

# EDT-135

## E1 and Data Tester



### Applications

- Installing, commissioning and maintaining E1 circuits and multiplexers
- Commissioning and maintaining datacom and V.24 modem circuits
- Commissioning Frame Relay services
- Installing and maintaining GSM circuits

This powerful tester includes a full set of measurements to install, commission and troubleshoot E1 and data circuits, along with the services that run over them.

Installation tests require basic out-of-service Bit Error Rate (BER) testing to assess cabling integrity.

Full commissioning requires extended BER testing to international standards, as well as stress testing and complete assessment of link performance with respect to error and alarm reporting.

For successful maintenance, rapid identification of the current line status is critical to the speedy resolution of problems.

Specific services (such as Frame Relay and GSM) have their own testing requirements, and require a tailored solution to ensure satisfactory operation.

### Functions

- E1 and n x 64k BERT with Autoconfigure and G.821, G.826 and M.2100 testing
- Clear OK/Status Page
- Multi-interface capability: V.24/RS232, V.11/X.24, V.35, V.36/RS449, G.703 (2048/704kbit/s), G.703 co-directional
- Frame Relay commissioning tools, turn-up, PING and Fox
- Multiplexer tests include MUX/DEMUX and A-D/D-A measurements
- Special sub-rates (HCM, X.50, V.110)

Features such as Autoconfigure and the 'Big OK' result screen make it easy to use with a minimum of training.

Quality of Service can be measured with G.821, G.826 or M.2100. E1 signal quality measurements include jitter, level and pulse shape. Datacom interface control signals can be monitored and set.

V.24 modem tests include dial-up, auto-answer, distortion measurement and BER. Other important features include round trip delay measurements on E1 and datacom circuits and E1 drop and insert.

Comprehensive service testing is possible using dedicated options.

- Minimum training for installation and commissioning applications
- Robust and reliable, low life-cycle cost
- All the tests needed to find simple and complex faults
- Service application family includes Frame Relay, GSM, and special sub rates



## Easy to Use

The EDT-135 has been designed with the user in mind. As well as being lightweight and comfortable to hold and carry, all testers feature large LCD screens with integral backlight for the most demanding testing environments. If you wish to self-support the tester, the integral two-position backstand/carry handle can easily be folded out, and can also be configured to suspend the instrument for hands-free viewing.

Test results are displayed in a concise, graphical format with our recognised 'Big OK' when no errors are present. Multiple language support is standard and comprehensive alarm and error status LEDs give clear indication of problems, even from a distance. And, as you'd expect, all results data can be stored for later analysis or printed to an external printer with a single keypress.

## Autoconfigure

The Autoconfigure feature greatly simplifies instrument set-up. A test can be started on framed or unframed traffic using just 2 key-presses. For a framed signal, the instrument can determine the framing type, timeslot allocation and test pattern type.

## Gelbrich Synchronization

The patented Gelbrich Synchronization method enables synchronization on a test pattern to be maintained and accurate BER measurement to be made even in the presence of rapid bursts of errors. It also enables differentiation to be made between bit slips and bit errors.

## Result Storage and Printing

The EDT-135 has 8 test memories for the storage of text and histogram results, for viewing or printing at a later time. Printing of results is supported through the serial port. A set-up screen enables the instrument to be set up for a range of printers.

## Programmable Timers

The instrument can be programmed to start a test at a specified date and time for a selectable duration.

## Remote Operation

The instrument is compatible with the DTM-32 remote operation solution.

## Battery/Mains Operation

8-10 hour battery life using rechargeable and exchangeable batteries. Long duration testing can be achieved with a.c. mains power.

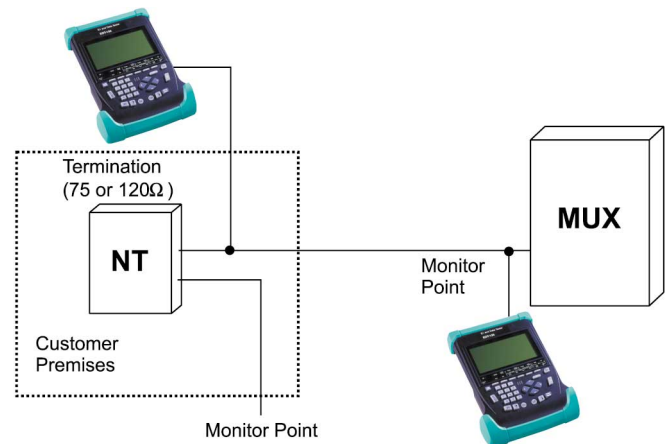
## Software Option Download

The testing capability of the EDT-135 can be greatly extended by downloading a range of software options. Applicable options include Signal Level Measurement, Pulse Shape Analysis, Jitter, Large Frequency Offset of Transmit Clock, Frame Relay, HCM, GSM, Enhanced Datacom Tests and Voice Channel Noise Measurement.

## Instrument Applications

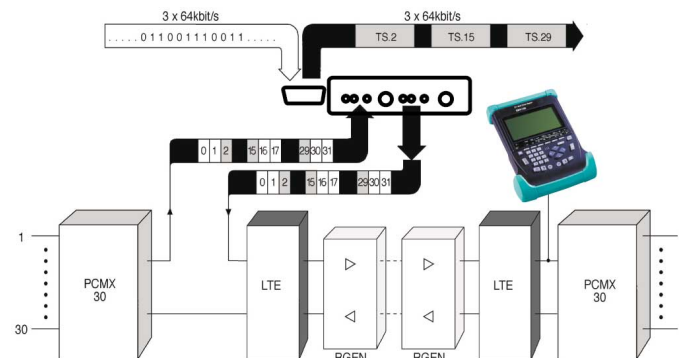
### E1 Service Turn-up

Availability and performance of an E1 link can be established using either an intrusive or a non-intrusive test. The EDT-135 can be connected via 75Ω/120Ω connectors using Hi-Z termination or at a protected monitor point. A typical simple E1 test will take no longer than 30 seconds, the OK screen quickly indicates when an E1 service is present and error-free. G.826/M.2100 test sequences can then be run, and the results displayed, stored and printed.



### n x 64kbit/s Timeslot Analysis

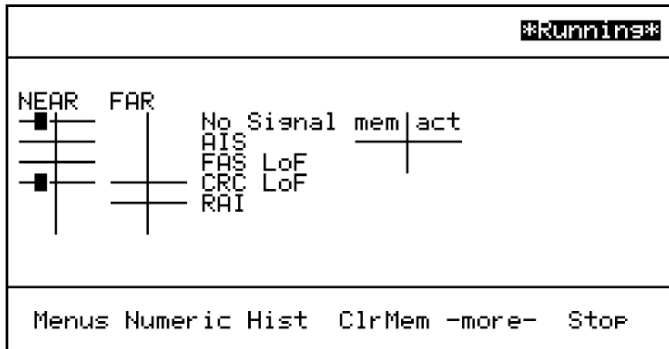
64kbit/s timeslots are grouped within the E1 frame to give end-customers intermediate data speeds such as 128 or 256kbit/s. The EDT-135 can perform BER analysis on bundles of n x 64kbit/s slots, and drop and insert n x 64 kbit/s to an external protocol analyser via V.11.



## G.826 and M.2100 Analysis

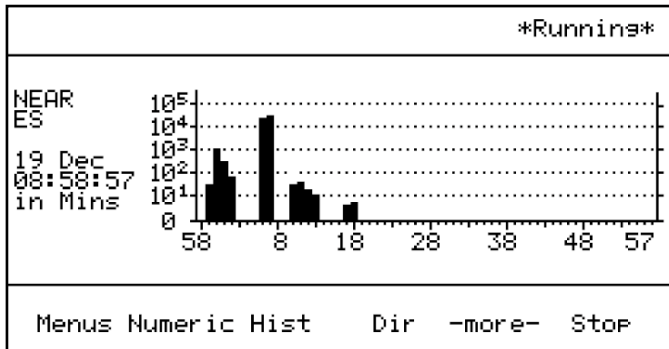
G.826 is the ITU-T recommendation for error performance of international digital paths at or above the Primary Rate. The complementary M.21xx series permits rigorous testing of PDH links but in shorter time periods. Both methods are included as standard software modules in the EDT-135 tester. The following screens illustrate the summary results from G.826 and M.2100 tests.

### Results Monitor



A graphical display of past and present alarm occurrences and error ratios for both near and far directions at the same time.

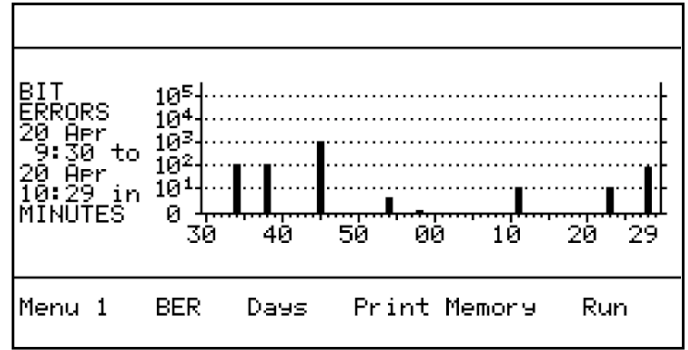
### Histograms



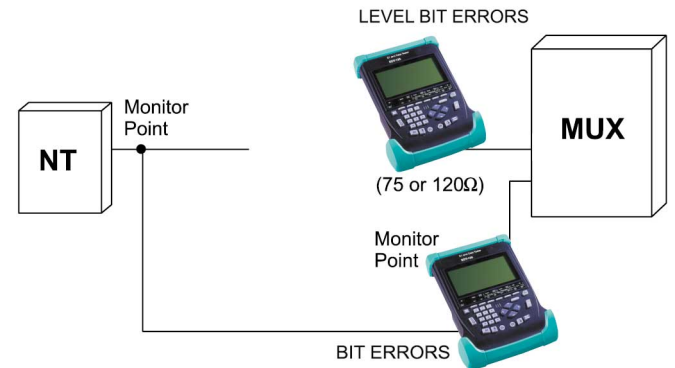
A set of histogram screens may be displayed, based on the recorded history of alarms, errors and G.826/M.2100 events. There are histograms for each valid alarm, error and G.826/M.2100 result type (up to 12) at each resolution (days, hours, minutes and seconds).

### E1 Service Troubleshooting

An extended bit error test will determine whether a periodic fault is causing problems. Electrical equipment such as air-conditioning may cause problems at regular times in the day. Error histograms make it possible to identify external events which can be isolated as causes of the problem.



Error histograms can be indicated as a histogram on a scale of up to 60 days.

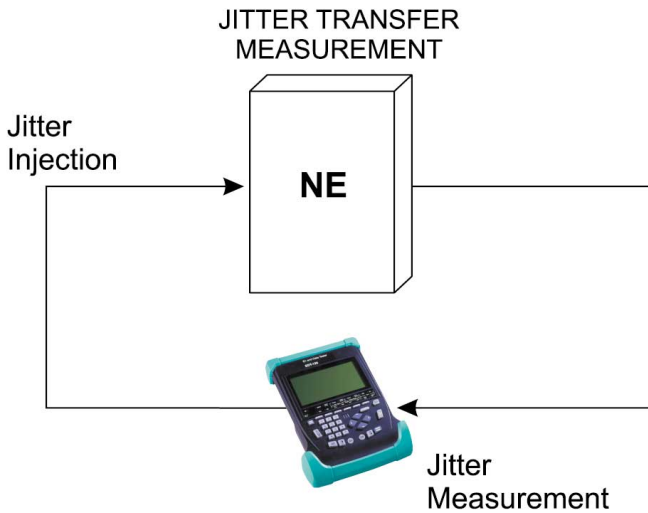


Faults in an E1 line can be caused by low signal, pulse distortion or jitter.

If loss of signal (LOS) or similar alarms are indicated by a network element, level measurement and pulse shape tests can easily be made to determine where the fault exists in a link, by examining the signal condition.

A low or distorted signal received by a network element would indicate a problem with the preceding element or the interconnecting cables.

Excessive jitter can result in bit errors, loss of frame synchronization or similar faults. Where these faults exist, jitter measurements can be performed to determine if jitter is the cause, and also to discover at which point in the system the jitter reaches unacceptable levels.

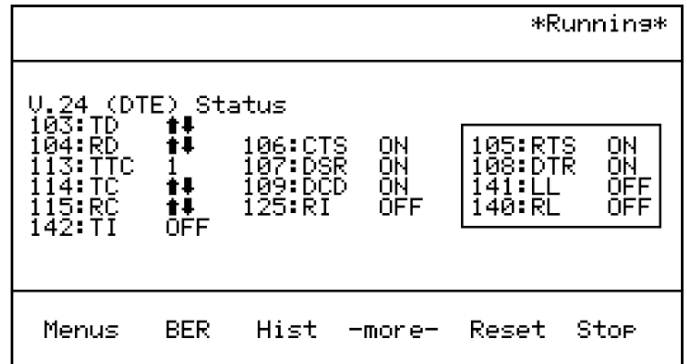
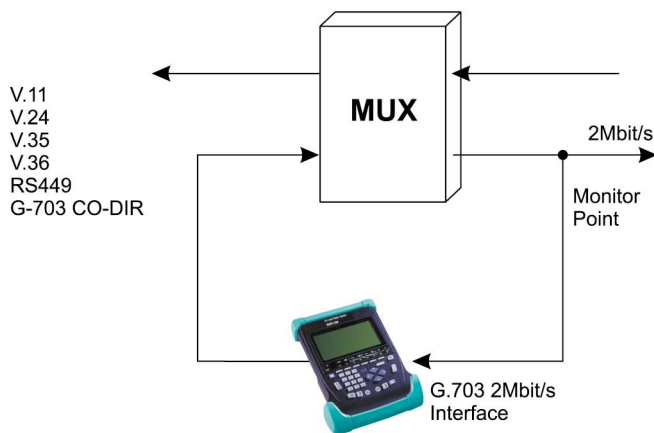


If high jitter levels are isolated to the outputs of particular network elements, these elements can be taken out of service and further tested by injecting jitter at a known level and testing the jitter on the output (jitter transfer).

Jitter testing, Level Measurement and Pulse Shape Analysis options can be ordered for the EDT-135.

### Primary Multiplexer Testing

The 2Mbit/s Framed capability of the EDT-135, and its wide range of interfaces enable in-service and out-of-service testing of a multiplexer to be carried out using a single instrument. Testing is possible in the mux and demux directions. For example, testing of the customer-network (mux) direction is performed by transmitting a test pattern into the multiplexer customer-side at n x 64kbit/s via V.24, V.11, V.35, V.36, RS449 or G.703 co-directional. The 2Mbit/s frame generated by the multiplexer is then monitored and the BER of the pattern in the appropriate timeslot(s) is evaluated.



## Service Turn-up

### HCM\* Testing (HCM Option)

High Capacity Multiplexing (HCM) is a Newbridge proprietary rate-adaption and sub-rate multiplexing scheme that provides a bandwidth granularity of 800bit/s throughout a network. HCM multiplexes multiple V.24 lines into a single G.703 timeslot with very good bandwidth efficiency. The HCM option for the EDT-135 enables users to verify correct configuration, the ability of the link to maintain synchronisation to communicate data without errors.

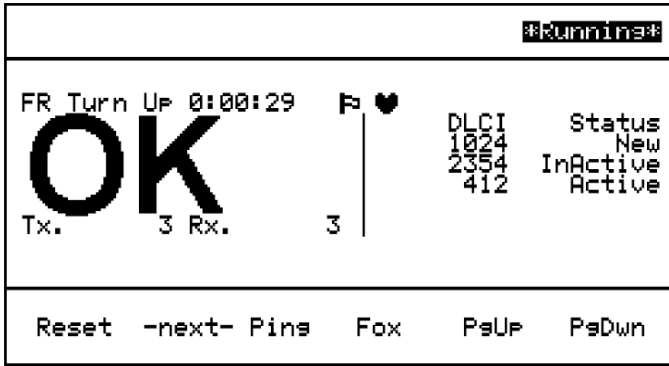
Various errors can be injected to simulate problems and test the network response. These include bit errors, HCM FAS and Signalling FAS errors, and HCM Frame and Signalling AIS errors.

\*HCM is proprietary to Newbridge networks corporation. Used with permission.

### Frame Relay Testing (Frame Relay Option)

Loaded into the EDT-135, the Frame Relay option provides three test modes suitable for installation and maintenance of Frame Relay services:

- Frame Relay service Turn-Up for verification of user-to-network connectivity and configuration
- 'Fox' test for stress testing and Committed Information Rate confirmation
- TCP/IP PING Request Testing, providing additional tests to verify the connectivity of far-end terminals.

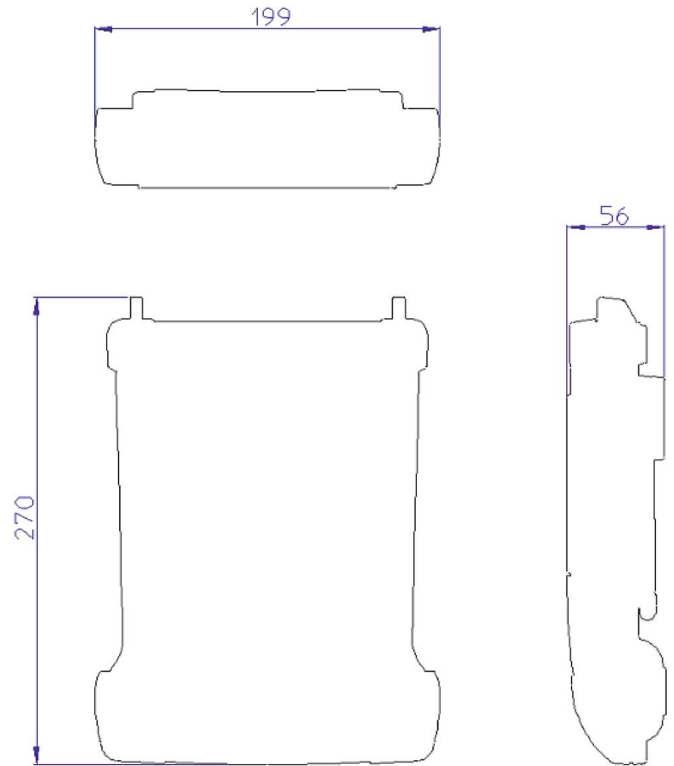


## Weight/Dimensions

Weight:

1.55kg approx

Dimensions (in mm):



## Accessories

### V.11 Cable Test Adapter

This accessory detects a number of common faults on V.11 cables, which due to the nature of balanced line interfaces would otherwise go unnoticed.

### ELM-2 Equalizer and Level Meter

The ELM-2 accessory allows the instrument to be connected to 2Mbit/s lines carrying hazardous voltages and  $\sqrt{f}$  distortion. It removes the DC voltage, equalizes the signal and also measures and displays the signal level.

### PenBERT 2Mbit/s Monitor

The PenBERT PCM monitor can be used with the EDT-135 to perform simple end-to-end tests on a 2Mbit/s line. Errors and alarms are indicated by LEDs.

### V Interface Troubleshooting (V Status Option)

The V Status option shows the status of input and output circuits when testing V.24, V.35 and V.11 interfaces. It also offers ON/OFF softkey control for a selection of the output circuits.

### Equipment Cases

A range of equipment cases and shoulder-bags is available to allow convenient transport and storage of the EDT-135 and accessories.

### DTM-32 Features

The DTM-32 product offers Remote Operation using an on-screen faceplate, via an easy to use Windows™ interface.

## Technical Specifications

### Generator/ Receiver

Interfaces:

G.703

Outputs:

Balanced 3 pin CF connector

Unbalanced BNC connector

### G.703 Test Modes:

#### RX

Framing:

PCM30, PCM30CRC, PCM31,

PCM31CRC, or Unframed

G.703 line code:

HDB3, AMI, co-directional

V.11 drop:

1 x 64kbit/s, n x 64kbit/s

#### RX/TX

As RX plus:

BER Test pattern generation:

Single timeslot

n x 64kbit/s timeslots

V.11 Drop/Insert:

Drop and/or Insert n x 64kbit/s

timeslots

Drop and Insert 1 timeslot

Programmable Si, Sa, A and E bits and

NMFAS

### Through Mode

As RX/TX plus Drop and/or Insert

via V.11

### Round Trip Delay

Framed and Unframed 2Mbit/s

### MUX and DEMUX Testing

Receiver and transmitter as for RX/TX mode Unframed TX and RX on V interfaces or G.703 co-directional

### Framed Monitor

Monitor and display of:

FAS, NFAS, MFAS, NMFAS, and

CRC MFAS words 8-bit digital code

word in any selected timeslot, CAS

status of all 30 channels with

idle/busy indication

### Level and Frequency

Digital generation/measurement of sinusoidal signals in a timeslot. (A-law coding to ITU-T Rec. G.711)

### X.50 Test Modes

Interfaces:

V.11, V.35, V.36, RS449 and G.703

co-directional

### Test Patterns

PRBS:

$2^6-1$ ,  $2^9-1$ ,  $2^{11}-1$ ,  $2^{15}-1$ ,

Alternating 1 and 0s, All 1s, All 0s,

8 and 16 bit programmable word

### Error Injection

Bit, Code, FAS, CRC errors:

Single, ratio or frequency

### Clocking

G.703 transmit clock source

2048kbit/s and co-dir:

Internal, External, From RX

### Error and Alarm Indication

LEDs:

2 summary, 14 alarm/error, option,

low battery

### Printer and Remote Operation

Interface:

V.24, DTE, Async

Baud rates:

300, 600, 1200, 2400, 9600, 19200,

38400

### Front Panel

Display:

42 character x 16 line LCD, LED

back-light

Keyboard:

Numerical keypad, 4 Cursor,

2 Contrast, Main Menu, 6 Softkeys,

Alt, On and Off

### Stores/Memory

8 test result memories and 8 configuration stores

### Self Check

Comprehensive self check at power on

### Languages

English, German, French, Spanish,

Italian, Turkish and Portuguese

### Power Supply

External supply:

External mains charger

Rechargeable batteries:

8 to 10 hours operating time

Battery low:

warning before auto switch off

## Ordering Information

EDT Platinum (M.2100, G.826, Extended PRBS, Level Measurement Options)	BN 4562/31
EDT X.50 Sub-Rate (M.2100, G.826, Extended PRBS, X.50, HCM, V.110 Options)	BN 4562/32
EDT Diamond (M.2100, G.826, Extended PRBS, Pulse Shape, Level Measurement, Jitter Options)	BN 4562/33
EDT Frame Relay (M.2100, G.826, Extended PRBS, Frame Relay, All 1s All 0s Options)	BN 4562/36
EDT Datacom (Includes all software options to comprehensively address datacomms testing)	BN 4562/37
EDT Complete (Includes all software options)	BN 4562/38

Complete with :

a.c. adapter/charger. Select appropriate plug :

US, European, UK or Australian

Operating Manual

M.2100 Option BN 4562/00.13

G.826 Option BN 4562/00.34

Extended PRBS Option BN 4562/00.36

### *Accessories (available at extra cost):*

External clock adapter	K 1513
V.24 Download cable	K 1515
Printer cable 25 way (M/F)	K 1500
V.11 DCE adapter cable	K 150
V.36/RS449 DTE adapter cable	K 1506
V.36/RS449 DCE adapter cable	K 1507
V.24/RS232 DCE adapter cable	K 1512

V.35 adapter cables (jackscrew fixing)	
V.35 DTE (AMP) 1.6 mm dia. pin male	K 1508
V.35 DCE (AMP) 1.6 mm dia. pin female	K 1509
V.35 DTE (Positronic) 1.6 mm dia. pin male	K 1525
V.35 DCE (Positronic) 1.6 mm dia. pin female	K 1526
V.35 adapter cables (clip fixing)	
V.35 DTE (Positronic) 1.0 mm dia. pin male	K 1510
V.35 DCE (Positronic) 1.0 mm dia. pin female	K 1511

DTM-32 Remote Operation Software	DTM32
Equipment case (small)	BN 4562/00.50
Equipment case (large)	BN 4562/00.51
Soft carrying case	BN 4518/00.08
Soft shoulder bag	BN 4562/00.01
Neck Strap	BN 4562/00.53
V.11 cable Test Adapter	BN 4534/00.37
ELM-2 Equalizer Level Meter	BN 4546/01
PenBERT 2Mbit/s Monitor	BN 4555/10

*Options (available at extra cost):*

French S/C bits	BN 4562/00.11
GSM	BN 4562/00.15
Large Frequency Offset	BN 4562/00.19
All Ones/All Zeros Histogram	BN 4562/00.20
Noise Measurement	BN 4562/00.23
V Interface Status Monitor	BN 4562/00.28
V.110	BN 4562/00.32
HCM	BN 4562/00.38
Frame Relay (Enhanced)	BN 4562/00.41
Jitter	BN 4562/00.42
Datacom	BN 4562/00.44
V Delay	BN 4562/00.48
Level Measurement	BN 4562/00.52
Pulse Shape Analysis	BN 4562/00.56

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