

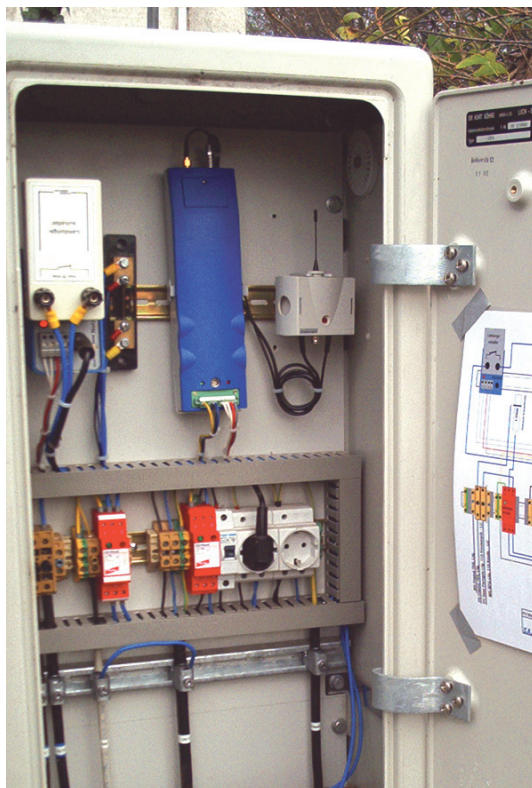
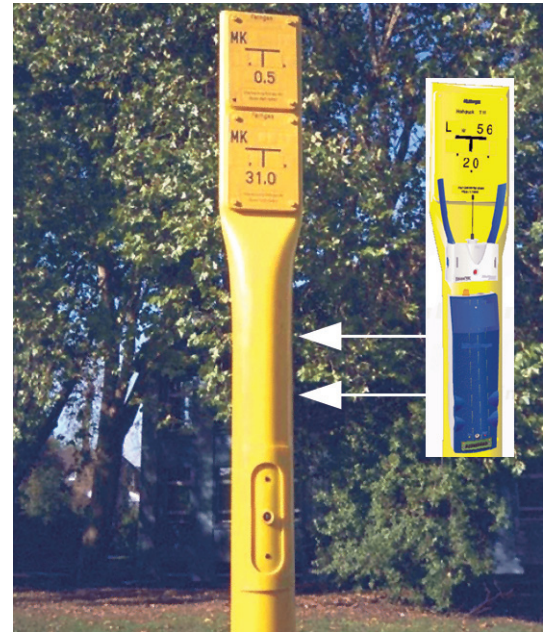
### **Mains-independent Remote Test Point Monitoring**

Remote monitoring of cathodic protection systems is only economically feasible if installed at test points and rectifier stations, too, thus reducing amount of time and labour otherwise required for regular manual monitoring of test points and rectifier stations.

MiniTrans has been specially designed for automated wireless remote monitoring of cathodic protection systems to monitor such values like on- and off-potentials, AC voltages, currents and microvolts.

Introduction of low-energy hardware and latest GSM radio technology allows 3 years of daily measurements and monitoring operations without battery change.

Depending on the frequency of connections a transmission rate of monthly 50 - 500 MB will arise.



### **Mains-Supplied Remote Monitoring of Rectifier Systems**

Trouble-free and reliable operation of cathodic protection systems depended hitherto on regular and manual supervision of functions and monitoring of rectifier voltages and rectifier currents of cathodic protection stations.

By introducing MiniTrans remote monitoring of protection systems, manual maintenance will be reduced to a minimum. Mains-supplied and wireless-operated MiniTrans monitors and controls rectifier voltages and currents, as well as on- and off-potentials of your cathodic protection system.

Rapid detection of a breakdown of protection systems as well as rectifier problems even in cases of mains failures is being ensured by MiniTrans remote monitoring system built-in back-up battery.

### **Switching of Rectifiers for Maintenance and Intensive Measurements**

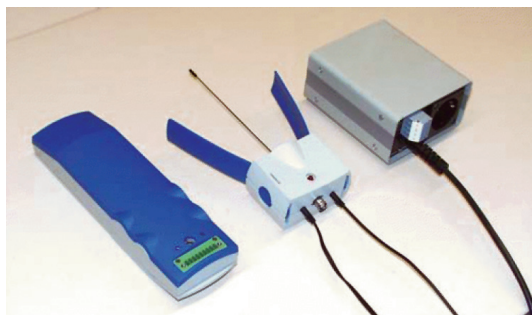
The installation of MiniTrans wireless sensors in rectifiers stations eliminates the hitherto time-consuming, but indispensable temporary installation of timer switches, required for maintenance and intensive measurements.

Activation of rectifier switching as well as selection of switching cycles of single or groups of rectifier stations may be carried out completely office-remote controlled or by mobile team.

### **Multi-Channel Data Logger for remote controlled Registration**

Over and above remote monitoring, MiniTrans allows remote controlled multi-channel registration.

MiniTrans thus offers indispensable functions to support measurement of stray currents and fault location.



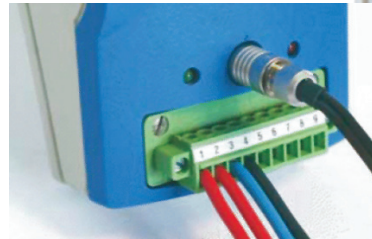
Combined system consisting of sensor, antenna combination and external power supply unit

### Low Cost Installation and Setup

Already during installation at test points, MiniTrans constitutes a simple and cost-saving solution.

The antenna combination specially designed for combined use of DCF-77 radio time and mobile phone purposes, will simply have to be slipped into the test point pole while wireless sensor will be mounted on top of the terminal board.

Incorporating a test point into remote monitoring network requires no more than wiring of input channels, followed by short test of functions.



Input channels and serial PC interface port



DCF-77 and GSM antenna terminal



Controlling rectifier stations by mobile phone

### Time and Cost Saving Remote Programming

Due to comprehensive remote programming facilities of measuring and radio transmission parameters, MiniTrans allows the technician-operator to control all functions right from the office, eliminating otherwise necessary time- and cost-intensive site travels.

MiniTrans thus allows quick and trouble-free reaction to changes of operational conditions of cathodic protection, such as measuring periods and volume.

In addition to standard requirements of CP measuring technique, MiniTrans continuously supervises and transmits internal data such as battery condition, DCF-77 and GSM signal strength, ambient temperature and state of synchronisation.

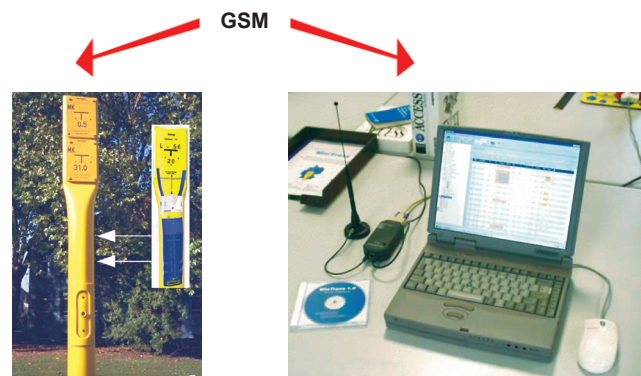
**Mobile Remote Control of Rectifiers by Mobil Phone** MiniTrans wireless sensors are serially fitted for remote functions via SMS-data. This allows the use of any SMS-capable mobile phone to activate different switching modes and cycles anytime, anywhere by means of simple key functions.

### Intelligent and site-independent Remote Monitoring

Intelligent utilisation of latest GSM radio technology allows the use of MiniTrans remote monitoring system locally and abroad including protection against data loss or mutilation.

During automatic data backing-up and transmission by means of GSM mailbox, each MiniTrans wireless sensor auto-secures its remote monitoring functions without the office PC to be in activated state.

Simultaneous reception of measuring data and control of remote monitoring functions by up to 3 offices or mobile supervisory teams is being supported thus allowing to run the entire remote monitoring system without having to operate from fixed office station.





## REMOTE MONITORING AND CONTROL MiniTrans Wireless Remote Monitoring

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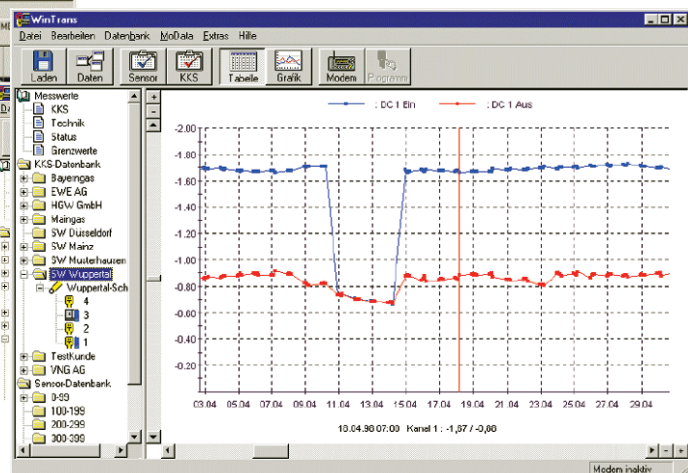
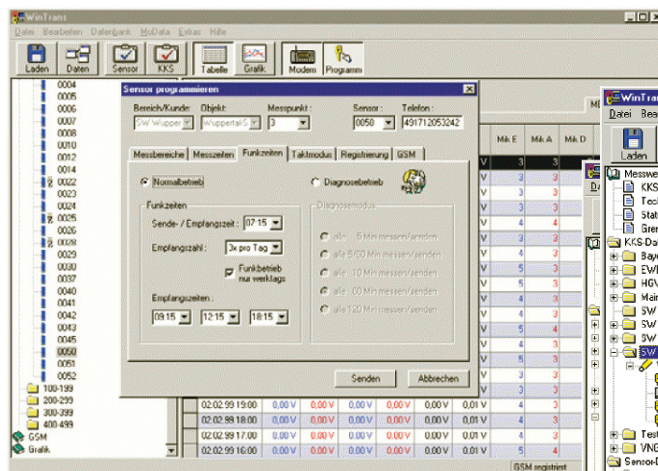
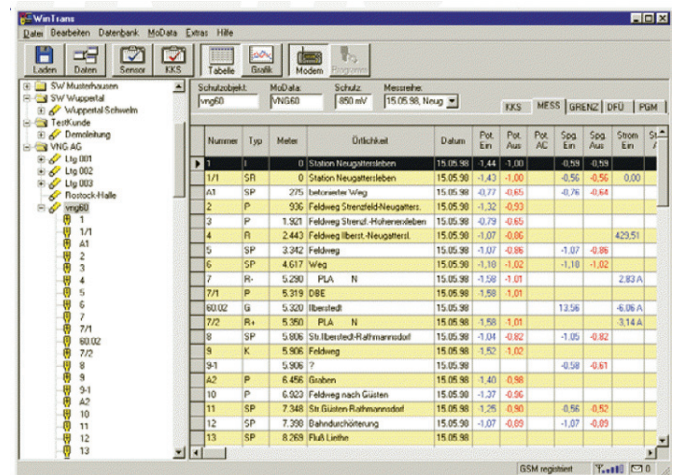


### WinTrans Software for Control and Evaluation of Remote Monitoring and Maintenance

The entire control and evaluation of MiniTrans wireless sensors is being effected by WinTrans software.

All parameters of current remote monitoring operations, like measuring ranges, measuring periods, radio transmission and switching cycles are being administrated by WinTrans and radioed to MiniTrans wireless sensors.

By means of a comprehensive and powerful database, optimally programmed to suit the monitoring require-ments of your cathodic protection system as well as those of your customers, WinTrans administers control and care of your entire CP test points and rectifier stations.

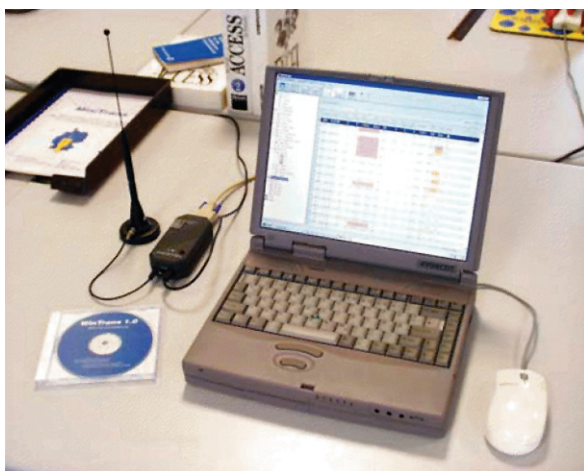


### Intelligent Remote Monitoring within Network

The aim to achieve intelligent and maintenance-free use of this remote monitoring system by consequent reduction of numbers of components, was also pursued in the design of the office equipment.

Reliable control and evaluation of test point and rectifier stations out of your office is being enabled by means of WinTrans radio modem, external radio antenna, as well as PC / Notebook-installed software WinTrans.

Linked with a network, all information regarding test points and rectifier stations of your entire organisation are handy at your fingertips.



# REMOTE MONITORING AND CONTROL

## MiniTrans Wireless Remote Monitoring

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### Technical Data

Description	Battery operated wireless sensor for radio-controlled monitoring and registration of CP-measuring data and for remote controlled switching of rectifier station
Measuring Inputs	2 x DC (with high AC attenuation) 2 x AC (parallel to DC channel measuring) 1 x $\mu$ V (with high AC attenuation)
Memory	32 KByte Program / 96 KByte Data
Interface	9600 Baud serial for programming and supervision on installation site
Timer	DCF-77synchronised real time clock with supply voltage change-over and active temperature compensation
Timer Deviation	50 ms max. at 12 DCF receiver sequences / day (between -20°C and 60°C)
Switching Load Output	30 V / 0.1 A / 30 (higher load with external power supply unit)
Wireless system	Internal radio modem for GSM networks at 900 MHz
Antenna	Special antenna combination for DCF and GSM-radio application for test point mounting or rectifier station installation
Program Updates	Wireless via remote transmission or direct via serial interface
Calibration control QM	Via serial interface with notebook on site
Battery Power Supply	Lithium battery pack 7,2 V / 13 Ah (uninterrupted data safety during battery change)
Mains Power Supply (optional)	External power supply unit with slave relais control
Dimensions / Weight	
Wireless sensor	65 x 240 x 40 mm (W x H x D) / 480 g (incl. Battery)
Antenna	75 x 60 x 40 mm (W x H x D) / 170 g (excl. Antenna rod)

### Measuring Ranges

DC Voltage	Channel 1 + 2	
	Range	Resolution
	$\pm 1000$ mV	0.1 mV
	$\pm 10$ V	1 mV
	$\pm 150$ V	15 V
Input Impedance	> 2 M $\Omega$	
Damping	at 16.6 Hz at 50.0 Hz	
	60 dB (factor 1.000)	100 dB (factor 100.000)
AC Voltage	Channel 1 + 2	
	Range	Resolution
	1 V eff.	0.2 mV
	10 V eff.	2 mV
	250 V eff.	50 V
Input Impedance	> 2 M $\Omega$	
Frequency range	15 - 500 Hz	
Microvolts	Channel 3	
	Range	Resolution
	$\pm 100$ mV	1 $\mu$ V
Input Impedance	> 200 k $\Omega$	
Damping	at 16.6 Hz at 50.0 Hz	
	60 dB (factor 1.000)	100 dB (factor 100.000)
Zero calibration	Automatic before measurement	

### Remote Monitoring / Switching of Rectifier Station

Monitoring facilities	2 DC channels On / Off (e.g. potential and protection tube) 2 AC channels (e.g. potential and foreign pipe) 1 $\mu$ V channel On / Off (e.g. pipe current or rectifier current)
Measuring periods	
Mode normal	Max. 4 complete on- and off measurements / day (timer free programmable)
Mode diagnosis	5, 10, 30, 60 or 120 min
Formation of mean value	Freely programmable (without or 1, 2, 4 or 8 min)
Switching options	
Permanent On	e.g. in case of interface measurements
Measuring Cycle	Standard setting at remote monitoring
Permanent Cycle	e.g. 12/3 or 4/2 for intensive measurement
Permanent Off	For pipe repair
Radio periods	
Mode normal	Max. 4 complete on- and off measurements / day (timer free programmable)
Mode diagnosis	Every 5, 10, 30, 60, or 120 min
Status monitoring	
DCF-77 Signal	Quality and reception successes
Synchronisation	Timer deviation in ms
Radio signal	Quality and reception successes
Battery state	Remaining capacity and operational time
Main power supply	Mains failure indicator
Temperature	Temperature measurements
Zero calibration	Monitoring measurements accuracy
Remote programming	All settings and measuring features are completely remote programmable
Battery life span	
Mode normal	Approx. 2.5 to 3 years
Radio on weekends off	Approx. 3.5 to 4 years

### Registration / Data Logger

Channels	2 DC, 2 AC, 1 Microvolts
Sampling Rate	
without microvolts measurements	0,5 s, 1 s, 2 s, 5 s, 10 s, 30 s
with microvolts measurements	2 s, 5 s, 10 s, 30 s
Measuring values memory	ca. 50.000 values
Programing	Number of channels Measuring range Sampling rate Start-up Terminal time
Data Transmission	Wireless by radio or direct via serial interface
Remote Programming	all features remote programmable
Battery Life Span	Approx. 80 single channel recordings at 1s sampling rate over 6 h (incl. radio transmission)
Zero calibration	Automatic during registration