



**Mustang Sampling<sup>®</sup>**

# Mustang<sup>®</sup> Sample Conditioning System Installation, Operation & Maintenance

MSCS<sup>®</sup>



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# SAFETY WARNINGS



Failure to abide by any of the safety warnings could result in serious injury or death.

- Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements (ANSI/UL 61010-1, 07/12/2004, Ed. 2).
- Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements (CAN/CSA C22.2 No. 61010-1, 07/01/2004, Ed. 2).
- Standard for Safety Explosion-Proof and Dust-Ignition Proof Electrical Equipment for Use in Hazardous (Classified) Locations (ANSI/UL 1203, 1028/09, Ed. 4).
- Explosion-Proof Enclosures for Use in Class 1 Hazardous Locations Industrial: Industrial Products (CSA C22.2 No. 30-M1986, (G.I. No. 2, 11/1988)).
- Electrical power must be "OFF" before and during installation and maintenance or personal injury may result. Follow site requirements for Safety Precaution Rules.
- Do not exceed any equipment pressure, or electrical ratings.
- To reduce the risk of fire or explosion, do not install where the marked operating temperature exceeds the ignition temperature of the hazardous atmosphere(s).
- Heated regulator surface temperature will approach temperature limit specified in technical specifications.
- Select a mounting location so that the system will not be subjected to impact or other damaging effects.
- The hazard location information specifying class and group listing of each system is marked on the nameplate.
- Properly ground all equipment to prevent static electric generation.

## PRODUCT DESCRIPTION

The Mustang® P53® Sample Conditioning System is an integral component to provide an Analytically Accurate® solution for natural gas sampling applications.

The P53 Sample Conditioning System solves the problem of hydrocarbon liquid condensation from Joule-Thomson cooling in natural gas analysis systems. High pressure natural gas samples are transported at a temperature well above the expected hydrocarbon dew point, which is maintained throughout the pressure reduction process, delivering a representative sample to the analyzers.

### APPLICATION

The Mustang P53 Sample Conditioning System is available with either the Mustang® Heated Regulator or Mustang® Joule-Thomson Heated Regulator, used in combination with a heated liquid membrane separator and is designed for use with integrally controlled, remote Mustang Pony® Probe Enclosure products.

### FEATURES

- Patented technology utilizing existing power supplied by electric heat trace tube bundle
- Remote or Direct Mount
- Rated for Class 1, Division 1, Group D locations
- Multiple streams in and out
- Digital Controller
- Steel latching closures
- Glass Fiber Reinforced Polyester (GRP) or Stainless Steel (SS) Enclosure
- NEMA 4X Enclosure
- Low Pressure Pump System (available for systems such as flares, ducts and vapor recovery)

### BENEFITS

- Requires no external power or natural gas for proper operation
- Conforms to the API Manual of Petroleum Measurement Standards chapter 14.1

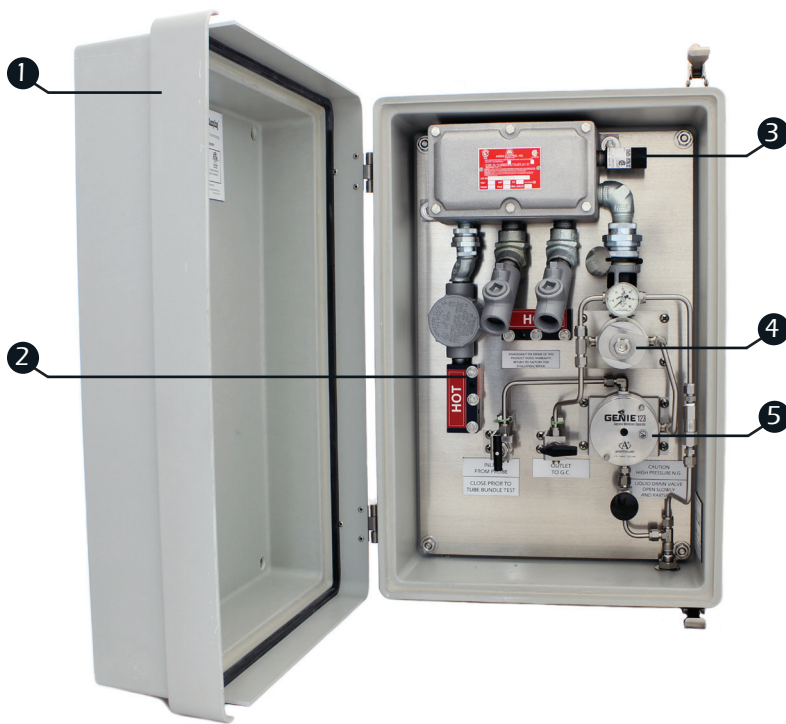
# TECHNICAL SPECIFICATIONS

Wetted Parts	316 SS
Maintains Sample Gas	Mustang® P53® Sample Conditioning System Standard set point at 120°F (49°C) Adjustable from 60°F to 400°F (16°C to 204°C)
	Mustang Pony® Probe Enclosure 98°F (37°C)
Heating Components	80 watt self-limiting block heater
Cabinet Construction Options	Hotpressed Glass Fiber Reinforced Polyester (GRP) Stainless Steel
Regulator Options	MHR® Single-Stage Regulator MJTHR® Multi-Stage Regulator
Input Supply Voltage	115 VAC 240 VAC 24 VDC
Maximum Allowable Operating Pressure	2000 psig @ 60°F (138 BAR at 16°C) (Standard Design - Liquid membrane separator upstream of MHR Single Stage Regulator)
	3750 psig @ 60°F (259 BAR at 16°C) (Liquid membrane separator downstream of MHR Single-Stage Regulator)
	6000 psig @ 60°F (414 BAR at 16°C) (Liquid membrane separator downstream of MJTHR Multi-Stage Regulator)

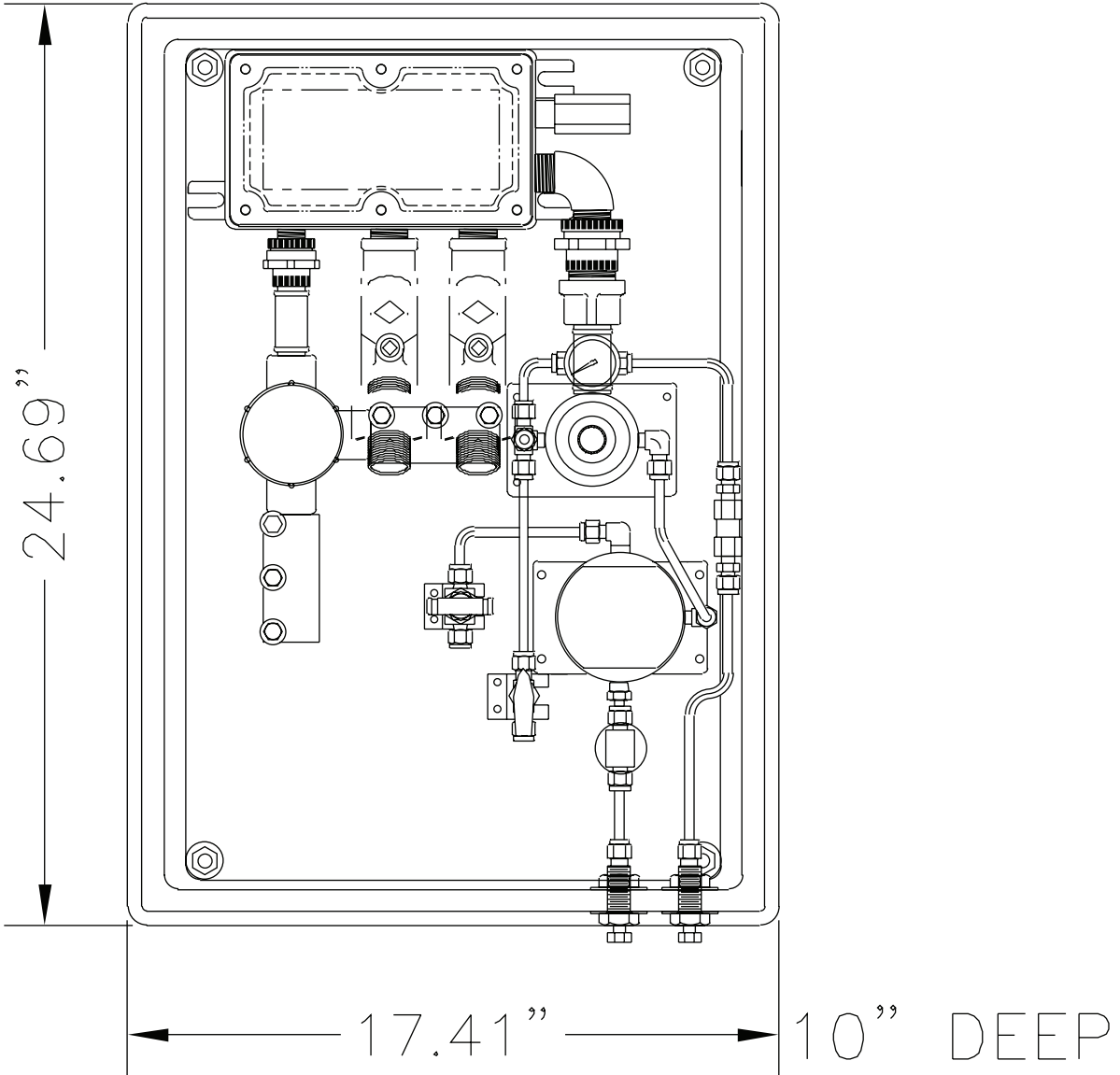
# Mustang® P53® Sample Conditioning System

## Oven Industries Controller Model

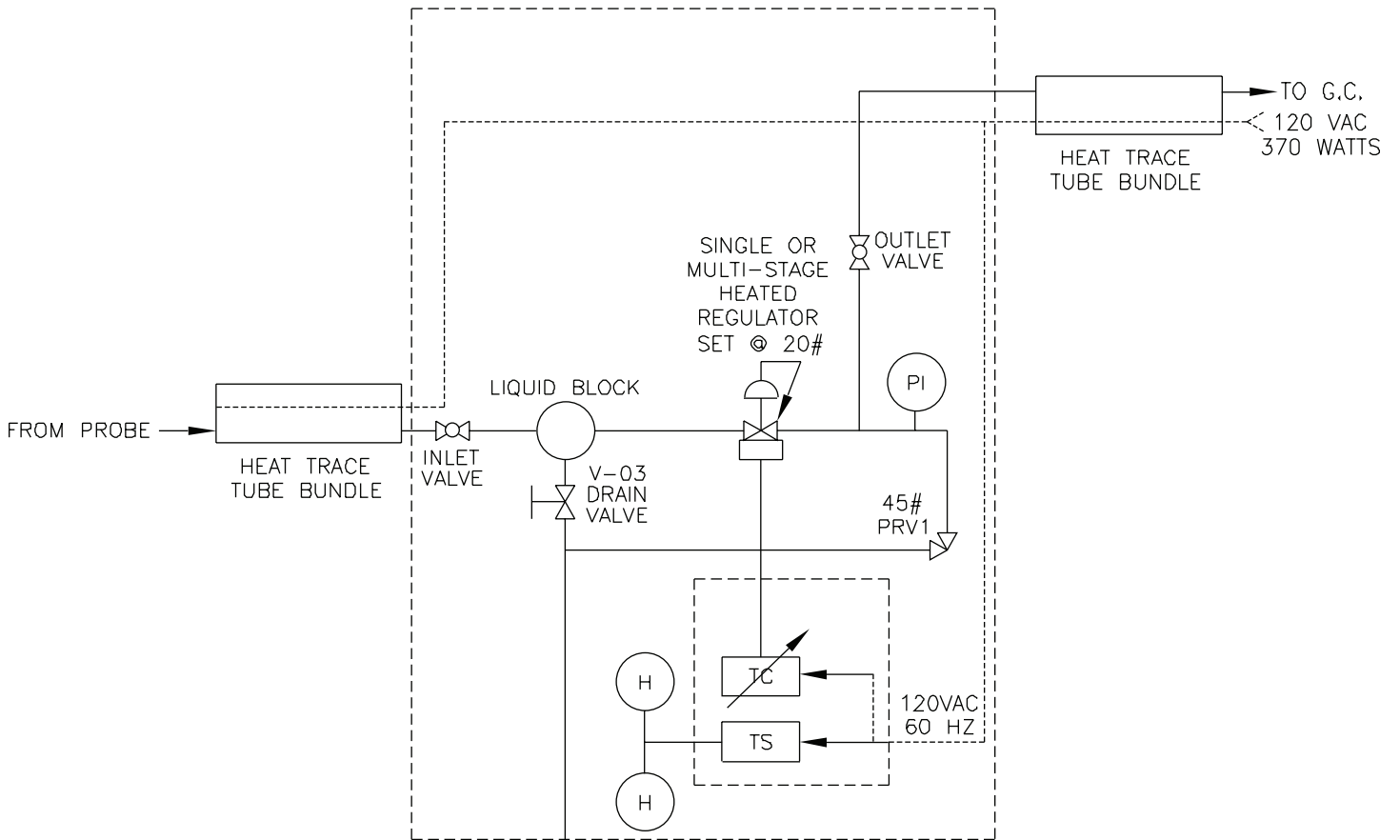
### PRODUCT DIMENSIONS & PARTS



Item Number	Description
1	Insulated Enclosure
2	Self-Limiting Block Heater
3	Temperature Controller
4	Single or Multi-Stage Heated Regulator
5	Liquid Membrane Separator



# PROCESS & INSTRUMENTATION DIAGRAM





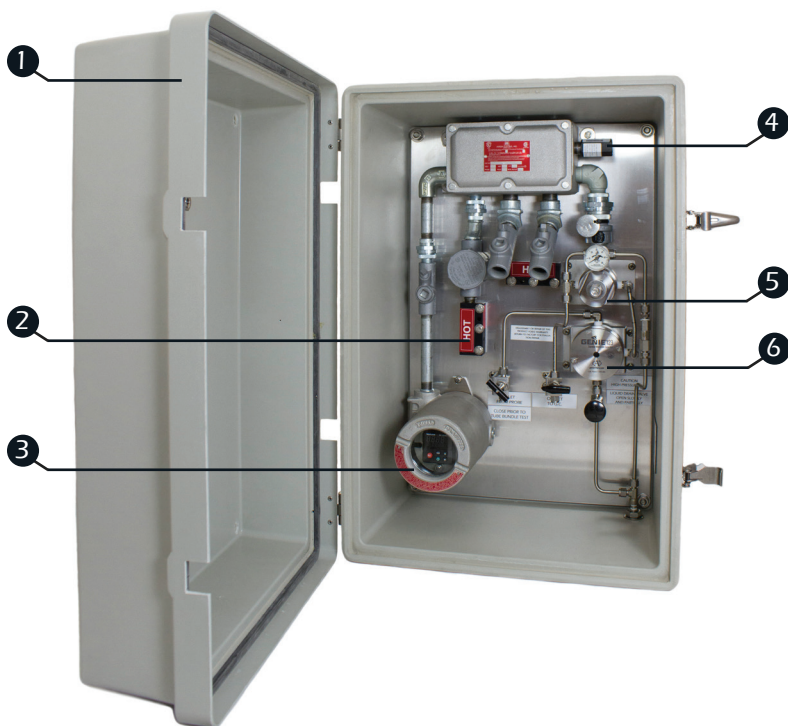


# Mustang® P53® Sample Conditioning System

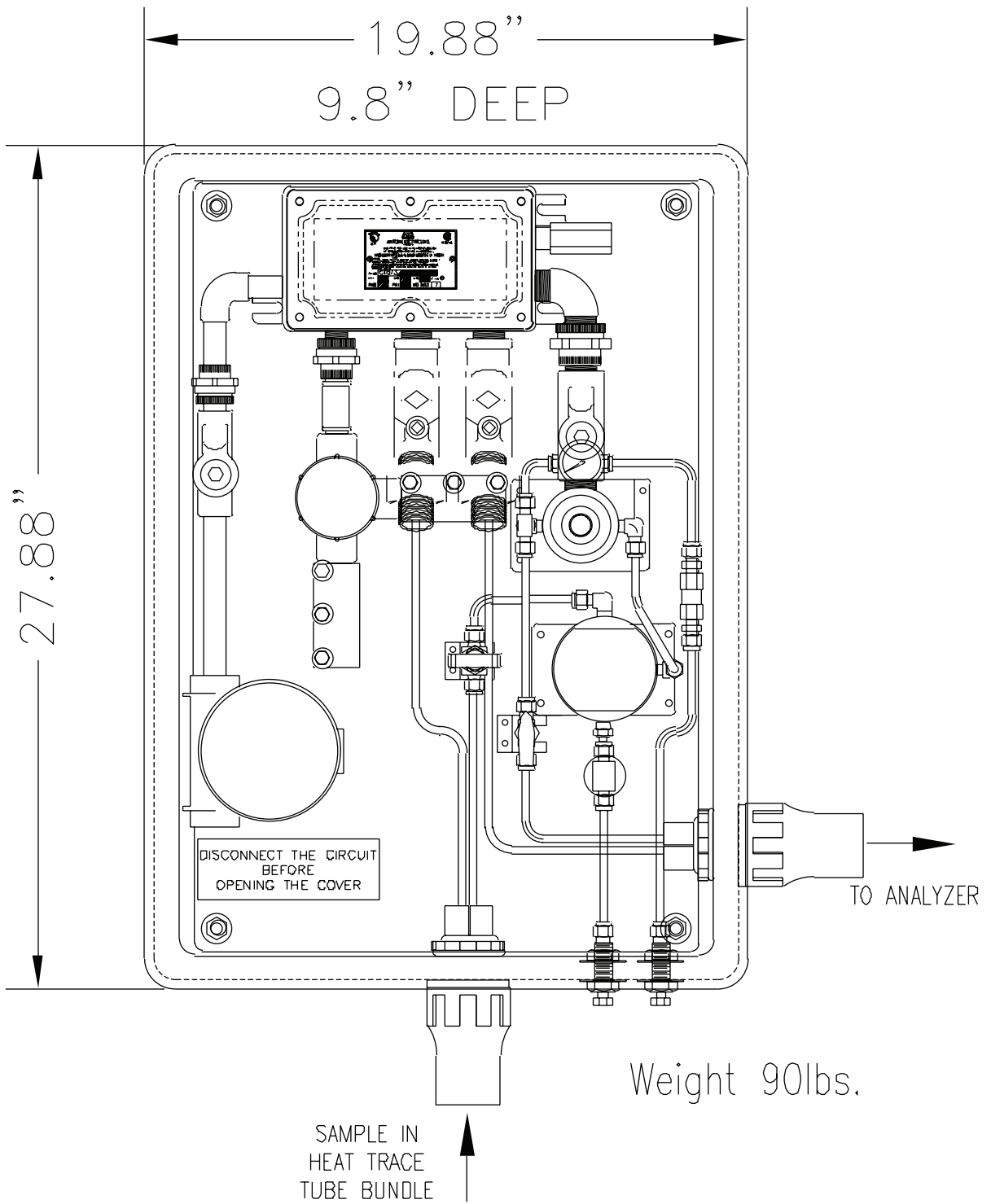
## Watlow® Controller Model

### PRODUCT DIMENSIONS & PARTS

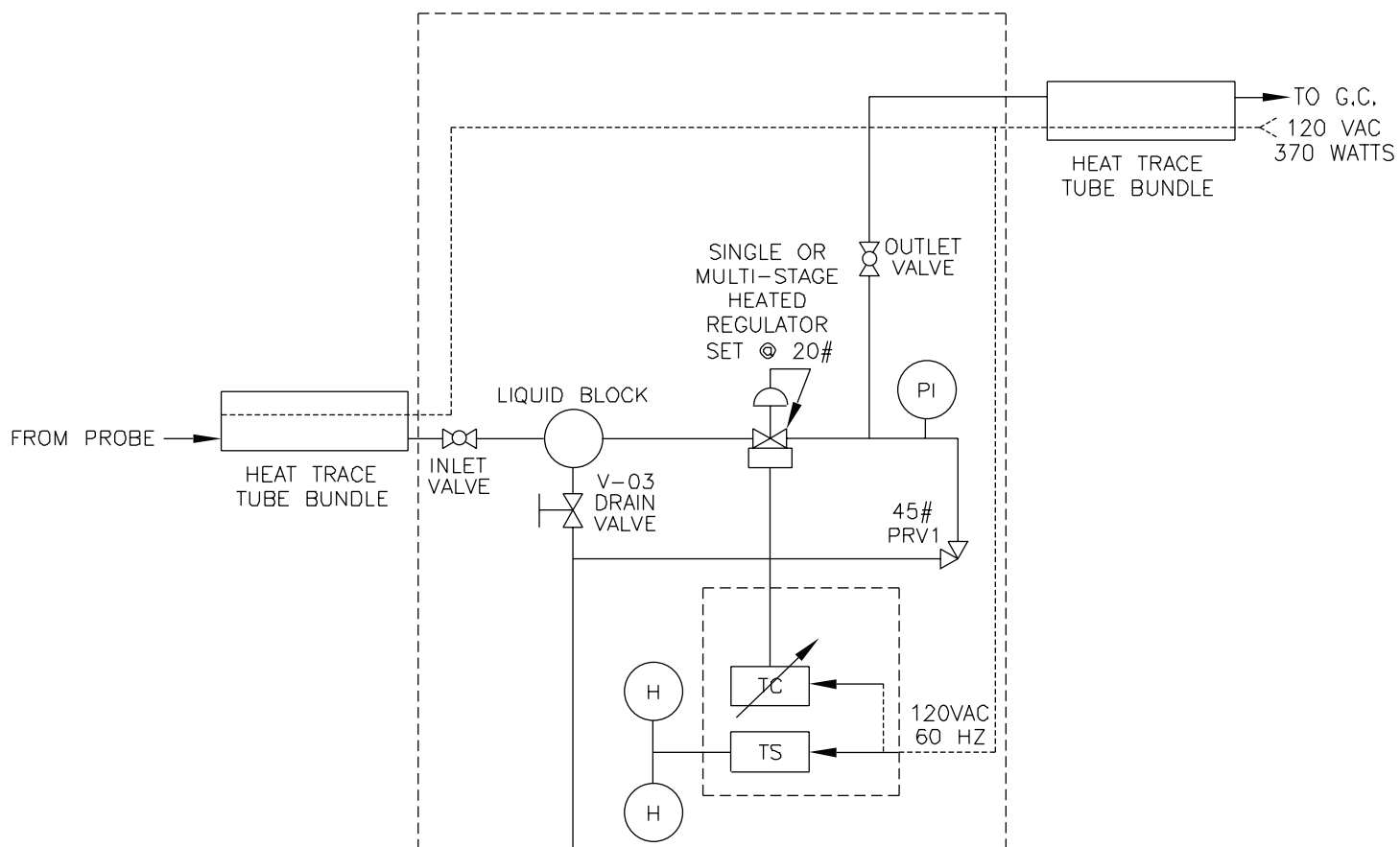
Oven Industries Controller Model



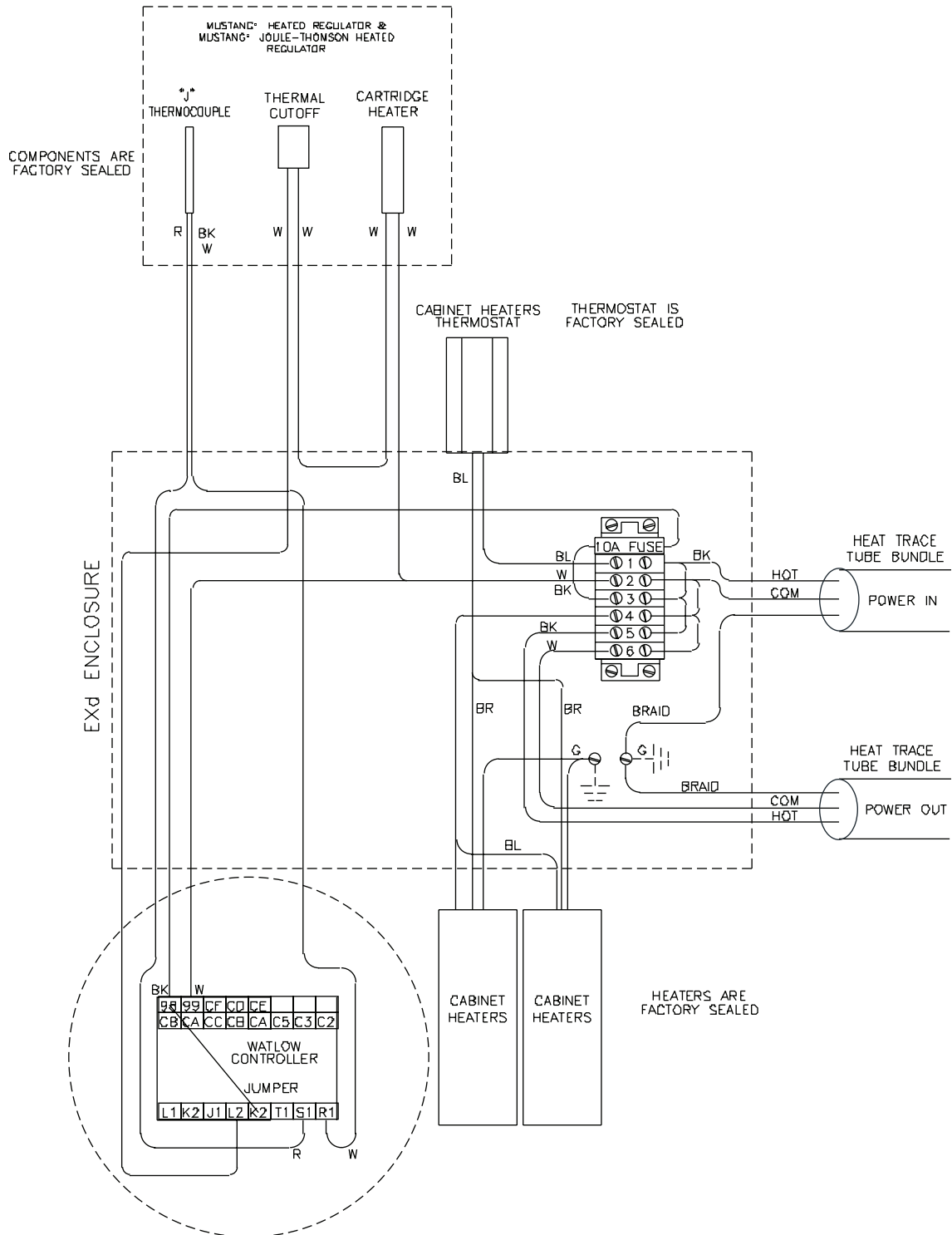
Item Number	Description
1	Insulated Enclosure
2	Self-Limiting Block Heater
3	PID Temperature Controller
4	System Temperature Limiter
5	Single or Multi-Stage Heated Regulator
6	Liquid Membrane Separator



# PROCESS & INSTRUMENTATION DIAGRAM



# ELECTRICAL & WIRING DIAGRAMS



(609453-P1-40-8062-E01-001)  
Exd ENCLOSURE

# Pony<sup>®</sup> Heated Probe Enclosure Oven Industries Controller Model

## PRODUCT DIMENSIONS & PARTS

Intertec Enclosure



Item Number	Description
1	Single or Multi-Stage Heated Regulator Location
2	Watlow <sup>®</sup> PID Temperature Controller
3	Probe Location
4	Insulated Clamshell Enclosure

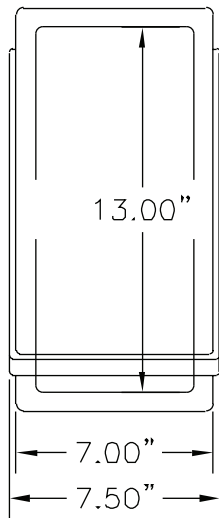
O'Brien Enclosure



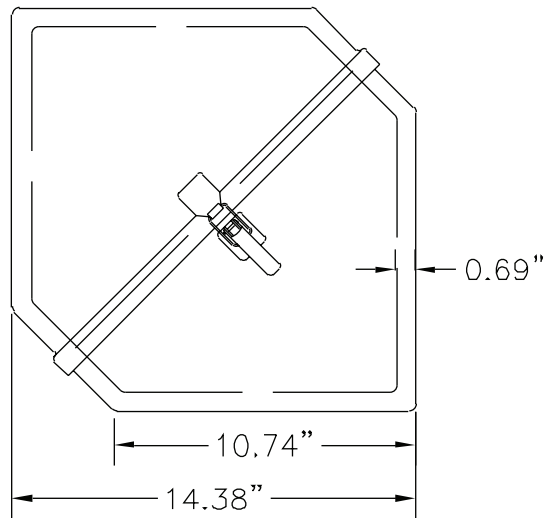
Stainless Steel Enclosure



**Intertec Enclosure**

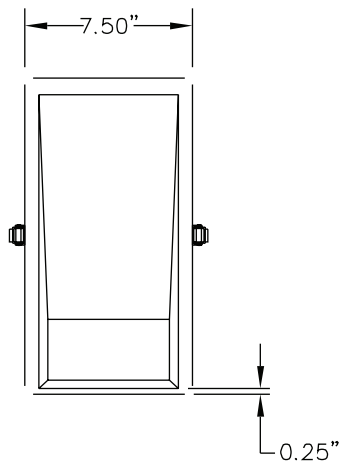


**Front View**

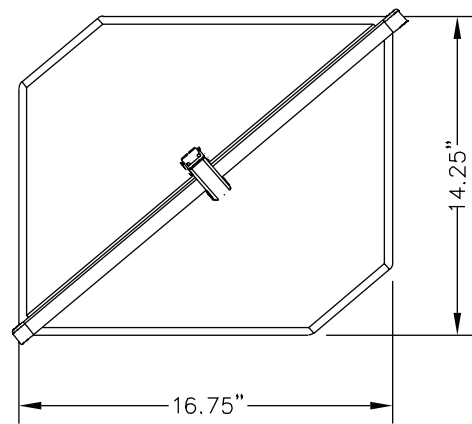


**Side View**

**O'Brien Enclosure**

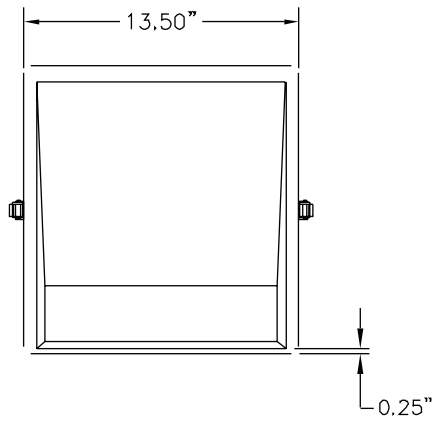


**Front View**

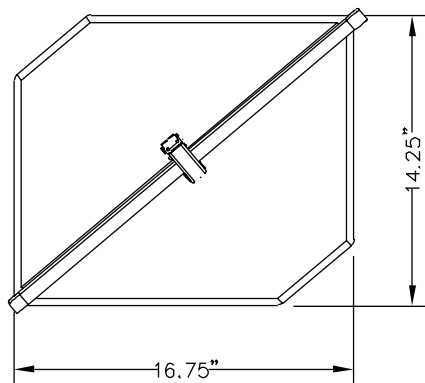


**Side View**

**Stainless Steel Enclosure**

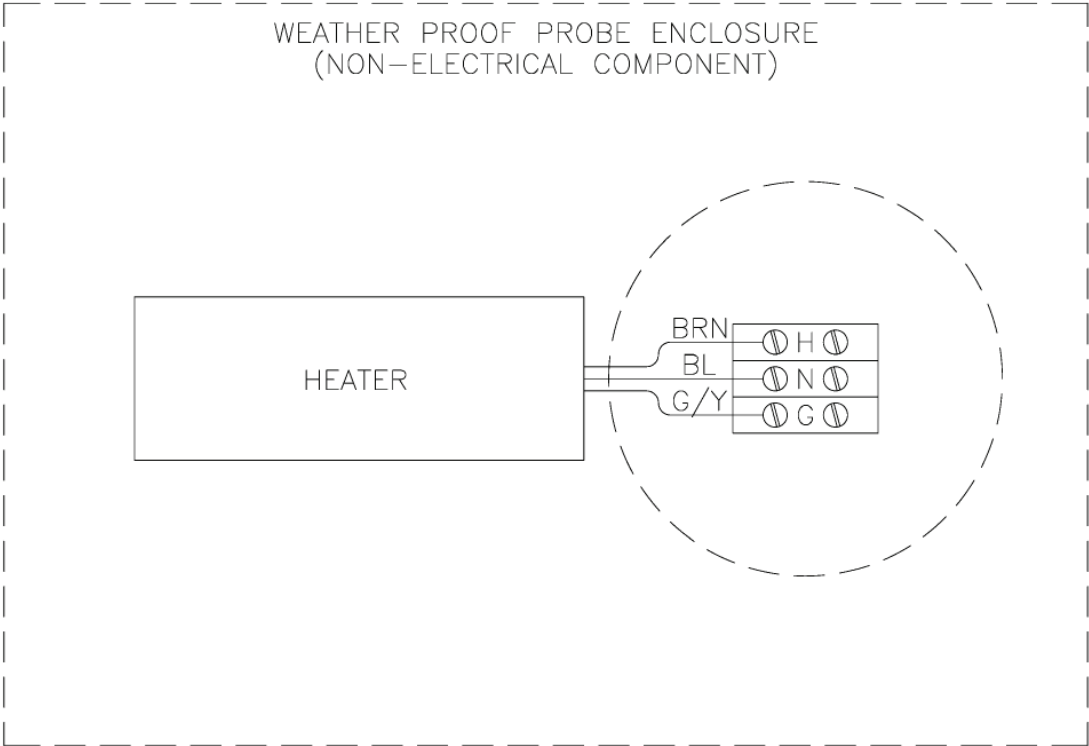


**Front View**



**Side View**

# ELECTRICAL & WIRING DIAGRAMS



NOTE:  
1. SEE BOM FOR SUPPLY VOLTAGE VARIATIONS



# INSTALLATION INSTRUCTIONS

## NOMENCLATURE

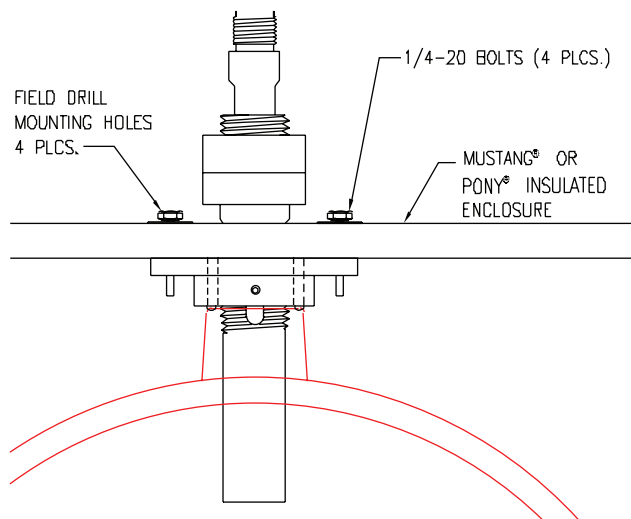
- **MAOP**—Maximum Allowable Operating Pressure
- **LNG**—Liquid Natural Gas
- **BTU**—British Thermal Unit

## TOOLS REQUIRED

- Standard Hand Tools
- Utility Knife

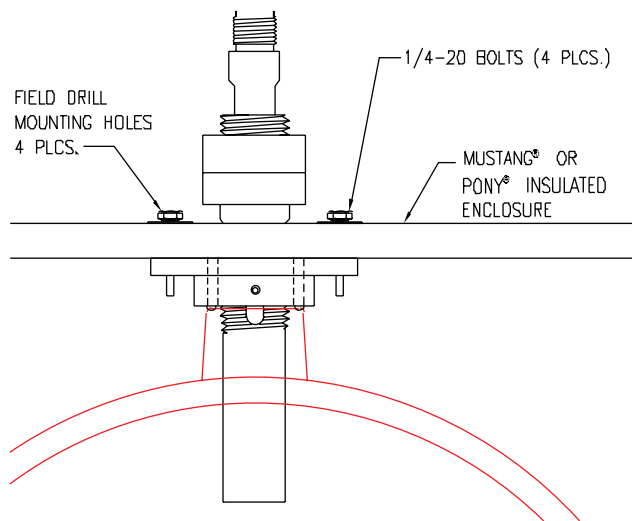
## INSTALLATION

1. Mount the Pony® Heated Probe Enclosure assembly in accordance with previous cautions and warnings.
2. Perform the electrical hook up with de-energized conductors.
3. Verify the unit that you are hooking up to matches voltage wise with the power supply that you are connecting. Damage to the unit can occur if the wrong source power is applied.
4. A seal fitting is required for the power input connection to the Pony conduit fitting to maintain its electrical hazard classification rating.
5. For 120 volt single phase input power: Connect the “hot” wire to wiring terminal #H. Connect the “Neutral” wire to wiring terminal #N. Connect the earthing (ground) wire to the green screw (G) in the bottom of the enclosure.
6. For 208 or 230 volt single phase input power: Connect one “hot” wire to wiring terminal #H1. Connect the “Neutral” to wiring terminal #N. Connect the second “hot” wire to wiring terminal #H2. Connect the earthing (ground) wire to the green screw in the bottom of the enclosure.
7. For 24 VDC input power: Connect the positive wire to wiring terminal #1. Connect the negative wire to wiring terminal #2. Connect the earthing (ground) wire to the green screw in the bottom of the enclosure.
8. Externally connect earthing (grounding) conductors from assembly to equipment ground connections.
9. After installing the probe housing, tighten the KT-Nut™ down onto the housing.
10. Back the KT-Nut off until the set screw is lined up with the set screw.



## INSTALLATION - Pony® Heated Probe Enclosure

1. Mount the Pony Heated Probe Enclosure assembly in accordance with previous cautions and warnings.
2. Perform the electrical hook up with de-energized conductors.
3. Verify the unit that you are hooking up to matches voltage wise with the power supply that you are connecting. Damage to the unit can occur if the wrong source power is applied.
4. A seal fitting is required for the power input connection to the Pony conduit fitting to maintain its electrical hazard classification rating.
5. For 120 volt single phase input power: Connect the "hot" wire to wiring terminal #H. Connect the "Neutral" wire to wiring terminal #N. Connect the earthing (ground) wire to the green screw (G) in the bottom of the enclosure.
6. For 208 or 230 volt single phase input power: Connect one "hot" wire to wiring terminal #H1. Connect the "Neutral" to wiring terminal #N. Connect the second "hot" wire to wiring terminal #H2. Connect the earthing (ground) wire to the green screw in the bottom of the enclosure.
7. For 24 VDC input power: Connect the positive wire to wiring terminal #1. Connect the negative wire to wiring terminal #2. Connect the earthing (ground) wire to the green screw in the bottom of the enclosure.
8. Externally connect earthing (grounding) conductors from assembly to equipment ground connections.
9. After installing the probe housing, tighten the KT-Nut® down onto the housing.
10. Back the KT-Nut off until the set screw is lined up with the set screw.



11. Set the Pony Heated Probe Enclosure onto the probe housing, lining the enclosure up with the pipe line.
12. Mark the set screw and 4 bolt holes on the bottom of the enclosure.
13. Remove the enclosure from the probe house.
14. Place the yellow cover (provided) over the probe to keep dirt out of the housing.
15. Drill 4 holes into the bottom of the enclosure using a 3/8" drill bit.
16. Place the enclosure onto the housing, and using split washers, bolt the enclosure to the KT-Nut™ with 1/4-20 bolts.
17. Once the enclosure is secured, determine the best place for the Heat Trace Bundle Tube to come into the Pony® Probe Enclosure. With a 1-1/2" conduit hole saw, drill a hole into the side of the enclosure making sure the lid will be able to shut.
18. Screw in the Mustang® Heat Trace Tube Bundle seal 1.60 leaving about 5 feet. Mark the tubing bundle and strip back the black coating and insulation. DO NOT CUT INTO HEAT TRACE. Carefully cut foil coating exposing tubing and Heat Trace.
19. Slide the 2 legged Raychem TS1-SB2 boot over the tubing and Heat Trace. Heat shrink the boot to the bundle.
20. Pull the bundle through the 1.60 boot leaving 3/4"-1" exposed inside the Pony® Probe Enclosure. Heat shrink the

1.60 boot.

21. With a 1/2" drive ratchet, take the plug out of the seal. Loop the Heat Trace over to the seal and mark the Heat Trace where it is in the center of the seal.
22. Tape the end of the wires on the Heat Trace and slide the gland with the screws over the Heat Trace followed by the red grommet.
23. Carefully pull the wires through the seal into the enclosure leaving 1/2"-1" of white core inside the enclosure. Remove the tape and insert the bus wires into the guide tubes of the CS-100 core sealer. **MAKE SURE THE WIRES ARE NOT CROSSED.**
24. Using pin terminals, dead end the circuit into the terminal block provided.
25. **NOTE:** In the Pony enclosure with Heater Block, you must **NOT** terminate until you check for polarity and land bus wires accordingly

## **INSTALLATION - Mustang® P53® Sample Conditioning System**

1. Mount the P53 Sample Conditioning System assembly in accordance with previous cautions and warnings.
2. Perform the electrical hook up with de-energized conductors.
3. Verify the unit that you are hooking up to matches voltage wise with the power supply that you are connecting. Damage to the unit can occur if the wrong source power is applied.
4. A seal fitting is required for the power input connection to the controller enclosure to maintain its electrical hazard classification rating.
5. For 120 volt single phase input power: Connect the "hot" wire to wiring terminal #1. Connect the "Neutral" wire to wiring terminal #2. Connect the earthing (ground) wire to the green screw in the bottom of the enclosure.
6. For 240 volt single phase input power: Connect one "hot" wire to wiring terminal #1. Connect the "Neutral" to wiring terminal #2. Connect the second "hot" wire to wiring terminal #3. Connect the earthing (ground) wire to the green screw in the bottom of the enclosure.
7. For 24 VDC input power: Connect the positive wire to wiring terminal #1. Connect the negative wire to wiring terminal #2. Connect the earthing (ground) wire to the green screw in the bottom of the enclosure.
8. A seal fitting is required between the controller enclosure and the Mustang® Heated Regulator heater block.
9. Externally connect earthing (grounding) conductors from assembly to equipment ground connections.
10. Connections from the controller to the heater block are pre-wired from the factory. If replacement or troubleshooting is required, refer to the electrical schematic supplied with the unit.

## **HEAT TRACE CONNECTION**

Refer to the Mustang Sampling Heat Trace Stripping Preparation Guide.

## **ADJUST THE TEMPERATURE SET POINT**

The heater in the Pony® heated probe enclosure is a self-limiting heater.

The temperature controller in the Mustang P53 Sample Conditioning System comes from the factory set to 120°F unless otherwise specified.

If a different temperature is required, refer to the temperature controller operation manual for the complete setup and adjustment procedures.

## **SET REGULATOR PRESSURE**

Apply input pressure and adjust the regulator adjustment screw until the desired output pressure is attained. The nut on the adjustment screw may be used to secure the adjustment screw at its set point.

## **STARTUP PROCEDURE**

1. Close the covers on the Pony® Heated Probe Enclosure and Mustang® P53® Sample Conditioning System.
2. Turn on the electrical supply to the controllers.
3. Allow a few minutes for the system temperature to stabilize.
4. Seal the seal fittings if the Pony Heated Probe Enclosure block heater is functioning as desired.

## OPERATION INSTRUCTIONS

1. Close the cover on the controller enclosure.
2. Turn on the electrical supply to the controller.
3. Allow a few minutes for the system temperature to stabilize.
4. The pressure set point may have to be adjusted once the temperature has stabilized.
5. Verify that sample stream supply is shut off.
6. Verify that power to the controller is off.
7. Turn power on to the controller.
8. Set the regulator temperature set point to the recommended temperature.
9. Initially set the regulator temperature at 120°F.
10. Slowly turn in the sample fluid flow to full open to the regulator.
11. Adjust the regulator adjusting screw to obtain the desired output pressure.
12. Once sample fluid is being regulated, monitor the regulator temperature to verify that the controller is maintaining the set point temperature.
13. Verify the pressure and flow to the remote gas chromatograph or analyzer.
14. Once the flow is correctly established to the analyzer or gas chromatograph, document the flow value. Do not adjust the flow value unless a calibration check is made on the analyzer.
15. Do not leave power on for extended periods of time without flow through the unit.

## MAINTENANCE INSTRUCTIONS

1. Once system is operational, no routine maintenance is required.
2. Monitoring of flow and temperature values is recommended at least annually.





## Analytically Accurate® **TECHNOLOGY**

### **About Mustang Sampling**

Mustang Sampling, LLC is the innovator of Analytically Accurate® solutions within sample conditioning systems. We provide custom solutions of products and services globally to the Natural Gas, Natural Gas Liquids (NGL), and Liquefied Natural Gas (LNG) industries. Mustang Sampling continues to pioneer integrated control systems, allowing our customers to maintain phase stability from sample extraction at the source through sample analysis. Our products are continuously improved and subjected to the highest quality standards which provides our customers with the best sample conditioning solutions.

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U.S. Patent 7,162,933. Other patents pending.

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