# 1, 2 & 4 Series
# Portable Hydraulic Testers User Manual

# Bedienungsanleitung für tragbare Hydraulik Testgeräte der Reihen 1, 2 und 4

# Manuel d'utilisation des Testeurs Hydrauliques portables des séries 1, 2 & 4

# Manual de usuario de los Testers Hidráulicos Portátiles Serie 1, 2 y 4

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**Meters with Bluetooth Contain Transmitter Module FCC ID: T9JRN4020 - IC: 6514A-RN4020**
**Tester mit Bluetooth enthalten Transmittermodul FCC ID: T9JRN4020 - IC: 6514A-RN4020**
**Débitmètres avec la fonctionnalité Bluetooth, contient un émetteur FCC ID: T9JRN4020 - IC: 6514A-RN4020**
**Medidores con Bluetooth contienen Módulo Transmisor FCC ID: T9JRN4020 - IC: 6514A-RN4020**

**EU - English**
This product contains a Bluetooth® Low Energy Module which broadcasts in the license free ISM Band as follows:
- 2.402 to 2.480GHz
- Channels 0-39
- Transmit power: +7dBm

**EU - Deutsch**
Dieses Produkt enthält ein Bluetooth® Low Energy Modul, welches im lizenzfreien ISM-Band sendet und zwar wie folgt:
- 2.402 bis 2.480GHz
- Kanäle 0-39
- Sende-Leistung: +7dBm

**UE - Français**
Ce produit contient un module basse consommation Bluetooth® qui fonctionne avec la licence gratuite ISM comme ci-dessous :
- 2.402 à 2.480GHz
- 0-39 voies
- Puissance transmise: +7dBm

**UE - Español**
Este producto contiene un módulo Bluetooth® de energía baja que emite en la licencia libre ISM Band de la siguiente:
- 2.402 a 2.480GHz
- Canales 0-39
- Potencia de transmisión: +7dBm

**United States**
Contains Transmitter Module FCC ID: T9JRN4020
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Canada**
This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Contains transmitter module IC: 6514A-RN4020

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

# Introduction

Webtec Portable Hydraulic Testers have been designed for easy connection to a hydraulic circuit so that flow, pressure and temperature can be readily checked. Testers can take full back pressure up to 210/420/480 bar (3000/6000/7000 psi) depending on the model, and the built in loading valve enables many of the operating conditions to be simulated. The tester can be connected anywhere in the hydraulic system to test pumps, motors, valves and cylinders in both flow directions.

**The tester range consists of the following types:**

- DHT 1 Series Digital Hydraulic Tester
- HT 2 Series Analogue Hydraulic Tester
- DHT 2 Series Digital Hydraulic Tester
- DHM 4 Series Digital Hydraulic Multimeter

There are different sizes and porting options to cover a wide range of flows.
**This manual covers all testers.**

Before first operating the equipment read the whole of these instructions. Safety may be impaired if they are not followed.

Webtec have been designing and manufacturing flow meters and hydraulics components for over 50 years. We operate within a Quality Management System that complies with the requirements of BS EN ISO 9001 which is externally audited and certificated each year. Beyond compliance to the standard, Webtec is committed to continually improving in everything we do; with particular emphasis on understanding what matters to our customers and suppliers, and designing our systems and work to meet their needs. We are always keen to hear from customer who may have special requirements not covered by our standard ranges.

# Basic operation

**Flow measurement**
The tester measures flow using an axial turbine mounted in the aluminium base block. The oil flow rotates the turbine and its speed is proportional to the oil velocity. The revolutions of the turbine are measured by means of a magnetic sensing head which feeds a pulse every time a turbine blade goes by to an electronic circuit. The electronic circuit has a built-in micro processor; the signal is amplified and linearised to maximise accuracy. The readout is calibrated in lpm or gpm, units are selectable on some models.

**Pressure measurement**
Where fitted, the pressure gauge has a spiral Bourdon tube and the gauge case is filled with glycerine to ensure good dampening of pulsating pressures. The gauge is connected to the base block by a fine bore capillary tube. The DHM series meters have a pressure transducer fitted directly to the base block which improves fast transient capture. All testers are bi-directional and incorporate a shuttle valve which directs the highest pressure (from inlet or outlet) to the measuring point. A gauge port is provided on the back of the base block for the addition of a low pressure gauge kit.

**Temperature**
The Thermistor temperature transducer is in contact with the oil flow and readout is on the meter scale calibrated 32 - 250°F or 0 - 120°C.

**Bi-Directional Loading Valve**
The reverse flow valve gives positive shut-off and pressure control in both directions of flow. The loading valve has two easily replaceable safety discs located in the valve assembly which internally protect the tester and machine in both flow directions.

# Installation guidance

- All hydraulic connections should be made by suitably qualified personnel.
- Avoid sharp bends because high pressure hoses will deflect and straighten under pressure.
- A preliminary check of the hydraulic system's oil supply, pump rotation, filters, oil lines, cylinder rods as well as looking for external leaks should be made prior to installing the Hydraulic Tester.
- Although the Bi-Directional tester can be used in both flow directions, the preferred direction is indicated by the larger arrow on the panel. When the tester is used for reverse flow tests, slightly lower accuracies may be obtained depending on the oil viscosity, density and compressibility.
- The tester should be connected to the hydraulic circuit by means of flexible hoses 1 - 2 metres long.
- The use of quick-disconnect couplings can save time. Make sure the hoses are long enough so that the tester can be used safely on the machine.
- The hoses and fittings at the inlet to the tester must be of adequate size for the flow being tested. Elbows, rotary couplings etc., at the inlet and outlet ports of the tester should be avoided to ensure accurate readings.
- The use of the flexible hoses will help to isolate the test unit from vibration which often exists.
- The internal burst discs are to protect the tester not the hydraulic installation. Always ensure the appropriate relief devices are fitted to protect the installation.

# General Operation

**All tests should be performed by suitably qualified personnel.**

1. Connect the Tester to the circuit (see above for installation guidance)
2. Ensure that the pressure loading valve is fully opened by turning the knob counter clockwise.
3. Switch the unit on. On digital models if the display flashes, or on analogue models if the needle points to the symbol, then the battery needs replacing.
4. Select the desired test using the front panel controls where applicable.
5. IMPORTANT: Ensure that all connections are tightened and the oil can flow freely throughout the hydraulic system BEFORE running the machine at full speed. Check that the circuit is correctly connected and any shut-off valves are opened. Also quick disconnect couplers MUST be open.
6. Start the pump momentarily to ensure there is no obstruction which could cause pressure build up.
7. Check for leaks and free flow of oil
8. The tester is now ready for use - run the machine and adjust the loading valve as needed
9. When the test is completed fully open loading valve.

## Notes

When low pressure testing is required, connect the optional low pressure gauge with automatic cut-out valve to the tester block.

Testers have an automatic electronic system which shuts the power off after approximately 20 minutes should you forget. To reactivate the tester, turn the selector switch to the “OFF / RESET” position then back to ‘ON’.

**Performance**

All 600 & 800 models have limited pressure control below 86 lpm (23 USgpm). The maximum controllable pressure in this region is calculated by: Max. pressure (in bar) = 5 x flow (lpm) +30.

**Do not use with water**

The standard Webtec Hydraulic Testers are designed for use with mineral oil having reasonable lubrication properties. They are not suitable for use with water or fluids with a high water content. If a tester is contaminated with water it should be flushed immediately with white or methylated spirit or similar and then flushed with mineral oil to minimise any internal corrosion. This may avoid an expensive repair. Damage to a tester from the use of a non-approved fluid invalidates our normal warranty.

# General Specification for all models

**Ambient temperature**: 5 to 40°C (41 - 104°F)
**Fluid type**: Mineral oil to ISO 11158 category HM (for other fluid types please contact Sales).
**Fluid temperature**: DHT & HT - 0 to 120°C (32 - 250°F)
DHM - 0 to 105°C (32 - 220°F)
**Accuracy**: see model specifications
**EMC Environment**: This equipment is intended for use within industrial and residential environments and does not suffer any degradation in operation when subjected to test conditions according to requisite standards.

**Construction materials**
**Case**: Painted mild steel
**Flow block**: High tensile aluminium
**Seals**: FKM as standard - EPDM seals on request

**Battery Details**
PP3 9 volt Alkaline (IEC6LR61, ANSI/NEDA 1604A)

## Dimensions and Weight

| Model | Height | Width | Depth | Weight |
|---|---|---|---|---|
| DHT401<br>HT302/402<br>DHT302/402<br>DHM404 | 200 mm<br>7.87 inches | 240 mm<br>9.45 inches | 200 mm<br>7.87 inches | 6.5 kg<br>14.33 lbs |
| DHT801<br>HT602/802<br>DHT602/802<br>DHM804 | 225 mm<br>8.86 inches | 245 mm<br>9.65 inches | 225 mm<br>8.86 inches | 10 kg<br>22 lbs |

## Fluid viscosity

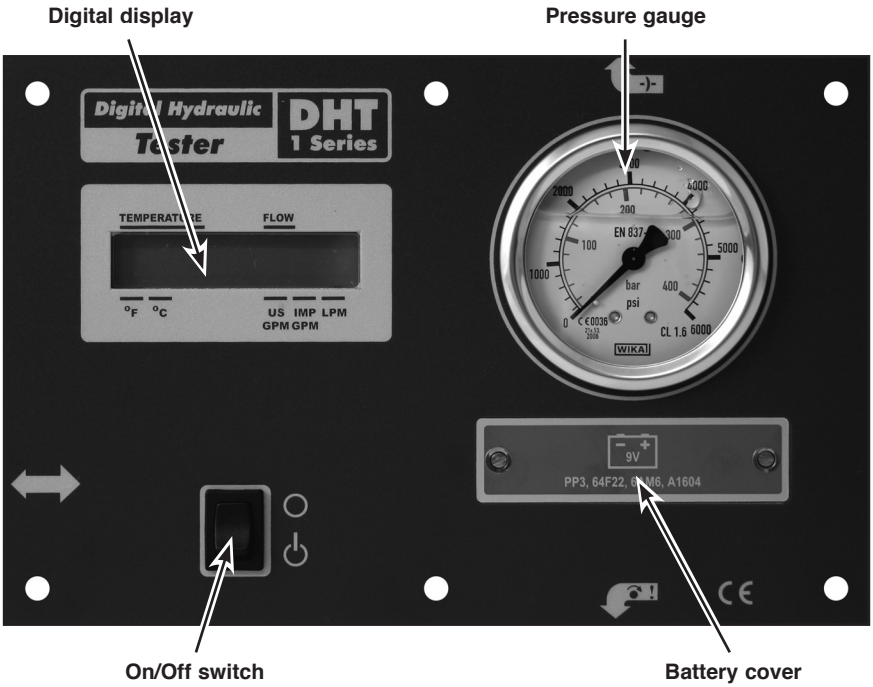
The performance of the tester can be affected by the viscosity of the fluid measured. Our testers are calibrated at a mean viscosity of 21 cSt using ISO32 hydraulic mineral oil to ISO11158 category HM. The shaded area of the table shows the range of viscosities that can be measured by a tester with standard calibration with minimal effect on the accuracy (less that ± 1% FS).

**Table showing kinematic viscosity (cSt) of different mineral oils at specific temperatures**

| | Fluid type | | | | | |
|---|---|---|---|---|---|---|
| **Temp °C** | **ISO15** | **ISO22** | **ISO32** | **ISO37** | **ISO46** | **ISO68** |
| 0 | 85.9 | 165.6 | 309.3 | 449.9 | 527.6 | 894.3 |
| 10 | 49.0 | 87.0 | 150.8 | 204.7 | 244.9 | 393.3 |
| 20 | 30.4 | 50.5 | 82.2 | 105.5 | 127.9 | 196.1 |
| 30 | 20.1 | 31.6 | 48.8 | 59.8 | 73.1 | 107.7 |
| 40 | 14.0 | 21.0 | 31.0 | 36.6 | 44.9 | 63.9 |
| 50 | 10.2 | 14.7 | 20.8 | 23.9 | 29.4 | 40.5 |
| 60 | 7.7 | 10.7 | 14.7 | 16.5 | 20.2 | 27.2 |
| 70 | 6.0 | 8.1 | 10.9 | 12.0 | 14.6 | 19.2 |
| 80 | 4.8 | 6.4 | 8.4 | 9.1 | 11.1 | 14.3 |
| 90 | 4.0 | 5.2 | 6.6 | 7.2 | 8.7 | 11.1 |
| 100 | 3.3 | 4.3 | 5.5 | 6.0 | 7.1 | 8.9 |

ISO 15, 22, 32, 46 and 68 based on typical figures for the Esso Nuto range of HM oils. ISO 37 based on Shell Tellus HM oil.

# DHT 1 Series Digital Hydraulic Tester




## Specification

**EU** (lpm/Centigrade)

| Model Number | Flow Range (lpm) | Pressure Range (bar) | Inlet/Outlet Ports |
|---|---|---|---|
| DHT401-B-6 | 10 - 400 | 0 - 420 | 1” BSPP |
| DHT801-S-7-L | 20 - 800 | 0 - 480 | 1-7/8” -12UN #24 SAE ORB |
| DHT801-F-3-L | 20 - 800 | 0 - 210* | 1-1/2” SAE Code 61 4-Bolt Flange |

**US** (gpm/Fahrenheit)

| Model Number | Flow Range (gpm) | Pressure Range (psi) | Inlet/Outlet Ports |
|---|---|---|---|
| DHT401-S-6 | 2.5 - 100 | 6000 | 1-5/16” -12UN #16 SAE ORB |
| DHT801-S-7 | 5 - 210 | 7000 | 1-7/8” -12UN #24 SAE ORB |
| DHT801-F-3 | 5 - 210 | 3000* | 1-1/2” SAE Code 61 4-Bolt Flange |

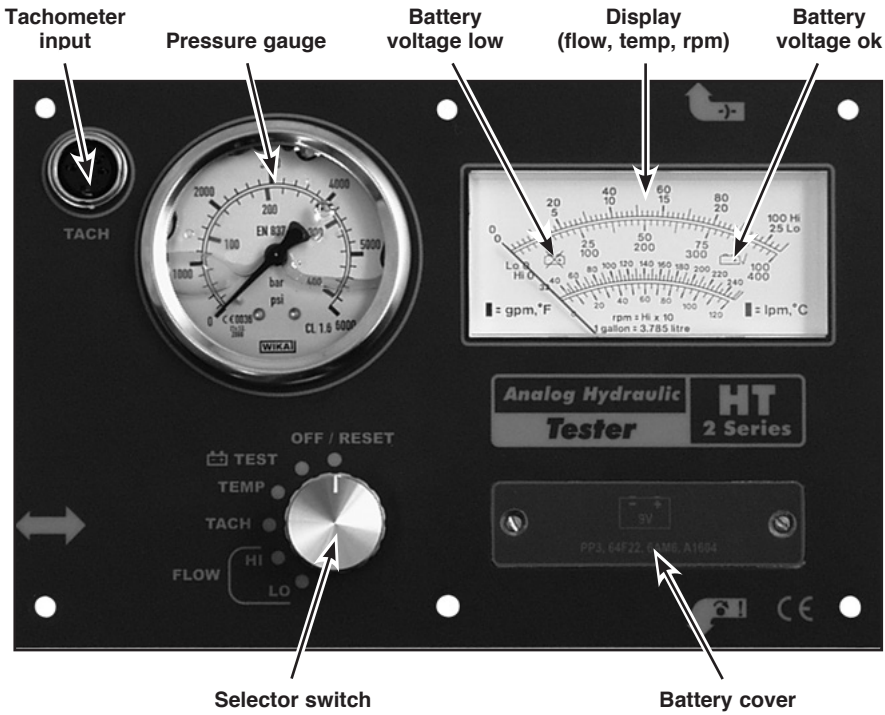
* per J518 SAE Code 61 standard

**Flow Accuracy:** ± 1% of full scale.

**Pressure Accuracy:** ± 1.6 % of full scale.

**Temperature Accuracy:** ± 1°C, 2°F.

# HT 2 Series Analogue Hydraulic Tester




- **Tachometer input** - Connection socket for the optional infra-red phototachometer.
- **Selector switch** - Turn the switch to select the required function.
  - **OFF/RESET** - Switches the tester off and resets the unit after automatic power shut off.
  - **'B' TEST** - Checks the condition of the battery.
  - **TEMP** - Temperature is indicated on the display.
  - **TACH** - RPM is indicated on the display.
  - **FLOW 'HI'** - Flow is indicated on the 'Hi' scale of the display.
  - **FLOW 'LO'** - Flow is indicated on the 'LO' scale of the display.

# Specification

**EU**

| Model Number | Flow Range (lpm) | Flow Scales (lpm) Low | High | Pressure Range (bar) | Speed (rpm) | Inlet/Outlet Ports |
|---|---|---|---|---|---|---|
| HT302-B-6 | 8 - 300 | 0 - 75 | 0 - 300 | 0 - 420 | 300 - 3000 | 1” BSPP |
| HT402-B-6 | 10 - 400 | 0 - 100 | 0 - 400 | 0 - 420 | 300 - 4000 | 1” BSPP |
| HT602-S-7 | 20 - 600 | 0 - 150 | 0 - 600 | 0 - 480 | 300 - 6000 | 1-7/8” -12UN #24 SAE ORB |
| HT802-S-7 | 20 - 800 | 0 - 200 | 0 - 800 | 0 - 480 | 300 - 5000 | 1-7/8” -12UN #24 SAE ORB |

**US**

| Model Number | Flow Range (gpm) | Flow Scales (gpm) Low | High | Pressure Range (psi) | Speed (rpm) | Inlet/Outlet Ports |
|---|---|---|---|---|---|---|
| HT302-S-6 | 2 - 80 | 0 - 20 | 0 - 80 | 6000 | 300 - 3000 | 1-5/16” -12UN #16 SAE ORB |
| HT402-S-6 | 2.5 - 100 | 0 - 25 | 0 - 100 | 6000 | 300 - 4000 | 1-5/16” -12UN #16 SAE ORB |
| HT602-F-3 | 5 - 160 | 0 - 40 | 0 - 160 | 3000* | 300 - 6000 | 1-1/2” SAE Code 61 4-Bolt Flange |
| HT602-S-7 | 5 - 160 | 0 - 40 | 0 - 160 | 7000 | 300 - 6000 | 1-7/8” -12UN #24 SAE ORB |
| HT802-F-3 | 5 - 210 | 0 - 50 | 0 - 210 | 3000* | 300 - 5000 | 1-1/2” SAE Code 61 4-Bolt Flange |
| HT802-S-7 | 5 - 210 | 0 - 50 | 0 - 210 | 7000 | 300 - 5000 | 1-7/8” -12UN #24 SAE ORB |

* per J518 SAE Code 61 standard

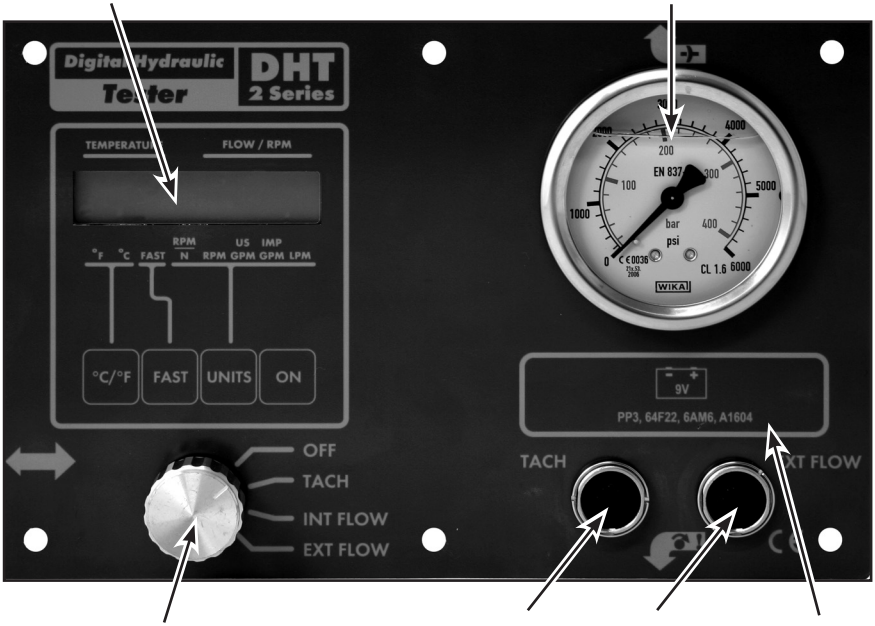
**Flow Accuracy:** ± 1% of full scale.

**Pressure Accuracy:** ± 1.6% of full scale.

**Temperature Accuracy:** ± 2°C, 4°F.

**Speed:** Needs optional infra-red phototachometer using one or more retro-reflective marks. Range: See Table.
**Accuracy:** ± 2% of full scale.

# DHT 2 Series Digital Hydraulic Tester




- **Change settings indicated by the ^ on the display** - using the °C/°F and UNITS buttons. The FAST button changes the screen refresh from 1 to 3 times per second.
- **Tachometer input** - Connection socket for the optional infra-red phototachometer.
- **External flow** - Connection socket for optional second 'LT' series flow meter, to measure a second flow and temperature.
- **Selector switch** - Turn the switch to select the required function.
  - **OFF** - Switches the tester off and disconnects the battery.
  - **TACH** - RPM is indicated on the display.
  - **INT FLOW** - Display flow and temperature measured by the internal flow meter.
  - **EXT FLOW** - Display flow and temperature measured by the optional external flow meter.

# Specification

**EU** (lpm/Centigrade)

| Model Number | Flow Range (lpm) | Pressure Range (bar) | Speed (rpm) | Inlet/Outlet Ports |
|---|---|---|---|---|
| DHT302-B-6 | 8 - 300 | 0 - 420 | 300 - 6000 | 1” BSPP |
| DHT402-B-6 | 10 - 400 | 0 - 420 | 300 - 6000 | 1” BSPP |
| DHT602-F-3-L | 20 - 600 | 0 - 210* | 300 - 6000 | 1-1/2” SAE Code 61 4-Bolt Flange |
| DHT602-S-7-L | 20 - 600 | 0 - 480 | 300 - 6000 | 1-7/8” -12UN #24 SAE ORB |
| DHT802-F-3-L | 20 - 800 | 0 - 210* | 300 - 6000 | 1-1/2” SAE Code 61 4-Bolt Flange |
| DHT802-S-7-L | 20 - 800 | 0 - 480 | 300 - 6000 | 1-7/8” -12UN #24 SAE ORB |

**US** (gpm/Fahrenheit)

| Model Number | Flow Range (gpm) | Pressure Range (psi) | Speed (rpm) | Inlet/Outlet Ports |
|---|---|---|---|---|
| DHT302-S-6 | 2 - 80 | 6000 | 300 - 6000 | 1-5/16” -12UN #16 SAE ORB |
| DHT402-S-6 | 2.5 - 100 | 6000 | 300 - 6000 | 1-5/16” -12UN #16 SAE ORB |
| DHT602-F-3 | 5 - 160 | 3000* | 300 - 6000 | 1-1/2” SAE Code 61 4-Bolt Flange |
| DHT602-S-7 | 5 - 160 | 7000 | 300 - 6000 | 1 7/8” -12UN #24 SAE ORB |
| DHT802-F-3 | 5 - 210 | 3000* | 300 - 6000 | 1-1/2” SAE Code 61 4-Bolt Flange |
| DHT802-S-7 | 5 - 210 | 7000 | 300 - 6000 | 1 7/8” -12UN #24 SAE ORB |

* per J518 SAE Code 61 standard

**Flow Accuracy:** ± 1% of indicated reading (over 15 - 100% of range).
**Pressure Accuracy:** ±1.6% of full scale.
**Temperature Accuracy:** ± 1°C, 2°F.
**Speed:** Needs optional infra-red phototachometer using one or more reflective marks. Range 300 - 6000 rpm. **Accuracy:** ± 1/4% of full scale with one count per revolution.

## Program Mode - EXT, INT and TACH.

**External Flow - EXT**

1. Turn selector switch to Ext.Flow.
2. Press °C/°F button and hold down. Then press ON i.e. two buttons are pressed at the same time.
3. On the left side of the display appears the turbine type number i.e. 750 is 750 lpm, on the right side of the display is the standard calibration number. Use the FAST key to browse through the list of turbine types. Press UNITS to select a turbine type.
4. Use the FAST key to increment the number above the cursor. Press UNITS to move to the next column. After entering the calibration factor press UNITS until the display overflows. The display will now show the number of digits after the decimal point. Use the FAST key to select the number of decimal places to appear on the display.
5. Press the ON button to store the entries.

**Internal Flow - INT**

The internal calibration factor can be loaded by switching to INT and repeating the program instructions above.

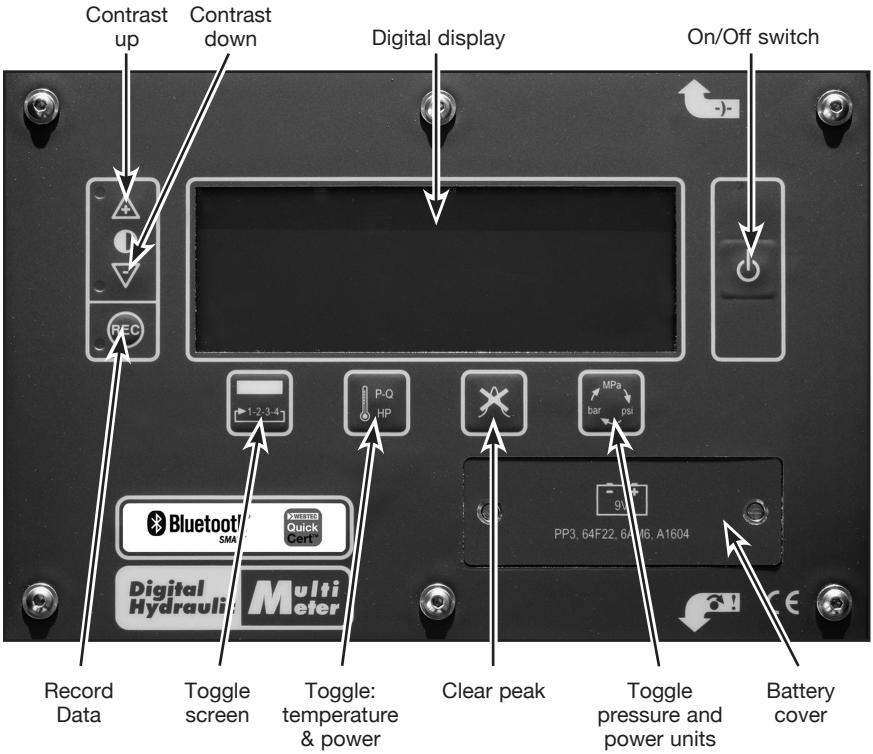
**TACH**

The calibration factor for RPM is pre-programmed for a factor of 1.0. For the RPM/N function the tachometer provides N pulses per revolution of the shaft.

**To set factor N:**

1. Turn selector switch to TACH.
2. Press °C/°F button and hold down. Then press ON i.e. two buttons are pressed at the same time.
3. The display shows the current value for “N”. Use the FAST key to increment the number above the cursor. Press UNITS to move to the next column.
4. Press the ON button to store the entries.

# DHM 4 Series Digital Hydraulic Multimeter




- **Contrast up** - Press & hold to make the screen text darker and easier to read in different light conditions.
- **Contrast down** - Press & hold to make the screen text lighter.
- **Record data** – Pressing this button when viewing live data (screen 1, 2 or 3) will record the current values.
- **Toggle screen** - This button toggles through the four display screens, three live data views and the record review screen.
- **Toggle between temperature & power (P-Q)** - Pressing this button will change the bottom line of the display from temperature to power. This button is also used to start the efficiency display on screen 3.
- **Clear peak** - Press to clear the peak pressure value
- **Toggle pressure and power units** - Toggles through a selection of engineering units for pressure and the corresponding power units.
- **ON/OFF button** – A momentary press turns the unit ON. Press and hold for 2sec to turn OFF.

# Specification

**EU** (lpm/Centigrade)

| Model Number | Flow Range (lpm) | Pressure Range (bar) | Inlet/Outlet Ports |
|---|---|---|---|
| DHM404-B-6 | 10 - 400 | 0 - 420 (0 - 600 peak) | 1” BSPP |
| DHM804-S-7-L | 20 - 800 | 0 - 480 (0 - 600 peak) | 1-7/8” -12UN #24 SAE ORB |

**US** (gpm/Fahrenheit)

| Model Number | Flow Range (gpm) | Pressure Range (psi) | Inlet/Outlet Ports |
|---|---|---|---|
| DHM404-S-6 | 2.5 - 100 | 0 - 6000 (0 - 8700 peak) | 1-5/16” -12UN #16 SAE ORB |
| DHM804-S-7 | 5 - 210 | 0 - 7000 (0 - 8700 peak) | 1-7/8” -12UN #24 SAE ORB |

**Flow**
The EU version displays flow in lpm, the US version displays flow in gpm.
**Accuracy:** ± 1% of indicated reading (over 15 - 100% of range).

**Pressure and peak pressure**
Measured using a built-in pressure transducer rated to 600 bar / 8700 psi. The transducer has a typical response time of <1 ms to enable the accurate capture of peak pressures. The meter samples the pressure transducer 1000 times per second and updates the peak display appropriately. The engineering units for pressure can be changed using the ‘pressure units’ button on the front panel. Standard units are ‘BAR, PSI, MPA, KSC’.
**Accuracy:** Pressure 0.5% FSD, Peak 1% FSD.
**Peak Pressure:** capture rate = 1ms

**Temperature**
Sensed by a thermistor built into the flow transducer to maximise contact with the oil flow and ensure fast response. The EU version displays temperature in °C, the US version displays temperature in °F.
**Accuracy:** ± 1°C, 2°F.

**Power**
Calculated from the flow and pressure, the hydraulic power is displayed in either HP or KW. The engineering units for power are linked to the pressure units and can be changed using the ‘pressure units’ button on the front panel.
**Accuracy:** ± 3 kW / 4 HP (≤ 100 kW / 134 HP), ± 5 kW / 6.7 HP (> 100 kW / 134 HP).

**Volumetric efficiency**
Calculated as a ratio of the flow at high pressure to the flow under reference conditions. Volumetric Efficiency is expressed as a percentage, at constant rpm.
**Accuracy:** ± 1% point.

**Data Recording:** up to 12 sets of data points can be saved to internal memory

**LCD Display:** High contrast, fast response 4 line display. Update rates of measurements:
Digital values @1.4Hz
Analogue bars @ 14Hz
Peak Pressure capture @1ms

**Battery Life:** approximately 15 hours of normal use with high capacity Alkaline unit.

**IP54** Internal Protection of electronic circuits.

**iOS® App’**
Application programs are only available for phones or tablets running iOS operating systems.
Handheld devices must support Bluetooth® Smart (v4.1) or greater.
Apple iOS v8.1 or higher.
NB. For Apple iPhone 5S upwards.

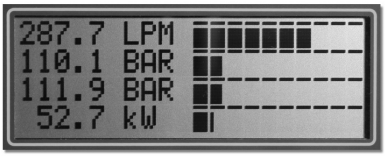
Download on the App Store | WEBTEC Quick Cert™

Visit the iTunes® store and download the Webtec Quick Cert App’ to your mobile device.

**Screen 1 (Digital)**


This screen displays the measurement type, value and engineering units in digital format. Bottom line displays either Power or Temperature depending on selection.

**Screen 2 (Analogue)**



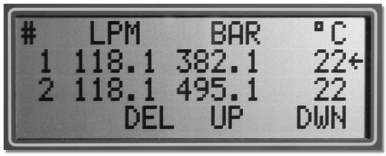

This screen displays the measurements in the same order as in SCREEN 1, but this time displays the value, engineering units and a bar graph which corresponds to the value indicated. The bar graph is scaled from zero to the maximum value for the tester (see below). Bottom line displays Power or Temperature depending on selection.
NB. Analogue bars update @14Hz to provide a visual indication of rapid activity.

| **Bar graph scaling:** | | **EU** | | | **US** | |
|---|---|---|---|---|---|---|
| | | **DHM404** | **DHM804** | | **DHM404** | **DHM804** |
| **Flow** | **LPM** | 0 - 400 | 0 - 800 | **GPM** | 0 - 100 | 0 - 210 |
| **Pressure** | **BAR** | 0 - 600 | 0 - 600 | **PSI** | 0 - 8700 | 0 - 8700 |
| **Peak** | **BAR** | 0 - 600 | 0 - 600 | **PSI** | 0 - 8700 | 0 - 8700 |
| **Temperature** | **°C** | 0 - 120 | 0 - 120 | **°F** | 32 - 250 | 32 - 250 |
| **Power** | **kW** | 0 - 400 | 0 - 800 | **HP** | 0 - 536 | 0 - 1072 |

**Screen 3 (P - Q)**


This screen is used for testing pump volumetric efficiency. The screen initially displays flow and pressure on the top two lines as in SCREEN 2 and power on the bottom two lines. Once the efficiency reference point has been captured, then the third line displays the current efficiency and the bottom line shows the reference point, the top two lines will continue to display the current flow and pressure.

**Screen 4 (Data Review)**




This screen displays any recorded parameters and provides delete options.

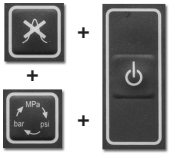
## DHM Operation

To turn the meter ON press this button momentarily.
To turn the meter OFF press and hold this button.

As the meter turns on two information screens display status data including:

- Current version of software running on the meter.
- Total run time in minutes.
- Turbine type.
- Turbine calibration number.
- Calibration date.
- Meter serial number.

After the two information screens the meter reverts to the previously used display screen.
**Note:** Low battery warning is issued by the display screen flashing. Reliable operation cannot be expected in these circumstances - the battery must be replaced.




Holding the clear peaks button at power on will toggle the temperature units.

Holding the pressure units button at power on will toggle the flow units.

Holding both buttons at power on will toggle the temperature and flow units.

When the meter is turned ON the contrast buttons can be used to adjust the display to suite the ambient light conditions. Settings are saved.


Pressing the P-Q button while on screen 1 will toggle the bottom line, temperature display between power and temperature.


As pressure changes the actual and peak values are updated on the display. Peak pressure is captured at a typical rate of 1ms, allowing the display of rapid transition spikes, otherwise missed.

Pressing the clear peaks button clears the peak capture memory.


Pressing the pressure units button scrolls through the available pressure engineering units. If power is being displayed, then its engineering units will change to suite the selected pressure units.


Pressing the screen selection button scrolls through the four available screens: digital display, digital + bar graphs, power/efficiency and record review.


Pressing the P-Q/HP button while in screen 3 initiates the efficiency display. It captures the flow and pressure to memory and treats this as the 100% reference point. The bottom line of the display shows the flow and pressure that are saved as the reference marker:


In efficiency mode, as the flow and pressure vary the % value on line 3 changes to indicate the difference from the starting point:



Pressing the record button while in screens 1, 2 or 3 (live data view) will save the instantaneous flow pressure and temperature values to memory. If there is available memory the display acknowledges by displaying “SAVED”. If there is no available memory the display warns “MEMORY FULL”.

This is screen 4, recorded data review and delete screen:


This display shows a table of captured data points that can be navigated by the ‘soft menu’ keys designated on the bottom line.

Clear peaks button becomes the scroll “UP” key.


Pressure unit’s button becomes the scroll “DWN” key.


PQ/HP button becomes the “DEL” key.

The ‘soft menu’ action of these buttons allows the user to scroll up and down the recorded data table with an option to delete data.


The delete options are indicated by ‘soft menu’ designators on line 4 and allow either the last data item or all data items to be erased.

**Failure to connect to mobile device**

If there are persistent failures when attempting to Import data with a mobile device the following reset procedure may help:

- Turn the meter OFF
- Hold down the REC button and turn the meter ON. Keep the REC button pressed until normal display screen appears.

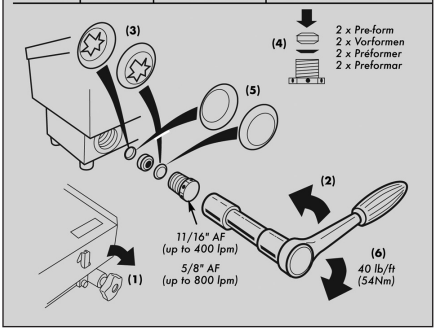
# Maintenance and service

## Battery replacement

- Turn tester off.
- Loosen the two screws either end of the battery cover.
  **Note**: They are captive screws.
- Carefully remove battery and disconnect.
- Connect new PP3 battery (See General Specification for details), place in tester and replace battery cover.
  **Note**: Only replace with similar size and type of battery.

## Replacement of burst discs

| Flow size | Part No. | Pressure Rating | Colour Code |
|---|---|---|---|
| up to 400 lpm (Ø16mm) | FT338-4<br>FT338-5<br>FT338-6 | 4000 psi (280 bar)<br>5000 psi (345 bar)<br>6000 psi (420 bar) | Green; Grün; Vert; Verde<br>Blue; Blau; Bleu; Azul<br>Red; Rot; Rouge; Rojo |
| up to 800 lpm (Ø19,8mm) | FT545-3<br>FT545-5<br>FT545-6<br>FT545-7 | 3000 psi (210 bar)<br>5000 psi (345 bar)<br>6000 psi (420 bar)<br>7000 psi (480 bar) | Yellow, Gelb, Jaune, Amarillo<br>Blue; Blau; Bleu; Azul<br>Red; Rot; Rouge; Rojo<br>Orange; Orange; Orange; Naranja |




- Disconnect the tester from the hydraulic circuit
- Locate the new discs - the tester is shipped with spare discs located in the block
- Screw the load valve fully shut - (clockwise)
- Unscrew the safety disc holder from the valve
- Remove the disc spacer and ruptured discs from the valve and disc holder
- Carefully shape the two new discs by pressing them by hand between the disc holder and spacer
- Place the first disc inside the valve
- Replace the spacer
- Place the second disc on top of the spacer
- Screw in the disc holder, tighten to 54 Nm (40 lb.ft)
- Unscrew the load valve fully
- Re-connect the tester if required

### Calibration

Recommended period between calibrations is 12 months. Maximum period between calibrations is 36 months. Unit accuracy may be affected by operating cycle, fluid condition or extended periods between recalibrations.

Testers can be specially calibrated at a different viscosity to the standard, please contact sales for further information.

# Accessories

Low pressure gauge kit - comprises 63 mm Glycerine filled 40 bar (600 psi) gauge with automatic cut-out valve, pressure test point and 300 mm (12”) long micro bore hose. The test point is fitted permanently into the tester block and the low pressure gauge can be connected by hand without the need to stop the machine.

For 2 series testers only: Infrared photo tachometer comprises infrared photo tach head, six metre connecting cable and reflective tape. The BA20 magnetic base with flexible arm is also available, this is used to secure the tacho head on the machine.

A range wide range of general accessories are available, these include pressure transducers, high pressure temperature sensors adaptors, cables and remote displays, please consult sales office

Only use Webtec approved parts and accessories, using other parts could cause permanent damage to the tester or comprise safety.

## Manufacturer's Five Year Limited Warranty

Webtec Products Ltd. warrants to the original purchaser, for the period of five years from the date of purchase, that each new hydraulic tester is free from defect in materials and workmanship.

This warranty does not cover any hydraulic tester that has been damaged due to abuse or operation beyond the maximum specifications stated by Webtec Products Ltd. in the associated hydraulic tester literature or by use on incompatible fluids.

Webtec Products Ltd. sole obligation under the warranty is limited to the repair or the replacement of parts, at no charge, found to be defective after inspection by Webtec Products Ltd. or one of its divisions. Repair or replacement of parts will be at Webtec Products Ltd. discretion.

Written authorisation from Webtec Products Ltd. is required before any hydraulic tester can be returned under warranty. Cost of shipping and handling is covered during the first 12 months from the date of purchase. After 12 months from the date of purchase, cost of shipping and handling is not covered by the warranty.

Webtec Products Ltd. is not liable for any consequential damages or any contingent liabilities arising out of the failure of any hydraulic tester, component part or accessory.

The above warranty supersedes and is in place of all other warranties, either expressed or implied and all other obligation or liabilities. No agent, or representative or distributor has any authority to alter the terms of this warranty in any way.

## Fünf Jahre begrenzte Garantie des Herstellers

Webtec Products Ltd. garantiert an den Erstkäufer, über einen Zeitraum von fünf Jahren ab Verkaufsdatum, dass jeder neue Hydrauliktester frei von Fehlern in Material und Verarbeitung ist.

Diese Garantie erstreckt sich nicht auf Hydrauliktester, welche durch Missbrauch, fehlerhafter Bedienung oder Bedienung über die Grenzen des Testers (wie von Webtec Products Ltd in der Literatur angegeben) hinaus, entstanden sind. Ferner durch die Verwendung von nicht geeigneten Flüssigkeiten.

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Schriftliche Ermächtigung durch Webtec Products Ltd ist notwendig, bevor ein Tester unter Garantie retourniert werden darf. Versand- und Bearbeitungsgebühren sind, während den ersten 12 Monaten ab Verkaufsdatum, gedeckt. Nach 12 Monaten ab Verkaufsdatum sind Versand- und Bearbeitungsgebühren nicht durch die Garantie gedeckt.

Webtec Products Ltd. ist nicht haftbar für Folgeschäden oder Folgekosten, welche durch einen Ausfall oder einer Fehlfunktion eines Hydrauliktesters, Zubehörs, Teile davon oder Komponententeile entstehen könnten.

Obige Garantie ersetzt und ist anstelle aller anderen Garantien, welche angeführt oder angedeutet wurden und anstelle aller anderen Verpflichtungen und Verbindlichkeiten. Kein Wiederverkäufer, Agent oder Distributor hat ein Recht die Konditionen dieser Garantie in irgendeiner Weise zu ändern.

## Cinq ans de garantie fabricant

Webtec Products Ltd. garantit à l'acheteur initial que pendant la période de cinq années qui suit l'achat, tout nouveau testeur hydraulique est exempt de défaut de fabrication et de matériaux.

Cette garantie ne couvre pas les testeurs hydrauliques détériorés par une utilisation abusive, ou utilisés au dessus des spécifications maximales établies par Webtec Products Ltd. dans les documentations techniques associées, ou encore par l'utilisation d'un fluide incompatible.

Dans le cadre de la garantie, l'unique obligation de Webtec Products Ltd. se limite, à titre gratuit, à la réparation ou remplacement des pièces que Webtec Products Ltd. ou une de ses divisions aura trouvées défectueuses. La réparation ou le changement des pièces se fera à notre discrétion.

Une autorisation écrite de Webtec Products Ltd est requise avant tout retour, sous garantie, d'un testeur hydraulique. Les frais de transport et de garde sont couverts durant les 12 mois qui suivent la date d'achat. 12 mois après la date d'achat, les frais de transport et de garde ne sont plus couverts par la garantie.

Webtec Products Ltd. n'est en aucun cas responsable des dégâts causés ou des éventuelles conséquences qui résulteraient d'un défaut d'un testeur hydraulique, d'une pièce ou d'un accessoire.

La garantie présentée ci-dessus supplante et prend la place de toutes les autres garanties, exprimées ou impliquées ainsi que les autres obligations et responsabilités. Aucun agent, revendeur ou distributeur, en aucun cas, n'a le pouvoir ou l'autorité de modifier les termes de cette garantie.

## Garantía limitada del fabricante de 5 años

Webtec Products Ltd. garantiza al comprador original, durante un periodo de cinco años a partir de la fecha de compra, que todos los testers hidráulicos nuevos estarán libres de defectos materiales y de mano de obra.

Esta garantía no incluye ningún tester hidráulico que haya resultado dañado debido al abuso o funcionamiento más allá de las especificaciones máximas indicadas por Webtec Products Ltd. en la literatura asociada con el tester hidráulico o mediante su uso con líquidos incompatibles.

La única obligación de Webtec Products Ltd. al amparo de esta garantía está limitada a la reparación o sustitución de piezas gratis, siempre y cuando las mismas demuestren estar defectuosas después de la inspección realizada por Webtec Products Ltd. o por una de sus divisiones. La reparación o sustitución de las piezas defectuosas será a la absoluta discreción de Webtec Products Ltd.

Antes de devolver cualquier tester hidráulico al amparo de esta garantía es necesario obtener el consentimiento escrito de Webtec Products Ltd. Los gastos de envío y manipulación están cubiertos durante los 12 primeros meses de la fecha de compra. Después de 12 meses de la fecha de compra, los gastos de envío y manipulación no están cubiertos por la garantía.

Webtec Products Ltd. no es responsable de ningún daño indirecto ni de cualquier responsabilidad contingente que pueda surgir del fallo de cualquier tester hidráulico, componente, pieza o accesorio.

Esta garantía sustituye y se ofrece en lugar de cualquier otra garantía, expresa o implícita y de cualquier otra obligación o responsabilidad. Ningún agente, representante o distribuidor está autorizado a modificar en forma alguna los términos de esta garantía.

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Veuillez ne pas retourner d'appareil sans autorisation écrite
Favor de no devolver mercancías sin autorización por escrito

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