VCL-TP, Teleprotection over IP/MPLS, MPLS-TP

Product Overview:

VCL-TP, Teleprotection over IP/MPLS Equipment is an extremely reliable product that offers up to 8 independent Binary Command Input and 8 independent Binary Command Output channels which can be operated selectively, or simultaneously over Ethernet / IP / MPLS-IP and MPLS-TP transmission links. The VCL-TP, Teleprotection over Ethernet/ IP/ MPLS equipment offers both, 10/100BaseT (Electric al) and 100BaseFX (Optical) Ethernet transmission interface options.

VCL-TP, Teleprotection over IP/MPLS equipment may be used in standalone point-to-point applications over Ethernet / IP/ MPLS, MPLS-TP links, or over an Ethernet over SDH (EoS) network.

VCL-TP, Teleprotection over IP/MPLS equipment may be used independently in a standalone point-to-point application over Ethernet / IP/ MPLS, MPLS-TP links, or over an Ethernet over SDH (EoS) network.

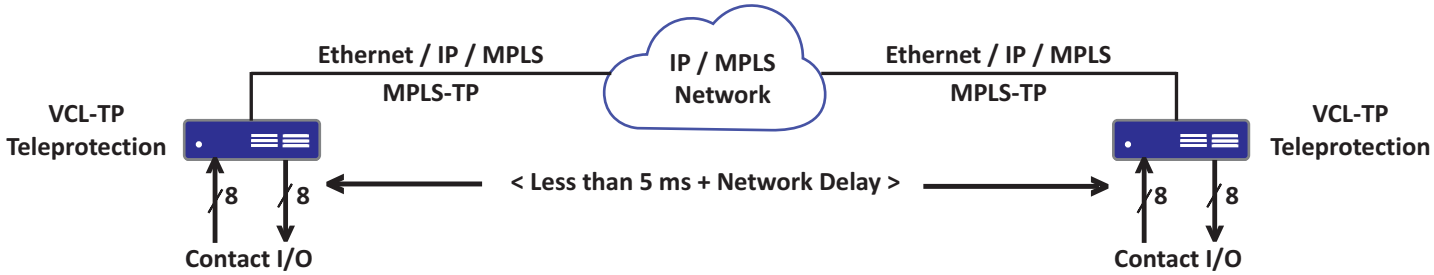
The "Trip Counter Display" shows the total number of "Trip Input / Trip Receive" and "Trip Output / Trip Send" commands on each of the 8 Teleprotection channels, individually. A manual display counter reset option is also provided which may be enabled or disabled by the system administrator.

Trip Counter Display and Alarm Extension Unit is designed as an optional extension of the Teleprotection Equipment to provide 8 Channel, Digital Trip Counter Display along with 8 External Relay Alarm outputs.

The Trip Counter Display and Alarm Extension Unit may be powered from a 48V DC, 110V DC, 220V DC or 250V DC power source. 1+1 Redundant Power is also offered as an option.

Application Diagram:

Teleprotection over IP/MPLS / MPLS-TP Network



Transmission interface provides both, Ethernet/ IP/ MPLS, 10/100BaseT (Electrical) and 100BaseFX (Optical) Ethernet transmission interface options.

Features and Benefits:

- Unrivaled Speed, Security and Reliability
- Use in Point-To-Point Applications over an Ethernet/IP/ MPLS, or over an MPLS-TP transmission links
- Use in Point-To-Point Applications in Ethernet over SDH network
- Compact, standard 19-Inch Rack-mountable chassis
- Bi-directional Transmission of 8 command Inputs and 8 command outputs
- 8 Channel "Trip Counter Display"
- Full Duplex Operation, Automatic loop test facility
- User programmable for Direct Tripping, Permissive Tripping and Blocking Protection (Distance Teleprotection) Schemes
- IP/MPLS Network Interface to provide "Distance Protection" over Ethernet /IP/MPLS-IP and MPLS-TP transmission links.
- Compliant with IEC 60834-1 and all applicable sections of IEC 60834-2 standards
- SNMPv2 and SNMPv3 protocol for remote monitoring
- Available in 24V DC, 48V DC, 110V DC, 220V DC, 250V DC, 110V AC and 220V AC powered configurations.

Performance:

- Less than 2ms back-to-back transmission time and less than 3ms relay operating time. Typically, less than 5ms back-to-back command transfer time (including relay operating time).

Flexibility and User Programmability:

- User programmable command holding delay for error resistant command inputs
- User programmable command sampling rate for error resistant command transmission

Network Port Specifications

Command Transmission Time	< 2ms
Relay Operating Time	< 3ms
Back to Back Command Transfer Time (which includes command transmission time and relay operating time)	< 5ms

Maintenance

- **Manual Loop Test:** This feature initiates a "Manual Loop-Test" which verifies the integrity of the transmission link between the "Local" Teleprotection Terminal and the "Remote" Teleprotection Terminal.
- **Automatic Loop Test:** The Automatic Link Test feature automatically initiates "Periodic Loop Tests" at user programmed intervals to check the integrity of the transmission link between the "Local" Teleprotection Terminal and the "Remote" Teleprotection Terminal.
- **Delay Measurement:** This feature automatically initiates an end-to-end "Delay Measurement Test" between the "Local" and the "Remote" Teleprotection Terminal through the interconnecting transmission link.

Event and Alarm Logging

- Time-Stamped Alarm Logging
- Time-Stamped Event Logging
- NTP time synchronization option to synchronize time-stamps with NTP Server
- IEEE-1588v2 time synchronization option to synchronize time-stamps with PTP Grandmaster.

Management and Monitoring

- RS232 serial, USB serial interfaces for local terminal access
- 10/100BaseT Ethernet Interface for remote access over an IP network
- Encrypted Password Protection
- Telnet - Remote access over IP links
- SSH - Secured remote access using Secure Shell Protocol over IP links
- Graphical User (GUI) Interface
- SNMP Traps and NMS for real time remote monitoring and management over an IP network
- Automatic Link Test feature – link testing at user programmable periodical intervals
- Visual I/O status – LED Display
- Dry contact external alarm relay to connect an external alarm on an annunciator panel, which can be wired up for either NO or NC condition.

Reliability

- Advanced Communication Protocols to ensure reliable transmission of commands
- Power Supply Immunity to withstand impulse surges and transients of up to 10,000 Volts
- High Quality Relays – withstands voltage 10 kV between coil and contacts (1.2 × 50 µbs)
- 2.5kV RMS - Contact Input / Output Hi-port dielectric strength
- Maximum Switching Voltage: 400V AC or 300V DC
- Optoisolated Command Inputs
- Optoisolated Relay Outputs
- Relays compliant with IEC-255-0-20 / VDE 0435, 0631, 0700, 40013847 standards
- Relays - Mechanical: 10,000,000 operations min. (at 18,000 operations/hour).

Error Detection and Coding

- Link Loss Detection
- LOS (Loss of Signal) Detection
- Block Command Encoding.

Technical Specifications:

IP / MPLS Network Interface:

Number of Interfaces	1
Conformity	IEEE 802.3
Interface(s)	10/100baseT (Electrical Ethernet) - RJ45 100BaseFX Optical Ethernet – SFP
Bandwidth requirement	Less than 1 Mbps

Command Voltage Options:

48V DC	110V DC	220V DC	250V DC

Teleprotection Inputs Commands

Command	48V DC, 110V DC, 220V DC, 250V DC
Minimum Operating Command Voltage	41V DC, 75V DC, 172V DC, 172V DC
Maximum Operating Command Voltage	72V DC, 140V DC, 290V DC, 290V DC
Sense Off	<25V DC,<60V DC,<140V DC,<140V DC
Consumption on a digital input (W)	≤ 5mA @ 48V DC; < 0.24W ≤ 5mA @ 110V DC; < 0.55W ≤ 5mA @ 220V DC; < 1.1W ≤ 5mA @ 250V DC; < 1.25W

Teleprotection Outputs Commands:

Maximum Switching Voltage	400V AC or 300V DC
Closing Ability (W/VA)	91W / 1,000VA
Short time current (0.5 sec.)	20A
Crossing a continuous-current (A)	5A
Maximum breaking current at 220V DC	8A
Surge protection arrestor module	Built-in / Integrated, MOV Protected @ > 350 V DC

Number of Commands:

Number of Input Commands	8	Type - Binary
Number of Output Commands	8	Type - Potential Free

Input / Output Commands Combination Options:

off	When all 8 inputs are independent
and	When two adjacent inputs are used logically, "and-ed"
or	When two adjacent inputs are used logically, "or-ed"

Time Clock:

- Built-in real time clock (RTC).
- NTP and IEEE-1588v2 Time synchronization options.

Operations and Maintenance Interfaces:

- RS232 serial interface for local terminal access
- USB serial interfaces for local terminal access
- 10/100BaseT Ethernet Interface for remote access over an IP network.

Configuration and Access Command Language:

- Command Line Interface (English text commands).

Transmission Standards and Compliances:

- Laser: Class I (for Single-Mode Optical Interface) - Eye-safe as per EN 60825-1 specifications
- Ethernet: As per IEEE 802.3 specifications

Teleprotection Standards and Compliances

- IEC 60834-1 and IEC 60834-2 (Teleprotection Command Systems)

Power Supply Options:

- 24V DC, range 18V DC ~ 32V DC
- 48V DC, range 36V DC ~ 70V DC
- 110V DC / 125V DC, range 80V DC ~ 140V DC
- 220V DC / 250V DC, range 80V DC ~ 300V DC
- 110V AC / 220V AC, range 80V AC ~ 264V AC
- Voltage Withstand: Meets and exceeds IEC 834-1 and IEC 255 requirements
- Dual / redundant power supply inputs and power supplies are also offered as an option
- Short circuit protection
- Reverse power input protection.

Power Consumption:

- < 24 Watts.

EMI, EMC, Surge Withstand and other Compliances

EN 50081-2	EN 50082-2	IEC 60068-2-29
IEC 61000-4-6 (Conducted Immunity)	IEC 60068-2-6	IEC 60068-2-2
IEC 60068-2-78	IEC 60068-2-1	IEC 60068-2-14
CISPR 32 / EN55032 Class B (Conducted Emission and Radiated Emission)		
IS 9000 (Part II Sec. 1-4, Part III Sec. 1-5, Part IV, Part 14 Sec. 1-3)		
IEC 60870-2-1	IEC 61000-4-5	IEC 61000-4-12
IEC 61000-4-3 (Radiated Immunity)	IEC 61000-4-8, IEC 60068-2-30	IEC 61000-4-16
IEC 61000-4-2	IEC 61000-4-10	Telcordia
IEC 61000-4-4	IEC 61000-4-11	GR-1089 Surge and Power Contact

- ESD, Voltage and Surge Withstand: Meets and exceeds IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-5, Level 4 specifications.
- Immunity to Voltage Dips, Short Power Supply Interruptions and Voltage Variations meets and exceeds IEC 61000-4-11, Level 1 specifications.

Other Regulatory Compliances:

- CE
- Complies with FCC Part 68 and EMC FCC Part 15

Compliance / Regulatory

- RoHS
- Meets CE requirements
- Complies to IEEE and IEC standards
- Complies with FCC Part 68 and EMC FCC Part 15 and CISPR 22 Class B
- Operation ETS 300 019 Class 3.2
- Storage ETS 300 019 Class 1.2
- Transportation ETS 300 019 Class 2.3

Electromagnetic Standards Compliance

- EN 50081-2, EN 50082-2
- IEC 61000-6-2 (immunity)
- IEC 610000-6-4 (emission)

Environmental

Operating Temperature	-20°C to +60°C
Maximum Operating Humidity	95% R.H., Non-Condensing
Maximum Operating Altitude	Up to 3,000 meters above sea Level
Operation	Complies with ETS 300 019 Class 3.2
Storage Temperature	-40C to +70C
Storage	Complies with ETS 300 019 Class 1.2
Maximum Storage Humidity	98% R.H., Non-Condensing
Maximum Storage Altitude	Up to 3,000 meters above sea level
Transportation	Complies with ETS 300 019 Class 2.3

Physical Dimensions

Dimensions	Teleprotection Unit	Trip Counter Display
Rack mounting	Standard 19-Inch. DIN Rack	
Height	88 mm / 133mm – standard 2U high	88 mm. standard 2U high
Depth	340 mm.	240 mm
Width	482 mm.	482 mm
Weight	4.2 kg	3.6 kg

Ordering Information
BASE UNIT without Network Interface and PSUs

Part #:	Description:

VCL-TP-1531 -2715-2154	VCL-TeleProtection over IP/MPLS equipment
	19-Inch, Rack mountable
	Supports:
	- Upto 8, 2-way independent-simultaneous command channels which may be configured to operate selectively or simultaneously over Optical / IP / MPLS Transmission Link / Ethernet over SDH network(s)
	- IP / MPLS Interface
	  - 1 x 10/100BaseT Electrical Ethernet Port [RJ45 (F)]
	  - 1 x 100BaseFX Optical Ethernet Port [without SFP]
	- OAM [SNMP, Telnet (RJ45 Port) and Serial Port (USB and DB-9 COM Port)]
	- NTP / 1588 PTP Time synchronization
	- Graphical User Interface (GUI) and Installation kit

[# Select / Specify Command Voltage]	
[# Add Trip Counter Display (optional)]	
[# Add Power Supply]	

Specify Command Voltage (Any One Option)

Part #	Description
CV024048	Command Voltages : 16-24V DC / 38-48V DC
CV048110	Command Voltages : 38-48V DC / 110V-125V DC
Cv110220	Command Voltages : 110-125V DC / 220-250V DC

Ordering Information

Select SFP Option from below (Maximum 1 SFP per UNIT for 1569 & 2 SFPs per UNIT for 1569R ONLY)

Part #	Description
VCL-EMOD 0469-TP	SFP Transceiver, Duplex LC, 14dB, 820nm, 1 Mile / 2Km, MM (Multi-Mode)
VCL-EMOD 0294-TP	SFP Transceiver, Duplex LC, 14dB, 1310nm, 1 Mile / 2Km, MM (Multi-Mode)
VCL-EMOD 0193-TP	SFP Transceiver, Duplex LC, 13dB, 1310nm, 9 Miles / 15Km, SM (Single-Mode)
VCL-EMOD 0194TP	SFP Transceiver, Duplex LC, 29dB, 1310nm, 25 Miles / 40Km, SM (Single-Mode)
VCL-EMOD 0348-TP	SFP Transceiver, Duplex LC, 29dB, 1550nm, 25 Miles / 40Km, SM (Single-Mode)
VCL-EMOD 0217-TP	SFP Transceiver, Duplex LC, 29dB, 1550nm, 49 Miles / 80Km, SM (Single-Mode)
VCL-EMOD 0402-TP	SFP Transceiver, Duplex LC, 37dB, 1550nm, 99 Miles / 160Km, SM (Single-Mode)

Add VCL-TP external feed-through terminal block panel optional, if required (External feed-through terminal block panel)

Part #	Description
VCL-HTER 1030-60IO	VCL-TP external feed-through Knife disconnect Terminal Block (TB) 60-I/O (2 x input and 2 x output) 19" 2U High Rack Mount Version
VCL-HRNS 1294-08-01.00M	8-Point, Feed-through Cable (8PINF/RA/Screw Flange to open, 1 meter) [4 cables required to order]
VCL-HRNS 1294-04-01.00M	4-Point, Feed-through Cable (8PINF/RA/Screw Flange to open, 1 meter) [2 cables required to order]
VCL-HRNS 1294-03-01.00M	3-Point, Feed-through Cable (5PINF/RA to open, 1 meter) [2 cables required to order]

Add Trip Counter Display – Optional (External Trip Counter Display)

Part #	Description
VCL-DISP-1599 -1597-08	Trip Counter Display / Alarm Extension Unit - 16 x Trip (8 Input and 8 Output) Counter Display - 8 x User Assignable External Relay Alarm Outputs - 19-Inch, 2U High Rack mountable

Add Power Supply Option (Any One Option)

Part #	Description
AC220	1 x 110~240V AC Power Supply Input
AC220R	2 x 110~240V AC Power Supply Input [Redundant]
DC048	1 x 48V DC Power Supply Input
DC110	1 x 110V~125V DC Power Supply Input
DC220	1 x 110V~250V DC Power Supply Input
DC048R	2 x 48V DC Power Supply Input [Redundant]
DC110R	2 x 110V~125V DC Power Supply Input [Redundant]
DC220R	2 x 110V~250V DC Power Supply Input [Redundant]

Note 1: The Trip Counter Display and Alarm Extension Unit is an optional extra unit which interconnects with the main Teleprotection unit through an interconnecting cable (supplied with the Trip Counter Display and Alarm Extension Unit).

Note 2: The Trip Counter Display and Alarm Extension Unit may, or may not be ordered with the Teleprotection Equipment, depending upon the user requirements.

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