Yellow Protects
Pipeline Protection


**Total Package for Pipeline Protection**

In order to protect CCP systems against the effects of lightning strokes and overloads by induced ac currents it is necessary to provide an effective protection. This is possible by installing a PP BCD TNS 25/100 at the ac power supply side of the CCPS and an EnerPro 65V/12A-Tr plus a DataPro2x1RLC/50V-Tr on the dc side.

The pipeline has to be divided into sections by applying insulating flanges (joints) or insulating parts at pipelines with a narrow diameter. These sections limit the range of influence of the CCPS.

In case of a lightning stroke to the area, the insulating flange has to be bridged to prevent a potential difference that may result in an electrical flashover and, thus, damage to the inside or outside pipeline insulation. This equipotential bonding is achieved by applying special lightning current resistant, hermetically sealed high-performance isolating spark gaps (100 kA, 10/350 µs) filled with rare gas. Their fail-safe behaviour impedes mechanical damage at overloads.

Pipelines that transport hazardous mediums like natural gas and run in a duct above or below ground have to be protected with ATEX-certified spark gaps with a low sparkover voltage (70 V ac / 100 V dc) and fail-safe function. In case of direct-buried pipelines no ATEX certification of the isolation spark gap is necessary. Hence, the waterproof isolation spark gap SGO 70/100 QA is the preferred choice.

Due to the bridged insulating flanges the pipeline, at a lightning stroke, acts like an earthing conductor. At certain distances an earthing point has to be set up, either at a pumping station or between them. In the latter case two isolation spark gaps are mandatory at the insulating flange, as mentioned above.

If the pipeline runs in parallel with overhead lines or ac cable systems, alternating currents are induced in the pipeline impeding the proper function of the CCPS and causing ac cathodic corrosion. The ac current diverter PLPro 40A-iV prevents this by diverting the induced alternating currents to ground while blocking the direct currents of the CCPS. Therefore, the CCPS continues to stay in effect.

The PLPro 40A-iV is effectively and steadily protected against direct lightning strokes by an isolation spark gap TSF 100 (or TC 100 A in hazardous areas) with 100 kA (10/350 µs). An integrated current transformer measures the diverted alternating current. An HF filter, included as well, ensures an efficient operation and blocks the 10 kHz detection signal of HF leakage detectors. The amply dimensioned long-life power capacitors are additionally protected by fine-protection diodes.

Buried natural gas pipelines as well as drinking-water pipeline are protected with CCP systems.

Leutron makes sure that cathodic corrosion protection systems work properly and, thus, corrosion is given no chance.
Features of PLPro…A:
• Maintenance-free
• Integrated lightning and surge current protection for up to 100 kA (10/350 µs)
• High discharge currents, can be connected in parallel to increase capacity
• Safety switch for discharging the capacitors
• Does not have to be disconnected during leakage detection with HF detector (10 kHz)
• Can be mounted in a weather-proof outdoor cabinet or box without further protection measures
• Built-in measuring circuit with analogue display for ac discharge current
• No danger for operating personnel

In general, PLPro…A consists of five components:
1. AC discharge unit, consisting of high-performance capacities (2 pieces per 40 A)
2. Surge protection device (fine protection) for the capacitors
3. Measurement of the discharge current 100/1 A, AC current transformer, indicating instrument (on request)
4. 10 kHz band-elimination filter which prevents the diversion of the 10 kHz search frequency of the leakage detectors against earth
5. Lightning protection (coarse protection) by rare-gas-filled isolating spark gap 100 kA (10/350 µs) with low sparkover voltage
References of Swissgas, Zurich/Switzerland

Natural gas pipeline Rhonetal, section „Obergesteln-Visp“, pipe diameter 14“, PLPro AC-Diverter “Lax”
The PLPro AC-Diverter is installed in a free standing over ground mounted metal enclosure, together with the CCP Measuring point (AC- / DC measuring probe).
As earthing system for the AC-Diverter the earth cable of the “Gotthard-Matterhorn” railway system is used. The Diverter is diverting AC-currents in the range of 16 2/3 Hz and 50 Hz.
The max. continuous AC-current flow capability on this application with 2 capacitors is 40 A.
This PLPro AC-Diverter can manually be switched on and off.
Since middle of 1997 till now the PLPro AC-Diverter is working without any failures.
R. FASLER, JULY 2004

Natural gas pipeline Rhone-valley, section „Obergesteln - Visp“, pipe diameter 14“, PLPro AC-Diverter “Massaboden”
“The PLPro AC-Diverter is installed in a concrete cabinet in which previously two KIRK-cells (polarization cell) of type K-25 were built in.
The PLPro AC-Diverter is directly connected with the earthing system of the electric power station “Massaboden” (it produces the required electrical energy for the AC-railway system) and diverts mainly AC-railway currents (16 2/3 Hz) to earth. The max. continuous AC-current flow capability on this application with eight capacitors is 160 A.
This PLPro AC-Diverter can be manually be switched on and off.
Since middle of 1995 till now the PLPro AC-Diverter is working without any failures.
R. FASLER, JULY 2004

Natural gas pipeline Rhone-valley, section “Obergesteln – Visp“, pipe diameter 14“, PLPro AC-Diverter “Naters-East (Kelchbach)”
The PLPro AC-Diverter is installed in a metal enclosure, together with the measuring and control system of the gate valve station.
The PLPro AC-Diverter is directly connected to an iron earth band of low Ω resistance and diverts mainly AC-railway current (16 2/3 Hz) to earth. The max. continuous AC-current flow capability on this application with four capacitors is 80 A.
This PLPro AC-Diverter can be switched on and off by frequency remote control after the SWISSGAS-dispatching. Additionally the diverted AC-current is converted over a current transformer and current/voltage converter to a signal which can be transmitted to central control station for registration.
Since beginning of 1999 till now the PLPro AC-Diverter in “Naters-East” is working without any failures.
R. FASLER, JULY 2004

Reference of V&C Kathodischer Korrosionsschutz Ges.m.b.H, Austria
[...]
“For many years we have been using your product LEUTRON PLPro….., to divert alternating currents to ground. The CCPS plants which have been installed with it so far work reliably and we are not aware of any client complaints.
Also your ATEX certified spark gaps TC 100 A of which we use many in our CCPS plants on insulation flanges, have secured us many satisfied clients so far. Up to today not one single failure or malfunction has been recorded.”
[...]
ALFRED NOLZ AND WALTER PLAG, MAY 2006

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