

## SPECIFICATION T-2098 B

### LOW SPEED PROGRAMMABLE MODEMS

**1. GENERAL:**

The required equipment will be used for the transmission of DATA for telemetering, telesignaling, telecontrol etc. through the PLC (power line carrier) network of IPTO. It will be installed in Power Stations, High Voltage Substations and Energy Control Centers.

Modem must be arranged in chassis powered by the existing 48 VDC supply system.

**2. TRANSMISSION SYSTEM:**

Asynchronous through analog voice frequency lines 300-3700 Hz with FSK modulation.

**3. TRANSMISSION LINE:**

Two wire (2w) or four wire (4w) lines of PLCs, cables, leased lines, MUX with characteristic impedance of 600 Ω.

**4. SETTINGS AND SELECTION OF CHANNELS:**

All settings and channel selection must be executed via PC or other suitable way.

All necessary communication software together with required accessories must be provided.

In case a special programming unit is required, twenty (20) programming units must be provided.

**5. REQUIRED CHANNELS:**

Every MODEM unit must be programmable via PC, or other suitable way, in one of the following channels:

Speed (baud)	Bandwidth (Hz)	Nbr and type of channels
50	120	25 ITU-T R.35
100	240	12 ITU-T R.37
200	360	8 ITU-T R.38B
200/300	480	6 ITU-T R.38A
600	960	3 (601-602-603)
1200	1820	1 (701)

**6. LINKS:**

- A. Point to point
- B. Point to multipoint with carrier transmission control

**7. TRANSMISSION/RECEPTION LEVELS:**

Transmission: 0 to - 30 dBm in steps of 1 dB

Reception: 0 to -30 dBm in steps of 1 dB  
min. threshold at - 40 dBm

**8. GPTD CORRECTION:**

Availability of group propagation time distortion correction optional.

**9. CONNECTIONS:**

DTE Interface:

SUB -D25 pins connector (female) RS232 C V.24/V.28  
RTS/CTS: adjustable duration

Line Interface:

SUB -D15 pins connector (female),  
2 or 4 wire, 600 Ω or high impedance.

**10. INDICATIONS:**

LEDs  
State indicating  
Flashing RD/SD  
Flashing TD/RTS  
Fault

**11. FAULT RELAYS:**

Potential free contact NO – NC

**12. TEST POINTS:**

- A. Transmission – reception signals
- B. Availability of REMOTE TEST and LOOP BACK. REMOTE LOOP execution through external contact and/or via PC.

**13. INSTALLATION:**

Installation of the equipments will be performed by IPTO technicians.

**14. ENVIRONMENT:**

Operating temperature: 0 – 50 °C  
Humidity: up to 80% 23 °C

**15. POWER SUPPLY:**

Central 48 VDC.  
Polarity inversion protected.  
Availability of external contact RESET button.

**16. MECHANICAL CHARACTERISTICS:**

European standard rack: 19" unit, 1U Height  
INSULATION IEC 495

**17. TECHNICAL EVALUATION:**

For the purpose of evaluation a sample of the offered equipment must be available to the technical evaluation committee.

**18. TECHNICAL OFFER FORMAT:**

Every offer must be accompanied by the following:

- A. Complete set of Technical documentation.
- B. Compliance list stating the compliance or no compliance with all the relative requirements of the specification.
- C. Full break down list of all offered materials.