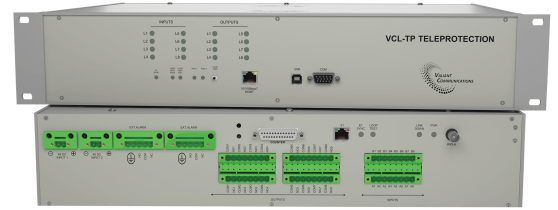# TELEPROTECTION

Description:

VCL-TP, Teleprotection / Digital Tele Protection Coupler (DTPC) / Digital Protection Signalling Equipment (PSE) is an extremely reliable and rugged, sub-station hardened equipment that is designed to operate very reliably even under the most demanding conditions and harsh environments. The VCL-TP, Teleprotection Equipment provides up to 8, 2-way independent "binary command" channels which can be operated selectively; or in a combination; or simultaneously over a diverse range of communication interfaces.

Substation interface options include:

- 8 Binary Commands
- IEC-61850 GOOSE (PSCH1 and PSCH2)

Network / Transmission interface options include:

- E1 (2.048Mbps)
- 1+1, E1 (2.048Mbps), point-to-point transmission links with path protection / route protection with automatic failover
- Dual E1 (2.048Mbps) transmission links transferring 4+4 Binary Commands over E1 links in a point-to-multipoint application
- IEEE C37.94 Optical link
- 1+1 redundant, C37.94 Optical Interface, point-to-point transmission links with path protection / route protection with automatic failover protection
- E1 plus IEEE C37.94 Optical, 1+1 redundant transmission links with path protection / route protection with automatic failover
- Ethernet / IP/MPLS / MPLS-TP (10/100BaseT RJ45; or 100BaseFX Optical) transmission link
- E1 + Ethernet / IP/MPLS / MPLS-TP (10/100BaseT RJ45; or 100BaseFX Optical) transmission link with path protection / route protection
- E1 plus IEEE C37.94 Optical plus Ethernet / IP/MPLS / MPLS-TP (1+N redundant transmission) links
- IEC 61850 GOOSE Over Ethernet / IP/MPLS / MPLS-TP
- Binary Plus IEC-61850 GOOSE (10/100BaseT RJ45; or 100BaseFX Optical)

E1

C37.94

IEC-61850 GOOSE

IP/MPLS-TP

Command Transfer Time (including relay operating time)

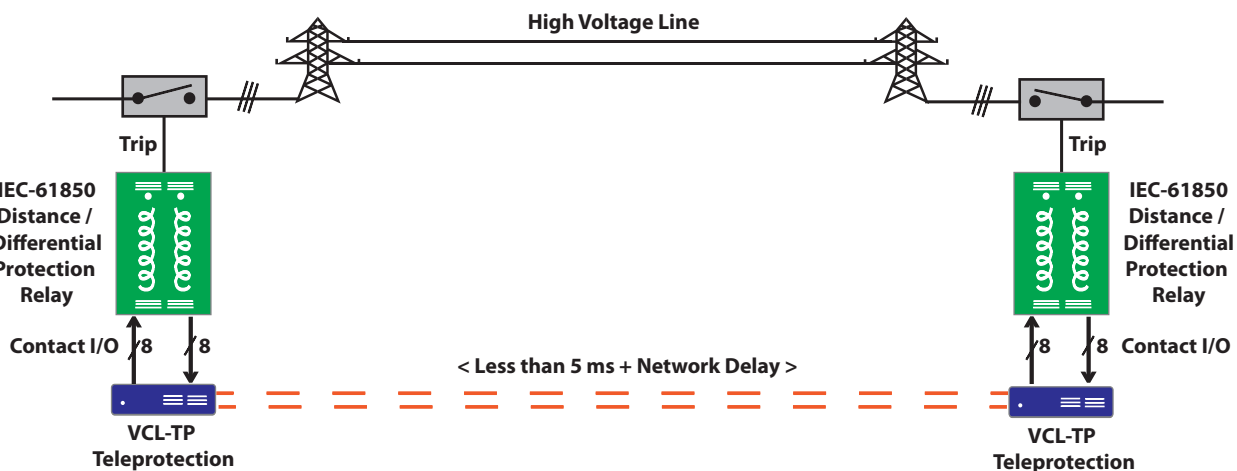| Interface Type	Command Transfer Time	Relay Operating Time	Total Command Transfer Time
E1 (2.048 Mbps)	<2ms	<3ms	<5ms
E1 plus E1 (1+1 redundant)	<2ms	<3ms	<5ms
IEEE C37.94 Optical	<2ms	<3ms	<5ms
C37.94 plus C37.94 (1+1 redundant)	< 2ms	<3ms	<5ms
E1 (2.048Mbps) plus IEEE C37.94 (1+1)	<2ms	<3ms	<5ms
Ethernet / IP/MPLS / MPLS-TP	<2ms	<3ms	<5ms
E1 + Ethernet / IP/MPLS / MPLS-TP	<2ms	<3ms	<5ms
E1 + IEEE C37.94 + Ethernet / IP/MPLS / MPLS-TP	<2ms	<3ms	<5ms
IEC 61850 GOOSE Over Ethernet / IP/MPLS / MPLS-TP	<3ms	-	<3ms
Binary Plus IEC-61850 GOOSE Interface over E1 / IEEE C37.94 / Ethernet / IP/MPLS / MPLS-TP	<2ms	<3ms	<5ms

Additional Features:

- Bi-directional transmission of 8 Binary Command Inputs and 8 Binary Command Outputs
- User programmable to support "Direct Tripping", "Permissive Tripping" and "Blocking" Protection Schemes. Default "Direct Tripping".
- Uses standard IEEE C37.94 protocol and coding for error resistant transmission
- Meets IEC-60834-1 specifications for dependability and reliability
- 1+1 Power Supply Options. 48V DC, 110V DC, 220V DC and 250V DC Input Power Supply Options
- Available with 48V DC, 110V DC, 220V DC and 250V DC command and switching voltage options
- Optional 8 Input and 8 Output Trip Counter Display with 8 user assignable external relay alarm outputs
- IRIG-B / NTP time synchronization options to synchronize the equipment time with an external IRIG-B or NTP source for accurate event time-stamping.
- SNMPv2 / SNMPv3 Monitoring and NMS
- **Smart Grid Ready:**
    - Sub-station Interfaces: Binary Commands, or may be directly interfaced to IEC-61850 Protection Relays using GOOSE messages (PSCH.1 and PSCH.2)
    - Network Interfaces: E1, IEEE C37.94, Optical and IP/MPLS / MPLS-TP Interface Options
- Centralized NMS option for remote monitoring and management of more than 1000 units from central site over an IP network.
- Assignable user assigned access levels for configuration and monitoring
- Secure password control
- Encrypted Password Protection
- Maintains logs of all successful and un-successful access attempts
- Generates SNMP Trap to alert the network administrator in the event of 3 un-successful access attempts.
- User programmable "Input" Command sampling time and "Output" Command holding time:
    - Input Sampling Time - Sets the "Sampling Time" of the INPUT Pulse.
    - Output Command holding time is the Relay Deactivation Time which sets the duration of the OUTPUT Pulse.
- Complies with all relevant Teleprotection Standards and Regulatory Compliances.

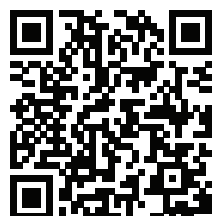## Optional - Trip Counter Display Panel and Alarm Extension Unit:

- The Trip Counter Display Panel and Alarm Extension Unit can be installed in conjunction with the Teleprotection unit to display the count of the "Trip Input Sense" and "Trip Output Initiate" events and to obtain and extend additional alarm outputs to the Sub-Station "Alarm Annunciator" panel.
- 16, (8 Inputs and 8 Outputs) Trip Counter Display Panel to display the count of the "Trip Input Sense" and "Trip Output Initiate" events
- Additionally provides 8 user configurable external dry contact alarm outputs to extend up to 8, separate user assignable alarms
- Each alarm output can be individually assigned to any type of event, including failure of Transmission Link, PSU Failure Alarm, Trip Input Sense / Trip Output Initiate Commands.

Typical Point-To-Point Application

VCL-TP