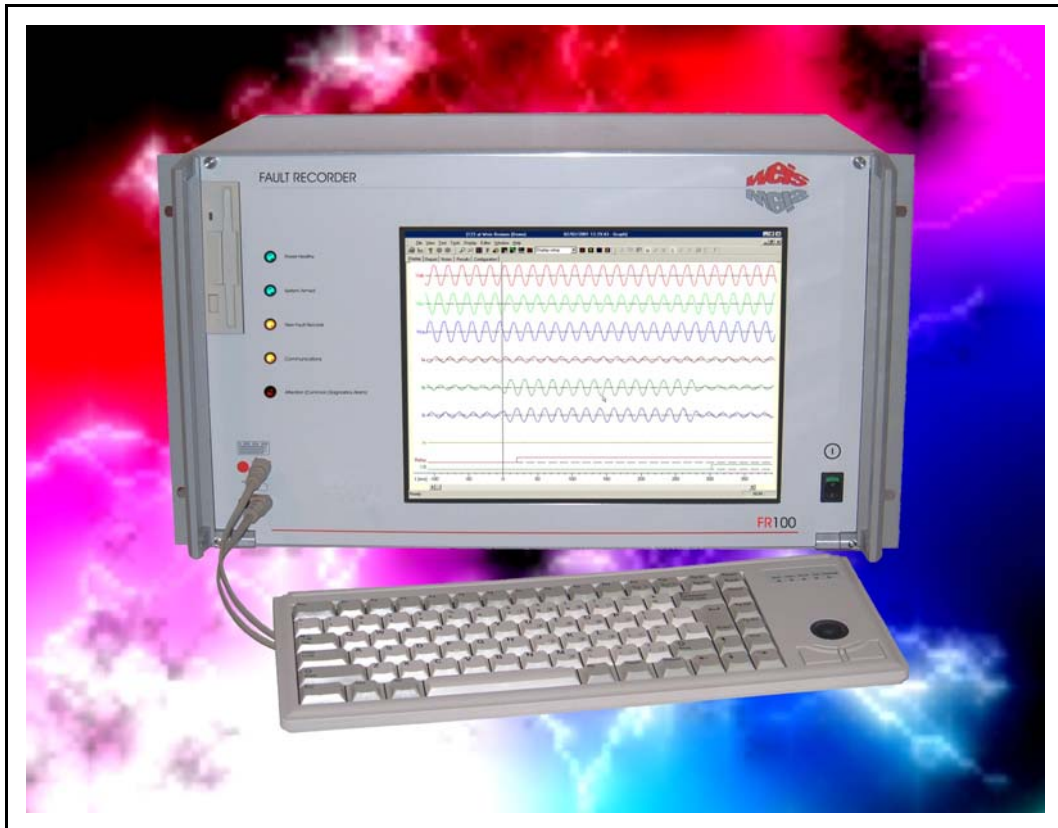


WEIS
MEIS



FR100

Fault Recorder
Fault Analysis

Fault Recorder

Introduction

Weis is a specialist company with over 20 years of experience in the commissioning, testing & maintenance of switchgear and power network fault monitoring within the Power Utility Industry.

The **F**ault **R**ecorder (**FR100**) is an essential substation preventative maintenance tool and aid for power utilities with ever increasing demands for more reliable low cost energy and on-time maintenance.

The high speed, high resolution recording and flexible triggering modes make the Weis Fault Recorder ideal for capturing power network faults / disturbances. It can be used for verifying protection / breaker operation as well as monitoring power quality.

The **FR100** is typically part of an integrated monitoring network with multiple **F**ault **R**ecorders located within substations over a region, and a Windows™ based Master Evaluation Station normally located at the regional control centre running Weis Communication, Configuration and Analysis software. Communications between the Master Evaluation Station and the **F**ault **R**ecorders is normally by plug-in data modems using the local telephone exchange, but other networks can be supported.

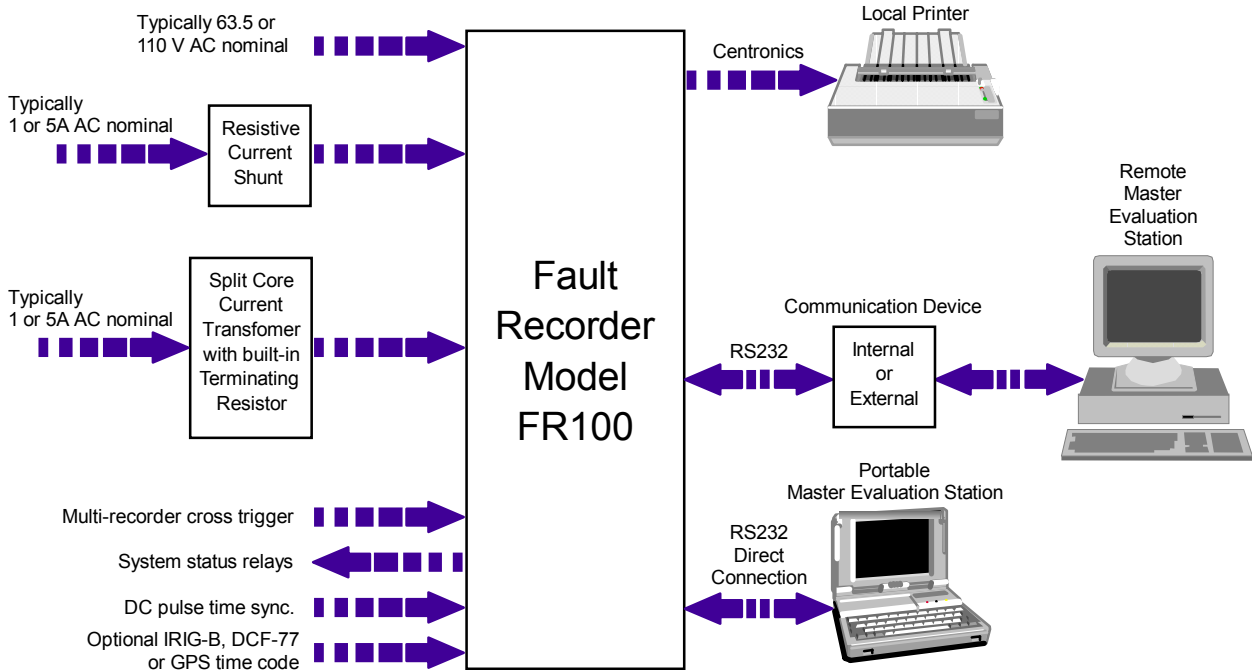
An optional built in screen and external keyboard with trackball may be provided for local configuration & analysis or portable applications.



Features

- ◆ 8 TO 32 ANALOGUE CHANNELS
- ◆ 16 TO 64 DIGITAL CHANNELS
- ◆ MULTI-RECORDER CROSS-TRIGGERING TO FORM LARGER SYSTEMS
- ◆ SIMULTANEOUS SAMPLING UP TO 192 SAMPLES PER CYCLE ON ALL CHANNELS
- ◆ 12-BIT A/D RESOLUTION WITH OPTION FOR 16-BIT
- ◆ VARIOUS SOFTWARE TRIGGERS AVAILABLE ON ALL CHANNELS SIMULTANEOUSLY
- ◆ 32-BIT SOFTWARE FOR COMMUNICATION, CONFIGURATION AND ANALYSIS
- ◆ DC PULSE OR OPTIONAL IRIG-B (TIME CODE), DCF77 (RADIO) OR GPS (SATALITE) TIME SYNCHRONISATION
- ◆ OPTIONAL BUILT-IN PC WITH A 12.1" **HIGH-BRIGHT** COLOUR TFT DISPLAY
- ◆ BASIC STAND ALONE OPERATION POSSIBLE WITH OPTIONAL LOCAL PRINTER

Architecture



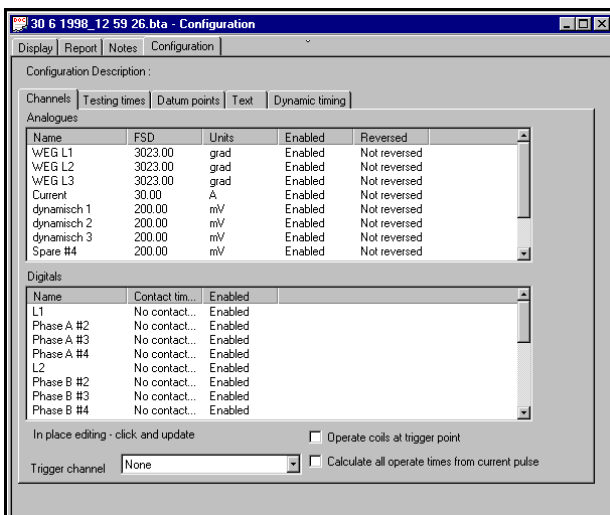
Software

Fault **R**ecorder **C**onfiguration & **A**nalysis software is an essential 32-bit Windows™ database program that provides an easy to use operator interface for configuring, displaying & analysing FR100 fault records.

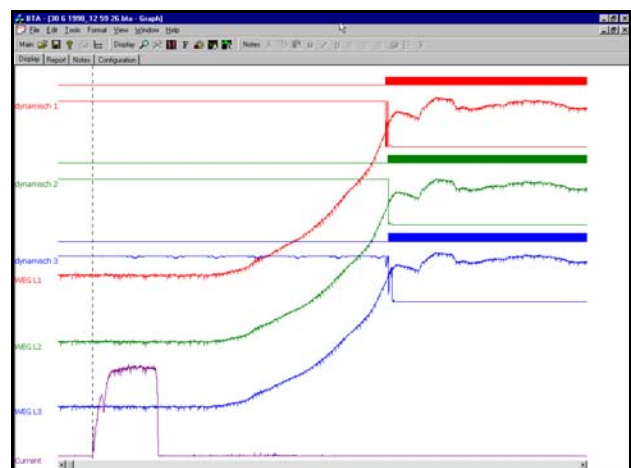
Features:-

- ◆ Communication, configuration and data retrieval
- ◆ Graphical display of captured waveforms with measurement cursors
- ◆ Archiving of all fault records and fault recorder configurations
- ◆ Export fault records in Comtrade format

FR100 software runs on a standard IBM compatible PC with a 32-bit Windows™ operating system. This permits the transportation of test records to regular office based or portable computers.



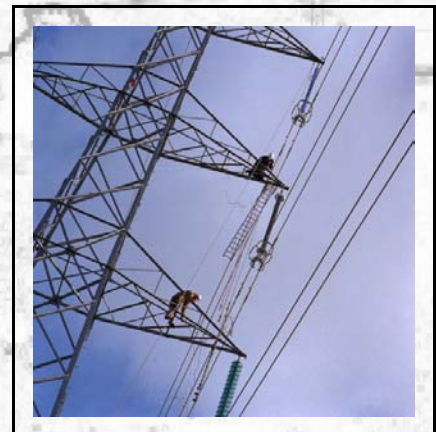
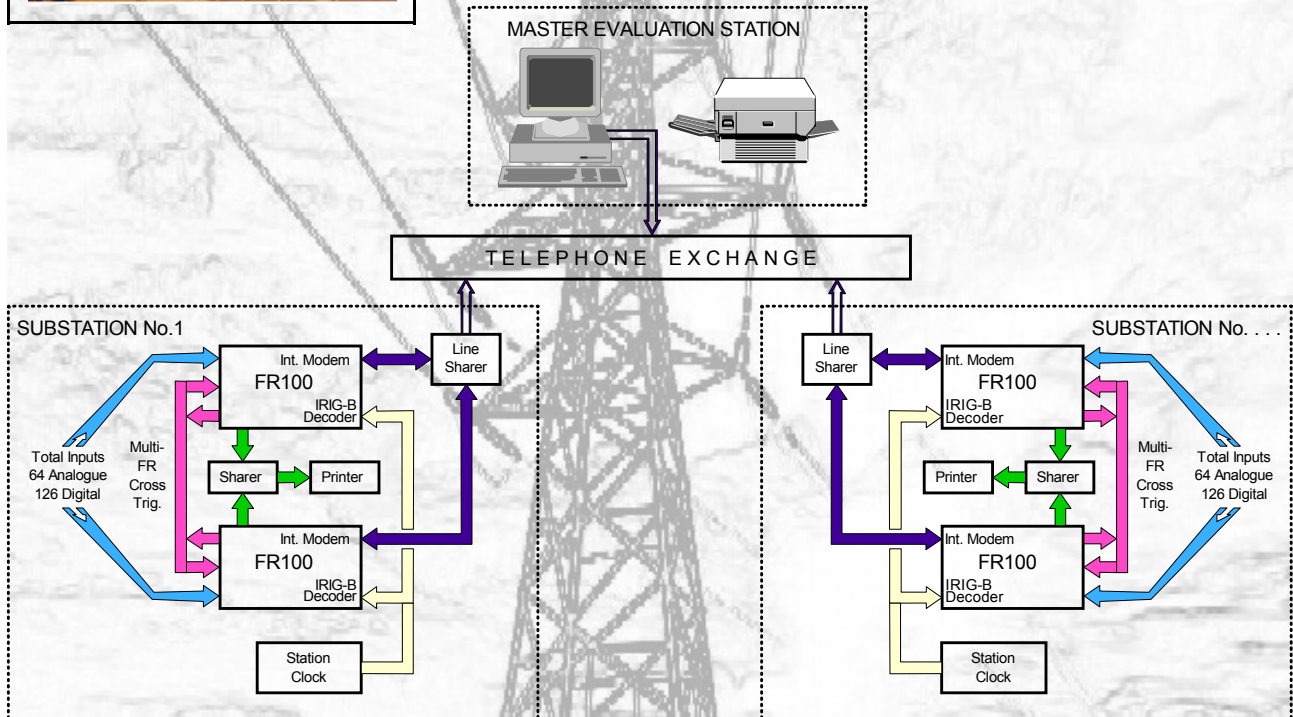
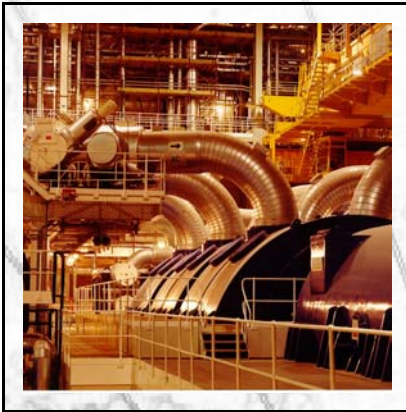
Configuration



Graphical View

Fault Recorder

Typical System Capabilities

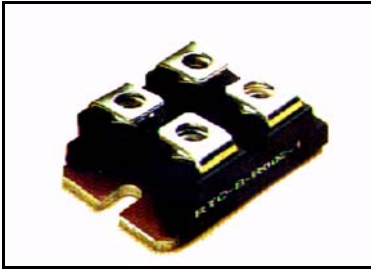


Services such as installation, start-up, training, technical support and after sales field service are readily available.

Optional Items

Resistive Current Shunts

The Resistive Current Shunt is designed for permanent applications as a interface from the CT secondary wiring to a Weis **FR100** series **F**ault **R**ecorder.



The shunts compact design makes it ideal for mounting within fault recorder panels. It also offers an excellent level of overload withstand at 150A continuous and 300A pulsed.

Being resistive rather than inductive, greater levels of accuracy in terms of phase angle and magnitude are possible, particularly in applications where Distance to Fault calculations are to be made.

Ranges: Customer specified. All ranges available.

FR100 Internal Hardware

Modem card.
Network card.
IRIG-B time decoder.
DCF77 real time clock card.
GPS real time clock card.



Transportation Case

Robust purpose made transportation cases are available for the **FR100** Fault Recorder.



Panels

Wide range of enclosures.



Fault Recorder

Specifications

INPUTS

| | |
|----------------------------|---|
| Configurations: | 8 Analogue, 16 Digital. 16 Analogue, 32 Digital. 24 Analogue, 48 Digital. 32 Analogue, 64 Digital. Analogue channels selectable for voltage or current measurement. |
| Nominal Voltage: | 63.5 or 110V AC (other levels available). |
| Nominal Current: | 1 or 5A AC via external resistive shunt (other levels available). |
| Measurement Range: | Typically nominal voltage x1.9, nominal current x20 (other ranges available). |
| Analogue Bandwidth: | DC - 3kHz. |
| A/D Resolution: | 12 bits (optionally 16 bits). |
| Analogue Accuracy: | Better than 0.25% of measurement range. |
| Digital: | 24 - 250V DC normally open or closed wet contacts with adjustable debounce filtering. |

FAULT RECORDING

| | |
|-------------------------|---|
| Sample Rate: | Up to 192 samples per cycle (9.6kHz on a 50Hz system, 11.52kHz on a 60Hz system). |
| Pre-Fault Time: | 34ms to 1s. |
| Post Fault Time: | 134ms to 1s. |
| Fault Time: | Recording can be extended up to 5s with operation limiter on longer fault/trigger conditions. |
| Synchronisation: | All inputs sampled simultaneously. |
| Data Storage: | Buffer memory (RAM) with auto-transfer to non-volatile mass memory device. |

FAULT TRIGGERING

| | |
|----------------------------|---|
| Analogue: | Over / under level equipped with hysteresis. Rate of change of level. Over / under frequency (1 per 8 analogue channels). |
| Trigger Accuracy: | Better than 2% |
| Digital: | On alarm with option for return to normal. |
| Multiple Recorders: | Recorders can be inter-triggered to form larger systems. |

REAL TIME CLOCK

| | |
|-------------------------|---|
| Range: | Time, date, leap year and day of the year with internal battery backup. |
| Resolution: | 1mSec. |
| Accuracy: | Better than 1s per day (free running internal clock). |
| Synchronisation: | 1 pulse per second, minute or hour. IRIG-B time code (optional). DCF-77 radio signal (optional). Limited signal availability. GPS satellite signal (optional). |

COMMUNICATIONS

| | |
|-----------------|---|
| Local: | RS232 direct connection to local PC. |
| Remote: | Modem connection to remotely located PC (optional). |
| Network: | Ethernet connection using TCP/IP protocol to PC. |

FR100

LOCAL PRINTOUT

Connection: Parallel printer port.
Compatibility: Epson compatible 9 and 24 pin dot matrix parallel printer.

GENERAL

Visual Indication: Front panel LED's for Power Healthy, System Armed, New Fault Records, Communications and Attention (Common Diagnostics Alarm).
Contact Outputs: Volt-free normally open or closed system status contact for remote indication for Power Healthy, System Armed, Recorder Triggered (auto reset) and Attention (Common Diagnostics Alarm).
Optional Built-in PC: VGA Colour '**High Bright**' TFT display with PS/2 connections for an external keyboard with built in trackball.

OPERATING VOLTAGES

Prime Power: 100 to 350V DC, 88 to 264V AC auto-sensing via IEC power connection.
Burden: <60 VA load.

ENVIRONMENTAL

Operating Temperature: -20°C to +60°C (-4°F to +140°F)
Humidity: 0 to 97% RH non-condensing.
Isolation: 2kV rms for 1 minute (channel to channel, channel to earth).
Surge Withstand Transient: To IEC 801-5. 1.2/50µS.
Common Mode: Severity level class 4.
Series Mode: Severity level class 3.
Fast Transient Burst: To IEC 801-4 level 3.
RFI Immunity: To IEC801-3 level 3. 10V/m 26-1000MHz.
Emissions: To EN50081-1: 1992.

MECHANICAL DETAILS

Enclosure: 6U steel enclosure suitable for Euro 19" wide rack mounting or free standing (tabletop).
Ventilation: Fan assisted.
Terminals: Rear access screw compression type - up to 1.5sq mm.
Weight: <15kg.



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