



H40 monitor module & probe

H40 - WAVE PROBE SYSTEM

A simple and robust instrument for the measurement and recording of water waves in hydraulic models and ship tanks, which works on the principle of measuring the electrical conductivity between two parallel wires.

INSTRUCTIONAL CAPABILITIES

- > easily set up and calibrated
- > high dynamic accuracy
- > linear calibration over a large range
- > outputs for high speed recorders and data loggers
- > can be operated at different energisation frequencies to avoid mutual interaction between two or more closely spaced probes
- > supplied as a complete working system, with the option of 1, 2, or 3 channels of measurement

DESCRIPTION

Each probe consists of a pair of stainless steel wires which dip into the water waves. The electrical conductivity between them is measured, and is linearly related to their depth of immersion hence to wave height. The method is free of meniscus and 'wetting' effects.

The result is a system giving high dynamic accuracy over a wide range of wave heights and frequencies.

Energisation is conducted by means of an audio frequency drive signal which avoids all polarisation effects at the wire interface. The signal is balanced relative to earth, to render the system immune to common mode voltages between the water and instrument earth. The frequency can be altered to permit two or more sensors to operate in close proximity without mutual interference.

The probe consists of two 1.5mm diameter stainless steel wires spaced 12.5mm apart and 300mm long or 500mm long as required.

Each probe is connected to its own wave monitor module in the electronic console by a twin core flexible cable 10m long. The distance between the console and probe may be increased up to 100m using commonly available low current cables.

The power supply module and appropriate number of wave monitor modules are mounted in a console, finished in matt textured blue paint and fitted with four rubber feet and carrying handle.

High quality GRP circuit boards are rigidly mounted in heavy duty plug-in modules. Rear connections are via heavy duty plug and socket connectors.

Each module is supplied with a calibrated holder which permits easy setting and checking of overall system calibration, from the probe to a recorder or data logger (to be supplied by the user) by allowing the sensor to be moved vertically in steps of 10mm up to a maximum of 170mm.

The wave monitor module provides output signals to drive a chart recorder or for input to a data logger (both to be supplied by the user). The records enable wave height, frequency and profile to be observed. Wave velocity can be measured by means of two sensors, spaced a known distance apart, each giving a recorder trace via its own monitor module.

The module incorporates a unique system of compensation for the resistance of the probe connecting cable which ensures that the characteristic of the probe remains linear, even for large dynamic ranges.

The compensation is set up quickly and easily by disconnecting the cable at the probe end and plugging it into two additional sockets on the module panel, and then adjusting a preset potentiometer.

No additional modules or test instruments are required.

A 'Datum' control enables the output from the module to be set to zero for any chosen depth of probe immersion.

A power supply incorporated in the electronic console provides $\pm 15V$ regulated outputs.

H40 - WAVE PROBE SYSTEM - continued

TECHNICAL DETAILS

Twin Wire Probe:	
Construction:	Two 1.5mm stainless steel wires spaced 12.5mm apart. Length 300mm or 500mm.
Not suitable for use in salt water	
Range of wave heights:	5mm to 300mm/500mm
Temperature coefficient:	2% of span per 1°C change in water temperature. The wave monitor module incorporates a control for easy calibration and resetting. Supplied with holder allowing calibration of the probe in steps of 10mm over the range 170mm.
Power Supply Module:	The system incorporates a power supply module. Alternative power supplies are available for operation from ac mains (refer to specification summary).
Input (ac mains):	220/240V, 50Hz or 120V/60Hz
Consumption:	700mA nominal on full load
Output:	±15V dc regulated with short-circuit protection.
Wave Monitor Module:	
Input connections:	Two 4mm sockets on front panel or via back wiring for sensor. Two 4mm sockets on front panel for 'compensation'.
Voltage output:	±10V max., centre zero, via BNC coaxial connector on front panel or via back connector max. load 10mA.
Current output:	±10mA max., centre zero, via back connector source impedance 1k.
Indicating meter:	Centre zero for adjustment of datum. 10 turn potentiometer with calibrated dial for adjustment of output voltage. Single turn preset potentiometer for adjustment of cable compensation.
Frequency response to 95% output:	10Hz
Phase lag at 95% output:	17°
Energisation:	Nominal values
Frequencies:	4kHz, 5kHz, 6kHz, 7kHz, 9kHz, 10kHz selectable by plug and socket connector on circuit board.

SHIPPING SPECIFICATION

H40-1-1-A, H40-1-1-B and H40-1-1-G:	Volume: 0.10m ³ Gross weight: 10kg
H40-1-2-A, H40-1-2-B and H40-1-2-G:	Volume: 0.15m ³ Gross weight: 20kg
H40-1-3-A, H40-1-3-B and H40-1-3-G:	Volume: 0.17m ³ Gross weight: 30kg
H40-2-1-A, H40-2-1-B and H40-2-1-G:	Volume: 0.10m ³ Gross weight: 10kg
H40-2-2-A, H40-2-2-B and H40-2-2-G:	Volume: 0.15m ³ Gross weight: 20kg
H40-2-3-A, H40-2-3-B and H40-2-3-G:	Volume: 0.17m ³ Gross weight: 30kg

ORDERING SPECIFICATION

A simple and robust system for the measurement and recording of water wave profiles, which uses the principle of measuring the electrical conductivity between two parallel wires. The system is available in 1, 2 or 3 channel form and can display data by high speed recorder or input to a data logger. Alternative lengths of probe are 300mm or 500mm.

H40-1-1-A:	1 x 300mm probe, 1 x calibrating holder, 1 x monitor unit, 1 x power supply unit (mains), 2x blanking plates, 10m cable. Power supply: 220-240V/1ph/50Hz
H40-1-1-B:	As per A suffix, but power supply: 120V/1ph/60Hz
H40-1-1-G:	As per A suffix, but power supply: 220-240V/1ph/60Hz
H40-1-2-A:	2 x 300mm probes, 2 x calibrating holders, 2 x monitor units, 1 x power supply unit (mains), 1 x blanking plate, 2 x 10m cable. Power supply: 220-240V/1ph/50Hz
H40-1-2-B:	As per A suffix, but power supply: 120V/1ph/60Hz
H40-1-2-G:	As per A suffix, but power supply: 220-240V/1ph/60Hz

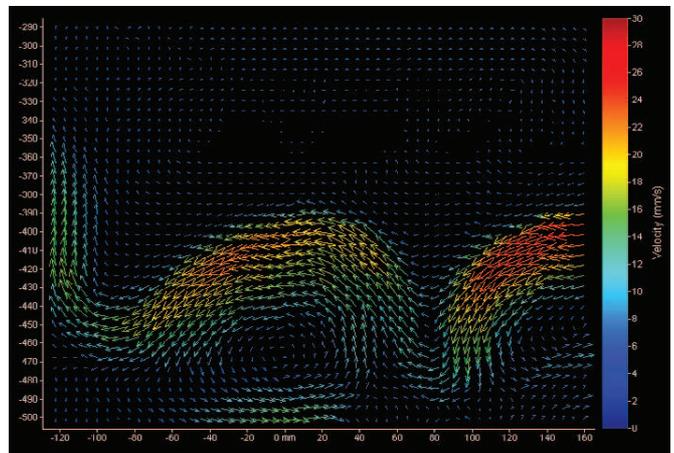


H41 - LASER PIV SYSTEM

Armfield/Etalon Research

H40 ORDERING SPECIFICATION - continued

- H40-1-3-A:** 3 x 300mm probes,
3 x calibrating holders,
3 x monitor units,
1 x power supply unit (mains),
3 x 10m cable.
Power supply: 220-240V/1ph/50Hz
- H40-1-3-B:** As per A suffix, but power supply:
120V/1ph/60Hz
- H40-1-3-G:** As per A suffix, but power supply:
220-240V/1ph/60Hz
- H40-2-1-A:** 1 x 500mm probe,
1 x calibrating holder,
1 x monitor unit,
1 x power supply unit (mains),
2 x blanking plates, 10m cable.
Power supply: 220-240V/1ph/50Hz
- H40-2-1-B:** As per A suffix, but power supply:
120V/1ph/60Hz
- H40-2-1-G:** As per A suffix, but power supply:
220-240V/1ph/60Hz
- H40-2-2-A:** 2 x 500mm probe,
2 x calibrating holder,
2 x monitor units,
1 x power supply unit (mains),
1 x blanking plate,
2 x 10m cable.
Power supply: 220-240V/1ph/50Hz
- H40-2-2-B:** As per A suffix, but power supply:
120V/1ph/60Hz
- H40-2-2-G:** As per A suffix, but power supply:
220-240V/1ph/60Hz
- H40-2-3-A:** 3 x 500mm probe,
3 x calibrating holder,
3 x monitor units,
1 x power supply unit (mains),
3 x 10m cable.
Power supply: 220-240V/1ph/50Hz
- H40-2-3-B:** As per A suffix,
but power supply: 120V/1ph/60Hz
- H40-2-3-G:** As per A suffix,
but power supply: 220-240V/1ph/60Hz



FEATURES

The H41 uses particle image velocimetry (PIV) to measure, non-intrusively, fluid velocities at multiple points in a flow, at a rate of up to 16Hz.

The compact and portable hardware (which uses a safe, non-pulsed, Class 3b laser) and the extremely easy to use software with real time display, make this an ideal tool for undergraduate teaching and demonstration.

With its sophisticated multi-pass processing, the H41 matches the performance of higher power PIV systems costing several times more. It is therefore also an ideal, cost-effective tool for experimental fluid dynamics research.

The intuitive software provides a wide range of processing, display and recording functions for both velocity and derived statistical data, using a standard PC

