T-600 Series Operation Manual

for T-620, T-620H, T-620H-CPF and Systems C & H

AMETEK®
TEST & CALIBRATION INSTRUMENTS

1.888.610.7664 www.calcert.com sales@calcert.com

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Overview

INTRODUCTION

The T-600 Series hydraulic hand pump you have chosen, is an extremely effective pressure pump, and we are confident that it will live up to your expectations. Over the course of many years, we have acquired extensive knowledge of industrial precision pressure calibration. This expertise is reflected in our products, all of which are designed for daily use in an industrial environment. If you have any ideas or suggestions for ways we might improve our products, we would be very interested in hearing from you.

The T-600 Series hydraulic hand pumps, designed by Mansfield & Green, are specially designed for high pressure applications. The pumps are compatible with petroleum-based oils or hydraulic fluids.

The T-620 pump generates up to 200 bar (3000 psi). The T-620H and T-620H-CPF pumps generate up to 350 bar (5000 psi). The CPF◆ version includes Crystal Pressure Fittings (CPF), which allow users to produce leak-free seals without tools or thread tape. CPF fittings also include a self-venting weep hole to help assure a safe disconnection from a pressurized system.

◆U.S. Patent No. 8,794,677

The T-600 Series hydraulic hand pump may be ordered as part of a Pump System, complete with a JOFRA or Crystal Pressure Indicator. T-600 Series Pump Systems include the most commonly used pressure fittings, seals, etc. All packaged in a carrying case with custom insert.

T-600 Series Pumps

	Pressure Range	Pump System
T-620	200 bar / 3000 psi	CXX
T-620H	350 bar / 5000 psi	CHX
T-620H-CPF	350 bar / 5000 psi	CHX and HOX

FEATURES AND PARTS LISTS

The T-600 series hand pumps feature a 0.5 pint/20 cl built-in oil reservoir, vent valve and fine adjust knob. The pump has two pressure ports – one for the device under test and one for the reference indicator.

Parts Included with Pump (T-620 and T-620H)

▶ Reference Pressure Port (1/4" NPT Female, swivel)

No additional fittings are included for the Reference Pressure Port.

▶ Device Under Test Pressure Port

Part Number	Description
T-649	0.61 meter hose with 1/4" NPT Female connector
T-786	1/4" NPT Male x 1/4" BSP Female adapter

Parts Included with Pump (T-620H-CPF)

▶ Reference Pressure Port (1/4" NPT Female, swivel)

No additional fittings are included for the Reference Pressure Port.

▶ Device Under Test Pressure Port

Part Number	Description
MPF-1/4FPT	1/4" NPT Female to CPF Female
MPM-PLUG	CPF Plug
MPH-1	1.0 meter CPF Hose

T-620H-CPF

Parts Included with Pump Systems for JOFRA Reference Indicators

Part Number	Description	System C CXX (T-620)	System C CHX (T-620H)
T-786	1/4" NPT Male to 1/4" BSP Female Fitting	■	■
127400 *	1/8" BSP Male to 1/4" NPT Male Fitting	■	■
127401 *	1/8" BSP Male to 1/4" BSP Female Fitting	■	■
127402 *	1/8" Bonded Seals	■	■
60R120	1/4" Bonded Seals	■	■
T-649	0.61 meter hose, 1/4" NPT Female connection	■	■
104203 *	Test Leads; Red & Black, including clips	■	■
60I104	Pack Tape (1 roll)	■	■
124004	Shoulder Strap	■	■
124299	Aluminum Carrying Case	■	■
2888 **	Waterproof Carrying Case	□	□

* Included with HPC.

** Pump Systems C may be ordered with a Waterproof Carrying Case. By entering *-W* in the pump system ordering code, the Shoulder Strap and Aluminum Carrying Case will be replaced by the Waterproof Carrying Case. See *Ordering a Pump System* below.

Carrying Case Options

Pump Systems C are delivered with an Aluminum Carrying Case with a pump filled with hydraulic fluid. Alternately, you may order a Pump System C with a Waterproof Carrying Case. Waterproof Carrying Cases are only available with drained pumps. So when ordering, add *-E-W* to designate a drained pump in a waterproof case. See Ordering a Pump System below.

Ordering a Pump System

Any T-600 Series Pump System may be ordered with or without a reference indicator. The table below provides an explanation of the Pump System ordering scheme when ordering a system without an indicator. For details on ordering the Pump Systems with an indicator, see the indicator datasheet.

Reference Indicator	Reference Indicator Included	Pump System	Liquid	Carrying Case
HPC500 Series . . . **HPC500**	No. . . **-NONE**	System C (T-620) . . . . . **-CXX**	Full . . . . . (omit)	Aluminum . . . . (omit)
		System C (T-620H) . . . **-CHX**	Drained. . . **-E**	Waterproof . . . -W

▶ SAMPLE PART NUMBERS

HPC-NONE-CXX . . . . . System C pump system (for HPC500) with an aluminum carrying case.

HPC-NONE-CHX-E-W . . . . . System C pump system (for HPC500) with a water proof carrying case and the pump drained of fluid.

HPC500-035G-CXX . . . . . System C with a HPC500 calibrator -0.82 to 35 bar in an aluminum case.

Parts Included with Pump Systems for Crystal Reference Indicators

Part Number	Description	System C CXX (T-620)	System C CHX (T-620H)	System H HOX (T-620H and T-975)
5238	3/8" BSP Male to CPF Male Fitting			■
5252	5/16-24 SAE Male to CPF Female Fitting			■
MPF-1/4FPT	CPF Female to 1/4" NPT Female Fitting	■	■	■ (2)
MPF-1/4BSPF	CPF Female to 1/4" BSP Female Fitting	■	■	■ (2)
MPF-1/8MPT *	CPF Female to 1/8" NPT Male Fitting	■	■	■
MPM-PLUG	CPF Male Plug Fitting	■	■	■
MPF-CAP	CPF Female Cap Fitting	■	■	■
MPH-1	1 meter CPF Male Hose	■	■	■ (2)
60R120	1/4" Bonded Seals	■ (5)	■ (5)	■ (5)
50-REP700	O-ring and Lock Clip			■ (5)
1351 **	Test Leads; Red & Black, including clips	■	■	■
5249	Protective Vinyl Cap	■ (4)	■ (4)	■ (4)
60I104	Pack Tape (1 roll)	■	■	■
124004	Shoulder Strap	■	■	
124299	Aluminum Carrying Case (for nVision and 30 Series)	■	■	
125255	Aluminum Carrying Case (for XP2i and m1)	■	■	
2888 ***	Waterproof Carrying Case	□	□	■

* When a Pump System C is ordered for a 30 Series Calibrator, two (2) additional MPF-1/8MPT fittings are included.

** The 1351 Test Leads are included *only* with Pump Systems for the 30 Series Calibrator.

*** Pump Systems C may be ordered with a Waterproof Carrying Case. By entering *-W* in the pump system ordering code, the Shoulder Strap and Aluminum Carrying Case will be replaced by the Waterproof Carrying Case. See *Ordering a Pump System* below.

Carrying Case Options

Pump Systems C are delivered with an Aluminum Carrying Case with a pump filled with hydraulic fluid. Alternately, you may order a Pump System C with a Waterproof Carrying Case. Waterproof Carrying Cases are only available with drained pumps. So when ordering, add -E-W to designate a drained pump in a waterproof case.
See Ordering a Pump System below.

The Waterproof Carrying Case is the only option for Pump System H.

Ordering a Pump System

Any T-600 Series Pump System may be ordered with or without a reference indicator. The table below provides an explanation of the Pump System ordering scheme when ordering a system without an indicator. For details on ordering the Pump Systems with an indicator, see the indicator datasheet.

Reference Indicator	Reference Indicator Included	Pump System	Liquid	Carrying Case
nVision ....**NV**	No... **-NONE**	System C (T-620).....**-CXX**	Full .....(omit)	Aluminum ....(omit)
30 Series...**IS30**		System C (T-620H) .....**-CHX**	Drained...**-E**	Waterproof ...-W
XP2i **XP2i**		System H (T-620H and T-975)...**-HOX**		
m1.....**M1**				

▶ SAMPLE PART NUMBERS

IS30-NONE-HOX-E-W ... System H pump system (for 30 Series) with a waterproof case and the pump drained of fluid.

NV-NONE-CXX..... System C pump system (for nVision) with an aluminum carrying case and the pump filled with fluid.

15PSIXP2i-CXX-W..... System C pump system with an XP2i gauge and a waterproof carrying case.

Safety Instructions

SAFETY INSTRUCTIONS

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

Please notice the pump comes in 2 different pressure ranges. Therefore it is very important to check the version of the pump to avoid over-pressurizing the indicator.

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 unauthorized spare parts.

When using this pump:

- Avoid knocking, bumping, or dropping the pump. This can cause permanent damage.
- The pump must not be used for any purposes other than those described in this manual, or for any application other than precision pressure calibration tasks.
- The pump should only be used by TRAINED PERSONNEL.
- None of our calibration systems are cleaned or prepared for OXYGEN MEDIUMS. DO NOT USE our systems for this purpose.
- Do not disconnect any parts from the system when pressurized.

! WARNING: Do not connect any external pressure source to this system. This system 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.

Generating Pressure

Follow these steps in order to operate the pump correctly. See the diagram on page 2 for reference..

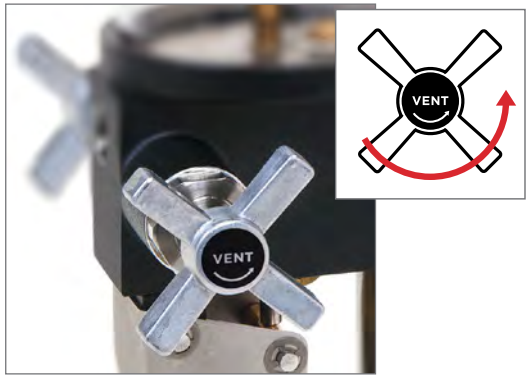
Connecting to the Pump

1 Remove the fill plug and fill the reservoir approximately 2/3 full of test fluid.

! CAUTION: **Do not use solvents , alcohol, or synthetic fluids that will adversely affect the operation of the pump. Please refer to the Recommended Test Fluids section on page 10 for more information.**

2 Connect and tighten the fill plug.

3 Turn the pressure vent valve and fine adjust knob counter-clockwise until fully open.



4 Prime the system by pumping the movable handle until air bubbles in the reservoir stop.

5 Turn the pressure vent valve clockwise until fully closed. (***Close by hand only.***)

6 Connect the reference indicator to the reference pressure port per the connection diagrams on pages 8 and 9.

7 Operate the handle until the test fluid is visible at the end of the pressure hose. Pre-filling the hose will help speed the operating of the pump.

8 Connect the device-under-test to the test pressure port.

Note: If CPF Fittings are used in your pressure system remaining air can be purged by applying 10 psi or less and loosening the CPF fitting closest to the pressure device. When fluid and air escape from the CPF weep hole, that portion of the system is purged. Repeat this process for each pressure device in the pressure system which is connected to a CPF fitting.

Applying Pressure

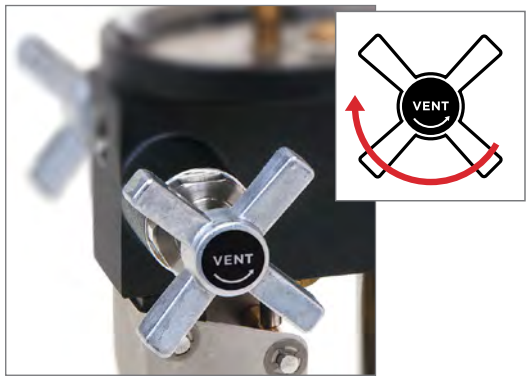
CAUTION: Ensure all fittings and devices are connected correctly and without leaks.

1 Ensure the device-under-test and reference indicator are powered on and are indicating pressure readings.

2 Turn the pressure vent valve and fine adjust knob counter-clockwise until fully open.

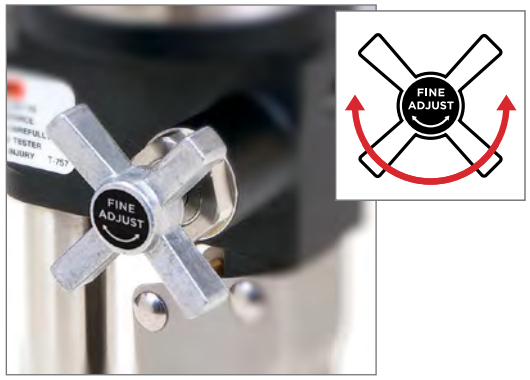
3 Zero the reference indicator.

4 Turn the pressure vent valve clockwise until fully closed. (***Close by hand only.***)



5 Operate the handle to apply pressure until the target pressure is nearly reached.

6 Turn the fine adjust knob to reach the target pressure, as indicated on the reference indicator.
Allow time for adiabatic effect to stabilize. Turn the fine adjust knob as needed to achieve stable pressure.



Note: When you operate with high pressure the system is extremely sensitive with regard to temperature and movements.

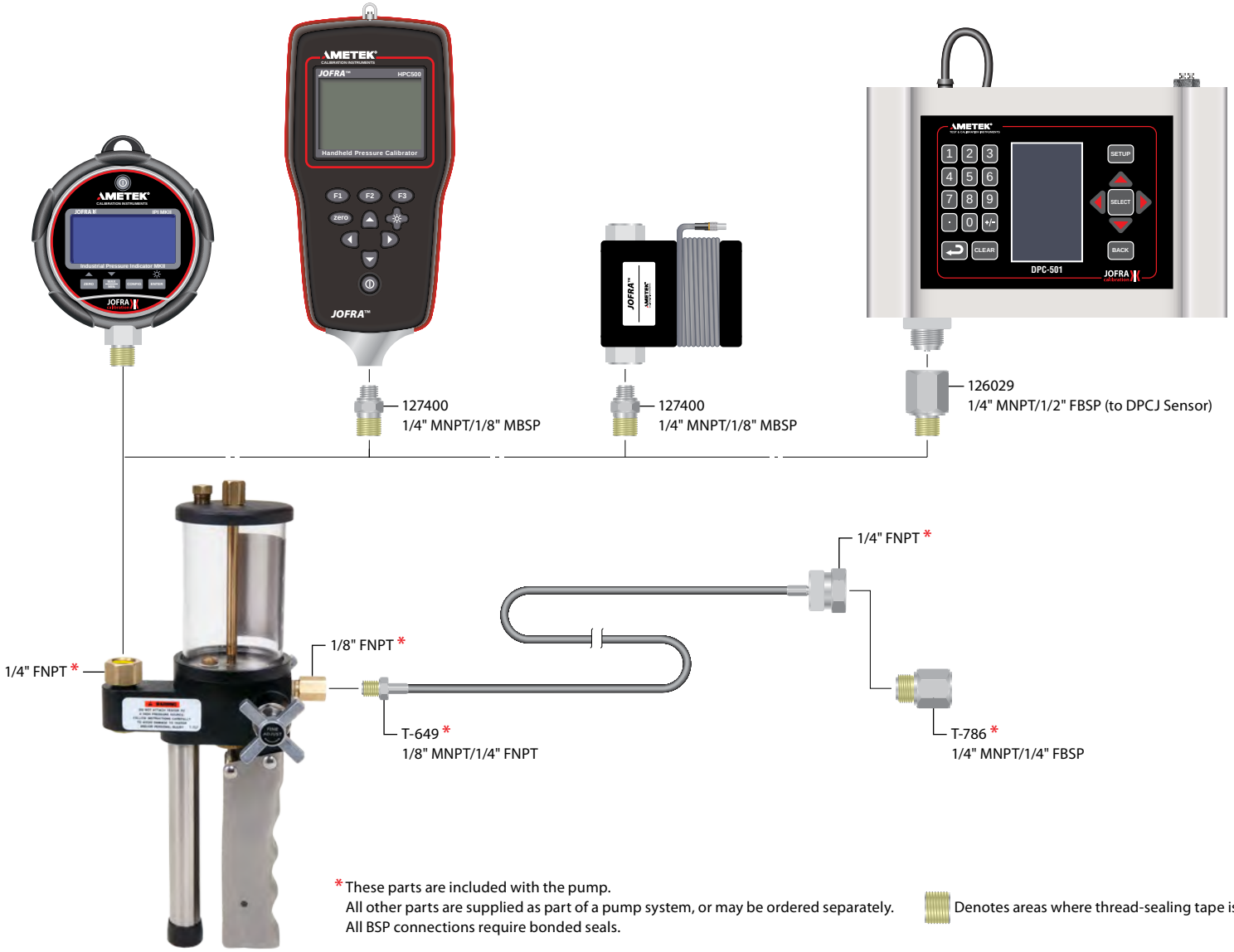
Disconnecting from the Pump

1 Release pressure by turning the vent valve counter-clockwise.

2 Remove the device under test.

Connection Diagrams

JOFRA REFERENCE INDICATORS



* These parts are included with the pump.
All other parts are supplied as part of a pump system, or may be ordered separately.
All BSP connections require bonded seals.

Denotes areas where thread-sealing tape is required.

CRYSTAL REFERENCE INDICATORS

FITTINGS FOR LiFE CPF

NPT MALE

MPF-1/8QTM	1/8" Quick Test NPT Male
MPF-1/8MPT	1/8" NPT Male
MPF-1/4QTM	1/4" Quick Test NPT Male
MPF-1/4MPT	1/4" NPT Male

Additional NPT sizes available in non-CPF MP adapters

NPT FEMALE

MPF-1/8QTF	1/8" Quick Test NPT Female
MPF-1/4QTF	1/4" Quick Test NPT Female
MPF-1/4FPT *	1/4" NPT Female
MPF-1/2QTF	1/2" Quick Test NPT Female

Additional NPT sizes available in non-CPF MP adapters

BSP

MPF-1/8BSPF	G 1/8" Female
MPF-1/4BSPF	G 1/4" Female
MPF-3/8BSPF	G 3/8" Female
MPF-1/2BSPF	G 1/2" Female

TRANSMITTER

MPF-5/16TRM	for Foxboro, Rosemount, & Yokogawa
MPF-1/4TRM	for Honeywell

TUBE

MPF-1/4TBM	1/4" Tube Male
MPF-3/8TBM	3/8" Tube Male
MPF-1/2TBM	1/2" Tube Male

CPF

MPF-MPF	Female to Female
MPF-MPFTU	T-Union (Female)
MPF-MPFBULK	Bulkhead (Female to Female)
MPF-CAP	Cap

ADDITIONAL

MPF-M20QTF	M20 x 1.5 Quick Test Female
MPF-M20X1.5F	M20 x 1.5 Female
MPF-QCN	Quick-Connect Nut
MPF-AN4M	AN4 Male

* These parts are included with the T-620H-CPF pump. Additional parts are supplied as part of a pump system, or may be ordered separately.

Denotes areas where thread-sealing tape is required.

Specifications

Pressure Ranges

T-620 . . . . . 0 to 200 bar / 0 to 3000 psi

T-620H . . . . . 0 to 350 bar / 0 to 5000 psi

T-620H-CPF . . . . . 0 to 350 bar / 0 to 5000 psi

Capacity

Reservoir . . . . . 0.5 pint/20 cl

Materials

T-620 and T-620H . . . . . Aluminum, brass, stainless steel, Teflon, Lexan, Buna N, and Nylon.

T-620H-CPF . . . . . Aluminum, brass, stainless steel, Teflon, Lexan, Buna N, Viton, and Polyamide.

Recommended Test Fluids

The following fluids are recommended for use with this pump:

- Petroleum based oils
- Hydraulic fluids

Pressure Connections

Reference Port

T-620, T-620H . . . . . 1/4" NPT Female.

T-620H-CPF . . . . . 1/4" NPT Female.

Device Under Test Port

T-620, T-620H . . . . . 0.61 m / 24" hose with 1/4" NPT Female connector
(adapter for 1/4" BSP Female)

T-620H-CPF . . . . . 1.0 m / 40" inch MPH-1 CPF hose with 1/4" NPT Female connector

Dimensions

Pump . . . . . 280 (L) x 150 (W) x 115 (D) mm.

Weight . . . . . 3 lbs / 1.4 kg

Support

TROUBLESHOOTING

Unstable Pressure

▶ **Problem:** Pressure cannot be generated correctly, or set pressure does not remain stable.

▶ **Solutions:**

- Check that all adapters and pressure fittings have been tightened sufficiently to eliminate leaks.
- Confirm test fluid does not contain air (air in the fluid can increase adiabatic effects). Replace test fluid if necessary.
- Replace hose (hose expansion can cause unstable pressure).

Pressure does not Increase

▶ **Problem:** The system fails to indicate a pressure increase after considerable pumping action of the handle.

▶ **Solutions:**

- Close the pressure vent valve.
- Remove the fill plug, and push the middle of the Check Valve In. If the vent valve cannot be reached because it's not aligned with the fill plug, loosen the reservoir lid and rotate until aligned.
- Check that all adapters and pressure fittings have been tightened sufficiently.
- Pump requires service (please contact your local sales office for advice).

MAINTENANCE

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

Exterior cleaning .....Clean using a soft, damp cloth.

Visual Inspection .....Make sure that the bottom of the reservoir and the fluid does not contain contaminants or solids.

FITTING KITS AND SPARE PARTS

Service Kits

▶ **T-620, T-620H Series**

P/N: T-656 . . . . . **T-620, T-620H**

▶ **T-620H-CPF**

P/N: T-656 . . . . . **T-620H-CPF**

Hoses

▶ **T-620 and T-620H**

P/N: T-649 . . . . . **Hose.** 0.61 m, 1/4" NPT Female connection.

▶ **T-620H-CPF**

P/N: MPH-1 . . . . . **Hose.** 1.0 m, CPF MP Male connection.

P/N: MPH-1.5 . . . . . **Hose.** 1.5 m, CPF MP Male connection.

P/N: MPH-3 . . . . . **Hose.** 3.0 m, CPF MP Male connection.

P/N: MPH-5 . . . . . **Hose.** 5.0 m, CPF MP Male connection.

P/N: MPH-10 . . . . . **Hose.** 10.0 m, CPF MP Male connection.

Adapters

▶ **T-620 and T-620H**

P/N: T-786 . . . . . **Adapter.** 1/4"BSP Female for hose connection.

P/N: 101549 . . . . . **Bonded Seal.** For 1/2" BSP.

P/N: 60R120 . . . . . **Bonded Seal.** For 1/4" BSP.

P/N: 127402 . . . . . **Bonded Seal.** For 1/8" BSP.

▶ **T-620H-CPF**

Refer to the connection diagram on page 9 for a complete list of adapters.

Test Fluid

▶ **T-620, T-620H, and T-620H-CPF**

P/N: MGAAA/QT . . . **Hydraulic Oil.** Quart.

P/N: MGAAA/GL . . . **Hydraulic Oil.** Gallon.

CONTACT US

RETURNING PRODUCT TO AMETEK

Please contact your sales representative to complete a Return Material Authorization (RMA) form and/or receive an RMA number.
Return/shipping instructions will be provided with the RMA number.

WARRANTY

This instrument is warranted against defects in workmanship, material and design for one (1) year from date of delivery to the extent that AMETEK will, at its sole option, repair or replace the instrument or any part thereof which is defective, provided, however, that this warranty shall not apply to instruments subjected to tampering or, abuse, or exposed to highly corrosive conditions.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED AND AMETEK HEREBY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. AMETEK SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, ANY ANTICIPATED OR LOST PROFITS.

This warranty is voidable if the purchaser fails to follow any and all instructions, warnings or cautions in the instrument's Instruction Manual.

If a manufacturing defect is found, AMETEK will replace or repair the instrument or replace any defective part thereof without charge; however, AMETEK's obligation hereunder does not include the cost of transportation, which must be borne by the customer. AMETEK assumes no responsibility for damage in transit, and any claims for such damage should be presented to the carrier by the purchaser.