OPERATING INSTRUCTIONS

DURHAM GEO ENTERPRISES, INC. ™

S-611 LOADING FRAME

FOR UNCONFINED COMPRESSION
CBR AND LBR TESTING

Durham Geo – Enterprises, Inc.
2175 West Park Court
P.O. Box 870907
Stone Mountain, GA 30087
(770) 465-7557 • 1-800-837-0864
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IMPORTANT

THE OPERATOR SHOULD READ THE ENTIRE INSTRUCTION MANUAL BEFORE ATTEMPTING TO OPERATE THIS SYSTEM.

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. We reserve the right to make changes at any time without notice and without incurring any obligation.

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INTRODUCTION

Congratulations! You have just purchased a **Durham Geo ™ S-611 Load Frame**. This frame has been designed for a wide range of needs in the soils laboratory, including performing measurements of soil bearing strengths (CBR and LBR) and Unconfined Compressive testing.

The **S-611 Load Frame** has a digital speed controller capable of providing consistent load rates of .005"/min and .200"/min, up to a maximum load of 10,000 lbs.

The **S-611 Load Frames** have been assembled by Durham with the highest quality standards in mind. However, occasionally circumstances beyond our control may result in damage during packing or shipping. Please inspect all packages received and note any missing or damaged parts as soon as possible. If you find any problems, please contact us immediately.

General specifications:

Manual Mode:

Direction control:	Down/stop/up rotary switch, rapid button, and travel limit indicator lights.
Speed Control:	By touch panel, digital display: UP arrow – increases speed, DOWN arrow – decreases speed.

Auto Mode:

Direction Control:	With auto selected and the rotary switch in the up direction, the controls are set too automatic and are controlled via the meter-reset button. Rapid button is still functional in the up direction only.
Speed Control:	By touch panel, digital display: UP arrow – increases speed, DOWN arrow – decreases speed.

All Modes:

Speed Range:	From .005" up to 0.200" per minute.
Bottom platen:	6.25" dia. (made in such a way to receive different adapters.)

General specifications

Platen travel:	3-1/4" maximum
Horizontal Clearance:	11-3/4"
Vertical daylight (without Load measurements device):	20"
Vertical daylight with Extended rods:	35"
Strain Measurement:	Electronic Linear Displacement Transducer with Digital Readout. (See separate manual) optional.
Load Measurement:	Load cell with digital readout, (see separate manual).
Overall Dimensions:	19"W x 15"D x 35"H
Weight:	160 pounds

SETTING UP THE LOAD FRAME

1. Remove the S-611 accessories from the packing crate. Check the contents you have received against the enclosed packing slip. Check all components and notify Durham Geo immediately if shortages or damages are found.

2. Place the load frame on a sturdy, level surface. It is important that the machine be as level as possible. After being sure that the (**OFF,UP,DOWN**) switch is turned to off, plug the unit into a 110V AC socket.

3. After adjusting the height of the crossbar for your particular type of test use a bubble level and verify that the crossbar is parallel with the bottom platen.

IMPORTANT MACHINE MAINTENANCE

Due to the nature of the test run on this machine, proper lubrication is essential for the long-term life of the load frame. We recommend monthly lubrication of the spindle with a medium weight gear lube. This is accomplished by removing the socket head cap screw in the center of the platen and dripping 2 or 3 drops of oil into the spindle assembly (refer to figure 1). **ALWAYS HAVE THE SOCKET HEAD CAP SCREW IN PLACE WHEN TESTING.** This prevents water from dripping into the spindle assembly and damaging the bearings. The best way to enjoy a trouble-free machine is to keep it relatively dry, clean and lubricated. Following these guidelines should result in years of trouble free testing.

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INSTRUCTIONS
S-611
Automated System

1) Connect the machine's power cord to a 115 v grounded outlet

2) Connect the display power cord to one of the auxillary sockets on the back of the load frame.

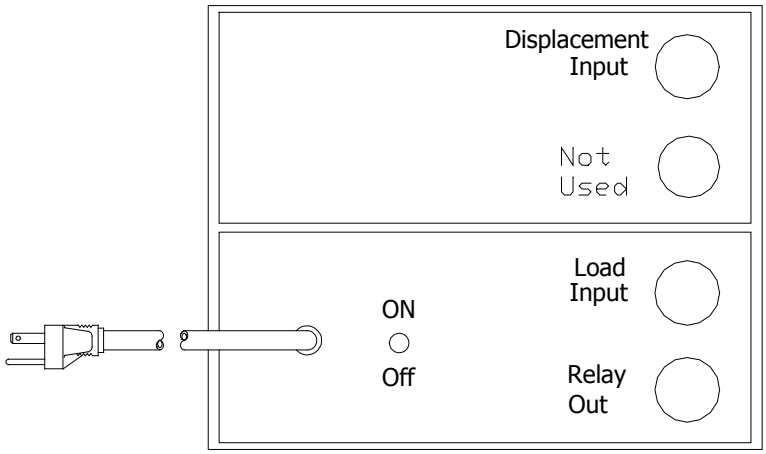
3) Connect the RS-485 converter power supply to one of the auxiliary sockets on the back of the load frame.

4) Connect displacement transducer to the top meter input.

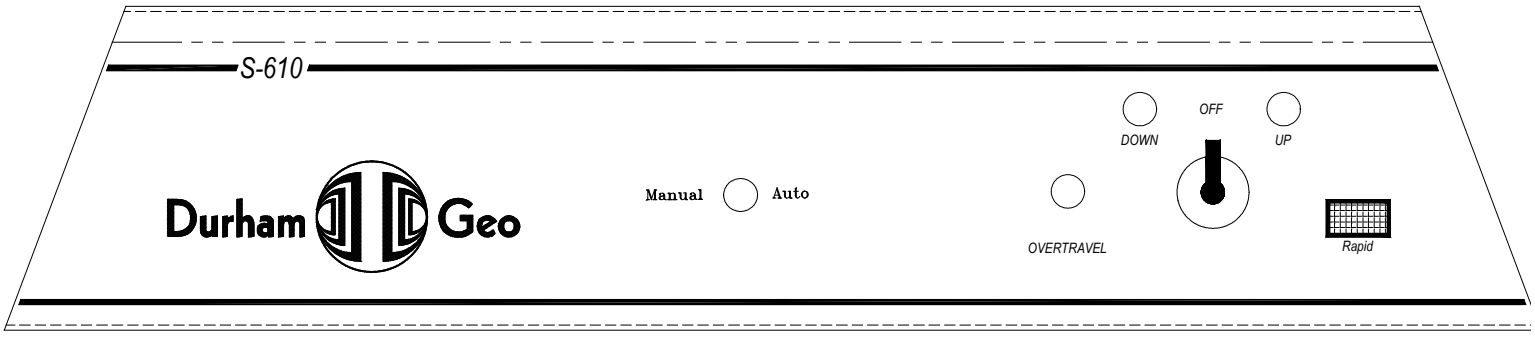
5) Connect the Load transducer to the bottom meter input.

6) The cable from the S-611 frame should be placed into the relay out socket on the back of the display assembly.

7) The free end of the phone cable from the back of the display units should be attached to the RS-485 converter, and the computer cable should continue from the RS-485 converter to a COM port on your PC.



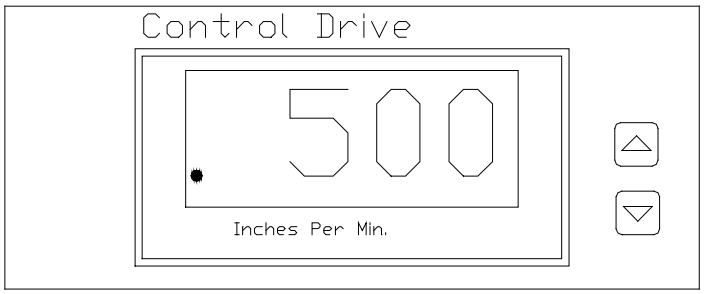
FRONT PANEL CONTROLS



MANUAL MODE: With the (**AUTO/MANUAL**) switch in the **MANUAL** position, all functions are manually controlled and are described later in this manual.

AUTO MODE: With the switch (**AUTO/MANUAL**) in the **AUTO** position, the following features apply.

Speed Controller set to .050 in per min.



A. Setting the required speed:

Before this equipment is used in the AUTO Mode you must first select the platen speed for the specific test to be preformed.

1) Turn the **(AUTO/MANUAL)** switch to the manual position.

2) Turn the **(UP,OFF,DOWN)** switch to the up position. This will start the platen in the up direction and the speed controller will show the set speed in inches per minute.

3) Using the (up, down) keys on the front of the controller adjust the setting to your speed requirement. The decimal on the controller is to the far left of the four digit display. An example of .0500 in/min, the controller would be set to 500.

4) Once the speed is set, turn **(UP,OFF,DOWN)** switch to down, allow the platen to travel until the over travel light illuminates, turn (**UP,OFF,DOWN**) switch to off position and turn (**Auto/Manual**) switch to Auto. When the operator is ready for the test to start, turn the **(UP,OFF,DOWN**) switch to the UP position. The Up direction light will illuminate to indicate upward movement. The platen will move at the preset speed until the limit of either load, displacement, or upper travel has been reached.

Note: If either the Load or Displacement limits are reached the platen will automatically return to the home position at rapid speed.

Note: Pushing in the Rapid button will initiate maximum platen speed.

Note: If **(UP,OFF,DOWN)** switch is turned to the **down** position in the AUTO MODE, the machine **will not** operate.

B. Running a test:

Place a sample onto the platen and insure it is centered When you are ready to start the test, **momentarily push the red (reset button) on the left of the display.** This resets the alarms, and starts the load frame in the upward direction at the preset speed. See Page 7 for drawing.

C. Limit Alarms:

In AUTO mode, if either meter 1 (**Displacement**, Green display) or meter 2 (**Load**, Red display) exceeds its alarm value, the number (①) will be shown on the display in the upper left hand corner of that meter. When this is displayed, the machine will automatically return to the lowest position in rapid mode. The machine will automatically stop when it reaches its lowest position and the over-travel light will illuminate.

Note: If the upper limit is tripped:

1) Turn the (**Auto/Manual**) switch to manual, Turn the (**UP,OFF,DOWN**) switch to down, and depress the rapid button. Once the platen has returned to the lower limit position, depress the rapid button to disengage the rapid mode, turn the (**Auto/Manual**) switch back to the auto position and when the next test is ready to run, turn the (**UP,OFF,DOWN**) switch to the up position.

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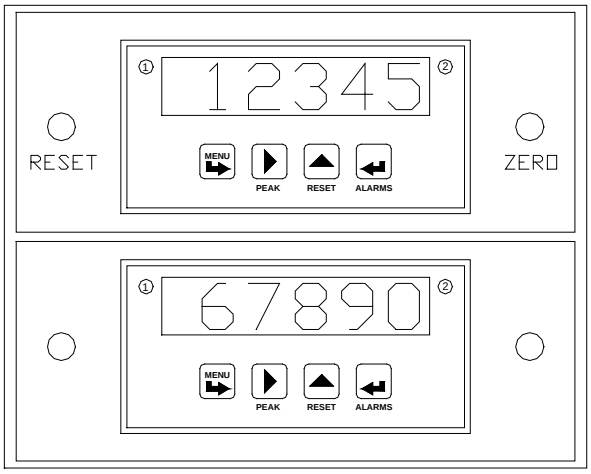
SETTING THE (HIGH) ALARMS FOR LOAD AND DISPLACEMENT



1) Press the alarm button and the display will show the current alarm status (all digits flashing).

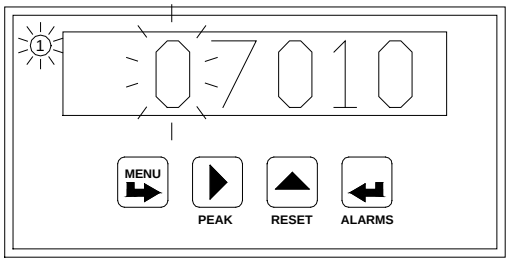
2) Press the peak button to highlight the digit to be changed.

Note: **Peak** moves the flashing digit to the next position.
Reset adjusts the digit upwards. Continue pressing reset until the desired reading is achieved.

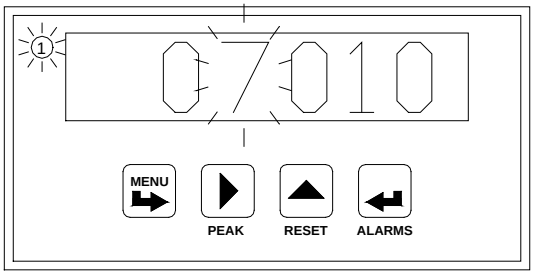
Note: The alarm display is in engineering units for the meter being adjusted (Green display-Penetration), (Red display-Load).

3) Pressing the alarm button twice stores the new values and resets the meter to the normal operating mode.

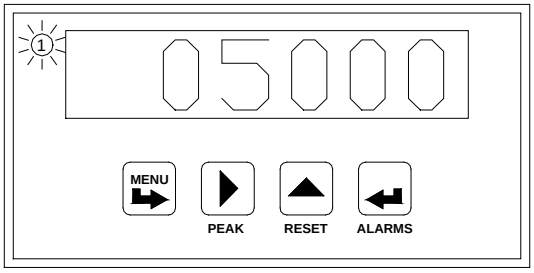
Example: Press the Alarm button on meter 2 (Load), the load limit is displayed.



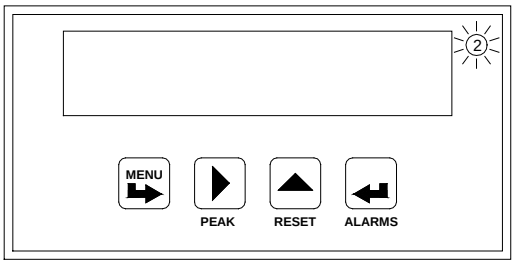
Press Peak: Use the Peak button to move the flashing digit to number '7':
Now press the **Reset** button to adjust '7' to read '5'.



Next, press Peak button until the '1' is flashing. Press the Reset button to adjust the '1' to '0'.



The display is now showing that the alarm is set to trigger at 5000 Lbs. Press the ALARM button and the meter will store this change.



Alarm two (②) will now be displayed. Ignore this alarm. Press the ALARM button to go back to reset. Reset will be displayed momentarily. Then actual load or displacement reading will then be shown.

Manual Operation of the S-611 Load Frame

There are two operating modes for the **S-611**. These are:

1) "Manual" mode
2) "Auto" mode

AUTO MODE: With the switch (**AUTO/MANUAL**) in the **AUTO** position,
. **See page 5 for details on running in Auto**.

MANUAL MODE: With the (**AUTO/MANUAL**) switch in the **MANUAL** position, all functions are manually controlled and are as follows.

To start the **S-611** load frame in the manual mode, turn the (**AUTO/MANUAL**) switch to Manual, turn the **(Up/Down)** Selector Switch to the desired direction. The indicator light for that direction will illuminate and the machine will begin to move in that direction.

Note: The following sections discuss the various functions and uses of the front panel controls, See page 5 for drawing of the front panel.

A. **Setting the required speed:**

Before this equipment is used in the MANUAL Mode you must first select the platen speed for the specific test to be preformed.

1) Turn the **(AUTO/MANUAL)** switch to the manual position.

2) Turn the **(UP,OFF,DOWN)** switch to the up position. This will start the platen in the up direction and the speed controller will show the set speed in inches per minute.

3) Using the (up, down) keys on the front of the controller adjust the setting to your speed requirement. The decimal on the controller is to the far left of the four digit display. An example of .0500 in/min, the controller would be set to 500.

4) Once the speed is set, turn **(UP,OFF,DOWN)** switch to down, allow the platen to travel until the over travel light illuminates, turn (**UP,OFF,DOWN**) switch to off position.. When the operator is ready for the test to start, turn the **(UP,OFF,DOWN**) switch to the UP position. The Up direction light will illuminate to indicate upward movement. The platen will move at the preset speed until the upper limit is reached.

NOTE: The selected speed will be maintained in memory even when power switch is off.

OVERTRAVEL INDICATOR

The overtravel indicator light comes on and the machine automatically stops when the platen overtravels in the up or down direction. To move the machine off the overtravel limit, simply reverse the direction of motion until the overtravel light is extinguished.

ACCESSORIES

The back of the load frame has two auxiliary power receptacles built into it. These are 110V AC outlets and are meant to be used at the power for peripheral devices such as Readouts. Each unit is checked for accuracy and factory set before being shipped.

MOUNTING OPTIONAL STRAIN MEASUREMENT HARDWARE

Before running a test you will need to install the various measurement devices appropriate for that test. If you have purchased our E-870 strain measurement hardware kit or Unconfined testing accessories, the following sections will explain their installation and use. If you already have strain measurement hardware and are not sure how to use it on the S-611, please contact Durham Geo Enterprises for further assistance.

USING THE E-870 PACKAGE

Several options are available for mounting the strain hardware. Included with the strain hardware are the following items:

1) ½" dia. rod threaded one end (161101)
2) ½" jam nut
3) bracket –indicator support rod (161701)
4) tie rod adapter

5) dial indicator pick up bar (161501)
6) gauge support arm assembly (117301)
7) gauge support rod w/washer and cap screw (118001)
8) LDT mounting bracket (158401)

A diagram (figure 3) of the suggested mounting arrangement is included with these instructions. An important thing to remember is that the load cell and proving ring are a source of defection and any measurements of piston travel should be made below the load cell. We recommend mounting the dial indicator pickup bar between the load cell and the penetration piston. Use this as the pickup point for the linear transducer or dial indicator. This arrangement allows for true measurement of penetration.

USING UNCONFINED HARDWARE

Unconfined hardware consists of the following parts:

1) ¾" UNF x ½: UNF adapter
2) 1.4 and/or 2.8 loading cap
3) 1.4 and/or 2.8 pedestal
4) ¼-20 cap screw

To install the unconfined pedestal, remove the socket head cap screw from the center of the platen (see fig. 1 & 4) and screw the pedestal onto the platen. The cap has a ½-20 male thread and can be attached to a load cell directly or by using the adapter provided. (See figure 4).

TROUBLESHOOTING

The S-611 has been designed and assembled to give years of testing performance with a minimum of maintenance, however problems do arise. Please refer to the following chart if you encounter problems and don't hesitate to call Durham Geo Enterprises if you encounter a situation not covered here.

PROBLEM	**POSSIBLE CAUSE & SOLUTION**
• Frame not running	Blown fuses needs replacement. Fuse holder is found on the back panel. Replace with same ratting fuse.
• Machine running Load not increasing	Sprocket slipping on shaft. Inspect sprockets for slippage. If found, tighten set screw.
• Frame running, rate Not controllable.	Electrical problem. Call Durham Geo Enterprises.

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WARNING

Do not attempt to remove any panels with the unit plugged in. Before examining the interior of the machine disconnect power to the Load Frame. 110 volts is painful and can cause serious injury to you and the machine.

WARRANTY STATEMENT

Durham Geo-Enterprises warrants that equipment shall be free from defects in material and workmanship for a period of **90 days** from the time the equipment is put into service. In any event, the warranty period will not exceed **6 months** from the date of shipment.

Durham Geo liability shall be limited to replacement of components or equipment (at the manufacturer's discretion) that has been determined by the manufacturer to be faulty. No claims in excess of component replacement value will be recognized. Durham Geo will not be held liable for damages or lost business relating to a warranty claim.

Specifically excluded from this warranty are claims deemed by the manufacturer to have resulted from normal wear and tear, improper use, or abuse of the equipment.

For complete warranty disclosure, please call 1-800-837-0864(outside GA) or 770-465-7557 (inside GA).

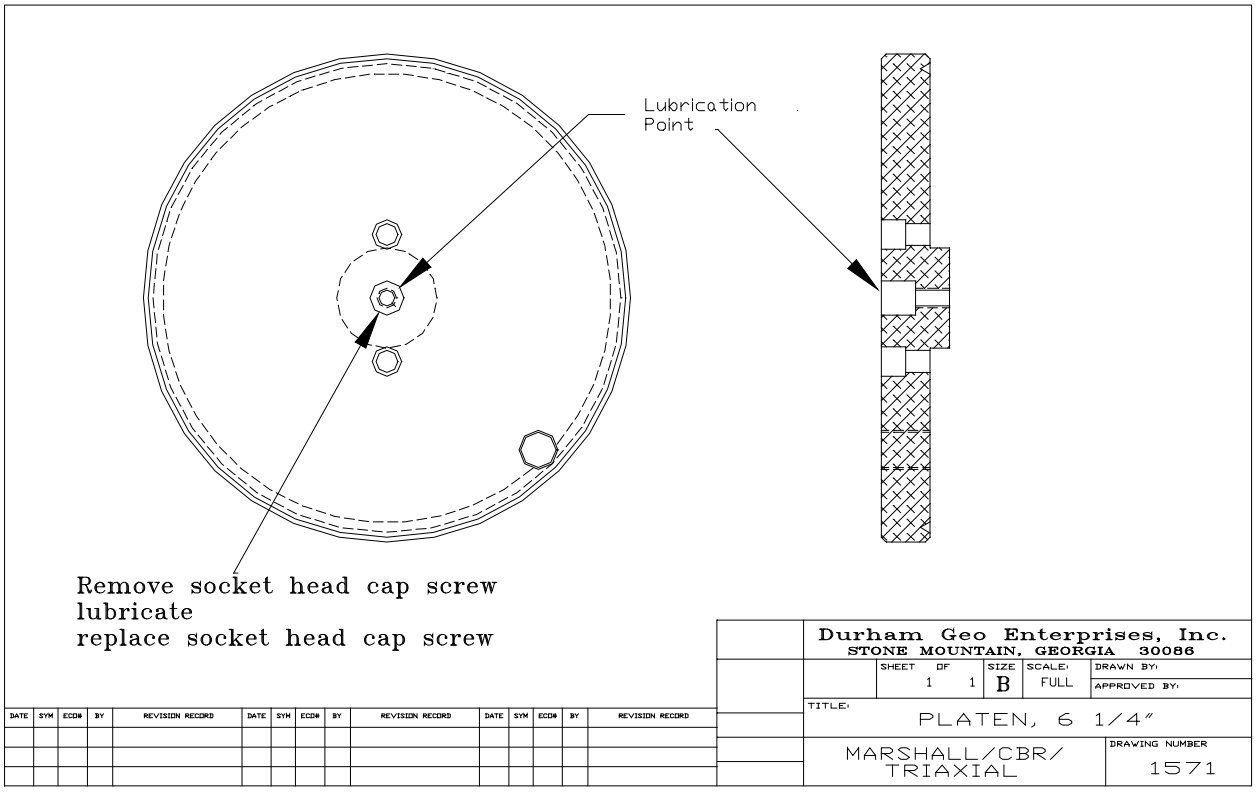
Lubrication Point
Remove socket head cap screw
lubricate
replace socket head cap screw
Durham Geo Enterprises, Inc.
STONE MOUNTAIN, GEORGIA 30086
SHEET 1 OF 1
SIZE B
SCALE: FULL
DRAWN BY:
APPROVED BY:
TITLE: PLATEN, 6 1/4"
MARSHALL/CBR/ TRIAXIAL
DRAWING NUMBER 1571
DATE SYM ECO# BY REVISION RECORD

Fig. 1

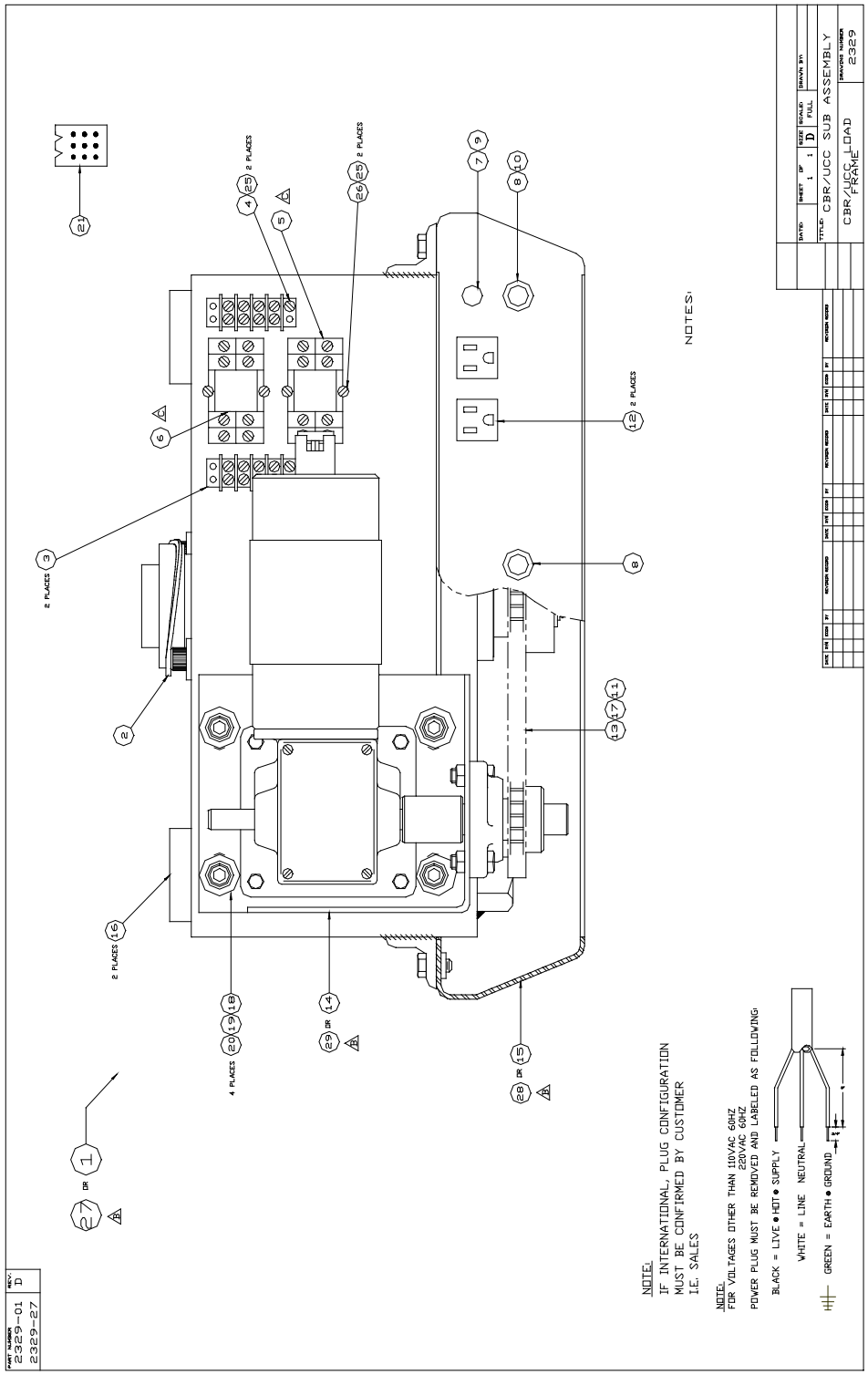
CBR/UCC SUB ASSEMBLY
CBR/UCC LOAD FRAME
2329
NOTES:
NOTE:
IF INTERNATIONAL, PLUG CONFIGURATION
MUST BE CONFIRMED BY CUSTOMER
I.E. SALES
NOTE:
FOR VOLTAGES OTHER THAN 110VAC 60HZ
220VAC 60HZ
POWER PLUG MUST BE REMOVED AND LABELED AS FOLLOWING
BLACK = LIVE • HOT • SUPPLY
WHITE = LINE NEUTRAL
GREEN = EARTH • GROUND
2329-01 D
2329-27

Fig 2

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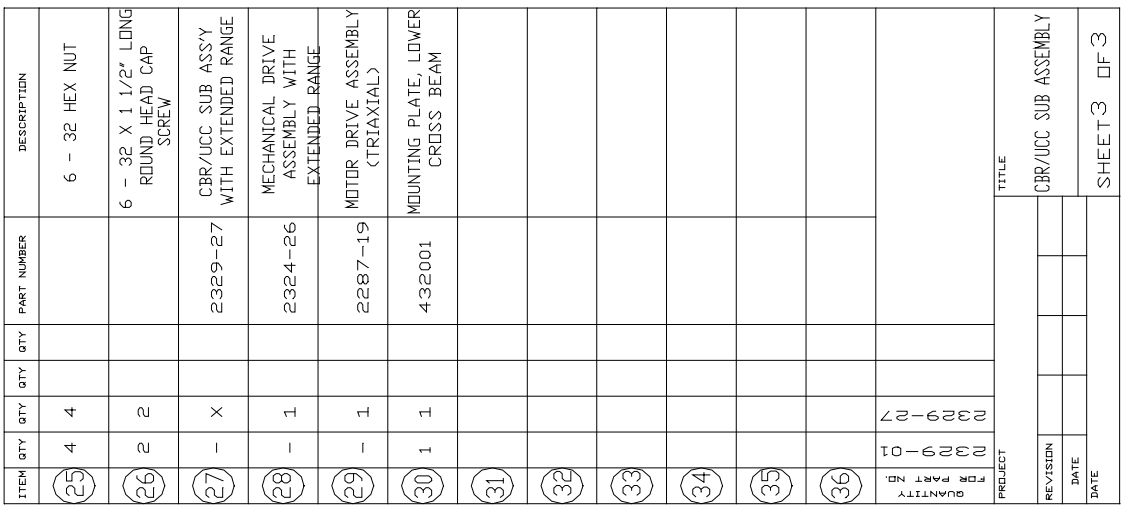

ITEM	QTY	QTY	QTY	PART NUMBER	DESCRIPTION
25	4				6 - 32 HEX NUT
26	2				6 - 32 X 1 1/2" LONG ROUND HEAD CAP SCREW
27	-	X		2329-27	CBR/UCC SUB ASS'Y WITH EXTENDED RANGE
28	-	1		2324-26	MECHANICAL DRIVE ASSEMBLY WITH EXTENDED RANGE
29	-	1		2287-19	MOTOR DRIVE ASSEMBLY (TRIAXIAL)
30	1	1		432001	MOUNTING PLATE, LOWER CROSS BEAM
31					
32					
33					
34					
35					
36					
	QUANTITY FOR PART NO.	R3129-01	R3129-27		

PROJECT
REVISION
DATE
DATE
TITLE: CBR/UCC SUB ASSEMBLY
SHEET 3 OF 3

ITEM	QTY	QTY	QTY	PART NUMBER	DESCRIPTION
13	AS REQ	AS REQ			3/8 PITCH #35 ROLLER CHAIN
14	1	-		2287-02	MOTOR MOUNT ASS'Y (CBR/UCC)
15	1	-		2324-01	MECHANICAL DRIVE ASS'Y
16	2	2		1572-01	STRAIN ROD GUIDE
17	1	1			#35 CONNECTING LINK
18	4	4			3/8" - 16 X 1" LONG SOCKET HEAD CAP SCREW
19	4	4			3/8" LOCK WASHER
20	4	4			3/8" FLAT WASHER
21	1	1		2153-058	9 PIN MOLEX PLUG
22					
23					
24					
	QUANTITY FOR PART NO.	R3129-01	R3129-27		

PROJECT: CBR/UCC LOAD FRAME (A, B, C, D)
TITLE: CBR/UCC SUB ASSEMBLY
SHEET 2 OF 3

ITEM	QTY	QTY	QTY	PART NUMBER	DESCRIPTION
1	-			2329-01	CBR/UCC SUB ASS'Y
2	1	1		1829-01	NEOPRENE GASKET
3	2	2		2153-045	BLOCK, CONNECTOR, 4-WAY
4	2	2			6 - 32 X 1" LONG ROUND HEAD CAP SCREW
5	2	2		2153-052	RELAY SOCKET, PANEL MOUNT
6	2	2		2153-044	RELAY, 10 AMP, 120 VAC
7	1	1		2153-136	5 AMP, SLOW BLOW FUSE
8	2	2		2381-01	CABLE GLAND, HEAVY DUTY
9	1	1		2153-050	FUSE HOLDER W/ CAP
10	1	1		2153-075	BLACK POWER CORD, 3 WIRE
11	AS REQ	AS REQ			OFFSET LINK, #35 ROLLER CHAIN
12	2	2		2153-047	3 PRONG, 110V SOCKET PANEL MOUNT
	QUANTITY FOR PART NO.	R3129-01	R3129-27		

PROJECT: CBR/UCC LOAD FRAME (A, B, C, D)
TITLE: CBR/UCC SUB ASSEMBLY
SHEET 1 OF 3

BOM Fig 2

CBR \ LBR
"S" TYPE LOAD CELL

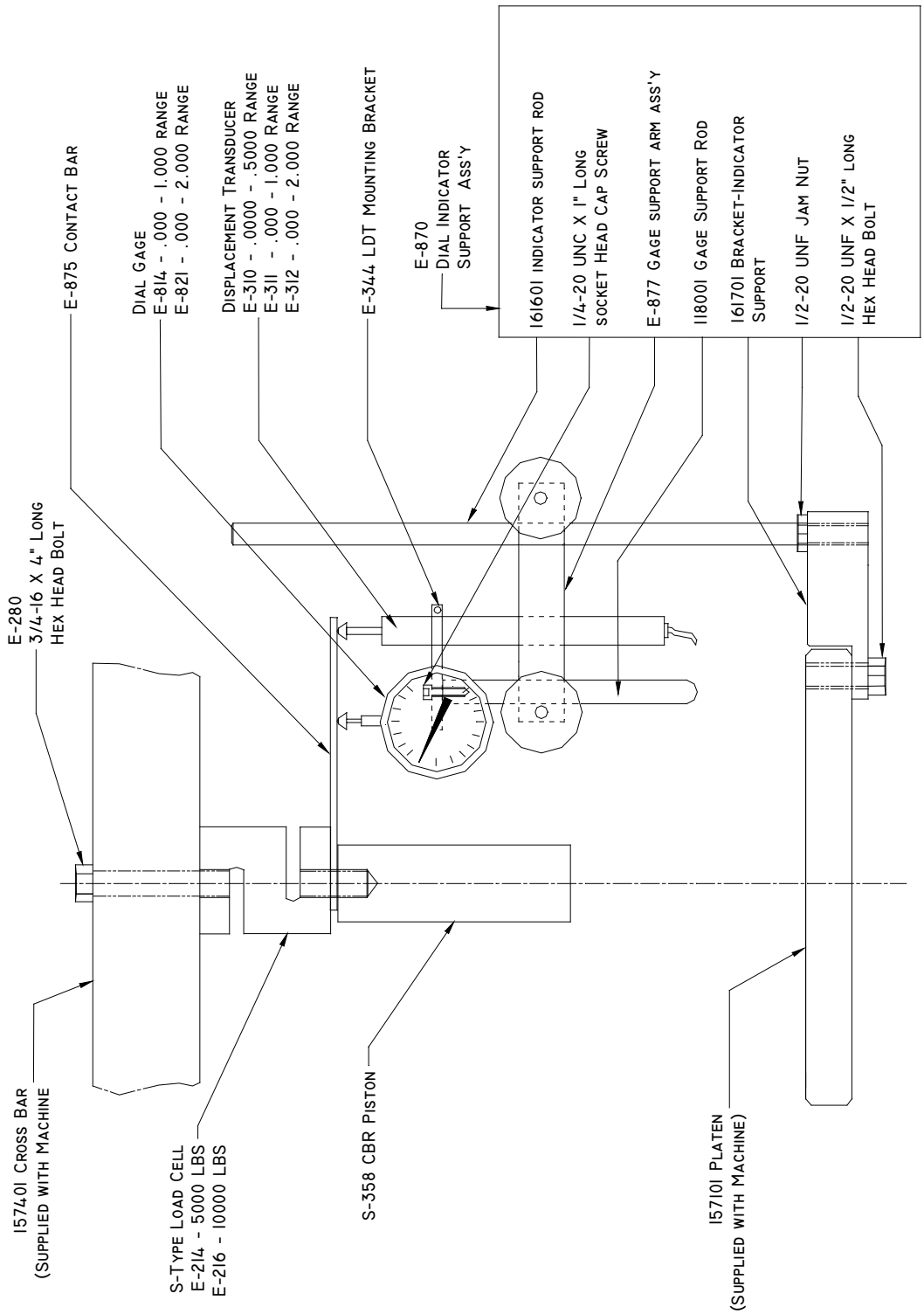

Fig 3

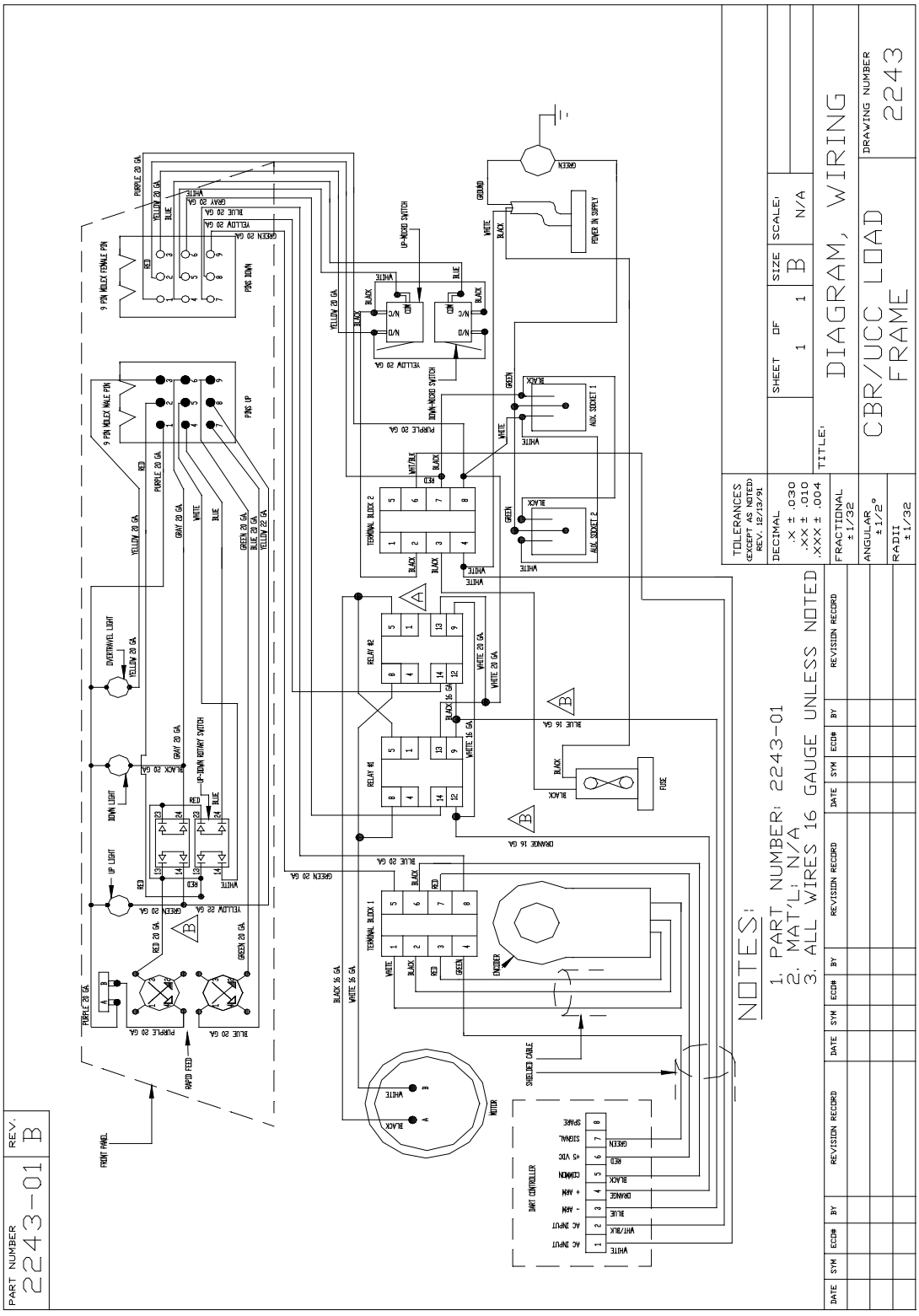
NOTES:
1. PART NUMBER: 2243-01
2. MAT'L: N/A
3. ALL WIRES 16 GAUGE UNLESS NOTED
TITLE: DIAGRAM, WIRING
CBR/UCC LOAD FRAME
DRAWING NUMBER 2243
SHEET 1 OF 1
SIZE B
SCALE: N/A
PART NUMBER 2243-01
REV. B
TOLERANCES (EXCEPT AS NOTED) REV. 12/13/91
DECIMAL .X ± .030 .XX ± .010 .XXX ± .004
FRACTIONAL ± 1/32
ANGULAR ± 1/2°
RADII ± 1/32
REVISION RECORD
DATE
SYM
ECO#
BY
9 PIN MOLEX FEMALE PIN
9 PIN MOLEX MALE PIN
UP-MOOD SWITCH
DOWN-MOOD SWITCH
AUX. SOCKET 1
AUX. SOCKET 2
TERMINAL BLOCK 1
TERMINAL BLOCK 2
RELAY #1
RELAY #2
FUSE
ENCODER
MOTOR
SHIELDED CABLE
DART CONTROLLER
FRONT PANEL
RAPID FEED
GROUND
POWER IN SUPPLY
OVERTRAVEL LIGHT
DOWN LIGHT
UP LIGHT
UP-DOWN ROTARY SWITCH

Fig 6

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