AUSTIN ENERGY

PURCHASE SPECIFICATION

FOR

SWITCH, DIST, OH, 3PH, 14.4KV, GROUP OPERATED

AUTOMATION REMOTE SUPERVISORY CONTROL

Date	Prepared by	Issuance/Revision	Department Approval Division Manager/Standards Manager
04/11/91	Steven Booher	Issuance	
04/12/96	Steven Booher	Revision	
05/06/96	Gary Noble	Revision	

This specification, until revised or rescinded, shall apply to each future purchase and contract for the commodity described herein. Retain for future reference.

464/specs

AUSTIN ENERGY

PURCHASE SPECIFICATION

FOR

THREE PHASE GROUP OPERATED DISTRIBUTION AUTOMATION

SWITCHES FOR REMOTE SUPERVISORY CONTROL

1.0 SCOPE AND CLASSIFICATION

1.1 Scope

This specification covers the complete switching system that includes two major components: an integer style load type interrupting switch and a communication and control unit that provides an interface between the switch and the master-station computer. This switching system provides for a completely self-sufficient automated distribution switching installation that includes the switch; operating mechanism; current and voltage sensors; self-contained 120 volt 60 hertz power source; battery with charger; and a remote terminal unit (RTU) and digital interface radio for two-way communication with a master station computer by means of a 900-Mhz master radio transceiver. (Receive 952.6125 Mhz - Transmit 928.6175 Mhz.)

1.2 Any items supplied under these specifications not in complete source compliance with these specifications shall be subjected to bid rejection.

1.3 All manufacturers furnishing switches under these specifications shall have at least five (5) years experience in the manufacturing and sale of three phase distribution group operated switches.

2.0 APPLICABLE SPECIFICATION

2.1 The switch furnished under this specification shall conform to the latest NEMA, IEEE, ANSI/IEEE, ANSI, and ASTM standards applicable to switches and other equipment covered by this specification. In the case of a conflict between any of the standards mentioned in this specification and the contents of this document, the City of Austin Specification shall govern.

3.0 BID REQUIREMENTS

3.1 The supplier shall furnish the following test data and design details with the proposal: (1) dimensioned, outline drawings of switch and RTU (2) Maximum short time current test (3) Maximum fault closing capability (4) Maximum continuous current.

3.2 Test results demonstrating the interrupting, dielectric, RIV, temperature rise, short time and fault closing shall be provided with tests conducted in accordance with ANSI test code for high voltage switches, ANSI/IEEE C37.34.

3.3 The supplier shall state in the bid any deviation from this specification, and explain the reason for desiring the deviation.

4.0 SWITCH RATINGS

4.1 The switches shall have the ratings as follows:

kv			Amperes, Rms		Five-Time Duty-Cycle Fault-Closing,
Nom.	Max	BIL	Cont. and Interr.	Mom.	Amps, Rms, Asym.
14.4	17.0	110	600*	25,000	20,000

4.2 Switches will be applied at system voltages less than the nominal voltage rating listed above.

4.3 The switches must carry up to 900 amperes for eight hours for ambient temperatures to 40^{o} C with a minimum wind velocity of two feet per second. Successful emergency interrupting performance shall be provided for currents up to 900 amperes.

4.4 For line or cable dropping, the following maximum conductor miles apply; line dropping to 50 miles of line; cable dropping to 12 miles of 1/0 cable or 5 miles of 100 kg mil cable, or equivalent.

4.5 The 1-second rating is 16,000 rms symmetrical.

*** NOTE:** Switch shall have an emergency rating as per section 4.3.

4.6 The duty-cycle fault-closing defines the ability to close the switch the specified number of times against a three-phase fault with asymmetrical current in at least one phase equal to the listed value, with the switch remaining operable and able to carry and interrupt rated continuous current.

4.7 Fault-closing duty cycle value represents asymmetrical, RMS, amperes into which a manually operated switch, when operated vigorously without hesitation through its full travel, can be closed five times with the switch remaining operable and the ability to carry and interrupt at rated continuous current.

5.0 SWITCHES

5.1 The switch shall be a three-pole, group-operated interrupter switch rated 600 amperes continuous and interrupting, 14.4 kV. Switches shall be factory assembled on a one piece base, and include a integral stored-energy operating mechanism that provides up to six switch operations on a single spring charge. Circuit making and circuit breaking shall be accomplished within sealed interrupters in a controlled sulfur hexaflouride (SF6) environment. Switches shall feature a five-time duty-cycle fault-closing rating of 20,000 amperes RMS asymmetrical, with full live-switching performance under any and all ice conditions due to the fact that circuit making and circuit breaking shall be accomplished internally. There shall be no external moving parts. Visible air-gap isolation of switch-open circuits shall be provided by an integral, ground level operated three-pole disconnect. When the switch is operated manually from the ground into the visably open position, a mechanism shall be designed to lock all three switches in the fully open position.

5.2 The three-pole group-operated integer style switches shall be factory assembled on a single base with:

(1) Six operation stored-energy operating mechanism mounted on switch base for automated circuit making and circuit breaking within sealed interrupters.

(2) Their shall be a manual and lockable, vertical operating handle that allows three-pole disconnect from the ground for visible air-gap isolation of switched-open circuits.

(3) Sensors for three-phase monitoring of line current ($\pm$5% accuracy) and a three-phase monitoring of system line voltage ($\pm$ 2% accuracy) shall be built into the switch.

(4) Sensors shall provide at least 20 volt ampere 120 volt 60 hertz voltage source for charging the batteries for the complete automated switch installation.

(5) Provisions for mounting six surge arresters (three on each side of switch).

(6) 25 foot shielded control cable for low-voltage electrical connection of the switch to the communication and control unit.

(7) Removable lifting means for convenient rigging and hoisting of the switch during installation.

(8) Complete installation instructions, including wiring diagram and operating manual.

6.0 BEARINGS

6.1 Any bearings which are part of the switch should be permanently sealed and require no lubrications.

7.0 TERMINAL PADS

7.1 All switches shall be furnished with terminal pads that have two (2) 9/16" holes on 1-3/4" centers unless otherwise specified.

7.2 Terminal connectors on each switch shall be tin plated copper spades.

8.0 RIV LIMIT

8.1 Switches shall be designed to run at radio current voltage 500 microvolts at 1-MHz with 120% of line to ground voltage applied for test.

9.0 COMMUNICATION AND CONTROL UNIT

9.1 The communication and control unit shall have the following features:

9.1.1 Distribution Automation Remote Terminal microprocessor-based remote terminal unit (RTU) that is suited for automated distribution switching application. The microprocessor board shall accept alternating current (AC) analog input connections from current and voltage sensors, eliminating the need for transducers. The micro-processor shall feature six analog inputs (three voltage and three current), six status (digital) inputs, and two control outputs: (Each of the four relays with one momentary form C contact). The contact rating of the control output relays shall be sufficient to operate the switch.

9.1.2 The RTU shall be configured to communicate with a Harris M9400 master computer using either Harris 5000 or Harris DNP 3.0 protocol (selectable).

9.1.3 The microprocessor shall feature a means of detecting faults that occur on the load side of the switching system. The scheme shall detect phase-to-ground, phase-to-phase and phase-to-phase to ground faults and special control software shall determine whether the protective device clearing the fault successfully reclosed or operated to lockout. Other control software shall eliminate false indication due to transformer magnetizing-inrush currents, asymmetry, or reverse current flow (backfeed). Pickup settings (magnitude and duration) for both phase faults and ground faults are independently field selectable. If latching indication is provided, a control point will be used to remotely reset the fault detector status input.

9.1.4 The microprocessor shall automatically calculate a number of different analog system parameters, such as watts, vars, power factor, phase-angle, and direction of current flow. These analog input parameters can be used alone, or collectively, by the system operator to monitor the operating performance of the feeder.

9.1.5 The digital interface radio shall be equivalent to the Alligator model number 1888A with auto deviation control, auto level control, high/low alarm limits, event counter, DOX/VOX keying, over the air change, remote reset and automatic global frequency calibration options.

9.1.6 The battery charger shall receive control output signals from the remote terminal unit to start and stop the battery capacity testing feature. The battery charger shall provide the following alarm inputs to the remote terminal unit: AC failure, battery low voltage and battery high voltage. The 12 VDC battery shall be an approved equal to two Gates 6 VDC 8 Ah monobloc sealed lead acid batteries in order to provide power to the remote terminal unit for up to forty-eight hours. The battery charger shall be an approved equal to Harris Westronics Dart Charger Type 3.

9.1.7 Switch-control circuit board with open/close pushbuttons, local/remote switch, and an operation counter.

9.1.9 Stainless steel NEMA 4X enclosure.

10.0 SWITCH-CONTROL UNIT

10.1 The switch-control unit shall have the following features:

10.1.1 AC power supply and switch-control circuit board with open/close push buttons, local/remote switch, and an operation counter.

10.1.2 Terminal strip for connection of switch-control power and tripping power inputs plus switch-positions indication, and current and voltage sensor outputs.

10.1.3 Stainless steel NEMA 4X enclosure.

10.1.4 Complete installation instructions, including wiring diagram and operating manual.

10.1.5 The supplier shall furnish all transformers/sensors/power supplies to provide all necessary power (including logic and control power) for the supplied equipment. The City of Austin will provide the 7.2 kV (phase to ground) power source.

11.0 NAMEPLATE

11.1 A nameplate shall be secured to the side of each switch base on each pole with lettering parallel to switch blade, and each shall show information as follows: (1) manufacturer's name, (2) type, (3) rated kilovoltage, (4) continuous current in amperes, (5) momentary amperes and (6) fault closing duty cycle five time in amperes asymmetrical, and (7) manufacturer's identification or serial number. The nameplate material shall be brass or other non-corrosive material.

11.1.1 Nameplate information shall remain permanently legible.

11.2 One (1) specimen nameplate for each item on order shall be submitted with drawings for approval that shows normal information minus purchase order information and serial number.

12.0 DRAWINGS AND INDUSTRIAL MANUALS

12.1 Approval of drawings by City of Austin, Electric Utility Department shall be required prior to switch fabrication.

12.2 The Supplier shall submit for approval five (5) complete sets of construction and erection drawings and complete instruction books, and a sample nameplate, as required, to the City of Austin.

12.2.1 Approval drawings shall be received by Austin no later than four (4) weeks after receipt of the purchase order by the manufacturer.

12.2.2 The Supplier shall identify type of equipment, and show purchaser's purchase order number on all instruction books, final drawings, and correspondence.

12.2.3 One copy of these drawings will be returned to the Supplier approved or approved with comments.

12.2.4 The Supplier shall then promptly return to the individual specified in the purchase order five (5) sets of test results and instruction books and one (1) set of test results and instruction books to the Electric Utility Standards and Specifications Division.

12.3 Switch drawings submitted for approval shall include the following information: (1) dimensioned outline drawing of switch, including switch base, types of contacts and Bill of Material item numbers on all parts, (2) dimensioned drawing of control arrangement with Bill of Material item numbers on all parts, (3) detailed drawings of all control parts, including parts to adapt control parts to the Austin structure, (4) Bill of Material listing all parts, and (5) installation, adjustment and maintenance instructions.

12.4 The Supplier shall submit four (4) detailed instruction manuals for Communication Control Unit and Switch Control Unit which includes schematic diagrams, circuit board layouts, parts lists, bench-check procedures, and operating descriptions for the microprocessor, radio transceiver, switch control circuit board, battery charger and AC power supply.

12.5 Waiving of drawing approval does not relieve the Supplier from complete compliance with this specification or from furnishing all final drawings, test results, instruction books, etc. covered by this specification.

13.0 SHIPMENT

13.1 Switches shall be furnished assembled on insulators and bases unless otherwise specified on the inquiry and/or purchase order and shall be crated for safe stacking.

13.2 All control parts to be shipped in same crate as switch.