SCOPE

3i

SWITCHGEAR AND CABLE MONITORING SYSTEMS

A DIMRUS PRODUCT
MARKETED BY SCOPE

Portable Device for On-line Insulation Monitoring in Switchgear Cells and HV/MV Cables by Partial Discharges (PD)...

... 3i

The Product

3i : SWITCHGEAR AND CABLE MONITORING SYSTEMS

The multipurpose 3i device is for on-line insulation condition estimation in the following equipment:

- 6 ÷ 35 kV switchgears of various designs;
- Terminations and joints of cables;
- High-voltage gas-insulated equipment (Gas-Insulated switchgear (GIS)) of any rated voltage.
- The tanks of power transformers, breakers, etc.

Application

The portable multipurpose 3i device (Intellectual Insulation Indicator) is for effective high-voltage equipment insulation monitoring on-line.

The 3i device measures and analyses partial discharges (PD). For effective PD measurement and noise rejection, there are two types of sensors used in the device: the acoustic sensor and the TEV sensor. Both the sensors are built into the device case, and so do not need any connection cables.

The device is supplied in a strong metal case; at the faceplate there are the colored screen and two buttons: power button and function button.

The Device Specifications:

The staff does not need any special training for the use of the device, the latter it is easy to operate and maintain. In the measurement mode the device is operated by the switch button on the faceplate. After pressing the button, the device switches on and starts measuring; after pressing the switch button secondly, the measurements stop and the data is saved in the device memory. For the next measurement press the switch button again.

The 3i device acoustic sensor can effectively detect PD pulses from a few centimeters to a meter, or a little over. For the measurement, the acoustic sensor should be pointed at the object.

The TEV sensor (Transient Earth Voltage) needs to be pressed to the metal surfaces of the switchgear enclosure, Gas-Insulated switchgears (GIS) tanks and others.

The F button (functional button) is for switching between operation modes, as well as for data saving and further processing. The key is actively used in the extended 3i+ version of the device, where the connection of an additional sensor (acoustic of TEV) is possible.

The information about the measured PD pulses is shown at the device screen; it can be stored in the device memory, passed to the PC, viewed and stored with «iNVA» software, supplied with the device.

The Information Displaying.

The information about PD is displayed in the form of bar charts, numbers and signal graphs. The time of the signal processing and the image change is half a second on default, but it can be adjusted by the user.

The bar charts displayed illustrate PD intensity. The information from each PD measurement channel is displayed at the screen in two columns - the bar charts. The left one represents the PD energy, and the right one - the number of the PD pulses per second.

At the bottom of the screen the PD form and PD timing is shown. The signals from both the sensors are measured simultaneously, so the PD signal damping and timing can be estimated from the sensor of different types.

Additionally, you can efficiently trace the PD level and intensity using stereo headphones. In one ear you hear the modified signals corresponding to the partial discharges measured with the acoustic sensor, and in the other – to that of the «TEV» sensor. For the effective analysis and defect location, the level of audio signals is proportional PD pulse amplitude, and the signal frequency is proportional to the number of the pulses measured.

3i Operation Modes

There are three different operation modes of the 3i device, they are Indicator, Diagnost, Expert. The mode is chosen after switching on the device; the Indicator mode is set on default.

The Indicator mode is the simplest, it requires minimal user training. Just switch on the device, and it will start PD measurement.

If partial discharges are measured with the acoustic sensor, the sensor should be pointed at the object of measurement. Moving the device along the object allows identifying the zone of maximum PD activity.

If partial discharges are measured with the inbuilt TEV sensor, then the device should be pressed to the metal surfaces of the enclosure or the tank. The closer is the device to the insulation defect, the wider is the PD amplitude.

For comparing PD activity in different parts of the monitored equipment, there is a 15-second PD activity trend at the bottom of display.

The Diagnost mode of the 3i device is for mass periodic inspections of the high-voltage equipment.
First in this mode the database of the monitored equipment is created with iNVA software, and all the points for periodic PD measurements are defined.
For each type of the equipment you should set the levels of insulation condition, determined by PD activity. The levels are normal level (green color signal light), warning level (yellow) and alarm level (red). With the color signal lights you can effectively assess the insulation condition while measuring.
The Diagnost mode is for routing way of the measurements. The route of the measurements is generated on a computer and is downloaded into the device. The measurements are taken according to the given route; the data is stored in the device memory and is easily transferred to iNVA database.
The Expert mode of the 3i device is the most complicated; it is for the detailed diagnostics of the equipment, especially the critical one. The effectiveness of the device operation in this mode depends on the expert knowledge and experience.
The new diagnostic functions are available through the use of the additional plug-in external PD sensors. An additional sensor, either acoustic, or TEV, at the user's choice, is connected to the special slot, and the device recognizes its type by itself.
The use of both the in-built and external sensors simultaneously allows PD measuring in different points of the equipment. This helps to locate the defect places more precisely. The use of external sensors is also effective for taking measurements in hard-to-reach places, where it is impossible to install the 3i device itself.
In the Expert mode it is possible to estimate the noise level and to distinguish it from the measured PD level. For that you should carry out the preliminary noise measurement by the built-in sensor, or use the additional external sensor.

Specification

No.	Parameters	DIM-Loc
1	In-built PD sensors	acoustic, TEV
2	In-built acoustic sensor frequency range, kHz	40 ± 2
3	In-built TEV sensor frequency range, MHz	10 ÷ 100
4	LCD resolution, pixels	240 * 320
5	PC connection	USB
6	Battery life, hours	10
7	Operation temperature range, °C	-20 ÷ 40
8	Device dimensions, mm	187 * 78 * 43
9	Weight, kg	0,6

Ordering Information

Description	Std Qty 3i	Std Qty 3i+
Standard Accessories		
The 3i device	+	+
External acoustic sensor	-	+
External TEV sensor	-	+
Charger with the USB slot	+	+
USB-micro USB cable	+	+
CD with iNVA software and documents	+	+
Headphones	+	+
Transportation case	+	+

The in-built battery is charged through the standard microUSB port. The same port and cable is used for PC connection.

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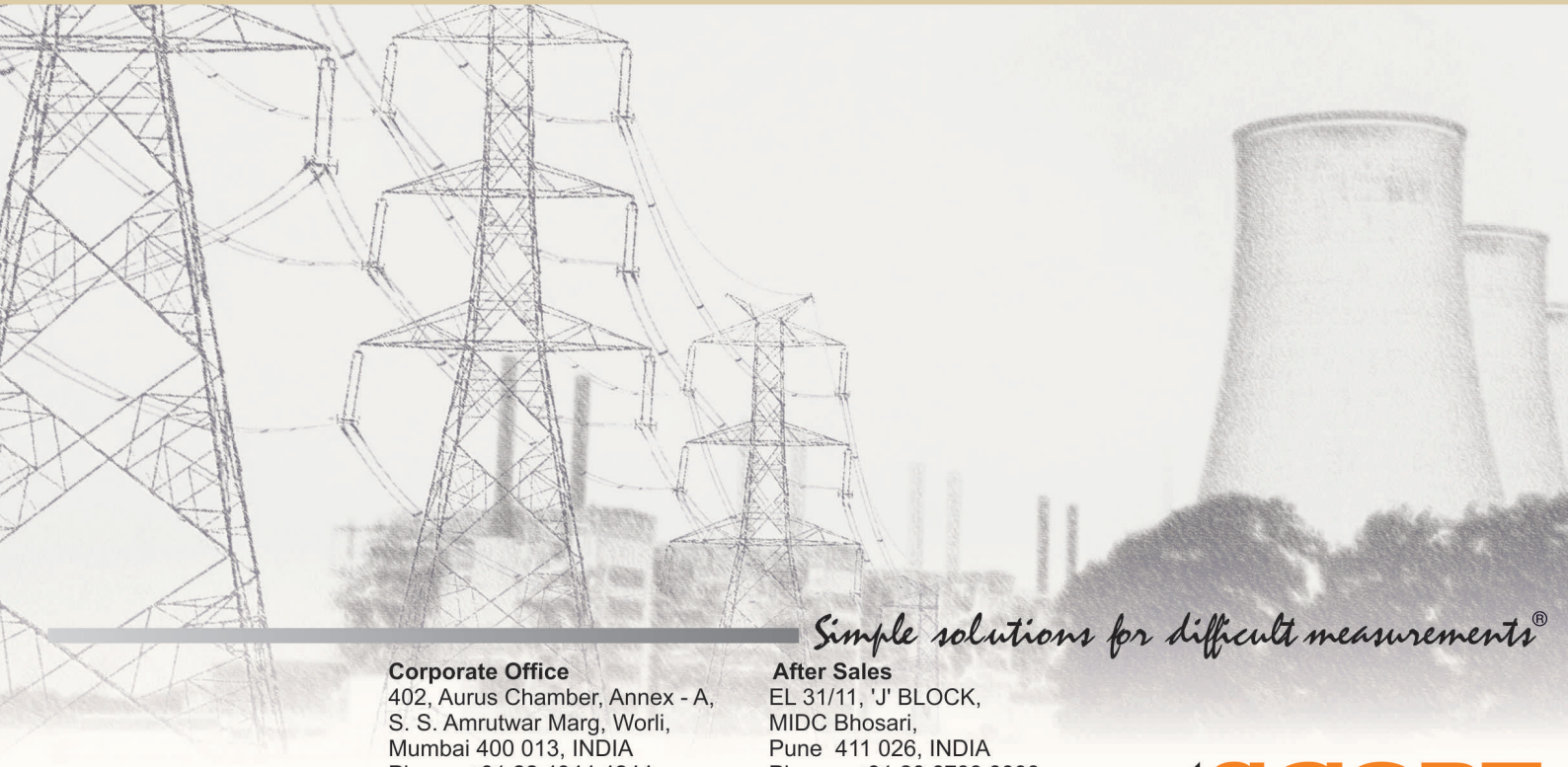
... there is **SCOPE** *always !*



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Corporate Office
402, Aurus Chamber, Annex - A,
S. S. Amrutwar Marg, Worli,
Mumbai 400 013, INDIA
Phone: +91 22 4344 4244
FAX : +91 22 4344 4242
e-mail: marketing@scopetnm.com

After Sales
EL 31/11, 'J' BLOCK,
MIDC Bhosari,
Pune 411 026, INDIA
Phone: +91 20 6733 3999
FAX : +91 20 6733 3900
e-mail : works@scopetnm.com

Product Manufacturer : **DIMRUS**
Marketed : **SCOPE T&M Pvt. Ltd**

SCOPE
T&M Pvt Ltd
www.scopetnm.com