

OSC 77FD100HB Hydraulics Bench

<Features>

- This is a basic unit which provide water supply and volumetric measurement services for use in conjunction with accessories for specific experiments
- The bench top is molded into a measuring tank and a channel
- Water is admitted at one end of the channel via a quick coupling for connection to an accessory which is mounted across and discharges water into the channel
- The open channel discharges water into the measuring tank which inturn discharges water to ma main storage tank and can be drained by a bottom valve
- Both bench top and storage tanks are made of fiber glass
- The measuring tank is stepped to enable accurate measurement of both high and low flow rates
- A level gauge at the side of the bench is provided for measurement of volume in the measuring tank
- A bull's eye level is provided to indicate the bench level



Photograph includes optional equipment

<Specifications>

Model	OSC 77FD 100HB
Pump	0.37kW centrifugal pump with a maximum flow rate over 80Lpm and a maximum head over 18m water
Bench top dimension	1360mm long x 770mm wide
Open channel	750mm long x 250mm wide x 170mm deep
Measuring tank	Low flow 101, High flow 451
Main storage tank	165L
Power supply	220V, 1Ph, 50Hz. Other power supply is available on request
Size	Approx. 780 x 1360 x 1050mm
Weight	Approx. 111kg

<Optional Accessories>

001HB	Bench leveling screws
002HB	Two side leve gauges are provided instead of one. The second level gauge measures level in the channel. Thus flow over a notch experiment can be run without using hook and point gauge.
003HB	Variable speed pump with a control panel instead of fixed speed pump
005HB	Measuring tank stilling baffle
006HB	Full length storage tank with capacity 250L instead of short storage tank
007HB	0.37kW submergible pump with flow rate over 150Lpm instead of contrifugal pump
011HF	Variable area flow meter, upto 75Lpm to facilitate the experiments
011-120HF	Variable area flow meter, 20-150Lpm
001HP	Pump motor if replaced by 0.55kW motor dynamometer with an inverter, a digital speed indicator and a spring balance for measurement of pump input, and pressure gauges for

*Larger pump and other accessories can be supplied on request.

OSC 77FD100HB Optional Accessories

<Features>

- The tester is designed to calibrate pressure gauge
- It consist of a precision machined stainless steel piston and cylinder lining using calibrated weights applied on the upper end of the piston rod
- The assembly is mounted on adjusting screws with a bull's eye level
- The pressure gauge is connected to the cylinder, thus+ subject to known pressure and comparison with the gauge reading can be made
- Leaking liquid from the cylinder is returned to a reservoir
- The cylinder can be refilled without removing the piston



011HB Dead Weight Pressure Tester

<Spefications>

Model	OSC 77FD 011HB
Pressure gauge	Bourdon tube, 0~3kg/cm ²
Piston cross-section	250mm ²
Piston weight	0.5kg
Calibration weight	1 x 0.5kg, 2 x 1.0, 2kg x 2.0kg
Size (WxLxH)	Approx. 200(W)x390(L)x300(H)mm
Weight	Approx. 18kg

Optional HB011-002 Additional calibration pressure gauge Cl.1 with connection.
Pressure gauge reading in kN/cm² and weights in N.

<Features>

- This equipment allows the mament caused by a fluid thrust on a wholly or partially submerged plane surface to be measured directly
- A PVC quadrand is mounted on a balance arm pivoted on knife edges which coincide with the quaderant center
- When the quadrant immerses in water, there are hydrostatic forces
- The balance arm has an adjustable counter balance and weights with a hanger
- The quadrant is mounted on top of a clear acrylic tank which allows water to be admitted and drained to a required level by a valve
- The tank rests on adjustable footings and a bull's eye level is provided



012HB Hydrostatic Pressure

<Spefications>

Model	OSC 77FD 012HB
Quadrant	Inner radius : 100mm Outer radius : 200mm Width : 75mm
Depth scale	1mm graduation
Suspended mass to fulcrum	280mm or as required
Tank capacity	6L
Weights	10g x 2, 20g x 2, 50g x 2, 100g x 2, 200g x 2 or weights in N
Size (WxLxH)	Approx. 360x460x350mm
Weight	Approx. 19kg

OSC 77FD100HB Optional Accessories

<Features>

- The apparatus is for the study of flow over a notched weir
- Three weir plates, a rectangular notch and two vee notches, are provided
- Characteristics of flow over the notches can be observed and coefficients of discharge can be determined
- The plates are attached to the open channel of the Hydraulics Bench
- Water is supplied to the channel via a discharge strainer and passes through a stilling baffle to smooth the flow
- A vernier hook and point gauge is provided to measure the height of water level in the channel



HB013 Flow Over a Notch

<Specifications>

Model	OSC 77FD 013HB
Plastic weir plates	Size (HxWxD) 165 x 245 x 5 mm
	Type : Rectangular notch, V notch (60°, 90°)
Point gauge	Range : 0~150mm Reading : 0.05mm
Size (WxLxH)	Approx. 200x600x100mm
Weight	Approx. 4kg

<Features>

- This equipment is designed to determine the metacentric height of a floating body and the height variation with the tilt angle
- The equipment consists of a rectangular pontoon
- The center of gravity of the pontoon can be moved sideways by moving horizontal jockey weight
- The angle of tilt of the pontoon is indicated by a plumb-bob on a scale attached
- The center of gravity of the pontoon can also be moved vertically by means of adjustable vertical weights on the mast and is determined by a special tool with a knife edge



014HB
Metacentric Height

<Specifications>

Model	OSC 77FD014HB
Pontoon	Size (LxWxH): 400x200x100mm 5mm thick plastics or as requested
Horizontal scale	1mm graduation
Mast height	450mm or as requested x 1mm graduation
Max. angle of tilt	±13° x 0.5° graduation
Vertical sliding weight	500g
Jockey weight	200g
Size (WxLxH)	Approx. 220x400x480mm
Weight	Approx. 3kg

OSC 77FD100HB Optional Accessories

<Features>

- Bernoulli's theorem is applied on flow through a clear acrylic Venturi tube
- Static pressure at various points along the wall of a transparent Venturi tube are directly measured on a manometer equipped with a vent valve and a hand air pump
- A movable stainless steel total head probe is also provided
- Flow through the Venturi tube is controlled by a valve at the outlet
- As a primary flow measuring device, coefficient of discharge for the Venturi tube can be determined
- The apparatus has a hose with a male quick coupling to connection to the Hydraulic B



015HB

Bernoulli's Theorem Apparatus

<Specifications>

Model	OSC 77FD 015HB
Deimeter	28mm with 14mm throat
Taper	Upstream 21°, downstream 10° or as required
Water manometer	8 tubes x 500mm x 1mm graduation
Size (WxLxH)	Approx. 360x600x83mm
Weight	Approx. 6kg

* **Option** : HF010 Flow meter, up to 35L/m to facilitate the experiments

<Features>

- This equipment determined the coefficients of discharge for different flow measuring device
- The equipment consists of a Venturi tube, an orifice plate, and a Pitot tube made from a clear acrylic, connected in series
- Pressure drop across each device is connected to a water manometer bank with a vent valve and a hand air pump
- The apparatus has a hose with a quick male coupling for connection to the Hydraulics Bench



016HB Flow Meters

<Specifications>

Model	OSC 77FD 016HB
Variable area flow meter	up to 35L/m
Venturi diameter	29mm with 17mm throat or as required
	21° or 14° taper
Orifice plate dia.	20mm on 29mm diameter tube
Pitot tube	On 19mm diameter tube
Water manometer	8 tube x 500mm x 1mm graduation
Size (WxLxH)	Approx. 360x720x780mm
Weight	Approx. 16kg

OSC 77FD100HB Optional Accessories

<Features>

- This equipment provides measurement of force developed by a water jet on difference stationary targets
- The equipment consists of a removable clear acrylic cylinder
- Water is supplied through a tube at the bottom of the cylinder and discharged vertically through a nozzle onto a target plate
- Each plate maintains the same working distance from the nozzle
- A clear acrylic guard is provided to prevent water jet from splashing on the target
- Force on the plate pushes its stem upward
- Dead weight is then applied on the stem to counter balance the force exerted by the water jet
- This balance is indicated by a pointer on a steel rod next to the weight
- The apparatus rests on adjustable footings and a bull's eye level is provided
- The apparatus has a hose with quick male coupling for connection to the Hydraulics Bench



020HB Impact of a Jet

<Specifications>

Model	OSC 77FD 020HB
Cylinder diameter	200mm
Nozzle diameter	7mm or as required
Target plate diameter	36mm or are required
Target plates	Flat 120° cone, 180° hemisphere
Nozzle and target plate material	Plastics or as required
Weights	10gx2, 20gx2, 50gx2, 100gx2, 200gx2 or weight in N
Size (WxLxH)	Approx. 360x350x760mm
Weight	Approx. 8kg

<Features>

- This equipment is designed to produce and measure free and forced vortices
- The equipment consists of a clear acrylic cylinder on a plinth
- The free vortex is generated by water discharging through an interchangeable orifice at the base of the cylinder and the resulting profile is measured by a combined caliper and depth scale
- The forced vortex is generated by a paddle at the base of the cylinder which is rotated by jets of water, and the profile is measured by a series of depth gauge
- The velocity at any point in the free and forced vortices may be measured using a pitot tube
- The apparatus has a hose with quick male coupling for connection to the Hydraulics Bench



022HB Free and Force Vortex, Rotating Paddle

<Specifications>

Model	OSC 77FD 022HB
Cylinder diameter	250mm
Height to over flow point	180mm
Orifice diameters	8, 12, 16 and 24mm
Distance from center of depth probe	0, 30, 50, 70, 90 and 110mm
Pitot tube measuring point	15, 25 and 30mm radius
Size (WxLxH)	Approx. 360x680x400mm
Weight	Approx. 8kg

OSC 77FD100HB Optional Accessories

<Features>

- This equipment demonstrates Francis turbine characteristics i.e. torque, power and efficiency at different speeds for various heads and flow rates of water
- The turbine adjustable guide vanes direct water spirally to the runner
- Inlet pressure is indicated by a pressure gauge
- Torque is measured by a prony brake with two spring balances
- Speed is indicated on a portable tachometer which is separately supplied
- Flow rate is measured by the Hydraulics Bench measuring tank
- The apparatus has a hose with a quick male coupling for connection to the Hydraulics Bench



023HBF Mini Francis Turbine

<Specifications>

Model	OSC 77FD 023HBF	OSC 77FD 023HBK
Construction	65mm diameter, 6 section bronze runner	33.5mm diameter 24 blades stainless steel runner
	Stainless steel shaft and non corrosion metal housing	
	7 adjustable stainless steel guide vanes	
	Oil seal on hardened shaft sleeve	
Rating	Transparent window	
	Max. speed : approx. 350rpm	Max. speed : approx. 5500rpm
Instrument	Max. power over 20W from 0.37kW pump	
	Pressure : 0~3kg/cm ² pressure gauge	
	Torque : 2 ea. Spring balances	
Size	Speed : Portable tachometer (option)	
Weight	Approx. 300x530x300mm (WxLXH)	
	Approx. 8.5kg	

<Features>

- This equipment demonstrates Pelton turbine characteristics i. e. torque, power and efficiency at different speeds for various heads and flow rates of water
- The turbine nozzle directs water jet to the runner buckets
- Nozzle pressure is indicated by a pressure gauge
- Torque is measured by a prony brake with two spring balances
- Speed is indicated on a portable tachometer which is separately supplied
- Flow rate is measured by the Hydraulics Bench measuring tank
- The apparatus has a hose with a quick male coupling for connection to the Hydraulics Bench



023HBP
Mini Pelton Turbine

<Specifications>

Model	OSK 77FD 023HBP
Construction	160mm diameter stainless steel runner
	Adjustable stainless steel nozzle, shaft and housing
	Mechanical seal
	Transparent window
Rating	Maximum speed approx. 1500rpm
	Maximum power over 30W for 0.37kW pump
Instruments	Pressure : 0~3kg/cm ² pressure gauge
	Torque : 2 ea, spring balances
	Speed : Potable tachmeter (option)
Size (WxLXH)	Approx. 360x450x700mm
Weight	Approx. 17kg