

| 8 |   |         | 7                                    |         |     | 6 |         |                                      | 5        |     |   | 4      |                                                      |          | 3   |     |        | DWG. NO. 430022                                                  |         | SH.      | REV. | T | 1 |  |
|---|---|---------|--------------------------------------|---------|-----|---|---------|--------------------------------------|----------|-----|---|--------|------------------------------------------------------|----------|-----|-----|--------|------------------------------------------------------------------|---------|----------|------|---|---|--|
|   | R | 403.583 | 25S-GO BACK TO 150W HTRS             | 1-16-13 | RDG | K | 97.487  | ADD HTR CA CLAMP TO 10S              | 3-17-08  | RDG | E | 68.243 | UPDATE FOR NRTL-ADD LABELS AND EARTH GROUND HARDWARE | 10-25-06 | RDG | REV | CO #   | DESCRIPTION                                                      | DATE    | APPROVED |      |   |   |  |
|   | S | 402.738 | BOLT HTRS TO BOTTOM OF S PUMP BODIES | 3-08-13 | RDG | L | 116.750 | ADD 10SW, 25SVW AND 1200LX           | 3-30-09  | RDG | F | 80.736 | REMOVED 120 FUSED PLUG (NON-ROHS)                    | 4-30-07  | RDG | A   | 936    | RELEASE                                                          | 9-27-05 | RDG      |      |   |   |  |
|   | T | 436.864 | MOVE S HEATERS TO FLUX PLATE         | 11-4-14 | RDG | M | 122.781 | 800LX USES 4 POWER CORDS             | 9-02-09  | RDG | G | 72.344 | ADDED CA CLAMP DETAIL TO DETAIL B                    | 8-06-07  | RDG | B   | 14.747 | ADD 390746 SLEEVE/CHG JUMPER TO HEAVIER GA WIRE                  | 3-22-06 | RDG      |      |   |   |  |
|   |   |         |                                      |         |     | N | 144.578 | CHG TO 101288 HTR MTG SCREW-LP PUMPS | 10-04-10 | RDG | H | 63.074 | ADDED ITT600LX; ADDED SEM PMP DETAIL                 | 11-07-07 | RDG | C   | 14.635 | ADDED 75S HEATER INFO                                            | 6-29-06 | RDG      |      |   |   |  |
|   |   |         |                                      |         |     | P | 287.115 | 75S- 300W HTRS WERE 200W             | 8-27-12  | RDG | J | 88.016 | ADD 600TV TO CHART; FIX DET B                        | 1-08-08  | RDG | D   | 20.555 | 10S HTR SHROUD WAS INCORRECTLY LISTED AS 320088 ON DETAIL C BOM. | 8/15/06 | MHC      |      |   |   |  |
|   |   |         |                                      |         |     | Q | 402.865 | GENERAL UPDATES;25S/45S WATTS CHG    | 11-20-12 | RDG |   |        |                                                      |          |     |     |        |                                                                  |         |          |      |   |   |  |

## ION PUMP HEATER INSTALLATION CHART

| NOM PUMP SIZE | 120 VAC HTR KIT           | 120 VAC HTR PN   | HTR QTY | MAX AMPS PER PWR CORD  | 240 VAC HTR KIT | 240 VAC HTR PN   | HTR QTY | MAX AMPS PER PWR CORD  | INDIVIDUAL HTR WATTS | HTR INSTALL DETAIL | 390099 TERM BLK QTY | TERM BLK INSTALL DETAIL | TERM BLOCK JUMPER | 370014 CRIMP QTY | POWER CORD QTY | TOTAL WATTS PER POWER CORD | NOTES                               | NOM PUMP SIZE |
|---------------|---------------------------|------------------|---------|---------------------------------------------------------------------------------------------------------|-----------------|------------------|---------|-----------------------------------------------------------------------------------------------------------|----------------------|--------------------|---------------------|-------------------------|-------------------|------------------|----------------|----------------------------|-------------------------------------|---------------|
| 10S/10SW      | 10SW-110                  | 270021           | 1       | 3                                                                                                       | 10SW-220        | 270022           | 1       | 3                                                                                                         | 150                  | DETAIL A           | NONE                | NONE                    | NONE              | 0                | 1              | 150                        | SEE DETAIL C FOR HEATER WIRING      | 10S/10SW      |
| 20S/25S       | 25S-110                   | 270021           | 1       | 3                                                                                                       | 25S-220         | 270022           | 1       | 3                                                                                                         | 150                  | DETAIL B           | NONE                | NONE                    | NONE              | 0                | 1              | 150                        | SEE DETAIL C FOR HEATER WIRING      | 20S/25S       |
| 25SVW         | 25SVW-110                 | 270021           | 1       | 3                                                                                                       | 25SVW-220       | 270022           | 1       | 3                                                                                                         | 150                  | DETAIL A           | NONE                | NONE                    | NONE              | 0                | 1              | 150                        | SEE DETAIL C FOR HEATER WIRING      | 25SVW         |
| 40S           | 45S-110                   | 270020           | 1       | 3                                                                                                       | 45S-220         | 270014           | 1       | 3                                                                                                         | 300                  | DETAIL B           | NONE                | NONE                    | NONE              | 0                | 1              | 300                        | SEE DETAIL C FOR HEATER WIRING      | 40S           |
| 45S           | 45S-110                   | 270020           | 1       | 3                                                                                                       | 45S-220         | 270014           | 1       | 3                                                                                                         | 300                  | DETAIL B           | NONE                | NONE                    | NONE              | 0                | 1              | 300                        | SEE DETAIL C FOR HEATER WIRING      | 45S           |
| 75S           | 75S-110                   | 270020           | 1       | 3                                                                                                       | 75S-220         | 270014           | 1       | 3                                                                                                         | 300                  | DETAIL B           | NONE                | NONE                    | NONE              | 0                | 1              | 300                        | SEE DETAIL C FOR HEATER WIRING      | 75S           |
| 100L          | 100L-110                  | 270019           | 4       | 10                                                                                                      | 100L-220        | 270000           | 4       | 6                                                                                                         | 200                  | DETAIL G           | 1                   | DETAIL H                | NONE              | 9                | 1              | 800                        |                                     | 100L          |
| 200L          | 200L-110                  | 270020           | 4       | 12                                                                                                      | 200L-220        | 270014           | 4       | 6                                                                                                         | 300                  | DETAIL G           | 1                   | DETAIL H                | NONE              | 9                | 1              | 1200                       |                                     | 200L          |
| 300L          | 300L-110                  | 270020           | 4       | 12                                                                                                      | 300L-220        | 270014           | 4       | 6                                                                                                         | 300                  | DETAIL G           | 1                   | DETAIL H                | NONE              | 9                | 1              | 1200                       |                                     | 300L          |
| 400L          | 400L-110                  | 270018           | 8       | 6                                                                                                       | 400L-220        | 270017           | 8       | 3                                                                                                         | 150                  | DETAIL J           | 2                   | DETAIL H                | NONE              | 18               | 2              | 600                        | TWO HTR RATING PLATES               | 400L          |
| 400LX         | 400LX-110                 | 270020           | 8       | 12                                                                                                      | 400LX-220       | 270014           | 8       | 6                                                                                                         | 300                  | DETAIL G           | 2                   | DETAIL H                | NONE              | 18               | 2              | 1200                       | TWO HTR RATING PLATES               | 400LX         |
| 600L          | 600L-110                  | 270019           | 8       | 10                                                                                                      | 600L-220        | 270000           | 8       | 6                                                                                                         | 200                  | DETAIL J           | 2                   | DETAIL H                | NONE              | 18               | 2              | 800                        | TWO HTR RATING PLATES               | 600L          |
| 600LX         | 600LX-110                 | 270020           | 8       | 12                                                                                                      | 600LX-220       | 270014           | 8       | 6                                                                                                         | 300                  | DETAIL G           | 2                   | DETAIL H                | NONE              | 18               | 2              | 1200                       | TWO HTR RATING PLATES               | 600LX         |
| ITT 600LX     | NA                        | NA               | NA      | NA                                                                                                      | NA              | 270023           | 8       | 10                                                                                                        | 400                  | NA                 | 2                   | DETAIL H                | NONE              | 14               | 2              | 1600                       | TWO HEATER RATING PLATES            | ITT 600LX     |
| 800LX         | 800LX-110                 | 270018           | 16      | 6                                                                                                       | 800LX-220       | 270017           | 16      | 3                                                                                                         | 150                  | DETAIL J           | 4                   | DETAIL H                | NONE              | 36               | 4              | 600                        | FOUR HTR RATING PLATES              | 800LX         |
| 1200LX        | 1200LX-110                | 270019           | 16      | 10                                                                                                      | 1200LX-220      | 270000           | 16      | 6                                                                                                         | 200                  | DETAIL J           | 4                   | DETAIL H                | NONE              | 36               | 4              | 800                        | FOUR HTR RATING PLATES              | 1200LX        |
| 150T-150TV    | 150T/TV-110               | 270020           | 2       | 6                                                                                                       | 150T/TV-220     | 270014           | 2       | 3                                                                                                         | 300                  | DETAIL E           | 1                   | DETAIL E                | NONE              | 6                | 1              | 600                        |                                     | 150T-150TV    |
| 200T          | 200T-110                  | 270020<br>270019 | 2<br>1  | 10                                                                                                      | 200T-220        | 270014<br>270000 | 2<br>1  | 6                                                                                                         | 300<br>200           | DETAIL E           | 1                   | DETAIL E                | NONE              | 9                | 1              | 800                        | SEE NOTE 4                          | 200T          |
| 250T          | 250T-110                  | 270020<br>270019 | 2<br>2  | 10                                                                                                      | 250T-220        | 270014<br>270000 | 2<br>2  | 6                                                                                                         | 300<br>200           | DETAIL E           | 1                   | DETAIL E                | NONE              | 9                | 1              | 1000                       | SEE NOTE 4                          | 250T          |
| 300T-300TV    | 300T/TV-110               | 270020           | 4       | 12                                                                                                      | 300T/TV-220     | 270014           | 4       | 6                                                                                                         | 300                  | DETAIL E           | 1                   | DETAIL E                | NONE              | 9                | 1              | 1200                       |                                     | 300T-300TV    |
| 500T          | 500T-110                  | 270019           | 8       | 10                                                                                                      | 500T-220        | 270000           | 8       | 6                                                                                                         | 200                  | DETAIL E           | 2                   | DETAIL E                | NONE              | 18               | 2              | 800                        | TWO HTR RATING PLATES               | 500T          |
| 500T SPCL     | 220V ONLY WITH 1 PWR CORD |                  |         |                                                                                                         | SPECIAL         | 270000           | 8       | 10                                                                                                        | 200                  | DETAIL E           | 2                   | DETAIL E                | QTY 1             | 21               | 1              | 1600                       | ONE HTR RATING PLATE-MARKED 10 AMPS | 500T SPCL     |
| 600TV         | 600TV-110                 | 270020<br>270019 | 4<br>2  | 10                                                                                                      | 600TV-220       | 270014<br>270000 | 4<br>2  | 6                                                                                                         | 300<br>200           | DETAIL E           | 2                   | DETAIL E                | NONE              | 18               | 2              | 800                        | TWO HTR RATING PLATES<br>SEE NOTE 4 | 600TV         |

NOTES:

1.  REMOVE INSULATION FROM CRIMP LUG BEFORE INSTALLING WIRE. UNLESS OTHERWISE NOTED, THE FOLLOWING RULES APPLY:

- 1.1 TWO HEATER LEADS MAXIMUM PER CRIMP LUG.
- 1.2 TWO CRIMP LUGS MAXIMUM PER BLOCK TERMINAL.
- 1.3 FOUR HEATERS MAXIMUM PER TERMINAL BLOCK.
- 1.4 ALL HEATERS ARE TO BE CONNECTED ON PARALLEL (REF DETAIL H)

2.  UNLESS OTHERWISE NOTED, HEATER LEADS ARE TO EXIT FROM HV FEEDTHRU SIDE OF PUMP. FOR PUMPS WITH TWO POWER CORDS, SECOND CORD IS TO EXIT 180° FROM HV FEEDTHRU.

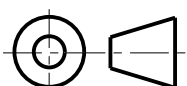
3.  INDICATED PUMPS HAVE MORE TERMINAL BLOCKS THAN POWER CORDS, CREATE JUMPER CORD TO LENGTH REQUIRED AS SHOWN IN DETAIL K. INSTALL JUMPER CORD BETWEEN TWO TERMINAL BLOCKS. DO NOT EXCEED TWO CRIMP LUGS PER TERMINAL (REF NOTE 1). JUMPER CORDS MUST BE INSTALLED INTO SAME SIDE OF TERMINAL BLOCK AS MAIN POWER CORD.

4.  INDICATED PUMPS USE TWO DIFFERENT WATTAGE HEATERS. UNLESS OTHERWISE NOTED, LOWER WATTAGE HEATERS MOUNT IN CENTER.

5.  GREEN GROUND WIRES MUST BE INSTALLED IN GROUND TERMINAL () OF TERMINAL BLOCK.

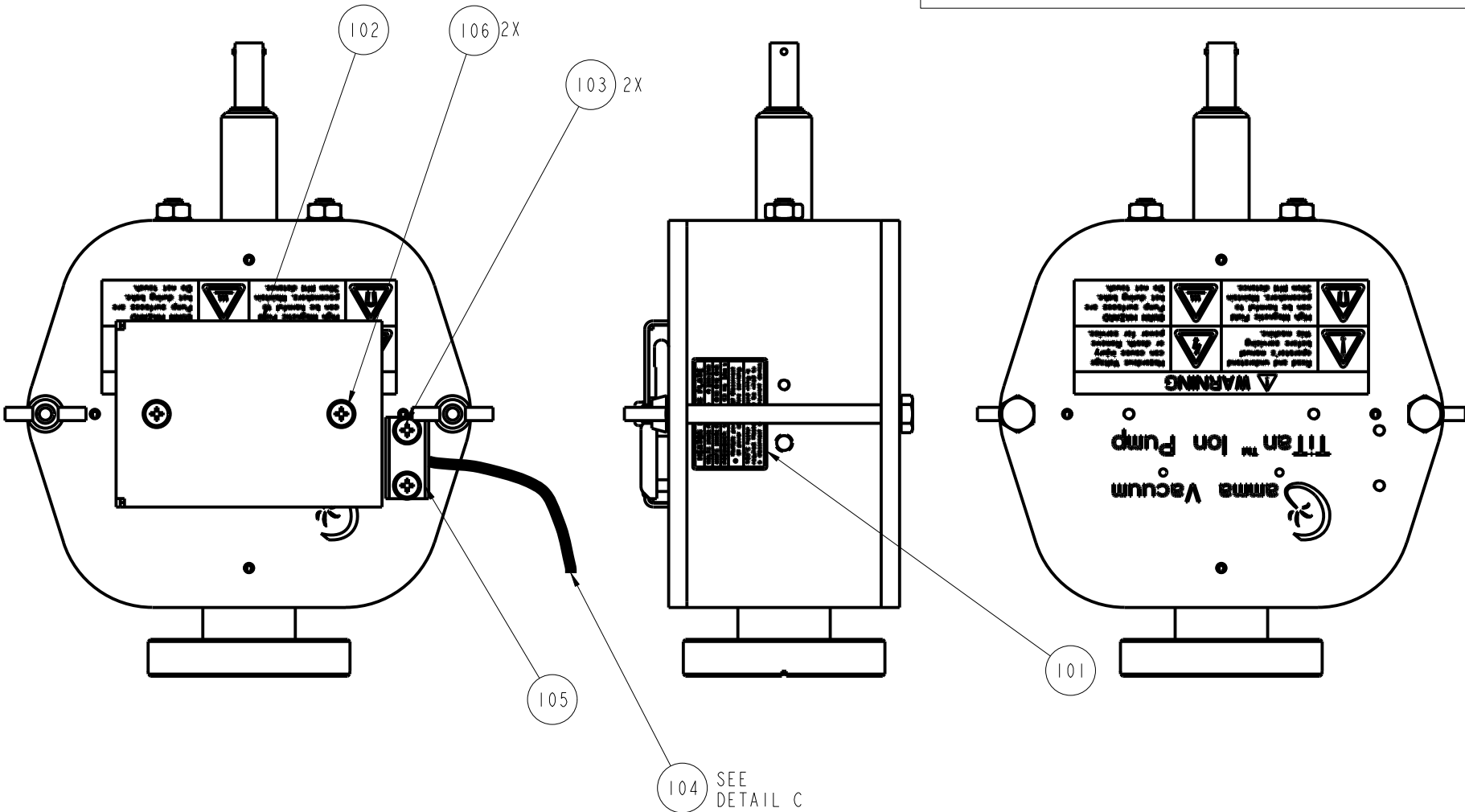
6.  HEATER RATING PLATE MUST BE INSTALLED ON ALL PUMPS WITH HEATERS. MARK RATING PLATE WITH CORRECT VOLTAGE AND MAX AMPS (SEE CHART). ALSO, IF PUMP HAS TWO POWER CORDS, MARK RATING PLATE TO INDICATE MULTIPLE POWER CORDS. PUMPS WITH TWO POWER CORDS REQUIRE TWO RATING PLATES. MARK BOTH PLATES WITH SAME VOLTAGE AND MAX AMPS. PUMPS WITH TWO TERMINAL BLOCKS BUT ONLY ONE POWER CORD REQUIRE ONLY ONE RATING PLATE LOCATED ON TERMINAL COVER EQUIPPED WITH POWER CORD.

7. CERAMIC BLOCK TORQUE SPEC: 8 IN-LBS .

|                                                                                       |  |                                                                                                                                                                                                                                                                                                |  |                                                     |                |                                                                    |  |
|---------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------|----------------|--------------------------------------------------------------------|--|
| <b>METRIC</b>                                                                         |  | UNLESS OTHERWISE SPECIFIED:<br>DIMENSIONS ARE IN MILLIMETERS<br>SURFACE ROUGHNESS IN MICROMETERS                                                                                                                                                                                               |  | DRW R GOLLA                                         | DATE 22-Sep-05 | <b>Gamma Vacuum</b><br>2915 133rd Street West • Shakopee, MN       |  |
| THIRD ANGLE PROJECTION                                                                |  | TOLERANCES:<br>LINEAR ±0.13<br>HOLES ±0.13<br>ANGULAR (±)<br>MACHINED 0.5°<br>FORMED 1°<br>CHAMFER 5°<br>MACHINED SURFACES <br>BREAK SHARP EDGES:<br>R.2 OR 45° 0.2 MAX.<br>INTERNAL MACH CORNER R.4 MAX. |  | CHK MHC                                             | DATE 9-27-05   |                                                                    |  |
|  |  | THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS AGREE TO IN WRITING.                                                                                                                                   |  | APPV RDG                                            | DATE 9-27-05   | TITLE<br>SPEC-HEATER INSTALLATION, PUMPS                           |  |
|                                                                                       |  |                                                                                                                                                                                                                                                                                                |  | TOLERANCING AND DIMENSIONING PER ANSI Y14.5M - 1982 |                | SIZE<br>D                                                          |  |
|                                                                                       |  |                                                                                                                                                                                                                                                                                                |  | DRAWING NO. 430022                                  |                | REV. T                                                             |  |
|                                                                                       |  |                                                                                                                                                                                                                                                                                                |  | SCALE 1:000                                         |                | DETACHED <input type="checkbox"/> PL <input type="checkbox"/> SPEC |  |
|                                                                                       |  |                                                                                                                                                                                                                                                                                                |  | SHT 1 OF 10                                         |                |                                                                    |  |

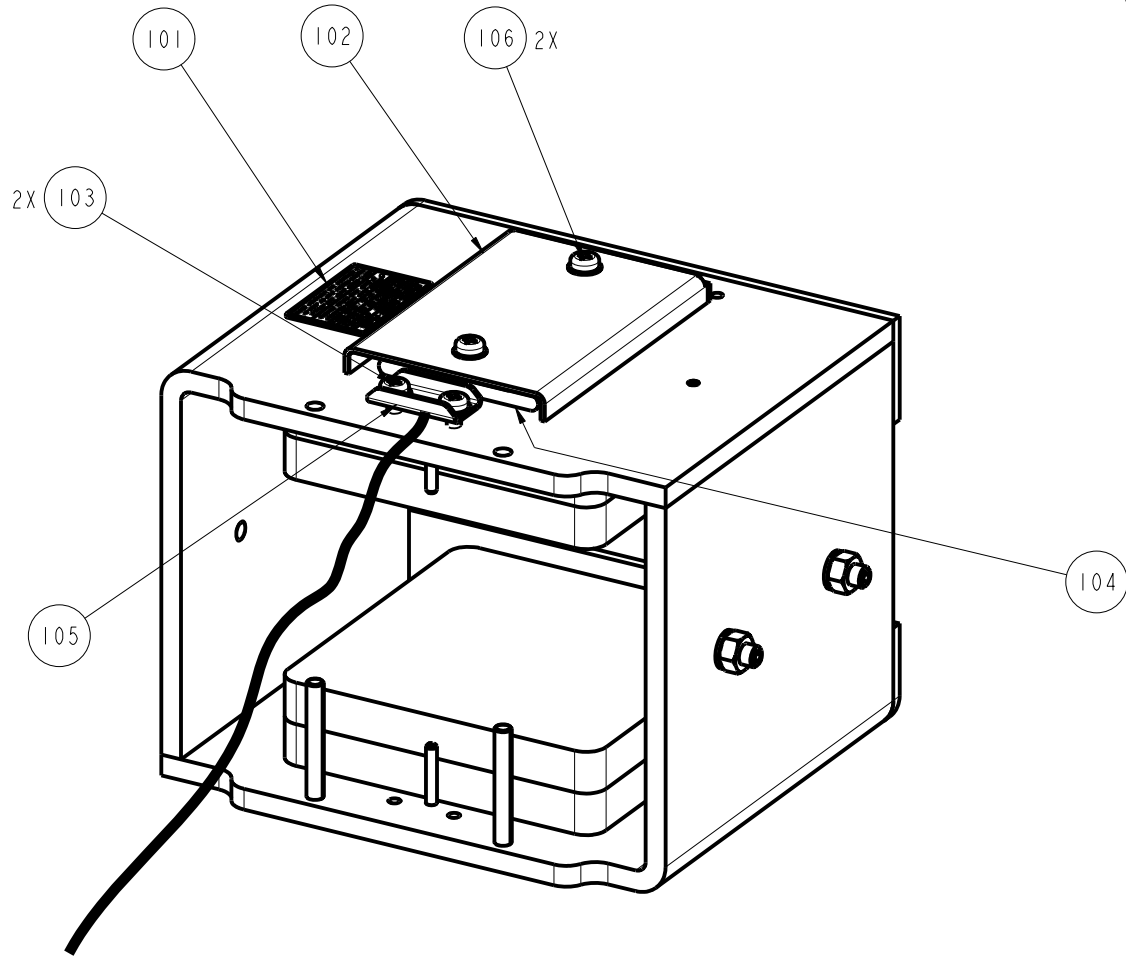
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| 10S BAKE HARDWARE BOM |             |     |                                |
|-----------------------|-------------|-----|--------------------------------|
| ITEM                  | PART NUMBER | QTY | DESCRIPTION                    |
| 101                   | 290042      | 1   | LABEL-HTR ELEC RATING,PMP,HTM  |
| 102                   | 320205      | 1   | SHROUD,HTR STRIP,91.5X64,SS    |
| 103                   | 101187      | 2   | SCR,SEMS,INT,PHIL,M4X12,STL/Zn |
| 104                   | PN VARIES   | 1   | 150 WATT HEATER                |
| 105                   | 320350      | 1   | BRKT,CA CLAMP,SM PMP HTRS      |
| 106                   | 101188      | 2   | SCR,SEMS,INT,PHIL,M4X16,STL/Zn |



# 10S SERIES BAKE KIT

## DETAIL A



# 10SW/25SVW BAKE KIT

METRIC

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE ROUGHNESS IN MICROMETERS

TOLERANCES:  
LINEAR ±0.13  
HOLES ±0.13  
ANGULAR (±)

MACHINED 0.5°  
FORMED 1°  
CHAMFER 5°

MACHINED SURFACES 1.6

BREAK SHARP EDGES:  
R.2 OR 45° 0.2 MAX.  
INTERNAL MACH CORNER R.4 MAX.

DRN R GOLLA

CHK MHC

APPV RDG

RI RDG

DATE 10-18-06

DATE 10-18-06

DATE 10-18-06

TOLERANCING AND DIMENSIONING  
PER ANSI Y14.5M - 1982

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TITLE

SPEC-HEATER INSTALLATION, PUMPS

SIZE

DRAWING NO. 430022

REV. T

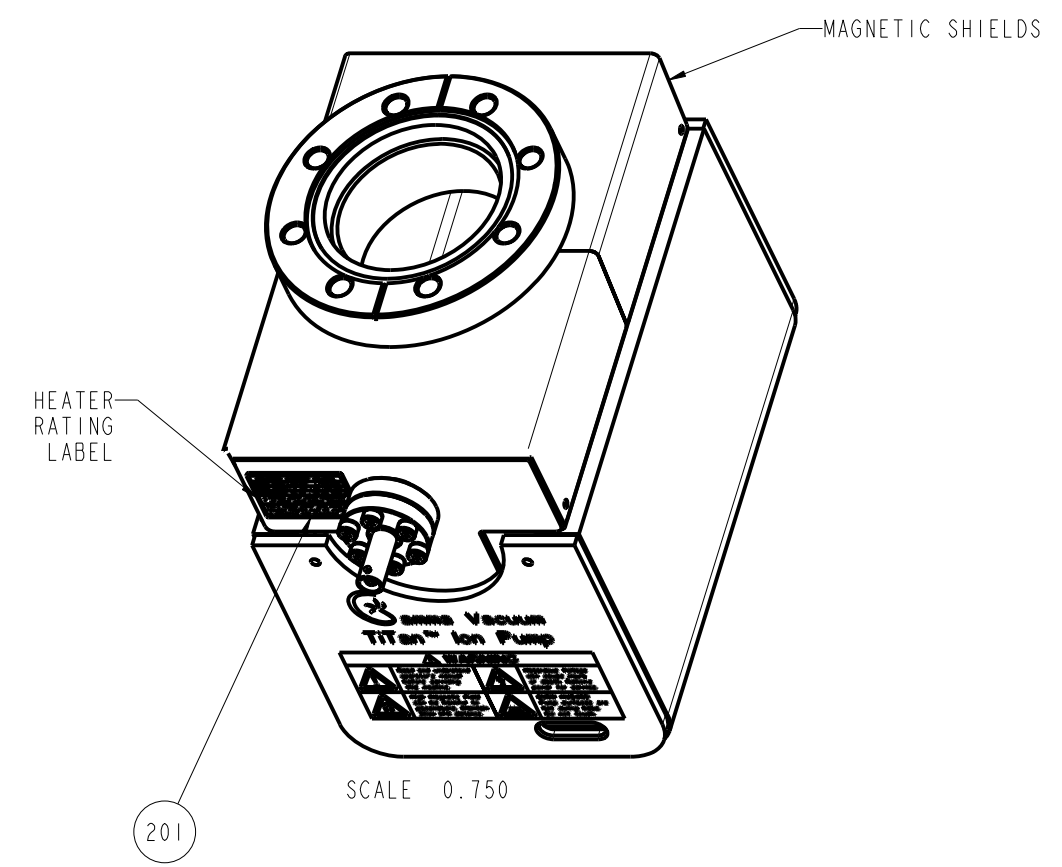
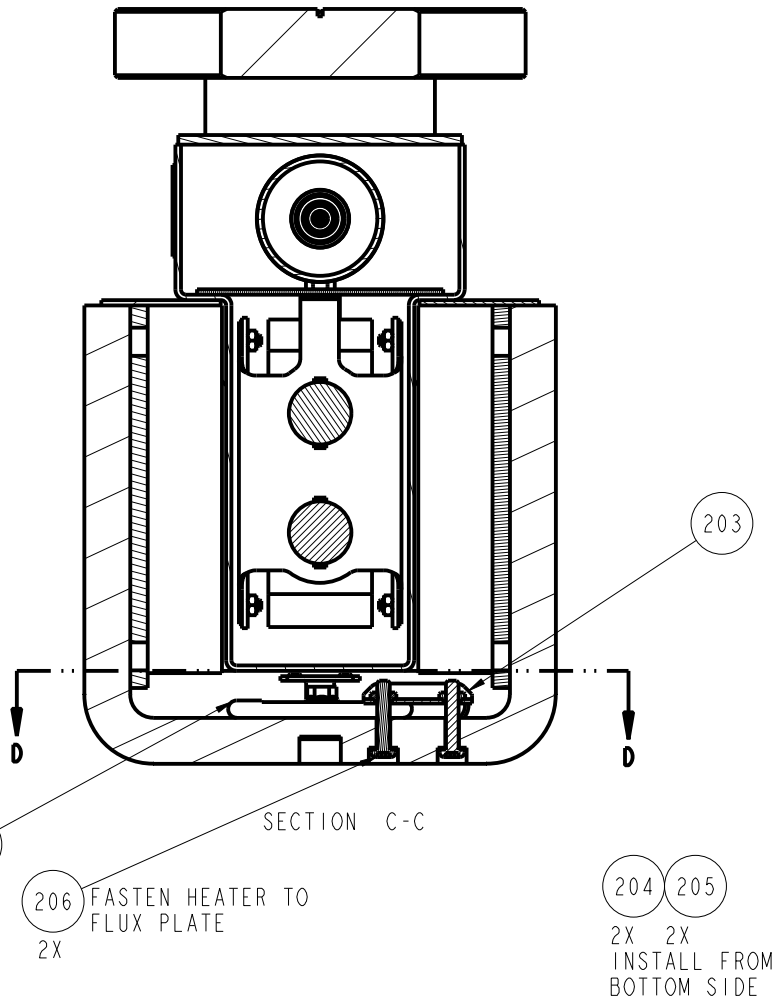
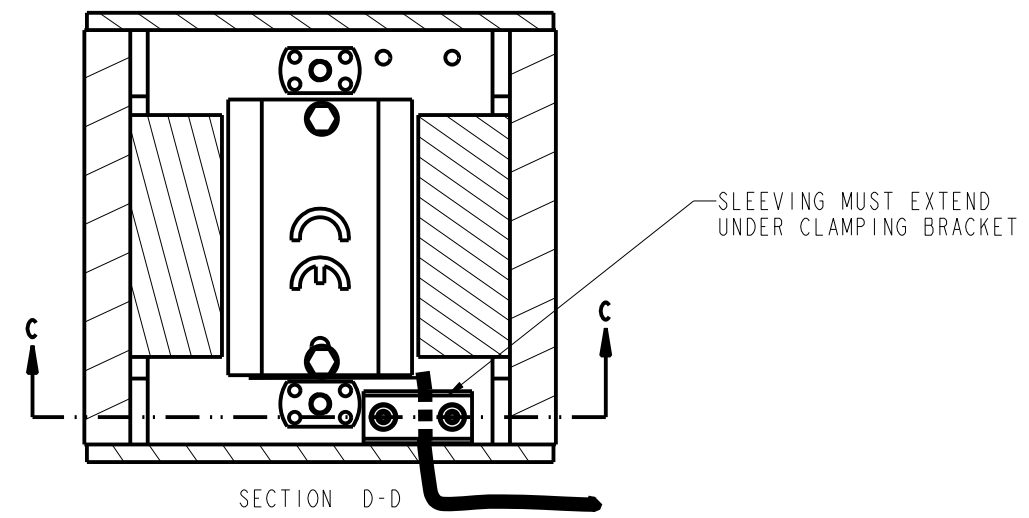
SCALE 1.000

DETACHED

PI SPEC

SHT 2 OF 10

| BAKE HARDWARE BOM |             |     |                               |
|-------------------|-------------|-----|-------------------------------|
| ITEM              | PART NUMBER | QTY | DESCRIPTION                   |
| 201               | 290042      | 1   | LABEL-HTR ELEC RATING,PMP,HTM |
| 202               | PN VARIES   | 1   | HEATER STRIP-SEE CHART        |
| 203               | 320825      | 1   | BRKT ASY,CA CLAMP,SM PMP HTRS |
| 204               | 100627      | 2   | WASHER,LOCK,INT TOOTH,#6,SS   |
| 205               | 100417      | 2   | SCR,PHIL HEAD,#6-32X.750,SS   |
| 206               | 100095      | 2   | SCREW,SELF TAPPING,M4         |



SEM PUMPS(25S, 45S AND 75S)  
HEATER RATING LABEL LOCATION

D

C

B

A

D

C

B

A

DETAIL C  
TYPICAL INSTALLATION  
20S/25S, 40S/45S, AND 75S PUMPS

METRIC

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE ROUGHNESS IN MICROMETERS

TOLERANCES:  
LINEAR ±0.13  
HOLES ±0.13  
ANGULAR (±)

MACHINED 0.5°  
FORMED 5°  
CHAMFER 5°

MACHINED SURFACES 1.6

BREAK SHARP EDGES:  
R.2 OR 45° 0.2 MAX.  
INTERNAL MACH CORNER R.4 MAX.

DRN R GOLLA DATE 10-18-06

CHK MHC DATE 10-18-06

APPV RDG DATE 10-18-06

RI RDG

TOLERANCING AND DIMENSIONING PER ANSI Y14.5M - 1982

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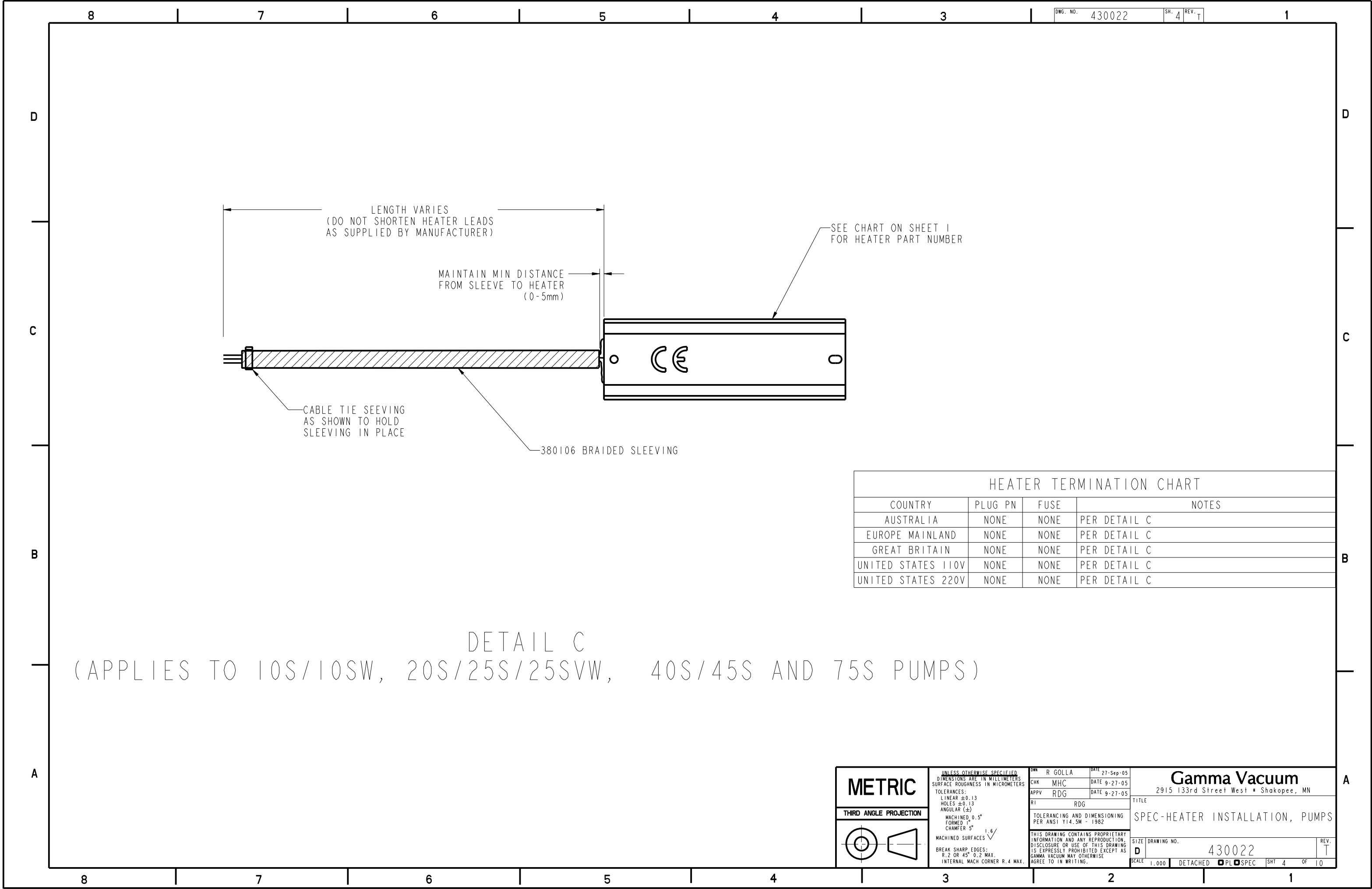
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TITLE  
SPEC-HEATER INSTALLATION, PUMPS

SIZE D DRAWING NO. 430022

SCALE 1.000 DETACHED ☐ PL ☐ SPEC SHT 3 OF 10

REV. T



| HEATER TERMINATION CHART |         |      |              |
|--------------------------|---------|------|--------------|
| COUNTRY                  | PLUG PN | FUSE | NOTES        |
| AUSTRALIA                | NONE    | NONE | PER DETAIL C |
| EUROPE MAINLAND          | NONE    | NONE | PER DETAIL C |
| GREAT BRITAIN            | NONE    | NONE | PER DETAIL C |
| UNITED STATES 110V       | NONE    | NONE | PER DETAIL C |
| UNITED STATES 220V       | NONE    | NONE | PER DETAIL C |

DETAIL C  
(APPLIES TO 10S/10SW, 20S/25S/25SVW, 40S/45S AND 75S PUMPS)

METRIC

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE ROUGHNESS IN MICROMETERS

TOLERANCES:  
LINEAR ±0.13  
HOLES ±0.13  
ANGULAR (±)

MACHINED 0.5°  
FORMED 1°  
CHAMFER 5°

MACHINED SURFACES 1.6

BREAK SHARP EDGES:  
R.2 OR 45° 0.2 MAX.  
INTERNAL MACH CORNER R.4 MAX.

DRN R GOLLA  
CHK MHC  
APPV RDG  
RI RDG

DATE 27-Sep-05  
DATE 9-27-05  
DATE 9-27-05

TOLERANCING AND DIMENSIONING  
PER ANSI Y14.5M - 1982

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TITLE  
SPEC-HEATER INSTALLATION, PUMPS

SIZE D  
SCALE 1:000

DRAWING NO.  
430022

DETACHED ☐ PL ☐ SPEC

REV. T

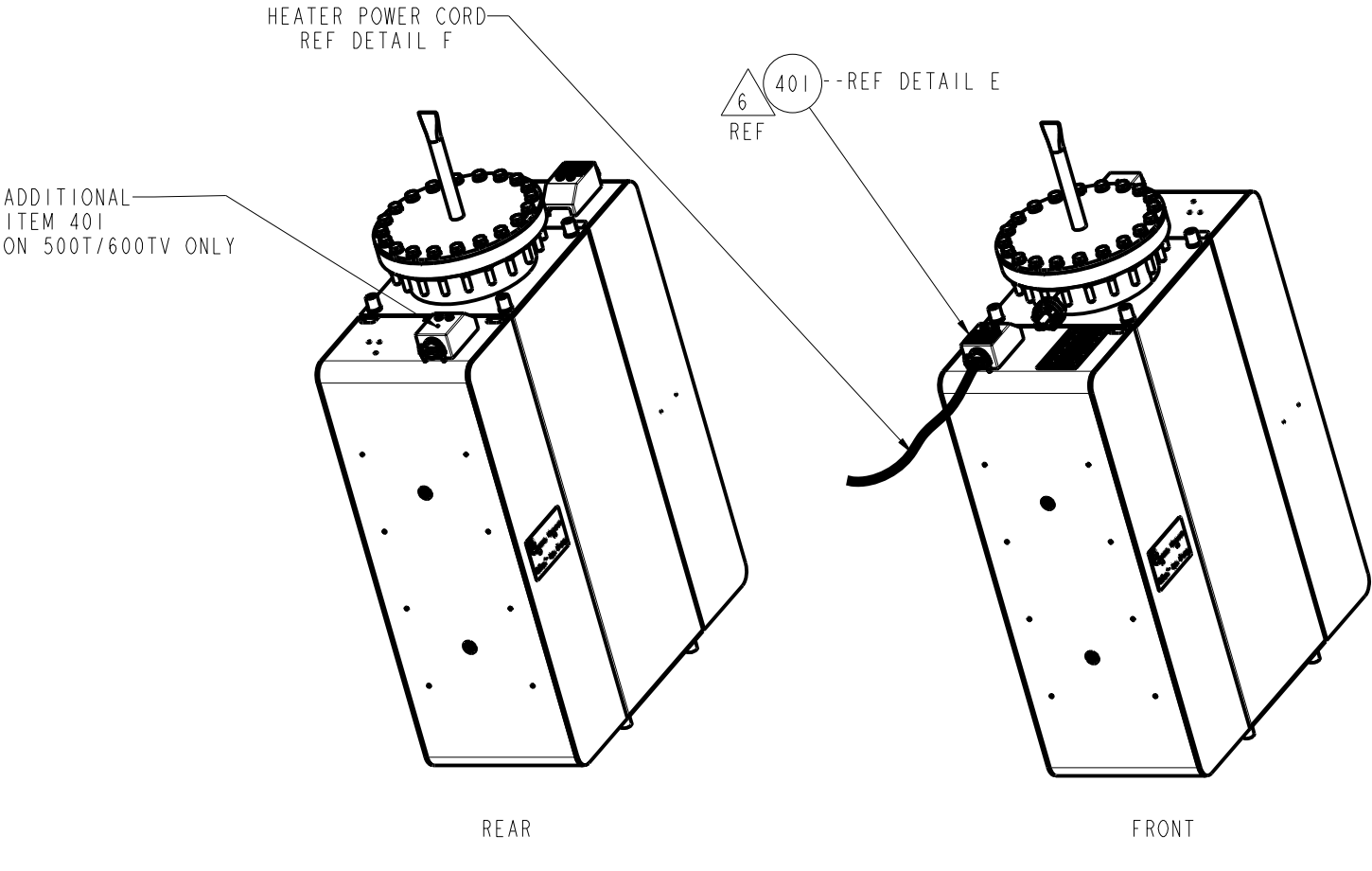
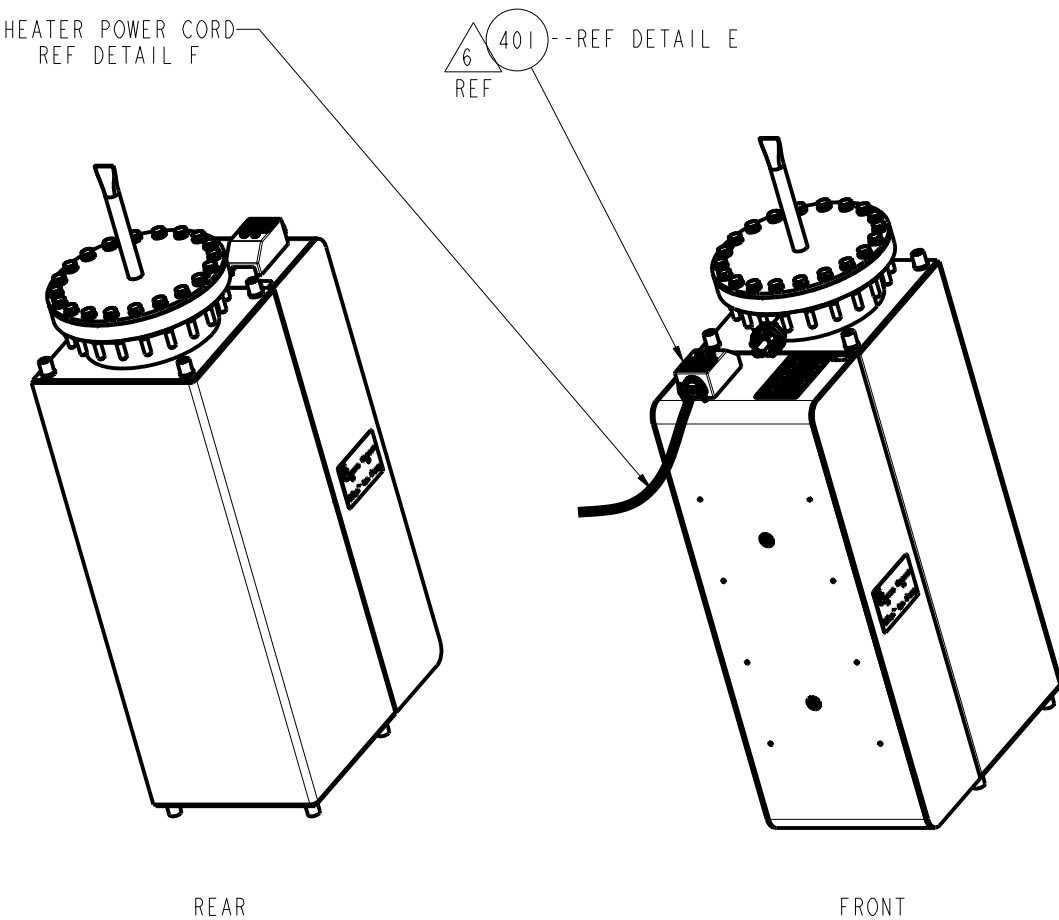
SHT 4 OF 10

| BAKE LABEL CHART |             |            |                               |
|------------------|-------------|------------|-------------------------------|
| ITEM             | PART NUMBER | QTY        | DESCRIPTION                   |
| 401              | 290042      | REF NOTE 6 | LABEL-HTR ELEC RATING,PMP,HTM |

DWG. NO. 430022 SH. 5 REV. T

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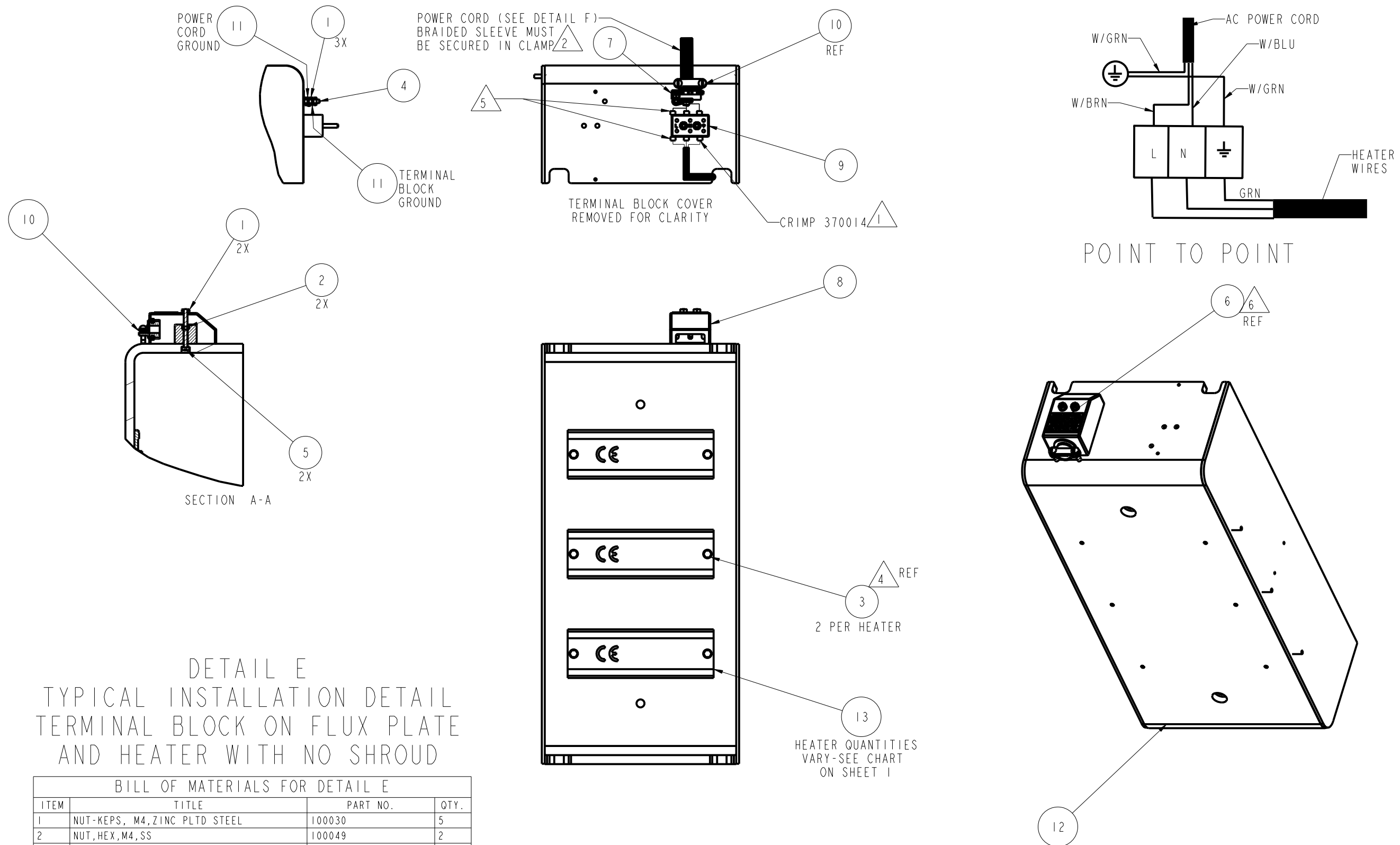
# TALL PUMPS



TYPICAL 150T, 150TV, 200T,  
AND 250T INSTALLATION

TYPICAL 300T, 300TV, 500T,  
AND 600TV INSTALLATION

|                                             |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                   |                                                                        |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>METRIC</b><br>THIRD ANGLE PROJECTION<br> | UNLESS OTHERWISE SPECIFIED:<br>DIMENSIONS ARE IN MILLIMETERS<br>SURFACE ROUGHNESS IN MICROMETERS<br>TOLERANCES:<br>LINEAR ±0.13<br>HOLES ±0.13<br>ANGULAR (±)<br>MACHINED 0.5°<br>FORMED 1°<br>CHAMFER 5°<br>MACHINED SURFACES 1.6<br>BREAK SHARP EDGES:<br>R.2 OR 45° 0.2 MAX.<br>INTERNAL MACH CORNER R.4 MAX. | DRW R GOLLA<br>CHK MHC<br>APPV RDG<br>RI RDG<br>TOLERANCING AND DIMENSIONING<br>PER ANSI Y14.5M - 1982<br>THIS DRAWING CONTAINS PROPRIETARY<br>INFORMATION AND ANY REPRODUCTION,<br>DISCLOSURE OR USE OF THIS DRAWING<br>IS EXPRESSLY PROHIBITED EXCEPT AS<br>AGREE TO IN WRITING. | DATE 23-Oct-06<br>DATE 12-12-06<br>DATE 12-12-06<br>TITLE<br>SPEC-HEATER INSTALLATION, PUMPS<br>SIZE D<br>DRAWING NO. 430022<br>SCALE 1:1000<br>DETACHED <input type="checkbox"/> PL <input type="checkbox"/> SPEC<br>SHT 5 OF 10 | <b>Gamma Vacuum</b><br>2915 133rd Street West • Shakopee, MN<br>REV. T |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|



DETAIL E  
TYPICAL INSTALLATION DETAIL  
TERMINAL BLOCK ON FLUX PLATE  
AND HEATER WITH NO SHROUD

| BILL OF MATERIALS FOR DETAIL E |                                         |                     |      |
|--------------------------------|-----------------------------------------|---------------------|------|
| ITEM                           | TITLE                                   | PART NO.            | QTY. |
| 1                              | NUT-KEPS, M4,ZINC PLTD STEEL            | 100030              | 5    |
| 2                              | NUT, HEX, M4, SS                        | 100049              | 2    |
| 3                              | SCR, CAP, HEX, THFRM, M4X.7X12, Zn      | 100094              | 6    |
| 4                              | SCR_CAP_SKT_HEX_M4X.7X20, AG            | 101133              | 1    |
| 5                              | SCR-MACH, PHPAN, M4X40, FULL THRD, SST  | 101209              | 2    |
| 6                              | LABEL-HTR ELEC RATING, PMP, HTMP        | 290042              | 1    |
| 7                              | LABEL, GND, PROT EARTH, HITEMP          | 290043              | 1    |
| 8                              | SHROUD, HEATER TERM. BLK, SS            | 320195              | 1    |
| 9                              | CONN, TERM., CERAM, 3POL, 15A, 500C     | 390099              | 1    |
| 10                             | CLAMP, 3/8" CABLE, 1/2" KO, CAST        | 390586              | 1    |
| 11                             | LUG-RING, 22-16GA, #8, UN, .310W, HTEMP | 390844              | 2    |
| 12                             | PLATE, FLUX, CUPPED-TALL PUMPS          | PN VARIES PER PUMP  | 1    |
| 13                             | HEATER STRIP                            | PN VARIES-SEE CHART | 3    |

METRIC

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE ROUGHNESS IN MICROMETERS

TOLERANCES:

LINEAR ±0.13  
HOLES ±0.13  
ANGULAR (±)

MACHINED 0.5°  
FORMED 1°  
CHAMFER 5°

MACHINED SURFACES ✓  
1.6

BREAK SHARP EDGES:  
R.2 OR 45° 0.2 MAX.  
INTERNAL MACH CORNER R.4 MAX.

DRN R GOLLA  
CHK MHC  
APPV RDG  
RI RDG

DATE 22-Sep-05  
DATE 9-27-05  
DATE 9-27-05

TOLERANCING AND DIMENSIONING  
PER ANSI Y14.5M - 1982

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INFORMATION AND ANY REPRODUCTION,  
DISCLOSURE OR USE OF THIS DRAWING  
IS EXPRESSLY PROHIBITED EXCEPT AS  
GAMMA VACUUM MAY OTHERWISE  
AGREE TO IN WRITING.

**Gamma Vacuum**  
2915 133rd Street West • Shakopee, MN

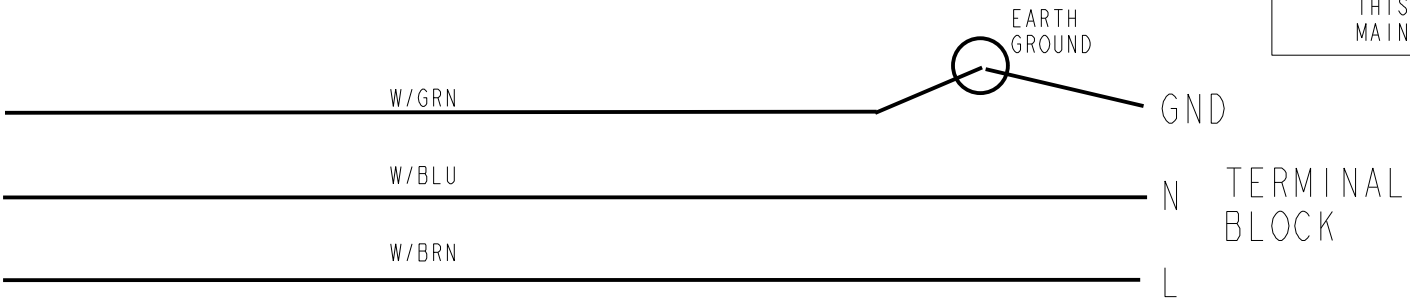
TITLE  
SPEC-HEATER INSTALLATION, PUMPS

SIZE D  
DRAWING NO. 430022  
SCALE 1:1000  
DETACHED ☐ PL ☐ SPEC  
SHT 6 OF 10

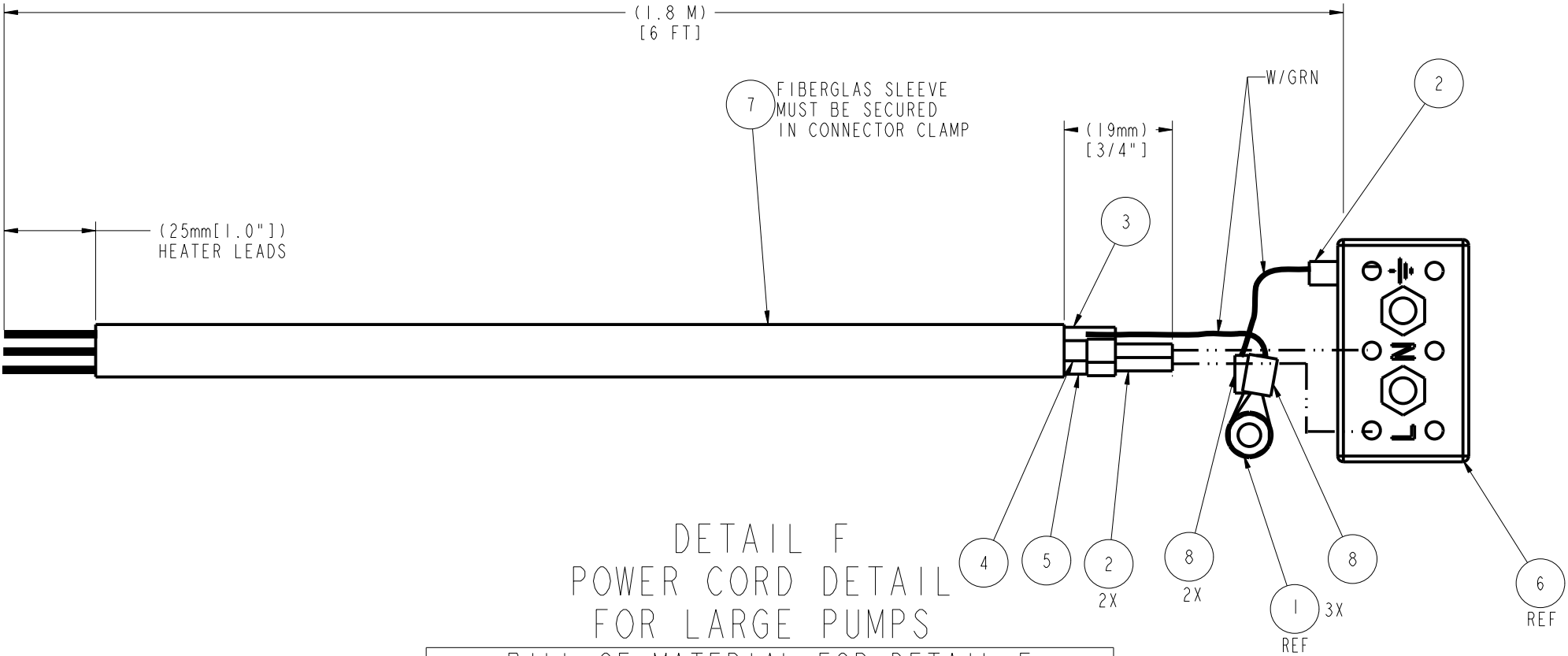
REV. T



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POINT TO POINT



DETAIL F  
POWER CORD DETAIL  
FOR LARGE PUMPS

| BILL OF MATERIAL FOR DETAIL F |      |                                      |          |      |  |
|-------------------------------|------|--------------------------------------|----------|------|--|
| ITEM                          | TYPE | TITLE                                | PART NO. | QTY. |  |
| 1                             | PART | NUT-KEPS, M4,ZINC PLTD STEEL         | 100030   | 3    |  |
| 2                             | PART | TERM,CRIMP,BLADE,16-14AWG,VINY       | 370014   | 3    |  |
| 3                             | PART | WIRE,STD,14GA,600V/450C,GREEN STRIPE | 380103   | 1    |  |
| 4                             | PART | WIRE,STD,14GA,600V/450C,BL STRIPE    | 380104   | 1    |  |
| 5                             | PART | WIRE,STD,14GA,600V/450C,BROWN STRIPE | 380105   | 1    |  |
| 6                             | PART | CONN,TERM.,CERAM,3POL,15A,500C       | 390099   | 1    |  |
| 7                             | PART | SLEEVE,TEF/FIBERGLASS,3/8",BLACK     | 390746   | 1    |  |
| 8                             | PART | LUG-RING,22-16GA, #8,UN ,.310W,HTEMP | 390844   | 2    |  |

METRIC

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE ROUGHNESS IN MICROMETERS

TOLERANCES:

LINEAR ±0.13  
HOLES ±0.13  
ANGULAR (±)

MACHINED 0.5°  
FORMED 1°  
CHAMFER 5°

MACHINED SURFACES ✓  
1.6

BREAK SHARP EDGES:  
R.2 OR 45° 0.2 MAX.  
INTERNAL MACH CORNER R.4 MAX.

DRN R GOLLA  
CHK MHC  
APPV RDG  
RI RDG

DATE 22-Mar-06  
DATE 3-22-06  
DATE 3-22-06

TOLERANCING AND DIMENSIONING  
PER ANSI Y14.5M - 1982

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Gamma Vacuum

2915 133rd Street West • Shakopee, MN

TITLE  
SPEC-HEATER INSTALLATION, PUMPS

SIZE D  
SCALE 1:000

DRAWING NO.  
430022

DETACHED ☐ PL ☐ SPEC

REV. T

SHT 7 OF 10

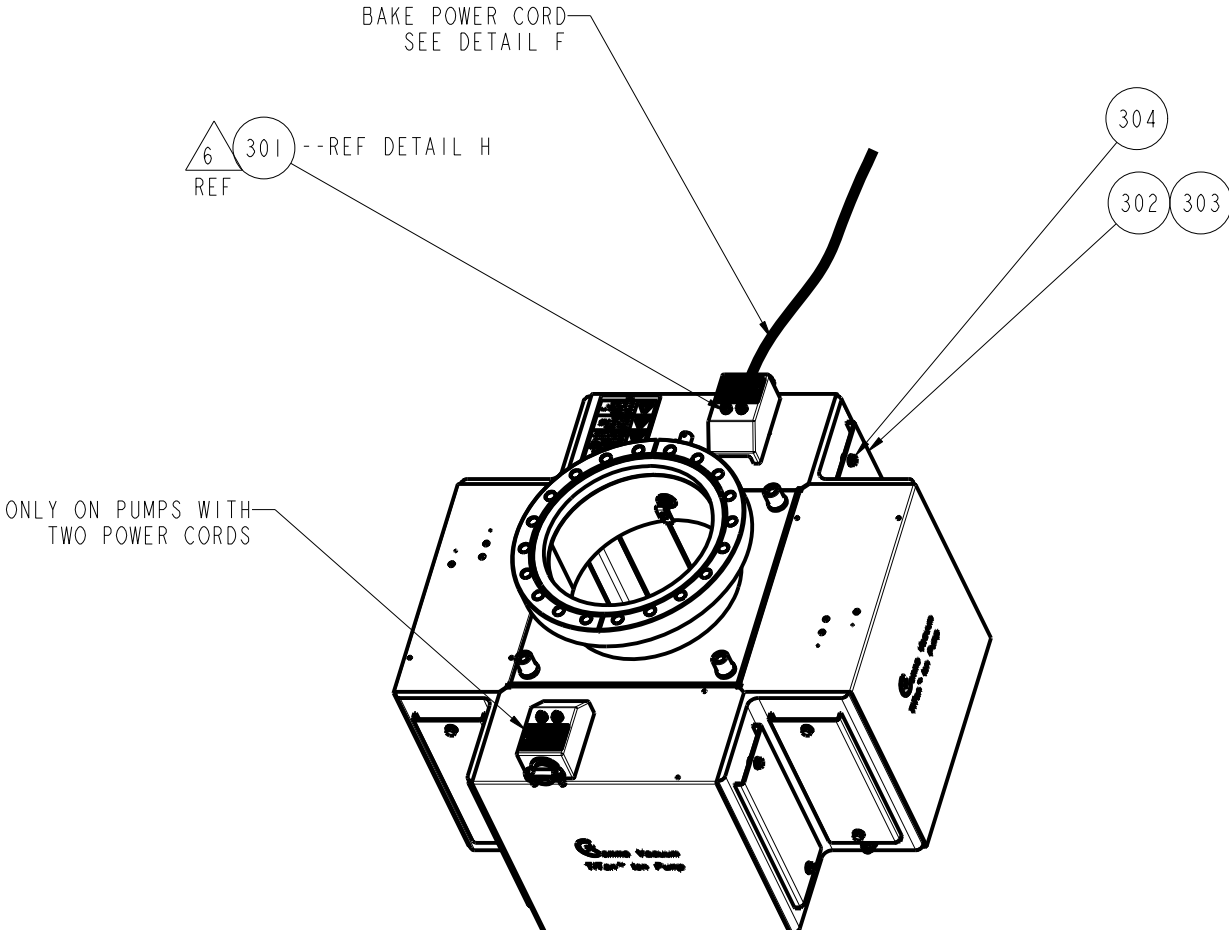
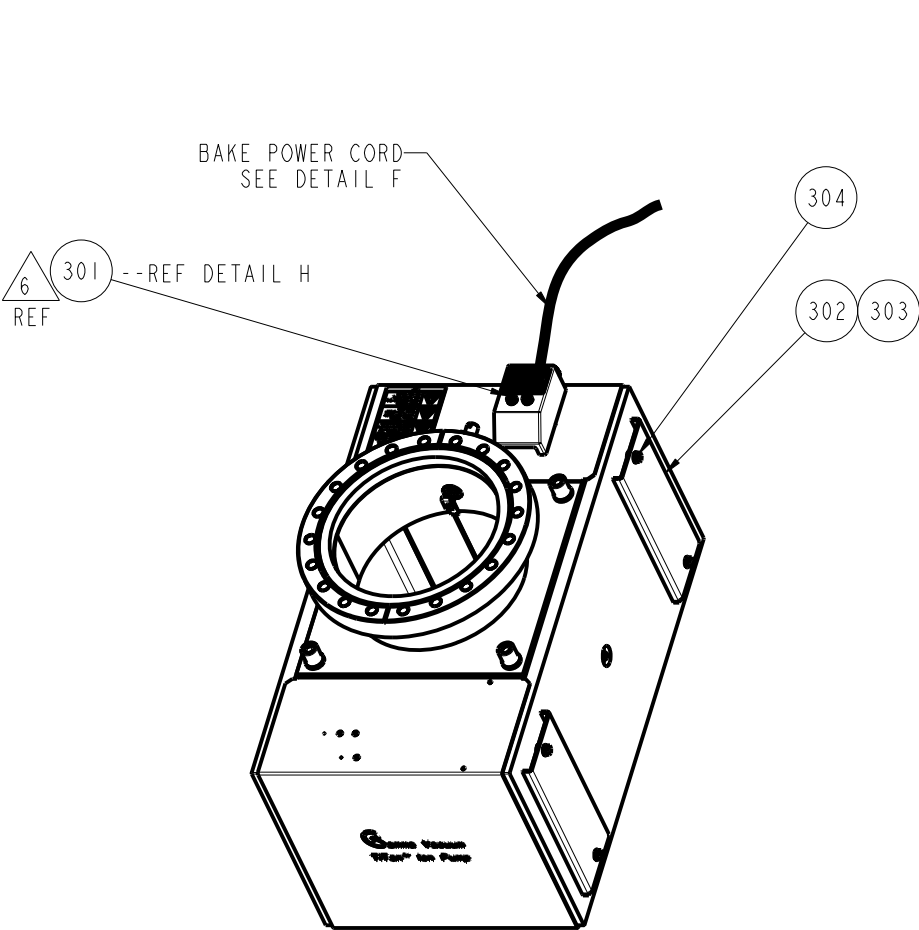
| BILL OF MATERIALS FOR DETAIL G |             |            |                               |
|--------------------------------|-------------|------------|-------------------------------|
| ITEM                           | PART NUMBER | QTY        | DESCRIPTION                   |
| 301                            | 290042      | REF NOTE 6 | LABEL-HTR ELEC RATING,PMP,HTM |
| 302                            | PN VARIES   | SEE CHART  | STRIP HEATER                  |
| 303                            | 320088      | 1 PER HTR  | SHROUD-HTR STRIP              |
| 304                            | 101288      | 2 PER HTR  | SCR,CAP,HEX,THFRM,M4X.7X20,Zn |

DWG. NO. 430022

SH-8REV-T

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LOW PROFILE PUMPS



TYP 100L,200L,300L,400LX, AND 600LX

TYP 400L, 600L AND 800LX  
NOTE- IF PUMP HAS TWO BAKE POWER CORDS,  
IT NEEDS QTY 2 BAKE RATING PLATES (ITEM 301)

DETAIL G

METRIC

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE ROUGHNESS IN MICROMETERS

TOLERANCES:  
LINEAR ±0.13  
HOLES ±0.13  
ANGULAR (±)

MACHINED 0.5°  
FORMED 1°  
CHAMFER 5°

MACHINED SURFACES 1.6

BREAK SHARP EDGES:  
R.2 OR 45° 0.2 MAX.  
INTERNAL MACH CORNER R.4 MAX.

DRW R GOLLA DATE 10-23-06  
CHK MHC DATE 10-23-06  
APPV RDG DATE 10-23-06  
RI RDG

TOLERANCING AND DIMENSIONING PER ANSI Y14.5M - 1982

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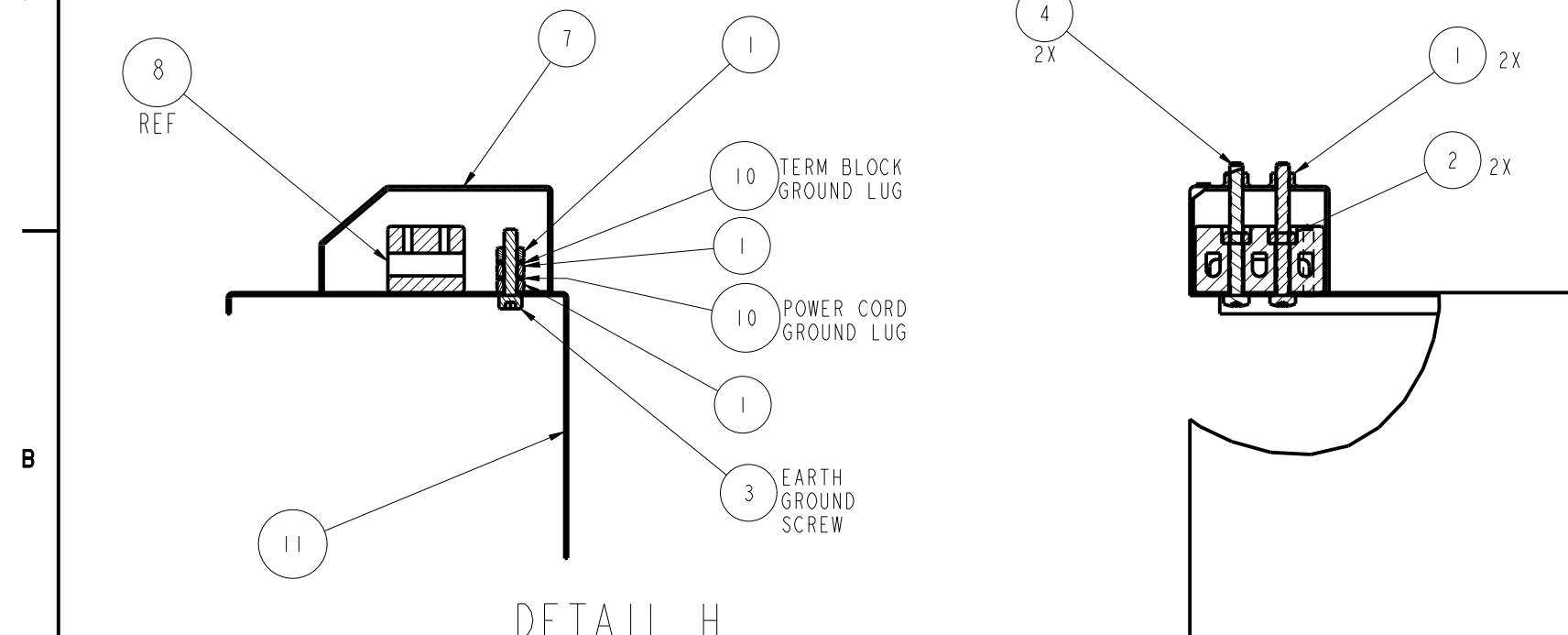
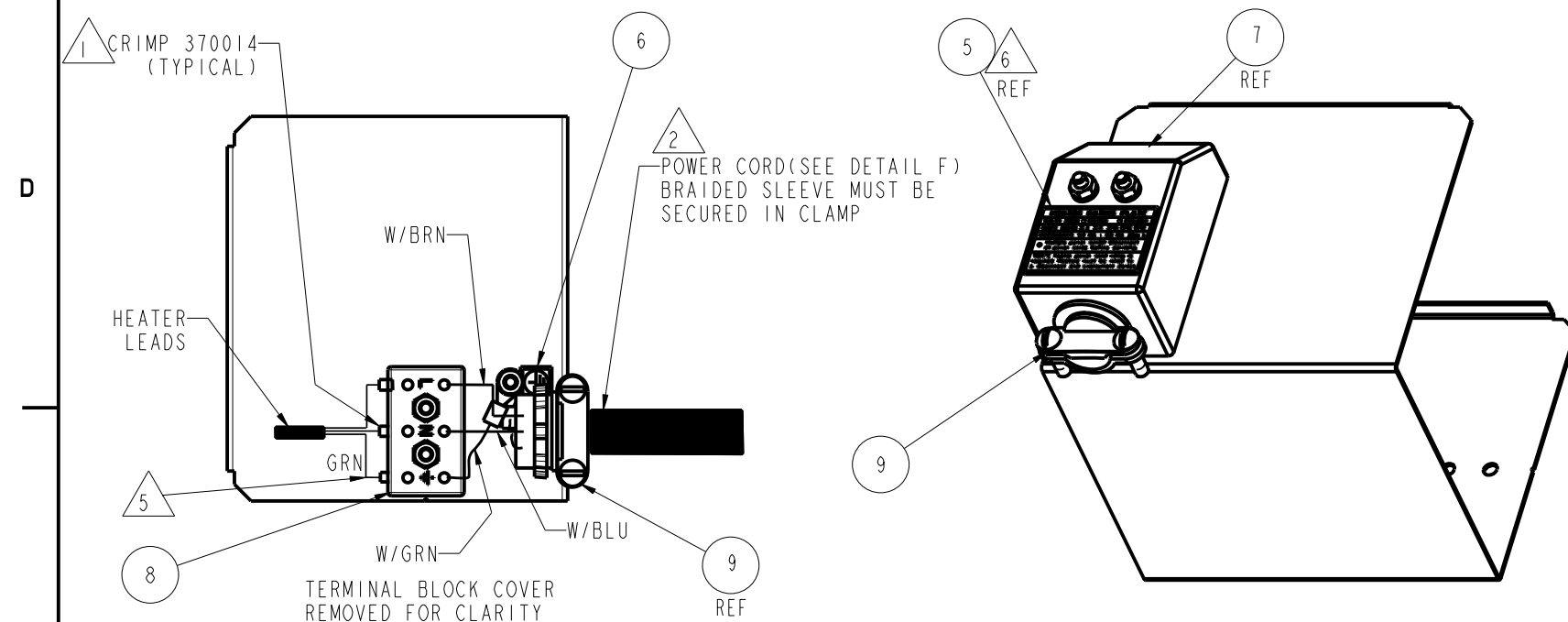
**Gamma Vacuum**  
2915 133rd Street West • Shakopee, MN

TITLE  
SPEC-HEATER INSTALLATION, PUMPS

SIZE D  
DRAWING NO. 430022  
SCALE 1:1000  
DETACHED ☐ PL ☐ SPEC  
SHT 8 OF 10

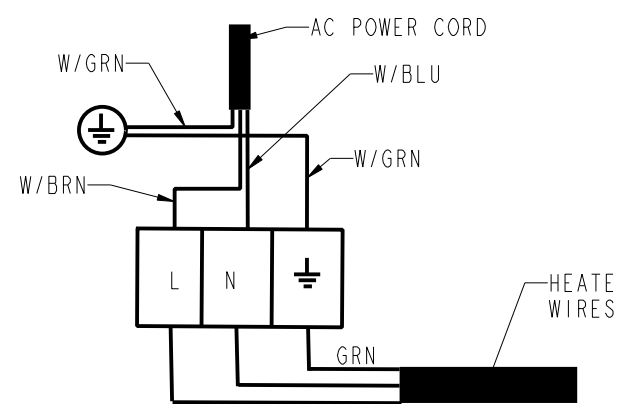
REV. T



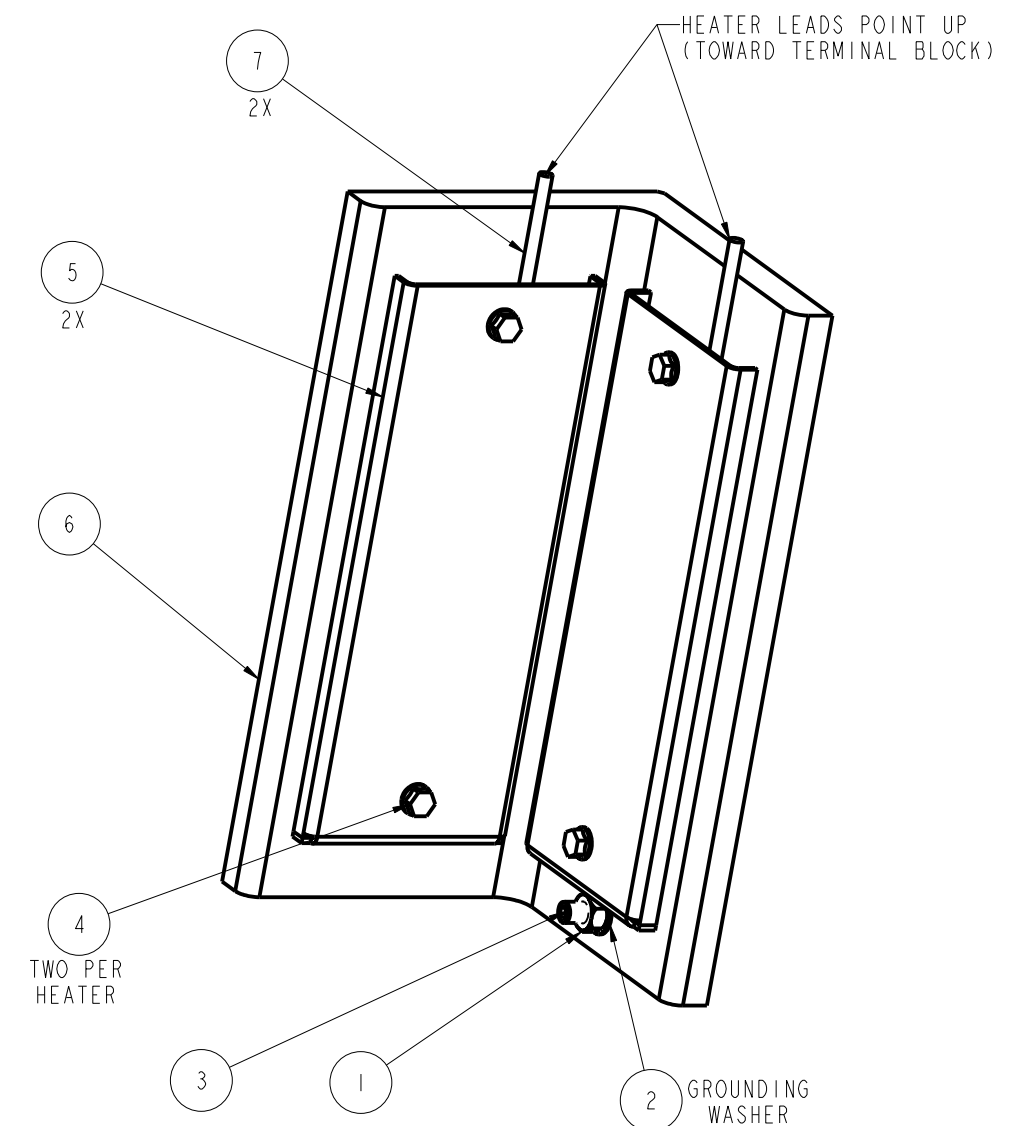


DETAIL H  
TYPICAL INSTALLATION DETAIL  
TERMINAL BLOCK ON SHEET METAL COVER

| BILL OF MATERIALS FOR DETAIL H |                                      |                    |      |
|--------------------------------|--------------------------------------|--------------------|------|
| ITEM                           | TITLE                                | PART NO.           | QTY. |
| 1                              | NUT-KEPS, M4,ZINC PLTD STEEL         | 100030             | 5    |
| 2                              | NUT,HEX,M4,SS                        | 100049             | 2    |
| 3                              | SCR_CAP_SKT_HEX_M4X.7X20,AG          | 101133             | 1    |
| 4                              | SCR-MACH,PHPAN,M4X40,FULL THRD,SST   | 101209             | 2    |
| 5                              | LABEL-HTR ELEC RATING,PMP,HTMP       | 290042             | 1    |
| 6                              | LABEL,GND,PROT EARTH,HITEMP          | 290043             | 1    |
| 7                              | SHROUD,HEATER TERM. BLK,SS           | 320195             | 1    |
| 8                              | CONN,TERM.,CERAM,3POL,15A,500C       | 390099             | 1    |
| 9                              | CLAMP,3/8" CABLE,1/2" KO,CAST        | 390586             | 1    |
| 10                             | LUG-RING,22-16GA, #8,UN.,.310W,HTEMP | 390844             | 2    |
| 11                             | COVER-ION PUMP (STYLES VARY)         | PART NUMBER VARIES | 1    |



POINT TO POINT



DETAIL J  
TYPICAL INSTALLATION DETAIL  
CORNER HEATER WITH SHROUD

| BILL OF MATERIALS FOR DETAIL J |                                     |                      |      |
|--------------------------------|-------------------------------------|----------------------|------|
| ITEM                           | TITLE                               | PART NO.             | QTY. |
| 1                              | NUT, HEX, M6X1.0, SST, Ag PL        | 100051               | 1    |
| 2                              | WSHR-INT TOOTH LOCK, 1/4, SST       | 100630               | 1    |
| 3                              | SCR, SET, HEX, M6X1.0X45, ALLOY STL | 101207               | 1    |
| 4                              | SCR, CAP, HEX, THFRM, M4X.7X20, Zn  | 101288               | 4    |
| 5                              | SHROUD, HTR STRIP                   | 320088               | 2    |
| 6                              | FLUX, CORNER, LOW P, CRS            | PART NUMBER MAY VARY | 1    |
|                                | HEATER STRIP                        | PN VARIES-SEE CHART  | 2    |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |                                                                                                                             |                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <h1>METRIC</h1> | <p>UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS SURFACE ROUGHNESS IN MICROMETERS</p> <p>TOLERANCES:</p> <p>LINEAR <math>\pm 0.13</math><br/>HOLES <math>\pm 0.13</math><br/>ANGULAR (<math>\pm</math>)</p> <p>MACHINED 0.5°<br/>FORMED 1°<br/>CAMMER 5°</p> <p>MACHINED SURFACES <math>\sqrt{1.6}</math></p> <p>BREAK SHARP EDGES:<br/>R.2 OR 45° 0.2 MAX.<br/>INTERNAL MACH CORNER R.4 MAX.</p> | <p>DATE 22-Sep-05</p>                                 | <h2>Gamma Vacuum</h2> <p>2915 133rd Street West • Shakopee, MN</p>                                                          |                                                       |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                               | <p>CHK MHC</p> <p>DATE 9-27-05</p>                    | <p>DATE 9-27-05</p>                                                                                                         | <p>TITLE</p> <h3>SPEC-HEATER INSTALLATION, PUMPS</h3> |
|                 | <p>DR R GOLA</p> <p>CHK MHC</p> <p>APPV RDG</p> <p>RI RDG</p> <p>TOLERANCING AND DIMENSIONING PER ANSI Y14.5M - 1982</p> <p>THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING IS EXPRESSLY PROHIBITED EXCEPT AS GAMMA VACUUM MAY OTHERWISE AGREE TO IN WRITING.</p>                                                                                       | <p>SIZE DRAWING NO.</p> <p>D 430022</p> <p>REV. T</p> | <p>SCALE 1:1000</p> <p>DETACHED <input checked="" type="checkbox"/> PL <input type="checkbox"/> SPEC</p> <p>SHT 9 OF 10</p> |                                                       |

8

7

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5

4

3

DWG. NO. 430022

SHT 10

REV. T

1

D

D

C

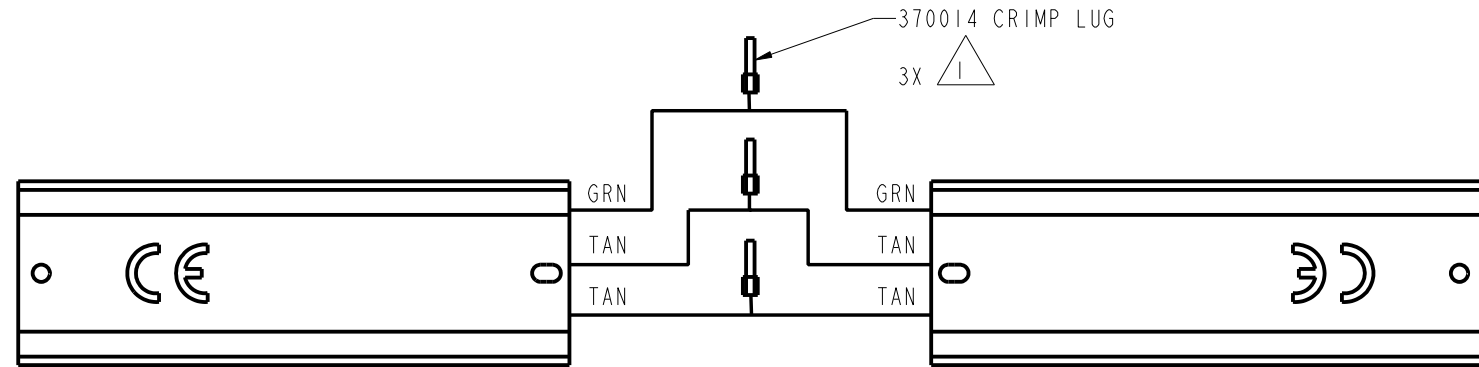
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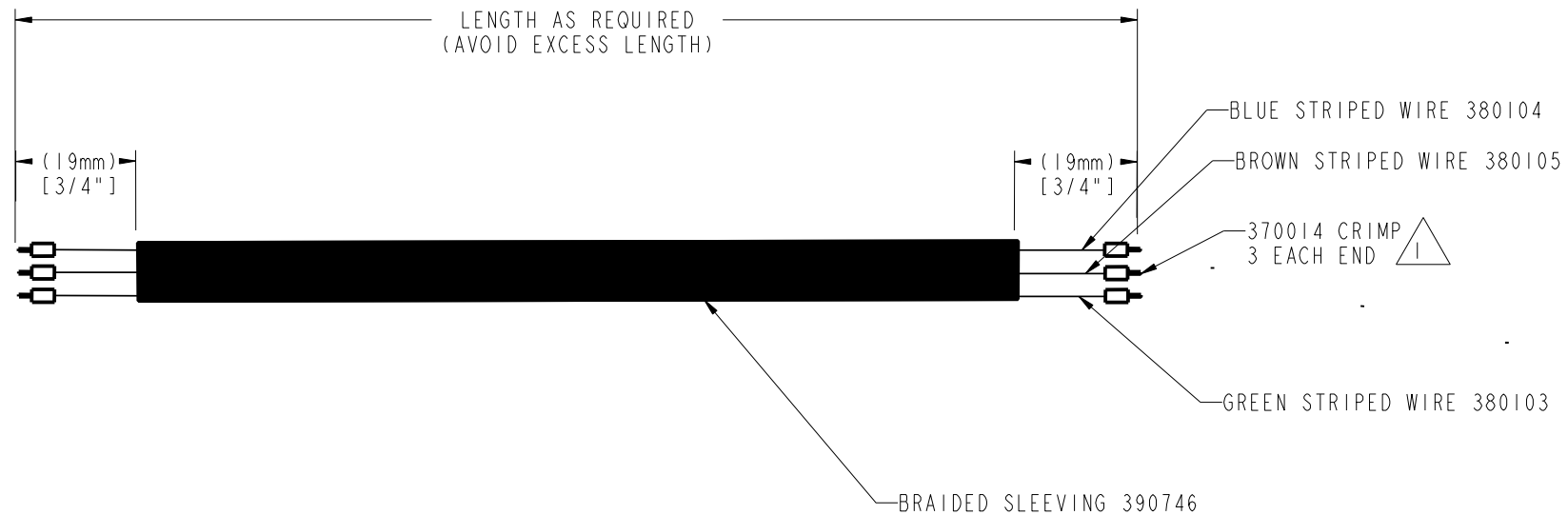
B

A

A



DETAIL M  
TYPICAL HEATERS WIRED IN PARALLEL



DETAIL K  
TERMINAL BLOCK JUMPER CORD  
REF NOTE 3

|                        |  |                                                                                                  |  |                                                                                                                                                                           |                       |                                                              |  |
|------------------------|--|--------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------|--|
| <b>METRIC</b>          |  | UNLESS OTHERWISE SPECIFIED:<br>DIMENSIONS ARE IN MILLIMETERS<br>SURFACE ROUGHNESS IN MICROMETERS |  | DRN R GOLLA DATE 22-Sep-05                                                                                                                                                |                       | <b>Gamma Vacuum</b><br>2915 133rd Street West • Shakopee, MN |  |
|                        |  | TOLERANCES:<br>LINEAR $\pm 0.13$<br>HOLES $\pm 0.13$<br>ANGULAR ( $\pm$ )                        |  | CHK MHC DATE 9-27-05                                                                                                                                                      | APPV RDG DATE 9-27-05 |                                                              |  |
| THIRD ANGLE PROJECTION |  | MACHINED 0.5°<br>FORMED 1°<br>CHAMFER 5°                                                         |  | TOLERANCING AND DIMENSIONING<br>PER ANSI Y14.5M - 1982                                                                                                                    |                       | TITLE<br>SPEC-HEATER INSTALLATION, PUMPS                     |  |
|                        |  | MACHINED SURFACES 1.6                                                                            |  | THIS DRAWING CONTAINS PROPRIETARY<br>INFORMATION AND ANY REPRODUCTION,<br>DISCLOSURE OR USE OF THIS DRAWING<br>IS EXPRESSLY PROHIBITED EXCEPT AS<br>AGREED TO IN WRITING. |                       | SIZE D DRAWING NO. 430022 REV. T                             |  |
|                        |  | BREAK SHARP EDGES:<br>R.2 OR 45° 0.2 MAX.<br>INTERNAL MACH CORNER R.4 MAX.                       |  | SCALE 1.000 DETACHED <input type="checkbox"/> PL <input type="checkbox"/> SPEC SHT 10 OF 10                                                                               |                       |                                                              |  |