

Continual measurement of frog cross sections **ELECTRONIC FROG PROFILE METER**



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This **ELECTRONIC FROG PROFILE METER** is a device designed to measure the cross sections of frogs.

The practical applications of this profile meter are as follows::

- Checking the operational wear of wing rails and frog tips, stock rails and tongues,
- Checking the frogs for their conditions once they are welded on,
- Continual measurement of a general rolled profile for its surface shape.

Meter Description

An **ELECTRONIC FROG PROFILE METER** is a device designed for precise continual measurement of the frog cross sections. A contact method is used, in steps from 0.1 to 0.5 mm. The measuring tip is moved manually. The entire measuring system is encased. For mounting onto an object measured, there is a special leverage. The cross sections are measured to a reference straight line. This line will arise as follows: the marks are punched into the outer surfaces of the rail heads and the spring-mounted tips of the leverage are fitted into them to hold the meter. The frog wear is then assessed relative to this reference straight line. The Y-sensor and measuring tip drive is carried on the SKF trolley moved along the trajectory (made by linear SKF guides) in parallel with the reference plane. The measuring tip inclined by 45° is sliding on the measured surface with its motion converted via a friction gear to the Megatron rotary sensor of incrementing type. The X movement of the trolley is detected by the second Megatron incrementing sensor. To measure the vertical surfaces of both inner sides of wing rails and both sides of the frog point the measuring tip is of a turnable design. Every time the tip is turned, both incrementing sensors seated on the calibration plate on the meter's left fix brackets must be reset.

The values measured are shown on the measuring computer's LCD display as the diagrams depicting the frog cross profiles (SRDCOV_M.EXE measurement program). Concurrently, these data are stored on disk to be there ready for further processing, display and evaluation by means of the SRDCOV_V.EXE program which makes it possible to check up to five diagrams, to compare them, to read off the co-ordinates of two diagrams, to edit the measurement descriptors, to enter the turn-out information, traveled load, etc.

While the measurement is being analysed, the calculation of the wear suffered by the wing rails and frog point, as well as of the vertical wear to the same parts is carried out in any point on the X-axis.

At its output the analysis will give printed diagrams and tables plus an account of quantities measured on the frog.

Measurement Ranges and Accuracy

X-measurement accuracy is given by an adjustable mechanical stop. The standard X-range is from 0 to 500 mm. The accuracy of the IRC sensor setting on the calibration plate (zero setting of X and Y) – the sensor defining the coordinates origin – is $0 \pm 0.04\text{mm}$. The frog cross profile is sensed along the X-axis in steps from 0.1 mm to 0.5mm with accuracy of 0.02 mm.

Y-measurement accuracy is given by the measuring tip mechanical stops and is between +10mm and -50mm. The sensing accuracy along the Y-axis (on curved surfaces) is $\pm 0.04\text{mm}$.

Parts of ELECTRONIC FROG PROFILE METER

Measuring computer: A standard notebook, or a heavy duty HUSKY MP 2500 industrial type (processor Intel 386EX, 8MHz, 2 MB DRAM with MS-DOS 6.22, sized 242x132x44mm, weight 0.7kg, IP 65, resilient to falls from 1.5 m above ground, operational temperature range from -30°C to $+60^{\circ}\text{C}$).

Serial cable: A triple-core non-standard cable with KANON 9 (KANON 25) connectors for interconnection between the measuring computer and card box and power supply.

Card box and power supply: The box contains a card to control the micro-switch, reading the IRC sensors, lead battery (to power the sensors), a rechargeable module capable to detect and indicate the battery capacity, SKF trolley, measuring tip mechanical guides, brake, and an interconnection module. On the box, there is a (red coloured) sensor powering/battery recharging mode selector. The battery capacity diode indicator (green = enough capacity / red = insufficient capacity). The battery low/high diode indicator (green = battery high / red = battery low). Connector of the notebook's external power adapter used to recharge the LONG 6V 1,2 Ah built-in battery. Via the KANON 25 connector, a 2m long non-standard communication cable is lead out of the box for computer control of the FROG PROFILE METER.

Profile meter mechanical section: Clipping the computer. Movable bracket with the meter clipping leverage. Fix bracket with a calibration plate, bubble level for profile meter vertical setting, and SKF linear guides.

FROG PROFILE METER: Main Technical Characteristics

Electronic system power supply: Lead-cell batteries (maintenance-free) LONG 6V 1.2Ah, sized 25*97*51mm, weight 0.32 kg. The capacity will cover 20 hours of measurement without any intermediate battery recharging.

Measuring computer power supply: From AA alkaline or NiCd rechargeable batteries 1.2 V

Measuring computer weight: Texas Instruments Extensa 600 - 2.5kg. / HUSKY MP 2500 - 0.7kg.

Profile meter weight: some 6.0 kg.

Operating staff: One person.