

OWNER'S MANUAL

SMD-206 S/N

INFRARED FURNACE SYSTEM

FEBRUARY, 1991

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1.0 INTRODUCTION

1.1 Manual Organization

This manual is intended for users of the Radiant Technology SMD-206 series infrared furnace system. The manual will help in understanding the machine's capabilities, uses, routine maintenance, and basic design features. The introductory section briefly describes the series and specifications, and sets forth requirements for proper installation and initial start up.

Section 2.0 will be of specific interest to personnel who will set up and operate the system. The service manual, beginning with section 3.0, contains maintenance and trouble shooting information. Section 4.0 covers the temperature controls, and section 5.0 contains the documentation package.

1.2 Machine Description

The SMD-206 infrared furnace is a general purpose low temperature system which is suitable for a wide variety of applications that do not require close control of temperature and atmosphere. The machine is equipped with a 6.0 inch wide conveyor belt, running through an infrared furnace chamber, and is capable of temperatures of to 400°C.

1.2.1 Process Section

The process section of this series contains an entrance and exit baffle, infrared heating section, and a forced air cooling section.

The entrance baffle, exit baffle, and infrared heating section is housed in a welded aluminum shell lined with ceramic fiber insulation. Gas curtains, of either nitrogen or air, are generated by introducing gases near the entrance and exit ends of the process chamber from below the transport belt. These gases and hanging baffles at the entrance and exit serve to purge the chamber and prevent ambient air from entering the furnace section. Venturi assisted exhaust stacks at each end of the furnace chamber draw furnace gases across a pair of removable drip trays to prevent exhaust condensation from falling on the transport belt. The furnace section is hermetically sealed, except for the belt openings. Inside the chamber, three nichrome filament heating elements, located above the transport belt, generate heat in the far infrared region. The heating elements produce up to 40 watts per inch, and are capable of heating the furnace interior to a state of equilibrium within minutes. Process gas is introduced in the center of the furnace chamber, and is preheated by allowing it to permeate through the porous ceramic fiber insulation. This method of introducing the process gas does not affect the temperature profile, and helps to keep the furnace interior clean. The heating profile in this series is a fixed profile, and is determined by the lamp spacing, heater design, and operating voltage. Although the heating profile across the belt is fairly uniform, losses through the furnace side walls produce a temperature drop near the edges of the transport belt which are not compensated for.

The forced air cooling section is located outside the furnace section, next to the exit baffle. A small adjustable fan forces ambient air through the belt to help cool thermally massive parts.

1.2.2 Control System

The heated zone of the furnace is controlled via a closed loop temperature control system, which utilizes a K-type thermocouple for feedback. The system has a resolution and accuracy of $\pm 5^{\circ}\text{C}$. As a further control on the amount of heat reaching the product, the belt drive system utilizes a motor shaft tachometer and quartz crystal time base for belt speed control within .15 in/min.

1.3 Specifications

1.3.1 Physical Specifications

Length: 48.0 inches

Width: 13.8 inches

Height: 18.5 inches

Conveyor Width: 6.0 inches

Weight: 150 lbs crated

1.3.2 Electrical Specifications

Input Voltage: 120 or 220 V, 60 Hz
(Note: Consult the factory for other optional factory selectable voltages.)

Input Power: 2.7 KW

1.3.3 Process Gas Requirements

Clean dry air @ 59°F maximum dew point recommended, or nitrogen, as required, regulated to 70 psi maximum.

Consumption: 450 SCFH maximum

1.3.4 Operating Parameters

Temperature Range: 100°C to 400°C

Belt Speed: 1.5 to 30.0 inches/minute

1.4 Warranty

Radiant Technology infrared ovens are warranted for one (1) year from the date of shipment for parts shown to be defective in material or workmanship, exclusive of shipment, and for three (3) months for labor performed by Radiant Technology personnel, exclusive of travel. All warranty parts are FOB Anaheim, California. Labor is limited to the continental United States. This warranty contains Radiant Technology's entire obligation, and no other warranties, express or implied, including consequential damages, are given. Extended warranties may be purchased at additional cost through the RTC Customer Service department.

1.5 Installation

1.5.1 Machine Inspection

Remove the butterfly valves from the process stacks, and then remove the top cover by gently pulling straight up and tilting, as necessary, to clear protruding machine components. Remove the rear side cover, exposing the electrical panel. Inspect the exposed electrical panel for shipping damage, loose connections, and any foreign objects that may have come loose during shipment. Report any shipping damage immediately to the Radiant Technology Customer Service department.

1.5.2 Providing Power

These machines are built and tested to the voltage specified on the nameplate located adjacent to the power cord hole in the rear of the machine. Electrical power, matching the specifications on the nameplate, is to be supplied either with the cord provided or with hard conduit. All city and local codes should be followed when wiring this system for power.

1.5.3 Providing Gas and Air

Uncoiled dry shop air, at a maximum recommended dew point of 59°F, is to be brought to the machine through a customer supplied line with a minimum inside diameter of 1/4 inch. In addition to the supply line, a regulator is recommended if the supply pressure fluctuates or goes above 70 psi.

Warning: Do not operate the machine, at any time, above 70 psi. Failure to follow these instructions will expose the operator to injury from a possible flowmeter failure.

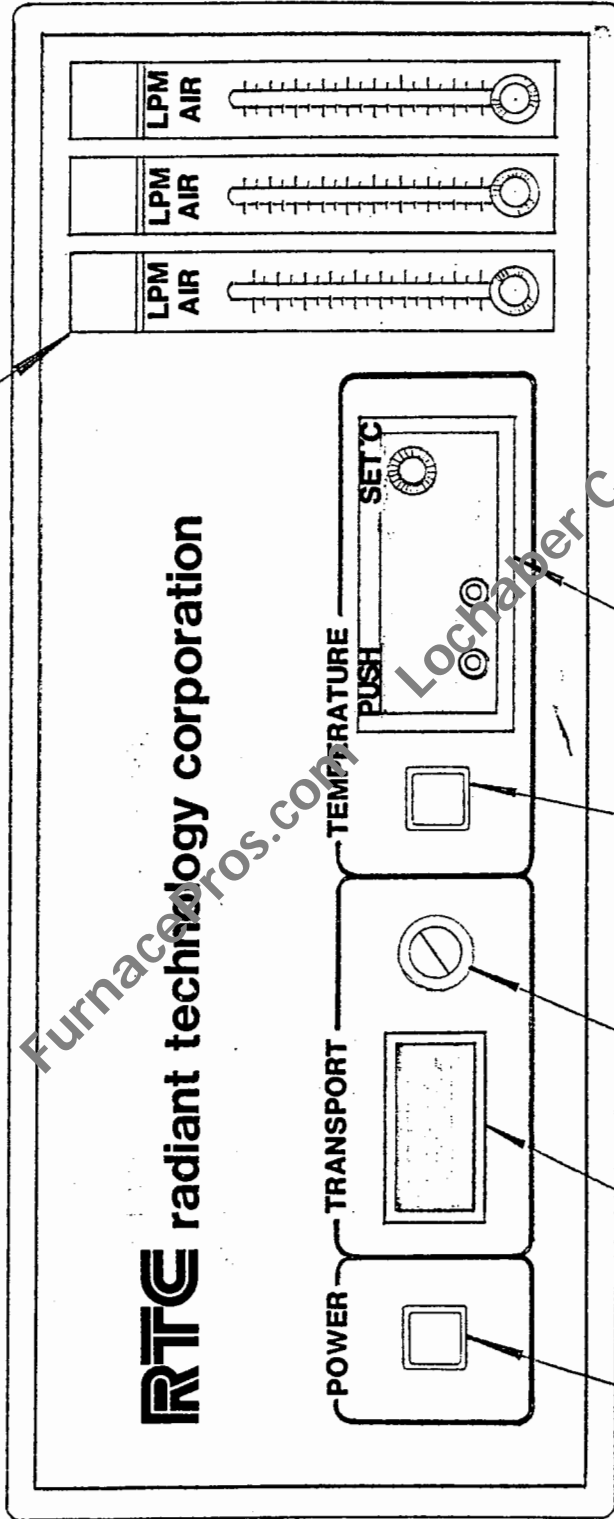
The supply temperature of air or gas should be maintained above the dew point of the room air to prevent condensation from forming on the feed lines and dripping into the machine electronics.

1.5.4 Process Exhaust Requirements

In some applications, it may be desirable to vent process exhaust and heat to the outside atmosphere. It is the customers responsibility to review his process, local laws, and facility in deciding on an exhaust system. Uninsulated exhaust tubing and a collector hood with a 3 inch inside diameter, or larger, is routinely used.

FLOWMETERS
REFER TO 2.2.2

FORCED AIR COOLING
CONTROL KNOB



SEE FIGURE 2

HEAT SYSTEM SWITCH

BELT SPEED ADJUSTMENT

BELT SPEED DISPLAY

POWER SWITCH

FIGURE 2.1 - CONTROL PANEL

2.0 OPERATING INSTRUCTIONS

2.1 Front Panel Controls and Indicators

Figure 2.1 shows the locations of the front panel controls described below.

2.1.1 Power (Left Side of Panel)

Pressing this switch turns the power on, providing the power line is connected and fuses are installed. A pilot light illuminates the pushbutton whenever the power is on.

2.1.2 Transport

Turning this knob controls the speed of the transport belt. Clockwise rotation increases belt speed. Directly to the left of this knob, a digital display shows the belt speed in inches per minute.

2.1.3 Temperature

2.1.3.1 Push Button Switch

Pressing this switch turns on the heating system. A pilot light illuminates the push button whenever the heating system is on.

2.1.4 Forced Air Cooling Knob

Clockwise rotation of this knob increases fan speed and cooling air. Full counterclockwise rotation turns the fan off.

2.2 Functional Checkout

Before operating the furnace for the first time, or after a prolonged shutdown, a functional check of the control system is essential for successful operation.

2.2.1 Turn on Supply Gas

Turn on the atmosphere supply gas and adjust the inlet regulator to 50 psi.

DIGITAL TEMPERATURE DISPLAY

TEMPERATURE

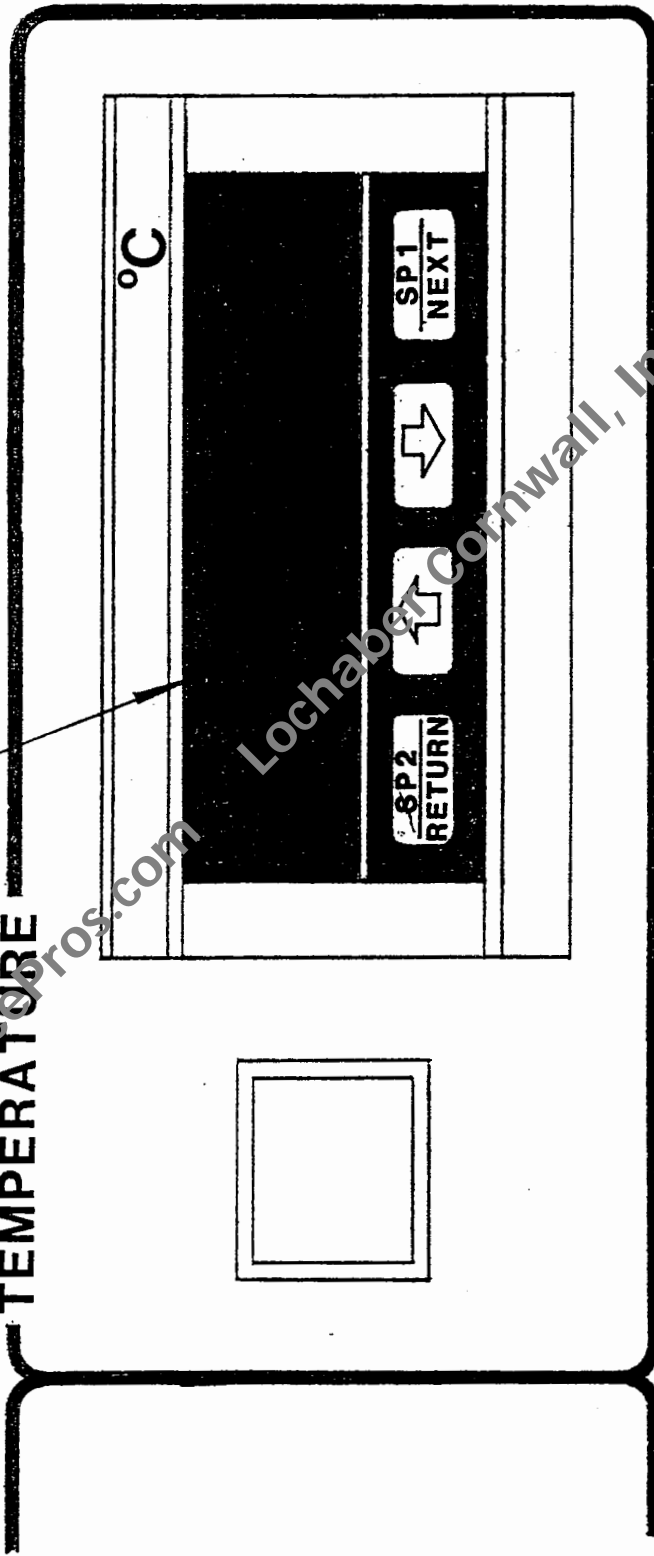


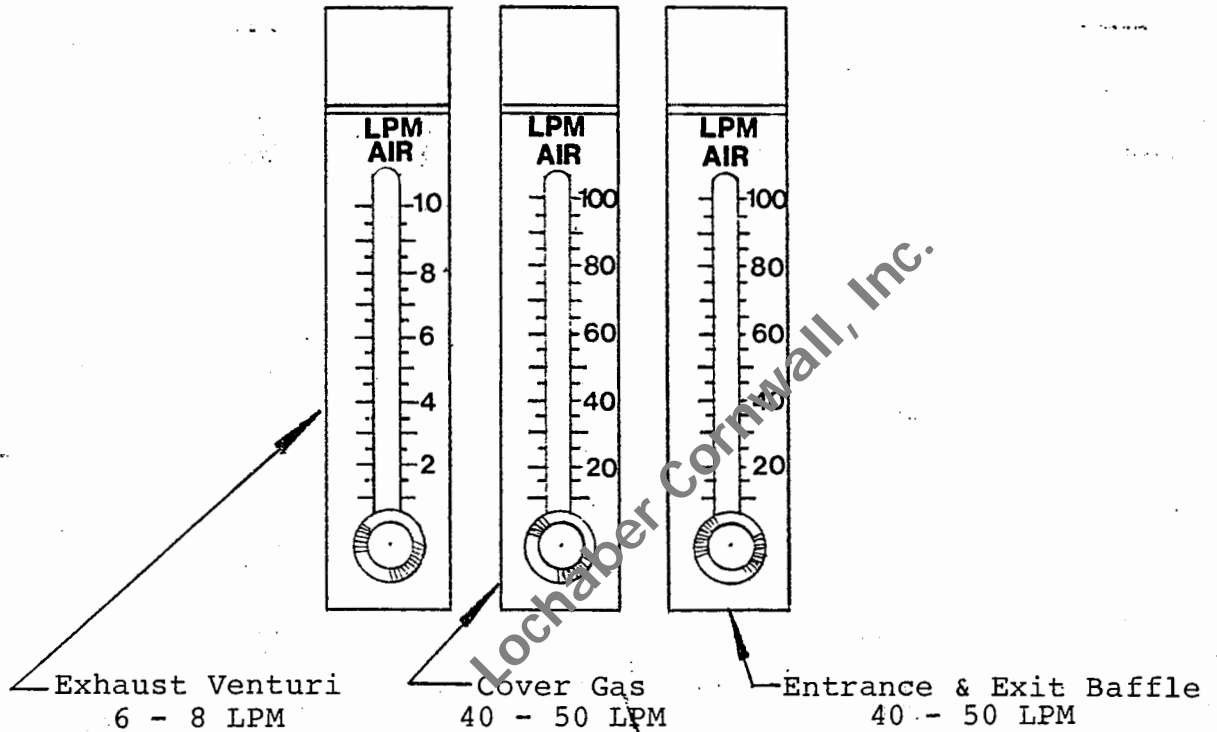
FIGURE 2.2

TEMPERATURE CONTROLLER

(Note: Typical temperature controller, models may vary)

2.2.2 Flowmeters

Adjust flowmeters as noted below.



2.2.3 Press Power Switch

Press the power switch. The push button should illuminate.

2.2.4 Electrical Panel Cooling Fan

Check the cooling fan on the electrical panel and make sure that it is running.

2.2.5 Conveyor Speed

Vary the conveyor speed from minimum to maximum, checking for smooth operation at all speeds. Verify the belt speed accuracy by placing an object on the belt and timing it through two fixed points.

2.2.6 Forced Air Cooling Fan

Turn the forced air cooling control knob from minimum to maximum, while holding your hand above the air outlet adjacent to the exit end of the furnace. The air flow should increase as the control knob is turned clockwise.

2.2.7 Press Temperature Switch

Press the temperature switch. The pushbutton should illuminate.

2.2.8 Set Temperature Controller

Set the temperature controller to 300°C, and allow the machine to reach equilibrium. Visible smoke and fumes may exit the exhaust stacks during the first several minutes of operation. Allow the machine to run at this temperature long enough for the smoke and fumes to stop. During this run in period, check the system for signs of instability or cycling, and correct if necessary. See section 3.0.

Note: Specific instructions for operating each type of temperature controller are included in the documentation package of this manual.

2.2.9 Shut Off Heating Elements

Shut off the heating elements and allow the oven to cool for 10 to 15 minutes before turning the power off.

2.2.10 Turn Off Supply Gas

Turn off the supply gas at its source. This completes the functional checkout.

2.3 Machine Operation

Reliable operation of the machine and repetitive results can be enhanced by following a routine start up procedure. This is particularly true when the products being manufactured are sensitive to oxidation or to temperature variations. To minimize the causes of these variations, it is recommended that the gas flows be established before the heat is turned on, and that the oven is allowed to reach equilibrium for several minutes before processing sensitive products.

3.0 SERVICE INFORMATION

3.1 Routine Maintenance

3.1.1 Daily Maintenance

Daily maintenance consists of a simple series of functional checks that will alert maintenance personnel to any signs of developing problems. The importance of regularly checking the machine cannot be overstressed to prevent not only damage to the machine, but also loss of productive time.

Whenever the furnace is started up, each control and indicator should be briefly checked to insure that all functions are working properly. The belt should speed up when the control knob is turned clockwise, etc. Any controls that do not respond as expected should be checked out and corrected before putting the machine into operation.

3.1.2 Monthly Maintenance

Monthly maintenance, in general, means four weeks of operation for one eight hour shift per day. This period of operation is not an absolute number, and it is possible that some of the tasks are needed more often. Experience with the machine and process being performed should dictate the need.

3.1.2.1 Remove the top and rear side covers, exposing the electrical panel. Remove the four hex head sheet metal screws attaching the sheet metal fan bracket to the electrical panel. Remove the foam sponge air filter; clean and replace. This filter can be cleaned with a mild detergent and water, but must be completely dry before being replaced.

3.1.2.2 During the first month of operation, the transport belt may stretch rapidly from the heat and from the spring loaded take up roller. Check the take up mechanism at the entrance end of the furnace, making sure that at least .25 inch of additional movement remains. If less than .25 inch remains, shorten the transport belt by removing a small length of belt adjacent to the splice wire, and resplicing.

3.1.2.4 Lubricate the drive chain, after the first 30 days of operation, with a non-dripping chain lube, and every 30 days thereafter.

3.1.3 Other Scheduled Maintenance

3.1.3.1 Check the exhaust stacks, after the first 60 days of operation, for possible buildup of materials generated from the firing process. The stacks should be cleaned, as necessary, with a brush and solvent to remove the buildup. A periodic inspection of the stacks is essential to establish a sensible maintenance cycle, since some processes will require frequent cleaning, and others require none at all.

3.1.3.2 Inspect the forced air cooling fan, every 60 days, for freedom of movement and proper operation.

3.1.3.3 After the first 90 days of operation, the drip trays, located under the process exhaust stacks, should be removed and cleaned. The trays are accessible from the entrance and exit ends of the furnace. To remove and clean the trays, proceed as follows.

3.1.3.3.1 Remove the top cover from the furnace.

3.1.3.3.2 Remove the tray and baffles that are held in place (both ends) with #10-32 screws.

3.1.3.3.3 Clean the trays with a suitable solvent.

3.1.3.3.4 Inspect the furnace insulation above the drip trays and gently scrape or knock loose any materials that have collected there.

3.1.3.3.5 Depending on the firing process, if very little buildup is found, cleaning may not be necessary more than once a year.

3.2 Trouble Shooting

3.2.1 Temperature Controls

3.2.1.1 The temperature is unstable. The temperature goes up and down by several degrees.

Improper proportional band setting: To stabilize the heaters, increase the proportional band setting. This will cause the elements to take a longer time to reach temperature, but will stop the oscillation. Refer to the Temperature Control manual, section 4.0.

3.2.1.2 The controller does not stabilize.

Defective controller: Check by interchanging with a known, good controller.

3.2.1.3 The temperature is off scale at the high end, but the elements are cold.

Open thermocouple: An open thermocouple will shut off the heat and indicate very high temperature.

3.2.1.4 The temperature indication is below set point. The heat is on full.

Shorted thermocouple: A shorted thermocouple will turn the heat on full, but indicate very low temperature.

3.2.1.5 The heat is in a run away condition and cannot be controlled with the temperature controller.

Failed SCR: The SCR has failed and shorted out.

3.2.2 Conveyor System

3.2.2.1 The conveyor belt does not move. It has little or no tension. The motor digital display is operational.

Belt is too long: The tensioning springs are not working because of belt stretch. Remove the splice wire and shorten the belt an appropriate amount adjacent to one of the free ends. Reassemble, making sure that the tensioner mechanism has at least 1/4" of travel.

3.2.2.2 The conveyor belt does not move. The motor digital display is dark.

Fuses: Check 6A, ACG, and if ok, check F2 on the motor control board, mounted in the electrical panel.

3.2.2.3 The conveyor belt runs only at full speed. The digital display is at zero or very erratic.

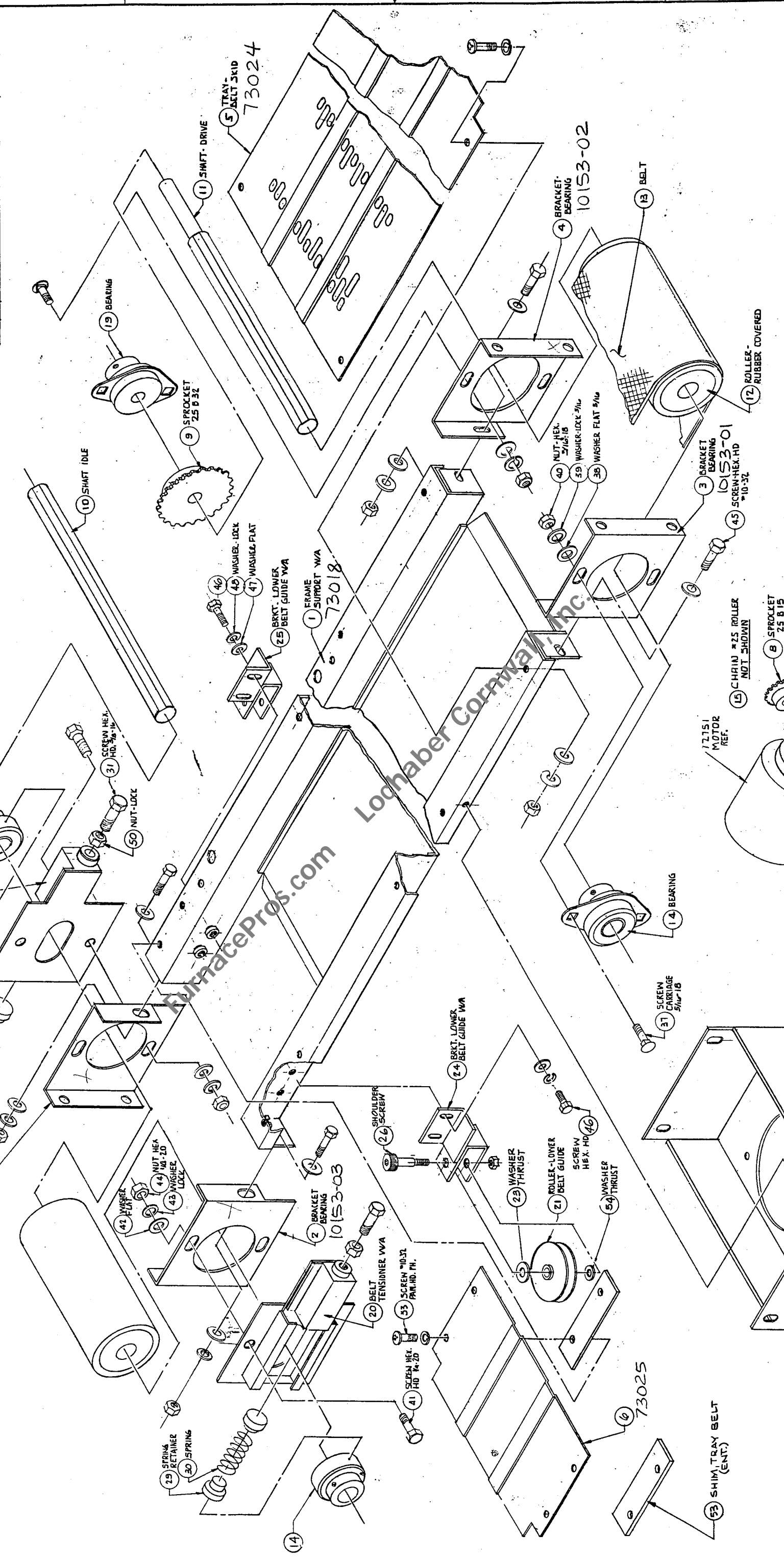
Optical coupler adjustment: The optical coupler, mounted on the motor, must be kept clean and be positioned properly. The timing wheel must be adjusted so that the edge of the wheel and the faces of the wheel have all the same spacing, with respect to the optical coupler.

3.2.2.4 The conveyor belt runs at full speed. The digital display is at zero or erratic. The optical coupler position is ok.

Replace motor or optical coupler: If after it has been determined that the optical coupler is clean and adjusted, as in 3.2.2.3, replace the motor assembly, optical coupler, or motor control.

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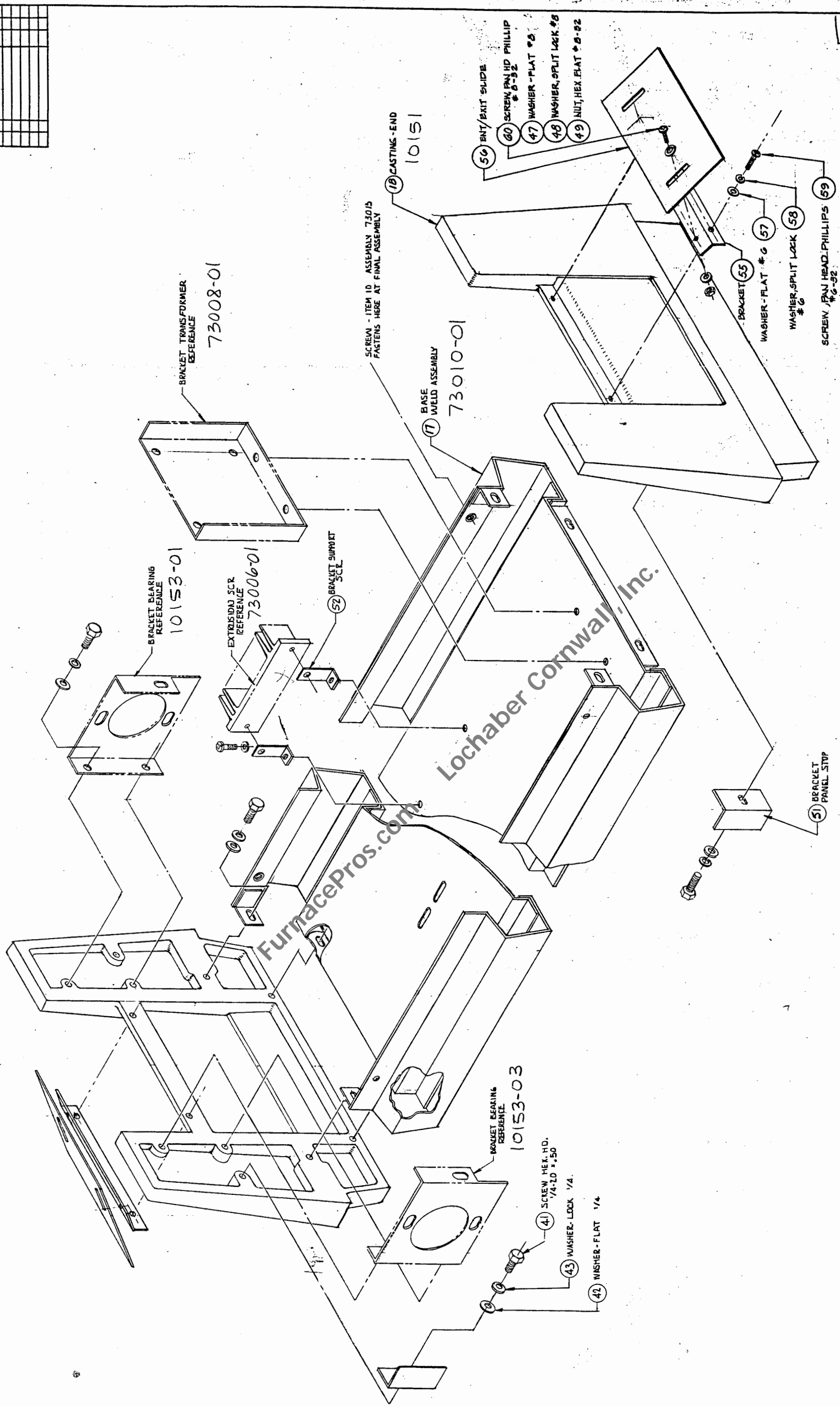


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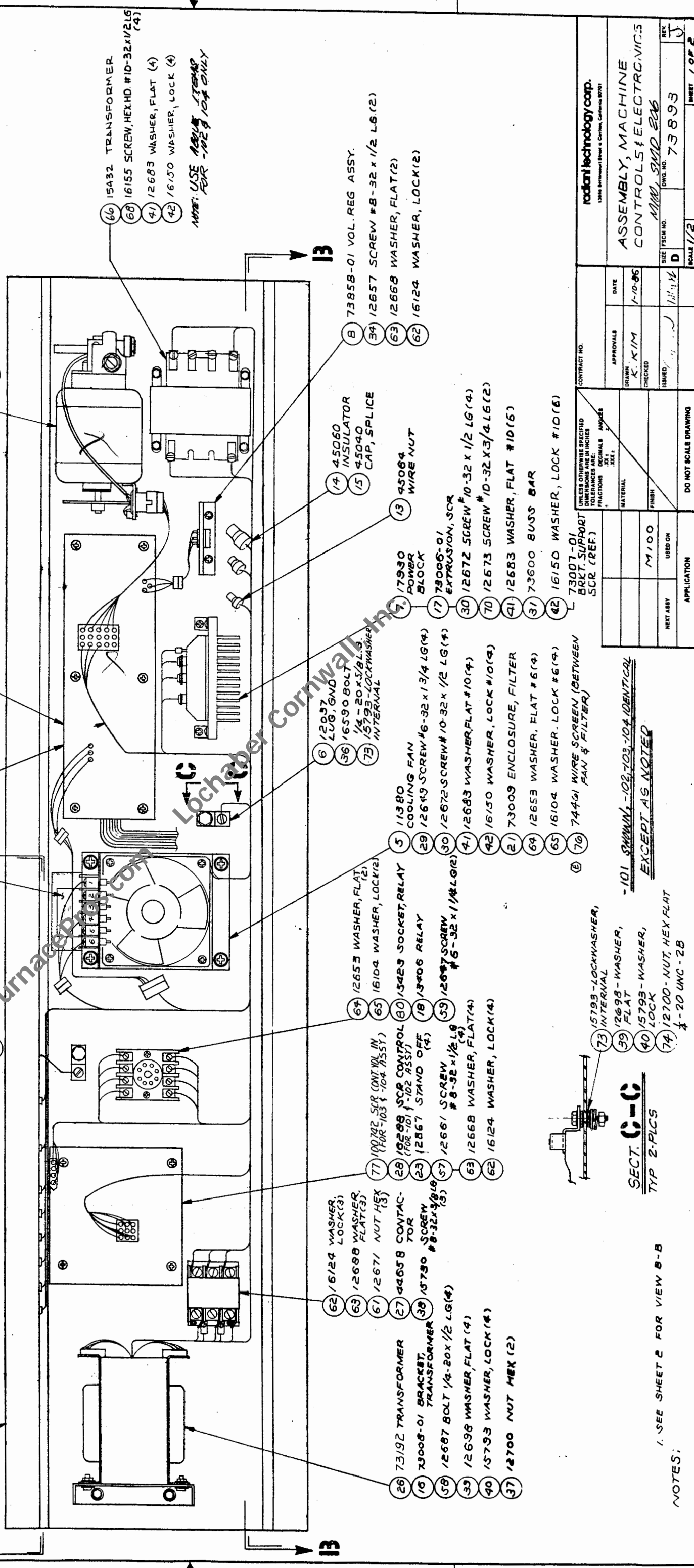
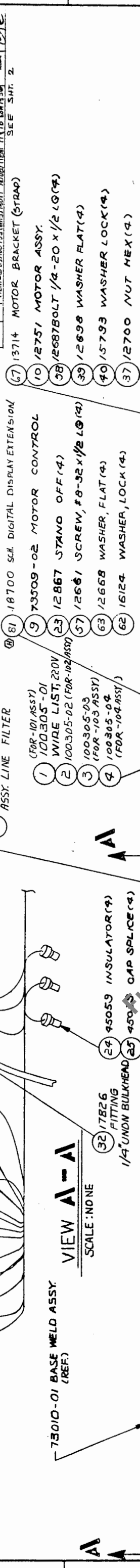
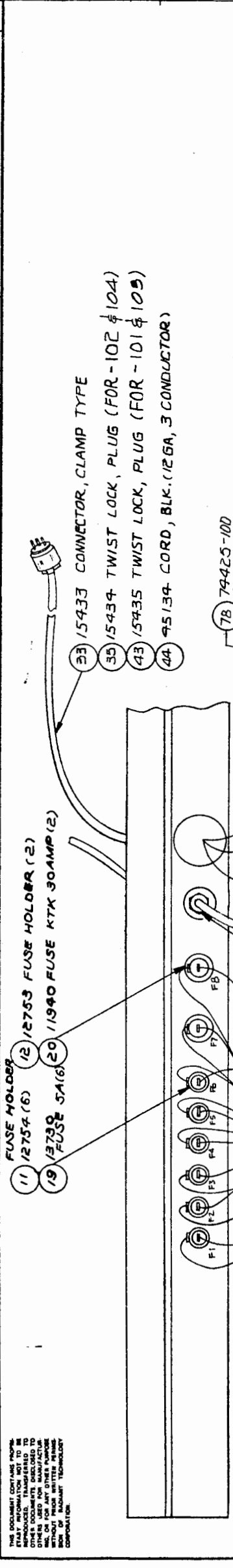


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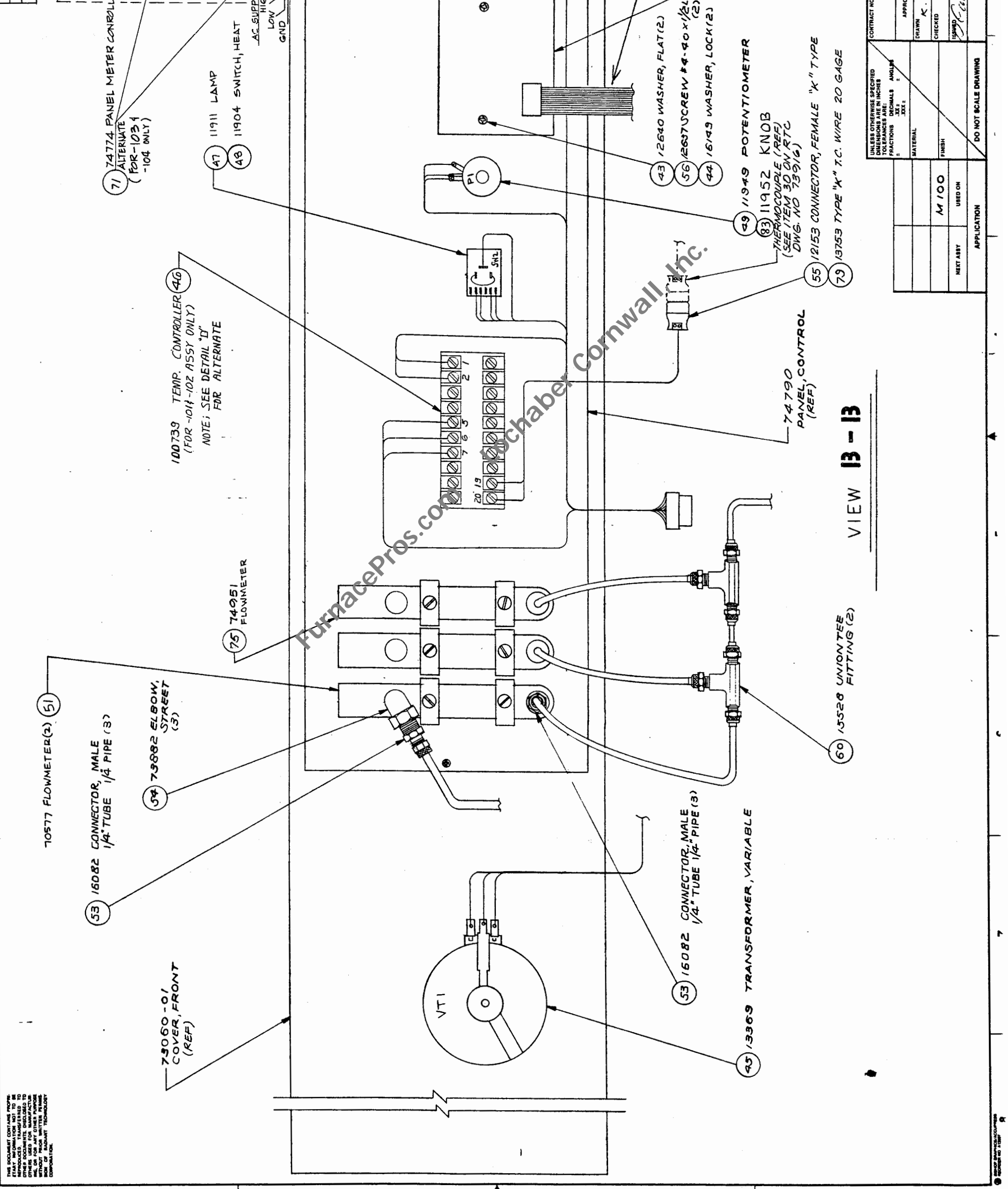
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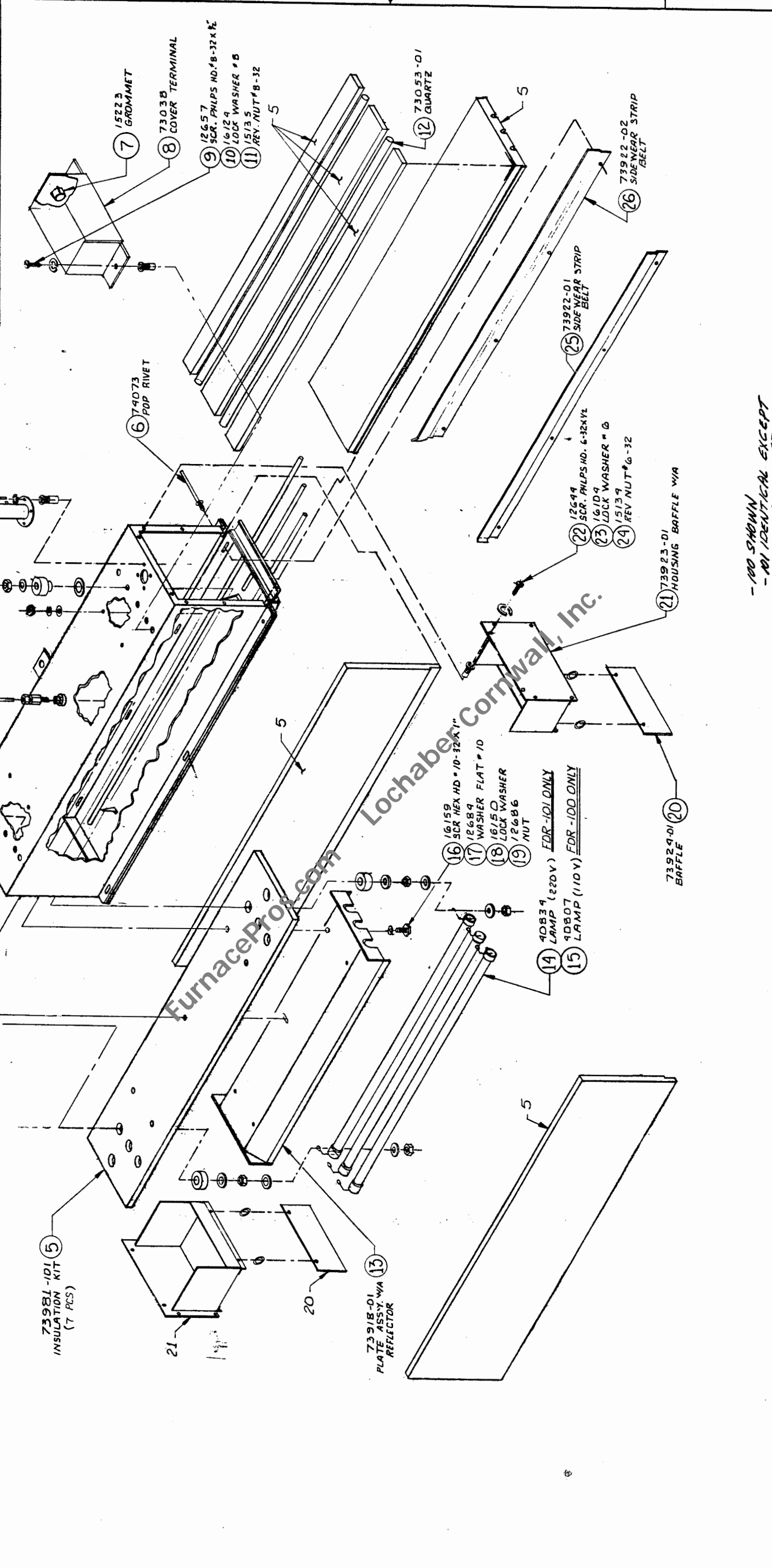
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D	DELETED ITEMS 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	PHL	R [Signature]
E	EXHAUST STACK HOWR IS ITEM 27, 28, 34, WAS 25, 26, 33 EOP 3400	5-8-90	MJ
F	COMPLETELY REV. EOP 3578	10-5-90	R [Signature]

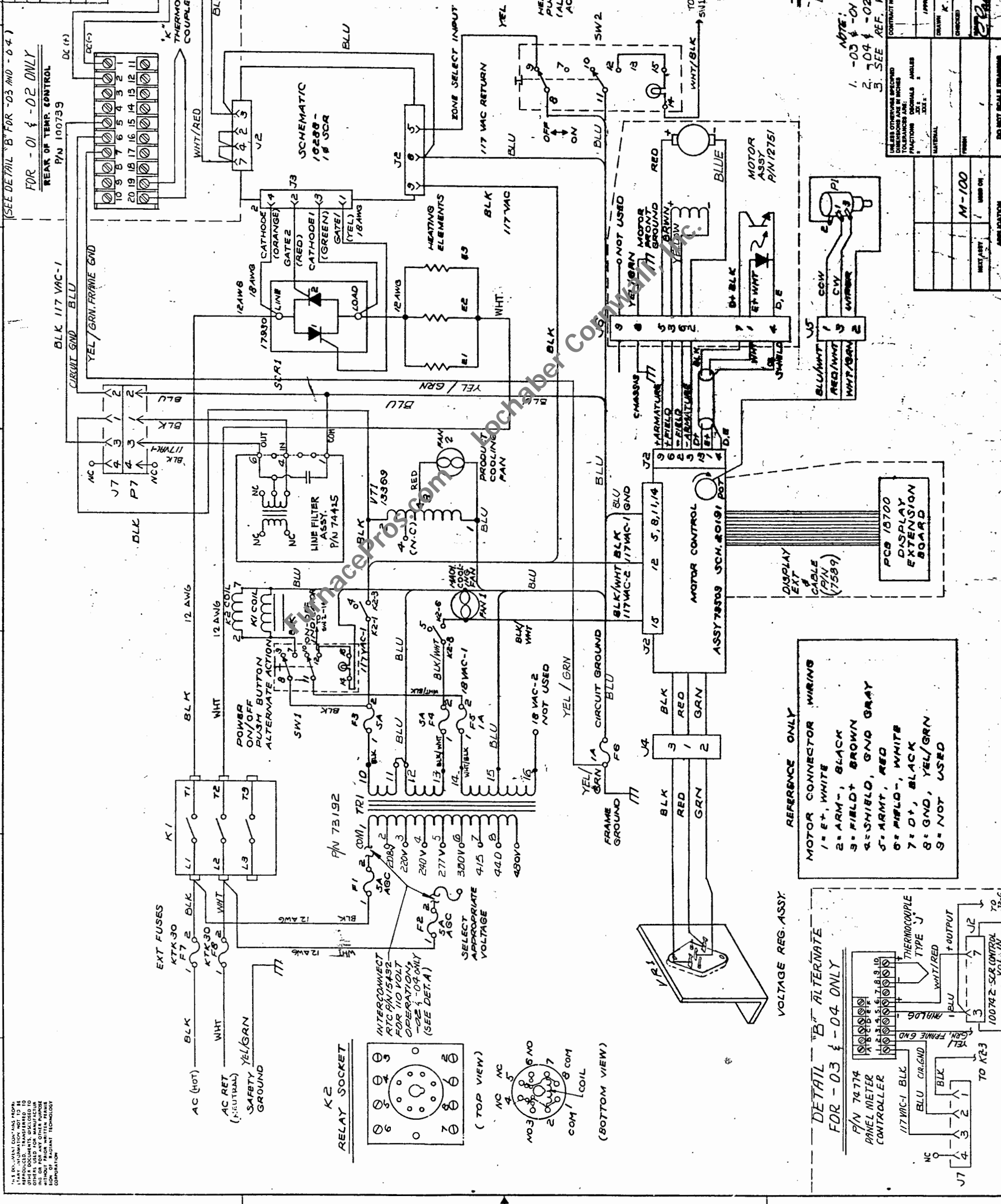


- NO SHOWN
- NOT IDENTICAL EXCEPT
AS NOTED

radiant technology corp. 13888 Serrano Street • Corona, California 92701	
FURNACE CHAMBER ASSY SMD-206	
CONTRACT NO.	DATE
APPROVALS D. GUERREQUE	1-29-86
CHECKED	ISSUED
MATERIAL	FINISH
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES .XX.X .XX .XXE	DO NOT SCALE DRAWING
M-100 NEXT ASSY	USED ON
APPLICATION	SCALE
SIZE FROM NO.	DWG. NO. 73916
REV.	REV.
D	F
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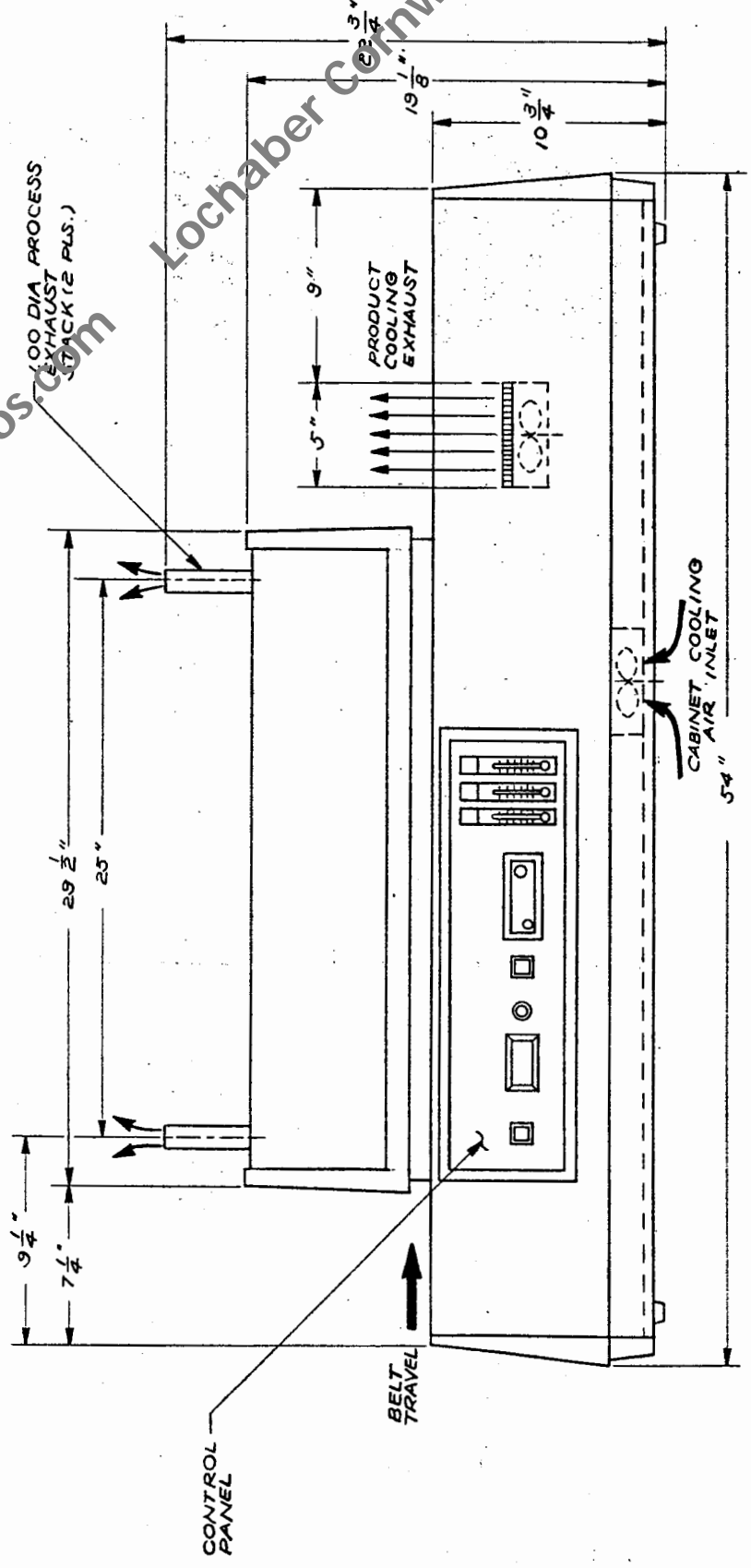
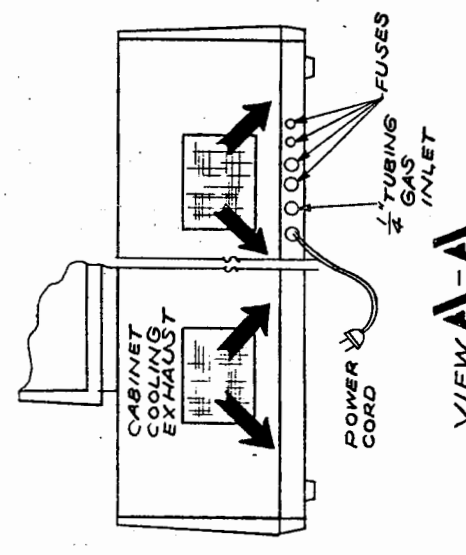
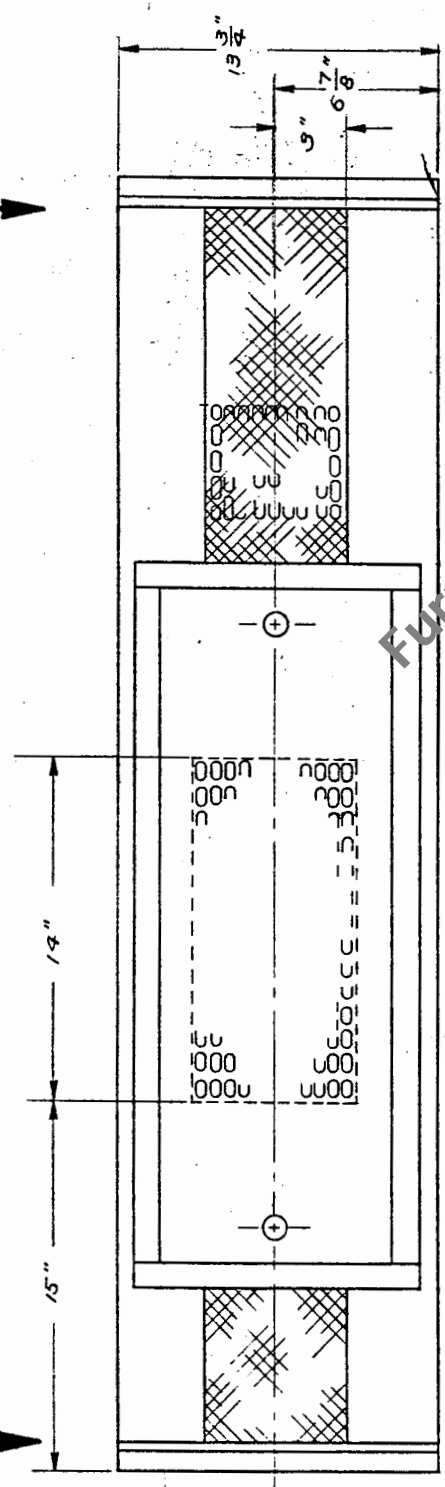
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ZONE	REV.	DESCRIPTION	DATE	APPROVED
A	1	PROD. REL. PER E.O. 12812	12-10-87	WHT/BLK
B	2	ADDED RELAY, REDRAWN CORRECT WIRING OF HEAT/PUSH SW, ADDED WIRE COLOR, ADDED WIRE COLOR, ADDED WIRE COLOR	1-2-88	WHT/BLK
C	3	ADDED RELAY, REDRAWN CORRECT WIRING OF HEAT/PUSH SW, ADDED WIRE COLOR, ADDED WIRE COLOR, ADDED WIRE COLOR	1-2-88	WHT/BLK
D	4	ADDED WIRE COLOR, ADDED WIRE COLOR, ADDED WIRE COLOR, ADDED WIRE COLOR	1-2-88	WHT/BLK
E	5	CHANGED: TEMP. CONTROLLER P/N 74774 WAS 73077-01. ADDED: P/N 100453 ADAPTER CARD, LAST LINE FILTER P/N 74425	9-19-84	WHT/BLK
F	6	CHANGED WIRE COLOR TO CONVEYOR MOTOR SEE E.O. # 1786	8-13-87	WHT/BLK
G	7	CHANGED: TEMP. CONTROLLER P/N 74774 WAS 73077-01. ADDED: P/N 100453 ADAPTER CARD, LAST LINE FILTER P/N 74425	12-2-87	WHT/BLK



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ZONE	REV.	DESCRIPTION	DATE	APPROVED
A		PROD. REL. PER E.O. 00577	12-3-85	[Signature]



	M 100
POWER CONSUMPTION (PEAK)	3.5 KW
(AVERAGE)	1.2 KW
GAS CONSUMPTION (MAX)	300 SCFH
GAS PRESSURE REQ. (MAX)	100 PSIG
(MIN)	30 PSIG
PROCESS EXHAUST (MAX.)	250 SCFH
(MIN.)	250 °C
PRODUCT COOLING (MAX.)	75 CFM

2. DIMENSIONS SHOWN FOR INSTALLATION REFERENCE ONLY
 1. MAXIMUM PARTS HEIGHT 4 INCHES.

NOTES:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES .XXX .XXX °		CONTRACT NO.	rodion technology corp. 19845 Investment Place & Corral, Colton, CA 92304
MATERIAL	APPROVALS	DATE	INSTALLATION DRAWING INFRARED FURNACE, M-100 & SMD-206
FINISH	DRAWN K. K/M	11-21-85	SIZE FROM NO. 100289-01 SCALE D
USED ON	CHECKED [Signature]	ISSUED	SHEET / OF / 1 A
APPLICATION	DO NOT SCALE DRAWING		

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION...
 LOCHABER CORNWALL, INC.