WARRANTY

Intek, Inc. warrants each *Rheotherm* product to be free from defects in material and workmanship under normal use and service, Intek's obligation under this warranty being limited to making good any part or parts thereof which shall, within one (1) year after delivery of such product to the original purchaser, be returned to Intek with transportation charges prepaid and which Intek's examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties, express or implied and all other obligation or liabilities on Intek's part. The purchaser will assume all responsibility and expense for removal, decontamination and reinstallation of equipment.

Rheotherm flow meters are manufactured under United States patent numbers 4,255,968, 4,942,763, 4,949,578, 5,485,754 and 5,752,411

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SECTION 1 – GENERAL INFORMATION

1.1 INTRODUCTION

Rheotherm® precision flow meters are designed to provide accurate linear or non-linear (depending on the model) representation of fluid flow rate. They are manufactured exclusively by Intek, Inc. and employ a patented thermal technique used by industry since 1978. The unique transducers have protected sensor design, are easy to install and require little or no maintenance.

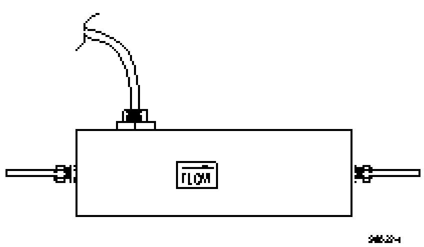
Each *Rheotherm* flow meter consists of two elements — a transducer and an electronics unit. The transducers come in two basic designs, intrusive and nonintrusive (SECTION 2.1). Design selection is based on application constraints or customer preference. The electronics, for signal processing, are housed in one of four basic enclosure styles (SECTION 2.2). Again, selection is based on application requirement.

Key features of *Rheotherm* instruments are:

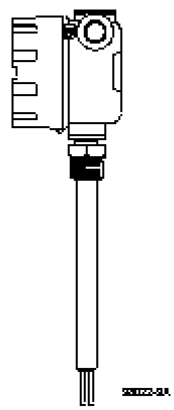
- Nonintrusive flow measurement — For pipe sizes from 0.030 to 1.5 inches, flow sensing can be done from outside the flow tube.
- No moving parts — There are no rotating, translating, undulating or oscillating parts to wear, stick, break or fatigue.
- Chemical compatibility — The wetted surface(s) can be any of a number of corrosion resistant metals or alloys. There are no internal joints or seals in most tube type transducers.
- Flexibility — *Rheotherm* meters can be ordered calibrated for mass or volumetric units or in average velocity. Flow rate, totalization and fluid temperature displays or output signals are available as well as rangeability up to 100:1 or more.
- Fluid temperature options to 500°F.
- Fluid pressure options to 10,000 psi (check transducer tag for rating on your unit).
- Withstands over ranging — No damage or change in calibration will occur due to excessive flow rates many times higher than calibration range.
- Immunity to shock and vibration.
- Optional nuclear radiation hardening.
- Range of application includes measurements in capillary tubes to large diameter pipes or ducts.

1.2 DESCRIPTION OF OPERATION

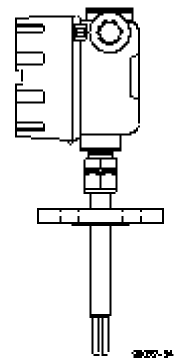
Rheotherm flow meters are available with various nonintrusive and intrusive transducer designs, but they all use the same thermal sensing technique. Two temperature sensors are used — one is in thermal equilibrium with the fluid and provides a fluid temperature reference, while the second temperature sensor is located near a heater so that its temperature is slightly above that of the fluid. In tube style transducers, the temperature sensors and heater are attached to the outside of the flow tube, whereas the probe transducers have the sensors and heater located in the probe(s) that are inserted into the stream. The amount of heat removed from the heated sensor by the stream is related to fluid velocity. Hence, the measured temperature differential between the reference sensor and heated sensor is a function of flow rate. Intek, Inc. is licensed to use this patented and trademarked flow measurement technique.



Nonintrusive tube transducer



Example of
probe
with NPT fitting



Example of
probe with
flange for mounting

1.3 PRECAUTIONS

1. Use proper input power — Check the label on the electronics for the input power requirements.

2. Use reasonable care in handling the transducer. Do not try to disassemble the transducers; there are no removable parts.

   Tube (TU, TUL, TUS, etc.) — excessive twisting or bending can damage the sensor. The flow tubes are thin-walled tubing.
   Probes (NPT/2I, NPT/I, BF/2I, BF/I, etc.) — take care not to bend the probes or damage the tips. Do not try to remove or turn the conduit junction box.

3. All tube sensors under ¼" should be supported by the sensor shell, not the tube stubs. Tube sensors using junction boxes or sensors without junction boxes can be supported with the pipe clamps or some other appropriate means. Tube sensors with junction box can be supported using the brackets machined into the junction box.

4. Check the transducer maximum temperature rating — do not operate a transducer at or subject it to a temperature above its specified limit.
5. Keep moisture out of the electronic enclosure and sensor junction box. Once cable connections are made in the junction box, make sure the lid is tightly closed. Seal conduit lines if they can become wet inside.

6. Keep transducer wetted surfaces clean and free of permanent layer build-up.

7. Do not exceed pressure limits of the tube or fittings.

8. Maintain a thermally stable environment (short-term) for the transducer and adjacent line. (See SECTION 2 — INSTALLATION.)

These instructions cover installation, calibration and maintenance of *Rheotherm* meters in standard configurations. Any special information pertaining to your unit is covered under CUSTOM INFORMATION (SECTION 6). Time should be taken to carefully read these instructions prior to installation of the equipment. Should any questions arise or problems occur, call Intek for immediate assistance.

SECTION 2 – INSTALLATION

‼ **IMPORTANT:** All transducers have a directional arrow on the tag and/or etched into a metal part. Before installing a sensor, please note proper flow direction. This is critical to sensor operation.

‼ **IMPORTANT:** If you have more than one *Rheotherm* unit, make sure the complete serial number of the transducer matches the complete serial number of the electronics. The transducer and electronics are a matched set. Components with different serial numbers should not be interchanged. The transducers have no user serviceable parts, so do not try to disassemble, as permanent damage may result.

‼ **IMPORTANT:** If you are installing *Rheotherm* instruments in outdoor environment, it is highly recommended that a "roof," "shelter" or protective cover to be provided to shield the transducer and electronics from direct impact of environment conditions. Sudden and large changes in temperature can affect instrument performance. Heat from the outside can build up the temperature inside electronics enclosures, and can exceed the temperature ratings for the electronics within.

2.1 TRANSDUCER

The transducer style supplied with your meter is listed in the model code number in SECTION 6. Proper installation of the sensor is necessary for achieving accuracy and repeatability. Installation suggestions for each type of standard transducer are given here. For custom transducer installations, refer to CUSTOM INFORMATION — SECTION 6.

Be sure wetted surfaces are clean before installing. If cleaning is needed, use non-residue solvent and wipe dry. If the sensor has a connector box, keep moisture out. Make sure the lid is tightly sealed and, if supplied, the gasket is in place. Seal conduit lines at the connector box if conduit lines can become wet.

1. Tube (nonintrusive) — $^1/_{16}$ and ⅛ transducers, unless they have optional ¼" O.D. ends, particularly require special care in handling and installing to avoid damage to sensor tube stubs.

   ‼ **CAUTION:** Tube transducers are made with thin-walled tubing — use care when installing.

   All tube transducers (other than $^1/_{16}$ & ⅛ inch) should have straight line input and output sections, typically 20 pipe diameters on the inlet and 6 to 10 diameters on the outlet. Installation locations for tube style transducers should be selected to ensure a continuous and uniform fluid flow within the sensing tube. Vertical or angled installations should be in locations where the fluid is flowing up through the sensor. Connection in the line is via compression fittings, hose with clamp, threaded fittings or flanges, whichever is appropriate. Care must be taken not to transmit a twisting force through the transducer's midsection. The tube transducer, whether flanged or not, must not be used to pull other piping together or to make up angular mismatch of fittings. The transducer junction box (if supplied) should never be rotated for any reason.

The $^{1}/_{16}$" tube transducers may be sleeved with a ⅛" tube for added support. Connection should always be made to the $^{1}/_{16}$" tube, as there is no assured seal between the flow tube and the ⅛" support sleeve.

Some tube transducers have an integrally mounted cable; do not pull on this cable, or attempt to remove the fitting where the cable enters the sensor shell.

Fluid temperatures other than ambient require special attention. Thermal gradients from one end of the transducer to the other, as well as along the radius of the connection pipe, are undesirable. Therefore, effective insulation should be installed around the inlet and outlet straight line runs. Gradients which may exist in the line further up stream can be removed if an insulated elbow is installed in the line prior to entering the straight line portion of the plumbing. Metallic support braces for the sensor or adjoining plumbing can act as a heat sink and cause operational problems in high temperature applications. The support braces should be thermally isolated from the line to avoid large heat conduction effects.

If the transducer is for use above 300°F, it will have a side arm and connector box, where the internal high temperature wiring is connected to the lower temperature transducer cable. Free air should be allowed to flow around the side arm and connector box to keep the box cool. The side arm can be insulated up to one third of its length from the transducer body.

In these applications, proper thermal control is vital to accurate meter performance. Non-uniform heat tracing, relay on/off temperature controllers and oscillating proportional type control should always be avoided. Steam trace lines with good pressure regulation or properly tuned proportional temperature control systems are effective in maintaining uniform fluid temperature. ***A box around the sensor and inlet tubing is highly recommended for operating temperatures higher than room ambient. Allow enough inlet tubing inside the box to allow the fluid temperature to become the same temperature as the surrounding air. Separately control the box air temperature at the same temperature as the incoming fluid temperature to minimize thermally induced indication errors.***

Flow stream conditioning must also be considered to maximize meter performance. Avoid upstream protrusions and short distance straight runs. Flow pulsations, such as those created by metering pumps, may cause the instrument to differ from the factory calibration. Furthermore, if the flow is varied by stroke and by pump speed adjustment, the indication will most likely be non-repeatable. If you are using a pump of this type, it is recommended that a pulsation dampening device be used to provide smooth continuous flow. A second choice would require readjustment of the instrument calibration (cal) potentiometer after installation (See SECTION 4.2).

For liquid measurement systems using high pressure gas to force flow, the effects of the absorbed gas must be considered. In these cases, sudden pressure drops up stream of the sensor such as line size expansions, control valves, and pressure dropping regulators must be avoided. Sudden pressure drops can cause the absorbed gas to release into the liquid, making the flow sporadic and difficult to measure. Control valves should be placed down stream of the sensor.

The ideal installation will provide the sensor with well established smooth flow, uniform system temperature and consistent fluid media.

2. Intrusive Probes —

    ‼ **IMPORTANT:** Recommended straight run for best accuracy is 20 diameters up stream and 10 diameters down stream.

    The various probe transducers are mounted through a threaded collar (NPT/2I and NPT/I) or flange (BF/2I or BF/I). Other fittings and sensor designs are also available and are discussed on the Custom Information page. Generally the probes are sized so the tips extend ½ to 1 inch beyond the pipe center line when properly installed. There are exceptions to this in certain applications; see CUSTOM INFORMATION (SECTION 6) as it applies.

    Proper alignment of the sensor with flow is important; the flow direction is indicated on the transducer tag and/or etched into the transducer. All dual probe transducers (NPT/2I, BF/2I) are installed so that the two probes are side-by-side across the fluid stream. Never rotate the junction box that houses the terminal cable connection. If this occurs the transducer could be damaged and/or installed misaligned with the flow direction.

    For high temperature applications, the sensor and surrounding line should be well insulated. Leave a portion of the transducer neck un-insulated to allow heat dissipation before reaching the junction box.

2.2 ELECTRONICS

Various types of electronics housings are available. These include NEMA 4, laboratory bench type, explosion proof, and panel mount enclosures as well as special models to meet customer requirements. These come in different sizes to accommodate options and special features.

1. <u>NEMA 4</u> — The standard industrial housing, this enclosure is watertight (non-submersible) when the door is properly clamped shut. The housing should be mounted such that wire/cable ports are located at the bottom of the housing, to reduce problems associated with water spray, condensation and settling of dust and dirt. An all stainless steel version for corrosive environments is also available.

2. <u>NEMA 7</u> — For use in hazardous (class I) environments. The lid should be closed and all bolts tightened before the unit is powered up. If a NEMA 7/NEMA 4 enclosure was ordered, the unit will have a rubber gasket in a groove in the top of the enclosure base. Conduit seals are frequently required, so applicable code requirements should be met when installing the conduit into the box.

3. Laboratory — This table-top unit is NEMA 1 only; do not spill liquid on it or use in a wet environment. This unit typically has a grounded power cord, and all transducer and output connections are located on the back of the enclosure.

4. Panel Mount — For use in a control panel, mounted so the enclosure face is flush with the panel surface. Most or all connections are made on the back of the enclosure. NEMA 1 only; do not use in a wet environment.

The electronics housing should be installed keeping in mind the length and routing of the transducer cable. Standard cable length is ten (10) feet but it can be specified up to 200 feet. If, after calibration of the unit, the cable length is changed (a portion cut off or additional cable spliced on), there may be a shift in the calibration due to the change in cable resistance. The size of this effect depends on the amount of change. If a noticeable shift occurs, it may be calibrated out following the single point calibration instructions in SECTION 4.2.

Unless otherwise specified, normal ambient environment for the electronics is 0-120°F. Recommended maximum temperature is 135°F.

2.3 ELECTRICAL CONNECTIONS

1. Transducer Cable — The standard transducer cable is 22 or 24 gauge, multi-conductor (6), shielded cable with a PVC jacket. Connect the transducer cable to the electronics (and transducer junction box if supplied) following the wire color codes shown on the wiring diagram (Figure 1). Make sure all connections are tight. If the unit does not operate properly after installation is completed, check these connections again.

   In general the laboratory unit will have a plug-in connector for the transducer cable.

2. Power — The input power requirement is listed on the tag on the electronics enclosure and is shown on the input power connector; make sure the input power source is compatible. The standard power requirement is 115 Vac, 60 Hz, ½ A, single phase. (For units going to Europe, the standard is 230 Vac, 50 Hz, ¼ A, single phase.) Power connections are as shown in Figure 1. Laboratory units sold in the U.S. have a power cord with grounded plug.

   !! **CAUTION:** Never make or break transducer cable connections with the electronics powered up (unless specifically instructed by factory to do so).

   As a general rule, if the flow is to be shut off or the flow line empty for long periods of time, power to the unit should also be turned off. An on/off switch, provided by the customer, is recommended for all industrial installations.

3. Output — Output connections are made to the output terminal as shown in Figure 1. If the unit has a 4-20 mA output, the standard is an isolated 4-wire transmitter with the current loop powered by the *Rheotherm* electronics. Do not attempt to use with a system that also sources the current unless the instrument was specifically ordered that way.

SECTION 3 – OPERATION

3.1 START UP

Typically, the instruments come from the factory set up for the flow range of interest to the customer. Following installation all that is required is to switch on power and initiate flow in the measurable flow rate range. Flow sensors that are not calibrated directly on the fluid to be measured are so indicated in this manual (SECTION 6) and require an in-line field calibration.

When power is first turned on, the output reading or signal will indicate full scale. After ten to forty-five seconds (depending on flow range adjustment) the reading will stabilize. The instrument time constant is generally between 4 to 12 seconds. Higher average flow rates will result in an observed faster response time for a given unit.

3.2 GENERAL INFORMATION

The *Rheotherm* instrument is compensated for a wide range of both ambient and flowing media temperatures. However, abrupt changes in the temperature of the flowing material can cause the instrument output to deviate from the true representation of flow rate. A proper reading is obtained only when the transducer is in thermal equilibrium with the material. Typically, a 20°F abrupt change in temperature may require 40 seconds to stabilize. Temperature ramps should be kept below 1°C/minute.

Rheotherm instruments are calibrated for a particular fluid, either at the factory or in the field. If the fluid changes properties, the calibration changes. Therefore, once calibrated, do not allow fluid properties such as density and viscosity to change (other than the intrinsic changes which occur with temperature variation). If the fluid is changed, a recalibration may be attempted following the procedure in SECTION 4.2. If this procedure does not provide a good calibration for the range of interest on the new fluid, contact the factory.

3.3 OPTIONS (Refer to those Sections that apply to the instrument you have purchased)

1. Analog Outputs — The unit will have a 0-5 Vdc, 0-10 Vdc or 4-20 mA output. See SECTION 2.3 Output for a discussion of the 4-20 mA output.

2. Pulse Output — For either pulse option shown below, the factory standard for pulse frequency is 2 KHz at full scale flow. Specific units of volume or mass per pulse may also be supplied. Unless otherwise specified, the minimum pulse duration is 250 µs.

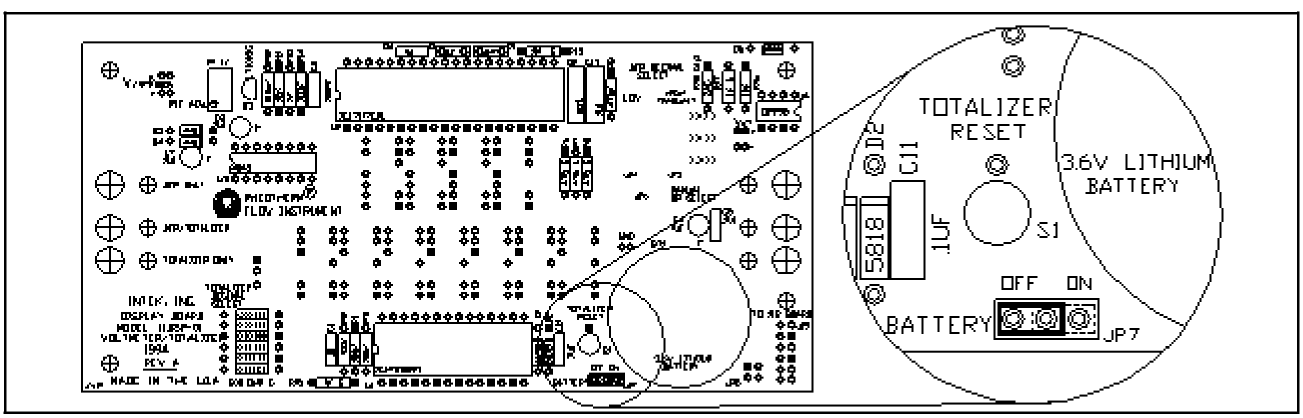
   A. Open collector — The (+) connection on the output terminal is the collector of a 2N3904 NPN transistor. The (–) connection is the emitter of the same transistor. The pulse rate is linear with flow. Recommended maximum current is 150 mA; maximum voltage is 36V.
   B. Voltage pulse — This option uses the same circuit and connections as the open collector. A 1kΩ pull-up resistor is added and tied to either a +5V or a +12V voltage source. This provides a 0-5V or a 0-12V voltage pulse.

3. Flow rate display — The standard display is a 3½ digit LED. The left digit shows only 0 or 1.

4. Totalizer — The standard totalizer is a 7 digit LED. It has a built-in lithium battery with an 8 year life for power off count retention. A reset button is located inside the enclosure, on the totalizer printed wiring board. Additionally, the totalizer may be reset without opening the enclosure through the use of a small magnet; a magnet is provided with the unit, and is located on the inside surface of the enclosure door. To utilize this method, the magnet should be placed on the outside of the enclosure after installation of the unit. Simply bring the magnet close to the totalizer window, to the spot labeled "TOTALIZER RESET;" this action will reset the totalizer.

   Installation note: To preserve its life during storage, the totalizer battery is shipped in the "***off***" position. It must be turned "***on***" in order to properly retain its count when power to the unit is disconnected. To turn the battery "***on***," go to the display board mounted in the enclosure window. The shunt header is located near the battery (see drawing). Move the shunt from the "***off***" position (left and center pins) to the "***on***" position (center and right pins). If the unit is ever put into long term storage, the shunt should be returned to the "***off***" position to preserve battery life.

5. Flow switch relay — Flow switches may initially indicate a high flow rate even for zero flow when power is first applied to the unit. Correct indication of flow will result after an initial period which can extend to forty seconds depending on where the trip value is set. The relay in standard flow switches is picked up (energized) when the flow rate is above a set point. A loss of flow is therefore indicated in the event of loss of power to the sensor when connected to N.C. contacts. If the switch option has been ordered for high flow indication, the relay will be energized with flow below the trip value. See CUSTOM INFORMATION, SECTION 6 for details on operation of the relay.



3.4 OUTPUT CURVE

Figure 3 (p. 20) is the final linearized output curve for your unit. The instrument has been calibrated over the actual flow rate range indicated on the ordinate (Y axis).

3.5 TRANSDUCER & ELECTRONICS FUNCTIONAL TESTS

A test of the *Rheotherm* instrument functional operation can be performed in three phases as outlined below:

- Transducer continuity check, Diagram A on the next page.
- Transducer isolation check, Diagram B on the next page.
- Front end board TP4 signal to 4/20 mA output using Table II, calibration data.

1. The transducer continuity check is performed as follows:

   A. Turn off power to the unit.
   B. Disconnect the transducer cable from the electronics.
   C. Make resistance measurements between the cable pairs as shown in Diagram A. The readings should be as indicated; if not, consult factory for repair.

2. The transducer isolation check is performed as follows:

   A. Turn off power to the unit.
   B. Disconnect the transducer cable from the electronics.
   C. Make the circuit connections illustrated in Diagram B.
   D. Probe all the conductors and note the voltages with respect to the shield. All readings should be less than 0.5 Vdc.

3. The sensor input to flow output of the electrical circuit is checked as follows:

   A. Construct the dummy transducer as illustrated in Diagram C.
   B. Turn off power to the unit.
   C. Disconnect the transducer cable from the instrument.
   D. Connect the dummy transducer to the instrument input.
   E. Restore power.
   F. Connect a DC voltmeter to the TEMP (+) pin on the front end board (see Figure 2 on page 18) and to GND (-). Connect a second DC voltmeter to pin ΔT (+), and again to GND (-).
   G. Vary the R1 & R3 pots of the dummy transducer to obtain values for TEMP and ΔT of Table II Orginal Calibration Data for Functional Test. Compare the measured non-linear output (TP4) and the indicated linear flow rate to data of Table II. If there are large discrepancies between these numbers, contact factory for advice.

*resistors of dummy transducer

TRANSDUCER CONTINUITY CHECK

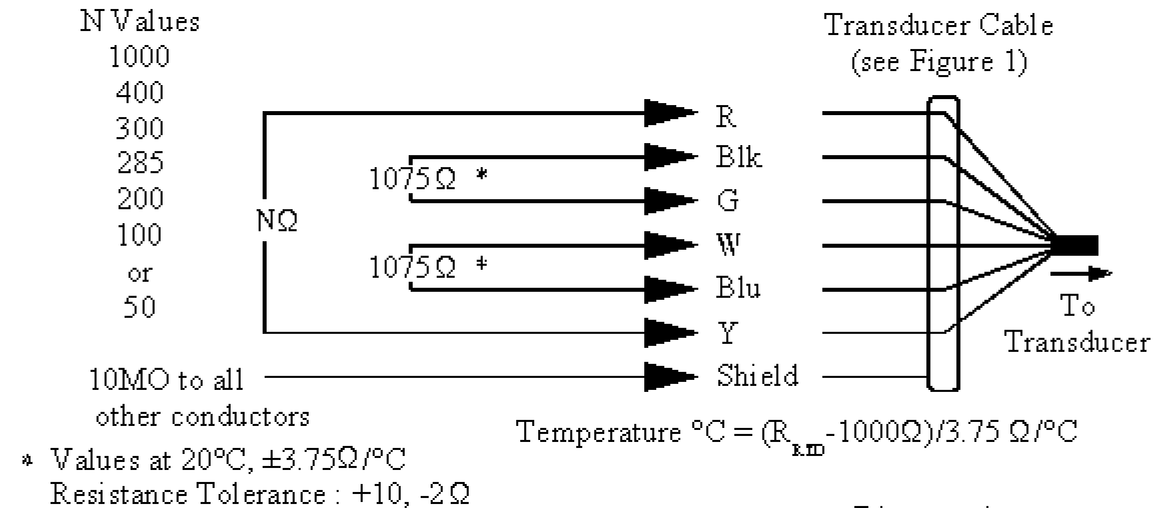


Diagram A

TRANSDUCER ISOLATION CHECK

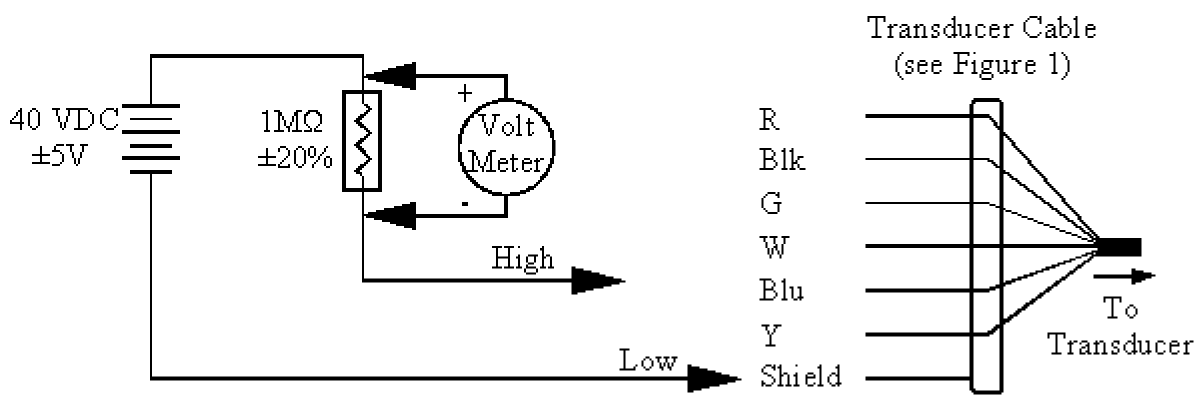
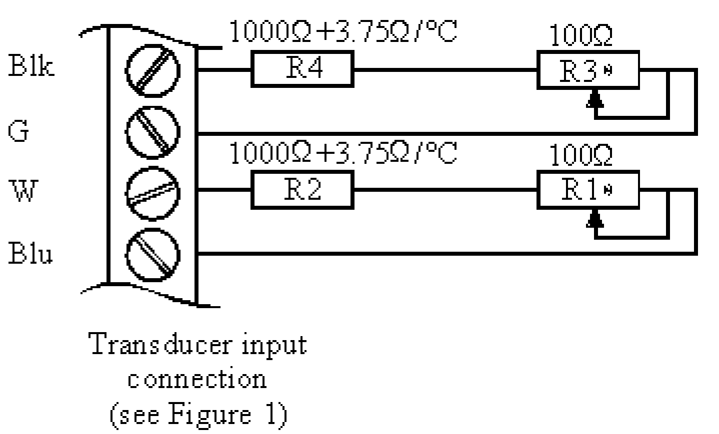


Diagram B

DUMMY TRANSDUCER FOR ELECTRONICS FUNCTIONAL CHECK



* A 10-20 turn potentiometer
is recommended

Diagram C

(dwg. #II-92147-1)

SECTION 4 – MAINTENANCE

4.1 GENERAL MAINTENANCE

Certain precautions should be taken to insure proper performance of all models of flow instruments. Since the measurement technique involves a signal resulting from heat transfer to the flowing medium, care should be exercised to prevent build-up of varying layers on the walls of the transducer. Layers such as bacterial growth, dried paints, gas bubbles and non-solubles can result in measurement below actual flow rates. Periodic checks and cleaning should be performed to insure a clean pipe or probe wetted surface.

It should be part of normal maintenance procedure to check the system for proper functioning. Experience and other observable conditions should be utilized to determine the frequency of inspection. Long term drift in the unit calibrations is not expected, but if a single point recalibration is required, refer to SECTION 4.2. To test the flow switch action (if that option was ordered), the flow rate should be reduced below (for low flow switch) or raised above (for high flow switch) the switching level. Then check and insure relay action and continuity of the shut down or warning circuits which it operates.

The joints of all intrusive probes tips should be inspected for wear and corrosion.

4.2 SINGLE POINT FIELD CALIBRATION

When field calibration is required, for any reason, the simplest adjustment is a single point linear offset, and this should usually be tried first. All calibrations should be done at normal operating temperature. When a single point calibration (or recalibration) is required, it is performed as follows:

> Establish a known flow rate in the upper third of the calibrated range that is shown on the output curve (Figure 2). Adjust calibration potentiometer P2 (cal), Figure 1, for a correct output reading or signal.

If P2 runs out of adjustment before the meter is reading correctly, P1 (see Board Layout P.17) can be used to further offset the signal. Turning P1 clockwise decreases the signal. (Note: P1 has no effect on some meters.)

Sometimes you may find the single point calibration is not sufficient to align the output over a wide flow rate range. If so, a two-point offset/gain calibration can be performed as described below.

A. Establish a known flow rate at the low end (10-15% of full scale) of the factory calibrated range (Figure 2, page 18).[1] Adjust P2 potentiometer, Figure 1, for an accurate output signal.
B. Establish a flow rate near 90-95% of full scale.[1] Adjust "Flow Span" potentiometer, P3 (Figure 1) for an accurate output signal.
C. Repeat steps A and B until desired accuracy is achieved. Record flow vs. output relationships for various flows and compare with output curve. Construct a new calibration curve if needed.

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1 Ensure the flow meter output has been stabilized before making any adjustment. A strip chart or data logger monitoring of the output is very helpful in determining when the flow has entered steady-state conditions, especially at low or noisy flows.

4.3 SPARE PARTS

There are no normally recommended spare parts to stock. The transducer and electronics are a matched set and therefore are not interchangeable with others. Should a spare be needed, a complete unit should be ordered and stocked. For AC powered units, the spare fuse is a ½A, fast acting fuse. Replace fuse with Wickmann part number 3730500041 or equivalent. For units powered by 24 Vdc, the fuse is a 1A slow blow fuse. Replace with Wickmann part number 3741100041 or equivalent.

4.4 TROUBLE SHOOTING

TABLE I. TROUBLE SHOOTING GUIDE

OBSERVATION	PROBABLE CAUSE	REMEDY
Output continually drifting downward with constant flow	1. Coating forming on wetted surface of transducer	1. Clean transducer periodically or adjust calibration (cal) potentiometer until layer build-up stabilizes
Output saturates high or low — will not respond to flow change	1. Loose transducer cable connections 2. Flow rate not yet within range of meter 3. Meter/Calib switch in wrong position 4. Transducer cable damaged 5. Bad electronic component 6. Blown fuse	1. Securely connect transducer cable 2. Check flow 3. Check Meter/Calib switch is in "meter" position 4. Check cable continuity 5. Perform transducer and electronics functional test (see SECTION 3.5). Write results down and consult factory 6. Replace fuse as needed
Output varies with flow but not stable	1. Fluid temperature not stable 2. Fluid mixture not properly blended 3. Gas mixed with liquid 4. Flow not fully developed	1. Tune temperature controller, add insulation and/or add static mixer in front of transducer 2. Add static mixer in front of transducer 3. Reduce gas pressure or check for air ingress on suction side of pump. Refer to Installation Section 4. Check inlet and outlet for proper straight line length & freedom from obstructions

SECTION 5 – CUSTOMER SERVICE

Intek's corporate philosophy is to solve our customer's difficult flow measurement problems. This means that each instrument is custom configured and calibrated for the application. When you purchase a *Rheotherm* instrument you also receive Intek's dedicated customer service. For sales or product service, call your local representative or Intek directly at (614) 895-0301, 8AM to 5PM EST/EDT weekdays or fax us anytime at (614) 895-0319. E-mail inquiries should be sent to *sales@Intekflow.com* or *techsupport@Intekflow.com*. Our customer service staff will provide assistance promptly.

5.1 QUESTION ON EXISTING HARDWARE

To allow us to help you more quickly, please have the serial number of the equipment available before you call.

5.2 TROUBLE SHOOTING

If you have reviewed SECTION 4.4 TROUBLE SHOOTING and have questions, please call our experienced engineers for assistance. In many cases we can solve a problem over the phone. Please provide as complete a description as possible of the problems encountered.

5.3 FACTORY AND FIELD SERVICE

If you request field service, Intek has experienced engineers available to meet your needs. Many of the repairs or recalibrations will require returning the instrument to the factory. If a problem cannot be solved over the phone, with your help, we will determine if factory service or field service will be the best solution.

To request factory service, a Return Material Authorization (RMA) and purchase order is required. Our customer service staff will assist you with the required information to return instruments for service.

5.4 DECONTAMINATION OF EQUIPMENT

For the safety of your personnel and ours, any hardware that has been in contact with potentially hazardous liquids or gases must be properly decontaminated before shipment to Intek.

5.5 QUESTIONS ON NEW EQUIPMENT

For a new *Rheotherm* application or any liquid or gas flow measurement need, contact your local *Rheotherm* representative or the Intek technical sales department at the above phone/fax numbers. Our staff will be pleased to answer all questions and provide quotations.

SECTION 6 – CUSTOM INFORMATION

6.1 UNIT IDENTIFICATION

Model no.: ____

Serial no.: ____

Customer identification: _____________________________

6.2 CONFIGURATION

The configuration of this unit, as originally shipped from the factory:

Input Power:
☐ 115 Vac, 50/60 Hz ☐ 230 Vac, 50/60 Hz ☐ 24 Vdc

Output:
☐ 4-20 mA ☐ 0-5 Vdc ☐ 0-10 Vdc

Pressure Rating: _________________ Sensor Temperature Rating: _____________

Calibrated Range: _________________

Wetted Material:
☐ 316 stainless steel ☐ other ______________

Enclosure Type:
☐ NEMA 4 ☐ NEMA 4X ☐ NEMA 7 (CL I, Grp BCD) ☐ Other _________

Process Connection: _________________

6.3 SPECIAL INSTRUCTIONS

	Reference			Reference	
☐	None	_________	☐	Installation	________
☐	Single point calibration required	_________	☐	Other	________

TABLE II. ORIGINAL CALIBRATION DATA FOR FUNCTIONAL TEST

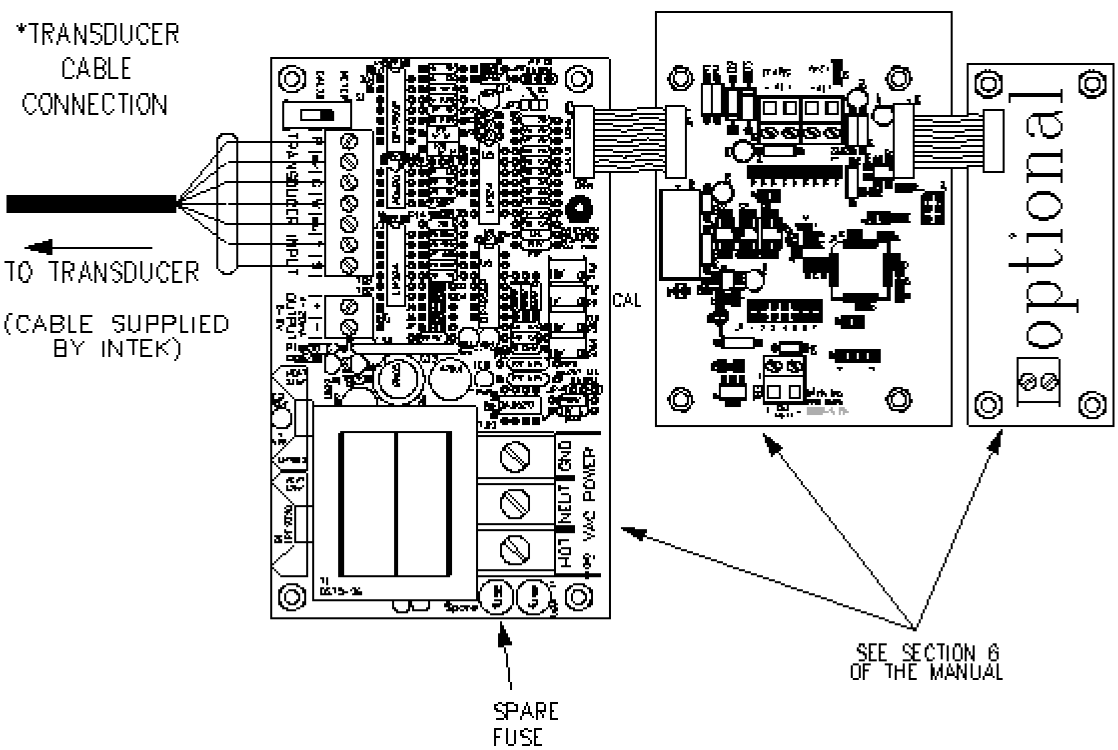
Unit Serial Number - __________

I	II	III	IV	V	VI
TEMP	ΔT	TP4	Linear Output ________	Instrument Display ________	Flow Rate ________

Note: An offset of data in Column III and IV (with respect to Column II) may appear if the instrument has been field adjusted.

Figure 1

TRANSDUCER/ELECTRONIC/ELECTRICAL
INTERFACE DRAWING
(dwg. # 96047-1)



* Transducer serial number must
match electronics serial number

Figure 2. *Rheotherm*® Signal Conditioner PWB Layout

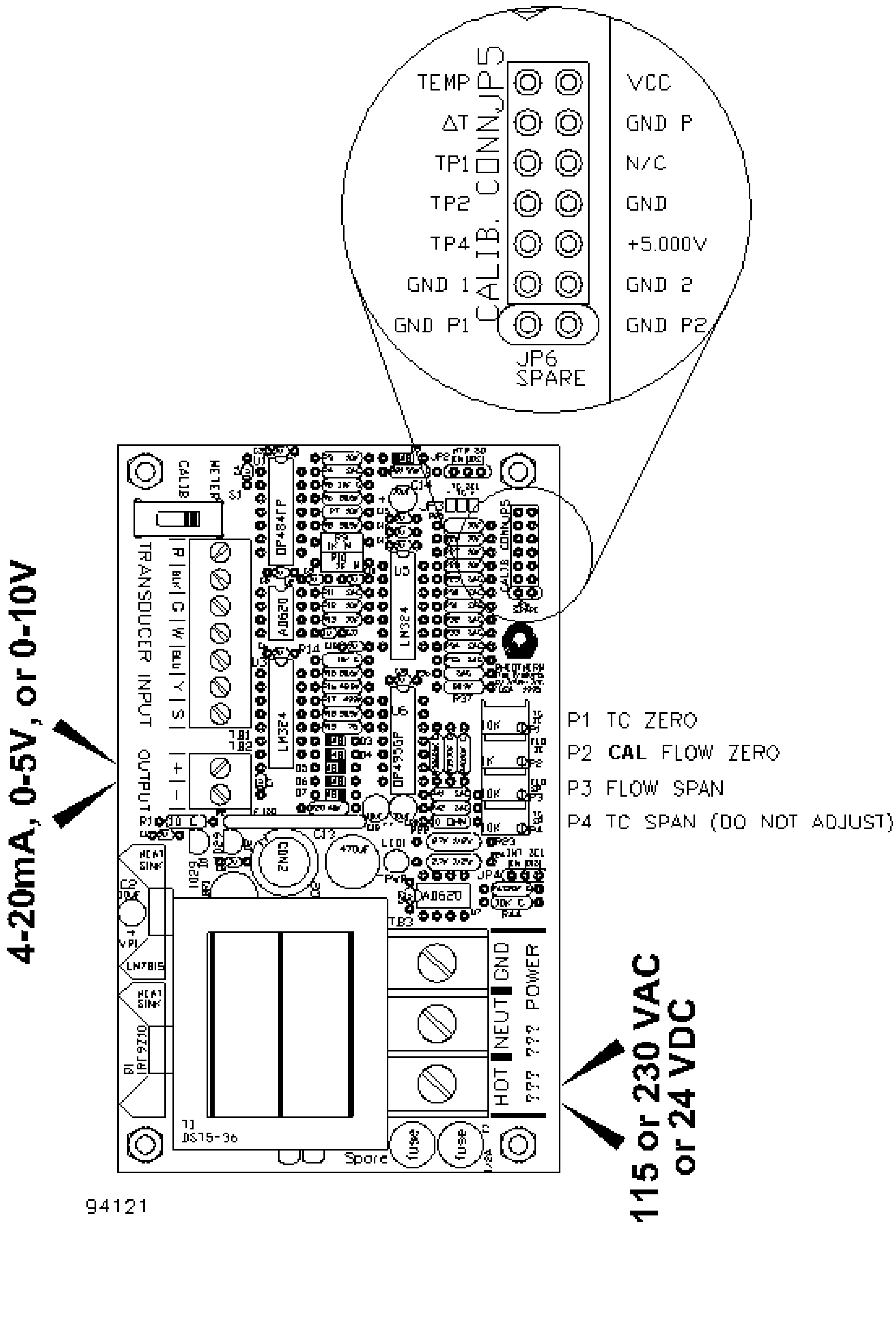


Figure 3. Flow Rate vs. Output Curve

JUST A HOLDING SPACE