# Installation & Operating Instructions

#### THREADED VALVE CONNECTIONS

NuTech threaded connections are tapered type (NPT) and should be made up according to industry standards.

Inspect and clean pipe threads on both components and piping. Apply sealant, either sealing compound or tape to the threads. If the product contains a union nut, remove the nut and O-ring from the assembly.

Place the union nut over the pipe past the threads. Install the tailpiece with a socket wrench. Attach the body section to the other end of the piping.

Rotate the body using the hex flats nearest the joint being tightened. *Do not use a wrench on the main body of the component*. Position the body so that the PT Port, PV, Vent, Drain Valve and or Valve Handle are in the proper position.



Make sure that the flow arrow is pointing in the direction of the flow. After both ends of the valve are assembled to the piping, reinstall the O-ring and tighten the union nut hand tight and then tighten an additional quarter turn. Care must be taken not to cut or pinch the O-ring.

### SWEAT VALVE CONNECTIONS

NuTech products with sweat connections are designed to be soft soldered.

Clean both copper tube and component ends with sand paper and/or a wire brush, wipe clean and apply flux uniformly. If the product contains a union nut, remove the nut and O-ring from the assembly. Place the union nut over the copper tube past the flux surface. Install the tailpiece and/or body on the copper tube with a twisting motion to distribute the flux uniformly when inserted. Position the body so that the PT Port, PV, Vent, Drain Valve and/or Valve Handle are in the proper position. Make sure that flow arrow is pointing in the direction of the flow.

#### A heat sink is required during soldering.

An appropriate heat sink is a wet rag wrapped around the component closest to the solder connection.

Ball valves are required to be fully closed during soldering to avoid deformation to the Teflon seat.

Valves should be allowed to cool before operating.

Apply heat with the flame directed way from the center of the valve body. Do not exceed the rated temperature of the component. Excessive heat will damage internal components such as O-rings, PT seals, and Teflon seats.



After the solder begins to melt, remove the flame and continue to apply solder until a ring is formed completely around the circumference of the joint. While the joint is still hot, remove excess flux and solder.

After both ends of the component have been assembled to the piping, reinstall the O-ring and tighten the union nut hand tight and then tighten an additional quarter turn.

Care must be taken not to cut or pinch the O-ring.

The factory installed accessories (PT Port, PV, Vent and Hose End Drain Valve) will withstand the solder temperatures *if properly heat-sinked with a wet cloth*.

# FLANGE VALVE CONNECTIONS

Class 150 Valves are mechanically compatible with standard ANSI 150 lb, flat-faced or raised-faced steel flanges or with 125 lb, cast iron flanges.

Appropriated gasket material must be used when installing flanged-mounted flow control devices (for example 1/16" thick ring type fiber filled gaskets).

(Flange gaskets are not supplied by NuTech).

All products have a flow direction arrow. Make sure the flow direction arrow is pointing in the direction of the flow.

Installing a Butterfly Valve: *Do not use flange gaskets*. The Butterfly Valve's molded valve gasket will seal against standard ANSI flanges. Before tightening any bolts on the Butterfly Valve, turn the disk of the butterfly to the full open position.

## **GROOVED END VALVE CONNECTIONS**

Grease the pipe ends, valve ends and rubber gasket lips with grease, graphite paste or similar grease. Slip the rubber gasket over the pipe end of each joint. Slide the gasket past the grooves. Position the grooved end valve between the pipe ends and slide the gaskets back into the central spanned position.

All products have a flow direction arrow. Make sure the flow direction arrow is pointing in the direction of the flow.

Apply grease on the outside of the gasket. Install housing clamps over the gasket – insert bolts and nuts. Tighten nuts evenly, using socket or other wrench. Tighten so that housing clamps come together evenly.



Center the valve and hand tighten all bolts. Slowly close the disk to check for adequate disk clearance. When properly aligned, return the disk to the open position and evenly cross-tighten all bolts. Make sure the disk opens and closes properly.



The connection is complete when housing clamps meet metal to metal, further tightening of bolts is not necessary. Pre-assemble large diameter multi-segment housing clamps loosely and install them as half-housings. Take up evenly from top to bottom on alternate bolts.

### WELD END VALVE CONNECTIONS

Clean the end of the pipe and the valve where the welds will be made. Make up the assembly butting the connections together.

All products have a flow direction arrow. Make sure the flow direction arrow is pointing in the direction of the flow. Tack weld the assembly together and observe the fit.

Warning: If the valve contains a Butterfly Valve do not finish welding the assembly with the Butterfly Valve installed between the flanges. This will result in serious damage to the valve seat.



#### PRESSURE TEMPERATURE PORT (PT) / PRESSURE TEMPERATURE VENT (PV)

"PT" Pressure/Temperature Ports and "PV" Pressure/Temperature Vents are typically factory installed.

Factory installed accessories (PT Port, PV Vent and Hose End Drain Valve) are installed with a hydraulic sealant and should not be disturbed.

If it is absolutely necessary to remove, tighten and/or adjust an accessory, it should be cleaned and resealed with new sealant and/or Teflon tape.

Care should be taken not to over tighten.

Field installations are done in accordance with general plumbing/fitting practices. Pipe dope or Teflon tape should be used to seal threads.

*Do not expose PT Ports and PV Vents to soldering, brazing or weld heat.* Complete this work before installing the PT Ports and/or PV Vents.

The PV Vent should always be installed in a vertical position. It is preferable to install the PT Port horizontally or higher. Do not install down at the 6 o'clock position.

#### SAFETY INSTRUCTIONS

Seals are made of EPDM. EPDM is compatible with hot and cold water. EPDM is resistant to: glycol, alcohol, phosphates, esters, ketones and detergents.

**Do not use with:** Petroleum products, hydrocarbons solvents and/or oils, chlorinated hydrocarbon or turpentine. Always wear eye protection when using PT Ports and /or PV Vents.

Attach a drain hose to the hose barb connection for collecting water or water vapor from the PV Vent.

Always use a pressure gauge with a rating greater than the pressure in the system.

Recommended for use in hydronic systems only. Not recommended for gas, steam or high temperature hot water.



#### OPERATION

PV Venting:

Venting is achieved by rotating the valve body 1/2 turn or until you hear air escape.

#### NOTE: The PV has a soft seat and only requires to be finger-tightened for bubble-tight shut-off. Do not use pliers or vise grips to tighten.

Close valve when venting is completed.

PT Port and PV Vent Temperature/Pressure Readings: Remove cap slowly, look and listen for leaks. Remove any foreign material from the entrance hole. Select either the pressure or the temperature device to be used. Examine the probe and remove any existing burrs. Apply silicone lubricant to the probe, especially for first time use. Insert probe slowly with a twisting motion. As soon as the necessary readings and adjustments are made, remove the probe and replace cap.

#### MAINTENANCE

If the device leaks persistently, replace it. Keep debris out of the device and keep caps on.

### PRESS FIT ADAPTERS - FNPT & MNPT

### WARNING

Read and understand all instructions for installing the NuTech Press Fittings. Failure to follow all instructions may result in extensive property damage, serious injury or death.

NuTech Press Fit Adapters come in 0.50", 0.75" and 1.00" in both FNPT and MNPT for Types K, L and M Hard Copper Tubing in 0.50" to 1.00" which complies with ASTM B88 Standards. The NuTech press fittings are manufactured with an EPDM O'ring seal installed at the factory and are made from low lead (maximum lead content of 0.25% by weight).

- 1. Cut copper tubing at right angles using a displacement-type cutter or fine-toothed steel saw.
- Remove all burrs from the inside and outside of the tubing to prevent any cutting / damage to the O'ring.
  NOTE: Tubing must be free of surface imperfections including metal stamped print lines. All components and associated piping must be free from dirt, debris or items that may interfere with the O'ring seal and the press connection.
- Confirm fitting has an O'ring installed on the inside diameter. O'ring is prelubricated.
  DO NOT USE OIL OR ADDITIONAL LUBRICANT ON O'RINGS.
- 4. Insert copper tube into the fitting. While turning slightly, and at the same time, slide the press fitting onto the tubing until it hits the built-in internal stop.

CAUTION: Improper insertion depth may result in an improper seal. End of tubing must contact the stop.



- 5. Insert appropriate jaw into the pressing tool and push in-holding pin until it locks in place.
- 6. Open the jaw and place at right angles on the fitting.
- 7. Using the press tool, hold the trigger until the jaw has engaged the fitting.
- 8. The jaw can be opened again once the press connection has been completed. When the fitting is pressed, a permanent, sealed, non-detachable, mechanical connection is made.

#### AUTOMATIC BALANCING VALVES

#### INSTALLATION

There are no minimum straight-piping requirements for the inlet or the outlet.

Valves may be installed in horizontal or vertical lines. The flow arrow on the valve body must be pointed in the direction of flow.

Avoid placing the valve close to a pump discharge. Allow 10' before the valve if possible.

#### OPERATION

NuTech Automatic Balancing Valves incorporate a removable flow cartridge that is factory set to limit the GPM to within  $\pm$  5% of the specified flow.

The flow can be verified by measuring the differential pressure (D.P.) across the valve using the PT Ports provided. If it measures between 2-32 PSID the flow is with in the specified flow range.

#### MAINTENANCE

There is no periodic maintenance required on the Automatic Balancing Valve.

Using a Y Strainer is always recommended to prevent clogging. A 40 mesh screen is recommended for flow of 1.5 GPM or less. The controlled flow rate can be changed in the field without having to remove the valve from the line. Isolate the system, relieve pressure and drain water. Carefully remove the cap and pull out the cartridge with your fingers. When refitting make sure the O-ring on the cartridge and cap are in place.

#### MANUAL BALANCING VALVES

#### INSTALLATION

NuTech Manual Balancing Valves & Venturi's are unidirectional, observe the flow arrows on valve body to be pointed in the direction of flow. All models can be installed in horizontal or vertical pipe.

#### STRAIGHT-RUN REQUIREMENTS

The MB models have the necessary straight-run length built in and can be installed directly downstream of a 90 degree elbow or a control valve. If the control valve is smaller then the MB, then the reduction can be done with a NuTech tailpiece or reducing coupling to insure a proper reading.

Model MF, MG, VF, VG and VW can be installed with no additional pipe diameters upstream or downstream for line size connections. Where the elbow, control valve or fitting is not line sized, five pipe diameters of straight pipe shall be required upstream of the manual balancing valve. No pipe diameter shall be required downstream of the manual balancing valve. Tap Locations (Pressure Taps or PT Ports). For portable D.P. metering, the taps can be pointing at any clock location, except at 6 o'clock.

Optional accessories such as air vents should always point up and drain down.

#### OPERATION

The flow is determined by measuring the differential pressure (D.P.) across the high (Red) and low (Blue) taps on the venturi.



CHART	SIZE	MODELS
FCMB	0.50" - 2.00"	MB1e, MB2e, MB3e, MB4,
FC1	2.50" - 6.00"	MF, MG, MP, VF, VG, VW
FC2	8.00" - 12.00"	MF, MG
FC2	8.00" - 16.00"	VF, VG, VW

Convert the measured D.P. to inches W.C. and use the appropriate NuTech chart to read the flow.

Models MB and MF are equipped with a downstream throttling valve to adjust the flow.

Slowly close the valve while reading the D.P. gauge until the desired flow is reached. Set the memory stop so the handle position is maintained even if the valve is temporarily closed.

#### MAINTENANCE

There is no periodic maintenance required on these devices.

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# PM-4.5 & 6.0 Differential Pressure Meter Kit

Designed for use with Manual Balancing Valves



## **KIT CONTENTS:**

Gauge – 4.50" or 6.00" Dial Gauge Piston Type Differential Pressure, Accuracy + /- 2% Full Scale, 3000 PSI WP, 175 F Maximum Temperature, Stainless Steel Case, Stainless Steel Wetted Parts, Buna-N Seals, Glass Window, White Dial Face with Markings 0-160" DP with 10" Intermediate Marks or 0-300" DP with 20" Intermediate Marks.

Two Shut-off Ball Valves

Two 10' hoses with Shut-off Ball Valves 0-300" DP Range

Gauge Adapters-Two 0.75" x 0.063" Stainless Steel Probe Type with Guards

Two Plastic Bleed / Vent Tubing Sets

One Bungee Cord

Carrying Case Aluminum with Lock, Handle, Shoulder Strap and Protective Foam Inserts **PM - 4.5 - 160** 4.50" Dial Gauge, 0 - 160" DP

PM-6.0-160 6.00" Dial Gauge, 0-160" DP

PM-4.5-300 4.50" Dial Gauge, 0-300" DP

PM-6.0-300 6.00" Dial Gauge, 0-300" DP

# PM-4.5 & 6.0 Differential Pressure Meter Kit OPERATING INSTRUCTIONS

# WARNING:

All operations should be done slowly and carefully. Take all necessary safety precautions, (i.e. safety glasses, gloves, etc.) while using this kit.

## **Differential Pressure Measurement:**

Ensure All Valves Are Closed Prior To Start

- · Slowly insert and secure Gauge Adapters into test plugs
- Slowly open Red (High Side) Hose Valves
- Slowly open Red (High Side) Bleed Valves
- · Close Red (High Side) Bleed Valve after water flows
- Slowly open Blue (Low Side) Hose Valves
- Slowly open Blue (Low Side) Bleed Valves
- Close Blue (Low Side) Bleed Valve after water flows
- Read and Record Differential Pressure
- · Slowly close all valves- High Side first
- Slowly remove Gauge Adapters from test plugs
- Ensure components are dry and free from water
- Return meter to case and store in temperatures above 50° F

## **IMPORTANT!!**

- · Check all fittings and tighten as necessary before operating.
- KEEP FROM FREEZING MUST BE DRAINED IMMEDIATELY AFTER USE

To Drain: Disconnect Hoses Open Valves on Meter Body Drain Meter and Hoses Tilt Meter left and right for complete draining

# DHM-4.5 Dual Hose Meter Kit Designed for use with Automatic

Flow Control Valves



## **KIT CONTENTS:**

Gauge – 4.50" Dial Stainless Steel Case, White Dial Face with Markings 0-160 PSIG, Shatter Proof Lens, Face Mounted Recalibrator, Phosphor Bronze Movement, Bronze Bourdon Tube, Accuracy +/- 1%, 0-160 PSI Range

DHM- 4.5 4.50" Dial Gauge, 0-160" DP

Three Shut-off Ball Valves

Two 10' Hoses with Shut-off Ball Valves

Gauge Adapters Two 0.75" x 0.063" Stainless Steel Probe Type with Guards

**One Plastic Bleed Hose** 

One Bungee Cord

Carrying Case Aluminum with Lock, Handle, Shoulder Strap and Protective Foam Inserts

# DHM-4.5 Dual Hose Meter Kit OPERATING INSTRUCTIONS

# WARNING:

All operations should be done slowly and carefully. Take all necessary safety precautions, (i.e. safety glasses, gloves, etc.) while using this kit.

## Pressure Measurement:

## **Ensure All Valves Are Closed Prior To Start**

- · Slowly insert and secure gauge adapters into test plugs
- Open Red (High Side) Hose Valve
- Open Bleed Valve
- Close Bleed Valve after water flows
- Read and Record Pressure Measurements
- Open Blue (Low Side) Hose Valve
- Open Bleed Valve
- Close Bleed Valve after water flows
- Read and Record Pressure Measurements
- Subtract Pressure Measurements to obtain Differential Pressure Measurements
- Slowly close all valves- High Side first
- Slowly remove gauge Adapters from test plug
- Ensure components are dry and free from water
- Return meter to case and store in temperatures above 50° F

# IMPORTANT !!

- Check all fittings and tighten as necessary before operating.
- KEEP FROM FREEZING MUST BE DRAINED IMMEDIATELY AFTER USE

To Drain: Disconnect Hoses

Open Valves on Meter Body Drain Meter and Hoses Tilt Meter left and right for complete draining

# PTK 1-25 & PTK 2-25 Pressure Temperature Test Kit



### **KIT CONTENTS:**

#### Gauge 2.50"

Phosphour Bronze Bourdon Tube, Black Steel Case, Chrome Bezel, Brass Socket, White Face, Black Numerals, Accuracy +/-2% Mid-Scale, Suitable for Air, Water, Oil & Gas

Gauge Adapter 2-3/4" x 0.063" Stainless Steel Probe Type with Probe Guards

Available Gauge Ranges 0-100 PSI, 0-160 PSI, 0-200 PSI, 0-300 PSI

#### Thermometers

Two included, Bimetal, 5" x 0.142" Stem, 1" Dial, Accuracy +/- 1%, High & Low Ranges 0-220°F & 25-125°F, Protective Sleeve with Clip

Carrying Case Aluminum with Handle & Protective Foam Inserts

#### PTK 1-25 (1) 2-1/2" Gauge, (1) adapter,

(2) Thermometers, (Select One Gauge)

#### PTK 2-25

(2) 2-1/2" Gauges, (2) Adapters,(2) Thermometers, (Select Two Gauges)

# PTK 1-25 & PTK 2-25 Pressure Temperature Port Test Kit OPERATING INSTRUCTIONS

# WARNING:

All operations should be done slowly and carefully. Take all necessary safety precautions, (i.e. safety glasses, gloves, etc.) while using this kit.

## **Pressure Measurement:**

- Slowly insert and secure Gauge Adapters into test plug
- Read and Record Pressure Measurement

## **Temperature Measurement:**

- Slowly insert Thermometer into test plug
- Read and Record Temperature Measurement

## Storage:

- Ensure components are dry and free from water
- Return meter to case and store in temperatures above 50° F

# Limited Warranty

NuTech warrants that our products are free from defects in material and workmanship and will possess the characteristics represented by us for a period of 12 months from the date of shipment.

Upon satisfactory proof of claim, we will, within a reasonable time, make any necessary repairs, additions or corrections or, at our option, replace defective parts free of charge. Charges for correcting defects or making additions will not be allowed, nor will we accept products returned for credit unless the return is authorized by us in writing.

This warranty shall not apply to any material which has been subject to misuse, negligence, modification, temperature or pressures in excess of the limits recommended by NuTech.

NuTech makes no other warranties either expressed or implied, including the warranties of mechanical ability or fitness for a particular purpose.

The company neither assumes nor authorizes any other persons to assume for it any liability in connection with the sales of its parts and material except under the conditions of this warranty.

There are no warranties which extend beyond the description on the face hereof. NuTech is not liable for incidental or consequential damages including, but not limited to, damage or delay, loss of profit or expense incurred by the purchaser.

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