

TECHNICAL SPECIFICATION T-2032 E

VOICE FREQUENCY TELEPROTECTION DEVICE FOR HIGH VOLTAGE POWER TRANSMISSION LINES (150 KV) FOR USE WITH PLC EQUIPMENT

The required VF teleprotection devices must work with PLC equipment and must be suitable for the protection of double circuit HV transmission lines in conjunction with the accounted protection relays.

1. GENERAL CHARACTERISTICS

1. The PLC's, will be of the single side band type (Item 1 of the tender).
2. The operation of the devices must be based on the five frequency shift keying (F6) system and fulfill the following requirement:
 - a. The transmitter should transmit five discrete signals according to the protection relay requirements.
 - b. The highest frequency must be used as a guard signal. This signal will be disconnected and replaced by the TRIP signals as per protection requirements.
 - c. The selection of the TRIP frequency signal is according to the line fault i.e. TRIP A, TRIP B, TRIP C or TRIP D (or TRIP A+ B or TRIP B+C) in order to protect one or two H.V. lines.
 - d. The loss of the guard signal will initiate the trip procedure in conjunction with the presence of the appropriate trip frequency.
3. The guard signal must be constantly monitored and if its level drops below a certain level an ALARM must be set and teleprotection inhibited.
4. If the TRIP signal is applied for more than 0.5 sec an ALARM must be set and teleprotection inhibited.
5. The offered devices must fully comply with the latest regulations and IEC-60834-1 recommendations.

2. CONSTRUCTION

1. The devices should be of the latest technology concerning its design and components.
2. Must be constructed in operational plug in units.
3. Operation indication LEDs and measuring points must be included in the phase of the unit.
4. The device should include an operational supervision system (AUTO TEST) providing for local and remote indications.
This system must not induce any fowls TRIP in any way.
5. The operational supervision system must also include counters for the transmitted and received TRIPs.
6. All wiring must be prefabricated so that no soldering will be required during installation.

7. The device should be suitable for installation in 19’’ cabinets. Dimension and photo’s must be submitted.
8. If the use of PC is required for the configuration of the device or other maintenance works, the necessary software must be offered suitable for Windows operating system (new and old) accompanied by the appropriate interconnection cables. (at least 20 sets).

3. **TECHNICAL CHARACTERISTICS**

3.1 The device must be fully compatible with the PLC equipment (item 1 of the tender).	
3.2 Maximum TRIP delay	≤ 15msec
3.3 Transmission input (TRIP)	Optoisolated with operation voltage 24, 48, 110, 220 VDC.
3.4 Trip output	: MERCURY-WETTED) reed contacts (NO) with surge protection 250 VDC 0,5A or solid state relay.
3.5 Trip duration adjustable	to 200 msec
3.6 Alarm contacts	Two double throw potential free contacts 250VDC 0.6 A
3.7 Operating frequencies must be stated	α) Guard β) Trip-A γ) Trip-B δ) Trip-C ε) Trip-D(or A+B or B+C)
3.8 Power supply	48 VDC – 15% to +20%
3.9 Transmitter interface 3.9.1 Output impedance 3.9.2 Adjustable output levels 3.9.3 Blocking output	600 OHMS balanced -25 to +3 dBm OPTOISOLATOR (30V/20mA)
3.10 Receiver Interface 3.10.1 Input impedance 3.10.2 Adjustable input levels 3.10.3 Alarm Level	600 OHMS balanced -20 to +3 dBm Adjustable to 12 dB below reference
3.11 Operational Temperatures α) Guaranteed operation b) Acceptable operation c) Storage d) Humidity	0°C to + 45° C -10°C to + 55° C -20°C to + 60°C 0 to 90%
3.12 Insulation	2KV rms/50Hz/ 1 min per terminal to ground

4. DOCUMENTS AND DRAWINGS

4.1. Each teleprotection device must be provided with a complete set of technical documentation.

4.2. The provided technical documentation must be in Greek or English. Any other language of technical documentation will not be accepted.

4.3. The technical documents must include the following :

4.3.1. Detailed operational diagrams for each module/unit and a block diagrams showing the interconnection among all the units that consist the teleprotection device.

4.3.2. Initial installation procedures and configuration parameters.

4.3.3. Detailed description of the operation of the device/unit.

4.3.4. Technical information, diagrams-curves, graphical representations of the variables of the operational characteristics of the teleprotection device.

4.3.5. Detailed circuit diagrams and topological drawings for each unit and sub-units.

4.3.6. Detailed list of all used parts, and elements/components used in each unit and sub unit (electrical or electronic elements) constituting each device stating the exact serial production number and the corresponding commercial number.

5. SPARE PARTS

5.1. The complete spare part list should be provided including the relevant serial numbers.

6. WARRANTY

The supplier must provide a warranty of at least two (2) years, starting from the date of equipment delivery.

7. TRAINING

Training of ten (10) technicians must be included in the offer. The training will take place at the IPTO premises. The teleprotection training will take place during the one week offered PLC training.

8. PACKING REQUIREMENTS

8.1. Each device should be delivered packed in a robust paper box suitable to withstand transport hazards, accompanied by its accessories.

8.2. It should be written on each box the type of the device, its serial production number and the number of contract.

9. SAMPLE FOR EVALUATION

The submitted sample should be of the exact type with the offered and should be accompanied with all the relevant type tests and certificates.

10. **INSTRUCTIONS FOR TECHNICAL OFFER FORMAT**

1. The technical offer must be typed in Greek or in English and submitted in two (2) copies.
2. Every offer must be accompanied by the following :
 - 2.1. Complete set of technical manuals of the exact type of equipment offered in accordance with par 4 of technical specification.
 - 2.2. Full compliance list.

In this list must be stated the compliance or non compliance to all relative specification requirements par. by par. Answers must be clear with references to the technical manuals and/ or other documents accompanying the offer.

E.g. : Comply and offered. See technical manual, page, par.....

or : Not comply, but we offer equivalent. See technical manual, page....., par.....
 - 2.3. Equipment composition list stating :
 - 2.3.1. The exact type of the equipment offered.
 - 2.3.2. Complete and analytic composition list of the equipment offered with description and number of units and subunits used, mechanical parts etc. as with their code numbers.

Each set of equipment must be offered complete with all accessories necessary for its independent operation.
 - 2.4. Sample of the equipment offered for technical evaluation.
 - 2.4.1. All bidders within ten (10) working days from the date of acceptance for evaluation should submit to the technical department of IPTO a sample of the exact type of the equipment offered for further technical evaluation, otherwise the offer will be considered as non acceptable.
 - 2.4.2. In case that the offered equipment is identical to previously supplied to IPTO it is not necessary to provide a sample but must state the number of the relevant contract.
 - 2.4.3. The supplied sample will remain with IPTO for at least the duration of the validity of the economic offer.
 - 2.5. List of spare parts offered. In this list all equipment parts (units, subunits etc) and components must be included with description, manufacturers part number and where possible commercial type number.
 - 2.6. Certificates and guaranties as required by specifications.
 - 2.7. The supplier must provide a customer list with company names, addresses, FAX and emails of utility companies where has installed and successful operated.
 - 2.8. If the equipment offered is manufactured under license the relative documents must be supplied.
 - 2.9. Exact and complete photocopy of economic offer without prices and discounts.

3. The following clarifications must be seriously noted :
 - 3.1. Every par. of the specification requirements that has not been answered or has not been answered clearly will be considered as negative answer.
 - 3.2. Any offer not containing all requirements of par. 4 of the technical specifications will be rejected as not technically acceptable.
 - 3.3. The required lists 2.3. and 2.5. above must not include prices otherwise the offer will be rejected. However these lists 2.3. and 2.5. must be included in the economic offer with price break – down. The sum of the break – down prices of the units of the composition list 2.3. must equal the total value of the system offered.
 - 3.4. IPTO reserves the right to decide which spare parts and their quantity that will be included in the final contractual agreement.
The price of the spare parts will not be considered in the economic evaluation of the offers.
 - 3.5. For the award of the contract the following will be seriously considered :
 - 3.5.1. The compliance to the technical and other requirements.
 - 3.5.2. The conduct of the supplier and the quality of the material supplied to IPTO in previous contracts if any.
 - 3.5.3. The delivery time of the requested equipment.