

CITY OF VICTORVILLE



FOR

**CC17-036
POWER QUALITY METER INSTALLATION**

BID OPENING DATE AND TIME:

WEDNESDAY, DECEMBER 7, 2016

AT

2:30 PST

CITY OF VICTORVILLE

TABLE OF CONTENTS

CC17-036 POWER QUALITY METER INSTALLATION

SPECIAL PROVISIONS

I. BIDS.....

II. MANDATORY PRE-BID MEETING

III. EXECUTION OF CONTRACT

IV. AFTER AWARD OF CONTRACT.....

V. BEGINNING OF WORK AND TIME OF COMPLETION.....

VI. LIQUIDATED DAMAGES.....

VII. PROPOSAL GUARANTY.....

VIII. FAILURE TO EXECUTE CONTRACT.....

IX. RETURN OF PROPOSAL GUARANTY.....

X. BID PROPOSAL AND CONTRACT DOCUMENT.....

XI. PROHIBITED INTEREST.....

XII. AFFIRMATIVE ACTION.....

XIII. CONTRACT DOCUMENTS.....

XIV. WITHDRAWAL OF PROPOSALS.....

XV. RELIEF OF BIDDERS.....

XVI. PAYMENT.....

XVII. BOND REQUIREMENTS.....

XVIII. SENATE BILL 854.....

XIX. PREVAILING WAGES.....

XX. ELECTRONIC CERTIFIED PAYROLL REPORTING.....

XXI. CONTRACTOR'S LICENSE.....

XXII. EVALUATION OF BIDS.....

XXIII. TERMINATION FOR CONVINIENCE.....

XXIV. TERMINATION FOR DEFAULT.....

XXV. DISPUTES.....

XXVI. ATTORNEY'S FEES.....

XXVII. INDEMNIFICATION.....

XXVIII. OWNERSHIP OF DOCUMENTS.....

XXIX. UNFAIR BUSINESS PRACTICE CLAIMS.....

XXX. SEVERABILITY.....

XXXI. WAIVER.....

XXXII. SUBSTITUTE OF SECURITIES.....

XXXIII. APPRENTICES ON PUBLIC WORKS.....

XXXIV. AWARD OF CONTRACT.....

SECTION C – TECHNICAL PROVISIONS

SECTION D - BID PROPOSAL DOCUMENTS

SUBMISSION CERTIFICATION.....
QUESTIONNAIRE.....
BIDDER'S BOND (10% OF THE BID AMOUNT).....
BID PROPOSAL FORM.....
LIST OF SUBCONTRACTORS.....
NON-COLLISION AFFIDAVIT.....
ADDENDA ACKNOWLEDGEMENT.....
PROPOSER IDENTIFICATION.....
CUSTOMER REFERENCES.....
WORKER'S COMPENSATION.....
SB 854
DEBARRED CERTIFICATION.....

CONTRACT DOCUMENTS AND SAMPLE FORMS

CONSTRUCTION AGREEMENT
GUARANTY, FAITHFUL PERFORMANCE AND PAYMENT BOND
PROOF OF PAYROLL SUBMISSIONS

EXHIBIT A:

- SEL-735 Power Quality and Revenue Meter Data Sheet
- Introduction and Specifications
- Location map

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

SPECIAL PROVISIONS

PROJECT SUMMARY: The City of Victorville is soliciting a qualified contractor to install SEL 735 power quality meter (PQM) on VMUS 33kv feed into Southern California Logistics Airport (SCLA) Substation on a pole within the substation yard.

I. BIDS: Sealed bids will be received by the Administrative Services Dept., Finance Division, Purchasing Section of the City of Victorville, 14343 Civic Drive, Victorville, CA 92392, until **2:30 p.m. PST on WEDNESDAY, DECEMBER 7, 2016** for furnishing all labor, services, materials, tools, equipment, supplies, transportation, utilities, and all other items and facilities necessary for the completion of the project provided in the Contract Documents ("Contract").

II. MANDATORY PRE-BID MEETING: All prospective bidders are invited to attend the mandatory pre-bid meeting on **WEDNESDAY, NOVEMBER 16, 2016 at 10:00 a.m.** Prospective bidders are encouraged to address questions, problems, and other issues regarding this project. The meeting will take place at the Southern California Logistics Airport, Conference Room C, 18374 Phantom West Victorville, CA 92394. Phone number if needed direction (760) 243-1900. Site visit to follow.

III. EXECUTION OF CONTRACT: The Contract shall be signed by the successful bidder and returned, together with contract bonds, copies of insurance policies, and copy of City of Victorville Business License within 10 days, not including Friday, Saturday, Sunday, and legal holidays, after the bidder has received the Contract for execution.

IV. AFTER AWARD OF CONTRACT: A fully executed Construction Agreement will be provided to the awarded Contractor during the pre-construction meeting. All submittals have to be approved by the Project Manager and a Notice to Proceed will be issued prior to beginning of work.

V. BEGINNING OF WORK AND TIME OF COMPLETION: The work under this Contract shall be diligently prosecuted to completion before expiration of the **(45) forty-five CALENDAR DAYS** beginning within fifteen calendar days after the "Notice to Proceed" date.

VI. LIQUIDATED DAMAGES: The Contractor shall pay the City of Victorville the sum of **\$500.00 AND 00/100 DOLLARS (\$500.00) per calendar day** for each and every calendar day delay in finishing the work in excess of **forty-five (45) CALENDAR DAYS** as specified above as Liquidated Damages.

VII. PROPOSAL GUARANTY: Each bid must be accompanied by 10% in cash, a cashier's check, a certified check or a corporate surety bond on the form furnished by the City of Victorville, as a guarantee that the bidder will, if an award is made in accordance with the terms of this bid, promptly secure Workmen's Compensation Insurance, Liability Insurance, execute a Contract on the required form, and furnish satisfactory bonds for the 100% of the bid amount Faithful Performance and Payment of the Contract. Said proposal guaranty shall accompany and be enclosed in the same envelope with the Bid Proposal.

VIII. FAILURE TO EXECUTE CONTRACT: Failure of the lowest responsible bidder, the second lowest responsible bidder, or the third lowest responsible bidder to execute the Contract and file acceptable bonds as provided herein within 10 days, not including Friday, Saturday, Sunday, or legal holidays, after the bidder has received the Contract for execution, shall be just cause for the forfeiture of the proposal guaranty. The successful bidder may file with the City a written notice, signed by the bidder or the bidder's authorized representative, specifying that the bidder will refuse to execute the Contract if it is presented. The filing of this notice shall have the same force and effect as the failure of the bidder to execute the Contract and furnish acceptable bonds within the time hereinbefore prescribed.

IX. RETURN OF PROPOSAL GUARANTIES: The proposal guaranties accompanying the proposals of the first, second and third lowest responsible bidders will be retained until the Contract has been finally executed, after which those proposal guaranties, except bidder's bonds and any guaranties which have been forfeited, will be returned to the respective bidders whose proposal they accompany. The proposal guaranties, other bidders bonds, submitted by all other unsuccessful bidders will be returned upon determination, by the City, of the first, second and third lowest responsible bidders.

X. BID PROPOSAL AND CONTRACT DOCUMENT: The Bid Proposal Documents and Contract Documents shall consist of the Notice Inviting Bids, Instructions to Bidders, General Requirements, Technical Requirements, Proposal Instructions, Proposal, Questionnaire, Bidder's Bond with cash, certified check, cashier's check or bond, Bid Proposal, List of Subcontractors, Non-Collusion Affidavit, Addenda Acknowledgment, Exception Form, Contract, Payment Bond, Faithful Performance Bond, and Guaranty, together with all additions, deletions, modifications, appendices, and all addenda, as prepared prior to the date of this bid opening, setting forth any modifications or interpretations of said documents, are hereby incorporated in and made a part of these Special Provisions, Proposal, and Contract.

XI. PROHIBITED INTEREST: No member, officer, or employee of the City or of a local public body during his tenure or for one (1) year thereafter shall have any interest, direct or indirect, in this Contract or the proceeds thereof.

Furthermore, the parties hereto covenant and agree that to their knowledge no board member, officer, or employee of the City has any interest, whether contractual, non-contractual, financial, or otherwise, in this transaction or in the business of the contracting party other than the City, and if any such interest comes to the knowledge of either party at any time, a full and complete disclosure of such information will be made, in writing, to the other party or parties; even if such interest would not be considered conflict of interest under Article 4 (commencing with Section 1090) or Article 4.6 (commencing with Section 1120) of Division 4 of Title 1 of the Government Code of the State of California.

XII. AFFIRMATIVE ACTION: The City hereby notifies all bidders that it will affirmatively ensure that, in any Contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration of award.

XIII. CONTRACT DOCUMENTS: The Plans and Special Provisions are available at the City of Victorville's website at <http://www.victorvilleca.gov/Site/CityDepartments.aspx?id=4204>. By clicking on the link to download, potential bidders will be directed to the outside website Ebidboard. Potential bidders must register and place their name on the plan holders list to receive

updates, addenda and download the project files in portable digital format (pdf).

XIV. WITHDRAWAL OF PROPOSALS: Any bid may be withdrawn at any time prior to date and time indicated in Section II, "Sealed Bids" of Notice Inviting Bids only by written request for the withdrawal of the bid received by the City of Victorville Engineering Department. The request shall be executed by the bidder or bidder's duly authorized representative.

XV. RELIEF OF BIDDERS: Attention is directed to the provisions of Public Contract Code Sections 5100 to 5107, inclusive, concerning relief of bidders and in particular to the requirement therein, that if the bidder claims a mistake was made in the bid presented, the bidder shall give the City written notice within 5 days, not including Friday, Saturday, Sunday or legal holidays, after the opening of the bids of the alleged mistake, specifying in the notice in detail how the mistake occurred.

XVI. PAYMENT: On or about the first of each calendar month, the Contractor shall request payment for the work performed prior to such date. Each payment request shall be accompanied by the updated progress schedule indicating progress achieved to that date.

Upon approval by the Director of Public Works & Water, or his designee, of the Contractor's estimate of work completed, the City will make a progress payment to the Contractor equal in amount to the approved estimate less a retention of five (5) percent and less the total of all previous payments. Retention held will be released 45 days after the Notice of Completion has been accepted by Council.

In preparing estimates, the material delivered on the site, preparatory work done, and the cost of bonds and insurance paid may be taken into consideration.

The making of any payment to the Contractor under this Contract shall not relieve the Contractor of its obligation hereunder. The Contractor is obligated to complete the Contract in its entirety and to deliver to the City such completed work, finished product or structure as is specified in the Contract, at the time or times specified, and until this Contract is fully performed by the Contractor and the work, product, or structure produced thereby is accepted by the City, the Contractor shall be obligated to repair, replace, restore, or rebuild any fully or partially completed work or structure, or any materials or equipment required to be provided under the Contract which may be damaged, lost, stole, or otherwise injured in any way; provided, however, that with respect to any major unit of the type mentioned in this section, this particular obligation of the Contractor will terminate upon the completion of the Contract and acceptance by the City of such major unit, and provided further that all work, any structure, materials, and equipment covered by any partial payment is made.

When a "Notice to Withhold" is served upon the City, pursuant to the lien statutes of the State of California, to withhold sufficient funds from payments to the Contractor in support of a claim resulting from default by the Contractor in payment for labor or materials used in the execution of this Contract, the City will withhold from payments due the Contractor, an amount of money equal to the amount of the claim stated in the "Notice to Withhold," and an additional amount equal to twenty-five percent (25%) of the amount of said claim to defray any costs of litigation in the event of court action on the claim, for a total withholding of one and one-quarter (1¼) times in the stated amount of the claim.

The Contractor will be required, in requests for payment, to certify, under penalty of perjury, the following:

1. No workmen were required or permitted to work more than eight (8) hours in any one calendar day, except in cases of emergency, and except as provided by law.
2. Not less than the prevailing rates, as set forth in the Contract for this work, have been paid all laborers, workmen, and mechanics employed to perform this work.
3. There were no substitutions of subcontractors, no assignments or transference of subcontractors, except as approved by the City Engineer or his designee.
4. All of the provisions of the Victorville Municipal Code, pertaining to non-discrimination in employment have been complied with.
5. The Record Drawings maintained on the job have been noted with all changes made subsequent to the previous request for payment.
6. The Map and Drawings have been submitted and approved by the Contractor or the Consultant, City Engineer, or the designee, as applicable.

The City shall make progress payments on any properly completed payment request submitted by the Contractor. The payment request shall not be deemed properly completed unless eCPR Online Submission Form(s) have been properly completed and submitted on a weekly basis, for each week worked or idle during the time period covered by said payment request.

If payments are to be made for materials or equipment not incorporated in the work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditional upon submission by the Contractor of bills of sale or such other procedures satisfactory to the City to establish the City's title to such materials or equipment or otherwise protect the City's interest, including applicable insurance and transportation to the site.

The Contractor warrants and guarantees that title to all work, materials and equipment covered by an application for payment will pass to the City of Victorville upon receipt of such payment by the Contractor, free and clear of all liens, claims, security interests, or encumbrances - hereinafter referred to in this section as "liens"; and that no work, materials or equipment covered by a request for payment will have been acquired by the Contractor, or by any other person performing the work at the site or furnishing materials and equipment to the project.

XVII. BOND REQUIREMENTS: Prior to execution of the Contract, the successful bidder shall provide a **one-hundred percent (100%) Payment and Faithful Performance Bond** based on the bid amount accepted by the City of Victorville.

XVIII. SENATE BILL 854 REQUIREMENTS

Senate Bill 854 established a new public works contractor registration program which collects fees to fund compliance monitoring and enforcement. All contractors and subcontractors intending to bid or perform work on public works projects will be required to register, and annually renew, online for the program. The cost to register is currently \$300.00 and is a non-refundable DIR fee paid to the State.

No contractor or subcontractor may be listed on or awarded a contract for any public works project unless registered with the Department of Industrial Relations (DIR) pursuant to Labor Code section 1725.5, with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a).

This project is subject to compliance monitoring and enforcement by the DIR. (www.dir.ca.gov)

XIX. PREVAILING WAGES: The Contractor and sub-contractor(s) shall comply with all state regulations and guidelines required in the performance of this Contract. Updated wage rates can be obtained by visiting www.dir.ca.gov for State Prevailing Wage Rates. Notwithstanding anything in the Contract Documents to the contrary, Contractor shall be responsible for using up-to-date wage rates. This project is subject to compliance monitoring and enforcement by the DIR.

XX. ELECTRONIC CERTIFIED PAYROLL REPORTING (eCPR): Contractors and Subcontractors on all public works projects must use this system to furnish certified payroll records (CPRs) to the Labor Commissioner. For more information please go to www.dir.gov under Labor Law Public Works.

XXI. CONTRACTOR'S LICENSE: All contractors shall be licensed in accordance with the laws of State of California, must hold a valid **CLASS A or C-10** license; Electrical Contractor with experience working for a major utility such as SCE, SDG&E, PG&E, should be qualified. Any contractor not so licensed shall be subject to penalties imposed by such laws. Contractor shall possess the appropriate license prior to award of Contract.

In addition to being properly licensed, Contractor must trained and experienced in the performance of medium voltage electrical distribution work. At minimum, the Contractor must have current similar experience in working directly for at least one California electric utilities in the past three years. Contractor and/or sub-contractors shall provide qualifications and experience with bid proposals.

XXII. EVALUATION OF BIDS: The City reserves the right to accept or reject any and all bids and to award a Contract to the bidder who best meets its requirements. Relevant factors that shall be considered in evaluating the bids are: completeness and accuracy of bid; length and nature of warranties; anticipated length of life of materials; as well as the lowest and best price.

XXIII. TERMINATION FOR CONVENIENCE: The City of Victorville may, by written notice, terminate this Contract in whole or in part, when deemed in the City's interest. Upon termination of this Contract, the City of Victorville shall only be liable for payment under the payment provisions of this Contract for services rendered or supplies furnished prior to the effective date of termination.

XXIV. TERMINATION FOR DEFAULT: In the event either party fails to perform its obligations hereunder, the non-defaulting party shall provide the defaulting party written notice of such default. The defaulting party shall have ten (10) calendar days to cure the default; provided that, if the default is not reasonably susceptible to being cured within said ten (10) calendar days, the defaulting party shall have a reasonable time to cure the default, not to exceed a maximum of thirty (30) calendar days, so long as the defaulting party commences to cure such default within ten (10) calendar days of service of such notice and diligently prosecutes the cure to completion; provided further that if the default is an immediate danger to the health, safety and general welfare, the defaulting party shall take such immediate action as may be

necessary. Notwithstanding the foregoing, the non-defaulting party may, in its sole and absolute discretion, grant a longer cure period. Should the defaulting party fail to cure the default within the time period provided in this Section, the non-defaulting party shall have the right, in addition to any other rights the non-defaulting party may have at law or in equity, to terminate this Agreement. Compliance with the provisions of this Section shall be a condition precedent to bringing any legal action, and such compliance shall not be a waiver of any party's right to take legal action in the event that the dispute is not cured.

XXV. DISPUTES: Any controversy or claim arising out of or relating to the provisions of this Agreement or the breach thereof shall be settled by arbitration, in accordance with the Rules of the American Arbitration Association, unless the parties agree, in writing, to some other form of alternative dispute resolution.

XXVI. ATTORNEY'S FEES: Should any litigation, specifically including but not limited to, arbitration and other non-judicial resolution of disputes be commenced between the parties to this agreement concerning this agreement or the rights and duties of either in relation thereto, the parties prevailing in such litigation or other proceeding shall be entitled, in addition to such other relief as may be granted, to a reasonable sum as and for attorney fees in such litigation where the proceeding which, if not agreed upon by the parties, shall be determined by the court or other entity in which such litigation or other proceeding is brought.

XXVII. INDEMNIFICATION: Notwithstanding the limits of any insurance, Contractor shall indemnify the City, its officials, officers, agents, volunteers and employees against, and will hold and save them and each of them harmless from, any and all actions, suits, claims, damages to persons or property, losses, costs, penalties, obligations, errors, omissions or liabilities, (herein "claims or liabilities") that may be asserted or claimed by any person, firm or entity arising or alleged to arise out of or in connection with the negligent performance of the work, operations or activities of Contractor, its agents, employees, subcontractors, or invitees, provided for herein, or arising or alleged to arise from the negligent acts or omissions of Contractor hereunder, or arising or alleged to arise from Contractor's negligent performance of or failure to perform any term, provision, covenant or condition of this Agreement, but excluding such claims or liabilities or portion of such claims or liabilities arising or alleged to arise from the negligence or willful misconduct of the City its officials, officers, agents, volunteers or employees, and in connection therewith:

- (a) Contractor will defend any action or actions filed in connection with any of said claims or liabilities and will pay all costs and expenses, including legal costs and attorneys' fees incurred in connection therewith;
- (b) Contractor will promptly pay any judgment rendered against the City, its officials, officers, agents or employees for any such claims or liabilities arising or alleged to arise out of or in connection with Contractor's (or its agents, employees, subcontractors or invitees) negligent performance of or failure to perform such work, operations or activities hereunder; and Contractor agrees to save and hold the City, its officials, volunteers, officers, agents, and employees harmless therefrom;
- (c) In the event the City, its officials, officers, agents, volunteers or employees is made a party to any action or proceeding filed or prosecuted against Contractor for such damages or other claims arising or alleged to arise out of or in connection with the negligent performance of or failure to perform the work, operation or activities of Contractor hereunder, Contractor shall pay to the City, its officials, volunteers officers, agents or employees, any and all costs and expenses incurred by the City, its officers, agents or employees in such action or proceeding, including but not limited to, legal costs and attorneys' fees for counsel acceptable to City.

- (d) Contractor's duty to defend and indemnify as set out in this Section shall include any claims, liabilities, obligations, losses, demands, actions, penalties, suits, costs, expenses or damages or injury to persons or property arising or alleged to arise from, in connection with, as a consequence of, or pursuant to, any state or federal law or regulation regarding hazardous substances, including but not limited to the Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA"), Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), Resource Conservation and Recovery Act of 1976 ("RCRA"), the Hazardous and Solid Waste Amendments of 1984, the Hazardous Material Transportation Act, the Toxic Substances control Act, the Clean Air Act, the Clean Water Act, the California Hazardous Substance Account Act, the California Hazardous Waste Control Law or the Porter-Cologne Water Quality Control Act, as any of those statutes may be amended from time to time.

The Contractor's indemnification obligations pursuant to this Section shall survive the termination of this Agreement. Contractor shall require the same indemnification from all subcontractors.

XXVIII. OWNERSHIP OF DOCUMENTS: All drawings, specifications, reports, records, documents and other materials prepared by Contractor, its employees, subcontractors and agents in the performance of this Agreement shall be the property of the City and shall be delivered to the City upon request of the Contract Officer or upon the termination of this Agreement, and Contractor shall have no claim for further employment or additional compensation as a result of the exercise by the City of its full rights of ownership of the documents and materials hereunder. Contractor may retain copies of such documents for its own use. Contractor shall have an unrestricted right to use the concepts embodied therein. All subcontractors shall provide for assignment to the City of any documents or materials prepared by them, and in the event Contractor fails to secure such assignment, Contractor shall indemnify the City for all damages resulting there from.

XXIX. UNFAIR BUSINESS PRACTICE CLAIMS: In entering into a public works contract or a subcontract to supply goods, services or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2, (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body renders final payment to the Contractor without further acknowledgment by the parties. (Sec. 7103.5, California Public Contract Code).

XXX. SEVERABILITY: In the event that any one or more of the phrases, sentences, clauses, paragraphs, or sections contained in this Agreement shall be declared invalid or unenforceable by a valid judgment or decree of a court of competent jurisdiction, such invalidity or unenforceability shall not affect any of the remaining phrases, sentences, clauses, paragraphs, or sections of this Agreement which are hereby declared as severable and shall be interpreted to carry out the intent of the parties hereunder unless the invalid provision is so material that its invalidity deprives either party of the basic benefit of their bargain or renders this Agreement meaningless.

XXXI. WAIVER: No delay or omission in the exercise of any right or remedy by a non-

defaulting party on any default shall impair such right or remedy or be construed as a waiver. A party's consent to or approval of any act by the other party requiring the party's consent or approval shall not be deemed to waive or render unnecessary the other party's consent to or approval of any subsequent act. Any waiver by either party of any default must be in writing and shall not be a waiver of any other default concerning the same or any other provision of this Agreement.

XXXII. SUBSTITUTION OF SECURITIES: Pursuant to California Public Contract Code Section 22300, substitution of eligible equivalent securities for any moneys withheld to ensure performance under the Contract for the work to be performed will be permitted at the request and expense of the successful bidder.

XXXIII. APPRENTICES ON PUBLIC WORKS: The Contractor shall comply with all applicable provisions of Section 1775.5 and 1777.6 of the California Labor Code relating to employment of apprentices on public works projects. Prior to commencing work on a contract for public works, Contractor shall submit Contract award information to an applicable apprenticeship program that can supply apprentices to the site of the public works. Contractor and Subcontractor shall provide and keep accurate payroll records and shall be available for inspection by the Labor Standards Enforcement (full texts of these codes are available at www.leginfo.ca.gov/calaw.html).

XXXIV. AWARD OF CONTRACT: The City of Victorville reserves the right to reject any and all bids and waive any irregularities or informalities in any bid or in the bidding. The City of Victorville further reserves the right to award the Contract to other than the lowest bidder if such action is deemed to be in the best interest of the City. The award of the Contract, if awarded, will be made within ninety (90) calendar days after opening of the Bid Proposals. The Contractor's signature on the Proposal form shall constitute a commitment on the part of the bidder to furnish the equipment as set forth in the Bid Proposal form, Scope of Work and the Special Provisions. The bidder to whom the Contract is awarded shall be notified upon approval of the Contract by the City Council.

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

SCOPE OF WORK

OBJECTIVE: To have the ability to verify the quality of energy provided to Victorville Municipal Utility Services (VMUS) on Southern California Edison's 33kv distribution circuit at 13576 Mustang Street, Victorville, California.

SCOPE OF WORK:

- Install City-provided SEL 735 power quality meter (PQM) on VMUS' 33kv feed into SCLA Substation on a pole within the substation yard.
- Provide a cellular automatic notification (auto dialer) system that is compatible with the SEL 735 Power Quality Meter.
- Contractor shall supply all other materials, parts, and labor associated with, and required for installation of the PQM.
- Installation of the PQM shall be performed in accordance with the manufacturer's installation guide which is provided in the attached manual sections.
- Contractor shall include programming of SEL 735 PQM and training to enable VMUS staff to read and download voltage, amps and frequency of incoming power (MV-90 output).

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

SUBMISSION CERTIFICATION

I hereby submit to the City of Victorville the following bid proposal for work outlined in plans and specifications entitled **POWER QUALITY METER INSTALLATION**. All of the following documents (check below) are completed, fully executed, and included in my bid as required in the bid documents:

- _____ Submission Certification
- _____ Public Contract Code Section 10162 Questionnaire
- _____ Bidder's Bond (10% of the Bid Amount)
- _____ Bid Proposal Form
- _____ List of Subcontractors
- _____ Non-Collusion Affidavit
- _____ Addenda Acknowledgement
- _____ Proposer Identification
- _____ Customer References
- _____ Workers Compensation
- _____ SB 854 Certification
- _____ Debarred Certification Acknowledgement

My signature on this submittal Certification is affirmation that all items listed above are fully completed and executed and are hereby submitted with proposal as required. I understand that failure to complete and/or submit any of the required documents may be cause for rejection of my bid proposal.

Authorized Signature

Printed Name and Title

Date Signed

Telephone Number

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

QUESTIONNAIRE

In accordance with Government code Section 14310.5, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State, or local government project because of a violation of law or a safety regulation?

Yes ____ No

If the answer is yes, explain the circumstances in the following space:

NOTE: This questionnaire constitutes a part of the Proposal and signature on the signature portion of this Proposal shall constitute signature of this questionnaire.

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION
BIDDER'S BOND**

To ACCOMPANY BID PROPOSAL FORM

KNOW ALL MEN BY THESE PRESENTS,

THAT WE, _____, as Principal, and _____, as Surety, are held and firmly bound unto the CITY OF VICTORVILLE in the sum of TEN PERCENT (10%) of the total amount of the bid of the Principal, to be paid to the City, for which payment, well and truly to be made, we bind ourselves, our heirs, executors, and administrators, successors, or assignees, jointly and severally, firmly by the presents.

In no case shall the liability of the Surety hereunder exceed the sum of \$_____.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, WHEREAS the Principal has submitted a bid to CITY OF VICTORVILLE for the certain construction for which bids are to be opened at Office of the City Clerk of the CITY OF VICTORVILLE on **December 7, 2016 at 2:30 P.M.**, as shown on Plans entitled **CC17-036 POWER QUALITY METER INSTALLATION.**

NOW THEREFORE, if the aforesaid Principal is awarded the Contract, and within the time and manner required under the said Special Provisions, enters into a written Contract, in the prescribed form, in accordance with the bid and files the two (2) required Bonds with the CITY OF VICTORVILLE, one (1) to guarantee faithful performance and one (1) to guarantee payment for labor and materials as required by law, then this obligation shall be null and void; otherwise, it shall be and remain in full force and virtue.

In the event suit is **brought upon this Bond by the City and judgment is recovered, the Surety shall pay all costs incurred by the City** in such suite, including reasonable attorney's fee to be fixed by the Court.

Accompanying this Proposal is () \$ _____ Cash, () Cashier's Check, () Certified Check, () Bidder's Bond in the amount equal to at least ten percent (10%) of the total bid.

THE UNDERSIGNED further agrees that in case of default in executing the required Contract together with the necessary bonds within the period of time provided by the Proposal requirements, the proceeds of the security accompanying this bid shall become the property of City of Victorville, California, and this Proposal and the acceptance thereof may be considered null and void.

Principal is licensed in the State of California in accordance with an act providing for the registration of contractors. License No. _____.

_____ (Seal)

By: _____ (Seal)

_____ (Seal)
PRINCIPAL

_____ (Seal)

By: _____ (Seal)
SURETY

_____ ADDRESS

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

BID PROPOSAL FORM

TO THE CITY COUNCIL OF THE CITY OF VICTORVILLE, CALIFORNIA:

The undersigned declares that he/she has carefully examined the locations of the proposed Work, the Plans, Special Provisions, and other Contract Documents; and being familiar with all of the conditions surrounding the Work, including the availability of materials and labor, hereby proposes to furnish all labor, materials, tools, equipment, and incidentals to complete the installation of the PQM. All of the aforementioned shall be done in accordance with the said Scope, Special Provisions, and Contract Documents and all applicable addenda.

ITEM	QTY.		UOM	COST
1	1	Install (1) one City-provided power quality meter, SEL735 on VMUS' 33kv feed into SCLA Substation on a pole within substation yard		
2	1	Materials to complete the installation		
3	1	Other if any please specify		
SUBTOTAL				
TAX ON MATERIALS ONLY				
TOTAL BID				

TOTAL BID IN WORDS: _____

Contractor: _____

By: _____

Contractor's License No.: _____

Address: _____

Phone: _____ Fax: _____

Email Address: _____

Name & Title: _____

Signature Date

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

LIST OF SUBCONTRACTORS

The bidder is required to furnish the following information in accordance with the provisions of Section 4100 to 4113, inclusive, of the Government code of the State of California.

The contractor shall perform with its own organization contract work amounting to not less than 30 percent (30%) of the total original contract price, excluding any specialty items designated by the City. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the amount of work required to be performed by the contractor's own organization.

Bidder's Name _____

Name Subcontractor is licensed under: _____

License Number and Classification: _____

Address of Subcontractor: _____

Percent (%) of Total Contract: _____ %

Specific Description of Subcontract: _____

DIR Registration number: _____

Name Subcontractor is licensed under: _____

License Number and Classification: _____

Address of Subcontractor: _____

Percent (%) of Total Contract: _____ %

Specific Description of Subcontract: _____

DIR Registration Number: _____

TOTAL PERCENTAGE SUBCONTRACTED: _____

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION
NON-COLLUSION AFFIDAVIT**

STATE OF CALIFORNIA }
COUNTY OF }
 }

_____, being first duly sworn, deposes, and say he, they

(sole owner, partner, president, secretary, etc.)

of _____, the party making the foregoing bid; that such bid is not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization, or corporation; that such bid is genuine and not collusive or sham; that said bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, nor that anyone shall refrain from bidding; that said bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of said bidder or of any other bidder; nor to fix any overhead profit, or cost element of such bid price, nor that of any other bidder; nor to secure any proposed contract; that all statements contained in such bid are true. And further, that said bidder has not directly or indirectly submitted his bid price or any breakdown thereof, nor paid and will not pay fees in connection therewith to any corporation, partnership, company, association, organization, bid depository, not to any member or agent thereof, nor to any other individual except to such person or persons as have a partnership or other financial interest with said bidder in his general business.

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

I certify (or declare) under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Signature	Company Name
Printed Name	Title

State of California

County of _____

Subscribed and sworn to (or affirmed) before me on this _____ day of _____, 20____, by _____ proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

(Seal)

Signature_____

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

PROPOSER IDENTIFICATION

1. Legal name of Proposer: _____
2. Street Address: _____
3. Mailing Address: _____
4. Business Telephone: _____
5. Facsimile Telephone: _____
6. Email Address: _____
7. Type of Business:
 Sole Proprietor Partnership Corporation
Other: _____
If corporation, indicate State where incorporated: _____
8. Business License number issued by the City where the Proposer's principal place of business is located.
Number: _____ Issuing City: _____
9. Federal Tax Identification Number: _____
10. Proposer's Project Manager: _____

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

CUSTOMER REFERENCES

Bidder: _____

LIST FOUR (4) YOU HAVE DONE BUSINESS WITH WITHIN THE LAST THREE YEARS – PREFERABLY PUBLIC AGENCIES		
1.	Name of Agency	
	Address	
	Contact Person Name:	
	Contact Person Phone:	
	Email Address:	
2.	Name of Agency	
	Address	
	Contact Person Name:	
	Contact Person Phone:	
	Email Address:	
3.	Name of Agency	
	Address	
	Contact Person Name:	
	Contact Person Phone:	
	Email Address:	
4	Name of Agency	
	Address	
	Contact Person Name:	
	Contact Person Phone:	
	Email Address:	

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

WORKERS' COMPENSATION

The Proposer shall execute the following form as required by the California Labor Code, Sections 1860 and 1861:

I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and on behalf of my firm, I will comply with such provisions before commencing the performance of the services of any contract entered into.

Signature Company Name

Printed Name Business License Number

Title Date

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

SENATE BILL 854

<http://www.dir.ca.gov/Public-Works/PublicWorks.html>

Senate Bill 854 signed into law on June 20, 2014, became effective immediately. It established a new public works contractor registration program which will collect fees to fund compliance monitoring and enforcement, determine prevailing wage and public works coverage, and hear enforcement appeals.

All contractors and subcontractors intending to bid or perform work on public works projects will be required to register, and annually renew, online for the program. The annual cost to register for the program is currently \$300.00 and is non-refundable. This is a Department of Industrial Relations (DIR) fee paid to the State of California. The City will not register a contractor/subcontractor, nor collect funds for registration.

Contractors or subcontractors submitting bids, intent to bid, and/or to provide services to City must be registered. The requirement to use only registered contractors and subcontractors greater than \$1,000.00 applies to all public works projects. No bid can be accepted nor any contract or subcontract entered into nor purchase order issued without proof that the contractor or subcontractor is registered.

Effective immediately, the City will be required to fill out a form alerting the DIR of the services you are providing the City. Detailed information is required to complete this form. You may be asked to provide information needed to complete the DIR form. You will be asked to complete this in a timely manner to avoid interruption in the services you are providing.

Are you currently registered with the DIR?

Yes _____ **No** _____ If yes, what is your registration number? _____
(please submit proof of your registration)

Bidder: _____ Federal I.D. No: _____

Address: _____

Phone: _____ Fax: _____ Email: _____

Signature: _____ Date: _____

Name Printed: _____ Title: _____

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

DEBARRED CERTIFICATION ACKNOWLEDGEMENT

(a)(1) The Offeror/Bidder certifies, to the best of its knowledge and belief, that—

(i) The Offeror/Bidder and/or any of its Principals—

(A) Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have not, within a three-year period preceding this solicitation, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) contract or subcontract; violation of Federal or State antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal criminal tax laws, or receiving stolen property;

(C) Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision;

(ii) The Offeror/Bidder has not, within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) “Principal,” for the purposes of this certification, means an officer, director, owner, partner, or a person having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a division or business segment; and similar positions).

This certification concerns a matter within the Jurisdiction of an agency of the United States and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Section 1001, Title 18, United States Code.

(b) The Offeror/Bidder shall provide immediate written notice to the City if, at any time prior to contract award, the Offeror/Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror’s/Bidder’s responsibility. Failure of the Offeror/Bidder to furnish a certification or provide such additional information as requested by the City may render the Offeror/Bidder nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror/Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror/Bidder knowingly rendered an erroneous certification, in addition to other remedies available to the City, the City may terminate the contract resulting from this solicitation for default.

The Offeror/Bidder certifies that the foregoing is true and correct:

Offeror/Bidder: _____ Federal I.D. No: _____

Address: _____

Phone: _____ Fax: _____ Email: _____

Signature: _____ Date: _____

Name Printed: _____ Title: _____

SAMPLE CONSTRUCTION AGREEMENT

**“SAMPLE”
CONSTRUCTION AGREEMENT
BY AND BETWEEN
THE CITY OF VICTORVILLE
AND
NAME OF CONTRACTOR
FOR
CC17-036 POWER QUALITY METER INSTALLATION**

THIS CONSTRUCTION AGREEMENT (the “Agreement”) is made and entered into by and between the City of Victorville, a municipal corporation located in the County of San Bernardino, State of California, hereinafter referred to as the “City”, and **NAME OF CONTRACTOR**, hereinafter referred to as the “Contractor”. The City and the Contractor are sometimes hereinafter referred to as a “Party” or as the “Parties”.

RECITALS:

WHEREAS, THE CITY requires **DESCRIBE SERVICES** (the “Project”); and

WHEREAS, in light of the facts set forth above, the City desires to retain Contractor in connection with **DESCRIBE SERVICES**.

NOW, THEREFORE, IN CONSIDERATION OF THE COVENANTS, CONDITIONS, AND PROMISES CONTAINED HEREIN AND FOR SUCH OTHER GOOD AND VALUABLE CONSIDERATION, THE PARTIES HERETO AGREE AS FOLLOWS:

Section 1. RECITALS

The Recitals set forth above are true and correct and are hereby incorporated into this Agreement by this reference, as though set forth herein.

Section 2. TERM OF AGREEMENT

This Agreement shall commence within **NUMBER (QTY) OF CALENDAR DAYS** after issuance of Notice to Proceed (the “Commencement Date”) and shall terminate upon completion of the Project **NUMBER (QTY) OF CALENDAR DAYS** after Commencement Date unless sooner terminated in accordance with the provisions of this Agreement.

Section 3. TERMINATION OR SUSPENSION

a. This Agreement may be terminated or suspended without cause by either Party at any time, provided that the Party initiating the termination provides the other Party at least thirty (30) days advance written notice of such termination or suspension. In the event of such termination, the City shall only be liable for payment under the payment provisions of this Agreement for satisfactory services rendered or supplies actually furnished prior to the effective date of termination.

b. This Agreement may be terminated or suspended with cause by either Party at any time, provided that the Party initiating termination provides the other Party at least ten (10) days advance written notice of such termination or suspension. In the event of such termination, the City

shall only be liable for payment under the payment provisions of this Agreement for satisfactory services rendered or supplies actually furnished prior to the effective date of termination.

Section 4. CONTRACT DOCUMENTS; PRIORITY

The contract documents shall include the following documents, attached hereto as exhibits and incorporated herein by this reference as though set forth in full (the “Contract Documents”):

- This Agreement.
Exhibits:
- Notice Inviting Bids for the Project;
- City Specifications for the Project;
- Special Provisions;
- Bid Proposal Form(s) for the Project; and
- Accepted Proposal.

In the event of any conflict between or among the Contract Documents, or any dispute as to the meaning of any term or provision, the Contract Documents shall be given priority according to the order listed herein above. In the event of any conflict or dispute that cannot be resolved by reference to the Contract Documents, the following documents may be used to clarify or interpret any term therein:

- Non-Collusion Affidavit;
- Bidder’s Bond;
- List of Subcontractors;
- Faithful Performance Bond;
- Payment Bond; and
- Guaranty.

Section 5. CONTRACTOR’S OBLIGATIONS

Contractor shall complete the Project as specifically set forth in the Contract Documents. Contractor shall furnish, at its own cost and expense, all labor, services, material, tools, equipment, supplies, transportation, and any other items and facilities necessary therefore, as provided in the Contract Documents.

Section 6. COMPENSATION

The Contractor agrees to receive and accept the following amount, not to exceed **SPELL OUT DOLLAR AMOUNT AND 00/100 DOLLARS (\$0.00)**, as full compensation for furnishing; all materials, doing all the work contemplated and embraced in this contract, all loss or damage arising out of the nature of the work aforesaid, the action of the elements, any unforeseen difficulties or obstructions which may arise or be encountered in the execution of the work until its acceptance by the City of Victorville, and for all risks of every description connected with the work, all expenses incurred by or in consequence of the suspension or discontinuance of work well and faithfully completing the whole work, thereof, according to the requirements of **INSERT DEPT. HEAD NAME AND TITLE**, or his designee, to wit: See **Exhibit “A”, Scope of Work**.

Section 7. BID PROPOSAL FORMS

The City shall pay Contractor as provided in the Bid Proposal Forms, attached hereto as **Exhibit "B"**, and incorporated herein by this reference as thought set forth in full, subject to approval of the City, when applicable.

Section 8. PREVAILING WAGES

In accordance with the provisions of the California Labor Code, the State Director of Industrial Relations has determined the general prevailing rates of per diem wages in the locality where the Project is to be done. Copies of the prevailing rate of per diem wages are on file at the City of Victorville Finance Division and shall be made available to any interested party on request. Notwithstanding anything in the Contract Documents to the contrary, Contractor shall be responsible for using up-to-date prevailing wage rates.

NOTE: A WEEKLY CERTIFIED PAYROLL AND DAILY SIGN IN SHEETS are required with each invoice to the City. Payment of the invoice may be delayed when a certified payroll is not included with the Contractor's invoice (Exhibits E & C are attached).

Exhibit "D", attached, is the Employee Information Sheet. This required document is due prior to, or along with the first invoice. This document is required only once per employee.

Section 9. WORKERS' COMPENSATION INSURANCE

Contractor shall procure and maintain, at its own expense, during the Term of this Agreement, workers' compensation insurance, providing coverage as required by the California State Workers' Compensation Law. If any class of employees employed by Contractor is not protected by the California State Workers' Compensation Law, Contractor shall provide adequate insurance for the protection of such employees to the satisfaction of the City.

In conformance with current statutory requirements of Section 1860 et seq., of the Labor Code of the State of California, the undersigned confirms the following as their certification:

I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions before commencing the performance of the work of this contract.

Section 10. NOTICE TO PROCEED

No work, service, material, or equipment shall be performed or furnished under this Contract unless and until a Notice to Proceed has been given to the Contractor by the City. Contractor shall commence work pursuant to the Contract Documents as directed by the City in the Notice to Proceed, and to diligently execute the same to completion within the time limits set forth in the Contract Documents.

Section 11. COMPLIANCE WITH LAWS

Contractor shall comply with all local, state, and federal laws and regulations applicable to the services required hereunder, including any rule, regulation, or bylaw governing the conduct or performance of Contractor or its employees, officers, or board members.

Section 12.

COMMERCIAL GENERAL AND AUTOMOBILE LIABILITY INSURANCE

Contractor shall procure and maintain at its own expense, during the term of this Agreement, commercial general liability insurance, of not less than One Million Dollars (\$1,000,000) per occurrence, and Two Million Dollars (\$2,000,000) in the aggregate, for bodily injury, personal injury, death, loss, or damage resulting from the wrongful or negligent acts by the Contractor or its officers, employees, servants, volunteers, and agents and independent contractors.

Contractor shall further procure and maintain, at its own expense, during the Term of this Agreement, commercial vehicle liability insurance covering personal injury and property damage, of not less than One Million Dollars (\$1,000,000) Combined Single Limit, covering any vehicle(s) utilized by Contractor or its officers, employees, servants, volunteers, or agents and independent contractors in performing the services required by this Agreement.

Section 13.

COURSE OF CONSTRUCTION/BUILDER'S RISK

Contractor, and or any of its subcontractors, suppliers, vendors, employees, or person who is performing any work under this agreement shall purchase and maintain insurance to the full contract and insurable value thereof commonly referred to as a Course of Construction, or a Builders' Risk policy that offers "Installation" coverage for all materials, supplies, equipment, and property obtained by, or for, Contractor, which is to become part of the work while such equipment and property is stored at the jobsite, at temporary locations, or while in transit to the project from such temporary locations. **Contractor, and or any of its subcontractors, suppliers, vendors, employees, or person who is performing any work under this agreement shall also be responsible for insuring their owned, leased, rented or borrowed equipment.** Insurance should also include a Loss Payee, and a Waiver of Subrogation Endorsement in favor of The City of Victorville.

Section 14.

ADDITIONAL INSURED

Notwithstanding any inconsistent statement in any required insurance policies or any subsequent endorsements attached thereto, the protection offered by all policies, except for Workers' Compensation coverage, shall bear an endorsement whereby it is provided that, the City and its officers, employees, servants, volunteers, and agents and independent contractors, including, without limitation, the City Attorney, are named as Additional Insureds.

Section 15.

WAIVER OF SUBROGATION RIGHTS

Contractor shall require the carriers of all required insurance policies to waive all rights of subrogation against the City and its officers, volunteers, employees, contractors, and subcontractors. Each policy of insurance shall be endorsed to reflect such waiver.

Section 16.

PROOF OF INSURANCE COVERAGE; REQUIRED PRIOR TO COMMENCEMENT OF SERVICES

a. Contractor shall secure from a good and responsible company or companies authorized to do insurance business in the State of California the policies of insurance required by this Agreement and furnish to the City Clerk certificates of said insurance at least one (1) day prior to the commencement of any services to be performed under this Agreement.

b. The certificates of insurance shall bear an endorsement whereby it is provided that, in the event of cancellation or amendment of any required insurance policy for any reason whatsoever, the City shall be notified by mail, postage prepaid, not less than thirty (30) days before the cancellation or amendment is effective. In the case of non-payment, ten (10) days' advance written notice shall be given.

c. The certificates of insurance shall bear an endorsement whereby it is provided that the respective insurance policy shall not be terminated or expire without first providing thirty (30) days written notice to the City of such termination or expiration.

d. The certificates of insurance shall indicate that the respective insurance policy will be maintained throughout the Term of this Agreement.

e. The Commercial General Liability and vehicle liability policies shall be endorsed to contain the following provision: "For any claims related to this Contract, Contractor's service coverage shall be primary with respect to the City. Any insurance maintained by the City shall be in excess of Contractor's insurance and shall not contribute to it.

Section 17. TIME OF THE ESSENCE

Time is of the essence in the performance of this Agreement.

Section 18. INDEMNIFICATION

Notwithstanding the limits of any insurance, Contractor shall indemnify the City, its officials, officers, agents, volunteers and employees against, and will hold and save them and each of them harmless from, any and all actions, suits, claims, damages to persons or property, losses, costs, penalties, obligations, errors, omissions or liabilities, (herein "claims or liabilities") that may be asserted or claimed by any person, firm or entity arising or alleged to arise out of or in connection with the negligent performance of the work, operations or activities of Contractor, its agents, employees, subcontractors, or invitees, provided for herein, or arising or alleged to arise from the negligent acts or omissions of Contractor hereunder, or arising or alleged to arise from Contractor's negligent performance of or failure to perform any term, provision, covenant or condition of this Agreement, but excluding such claims or liabilities or portion of such claims or liabilities arising or alleged to arise from the negligence or willful misconduct of the City its officials, officers, agents, volunteers or employees, and in connection therewith:

- (a) Contractor will defend any action or actions filed in connection with any of said claims or liabilities and will pay all costs and expenses, including legal costs and attorneys' fees incurred in connection therewith;
- (b) Contractor will promptly pay any judgment rendered against the City, its officials, officers, agents or employees for any such claims or liabilities arising or alleged to arise out of or in connection with Contractor's (or its agents', employees', subcontractors' or invitees') negligent performance of or failure to perform such work, operations or activities hereunder; and Contractor agrees to save and hold the City, its officials, volunteers, officers, agents, and employees harmless there from;
- (c) In the event the City, its officials, officers, agents, volunteers or employees is made a party to any action or proceeding filed or prosecuted against Contractor for such damages or other claims arising or alleged to arise out of or in connection with the

negligent performance of or failure to perform the work, operation or activities of Contractor hereunder, Contractor shall pay to the City, its officials, volunteers officers, agents or employees, any and all costs and expenses incurred by the City, its officers, agents or employees in such action or proceeding, including but not limited to, legal costs and attorneys' fees for counsel acceptable to City.

- (d) Contractor's duty to defend and indemnify as set out in this Section shall include any claims, liabilities, obligations, losses, demands, actions, penalties, suits, costs, expenses or damages or injury to persons or property arising or alleged to arise from, in connection with, as a consequence of or pursuant to any state or federal law or regulation regarding hazardous substances, including but not limited to the Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA"), Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), Resource Conservation and Recovery Act of 1976 ("RCRA"), the Hazardous and Solid Waste Amendments of 1984, the Hazardous Material Transportation Act, the Toxic Substances control Act, the Clean Air Act, the Clean Water Act, the California Hazardous Substance Account Act, the California Hazardous Waste Control Law or the Porter-Cologne Water Quality Control Act, as any of those statutes may be amended from time to time.

The Contractor's indemnification obligations pursuant to this Section shall survive the termination of this Agreement. Contractor shall require the same indemnification from all subcontractors.

Section 19. REPORTS

Upon request by **INSERT DEPT. HEAD NAME AND TITLE**, or his designee, Contractor shall prepare and submit reports concerning Contractor's performance of the services required by this Agreement.

Section 20. RECORDS

a. Contractor shall keep such books and records as shall be necessary to perform the services required by this Agreement and enable **INSERT DEPT. HEAD NAME AND TITLE**, or his designee, to evaluate the cost and the performance of such services.

b. Books and records pertaining to costs shall be kept and prepared in accordance with generally accepted accounting principles.

c. **INSERT DEPT. HEAD NAME AND TITLE**, or his designee, shall have full and free access to such books and records at all reasonable times, including the right to inspect, copy, audit, and make records and transcripts from such records.

d. Records and supporting documents pertaining to the use of funds paid to Contractor hereunder shall be retained by Contractor and made available to **INSERT DEPT. HEAD NAME AND TITLE**, or his designee, for purposes of performing an audit for a period of five (5) years from the date of termination of this Agreement.

Section 21. MODIFICATIONS AND AMENDMENTS

This Agreement may be modified or amended only by a written instrument signed by both parties.

Section 22. ENTIRE AGREEMENT

a. This Agreement supersedes any and all prior or contemporaneous agreements, either oral or written, between the City and Contractor with respect to the subject matter of this Agreement.

b. The Contract Documents contain all of the covenants and agreements between the parties with respect to the subject matter herein, and each party acknowledges that no representations, inducements, promises, or agreements have been made by or on behalf of any party, except those covenants and agreements in this Agreement and the Contract Documents.

c. No agreement, statement, or promise with respect to the subject matter of the Contract Documents, which is not contained in the Contract Documents, or in a valid modification or amendment to the Contract Documents, shall be valid or binding on either party.

Section 23. AMBIGUITIES

This Agreement is in all respects intended by each Party hereto to be deemed and construed to have been jointly prepared by the Parties and the Parties hereby expressly agree that any uncertainty or ambiguity existing herein shall not be interpreted against either of them. Except as expressly limited by this paragraph, all of the applicable rules of interpretation of contract shall govern the interpretation of any uncertainty or ambiguity of this Agreement.

Notwithstanding the foregoing, the Parties agree that **Exhibit "A"** is attached hereto for reference purposes and to the extent there are any ambiguities, inconsistencies or conflicts between the terms of this Construction Agreement and **Exhibit "A"**, the terms of this Construction Agreement shall control and nothing set forth in **Exhibit "A"** shall be deemed to supersede any of the provisions of this Construction Agreement.

Section 24. NOTICES

a. Any notice to be provided pursuant to this Agreement shall be in writing, and all such notices shall be delivered by personal service or by deposit in the United States mail, certified or registered, return receipt requested, with postage prepaid, and addressed to the parties as follows:

To the City: **DEPT. HEAD NAME AND TITLE**
REQUESTING Department
City of Victorville
14343 Civic Drive
Victorville, CA 92392

To Contractor: **CONTRACTOR REP. NAME AND TITLE**
COMPANY NAME
ADDRESS
CITY, STATE, ZIP

b. Notices, payments, and other documents shall be deemed delivered upon receipt by personal service or as of the second (2nd) day after deposit in the United States mail.

Section 25. NON-LIABILITY OF CITY OFFICERS AND EMPLOYEES

No officer or employee of the City shall be personally liable to Contractor, or any successor in interest, in the event of any default or breach by the City or for any amount, which may become due to Contractor or to its successor(s), or for any breach of any obligation of the terms of this Agreement.

Section 26. REVIEW BY ATTORNEYS

Each party hereto has had its attorneys review this Agreement and all related documents. Each party hereto has consulted with its attorneys and has negotiated the terms of this Agreement based on such consultation.

Section 27. CARE OF WORK

The performance of services by Contractor or the payment of money by the City shall not relieve Contractor from any obligation to correct any incomplete, inaccurate, or defective work at no further cost to the City, when such inaccuracies are due to the negligence of Contractor.

Section 28. CAPTIONS AND HEADINGS

The captions and headings contained in this Agreement are provided for identification purposes only and shall not be interpreted to limit or define the content of the provisions described under the respective caption or heading.

Section 29. SUCCESSORS, HEIRS, AND ASSIGNS

Except as otherwise expressly provided herein, this Agreement shall be binding upon the successors, endorsees, assigns, heirs, and personal representatives of each of the parties to this Agreement and, likewise, shall inure to the benefit of the successors, endorsees, assigns, heirs, and personal representatives of each of the parties.

Section 30. GENDER; PLURAL

In this Agreement, unless the context clearly requires otherwise, the masculine, feminine and neuter genders and the singular and the plural shall include one another.

Section 31. SEVERABILITY

If any one or more of the sentences, clauses, paragraphs, or sections contained herein is declared invalid, void, or unenforceable by a court of competent jurisdiction, the same shall be deemed severable from the remainder of this Agreement and shall not affect, impair, or invalidate any of the remaining sentences, clauses, paragraphs, or sections contained herein.

Section 32. GOVERNING LAW

The validity of this Agreement and any of its terms or provisions, as well as the rights and duties of the parties under this Agreement, shall be construed pursuant to and in accordance with California law.

Section 33. CUMULATIVE REMEDIES

Except with respect to rights and remedies expressly declared to be exclusive in this Agreement, the rights and remedies of the parties are cumulative and the exercise by either party of one or more of such rights or remedies shall not preclude the exercise by it, at the same or different times, of any other rights or remedies for the same default of any other default by the other party.

Section 34. VENUE

All proceedings involving disputes over the terms, provisions, covenants, or conditions contained in this Agreement and all proceedings involving any enforcement action related to this Agreement shall be initiated and conducted in the applicable court or forum in San Bernardino County, California.

Section 35. ATTORNEY'S FEES

Should any litigation, specifically including but not limited to, arbitration and other non-judicial resolution of disputes be commenced between the parties to this agreement concerning this agreement or the rights and duties of either in relation thereto, the parties prevailing in such litigation or other proceeding shall be entitled, in addition to such other relief as may be granted, to a reasonable sum as and for attorney fees in such litigation where the proceeding which, if not agreed upon by the parties, shall be determined by the court or other entity in which such litigation or other proceeding is brought.

Section 36. EFFECTIVENESS OF AGREEMENT

This Agreement shall not be binding upon the City, until signed by the authorized representative(s) of Consultant, approved by the City's Risk Manager, and executed by the authorized City personnel or Mayor.

Section 37. REPRESENTATIONS OF PARTIES AND PERSONS EXECUTING AGREEMENT

(a) Each of the parties to this Agreement hereby represents that all necessary and appropriate actions of their governing bodies have been taken to make this Agreement a binding obligation of each of the parties hereto.

(b) The persons executing this Agreement warrant that they are duly authorized to execute this Agreement on behalf of and bind the parties each purports to represent.

Section 38. COUNTERPARTS

This Agreement may be executed by the parties in counterparts, and when executed by each of the parties, each counterpart shall be deemed to be a part of this Agreement.

(END OF THIS PAGE)

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed as of the dates written below.

THE CITY OF VICTORVILLE

By: _____
NAME, MAYOR

Dated: _____

CONTRACTOR

By: _____
NAME, TITLE

Dated: _____

ATTEST

By: _____
Carolee Bates, City Clerk

THE CITY OF VICTORVILLE

By: _____
Chuck Buquet, Risk Manager

Dated: _____

APPROVED AS TO STANDARD FORM

By: _____
Andre de Bortnowsky, City Attorney

Dated: _____

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

FAITHFUL PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT WE, _____, hereinafter referred to as "Contractor," as principal, and _____, as Surety, are held and firmly bond unto the CITY OF VICTORVILLE, in the sum of _____ Dollars, (\$ _____), lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents. The conditions of the foregoing obligation is such that:

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said CITY OF VICTORVILLE for completion of " **CC17-036 POWER QUALITY METER INSTALLATION PROJECT**" as specifically set forth in documents entitled " **CC17-036 POWER QUALITY METER INSTALLATION PROJECT**" and is required under the terms of the Contract to give this bond in connection with the execution of said Contract;

NOW, THEREFORE, if the said Contractor shall well and truly do and perform all of the covenants and obligations of said Contract on its part to be done and performed at the times and in the manner specified herein, then its obligation shall be null and void, otherwise, it shall be and remain in full force and effect;

PROVIDED, that any alterations in the work to be done, or the material to be furnished, which may be made pursuant to the terms of said Contract, shall not in any way release either the Contractor or the Surety thereunder, nor shall any extensions of time that may be granted under the provision of said Contract release either the Contractor or the Surety, and notice of such alterations or extensions of the Contract is hereby waived by the Surety.

WITNESS our hands this _____ day of _____, _____.

(SEAL)

CONTRACTOR

SURETY

By: _____

By: _____

Title: _____

NOTE: Signature of the party executing for the Surety must be properly acknowledged.

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT WE, _____, hereinafter referred to as "Contractor," as principal, and _____, as Surety, are held and firmly bound unto the CITY OF VICTORVILLE, in the sum of _____ Dollars (\$ _____), lawful money of the United States of America, for the payment of which sum well and truly be made, we bind ourselves, jointly and severally, firmly by these presents. The condition of the foregoing obligation is such that:

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said CITY OF VICTORVILLE for completion of " **CC17-036 POWER QUALITY METER INSTALLATION PROJECT**" as specifically set forth in documents entitled " **CC17-036 POWER QUALITY METER INSTALLATION PROJECT**" and is required under the terms of the Contract to give this bond in connection with the execution of said Contract.

NOW, THEREFORE, if the said Contractor or any of its subcontractors fails to pay any of the persons named in Section 3181 of the Civil Code of the State of California, or amounts due under the Unemployment Insurance Code with respect to work or labor performed by any such person for or about the performance of the aforementioned contract, said Surety will pay the same, in an amount not exceeding the sum specified in this bond, and also, in case suit is brought upon the bond, a reasonable attorney's fee to be fixed by the Court. This bond shall insure to the benefit of any and all persons named in Section 3181 of the Civil Code of the State of California so as to give a right of action to such persons or their assignees in any suit brought upon this bond. This bond shall be subject to and include all of the provisions of Title 15 of Part 4 of Division 3 of the Civil Code of the State of California relating to Payment Bond for Public Works, including but not confined to, Civic Code Section 3225-3228, inclusive, and Section 3247-3252, inclusive.

PROVIDED, that any alterations in the work to be done, or the material to be furnished, which may be made pursuant to the terms of said contract, shall not in any way release either the Contractor or the Surety thereunder, nor shall any extensions of time granted under the provisions of said Contract release either the Contractor or the Surety, and notice of such alterations or extensions of the Contract is hereby waived by the Surety.

WITNESS our hands this ___ day of _____, _____.

(SEAL)

CONTRACTOR

SURETY

By: _____

By: _____

Name _____

Title: _____

**CITY OF VICTORVILLE
CC17-036 POWER QUALITY METER INSTALLATION**

GUARANTY

TO THE CITY OF VICTORVILLE, CALIFORNIA

The undersigned guarantees the completion of " **CC17-036 POWER QUALITY METER INSTALLATION**".

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished, or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the Plans and Specifications and/or manufacturers specifications, due to any of the above causes, all within twelve (12) months after date on which this Contact is accepted by the City, the undersigned agrees to reimburse the City, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the City, to replace any such materials and to repair said work completely without cost to the City so that said work will function successfully as originally contemplated.

The City shall have the unqualified option to make any needed replacements or repairs itself or to have such replacements or repairs done by the undersigned.

In the event the City elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within the time limit designated by the City. If the undersigned shall fail or refuse to comply with their obligations under this guaranty, the City shall be entitled to all costs and expenses, including attorney's fees, reasonably incurred by reason of said failure or refusal.

SIGNED: _____
CONTRACTOR

By: _____ Title: _____

Dated this _____ day of _____, _____.

NOTE: This Guaranty shall be executed by the successful bidder in accordance with instructions in the Special Provisions. The bidder may execute the Guaranty on this page at the time of submitting the bid.

EXHIBIT A
SEL-735 POWER QUALITY &
REVENUE METER DATA SHEET,
INTRODUCTION & SPECIFICATIONS
AND
JOB SITE MAP



SEL-735 Power Quality and Revenue Meter

IEC 61000-4-30
Power Quality
Compliant



The SEL-735 meter combines leading power quality capabilities with exceptional revenue metering accuracy at an economical price. Power quality reports with IEC 61000-4-30 compliance help identify and troubleshoot problems in power system equipment. Advanced communications deliver critical and historical information in real-time to virtually any communications system. The SEL-735 is the essential meter for substation, power plant, and industrial metering.

Features and Benefits

- High Precision Revenue Metering Guarantee: 0.06%, 0.02% typical.
- Capture every power quality disturbance with preconfigured logs and triggers.
- Compare power quality measurements across the system with IEC 61000-4-30 power quality compliance.
- Perform statistical calculations while reporting only critical information to save system bandwidth.
- Standardize on one revenue meter for generation, transmission, distribution, intertie, main entrance, and submeter applications.
- Deliver complete billing data to Itron® MV-90® software over any communications port.
- Integrate into virtually any system with copper or fiber-optic Ethernet, serial, multidrop, infrared, or telephone modern communications.
- Simultaneously communicate with ten other devices using industry standard protocols.

One Package, Three Flexible Solutions

Three SEL-735 variants provide a meter for any application and any budget.

Metering, General	SEL-735 Basic PQ	SEL-735 Intermediate PQ	SEL-735 Advanced PQ
Stated list price	\$1,500	\$2,000	\$2,500
Watt-hour Accuracy	0.06%	0.06%	0.06%
Voltage Range	5-300 V _{L-N} , 9-520 V _{L-L}	5-300 V _{L-N} , 9-520 V _{L-L}	5-300 V _{L-N} , 9-520 V _{L-L}
Current Range	0.001-22 A	0.001-22 A	0.001-22 A
Form Options (Elements)	5 and 9 (2,3)	5 and 9 (2,3)	5 and 9 (2,3)
Load Profile Recorders x Channels	1 x 16	12 x 16	12 x 16
Memory	32 MB	128 MB	128 MB

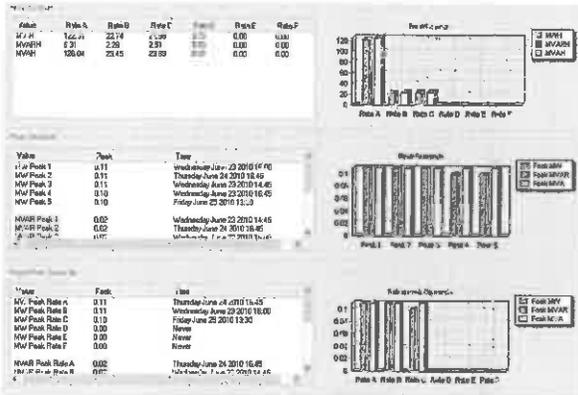
IEC 61000-4-30 Power Quality	SEL-735 Basic PQ	SEL-735 Intermediate PQ	SEL-735 Advanced PQ
Measurement Aggregation			
10/12 Cycle Intervals	A	A	A
150/180 Cycles, 10 min., 120 min. Intervals	-	A	A
Voltage and Current	A	A	A
Voltage and Current Unbalance	A	A	A
Individual Voltage and Current Harmonics	S	S	S
Voltage and Current THD	A	A	A
Real, Reactive, and Apparent Power	A	A	A
Power Quality Parameters			
Real-Time Clock	S	S	S
Frequency	A	A	A
Flicker	-	S	S
Voltage Dips, Swells, and Interruptions	A	A	A
Voltage and Current Interharmonics	-	-	S
Harmonic Power	-	-	S
Harmonic Phase Angles	-	-	S
Transient Detection	-	-	(future)
Maximum Harmonic Order	15th	63rd	63rd
Waveform Capture			
Samples-per-cycle	16	16 and 128	16, 128, and 512
Duration (cycles)	15	15, 30, 60, 120, 300, 600	15, 30, 60, 120, 300, 600
Number of Events	64	16-3155	4-3155
COMTRADE Reports	Y	Y	Y

A = IEC 61000-4-30 Class A compliant.

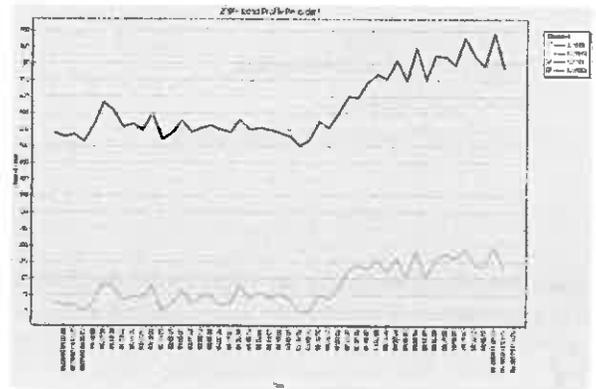
S = IEC 61000-4-30 Class S compliant.

Power Dashboard

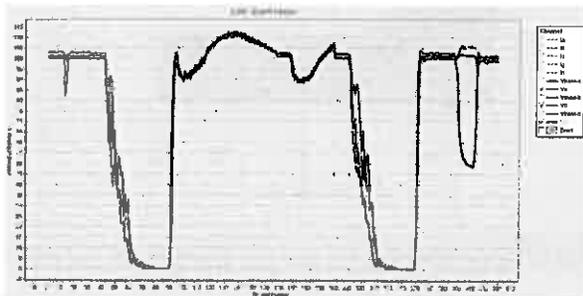
View a complete state of the power system using no-cost ACSELERATOR QuickSet[®] SEL-5030 Software. Quickly assemble an overview of the most important system parameters. Load profile trending displays voltage, current, power, and harmonic information. Record years of voltage, current, power, frequency, and harmonic information on a per-phase basis.



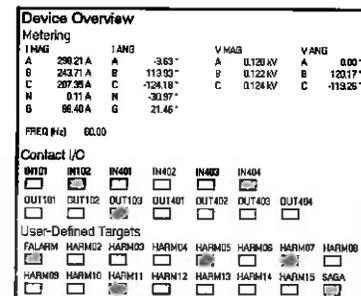
TOU stores and resets peak demand data



Load Profile trends power draw and energy consumption



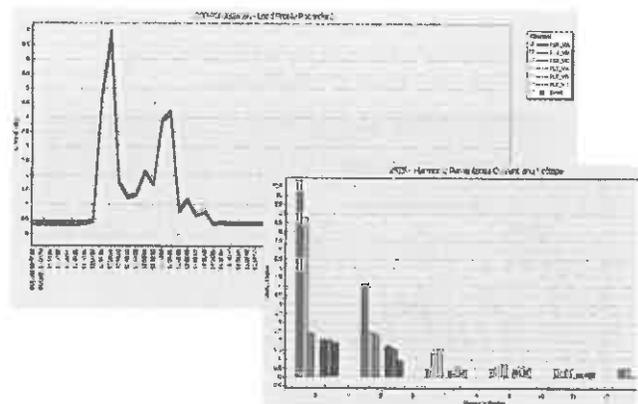
Voltage/Sag/Swell/Interruption reports system interruptions with 1ms resolution



Meter monitoring software standard with the SEL-735

Power Quality Measurements

- IEC 61000-4-30 power quality compliant
- Statistical trending of virtually any parameter, including:
 - Voltage and current
 - Frequency
 - Harmonics up to the 63rd
 - Total harmonic distortion (THD)
 - Unbalance—symmetrical components
- Sags, swells, and interruptions
- Flicker measurement
- Waveform capture up to 512 samples/cycle
- Transients (future addition)



Flicker and harmonics reports help locate system disturbances

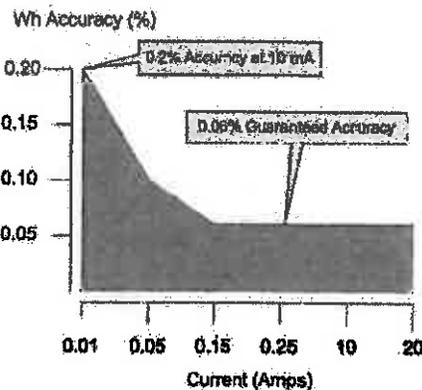
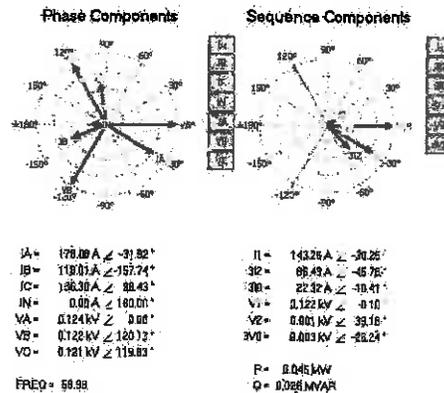
High-Function Metering for Substations, Power Generation, and Industrial Loads

Revenue metering applications require a diverse set of features to cover both new and legacy metering requirements. The SEL-735 supports a large feature set to cover a wide range of metering needs.

- 4-Quadrant Metering
- Multiple Load Profile Recorders
- Time-of-Use Metering
- Transformer/Line-Loss Compensation

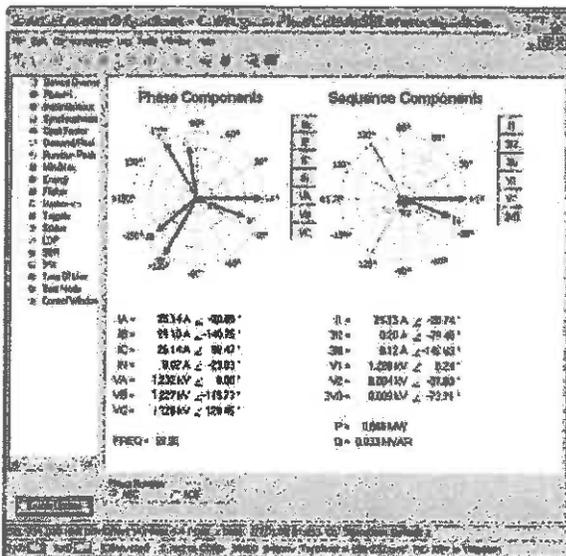
High Accuracy Metering for High Value Applications

Many new metering installations, such as distributed generation, operate over a very large current range. The SEL-735 provides high accuracy over an extended operating range with a 0.06% Wh guarantee. Typical Wh accuracy errors of 0.02% better the accuracy of many measurement standards.



Simplified Setup and Troubleshooting

- Use ACCELERATOR QuickSet to customize your metering. Set and edit meter configuration, settings, and logic.
- View the HMI screens in ACCELERATOR QuickSet to check wiring connections, phase rotation, and power flow direction.
- Voltage and current sequence elements allow fast troubleshooting of miswired installations.



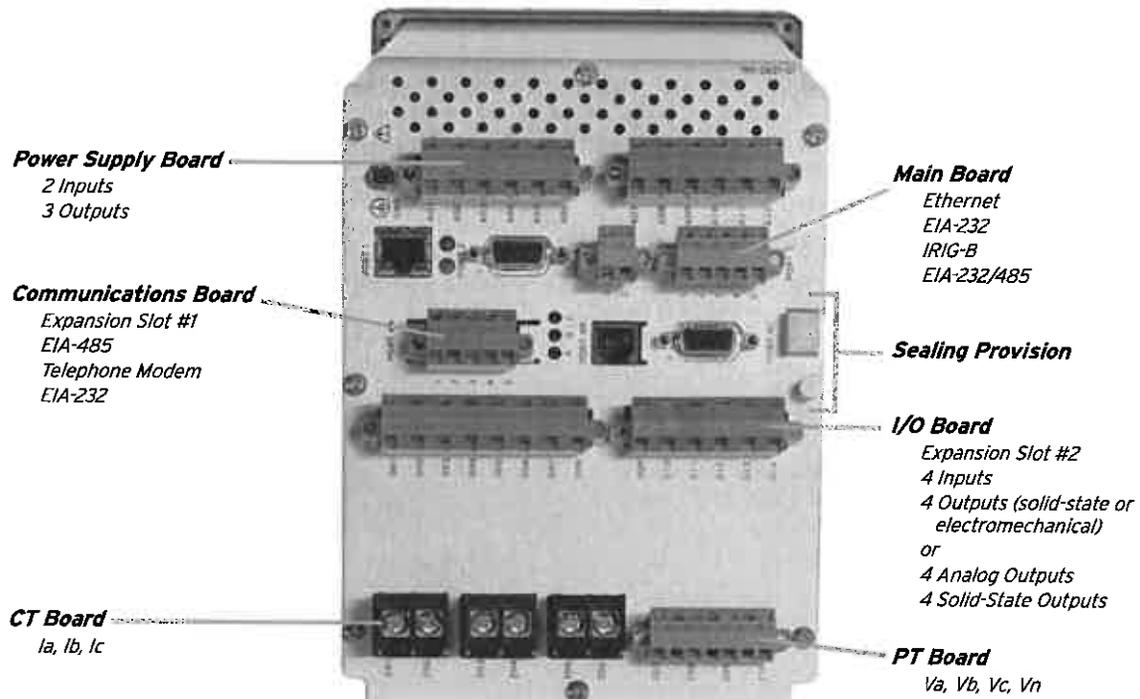
Feature Overview

- Form 5, 3-Wire Delta and Form 9, 4-Wire Wye metering connections
- ANSI C12.20 0.2 and IEC 62053-22 0, 2S accuracy class leading
- Rack-mount, panel-mount, easily extractable meter (EXM), wall-mount, and NEMA enclosure options
- Simultaneous Ethernet, EIA-485, EIA-232, telephone modem, and optical probe communications
- Synchrophasor data with IEEE C37.118 accuracy (future release)
- Enhanced SELOGIC® control equations
- Communication protocols
 - SEL ASCII
 - Modbus® RTU/TCP
 - SEL Fast Operate/Fast Meter
 - MIRRORED BITS® communications
 - SEL Distributed Port Switch (LMD)
 - DNP3 Serial and LAN/WAN
- Inputs/outputs
 - 2 digital inputs, 3 electromechanical outputs
 - 4 digital inputs, 4 KY outputs with programmable Kc
 - 4 digital inputs, 4 electromechanical outputs
 - 4 analog outputs, 4 KY outputs with programmable Ke

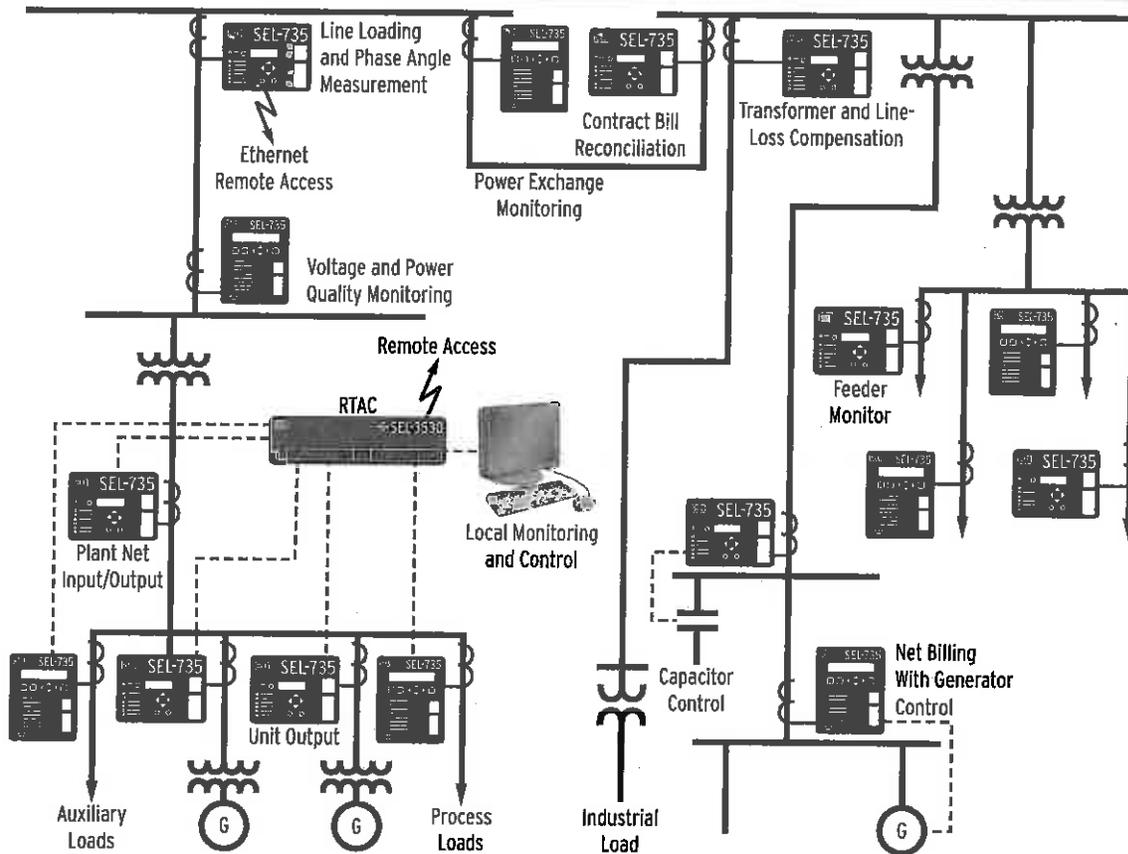
See model option table for available configurations and options.

Product Overview

Advanced Display and Controls



Functional Overview



SEL-735 Capabilities

Accurate Revenue Metering

The SEL-735 exceeds ANSI C12.20 0.2 and IEC 62053-22 0, 2S accuracy class requirements. Transformer/line-loss compensation adds to meter accuracy when the meter location and billing points differ. ACSELERATOR QuickSet provides a simple test mode interface to easily verify meter accuracy.

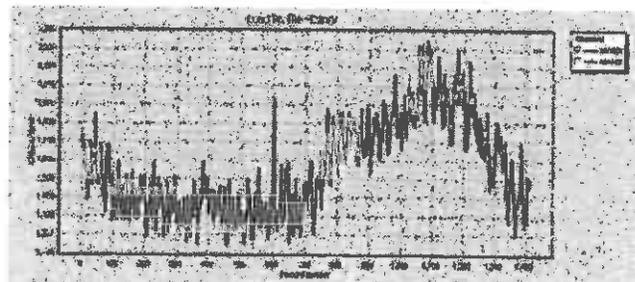
Load Profile Recorder

Independent load profile recorders in the SEL-735 allow simultaneous meter and power quality logging of up to 192 data channels. Trend averages, minimums, maximums, changes, and snapshots at a rate of once every three seconds.

ACSELERATOR QuickSet offers a fast and simple method to retrieve, plot, and export load profile data to .HHF or .CSV formats. Itron MV-90 meter reading software communicates to any SEL-735 communications port and automates meter reads for large-scale metering installations.

Communications and I/O

Select from seven communications ports and six communications protocols, including 10/100BASE-T or 100BASE-FX Ethernet. Advanced communications and protocols, such as DNP3, reduce the need for analog and digital outputs. When installations must communicate with legacy equipment, SEL offers digital and analog output options for the SEL-735. The SEL-2800 Fiber-Optic Transceivers provide electrically isolated communications paths between EIA-232 ports.



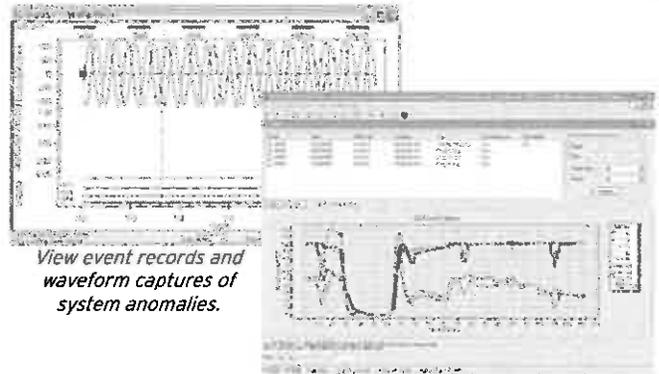
Save LDP data in .HHF or .CSV formats.

Power Quality Capabilities

Measure and Record the Following:

- IEC 61000-4-30 compliant current, voltage, power, energy, harmonic, flicker, and unbalance
- Measurement aggregation in 10/12 cycle, 3-second*, 10-minute*, and 120-minute intervals*
- Harmonic angles for voltage and current*
- High-resolution, 512 samples/cycle waveform capture*
- Total harmonic distortion (THD), crest factor, and K-factor metering with up to 63rd harmonic content
- High-speed load profile recording with three-second resolution*
- VSSI
- Symmetrical components (unbalance)

* Optional Benefits

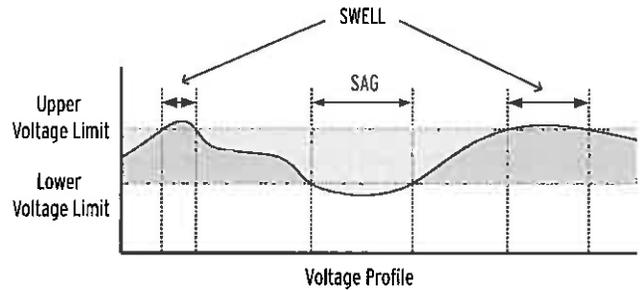


View event records and waveform captures of system anomalies.

VSSI reports detail system interruptions with 1 ms resolution.

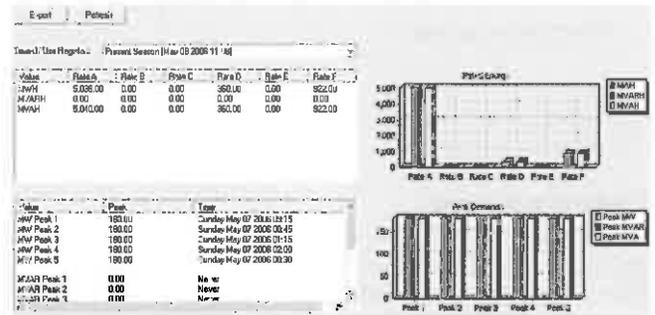
VSSI Recorder

Correlate system disturbances with the voltage sag/swell/interruptions (VSSI) recorder. Enabled from the factory, the VSSI recorder time-stamps voltage excursions with up to 1 ms resolution and records indefinitely using an adaptive sampling rate. The SEL-735 stores and reports residual voltage, duration, affected phases, CBEMA/ITIC reports, and time stamp of occurrence. The VSSI settings include trigger thresholds from $\pm 3\%$ to $\pm 100\%$ of the actual value and automatic recording duration dependent on the length of the voltage excursion. ACSELERATOR QuickSet automatically graphs and analyzes VSSI data and includes an export feature. Applications with SCADA systems can also retrieve this data using the DNP3 protocol.



Time-of-Use (TOU) Metering

Record demand and energy consumption with a user-defined calendar; use TOU metering to bill consumption at different rates based on season, day type, and time of day. The program automatically self-reads and resets demand; there is no need to manually reset meters.



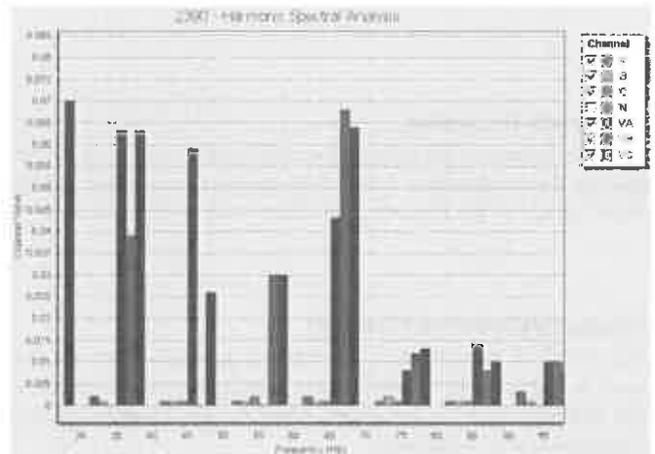
TOU stores and resets peak demand data.

Harmonic Metering

Monitor, record, and control using individual harmonic values, THD, and K-factor with resolution up to the 63rd harmonic.

Interharmonic Metering

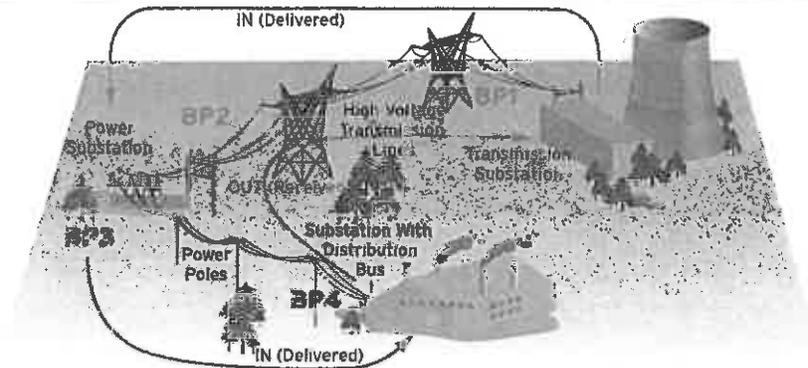
Measure, record, and control using Group THD. Measure interharmonics from 5 Hz to 3800 Hz in 5 Hz bins.



Advanced Capabilities

Transformer/Line-Loss Compensation

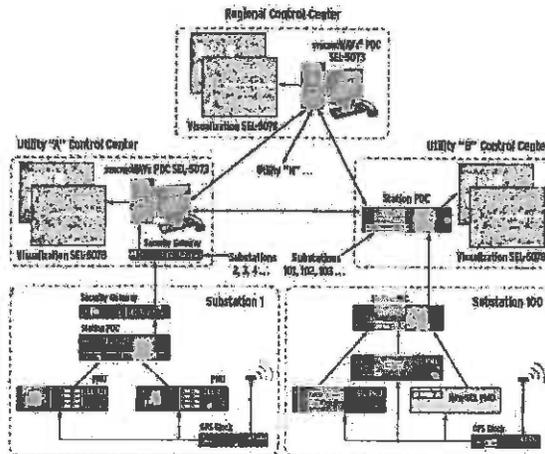
When the contractual billing point differs from the meter location, use transformer and line-loss compensation (TLLC) to optimize the metering location and reduce the instrument transformer costs.



Choose from four billing and metering points with TLLC.

Synchronized Phasor Measurement (future release)

Combine the SEL-735 with an SEL IRIG-B time source to measure the system angle in real time with a performance that meets the IEEE C37.118-2005 accuracy requirements. Measure instantaneous voltage and current phase angles in real time to improve system operation with synchrophasor information. Replace state measurement, study validation, or track system stability.



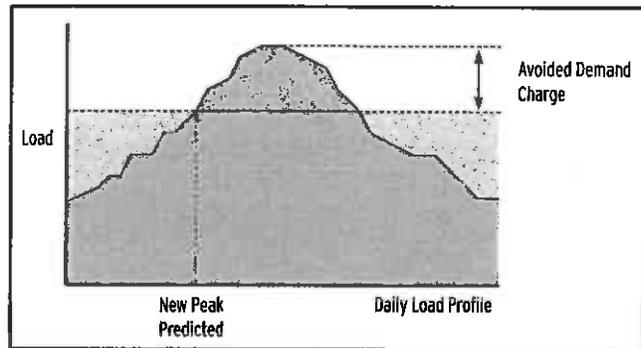
View system angle at multiple locations.

Use the SEL-3373 Station Phasor Data Concentrator (PDC) or SEL-5073 SYNCHROWAVE[®] Server Software* PDC to combine and archive time-synchronized data from multiple measurement sources, such as the SEL-735.

*Additional cost software.

Predictive Demand

The predictive demand function monitors accumulated demand and alarms when the demand exceeds a user-defined limit. The SEL-735 can then shut down loads or peak-shave with generation to avoid demand charges as shown to the right. The predictive demand alarm is available through Modbus, DNP, MIRRORING BITS communications, or the front-panel LEDs.



Reduce peak demand charges with the predictive demand alarm.

Frequency Recording

Measure frequency for local and remote indication or use in control and data acquisition. Use a load profile recorder for a "strip chart" record of the frequency as often as every three seconds.

Time	Min	Max	PDC	Min	Max	PDC	Min	Max
00:00:00	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:01	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:02	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:03	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:04	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:05	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:06	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:07	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:08	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:09	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87
00:00:10	2545.73	2721.87	1.8	2545.73	2721.87	1.8	2545.73	2721.87

Capture minimum/maximum quantities with half-cycle resolution.

Minimum/Maximum Metering

The SEL-735 automatically records the date and time of minimum and maximum voltage, current, and power measurements. Use this capability for equipment selection, troubleshooting, and diagnosis of any installation.

Advanced Capabilities (Continued)

Logging and Recording

Store up to 21,000 sequential events records capturing any power quality disturbance. Retrieve data using ACSELERATOR QuickSet, Modbus, DNP3, or ASCII. Store and analyze waveform capture data using ACSELERATOR QuickSet.

Automatic Event Reporting

After recording an event report, the SEL-735 can automatically report event data through SEL or DNP3 protocols to a communications master. ACSELERATOR TEAM™ SEL-5045 Software can automatically collect SEL-735 waveform data without the need for manual retrieval.

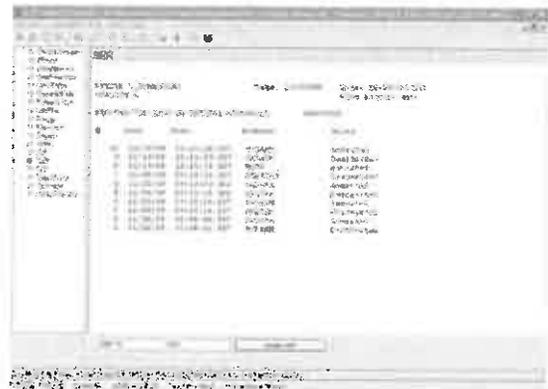
Password Protection

Three password levels ensure protection of critical meter configuration and billing data. Password levels include read only, limited read/write, and full read/write capabilities.

Programmable Logic (SELogic Control Equations)

The meter provides user-programmable logic to combine meter calculations, contact inputs, remote command inputs, and timers to control internal logic and contact outputs. The logic allows the following operations:

- Logic (OR, AND, NOT)
- Math (+, -, x, /)
- Analog compare (>, <, <>, =, >=, <=)
- Triggers (RISING EDGE, FALLING EDGE)
- Sixteen latches
- Sixteen remote-control logic units
- Sixteen programmable logic variables with pickup and dropout timers
- Sixteen programmable analog variables



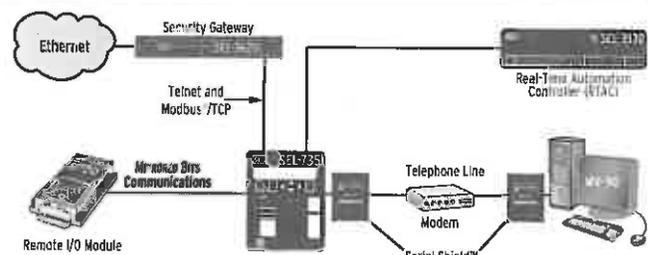
Monitor device and power system events with the Sequential Events Recorder (SER).

Metering Integration

Communication Integration and Security

Use the SEL-735 as part of a complete station integration package. Retrieve metering values with comprehensive security:

- Multitiered password protection
- Port security configuration
- Copper or fiber-optic Ethernet
- DNP3, Modbus®, Fast Message, SEL, and MIRRORED BITS communications protocols
- Itron MV-90 compatible over serial, modem, and Ethernet



Integrate with many communications paths.

Test Block Integration

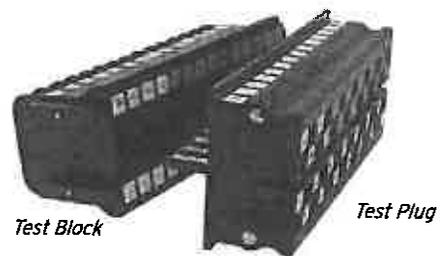
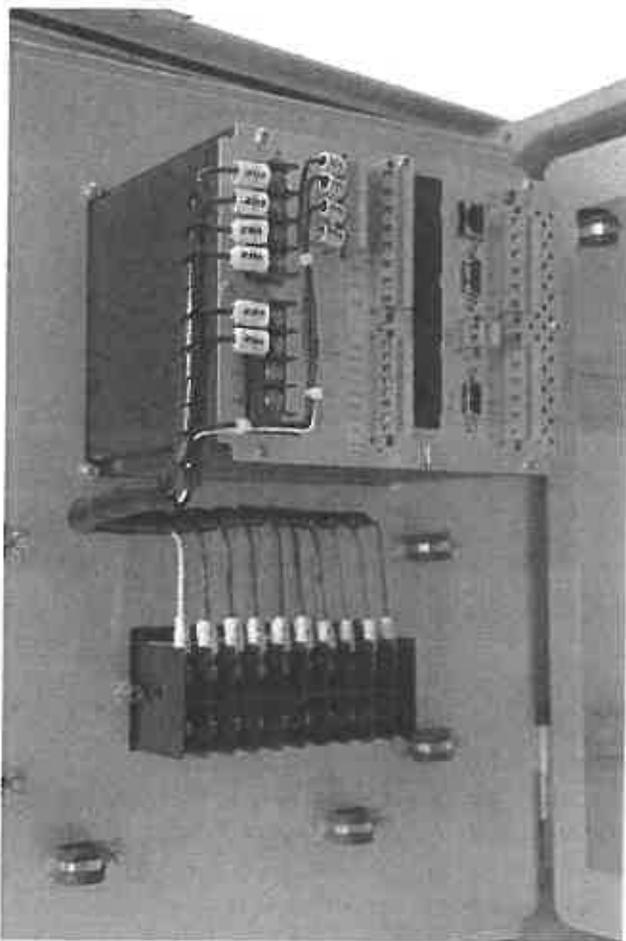
SEL supplies several types of test block as accessories for the SEL-735. The 4600 series test blocks and plugs ensure safety with current shorting and voltage isolation to protect the user and speed testing. Upon request, SEL will prewire the SEL-735 to a test switch installed in a rack-mount bracket, appearance bezel for panel mounting, indoor enclosures, and outdoor enclosures.

Metering Integration (Continued)

Self-Shorting Current Connector and FMS Test Switch

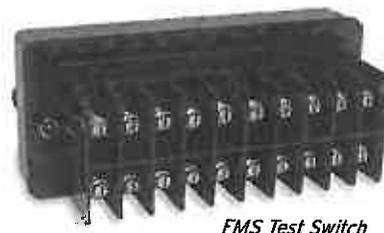
Use 4600 Series Test Blocks and Plugs to provide a complete test system interface for all electric apparatus. Safely disconnect live voltages and currents and easily service your meter with a self-shorting current connector or a test switch.

Self-Shorting Current Connector and FMS Test Switch	Part Number
10-Position Test Block	4610BTPxxHXXX
10-Position Test Plug	4610PSPxxHXXX
FMS Test Switch	240-1010
Self-Shorting Current Connector	915900048
4600 Retrofit Bezel for FT-1 Cutout	915900126



Test Block

Test Plug



FMS Test Switch

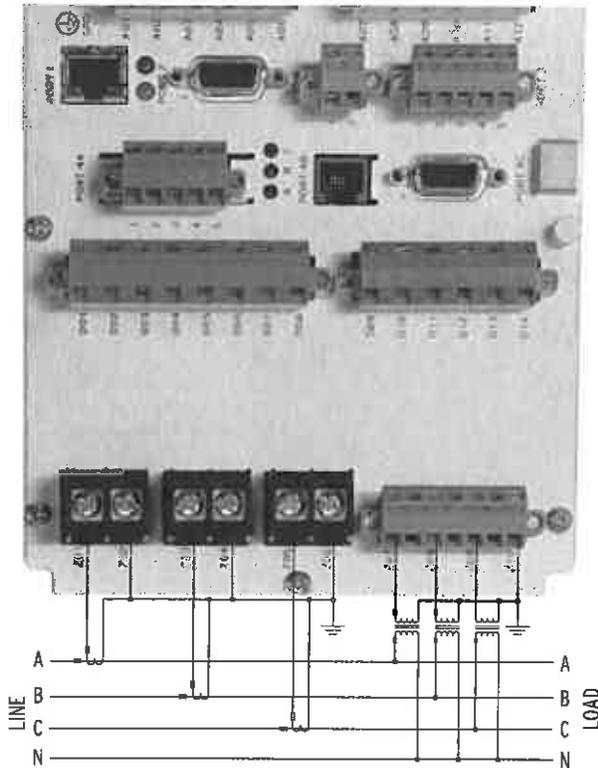


Self-Shorting Current Connector

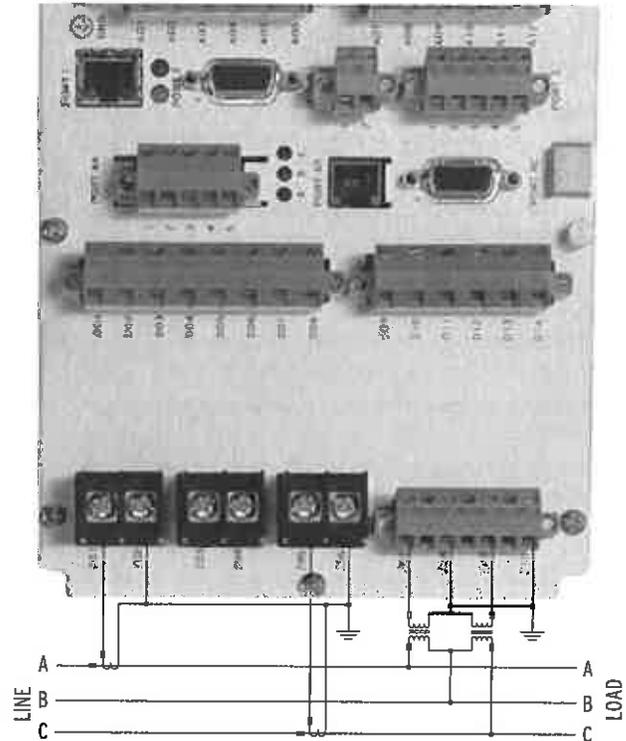
Metering Integration (Continued)

Wye or Open-Delta Integration

The SEL-735 supports four-wire wye-connected (Form 9) and three-wire open-delta connected (Form 5) configurations as shown below. The end user can select between Form 9 and Form 5 metering options in the field by simply issuing a command to the meter.



Form 9, 3-Element, Four-Wire Wye



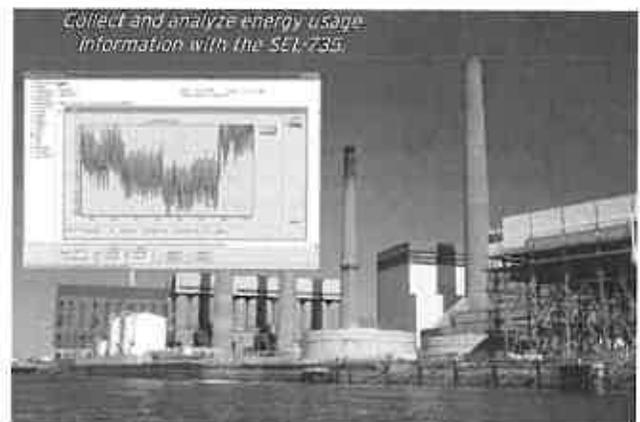
Form 5, 2-Element, Three-Wire Delta

Advanced Metering Applications

Industrial

- Support complex tariffs with a high-speed, 192-channel load profile data recorder in the SEL-735.
- Measure flicker induced by electric arc furnaces.
- Verify effectiveness of harmonic filters on large motor drives.
- Provide predictive demand for load control and energy usage information to the customer.
- Simplify troubleshooting by monitoring harmonics and interharmonics, triggering alarms, and capturing waveforms.

See the "Industrial Application of the SEL-734 Meter" white paper for the benefits of installing the SEL-735 into industrial applications. The paper can be found at www.selmeters.com/literature.html.



Advanced Metering Applications (Continued)

Substation

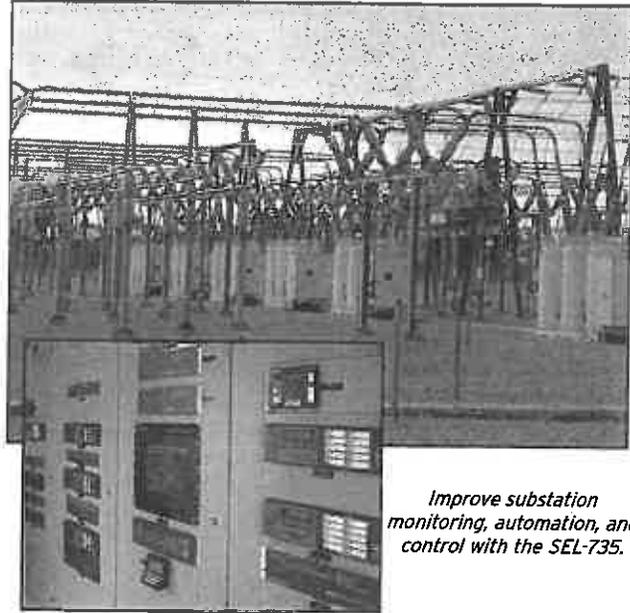
- Integrate the SEL-735 into your substation, automation, and protection system.
- Collect metering, power quality, and phasor measurements from remote substations.
- Use the SEL-735 as a real-time feeder monitor to collect event logs, waveforms, and power quality information.

Submetering

- Allocate energy costs by applying SEL-735 meters as submeters.
- Use advanced SELOGIC control equations to manage load and energy costs.

Mini-SCADA or Transducer Replacement

- Use the SEL-735 to collect real-time voltage, current, and kVA information for direct SCADA interrogation via DNP3 protocol.
- Replace old, inaccurate, and maintenance-intensive transducers.
- Interface directly with auxiliary equipment and legacy devices, using status inputs and output relays.



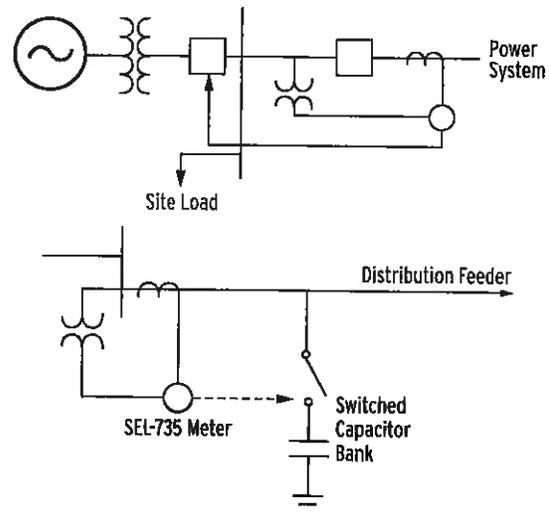
Improve substation monitoring, automation, and control with the SEL-735.

Distributed Generation Control

Use the SEL-735 to provide automatic start and remote control of distributed generation facilities. SELOGIC control equations support any logical or mathematical combination of measured quantities and set points to control a generator or load switch.

Capacitor Bank Control

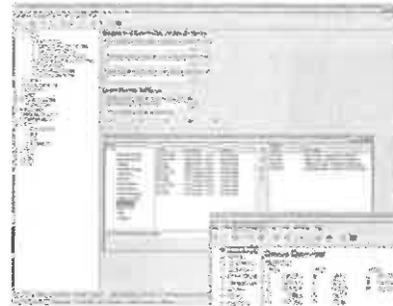
Use the SEL-735 to provide automatic control of switched capacitor banks in distribution feeder applications (as shown at right). The SELOGIC meter capabilities combine fixed pickup settings with metered quantities, such as VAR flow, voltage, time-of-day, and current flow on the feeder.



Simple Software Applications

Settings Editor

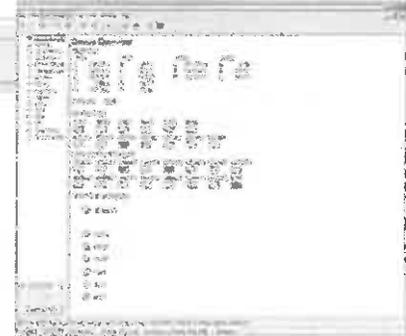
- Use the menu-driven graphical interface with detailed help screens.
- Speed installation by standardizing settings files and modifying application-specific items.
- Develop settings offline.



Simple settings software.

ACSELERATOR QuickSet HMI

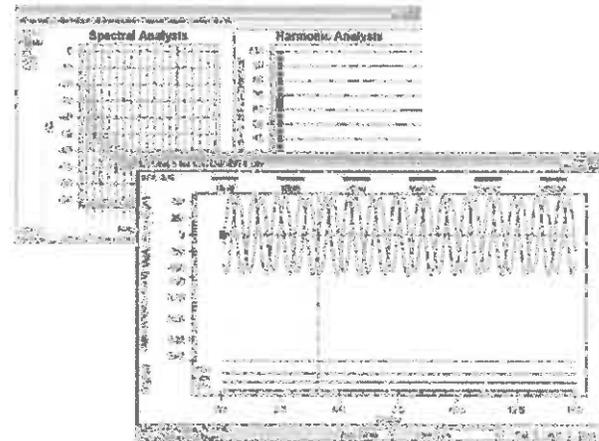
- Remotely monitor and reset real-time metering information, which includes:
 - Energy data
 - Demand and peak demand
 - Minimum/maximum records
 - Sequential Events Recorder (SER) data
- View load profile data.
- Monitor and control inputs and outputs.
- Read and save TOU data.
- Place meter into test mode and monitor test pulse output.



Meter monitoring software standard with the SEL-735.

Event Reports and Analysis

- Quickly analyze event records, status bits, spectral analysis, and harmonic content using the ACSELERATOR Waveform Viewer.
- Convert event reports to oscillography with time-coordinated Device Word bit assertion and phasor/sequence element diagrams.
- Use the SEL-735 modem dial-out capability to automatically transfer event files to ACSELERATOR TEAM software*.



ACSELERATOR QuickSet Designer*

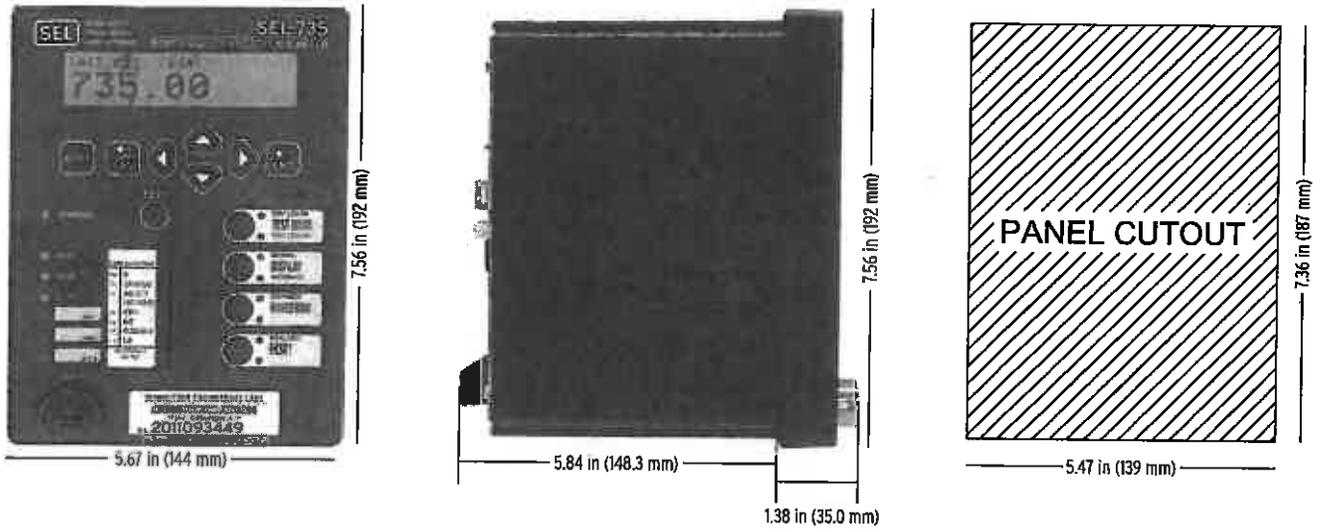
- Use ACSELERATOR QuickSet SEL-5030 Software with a template license to create custom views of settings, called QuickSet Design Templates. This makes installation of a new device simple and helps ensure that new devices are applied according to your organization's standards.
- Import and use QuickSet Design Templates with ACSELERATOR QuickSet. Each meter needs fewer settings because the template hides standardized and unused settings.

* Additional cost software

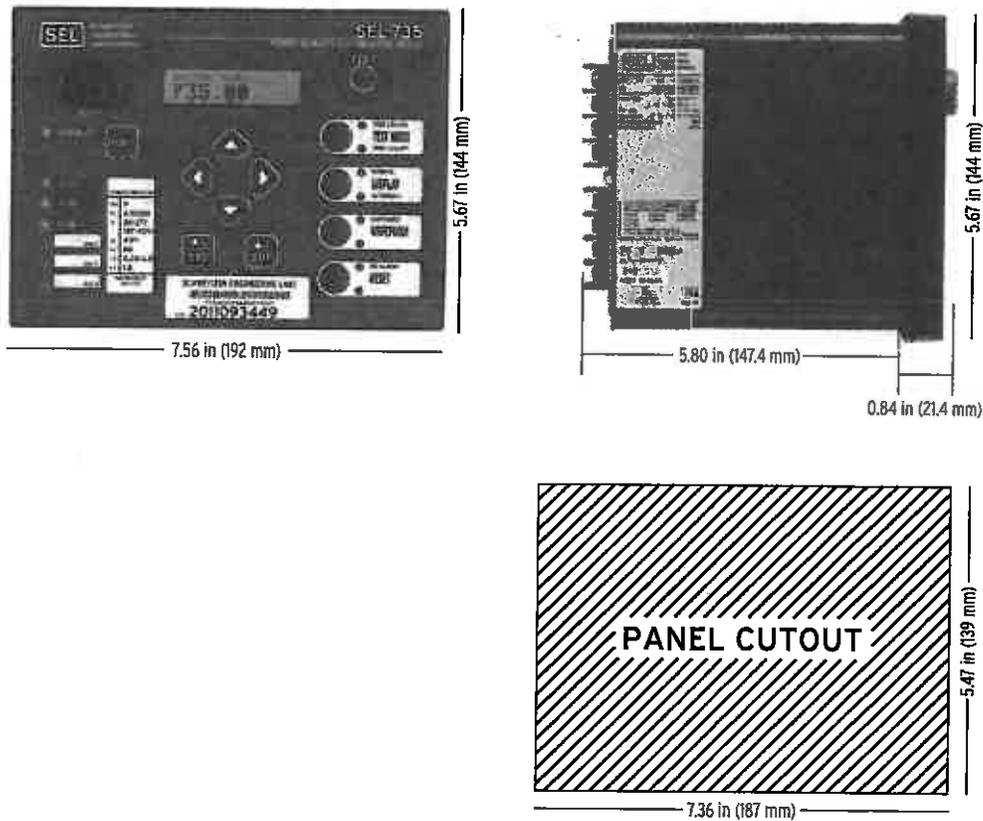


Dimensions and Mounting

SEL-735 Vertical Dimensions



SEL-735 Horizontal Dimensions



Guideform Specification

The meter shall be 32-bit microprocessor-based with a combination of recording, automation, and communications capabilities. The meter shall include self-diagnostic functions to alarm upon detected failure. Specific requirements are as follows:

Accuracy. Accuracy shall exceed ANSI and IEC Class 0.2 with a $\pm 0.06\%$ Wh guarantee and a Class 0.2 accuracy guarantee for at least ten years.

Power Quality. The meter shall meet IEC 61000-4-30 power quality accuracy for voltage, current, power, harmonics, and flicker.

True Four-Quadrant Metering. Energy and demand registers shall report delivered and received watts as well as leading and lagging VARs for delivered and received power.

Recording. The meter shall include at least 128 MB of nonvolatile memory for data storage and simultaneously record 192 channels for at least 140 days at five-minute intervals. Statistical recording shall include minimum, maximum, average, change-over interval, and end-of-interval calculations.

Transformer/Line-Loss Compensation. The meter shall compensate for meter locations remote from billing points. Bidirectional compensation shall include factors for excitation and loading losses in the transformer.

Minimum/Maximum Recording. Each phase voltage and current shall have the date and time of the last maximum and minimum value since resetting the maximum/minimum.

Voltage Sag/Swell/Interruption Recording. A VSSI recorder shall capture excursions outside of a preset band around nominal voltage setting. Record intervals shall adapt sampling rates from quarter cycle to daily to maximize memory usage.

Waveform Capture. The meter shall simultaneously capture six-channel 512 samples-per-cycle waveforms with programmable logic triggers.

Human-Machine Interface. The meter shall have a configurable LCD, 14 programmable LEDs, and 4 programmable pushbuttons with slide-in labels.

Harmonic Metering. The meter shall report individual harmonics up to the 63rd order, including voltage, current, phase angles, and power magnitudes. The meter shall exceed IEC 61000-4-7 Class II accuracy. Interharmonic values shall encompass 5 Hz to 3800 Hz in 5 Hz bins.

Flicker. The meter shall report instantaneous, short-term, and long-term flicker measurement per IEC 61000-4-15.

Inputs and Outputs. The meter shall support four digital inputs and four electromechanical, solid-state, or analog outputs.

K-Factor Calculation. The meter shall perform K-factor calculations for transformer loading, as defined by IEEE transformer loading guides.

Synchronized Phasor Measurements (future release).

High-accuracy phasor measurements for voltages and currents when combined with an IRIG-B signal.

Analog and Math Logic. The meter shall support programmable logic for RTU, control, and automation. The logic shall use any internal meter logic point for Boolean logic calculations and any analog value for mathematical functions. Boolean logic shall include AND, OR, NOT, rising-edge detection, falling-edge detection as well as latches and counters. Math functions shall include add, subtract, multiply, and divide as well as analog compare functions.

Predictive Demand. A predictive demand calculation shall alarm when the demand for a fixed interval will pass a set value.

Communication. The meter shall support up to 10 simultaneous communications sessions via serial, multidrop, infrared, copper Ethernet, fiber-optic Ethernet, or telephone modem.

Clock. The meter shall have an internal battery-backed time-clock and retain time without power for at least 10 years. The meter shall allow time sets through each protocol.

Protocols. The meter shall support simultaneous SEL, Modbus, DNP3, MV-90, ASCII, Mirrored Bits, and binary interleaved communications protocols.

Programming. Graphical user software shall program the meter and retrieve historical information over any communications port.

Time-of-Use Metering. The meter shall record demand and energy consumption during different time periods based on a user-defined calendar. Programming will allow for 4 seasons, 6 rates, 10 day types, 40 rate schedules, a 20-year calendar, and 15 self-reads.

Temperature. The meter shall function for an ambient temperature ranging from -40° to $+85^{\circ}\text{C}$ (-40° to $+185^{\circ}\text{F}$).

Reliability. The vendor shall supply the actual measured Mean-Time Between Failures (MTBF) for the device upon request.

Service. The device shall include no-charge technical support for the life of the product.

Manufacturer. The manufacturer shall design and assemble all components including the printed-circuit boards in a wholly-owned manufacturing facility within the United States.

Conformal Coating. The device shall have optional conformal coating to protect the circuit boards from harsh environments.

Warranty Return. The vendor shall support a 72-hour turn-around on all warranty repairs.

Warranty. The device shall include a ten-year, no-questions-asked warranty for all material and workmanship defects. In addition, the warranty shall cover accidental customer-induced damage.

Specifications

General

AC Voltage Inputs

Maximum Rating:	300 V_{L-N} , 520 V_{L-L} continuous 600 V_{L-N} , 1039 V_{L-L} for 10 seconds
Range:	
Revenue:	28–300 V_{L-N} , 57–520 V_{L-L}
Measurement:	5–300 V_{L-N} , 9–520 V_{L-L}
Burden:	10 M Ω

AC Current Inputs

Maximum Rating:	22 A continuous 500 A for 1 second
Range:	
Current Class CL2/CL10/CL20, optimized for low-end accuracy:	
Revenue:	0.010–22 A
Measurement:	0.001–22 A continuous
Current Class CL10/CL20, optimized for 100 A fault recording:	
Revenue:	0.005–22 A
Measurement:	0.005–22 A continuous 22–100 A symmetrical for 25 seconds
Burden:	≤ 0.5 VA
Measurement Category:	II

Frequency and Rotation

60 or 50 Hz system frequency specified at time of order. User selectable ABC/ACB phase rotation.
Frequency tracking range: 40 to 70 Hz based on V_A or V_C .

Power Supply

Continuous Operating Limits	
125/250 Volt Supply:	85–264 Vac (50/60 Hz) 85–275 Vdc
24/48 Volt Supply:	19–58 Vdc
12/24 Volt Supply:	9.6–30 Vdc
VA Rating:	<40 VA/15 W maximum <20 VA/7 W typical
Interruption (IEC 60255-11:1979)	50 ms at 125 Vac/Vdc 50 ms at 48 Vdc 10 ms at 24 Vdc 2 ms at 12 Vdc
Ripple (IEC 60255-11:1979)	12% for dc inputs
Terminal Voltage Dropout:	<40 V within 1 minute of power removal
Rated Insulation Voltage (IEC 6066401:2002):	300 Vac
Dielectric Test Voltage:	3.1 kVdc

Fiber-Optic Ethernet Port

Wavelength:	1300 nm
Optical Connector Type:	LC
Fiber Type:	Multimode
Link Budget:	16.1 dB
Typical TX Power:	–15.7 dBm
RX Min. Sensitivity:	–31.8 dBm
Fiber Size:	62.5/125 μ m or 50/125 μ m
Approximate Range:	6.4 Km

Data Rate:	100 Mb
Typical Fiber Attenuation:	–2 dB/Km

Output Contacts

Ratings determined by IEC 60255-23:1994.	
Standard (Electromechanical)	
Make:	30 A per IEEE C37.90-1989 3.6 kVA, Cos ϕ = 0.3
Break Rating:	360 VA, Cos ϕ = 0.3
Breaking Capacity (10000 operations):	
12/24 Vdc	0.75 A L/R = 40 ms
48 Vdc	0.50 A L/R = 40 ms
125 Vdc	0.30 A L/R = 40 ms
250 Vdc	0.20 A L/R = 40 ms
Carry:	3 A at 120 Vac, 50/60 Hz 1.5 A at 240 Vac, 50/60 Hz 50 A for 1 second
Durability:	>10,000 cycles at rated conditions
Pickup/Dropout Time:	<16 ms
Maximum Operating Voltage (Ue):	250 V
Rated Insulation Voltage (Ui) (excluding EN 61010):	300 V

Optional (Solid State)

Carry:	80 mA continuous 250 Vac/Vdc
Maximum On Resistance:	100 mA typical: 50 Ω guaranteed: 75 Ω 30 mA typical: 75 Ω guaranteed: 125 Ω 10 mA typical: 125 Ω guaranteed: 200 Ω
Minimum Off Resistance:	10 M Ω
Pickup/Dropout Time:	<25 ms

Analog Outputs

± 1 mA Output	
Range:	± 1.2 mA
Minimum Output Impedance:	100 M Ω
Maximum Resistive Load:	10 k Ω
Accuracy:	$\pm 0.15\% \pm 2.0$ μ A at 25°C
4–20 mA Output	
Range:	± 24 mA
Minimum Output Impedance:	100 M Ω
Maximum Resistive Load:	500 Ω
Accuracy:	$\pm 0.20\% \pm 10$ μ A at 25°C

Optoisolated Input Ratings

DC Control Signal	
250 Vdc:	Pickup 200–275 Vdc Dropout 150 Vdc
220 Vdc:	Pickup 176–242 Vdc Dropout 132 Vdc
125 Vdc:	Pickup 100–137.5 Vdc Dropout 75 Vdc
110 Vdc:	Pickup 88–121 Vdc Dropout 66 Vdc
48 Vdc:	Pickup 38.4–52.8 Vdc Dropout 28.8 Vdc

24 Vdc:	Pickup 15–30 Vdc Dropout <5 Vdc
12 Vdc:	Pickup 9.6–13.2 Vdc Dropout <6 Vdc

AC Control Signal

250 Vac:	Pickup 170.6–300 Vac Dropout 106 Vac
220 Vac:	Pickup 150.3–264 Vac Dropout 93.2 Vac
125 Vac:	Pickup 85–150 Vac Dropout 53 Vac
110 Vac:	Pickup 75.1–132 Vac Dropout 46.6 Vac
48 Vac:	Pickup 32.8–57.6 Vac Dropout 20.3 Vac
24 Vac:	Pickup 14–27 Vac Dropout <5 Vac
Current Draw at Nominal DC Voltage:	2–6 mA

Time-Code Input

Meter accepts demodulated IRIG-B time-code input at EIA-232 Port 3, Port 2, or 2-pin Phoenix connector. Meter time is synchronized to within $\pm 10 \mu\text{s}$ of time-source input.

Nominal Voltage:	5 Vdc
Maximum Voltage:	8 Vdc

The SEL-735 IEEE C37.118-2005 Level 0 performance is specified below.

Voltage and Current Accuracy:	$F_{nom} = 60 \text{ Hz} \pm 5 \text{ Hz}$ TVE = 1% $F_{nom} = 50 \text{ Hz} \pm 5 \text{ Hz}$ TVE = 1% for V1 and I1 TVE = 1% + 50-F /10% for voltage and current
Frequency Accuracy:	$\pm 5 \text{ mHz}$ for $F_{nom} \pm 9 \text{ Hz}$

Operating Temperature

IEC 60068-2-2:1993: -40° to $+85^\circ\text{C}$ (-40° to $+185^\circ\text{F}$)

Note: Not applicable to UL applications.

LCD: -20° to $+70^\circ\text{C}$ (-4° to $+158^\circ\text{F}$)

Operating Environment

Pollution Degree:	2
Overvoltage Category:	II
Indoor Use	
Maximum Altitude:	2000 M
Maximum Humidity:	95% RH

Weight

2.3 kg (5.0 lbs)

Dimensions

Refer to *Figure 2.1* and *Figure 2.2* for meter dimensions.

Routine Dielectric Test

Current Inputs:	2.75 kVac for 1 s
Voltage Inputs:	2.2 kVac for 1 s
Inputs and Outputs:	2.2 kVac for 1 s
Power Supply:	3.11 kVdc for 1 s
EIA-485 Port:	1.5 kVdc for 1 s

IEC 60255-5:2000
Dielectric tests performed on
all units with the CE mark:

2200 Vdc for 1 s on EIA-485 communications
port
2000 Vac for 1 s on contact inputs, contact
outputs, and analog inputs

Terminal Connections

Rear Screw-Terminal Tightening Torque

Current Input Terminal Block (ring terminals are recommended)

Minimum:	0.9 Nm (8 in-lb)
Maximum:	1.4 Nm (12 in-lb)

Connectorized[®]

Minimum:	0.5 Nm (4.4 in-lb)
Maximum:	1.0 Nm (8.8 in-lb)

Connectorized terminals accept wire size 12–24 AWG.

User terminals or stranded copper wire should be at a minimum temperature rating of 105°C (221°F).

Processing Specifications**AC Voltage and Current Inputs**

512 samples per power system cycle.

Control Processing

1/2-cycle processing interval

SELogic Pickup and Accuracies

SELOGIC Timers:	$\pm 1/2$ cycle
Analog Values:	$\pm 3\%$

Metering/Monitoring

Metering Accuracy

Voltage, Current, Power, and Energy:	$\pm 0.06\%$ $\pm 0.02\%$ typical
Frequency:	$\pm 0.001 \text{ Hz}$
Power Quality:	IEC 61000-4-30:2008
Flicker	
P_{ST} :	$\pm 5\%$ over the range 0.5–25 P_{ST} (10-min. interval)
P_{LT} :	$\pm 5\%$ over the range 0.5–25 P_{LT} (2-hour interval)

Type Tests**Electromagnetic Compatibility Immunity**

Surge Withstand Capability:	IEC 60255-22-1:2007, Severity Level: 2.5 kV common mode, 1.0 kV differential mode 1.0 kV peak common mode on communications ports IEEE C37.90.1-2002 Severity Level: 2.5 kV oscillatory, 4 kV fast transient
Electrostatic Discharge Immunity:	IEC 60255-22-2:2008 Severity Level: 4 (both polarities at Levels 1, 2, 3, and 4) IEC 61000-4-2:2008 Severity Level: 4
Radiated Electromagnetic Field Immunity:	IEC 60255-22-3:2007 IEC 61000-4-3:2010, Severity Level: 10 V/m ANSI C12.20-1998, Severity Level: 15 V/m

Electrical Fast Transient Burst Immunity:	IEC 61000-4-4:2011, Severity Level: 4 kV
Surge Immunity:	IEC 62052-11:2003, 4 kV for Current, Voltage, and Power Supply Mains 1 kV for Auxiliary Circuits
Conducted Radio Frequency Immunity:	IEC 61000-4-6:2008, Severity Level: 10 Vrms
Power Frequency Magnetic Field Immunity:	IEC 61000-4-8:2009, Severity Level: 100 A/m for 60 seconds; 1000 A/m for 3 seconds, Level 5 excludes optional modem
Pulse Magnetic Field Immunity:	IEC 61000-4-9:2001, Severity Level: 1000 A/m, Level 5

Environmental

Cold:	IEC 60068-2-1:2007 Test Ad: 16 hours at -40°C IEEE 1613-2009 + A1-2011
Dry Heat:	IEC 60068-2-2:2007, Test Bd: 16 hours at +85°C IEEE 1613-2009 + A1-2011
Damp Heat, Cyclic:	IEC 60068-2-30:2005 Test Db: 5% RH, 25° to 55°C, 6 cycles (12 + 12 hour cycle)
Enclosure Protection:	IEC 60529:2001, IP65, enclosed in panel with available gasket (P/N: 915900097); IP41 without gasket; IP20 for rear panel

Vibration

Vibration Resistance:	IEC 60255-21-1:1988 Class 1 Vibration Endurance Class 2 Vibration Response
Shock Resistance:	IEC 60255-21-2:1988 Class 1 Shock Withstand Class 2 Shock Response Class 1 Bump Withstand
Seismic:	IEC 60255-21-3:1993 Class 2 Quake Response

Safety

Dielectric Strength/Impulse:	IEC 60255-5:2000 IEEE C37.90:2005 IEEE 1613-2009 + A1-2011 Severity Level: 2500 Vac for 1 minute, 3100 Vdc for 1 minute on power supply Severity Level: 0.5 Joules, 5 kV
High-Voltage Line Surges:	IEEE C62.41-1991 100 kHz Ring Wave for Location Category B3, Peak Voltage of 6 kV and Short-Circuit Peak Current of 3 kA 1.2/50 µs Combination Wave for Location Category B3, Peak Voltage of 6 kV and Short-Circuit Peak Current of 3 kA
Rated Impulse Withstand Voltage (U_{imp}):	IEC 60664-1:2007 6 kV on power supply, ac current inputs, and voltage inputs

Compliance

ISO:	Meter is designed and manufactured using ISO 9001:2000 certified quality program.
ANSI C12.20:2010 Accuracy:	class 0.2, CL2, and CL10/CL20
IEC 62053-22:2003:	class 0,2 S
IEC 62052-11:	rack-mounted meters
IEC 62053-23:2003:	class 0,2 S
UL 508	CAN/CSA C22.2 No. 142
ERCOT Compliant	
CFG G0000-48-2010 Compliant	per LAPEM
CE:	Mark-EMC Directive, Low Voltage Directive
Note:	Optional modem not CE compliant.

Notes

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This product is covered by the standard SEL 10-year warranty. For warranty details, visit www.selinc.com or contact your customer service representative.

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Section 1

Introduction and Specifications

Overview

This section includes the following overviews of the SEL-735 Power Quality and Revenue Meter.

- *SEL-735 Meter Forms and Models*
- *Applications on page 1.3*
- *Hardware Connection Features on page 1.4*
- *Communications Connections on page 1.5*
- *Specifications on page 1.6*

SEL-735 Meter Forms and Models

This instruction manual covers the following SEL-735 meter forms and models.

Table 1.1 SEL-735 Form Numbers

Meter Form	Type
Form 5	3 wire delta
Form 9	4 wire wye

You may order the SEL-735 as a Form 5 or Form 9 meter, but you may change the form using the **FORM** command from a terminal session at the 2AC level. Model numbers are derived from the SEL-735 Model Option Table (MOT). For the available options, associated option codes, or to order an SEL-735, refer to the MOT for this product at the SEL website.

The SEL-735 offers a standard current measurement range from 1 mA to 22 A. You therefore do not have to specify a CL 2, CL 10, or CL 20 meter thanks to the wide dynamic measurement range. The line-to-neutral voltage range is from 28 V to 277 V.

The SEL-735 also offers a fault recording measurement range from 5 mA to 100 A. The meter can measure fault currents of 22–100 A for 25 seconds and normal currents of 0.005–22 A continuously.

The SEL-735 is available with three different power quality and recording options. *Table 1.2* shows these features and their IEC 61000-4-30 class.

Table 1.2 SEL-735 Feature Availability

IEC 61000-4-30 Power Quality	SEL-735 Basic PQ	SEL-735 Intermediate PQ	SEL-735 Advanced PQ
Measurement Aggregation			
10/12 Cycle Intervals	A	A	A
150/180 cycles, 10 min., 120 min. Intervals	–	A	A
Voltage and Current	A	A	A
Voltage and Current Unbalance	A	A	A
Individual Voltage and Current Harmonics	S	S	S
Voltage and Current THD	A	A	A
Real, Reactive, and Apparent Power	A	A	A
Power Quality Parameters			
Real-Time Clock	S	S	S
Frequency	A	A	A
Flicker	–	S	S
Voltage Dips, Swells, and Interruptions	A	A	A
Voltage and Current Interharmonics	–	–	S
Harmonic Power	–	–	S
Harmonic Phase Angles	–	–	S
Transient Detection	–	–	(future)
Maximum Harmonic Order	15th	63rd	63rd
Waveform Capture			
Samples per cycle	16	16 and 128	16, 128, and 512
Duration (cycles)	15	15, 30, 60, 120, 300, 600	15, 30, 60, 120, 300, 600
Number of Events	64	16–3155	4–3155
COMTRADE Reports	Y	Y	Y

A = IEC 6100-4-30 Class A compliant.
 S = IEC 61000-4-30 Class S compliant.

Applications

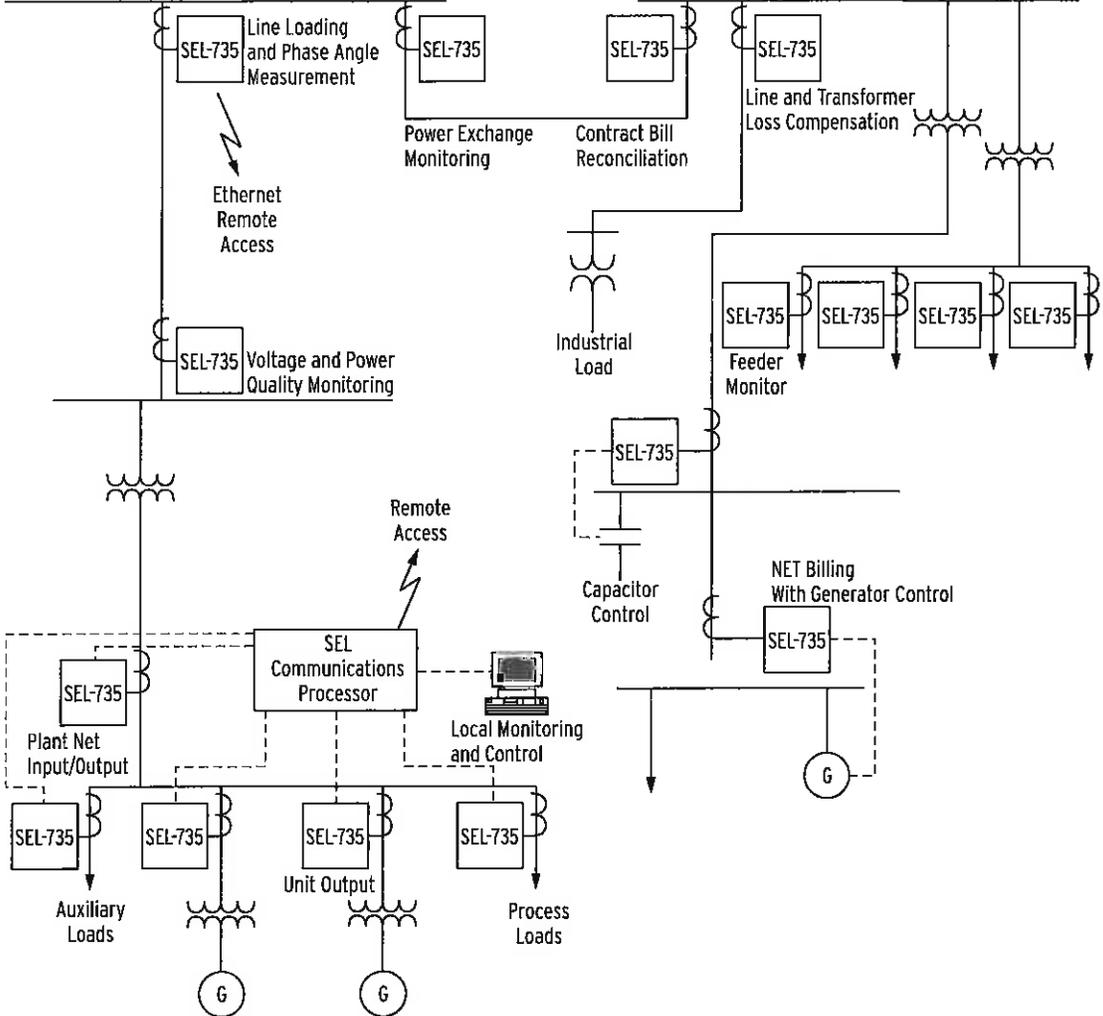


Figure 1.1 SEL-735 Applied at Billing Points Throughout the Power System

Hardware Connection Features

See *Specifications on page 1.6* and *Section 2: Installation* for more information on hardware and connections.

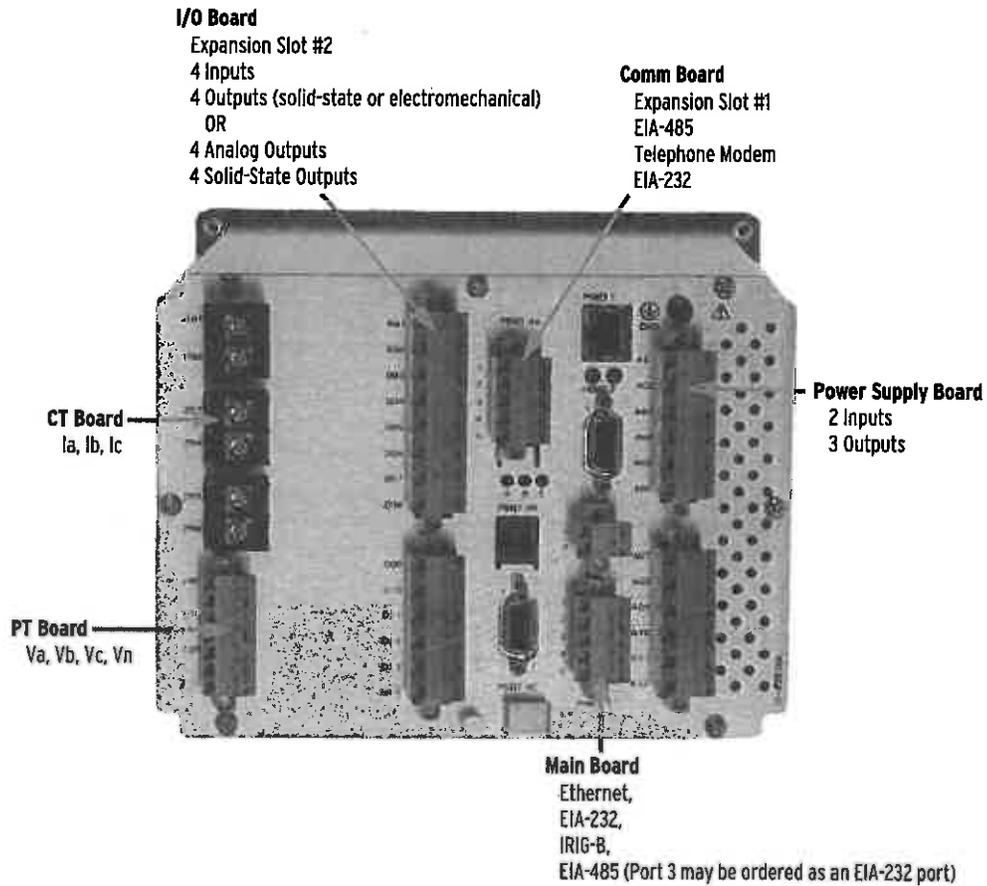


Figure 1.2 SEL-735 Inputs, Outputs, and Communications Ports

Communications Connections

See *Port Connector and Communications Cables* on page 8.5 for more communications connection information.

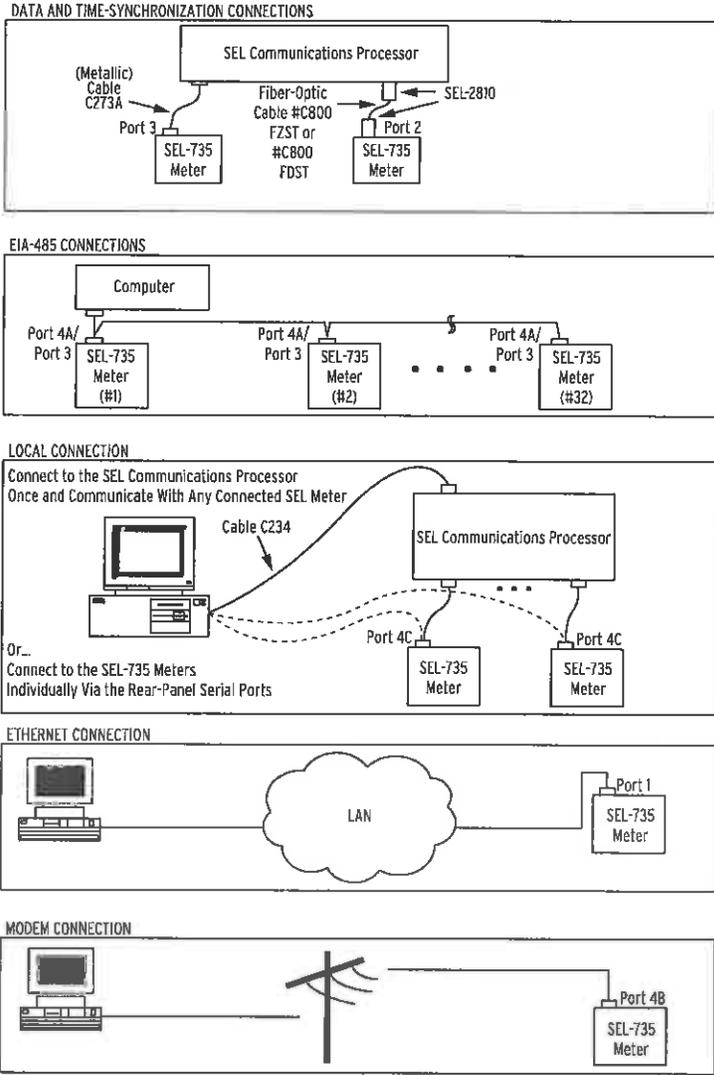


Figure 1.3 SEL-735 Communications Connection Examples

Specifications

General

AC Voltage Inputs

Maximum Rating:	300 V_{L-N} , 520 V_{L-L} continuous 600 V_{L-N} , 1039 V_{L-L} for 10 seconds
Range:	
Revenue:	28–300 V_{L-N} , 57–520 V_{L-L}
Measurement:	5–300 V_{L-N} , 9–520 V_{L-L}
Burden:	10 M Ω

AC Current Inputs

Maximum Rating:	22 A continuous 500 A for 1 second
Range:	
Current Class CL2/CL10/CL20, optimized for low-end accuracy:	
Revenue:	0.010–22 A
Measurement:	0.001–22 A continuous
Current Class CL10/CL20, optimized for 100 A fault recording:	
Revenue:	0.005–22 A
Measurement:	0.005–22 A continuous 22–100 A symmetrical for 25 seconds
Burden:	\leq 0.5 VA
Measurement Category:	II

Frequency and Rotation

60 or 50 Hz system frequency specified at time of order. User selectable ABC/ACB phase rotation.
Frequency tracking range: 40 to 70 Hz based on V_A or V_C .

Power Supply

Continuous Operating Limits	
125/250 Volt Supply:	85–264 Vac (50/60 Hz) 85–275 Vdc
24/48 Volt Supply:	19–58 Vdc
12/24 Volt Supply:	9.6–30 Vdc
VA Rating:	<40 VA/15 W maximum <20 VA/7 W typical
Interruption (IEC 60255-11:1979)	50 ms at 125 Vac/Vdc 50 ms at 48 Vdc 10 ms at 24 Vdc 2 ms at 12 Vdc
Ripple (IEC 60255-11:1979)	12% for dc inputs
Terminal Voltage Dropout:	<40 V within 1 minute of power removal
Rated Insulation Voltage (IEC 6066401:2002):	300 Vac
Dielectric Test Voltage:	3.1 kVdc

Fiber-Optic Ethernet Port

Wavelength:	1300 nm
Optical Connector Type:	LC
Fiber Type:	Multimode
Link Budget:	16.1 dB
Typical TX Power:	–15.7 dBm

RX Min. Sensitivity:	–31.8 dBm
Fiber Size:	62.5/125 μ m or 50/125 μ m
Approximate Range:	6.4 km
Data Rate:	100 Mb
Typical Fiber Attenuation:	–2 dB/km

Output Contacts

Ratings determined by IEC 60255-23:1994,
Standard (Electromechanical)

Make:	30 A per IEEB C37.90-1989 3.6 kVA, Cos ϕ = 0.3
Break Rating:	360 VA, Cos ϕ = 0.3
Breaking Capacity (10000 operations):	
12/24 Vdc	0.75 A L/R = 40 ms
48 Vdc	0.50 A L/R = 40 ms
125 Vdc	0.30 A L/R = 40 ms
250 Vdc	0.20 A L/R = 40 ms
Carry:	3 A at 120 Vac, 50/60 Hz 1.5 A at 240 Vac, 50/60 Hz 50 A for 1 second
Durability:	>10,000 cycles at rated conditions
Pickup/Dropout Time:	<16 ms
Maximum Operating Voltage (Ue):	250 V
Rated Insulation Voltage (Ui) (excluding EN 61010):	300 V

Optional (Solid State)

Carry:	80 mA continuous 250 Vac/Vdc
Maximum On Resistance:	100 mA typical: 50 Ω guaranteed: 75 Ω 30 mA typical: 75 Ω guaranteed: 125 Ω 10 mA typical: 125 Ω guaranteed: 200 Ω
Minimum Off Resistance:	10 M Ω
Pickup/Dropout Time:	<25 ms

Analog Outputs

\pm 1 mA Output	
Range:	\pm 1.2 mA
Minimum Output Impedance:	100 M Ω
Maximum Resistive Load:	10 k Ω
Accuracy:	\pm 0.15% \pm 2.0 μ A at 25°C
4–20 mA Output	
Range:	\pm 24 mA
Minimum Output Impedance:	100 M Ω
Maximum Resistive Load:	500 Ω
Accuracy:	\pm 0.20% \pm 10 μ A at 25°C

Optoisolated Input Ratings**DC Control Signal**

250 Vdc:	Pickup 200–275 Vdc Dropout 150 Vdc
220 Vdc:	Pickup 176–242 Vdc Dropout 132 Vdc
125 Vdc:	Pickup 100–137.5 Vdc Dropout 75 Vdc
110 Vdc:	Pickup 88–121 Vdc Dropout 66 Vdc
48 Vdc:	Pickup 38.4–52.8 Vdc Dropout 28.8 Vdc
24 Vdc:	Pickup 15–30 Vdc Dropout <5 Vdc
12 Vdc:	Pickup 9.6–13.2 Vdc Dropout <6 Vdc

AC Control Signal

250 Vac:	Pickup 170.6–300 Vac Dropout 106 Vac
220 Vac:	Pickup 150.3–264 Vac Dropout 93.2 Vac
125 Vac:	Pickup 85–150 Vac Dropout 53 Vac
110 Vac:	Pickup 75.1–132 Vac Dropout 46.6 Vac
48 Vac:	Pickup 32.8–57.6 Vac Dropout 20.3 Vac
24 Vac:	Pickup 14–27 Vac Dropout <5 Vac

Current Draw at
Nominal DC Voltage: 2–6 mA

Time-Code Input

Meter accepts demodulated IRIG-B time-code input at EIA-232 Port 3, Port 2, or 2-pin Phoenix connector. Meter time is synchronized to within $\pm 10 \mu\text{s}$ of time-source input.

Nominal Voltage:	5 Vdc
Maximum Voltage:	8 Vdc

The SEL-735 IEEE C37.118-2005 Level 0 performance is specified below.

Voltage and Current Accuracy:	$F_{\text{nom}} = 60 \text{ Hz} \pm 5 \text{ Hz}$ TVE = 1%
	$F_{\text{nom}} = 50 \text{ Hz} \pm 5 \text{ Hz}$ TVE = 1% for V1 and I1 TVE = 1% + 150-F/10% for voltage and current

Frequency Accuracy: $\pm 5 \text{ mHz}$ for $F_{\text{nom}} \pm 9 \text{ Hz}$

Operating Temperature

IEC 60068-2-2:1993: -40° to $+85^\circ\text{C}$ (-40° to $+185^\circ\text{F}$)

Note: Not applicable to UL applications.

LCD: -20° to $+70^\circ\text{C}$ (-4° to $+158^\circ\text{F}$)

Operating Environment

Pollution Degree: 2
Overvoltage Category: II

Indoor Use

Maximum Altitude: 2000 M
Maximum Humidity: 95% RH

Weight

2.3 kg (5.0 lbs)

Dimensions

Refer to Figure 2.1 and Figure 2.2 for meter dimensions.

Routine Dielectric Test

Current Inputs:	2.75 kVac for 1 s
Voltage Inputs:	2.2 kVac for 1 s
Inputs and Outputs:	2.2 kVac for 1 s
Power Supply:	3.11 kVdc for 1 s
EIA-485 Port:	1.5 kVdc for 1 s
IEC 60255-5:2000 Dielectric tests performed on all units with the CE mark:	2200 Vdc for 1 s on EIA-485 communications port 2000 Vac for 1 s on contact inputs, contact outputs, and analog inputs

Terminal Connections**Rear Screw-Terminal Tightening Torque**

Current Input Terminal Block (ring terminals are recommended)

Minimum:	0.9 Nm (8 in-lb)
Maximum:	1.4 Nm (12 in-lb)

Connectorized[®]

Minimum:	0.5 Nm (4.4 in-lb)
Maximum:	1.0 Nm (8.8 in-lb)

Connectorized terminals accept wire size 12–24 AWG.

User terminals or stranded copper wire should be at a minimum temperature rating of 105°C (221°F).

Processing Specifications**AC Voltage and Current Inputs**

512 samples per power system cycle.

Control Processing

1/2-cycle processing interval

SELogic Pickup and Accuracies

SELOGIC Timers:	$\pm 1/2$ cycle
Analog Values:	$\pm 3\%$

Metering/Monitoring**Metering Accuracy**

Voltage, Current, Power, and Energy:	$\pm 0.06\%$ $\pm 0.02\%$ typical
---	--------------------------------------

Frequency: $\pm 0.001 \text{ Hz}$

Power Quality: IEC 61000-4-30:2008

Flicker

P_{ST} : $\pm 5\%$ over the range 0.5–25 P_{ST}
(10-min. interval)

P_{LT} : $\pm 5\%$ over the range 0.5–25 P_{LT}
(2-hour interval)

Type Tests**Electromagnetic Compatibility Immunity**

Surge Withstand Capability:	IEC 60255-22-1:2007, Severity Level: 2.5 kV common mode, 1.0 kV differential mode 1.0 kV peak common mode on communications ports IEEE C37.90.1-2002 Severity Level: 2.5 kV oscillatory, 4 kV fast transient
--------------------------------	--

Electrostatic Discharge Immunity:	IEC 60255-22-2:2008 Severity Level: 4 (both polarities at Levels 1, 2, 3, and 4) IEC 61000-4-2:2008 Severity Level: 4
Radiated Electromagnetic Field Immunity:	IEC 60255-22-3:2007 IEC 61000-4-3:2010, Severity Level: 10 V/m ANSI C12.20-1998, Severity Level: 15 V/m
Electrical Fast Transient Burst Immunity:	IEC 61000-4-4:2011, Severity Level: 4 kV
Surge Immunity:	IEC 62052-11:2003, 4 kV for Current, Voltage, and Power Supply Mains 1 kV for Auxiliary Circuits
Conducted Radio Frequency Immunity:	IEC 61000-4-6:2008, Severity Level: 10 Vrms
Power Frequency Magnetic Field Immunity:	IEC 61000-4-8:2009, Severity Level: 100 A/m for 60 seconds; 1000 A/m for 3 seconds, Level 5 excludes optional modem
Pulse Magnetic Field Immunity:	IEC 61000-4-9:2001, Severity Level: 1000 A/m, Level 5
Environmental	
Cold:	IEC 60068-2-1:2007 Test Ad: 16 hours at -40°C IEEE 1613-2009 + A1-2011
Dry Heat:	IEC 60068-2-2:2007, Test Bd: 16 hours at +85°C IEEE 1613-2009 + A1-2011
Damp Heat, Cyclic:	IEC 60068-2-30:2005 Test Db: 5% RH, 25° to 55°C, 6 cycles (12 + 12 hour cycle)
Enclosure Protection:	IEC 60529:2001, IP65, enclosed in panel with available gasket (P/N: 915900097); IP41 without gasket; IP20 for rear panel
Vibration	
Vibration Resistance:	IEC 60255-21-1:1988 Class 1 Vibration Endurance Class 2 Vibration Response
Shock Resistance:	IEC 60255-21-2:1988 Class 1 Shock Withstand Class 2 Shock Response Class 1 Bump Withstand
Seismic:	IEC 60255-21-3:1993 Class 2 Quake Response

Safety

Dielectric Strength/ Impulse:	IEC 60255-5:2000 IEEE C37.90:2005 IEEE 1613-2009 + A1-2011 Severity Level: 2500 Vac for 1 minute, 3100 Vdc for 1 minute on power supply Severity Level: 0.5 Joules, 5 kV
High-Voltage Line Surges:	IEEE C62.41-1991 100 kHz Ring Wave for Location Category B3, Peak Voltage of 6 kV and Short-Circuit Peak Current of 3 kA 1.2/ 50 μ s Combination Wave for Location Category B3, Peak Voltage of 6 kV and Short-Circuit Peak Current of 3 kA
Rated Impulse Withstand Voltage (U_{imp}):	IEC 60664-1:2007 6 kV on power supply, ac current inputs, and voltage inputs

Compliance

ISO: Meter is designed and manufactured using ISO 9001:2000 certified quality program.

ANSI C12.20:2010 Accuracy; class 0.2, CL2, and CL10/CL20

IEC 62053-22:2003; class 0,2 S

IEC 62052-11; rack-mounted meters

IEC 62053-23:2003; class 0,2 S

UL 508
CAN/CSA C22.2 No. 142

ERCOT Compliant

CFG G0000-48-2010 Compliant per LAPEM

CE: Mark-EMC Directive, Low Voltage Directive

Note: Optional modem not CE compliant.

Section 2

Installation

Overview

This section provides instructions and guidelines required to correctly install and check the SEL-735 in the field. SEL recommends that you complete the following steps to install the SEL-735 correctly.

- *Mount Meter*
- *Make Rear-Panel Connections on page 2.5*
- *Configure and Check Meter Status on page 2.7*

Device Placement

Physical Location

You can mount the SEL-735 in a sheltered indoor environment, a building, or an enclosed cabinet that does not exceed the temperature and humidity ratings for the device. For voltage and current inputs, the SEL-735 is rated for Measurement Category III (LEA inputs are rated for Measurement Category II), and Pollution Degree 2. This rating allows mounting of the meter indoors or in an outdoor enclosure where the meter is protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity are controlled. You can place the meter in extreme temperature and humidity locations. The temperature range over which the meter operates is -40° to $+80^{\circ}\text{C}$ (-40° to $+176^{\circ}\text{F}$). The meter operates in a humidity range from 5 percent to 95 percent, no condensation. The power supply supports voltage fluctuations to as much as ± 10 percent of nominal voltage. For IEC 61010 certification, the SEL-735 rating is 2000 meters (6560 feet) above mean sea level.

Mount Meter

Figure 2.1, Figure 2.2, and Figure 2.3 give the SEL-735 dimensions for the panel-mount applications.

This section explains how to mount the device in a panel or bracket.

CHASSIS

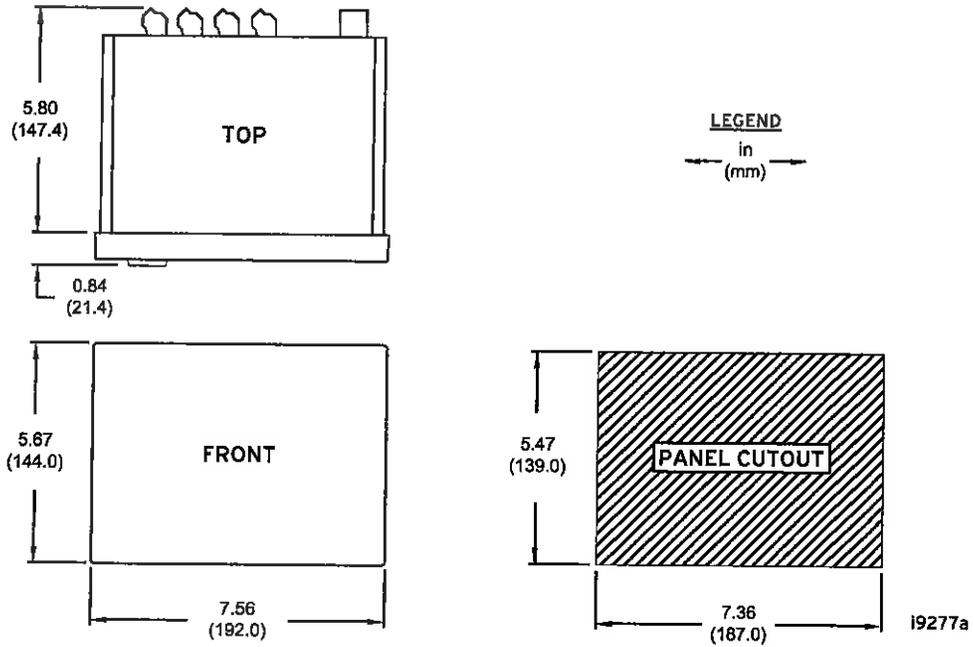


Figure 2.1 SEL-735 Horizontal Panel-Mount Dimensions

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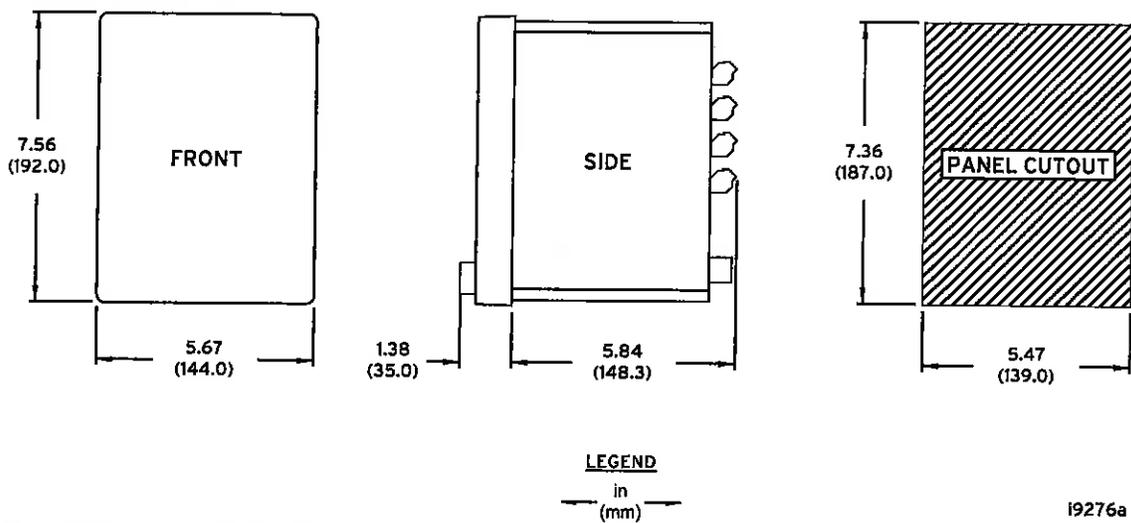


Figure 2.2 SEL-735 Vertical Panel-Mount Dimensions

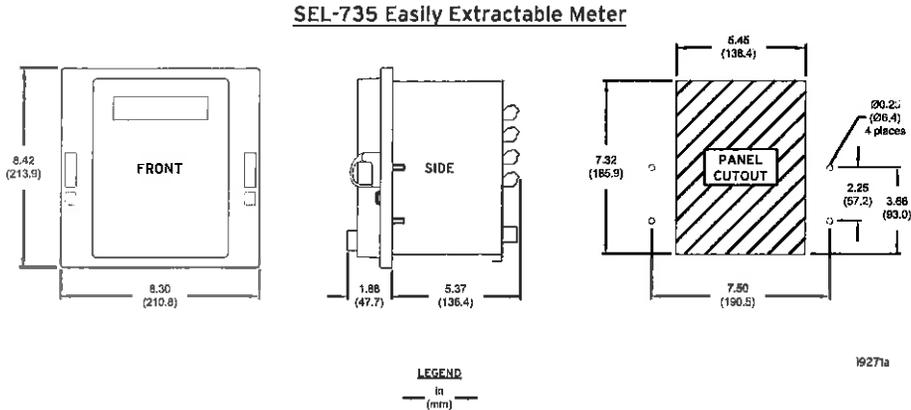


Figure 2.3 SEL-735 Easily Extractable Meter Panel-Mount Dimensions

Panel-Based or Bracket Mounting

A #3 Phillips® slotted screwdriver with 152.4 mm (6") shaft is required for panel mounting.

Perform the following steps to safely mount the SEL-735.

- Step 1. Ensure that the installation site is ready for the installation.
 - a. Ensure the site is well lit and free from debris, and ensure that personnel are safe from contact with any energized circuits.
 - b. Ensure that the panel or bracket cutout is in accordance with the associated dimensions.
 - c. Ensure there is at least about 152 mm (6") of clearance behind the panel cutout. The SEL-735 with Connectorized® connectors extends 148.34 mm (5.84") behind the panel.

Step 2. If you have a gasket for the SEL-735 front panel, place the seal around the device. Ensure that the seal sits flush against the rear edge of the front panel and is not twisted.

Step 3. Insert the SEL-735 into the panel cutout and hold the device flush against the panel.

Step 4. While holding the SEL-735 flush against the panel, screw the four Phillips #3 screws into the rear of the device front panel.

Outdoor Enclosure Mounting

NOTE: The outdoor enclosure weighs approximately 14 kg (30 lbs).

You can order the SEL-735 prewired outdoor enclosure option with mounting hardware for either pole mounting or flush mounting.

Use *Figure 2.4* as a guide to installing mounting hardware.

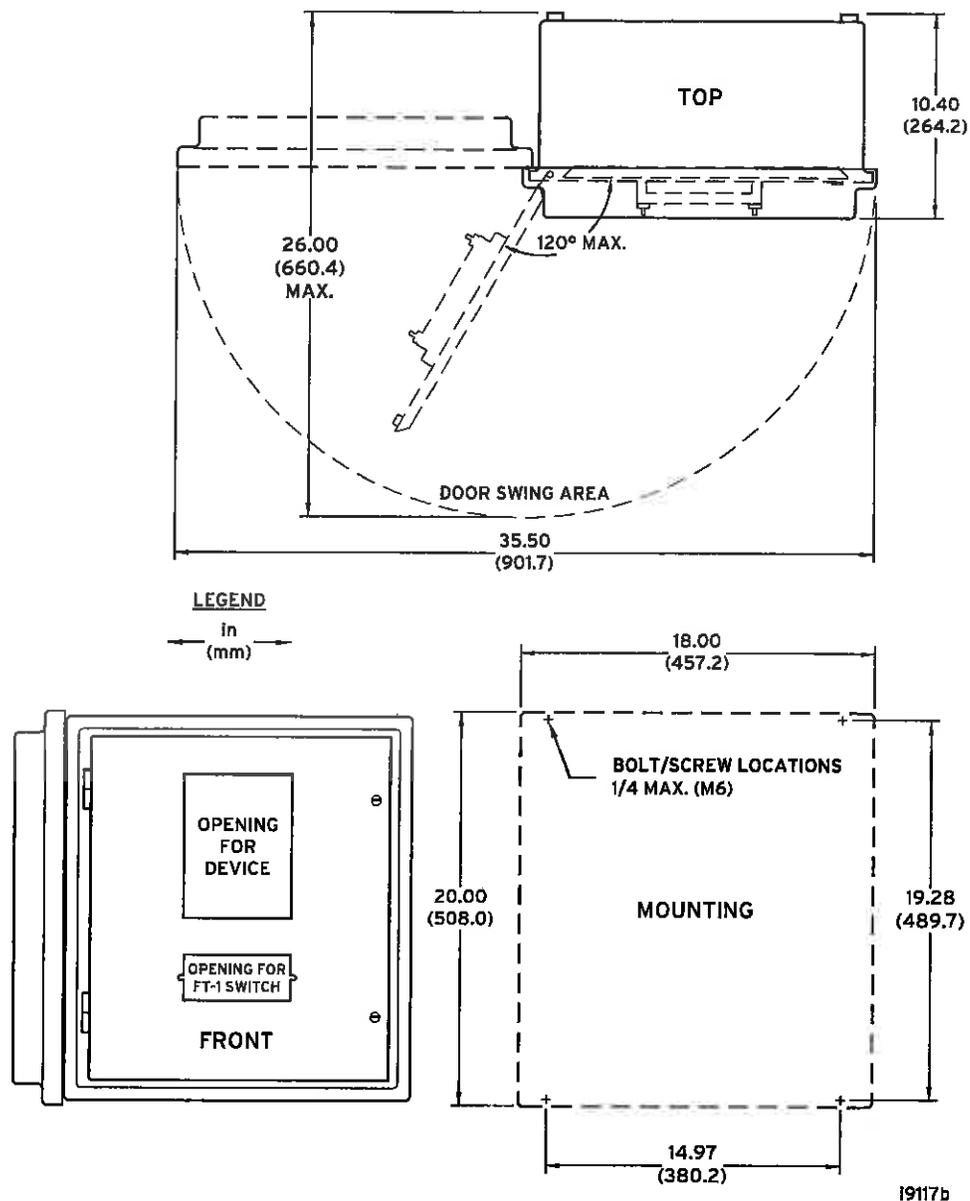


Figure 2.4 Outdoor Enclosure Dimensions

Install adequate hardware to secure the enclosure to a solid structure.

Chassis Ground (Earthing)

Ground the meter chassis at the ground terminal located on the rear of the meter.

You must connect the ground terminal labeled **GND** on the rear of the panel to a rack frame or switchgear ground for safety and performance. Use 10 AWG (6 mm²) to 12 AWG (4 mm²) less than 2 m (6.6 feet) in length for the ground connection.



Figure 2.5 Grounding Terminal Symbol

Make Rear-Panel Connections

SEL terminals accelerate and simplify connection and disconnection of wiring from the back of the SEL-735.

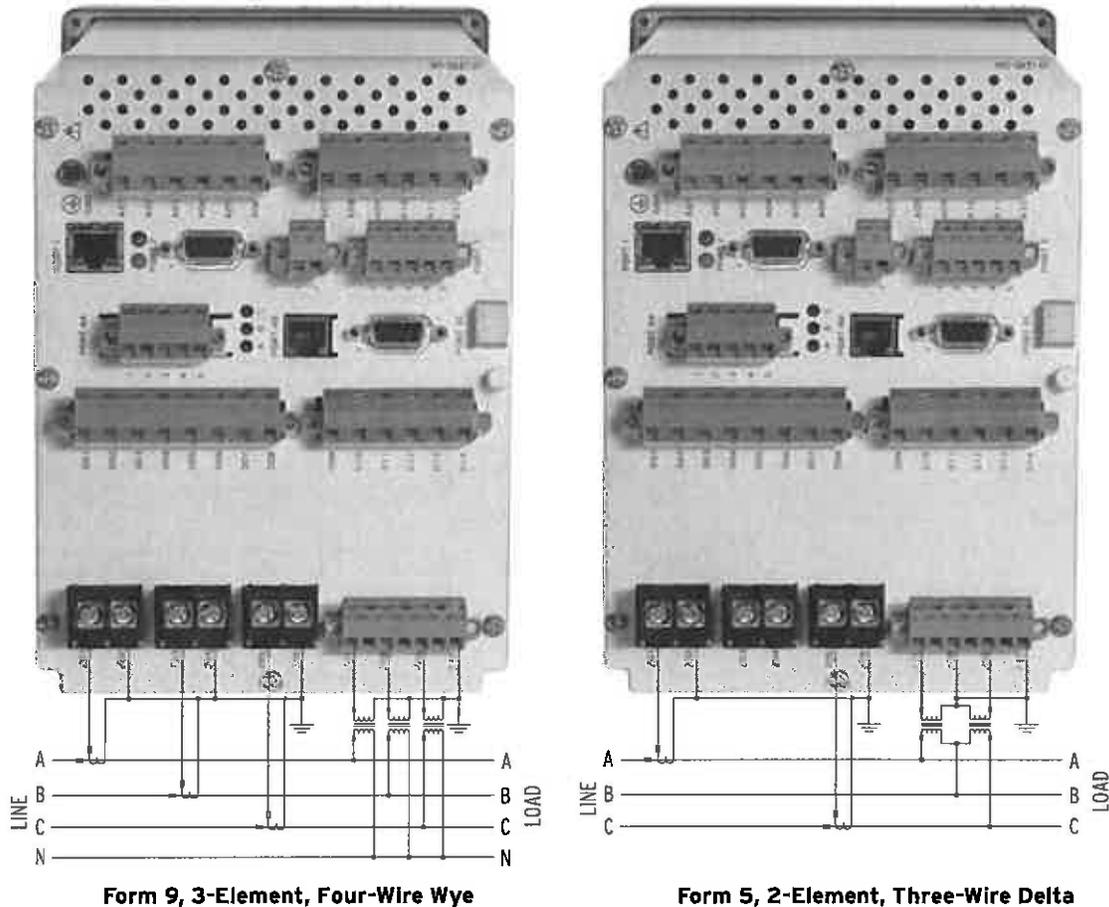


Figure 2.6 Four-Wire Wye and Three-Wire Delta Wiring Diagrams

Follow these steps to connect Connectorized terminals.

- Step 1. Ensure that the conductor size is between 0.25 mm² (24 AWG) and 4 mm² (12 AWG).
- Step 2. Strip the conductor end to ensure an electrical connection is made.
- Step 3. Insert the bare conductor into the connection and past the connection jaw.
- Step 4. Tighten the connector to about 0.79 Nm (7 in-lbs) of torque.
- Step 5. Complete other wiring connections.
- Step 6. Hand-tighten the Connectorized connection mounting screws to the proper terminal on the SEL-735.

NOTE: The minimum torque is 0.49 Nm (4.4 in-lbs) and the maximum torque is 0.994 Nm (8.8 in-lbs).

Table 2.1 lists the minimum connections necessary for three-phase voltage and current metering.

Table 2.1 Required Rear-Panel Connections

Voltage/Current Input Card	Connection Type	Rear-Panel Connection Label	Side-Panel Connection Label	Rear-Panel Connection Input
N/A	Chassis Ground	GND	GND	Ground Reference
N/A	Power Supply	A01	+/H	Positive Voltage Supply
		A02	-/N	Neutral Voltage Supply
Voltage/Current Transformer	Secondary Current Measurement	Z01	IA+	Phase A Current (IA) IN
		Z02	IA-	Phase A Current (IA) OUT
		Z03	IB+	Phase B Current ^a (IB) IN
		Z04	IB-	Phase B Current ^a (IB) OUT
		Z05	IC+	Phase C Current (IC) IN
		Z06	IC-	Phase C Current (IC) OUT
	Secondary Voltage Measurement	Z07	VA	Phase A Voltage (VA)
		Z08	VB	Phase B Voltage ^a (VB)
		Z09	VC	Phase C Voltage (VC)
		Z10	VN	VA, VB, VC Neutral

^a For Form 5 metering: Phase B voltage measurement input must be connected to neutral; Phase B current measurement input may be connected but will not be used in measurements.

Perform the following steps to make the necessary wiring connection to the SEL-735.

- Step 1. Ensure that power supply and metering instrument wiring is safe.
- Step 2. Route the power supply and metering instrument wiring to the rear of the device.
- Step 3. Ensure the power supply voltage source is within the SEL-735 power supply input range, and connect the positive and neutral power supply wires to connections E01 and E02, respectively.

The power supply input range is printed on the side-panel (vertical option) or top-panel (horizontal option) label. Refer to this label for the power supply input range to your SEL-735.
- Step 4. Refer to Table 2.1 and Figure 2.6 and connect all necessary rear-panel connections. Ensure that connected circuits conform to the SEL-735 specifications, given in *Specifications* on page 1.6.
- Step 5. Refer to the panel label to connect other necessary rear-panel connections.

- Step 6. Ensure that conductors are properly supported, free from hazards, and installed in accordance with local electrical codes.
- Step 7. Provide power to the power supply connections you wired in *Step 3*.
- Step 8. View the front-panel LCD of the device. Verify that the front-panel LCD illuminates.
- Step 9. Continue to *Configure and Check Meter Status*.

Configure and Check Meter Status

This step describes how to check the status and make the necessary initial configuration settings through the front-panel LCD and menu pushbuttons, or any communications port. Please refer to *Section 4: ACSELERATOR QuickSet* for a complete description of how to perform settings changes.

This step separates into three different substeps based on the interface you use: front-panel interface, port communications, and IRIG-B input; you only need to complete certain steps, depending on the physical interface requirements. The following list explains the recommended installation procedures. Complete each step that pertains to your installation requirements.

- Front-panel pushbutton menu. A PC is not required to perform this step.
- Front optical port, serial port, or Ethernet communications. Perform this step during meter installations, using a PC to program the device.
- IRIG-B port. Carry out this step if an IRIG-B time source is used.

Configure and Check Meter Status Through the Front-Panel Pushbuttons

The front-panel pushbutton interface eliminates the need for a PC to gain access to meter settings. Front-panel pushbuttons provide access to communications settings, general meter settings, and diagnostics. This section explains only essential meter settings configuration.

Please follow these guidelines when navigating the front-panel menu tree.

- Front-panel pushbuttons ENT, ESC, UP, DOWN, LEFT, and RIGHT navigate through the front-panel LCD menu tree.
- At any time, you can press ESC to exit the active menu.
- Appearance of the cursor under a menu item indicates that that menu item is active.
- Press ENT to view and configure the active menu structure. A blinking cursor indicates a meter request for a user prompt.
- Use the pushbuttons to interact with the LCD text entry display and enter new text strings.
- Press and hold the ESC pushbutton to adjust the contrast of the front-panel LCD.

Follow the instructions below to configure the meter identifier, the terminal identifier, and the potential and current transformer ratios through the front-panel pushbuttons.

Step 1. Configure the initial device settings.

- a. Press ENT.

The meter displays the top of the menu structure. The menu structure allows for viewing and changing meter measurements and settings.

- b. Press DOWN to scroll down until Set/Show is active.
- c. Press ENT.

The meter displays the top of the setting groups available for configuration and display.

- d. Press ENT.

The meter displays the beginning of the front-panel General Settings group. The following *Table 2.2* shows a list of essential initial settings available through the front-panel pushbuttons. Note that *Table 2.2* lists only those settings necessary for initial installation.

Table 2.2 Essential Initial Settings

Setting Name	Description	Default Setting	Range
MID	Meter Identifier	FEEDER 1	String
TID	Terminal Identifier	STATION A	String
CTR	Current Transformer Ratio	1.0000	1.0000–6000.0000
PTR	Potential Transformer Ratio	1.0000	1.0000–6000.0000
VOLT_SCA	Voltage Scaling	KILO	UNITY, KILO, MEGA
POWR_SCA	Power Scaling	KILO	UNITY, KILO, MEGA
ENRG_SCA	Energy Scaling	KILO	UNITY, KILO, MEGA
PRI_SCA	Analog Quantity Scaling	Y	Y, N

- e. Press ENT.

- f. Enter the Access Level 2 (2AC) password by following the text entry prompts on the LCD.

The default EAC password is BLONDEL, and the default 2AC password is TAIL.

- g. Enter the new MID by following the text entry prompts on the LCD.

The MID is a user-defined text string that is available to the communication protocols. For example, Itron MV-90 communications read the MID or TID strings as one step toward validating the meter.

- h. Repeat *Step g*, except scroll down further to enter new terminal identifier, potential and current transformer ratios, and any other necessary settings.

- i. Press ESC to escape the menu item until the LCD prompts SAVE SETTINGS (Y/N)?

- j. Enter Y to indicate Yes and press ENT.

- k. Press ESC to exit the menu.

NOTE: Instrument ratios have either 1V or 1A base.

- Step 2.** Check the measured voltage quantities.
- a. Press **ENT**, and then activate **MAIN > Meter > Voltage**.
 The meter displays the rms voltage quantities and their scaling.
 - b. Ensure the measured quantities are correct.

Optionally, repeat *Step a* and *Step b*, but check the rms current quantities from the menu item **MAIN > Meter > Current**.

- c. Press **ENT**, and then activate **MAIN > Status**.
- d. Press **DOWN** to scroll down and view the following diagnostic points.
 Device Status (STATUS)
 Firmware Identifier (FID)
 Part Number (PARTNO)
 Power Supply Status (Batt, Temp)
- e. Record the FID string of the device for use in subsequent steps.

Configure and Check Meter Status Through the Front Optical Port, Serial Port, or Ethernet Port

The front optical, serial, and Ethernet ports of the SEL-735 allow fast communications through a secure communications channel from your PC to the SEL-735. Once you have established a communications link, you can use ACSELERATOR QuickSet to configure the meter. Refer to *Section 4: ACSELERATOR QuickSet* for complete details of the features of the software.

For connection to a serial port, complete the following steps.

- Step 1.** Connect the communications cable from your PC to the SEL-735.
- a. For front optical communications, connect the optical probe from your PC to the SEL-735 front optical port.
 Ensure that you have installed drivers properly for the type of optical probe you will be using.
 The following list shows the known compatible optical probes of the SEL-735.
 Abacus Electris A9U, USB (Requires additional software drivers)
 Abacus Electris A7Z
 Abacus Electris A6Z
 ABB Unicom III
 GE SmartCoupler SC-1A
 Microtex Electronics FR3 (Requires additional software drivers)
 P+E Technik K01-USB (Requires additional software drivers)
 uData Net PM500-300
 - b. For serial communications, connect a C234, C272, C287, or equivalent cable from your PC's DB-9 serial port to any SEL-735 EIA-232 serial port.
 Table 2.3 shows the pin functions of serial ports.

Table 2.3 Serial Port Pin Function

EIA-232 Port Pin Number	Pin Function
1	+5 VDC
2	RXD
3	TXD
4	+IRIG-B ^a
5	GND
6	-IRIG-B ^a
7	RTS
8	CTS
9	GND

^a Not available on Port F.

- c. For Ethernet communications, connect a C627 or equivalent Ethernet cable from your PC Ethernet port to the SEL-735 Ethernet port (Port 1).

Step 2. Open ACSELERATOR QuickSet on the PC.

Step 3. Activate the Communication Parameters window through the menu, toolbar, or by pressing <Ctrl+R>. Figure 2.7 shows the ACSELERATOR QuickSet Communication Parameters window.

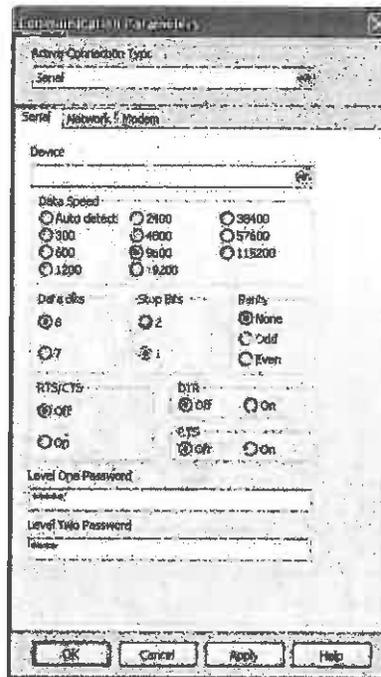


Figure 2.7 ACSELERATOR QuickSet Communication Parameters

Table 2.4 shows the default communications settings and corresponding ACSELERATOR communications settings necessary for initial communications to the device. Use this table for basic communications setup. For advanced

communications such as DNP3, MIRRORING BITS[®] communications, and EIA-485, associated *SEL-735 Instruction Manual* sections provide details.

Table 2.4 Default SEL-735 Settings and Required ACSELERATOR QuickSet Communications Parameters

Communications Connection Type	SEL-735 Setting Name	SEL-735 Default Setting	ACSELERATOR QuickSet Communications Setting Name	ACSELERATOR QuickSet Communications Required Setting
All Communications Protocols and Channels	PAS 1	"OTTER"	Level One Password	"OTTER"
	PAS E	"BLONDEL"	N/A	N/A
	PAS 2	"TAIL"	Level Two Password	"TAIL"
	PAS C	"PAPOULIS"	Calibration Level Password	N/A
All Ports, Port Specific	EPORT	Y	N/A	N/A
	MAXACC	2	N/A	N/A
Front Optical Port (Port F)	PROTO	SEL	Active Connection Type	Serial
	SPEED	9600	Data Speed	9600
	BITS	8	Data Bits	8
	PARITY	N	Parity	None
	STOP	1	Stop Bits	1
	N/A	N/A	RTS/CTS	(see Table 2.5)
	N/A	N/A	DTR	(see Table 2.5)
Serial Ports (EIA-232 Ports 2, 4, or F; Port 3)	COMMINF	232	Active Connection Type	Serial
	PROTO	SEL		
	SPEED	9600	Data Speed	9600
	BITS	8	Data Bits	8
	STOP	0	Stop Bits	0
	PARITY	N	Parity	None
Ethernet Communications (Port 1)	EテルNET	Y	Active Connection Type	Network
			File Transfer Option	Telnet
	IPADDR	192.168.0.2	Host IP Address	192.168.0.2
	TPORT	23	Port Number	23

Each port has an Enable Port (EPORT) setting and a Maximum Access Level (MAXACC) setting specific to that port. The EPORT setting opens or closes all port communication. The MAXACC setting controls the maximum access level allowed on the port.

Table 2.5 shows the necessary ACSELERATOR QuickSet Communication Parameter settings associated with the specific optical probe type. Ensure that you have set these settings properly before attempting to communicate to the meter via optical probes.

Table 2.5 Optical Probe Required Communications Settings

Optical Probe Type	ACSELERATOR QuickSet Communications Setting Name	ACSELERATOR QuickSet Communications Required Setting
Abacus Electris A9U, USB (SEL part #C661)	RTS/CTS	Off
	DTR	Off
	RTS	On
Abacus Electris A7Z, ABB Unicom III, GE SmartCoupler SC-1A	DTR	Off
Microtex Electronics FR3	Data Speed	19200 or slower

- Step 4. Enter the proper ACSELERATOR QuickSet Communication Parameters that correspond to the communications link you have chosen, shown in Table 2.4 and Table 2.5.
- Step 5. Click **Apply**.
- Step 6. Verify that the TXD and RXD indicators flash green and red, indicating transmitted and received communication activity, respectively. These are located in the lower left-hand corner of ACSELERATOR QuickSet, as shown in Figure 2.8.
- Step 7. Verify that the connection status indicates Connected, also shown in Figure 2.8.

The Transmit and Receive indicators only illuminate during communications activity. The connection status shows whether the link is connected or disconnected. The connection details show the communications settings. The terminal protocol shows the protocol that terminal sessions use. Finally, the file transfer protocol shows the protocol of file transfer communications.

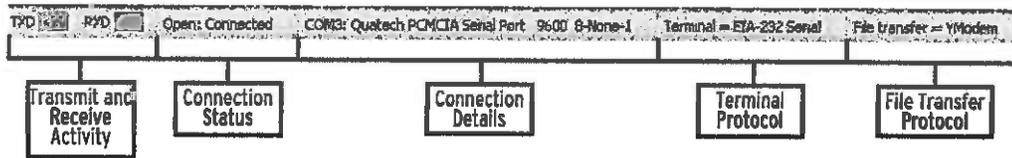
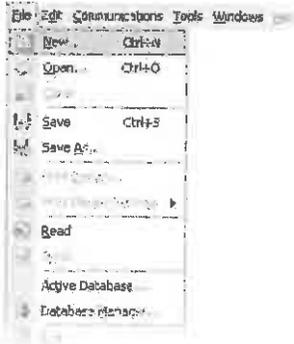


Figure 2.8 ACSELERATOR QuickSet Communications Activity and Status

If the communications fail to connect, please verify operation of the applicable port communications through the front-panel pushbuttons.

- Step 8. Click **OK**.

ACSELERATOR QuickSet is now connected to the SEL-735, and you can use this interface to configure device settings and access all meter data.



Step 9. Complete either *Step 9a* or *Step 9b* to create a new settings file.

a. Create New Settings.

When you create new settings from ACSELERATOR QuickSet, all default settings load into the new device Settings Editor instance. ACSELERATOR QuickSet displays an interactive part number selector, so you can easily choose the correct part number of your SEL-735 Settings Editor instance. By default, ACSELERATOR QuickSet hides the advanced and nonapplicable settings in the new Settings Editor.

- i. Click **File > New** (or **Ctrl+N**).
- ii. Select the correct part number for your device.
- iii. Click **OK**.

Figure 2.9 shows the default options for the SEL-735.

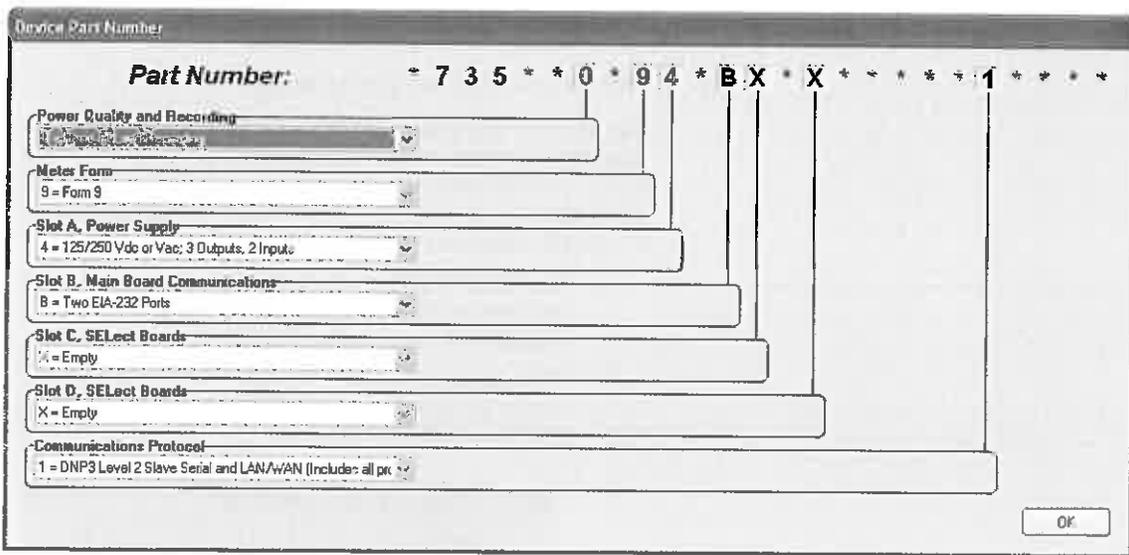


Figure 2.9 SEL-735 Model Option Table

b. Read Settings.

The following steps and ACSELERATOR QuickSet menu/toolbar diagrams show how to read device settings from the SEL-735 and the reading process behavior. SEL recommends you read and save settings before and after each settings change.

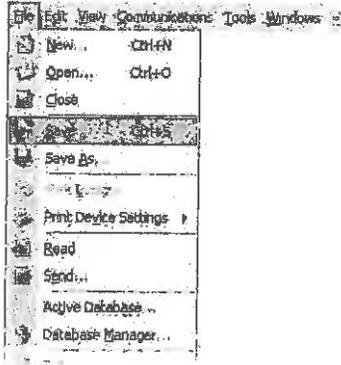
- i. Click **File > Read** (or **Alt+F+R**).
- ii. Click **OK**.

ACSELERATOR QuickSet reads the settings from the SEL-735, and populates the settings into a new Settings Editor instance. Any settings groups that ACSELERATOR QuickSet did not read will open with default values in the Settings Editor. You can then compare old and new settings with each other, and you can have ACSELERATOR QuickSet produce a settings change report. To compare settings, select **Edit > Compare**.



Step 10. Save Settings

The following steps and ACSELERATOR QuickSet menu/toolbar diagrams show how to save device settings to your PC.



- a. Click **File > Save** (or **Ctrl+S**).
- b. Type a new settings name to save the active settings as a new settings file, or select a previously saved settings file to save over the selected file.
- c. Click **OK**, or press **<Enter>**.

ACSELERATOR QuickSet saves the active device settings in the Active Database. The default database is normally stored as C:\Program Files\SEL\acSELERATOR\Quickset\Relay.rdb, but you can also use other databases. Please refer to the Database Manager instructions. You can then compare old and new settings with each other, and have ACSELERATOR QuickSet produce a settings change report. To compare settings, select **Edit > Compare**.

Step 11. Configure Identifier and Scaling Settings

The Identifier and Scaling settings are essential for proper metering operations. These settings define the identifier of your device, the instrument transformer ratios, and the scaling the meter applies to external interfaces. *Figure 2.10* shows the default Identifier and Scaling settings.

- a. Enter the new meter identifier (MID). This is a user-defined text string that is available to communication channels. Allowed characters are A–Z, 0–9, /, and –.
- b. Enter the current transformer ratio (CTR), the neutral current transformer ratio (CTRN), and the potential transformer ratio (PTR).

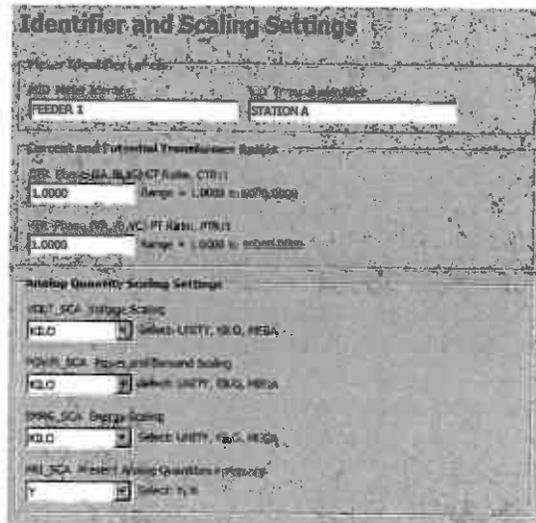


Figure 2.10 Identifier and Scaling Settings

- c. Enter the scale factor for voltage (VOLT_SCA), power (POWR_SCA), and energy (ENRG_SCA) values that the meter applies to the respective analog quantity on all external interfaces. You can also use one of the 1000 available configurable registers to perform custom scaling and formatting of analog quantities.
- d. Configure scale factors (PRI_SCA) to scale all analog quantities in either primary or secondary units. The scale factor applies to all external interfaces.

Step 12. Send Settings

The following steps and ACSELERATOR QuickSet menu/toolbar diagrams explain how to send active device settings to the SEL-735 and the writing process behavior. SEL recommends that you save settings with a unique name before sending them.

- a. Click **Send**.

The Settings Group/Class Select window opens as shown in *Figure 2.11*. ACSELERATOR QuickSet automatically selects any setting groups that have changed since the last read.

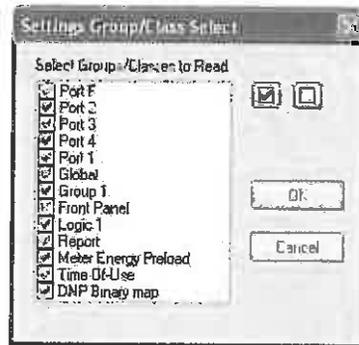
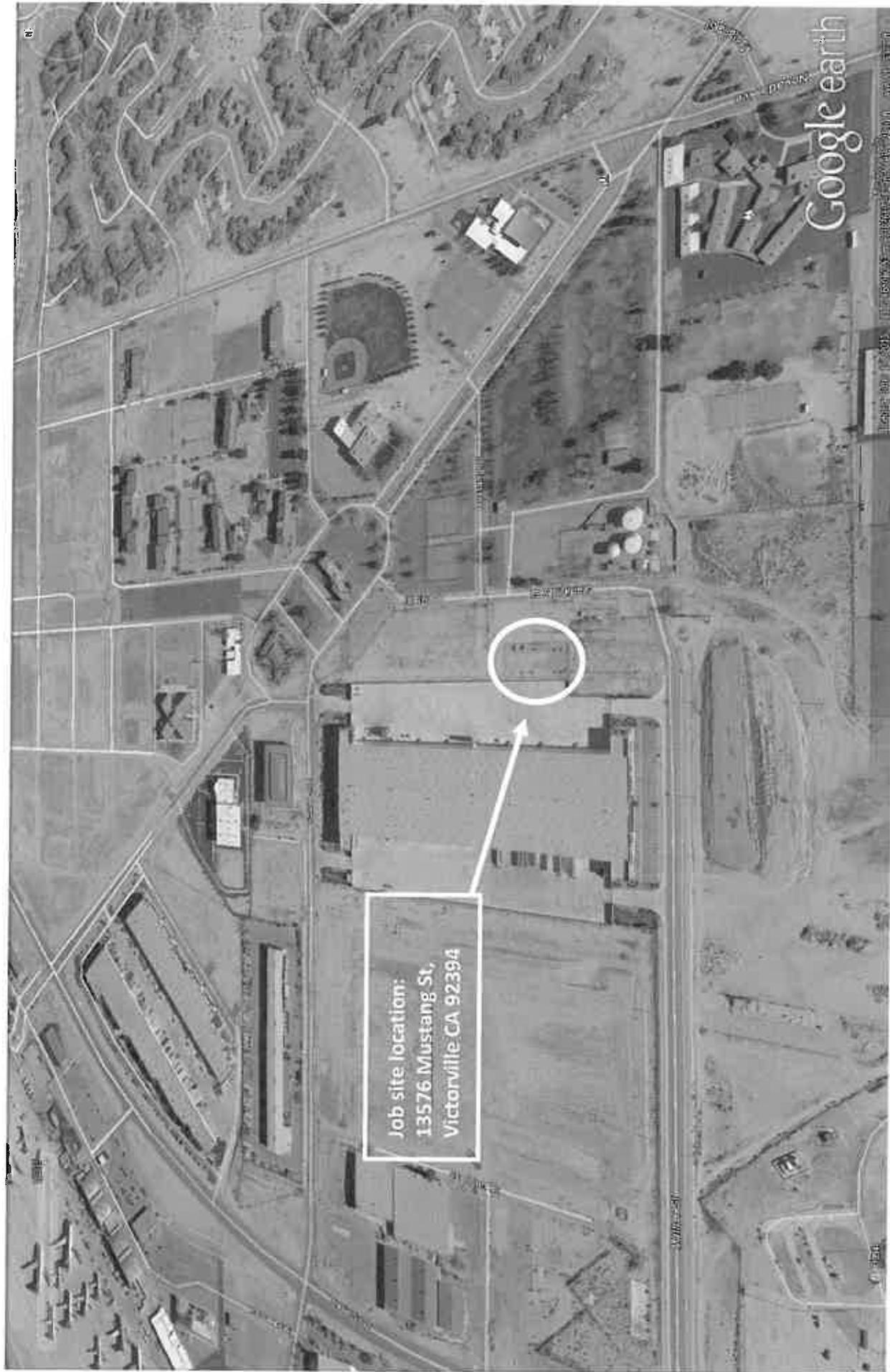


Figure 2.11 Settings Group/Class Select to Send Window

- b. Select or deselect the appropriate group settings.
- c. Click **OK**.

ACSELERATOR QuickSet sends the selected groups to the device.



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