Mustang Sampling®

Installation, Operation, & Maintenance Manual

Mustang® Sample Conditioning System

MODEL: P53 Direct, P53 Remote

MUSTANG®

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Manufactured by
Valtronics, Inc. for
Mustang Sampling, LLC

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Systems and equipment are subject of Patents: US7162933, AU2005260719, CA2573120, EP05769462.2, US7882729, AU2006216870, CA2605119, CN200680013386.3, EP06735575.0. Other Patents Pending

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PRODUCT LABEL

Mustang Sampling®

MUSTANG®
SAMPLE CONDITIONING SYSTEM

PATENT # US7169933
Other Patents Pending

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MODEL:_____
VOLTAGE:_____
HZ:_____, PHASE:_____, WATTS:_____

Class 1, Division 1, Group C, D, T3

CAUTION: TO REDUCE THE RISK OF IGNITION OF HAZARDOUS ATMOSPHERES, DISCONNECT THE EQUIPMENT FROM THE SUPPLY CIRCUIT BEFORE OPENING.

OUVRIR LE CIRCUIT AVANT D'ENLEVER LE COUVERCLE

KEEP ASSEMBLY TIGHTLY CLOSED WHEN IN OPERATION.

GARDER LE COUVERCLEBIEN FERME TANT GUE LES CIRCUITS SONT SOUS TENSION.

SAFETY WARNINGS

STANDARDS

- 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))
-

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

- 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 FEATURES

The Mustang® sample conditioning system (MSCS) ensures optimal performance of gas analyzers by delivering a heated sample through patented technology to the analytical device.

The MSCS avoids costly errors resulting from hydrocarbon dew point drop out by maintaining at least 30°F above the expected hydrocarbon dew point.

The gas sample is heated inside of the regulator before and after the pressure is reduced eliminating hydrocarbon liquid condensation caused by the Joule-Thomson effect during the pressure reduction.

The MSCS conforms to the API 14.1 requirements for hydrocarbon liquid removal and heat tracing. The system extracts, conditions and transports the sample from the pipeline to the analyzer as follows:

A membrane probe, housed in its own heated enclosure extracts a representative vapor phase sample from the pipeline. Liquids are removed at pipeline conditions of pressure and temperature thereby avoiding gas phase composition changes

The liquid and particle free gas sample is then transported through a heated line to a sample system housed in its heated enclosure. A second separator equipped with a membrane and a liquid block mechanism provides a second and third means of protection against liquid damage to the analyzer.

A heated pressure regulator (MHR, MJTHR, or MJTHRHP) downstream of the membrane separator reduces the sample pressure to the level required for the analyzer. The gas sample is heated inside of the regulator **before** and **after** the pressure is reduced. This insures that the Joule-Thomson cooling effect will not cause hydrocarbon liquid condensation during the pressure reduction.

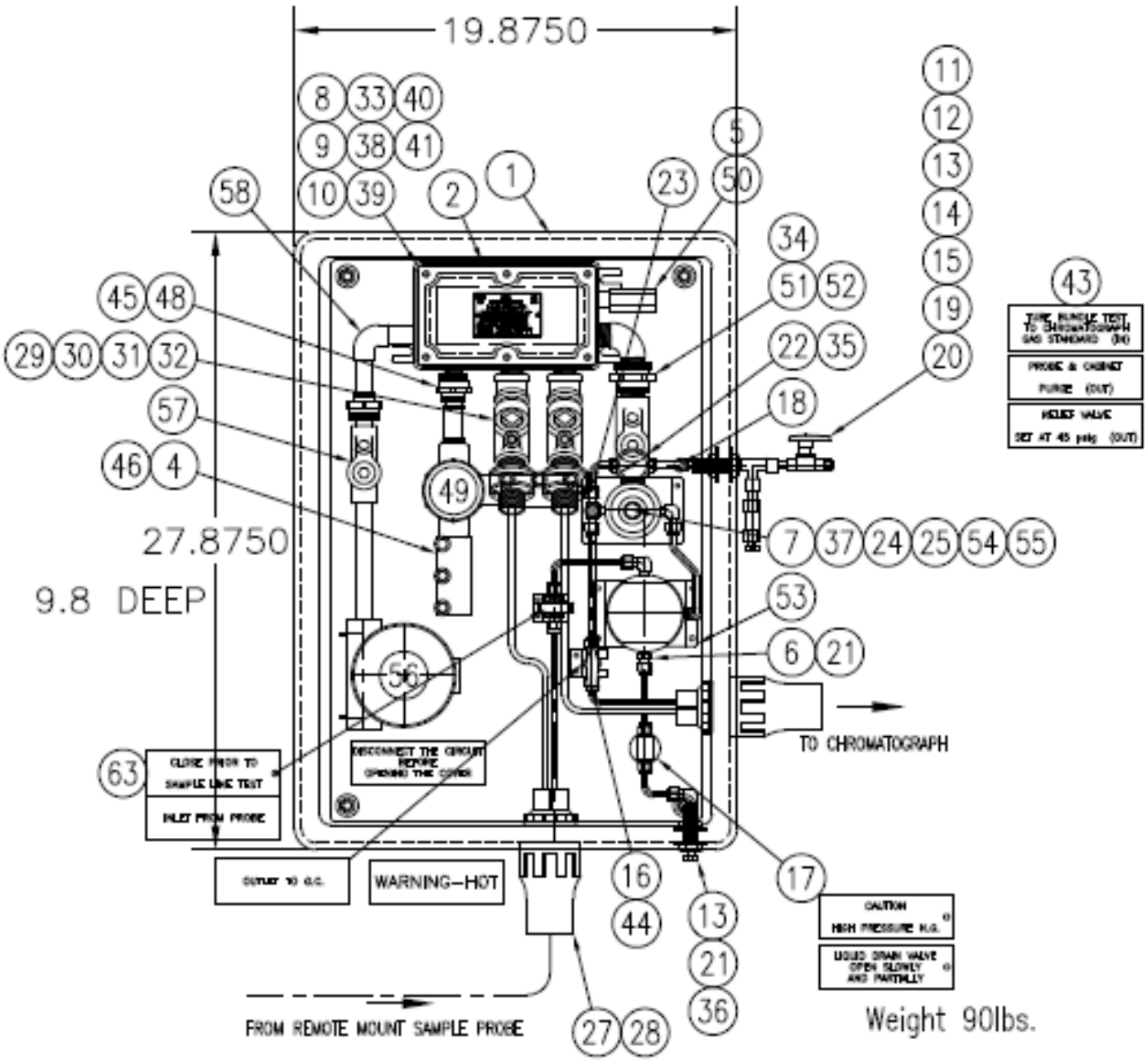
The conditioned sample is transported to the analyzer via heat traced tubing to maintain the gas temperature.

- Analytically Accurate™ design
- Patented technology utilizing existing power supplied by heat trace sample tubing
- Requires no external power or natural gas for proper operation
- Conforms to API 14.1 guidelines for hydrocarbon liquid removal and heat tracing
- Rated for Class 1, Div 1, Group D locations
- Optional remote mount w/ Pony® enclosure
- Optional integration with analyzer enclosures

TECHNICAL SPECIFICATIONS

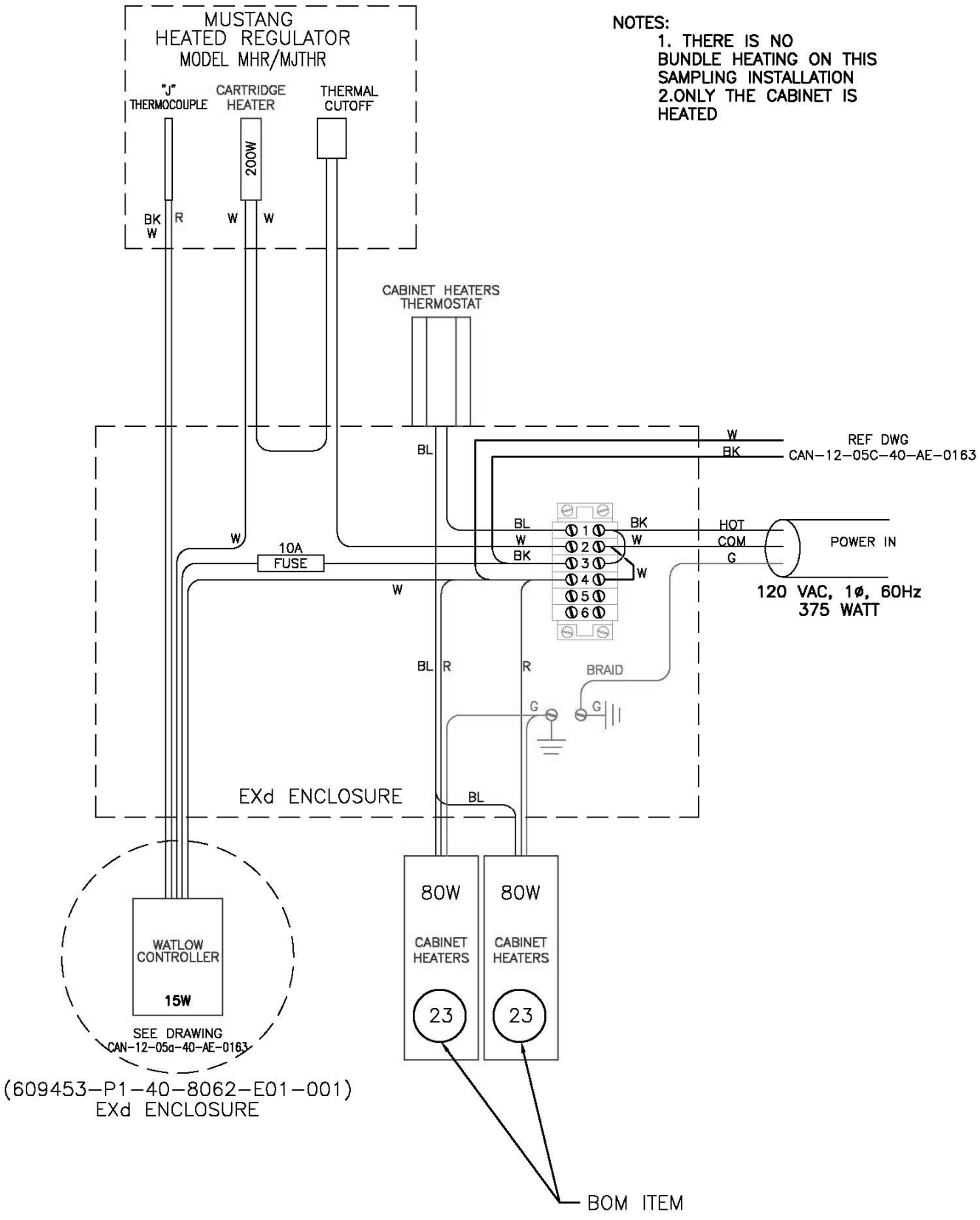
Classification	Class 1, Div 1, Group C, D, & T3 Zone 1 Group IIB, Category 2G, IP66, Ex d IIC T3 Gb
MAOP	3750 psig (259 BAR) @ 60°F (16°C)
Outlet Pressure Range	0-10, 2-25, 0-50, 0-100, 0-250, or 0-500 psig (0-0.69, 0-1.72, 0-3.45, 0-6.89, 0-17.24, or 0-34.47 bar)
Internal Volume	5.0 cc
Control Range	0-140° C
Thermal Cut-Off	Opens at 230° F (110° C) or 266° F (130° C) (customer specified)
Connections	1/4" FNPT 3/4" FNPT
Controller	Watlow Model PM6C1EH-2AAAAA
Regulator	MHR MJTHR MJTHRHP
Power	120 VAC—50/60 Hz, 375 W 208 VAC—50/60 Hz, 375 W 230 VAC—50/60 Hz, 375W 24 DC—205 W
Maintains Sample Gas	Standard set point at 120°F (49°C) Adjustable from 60-400°F (16-204°C)
Cabinet Construction	Hotpressed Glass Fiber Reinforced Polyester (GRP) or Stainless Steel
Wetted Materials	316 SS/NACE Compliant; O-rings, Viton™, Other materials available—consult factory.
Seat Material	Teflon™

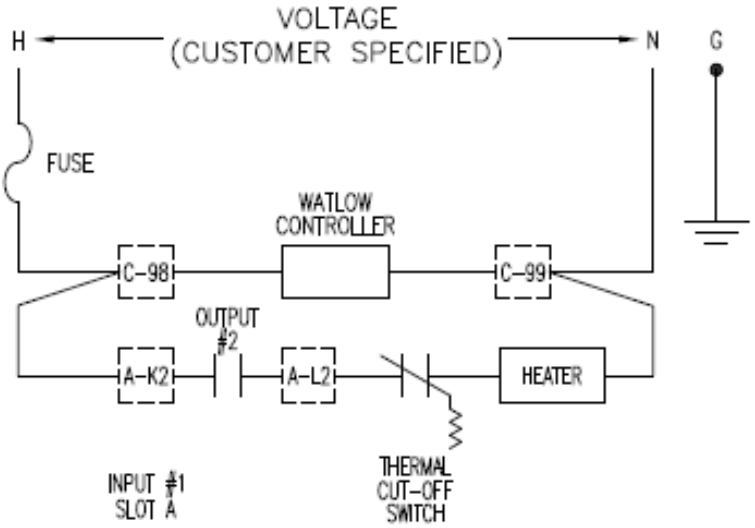
PRODUCT DIMENSIONS & PARTS

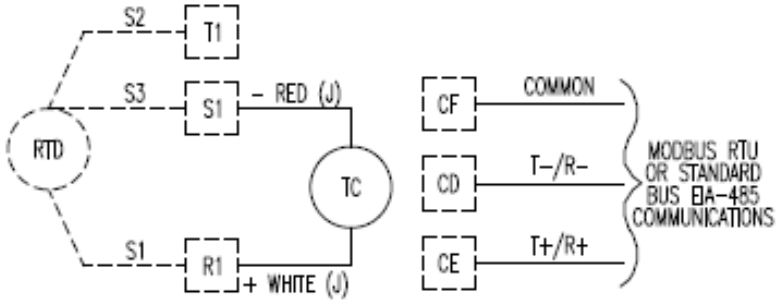


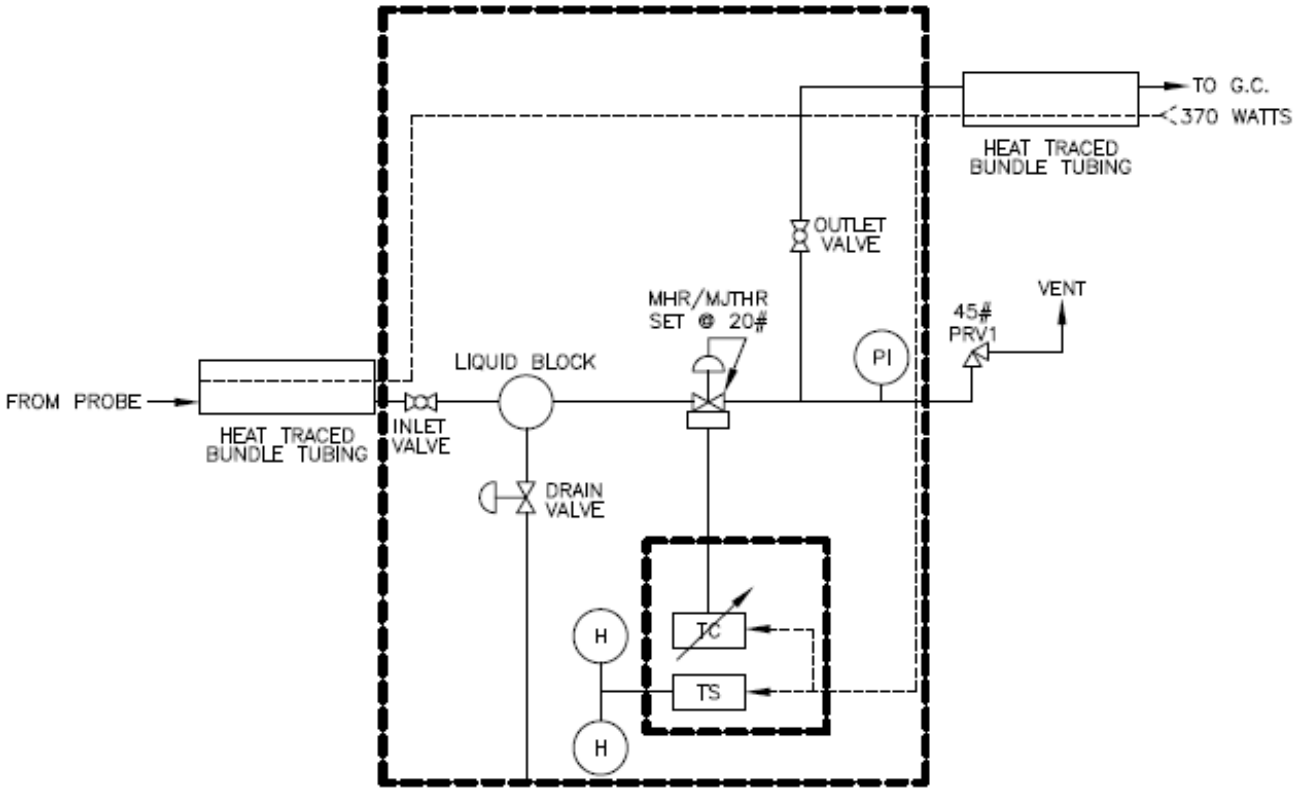
BILL OF MATERIALS			
ITEM	**QTY**	**DESCRIPTION**	**VAL ITEM #**
1	1	ENCLOSURE; INTERTEC MULTI-BOX TYPE OR SS	16334
2	1	MOUNTING PLATE; INTERTEC, ALUMINUM 26-1/4 X 1/4	
3	-	INTENTIONALLY LEFT BLANK	
4	2	HEATER; INTERTEC, 80 W MINITHERM SL CBA T3	10352
5	1	THERMOSTAT; INTERTEC P/N TS-50	5602
6	1	LIQUID BLOCK; A+ GENIE P/N 123HP-006-SS-LB	5237
7	1	HEATER PRESSURE REGULATOR; VALTRONICS P/N MHR, OR MJTR	1181, 12920
8	1	TEMPERATURE CONTROLLER; WATLOW MODEL PM6C1CH-AAAAAAA, OR PM6CIEH-2AAAAAA	14553
9	1	THERMOCOUPLE; J TYPE	15600
10	1	CARTRIDGE HEATER; 200 W, 120 VAC, HOT WATT P/N HS37-1.5 OR 24 VDC	6000
11	1	RELIEF VALVE; 1/8" FNPT ENDS, SWAGELOK P/N SS-2C4-45	4993
12	1	VALVE; 2-WAY, 1/8" FNPT ENDS, SWAGELOK P/N SS-42-GF2	5004
13	2	BUG VENT, 1/8" MNPT, SWAGELOK P/N SS-MD2	5007
14	2	CLOSE NIPPLE; 1/8" MNPT, SWAGELOK P/N SS-2-CN	4985
15	1	STREET TEE, 1/8" MNPT X 1/8" FNPT, SWAGELOK P/N SS-2-ST	7788
16	1	VALVE; 2-WAY, 1/4" TUBE, W/ HANDLE, SWAGELOK P/N SS-42GS4	5611
17	1	VALVE; 2-WAY, 1/4" TUBE, W/ KNOB, SWAGELOK P/N SS-1VS4 (31RS4)	5516
18	4	ELBOW; MALE CONNECTOR, 1/4" MNPT X 1/4" TUBE, SWAGELOK P/N SS-400-2-4	537
19	1	PLUG; 1/8" MNPT, SWAGELOK P/N SS-200P	6059
20	2	ELBOW; MALE CONNECTOR, 1/8" MNPT X 1/4" TUBE, SWAGELOK P/N SS-400-2-2	536
21	1	MALE CONNECTOR; 1/4" MNPT X 1/4" TUBE, SWAGELOK P/N SS-400-1-4	533
22	1	TEE; BRANCH, 1/4" FNPT X 1/4", SWAGELOK P/N SS-400-3TTF	10430
23	1	TEE; UNION, 1/4" TUBE, SWAGELOK P/N SS-400-3	539
24	-	HEAT SHRINK TUBING; SMALL 3", LARGE 2", MCMASTER CARR (7564K19), (7564K25)	11227, 11228
25	-	TEFLON TUBING FOR THERMISTER; 1/4" LONG, MCMASTER CARR 51805K32	11225
26	3'	TUBING, 1/4" STAINLESS STEEL SS-T4-S-035-20	643
27	2	BUNDLE SEAL, 2 LEG, RAYCHEM P/N SSB1202FR	4614
28	2	BUNDLE SEAL, RAYCHEM P/N SEAL 1.60	4745
29	2	GLAND SEAL KIT; RAYCHEM P/N C75-100A	4748
30	3	SEALING FITTING; 3/4"	1584
31	4	CLOSE NIPPLE; 3/4" CONDUIT	934
32	2	ELBOW; 45°, 3/4" CONDUIT	9073
33	1	ENCLOSURE; 1D1	7899
34	1	UNION; 1" CONDUIT, ALUMINUM	1685
35	1	PRESSURE GAUGE; 0-60 psig, 1/8" MNPT, CHEMAC, MCDANIEL CODE R7CL	6815
36	2	BULKHEAD UNION, 1/8" FNPT, HALL MACHINE P/N 200412-6	5080
37	1	BRACKET; REGULATOR, HALL MACHINE P/N 200412-4	5078
38	6	TERMINAL BLOCK	5519
39	1	END BARRIER	6521
40	2	END CLAMP	6520
41	1	MOUNTING CHANNEL	5520
42	2	SIGN; MUSTANG, WARNING HOT	6500, 8325
43	10	SIGN; SMALL, 1" X 3"	6064, 6501, 6502, 6503, 6504, 8786, 9134, 9135
44	2	BRACKET; SMALL VALVE, HALL MACHINE	8593
45	2	UNION; 1/2" CONDUIT, ALUMINUM	1684
46	2	MOUNTING BLOCK; FOR HEATERS (B MACHINE)	10538
47	1	THERMOMETER; DOOR, 0-200°F	6005
48	1	OFFSET NIPPLE; 1/2" CONDUIT	8718
49	1	HOUSING; APPLETON, 1/2" GRJT	10111
50	4	CLOSE NIPPLE; 1/2" CONDUIT	4856
51	1	SEALING COMPOUND	1954, 1936
52	1	D1 90° ELBOW, 3/4"	8927
53	1	LIQUID BLOCK BRACKET; A+	4992
54	1	THERMAL CUT-OFF SWITCH; SELCO P/N UP61-110C	11220
55	2'	HIGH-TEMP WIRE; MCMASTER CARR P/N 7304K132	11226
56	1	ENCLOSURE; AKRON ELECTRIC, P/N XJIH-S2, OR KILLARK HKB-4DC	12043, 12986
57	1	SEALING FITTING; 1/2"	4856
58	1	ELBOW; 1/2", APPLETON, ELF90-50	8926
59	1	NIPPLE; CONDUIT, RIGID, 1/2" X 6"	7698
60	1	NIPPLE; CONDUIT, RIGID, 1/2" X 3-1/2"	7930
61	2	NIPPLE; CONDUIT, RIGID, 1/2" X 2"	953
62	9"	CONDUIT; RIGID, 1/2"	705
63	1	VALVE; 2-WAY, 1/4" TUBE, W/ HANDLE, SWAGELOK P/N SS-3NBS4	531
64	1	NIPPLE; 3/4" X 2"	954

ELECTRICAL & WIRING DIAGRAMS




VOLTAGE
(CUSTOMER SPECIFIED)
H
N
G
FUSE
WATLOW
CONTROLLER
C-98
C-99
OUTPUT
#2
A-K2
A-L2
HEATER
INPUT #1
SLOT A
THERMAL
CUT-OFF
SWITCH


S2
T1
S3
S1
- RED (J)
RTD
TC
S1
R1
+ WHITE (J)
CF
COMMON
CD
T-/R-
CE
T+/R+
MODBUS RTU
OR STANDARD
BUS EIA-485
COMMUNICATIONS


TO G.C.
370 WATTS
HEAT TRACED
BUNDLE TUBING
OUTLET
VALVE
VENT
MHR/MJTHR
SET @ 20#
45#
PRV1
PI
FROM PROBE
LIQUID BLOCK
HEAT TRACED
BUNDLE TUBING
INLET
VALVE
DRAIN
VALVE
H
TC
TS
H

INSTALLATION INSTRUCTIONS

NOMENCLATURE

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

TOOLS REQUIRED

- Standard Hand Tools
- Utility Knife

The Mustang® Sample Conditioning System assembly can be mounted in one of several mounting configurations.

- Mount the Model P53 assembly in accordance with previous cautions and warnings.
- Perform the electrical hook up with de-energized conductors.
- 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.
- A seal fitting is required for the power input connection to the controller enclosure to maintain its electrical hazard classification rating.
- 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.
- For 208 or230 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.
- 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.
- A seal fitting is required between the controller enclosure and the MHR heater block.
- Externally connect earthing (grounding) conductors from assembly to equipment ground connections.

- 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.

ADJUST THE TEMPERATURE SET POINT.

- The temperature controller comes from the factory set to 120 F unless otherwise specified. If a different temperature is required, refer to the Watlow 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.

OPERATION INSTRUCTIONS

- Close the cover on the controller enclosure.
- Turn on the electrical supply to the controller.
- Allow a few minutes for the system temperature to stabilize.
- The pressure set point may have to be adjusted once the temperature has stabilized.
- Verify that sample stream supply is shut off.
- Verify that power to the controller is off.
- Install the Watlow supplied software (EZ-Zone Configurator) on a laptop or other computer.
- Connect to the Watlow controller using a RS-485 adapter (B&B Electronics Model 485SD9 TB or equal). Plug the adapter into the serial port. Select the serial port on the computer to be used (i.e.COM 1-COM17). The other end connects to the RS-485 terminals.
- On the computer, start program "EZ-Zone Configurator ".
- Turn power on to the controller.
- Establish communication with the Watlow controller.
- Set its address to "1" or user preference.
- Set the regulator temperature set point to the recommended temperature.
- Initially set the regulator temperature at 120 F.
- For all other Watlow parameter settings, refer to the EZ-Zone User's Manual.
- Slowly turn in the sample fluid flow to full open to the regulator.
- Adjust the regulator adjusting screw to obtain the desired output pressure.
- Once sample fluid is being regulated, monitor the regulator temperature to verify that the controller is maintaining the set point temperature.
- Verify the pressure and flow to the remote gas chromatograph or analyzer.
- 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.
- Do not leave power on for extended periods of time without flow through the unit.

MAINTENANCE INSTRUCTIONS

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

Mustang Sampling®

Analytically Accurate™ Liquid & Gas Solutions