



Grid Solutions

TELECOM PRODUCT SOLUTIONS

Gridcom TPHF

High frequency teleprotection

The **Gridcom TPHF** ensures reliable signal transmission to protect the power grid.



A new generation of high frequency teleprotection

The high frequency teleprotection **Gridcom TPHF** provides a reliable, fast, secure and independent communication channel for protection equipment at each end of the power line.

The use of high-voltage power line as a communication medium allows the operator to have full control of his communication medium without paying the high cost of renting a dedicated communication line from a telecom operator.

In case a digital communication medium is available, **Gridcom TPHF** can be optionally equipped with a digital communication interface, electrical or optical, acting as a redundancy to an existing HF channel to improve reliability and transfer time of transmitted orders.

Gridcom TPHF is particularly well suited to equip HV line sections in the power grid where other types of communication are expensive or unavailable.

EASY IMPLEMENTATION

Easy implementation of the **Gridcom TPHF** can be realized on existing or new built facilities. The design of the **Gridcom TPHF** is based on the proven PLC **Gridcom T390** platform, allowing free maintenance during its long operational lifetime.

Tools are available for remote monitoring with the possibility to connect to a network management system such as **Sentinel**.

And, as security access is particularly critical for teleprotection purpose, it is possible to have a password for each piece of **Gridcom TPHF** equipment and the transmission between operator and the equipment can be encrypted (optional).

CUSTOMER BENEFITS

- Fully controlled communication thanks to the use of the power line as support
- Possibility to increase the reliability of the protection scheme by adding a redundant digital link
- Low total cost of use, no maintenance during lifetime of the equipment
- Low spectral space, only 2 kHz necessary bandwidth
- Advanced supervision function supporting TCP/IP, SNMP
- Secure access with passwords and encryption

Gridcom TPHF, a solution to address your operational and financial constraints

SUITABLE FOR MOST CONGESTED FREQUENCY PLANS BINDING

Gridcom TPHF can be used in 2 kHz (1 + 1 kHz) bandwidth to transmit up to two commands thus adapting to the most congested frequency plan. It is also possible to transmit up to three commands of two + 2 kHz in adjacent or separate mode.

Bandwidth and communication frequencies are configurable through HMI, easily adaptable to spectral constraints and applicable emitted power.

NUMEROUS I/O FOR HIGHER FLEXIBILITY

Gridcom TPHF offers eight input contacts and up to 14 output contacts (8 NO / 6 NC) which may be associated to alarms or commands. This allows the user to associate each transmitted order to a desired number of output contacts.

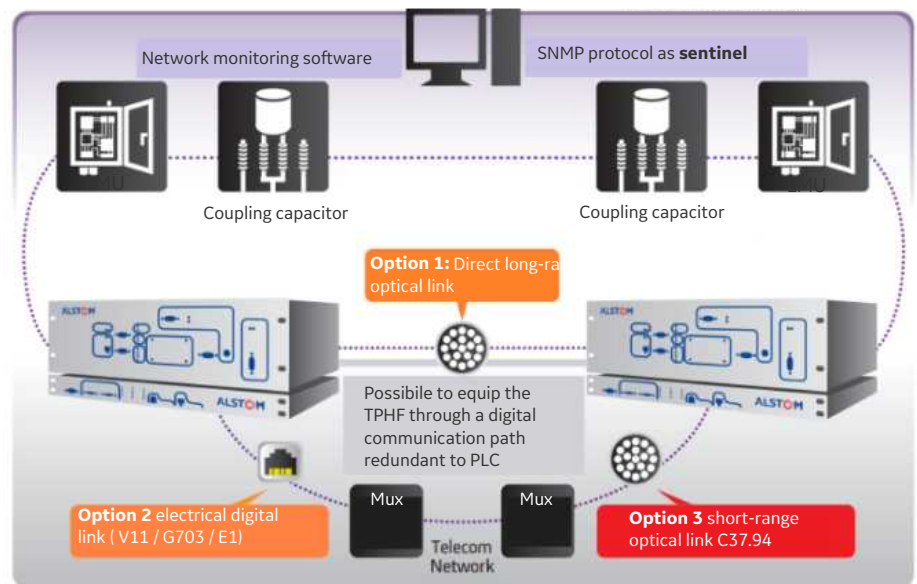
OPTIMISED COMMISSIONING

Gridcom TPHF is fully customer-configurable. Software configuration can be made offline and then downloaded to the *in situ* equipment. Support tools such as forced commands and inputs / outputs and loopback test are available to optimise the performance of the TPHF link and the global protection scheme.

PERFORMANCE : A PROVEN SOLUTION

The use of dual tone coding mode for sending commands with cutoff on guard frequency ensures the best compromise between transfer time, dependability (Pmc) and security (Puc), making it particularly suitable for protection schemes in permissive mode.

Gridcom TPHF offers much better performance than recommended by the international standard IEC 60834.



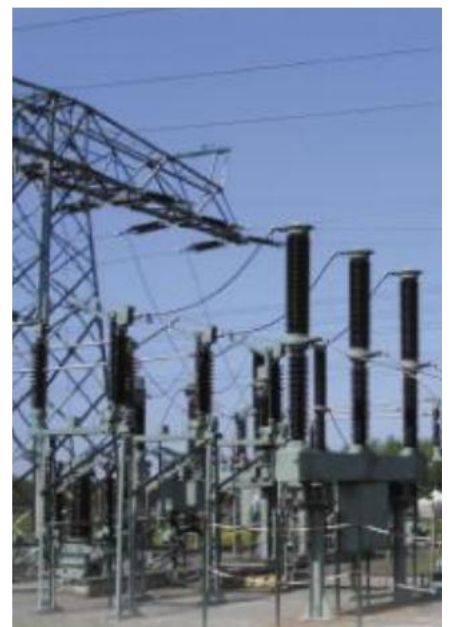
Max 40 or 80 W (option)

A FULL RANGE OF TELECOMMUNICATION SOLUTIONS FOR POWER UTILITIES

- **Gridcom TPHF** offers exceptional reliability and quality of services for teleprotection through power line for simple, reliable and quick installation and configuration.
- **Gridcom TPHF** is part of Grid Solutions' full portfolio dedicated to power grid telecommunications.
- For more than 50 years we've designed, produced and offered a complete range of telecommunication equipment. Anywhere in the world, our Telecom experts, specialised in the power grid, can meet all your telecommunication needs.

TECHNICAL SPECIFICATIONS

- **Power supply** : 48 Vcc nominal (38 to 72 Vcc wide range)
- **Required power**:
 - > 72 W for HF amplifier unit
 - > up to 30 W for Teleprotection unit
- **Temperature range**: from -30°C to 55°C according to IEC 60495 clause 3.1
- **Maximum relative humidity** : 95% at 23°C
- **Storage temperature** : from -40°C to +70°C up to 100% humidity
- **Applicable standards compliant to**
 - > IEC 60834
 - > Insulation & EMC
 - > IEC 60495/ IEC 60950
 - > IEC 61000-6-4 (CISPR11)
 - > IEC 61000-6-2 / 6-5
 - > IEEE C37.90.1/.2/.3
- **MTBF**: 20 years
- **2 Ethernet Interfaces**
 - > 10/100 Mbit with distinct address for configuration and SNMP supervision
- **HF Amplifier unit**
 - > HF frequency range: 24-500 kHz
 - > Transmitted power: from 1 to 40 W (80 W in option)
adjustable via HMI by step of 1 W
 - > Bandwidth spacing Tx and Rx: 1 kHz adjacent, 2 kHz adjacent or separated (min. 4 kHz)
 - > Output impedance: 50, 75, 125 or 150 ohms symmetrical or not
 - > Receiver sensibility:
Absolute: -50 dBm
AGC range: 69 dB (-21 ~48 dB)
- **Teleprotection unit**
 - > Maximum number of simultaneous commands :
 - 1 kHz : 2
 - 2 kHz: up to 3 independant
 - > Coding type : dual tone and guard frequency
 - > Number of input contacts optocoupleur acquisition by tension (24 to 250 Vcc)
 - > Number of output contacts
 - 8 NO + 6 NO/NC High capacity configurable in order to output or alarm matrix allocation
 - > Maximum permanent current 8 A (for 100 Vcc)
 - > Possibility of redundant digital link (electrical or optical) as an option
 - > Performance according to IEC 60834



PERFORMANCE ANALOG MODE

PERFORMANCE ACCORDING TO IEC 60834-1 MODE 2 KHZ, 2 CMDS

	T0 (ms)	Tac (ms) for SNR=6dB	Pmc for BER = 6dB	Puc (Worst case)
Type 2 (Permissive)	15	30	10 ⁻⁴	10 ⁻⁴

Performance according to IEC 60834-1 for mode 1 kHz 2 cmds:

Time delay is increased of around 4ms

Performance according to IEC 60834-1 for mode 2 kHz, 3 cmds :

Time delay is increased of around 1ms

DIMENSIONS AND WEIGHT

- Amplifier unit L x H x W: 483mm: (19") x 134 mm (3U) x 260 mm
- Weight : 9 kg
- Teleprotection unit L x H x W: 483 (19") x 43,6 mm (1U) x 260 mm
- Weight : 3,6 kg

PERFORMANCE DIGITAL MODE (OPTION)

PERFORMANCE ACCORDING TO IEC 60834-1

Protection mode			Blocking	Permissi ve	Direct tripping
Transfer time	64 kbps	4 CMDS	6 ms	7 ms	8 ms
Transfer time	2 Mbps	4 CMDS	<1 ms	<1 ms	<1 ms
Dependability (Pmc) for BER = 1E-3	Pmc = Probability of a missing command (10 ms)		<1E-35	<1E-20	<1E-15
Security (Puc)	(Worst case)		1E-05	1E-13	1 E-20
Recovery time	<8 ms at 64 kBps				

SUPERVISION AND CYBER SECURITY

- TCP / IP network supervision supporting SNMP V2 protocol
- Password and AES128 encryption provides secure access to the equipment

For more information please contact
GE
Grid Solutions

Worldwide Contact Center

Web: www.GEGridSolutions.com/contact
Phone: +44 (0) 1785 250 070
www.GEGridSolutions.com

