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Budenberg BGH600DWT Series

Portable Hydraulic Dead-Weight Testers



Operating and Maintenance Instructions

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Safety Precautions

MINERAL OILS HEALTH AND SAFETY (C.O.S.H.H.) INFORMATION

Budenberg provide hydraulic mineral oil in 500 ml containers labelled "ISO VG 22" for use up to 1400 bar in dead-weight testers and pressure comparators. It is no more hazardous than other common lubricating oils.

It is the nature of the way in which this equipment is used, that there could be frequent and/or prolonged skin contact; in a few individuals this could give rise to skin irritation (Keratosis or Dermatitis). The use of an effective barrier cream will greatly reduce this possibility.

DESCRIPTION

Closed flash point:	greater than 120°C.
Storage:	not above 30°C.
Oral LD 50:	15 g per kg body weight.
Threshold limit value:	5 mg/m ³ .
Fire extinguishing media:	carbon dioxide/dry chemical foam or water fog.
Spillage:	Soak with absorbent clay or proprietary absorbent.
Waste disposal:	Burn or dump in approved area.

EMERGENCY TREATMENT OF ACUTE EFFECTS

Ingestion:	Do not induce vomiting. Administer 250 ml milk or olive oil.
Aspiration:	The main hazard following accidental ingestion is aspiration of liquid into lungs. Send to hospital immediately.
Inhalation:	Remove to fresh air, if nausea persists seek medical attention.
Eye Contact:	Wash with copious amounts of water for at least 10 minutes. If irritation results or persists, obtain medical advice.
Skin Contact:	Where skin rashes or other abnormalities occur as a result of prolonged or repeated contact, medical advice should be obtained as soon as possible.

OTHER LIQUIDS

For some very particular applications we supply specially constructed liquids. Copies of manufacturer's data will be sent to users on request.

LIFTING OF WEIGHTS

Care must be taken when lifting the weights for the dead-weight tester. Each weight must be lifted individually and never attempt to lift stacks of weights on or off the tester.

Data Sheet

1.1 TESTER DIMENSIONS

Width	= mm
Depth	= mm
Height with BGH600DWT PCU	= mm
Mass - with weights and carry cases	= kg

1.2 PRESSURE RANGES

BGH600DWT	1 to 40 bar (10 to 600 lb/in ²)
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1.3 LIQUIDS USED

A hydraulic mineral oil viscosity 20 to 37 cSt at 40°C viscosity grade VG20 to VG37 to ISO3448 (BS4231) is used for all the BGH base units. The more viscous oils give lower leak rates at higher pressures (say above 100 bar). Less viscous oils give greater sensitivity at lower pressures. Most users will be able to obtain locally a suitable oil (see below) as used in hydraulic machinery. However for the convenience of users we can supply a 500 ml bottle of oil, viscosity grade VG22.

OILS SUITABLE FOR TESTERS

The following oils are the commercially available oils suitable for use in the dead-weight tester.

ISO 3448 viscosity grade	Approx. SAE viscosity classification	Shell	Esso	Mobil
VG22	-	Tellus 22 Tellus R22	Nuto H22	DTE 22
VG32	10W	Tellus V32 DTE 24	Nuto H32	DTE Oil Light
VG37	-	Tellus 37 Tellus R37 Tellus T37 Tellus V37	-	-
	-		-	-

OTHER LIQUIDS

The BGH600DWT dead weight tester is only available for use on the oils mentioned above

Description

21 GENERAL

The BGH600DWT series dead-weight tester is configured as a portable dead weight tester comprising base, piston-cylinder unit and mass set in two carry cases. The series is based around the BGH600C series base unit which is common to all the different configurations. The base unit provides a pressure source, liquid reservoir, control valves and gauge and piston cylinder connection. When the base unit is used with the BGH600DWT PCU, the configuration provides a high accuracy dead-weight tester.

In the dead-weight tester configuration the selected piston unit is normally screwed on to the left hand side pressure block of the base unit and the gauge under test is connected to the right hand pressure block of the base unit.

2.2 BGH600DWT series BASE UNIT

The BGH600DWT series base unit consists of a solid aluminium base plate mounted on four adjustable levelling feet, a screw pump, reservoir, control valves and pipework to two stainless steel pressure connection blocks. The base is carried in a weatherproof case and should be mounted to the case lid when in use to provide a stable and completely self-contained deadweight tester

SCREW PUMP

The screw pump is bolted to the reservoir/high pressure cylinder block fastened to the base unit. The rotating handwheel which is operated by the spokes is attached to a threaded spindle. The large diameter of the ram in the barrel of the pump is used to prime the tester and generates the pressure up to 40 bar (600 lb/in²).

RESERVOIR

A liquid reservoir is provided on the top of reservoir/high pressure cylinder block. The reservoir contains enough liquid to enable normal operation of the tester to be carried out.

CONTROL VALVES

Two control valves are provided, one on the top of reservoir/high pressure cylinder block and one on the stand for the device under test (DUT). The reservoir valve mechanism is built into the reservoir/high pressure cylinder block and controls the flow of liquid through internal drillings in the reservoir/high pressure cylinder block. The DUT valve can be used to easily isolate the external instrument for removal and replacement during multiple calibrations.

CONNECTION BLOCKS

Pressure supply pipes from the screw pump are terminated at two pressure blocks mounted on the base unit. The pressure blocks are fitted with threaded bosses projecting up through the cover plate of the base unit. These threaded bosses enable the piston unit to be directly screwed into the LHS block or the DUT to the RHS block.

2.3

GA of BGH600DWT set-up

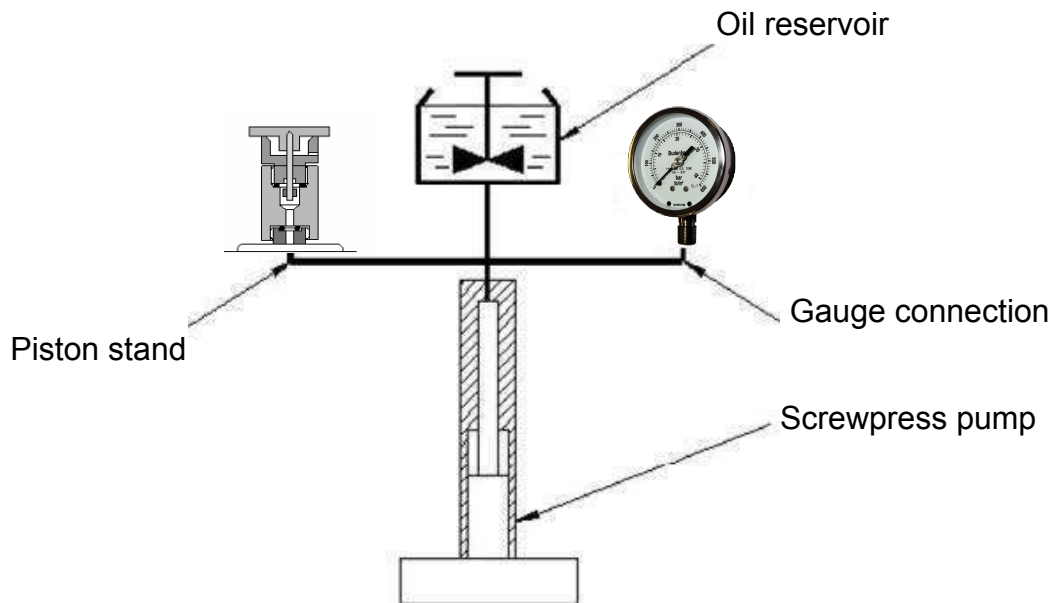
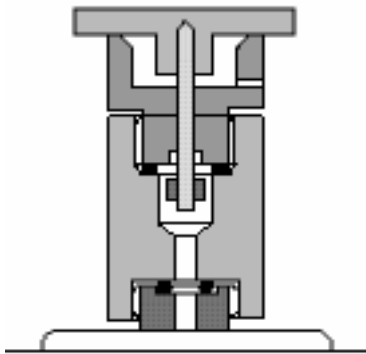


Fig. 2.3 Sectioned view of screw pump

2.4 BGH600DWT PISTON UNIT

The BGH600DWT PCU piston unit is a simple rugged single range piston unit which covers pressures up to 40 bar (600 lb/in²). The cylinder for the piston unit is screwed into a connection which screws to the base unit pressure connection blocks threaded boss. The piston head carries the calibration weights and is fitted to the end of the piston. A stop on the opposite end of the piston abuts the internal end of the cylinder when the maximum piston extension is reached. A sighting hole is provided in the cylinder wall so that the base of the piston head can be seen and monitored to ensure that the piston head is floating when in use. The pressure datum level of the piston unit is marked on the connection used to screw the piston unit cylinder on to the base unit pressure connection block's threaded boss.



MODEL BGH600DWT PCU

Fig. 2.4 Piston unit

2.5 FUNCTIONAL (Fig. 2.5)

Operation of the tester is controlled by the two valves A (on the reservoir) and B on the DUT stand. When initially priming the system valves A and B are opened to fill the system with oil from the reservoir. Prime the system by operating the screwpress 2-3 times to remove trapped air. To provide the pressure, valve A is closed and valve B is opened and the screw-pump operated in a clockwise direction. To release the test pressure the screw pump is wound out anti-clockwise and valve A is opened. If required Valve B can then be closed with valve A left open and the calibrated DUT can be replaced with a pre-filled DUT fitted directly to the stand.

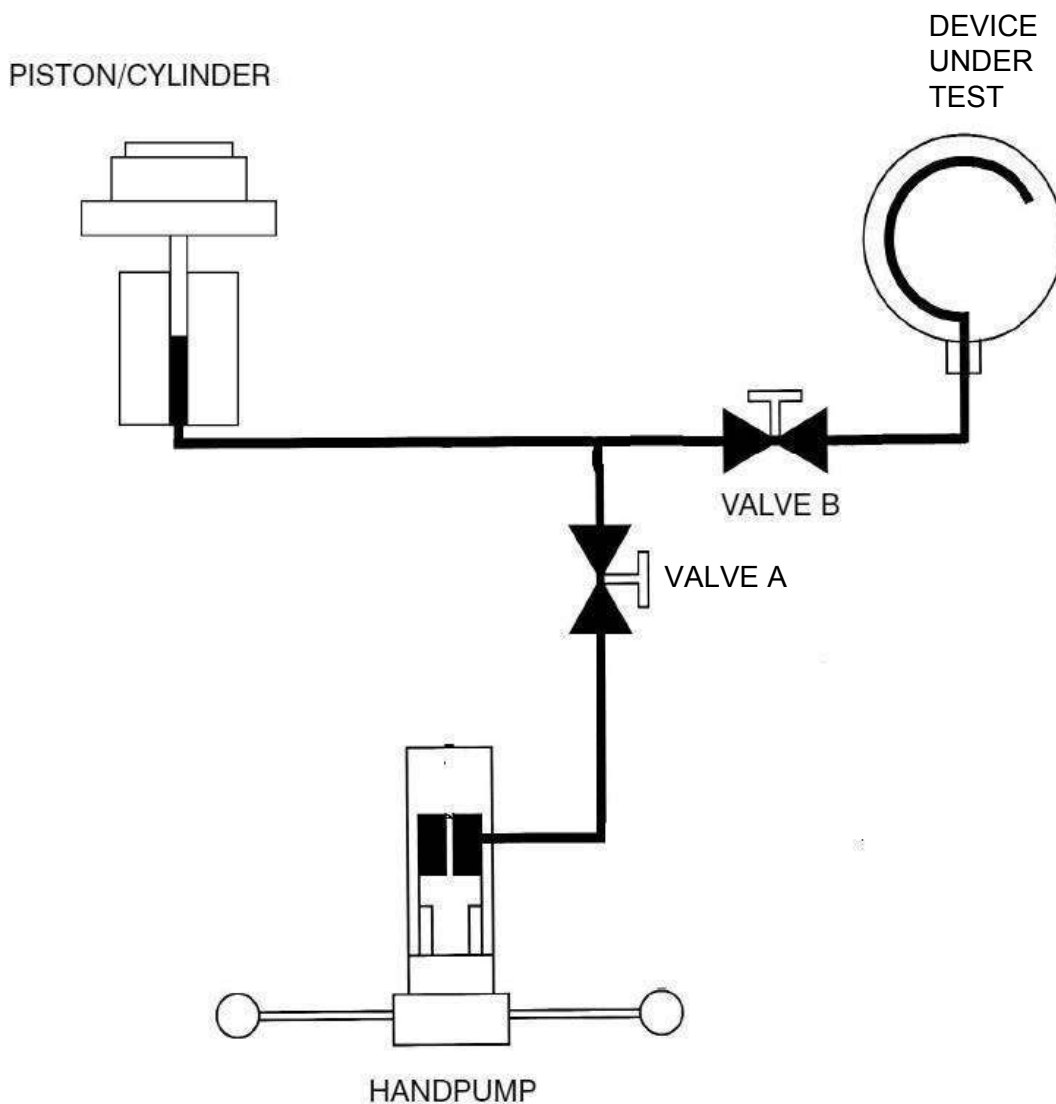


Fig. 2.5 Schematic diagram

Installation

3.1 UNPACKING THE TESTER

As soon as possible after delivery, open the packaging of the dead-weight tester and check that you have all the items detailed for your tester in the packing list detailed in section 3.4.

As you are unpacking the items examine the items for signs of damage or breakage during transit. If any items are missing get in touch immediately with Budenberg to inform us of the shortage.

3.2 ENVIRONMENTAL REQUIREMENTS

When siting the tester, if not in a temperature controlled laboratory, look for an area that satisfies the following criteria as much as possible

- a constant temperature area free from draughts and sources of heat or cold
- an area free from noise and vibration; if possible an area away from any constantly used pathways
- a clean dry area free from corrosive liquids or vapours.

A strong, stable, level table or workbench is required with the capability of supporting the tester plus a full load of test weights and with sufficient space to operate the test unit.

3.3 ASSEMBLY OF BASE UNITS

Fastening Base to Bench

The base is to be mounted to the aluminium plate on the inside of the carry case lid by means of the wing-nuts provided on a firm, level table or bench about 0.9 m high. Space is normally required for storing the weights on the left hand side of the bench.

- (1) Screw in the two handwheel spokes into the hub.
- (2) Using the spirit level provided, level the unit in both the front / rear axis and the side to side axis by adjusting the four knurled feet after the piston unit has been fitted to the dead-weight tester and the spirit level should be placed on the weight carrier during the levelling procedure.

3.4 PACKING LIST

A full packing list for all models of testers is detailed in Fig. 3.1.

Fig. 3.1 Packing list (sheet 1 of 3)

FOR ALL MODELS

The tester carton should contain:-

- 1 - copy of the operating and maintenance instructions (this manual)
- 1 - BGH600DWT series base
- 1 - Tool roll containing:-
 - 1 - Hexagon wrench key 3 mm A/F 2 - 30 mm A/F open ended spanners
 - 1- Spirit level
 - 1 - Bag of start-up seals
 - 1 - G1/2 (1/2" BSP) angle connection (If ordered Separately)
 - 1 - Pointer punch
 - 1 - Pointer remover
 - 1 - 500 ml bottle of oil
 - 1 - Piston/Cylinder unit
 - 1 - Set of weights supplied in separate carry case
 - 1 - Base carry case with internal mounting plate
 - 1 - Certificate of accuracy
 - 1 - Set of connections if ordered from the following options:

B.S.P	N.P.T.	
1 - G 1/8	1 - 1/8 in	
1 - G 1/4	1 - 1/4 in	METRIC
1 - G 3/8	1 - 3/8 in	1 - M12 X 1.5
1 - G 1/2	1 - 1/2 in	1 - M20 X 1.5

SETS OF WEIGHTS SUPPLIED FOR DEAD-WEIGHT TESTERS

1)	MODELBGH600DWT	Bar (or kg/cm ²)	OR	lb/in²
	Area = 1/16 in ² Range 1 to 40 bar (or kg/cm ²) or 10 to 600 lb/in ²	6 x 5		2 x 200
		1 x 4		1 x 100
		2 x 2		2 x 40
		1 x 1		2 x 10
		1 x 0.5		1 x 5
		Make up to 1		

WEIGHT SETS CAN BE PROVIDED IN ALTERNATIVE PRESSURE UNITS AND MANUFACTURED FOR LOCAL GRAVITY. CONSULT YOUR LOCAL DISTRIBUTOR FOR ADVICE ON AVAILABILITY.

Fig. 3.1 Packing list (sheet 2 of 2)

3.5 ASSEMBLY OF THE DEAD-WEIGHT TESTER

- (1) Fit the piston unit for the gauges to be calibrated to the L.H. connection and the gauge to the R.H. connection. Ensure that the mating faces are absolutely clean and the suitable seals are correctly located. Excess force is not required.
- (2) Check the level of the tester with the spirit level on the piston unit weight carrier. Level if necessary by using the levelling screws.
- (3) Fit the appropriate connection to the gauge stand, using a bonded seal to make the joint and screw a test gauge (for installation use a known gauge) into position, also with a bonded seal. The loose nut on the tester base enables the gauge to be positioned as required and for back connection gauges the angle connection is screwed into the loose connection.

Filling the base unit with liquid

- (1) Oil should be added via the reservoir only
- (2) Open valves A and B.
- (3) Wind screw pump handle fully clockwise.
- (4) Fill reservoir with appropriate liquid. Use the oil supplied or an approved substitute
- (5) Wind screw pump handle fully anti-clockwise
- (6) Top up reservoir if necessary and repeat to check.

Post assembly test

- (1) Carry out a test calibration of a known gauge (Section 4) to ensure that the unit is working correctly.
- (2) Release the pressure and remove the test gauge.

NOTE: To remove the gauge from the equipment, use the appropriate size of spanners on the top section of the gauge connection and on the body of the gauge only. Ensure that the lower part of the gauge connection is not rotated as this may release the gauge stand from the base.

- (3) The equipment is now ready for use.

Operating Instructions

CAUTION: If the volume required to be filled is very large it may be necessary to connect an additional pump to the test system circuit. Alternatively we can supply a modified tester and hand pump for this operation. For further information on both items contact Budenberg.

NOTES:

- (1) When testing equipment with a large volume, the capacity of the screw pump may be insufficient to reach the pressure required. In this case the equipment should be filled as far as possible with the liquid before connecting it to the comparator, so that the displacement needed is reduced.
- (2) Dirty or chemically contaminated gauges should not be fitted as they contaminate the tester unless they are first cleaned. Severe damage may otherwise be caused to the piston/cylinder unit.

4.1 PROCEDURE

Model BGH600DWT

- (1) Load the weight carrier with the weights equivalent to the desired pressure. Do not forget to take the weight of the piston carrier into account. Each weight is marked with the pressure equivalent and the piston area. The Model BGH600DWT PCU has a basic 10 lb/in² start, for other pressure units a make-up weight is added to the weight carrier for conversion to 1 bar (or kg/cm²).
- (2) Apply pressure as detailed in the 'To apply pressure' sub-section.

TO APPLY PRESSURE

For pressures up to 40 bar (about 600 lb/in²)

- (1) Close valve A (valve B remaining open).
- (2) Wind screw pump handle clockwise. This will generate pressure up to approximately 40 bar or 600 lb/in², as handle is wound in. When handle becomes stiff to rotate this will indicate that the pressure limit for this range has been reached.

DURING CALIBRATION

When the tester is correctly set up and there are no leaks the piston head should "float" for many minutes without it being necessary to touch the screw pump handwheel. On the initial setting up, however, there may be some air trapped in the base of the piston/cylinder unit. As this leaks past the piston the weights may fall slightly but it will only be for a matter of a few minutes until the air has escaped. If the piston continues to fall check the connections for leaks.

During calibration the weights should be rotated by hand. It is desirable that the weights should only be rotated when approximately the correct pressure is obtained. For any dual range unit, changing from one range to the other with the weights spinning does no harm. Weights should not be brought to rest by fully releasing the pressure and allowing the piston head to rotate against its stop under the full load of the weight pile.

Stops come into action if the pressure is too high or too low and it is essential that the weights should be spinning freely whilst taking readings. At the lowest pressures the weights will not spin for more than a few seconds unless a very thin oil is used, but provided the weight is rotated by hand immediately before taking a reading and is obviously "floating" an accurate reading will be given.

4.2 COMPLETION

- (1) After the test is finished, stop the weights rotating.
- (2) Wind screw pump handle fully anti-clockwise to lower pressure.
- (3) Gently open valve A and/or B to release residual pressure.
- (4) Ensure that both valves A and B are fully open.

The comparator/dead weight tester is now ready for another test and any residual pressure is relieved.

4.3 CLEANING GAUGES

WARNING

THIS CLEANING/DEGREASING PROCESS IS ONLY SUITABLE FOR USE WITH PRESSURE GAUGES WITH EITHER PHOSPHOR BRONZE, BERYLLIUM COPPER, MONEL OR STAINLESS STEEL BOURDON TUBES IN THE FORM OF A 'C'.

IT IS NOT ADVISABLE TO DEGREASE PRESSURE GAUGES WITH STEEL BOURDON TUBES SINCE A VERY SMALL AMOUNT OF CORROSION ON THE BORE OF A BOURDON TUBE CAN CAUSE INACCURACIES OF READING AND EARLY FAILURE OF THE TUBE.

THIS METHOD OF CLEANING IS NOT SUITABLE FOR USE WITH PRESSURE GAUGES WHICH ARE FITTED WITH COILED BOURDON TUBES, NOR ANY GAUGES WHICH ARE TO BE USED ON OXYGEN, AS COMPLETE REMOVAL OF OIL IS NOT ASSURED, REFER TO MANUFACTURER.

EQUIPMENT

This consists of a syringe and a special needle with the point bent through 90°.

INSTRUCTIONS

- (1) Fill syringe with solvent (Proprietary cold degreasing liquid).
- (2) With gauge connection pointing upwards, put needle into connection and insert by feel the point into the hole leading to the tube (See Fig. 4.1).
- (3) Inject the solvent. Ideally the tube should be half full.
- (4) Shake gauge in various attitudes to agitate solvent.
- (5) Suck solvent back into syringe, holding gauge at an angle (See Fig. 4.1).
- (6) Check that solvent removed is clean. To be sure that all oil has been removed, repeat cleaning process until solvent removed from gauge is as clean as that put in.
- (7) Shake out solvent remaining in gauge.

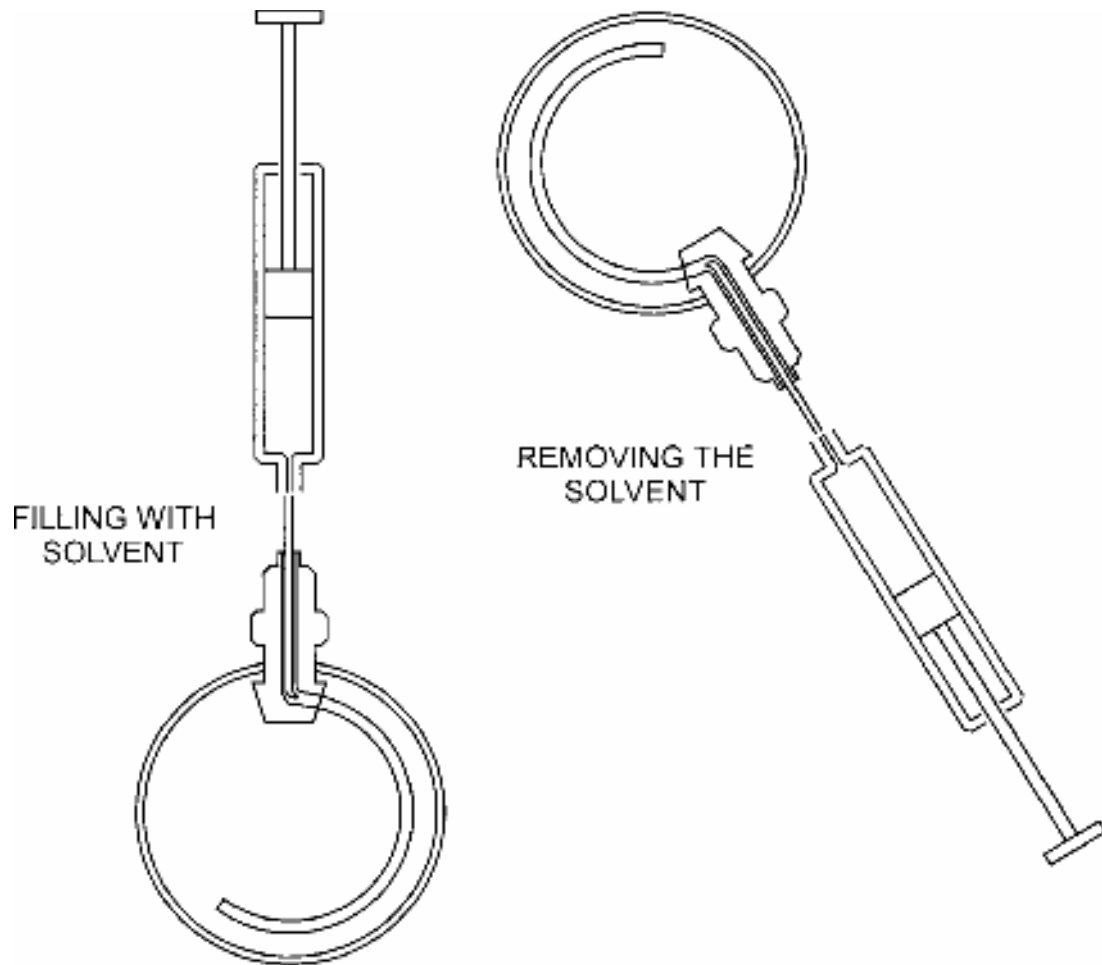
4.4 TEMPERATURE MEASUREMENT OF PISTON UNITS

For many purposes, such as calibrating most types of dial gauges and transducers, accurate knowledge of the temperature of a piston unit is not necessary. However, in order to achieve the utmost accuracy from a dead-weight tester it is important to know the temperature of the piston unit as close as possible to the working part of the unit.

In laboratories where the room temperature is controlled it is most likely that the temperature of the working parts of the unit will not differ from the ambient temperature by more than 0.5° C. When working in uncontrolled temperatures, however, one would have to measure the temperature of the piston unit.

A possible way to do this is to use a disc shaped thermistor type probe sensing element taped to the outer surface of the piston unit. The sensing element should be insulated from the ambient temperature by covering the element with a thin strip of polystyrene, or other insulating material, then taping this to the piston unit.

We can supply a suitable instrument. Consult your local distributor for advice on availability.



Fault Finding

The following chart is an aid to fault finding on your equipment in the event of a fault occurring.:-

Fault	Possible Cause	Remedy
Equipment does not provide any output pressure	No liquid in tester	Check that the tester is filled with liquid. Fill the equipment with fluid as necessary. Refer to section 3 (Filling the equipment with liquid)
	Valve A is open	Close valve A and try again
	Component being tested has a large volume	Pre-fill component with liquid before test
	Missing or damaged liquid seals shown by signs of unexplained liquid leaks	Examine seals on equipment to ensure they are fitted correctly and are undamaged. Replace as necessary.
	Handwheel disconnected from spindle	Check security of handwheel to spindle as necessary
	Valve A assembly or valve seat damaged	Examine condition of valve A and valve seat. Replace valve assembly or return tester to Budenberg for overhaul as necessary.
	If unable to locate a cause	Return system to Budenberg for investigation
Equipment provides pressure but pressure decays to zero	Incorrect operating procedure being used	Ensure that correct operating procedure is being followed (refer to section 4)
	Missing or damaged liquid seals shown by signs of unexplained liquid leaks	Examine seals on equipment to ensure they are fitted correctly and are undamaged - replace if necessary.
	Valve A assembly or valve seat damaged	Examine condition of valves A and of valve seats. Replace valve assemblies or return system to Budenberg for investigation
	If unable to locate a cause	Return system to Budenberg for investigation.

Fault	Possible Cause	Remedy
Equipment provides pressure, but pressure decays when valves A and B are operated.	Incorrect operation procedure being used.	Ensure that correct operating procedure is being followed (refer to Section 4)
	If unable to locate a cause	Return system to Budenberg for overhaul
Equipment provides pressure, but pressure decays to lower value and then remains steady.	Insufficient liquid in tester.	Check liquid level in resevoir. Fill resevoir with appropriate liquid. (Refer to section 4)
	Air in the system.	Prefill component under test with appropriate liquid. If necessary re-fill tester with appropriate liquid.
	If unable to locate a cause	Return system to Budenberg for overhaul
System screw press becomes very stiff to operate when tester is being used in range below 40 bar (600 lb/in ²)	Internal damage.	Return system to Budenberg for overhaul

Periodic Maintenance

61 CLEANING THE UNIT AND CHECKING THE LIQUID LEVELS

Cleaning the units and checking the liquid levels is the only periodic maintenance required. With normal use no further maintenance should be necessary. If required, the tester or comparator can be returned to our works for re-conditioning. If unable to return the unit, details on stripping the unit and replacing the spare parts is given in corrective maintenance. Accuracy, overhaul and re-certification is also explained in corrective maintenance.

Oil operation

Keep the tester and weights clean and free from spilt oil, wipe out the oil cups under the gauge stands as necessary. A slight leakage through the vent hole of the piston/cylinder unit is normal, but this should not be excessive unless working frequently at high pressures with a thin viscous oil. It is advisable not to dismantle the piston/cylinder unit. Do not use any cleansing solvents as they may damage the seals.

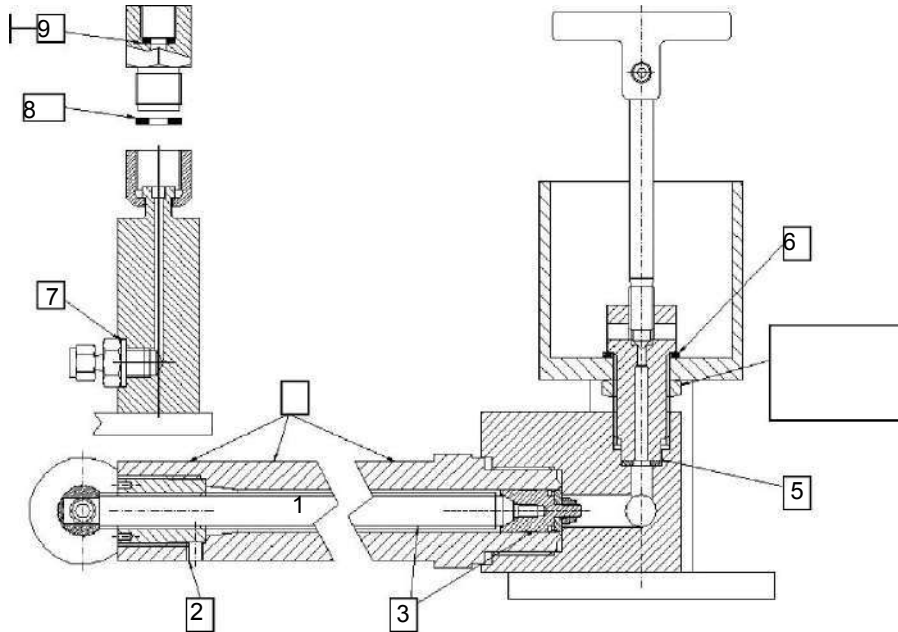
Ensure that the reservoir contains sufficient liquid to carry out any calibrations required. If necessary top up the reservoir with the same liquid that is already being used. Do not mix various types or brands of liquid in the tester.

If the oil in the tester becomes dirty, use the screw pump to flush through the clean oil with a drain screwed in the gauge stand. (The angle connection is suitable.) The screw pump should be turned fully clockwise before starting. Remove the piston/cylinder unit complete and wipe away any dirt that has accumulated on the thread on the base.

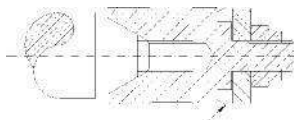
Corrective Maintenance

7.1 GENERAL

This section contains details on stripping the unit and replacing the spare parts which are listed in section 8. The component identification numbers in brackets in each procedure refer to figure 7.1



SCREWPRESS	1	Sub-ASSEMBLY OF SPINDLE , SPINDLE NUT AND PISTON ASSEMBLY	YC1875 YC1870 YC1795
	2	CYLINDER	YC1835
	3	SPINDLE/PISTON ASSEMBLY (INCLUDING ITEM 4)	YC1875 YC1795
	4#	H.P. SEAL	YR3385
OIL RESERVOIR	5#	COPPER WASHER	GNWS09W
	6#	SELON WASHER	YR1465
GAUGE CONNECTIONS	7#	BONDED SEAL	YR1336
	8#	G1/2 BONDED SEAL	YR1321
	9#	G3/8 BONDED SEAL	YR1320



4

ENLARGED DETAIL OF PISTON ASSEMBLY.

LOCTITE SPINDLE TO PISTON USING
LOCTITE GRADE 648, OR EQUIVALENT

Fig. 7.1 Sectioned view of screw pump and high pressure block

7.2 PISTON/CYLINDER UNIT

As the piston/cylinder unit represents a high proportion of the total value of the tester, it should always be handled with care and every effort made to keep it clean.

The piston/cylinder unit is made to extremely fine limits of accuracy and it is not advisable to dismantle it. If it is necessary to clean it, the piston and cylinder bore must be oiled immediately, in order to protect the high grade finish. Should the unit become damaged it should be returned complete for replacement or repair. Parts from different units are not inter-changeable as they have to be weighed and evaluated as a whole.

The serial number of the piston/cylinder unit appears in the certificate of accuracy and is marked on the body of the unit. This number, as well as the tester serial number should always be quoted in correspondence concerning the piston/cylinder unit.

The piston/cylinder connections should be blanked if it is removed from the tester. If the unit is taken off for any reason it should be stored upside-down resting on the weight carrier.

This covers stripping the unit to enable simple repairs and the fitting of recommended spare parts to be carried out.

7.3 FACTORY OVERHAUL AND RE-CERTIFICATION OF DEAD-WEIGHT TESTERS MAINTENANCE OF ACCURACY

The accuracy of a dead-weight tester depends primarily on the effective area of the piston unit and on the weights applied to the piston. The effective area of the piston unit can be affected by wear of the unit. This is generally caused by contamination of the oil in the tester by foreign matter from instruments being calibrated, by water, or chemicals from instruments, or by rust or corrosion caused by contaminants.

Weights are made of austenitic stainless steel which are entirely stable. In the past we have supplied testers with specially treated cast iron weights and martensitic stainless steel weights. Whilst these earlier weights were entirely suitable under normal conditions of use, they may exhibit some instability of mass if left in contact with damp materials or water.

NEED OR OVERHAUL AND RE-CERTIFICATION

We recommend that the tester be returned to us for overhaul and re-certification at any time if when used in accordance with instructions:

- (a) The piston does not spin freely.
- (b) The rate of fall of the piston is appreciably greater than when new and makes use of the tester difficult.
- (c) The weights are damaged or seriously corroded.
- (d) The tester cannot be made to operate satisfactorily due to wear or damage to pump piping or valves which cannot be rectified by the user.

Many testers are used for calibration of instruments with an expected accuracy of 1, 0.5 or 0.25%. Such testers need not be sent back frequently for overhaul and re-certification and provided they are working well can be trusted for many years. Under these circumstances an interval of five years might be appropriate between overhauls.

When high accuracy is required of dead-weight testers the testers should be returned for overhaul and re-certification more frequently. The actual period will depend on how a tester is used. A tester kept in a laboratory and carefully used might need to be returned every 2 to 3 years. A tester carried around from site to site and used for calibrating high accuracy gauges or transducers from industrial process plant or for measuring pressures directly might well need to be returned at intervals of less than a year.

The actual period between overhaul and re-certification should be fixed by the user in the light of the above comments taking into account the requirements of any inspection authority which might be involved.

IDENTIFICATION OF WEIGHTS

All weight sets supplied with a dead-weight tester have allocated, and are marked with, a weight set number. Additionally, if users wish to ensure that only specific weights sets are used with an individual dead-weight tester or piston and cylinder unit, then the serial number of the tester, and/or piston cylinder unit may also be marked on the main weights. Regrettably due to their size, increment weights can only be marked with the serial number of a piston and cylinder unit.

OVERHAUL AND RE-CERTIFICATION

To provide the best possible service, testers should be returned as complete units comprising the base, the piston and cylinder unit, and all weights. Users may at their discretion elect to service the base themselves and only return the piston and cylinder unit with weights for overhaul. In such instances, certification issued after overhaul can only refer to the piston and cylinder and weight set numbers and not to the base to which they were originally fitted.

Tester bases will be stripped, all pipework cleaned, all seals replaced, worn components replaced where desirable and all reassembled and tested.

The weights will all be checked and brought to within original limits if possible. If one or two weights are missing or beyond economic repair they will be replaced. If more are missing/beyond economic repair customers instructions will be sought.

The piston unit will be checked for accuracy and sensitivity. If it is not satisfactory for any reason a quotation will be submitted for a replacement unit.

A new certificate of accuracy will be issued for each overhauled tester. Unless otherwise instructed on order when there has been a slight change in area of the piston unit the certificate will reflect this; the accuracy will not be affected by more than 0.03%. For example the certificate of accuracy of an overhauled tester might show that the error does not exceed 0.05% when the original certificate shows that the error did not exceed 0.02%.

We can provide UKAS certificates for overhauled testers and also for testers in good condition whether or not of our manufacture. Details will be supplied on request.

ORDERING AND PRICING

No tester will be overhauled if it is not economic to do so. By far the most expensive component likely to need replacement is the piston unit; this unit will not be replaced unless customers approval has been obtained.

When customers ordering procedure does not allow an open order to be placed we quote a basic price for the overhaul and re-certification of particular model of tester. This assumes that the tester and weights are in good condition and covers stripping, cleaning of pipework, replacement of seals, re-assembly and testing, checking of weights and of piston unit. The basic price covers our certificate of accuracy in the typical form shown in our catalogue. Customers requiring a more detailed certificate of calibration should state this on their order.

Any additional work required will be carried out and will be charged on a time and material basis. These additional charges will be detailed on the invoice but the piston units will not be replaced without customers approval. Orders should therefore state basic quoted price "plus additional service and replacement parts as required".

Spare Parts

8.1 SPARE PARTS LIST

This list covers all the items subject to wear. Any enquiries should be addressed to Budenberg.

ITEM No	DESCRIPTION
1	Piston/cylinder assembly
	Model BGH600DWT PCU
2	Seal Kit

8.2 ORDERING SPARES

When ordering spares or making enquiries always give:

- 1) Tester model No. (on front of this manual)
- 2) Tester serial No. (on nameplate)
- 3) Description of part. See spare parts list.

Whilst every effort is made to ensure that the correct parts are supplied, this cannot be guaranteed unless full information is given.

Ordering spares can be carried out from our service department at the following addresses:

EUROPE AND AMERICAS

Budenberg Customer Services,
4 Gilchrist Road, Northbank Industrial
Estate, Irlam, Manchester
M44 5AY United Kingdom
www.budenberg.co.uk

Tel: +44 (0)161 777 7300
Fax: +44 (0)161 777 7399
Email: customer.services@budenberg.co.uk

MIDDLE EAST & AFRICA

Budenberg Middle East LLC
Office No. 217, Splash Building PO
Box 18980, Al Qusais Dubai,
United Arab Emirates
web: www.budenberg-me.com

Tel: +971 4 2511670
Fax: +971 4 2511671
Email: sales@budenberg-me.com

INDIA

Budenberg Gauge Pvt Ltd,
299-300, IInd Main Road,
Nehru Nagar , Old Mahabalipuram Road (OMR),
Chennai - 600 096,
Tamil Nadu , India
www.budenberg-gauge.in

Tel: +91 44 24541074
Fax: +91 44 24541075
Email: sales@budenberg-gauge.in

FAR EAST

Budenberg Asia Pacific Ltd
Unit 7A G/F Cheung Fat Ind Bldg
64-76 Larch St Tai Kok Tsui Kin
Hong Kong
www.budenberg-gauge.asia

Tel : +852 3709 0020
Email: sales@budenberg-gauge.asia

Optional Accessories

9.1 MODEL 29 POWER ROTATION UNIT

The model 29 power rotation unit is not available for use on the BGH600DWT - please consult Budenberg Sales for further information

9.2 OIL FREE TESTING

Model 38 oil seal is available for use during oil free testing. The seals have a synthetic rubber sac which separates the oil in the tester from the liquid on which the gauge is to be tested. The model 38 oil seal can be used on any tester up to a maximum working pressure of 700 bar or 10000 lb/in².

9.3 FINE INCREMENT WEIGHTS

Extra weight sets to give fine increments of pressure less than those normally supplied with the tester can be supplied for use with all piston/cylinder units.

9.4 MODEL 27 - TWO GAUGE STAND

This is available for the testing of two gauges simultaneously.

9.5 MODEL 360 BASE

A Model 360 oil dead-weight pressure balance incorporating the piston unit and weights used in the Model BGH series dead-weight testers. This balance enables an operator to calibrate a transducer/pressure gauge at two different pressures without adding/removing any weights, thus speeding up the calibration process.

9.6 MODEL 433 AND 436 CARRYING CASES

These cases are provided as standard with the BGH600DWT but can also be ordered as additional extras if required - please consult Budenberg Sales for information

9.7 MODEL 437 WEIGHT STORAGE CASE

Weights carry cases are provided as standard with the BGH600DWT but these can also be ordered as additional extras if required - please consult Budenberg Sales for information

9.8 UKAS CERTIFICATION

All testers are available with certification of calibration on pressure, also certification of effective area and mass of the piston unit, also of the mass of the weights.

Consult your local distributor for advice.