

9.2 AUTOMATIC TRANSFER SWITCH (ATS)

- A. REFERENCES
- NEMA ICS 1 - General Standards for Industrial Control and Systems
 - NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies
 - NEMA ICS 6 - Enclosures for Industrial Controls and Systems
 - NEMA ICS 10 - AC Automatic Transfer Switches
 - UL 1008 - Standard for Automatic Transfer Switches
- B. MANUFACTURERS
- Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - Emerson; ASCO Power Technologies, LP.
 - GE Zenith Controls.
 - Generator manufacturer.
- C. GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS
- Provide transfer switches with number of poles, voltage and current ratings and accessories as shown on drawings.
 - Transfer switches shall be electrically operated and mechanically held.
 - The electrical operator shall be a solenoid mechanism, momentarily energized to minimize power consumption and heat generation.
 - Transfer switches shall include both electrical and mechanical interlocks to prevent both sets of main contacts from being closed at the same time.
 - Transfer switches shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized.
 - Transfer switches shall be provided with a microprocessor control panel and a door-mounted display panel for user interface.
 - Inspection of all contacts shall be possible from the front of the switch, without disassembly of operating linkages and without disconnection of power conductors.
 - Transfer switches shall be capable of handling continuous-duty repetitive transfer of full-rated current between active power sources.
 - Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.
 - Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code where applicable and by numbered or lettered wire and cable tape markers at terminations.
 - Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
 - Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
 - Control Wiring: Equipped with lugs suitable for connection to terminal strips.
- D. RATINGS

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- Available interrupting capacity (AIC) rating for each transfer switch shall meet or exceed the values listed within the drawings.
 - Series rating with upstream devices shall be allowed per UL-1008.
 - The required series rating shall be the larger of the two AIC values when the AIC rating of the equipment feeding the normal and emergency sides of the transfer switch is not equivalent.
- E. AUTOMATIC TRANSFER-SWITCH SEQUENCE OF OPERATION
- Initiate Time Delay to Start Alternate Source Engine Generator:
 - Upon initiation by normal source monitor.
 - Time Delay to Start Alternate Source Engine Generator:
 - Zero (0) to ten (10) seconds, adjustable.
 - Initiate Transfer Load to Alternate Source:
 - Upon initiation by normal source monitor and permission by alternate source monitor.
 - Time Delay Before Transfer to Alternate Power Source:
 - Zero (0) to thirty (30) seconds, adjustable.
 - Initiate Retransfer Load to Normal Source:
 - Upon permission by normal source monitor.
 - Time Delay Before Transfer to Normal Source:
 - Zero (0) to thirty (30) minutes, adjustable. Bypass shall have a time delay in the event of an alternate source failure.
 - Time Delay Before Engine Shut Down:
 - Zero (0) to thirty (30) minutes, adjustable. Time delay shall begin when generator is unloaded.
- F. ANNUNCIATOR SYSTEM
- Functional Description: Contacts for monitoring by a remote annunciator panel include the following:
 - Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
 - Switch position.
 - Indicating Lights: Provide indicating lights mounted in cover of enclosure to indicate the following:
 - Normal Source Available.
 - Alternate Source Available.
 - Switch Position.
- G. ACCESSORIES
- Engine Exerciser: Provide an integral engine exerciser to automatically test the engine generator set with or without load on a set schedule and duration. Parameters associated with start time (day, week, month), frequency and duration of test shall be fully programmable.
 - Strip Heater: Equip switches exposed to outdoor temperatures and humidity, and other units indicated, with an internal heater. Provide thermostat within enclosure to control heater.

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SECTION 10 - SITE REQUIREMENTS

101 SITE AND ACCESS ROAD PAVEMENT

Pavement will be required at the pumping station as follows:

- A. Station Area
- All pump and valve chambers shall have an 8" (minimum width) paved apron placed around the pumping structures. Drive surfaces will be 8" concrete with fiber mesh. All surfaces within the fenced area shall be paved. The pavement shall be sloped so as to permit surface water to drain away from the station. Construction Joints shall be spaced to meet City requirements and expansion joints shall be placed around all structures
- When fencing is required around the station area, the pavement shall be extended an additional foot beyond the fencing perimeter.
- B. Station Access Road
- The access road shall be: Minimum of twelve-foot wide and be designed to limit the access road grade to a 10% maximum. If the road grade must exceed a 10% slope, a combination of step type sloping and protection barriers will be required.
- The access road shall have a turn around area at the station end of the access road large enough to accommodate the turning radius of a 16-foot service van.
- The centerline of the entrance road shall bisect the station gate entrance, security fence, and the valve and wet well structures. If this type entry is not feasible for a particular site, the closest structure to the gate and road shall be the wet well.
- C. Pavement Specifications
- Poured Concrete: Concrete pavement, which includes all drive surfaces, shall be Class A 8" thick, six sack mix with a 4" slump. Pavement shall be reinforced with fiber mesh. The concrete shall be laid over a well-compacted 4" stone base.
 - Reinforcing Steel and dowel bars shall meet ASTM A615.
 - Fiber reinforcement shall be monofilament polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, Type III, 1" to 1-1/2" long.
- D. Entrance Road Barriers
- Stations requiring entrance roads shall have 36-inch high barrier posts installed at the road entrance at the City's discretion. Post shall be constructed of 6" concrete filled steel or iron pipe posts. Posts shall be set 30" below ground in an 18" x 36" poured concrete base. A 5/16" diameter galvanized chain locked on one end and firmly fastened to the other,

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shall be run between the poles. For safety purposes, a 4" x 12" reflective plate shall be attached to the chain at the span center.

102 FENCING

Fencing shall be required around all pump station sites. Fencing must be included on the pump station site plan. Alterations to the approved fencing plans shall only be considered for compliance with municipal requirements.

- A. Fencing Specifications
- Wire fabric for the fence shall be black vinyl clad 8" high chain link fabric. Wire shall be No. 9 gauge woven in a 2" mesh. Top and bottom selvages shall be barbed.

All posts and other appurtenances used in the construction of the fence shall be black or green vinyl clad schedule 40 pipe. Fiberglass or other material fencing components will not be acceptable.

A 14' wide entrance gate will be provided for access to the station grounds. A 3' wide man entry shall be provided with a separate lock.

Posts shall be sized and set as follows:

TYPE	SIZE	PULL
Top Rails & Brace	1-1/4" Nominal (1.66" O.D.)	2.27 lbs./ft.
Line Post & Gate	1-1/2" Nominal (1.9" O.D.)	2.72 lbs./ft.
Frame End Corner or Pull Post	2" Nominal (2.375" O.D.)	5.79 lbs./ft.
Gate Post	3-1/2" Nominal (4" O.D.)	9.11 lbs./ft.

Posts shall be set in the concrete bases so that the pole bottom rests 6" higher than the concrete base bottom.

Horizontal support bars shall be installed half way between the top rail and the ground.

A #7 tension wire shall be installed at the bottom of the fencing fabric and stretched taught enough so as to not allow the bottom of the fencing fabric to be lifted away from the fencing poles and/or ground.

- B. Fencing Placement
- Fencing shall be located so that:
- There is a 4' space between all auxiliary pump station equipment, panels, antenna poles, generators, etc. and the fence perimeter.
 - The access gate shall be located so that hoisting or cleaning equipment can easily

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access the valve and wet well chambers.

- C. Warning Signs
- Warning signs shall be placed along all sides of the fence and on each gate. Signs shall be 1.5" high black letters on a white background and read "CITY OF O'FALLON PROPERTY KEEP OUT". Signs shall be 18 gauge aluminum and mounted to fence using vinyl coated #9 fencing wire.

103 POTABLE WATER FROST PROOF HYDRANT AND SERVICE LINE

Water service shall be provided to the site.

- A. Post (flush) hydrant
- The hydrant provided shall be a post style hydrant and located so as not to interfere with the operations of the lift station, control panel, generator, etc. and shall not inhibit access to the site. Hydrant shall be a Mueller A-411 or approved equal.
- B. Water service line
- The water service line shall be 2" with a meter installed per City of O'Fallon specifications. Service line and hydrant shall meet all DNR separation requirements.

104 SITE MAINTENANCE

Temporary erosion control shall be provided in accordance with state and local requirements. Surface water must directed away from the pump station paved area to prevent debris from washing over the paved area.

105 RESTORATION

The site shall be restored and ground cover established. Ground cover shall be grass seed or sod and shall match the surrounding area. Final acceptance of the station shall be withheld until the site is restored to the City's satisfaction.

106 LIGHTING

A security light shall be provided. The security light shall be directional style and wired to a switch and breaker inside the pump control panel. The light shall be a LED style light with photoelectric control and impact resistant lens. Light pole shall be 20-ft. tall as measured from the ground. Base and foundation shall meet all required local codes.

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SECTION 11 - INSPECTION AND ACCEPTANCE REQUIREMENTS

In addition to the ongoing construction inspection by City Inspectors, Operations/Pump Station personnel shall make two inspections of the constructed work at specific stages of the pump station construction. The contractor responsible for constructing the pump station shall notify the City when the facility is ready for inspection. Failure to have the inspection performed at the proper time during the construction process could result in the City requiring the removal and reconstruction of the completed work.

111 STAGE ONE OPERATIONS/PUMP STATION CONSTRUCTION INSPECTION

This inspection shall be performed following the completion of the wet well floor, the installation of the pump bases and prior to allowing water or sewage into the pump station. The contractor shall be responsible for ensuring that the floor is clean and dry for this inspection.

112 STAGE TWO OPERATIONS/PUMP STATION CONSTRUCTION INSPECTION

This inspection shall be performed when one hundred percent (100%) of the pump station structure, storage tank and force main have been completed and all electrical and mechanical equipment and appurtenances, access road and other pavement have been installed and are in operating condition. Representatives from the pump equipment manufacturer and the installing electrical contractor shall be present at the pump station for this inspection. Representatives shall train City personnel as necessary in the operation and maintenance of the pump station.

A. Submittal Requirements

Prior to requesting this inspection the following items shall be submitted to the City Inspector for distribution to the appropriate personnel:

- Four sets of As-built electrical schematics, with an additional laminated schematic provided mounted within the panel.
- Three sets of as-built prints of the pump station site, prepared by an engineer or land surveyor registered in the Missouri, certifying that all structures, sewers, roads and other pavement were built in accordance with the approved plans and located within existing easements
- A complete set of the as-built drawing computer files in AutoCADD Lt format and PDF (CD)
- Manufacturer's Pump start-up test procedures; the recorded factory test readings for voltage, current and other significant parameters documented on standard forms; and blank forms for the field test.
- Letter of completion from paving contractor, guaranteeing that all pavement and pavement subsurface has been installed per the approved plans and specifications
- Control panel schematics, 11"x17" in size, laminated to the inside of the control panel exterior door
- Operating manuals and specification literature (2 copies of all documents)
- Copy of electric, gas and water bills to facilitate the transfer of these accounts to the City at the time of dedication.

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- B. Pump Tests
- In the presence of the City personnel, the contractor shall subject the pump equipment to such operating tests as may be required by the City to demonstrate that the equipment performs in accordance with the design requirements. As a minimum, the following tests shall be performed:

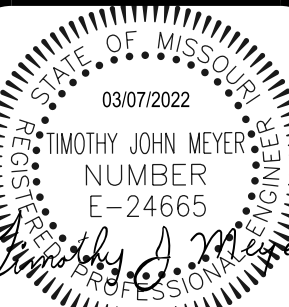
- The insulation resistance of the pump's windings and cables shall be tested. The installed pumps shall not register less than 100 meg-ohms resistance per winding on a meg-ohm meter.
- The pumps shall be subjected to start-up tests with the voltage, current and other significant parameters being recorded on the standard forms provided by the manufacturer. The contractor shall arrange for an adequate supply of clean water for the tests. The minimum quantity of water to be provided shall be equivalent to 1.5 minutes of continuous pumping at the rated pump capacity for each pump operating alone. Each pump shall be tested a minimum of two times.
- All alarms, floats and switches, pumps etc. shall be tested prior to the City taking ownership. Developer to incur the cost of providing all testing and personnel to provide testing until the City has accepted all components of the lift station and considers the station to be substantially complete.

- C. Communication System Test
- The communication system shall be tested to verify that it has been activated and is in proper working order and interfacing with the City system.

11.3 CONSTRUCTION ACCEPTANCE

Construction Acceptance of the Pump Station shall be subject to the completion of all items stated above as well as the installation of fencing and satisfactory completion of all site restoration.

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INVERNESS

PUMP STATION - DETAILS

PHASE 3

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