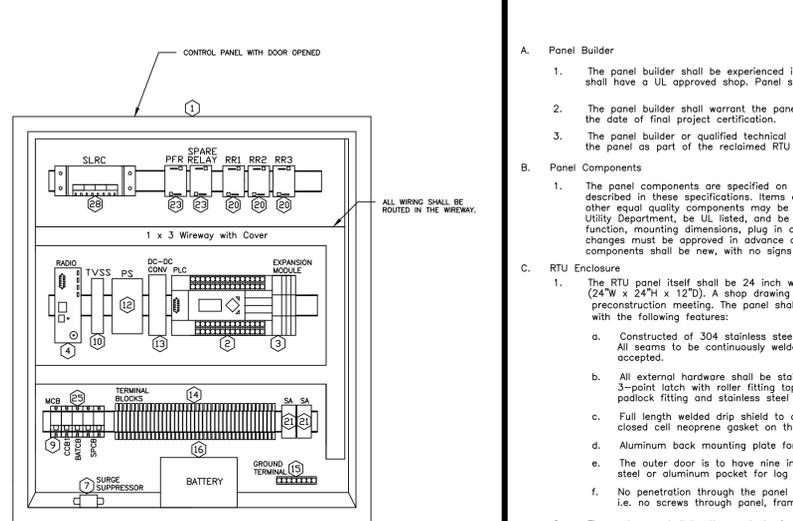


- NOTES: 1. MAST AND METAL STRUCTURE SHALL BE GROUNDED IN ACCORDANCE WITH NEC SECTION 810-21. 2. ANTENNA INSTALLATION SHALL MEET THE WIND LOADING REQUIREMENT PER FLORIDA BUILDING CODE. 3. MINIMUM ANTENNA HEIGHT SHALL BE 12 FEET, IF ANY OBSTRUCTION IS LOCATED BETWEEN THE RADIO COMMUNICATION PATH, ANTENNA HEIGHT SHALL BE HIGHER THAN THOSE OBSTRUCTIONS. 4. CONDUITS SHALL NOT ENTER THE TOP OF CONTROL PANEL. 5. ALL ELECTRICAL PANELS SHALL BE GROUNDED. 6. METER AND SERVICE ENTRANCE RATED LOAD CENTER ARE NOT REQUIRED IF THE RTU IS SUPPLIED BY SOLAR POWER OR NEARBY LIFT STATION POWER. 7. ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL. 8. MAINTAIN 36" CLEARANCE IN FRONT OF ALL ELECTRICAL PANELS. 9. SOLAR PANEL IS NOT REQUIRED IF 120 VAC POWER IS AVAILABLE. 10. ELECTRICAL PANEL SUPPORT STRUCTURE / ANTENNA TOWER HAS BEEN DESIGNED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE 2010 FOR THE FOLLOWING CRITERIA: \* RISK CATEGORY IV \* EXPOSURE CATEGORY 'C' \* WIND VELOCITY, Vult = 181 MPH

RECLAIMED WATER SYSTEM RTU ANTENNA AND PANEL MOUNTING DETAIL 41R

- A. Panel Builder 1. The panel builder shall be experienced in the construction of control panels/RTUs, shall have a UL approved shop. Panel shall be UL listed and UL labeled. 2. The panel builder shall warrant the panel for one (1) full year minimum from the date of final project certification. 3. The panel builder or qualified technical representative shall check-out and test the panel as part of the reclaimed RTU system start-up. B. Panel Components 1. The panel components are specified on the drawings with the exception of items described in these specifications. Items are listed by manufacturer and catalog number, other equal quality components may be substituted but they must be preapproved by Utility Department, be UL listed, and be fully interchangeable with those specified in size, function, mounting dimensions, plug in connections, and ampacity. Any substitutions or changes must be approved in advance and in writing by the Utility Department. All components shall be new, with no signs or evidence of corrosion. C. RTU Enclosure 1. The RTU panel itself shall be 24 inch wide x 24 inch high x 12 inch deep (24"W x 24"H x 12"D). A shop drawing must be of a NEMA 4X construction with the following features: a. Constructed of 304 stainless steel 14 gauge with white powder coated. All seams to be continuously welded, spot welded panels will not be accepted. b. All external hardware shall be stainless steel with piano hinge, 3-point latch with roller fitting top and bottom and single handle with padlock fitting and stainless steel external parts. c. Full length welded gasket to deflect water from the door, a continuous closed cell neoprene gasket on the door. d. Aluminum back mounting plate for heavy components (min. .090 thickness). e. The outer door is to have nine inch by eleven inch (9" x 11") stainless steel or aluminum pocket for log book, tack weld to door. f. No penetration through the panel will be allowed except for conduits, i.e. no screws through panel, frame, no top penetration. 2. The enclosure shall be the product of a UL approved manufacturer and shall be a NEMA-4X enclosure. Manufacturer shall be Hoffman or approved equal. Enclosure shall have lugs for mounting. D. Wiring 1. All wiring shall be copper THWN or approved equal, AWG 14 minimum. Color code wires as follows: Ground - Green Neutral - White 120 Volt Power - Black 24 Volt Control - Violet Analog Signal - Black and White Special - Blue Different control wiring colors are acceptable if clearly identified. Power wiring shall be kept separate from control wiring, and shall be identified by phase. 2. All wires shall be numbered with machine made plastic wrap around labels at both ends. 3. All external connection and internal connections, where shown on the drawings, shall be brought to the drawings. 4. Wiring shall be enclosed in conduit or equivalent wireways and wiring between the doors and the panel shall be enclosed in a spiral wrap or approved equal with sufficient slack to allow full opening of the door. 5. Wiring shall be secured with screw-on tabs, tabs with adhesives shall not be used. 6. All wiring shall be front accessible. 7. All electrical wiring must meet or exceed National Electric Code and Local Code Standards. 8. Any place that electrical wire passes through a metal cover or shield, insulating grommet is required to protect the wire. E. Component Mounting 1. All components shall be securely mounted with stainless steel hardware. Self tapping screws are not acceptable. 2. All relay bases shall be front mounted with screw terminals, no soldered connections shall be used. All base terminals shall be numbered to correspond to relay numbers. Where plug-in components are not firmly secured in bases, hold down clamps shall be provided. F. Identification 1. All components shall be identified in accordance with the schematic diagram, using permanent name tags on the panel of laminated micarta or approved equal. The permanent name tags shall be securely attached and in a position where they are clearly visible. 2. All operator's controls shall be provided with laminated micarta name tags attached with stainless steel screws, with minimum lettering height of 1/8 inch. 3. Provide a laminated schematic drawing attached to the inside of the outer door - minimum size 11 inches by 17 inches (11" x 17"). G. Drawings 1. Panel builder shall provide the following drawings: a. Schematic drawing showing all components. Components shall be properly identified by number and function. All connections shall be numbered to correspond to the component numbers. All wires and terminals shall be clearly numbered and identified. b. Bill of material listing all parts as follows, in tabular format: 1) Drawing Reference 2) Description 3) Manufacturer 4) Catalog Number 5) Type 6) Notes c. Layout drawing showing the front view of the operators panel and with the panel open. Layout drawings shall also show the outside dimensions of the panels and dimensional mounting supports. d. Plastic encased drawing inside the panel as previously noted herein. 2. Drawings shall be clear and readable and a minimum of 11 inches by 17 inches (11" x 17"). "Fuzzy" reductions will be rejected. H. See Remote Telemetry Units (RTU specifications) for programmable logic controller (PLC), I/O expansion module, Radio, solar power system, etc. requirements.

RECLAIMED WATER SYSTEM RTU PANEL SPECIFICATIONS 34-35R

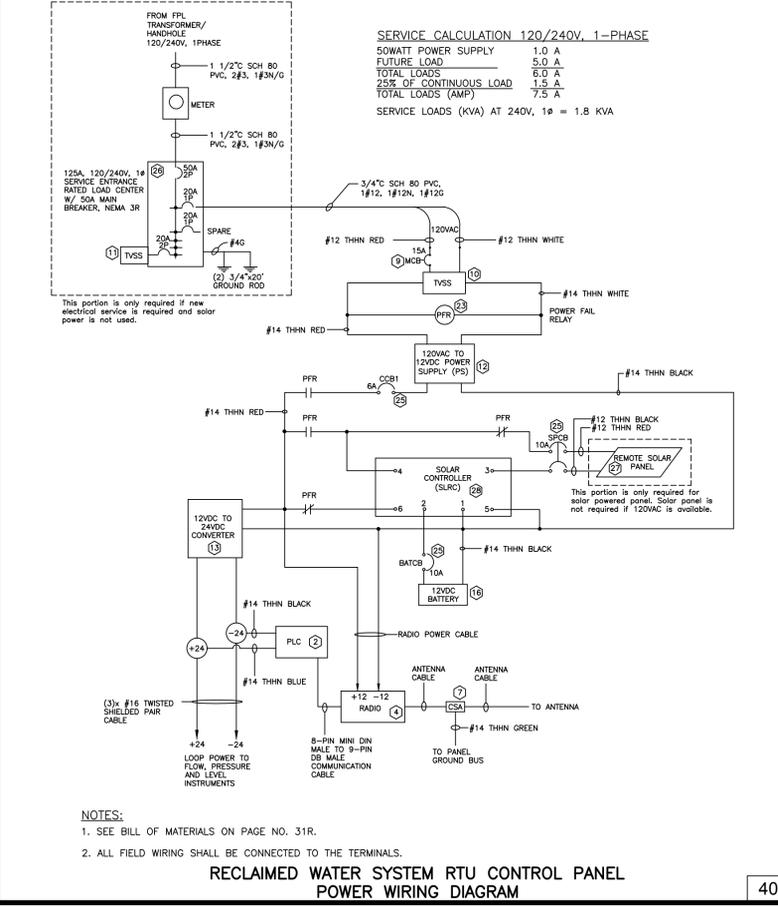


- NOTES: 1. SEE BILL OF MATERIALS PAGE NO. 31R. 2. ALL FIELD WIRING SHALL BE CONNECTED TO THE TERMINALS. 3. BATTERY SHALL BE LOCATED ON THE BOTTOM OF THE CONTROL PANEL, AWAY FROM ANY HEAT SOURCE. 4. PANEL BUILDER SHALL ADJUST THE PANEL LAYOUT AS NEEDED.

RECLAIMED WATER SYSTEM RTU CONTROL PANEL 33R

Table with columns: ITEM NAME, DESCRIPTION, MANUFACTURER, TYPE. Lists components like Control Panel, PLC, Expansion Module, Radio, Antenna Cable, RF Coaxial Connector, RF Surge Suppressor, Yagi Antenna, 120V Main Circuit Breaker, 120V TVSS, 1240V TVSS, Power Supply, Power Converter, Terminal block, Ground Terminal, Battery, 17 Level Transmitter, Pressure Transmitter, Flow Transmitter, Control Relay, 21 Low Voltage Surge, Cat. 5E Cable, 120VAC Relay, Antenna Tower, Circuit Breaker, Load Center, Solar Panel, Solar Controller, Power Supply for Solenoid, Terminal J-Box.

RECLAIMED WATER SYSTEM RTU CONTROL PANEL 32R



RECLAIMED WATER SYSTEM RTU CONTROL PANEL POWER WIRING DIAGRAM 40R

- A. REMOTE TELEMETRY UNITS AND APPURTENANCES (RTU). 1. Remote Telemetry Units shall be microprocessor based, user programmable, Programmable Logic Controller (PLC) which shall serve as an interface to accumulate, process, transmit and receive discrete and analog status and control messages between the base stations and the remote RTU sites located within a ten mile radius of the base station. 2. Each RTU shall be PLC based, with sufficient battery backed RAM, or EEPROM non-volatile backup memories to provide all discrete and analog status, monitoring and control functions and shall be designed to operate in an outdoor industrial environment. 3. The programmable controller shall be designed to operate in an industrial environment. The PLC shall be capable of operation in an ambient temperature range of 0-60°C and a relative humidity of 5-95 percent, non-condensing. The PLC shall be capable of operation on supply voltages of 24VDC. 4. All components of the PLC system shall be of the same manufacturer who is regularly engaged in the manufacture of programmable controllers. The manufacturer shall have fully tested units similar to that being furnished in an industrial environment with associated electrical noise. The processing unit shall perform the operations functionally described herein based on the program stored in memory and the status of the inputs and outputs. 5. The processor and its associated memory shall be enclosed in a modular sheet metal enclosure. Memory shall consist of battery-backed RAM, which shall retain the control program in the event of AC power loss. Memory shall be not less than 8K user logic for any PLC and shall be adequate for all control functions specified. A minimum of 1920 on-board registers shall be addressable. 6. The relay logic instructions of the programmable controller shall include normally open; normally closed; transitional positive and negative contacts; timers in .01, .1, and 1.0-second resolution; and up/down counters. Register and table instructions shall include block moves, table to register, register to table, FIFO, table search, and table to table. Register matrix operations shall include bit sense, bit set/clear, and, or, exclusive or, bit rotate, and complement. 7. LED-type indicating lights shall be provided as follows: READY, RUN. 8. Programmable controllers and accessory equipment shall be Allen Bradley MicroLogix 1400/1766-1328XB, with memory module and analog extension module. 9. All RTUs shall be powered with either 120VAC through a power supply or 120VDC from solar controller capable of float charging (Gel-cell batteries). In a 120VAC powered panel, solar panel and solar controller are not required. For 120V, it shall include an AC power loss alarm output to the RTU on loss of AC power. Power supply shall be of sufficient capacity to provide all required DC power to all RTU equipment, discrete and analog input/output circuitry, under full load, communications interface equipment, PC modems, radios and other radio interface/conditioning equipment as required. The primary power supply for radio and battery backup shall be 120VAC. A 12V to 24V Converter is required for the PLC and I/O uses. The batteries shall not be older than (3) months at the time of RTU acceptance and shall be lead acid sealed, 12 volt, 18 ampere-hour, model Power Sonic PS-12180. The battery charger/power supply shall be compatible with the battery, type 1606-XLP508 by Allen Bradley and set the output voltage at 13.6V. The 12V to 24V converter shall be model: PSP24-DC12-1 by Automation Direct or approved equal. In a Solar powered panel, provide a Solar Panel with all necessary components including a solar controller. Solar panel shall be mounted on the antenna pole with stainless steel U-bolts. The solar panel installation shall meet 150MPPH wind loading requirement. Solar panel shall be 110 watts, 12V Sunwize SW-S110P-04 or Solartech SPM110P-FSW with pole mount kit Sunwize 007954 or by DPW Solar. The solar controller shall be Morningstar Sunser SS-20L-12V. See wiring schematics. J. Spare parts are not required. K. All analog inputs shall be furnished with lightning surge protection devices. Sufficient I/O shall be provided for each RTU to accommodate the scheduled I/O. 1. Digital inputs shall be 24VDC from dry contacts. 2. All analog inputs shall be wired through interposing relays. 3. Analog input circuits shall be isolated, 15-bit resolution type. Analog inputs shall be coordinated with the receivers but shall generally be isolated 24V +/-20 mA inputs powered from the PLC. Analog input hardware shall be provided as required for all types of analog inputs being transmitted to the PLC. L. The RTU hardware shall be assembled to a back plate mounted inside the RTU control panel. All components shall be mechanically secured and fully wired. A bonding wire #12 AWG with crimped end terminals is required between the back plate and control panel. M. The summary of approved remote telemetry equipment/materials and manufacturers are listed in the Bill of Materials. I/O List: Power Loss Alarm (Spare in Solar) digital input I/O (only for 120VAC panel) Valve Open Command digital output O/V Valve Close Command digital output O/V Reclaimed Water Pressure analog input I/V (extension module) Lake Level analog input I/V (extension module) Reclaimed Water Flow analog input I/V (extension module) N. Manufacturer's Requirements: All surge suppressor devices shall be manufactured by a company that has been engaged in the design, development, and manufacture of such devices for at least 5 years. O. Suppressor Locations: As a minimum, provide surge suppressors at the following locations: 1. At main breaker of the RTU control panel for 120VAC power panel. 2. At the field, panel, or assembly connections of all analog signal circuits that have any portion of the circuit extending outside of a protective building. 3. Between the radio and external mounted antenna. 4. Surge Suppressor Assemblies for 120-Volt AC Power Supply Connectors: Surge suppressors for connections to ac power supply circuits shall be assemblies that: 1. Pluggable, DIN-rail mounting AC power protection. 2. Power on and protection status indicator. 3. Hybrid MOV and RFI filtering components. 4. UL 1449, 3rd edition and 10 year product warranty. 5. The suppressor shall be of the type MA15 by Alltel Scientific. P. Surge Suppressors for Analog Signal Connections: Surge suppressors for analog signal circuit shall: 1. Have four lead devices with a threaded mounting/grounding stud. 2. Have a circuit consisting of a 3-electrode gas tube and silicone avalanche devices to clamp each line to ground. High-energy gas tube and silicone avalanche devices shall be separated by series impedance. 3. Be epoxy encapsulated with a nonflammable phenolic enclosure. Epoxy encapsulation shall be flame retardant. 4. Limit line-to-ground and line-to-line voltage to 36 volts on 24V dc circuits. 5. Meet or exceed the following performance criteria based on a test surge wave with 8-microsecond rise time and 20-microsecond exponential decay time. a. Recovery: Automatic b. Peak Source Current: 10,000 amps c. Pulse Life Before Failure: 100 occurrences d. Minimum Voltage Clamp Rating: 36 volts e. Series Impedance: 24 ohms load f. Temperature Range: -20 degrees C to +85 degrees C g. Operating Voltage: Less than 30V dc h. Operating Current: 4 to 20 mA dc i. Resistance Line-to-Ground: Greater than 1 mega-ohm 6. The suppressor shall be of the type PC 642C-036 by EDOO Inc. or approved equal. F. RF Surge Suppressors: RF surge suppressors shall: 1. Meet or exceed the following technical specifications: a. Surge: 500A IEC 1000-4-5 8/20ms Waveform 500 Joules b. Turn on: 600 VDC +/-20% c. Turn on time: 2.5ns for 24V/ns d. Frequency Range: 125MHz to 1GHz e. VSWR: <1:1 to 1 over frequency range f. Insertion Loss: <0.1 dB over frequency range g. Temperature: -45°C to +85°C Storage/Operating +50°C Unit Impedance: 50 Ohm l. Mounting: Flange 2. The suppressor shall be of the type IS-50X-C2 by PolPhase Inc. or approved equal. 5. RTU CORROSION PROTECTION A. All indoor and outdoor cabinets, panels and consoles shall be fitted with vapor phase corrosion inhibitor capsules capable of protecting 5-cubic feet of space for one year; Hoffman Model A-HCI5E, ZERUST Model VC-6-2 or approved equal. Capsules shall be labeled with the date of activation. 6. RTU FABRICATION A. Cabinets and panels shall provide mounting for power supplies, control equipment, input/output subsystems, panel mounted equipment and appurtenances. Ample space shall be provided between equipment to facilitate service and cooling. B. Terminal blocks shall be factory assembled on a miniature mounting channel and the channel bolted to the steel strip. Terminals shall be miniature screw type with integral fuse holder unless otherwise required. Terminal blocks shall provide access to screw terminals without disassembling the fuses. C. The terminals shall be marked vertically with a permanent, continuous marking strip from top to bottom. One side of each terminal strip shall be reserved exclusively for field incoming conductors. Common connections and jumpers required for internal wiring shall not be made on the field side of the terminal. Subject to the approval of the Owner, a vendor's pre-engineered and prefabricated wiring termination system will be acceptable. D. Wiring shall comply with accepted standard instrumentation and electrical practices and codes. For each pair of parallel terminal blocks, the field wiring shall be between the blocks. Solder-less horseshoe (spade) connectors, with insulating sleeves, shall be used for connecting wires to terminal blocks. E. All wiring shall be bundled and run open or enclosed in vented plastic wire way, as required. All conductors run open shall be bundled and bound at regular intervals, not exceeding 12 inches, with nylon cable ties. Core shall be kept separate from electrical signal, discrete signal, and power wiring. A copper ground bus shall be installed the full length of each panel. Interior panel wiring and field wiring shall be tagged at all terminals with machine-printed plastic sleeves. The wire number shall be the ID number listed in the input/output schedules. NOTES: 1. SEE BILL OF MATERIALS ON PAGE NO. 31R. 2. ALL FIELD WIRING SHALL BE CONNECTED TO THE TERMINALS.

RECLAIMED WATER SYSTEM RTU SPECIFICATIONS 36-39R