



Instruction Manual

Model 270SF *Extractive Gas Sample Probe*



AMETEK[®]

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Receiving and Storage

The UAI 270SF Extractive Gas Sample Probe is a complete pre-installed unit. No assembly is necessary when received on-site.

Carefully inspect the product and any special accessories included with it immediately on arrival by removing them from the packing and checking for missing articles against the packing list.

Check the items for any damage in transit and, if required, inform the shipping insurance company immediately of any damage found.

Storage Location should be protected from the elements. Although all components provided are designed to resist corrosion, additional protection from heat (>140°F/ 60°C) and humidity is recommended.

Definition of Symbols



WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR HAZARDOUS AREA INSTALLATION.

THE SUPPLY POWER CIRCUIT MUST INCLUDE AN OVERPROTECTION DEVICE WITH A MAXIMUM RATING OF 20 A. A DISCONNECT SWITCH MUST BE LOCATED IN CLOSE PROXIMITY TO THE PROBE.

IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED PER CLAUSE 5.4.4(i) IN STANDARD EN 61010-1

CAUTION, RISK OF DANGER SYMBOL INDICATES INJURY MAY OCCUR IF MANUFACTURER'S INSTRUCTIONS ARE NOT ADHERED TO. PLEASE READ MANUAL CAREFULLY WHEN SYMBOL IS DISPLAYED



CAUTION, HOT SURFACE SYMBOL INDICATES EXPOSED SURFACE TEMPERATURE CAN CAUSE BURNS OR PERSONAL INJURY. CARE SHOULD BE TAKEN WHEN CONTACT IS REQUIRED.



CAUTION, RISK OF ELECTRICAL SHOCK SYMBOL INDICATES ELECTRICAL SHOCK MAY OCCUR. CAUTION SHOULD BE TAKEN BEFORE DISCONNECTING OR CONTACTING ANY ELECTRICAL CONNECTIONS.



PROTECTIVE CONDUCTOR TERMINAL SYMBOL INDICATES THE TERMINAL LOCATION FOR THE PROTECTIVE CONDUCTOR. FAILURE TO CONNECT TO THE PROTECTIVE CONDUCTOR TERMINAL MAY RESULT IN A SHOCK HAZARD.

Product Identification

Extractive Gas Sample Probe (Part Number Configurator: 270)	
270	Extractive Gas Sample Probe
Chamber Material	
S	316SS <400°F - 3/4" NPT Pipe Connection
SF	316SS <400°F (Standard) - Sub-Flange Mount
C	Hastelloy C-276 <400°F - 3/4" NPT Pipe Connection
CF	Hastelloy C-276 <400°F - Sub-Flange Mount
ST	316SS with TFE Coating <400°F - 3/4" NPT Pipe Connection
STF	316SS with TFE Coating <400°F - Sub-Flange Mount
SN	316SS with Sulfinert® Coating <400°F - 3/4" NPT Pipe Connection
SNF	316SS with Sulfinert® Coating <400°F - Sub-Flange Mount
SH	316SS Hi Temp with Kalrez® O-Rings <550°F - 3/4" NPT Pipe Connection
SHF	316SS Hi Temp with Kalrez® O-Rings <550°F - Sub-Flange Mount
CH	Hastelloy C-276 Hi Temp with Kalrez® O-Rings <550°F - 3/4" NPT Pipe Connection
CHF	Hastelloy C-276 Hi Temp with Kalrez® O-Rings <550°F - Sub-Flange Mount
SNH	316SS with Sulfinert® Coating & Kalrez® O-Rings <550°F - 3/4" NPT Pipe Connection
SNHF	316SS with Sulfinert® Coating & Kalrez® O-Rings <550°F - Sub-Flange Mount
Mounting Flange	
F1.5	1.5" Flange
F2	2" Flange
F3	3" Flange
F4	4" Flange
F6	6" Flange
F1.T	1.5" Flange - Top Dead Center
F2.T	2" Flange - Top Dead Center
F3.T	3" Flange - Top Dead Center
F4.T	4" Flange - Top Dead Center
F6.T	6" Flange - Top Dead Center
N	No Flange - 3/4" MNPT
Chamber Temperature Control	
TS340	340°F Temperature Switch (Standard) - Mandatory for Agency Approved Units (Standard)
STM	Steam**
Chamber Blowback	
BB	Blowback (Standard)
HBB	Heated Blowback
N	No Blowback
Blowback Port	
SBB	Standard Blowback
BPT	Blowback Probe Tip Filter Only
DBB	Dual Blowback Chamber & Probe Tip Filter
N	None
Blowback Valve Voltage	
24	24VDC Actuator
115	115VAC Actuator
230	230VAC Actuator
AIR	Pneumatic Actuator
N	No Blowback
Enclosure	
FG	Fiberglass Enclosure (Standard), 3" Boot
FGI	Fiberglass Enclosure, Insulated, 3" Boot
FGH	Fiberglass Enclosure, Insulated/Heated, 3" Boot (Not available for FM)
SS	SS Enclosure, 3" Boot
SSI	SS Enclosure, Insulated, 3" Boot
SSH	SS Enclosure, Insulated/Heated, 3" Boot (Not available for FM)
N	No Enclosure
Enclosure Heater Control	
EX	ATEX Approved Heater (160°F/71°C)
N	No Heat Enclosure (Standard)
Power Supply	
115	115VAC 50/60 Hz General Purpose
230	230VAC 50/60 Hz General Purpose
Filter	
CM	2 µm Ceramic
CA	1 µm Ceramic
CC	0.1 µm Ceramic
SS	2 µm Sintered 316SS
Alarm Output	
C	Closed on Alarm
F	Fail Safe (Standard)
TK	Type K ThermoCouple
RD	100 Ohm RTD
N	None

270 -SF -F4 -TS340 -BB -SBB -115 -FG -N -115 -CM -F Sample Part #

NOTE: Probe Tip Filters & Probe Tubes Purchased Separately.

Specifications

OPERATING SPECIFICATIONS	
Sample Flow Rate	0 to 20 l/m
Calibration Gas Requirement	Sample flow rate plus 10%
Operating Pressure Drop at 10 l/m	12" water column
Maximum Stack Temperature	700°F (370°C)
Oven Temperature	340°F (171°C)
Enclosure Dimensions:	
Fiberglass	H 18" x W 16" x D 10" (H 458mm x W 407mm x D 255mm) f
SS	H 16" x W 14" x D 8" (H 407mm x W 356mm x D 203mm)
Weight	25 lbs (12kg) (plus probe)
Input Voltage Requirement	115/230VAC 50/60 Hz
Input Power Requirement	150 watts
With Optional Heated Enclosure	350 watts **External fuse required of 20 A or less**
Electrical Classification	General purpose
Ambient Temperature, Operating	200°F maximum (93°C)
Blowback Tank Volume	0.7 scf (19.8 l) when at 100 psig (7.4 barg)
Blowback Duration	0.5 sec. to empty accumulator
Enclosure	Nema 4x fiberglass (standard) Stainless steel (optional)
Sample Line Connection	3" Heat shrink boot (standard) 4" Heat shrink boot (optional) 2" Heat shrink boot (optional)
Heater Type	Rod heaters in aluminum block, controlled w/ thermal switch
Available Filter	2 µm ceramic (standard) 316SS (optional)
Chamber Materials	316SS (standard) 316SS, SilcoNert™ coated Hastelloy C-276

Description and Principle of Operation

APPLICATION

The Universal Analyzers Model 270SF Extractive Gas Sample Probe Assembly is designed to be installed on sample stacks containing non hazardous gases. The 270 may be installed in an unclassified location. Filter changes can be made in less than one minute.

The 270SF filter will mount by means of a pipe flange to a mating flange on the stack. The size of the flange can be specified by the user and can include 2", 3", 4", 6" or DIN type. A 1/2" NPT female threaded connection is provided for the sample probe to mount inside the mounting flange. Stack temperatures and corrosive gases will determine the material and design of the probe to be used.

Sample flow rates of up to 20 liters per minute can be extracted and filtered through the Model 270 with a minimal amount of pressure drop.

GENERAL DESCRIPTION, HEATED FILTER SECTION

The Model 270SF is a Extractive Gas Sample Probe Assembly consisting of the filter body mounted in a NEMA 4X Fiberglass Enclosure or Stainless Steel Enclosure. An optional blowback system is provided to allow the blowback to occur on command from a computer, data logger, PLC, UAI timer card or external switch mounted in a safe area.

Two 63 watt heaters are mounted in an aluminum sleeve around the filter cavity. The heater holds the temperature of the filter at 340°F (171°C). A hermetically sealed bi-metallic thermal switch mounted to the filter body keeps the temperature from exceeding 350°F (177°C) by opening the circuit at that temperature. An optional independent temperature sensor can be provided as a means to measure and transmit or record the temperature of the filter. A second thermal switch, set at 225°F (107°C) is provided to be used as an alarm contact, if the temperature drops below the switch temperature. In colder climates, an additional heater can be supplied for the enclosure. This heater will maintain 150°F (65°C) inside the enclosure.

Several types of filter elements can be supplied with the Model 270. The 2 µm ceramic filter is supplied as an economical general purpose filter. A similar ceramic filter with an internal 0.1 µm coating is available for finer filtration or to provide a surface to enhance the blowback capability where the particulates have a tendency to fill the pores of the 2 µm element. A 2 µm, 316SS Filter can be inserted for those applications where the ceramic filter is determined to be unsuitable. Additional filtration materials and pore sizes are available on request.

Blowback air is used to clean the filter element. Compressed air supplied to the blowback assembly needs to be clean and dry (-40°F/°C recommended). Instrument quality air is preferred. The pressure should be as high as possible, up to 125 psig (8.8 barg). High pressure air fills the accumulator (a 7" (178mm) diameter SS sphere) and provides a substantial blast when the high flow solenoid valve opens. This loosens the particles on the filter surface and forces them back through the sample probe into the sample point. The period of time between blowback cycles should be set to occur before the pressure drop across the filter begins to increase beyond acceptable limits. By installing and monitoring a vacuum gauge ahead of the sample pump, a maintenance interval can be established. This can be as often as every fifteen minutes but no less frequently than once per day. The time period between blowback cycles can be based on a calculation to estimate the amount of sample required to deposit from three to five grams of solids in the filter element.

Instrument air usage is minimal and smoothed by the fact that the air accumulator is charged over a period of time through a 1/4" instrument air line. The recharge time could be extended with a restriction in the air line if it were desired to reduce the pressure pulses on the instrument air supply and to consume instrument air more slowly.

The calibration gas is injected into the chamber ahead of the filter. This is close to the sample source, as is required by many EPA officers. A back pressure check valve (set at 3 psig (0.2 barg)) is provided in the cal gas injection path to insure that calibration gas does not leak into the sample while the sample is being drawn through the filter.

Installation

The probe tube (stinger) should be screwed into the 1/2" NPT fitting on the inside of the mounting flange. To prevent galling, coat the threads with an anti-seize compound. Remove and anti-seize compound from the inner wall of the probe tube before attaching it to the probe. The length of the probe should be selected to extend into the center third of the stack; or if the stack diameter is greater than 12', at least 6' into that stack. The studs on the mounting flange should be joined to the sampling nozzle on the stack and the assembly bolted into place.

A heated sample line should be supported close to the Model 270. The heated sample line should be fed through the heat shrink boot on the bottom of the enclosure. Connect the sample tube to the center tubing fitting (3/8") on the filter. The unheated portion of the sample line should be kept short and insulated to avoid condensation. Connect the calibration gas line to 1/4" tubing fitting located on the left side of the chamber and is connected to the chamber via a check valve. If the compressed air line is part of the heated sample line, it can be connected to the 1/4" fitting adjacent to the blowback accumulator. If an external air line is to be used for blowback, bring the air into the enclosure through a bulkhead fitting (supplied by others) to be installed in the wall of the enclosure, typically the mounting location is in the bottom of the enclosure, and connect the air to the same 1/4" fitting.

Provide power to the terminal block(s) within the stack filter enclosure in the Model 270. 150 watts (without heated enclosure) or 350 watts with heated enclosure, at 115/230VAC is required.



NOTE: The supply power circuit MUST include an overprotection device with a maximum rating of 20A. A disconnect switch must be located in close proximity to the probe.

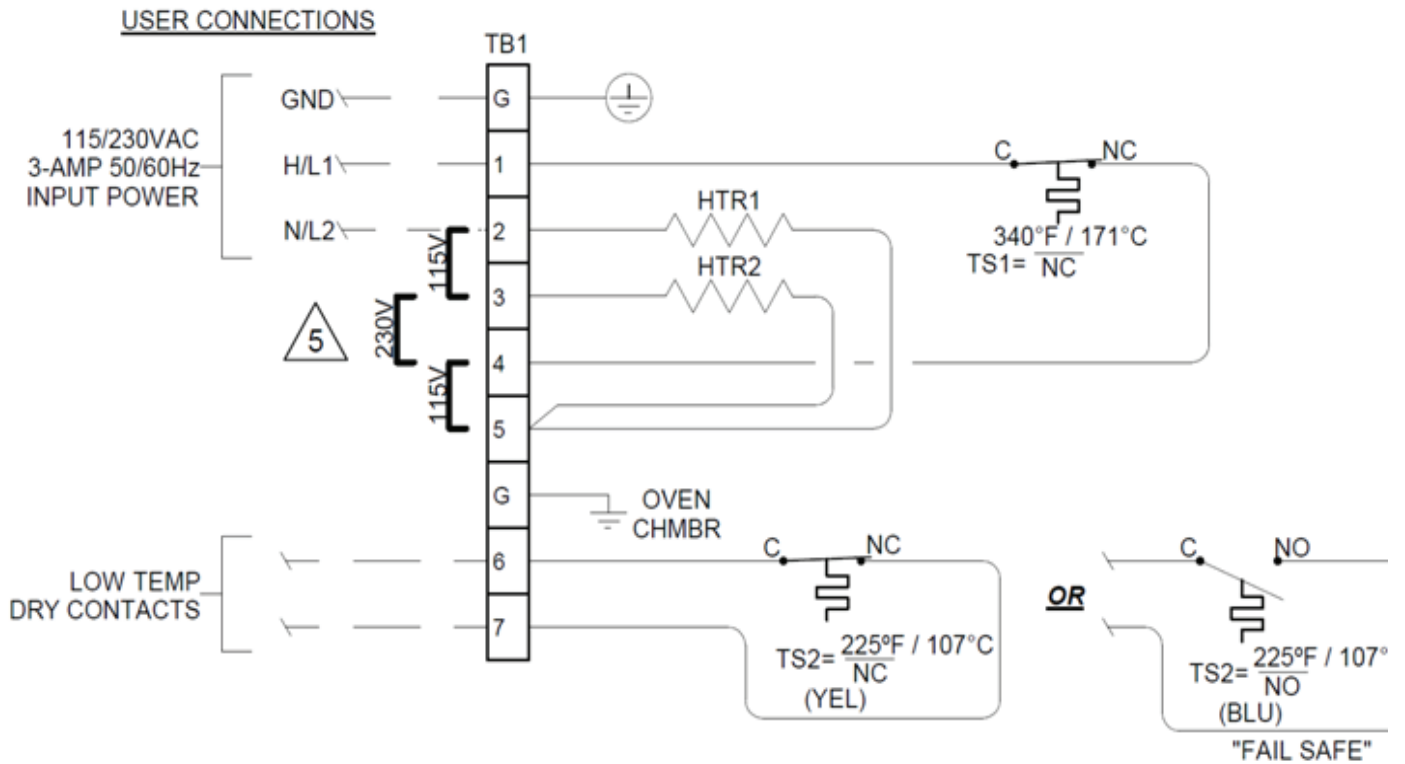


A thermal switch mounted in the aluminum heater will control the temperature to 340°F (171°C). Insure the power supplied to the heater matches the heater voltage requirement shown on the serial number tag. The voltage requirement can be changed by changing the jumpers on the terminal strips (reference terminal strip label or drawings for details). **An independent ground wire should be run to the grounding terminal on the terminal strip.**

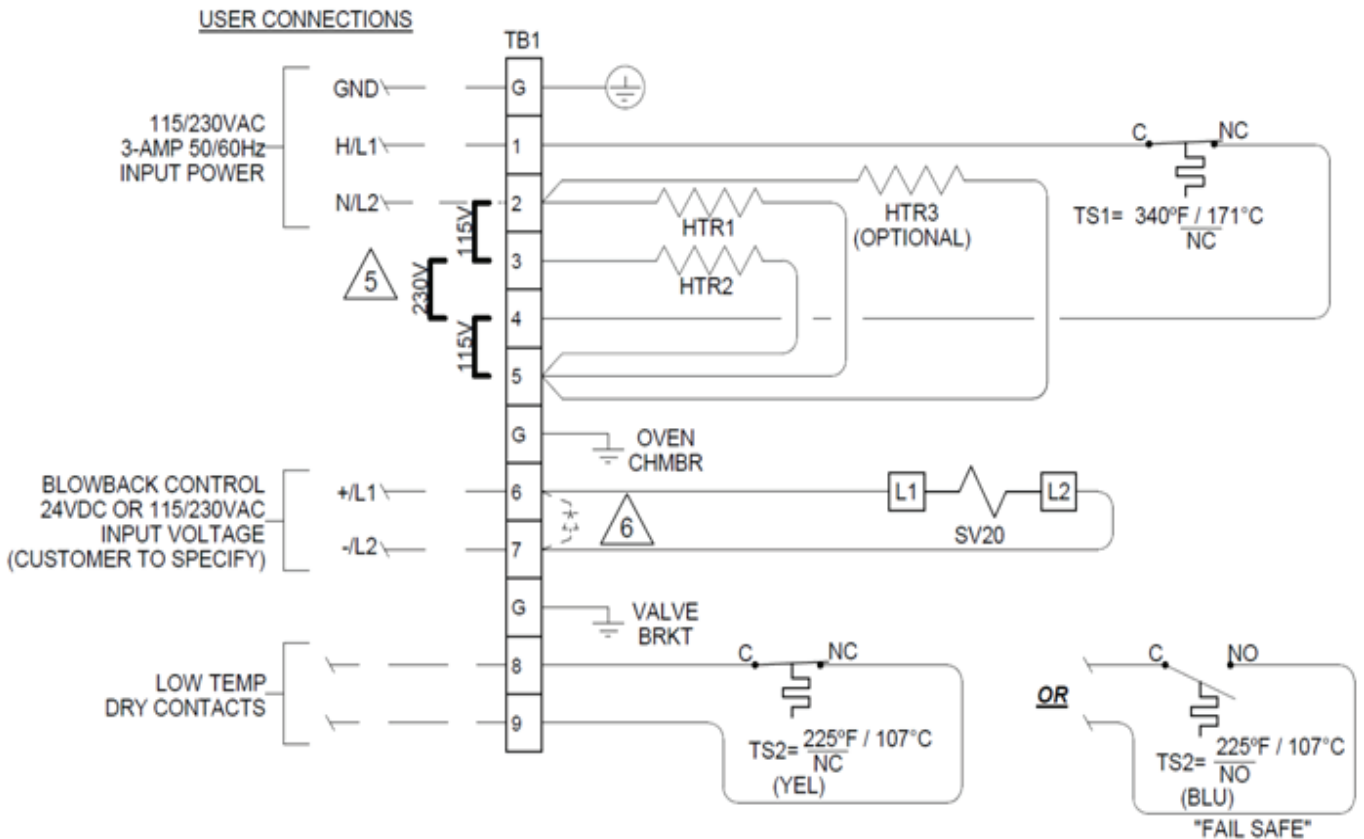
If an independent measurement and display of the oven temperature is desired, a temperature sensor can be slipped into a 1/8" diameter thermowell supplied on the heater tube assembly.

The final installation step is to insure that the sample line is insulated completely. Close the cover of the enclosure and secure the latches. After securing the heated sample line, use a heat gun to shrink the entry boot onto the sample line. The goal is to keep the temperature of the gas sample at a temperature above the dew point of the gas all the way from the stack to the sample cooler/dehydrator.

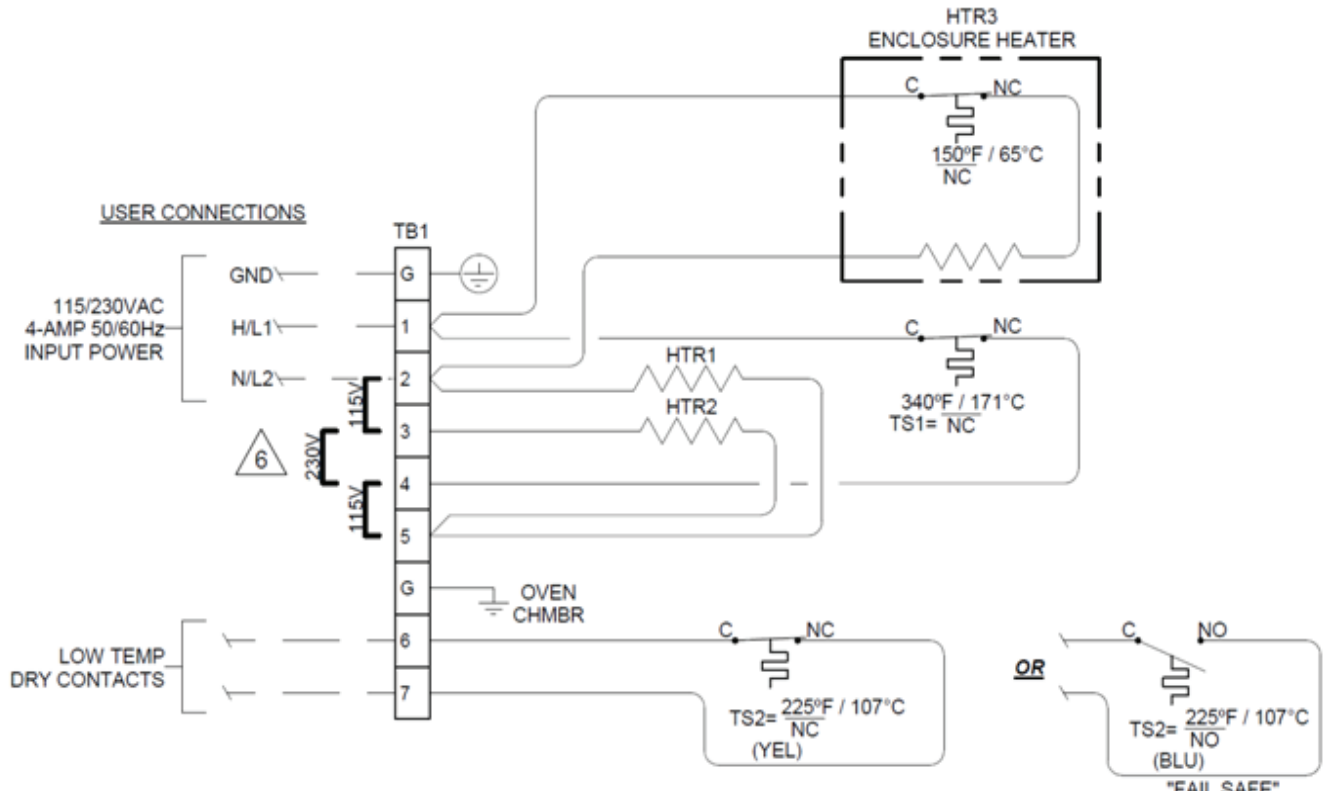
Electrical Connections Model 270SF



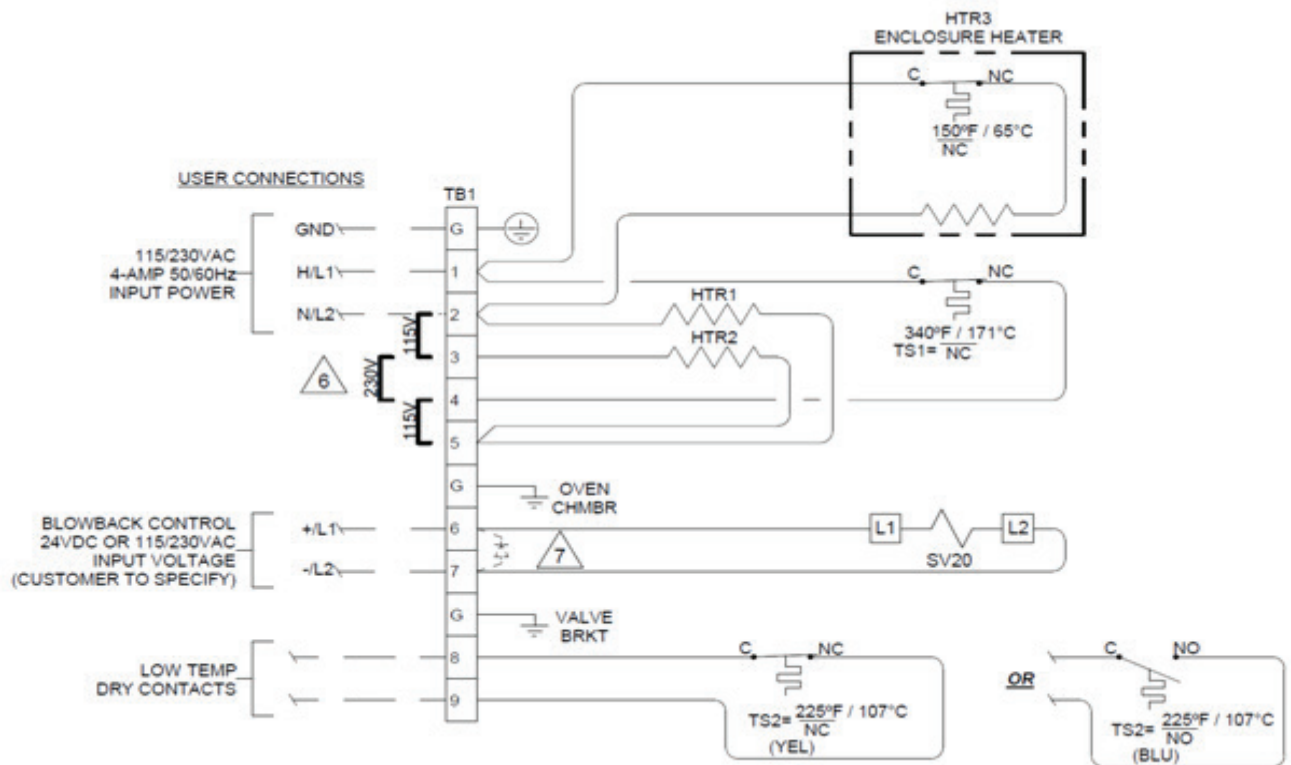
Non-Heated Enclosure Configuration w/o Blowback



Electrical Connections Model 270SF

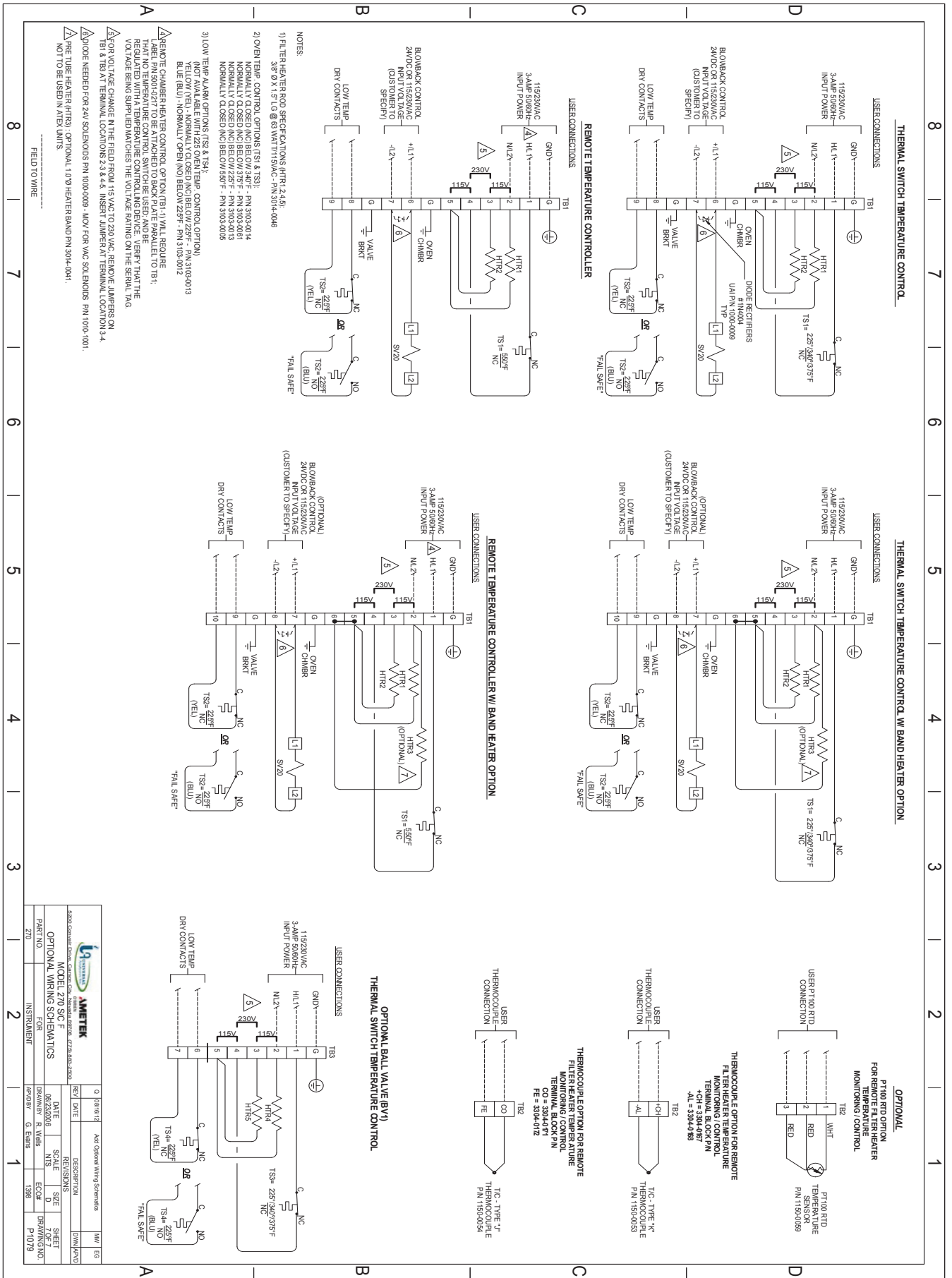


Heated Enclosure Configuration w/o Blowback



Heated Enclosure w/ Blowback

Electrical Connections Model 270SF



NOTES

1) FLEET HEATER BOO SPECIFICATIONS: HTRV 2.4.5V 38" Ø X 1.57' LG @ 63 WATT/115VAC - PN 3014-0046

2) OVEN TEMP. CONTROL OPTIONS (TS1 & TS2):
 TS1 - PN 3103-0014
 NORMALLY CLOSED (NO) BELOW 225°F - PN 3103-0061
 NORMALLY CLOSED (NO) BELOW 225°F - PN 3103-0013
 NORMALLY CLOSED (NO) BELOW 550°F - PN 3103-0005

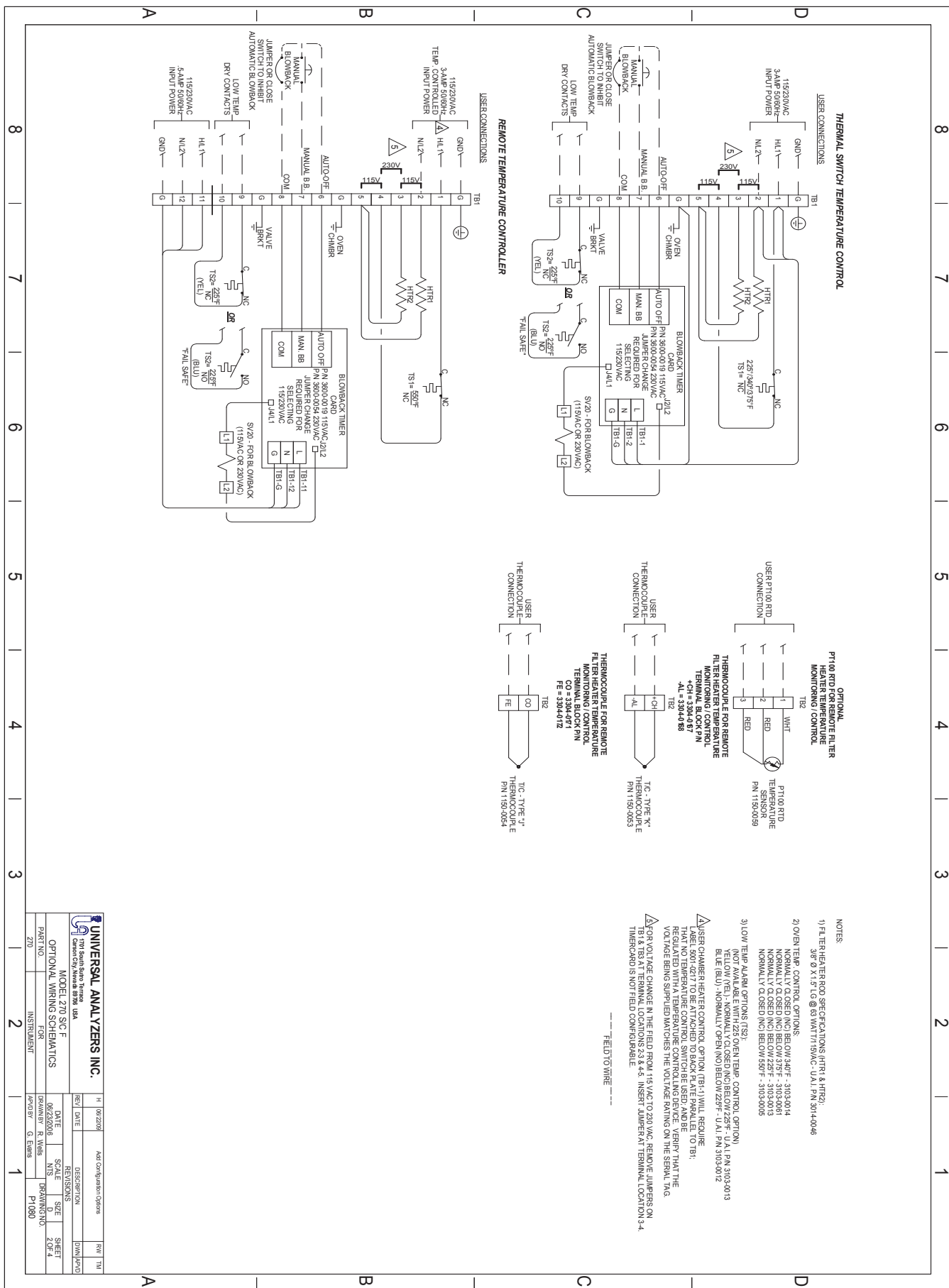
3) LOW TEMP. ALARM OPTIONS (TS2 & TS4):
 (NOT AVAILABLE WITH 225 OVEN TEMP. CONTROL OPTION)
 YELLOW (VEL) - NORMALLY CLOSED (NO) BELOW 225°F - PN 3103-0013
 BLUE (BLU) - NORMALLY OPEN (NO) BELOW 225°F - PN 3103-0012

△ REMOTE CHAMBER HEATER CONTROL OPTION (TS1-1) WILL REQUIRE LABEL PIN 500-02217 TO BE ATTACHED TO BACK PLATE PARALLEL TO TR1. REMOTE CHAMBER HEATER CONTROL SWITCH CAN BE USED IN EITHER NORMAL OR REVERSE POSITION. THE VOLTAGE RATING OF THE SWITCH MUST BE 250VAC. THE VOLTAGE BEING SUPPLIED MATCHES THE VOLTAGE RATING ON THE SERIAL TAG.

△ FOR VOLTAGE CHANGE IN THE FIELD FROM 115 VAC TO 230 VAC, REMOVE JUMPERS ON TS1 & TS2 AT TERMINAL LOCATIONS 2, 3 & 4.3. INSERT JUMPER AT TERMINAL LOCATION 3.4. △ DIODE NEEDED FOR 24V SOLENOIDS PN 1000-0099 - MOV FOR VAC SOLENOIDS PN 1000-1001. NOT TO BE USED IN ATEX UNITS.

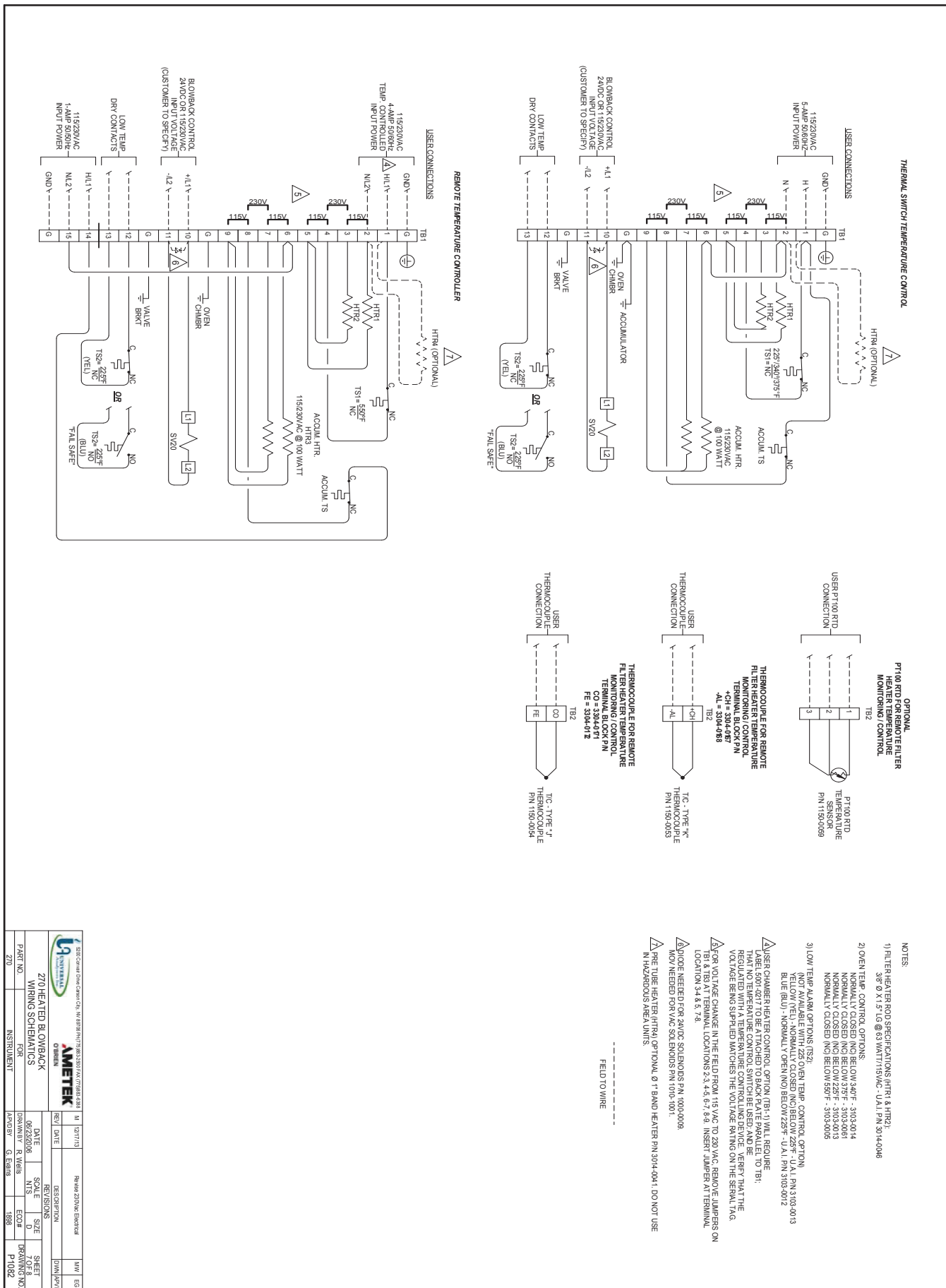
Q	10/10/12	3401 General Wiring Schematics	MAN	ES
REV	DATE	DESCRIPTION	BY	CHKD
DATE	SCALE	REVISIONS	SIZE	SHEET
06/23/2016	N/A	0	7.62 F	7 OF 7
PART NO.	DRAWN BY	R. WILKS	ECN#	DRAWING NO.
270	INSTRUMENT	G. EBERS	1389	P1079

Electrical Connections Model 270SF



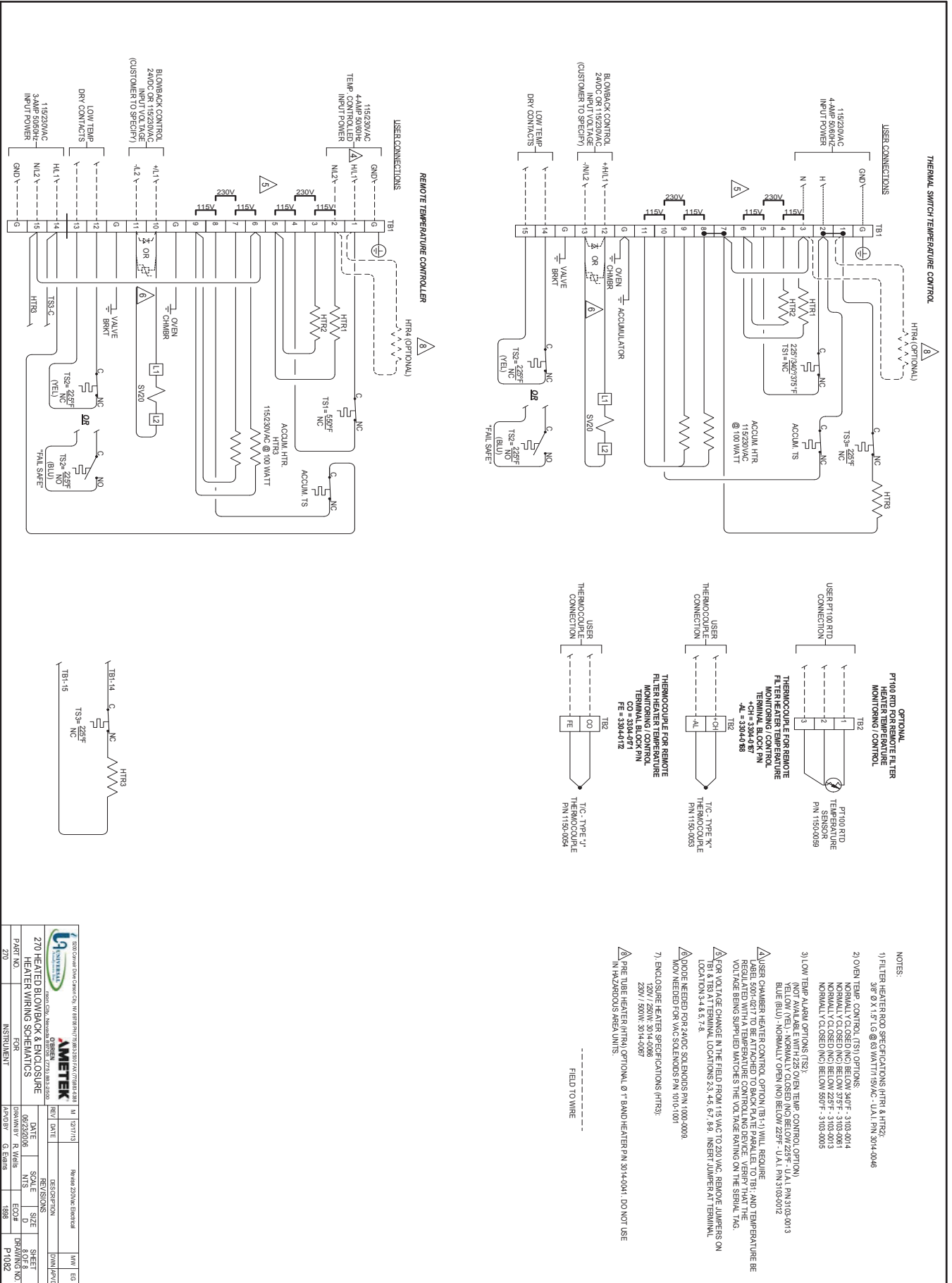
UNIVERSAL ANALYZERS INC. 1711 South Main Street Chertsey, Nevada 89706 USA		REV. DATE	DESCRIPTION	REV. DATE	DESCRIPTION
MODEL 270 SIG F OPTIONAL WIRING SCHEMATICS		08/23/00	REVISED	08/23/00	REVISED
PART NO.	270	DESIGNED BY	R. Weiss	DRAWN BY	G. Ebers
INSTRUMENT		PI1090			

Electrical Connections Model 270SF



		Re-use 27006 Electrical		MW ES	
270 HEATED BLOWBACK WIRING SCHEMATICS		REV. DATE		DISPOSITION	
PART NO. 270		FOR INSTRUMENT		DATE 06/23/2006	
DRAWN BY G. EDWARDS		SCALE NTS		SIZE D	
SHEET 1 OF 8		DATE 06/23/2006		DRAWN BY G. EDWARDS	
INSTRUMENT		REV. 1888		DATE 06/23/2006	

Electrical Connections Model 270SF



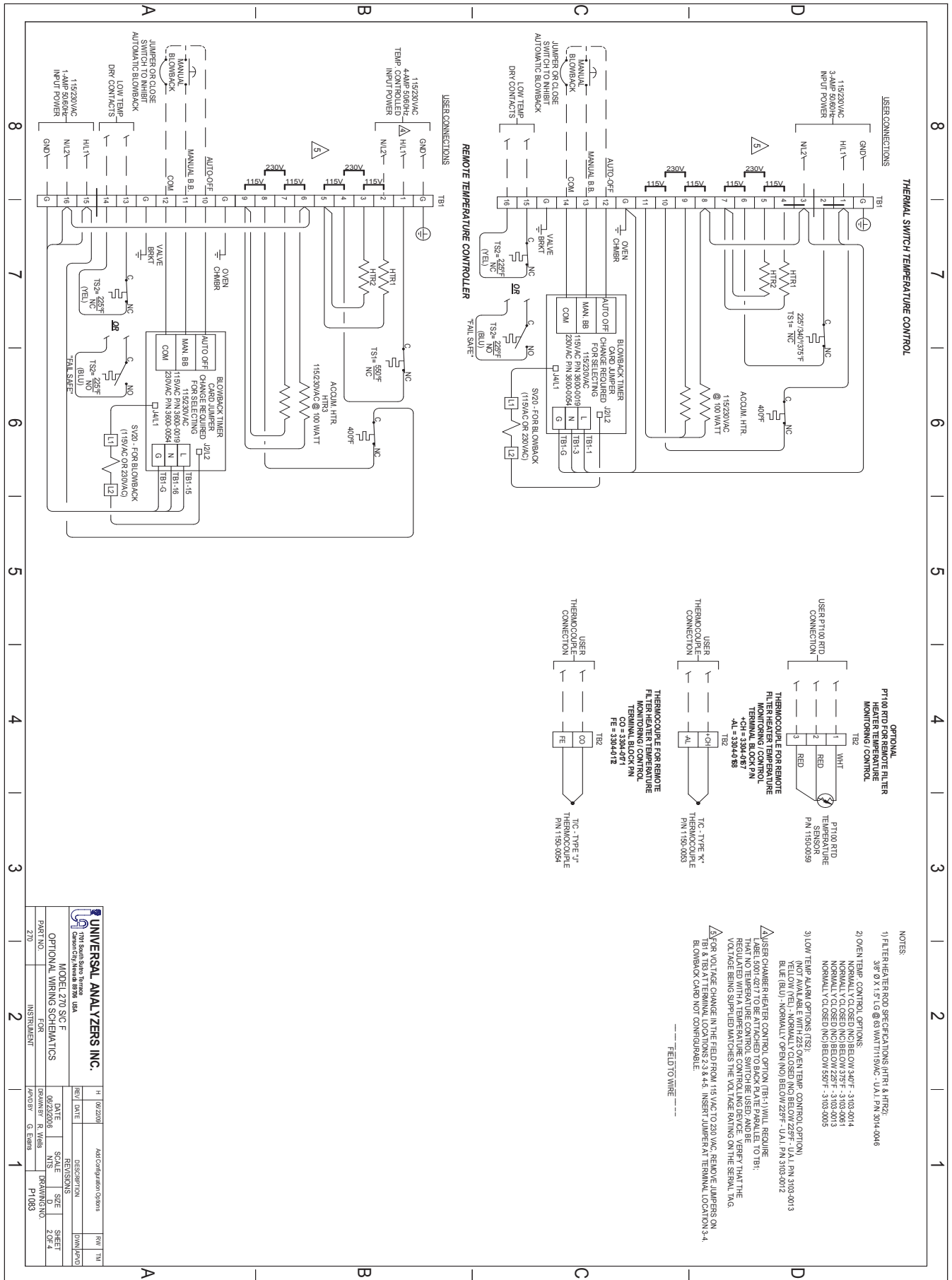
AMMETER
3000 Convent Blvd, Dayton, OH 45424
2700 Riverchase Blvd, Birmingham, AL 35244
8000 Woodloch Forest Dr, Dallas, TX 75243

REV#	DATE	DESCRIPTION	BY	CHKD
1	05/02/06	REVISED TO ADD P100 RTD	R. WEAVER	G. EMMERT
2	06/20/06	REVISED TO ADD P100 RTD	R. WEAVER	G. EMMERT

DATE: 06/20/06
 TIME: 1:45
 REVISION: 2
 SHEET: 8 OF 8
 DRAWING NO: P1082

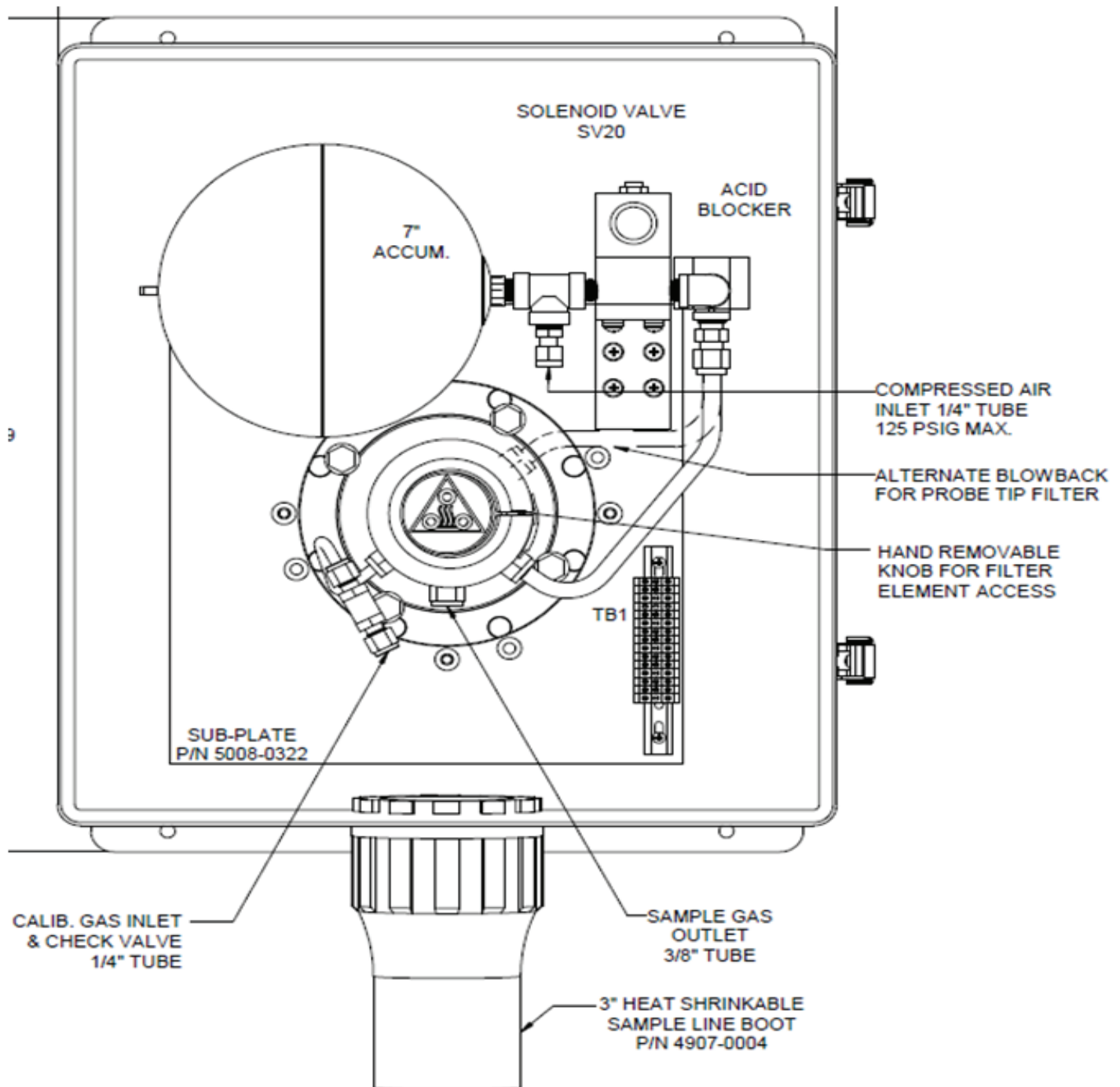
- NOTES:**
- 1) FILTER HEATER ROD SPECIFICATIONS HTR1 & HTR2:
 $3/8" \times 1.5" \times 15"$ LG @ 68 WATT/115VAC - U/LAL PN 3014-0046
 - 2) OVEN TEMP. CONTROL (TS1) OPTIONS:
 NORMALTY CLOSED (NC) BELOW 340°F - 3103-0014
 NORMALTY OPEN (NO) BELOW 375°F - 3103-0015
 NORMALTY CLOSED (NC) BELOW 225°F - 3103-0013
 NORMALTY CLOSED (NC) BELOW 50°F - 3103-0025
 - 3) LOW TEMP. ALARM OPTIONS (TS2):
 (NOT AVAILABLE WITH H 225 OVEN TEMP. CONTROL OPTION)
 YELLOW (YEL) - NORMALTY CLOSED AND BELOW 225°F - U/LAL PN 3103-0013
 BLUE (BLU) - NORMALTY OPEN (NO) BELOW 225°F - U/LAL PN 3103-0012
- △ USER CHAMBER HEATER CONTROL OPTION (TB1-1) WILL REQUIRE LABEL 500-0271 TO BE ATTACHED TO BLOWBACK PLATE PARALLEL TO TB1 - AND TEMPERATURE BE VOLTAGE BEING SUPPLIED MATCHES THE VOLTAGE RATING ON THE SERIAL TAG.
- △ FOR VOLTAGE CHANGE IN THE FIELD FROM 115 VAC TO 230 VAC, REMOVE JUMPERS ON LOCATION 3, 4 & 5, 7, 8.
- △ DIODE NEEDED FOR 240VAC SOLENOIDS P/N 1000-0009,
 120V / 250W - 3014-0106
 MOV NEEDED FOR VAC SOLENOIDS P/N 1010-1001
- 7) ENCLOSURE HEATER SPECIFICATIONS (HTR3):
 230V / 300W - 3014-0107
- △ PRE TUBE HEATER (HTR1) OPTIONAL, Ø 1" BAWD HEATER P/N 3014-0104 - DO NOT USE IN HAZARDOUS AREA UNITS.

Electrical Connections Model 270SF



UNIVERSAL ANALYZERS INC.		REV. DATE		DESCRIPTION		REV. DATE	
1711 South Main Street Channahon, Illinois 61870 USA		08/23/00		MAG Configuration 03/99		RWI TMI	
MODEL 270 SIG F		DATE		REVISIONS		DRAWN/CHKD	
OPTIONAL WIRING SCHEMATICS		08/23/00		0		20F4	
PART NO. 270		FOR		DRAWING NO.		SHEET	
INSTRUMENT		P1033		DRAWN BY: R. Vines		2 OF 4	
				APPROVED: G. Ebers			

Process and Piping Connections Model 270SF



Start-Up

Apply power to the Model 270. Allow fifteen to twenty minutes for the filter to come to temperature. This warm-up period is extremely important to avoid the condensation within the Model 270 filter which would cement the particulates to the filter surface.

Start the sample pump and determine that the proper amount of sample is being supplied to the instrumentation.

Perform a calibration cycle to insure that the calibration lines are properly installed and sealed. A flow meter should be installed in the calibration gas supply line to insure that there is at least 10 percent more calibration gas being supplied to the Model 270 than is being withdrawn as sample. This will ensure that the filter and probe are being properly flooded with calibration gas. The excess calibration gas will pass through the probe tube into the stack.

Open the instrument air valve to charge the blowback accumulator. Exercise the blowback solenoid valve to insure it is properly wired. After a blowback cycle, the presence of a slight pulse on the sample tubing in the analyzer shelter and the momentary dilution of the sample with instrument air is normal and signifies that a blowback cycle has occurred.

The optimum time between blowback cycles is to be determined by experience, once a day is sufficient in relatively clean applications. The requirement could be as frequent as every fifteen minutes where the dust and soot levels are severe. It is better to blowback too often than not often enough. A vacuum gauge in the sample line can be helpful to indicate if the particulate loading of the filter has started to restrict the flow of sample. The blowback cycle should be initiated before unacceptable pressure drop occurs.

Shutdown

Before removing power from the unit, ensure filter chamber has been purged of any potentially hazardous components.

To purge the chamber, perform the following:

1. If equipped, perform a manual blowback operation.
2. Close the filter stack isolation valve(s).
3. Ensure no sample is being drawn through the filter chamber. If the sample is being drawn using a sample pump, turn off the power to the pump or disconnect the sample line.
4. If not already done, disconnect the sample line.
5. Use instrument air or other inert gas, flow ~10 l/m for 15-30 minutes through the filter chamber.
Note: Inert gas can be routed through the chamber via the calibration gas line.
6. After purging is complete, follow the maintenance procedure to change the filter.
7. Cap the sample outlet tube connection and disconnect power from the unit.

Note: If electrical wires are to be disconnected, follow applicable 'Lock Out/ Tag Out' requirements.

Maintenance

CHANGING THE FILTER



CAUTION: THIS PROCEDURE CAN CAUSE SEVERE BURNS. USE PROPER PROTECTION.

Changing the filter in the Model 270 Heated Filter Assembly is extremely easy. Using gloves to protect the hand, grasp the cap on the end of the filter body opposite the probe and turn it counterclockwise. The cover may be hot to the touch and may cause burns to the hand if not protected. Removing the cover exposes the filter. The cover is secured to the assembly with a retainer chain. Reach into the heated oven with pliers to pull out the old filter.

Inspect the O-Rings which are at each end of the filter to ensure they are still elastic and will seal the filter. Replace O-Rings if they are charred or deformed.

Replace the filter with a new one, again handling it with pliers. Ensure that the filter is pushed in the center of the oven so that it is in contact with the O-Ring on the far end of the filter. Screw the cap back on the filter body. The filter replacement procedure is complete.

Troubleshooting

The following table should give an overview of possible errors and an instruction to check and to repair them (is not valid for the starting-up period of cooler).

Error	Possible reason	Check/Repair
No sample gas flow	Filter element plugged Filter chamber exit port plugged	Check/ replace filter element Remove filter element and inspect exit port. Exit port will be located at 0° or 180° depending on configuration
Low temperature alarm	Insufficient warm-up time Power disconnected Control switch defective	Ensure power has been applied to the unit for a minimum of 15 minutes Ensure power is supplied to the unit. Check by measuring for AC voltage on TB1-1 & 2 Verify by measuring for a closed circuit between TB1-1 & 4
High oxygen readings/ low pollutant readings	Leak	Leaking past the filter element O-Rings. Remove filter element and inspect O-Rings. There are two O-Rings, one located at the base of the filter element and the other in the cap. Ensure both are pliable and seated in their respective grooves Leaking blowback solenoid valve. Block or disconnect the blowback supply Loose connection Verify all fittings are leak free
Low readings during calibration	Insufficient calibration gas flow	Ensure calibration flow is at least 110% of the sample gas flow

Spare Parts

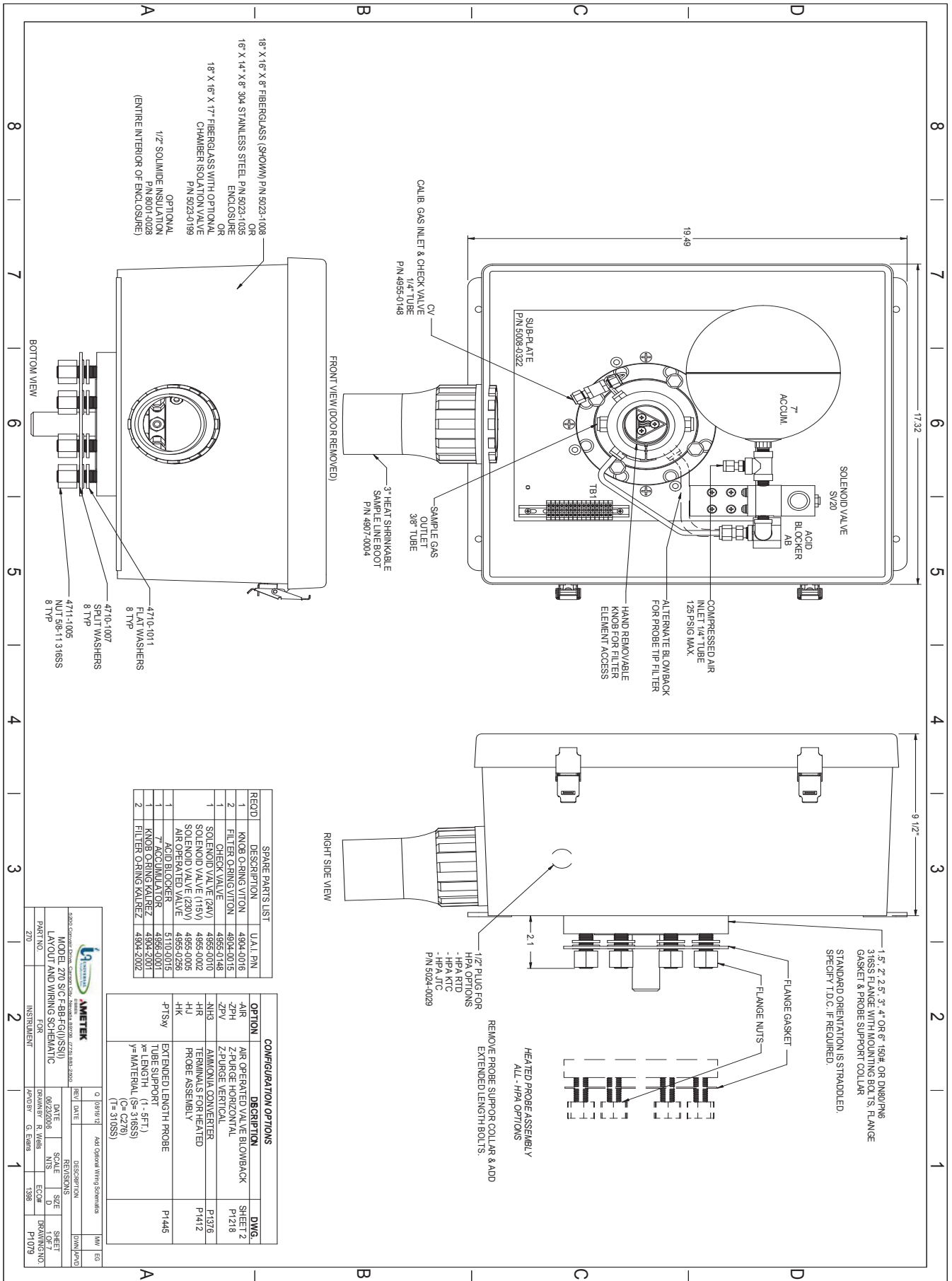
Consumable Spare Parts	
Part	P/N
O-Ring, Viton 2-208, Filter Element	4904-0015
O-Ring, Viton 2-217, Knob Assembly	4904-0016
Heater Element Paste	8010-0001
Filter Element Ceramic Alumina, 2 µm (Standard)	4980-0007
Filter Element Ceramic Coalesc. 1µm Coated	4980-0018
Filter Element Sintered 316SS, 2 µm	4980-0023
Filter Element Ceramic Alumina, 1 µm	4980-0127

Spare Parts	
Part	P/N
Temp. Switch Heater Control, Normally Closed Below 340°F (171°C)	3103-0014
Knob Assembly	5209-0083
Low Temp. Switch, Normally Closed Below 225°F	3103-0013
Low Temp. Switch, Normally Open Below 225°F (107°C) "Fail Safe"	3103-0012
Valve Check 1/4"Tube X 1/4" Tube 316SS Set At 3 PSI	4955-0148

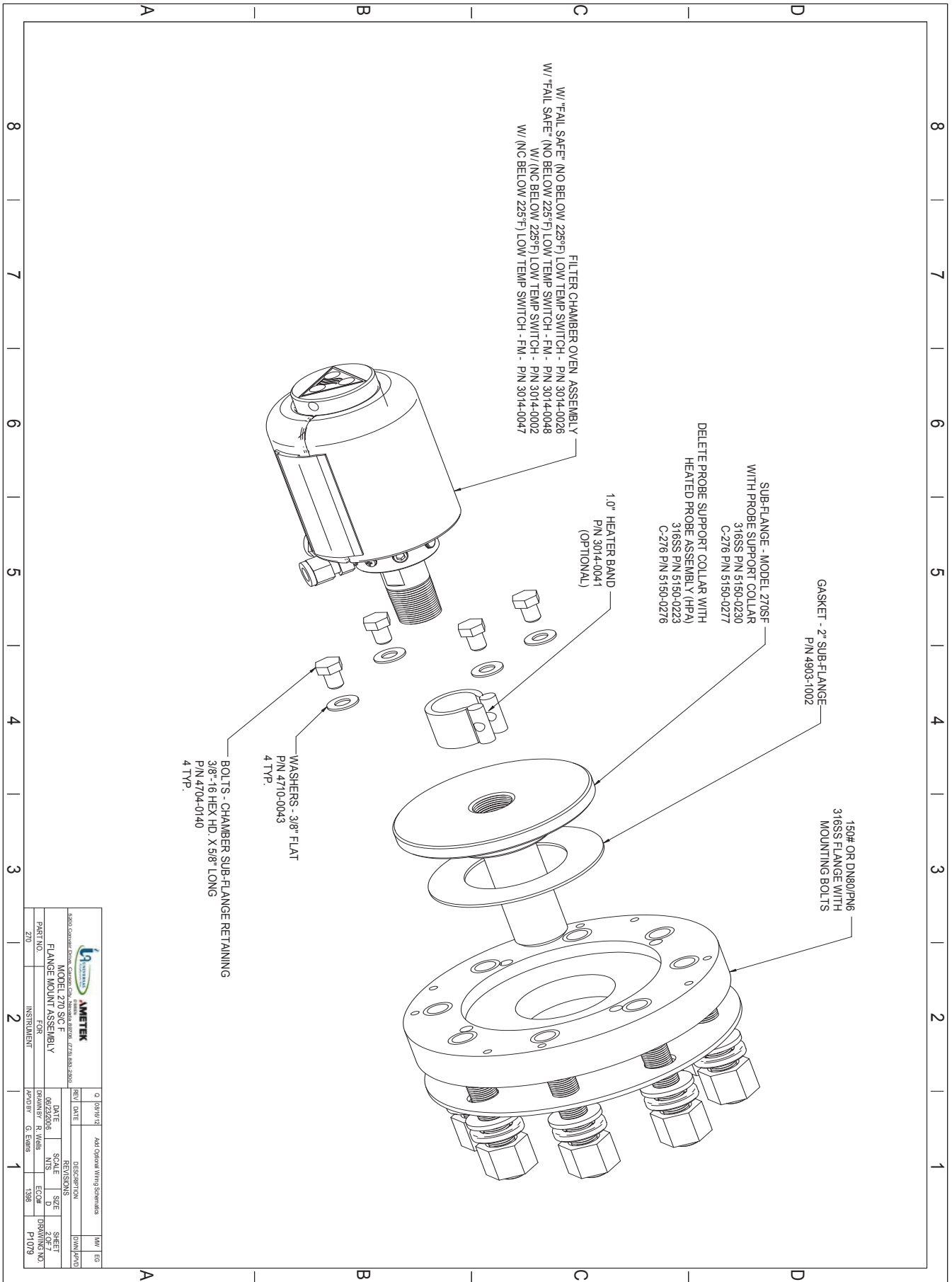
Optional Parts	
Part	P/N
Heater Tube Assembly (Incl. Alum Oven, Heater Elements, Temp. Switch's & Insulation Blanket)	3014-0002
Heater Tube Assembly (Incl. Alum Oven, Heater Elements, Temp. Switch's & Insulation Blanket) – "Fail Safe"	3014-0026
Solenoid Valve Blowback, 2-Way 24VDC	4955-0010
Solenoid Valve Blowback, 2-Way 120VAC	4955-0002
Solenoid Valve Blowback, 2-Way 240VAC	4955-0005
Check Valve Calib. Gas, Adjustable Pressure	5150-0014
Accumulator Sphere Blowback, Unheated	4956-0001
Acid Blocker Assembly, Blowback	5110-0015
Gasket Ring For 4" 150# Flange Garlock 9850 1/16" Thk	4903-0001

* Commissioning Spare Part

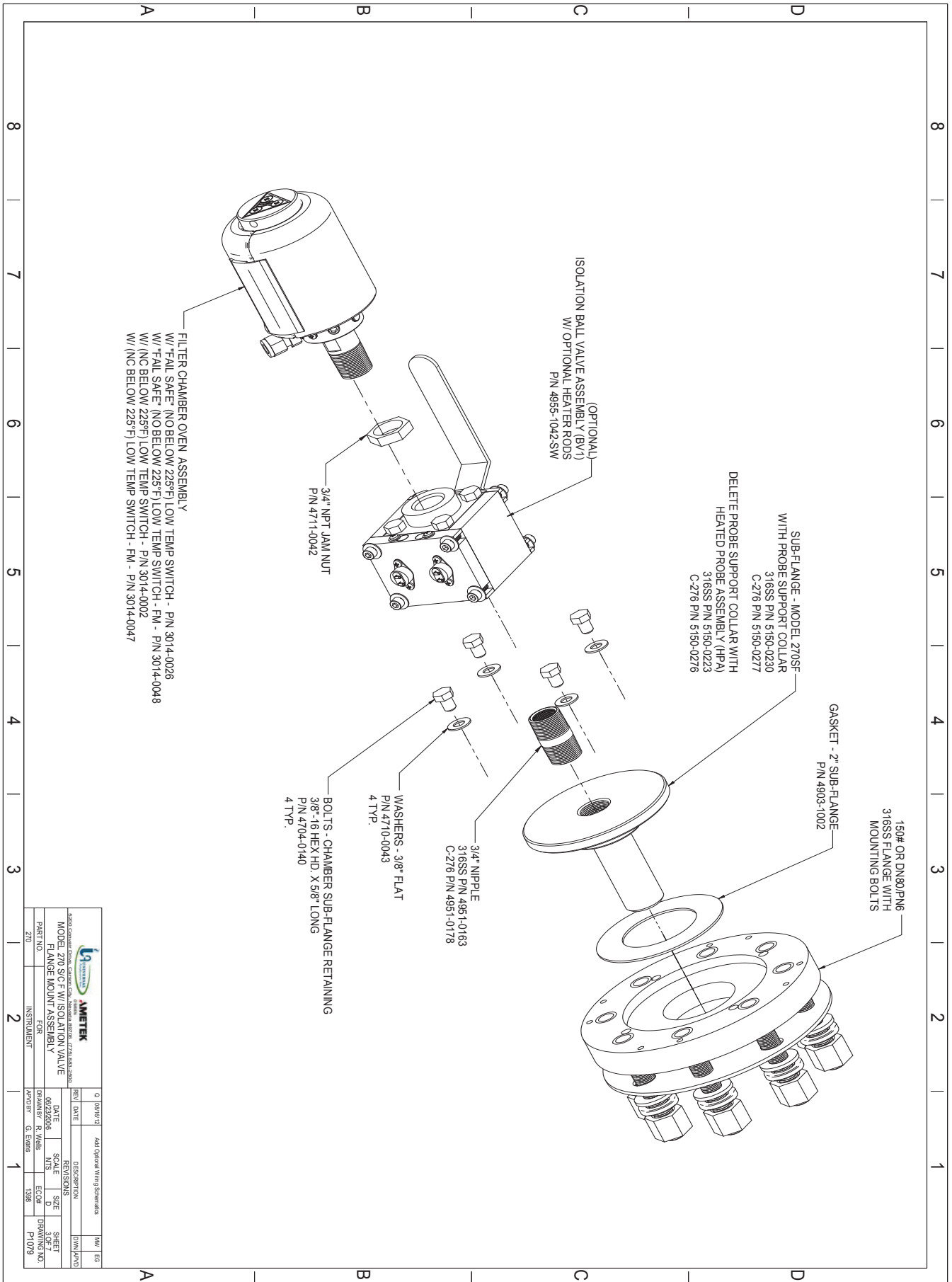
Drawings Model 270SF



Drawings Model 270SF

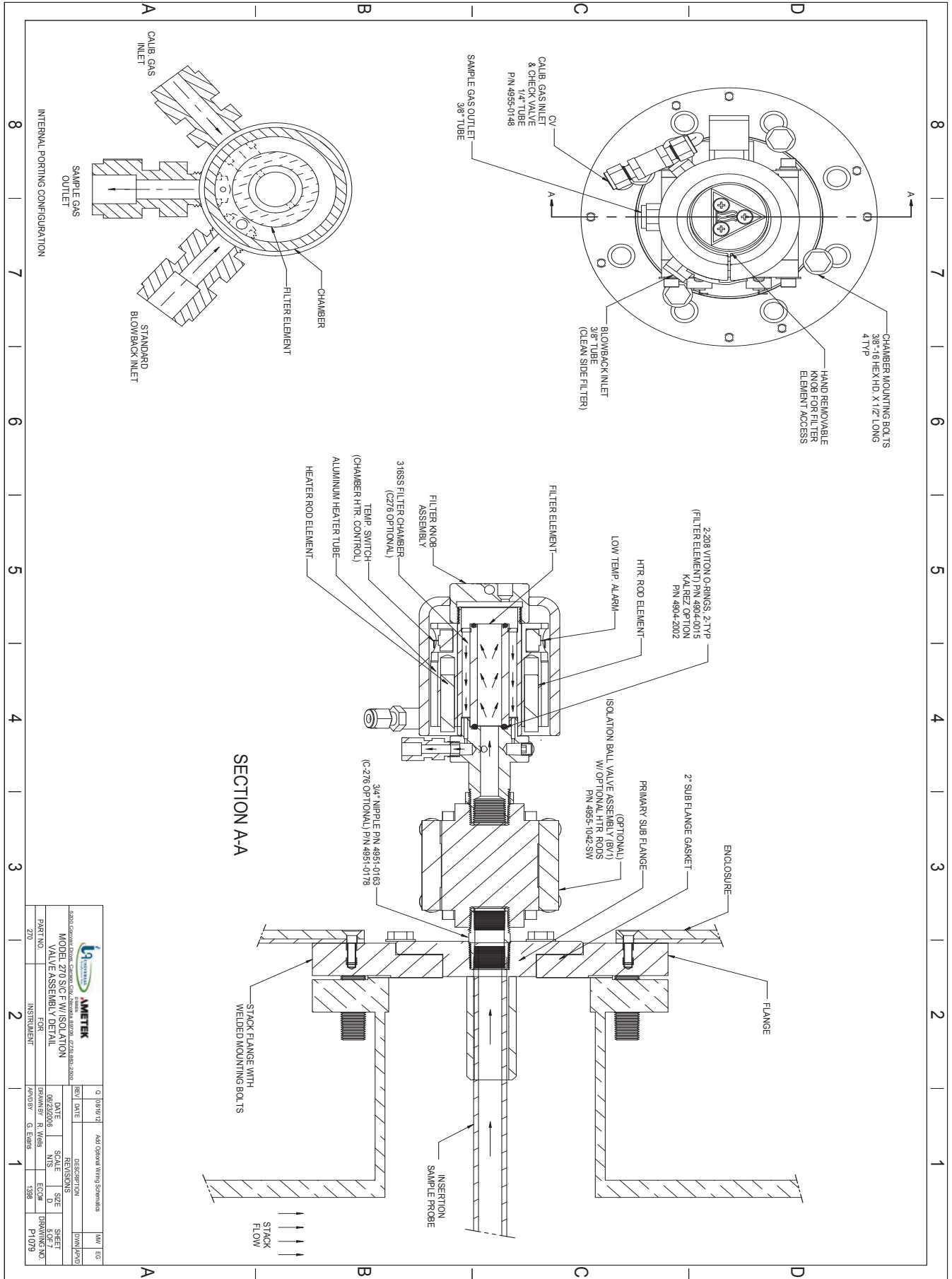


Drawings Model 270SF



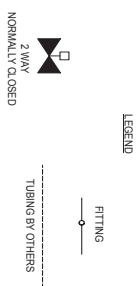
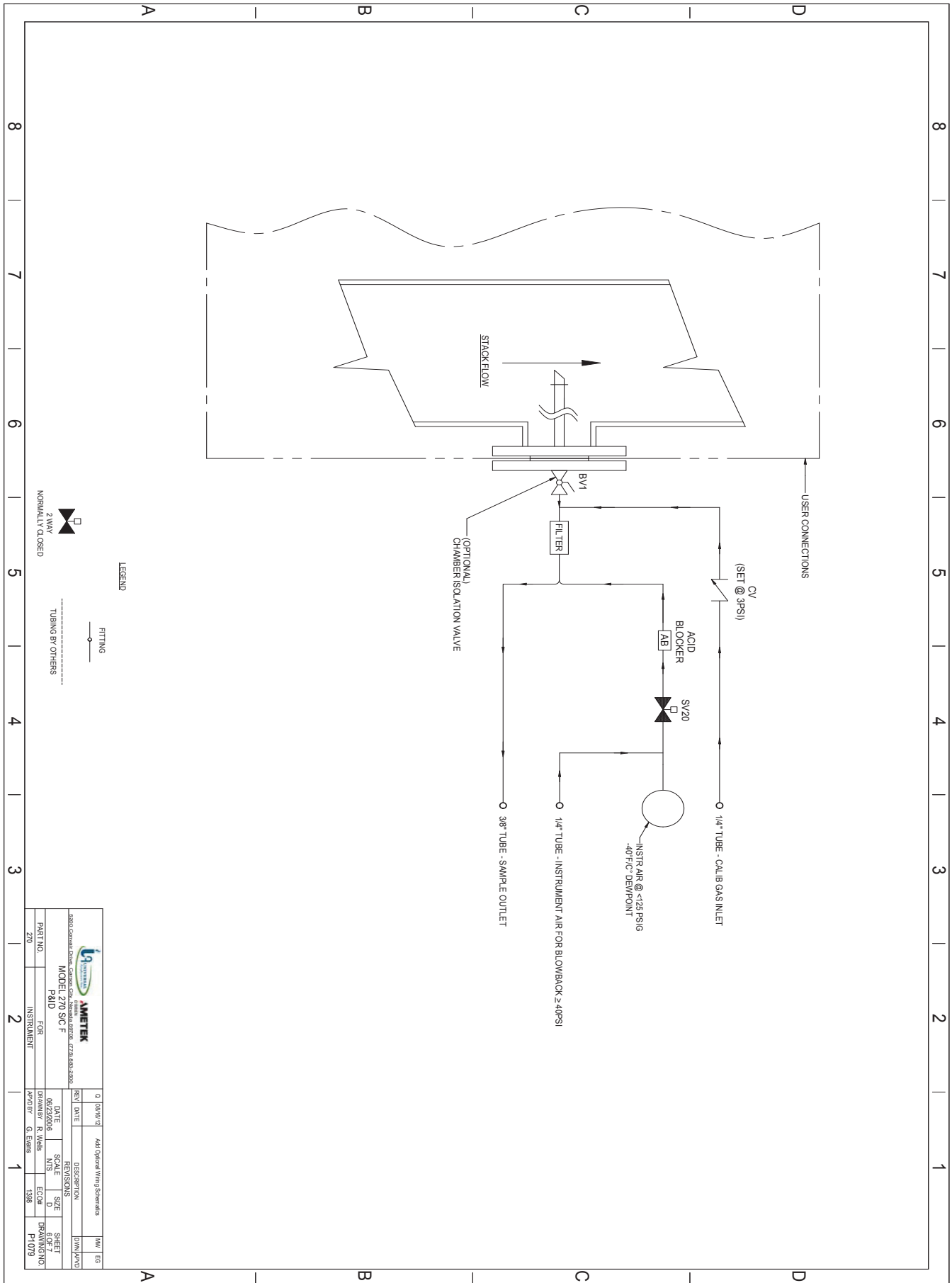
		Q	REV	DATE	3-ADT Original Wiring Schematic	REV	DATE	3-ADT Original Wiring Schematic
3500 Corporate Drive, Columbus, Ohio 43260-1099 Model 270 S/C F/W/ Isolation Valve Flange Mount Assembly		1	REV	DATE	08/23/2016	1	REV	DATE
PART NO. 270 INSTRUMENT		2	REV	DATE		2	REV	DATE
DRAWING NO. P1079		3	REV	DATE		3	REV	DATE
DRAWING BY: R. Weiss APPROVED: G. Ebers		4	REV	DATE		4	REV	DATE
INSTRUMENT		5	REV	DATE		5	REV	DATE
INSTRUMENT		6	REV	DATE		6	REV	DATE
INSTRUMENT		7	REV	DATE		7	REV	DATE
INSTRUMENT		8	REV	DATE		8	REV	DATE
INSTRUMENT		9	REV	DATE		9	REV	DATE
INSTRUMENT		10	REV	DATE		10	REV	DATE

Drawings Model 270SF



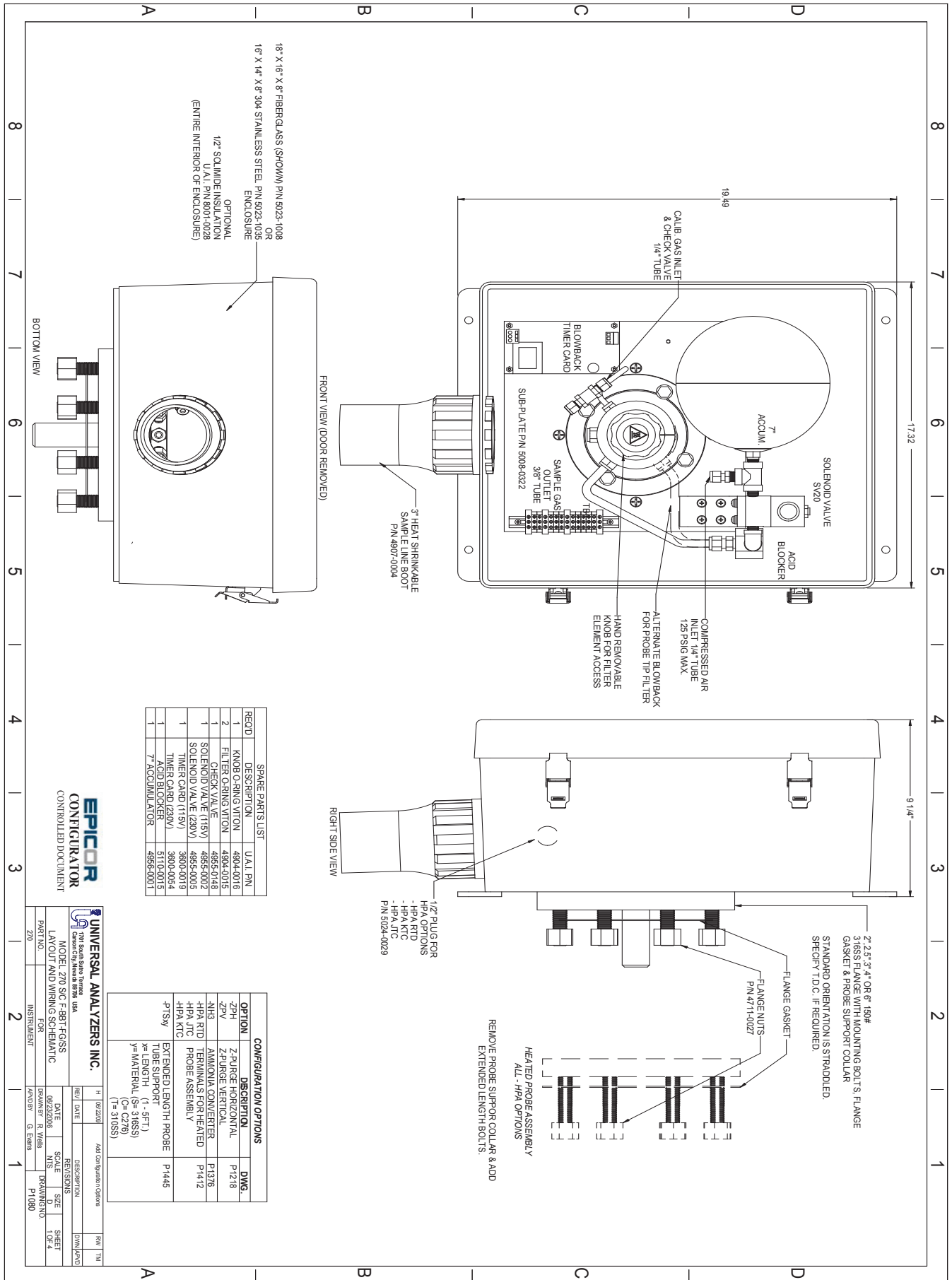
		3900 CHAMBER DRIVE, GREENBUSH, NEW YORK 12061-2902 MODEL 270 SF CV ISOLATION VALVE ASSEMBLY DETAIL	
REV	DATE	DESCRIPTION	DATE
01	08/22/2008	REVISED TO ADD BUSHING	
02	08/22/2008	REVISED TO ADD BUSHING	
PART NO. 270		INSURANCE	
Q. Part of 441 General Wiring Schematics DWG. NO. 153		SCALE: N/A SIZE: 11" x 17"	SHEET: 1 OF 1 PLOT NO: P1.079

Drawings Model 270SF



		1401 General Fitting Schematics REV. DATE DESCRIPTION DWG. # 270	
3800 Corporate Drive, Aurora, CO, 80014-3001 MODEL 270 SFC F PART NO. 270		DATE 06/23/2008 DRAWN BY R. Vines CHECKED BY G. Evans	
FOR INSTRUMENT		SHEET 6 OF 7 DRAWING NO. F1 019	

Drawings Model 270SF



SPARE PARTS LIST

QTY	DESCRIPTION	U.A.I. P/N
1	KNOB ORRING W/IN	4804-0016
2	FILTER ORRING W/IN	4804-0015
1	CHECK VALVE	4855-0148
1	SOLENOID VALVE (15V)	4855-0002
1	SOLENOID VALVE (24V)	4855-0005
1	TIMER CARD (15V)	3800-0009
1	TIMER CARD (24V)	5110-0015
1	7-ACCUMULATOR	4956-0007

CONFIGURATION OPTIONS

OPTION	DESCRIPTION	DWG.
ZPH	Z-PURGE HORIZONTAL	P1218
ZPV	Z-PURGE VERTICAL	P1376
NH3	AMMONIA CONVERTER	P1412
HPA RTD	TERMINALS FOR HEATED PROBE ASSEMBLY	
HPA KIT		
PTSV	EXTENDED LENGTH PROBE	P1445
	TUBE SUPPORT	
	x= LENGTH (1 - 5FT.)	
	y= MATERIAL (S= 316SS)	
	(C= 3276)	
	(I= 310SS)	

EPICOR CONFIGURATOR
CONTROLLED DOCUMENT

UNIVERSAL ANALYZERS INC.
1701 South Main Street
Cedar City, Nevada 89706 USA

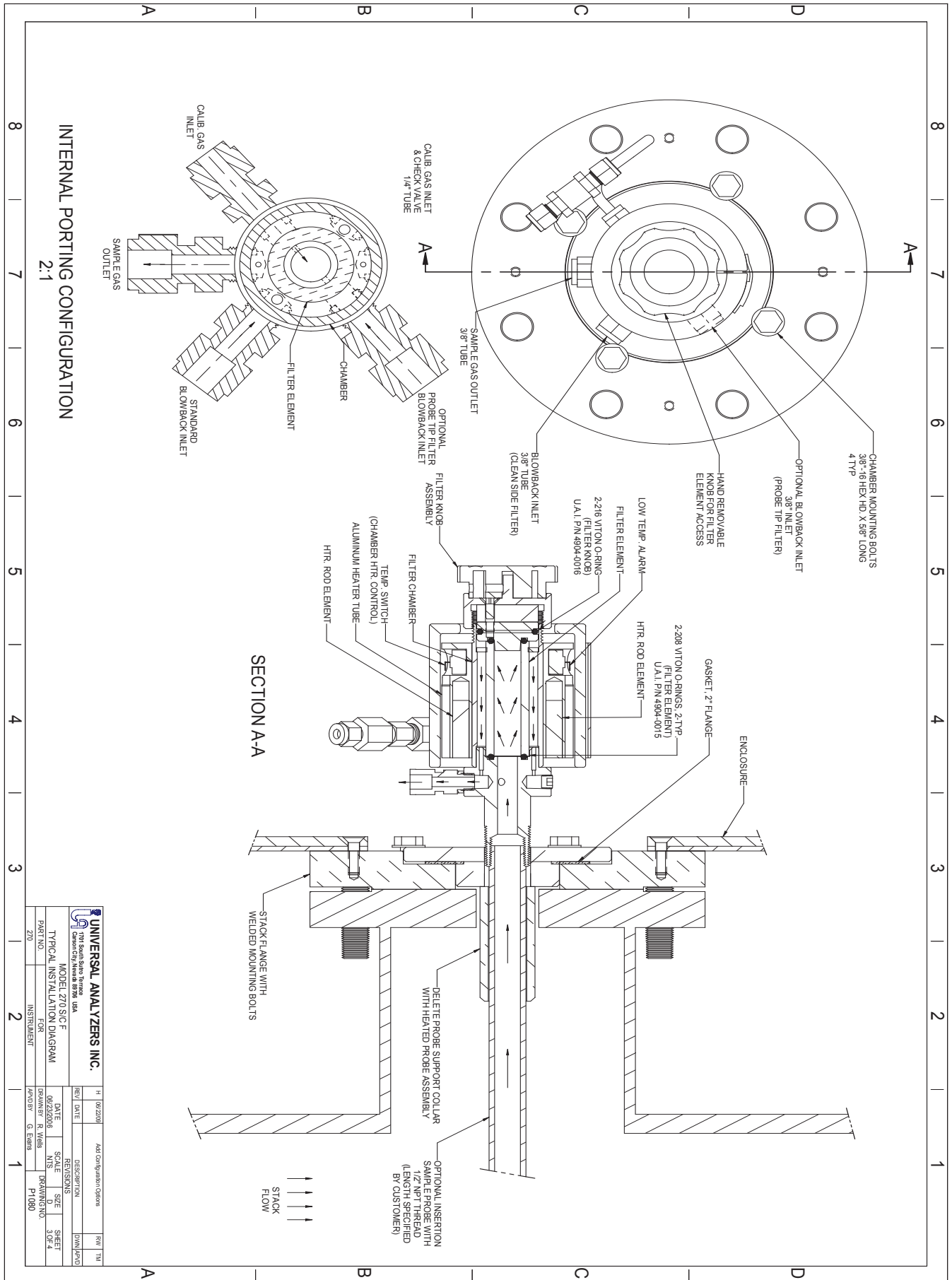
MODEL 270 S/C F-8BT FG/SS
LAYOUT AND WIRING SCHEMATIC

PART NO. 270
FOR INSTRUMENT P1090

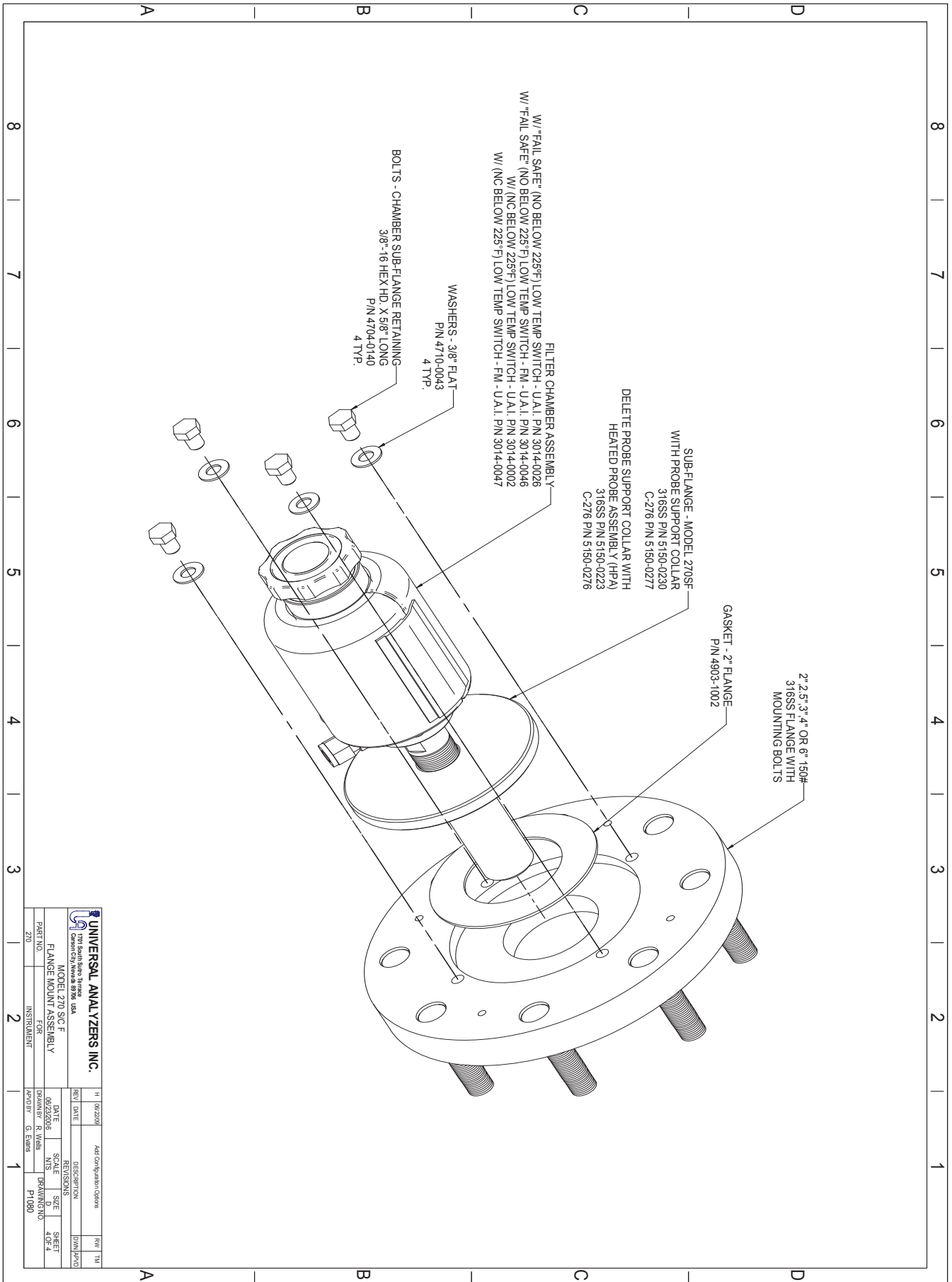
REV. DATE	DESCRIPTION	BY	DATE
06/23/00	0	R. VIKES	
06/23/00	1	G. EBERS	

DRWING NO. P1090

Drawings Model 270SF

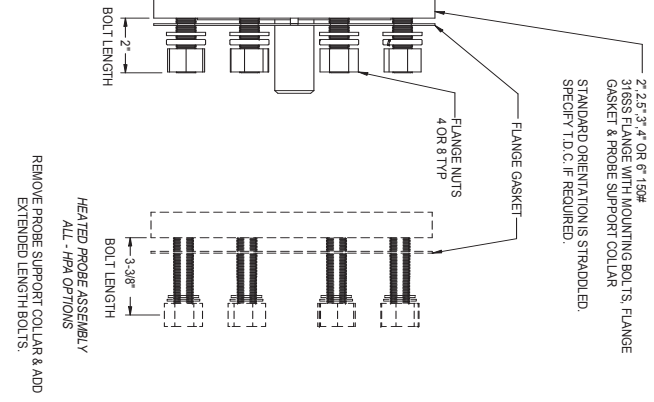
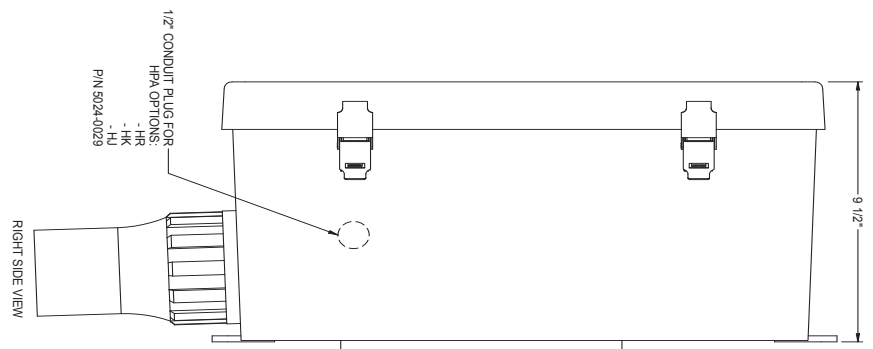
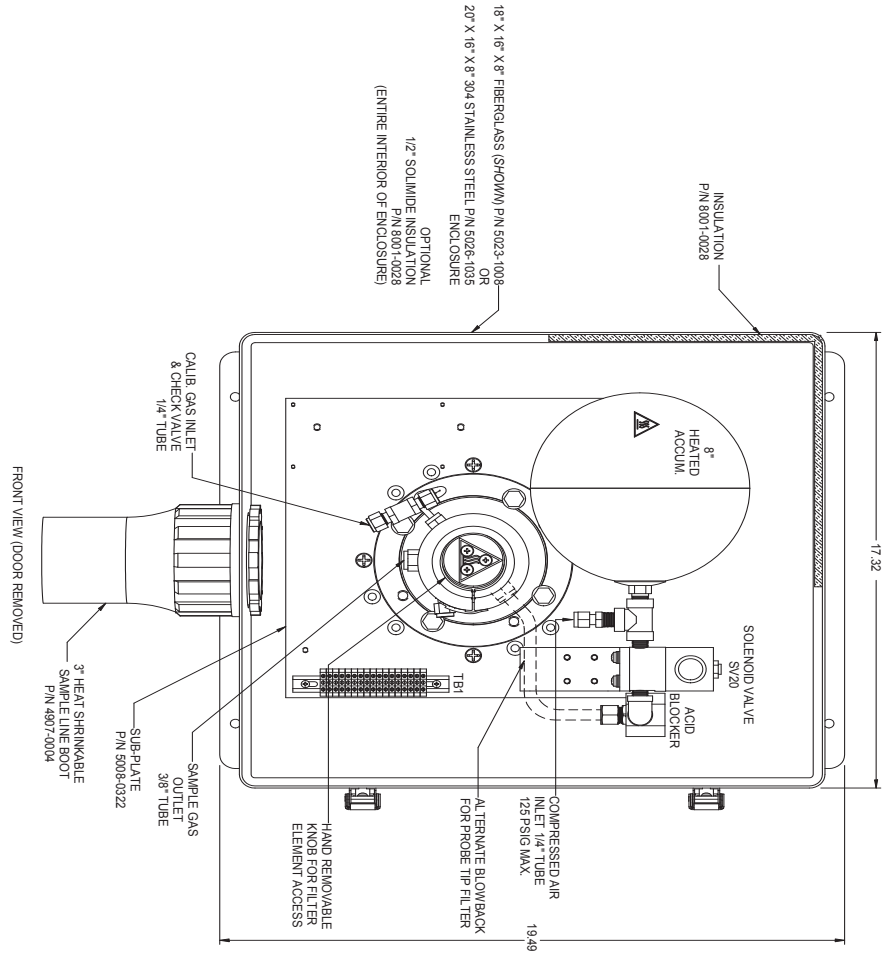


Drawings Model 270SF



UNIVERSAL ANALYZERS INC. 1711 South Main, Torrance Carson City, Nevada 89706 USA		REV	H	10/22/01	Add Configuration Options	REV	TM
MODEL 270 SIG F FLANGE MOUNT ASSEMBLY		DATE	08/23/00	SCALE	1:1	DRAWN	AVD
PART NO. 270 INSTRUMENT P1090		DESIGNER	R. Weiss	DRWING NO.	P1090		

Drawings Model 270SF



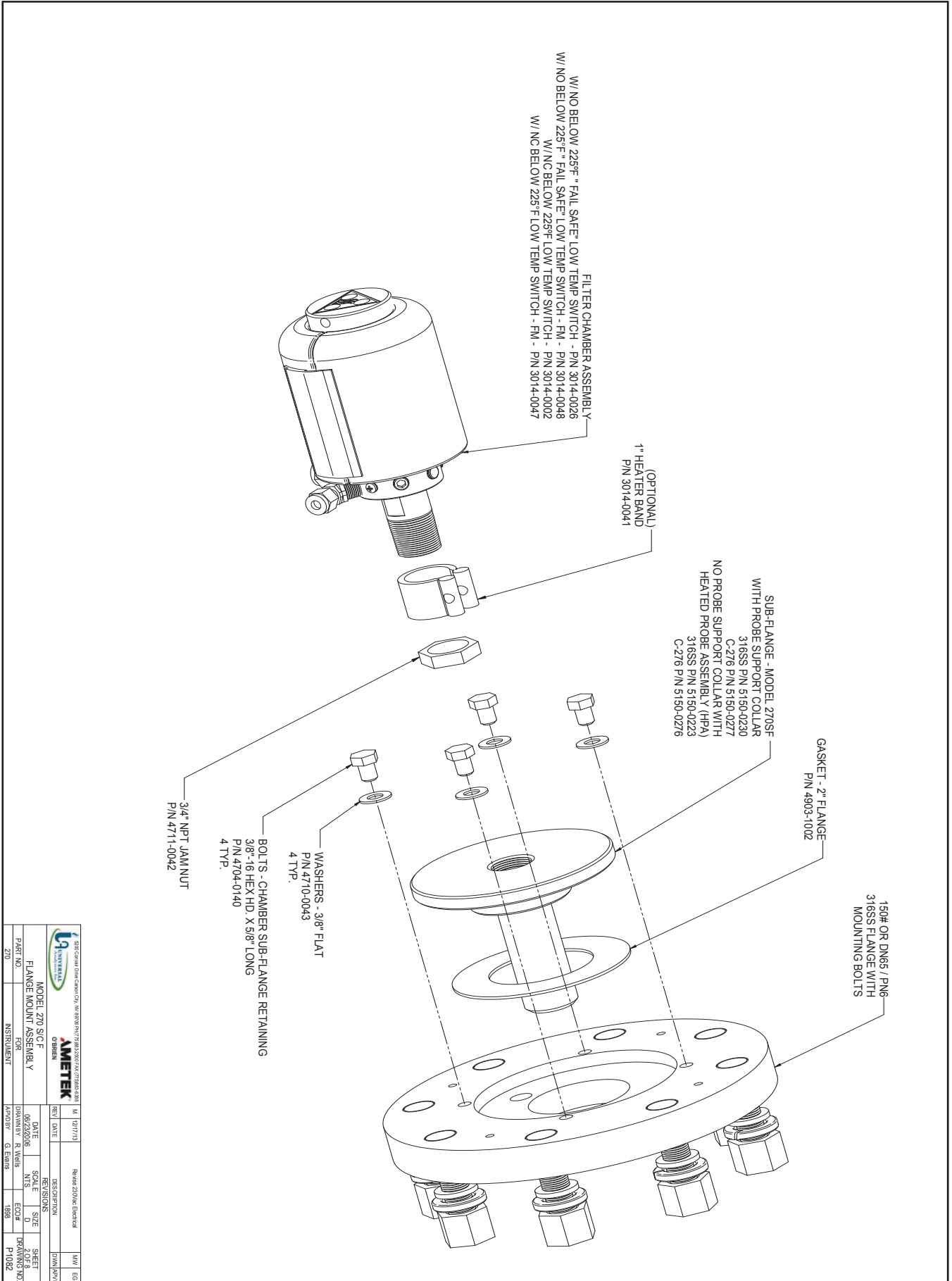
CONFIGURATION OPTIONS		
OPTION	DESCRIPTION	DMG.
-ZPH	Z-PURGE HORIZONTAL	P1218
-ZPV	Z-PURGE VERTICAL	
-NH3	AMMONIA CONVERTER	P1376
-HR	TERMINALS FOR HEATED	P1412
-HJ	PROBE ASSEMBLY	
-HK	EXTENDED LENGTH PROBE	P1445
-Pxy	TUBE SUPPORT (x= LENGTH (1'-5FT.) y= MATERIAL (S= 316SS) (C= C276) (I= 310SS)	

MODEL 270 S/C-F-HBB-F(G)SS(I)
 LAYOUT AND DIMENSIONS

REV#	DATE	DESCRIPTION	APP'D
1	10/17/10	REVISED DRAWING	

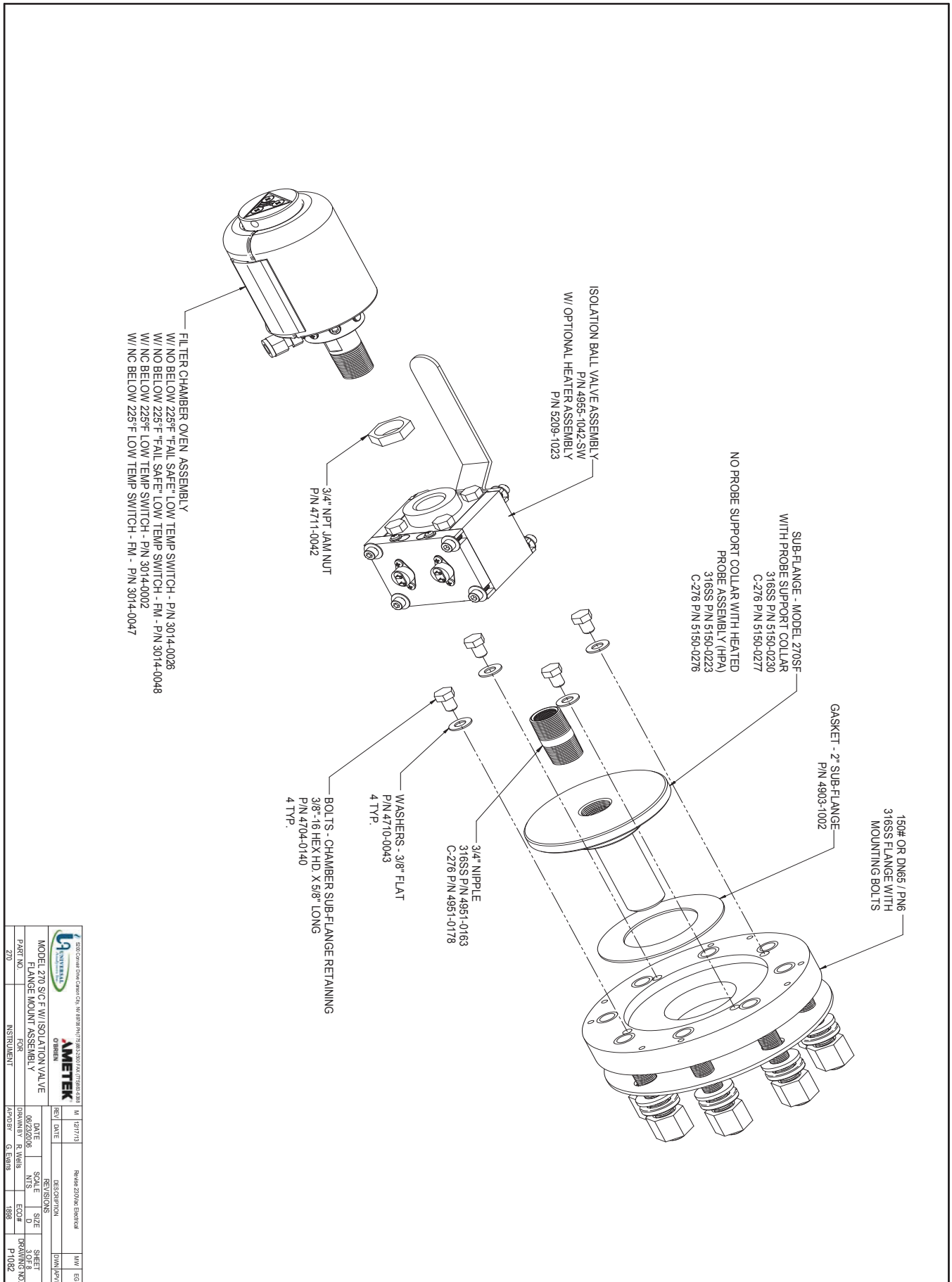
DATE: 06/22/06
 DRAWN BY: R. Weis
 CHECKED BY: G. Evans
 INSTRUMENT NO: 270

Drawings Model 270SF

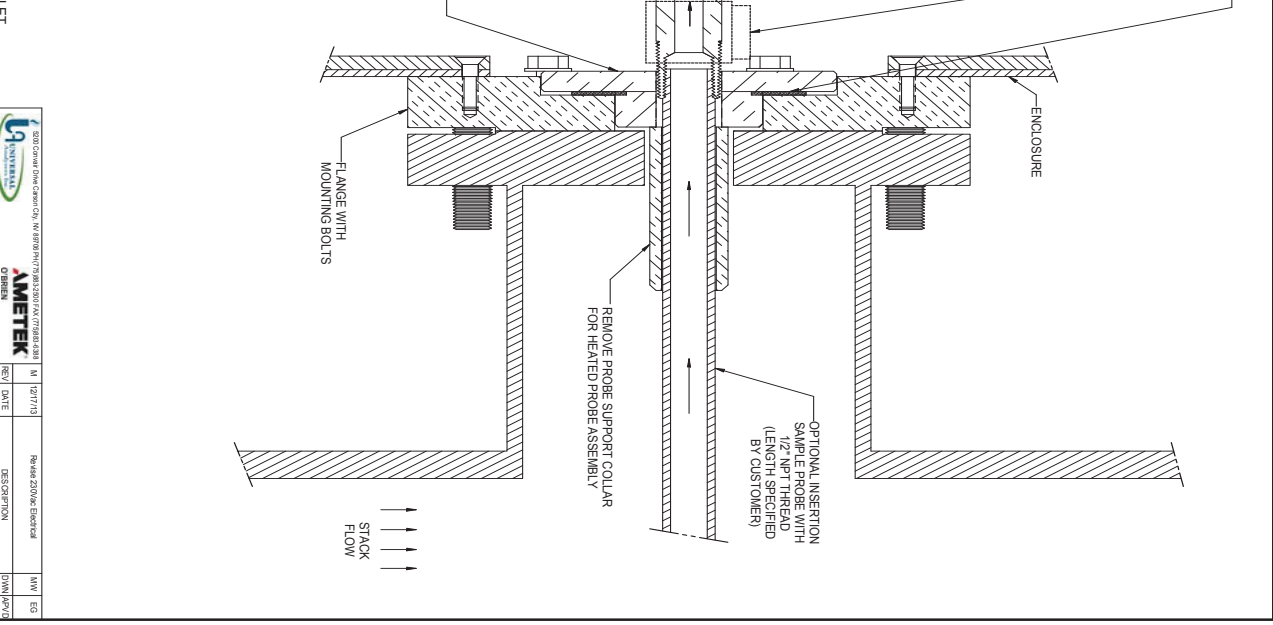
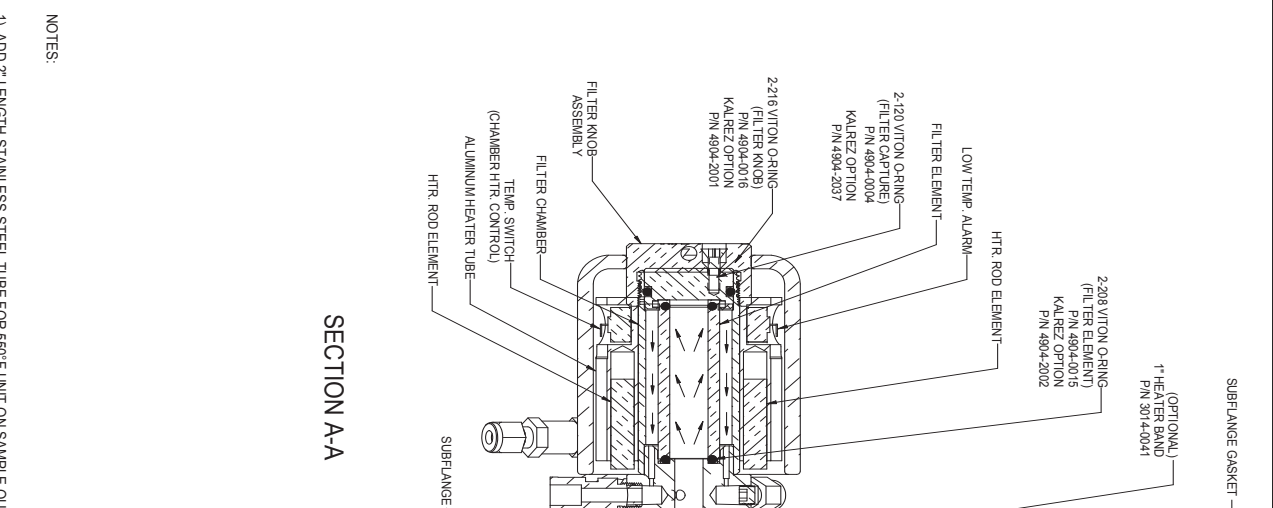
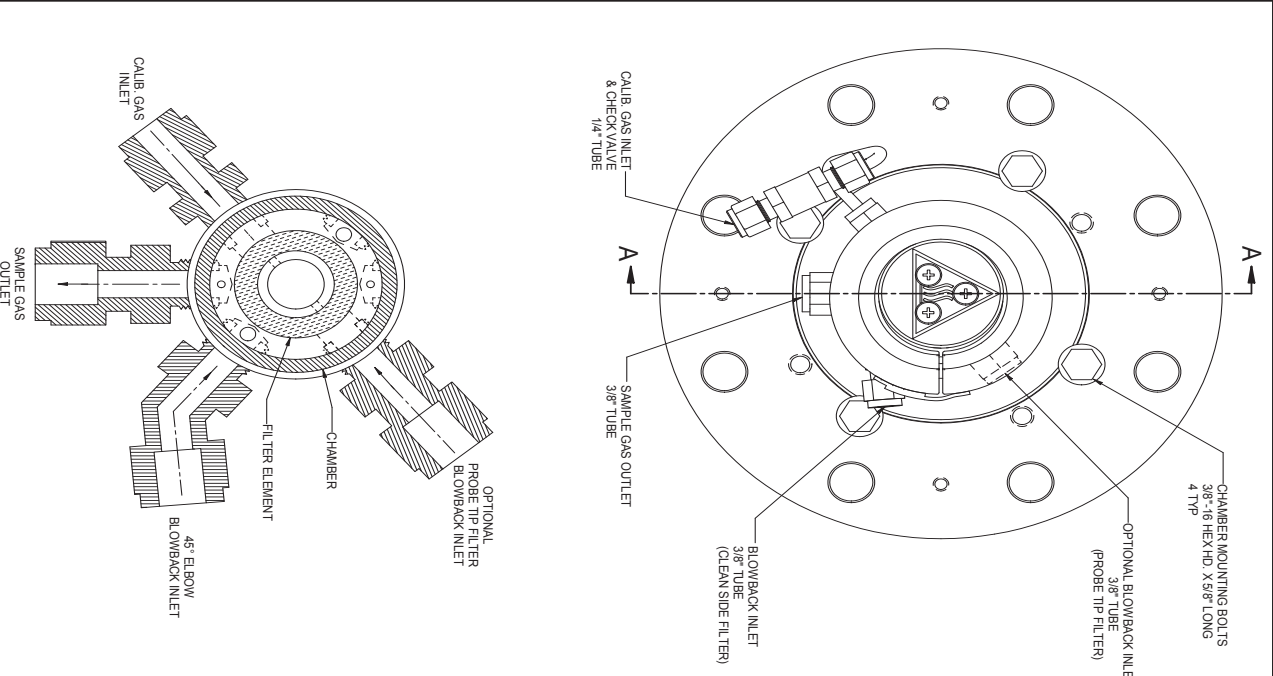


		REV. DATE 1 12/17/15		REV. DATE 1 12/17/15	
MODEL 270 S/C F FLANGE MOUNT ASSEMBLY		DATE 06/20/15		SCALE NTS	
PART NO. Z70		INSTRUMENT INSTRUMENT		SHEET P1082	
DRAWN BY G. Ewins		CHECKED BY R. Vais		DATE 1998	

Drawings Model 270SF



		Model 270SF FLANGE MOUNT ASSEMBLY	
DATE	12/17/13	REV	1
DATE	06/23/06	REV	1
SCALE	NTS	REV	1
SIZE	D	REV	1
SHEET	3 OF 8	REV	1
DRAWING NO.	F102	REV	1
INSTRUMENT FOR		INSTRUMENT	
APPROVED BY: G. EDWARDS		APPROVED BY: G. EDWARDS	

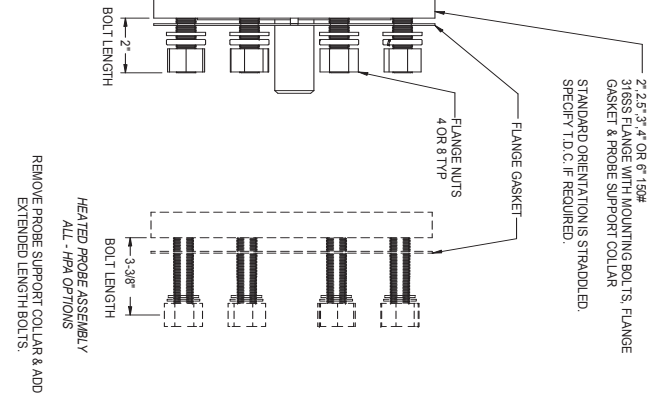
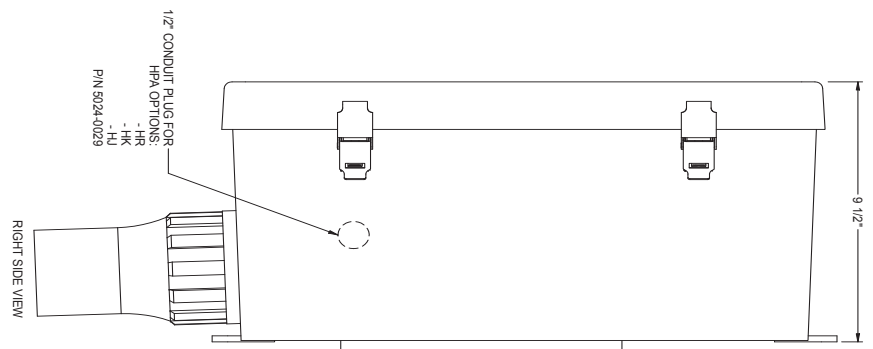
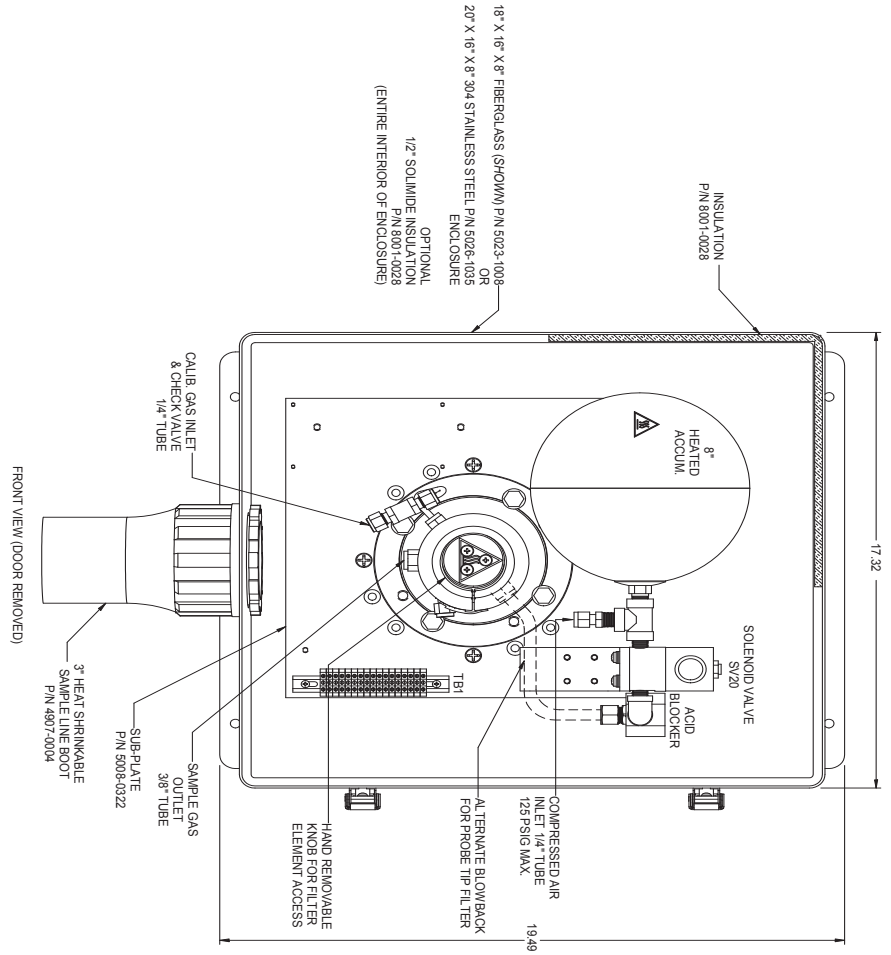


NOTES:


1). ADD 2" LENGTH STAINLESS STEEL TUBE FOR 550-F UNIT ON SAMPLE OUTLET.

MODEL 270 SF-T TYPICAL INSTALLATION DIAGRAM FOR INSTRUMENT			
PART NO.	270	DATE	12/17/15
REV		REVISED BY	
DATE	06/23/2006	SCALE	1:1
REV		SIZE	D
ECO#		SHEET	1 OF 8
APPROVER	G. EARL	DATE	06/23/06
DESIGNER		BY	
DATE	12/17/15	BY	
SCALE	1:1	BY	
SIZE	D	BY	
SHEET	1 OF 8	BY	
DATE	06/23/06	BY	
BY		BY	
BY		BY	

Drawings Model 270SF



CONFIGURATION OPTIONS		
OPTION	DESCRIPTION	DMG.
-ZPH	Z-PURGE HORIZONTAL	P1218
-ZPV	Z-PURGE VERTICAL	
-NH3	AMMONIA CONVERTER	P1376
-HR	TERMINALS FOR HEATED	P1412
-HJ	PROBE ASSEMBLY	
-HK	EXTENDED LENGTH PROBE	P1445
-Pxy	TUBE SUPPORT (x= LENGTH (1'-9FT.) y= MATERIAL (S= 316SS) (C= C276) (I= 310SS)	

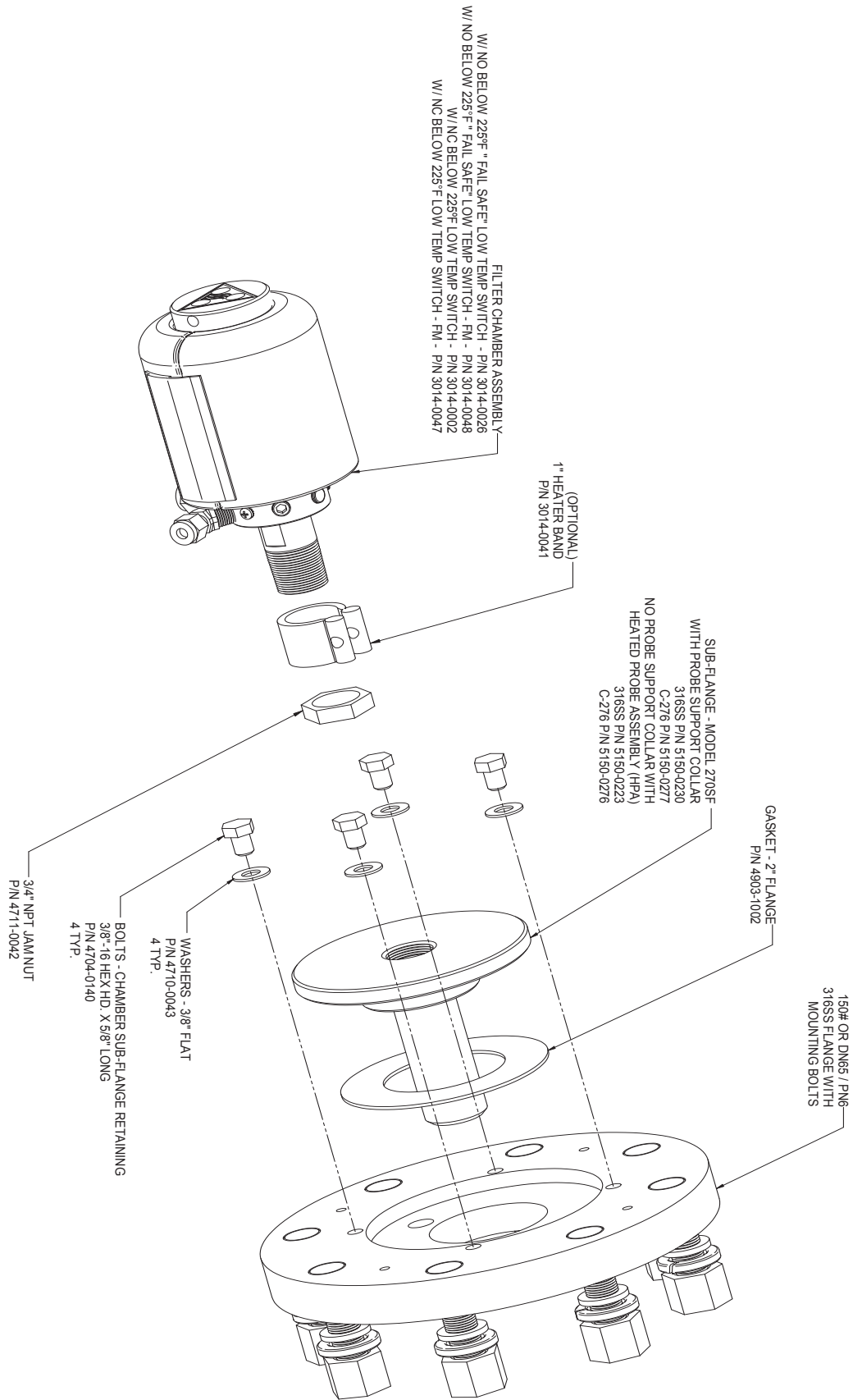



3030 Central Expressway, Channahon, IL 61515
 MODEL 270 S/C-F-HBB-F(G)SS(I)
 LAYOUT AND DIMENSIONS
 PART NO. 270 INSTRUMENT

REV#	DATE	DESCRIPTION	REV#	DATE	DESCRIPTION
1	10/17/10	Rev'd 270/Rev'd			
	06/22/06				

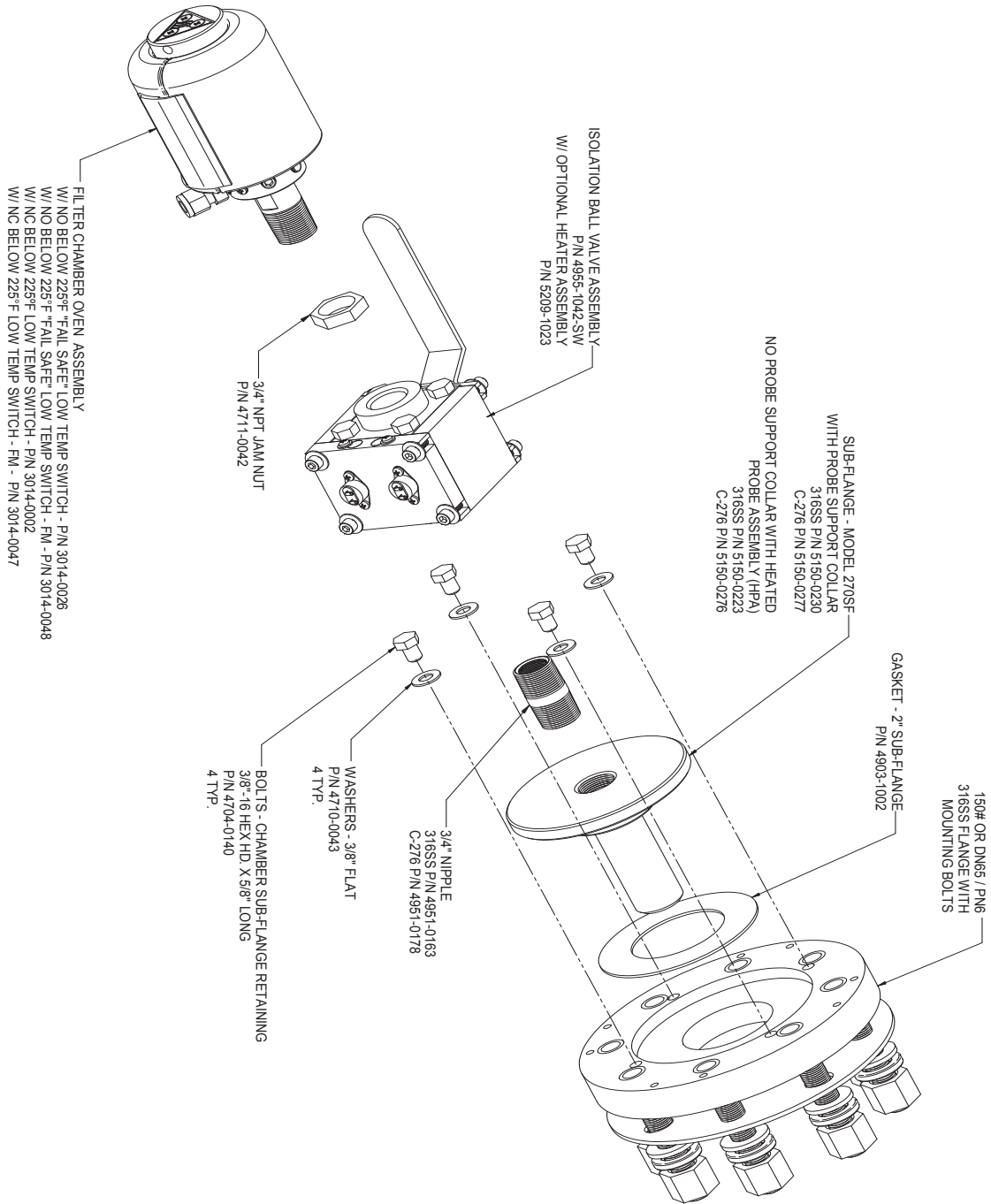
DRAWING NO. P1082
 SHEET 1 OF 8
 DATE 10/17/10
 DRAWN BY R. WEIS
 CHECKED G. EHRHART

Drawings Model 270SF



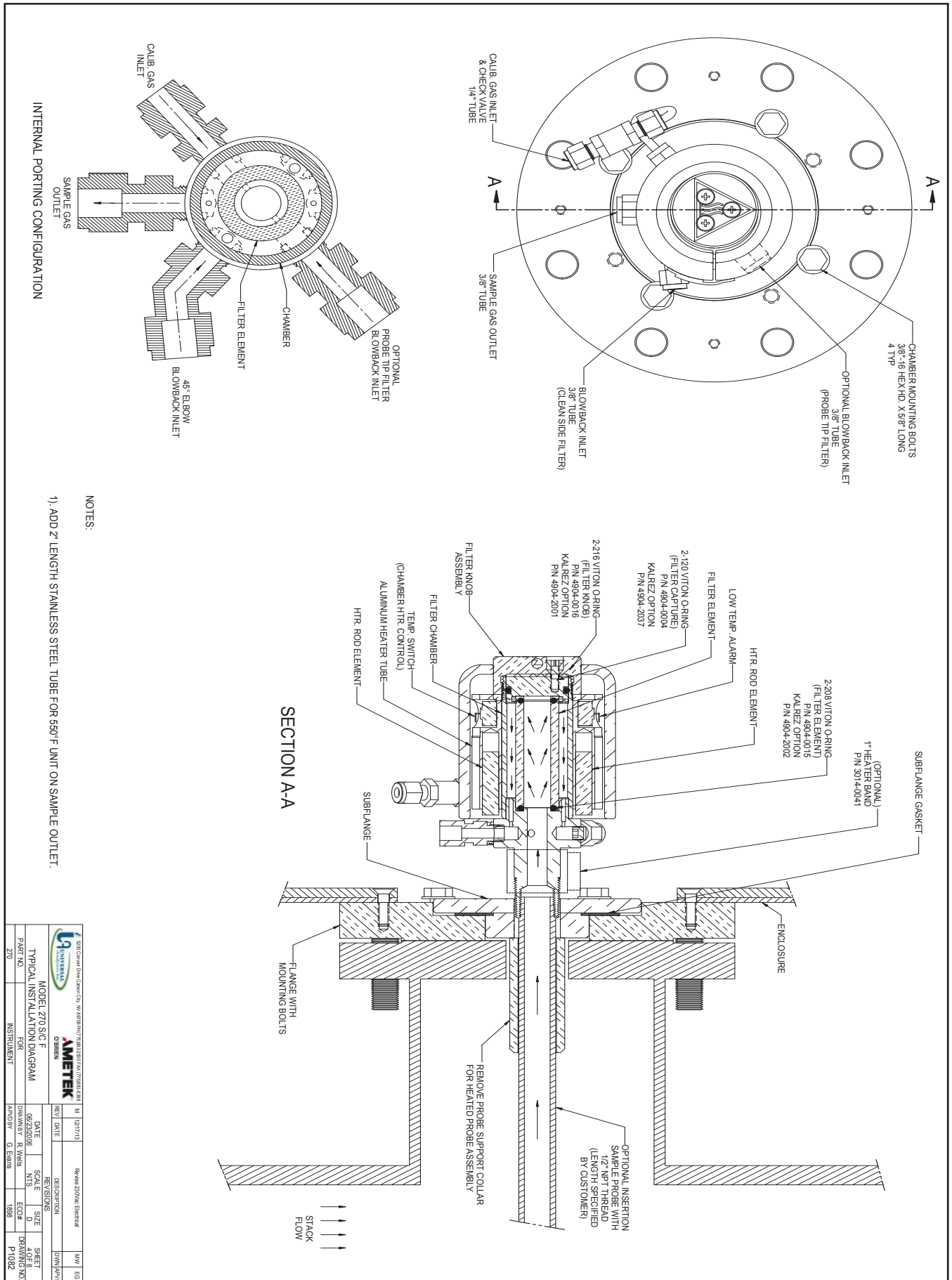
		MODEL 270 SF F FLANGE MOUNT ASSEMBLY	
PART NO. 270		INSTRUMENT FOR	
DATE 06/23/06	SCALE NTS	SIZE D	SHEET 2 OF 8
DRAWN BY R. WELLS	ECO# 1888	APPROVED BY G. EDWARDS	DATE 12/17/13
REV. DATE _____	DESCRIPTION _____	DRAWN BY _____	DATE _____

Drawings Model 270SF

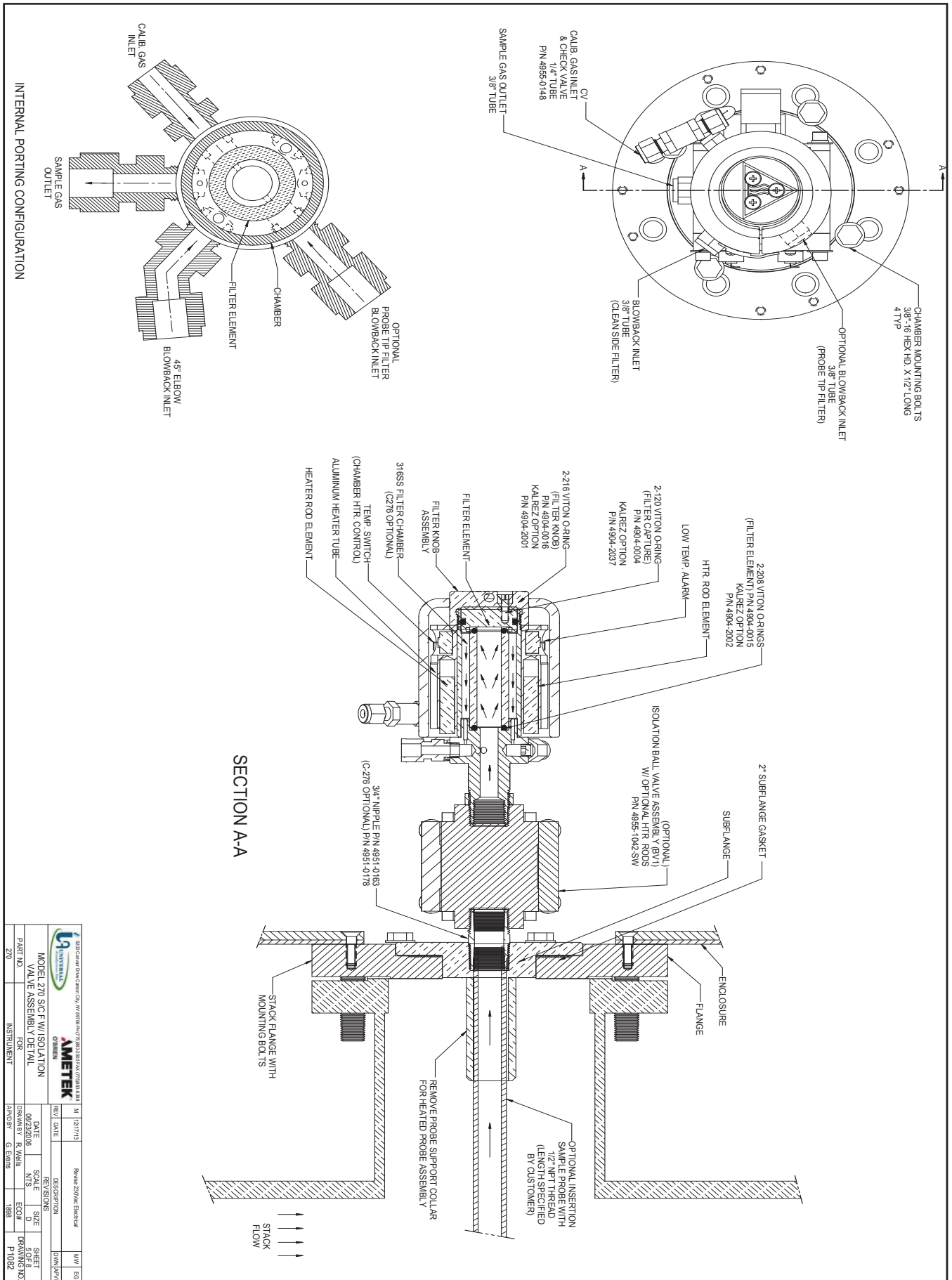


		REVISIONS DATE BY DESCRIPTION	
MODEL 270 S/C F W/ ISOLATION VALVE FLANGE MOUNT ASSEMBLY		DATE: 06/22/2006 DRAWN BY: R. Wells CHECKED BY: G. Evans	
PART NO: Z70		INSTRUMENT	
DRAWING NO: P1082		SHEET: 3 OF 8	

Drawings Model 270SF

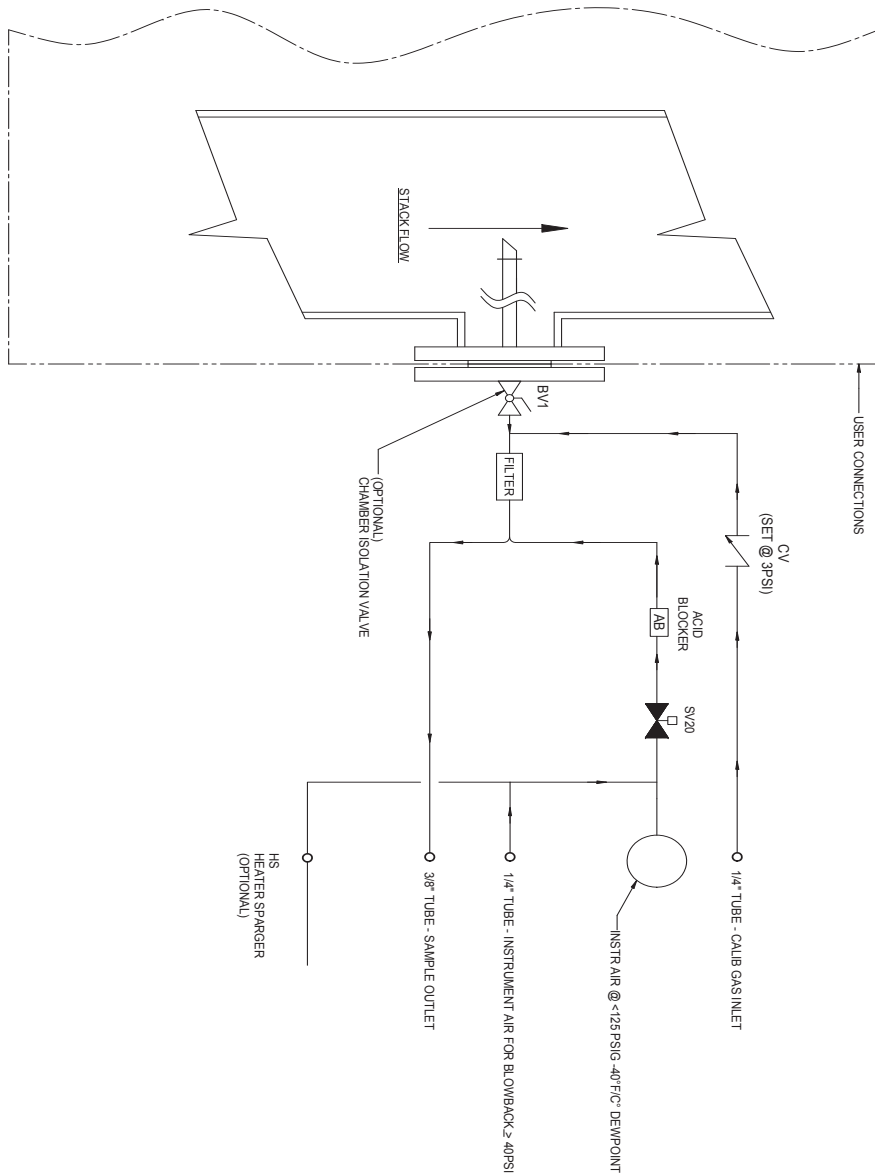


Drawings Model 270SF



		MODEL 270 S/C F W/ ISOLATION VALVE ASSEMBLY DETAIL	
PART NO.	270	FOR INSTRUMENT	
DATE	06/20/06	SCALE	1:1
DESIGNER	R. WILS	SIZE	A
APP'D BY	G. EARNS	ECONOMY	
REV#	1	DATE	10/17/15
REV#	2	DATE	
REV#	3	DATE	
REV#	4	DATE	
REV#	5	DATE	
REV#	6	DATE	
REV#	7	DATE	
REV#	8	DATE	
REV#	9	DATE	
REV#	10	DATE	
REV#	11	DATE	
REV#	12	DATE	
REV#	13	DATE	
REV#	14	DATE	
REV#	15	DATE	
REV#	16	DATE	
REV#	17	DATE	
REV#	18	DATE	
REV#	19	DATE	
REV#	20	DATE	

Drawings Model 270SF



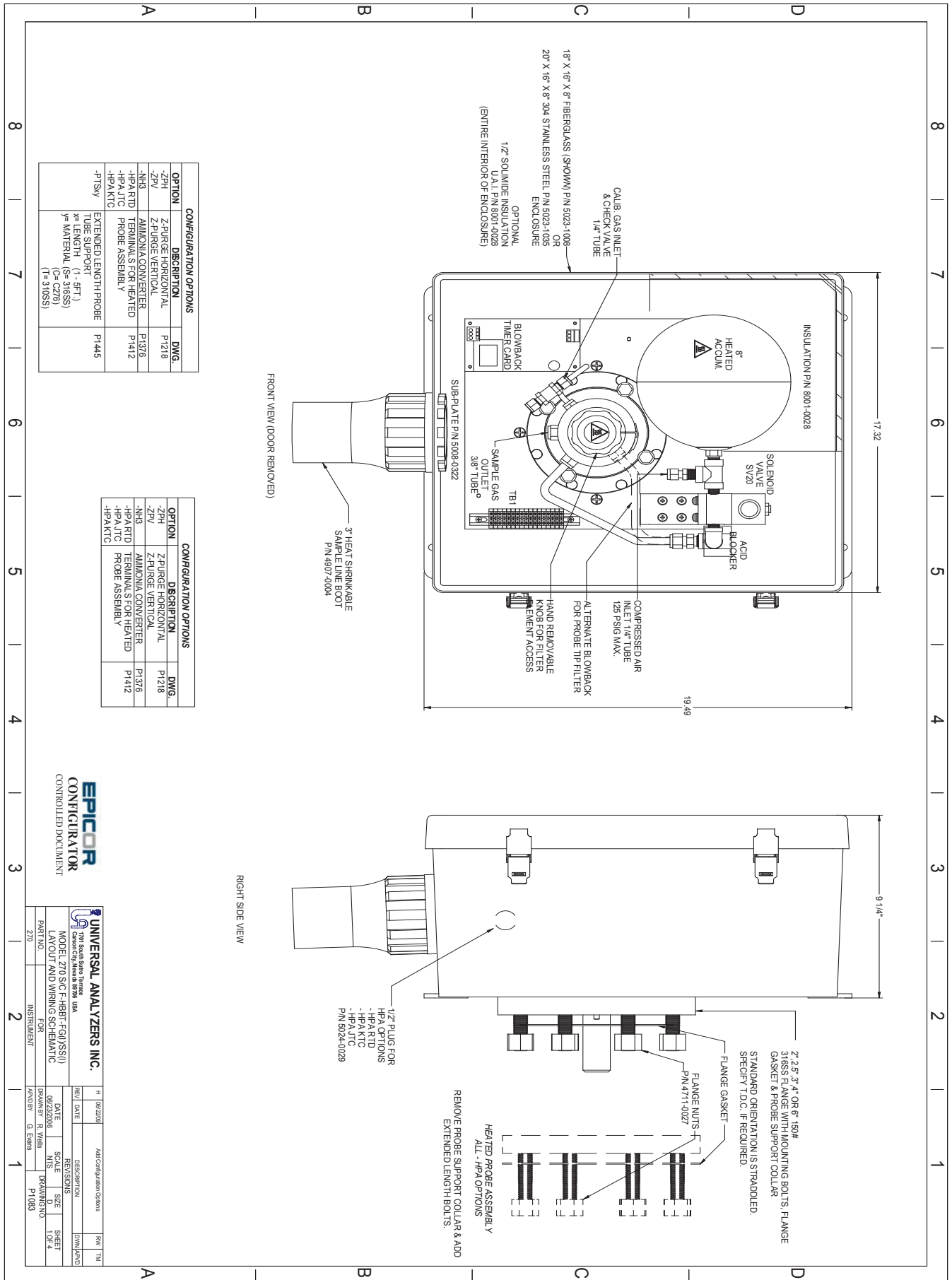
LEGEND



TUBING BY OTHERS

5000 Central Express Drive, Channahon, IL 61018 815-422-0000		12017113	
MODEL 270 SFC F PAID		REVISIONS	
FOR INSTRUMENT		DATE 08/20/06 BY R. Weiss APPROVED G. Evans	
PART NO. Z70		REVISIONS SIZE SHEET OF 8 DRAWING NO. P1082	
INSTRUMENT		REV. DATE N 12/17/13	
INSTRUMENT		DESCRIPTION Reval 270M Rev'd	
INSTRUMENT		DWG/REV EGS	

Drawings Model 270SF



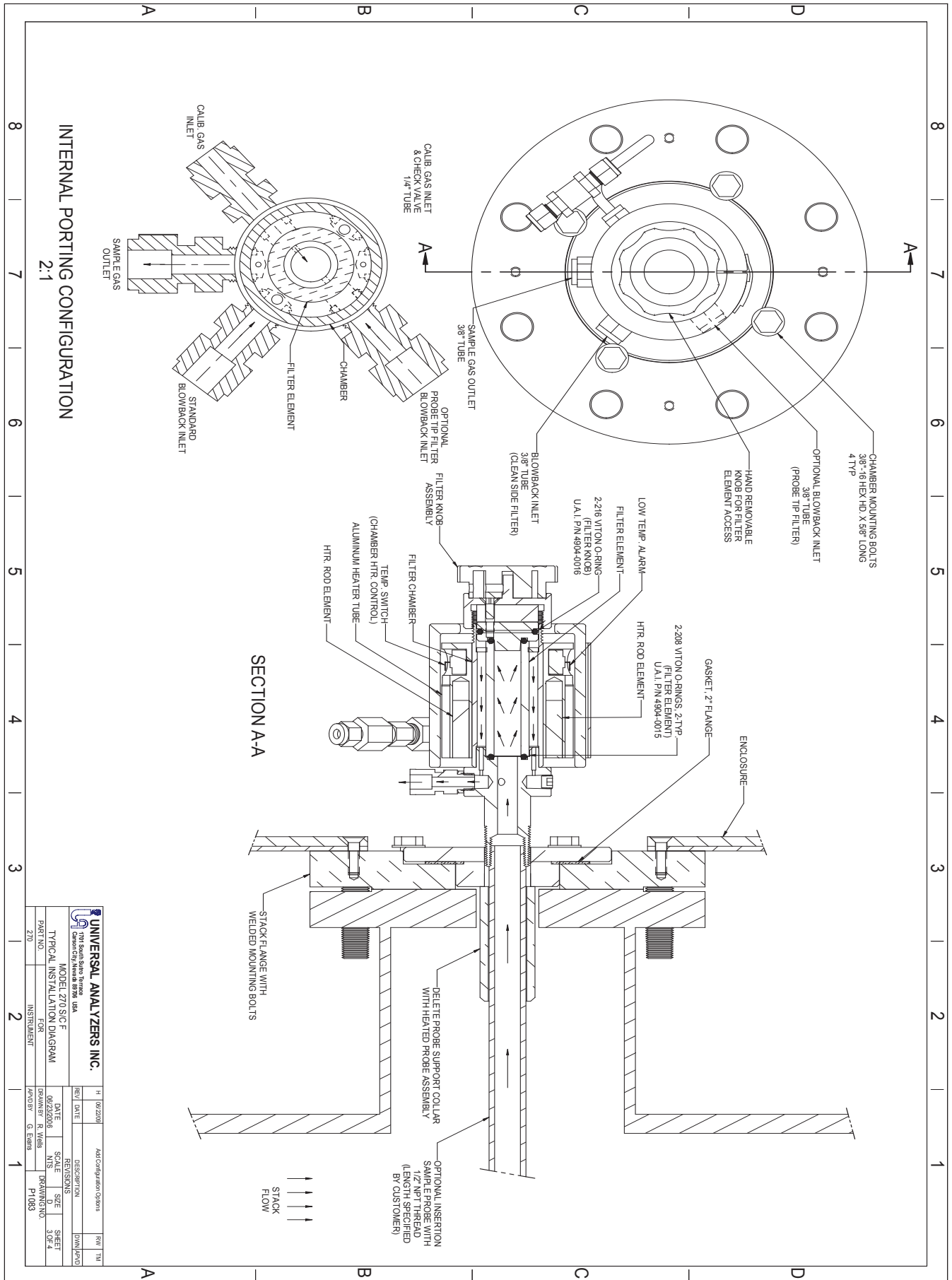
CONFIGURATION OPTIONS		
OPTION	DESCRIPTION	DWG.
-ZPH	Z-PURGE HORIZONTAL	P1218
-ZPV	Z-PURGE VERTICAL	P1218
-NH3	AMMONIA CONVERTER TERMINALS FOR HEATED PROBE ASSEMBLY	P1376
-HPA RTD	TERMINALS FOR HEATED PROBE ASSEMBLY	P1412
-HPA JTC	TERMINALS FOR HEATED PROBE ASSEMBLY	P1412
-HPA KTC	TERMINALS FOR HEATED PROBE ASSEMBLY	P1412
-PT3xy	EXTENDED LENGTH PROBE TUBE SUPPORT (1 - 5FT.) Y= MATERIAL (S= 316SS) (C= 0216) (I= 310SS)	P1445

CONFIGURATION OPTIONS		
OPTION	DESCRIPTION	DWG.
-ZPH	Z-PURGE HORIZONTAL	P1218
-ZPV	Z-PURGE VERTICAL	P1218
-NH3	AMMONIA CONVERTER TERMINALS FOR HEATED PROBE ASSEMBLY	P1376
-HPA RTD	TERMINALS FOR HEATED PROBE ASSEMBLY	P1412
-HPA JTC	TERMINALS FOR HEATED PROBE ASSEMBLY	P1412
-HPA KTC	TERMINALS FOR HEATED PROBE ASSEMBLY	P1412

EPICOR
CONFIGURATOR
 CONTROLLED DOCUMENT

UNIVERSAL ANALYZERS INC. 1711 South 14th Street Cedar Rapids, Iowa 52402 USA		REV	DATE	DESCRIPTION	REV	DATE
MODEL 270 S/C F-HBRT-FG(I)/SSI LAYOUT AND WIRING SCHEMATIC		DATE	06/23/2016	REVISIONS	DATE	DESCRIPTION
PART NO.	270	BY	R. Vials	NO.	1	OF 4
FOR INSTRUMENT	270	APPROV	G. Ewers	NO.	1	OF 4
INSTRUMENT P1083		DATE	06/23/2016	NO.	1	OF 4

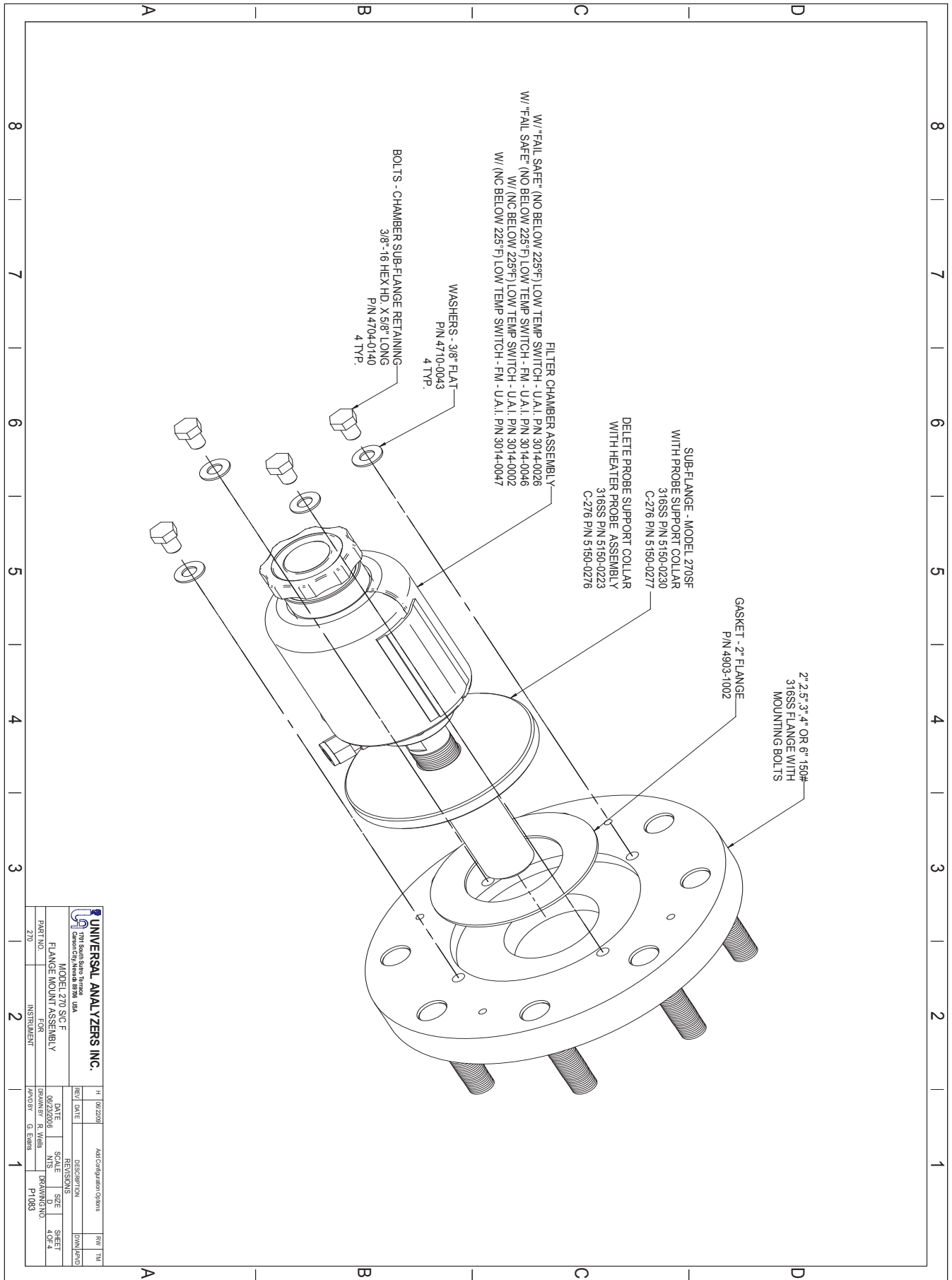
Drawings Model 270SF

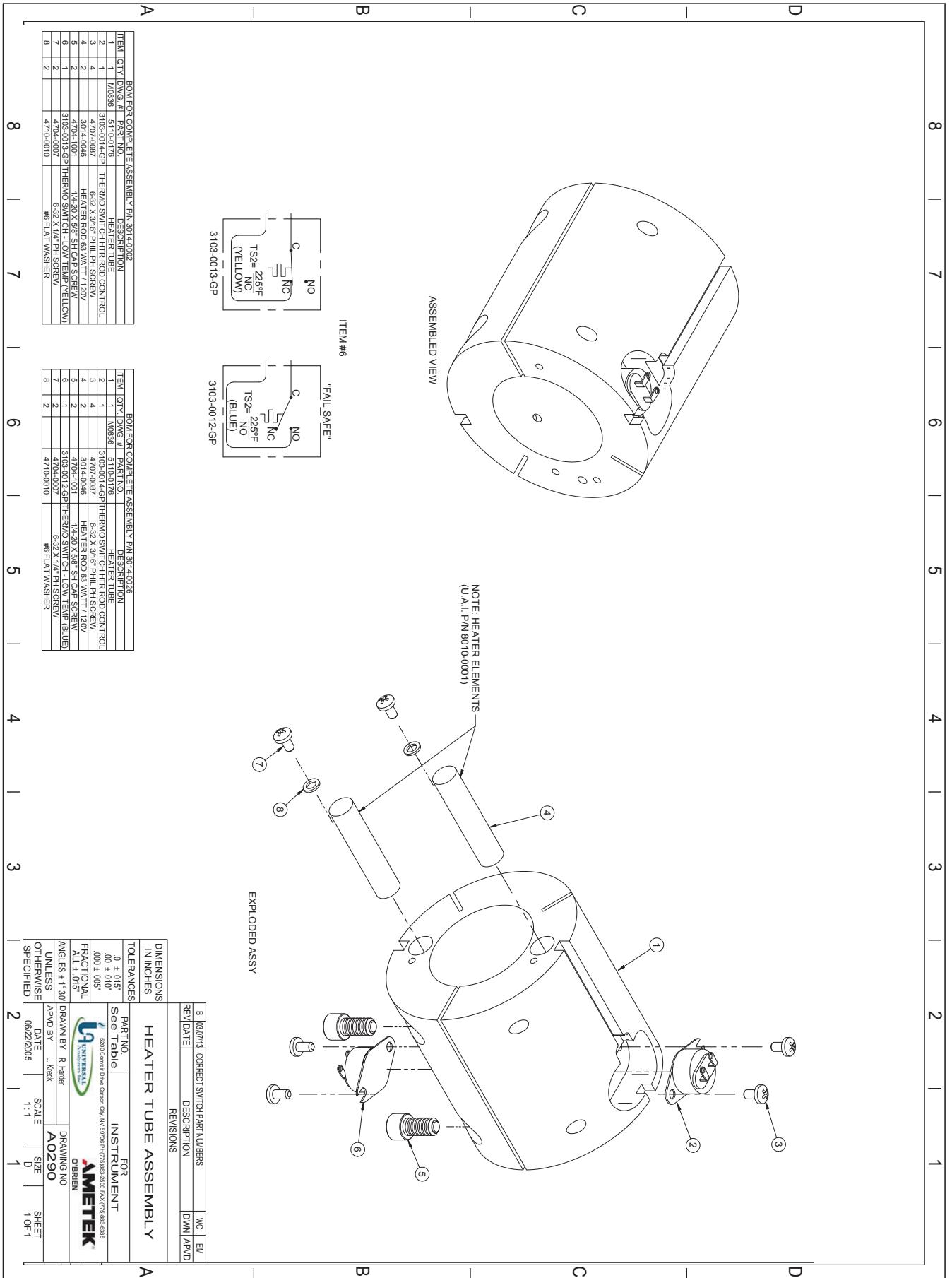


INTERNAL PORTING CONFIGURATION 2:1

UNIVERSAL ANALYZERS INC.		REV. DATE		REV. DATE	
1711 South Main, Springdale, AR 72762 USA		H 10/22/01		H 10/22/01	
MODEL 270 S/C/F		DATE		DESCRIPTION	
TYPICAL INSTALLATION DIAGRAM		06/23/06		REVISIONS	
FOR		DRAWN BY		SIZE	
INSTRUMENT		R. VINES		D	
270		APPROV. BY		SHEET	
		G. EBERS		3 OF 4	
		P1033		DRAWING NO.	
				P1033	

Drawings Model 270SF





Limited Warranty

I. Limited Warranty

1. Limited Warranty. Universal Analyzers, Inc (UAI) offers a limited warranty on each of its products against failure due to defects in material and workmanship for a period ending the earlier of (i) fifteen (15) months from the date of the invoice relating to the sale of the product and (ii) twelve (12) months from the date of installation of the product (collectively, the "Initial Warranty"). During the Initial Warranty, UAI offers a limited warranty against failure due to defects in material and workmanship on each part of a product repaired or replaced by an authorized service person for a period ending the later of (a) the remaining term of the Initial Warranty of the product and (b) ninety (90) days from the date of such repair or replacement. After expiration of the Initial Warranty, UAI offers a limited warranty against failure due to defects in material and workmanship on each part of a product repaired or replaced by an authorized service person for a period ending ninety (90) days from the date of such repair or replacement. UAI further offers a limited warranty that the products and parts it sells will conform to UAI's written specifications therefor. The foregoing limited warranties cover parts and labor only and UAI does not warrant and will not reimburse the buyer of its products ("Buyer") for any costs relating to the access by service persons of UAI to the product at issue. The foregoing limited warranties cover only the repair or replacement of defective parts and such determination will be in the sole discretion of UAI. In its sole discretion, UAI may make repairs or replacements under these limited warranties with either new or refurbished parts. To the extent Buyer's product cannot be remedied under these limited warranties through repair or replacement of parts, Buyer may return the product for a refund of the purchase price, less a reasonable reduction in such purchase price equal to the depreciation expense incurred by Buyer relating to such product. The limited warranties of this Section I.1. are further subject to those warranty exclusions set forth below in Section I.2.

2. Limited Warranty Exclusions. Excluding the warranties provided for in Section I.1., UAI provides all products to Buyer "as-is," without any other warranty of any kind. UAI disclaims any and all express or implied warranties of merchantability, fitness for a particular purpose and non-infringement of the intellectual property of others. UAI makes no warranty, express or implied, as to the design, sale, installation or use of its products. UAI's warranties will not be enlarged by, nor will any obligation or liability of UAI arise due to UAI providing technical advice, facilities or service in connection with any product. There is no warranty by UAI with respect to any product's: (i) uninterrupted or error-free operation; (ii) actual performance, other than the product's capability to meet UAI's specifications therefor; (iii) removal or installation from a worksite or process; (iv) electronic components or associated accessories (including without limitation circuit boards and integrated circuits); (v) maintenance (including without limitation gasket and seal replacements, adjustments, minor repairs and other inspection requirements, preventative or otherwise); (vi) use under inappropriate conditions or not in accordance with operating instructions; or (vii) use in connection with the operation of a nuclear facility. There is no warranty for labor expenses associated with field repairs or the repair or replacement of defective parts in the engine or power unit of any product if such product has been in the possession of the owner or operator for greater than twelve (12) months. There is no warranty for products determined to be, in UAI's sole discretion, damaged as a result of (a) misuse, neglect or accident; (b) improper application, installation, storage or use; (c) improper or inadequate maintenance or calibration; (d) operation outside of the published environmental specification; (e) improper site preparation or maintenance; (f) unauthorized repairs or replacements; (g) modifications negligently or otherwise improperly made or performed by persons other than UAI; (h) Buyer-supplied software or supplies; (i) use in conjunction with or interfacing with unapproved accessory equipment; (j) use of ABC-style or dry powder fire suppression agents; or (k) leaked sample materials. To the extent a UAI product is used in connection with the operation of a nuclear power facility, Buyer agrees to indemnify and hold UAI harmless from any and all actions, claims, suits, damages and expenses arising from such use. UAI provides no warranty on the oral representations made by its personnel while they are attempting to assist Buyer in the operation of a product. This Standard Limited Warranty does not apply to items consumed by the products during their ordinary use, including but not limited to fuses, batteries, paper, septa, fittings, screws, fuses, pyrolysis, dryer or scrubber tubes, sample boats, furnaces or UV lamps.

3. Non-UAI Products. UAI does not in any way warrant products it does not manufacture except to the extent the warranty of the manufacturer of the product at issue passes through or is otherwise assigned to UAI. If a manufacturer warranty is so assigned to UAI, UAI will only be bound to comply with the length of time associated with such warranty. All other terms of such warranty will be governed by this Standard Limited Warranty and UAI's General Terms and Conditions incorporated herein by reference.

Limited Warranty

4. Expenses on Non-Warranty Work. All repairs or replacements by UAI after the expiration of any applicable limited warranty period will be performed in accordance with UAI's standard rate for parts and labor. Further, if upon UAI's inspection and review, UAI determines the condition of the products is not caused by a defect in UAI's material and workmanship, but is the result of some other condition, including but not limited to damage caused by any of the events or conditions set forth in Section I.2., Buyer shall be liable for all direct expenses incurred by UAI to conduct the inspection and review of the product.

5. Exclusive Remedy. The foregoing limited warranty constitutes Buyer's exclusive remedy with respect to products sold by UAI and UAI's liability shall be exclusively limited to the written limited warranty specified herein. No employee, representative or agent of UAI is authorized to either expressly or impliedly modify, extend, alter or change any of the limited warranties expressed herein to Buyer.

6. Procedure and Costs. All limited warranty claims must be made in writing promptly following discovery of any defect. Buyer must hold defective products for inspection by UAI. If requested by UAI, Buyer must send the product to UAI for inspection. Any such returns by Buyer will be at Buyer's expense and Buyer will remain liable for any loss of or damage to the product during such product's transportation to UAI. No products will be sent to UAI for inspection unless UAI has authorized Buyer to do so.

7. Terms and Conditions. UAI's General Terms and Conditions are incorporated herein by reference and Buyer accordingly agrees to be bound by the terms thereof.

II. Limitations on UAI Liability

1. In General. Buyer agrees UAI shall not be liable for any direct, indirect, incidental, punitive or consequential damages, including lost profits, lost savings or loss of use, whether Buyer's claim is based in contract, tort, warranty, strict liability or otherwise, which Buyer may suffer for any reason, including reasons attributable to UAI. Buyer agrees these limitations on UAI's liability are reasonable and reflected in the amounts charged by UAI for its products.

2. Force Majeure. This Standard Limited Warranty does not cover and UAI shall not be liable for either direct or consequential damage caused, either directly or indirectly, as a result of: (i) any act of God, including but not limited to natural disaster, such as floods, earthquakes, or tornadoes; (ii) damages resulting from or under the conditions of strikes or riots, war, damages or improper operation due to intermittent power line voltage, frequency, electrical spikes or surges, unusual shock or electrical damage; or (iii) accident, fire or water damage, neglect, corrosive atmosphere or causes other than ordinary use.

3. Limitation on Warranty Claims. Prior to any obligation of UAI to perform any limited warranty service as set forth herein, Buyer must have: (i) paid all invoices to UAI in full, whether or not they are specifically related to the product at issue; and (ii) notified UAI of the limited warranty claim within sixty (60) days from the date Buyer knew or had reason to know of the defect

