Transfers
- Automatic Fuel Polishing
- Manual Fuel Transfers and Polishing (Supervised)
- Emergency Manual Fuel Transfers (Unsupervised)

SafeSite Critical Mission Fuel Transfer System | Specifications

General: The Safesite Integrated Critical Mission Fuel Transfer System (CMFTS) is designed to continuously monitor and control the level of fuel in day/belly tanks, provide leak detection and alarms for tanks and piping, as well as control of pumps and valves for critical emergency power applications. CMFTS integrates the following into one system:

- A. Multiple main storage tanks.
- B. Multiple generator day/belly tanks.
- C. Duplex pump controls.
- D. Return pump controls.
- E. Automatic pump alternation sequencing.
- F. Pump / Motor status monitoring.
- G. Main tank leak and level monitoring.
- H. Day/Belly tank leak and level monitoring.
- I. Piping and piping sump monitoring.
- J. Automatic fuel polishing system.

2.1 The Safesite CMFTS Controller shall include the following NEMA or IEC rated UL listed components:

- A. NEMA 4x stainless steel 304 enclosure.
 - 1. The enclosure will be capable of being wall mounted or floor mounted if required.
- B. Microprocessor programmable logics control (PLC).
 - 1. Microprocessor controlled, three built-in communication ports (two rs-232 ports and one rs-485 port), both rs-232 ports supply 5 vdc, without an additional power supply. two analog in, two analog out (current / voltage selectable), program and documentation stored in cpu, flash memory, rll ladder style programming, ladder memory (steps) 8k, total data memory (words) 8k, memory backup, battery backup, password security, system error log, user error log, internal diagnostics, calendar/clock, math (integer and hex), software for windows, power led (green), run led (green), error led (red), tx & rx led (green), input leds (green), output leds (red). Removable terminal blocks for easy wiring.
- C. Graphic interface Touch screen display (HMI).
 - 1. 8.4" diagonal color TFT (thin film, transfer) LC display with 64k colors, 640 x 480 pixel resolution, 300 nits display brightness, 50,000 hour average backlight lifetime, user replaceable analog resistive (1024 x 1024) touch, screen allowing unlimited touch areas usb port b (program/download) and usb port a (usb device options), ethernet 10/100 base-t port, (program/download & plc comm), remote internet access, serial plc interface (rs 232/422/485), compact flash card slot, built-in, expansion assembly (optional) for compact flash devices (use with optional cf card interface module), 24 vdc powered, 110 vac power adapter (optional), audio line out, stereo - requires amplifier and speaker(s), 10 mbyte project memory, data logging, 0 to 50°C (32 to 122°F) operating, temperature range, Nema 4/4x, ip65 compliant., slim design saves panel space, ul, cul & ce agency approvals, 2-year warranty from date of purchase. The HMI will have the capabilities to send e-mail, access ftp server, act as a web server, remote internet access.
- D. Surge protection.
- E. Circuit breaker protected, fuses not allowed.
- F. Power transformer.
- G. 110db buzzer and strobe.
- H. Hand-Off-Auto" switches.
- I. Magnetic motor starters.
- J. Motor circuit protectors.
- K. Emergency Stop.
- L. Keyed emergency manual override switch.
- M. GFI receptacle (for laptop)

2.2 The system shall bear the inspection labels of the Underwriters Laboratories (UL508a). The system shall comply with NFPA 70 and NFPA 30, 31, 37, 110 IFC 34 & 6 and labeled accordingly for its intended use.

2.3 The Safesite CMFTS Controller shall include the following capabilities:

- A. Controlling motor starters for each pump.
 - 1. Duplex Supply Pumps.
 - 2. Day/Belly return pumps.
- B. Monitoring the main storage tanks for:
 - 1. 90% high level alarms.
 - 2. 85% high level warnings.
 - 3. 25% low level warnings.
 - 4. 10% low level alarms.
 - 5. Interstitial leak alarms.
 - 6. Gallons, inches, tank percent.
- C. Monitoring day/belly tanks for:
 - 1. 90% high level alarms.
 - 2. 85% high level warnings.
 - 3. Normal product level.
 - 4. 25% low level warnings.
 - 5. 10% low level alarms.
 - 6. Interstitial leak alarms.
- D. Duplex filtration System for:
 - 1. Differential pressure alarm.
 - 2. Water in filter alarm.
 - 3. Enclosure leak alarm.

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2.4 The Safesite CMFTS System will consist of one master control panel that houses all the components necessary to monitor and control the complete fuel oil system for the emergency generators including and not limited to the main storage tanks, day tanks, the fuel oil supply and return pumps and the fuel polishing system in relation to the entire project. The system will have one incoming power source, and is housed in one single enclosure. The system shall be a duplex lead pump control system. The system shall have three modes of operation as per the following:

- A. Full Auto Mode – the system shall maintain the fuel level in all day/belly tank(s) between 60% (pump start) - 80% (pump stop) full capacity of each day tank. The lag pump will automatically come on if the level in any day/belly tank falls below 50% or if the lead pump registers a low flow alarm.
- B. Supervised Manual Mode – the pumps will not automatically start, all alarms and warning are still monitored. Each pump will have to be placed in the hand position to operate and the system will monitor the day/belly tank levels and shut off all pump if any day tank reaches 90% (high level alarm).
- C. Emergency Manual Keyed Mode – the alarm will sound and the strobe will flash, the pumps will not automatically start. All alarms and warning are still monitored. When an H-O-A selector switch is placed in the hand position the corresponding device (pumps and valves) will active without being supervised. The operator assumes full responsibility of all levels. This mode is only used in case a PLC failure.

2.5 Programmable System Parameters - the system shall be capable of making parameter modifications without the use of a computer. The following parameters shall be password protected and must be able to be modified on the HMI:

- A. System time and date (24 hour clock).
- B. Periodic maintenance reminders (day/month).
- C. Main tank hi level alarm percent set points.
- D. Main tank high level warning percent set points.
- E. Main tank low level warning percent set points.
- F. Main tank low level alarm percent set points.
- G. Main tank level probes setup and calibration.
- H. Main tank profile types selectable from (horizontal cylindrical, rectangular, or vertical cylindrical). The system must be able to perform math functions to convert inches to gallons for all three tank profile types.
- I. Add or subtract main or day tank leak sensors.
- J. Add or subtract piping leak sensors.
- K. Seven-day filtration circulation schedule (day, time, duration) one entrée 1 per tank.
- L. Lead pump select.

2.6 The system shall be capable of the follow remote communications capable of interfacing with building management systems (BMS):

- A. ModBus/Ethernet/RS232/422/485.
- B. System Summary Alarms (4 dry)
 - 1. Critical system alarm summery.
 - 2. Non critical system warning summery.
 - 3. Emergency Stop button depressed.
 - 4. System not in full Auto Mode Alarm.

2.7 The HMI touch screen shall be capable of displaying the follow:

- A. Main Tanks:
 - 1. Gallons.
 - 2. Inches.
 - 3. Percent.
 - 4. Pump Flow Switch Status.
 - 5. Leak Sensor Status.
 - 6. H-O-A Selector Switch Position
- B. Day/Belly Tanks:
 - 1. 90% High Level Status.
 - 2. 85% Pump Stop Level Status.
 - 3. Normal Level Status
 - 4. 60% Pump Start Level Status.
 - 5. 50% Low Level Status.
 - 6. Pipe Flow Switch Status.
 - 7. Leak Sensor Status.
 - 8. H-O-A Selector Switch Position.
 - 9. 95% Return Pump Start Status.
 - 10. 70% Return Pump Stop Status.
 - 11. H-O-A Selector Switch Position.
- C. Supply Pumps:
 - 1. Pump On Status.
 - 2. Motor Starter Status.
 - 3. Motor Overload (MCP) Status.
 - 4. Hour Meter.
 - 5. Pipe Flow Switch Status.
 - 6. H-O-A Selector Switch Position.

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D. Return Pumps:

1. Pump On Status.
2. Motor Starter Status.
3. Motor Overload (MCP) Status.
4. Hour Meter.
5. Pipe Flow Switch Status.
6. H-O-A Selector Switch Position.

DI. Filtration System:

1. Pressure Differential Status.
2. Water in Filter Status.
3. Pipe Flow Switch Status.
4. Enclosure Leak.
5. H-O-A Selector Switch Position.

2.8 The Safesite CMFTS Controller shall be capable displaying the follow **present and historical alarms** on the HMI touch screen display:

- A. System Warnings (all).
- B. System Alarms (all).
- C. System Out of Service Alarm.
- D. Not in Auto Mode Warning.
- E. In Manual Mode Warning.
- F. Emergency Stop Depressed Alarm.
- G. Call For Fuel Alarm.
- H. Emergency Manual Mode Selected Alarm.
- I. Main Tank High Levels.
- J. Main Tank High Warnings.
- K. Main Tank Low Level Warnings.
- L. Main Tank Low level Alarms.
- M. Main Tank Leak Alarms.
- N. Main Tank Low Flow Alarms.
- O. Day Tank High Level Alarms.
- P. Day Tank Low Level Alarms.
- Q. Day Tank Leak Alarms.
- R. Day Tank Low Flow Alarms.
- S. Day Tank Return Pump Activated Alarm.
- T. Filter Differential Warning.
- U. Filter Water Warning.
- V. Filter Leak Alarm.
- W. Filter Low Flow Alarms.
- X. Pump Trouble Alarm.
- Y. Pump Failure Alarm.
- Z. Pump Low Flow Alarm.
- AA. Pump Enclosure Leak Alarm.
- BB. Return Pump Activated Alarm.
- CC. Piping Sump Leak Alarms (all).

2.9 The system shall include main tank remote level indication (gallons, inches, and percent along with 90% high level alarm, light and reset) in a NEMA 4x enclosure.

2.10 The system shall be capable of Virtual Network Computing (VNC) as a server which allows for remote communication to the HMI with a computer, cell phone or other device with a VNC client app. The VNC shall be multi level password protected.

2.11 System hardware and software shall be fully tested and ready for field installation. Final configuration to be performed by an authorized factory representative.

2.12 Acceptable Manufacturer: **Safesite CMFTS** Integrated Critical Mission Fuel Transfer System as configured and suppliedby: Core Engineered Solutions, Inc. 703-563-0320 or 518-635-4343 NY Office. **2.13** Startup and

Training:

- A. Installation shall be in compliance with manufacturer's instructions, drawings and recommendations.
- B. A factory trained technical representative shall be required to inspect the contractor's installation, startup and commission the package furnished under this specification.
- C. The factory trained technical representative shall have 24 hour service support.
- D. The factory trained technician shall be onsite for a maximum of [] days to conduct.
- E. start-up and [] days for training of the owner's personnel.