PERMADUR INDUSTRIES, INC.
MAGNETICS DIVISION LOADPOSITIONER DIVISION
186 ROUTE 206 SOUTH • HILLSBOROUGH, NJ 08844 • (908) 359-9767 • FAX (908) 359-9773

PERMADUR

MAGNETIC LIFTING SYSTEM
OPERATION AND MAINTENANCE MANUAL

Model #: Series 612 Plate Handling System w/ 12ea. TP-2000 Permadur Lifting Magnets on 26' load beam.
Power Source: 460 VAC, single phase
Serial Number: 002754
Original Purchaser: UTLX Manufacturing, Inc. Houston, TX
Ship Date: 1/08

Permadur Industries, Inc.
186 Route 206 South, P.O. Box 1032 **PH(908)359-9767**
Somerville, NJ 08876 **FAX(908)359-9773**
Website: www.permadur.com email: info@permadur.com

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INTRODUCTION

The Permadur Magnet is a material handling device tool carefully designed to provide efficient operation and maximum safety. Properly utilized and maintained, the working life of this unit is virtually indefinite. As with any heavy material handling device, the utmost caution and respect is recommended. This Operation and Maintenance Manual is intended to instruct and identify the proper application of the Permadur Magnet System. We suggest that you read it thoroughly and review the contents with the magnet operator to assure that your Permadur Magnet System will provide a long, productive, and safe working life.

OPERATING PRINCIPLE

The Permadur Magnet is an electrically controlled permanent magnet. It requires no continuous source of energy to maintain holding power. “On-Off” control is obtained by controlling the path of the magnetic holding forces generated by the permanent magnetic material. A brief pulse of current from the power source will direct these holding forces either out the bottom of the magnet and into the load, or through the top of the magnet and into an internal steel “Keeper” plate. Once directed, the magnetic lines of force will remain in either the load or keeper without consuming energy until redirected. Power failure has no effect on Permadur Magnet capacity and will not cause loads to be released.

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PURPOSE

The primary purpose of the Permadur Plate/Part Handling System covered by this instruction Manual is to load and unload single plates. The rated capacity of the System is **8,825 lbs. (90”-149”W x 317”-372”L x 7/16”-9/16”Thick)**, with all magnets operating and in full contact with the mild steel plate. Please contact Permadur if larger and/or heavier lifts are desired.

The Permadur Lifting Magnet System covered by these operating instructions consists of 12 each Permadur TP-2000 Lifting Magnets suspended from 12ea. Spring Suspension Assemblies on a 26’ load beam.

The Permadur Lifting Magnet System is equipped with an “On-Off” Safety Indicator Lighting panel, which allows the operator to select which magnets are to be utilized for the lift and to visually confirm proper magnet operation prior to making the lift. Actuation of the “ON” selector switch for each magnet at the main control panel will turn the corresponding red light on verifying that the magnet is intended for use in the lift. Actuation of the System “ON” button on the pushbutton Pendant will turn the green lights on at the control panel when the selected magnets have attached to the plate/parts to be lifted. If the green light does not come on, the magnet is not attached and is not ready for lifting.

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LIMITATIONS

Certain limitations apply to the use of the Permadur Lifting Magnet. These limitations are in part due to the special characteristics of the Permadur Magnet, but generally reflect the operating characteristics of any Lifting Magnet System.

- The Permadur Magnet will not operate unless a minimum of 50% of the area of the magnet poles is in contact with the material being lifted. This is 11" of the TP-2000 pole surface length. This can be multiple pieces as long as they add up to 11".
- The Permadur Lifting Magnet will not release its load unless the tension on the magnets lifting eye is removed and there is sufficient slack in the suspension to allow the magnet lifting eye to drop ½".
- Air gaps can cause severe derating of the lifting magnet (see chart in Lifting Magnet Derating section). Plates to be lifted must be swept clean of debris. Plate variation from flatness across the width of the plate must be less than 1/8" for a 96" plate up to 3/4" Thick. This allowable variation would be reduced linearly for plate of lesser width.
- Do not attempt to lift stacks of plate. This System has been designed to lift only the plate in contact with the Magnet. **Note:** For this application the tack welding of plates will enable two plate lifting.

WARNING:

- Do not electric weld on plates in contact with magnets, as they will cause severe and permanent damage to the magnetic field.

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OPERATING INSTRUCTIONS

1) Lift the load beam and wipe all poles clean. Any materials embedded or attached to the magnet poles should be removed.

2) Place the center line of the Magnet System on the center line of the plate to be lifted. Magnet rows should be positioned on the load beam so that they are within 2' of the ends and sides of the plate to be handled. Spacing between magnet rows should not exceed 8'.

3) Select those magnets to be used for the lift via the Magnet Row Selector Switches on the Control Panel (one Switch for each row of Magnets). Selection of the Magnet Row for use in the lift will turn the corresponding red light on verifying that the magnet Row is intended to be used.

4) Activate the Magnet System by depressing the "ON" control button on the controller pendant or on the Crane Control Pendant (by customer).

5) Upon activating the "ON" button, observe that the green light is "LIT" for each magnet intended for use. **DO NOT MAKE A LIFT UNTIL THERE IS A CORRESPONDING GREEN LIGHT LIT FOR EVERY RED LIGHT THAT IS "LIT" ON THE SAFETY INDICATOR CONTROL PANEL. THIS INDICATES THAT EVERY MAGNET ROW INTENDED FOR USE (RED LIGHT) HAS ATTACHED TO THE LOAD (GREEN LIGHT).**

6) Hold the control button in the "ON" position until the load has cleared the ground. At this time the "ON" button should be released.

7) Move the Magnet System and load to their destination and lower the Magnet System until the load has been lowered into place and the load beam is resting on its sit-down legs resulting in a slack suspension which is required prior to magnet release of load.

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OPERATING INSTRUCTIONS

1) Lift the load beam and wipe all poles clean. Any materials embedded or attached to the magnet poles should be removed.

2) Confirm that all the Magnets are handing in Plane to insure proper Magnet load sharing.

3) Confirm that the load to be handled is within the System design parameters: 90”-149”W x 317”-372”L x 7/16”-9/16” Thick Mild Hot Rolled Steel Plate: 8825 lbs.

4) Place the center line of the Magnet System on the center line of the plate to be lifted. Magnet rows should be positioned on the load beam so that they are within 2’ of the ends and sides of the plate to be handled. Spacing between magnet rows should not exceed 8’. Magnet rows #1 & #6, #2 & #5, and #3 & #4 should be positioned equidistant from the center line of the Magnet System, so that the System and load are balanced. Lower the System until the Magnet lifting poles (bottom of Magnets) are in contact with the plate to be lifted. Use all 12 Magnets for handling 149” x 372” Plate.

5) Select those magnet rows to be used for the lift via the Magnet Row Selector Switches on the Control Panel (one Switch for each row of Magnets). Selection of the Magnet Row for use in the lift will turn the corresponding red light on verifying that the magnet Row is intended to be used.

6) Activate the Magnet System by depressing the “ON” control button on the controller pendant or on the Crane Control Pendant (by customer).

7) Upon activating the “ON” button, observe that the green light is “LIT” for each magnet intended for use. **DO NOT MAKE A LIFT UNTIL THERE IS A CORRESPONDING GREEN LIGHT LIT FOR EVERY RED LIGHT THAT IS “LIT” ON THE SAFETY INDICATOR CONTROL PANEL. THIS INDICATES THAT**

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OPERATING INSTRUCTIONS (CONT.)

EVERY MAGNET ROW INTENDED FOR USE (RED LIGHT) HAS ATTACHED TO THE LOAD (GREEN LIGHT).

8) Hold the control button in the "ON" position until the load has cleared the ground. At this time the "ON" button should be released.

9) Move the Magnet System and load to their destination and lower the Magnet System until the load has been lowered into place and the load beam is resting on its sit-down legs resulting in a slack suspension which is required prior to magnet release of load.

10) Depress the magnet "OFF" button on the control pendant and hold until all green lights have gone out. Continue to hold the "OFF" button until the Permadur Magnet System has been lifted clear of the load.

11) If difficulty is encountered in releasing the load, repeat Steps #9 and #10. Contact Permadur if System does not release load after step #11.

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PERMADUR LIFTING MAGNET

SAFETY CHECKLIST

BEFORE EVERY LIFT……..

- Clean and deburr magnet faces and load.
- Check load weight and dimensions against maximum capacity figure.
- Check for proper positioning of magnets.
- Check that Safety Indicator Light is green for all magnets selected for attachment to load and hold Pendant “ON” button until load is suspended.

DURING EVERY LIFT……..

- Never carry load over yourself or others.
- Never lift unbalanced loads.
- Never leave suspended loads unattended.

AFTER EVERY LIFT…….

Hold the pendant “OFF” button until all magnets are removed from the load.

MAINTENANCE……..

Store Magnet System off the floor on boards which support all lifting magnets.

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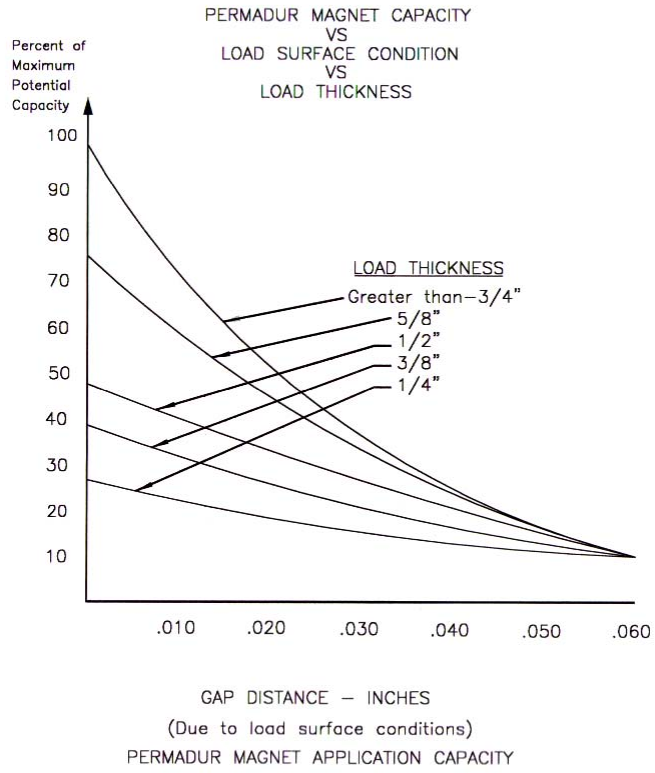

LIFTING MAGNET DERATING

The design rated capacity of the Series 612 Permadur System with 12 each TP-2000 Lifting Magnets is 8,825 lbs. (based on largest plate size of 149" x 372" x 9/16"Thick), with all twelve (12) lifting magnets in full contact with the mild steel plate. Contact Permadur before handling larger or heavier plate sizes.

The Maximum potential capacity of each individual TP-2000 Lifting Magnet is 8000 lbs. on ¾" Thick Mild Steel with a ground surface finish. The rated capacity of a TP-2000 is 2000 lbs. on ¾" Thick Hot Rolled Steel with a 2 to 1 Safety factor. As part of this Series 612 System, on 9/16" Thick Hot Rolled Steel, each TP-2000 Lifting Magnet is rated at 735 lbs. with a 4 to 1 safety factor. Magnets must be positioned via the overhead crane and/or the magnet crossarms to provide two pole contact of each magnet with all parts to be lifted. Also refer to the previous LIMITATIONS section prior to magnet system use.

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INSPECTIONS AND MAINTENANCE

EVERY LIFT INSPECTION:

- Check that magnet poles are clean and free from burrs. Magnet Poles can generally be cleaned with a brush or broom.
- Check condition of all beam and magnet suspension members. All magnets should be hanging in plane (± 1/16").

DAILY INSPECTION:

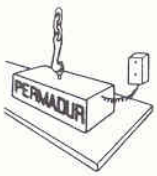
- All items for EVERY LIFT INSPECTION.
- Magnet Systems should be placed on wooden supports and magnet pole faces carefully inspected and cleaned to remove any materials imbedded into poles.
- System Safety Lights should be checked and replaced when necessary.
- Check all external wiring for loose connections and insulation damage.
- Check that the suspension assemblies of each magnet provide free operation of magnet (ON/OFF) when system is at rest.

QUARTERLY INSPECTION:

- All items for DAILY INSPECTION.
- Inspect all internal electrical connections for loosening, corrosion, insulation, and damage.
- Check System Power Supply for proper input voltage to Transformer and Transformer secondary output voltage to controller.
- Check System Controller for proper ON/OFF voltage to each Magnet.
- Check Magnet Coils for proper resistance (3.75 ohms) and grounds.
- Check for proper Proximity Switch operation.

ANNUAL INSPECTION:

- All items for QUARTERLY INSPECTION.
- Load test of magnet unit.



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FIELD LOAD TEST

1) Review INSPECTION AND MAINTENANCE section.
2) Clean Magnet poles of burrs and debris as they will derate total lifting capacity.
3) Use a Plate of length (372”) and width (149”W) and Thickness (3/4”) to provide a Test weight that is **125%** maximum recommended System Capacity (or 11765 lbs.). Solid Plate must be used for this Test, not a stack of plate welded together. Lifting this Plate(s) will demonstrate that the System meets and exceeds ASME B30.20-1999 Specifications for Below-the-Hook Equipment Safety Factor (125%).
4) Lift this plate 2”-3” per normal operating procedure. **Do not** suspend load over personnel or machinery.
5) Record date and results of test.

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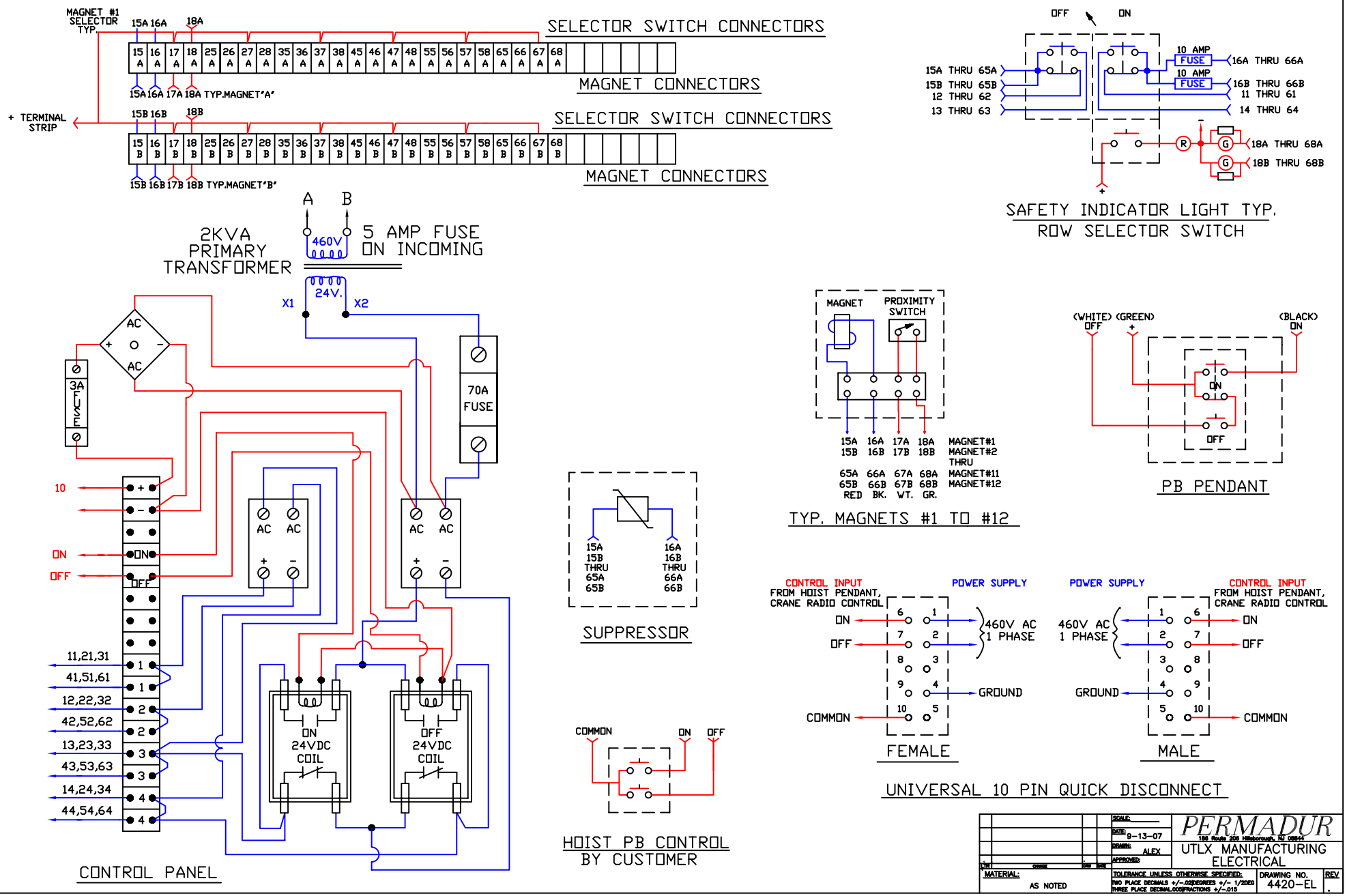
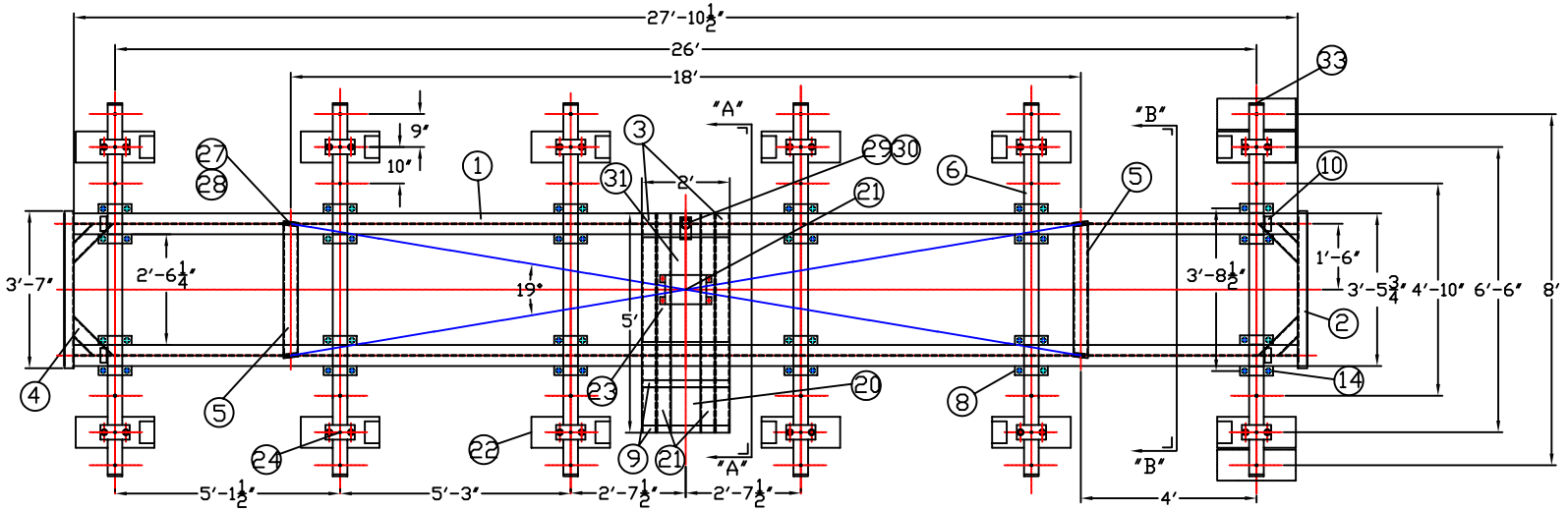
PERMADUR MAGNET REPAIR PROCEDURE

(CONTACT PERMADUR PRIOR TO STARTING AS THIS MAY VOID WARRANTY)

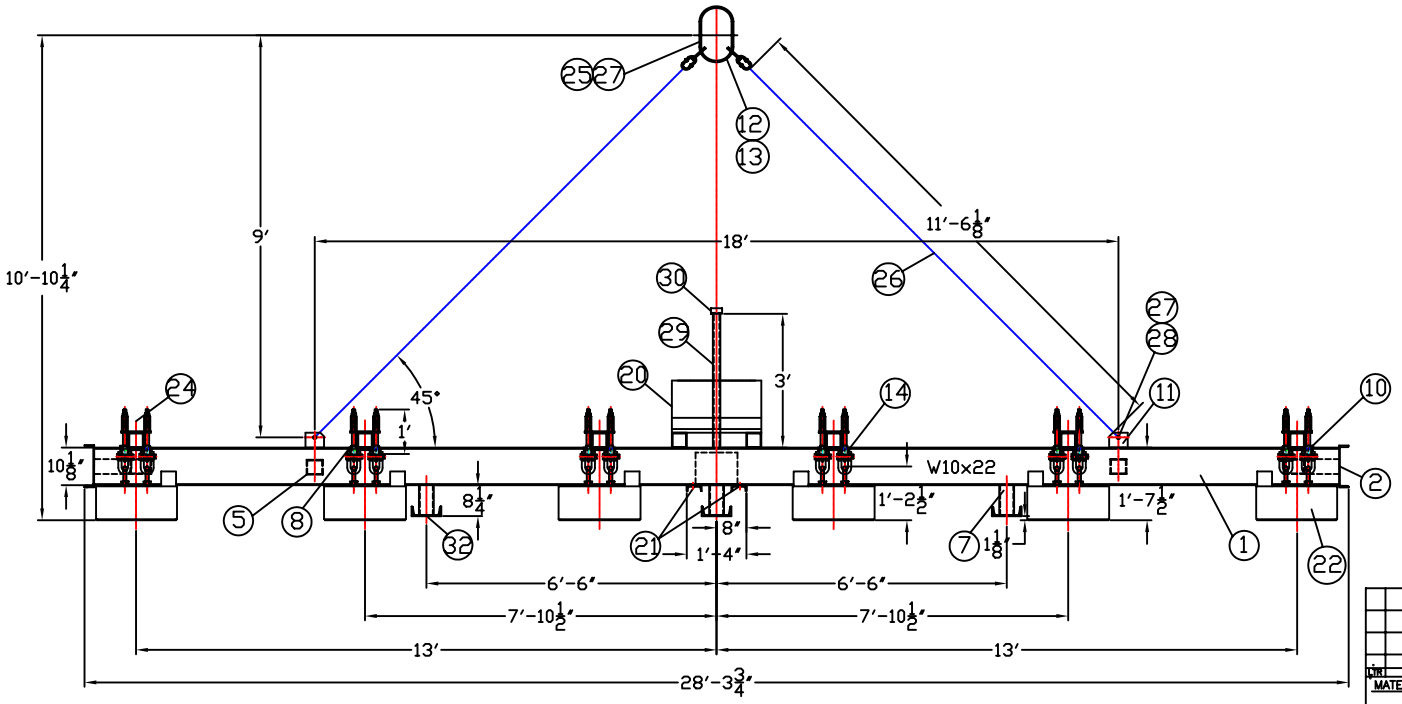
1) Detach lifting magnet from load beam by removing shackles.
2) Mark and disconnect coiled cord from lifting magnets at junction box on magnet.
3) Move load beam away from magnet to be repaired.
4) Mark and disconnect magnet coil wires from terminal board in magnet junction box. Straighten wires so that they can be pulled thru hole in magnet junction box when housing is removed.
5) Match mark lifting eyes, drive out roll pins, and remove lift eyes and rubber bellows.
6) Remove button head socket head screws from sides of housing. Spacer block and steel guards will drop out when all screws are removed from each side. Note configuration for re-assembly.
7) Carefully lift housing from magnet making sure coil lead wires feed through control box handle.
8) Mark top keeper plate orientation relative to magnet coil leads for proper re-installation as keeper may not be symmetrical.
9) Examine space between top of magnet sandwich and underside of keeper plate to determine what is preventing keeper from coming down.
10) Make a temporary reconnection of magnet control wires in coiled cord to magnet coil wires. Depress “OFF” button in pendant to see if problem still exists. If so, depress “ON” button and lift top keeper away from top of Magnet. Replace springs according to current red/blue spring arrangement. Replace top keeper in same orientation as it was when removed. **DO THIS BY HOLDING FORM TOP WITH LIFT EYES. DO NOT PUT FINGERS BETWEEN TOP KEEPER AND TOP OF MAGNET.**
11) Test that magnet is operational by depressing “OFF” button in pendant control and observe that top keeper moves down into contact with top of magnet sandwich. Press “ON” button to see that keeper moves up freely.
12) Replace housing, spacers, guards, etc., with keeper in “UP” position. Be careful to pull coil wires through hole in magnet control box without damage.
13) Re-connect magnet and test.


MAGNET #1 SELECTOR TYP.
15A 16A
18A
SELECTOR SWITCH CONNECTORS
15 A 16 A 17 A 18 A 25 A 26 A 27 A 28 A 35 A 36 A 37 A 38 A 45 A 46 A 47 A 48 A 55 A 56 A 57 A 58 A 65 A 66 A 67 A 68 A
MAGNET CONNECTORS
15A 16A 17A 18A TYP.MAGNET "A"
+ TERMINAL STRIP
15B 16B
18B
SELECTOR SWITCH CONNECTORS
15 B 16 B 17 B 18 B 25 B 26 B 27 B 28 B 35 B 36 B 37 B 38 B 45 B 46 B 47 B 48 B 55 B 56 B 57 B 58 B 65 B 66 B 67 B 68 B
MAGNET CONNECTORS
15B 16B 17B 18B TYP.MAGNET "B"
OFF
ON
10 AMP FUSE
10 AMP FUSE
15A THRU 65A
15B THRU 65B
12 THRU 62
13 THRU 63
16A THRU 66A
16B THRU 66B
11 THRU 61
14 THRU 64
18A THRU 68A
18B THRU 68B
SAFETY INDICATOR LIGHT TYP. ROW SELECTOR SWITCH
A B
2KVA PRIMARY TRANSFORMER
460V
5 AMP FUSE ON INCOMING
24V.
X1
X2
AC
AC
3A
70A FUSE
10
ON
OFF
11,21,31
41,51,61
12,22,32
42,52,62
13,23,33
43,53,63
14,24,34
44,54,64
ON 24VDC COIL
OFF 24VDC COIL
CONTROL PANEL
15A 15B THRU 65A 65B
16A 16B THRU 66A 66B
SUPPRESSOR
COMMON
ON
OFF
HOIST PB CONTROL BY CUSTOMER
MAGNET
PROXIMITY SWITCH
15A 15B
16A 16B
17A 17B
18A 18B
MAGNET#1 MAGNET#2 THRU
65A 65B
66A 66B
67A 68B
MAGNET#11 MAGNET#12
RED BK. WT. GR.
TYP. MAGNETS #1 TO #12
(WHITE) OFF
(GREEN)
(BLACK) ON
ON
OFF
PB PENDANT
CONTROL INPUT FROM HOIST PENDANT, CRANE RADIO CONTROL
POWER SUPPLY
ON
OFF
460V AC 1 PHASE
GROUND
COMMON
FEMALE
POWER SUPPLY
CONTROL INPUT FROM HOIST PENDANT, CRANE RADIO CONTROL
460V AC 1 PHASE
ON
OFF
GROUND
COMMON
MALE
UNIVERSAL 10 PIN QUICK DISCONNECT
SCALE:
DATE: 9-13-07
DRAWN: ALEX
APPROVED:
MATERIAL: AS NOTED
TOLERANCE UNLESS OTHERWISE SPECIFIED:
TWO PLACE DECIMALS +/-.02DEGREES +/- 1/2DEG
THREE PLACE DECIMAL.005FRACTIONS +/-.015
PERMADUR
188 Route 206 Hillsborough, NJ 08844
UTLX MANUFACTURING
ELECTRICAL
DRAWING NO. 4420-EL
REV .



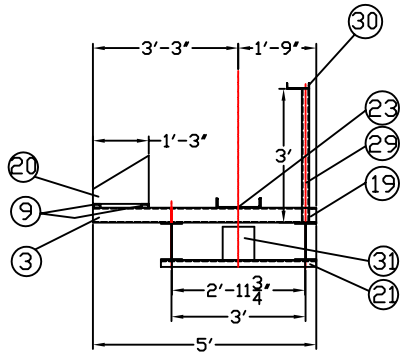
8825# –SYS. CAP.

7000# –SYS. WT.

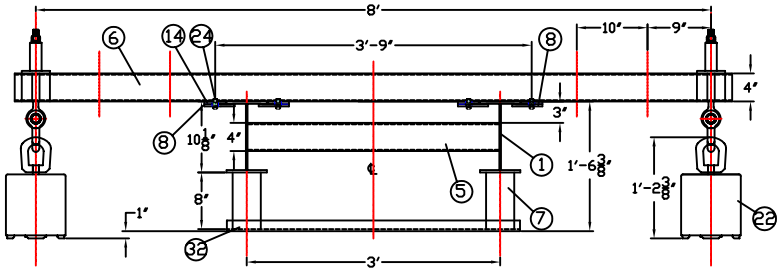


NOTE: SHIP SYSTEM FROM FACTORY WITH MAGNETS IN MIDDLE POSITION

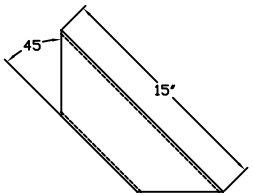
SECTION 'A-A'



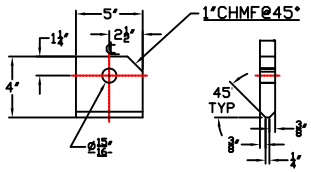
	SCALE:	PERMADUR	
	DATE: 9-13-07	186 Route 206 Hillsborough, NJ 08844	
	DRAWN: ALEX	UTLX MANUFACTURING	
	APPROVED:		
LTR CHANGE DWG DATE			
MATERIAL: AS NOTED	TOLERANCE UNLESS OTHERWISE SPECIFIED: TWO PLACE DECIMALS +/-.02 ANGLES +/- 1/2DEG THREE PLACE DECIMAL.005 FRACTIONS +/-.015	DRAWING NO. 4420-LB SHEET 1 OF 2	REV



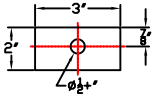
SECTION 'B-B'



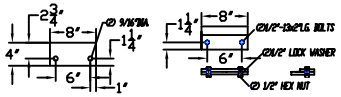
ITEM #4



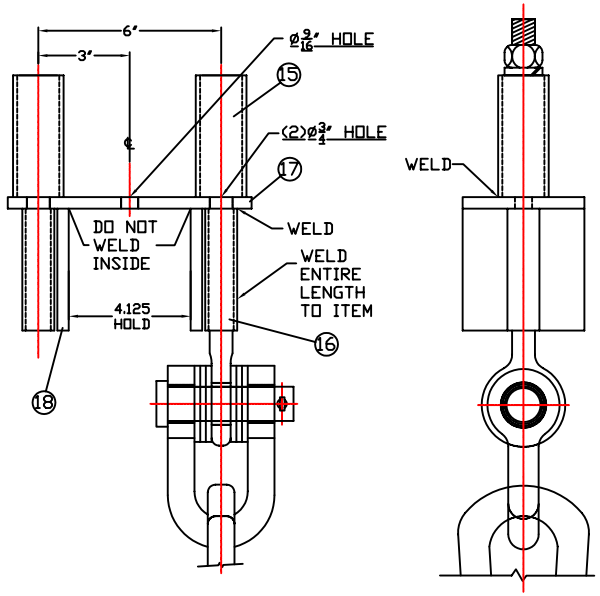
LIFTING LUG #11



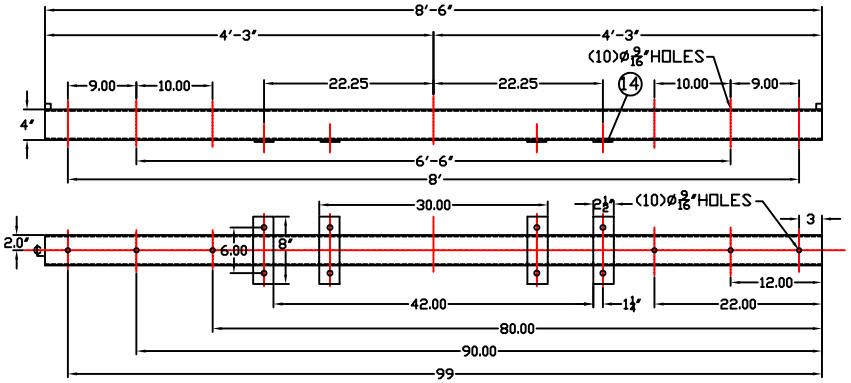
SPACER#14



DETAIL #8 DETAIL #8,14



SUSPENSION ASS'Y



MOVEABLE CROSSARM
ITEM #6,#14,#33

ITEM NO.	DESCRIPTION	QTY.
1	W10x22# x 27'-10 1/2"LG	2
2	CHANNEL C12x20.7x 43"LG	2
3	SUPPORT TUBING 4"x4"x1/4"W x 60" LONG	2
4	BRACE TUBING 4"x4"x1/4"WALL x 15" LONG	4
5	CROSS TUBING 4"x4"x1/4"WALL x 35 3/4" LONG	2
6	MAGNET TUBING 4"x4"x1/4"WALL x 8'-6" LONG	6
7	LEG TUBING 4"x4"x1/4"WALL x 8" LG	6
8	CLAMP PL. HRF. 1/4"x8"x4"LG	24
9	CHANNEL C2x1x24"LG	2
10	STOP L.3/8"x2"x2"x4"LG. (SEE NOTE#1)	4
11	LIFTING LUG HRF. 4"x1"x5"LG.	4
12	1/4" CHAINx4'-0"LG	1
13	1/4" LOCK-A-LOY	1
14	SPACER HRF.5/16"x2 1/2"x8"LG	24
15	PIPE 1 1/4" DIA. SCH 40 x 4" LG.	24
16	PIPE 3/4" DIA. SCH 40 x 4" LG.	24
17	HRF 4"x1/2"x8"LG	12
18	HRF 4"x3/8"x4"LG	24
19	1/2" ALLEN HEAD SCREWS	4
20	CONTROL BOX C16C24	1
21	TRANSFORM.CHNL C4x5.4#x41"LG	2
22	TP-2000 AND SPRING 12' SUSPENSION SYSTEM	12
23	C12 COVER CHANNEL x23"LG.	1
24	1/2-13x5 1/2"LG HEX HD BOLT, 1/2-13 NUT, 1/2 NOM.WASHER	12EA.
25	1"A-345 MASTER LINK W/COUPL	1
26	3/8" SPEC 8 CHAIN (46'-8"TOTAL)	4@140"
27	3/8" LOK-A-LOY	8
28	3/4"SHACKLE-4 3/4TON G215	4
29	CHAIN PIPE 1 1/2"Sch.40x36"LG.	1
30	CHAIN CHANNEL C6x10.5x3"LG	1
31	TRANSFORMER 460/24V 2KVA	1
32	LEG CHANNEL C6x8.2#x42"LG	3
33	END STOP HRF. 1/2"x1/2"x3"LG	12

PERMADUR
UTLX MANUFACTURING

MATERIAL: AS NOTED

DRAWING NO. 4420-LB

REV.