User Manual
Portable Pressure Calibration Set
MGC-LOW, MGC-HIGH

About this manual….

- **The structure of the manual**
  This user manual is aimed at users who are familiar with Ametek pressure calibration systems, as well as those who are not. The manual is divided into 9 chapters which describe how to set up, operate, service and maintain the pressure calibration system. The technical specifications are described and accessories may be ordered from the list of accessories.

- **Safety symbols**
  This manual contains a number of safety symbols designed to draw your attention to instructions which must be followed when using the instrument, as well as any risks involved.

Warning

Events which may compromise the safe use of the instrument and result in considerable personal or material damage.

Caution…

Events which may compromise the safe use of the instrument and result in slight personal or material damage.

Note…

Special situations which demand the user's attention.

List of contents

1.0 Introduction

Congratulations on your new Ametek Portable Pressure Calibration Set!

With the Ametek Portable Pressure Calibration Set, you have chosen an extremely effective pressure system which we hope will live up to all your expectations. Over the past many years, we have acquired extensive knowledge of industrial precision pressure calibration. This expertise is reflected in our products which are all designed for daily use in an industrial environment. Please note that we would be very interested in hearing from you if you have any ideas or suggestions for changes to our products.

This user manual applies to the following systems:

- **MGC-LOW, System 1**
- **MGC-LOW, System 2**
- **MGC-LOW, System 3**
- **MGC-HIGH, System 1**
- **MGC-HIGH, System 2**
- **MGC-HIGH, System 3**
- **MGC-HIGH, System 4**

☞ **ISO-9001 certified**

Ametek Denmark A/S was awarded the ISO-9001 certificate in September 1994 by BVQI - Bureau Veritas Quality International.

☞ CE-label

Your new pressure calibration system bears the CE label and conforms to the EMC directive and the Low-voltage Directive.

☞ Technical assistance

Please contact the dealer from whom you acquired the pressure calibration system if you require technical assistance.

☞ Guarantee

According to current terms of sale and delivery.

This guarantee only covers defects in manufacture and becomes void if the pressure calibration system has been subject to unauthorised intervention and/or misuse.

2.0 Safety instructions

Read this manual carefully before using the pressure system!

Please follow the instructions and procedures described in this manual. They are designed so that you get the most out of your pressure system and avoid any personal injuries and/or damage to the system.

Warning……

About the handling:

- **Avoid** knocking, bumping or dropping the pressure system. This can cause permanent damage to the system and loss of accuracy.

About the use:

- The pressure system **must not** be used for any purposes other than those described in this manual and for any application other than precision pressure calibration jobs.
- The pressure system should only be used by TRAINED PERSONNEL.
- **Never** subject the pressure gauges to overpressure. In case of overpressure the gauge should **not be used** for calibration purposes.
- None of our calibration systems are cleaned or prepared for **OXYGEN OBJECTS so DO NOT USE** our systems for this purpose.
- **Do not** disconnect any parts from the system when pressurised.
- **Do not** connect any external pressure source to this instrument. This unit is designed to test pressure measuring devices connected to the manifold only. Pressure from an external source can result in explosion of the liquid reservoir and possible personal injuries.

Note…

The product liability **only** applies if the pressure system is subject to a manufacturing defect. This liability becomes void if the user fails to follow the maintenance instructions set out in this manual or uses unauthorised spare parts.

3.0 Identifying your pressure calibration system

3.1 Model description

MGC-LOW

The JF Model MGC-LOW consists of 2 dual scaled precision pressure gauges with ±1% F.S.

- **System 1** : 0 – 6 BAR & Kg / cm² and 0 – 16 BAR & Kg / cm²
- **System 2** : 0 – 16 BAR & Kg / cm² and 0 – 40 BAR & Kg / cm²
- **System 3** : 0 – 40 BAR & Kg / cm² and 0 – 100 BAR & Kg / cm²

MGC-HIGH

The JF Model MGC-HIGH consists of 3 or 4 dual scaled precision pressure gauges with ±0.6% F.S.

- **System 1** : 0 – 6 BAR & Kg / cm², 0 – 16 BAR & Kg / cm² and 0 – 40 BAR & Kg / cm²
- **System 2** : 0 – 10 BAR & Kg / cm², 0 – 40 BAR & Kg / cm², 0 – 100 BAR & Kg / cm² and 0 – 300 BAR & Kg / cm²
- **System 3** : 0 – 10 BAR & Kg / cm², 0 – 40 BAR & Kg / cm² and 0 – 100 BAR & Kg / cm²
- **System 4** : 0 – 10 BAR & Kg / cm², 0 – 40 BAR & Kg / cm² and 0 – 300 BAR & Kg / cm²

Both models are supplied with a hydraulic hand pump fitted with hose, valve and couplings all delivered in a handy carrying case.

The precision pressure gauges are all dual scaled in BAR and kg/cm² and are designed for marine use.

The calibrator is easy to operate and the hydraulic pump very rapidly produces the required testing pressure. The calibrator quickly shows the user if there is an indication error on a pressure gauge or valve and how large it is. When the size of the error is known, it is possible to compensate for it or note it – and thereby only replace faulty pressure indicators.

3.2 Receipt of the pressure calibration system

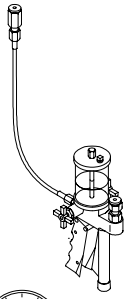
The pressure calibration system is delivered as standard in a carrying case and should always be placed in the case after use.

When you receive the pressure calibration system…

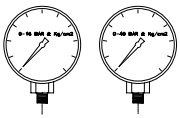
- Carefully unpack and check the pump, the pressure gauges and the accessories.
- Check the parts off against the list shown below.

  If any of the parts are missing or damaged, please contact the dealer who sold the pressure calibration system.

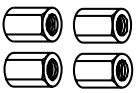
You should receive:



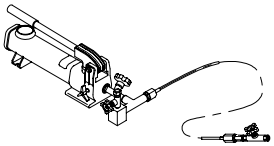
- 1 pump system T-620 incl. 0.5 m hose (MGC-LOW)



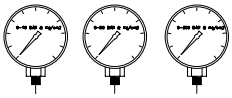
- 2 precision pressure gauges (3/8” BSP) (MGC-LOW)



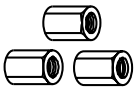
- 4 adapters (1/4” x 1/4” BSP, 1/4” x 3/8” BSP, 1/2” x 1/4” BSP, 1/4" x 3/4" BSP) (MGC-LOW)



- 1 pump system P-142 incl. 0.5 m hose (MGC-HIGH)



- 3 precision pressure gauges (3/8” BSP) (MGC-HIGH)

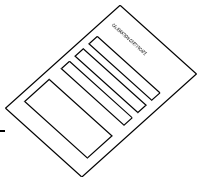


- 3 adapters (1/4” x 1/4” BSP, 1/2” x 1/4” BSP, 1/4" x 3/4" BSP) (MGC-HIGH)

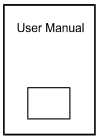
- 1 plug 1/4" BSP

- 2 bonded seal 1/4" BSP

- 1 traceable certificate per gauge



- 1 user manual



4.0 Operating instructions

4.1 Operating the MGC-LOW

Warning……

About the handling:

- **Avoid** knocking, bumping or dropping the pressure system. This can cause permanent damage to the system and loss of accuracy.

About the use:

- The pressure system **must not** be used for any purposes other than those described in this manual.
- **Do not** use this system for any applications other than precision pressure calibration jobs.
- The pressure system should only be used by TRAINED PERSONNEL.
- **Never** subject the pressure gauges to overpressure. In case of overpressure the gauge should **not be used** for calibration purposes.
- None of our calibration systems are cleaned or prepared for **OXYGEN OBJECTS so DO NOT USE** our systems for this purpose.
- **Do not** disconnect any parts from the system when pressurised.
- **Do not** connect any external pressure source to this instrument. This unit is designed to test pressure measuring devices connected to the manifold only. Pressure from an external source can result in explosion of the liquid reservoir and possible personal injuries.
- Follow these instructions carefully to avoid damage to the pump and/or personal injuries.

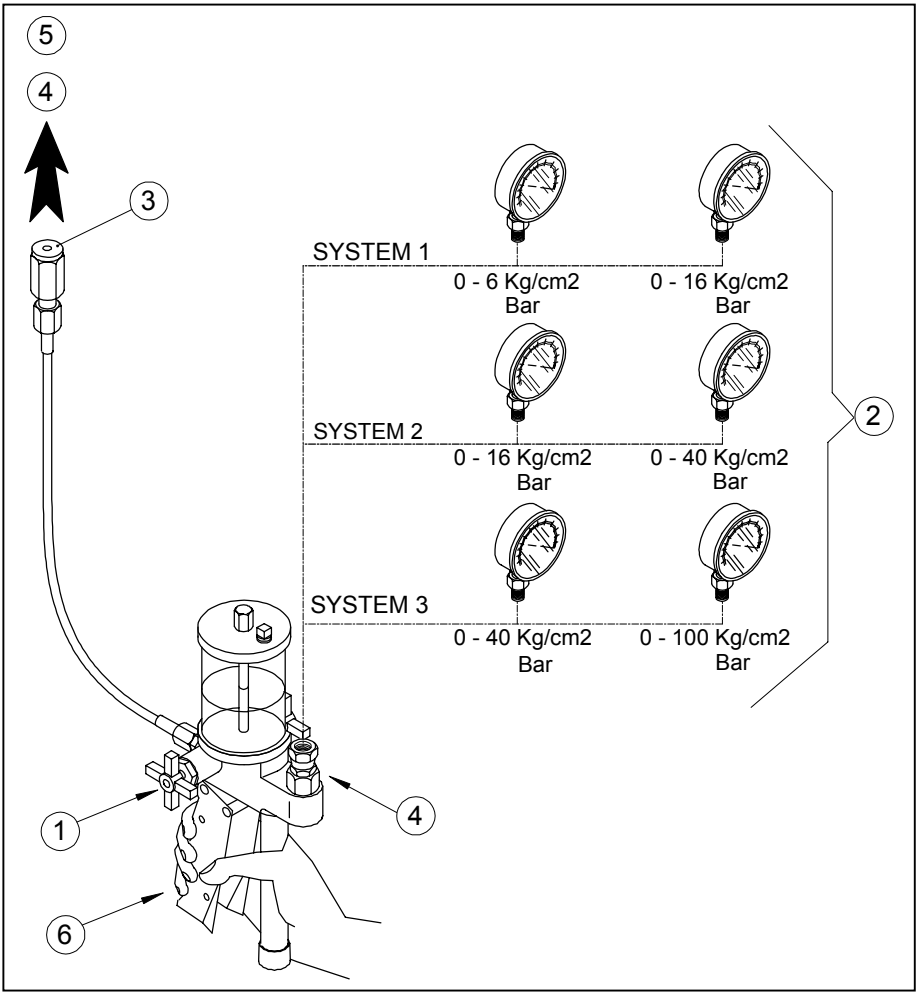


Fig. 1

Warning

Before use the precision pressure gauge should be placed in a vertical position (fig. 1) with no pressure applied and zero pressure should be indicated. If this is not the case, the pressure gauge may have been subjected to over-pressure and should not be used for calibration purposes.

This routine must be followed in order to operate the system correctly (see fig. 1 accordingly).

1. Make sure that the system to be tested is depressurised.

2. Open the pump valve (pos. 1) to release pump pressure. Make sure that the pressure system is depressurised.

3. Connect the precision pressure gauge to the pump (pos. 2).

4. Dismount the plug (pos. 3) from the hose and connect the object for calibration (pos. 4).

Note…

After connection of all parts and before pressure is created the air can be released from the system by loosening the connectors (pos. 5). It is now possible to pump out oil and air until no air is left in the oil.

4. If other connectors than those supplied are needed, please use fittings with correct pressure rating and correct threading and use the necessary sealing material to avoid leakage in the pressure system.

5. Close the pump valve (pos. 1).

6. Operate the pump handle (pos. 6) gently to pressurise the system.

7. Read the pressure on the precision pressure gauge and on the object for calibration and repeat step 6 to proceed with the calibration.

4.1.1 Media to be used

Oil
Use hydraulic oils: Jack oil, Exxon Nuto HP15 or H15, Tellus T14 or the like.

Water
Use distilled water only.

Other fluids
Contact AMETEK DENMARK if you want to use other fluids than those stated above. For example SKYDROL or the like.

4.1.2 After calibration

1. Open the pump valve (pos. 1).

2. Make sure that the pressure system is depressurised before all items are disconnected.

3. Disconnect all items.

4. Close the pump valve (pos. 1).

5. Remount the plug on the hose (pos. 3) to avoid leakage of oil.

6. Clean all parts and put them back in the carrying case.

4.2 Operating the MGC-HIGH

Warning……

About the handling:

- **Avoid** knocking, bumping or dropping the pressure system. This can cause permanent damage to the system and loss of accuracy.

About the use:

- The pressure system **must not** be used for any purposes other than those described in this manual.
- **Do not** use this system for any applications other than precision pressure calibration jobs.
- The pressure system should only be used by TRAINED PERSONNEL.
- **Never** subject the pressure gauges to overpressure. In case of overpressure the gauge should **not be used** for calibration purposes.
- None of our calibration systems are cleaned or prepared for **OXYGEN OBJECTS so DO NOT USE** our systems for this purpose.
- **Do not** disconnect any parts from the system when pressurised.
- **Do not** connect any external pressure source to this instrument. This unit is designed to test pressure measuring devices connected to the manifold only. Pressure from an external source can result in explosion of the liquid reservoir and possible personal injuries.
- Follow these instructions carefully to avoid damage to the pump and/or personal injuries.

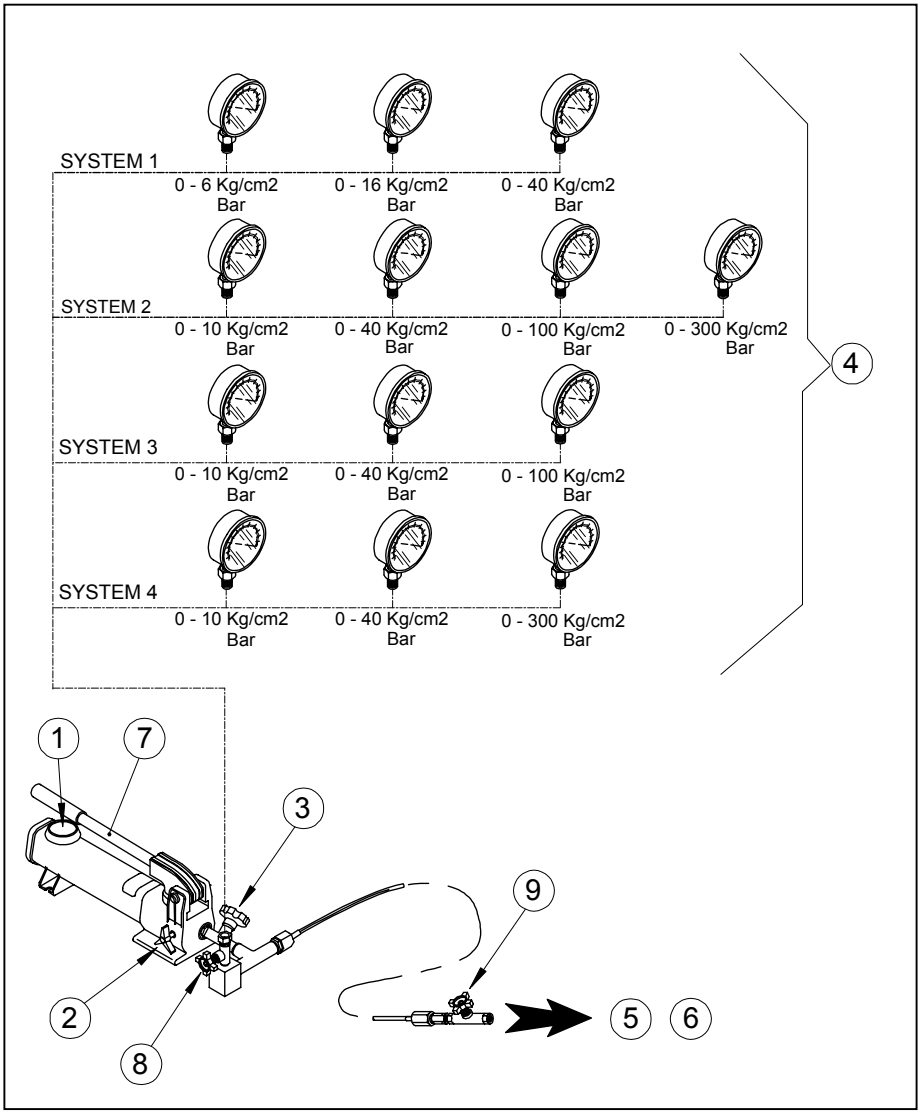


Fig. 2

Warning

Before use the precision pressure gauge should be placed in a vertical position (fig. 2) with no pressure applied and zero pressure should be indicated. If this is not the case, the pressure gauge may have been subjected to over-pressure and should not be used for calibration purposes.

This routine must be followed in order to operate the system correctly (see fig. 2 accordingly).

1. Set the filling valve (pos. 1) on the hand pump in position “Vent”.

2. Open both pump valves (pos. 2 and 3) to release pump pressure.
Make sure that the pressure system is depressurised.

3. Connect the precision pressure gauge to the pump (pos. 4) and connect the object for calibration (pos. 5).

Note…

After connection of all parts and before pressure is created the air can be released from the system by loosening the connectors (pos. 6). It is now possible to pump out oil and air until no air is left in the oil.

4. If other connectors than those supplied are needed, please use fittings with correct pressure rating and correct threading and use the necessary sealing material to avoid leakage in the pressure system.

5. Close the pump valve (pos. 2) on the right side of the pump.

6. Operate the pump handle (pos. 7) gently to pressurise the system.

7. When the required pressure is reached, close the pump valve (pos. 3) mounted on the front part of the pump. The gauge valve (pos. 8) (orange handle) can be used to fine adjust the pressure.

8. Read the pressure on the precision pressure gauge and on the object for calibration and repeat step 6 to proceed with the calibration.

4.2.1 Media to be used

Oil
Use hydraulic oils: Jack oil, Exxon Nuto HP15 or H15, Tellus T14 or the like.

Other fluids
Contact AMETEK DENMARK if you want to use other fluids than those stated above. For example SKYDROL or the like.

4.2.2 After calibration

1. Open the pump valve (pos. 2) on the right side of the pump.

2. Open the pump valve (pos. 3) on the front of the pump gently to protect the gauges from the pressure shock.

3. Make sure that the pressure system is depressurised before all items are disconnected.

4. Disconnect all items.

5. Close the filling valve (pos. 1) and the gauge valve (pos. 8).

6. Close the valve (pos. 9) on the adapter mounted on the hose to avoid leakage of oil.

7. Clean all parts and put them back in the carrying case.

4.3 Operating the optional Lloyds valve system with clamp

Warning……

About the use:

- The Lloyds valve system with clamp **must not** be used for any purposes other than those described in this manual.
- **Do not** use this system for any applications other than precision pressure calibration jobs.
- **Never** subject the valve system to overpressure.
- **Do not** disconnect any parts from the system when pressurised.
- Follow these instructions carefully to avoid damage to the Lloyds valve system and/or personal injuries.

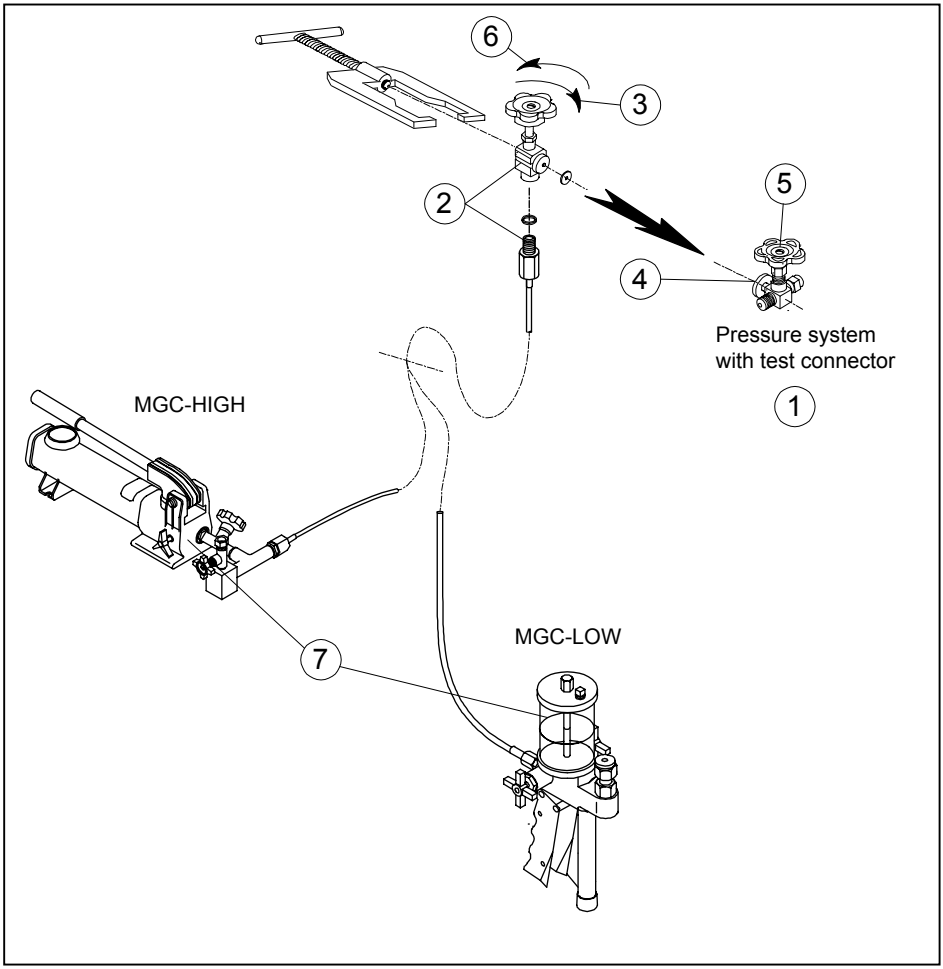


Fig. 3

Some pressure systems with gauges are prepared for test fitted with a valve with test connector.
To operate this kind of system a Lloyds valve system with clamp from Ametek Denmark A/S can be used.

This routine must be followed in order to operate the system correctly (see fig. 3 accordingly).

1. Make sure that the system to be tested (pos. 1) is depressurised.

2. Connect the Lloyds valve system to the 1/4" adapter mounted on the hose (pos. 2).

3. Start pumping out oil from the MGC calibrator system until the oil is coming out of the Lloyds valve system.

4. Close the Lloyds valve system (pos. 3).

5. Connect the Lloyds valve system to the valve with test connector located on the system, which is to be tested (pos. 4).

6. Open the valve on the system to be tested (pos. 5).

7. Open the Lloyds valve system (pos. 6).

8. Create pressure by operating the MGC-pump (pos. 7).

9. Read the pressure on the precision pressure gauge and on the object for calibration and repeat step 8 to proceed with the calibration.

10. Release the pressure and close the valve on the system to be tested (pos. 5).

11. Close the Lloyds valve system (pos. 3) and disconnect it from the pressure system with test connector (pos. 1).

5.0 Errors

Generally the AMETEK Portable Pressure Calibration Set is manufactured for field use and will normally cause no problems for the user.

Note…

Ametek Denmark's liability ceases if:

- parts are replaced/repaired using spare parts which are not identical to those recommended by the manufacturer.
- non-original parts are used in any way when operating the instrument.

Ametek Denmark's liability is restricted to errors which originated from the factory.

Due to many years of experience we hereby reveal typical question and answers.

FAILURE	CAUSE	ACTION
The pressure is not stabilising	The system may be leaking.	Check all connections.
	The compressed medium includes air.	You may have to adjust the pressure a few times before the pressure is stable enough for calibration. Release air. (See Notes page 13 or 17)
	If you have a hose in the pressure loop - the hose will expand and give some movement.	The effect will disappear rapidly.
	Adiabatic and thermodynamic effects are present within all pressure systems.	The effect will disappear rapidly.

Note…

Always readjust the pressure after 5 – 10 minutes to allow time for settling of above effects.

When you operate with high pressure the sensitivity of the system is high with regard to temperature and movements.

5.1 Re-calibration

Depending on the conditions the pressure calibration set should be checked with certain intervals by the factory or an authorized standard laboratory and if necessary re-calibrated.

6.0 Returning the pressure calibration set for service

When returning the pressure calibration set to the manufacturer for service, please enclose a fully completed service information form. Simply copy the form on the following page and fill in the required information.
The pressure calibration set should be returned in the original packing.

Always secure a traceable certificate for confirmation of re-calibration.

Service info

Customer data: **Date:**

Customer name and address:_____

Attention and Dept.:_____

Fax no./Phone no.:_____

Your order no.:_____

Delivery address:_____

Distributor name:_____

Instrument data:

Model and Serial no.:_____

Warranty claimed Yes:____ No:_____ Original invoice no.:_____

Pressure calibration	**Service request:**	**This instrument is sent for (please tick off):**
☐	___ Calibration as left	___ Check
☐	___ Calibration as found and as left	___ Service
☐	___ Accredited calibration as left	___ Repair
☐	___ Accredited calibration as found and as left.	

Diagnosis data/cause for return:

Diagnosis/Fault description:_____

_____

Special requests:_____

_____

Safety precautions: if the product has been exposed to any hazardous substances, it must be thoroughly decontaminated before it is returned to Ametek. Details of the hazardous substances and any precautions to be taken must be enclosed.

7.0 Maintenance

7.1 Cleaning

Users should/must carry out the following cleaning procedures as and when required:

- **The exterior of the instrument -** Clean using water and a soft cloth.
  The cloth should be wrung out hard to avoid any water penetrating the calibrator and causing damage.
  The instrument may also be cleaned using isopropyl alcohol when heavily soiled.

8.0 Technical specifications

Pressure specifications

Specifications		Model
		MGC-LOW
Range	:	0 – 6 BAR & kg / cm² 0 – 16 BAR & kg / cm² 0 – 40 BAR & kg / cm² 0 – 100 BAR & kg / cm²
Max. pressure	:	350 BAR / 5000 PSI
Min. pressure	:	0 BAR
		MGC-HIGH
Range	:	0 – 6 BAR & kg / cm² 0 – 10 BAR & kg / cm² 0 – 16 BAR & kg / cm² 0 – 40 BAR & kg / cm² 0 – 100 BAR & kg / cm² 0 – 300 BAR & kg / cm²
Max. pressure	:	700 BAR / 10000 PSI
Min. pressure	:	0 BAR

Mechanical specifications

Specifications		Model
		MGC-LOW
Weight	:	1.9 kg. / 4.2 lb.
Dimensions LxWxH	:	170 x 120 x 340 mm / 6.7 x 4.7 x 13.4 inch
Operating temp.	:	10 to 40°C / 50 to 104°F
Storage temp.	:	0 to 50°C / 32 to 122°F
Humidity range	:	0 to 90% RH
Protection class	:	IP33
Wetted parts	:	Aluminium, brass, stainless steel, polycarbonat
Leakage	:	Max. 5% over 5 minutes
Reservoir volume	:	130 cm^3 (full : 180 cm^3)
		MGC-HIGH
Weight	:	4.4 kg. / 9.7 lb.
Dimensions LxWxH	:	460 x 220 x 290 mm / 18.1 x 8.7 x 11.4 inch
Operating temp.	:	10 to 40°C / 50 to 104°F
Storage temp.	:	0 to 50°C / 32 to 122°F
Humidity range	:	0 to 90% RH
Protection class	:	IP33
Wetted parts	:	Aluminium, brass, stainless steel

Leakage	:	Max. 3% over 5 minutes
Reservoir volume	:	500 cm^3

9.0 List of accessories

All parts listed in the list of accessories can be obtained from the factory through our dealers.

Please contact your dealer for assistance if you require parts which do not appear on the list.

List of accessories

Accessories	Parts no.
Pump system T-620, System 1, 2 and 3 (MGC-LOW)	103306T3
Gauge, System 1; 0 – 6 BAR & kg/cm^2 (MGC-LOW)	102151
Gauge, System 1+2; 0 – 16 BAR & kg/cm^2 (MGC-LOW)	102158
Gauge, System 2+3; 0 – 40 BAR & kg/cm^2 (MGC-LOW)	102165
Gauge, System 3; 0 – 100 BAR & kg/cm^2 (MGC-LOW)	102172
Pump system P-142, System 1, 2, 3 and 4 (MGC-HIGH)	103306T4
Gauge, System 1; 0 – 6 BAR & kg/cm^2 (MGC-HIGH)	100403
Gauge, System 2+3+4; 0 – 10 BAR & kg/cm^2 (MGC-HIGH)	100404
Gauge, System 1; 0 – 16 BAR & kg/cm^2 (MGC-HIGH)	100405
Gauge, System 1+2+3+4; 0 – 40 BAR & kg/cm^2 (MGC-HIGH)	100406
Gauge, System 2+3; 0 – 100 BAR & kg/cm^2 (MGC-HIGH)	100409
Gauge, System 2+4; 0 – 300 BAR & kg/cm^2 (MGC-HIGH)	100411
Carrying case (MGC-LOW)	124993
Carrying case (MGC-HIGH)	124992
T-620 pump, service kit	T-656
Adapter, 1/4" x 1/4" BSP male	60R115
Adapter, 1/4" x 1/4" BSP female	60R324
Adapter, 1/4" x 3/8" BSP female	60R325
Adapter, 1/2" x 1/4" BSP female	60R326
Adapter, 1/4" x 3/4" BSP female	60R327
Lloyds valve	60R155
Clamp for valve	60R160
Bonded seal 1/4"	60R120
1.0 m (3.3 ft.) hose with 1/4" BSP female/male (MGC-LOW)	65P175
2.0 m (6.6 ft.) hose with 1/4" BSP female/male (MGC-LOW)	65P180

1.5 m (4.92 ft.) hose with 1/4" BSP female/male	60I156
5.0 m (16.4 ft.) hose with 1/4" BSP female/male	60I157
User manual	124945
Quick connection set, male and female	50-REP 615